

INDUSTRY PROCESS
AND AUTOMATION SOLUTIONS



BONFIGLIOLI
RIDUTTORI

W

VF



BONFIGLIOLI



INFORMAZIONI GENERALI
GENERAL INFORMATION
ALLGEMEINE INFORMATIONEN
INFORMATIONS GENERALES

| Paragrafo Chapter Abschnitt Paragraphe | | | | Pagina Page Seite Page |
|---|------------------------------|-------------------------------------|--------------------------|---------------------------------|
| 1 | Simbologia e unità di misura | <i>Symbols and units of measure</i> | Symbole und Maßeinheiten | 2 |
| 2 | Definizioni | <i>Definitions</i> | Definitionen | 4 |
| 3 | Manutenzione | <i>Maintenance</i> | Wartung | 8 |
| 4 | Selezione | <i>Selection</i> | Antriebsauswahl | 8 |
| 5 | Verifiche | <i>Verification</i> | Prüfungen | 11 |
| 6 | Installazione | <i>Installation</i> | Installation | 12 |
| 7 | Stoccaggio | <i>Storage</i> | Lagerung | 14 |
| 8 | Condizioni di fornitura | <i>Conditions of supply</i> | Lieferbedingungen | 15 |

RIDUTTORI A VITE SENZA FINE
WORMGEARS
SCHNECKENGETRIEBE
REDUCTEURS A VIS SANS FIN

| | | | | | |
|----|--|--|---|--|-----|
| 9 | Caratteristiche costruttive | <i>Design features</i> | Konstruktive Eigenschaften | <i>Caractéristiques de construction</i> | 16 |
| 10 | Forme costruttive | <i>Versions</i> | Bauformen | <i>Formes de construction</i> | 18 |
| 11 | Esecuzioni di montaggio | <i>Arrangements</i> | Bauform | <i>Execution de montage</i> | 19 |
| 12 | Codici ordinativo | <i>Description key</i> | Bezeichnung | <i>Designation</i> | 22 |
| 13 | Opzioni riduttore | <i>Gearbox options</i> | Getriebe Optionen | <i>Options reducteurs</i> | 24 |
| 14 | Posizioni di montaggio e orientamento morsetti | <i>Mounting position and terminal box angular location</i> | Einbaulagen und lage des klemmenkastens | <i>Positions de montage et orientation boîte a borne</i> | 25 |
| 15 | Lubrificazione | <i>Lubrication</i> | Schmierung | <i>Lubrification</i> | 36 |
| 16 | Carichi radiali | <i>Overhung loads</i> | Radialkräfte | <i>Charges radiales</i> | 38 |
| 17 | Carichi assiali | <i>Thrust loads</i> | Axialkräfte | <i>Charges axiales</i> | 40 |
| 18 | Informazioni generali | <i>General information</i> | Allgemeine Informationen | <i>Informations generales</i> | 42 |
| 19 | Giochi angolari | <i>Angular backlash</i> | Winkelspiele | <i>Jeex angulaires</i> | 45 |
| 20 | Tabelle di selezione motoriduttore | <i>Gearmotor selection</i> | Getriebemotoren-Auswahltabellen | <i>Tableaux selection motoreducteur</i> | 46 |
| 21 | Tabelle dati tecnici | <i>Speed reducer rating charts</i> | Getriebe auswahltabellen | <i>Donnees techniques reducteurs</i> | 85 |
| 22 | Predisposizioni motore | <i>Motor availability</i> | Motor Anbaumöglichkeiten | <i>Predisposition moteur</i> | 108 |
| 23 | Momento d'inerzia | <i>Moment of inertia</i> | Trägheitsmoment | <i>Moments d'inertie</i> | 111 |
| 24 | Dimensioni | <i>Dimensions</i> | Abmessungen | <i>Dimensions</i> | 120 |
| 25 | Dimensioni riduttori | <i>Speed reducer dimensions</i> | Getriebe -Abmessungen | <i>Dimensions reducteurs</i> | 181 |
| 26 | Opzioni | <i>Options</i> | Optionen | <i>Options</i> | 185 |
| 27 | Accessori | <i>Accessories</i> | Zubehör | <i>Accessoires</i> | 186 |
| 28 | Albero cliente | <i>Customer's shaft</i> | Kundenseitige Wellen | <i>Arbre machine</i> | 188 |
| 29 | Limitatore di coppia | <i>Torque limiter</i> | Rutschkupplung | <i>Limiteur de couple</i> | 189 |
| 30 | Dispositivo fine-corsa RVS | <i>RVS limit-stop device</i> | Endschalter-Vorrichtung RVS | <i>Dispositif de fin de course RVS</i> | 193 |
| 31 | Codici per l'ordinativo | <i>Ordering codes</i> | Art.-nr. für die bestellung | <i>References pour la commande</i> | 194 |
| 32 | Istruzioni per il montaggio del dispositivo fine-corsa sul riduttore | <i>Instructions for the assembling of the limit-switch device onto gearbox</i> | Anweisungen für die montage der endschalter- vorrichtung auf das getriebe | <i>Instructions de montage du dispositif de fin de course sur le reducteur</i> | 195 |
| 33 | Regolazione delle posizioni di apertura e chiusura | <i>Setting of the limit-switch device rvs</i> | Einstellungen der öffnungs- und schliesspositionen | <i>Reglage des positions d'ouverture et de fermeture</i> | 196 |
| 34 | Designazione | <i>Designation</i> | Bezeichnung | <i>Designation</i> | 198 |
| 35 | Tabelle di selezione motoriduttore | <i>Gearmotor selection</i> | Getriebemotoren- auswahltabellen | <i>Tableaux selection motoreducteur</i> | 199 |
| 36 | Dimensioni | <i>Dimensions</i> | Abmessungen | <i>Dimensions</i> | 202 |
| 37 | Opzioni | <i>Option</i> | Optionen | <i>Option</i> | 206 |

MOTORI ELETTRICI
ELECTRIC MOTORS
ELEKTROMOTOREN
MOTEURS ELECTRIQUES

| | | | | | |
|-----|---|-------------------------------------|---|--|-----|
| M1 | Simbologia e unità di misura | <i>Symbols and units of measure</i> | Symbole und Maßeinheiten | <i>Symboles et unités de mesure</i> | 207 |
| M2 | Caratteristiche generali | <i>General characteristics</i> | Allgemeine Eigenschaften | <i>Caractéristiques générales</i> | 208 |
| M3 | Caratteristiche meccaniche | <i>Mechanical features</i> | Mechanische Eigenschaften | <i>Caractéristiques mécaniques</i> | 211 |
| M4 | Caratteristiche elettriche | <i>Electrical characteristics</i> | Elektrische Eigenschaften | <i>Caractéristiques électriques</i> | 216 |
| M5 | Motori asincroni autofrenanti | <i>Asynchronous brake motors</i> | Drehstrombremsmotoren | <i>Moteurs frein asynchrones</i> | 223 |
| M6 | Motori autofrenanti in C.C., tipo BN_FD | <i>DC brake motors type BN_FD</i> | Drehstrombremsmotoren mit gleichstrombremse: typ BN_FD | <i>Moteurs frein en C.C., type BN_FD</i> | 224 |
| M7 | Motori autofrenanti in C.A., tipo BN_FA | <i>AC brake motors type BN_FA</i> | Wechselstrombremsmotoren- typ BN_FA | <i>Moteurs frein en C.A., type BN_FA</i> | 229 |
| M8 | Motori autofrenanti in C.A., tipo BN_BA | <i>AC brake motors type BN_BA</i> | Drehstrom-bremsmotoren mit wechselstrombremse vom typ BN_BA | <i>Moteurs frein en C.A., type BN_BA</i> | 233 |
| M9 | Sistemi di sblocco freno | <i>Brake release systems</i> | wechslüfthebel | <i>Systèmes de deblocage frein</i> | 237 |
| M10 | Opzioni | <i>Options</i> | Optionen | <i>Options</i> | 239 |
| M11 | Dati tecnici motori | <i>Motor rating charts</i> | Motorenauswahl Tabellen | <i>Données techniques des moteurs</i> | 246 |
| M12 | Dimensioni motori | <i>Motors dimensions</i> | Motorenabmessungen | <i>Dimensions moteurs</i> | 262 |
| M13 | Motori elettrici serie K | <i>Electric motors series K</i> | Elektromotoren serie K | <i>Moteurs électriques serie K</i> | 273 |

Revisions
L'indice di revisione del catalogo è riportato a pag. 284.
Al sito www.bonfiglioli.com sono disponibili i cataloghi con le revisioni aggiornate.

Revisions
Refer to page 284 for the catalogue revision index.
Visit www.bonfiglioli.com to search for catalogues with up-to-date revisions.

Änderungen
Das Revisionsverzeichnis des Katalogs wird auf Seite 284 wiedergegeben. Auf unserer Website www.bonfiglioli.com werden die Kataloge in ihrer letzten, überarbeiteten Version angeboten.

Révisions
Le sommaire de révision du catalogue est indiqué à la page 284.
Sur le site www.bonfiglioli.com des catalogues avec les dernières révisions sont disponibles.



| 1 - SIMBOLOGIA E UNITÀ DI MISURA | | 1 - SYMBOLS AND UNITS OF MEASUREMENT | | 1 - SYMBOLE UND MAßEINHEITEN | | 1 - SYMBOLES ET UNITES DE MESURE | |
|----------------------------------|--|---|---|---|--|----------------------------------|--|
| Descrizione | | Description | | Beschreibung | | Description | |
| $A_{N 1, 2}$ [N] | Carico assiale nominale | <i>Permissible axial force</i> | Nenn-Axialbelastung | <i>Charge axiale nominale</i> | | | |
| f_s – | Fattore di servizio | <i>Service factor</i> | Betriebsfaktor | <i>Facteur de service</i> | | | |
| f_T – | Fattore termico | <i>Thermal factor</i> | Temperaturfaktor | <i>Facteur thermique</i> | | | |
| f_{TP} – | Fattore di temperatura | <i>Temperature factor</i> | Wärmefaktor | <i>Facteur de température</i> | | | |
| i – | Rapporto di trasmissione | <i>Gear ratio</i> | Übersetzung | <i>Rapport de réduction</i> | | | |
| I – | Rapporto di intermittenza | <i>Cyclic duration factor</i> | Relative Einschaltdauer | <i>Rapport d'intermittence</i> | | | |
| J_C [Kgm ²] | Momento di inerzia carico | <i>Mass moment of inertia to be driven</i> | Massenträgheitsmoment der externen Massen | <i>Moment d'inertie de la charge</i> | | | |
| J_M [Kgm ²] | Momento di inerzia motore | <i>Motor mass moment of inertia</i> | Motorträgheitsmoment | <i>Moment d'inertie du moteur</i> | | | |
| J_R [Kgm ²] | Momento di inerzia riduttore | <i>Mass moment of inertia for the gear unit</i> | Getriebeträgheitsmoment | <i>Moment d'inertie du réducteur</i> | | | |
| K – | Fattore di accelerazione delle masse | <i>Mass acceleration factor</i> | Massenbeschleunigungsfaktor | <i>Facteur d'accélération des masses</i> | | | |
| K_r – | Costante di trasmissione | <i>Transmission element factor</i> | Belastungsfaktor der Radiallast | <i>Constante de transmission</i> | | | |
| $M_{1, 2}$ [Nm] | Coppia | <i>Torque</i> | Drehmoment | <i>Couple</i> | | | |
| $M_c 1, 2$ [Nm] | Coppia di calcolo | <i>Calculated torque</i> | Berechnetes Drehmoment | <i>Couple de calcul</i> | | | |
| $M_n 1, 2$ [Nm] | Coppia nominale | <i>Rated torque</i> | Nennmoment | <i>Couple nominal</i> | | | |
| $M_r 1, 2$ [Nm] | Coppia richiesta | <i>Torque demand</i> | Benötigtes Drehmoment | <i>Couple nécessaire</i> | | | |
| $n_{1, 2}$ [min ⁻¹] | Velocità | <i>Speed</i> | Abtriebsdrehzahl | <i>Vitesse</i> | | | |
| $P_{1, 2}$ [kW] | Potenza | <i>Power</i> | Leistung | <i>Puissance</i> | | | |
| $P_N 1, 2$ [kW] | Potenza nominale | <i>Rated power</i> | Nennleistung | <i>Puissance nominale</i> | | | |
| $P_R 1, 2$ [kW] | Potenza richiesta | <i>Power demand</i> | Benötigte Leistung | <i>Puissance nécessaire</i> | | | |
| $R_C 1, 2$ [N] | Carico radiale di calcolo | <i>Calculated radial force</i> | Berechnete Axialbelastung | <i>Charge radiale de calcul</i> | | | |
| $R_N 1, 2$ [N] | Carico radiale nominale | <i>Permissible overhung load</i> | Zulässige Radialbelastung | <i>Charge radiale nominale</i> | | | |
| S – | Fattore di sicurezza | <i>Safety factor</i> | Sicherheitsfaktor | <i>Facteur de sécurité</i> | | | |
| t_a [°C] | Temperatura ambiente | <i>Ambient temperature</i> | Umgebungstemperatur | <i>Température ambiante</i> | | | |
| t_f [min] | Tempo di funzionamento a carico costante | <i>Work time under constant load</i> | Betriebszeit während nennbetrieb | <i>Temps de fonctionnement à charge constante</i> | | | |
| t_r [min] | Tempo di riposo | <i>Rest time</i> | Stillstandszeit | <i>Temps de repos</i> | | | |
| η_d – | Rendimento dinamico | <i>Dynamic efficiency</i> | Dynamischer Wirkungsgrad | <i>Rendement dynamique</i> | | | |
| η_s – | Rendimento statico | <i>Static efficiency</i> | Statischer Wirkungsgrad | <i>Rendement statique</i> | | | |

1 valore riferito all'albero veloce

1 value applies to input shaft

1 Werte beziehen sich auf die Antriebswelle

1 valeurs pour l'arbre rapide

2 valore riferito all'albero lento

2 value applies to output shaft

2 Werte beziehen sich auf die Abtriebswelle

2 valeurs pour l'arbre lent



Questo simbolo riporta i riferimenti angolari per l'indicazione della direzione del carico radiale (l'albero è visto di fronte).



This symbol refers to the angle the overhung load applies (viewing from drive end).



Dieses Symbol gibt die Winkelbezugswerte für die Angabe der Richtung der Radialkräfte an (Stirnansicht der Welle).



Ce symbole présente les références angulaires pour l'indication de la direction de la charge radiale (l'arbre est vu de face).



Simbolo riferito al peso dei riduttori e dei motoriduttori. I valori riportati nelle tabelle dei motoriduttori sono comprensivi sia del peso del motore a 4 poli sia del peso del lubrificante contenuto, qualora previsto da BONFIGLIOLI RIDUTTORI.



Symbol refers to weight of gearmotors and speed reducers. Figure for gearmotors incorporates the weight of the 4-pole motor and for life lubricated units, where applicable, the weight of the oil.



Symbol für das Gewicht der Getriebe und der Getriebemotoren. Die in der Getriebemotoren-Tabelle genannten Werte schließen das Gewicht des vierpoligen Motors und die eingefüllte Schmierstoffmenge ein, sofern von BONFIGLIOLI RIDUTTORI vorgesehen.



Symbole se référant aux poids des réducteurs et des motoréducteurs. Les valeurs indiquées dans les tableaux des motoréducteurs comprennent tant le poids du moteur à 4 pôles que le poids du lubrifiant contenu, lorsque prévu par BONFIGLIOLI RIDUTTORI.



2 - DEFINIZIONI

2.1 COPPIA

Coppia nominale

M_{n2} [Nm]

È la coppia trasmissibile in uscita con carico continuo uniforme, riferita alla velocità in ingresso n_1 e a quella corrispondente in uscita n_2 .

È calcolata in base ad un fattore di servizio $f_s = 1$.

Coppia richiesta

M_{r2} [Nm]

Rappresenta la coppia richiesta dall'applicazione e dovrà sempre essere uguale o inferiore alla coppia in uscita nominale M_{n2} del riduttore.

Coppia di calcolo

M_{c2} [Nm]

È il valore di coppia da utilizzare per la selezione del riduttore considerando la coppia richiesta M_{r2} e il fattore di servizio f_s ed è dato dalla formula:

2 - DEFINITIONS

2.1 TORQUE

Rated torque

M_{n2} [Nm]

The torque that can be transmitted continuously through the output shaft, with the gear unit operated under a service factor $f_s = 1$.

Rating is speed sensitive.

Required torque

M_{r2} [Nm]

The torque demand based on application requirement.

It is recommended to be equal to or less than torque M_{n2} the gearbox under study is rated for.

Calculated torque

M_{c2} [Nm]

Computational torque value to be used when selecting the gearbox.

It is calculated considering the required torque M_{r2} and service factor f_s , as per the relationship here after:

2 - DEFINITIONEN

2.1 ABTRIEBSMOMENT

Nenn-Drehmoment

M_{n2} [Nm]

Dies ist das an der Abtriebswelle übertragbare Drehmoment bei gleichförmiger Dauerbelastung bezogen auf die Antriebsdrehzahl n_1 und die entsprechende Abtriebsdrehzahl n_2 .

Das Drehmoment wird auf Grundlage eines Betriebsfaktor $f_s = 1$ berechnet.

Verlangtes Drehmoment

M_{r2} [Nm]

Dies ist das von der Anwendung verlangte Drehmoment, das stets kleiner oder gleich dem Nenn-Abtriebsmoment M_{n2} des gewählten Getriebes sein muß.

Soll-Drehmoment

M_{c2} [Nm]

Dies ist das bei der Wahl des Getriebes zugrundezulegende Drehmoment, wobei das übertragene Drehmoment M_{r2} und der Betriebsfaktor f_s zu berücksichtigen sind; das Soll-Drehmoment wird mit folgender Gleichung berechnet:

2 - DEFINITIONS

2.1 COUPLE

Couple nominal

M_{n2} [Nm]

C'est le couple transmissible en sortie avec une charge continue uniforme se référant à la vitesse en entrée n_1 et à celle correspondante en sortie n_2 .

Il est calculé sur la base d'un facteur de service $f_s = 1$.

Couple requis

M_{r2} [Nm]

Il représente le couple requis par l'application et devra toujours être inférieur ou égal au couple en sortie nominal M_{n2} du réducteur choisi.

Couple de calcul

M_{c2} [Nm]

C'est la valeur de couple à utiliser pour la sélection du réducteur en considérant le couple requis M_{r2} et le facteur de service f_s et s'obtient avec la formule:

$$M_{c2} = M_{r2} \times f_s \leq M_{n2} \quad (1)$$

2.2 POTENZA

Potenza nominale in entrata

P_{n1} [kW]

Il parametro è riscontrabile nelle tabelle dei dati tecnici nominali e rappresenta la potenza applicabile al riduttore in relazione alla velocità di comando n_1 e al fattore di servizio $f_s = 1$.

2.2 POWER

Rated input power

P_{n1} [kW]

The parameter can be found in the gearbox rating charts and represents the KW that can be safely transmitted to the gearbox, based on input speed n_1 and service factor $f_s = 1$.

2.2 LEISTUNG

Nennleistung Antriebswelle

P_{n1} [kW]

Diesen Parameter finden sie in den Getriebeauswahltabellen. Er gibt die Leistung in KW an, welche durch das Getriebe sicher übertragen werden kann. Die Werte beziehen sich auf die Eingangs-drehzahl n_1 und einen Betriebsfaktor von $f_s = 1$.

2.2 PUISSANCE

Puissance en entrée

P_{n1} [kW]

Dans les tableaux de sélection des réducteurs, c'est la puissance applicable en entrée se rapportant à la vitesse n_1 et en considérant un facteur de service $f_s = 1$.



2.3 RENDIMENTO

2.3 EFFICIENCY

2.3 WIRKUNGSGRAD

2.3 RENDEMENT

2.3.1 Rendimento dinamico [η_d]

Si definisce come il rapporto fra la potenza in uscita P_2 e quella in entrata P_1 :

2.3.1 Dynamic efficiency [η_d]

The dynamic efficiency is the relationship of power delivered at output shaft P_2 to power applied at input shaft P_1 :

2.3.1 Dynamischer Wirkungsgrad [η_d]

Er ist gegeben durch das Verhältnis der Abtriebsleistung P_2 zur Antriebsleistung P_1 :

2.3.1 Rendement dynamique [η_d]

Il est donné par le rapport entre la puissance en sortie P_2 et celle en entrée P_1 :

$$\eta_d = \frac{P_2}{P_1} \quad (2)$$

È opportuno evidenziare che i valori di coppia nominale M_{n2} sono calcolati tenendo conto del rendimento dinamico η_d che si produce al termine della fase di rodaggio dei riduttori.

Dopo il rodaggio si ha anche una riduzione e infine una stabilizzazione della temperatura di funzionamento.

La temperatura sotto carico è influenzata dal tipo di servizio e dalla temperatura ambiente e può raggiungere valori, misurati sulla carcassa in corrispondenza della vite senza fine, nell'intorno di 80-100 °C, senza che questo pregiudichi la meccanica del riduttore.

Se si ha motivo di attendersi temperature di funzionamento nell'estremo superiore, orientativamente 90-100 °C, è opportuno equipaggiare il riduttore di anelli di tenuta in Viton®, specificando nell'ordinativo l'opzione **PV**.

It may be worth highlighting that values of rated torque M_{n2} given in the catalogue take the dynamic efficiency into consideration.

Values of η_d are calculated for gearboxes after a sufficiently long running-in period.

After the running-in period the surface temperature in operation reduces and finally stabilises.

The operating temperature is affected by both the duty and the ambient temperature and may result into values, measured onto the gear case in the area of the worm shaft, in the range of 80-100 °C without this affecting the operation of the gear unit adversely.

*If however, surface temperatures in the 90-100 °C range are to be expected it is recommended that oil seals in Viton® compound are specified at the time of order through option **PV**.*

Es soll hier insbesondere daran erinnert werden, daß die Katalogangaben für das Drehmoment M_{n2} auf Basis des dynamischen Wirkungsgrads η_d nach der Einlaufphase berechnet wurden.

Nach der Einlaufzeit erreicht man auch eine Reduzierung und endlich eine Stabilisierung der Betriebstemperatur.

Die Temperatur unter Last wird vom Betriebsart und von der Umwelttemperatur beeinflusst und kann Werte erreichen, die auf die Gehäuse neben der Schneckenachse gegen 80-100 °C gemessen werden, ohne die Mechanik des Getriebes zu schaden.

Wenn man höheren Temperaturen - gegen ca. 90-100 °C, sich erwartet, ist es notwendig das Getriebe mit Viton®-Dichtungen auszurüsten und in der Bestellung die Option **PV** anzugeben.

En particulier, il est opportun de rappeler que les caractéristiques de couple M_{n2} du catalogue ont été calculées sur la base du rendement dynamique η_d que l'on obtient sur les groupes fonctionnant en régime après rodage.

Après une période de rodage on constate également une réduction et finalement la stabilisation de la température de fonctionnement.

La température en charge est influencée par le type de service et par la température ambiante et peut atteindre des valeurs, mesurées sur le carter au niveau de l'axe de la vis sans fin, qui avoisinent 80-100°C, sans que cela porte aucun préjudice à la mécanique du réducteur.

*S'il y a lieu que la température de fonctionnement puisse atteindre la limite supérieure - dans l'ordre de 90-100°C - il est conseillé d'équiper le réducteur de bagues d'étanchéité en Viton®, en rappelant sur la commande l'option **PV**.*

2.3.2 Rendimento statico [η_s]

È il rendimento applicabile all'avviamento del riduttore. Il parametro non è generalmente rilevante nel caso di ingranaggi elicoidali, ma deve essere tenuto in particolare considerazione nella scelta di motorizzazioni a vite senza fine, quando questi operano con un tipo di servizio intermittente (es. sollevamenti).

2.3.2 Static efficiency [η_s]

Efficiency applicable at start-up of the gearbox. Although this is generally not a significant factor for helical gears, it may be instead critical when selecting worm gearmotors operating under intermittent duty (e.g. hoisting).

2.3.2 Statischer Wirkungsgrad [η_s]

Dies ist der Wirkungsgrad beim Anlaufen des Getriebes, der, obgleich er bei Zahnradgetrieben vernachlässigt werden kann, bei der Wahl von Antrieben mit Schneckengetrieben, die für den Aussetzbetrieb (z.B. Hubbetrieb) bestimmt sind, besondere Beachtung verdient.

2.3.2 Rendement statique [η_s]

C'est le rendement que l'on obtient au démarrage du réducteur et, s'il peut être négligé pour les réducteurs à engrenages, il doit être pris en considération dans le choix des motorisations avec réducteurs à vis sans fin destinés aux applications caractérisées par un type de service intermittent (ex. levages).



2.4 RAPPORTO DI RIDUZIONE [i]

Il valore del rapporto di riduzione della velocità, identificato con il simbolo [i], è espresso tramite il rapporto fra le velocità all'albero veloce e lento del riduttore e riassunto nell'espressione:

2.4 GEAR RATIO [i]

The value for the gear ratio is referred to with the letter [i] and calculated through the relationship of the input speed n_1 to the output speed n_2 :

2.4 GETRIEBEÜBERSETZUNG [i]

Die Übersetzung des Getriebes wird mit dem Buchstaben [i] bezeichnet und ist folgendermaßen definiert:

2.4 RAPPORT DE REDUCTION [i]

Le rapport de réduction est identifiée par la lettre [i] et son calcul s'effectue à partir de la vitesse d'entrée n_1 et de la vitesse de sortie n_2 en utilisant la relation suivante :

$$i = \frac{n_1}{n_2} \quad (3)$$

Il rapporto di riduzione è solitamente un numero decimale che viene rappresentato nel catalogo con una sola cifra decimale, o nessuna nel caso di $i > 1000$. Se si è interessati a conoscere il numero in tutte le componenti decimali consultare il Servizio Tecnico di Bonfiglioli Riduttori.

The gear ratio is usually a decimal number which in this catalogue is truncated at one digit after the comma (no decimals for $i > 1000$).

If interested in knowing the exact value please consult Bonfiglioli's Technical Service.

In diesem Katalog wird die Übersetzung mit einer Stelle hinter dem Komma angegeben, bei Übersetzungen $i > 1000$ ohne Dezimalstelle.

Wenn genaue Angaben zur Übersetzung benötigt werden, wenden sie sich bitte an den technischen Service von Bonfiglioli Riduttori.

Dans le catalogue, le rapport de réduction a une précision d'un chiffre après la virgule (sauf pour $i > 1000$).

Si une plus grande précision est nécessaire, contacter le Service Technique de Bonfiglioli.

2.5 MOMENTO D'INERZIA J_r [Kgm²]

I momenti d'inerzia indicati a catalogo sono riferiti all'albero veloce del riduttore e pertanto, nell'accoppiamento con un motore elettrico, il loro valore si somma semplicemente a quello del motore stesso.

2.5 MOMENT OF INERTIA J_r [Kgm²]

Moments of inertia specified in the catalogue refer to the input shaft of the gear unit and, as such, they can be simply added to the inertia of the motor, when this is combined.

2.5 TRÄGHEITSMOMENT J_r [Kgm²]

Die im Katalog angegebenen Trägheitsmomente sind auf die Antriebswelle des Getriebes bezogen und daher im Falle einer direkten Verbindung schon zur Motordrehzahl in Beziehung gesetzt.

2.5 MOMENT D'INERTIE J_r [Kgm²]

Les moments d'inertie indiqués dans le catalogue se réfèrent à l'axe d'entrée du réducteur par conséquent, dans le cas d'accouplement direct, ils se rapportent déjà à la vitesse du moteur.

2.6 FATTORE DI SERVIZIO [f_s]

Il fattore di servizio è il parametro che traduce in un valore numerico la gravosità del servizio che il riduttore è chiamato a svolgere, tenendo conto, benché con inevitabile approssimazione, del funzionamento giornaliero, della variabilità del carico e di eventuali sovraccarichi, connessi con la specifica applicazione del riduttore.

Nel grafico seguente riportato il fattore di servizio si ricava, dopo aver selezionato la colonna relativa alle ore di funzionamento giornaliere, per intersezione fra il numero di avviamenti orari e una fra le curve K1, K2 e K3.

Le curve $K_$ sono associate alla natura del servizio (approssimativamente: uniforme, medio e pesante) tramite il fattore di accelerazione delle masse K , le-

2.6 SERVICE FACTOR [f_s]

This factor is the numeric value describing reducer service duty. It takes into consideration, with an unavoidable approximation, daily operating conditions, load variations and overloads connected with reducer application. In the graph below, after selecting proper "daily working hours" column, the service factor is given by intersecting the number of starts per hour and one of the K1, K2 or K3 curves.

$K_$ curves are linked with the service nature (approximately: uniform, medium and heavy) through the acceleration factor of masses K , connected to the ratio between driven masses and motor inertia values.

Regardless to the value given for the service factor, we would like to remind that in some ap-

2.6 BETRIEBSFAKTOR [f_s]

Beim Betriebsfaktor handelt es sich um den Parameter, der die Betriebsbelastung, die das Getriebe aushalten muss, in einem Wert ausdrückt. Dabei berücksichtigt er, auch wenn nur mit einer unvermeidbaren Annäherung, den täglichen Einsatz, die unterschiedlichen Belastungen und eventuelle Überbelastungen, die mit der spezifischen Applikation des Getriebes verbunden sind. Der nachstehenden Grafik kann, nach der Wahl der entsprechenden Spalte mit der Angabe der täglichen Betriebsstunden der Betriebsfaktor entnommen werden, indem man die Schnittstelle zwischen der stündlichen Schaltungen und einer der Kurven K1, K2 und K3 sucht. Die mit $K_$ gekennzeichneten Kurven sind über den Beschleunigungsfaktor der Mas-

2.6 FACTEUR DE SERVICE [f_s]

Le facteur de service est le paramètre qui traduit en une valeur numérique la difficulté du service que le réducteur est appelé à effectuer en tenant compte, avec une approximation inévitable, du fonctionnement journalier, de la variabilité de la charge et des éventuelles surcharges liées à l'application spécifique du réducteur.

Sur le graphique ci-dessous, le facteur de service peut être trouvé, après avoir sélectionné la colonne relative aux heures de fonctionnement journalier, à l'intersection entre le nombre de démarrages horaires et l'une des courbes K1, K2 et K3.

Les courbes $K_$ sont associées à la nature du service (approximativement : uniforme, moyen et difficile) au moyen du facteur



gato al rapporto fra le inerzie delle masse condotte e del motore.

Indipendentemente dal valore così ricavato del fattore di servizio, segnaliamo che esistono applicazioni fra le quali, a puro titolo di esempio i sollevamenti, per le quali il cedimento di un organo del riduttore potrebbe esporre il personale che opera nelle immediate vicinanze a rischio di ferimento.

Se esistono dubbi che l'applicazione possa presentare questa criticità vi invitiamo a consultare preventivamente il ns. Servizio Tecnico.

plications, which for example involve lifting of parts, failure of the reducer may expose the operators to the risk of injuries.

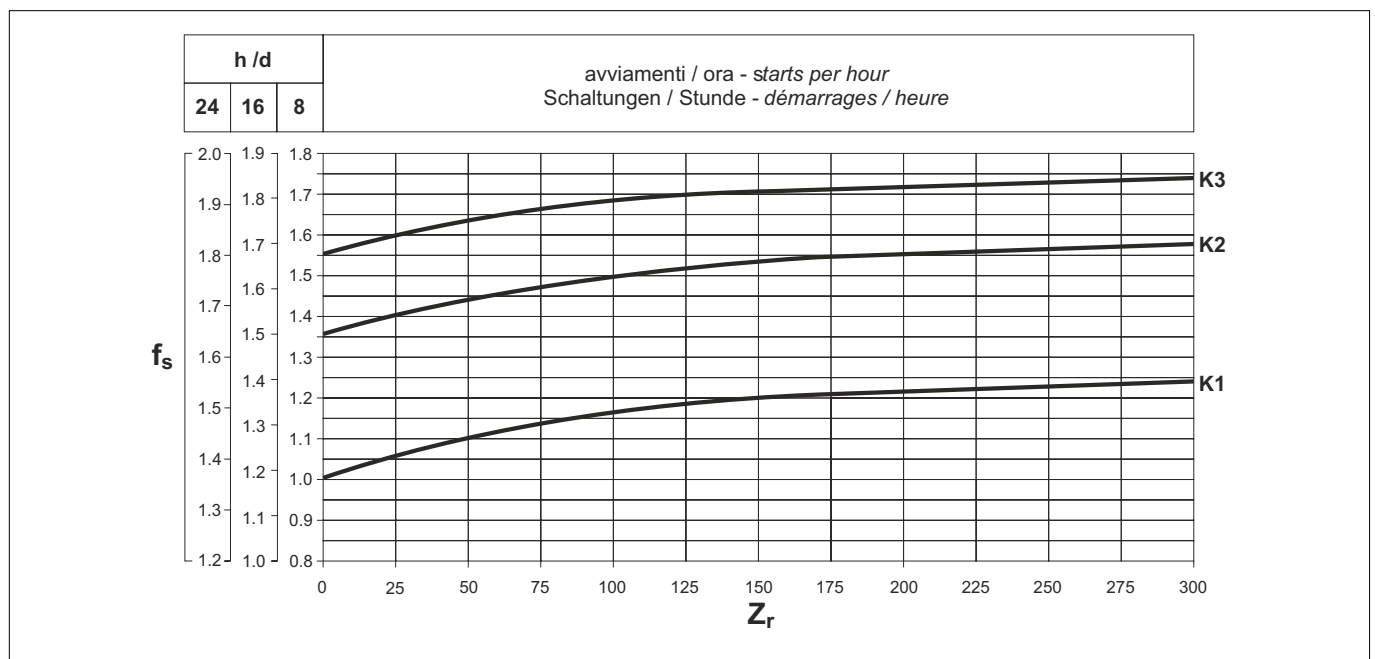
If in doubt, please contact Bonfiglioli's Technical Service.

sen K an die Betriebsart gekoppelt (annähernd: gleichmäßige, mittlere oder starke Belastung), der wiederum an das Verhältnis zwischen Trägheitsmoment der angetriebenen Massen und dem des Motors gebunden ist. Unabhängig von dem so erhaltenen Betriebsfaktor, möchten wir Sie darauf hinweisen, dass es Applikationen gibt, unter denen beispielsweise auch die Hebefunktionen zu finden sind, bei denen das Nachgeben eines Getriebeorgans, das in dessen Nähe arbeitende Personal einer Verletzungsgefahr aussetzen könnte. Sollten daher Zweifel darüber bestehen, ob die entsprechende Applikation sich in diesem Bezug als kritisch erweist, bitten wir Sie sich zuvor mit unseren Technischen Kundendienst in Verbindung zu setzen.

d'accélération des masses K, lié au rapport entre les inerties des masses conduites et le moteur.

Indépendamment de la valeur du facteur de service ainsi trouvée, nous signalons qu'il existe des applications parmi lesquelles, à titre d'exemple, les levages, pour lesquels la rupture d'un organe du réducteur pourrait exposer le personnel opérant à proximité immédiate à des risques de lésion.

En cas de doute concernant les risques éventuels de l'application, nous vous conseillons de contacter préalablement notre Service Technique.



Fattore di accelerazione delle masse, [K]

Il parametro serve a selezionare la curva relativa al particolare tipo di carico. Il valore è dato dal rapporto:

Acceleration factor of masses, [K]

This parameter serves for selecting the right curve for the type of load. The value is given by the following ratio:

Beschleunigungsfaktor der Massen, [K]

Dieser Parameter dient der Wahl der Kurve, die sich auf die jeweilige Belastungsart bezieht. Der Wert ergibt sich aus folgender Formel:

Facteur d'accélération des masses, [K]

Le paramètre sert à sélectionner la courbe relative au type de charge particulier. La valeur est obtenue par l'équation :

$$K = \frac{J_c}{J_m} \quad (4)$$



| | | | |
|---|---|--|---|
| dove: | where: | wobei: | où: |
| J_c momento d'inerzia delle masse comandate, riferito all'albero del motore | J_c <i>moment of inertia of driven masses referred to motor shaft</i> | J_c Trägheitsmoment der angetriebenen Massen, bezogen auf die Motorwelle | J_c <i>moment d'inertie des masses commandées se référant à l'arbre du moteur</i> |
| J_m momento d'inerzia del motore | J_m <i>moment of inertia of motor</i> | J_m Trägheitsmoment des Motors | J_m <i>moment d'inertie du moteur</i> |

| $K = \frac{J_c}{J_m}$ | curva / curve Kurve / courbe | tipo di carico | type of duty | Belastung | charge |
|-----------------------|---------------------------------|--|---|---|---|
| $K \leq 0.25$ | K1 | uniforme | <i>uniform load</i> | Gleichförmig | <i>uniforme</i> |
| $0.25 < K \leq 3$ | K2 | urti moderati | <i>moderate shock load</i> | Ungleichförmig | <i>chocs modérés</i> |
| $3 < K \leq 10$ | K3 | forti urti | <i>heavy shock load</i> | Stark ungleichförmig | <i>chocs importants</i> |
| $K > 10$ | - | consultare il Servizio Tecnico Bonfiglioli | <i>please contact Bonfiglioli's Technical Service</i> | sich mit unseren Technischen Kundendienst in Verbindung zu setzen | <i>nous vous conseillons de contacter notre Service Technique</i> |

3 - MANUTENZIONE

I riduttori forniti con lubrificazione permanente non necessitano di sostituzioni periodiche dell'olio. Per gli altri si consiglia di effettuare una prima sostituzione del lubrificante dopo circa 300 ore di funzionamento provvedendo ad un accurato lavaggio interno del gruppo con adeguati detersivi. Evitare di miscelare olii a base minerale con olii sintetici. Controllare periodicamente il livello del lubrificante effettuando la sostituzione indicativamente agli intervalli riportati in tabella.

3 - MAINTENANCE

Life lubricated gearboxes do not require any periodical oil changes. For other types of gearboxes, the oil must be first changed after approx. 300 hours of operation, carefully flushing the gear unit using suitable detergents. Do not mix mineral oils with synthetic oils. Check oil level regularly and change oil at the intervals shown in the table.

3 - WARTUNG

Die mit Dauerschmierung gelieferten Getriebe bedürfen periodische Ölwechsel. Bei den übrigen Getrieben wird ein erster Ölwechsel nach ca. 300 Betriebsstunden empfohlen, wobei das Innere der Gruppe sorgfältig mit einem geeigneten Reinigungsmittel zu waschen ist. Mineralöle nicht mit Syntheseölen mischen. Den Ölstand regelmäßig kontrollieren. Die Ölwechsel in den in der Tabelle angegebenen Fristen durchführen.

3 - ENTRETIEN

Les réducteurs fournis avec lubrification permanente n'ont besoin d'aucun remplacement périodique de huile. Pour les autres, nous conseillons d'effectuer une première vidange du lubrifiant après les 300 premières heures de fonctionnement en réalisant un lavage soigné à l'intérieur du groupe avec des produits détergents appropriés. Eviter de mélanger les huiles à base minérale avec des huiles synthétiques. Contrôler périodiquement le niveau du lubrifiant en effectuant les vidanges conformément aux intervalles indiqués dans le tableau.

| Temperatura olio / Oil temperature Öltemperatur / Température huile [°C] | Intervallo di lubrificazione / Oil change interval Schmierfrist / Intervalle de lubrification [h] | |
|--|---|--|
| | olio minerale / mineral oil Mineralöl / huile minérale | olio sintetico / synthetic oil Syntheseöl / huile synthétique |
| < 65 | 8000 | 25000 |
| 65 - 80 | 4000 | 15000 |
| 80 - 95 | 2000 | 12500 |

4 - SELEZIONE

4.1 Selezione di un motoriduttore

- Determinare il fattore di servizio f_s come precedentemente descritto.
- Ricavare la potenza richiesta all'albero veloce del riduttore.

4 - SELECTION

4.1 Selecting a gearmotor

- Determine service factor f_s as formerly specified.
- Determine power required at gearbox input shaft:

4 - ANTRIEBSAUSWAHL

4.1 Wahl des Getriebemotors

- Stellen Sie Betriebsfaktor f_s fest, wie früher spezifiziert.
- Bestimmen sie die benötigte Leistung an der Getriebeeingangswelle.

4 - SELECTION

4.1 Sélection des motoréducteurs

- Déterminez le facteur de service f_s comme autrefois indiqué.
- Déterminez la puissance requise à l'entrée du réducteur :

$$P_{r1} = \frac{M_{r2} \times n_2}{9550 \times \eta_d} \quad [\text{kW}] \quad (5)$$



- c) Nel capitolo: «Dati tecnici motoriduttori» individuare la tabella relativa ad una potenza motore normalizzata P_n tale che:
- c) *Consult the gearmotor rating charts and locate the table corresponding to normalised power P_n :*
- c) Unter den Getriebemotoren-Auswahltabellen die Tabelle auswählen, die folgender Leistung P_n entspricht:
- c) *Rechercher parmi les tableaux données techniques motoréducteurs celui correspondant à une puissance P_n :*

$$P_n \geq P_{r1} \quad (6)$$

Se non diversamente indicato, la potenza P_n dei motori riportata a catalogo si riferisce al servizio continuo S1. Per i motori utilizzati in condizioni diverse da S1, sarà necessario identificare il tipo di servizio previsto con riferimento alle Norme CEI 2-3/IEC 34-1. In particolare, per i servizi da S2 a S8 e per le grandezze motore uguali o inferiori a 132, è possibile ottenere una maggiorazione della potenza rispetto a quella prevista per il servizio continuo, pertanto la condizione da soddisfare sarà:

Unless otherwise specified, power P_n of motors indicated in the catalogue refers to continuous duty S1. For motors used in conditions other than S1, the type of duty required by reference to CEI 2-3/IEC 34-1 Standards must be mentioned. For duties from S2 to S8 in particular and for motor frame 132 or smaller, extra power output can be obtained with respect to continuous duty. Accordingly the following condition must be satisfied:

Wenn nicht anders angegeben, bezieht sich die im Katalog angegebene Leistung P_n der Motoren auf Dauerbetrieb S1. Bei Motoren, die unter anderen Bedingungen als S1 eingesetzt werden, muß die vorgesehen Betriebsart unter Bezug auf die CEI-Normen 2-3/IEC 34-1 bestimmt werden. Insbesondere kann man für die Betriebsarten S2 bis S8 (und für Motorbaugrößen gleich oder niedriger als 132) eine Überdimensionierung der Leistung relativ zu der für den Dauerbetrieb vorgesehenen Leistung erhalten; die zu erfüllende Bedingung ist dann:

Sauf indication contraire la puissance P_n des moteurs indiquée dans le catalogue se réfère à un service continu S1. Pour les moteurs utilisés dans des conditions différentes du service S1, il sera nécessaire d'identifier le type de service prévu en se référant aux normes CEI 2-3/IEC 34-1. En particulier, pour les services de type S2 à S8 ou pour les tailles de moteurs égales ou inférieures à 132 il est possible d'obtenir une majoration de la puissance par rapport à celle prévue pour le service continu. Par conséquent, la condition à satisfaire sera:

$$P_n \geq \frac{P_{r1}}{f_m} \quad (7)$$

Il fattore di maggiorazione f_m è ricavabile dalla tabella che segue.

The adjusting factor f_m can be obtained from table here after.

Der Überdimensionierungsfaktor f_m kann der Tabelle entnommen werden.

Le facteur de majoration f_m peut être obtenu en consultant le tableau suivante.

Rapporto di intermittenza

Intermittence ratio

Relative Einschaltdauer

Rapport d'intermittence

$$I = \frac{t_f}{t_f + t_r} \times 100 \quad (8)$$

t_f = tempo di funzionamento a carico costante
 t_r = tempo di riposo

t_f = work time at constant load
 t_r = rest time

t_f = Betriebszeit mit konstanter Belastung
 t_r = Aussetzzeit

t_f = temps de fonctionnement à charge constante
 t_r = temps de repos

| | SERVIZIO / DUTY / BETRIEB / SERVICE | | | | | | |
|-------|---|------|------|---|------|-----|---|
| | S2 | | | S3* | | | S4 - S8 |
| | Durata del ciclo / Cycle duration [min] Zyklusdauer / Durée du cycle [min] | | | Rapporto di intermittenza / Cyclic duration factor (I) Relative Einschaltdauer / Rapport d'intermittence (I) | | | Interpellarci Please contact us Rückfrage Nous contacter |
| | 10 | 30 | 60 | 25% | 40% | 60% | |
| f_m | 1.35 | 1.15 | 1.05 | 1.25 | 1.15 | 1.1 | |

* La durata del ciclo dovrà comunque essere uguale o inferiore a 10 minuti; se superiore interpellare il Servizio Tecnico di Bonfiglioli Riduttori.

* Cycle duration, in any event, must be 10 minutes or less. If it is longer, please contact our Technical Service.

* Die Zyklusdauer muß in jedem Fall kleiner oder gleich 10 min sein; wenn sie darüber liegt, unseren Technischen Kundendienst zu Rate ziehen.

* La durée du cycle devra être égale ou inférieure à 10 minutes. Si supérieure, contacter notre Service Technique.



Nella sezione relativa alla potenza installata P_n selezionare infine il motoriduttore che sviluppa la velocità di funzionamento più prossima alla velocità n_2 desiderata e per il quale il fattore di sicurezza S sia uguale, o superiore, al fattore di servizio f_s .

Next, refer to the appropriate P_n section within the gearmotor selection charts and locate the unit that features the desired output speed n_2 , or closest to, along with a safety factor S that meets or exceeds the applicable service factor f_s .

Als nächstes wählen Sie anhand der Getriebemotoren auswahlta-bellen den Abschnitt mit der entsprechenden P_n und suchen die gewünschte Abtriebsdrehzahl n_2 , oder die nächstmögliche Drehzahl, zusammen mit dem Sicherheitsfaktor S , der den zutreffenden Betriebsfaktor f_s erreicht oder überschreitet.

Dans la section relative à la puissance installée P_n sélectionner enfin le motoréducteur qui développe la vitesse de fonctionnement la plus proche à la vitesse n_2 désirée et pour lequel le facteur de sécurité S soit pareil, ou supérieur, au facteur de service f_s .

$$S \geq f_s \quad (9)$$

Il fattore di sicurezza è così definito:

The safety factor is so defined:

Der Sicherheitsfaktor wird wie folgt berechnet:

Le facteur de sécurité est défini ainsi:

$$S = \frac{M_{n2}}{M_2} = \frac{P_{n1}}{P_1} \quad (10)$$

Nelle tabelle di selezione motoriduttori gli abbinamenti sono sviluppati con motori a 2, 4 e 6 poli alimentati a 50 Hz. Per velocità di comando diverse da queste, effettuare la selezione con riferimento ai dati nominali forniti per i riduttori.

As standard, gear and motor combinations are implemented with 2, 4 and 6 pole motors, 50 Hz supplied. Should the drive speed be different from 2800, 1400 or 900 min^{-1} , base the selection on the gear unit nominal rating.

Standardmäßig stehen Getriebemotorenkombinationen mit 2, 4 und 6 poligen Motoren für eine Frequenz von 50 Hz zur Verfügung. Sollten die Antriebsdrehzahlen abweichend von 2800, 1400 oder 900 min^{-1} sein, dann stützen Sie die Auslegung des Getriebes auf die Getriebe-nendaten.

Dans les tableaux de sélection des motoréducteurs les accou- plements sont développés avec moteurs à 2, 4 et 6 poles ali- mentés à 50 Hz. Pour vitesses de commande différentes à cel- les-ci, sélectionner suite aux données nominales fournies par les réducteurs.

4.2 Selezione di un riduttore

- a) Determinare il fattore di servizio f_s .
b) Determinare la coppia di calcolo M_{c2} dalla relazione:

4.2 Selecting a speed reducer

- a) Determine service factor f_s .
b) Determine the computa- tional torque M_{c2} :

4.2 Wahl des Getriebes

- a) Den Betriebsfaktor f_s be- stimmen.
b) Bestimmen sie das Soll-Drehmoment M_{c2} :

4.2 Sélection des réducteurs

- a) Déterminer le facteur de service f_s .
b) Procédez à la définition du couple de calcul :

$$M_{c2} = M_{r2} \times f_s \quad (11)$$

- c) Ricavare il rapporto di tra- smissione:

- c) Determine the required gear ratio:

- c) Bestimmen Sie die erforderliche Getriebeuntersetzung.

- c) Calculez le rapport de ré- duction :

$$i = \frac{n_1}{n_2} \quad (12)$$

- d) Nel capitolo: «Dati tecnici ri- duttori» individuare la gran- dezza di riduttore il quale, per la velocità di comando n_1 e per il rapporto $[i]$ più prossimo a quello calcolato, offra una coppia nominale che soddisfi la seguente condizione:

- d) Consult the «Speed reducer rating charts» and locate the frame size that, for drive speed n_1 and gear ratio closest to $[i]$ features a rated torque M_{n2} that satis- fies the following condition:

- d) Beziehen Sie sich auf die Getriebe Auswahl Tabellen und bestimmen Sie eine Ge- triebegröße, dessen Nenn- drehmoment bei der Antri- ebsdrehzahl n_1 und einer passenden Untersetzung $[i]$ folgende Bedingungen erfüllt:

- d) Dans le chapitre « Données techniques réducteurs » sé- lectionner la taille qui, pour la vitesse d'entrée n_1 et pour le rapport $[i]$ est la plus proche, et offre un couple nominal satisfaisant à la condition suivante :

$$M_{n2} \geq M_{c2} \quad (13)$$

Verificare l'applicabilità del motore selezionato al para- grafo: «Predisposizioni mo- tore».

Check applicability of the electric motor selected at chapter: «Motor availabil- ity».

Überprüfen Sie die Anbau- möglichkeit des gewählten Motors im Kapitel „Motor Anbaumöglichkeiten“.

Vérifier la possible adapta- tion du moteur électrique en consultant le tableau des prédispositions possibles.

**5 - VERIFICHE****5 - VERIFICATION****5 - PRÜFUNGEN****5 - VERIFICATIONS**

Effettuata la selezione del riduttore, o motoriduttore, è opportuno procedere alle seguenti verifiche:

After the selection of the speed reducer, or gearmotor, is complete it is recommended that the following verifications are conducted:

Nachdem die Auswahl des Getriebe oder Getriebemotor abgeschlossen ist, werden die folgenden Schritte empfohlen:

Une fois effectuée la sélection du réducteur, ou motoréducteur, il faut procéder aux suivantes vérifications:

a) Coppia massima

Generalmente la coppia massima (intesa come punta di carico istantaneo) applicabile al riduttore non deve superare il 300% della coppia nominale M_{n2} ; verificare pertanto che tale limite non venga superato adottando, se necessario, opportuni dispositivi per la limitazione della coppia.

Per i motori trifase a doppia polarità è necessario rivolgere particolare attenzione alla coppia di commutazione istantanea che viene generata durante la commutazione dall'alta velocità alla bassa in quanto può essere decisamente più elevata della coppia massima stessa.

Un metodo semplice ed economico per ridurre tale coppia è quello di alimentare solo due fasi del motore durante la commutazione (il tempo di alimentazione a due fasi può essere regolato mediante un relè a tempo):

a) Maximum torque

The maximum torque (intended as instantaneous peak load) applicable to the gearbox must not, in general, exceed 300% of rated torque M_{n2} . Therefore, check that this limit is not exceeded, using suitable torque limiting devices, if necessary.

For three-phase switch-pole motors, it is recommended to pay attention to the switching torque which is generated when switching from high to low speed, because it could be significantly higher than maximum torque.

A simple, economical way to minimize overloading is to power only two phases of the motor during switch-over (power-up time on two phases can be controlled with a time-relay):

a) Max. Drehmoment

Im allgemeinen darf das max. Drehmoment (verstanden als momentane Lastspitze), das auf das Getriebe aufgebracht werden kann, 300 % des Nenndrehmoments M_{n2} nicht überschreiten. Sicherstellen, daß dieser Grenzwert nicht überschritten wird, und nötigenfalls die entsprechenden Vorrichtungen zur Begrenzung des Drehmoments vorsehen.

Bei polumschaltbaren Drehstrommotoren muss dem Umschaltmoment, das beim Umschalten von der hohen auf die niedrige Drehzahl erzeugt wird, besondere Aufmerksamkeit geschenkt werden, da es entschieden größer sein kann als das Nenn-Drehmoment.

Eine einfache und kostengünstige Methode zum Senken dieses Drehmoments besteht darin, daß nur zwei Phasen des Motors während des Umschaltens gespeist werden (die Dauer der Speisung von nur 2 Phasen kann durch ein Zeitrelais gesteuert werden):

a) Couple maximum

Généralement, le couple maximum (à considérer comme une pointe de charge instantanée) applicable au réducteur ne doit pas dépasser les 300% du couple nominal M_{n2} . Vérifier par conséquent que cette limite ne soit pas dépassée en adoptant, si nécessaire, des dispositifs adaptés pour limiter le couple.

Pour les moteurs triphasés à double polarité, il est nécessaire de prêter une attention particulière au couple de commutation instantané qui est généré lors du passage de la grande à la petite vitesse étant donné qu'il peut être considérablement plus élevé que le couple maximum lui même.

Une méthode simple et économique pour réduire ce couple consiste à alimenter seulement deux phases du moteur pendant la commutation (la durée d'alimentation sur deux phases peut être réglée au moyen d'un relais temporisateur) :

Coppia di commutazione / Switching torque / Umschaltmoment / Couple de commutation

$$Mg_2 = 0.5 \times Mg_3$$

| | | | | |
|-----------------------|---|--|--|--|
| Mg₂ | Coppia di commutazione alimentando 2 fasi | Switching torque with two phase power-up | Umschaltmoment bei Speisung von 2 Phasen | Couple de commutation en alimentant deux phases |
| Mg₃ | Coppia di commutazione alimentando 3 fasi | Switching torque with three-phase power-up | Umschaltmoment bei Speisung von 3 Phasen | Couple de commutation en alimentant trois phases |

b) Carichi radiali

Verificare che i carichi radiali agenti sugli alberi di entrata e/o uscita rientrino nei valori di catalogo ammessi. Se superiori, aumentare la grandezza del riduttore oppure modificare la supportazione del carico.

Ricordiamo che tutti i valori indicati nel catalogo si riferiscono a carichi agenti sulla mezzeria della sporgenza dell'albero in esame per cui, in fase di verifica, è indi-

b) Radial loads

Make sure that radial forces applying on input and/or output shaft are within permitting catalogue values. If they were higher consider designing a different bearing arrangement before switching to a larger gear unit.

Catalogue values for rated overhung loads refer to mid-point of shaft under study.

Should application point of the overhung load be local-

b) Radialkräfte

Sicherstellen, daß die auf die Antriebswellen und/oder Abtriebswellen wirkenden Radialkräfte innerhalb der zulässigen Katalogwerte liegen. Wenn sie höher sind, das Getriebe größer dimensionieren bzw. die Abstützung der Last verändern. Wir erinnern daran, daß alle im Katalog angegebenen Werte sich auf Kräfte beziehen, die auf die Mitte des Wellenendes wirken. Diese Tatsache

b) Charges radiales

Vérifier que les charges radiales agissant sur les arbres d'entrée et/ou de sortie se situent dans les valeurs de catalogue admises. Si elles sont supérieures, choisir la taille du réducteur supérieure ou modifier la reprise de charge. Rappelons que toutes les valeurs indiquées dans le catalogue se réfèrent à des charges agissant au milieu de la longueur disponible de l'arbre contrôlé. Par conséquent, en



spensabile tenere conto di questa condizione provvedendo, se necessario, a determinare con le apposite formule il carico ammissibile alla distanza x a cui si applica la risultante del carico radiale.

ised further out the revised loading capability must be adjusted as per instructions given in this manual.

muß bei der Prüfung unbedingt berücksichtigt werden und nötigenfalls muß mit Hilfe der geeigneten Formeln die zulässige Kraft beim gewünschten Abstand x bestimmt werden. Siehe hierzu die Erläuterungen zu den Radialkräften in diesem Katalog.

phase de vérification, il est indispensable de prendre en considération cette condition en déterminant, si nécessaire, avec les formules appropriées, la charge admissible à la distance x désirée. Se rapporter à ce propos aux paragraphes relatifs aux charges radiales.

c) Carichi assiali

Anche gli eventuali carichi assiali dovranno essere confrontati con i valori ammissibili.

Se si è in presenza di carichi assiali molto elevati o combinati con carichi radiali, si consiglia di interpellare il ns. Servizio Tecnico.

c) *Thrust loads*

Actual thrust load must be found within 20% of the equivalent overhung load capacity.

Should an extremely high thrust, or a combination of radial and axial load apply, consult Bonfiglioli Technical Service.

c) Axialkräfte

Auch die eventuell vorhandenen Axialkräfte müssen mit den im Katalog angegebenen zulässigen Werten verglichen werden. Wenn sehr hohe Axialkräfte wirken oder Axialkräfte in Kombination mit Radialkräften, bitte unseren Technischen Kundendienst zu Rate ziehen.

c) *Charges axiales*

Les éventuelles charges axiales devront être comparées avec les valeurs admissibles. Si l'on est en présence de charges axiales très élevées ou combinées avec des charges radiales, nous conseillons d'interpeller notre Service Technique.

d) Avviamenti orari

Per servizi diversi da S1, con un numero rilevante di inserzioni/ora si dovrà tener conto di un fattore Z (determinabile con le indicazioni riportate nel capitolo dei motori) il quale definisce il numero max. di avviamenti specifico per l'applicazione in oggetto.

d) *Starts per hour*

For duties featuring a high number of switches the actual starting capability in loaded condition [Z] must be calculated.

Actual number of starts per hour must be lower than value so calculated.

d) Schaltungen/Stunde

Bei anderen Betriebsarten als S1 mit einem hohen Wert für die Schaltungen/Stunde muß der Faktor Z berücksichtigt werden (er kann mit Hilfe der Angaben im Kapitel Motoren bestimmt werden), der die max. zulässige Anzahl von Schalten für eine bestimmte Anwendung definiert.

d) *Démarrages/heure*

Pour les services différents de S1, avec un nombre important d'insertions/heure, il faudra prendre en considération un facteur Z (déterminé à l'aide des informations reportées dans le chapitre des moteurs) qui définit le nombre maximum de démarrages spécifique pour l'application concernée.

6 - INSTALLAZIONE

6 - INSTALLATION

6 - INSTALLATION

6 - INSTALLATION

6.1 Specifiche di carattere generale

6.1 General instructions

6.1 Allgemeine Eigenschaften

6.1 Instructions générales

a) Assicurarsi che il fissaggio del riduttore sia stabile onde evitare qualsiasi vibrazione. Se si prevedono urti, sovraccarichi prolungati o possibili bloccaggi installare giunti idraulici, frizioni, limitatori di coppia, ecc.

a) *Make sure that the gearbox is securely bolted to avoid vibrations in operation. If shocks or overloads are expected, fit hydraulic couplings, clutches, torque limiters, etc.*

a) Sicherstellen, daß die Befestigung des Getriebes stabil ist, damit keine Schwingungen entstehen. Wenn es voraussichtlich zu Stößen, längerdauernden Überlasten oder zu Blockierungen kommen kann, sind entsprechende Schutzelemente wie hydraulische Kupplungen, Kupplungen, Rutschkupplungen usw. zu installieren.

a) *S'assurer que la fixation du réducteur soit stable afin d'éviter toute vibration. En cas de chocs, de surcharges prolongées ou de blocages installer des coupleurs hydrauliques, des embrayages, des limiteurs de couple etc...*

b) Prima della eventuale verniciatura proteggere le superfici lavorate e il bordo degli anelli di tenuta per evitare che il solvente venga a contatto con la gomma, pregiudicando l'integrità del paraolio stesso.

b) *Before being paint coated, any machined surfaces and the outer face of the oil seals must be protected to prevent paint drying out the rubber and jeopardising the sealing function.*

b) Beim Lackieren die bearbeiteten Flächen und die Dichtungen schützen, damit der Anstrichstoff nicht dem Kunststoff angreift und somit die Dichtigkeit der Ölabdichtungen in Frage gestellt wird.

b) *En phase de peinture, il faudra protéger les plans usinés et le bord extérieur des bagues d'étanchéité pour éviter que la peinture ne dessèche le caoutchouc, ce qui risque de nuire à l'efficacité du joint.*



- c) Gli organi che vanno calettati sugli alberi di uscita del riduttore devono essere lavorati con tolleranza ISO H7 per evitare accoppiamenti troppo bloccati che, in fase di montaggio potrebbero danneggiare irreparabilmente il riduttore stesso. Inoltre, per il montaggio e lo smontaggio di tali organi si consiglia l'uso di adeguati tiranti ed estrattori utilizzando il foro filettato posto in testa alle estremità degli alberi.
- c) *Parts fitted on the gearbox output shaft must be machined to ISO H7 tolerance to prevent interference fits that could damage the gearbox itself. Further, to mount or remove such parts, use suitable pullers or extraction devices using the tapped hole located at the top of the shaft extension.*
- c) Die Organe, die mit einer Keilverbindung auf der Abtriebswelle des Getriebes befestigt werden, müssen mit einer Toleranz ISO H7 gearbeitet sein, um allzu fest blockierte Verbindungen zu vermeiden, die eventuell zu einer irreparablen Beschädigung des Getriebes während des Einbaus führen könnten. Außerdem sind beim Ein- und Ausbau dieser Organe geeignete Zugstangen und Abzieher zu verwenden, wobei die Gewindebohrung an den Köpfen der Wellen zu verwenden ist.
- c) *Les organes qui sont calés sur les arbres de sortie du réducteur doivent être réalisés avec une tolérance ISO H7 pour éviter les accouplements trop serrés qui, en phase de montage, pourraient endommager irrémédiablement le réducteur. En outre, pour le montage et le démontage de ces organes, nous conseillons d'utiliser un outillage et des extracteurs appropriés en utilisant le trou taraudé situé en extrémité d'arbre.*
- d) Le superfici di contatto dovranno essere pulite e trattate con adeguati protettivi prima del montaggio, onde evitare l'ossidazione e il conseguente bloccaggio delle parti.
- d) *Mating surfaces must be cleaned and treated with suitable protective products before mounting to avoid oxidation and, as a result, seizure of parts.*
- d) Die Berührungsflächen müssen sauber sein und vor der Montage mit einem geeigneten Schutzmittel behandelt werden, um Oxidierung und die daraus folgende Blockierung der Teile zu verhindern.
- d) *Les surfaces de contact devront être propres et traitées avec des produits de protections appropriés avant le montage afin d'éviter l'oxydation et par suite le blocage des pièces.*
- e) Prima della messa in servizio del riduttore accertarsi che la macchina che lo incorpora sia in regola con le disposizioni della Direttiva Macchine 89/392, e successivi aggiornamenti.
- e) *Prior to putting the gear unit into operation make sure that the equipment that incorporates the same complies with the current revision of the Machines Directive 89/392.*
- e) Bevor das Getriebe in Betrieb zu setzen, muß man sich vergewissern daß die das Getriebe einbauende Maschine gemäß den aktuellen Regelungen der Maschine Richtlinie 89/392 ist.
- e) *Avant la mise en service du réducteur, vérifier que la machine où il est monté est conforme aux normes de la Directive Machines 89/392 et ses mises à jour.*
- f) Prima della messa in funzione della macchina, accertarsi che la posizione del livello del lubrificante sia conforme alla posizione di montaggio del riduttore e che la viscosità sia adeguata al tipo del carico.
- f) *Before starting up the machine, make sure that oil level is suitable for the mounting position specified for the gear unit.*
- f) Vor Inbetriebnahme der Maschine sicherstellen, daß die Anordnung der Füllstandschraube der Einbaulage angemessen ist, und die Viskosität des Schmiermittels der Belastungsart entspricht.
- f) *Avant la mise en marche de la machine, s'assurer que la position du niveau du lubrifiant soit conforme à la position de montage du réducteur et que la viscosité soit appropriée au type de charge.*
- g) Nel caso di installazione all'aperto prevedere adeguate protezioni e/o carterature allo scopo di evitare l'esposizione diretta agli agenti atmosferici e alla radiazione solare.
- g) *For outdoor installation provide adequate guards in order to protect the drive from rainfalls as well as direct sun radiation.*
- g) Bei Inbetriebnahme in Frein, muß man geeigneten Schutzgeräte vorsehen, um das Antrieb gegen Regen und direkte Sonnenstrahlung zu schützen.
- g) *En cas d'installation en plein air, il est nécessaire d'appliquer des protections et/ou des caches appropriés de façon à éviter l'exposition directe aux agents atmosphériques et aux rayonnements solaires.*

6.2 Messa in servizio riduttori serie W

I gruppi W 63, W 75 e W 86 sono forniti di un coperchio laterale orientabile, dotato di un tappo cieco per esigenze di trasporto.

Prima della messa in servizio dell'apparecchiatura questo deve

6.2 Commissioning of W gear units

Gear units type W63, W75 and W86 feature a side cover carrying a blank plug for transportation purposes.

Prior to putting the gearbox into service the blank plug must be replaced by the breather plug

6.2 Inbetriebnahme der W-Getriebeeinheiten

Die Getriebeeinheiten W63, W75 und W86 werden für Transportzwecke mit einem Blindstopfen im seitlichen Deckel ausgeliefert. Vor der Inbetriebnahme muss dieser Stopfen durch einen Lüfter,

6.2 Mise en service des réducteurs série W

Les groupes W63, W75 et W86 sont fournis avec un couvercle latéral orientable, équipé d'un bouchon fermé pour le transport.

Avant la mise en service de l'appareil, celui-ci doit être rem-

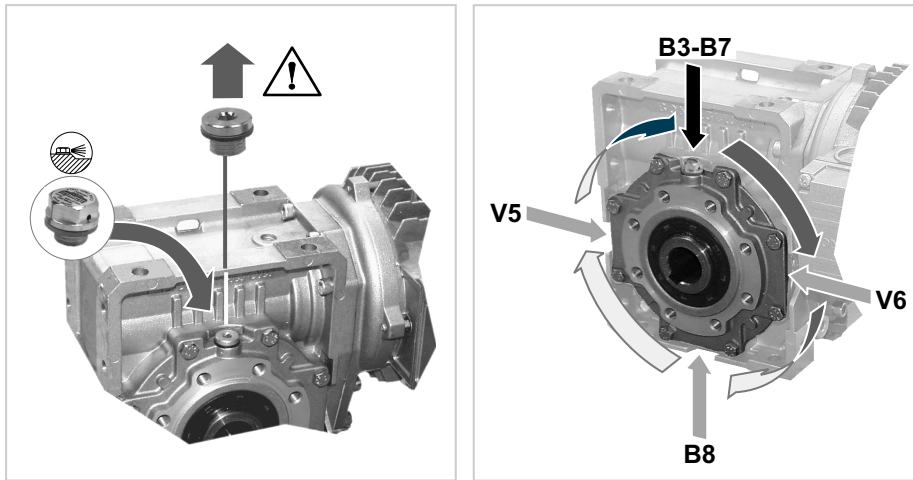


essere sostituito con il tappo di sfiato che è fornito a corredo. Vedi figura:

that is supplied with each unit. See figure below:

ausgetauscht werden. Siehe nachfolgende Abbildung.

placé par le reniflard fourni avec chaque unité. Voir la figure :



Nell'orientamento B6 invece il tappo chiuso NON dovrà essere sostituito con il tappo di sfiato.



Note that the blind plug MUST BE LEFT IN PLACE when the reducer is fitted in mounting position B6.



Bei der Ausrichtung B6 darf dieser Blindstopfen jedoch NICHT durch die Entlüftungsschraube ersetzt werden.



En revanche, en ce qui concerne l'orientation B6, le bouchon fermé NE doit PAS être remplacé par le bouchon de purge.

7 - STOCCAGGIO

Il corretto stoccaggio dei prodotti richiede l'esecuzione delle seguenti attività:

- a) Escludere aree all'aperto, zone esposte alle intemperie o con eccessiva umidità.
- b) Interporre sempre tra il pavimento ed i prodotti, pianali lignei o di altra natura, atti ad impedire il diretto contatto col suolo.
- c) Per periodi di stoccaggio e soste prolungate le superfici interessate agli accoppiamenti quali flange, alberi e giunti devono essere protette con idoneo prodotto antiossidante (Mobilarma 248 o equivalente). In questo caso i riduttori dovranno essere posizionati

7 - STORAGE

Observe the following instructions to ensure correct storage of the products:

- a) Do not store outdoors, in areas exposed to weather or with excessive humidity.
- b) Always place boards, wood or other material between the products and the floor. The gearboxes should not have direct contact with the floor.
- c) In case of long-term storage all machined surfaces such as flanges, shafts and couplings must be coated with a suitable rust inhibiting product (Mobilarma 248 or equivalent). Furthermore gear units must be placed with the fill plug in the highest position and

7 - LAGERUNG

Die korrekte Lagerung der Antriebe erfordert folgende Vorkehrungen:

- a) Die Produkte nicht im Freien lagern und nicht in Räumen, die der Witterung ausgesetzt sind, oder eine hohe Feuchtigkeit aufweisen.
- b) Die Produkte nie direkt auf dem Boden, sondern auf Unterlagen aus Holz oder einem anderen Material lagern.
- c) Bei anhaltenden Lager- und Haltszeiten müssen die Oberflächen für die Verbindung, wie Flansche, Wellen oder Kuppungen mit einem geeigneten Oxidationsschutzmittel behandelt werden (Mobilarma 248 oder ein äquivalentes Mittel).

7 - STOCKAGE

Un correct stockage des produits nécessite de respecter les règles suivantes:

- a) Exclure les zones à ciel ouvert, les zones exposées aux intempéries ou avec humidité excessive.
- b) Interposer dans tous les cas entre le plancher et les produits des planches de bois ou des supports d'autre nature empêchant le contact direct avec le sol.
- c) Pour une stockage de long durée il faut protéger les surfaces d'accouplement (brides, arbres, manchon d'accouplement) avec produit anti oxydant (Mobilarma 248 ou equivalent). Dans ce cas les réducteurs devront être placés avec bouchon reniflard vers le



con il tappo di sfiato nella posizione più alta e riempiti interamente d'olio. Prima della loro messa in servizio nei riduttori dovrà essere ripristinata la corretta quantità, e il tipo di lubrificante.

filled up with oil. Before putting the units into operation the appropriate quantity, and type, of oil must be restored.

Übrigens müssen die Getriebe mit nach oben gerichteter Entlüftungsschraube gelagert und mit Öl gefüllt werden. Die Getriebe müssen vor ihrer Verwendung mit der angegebenen Menge des vorgesehenen Schmiermittels gefüllt werden.

haut et complètement rempli d'huile. Avant de la mise en service du réducteur, la bon quantité d'huile devra être rétabli selon la quantité indiqué sur le catalogue.

8 - CONDIZIONI DI FORNITURA

8 - CONDITIONS OF SUPPLY

8 - LIEFERBEDINGUNGEN

8 - CONDITIONS DE LIVRAISON

I riduttori vengono forniti come segue:

Gear units are supplied as follows:

Die Getriebe werden in folgendem Zustand geliefert:

Les réducteurs sont livrés comme suit:

a) predisposti per essere installati nella posizione di montaggio come specificato in fase di ordine;

a) configured for installation in the mounting position specified at the time of order;

a) schon bereit für die Montage in der bei Bestellung festgelegten Einbaulage;

a) déjà prédisposés pour être installés dans la position de montage comme défini en phase de commande;

b) collaudati secondo specifiche interne;

b) tested to manufacturer specifications;

b) nach werksinternen Spezifikationen geprüft;

b) testés selon les spécifications internes;

c) superfici di accoppiamento non verniciate;

c) mating machined surfaces come unpainted;

c) die Verbindungsflächen sind nicht lackiert;

c) les surfaces de liaison ne sont pas peintes;

d) esecuzioni predisposte per l'attacco motore complete di viti e dadi per il fissaggio del motore stesso;

d) nuts and bolts for mounting motors are provided;

d) ausgestattet mit Schrauben und Muttern für die Montage der Motoren (Version mit Adapter für IEC-Motoren);

d) équipés d'écrous et de boulons pour le montage des moteurs normalisés pour la version CEI;

e) alberi protetti da guaine o cappellotti in plastica per le esigenze del trasporto;

e) shafts are protected during transportation by plastic caps;

e) alle Getriebe werden mit Kunststoffschutz auf den Wellen geliefert;

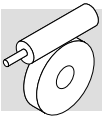
e) embouts de protections en plastique sur les arbres;

f) provvisti di golfare di sollevamento (dove previsto).

f) supplied with lifting lug (where applicable).

f) mit Transporterring zum Anheben (falls vorgesehen).

f) dotés d'un crochet de levage (quand cela est prévu).



9 - CARATTERISTICHE COSTRUTTIVE

Caratteristiche salienti comuni a tutti i riduttori a vite Bonfiglioli sono:

- Albero lento cavo simmetrico per fissaggio bilaterale del riduttore e degli alberi lenti riportati (disponibili come accessorio).
- Ingranaggi a vite senza fine rettificati e lavorazioni meccaniche di precisione consentono elevati rendimenti e grande silenziosità nel funzionamento
- Numerose opzioni per il fissaggio del riduttore sfruttando le configurazioni con piedi, con flangia, o pendolare (con braccio di reazione opzionale).
- Estesa possibilità di personalizzazione ricorrendo alla lista delle opzioni disponibili.

Caratteristiche specifiche dei gruppi tipo VF sono:

- Casse in Alluminio pressofuso per VF27, VF30, VF44 e VF49. Cassa in ghisa per gruppi da VF130 a VF250. Questi ultimi sono verniciati con polveri epossidiche termoisolanti.

Caratteristiche specifiche dei gruppi tipo W sono:

- Cassa monoblocco in Alluminio, rigida e precisa.
- Grande versatilità e flessibilità nell'applicazione, data dalla forma cubica e dalle numerose superfici lavorate e disponibili per il fissaggio del riduttore, o di organi accessori.

9 - DESIGN FEATURES

Key features common to all Bonfiglioli worm gears are:

- *Symmetrical hollow output shaft for facilitated mounting of the gear unit and plug-in shafts (after-sales kit only) on either side.*
- *Ground finished wormshafts and precise machining lend optimal efficiency and extremely low noise in operation.*
- *Numerous product configurations allow for foot, flange or shaft mounting. Torque arm is available as an option.*
- *Extensive customisation possible through the range of standard options available.*

Key features of VF-style worm gears:

- *Die cast aluminium gear cases for VF27, VF30, VF44 and VF49. Sturdy cast iron for VF130 through VF250. The latter group is paint coated with thermo setting epoxy powder.*

Key features of W-style worm gears:

- *Rigid monobloc gear case made from Aluminium.*
- *The cubic shape of the gear case and machining of all sides lend extreme flexibility for the installation of the gearbox and ancillary devices.*

9 - KONSTRUKTIVE EIGENSCHAFTEN

Charakteristische Eigenschaften aller Bonfiglioli Schneckengetriebe:

- Symmetrische Hohlwellen ermöglichen eine Montage der Getriebe und der Einsteckwellen (nur als Service-Kit) auf beiden Seiten.
- Geschliffene Schneckenwellen und ihre präzise Bearbeitung ermöglichen einen hohen Wirkungsgrad und extrem niedrige Betriebsgeräusche.
- Zahlreiche Produktkonfigurationen erlauben eine Montage über Fuß-, Flansch- oder Wellenbefestigung. Drehmomentstützen können optional geliefert werden.
- Durch zusätzliche Optionen lassen sich die Antriebe an unterschiedliche Anwendungen anpassen.

Charakteristische Eigenschaften der VF - Serie

- Aluminium Druckguss Gehäuse für die Baugrößen: VF27, VF30, VF44 und VF49. Robuster Stahlguss für die Baugrößen: VF130 bis VF250. Wobei die letztere Gruppe mit einem Wärmehärtenden epoxy Pulver überzogen werden.

Charakteristische Eigenschaften der W-Serie

- Monoblockgehäuse aus Aluminium.
- Die kubische Form des Getriebegehäuses und die bearbeiteten Flächen aller Gehäuseseiten verleihen den Getrieben eine extreme Flexibilität bei der Montage. Durch zusätzliche Bauteile wird diese Flexibilität erweitert.

9 - CARACTERISTIQUES DE CONSTRUCTION

Les principales caractéristiques des réducteurs à roue et vis sans fin Bonfiglioli sont :

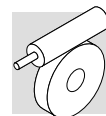
- *Arbre lent creux symétrique pour une fixation aisée sur chaque face du réducteur, ainsi que pour les arbres lents rapportés (disponibles comme accessoires).*
- *La rectification de la vis sans fin et les usinages de précision autorisent des rendements élevés ainsi qu'un grand silence de fonctionnement.*
- *Nombreuses possibilités de fixation du réducteur comme la configuration à pattes, à bride ou pendulaire (bras de réaction en option).*
- *Possibilité de personnalisation étendue grâce à la liste d'options disponibles.*

Les caractéristiques spécifiques aux groupes du type VF sont :

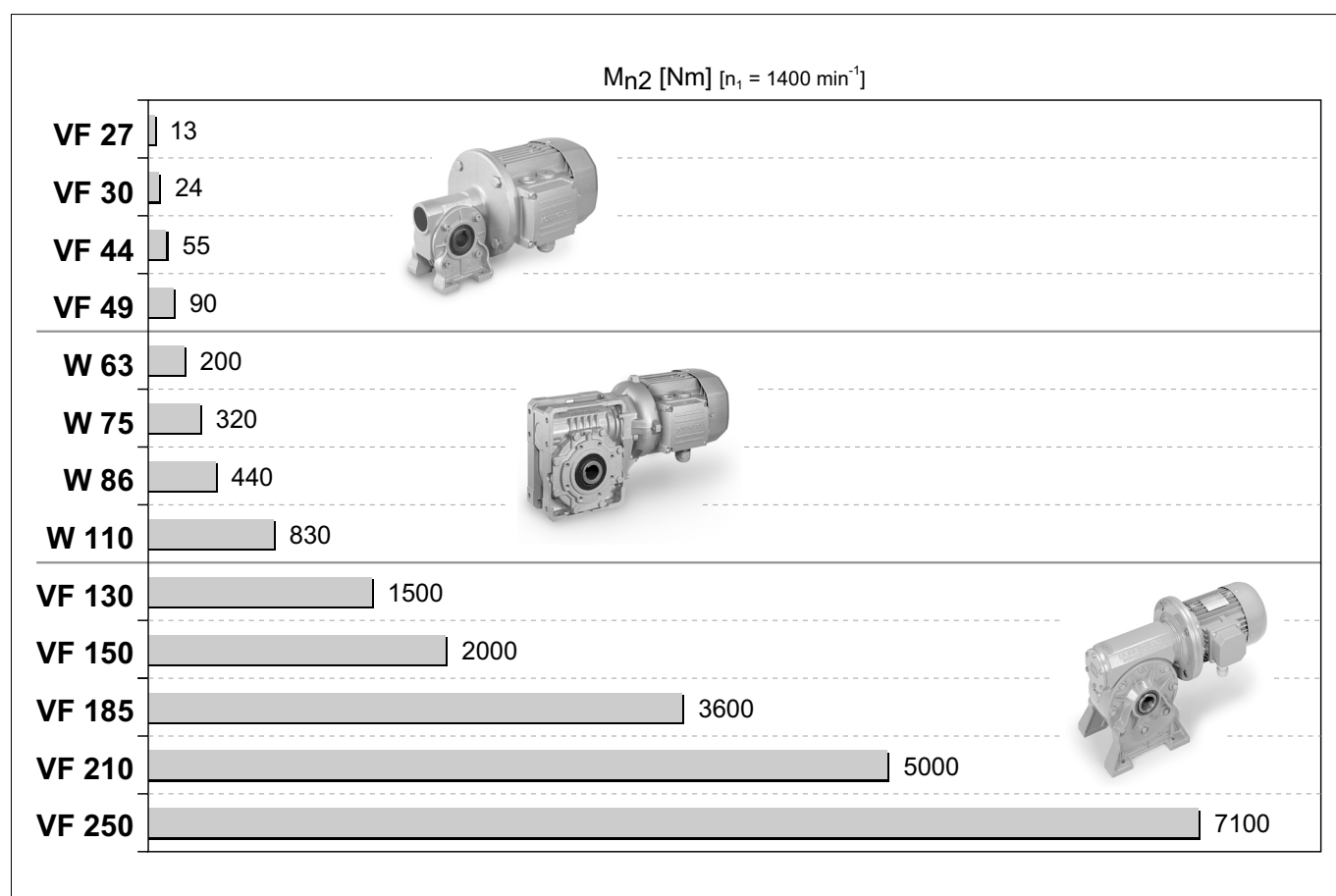
- *Carters en aluminium moulé sous pression pour les VF27, VF30, VF44 e VF49. Carters en fonte pour les VF130 à VF250. Ces derniers sont recouverts d'une peinture epoxy thermodurcissable.*

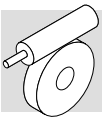
Les caractéristiques spécifiques aux groupes du type W sont :

- *Carter monobloc en Aluminium.*
- *Grande versatilité et flexibilité d'utilisation, permises par la forme cubique et par les nombreuses surfaces usinées pour la fixation du réducteur, et des accessoires.*

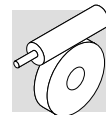


- Configurazione motoriduttore integrale particolarmente compatta, leggera ed economica.
- Anello di tenuta su albero veloce dei gruppi W63, W75 e W86 collocato in posizione interna e con mescola in Viton® per migliorate condizioni di funzionamento e durata.
- *The integral gearmotor configuration is lightweight, compact and price effective.*
- *Input shaft oil seal of W63, W75 and W86 units is located internally, and made from a Viton® compound for improved durability and extended lifetime.*
- Die Getriebe mit integrierten Motoren bauen sehr kompakt, haben geringe Gewichte und sind sehr preiswert.
- Die Wellendichtringe an der Eingangswelle der Baugrößen: W63, W75 und W86 sind aus Viton® und im Gehäuse integriert. Dies erhöht die Haltbarkeit und verlängert die Lebensdauer.
- *La configuration avec moteur intégré est particulièrement compacte, légère et économique.*
- *La bague à lèvres de l'arbre rapide des groupes W63, W75 et W86 est en position interne, et est faite en Viton® afin d'améliorer les conditions de fonctionnement et la durée de vie.*





| VF □ | | W □ | |
|------|--|-----|---|
| | <p>N VF27...VF250</p> <p>Piedi e vite orizzontale in basso <i>Foot mounted, underdriven</i> Füßen und untenliegendet Schneckenwelle <i>Pattes et vis horizontale en bas</i></p> | | <p>U W63...W110</p> <p>Cassa montaggio universale <i>Universal gear case</i> Universalgehäuse <i>Carter universel</i></p> |
| | <p>A VF27...VF250</p> <p>Piedi e vite orizzontale in alto <i>Foot mounted, overdriven</i> Füßen und Schneckenwelle oben <i>Pattes et vis horizontale en haut</i></p> | | |
| | <p>V VF27...VF250</p> <p>Piedi e vite verticale <i>Foot mounted, wormshaft vertical</i> Füßen und senkrechter Schneckenwelle <i>Pattes et vis verticale</i></p> | | |
| | <p>F VF27...VF185</p> <p>Flangia standard <i>Standard flange</i> Standardflansch <i>Bride standard</i></p> | | <p>UF1 UF2 W63...W110</p> <p>Flangia di montaggio standard <i>Standard mounting flange</i> Standardanbaufansch <i>Bride standard</i></p> |
| | <p>FA VF27...VF49</p> <p>Flangia alta <i>Extended output flange</i> Hohem Flansch <i>Bride haute</i></p> | | <p>UFC1 UFC2 W63...W110</p> <p>Flangia di lunghezza ridotta <i>Mounting flange reduced in length</i> Kurzer Anbaufansch <i>Bride reduit en longueur</i></p> |
| | <p>FC VF130...VF185</p> <p>Flangia corta <i>Short flange</i> Kurzem Flansch <i>Bride courte</i></p> | | |
| | <p>FR VF130...VF185</p> <p>Flangia corta e cuscinetti rinforzati <i>Short flange and reinforced bearings</i> Kurze Flansch und verstärkten Lagern <i>Bride courte et roulements renforcés</i></p> | | <p>UFCR1 UFCR2 W75</p> <p>Flangia ridotta in lunghezza e diametro <i>Mounting flange reduced in length and diameter</i> Verkürzter Anbaufansch in Länge und Durchmesser <i>Bride reduit en longueur et diamètre</i></p> |
| | <p>P VF30...VF250</p> <p>Flangia pendolare <i>Side cover for shaft mounting</i> Flansch für Drehmomentstütze <i>Bride pendulaire</i></p> | | |
| | <p>U VF30...VF49</p> <p>Piedi integrali <i>Foot mount</i> Mit integrierten Füßen <i>Carter à pattes monobloc</i></p> | | |



11 - ESECUZIONE DI MONTAGGIO

Per i riduttori combinati, se non diversamente specificato in fase di ordinativo, verranno configurate le esecuzioni di montaggio evidenziate in grigio nello schema seguente.

11 - ARRANGEMENTS

For combined worm gear units, unless otherwise specified at the time of ordering, the arrangements highlighted in grey in the diagrams below will be configured at the factory.

11 - BAUFORM

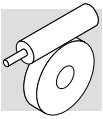
Bei Doppelschneckengetrieben werden, wenn nicht anders in der Bestellung spezifiziert, die grau hinterlegten Konfigurationen aus der nachstehenden Tabelle im Werk montiert.

11 - EXECUTION DE MONTAGE

Les réducteurs combinés, si rien n'est spécifié lors de la commande, seront configurés suivant l'exécution de montage en gris dans les tableaux ci-dessous.

| | CW1 | CCW1 | CW2 | CCW2 | CW3 | CCW3 | CW4 | CCW4 |
|---|-----|------|-----|------|-----|------|-----|------|
| U | | | | | | | | |
| UF UFC UFRC | | | | | | | | |
| N | | | | | | | | |
| A | | | | | | | | |
| V | | | | | | | | |
| F1 FA1 FC1 FR1 | | | | | | | | |
| F2 FA2 FC2 FR2 | | | | | | | | |
| P1 | | | | | | | | |
| P2 | | | | | | | | |

 Coperchio per fissaggio pendolare
 Shaft-mount cover
 Deckel für Aufsteckmontage
 Couverture pour fixation pendulaire

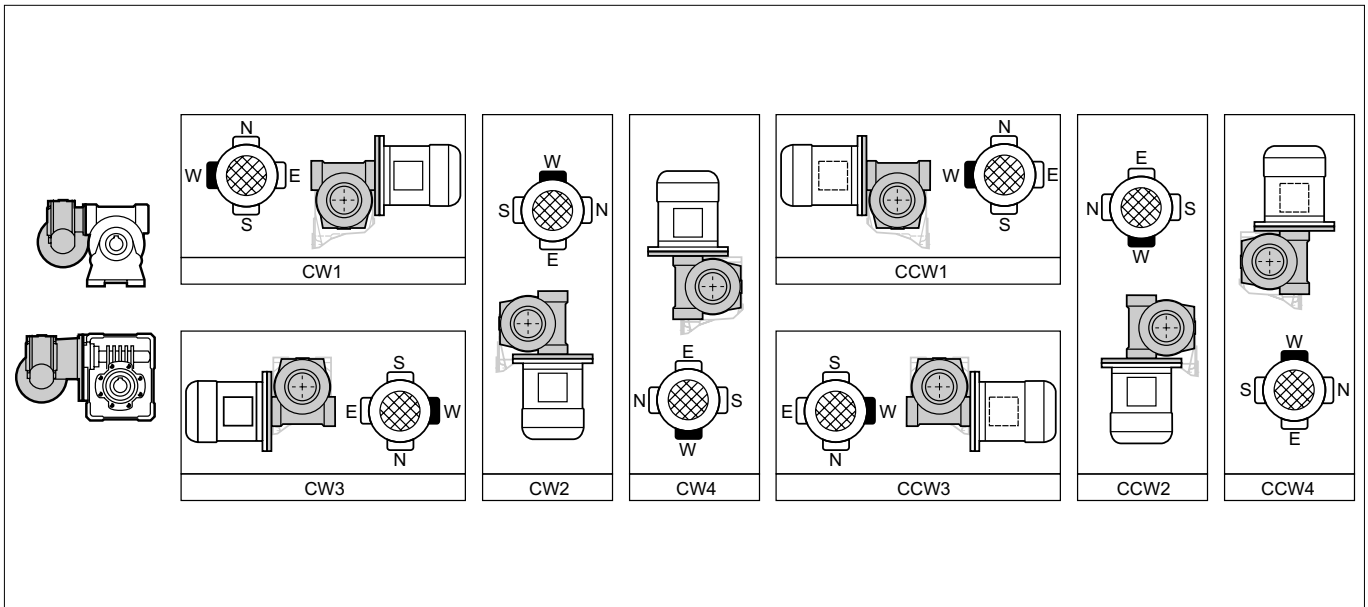


Orientamento morsetteria

Terminal box position

Ausrichtung des Klemmenkastens

Orientation boîte à bornes

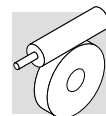


Nella configurazione HS (albero veloce cilindrico) è possibile ottenere tutte le esecuzioni di montaggio raffigurate. Nella configurazione P (IEC) determinate esecuzioni di montaggio possono essere ottenute solo utilizzando flange IEC (B5 o B14) di grandezza uguale o inferiore a quelle riportate nella tabella.

For units with the HS input (free shaft), all the mounting options shown are available. For units with the P (IEC), certain mounting options can be obtained only by using IEC flanges (B5 or B14) of the same size or smaller than those shown in tables.

Bei der Ausführung HS (Getriebe) sind alle abgebildeten Montageausführungen möglich. Bei der Ausführung P (IEC) können bestimmte Montageausführungen nur durch Verwendung von IEC-Flanschen (B5 oder B14) erreicht werden, die gleich groß oder kleiner als die in den Tabellen angegebenen sind.

Dans la configuration HS (réducteur), il est possible d'obtenir toutes les exécutions de montage présentées. Dans la configuration P (IEC), certaines exécutions de montage ne peuvent être obtenues qu'en utilisant des brides CEI (B5 ou B14) de taille inférieure ou égale aux tailles indiquées dans les tableaux.



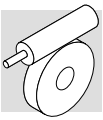
| | | CW1 CCW1 | CW2 CCW2 | CW3 | CCW3 | CW4 CCW4 |
|---------------------|--------------|---------------------|---------------------|--------------|--------------|---------------------|
| VF/VF30/44 | A, N, V, P1 | 63B14 | 63B14 | 63B14 | 63B14 | 63B14 |
| | F-FA | | | | | |
| VF/VF30/49 | A, N, V, P1 | 63B14 | 63B14 | 63B14 | 63B14 | 63B14 |
| | F-FA | | | | | |
| VF/W30/63 | U | 63B5-63B14 | 63B5-63B14 | 63B5-63B14 | 63B5-63B14 | 63B5-63B14 |
| | UF-UFC | | | | | |
| VF/W44/75 | U | 71B5-71B14 | 71B5-71B14 | 71B5-71B14 | 71B5-71B14 | 71B5-71B14 |
| | UF-UFC-UFCR | | | | | |
| VF/W44/86 | U | 71B5-71B14 | 71B5-71B14 | 71B5-71B14 | 71B5-71B14 | 71B5-71B14 |
| | UF-UFC | | | | | |
| VF/W49/110 | U | 80B5-80B14 | 80B5-80B14 | 80B5-80B14 | 80B5-80B14 | 80B5-80B14 |
| | UF-UFC | | | | | |
| W/VF63/130 | N | 71B5-90B14 | 90B5-90B14 | 71B5-90B14 | 71B5-90B14 | 71B5-90B14 |
| | A | 90B5-90B14 | 71B5-90B14 | 90B5-90B14 | 90B5-90B14 | 90B5-90B14 |
| | V | | 90B5-90B14 | | | - |
| | F1 | 90B5-90B14 | 71B5-90B14 | 90B5-90B14 | 71B5-90B14 | 90B5-90B14 |
| | FC1-FR1 | | | | 90B5-90B14 | |
| | P1 | | | | 90B5-90B14 | |
| | F2 | 90B5-90B14 | 71B5-90B14 | 71B5-90B14 | 90B5-90B14 | 90B5-90B14 |
| | FC2-FR2 | | | 90B5-90B14 | | |
| P2 | 90B5-90B14 | | | | | |
| W/VF86/150 | N | 112B5-112B14 | 112B5-112B14 | 71B5-112B14 | 71B5-112B14 | 71B5-112B14 |
| | A | 71B5-112B14 | 71B5-112B14 | 112B5-112B14 | 112B5-112B14 | 112B5-112B14 |
| | V | 112B5-90B14 | 112B5-90B14 | | | 71B5-112B14 |
| | F1 | 112B5-112B14 | 71B5-90B14 | 112B5-112B14 | 71B5-90B14 | 112B5-112B14 |
| | FC1-FR1 | | | | 90B5-112B14 | |
| | P1 | | | | 90B5-112B14 | |
| | F2 | 112B5-112B14 | 71B5-90B14 | 71B5-90B14 | 112B5-112B14 | 112B5-112B14 |
| | FC2-FR2 | | | 90B5-112B14 | | |
| P2 | 90B5-112B14 | | | | | |
| W/VF86/185 | N | 112B5-112B14 | 112B5-112B14 | 90B5-112B14 | 90B5-112B14 | 90B5-112B14 |
| | A | 90B5-112B14 | | 112B5-112B14 | 112B5-112B14 | 112B5-112B14 |
| | V | 112B5-90B14 | | | | 90B5-112B14 |
| | F1 | 112B5-112B14 | 90B5-112B14 | 112B5-112B14 | 90B5-112B14 | 112B5-112B14 |
| | FC1-FR1 | | | | 112B5-112B14 | |
| | P1 | | | | 112B5-112B14 | |
| | F2 | 112B5-112B14 | 90B5-112B14 | 90B5-112B14 | 112B5-112B14 | 112B5-112B14 |
| | FC2-FR2 | | | 90B5-112B14 | | |
| P2 | 112B5-112B14 | | | | | |
| VF/VF130/210 | N | # | 132B5 | # | # | # |
| | A | 132B5 | # | 132B5 | 132B5 | 132B5 |
| | V | | | | | |
| | P | | | | | |
| VF/VF130/250 | N | # | 132B5 | # | # | # |
| | A | 132B5 | # | 132B5 | 132B5 | 132B5 |
| | V | | 132B5 | | | |
| | P | | # | | | |

Consultare il ns. servizio Tecnico Commerciale

Consult our Technical Service

Bitte nehmen Sie mit unserem Technischen Verkaufsdienst Kontakt auf

Consulter notre Service Technico-Commercial



12 - CODICI ORDINATIVO 12 - DESCRIPTION KEY 12 - BEZEICHNUNG 12 - DESIGNATION
 12.1 Designazione riduttore 12.1 Gearbox designation 12.1 Getriebe-Bezeichnung 12.1 Désignation réducteur

W 63 L1 UF1 — 24 S2 — B3

OPZIONI / OPTIONS / OPTIONEN / OPTIONS

ESECUZ. DI MONTAGGIO / MOUNTING ARRANGEMENT
 BAUFORM / ASSEMBLAGE

CW (1, 2, 3, 4)
CCW (1, 2, 3, 4)

POSIZIONE DI MONTAGGIO / MOUNTING POSITION
 EINBAULAGEN / POSITION DE MONTAGE

B3 (default), B6, B7, B8, V5, V6

INTERFACCIA MOTORE IEC / MOTOR MOUNTING
 MOTOR BAUFORM / FORME DE CONSTRUCTION DU MOTEUR

B5 (VF30...VF250, VFR49...VFR250, W, WR)
B14 (VF30...VF110, W63...W110)

DESIGNAZIONE INGRESSO / INPUT CONFIGURATION
 BEZEICHNUNG DER ANTRIEBSSEITE / DESIGNATION ENTREE

| | VF | W |
|--------|----|---|
| P(IEC) | | |
| S_ | — | |
| HS | | |

RAPPORTO DI RIDUZIONE / GEAR RATIO / ÜBERSETZUNG / RAPPORT DE REDUCTION

DIAMETRO ALBERO LENTO / OUTPUT SHAFT BORE
 ABTRIEBSWELLE DURCHMESSER / DIAMETRE ARBRE LENT

| | | |
|------------|------------|--|
| W 75 | D30 | Standard |
| VF/W 44/75 | D28 | Su richiesta / on request / Option / sur demande |

FORMA COSTRUTTIVA / VERSION / BAUFORM / FORME DE CONSTRUCTION

LIMITATORE DI COPPIA / TORQUE LIMITER / RUTSCHKUPPLUNG / LIMITEUR DE COUPLE

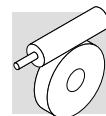
| | |
|---------|-----------|
| VF, VFR | L1 |
| W, WR | L2 |
| VF / VF | LF |

GRANDEZZA RIDUTTORE / GEAR FRAME SIZE / GETRIEBEBAUGRÖSSE / TAILLE REDUCTEUR

| | | | |
|--------|--|-------|---------------------------------------|
| VF | 27, 30, 44, 49, 130, 150, 185, 210, 250 | VF/VF | 30/44, 30/49, 130/210, 130/250 |
| VFR | 44, 49, 130, 150, 185, 210, 250 | VF/W | 30/63, 44/75, 44/86, 49/110 |
| W - WR | 63, 75, 86, 110 | W/VF | 63/130, 86/150, 86/185 |

TIPO RIDUTTORE / GEARBOX TYPE / GETRIEBETYP / TYPE DU REDUCTEUR

| | |
|--------------------------|--|
| VF, W | Riduttore a vite senza fine / Worm gearbox / Schneckengetriebe / Réducteur a vis sans fin |
| VFR, WR | Riduttore con precoppia elicoidale / Helical-worm gear unit Schneckengetriebe mit Vorstufe / Réducteur avec pre-étage |
| VF/VF, VF/W, W/VF | Riduttore combinato / Combined gearbox / Doppelschneckengetriebe / Réducteur combiné |



12.2 Designazione motore

12.2 Motor designation

12.2 Motor Bezeichnung

12.2 Désignation moteur

MOTORE / MOTOR / MOTOR / MOTEUR

FRENO / BRAKE / BREMSE / FREIN

BN 63A 4 230/400-50 IP54 CLF ... W FD 3.5 R SB 220SA ...

OPZIONI / OPTIONS
OPTIONEN / OPTIONS

ALIMENT. FRENO / BRAKE SUPPLY
BREMSVERSORGUNG / ALIMENT. FREIN

TIPO ALIMENTATORE / RECTIFIER TYPE
GLEICHRICHTERTYP / TYPE ALIMENTATEUR

M NB, SB, NBR, SBR

K -

BN NB, SB, NBR, SBR

LEVA DI SBLOCCO FRENO
BRAKE HAND RELEASE
BREMSHANDLÜFTUNG
LEVIER DE DEBLOCAGE FREIN

M R, RM

K R

BN R, RM

COPPIA FRENANTE / BRAKE TORQUE
BREMSMOMENT / COUPLE FREIN

TIPO FRENO / BRAKE TYPE / BRESENTYP / TYPE DE FREIN

M FD, FA

K FC

BN FD, FA, BA

POSIZIONE MORSETTIERA / TERMINAL BOX POSITION
KLEMMENKASTENLAGE / POSITION BOITE A BORNE

M W (default), N, E, S

K W (default), N, E, S

BN W (default), N, E, S

FORMA COSTRUTTIVA / MOTOR MOUNTING
BAUFORM / FORM DE CONSTRUCTION

M -

K B5

BN B5, B14

CLASSE ISOLAMENTO / INSULATION CLASS
ISOLIERUNGSKLASSE / CLASSE ISOLATION

CL F standard **CL H** option

GRADO DI PROTEZIONE / DEGREE OF PROTECTION
SCHUTZART / DEGRE DE PROTECTION

IP55 standard (IP54 - autotr. / brake motor / Bremssmotor / moteur frein)

TENSIONE-FREQUENZA / VOLTAGE-FREQUENCY / SPANNUNG-FREQUENZ / TENSION-FREQUENCE

NUMERO DI POLI / POLE NUMBER / POLZAHL / N.bre POLES

2, 4, 6, 2/4, 2/6, 2/8, 2/12, 4/6, 4/8

GRANDEZZA MOTORE / MOTOR SIZE / MOTOR-BAUGRÖSSE / TAILLE MOTEUR

M 1SC...3LC

K 63 - 71

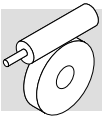
BN 56...225 BN 27, BN 44 (motori speciali / special motors / Spezialmotoren / moteurs speciaux)

TIPO MOTORE / MOTOR TYPE / MOTORTYP / TYPE MOTEUR

M trifase integrato / 3-phase integral / kompaktes Dreiphasen / 3 phasé compact

K trifase compatto / three phase motor compact type / Drehstrom - Kompaktmotor / Moteur triphasé compact

BN trifase IEC / IEC 3-phase / IEC Dreiphasen / 3 phasé CEI



13 - OPZIONI RIDUTTORE

SO

I riduttori tipo VF30, VF44, VF49, W63, W75, W86, solitamente riempiti in fabbrica di lubrificante, sono in questo caso forniti privi di olio.

LO

I riduttori delle grandezze da VF130 a VF250 e W110, solitamente sprovvisti di lubrificante, sono richiesti con olio sintetico del tipo correntemente utilizzato da BONFIGLIOLI RIDUTTORI e riempiti in accordo alla posizione di montaggio specificata. Relativamente ai gruppi W 110 e WR 110 l'opzione LO è applicabile come illustrato nello schema seguente:

13 - GEARBOX OPTIONS

SO

Gear units VF30, VF44, VF49, W63, W75 and W86, usually factory filled with oil, are, in this case, supplied unlubricated.

LO

Gearboxes VF130...VF250 and W110, usually supplied unlubricated, to be filled with synthetic oil currently used by BONFIGLIOLI RIDUTTORI according to the mounting position specified. As far as gear units W 110 and WR 110 the applicability of the LO option is described by the chart below:

| LO | B3 | B6 | B7 | B8 | V5 | V6 |
|------------------|----|----|----|----|----|----|
| W 110_HS | ⊖ | X | X | X | ⊖ | ⊖ |
| W 110_P63...P132 | X | X | X | X | ⊖ | ⊖ |
| W 110_S1...S4 | X | X | X | X | ⊖ | ⊖ |

13 - GETRIEBE OPTIONEN

SO

Die Getriebetypen VF30, VF44, VF49, W63, W75, W86, das normalerweise sind mit Schmiermittel geliefert, werden ohne Öl geliefert.

LO

Die normalerweise ohne Schmiermittel gelieferten Getriebe vom Typ VF130...VF250 und W110, die gewöhnlich ohne Schmiermittel geliefert werden, in Übereinstimmung mit der Einbaulage gefüllt mit dem normalerweise von BONFIGLIOLI RIDUTTORI verwendeten synthetischen Schmierstoff. In Bezug auf die Baugrosse W 110 und WR 110 die Ausführung LO ist nach der folgenden Tabelle möglich:

13 - OPTIONS REDUCTEURS

SO

Les réducteurs VF30, VF44, VF49, W63, W75, W86, habituellement fourni avec lubrifiant, sont livrés sans huile.

LO

Les réducteurs type VF130...VF250 et W 110, habituellement dépourvus de lubrifiants, sont demandés avec huile synthétique du type couramment utilisé par BONFIGLIOLI RIDUTTORI et remplis conformément à la position de montage demandée. Pour ce qui concerne les réducteurs W 110 et WR 110, l'option LO peut être appliquée comme indiqué dans le tableau suivant :

RB

Albero veloce sporgente sul lato opposto comando.

RBO

Albero veloce sporgente sul 2° riduttore.
(solo per esecuzioni combinate)

VV

Anello di tenuta in Viton® sull'albero veloce. Disponibile solo per gruppi serie VF, ad esclusione di VF30 con opzione RB, e VF 30_HS.

PV

Fornitura di anelli di tenuta in Viton® sia sull'albero lento sia sull'albero veloce, ad esclusione di VF30 con opzione RB, e VF 30_HS.

KA

Kit piedi W63...W110 per intercambiabilità con gruppi equivalenti VF_A.

KV

Kit piedi W63...W110 per intercambiabilità con gruppi equivalenti VF_V. (escluso W con opzione RB).

AO

Albero su lato opposto a standard (VF 27).

Opzioni motori

Per informazioni sulle opzioni, consultare i relativi capitoli nella sezione Motori Elettrici.

RB

Double-ended input shaft at non-drive-end.

RBO

Double-ended input shaft at N.D.E. of 2nd gearbox. (combined execution only)

VV

Viton® oil seal on input shaft. The option is only available for units of the VF series, barring all VF30's c/w option RB and VF30_HS.

PV

Oil seals from Viton® compound on both the input and the output shaft, barring all VF30's c/w option RB and VF30_HS.

KA

VF_A interchangeability kit. Option is available for units W63 to W110.

KV

VF_V interchangeability kit (barring W + option RB). Option is available for units W63 to W110.

AO

Output shaft on side opposite to standard (VF 27).

Motor options

For more detailed information please consult the Electric Motor section in this book.

RB

Zweites Wellenende gegenüber von Eigangswelle.

RBO

Zusätzliches Schneckenwellenende am 2. Getriebe. (nur bei Doppelschneckengetrieben)

VV

Wellendichtringe aus Viton® auf der Antriebswelle. Lieferbar nur für die VF-Reihe. Ausschließlich VF30 nach Ausführung RB und/oder HS.

PV

Alle Wellendichtringen aus Viton®. Ausschließlich VF30 nach Ausführung RB und/oder HS.

KA

Durch mit VF_A austauschbarem Satz - Abstellfüße komplettiert.

KV

Durch mit VF_V austauschbarem Satz - Abstellfüße komplettiert (W mit Option RB ausgeschlossen).

AO

Abtriebswelle auf die Gegenseite als Standard (VF 27).

Optionen Motoren

Detaillierte Informationen entnehmen Sie bitte dem Kapitel "Elektromotoren".

RB

Vis saillante sur le côté opposé commande.

RBO

Vis saillante sur le 2ème réducteur (seulement pour les exécutions combinées)

VV

Bague d'étanchéité en Viton® sur arbre rapide. Disponible uniquement pour groupes VF, a l'exclusion de VF30 avec option RB et VF30_HS.

PV

Les réducteurs sont équipées de bagues d'étanchéité en Viton® soit sur l'arbre se sortie que sur l'arbre d'entrée, a l'exclusion de VF30 avec option RB et VF30_HS.

KA

Kit pieds pour interchangeabilité avec groupe équivalent type VF_A.

KV

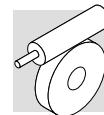
Kit piedes pour interchangeabilité avec groupe équivalent type VF_V (a l'exclusion de W avec option RB).

AO

Arbre coté opposé par rapport au standard (VF 27).

Options moteurs

Pour plus d'informations sur les options, consulter les chapitres correspondants dans la section Moteurs électriques.



**14 - POSIZIONI
DI MONTAGGIO
E ORIENTAMENTO
MORSETTIERA**

Gli orientamenti delle morsettiere dei motori sono identificati osservando il motore dal lato ventola; l'orientamento pre-impostato in fabbrica è evidenziato in nero (W).

Le posizioni morsettiere illustrate non sono valide per VFR44. Fare riferimento alle pag.23 e alle pag.124..129 per la designazione e l'identificazione della forma costruttiva.

Posizione angolare leva di sblocco freno.

Nei motori autofrenanti, la leva di sblocco freno (se richiesta) ha l'orientamento standard a 90° rispetto alla morsettiere (posizione AB); specificare con relative opzioni qualora l'orientamento desiderato sia diverso.

**14 - MOUNTING POSITION
AND TERMINAL BOX
ANGULAR LOCATION**

Location of motor terminal box can be specified by viewing the motor from the fan side; standard location is shown in black (W).

The terminal box positions indicated in table V20 do not apply to VFR44. Please refer to page 23 and pages 124..129 for designation and identification of design version.

Angular location of the brake release lever.

Unless otherwise specified, brake motors have the manual device side located, 90° apart from terminal box. Different angles can be specified through the relevant options available.

**14 - EINBAULAGEN
UND LAGE DES
KLEMMENKASTENS**

Die Angaben zur Lage des Klemmenkastens beziehen sich auf das von der Lüfterseite her betrachtete Getriebe. Die Standardorientierung ist schwarz hervorgehoben (W).

Die in der Tabelle dargestellten Positionen auf der Klemmenleiste sind für VFR44 gültig. Für die Zuzuordnung und die identifizierung der Bauform ist Bezug auf die Seiten 23 und 124..129 zu nehmen.

Winkellage des Handlüfterhebels.

Bei Bremsmotoren wird der Handlüfterhebel (auf Anfrage) standardmäßig auf 90° gegenüber des Klemmkastens (AB-Anordnung) geliefert; wird eine andere Anordnung verlangt, muß dies bei der Bestellung durch das geeignete Option angegeben werden.

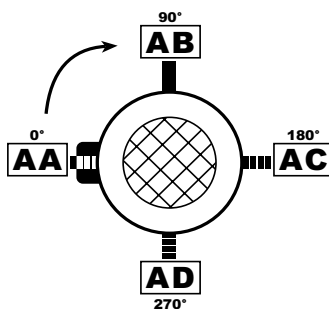
**14 - POSITIONS
DE MONTAGE ET
ORIENTATION BOITE
A BORNE**

Les orientations des boîtes à bornes des moteurs sont définies en regardant le moteur du côté ventilateur. L'orientation standard est indiquée en noir (W).

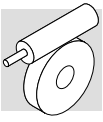
Les positions de la boîte à bornes ne sont pas valables pour VFR44. Se reporter à la page 23 et aux pages 124..129 pour la désignation et l'identification de la forme de construction.

Position angulaire levier déblocage frein.

Dans les moteurs freins, ce levier (si requis) aura l'orientation standard de 90° par rapport à la boîte à bornes (position AB); spécifier avec options relatives si l'orientation désirée est différente.



| Legenda: | Key: | Zeichenerklärung: | Légende: | |
|----------|--------------------------|-------------------------|--------------------------|--------------------------------|
| | Tappo di sfiato / carico | Filling / breather plug | Einfüll / Lüfterschraube | Bouchon de event / remplissage |
| | Tappo di livello | Level plug | Ölstandsschraube | Bouchon de niveau |
| | Tappo di scarico | Drain plug | Ablaßschraube | Bouchon de vidange |



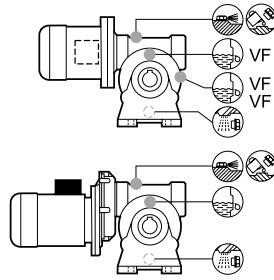
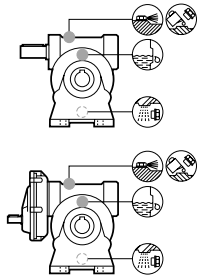
VF...A

VFR...A

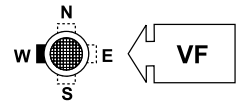
HS

P (IEC)

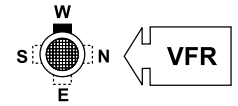
B3



VF 130-150 ($46 \leq i \leq 100$)
 VF 130-150 ($7 \leq i \leq 40$)
 VF 185...250

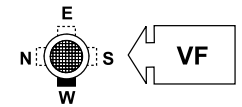
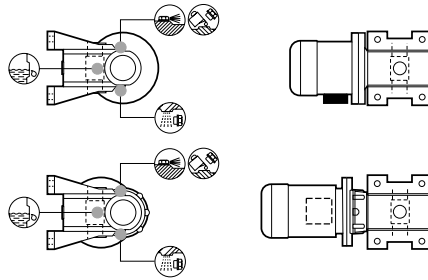
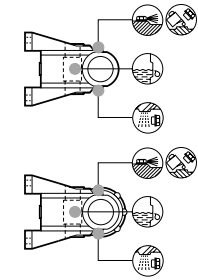


← VF

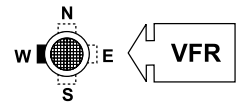


← VFR

B6

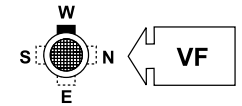
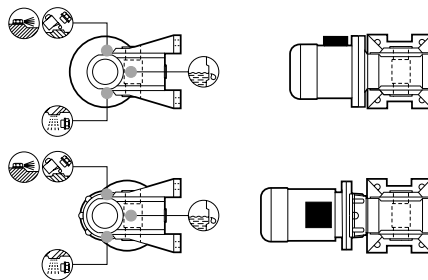
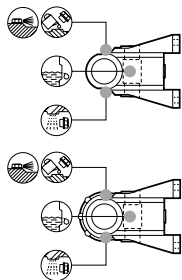


← VF

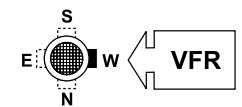


← VFR

B7

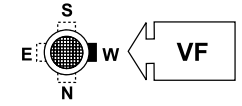
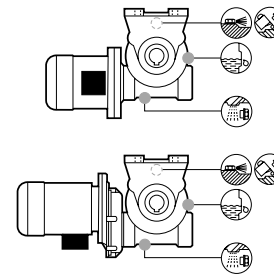
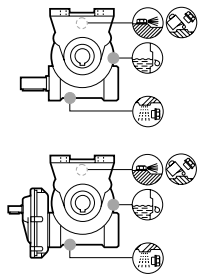


← VF

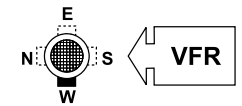


← VFR

B8

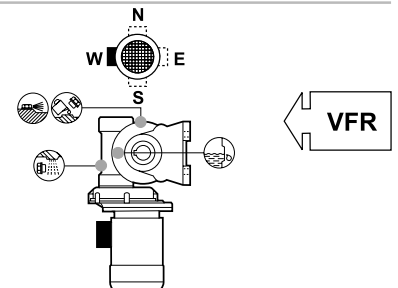
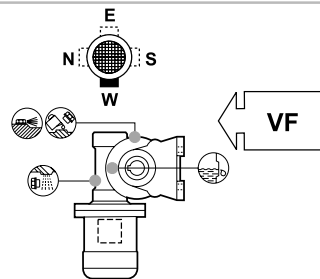
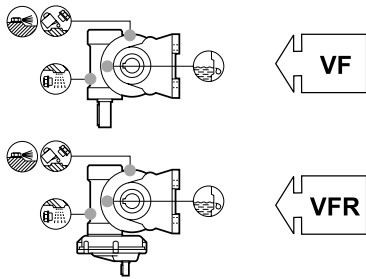


← VF

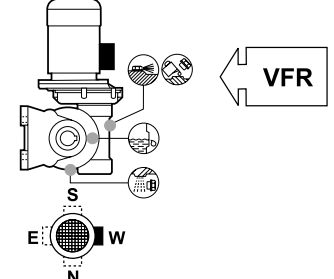
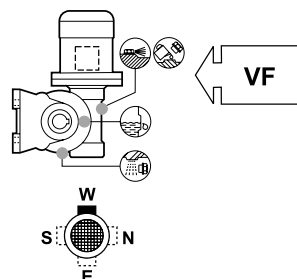
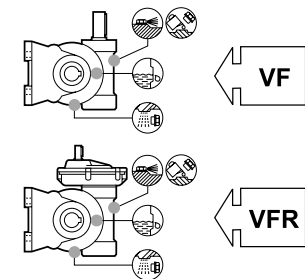


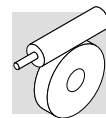
← VFR

V5



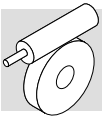
V6





| | |
|---------------|----------------|
| VF...N | VFR...N |
|---------------|----------------|

| | HS | P (IEC) | |
|-----------|----|---------|------|
| B3 | | | |
| B6 | | | |
| B7 | | | |
| B8 | | | |
| V5 | | | |
| V6 | | | |



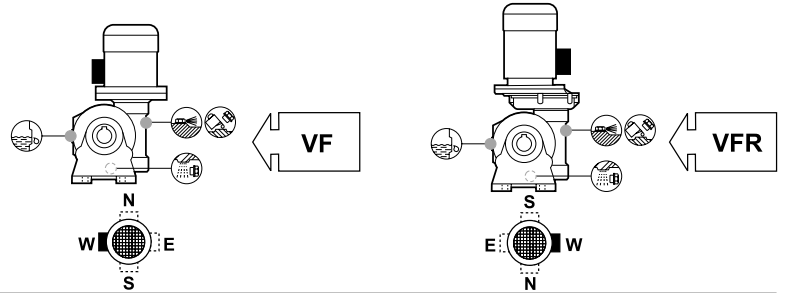
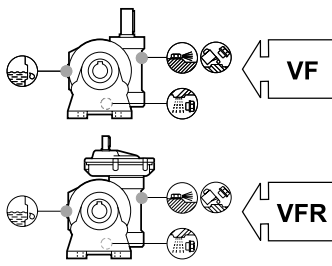
VF...V

VFR...V

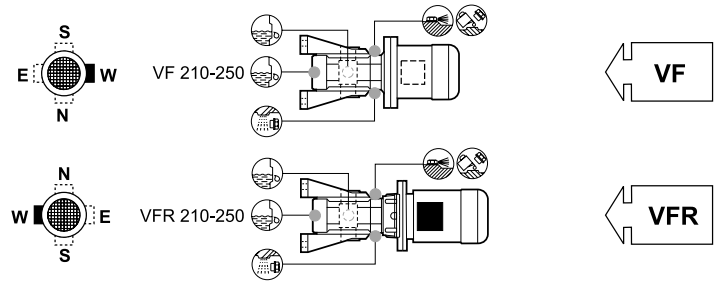
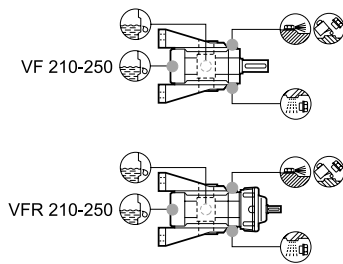
HS

P (IEC)

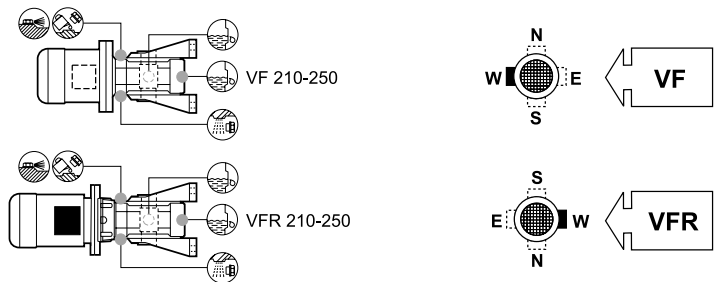
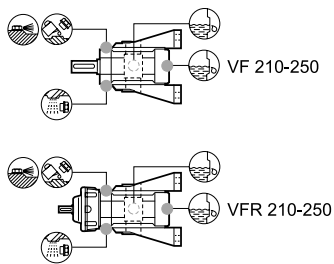
B3



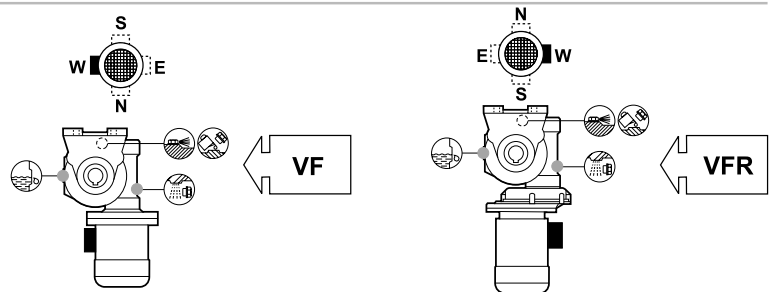
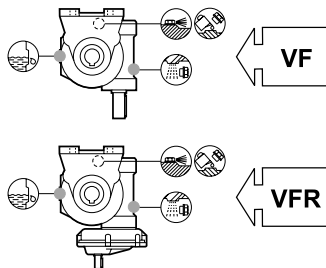
B6



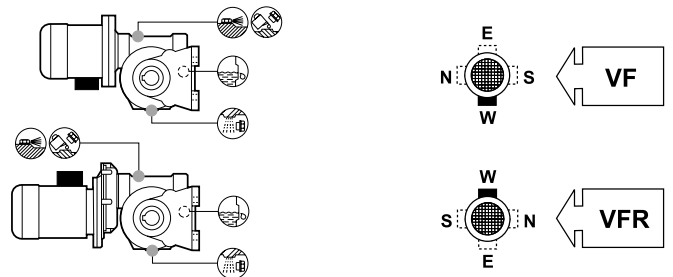
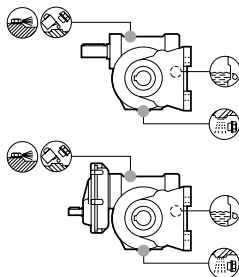
B7



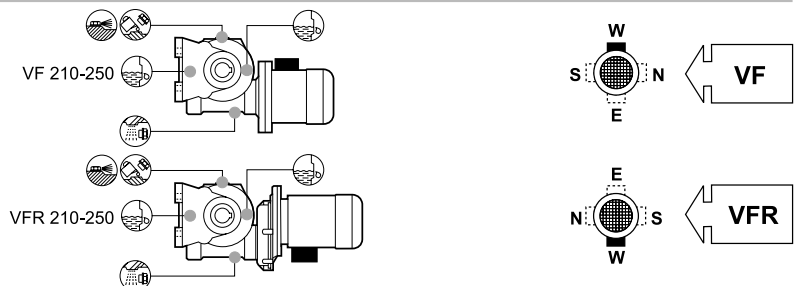
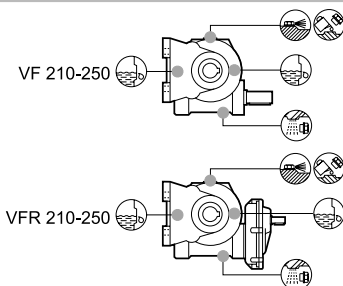
B8

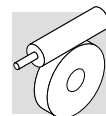


V5



V6





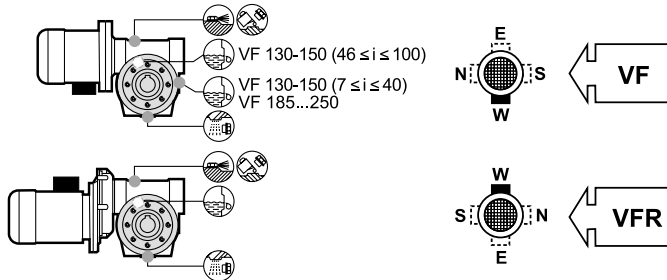
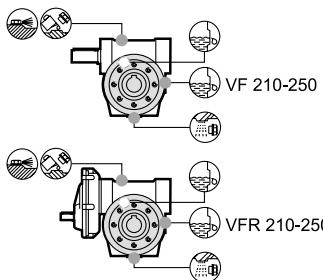
VF...P

VFR...P

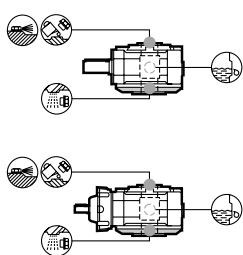
HS

P (IEC)

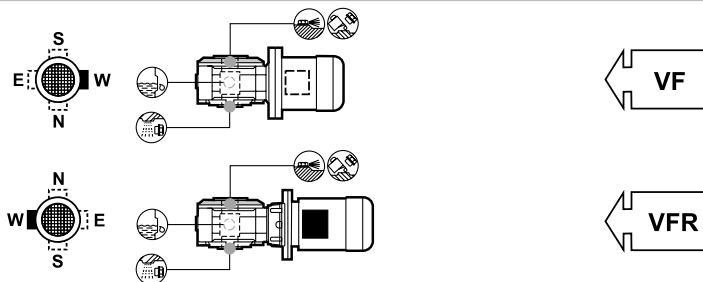
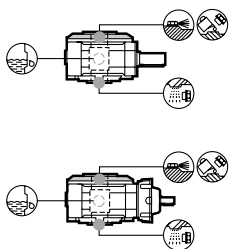
B3



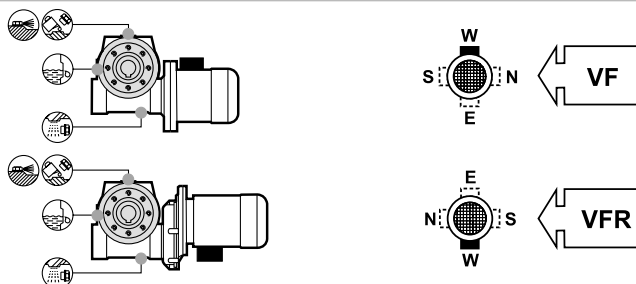
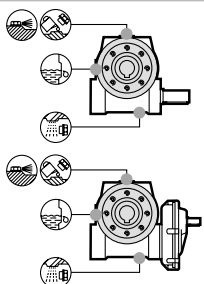
B6



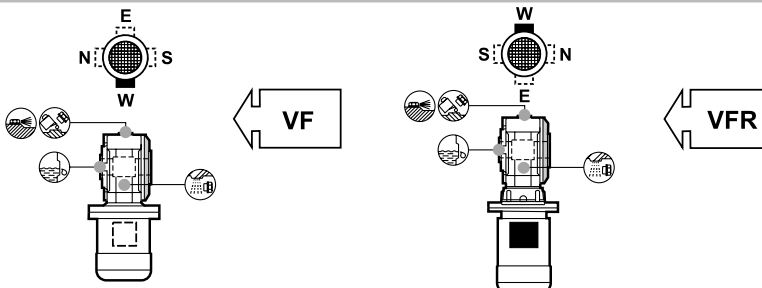
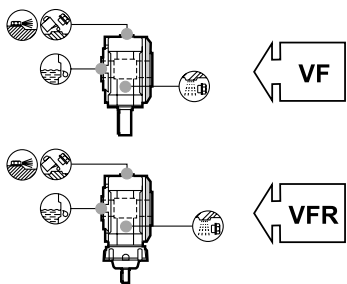
B7



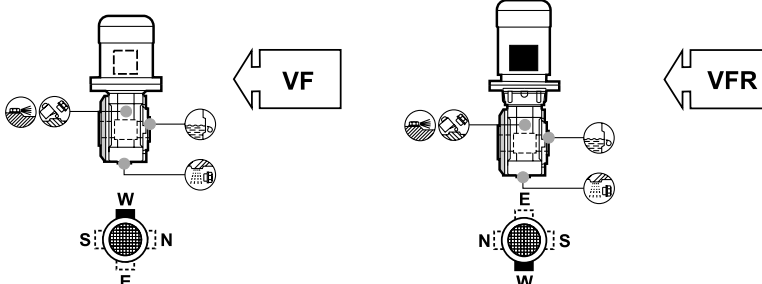
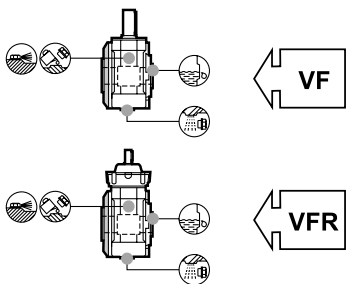
B8

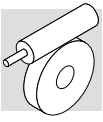


V5



V6





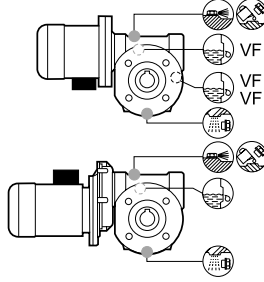
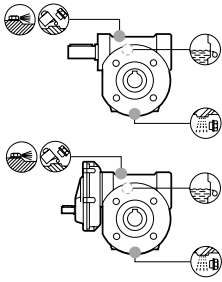
VF...F

VFR...F

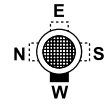
HS

P (IEC)

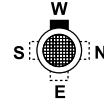
B3



VF 130-150 ($46 \leq i \leq 100$)
VF 130-150 ($7 \leq i \leq 40$)
VF 185...250

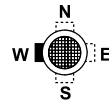
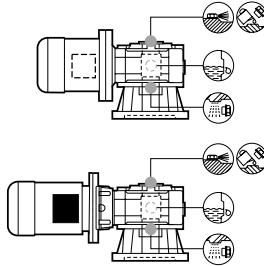
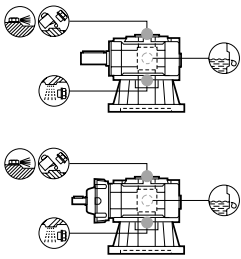


VF

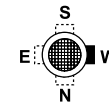


VFR

B6

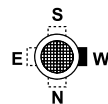
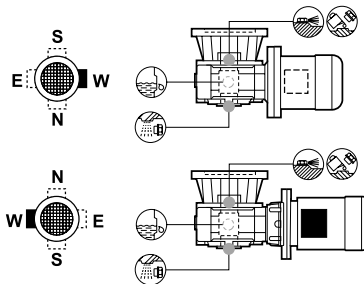
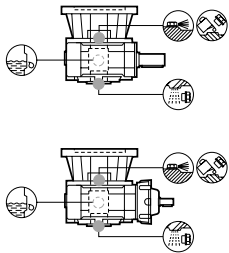


VF

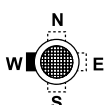


VFR

B7

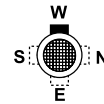
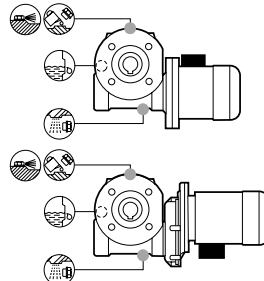
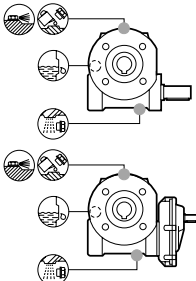


VF

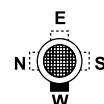


VFR

B8

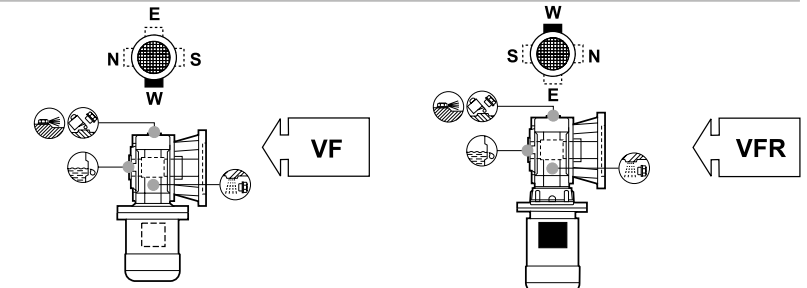
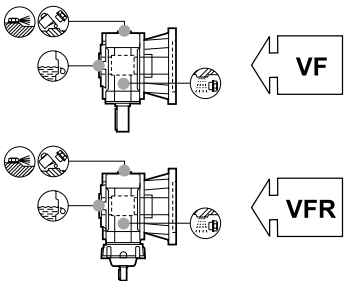


VF

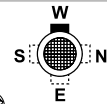


VFR

V5

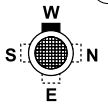
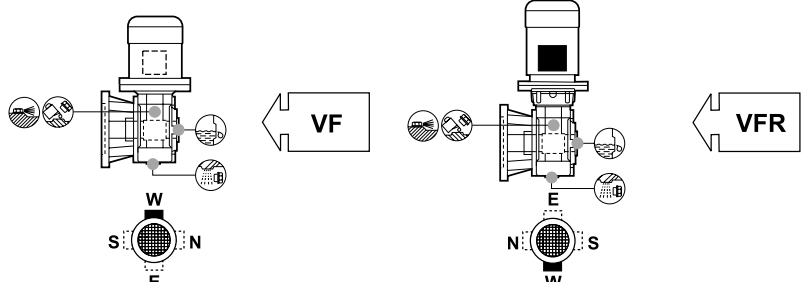
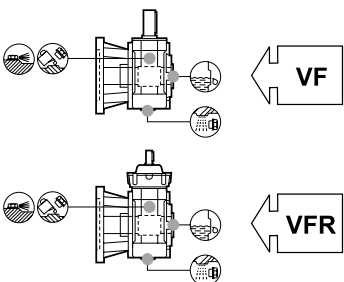


VF

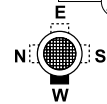


VFR

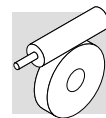
V6



VF

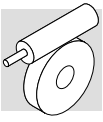


VFR



| | |
|---------------|----------------|
| VF...U | VFR...U |
|---------------|----------------|

| | HS | P (IEC) | |
|-----------|----|---------|--|
| B3 | | | |
| B6 | | | |
| B7 | | | |
| B8 | | | |
| V5 | | | |
| V6 | | | |



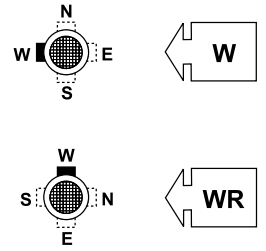
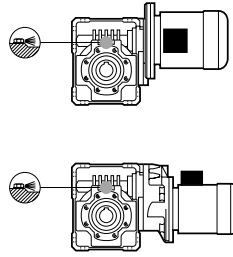
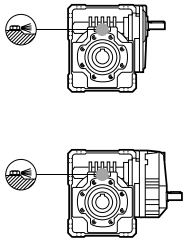
W 63U, 75U, 86U

WR 63U, 75U, 86U

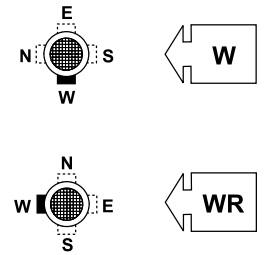
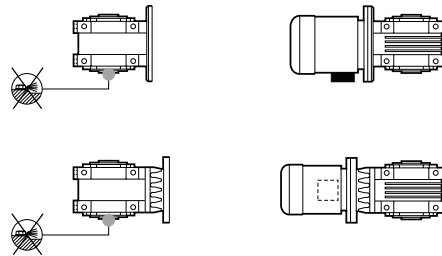
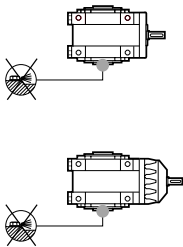
HS

S - P (IEC)

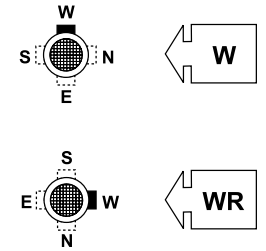
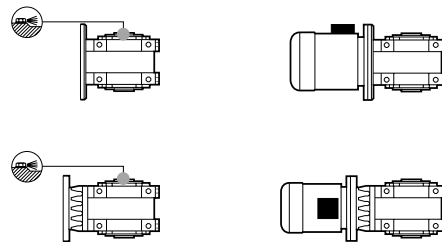
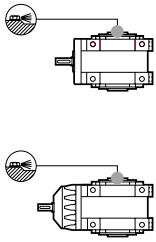
B3



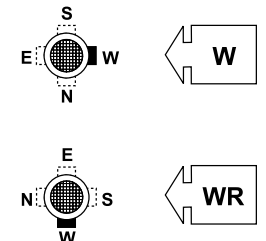
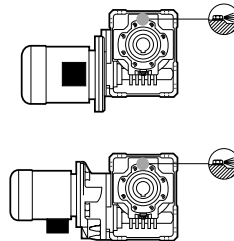
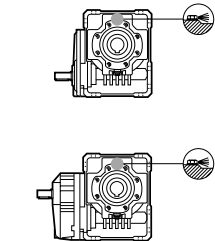
B6



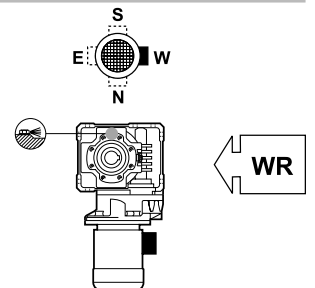
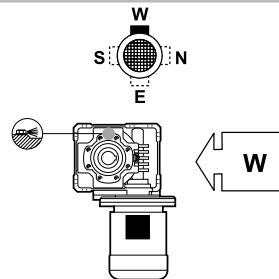
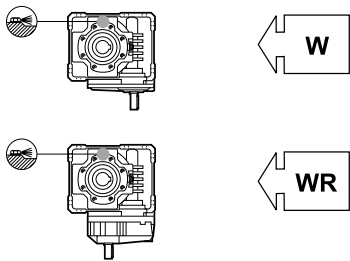
B7



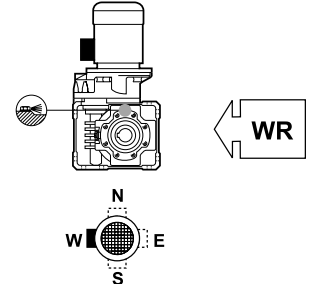
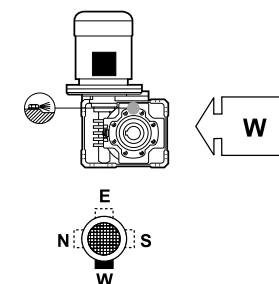
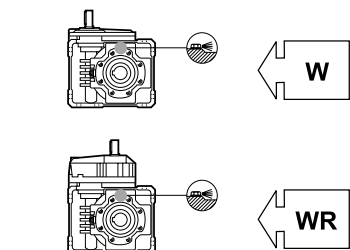
B8

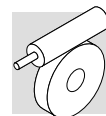


V5



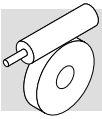
V6





W 63UF/UFC, 75UF/UFC, 86UF/UFC WR 63UF/UFC, 75UF/UFC, 86UF/UFC

| | HS | S - P (IEC) | |
|----|-------------|-------------|-------------|
| B3 | | | ← W |
| | | | ← WR |
| B6 | | | ← W |
| | | | ← WR |
| B7 | | | ← W |
| | | | ← WR |
| B8 | | | ← W |
| | | | ← WR |
| V5 | ← W | ← W | ← WR |
| | ← WR | | |
| V6 | ← W | ← W | ← WR |
| | ← WR | | |



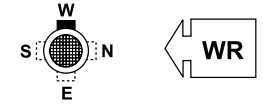
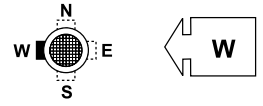
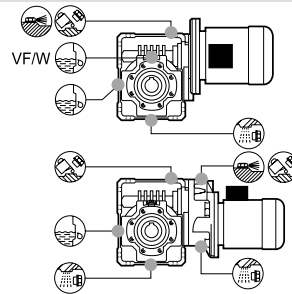
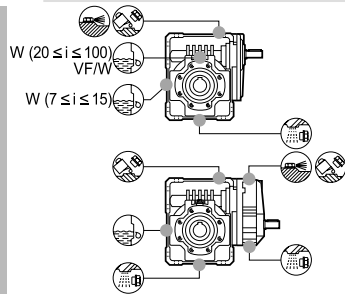
W 110U

WR 110U

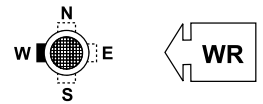
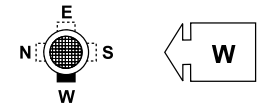
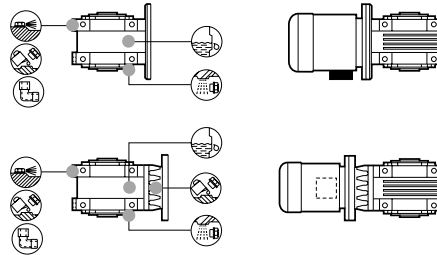
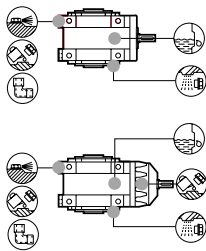
HS

S - P (IEC)

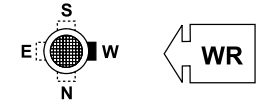
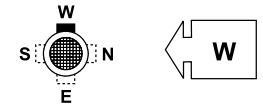
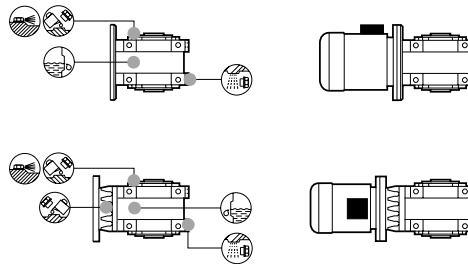
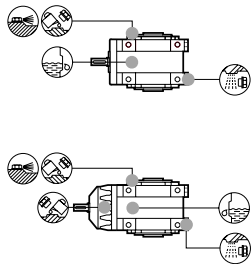
B3



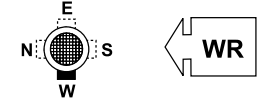
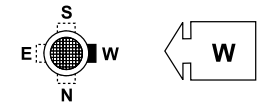
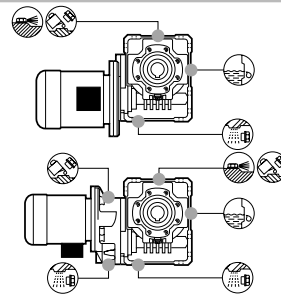
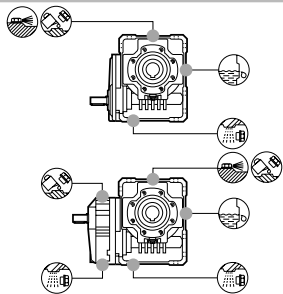
B6



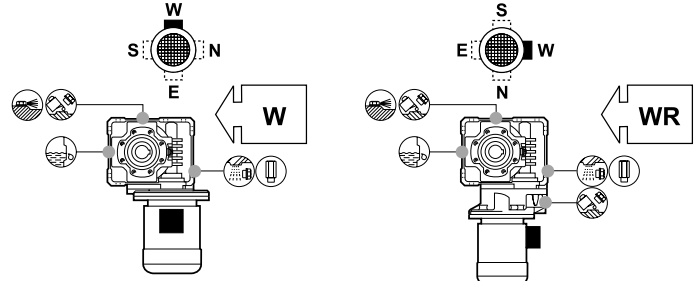
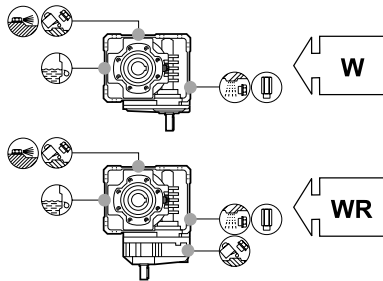
B7



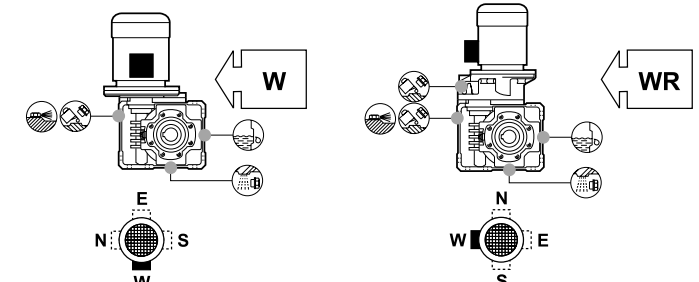
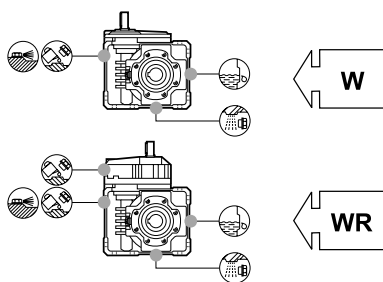
B8

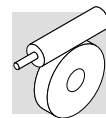


V5



V6





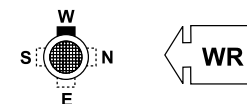
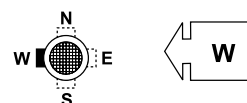
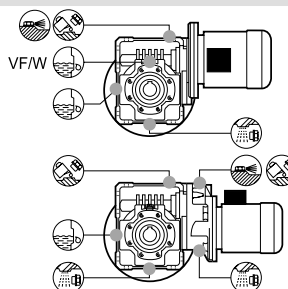
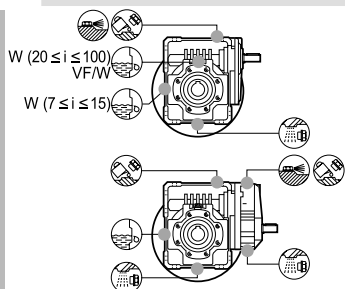
W 110U/UFC

WR 110UF/UFC

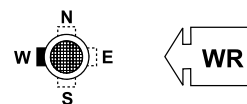
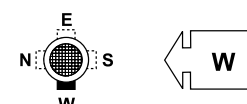
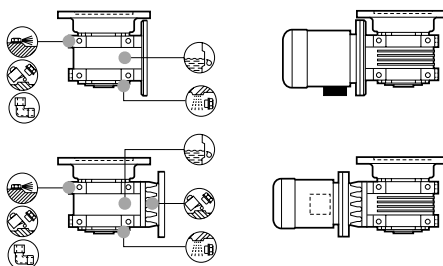
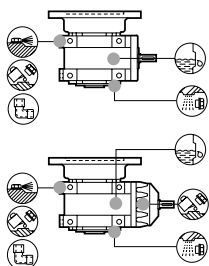
HS

S - P (IEC)

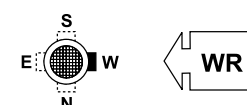
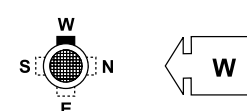
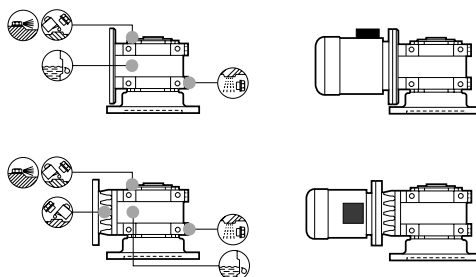
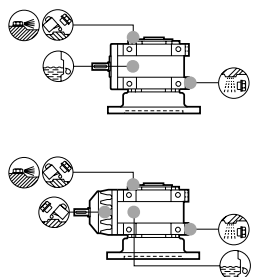
B3



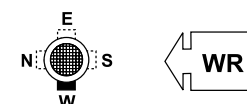
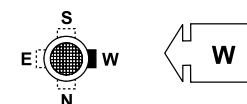
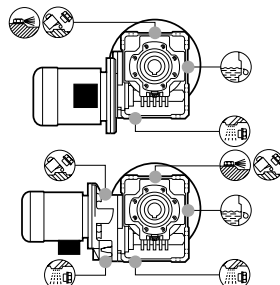
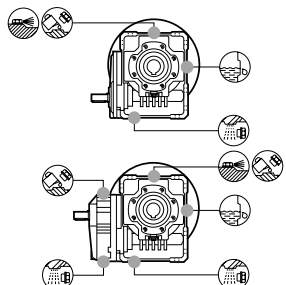
B6



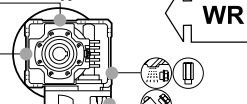
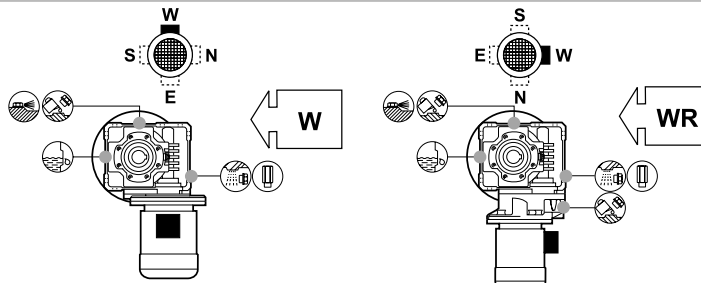
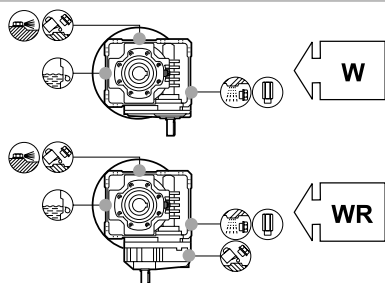
B7



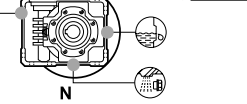
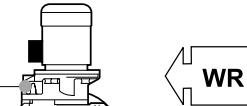
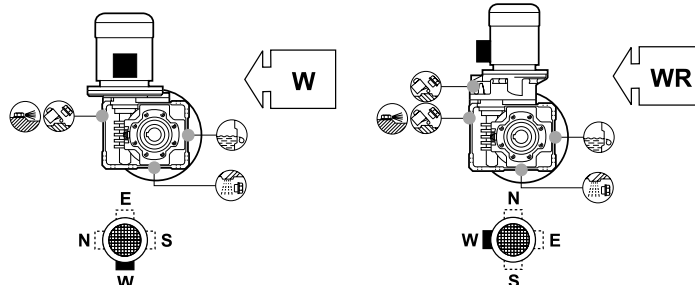
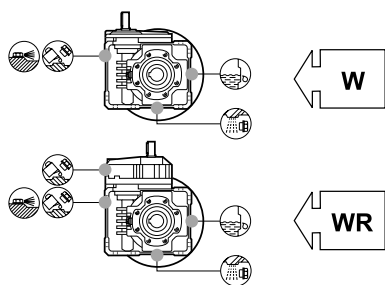
B8

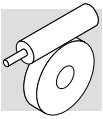


V5



V6





15 - LUBRIFICAZIONE

15.1 Lubrificazione riduttori W e VF

I gruppi VF30, VF44, VF49, W63, W75 e W86 sono normalmente consegnati con carica di lubrificante del tipo "long life" dalla fabbrica, o dalla rete di vendita ufficiale.

Su richiesta gli stessi riduttori possono essere forniti privi di lubrificante, specificando per questi l'opzione **SO**.

I gruppi di grandezza da VF130 a VF250 e W110 sono normalmente forniti privi di lubrificante e sarà cura dell'utilizzatore riempirli di olio prima della messa in servizio.

Per questi stessi gruppi è disponibile l'opzione **LO** che, qualora specificata in fase di ordinativo, garantisce il primo riempimento in fabbrica con lubrificante sintetico, in quantità dipendente dalla posizione di montaggio.

L'opzione **LO** non è applicabile ai riduttori W110 e WR 110 configurati per le posizioni di montaggio B3, V5 e V6.

Le tavole che seguono sono da riferimento nell'interpretazione delle posizioni di montaggio, della collocazione dei tappi di servizio e delle quantità di lubrificante.

Queste ultime sono indicative, e per il corretto riempimento si dovrà fare riferimento alla mezzeria del tappo, o dell'astina di livello, se presente. Rispetto a questa condizione la quantità di lubrificante riportata in tabella può presentare scostamenti, occasionalmente anche rilevanti.

Il lubrificante "long life" fornito di serie è di natura sintetica e, a meno di contaminazione dall'esterno, non richiede sostituzioni periodiche per tutto l'arco di vita del riduttore.

Il funzionamento dei riduttori è ammesso per temperature ambiente comprese fra -20°C e +40°C. Per temperature ambiente comprese fra -20°C e -10°C l'avviamento del riduttore potrà avvenire solo dopo aver effettuato un pre-riscaldamento progressivo ed omogeneo del gruppo, oppure con funzionamento "a vuoto", senza carico collegato.

Il carico potrà poi essere applicato all'albero del riduttore quando la temperatura dello stesso avrà raggiunto la temperatura di -10°C, o superiore.

15 - LUBRICATION

15.1 Lubrication for W and VF

Frame sizes VF30, VF44, VF49, W63, W75 and W86 are supplied by the factory, or by authorized dealers, already filled with "long life" synthetic oil.

On request, these units can be supplied unlubricated, in which case, the option **SO** must be specified on the order.

Unless otherwise specified, units type VF130 to VF250 and W110 are generally supplied unlubricated at it is the customer's responsibility to fill them with oil prior to putting them into operation.

By requesting the **LO** option at the time of order, these units will be factory filled with synthetic lubricant in the quantity relevant to the mounting position that was specified in the purchase order.

The **LO** option does not apply to units type W110 and WR110 configured for mounting positions B3, V5 and V6.

The charts below must be referred to for the mounting position and related oil plugs, if applicable, as well as the lubricant quantity.

Oil quantities are approximate only. For correct filling always refer to the centre of the sight glass or the dipstick, when this is supplied.

In some cases, even substantial discrepancies may occur compared to the oil quantities listed in the chart.

In the absence of contamination, the "long life" synthetic lubricant supplied by the factory, does not require periodical changes throughout the lifetime of the gear unit.

Operation of gear units is permitted at ambient temperatures between -20°C and +40°C. However, for temperatures between -20°C and -10°C unit may only start up after it has been progressively and evenly pre-heated, or otherwise initially operated unloaded.

Load may then be connected to the output shaft when the gear unit has reached the temperature of -10°C, or higher.

15 - SCHMIERUNG

15.1 Schmierung der Getriebe der serie W und VF

Die Getriebegrößen VF30, VF44, VF49, W63, W75 und W86 sind bei der Lieferung ab Werk bzw. ab offiziellem Verkaufsnetz mit einer synthetischen "Long-Life" -Dauerschmierung versehen.

Auf Anfrage können die oben benannten Einheiten auch ohne Öl geliefert werden. Hier muss bei der Bestellung die Option **SO** angegeben werden.

Falls nicht anders spezifiziert werden die Getriebe ab der Größe VF130 bis VF250 und die Größe W110 grundsätzlich ohne Ölfüllung ausgeliefert. Vor der Inbetriebnahme muss das Getriebe kundenseitig mit der richtigen Ölfüllmenge befüllt werden.

Sollten Sie diese Getriebe mit der Option **LO** bestellen, werden die Einheiten direkt vom Werk aus mit synthetischem Öl, gemäß der spezifizierten Einbaulage, befüllt.

Die Option **LO** kann nicht für die Getriebe W110 und WR 110 eingesetzt werden, die für ein Einbaulagen B3, V5 und V6 konfiguriert sind.

Die folgenden Tabellen dienen für die Interpretation der Einbaulagen, für die Anbringung der Stopfen und der Ölfüllmengen.

Die angegebene Ölfüllmengen sind Anhaltswerte! Je nach Einbaulage muss das Getriebe bis zur Mitte des Stopfens bzw., falls vorhanden, des Pegelstabes befüllt werden. Bitte beachten Sie, dass die tatsächlichen Füllmengen u.U. stark von den Tabellenwerten abweichen können.

Die mit Lebensdauerschmierung gelieferten Getriebe sind mit synthetischem Öl auf Polyglykolbasis befüllt. Sollte das Öl nicht durch äußere Einwirkungen verunreinigt werden, benötigt das Getriebe über die gesamte Lebensdauer keinen Ölwechsel.

Die Getriebe dürfen bei einer Umgebungstemperatur von -20°C bis +40°C betrieben werden. Allerdings darf ein Start unter Last bei -20°C bis -10°C erst nach stufenweiser und gleichmäßiger Vorwärmung erfolgen.

Anderfalls muss das Anfahren ohne Last erfolgen.

Die Last darf erst zugeschaltet werden, wenn die Getriebeeinheit eine Temperatur von mindestens -10° oder höher erreicht hat.

15 - LUBRIFICATION

15.1 Lubrification reduceurs serie W et VF

Les groupes VF30, VF44, VF49, W63, W75 et W86 sont normalement livrés par l'usine, ou par le réseau de vente officiel, avec une charge de lubrifiant synthétique.

Sur demande les mêmes réducteurs peuvent être fournis sans lubrifiant, en spécifiant l'option **SO**.

Les groupes des tailles VF130 à VF250 et W110 sont normalement fournis sans lubrifiant, le remplissage précédent la mise en service sera à la charge de l'utilisateur.

En précisant l'option **LO** lors de la commande, ces groupes seront remplis d'huile synthétique en usine, avec la quantité correspondante à la position de montage.

L'option **LO** n'est pas applicable aux réducteurs W110 et WR110 configurés pour les positions de montage B3, V5 et V6.

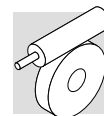
Les tables suivantes sont la référence dans l'interprétation des positions de montage, le placement des bouchons de service et pour la quantité de lubrifiant.

Ces dernières sont indicatives, et pour un remplissage correct il faut faire référence au milieu du bouchon de niveau ou à la jauge à huile, si présents. Par rapport à cette condition la quantité de lubrifiant indiqué dans le tableau peut présenter des écarts, occasionnellement considérables.

Le lubrifiant "long life" ; fourni de série est de nature synthétique et, à moins de contamination par l'extérieur, il ne demande pas des remplacements périodiques pour toute la durée de vie du réducteur. Le même lubrifiant permet de fonctionner à des températures ambiantes 0 ≤ t_a ≤ 50 °C.

Le fonctionnement des réducteurs est admis pour des températures ambiantes comprises entre -20°C et +40°C.

Pour des températures ambiantes comprises entre -20°C et -10°C le démarrage du réducteur est admis seulement après un préchauffage progressif et homogène, ou avec un fonctionnement « à vide », sans charge appliquée. La charge pourra être ensuite appliquée à l'arbre du réducteur quand celui-ci aura atteint une température de -10°C, ou supérieure.



| | | | oil [] | | | | | | | |
|-------|-------------------------------------|---------|--------------|------|------|------|------|------|------|------|
| | | | B3 | B6 | B7 | B8 | V5 | V6 | R | |
| W 63 | i = 7, 10, 12, 15 | | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.15 | |
| | i = 19, 24, 30, 38, 45, 64, 80, 100 | | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | 0.38 | | |
| W 75 | i = 7, 10, 15 | | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.25 | |
| | i = 30, 40 | | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | | |
| | i = 20, 25, 50, 60, 80, 100 | | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | 0.56 | | |
| W 86 | i = 7, 10, 15 | | 0.64 | 0.64 | 0.64 | 0.64 | 0.64 | 0.64 | 0.25 | |
| | i = 30 | | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | 0.73 | | |
| | i = 20, 23, 40, 46, 56, 64, 80, 100 | | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | | |
| | | | B3 | B6 | B7 | B8 | V5 | V6 | R | |
| W 110 | P80...P132 | M2 - M3 | 7 ≤ i ≤ 15 | 1.6 | 1.7 | 1.7 | 1.9 | 1.9 | 1.8 | 0.40 |
| | - | - | 20 ≤ i ≤ 100 | 2.8 | 1.7 | 1.7 | 1.9 | 1.9 | 1.8 | - |

Riduttori normalmente dotati di carica di lubrificante "a vita".

Life-time lubricated gear units.

Getriebe, zu deren normaler Ausstattung eine Schmierstoffladung für Dauerschmierung gehört.

Réducteurs normalement livrés avec un plein de lubrifiant « à vie ».

| | | | oil [] | | | | | |
|---------|----------------------------|--------------------------|---------|-------|-------|-------|-------|-------|
| | | | B3 | B6 | B7 | B8 | V5 | V6 |
| VF 27 | N - A - V - F | HS - P(IEC) | 0.025 | 0.025 | 0.025 | 0.025 | 0.025 | 0.025 |
| VF 30 | N - A - V - F - P - U | HS - P(IEC) | 0.045 | 0.045 | 0.045 | 0.045 | 0.045 | 0.045 |
| VF 44 | N - A - V - F - FA - P - U | HS - P(IEC) | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 |
| VFR 44 | N - A - V - F - FA - P - U | P(IEC) | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 | 0.050 |
| VF 49 | N - A - V - F - FA - P - U | HS - P(IEC) | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| VFR 49 | N - A - V - F - FA - P - U | HS - P(IEC) | 0.065 | 0.065 | 0.065 | 0.065 | 0.065 | 0.065 |
| VF 130 | N | HS - P(IEC) | 2.3 | 2.5 | 2.5 | 3.0 | 3.2 | 3.4 |
| VFR 130 | N | HS - P(IEC) | 0.70 | 0.50 | 0.50 | 0.40 | 0.40 | 0.50 |
| VF 130 | V | HS - P(IEC) | 3.4 | 2.5 | 2.5 | 3.1 | 3.0 | 2.5 |
| VFR 130 | V | HS - P(IEC) | 0.50 | 0.50 | 0.50 | 0.40 | 0.40 | 0.70 |
| VF 130 | A - F - FC - FR - P | HS - P(IEC) 46 ≤ i ≤ 100 | 3.9 | 2.5 | 2.5 | 2.3 | 3.3 | 3.3 |
| VF 130 | A - F - FC - FR - P | P(IEC) 7 ≤ i ≤ 40 | 3.0 | 2.5 | 2.5 | 2.3 | 3.3 | 3.3 |
| VFR 130 | A - F - FC - FR - P | HS - P(IEC) | 0.40 | 0.50 | 0.50 | 0.70 | 0.40 | 0.50 |
| VF 150 | N | HS - P(IEC) | 3.0 | 3.5 | 3.5 | 4.3 | 3.8 | 4.0 |
| VFR 150 | N | HS - P(IEC) | 1.0 | 0.80 | 0.80 | 0.60 | 0.40 | 1.0 |
| VF 150 | V | HS - P(IEC) | 4.0 | 3.5 | 3.5 | 3.6 | 4.3 | 3.0 |
| VFR 150 | V | HS - P(IEC) | 1.0 | 0.80 | 0.80 | 0.40 | 0.60 | 1.0 |
| VF 150 | A - F - FC - FR - P | HS - P(IEC) 46 ≤ i ≤ 100 | 4.5 | 3.5 | 3.5 | 3.0 | 3.9 | 3.9 |
| VF 150 | A - F - FC - FR - P | P(IEC) 7 ≤ i ≤ 40 | 4.3 | 3.5 | 3.5 | 3.0 | 3.9 | 3.9 |
| VFR 150 | A - F - FC - FR - P | HS - P(IEC) | 0.60 | 0.80 | 0.80 | 1.0 | 0.40 | 1.0 |
| VF 185 | N | HS - P(IEC) | 5.0 | 5.5 | 5.5 | 7.8 | 6.6 | 6.8 |
| VFR 185 | N | HS - P(IEC) | 1.0 | 0.80 | 0.80 | 0.60 | 0.40 | 1.0 |
| VF 185 | V | HS - P(IEC) | 6.8 | 5.5 | 5.5 | 6.4 | 7.8 | 5.4 |
| VFR 185 | V | HS - P(IEC) | 1.0 | 0.80 | 0.80 | 0.40 | 0.60 | 1.0 |
| VF 185 | A - F - FC - FR - P | HS | 9.6 | 5.5 | 5.5 | 5.0 | 6.7 | 6.7 |
| VF 185 | A - F - FC - FR - P | P(IEC) | 7.8 | 5.5 | 5.5 | 5.0 | 6.7 | 6.7 |
| VFR 185 | A - F - FC - FR - P | HS - P(IEC) | 0.60 | 0.80 | 0.80 | 1.0 | 0.40 | 1.0 |
| VF 210 | N | HS - P(IEC) | 7.5 | 9.5 | 9.5 | 7.3 | 9.2 | 9.0 |
| VFR 210 | N | HS - P(IEC) | 1.3 | 1.1 | 1.1 | 0.80 | 0.70 | 1.3 |
| VF 210 | V | HS - P(IEC) | 8.9 | 9.5 | 9.5 | 7.3 | 11 | 8.0 |
| VFR 210 | V | HS - P(IEC) | 1.3 | 1.1 | 1.1 | 0.60 | 0.90 | 1.3 |
| VF 210 | A - F - FC - FR - P | HS | 15 | 9.5 | 9.5 | 7.5 | 9.4 | 8.9 |
| VF 210 | A - F - FC - FR - P | P(IEC) | 11 | 9.5 | 9.5 | 7.5 | 9.4 | 8.9 |
| VFR 210 | A - F - FC - FR - P | HS - P(IEC) | 0.80 | 1.1 | 1.1 | 1.3 | 0.70 | 1.3 |
| VF 250 | N | HS - P(IEC) | 11 | 17 | 17 | 11 | 17 | 17 |
| VFR 250 | N | HS - P(IEC) | 1.3 | 1.1 | 1.1 | 0.80 | 0.70 | 1.3 |
| VF 250 | V | HS - P(IEC) | 17 | 17 | 17 | 11 | 23 | 11 |
| VFR 250 | V | HS - P(IEC) | 1.3 | 1.1 | 1.1 | 0.60 | 0.90 | 1.3 |
| VF 250 | A - F - FC - FR - P | HS | 28 | 17 | 17 | 11 | 18 | 17 |
| VF 250 | A - F - FC - FR - P | P(IEC) | 23 | 17 | 17 | 11 | 18 | 17 |
| VFR 250 | A - F - FC - FR - P | HS - P(IEC) | 0.80 | 1.1 | 1.1 | 1.3 | 0.70 | 1.3 |

Lubrificazione permanente.

Lifetime lubrication.

Dauerschmierung.

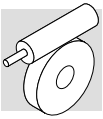
Lubrification permanente.

Per i gruppi VFR la quantità si riferisce al lubrificante del solo pre-stadio di riduzione elicoidale.

For VFR units the lubricant charge refers only to the additional helical reduction.

Bei den VFR-Gruppen bezieht sich die Menge nur auf den Schmierstoff in der Varianzstufe des Stirnradgetriebes.

Pour les groupes VFR, il s'agit de la quantité de lubrifiant du seul pré-étage de réduction hélicoïdale.



15.2 Lubrificazione riduttori combinati VF/VF, VF/W e W/VF

I riduttori combinati serie VF/VF, VF/W e W/VF sono costituiti da due unità distinte lubrificate autonomamente.

Per quanto concerne la quantità di lubrificante, l'eventuale riempimento - se non già effettuato dalla fabbrica - dovrà essere fatto con le quantità indicate dal catalogo per ogni singolo riduttore e in funzione della relativa esecuzione e posizione di montaggio. Per quanto riguarda il riduttore secondario (lato macchina) la quantità di lubrificante deve essere determinata con riferimento alla configurazione veloce HS..

15.2 Lubrication for VF/VF, VF/W and W/VF combined gearboxes

Double worm gears type VF/VF, VF/W and W/VF consist of two separate units, independently lubricated.

With regards to oil quantity, unless units are already filled at the factory, this should be done by the customer prior to putting the drive into operation for each gear unit with reference to actual version and mounting position. As far as the secondary drive is concerned (the one bolting onto the driven machine) oil quantity shall be determined with reference to the HS type of input.

15.2 Schmierung der Getriebe der serie VF/VF, VF/W und W/VF

Doppelschneckengetriebe Typ VF/VF, VF/W und W/VF bestehen aus zwei separaten Einheiten mit eigenen Ölfüllungen.

Die Getriebe müssen vor Inbetriebnahme vom Kunden entsprechend der Ausführung und der Einbaulage mit Öl gefüllt werden, es sei denn es handelt sich um Getriebe die bereits ab Werk mit Öl geliefert werden. Bei Doppelschneckengetrieben muss das zweite Schneckengetriebe (Motoranschlussseite) mit der Ölfüllmenge des vergleichbaren Getriebes in Ausführung HS befüllt werden.

15.2 Lubrification reducteurs serie VF/VF, VF/W et W/VF

Les réducteurs combinés séries VF/VF, VF/W et W/VF sont constitués de deux unités dont la lubrification est distincte.

Pour ce qui concerne la quantité de lubrifiant, si le remplissage n'est pas fait par nos soins, il devra être réalisé par le client avec la quantité indiquée dans le catalogue, préalablement à la mise en fonctionnement, en tenant compte de la position de montage. Pour ce qui concerne le réducteur secondaire (coté machine), la quantité de lubrifiant devra être déterminée en référence avec la configuration rapide HS.

15.3 Tipo di lubrificante

15.3 Type of lubricant

15.3 Ölsorte

15.3 Type de lubrifiant

| | | Posizione di montaggio / mounting position Einbaulagen / position de montage | |
|--|--|---|------------------|
| | | B3 - B6 - B7 - B8 - V5 | V6 |
| | Precoppia elicoidale Helical reduction Plantenvorgelege Précouple hélicoïdal | WR 63...WR 86 | Tivela oil S 320 |
| | | VFR 44...VFR 250 WR 110 | Tivela oil S 320 |
| | Riduttori a vite senza fine Worm gear unit Schneckengetriebe Réducteurs à vis sans fin | W 63...W 110 VF 44...VF 250 | Tivela oil S 320 |
| | Riduttore con limitatore di coppia Worm gear unit c/w torque limiter Getriebe mit Drehzahlbegrenzer Réducteur avec limiteur de couple | W 63...W 110 VF 44...VF 49 | Tivela oil S 460 |

Si raccomanda, qualora il lubrificante sia scelto al di fuori del tipo SHELL consigliato, che questo sia di composizione equivalente in merito alla natura sintetica e alla viscosità, inoltre sia dotato degli opportuni additivi con funzione antischiuma.

When using a lubricant other than the recommended SHELL lubricant, be sure it is a synthetic lubricant with equivalent viscosity and composition and added with adequate anti-foaming agents.

Bonfiglioli weist noch darauf hin, dass im Fall einer Wahl eines Schmiermittels, das nicht vom empfohlenen Typ SHELL ist, dieses in seiner Zusammensetzung im Hinblick auf die synthetische Natur und die Viskosität gleichwertig und darüber hinaus mit den entsprechenden schaumhemmenden Zusatzstoffen ausgestattet sein muss.

Enfin, si le lubrifiant utilisé n'est pas de type SHELL comme conseillé, Bonfiglioli recommande qu'il soit de composition équivalente du point de vue de la nature synthétique et de la viscosité, de plus, il doit comporter des additifs anti-mousse.

16 - CARICHI RADIALI

16 - OVERHUNG LOADS

16 - RADIALKRÄFTE

16 - CHARGES RADIALES

16.1 Forza risultante sull'albero

16.1 Calculating the resulting overhung load

16.1 Berechnung der Überhängenden Last

16.1 Calcul de la force résultant

Organi di trasmissione calettati sugli alberi di ingresso e/o di uscita del riduttore generano forze la cui risultante agisce in senso radiale sull'albero stesso. L'entità di questi carichi deve essere compatibile con la capacità di sopportazione del siste-

External transmissions keyed onto input and/or output shaft generate loads that act radially onto same shaft.

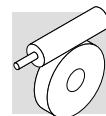
Resulting shaft loading must be compatible with both the bearing and the shaft capacity. Namely shaft loading (R_{c1} for

Die mit den Antriebs- und/oder Abtriebswellen des Getriebes verbundenen Antriebsorgane bilden Kräfte, die in radiale Richtung auf die Welle selbst wirken.

Das Ausmaß dieser Kräfte muß mit der Festigkeit des Systems

Les organes de transmission calés sur les arbres d'entrée et/ou de sortie du réducteur génèrent des forces dont la résultante agit sur l'arbre dans le sens radial.

L'entité de ces charges doit être compatible avec la capacité



ma albero-cuscinetti del riduttore, in particolare il valore assoluto del carico applicato (R_{c1} per albero di ingresso, R_{c2} per albero di uscita) deve essere inferiore al valore nominale (R_{n1} per albero di ingresso, R_{n2} per albero di uscita) riportato nelle tabelle dati tecnici.

Il procedimento sotto descritto si applica indifferentemente all'albero veloce o all'albero lento avendo l'avvertenza di utilizzare le costanti relative all'albero interessato dal calcolo.

Il carico generato da una trasmissione esterna può essere calcolato, con buona approssimazione, tramite la formula seguente:

input shaft, R_{c2} for output shaft), must be equal or lower than admissible overhung load capacity for shaft under study (R_{n1} for input shaft, R_{n2} for output shaft). OHL capability listed in the rating chart section.

In the formulas given below, index (1) applies to parameters relating to input shaft, whereas index (2) refers to output shaft.

The load generated by an external transmission can be calculated with close approximation by the following equation:

aus Getriebewelle/lager kompatibel sein, insbesondere muß der absolute Wert der angetragenen Belastung (R_{c1} für Antriebswelle und R_{c2} für Abtriebswelle) unter dem in den Tabellen der Technischen Daten angegebenen Nennwert (R_{n1} für Antriebswelle und R_{n2} für Abtriebswelle) liegen.

In den nachstehenden Formeln bezieht sich die Angabe (1) auf die Maße der Antriebswelle, die Angabe (2) auf die Abtriebswelle. Die von einem externen Antrieb erzeugte Kraft kann, recht genau, anhand der nachstehenden Formel berechnet werden:

d'endurance du système arbre-roulements du réducteur. Plus particulièrement, la valeur absolue de la charge appliquée (R_{c1} pour l'arbre d'entrée, R_{c2} pour l'arbre de sortie) doit être inférieure à la valeur nominale (R_{n1} pour l'arbre d'entrée, R_{n2} pour l'arbre de sortie) indiquée dans les tableaux des données techniques.

ans les formules qui suivent, l'indice (1) se réfère à des tailles relatives à l'arbre rapide, l'indice (2) concerne l'arbre lent.

La charge générée par une transmission extérieure peut être calculée, avec une bonne approximation, au moyen de la formule suivante:

$$R_c = \frac{2000 \times M \times K_r}{d}$$

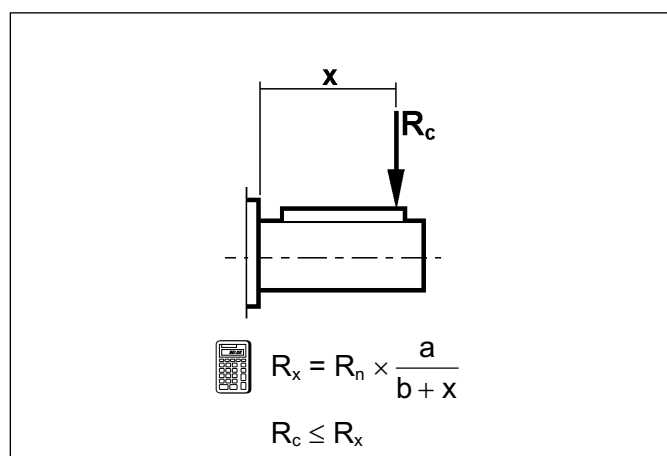
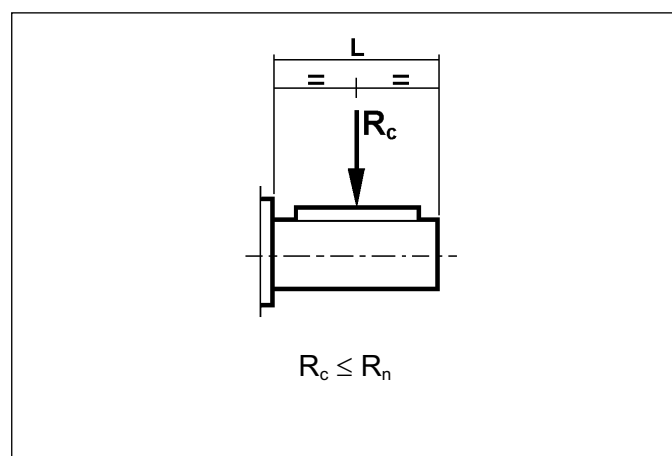
| | |
|-------------------|--|
| $K_r = 1$ | |
| $K_r = 1.25$ | |
| $K_r = 1.5 - 2.0$ | |
| M [Nm] | |
| d [mm] | |

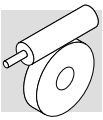
16.2 Verifica sopportazione radiale

16.2 Overhung loading verification

16.2 Überprüfung der Radiallast

16.2 Vérification de la charge axiale





16.3 Costanti del riduttore

16.3 Load location factor

16.3 Getriebekonstanten

16.3 Constantes du réducteur

| | Albero lento / Output shaft / Abtriebswelle / Arbre lent | | R _{n2} max [N] |
|---------------------------------|--|-----|-------------------------|
| | a | b | |
| VF 27 | 56 | 44 | 600 |
| VF 30 | 60 | 45 | 1700 |
| VF 44 - VFR 44 - VF/VF 30/44 | 71 | 51 | 2500 |
| VF 49 - VFR49 - VF/VF 30/49 | 99 | 69 | 3450 |
| W 63 - WR 63 - VF/W 30/63 | 132 | 102 | 5000 |
| W 75 - WR 75 - VF/W 44/75 | 139 | 109 | 6200 |
| W 86 - WR 86 - VF/W 44/86 | 149 | 119 | 7000 |
| W 110 - WR 110 - VF/W 49/110 | 173 | 136 | 8000 |
| VF 130 - VFR 130 - W/VF 63/130 | 182 | 142 | 13800 |
| VF 150 - VFR 150 - W/VF 86/150 | 198 | 155 | 16000 |
| VF 185 - VFR 185 - W/VF 86/185 | 220 | 170 | 19500 |
| VF 210 - VFR 210 - W/VF 130/210 | 268 | 203 | 34500 |
| VF 250 - VFR 250 - W/VF 130/250 | 334 | 252 | 52000 |

17 - CARICHI ASSIALI, A_{n1}, A_{n2}

I valori di carico assiale ammissibile sugli alberi veloce [A_{n1}] e lento [A_{n2}] si possono ricavare con riferimento al corrispondente valore di carico radiale [R_{n1}] e [R_{n2}] tramite le espressioni che seguono:

17 - THRUST LOADS, A_{n1}, A_{n2}

Permissible thrust loads on input [A_{n1}] and output [A_{n2}] shafts are obtained from the radial loading for the shaft under consideration [R_{n1}] and [R_{n2}] through the following equation:

17 - AXIALKRÄFTE, A_{n1}, A_{n2}

Die Werte der zulässigen, auf die Antriebswelle [A_{n1}] und auf die Abtriebswelle [A_{n2}] einwirkenden Axialkräfte können unter Bezugnahme auf den jeweiligen Wert der Radialkraft [R_{n1}] und [R_{n2}] anhand der nachstehenden Angaben berechnet werden:

17 - CHARGES AXIALES, A_{n1}, A_{n2}

Les valeurs de charge axiale admissible sur les arbres rapides [A_{n1}] et lent [A_{n2}] peuvent être calculées, en se référant à la valeur de charge radiale correspondante [R_{n1}] et [R_{n2}] au moyen des formules suivantes :

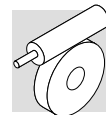
$$\begin{aligned}
 A_{n1} &= R_{n1} \times 0,2 \\
 A_{n2} &= R_{n2} \times 0,2
 \end{aligned}
 \tag{14}$$

I valori di carico assiale ammissibile così calcolati si riferiscono al caso di forze assiali agenti contemporaneamente ai carichi radiali nominali. Nel solo caso in cui il valore del carico radiale agente sull'albero del riduttore sia nullo, si può considerare il carico assiale ammissibile [A_n] pari al 50% del valore di carico radiale ammissibile [R_n] sullo stesso albero. In presenza di carichi assiali eccedenti il valore ammissibile, o di forze assiali fortemente prevalenti sui carichi radiali, è consigliabile contattare il Servizio Tecnico di Bonfiglioli Riduttori per una verifica puntuale.

The thrust loads calculated through these formulas apply to thrust forces occurring at the same time as rated radial loads. In the only case that no overhung load acts on the shaft the value of the admissible thrust load [A_n] amounts to 50% of rated OHL [R_n] on same shaft. Where thrust loads exceed permissible value or largely prevail over radial loads, contact Bonfiglioli Riduttori for an in-depth analysis of the application.

Die so errechneten Werte der zulässigen Axialkräfte beziehen sich auf den Fall, in dem die Axialkräfte gleichzeitig mit den Nennradialkräften einwirken. Nur im Fall, es keine Radialbelastung auf die Getriebewelle gibt, ist der Wert der zulässigen Axialbelastung [A_n] gleich zu 50% der zulässigen Radialbelastung [R_n] auf die gleiche Welle. In Anwesenheit von übermäßigen Axialkräften, oder stark auf die Radialkräfte einwirkende Kräfte, wird im Hinblick auf eine genaue Kontrolle empfohlen, sich mit dem Technischen Kundendienst der Bonfiglioli Riduttori in Verbindung zu setzen.

Les valeurs de charge axiale admissible ainsi calculées se réfèrent au cas de forces axiales agissant en même temps que les charges radiales nominales. Dans le seul cas la valeur de la charge radiale agissant sur l'arbre soit nul, l'on peut considérer la charge axiale admissible [A_n] égale à 50% de la valeur de la charge radiale admissible [R_n] sur le même arbre. En présence de charges axiales excédant la valeur admissible, ou de forces axiales fortement supérieures aux charges radiales, il est conseillé de contacter le Service Technique Bonfiglioli Riduttori pour une vérification.



Carichi assiali massimi ammissibili nella forma costruttiva FR

Per soddisfare le applicazioni che richiedono dei carichi assiali molto elevati, è disponibile la forma costruttiva FR prevista nelle grandezze VF 130, VF 150 e VF 185. Questa forma costruttiva, le cui dimensioni esterne sono identiche a quelle della forma FC, può sopportare i carichi assiali (notevolmente superiori a quelli ammessi dalle forme standard) riportati nella tabella seguente riferiti al rapporto di trasmissione [i] ed al senso di rotazione +/- dell'albero lento.

Maximum axial loading for FR version

The FR version is designed to meet the requirements of applications entailing very high axial loads. It is available for units size 130, 150 and 185.

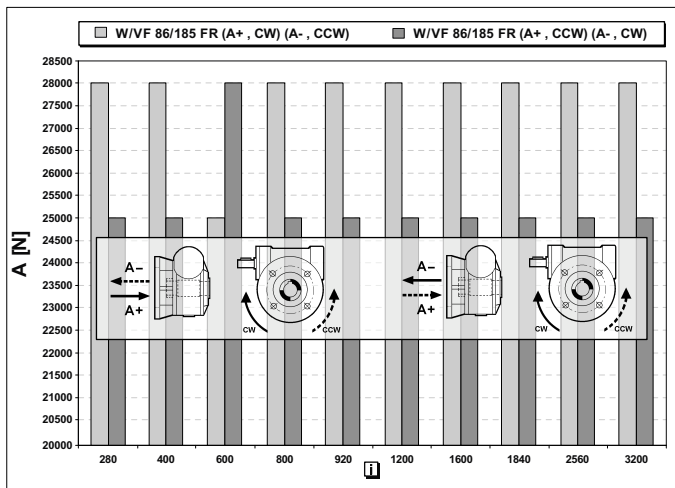
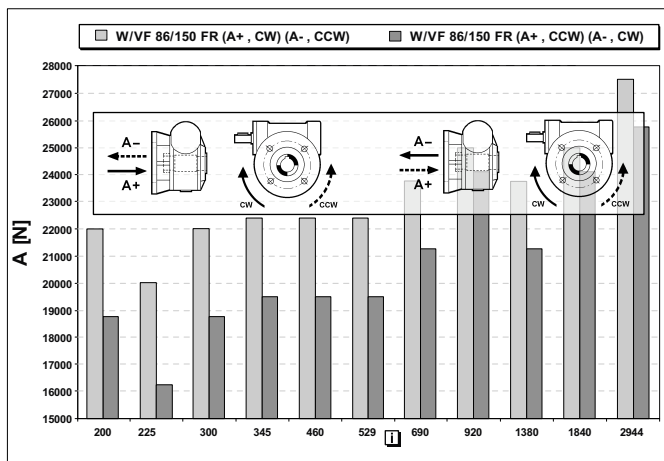
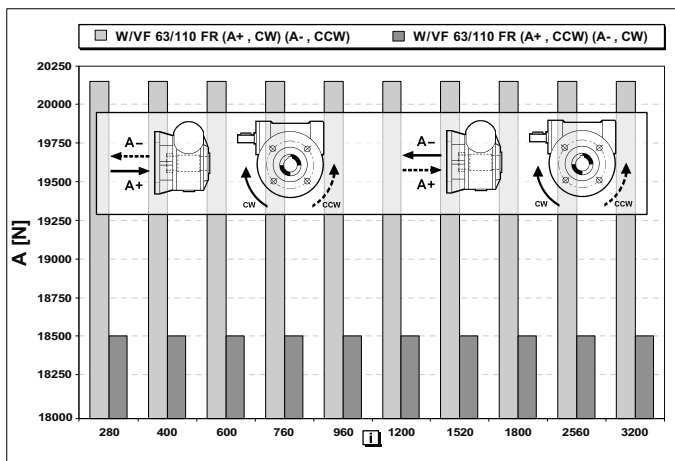
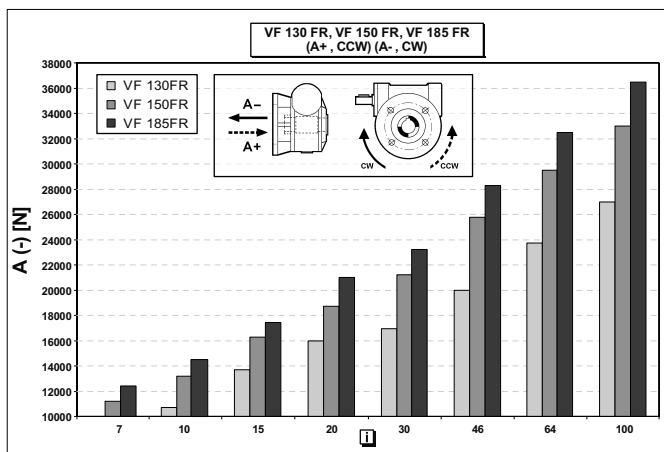
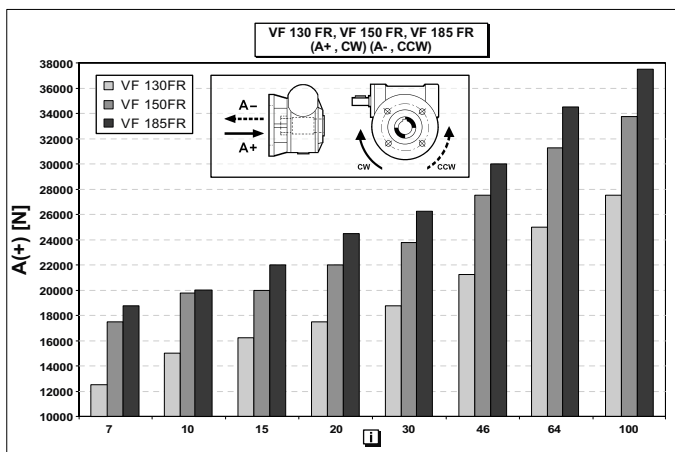
This version, within the same external dimensions as the FC version, is capable of bearing axial loads (well above those of the standard versions) indicated in the table below referred to the output shaft, gear ratio [i] and +/- direction of rotation.

Maximal zulässige Radialkräfte bei der Bauform FR

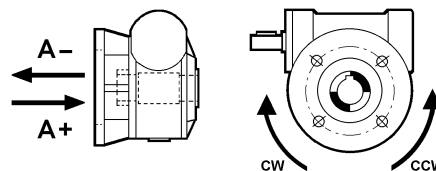
Um den Verwendungen entsprechen zu können, die sehr hohe Axialkräfte erfordern, wurde die Bauform FR in den Größen VF 130, VF 150 und VF 185 entwickelt. Diese Bauform, deren äußeren Maße denen der Bauform FC identisch sind, kann die in der nachstehenden Tabelle aufgeführten (weit über den von den Standardformen zugelassenen liegenden) und sich auf das Übersetzungsverhältnis [i] und die Drehrichtung +/- der Abtriebswelle bezogenen Axialkräfte aufnehmen.

Charges axiales maximales admises dans la version FR

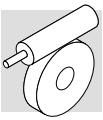
Pour les applications nécessitant des charges axiales très élevées, nous fournissons la version FR dans les tailles 130, 150, 185. Cette version, dont les dimensions externes sont identiques à celles de la version FC, peut supporter les charges axiales (considérablement supérieures aux charges admises par les versions standard) indiquées dans le tableau suivant se référant au rapport de transmission [i] et au sens de rotation +/- de l'arbre de sortie.



Legenda / Key / Zeichenerklärung / Légende:



- A+** = Carico assiale in compressione / Compressive load
Axiallast auf Druck / Charge axiale en compression
- A-** = Carico assiale in trazione / Pull load
Axiallast auf Zug / Charge axiale en traction
- CW** = Rotazione oraria / Clockwise rotation
Rechtsdrehung / Rotation horaire
- CCW** = Rotazione antioraria / Counterclockwise rotation
Linksdrehung / Rotation anti-horaire



18 - INFORMAZIONI GENERALI

18.1 Rendimento

Il rendimento $[\eta]$ dipende dai seguenti parametri:

- angolo d'elica dell'ingranaggio
- velocità di comando
- rodaggio dell'ingranaggio

A tale proposito è utile ricordare che il valore ottimale si manifesta dopo alcune ore di rodaggio e viene raggiunto successivamente nei riduttori funzionanti a regime come illustrato nella tabella sotto riportata, per cui in determinate applicazioni dove è previsto un servizio intermittente (sollevamenti, azionamenti, ecc.) è necessario incrementare adeguatamente la potenza del motore al fine di compensare il basso rendimento che si ha nel riduttore all'avviamento.

I valori di coppia nominale M_{n2} riportati a catalogo sono riferiti al funzionamento a regime, dopo rodaggio.

La tabella riporta, a titolo indicativo, il tempo necessario per raggiungere il massimo valore di rendimento dinamico.

18 - GENERAL INFORMATION

18.1 Efficiency

Efficiency $[\eta]$ depends on the following parameters:

- helix angle of gearing
- driving speed
- running-in of gearing

In this connection, remember that the optimum value is reached after several hours of running-in and is reached later on in steady-state operating gearboxes as shown in the table below.

Therefore, in applications calling for intermittent duty (e.g. hoisting, drives, etc.), motor power must be adequately increased to compensate for the gearbox's low efficiency at start-up.

Torque values M_{n2} indicated in the catalogue are calculated by considering the steady-state performance of the gearboxes.

The diagram shows indicatively the time required to reach the maximum value of dynamic efficiency.

18 - ALLGEMEINE INFORMATIONEN

18.1 Wirkungsgrad

Der Wirkungsgrad $[\eta]$ hängt von den folgenden Parametern ab:

- Eingriffswinkel
- Schmierung
- Einlaufen des Getriebes

Dabei ist auch zu berücksichtigen, daß der beste Wert erst nach einer Einlaufphase von einigen Stunden erreicht wird, aus Abbildung unter geht hervor, wann bei Getrieben, die mit Nenn Drehzahlen arbeiten der beste Wirkungsgrad erreicht wird. Für Anwendungsfälle mit intermittierendem Betrieb (Heben, Antrieb, sw.) ist es notwendig, die Motorleistung angemessen zu erhöhen, um den ungünstigen Wirkungsgrad des Getriebes während des Anfahrens zu überwinden.

Die Drehmomentwerte M_{n2} , die im Katalog angegeben sind, wurden im Hinblick auf den Wirkungsgrad von Getrieben berechnet, die bei einer Drehzahl von n_d laufen.

Die Abbildung zeigt die Zeit, die ungefähr notwendig ist, um den maximalen dynamischen Wirkungsgrad zu erreichen.

18 - INFORMATIONS GENERALES

18.1 Rendement

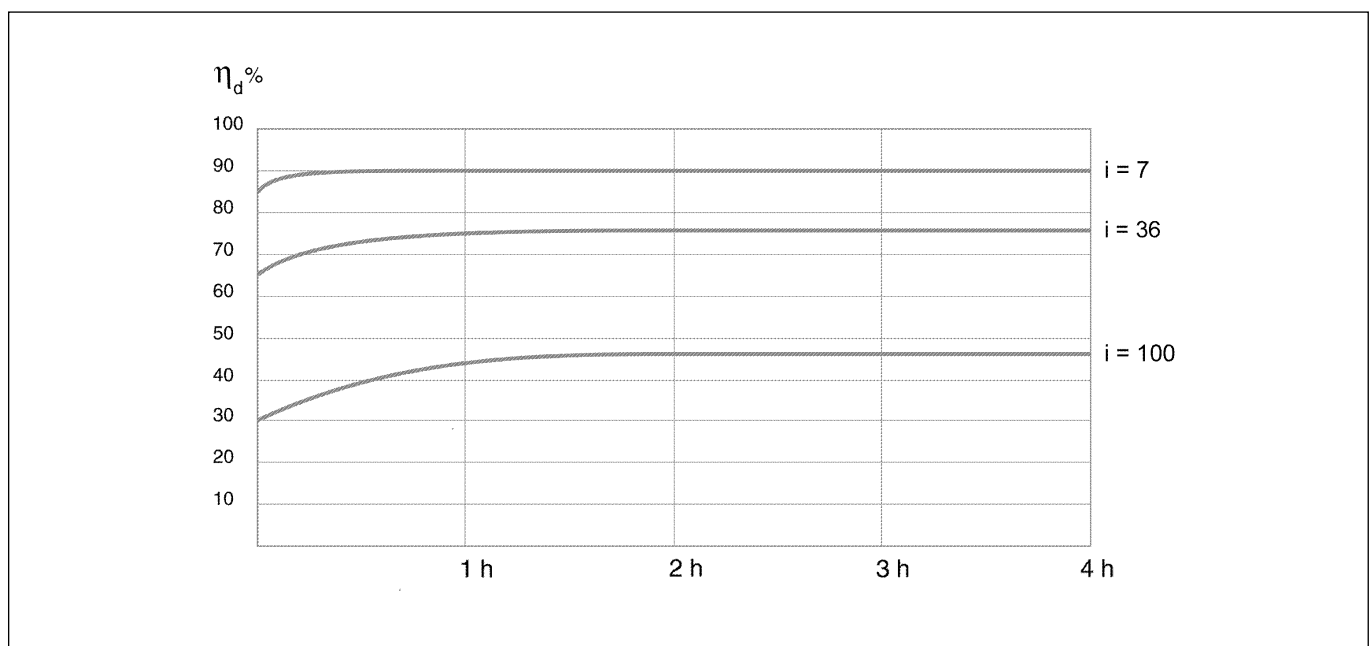
Le rendement $[\eta]$ dépend des paramètres suivants :

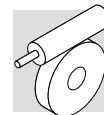
- angle d'hélice de l'engrenage
- vitesse d'entrée
- rodage de l'engrenage

Rappelons à ce sujet que la valeur optimale se manifeste au bout de quelques heures de rodage et est atteinte ensuite sur les réducteurs fonctionnant à plein régime de la façon indiquée dans le tableau suivante, si bien que pour les applications prévoyant un service intermittent (levage, actionnement etc.), il faut augmenter de façon appropriée la puissance du moteur, afin de compenser le faible rendement du réducteur au démarrage.

Les valeurs de couple M_{n2} indiquées dans le catalogue sont calculées en tenant compte du rendement des réducteurs à régime n_d .

Le tableau fournit, à titre indicatif, le temps nécessaire pour atteindre la valeur maximum de rendement dynamique.





18.2 Irreversibilità

Alcune applicazioni possono comportare occasionalmente la trasmissione del moto retrogrado tramite l'albero lento, mentre altre impongono che il carico sia trattenuto in posizione dal motoriduttore, anche in assenza di alimentazione elettrica.

Alcuni gruppi a vite senza fine offrono la caratteristica di essere irreversibili e il parametro che ne influenza maggiormente questa prestazione è il rendimento.

In particolare il rendimento statico η_s è responsabile della irreversibilità statica (passaggio attraverso una posizione di sosta), mentre il rendimento dinamico η_d è responsabile della eventuale irreversibilità dinamica (moto continuato nella stessa direzione).

L'irreversibilità può esprimersi in misura diversa con i rapporti più lunghi ($i=64$ e superiori) ad offrire una irreversibilità sempre maggiore.

18.2 Self-locking units

Some applications may require occasionally the gearbox to be back-driven by the load through the output shaft, some others instead require the gearbox to lock and hold the load when electric power switches off.

The factor affecting reversibility of worm gears the most is the efficiency with more precisely static efficiency η_s affecting static reversibility and dynamic efficiency η_d affecting dynamic reversibility.

Generally only gear ratios $i=64$ and higher offer locking properties with the grater ratios being totally non reversible.

18.2 Selbsthemmung

Einige Applikationsarten können gelegentlich dazu führen, dass die Antriebsübertragung über die Abtriebswelle erfolgt, während andere es erforderlich machen, dass die Last, auch ohne elektrische Versorgung, vom Getriebe-motor in Position gehalten wird. Einige Schneckeneinheiten bieten die Eigenschaft der Nichtumkehrbarkeit und der Kennwert, der diese Eigenschaft am meisten beeinflusst, stellt sich in ihrem Wirkungsgrad dar. Insbesondere ist der statische Wirkungsgrad η_s für die statische Nichtumkehrbarkeit (Passage über eine Aussetzposition) verantwortlich, während der dynamische Wirkungsgrad η_d für die eventuelle dynamische Nichtumkehrbarkeit (kontinuierlicher Antrieb in die gleiche Richtung) zuständig ist. Die Nichtumkehrbarkeit kann sich bei längeren Übersetzungsverhältnissen ($i=64$ und höher) in anderen Maßen ausdrücken und so eine immer höhere Nichtumkehrbarkeit bieten.

18.2 Irréversibilité

Certaines applications peuvent occasionnellement comporter la transmission du mouvement au moyen de l'arbre lent tandis que d'autres impliquent que la charge soit retenue en position par le motoréducteur, même en l'absence d'alimentation électrique.

Certains groupes à vis sans fin présentent la caractéristique d'être irréversibles et le paramètre qui influence le plus cette performance est leur rendement. Plus particulièrement, le rendement statique η_s est responsable de l'irréversibilité statique (passage à travers une position de repos), tandis que le rendement dynamique η_d est responsable de l'éventuelle irréversibilité dynamique (mouvement continu dans la même direction). L'irréversibilité peut s'exprimer différemment avec des rapports plus longs ($i=64$ et plus) afin d'offrir une irréversibilité supérieure.

18.3 Irreversibilità statica

Con questa condizione non si può avere la trasmissione del moto con comando dall'asse lento senza escludere però dei ritorni lenti nel caso in cui il gruppo sia sottoposto a vibrazioni. La condizione teorica perché si verifichi la irreversibilità statica è la seguente:

18.3 Static non-reversing

In this condition the gear units cannot be driven back from the output shaft, however slow running-back may still occur if the worm gears are subject to vibrations.

The theoretical condition for the static non-reversing to occur is:

18.3 Statische Selbsthemmung

Unter dieser Bedingung ist bei Belastung der Abtriebswelle im Stillstand kein Durchlaufen möglich, jedoch sind kleine Bewegungen im Falle von Vibrationen nicht auszuschließen. Die theoretische Voraussetzung für eine statische Selbsthemmung ist:

18.3 Irréversibilité statique

Cette condition n'exclut pas le retour lent lorsque le groupe est soumis à des vibrations.

La condition théorique pour que se vérifie l'irréversibilité statique est la suivante:

$$\eta_s < 0.4 - 0.5 \quad (15)$$

dove η_s rappresenta il rendimento statico (valore riportato nelle tabelle dei dati tecnici dei riduttori).

Ovviamente, per soddisfare la condizione inversa, cioè la reversibilità statica, si dovrà verificare che:

The η_s value for each worm gear can be found in the respective rating chart.

The opposite situation, i.e. static reversibility applies, theoretically when:

wobei der statische Wirkungsgrad η_s ist (diesen Wert findet man in den Tabellen der technischen Daten der Getriebe). Das genaue Gegenteil, ein Weiterdrehen der Abtriebswelle aus dem Stillstand, ergibt sich bei:

où η_s est le rendement statique (valeur indiquée dans les tableaux des données techniques des réducteurs). De même pour satisfaire la condition inverse, c'est à dire une réversibilité statique, il faut:

$$\eta_s > 0.5 \quad (16)$$

18.4 Irreversibilità dinamica

La condizione è influenzata direttamente dalla velocità di rotazione, dal rendimento e dalle vibrazioni continue del carico. È caratterizzata da un arresto quasi istantaneo della rotazione quando sull'asse della vite non

18.4 Dynamic non-reversing

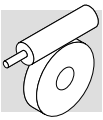
The load-holding capability is dependent on drive speed, dynamic efficiency and, if any, vibrations. The result of non-reversibility is the locking of the output shaft is no longer driven. Partial or total non reversibility

18.4 Dynamische Selbsthemmung

Diese Eigenschaft ist äußerst schwierig zu erreichen, da sie direkt von der Drehzahl, dem Wirkungsgrad und andauernden Vibrationen der Last abhängig ist. Sie wird durch einen praktisch sofortigen Stillstand charakteri-

18.4 Irréversibilité dynamique

C'est la condition la plus difficile à réaliser car elle est influencée directement par la vitesse de rotation, le rendement et les vibrations dues à la charge. Elle est caractérisée par un arrêt instantané du mouvement de



ci sono più condizioni di moto. Essa è sottoposta alla condizione teorica:

should be taken into consideration particularly when high inertia loads are driven, because of the considerable overloads that may apply to the gearbox.

siert, wenn die Schneckenwelle nicht mehr angetrieben wird.

rotation quand la vis n'est plus entraînée. Elle est soumise à la condition théorique suivante:

$$\eta_d < 0.5 \quad (17)$$

dove η_d rappresenta il rendimento dinamico del riduttore nelle condizioni di esercizio (valore riportato nelle tabelle dei dati tecnici).

La condizione inversa, cioè di reversibilità dinamica, è fisicamente possibile quando:

Where η_d is the value for the dynamic efficiency of the gear unit in the actual operating conditions.

Value can be found in the speed reducer rating chart.

The opposite condition, i.e. dynamic reversing is physically possible when:

Die theoretische Voraussetzung für eine dynamische Selbsthemmung ist ein dynamischer Wirkungsgrad von bei vollen Betriebsbedingungen (den Wert findet man in den Tabellen der technischen Daten der Getriebe), während das Gegenteil bei einem Wirkungsgrad von:

où η_d est le rendement dynamique du réducteur dans les conditions réelles de fonctionnement (valeur indiquée dans les tableaux des données techniques des réducteurs). La condition inverse, c'est-à-dire une réversibilité dynamique est réalisée avec:

$$\eta_d > 0.5 \quad (18)$$

La tabella di seguito propone indicativamente i vari gradi di reversibilità in funzione del tipo di riduttore e del rapporto di riduzione (dati riferiti solo alla coppia vite-corona).

Ovviamente questi dati sono indicativi in quanto si può avere una irreversibilità più o meno accentuata a causa dell'influenza dei fattori citati precedentemente.

Table below is a guideline to the various degrees of reversibility for each drive size and gear ratio (data refer to the worm gearing only).

Values for reversibility are indicative as this may be affected by vibrations, operating temperature, lubricating conditions, gear wear, etc.

Die Abbildung unter gibt Auskunft über die verschiedenen Reversierbarkeitsstufen, je nach Getriebeart und dem Untersetzungsverhältnis (die Angaben beziehen sich nur auf das Kräftepaar Schneckenwelle-Schneckenrad).

Natürlich dienen diese Daten nur zur allgemeinen Information, denn die Selbsthemmung kann wegen den bereits genannten Faktoren mehr oder weniger verstärkt sein.

Le tableau suivant propose, à titre indicatif, les différents degrés de réversibilité en fonction du type de réducteur et du rapport de réduction (données se référant au couple vis-couronne).

Il va de soi que ces données n'ont de valeur qu'indicative car on peut avoir une irréversibilité plus ou moins accentuée du fait de l'influence des facteurs mentionnés ci-dessus.

| Grado di reversibilità / Backdriving / Selbsthemmungsgrad / Degré de réversibilité | | VF | | | | W | | | | VF | | | | |
|---|---|----------------|----------------|----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------------|----------------------------|----------------------|----------------------------|----------------------|
| Reversibilità statica Static reversing Statische Reversierbarkeit Réversibilité statique | Reversibilità dinamica Dynamic reversing Dynamische Reversierbarkeit Réversibilité dynamique | 27 | 30 | 44 | 49 | 63 | 75 | 86 | 110 | 130 | 150 | 185 | 210 | 250 |
| yes | yes | - | - | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| yes | yes | 7 10 | 7 10 | 10 14 | 10 14 | 10 12 15 | 10 15 | 10 15 20 23 | 10 15 20 23 | 10 15 20 23 | 10 15 20 23 | 10 15 20 | 10 15 20 | 10 15 20 |
| incerta uncertain unsicher incertaine | yes | 15 20 30 | 15 20 30 | 20 28 35 | 18 24 28 36 | 19 24 30 38 | 20 25 30 40 | 30 40 46 56 | 30 40 46 56 | 30 40 46 56 64 | 30 40 46 56 64 | 30 40 50 60 | 30 40 40 50 60 | 30 40 50 60 |
| no | bassa low leicht mauvaise | 40 60 | 40 60 | 46 60 70 | 45 60 70 | 45 64 80 | 50 60 80 | 64 80 100 | 64 80 100 | 80 100 | 80 100 | 80 100 | 60 80 100 | 80 100 |
| no | no | 70 | 70 | 100 | 80 100 | 100 | 100 | - | - | - | - | - | - | - |



Essendo praticamente impossibile realizzare e garantire una irreversibilità totale è necessario, dove esiste questa esigenza, prevedere un freno esterno sufficiente ad



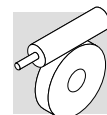
As it is virtually impossible to provide and guarantee total non reversing, we recommend the use of an external brake with sufficient capability to prevent vibrations in-



Da es praktisch unmöglich ist, eine totale Selbsthemmung zu realisieren oder zu garantieren, muß man, falls diese unerlässlich sein sollte, eine äußere Bremse anbrin-



Puisque il est pratiquement impossible de réaliser et de garantir une irréversibilité totale, il faudra, là où cela est nécessaire, prévoir un frein extérieur suffisant pour em-



impedire l'avviamento per effetto delle vibrazioni.

duced starting, where these circumstances are required.

gen, die ein durch Vibrationen verursachtes Anlaufen ausschließt.

pêcher le démarrage sous l'effet des vibrations.

18.5 Avvertenze per il montaggio del motore su VF30, VF44, VF49

Gli anelli O-ring presenti nelle viti posizionate nelle flange dei riduttori esecuzione P(IEC) dei VF 30, VF 44 e VF 49 sono stati inseriti al solo scopo di evitare lo sfilamento delle stesse durante il trasporto.

Prima dell'accoppiamento dei riduttori con i motori, i suddetti anelli devono essere rimossi.

18.5 Installation guidelines for VF 30, VF 44 and VF 49

Rubber O-rings are fitted underneath motor connecting bolts of P(IEC) inputs of VF 30, VF 44 and VF 49 with the only purpose of preventing the same from coming loose during transportation.

Make sure that all of the O-rings are removed prior to fitting the motor onto gear unit.

18.5 Anmerkungen für eine korrekte montage VF30, VF44, VF49

Die O-Ringe in den Schrauben, die in den Flanschen der Getriebe in P(IEC)-Ausführung von VF 30, VF44 und VF 49 placiert sind, wurden eingesetzt nur, um ihr Hearsufallen während Transport zu vermeiden.

Bevor der Getriebeverbindung mit den Motoren, müssen die o.g. Ringe entfernt werden.

18.5 Remarques pour un montage correct VF30, VF44, VF49

Les joints O-ring montés sur les vis fixées sur les brides des réducteurs P(IEC) (prédisposés pour recevoir un moteur électrique), dans les tailles VF 30, VF 44 et VF 49, ont été ajoutés dans le seul but d'éviter que ces dernières tombent durant le transport. En phase d'accouplement des réducteurs avec leurs moteurs, les joints O-ring doivent être enlevés.

19 - GIOCHI ANGOLARI

La tabella seguente riporta i valori indicativi del gioco angolare riferito all'albero lento, con albero veloce quindi bloccato.

La misura avviene con l'applicazione di una coppia di 5 Nm all'albero lento.

19 - ANGULAR BACKLASH

The following chart shows indicative values for the angular backlash at output shaft of W gear units (input blocked).

Measurement is taken with 5 Nm torque applying to output shaft.

19 - WINKELSPIELE

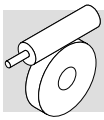
In der nachstehenden Tabelle werden die Anhaltswerte für das Winkelspiel bezüglich der Abtriebswelle, d.h. also bei blockierter Antriebswelle, gegeben. Das Maß ist durch das Ansetzen eines Drehmoments von 5 Nm an der Abtriebswelle erhältlich.

19 - JEUX ANGULAIRES

Le tableau suivant contient les valeurs indicatives du jeu angulaire se référant à l'arbre lent, donc avec arbre rapide bloqué.

La mesure est effectuée en appliquant un couple de 5 Nm à l'arbre lent.

| Giochi angolari (veloce bloccato) / angular backlash (input shaft locked) Winkelspiele (Antriebswelle blockiert) / Jeux angulaires (arbre d'entrée bloqué) | | |
|---|--|----------------------|
| | $\Delta\gamma$ ['] | $\Delta\gamma$ [rad] |
| VF 30 | 30' ± 10' | 0.00873 ± 0.00291 |
| VF 44 | 25' ± 5' | 0.00728 ± 0.00145 |
| VFR 44 | 30' ± 10' | 0.00873 ± 0.00291 |
| VF 49 | 25' ± 5' | 0.00728 ± 0.00145 |
| VFR 49 | 30' ± 10' | 0.00873 ± 0.00291 |
| W 63 | 20' ± 5' | 0.00582 ± 0.00145 |
| WR 63 | 25' ± 5' | 0.00728 ± 0.00145 |
| W 75 | 20' ± 5' | 0.00582 ± 0.00145 |
| WR 75 | 22' ± 5' | 0.00640 ± 0.00145 |
| W 86 | 15' ± 5' | 0.00436 ± 0.00145 |
| WR 86 | 20' ± 5' | 0.00582 ± 0.00145 |
| W 110 | 15' ± 5' | 0.00436 ± 0.00145 |
| WR 110 | 18' ± 5' | 0.00524 ± 0.00145 |
| VF 130 | 12' ± 3' | 0.00349 ± 0.00087 |
| VFR 130 | 15 ± 3' | 0.00436 ± 0.00087 |
| VF 150 | 12' ± 3' | 0.00349 ± 0.00087 |
| VFR 150 | 15' ± 3' | 0.00436 ± 0.00087 |
| VF 185 | 10' ± 3' | 0.00291 ± 0.00087 |
| VFR 185 | 13' ± 3' | 0.00378 ± 0.00087 |
| VF 210 | Interpellarci / Consult factory / Rückfrage an Hersteller / Nous contacter | |
| VFR 210 | | |
| VF 250 | | |
| VFR 250 | | |










20 - TABELLE DI SELEZIONE
MOTORIDUTTORE

20 - GEARMOTOR
SELECTION

20 - GETRIEBEMOTOREN-
AUSWAHLTABELLEN

20 - TABLEAUX SELECTION
MOTOREDUCTEUR

0.04 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|---|---|
| 19.3 | 9 | 1.0 | 70 | 600 | — | — | — | VF 27_70 | P27 | BN27A4* | 120 |
| 22.5 | 8 | 1.1 | 60 | 600 | — | — | — | VF 27_60 | P27 | BN27A4* | 120 |
| 34 | 6 | 1.4 | 40 | 600 | — | — | — | VF 27_40 | P27 | BN27A4* | 120 |
| 45 | 5 | 1.7 | 30 | 600 | — | — | — | VF 27_30 | P27 | BN27A4* | 120 |
| 68 | 4 | 2.2 | 20 | 600 | — | — | — | VF 27_20 | P27 | BN27A4* | 120 |
| 90 | 3 | 2.8 | 15 | 600 | — | — | — | VF 27_15 | P27 | BN27A4* | 120 |
| 135 | 2 | 3.8 | 10 | 600 | — | — | — | VF 27_10 | P27 | BN27A4* | 120 |
| 193 | 2 | 5.5 | 7 | 600 | — | — | — | VF 27_7 | P27 | BN27A4* | 120 |

0.06 kW

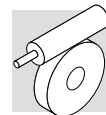
| | | | | | | | | | | | |
|------|-----|-----|------|------|---|---|---|-----------------|-----|---------|-----|
| 0.59 | 203 | 1.0 | 2280 | 5000 | — | — | — | VF/W 30/63_2280 | P56 | BN56A4 | 139 |
| 0.89 | 155 | 1.4 | 1520 | 5000 | — | — | — | VF/W 30/63_1520 | P56 | BN56A4 | 139 |
| 1.1 | 122 | 1.7 | 1200 | 5000 | — | — | — | VF/W 30/63_1200 | P56 | BN56A4 | 139 |
| 1.5 | 115 | 1.8 | 900 | 5000 | — | — | — | VF/W 30/63_900 | P56 | BN56A4 | 139 |
| 1.9 | 113 | 1.9 | 720 | 5000 | — | — | — | VF/W 30/63_720 | P56 | BN56A4 | 139 |
| 2.5 | 85 | 1.1 | 540 | 3450 | — | — | — | VF/VF 30/49_540 | P56 | BN56A4 | 134 |
| 2.8 | 50 | 1.0 | 500 | 5000 | — | — | — | VFR 44_500 | S44 | BN44B4* | 126 |
| 3.2 | 73 | 1.3 | 420 | 3450 | — | — | — | VF/VF 30/49_420 | P56 | BN56A4 | 134 |
| 4.0 | 54 | 1.0 | 350 | 5000 | — | — | — | VFR 44_350 | S44 | BN44B4* | 126 |
| 4.3 | 53 | 1.8 | 315 | 3450 | — | — | — | VF/VF 30/49_315 | P56 | BN56A4 | 134 |
| 4.5 | 59 | 1.0 | 300 | 2500 | — | — | — | VFR 44_300 | S44 | BN44B4* | 126 |
| 5.8 | 50 | 1.2 | 230 | 2500 | — | — | — | VFR 44_230 | S44 | BN44B4* | 126 |
| 7.7 | 42 | 1.5 | 175 | 2500 | — | — | — | VFR 44_175 | S44 | BN44B4* | 126 |
| 9.6 | 36 | 1.4 | 140 | 2500 | — | — | — | VFR 44_140 | S44 | BN44B4* | 126 |
| 13.4 | 29 | 1.8 | 100 | 2500 | — | — | — | VFR 44_100 | S44 | BN44B4* | 126 |
| 19.1 | 22 | 1.8 | 70 | 2500 | — | — | — | VFR 44_70 | S44 | BN44B4* | 126 |
| 19.3 | 14 | 1.1 | 70 | 1600 | — | — | — | VF 30_70 | P56 | BN56A4 | 122 |
| 22.5 | 13 | 1.5 | 60 | 1600 | — | — | — | VF 30_60 | P56 | BN56A4 | 122 |
| 34 | 10 | 0.9 | 40 | 600 | — | — | — | VF 27_40 | P27 | BN27B4* | 120 |
| 34 | 10 | 1.9 | 40 | 1650 | — | — | — | VF 30_40 | P56 | BN56A4 | 122 |
| 45 | 8 | 1.1 | 30 | 600 | — | — | — | VF 27_30 | P27 | BN27B4* | 120 |
| 45 | 8 | 2.4 | 30 | 1340 | — | — | — | VF 30_30 | P56 | BN56A4 | 122 |
| 68 | 6 | 1.5 | 20 | 600 | — | — | — | VF 27_20 | P27 | BN27B4* | 120 |
| 68 | 6 | 2.9 | 20 | 1180 | — | — | — | VF 30_20 | P56 | BN56A4 | 122 |
| 90 | 5 | 1.9 | 15 | 600 | — | — | — | VF 27_15 | P27 | BN27B4* | 120 |
| 90 | 5 | 3.7 | 15 | 1080 | — | — | — | VF 30_15 | P56 | BN56A4 | 122 |
| 135 | 4 | 2.6 | 10 | 595 | — | — | — | VF 27_10 | P27 | BN27B4* | 120 |
| 135 | 3 | 4.7 | 10 | 950 | — | — | — | VF 30_10 | P56 | BN56A4 | 122 |
| 193 | 2 | 3.6 | 7 | 533 | — | — | — | VF 27_7 | P27 | BN27B4* | 120 |
| 193 | 2 | 6.4 | 7 | 840 | — | — | — | VF 30_7 | P56 | BN56A4 | 122 |

(*) Possibilità di specificare per i motori BN27, BN44, BN56 l'opzione IF, isolamento rinforzato per alimentazione da inverter.








(*) For motors BN27, BN44 and BN56 it is possible to specify the option IF, extra insulation for inverter duty.

(*) Nur für Motoren BN27, BN44 und BN56 - Option IF, verstärkte Isolierung für Frequenzumrichterversorgung.

(*) Seulement pour moteurs BN27, BN44 et BN56 - Insulation renforcée IF pour alimentation par inverter.



0.09 kW

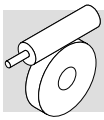
| n_2 min ⁻¹ | M ₂ Nm | S | i | R _{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|----------------------|-----|------|----------------------|---|---|---|---|---|---|---|-----|
| 0.31 | 574 | 1.8 | 2800 | 8000 | — | — | — | — | — | VF/W 49/110_2800 P63 | BN63A6 | 151 |
| 0.42 | 579 | 1.0 | 2116 | 7000 | — | — | — | — | — | VF/W 44/86_2116 P63 | BN63A6 | 147 |
| 0.43 | 505 | 2.1 | 2070 | 8000 | — | — | — | — | — | VF/W 49/110_2070 P63 | BN63A6 | 151 |
| 0.48 | 503 | 1.1 | 1840 | 7000 | — | — | — | — | — | VF/W 44/86_1840 P63 | BN63A6 | 147 |
| 0.53 | 485 | 2.2 | 1656 | 8000 | — | — | — | — | — | VF/W 49/110_1656 P63 | BN63A6 | 151 |
| 0.64 | 377 | 1.5 | 1380 | 7000 | — | — | — | — | — | VF/W 44/86_1380 P63 | BN63A6 | 147 |
| 0.65 | 369 | 2.8 | 1350 | 8000 | — | — | — | — | — | VF/W 49/110_1350 P63 | BN63A6 | 151 |
| 0.73 | 363 | 1.1 | 1200 | 5750 | — | — | — | — | — | VF/W 44/75_1200 P63 | BN63A6 | 143 |
| 0.81 | 316 | 3.3 | 1080 | 8000 | — | — | — | — | — | VF/W 49/110_1080 P63 | BN63A6 | 151 |
| 0.89 | 232 | 0.9 | 1520 | 5000 | — | — | — | — | — | VF/W 30/63_1520 P56 | BN56B4 | 139 |
| 0.96 | 323 | 1.2 | 920 | 5750 | — | — | — | — | — | VF/W 44/75_920 P63 | BN63A6 | 143 |
| 0.96 | 332 | 1.7 | 920 | 7000 | — | — | — | — | — | VF/W 44/86_920 P63 | BN63A6 | 147 |
| 0.98 | 255 | 0.9 | 900 | 5000 | — | — | — | — | — | VF/W 30/63_900 P63 | BN63A6 | 139 |
| 1.1 | 183 | 1.1 | 1200 | 5000 | — | — | — | — | — | VF/W 30/63_1200 P56 | BN56B4 | 139 |
| 1.2 | 225 | 1.0 | 720 | 5000 | — | — | — | — | — | VF/W 30/63_720 P63 | BN63A6 | 139 |
| 1.3 | 267 | 1.5 | 700 | 5750 | — | — | — | — | — | VF/W 44/75_700 P63 | BN63A6 | 143 |
| 1.3 | 253 | 2.2 | 700 | 7000 | — | — | — | — | — | VF/W 44/86_700 P63 | BN63A6 | 147 |
| 1.5 | 172 | 1.2 | 900 | 5000 | — | — | — | — | — | VF/W 30/63_900 P56 | BN56B4 | 139 |
| 1.7 | 210 | 1.9 | 525 | 5750 | — | — | — | — | — | VF/W 44/75_525 P63 | BN63A6 | 143 |
| 1.7 | 200 | 2.8 | 525 | 7000 | — | — | — | — | — | VF/W 44/86_525 P63 | BN63A6 | 147 |
| 1.9 | 170 | 1.2 | 720 | 5000 | — | — | — | — | — | VF/W 30/63_720 P56 | BN56B4 | 139 |
| 2.2 | 164 | 2.4 | 400 | 5750 | — | — | — | — | — | VF/W 44/75_400 P63 | BN63A6 | 143 |
| 2.2 | 160 | 3.4 | 400 | 7000 | — | — | — | — | — | VF/W 44/86_400 P63 | BN63A6 | 147 |
| 2.4 | 145 | 1.4 | 570 | 5000 | — | — | — | — | — | VF/W 30/63_570 P56 | BN56B4* | 139 |
| 2.9 | 111 | 1.2 | 300 | 5000 | — | — | — | — | — | WR 63_300 P63 | BN63A6 | 138 |
| 2.9 | 120 | 1.7 | 300 | 6200 | — | — | — | — | — | WR 75_300 P63 | BN63A6 | 142 |
| 2.9 | 132 | 2.4 | 300 | 7000 | — | — | — | — | — | WR 86_300 P63 | BN63A6 | 146 |
| 3.0 | 117 | 1.8 | 450 | 5000 | — | — | — | — | — | VF/W 30/63_450 P56 | BN56B4 | 139 |
| 3.2 | 110 | 0.9 | 420 | 3450 | — | — | — | — | — | VF/VF 30/49_420 P56 | BN56B4 | 134 |
| 3.7 | 101 | 1.4 | 240 | 5000 | — | — | — | — | — | WR 63_240 P63 | BN63A6 | 138 |
| 3.7 | 105 | 2.1 | 240 | 6200 | — | — | — | — | — | WR 75_240 P63 | BN63A6 | 142 |
| 3.7 | 117 | 2.6 | 240 | 7000 | — | — | — | — | — | WR 86_240 P63 | BN63A6 | 146 |
| 4.2 | 84 | 0.9 | 210 | 3450 | — | — | — | — | — | VFR 49_210 P63 | BN63A6 | 132 |
| 4.3 | 80 | 1.2 | 315 | 3450 | — | — | — | — | — | VF/VF 30/49_315 P56 | BN56B4 | 134 |
| 4.3 | 84 | 2.5 | 315 | 5000 | — | — | — | — | — | VF/W 30/63_315 P56 | BN56B4* | 139 |
| 4.6 | 88 | 1.7 | 192 | 5000 | — | — | — | — | — | WR 63_192 P63 | BN63A6 | 138 |
| 4.9 | 79 | 0.9 | 180 | 3450 | — | — | — | — | — | VFR 49_180 P63 | BN63A6 | 132 |
| 4.9 | 90 | 3.1 | 180 | 6200 | — | — | — | — | — | WR 75_180 P63 | BN63A6 | 142 |
| 5.2 | 94 | 4.2 | 168 | 7000 | — | — | — | — | — | WR 86_168 P63 | BN63A6 | 146 |
| 5.5 | 62 | 1.0 | 245 | 2500 | — | — | — | — | — | VF/VF 30/44_245 P56 | BN56B4 | 128 |
| 6.5 | 66 | 1.2 | 135 | 3450 | — | — | — | — | — | VFR 49_135 P63 | BN63A6 | 132 |
| 6.5 | 71 | 2.5 | 135 | 5000 | — | — | — | — | — | WR 63_135 P63 | BN63A6 | 138 |
| 7.7 | 63 | 1.0 | 175 | 2900 | — | — | — | — | — | VFR 44_175 S44 | BN44C4* | 126 |
| 7.7 | 65 | 3.1 | 114 | 5000 | — | — | — | — | — | WR 63_114 P63 | BN63A6 | 138 |
| 8.1 | 58 | 1.4 | 108 | 3450 | — | — | — | — | — | VFR 49_108 P63 | BN63A6 | 132 |
| 8.8 | 41 | 1.3 | 100 | 3300 | VF 49_100 | P63 | K63A6 | 130 | VF 49_100 | P63 | BN63A6 | 130 |

(*) Possibilità di specificare per i motori BN27, BN44, BN56 l'opzione IF, isolamento rinforzato per alimentazione da inverter.








(*) For motors BN27, BN44 and BN56 it is possible to specify the option IF, extra insulation for inverter duty.

(*) Nur für Motoren BN27, BN44 und BN56 - Option IF, verstärkte Isolierung für Frequenzumrichterversorgung.

(*) Seulement pour moteurs BN27, BN44 et BN56 - Insulation renforcée IF pour alimentation par inverter.



0.09 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|---|---|-----|
| 9.6 | 54 | 0.9 | 140 | 2900 | | — | | | VFR 44_140 | S44 | BN44C4* | 126 |
| 9.8 | 55 | 3.8 | 90 | 5000 | | — | | | WR 63_90 | P63 | BN63A6 | 138 |
| 10.5 | 48 | 1.9 | 84 | 3450 | | — | | | VFR 49_84 | P63 | BN63A6 | 132 |
| 11.0 | 37 | 1.6 | 80 | 3300 | VF 49_80 | P63 | K63A6 | 130 | VF 49_80 | P63 | BN63A6 | 130 |
| 12.2 | 45 | 1.8 | 72 | 3450 | | — | | | VFR 49_72 | P63 | BN63A6 | 132 |
| 12.2 | 48 | 4.0 | 72 | 5000 | | — | | | WR 63_72 | P63 | BN63A6 | 138 |
| 12.6 | 35 | 1.1 | 70 | 2300 | VF 44_70 | P63 | K63A6 | 124 | VF 44_70 | P63 | BN63A6 | 124 |
| 12.6 | 34 | 1.8 | 70 | 3300 | VF 49_70 | P63 | K63A6 | 130 | VF 49_70 | P63 | BN63A6 | 130 |
| 13.4 | 43 | 1.2 | 100 | 2900 | | — | | | VFR 44_100 | S44 | BN44C4* | 126 |
| 14.7 | 32 | 1.4 | 60 | 2300 | VF 44_60 | P63 | K63A6 | 124 | VF 44_60 | P63 | BN63A6 | 124 |
| 14.7 | 34 | 1.7 | 60 | 3300 | VF 49_60 | P63 | K63A6 | 130 | VF 49_60 | P63 | BN63A6 | 130 |
| 16.3 | 36 | 2.2 | 54 | 3450 | | — | | | VFR 49_54 | P63 | BN63A6 | 132 |
| 19.1 | 33 | 1.2 | 70 | 2900 | | — | | | VFR 44_70 | S44 | BN44C4* | 126 |
| 19.1 | 27 | 1.8 | 46 | 2300 | VF 44_46 | P63 | K63A6 | 124 | VF 44_46 | P63 | BN63A6 | 124 |
| 19.6 | 26 | 2.7 | 45 | 3300 | VF 49_45 | P63 | K63A6 | 130 | VF 49_45 | P63 | BN63A6 | 130 |
| 21.0 | 30 | 2.8 | 42 | 3360 | | — | | | VFR 49_42 | P63 | BN63A6 | 132 |
| 22.0 | 22 | 0.9 | 40 | 1560 | VF 30_40 | P63 | K63A6 | 122 | VF 30_40 | P63 | BN63A6 | 122 |
| 22.5 | 19 | 1.0 | 60 | 1600 | | — | | | VF 30_60 | P56 | BN56B4* | 122 |
| 24.4 | 22 | 3.4 | 36 | 3300 | VF 49_36 | P63 | K63A6 | 130 | VF 49_36 | P63 | BN63A6 | 130 |
| 25.1 | 22 | 2.2 | 35 | 2300 | VF 44_35 | P63 | K63A6 | 124 | VF 44_35 | P63 | BN63A6 | 124 |
| 29.3 | 18 | 1.2 | 30 | 1440 | VF 30_30 | P63 | K63A6 | 122 | VF 30_30 | P63 | BN63A6 | 122 |
| 31 | 18 | 2.7 | 28 | 2300 | VF 44_28 | P63 | K63A6 | 124 | VF 44_28 | P63 | BN63A6 | 124 |
| 34 | 15 | 1.2 | 40 | 1410 | | — | | | VF 30_40 | P56 | BN56B4* | 122 |
| 44 | 14 | 1.5 | 20 | 1230 | VF 30_20 | P63 | K63A6 | 122 | VF 30_20 | P63 | BN63A6 | 122 |
| 44 | 14 | 3.1 | 20 | 2300 | VF 44_20 | P63 | K63A6 | 124 | VF 44_20 | P63 | BN63A6 | 124 |
| 45 | 12 | 1.6 | 30 | 1290 | | — | | | VF 30_30 | P56 | BN56B4* | 122 |
| 59 | 11 | 1.8 | 15 | 1170 | VF 30_15 | P63 | K63A6 | 122 | VF 30_15 | P63 | BN63A6 | 122 |
| 68 | 9 | 1.9 | 20 | 1140 | | — | | | VF 30_20 | P56 | BN56B4* | 122 |
| 69 | 9 | 1.0 | 20 | 600 | | — | | | VF 27_20 | P27 | BN27C4* | 120 |
| 88 | 8 | 2.3 | 10 | 1050 | VF 30_10 | P63 | K63A6 | 122 | VF 30_10 | P63 | BN63A6 | 122 |
| 90 | 7 | 2.5 | 15 | 1050 | | — | | | VF 30_15 | P56 | BN56B4* | 122 |
| 92 | 7 | 1.3 | 15 | 600 | | — | | | VF 27_15 | P27 | BN27C4* | 120 |
| 126 | 6 | 3.2 | 7 | 920 | VF 30_7 | P63 | K63A6 | 122 | VF 30_7 | P63 | BN63A6 | 122 |
| 135 | 5 | 3.1 | 10 | 920 | | — | | | VF 30_10 | P56 | BN56B4* | 122 |
| 138 | 5 | 1.7 | 10 | 565 | | — | | | VF 27_10 | P27 | BN27C4* | 120 |
| 193 | 4 | 4.3 | 7 | 820 | | — | | | VF 30_7 | P56 | BN56B4* | 122 |
| 197 | 4 | 2.5 | 7 | 510 | | — | | | VF 27_7 | P27 | BN27C4* | 120 |

0.12 kW

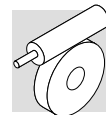
| | | | | | | | | | | | | |
|------|-----|-----|------|------|--|---|--|--|------------------|-----|--------|-----|
| 0.31 | 775 | 1.4 | 2800 | 8000 | | — | | | VF/W 49/110_2800 | P63 | BN63B6 | 151 |
| 0.47 | 588 | 1.7 | 2800 | 8000 | | — | | | VF/W 49/110_2800 | P63 | BN63A4 | 151 |
| 0.53 | 654 | 1.6 | 1656 | 8000 | | — | | | VF/W 49/110_1656 | P63 | BN63B6 | 151 |
| 0.62 | 518 | 1.0 | 2116 | 7000 | | — | | | VF/W 44/86_2116 | P63 | BN63A4 | 147 |
| 0.63 | 507 | 2.0 | 2070 | 8000 | | — | | | VF/W 49/110_2070 | P63 | BN63A4 | 151 |

(*) Possibilità di specificare per i motori BN27, BN44, BN56 l'opzione IF, isolamento rinforzato per alimentazione da inverter.







(*) For motors BN27, BN44 and BN56 it is possible to specify the option IF, extra insulation for inverter duty.

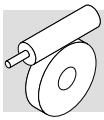
(*) Nur für Motoren BN27, BN44 und BN56 - Option IF, verstärkte Isolierung für Frequenzumrichterversorgung.

(*) Seulement pour moteurs BN27, BN44 et BN56 - Insulation renforcée IF pour alimentation par inverter.


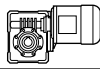







0.12 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  | IEC |  |  | |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|----------------------|---|---|-----|
| 0.71 | 483 | 1.0 | 1840 | 7000 | — | — | — | — | VF/W 44/86_1840 P63 | BN63A4 | 147 | |
| 0.79 | 435 | 2.3 | 1656 | 8000 | — | — | — | — | VF/W 49/110_1656 P63 | BN63A4 | 151 | |
| 0.95 | 386 | 1.3 | 1380 | 7000 | — | — | — | — | VF/W 44/86_1380 P63 | BN63A4 | 147 | |
| 0.97 | 354 | 2.8 | 1350 | 8000 | — | — | — | — | VF/W 49/110_1350 P63 | BN63A4 | 151 | |
| 1.2 | 293 | 3.4 | 1080 | 8000 | — | — | — | — | VF/W 49/110_1080 P63 | BN63A4 | 151 | |
| 1.4 | 322 | 1.1 | 920 | 5750 | — | — | — | — | VF/W 44/75_920 P63 | BN63A4 | 143 | |
| 1.4 | 322 | 1.6 | 920 | 7000 | — | — | — | — | VF/W 44/86_920 P63 | BN63A4 | 147 | |
| 1.5 | 236 | 0.9 | 900 | 5000 | — | — | — | — | VF/W 30/63_900 P63 | BN63A4 | 139 | |
| 1.8 | 233 | 0.9 | 720 | 5000 | — | — | — | — | VF/W 30/63_720 P63 | BN63A4 | 139 | |
| 1.9 | 257 | 1.4 | 700 | 5750 | — | — | — | — | VF/W 44/75_700 P63 | BN63A4 | 143 | |
| 1.9 | 239 | 2.1 | 700 | 7000 | — | — | — | — | VF/W 44/86_700 P63 | BN63A4 | 147 | |
| 2.3 | 199 | 1.1 | 570 | 5000 | — | — | — | — | VF/W 30/63_570 P63 | BN63A4 | 139 | |
| 2.5 | 202 | 1.8 | 525 | 5750 | — | — | — | — | VF/W 44/75_525 P63 | BN63A4 | 143 | |
| 2.5 | 193 | 2.6 | 525 | 7000 | — | — | — | — | VF/W 44/86_525 P63 | BN63A4 | 147 | |
| 2.9 | 150 | 0.9 | 300 | 5000 | — | — | — | — | WR 63_300 P63 | BN63B6 | 138 | |
| 2.9 | 162 | 1.2 | 300 | 6200 | — | — | — | — | WR 75_300 P63 | BN63B6 | 142 | |
| 2.9 | 178 | 1.7 | 300 | 7000 | — | — | — | — | WR 86_300 P63 | BN63B6 | 146 | |
| 2.9 | 161 | 1.3 | 450 | 5000 | — | — | — | — | VF/W 30/63_450 P63 | BN63A4 | 139 | |
| 3.3 | 161 | 2.3 | 400 | 5750 | — | — | — | — | VF/W 44/75_400 P63 | BN63A4 | 143 | |
| 3.3 | 143 | 3.5 | 400 | 7000 | — | — | — | — | VF/W 44/86_400 P63 | BN63A4 | 147 | |
| 3.6 | 136 | 1.0 | 240 | 5000 | — | — | — | — | WR 63_240 P63 | BN63B6 | 138 | |
| 3.6 | 142 | 1.5 | 240 | 6200 | — | — | — | — | WR 75_240 P63 | BN63B6 | 142 | |
| 3.6 | 142 | 1.6 | 240 | 5000 | — | — | — | — | VF/W 30/63_240 P63 | BN63B6 | 139 | |
| 3.6 | 158 | 2.0 | 240 | 7000 | — | — | — | — | WR 86_240 P63 | BN63B6 | 146 | |
| 4.2 | 110 | 0.9 | 315 | 3450 | — | — | — | — | VF/VF 30/49_315 P63 | BN63A4 | 134 | |
| 4.2 | 116 | 1.8 | 315 | 5000 | — | — | — | — | VF/W 30/63_315 P63 | BN63A4 | 139 | |
| 4.4 | 108 | 1.2 | 300 | 5000 | — | — | — | — | WR 63_300 P63 | BN63A4 | 138 | |
| 4.4 | 115 | 1.6 | 300 | 6200 | — | — | — | — | WR 75_300 P63 | BN63A4 | 142 | |
| 4.4 | 129 | 2.1 | 300 | 7000 | — | — | — | — | WR 86_300 P63 | BN63A4 | 146 | |
| 4.4 | 134 | 2.8 | 300 | 5750 | — | — | — | — | VF/W 44/75_300 P63 | BN63A4 | 143 | |
| 4.8 | 121 | 2.3 | 180 | 6200 | — | — | — | — | WR 75_180 P63 | BN63B6 | 142 | |
| 5.2 | 126 | 3.1 | 168 | 7000 | — | — | — | — | WR 86_168 P63 | BN63B6 | 146 | |
| 5.2 | 125 | 3.0 | 250 | 5750 | — | — | — | — | VF/W 44/75_250 P63 | BN63A4 | 143 | |
| 5.5 | 94 | 1.0 | 240 | 3450 | — | — | — | — | VF/VF 30/49_240 P63 | BN63A4 | 134 | |
| 5.5 | 97 | 1.4 | 240 | 5000 | — | — | — | — | WR 63_240 P63 | BN63A4 | 138 | |
| 5.5 | 103 | 2.1 | 240 | 6200 | — | — | — | — | WR 75_240 P63 | BN63A4 | 142 | |
| 5.5 | 99 | 2.1 | 240 | 5000 | — | — | — | — | VF/W 30/63_240 P63 | BN63A4 | 139 | |
| 5.5 | 111 | 2.7 | 240 | 7000 | — | — | — | — | WR 86_240 P63 | BN63A4 | 146 | |
| 5.8 | 109 | 2.9 | 150 | 6200 | — | — | — | — | WR 75_150 P63 | BN63B6 | 142 | |
| 6.4 | 89 | 0.9 | 135 | 3300 | — | — | — | — | VFR 49_135 P63 | BN63B6 | 132 | |
| 6.4 | 96 | 1.9 | 135 | 5000 | — | — | — | — | WR 63_135 P63 | BN63B6 | 138 | |
| 6.8 | 86 | 1.8 | 192 | 5000 | — | — | — | — | WR 63_192 P63 | BN63A4 | 138 | |
| 7.3 | 76 | 0.9 | 180 | 3300 | — | — | — | — | VFR 49_180 P63 | BN63A4 | 132 | |
| 7.3 | 87 | 2.7 | 180 | 6200 | — | — | — | — | WR 75_180 P63 | BN63A4 | 142 | |
| 8.7 | 55 | 0.9 | 100 | 3300 | VF 49_100 | P63 | K63B6 | 130 | VF 49_100 | P63 | BN63B6 | 130 |
| 9.7 | 64 | 1.4 | 135 | 3450 | — | — | — | — | VFR 49_135 P63 | BN63A4 | 132 | |
| 9.7 | 68 | 2.5 | 135 | 5000 | — | — | — | — | WR 63_135 P63 | BN63A4 | 138 | |
| 10.9 | 50 | 1.2 | 80 | 3300 | VF 49_80 | P63 | K63B6 | 130 | VF 49_80 | P63 | BN63B6 | 130 |
| 11.5 | 61 | 3.0 | 114 | 5000 | — | — | — | — | WR 63_114 P63 | BN63A4 | 138 | |
| 12.1 | 55 | 1.5 | 108 | 3450 | — | — | — | — | VFR 49_108 P63 | BN63A4 | 132 | |

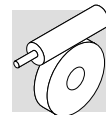


0.12 kW








| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|---|---|-----|
| 13.1 | 41 | 1.2 | 100 | 3150 | VF 49_100 | P63 | K63A4 | 130 | VF 49_100 | P63 | BN63A4 | 130 |
| 14.5 | 43 | 1.1 | 60 | 2300 | VF 44_60 | P63 | K63B6 | 124 | VF 44_60 | P63 | BN63B6 | 124 |
| 15.3 | 53 | 3.6 | 57 | 5000 | | — | | | WR 63_57 | P63 | BN63B6 | 138 |
| 15.6 | 46 | 1.9 | 84 | 3450 | | — | | | VFR 49_84 | P63 | BN63A4 | 132 |
| 16.4 | 36 | 1.5 | 80 | 3150 | VF 49_80 | P63 | K63A4 | 130 | VF 49_80 | P63 | BN63A4 | 130 |
| 18.2 | 42 | 1.8 | 72 | 3430 | | — | | | VFR 49_72 | P63 | BN63A4 | 132 |
| 18.7 | 34 | 0.9 | 70 | 3300 | | — | | 124 | VF 44_70 | P63 | BN63A4 | 124 |
| 18.7 | 33 | 1.7 | 70 | 3150 | VF 49_70 | P63 | K63A4 | 130 | VF 49_70 | P63 | BN63A4 | 130 |
| 21.8 | 30 | 1.3 | 60 | 2300 | VF 44_60 | P63 | K63A4 | 124 | VF 44_60 | P63 | BN63A4 | 124 |
| 21.8 | 30 | 1.9 | 60 | 3150 | VF 49_60 | P63 | K63A4 | 130 | VF 49_60 | P63 | BN63A4 | 130 |
| 24.3 | 34 | 2.2 | 54 | 3140 | | — | | | VFR 49_54 | P63 | BN63A4 | 132 |
| 28.5 | 25 | 1.5 | 46 | 2300 | VF 44_46 | P63 | K63A4 | 124 | VF 44_46 | P63 | BN63A4 | 124 |
| 29.0 | 24 | 0.9 | 30 | 1360 | VF 30_30 | P63 | K63B6 | 122 | VF 30_30 | P63 | BN63B6 | 122 |
| 29.1 | 25 | 2.6 | 45 | 3040 | VF 49_45 | P63 | K63A4 | 130 | VF 49_45 | P63 | BN63A4 | 130 |
| 31 | 27 | 2.9 | 42 | 2920 | | — | | | VFR 49_42 | P63 | BN63A4 | 132 |
| 33 | 21 | 0.9 | 40 | 1360 | VF 30_40 | P63 | K63A4 | 122 | VF 30_40 | P63 | BN63A4 | 122 |
| 36 | 21 | 3.3 | 36 | 2830 | VF 49_36 | P63 | K63A4 | 130 | VF 49_36 | P63 | BN63A4 | 130 |
| 37 | 21 | 1.9 | 35 | 2300 | VF 44_35 | P63 | K63A4 | 124 | VF 44_35 | P63 | BN63A4 | 124 |
| 44 | 17 | 1.2 | 30 | 1250 | VF 30_30 | P63 | K63A4 | 122 | VF 30_30 | P63 | BN63A4 | 122 |
| 47 | 17 | 2.2 | 28 | 2300 | VF 44_28 | P63 | K63A4 | 124 | VF 44_28 | P63 | BN63A4 | 124 |
| 58 | 15 | 1.4 | 15 | 1130 | VF 30_15 | P63 | K63B6 | 122 | VF 30_15 | P63 | BN63B6 | 122 |
| 62 | 14 | 2.7 | 14 | 2150 | VF 44_14 | P63 | K63B6 | 124 | VF 44_14 | P63 | BN63B6 | 124 |
| 66 | 13 | 1.4 | 20 | 1110 | VF 30_20 | P63 | K63A4 | 122 | VF 30_20 | P63 | BN63A4 | 122 |
| 66 | 13 | 2.9 | 20 | 2100 | VF 44_20 | P63 | K63A4 | 124 | VF 44_20 | P63 | BN63A4 | 124 |
| 87 | 10 | 1.8 | 15 | 1020 | VF 30_15 | P63 | K63A4 | 122 | VF 30_15 | P63 | BN63A4 | 122 |
| 94 | 10 | 2.9 | 14 | 1870 | VF 44_14 | P63 | K63A4 | 124 | VF 44_14 | P63 | BN63A4 | 124 |
| 124 | 8 | 2.4 | 7 | 900 | VF 30_7 | P63 | K63B6 | 122 | VF 30_7 | P63 | BN63B6 | 122 |
| 131 | 7 | 2.3 | 10 | 900 | VF 30_10 | P63 | K63A4 | 122 | VF 30_10 | P63 | BN63A4 | 122 |
| 138 | 6 | 1.1 | 20 | 560 | | — | | | VF 27_20 | P27 | BN27C2 | 120 |
| 138 | 7 | 2.2 | 20 | 840 | | — | | | VF 30_20 | P56 | BN56B2 | 122 |
| 183 | 5 | 1.4 | 15 | 520 | | — | | | VF 27_15 | P27 | BN27C2 | 120 |
| 187 | 5 | 3.1 | 7 | 810 | VF 30_7 | P63 | K63A4 | 122 | VF 30_7 | P63 | BN63A4 | 122 |
| 275 | 4 | 2.0 | 10 | 460 | | — | | | VF 27_10 | P27 | BN27C2 | 120 |
| 275 | 4 | 3.4 | 10 | 740 | | — | | | VF 30_10 | P56 | BN56B2 | 122 |
| 393 | 3 | 2.8 | 7 | 410 | | — | | | VF 27_7 | P27 | BN27C2 | 120 |
| 393 | 3 | 4.7 | 7 | 660 | | — | | | VF 30_7 | P56 | BN56B2 | 122 |

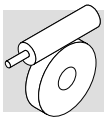
0.18 kW

| | | | | | | | | | | | |
|------|------|-----|------|-------|---|--|--|--|-----------------------|--------|-----|
| 0.28 | 978 | 1.9 | 3200 | 13800 | — | | | | W /VF 63/130_3200 P71 | BN71A6 | 157 |
| 0.28 | 1345 | 3.3 | 3200 | 19500 | — | | | | W /VF 86/185_3200 P71 | BN71A6 | 169 |
| 0.31 | 1406 | 1.9 | 2944 | 16000 | — | | | | W /VF 86/150_2944 P71 | BN71A6 | 163 |
| 0.35 | 1027 | 1.8 | 2560 | 13800 | — | | | | W /VF 63/130_2560 P71 | BN71A6 | 157 |
| 0.35 | 1320 | 3.3 | 2560 | 19500 | — | | | | W /VF 86/185_2560 P71 | BN71A6 | 169 |
| 0.47 | 875 | 1.1 | 2800 | 8000 | — | | | | VF/W 49/110_2800 P63 | BN63B4 | 151 |
| 0.49 | 1265 | 2.1 | 1840 | 16000 | — | | | | W /VF 86/150_1840 P71 | BN71A6 | 163 |
| 0.50 | 894 | 2.1 | 1800 | 13800 | — | | | | W /VF 63/130_1800 P71 | BN71A6 | 157 |
| 0.54 | 949 | 1.1 | 1656 | 8000 | — | | | | VF/W 49/110_1656 P71 | BN71A6 | 151 |
| 0.59 | 871 | 2.1 | 1520 | 13800 | — | | | | W /VF 63/130_1520 P71 | BN71A6 | 157 |


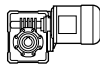







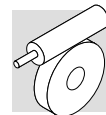
0.18 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|---|---|
| 0.64 | 755 | 1.3 | 2070 | 8000 | — | — | — | VF/W 49/110_2070 | P63 | BN63B4 | 151 |
| 0.65 | 1054 | 2.6 | 1380 | 16000 | — | — | — | W /VF 86/150_1380 | P71 | BN71A6 | 163 |
| 0.75 | 733 | 2.5 | 1200 | 13800 | — | — | — | W /VF 63/130_1200 | P71 | BN71A6 | 157 |
| 0.80 | 647 | 1.5 | 1656 | 8000 | — | — | — | VF/W 49/110_1656 | P63 | BN63B4 | 151 |
| 0.94 | 642 | 2.9 | 960 | 13800 | — | — | — | W /VF 63/130_960 | P71 | BN71A6 | 157 |
| 0.98 | 527 | 1.9 | 1350 | 8000 | — | — | — | VF/W 49/110_1350 | P63 | BN63B4 | 151 |
| 0.98 | 756 | 3.6 | 920 | 16000 | — | — | — | W /VF 86/150_920 | P71 | BN71A6 | 163 |
| 1.2 | 537 | 3.4 | 760 | 13800 | — | — | — | W /VF 63/130_760 | P71 | BN71A6 | 157 |
| 1.2 | 436 | 2.3 | 1080 | 8000 | — | — | — | VF/W 49/110_1080 | P63 | BN63B4 | 151 |
| 1.4 | 479 | 1.0 | 920 | 7000 | — | — | — | VF/W 44/86_920 | P63 | BN63B4 | 147 |
| 1.7 | 391 | 1.4 | 525 | 7000 | — | — | — | VF/W 44/86_525 | P71 | BN71A6 | 147 |
| 1.8 | 375 | 2.7 | 720 | 8000 | — | — | — | VF/W 49/110_720 | P63 | BN63B4 | 151 |
| 1.9 | 356 | 1.4 | 700 | 7000 | — | — | — | VF/W 44/86_700 | P63 | BN63B4 | 147 |
| 2.3 | 321 | 1.2 | 400 | 5750 | — | — | — | VF/W 44/75_400 | P71 | BN71A6 | 143 |
| 2.3 | 313 | 1.8 | 400 | 7000 | — | — | — | VF/W 44/86_400 | P71 | BN71A6 | 147 |
| 2.3 | 344 | 3.1 | 400 | 8000 | — | — | — | VF/W 49/110_400 | P71 | BN71A6 | 151 |
| 2.4 | 288 | 3.5 | 540 | 8000 | — | — | — | VF/W 49/110_540 | P63 | BN63B4 | 151 |
| 2.5 | 301 | 1.2 | 525 | 5750 | — | — | — | VF/W 44/75_525 | P63 | BN63B4 | 143 |
| 2.5 | 287 | 1.7 | 525 | 7000 | — | — | — | VF/W 44/86_525 | P63 | BN63B4 | 147 |
| 3.0 | 258 | 1.2 | 300 | 7000 | — | — | — | WR 86_300 | P71 | BN71A6 | 146 |
| 3.0 | 264 | 1.5 | 300 | 5750 | — | — | — | VF/W 44/75_300 | P71 | BN71A6 | 143 |
| 3.0 | 275 | 2.1 | 300 | 8000 | — | — | — | WR 110_300 | P71 | BN71A6 | 150 |
| 3.0 | 241 | 2.3 | 300 | 7000 | — | — | — | VF/W 44/86_300 | P71 | BN71A6 | 147 |
| 3.0 | 269 | 3.9 | 300 | 8000 | — | — | — | VF/W 49/110_300 | P71 | BN71A6 | 151 |
| 3.3 | 240 | 1.5 | 400 | 5750 | — | — | — | VF/W 44/75_400 | P63 | BN63B4 | 143 |
| 3.3 | 214 | 2.3 | 400 | 7000 | — | — | — | VF/W 44/86_400 | P63 | BN63B4 | 147 |
| 3.8 | 206 | 1.1 | 240 | 6200 | — | — | — | WR 75_240 | P71 | BN71A6 | 142 |
| 3.8 | 229 | 1.4 | 240 | 7000 | — | — | — | WR 86_240 | P71 | BN71A6 | 146 |
| 3.8 | 243 | 2.4 | 240 | 8000 | — | — | — | WR 110_240 | P71 | BN71A6 | 150 |
| 3.9 | 233 | 2.4 | 230 | 7000 | — | — | — | VF/W 44/86_230 | P71 | BN71A6 | 147 |
| 4.2 | 172 | 1.2 | 315 | 5000 | — | — | — | VF/W 30/63_315 | P63 | BN63B4 | 139 |
| 4.4 | 172 | 1.0 | 300 | 6200 | — | — | — | WR 75_300 | P63 | BN63B4 | 142 |
| 4.4 | 191 | 1.4 | 300 | 7000 | — | — | — | WR 86_300 | P63 | BN63B4 | 146 |
| 4.4 | 199 | 1.9 | 300 | 5750 | — | — | — | VF/W 44/75_300 | P63 | BN63B4 | 143 |
| 4.4 | 176 | 2.8 | 300 | 7000 | — | — | — | VF/W 44/86_300 | P63 | BN63B4 | 147 |
| 4.7 | 202 | 1.9 | 192 | 7000 | — | — | — | WR 86_192 | P71 | BN71A6 | 146 |
| 5.0 | 175 | 1.6 | 180 | 6200 | — | — | — | WR 75_180 | P71 | BN71A6 | 142 |
| 5.3 | 186 | 2.0 | 250 | 5750 | — | — | — | VF/W 44/75_250 | P63 | BN63B4 | 143 |
| 5.4 | 183 | 2.1 | 168 | 7000 | — | — | — | WR 86_168 | P71 | BN71A6 | 146 |
| 5.5 | 144 | 0.9 | 240 | 5000 | — | — | — | WR 63_240 | P63 | BN63B4 | 138 |
| 5.5 | 153 | 1.4 | 240 | 6200 | — | — | — | WR 75_240 | P63 | BN63B4 | 142 |
| 5.5 | 147 | 1.4 | 240 | 5000 | — | — | — | VF/W 30/63_240 | P63 | BN63B4 | 139 |
| 5.5 | 166 | 1.8 | 240 | 7000 | — | — | — | WR 86_240 | P63 | BN63B4 | 146 |
| 5.7 | 162 | 3.1 | 230 | 7000 | — | — | — | VF/W 44/86_230 | P63 | BN63B4 | 147 |
| 6.0 | 158 | 2.0 | 150 | 6200 | — | — | — | WR 75_150 | P71 | BN71A6 | 142 |
| 6.5 | 161 | 2.7 | 138 | 7000 | — | — | — | WR 86_138 | P71 | BN71A6 | 146 |
| 6.9 | 128 | 1.2 | 192 | 5000 | — | — | — | WR 63_192 | P63 | BN63B4 | 138 |
| 6.9 | 145 | 2.3 | 192 | 7000 | — | — | — | WR 86_192 | P63 | BN63B4 | 146 |
| 7.3 | 129 | 1.8 | 180 | 6200 | — | — | — | WR 75_180 | P63 | BN63B4 | 142 |
| 7.5 | 138 | 2.4 | 120 | 6200 | — | — | — | WR 75_120 | P71 | BN71A6 | 142 |










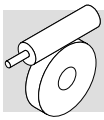
0.18 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|---|---|-----|
| 7.9 | 131 | 2.7 | 168 | 7000 | | — | | | WR 86_168 | P63 | BN63B4 | 146 |
| 7.9 | 126 | 1.6 | 114 | 5000 | | — | | | WR 63_114 | P71 | BN71A6 | 138 |
| 8.8 | 113 | 2.3 | 150 | 6200 | | — | | | WR 75_150 | P63 | BN63B4 | 142 |
| 9.0 | 88 | 1.4 | 100 | 5000 | W63_100 | S1 | M1SC6 | 136 | W 63_100 | P71 | BN71A6 | 137 |
| 9.0 | 96 | 1.7 | 100 | 6200 | W75_100 | S1 | M1SC6 | 140 | W 75_100 | P71 | BN71A6 | 141 |
| 9.0 | 105 | 2.4 | 100 | 7000 | W86_100 | S1 | M1SC6 | 144 | W 86_100 | P71 | BN71A6 | 145 |
| 9.8 | 102 | 1.7 | 135 | 5000 | | — | | | WR 63_135 | P63 | BN63B4 | 138 |
| 10.0 | 107 | 1.9 | 90 | 5000 | | — | | | WR 63_90 | P71 | BN71A6 | 138 |
| 11.0 | 98 | 3.1 | 120 | 6200 | | — | | | WR 75_120 | P63 | BN63B4 | 142 |
| 11.3 | 79 | 1.6 | 80 | 5000 | W63_80 | S1 | M1SC6 | 136 | W 63_80 | P71 | BN71A6 | 137 |
| 11.3 | 83 | 2.4 | 80 | 6200 | W75_80 | S1 | M1SC6 | 140 | W 75_80 | P71 | BN71A6 | 141 |
| 11.3 | 90 | 3.1 | 80 | 7000 | W86_80 | S1 | M1SC6 | 144 | W 86_80 | P71 | BN71A6 | 145 |
| 11.6 | 91 | 2.0 | 114 | 5000 | | — | | | WR 63_114 | P63 | BN63B4 | 138 |
| 12.0 | 100 | 3.3 | 75 | 6200 | | — | | | WR 75_75 | P71 | BN71A6 | 142 |
| 12.2 | 82 | 1.0 | 108 | 3450 | | — | | | VFR 49_108 | P63 | BN63B4 | 132 |
| 14.7 | 75 | 2.5 | 90 | 5000 | | — | | | WR 63_90 | P63 | BN63B4 | 138 |
| 15.0 | 61 | 1.1 | 60 | 3000 | VF 49_60 | P71 | K71A6 | 130 | VF 49_60 | P71 | BN71A6 | 130 |
| 15.0 | 60 | 1.1 | 180 | 3300 | | — | | | VFR 49_180 | P63 | BN63A2 | 132 |
| 15.7 | 68 | 1.3 | 84 | 3420 | | — | | | VFR 49_84 | P63 | BN63B4 | 132 |
| 16.5 | 54 | 1.0 | 80 | 3150 | VF 49_80 | P63 | K63B4 | 130 | VF 49_80 | P63 | BN63B4 | 130 |
| 18.3 | 63 | 1.2 | 72 | 3270 | | — | | | VFR 49_72 | P63 | BN63B4 | 132 |
| 18.3 | 66 | 2.8 | 72 | 5000 | | — | | | WR 63_72 | P63 | BN63B4 | 138 |
| 18.9 | 49 | 1.1 | 70 | 3150 | VF 49_70 | P63 | K63B4 | 130 | VF 49_70 | P63 | BN63B4 | 130 |
| 20.0 | 50 | 1.4 | 135 | 3280 | | — | | | VFR 49_135 | P63 | BN63A2 | 132 |
| 20.0 | 54 | 2.9 | 45 | 5000 | W63_45 | S1 | M1SC6 | 136 | W 63_45 | P71 | BN71A6 | 137 |
| 22.0 | 45 | 0.9 | 60 | 2300 | | — | | 124 | VF 44_60 | P63 | BN63B4 | 124 |
| 22.0 | 45 | 1.3 | 60 | 3150 | VF 49_60 | P63 | K63B4 | 130 | VF 49_60 | P63 | BN63B4 | 130 |
| 23.2 | 54 | 3.3 | 57 | 4910 | | — | | | WR 63_57 | P63 | BN63B4 | 138 |
| 24.4 | 50 | 1.5 | 54 | 3010 | | — | | | VFR 49_54 | P63 | BN63B4 | 132 |
| 28.7 | 38 | 1.0 | 46 | 2500 | VF 44_46 | P63 | K63B4 | 124 | VF 44_46 | P63 | BN63B4 | 124 |
| 29.3 | 37 | 1.8 | 45 | 2300 | VF 49_45 | P63 | K63B4 | 130 | VF 49_45 | P63 | BN63B4 | 130 |
| 31 | 40 | 1.9 | 42 | 2810 | | — | | | VFR 49_42 | P63 | BN63B4 | 132 |
| 32 | 36 | 1.4 | 28 | 2290 | VF 44_28 | P71 | K71A6 | 124 | VF 44_28 | P71 | BN71A6 | 124 |
| 37 | 31 | 2.2 | 36 | 2760 | VF 49_36 | P63 | K63B4 | 130 | VF 49_36 | P63 | BN63B4 | 130 |
| 38 | 31 | 1.3 | 35 | 2430 | VF 44_35 | P63 | K63B4 | 124 | VF 44_35 | P63 | BN63B4 | 124 |
| 47 | 26 | 1.5 | 28 | 2270 | VF 44_28 | P63 | K63B4 | 124 | VF 44_28 | P63 | BN63B4 | 124 |
| 47 | 26 | 2.9 | 28 | 2560 | VF 49_28 | P63 | K63B4 | 130 | VF 49_28 | P63 | BN63B4 | 130 |
| 55 | 23 | 2.7 | 24 | 2430 | VF 49_24 | P63 | K63B4 | 130 | VF 49_24 | P63 | BN63B4 | 130 |
| 66 | 19 | 0.9 | 20 | 1040 | VF 30_20 | P63 | K63B4 | 122 | VF 30_20 | P63 | BN63B4 | 122 |
| 66 | 20 | 1.9 | 20 | 2040 | VF 44_20 | P63 | K63B4 | 124 | VF 44_20 | P63 | BN63B4 | 124 |
| 73 | 18 | 3.2 | 18 | 2230 | VF 49_18 | P63 | K63B4 | 130 | VF 49_18 | P63 | BN63B4 | 130 |
| 77 | 16 | 1.8 | 35 | 1970 | VF 44_35 | P63 | K63A2 | 124 | VF 44_35 | P63 | BN63A2 | 124 |
| 88 | 15 | 1.2 | 15 | 960 | VF 30_15 | P63 | K63B4 | 122 | VF 30_15 | P63 | BN63B4 | 122 |
| 94 | 15 | 2.0 | 14 | 1830 | VF 44_14 | P63 | K63B4 | 124 | VF 44_14 | P63 | BN63B4 | 124 |
| 132 | 11 | 1.5 | 10 | 860 | VF 30_10 | P63 | K63B4 | 122 | VF 30_10 | P63 | BN63B4 | 122 |
| 132 | 11 | 2.7 | 10 | 1640 | VF 44_10 | P63 | K63B4 | 124 | VF 44_10 | P63 | BN63B4 | 124 |
| 189 | 8 | 2.1 | 7 | 770 | VF 30_7 | P63 | K63B4 | 122 | VF 30_7 | P63 | BN63B4 | 122 |
| 193 | 7 | 2.9 | 14 | 1470 | VF 44_14 | P63 | K63A2 | 124 | VF 44_14 | P63 | BN63A2 | 124 |
| 270 | 5 | 2.2 | 10 | 710 | VF 30_10 | P63 | K63A2 | 122 | VF 30_10 | P63 | BN63A2 | 122 |
| 386 | 4 | 3.1 | 7 | 640 | VF 30_7 | P63 | K63A2 | 122 | VF 30_7 | P63 | BN63A2 | 122 |










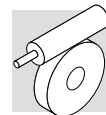
0.25 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|---|---|
| 0.28 | 1358 | 1.4 | 3200 | 13800 | — | — | — | W /VF 63/130_3200 P71 | BN71B6 | 157 | |
| 0.28 | 1868 | 2.4 | 3200 | 19500 | — | — | — | W /VF 86/185_3200 P71 | BN71B6 | 169 | |
| 0.31 | 1952 | 1.4 | 2944 | 16000 | — | — | — | W /VF 86/150_2944 P71 | BN71B6 | 163 | |
| 0.43 | 945 | 1.9 | 3200 | 13800 | — | — | — | W /VF 63/130_3200 P71 | BN71A4 | 157 | |
| 0.43 | 1334 | 3.1 | 3200 | 19500 | — | — | — | W /VF 86/185_3200 P71 | BN71A4 | 169 | |
| 0.47 | 1380 | 1.9 | 2944 | 16000 | — | — | — | W /VF 86/150_2944 P71 | BN71A4 | 163 | |
| 0.49 | 1562 | 2.8 | 1840 | 19500 | — | — | — | W /VF 86/185_1840 P71 | BN71B6 | 169 | |
| 0.54 | 1022 | 1.8 | 2560 | 13800 | — | — | — | W /VF 63/130_2560 P71 | BN71A4 | 157 | |
| 0.54 | 1289 | 3.3 | 2560 | 19500 | — | — | — | W /VF 86/185_2560 P71 | BN71A4 | 169 | |
| 0.65 | 1464 | 1.8 | 1380 | 16000 | — | — | — | W /VF 86/150_1380 P71 | BN71B6 | 163 | |
| 0.66 | 1006 | 1.0 | 2070 | 8000 | — | — | — | VF/W 49/110_2070 P71 | BN71A4 | 151 | |
| 0.75 | 1214 | 2.1 | 1840 | 16000 | — | — | — | W /VF 86/150_1840 P71 | BN71A4 | 163 | |
| 0.75 | 1019 | 1.8 | 1200 | 13800 | — | — | — | W /VF 63/130_1200 P71 | BN71B6 | 157 | |
| 0.76 | 875 | 2.1 | 1800 | 13800 | — | — | — | W /VF 63/130_1800 P71 | BN71A4 | 157 | |
| 0.83 | 863 | 1.2 | 1656 | 8000 | — | — | — | VF/W 49/110_1656 P71 | BN71A4 | 151 | |
| 0.90 | 845 | 2.1 | 1520 | 13800 | — | — | — | W /VF 63/130_1520 P71 | BN71A4 | 157 | |
| 0.98 | 1049 | 2.6 | 920 | 16000 | — | — | — | W /VF 86/150_920 P71 | BN71B6 | 163 | |
| 1.0 | 1006 | 2.6 | 1380 | 16000 | — | — | — | W /VF 86/150_1380 P71 | BN71A4 | 163 | |
| 1.0 | 703 | 1.4 | 1350 | 8000 | — | — | — | VF/W 49/110_1350 P71 | BN71A4 | 151 | |
| 1.1 | 708 | 2.5 | 1200 | 13800 | — | — | — | W /VF 63/130_1200 P71 | BN71A4 | 157 | |
| 1.2 | 746 | 2.5 | 760 | 13800 | — | — | — | W /VF 63/130_760 P71 | BN71B6 | 157 | |
| 1.3 | 581 | 1.7 | 1080 | 8000 | — | — | — | VF/W 49/110_1080 P71 | BN71A4 | 151 | |
| 1.3 | 860 | 3.1 | 690 | 16000 | — | — | — | W /VF 86/150_690 P71 | BN71B6 | 163 | |
| 1.4 | 617 | 2.9 | 960 | 13800 | — | — | — | W /VF 63/130_960 P71 | BN71A4 | 157 | |
| 1.7 | 544 | 1.9 | 540 | 8000 | — | — | — | VF/W 49/110_540 P71 | BN71B6 | 151 | |
| 1.7 | 543 | 1.0 | 525 | 7000 | — | — | — | VF/W 44/86_525 P71 | BN71B6 | 147 | |
| 1.8 | 515 | 3.5 | 760 | 13800 | — | — | — | W /VF 63/130_760 P71 | BN71A4 | 157 | |
| 1.9 | 500 | 2.0 | 720 | 8000 | — | — | — | VF/W 49/110_720 P71 | BN71A4 | 151 | |
| 2.0 | 474 | 1.1 | 700 | 7000 | — | — | — | VF/W 44/86_700 P71 | BN71A4 | 147 | |
| 2.5 | 384 | 2.6 | 540 | 8000 | — | — | — | VF/W 49/110_540 P71 | BN71A4 | 151 | |
| 2.6 | 383 | 1.3 | 525 | 7000 | — | — | — | VF/W 44/86_525 P71 | BN71A4 | 147 | |
| 3.0 | 366 | 1.1 | 300 | 5750 | — | — | — | VF/W 44/75_300 P71 | BN71B6 | 143 | |
| 3.0 | 382 | 1.5 | 300 | 8000 | — | — | — | WR 110_300 P71 | BN71B6 | 150 | |
| 3.0 | 374 | 2.8 | 300 | 8000 | — | — | — | VF/W 49/110_300 P71 | BN71B6 | 151 | |
| 3.4 | 319 | 1.2 | 400 | 5750 | — | — | — | VF/W 44/75_400 P71 | BN71A4 | 143 | |
| 3.4 | 285 | 1.8 | 400 | 7000 | — | — | — | VF/W 44/86_400 P71 | BN71A4 | 147 | |
| 3.4 | 313 | 3.2 | 400 | 8000 | — | — | — | VF/W 49/110_400 P71 | BN71A4 | 151 | |
| 3.8 | 318 | 1.0 | 240 | 7000 | — | — | — | WR 86_240 P71 | BN71B6 | 146 | |
| 3.8 | 337 | 1.7 | 240 | 8000 | — | — | — | WR 110_240 P71 | BN71B6 | 150 | |
| 3.9 | 323 | 1.7 | 230 | 7000 | — | — | — | VF/W 44/86_230 P71 | BN71B6 | 147 | |
| 3.9 | 311 | 3.4 | 230 | 8000 | — | — | — | VF/W 49/110_230 P71 | BN71B6 | 151 | |
| 4.6 | 255 | 1.1 | 300 | 7000 | — | — | — | WR 86_300 P71 | BN71A4 | 146 | |
| 4.6 | 266 | 1.4 | 300 | 5750 | — | — | — | VF/W 44/75_300 P71 | BN71A4 | 143 | |
| 4.6 | 266 | 2.1 | 300 | 8000 | — | — | — | WR 110_300 P71 | BN71A4 | 150 | |
| 4.6 | 234 | 2.1 | 300 | 7000 | — | — | — | VF/W 44/86_300 P71 | BN71A4 | 147 | |
| 4.7 | 280 | 1.4 | 192 | 7000 | — | — | — | WR 86_192 P71 | BN71B6 | 146 | |
| 5.5 | 247 | 1.5 | 250 | 5750 | — | — | — | VF/W 44/75_250 P71 | BN71A4 | 143 | |
| 5.7 | 204 | 1.1 | 240 | 6200 | — | — | — | WR 75_240 P71 | BN71A4 | 142 | |
| 5.7 | 221 | 1.4 | 240 | 7000 | — | — | — | WR 86_240 P71 | BN71A4 | 146 | |
| 5.7 | 233 | 2.4 | 240 | 8000 | — | — | — | WR 110_240 P71 | BN71A4 | 150 | |










0.25 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|---|---|-----|
| 6.0 | 216 | 2.3 | 230 | 7000 | | — | | | VF/W 44/86_230 | P71 | BN71A4 | 147 |
| 6.0 | 219 | 1.4 | 150 | 6200 | | — | | | WR 75_150 | P71 | BN71B6 | 142 |
| 6.7 | 193 | 0.9 | 135 | 5000 | | — | | | WR 63_135 | P71 | BN71B6 | 138 |
| 7.2 | 193 | 1.7 | 192 | 7000 | | — | | | WR 86_192 | P71 | BN71A4 | 146 |
| 7.2 | 200 | 3.1 | 192 | 8000 | | — | | | WR 110_192 | P71 | BN71A4 | 150 |
| 7.6 | 172 | 1.4 | 180 | 6200 | | — | | | WR 75_180 | P71 | BN71A4 | 142 |
| 7.9 | 175 | 1.1 | 114 | 5000 | | — | | | WR 63_114 | P71 | BN71B6 | 138 |
| 8.2 | 175 | 2.0 | 168 | 7000 | | — | | | WR 86_168 | P71 | BN71A4 | 146 |
| 9.0 | 122 | 1.0 | 100 | 5000 | W63_100 | S1 | M1SD6 | 136 | — | — | — | |
| 9.0 | 133 | 1.2 | 100 | 6200 | W75_100 | S1 | M1SD6 | 140 | W 75_100 | P71 | BN71B6 | 141 |
| 9.0 | 146 | 1.7 | 100 | 7000 | W86_100 | S1 | M1SD6 | 144 | W 86_100 | P71 | BN71B6 | 145 |
| 9.2 | 151 | 1.7 | 150 | 6200 | | — | | | WR 75_150 | P71 | BN71A4 | 142 |
| 10.0 | 151 | 2.7 | 138 | 7000 | | — | | | WR 86_138 | P71 | BN71A4 | 146 |
| 10.0 | 160 | 2.3 | 90 | 6200 | | — | | | WR 75_90 | P71 | BN71B6 | 142 |
| 10.2 | 136 | 1.3 | 135 | 5000 | | — | | | WR 63_135 | P71 | BN71A4 | 138 |
| 11.3 | 110 | 1.1 | 80 | 5000 | W63_80 | S1 | M1SD6 | 136 | — | — | — | |
| 11.3 | 115 | 1.7 | 80 | 6200 | W75_80 | S1 | M1SD6 | 140 | W 75_80 | P71 | BN71B6 | 141 |
| 11.3 | 125 | 2.2 | 80 | 7000 | W86_80 | S1 | M1SD6 | 144 | W 86_80 | P71 | BN71B6 | 145 |
| 11.5 | 131 | 2.3 | 120 | 6200 | | — | | | WR 75_120 | P71 | BN71A4 | 142 |
| 11.5 | 138 | 2.8 | 120 | 7000 | | — | | | WR 86_120 | P71 | BN71A4 | 146 |
| 12.1 | 121 | 1.5 | 114 | 5000 | | — | | | WR 63_114 | P71 | BN71A4 | 138 |
| 13.8 | 89 | 1.3 | 100 | 5000 | | — | | | W 63_100 | P71 | BN71A4 | 137 |
| 13.8 | 96 | 1.6 | 100 | 6200 | | — | | | W 75_100 | P71 | BN71A4 | 141 |
| 13.8 | 102 | 2.2 | 100 | 7000 | | — | | | W 86_100 | P71 | BN71A4 | 145 |
| 15.3 | 100 | 1.9 | 90 | 5000 | | — | | | WR 63_90 | P71 | BN71A4 | 138 |
| 15.3 | 108 | 3.0 | 90 | 6200 | | — | | | WR 75_90 | P71 | BN71A4 | 142 |
| 17.2 | 78 | 1.5 | 80 | 5000 | | — | | | W 63_80 | P71 | BN71A4 | 137 |
| 17.2 | 82 | 2.2 | 80 | 6200 | | — | | | W 75_80 | P71 | BN71A4 | 141 |
| 17.2 | 89 | 2.9 | 80 | 7000 | | — | | | W 86_80 | P71 | BN71A4 | 145 |
| 18.3 | 95 | 3.1 | 75 | 6200 | | — | | | WR 75_75 | P71 | BN71A4 | 142 |
| 19.1 | 88 | 2.1 | 72 | 5000 | | — | | | WR 63_72 | P71 | BN71A4 | 138 |
| 20.0 | 70 | 1.0 | 45 | 3150 | VF 49_45 | P71 | K71B6 | 130 | — | — | — | |
| 21.5 | 68 | 1.8 | 64 | 5000 | | — | | | W 63_64 | P71 | BN71A4 | 137 |
| 22.0 | 63 | 0.9 | 60 | 3150 | VF 49_60 | P63 | K63C4 | 130 | — | — | — | |
| 22.9 | 68 | 3.0 | 60 | 6200 | | — | | | W 75_60 | P71 | BN71A4 | 141 |
| 24.1 | 72 | 2.5 | 57 | 4780 | | — | | | WR 63_57 | P71 | BN71A4 | 138 |
| 29.3 | 51 | 1.3 | 45 | 2850 | VF 49_45 | P63 | K63C4 | 130 | — | — | — | |
| 31 | 52 | 2.8 | 45 | 4550 | | — | | | W 63_45 | P71 | BN71A4 | 137 |
| 31 | 59 | 3.0 | 45 | 4460 | | — | | | WR 63_45 | P71 | BN71A4 | 138 |
| 32 | 50 | 1.0 | 28 | 2300 | VF 44_28 | P71 | K71B6 | 124 | VF 44_28 | P71 | BN71B6 | 124 |
| 36 | 46 | 3.4 | 38 | 4320 | | — | | | W 63_38 | P71 | BN71A4 | 137 |
| 37 | 44 | 1.6 | 36 | 2670 | VF 49_36 | P63 | K63C4 | 130 | VF 49_36 | P71 | BN71A4 | 130 |
| 38 | 43 | 0.9 | 35 | 2300 | VF 44_35 | P63 | K63C4 | 124 | VF 44_35 | P71 | BN71A4 | 124 |
| 38 | 49 | 3.3 | 36 | 4160 | | — | | | WR 63_36 | P71 | BN71A4 | 138 |
| 45 | 39 | 1.1 | 20 | 2190 | VF 44_20 | P71 | K71B6 | 124 | VF 44_20 | P71 | BN71B6 | 124 |
| 47 | 36 | 1.1 | 28 | 2190 | VF 44_28 | P63 | K63C4 | 124 | VF 44_28 | P71 | BN71A4 | 124 |
| 47 | 36 | 2.1 | 28 | 2480 | VF 49_28 | P63 | K63C4 | 130 | VF 49_28 | P71 | BN71A4 | 130 |
| 55 | 33 | 1.9 | 24 | 2360 | VF 49_24 | P63 | K63C4 | 130 | VF 49_24 | P71 | BN71A4 | 130 |
| 64 | 29 | 1.3 | 14 | 1980 | VF 44_14 | P71 | K71B6 | 124 | VF 44_14 | P71 | BN71B6 | 124 |
| 64 | 29 | 2.5 | 14 | 2260 | VF 49_14 | P71 | K71B6 | 130 | VF 49_14 | P71 | BN71B6 | 130 |

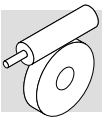


0.25 kW








| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|---|---|-----|
| 66 | 28 | 1.4 | 20 | 1970 | VF 44_20 | P63 | K63C4 | 124 | VF 44_20 | P71 | BN71A4 | 124 |
| 73 | 25 | 2.3 | 18 | 2170 | VF 49_18 | P63 | K63C4 | 130 | VF 49_18 | P71 | BN71A4 | 130 |
| 77 | 23 | 1.3 | 35 | 1930 | VF 44_35 | P63 | K63B2 | 124 | VF 44_35 | P63 | BN63B2 | 124 |
| 90 | 22 | 1.8 | 10 | 1780 | VF 44_10 | P71 | K71B6 | 124 | VF 44_10 | P71 | BN71B6 | 124 |
| 90 | 22 | 2.9 | 10 | 2040 | VF 49_10 | P71 | K71B6 | 130 | VF 49_10 | P71 | BN71B6 | 130 |
| 94 | 21 | 1.4 | 14 | 1770 | VF 44_14 | P63 | K63C4 | 124 | VF 44_14 | P71 | BN71A4 | 124 |
| 94 | 21 | 3.2 | 14 | 2010 | VF 49_14 | P63 | K63C4 | 130 | VF 49_14 | P71 | BN71A4 | 130 |
| 113 | 17 | 2.8 | 24 | 1930 | VF 49_24 | P63 | K63B2 | 130 | VF 49_24 | P63 | BN63B2 | 130 |
| 129 | 16 | 2.5 | 7 | 1590 | VF 44_7 | P71 | K71B6 | 124 | VF 44_7 | P71 | BN71B6 | 124 |
| 132 | 15 | 1.9 | 10 | 1590 | VF 44_10 | P63 | K63C4 | 124 | VF 44_10 | P71 | BN71A4 | 124 |
| 135 | 14 | 1.0 | 20 | 840 | VF 30_20 | P63 | K63B2 | 122 | VF 30_20 | P63 | BN63B2 | 122 |
| 180 | 11 | 1.3 | 15 | 780 | VF 30_15 | P63 | K63B2 | 122 | VF 30_15 | P63 | BN63B2 | 122 |
| 189 | 11 | 2.7 | 7 | 1420 | VF 44_7 | P63 | K63C4 | 124 | VF 44_7 | P71 | BN71A4 | 124 |
| 270 | 8 | 1.6 | 10 | 690 | VF 30_10 | P63 | K63B2 | 122 | VF 30_10 | P63 | BN63B2 | 122 |
| 270 | 8 | 2.9 | 10 | 1300 | VF 44_10 | P63 | K63B2 | 124 | VF 44_10 | P63 | BN63B2 | 124 |
| 386 | 5 | 2.2 | 7 | 620 | VF 30_7 | P63 | K63B2 | 122 | VF 30_7 | P63 | BN63B2 | 122 |

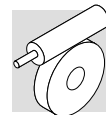
0.37 kW

| | | | | | | | | | | |
|------|------|-----|------|-------|---|---|---|-----------------------|--------|-----|
| 0.28 | 2734 | 1.6 | 3200 | 19500 | — | — | — | W /VF 86/185_3200 P80 | BN80A6 | 169 |
| 0.31 | 2858 | 0.9 | 2944 | 16000 | — | — | — | W /VF 86/150_2944 P80 | BN80A6 | 163 |
| 0.36 | 2684 | 1.6 | 2560 | 19500 | — | — | — | W /VF 86/185_2560 P80 | BN80A6 | 169 |
| 0.43 | 1403 | 1.3 | 3200 | 13800 | — | — | — | W /VF 63/130_3200 P71 | BN71B4 | 157 |
| 0.43 | 1981 | 2.1 | 3200 | 19500 | — | — | — | W /VF 86/185_3200 P71 | BN71B4 | 169 |
| 0.47 | 2050 | 1.3 | 2944 | 16000 | — | — | — | W /VF 86/150_2944 P71 | BN71B4 | 163 |
| 0.54 | 1519 | 1.2 | 2560 | 13800 | — | — | — | W /VF 63/130_2560 P71 | BN71B4 | 157 |
| 0.54 | 1915 | 2.2 | 2560 | 19500 | — | — | — | W /VF 86/185_2560 P71 | BN71B4 | 169 |
| 0.60 | 1771 | 1.0 | 1520 | 13800 | — | — | — | W /VF 63/130_1520 P80 | BN80A6 | 157 |
| 0.66 | 2143 | 1.3 | 1380 | 16000 | — | — | — | W /VF 86/150_1380 P80 | BN80A6 | 163 |
| 0.74 | 1803 | 1.4 | 1840 | 16000 | — | — | — | W /VF 86/150_1840 P71 | BN71B4 | 163 |
| 0.74 | 1614 | 2.6 | 1840 | 19500 | — | — | — | W /VF 86/185_1840 P71 | BN71B4 | 169 |
| 0.76 | 1300 | 1.4 | 1800 | 13800 | — | — | — | W /VF 63/130_1800 P71 | BN71B4 | 157 |
| 0.86 | 1444 | 2.9 | 1600 | 19500 | — | — | — | W /VF 86/185_1600 P71 | BN71B4 | 169 |
| 0.90 | 1255 | 1.4 | 1520 | 13800 | — | — | — | W /VF 63/130_1520 P71 | BN71B4 | 157 |
| 0.99 | 1357 | 3.2 | 920 | 19500 | — | — | — | W /VF 86/185_920 P80 | BN80A6 | 169 |
| 0.99 | 1495 | 1.7 | 1380 | 16000 | — | — | — | W /VF 86/150_1380 P71 | BN71B4 | 163 |
| 1.0 | 1045 | 1.0 | 1350 | 8000 | — | — | — | VF/W 49/110_1350 P71 | BN71B4 | 151 |
| 1.1 | 1052 | 1.7 | 1200 | 13800 | — | — | — | W /VF 63/130_1200 P71 | BN71B4 | 157 |
| 1.3 | 864 | 1.2 | 1080 | 8000 | — | — | — | VF/W 49/110_1080 P71 | BN71B4 | 151 |
| 1.3 | 1259 | 2.1 | 690 | 16000 | — | — | — | W /VF 86/150_690 P80 | BN80A6 | 163 |
| 1.4 | 916 | 2.0 | 960 | 13800 | — | — | — | W /VF 63/130_960 P71 | BN71B4 | 157 |
| 1.5 | 1068 | 2.4 | 920 | 16000 | — | — | — | W /VF 86/150_920 P71 | BN71B4 | 163 |
| 1.7 | 797 | 1.3 | 540 | 8000 | — | — | — | VF/W 49/110_540 P80 | BN80A6 | 151 |
| 1.7 | 1068 | 2.5 | 529 | 16000 | — | — | — | W /VF 86/150_529 P80 | BN80A6 | 163 |
| 1.8 | 764 | 2.4 | 760 | 13800 | — | — | — | W /VF 63/130_760 P71 | BN71B4 | 157 |
| 1.9 | 743 | 1.3 | 720 | 8000 | — | — | — | VF/W 49/110_720 P71 | BN71B4 | 151 |
| 2.0 | 890 | 2.9 | 690 | 16000 | — | — | — | W /VF 86/150_690 P71 | BN71B4 | 163 |
| 2.3 | 619 | 2.9 | 600 | 13800 | — | — | — | W /VF 63/130_600 P71 | BN71B4 | 157 |










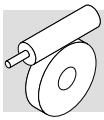
0.37 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|---|---|-----|
| 2.5 | 571 | 1.8 | 540 | 8000 | | — | | | | | | |
| 2.6 | 750 | 3.5 | 529 | 16000 | | — | | | | | | |
| 3.0 | 559 | 1.0 | 300 | 8000 | | — | | | | | | |
| 3.0 | 571 | 1.8 | 300 | 13800 | | — | | | | | | |
| 3.0 | 547 | 1.9 | 300 | 8000 | | — | | | | | | |
| 3.4 | 423 | 1.2 | 400 | 7000 | | — | | | | | | |
| 3.4 | 464 | 2.2 | 400 | 8000 | | — | | | | | | |
| 3.8 | 494 | 1.2 | 240 | 8000 | | — | | | | | | |
| 3.8 | 503 | 2.4 | 240 | 13800 | | — | | | | | | |
| 4.0 | 455 | 2.3 | 230 | 8000 | | — | | | | | | |
| 4.6 | 395 | 1.4 | 300 | 8000 | | — | | | | | | |
| 4.6 | 348 | 1.4 | 300 | 7000 | | — | | | | | | |
| 4.6 | 371 | 2.7 | 300 | 8000 | | — | | | | | | |
| 4.7 | 410 | 1.0 | 192 | 7000 | | — | | | | | | |
| 4.7 | 425 | 1.6 | 192 | 8000 | | — | | | | | | |
| 4.7 | 432 | 3.0 | 192 | 13800 | | — | | | | | | |
| 5.4 | 372 | 1.0 | 168 | 7000 | | — | | | | | | |
| 5.4 | 391 | 2.0 | 168 | 8000 | | — | | | | | | |
| 5.4 | 391 | 3.4 | 168 | 13800 | | — | | | | | | |
| 5.7 | 328 | 0.9 | 240 | 7000 | | — | | | | | | |
| 5.7 | 347 | 1.6 | 240 | 8000 | | — | | | | | | |
| 6.0 | 320 | 1.6 | 230 | 7000 | | — | | | | | | |
| 6.0 | 308 | 3.2 | 230 | 8000 | | — | | | | | | |
| 6.1 | 320 | 1.0 | 150 | 6200 | | — | | | | | | |
| 6.6 | 327 | 1.3 | 138 | 7000 | | — | | | | | | |
| 6.6 | 338 | 2.4 | 138 | 8000 | | — | | | | | | |
| 7.1 | 287 | 1.1 | 192 | 7000 | | — | | | | | | |
| 7.1 | 297 | 2.1 | 192 | 8000 | | — | | | | | | |
| 7.6 | 294 | 1.5 | 120 | 7000 | | — | | | | | | |
| 7.6 | 303 | 2.9 | 120 | 8000 | | — | | | | | | |
| 7.6 | 255 | 0.9 | 180 | 6200 | | — | | | | | | |
| 8.2 | 260 | 1.4 | 168 | 7000 | | — | | | | | | |
| 8.2 | 273 | 2.6 | 168 | 8000 | | — | | | | | | |
| 9.1 | 214 | 1.2 | 100 | 7000 | W86_100 | S1 | M1LA6 | 144 | W 86_100 | P80 | BN80A6 | 145 |
| 9.1 | 224 | 1.2 | 150 | 6200 | | — | | | WR 75_150 | P71 | BN71B4 | 142 |
| 9.9 | 224 | 1.8 | 138 | 7000 | | — | | | WR 86_138 | P71 | BN71B4 | 146 |
| 9.9 | 235 | 3.0 | 138 | 8000 | | — | | | WR 110_138 | P71 | BN71B4 | 150 |
| 10.1 | 234 | 1.6 | 90 | 6200 | | — | | | WR 75_90 | P80 | BN80A6 | 142 |
| 11.4 | 168 | 1.2 | 80 | 6200 | W75_80 | S1 | M1LA6 | 140 | W 75_80 | P80 | BN80A6 | 141 |
| 11.4 | 183 | 1.5 | 80 | 7000 | W86_80 | S1 | M1LA6 | 144 | W 86_80 | P80 | BN80A6 | 145 |
| 11.4 | 195 | 1.6 | 120 | 6200 | | — | | | WR 75_120 | P71 | BN71B4 | 142 |
| 11.4 | 204 | 1.9 | 120 | 7000 | | — | | | WR 86_120 | P71 | BN71B4 | 146 |
| 12.0 | 179 | 1.0 | 114 | 5000 | | — | | | WR 63_114 | P71 | BN71B4 | 138 |
| 12.1 | 204 | 1.6 | 75 | 6200 | | — | | | WR 75_75 | P80 | BN80A6 | 142 |
| 13.2 | 196 | 2.0 | 69 | 7000 | | — | | | WR 86_69 | P80 | BN80A6 | 146 |
| 13.7 | 142 | 1.1 | 100 | 6200 | W75_100 | S1 | M1SD4 | 140 | W 75_100 | P71 | BN71B4 | 141 |
| 13.7 | 152 | 1.5 | 100 | 7000 | W86_100 | S1 | M1SD4 | 144 | W 86_100 | P71 | BN71B4 | 145 |
| 14.2 | 139 | 1.0 | 64 | 5000 | W63_64 | S1 | M1LA6 | 136 | W 63_64 | P80 | BN80A6 | 137 |
| 15.2 | 140 | 1.5 | 60 | 6200 | W75_60 | S1 | M1LA6 | 140 | W 75_60 | P80 | BN80A6 | 141 |
| 15.2 | 149 | 1.3 | 90 | 5000 | | — | | | WR 63_90 | P71 | BN71B4 | 138 |










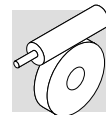
0.37 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|---|---|-----|
| 15.2 | 160 | 2.0 | 90 | 6200 | | — | | | WR 75_90 | P71 | BN71B4 | 142 |
| 15.2 | 156 | 2.8 | 90 | 7000 | | — | | | WR 86_90 | P71 | BN71B4 | 146 |
| 16.3 | 144 | 2.3 | 56 | 7000 | W86_56 | S1 | M1LA6 | 144 | W 86_56 | P80 | BN80A6 | 145 |
| 17.1 | 116 | 1.0 | 80 | 5000 | W63_80 | S1 | M1SD4 | 136 | W 63_80 | P71 | BN71B4 | 137 |
| 17.1 | 122 | 1.5 | 80 | 6200 | W75_80 | S1 | M1SD4 | 140 | W 75_80 | P71 | BN71B4 | 141 |
| 17.1 | 132 | 1.9 | 80 | 7000 | W86_80 | S1 | M1SD4 | 144 | W 86_80 | P71 | BN71B4 | 145 |
| 18.3 | 141 | 2.1 | 75 | 6200 | | — | | | WR 75_75 | P71 | BN71B4 | 142 |
| 19.0 | 130 | 1.4 | 72 | 4830 | | — | | | WR 63_72 | P71 | BN71B4 | 138 |
| 19.9 | 133 | 2.8 | 69 | 7000 | | — | | | WR 86_69 | P71 | BN71B4 | 146 |
| 20.2 | 136 | 2.6 | 45 | 6200 | | — | | | WR 75_45 | P80 | BN80A6 | 142 |
| 21.4 | 101 | 1.2 | 64 | 4870 | W63_64 | S1 | M1SD4 | 136 | W 63_64 | P71 | BN71B4 | 137 |
| 21.4 | 112 | 2.5 | 64 | 7000 | W86_64 | S1 | M1SD4 | 144 | W 86_64 | P71 | BN71B4 | 145 |
| 22.8 | 101 | 2.0 | 60 | 6200 | W75_60 | S1 | M1SD4 | 140 | W 75_60 | P71 | BN71B4 | 141 |
| 22.8 | 119 | 2.5 | 60 | 6200 | | — | | | WR 75_60 | P71 | BN71B4 | 142 |
| 22.8 | 119 | 3.2 | 60 | 7000 | | — | | | WR 86_60 | P71 | BN71B4 | 146 |
| 24.0 | 107 | 1.7 | 57 | 4540 | | — | | | WR 63_57 | P71 | BN71B4 | 138 |
| 24.5 | 101 | 3.0 | 56 | 7000 | W86_56 | S1 | M1SD4 | 144 | W 86_56 | P71 | BN71B4 | 145 |
| 27.4 | 88 | 2.5 | 50 | 6200 | W75_50 | S1 | M1SD4 | 140 | W 75_50 | P71 | BN71B4 | 141 |
| 30 | 73 | 0.9 | 45 | 2680 | VF 49_45 | P71 | K71B4 | 130 | VF 49_45 | P71 | BN71B4 | 130 |
| 30 | 78 | 1.9 | 45 | 4400 | W63_45 | S1 | M1SD4 | 136 | W 63_45 | P71 | BN71B4 | 137 |
| 30 | 88 | 2.0 | 45 | 4250 | | — | | | WR 63_45 | P71 | BN71B4 | 138 |
| 30 | 93 | 3.2 | 45 | 5885 | | — | | | WR 75_45 | P71 | BN71B4 | 142 |
| 34 | 74 | 3.4 | 40 | 5820 | W75_40 | S1 | M1SD4 | 140 | W 75_40 | P71 | BN71B4 | 141 |
| 36 | 69 | 2.3 | 38 | 4180 | W63_38 | S1 | M1SD4 | 136 | W 63_38 | P71 | BN71B4 | 137 |
| 38 | 62 | 1.1 | 36 | 2530 | VF 49_36 | P71 | K71B4 | 130 | VF 49_36 | P71 | BN71B4 | 130 |
| 38 | 73 | 2.2 | 36 | 3980 | | — | | | WR 63_36 | P71 | BN71B4 | 138 |
| 46 | 57 | 2.8 | 30 | 3900 | W63_30 | S1 | M1SD4 | 136 | W 63_30 | P71 | BN71B4 | 137 |
| 49 | 51 | 1.4 | 28 | 2360 | VF 49_28 | P71 | K71B4 | 130 | VF 49_28 | P71 | BN71B4 | 130 |
| 57 | 46 | 1.4 | 24 | 2250 | VF 49_24 | P71 | K71B4 | 130 | VF 49_24 | P71 | BN71B4 | 130 |
| 57 | 48 | 3.2 | 24 | 3650 | W63_24 | S1 | M1SD4 | 136 | W 63_24 | P71 | BN71B4 | 137 |
| 65 | 42 | 1.7 | 14 | 1940 | VF 49_14 | P71 | K71C6 | 130 | VF 49_14 | P80 | BN80A6 | 130 |
| 69 | 40 | 1.0 | 20 | 1870 | VF 44_20 | P71 | K71B4 | 124 | VF 44_20 | P71 | BN71B4 | 124 |
| 72 | 40 | 3.8 | 19 | 3400 | W63_19 | S1 | M1SD4 | 136 | W 63_19 | P71 | BN71B4 | 137 |
| 76 | 36 | 1.6 | 18 | 2080 | VF 49_18 | P71 | K71B4 | 130 | VF 49_18 | P71 | BN71B4 | 130 |
| 79 | 33 | 0.9 | 35 | 1860 | VF 44_35 | P63 | K63C2 | 124 | VF 44_35 | P71 | BN71A2 | 124 |
| 91 | 32 | 2.0 | 10 | 1930 | VF 49_10 | P71 | K71C6 | 130 | VF 49_10 | P80 | BN80A6 | 130 |
| 98 | 29 | 1.0 | 14 | 1690 | VF 44_14 | P71 | K71B4 | 124 | VF 44_14 | P71 | BN71B4 | 124 |
| 98 | 29 | 2.2 | 14 | 1940 | VF 49_14 | P71 | K71B4 | 130 | VF 49_14 | P71 | BN71B4 | 130 |
| 117 | 24 | 2.0 | 24 | 1880 | VF 49_24 | P63 | K63C2 | 130 | VF 49_24 | P71 | BN71A2 | 130 |
| 137 | 22 | 1.3 | 10 | 1520 | VF 44_10 | P71 | K71B4 | 124 | VF 44_10 | P71 | BN71B4 | 124 |
| 137 | 22 | 2.7 | 10 | 1750 | VF 49_10 | P71 | K71B4 | 130 | VF 49_10 | P71 | BN71B4 | 130 |
| 138 | 21 | 1.4 | 20 | 1570 | VF 44_20 | P63 | K63C2 | 124 | VF 44_20 | P71 | BN71A2 | 124 |
| 153 | 19 | 2.3 | 18 | 1720 | VF 49_18 | P63 | K63C2 | 130 | VF 49_18 | P71 | BN71A2 | 130 |
| 196 | 16 | 1.9 | 7 | 1360 | VF 44_7 | P71 | K71B4 | 124 | VF 44_7 | P71 | BN71B4 | 124 |
| 196 | 16 | 3.5 | 7 | 1570 | VF 49_7 | P71 | K71B4 | 130 | VF 49_7 | P71 | BN71B4 | 130 |
| 275 | 11 | 2.0 | 10 | 1260 | VF 44_10 | P63 | K63C2 | 124 | VF 44_10 | P71 | BN71A2 | 124 |
| 393 | 8 | 2.8 | 7 | 1120 | VF 44_7 | P63 | K63C2 | 124 | VF 44_7 | P71 | BN71A2 | 124 |










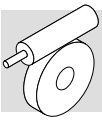
0.55 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|---|---|
| 0.29 | 4019 | 1.1 | 3200 | 19500 | — | — | — | W /VF 86/185_3200 | P80 | BN80B6 | 169 |
| 0.36 | 3946 | 1.1 | 2560 | 19500 | — | — | — | W /VF 86/185_2560 | P80 | BN80B6 | 169 |
| 0.43 | 2902 | 1.4 | 3200 | 19500 | — | — | — | W /VF 86/185_3200 | P80 | BN80A4 | 169 |
| 0.47 | 3004 | 0.9 | 2944 | 16000 | — | — | — | W /VF 86/150_2944 | P80 | BN80A4 | 163 |
| 0.50 | 3362 | 1.3 | 1840 | 19500 | — | — | — | W /VF 86/185_1840 | P80 | BN80B6 | 169 |
| 0.54 | 2805 | 1.5 | 2560 | 19500 | — | — | — | W /VF 86/185_2560 | P80 | BN80A4 | 169 |
| 0.76 | 2642 | 1.0 | 1840 | 16000 | — | — | — | W /VF 86/150_1840 | P80 | BN80A4 | 163 |
| 0.76 | 2364 | 1.8 | 1840 | 19500 | — | — | — | W /VF 86/185_1840 | P80 | BN80A4 | 169 |
| 0.77 | 1905 | 0.9 | 1800 | 13800 | — | — | — | W /VF 63/130_1800 | P80 | BN80A4 | 157 |
| 0.87 | 2116 | 2.0 | 1600 | 19500 | — | — | — | W /VF 86/185_1600 | P80 | BN80A4 | 169 |
| 0.91 | 1838 | 1.0 | 1520 | 13800 | — | — | — | W /VF 63/130_1520 | P80 | BN80A4 | 157 |
| 1.0 | 1996 | 2.2 | 920 | 19500 | — | — | — | W /VF 86/185_920 | P80 | BN80B6 | 169 |
| 1.0 | 2190 | 1.2 | 1380 | 16000 | — | — | — | W /VF 86/150_1380 | P80 | BN80A4 | 163 |
| 1.2 | 1542 | 1.2 | 1200 | 13800 | — | — | — | W /VF 63/130_1200 | P80 | BN80A4 | 157 |
| 1.2 | 1542 | 2.7 | 1200 | 19500 | — | — | — | W /VF 86/185_1200 | P80 | BN80A4 | 169 |
| 1.3 | 1852 | 1.5 | 690 | 16000 | — | — | — | W /VF 86/150_690 | P80 | BN80B6 | 163 |
| 1.4 | 1342 | 1.3 | 960 | 13800 | — | — | — | W /VF 63/130_960 | P80 | BN80A4 | 157 |
| 1.5 | 1564 | 1.7 | 920 | 16000 | — | — | — | W /VF 86/150_920 | P80 | BN80A4 | 163 |
| 1.5 | 1460 | 2.9 | 920 | 19500 | — | — | — | W /VF 86/185_920 | P80 | BN80A4 | 169 |
| 1.5 | 1473 | 3.0 | 600 | 19500 | — | — | — | W /VF 86/185_600 | P80 | BN80B6 | 169 |
| 1.7 | 1300 | 3.2 | 800 | 19500 | — | — | — | W /VF 86/185_800 | P80 | BN80A4 | 169 |
| 1.7 | 1570 | 1.7 | 529 | 16000 | — | — | — | W /VF 86/150_529 | P80 | BN80B6 | 163 |
| 1.8 | 1120 | 1.6 | 760 | 13800 | — | — | — | W /VF 63/130_760 | P80 | BN80A4 | 157 |
| 2.0 | 1304 | 2.0 | 690 | 16000 | — | — | — | W /VF 86/150_690 | P80 | BN80A4 | 163 |
| 2.3 | 1028 | 1.0 | 400 | 8000 | — | — | — | VF/W 49/110_400 | P80 | BN80B6 | 151 |
| 2.3 | 907 | 2.0 | 600 | 13800 | — | — | — | W /VF 63/130_600 | P80 | BN80A4 | 157 |
| 2.6 | 837 | 1.2 | 540 | 8000 | — | — | — | VF/W 49/110_540 | P80 | BN80A4 | 151 |
| 2.6 | 1099 | 2.4 | 529 | 16000 | — | — | — | W /VF 86/150_529 | P80 | BN80A4 | 163 |
| 3.0 | 956 | 2.7 | 460 | 16000 | — | — | — | W /VF 86/150_460 | P80 | BN80A4 | 163 |
| 3.1 | 839 | 1.2 | 300 | 13800 | — | — | — | VFR 130_300 | P80 | BN80B6 | 154 |
| 3.1 | 805 | 1.3 | 300 | 8000 | — | — | — | VF/W 49/110_300 | P80 | BN80B6 | 151 |
| 3.5 | 680 | 1.5 | 400 | 8000 | — | — | — | VF/W 49/110_400 | P80 | BN80A4 | 151 |
| 3.5 | 665 | 2.7 | 400 | 13800 | — | — | — | W /VF 63/130_400 | P80 | BN80A4 | 157 |
| 3.8 | 740 | 1.6 | 240 | 13800 | — | — | — | VFR 130_240 | P80 | BN80B6 | 154 |
| 4.0 | 670 | 1.6 | 230 | 8000 | — | — | — | VF/W 49/110_230 | P80 | BN80B6 | 151 |
| 4.0 | 756 | 3.4 | 345 | 16000 | — | — | — | W /VF 86/150_345 | P80 | BN80A4 | 163 |
| 4.6 | 578 | 0.9 | 300 | 8000 | — | — | — | WR 110_300 | P80 | BN80A4 | 150 |
| 4.6 | 601 | 1.5 | 300 | 13800 | — | — | — | VFR 130_300 | P80 | BN80A4 | 154 |
| 4.6 | 544 | 1.8 | 300 | 8000 | — | — | — | VF/W 49/110_300 | P80 | BN80A4 | 151 |
| 4.8 | 625 | 1.1 | 192 | 8000 | — | — | — | WR 110_192 | P80 | BN80B6 | 150 |
| 5.0 | 529 | 3.4 | 280 | 13800 | — | — | — | W /VF 63/130_280 | P80 | BN80A4 | 157 |
| 5.8 | 508 | 1.1 | 240 | 8000 | — | — | — | WR 110_240 | P80 | BN80A4 | 150 |
| 5.8 | 517 | 2.2 | 240 | 13800 | — | — | — | VFR 130_240 | P80 | BN80A4 | 154 |
| 6.0 | 452 | 2.2 | 230 | 8000 | — | — | — | VF/W 49/110_230 | P80 | BN80A4 | 151 |
| 6.7 | 504 | 3.0 | 138 | 13800 | — | — | — | VFR 130_138 | P80 | BN80B6 | 154 |
| 7.2 | 435 | 1.4 | 192 | 8000 | — | — | — | WR 110_192 | P80 | BN80A4 | 150 |
| 7.2 | 443 | 2.7 | 192 | 13800 | — | — | — | VFR 130_192 | P80 | BN80A4 | 154 |
| 7.7 | 432 | 1.0 | 120 | 7000 | — | — | — | WR 86_120 | P80 | BN80B6 | 146 |
| 8.3 | 381 | 0.9 | 168 | 7000 | — | — | — | WR 86_168 | P80 | BN80A4 | 146 |
| 8.3 | 400 | 1.8 | 168 | 8000 | — | — | — | WR 110_168 | P80 | BN80A4 | 150 |










0.55 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|---|---|-----|
| 8.3 | 406 | 3.0 | 168 | 13800 | | — | | | VFR 130_168 | P80 | BN80A4 | 154 |
| 9.2 | 325 | 1.5 | 100 | 8000 | W110_100 | S2 | M2SA6 | 148 | W 110_100 | P80 | BN80B6 | 149 |
| 10.1 | 329 | 1.2 | 138 | 7000 | | — | | | WR 86_138 | P80 | BN80A4 | 146 |
| 10.1 | 344 | 2.1 | 138 | 8000 | | — | | | WR 110_138 | P80 | BN80A4 | 150 |
| 10.2 | 344 | 1.1 | 90 | 6200 | | — | | | WR 75_90 | P80 | BN80B6 | 142 |
| 11.5 | 269 | 1.0 | 80 | 7000 | W86_80 | S2 | M2SA6 | 144 | W 86_80 | P80 | BN80B6 | 145 |
| 11.6 | 286 | 1.1 | 120 | 6200 | | — | | | WR 75_120 | P80 | BN80A4 | 142 |
| 11.6 | 299 | 1.3 | 120 | 7000 | | — | | | WR 86_120 | P80 | BN80A4 | 146 |
| 11.6 | 308 | 2.6 | 120 | 8000 | | — | | | WR 110_120 | P80 | BN80A4 | 150 |
| 12.3 | 300 | 1.1 | 75 | 6200 | | — | | | WR 75_75 | P80 | BN80B6 | 142 |
| 13.3 | 288 | 1.4 | 69 | 7000 | | — | | | WR 86_69 | P80 | BN80B6 | 146 |
| 13.3 | 295 | 2.5 | 69 | 8000 | | — | | | WR 110_69 | P80 | BN80B6 | 150 |
| 13.8 | 225 | 1.0 | 100 | 7000 | W86_100 | S1 | M1LA4 | 144 | W 86_100 | P80 | BN80A4 | 145 |
| 15.4 | 235 | 1.4 | 90 | 6200 | | — | | | WR 75_90 | P80 | BN80A4 | 142 |
| 15.4 | 228 | 1.9 | 90 | 7000 | | — | | | WR 86_90 | P80 | BN80A4 | 146 |
| 15.4 | 238 | 3.5 | 90 | 8000 | | — | | | WR 110_90 | P80 | BN80A4 | 150 |
| 16.4 | 211 | 1.5 | 56 | 7000 | W86_56 | S2 | M2SA6 | 144 | W 86_56 | P80 | BN80B6 | 145 |
| 17.3 | 180 | 1.0 | 80 | 6200 | W75_80 | S1 | M1LA4 | 140 | W 75_80 | P80 | BN80A4 | 141 |
| 17.3 | 195 | 1.3 | 80 | 7000 | W86_80 | S1 | M1LA4 | 144 | W 86_80 | P80 | BN80A4 | 145 |
| 18.5 | 207 | 1.4 | 75 | 6200 | | — | | | WR 75_75 | P80 | BN80A4 | 142 |
| 20.1 | 196 | 1.9 | 69 | 7000 | | — | | | WR 86_69 | P80 | BN80A4 | 146 |
| 20.1 | 201 | 3.2 | 69 | 8000 | | — | | | WR 110_69 | P80 | BN80A4 | 150 |
| 20.4 | 162 | 1.0 | 45 | 4540 | W63_45 | S2 | M2SA6 | 136 | W 63_45 | P80 | BN80B6 | 137 |
| 21.6 | 166 | 1.7 | 64 | 7000 | W86_64 | S1 | M1LA4 | 144 | W 86_64 | P80 | BN80A4 | 145 |
| 23.0 | 148 | 1.3 | 60 | 6200 | W75_60 | S1 | M1LA4 | 140 | W 75_60 | P80 | BN80A4 | 141 |
| 23.0 | 162 | 2.2 | 40 | 7000 | W86_40 | S2 | M2SA6 | 144 | W 86_40 | P80 | BN80B6 | 145 |
| 23.2 | 175 | 1.7 | 60 | 6040 | | — | | | WR 75_60 | P80 | BN80A4 | 142 |
| 23.2 | 175 | 2.2 | 60 | 7000 | | — | | | WR 86_60 | P80 | BN80A4 | 146 |
| 24.2 | 143 | 1.2 | 38 | 4340 | W63_38 | S2 | M2SA6 | 136 | W 63_38 | P80 | BN80B6 | 137 |
| 24.6 | 149 | 2.0 | 56 | 7000 | W86_56 | S1 | M1LA4 | 144 | W 86_56 | P80 | BN80A4 | 145 |
| 27.6 | 129 | 1.7 | 50 | 5960 | W75_50 | S1 | M1LA4 | 140 | W 75_50 | P80 | BN80A4 | 141 |
| 30 | 128 | 2.7 | 46 | 7000 | W86_46 | S1 | M1LA4 | 144 | W 86_46 | P80 | BN80A4 | 145 |
| 31 | 115 | 1.3 | 45 | 4140 | W63_45 | S1 | M1LA4 | 136 | W 63_45 | P80 | BN80A4 | 137 |
| 31 | 136 | 2.2 | 45 | 5580 | | — | | | WR 75_45 | P80 | BN80A4 | 142 |
| 31 | 133 | 2.9 | 45 | 7000 | | — | | | WR 86_45 | P80 | BN80A4 | 146 |
| 35 | 110 | 2.3 | 40 | 5610 | W75_40 | S1 | M1LA4 | 140 | W 75_40 | P80 | BN80A4 | 141 |
| 35 | 114 | 2.9 | 40 | 7000 | W86_40 | S1 | M1LA4 | 144 | W 86_40 | P80 | BN80A4 | 145 |
| 36 | 101 | 1.5 | 38 | 3950 | W63_38 | S1 | M1LA4 | 136 | W 63_38 | P80 | BN80A4 | 137 |
| 40 | 105 | 3.3 | 23 | 7000 | W86_23 | S2 | M2SA6 | 144 | W 86_23 | P80 | BN80B6 | 145 |
| 46 | 84 | 1.9 | 30 | 3700 | W63_30 | S1 | M1LA4 | 136 | W 63_30 | P80 | BN80A4 | 137 |
| 46 | 88 | 3.1 | 30 | 5150 | W75_30 | S1 | M1LA4 | 140 | W 75_30 | P80 | BN80A4 | 141 |
| 46 | 95 | 2.9 | 30 | 4950 | | — | | | WR 75_30 | P80 | BN80A4 | 142 |
| 49 | 76 | 1.0 | 28 | 2170 | VF 49_28 | P71 | K71C4 | 130 | VF 49_28 | P80 | BN80A4 | 130 |
| 55 | 76 | 3.3 | 25 | 4880 | W75_25 | S1 | M1LA4 | 140 | W 75_25 | P80 | BN80A4 | 141 |
| 58 | 69 | 0.9 | 24 | 2080 | VF 49_24 | P71 | K71C4 | 130 | VF 49_24 | P80 | BN80A4 | 130 |
| 58 | 71 | 2.2 | 24 | 3480 | W63_24 | S1 | M1LA4 | 136 | W 63_24 | P80 | BN80A4 | 137 |
| 66 | 62 | 1.1 | 14 | 1960 | | — | | | VF 49_14 | P80 | BN80B6 | 130 |
| 73 | 59 | 2.6 | 19 | 3260 | W63_19 | S1 | M1LA4 | 136 | W 63_19 | P80 | BN80A4 | 137 |
| 77 | 53 | 1.1 | 18 | 1930 | VF 49_18 | P71 | K71C4 | 130 | VF 49_18 | P80 | BN80A4 | 130 |
| 92 | 47 | 1.4 | 10 | 1800 | | — | | | VF 49_10 | P80 | BN80B6 | 130 |

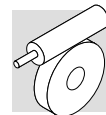


0.55 kW


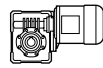





| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|---|---|-----|
| 92 | 47 | 3.2 | 15 | 3050 | W63_15 | S1 | M1LA4 | 136 | W 63_15 | P80 | BN80A4 | 137 |
| 99 | 43 | 1.5 | 14 | 1810 | VF 49_14 | P71 | K71C4 | 130 | VF 49_14 | P80 | BN80A4 | 130 |
| 115 | 39 | 3.6 | 12 | 2850 | W63_12 | S1 | M1LA4 | 136 | W 63_12 | P80 | BN80A4 | 137 |
| 117 | 35 | 1.3 | 24 | 1800 | VF 49_24 | P71 | K71B2 | 130 | VF 49_24 | P71 | BN71B2 | 130 |
| 131 | 35 | 3.7 | 7 | 2700 | W63_7 | S2 | M2SA6 | 136 | W 63_7 | P80 | BN80B6 | 137 |
| 138 | 32 | 1.8 | 10 | 1650 | VF 49_10 | P71 | K71C4 | 130 | VF 49_10 | P80 | BN80A4 | 130 |
| 141 | 30 | 1.0 | 20 | 1490 | VF 44_20 | P71 | K71B2 | 124 | VF 44_20 | P71 | BN71B2 | 124 |
| 156 | 28 | 1.6 | 18 | 1650 | VF 49_18 | P71 | K71B2 | 130 | VF 49_18 | P71 | BN71B2 | 130 |
| 197 | 23 | 2.4 | 7 | 1480 | VF 49_7 | P71 | K71C4 | 130 | VF 49_7 | P80 | BN80A4 | 130 |
| 281 | 16 | 1.4 | 10 | 1210 | VF 44_10 | P71 | K71B2 | 124 | VF 44_10 | P71 | BN71B2 | 124 |
| 281 | 16 | 2.7 | 10 | 1390 | VF 49_10 | P71 | K71B2 | 130 | VF 49_10 | P71 | BN71B2 | 130 |
| 401 | 12 | 1.9 | 7 | 1080 | VF 44_7 | P71 | K71B2 | 124 | VF 44_7 | P71 | BN71B2 | 124 |

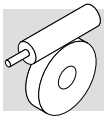
0.75 kW

| | | | | | | | | | | | | |
|------|------|-----|------|-------|---|---|---|---|--------------------|-----|--------|-----|
| 0.29 | 4983 | 1.3 | 3200 | 34500 | — | — | — | — | VF/VF 130/210_3200 | P90 | BN90S6 | 174 |
| 0.29 | 4733 | 1.9 | 3200 | 52000 | — | — | — | — | VF/VF 130/250_3200 | P90 | BN90S6 | 180 |
| 0.36 | 4783 | 1.4 | 2560 | 34500 | — | — | — | — | VF/VF 130/210_2560 | P90 | BN90S6 | 174 |
| 0.36 | 4584 | 2.0 | 2560 | 52000 | — | — | — | — | VF/VF 130/250_2560 | P90 | BN90S6 | 180 |
| 0.44 | 3929 | 1.1 | 3200 | 19500 | — | — | — | — | W /VF 86/185_3200 | P80 | BN80B4 | 169 |
| 0.50 | 4584 | 1.0 | 1840 | 19500 | — | — | — | — | W /VF 86/185_1840 | P90 | BN90S6 | 169 |
| 0.50 | 4011 | 1.6 | 1840 | 34500 | — | — | — | — | VF/VF 130/210_1840 | P90 | BN90S6 | 174 |
| 0.50 | 4154 | 2.2 | 1840 | 52000 | — | — | — | — | VF/VF 130/250_1840 | P90 | BN90S6 | 180 |
| 0.55 | 3798 | 1.1 | 2560 | 19500 | — | — | — | — | W /VF 86/185_2560 | P80 | BN80B4 | 169 |
| 0.76 | 3201 | 1.3 | 1840 | 19500 | — | — | — | — | W /VF 86/185_1840 | P80 | BN80B4 | 169 |
| 0.88 | 2865 | 1.5 | 1600 | 19500 | — | — | — | — | W /VF 86/185_1600 | P80 | BN80B4 | 169 |
| 1.0 | 2722 | 1.6 | 920 | 19500 | — | — | — | — | W /VF 86/185_920 | P90 | BN90S6 | 169 |
| 1.2 | 2087 | 0.9 | 1200 | 13800 | — | — | — | — | W /VF 63/130_1200 | P80 | BN80B4 | 157 |
| 1.2 | 2087 | 2.0 | 1200 | 19500 | — | — | — | — | W /VF 86/185_1200 | P80 | BN80B4 | 169 |
| 1.3 | 2525 | 1.1 | 690 | 16000 | — | — | — | — | W /VF 86/150_690 | P90 | BN90S6 | 163 |
| 1.5 | 1817 | 1.0 | 960 | 13800 | — | — | — | — | W /VF 63/130_960 | P80 | BN80B4 | 157 |
| 1.5 | 2118 | 1.2 | 920 | 16000 | — | — | — | — | W /VF 86/150_920 | P80 | BN80B4 | 163 |
| 1.5 | 1977 | 2.1 | 920 | 19500 | — | — | — | — | W /VF 86/185_920 | P80 | BN80B4 | 169 |
| 1.7 | 2142 | 1.3 | 529 | 16000 | — | — | — | — | W /VF 86/150_529 | P90 | BN90S6 | 163 |
| 1.8 | 1760 | 2.4 | 800 | 19500 | — | — | — | — | W /VF 86/185_800 | P80 | BN80B4 | 169 |
| 1.8 | 1516 | 1.2 | 760 | 13800 | — | — | — | — | W /VF 63/130_760 | P80 | BN80B4 | 157 |
| 2.0 | 1765 | 1.5 | 690 | 16000 | — | — | — | — | W /VF 86/150_690 | P80 | BN80B4 | 163 |
| 2.3 | 1228 | 1.5 | 600 | 13800 | — | — | — | — | W /VF 63/130_600 | P80 | BN80B4 | 157 |
| 2.3 | 1381 | 3.0 | 600 | 19500 | — | — | — | — | W /VF 86/185_600 | P80 | BN80B4 | 169 |
| 2.6 | 1489 | 1.7 | 529 | 16000 | — | — | — | — | W /VF 86/150_529 | P80 | BN80B4 | 163 |
| 3.0 | 1294 | 2.0 | 460 | 16000 | — | — | — | — | W /VF 86/150_460 | P80 | BN80B4 | 163 |
| 3.1 | 1144 | 0.9 | 300 | 13800 | — | — | — | — | VFR 130_300 | P90 | BN90S6 | 154 |
| 3.1 | 1167 | 1.2 | 300 | 16000 | — | — | — | — | VFR 150_300 | P90 | BN90S6 | 160 |
| 3.1 | 1168 | 2.1 | 300 | 19500 | — | — | — | — | VFR 185_300 | P90 | BN90S6 | 166 |
| 3.5 | 921 | 1.1 | 400 | 8000 | — | — | — | — | VF/W 49/110_400 | P80 | BN80B4 | 151 |
| 3.5 | 900 | 2.0 | 400 | 13800 | — | — | — | — | W /VF 63/130_400 | P80 | BN80B4 | 157 |
| 3.8 | 1009 | 1.2 | 240 | 13800 | — | — | — | — | VFR 130_240 | P90 | BN90S6 | 154 |
| 3.8 | 1009 | 1.7 | 240 | 16000 | — | — | — | — | VFR 150_240 | P90 | BN90S6 | 160 |
| 3.8 | 1009 | 2.8 | 240 | 19500 | — | — | — | — | VFR 185_240 | P90 | BN90S6 | 166 |



0.75 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|---|---|-----|
| 4.1 | 1024 | 2.5 | 345 | 16000 | | — | | W /VF 86/150_345 | P80 | BN80B4 | 163 | |
| 4.7 | 813 | 1.1 | 300 | 13800 | | — | | VFR 130_300 | P80 | BN80B4 | 154 | |
| 4.7 | 737 | 1.4 | 300 | 8000 | | — | | VF/W 49/110_300 | P80 | BN80B4 | 151 | |
| 4.7 | 890 | 2.9 | 300 | 16000 | | — | | W /VF 86/150_300 | P80 | BN80B4 | 163 | |
| 4.8 | 882 | 2.2 | 192 | 16000 | | — | | VFR 150_192 | P90 | BN90S6 | 160 | |
| 5.0 | 716 | 2.5 | 280 | 13800 | | — | | W /VF 63/130_280 | P80 | BN80B4 | 157 | |
| 5.5 | 785 | 1.0 | 168 | 8000 | | — | | WR 110_168 | P90 | BN90S6 | 150 | |
| 5.5 | 798 | 2.4 | 168 | 16000 | | — | | VFR 150_168 | P90 | BN90S6 | 160 | |
| 5.8 | 700 | 1.6 | 240 | 13800 | | — | | VFR 130_240 | P80 | BN80B4 | 154 | |
| 6.1 | 612 | 1.6 | 230 | 8000 | | — | | VF/W 49/110_230 | P80 | BN80B4 | 151 | |
| 6.7 | 677 | 1.2 | 138 | 8000 | | — | | WR 110_138 | P90 | BN90S6 | 150 | |
| 6.7 | 688 | 2.2 | 138 | 13800 | | — | | VFR 130_138 | P90 | BN90S6 | 154 | |
| 6.7 | 688 | 3.2 | 138 | 16000 | | — | | VFR 150_138 | P90 | BN90S6 | 160 | |
| 7.3 | 589 | 1.1 | 192 | 8000 | | — | | WR 110_192 | P80 | BN80B4 | 150 | |
| 7.3 | 599 | 2.0 | 192 | 13800 | | — | | VFR 130_192 | P80 | BN80B4 | 154 | |
| 8.3 | 541 | 1.3 | 168 | 8000 | | — | | WR 110_168 | P80 | BN80B4 | 150 | |
| 8.3 | 550 | 2.2 | 168 | 13800 | | — | | VFR 130_168 | P80 | BN80B4 | 154 | |
| 9.2 | 444 | 1.1 | 100 | 8000 | W110_100 | S2 | M2SB6 | 148 | W 110_100 | P90 | BN90S6 | 149 |
| 9.2 | 459 | 1.7 | 100 | 13200 | | — | | VF 130_100 | P90 | BN90S6 | 152 | |
| 10.1 | 445 | 0.9 | 138 | 7000 | | — | | WR 86_138 | P80 | BN80B4 | 146 | |
| 10.1 | 466 | 1.5 | 138 | 8000 | | — | | WR 110_138 | P80 | BN80B4 | 150 | |
| 10.1 | 473 | 2.9 | 138 | 13800 | | — | | VFR 130_138 | P80 | BN80B4 | 154 | |
| 11.5 | 411 | 1.1 | 80 | 8000 | W110_80 | S2 | M2SB6 | 148 | W 110_80 | P90 | BN90S6 | 149 |
| 11.5 | 399 | 2.4 | 80 | 13200 | | — | | VF 130_80 | P90 | BN90S6 | 152 | |
| 11.7 | 405 | 1.0 | 120 | 7000 | | — | | WR 86_120 | P80 | BN80B4 | 146 | |
| 11.7 | 417 | 1.9 | 120 | 8000 | | — | | WR 110_120 | P80 | BN80B4 | 150 | |
| 11.7 | 411 | 3.4 | 120 | 13800 | | — | | VFR 130_120 | P80 | BN80B4 | 154 | |
| 13.3 | 403 | 1.9 | 69 | 8000 | | — | | WR 110_69 | P90 | BN90S6 | 150 | |
| 14.0 | 317 | 1.5 | 100 | 8000 | W110_100 | S2 | M2SA4 | 148 | W 110_100 | P80 | BN80B4 | 149 |
| 14.4 | 314 | 1.0 | 64 | 7000 | W86_64 | S2 | M2SB6 | 144 | W 86_64 | P90 | BN90S6 | 145 |
| 14.4 | 339 | 3.1 | 64 | 13200 | | — | | VF 130_64 | P90 | BN90S6 | 152 | |
| 15.6 | 318 | 1.0 | 90 | 6200 | | — | | WR 75_90 | P80 | BN80B4 | 142 | |
| 15.6 | 308 | 1.4 | 90 | 7000 | | — | | WR 86_90 | P80 | BN80B4 | 146 | |
| 15.6 | 322 | 2.6 | 90 | 8000 | | — | | WR 110_90 | P80 | BN80B4 | 150 | |
| 16.4 | 288 | 1.1 | 56 | 7000 | W86_56 | S2 | M2SB6 | 144 | W 86_56 | P90 | BN90S6 | 145 |
| 16.4 | 296 | 2.2 | 56 | 8000 | W110_56 | S2 | M2SB6 | 148 | W 110_56 | P90 | BN90S6 | 149 |
| 17.5 | 262 | 1.0 | 80 | 7000 | W86_80 | S2 | M2SA4 | 144 | W 86_80 | P80 | BN80B4 | 145 |
| 17.5 | 270 | 1.7 | 80 | 8000 | W110_80 | S2 | M2SA4 | 148 | W 110_80 | P80 | BN80B4 | 149 |
| 18.4 | 245 | 1.0 | 50 | 6200 | W75_50 | S2 | M2SB6 | 140 | W 75_50 | P90 | BN90S6 | 141 |
| 18.7 | 280 | 1.1 | 75 | 5980 | | — | | WR 75_75 | P80 | BN80B4 | 142 | |
| 20.3 | 265 | 1.4 | 69 | 7000 | | — | | WR 86_69 | P80 | BN80B4 | 146 | |
| 20.3 | 272 | 2.4 | 69 | 8000 | | — | | WR 110_69 | P80 | BN80B4 | 150 | |
| 20.4 | 273 | 1.3 | 45 | 6010 | | — | | WR 75_45 | P90 | BN90S6 | 142 | |
| 21.9 | 223 | 1.3 | 64 | 7000 | W86_64 | S2 | M2SA4 | 144 | W 86_64 | P80 | BN80B4 | 145 |
| 21.9 | 229 | 2.3 | 64 | 8000 | W110_64 | S2 | M2SA4 | 148 | W 110_64 | P80 | BN80B4 | 149 |
| 23.0 | 212 | 1.3 | 40 | 5930 | W75_40 | S2 | M2SB6 | 140 | W 75_40 | P90 | BN90S6 | 141 |
| 23.3 | 200 | 1.0 | 60 | 5960 | W75_60 | S2 | M2SA4 | 140 | W 75_60 | P80 | BN80B4 | 141 |
| 23.3 | 236 | 1.2 | 60 | 5640 | | — | | WR 75_60 | P80 | BN80B4 | 142 | |
| 23.3 | 236 | 1.6 | 60 | 7000 | | — | | WR 86_60 | P80 | BN80B4 | 146 | |
| 23.3 | 243 | 2.8 | 60 | 8000 | | — | | WR 110_60 | P80 | BN80B4 | 150 | |

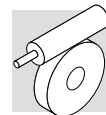


0.75 kW








| n ₂ min ⁻¹ | M ₂ Nm | S | i | R _{n2} N | | | | | | | | |
|-------------------------------------|----------------------|-----|----|----------------------|----------|-----|-------|-----|----------|-----|--------|-----|
| 25.0 | 201 | 1.5 | 56 | 7000 | W86_56 | S2 | M2SA4 | 144 | W 86_56 | P80 | BN80B4 | 145 |
| 25.0 | 206 | 2.9 | 56 | 8000 | W110_56 | S2 | M2SA4 | 148 | W 110_56 | P80 | BN80B4 | 149 |
| 28.0 | 174 | 1.3 | 50 | 5670 | W75_50 | S2 | M2SA4 | 140 | W 75_50 | P80 | BN80B4 | 141 |
| 30 | 172 | 2.0 | 46 | 7000 | W86_46 | S2 | M2SA4 | 144 | W 86_46 | P80 | BN80B4 | 145 |
| 30 | 174 | 3.4 | 46 | 8000 | W110_46 | S2 | M2SA4 | 148 | W 110_46 | P80 | BN80B4 | 149 |
| 31 | 154 | 0.9 | 45 | 3860 | W63_45 | S2 | M2SA4 | 136 | W 63_45 | P80 | BN80B4 | 137 |
| 31 | 184 | 1.6 | 45 | 5250 | | — | | | WR 75_45 | P80 | BN80B4 | 142 |
| 31 | 180 | 2.2 | 45 | 7000 | | — | | | WR 86_45 | P80 | BN80B4 | 146 |
| 35 | 147 | 1.7 | 40 | 5370 | W75_40 | S2 | M2SA4 | 140 | W 75_40 | P80 | BN80B4 | 141 |
| 35 | 153 | 2.2 | 40 | 7000 | W86_40 | S2 | M2SA4 | 144 | W 86_40 | P80 | BN80B4 | 145 |
| 37 | 136 | 1.1 | 38 | 3700 | W63_38 | S2 | M2SA4 | 136 | W 63_38 | P80 | BN80B4 | 137 |
| 40 | 143 | 2.4 | 23 | 7000 | W86_23 | S2 | M2SB6 | 144 | W 86_23 | P90 | BN90S6 | 145 |
| 47 | 114 | 1.4 | 30 | 3490 | W63_30 | S2 | M2SA4 | 136 | W 63_30 | P80 | BN80B4 | 137 |
| 47 | 129 | 2.1 | 30 | 4680 | | — | | | WR 75_30 | P80 | BN80B4 | 142 |
| 47 | 118 | 2.3 | 30 | 4950 | W75_30 | S2 | M2SA4 | 140 | W 75_30 | P80 | BN80B4 | 141 |
| 47 | 117 | 3.2 | 30 | 7000 | W86_30 | S2 | M2SA4 | 144 | W 86_30 | P80 | BN80B4 | 145 |
| 56 | 102 | 2.4 | 25 | 4700 | W75_25 | S2 | M2SA4 | 140 | W 75_25 | P80 | BN80B4 | 141 |
| 58 | 96 | 1.6 | 24 | 3290 | W63_24 | S2 | M2SA4 | 136 | W 63_24 | P80 | BN80B4 | 137 |
| 61 | 96 | 3.3 | 23 | 7000 | W86_23 | S2 | M2SA4 | 144 | W 86_23 | P80 | BN80B4 | 145 |
| 70 | 85 | 2.9 | 20 | 4400 | W75_20 | S2 | M2SA4 | 140 | W 75_20 | P80 | BN80B4 | 141 |
| 74 | 79 | 1.9 | 19 | 3100 | W63_19 | S2 | M2SA4 | 136 | W 63_19 | P80 | BN80B4 | 137 |
| 93 | 64 | 2.4 | 15 | 2910 | W63_15 | S2 | M2SA4 | 136 | W 63_15 | P80 | BN80B4 | 137 |
| 100 | 58 | 1.1 | 14 | 1690 | | — | | | VF 49_14 | P80 | BN80B4 | 130 |
| 117 | 49 | 1.0 | 24 | 1710 | VF 49_24 | P71 | K71C2 | 130 | VF 49_24 | P80 | BN80A2 | 130 |
| 117 | 52 | 2.7 | 12 | 2740 | W63_12 | S2 | M2SA4 | 136 | W 63_12 | P80 | BN80B4 | 137 |
| 131 | 47 | 2.7 | 7 | 2590 | W63_7 | S2 | M2SB6 | 136 | W 63_7 | P90 | BN90S6 | 137 |
| 140 | 43 | 1.4 | 10 | 1540 | | — | | | VF 49_10 | P80 | BN80B4 | 130 |
| 140 | 44 | 3.2 | 10 | 2600 | W63_10 | S2 | M2SA4 | 136 | W 63_10 | P80 | BN80B4 | 137 |
| 187 | 33 | 3.8 | 15 | 2440 | W63_15 | S1 | M1LA2 | 136 | W 63_15 | P80 | BN80A2 | 137 |
| 200 | 31 | 1.8 | 7 | 1400 | | — | | | VF 49_7 | P80 | BN80B4 | 130 |
| 200 | 32 | 3.8 | 7 | 2340 | W63_7 | S2 | M2SA4 | 136 | W 63_7 | P80 | BN80B4 | 137 |
| 280 | 22 | 2.0 | 10 | 1340 | VF 49_10 | P71 | K71C2 | 130 | VF 49_10 | P80 | BN80A2 | 130 |
| 400 | 16 | 2.6 | 7 | 1200 | VF 49_7 | P71 | K71C2 | 130 | VF 49_7 | P80 | BN80A2 | 130 |

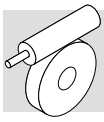
1.1 kW

| | | | | | | | | | | | |
|------|------|-----|------|-------|---|--|--|--|------------------------|--------|-----|
| 0.29 | 7308 | 0.9 | 3200 | 34500 | — | | | | VF/VF 130/210_3200 P90 | BN90L6 | 174 |
| 0.29 | 6942 | 1.3 | 3200 | 52000 | — | | | | VF/VF 130/250_3200 P90 | BN90L6 | 180 |
| 0.36 | 7016 | 0.9 | 2560 | 34500 | — | | | | VF/VF 130/210_2560 P90 | BN90L6 | 174 |
| 0.36 | 6723 | 1.4 | 2560 | 52000 | — | | | | VF/VF 130/250_2560 P90 | BN90L6 | 180 |
| 0.44 | 5283 | 1.2 | 3200 | 34500 | — | | | | VF/VF 130/210_3200 P90 | BN90S4 | 174 |
| 0.44 | 5042 | 1.8 | 3200 | 52000 | — | | | | VF/VF 130/250_3200 P90 | BN90S4 | 180 |
| 0.50 | 7143 | 0.9 | 1840 | 34500 | — | | | | VF/VF 130/210_1840 P90 | BN90L6 | 174 |
| 0.50 | 6093 | 1.5 | 1840 | 52000 | — | | | | VF/VF 130/250_1840 P90 | BN90L6 | 180 |
| 0.55 | 4610 | 1.4 | 2560 | 34500 | — | | | | VF/VF 130/210_2560 P90 | BN90S4 | 174 |
| 0.55 | 4802 | 1.9 | 2560 | 52000 | — | | | | VF/VF 130/250_2560 P90 | BN90S4 | 180 |
| 0.76 | 4694 | 0.9 | 1840 | 19500 | — | | | | W /VF 86/185_1840 P90 | BN90S4 | 169 |










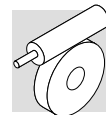
1.1 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|---|---|
| 0.76 | 4832 | 1.3 | 1840 | 34500 | — | — | — | VF/VF 130/210_1840 P90 | BN90S4 | 174 | |
| 0.76 | 4280 | 2.1 | 1840 | 52000 | — | — | — | VF/VF 130/250_1840 P90 | BN90S4 | 180 | |
| 0.88 | 4202 | 1.0 | 1600 | 19500 | — | — | — | W /VF 86/185_1600 P90 | BN90S4 | 169 | |
| 1.0 | 3992 | 1.1 | 920 | 19500 | — | — | — | W /VF 86/185_920 P90 | BN90L6 | 169 | |
| 1.2 | 3061 | 1.4 | 1200 | 19500 | — | — | — | W /VF 86/185_1200 P90 | BN90S4 | 169 | |
| 1.5 | 2899 | 1.4 | 920 | 19500 | — | — | — | W /VF 86/185_920 P90 | BN90S4 | 169 | |
| 1.8 | 2581 | 1.6 | 800 | 19500 | — | — | — | W /VF 86/185_800 P90 | BN90S4 | 169 | |
| 2.0 | 2589 | 1.0 | 690 | 16000 | — | — | — | W /VF 86/150_690 P90 | BN90S4 | 163 | |
| 2.3 | 1801 | 1.0 | 600 | 13800 | — | — | — | W /VF 63/130_600 P90 | BN90S4 | 157 | |
| 2.3 | 2026 | 2.1 | 600 | 19500 | — | — | — | W /VF 86/185_600 P90 | BN90S4 | 169 | |
| 2.6 | 2183 | 1.2 | 529 | 16000 | — | — | — | W /VF 86/150_529 P90 | BN90S4 | 163 | |
| 3.0 | 1898 | 1.4 | 460 | 16000 | — | — | — | W /VF 86/150_460 P90 | BN90S4 | 163 | |
| 3.1 | 1713 | 1.4 | 300 | 19500 | — | — | — | VFR 185_300 P90 | BN90L6 | 166 | |
| 3.5 | 1321 | 1.4 | 400 | 13800 | — | — | — | W /VF 63/130_400 P90 | BN90S4 | 157 | |
| 3.5 | 1441 | 2.9 | 400 | 19500 | — | — | — | W /VF 86/185_400 P90 | BN90S4 | 169 | |
| 3.8 | 1480 | 1.1 | 240 | 16000 | — | — | — | VFR 150_240 P90 | BN90L6 | 160 | |
| 3.8 | 1480 | 1.9 | 240 | 19500 | — | — | — | VFR 185_240 P90 | BN90L6 | 166 | |
| 4.1 | 1501 | 1.7 | 345 | 16000 | — | — | — | W /VF 86/150_345 P90 | BN90S4 | 163 | |
| 4.7 | 1222 | 1.1 | 300 | 16000 | — | — | — | VFR 150_300 P90 | BN90S4 | 160 | |
| 4.7 | 1238 | 1.9 | 300 | 19500 | — | — | — | VFR 185_300 P90 | BN90S4 | 166 | |
| 4.7 | 1306 | 2.0 | 300 | 16000 | — | — | — | W /VF 86/150_300 P90 | BN90S4 | 163 | |
| 4.8 | 1272 | 1.0 | 192 | 13800 | — | — | — | VFR 130_192 P90 | BN90L6 | 154 | |
| 5.0 | 1051 | 1.7 | 280 | 13800 | — | — | — | W /VF 63/130_280 P90 | BN90S4 | 157 | |
| 5.8 | 1026 | 1.1 | 240 | 13800 | — | — | — | VFR 130_240 P90 | BN90S4 | 154 | |
| 5.8 | 1044 | 1.5 | 240 | 16000 | — | — | — | VFR 150_240 P90 | BN90S4 | 160 | |
| 5.8 | 1063 | 2.6 | 240 | 19500 | — | — | — | VFR 185_240 P90 | BN90S4 | 166 | |
| 6.2 | 1064 | 2.4 | 225 | 16000 | — | — | — | W /VF 86/150_225 P90 | BN90S4 | 163 | |
| 6.7 | 1008 | 1.5 | 138 | 13800 | — | — | — | VFR 130_138 P90 | BN90L6 | 154 | |
| 6.7 | 1008 | 2.2 | 138 | 16000 | — | — | — | VFR 150_138 P90 | BN90L6 | 160 | |
| 7.0 | 960 | 2.7 | 200 | 16000 | — | — | — | W /VF 86/150_200 P90 | BN90S4 | 163 | |
| 7.3 | 879 | 1.4 | 192 | 13800 | — | — | — | VFR 130_192 P90 | BN90S4 | 154 | |
| 7.3 | 893 | 1.9 | 192 | 16000 | — | — | — | VFR 150_192 P90 | BN90S4 | 160 | |
| 7.7 | 891 | 1.0 | 120 | 8000 | — | — | — | WR 110_120 P90 | BN90L6 | 150 | |
| 7.8 | 878 | 3.4 | 180 | 19500 | — | — | — | VFR 185_180 P90 | BN90S4 | 166 | |
| 8.3 | 807 | 1.5 | 168 | 13800 | — | — | — | VFR 130_168 P90 | BN90S4 | 154 | |
| 8.3 | 819 | 2.1 | 168 | 16000 | — | — | — | VFR 150_168 P90 | BN90S4 | 160 | |
| 9.2 | 674 | 1.2 | 100 | 13200 | — | — | — | VF 130_100 P90 | BN90L6 | 152 | |
| 10.1 | 683 | 1.0 | 138 | 8000 | — | — | — | WR 110_138 P90 | BN90S4 | 150 | |
| 10.1 | 694 | 1.9 | 138 | 13800 | — | — | — | VFR 130_138 P90 | BN90S4 | 154 | |
| 10.1 | 704 | 2.8 | 138 | 16000 | — | — | — | VFR 150_138 P90 | BN90S4 | 160 | |
| 10.2 | 678 | 1.3 | 90 | 8000 | — | — | — | WR 110_90 P90 | BN90L6 | 150 | |
| 11.5 | 585 | 1.6 | 80 | 13200 | — | — | — | VF 130_80 P90 | BN90L6 | 152 | |
| 11.7 | 612 | 1.3 | 120 | 8000 | — | — | — | WR 110_120 P90 | BN90S4 | 150 | |
| 11.7 | 603 | 2.3 | 120 | 13800 | — | — | — | VFR 130_120 P90 | BN90S4 | 154 | |
| 11.7 | 612 | 3.3 | 120 | 16000 | — | — | — | VFR 150_120 P90 | BN90S4 | 160 | |
| 14.0 | 465 | 1.0 | 100 | 8000 | W110_100 | S2 | M2SB4 | 148 | W 110_100 P90 | BN90S4 | 149 |
| 14.0 | 525 | 1.1 | 100 | 12600 | — | — | — | — | VF 130_100 P90 | BN90S4 | 152 |
| 15.6 | 473 | 1.8 | 90 | 8000 | — | — | — | — | WR 110_90 P90 | BN90S4 | 150 |
| 15.6 | 479 | 3.1 | 90 | 13800 | — | — | — | — | VFR 130_90 P90 | BN90S4 | 154 |










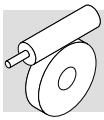
1.1 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|---|---|-----|
| 17.5 | 396 | 1.2 | 80 | 8000 | W110_80 | S2 | M2SB4 | 148 | W 110_80 | P90 | BN90S4 | 149 |
| 17.5 | 408 | 2.2 | 80 | 12600 | | — | | | VF 130_80 | P90 | BN90S4 | 152 |
| 20.0 | 362 | 1.0 | 46 | 7000 | W86_46 | S3 | M3SA6 | 144 | W 86_46 | P90 | BN90L6 | 145 |
| 20.0 | 383 | 3.0 | 46 | 13200 | | — | | | VF 130_46 | P90 | BN90L6 | 152 |
| 20.3 | 388 | 1.0 | 69 | 7000 | | — | | | WR 86_69 | P90 | BN90S4 | 146 |
| 20.3 | 399 | 1.6 | 69 | 8000 | | — | | | WR 110_69 | P90 | BN90S4 | 150 |
| 20.3 | 393 | 3.3 | 69 | 13800 | | — | | | VFR 130_69 | P90 | BN90S4 | 154 |
| 21.9 | 336 | 1.6 | 64 | 8000 | W110_64 | S2 | M2SB4 | 148 | W 110_64 | P90 | BN90S4 | 149 |
| 21.9 | 341 | 2.7 | 64 | 12600 | | — | | | VF 130_64 | P90 | BN90S4 | 152 |
| 23.0 | 324 | 1.1 | 40 | 7000 | W86_40 | S3 | M3SA6 | 144 | W 86_40 | P90 | BN90L6 | 145 |
| 23.3 | 347 | 1.1 | 60 | 7000 | | — | | | WR 86_60 | P90 | BN90S4 | 146 |
| 23.3 | 356 | 1.9 | 60 | 8000 | | — | | | WR 110_60 | P90 | BN90S4 | 150 |
| 25.0 | 294 | 1.0 | 56 | 7000 | W86_56 | S2 | M2SB4 | 144 | W 86_56 | P90 | BN90S4 | 145 |
| 25.0 | 303 | 2.0 | 56 | 8000 | W110_56 | S2 | M2SB4 | 148 | W 110_56 | P90 | BN90S4 | 149 |
| 25.0 | 307 | 3.1 | 56 | 12600 | | — | | | VF 130_56 | P90 | BN90S4 | 152 |
| 30 | 252 | 1.3 | 46 | 7000 | W86_46 | S2 | M2SB4 | 144 | W 86_46 | P90 | BN90S4 | 145 |
| 30 | 255 | 2.3 | 46 | 8000 | W110_46 | S2 | M2SB4 | 148 | W 110_46 | P90 | BN90S4 | 149 |
| 31 | 270 | 1.1 | 45 | 5010 | | — | | | WR 75_45 | P90 | BN90S4 | 142 |
| 31 | 263 | 1.5 | 45 | 7000 | | — | | | WR 86_45 | P90 | BN90S4 | 146 |
| 31 | 270 | 2.6 | 45 | 8000 | | — | | | WR 110_45 | P90 | BN90S4 | 150 |
| 35 | 216 | 1.2 | 40 | 4980 | W75_40 | S2 | M2SB4 | 140 | W 75_40 | P90 | BN90S4 | 141 |
| 35 | 225 | 1.5 | 40 | 7000 | W86_40 | S2 | M2SB4 | 144 | W 86_40 | P90 | BN90S4 | 145 |
| 35 | 228 | 2.9 | 40 | 8000 | W110_40 | S2 | M2SB4 | 148 | W 110_40 | P90 | BN90S4 | 149 |
| 37 | 217 | 1.2 | 37.5 | 4790 | | — | | | WR 75_37.5 | P90 | BN90S4 | 142 |
| 40 | 210 | 1.6 | 23 | 7000 | W86_23 | S3 | M3SA6 | 144 | W 86_23 | P90 | BN90L6 | 145 |
| 41 | 207 | 1.7 | 34.5 | 7000 | | — | | | WR 86_34.5 | P90 | BN90S4 | 146 |
| 47 | 167 | 1.0 | 30 | 3130 | W63_30 | S2 | M2SB4 | 136 | W 63_30 | P90 | BN90S4 | 137 |
| 47 | 189 | 1.5 | 30 | 4530 | | — | | | WR 75_30 | P90 | BN90S4 | 142 |
| 47 | 173 | 1.6 | 30 | 4640 | W75_30 | S2 | M2SB4 | 140 | W 75_30 | P90 | BN90S4 | 141 |
| 47 | 185 | 1.9 | 30 | 7000 | | — | | | WR 86_30 | P90 | BN90S4 | 146 |
| 47 | 171 | 2.2 | 30 | 7000 | W86_30 | S2 | M2SB4 | 144 | W 86_30 | P90 | BN90S4 | 145 |
| 56 | 150 | 1.7 | 25 | 4420 | W75_25 | S2 | M2SB4 | 140 | W 75_25 | P90 | BN90S4 | 141 |
| 58 | 140 | 1.1 | 24 | 2990 | W63_24 | S2 | M2SB4 | 136 | W 63_24 | P90 | BN90S4 | 137 |
| 61 | 142 | 2.3 | 23 | 7000 | W86_23 | S2 | M2SB4 | 144 | W 86_23 | P90 | BN90S4 | 145 |
| 70 | 125 | 2.0 | 20 | 4160 | W75_20 | S2 | M2SB4 | 140 | W 75_20 | P90 | BN90S4 | 141 |
| 70 | 126 | 2.5 | 20 | 7000 | W86_20 | S2 | M2SB4 | 144 | W 86_20 | P90 | BN90S4 | 145 |
| 74 | 115 | 1.3 | 19 | 2840 | W63_19 | S2 | M2SB4 | 136 | W 63_19 | P90 | BN90S4 | 137 |
| 93 | 93 | 1.6 | 15 | 2690 | W63_15 | S2 | M2SB4 | 136 | W 63_15 | P90 | BN90S4 | 137 |
| 93 | 96 | 2.6 | 15 | 3850 | W75_15 | S2 | M2SB4 | 140 | W 75_15 | P90 | BN90S4 | 141 |
| 93 | 96 | 3.4 | 15 | 6820 | W86_15 | S2 | M2SB4 | 144 | W 86_15 | P90 | BN90S4 | 145 |
| 117 | 77 | 1.8 | 12 | 2550 | W63_12 | S2 | M2SB4 | 136 | W 63_12 | P90 | BN90S4 | 137 |
| 140 | 65 | 2.2 | 10 | 2440 | W63_10 | S2 | M2SB4 | 136 | W 63_10 | P90 | BN90S4 | 137 |
| 140 | 66 | 3.5 | 10 | 3420 | W75_10 | S2 | M2SB4 | 140 | W 75_10 | P90 | BN90S4 | 141 |
| 187 | 48 | 2.6 | 15 | 2330 | W63_15 | S2 | M2SA2 | 136 | W 63_15 | P80 | BN80B2 | 137 |
| 200 | 44 | 1.1 | 14 | 1370 | | — | | | VF 49_14 | P80 | BN80B2 | 130 |
| 200 | 46 | 2.6 | 7 | 2210 | W63_7 | S2 | M2SB4 | 136 | W 63_7 | P90 | BN90S4 | 137 |
| 233 | 39 | 3.2 | 12 | 2190 | W63_12 | S2 | M2SA2 | 136 | W 63_12 | P80 | BN80B2 | 137 |
| 280 | 32 | 1.4 | 10 | 1250 | | — | | | VF 49_10 | P80 | BN80B2 | 130 |
| 280 | 33 | 3.8 | 10 | 2080 | W63_10 | S2 | M2SA2 | 136 | W 63_10 | P80 | BN80B2 | 137 |
| 400 | 23 | 1.8 | 7 | 1130 | | — | | | VF 49_7 | P80 | BN80B2 | 130 |


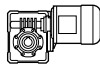







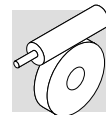
1.5 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|---|---|
| 0.29 | 9266 | 1.0 | 3200 | 52000 | — | — | — | VF/VF 130/250_3200 | P100 | BN100LA6 | 180 |
| 0.37 | 8973 | 1.0 | 2560 | 52000 | — | — | — | VF/VF 130/250_2560 | P100 | BN100LA6 | 180 |
| 0.44 | 7152 | 0.9 | 3200 | 34500 | — | — | — | VF/VF 130/210_3200 | P90 | BN90LA4 | 174 |
| 0.44 | 6827 | 1.3 | 3200 | 52000 | — | — | — | VF/VF 130/250_3200 | P90 | BN90LA4 | 180 |
| 0.51 | 8132 | 1.1 | 1840 | 52000 | — | — | — | VF/VF 130/250_1840 | P100 | BN100LA6 | 180 |
| 0.55 | 6242 | 1.0 | 2560 | 34500 | — | — | — | VF/VF 130/210_2560 | P90 | BN90LA4 | 174 |
| 0.55 | 6502 | 1.4 | 2560 | 52000 | — | — | — | VF/VF 130/250_2560 | P90 | BN90LA4 | 180 |
| 0.77 | 6543 | 1.0 | 1840 | 34500 | — | — | — | VF/VF 130/210_1840 | P90 | BN90LA4 | 174 |
| 0.77 | 5795 | 1.6 | 1840 | 52000 | — | — | — | VF/VF 130/250_1840 | P90 | BN90LA4 | 180 |
| 1.0 | 4907 | 1.3 | 920 | 34500 | — | — | — | VF/VF 130/210_920 | P100 | BN100LA6 | 174 |
| 1.0 | 4907 | 1.9 | 920 | 52000 | — | — | — | VF/VF 130/250_920 | P100 | BN100LA6 | 180 |
| 1.2 | 4145 | 1.0 | 1200 | 19500 | — | — | — | W /VF 86/185_1200 | P90 | BN90LA4 | 169 |
| 1.2 | 4633 | 1.4 | 800 | 34500 | — | — | — | VF/VF 130/210_800 | P100 | BN100LA6 | 174 |
| 1.2 | 4877 | 1.9 | 800 | 52000 | — | — | — | VF/VF 130/250_800 | P100 | BN100LA6 | 180 |
| 1.5 | 3926 | 1.1 | 920 | 19500 | — | — | — | W /VF 86/185_920 | P90 | BN90LA4 | 169 |
| 1.6 | 3932 | 1.7 | 600 | 34500 | — | — | — | VF/VF 130/210_600 | P100 | BN100LA6 | 174 |
| 1.6 | 3932 | 2.3 | 600 | 52000 | — | — | — | VF/VF 130/250_600 | P100 | BN100LA6 | 180 |
| 1.8 | 3495 | 1.2 | 800 | 19500 | — | — | — | W /VF 86/185_800 | P90 | BN90LA4 | 169 |
| 2.4 | 2743 | 1.5 | 600 | 19500 | — | — | — | W /VF 86/185_600 | P90 | BN90LA4 | 169 |
| 2.4 | 2926 | 2.2 | 400 | 34500 | — | — | — | VF/VF 130/210_400 | P100 | BN100LA6 | 174 |
| 2.4 | 2865 | 3.2 | 400 | 52000 | — | — | — | VF/VF 130/250_400 | P100 | BN100LA6 | 180 |
| 2.7 | 2956 | 0.9 | 529 | 16000 | — | — | — | W /VF 86/150_529 | P90 | BN90LA4 | 163 |
| 3.1 | 2570 | 1.0 | 460 | 16000 | — | — | — | W /VF 86/150_460 | P90 | BN90LA4 | 163 |
| 3.1 | 2286 | 1.0 | 300 | 19500 | — | — | — | VFR 185_300 | P100 | BN100LA6 | 166 |
| 3.1 | 2240 | 1.6 | 300 | 34500 | — | — | — | VFR 210_300 | P100 | BN100LA6 | 172 |
| 3.1 | 2377 | 2.2 | 300 | 52000 | — | — | — | VFR 250_300 | P100 | BN100LA6 | 178 |
| 3.4 | 2134 | 3.0 | 280 | 34500 | — | — | — | VF/VF 130/210_280 | P100 | BN100LA6 | 174 |
| 3.5 | 1788 | 1.0 | 400 | 13800 | — | — | — | W /VF 63/130_400 | P90 | BN90LA4 | 157 |
| 3.5 | 1951 | 2.2 | 400 | 19500 | — | — | — | W /VF 86/185_400 | P90 | BN90LA4 | 169 |
| 3.9 | 1975 | 0.9 | 240 | 16000 | — | — | — | VFR 150_240 | P100 | BN100LA6 | 160 |
| 3.9 | 1975 | 1.4 | 240 | 19500 | — | — | — | VFR 185_240 | P100 | BN100LA6 | 166 |
| 3.9 | 1975 | 2.2 | 240 | 34500 | — | — | — | VFR 210_240 | P100 | BN100LA6 | 172 |
| 3.9 | 2048 | 2.8 | 240 | 52000 | — | — | — | VFR 250_240 | P100 | BN100LA6 | 178 |
| 4.1 | 2033 | 1.3 | 345 | 16000 | — | — | — | W /VF 86/150_345 | P90 | BN90LA4 | 163 |
| 4.7 | 1676 | 1.4 | 300 | 19500 | — | — | — | VFR 185_300 | P90 | BN90LA4 | 166 |
| 4.7 | 1768 | 1.5 | 300 | 16000 | — | — | — | W /VF 86/150_300 | P90 | BN90LA4 | 163 |
| 4.9 | 1726 | 1.1 | 192 | 16000 | — | — | — | VFR 150_192 | P100 | BN100LA6 | 160 |
| 5.0 | 1422 | 1.3 | 280 | 13800 | — | — | — | W /VF 63/130_280 | P90 | BN90LA4 | 157 |
| 5.0 | 1479 | 2.8 | 280 | 19500 | — | — | — | W /VF 86/185_280 | P90 | BN90LA4 | 169 |
| 5.2 | 1646 | 2.0 | 180 | 19500 | — | — | — | VFR 185_180 | P100 | BN100LA6 | 166 |
| 5.2 | 1481 | 3.3 | 180 | 34500 | — | — | — | VFR 210_180 | P100 | BN100LA6 | 172 |
| 5.6 | 1536 | 0.9 | 168 | 13800 | — | — | — | VFR 130_168 | P100 | BN100LA6 | 154 |
| 5.9 | 1414 | 1.1 | 240 | 16000 | — | — | — | VFR 150_240 | P90 | BN90LA4 | 160 |
| 5.9 | 1439 | 1.9 | 240 | 19500 | — | — | — | VFR 185_240 | P90 | BN90LA4 | 166 |
| 6.3 | 1440 | 1.8 | 225 | 16000 | — | — | — | W /VF 86/150_225 | P90 | BN90LA4 | 163 |
| 7.1 | 1300 | 2.0 | 200 | 16000 | — | — | — | W /VF 86/150_200 | P90 | BN90LA4 | 163 |
| 7.3 | 1190 | 1.0 | 192 | 13800 | — | — | — | VFR 130_192 | P90 | BN90LA4 | 154 |
| 7.3 | 1209 | 1.4 | 192 | 16000 | — | — | — | VFR 150_192 | P90 | BN90LA4 | 160 |
| 7.8 | 1189 | 2.5 | 180 | 19500 | — | — | — | VFR 185_180 | P90 | BN90LA4 | 166 |
| 8.4 | 1092 | 1.1 | 168 | 13800 | — | — | — | VFR 130_168 | P90 | BN90LA4 | 154 |



1.5 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|---|---|-----|
| 8.4 | 1109 | 1.6 | 168 | 16000 | | — | | | VFR 150_168 | P90 | BN90LA4 | 160 |
| 9.4 | 930 | 1.2 | 100 | 15500 | | — | | | VF 150_100 | P100 | BN100LA6 | 158 |
| 9.4 | 945 | 2.1 | 100 | 19500 | | — | | | VF 185_100 | P100 | BN100LA6 | 164 |
| 9.4 | 1021 | 3.2 | 150 | 16000 | | — | | | VFR 185_150 | P90 | BN90LA4 | 166 |
| 10.2 | 939 | 1.4 | 138 | 13800 | | — | | | VFR 130_138 | P90 | BN90LA4 | 154 |
| 10.2 | 953 | 2.1 | 138 | 16000 | | — | | | VFR 150_138 | P90 | BN90LA4 | 160 |
| 10.4 | 905 | 1.0 | 90 | 8000 | | — | | | WR 110_90 | P100 | BN100LA6 | 150 |
| 10.4 | 1001 | 3.2 | 90 | 19500 | | — | | | VFR 185_90 | P100 | BN100LA6 | 166 |
| 11.8 | 829 | 1.0 | 120 | 8000 | | — | | | WR 110_120 | P90 | BN90LA4 | 150 |
| 11.8 | 780 | 1.2 | 80 | 13200 | | — | | | VF 130_80 | P100 | BN100LA6 | 152 |
| 11.8 | 792 | 1.7 | 80 | 15500 | | — | | | VF 150_80 | P100 | BN100LA6 | 158 |
| 11.8 | 817 | 1.7 | 120 | 13800 | | — | | | VFR 130_120 | P90 | BN90LA4 | 154 |
| 11.8 | 829 | 2.4 | 120 | 16000 | | — | | | VFR 150_120 | P90 | BN90LA4 | 160 |
| 11.8 | 805 | 3.0 | 80 | 19000 | | — | | | VF 185_80 | P100 | BN100LA6 | 164 |
| 13.6 | 789 | 1.0 | 69 | 8000 | | — | | | WR 110_69 | P100 | BN100LA6 | 150 |
| 13.6 | 778 | 1.9 | 69 | 13800 | | — | | | VFR 130_69 | P100 | BN100LA6 | 154 |
| 13.6 | 778 | 2.6 | 69 | 16000 | | — | | | VFR 150_69 | P100 | BN100LA6 | 160 |
| 14.7 | 673 | 2.2 | 64 | 15500 | | — | | | VF 150_64 | P100 | BN100LA6 | 158 |
| 15.7 | 640 | 1.3 | 90 | 8000 | | — | | | WR 110_90 | P90 | BN90LA4 | 150 |
| 15.7 | 649 | 2.3 | 90 | 13800 | | — | | | VFR 130_90 | P90 | BN90LA4 | 154 |
| 15.7 | 658 | 3.0 | 90 | 16000 | | — | | | VFR 150_90 | P90 | BN90LA4 | 160 |
| 16.8 | 580 | 1.1 | 56 | 8000 | W110_56 | S3 | M3LA6 | 148 | W 110_56 | P100 | BN100LA6 | 149 |
| 16.8 | 597 | 1.8 | 56 | 13200 | | — | | | VF 130_56 | P100 | BN100LA6 | 152 |
| 16.8 | 606 | 2.5 | 56 | 15500 | | — | | | VF 150_56 | P100 | BN100LA6 | 158 |
| 17.6 | 553 | 1.6 | 80 | 12600 | | — | | | VF 130_80 | P90 | BN90LA4 | 152 |
| 20.4 | 540 | 1.2 | 69 | 8000 | | — | | | WR 110_69 | P90 | BN90LA4 | 150 |
| 20.4 | 498 | 1.3 | 46 | 8000 | W110_46 | S3 | M3LA6 | 148 | W 110_46 | P100 | BN100LA6 | 149 |
| 20.4 | 533 | 2.4 | 69 | 13800 | | — | | | VFR 130_69 | P90 | BN90LA4 | 154 |
| 20.4 | 519 | 3.4 | 46 | 15500 | | — | | | VF 150_46 | P100 | BN100LA6 | 158 |
| 20.4 | 540 | 3.4 | 69 | 16000 | | — | | | VFR 150_69 | P90 | BN90LA4 | 160 |
| 22.0 | 455 | 1.2 | 64 | 8000 | W110_64 | S3 | M3SA4 | 148 | W 110_64 | P90 | BN90LA4 | 149 |
| 22.0 | 462 | 2.0 | 64 | 12600 | | — | | | VF 130_64 | P90 | BN90LA4 | 152 |
| 23.5 | 482 | 1.4 | 60 | 8000 | | — | | | WR 110_60 | P90 | BN90LA4 | 150 |
| 23.5 | 445 | 2.7 | 40 | 13200 | | — | | | VF 130_40 | P100 | BN100LA6 | 152 |
| 23.5 | 475 | 2.8 | 60 | 13800 | | — | | | VFR 130_60 | P90 | BN90LA4 | 154 |
| 25.2 | 410 | 1.5 | 56 | 8000 | W110_56 | S3 | M3SA4 | 148 | W 110_56 | P90 | BN90LA4 | 149 |
| 25.2 | 415 | 2.3 | 56 | 12600 | | — | | | VF 130_56 | P90 | BN90LA4 | 152 |
| 31 | 341 | 1.0 | 46 | 7000 | W86_46 | S3 | M3SA4 | 144 | W 86_46 | P90 | BN90LA4 | 145 |
| 31 | 346 | 1.7 | 46 | 8000 | W110_46 | S3 | M3SA4 | 148 | W 110_46 | P90 | BN90LA4 | 149 |
| 31 | 355 | 3.0 | 46 | 12600 | | — | | | VF 130_46 | P90 | BN90LA4 | 152 |
| 31 | 357 | 1.1 | 45 | 7000 | | — | | | WR 86_45 | P90 | BN90LA4 | 146 |
| 31 | 366 | 1.9 | 45 | 8000 | | — | | | WR 110_45 | P90 | BN90LA4 | 150 |
| 35 | 305 | 1.1 | 40 | 7000 | W86_40 | S3 | M3SA4 | 144 | W 86_40 | P90 | BN90LA4 | 145 |
| 35 | 309 | 2.2 | 40 | 8000 | W110_40 | S3 | M3SA4 | 148 | W 110_40 | P90 | BN90LA4 | 149 |
| 38 | 293 | 0.9 | 37.5 | 4330 | | — | | | WR 75_37.5 | P90 | BN90LA4 | 142 |
| 38 | 293 | 0.9 | 25 | 4330 | W75_25 | S3 | M3LA6 | 140 | W 75_25 | P100 | BN100LA6 | 141 |
| 41 | 280 | 1.2 | 34.5 | 7000 | | — | | | WR 86_34.5 | P90 | BN90LA4 | 146 |
| 41 | 280 | 1.2 | 23 | 7000 | W86_23 | S3 | M3LA6 | 144 | W 86_23 | P100 | BN100LA6 | 145 |
| 47 | 256 | 1.1 | 30 | 4130 | | — | | | WR 75_30 | P90 | BN90LA4 | 142 |
| 47 | 235 | 1.2 | 30 | 4270 | W75_30 | S3 | M3SA4 | 140 | W 75_30 | P90 | BN90LA4 | 141 |

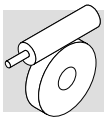


1.5 kW








| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N | | | | | | IEC | | | |
|----------------------------|-------------|----------|----------|---------------|---------|----|-------|-----|----------|------------|----------|---------|-----|
| 47 | 250 | 1.4 | 30 | 7000 | | — | | | | WR 86_30 | P90 | BN90LA4 | 146 |
| 47 | 232 | 1.6 | 30 | 7000 | W86_30 | S3 | M3SA4 | 144 | W 86_30 | P90 | BN90LA4 | 145 | |
| 47 | 235 | 3.0 | 30 | 8000 | W110_30 | S3 | M3SA4 | 148 | W 110_30 | P90 | BN90LA4 | 149 | |
| 56 | 203 | 1.2 | 25 | 4100 | W75_25 | S3 | M3SA4 | 140 | W 75_25 | P90 | BN90LA4 | 141 | |
| 61 | 192 | 1.7 | 23 | 7000 | W86_23 | S3 | M3SA4 | 144 | W 86_23 | P90 | BN90LA4 | 145 | |
| 61 | 194 | 2.8 | 23 | 8000 | W110_23 | S3 | M3SA4 | 148 | W 110_23 | P90 | BN90LA4 | 149 | |
| 71 | 169 | 1.5 | 20 | 3880 | W75_20 | S3 | M3SA4 | 140 | W 75_20 | P90 | BN90LA4 | 141 | |
| 71 | 171 | 1.9 | 20 | 7000 | W86_20 | S3 | M3SA4 | 144 | W 86_20 | P90 | BN90LA4 | 145 | |
| 71 | 171 | 3.3 | 20 | 8000 | W110_20 | S3 | M3SA4 | 148 | W 110_20 | P90 | BN90LA4 | 149 | |
| 74 | 156 | 1.0 | 19 | 2550 | | — | | | W 63_19 | P90 | BN90LA4 | 137 | |
| 94 | 126 | 1.2 | 15 | 2450 | | — | | | W 63_15 | P90 | BN90LA4 | 137 | |
| 94 | 130 | 1.9 | 15 | 3630 | W75_15 | S3 | M3SA4 | 140 | W 75_15 | P90 | BN90LA4 | 141 | |
| 94 | 131 | 2.4 | 15 | 6520 | | — | | | WR 86_15 | P90 | BN90LA4 | 146 | |
| 94 | 130 | 2.5 | 15 | 6610 | W86_15 | S3 | M3SA4 | 144 | W 86_15 | P90 | BN90LA4 | 145 | |
| 118 | 104 | 1.4 | 12 | 2340 | | — | | | W 63_12 | P90 | BN90LA4 | 137 | |
| 134 | 94 | 2.2 | 7 | 3150 | W75_7 | S3 | M3LA6 | 140 | W 75_7 | P100 | BN100LA6 | 141 | |
| 141 | 87 | 1.6 | 10 | 2250 | | — | | | W 63_10 | P90 | BN90LA4 | 137 | |
| 141 | 89 | 2.6 | 10 | 3250 | W75_10 | S3 | M3SA4 | 140 | W 75_10 | P90 | BN90LA4 | 141 | |
| 141 | 89 | 3.2 | 10 | 5850 | W86_10 | S3 | M3SA4 | 144 | W 86_10 | P90 | BN90LA4 | 145 | |
| 187 | 66 | 1.9 | 15 | 2200 | W63_15 | S2 | M2SB2 | 136 | W 63_15 | P90 | BN90SA2 | 137 | |
| 187 | 68 | 3.3 | 15 | 3120 | W75_15 | S2 | M2SB2 | 140 | W 75_15 | P90 | BN90SA2 | 141 | |
| 201 | 63 | 1.9 | 7 | 2060 | | — | | | W 63_7 | P90 | BN90LA4 | 137 | |
| 201 | 64 | 3.0 | 7 | 2920 | W75_7 | S3 | M3SA4 | 140 | W 75_7 | P90 | BN90LA4 | 141 | |
| 201 | 63 | 3.9 | 7 | 5240 | W86_7 | S3 | M3SA4 | 144 | W 86_7 | P90 | BN90LA4 | 145 | |
| 233 | 53 | 2.3 | 12 | 2080 | W63_12 | S2 | M2SB2 | 136 | W 63_12 | P90 | BN90SA2 | 137 | |
| 280 | 45 | 2.8 | 10 | 1980 | W63_10 | S2 | M2SB2 | 136 | W 63_10 | P90 | BN90SA2 | 137 | |

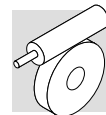
1.85 kW

| | | | | | | | | | | | | |
|------|------|-----|------|-------|--|---|--|--|--|------------------------|----------|-----|
| 0.44 | 8480 | 1.1 | 3200 | 52000 | | — | | | | VF/VF 130/250_3200P90 | BN90LB4 | 180 |
| 0.55 | 8077 | 1.1 | 2560 | 52000 | | — | | | | VF/VF 130/250_2560P90 | BN90LB4 | 180 |
| 0.76 | 7198 | 1.3 | 1840 | 52000 | | — | | | | VF/VF 130/250_1840P90 | BN90LB4 | 180 |
| 1.0 | 6117 | 1.1 | 920 | 34500 | | — | | | | VF/VF 130/210_920 P100 | BN100LB6 | 174 |
| 1.0 | 6117 | 1.5 | 920 | 52000 | | — | | | | VF/VF 130/250_920 P100 | BN100LB6 | 180 |
| 1.2 | 5775 | 1.1 | 800 | 34500 | | — | | | | VF/VF 130/210_800 P100 | BN100LB6 | 174 |
| 1.2 | 6079 | 1.5 | 800 | 52000 | | — | | | | VF/VF 130/250_800 P100 | BN100LB6 | 180 |
| 1.6 | 4901 | 1.3 | 600 | 34500 | | — | | | | VF/VF 130/210_600 P100 | BN100LB6 | 174 |
| 1.6 | 4901 | 1.9 | 600 | 52000 | | — | | | | VF/VF 130/250_600 P100 | BN100LB6 | 180 |
| 1.8 | 4341 | 1.0 | 800 | 19500 | | — | | | | W /VF 86/185_800 P90 | BN90LB4 | 169 |
| 2.3 | 3647 | 1.8 | 400 | 34500 | | — | | | | VF/VF 130/210_400 P100 | BN100LB6 | 174 |
| 2.3 | 3571 | 2.6 | 400 | 52000 | | — | | | | VF/VF 130/250_400 P100 | BN100LB6 | 180 |
| 2.3 | 3407 | 1.2 | 600 | 19500 | | — | | | | W /VF 86/185_600 P90 | BN90LB4 | 169 |
| 3.1 | 2793 | 1.3 | 300 | 34500 | | — | | | | VFR 210_300 P100 | BN100LB6 | 172 |
| 3.1 | 2964 | 1.8 | 300 | 52000 | | — | | | | VFR 250_300 P100 | BN100LB6 | 178 |
| 3.3 | 2660 | 2.4 | 280 | 34500 | | — | | | | VF/VF 130/210_280 P100 | BN100LB6 | 174 |
| 3.3 | 2713 | 3.4 | 280 | 52000 | | — | | | | VF/VF 130/250_280 P100 | BN100LB6 | 180 |
| 3.5 | 2423 | 1.7 | 400 | 19500 | | — | | | | W /VF 86/185_400 P90 | BN90LB4 | 169 |
| 3.9 | 2462 | 1.1 | 240 | 19500 | | — | | | | VFR 185_240 P100 | BN100LB6 | 166 |
| 3.9 | 2462 | 1.8 | 240 | 34500 | | — | | | | VFR 210_240 P100 | BN100LB6 | 172 |


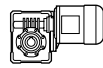







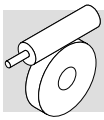
1.85 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|---|---|-----|
| 3.9 | 2553 | 2.3 | 240 | 52000 | — | — | — | VFR 250_240 | P100 | BN100LB6 | 178 | |
| 4.1 | 2525 | 1.0 | 345 | 16000 | — | — | — | W /VF 86/150_345 | P90 | BN90LB4 | 163 | |
| 4.7 | 2082 | 1.1 | 300 | 19500 | — | — | — | VFR 185_300 | P90 | BN90LB4 | 166 | |
| 4.7 | 2196 | 1.2 | 300 | 16000 | — | — | — | W /VF 86/150_300 | P90 | BN90LB4 | 163 | |
| 4.8 | 2152 | 0.9 | 192 | 16000 | — | — | — | VFR 150_192 | P100 | BN100LB6 | 160 | |
| 5.0 | 1767 | 1.0 | 280 | 13800 | — | — | — | W /VF 63/130_280 | P90 | BN90LB4 | 157 | |
| 5.0 | 1837 | 2.3 | 280 | 19500 | — | — | — | W /VF 86/185_280 | P90 | BN90LB4 | 169 | |
| 5.2 | 2052 | 1.6 | 180 | 19500 | — | — | — | VFR 185_180 | P100 | BN100LB6 | 166 | |
| 5.2 | 1847 | 2.7 | 180 | 34500 | — | — | — | VFR 210_180 | P100 | BN100LB6 | 172 | |
| 5.2 | 2120 | 3.2 | 180 | 52000 | — | — | — | VFR 250_180 | P100 | BN100LB6 | 178 | |
| 5.8 | 1757 | 0.9 | 240 | 16000 | — | — | — | VFR 150_240 | P90 | BN90LB4 | 160 | |
| 5.8 | 1787 | 1.6 | 240 | 19500 | — | — | — | VFR 185_240 | P90 | BN90LB4 | 166 | |
| 6.2 | 1767 | 3.0 | 150 | 34500 | — | — | — | VFR 210_150 | P100 | BN100LB6 | 172 | |
| 6.2 | 1789 | 1.5 | 225 | 16000 | — | — | — | W /VF 86/150_225 | P90 | BN90LB4 | 163 | |
| 6.7 | 1678 | 0.9 | 138 | 13800 | — | — | — | VFR 130_138 | P100 | BN100LB6 | 154 | |
| 6.7 | 1678 | 1.3 | 138 | 16000 | — | — | — | VFR 150_138 | P100 | BN100LB6 | 160 | |
| 7.0 | 1615 | 1.6 | 200 | 16000 | — | — | — | W /VF 86/150_200 | P90 | BN90LB4 | 163 | |
| 7.3 | 1502 | 1.1 | 192 | 16000 | — | — | — | VFR 150_192 | P90 | BN90LB4 | 160 | |
| 7.8 | 1476 | 2.0 | 180 | 19500 | — | — | — | VFR 185_180 | P90 | BN90LB4 | 166 | |
| 8.3 | 1357 | 0.9 | 168 | 13800 | — | — | — | VFR 130_168 | P90 | BN90LB4 | 154 | |
| 8.3 | 1378 | 1.3 | 168 | 16000 | — | — | — | VFR 150_168 | P90 | BN90LB4 | 160 | |
| 9.3 | 1159 | 1.0 | 100 | 15500 | — | — | — | VF 150_100 | P100 | BN100LB6 | 158 | |
| 9.3 | 1178 | 1.7 | 100 | 19000 | — | — | — | VF 185_100 | P100 | BN100LB6 | 164 | |
| 9.3 | 1268 | 2.6 | 150 | 19500 | — | — | — | VFR 185_150 | P90 | BN90LB4 | 166 | |
| 10.1 | 1167 | 1.2 | 138 | 13800 | — | — | — | VFR 130_138 | P90 | BN90LB4 | 154 | |
| 10.1 | 1184 | 1.7 | 138 | 16000 | — | — | — | VFR 150_138 | P90 | BN90LB4 | 160 | |
| 11.6 | 973 | 1.0 | 80 | 13200 | — | — | — | VF 130_80 | P100 | BN100LB6 | 152 | |
| 11.6 | 988 | 1.4 | 80 | 15500 | — | — | — | VF 150_80 | P100 | BN100LB6 | 158 | |
| 11.6 | 1003 | 2.4 | 80 | 19000 | — | — | — | VF 185_80 | P100 | BN100LB6 | 164 | |
| 11.7 | 1015 | 1.4 | 120 | 13800 | — | — | — | VFR 130_120 | P90 | BN90LB4 | 154 | |
| 11.7 | 1030 | 1.9 | 120 | 16000 | — | — | — | VFR 150_120 | P90 | BN90LB4 | 160 | |
| 11.7 | 1060 | 3.4 | 120 | 19500 | — | — | — | VFR 185_120 | P90 | BN90LB4 | 166 | |
| 13.5 | 970 | 1.5 | 69 | 13800 | — | — | — | VFR 130_69 | P100 | BN100LB6 | 154 | |
| 13.5 | 970 | 2.1 | 69 | 16000 | — | — | — | VFR 150_69 | P100 | BN100LB6 | 160 | |
| 14.5 | 839 | 1.7 | 64 | 15500 | — | — | — | VF 150_64 | P100 | BN100LB6 | 158 | |
| 15.6 | 795 | 1.0 | 90 | 8000 | — | — | — | WR 110_90 | P90 | BN90LB4 | 150 | |
| 15.6 | 806 | 1.9 | 90 | 13800 | — | — | — | VFR 130_90 | P90 | BN90LB4 | 154 | |
| 15.6 | 818 | 2.4 | 90 | 16000 | — | — | — | VFR 150_90 | P90 | BN90LB4 | 160 | |
| 15.6 | 863 | 3.2 | 90 | 19500 | — | — | — | VFR 185_90 | P90 | BN90LB4 | 166 | |
| 16.6 | 755 | 2.0 | 56 | 15500 | — | — | — | VF 150_56 | P100 | BN100LB6 | 158 | |
| 17.5 | 687 | 1.3 | 80 | 12600 | — | — | — | VF 130_80 | P90 | BN90LB4 | 152 | |
| 20.2 | 647 | 2.7 | 46 | 15500 | — | — | — | VF 150_46 | P100 | BN100LB6 | 158 | |
| 20.3 | 670 | 1.0 | 69 | 8000 | — | — | — | WR 110_69 | P90 | BN90LB4 | 150 | |
| 20.3 | 662 | 2.0 | 69 | 13800 | — | — | — | VFR 130_69 | P90 | BN90LB4 | 154 | |
| 20.3 | 670 | 2.8 | 69 | 16000 | — | — | — | VFR 150_69 | P90 | BN90LB4 | 160 | |
| 21.9 | 565 | 0.9 | 64 | 8000 | — | — | — | W 110_64 | P90 | BN90LB4 | 149 | |
| 21.9 | 573 | 1.6 | 64 | 12600 | — | — | — | VF 130_64 | P90 | BN90LB4 | 152 | |
| 23.3 | 555 | 1.3 | 40 | 8000 | W110_40 | S3 | M3LB6 | 148 | W 110_40 | P100 | BN100LB6 | 149 |
| 23.3 | 562 | 3.1 | 40 | 15500 | — | — | — | VF 150_40 | P100 | BN100LB6 | 158 | |
| 23.3 | 598 | 1.1 | 60 | 8000 | — | — | — | WR 110_60 | P90 | BN90LB4 | 150 | |










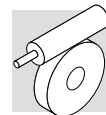
1.85 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC |  |  |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|------|---|---|
| 23.3 | 591 | 2.3 | 60 | 13800 | | — | | | VFR 130_60 | P90 | BN90LB4 | 154 |
| 23.3 | 598 | 3.2 | 60 | 16000 | | — | | | VFR 150_60 | P90 | BN90LB4 | 160 |
| 25.0 | 509 | 1.2 | 56 | 8000 | | — | | | W 110_56 | P90 | BN90LB4 | 149 |
| 25.0 | 516 | 1.9 | 56 | 12600 | | — | | | VF 130_56 | P90 | BN90LB4 | 152 |
| 30 | 430 | 1.4 | 46 | 8000 | | — | | | W 110_46 | P90 | BN90LB4 | 149 |
| 30 | 441 | 2.4 | 46 | 12600 | | — | | | VF 130_46 | P90 | BN90LB4 | 152 |
| 31 | 416 | 1.0 | 30 | 7000 | W86_30 | S3 | M3LB6 | 144 | W 86_30 | P100 | BN100LB6 | 145 |
| 31 | 443 | 0.9 | 45 | 7000 | | — | | | WR 86_45 | P90 | BN90LB4 | 146 |
| 31 | 454 | 1.6 | 45 | 8000 | | — | | | WR 110_45 | P90 | BN90LB4 | 150 |
| 35 | 384 | 1.7 | 40 | 8000 | | — | | | W 110_40 | P90 | BN90LB4 | 149 |
| 40 | 350 | 1.0 | 23 | 7000 | W86_23 | S3 | M3LB6 | 144 | W 86_23 | P100 | BN100LB6 | 145 |
| 40 | 354 | 3.0 | 23 | 13200 | | — | | | VF 130_23 | P100 | BN100LB6 | 152 |
| 41 | 348 | 1.0 | 34.5 | 7000 | | — | | | WR 86_34.5 | P90 | BN90LB4 | 146 |
| 42 | 339 | 3.1 | 69 | 13800 | | — | | | VFR 130_69 | P90 | BN90SB2 | 154 |
| 47 | 308 | 1.1 | 20 | 7000 | W86_20 | S3 | M3LB6 | 144 | W 86_20 | P100 | BN100LB6 | 145 |
| 47 | 312 | 3.4 | 20 | 13200 | | — | | | VF 130_20 | P100 | BN100LB6 | 152 |
| 47 | 292 | 0.9 | 30 | 3960 | | — | | | W 75_30 | P90 | BN90LB4 | 141 |
| 47 | 310 | 1.1 | 30 | 7000 | | — | | | WR 86_30 | P90 | BN90LB4 | 146 |
| 47 | 288 | 1.3 | 30 | 7000 | | — | | | W 86_30 | P90 | BN90LB4 | 145 |
| 47 | 318 | 2.1 | 30 | 8000 | | — | | | WR 110_30 | P90 | BN90LB4 | 150 |
| 47 | 292 | 2.4 | 30 | 8000 | | — | | | W 110_30 | P90 | BN90LB4 | 149 |
| 56 | 252 | 1.0 | 25 | 3820 | | — | | | W 75_25 | P90 | BN90LB4 | 141 |
| 61 | 238 | 1.3 | 23 | 7000 | | — | | | W 86_23 | P90 | BN90LB4 | 145 |
| 61 | 241 | 2.2 | 23 | 8000 | | — | | | W 110_23 | P90 | BN90LB4 | 149 |
| 62 | 237 | 1.1 | 15 | 3600 | W75_15 | S3 | M3LB6 | 140 | W 75_15 | P100 | BN100LB6 | 141 |
| 62 | 234 | 1.5 | 15 | 7000 | W86_15 | S3 | M3LB6 | 144 | W 86_15 | P100 | BN100LB6 | 145 |
| 67 | 228 | 2.6 | 21 | 8000 | | — | | | WR 110_21 | P90 | BN90LB4 | 150 |
| 70 | 209 | 1.2 | 20 | 3650 | | — | | | W 75_20 | P90 | BN90LB4 | 141 |
| 70 | 212 | 1.5 | 20 | 6960 | | — | | | W 86_20 | P90 | BN90LB4 | 145 |
| 70 | 212 | 2.7 | 20 | 8000 | | — | | | W 110_20 | P90 | BN90LB4 | 149 |
| 93 | 163 | 1.5 | 10 | 3280 | W75_10 | S3 | M3LB6 | 140 | W 75_10 | P100 | BN100LB6 | 141 |
| 93 | 157 | 1.0 | 15 | 2230 | | — | | | W 63_15 | P90 | BN90LB4 | 137 |
| 93 | 161 | 1.6 | 15 | 3440 | | — | | | W 75_15 | P90 | BN90LB4 | 141 |
| 93 | 161 | 2.1 | 15 | 6450 | | — | | | W 86_15 | P90 | BN90LB4 | 145 |
| 117 | 129 | 1.1 | 12 | 2150 | | — | | | W 63_12 | P90 | BN90LB4 | 137 |
| 133 | 117 | 1.8 | 7 | 2970 | W75_7 | S3 | M3LB6 | 140 | W 75_7 | P100 | BN100LB6 | 141 |
| 133 | 117 | 2.3 | 7 | 5700 | W86_7 | S3 | M3LB6 | 144 | W 86_7 | P100 | BN100LB6 | 145 |
| 140 | 109 | 1.3 | 10 | 2090 | | — | | | W 63_10 | P90 | BN90LB4 | 137 |
| 140 | 111 | 2.1 | 10 | 3100 | | — | | | W 75_10 | P90 | BN90LB4 | 141 |
| 140 | 111 | 2.6 | 10 | 5730 | | — | | | W 86_10 | P90 | BN90LB4 | 145 |
| 192 | 79 | 1.6 | 15 | 2080 | | — | | | W 63_15 | P90 | BN90SB2 | 137 |
| 192 | 81 | 2.8 | 15 | 3000 | | — | | | W 75_15 | P90 | BN90SB2 | 141 |
| 200 | 78 | 1.5 | 7 | 1930 | | — | | | W 63_7 | P90 | BN90LB4 | 137 |
| 200 | 80 | 2.4 | 7 | 2790 | | — | | | W 75_7 | P90 | BN90LB4 | 141 |
| 200 | 79 | 3.2 | 7 | 5140 | | — | | | W 86_7 | P90 | BN90LB4 | 145 |
| 240 | 64 | 2.0 | 12 | 1980 | | — | | | W 63_12 | P90 | BN90SB2 | 137 |
| 288 | 54 | 2.3 | 10 | 1890 | | — | | | W 63_10 | P90 | BN90SB2 | 137 |
| 288 | 55 | 3.7 | 10 | 2670 | | — | | | W 75_10 | P90 | BN90SB2 | 141 |
| 411 | 39 | 2.7 | 7 | 1720 | | — | | | W 63_7 | P90 | BN90SB2 | 137 |


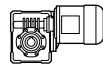







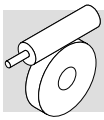
2.2 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|---|---|
| 0.44 | 10013 | 0.9 | 3200 | 52000 | — | — | — | VF/VF 130/250_3200 | P100 | BN100LA4 | 180 |
| 0.55 | 9536 | 0.9 | 2560 | 52000 | — | — | — | VF/VF 130/250_2560 | P100 | BN100LA4 | 180 |
| 0.77 | 8499 | 1.1 | 1840 | 52000 | — | — | — | VF/VF 130/250_1840 | P100 | BN100LA4 | 180 |
| 0.88 | 7629 | 1.2 | 1600 | 52000 | — | — | — | VF/VF 130/250_1600 | P100 | BN100LA4 | 180 |
| 1.0 | 7197 | 0.9 | 920 | 34500 | — | — | — | VF/VF 130/210_920 | P112 | BN112M6 | 174 |
| 1.0 | 7197 | 1.3 | 920 | 52000 | — | — | — | VF/VF 130/250_920 | P112 | BN112M6 | 180 |
| 1.2 | 6258 | 1.0 | 1200 | 34500 | — | — | — | VF/VF 130/210_1200 | P100 | BN100LA4 | 174 |
| 1.2 | 6258 | 1.4 | 1200 | 52000 | — | — | — | VF/VF 130/250_1200 | P100 | BN100LA4 | 180 |
| 1.5 | 5072 | 1.2 | 920 | 34500 | — | — | — | VF/VF 130/210_920 | P100 | BN100LA4 | 174 |
| 1.5 | 5072 | 1.8 | 920 | 52000 | — | — | — | VF/VF 130/250_920 | P100 | BN100LA4 | 180 |
| 1.8 | 4887 | 1.3 | 800 | 34500 | — | — | — | VF/VF 130/210_800 | P100 | BN100LA4 | 174 |
| 1.8 | 5007 | 1.8 | 800 | 52000 | — | — | — | VF/VF 130/250_800 | P100 | BN100LA4 | 180 |
| 2.4 | 4023 | 1.0 | 600 | 19500 | — | — | — | W /VF 86/185_600 | P100 | BN100LA4 | 169 |
| 2.4 | 3844 | 1.6 | 600 | 34500 | — | — | — | VF/VF 130/210_600 | P100 | BN100LA4 | 174 |
| 2.4 | 3934 | 2.3 | 600 | 52000 | — | — | — | VF/VF 130/250_600 | P100 | BN100LA4 | 180 |
| 3.1 | 3286 | 1.1 | 300 | 34500 | — | — | — | VFR 210_300 | P112 | BN112M6 | 172 |
| 3.1 | 3487 | 1.5 | 300 | 52000 | — | — | — | VFR 250_300 | P112 | BN112M6 | 178 |
| 3.5 | 2861 | 1.5 | 400 | 19500 | — | — | — | W /VF 86/185_400 | P100 | BN100LA4 | 169 |
| 3.5 | 2980 | 2.1 | 400 | 34500 | — | — | — | VF/VF 130/210_400 | P100 | BN100LA4 | 174 |
| 3.5 | 2921 | 3.1 | 400 | 52000 | — | — | — | VF/VF 130/250_400 | P100 | BN100LA4 | 180 |
| 3.9 | 2897 | 1.0 | 240 | 19500 | — | — | — | VFR 185_240 | P112 | BN112M6 | 166 |
| 3.9 | 2897 | 1.5 | 240 | 34500 | — | — | — | VFR 210_240 | P112 | BN112M6 | 172 |
| 3.9 | 3004 | 1.9 | 240 | 52000 | — | — | — | VFR 250_240 | P112 | BN112M6 | 178 |
| 4.7 | 2459 | 0.9 | 300 | 19500 | — | — | — | VFR 185_300 | P100 | BN100LA4 | 166 |
| 4.7 | 2459 | 1.4 | 300 | 34500 | — | — | — | VFR 210_300 | P100 | BN100LA4 | 172 |
| 4.7 | 2548 | 2.0 | 300 | 52000 | — | — | — | VFR 250_300 | P100 | BN100LA4 | 178 |
| 5.0 | 2170 | 1.9 | 280 | 19500 | — | — | — | W /VF 86/185_280 | P100 | BN100LA4 | 169 |
| 5.0 | 2170 | 2.9 | 280 | 34500 | — | — | — | VF/VF 130/210_280 | P100 | BN100LA4 | 174 |
| 5.6 | 2291 | 0.9 | 168 | 16000 | — | — | — | VFR 150_168 | P112 | BN112M6 | 160 |
| 5.9 | 2110 | 1.3 | 240 | 19500 | — | — | — | VFR 185_240 | P100 | BN100LA4 | 166 |
| 5.9 | 2110 | 1.8 | 240 | 34500 | — | — | — | VFR 210_240 | P100 | BN100LA4 | 172 |
| 5.9 | 2181 | 2.5 | 240 | 52000 | — | — | — | VFR 250_240 | P100 | BN100LA4 | 178 |
| 7.3 | 1774 | 1.0 | 192 | 16000 | — | — | — | VFR 150_192 | P100 | BN100LA4 | 160 |
| 7.8 | 1690 | 0.9 | 120 | 13800 | — | — | — | VFR 130_120 | P112 | BN112M6 | 154 |
| 7.8 | 1743 | 1.7 | 180 | 19500 | — | — | — | VFR 185_180 | P100 | BN100LA4 | 166 |
| 7.8 | 1717 | 2.5 | 180 | 34500 | — | — | — | VFR 210_180 | P100 | BN100LA4 | 172 |
| 7.8 | 1797 | 3.5 | 180 | 52000 | — | — | — | VFR 250_180 | P100 | BN100LA4 | 178 |
| 8.4 | 1627 | 1.1 | 168 | 16000 | — | — | — | VFR 150_168 | P100 | BN100LA4 | 160 |
| 9.4 | 1386 | 1.4 | 100 | 19000 | — | — | — | VF 185_100 | P112 | BN112M6 | 164 |
| 9.4 | 1498 | 2.2 | 150 | 19500 | — | — | — | VFR 185_150 | P100 | BN100LA4 | 166 |
| 9.4 | 1498 | 3.0 | 150 | 34500 | — | — | — | VFR 210_150 | P100 | BN100LA4 | 172 |
| 10.2 | 1378 | 1.0 | 138 | 13800 | — | — | — | VFR 130_138 | P100 | BN100LA4 | 154 |
| 10.2 | 1398 | 1.4 | 138 | 16000 | — | — | — | VFR 150_138 | P100 | BN100LA4 | 160 |
| 10.4 | 1468 | 2.2 | 90 | 19500 | — | — | — | VFR 185_90 | P112 | BN112M6 | 166 |
| 10.4 | 1448 | 3.2 | 90 | 34500 | — | — | — | VFR 210_90 | P112 | BN112M6 | 172 |
| 11.8 | 1162 | 1.2 | 80 | 15500 | — | — | — | VF 150_80 | P112 | BN112M6 | 158 |
| 11.8 | 1198 | 1.2 | 120 | 13800 | — | — | — | VFR 130_120 | P100 | BN100LA4 | 154 |
| 11.8 | 1216 | 1.6 | 120 | 16000 | — | — | — | VFR 150_120 | P100 | BN100LA4 | 160 |
| 11.8 | 1180 | 2.0 | 80 | 19000 | — | — | — | VF 185_80 | P112 | BN112M6 | 164 |
| 11.8 | 1252 | 2.9 | 120 | 19500 | — | — | — | VFR 185_120 | P100 | BN100LA4 | 166 |










2.2 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC |  |  |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|-------------|---|---|
| 11.8 | 1252 | 4.0 | 120 | 34500 | | — | | | | VFR 210_120 | P100 BN100LA4 | 172 |
| 13.6 | 1141 | 1.3 | 69 | 13800 | | — | | | | VFR 130_69 | P112 BN112M6 | 154 |
| 13.6 | 1141 | 1.8 | 69 | 16000 | | — | | | | VFR 150_69 | P112 BN112M6 | 160 |
| 14.1 | 969 | 1.2 | 100 | 14700 | | — | | | | VF 150_100 | P100 BN100LA4 | 158 |
| 14.1 | 969 | 2.0 | 100 | 18000 | | — | | | | VF 185_100 | P100 BN100LA4 | 164 |
| 14.7 | 973 | 1.1 | 64 | 13200 | | — | | | | VF 130_64 | P112 BN112M6 | 152 |
| 15.7 | 952 | 1.6 | 90 | 13800 | | — | | | | VFR 130_90 | P100 BN100LA4 | 154 |
| 15.7 | 966 | 2.0 | 90 | 16000 | | — | | | | VFR 150_90 | P100 BN100LA4 | 160 |
| 15.7 | 952 | 2.7 | 60 | 19000 | | — | | | | VF 185_60 | P112 BN112M6 | 164 |
| 15.7 | 1019 | 2.7 | 90 | 19500 | | — | | | | VFR 185_90 | P100 BN100LA4 | 166 |
| 16.8 | 876 | 1.2 | 56 | 13200 | | — | | | | VF 130_56 | P112 BN112M6 | 152 |
| 17.6 | 811 | 1.1 | 80 | 12600 | | — | | | | VF 130_80 | P100 BN100LA4 | 152 |
| 17.6 | 823 | 1.5 | 80 | 14700 | | — | | | | VF 150_80 | P100 BN100LA4 | 158 |
| 17.6 | 823 | 2.6 | 80 | 18000 | | — | | | | VF 185_80 | P100 BN100LA4 | 164 |
| 20.4 | 751 | 1.5 | 46 | 13200 | | — | | | | VF 130_46 | P112 BN112M6 | 152 |
| 20.4 | 781 | 1.7 | 69 | 13800 | | — | | | | VFR 130_69 | P100 BN100LA4 | 154 |
| 20.4 | 761 | 2.3 | 46 | 15500 | | — | | | | VF 150_46 | P112 BN112M6 | 158 |
| 20.4 | 792 | 2.3 | 69 | 16000 | | — | | | | VFR 150_69 | P100 BN100LA4 | 160 |
| 20.9 | 774 | 1.1 | 45 | 8000 | | — | | | | WR 110_45 | P112 BN112M6 | 150 |
| 22.0 | 677 | 1.4 | 64 | 12600 | | — | | | | VF 130_64 | P100 BN100LA4 | 152 |
| 22.0 | 687 | 1.9 | 64 | 14700 | | — | | | | VF 150_64 | P100 BN100LA4 | 158 |
| 23.3 | 660 | 1.1 | 40 | 8000 | W110_40 | S3 | M3LC6 | 148 | | W 110_40 | P112 BN112M6 | 149 |
| 23.5 | 706 | 1.0 | 60 | 8000 | | — | | | | WR 110_60 | P100 BN100LA4 | 150 |
| 23.5 | 697 | 1.9 | 60 | 13800 | | — | | | | VFR 130_60 | P100 BN100LA4 | 154 |
| 23.5 | 706 | 2.7 | 60 | 16000 | | — | | | | VFR 150_60 | P100 BN100LA4 | 160 |
| 23.5 | 662 | 3.4 | 60 | 18000 | | — | | | | VF 185_60 | P100 BN100LA4 | 164 |
| 25.2 | 601 | 1.0 | 56 | 8000 | W110_56 | S3 | M3LA4 | 148 | | W 110_56 | P100 BN100LA4 | 149 |
| 25.2 | 609 | 1.6 | 56 | 12600 | | — | | | | VF 130_56 | P100 BN100LA4 | 152 |
| 25.2 | 617 | 2.2 | 56 | 14200 | | — | | | | VF 150_56 | P100 BN100LA4 | 158 |
| 31 | 507 | 1.2 | 46 | 8000 | W110_46 | S3 | M3LA4 | 148 | | W 110_46 | P100 BN100LA4 | 149 |
| 31 | 521 | 2.0 | 46 | 12600 | | — | | | | VF 130_46 | P100 BN100LA4 | 152 |
| 31 | 528 | 2.9 | 46 | 14700 | | — | | | | VF 150_46 | P100 BN100LA4 | 158 |
| 31 | 536 | 1.3 | 45 | 8000 | | — | | | | WR 110_45 | P100 BN100LA4 | 150 |
| 31 | 550 | 3.1 | 45 | 16000 | | — | | | | VFR 150_45 | P100 BN100LA4 | 160 |
| 35 | 453 | 1.5 | 40 | 8000 | W110_40 | S3 | M3LA4 | 148 | | W 110_40 | P100 BN100LA4 | 149 |
| 35 | 453 | 2.4 | 40 | 12600 | | — | | | | VF 130_40 | P100 BN100LA4 | 152 |
| 35 | 459 | 3.4 | 40 | 14700 | | — | | | | VF 150_40 | P100 BN100LA4 | 158 |
| 41 | 416 | 2.5 | 23 | 13200 | | — | | | | VF 130_23 | P112 BN112M6 | 152 |
| 47 | 340 | 1.1 | 30 | 7000 | W86_30 | S3 | M3LA4 | 144 | | W 86_30 | P100 BN100LA4 | 145 |
| 47 | 344 | 2.0 | 30 | 8000 | W110_30 | S3 | M3LA4 | 148 | | W 110_30 | P100 BN100LA4 | 149 |
| 47 | 353 | 3.0 | 30 | 12600 | | — | | | | VF 130_30 | P100 BN100LA4 | 152 |
| 61 | 281 | 1.1 | 23 | 6990 | W86_23 | S3 | M3LA4 | 144 | | W 86_23 | P100 BN100LA4 | 145 |
| 61 | 284 | 1.9 | 23 | 8000 | W110_23 | S3 | M3LA4 | 148 | | W 110_23 | P100 BN100LA4 | 149 |
| 61 | 284 | 3.1 | 23 | 12600 | | — | | | | VF 130_23 | P100 BN100LA4 | 152 |
| 71 | 247 | 1.0 | 20 | 3410 | W75_20 | S3 | M3LA4 | 140 | | W 75_20 | P100 BN100LA4 | 141 |
| 71 | 250 | 1.3 | 20 | 6730 | W86_20 | S3 | M3LA4 | 144 | | W 86_20 | P100 BN100LA4 | 145 |
| 71 | 250 | 2.3 | 20 | 8000 | W110_20 | S3 | M3LA4 | 148 | | W 110_20 | P100 BN100LA4 | 149 |
| 94 | 190 | 1.3 | 15 | 3240 | W75_15 | S3 | M3LA4 | 140 | | W 75_15 | P100 BN100LA4 | 141 |
| 94 | 190 | 1.7 | 15 | 6270 | W86_15 | S3 | M3LA4 | 144 | | W 86_15 | P100 BN100LA4 | 145 |
| 94 | 188 | 3.2 | 15 | 8000 | W110_15 | S3 | M3LA4 | 148 | | W 110_15 | P100 BN100LA4 | 149 |

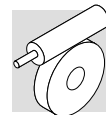


2.2 kW


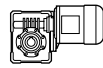





| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|---|---|-----|
| 133 | 139 | 1.5 | 7 | 2780 | W75_7 | S3 | M3LC6 | 140 | W 75_7 | P112 | BN112M6 | 141 |
| 133 | 139 | 1.9 | 7 | 5540 | W86_7 | S3 | M3LC6 | 144 | W 86_7 | P112 | BN112M6 | 145 |
| 141 | 131 | 1.8 | 10 | 2940 | W75_10 | S3 | M3LA4 | 140 | W 75_10 | P100 | BN100LA4 | 141 |
| 141 | 131 | 2.2 | 10 | 5590 | W86_10 | S3 | M3LA4 | 144 | W 86_10 | P100 | BN100LA4 | 145 |
| 187 | 99 | 2.3 | 15 | 2920 | W75_15 | S3 | M3SA2 | 140 | W 75_15 | P90 | BN90L2 | 141 |
| 187 | 98 | 3.0 | 15 | 5290 | W86_15 | S3 | M3SA2 | 144 | W 86_15 | P90 | BN90L2 | 145 |
| 192 | 94 | 1.3 | 15 | 1980 | — | — | — | — | W 63_15 | P90 | BN90L2 | 137 |
| 201 | 94 | 2.0 | 7 | 2660 | W75_7 | S3 | M3LA4 | 140 | W 75_7 | P100 | BN100LA4 | 141 |
| 201 | 93 | 2.7 | 7 | 5030 | W86_7 | S3 | M3LA4 | 144 | W 86_7 | P100 | BN100LA4 | 145 |
| 240 | 76 | 1.6 | 12 | 1890 | — | — | — | — | W 63_12 | P90 | BN90L2 | 137 |
| 281 | 67 | 3.0 | 10 | 2610 | W75_10 | S3 | M3SA2 | 140 | W 75_10 | P90 | BN90L2 | 141 |
| 288 | 64 | 1.9 | 10 | 1820 | — | — | — | — | W 63_10 | P90 | BN90L2 | 137 |
| 401 | 48 | 3.6 | 7 | 2350 | W75_7 | S3 | M3SA2 | 140 | W 75_7 | P90 | BN90L2 | 141 |
| 411 | 46 | 2.3 | 7 | 1660 | — | — | — | — | W 63_7 | P90 | BN90L2 | 137 |

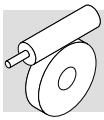
3 kW

| | | | | | | | | | | | | |
|------|-------|-----|------|-------|---|---|---|---|--------------------|------|----------|-----|
| 0.88 | 10403 | 0.9 | 1600 | 52000 | — | — | — | — | VF/VF 130/250_1600 | P100 | BN100LB4 | 180 |
| 1.0 | 9814 | 0.9 | 920 | 52000 | — | — | — | — | VF/VF 130/250_920 | P132 | BN132S6 | 180 |
| 1.2 | 8534 | 1.1 | 1200 | 52000 | — | — | — | — | VF/VF 130/250_1200 | P100 | BN100LB4 | 180 |
| 1.5 | 6917 | 0.9 | 920 | 34500 | — | — | — | — | VF/VF 130/210_920 | P100 | BN100LB4 | 174 |
| 1.5 | 6917 | 1.3 | 920 | 52000 | — | — | — | — | VF/VF 130/250_920 | P100 | BN100LB4 | 180 |
| 1.8 | 6665 | 0.9 | 800 | 34500 | — | — | — | — | VF/VF 130/210_800 | P100 | BN100LB4 | 174 |
| 1.8 | 6827 | 1.3 | 800 | 52000 | — | — | — | — | VF/VF 130/250_800 | P100 | BN100LB4 | 180 |
| 2.4 | 5242 | 1.2 | 600 | 34500 | — | — | — | — | VF/VF 130/210_600 | P100 | BN100LB4 | 174 |
| 2.4 | 5364 | 1.7 | 600 | 52000 | — | — | — | — | VF/VF 130/250_600 | P100 | BN100LB4 | 180 |
| 3.1 | 4755 | 1.1 | 300 | 52000 | — | — | — | — | VFR 250_300 | P132 | BN132S6 | 178 |
| 3.5 | 3901 | 1.1 | 400 | 19500 | — | — | — | — | W /VF 86/185_400 | P100 | BN100LB4 | 169 |
| 3.5 | 4064 | 1.6 | 400 | 34500 | — | — | — | — | VF/VF 130/210_400 | P100 | BN100LB4 | 174 |
| 3.5 | 3983 | 2.3 | 400 | 52000 | — | — | — | — | VF/VF 130/250_400 | P100 | BN100LB4 | 180 |
| 3.9 | 3950 | 1.1 | 240 | 34500 | — | — | — | — | VFR 210_240 | P132 | BN132S6 | 172 |
| 3.9 | 4096 | 1.4 | 240 | 52000 | — | — | — | — | VFR 250_240 | P132 | BN132S6 | 178 |
| 4.7 | 3353 | 1.0 | 300 | 34500 | — | — | — | — | VFR 210_300 | P100 | BN100LB4 | 172 |
| 4.7 | 3475 | 1.4 | 300 | 52000 | — | — | — | — | VFR 250_300 | P100 | BN100LB4 | 178 |
| 5.0 | 2958 | 1.4 | 280 | 19500 | — | — | — | — | W /VF 86/185_280 | P100 | BN100LB4 | 169 |
| 5.0 | 2958 | 2.1 | 280 | 34500 | — | — | — | — | VF/VF 130/210_280 | P100 | BN100LB4 | 174 |
| 5.0 | 3015 | 3.0 | 280 | 52000 | — | — | — | — | VF/VF 130/250_280 | P100 | BN100LB4 | 180 |
| 5.9 | 2877 | 1.0 | 240 | 19500 | — | — | — | — | VFR 185_240 | P100 | BN100LB4 | 166 |
| 5.9 | 2877 | 1.4 | 240 | 34500 | — | — | — | — | VFR 210_240 | P100 | BN100LB4 | 172 |
| 5.9 | 2975 | 1.8 | 240 | 52000 | — | — | — | — | VFR 250_240 | P100 | BN100LB4 | 178 |
| 7.8 | 2377 | 1.3 | 180 | 19500 | — | — | — | — | VFR 185_180 | P100 | BN100LB4 | 166 |
| 7.8 | 2341 | 1.8 | 180 | 34500 | — | — | — | — | VFR 210_180 | P100 | BN100LB4 | 172 |
| 7.8 | 2450 | 2.6 | 180 | 52000 | — | — | — | — | VFR 250_180 | P100 | BN100LB4 | 178 |
| 9.4 | 1859 | 1.6 | 100 | 33000 | — | — | — | — | VF 210_100 | P132 | BN132S6 | 170 |
| 9.4 | 2042 | 1.6 | 150 | 19500 | — | — | — | — | VFR 185_150 | P100 | BN100LB4 | 166 |
| 9.4 | 2042 | 2.2 | 150 | 34500 | — | — | — | — | VFR 210_150 | P100 | BN100LB4 | 172 |
| 9.4 | 1920 | 2.5 | 100 | 50000 | — | — | — | — | VF 250_100 | P132 | BN132S6 | 176 |
| 9.4 | 2042 | 3.2 | 150 | 52000 | — | — | — | — | VFR 250_150 | P100 | BN100LB4 | 178 |
| 10.2 | 1907 | 1.0 | 138 | 16000 | — | — | — | — | VFR 150_138 | P100 | BN100LB4 | 160 |


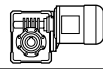







3 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC |  |  |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|----------|---|---|
| 11.8 | 1634 | 0.9 | 120 | 13800 | — | — | — | VFR 130_120 | P100 | BN100LB4 | 154 | |
| 11.8 | 1658 | 1.2 | 120 | 16000 | — | — | — | VFR 150_120 | P100 | BN100LB4 | 160 | |
| 11.8 | 1609 | 1.5 | 80 | 19000 | — | — | — | VF 185_80 | P132 | BN132S6 | 164 | |
| 11.8 | 1585 | 2.1 | 80 | 33000 | — | — | — | VF 210_80 | P132 | BN132S6 | 170 | |
| 11.8 | 1707 | 2.1 | 120 | 19500 | — | — | — | VFR 185_120 | P100 | BN100LB4 | 166 | |
| 11.8 | 1707 | 2.9 | 120 | 34500 | — | — | — | VFR 210_120 | P100 | BN100LB4 | 172 | |
| 11.8 | 1634 | 3.2 | 80 | 50000 | — | — | — | VF 250_80 | P132 | BN132S6 | 176 | |
| 11.8 | 1731 | 4.0 | 120 | 52000 | — | — | — | VFR 250_120 | P100 | BN100LB4 | 178 | |
| 14.1 | 1321 | 0.9 | 100 | 14700 | — | — | — | VF 150_100 | P100 | BN100LB4 | 158 | |
| 14.1 | 1321 | 1.4 | 100 | 18000 | — | — | — | VF 185_100 | P100 | BN100LB4 | 164 | |
| 15.7 | 1298 | 1.2 | 90 | 13800 | — | — | — | VFR 130_90 | P100 | BN100LB4 | 154 | |
| 15.7 | 1317 | 1.5 | 90 | 16000 | — | — | — | VFR 150_90 | P100 | BN100LB4 | 160 | |
| 15.7 | 1298 | 2.0 | 60 | 19000 | — | — | — | VF 185_60 | P132 | BN132S6 | 164 | |
| 15.7 | 1390 | 2.0 | 90 | 19500 | — | — | — | VFR 185_90 | P100 | BN100LB4 | 166 | |
| 15.7 | 1390 | 2.9 | 90 | 34500 | — | — | — | VFR 210_90 | P100 | BN100LB4 | 172 | |
| 15.7 | 1280 | 2.9 | 60 | 33000 | — | — | — | VF 210_60 | P132 | BN132S6 | 170 | |
| 17.6 | 1122 | 1.1 | 80 | 14700 | — | — | — | VF 150_80 | P100 | BN100LB4 | 158 | |
| 17.6 | 1122 | 1.9 | 80 | 18000 | — | — | — | VF 185_80 | P100 | BN100LB4 | 164 | |
| 20.4 | 1066 | 1.2 | 69 | 13800 | — | — | — | VFR 130_69 | P100 | BN100LB4 | 154 | |
| 20.4 | 1080 | 1.7 | 69 | 16000 | — | — | — | VFR 150_69 | P100 | BN100LB4 | 160 | |
| 22.0 | 923 | 1.0 | 64 | 12600 | — | — | — | VF 130_64 | P100 | BN100LB4 | 152 | |
| 22.0 | 936 | 1.4 | 64 | 14700 | — | — | — | VF 150_64 | P100 | BN100LB4 | 158 | |
| 23.5 | 951 | 1.4 | 60 | 13800 | — | — | — | VFR 130_60 | P100 | BN100LB4 | 154 | |
| 23.5 | 963 | 2.0 | 60 | 16000 | — | — | — | VFR 150_60 | P100 | BN100LB4 | 160 | |
| 23.5 | 902 | 2.5 | 60 | 18000 | — | — | — | VF 185_60 | P100 | BN100LB4 | 164 | |
| 25.2 | 831 | 1.2 | 56 | 12600 | — | — | — | VF 130_56 | P100 | BN100LB4 | 152 | |
| 25.2 | 842 | 1.6 | 56 | 14700 | — | — | — | VF 150_56 | P100 | BN100LB4 | 158 | |
| 28.2 | 772 | 3.2 | 50 | 18000 | — | — | — | VF 185_50 | P100 | BN100LB4 | 164 | |
| 31 | 710 | 1.5 | 46 | 12600 | — | — | — | VF 130_46 | P100 | BN100LB4 | 152 | |
| 31 | 720 | 2.2 | 46 | 14700 | — | — | — | VF 150_46 | P100 | BN100LB4 | 158 | |
| 31 | 731 | 1.0 | 45 | 8000 | — | — | — | WR 110_45 | P100 | BN100LB4 | 150 | |
| 31 | 677 | 1.1 | 30 | 8000 | — | — | — | W 110_30 | P132 | BN132S6 | 149 | |
| 31 | 750 | 2.3 | 45 | 16000 | — | — | — | VFR 150_45 | P100 | BN100LB4 | 160 | |
| 31 | 741 | 3.2 | 30 | 19000 | — | — | — | VF 185_30 | P132 | BN132S6 | 164 | |
| 35 | 618 | 1.1 | 40 | 8000 | W110_40 | S3 | M3LB4 | 148 | W 110_40 | P100 | BN100LB4 | 149 |
| 35 | 618 | 1.8 | 40 | 12600 | — | — | — | VF 130_40 | P100 | BN100LB4 | 152 | |
| 35 | 626 | 2.5 | 40 | 14700 | — | — | — | VF 150_40 | P100 | BN100LB4 | 158 | |
| 41 | 568 | 1.0 | 23 | 8000 | — | — | — | W 110_23 | P132 | BN132S6 | 149 | |
| 41 | 568 | 1.8 | 23 | 13200 | — | — | — | VF 130_23 | P132 | BN132S6 | 152 | |
| 41 | 575 | 2.6 | 23 | 15500 | — | — | — | VF 150_23 | P132 | BN132S6 | 158 | |
| 47 | 469 | 1.5 | 30 | 8000 | W110_30 | S3 | M3LB4 | 148 | W 110_30 | P100 | BN100LB4 | 149 |
| 47 | 482 | 2.2 | 30 | 12600 | — | — | — | VF 130_30 | P100 | BN100LB4 | 152 | |
| 47 | 488 | 2.8 | 30 | 14700 | — | — | — | VF 150_30 | P100 | BN100LB4 | 158 | |
| 47 | 518 | 2.9 | 30 | 16000 | — | — | — | VFR 150_30 | P100 | BN100LB4 | 160 | |
| 61 | 388 | 1.4 | 23 | 8000 | W110_23 | S3 | M3LB4 | 148 | W 110_23 | P100 | BN100LB4 | 149 |
| 61 | 388 | 2.3 | 23 | 12600 | — | — | — | VF 130_23 | P100 | BN100LB4 | 152 | |
| 61 | 388 | 3.3 | 23 | 14700 | — | — | — | VF 150_23 | P100 | BN100LB4 | 158 | |
| 71 | 341 | 0.9 | 20 | 6240 | W86_20 | S3 | M3LB4 | 144 | W 86_20 | P100 | BN100LB4 | 145 |
| 71 | 341 | 1.7 | 20 | 8000 | W110_20 | S3 | M3LB4 | 148 | W 110_20 | P100 | BN100LB4 | 149 |
| 71 | 341 | 2.6 | 20 | 12600 | — | — | — | VF 130_20 | P100 | BN100LB4 | 152 | |

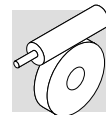


3 kW


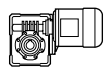





| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  | |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|---|---|-----|
| 94 | 259 | 1.0 | 15 | 2800 | W75_15 | S3 | M3LB4 | 140 | W 75_15 | P100 | BN100LB4 | 141 |
| 94 | 259 | 1.3 | 15 | 5890 | W86_15 | S3 | M3LB4 | 144 | W 86_15 | P100 | BN100LB4 | 145 |
| 94 | 256 | 2.3 | 15 | 8000 | W110_15 | S3 | M3LB4 | 148 | W 110_15 | P100 | BN100LB4 | 149 |
| 94 | 262 | 3.5 | 15 | 11800 | — | — | — | — | VF 130_15 | P100 | BN100LB4 | 152 |
| 124 | 198 | 3.4 | 23 | 11000 | — | — | — | — | VF 130_23 | P100 | BN100L2 | 152 |
| 141 | 179 | 1.3 | 10 | 2600 | W75_10 | S3 | M3LB4 | 140 | W 75_10 | P100 | BN100LB4 | 141 |
| 141 | 179 | 1.6 | 10 | 5300 | W86_10 | S3 | M3LB4 | 144 | W 86_10 | P100 | BN100LB4 | 145 |
| 141 | 177 | 3.1 | 10 | 8000 | W110_10 | S3 | M3LB4 | 148 | W 110_10 | P100 | BN100LB4 | 149 |
| 191 | 132 | 1.7 | 15 | 2680 | W75_15 | S3 | M3LA2 | 140 | W 75_15 | P100 | BN100L2 | 141 |
| 191 | 131 | 2.3 | 15 | 5070 | W86_15 | S3 | M3LA2 | 144 | W 86_15 | P100 | BN100L2 | 145 |
| 201 | 128 | 1.5 | 7 | 2380 | W75_7 | S3 | M3LB4 | 140 | W 75_7 | P100 | BN100LB4 | 141 |
| 201 | 127 | 2.0 | 7 | 4780 | W86_7 | S3 | M3LB4 | 144 | W 86_7 | P100 | BN100LB4 | 145 |
| 286 | 90 | 2.3 | 10 | 2430 | W75_10 | S3 | M3LA2 | 140 | W 75_10 | P100 | BN100L2 | 141 |
| 286 | 90 | 2.9 | 10 | 4510 | W86_10 | S3 | M3LA2 | 144 | W 86_10 | P100 | BN100L2 | 145 |
| 409 | 64 | 2.7 | 7 | 2190 | W75_7 | S3 | M3LA2 | 140 | W 75_7 | P100 | BN100L2 | 141 |
| 409 | 64 | 3.5 | 7 | 4040 | W86_7 | S3 | M3LA2 | 144 | W 86_7 | P100 | BN100L2 | 145 |

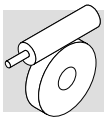
4 kW

| | | | | | | | | | | | | |
|------|------|-----|-----|-------|---|---|---|---|-------------------|------|----------|-----|
| 1.5 | 9157 | 1.0 | 920 | 52000 | — | — | — | — | VF/VF 130/250_920 | P112 | BN112M4 | 180 |
| 1.8 | 9039 | 1.0 | 800 | 52000 | — | — | — | — | VF/VF 130/250_800 | P112 | BN112M4 | 180 |
| 2.4 | 6941 | 0.9 | 600 | 34500 | — | — | — | — | VF/VF 130/210_600 | P112 | BN112M4 | 174 |
| 2.4 | 7102 | 1.3 | 600 | 52000 | — | — | — | — | VF/VF 130/250_600 | P112 | BN112M4 | 180 |
| 3.6 | 5380 | 1.2 | 400 | 34500 | — | — | — | — | VF/VF 130/210_400 | P112 | BN112M4 | 174 |
| 3.6 | 5273 | 1.7 | 400 | 52000 | — | — | — | — | VF/VF 130/250_400 | P112 | BN112M4 | 180 |
| 4.0 | 5404 | 1.1 | 240 | 52000 | — | — | — | — | VFR 250_240 | P132 | BN132MA6 | 178 |
| 4.7 | 4600 | 1.1 | 300 | 52000 | — | — | — | — | VFR 250_300 | P112 | BN112M4 | 178 |
| 5.1 | 3917 | 1.1 | 280 | 19500 | — | — | — | — | W /VF 86/185_280 | P112 | BN112M4 | 169 |
| 5.1 | 3917 | 1.6 | 280 | 34500 | — | — | — | — | VF/VF 130/210_280 | P112 | BN112M4 | 174 |
| 5.1 | 3992 | 2.3 | 280 | 52000 | — | — | — | — | VF/VF 130/250_280 | P112 | BN112M4 | 180 |
| 5.3 | 3908 | 1.3 | 180 | 34500 | — | — | — | — | VFR 210_180 | P132 | BN132MA6 | 172 |
| 5.3 | 4487 | 1.5 | 180 | 52000 | — | — | — | — | VFR 250_180 | P132 | BN132MA6 | 178 |
| 5.9 | 3809 | 1.0 | 240 | 34500 | — | — | — | — | VFR 210_240 | P112 | BN112M4 | 172 |
| 5.9 | 3938 | 1.4 | 240 | 52000 | — | — | — | — | VFR 250_240 | P112 | BN112M4 | 178 |
| 7.9 | 3147 | 1.0 | 180 | 19500 | — | — | — | — | VFR 185_180 | P112 | BN112M4 | 166 |
| 7.9 | 3099 | 1.4 | 180 | 34500 | — | — | — | — | VFR 210_180 | P112 | BN112M4 | 172 |
| 7.9 | 3244 | 1.9 | 180 | 52000 | — | — | — | — | VFR 250_180 | P112 | BN112M4 | 178 |
| 9.5 | 2704 | 1.2 | 150 | 19500 | — | — | — | — | VFR 185_150 | P112 | BN112M4 | 166 |
| 9.5 | 2704 | 1.7 | 150 | 34500 | — | — | — | — | VFR 210_150 | P112 | BN112M4 | 172 |
| 9.5 | 2704 | 2.4 | 150 | 52000 | — | — | — | — | VFR 250_150 | P112 | BN112M4 | 178 |
| 9.5 | 2453 | 1.2 | 100 | 33000 | — | — | — | — | VF 210_100 | P132 | BN132MA6 | 170 |
| 9.5 | 2533 | 1.9 | 100 | 50000 | — | — | — | — | VF 250_100 | P132 | BN132MA6 | 176 |
| 11.8 | 2195 | 0.9 | 120 | 16000 | — | — | — | — | VFR 150_120 | P112 | BN112M4 | 160 |
| 11.8 | 2260 | 1.6 | 120 | 19500 | — | — | — | — | VFR 185_120 | P112 | BN112M4 | 166 |
| 11.8 | 2260 | 2.2 | 120 | 34500 | — | — | — | — | VFR 210_120 | P112 | BN112M4 | 172 |
| 11.8 | 2292 | 3.1 | 120 | 52000 | — | — | — | — | VFR 250_120 | P112 | BN112M4 | 178 |
| 11.9 | 2123 | 1.1 | 80 | 19000 | — | — | — | — | VF 185_80 | P132 | BN132MA6 | 164 |
| 11.9 | 2091 | 1.6 | 80 | 33000 | — | — | — | — | VF 210_80 | P132 | BN132MA6 | 170 |
| 11.9 | 2155 | 2.4 | 80 | 50000 | — | — | — | — | VF 250_80 | P132 | BN132MA6 | 176 |










4 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC |  |  |
|----------------------------|-------------|-----|-----|---------------|---|---|---|---|---|------|---|---|
| 14.2 | 1749 | 1.1 | 100 | 18000 | — | — | — | — | — | — | — | — |
| 15.8 | 1719 | 0.9 | 90 | 13800 | — | — | — | — | — | — | — | — |
| 15.8 | 1743 | 1.1 | 90 | 16000 | — | — | — | — | — | — | — | — |
| 15.8 | 1840 | 1.5 | 90 | 19500 | — | — | — | — | — | — | — | — |
| 15.8 | 1840 | 2.2 | 90 | 34500 | — | — | — | — | — | — | — | — |
| 15.8 | 1888 | 3.2 | 90 | 52000 | — | — | — | — | — | — | — | — |
| 15.8 | 1713 | 1.5 | 60 | 19000 | — | — | — | — | — | — | — | — |
| 15.8 | 1689 | 2.2 | 60 | 33000 | — | — | — | — | — | — | — | — |
| 15.8 | 1737 | 3.2 | 60 | 50000 | — | — | — | — | — | — | — | — |
| 17.8 | 1485 | 1.4 | 80 | 18000 | — | — | — | — | — | — | — | — |
| 20.6 | 1411 | 0.9 | 69 | 13800 | — | — | — | — | — | — | — | — |
| 20.6 | 1429 | 1.3 | 69 | 16000 | — | — | — | — | — | — | — | — |
| 20.7 | 1369 | 1.3 | 46 | 15500 | — | — | — | — | — | — | — | — |
| 21.1 | 1448 | 3.4 | 45 | 34500 | — | — | — | — | — | — | — | — |
| 22.2 | 1240 | 1.1 | 64 | 14700 | — | — | — | — | — | — | — | — |
| 23.7 | 1259 | 1.1 | 60 | 13800 | — | — | — | — | — | — | — | — |
| 23.7 | 1275 | 1.5 | 60 | 16000 | — | — | — | — | — | — | — | — |
| 23.7 | 1194 | 1.9 | 60 | 18000 | — | — | — | — | — | — | — | — |
| 23.7 | 1307 | 2.5 | 60 | 19500 | — | — | — | — | — | — | — | — |
| 23.7 | 1291 | 3.6 | 60 | 34500 | — | — | — | — | — | — | — | — |
| 23.8 | 1174 | 1.0 | 40 | 13200 | — | — | — | — | — | — | — | — |
| 23.8 | 1206 | 3.6 | 40 | 33000 | — | — | — | — | — | — | — | — |
| 25.4 | 1100 | 0.9 | 56 | 12500 | — | — | — | — | — | — | — | — |
| 25.4 | 1115 | 1.2 | 56 | 14700 | — | — | — | — | — | — | — | — |
| 28.4 | 1022 | 2.4 | 50 | 18000 | — | — | — | — | — | — | — | — |
| 31 | 940 | 1.1 | 46 | 12600 | — | — | — | — | — | — | — | — |
| 31 | 953 | 1.6 | 46 | 14700 | — | — | — | — | — | — | — | — |
| 32 | 993 | 1.7 | 45 | 16000 | — | — | — | — | — | — | — | — |
| 32 | 1017 | 2.8 | 45 | 19500 | — | — | — | — | — | — | — | — |
| 32 | 929 | 1.3 | 30 | 13200 | — | — | — | — | — | — | — | — |
| 32 | 977 | 2.5 | 30 | 19000 | — | — | — | — | — | — | — | — |
| 32 | 965 | 3.5 | 30 | 33000 | — | — | — | — | — | — | — | — |
| 36 | 818 | 1.3 | 40 | 12600 | — | — | — | — | — | — | — | — |
| 36 | 829 | 1.9 | 40 | 14700 | — | — | — | — | — | — | — | — |
| 36 | 769 | 0.9 | 80 | 12600 | — | — | — | — | — | — | — | — |
| 41 | 749 | 1.4 | 23 | 13200 | — | — | — | — | — | — | — | — |
| 41 | 758 | 2.0 | 23 | 13200 | — | — | — | — | — | — | — | — |
| 45 | 641 | 1.1 | 64 | 12600 | — | — | — | — | — | — | — | — |
| 46 | 635 | 1.1 | 30 | 8000 | W110_30 | S3 | M3LC4 | 148 | W 110_30 | P112 | BN112M4 | 149 |
| 47 | 638 | 1.6 | 30 | 12600 | — | — | — | — | VF 130_30 | P112 | BN112M4 | 152 |
| 47 | 646 | 2.1 | 30 | 14700 | — | — | — | — | VF 150_30 | P112 | BN112M4 | 158 |
| 47 | 686 | 2.2 | 30 | 16000 | — | — | — | — | VFR 150_30 | P112 | BN112M4 | 160 |
| 60 | 525 | 1.0 | 23 | 8000 | W110_23 | S3 | M3LC4 | 148 | W 110_23 | P112 | BN112M4 | 149 |
| 62 | 514 | 1.7 | 23 | 12600 | — | — | — | — | VF 130_23 | P112 | BN112M4 | 152 |
| 62 | 514 | 2.5 | 23 | 14700 | — | — | — | — | VF 150_23 | P112 | BN112M4 | 158 |
| 63 | 485 | 1.6 | 46 | 12600 | — | — | — | — | VF 130_46 | P112 | BN112M2 | 152 |
| 70 | 462 | 1.2 | 20 | 8000 | W110_20 | S3 | M3LC4 | 148 | W 110_20 | P112 | BN112M4 | 149 |
| 71 | 452 | 2.0 | 20 | 12400 | — | — | — | — | VF 130_20 | P112 | BN112M4 | 152 |
| 93 | 350 | 0.9 | 15 | 5410 | W86_15 | S3 | M3LC4 | 144 | W 86_15 | P112 | BN112M4 | 145 |
| 93 | 346 | 1.7 | 15 | 8000 | W110_15 | S3 | M3LC4 | 148 | W 110_15 | P112 | BN112M4 | 149 |

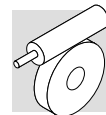


4 kW








| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC |  |  | |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|-----------|---|---|-----|
| 95 | 347 | 2.7 | 15 | 11400 | | — | | | | VF 130_15 | P112 | BN112M4 | 152 |
| 95 | 350 | 3.4 | 10 | 12700 | | — | | | | VF 150_10 | P132 | BN132MA6 | 158 |
| 139 | 242 | 1.0 | 10 | 2160 | W75_10 | S3 | M3LC4 | 140 | | W 75_10 | P112 | BN112M4 | 141 |
| 139 | 242 | 1.2 | 10 | 4940 | W86_10 | S3 | M3LC4 | 144 | | W 86_10 | P112 | BN112M4 | 145 |
| 139 | 239 | 2.3 | 10 | 7840 | W110_10 | S3 | M3LC4 | 148 | | W 110_10 | P112 | BN112M4 | 149 |
| 142 | 237 | 3.3 | 10 | 10100 | | — | | | | VF 130_10 | P112 | BN112M4 | 152 |
| 191 | 176 | 1.3 | 15 | 2400 | W75_15 | S3 | M3LB2 | 140 | | W 75_15 | P112 | BN112M2 | 141 |
| 191 | 174 | 1.7 | 15 | 4820 | W86_15 | S3 | M3LB2 | 144 | | W 86_15 | P112 | BN112M2 | 145 |
| 191 | 174 | 3.1 | 15 | 7380 | W110_15 | S3 | M3LB2 | 148 | | W 110_15 | P112 | BN112M2 | 149 |
| 199 | 173 | 1.1 | 7 | 1900 | W75_7 | S3 | M3LC4 | 140 | | W 75_7 | P112 | BN112M4 | 141 |
| 199 | 171 | 1.5 | 7 | 4490 | W86_7 | S3 | M3LC4 | 144 | | W 86_7 | P112 | BN112M4 | 145 |
| 199 | 171 | 2.9 | 7 | 7040 | W110_7 | S3 | M3LC4 | 148 | | W 110_7 | P112 | BN112M4 | 149 |
| 287 | 120 | 1.7 | 10 | 2210 | W75_10 | S3 | M3LB2 | 140 | | W 75_10 | P112 | BN112M2 | 141 |
| 287 | 120 | 2.2 | 10 | 4320 | W86_10 | S3 | M3LB2 | 144 | | W 86_10 | P112 | BN112M2 | 145 |
| 410 | 85 | 2.0 | 7 | 2010 | W75_7 | S3 | M3LB2 | 140 | | W 75_7 | P112 | BN112M2 | 141 |
| 410 | 85 | 2.7 | 7 | 3890 | W86_7 | S3 | M3LB2 | 144 | | W 86_7 | P112 | BN112M2 | 145 |

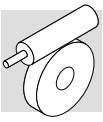
5.5 kW

| | | | | | | | | | | | | | |
|------|------|-----|-----|-------|--|---|--|--|--|-------------------|------|----------|-----|
| 2.4 | 9630 | 0.9 | 600 | 52000 | | — | | | | VF/VF 130/250_600 | P132 | BN132S4 | 180 |
| 3.4 | 7937 | 1.2 | 280 | 52000 | | — | | | | VF/VF 130/250_280 | P132 | BN132MB6 | 180 |
| 3.6 | 7295 | 0.9 | 400 | 34500 | | — | | | | VF/VF 130/210_400 | P132 | BN132S4 | 174 |
| 3.6 | 7149 | 1.3 | 400 | 52000 | | — | | | | VF/VF 130/250_400 | P132 | BN132S4 | 180 |
| 5.1 | 5311 | 1.2 | 280 | 34500 | | — | | | | VF/VF 130/210_280 | P132 | BN132S4 | 174 |
| 5.1 | 5413 | 1.7 | 280 | 52000 | | — | | | | VF/VF 130/250_280 | P132 | BN132S4 | 180 |
| 5.3 | 6203 | 1.1 | 180 | 52000 | | — | | | | VFR 250_180 | P132 | BN132MB6 | 178 |
| 6.3 | 5169 | 1.0 | 150 | 34500 | | — | | | | VFR 210_150 | P132 | BN132MB6 | 172 |
| 6.3 | 5253 | 1.3 | 150 | 52000 | | — | | | | VFR 250_150 | P132 | BN132MB6 | 178 |
| 8.0 | 4202 | 1.0 | 180 | 34500 | | — | | | | VFR 210_180 | P132 | BN132S4 | 172 |
| 8.0 | 4399 | 1.4 | 180 | 52000 | | — | | | | VFR 250_180 | P132 | BN132S4 | 178 |
| 9.5 | 3391 | 0.9 | 100 | 33000 | | — | | | | VF 210_100 | P132 | BN132MB6 | 170 |
| 9.5 | 3502 | 1.4 | 100 | 50000 | | — | | | | VF 250_100 | P132 | BN132MB6 | 176 |
| 9.6 | 3666 | 1.2 | 150 | 34500 | | — | | | | VFR 210_150 | P132 | BN132S4 | 172 |
| 9.6 | 3666 | 1.8 | 150 | 52000 | | — | | | | VFR 250_150 | P132 | BN132S4 | 178 |
| 11.8 | 2890 | 1.1 | 80 | 33000 | | — | | | | VF 210_80 | P132 | BN132MB6 | 170 |
| 11.8 | 2979 | 1.7 | 80 | 50000 | | — | | | | VF 250_80 | P132 | BN132MB6 | 176 |
| 12.0 | 3064 | 1.6 | 120 | 34500 | | — | | | | VFR 210_120 | P132 | BN132S4 | 172 |
| 12.0 | 3108 | 2.3 | 120 | 52000 | | — | | | | VFR 250_120 | P132 | BN132S4 | 178 |
| 14.4 | 2371 | 1.1 | 100 | 31500 | | — | | | | VF 210_100 | P132 | BN132S4 | 170 |
| 14.4 | 2590 | 1.4 | 100 | 19500 | | — | | | | VFR 185_100 | P132 | BN132S4 | 166 |
| 14.4 | 2480 | 1.5 | 100 | 47000 | | — | | | | VF 250_100 | P132 | BN132S4 | 176 |
| 15.8 | 2368 | 1.1 | 60 | 19000 | | — | | | | VF 185_60 | P132 | BN132MB6 | 164 |
| 15.8 | 2334 | 1.6 | 60 | 33000 | | — | | | | VF 210_60 | P132 | BN132MB6 | 170 |
| 15.8 | 2401 | 2.3 | 60 | 50000 | | — | | | | VF 250_60 | P132 | BN132MB6 | 176 |
| 16.0 | 2495 | 1.6 | 90 | 34500 | | — | | | | VFR 210_90 | P132 | BN132S4 | 172 |
| 16.0 | 2561 | 2.3 | 90 | 52000 | | — | | | | VFR 250_90 | P132 | BN132S4 | 178 |
| 18.0 | 2013 | 1.1 | 80 | 18000 | | — | | | | VF 185_80 | P132 | BN132S4 | 164 |
| 18.0 | 2013 | 1.4 | 80 | 31500 | | — | | | | VF 210_80 | P132 | BN132S4 | 170 |
| 18.0 | 2072 | 1.9 | 80 | 47000 | | — | | | | VF 250_80 | P132 | BN132S4 | 176 |



5.5 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|---|---|
| 19.2 | 2106 | 1.3 | 75 | 19500 | — | — | — | VFR 185_75 | P132 | BN132S4 | 166 |
| 20.5 | 1892 | 0.9 | 46 | 15500 | — | — | — | VF 150_46 | P132 | BN132MB6 | 158 |
| 21.0 | 2001 | 2.4 | 45 | 34500 | — | — | — | VFR 210_45 | P132 | BN132MB6 | 172 |
| 21.0 | 2051 | 3.3 | 45 | 52000 | — | — | — | VFR 250_45 | P132 | BN132MB6 | 178 |
| 23.6 | 1645 | 1.1 | 40 | 15500 | — | — | — | VF 150_40 | P132 | BN132MB6 | 158 |
| 24.0 | 1620 | 1.4 | 60 | 18000 | — | — | — | VF 185_60 | P132 | BN132S4 | 164 |
| 24.0 | 1598 | 1.9 | 60 | 31500 | — | — | — | VF 210_60 | P132 | BN132S4 | 170 |
| 24.0 | 1751 | 2.7 | 60 | 34500 | — | — | — | VFR 210_60 | P132 | BN132S4 | 172 |
| 24.0 | 1663 | 2.7 | 60 | 47000 | — | — | — | VF 250_60 | P132 | BN132S4 | 176 |
| 24.0 | 1773 | 4.0 | 60 | 52000 | — | — | — | VFR 250_60 | P132 | BN132S4 | 178 |
| 28.8 | 1430 | 1.3 | 50 | 15940 | — | — | — | VFR 150_50 | P132 | BN132S4 | 160 |
| 28.8 | 1386 | 1.8 | 50 | 18000 | — | — | — | VF 185_50 | P132 | BN132S4 | 164 |
| 28.8 | 1477 | 2.2 | 50 | 19500 | — | — | — | VFR 185_50 | P132 | BN132S4 | 166 |
| 28.8 | 1386 | 2.4 | 50 | 31500 | — | — | — | VF 210_50 | P132 | BN132S4 | 170 |
| 28.8 | 1386 | 3.2 | 50 | 47000 | — | — | — | VF 250_50 | P132 | BN132S4 | 176 |
| 31 | 1292 | 1.2 | 46 | 14700 | — | — | — | VF 150_46 | P132 | BN132S4 | 158 |
| 32 | 1284 | 1.0 | 30 | 13200 | — | — | — | VF 130_30 | P132 | BN132MB6 | 152 |
| 32 | 1362 | 3.0 | 45 | 34500 | — | — | — | VFR 210_45 | P132 | BN132S4 | 172 |
| 36 | 1109 | 1.0 | 40 | 12600 | — | — | — | VF 130_40 | P132 | BN132S4 | 152 |
| 36 | 1123 | 1.4 | 40 | 14700 | — | — | — | VF 150_40 | P132 | BN132S4 | 158 |
| 36 | 1138 | 2.3 | 40 | 18000 | — | — | — | VF 185_40 | P132 | BN132S4 | 164 |
| 36 | 1138 | 3.1 | 40 | 31500 | — | — | — | VF 210_40 | P132 | BN132S4 | 170 |
| 38 | 1101 | 1.5 | 37.5 | 15400 | — | — | — | VFR 150_37.5 | P132 | BN132S4 | 160 |
| 38 | 1149 | 2.4 | 37.5 | 19500 | — | — | — | VFR 185_37.5 | P132 | BN132S4 | 166 |
| 41 | 1035 | 1.0 | 23 | 13000 | — | — | — | VF 130_23 | P132 | BN132MB6 | 152 |
| 41 | 1048 | 1.4 | 23 | 15300 | — | — | — | VF 150_23 | P132 | BN132MB6 | 158 |
| 48 | 864 | 1.2 | 30 | 12600 | — | — | — | VF 130_30 | P132 | BN132S4 | 152 |
| 48 | 875 | 1.6 | 30 | 14700 | — | — | — | VF 150_30 | P132 | BN132S4 | 158 |
| 48 | 908 | 2.2 | 30 | 18000 | — | — | — | VF 185_30 | P132 | BN132S4 | 164 |
| 48 | 908 | 3.4 | 30 | 31500 | — | — | — | VF 210_30 | P132 | BN132S4 | 170 |
| 58 | 775 | 1.9 | 25 | 13400 | — | — | — | VFR 150_25 | P132 | BN132S4 | 160 |
| 58 | 784 | 3.3 | 25 | 19500 | — | — | — | VFR 185_25 | P132 | BN132S4 | 166 |
| 63 | 696 | 1.3 | 23 | 12100 | — | — | — | VF 130_23 | P132 | BN132S4 | 152 |
| 63 | 696 | 1.8 | 23 | 14000 | — | — | — | VF 150_23 | P132 | BN132S4 | 158 |
| 63 | 692 | 0.9 | 15 | 8000 | — | — | — | W 110_15 | P132 | BN132MB6 | 149 |
| 72 | 613 | 0.9 | 20 | 8000 | — | — | — | W 110_20 | P132 | BN132S4 | 149 |
| 72 | 613 | 1.5 | 20 | 11700 | — | — | — | VF 130_20 | P132 | BN132S4 | 152 |
| 72 | 613 | 2.1 | 20 | 13500 | — | — | — | VF 150_20 | P132 | BN132S4 | 158 |
| 96 | 460 | 1.3 | 15 | 8000 | — | — | — | W 110_15 | P132 | BN132S4 | 149 |
| 96 | 471 | 2.0 | 15 | 12800 | — | — | — | VF 130_15 | P132 | BN132S4 | 152 |
| 96 | 476 | 2.4 | 15 | 12400 | — | — | — | VF 150_15 | P132 | BN132S4 | 158 |
| 126 | 359 | 1.9 | 23 | 10400 | — | — | — | VF 130_23 | P132 | BN132SA2 | 152 |
| 126 | 359 | 2.7 | 23 | 11800 | — | — | — | VF 150_23 | P132 | BN132SA2 | 158 |
| 144 | 317 | 1.7 | 10 | 7330 | — | — | — | W 110_10 | P132 | BN132S4 | 149 |
| 144 | 321 | 2.5 | 10 | 9680 | — | — | — | VF 130_10 | P132 | BN132S4 | 152 |
| 144 | 321 | 3.3 | 10 | 11000 | — | — | — | VF 150_10 | P132 | BN132S4 | 158 |
| 193 | 237 | 2.3 | 15 | 7060 | — | — | — | W 110_15 | P132 | BN132SA2 | 149 |
| 206 | 227 | 2.2 | 7 | 6600 | — | — | — | W 110_7 | P132 | BN132S4 | 149 |
| 206 | 227 | 3.3 | 7 | 8650 | — | — | — | VF 130_7 | P132 | BN132S4 | 152 |
| 289 | 162 | 3.0 | 10 | 6290 | — | — | — | W 110_10 | P132 | BN132SA2 | 149 |

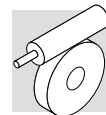


5.5 kW


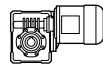





| n ₂ min ⁻¹ | M ₂ Nm | S | i | R _{n2} N | | | | IEC | |
|-------------------------------------|----------------------|-----|----|----------------------|---|--|-----------|---------------|-----|
| 289 | 164 | 3.6 | 10 | 8110 | — | | VF 130_10 | P132 BN132SA2 | 152 |
| 413 | 115 | 3.9 | 7 | 5640 | — | | W 110_7 | P132 BN132SA2 | 149 |
| 413 | 116 | 4.8 | 7 | 7230 | — | | VF 130_7 | P132 BN132SA2 | 152 |

7.5 kW

| | | | | | | | | | |
|------|------|-----|------|-------|---|--|-------------------|---------------|-----|
| 3.6 | 9749 | 0.9 | 400 | 52000 | — | | VF/VF 130/250_400 | P132 BN132MA4 | 180 |
| 5.1 | 7242 | 0.9 | 280 | 34500 | — | | VF/VF 130/210_280 | P132 BN132MA4 | 174 |
| 5.1 | 7381 | 1.2 | 280 | 52000 | — | | VF/VF 130/250_280 | P132 BN132MA4 | 180 |
| 6.4 | 7088 | 1.0 | 150 | 52000 | — | | VFR 250_150 | P160 BN160M6 | 178 |
| 8.0 | 5940 | 1.0 | 120 | 34500 | — | | VFR 210_120 | P160 BN160M6 | 172 |
| 8.0 | 5999 | 1.1 | 180 | 52000 | — | | VFR 250_180 | P132 BN132MA4 | 178 |
| 9.6 | 4725 | 1.0 | 100 | 50000 | — | | VF 250_100 | P160 BN160M6 | 176 |
| 9.6 | 4999 | 1.3 | 150 | 52000 | — | | VFR 250_150 | P132 BN132MA4 | 178 |
| 10.6 | 4860 | 0.9 | 90 | 34500 | — | | VFR 210_90 | P160 BN160M6 | 172 |
| 11.9 | 4020 | 1.3 | 80 | 50000 | — | | VF 250_80 | P160 BN160M6 | 176 |
| 12.0 | 4178 | 1.2 | 120 | 34500 | — | | VFR 210_120 | P132 BN132MA4 | 172 |
| 12.0 | 4238 | 1.7 | 120 | 52000 | — | | VFR 250_120 | P132 BN132MA4 | 178 |
| 14.4 | 3532 | 1.0 | 100 | 19500 | — | | VFR 185_100 | P132 BN132MA4 | 166 |
| 14.4 | 3382 | 1.1 | 100 | 47000 | — | | VF 250_100 | P132 BN132MA4 | 176 |
| 15.9 | 3150 | 1.2 | 60 | 33000 | — | | VF 210_60 | P160 BN160M6 | 170 |
| 16.0 | 3402 | 1.2 | 90 | 34500 | — | | VFR 210_90 | P132 BN132MA4 | 172 |
| 16.0 | 3492 | 1.7 | 90 | 52000 | — | | VFR 250_90 | P132 BN132MA4 | 178 |
| 18.0 | 2746 | 1.1 | 80 | 31500 | — | | VF 210_80 | P132 BN132MA4 | 170 |
| 18.0 | 2825 | 1.4 | 80 | 47000 | — | | VF 250_80 | P132 BN132MA4 | 176 |
| 19.2 | 2872 | 1.0 | 75 | 19500 | — | | VFR 185_75 | P132 BN132MA4 | 166 |
| 21.2 | 2700 | 1.8 | 45 | 34500 | — | | VFR 210_45 | P160 BN160M6 | 172 |
| 21.2 | 2768 | 2.5 | 45 | 52000 | — | | VFR 250_45 | P160 BN160M6 | 178 |
| 24.0 | 2208 | 1.0 | 60 | 18000 | — | | VF 185_60 | P132 BN132MA4 | 164 |
| 24.0 | 2179 | 1.4 | 60 | 31500 | — | | VF 210_60 | P132 BN132MA4 | 170 |
| 24.0 | 2388 | 2.0 | 60 | 31500 | — | | VFR 210_60 | P132 BN132MA4 | 172 |
| 24.0 | 2268 | 2.0 | 60 | 47000 | — | | VF 250_60 | P132 BN132MA4 | 176 |
| 24.0 | 2417 | 2.9 | 60 | 52000 | — | | VFR 250_60 | P132 BN132MA4 | 178 |
| 28.8 | 1950 | 1.0 | 50 | 14100 | — | | VFR 150_50 | P132 BN132MA4 | 160 |
| 28.8 | 1890 | 1.3 | 50 | 18000 | — | | VF 185_50 | P132 BN132MA4 | 164 |
| 28.8 | 2014 | 1.6 | 50 | 19500 | — | | VFR 185_50 | P132 BN132MA4 | 166 |
| 28.8 | 1890 | 1.7 | 50 | 31500 | — | | VF 210_50 | P132 BN132MA4 | 170 |
| 28.8 | 1890 | 2.4 | 50 | 47000 | — | | VF 250_50 | P132 BN132MA4 | 176 |
| 31 | 1762 | 0.9 | 46 | 14700 | — | | VF 150_46 | P132 BN132MA4 | 158 |
| 32 | 1858 | 2.2 | 45 | 34500 | — | | VFR 210_45 | P132 BN132MA4 | 172 |
| 32 | 1880 | 3.4 | 45 | 48800 | — | | VFR 250_45 | P132 BN132MA4 | 178 |
| 36 | 1532 | 1.0 | 40 | 14700 | — | | VF 150_40 | P132 BN132MA4 | 158 |
| 36 | 1552 | 1.7 | 40 | 18000 | — | | VF 185_40 | P132 BN132MA4 | 164 |
| 36 | 1552 | 2.3 | 40 | 31500 | — | | VF 210_40 | P132 BN132MA4 | 170 |
| 36 | 1572 | 3.1 | 40 | 47000 | — | | VF 250_40 | P132 BN132MA4 | 176 |
| 38 | 1501 | 1.1 | 37.5 | 13200 | — | | VFR 150_37.5 | P132 BN132MA4 | 160 |
| 38 | 1567 | 1.8 | 37.5 | 18300 | — | | VFR 185_37.5 | P132 BN132MA4 | 166 |
| 48 | 1179 | 0.9 | 30 | 11900 | — | | VF 130_30 | P132 BN132MA4 | 152 |

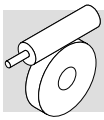


7.5 kW








| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC |  |  |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|----------|---|---|
| 48 | 1194 | 1.1 | 30 | 14200 | — | — | — | VF 150_30 | P132 | BN132MA4 | 158 | |
| 48 | 1239 | 1.6 | 30 | 18000 | — | — | — | VF 185_30 | P132 | BN132MA4 | 164 | |
| 48 | 1239 | 2.5 | 30 | 31500 | — | — | — | VF 210_30 | P132 | BN132MA4 | 170 | |
| 48 | 1283 | 3.0 | 30 | 33400 | — | — | — | VFR 210_30 | P132 | BN132MA4 | 172 | |
| 48 | 1253 | 3.2 | 30 | 4440 | — | — | — | VF 250_30 | P132 | BN132MA4 | 176 | |
| 58 | 1057 | 1.4 | 25 | 11000 | — | — | — | VFR 150_25 | P132 | BN132MA4 | 160 | |
| 58 | 1069 | 2.4 | 25 | 16700 | — | — | — | VFR 185_25 | P132 | BN132MA4 | 166 | |
| 63 | 950 | 0.9 | 23 | 11200 | — | — | — | VF 130_23 | P132 | BN132MA4 | 152 | |
| 63 | 950 | 1.3 | 23 | 13200 | — | — | — | VF 150_23 | P132 | BN132MA4 | 158 | |
| 64 | 968 | 2.3 | 15 | 16700 | — | — | — | VF 185_15 | P160 | BN160M6 | 164 | |
| 64 | 968 | 3.4 | 15 | 31500 | — | — | — | VF 210_15 | P160 | BN160M6 | 170 | |
| 72 | 836 | 1.1 | 20 | 10800 | — | — | — | VF 130_20 | P132 | BN132MA4 | 152 | |
| 72 | 836 | 1.6 | 20 | 12700 | — | — | — | VF 150_20 | P132 | BN132MA4 | 158 | |
| 96 | 627 | 1.0 | 15 | 7370 | — | — | — | W 110_15 | P132 | BN132MA4 | 149 | |
| 96 | 642 | 1.4 | 15 | 10200 | — | — | — | VF 130_15 | P132 | BN132MA4 | 152 | |
| 96 | 649 | 1.8 | 15 | 11700 | — | — | — | VF 150_15 | P132 | BN132MA4 | 158 | |
| 126 | 489 | 1.4 | 23 | 9900 | — | — | — | VF 130_23 | P132 | BN132SB2 | 152 | |
| 126 | 489 | 2.0 | 23 | 11400 | — | — | — | VF 150_23 | P132 | BN132SB2 | 158 | |
| 136 | 467 | 2.5 | 7 | 10200 | — | — | — | VF 150_7 | P160 | BN160M6 | 158 | |
| 144 | 433 | 1.3 | 10 | 6720 | — | — | — | W 110_10 | P132 | BN132MA4 | 149 | |
| 144 | 438 | 1.8 | 10 | 9150 | — | — | — | VF 130_10 | P132 | BN132MA4 | 152 | |
| 144 | 438 | 2.4 | 10 | 10500 | — | — | — | VF 150_10 | P132 | BN132MA4 | 158 | |
| 193 | 322 | 1.7 | 15 | 6660 | — | — | — | W 110_15 | P132 | BN132SB2 | 149 | |
| 206 | 310 | 1.6 | 7 | 6100 | — | — | — | W 110_7 | P132 | BN132MA4 | 149 | |
| 206 | 310 | 2.4 | 7 | 8210 | — | — | — | VF 130_7 | P132 | BN132MA4 | 152 | |
| 206 | 313 | 3.2 | 7 | 9400 | — | — | — | VF 150_7 | P132 | BN132MA4 | 158 | |
| 290 | 220 | 2.2 | 10 | 5980 | — | — | — | W 110_10 | P132 | BN132SB2 | 149 | |
| 290 | 222 | 2.7 | 10 | 7840 | — | — | — | VF 130_10 | P132 | BN132SB2 | 152 | |
| 414 | 156 | 2.9 | 7 | 5380 | — | — | — | W 110_7 | P132 | BN132SB2 | 149 | |
| 414 | 157 | 3.5 | 7 | 7010 | — | — | — | VF 130_7 | P132 | BN132SB2 | 152 | |

9.2 kW

| | | | | | | | | | | | |
|------|------|-----|-----|-------|---|---|---|-------------------|------|----------|-----|
| 5.1 | 9054 | 1.0 | 280 | 52000 | — | — | — | VF/VF 130/250_280 | P132 | BN132MB4 | 180 |
| 9.6 | 6132 | 1.1 | 150 | 52000 | — | — | — | VFR 250_150 | P132 | BN132MB4 | 178 |
| 12.0 | 5198 | 1.3 | 120 | 52000 | — | — | — | VFR 250_120 | P132 | BN132MB4 | 178 |
| 14.4 | 4149 | 0.9 | 100 | 47000 | — | — | — | VF 250_100 | P132 | BN132MB4 | 176 |
| 16.0 | 4173 | 1.0 | 90 | 34500 | — | — | — | VFR 210_90 | P132 | BN132MB4 | 172 |
| 16.0 | 4283 | 1.4 | 90 | 52000 | — | — | — | VFR 250_90 | P132 | BN132MB4 | 178 |
| 18.0 | 3368 | 0.9 | 80 | 31500 | — | — | — | VF 210_80 | P132 | BN132MB4 | 170 |
| 18.0 | 3466 | 1.1 | 80 | 47000 | — | — | — | VF 250_80 | P132 | BN132MB4 | 176 |
| 24.0 | 2672 | 1.1 | 60 | 31500 | — | — | — | VF 210_60 | P132 | BN132MB4 | 170 |
| 24.0 | 2929 | 1.6 | 60 | 34500 | — | — | — | VFR 210_60 | P132 | BN132MB4 | 172 |
| 24.0 | 2782 | 1.6 | 60 | 47000 | — | — | — | VF 250_60 | P132 | BN132MB4 | 176 |
| 24.0 | 2965 | 2.4 | 60 | 51900 | — | — | — | VFR 250_60 | P132 | BN132MB4 | 178 |
| 28.8 | 2319 | 1.1 | 50 | 18000 | — | — | — | VF 185_50 | P132 | BN132MB4 | 164 |
| 28.8 | 2471 | 1.3 | 50 | 18600 | — | — | — | VFR 185_50 | P132 | BN132MB4 | 166 |
| 28.8 | 2319 | 1.4 | 50 | 31500 | — | — | — | VF 210_50 | P132 | BN132MB4 | 170 |

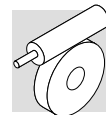


9.2 kW

| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|------|---------------|---|---|---|---|---|---|---|
| 28.8 | 2319 | 1.9 | 50 | 47000 | — | — | — | VF 250_50 | P132 | BN132MB4 | 176 |
| 32 | 2279 | 1.8 | 45 | 34500 | — | — | — | VFR 210_45 | P132 | BN132MB4 | 172 |
| 32 | 2306 | 2.8 | 45 | 48000 | — | — | — | VFR 250_45 | P132 | BN132MB4 | 178 |
| 36 | 1904 | 1.4 | 40 | 18000 | — | — | — | VF 185_40 | P132 | BN132MB4 | 164 |
| 36 | 1904 | 1.8 | 40 | 31500 | — | — | — | VF 210_40 | P132 | BN132MB4 | 170 |
| 36 | 1928 | 2.5 | 40 | 47000 | — | — | — | VF 250_40 | P132 | BN132MB4 | 176 |
| 38 | 1884 | 0.9 | 37.5 | 11900 | — | — | — | VFR 150_37.5 | P132 | BN132MB4 | 160 |
| 38 | 1922 | 1.5 | 37.5 | 17200 | — | — | — | VFR 185_37.5 | P132 | BN132MB4 | 166 |
| 48 | 1464 | 0.9 | 30 | 11300 | — | — | — | VF 150_30 | P132 | BN132MB4 | 158 |
| 48 | 1519 | 1.3 | 30 | 17900 | — | — | — | VF 185_30 | P132 | BN132MB4 | 164 |
| 48 | 1519 | 2.0 | 30 | 31500 | — | — | — | VF 210_30 | P132 | BN132MB4 | 170 |
| 48 | 1574 | 2.4 | 30 | 32600 | — | — | — | VFR 210_30 | P132 | BN132MB4 | 172 |
| 48 | 1538 | 2.6 | 30 | 43900 | — | — | — | VF 250_30 | P132 | BN132MB4 | 176 |
| 48 | 1574 | 3.8 | 30 | 42800 | — | — | — | VFR 250_30 | P132 | BN132MB4 | 178 |
| 58 | 1297 | 1.2 | 25 | 11200 | — | — | — | VFR 150_25 | P132 | BN132MB4 | 160 |
| 58 | 1312 | 2.0 | 25 | 15800 | — | — | — | VFR 185_25 | P132 | BN132MB4 | 166 |
| 63 | 1165 | 1.1 | 23 | 12500 | — | — | — | VF 150_23 | P132 | BN132MB4 | 158 |
| 72 | 1025 | 0.9 | 20 | 10100 | — | — | — | VF 130_20 | P132 | BN132MB4 | 152 |
| 72 | 1025 | 1.3 | 20 | 12100 | — | — | — | VF 150_20 | P132 | BN132MB4 | 158 |
| 72 | 1037 | 3.0 | 20 | 30400 | — | — | — | VF 210_20 | P132 | BN132MB4 | 170 |
| 96 | 787 | 1.2 | 15 | 9560 | — | — | — | VF 130_15 | P132 | BN132MB4 | 152 |
| 96 | 796 | 1.4 | 15 | 11200 | — | — | — | VF 150_15 | P132 | BN132MB4 | 158 |
| 126 | 599 | 1.1 | 23 | 9510 | — | — | — | VF 130_23 | P132 | BN132M2 | 152 |
| 126 | 599 | 1.6 | 23 | 11000 | — | — | — | VF 150_23 | P132 | BN132M2 | 158 |
| 144 | 531 | 1.0 | 10 | 6210 | — | — | — | W 110_10 | P132 | BN132MB4 | 149 |
| 144 | 537 | 1.5 | 10 | 8690 | — | — | — | VF 130_10 | P132 | BN132MB4 | 152 |
| 144 | 537 | 2.0 | 10 | 16100 | — | — | — | VF 150_10 | P132 | BN132MB4 | 158 |
| 193 | 395 | 1.4 | 15 | 6320 | — | — | — | W 110_15 | P132 | BN132M2 | 149 |
| 206 | 380 | 1.3 | 7 | 5670 | — | — | — | W 110_7 | P132 | BN132MB4 | 149 |
| 206 | 380 | 1.9 | 7 | 7820 | — | — | — | VF 130_7 | P132 | BN132MB4 | 152 |
| 206 | 384 | 2.6 | 7 | 9030 | — | — | — | VF 150_7 | P132 | BN132MB4 | 158 |
| 290 | 270 | 1.8 | 10 | 5720 | — | — | — | W 110_10 | P132 | BN132M2 | 149 |
| 290 | 273 | 2.2 | 10 | 7620 | — | — | — | VF 130_10 | P132 | BN132M2 | 152 |
| 290 | 273 | 2.9 | 10 | 8690 | — | — | — | VF 150_10 | P132 | BN132M2 | 158 |
| 414 | 191 | 2.3 | 7 | 5170 | — | — | — | W 110_7 | P132 | BN132M2 | 149 |
| 414 | 193 | 2.9 | 7 | 6820 | — | — | — | VF 130_7 | P132 | BN132M2 | 152 |

11 kW

| | | | | | | | | | | | |
|------|------|-----|-----|-------|---|---|---|-------------|------|----------|-----|
| 8.0 | 8798 | 0.9 | 120 | 52000 | — | — | — | VFR 250_120 | P160 | BN160L6 | 178 |
| 10.7 | 7288 | 0.9 | 90 | 52000 | — | — | — | VFR 250_90 | P160 | BN160L6 | 178 |
| 12.0 | 5865 | 0.9 | 80 | 50000 | — | — | — | VF 250_80 | P160 | BN160L6 | 176 |
| 12.0 | 6215 | 1.1 | 120 | 52000 | — | — | — | VFR 250_120 | P160 | BN160MR4 | 178 |
| 16.0 | 5056 | 1.1 | 60 | 34500 | — | — | — | VFR 210_60 | P160 | BN160L6 | 172 |
| 16.0 | 5121 | 1.2 | 90 | 52000 | — | — | — | VFR 250_90 | P160 | BN160MR4 | 178 |
| 16.0 | 4727 | 1.2 | 60 | 50000 | — | — | — | VF 250_60 | P160 | BN160L6 | 176 |
| 18.0 | 4144 | 0.9 | 80 | 47000 | — | — | — | VF 250_80 | P160 | BN160MR4 | 176 |
| 19.2 | 3939 | 1.0 | 50 | 33000 | — | — | — | VF 210_50 | P160 | BN160L6 | 170 |

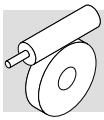


11 kW








| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N | | | | | | IEC | | |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|------------|---------------|-----|
| 21.3 | 3939 | 1.2 | 45 | 34500 | — | — | — | — | — | VFR 210_45 | P160 BN160L6 | 172 |
| 21.3 | 4038 | 1.7 | 45 | 51300 | — | — | — | — | — | VFR 250_45 | P160 BN160L6 | 178 |
| 24.0 | 3327 | 0.9 | 40 | 18000 | — | — | — | — | — | VF 185_40 | P160 BN160L6 | 164 |
| 24.0 | 3195 | 0.9 | 60 | 31500 | — | — | — | — | — | VF 210_60 | P160 BN160MR4 | 170 |
| 24.0 | 3283 | 1.3 | 40 | 33000 | — | — | — | — | — | VF 210_40 | P160 BN160L6 | 170 |
| 24.0 | 3502 | 1.3 | 60 | 34500 | — | — | — | — | — | VFR 210_60 | P160 BN160MR4 | 172 |
| 24.0 | 3327 | 1.4 | 60 | 47000 | — | — | — | — | — | VF 250_60 | P160 BN160MR4 | 176 |
| 24.0 | 3327 | 2.0 | 40 | 50000 | — | — | — | — | — | VF 250_40 | P160 BN160L6 | 176 |
| 24.0 | 3545 | 2.0 | 60 | 50900 | — | — | — | — | — | VFR 250_60 | P160 BN160MR4 | 178 |
| 28.8 | 2772 | 1.2 | 50 | 31500 | — | — | — | — | — | VF 210_50 | P160 BN160MR4 | 170 |
| 28.8 | 2772 | 1.6 | 50 | 47000 | — | — | — | — | — | VF 250_50 | P160 BN160MR4 | 176 |
| 32 | 2659 | 0.9 | 30 | 18100 | — | — | — | — | — | VF 185_30 | P160 BN160L6 | 164 |
| 32 | 2725 | 1.5 | 45 | 34500 | — | — | — | — | — | VFR 210_45 | P160 BN160MR4 | 172 |
| 32 | 2758 | 2.3 | 45 | 47100 | — | — | — | — | — | VFR 250_45 | P160 BN160MR4 | 178 |
| 36 | 2276 | 1.2 | 40 | 18500 | — | — | — | — | — | VF 185_40 | P160 BN160MR4 | 164 |
| 36 | 2276 | 1.5 | 40 | 31500 | — | — | — | — | — | VF 210_40 | P160 BN160MR4 | 170 |
| 36 | 2305 | 2.1 | 40 | 47000 | — | — | — | — | — | VF 250_40 | P160 BN160MR4 | 176 |
| 48 | 1816 | 1.1 | 30 | 17200 | — | — | — | — | — | VF 185_30 | P160 BN160MR4 | 164 |
| 48 | 1816 | 1.7 | 30 | 31500 | — | — | — | — | — | VF 210_30 | P160 BN160MR4 | 170 |
| 48 | 1882 | 2.0 | 30 | 31800 | — | — | — | — | — | VFR 210_30 | P160 BN160MR4 | 172 |
| 48 | 1838 | 2.2 | 30 | 43400 | — | — | — | — | — | VF 250_30 | P160 BN160MR4 | 176 |
| 48 | 1882 | 3.2 | 30 | 42100 | — | — | — | — | — | VFR 250_30 | P160 BN160MR4 | 178 |
| 48 | 1860 | 3.2 | 20 | 43100 | — | — | — | — | — | VF 250_20 | P160 BN160L6 | 176 |
| 64 | 1395 | 1.0 | 15 | 10900 | — | — | — | — | — | VF 150_15 | P160 BN160L6 | 158 |
| 64 | 1412 | 1.6 | 15 | 15300 | — | — | — | — | — | VF 185_15 | P160 BN160L6 | 164 |
| 64 | 1412 | 2.3 | 15 | 30500 | — | — | — | — | — | VF 210_15 | P160 BN160L6 | 170 |
| 72 | 1226 | 1.1 | 20 | 11400 | — | — | — | — | — | VF 150_20 | P160 BN160MR4 | 158 |
| 72 | 1240 | 1.8 | 20 | 15600 | — | — | — | — | — | VF 185_20 | P160 BN160MR4 | 164 |
| 72 | 1240 | 2.5 | 20 | 30000 | — | — | — | — | — | VF 210_20 | P160 BN160MR4 | 170 |
| 96 | 952 | 1.2 | 15 | 10600 | — | — | — | — | — | VF 150_15 | P160 BN160MR4 | 158 |
| 96 | 963 | 1.9 | 15 | 14200 | — | — | — | — | — | VF 185_15 | P160 BN160MR4 | 164 |
| 96 | 963 | 3.0 | 15 | 27700 | — | — | — | — | — | VF 210_15 | P160 BN160MR4 | 170 |
| 144 | 642 | 1.6 | 10 | 9670 | — | — | — | — | — | VF 150_10 | P160 BN160MR4 | 158 |
| 146 | 635 | 2.7 | 20 | 13300 | — | — | — | — | — | VF 185_20 | P160 BN160MR2 | 164 |
| 194 | 482 | 2.9 | 15 | 12200 | — | — | — | — | — | VF 185_15 | P160 BN160MR2 | 164 |
| 206 | 460 | 2.2 | 7 | 8660 | — | — | — | — | — | VF 150_7 | P160 BN160MR4 | 158 |
| 291 | 325 | 2.4 | 10 | 8440 | — | — | — | — | — | VF 150_10 | P160 BN160MR2 | 158 |
| 416 | 230 | 3.3 | 7 | 7530 | — | — | — | — | — | VF 150_7 | P160 BN160MR2 | 158 |

15 kW

| | | | | | | | | | | | | |
|------|------|-----|----|-------|---|---|---|---|---|------------|--------------|-----|
| 16.2 | 6380 | 0.9 | 60 | 50000 | — | — | — | — | — | VF 250_60 | P180 BN180L6 | 176 |
| 19.4 | 5390 | 1.2 | 50 | 50000 | — | — | — | — | — | VF 250_50 | P180 BN180L6 | 176 |
| 24.3 | 4430 | 1.0 | 40 | 33000 | — | — | — | — | — | VF 210_40 | P180 BN180L6 | 170 |
| 24.3 | 4489 | 1.4 | 40 | 50000 | — | — | — | — | — | VF 250_40 | P180 BN180L6 | 176 |
| 24.3 | 4474 | 1.0 | 60 | 47000 | — | — | — | — | — | VF 250_60 | P160 BN160L4 | 176 |
| 24.3 | 4768 | 1.5 | 60 | 48700 | — | — | — | — | — | VFR 250_60 | P160 BN160L4 | 178 |
| 29.2 | 3728 | 0.9 | 50 | 31500 | — | — | — | — | — | VF 210_50 | P160 BN160L4 | 170 |

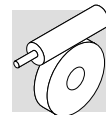


15 kW








| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|---|---|
| 29.2 | 3728 | 1.2 | 50 | 47000 | — | — | — | VF 250_50 | P160 | BN160L4 | 176 |
| 32 | 3665 | 1.1 | 45 | 33200 | — | — | — | VFR 210_45 | P160 | BN160L4 | 172 |
| 32 | 3709 | 1.7 | 45 | 45200 | — | — | — | VFR 250_45 | P160 | BN160L4 | 178 |
| 37 | 3061 | 0.9 | 40 | 16600 | — | — | — | VF 185_40 | P160 | BN160L4 | 164 |
| 37 | 3061 | 1.1 | 40 | 31500 | — | — | — | VF 210_40 | P160 | BN160L4 | 170 |
| 37 | 3100 | 1.5 | 40 | 45900 | — | — | — | VF 250_40 | P160 | BN160L4 | 176 |
| 49 | 2481 | 1.1 | 20 | 14800 | — | — | — | VF 185_20 | P180 | BN180L6 | 164 |
| 49 | 2443 | 1.2 | 30 | 31500 | — | — | — | VF 210_30 | P160 | BN160L4 | 170 |
| 49 | 2531 | 1.5 | 30 | 30000 | — | — | — | VFR 210_30 | P160 | BN160L4 | 172 |
| 49 | 2473 | 1.6 | 30 | 42400 | — | — | — | VF 250_30 | P160 | BN160L4 | 176 |
| 49 | 2531 | 2.4 | 30 | 40600 | — | — | — | VFR 250_30 | P160 | BN160L4 | 178 |
| 65 | 1905 | 1.2 | 15 | 13600 | — | — | — | VF 185_15 | P180 | BN180L6 | 164 |
| 65 | 1905 | 1.7 | 15 | 29300 | — | — | — | VF 210_15 | P180 | BN180L6 | 170 |
| 65 | 1927 | 2.8 | 15 | 38700 | — | — | — | VF 250_15 | P180 | BN180L6 | 176 |
| 73 | 1668 | 1.4 | 20 | 14300 | — | — | — | VF 185_20 | P160 | BN160L4 | 164 |
| 73 | 1668 | 1.9 | 20 | 29100 | — | — | — | VF 210_20 | P160 | BN160L4 | 170 |
| 73 | 1688 | 2.6 | 20 | 38100 | — | — | — | VF 250_20 | P160 | BN160L4 | 176 |
| 97 | 1280 | 0.9 | 15 | 9360 | — | — | — | VF 150_15 | P160 | BN160L4 | 158 |
| 97 | 1295 | 1.4 | 15 | 13200 | — | — | — | VF 185_15 | P160 | BN160L4 | 164 |
| 97 | 1295 | 2.2 | 15 | 27000 | — | — | — | VF 210_15 | P160 | BN160L4 | 170 |
| 97 | 1295 | 3.1 | 15 | 35100 | — | — | — | VF 250_15 | P160 | BN160L4 | 176 |
| 139 | 920 | 2.2 | 7 | 11400 | — | — | — | VF 185_7 | P180 | BN180L6 | 164 |
| 146 | 863 | 1.2 | 10 | 8720 | — | — | — | VF 150_10 | P160 | BN160L4 | 158 |
| 146 | 873 | 3.0 | 10 | 24000 | — | — | — | VF 210_10 | P160 | BN160L4 | 170 |
| 147 | 860 | 2.0 | 20 | 12700 | — | — | — | VF 185_20 | P160 | BN160MB2 | 164 |
| 195 | 653 | 2.1 | 15 | 11600 | — | — | — | VF 185_15 | P160 | BN160MB2 | 164 |
| 195 | 653 | 3.3 | 15 | 22700 | — | — | — | VF 210_15 | P160 | BN160MB2 | 170 |
| 209 | 618 | 1.6 | 7 | 7840 | — | — | — | VF 150_7 | P160 | BN160L4 | 158 |
| 293 | 440 | 1.8 | 10 | 7960 | — | — | — | VF 150_10 | P160 | BN160MB2 | 158 |
| 419 | 311 | 2.4 | 7 | 7120 | — | — | — | VF 150_7 | P160 | BN160MB2 | 158 |

18.5 kW

| | | | | | | | | | | | |
|------|------|-----|----|-------|---|---|---|-----------|------|----------|-----|
| 19.2 | 6717 | 0.9 | 50 | 50000 | — | — | — | VF 250_50 | P200 | BN200LA6 | 176 |
| 24.0 | 5595 | 1.2 | 40 | 48700 | — | — | — | VF 250_40 | P200 | BN200LA6 | 176 |
| 29.2 | 4598 | 1.0 | 50 | 47000 | — | — | — | VF 250_50 | P180 | BN180M4 | 176 |
| 32 | 4472 | 1.2 | 30 | 45200 | — | — | — | VF 250_30 | P200 | BN200LA6 | 176 |
| 37 | 3776 | 0.9 | 40 | 31500 | — | — | — | VF 210_40 | P180 | BN180M4 | 170 |
| 37 | 3824 | 1.3 | 40 | 44900 | — | — | — | VF 250_40 | P180 | BN180M4 | 176 |
| 49 | 3013 | 1.0 | 30 | 31200 | — | — | — | VF 210_30 | P180 | BN180M4 | 170 |
| 49 | 3049 | 1.3 | 30 | 41500 | — | — | — | VF 250_30 | P180 | BN180M4 | 176 |
| 64 | 2374 | 1.4 | 15 | 28300 | — | — | — | VF 210_15 | P200 | BN200LA6 | 170 |
| 64 | 2402 | 2.2 | 15 | 37800 | — | — | — | VF 250_15 | P200 | BN200LA6 | 176 |
| 73 | 2057 | 1.1 | 20 | 13200 | — | — | — | VF 185_20 | P180 | BN180M4 | 164 |
| 73 | 2057 | 1.5 | 20 | 28300 | — | — | — | VF 210_20 | P180 | BN180M4 | 170 |
| 73 | 2081 | 2.1 | 20 | 37400 | — | — | — | VF 250_20 | P180 | BN180M4 | 176 |
| 97 | 1597 | 1.2 | 15 | 12200 | — | — | — | VF 185_15 | P180 | BN180M4 | 164 |
| 97 | 1597 | 1.8 | 15 | 26200 | — | — | — | VF 210_15 | P180 | BN180M4 | 170 |



18.5 kW

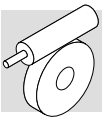
| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|---|---|
| 97 | 1597 | 2.5 | 15 | 34500 | — | — | — | VF 250_15 | P180 | BN180M4 | 176 |
| 146 | 1077 | 1.7 | 10 | 11400 | — | — | — | VF 185_10 | P180 | BN180M4 | 164 |
| 146 | 1077 | 2.5 | 10 | 23400 | — | — | — | VF 210_10 | P180 | BN180M4 | 170 |
| 146 | 1089 | 3.4 | 10 | 37800 | — | — | — | VF 250_10 | P180 | BN180M4 | 176 |
| 195 | 805 | 1.1 | 15 | 8260 | — | — | — | VF 150_15 | P160 | BN160L2 | 158 |
| 209 | 762 | 2.3 | 7 | 10100 | — | — | — | VF 185_7 | P180 | BN180M4 | 164 |
| 209 | 762 | 3.0 | 7 | 21200 | — | — | — | VF 210_7 | P180 | BN180M4 | 170 |
| 293 | 543 | 1.5 | 10 | 7550 | — | — | — | VF 150_10 | P160 | BN160L2 | 158 |
| 419 | 384 | 2.0 | 7 | 6760 | — | — | — | VF 150_7 | P160 | BN160L2 | 158 |

22 kW








| | | | | | | | | | | | |
|------|------|-----|----|-------|---|---|---|-----------|------|---------|-----|
| 22.5 | 7097 | 0.9 | 40 | 47100 | — | — | — | VF 250_40 | P200 | BN200L6 | 176 |
| 30 | 5673 | 1.0 | 30 | 43900 | — | — | — | VF 250_30 | P200 | BN200L6 | 176 |
| 37 | 4532 | 1.1 | 40 | 43900 | — | — | — | VF 250_40 | P180 | BN180L4 | 176 |
| 49 | 3571 | 0.9 | 30 | 30200 | — | — | — | VF 210_30 | P180 | BN180L4 | 170 |
| 49 | 3614 | 1.1 | 30 | 44700 | — | — | — | VF 250_30 | P180 | BN180L4 | 176 |
| 60 | 3011 | 1.1 | 15 | 27200 | — | — | — | VF 210_15 | P200 | BN200L6 | 170 |
| 60 | 3046 | 1.7 | 15 | 36900 | — | — | — | VF 250_15 | P200 | BN200L6 | 176 |
| 73 | 2438 | 0.9 | 20 | 12200 | — | — | — | VF 185_20 | P180 | BN180L4 | 164 |
| 73 | 2438 | 1.3 | 20 | 27500 | — | — | — | VF 210_20 | P180 | BN180L4 | 170 |
| 73 | 2467 | 1.8 | 20 | 36700 | — | — | — | VF 250_20 | P180 | BN180L4 | 176 |
| 98 | 1893 | 1.0 | 15 | 11300 | — | — | — | VF 185_15 | P180 | BN180L4 | 164 |
| 98 | 1893 | 1.5 | 15 | 25500 | — | — | — | VF 210_15 | P180 | BN180L4 | 170 |
| 98 | 1893 | 2.1 | 15 | 33900 | — | — | — | VF 250_15 | P180 | BN180L4 | 176 |
| 147 | 1276 | 1.4 | 10 | 10700 | — | — | — | VF 185_10 | P180 | BN180L4 | 164 |
| 147 | 1276 | 2.1 | 10 | 22900 | — | — | — | VF 210_10 | P180 | BN180L4 | 170 |
| 147 | 1291 | 2.9 | 10 | 30300 | — | — | — | VF 250_10 | P180 | BN180L4 | 176 |
| 209 | 904 | 1.9 | 7 | 9510 | — | — | — | VF 185_7 | P180 | BN180L4 | 164 |
| 209 | 904 | 2.5 | 7 | 20800 | — | — | — | VF 210_7 | P180 | BN180L4 | 170 |
| 209 | 914 | 3.5 | 7 | 27500 | — | — | — | VF 250_7 | P180 | BN180L4 | 176 |
| 293 | 645 | 2.1 | 10 | 9730 | — | — | — | VF 185_10 | P180 | BN180M2 | 164 |
| 293 | 645 | 3.1 | 10 | 23900 | — | — | — | VF 210_10 | P180 | BN180M2 | 170 |
| 419 | 457 | 2.9 | 7 | 8660 | — | — | — | VF 185_7 | P180 | BN180M2 | 164 |

30 kW

| | | | | | | | | | | | |
|-----|------|-----|----|-------|---|---|---|-----------|------|---------|-----|
| 45 | 5412 | 1.1 | 20 | 37600 | — | — | — | VF 250_20 | P225 | BN225M6 | 176 |
| 60 | 4154 | 1.3 | 15 | 35000 | — | — | — | VF 250_15 | P225 | BN225M6 | 176 |
| 74 | 3313 | 0.9 | 20 | 25800 | — | — | — | VF 210_20 | P200 | BN200L4 | 170 |
| 74 | 3352 | 1.3 | 20 | 35200 | — | — | — | VF 250_20 | P200 | BN200L4 | 176 |
| 98 | 2573 | 1.1 | 15 | 24000 | — | — | — | VF 210_15 | P200 | BN200L4 | 170 |
| 98 | 2573 | 1.6 | 15 | 32600 | — | — | — | VF 250_15 | P200 | BN200L4 | 176 |
| 147 | 1735 | 1.5 | 10 | 21600 | — | — | — | VF 210_10 | P200 | BN200L4 | 170 |
| 147 | 1754 | 2.1 | 10 | 29200 | — | — | — | VF 250_10 | P200 | BN200L4 | 176 |
| 210 | 1228 | 1.9 | 7 | 19700 | — | — | — | VF 210_7 | P200 | BN200L4 | 170 |
| 210 | 1242 | 2.6 | 7 | 26600 | — | — | — | VF 250_7 | P200 | BN200L4 | 176 |



30 kW

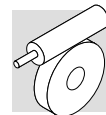
| n_2 min ⁻¹ | M_2 Nm | S | i | R_{n2} N |  |  |  |  |  | IEC  |  |
|----------------------------|-------------|-----|----|---------------|---|---|---|---|---|---|---|
| 295 | 874 | 2.3 | 10 | 19000 | — | | | VF 210_10 | P200 | BN200LA2 | 170 |
| 421 | 619 | 2.8 | 7 | 17200 | — | | | VF 210_7 | P200 | BN200LA2 | 170 |

37 kW

| | | | | | | | | | | | |
|-----|------|-----|----|-------|---|--|--|-----------|------|---------|-----|
| 74 | 4107 | 1.1 | 20 | 22800 | — | | | VF 250_20 | P225 | BN225S4 | 176 |
| 99 | 3152 | 0.9 | 15 | 22600 | — | | | VF 210_15 | P225 | BN225S4 | 170 |
| 99 | 3152 | 1.3 | 15 | 31400 | — | | | VF 250_15 | P225 | BN225S4 | 176 |
| 148 | 2125 | 1.2 | 10 | 20500 | — | | | VF 210_10 | P225 | BN225S4 | 170 |
| 148 | 2149 | 1.7 | 10 | 28300 | — | | | VF 250_10 | P225 | BN225S4 | 176 |
| 211 | 1504 | 1.5 | 7 | 18800 | — | | | VF 210_7 | P225 | BN225S4 | 170 |
| 211 | 1521 | 2.1 | 7 | 25800 | — | | | VF 250_7 | P225 | BN225S4 | 176 |
| 296 | 1074 | 1.9 | 10 | 18400 | — | | | VF 210_10 | P200 | BN200L2 | 170 |
| 296 | 1086 | 2.6 | 10 | 24500 | — | | | VF 250_10 | P200 | BN200L2 | 176 |
| 423 | 760 | 2.3 | 7 | 16800 | — | | | VF 210_7 | P200 | BN200L2 | 170 |


45 kW

| | | | | | | | | | | | |
|-----|------|-----|----|-------|---|--|--|-----------|------|---------|-----|
| 74 | 4994 | 0.9 | 20 | 32300 | — | | | VF 250_20 | P225 | BN225M4 | 176 |
| 99 | 3833 | 1.0 | 15 | 30100 | — | | | VF 250_15 | P225 | BN225M4 | 176 |
| 148 | 2584 | 1.0 | 10 | 19200 | — | | | VF 210_10 | P225 | BN225M4 | 170 |
| 148 | 2613 | 1.4 | 10 | 27300 | — | | | VF 250_10 | P225 | BN225M4 | 176 |
| 211 | 1829 | 1.3 | 7 | 17800 | — | | | VF 210_7 | P225 | BN225M4 | 170 |
| 211 | 1850 | 1.7 | 7 | 25000 | — | | | VF 250_7 | P225 | BN225M4 | 176 |
| 296 | 1307 | 1.5 | 10 | 17800 | — | | | VF 210_10 | P200 | BN225M2 | 170 |
| 296 | 1321 | 2.1 | 10 | 24000 | — | | | VF 250_10 | P200 | BN225M2 | 176 |
| 423 | 925 | 1.9 | 7 | 16200 | — | | | VF 210_7 | P200 | BN225M2 | 170 |
| 423 | 935 | 2.6 | 7 | 21800 | — | | | VF 250_7 | P200 | BN225M2 | 176 |




27

13 Nm

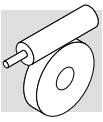
| |  | i | η_s % | n_2 | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_2 | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|----------|---|----|---------------|-------------------------------|------------------------------|----------|----------|----------|-------------------------------|------------------------------|----------|----------|----------|----------|----------|
| | | | | min^{-1} | Nm | kW | N | N | % | min^{-1} | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| VF 27 | VF 27_7 | 7 | 67 | 400 | 7 | 0.34 | — | 330 | 86 | 200 | 9 | 0.23 | 35 | 410 | 83 |
| | VF 27_10 | 10 | 62 | 280 | 7 | 0.24 | — | 400 | 84 | 140 | 9 | 0.16 | 30 | 500 | 80 |
| | VF 27_15 | 15 | 54 | 187 | 7 | 0.17 | — | 480 | 79 | 93 | 9 | 0.12 | — | 600 | 75 |
| | VF 27_20 | 20 | 49 | 140 | 7 | 0.14 | — | 540 | 76 | 70 | 9 | 0.09 | — | 600 | 71 |
| | VF 27_30 | 30 | 38 | 93 | 7 | 0.10 | — | 600 | 69 | 47 | 9 | 0.07 | — | 600 | 62 |
| | VF 27_40 | 40 | 33 | 70 | 7 | 0.08 | — | 600 | 64 | 35 | 9 | 0.06 | — | 600 | 57 |
| | VF 27_60 | 60 | 26 | 47 | 7 | 0.06 | — | 600 | 56 | 23.3 | 9 | 0.04 | — | 600 | 49 |
| | VF 27_70 | 70 | 24 | 40 | 7 | 0.06 | — | 600 | 53 | 20.0 | 9 | 0.04 | — | 600 | 45 |
| | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | |
| | VF 27_7 | 7 | 67 | 129 | 10 | 0.17 | 90 | 480 | 81 | 71 | 11 | 0.11 | 90 | 600 | 79 |
| | VF 27_10 | 10 | 62 | 90 | 11 | 0.13 | 20 | 570 | 78 | 50 | 12 | 0.08 | 90 | 600 | 76 |
| | VF 27_15 | 15 | 54 | 60 | 11 | 0.09 | — | 600 | 72 | 33 | 12 | 0.06 | 90 | 600 | 69 |
| | VF 27_20 | 20 | 49 | 45 | 11 | 0.08 | — | 600 | 68 | 25.0 | 12 | 0.05 | 90 | 600 | 65 |
| | VF 27_30 | 30 | 38 | 30.0 | 11 | 0.06 | — | 600 | 59 | 16.7 | 13 | 0.04 | — | 600 | 55 |
| VF 27_40 | 40 | 33 | 22.5 | 11 | 0.05 | — | 600 | 54 | 12.5 | 13 | 0.04 | — | 600 | 50 | |
| VF 27_60 | 60 | 26 | 15.0 | 11 | 0.04 | — | 600 | 45 | 8.3 | 12 | 0.02 | — | 600 | 41 | |
| VF 27_70 | 70 | 24 | 12.9 | 10 | 0.03 | — | 600 | 42 | 7.1 | 11 | 0.02 | — | 600 | 38 | |

30

24 Nm


| |  | i | η_s % | n_2 | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_2 | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|----------|---|----|---------------|-------------------------------|------------------------------|----------|----------|----------|-------------------------------|------------------------------|----------|----------|----------|----------|----------|
| | | | | min^{-1} | Nm | kW | N | N | % | min^{-1} | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| VF 30 | VF 30_7 | 7 | 69 | 400 | 12 | 0.58 | 120 | 510 | 87 | 200 | 16 | 0.41 | 140 | 630 | 84 |
| | VF 30_10 | 10 | 64 | 280 | 12 | 0.41 | 70 | 620 | 85 | 140 | 16 | 0.30 | 80 | 770 | 81 |
| | VF 30_15 | 15 | 56 | 187 | 14 | 0.34 | — | 720 | 81 | 93 | 18 | 0.24 | — | 910 | 76 |
| | VF 30_20 | 20 | 51 | 140 | 14 | 0.26 | — | 820 | 78 | 70 | 18 | 0.19 | — | 1030 | 73 |
| | VF 30_30 | 30 | 41 | 93 | 15 | 0.21 | — | 960 | 71 | 47 | 20 | 0.15 | — | 1200 | 65 |
| | VF 30_40 | 40 | 36 | 70 | 14 | 0.16 | — | 1090 | 66 | 35 | 19 | 0.12 | — | 1360 | 60 |
| | VF 30_60 | 60 | 29 | 47 | 14 | 0.12 | — | 1270 | 59 | 23.3 | 19 | 0.09 | — | 1590 | 51 |
| | VF 30_70 | 70 | 26 | 40 | 11 | 0.08 | — | 1380 | 55 | 20.0 | 15 | 0.07 | — | 1600 | 48 |
| | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | |
| | VF 30_7 | 7 | 69 | 129 | 18 | 0.30 | 150 | 730 | 82 | 71 | 20 | 0.19 | 150 | 920 | 81 |
| | VF 30_10 | 10 | 64 | 90 | 18 | 0.22 | 150 | 900 | 79 | 50 | 20 | 0.14 | 150 | 1120 | 77 |
| | VF 30_15 | 15 | 56 | 60 | 20 | 0.17 | — | 1060 | 74 | 33 | 22 | 0.11 | 150 | 1320 | 71 |
| | VF 30_20 | 20 | 51 | 45 | 20 | 0.14 | — | 1200 | 70 | 25.0 | 22 | 0.09 | 150 | 1490 | 67 |
| | VF 30_30 | 30 | 41 | 30 | 22 | 0.12 | — | 1400 | 61 | 16.7 | 24 | 0.07 | — | 1700 | 58 |
| VF 30_40 | 40 | 36 | 23 | 20 | 0.09 | — | 1590 | 56 | 12.5 | 22 | 0.06 | — | 1700 | 53 | |
| VF 30_60 | 60 | 29 | 15 | 20 | 0.07 | — | 1650 | 48 | 8.3 | 22 | 0.05 | — | 1700 | 44 | |
| VF 30_70 | 70 | 26 | 13 | 17 | 0.05 | — | 1700 | 45 | 7.0 | 19 | 0.04 | — | 1700 | 41 | |

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)




44

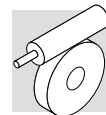
55 Nm

| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|--------------|---|-----|---------------|-------------------------------|----------|----------|----------|----------|-------------------------------|-------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| VF 44 | VF 44_7 | 7 | 71 | 400 | 22 | 1.1 | 220 | 950 | 88 | 200 | 29 | 0.71 | 220 | 1180 | 86 |
| | VF 44_10 | 10 | 66 | 280 | 22 | 0.74 | 220 | 1150 | 87 | 140 | 29 | 0.51 | 220 | 1430 | 84 |
| | VF 44_14 | 14 | 60 | 200 | 22 | 0.55 | 220 | 1340 | 84 | 100 | 29 | 0.37 | 220 | 1680 | 81 |
| | VF 44_20 | 20 | 55 | 140 | 29 | 0.52 | 220 | 1490 | 81 | 70 | 39 | 0.37 | 220 | 1860 | 77 |
| | VF 44_28 | 28 | 45 | 100 | 29 | 0.40 | 220 | 1710 | 76 | 50 | 39 | 0.29 | 220 | 2140 | 71 |
| | VF 44_35 | 35 | 42 | 80 | 29 | 0.33 | 220 | 1870 | 73 | 40 | 39 | 0.25 | 220 | 2300 | 68 |
| | VF 44_46 | 46 | 37 | 61 | 29 | 0.27 | 220 | 2080 | 69 | 30.0 | 39 | 0.19 | 220 | 2300 | 63 |
| | VF 44_60 | 60 | 32 | 47 | 29 | 0.22 | 220 | 2290 | 65 | 23.3 | 39 | 0.16 | 220 | 2300 | 58 |
| | VF 44_70 | 70 | 30 | 40 | 22 | 0.15 | 220 | 2300 | 62 | 20.0 | 29 | 0.11 | 220 | 2300 | 55 |
| | VF 44_100 | 100 | 24 | 28 | 21 | 0.11 | 220 | 2300 | 55 | 14.0 | 28 | 0.09 | 220 | 2300 | 47 |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | |
| VF 44 | VF 44_7 | 7 | 71 | 129 | 39 | 0.63 | 220 | 1300 | 85 | 71 | 45 | 0.41 | 220 | 1610 | 83 |
| | VF 44_10 | 10 | 66 | 90 | 39 | 0.45 | 220 | 1610 | 82 | 50 | 45 | 0.29 | 220 | 1980 | 80 |
| | VF 44_14 | 14 | 60 | 64 | 39 | 0.34 | 220 | 1890 | 78 | 36 | 50 | 0.25 | 220 | 2280 | 76 |
| | VF 44_20 | 20 | 55 | 45 | 45 | 0.29 | 220 | 2160 | 74 | 25.0 | 50 | 0.18 | 220 | 2500 | 72 |
| | VF 44_28 | 28 | 45 | 32 | 49 | 0.24 | 220 | 2300 | 67 | 17.9 | 55 | 0.16 | 220 | 2500 | 64 |
| | VF 44_35 | 35 | 42 | 25.7 | 49 | 0.20 | 220 | 2300 | 64 | 14.3 | 55 | 0.14 | 220 | 2500 | 60 |
| | VF 44_46 | 46 | 37 | 19.6 | 49 | 0.17 | 220 | 2300 | 59 | 10.9 | 50 | 0.10 | 220 | 2500 | 55 |
| | VF 44_60 | 60 | 32 | 15.0 | 45 | 0.13 | 200 | 2300 | 54 | 8.3 | 50 | 0.09 | 220 | 2500 | 50 |
| | VF 44_70 | 70 | 30 | 12.9 | 39 | 0.10 | 220 | 2300 | 51 | 7.1 | 45 | 0.07 | 220 | 2500 | 47 |
| | VF 44_100 | 100 | 24 | 9.0 | 30 | 0.06 | 220 | 2300 | 43 | 5.0 | 32 | 0.04 | 220 | 2500 | 39 |

70 Nm


| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|--------------------|---|------|---------------|-------------------------------|----------|----------|----------|----------|------------------------------|-------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | | |
| VF/VF 30/44 | VF/VF 30/44_245 | 245 | 29 | 5.7 | 60 | 0.09 | 140 | 2500 | 40 | 3.7 | 70 | 0.07 | 150 | 2500 | 38 |
| | VF/VF 30/44_350 | 350 | 27 | 4.0 | 60 | 0.07 | 80 | 2500 | 36 | 2.6 | 70 | 0.05 | 150 | 2500 | 38 |
| | VF/VF 30/44_420 | 420 | 25 | 3.3 | 60 | 0.06 | — | 2500 | 35 | 2.1 | 70 | 0.04 | — | 2500 | 39 |
| | VF/VF 30/44_560 | 560 | 23 | 2.5 | 60 | 0.05 | — | 2500 | 31 | 1.6 | 70 | 0.04 | — | 2500 | 29 |
| | VF/VF 30/44_700 | 700 | 21 | 2.0 | 60 | 0.04 | — | 2500 | 31 | 1.3 | 70 | 0.03 | — | 2500 | 31 |
| | VF/VF 30/44_840 | 840 | 18 | 1.7 | 60 | 0.04 | — | 2500 | 26 | 1.1 | 70 | 0.03 | — | 2500 | 26 |
| | VF/VF 30/44_1120 | 1120 | 16 | 1.3 | 60 | 0.03 | — | 2500 | 26 | 0.80 | 70 | 0.02 | — | 2500 | 29 |
| | VF/VF 30/44_1680 | 1680 | 13 | 0.83 | 60 | 0.02 | — | 2500 | 26 | 0.54 | 70 | 0.02 | — | 2500 | 20 |
| | VF/VF 30/44_2100 | 2100 | 12 | 0.67 | 60 | 0.02 | — | 2500 | 21 | 0.43 | 70 | 0.02 | — | 2500 | 16 |

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)




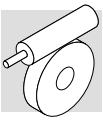
49

88 Nm

|  | i | η_s % | n_2 | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_2 | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | |
|---|----------|---------------|---|----------|----------|----------|----------|----------|---|----------|----------|----------|----------|----------|----|
| | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % | |
| | | | n ₁ = 2800 min ⁻¹ | | | | | | n ₁ = 1400 min ⁻¹ | | | | | | |
| VF 49 | VF 49_7 | 7 | 70 | 400 | 41 | 2.0 | 400 | 950 | 88 | 200 | 54 | 1.3 | 400 | 1170 | 86 |
| | VF 49_10 | 10 | 65 | 280 | 44 | 1.5 | 400 | 1140 | 86 | 140 | 59 | 1.0 | 400 | 1410 | 84 |
| | VF 49_14 | 14 | 59 | 200 | 49 | 1.2 | 400 | 1310 | 84 | 100 | 65 | 0.90 | 400 | 1630 | 81 |
| | VF 49_18 | 18 | 55 | 156 | 44 | 0.87 | 400 | 1520 | 82 | 78 | 59 | 0.60 | 400 | 1890 | 78 |
| | VF 49_24 | 24 | 50 | 117 | 47 | 0.73 | 400 | 1670 | 79 | 58 | 63 | 0.50 | 400 | 2110 | 75 |
| | VF 49_28 | 28 | 43 | 100 | 56 | 0.78 | 400 | 1740 | 75 | 50 | 74 | 0.55 | 400 | 2170 | 71 |
| | VF 49_36 | 36 | 39 | 78 | 52 | 0.59 | 400 | 1970 | 72 | 39 | 69 | 0.42 | 400 | 2460 | 67 |
| | VF 49_45 | 45 | 35 | 62 | 49 | 0.46 | 400 | 2180 | 69 | 31 | 65 | 0.33 | 400 | 2725 | 63 |
| | VF 49_60 | 60 | 30 | 47 | 44 | 0.34 | 400 | 2480 | 64 | 23.3 | 59 | 0.25 | 400 | 3100 | 58 |
| | VF 49_70 | 70 | 28 | 40 | 41 | 0.28 | 400 | 2650 | 61 | 20.0 | 55 | 0.21 | 400 | 3150 | 54 |
| VF 49_80 | 80 | 25 | 35 | 41 | 0.25 | 400 | 2780 | 59 | 17.5 | 54 | 0.19 | 400 | 3150 | 52 | |
| VF 49_100 | 100 | 22 | 28.0 | 37 | 0.20 | 400 | 3050 | 54 | 14.0 | 49 | 0.13 | 400 | 3150 | 47 | |
| | | | n ₁ = 900 min ⁻¹ | | | | | | n ₁ = 500 min ⁻¹ | | | | | | |
| VF 49 | VF 49_7 | 7 | 70 | 129 | 61 | 0.97 | 400 | 1370 | 85 | 71 | 74 | 0.67 | 400 | 1670 | 83 |
| | VF 49_10 | 10 | 65 | 90 | 64 | 0.75 | 400 | 1670 | 82 | 50 | 74 | 0.49 | 400 | 2060 | 80 |
| | VF 49_14 | 14 | 59 | 64 | 71 | 0.61 | 400 | 1920 | 78 | 36 | 78 | 0.39 | 400 | 2400 | 75 |
| | VF 49_18 | 18 | 55 | 50 | 68 | 0.47 | 400 | 2190 | 75 | 27.8 | 74 | 0.30 | 400 | 2730 | 72 |
| | VF 49_24 | 24 | 50 | 38 | 68 | 0.36 | 400 | 2480 | 71 | 20.8 | 74 | 0.24 | 400 | 3090 | 68 |
| | VF 49_28 | 28 | 43 | 32 | 82 | 0.41 | 400 | 2540 | 67 | 17.9 | 88 | 0.26 | 400 | 3180 | 63 |
| | VF 49_36 | 36 | 39 | 25.0 | 75 | 0.31 | 400 | 2880 | 63 | 13.9 | 80 | 0.20 | 400 | 3450 | 59 |
| | VF 49_45 | 45 | 35 | 20.0 | 71 | 0.25 | 400 | 3190 | 59 | 11.1 | 78 | 0.17 | 400 | 3450 | 55 |
| | VF 49_60 | 60 | 30 | 15.0 | 64 | 0.19 | 400 | 3300 | 53 | 8.3 | 69 | 0.12 | 400 | 3450 | 49 |
| | VF 49_70 | 70 | 28 | 12.9 | 60 | 0.16 | 400 | 3300 | 50 | 7.1 | 69 | 0.11 | 400 | 3450 | 46 |
| VF 49_80 | 80 | 25 | 11.3 | 58 | 0.14 | 400 | 3300 | 47 | 6.3 | 59 | 0.09 | 400 | 3450 | 43 | |
| VF 49_100 | 100 | 22 | 9.0 | 52 | 0.11 | 400 | 3300 | 42 | 5.0 | 59 | 0.08 | 400 | 3450 | 38 | |


95 Nm

|  | i | η_s % | n_2 | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_2 | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | |
|---|------------|---------------|---|----------|----------|----------|----------|----------|---|----------|----------|----------|----------|----------|----|
| | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % | |
| | | | n ₁ = 2800 min ⁻¹ | | | | | | n ₁ = 1400 min ⁻¹ | | | | | | |
| VFR 49 | VFR 49_42 | 42 | 58 | 67 | 71 | 0.65 | 230 | 1920 | 76 | 33 | 78 | 0.37 | 230 | 2500 | 74 |
| | VFR 49_54 | 54 | 54 | 52 | 68 | 0.50 | 230 | 2180 | 74 | 25.9 | 74 | 0.28 | 230 | 2830 | 71 |
| | VFR 49_72 | 72 | 49 | 39 | 68 | 0.40 | 230 | 2470 | 70 | 19.4 | 74 | 0.22 | 230 | 3190 | 67 |
| | VFR 49_84 | 84 | 42 | 33 | 82 | 0.44 | 230 | 2520 | 66 | 16.6 | 88 | 0.25 | 230 | 3290 | 62 |
| | VFR 49_108 | 108 | 38 | 25.9 | 75 | 0.33 | 230 | 2860 | 62 | 12.9 | 80 | 0.19 | 230 | 3450 | 58 |
| | VFR 49_135 | 135 | 34 | 20.7 | 71 | 0.27 | 230 | 3160 | 58 | 10.3 | 88 | 0.18 | 230 | 3450 | 54 |
| | VFR 49_180 | 180 | 29 | 15.6 | 64 | 0.20 | 230 | 3300 | 52 | 7.7 | 69 | 0.12 | 230 | 3450 | 48 |
| | VFR 49_210 | 210 | 27 | 13.3 | 60 | 0.17 | 230 | 3300 | 49 | 6.6 | 69 | 0.11 | 230 | 3450 | 45 |
| | VFR 49_240 | 240 | 25 | 11.7 | 58 | 0.15 | 230 | 3300 | 46 | 5.8 | 59 | 0.09 | 230 | 3450 | 42 |
| | VFR 49_300 | 300 | 22 | 9.3 | 52 | 0.12 | 230 | 3300 | 41 | 4.7 | 59 | 0.08 | 230 | 3450 | 37 |
| | | | n ₁ = 900 min ⁻¹ | | | | | | n ₁ = 500 min ⁻¹ | | | | | | |
| VFR 49 | VFR 49_42 | 42 | 58 | 21.4 | 82 | 0.26 | 230 | 2960 | 72 | 11.9 | 90 | 0.16 | 230 | 3450 | 70 |
| | VFR 49_54 | 54 | 54 | 16.7 | 79 | 0.20 | 230 | 3330 | 69 | 9.3 | 83 | 0.12 | 230 | 3450 | 67 |
| | VFR 49_72 | 72 | 49 | 12.5 | 79 | 0.16 | 230 | 3450 | 64 | 6.9 | 83 | 0.10 | 230 | 3450 | 62 |
| | VFR 49_84 | 84 | 42 | 10.7 | 91 | 0.17 | 230 | 3450 | 59 | 6.0 | 95 | 0.10 | 230 | 3450 | 57 |
| | VFR 49_108 | 108 | 38 | 8.3 | 84 | 0.13 | 230 | 3450 | 55 | 4.6 | 90 | 0.08 | 230 | 3450 | 52 |
| | VFR 49_135 | 135 | 34 | 6.7 | 82 | 0.11 | 230 | 3450 | 50 | 3.7 | 90 | 0.07 | 230 | 3450 | 48 |
| | VFR 49_180 | 180 | 29 | 5.0 | 75 | 0.09 | 230 | 3450 | 45 | 2.8 | 78 | 0.05 | 230 | 3450 | 42 |
| | VFR 49_210 | 210 | 27 | 4.3 | 75 | 0.08 | 230 | 3450 | 41 | 2.4 | 78 | 0.05 | 230 | 3450 | 39 |
| | VFR 49_240 | 240 | 25 | 3.8 | 64 | 0.06 | 230 | 3450 | 39 | 2.1 | 68 | 0.04 | 230 | 3450 | 36 |
| | VFR 49_300 | 300 | 22 | 3.0 | 63 | 0.06 | 230 | 3450 | 34 | 1.7 | 65 | 0.04 | 230 | 3450 | 32 |



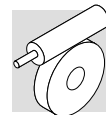
49

100 Nm

| |  | i | η_s % | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | |
|--------------------|---|------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|
| | | | | n_{2-1} min^{-1} | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | n_{2-1} min^{-1} | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % |
| VF/VF 30/49 | VF/VF 30/49_240 | 240 | 32 | 5.8 | 95 | 0.13 | 80 | 3450 | 45 | 3.8 | 100 | 0.09 | 150 | 3450 | 44 |
| | VF/VF 30/49_315 | 315 | 24 | 4.4 | 95 | 0.11 | 140 | 3450 | 40 | 2.9 | 100 | 0.07 | 150 | 3450 | 43 |
| | VF/VF 30/49_420 | 420 | 24 | 3.3 | 95 | 0.08 | — | 3450 | 41 | 2.1 | 100 | 0.06 | — | 3450 | 37 |
| | VF/VF 30/49_540 | 540 | 22 | 2.6 | 95 | 0.07 | — | 3450 | 37 | 1.7 | 100 | 0.05 | — | 3450 | 35 |
| | VF/VF 30/49_720 | 720 | 20 | 1.9 | 95 | 0.05 | — | 3450 | 39 | 1.3 | 100 | 0.04 | — | 3450 | 33 |
| | VF/VF 30/49_900 | 900 | 18 | 1.6 | 95 | 0.05 | — | 3450 | 31 | 1.0 | 100 | 0.04 | — | 3450 | 26 |
| | VF/VF 30/49_1120 | 1120 | 15 | 1.3 | 95 | 0.04 | — | 3450 | 31 | 0.80 | 100 | 0.03 | — | 3450 | 28 |
| | VF/VF 30/49_1440 | 1440 | 14 | 0.97 | 95 | 0.04 | — | 3450 | 24 | 0.63 | 100 | 0.03 | — | 3450 | 22 |
| | VF/VF 30/49_2160 | 2160 | 11 | 0.65 | 95 | 0.03 | — | 3450 | 21 | 0.42 | 100 | 0.02 | — | 3450 | 22 |
| | VF/VF 30/49_2700 | 2700 | 10 | 0.52 | 95 | 0.03 | — | 3450 | 17 | 0.33 | 100 | 0.02 | — | 3450 | 17 |


184

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)




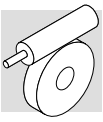
63

190 Nm

| |  | i | η_s % | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | | |
|----------|---|----|---------------|--|----------------|----------------|---------------|---------------|--|--------------------------------|----------------|----------------|---------------|----|---------------|---------------|
| | | | | n_{2-1} min^{-1} | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | n_{2-1} min^{-1} | M_{n2} Nm | P_{n1} kW | R_{n1} N | | R_{n2} N | η_d % |
| | | | | W 63 | | | | | | | | | | | | |
| W 63_7 | 7 | 70 | 400 | 105 | 4.9 | 480 | 1010 | 90 | 200 | 120 | 2.9 | 480 | 1550 | 88 | 182 | |
| W 63_10 | 10 | 66 | 280 | 125 | 4.2 | 370 | 1360 | 88 | 140 | 140 | 2.4 | 480 | 1840 | 86 | | |
| W 63_12 | 12 | 63 | 233 | 125 | 3.5 | 435 | 1540 | 87 | 117 | 140 | 2.0 | 480 | 2070 | 85 | | |
| W 63_15 | 15 | 59 | 187 | 125 | 2.8 | 410 | 1770 | 86 | 93 | 150 | 1.8 | 480 | 2280 | 83 | | |
| W 63_19 | 19 | 55 | 147 | 130 | 2.4 | 310 | 1990 | 84 | 74 | 150 | 1.4 | 480 | 2600 | 81 | | |
| W 63_24 | 24 | 52 | 117 | 130 | 1.9 | 370 | 2250 | 82 | 58 | 155 | 1.2 | 480 | 2890 | 78 | | |
| W 63_30 | 30 | 44 | 93 | 125 | 1.6 | 440 | 2540 | 78 | 47 | 160 | 1.1 | 460 | 3170 | 74 | | |
| W 63_38 | 38 | 40 | 74 | 130 | 1.3 | 330 | 2800 | 75 | 37 | 155 | 0.85 | 480 | 3580 | 70 | | |
| W 63_45 | 45 | 37 | 62 | 130 | 1.2 | 380 | 3020 | 73 | 31 | 145 | 0.71 | 480 | 3920 | 67 | | |
| W 63_64 | 64 | 31 | 44 | 110 | 0.75 | 480 | 3650 | 67 | 21.9 | 125 | 0.47 | 480 | 4680 | 61 | | |
| W 63_80 | 80 | 27 | 35 | 100 | 0.59 | 480 | 4050 | 62 | 17.5 | 115 | 0.38 | 480 | 5000 | 56 | | |
| W 63_100 | 100 | 23 | 28 | 100 | 0.51 | 480 | 4420 | 58 | 14.0 | 115 | 0.33 | 480 | 5000 | 51 | | |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | | |
| W 63_7 | 7 | 70 | 129 | 130 | 2.0 | 480 | 1870 | 87 | 71 | 140 | 1.2 | 480 | 2420 | 84 | 182 | |
| W 63_10 | 10 | 66 | 90 | 150 | 1.7 | 480 | 2220 | 84 | 50 | 165 | 1.1 | 480 | 2830 | 81 | | |
| W 63_12 | 12 | 63 | 75 | 150 | 1.4 | 480 | 2480 | 82 | 42 | 165 | 0.92 | 480 | 3140 | 79 | | |
| W 63_15 | 15 | 59 | 60 | 160 | 1.3 | 480 | 2740 | 80 | 33 | 180 | 0.83 | 480 | 3430 | 76 | | |
| W 63_19 | 19 | 55 | 47 | 160 | 1.0 | 480 | 3100 | 78 | 26.3 | 180 | 0.68 | 480 | 3860 | 73 | | |
| W 63_24 | 24 | 52 | 38 | 165 | 0.86 | 480 | 3440 | 75 | 20.8 | 185 | 0.58 | 480 | 4280 | 70 | | |
| W 63_30 | 30 | 44 | 30 | 170 | 0.76 | 480 | 3770 | 70 | 16.7 | 190 | 0.52 | 480 | 4690 | 64 | | |
| W 63_38 | 38 | 40 | 23.7 | 165 | 0.62 | 480 | 4240 | 66 | 13.2 | 185 | 0.42 | 480 | 5000 | 61 | | |
| W 63_45 | 45 | 37 | 20.0 | 155 | 0.52 | 480 | 4630 | 63 | 11.1 | 170 | 0.34 | 480 | 5000 | 58 | | |
| W 63_64 | 64 | 31 | 14.1 | 135 | 0.35 | 480 | 5000 | 56 | 7.8 | 150 | 0.24 | 480 | 5000 | 51 | | |
| W 63_80 | 80 | 27 | 11.3 | 125 | 0.28 | 480 | 5000 | 52 | 6.3 | 135 | 0.19 | 480 | 5000 | 46 | | |
| W 63_100 | 100 | 23 | 9.0 | 120 | 0.25 | 480 | 5000 | 46 | 5.0 | 130 | 0.17 | 480 | 5000 | 41 | | |


220 Nm

| |  | i | η_s % | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | | |
|-----------|---|----|---------------|--|----------------|----------------|---------------|---------------|--|--------------------------------|----------------|----------------|---------------|----|---------------|---------------|
| | | | | n_{2-1} min^{-1} | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | n_{2-1} min^{-1} | M_{n2} Nm | P_{n1} kW | R_{n1} N | | R_{n2} N | η_d % |
| | | | | WR 63 | | | | | | | | | | | | |
| WR 63_21 | 21 | 69 | 133 | 130 | 2.1 | 180 | 1840 | 87 | 67 | 140 | 1.2 | 320 | 2510 | 84 | 183 | |
| WR 63_30 | 30 | 65 | 93 | 150 | 1.7 | 300 | 2180 | 84 | 47 | 165 | 1.0 | 320 | 2920 | 81 | | |
| WR 63_36 | 36 | 62 | 78 | 150 | 1.5 | 320 | 2430 | 82 | 39 | 165 | 0.85 | 320 | 3240 | 79 | | |
| WR 63_45 | 45 | 58 | 62 | 160 | 1.3 | 320 | 2690 | 80 | 31 | 180 | 0.77 | 320 | 3540 | 76 | | |
| WR 63_57 | 57 | 54 | 49 | 160 | 1.1 | 320 | 3050 | 78 | 24.6 | 180 | 0.63 | 320 | 3980 | 73 | | |
| WR 63_72 | 72 | 51 | 39 | 165 | 0.90 | 320 | 3390 | 75 | 19.4 | 185 | 0.54 | 320 | 4410 | 70 | | |
| WR 63_90 | 90 | 44 | 31 | 170 | 0.79 | 320 | 3710 | 70 | 15.6 | 190 | 0.48 | 320 | 4830 | 64 | | |
| WR 63_114 | 114 | 39 | 24.6 | 165 | 0.62 | 320 | 4170 | 68 | 12.3 | 185 | 0.39 | 320 | 5000 | 61 | | |
| WR 63_135 | 135 | 36 | 20.7 | 155 | 0.53 | 320 | 4560 | 63 | 10.4 | 170 | 0.32 | 320 | 5000 | 58 | | |
| WR 63_192 | 192 | 30 | 14.6 | 135 | 0.37 | 320 | 5000 | 56 | 7.3 | 150 | 0.22 | 320 | 5000 | 51 | | |
| WR 63_240 | 240 | 26 | 11.7 | 125 | 0.29 | 320 | 5000 | 52 | 5.8 | 135 | 0.18 | 320 | 5000 | 46 | | |
| WR 63_300 | 300 | 22 | 9.3 | 120 | 0.25 | 320 | 5000 | 46 | 4.7 | 130 | 0.15 | 320 | 5000 | 41 | | |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | | |
| WR 63_21 | 21 | 69 | 43 | 155 | 0.85 | 320 | 2960 | 82 | 23.8 | 170 | 0.53 | 320 | 3750 | 80 | 183 | |
| WR 63_30 | 30 | 65 | 30 | 180 | 0.72 | 320 | 3470 | 79 | 16.7 | 200 | 0.45 | 320 | 4360 | 77 | | |
| WR 63_36 | 36 | 62 | 25.0 | 180 | 0.61 | 320 | 3830 | 77 | 14.0 | 200 | 0.40 | 320 | 4790 | 74 | | |
| WR 63_45 | 45 | 58 | 20.0 | 190 | 0.54 | 320 | 4230 | 74 | 11.1 | 200 | 0.33 | 320 | 5000 | 71 | | |
| WR 63_57 | 57 | 54 | 15.8 | 190 | 0.44 | 320 | 4740 | 71 | 8.8 | 200 | 0.27 | 320 | 5000 | 68 | | |
| WR 63_72 | 72 | 51 | 12.5 | 190 | 0.37 | 320 | 5000 | 68 | 6.9 | 190 | 0.22 | 320 | 5000 | 64 | | |
| WR 63_90 | 90 | 44 | 10.0 | 205 | 0.35 | 320 | 5000 | 62 | 5.6 | 220 | 0.22 | 320 | 5000 | 58 | | |
| WR 63_114 | 114 | 39 | 7.9 | 200 | 0.29 | 320 | 5000 | 58 | 4.4 | 210 | 0.18 | 320 | 5000 | 54 | | |
| WR 63_135 | 135 | 36 | 6.7 | 180 | 0.23 | 320 | 5000 | 54 | 3.7 | 190 | 0.15 | 320 | 5000 | 50 | | |
| WR 63_192 | 192 | 30 | 4.7 | 150 | 0.16 | 320 | 5000 | 47 | 2.6 | 150 | 0.10 | 320 | 5000 | 43 | | |
| WR 63_240 | 240 | 26 | 3.8 | 140 | 0.13 | 320 | 5000 | 43 | 2.1 | 140 | 0.08 | 320 | 5000 | 39 | | |
| WR 63_300 | 300 | 22 | 3.0 | 130 | 0.11 | 320 | 5000 | 38 | 1.7 | 130 | 0.07 | 320 | 5000 | 34 | | |



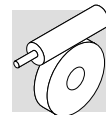
63

230 Nm

| |  | i | η_s % | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | |
|-------------------|---|------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|
| | | | | n_{2-1} min ⁻¹ | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | n_{2-1} min ⁻¹ | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % |
| VF/W 30/63 | VF/W 30/63_240 | 240 | 33 | 5.8 | 210 | 0.27 | 80 | 5000 | 47 | 3.8 | 230 | 0.20 | 150 | 5000 | 45 |
| | VF/W 30/63_315 | 315 | 26 | 4.4 | 210 | 0.23 | 140 | 5000 | 42 | 2.9 | 230 | 0.17 | 150 | 5000 | 41 |
| | VF/W 30/63_450 | 450 | 25 | 3.1 | 210 | 0.17 | — | 5000 | 41 | 2.0 | 230 | 0.11 | — | 5000 | 42 |
| | VF/W 30/63_570 | 570 | 22 | 2.5 | 210 | 0.14 | — | 5000 | 40 | 1.6 | 230 | 0.11 | — | 5000 | 36 |
| | VF/W 30/63_720 | 720 | 21 | 1.9 | 210 | 0.12 | — | 5000 | 37 | 1.3 | 230 | 0.09 | — | 5000 | 32 |
| | VF/W 30/63_900 | 900 | 18 | 1.6 | 210 | 0.11 | — | 5000 | 30 | 1.0 | 230 | 0.08 | — | 5000 | 29 |
| | VF/W 30/63_1200 | 1200 | 16 | 1.2 | 210 | 0.11 | — | 5000 | 24 | 0.75 | 230 | 0.07 | — | 5000 | 25 |
| | VF/W 30/63_1520 | 1520 | 14 | 0.92 | 210 | 0.08 | — | 5000 | 24 | 0.59 | 230 | 0.06 | — | 5000 | 23 |
| | VF/W 30/63_2280 | 2280 | 12 | 0.61 | 210 | 0.06 | — | 5000 | 21 | 0.39 | 230 | 0.04 | — | 5000 | 23 |
| | VF/W 30/63_2700 | 2700 | 11 | 0.52 | 210 | 0.05 | — | 5000 | 22 | 0.33 | 230 | 0.04 | — | 5000 | 19 |


184

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)




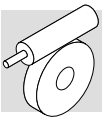
75

320 Nm

| |  | i | η_s % | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|----------|---|----|---------------|-------------------------------|----------|----------|----------|----------|-------------------------------|-------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| W 75 | W 75_7 | 7 | 71 | 400 | 170 | 7.8 | 750 | 700 | 91 | 200 | 190 | 4.4 | 750 | 1530 | 90 |
| | W 75_10 | 10 | 67 | 280 | 205 | 6.7 | 750 | 1610 | 90 | 140 | 230 | 3.8 | 750 | 2240 | 88 |
| | W 75_15 | 15 | 60 | 187 | 225 | 5.0 | 750 | 2120 | 88 | 93 | 250 | 2.9 | 750 | 2870 | 85 |
| | W 75_20 | 20 | 56 | 140 | 225 | 3.8 | 750 | 2550 | 86 | 70 | 250 | 2.2 | 750 | 3410 | 83 |
| | W 75_25 | 25 | 52 | 112 | 225 | 3.2 | 750 | 2900 | 83 | 56 | 250 | 1.8 | 750 | 3840 | 80 |
| | W 75_30 | 30 | 45 | 93 | 240 | 2.9 | 750 | 3100 | 81 | 47 | 270 | 1.7 | 750 | 4090 | 77 |
| | W 75_40 | 40 | 40 | 70 | 225 | 2.1 | 750 | 3660 | 77 | 35 | 255 | 1.3 | 750 | 4770 | 72 |
| | W 75_50 | 50 | 36 | 56 | 195 | 1.6 | 750 | 4180 | 73 | 28.0 | 220 | 0.95 | 750 | 5410 | 68 |
| | W 75_60 | 60 | 33 | 47 | 180 | 1.3 | 750 | 4610 | 70 | 23.3 | 200 | 0.75 | 750 | 5960 | 65 |
| | W 75_80 | 80 | 28 | 35 | 160 | 0.90 | 750 | 5310 | 65 | 17.5 | 180 | 0.56 | 750 | 6200 | 59 |
| W 75_100 | 100 | 25 | 28.0 | 135 | 0.65 | 750 | 5960 | 61 | 14.0 | 150 | 0.40 | 750 | 6200 | 55 | |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | |
| W 75 | W 75_7 | 7 | 71 | 129 | 205 | 3.1 | 750 | 2120 | 88 | 71 | 225 | 2.0 | 750 | 2940 | 86 |
| | W 75_10 | 10 | 67 | 90 | 250 | 2.7 | 750 | 2700 | 86 | 50 | 275 | 1.7 | 750 | 3480 | 84 |
| | W 75_15 | 15 | 60 | 60 | 270 | 2.0 | 750 | 3440 | 83 | 33 | 295 | 1.3 | 750 | 4380 | 80 |
| | W 75_20 | 20 | 56 | 45 | 270 | 1.6 | 750 | 4050 | 80 | 25.0 | 295 | 1.0 | 750 | 5120 | 77 |
| | W 75_25 | 25 | 52 | 36 | 270 | 1.3 | 750 | 4550 | 77 | 20.0 | 295 | 0.85 | 750 | 5720 | 73 |
| | W 75_30 | 30 | 45 | 30 | 290 | 1.2 | 750 | 4860 | 74 | 16.7 | 320 | 0.81 | 750 | 6080 | 69 |
| | W 75_40 | 40 | 40 | 22.5 | 275 | 1.0 | 750 | 5630 | 68 | 12.5 | 305 | 0.63 | 750 | 6200 | 63 |
| | W 75_50 | 50 | 36 | 18.0 | 235 | 0.70 | 750 | 6200 | 63 | 10.0 | 260 | 0.47 | 750 | 6200 | 58 |
| | W 75_60 | 60 | 33 | 15.0 | 215 | 0.56 | 750 | 6200 | 60 | 8.3 | 235 | 0.37 | 750 | 6200 | 55 |
| | W 75_80 | 80 | 28 | 11.3 | 195 | 0.43 | 750 | 6200 | 54 | 6.3 | 215 | 0.29 | 750 | 6200 | 49 |
| W 75_100 | 100 | 25 | 9.0 | 160 | 0.30 | 750 | 6200 | 50 | 5.0 | 180 | 0.21 | 750 | 6200 | 44 | |

420 Nm

| |  | i | η_s % | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|-----------|---|-----|---------------|-------------------------------|----------|----------|----------|----------|-------------------------------|-------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| WR 75 | WR 75_21 | 21 | 70 | 133 | 205 | 3.3 | 500 | 2030 | 88 | 67 | 225 | 1.8 | 500 | 3060 | 86 |
| | WR 75_30 | 30 | 66 | 93 | 250 | 2.8 | 500 | 2640 | 86 | 47 | 275 | 1.6 | 500 | 3610 | 84 |
| | WR 75_45 | 45 | 59 | 62 | 270 | 2.1 | 500 | 3380 | 83 | 31 | 295 | 1.2 | 500 | 4530 | 80 |
| | WR 75_60 | 60 | 55 | 47 | 270 | 1.6 | 500 | 3980 | 80 | 23.3 | 295 | 0.94 | 500 | 5280 | 77 |
| | WR 75_75 | 75 | 51 | 37 | 270 | 1.4 | 500 | 4480 | 77 | 18.7 | 295 | 0.79 | 500 | 5890 | 73 |
| | WR 75_90 | 90 | 44 | 31 | 290 | 1.3 | 500 | 4780 | 74 | 15.6 | 320 | 0.76 | 500 | 6200 | 69 |
| | WR 75_120 | 120 | 39 | 23.3 | 275 | 1.0 | 500 | 5540 | 68 | 11.7 | 305 | 0.59 | 500 | 6200 | 63 |
| | WR 75_150 | 150 | 35 | 18.7 | 235 | 0.73 | 500 | 6200 | 63 | 9.3 | 260 | 0.44 | 500 | 6200 | 58 |
| | WR 75_180 | 180 | 32 | 15.6 | 215 | 0.58 | 500 | 6200 | 60 | 7.8 | 235 | 0.35 | 500 | 6200 | 55 |
| | WR 75_240 | 240 | 27 | 11.7 | 195 | 0.44 | 500 | 6200 | 54 | 5.8 | 215 | 0.27 | 500 | 6200 | 49 |
| WR 75_300 | 300 | 24 | 9.3 | 160 | 0.31 | 500 | 6200 | 50 | 4.7 | 180 | 0.20 | 500 | 6200 | 44 | |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | |
| WR 75 | WR 75_21 | 21 | 70 | 43 | 245 | 1.3 | 500 | 3660 | 85 | 23.8 | 270 | 0.82 | 500 | 4660 | 82 |
| | WR 75_30 | 30 | 66 | 30 | 330 | 1.3 | 500 | 4070 | 82 | 16.7 | 370 | 0.81 | 500 | 5160 | 80 |
| | WR 75_45 | 45 | 59 | 20.0 | 350 | 0.94 | 500 | 5180 | 78 | 11.1 | 400 | 0.62 | 500 | 6200 | 75 |
| | WR 75_60 | 60 | 55 | 15.0 | 330 | 0.69 | 500 | 6180 | 75 | 8.3 | 370 | 0.45 | 500 | 6200 | 71 |
| | WR 75_75 | 75 | 51 | 12.0 | 330 | 0.59 | 500 | 6200 | 70 | 6.7 | 350 | 0.37 | 500 | 6200 | 66 |
| | WR 75_90 | 90 | 44 | 10.0 | 370 | 0.58 | 500 | 6200 | 67 | 5.6 | 420 | 0.39 | 500 | 6200 | 63 |
| | WR 75_120 | 120 | 39 | 7.5 | 330 | 0.43 | 500 | 6200 | 60 | 4.2 | 380 | 0.30 | 500 | 6200 | 56 |
| | WR 75_150 | 150 | 35 | 6.0 | 310 | 0.35 | 500 | 6200 | 55 | 3.3 | 350 | 0.24 | 500 | 6200 | 51 |
| | WR 75_180 | 180 | 32 | 5.0 | 280 | 0.29 | 500 | 6200 | 51 | 2.8 | 320 | 0.20 | 500 | 6200 | 47 |
| | WR 75_240 | 240 | 27 | 3.8 | 220 | 0.19 | 500 | 6200 | 45 | 2.1 | 280 | 0.15 | 500 | 6200 | 41 |
| WR 75_300 | 300 | 24 | 3.0 | 200 | 0.15 | 500 | 6200 | 41 | 1.7 | 260 | 0.12 | 500 | 6200 | 37 | |



75

370 Nm



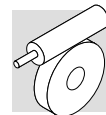
| | i | η_s % | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | |
|--------------------|------------|---------------|---|--|----------|----------|----------|----------|---|--|----------|----------|----------|----------|----|
| | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % | |
| | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| WR75_P90 B5 | WR 75_15 | 15 | 66 | 187 | 220 | 4.8 | — | 1960 | 89 | 93 | 250 | 2.8 | — | 2640 | 86 |
| | WR 75_22.5 | 22.5 | 59 | 124 | 240 | 3.6 | — | 2530 | 86 | 62 | 270 | 2.1 | — | 3380 | 83 |
| | WR 75_30 | 30 | 55 | 93 | 240 | 2.8 | — | 3020 | 84 | 47 | 270 | 1.6 | — | 3980 | 80 |
| | WR 75_37.5 | 37.5 | 51 | 75 | 240 | 2.3 | — | 3410 | 81 | 37 | 270 | 1.4 | — | 4480 | 77 |
| | WR 75_45 | 45 | 44 | 62 | 255 | 2.1 | — | 3660 | 79 | 31 | 290 | 1.3 | — | 4780 | 74 |
| | WR 75_60 | 60 | 39 | 47 | 240 | 1.6 | — | 4290 | 74 | 23.3 | 275 | 1.0 | — | 5540 | 68 |
| | WR 75_75 | 75 | 35 | 37 | 210 | 1.2 | — | 4860 | 70 | 18.7 | 235 | 0.73 | — | 6200 | 63 |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | |
| | WR 75_15 | 15 | 66 | 60 | 275 | 2.1 | — | 3150 | 84 | 33 | 330 | 1.4 | — | 3850 | 82 |
| | WR 75_22.5 | 22.5 | 59 | 40 | 295 | 1.5 | — | 4010 | 80 | 22.2 | 350 | 1.0 | — | 4920 | 78 |
| | WR 75_30 | 30 | 55 | 30 | 295 | 1.2 | — | 4710 | 77 | 16.7 | 330 | 0.77 | — | 5890 | 75 |
| | WR 75_37.5 | 37.5 | 51 | 24 | 295 | 1.0 | — | 5280 | 73 | 13.3 | 330 | 0.66 | — | 6200 | 70 |
| | WR 75_45 | 45 | 44 | 20 | 320 | 1.0 | — | 5610 | 69 | 11.1 | 370 | 0.64 | — | 6200 | 67 |
| WR 75_60 | 60 | 39 | 15 | 305 | 0.76 | — | 6200 | 63 | 8.3 | 330 | 0.48 | — | 6200 | 60 | |
| WR 75_75 | 75 | 35 | 12 | 260 | 0.56 | — | 6200 | 58 | 6.7 | 310 | 0.39 | — | 6200 | 55 | |

400 Nm




| | i | η_s % | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | |
|-------------------|-----------------|---------------|---|----------|----------|----------|----------|----------|--|----------|----------|----------|----------|----------|----|
| | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % | |
| | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | | |
| VF/W 44/75 | VF/W 44/75_250 | 250 | 34 | 5.6 | 370 | 0.38 | 220 | 4560 | 57 | 3.6 | 400 | 0.29 | 220 | 4660 | 52 |
| | VF/W 44/75_300 | 300 | 30 | 4.7 | 370 | 0.35 | 220 | 5160 | 51 | 3.0 | 400 | 0.27 | 220 | 5150 | 46 |
| | VF/W 44/75_400 | 400 | 26 | 3.5 | 370 | 0.29 | 220 | 6200 | 46 | 2.3 | 400 | 0.22 | 220 | 6200 | 42 |
| | VF/W 44/75_525 | 525 | 25 | 2.7 | 370 | 0.23 | 220 | 6200 | 44 | 1.7 | 400 | 0.18 | 220 | 6200 | 41 |
| | VF/W 44/75_700 | 700 | 24 | 2.0 | 370 | 0.18 | 220 | 6200 | 42 | 1.3 | 400 | 0.14 | 220 | 6200 | 39 |
| | VF/W 44/75_920 | 920 | 21 | 1.5 | 370 | 0.15 | — | 6200 | 40 | 1.0 | 400 | 0.11 | 60 | 6200 | 36 |
| | VF/W 44/75_1200 | 1200 | 18 | 1.2 | 370 | 0.12 | — | 6200 | 37 | 0.75 | 400 | 0.10 | 220 | 6200 | 31 |
| | VF/W 44/75_1500 | 1500 | 17 | 0.93 | 370 | 0.10 | 220 | 6200 | 37 | 0.60 | 400 | 0.09 | 220 | 6200 | 29 |
| | VF/W 44/75_2100 | 2100 | 14 | 0.67 | 370 | 0.09 | 220 | 6200 | 30 | 0.43 | 400 | 0.07 | 220 | 6200 | 24 |
| | VF/W 44/75_2800 | 2800 | 12 | 0.50 | 370 | 0.07 | 220 | 6200 | 26 | 0.32 | 400 | 0.06 | 220 | 6200 | 22 |

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)




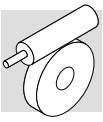
86

440 Nm

| |  | i | η_s % | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|-------------|---|----|---------------|-------------------------------|----------|----------|----------|----------|-------------------------------|-------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| W 86 | W 86_7 | 7 | 71 | 400 | 225 | 10.4 | 850 | 2930 | 91 | 200 | 250 | 5.9 | 850 | 3920 | 89 |
| | W 86_10 | 10 | 67 | 280 | 260 | 8.5 | 850 | 3490 | 90 | 140 | 290 | 4.8 | 850 | 4620 | 88 |
| | W 86_15 | 15 | 60 | 187 | 295 | 6.6 | 850 | 4200 | 87 | 93 | 330 | 3.8 | 850 | 5510 | 85 |
| | W 86_20 | 20 | 60 | 140 | 285 | 4.9 | 850 | 4900 | 86 | 70 | 320 | 2.8 | 850 | 6380 | 84 |
| | W 86_23 | 23 | 58 | 122 | 285 | 4.3 | 850 | 5250 | 85 | 61 | 320 | 2.5 | 850 | 6800 | 82 |
| | W 86_30 | 30 | 45 | 93 | 320 | 3.9 | 850 | 5740 | 81 | 47 | 370 | 2.4 | 850 | 7000 | 76 |
| | W 86_40 | 40 | 45 | 70 | 295 | 2.7 | 850 | 6670 | 79 | 35 | 330 | 1.6 | 850 | 7000 | 75 |
| | W 86_46 | 46 | 43 | 61 | 305 | 2.5 | 850 | 7000 | 77 | 30 | 340 | 1.5 | 850 | 7000 | 73 |
| | W 86_56 | 56 | 39 | 50 | 265 | 1.8 | 850 | 7000 | 75 | 25.0 | 300 | 1.1 | 850 | 7000 | 70 |
| | W 86_64 | 64 | 37 | 44 | 250 | 1.6 | 850 | 7000 | 73 | 21.9 | 280 | 0.94 | 850 | 7000 | 68 |
| | W 86_80 | 80 | 33 | 35 | 225 | 1.2 | 850 | 7000 | 69 | 17.5 | 255 | 0.73 | 850 | 7000 | 64 |
| W 86_100 | 100 | 29 | 28.0 | 205 | 0.92 | 850 | 7000 | 65 | 14.0 | 230 | 0.57 | 850 | 7000 | 59 | |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | |
| W 86 | W 86_7 | 7 | 71 | 129 | 270 | 4.1 | 850 | 4670 | 88 | 71 | 295 | 2.6 | 850 | 5890 | 85 |
| | W 86_10 | 10 | 67 | 90 | 310 | 3.4 | 850 | 5500 | 86 | 50 | 345 | 2.2 | 850 | 6860 | 82 |
| | W 86_15 | 15 | 60 | 60 | 355 | 2.7 | 850 | 6520 | 82 | 33 | 390 | 1.7 | 850 | 7000 | 78 |
| | W 86_20 | 20 | 60 | 45 | 345 | 2.0 | 850 | 7000 | 81 | 25.0 | 380 | 1.3 | 850 | 7000 | 77 |
| | W 86_23 | 23 | 58 | 39 | 345 | 1.8 | 850 | 7000 | 80 | 21.7 | 380 | 1.2 | 850 | 7000 | 75 |
| | W 86_30 | 30 | 45 | 30 | 400 | 1.7 | 850 | 7000 | 73 | 16.7 | 440 | 1.1 | 850 | 7000 | 67 |
| | W 86_40 | 40 | 45 | 22.5 | 355 | 1.2 | 850 | 7000 | 71 | 12.5 | 390 | 0.77 | 850 | 7000 | 66 |
| | W 86_46 | 46 | 43 | 19.6 | 365 | 1.1 | 850 | 7000 | 69 | 10.9 | 405 | 0.73 | 850 | 7000 | 63 |
| | W 86_56 | 56 | 39 | 16.1 | 325 | 0.83 | 850 | 7000 | 66 | 8.9 | 355 | 0.55 | 850 | 7000 | 60 |
| | W 86_64 | 64 | 37 | 14.1 | 300 | 0.70 | 850 | 7000 | 63 | 7.8 | 330 | 0.47 | 850 | 7000 | 58 |
| | W 86_80 | 80 | 33 | 11.3 | 275 | 0.55 | 850 | 7000 | 59 | 6.3 | 305 | 0.38 | 850 | 7000 | 53 |
| W 86_100 | 100 | 29 | 9.0 | 250 | 0.43 | 850 | 7000 | 55 | 5.0 | 275 | 0.29 | 850 | 7000 | 49 | |

550 Nm

| |  | i | η_s % | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|--------------|---|-----|---------------|-------------------------------|----------|----------|----------|----------|-------------------------------|-------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| WR 86 | WR 86_21 | 21 | 70 | 133 | 270 | 4.3 | 500 | 4590 | 88 | 67 | 295 | 2.4 | 500 | 6070 | 85 |
| | WR 86_30 | 30 | 66 | 93 | 310 | 3.5 | 500 | 5410 | 86 | 47 | 345 | 2.1 | 500 | 7000 | 82 |
| | WR 86_45 | 45 | 59 | 62 | 355 | 2.8 | 500 | 6420 | 82 | 31 | 390 | 1.6 | 500 | 7000 | 78 |
| | WR 86_60 | 60 | 59 | 47 | 345 | 2.1 | 500 | 7000 | 81 | 23.3 | 380 | 1.2 | 500 | 7000 | 77 |
| | WR 86_69 | 69 | 57 | 41 | 345 | 1.8 | 500 | 7000 | 80 | 20.3 | 380 | 1.1 | 500 | 7000 | 75 |
| | WR 86_90 | 90 | 44 | 31 | 400 | 1.8 | 500 | 7000 | 73 | 15.6 | 440 | 1.1 | 500 | 7000 | 67 |
| | WR 86_120 | 120 | 44 | 23.3 | 355 | 1.2 | 500 | 7000 | 71 | 11.7 | 390 | 0.72 | 500 | 7000 | 66 |
| | WR 86_138 | 138 | 42 | 20.3 | 365 | 1.1 | 500 | 7000 | 69 | 10.1 | 405 | 0.68 | 500 | 7000 | 63 |
| | WR 86_168 | 168 | 38 | 16.7 | 325 | 0.86 | 500 | 7000 | 66 | 8.3 | 355 | 0.52 | 500 | 7000 | 60 |
| | WR 86_192 | 192 | 36 | 14.6 | 300 | 0.73 | 500 | 7000 | 63 | 7.3 | 330 | 0.43 | 500 | 7000 | 58 |
| | WR 86_240 | 240 | 32 | 11.7 | 275 | 0.57 | 500 | 7000 | 59 | 5.8 | 305 | 0.35 | 500 | 7000 | 53 |
| WR 86_300 | 300 | 28 | 9.3 | 250 | 0.44 | 500 | 7000 | 55 | 4.7 | 275 | 0.27 | 500 | 7000 | 49 | |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | |
| WR 86 | WR 86_21 | 21 | 70 | 43 | 325 | 1.8 | 500 | 7000 | 83 | 23.8 | 355 | 1.1 | 500 | 7000 | 81 |
| | WR 86_30 | 30 | 66 | 30 | 375 | 1.5 | 500 | 7000 | 81 | 16.7 | 415 | 0.93 | 500 | 7000 | 78 |
| | WR 86_45 | 45 | 59 | 20.0 | 450 | 1.2 | 500 | 7000 | 76 | 11.1 | 500 | 0.80 | 500 | 7000 | 73 |
| | WR 86_60 | 60 | 59 | 15.0 | 430 | 0.90 | 500 | 7000 | 75 | 8.3 | 440 | 0.53 | 500 | 7000 | 72 |
| | WR 86_69 | 69 | 57 | 13.0 | 390 | 0.73 | 500 | 7000 | 73 | 7.2 | 400 | 0.43 | 500 | 7000 | 70 |
| | WR 86_90 | 90 | 44 | 10.0 | 500 | 0.82 | 500 | 7000 | 64 | 5.6 | 550 | 0.53 | 500 | 7000 | 60 |
| | WR 86_120 | 120 | 44 | 7.5 | 440 | 0.55 | 500 | 7000 | 63 | 4.2 | 470 | 0.35 | 500 | 7000 | 59 |
| | WR 86_138 | 138 | 42 | 6.5 | 430 | 0.48 | 500 | 7000 | 61 | 3.6 | 440 | 0.30 | 500 | 7000 | 56 |
| | WR 86_168 | 168 | 38 | 5.4 | 390 | 0.38 | 500 | 7000 | 57 | 3.0 | 410 | 0.24 | 500 | 7000 | 53 |
| | WR 86_192 | 192 | 36 | 4.7 | 390 | 0.35 | 500 | 7000 | 55 | 2.6 | 410 | 0.22 | 500 | 7000 | 50 |
| | WR 86_240 | 240 | 32 | 3.8 | 310 | 0.24 | 500 | 7000 | 50 | 2.1 | 320 | 0.15 | 500 | 7000 | 46 |
| WR 86_300 | 300 | 28 | 3.0 | 310 | 0.22 | 500 | 7000 | 45 | 1.7 | 320 | 0.14 | 500 | 7000 | 41 | |



86

500 Nm



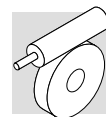
| | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | |
|--------------------|------------|---------------|-------------------------------|------------------------------|----------|----------|----------|----------|-------------------------------|------------------------------|----------|----------|----------|----------|----|
| | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % | |
| | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| WR86_P90 B5 | WR 86_15 | 15 | 66 | 187 | 275 | 6.1 | — | 4130 | 88 | 93 | 310 | 3.5 | — | 5410 | 86 |
| | WR 86_22.5 | 22.5 | 59 | 124 | 315 | 4.8 | — | 4920 | 86 | 62 | 355 | 2.8 | — | 6420 | 82 |
| | WR 86_30 | 30 | 59 | 93 | 305 | 3.5 | — | 5720 | 85 | 47 | 345 | 2.1 | — | 7000 | 81 |
| | WR 86_34.5 | 34.5 | 57 | 81 | 305 | 3.1 | — | 6110 | 84 | 41 | 345 | 1.8 | — | 7000 | 80 |
| | WR 86_45 | 45 | 44 | 62 | 350 | 3.0 | — | 6640 | 77 | 31 | 400 | 1.8 | — | 7000 | 73 |
| | WR 86_60 | 60 | 44 | 47 | 315 | 2.0 | — | 7000 | 77 | 23.3 | 355 | 1.2 | — | 7000 | 71 |
| | WR 86_69 | 69 | 42 | 41 | 325 | 1.8 | — | 7000 | 75 | 20.3 | 365 | 1.1 | — | 7000 | 69 |
| | WR 86_84 | 84 | 38 | 33 | 285 | 1.4 | — | 7000 | 72 | 16.7 | 325 | 0.86 | — | 7000 | 66 |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | |
| | WR 86_15 | 15 | 66 | 60 | 345 | 2.6 | — | 6330 | 82 | 33 | 375 | 1.6 | — | 7000 | 81 |
| | WR 86_22.5 | 22.5 | 59 | 40 | 390 | 2.1 | — | 7000 | 78 | 22.2 | 450 | 1.4 | — | 7000 | 76 |
| | WR 86_30 | 30 | 59 | 30 | 380 | 1.6 | — | 7000 | 77 | 16.7 | 430 | 1.0 | — | 7000 | 75 |
| | WR 86_34.5 | 34.5 | 57 | 26.1 | 380 | 1.4 | — | 7000 | 75 | 14.5 | 390 | 0.8 | — | 7000 | 73 |
| | WR 86_45 | 45 | 44 | 20.0 | 440 | 1.4 | — | 7000 | 67 | 11.1 | 500 | 0.9 | — | 7000 | 64 |
| WR 86_60 | 60 | 44 | 15.0 | 390 | 0.93 | — | 7000 | 66 | 8.3 | 440 | 0.61 | — | 7000 | 63 | |
| WR 86_69 | 69 | 42 | 13.0 | 405 | 0.88 | — | 7000 | 63 | 7.2 | 430 | 0.53 | — | 7000 | 61 | |
| WR 86_84 | 84 | 38 | 10.7 | 355 | 0.66 | — | 7000 | 60 | 6.0 | 390 | 0.43 | — | 7000 | 57 | |

550 Nm




| | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | |
|-------------------|-----------------|---------------|-------------------------------|----------|----------|----------|----------|----------|------------------------------|----------|----------|----------|----------|----------|----|
| | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % | |
| | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | | |
| VF/W 44/86 | VF/W 44/86_230 | 230 | 38 | 6.1 | 500 | 0.59 | 220 | 7000 | 54 | 3.9 | 550 | 0.43 | 220 | 7000 | 53 |
| | VF/W 44/86_300 | 300 | 30 | 4.7 | 500 | 0.54 | 220 | 7000 | 45 | 3.0 | 550 | 0.41 | 220 | 7000 | 42 |
| | VF/W 44/86_400 | 400 | 30 | 3.5 | 500 | 0.45 | 220 | 7000 | 41 | 2.3 | 550 | 0.32 | 220 | 7000 | 41 |
| | VF/W 44/86_525 | 525 | 25 | 2.7 | 500 | 0.33 | 220 | 7000 | 42 | 1.7 | 550 | 0.25 | 220 | 7000 | 39 |
| | VF/W 44/86_700 | 700 | 25 | 2.0 | 500 | 0.27 | 220 | 7000 | 39 | 1.3 | 550 | 0.20 | 220 | 7000 | 37 |
| | VF/W 44/86_920 | 920 | 22 | 1.5 | 500 | 0.20 | 220 | 7000 | 40 | 1.0 | 550 | 0.15 | — | 7000 | 37 |
| | VF/W 44/86_1380 | 1380 | 17 | 1.0 | 500 | 0.17 | 220 | 7000 | 32 | 0.65 | 550 | 0.13 | — | 7000 | 28 |
| | VF/W 44/86_1840 | 1840 | 17 | 0.76 | 500 | 0.13 | 220 | 7000 | 30 | 0.49 | 550 | 0.10 | — | 7000 | 28 |
| | VF/W 44/86_2116 | 2116 | 16 | 0.66 | 500 | 0.12 | 220 | 7000 | 28 | 0.43 | 550 | 0.09 | 220 | 7000 | 28 |
| | VF/W 44/86_2760 | 2760 | 14 | 0.51 | 500 | 0.11 | — | 7000 | 24 | 0.33 | 550 | 0.08 | 220 | 7000 | 24 |

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)




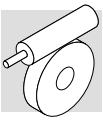
110

830 Nm

|  | i | η_s % | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | | |
|---|-----------|---------------|-------------------------------|----------|----------|----------|----------|----------|-------------------------------|----------|----------|----------|----------|----------|----|-----|
| | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % | | |
| | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | | |
| W 110 | W 110_7 | 7 | 71 | 400 | 445 | 20.7 | 1200 | 3710 | 90 | 200 | 500 | 11.8 | 1200 | 5020 | 89 | 182 |
| | W 110_10 | 10 | 67 | 280 | 490 | 16.1 | 1200 | 4650 | 89 | 140 | 550 | 9.3 | 1200 | 6190 | 87 | |
| | W 110_15 | 15 | 60 | 187 | 535 | 12.0 | 1200 | 5770 | 87 | 93 | 600 | 7.0 | 1200 | 7590 | 84 | |
| | W 110_20 | 20 | 61 | 140 | 510 | 8.7 | 1200 | 6790 | 86 | 70 | 570 | 5.0 | 1200 | 8000 | 84 | |
| | W 110_23 | 23 | 59 | 122 | 480 | 7.1 | 1200 | 7430 | 86 | 61 | 540 | 4.1 | 1200 | 8000 | 83 | |
| | W 110_30 | 30 | 45 | 93 | 625 | 7.5 | 1200 | 7780 | 81 | 47 | 700 | 4.4 | 1200 | 8000 | 77 | |
| | W 110_40 | 40 | 46 | 70 | 595 | 5.5 | 1200 | 8000 | 80 | 35 | 670 | 3.2 | 1200 | 8000 | 76 | |
| | W 110_46 | 46 | 44 | 61 | 535 | 4.3 | 1200 | 8000 | 79 | 30 | 600 | 2.6 | 1200 | 8000 | 74 | |
| | W 110_56 | 56 | 41 | 50 | 535 | 3.7 | 1200 | 8000 | 76 | 25.0 | 600 | 2.2 | 1200 | 8000 | 72 | |
| | W 110_64 | 64 | 38 | 44 | 470 | 2.9 | 1200 | 8000 | 74 | 21.9 | 530 | 1.7 | 1200 | 8000 | 70 | |
| | W 110_80 | 80 | 34 | 35 | 420 | 2.2 | 1200 | 8000 | 71 | 17.5 | 470 | 1.3 | 1200 | 8000 | 66 | |
| | W 110_100 | 100 | 30 | 28.0 | 410 | 1.8 | 1200 | 8000 | 67 | 14.0 | 460 | 1.1 | 1200 | 8000 | 62 | |
| | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | | |
| W 110 | W 110_7 | 7 | 71 | 129 | 540 | 8.3 | 1200 | 6040 | 88 | 71 | 595 | 5.2 | 1200 | 7680 | 86 | 182 |
| | W 110_10 | 10 | 67 | 90 | 590 | 6.5 | 1200 | 7410 | 86 | 50 | 655 | 4.1 | 1200 | 8000 | 84 | |
| | W 110_15 | 15 | 60 | 60 | 645 | 4.9 | 1200 | 8000 | 83 | 33 | 710 | 3.1 | 1200 | 8000 | 80 | |
| | W 110_20 | 20 | 61 | 45 | 615 | 3.5 | 1200 | 8000 | 82 | 25.0 | 675 | 2.2 | 1200 | 8000 | 79 | |
| | W 110_23 | 23 | 59 | 39 | 580 | 2.9 | 1200 | 8000 | 81 | 21.7 | 640 | 1.9 | 1200 | 8000 | 77 | |
| | W 110_30 | 30 | 45 | 30 | 755 | 3.2 | 1200 | 8000 | 74 | 16.7 | 830 | 2.1 | 1200 | 8000 | 70 | |
| | W 110_40 | 40 | 46 | 22.5 | 720 | 2.3 | 1200 | 8000 | 73 | 12.5 | 795 | 1.5 | 1200 | 8000 | 68 | |
| | W 110_46 | 46 | 44 | 19.6 | 645 | 1.9 | 1200 | 8000 | 71 | 10.9 | 710 | 1.2 | 1200 | 8000 | 66 | |
| | W 110_56 | 56 | 41 | 16.1 | 645 | 1.6 | 1200 | 8000 | 68 | 8.9 | 710 | 1.1 | 1200 | 8000 | 63 | |
| | W 110_64 | 64 | 38 | 14.1 | 570 | 1.3 | 1200 | 8000 | 65 | 7.8 | 630 | 0.86 | 1200 | 8000 | 60 | |
| | W 110_80 | 80 | 34 | 11.3 | 505 | 0.98 | 1200 | 8000 | 61 | 6.3 | 560 | 0.65 | 1200 | 8000 | 56 | |
| | W 110_100 | 100 | 30 | 9.0 | 495 | 0.82 | 1200 | 8000 | 57 | 5.0 | 545 | 0.56 | 1200 | 8000 | 51 | |

1000 Nm

|  | i | η_s % | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | $n_{2,1}$ | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | | |
|---|------------|---------------|-------------------------------|----------|----------|----------|----------|----------|-------------------------------|----------|----------|----------|----------|----------|----|-----|
| | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % | | |
| | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | | |
| WR 110 | WR 110_21 | 21 | 70 | 133 | 540 | 8.6 | 700 | 5930 | 88 | 67 | 595 | 4.8 | 700 | 7950 | 86 | 183 |
| | WR 110_30 | 30 | 66 | 93 | 590 | 6.7 | 700 | 7280 | 86 | 47 | 655 | 3.8 | 700 | 8000 | 84 | |
| | WR 110_45 | 45 | 59 | 62 | 645 | 5.1 | 700 | 8000 | 83 | 31 | 710 | 2.9 | 700 | 8000 | 80 | |
| | WR 110_60 | 60 | 60 | 47 | 615 | 3.7 | 700 | 8000 | 82 | 23.3 | 675 | 2.1 | 700 | 8000 | 79 | |
| | WR 110_69 | 69 | 58 | 41 | 580 | 3.0 | 700 | 8000 | 81 | 20.3 | 640 | 1.8 | 700 | 8000 | 77 | |
| | WR 110_90 | 90 | 44 | 31 | 755 | 3.3 | 700 | 8000 | 74 | 15.6 | 830 | 1.9 | 700 | 8000 | 70 | |
| | WR 110_120 | 120 | 45 | 23.3 | 720 | 2.4 | 700 | 8000 | 73 | 11.7 | 795 | 1.4 | 700 | 8000 | 68 | |
| | WR 110_138 | 138 | 43 | 20.3 | 645 | 1.9 | 700 | 8000 | 71 | 10.1 | 710 | 1.1 | 700 | 8000 | 66 | |
| | WR 110_168 | 168 | 40 | 16.7 | 645 | 1.7 | 700 | 8000 | 68 | 8.3 | 710 | 0.98 | 700 | 8000 | 63 | |
| | WR 110_192 | 192 | 37 | 14.6 | 570 | 1.3 | 700 | 8000 | 65 | 7.3 | 630 | 0.80 | 700 | 8000 | 60 | |
| | WR 110_240 | 240 | 33 | 11.7 | 505 | 1.0 | 700 | 8000 | 61 | 5.8 | 560 | 0.61 | 700 | 8000 | 56 | |
| | WR 110_300 | 300 | 29 | 9.3 | 495 | 0.85 | 700 | 8000 | 57 | 4.7 | 545 | 0.52 | 700 | 8000 | 51 | |
| | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | | |
| WR 110 | WR 110_21 | 21 | 70 | 43 | 645 | 3.4 | 700 | 8000 | 84 | 23.8 | 715 | 2.2 | 700 | 8000 | 82 | 183 |
| | WR 110_30 | 30 | 66 | 30 | 710 | 2.8 | 700 | 8000 | 81 | 16.7 | 785 | 1.7 | 700 | 8000 | 79 | |
| | WR 110_45 | 45 | 59 | 20.0 | 870 | 2.4 | 700 | 8000 | 77 | 11.1 | 950 | 1.5 | 700 | 8000 | 75 | |
| | WR 110_60 | 60 | 60 | 15.0 | 800 | 1.6 | 700 | 8000 | 77 | 8.3 | 850 | 1.0 | 700 | 8000 | 74 | |
| | WR 110_69 | 69 | 58 | 13.0 | 750 | 1.4 | 700 | 8000 | 75 | 7.2 | 820 | 0.86 | 700 | 8000 | 72 | |
| | WR 110_90 | 90 | 44 | 10.0 | 900 | 1.4 | 700 | 8000 | 66 | 5.6 | 1000 | 0.94 | 700 | 8000 | 62 | |
| | WR 110_120 | 120 | 45 | 7.5 | 870 | 1.1 | 700 | 8000 | 65 | 4.2 | 950 | 0.68 | 700 | 8000 | 61 | |
| | WR 110_138 | 138 | 43 | 6.5 | 800 | 0.87 | 700 | 8000 | 63 | 3.6 | 900 | 0.58 | 700 | 8000 | 59 | |
| | WR 110_168 | 168 | 40 | 5.4 | 775 | 0.72 | 700 | 8000 | 60 | 3.0 | 800 | 0.45 | 700 | 8000 | 55 | |
| | WR 110_192 | 192 | 37 | 4.7 | 685 | 0.59 | 700 | 8000 | 57 | 2.6 | 720 | 0.37 | 700 | 8000 | 53 | |
| | WR 110_240 | 240 | 33 | 3.8 | 590 | 0.44 | 700 | 8000 | 53 | 2.1 | 620 | 0.28 | 700 | 8000 | 48 | |
| | WR 110_300 | 300 | 29 | 3.0 | 570 | 0.37 | 700 | 8000 | 48 | 1.7 | 600 | 0.24 | 700 | 8000 | 44 | |



110

1050 Nm



i

η_s
%

n_{2-1}
min⁻¹

M_{n2}
Nm

P_{n1}
kW

R_{n1}
N

R_{n2}
N

η_d
%

n_{2-1}
min⁻¹

M_{n2}
Nm

P_{n1}
kW

R_{n1}
N

R_{n2}
N

η_d
%

$n_1 = 1400 \text{ min}^{-1}$

$n_1 = 900 \text{ min}^{-1}$

VF/W 49/110

VF/W 49/110_230

230

38

6.1

1000

1.2

400

8000

52

3.9

1050

0.84

400

8000

51

VF/W 49/110_300

300

29

4.7

1000

1.0

400

8000

48

3.0

1050

0.70

400

8000

47

VF/W 49/110_400

400

30

3.5

1000

0.81

400

8000

45

2.3

1050

0.55

400

8000

45

VF/W 49/110_540

540

25

2.6

1000

0.66

400

8000

41

1.7

1050

0.48

400

8000

38

VF/W 49/110_720

720

24

1.9

1000

0.51

400

8000

40

1.3

1050

0.36

400

8000

38

VF/W 49/110_1080

1080

18

1.3

1000

0.44

400

8000

31

0.83

1050

0.28

400

8000

30

VF/W 49/110_1350

1350

16

1.0

1000

0.36

400

8000

30

0.67

1050

0.26

400

8000

28

VF/W 49/110_1656

1656

17

0.85

1000

0.30

400

8000

30

0.54

1050

0.20

400

8000

30

VF/W 49/110_2070

2070

15

0.68

1000

0.25

400

8000

28

0.43

1050

0.19

400

8000

25

VF/W 49/110_2800

2800

13

0.50

1000

0.22

400

8000

24

0.32

1050

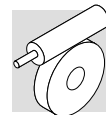
0.17

400

8000


21

184




130

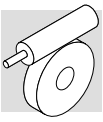
1500 Nm

| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|---------------|---|-----|---------------|-------------------------------|----------|----------|----------|----------|-------------------------------|-------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| VF 130 | VF 130_7 | 7 | 71 | 400 | 555 | 25 | 1500 | 4930 | 91 | 200 | 740 | 17.4 | 1500 | 5990 | 89 |
| | VF 130_10 | 10 | 67 | 280 | 593 | 19.3 | 1500 | 6210 | 90 | 140 | 790 | 13.3 | 1500 | 7620 | 88 |
| | VF 130_15 | 15 | 63 | 187 | 690 | 15.3 | 1500 | 7390 | 88 | 93 | 920 | 10.6 | 1500 | 9100 | 86 |
| | VF 130_20 | 20 | 59 | 140 | 675 | 11.4 | 1500 | 8670 | 87 | 70 | 900 | 8.0 | 1500 | 10700 | 84 |
| | VF 130_23 | 23 | 57 | 122 | 668 | 9.9 | 1500 | 9300 | 86 | 61 | 890 | 6.9 | 1500 | 11500 | 83 |
| | VF 130_30 | 30 | 49 | 93 | 788 | 9.3 | 1040 | 10100 | 83 | 47 | 1050 | 6.6 | — | 12500 | 79 |
| | VF 130_40 | 40 | 44 | 70 | 825 | 7.6 | — | 11400 | 80 | 35 | 1100 | 5.4 | — | 12600 | 76 |
| | VF 130_46 | 46 | 45 | 61 | 788 | 6.3 | 1290 | 12200 | 80 | 30.0 | 1050 | 4.5 | — | 12600 | 76 |
| | VF 130_56 | 56 | 42 | 50 | 720 | 4.8 | 1500 | 12600 | 78 | 25.0 | 960 | 3.4 | 940 | 12600 | 73 |
| | VF 130_64 | 64 | 39 | 44 | 698 | 4.2 | 1500 | 12600 | 76 | 21.9 | 930 | 3.0 | 1220 | 12600 | 71 |
| | VF 130_80 | 80 | 35 | 35 | 660 | 3.3 | 1500 | 12600 | 73 | 17.5 | 880 | 2.4 | 1500 | 12600 | 68 |
| | VF 130_100 | 100 | 31 | 28 | 585 | 2.5 | 1500 | 12600 | 70 | 14.0 | 780 | 1.8 | 1500 | 12600 | 64 |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | |
| VF 130 | VF 130_7 | 7 | 71 | 129 | 850 | 13.0 | 1500 | 6980 | 88 | 71 | 1000 | 8.8 | 1500 | 8670 | 86 |
| | VF 130_10 | 10 | 67 | 90 | 900 | 9.9 | 1500 | 8900 | 87 | 50 | 1100 | 6.9 | 1500 | 10800 | 84 |
| | VF 130_15 | 15 | 63 | 60 | 1080 | 8.1 | 1500 | 10490 | 84 | 33 | 1350 | 5.9 | 1500 | 12600 | 81 |
| | VF 130_20 | 20 | 59 | 45 | 1050 | 6.1 | 1500 | 12400 | 82 | 25.0 | 1350 | 4.6 | 1500 | 13800 | 79 |
| | VF 130_23 | 23 | 57 | 39 | 1050 | 5.4 | 1500 | 13200 | 81 | 21.7 | 1300 | 3.9 | 1500 | 13800 | 77 |
| | VF 130_30 | 30 | 49 | 30.0 | 1250 | 5.2 | — | 13200 | 77 | 16.7 | 1500 | 3.7 | — | 13800 | 72 |
| | VF 130_40 | 40 | 44 | 22.5 | 1200 | 3.9 | — | 13200 | 73 | 12.5 | 1400 | 2.8 | — | 13800 | 68 |
| | VF 130_46 | 46 | 45 | 19.6 | 1150 | 3.3 | 490 | 13200 | 73 | 10.9 | 1350 | 2.3 | 1270 | 13800 | 68 |
| | VF 130_56 | 56 | 42 | 16.1 | 1080 | 2.7 | 1500 | 13200 | 70 | 8.9 | 1200 | 1.8 | 1500 | 13800 | 65 |
| | VF 130_64 | 64 | 39 | 14.1 | 1050 | 2.4 | 1500 | 13200 | 68 | 7.8 | 1200 | 1.6 | 1500 | 13800 | 62 |
| | VF 130_80 | 80 | 35 | 11.3 | 950 | 1.8 | 1500 | 13200 | 64 | 6.3 | 1150 | 1.3 | 1500 | 13800 | 58 |
| | VF 130_100 | 100 | 31 | 9.0 | 800 | 1.3 | 1500 | 13200 | 59 | 5.0 | 900 | 0.91 | 1500 | 13800 | 54 |

1800 Nm


| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | |
|----------------|---|------------|---------------|-------------------------------|------------------------------|----------|----------|----------|-------------------------------|------------------------------|----------|----------|----------|----------|----------|----|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % | |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | | |
| VFR 130 | VFR 130_60 | 60 | 58 | 47 | 1050 | 6.4 | 1000 | 12400 | 81 | 23.3 | 1350 | 4.3 | 1000 | 13800 | 78 | |
| | VFR 130_69 | 69 | 56 | 41 | 1050 | 5.6 | 1000 | 13200 | 80 | 20.3 | 1300 | 3.7 | 1000 | 13800 | 76 | |
| | VFR 130_90 | 90 | 48 | 31 | 1250 | 5.4 | 1000 | 13200 | 76 | 15.6 | 1500 | 3.5 | 1000 | 13800 | 71 | |
| | VFR 130_120 | 120 | 43 | 23.3 | 1200 | 4.1 | 1000 | 13200 | 72 | 11.7 | 1400 | 2.6 | 1000 | 13800 | 67 | |
| | VFR 130_138 | 138 | 44 | 20.3 | 1150 | 3.4 | 1000 | 13200 | 72 | 10.1 | 1350 | 2.2 | 1000 | 13800 | 67 | |
| | VFR 130_168 | 168 | 41 | 16.7 | 1080 | 2.7 | 1000 | 13200 | 69 | 8.3 | 1200 | 1.6 | 1000 | 13800 | 64 | |
| | VFR 130_192 | 192 | 38 | 14.6 | 1050 | 2.4 | 1000 | 13200 | 67 | 7.3 | 1200 | 1.5 | 1000 | 13800 | 61 | |
| | VFR 130_240 | 240 | 34 | 11.7 | 950 | 1.9 | 1000 | 13200 | 63 | 5.8 | 1150 | 1.2 | 1000 | 13800 | 57 | |
| | VFR 130_300 | 300 | 30 | 9.3 | 800 | 1.4 | 1000 | 13200 | 58 | 4.7 | 900 | 0.83 | 1000 | 13800 | 53 | |
| | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | |
| | VFR 130 | VFR 130_60 | 60 | 58 | 15.0 | 1450 | 3.1 | 1000 | 13800 | 75 | 8.3 | 1600 | 1.9 | 1000 | 13800 | 74 |
| | | VFR 130_69 | 69 | 56 | 13.0 | 1450 | 2.7 | 1000 | 13800 | 74 | 7.2 | 1550 | 1.6 | 1000 | 13800 | 72 |
| VFR 130_90 | | 90 | 48 | 10.0 | 1600 | 2.5 | 1000 | 13800 | 68 | 5.6 | 1800 | 1.6 | 1000 | 13800 | 66 | |
| VFR 130_120 | | 120 | 43 | 7.5 | 1600 | 2.0 | 1000 | 13800 | 63 | 4.2 | 1800 | 1.3 | 1000 | 13800 | 61 | |
| VFR 130_138 | | 138 | 44 | 6.5 | 1500 | 1.6 | 1000 | 13800 | 64 | 3.6 | 1600 | 1.0 | 1000 | 13800 | 61 | |
| VFR 130_168 | | 168 | 41 | 5.4 | 1350 | 1.3 | 1000 | 13800 | 60 | 3.0 | 1450 | 0.78 | 1000 | 13800 | 58 | |
| VFR 130_192 | | 192 | 38 | 4.7 | 1300 | 1.1 | 1000 | 13800 | 58 | 2.6 | 1400 | 0.70 | 1000 | 13800 | 55 | |
| VFR 130_240 | | 240 | 34 | 3.8 | 1200 | 0.87 | 1000 | 13800 | 54 | 2.1 | 1250 | 0.54 | 1000 | 13800 | 51 | |
| VFR 130_300 | | 300 | 30 | 3.0 | 1000 | 0.64 | 1000 | 13800 | 49 | 1.7 | 1100 | 0.41 | 1000 | 13800 | 47 | |

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)



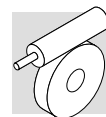
130

1850 Nm

| |  | i | η_s % | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | |
|--------------------|---|------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|
| | | | | n_{2-1} min ⁻¹ | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | n_{2-1} min ⁻¹ | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % |
| W/VF 63/130 | W/VF 63/130_280 | 280 | 31 | 5.0 | 1800 | 1.9 | 480 | 13800 | 50 | 3.2 | 1850 | 1.3 | 480 | 13800 | 48 |
| | W/VF 63/130_400 | 400 | 29 | 3.5 | 1800 | 1.5 | 480 | 13800 | 44 | 2.3 | 1850 | 0.99 | 480 | 13800 | 44 |
| | W/VF 63/130_600 | 600 | 26 | 2.3 | 1800 | 1.1 | 480 | 13800 | 40 | 1.5 | 1850 | 0.73 | 480 | 13800 | 40 |
| | W/VF 63/130_760 | 760 | 24 | 1.8 | 1800 | 0.89 | 480 | 13800 | 39 | 1.2 | 1850 | 0.62 | 480 | 13800 | 37 |
| | W/VF 63/130_960 | 960 | 23 | 1.5 | 1800 | 0.74 | 480 | 13800 | 37 | 0.94 | 1850 | 0.52 | 480 | 13800 | 35 |
| | W/VF 63/130_1200 | 1200 | 19 | 1.2 | 1800 | 0.65 | — | 13800 | 34 | 0.75 | 1850 | 0.45 | — | 13800 | 32 |
| | W/VF 63/130_1520 | 1520 | 18 | 0.92 | 1800 | 0.55 | — | 13800 | 32 | 0.59 | 1850 | 0.38 | — | 13800 | 30 |
| | W/VF 63/130_1800 | 1800 | 16 | 0.78 | 1800 | 0.52 | — | 13800 | 28 | 0.50 | 1850 | 0.37 | — | 13800 | 26 |
| | W/VF 63/130_2560 | 2560 | 14 | 0.55 | 1800 | 0.45 | — | 13800 | 23 | 0.35 | 1850 | 0.32 | — | 13800 | 21 |
| | W/VF 63/130_3200 | 3200 | 12 | 0.44 | 1800 | 0.49 | — | 13800 | 17 | 0.28 | 1850 | 0.34 | 480 | 13800 | 16 |


184

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)




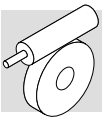
150

2000 Nm

| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|---------------|---|-----|---------------|-------------------------------|----------|----------|----------|----------|-------------------------------|-------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| VF 150 | VF 150_7 | 7 | 72 | 400 | 750 | 35 | 2200 | 5010 | 91 | 200 | 1000 | 24 | 2200 | 6040 | 90 |
| | VF 150_10 | 10 | 68 | 280 | 788 | 25 | 2200 | 6630 | 90 | 140 | 1050 | 17.5 | 2200 | 8120 | 88 |
| | VF 150_15 | 15 | 64 | 187 | 863 | 19.0 | 2200 | 8110 | 89 | 93 | 1150 | 13.1 | 2200 | 9990 | 87 |
| | VF 150_20 | 20 | 59 | 140 | 975 | 16.4 | 2200 | 9170 | 87 | 70 | 1300 | 11.3 | 2200 | 11300 | 84 |
| | VF 150_23 | 23 | 57 | 122 | 953 | 14.1 | 2200 | 9940 | 86 | 61 | 1270 | 9.8 | 2200 | 12300 | 83 |
| | VF 150_30 | 30 | 48 | 93 | 1028 | 12.1 | 2200 | 11100 | 83 | 47 | 1370 | 8.5 | 2200 | 13700 | 80 |
| | VF 150_40 | 40 | 44 | 70 | 1155 | 10.5 | 2200 | 12300 | 81 | 35 | 1540 | 7.4 | 830 | 14700 | 77 |
| | VF 150_46 | 46 | 45 | 61 | 1163 | 9.2 | 2200 | 13100 | 81 | 30.0 | 1550 | 6.5 | 1400 | 14700 | 77 |
| | VF 150_56 | 56 | 42 | 50 | 1028 | 6.8 | 2200 | 14600 | 79 | 25.0 | 1370 | 4.9 | 2200 | 14700 | 74 |
| | VF 150_64 | 64 | 39 | 44 | 998 | 5.9 | 2200 | 14700 | 77 | 21.9 | 1330 | 4.2 | 2200 | 14700 | 72 |
| | VF 150_80 | 80 | 35 | 35 | 938 | 4.6 | 2200 | 14700 | 74 | 17.5 | 1250 | 3.4 | 2200 | 14700 | 69 |
| | VF 150_100 | 100 | 31 | 28 | 863 | 3.6 | 2200 | 14700 | 71 | 14.0 | 1150 | 2.6 | 2200 | 14700 | 65 |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | |
| VF 150 | VF 150_7 | 7 | 72 | 129 | 1150 | 17.6 | 2200 | 7040 | 89 | 71 | 1400 | 12.2 | 2200 | 8560 | 87 |
| | VF 150_10 | 10 | 68 | 90 | 1200 | 13.0 | 2200 | 9480 | 87 | 50 | 1500 | 9.4 | 2200 | 11400 | 85 |
| | VF 150_15 | 15 | 64 | 60 | 1350 | 10.0 | 2200 | 11500 | 85 | 33 | 1700 | 7.3 | 2200 | 13800 | 83 |
| | VF 150_20 | 20 | 59 | 45 | 1500 | 8.6 | 2200 | 13100 | 83 | 25.0 | 1900 | 6.4 | 2200 | 15700 | 80 |
| | VF 150_23 | 23 | 57 | 39 | 1500 | 7.6 | 2200 | 14200 | 82 | 21.7 | 1850 | 5.5 | 2200 | 16000 | 78 |
| | VF 150_30 | 30 | 48 | 30.0 | 1600 | 6.5 | 2200 | 15500 | 77 | 16.7 | 1950 | 4.8 | 2200 | 16000 | 73 |
| | VF 150_40 | 40 | 44 | 22.5 | 1750 | 5.6 | 1150 | 15500 | 74 | 12.5 | 2000 | 3.9 | 2200 | 16000 | 69 |
| | VF 150_46 | 46 | 45 | 19.6 | 1750 | 4.9 | 2100 | 15500 | 74 | 10.9 | 2000 | 3.4 | 2200 | 16000 | 69 |
| | VF 150_56 | 56 | 42 | 16.1 | 1500 | 3.7 | 2200 | 15500 | 71 | 8.9 | 1750 | 2.6 | 2200 | 16000 | 66 |
| | VF 150_64 | 64 | 39 | 14.1 | 1450 | 3.2 | 2200 | 15500 | 69 | 7.8 | 1700 | 2.3 | 2200 | 16000 | 63 |
| | VF 150_80 | 80 | 35 | 11.3 | 1350 | 2.5 | 2200 | 15500 | 65 | 6.3 | 1550 | 1.8 | 2200 | 16000 | 59 |
| | VF 150_100 | 100 | 31 | 9.0 | 1150 | 1.8 | 2200 | 15500 | 61 | 5.0 | 1300 | 1.3 | 2200 | 16000 | 55 |

2600 Nm

| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|----------------|---|------------|---------------|-------------------------------|------------------------------|----------|----------|----------|-------------------------------|------------------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| VFR 150 | VFR 150_45 | 45 | 63 | 62 | 1350 | 10.6 | 1500 | 11600 | 84 | 31 | 1700 | 6.8 | 1500 | 14600 | 82 |
| | VFR 150_60 | 60 | 58 | 47 | 1500 | 9.0 | 1500 | 13100 | 82 | 23.3 | 1900 | 5.9 | 1500 | 16000 | 79 |
| | VFR 150_69 | 69 | 56 | 41 | 1500 | 7.9 | 1500 | 14100 | 81 | 20.3 | 1850 | 5.1 | 1500 | 16000 | 77 |
| | VFR 150_90 | 90 | 47 | 31 | 1600 | 6.9 | 1500 | 15500 | 76 | 15.6 | 1950 | 4.4 | 1500 | 16000 | 72 |
| | VFR 150_120 | 120 | 43 | 23.3 | 1750 | 5.9 | 1500 | 15500 | 73 | 11.7 | 2000 | 3.6 | 1500 | 16000 | 68 |
| | VFR 150_138 | 138 | 44 | 20.3 | 1750 | 5.1 | 1500 | 15500 | 73 | 10.1 | 2000 | 3.1 | 1500 | 16000 | 68 |
| | VFR 150_168 | 168 | 41 | 16.7 | 1500 | 3.8 | 1500 | 15500 | 70 | 8.3 | 1750 | 2.4 | 1500 | 16000 | 65 |
| | VFR 150_192 | 192 | 38 | 14.6 | 1450 | 3.3 | 1500 | 15500 | 68 | 7.3 | 1700 | 2.1 | 1500 | 16000 | 62 |
| | VFR 150_240 | 240 | 34 | 11.7 | 1350 | 2.6 | 1500 | 15500 | 64 | 5.8 | 1550 | 1.6 | 1500 | 16000 | 58 |
| | VFR 150_300 | 300 | 30 | 9.3 | 1150 | 1.9 | 1500 | 15500 | 60 | 4.7 | 1300 | 1.2 | 1500 | 16000 | 54 |
| | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | |
| | VFR 150 | VFR 150_45 | 45 | 63 | 20.0 | 1950 | 5.2 | 1500 | 16000 | 79 | 11.1 | 2100 | 3.2 | 1500 | 16000 |
| VFR 150_60 | | 60 | 58 | 15.0 | 2100 | 4.4 | 1500 | 16000 | 76 | 8.3 | 2300 | 2.7 | 1500 | 16000 | 74 |
| VFR 150_69 | | 69 | 56 | 13.0 | 2050 | 3.8 | 1500 | 16000 | 74 | 7.2 | 2200 | 2.3 | 1500 | 16000 | 72 |
| VFR 150_90 | | 90 | 47 | 10.0 | 2200 | 3.4 | 1500 | 16000 | 69 | 5.6 | 2400 | 2.1 | 1500 | 16000 | 66 |
| VFR 150_120 | | 120 | 43 | 7.5 | 2300 | 2.8 | 1500 | 16000 | 64 | 4.2 | 2600 | 1.8 | 1500 | 16000 | 62 |
| VFR 150_138 | | 138 | 44 | 6.5 | 2200 | 2.4 | 1500 | 16000 | 64 | 3.6 | 2400 | 1.5 | 1500 | 16000 | 62 |
| VFR 150_168 | | 168 | 41 | 5.4 | 1950 | 1.8 | 1500 | 16000 | 61 | 3.0 | 2100 | 1.1 | 1500 | 16000 | 59 |
| VFR 150_192 | | 192 | 38 | 4.7 | 1900 | 1.6 | 1500 | 16000 | 59 | 2.6 | 2000 | 1.0 | 1500 | 16000 | 56 |
| VFR 150_240 | | 240 | 34 | 3.8 | 1700 | 1.2 | 1500 | 16000 | 54 | 2.1 | 1800 | 0.76 | 1500 | 16000 | 52 |
| VFR 150_300 | | 300 | 30 | 3.0 | 1350 | 0.85 | 1500 | 16000 | 50 | 1.7 | 1450 | 0.54 | 1500 | 16000 | 47 |

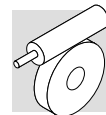


150

2700 Nm


| | | i | η_s % | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | |
|--------------------|-------------------------|------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|
| | | | | n_{2-1} min^{-1} | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | n_{2-1} min^{-1} | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % |
| W/VF 86/150 | W/VF 86/150_200 | 200 | 29 | 7.0 | 2600 | 3.0 | 850 | 16000 | 64 | 4.5 | 2700 | 2.1 | 850 | 16000 | 61 |
| | W/VF 86/150_225 | 225 | 26 | 6.2 | 2600 | 2.7 | 850 | 16000 | 63 | 4.0 | 2700 | 1.9 | 850 | 16000 | 60 |
| | W/VF 86/150_300 | 300 | 26 | 4.7 | 2600 | 2.2 | 850 | 16000 | 58 | 3.0 | 2700 | 1.5 | 850 | 16000 | 57 |
| | W/VF 86/150_345 | 345 | 26 | 4.1 | 2600 | 1.9 | 850 | 16000 | 58 | 2.6 | 2700 | 1.3 | 850 | 16000 | 57 |
| | W/VF 86/150_460 | 460 | 26 | 3.0 | 2600 | 1.5 | 850 | 16000 | 55 | 2.0 | 2700 | 1.0 | 850 | 16000 | 55 |
| | W/VF 86/150_529 | 529 | 26 | 2.6 | 2600 | 1.3 | 850 | 16000 | 55 | 1.7 | 2700 | 0.93 | 850 | 16000 | 52 |
| | W/VF 86/150_690 | 690 | 26 | 2.0 | 2600 | 1.1 | 850 | 16000 | 50 | 1.3 | 2700 | 0.78 | 850 | 16000 | 47 |
| | W/VF 86/150_920 | 920 | 26 | 1.5 | 2600 | 0.92 | 850 | 16000 | 45 | 0.98 | 2700 | 0.64 | 850 | 16000 | 43 |
| | W/VF 86/150_1380 | 1380 | 19 | 1.0 | 2600 | 0.66 | 850 | 16000 | 42 | 0.65 | 2700 | 0.46 | 850 | 16000 | 40 |
| | W/VF 86/150_1840 | 1840 | 19 | 0.76 | 2600 | 0.55 | 850 | 16000 | 38 | 0.49 | 2700 | 0.38 | 850 | 16000 | 36 |
| | W/VF 86/150_2944 | 2944 | 16 | 0.48 | 2600 | 0.48 | 850 | 16000 | 27 | 0.31 | 2700 | 0.35 | 850 | 16000 | 25 |

184




185

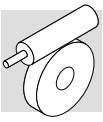
3600 Nm

| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|---------------|---|-----|---------------|-------------------------------|----------|----------|----------|----------|----------|-------------------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | |
| VF 185 | VF 185_7 | 7 | 72 | 400 | 1313 | 60 | 2800 | 4670 | 91 | 200 | 1750 | 41 | 2800 | 5570 | 90 |
| | VF 185_10 | 10 | 68 | 280 | 1365 | 44 | 2800 | 7390 | 90 | 140 | 1820 | 30 | 2800 | 8960 | 89 |
| | VF 185_15 | 15 | 66 | 187 | 1388 | 30 | 2800 | 9460 | 89 | 93 | 1850 | 21 | 2800 | 11600 | 88 |
| | VF 185_20 | 20 | 59 | 140 | 1703 | 28 | 2800 | 10500 | 88 | 70 | 2270 | 19.6 | 2800 | 12900 | 85 |
| | VF 185_30 | 30 | 54 | 93 | 1485 | 16.9 | 2800 | 13700 | 86 | 47 | 1980 | 11.8 | 2800 | 16900 | 83 |
| | VF 185_40 | 40 | 44 | 70 | 1973 | 17.6 | — | 14500 | 82 | 35 | 2630 | 12.4 | — | 17900 | 78 |
| | VF 185_50 | 50 | 41 | 56 | 1875 | 13.7 | — | 16300 | 80 | 28.0 | 2500 | 9.8 | — | 18000 | 76 |
| | VF 185_60 | 60 | 39 | 47 | 1703 | 10.7 | 2800 | 18000 | 78 | 23.3 | 2270 | 7.6 | 770 | 18000 | 74 |
| | VF 185_80 | 80 | 33 | 35 | 1590 | 7.8 | 2800 | 18000 | 75 | 17.5 | 2120 | 5.6 | 1140 | 18000 | 69 |
| | VF 185_100 | 100 | 30 | 28.0 | 1425 | 5.8 | 2800 | 18000 | 72 | 14.0 | 1900 | 4.3 | 2800 | 18000 | 65 |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | |
| VF 185 | VF 185_7 | 7 | 72 | 129 | 2000 | 30 | 2800 | 7120 | 89 | 71 | 2450 | 21 | 2800 | 8730 | 88 |
| | VF 185_10 | 10 | 68 | 90 | 2150 | 23 | 2800 | 10200 | 88 | 50 | 2600 | 16.0 | 2800 | 12500 | 86 |
| | VF 185_15 | 15 | 66 | 60 | 2250 | 16.4 | 2800 | 13100 | 86 | 33 | 2800 | 11.8 | 2800 | 15700 | 84 |
| | VF 185_20 | 20 | 59 | 45 | 2750 | 15.6 | 2800 | 14600 | 84 | 25.0 | 3300 | 10.9 | 2800 | 17900 | 81 |
| | VF 185_30 | 30 | 54 | 30.0 | 2400 | 9.4 | 2800 | 19000 | 81 | 16.7 | 2800 | 6.5 | 2800 | 19500 | 77 |
| | VF 185_40 | 40 | 44 | 22.5 | 3100 | 9.7 | — | 19000 | 76 | 12.5 | 3600 | 6.8 | — | 19500 | 71 |
| | VF 185_50 | 50 | 41 | 18.0 | 2900 | 7.6 | — | 19000 | 73 | 10.0 | 3300 | 5.2 | — | 19500 | 68 |
| | VF 185_60 | 60 | 39 | 15.0 | 2600 | 5.8 | 700 | 19000 | 71 | 8.3 | 3000 | 4.2 | 2800 | 19500 | 66 |
| | VF 185_80 | 80 | 33 | 11.3 | 2400 | 4.3 | 1770 | 19000 | 66 | 6.3 | 2800 | 3.2 | 2800 | 19500 | 60 |
| | VF 185_100 | 100 | 30 | 9.0 | 2000 | 3.0 | 2800 | 19000 | 62 | 5.0 | 2300 | 2.1 | 2800 | 19500 | 56 |

4200 Nm


| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|----------------|---|-----|---------------|-------------------------------|----------|----------|----------|----------|----------|-------------------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | |
| VFR 185 | VFR 185_90 | 90 | 53 | 31 | 2400 | 9.9 | 1700 | 19000 | 80 | 15.6 | 2800 | 6.0 | 1700 | 19500 | 76 |
| | VFR 185_120 | 120 | 43 | 23.3 | 3100 | 10.2 | 1700 | 19000 | 75 | 11.7 | 3600 | 6.3 | 1700 | 19500 | 70 |
| | VFR 185_150 | 150 | 40 | 18.7 | 2900 | 7.9 | 1700 | 19000 | 72 | 9.3 | 3300 | 4.8 | 1700 | 19500 | 67 |
| | VFR 185_180 | 180 | 38 | 15.6 | 2600 | 6.1 | 1700 | 19000 | 70 | 7.8 | 3000 | 3.8 | 1700 | 19500 | 65 |
| | VFR 185_240 | 240 | 32 | 11.7 | 2400 | 4.5 | 1700 | 19000 | 65 | 5.8 | 2800 | 2.9 | 1700 | 19500 | 59 |
| | VFR 185_300 | 300 | 29 | 9.3 | 2000 | 3.2 | 1700 | 19000 | 61 | 4.7 | 2300 | 2.0 | 1700 | 19500 | 55 |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | |
| VFR 185 | VFR 185_90 | 90 | 53 | 10.0 | 3200 | 4.6 | 1700 | 19500 | 73 | 5.6 | 3500 | 2.9 | 1700 | 19500 | 71 |
| | VFR 185_120 | 120 | 43 | 7.5 | 3800 | 4.5 | 1700 | 19500 | 66 | 4.2 | 4200 | 2.9 | 1700 | 19500 | 63 |
| | VFR 185_150 | 150 | 40 | 6.0 | 3400 | 3.4 | 1700 | 19500 | 63 | 3.3 | 3700 | 2.2 | 1700 | 19500 | 60 |
| | VFR 185_180 | 180 | 38 | 5.0 | 3300 | 2.9 | 1700 | 19500 | 60 | 2.8 | 3600 | 1.8 | 1700 | 19500 | 57 |
| | VFR 185_240 | 240 | 32 | 3.8 | 2800 | 2.0 | 1700 | 19500 | 54 | 2.1 | 2900 | 1.2 | 1700 | 19500 | 53 |
| | VFR 185_300 | 300 | 29 | 3.0 | 2400 | 1.5 | 1700 | 19500 | 50 | 1.7 | 2500 | 0.91 | 1700 | 19500 | 48 |

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)

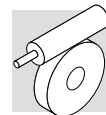


185

4400 Nm


| |  | i | η_s % | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | |
|--------------------|---|------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|
| | | | | n_{2-1} min ⁻¹ | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | n_{2-1} min ⁻¹ | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % |
| W/VF 86/185 | W/VF 86/185_280 | 280 | 31 | 5.0 | 4200 | 4.2 | 850 | 19500 | 52 | 3.2 | 4400 | 3.0 | 850 | 19500 | 49 |
| | W/VF 86/185_400 | 400 | 29 | 3.5 | 4200 | 3.2 | 850 | 19500 | 48 | 2.3 | 4400 | 2.3 | 850 | 19500 | 45 |
| | W/VF 86/185_600 | 600 | 26 | 2.3 | 4200 | 2.3 | 850 | 19500 | 45 | 1.5 | 4400 | 1.6 | 850 | 19500 | 43 |
| | W/VF 86/185_800 | 800 | 26 | 1.8 | 4200 | 1.8 | 850 | 19500 | 43 | 1.1 | 4400 | 1.3 | 850 | 19500 | 40 |
| | W/VF 86/185_920 | 920 | 26 | 1.5 | 4200 | 1.6 | 850 | 19500 | 42 | 1.0 | 4400 | 1.2 | 850 | 19500 | 38 |
| | W/VF 86/185_1200 | 1200 | 20 | 1.2 | 4200 | 1.5 | 850 | 19500 | 34 | 0.75 | 4400 | 0.99 | 850 | 19500 | 35 |
| | W/VF 86/185_1600 | 1600 | 20 | 0.88 | 4200 | 1.1 | 850 | 19500 | 35 | 0.56 | 4400 | 0.79 | 850 | 19500 | 33 |
| | W/VF 86/185_1840 | 1840 | 19 | 0.76 | 4200 | 0.98 | 850 | 19500 | 34 | 0.49 | 4400 | 0.70 | 850 | 19500 | 32 |
| | W/VF 86/185_2560 | 2560 | 16 | 0.55 | 4200 | 0.83 | 850 | 19500 | 29 | 0.35 | 4400 | 0.60 | 850 | 19500 | 27 |
| | W/VF 86/185_3200 | 3200 | 15 | 0.44 | 4200 | 0.80 | 850 | 19500 | 24 | 0.28 | 4400 | 0.59 | 850 | 19500 | 22 |

184




210

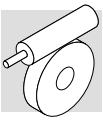
5000 Nm

| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|---------------|---|-----|---------------|-------------------------------|----------|----------|----------|----------|-------------------------------|-------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| VF 210 | VF 210_7 | 7 | 71 | 400 | 1725 | 79 | 5300 | 14000 | 91 | 200 | 2300 | 54 | 5300 | 16700 | 90 |
| | VF 210_10 | 10 | 69 | 280 | 1988 | 65 | 5300 | 16300 | 90 | 140 | 2650 | 44 | 5300 | 19500 | 89 |
| | VF 210_15 | 15 | 63 | 187 | 2138 | 47 | 5300 | 19700 | 89 | 93 | 2850 | 32 | 5300 | 23700 | 88 |
| | VF 210_20 | 20 | 57 | 140 | 2325 | 39 | 4970 | 22000 | 87 | 70 | 3100 | 27 | 1100 | 26600 | 85 |
| | VF 210_30 | 30 | 51 | 93 | 2288 | 26 | 5300 | 25900 | 85 | 47 | 3050 | 18.5 | 1760 | 31500 | 83 |
| | VF 210_40 | 40 | 42 | 70 | 2625 | 23 | — | 28300 | 81 | 35 | 3500 | 17.0 | — | 31500 | 78 |
| | VF 210_50 | 50 | 39 | 56 | 2475 | 18.4 | — | 31000 | 79 | 28.0 | 3300 | 13.0 | — | 31500 | 76 |
| | VF 210_60 | 60 | 36 | 47 | 2363 | 15.0 | — | 31500 | 77 | 23.3 | 3015 | 10.0 | — | 31500 | 73 |
| | VF 210_80 | 80 | 31 | 35 | 2175 | 10.9 | — | 31500 | 73 | 17.5 | 2900 | 7.7 | — | 31500 | 69 |
| | VF 210_100 | 100 | 27 | 28 | 2025 | 8.5 | 950 | 31500 | 70 | 14.0 | 2700 | 6.0 | — | 31500 | 65 |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | |
| VF 210 | VF 210_7 | 7 | 71 | 129 | 2700 | 41 | 5300 | 18800 | 89 | 71 | 3400 | 29 | 5300 | 21800 | 88 |
| | VF 210_10 | 10 | 69 | 90 | 3150 | 34 | 5300 | 21900 | 88 | 50 | 3800 | 23 | 5300 | 26000 | 87 |
| | VF 210_15 | 15 | 63 | 60 | 3300 | 24 | 5300 | 27000 | 86 | 33 | 4100 | 17.2 | 5300 | 31800 | 84 |
| | VF 210_20 | 20 | 57 | 45 | 3800 | 22 | — | 29900 | 83 | 25.0 | 4700 | 15.4 | — | 34500 | 81 |
| | VF 210_30 | 30 | 51 | 30.0 | 3400 | 13.4 | 3750 | 33000 | 80 | 16.7 | 4000 | 9.3 | 5300 | 34500 | 77 |
| | VF 210_40 | 40 | 42 | 22.5 | 4300 | 13.5 | — | 33000 | 75 | 12.5 | 5000 | 9.4 | — | 34500 | 71 |
| | VF 210_50 | 50 | 39 | 18.0 | 4000 | 10.5 | — | 33000 | 72 | 10.0 | 4500 | 7.1 | — | 34500 | 68 |
| | VF 210_60 | 60 | 36 | 15.0 | 3720 | 8.5 | — | 33000 | 70 | 8.3 | 4300 | 6.0 | — | 34500 | 65 |
| | VF 210_80 | 80 | 31 | 11.3 | 3300 | 6.0 | — | 33000 | 65 | 6.3 | 3900 | 4.4 | — | 34500 | 60 |
| | VF 210_100 | 100 | 27 | 9.0 | 3000 | 4.6 | — | 33000 | 61 | 5.0 | 3400 | 3.4 | 1470 | 34500 | 56 |

6300 Nm

| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|----------------|---|-----|---------------|-------------------------------|------------------------------|----------|----------|----------|-------------------------------|------------------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| VFR 210 | VFR 210_30 | 30 | 68 | 93 | 3150 | 36 | 1800 | 22100 | 87 | 47 | 3800 | 21.8 | 2200 | 27400 | 86 |
| | VFR 210_45 | 45 | 62 | 62 | 3300 | 25 | 1800 | 27000 | 85 | 31 | 4100 | 16.2 | 2200 | 33200 | 83 |
| | VFR 210_60 | 60 | 56 | 47 | 3800 | 22 | 1800 | 29900 | 82 | 23.0 | 4700 | 14.5 | 2200 | 34500 | 80 |
| | VFR 210_90 | 90 | 50 | 31 | 3400 | 14.1 | 1800 | 33000 | 79 | 15.6 | 4000 | 8.6 | 2200 | 34500 | 76 |
| | VFR 210_120 | 120 | 41 | 23.3 | 4300 | 14.3 | 1800 | 33000 | 74 | 11.7 | 5000 | 8.8 | 2200 | 34500 | 70 |
| | VFR 210_150 | 150 | 38 | 18.7 | 4000 | 11.1 | 1800 | 33000 | 71 | 9.3 | 4500 | 6.6 | 2200 | 34500 | 67 |
| | VFR 210_180 | 180 | 35 | 15.6 | 3720 | 8.8 | 1800 | 33000 | 69 | 7.8 | 4300 | 5.5 | 2200 | 34500 | 64 |
| | VFR 210_240 | 240 | 30 | 11.7 | 3300 | 6.3 | 1800 | 33000 | 64 | 5.8 | 3900 | 4.1 | 2200 | 34500 | 59 |
| | VFR 210_300 | 300 | 26 | 9.3 | 3000 | 4.9 | 1800 | 33000 | 60 | 4.7 | 3400 | 3.0 | 2200 | 34500 | 55 |
| | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | |
| VFR 210 | VFR 210_30 | 30 | 68 | 30.0 | 4800 | 18.1 | 2300 | 30100 | 84 | 16.7 | 5500 | 11.8 | 2650 | 34500 | 82 |
| | VFR 210_45 | 45 | 62 | 20.0 | 4900 | 12.9 | 2300 | 34500 | 80 | 11.1 | 5600 | 8.4 | 2650 | 34500 | 78 |
| | VFR 210_60 | 60 | 56 | 15.0 | 5400 | 11.1 | 2300 | 34500 | 77 | 8.3 | 6000 | 7.1 | 2650 | 34500 | 74 |
| | VFR 210_90 | 90 | 50 | 10.0 | 4600 | 6.7 | 2300 | 34500 | 72 | 5.6 | 5150 | 4.3 | 2650 | 34500 | 70 |
| | VFR 210_120 | 120 | 41 | 7.5 | 5900 | 7.1 | 2300 | 34500 | 66 | 4.2 | 6300 | 4.4 | 2650 | 34500 | 63 |
| | VFR 210_150 | 150 | 38 | 6.0 | 5300 | 5.4 | 2300 | 34500 | 62 | 3.3 | 5900 | 3.5 | 2650 | 34500 | 59 |
| | VFR 210_180 | 180 | 35 | 5.0 | 4900 | 4.4 | 2300 | 34500 | 59 | 2.8 | 5400 | 2.8 | 2650 | 34500 | 56 |
| | VFR 210_240 | 240 | 30 | 3.8 | 4400 | 3.2 | 2300 | 34500 | 54 | 2.1 | 4800 | 2.1 | 2650 | 34500 | 50 |
| | VFR 210_300 | 300 | 26 | 3.0 | 3600 | 2.3 | 2300 | 34500 | 49 | 1.7 | 4000 | 1.5 | 2650 | 34500 | 46 |

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)



210

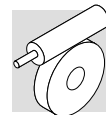
6500 Nm



| | i | η_s % | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | |
|----------------------|---------------------------|---------------|-------------------------------|----------------|----------------|---------------|---------------|---------------|----------------------------|------------------------------|----------------|---------------|---------------|---------------|----|
| | | | n_2 min^{-1} | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | n_2 min^{-1} | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | |
| VF/VF 130/210 | VF/VF 130/210_280 | 280 | 30 | 5.0 | 6300 | 6.3 | 1500 | 34500 | 52 | 3.2 | 6500 | 4.4 | 1500 | 34500 | 50 |
| | VF/VF 130/210_400 | 400 | 28 | 3.5 | 6300 | 4.6 | 1500 | 34500 | 50 | 2.3 | 6500 | 3.2 | 1500 | 34500 | 48 |
| | VF/VF 130/210_600 | 600 | 26 | 2.3 | 6300 | 3.6 | 1500 | 34500 | 43 | 1.5 | 6500 | 2.4 | 1500 | 34500 | 43 |
| | VF/VF 130/210_800 | 800 | 25 | 1.8 | 6300 | 2.8 | 1500 | 34500 | 41 | 1.1 | 6500 | 2.0 | 1500 | 34500 | 38 |
| | VF/VF 130/210_920 | 920 | 24 | 1.5 | 6300 | 2.7 | 1500 | 34500 | 37 | 1.0 | 6500 | 1.9 | 1500 | 34500 | 35 |
| | VF/VF 130/210_1200 | 1200 | 21 | 1.2 | 6300 | 2.2 | — | 34500 | 35 | 0.75 | 6500 | 1.5 | — | 34500 | 34 |
| | VF/VF 130/210_1600 | 1600 | 18 | 0.88 | 6300 | 1.8 | — | 34500 | 32 | 0.56 | 6500 | 1.2 | — | 34500 | 32 |
| | VF/VF 130/210_1840 | 1840 | 19 | 0.76 | 6300 | 1.7 | — | 34500 | 30 | 0.49 | 6500 | 1.2 | 490 | 34500 | 28 |
| | VF/VF 130/210_2560 | 2560 | 16 | 0.55 | 6300 | 1.5 | 1220 | 34500 | 24 | 0.35 | 6500 | 1.0 | 1500 | 34500 | 24 |
| | VF/VF 130/210_3200 | 3200 | 15 | 0.44 | 6300 | 1.3 | 1500 | 34500 | 22 | 0.28 | 6500 | 0.96 | 1500 | 34500 | 20 |


184

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)




250

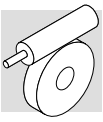
7100 Nm

| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|---------------|---|-----|---------------|-------------------------------|----------|----------|----------|----------|-------------------------------|-------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| VF 250 | VF 250_7 | 7 | 71 | 400 | 2400 | 109 | 7000 | 18300 | 92 | 200 | 3200 | 75 | 7000 | 21900 | 91 |
| | VF 250_10 | 10 | 69 | 280 | 2775 | 89 | 7000 | 21100 | 91 | 140 | 3700 | 61 | 7000 | 25300 | 90 |
| | VF 250_15 | 15 | 64 | 187 | 3000 | 65 | 7000 | 25100 | 90 | 93 | 4000 | 45 | 7000 | 30300 | 88 |
| | VF 250_20 | 20 | 59 | 140 | 3338 | 56 | 7000 | 28000 | 88 | 70 | 4450 | 38 | 7000 | 33900 | 86 |
| | VF 250_30 | 30 | 53 | 93 | 3000 | 34 | 7000 | 33400 | 86 | 47 | 4000 | 23 | 7000 | 40600 | 84 |
| | VF 250_40 | 40 | 41 | 70 | 3600 | 32 | 4680 | 36200 | 82 | 35 | 4800 | 22 | — | 44000 | 79 |
| | VF 250_50 | 50 | 36 | 56 | 3375 | 25 | 6370 | 39500 | 79 | 28.0 | 4500 | 17.0 | — | 47000 | 76 |
| | VF 250_60 | 60 | 38 | 47 | 3375 | 20.6 | 7000 | 42100 | 80 | 23.3 | 4500 | 15.0 | — | 47000 | 76 |
| | VF 250_80 | 80 | 32 | 35 | 2925 | 14.1 | 7000 | 47000 | 76 | 17.5 | 3900 | 10.0 | — | 47000 | 71 |
| | VF 250_100 | 100 | 29 | 28 | 2738 | 11.0 | 7000 | 47000 | 73 | 14.0 | 3650 | 7.8 | 3010 | 47000 | 68 |
| | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | | |
| VF 250 | VF 250_7 | 7 | 71 | 129 | 4150 | 63 | 7000 | 23700 | 90 | 71 | 5200 | 44 | 7000 | 27600 | 88 |
| | VF 250_10 | 10 | 69 | 90 | 4800 | 51 | 7000 | 27600 | 89 | 50 | 6000 | 36 | 7000 | 32300 | 87 |
| | VF 250_15 | 15 | 64 | 60 | 5300 | 39 | 7000 | 33200 | 87 | 33 | 6400 | 27 | 7000 | 39500 | 85 |
| | VF 250_20 | 20 | 59 | 45 | 5950 | 33 | 1640 | 37200 | 85 | 25.0 | 7100 | 24 | 1910 | 44400 | 82 |
| | VF 250_30 | 30 | 53 | 30.0 | 5500 | 21 | 7000 | 44900 | 81 | 16.7 | 6000 | 14.7 | 7000 | 52000 | 79 |
| | VF 250_40 | 40 | 41 | 22.5 | 6500 | 20.0 | — | 48800 | 76 | 12.5 | 7000 | 13.6 | — | 52000 | 72 |
| | VF 250_50 | 50 | 36 | 18.0 | 6200 | 16.2 | — | 50000 | 73 | 10.0 | 6500 | 11.1 | — | 52000 | 68 |
| | VF 250_60 | 60 | 38 | 15.0 | 5600 | 12.2 | — | 50000 | 72 | 8.3 | 6300 | 8.6 | 4350 | 52000 | 68 |
| | VF 250_80 | 80 | 32 | 11.3 | 5200 | 9.3 | — | 50000 | 67 | 6.3 | 5400 | 6.8 | 7000 | 52000 | 62 |
| | VF 250_100 | 100 | 29 | 9.0 | 4800 | 7.2 | 3010 | 50000 | 63 | 5.0 | 5000 | 5.3 | 4160 | 52000 | 58 |

9000 Nm

| |  | i | η_s % | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d | n_{2-1} | M_{n2} | P_{n1} | R_{n1} | R_{n2} | η_d |
|----------------|---|-----|---------------|-------------------------------|------------------------------|----------|----------|----------|-------------------------------|------------------------------|----------|----------|----------|----------|----------|
| | | | | min ⁻¹ | Nm | kW | N | N | % | min ⁻¹ | Nm | kW | N | N | % |
| | | | | $n_1 = 2800 \text{ min}^{-1}$ | | | | | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | |
| VFR 250 | VFR 250_30 | 30 | 68 | 93 | 4800 | 54 | 2800 | 27800 | 89 | 47 | 6000 | 34 | 3500 | 34000 | 86 |
| | VFR 250_45 | 45 | 63 | 62 | 5300 | 41 | 2800 | 33300 | 87 | 31 | 6400 | 25 | 3500 | 41300 | 84 |
| | VFR 250_60 | 60 | 58 | 47 | 5950 | 35 | 2800 | 37200 | 85 | 23.0 | 7100 | 21 | 3500 | 46100 | 81 |
| | VFR 250_90 | 90 | 52 | 31 | 5500 | 22 | 2800 | 44700 | 81 | 15.6 | 6000 | 12.6 | 3500 | 52000 | 78 |
| | VFR 250_120 | 120 | 40 | 23.3 | 6500 | 21.3 | 2800 | 48500 | 76 | 11.7 | 7000 | 12.1 | 3500 | 52000 | 71 |
| | VFR 250_150 | 150 | 35 | 18.7 | 6200 | 16.9 | 2800 | 50000 | 73 | 9.3 | 6500 | 9.5 | 3500 | 52000 | 67 |
| | VFR 250_180 | 180 | 37 | 15.6 | 5600 | 12.9 | 2800 | 50000 | 72 | 7.8 | 6300 | 7.7 | 3500 | 52000 | 67 |
| | VFR 250_240 | 240 | 31 | 11.7 | 5200 | 9.7 | 2800 | 50000 | 67 | 5.8 | 5400 | 5.4 | 3500 | 52000 | 61 |
| | VFR 250_300 | 300 | 28 | 9.3 | 4800 | 7.6 | 2800 | 50000 | 63 | 4.7 | 5000 | 4.3 | 3500 | 52000 | 57 |
| | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | $n_1 = 500 \text{ min}^{-1}$ | | | | | |
| VFR 250 | VFR 250_30 | 30 | 68 | 30.0 | 6500 | 24 | 3700 | 39600 | 84 | 16.7 | 7600 | 16.1 | 4200 | 47600 | 83 |
| | VFR 250_45 | 45 | 63 | 20.0 | 6800 | 17.5 | 3700 | 48000 | 82 | 11.1 | 7900 | 11.6 | 3500 | 52000 | 80 |
| | VFR 250_60 | 60 | 58 | 15.0 | 7600 | 15.2 | 3700 | 52000 | 79 | 8.3 | 8600 | 9.9 | 3500 | 52000 | 76 |
| | VFR 250_90 | 90 | 52 | 10.0 | 6500 | 9.3 | 3700 | 52000 | 74 | 5.6 | 7400 | 6.1 | 3500 | 52000 | 71 |
| | VFR 250_120 | 120 | 40 | 7.5 | 7500 | 8.8 | 3700 | 52000 | 67 | 4.2 | 9000 | 6.2 | 3500 | 52000 | 64 |
| | VFR 250_150 | 150 | 35 | 6.0 | 7000 | 7.0 | 3700 | 52000 | 63 | 3.3 | 8600 | 5.1 | 3500 | 52000 | 59 |
| | VFR 250_180 | 180 | 37 | 5.0 | 6700 | 5.7 | 3700 | 52000 | 62 | 2.8 | 7600 | 3.8 | 3500 | 52000 | 59 |
| | VFR 250_240 | 240 | 31 | 3.8 | 5800 | 4.1 | 3700 | 52000 | 56 | 2.1 | 6500 | 2.7 | 3500 | 52000 | 52 |
| | VFR 250_300 | 300 | 28 | 3.0 | 5300 | 3.2 | 3700 | 52000 | 52 | 1.7 | 6000 | 2.2 | 3500 | 52000 | 48 |

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)



250

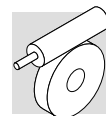
9200 Nm



| | i | η_s % | $n_1 = 1400 \text{ min}^{-1}$ | | | | | | | $n_1 = 900 \text{ min}^{-1}$ | | | | | | |
|----------------------|---------------------------|---------------|--------------------------------|----------------|----------------|---------------|---------------|---------------|--------------------------------|------------------------------|----------------|---------------|---------------|---------------|----|--|
| | | | n_{2-1} min ⁻¹ | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | n_{2-1} min ⁻¹ | M_{n2} Nm | P_{n1} kW | R_{n1} N | R_{n2} N | η_d % | | |
| VF/VF 130/250 | VF/VF 130/250_280 | 280 | 29 | 5.0 | 9000 | 8.9 | 1500 | 52000 | 53 | 3.2 | 9200 | 6.1 | 1500 | 52000 | 51 | |
| | VF/VF 130/250_400 | 400 | 27 | 3.5 | 9000 | 6.7 | 1500 | 52000 | 49 | 2.3 | 9200 | 4.6 | 1500 | 52000 | 47 | |
| | VF/VF 130/250_600 | 600 | 26 | 2.3 | 9000 | 5.0 | 1500 | 52000 | 44 | 1.5 | 9200 | 3.4 | 1500 | 52000 | 43 | |
| | VF/VF 130/250_800 | 800 | 24 | 1.8 | 9000 | 3.9 | 1500 | 52000 | 42 | 1.1 | 9200 | 2.7 | 1500 | 52000 | 40 | |
| | VF/VF 130/250_920 | 920 | 23 | 1.5 | 9000 | 3.9 | 1500 | 52000 | 37 | 0.98 | 9200 | 2.7 | 1500 | 52000 | 35 | |
| | VF/VF 130/250_1200 | 1200 | 20 | 1.2 | 9000 | 3.1 | — | 52000 | 35 | 0.75 | 9200 | 2.2 | — | 52000 | 33 | |
| | VF/VF 130/250_1600 | 1600 | 18 | 0.88 | 9000 | 2.6 | — | 52000 | 32 | 0.56 | 9200 | 1.8 | — | 52000 | 30 | |
| | VF/VF 130/250_1840 | 1840 | 18 | 0.76 | 9000 | 2.3 | — | 52000 | 31 | 0.49 | 9200 | 1.6 | 490 | 52000 | 29 | |
| | VF/VF 130/250_2560 | 2560 | 16 | 0.55 | 9000 | 2.1 | 1500 | 52000 | 25 | 0.35 | 9200 | 1.5 | 1500 | 52000 | 23 | |
| | VF/VF 130/250_3200 | 3200 | 14 | 0.44 | 9000 | 2.0 | 1500 | 52000 | 21 | 0.28 | 9200 | 1.4 | 1500 | 52000 | 19 | |

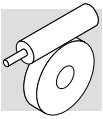
184

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (-) Contact our technical service department advising radial load data (rotation direction, load angle, offset)
 (-) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (-) Consulter notre service technique en donnant les détails concernant la charge radiale (sens de rotation, indexage, position)



Combinazioni dei rapporti nei riduttori combinati serie VF/VF, VF/W, W/VF
Ratio distribution for VF/VF, VF/W, W/VF series gearboxes
Kombination der Verhältnisse in den Getrieben der Serie VF/VF, VF/W, W/VF
Combinaisons des rapport réducteurs série VF/VF, VF/W, W/VF

| | Rapporti / Ratios / Verhältnisse / Rapports [i] | | | | | | | | | | | i max |
|----------------------|---|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| VF/VF 30/44 | 245 | 350 | 420 | 560 | 700 | 840 | 1120 | 1680 | 2100 | | | 7000 |
| VF 30 | 7 | 10 | 15 | 20 | 20 | 30 | 40 | 60 | 60 | | | 70 |
| VF 44 | 35 | 35 | 28 | 28 | 35 | 28 | 28 | 28 | 35 | | | 100 |
| VF/VF 30/49 | 240 | 315 | 420 | 540 | 720 | 900 | 1120 | 1440 | 2160 | 2700 | | 7000 |
| VF 30 | 10 | 7 | 15 | 15 | 20 | 20 | 40 | 40 | 60 | 60 | | 70 |
| VF 49 | 24 | 45 | 28 | 36 | 36 | 45 | 28 | 36 | 36 | 45 | | 100 |
| VF/W 30/63 | 240 | 315 | 450 | 570 | 720 | 900 | 1200 | 1520 | 2280 | 2700 | | 7000 |
| VF 30 | 10 | 7 | 15 | 15 | 30 | 30 | 40 | 40 | 60 | 60 | | 70 |
| W 63 | 24 | 45 | 30 | 38 | 24 | 30 | 30 | 38 | 38 | 45 | | 100 |
| VF/W 44/75 | 250 | 300 | 400 | 525 | 700 | 920 | 1200 | 1500 | 2100 | 2800 | | 10000 |
| VF 44 | 10 | 10 | 10 | 35 | 35 | 46 | 60 | 60 | 70 | 70 | | 100 |
| W 75 | 25 | 30 | 40 | 15 | 20 | 20 | 20 | 25 | 30 | 40 | | 100 |
| VF/W 44/86 | 230 | 300 | 400 | 525 | 700 | 920 | 1380 | 1840 | 2116 | 2760 | | 10000 |
| VF 44 | 10 | 10 | 10 | 35 | 35 | 46 | 46 | 46 | 46 | 60 | | 100 |
| W 86 | 23 | 30 | 40 | 15 | 20 | 20 | 30 | 40 | 46 | 46 | | 100 |
| VF/W 49/110 | 230 | 300 | 400 | 540 | 720 | 1080 | 1350 | 1656 | 2070 | 2800 | | 10000 |
| VF 49 | 10 | 10 | 10 | 18 | 36 | 36 | 45 | 36 | 45 | 70 | | 100 |
| W 110 | 23 | 30 | 40 | 30 | 20 | 30 | 30 | 46 | 46 | 40 | | 100 |
| W/VF 63/130 | 280 | 400 | 600 | 760 | 960 | 1200 | 1520 | 1800 | 2560 | 3200 | | 10000 |
| W 63 | 7 | 10 | 15 | 19 | 24 | 30 | 38 | 45 | 64 | 80 | | 100 |
| VF 130 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | 100 |
| W/VF 86/150 | 200 | 225 | 300 | 345 | 460 | 529 | 690 | 920 | 1380 | 1840 | 2944 | 10000 |
| W 86 | 10 | 15 | 15 | 15 | 20 | 23 | 23 | 23 | 46 | 46 | 64 | 100 |
| VF 150 | 20 | 15 | 20 | 23 | 23 | 23 | 30 | 40 | 30 | 40 | 46 | 100 |
| W/VF 86/185 | 280 | 400 | 600 | 800 | 920 | 1200 | 1600 | 1840 | 2560 | 3200 | | 10000 |
| W 86 | 7 | 10 | 15 | 20 | 23 | 30 | 40 | 46 | 64 | 80 | | 100 |
| VF 185 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | 100 |
| VF/VF 130/210 | 280 | 400 | 600 | 800 | 920 | 1200 | 1600 | 1840 | 2560 | 3200 | | 10000 |
| VF 130 | 7 | 10 | 15 | 20 | 23 | 30 | 40 | 46 | 64 | 80 | | 100 |
| VF 210 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | 100 |
| VF/VF 130/250 | 280 | 400 | 600 | 800 | 920 | 1200 | 1600 | 1840 | 2560 | 3200 | | 10000 |
| VF 130 | 7 | 10 | 15 | 20 | 23 | 30 | 40 | 46 | 64 | 80 | | 100 |
| VF 250 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | 100 |



22 - PREDISPOSIZIONI MOTORE

22.1 Motori standard IEC

Nelle tabelle vengono riportati gli abbinamenti motore possibili in termini puramente geometrici. La scelta del motoriduttore deve essere effettuata seguendo le istruzioni specificate al paragrafo: "Selezione", rispettando in particolare la condizione $S \geq f_s$.

22 - MOTOR AVAILABILITY

22.1 Motors to IEC standard

Motor-gearbox combinations resulting from charts are purely based on geometrical compatibility.
When selecting a gearmotor, refer to procedure specified at para: "Selection" and observe particularly the condition $S \geq f_s$.

22 - MOTOR ANBAUMÖGLICHKEITEN

22.1 Motoren nach IEC-Standard

In den Tabellen werden die von den Größen her gesehenden möglichen Passungen angegeben. Die angemessene Getriebe- wahl muss unter Befolgung der im Paragraph: „Antriebs- auswahl“ gegebenen Anlei- tungen und auf der Grundlage der Auswahltablelle der tech- nischen Daten erfolgen.

22 - PREDISPOSITION MOTEUR

22.1 Moteurs standard IEC

Dans les tableaux sont indiqués les accouplements possibles en termes de dimensions. Le choix le plus approprié du motoréducteur à utiliser doit être effectué selon les indica- tions du paragraphe: "Sélec- tion", ainsi qu'en fonction des tableaux de sélection, respectant en particulier la condition $S \geq f_s$.

| IEC | VF 27 | VF 30 | VF 44 | VF 49 | W 63 | W 75 | W 86 | W 110 | VF 130 | VF 150 | VF 185 | VF 210 | VF 250 |
|------|-----------|--------|---------|---------|---------|---------|---------|---------|----------|----------|----------|---------|---------|
| P27 | 7...70 | - | - | - | - | - | - | - | - | - | - | - | - |
| P56 | B5 B14 | 7...70 | - | - | - | - | - | - | - | - | - | - | - |
| P63 | B5 B14 | 7...60 | 7...100 | 7...100 | - | - | - | - | - | - | - | - | - |
| P71 | B5 B14 | - | 7...35 | 7...60 | 7...100 | 7...100 | 7...100 | - | - | - | - | - | - |
| P80 | B5 B14 | - | - | 7...28 | 7...100 | 7...100 | 7...100 | 7...100 | - | - | - | - | - |
| P90 | B5 B14 | - | - | - | 7...30 | 7...100 | 7...100 | 7...100 | 46...100 | - | - | - | - |
| P100 | B5 B14 | - | - | - | - | 7...100 | 7...100 | 7...100 | 7...80 | 23...100 | 50...100 | - | - |
| P112 | B5 B14 | - | - | - | - | - | 7...100 | 7...100 | 7...40 | 23...100 | 50...100 | - | - |
| P132 | B5 | - | - | - | - | - | - | 7...100 | 7...40 # | 7...46 | 30...80 | 7...100 | 7...100 |
| P160 | B5 | - | - | - | - | - | - | - | - | 7...20 # | 15...40 | 7...100 | 7...100 |
| P180 | B5 | - | - | - | - | - | - | - | - | - | 7...20 # | 7...100 | 7...100 |
| P200 | B5 | - | - | - | - | - | - | - | - | - | - | 7...100 | 7...100 |
| P225 | B5 | - | - | - | - | - | - | - | - | - | - | 7...100 | 7...100 |

| IEC | VFR 44 | VFR 49 | WR 63 | WR 75 | WR 86 | WR 110 | VFR 130 | VFR 150 | VFR 185 | VFR 210 | VFR 250 |
|------|----------|----------|----------|----------|----------|----------|------------|-----------|------------|------------|------------|
| S44 | 70...500 | - | - | - | - | - | - | - | - | - | - |
| P63 | B5 | 30...300 | 21...300 | 21...300 | 21...300 | - | - | - | - | - | - |
| P71 | B5 | - | 21...300 | 21...300 | 21...300 | 21...300 | - | - | - | - | - |
| P80 | B5 | - | - | 21...300 | 21...300 | 21...300 | 30...300 | - | - | - | - |
| P90 | B5 | - | - | 15...150 | 15...150 | 21...300 | 30...300 | 30...300 | 30...300 | - | - |
| P100 | B5 | - | - | - | - | 21...300 | 30...300 # | 30...300 | 30...300 | 30...300 | 30...300 |
| P112 | B5 | - | - | - | - | 21...300 | 30...300 # | 30...300 | 30...300 | 30...300 | 30...300 |
| P132 | B5 | - | - | - | - | - | - | 25...50 # | 25...100 # | 30...300 | 30...300 |
| P160 | B5 | - | - | - | - | - | - | - | - | 30...300 # | 30...300 # |

Rapporto della precoppia elicoidale $i = 1.5$

Gear ratio of the helical pre-stage $i = 1.5$

Untersetzung der Vorstufe $i = 1.5$

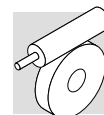
Rapport de l'étage à l'entrée hélicoidal $i = 1.5$

Gli accoppiamenti motore-riduttore marcati con [#] sono realizzati tramite linguette di tipo ribassato, fornite insieme al riduttore stesso.

Motor-gearbox combinations marked with [#] feature a lowered key, supplied with the reducer.

Motorgetriebe-Kombinationen durch [#] gekennzeichnet und werden mit abgeflachten Keilnut entwickelt, die gemeinsam mit den Getriebe geliefert werden.

Les accouplements repérés par [#] sont dotés d'une clavette à hauteur réduite, livrées avec le réducteur.



| IEC | VF/VF 30/44 | VF/VF 30/49 | VF/W 30/63 | VF/W 44/75 | VF/W 44/86 | VF/W 49/110 | W/VF 63/130 | W/VF 86/150 | W/VF 86/185 | VF/VF 130/210 | VF/VF 130/250 |
|--------------------------|----------------|----------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|------------------|------------------|
| P56 B5 B14 | 245...2100 | 240...2700 | 240...2700 | | | | | | | | |
| P63 B5 B14 | 245...2100 | 240...2700 | 240...2700 | 250...2800 | 230...2760 | 230...2800 | | | | | |
| P71 B5 B14 | | | | 250...700 | 230...700 | 230...2070 | 280...3200 | 200...2944 | 280...3200 | | |
| P80 B5 B14 | | | | | | 230...540 | 280...3200 | 200...2944 | 280...3200 | | |
| P90 B5 B14 | | | | | | | 280...1200 | 200...2944 | 280...3200 | 280...3200 | 280...3200 |
| P100 B5 B14 | | | | | | | | 200...2944 | 280...3200 | 280...3200 | 280...3200 |
| P112 B5 B14 | | | | | | | | 200...2944 | 280...3200 | 280...3200 | 280...3200 |
| P132 B5 | | | | | | | | | | 280...1600 # | 280...1600 # |

22.2 Motori compatti

22.2 Compact motor

22.2 Kompaktmotor

22.2 Moteur compact

| | M1 | M2 | M3 |
|--------------|-----------|-----------|-----------|
| W 63 | 7 ... 100 | 7 ... 100 | ⊘ |
| W 75 | 7 ... 100 | 7 ... 100 | 7 ... 100 |
| W 86 | 7 ... 100 | 7 ... 100 | 7 ... 100 |
| W 110 | ⊘ | 7 ... 100 | 7 ... 100 |

22.3 Motori non normalizzati

Per l'accoppiamento a motori elettrici non normalizzati, l'interfaccia motore dei riduttori serie W può essere configurata con combinazioni albero veloce/flangia ibride, non corrispondenti cioè alla normativa IEC.

La combinazione albero/flangia è esplicitata mediante i rispettivi diametri e qui di seguito esemplificata.

22.3 Motors not to IEC standard

For coupling with non-normalized electric motors, the motor coupling end of W speed reducers may be configured with hybrid (i.e., non IEC) input shaft and flange combinations.

Shaft and flange combinations are illustrated below.

The table shows the diameters in millimetres for each selection.

22.3 Nicht genormte Motoren

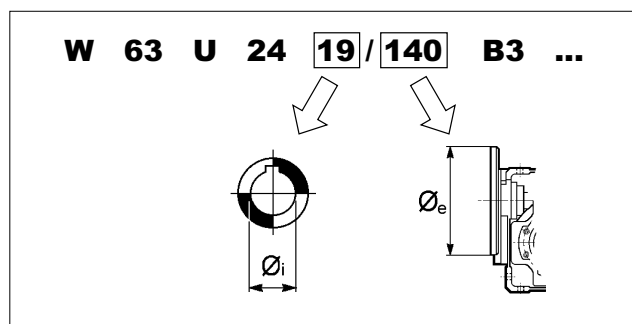
Für die Passung an nicht genormte Elektromotoren kann die Schnittstelle des Motors der zu den Serien W gehörenden Getriebe mit der Kombination Antriebswelle/ Hybridflansch konfiguriert werden, die jedoch nicht der Richtlinie IEC entspricht.

Die Kombination von Welle/ Flansch wird durch die jeweiligen Durchmesser gegeben und nachstehend aufgeführt.

22.3 Moteurs non normalisés

Pour l'accouplement à des moteurs électriques non normalisés, l'interface moteur des réducteurs série W peut être configurée avec des combinaisons arbre d'entrée/bride hybrides, c'est-à-dire ne répondant à la norme CEI.

La combinaison arbre/bride est exprimée au moyen des diamètres respectifs et sur la représentation simplifiée ci-après.

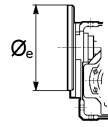
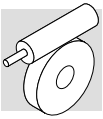


Gli abbinamenti albero/flangia disponibili, e i rapporti di trasmissione ai quali sono limitati, sono riportati nella tabella seguente.

The following table lists available configurations, as well as their limited ranges of gear ratios.

Die verfügbaren Kombinationen von Welle/Flansch und die Übersetzungsverhältnisse, auf die sie jeweils beschränkt sind, werden in den nachstehenden Tabelle angegeben.

Les associations arbre/bride disponibles ainsi que les rapports de transmission auxquelles elles sont limitées sont exprimées dans les tableaux suivants.



| | | 80 | 90 | 105 | 120 | 140 | 160 | 200 |
|-------|----|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| VF 30 | 9 | | $7 \leq i \leq 70$ | ● | | $7 \leq i \leq 70$ | ● | ● |
| | 11 | $7 \leq i \leq 60$ | | ● | $7 \leq i \leq 60$ | | ● | ● |
| VF 44 | HS | ● | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ | ● | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ | ● |
| | 11 | ● | | $7 \leq i \leq 100$ | ● | | $7 \leq i \leq 100$ | ● |
| | 14 | ● | $7 \leq i \leq 35$ | | ● | $7 \leq i \leq 35$ | | ● |
| VF 49 | HS | ● | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ |
| | 11 | ● | | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ | | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ |
| | 14 | ● | $7 \leq i \leq 60$ | | $7 \leq i \leq 60$ | $7 \leq i \leq 60$ | | $7 \leq i \leq 60$ |
| | 19 | ● | $7 \leq i \leq 28$ | $7 \leq i \leq 28$ | | $7 \leq i \leq 28$ | $7 \leq i \leq 28$ | |
| W 63 | 19 | ● | ● | ● | ● | $7 \leq i \leq 100$ | ● | |
| W 75 | 14 | ● | ● | ● | ● | ● | | $7 \leq i \leq 100$ |
| | 19 | ● | ● | ● | | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ | |
| | 24 | ● | ● | ● | $7 \leq i \leq 100$ | | $7 \leq i \leq 100$ | |
| W 86 | 14 | ● | ● | ● | ● | ● | | $7 \leq i \leq 100$ |
| | 19 | ● | ● | ● | | $7 \leq i \leq 100$ | $7 \leq i \leq 100$ | |
| | 24 | ● | ● | ● | $7 \leq i \leq 100$ | | $7 \leq i \leq 100$ | |
| W 110 | 19 | ● | ● | ● | | $7 \leq i \leq 100$ | ● | ● |
| | 24 | ● | ● | ● | $7 \leq i \leq 100$ | | ● | ● |

Abbinamenti standard

Standard arrangement

Standard-Passung

Couplage standard

Alcuni abbinamenti ibridi albero/flangia sono eseguibili anche per riduttori VF di interasse 130 e superiore. In questo caso consultare il Servizio Tecnico di Bonfiglioli per la disponibilità.

Le configurazioni risultanti dalla tabella sopra riportata sono da intendersi possibili esclusivamente per quanto riguarda la compatibilità geometrica.

La compatibilità meccanica dell'insieme motore/riduttore dovrà essere ulteriormente verificata mediante l'uso delle consuete tabelle di selezione per potenza/velocità.

In particolare dovranno essere evitati gli abbinamenti motore che generano fattori di sicurezza $S < 0,9$.

Some hybrid shaft/flange combinations are also possible for VF reduction units with center distance greater than 130 mm. Please contact Bonfiglioli Technical Service.

The table above report possible configurations strictly based on geometric criteria.

To determine the compatibility of a motor-gear unit assembly in terms of mechanical factors, double-check the selected configuration against the rating charts for power/speed.

Be sure to avoid those combinations that yield a safety factor $S < 0,9$.

Einige Hybridkombinationen von Welle/Flansch sind auch bei den Getrieben VF mit einem Achsenabstand von 130 und mehr realisierbar.

In diesem Fall bitten wir Sie jedoch, sich hinsichtlich der Verfügbarkeit mit dem Technischen Service der Bonfiglioli in Verbindung zu setzen.

Die aus den vorstehenden Tabelle resultierenden Konfigurationen sind, ausschließlich in Bezug auf die geometrische Kompatibilität, als Möglichkeiten zu verstehen.

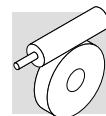
Die mechanische Kompatibilität der Einheit aus Motor-Getriebe muss anhand der üblichen Auswahltabellen im Hinblick auf Leistung/Drehzahl geprüft werden. Insbesondere sind solche Motorpassungen zu vermeiden, die Sicherheitsfaktoren von $S < 0,9$ erzeugen.

Certaines associations hybrides arbre/bride sont aussi réalisable pour les réducteurs VF avec entraxe de 130 et plus. Dans ce cas, contacter le Service Technique Bonfiglioli pour connaître la disponibilité.

Les configurations résultant des tableaux ci-dessus sont possibles exclusivement du point de vue de la compatibilité géométrique.

La compatibilité mécanique de l'ensemble moteur-réducteur doit être ultérieurement vérifiée en utilisant les tableaux habituels de sélection par puissance/vitesse.

Plus particulièrement, il convient d'éviter les associations moteur qui génèrent des facteurs de sécurité $S < 0,9$.



23 - MOMENTO D'INERZIA

Le tabelle tecniche seguenti indicano i valori del momento d'inerzia J_r [Kgm^2] riferiti all'asse veloce del riduttore; per una migliore facilità di lettura riportiamo le definizioni dei simboli usati:

23 - MOMENT OF INERTIA

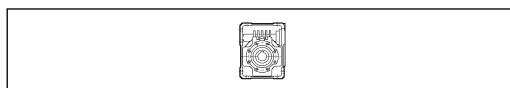
The following charts indicate the mass moment of inertia J_r [Kgm^2] referred to gear unit with high speed solid shaft. A key to the symbols used follows:

23 - TRÄGHEITSMOMENT

Die In den folgenden Tabellen angegebenen Trägheitsmomente J_r [Kgm^2] beziehen sich auf die Getriebeantriebsachse. Um das Lesen der Tabellen zu erleichtern, werden folgende Symbole verwendet:

23 - MOMENTS D'INERTIE

Les tableaux techniques suivants indiquent les valeurs du moment d'inertie J_r [Kgm^2] du niveau de l'arbre rapide du réducteur; pour une plus grande facilité de lecture, nous vous prions de noter les définitions des symboles employés :

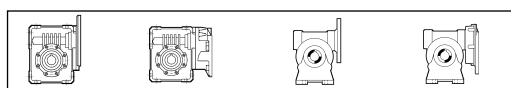


I valori relativi a questo simbolo sono da attribuire al riduttore compatto senza motore.

Values of the moment of inertia refer to compact gearmotors, less the motor inertia.

Die Werte beziehen sich dem Kompaktgetriebe, ohne Motor.

Les valeurs liées à ces symboles sont à assigner au réducteur compact, sans moteur.

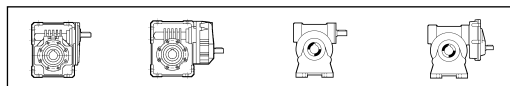


I valori relativi a questi simboli sono da attribuire al solo riduttore predisposto per attacco motore (grandezza IEC...).

Values refer to gearmotors, IEC style, less the motor.

Nur Getriebe vorbereitet für IEC-Motor (IEC-Größe...).

Les valeurs liées à ces symboles sont à assigner au réducteur prédisposé pour accouplement moteur seulement (taille CEI...).



I valori attribuiti al riduttore sono riferiti a questo simbolo.

Values refer to speed reducers (solid input shaft).

Dieses Symbol bezieht sich auf Getriebewerte.

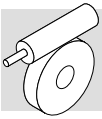
Les valeurs liées au réducteur sont assignées à ce symbole.

27

| | | i | J (x 10 ⁻⁴) [Kgm ²] | | | | | |
|-------|----------|----|---|---|---|---|---|------|
| | | | P27 | | | | | HS |
| VF 27 | VF 27_7 | 7 | 0.02 | — | — | — | — | 0.02 |
| | VF 27_10 | 10 | 0.01 | — | — | — | — | 0.01 |
| | VF 27_15 | 15 | 0.01 | — | — | — | — | 0.01 |
| | VF 27_20 | 20 | 0.01 | — | — | — | — | 0.01 |
| | VF 27_30 | 30 | 0.01 | — | — | — | — | 0.01 |
| | VF 27_40 | 40 | 0.01 | — | — | — | — | 0.01 |
| | VF 27_60 | 60 | 0.01 | — | — | — | — | 0.01 |
| | VF 27_70 | 70 | 0.01 | — | — | — | — | 0.01 |

30

| | | i | J (x 10 ⁻⁴) [Kgm ²] | | | | | |
|-------|----------|----|---|------|---|---|---|------|
| | | | P56 | P63 | | | | HS |
| VF 30 | VF 30_7 | 7 | 0.08 | 0.07 | — | — | — | 0.04 |
| | VF 30_10 | 10 | 0.07 | 0.06 | — | — | — | 0.03 |
| | VF 30_15 | 15 | 0.07 | 0.06 | — | — | — | 0.03 |
| | VF 30_20 | 20 | 0.06 | 0.06 | — | — | — | 0.03 |
| | VF 30_30 | 30 | 0.06 | 0.06 | — | — | — | 0.03 |
| | VF 30_40 | 40 | 0.06 | 0.06 | — | — | — | 0.03 |
| | VF 30_60 | 60 | 0.06 | 0.05 | — | — | — | 0.02 |
| | VF 30_70 | 70 | 0.06 | — | — | — | — | 0.02 |

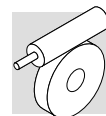



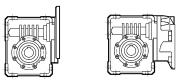
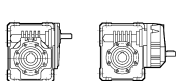
44

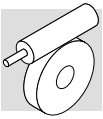
| | | i | J (x 10 ⁻⁴) [Kgm ²] | | | | | |
|---------------|------------|------|---|------|------|---|----|-------|
| | | | S44 | P63 | P71 | | HS | |
| VF 44 | VF 44_7 | 7 | — | 0.29 | 0.27 | — | — | 0.18 |
| | VF 44_10 | 10 | — | 0.24 | 0.22 | — | — | 0.14 |
| | VF 44_14 | 14 | — | 0.23 | 0.21 | — | — | 0.12 |
| | VF 44_20 | 20 | — | 0.19 | 0.18 | — | — | 0.009 |
| | VF 44_28 | 28 | — | 0.21 | 0.19 | — | — | 0.11 |
| | VF 44_35 | 35 | — | 0.19 | 0.18 | — | — | 0.09 |
| | VF 44_46 | 46 | — | 0.18 | — | — | — | 0.08 |
| | VF 44_60 | 60 | — | 0.17 | — | — | — | 0.07 |
| | VF 44_70 | 70 | — | 0.17 | — | — | — | 0.07 |
| | VF 44_100 | 100 | — | 0.17 | — | — | — | 0.07 |
| VFR 44 | VFR 44_70 | 70 | 0.21 | — | — | — | — | — |
| | VFR 44_100 | 100 | 0.20 | — | — | — | — | — |
| | VFR 44_140 | 140 | 0.20 | — | — | — | — | — |
| | VFR 44_175 | 175 | 0.20 | — | — | — | — | — |
| | VFR 44_230 | 230 | 0.20 | — | — | — | — | — |
| | VFR 44_300 | 300 | 0.20 | — | — | — | — | — |
| | VFR 44_350 | 350 | 0.20 | — | — | — | — | — |
| VFR 44_500 | 500 | 0.20 | — | — | — | — | — | |

49



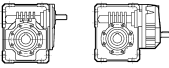
| | | i | J (x 10 ⁻⁴) [Kgm ²] | | | | | |
|---------------|------------|------|---|------|------|----|------|------|
| | | | P63 | P71 | P80 | HS | | |
| VF 49 | VF 49_7 | 7 | 0.69 | 0.67 | 0.61 | — | — | 0.42 |
| | VF 49_10 | 10 | 0.61 | 0.60 | 0.53 | — | — | 0.34 |
| | VF 49_14 | 14 | 0.58 | 0.57 | 0.5 | — | — | 0.31 |
| | VF 49_18 | 18 | 0.54 | 0.53 | 0.46 | — | — | 0.27 |
| | VF 49_24 | 24 | 0.52 | 0.5 | 0.44 | — | — | 0.24 |
| | VF 49_28 | 28 | 0.56 | 0.54 | 0.48 | — | — | 0.28 |
| | VF 49_36 | 36 | 0.53 | 0.51 | — | — | — | 0.25 |
| | VF 49_45 | 45 | 0.51 | 0.49 | — | — | — | 0.24 |
| | VF 49_60 | 60 | 0.50 | 0.48 | — | — | — | 0.23 |
| | VF 49_70 | 70 | 0.50 | — | — | — | — | 0.22 |
| | VF 49_80 | 80 | 0.49 | — | — | — | — | 0.22 |
| VF 49_100 | 100 | 0.49 | — | — | — | — | 0.22 | |
| VFR 49 | VFR 49_30 | 30 | 0.74 | — | — | — | — | 0.94 |
| | VFR 49_42 | 42 | 0.73 | — | — | — | — | 0.93 |
| | VFR 49_54 | 54 | 0.73 | — | — | — | — | 0.93 |
| | VFR 49_72 | 72 | 0.73 | — | — | — | — | 0.93 |
| | VFR 49_84 | 84 | 0.73 | — | — | — | — | 0.93 |
| | VFR 49_108 | 108 | 0.73 | — | — | — | — | 0.93 |
| | VFR 49_135 | 135 | 0.73 | — | — | — | — | 0.93 |
| | VFR 49_180 | 180 | 0.73 | — | — | — | — | 0.93 |
| | VFR 49_210 | 210 | 0.72 | — | — | — | — | 0.92 |
| | VFR 49_240 | 240 | 0.72 | — | — | — | — | 0.92 |
| | VFR 49_300 | 300 | 0.72 | — | — | — | — | 0.92 |




| | | i | J ($\cdot 10^{-4}$) [Kgm ²] | | | | | | | | | |
|--------------|-----------|-----|---|-----|------|---|------|-----|-----|---|------|---|
| | | |  S1 S2 S3 | | |  P63 P71 P80 P90 | | | | | |  HS |
| W 63 | W 63_7 | 7 | 3.4 | 3.6 | — | — | 3.5 | 3.5 | 3.5 | — | — | 3.6 |
| | W 63_10 | 10 | 3.1 | 3.3 | — | — | 3.2 | 3.3 | 3.2 | — | — | 3.3 |
| | W 63_12 | 12 | 3.1 | 3.3 | — | — | 3.1 | 3.2 | 3.1 | — | — | 3.3 |
| | W 63_15 | 15 | 3.0 | 3.2 | — | — | 3.0 | 3.1 | 3.0 | — | — | 3.2 |
| | W 63_19 | 19 | 2.9 | 3.1 | — | — | 2.9 | 3.0 | 2.9 | — | — | 3.1 |
| | W 63_24 | 24 | 2.8 | 3.1 | — | — | 2.9 | 3.0 | 2.9 | — | — | 3.0 |
| | W 63_30 | 30 | 2.9 | 3.1 | — | — | 2.9 | 3.0 | 2.9 | — | — | 3.1 |
| | W 63_38 | 38 | 2.8 | 3.1 | — | — | 2.9 | 3.0 | 2.9 | — | — | 3.0 |
| | W 63_45 | 45 | 2.8 | 3.0 | — | — | 2.9 | 2.9 | 2.9 | — | — | 3.0 |
| | W 63_64 | 64 | 2.8 | 3.0 | — | — | 2.8 | 2.9 | 2.8 | — | — | 3.0 |
| | W 63_80 | 80 | 2.8 | 3.0 | — | — | 2.8 | 2.9 | 2.8 | — | — | 3.0 |
| W 63_100 | 100 | 2.8 | 3.0 | — | — | 2.8 | 2.9 | 2.8 | — | — | 2.9 | |
| WR 63 | WR 63_21 | 21 | — | — | — | 0.84 | 0.83 | — | — | — | — | 0.81 |
| | WR 63_30 | 30 | — | — | — | 0.81 | 0.80 | — | — | — | — | 0.78 |
| | WR 63_36 | 36 | — | — | — | 0.81 | 0.80 | — | — | — | — | 0.77 |
| | WR 63_45 | 45 | — | — | — | 0.80 | 0.79 | — | — | — | — | 0.76 |
| | WR 63_57 | 57 | — | — | — | 0.79 | 0.78 | — | — | — | — | 0.75 |
| | WR 63_72 | 72 | — | — | — | 0.78 | 0.77 | — | — | — | — | 0.74 |
| | WR 63_90 | 90 | — | — | — | 0.79 | 0.78 | — | — | — | — | 0.75 |
| | WR 63_114 | 114 | — | — | — | 0.78 | 0.77 | — | — | — | — | 0.74 |
| | WR 63_135 | 135 | — | — | — | 0.78 | 0.77 | — | — | — | — | 0.74 |
| | WR 63_192 | 192 | — | — | — | 0.77 | 0.76 | — | — | — | — | 0.74 |
| | WR 63_240 | 240 | — | — | — | 0.77 | 0.76 | — | — | — | — | 0.74 |
| WR 63_300 | 300 | — | — | — | 0.77 | 0.76 | — | — | — | — | 0.73 | |



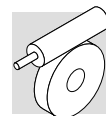
75



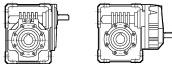
| | | J (· 10 ⁻⁴) [Kgm ²] | | | | | | | | | | |
|-------------|---------|---|-----|-----|--|-----|-----|-----|------|---|-----|-----|
| | |  | | |  | | | | |  | | |
| | | S1 | S2 | S3 | P63 | P71 | P80 | P90 | P100 | HS | | |
| W 75 | W 75_7 | 7 | 6.9 | 6.6 | 6.6 | — | 6.9 | 7.0 | 6.9 | 6.9 | — | 7.3 |
| | W 75_10 | 10 | 6.4 | 6.1 | 6.1 | — | 6.4 | 6.4 | 6.3 | 5.7 | — | 6.8 |
| | W 75_15 | 15 | 6.1 | 5.8 | 5.8 | — | 6.1 | 6.1 | 6.0 | 5.3 | — | 6.5 |
| | W 75_20 | 20 | 5.9 | 5.6 | 5.6 | — | 5.9 | 5.9 | 5.9 | 5.2 | — | 6.3 |
| | W 75_25 | 25 | 5.9 | 5.6 | 5.6 | — | 6.0 | 6.0 | 5.9 | 5.2 | — | 6.3 |
| | W 75_30 | 30 | 5.9 | 5.6 | 5.6 | — | 5.9 | 5.9 | 5.9 | 5.2 | — | 6.3 |
| | W 75_40 | 40 | 5.9 | 5.6 | 5.6 | — | 5.9 | 5.9 | 5.8 | 5.2 | — | 6.3 |
| | W 75_50 | 50 | 5.9 | 5.6 | 5.6 | — | 5.9 | 5.9 | 5.8 | 5.1 | — | 6.2 |
| | W 75_60 | 60 | 5.8 | 5.5 | 5.5 | — | 5.8 | 5.9 | 5.8 | 5.1 | — | 6.2 |
| | W 75_80 | 80 | 5.8 | 5.5 | 5.5 | — | 5.8 | 5.8 | 5.8 | 5.1 | — | 6.2 |
| W 75_100 | 100 | 5.8 | 5.5 | 5.5 | — | 5.8 | 5.8 | 5.7 | 5.0 | — | 6.2 | |

| | | | | | | | | | | | | |
|--------------|-----------|-----|---|---|-----|-----|-----|-----|---|---|-----|-----|
| WR 75 | WR 75_21 | 21 | — | — | — | 1.2 | 1.2 | 2.1 | — | — | — | 1.9 |
| | WR 75_30 | 30 | — | — | — | 1.1 | 1.1 | 2.1 | — | — | — | 1.1 |
| | WR 75_45 | 45 | — | — | — | 1.1 | 1.1 | 2.0 | — | — | — | 1.1 |
| | WR 75_60 | 60 | — | — | — | 1.1 | 1.1 | 2.0 | — | — | — | 1.0 |
| | WR 75_75 | 75 | — | — | — | 1.1 | 1.1 | 2.0 | — | — | — | 1.0 |
| | WR 75_90 | 90 | — | — | — | 1.1 | 1.1 | 2.0 | — | — | — | 1.0 |
| | WR 75_120 | 120 | — | — | — | 1.1 | 1.1 | 2.0 | — | — | — | 1.0 |
| | WR 75_150 | 150 | — | — | — | 1.1 | 1.1 | 2.0 | — | — | — | 1.0 |
| | WR 75_180 | 180 | — | — | — | 1.1 | 1.1 | 2.0 | — | — | — | 1.0 |
| | WR 75_240 | 240 | — | — | — | 1.1 | 1.1 | 2.0 | — | — | — | 1.0 |
| WR 75_300 | 300 | — | — | — | 1.1 | 1.1 | 2.0 | — | — | — | 1.0 | |


| | | J (· 10 ⁻⁴) [Kgm ²] | |
|--|--|---|---|
| | | i |  P90 |

| | | | |
|---------------------|------------|------|-----|
| WR 75_P90 B5 | WR 75_15 | 15 | 6.0 |
| | WR 75_22.5 | 22.5 | 5.9 |
| | WR 75_30 | 30 | 5.8 |
| | WR 75_37.5 | 37.5 | 5.8 |
| | WR 75_45 | 45 | 5.8 |
| | WR 75_60 | 60 | 5.8 |
| | WR 75_75 | 75 | 5.8 |

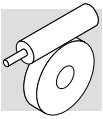


| | | J (· 10 ⁻⁴) [Kgm ²] | | | | | | | | | | |
|-------------|---------|---|-----|-----|--|-----|-----|-----|------|---|-----|------|
| | |  | | |  | | | | |  | | |
| | | S1 | S2 | S3 | P63 | P71 | P80 | P90 | P100 | HS | | |
| W 86 | W 86_7 | 7 | 9.7 | 9.4 | 9.4 | — | 9.7 | 9.7 | 9.6 | 9.6 | — | 10.1 |
| | W 86_10 | 10 | 8.4 | 8.1 | 8.1 | — | 8.4 | 8.4 | 8.3 | 7.7 | — | 8.9 |
| | W 86_15 | 15 | 7.7 | 7.4 | 7.4 | — | 7.7 | 7.7 | 7.7 | 7.0 | — | 8.2 |
| | W 86_20 | 20 | 6.9 | 6.6 | 6.6 | — | 6.9 | 7.0 | 6.9 | 6.2 | — | 7.4 |
| | W 86_23 | 23 | 6.8 | 6.5 | 6.5 | — | 6.8 | 6.9 | 6.8 | 6.1 | — | 7.3 |
| | W 86_30 | 30 | 7.3 | 7.0 | 7.0 | — | 7.3 | 7.3 | 7.3 | 6.6 | — | 7.8 |
| | W 86_40 | 40 | 6.7 | 6.4 | 6.4 | — | 6.7 | 6.7 | 6.6 | 6.0 | — | 7.2 |
| | W 86_46 | 46 | 6.7 | 6.4 | 6.4 | — | 6.7 | 6.7 | 6.6 | 5.9 | — | 7.1 |
| | W 86_56 | 56 | 6.6 | 6.3 | 6.3 | — | 6.6 | 6.7 | 6.6 | 5.9 | — | 7.1 |
| | W 86_64 | 64 | 6.6 | 6.3 | 6.3 | — | 6.6 | 6.6 | 6.5 | 5.9 | — | 7.1 |
| | W 86_80 | 80 | 6.6 | 6.3 | 6.3 | — | 6.6 | 6.6 | 6.5 | 5.9 | — | 7.1 |
| W 86_100 | 100 | 6.4 | 6.1 | 6.1 | — | 6.4 | 6.5 | 6.4 | 5.7 | — | 6.9 | |



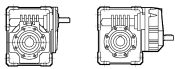
| | | | | | | | | | | | | |
|--------------|-----------|-----|---|---|---|-----|-----|-----|---|---|---|-----|
| WR 86 | WR 86_21 | 21 | — | — | — | 1.5 | 1.5 | 2.4 | — | — | — | 2.2 |
| | WR 86_30 | 30 | — | — | — | 1.4 | 1.3 | 2.3 | — | — | — | 1.3 |
| | WR 86_45 | 45 | — | — | — | 1.3 | 1.3 | 2.2 | — | — | — | 1.2 |
| | WR 86_60 | 60 | — | — | — | 1.2 | 1.2 | 2.1 | — | — | — | 1.2 |
| | WR 86_69 | 69 | — | — | — | 1.2 | 1.2 | 2.1 | — | — | — | 1.1 |
| | WR 86_90 | 90 | — | — | — | 1.2 | 1.2 | 2.2 | — | — | — | 1.2 |
| | WR 86_120 | 120 | — | — | — | 1.2 | 1.2 | 2.1 | — | — | — | 1.1 |
| | WR 86_138 | 138 | — | — | — | 1.2 | 1.2 | 2.1 | — | — | — | 1.1 |
| | WR 86_168 | 168 | — | — | — | 1.2 | 1.2 | 2.1 | — | — | — | 1.1 |
| | WR 86_192 | 192 | — | — | — | 1.2 | 1.1 | 2.1 | — | — | — | 1.1 |
| | WR 86_240 | 240 | — | — | — | 1.2 | 1.1 | 2.1 | — | — | — | 1.1 |
| | WR 86_300 | 300 | — | — | — | 1.1 | 1.1 | 2.1 | — | — | — | 1.1 |

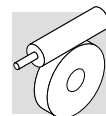
| | | J (· 10 ⁻⁴) [Kgm ²] | |
|--|--|---|---|
| | | i |  P90 |

| | | | |
|---------------------|------------|------|-----|
| WR 86_P90 B5 | WR 86_15 | 15 | 6.9 |
| | WR 86_22.5 | 22.5 | 6.6 |
| | WR 86_30 | 30 | 6.3 |
| | WR 86_34.5 | 34.5 | 6.2 |
| | WR 86_45 | 45 | 6.4 |
| | WR 86_60 | 60 | 6.2 |
| | WR 86_69 | 69 | 6.1 |
| | WR 86_84 | 84 | 6.1 |

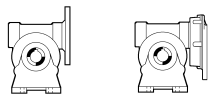
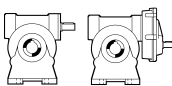


110

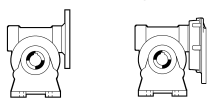
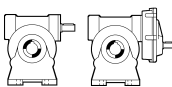
| | | i | J ($\cdot 10^{-4}$) [Kgm ²] | | | | | | | | | |
|---------------|------------|-----|---|----|----|--|-----|-----|-----|-----|---|-----|
| | | |  S1 S2 S3 | | |  P63 P71 P80 P90 P100 P132 | | | | |  HS | |
| W 110 | W 110_7 | 7 | — | 22 | 22 | — | — | 23 | 23 | 23 | 28 | 23 |
| | W 110_10 | 10 | — | 19 | 19 | — | — | 19 | 19 | 24 | 24 | 20 |
| | W 110_15 | 15 | — | 17 | 17 | — | — | 17 | 17 | 22 | 22 | 17 |
| | W 110_20 | 20 | — | 14 | 14 | — | — | 14 | 14 | 19 | 19 | 15 |
| | W 110_23 | 23 | — | 14 | 14 | — | — | 14 | 14 | 19 | 19 | 15 |
| | W 110_30 | 30 | — | 15 | 15 | — | — | 16 | 16 | 20 | 20 | 16 |
| | W 110_40 | 40 | — | 13 | 13 | — | — | 14 | 14 | 19 | 19 | 14 |
| | W 110_46 | 46 | — | 13 | 13 | — | — | 13 | 13 | 18 | 18 | 14 |
| | W 110_56 | 56 | — | 13 | 13 | — | — | 13 | 13 | 18 | 18 | 14 |
| | W 110_64 | 64 | — | 13 | 13 | — | — | 13 | 13 | 18 | 18 | 14 |
| | W 110_80 | 80 | — | 13 | 13 | — | — | 13 | 13 | 18 | 18 | 14 |
| W 110_100 | 100 | — | 13 | 13 | — | — | 13 | 13 | 18 | 18 | 14 | |
| WR 110 | WR 110_21 | 21 | — | — | — | — | 3.0 | 9.0 | 8.8 | 8.9 | — | 9.2 |
| | WR 110_30 | 30 | — | — | — | — | 2.5 | 8.6 | 8.4 | 8.4 | — | 8.8 |
| | WR 110_45 | 45 | — | — | — | — | 2.3 | 8.3 | 8.2 | 8.2 | — | 8.5 |
| | WR 110_60 | 60 | — | — | — | — | 2.0 | 8.1 | 7.9 | 7.9 | — | 8.3 |
| | WR 110_69 | 69 | — | — | — | — | 2.0 | 8.0 | 7.9 | 7.9 | — | 8.2 |
| | WR 110_90 | 90 | — | — | — | — | 2.2 | 8.2 | 8.1 | 8.1 | — | 8.4 |
| | WR 110_120 | 120 | — | — | — | — | 1.9 | 8.0 | 7.8 | 7.9 | — | 8.2 |
| | WR 110_138 | 138 | — | — | — | — | 1.9 | 8.0 | 7.8 | 7.8 | — | 8.2 |
| | WR 110_168 | 168 | — | — | — | — | 1.9 | 8.0 | 7.8 | 7.8 | — | 8.1 |
| | WR 110_192 | 192 | — | — | — | — | 1.9 | 7.9 | 7.8 | 7.8 | — | 8.1 |
| | WR 110_240 | 240 | — | — | — | — | 1.9 | 7.9 | 7.8 | 7.8 | — | 8.1 |
| WR 110_300 | 300 | — | — | — | — | 1.9 | 7.9 | 7.8 | 7.8 | — | 8.1 | |

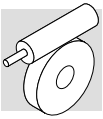


130



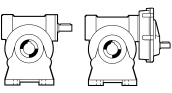
| | | i | J (x 10 ⁻⁴) [Kgm ²] | | | | |   | |
|----------------|-------------|-----|---|------|------|------|------|---|--|
| | | | P80 | P90 | P100 | P112 | P132 | | |
| VF 130 | VF 130_7 | 7 | — | — | 36.3 | 36.3 | 34.6 | 30.9 | |
| | VF 130_10 | 10 | — | — | 27.1 | 27.1 | 25.4 | 21.7 | |
| | VF 130_15 | 15 | — | — | 19.9 | 19.9 | 18.2 | 14.5 | |
| | VF 130_20 | 20 | — | — | 16.8 | 16.8 | 15.1 | 11.4 | |
| | VF 130_23 | 23 | — | — | 15.9 | 15.9 | 14.3 | 10.6 | |
| | VF 130_30 | 30 | — | — | 17.1 | 17.1 | 15.4 | 11.7 | |
| | VF 130_40 | 40 | — | — | 15.2 | 15.2 | 13.6 | 9.9 | |
| | VF 130_46 | 46 | — | 13.8 | 13.6 | — | — | 8.2 | |
| | VF 130_56 | 56 | — | 13.4 | 13.2 | — | — | 7.8 | |
| | VF 130_64 | 64 | — | 13.1 | 12.8 | — | — | 7.4 | |
| | VF 130_80 | 80 | — | 12.7 | 12.4 | — | — | 7.0 | |
| VF 130_100 | 100 | — | 12.5 | — | — | — | 8.9 | | |
| VFR 130 | VFR 130_30 | 30 | 5.3 | 5.3 | 5.2 | 5.2 | — | 5.7 | |
| | VFR 130_45 | 45 | 4.5 | 4.5 | 4.4 | 4.4 | — | 4.9 | |
| | VFR 130_60 | 60 | 4.2 | 4.1 | 4.1 | 4.1 | — | 4.6 | |
| | VFR 130_69 | 69 | 4.1 | 4.0 | 4.0 | 4.0 | — | 4.5 | |
| | VFR 130_90 | 90 | 4.2 | 4.1 | 4.1 | 4.1 | — | 4.6 | |
| | VFR 130_120 | 120 | 4.0 | 3.9 | 4.0 | 4.0 | — | 4.4 | |
| | VFR 130_138 | 138 | 3.8 | 3.8 | 3.7 | 3.7 | — | 4.2 | |
| | VFR 130_168 | 168 | 3.8 | 3.7 | 3.7 | 3.7 | — | 4.1 | |
| | VFR 130_192 | 192 | 3.7 | 3.7 | 3.6 | 3.6 | — | 4.1 | |
| | VFR 130_240 | 240 | 3.7 | 3.6 | 3.6 | 3.6 | — | 4.1 | |
| | VFR 130_300 | 300 | 3.9 | 3.8 | 3.8 | 3.8 | — | 4.3 | |

150



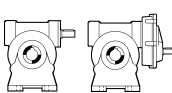
| | | i | J (x 10 ⁻⁴) [Kgm ²] | | | | |   | |
|----------------|--------------|------|---|------|------|------|------|---|--|
| | | | P80 | P90 | P100 | P112 | P132 | | |
| VF 150 | VF 150_7 | 7 | — | — | 59.7 | 59.7 | 57.8 | 49.6 | |
| | VF 150_10 | 10 | — | — | 45.5 | 45.5 | 43.6 | 35.4 | |
| | VF 150_15 | 15 | — | — | 31.2 | 31.2 | 29.4 | 21.1 | |
| | VF 150_20 | 20 | — | — | 29.1 | 29.1 | 27.2 | 18.9 | |
| | VF 150_23 | 23 | — | 29.2 | 27.6 | 27.6 | — | 17.4 | |
| | VF 150_30 | 30 | — | 32.3 | 30.6 | 30.6 | — | 20.5 | |
| | VF 150_40 | 40 | — | 28.1 | 26.4 | 26.4 | — | 16.3 | |
| | VF 150_46 | 46 | — | 25.2 | 23.5 | 23.5 | — | 13.4 | |
| | VF 150_56 | 56 | — | 24.8 | — | — | — | 12.8 | |
| | VF 150_64 | 64 | — | 24.2 | — | — | — | 12.4 | |
| | VF 150_80 | 80 | — | 23.2 | — | — | — | 11.4 | |
| VF 150_100 | 100 | — | 22.9 | — | — | — | 11.1 | | |
| VFR 150 | VFR 150_25 | 25 | — | — | — | 14.7 | — | — | |
| | VFR 150_30 | 30 | 10.4 | 10.4 | 10.4 | — | — | 11.3 | |
| | VFR 150_37.5 | 37.5 | — | — | — | 12.5 | — | — | |
| | VFR 150_45 | 45 | 8.8 | 8.8 | 8.8 | — | — | 9.7 | |
| | VFR 150_50 | 50 | — | — | — | 11.8 | — | — | |
| | VFR 150_60 | 60 | 8.4 | 8.3 | 8.3 | — | — | 9.2 | |
| | VFR 150_69 | 69 | 8.4 | 8.4 | 8.4 | — | — | 9.3 | |
| | VFR 150_90 | 90 | 8.3 | 8.7 | 8.7 | — | — | 9.7 | |
| | VFR 150_120 | 120 | 8.3 | 8.2 | 8.2 | — | — | 9.2 | |
| | VFR 150_138 | 138 | 8 | 7.9 | 7.9 | — | — | 8.9 | |
| | VFR 150_168 | 168 | 7.9 | 7.9 | 7.9 | — | — | 8.9 | |
| | VFR 150_192 | 192 | 7.9 | 7.8 | 7.8 | — | — | 8.8 | |
| | VFR 150_240 | 240 | 7.7 | 7.7 | 7.7 | — | — | 8.6 | |
| | VFR 150_300 | 300 | 7.7 | 7.7 | 7.7 | — | — | 8.6 | |

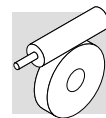


185

| | | i | J (x 10 ⁻⁴) [Kgm ²] | | | | | | |
|----------------|--------------|------|---|------|---|------|------|---|-------|
| | | |  | |  | | |  | |
| | | | P90 | P100 | P112 | P132 | P160 | P180 | HS |
| VF 185 | VF 185_7 | 7 | — | — | — | — | — | 145.8 | 128.2 |
| | VF 185_10 | 10 | — | — | — | — | — | 108.2 | 90.6 |
| | VF 185_15 | 15 | — | — | — | — | 70.2 | 87.5 | 49.9 |
| | VF 185_20 | 20 | — | — | — | — | 68.7 | 65.9 | 48.3 |
| | VF 185_30 | 30 | — | — | — | 58.1 | 54.2 | — | 33.8 |
| | VF 185_40 | 40 | — | — | — | 63.1 | 61.2 | — | 40.9 |
| | VF 185_50 | 50 | — | 59.1 | 59.1 | 57.5 | — | — | 35.3 |
| | VF 185_60 | 60 | — | 54.8 | 54.8 | 53.1 | — | — | 30.6 |
| | VF 185_80 | 80 | — | 52.1 | 52.1 | 50.5 | — | — | 28.3 |
| | VF 185_100 | 100 | — | 50.8 | 50.8 | — | — | — | 26.9 |
| VFR 185 | VFR 185_25 | 25 | — | — | — | 23.6 | — | — | — |
| | VFR 185_37.5 | 37.5 | — | — | — | 17.1 | — | — | — |
| | VFR 185_50 | 50 | — | — | — | 16.8 | — | — | — |
| | VFR 185_75 | 75 | — | — | — | 14.5 | — | — | — |
| | VFR 185_100 | 100 | — | — | — | 15.6 | — | — | — |
| | VFR 185_30 | 30 | 16.6 | 16.5 | 16.5 | — | — | — | 17.5 |
| | VFR 185_45 | 45 | 12.0 | 12.0 | 12.0 | — | — | — | 12.9 |
| | VFR 185_60 | 60 | 11.9 | 11.8 | 11.8 | — | — | — | 12.7 |
| | VFR 185_90 | 90 | 10.2 | 10.2 | 10.2 | — | — | — | 11.1 |
| | VFR 185_120 | 120 | 11.0 | 11.0 | 11.0 | — | — | — | 11.9 |
| | VFR 185_150 | 150 | 10.4 | 10.3 | 10.3 | — | — | — | 11.3 |
| | VFR 185_180 | 180 | 9.9 | 9.9 | 9.9 | — | — | — | 10.8 |
| | VFR 185_240 | 240 | 9.6 | 9.6 | 9.6 | — | — | — | 10.5 |
| | VFR 185_300 | 300 | 9.5 | 9.4 | 9.4 | — | — | — | 10.4 |

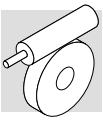
210

| | | i | J (x 10 ⁻⁴) [Kgm ²] | | | | | | | |
|----------------|-------------|-----|---|------|---|-------|-------|---|-------|-------|
| | | |  | |  | | |  | | |
| | | | P100 | P112 | P132 | P160 | P180 | P200 | P225 | HS |
| VF 210 | VF 210_7 | 7 | — | — | 285.9 | 285.9 | 285.9 | 285.9 | 285.9 | 285.9 |
| | VF 210_10 | 10 | — | — | 176.7 | 176.7 | 176.7 | 176.7 | 176.7 | 176.7 |
| | VF 210_15 | 15 | — | — | 120.2 | 120.2 | 120.2 | 120.2 | 120.2 | 120.2 |
| | VF 210_20 | 20 | — | — | 115.5 | 115.5 | 115.5 | 115.5 | 115.5 | 115.5 |
| | VF 210_30 | 30 | — | — | 80.5 | 80.5 | 80.5 | 80.5 | 80.5 | 80.5 |
| | VF 210_40 | 40 | — | — | 98.2 | 98.2 | 98.2 | 98.2 | 98.2 | 98.2 |
| | VF 210_50 | 50 | — | — | 83.7 | 83.7 | 83.7 | 83.7 | 83.7 | 83.7 |
| | VF 210_60 | 60 | — | — | 74.7 | 74.7 | 74.7 | 74.7 | 74.7 | 74.7 |
| | VF 210_80 | 80 | — | — | 67.5 | 67.5 | 67.5 | 67.5 | 67.5 | 67.5 |
| | VF 210_100 | 100 | — | — | 62.7 | 62.7 | 62.7 | 62.7 | 62.7 | 62.7 |
| VFR 210 | VFR 210_30 | 30 | 47.7 | 47.7 | 47.3 | 47.0 | — | — | — | 51.3 |
| | VFR 210_45 | 45 | 41.4 | 41.4 | 41.0 | 40.8 | — | — | — | 45.0 |
| | VFR 210_60 | 60 | 40.9 | 40.9 | 40.5 | 40.2 | — | — | — | 44.5 |
| | VFR 210_90 | 90 | 37.0 | 37.0 | 36.6 | 36.3 | — | — | — | 40.6 |
| | VFR 210_120 | 120 | 39.0 | 39.0 | 38.6 | 38.3 | — | — | — | 42.6 |
| | VFR 210_150 | 150 | 37.4 | 37.4 | 37.0 | 36.7 | — | — | — | 40.9 |
| | VFR 210_180 | 180 | 36.4 | 36.4 | 36.0 | 35.7 | — | — | — | 39.9 |
| | VFR 210_240 | 240 | 35.6 | 35.6 | 35.2 | 34.9 | — | — | — | 39.1 |
| | VFR 210_300 | 300 | 35.0 | 35.0 | 34.6 | 34.4 | — | — | — | 38.6 |



250

| | | i | J (x 10 ⁻⁴) [Kgm ²] | | | | | | | |
|----------------|-------------|-----|---|------|-------|-------|-------|-------|-------|-------|
| | | | | | | | | | | |
| | | | P100 | P112 | P132 | P160 | P180 | P200 | P225 | HS |
| VF 250 | VF 250_7 | 7 | — | — | 619.8 | 619.8 | 619.8 | 619.8 | 619.8 | 619.8 |
| | VF 250_10 | 10 | — | — | 387.3 | 387.3 | 387.3 | 387.3 | 387.3 | 387.3 |
| | VF 250_15 | 15 | — | — | 266.4 | 266.4 | 266.4 | 266.4 | 266.4 | 266.4 |
| | VF 250_20 | 20 | — | — | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 | 242.3 |
| | VF 250_30 | 30 | — | — | 184.2 | 184.2 | 184.2 | 184.2 | 184.2 | 184.2 |
| | VF 250_40 | 40 | — | — | 240.6 | 240.6 | 240.6 | 240.6 | 240.6 | 240.6 |
| | VF 250_50 | 50 | — | — | 240.3 | 240.3 | 240.3 | 240.3 | 240.3 | 240.3 |
| | VF 250_60 | 60 | — | — | 158.3 | 158.3 | 158.3 | 158.3 | 158.3 | 158.3 |
| | VF 250_80 | 80 | — | — | 160.0 | 160.0 | 160.0 | 160.0 | 160.0 | 160.0 |
| | VF 250_100 | 100 | — | — | 148.7 | 148.7 | 148.7 | 148.7 | 148.7 | 148.7 |
| VFR 250 | VFR 250_30 | 30 | 71.0 | 71.0 | 70.6 | 70.4 | — | — | — | 74.6 |
| | VFR 250_45 | 45 | 57.6 | 57.6 | 57.2 | 56.9 | — | — | — | 61.1 |
| | VFR 250_60 | 60 | 54.9 | 54.9 | 54.5 | 54.2 | — | — | — | 58.4 |
| | VFR 250_90 | 90 | 48.4 | 48.4 | 48.0 | 47.8 | — | — | — | 52.0 |
| | VFR 250_120 | 120 | 54.7 | 54.7 | 54.3 | 54.0 | — | — | — | 58.3 |
| | VFR 250_150 | 150 | 54.7 | 54.7 | 54.3 | 54.0 | — | — | — | 58.2 |
| | VFR 250_180 | 180 | 45.5 | 45.5 | 45.1 | 44.9 | — | — | — | 49.1 |
| | VFR 250_240 | 240 | 45.7 | 45.7 | 45.3 | 45.1 | — | — | — | 49.3 |
| | VFR 250_300 | 300 | 44.5 | 44.5 | 44.1 | 43.8 | — | — | — | 48.0 |



VF 27□...BN27□

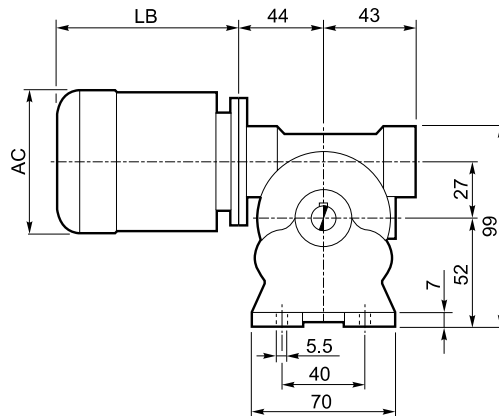
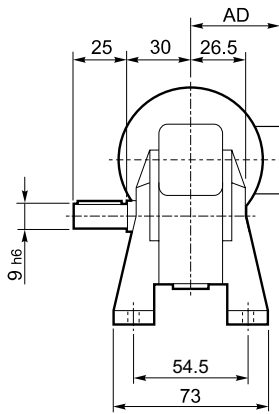
24 - DIMENSIONI

24 - DIMENSIONS

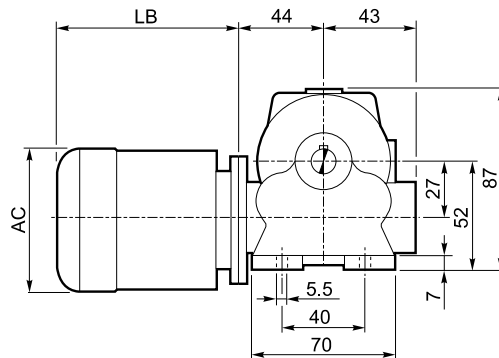
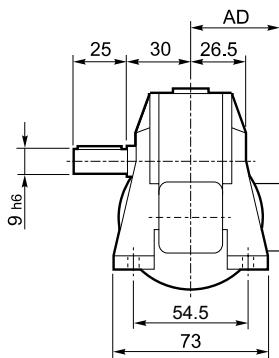
24 - ABMESSUNGEN

24 - DIMENSIONS

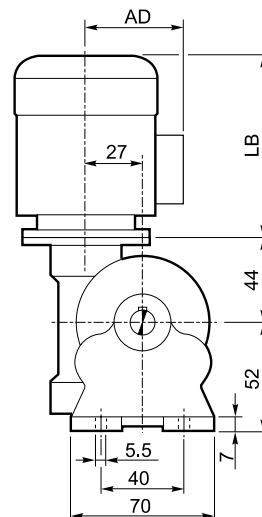
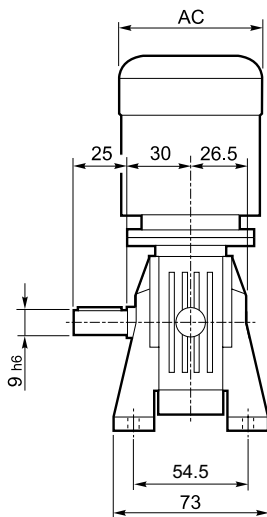
A



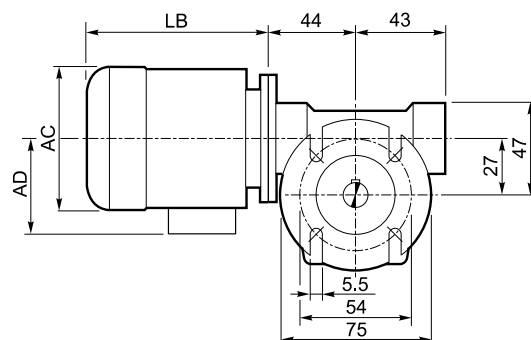
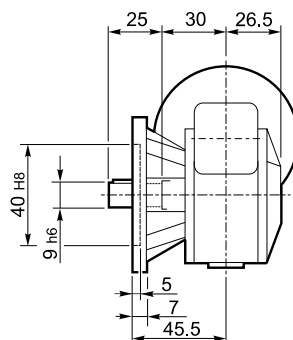
N



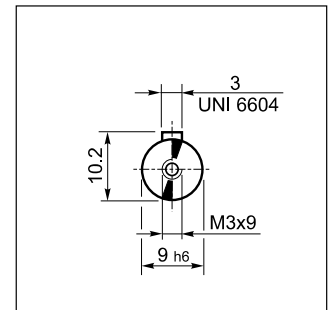
V

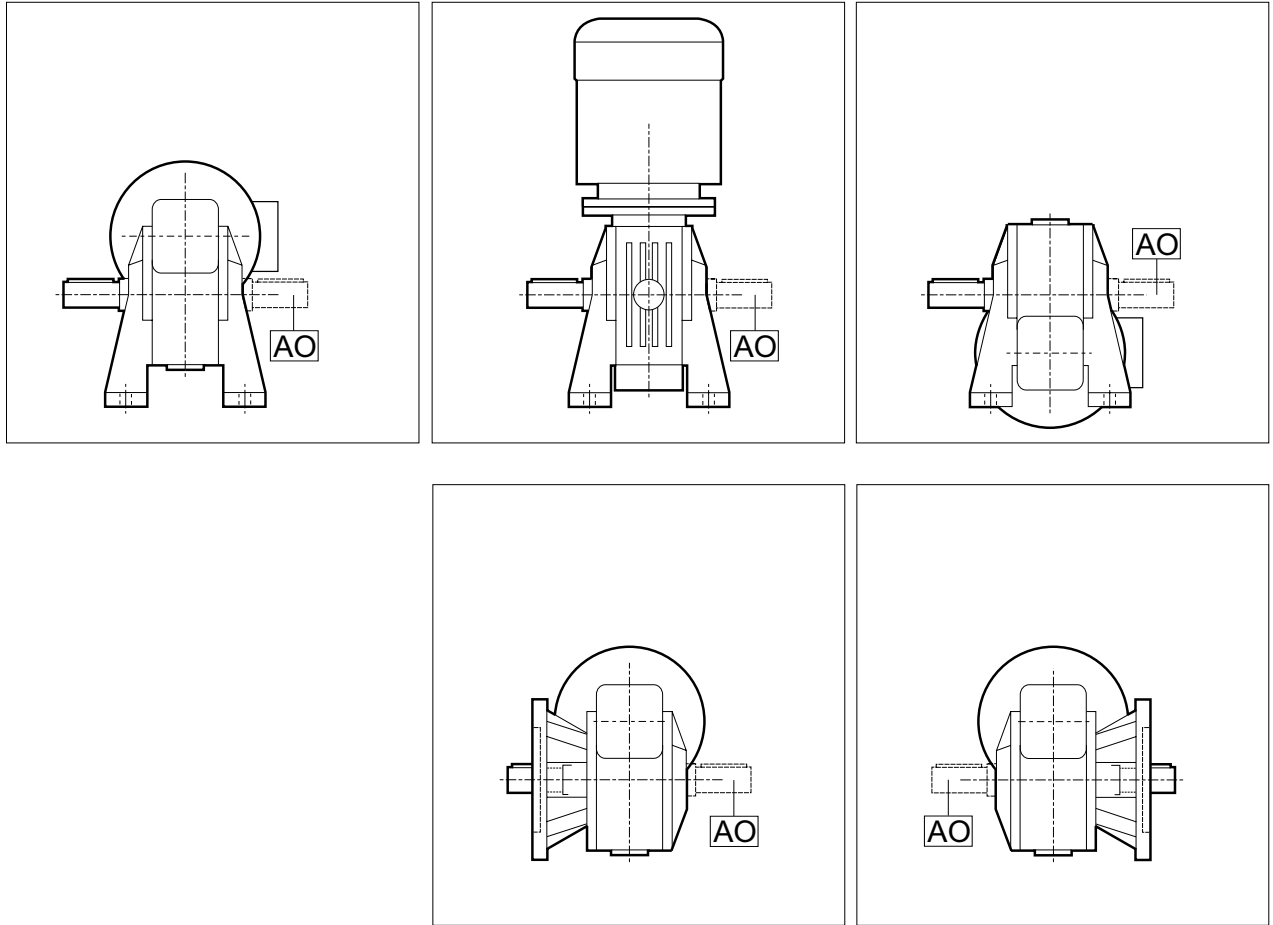
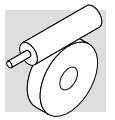


F

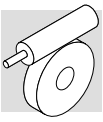


OUTPUT



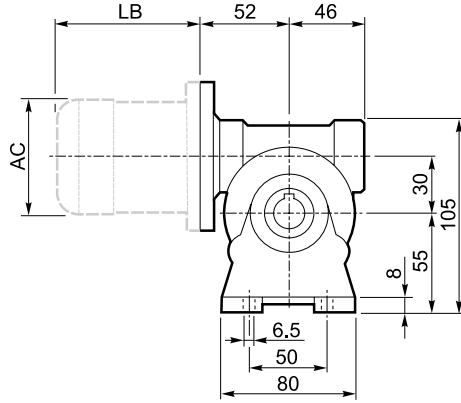
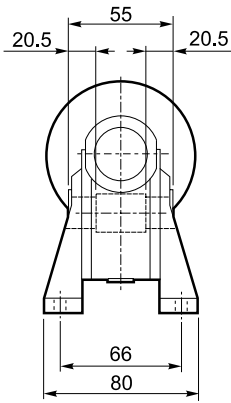


| | VF 27 | | | | | | | | | | | | | |
|----------------|-------------|--------------------------|-------------|-------------|---------------|----------------------|-------------------|-------------------|-------------------|--|-------------|-----|-----|----|
| | P_n kW | n min ⁻¹ | M_n Nm | η % | $\cos\varphi$ | I_n A (400V) | $\frac{I_s}{I_n}$ | $\frac{M_s}{M_n}$ | $\frac{M_a}{M_n}$ | J_m ($\cdot 10^{-4}$) kgm ² | Kg | LB | AC | AD |
| BN 27A4 | 0.04 | 1350 | 0.28 | 36 | 0.57 | 0.28 | 2.3 | 2.0 | 1.8 | 0.56 | 2.8 | 132 | 103 | 76 |
| BN 27B4 | 0.06 | 1360 | 0.42 | 39 | 0.57 | 0.39 | 2.5 | 2.2 | 1.9 | 0.76 | 3.1 | 149 | 103 | 76 |
| BN 27C4 | 0.09 | 1380 | 0.63 | 46 | 0.65 | 0.43 | 2.8 | 2.3 | 1.9 | 1.49 | 3.3 | 175 | 112 | 94 |

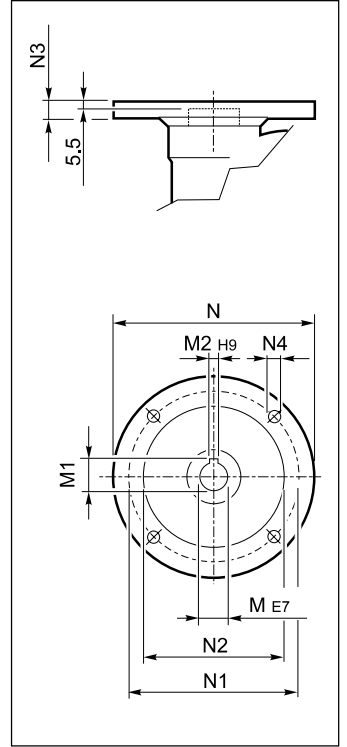


VF 30 □...P(IEC)

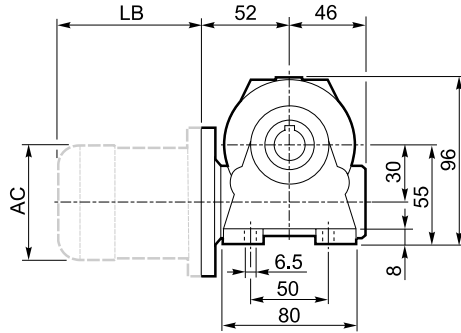
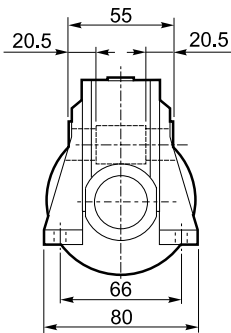
A



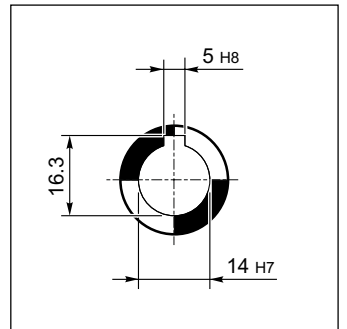
INPUT



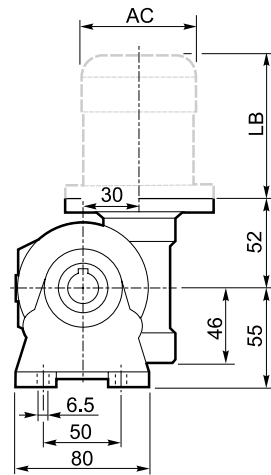
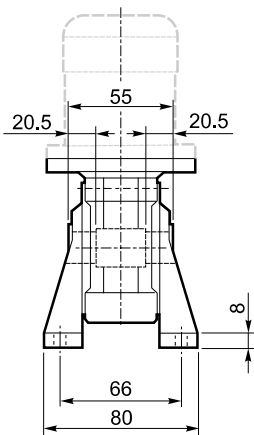
N



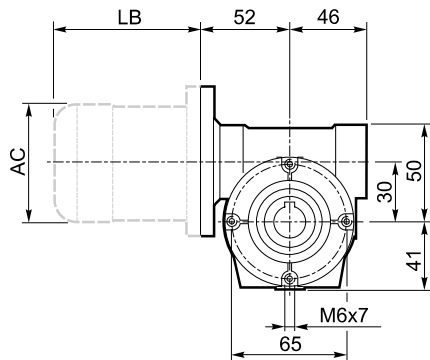
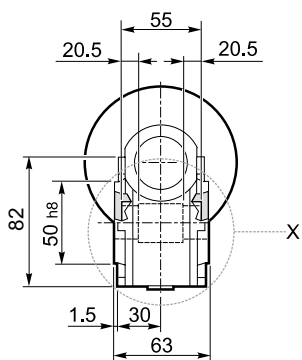
OUTPUT



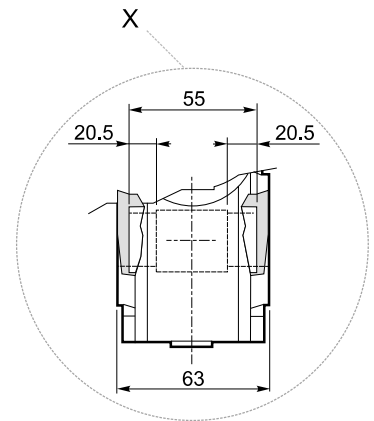
V

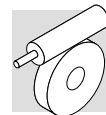


P

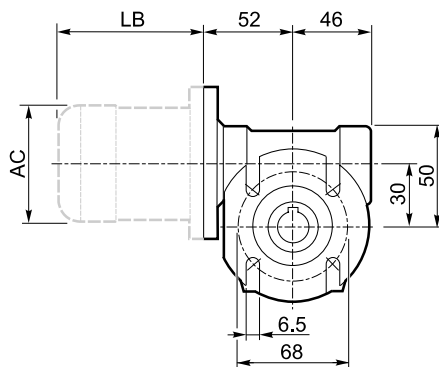
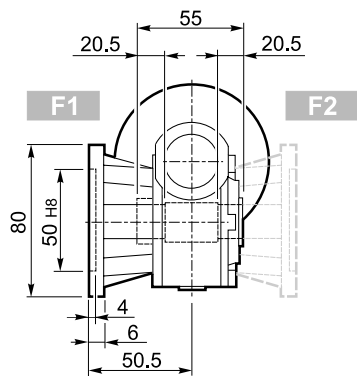


X

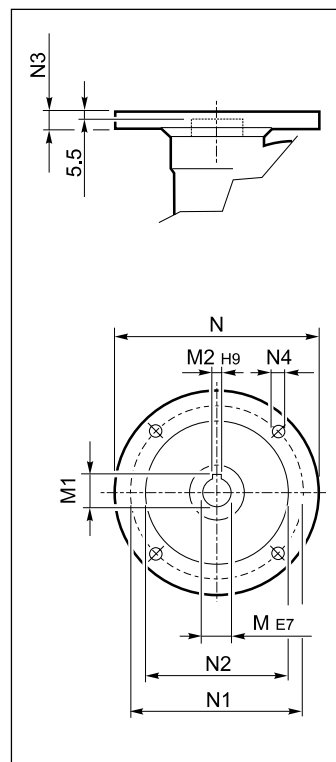




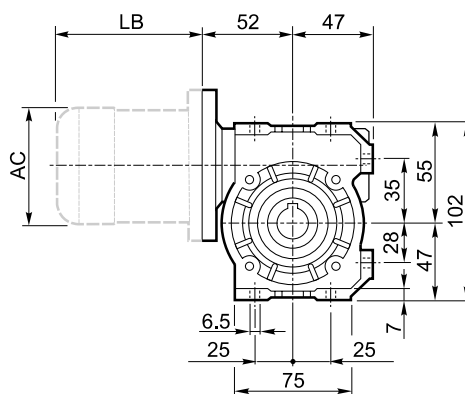
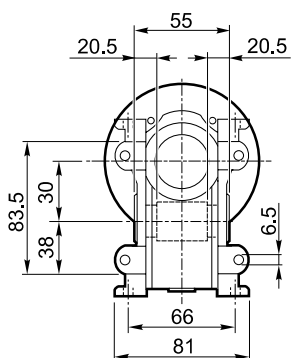
F



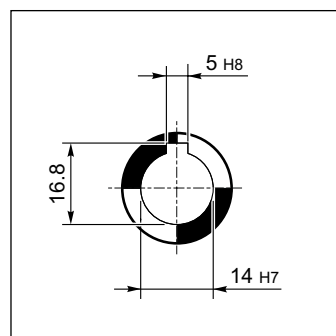
INPUT



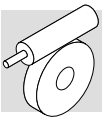
U



OUTPUT

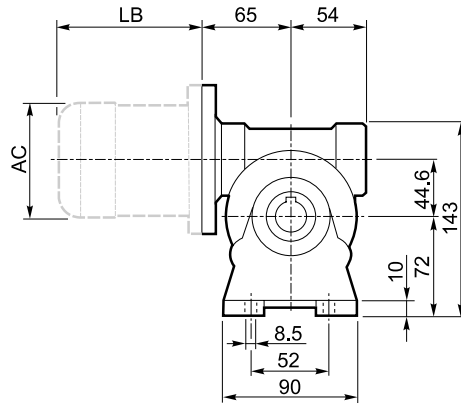
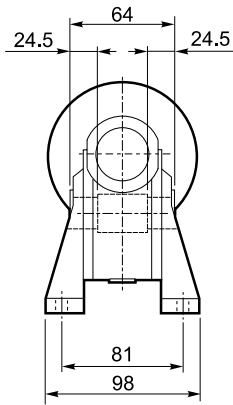


| VF 30_ | | | | | | | | | | | BN | | BN...FD BN...FA | | K | | K...FC | | | |
|--------|---------|----|------|----|-----|-----|----|----|-----|-----|----|----|--------------------|-----|-----|-----|--------|-----|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC | LB | AC | LB | AC | |
| VF 30 | P56 B5 | 9 | 10.4 | 3 | 120 | 100 | 80 | 7 | 7 | 1.1 | | 56 | 165 | 110 | — | — | — | — | — | |
| VF 30 | P56 B14 | 9 | 10.4 | 3 | 80 | 65 | 50 | 7 | 5.5 | | | 56 | 165 | 110 | — | — | — | — | — | |
| VF 30 | P63 B5 | 11 | 12.8 | 4 | 140 | 115 | 95 | 8 | 9.5 | | | 63 | 184 | 121 | 249 | 121 | 165 | 122 | 214 | 122 |
| VF 30 | P63 B14 | 11 | 12.8 | 4 | 90 | 75 | 60 | 6 | 5.5 | | | 63 | 184 | 121 | 249 | 121 | — | — | — | — |

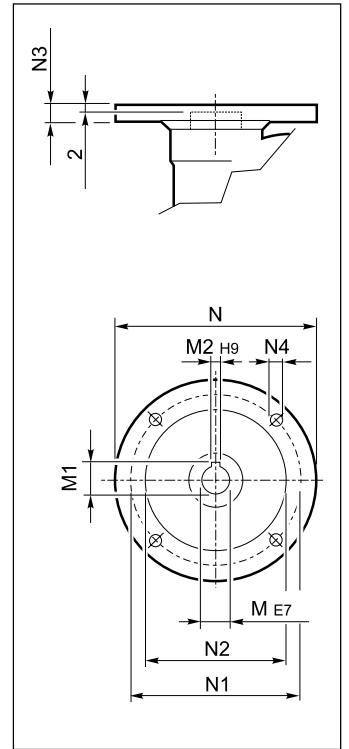


VF 44□...P(IEC)

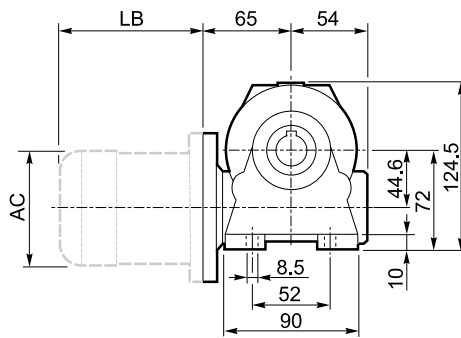
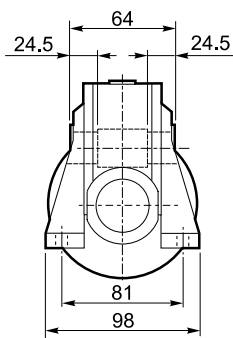
A



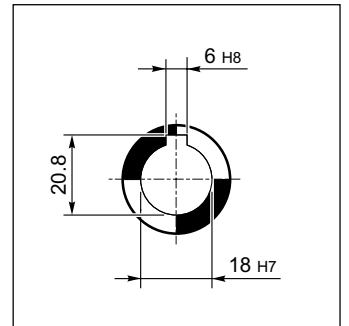
INPUT



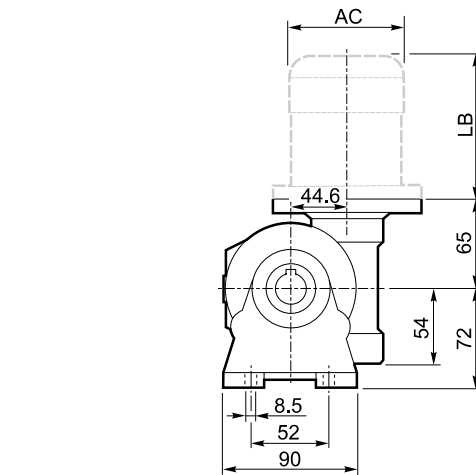
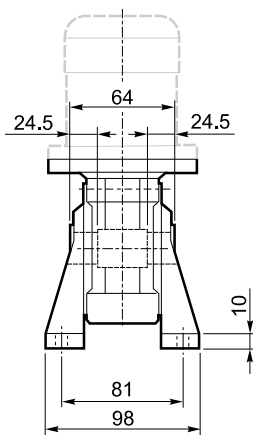
N



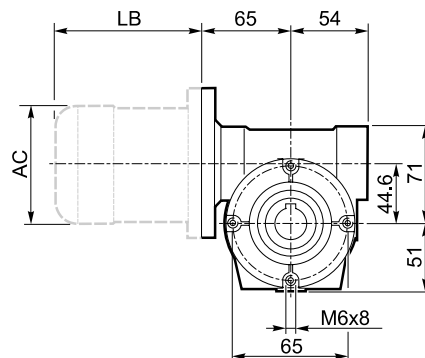
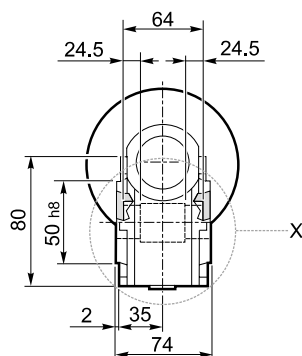
OUTPUT



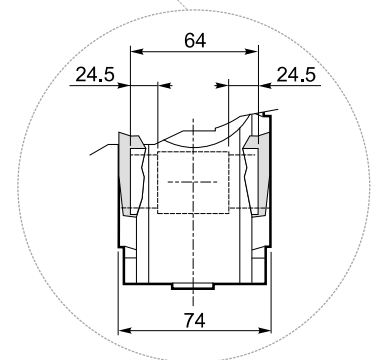
V

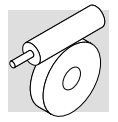


P

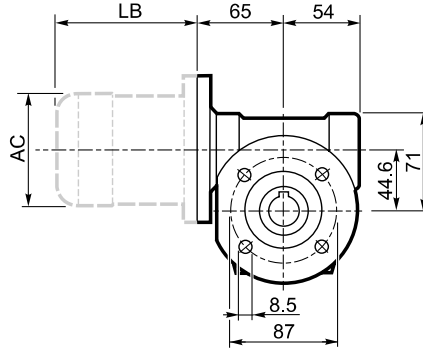
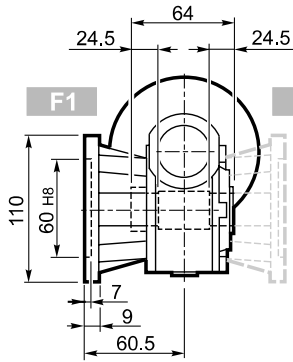


X

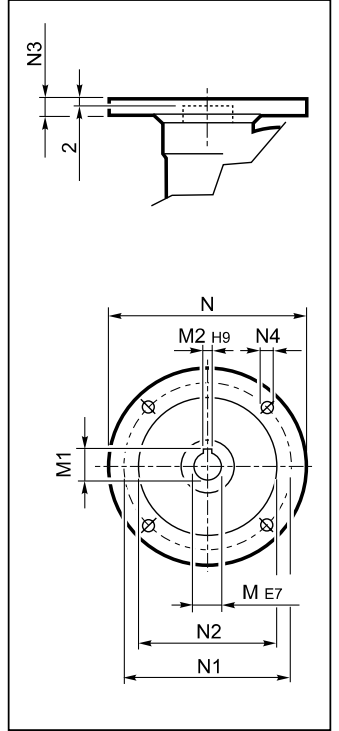




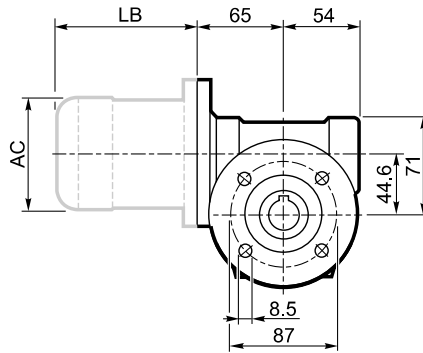
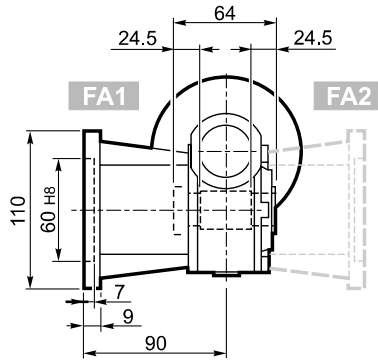
F_



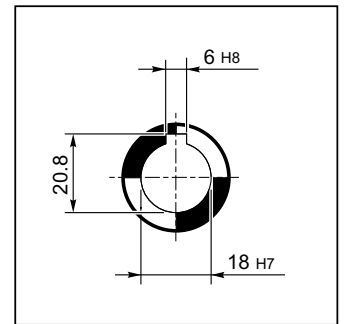
INPUT



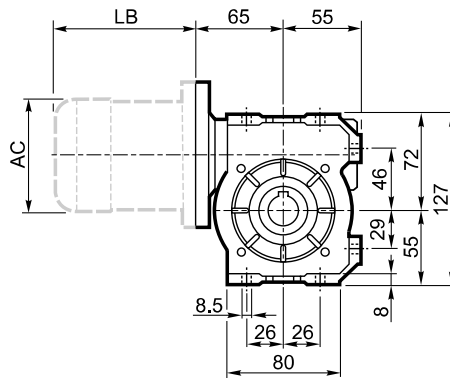
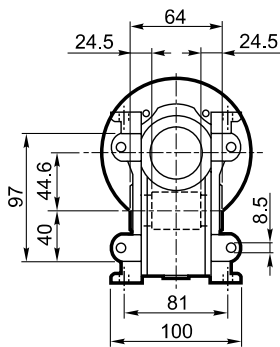
FA_



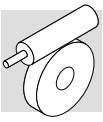
OUTPUT



U

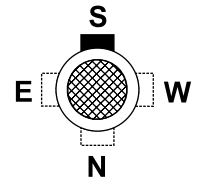
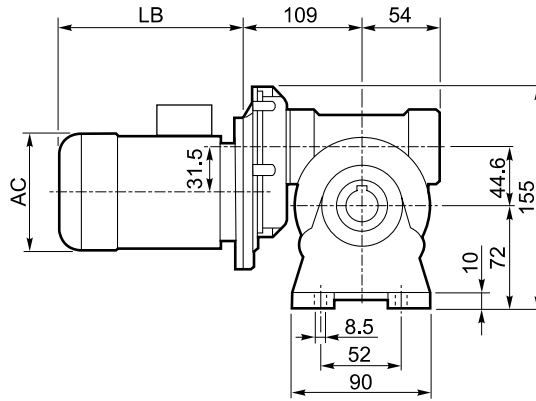
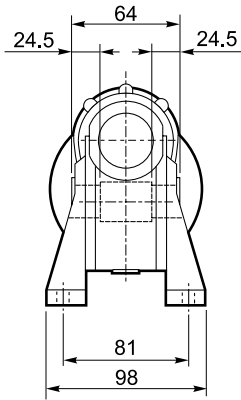


| VF 44_ | | | | | | | | | | | BN | | BN...FD BN...FA | | K | | K...FC | | | |
|--------|---------|----|------|----|-----|-----|-----|----|-----|-----|----|----|--------------------|-----|-----|-----|--------|-----|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC | LB | AC | LB | AC | |
| VF 44 | P63 B5 | 11 | 12.8 | 4 | 140 | 115 | 95 | 10 | 9.5 | 2.0 | | 63 | 184 | 121 | 249 | 121 | 165 | 122 | 214 | 122 |
| VF 44 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 10 | 9.5 | | | 71 | 219 | 138 | 280 | 138 | 186 | 139 | 219 | 139 |
| VF 44 | P63 B14 | 11 | 12.8 | 4 | 90 | 75 | 60 | 8 | 5.5 | | | 63 | 184 | 121 | 249 | 121 | — | — | — | — |
| VF 44 | P71 B14 | 14 | 16.3 | 5 | 105 | 85 | 70 | 10 | 7 | | | 71 | 219 | 138 | 280 | 138 | — | — | — | — |

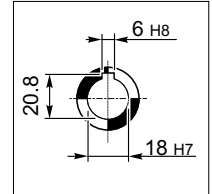


VFR 44...BN 44

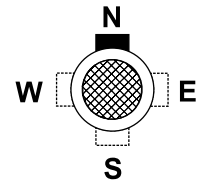
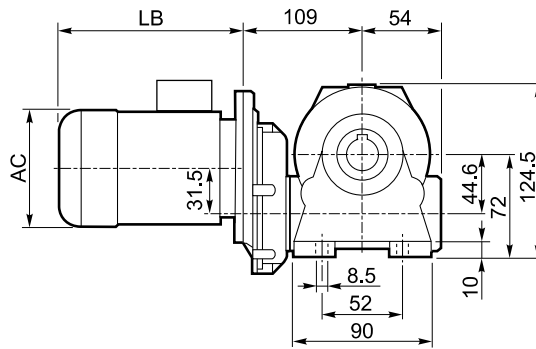
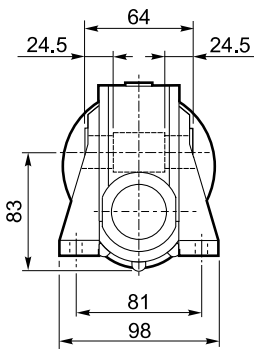
A



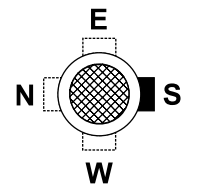
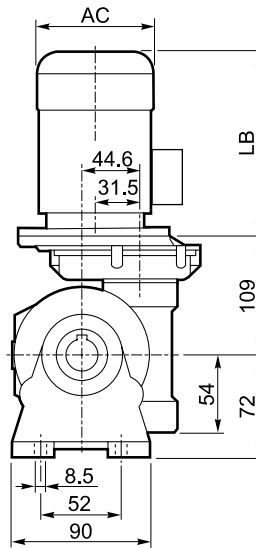
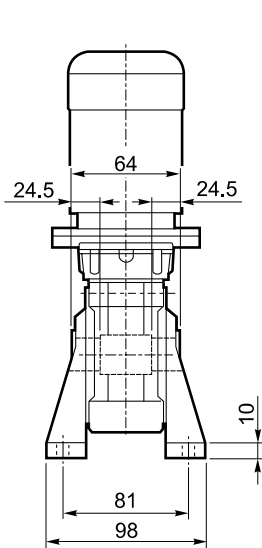
OUTPUT



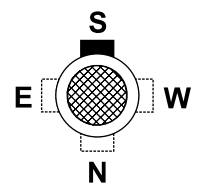
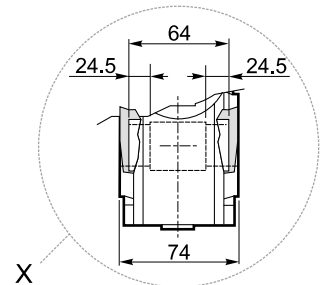
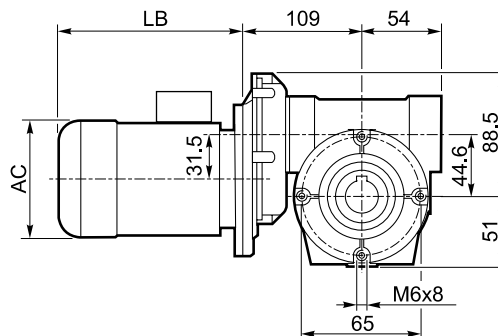
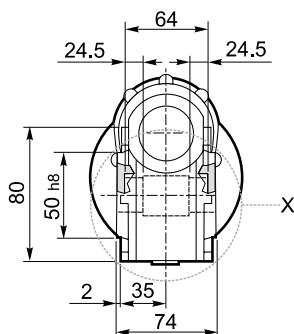
N



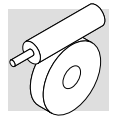
V



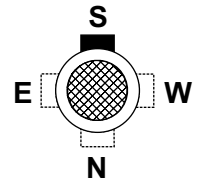
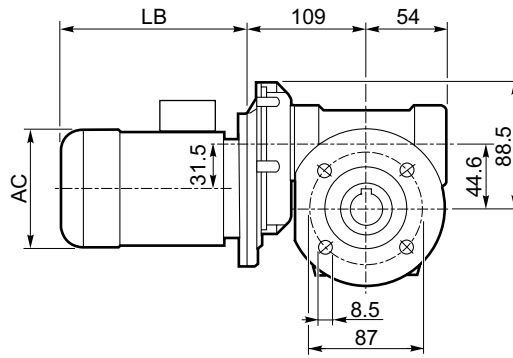
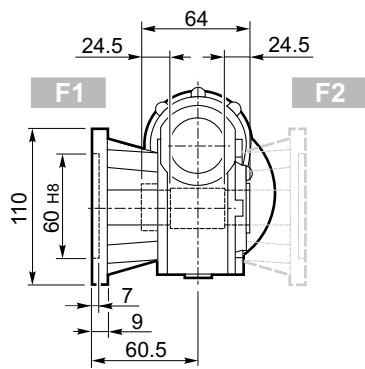
P



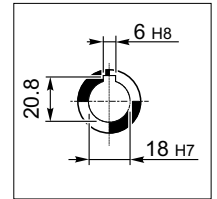
VFR 44...BN 44



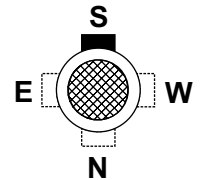
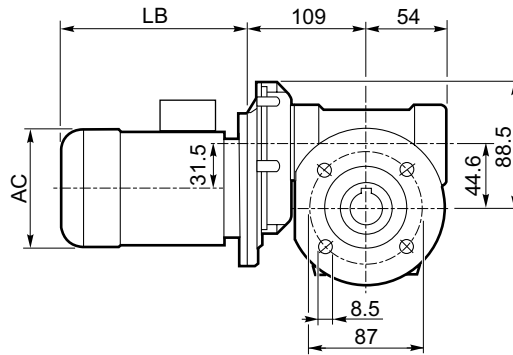
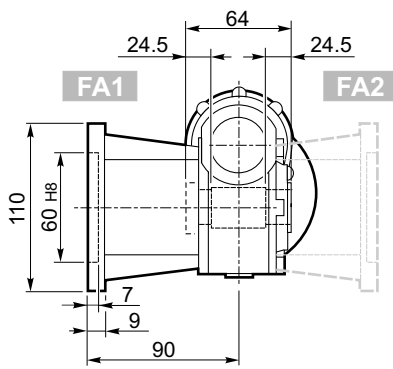
F_



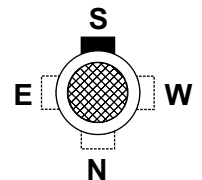
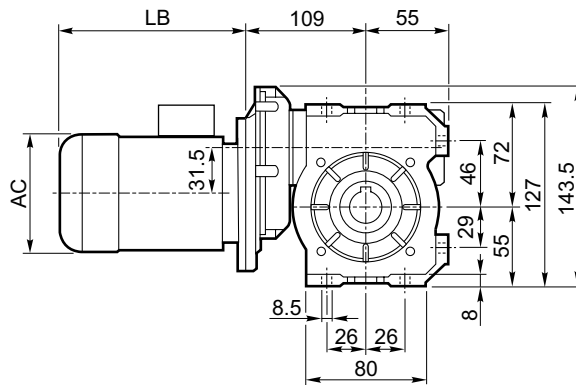
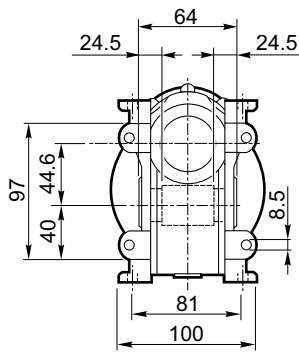
OUTPUT



FA_

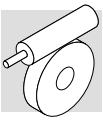


U



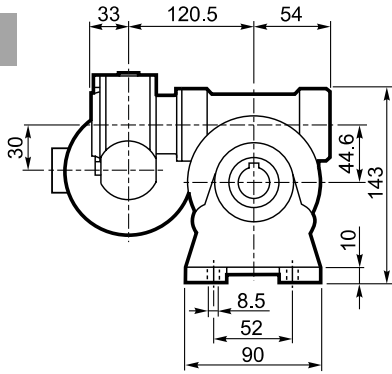
VFR 44_

| | VFR 44_ | | | | | | | | | | | | | |
|---------|-------------|--------------------------|-------------|-------------|---------------|----------------------|-------------------|-------------------|-------------------|--|-------------|-----|-----|----|
| | P_n kW | n min^{-1} | M_n Nm | η % | $\cos\varphi$ | I_n A (400V) | $\frac{I_s}{I_n}$ | $\frac{M_s}{M_n}$ | $\frac{M_a}{M_n}$ | J_m ($\cdot 10^{-4}$) kgm^2 | Kg | LB | AC | AD |
| BN 44B4 | 0.06 | 1380 | 0.42 | 40 | 0.58 | 0.38 | 2.4 | 2.3 | 1.9 | 1.22 | 4.7 | 168 | 112 | 94 |
| BN 44C4 | 0.09 | 1380 | 0.63 | 46 | 0.65 | 0.43 | 2.8 | 2.3 | 2 | 1.49 | 4.6 | 168 | 112 | 94 |

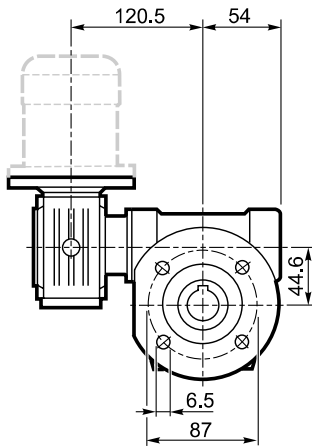


VF/VF 30/44 □...P(IEC)

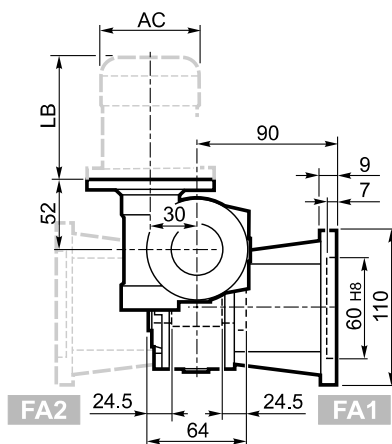
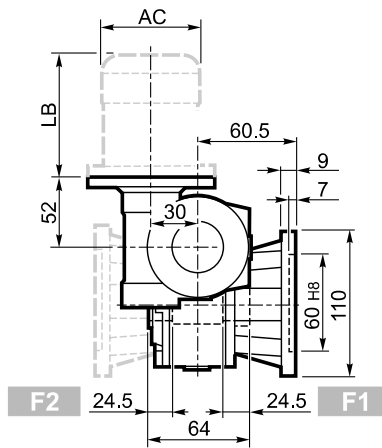
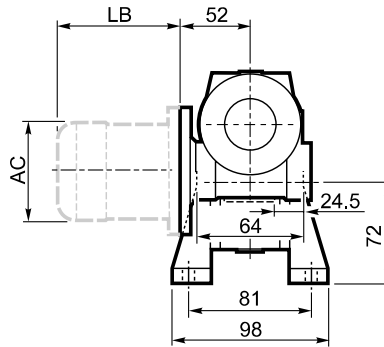
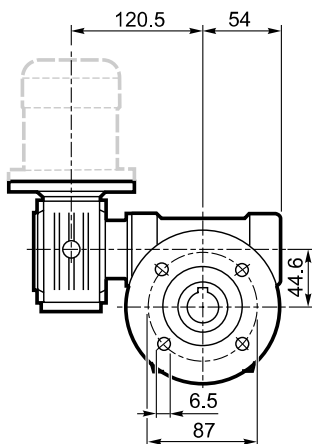
A



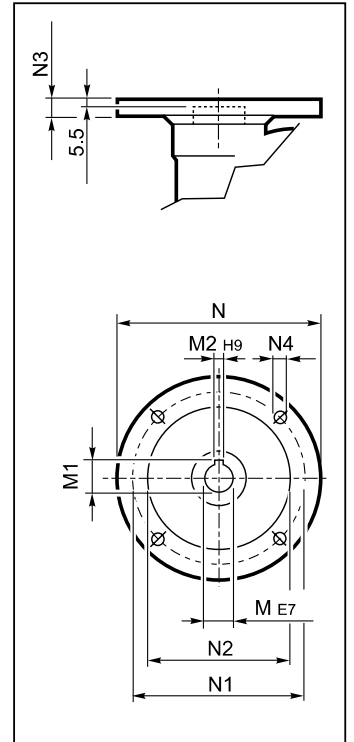
F



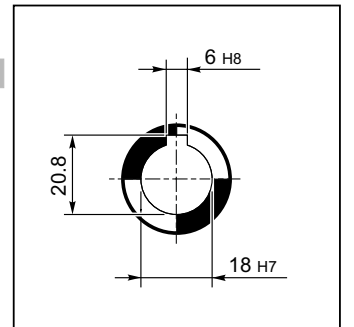
FA



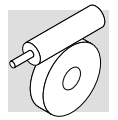
INPUT



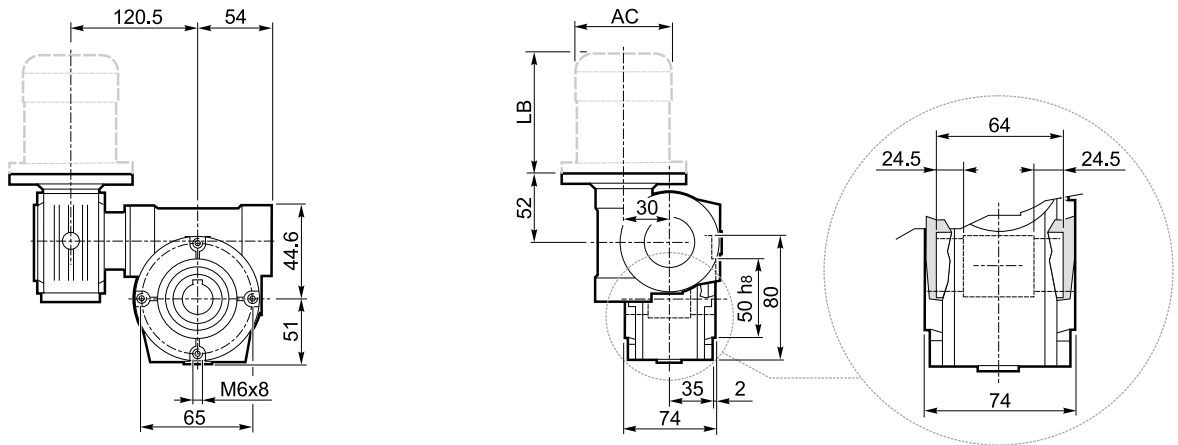
OUTPUT



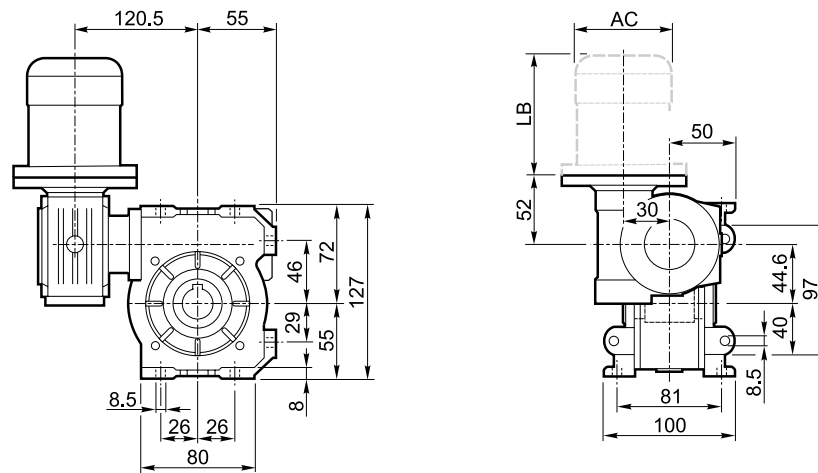
VF/VF 30/44 □...P(IEC)



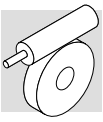
P



U

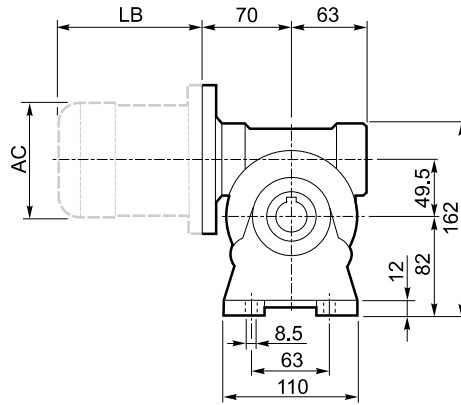
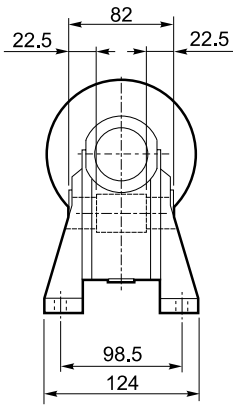


| VF/VF 30/44_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|--------------|---------|----|------|----|----|----|----|----|-----|-----|-------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VF/VF 30/44 | P56 B14 | 9 | 10.4 | 3 | 80 | 65 | 50 | 7 | 5.5 | 3.5 | BN 56 | 165 | 110 | — | — |
| VF/VF 30/44 | P63 B14 | 11 | 12.8 | 4 | 90 | 75 | 60 | 6 | 5.5 | | BN 63 | 184 | 121 | 249 | 121 |

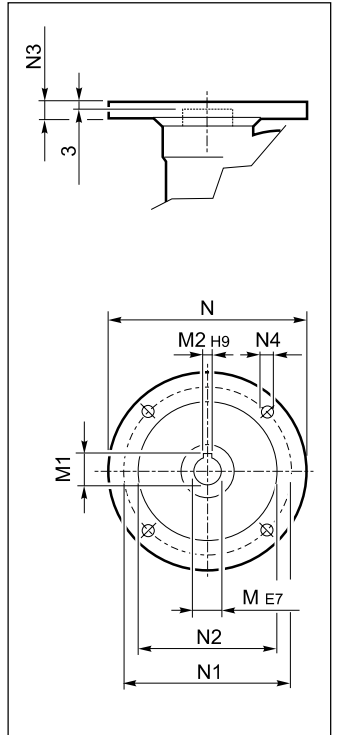


VF 49 □...P(IEC)

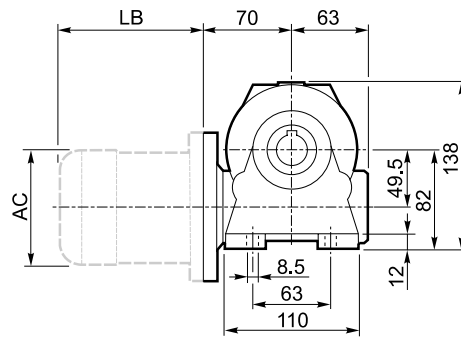
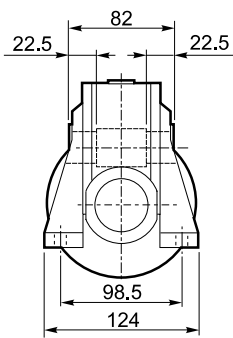
A



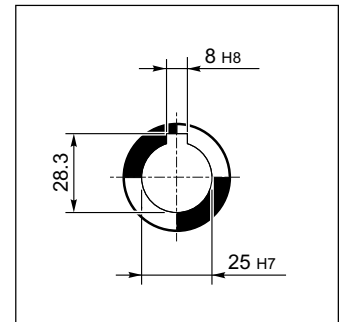
INPUT



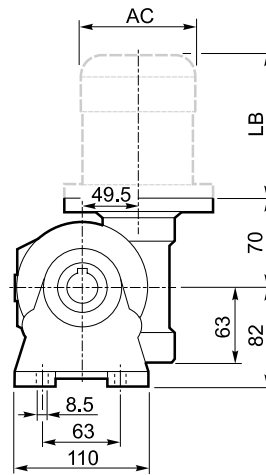
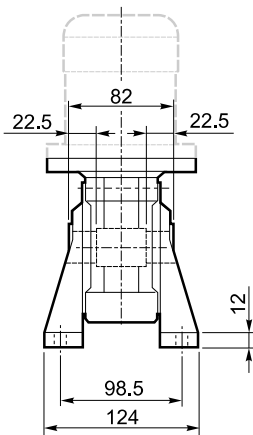
N



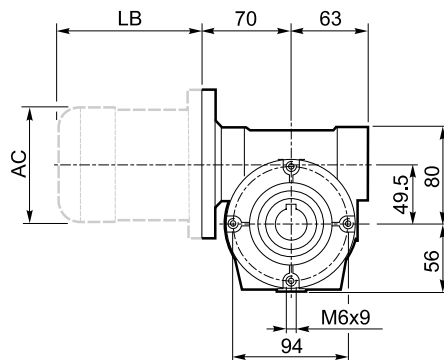
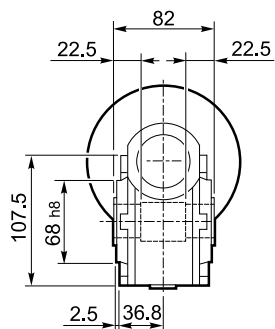
OUTPUT

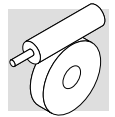


V

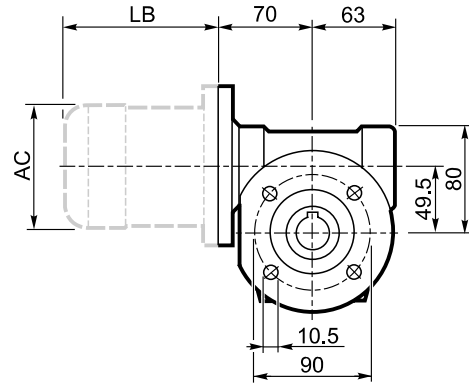
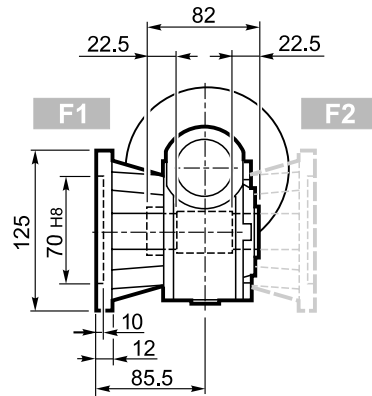


P

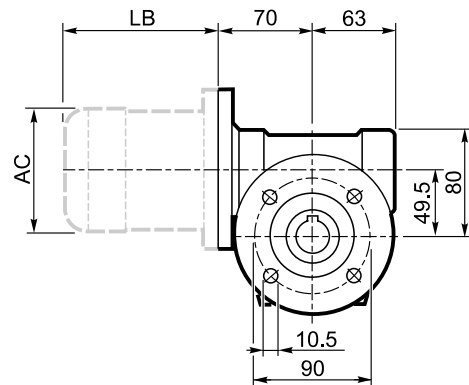
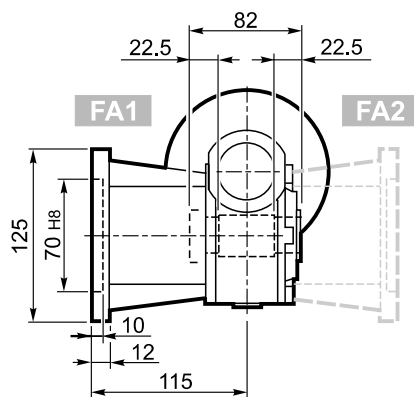




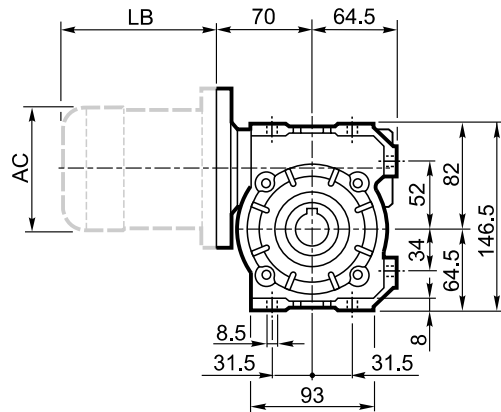
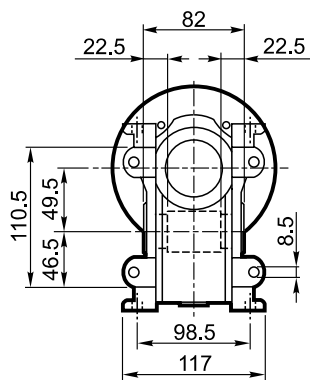
F_



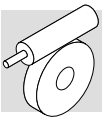
FA_



U

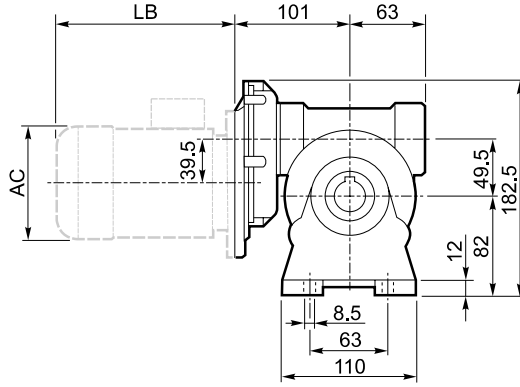
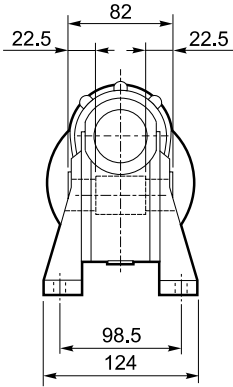


| VF 49_ | | | | | | | | | | | BN | | BN...FD BN...FA | | K | | K...FC | | |
|--------|---------|----|------|----|-----|-----|-----|------|------|-----|----|-----|--------------------|-----|-----|-----|--------|-----|-----|
| M | M1 | M2 | N | N1 | N2 | N3 | N4 | kg | IEC | LB | AC | LB | AC | LB | AC | LB | AC | | |
| VF 49 | P63 B5 | 11 | 12.8 | 4 | 140 | 115 | 95 | 10.5 | 9.5 | 3.0 | 63 | 184 | 121 | 249 | 121 | 165 | 122 | 214 | 122 |
| VF 49 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 10.5 | 9.5 | | 71 | 219 | 138 | 280 | 138 | 186 | 139 | 219 | 139 |
| VF 49 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 10 | 11.5 | | 80 | 234 | 156 | 306 | 156 | — | — | — | — |
| VF 49 | P63 B14 | 11 | 12.8 | 4 | 90 | 75 | 60 | 7 | 6 | | 63 | 184 | 121 | 249 | 121 | — | — | — | — |
| VF 49 | P71 B14 | 14 | 16.3 | 5 | 105 | 85 | 70 | 10.5 | 6.5 | | 71 | 219 | 138 | 280 | 138 | — | — | — | — |
| VF 49 | P80 B14 | 19 | 21.8 | 6 | 120 | 100 | 80 | 10 | 7 | | 80 | 234 | 156 | 306 | 156 | — | — | — | — |

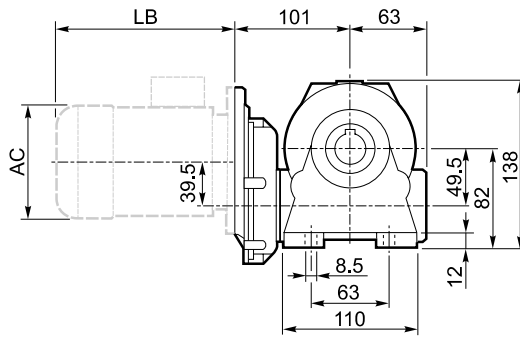
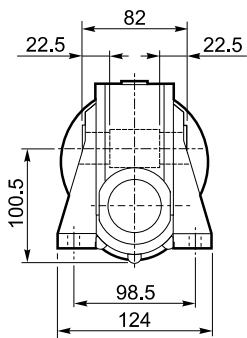


VFR 49□...P(IEC)

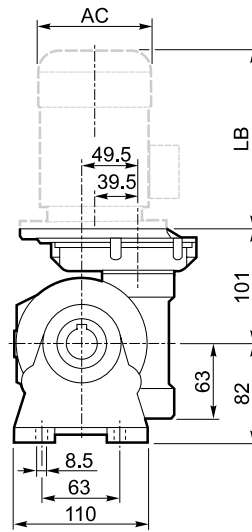
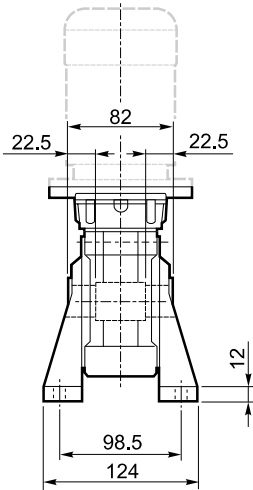
A



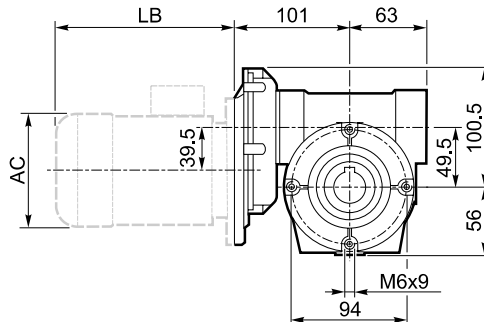
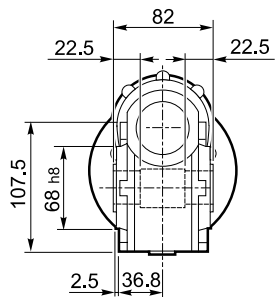
N



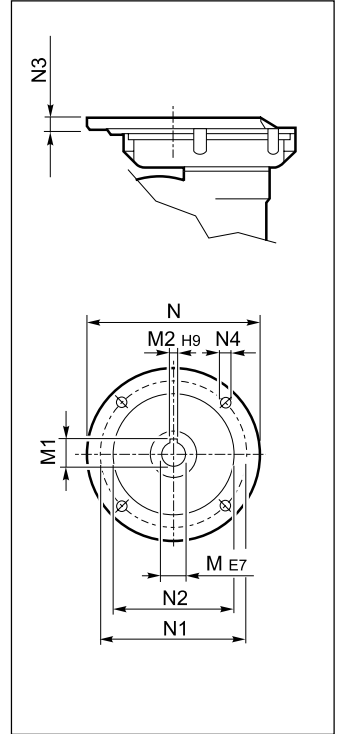
V



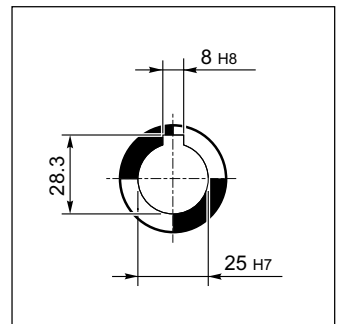
P



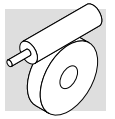
INPUT



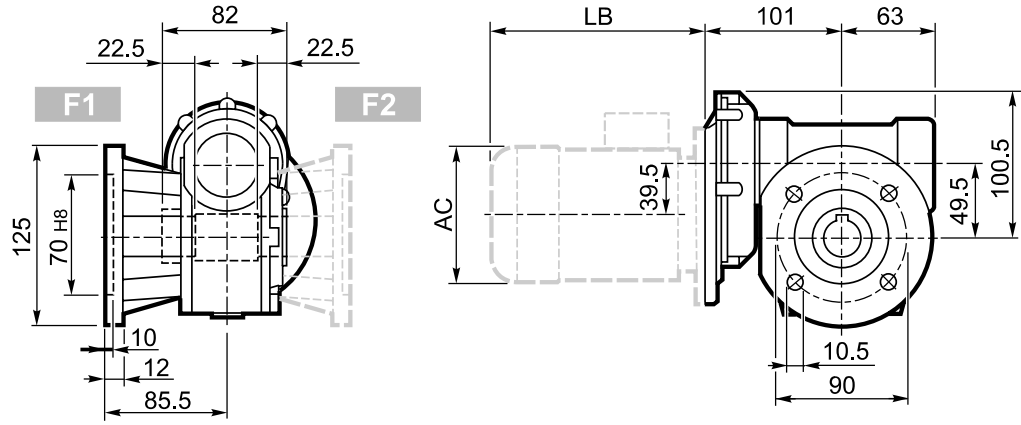
OUTPUT



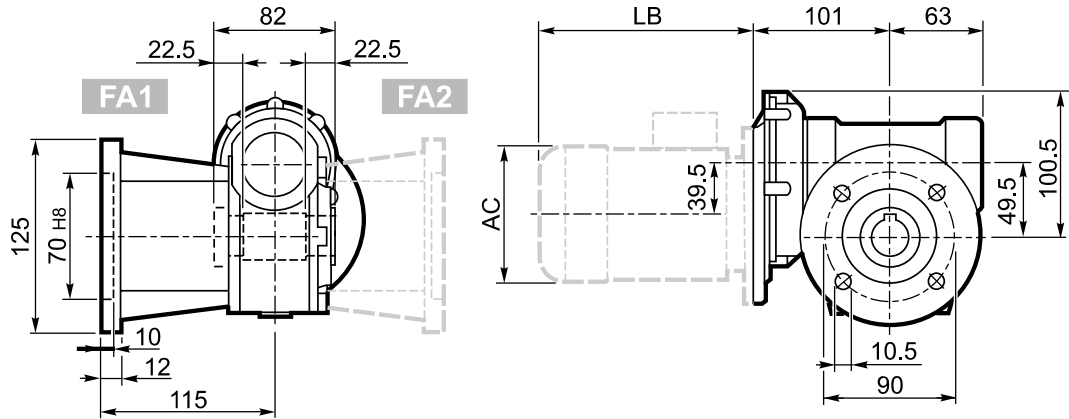
VFR 49 ...P(IEC)



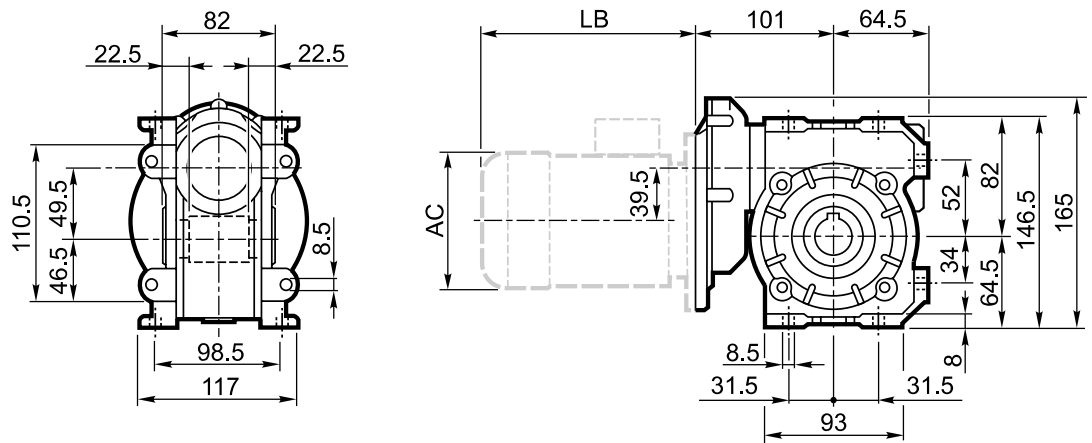
F_



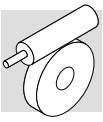
FA_



U

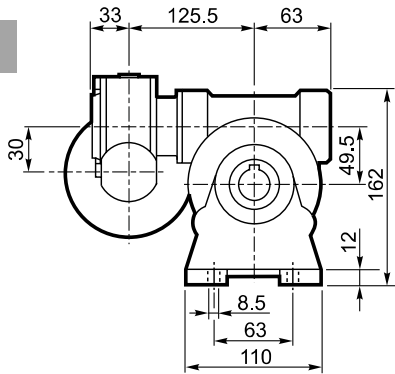


| VFR 49_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|---------|--------|----|------|----|-----|-----|----|----|---------|-----|-------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VFR 49 | P63 B5 | 11 | 12.8 | 4 | 140 | 115 | 95 | 11 | M8 x 19 | 5.0 | BN 63 | 184 | 121 | 249 | 121 |

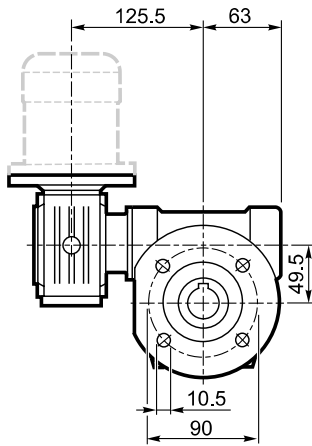


VF/VF 30/49 □...P(IEC)

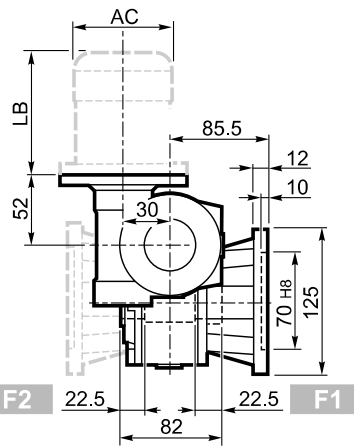
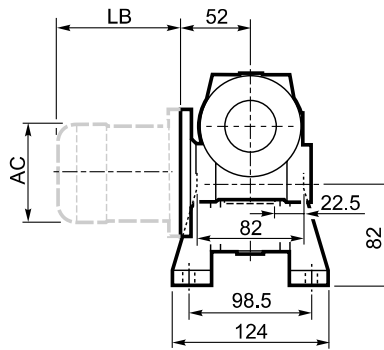
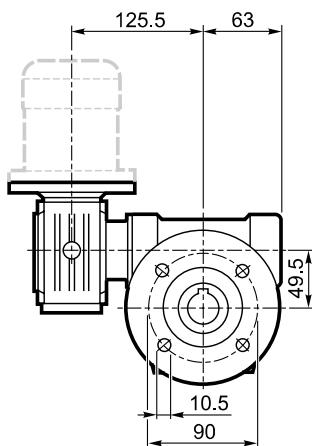
A



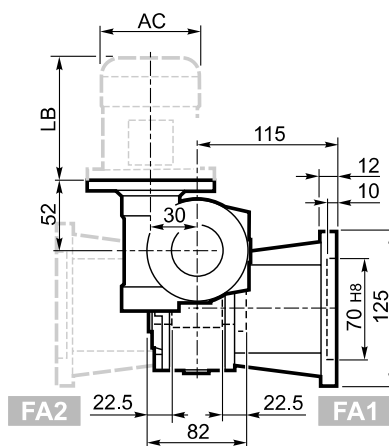
F_



FA_

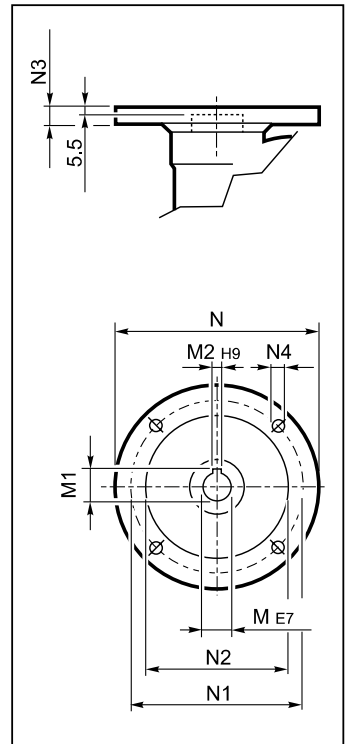


F2 **F1**

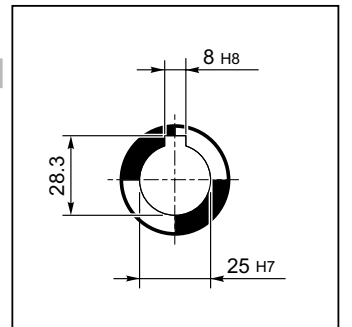


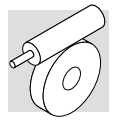
FA2 **FA1**

INPUT

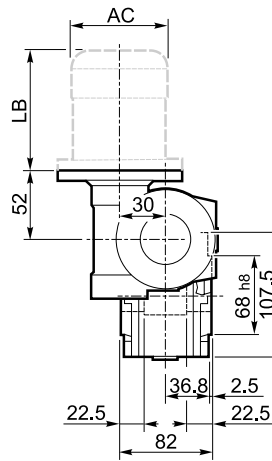
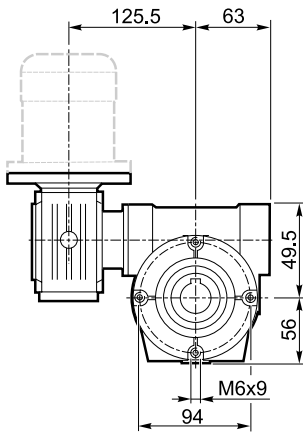


OUTPUT

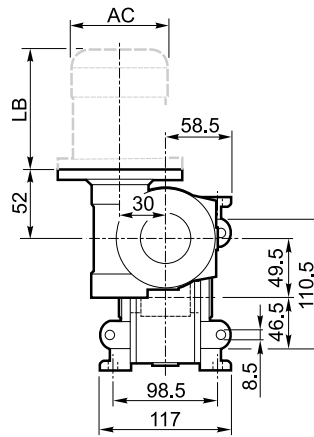
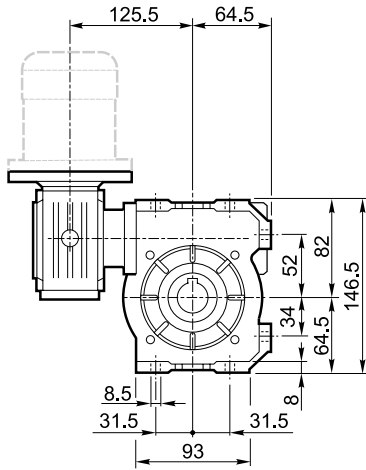




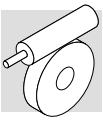
P



U

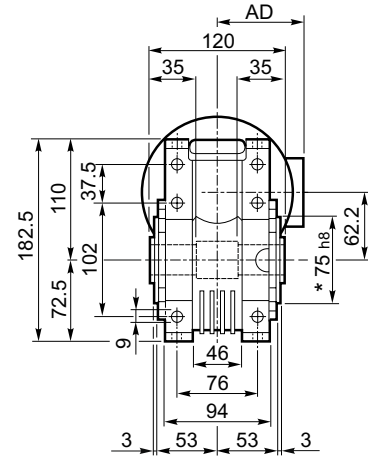
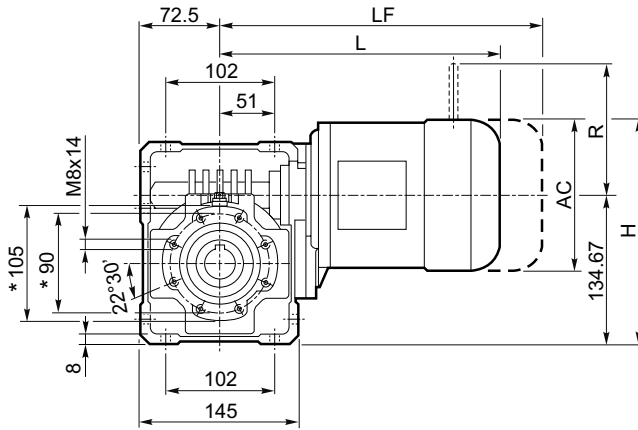


| VF/VF 30/49 | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|-------------|---------|----|------|----|----|----|----|----|-----|-----|-------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VF/VF 30/49 | P56 B14 | 9 | 10.4 | 3 | 80 | 65 | 50 | 7 | 5.5 | 4.5 | BN 56 | 165 | 110 | — | — |
| VF/VF 30/49 | P63 B14 | 11 | 12.8 | 4 | 90 | 75 | 60 | 6 | 5.5 | | BN 63 | 184 | 121 | 249 | 121 |

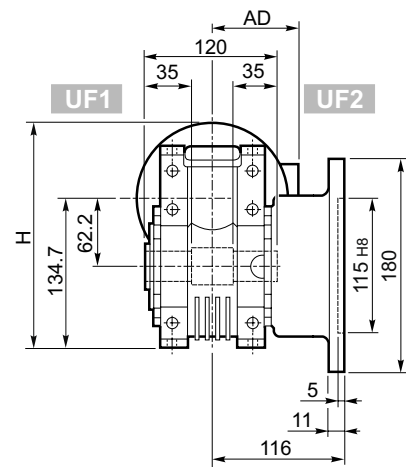
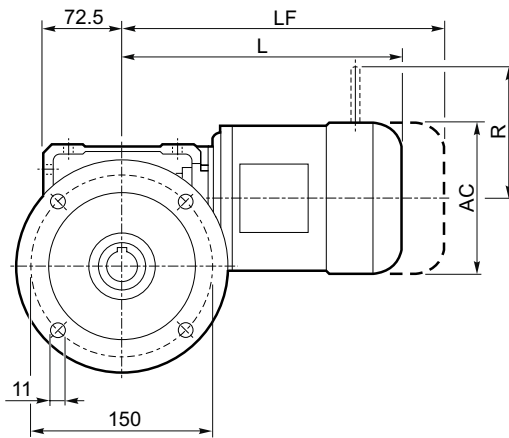


W 63 □...S □

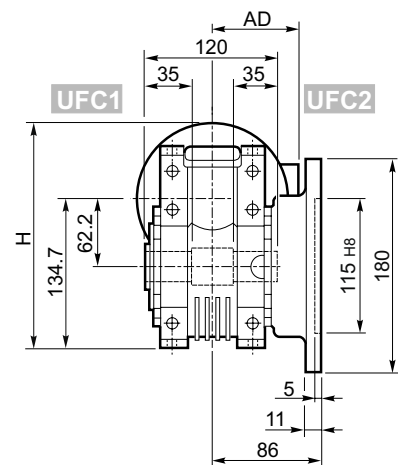
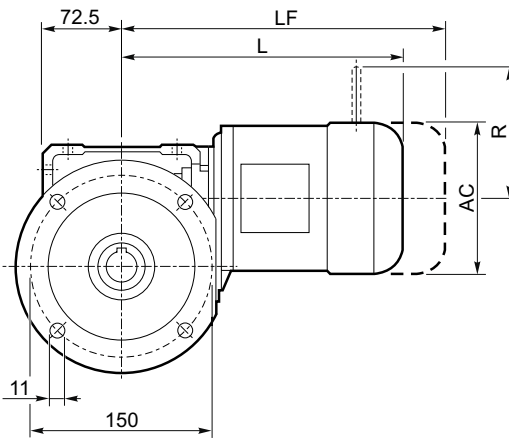
U



UF_

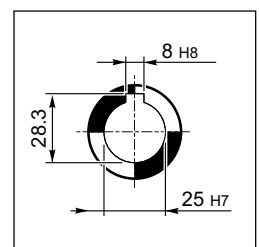


UFC_

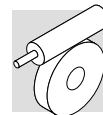


| W 63 | | | | | | | | | | | | | | |
|------|----|-----|-----|-----|-----|-----|----|-----|------------------|-----|--------|-----|--------|--|
| | | | M_ | | | | | | M...FD M...FA | | M...FD | | M...FA | |
| | | | AC | H | L | AD | Kg | LF | Kg | R | AD | R | AD | |
| W 63 | S1 | M1S | 138 | 204 | 265 | 108 | 11 | 328 | 13 | 103 | 132 | 124 | 108 | |
| W 63 | S1 | M1L | 138 | 204 | 289 | 108 | 13 | 350 | 15 | 103 | 132 | 124 | 108 | |
| W 63 | S2 | M2S | 156 | 213 | 317 | 119 | 17 | 393 | 20 | 129 | 143 | 134 | 119 | |

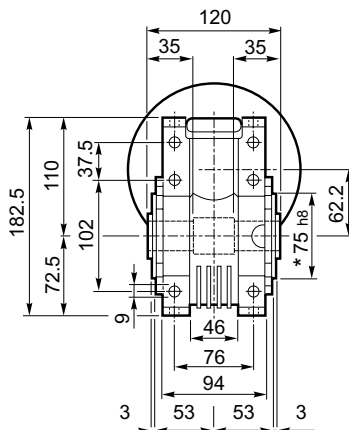
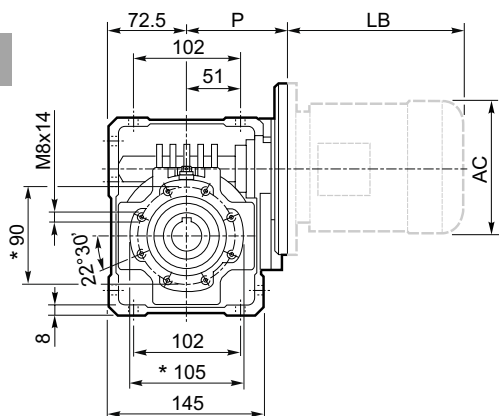
OUTPUT



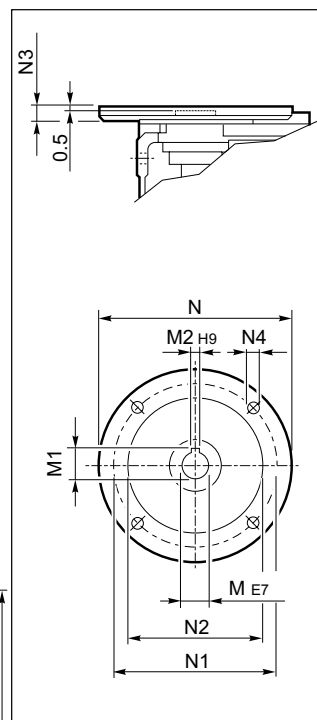
* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés



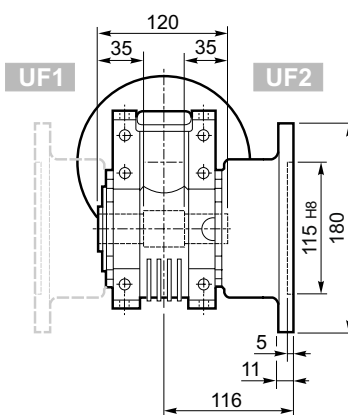
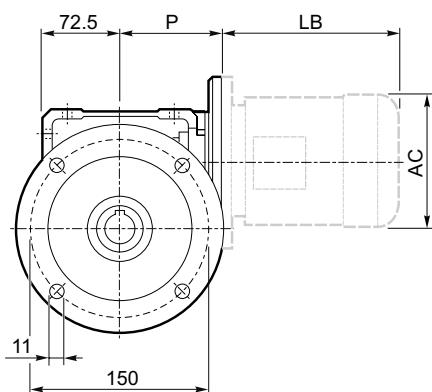
U



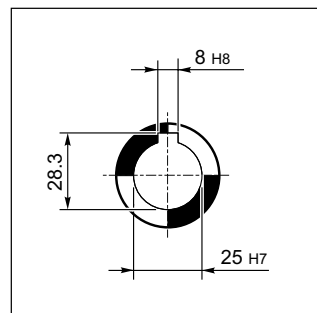
INPUT



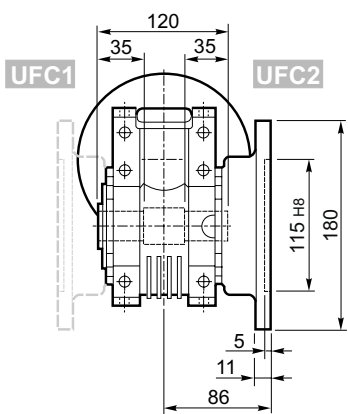
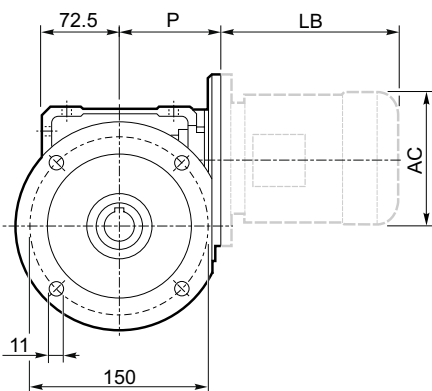
UF_



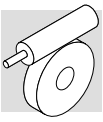
OUTPUT



UFC_

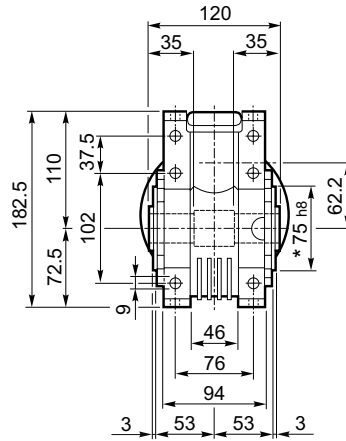
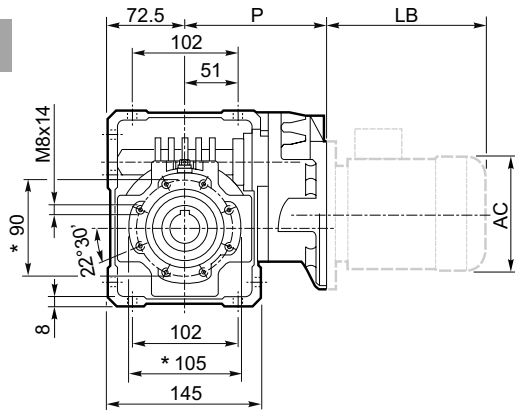


| W 63 | | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|------|---------|----|------|----|-----|-----|-----|----|------|-----|-----|-------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | P | | | LB | AC | LB | AC |
| W 63 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 11 | 9 | 95 | 6.3 | BN 71 | 219 | 138 | 280 | 138 |
| W 63 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 12 | 11.5 | 102 | 6.5 | BN 80 | 234 | 156 | 306 | 156 |
| W 63 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 12 | 11.5 | 102 | 6.4 | BN 90 | 276 | 176 | 359 | 176 |
| W 63 | P71 B14 | 14 | 16.3 | 5 | 105 | 85 | 70 | 11 | 6.5 | 95 | 6.1 | BN 71 | 219 | 138 | 280 | 138 |
| W 63 | P80 B14 | 19 | 21.8 | 6 | 120 | 100 | 80 | 11 | 6.5 | 102 | 6.3 | BN 80 | 234 | 156 | 306 | 156 |
| W 63 | P90 B14 | 24 | 27.3 | 8 | 140 | 115 | 95 | 11 | 8.5 | 102 | 6.3 | BN 90 | 276 | 176 | 359 | 176 |

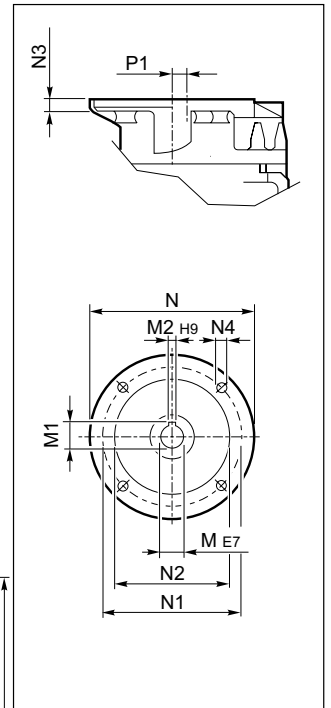


WR 63...P(IEC)

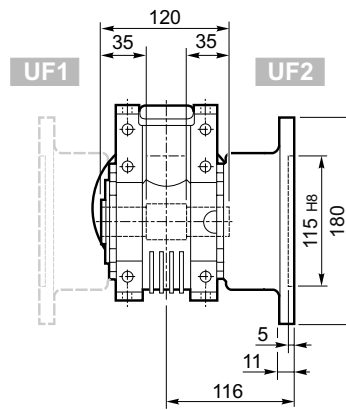
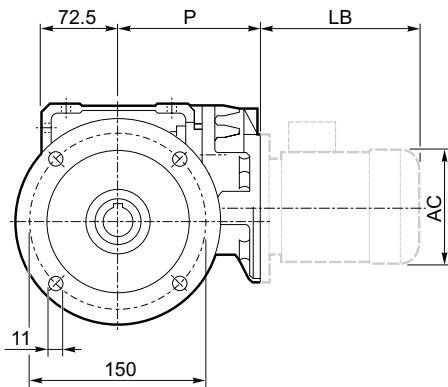
U



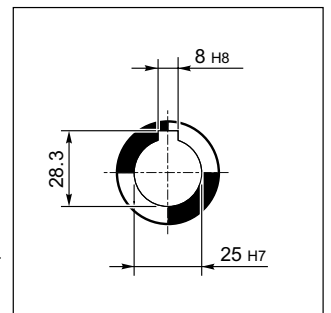
INPUT



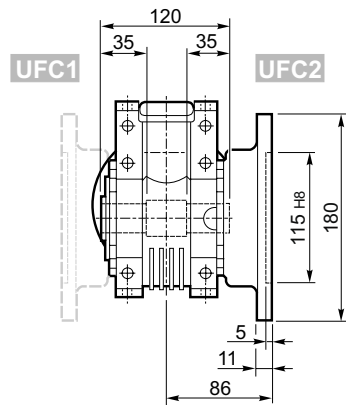
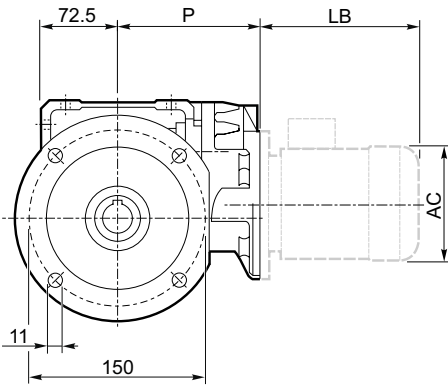
UF



OUTPUT



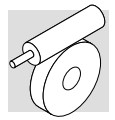
UFC



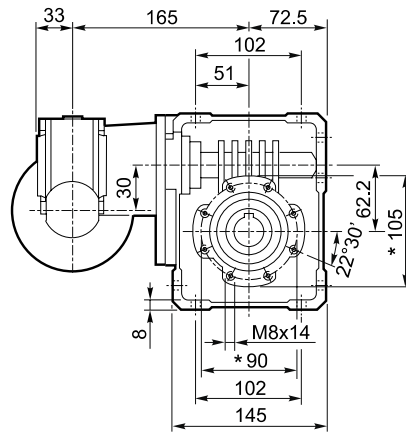
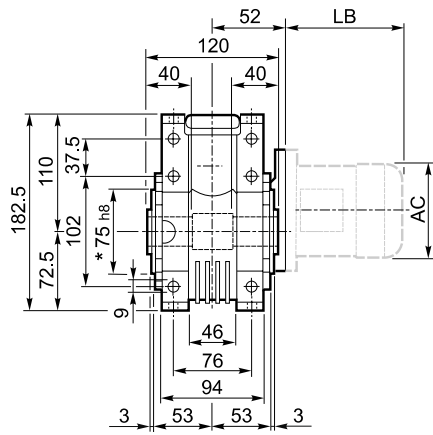
| WR 63 | | | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|-------|--|----|----------------|----------------|-----|----------------|----------------|----------------|----------------|-------|----------------|-----|-------|-----|--------------------|-----|-----|
| | | M | M ₁ | M ₂ | N | N ₁ | N ₂ | N ₃ | N ₄ | P | P ₁ | | LB | AC | LB | AC | |
| | | 11 | 12.8 | 4 | 140 | 115 | 95 | 10 | M8x10 | 133.5 | 11.42 | 7.1 | BN 63 | 184 | 121 | 249 | 121 |
| | | 14 | 16.3 | 5 | 160 | 130 | 110 | 10 | M8x10 | 133.5 | 11.42 | | BN 71 | 219 | 138 | 280 | 138 |

* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés

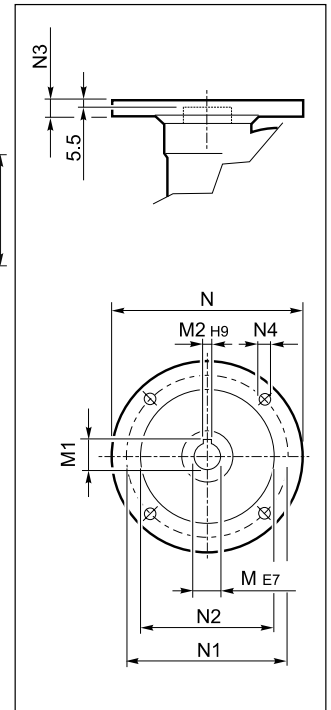
VF/W 30/63 □...P(IEC)



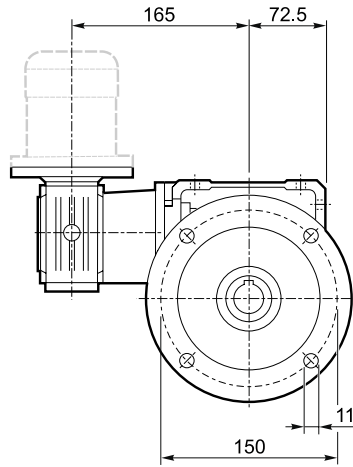
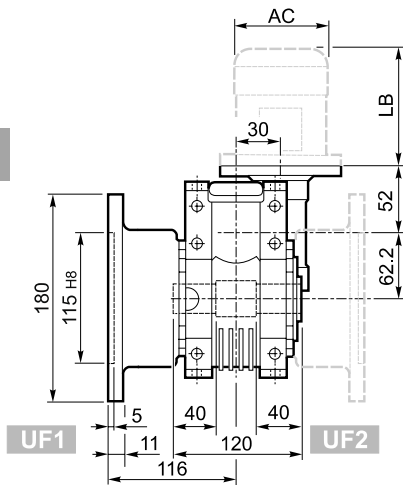
U



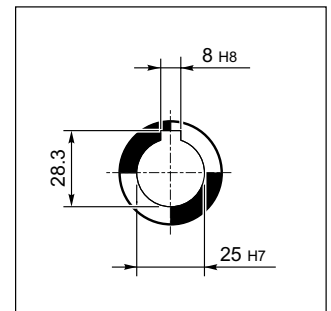
INPUT



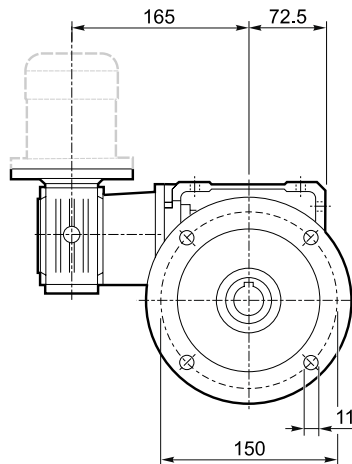
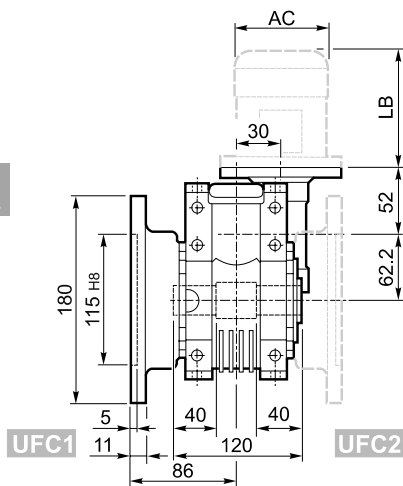
UF_



OUTPUT

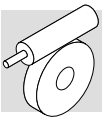


UFC_



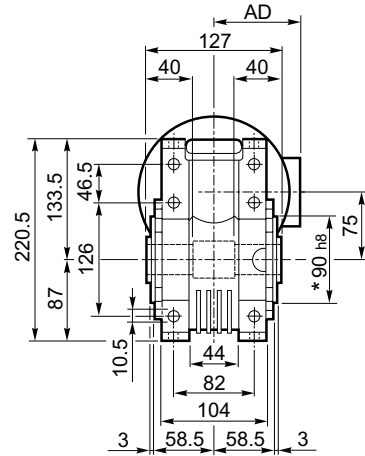
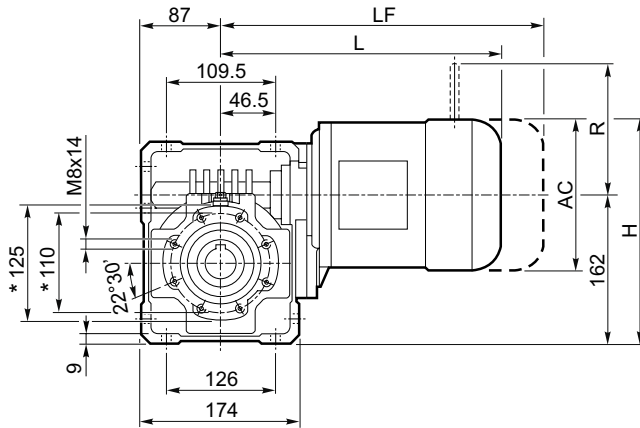
| VF/W 30/63_ | | | | | | | | | | | BN | | BN...FD BN...FA | | K | | K...FC | | |
|-------------|---------|----|------|----|-----|-----|----|----|-----|-----|----|-----|--------------------|-----|-----|-----|--------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC | LB | AC | LB | AC |
| VF/W 30/63 | P56 B5 | 9 | 10.4 | 3 | 120 | 100 | 80 | 7 | 7 | 8.0 | | 56 | 165 | 110 | — | — | — | — | — |
| VF/W 30/63 | P63 B5 | 11 | 12.8 | 4 | 140 | 115 | 95 | 8 | 9.5 | | 63 | 184 | 121 | 249 | 121 | 165 | 122 | 214 | 122 |
| VF/W 30/63 | P63 B14 | 9 | 10.4 | 3 | 80 | 65 | 50 | 7 | 5.5 | | 63 | 184 | 121 | 249 | 121 | 165 | 122 | 214 | 122 |
| VF/W 30/63 | P63 B14 | 11 | 12.8 | 4 | 90 | 75 | 60 | 6 | 5.5 | | 63 | 184 | 121 | 249 | 121 | — | — | — | — |

* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés

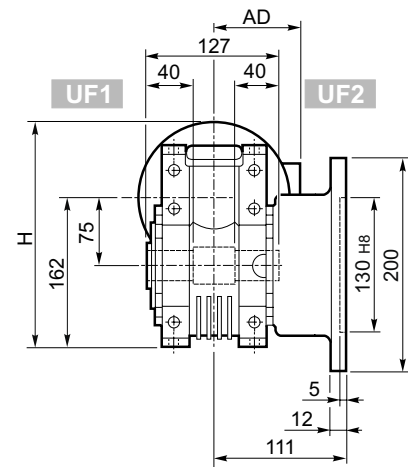
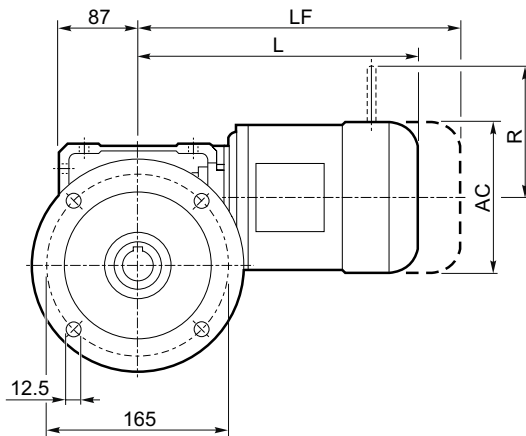


W 75 □...S □

U

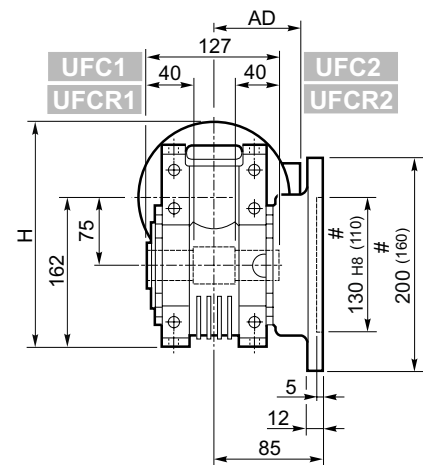
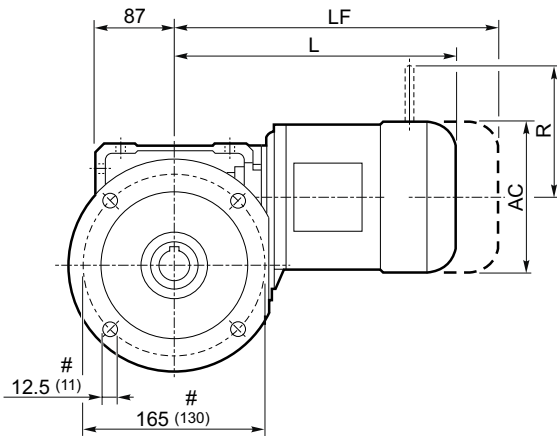


UF_

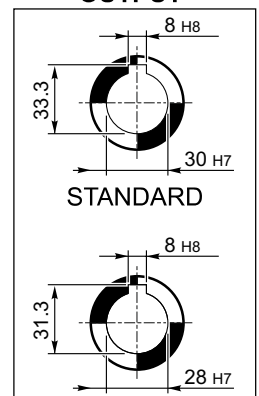


UFC_

UFCR_ #



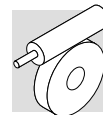
OUTPUT



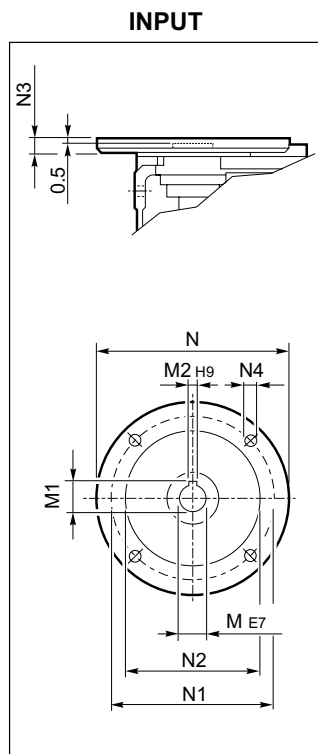
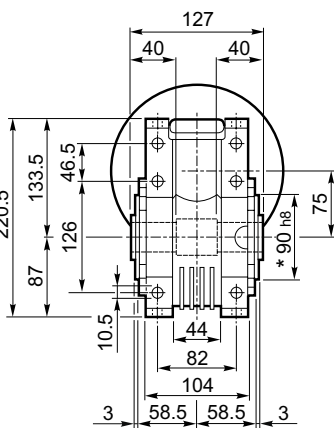
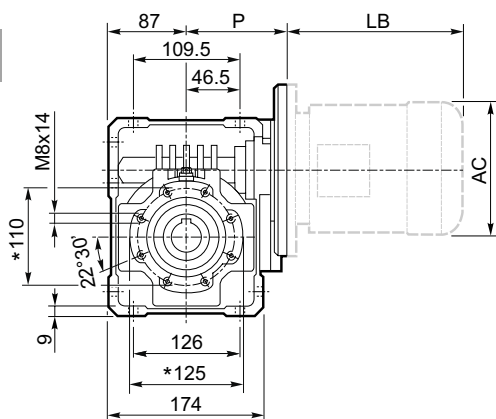
W 75

| | | | W 75 | | | | | | | | | | |
|-------|----|-----|------|-------|-----|-----|------------------|-----|--------|-----|--------|-----|-----|
| Image | S | M | M_ | | | | M...FD M...FA | | M...FD | | M...FA | | |
| | | | AC | H | L | AD | Kg | LF | Kg | R | AD | R | AD |
| | S1 | M1S | 138 | 231 | 284 | 108 | 14.0 | 347 | 16.2 | 103 | 132 | 124 | 108 |
| | S1 | M1L | 138 | 231 | 308 | 108 | 16.0 | 369 | 18.2 | 103 | 132 | 124 | 108 |
| | S2 | M2S | 153 | 240 | 333 | 119 | 18.5 | 409 | 21.6 | 129 | 143 | 134 | 119 |
| | S3 | M3S | 193 | 258.5 | 376 | 142 | 25.6 | 472 | 31 | 160 | 155 | 160 | 142 |
| | S3 | M3L | 193 | 258.5 | 408 | 142 | 28.6 | 499 | 34 | 160 | 155 | 160 | 142 |

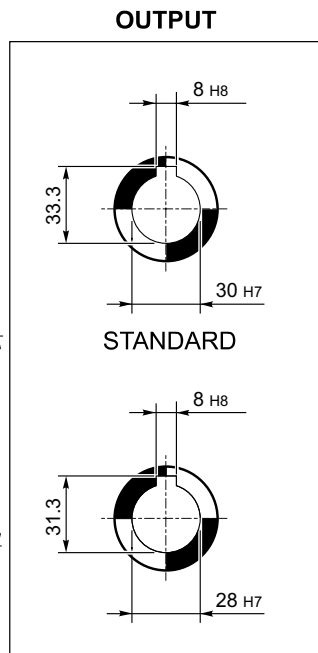
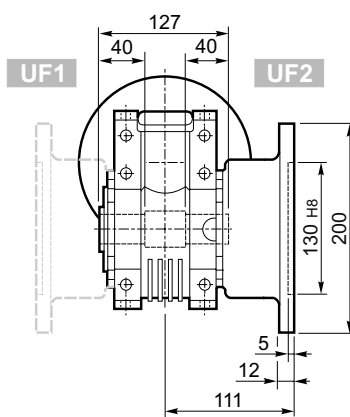
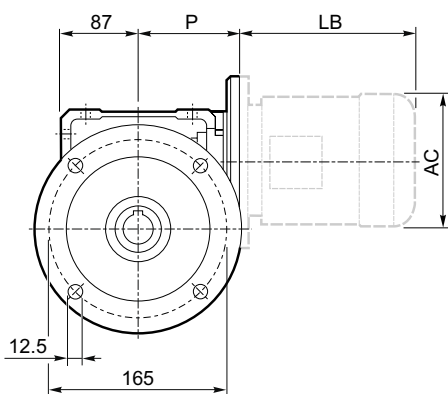
* Da ambo i lati / On both sides / Auf beiden Seiten / Tous le deux cotés
Flangia ridotta / Reduced flange / Verkürzte Flansch / Bride réduit



U

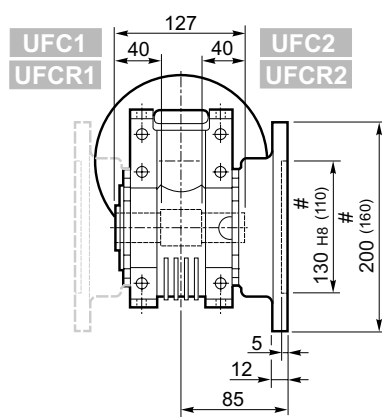
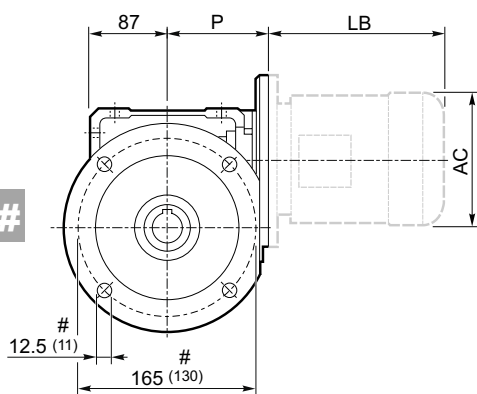


UF_



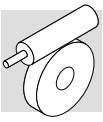
UFC_

UFCR_#



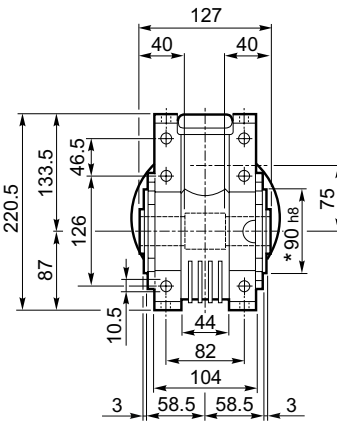
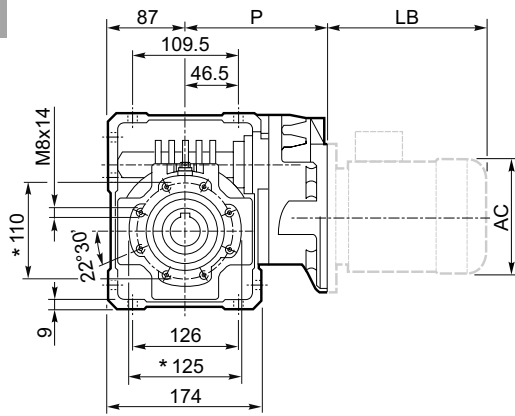
| W 75_ | | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|-------|----------|----|------|----|-----|-----|-----|-----|------|-----|-----|--------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | P | | | LB | AC | LB | AC |
| W 75 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 11 | 9 | 112 | 9.5 | BN 71 | 219 | 138 | 280 | 138 |
| W 75 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 12 | 11.5 | 112 | 9.7 | BN 80 | 234 | 156 | 306 | 156 |
| W 75 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 12 | 11.5 | 112 | 9.6 | BN 90 | 276 | 176 | 359 | 176 |
| W 75 | P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 13 | 12.5 | 120 | 9.7 | BN 100 | 307 | 195 | 398 | 195 |
| W 75 | P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 13 | 12.5 | 120 | 9.7 | BN 112 | 325 | 219 | 424 | 219 |
| W 75 | P80 B14 | 19 | 21.8 | 6 | 120 | 100 | 80 | 7.5 | 6.5 | 112 | 9.4 | BN 80 | 234 | 156 | 306 | 156 |
| W 75 | P90 B14 | 24 | 27.3 | 8 | 140 | 115 | 95 | 7.5 | 8.5 | 112 | 9.4 | BN 90 | 276 | 176 | 359 | 176 |
| W 75 | P100 B14 | 28 | 31.3 | 8 | 160 | 130 | 110 | 10 | 8.5 | 120 | 9.5 | BN 100 | 307 | 195 | 398 | 195 |
| W 75 | P112 B14 | 28 | 31.3 | 8 | 160 | 130 | 110 | 10 | 8.5 | 120 | 9.5 | BN 112 | 325 | 219 | 424 | 219 |

* Da ambo i lati / On both sides / Auf beiden Seiten / Tous le deux cotés
Flangia ridotta / Reduced flange / Verkürzte Flansch / Bride réduit

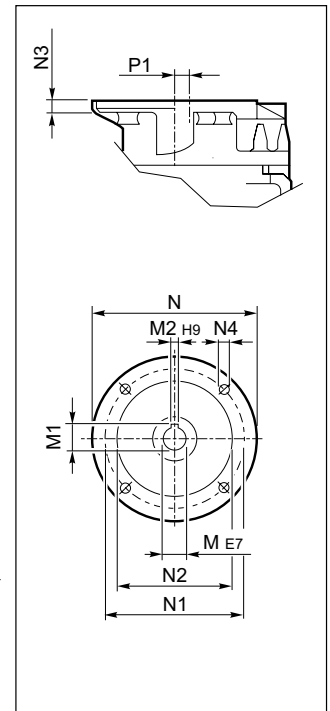


WR 75...P(IEC)

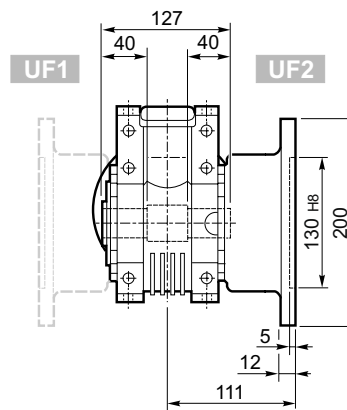
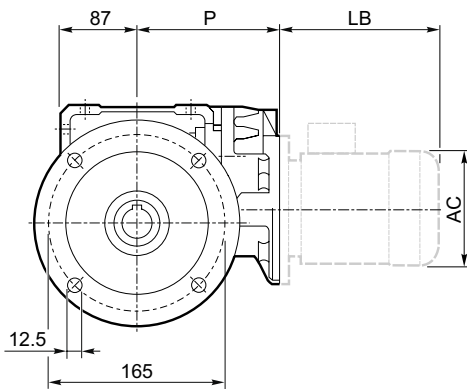
U



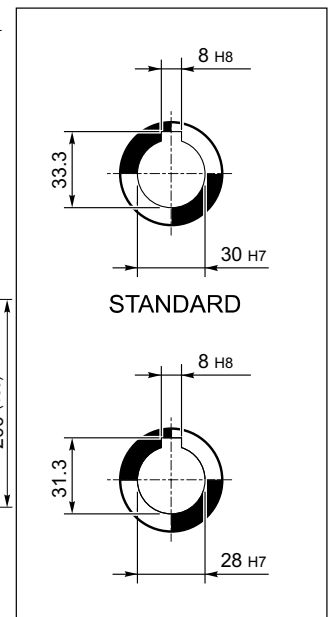
INPUT



UF_

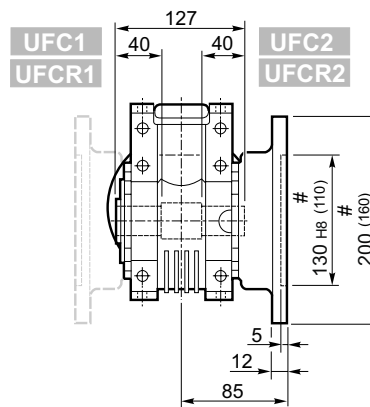
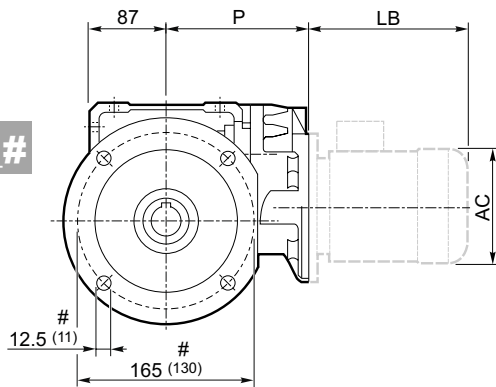


OUTPUT



UFC_

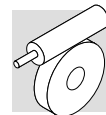
UFCR_#



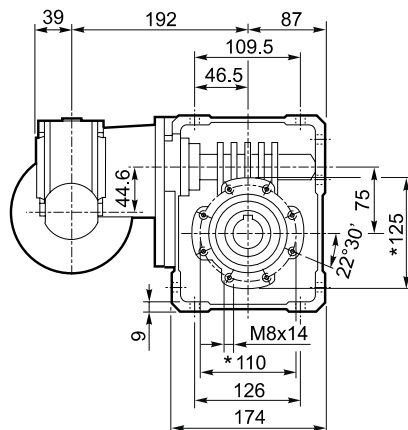
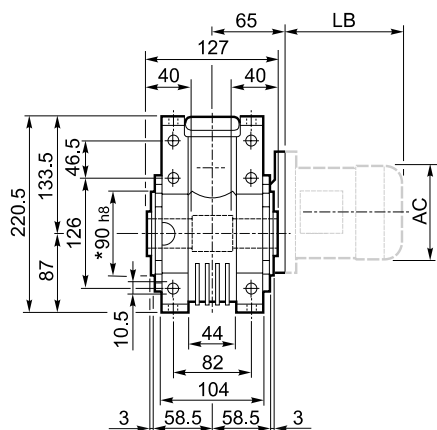
| WR 75_ | | | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|--------|--------|----|------|----|-----|-----|-----|----|--------|-------|-------|------|-------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | P | P1 | | | LB | AC | LB | AC |
| WR 75 | P63 B5 | 11 | 12.8 | 4 | 140 | 115 | 95 | 10 | M8x10 | 152 | 23.53 | 10.6 | BN 63 | 184 | 121 | 249 | 121 |
| WR 75 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 10 | M8x10 | 152 | 23.53 | 10.7 | BN 71 | 219 | 138 | 280 | 138 |
| WR 75 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 12 | M10x13 | 163.5 | 11 | 11.5 | BN 80 | 234 | 156 | 306 | 156 |
| WR 75 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 12 | M10x13 | 163.5 | 11 | 11.6 | BN 90 | 276 | 176 | 359 | 176 |

* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés
Flangia ridotta / Reduced flange / Verkürzte Flansch / Bride réduit

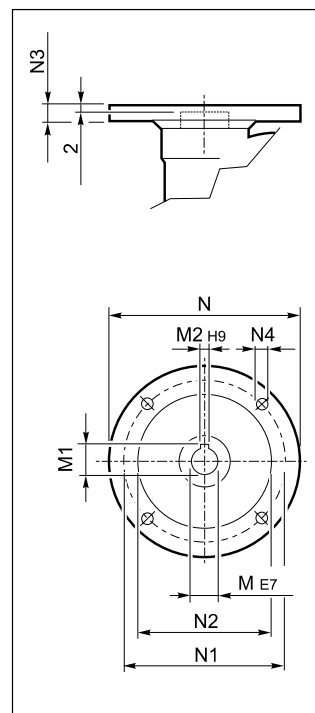
VF/W 44/75 □...P(IEC)



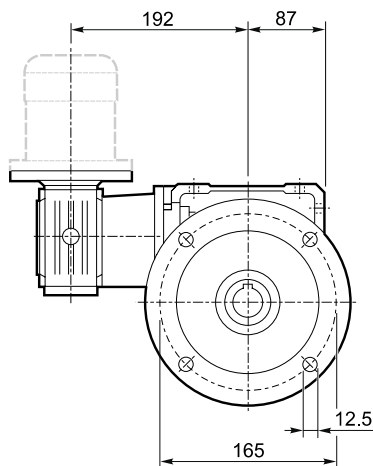
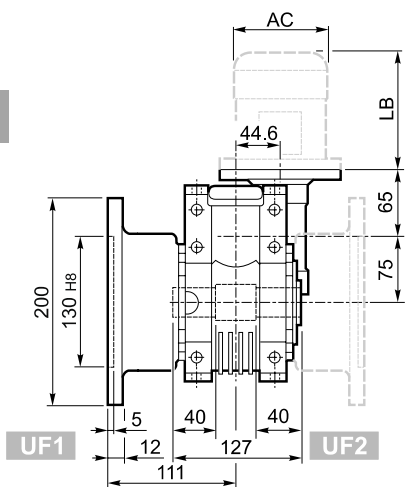
U



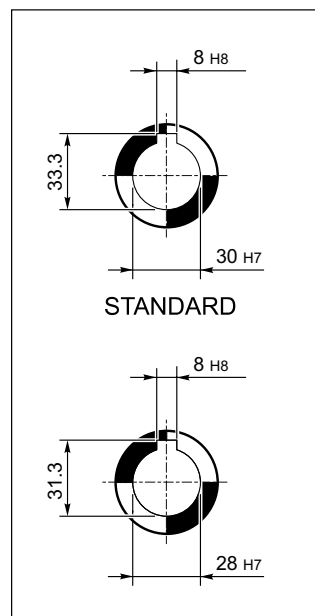
INPUT



UF_

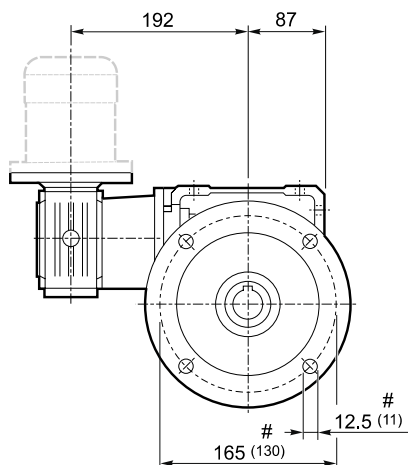
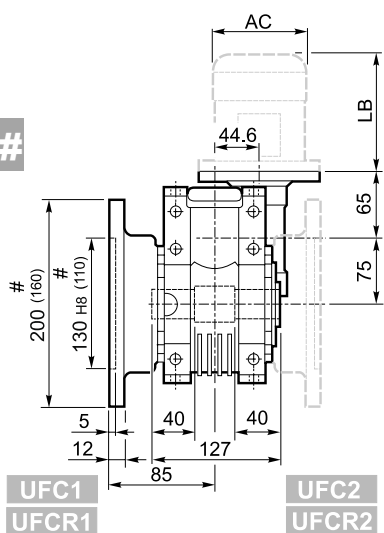


OUTPUT



UFC_

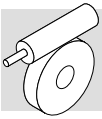
UF CR #



VF/W 44/75_

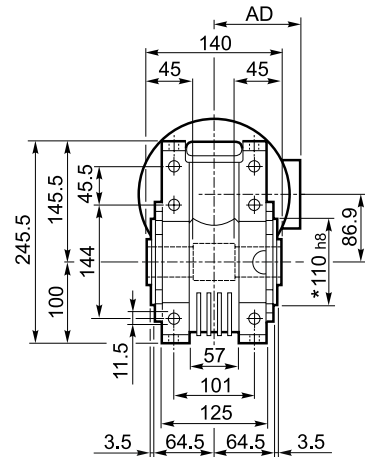
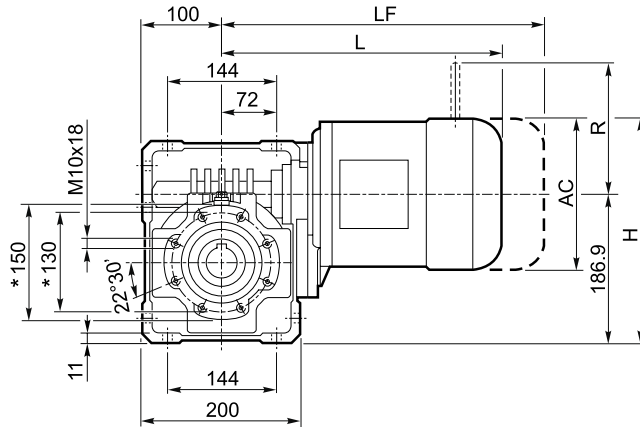
| | | VF/W 44/75_ | | | | | | | | | BN | | BN...FD BN...FA | | K | | K...FC | | | |
|-------------------|----------------|-------------|------|----|-----|-----|-----|----|-----|------|----|-----|--------------------|-----|-----|-----|--------|-----|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC | LB | AC | LB | AC | |
| | | 11 | 12.8 | 4 | 140 | 115 | 95 | 10 | 9.5 | 12.5 | | 63 | 184 | 121 | 249 | 121 | 165 | 122 | 214 | 122 |
| VF/W 44/75 | P63 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 10 | 9.5 | | 71 | 219 | 138 | 280 | 138 | 186 | 139 | 219 | 139 | |
| VF/W 44/75 | P63 B14 | 11 | 12.8 | 4 | 90 | 75 | 60 | 8 | 5.5 | | 63 | 184 | 121 | 249 | 121 | — | — | — | — | |
| VF/W 44/75 | P71 B14 | 14 | 16.3 | 5 | 105 | 85 | 70 | 10 | 7 | | 71 | 219 | 138 | 280 | 138 | — | — | — | — | |

* Da ambo i lati / On both sides / Auf beiden Seiten / Tous le deux cotés
Flangia ridotta / Reduced flange / Verkürzte Flansch / Bride réduit

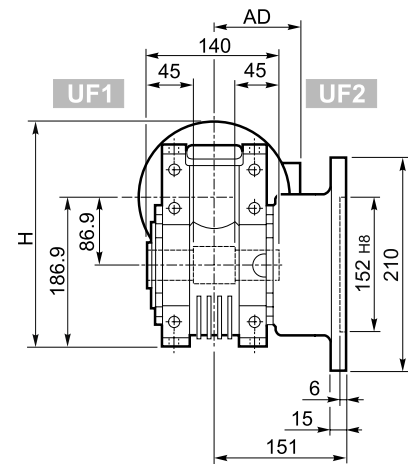
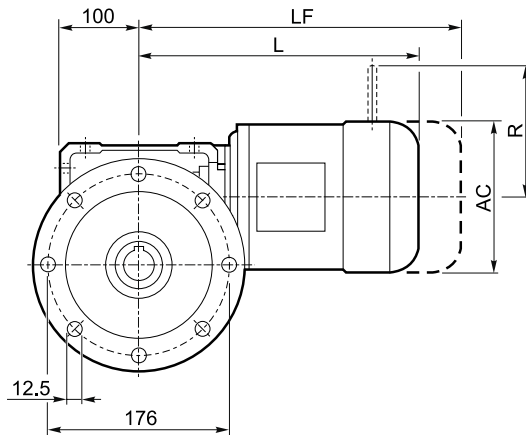


W 86...S

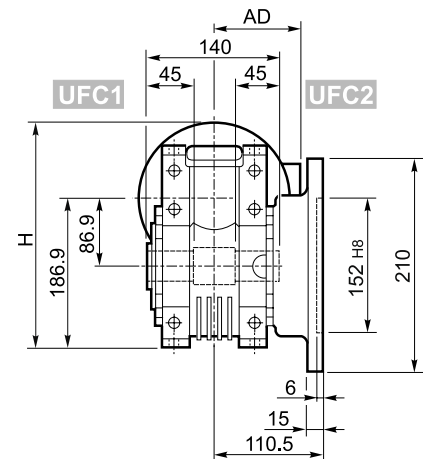
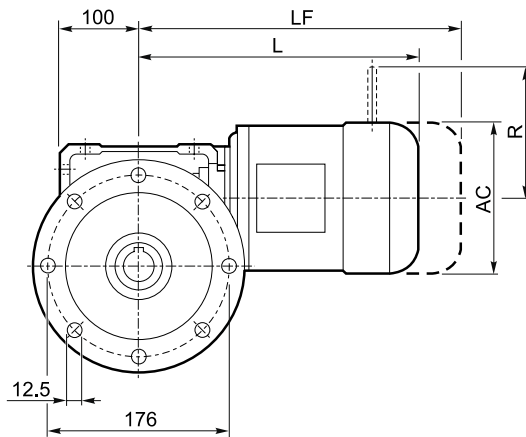
U



UF

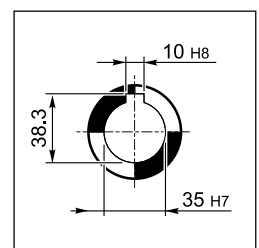


UFC

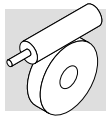


| W 86 | | | | | | | | | | | | | |
|-------|----|-----|-----|-------|-----|-----|------|------------------|------|--------|-----|--------|-----|
| Image | S | M | M_ | | | | | M...FD M...FA | | M...FD | | M...FA | |
| | | | AC | H | L | AD | Kg | LF | Kg | R | AD | R | AD |
| | S1 | M1S | 138 | 256 | 300 | 108 | 18.1 | 363 | 20.3 | 103 | 132 | 124 | 108 |
| | S1 | M1L | 138 | 256 | 324 | 108 | 20.1 | 385 | 22.3 | 103 | 132 | 124 | 108 |
| | S2 | M2S | 156 | 265 | 349 | 119 | 22.6 | 425 | 25.7 | 129 | 143 | 134 | 119 |
| | S3 | M3S | 193 | 283.5 | 392 | 142 | 29.7 | 488 | 35 | 160 | 155 | 160 | 142 |
| | S3 | M3L | 193 | 283.5 | 424 | 142 | 33 | 515 | 36 | 160 | 155 | 160 | 142 |

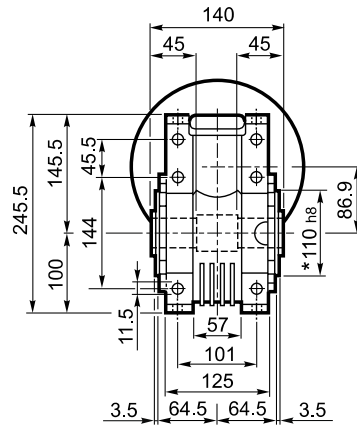
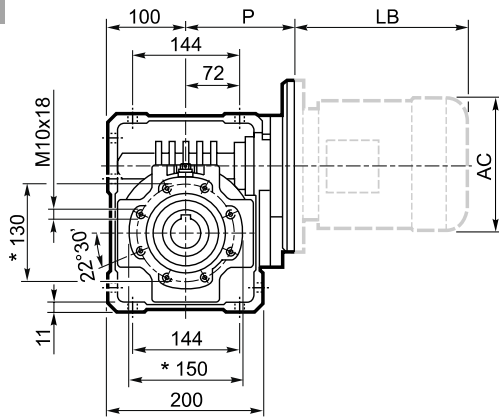
OUTPUT



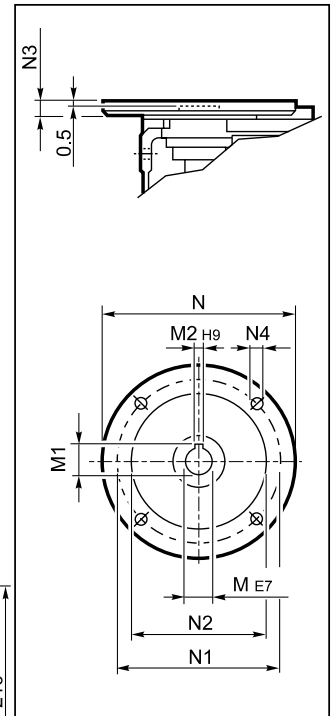
* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés



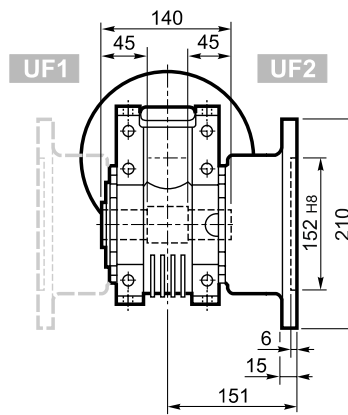
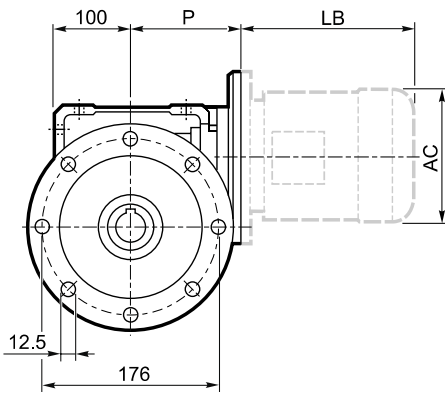
U



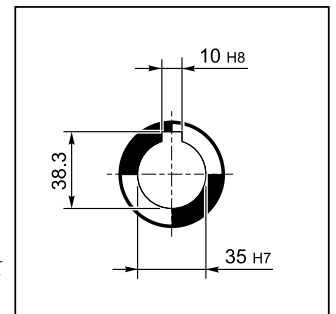
INPUT



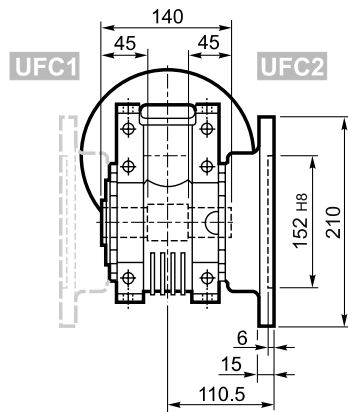
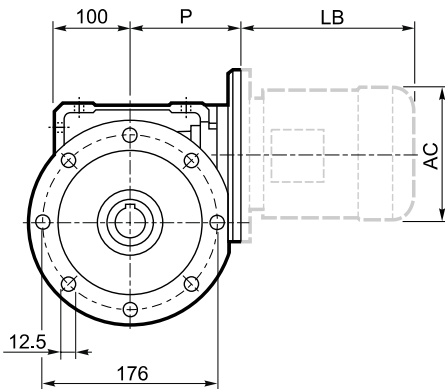
UF



OUTPUT

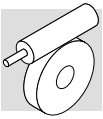


UFC



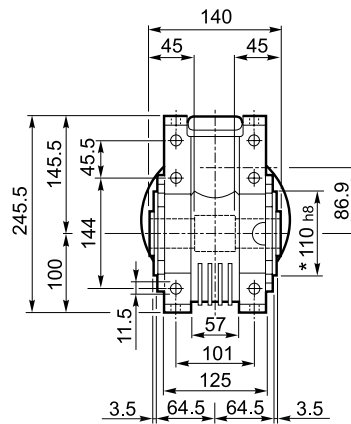
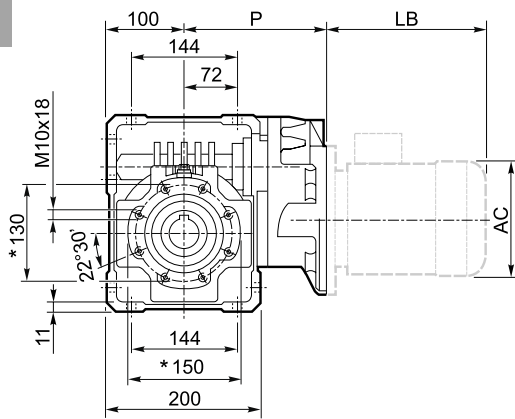
| W 86 | | | | | | | | | | | | | BN | | BN...FD BN...FA | |
|------|---------------|----|------|----|-----|-----|-----|-----|------|-----|------|--------|-----|-----|--------------------|-----|
| Icon | Series | M | M1 | M2 | N | N1 | N2 | N3 | N4 | P | kg | IEC | LB | AC | LB | AC |
| | W 86 P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 11 | 9 | 128 | 13.6 | BN 71 | 219 | 138 | 280 | 138 |
| | W 86 P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 12 | 11.5 | 128 | 13.8 | BN 80 | 234 | 156 | 306 | 156 |
| | W 86 P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 12 | 11.5 | 128 | 13.7 | BN 90 | 276 | 176 | 359 | 176 |
| | W 86 P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 13 | 12.5 | 136 | 13.8 | BN 100 | 307 | 195 | 398 | 195 |
| | W 86 P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 13 | 12.5 | 136 | 13.8 | BN 112 | 325 | 219 | 424 | 219 |
| | W 86 P80 B14 | 19 | 21.8 | 6 | 120 | 100 | 80 | 7.5 | 6.5 | 128 | 13.5 | BN 80 | 234 | 156 | 306 | 156 |
| | W 86 P90 B14 | 24 | 27.3 | 8 | 140 | 115 | 95 | 7.5 | 8.5 | 128 | 13.5 | BN 90 | 276 | 176 | 359 | 176 |
| | W 86 P100 B14 | 28 | 31.3 | 8 | 160 | 130 | 110 | 10 | 8.5 | 136 | 13.6 | BN 100 | 307 | 195 | 398 | 195 |
| | W 86 P112 B14 | 28 | 31.3 | 8 | 160 | 130 | 110 | 10 | 8.5 | 136 | 13.6 | BN 112 | 325 | 219 | 424 | 219 |

* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés

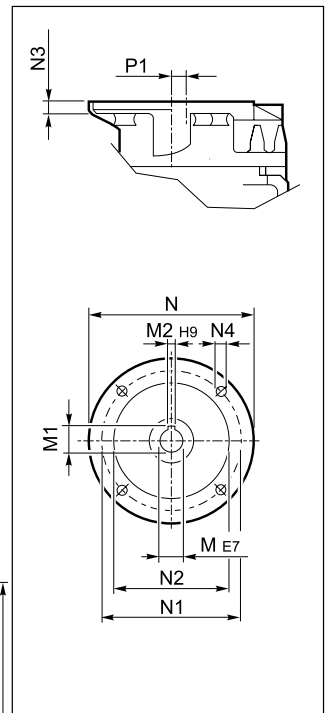


WR 86...P(IEC)

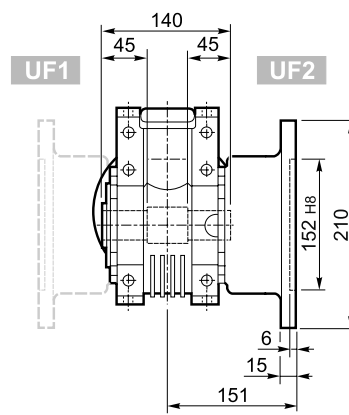
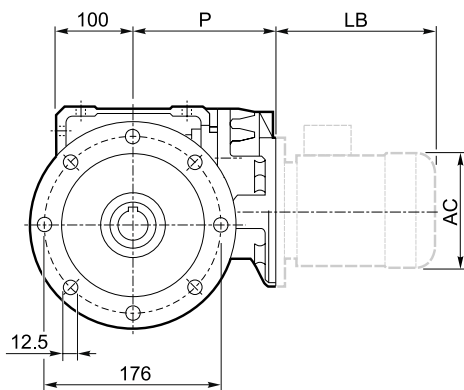
U



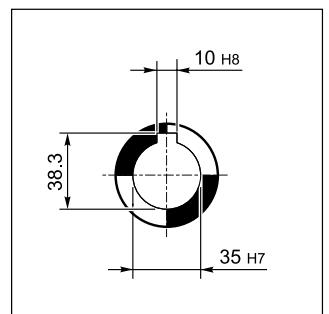
INPUT



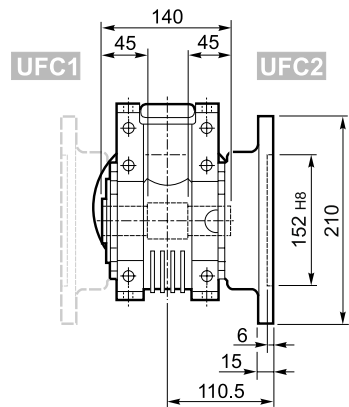
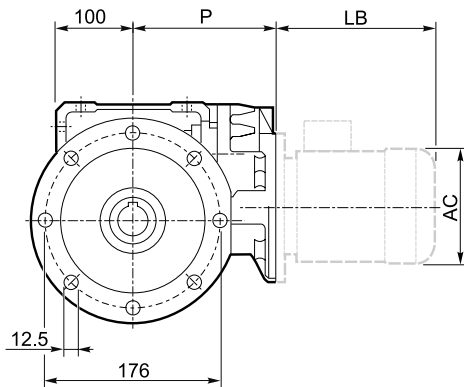
UF_



OUTPUT

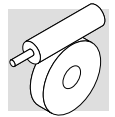


UFC_

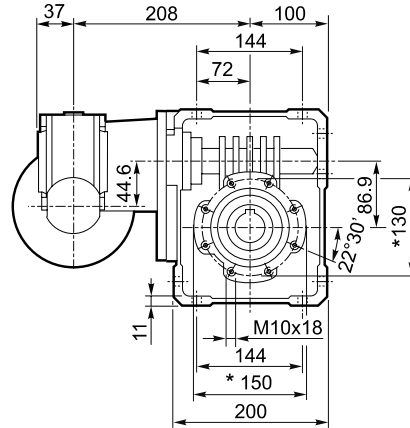
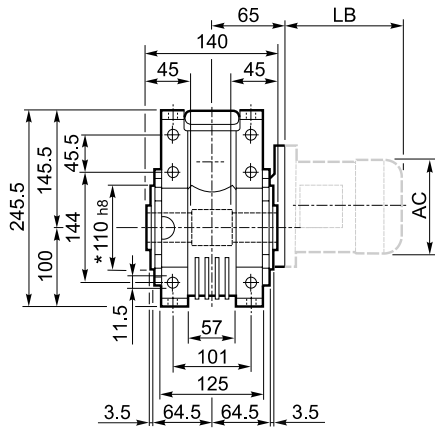


| WR 86_ | | | | | | | | | | | | | | BN | | BN...FD BN...FA | |
|--------|--------|----|------|----|-----|-----|-----|----|--------|-------|------|------|-------|-----|-----|--------------------|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | P | P1 | | | LB | AC | LB | AC |
| WR 86 | P63 B5 | 11 | 12.8 | 4 | 140 | 115 | 95 | 10 | M8x10 | 168 | 35.4 | 14.3 | BN 63 | 184 | 121 | 249 | 121 |
| WR 86 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 10 | M8x10 | 168 | 35.4 | 14.4 | BN 71 | 219 | 138 | 280 | 138 |
| WR 86 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 12 | M10x13 | 179.5 | 22.9 | 15.2 | BN 80 | 234 | 156 | 306 | 156 |
| WR 86 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 12 | M10x13 | 179.5 | 22.9 | 15.3 | BN 90 | 276 | 176 | 359 | 176 |

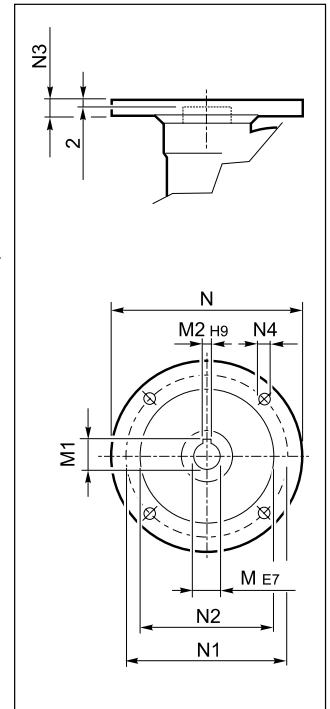
* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés



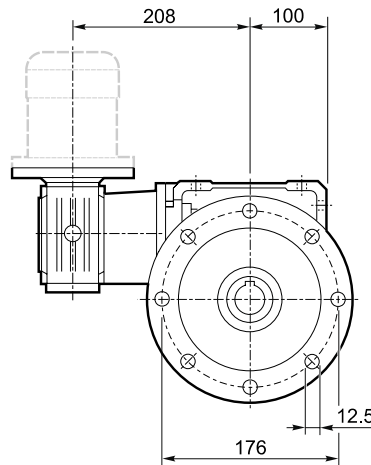
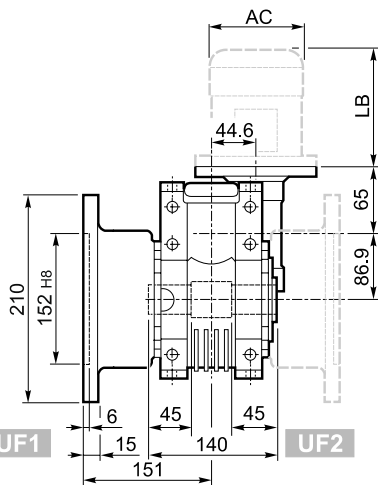
U



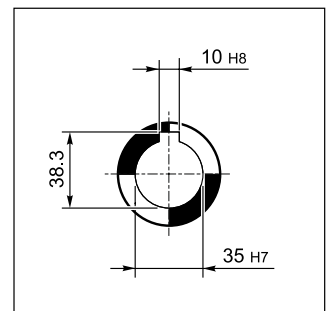
INPUT



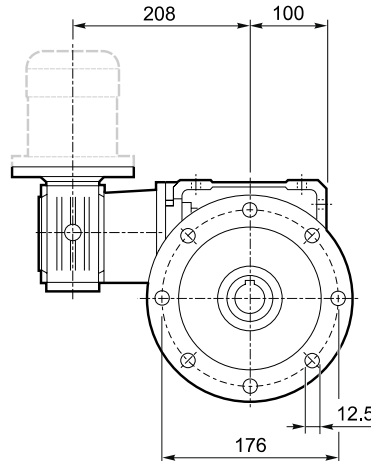
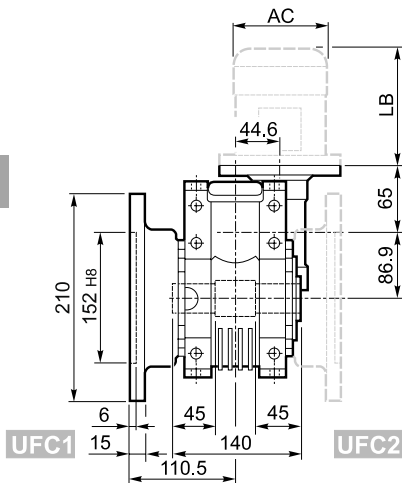
UF



OUTPUT

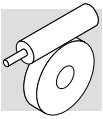


UFC



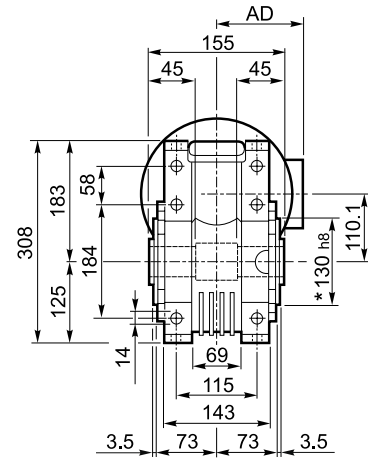
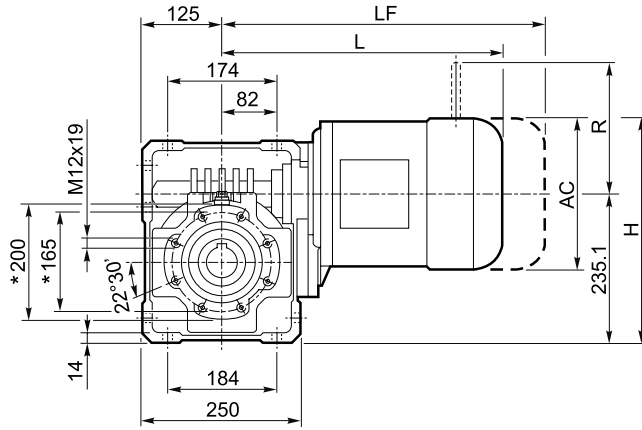
| VF/W 44/86 _ | | | | | | | | | | | BN | | BN...FD BN...FA | | K | | K...FC | | | |
|--------------|---------|----|------|----|-----|-----|-----|----|-----|------|----|-----|--------------------|-----|-----|-----|--------|-----|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC | LB | AC | LB | AC | |
| VF/W 44/86 | P63 B5 | 11 | 12.8 | 4 | 140 | 115 | 95 | 10 | 9.5 | 16.6 | | 63 | 184 | 121 | 249 | 121 | 165 | 122 | 214 | 122 |
| VF/W 44/86 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 10 | 9.5 | | 71 | 219 | 138 | 280 | 138 | 186 | 139 | 219 | 139 | |
| VF/W 44/86 | P63 B14 | 11 | 12.8 | 4 | 90 | 75 | 60 | 8 | 5.5 | | 63 | 184 | 121 | 249 | 121 | — | — | — | — | |
| VF/W 44/86 | P71 B14 | 14 | 16.3 | 5 | 105 | 85 | 70 | 10 | 7 | | 71 | 219 | 138 | 280 | 138 | — | — | — | — | |

* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés

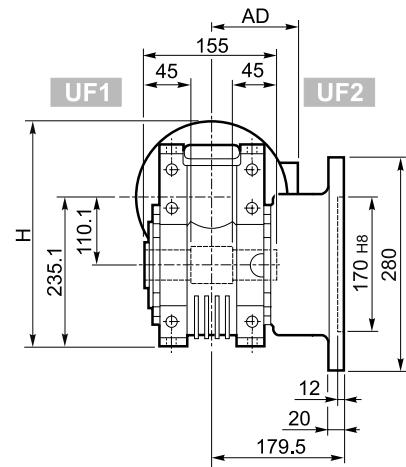
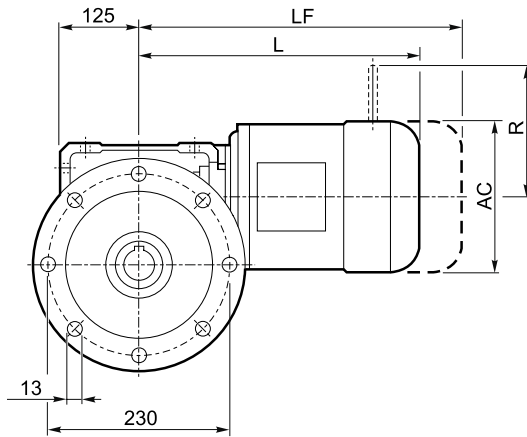


W 110 □...S □

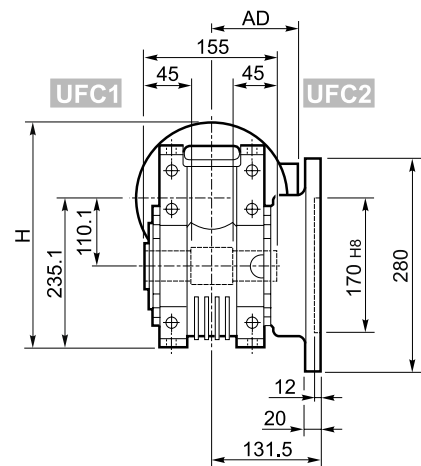
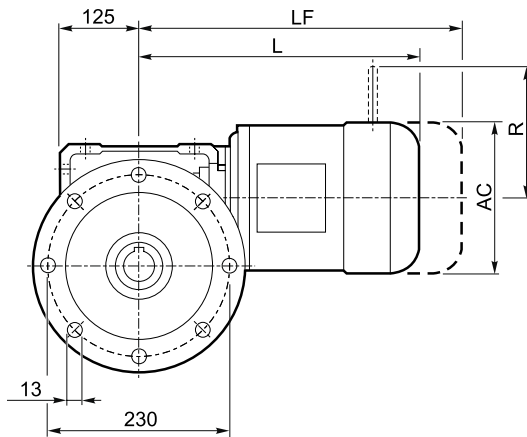
U



UF_

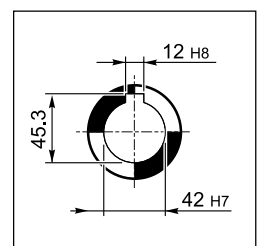


UFC_

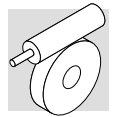


| W 110 | | | | | | | | | | | | | | |
|-------|----|-----|-----|-----|-----|-----|----|-----|------------------|-----|--------|-----|--------|--|
| | | | M_ | | | | | | M...FD M...FA | | M...FD | | M...FA | |
| | | | AC | H | L | AD | Kg | LF | Kg | R | AD | R | AD | |
| W 110 | S2 | M2S | 156 | 313 | 364 | 119 | 38 | 440 | 41 | 129 | 143 | 134 | 119 | |
| W 110 | S3 | M3S | 193 | 332 | 407 | 142 | 46 | 503 | 50 | 160 | 155 | 160 | 142 | |
| W 110 | S3 | M3L | 193 | 332 | 439 | 142 | 48 | 530 | 53 | 160 | 155 | 160 | 142 | |

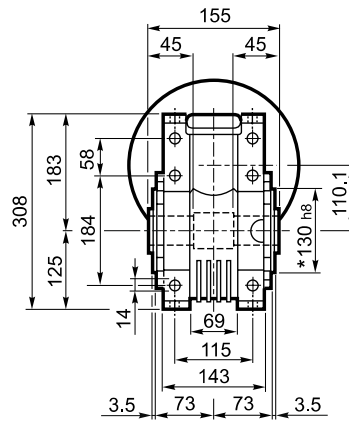
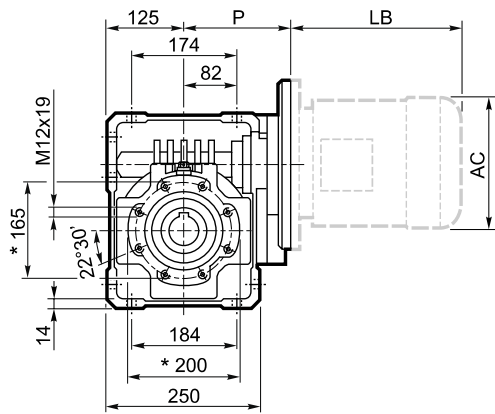
OUTPUT



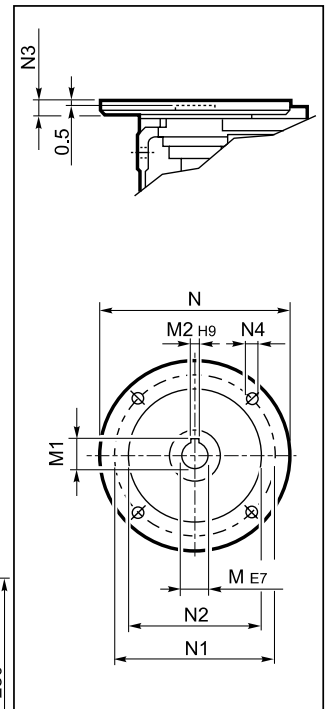
* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés



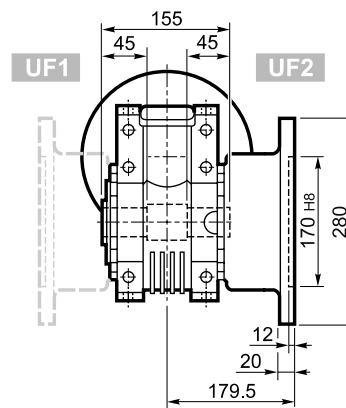
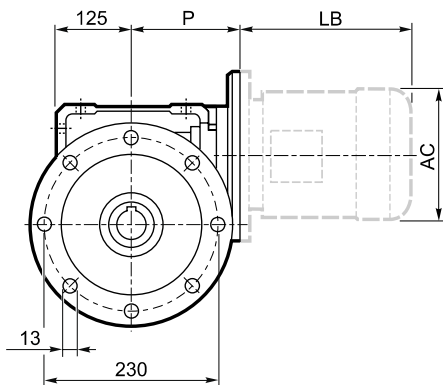
U



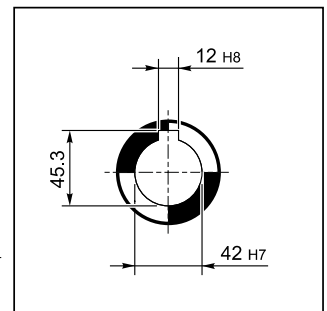
INPUT



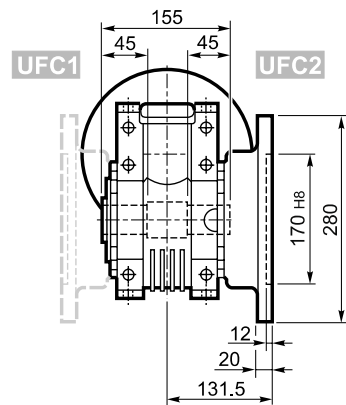
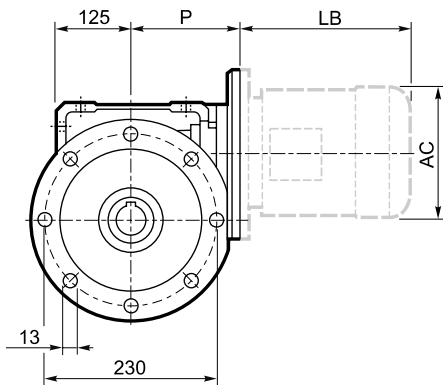
UF



OUTPUT

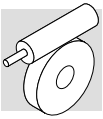


UFC



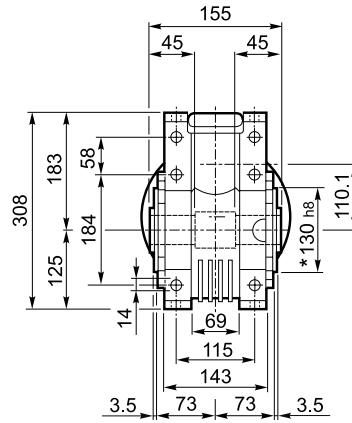
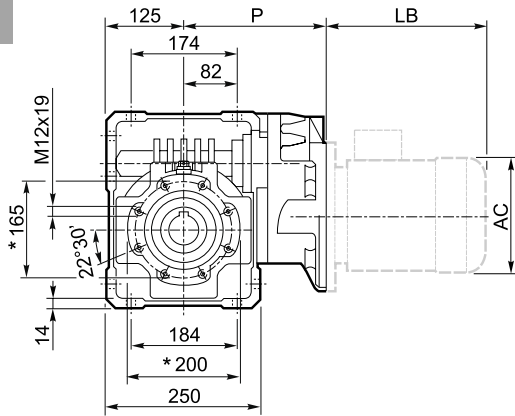
| W 110_ | | | | | | | | | | | | | BN | | BN...FD BN...FA | |
|--------|----------|----|------|----|-----|-----|-----|-----|--------|-----|------|--------|-----|-----|--------------------|-----|
| Icon | Icon | M | M1 | M2 | N | N1 | N2 | N3 | N4 | P | kg | IEC | LB | AC | LB | AC |
| W 110 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | — | M10x12 | 143 | 28 | BN 80 | 234 | 156 | 306 | 156 |
| W 110 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | — | M10x12 | 143 | 28 | BN 90 | 276 | 176 | 359 | 176 |
| W 110 | P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 13 | 13 | 151 | 29 | BN 100 | 307 | 195 | 398 | 195 |
| W 110 | P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 13 | 13 | 151 | 29 | BN 112 | 325 | 219 | 424 | 219 |
| W 110 | P132 B5 | 38 | 41.3 | 10 | 300 | 265 | 230 | 16 | 13 | 226 | 31 | BN 132 | 413 | 258 | 523 | 258 |
| W 110 | P80 B14 | 19 | 21.8 | 6 | 120 | 100 | 80 | 7.5 | 7 | 143 | 27.5 | BN 80 | 234 | 156 | 306 | 156 |
| W 110 | P90 B14 | 24 | 27.3 | 8 | 140 | 115 | 95 | 6.5 | 9 | 143 | 27.5 | BN 90 | 276 | 176 | 359 | 176 |
| W 110 | P100 B14 | 28 | 31.3 | 8 | 160 | 130 | 110 | 13 | 9 | 151 | 27 | BN 100 | 307 | 195 | 398 | 195 |
| W 110 | P112 B14 | 28 | 31.3 | 8 | 160 | 130 | 110 | 13 | 9 | 151 | 27 | BN 112 | 325 | 219 | 424 | 219 |

* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés

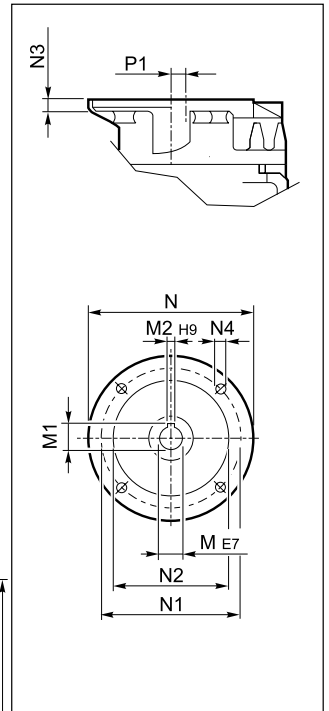


WR 110□...P(IEC)

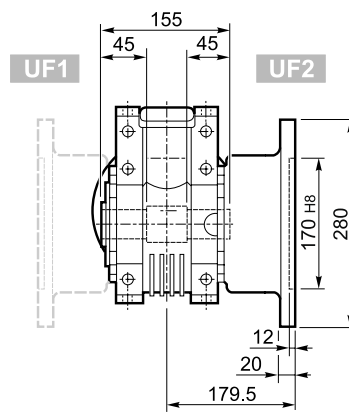
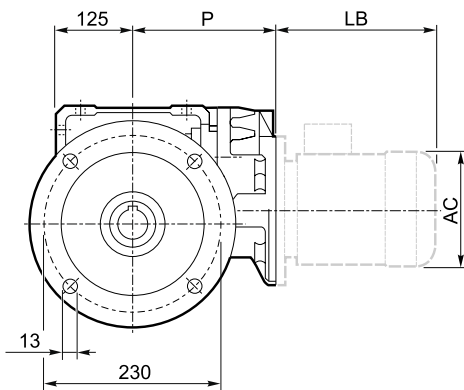
U



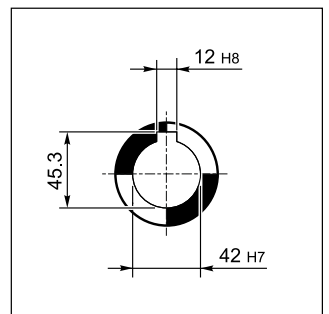
INPUT



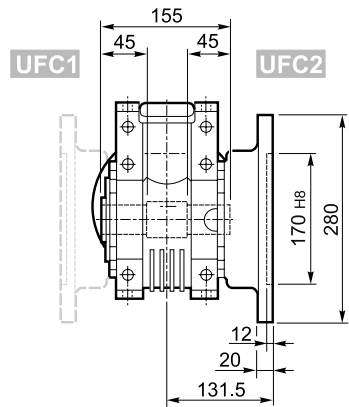
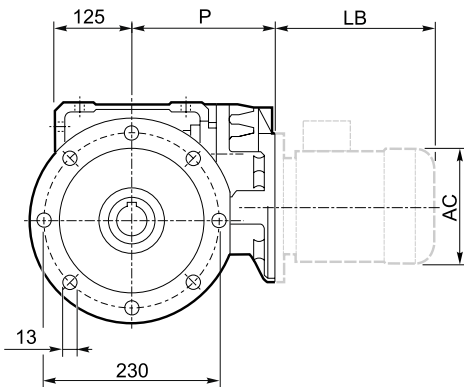
UF



OUTPUT



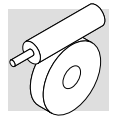
UFC



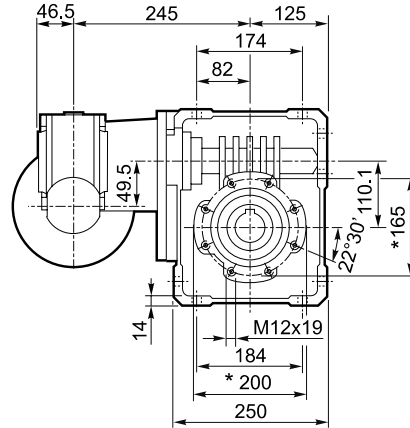
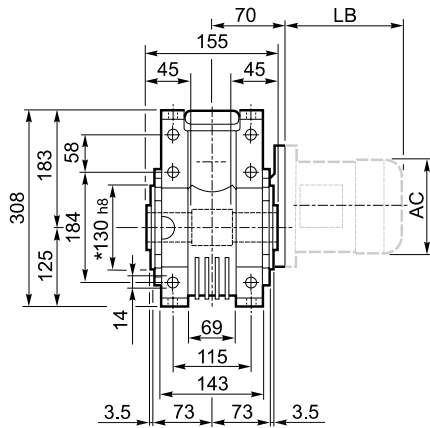
| WR 110_ | | | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|---------|---------|----|------|----|-----|-----|-----|----|--------|-----|------|------|--------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | P | P1 | | | LB | AC | LB | AC |
| WR 110 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 10 | M8x14 | 185 | 58.6 | 30.5 | BN 71 | 219 | 138 | 280 | 138 |
| WR 110 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 14 | M10x15 | 204 | 21.1 | 31 | BN 80 | 234 | 156 | 306 | 156 |
| WR 110 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 14 | M10x15 | 204 | 21.1 | 31 | BN 90 | 276 | 176 | 359 | 176 |
| WR 110 | P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 14 | M12x13 | 213 | 21.1 | 32 | BN 100 | 307 | 195 | 398 | 195 |
| WR 110 | P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 14 | M12x13 | 213 | 21.1 | 32 | BN 112 | 325 | 219 | 424 | 219 |

* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés

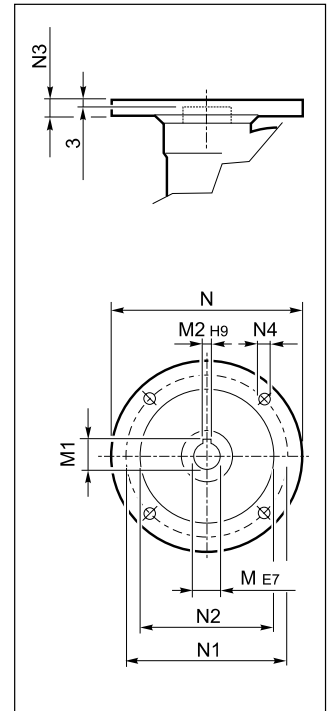
VF/W 49/110...P(IEC)



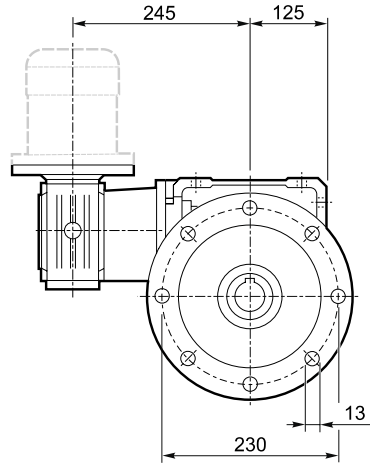
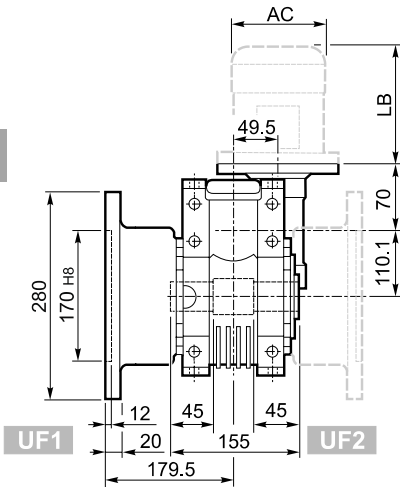
U



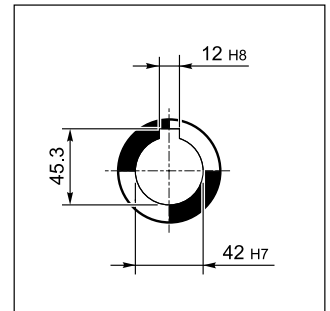
INPUT



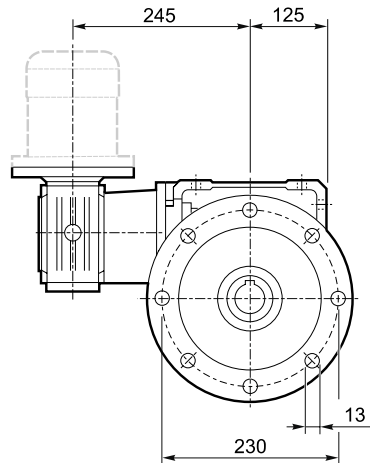
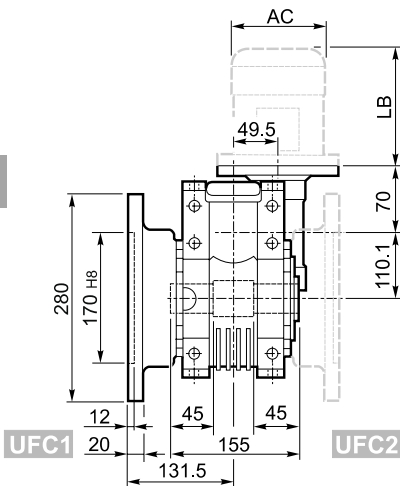
UF_



OUTPUT

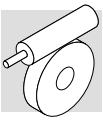


UFC_



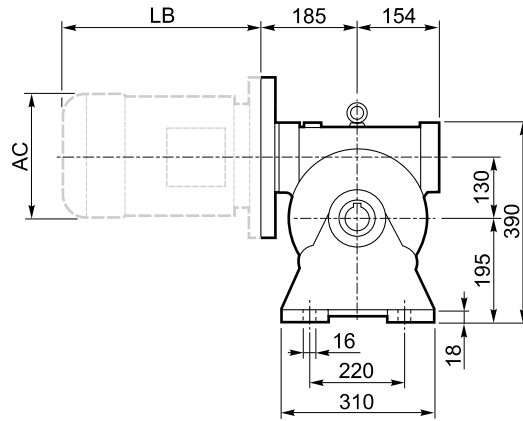
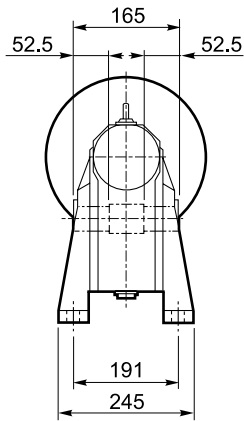
| VF/W 49/110_ | | | | | | | | | | | BN | | BN...FD BN...FA | | K | | K...FC | | | |
|--------------|---------|----|------|----|-----|-----|-----|------|------|----|----|----|--------------------|-----|-----|-----|--------|-----|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC | LB | AC | LB | AC | |
| VF/W 49/110 | P63 B5 | 11 | 12.8 | 4 | 140 | 115 | 95 | 10.5 | 9.5 | 33 | | 63 | 184 | 121 | 249 | 121 | 165 | 122 | 214 | 122 |
| VF/W 49/110 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 10.5 | 9.5 | | | 71 | 219 | 138 | 280 | 138 | 186 | 139 | 219 | 139 |
| VF/W 49/110 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 10 | 11.5 | | | 80 | 234 | 156 | 306 | 156 | — | — | — | — |
| VF/W 49/110 | P63 B14 | 11 | 12.8 | 4 | 90 | 75 | 60 | 7 | 6 | | | 63 | 184 | 121 | 249 | 121 | — | — | — | — |
| VF/W 49/110 | P71 B14 | 14 | 16.3 | 5 | 105 | 85 | 70 | 10.5 | 6.5 | | | 71 | 219 | 138 | 280 | 138 | — | — | — | — |
| VF/W 49/110 | P80 B14 | 19 | 21.8 | 6 | 120 | 100 | 80 | 10 | 7 | | | 80 | 234 | 156 | 306 | 156 | — | — | — | — |

* Da ambo i lati / On both sides / Auf beiden seiten / Tous le deux cotés

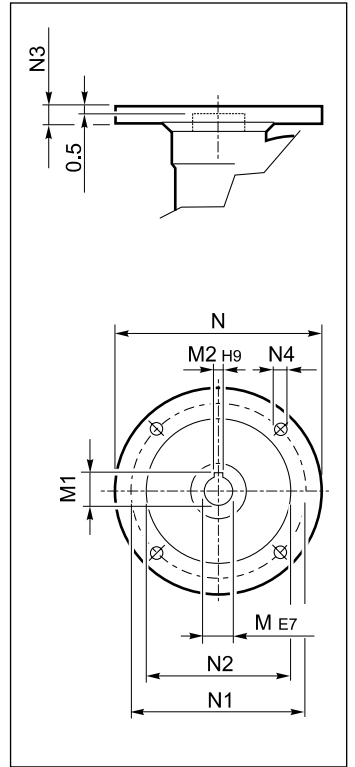


VF 130 □...P(IEC)

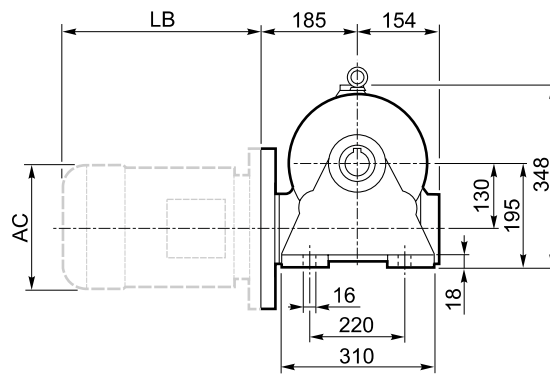
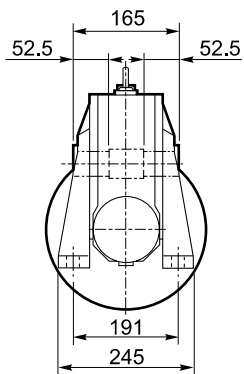
A



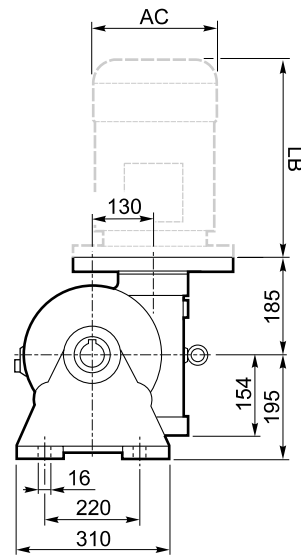
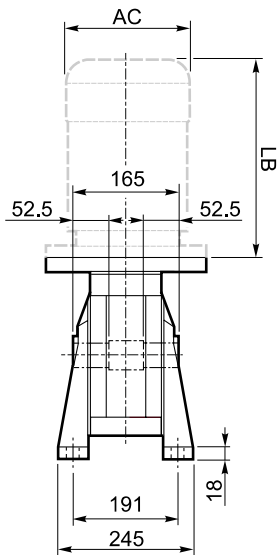
INPUT



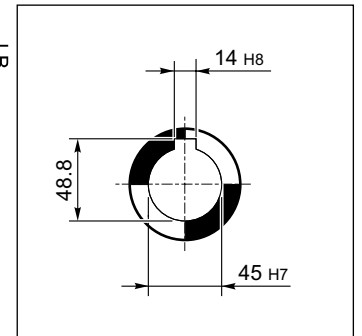
N

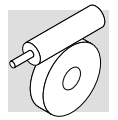


V

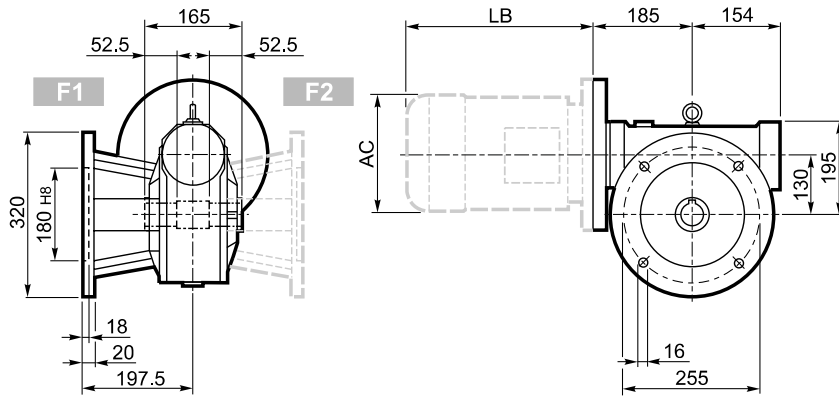


OUTPUT

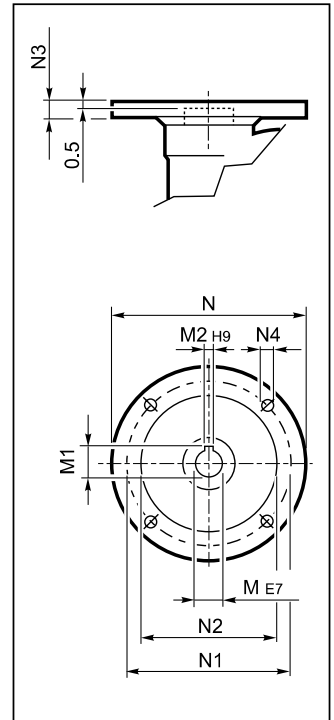




F_

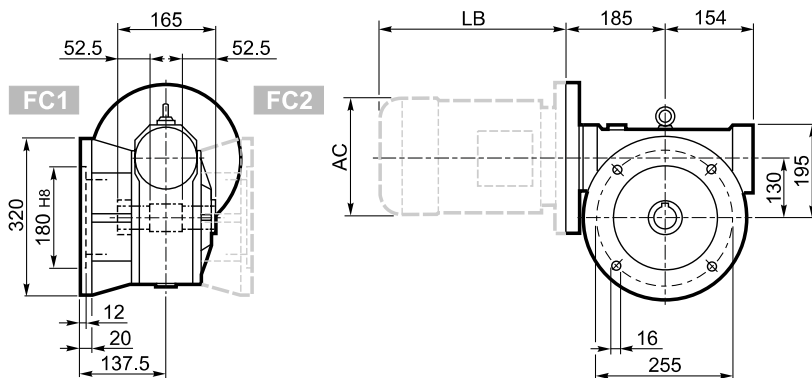


INPUT

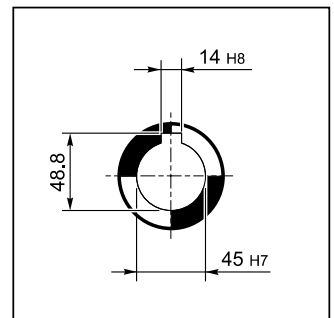


FC_

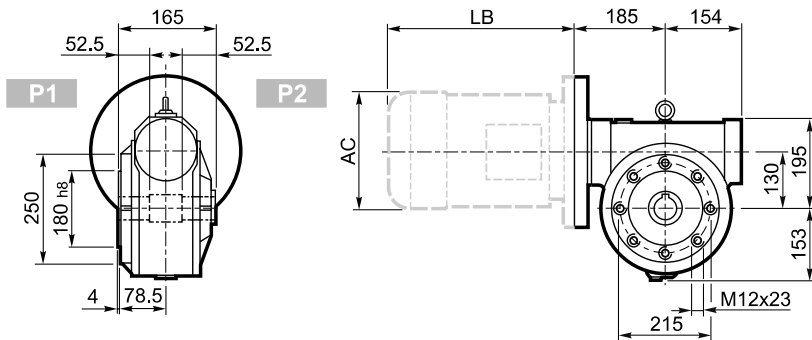
FR_



OUTPUT

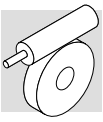


P_



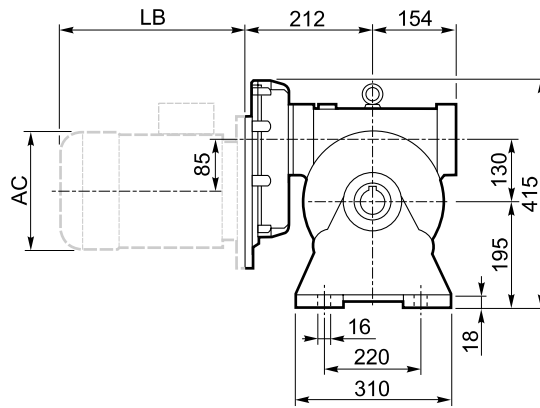
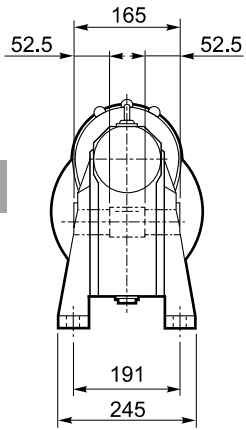
| VF 130_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|---------|---------|----|-------|----|-----|-----|-----|----|----|----|--------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VF130 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 17 | 11 | 49 | BN 90 | 276 | 176 | 359 | 176 |
| VF130 | P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 17 | 13 | | BN 100 | 307 | 195 | 398 | 195 |
| VF130 | P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 17 | 13 | | BN 112 | 325 | 219 | 424 | 219 |
| VF130 | P132 B5 | 38 | 40.1# | 10 | 300 | 265 | 230 | 17 | 13 | | BN 132 | 413 | 258 | 523 | 258 |

Linguetta ribassata / Lowered key / Verkleinertes Paßfeder / Clavette à hauteur réduite

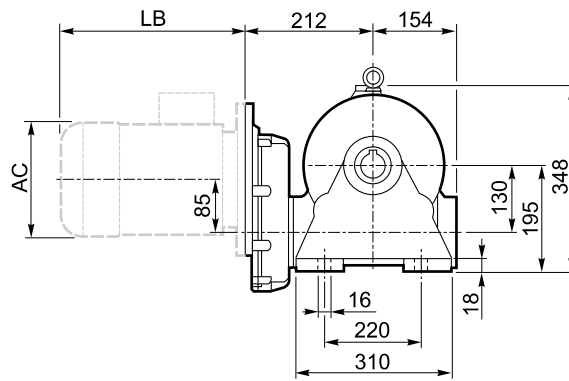
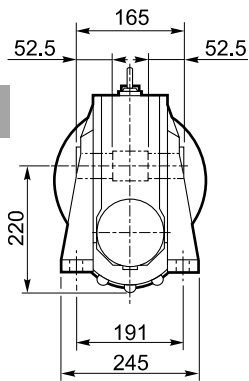


VFR 130□...P(IEC)

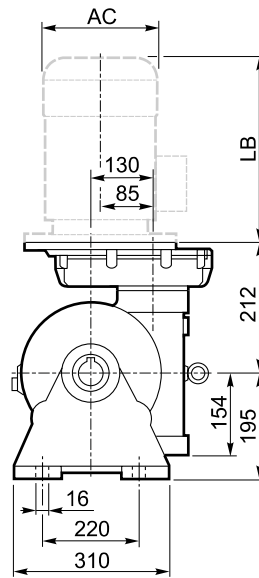
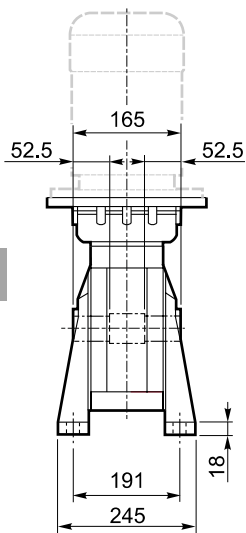
A



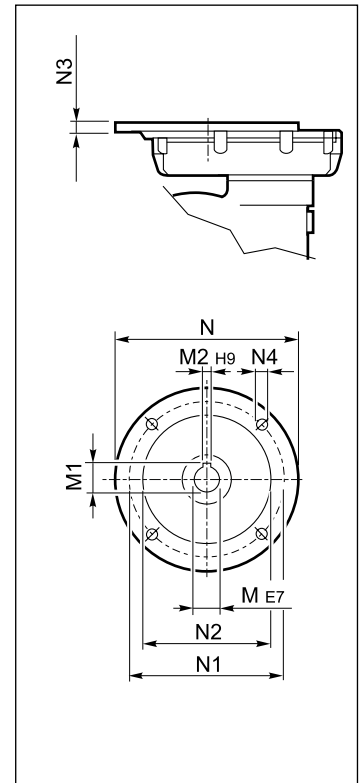
N



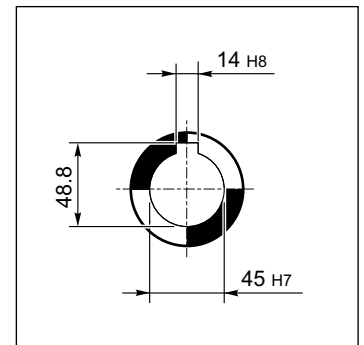
V

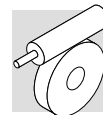


INPUT

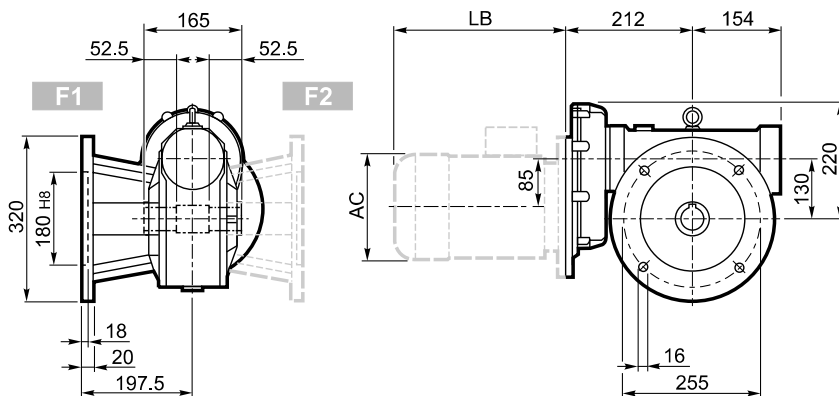


OUTPUT

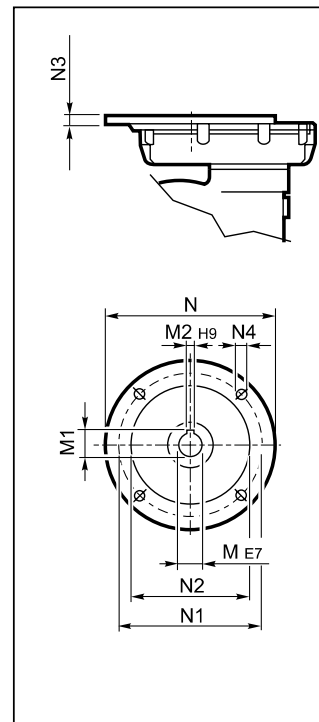




F_

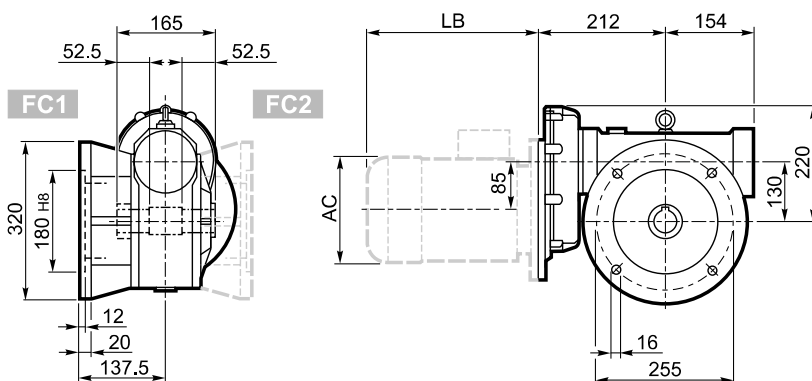


INPUT

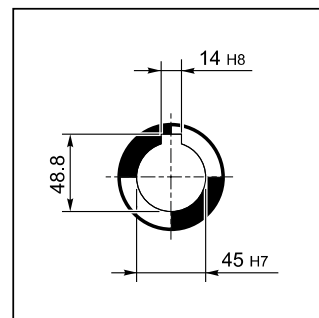


FC_

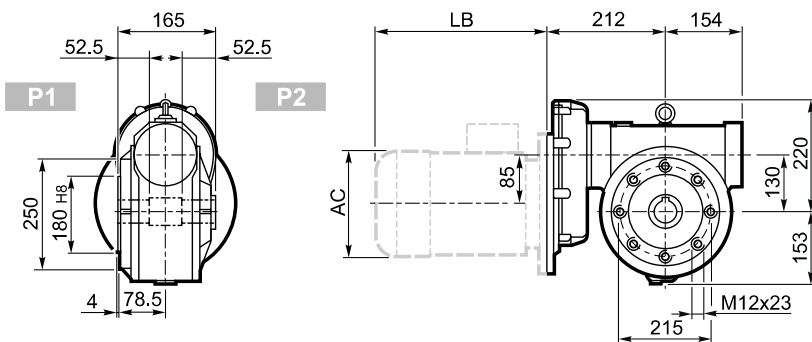
FR_



OUTPUT

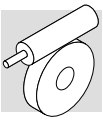


P_



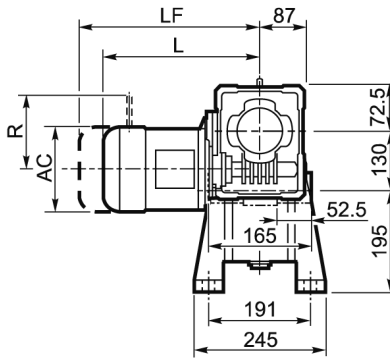
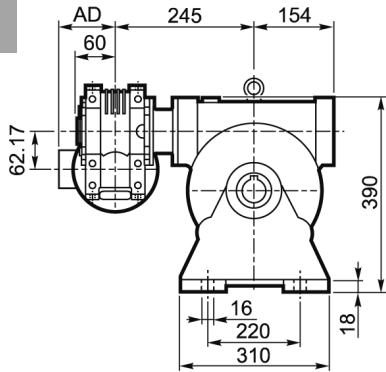
| VFR 130_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|----------|---------|-------|-------|----|-----|-----|-----|----|--------|----|--------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VFR 130 | P80 B5 | 19 K6 | 21.8 | 6 | 200 | 165 | 130 | 12 | M10x25 | 57 | BN 80 | 234 | 156 | 306 | 156 |
| VFR 130 | P90 B5 | 24 K6 | 27.3 | 8 | 200 | 165 | 130 | 12 | M10x25 | | BN 90 | 276 | 176 | 359 | 176 |
| VFR 130 | P100 B5 | 28 J6 | 29.1# | 8 | 250 | 215 | 180 | 13 | M12x35 | | BN 100 | 307 | 195 | 398 | 195 |
| VFR 130 | P112 B5 | 28 J6 | 29.1# | 8 | 250 | 215 | 180 | 13 | M12x35 | | BN 112 | 325 | 219 | 424 | 219 |

Linguetta ribassata / Lowered key / Verkleinertes Paßfeder / Clavette à hauteur réduite



W/VF 63/130 □...S □

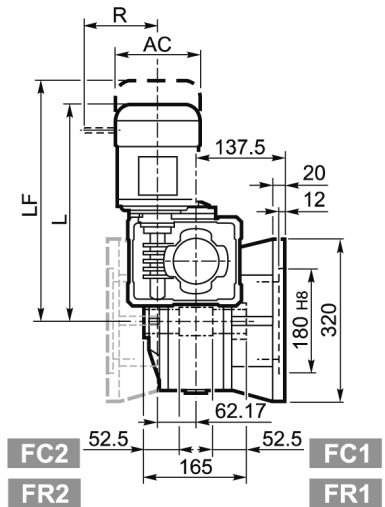
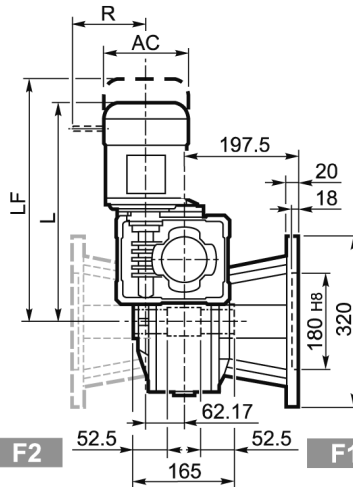
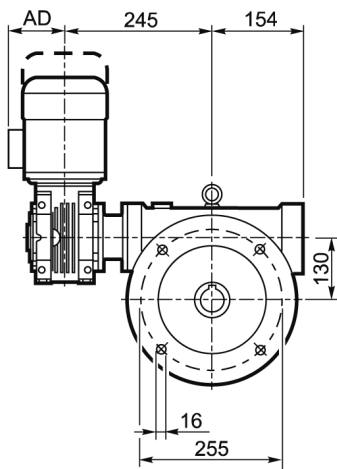
A



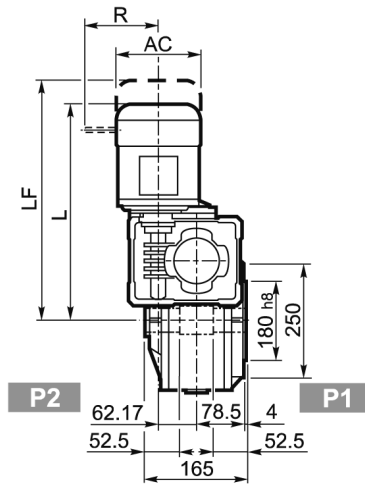
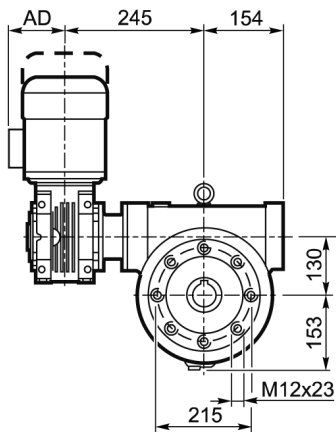
F_

FC_

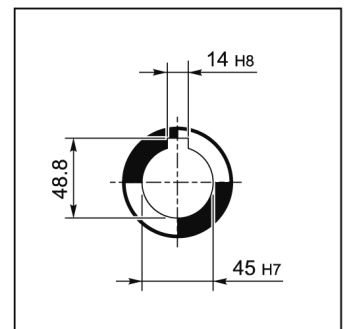
FR_



P_



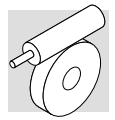
OUTPUT



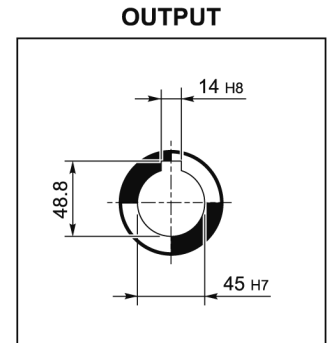
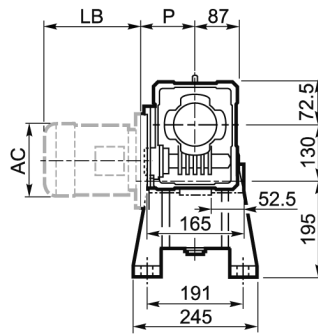
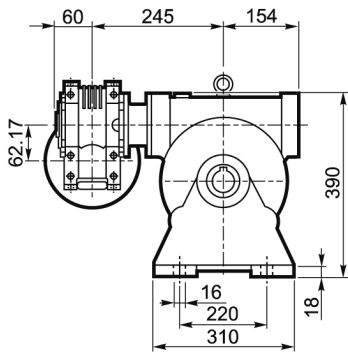
W/VF 63/130_

| | | | M_ | | | | M...FD | | M...FD | | M...FA | |
|-------------|----|-----|-----|-----|-----|----|--------|----|--------|-----|--------|-----|
| | | | AC | L | AD | Kg | LF | Kg | R | AD | R | AD |
| W/VF 63/130 | S1 | M1S | 138 | 395 | 108 | 62 | 458 | 64 | 103 | 132 | 124 | 108 |
| W/VF 63/130 | S1 | M1L | 138 | 419 | 108 | 63 | 480 | 65 | 103 | 132 | 124 | 108 |
| W/VF 63/130 | S2 | M2S | 156 | 447 | 119 | 68 | 523 | 71 | 129 | 143 | 134 | 119 |

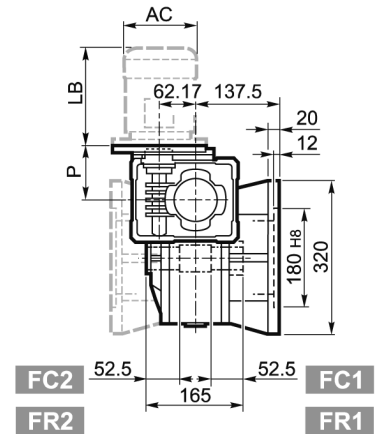
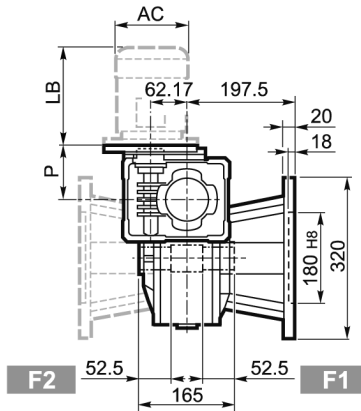
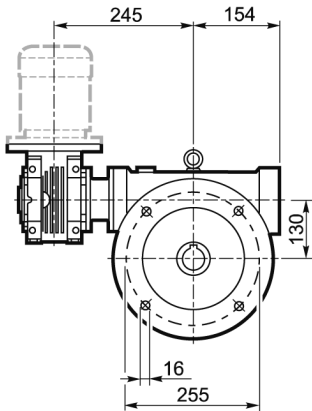
W/VF 63/130...P(IEC)



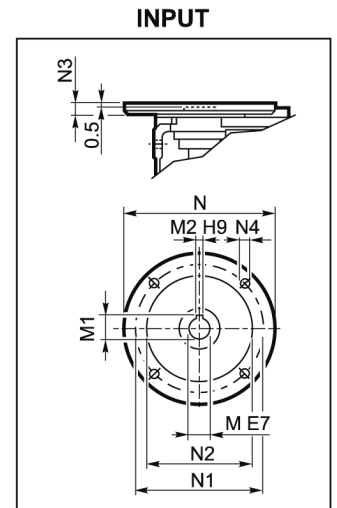
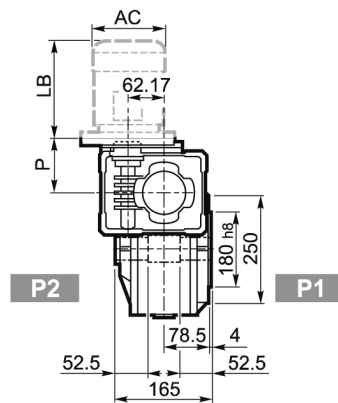
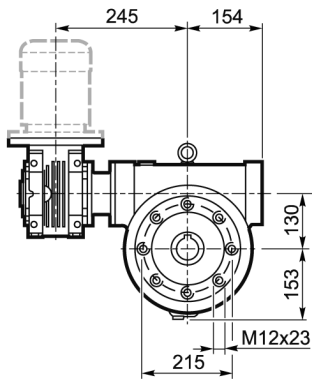
A



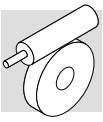
F_



P_

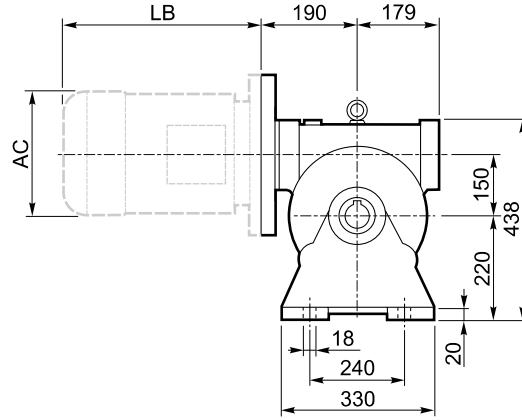
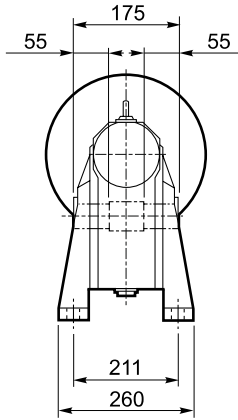


| W/VF 63/130_ | | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|--------------|---------|----|------|----|-----|-----|-----|----|------|-----|----|-------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | P | | | LB | AC | LB | AC |
| W/VF 63/130 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 11 | 9 | 95 | 57 | BN 71 | 219 | 138 | 280 | 138 |
| W/VF 63/130 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 12 | 11.5 | 102 | | BN 80 | 234 | 156 | 306 | 156 |
| W/VF 63/130 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 12 | 11.5 | 102 | | BN 90 | 276 | 176 | 359 | 176 |
| W/VF 63/130 | P71 B14 | 14 | 16.3 | 5 | 105 | 85 | 70 | 11 | 6.5 | 95 | | BN 71 | 219 | 138 | 280 | 138 |
| W/VF 63/130 | P80 B14 | 19 | 21.8 | 6 | 120 | 100 | 80 | 11 | 6.5 | 102 | | BN 80 | 234 | 156 | 306 | 156 |
| W/VF 63/130 | P90 B14 | 24 | 27.3 | 8 | 140 | 115 | 95 | 11 | 8.5 | 102 | | BN 90 | 276 | 176 | 359 | 176 |

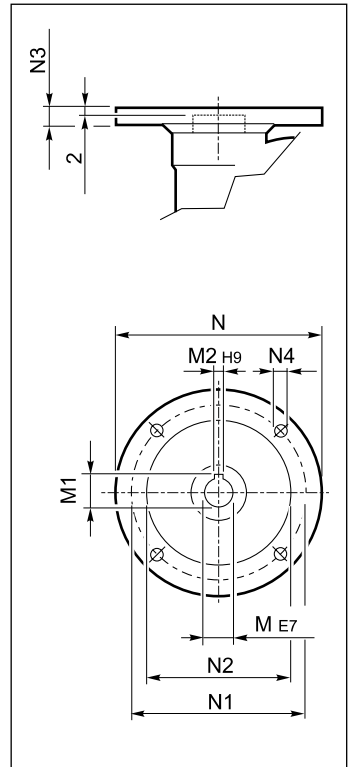


VF 150 □...P(IEC)

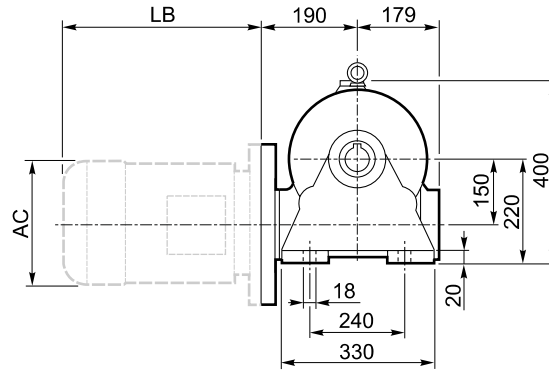
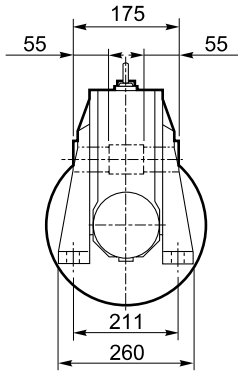
A



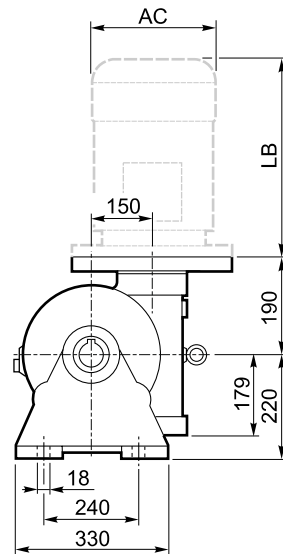
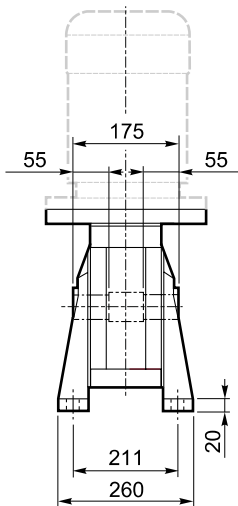
INPUT



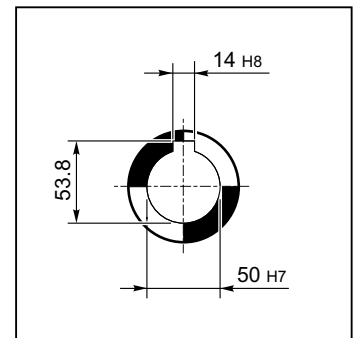
N

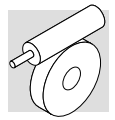


V

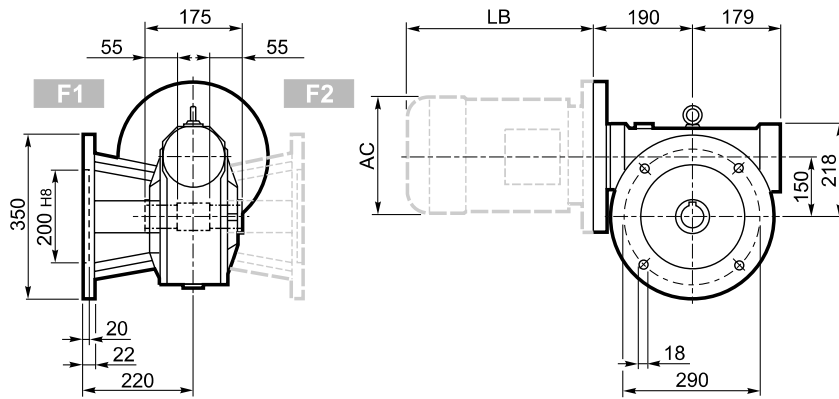


OUTPUT

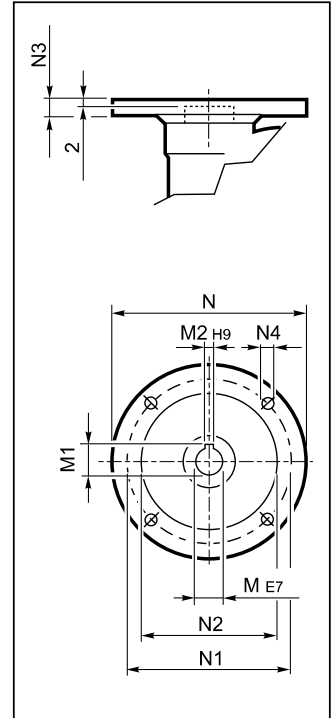




F_

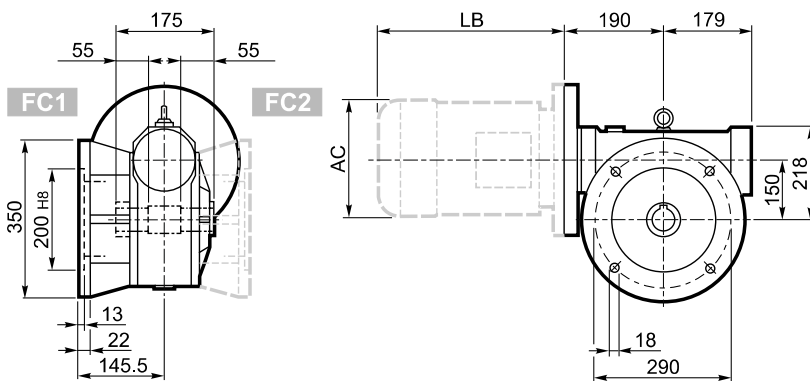


INPUT

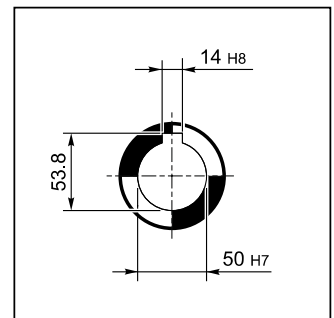


FC_

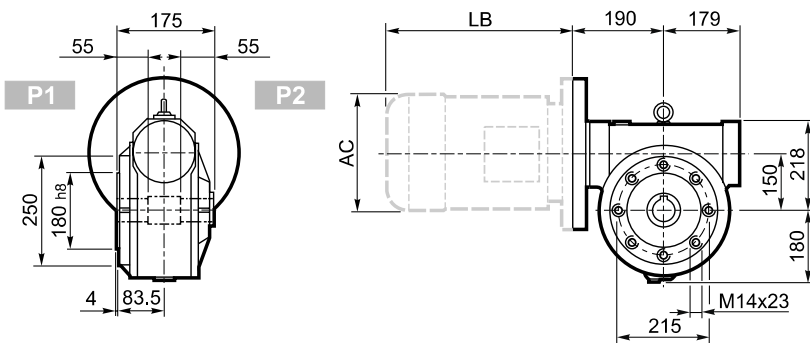
FR_



OUTPUT

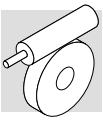


P_



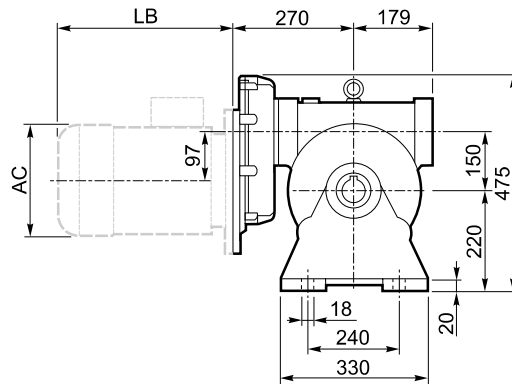
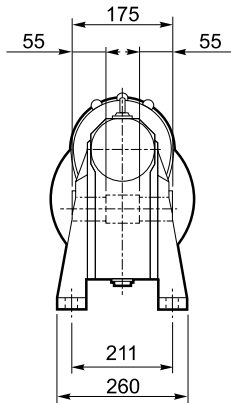
| VF 150_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|---------|---------|----|-------|----|-----|-----|-----|----|----|----|-----------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VF 150 | P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 11 | 13 | 60 | BN 100 | 307 | 195 | 398 | 195 |
| VF 150 | P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 11 | 13 | | BN 112 | 325 | 219 | 424 | 219 |
| VF 150 | P132 B5 | 38 | 41.3 | 10 | 300 | 265 | 230 | 16 | 13 | | BN 132 | 413 | 258 | 523 | 258 |
| VF 150 | P160 B5 | 42 | 44.6# | 12 | 350 | 300 | 250 | 18 | 18 | | BN 160MR | 452 | 258 | 562 | 258 |
| | | | | | | | | | | | BN 160M/R | 486 | 310 | 626 | 310 |

Linguetta ribassata / Lowered key / Verkleinertes Paßfeder / Clavette à hauteur réduite

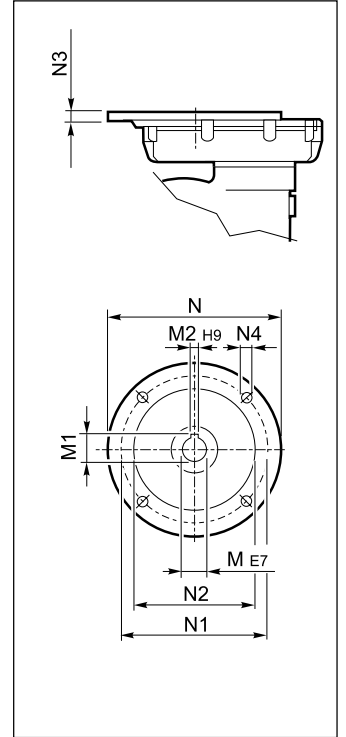


VFR 150□...P(IEC)

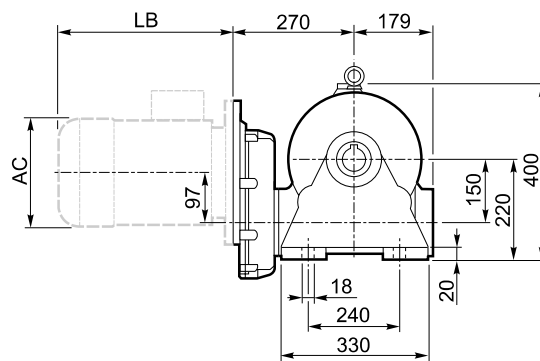
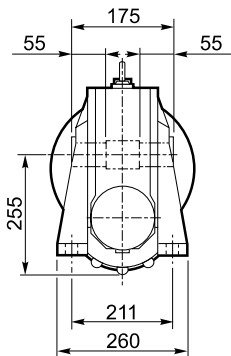
A



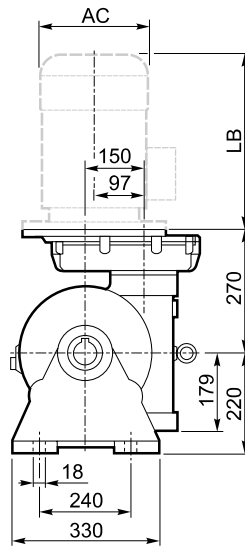
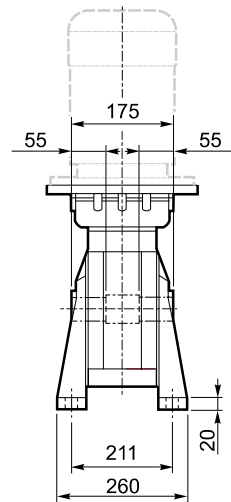
INPUT



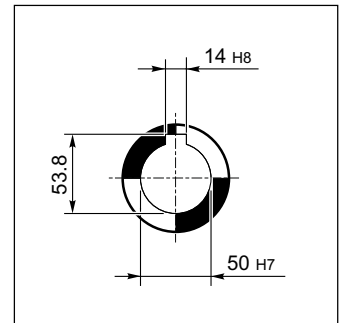
N

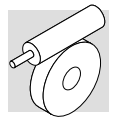


V

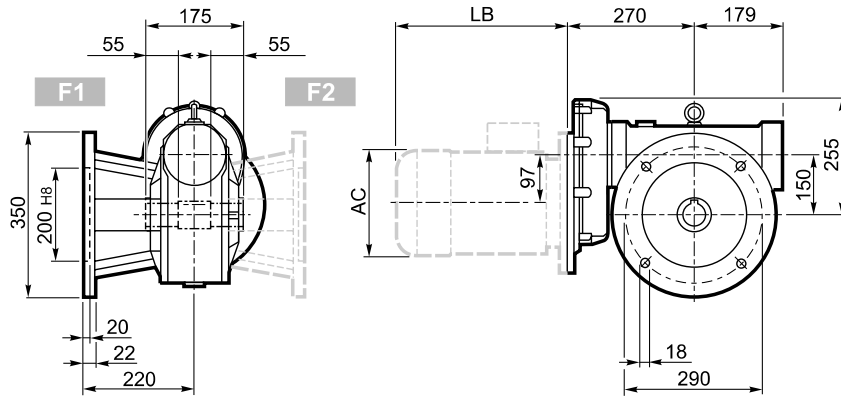


OUTPUT

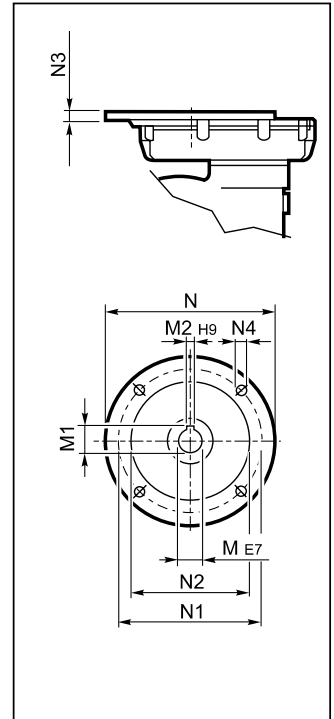




F_

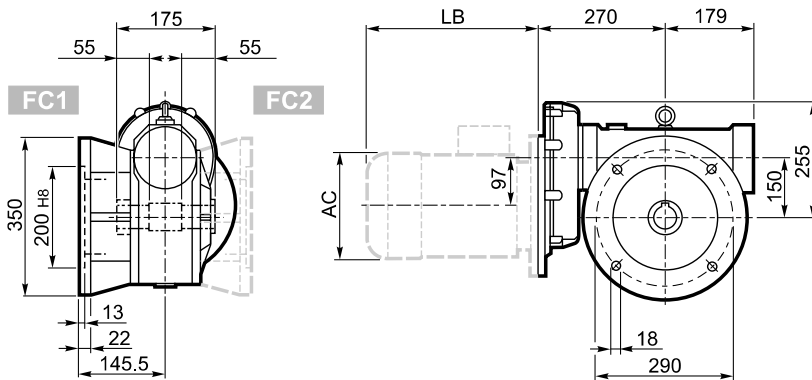


INPUT

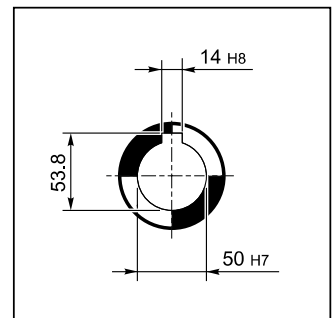


FC_

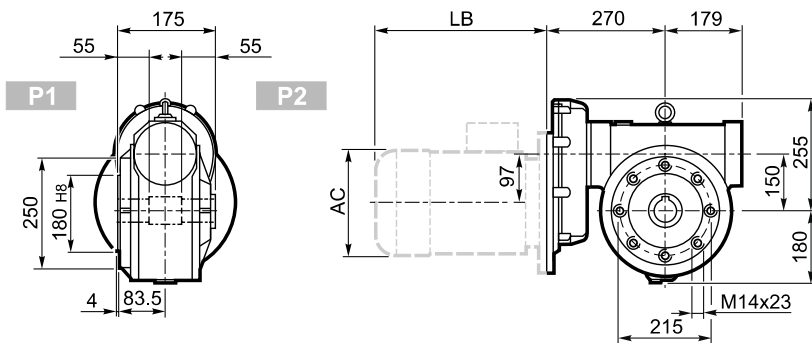
FR_



OUTPUT

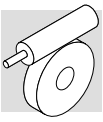


P_



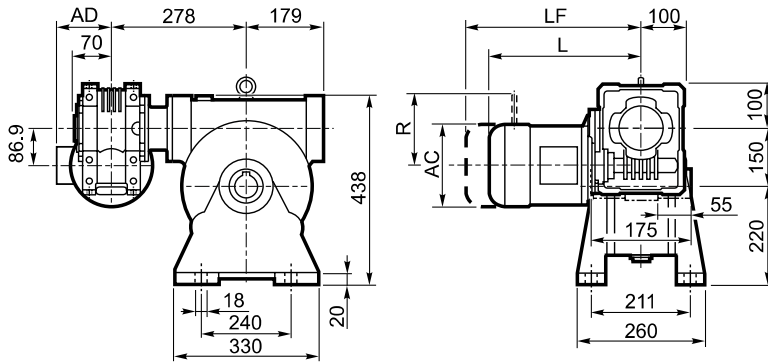
| VFR 150_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|----------|---------|-------|-------|----|-----|-----|-----|----|--------|----|--------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VFR 150 | P90 B5 | 24 K6 | 27.3 | 8 | 200 | 165 | 130 | 13 | M10x25 | 71 | BN 90 | 276 | 176 | 359 | 176 |
| VRF 150 | P100 B5 | 28 K6 | 31.3 | 8 | 250 | 215 | 180 | 13 | M12x35 | | BN 100 | 307 | 195 | 398 | 195 |
| VRF 150 | P112 B5 | 28 J6 | 31.3 | 8 | 250 | 215 | 180 | 13 | M12x35 | | BN 112 | 325 | 219 | 424 | 219 |
| VFR 150 | P132 B5 | 38 J6 | 39.6# | 10 | 300 | 265 | 230 | 13 | M12x35 | | BN 132 | 413 | 258 | 523 | 258 |

Linguetta ribassata / Lowered key / Verkleinertes Paßfeder / Clavette à hauteur réduite

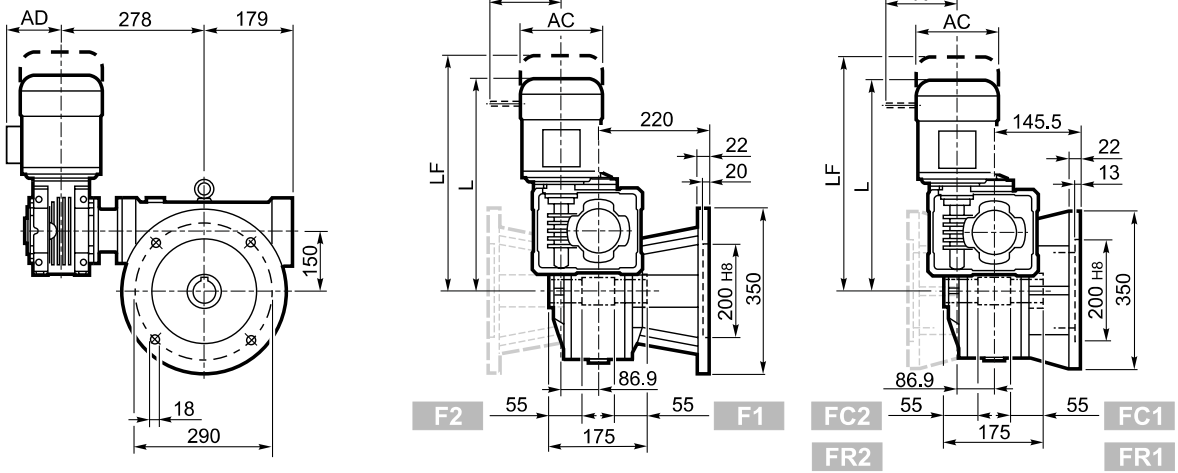


W/VF 86/150...S

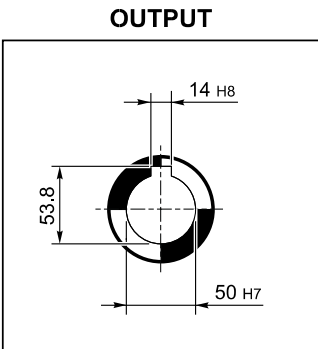
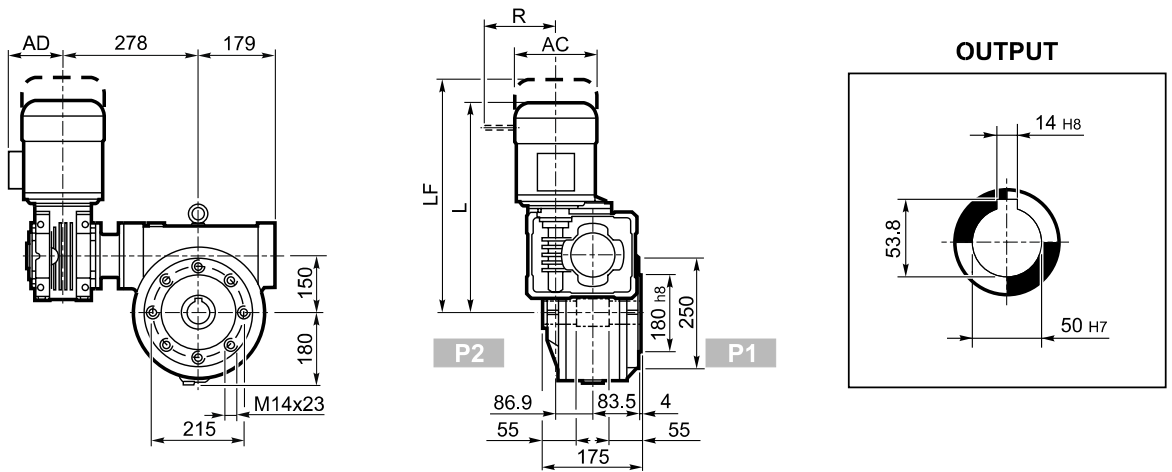
A



F_
FC_
FR_

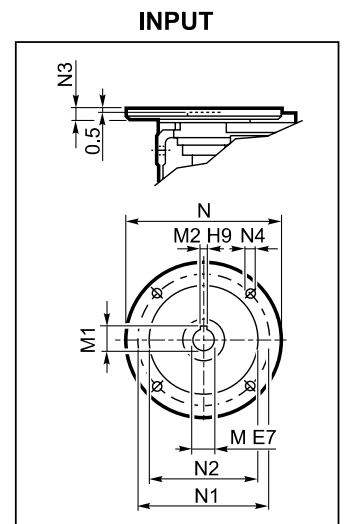
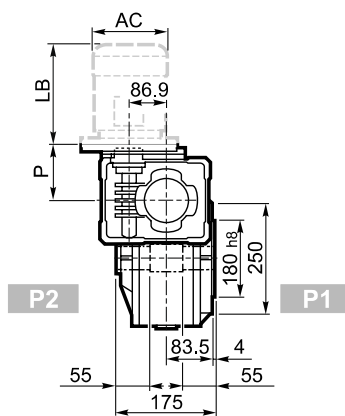
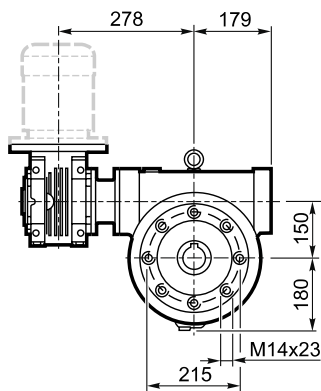
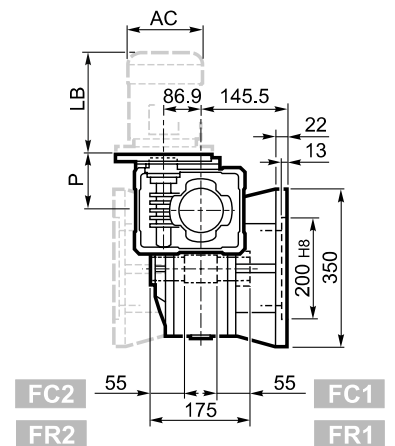
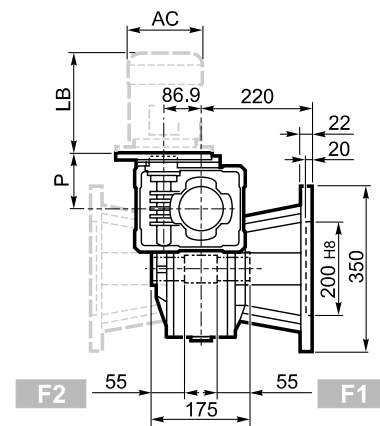
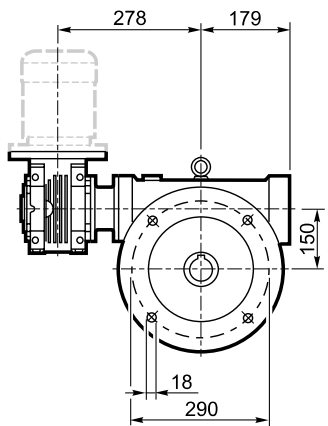
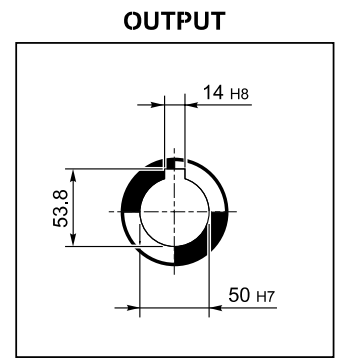
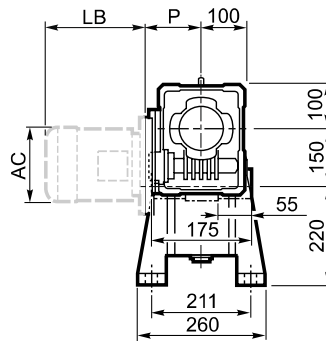
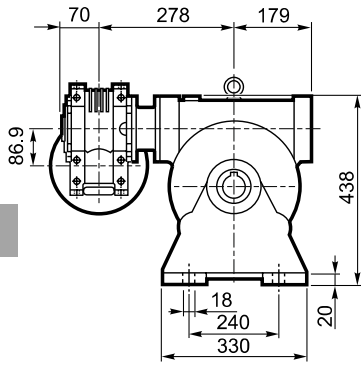
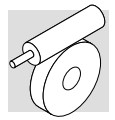


P_

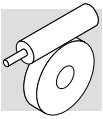


| W/VF 86/150_ | | | | | | | | | | | | |
|--------------|----|-----|-----|-----|-----|----|------------------|-----|--------|-----|--------|-----|
| Icon | S | M | M_ | | | | M...FD M...FA | | M...FD | | M...FA | |
| | | | AC | L | AD | Kg | LF | Kg | R | AD | R | AD |
| | S1 | M1S | 138 | 450 | 108 | 80 | 363 | 82 | 103 | 132 | 124 | 108 |
| | S1 | M1L | 138 | 474 | 108 | 82 | 385 | 84 | 103 | 132 | 124 | 108 |
| | S2 | M2S | 156 | 499 | 119 | 86 | 425 | 89 | 129 | 143 | 134 | 119 |
| | S3 | M3S | 193 | 542 | 142 | 91 | 488 | 97 | 160 | 155 | 160 | 142 |
| | S3 | M3L | 193 | 574 | 142 | 99 | 515 | 104 | 160 | 155 | 160 | 142 |

W/VF 86/150...P(IEC)

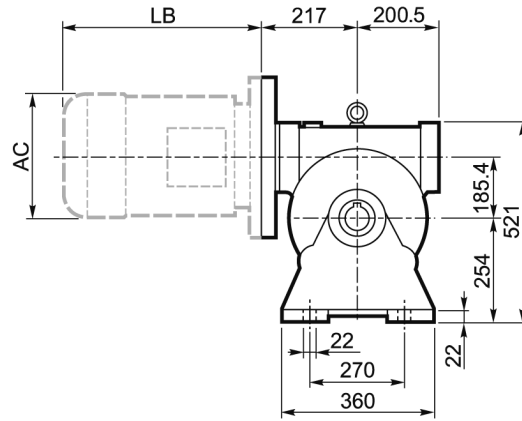
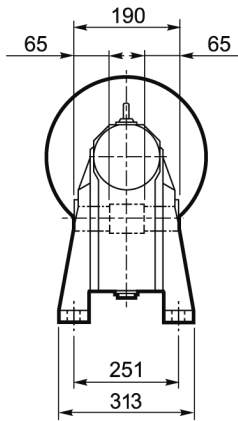


| W/VF 86/150_ | | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|--------------|----------|----|------|----|-----|-----|-----|-----|------|-----|----|--------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | P | kg | IEC | LB | AC | LB | AC |
| W/VF 86/150 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 11 | 9 | 128 | 75 | BN 71 | 219 | 138 | 280 | 138 |
| W/VF 86/150 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 12 | 11.5 | 128 | | BN 80 | 234 | 156 | 306 | 156 |
| W/VF 86/150 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 12 | 11.5 | 128 | | BN 90 | 276 | 176 | 359 | 176 |
| W/VF 86/150 | P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 13 | 12.5 | 136 | | BN 100 | 307 | 195 | 398 | 195 |
| W/VF 86/150 | P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 13 | 12.5 | 136 | | BN 112 | 325 | 219 | 424 | 219 |
| W/VF 86/150 | P80 B14 | 19 | 21.8 | 6 | 120 | 100 | 80 | 7.5 | 6.5 | 128 | | BN 80 | 234 | 156 | 306 | 156 |
| W/VF 86/150 | P90 B14 | 24 | 27.3 | 8 | 140 | 115 | 95 | 7.5 | 8.5 | 128 | | BN 90 | 276 | 176 | 359 | 176 |
| W/VF 86/150 | P100 B14 | 28 | 31.3 | 8 | 160 | 130 | 110 | 10 | 8.5 | 136 | | BN 100 | 307 | 195 | 398 | 195 |
| W/VF 86/150 | P112 B14 | 28 | 31.3 | 8 | 160 | 130 | 110 | 10 | 8.5 | 136 | | BN 112 | 325 | 219 | 424 | 219 |

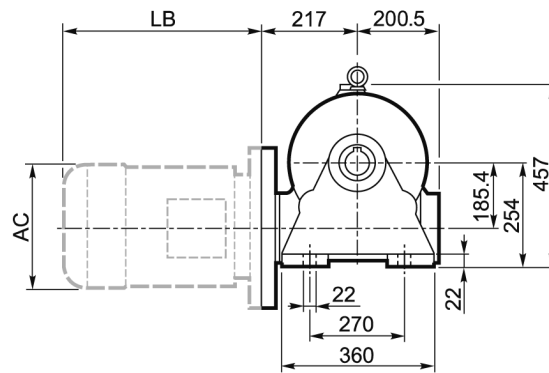
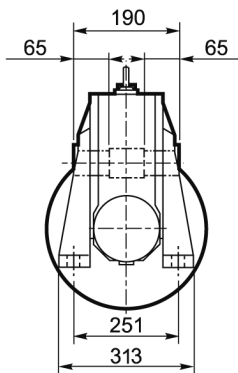


VF 185□...P(IEC)

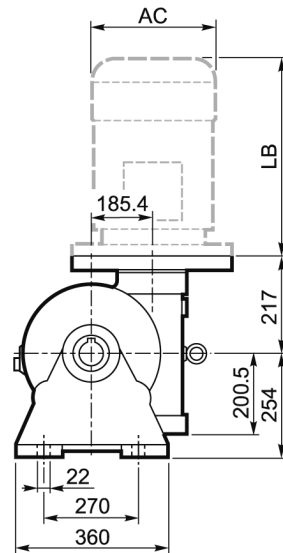
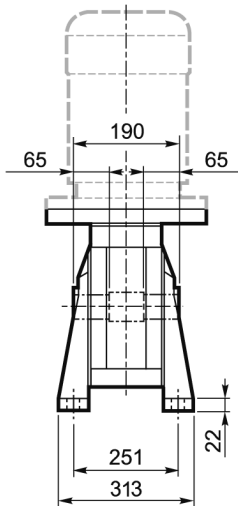
A



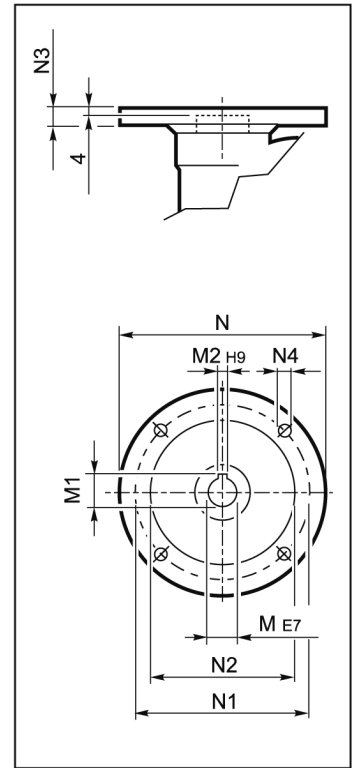
N



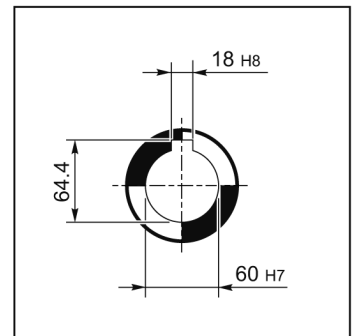
V

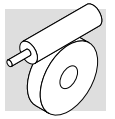


INPUT

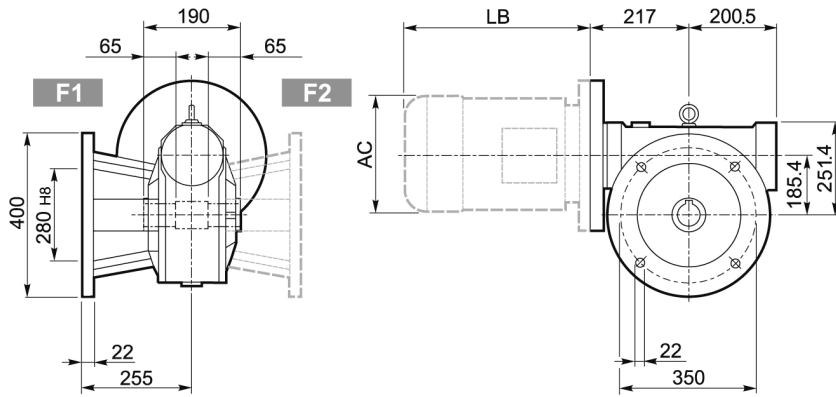


OUTPUT

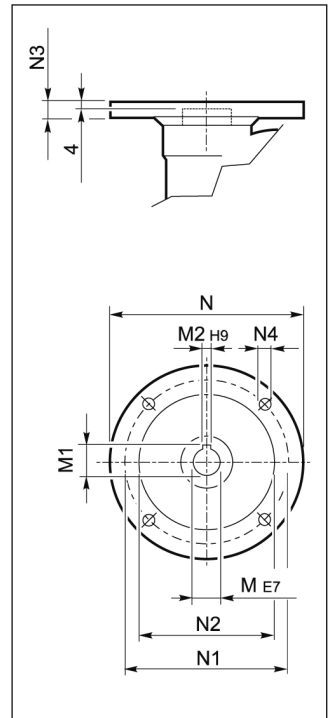




F_

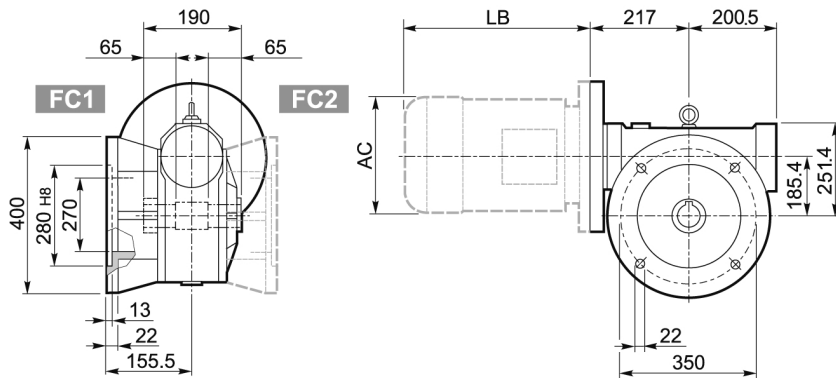


INPUT

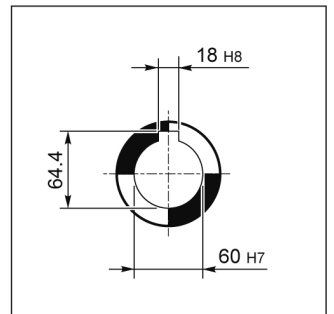


FC_

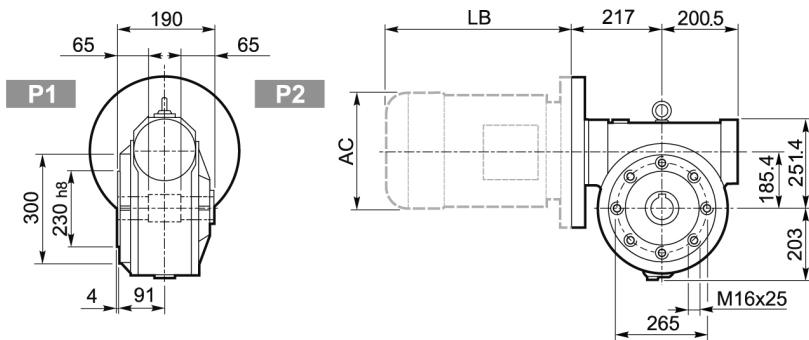
FR_



OUTPUT

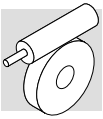


P_



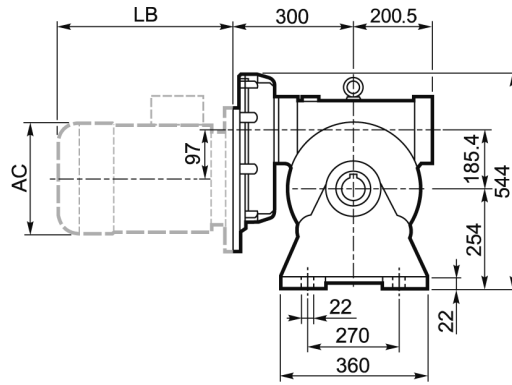
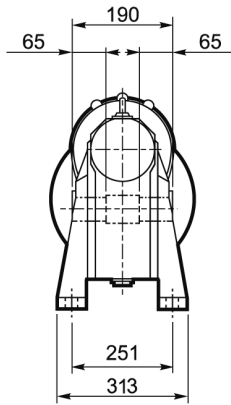
| VF 185_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|---------|---------|----|-------|----|-----|-----|-----|----|----|----|-----------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VF 185 | P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 16 | 13 | 94 | BN 100 | 307 | 195 | 398 | 195 |
| VF 185 | P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 16 | 13 | | BN 112 | 325 | 219 | 424 | 219 |
| VF 185 | P132 B5 | 38 | 41.3 | 10 | 300 | 265 | 230 | 16 | 13 | | BN 132 | 413 | 258 | 523 | 258 |
| VF 185 | P160 B5 | 42 | 45.3 | 12 | 350 | 300 | 250 | 18 | 18 | | BN 160MR | 452 | 258 | 562 | 258 |
| | | | | | | | | | | | BN 160M/L | 486 | 310 | 626 | 310 |
| | | | | | | | | | | | BN 180M | 530 | 310 | 670 | 310 |
| VF 185 | P180 B5 | 48 | 51.2# | 14 | 350 | 300 | 250 | 18 | 18 | | BN 180L | 598 | 348 | 756 | 348 |

Linguetta ribassata / Lowered key / Verkleinertes Paßfeder / Clavette à hauteur réduite

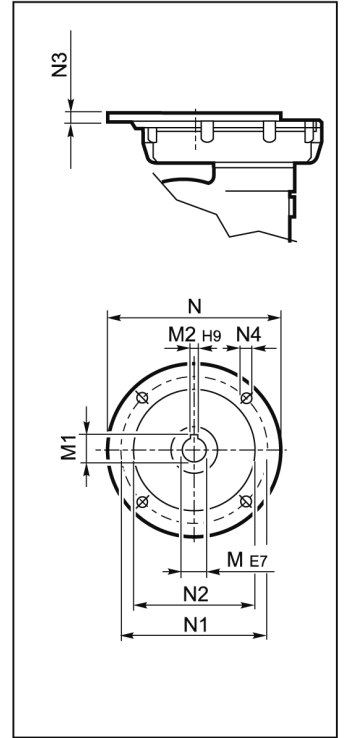


VFR 185...P(IEC)

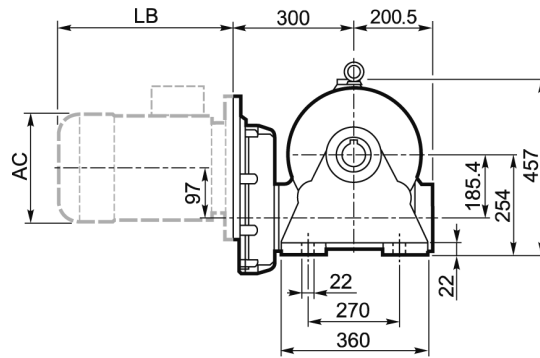
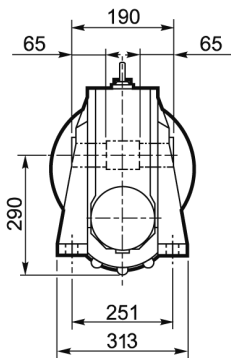
A



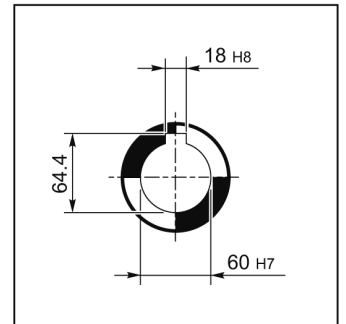
INPUT



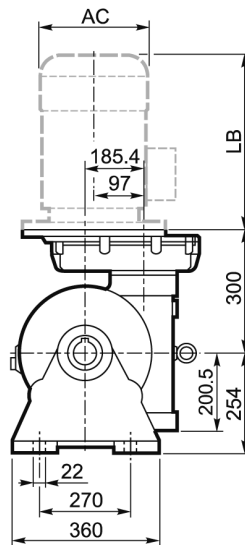
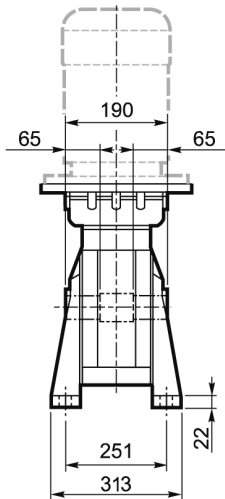
N



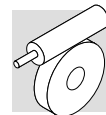
OUTPUT



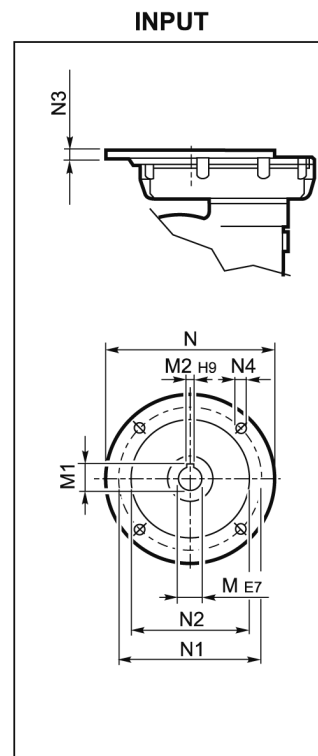
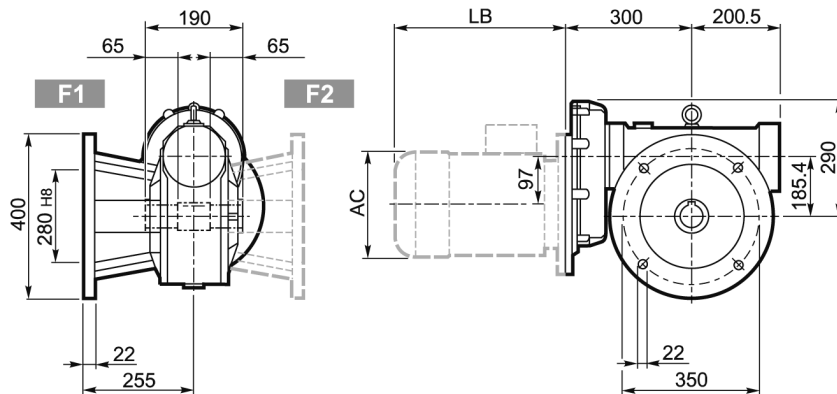
V



VFR 185...P(IEC)

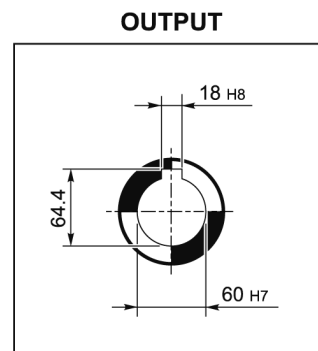
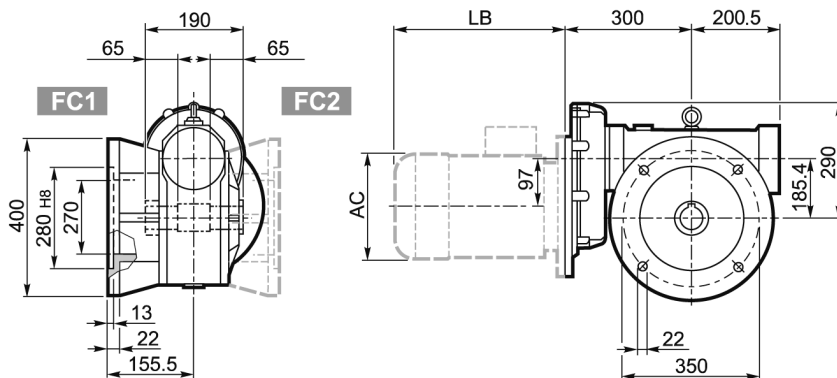


F_

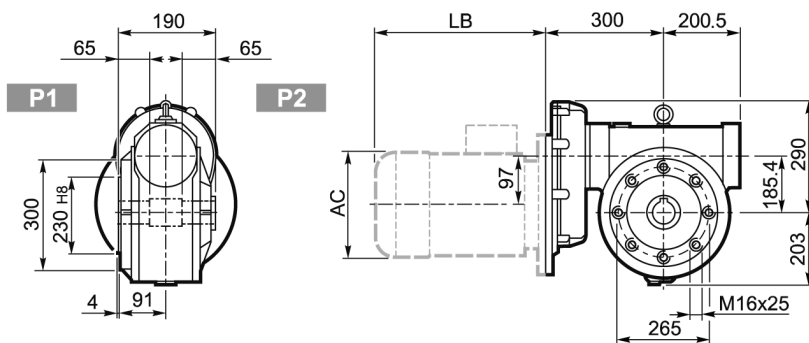


FC_

FR_

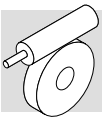


P_



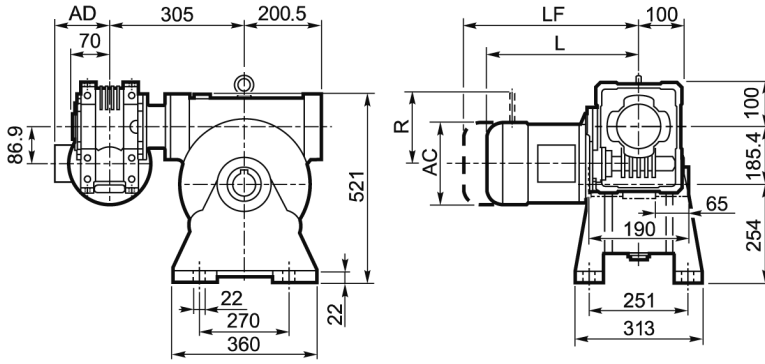
| VFR 185_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|----------|---------|-------|-------|----|-----|-----|-----|----|--------|-----|--------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VFR 185 | P90 B5 | 24 K6 | 27.3 | 8 | 200 | 165 | 130 | 13 | M10x25 | 110 | BN 90 | 276 | 176 | 359 | 176 |
| VRF 185 | P100 B5 | 28 K6 | 31.3 | 8 | 250 | 215 | 180 | 13 | M12x35 | | BN 100 | 307 | 195 | 398 | 195 |
| VRF 185 | P112 B5 | 28 K6 | 31.3 | 8 | 250 | 215 | 180 | 13 | M12x35 | | BN 112 | 325 | 219 | 424 | 219 |
| VFR 185 | P132 B5 | 38 J6 | 39.6# | 10 | 300 | 265 | 230 | 13 | M12x35 | | BN 132 | 413 | 258 | 523 | 258 |

Linguetta ribassata / Lowered key / Verkleinertes Paßfeder / Clavette à hauteur réduite



W/VF 86/185...S

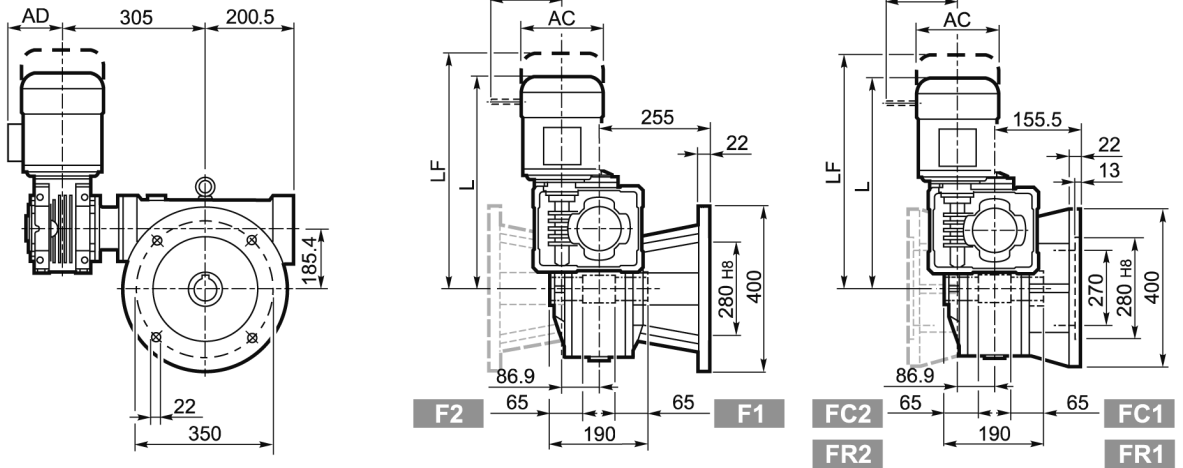
A



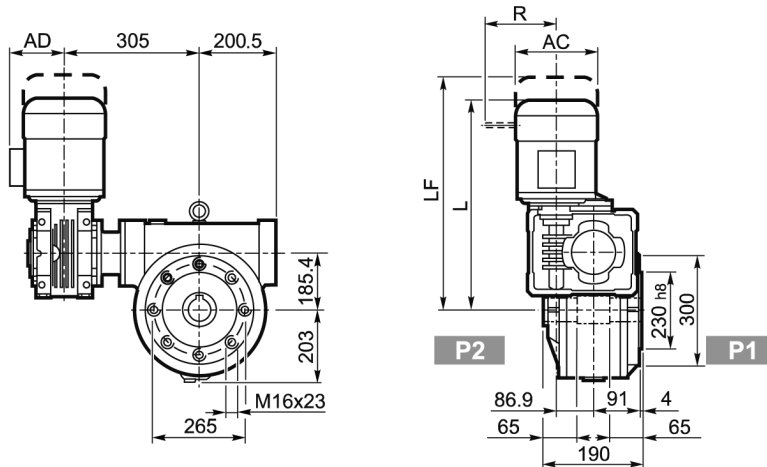
F_

FC_

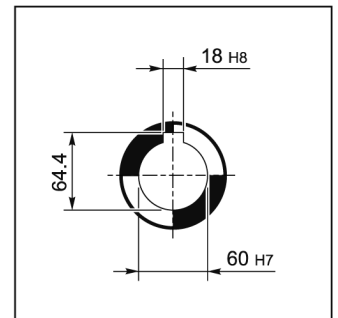
FR_



P_



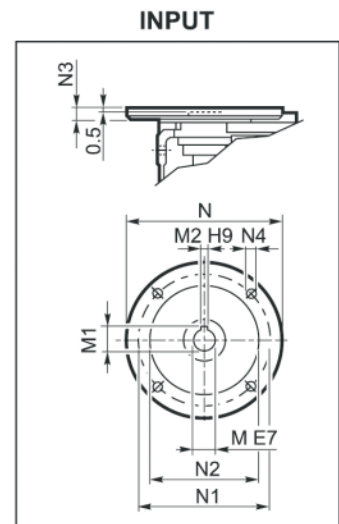
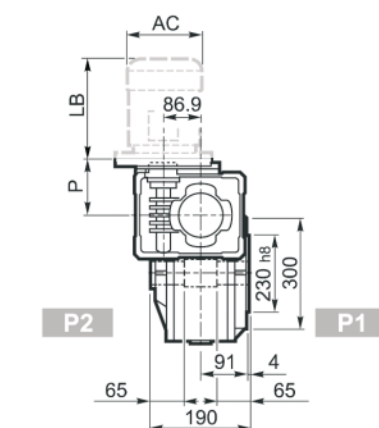
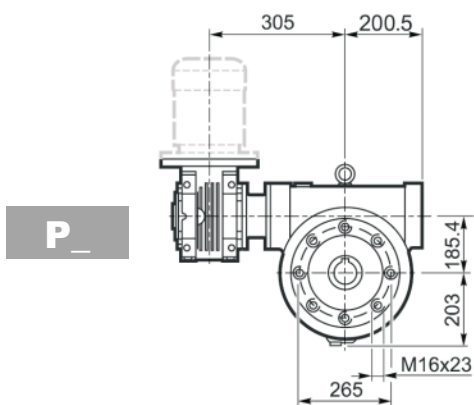
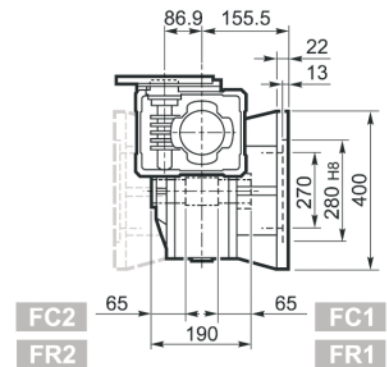
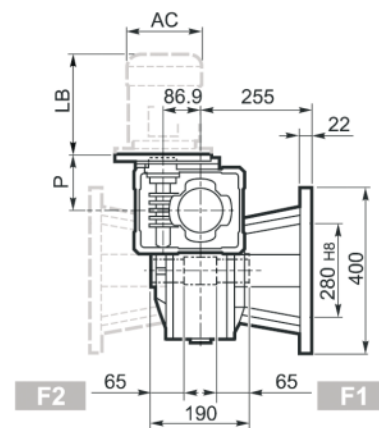
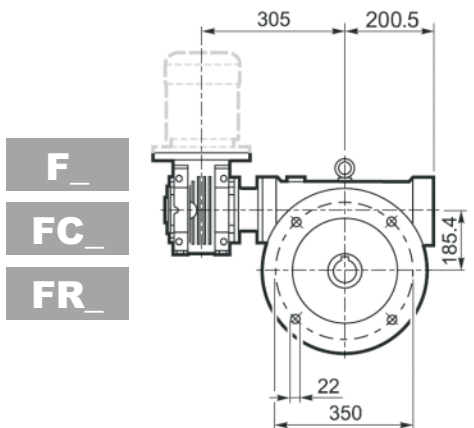
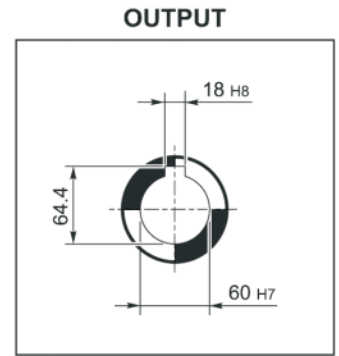
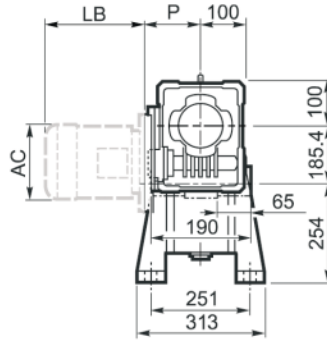
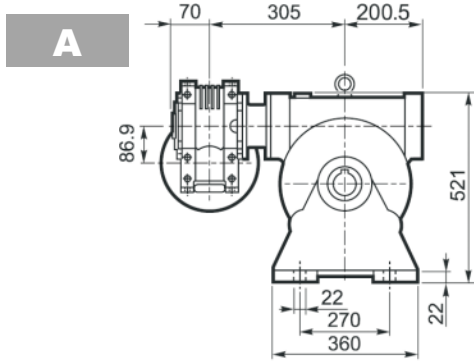
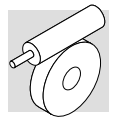
OUTPUT



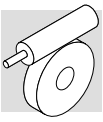
W/VF 86/150_

| | | | M_ | | | | M...FD M...FA | | M...FD | | M...FA | |
|-------------|----|-----|-----|-----|-----|-----|------------------|-----|--------|-----|--------|-----|
| | | | AC | L | AD | Kg | LF | Kg | R | AD | R | AD |
| | | | 138 | 485 | 108 | 114 | 548 | 116 | 103 | 132 | 124 | 108 |
| W/VF 86/185 | S1 | M1S | 138 | 509 | 108 | 116 | 570 | 118 | 103 | 132 | 124 | 108 |
| W/VF 86/185 | S2 | M2S | 156 | 534 | 119 | 120 | 610 | 123 | 129 | 143 | 134 | 119 |
| W/VF 86/185 | S3 | M3S | 193 | 577 | 142 | 125 | 673 | 131 | 160 | 155 | 160 | 142 |
| W/VF 86/185 | S3 | M3L | 193 | 609 | 142 | 133 | 700 | 138 | 160 | 155 | 160 | 142 |

W/VF 86/185...P(IEC)

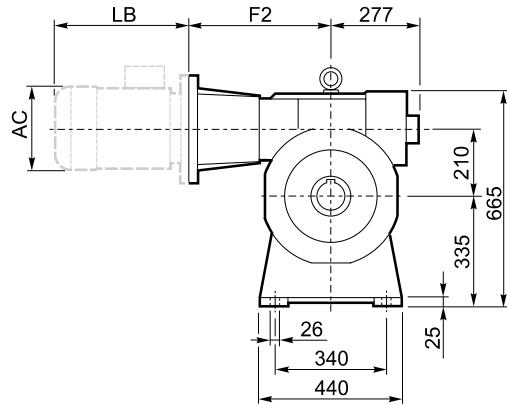
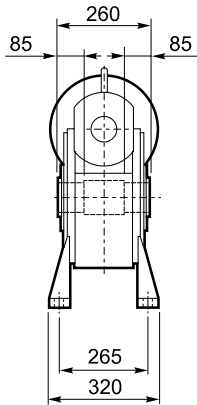


| W/VF 86/185_ | | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|--------------|----------|----|------|----|-----|-----|-----|-----|------|-----|-----|--------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | P | | | LB | AC | LB | AC |
| W/VF 86/185 | P71 B5 | 14 | 16.3 | 5 | 160 | 130 | 110 | 11 | 9 | 128 | 109 | BN 71 | 219 | 138 | 280 | 138 |
| W/VF 86/185 | P80 B5 | 19 | 21.8 | 6 | 200 | 165 | 130 | 12 | 11.5 | 128 | | BN 80 | 234 | 156 | 306 | 156 |
| W/VF 86/185 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 12 | 11.5 | 128 | | BN 90 | 276 | 176 | 359 | 176 |
| W/VF 86/185 | P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 13 | 12.5 | 136 | | BN 100 | 307 | 195 | 398 | 195 |
| W/VF 86/185 | P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 13 | 12.5 | 136 | | BN 112 | 325 | 219 | 424 | 219 |
| W/VF 86/185 | P80 B14 | 19 | 21.8 | 6 | 120 | 100 | 80 | 7.5 | 6.5 | 128 | | BN 80 | 234 | 156 | 306 | 156 |
| W/VF 86/185 | P90 B14 | 24 | 27.3 | 8 | 140 | 115 | 95 | 7.5 | 8.5 | 128 | | BN 90 | 276 | 176 | 359 | 176 |
| W/VF 86/185 | P100 B14 | 28 | 31.3 | 8 | 160 | 130 | 110 | 10 | 8.5 | 136 | | BN 100 | 307 | 195 | 398 | 195 |
| W/VF 86/185 | P112 B14 | 28 | 31.3 | 8 | 160 | 130 | 110 | 10 | 8.5 | 136 | | BN 112 | 325 | 219 | 424 | 219 |

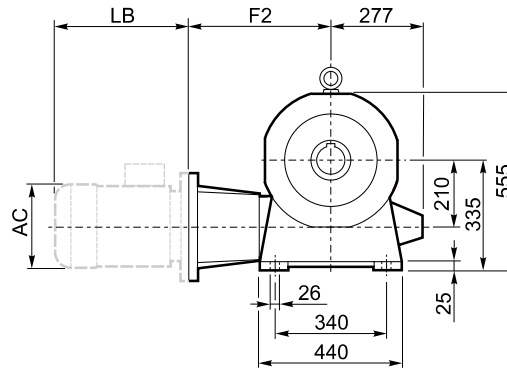
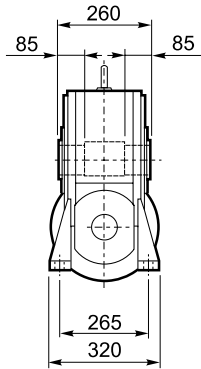


VF 210 □...P(IEC)

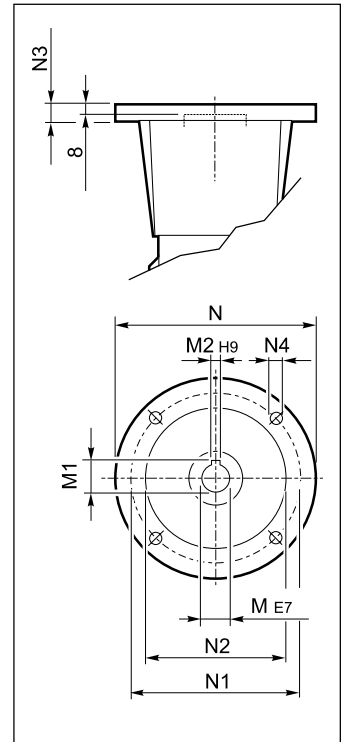
A



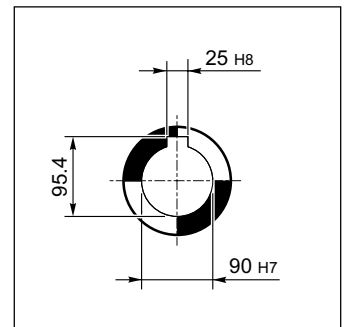
N

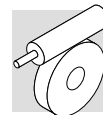


INPUT

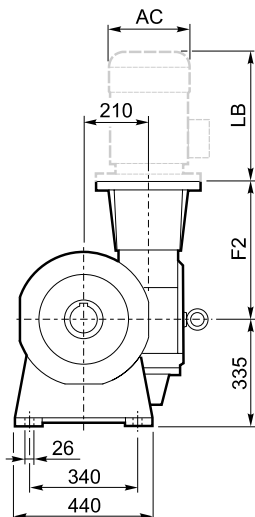
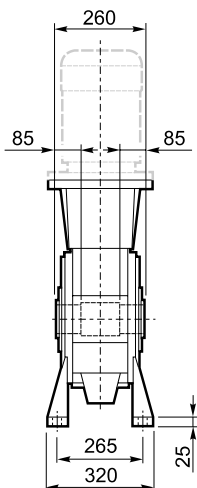


OUTPUT

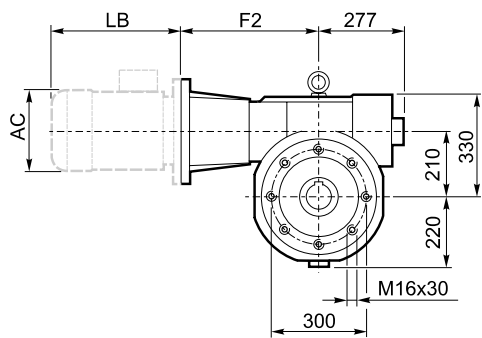
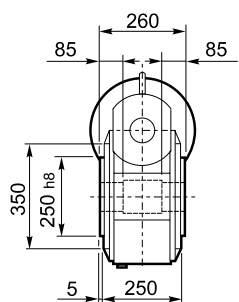




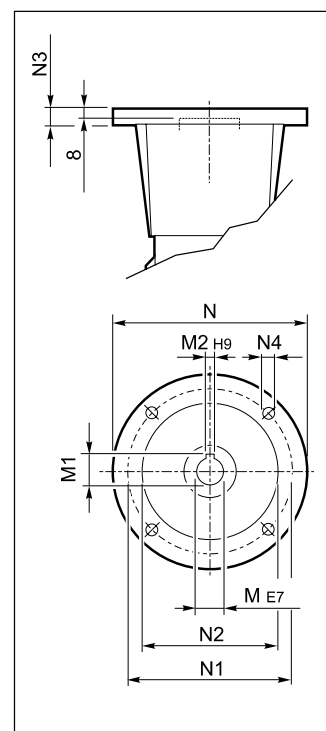
V



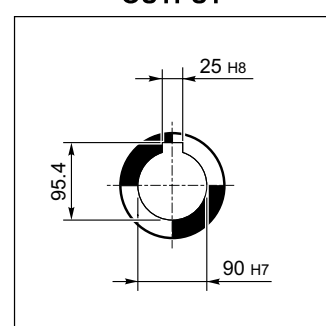
P



INPUT



OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.

Fan cooling as standard on versions A and P.

In den Ausführungen A und P wird das Lüfterrad eingebaut.

Dans les formes de construction A et P, il est prévu un ventilateur de refroidissement.

Nell'esecuzione P(IEC) è prevista di serie la fornitura del giunto completo per attacco motore.

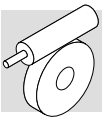
P(IEC) arrangements come complete with gear coupling enclosed in the bell housing.

Die Motorflansch-Ausführung wird serienmäßig mit kompletter Motorkupplung geliefert.

Dans la version P(IEC), la fourniture du joint complet d'accouplement moteur à été prévue de série.

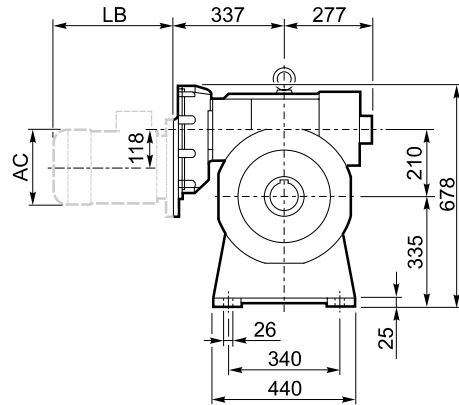
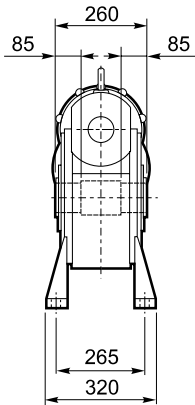
| VF 210_ | | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|---------|---------|-----|----|------|----|-----|-----|-----|----|------|-----|-----------|-----|--------------------|-----|-----|
| | | F2 | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VF 210 | P132 B5 | 485 | 38 | 41.3 | 10 | 300 | 265 | 230 | 25 | M12 | 210 | BN 132 | 413 | 258 | 523 | 258 |
| VF 210 | P160 B5 | 460 | 42 | 45.3 | 12 | 350 | 300 | 250 | 22 | 18 | | BN 160MR | 452 | 258 | 562 | 258 |
| | | | | | | | | | | | | BN 160M/L | 486 | 310 | 626 | 310 |
| VF 210 | P180 B5 | 460 | 48 | 51.8 | 14 | 350 | 300 | 250 | 22 | 18 | | BN 180M | 530 | 310 | 670 | 310 |
| VF 210 | P200 B5 | 485 | 55 | 59.3 | 16 | 400 | 350 | 300 | 25 | M16 | | BN 180L | 598 | 348 | 756 | 348 |
| VF 210 | P225 B5 | 490 | 60 | 64.4 | 18 | 450 | 400 | 350 | 22 | 18 # | | BN 200 | 612 | 348 | 768 | 348 |
| | | | | | | | | | | | | BN 225 | | | | |

N° 8 fori a 45° / N° 8 holes at 45° / N. 8 Bohrungen 45° / N. 8 trous 45°

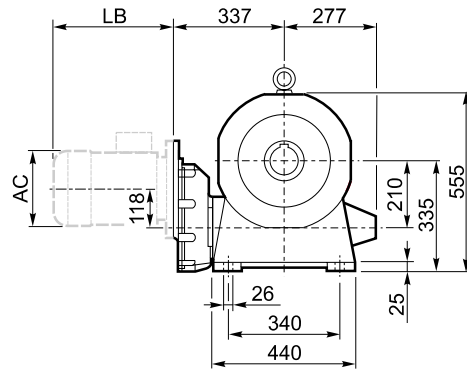
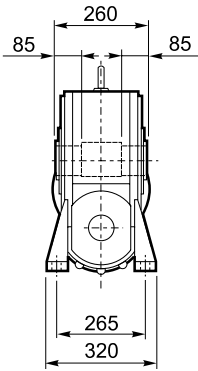


VFR 210□...P(IEC)

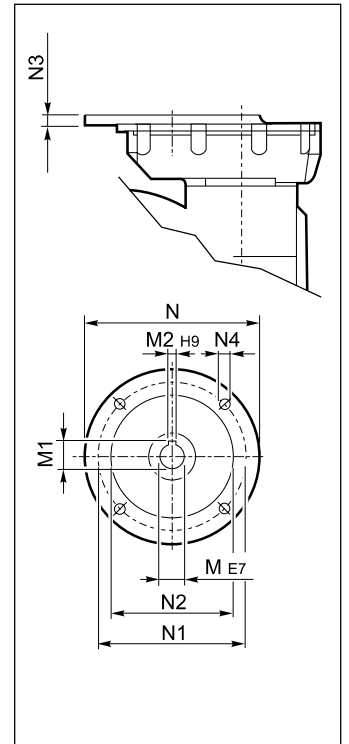
A



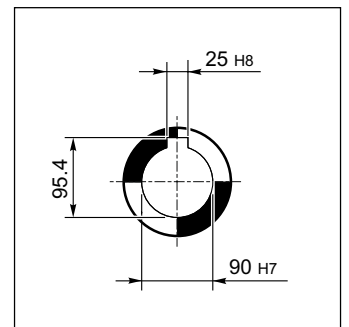
N



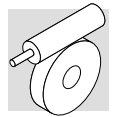
INPUT



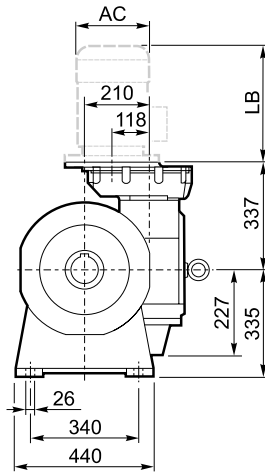
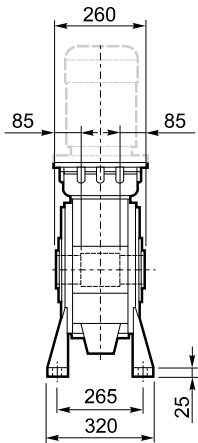
OUTPUT



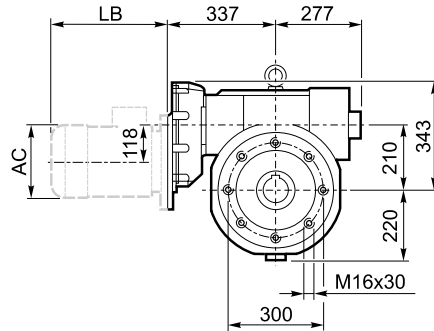
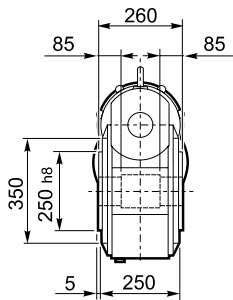
VFR 210 □...P(IEC)



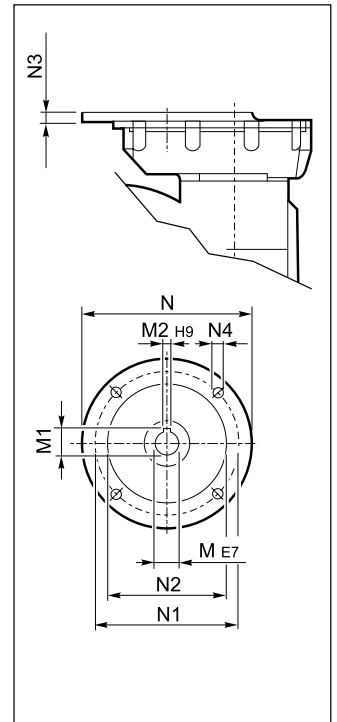
V



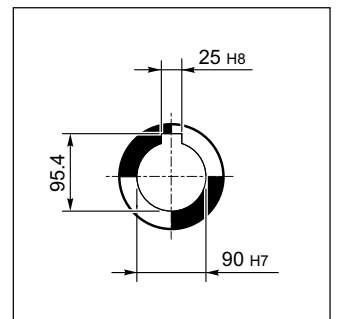
P



INPUT



OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.

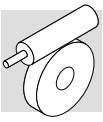
Fan cooling as standard on versions A and P.

In den Ausführungen A und P wird das Lüfterrad eingebaut.

Dans les formes de construction A et P, il est prévu un ventilateur de refroidissement.

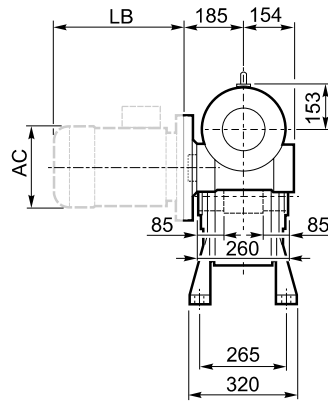
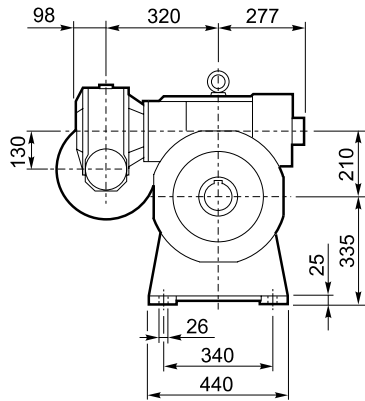
| VFR 210_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|----------|---------|-------|-------|----|-----|-----|-----|----|--------|-----|-----------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VFR 210 | P100 B5 | 28 K6 | 31.3 | 8 | 250 | 215 | 180 | 13 | M12x35 | 185 | BN 100 | 307 | 195 | 398 | 195 |
| VFR 210 | P112 B5 | 28 K6 | 31.3 | 8 | 250 | 215 | 180 | 13 | M12x35 | | BN 112 | 325 | 219 | 424 | 219 |
| VFR 210 | P132 B5 | 38 J6 | 41.3 | 10 | 300 | 265 | 230 | 13 | M12x35 | | BN 132 | 413 | 258 | 523 | 258 |
| VFR 210 | P160 B5 | 42 J6 | 44.3# | 12 | 350 | 300 | 250 | 18 | M16x60 | | BN 160MR | 452 | 258 | 562 | 258 |
| | | | | | | | | | | | BN 160M/L | 486 | 310 | 626 | 310 |

Linguetta ribassata / Lowered key / Verkleinertes Paßfeder / Clavette à hauteur réduite

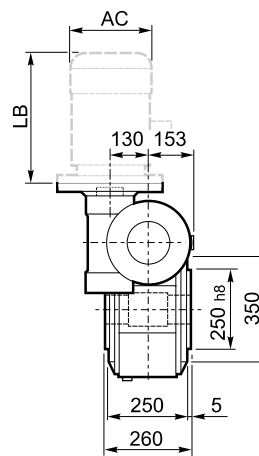
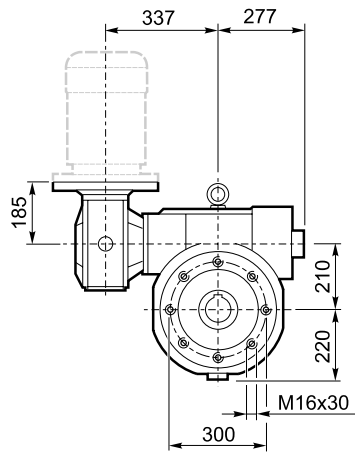


VF/VF 130/210 □...P(IEC)

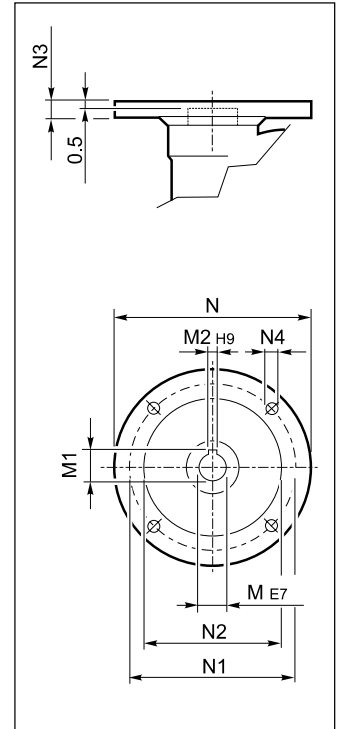
A



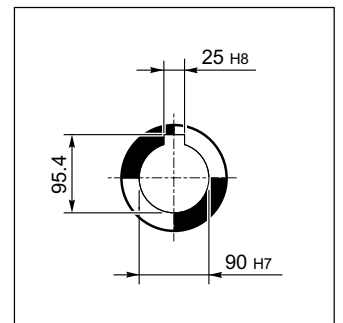
P



INPUT



OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.

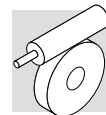
Fan cooling as standard on versions A and P.

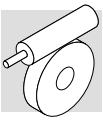
In den Ausführungen A und P wird das Lüfterrad eingebaut.

Dans les formes de construction A et P, il est prévu un ventilateur de refroidissement.

| VF/VF 130/210_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|----------------|---------|----|-------|----|-----|-----|-----|----|----|-----|--------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VF/VF 130/210 | P90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 17 | 11 | 225 | BN 90 | 276 | 176 | 359 | 176 |
| VF/VF 130/210 | P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 17 | 13 | | BN 100 | 307 | 195 | 398 | 195 |
| VF/VF 130/210 | P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 17 | 13 | | BN 112 | 325 | 219 | 424 | 219 |
| VF/VF 130/210 | P132 B5 | 38 | 40.1# | 10 | 300 | 265 | 230 | 17 | 13 | | BN 132 | 413 | 258 | 523 | 258 |

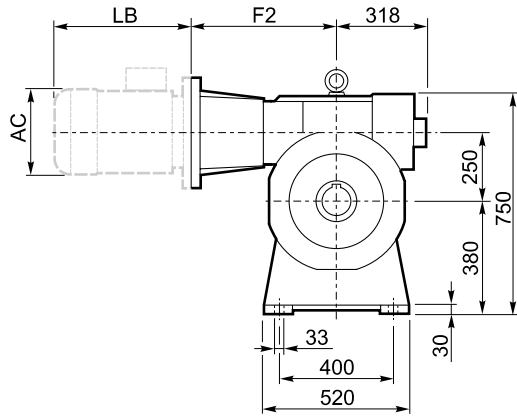
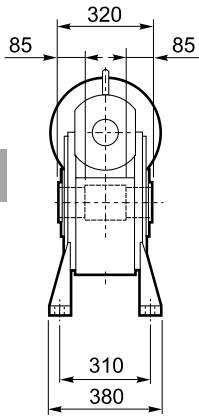
Linguetta ribassata / Lowered key / Verkleinertes Paßfeder / Clavette à hauteur réduite



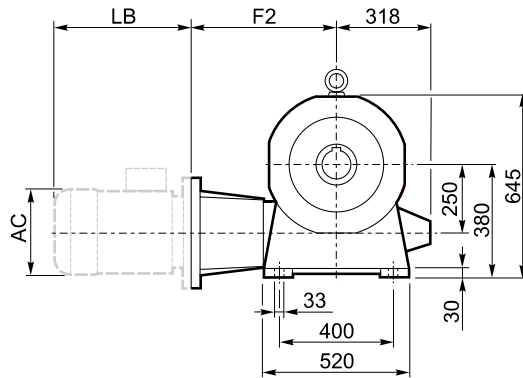
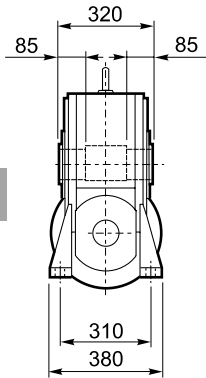


VF 250 □...P(IEC)

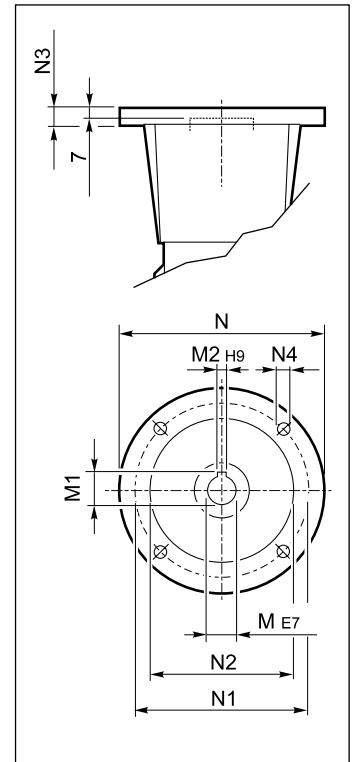
A



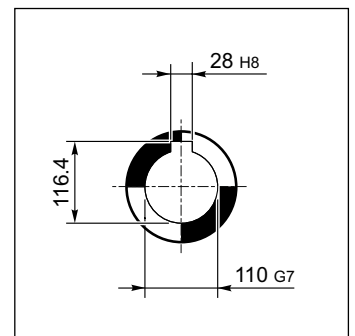
N

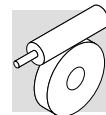


INPUT

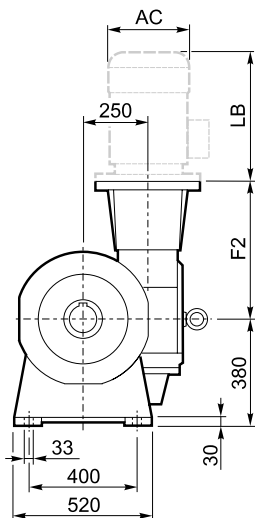
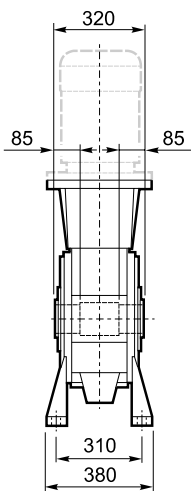


OUTPUT

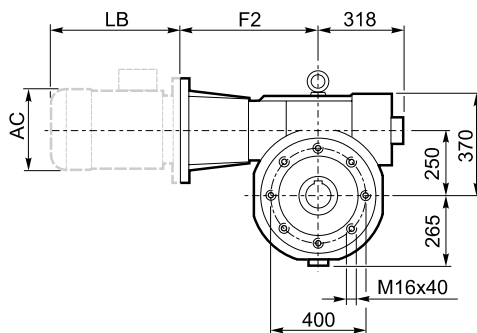
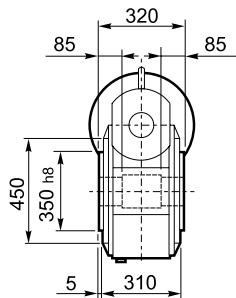




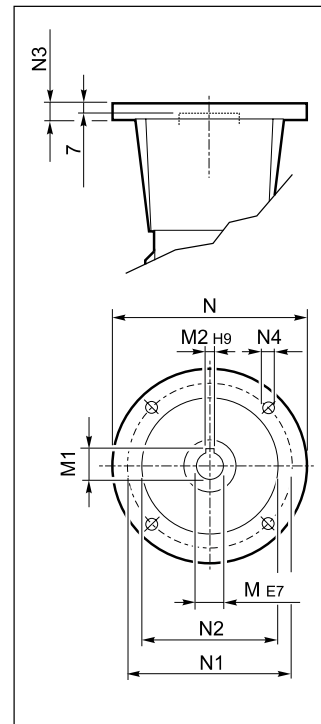
V



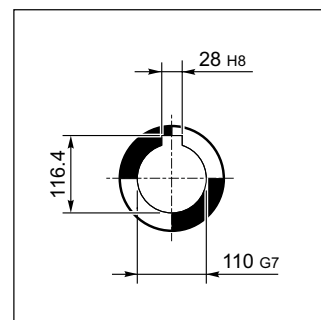
P



INPUT



OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.

Fan cooling as standard on versions A and P.

In den Ausführungen A und P wird das Lüfterrad eingebaut.

Dans les formes de construction A et P, il est prévu un ventilateur de refroidissement.

Nell'esecuzione P(IEC) è prevista di serie la fornitura del giunto completo per attacco motore.

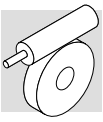
P(IEC) arrangements come complete with gear coupling enclosed in the bell housing.

Die Motorflansch-Ausführung wird serienmäßig mit kompletter Motor-Kupplung geliefert.

Dans la version P(IEC), la fourniture du joint complet d'accouplement moteur à été prévue de série.

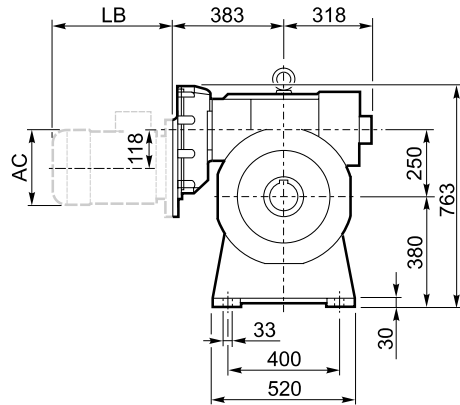
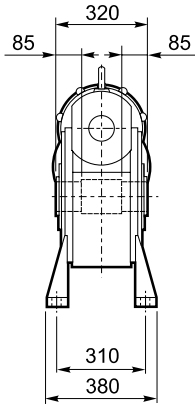
| VF 250_ | | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|---------|---------|-----|----|------|----|-----|-----|-----|----|-----|-----|-----------|-----|--------------------|-----|-----|
| | | F2 | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VF 250 | P132 B5 | 531 | 38 | 41.3 | 10 | 300 | 265 | 230 | 25 | M12 | 310 | BN 132 | 413 | 258 | 523 | 258 |
| VF 250 | P160 B5 | 506 | 42 | 45.3 | 12 | 350 | 300 | 250 | 22 | 18 | | BN 160MR | 452 | 258 | 562 | 258 |
| | | | | | | | | | | | | BN 160M/L | 486 | 310 | 626 | 310 |
| VF 250 | P180 B5 | 506 | 48 | 51.8 | 14 | 350 | 300 | 250 | 22 | 18 | | BN 180M | 530 | 310 | 670 | 310 |
| | | | | | | | | | | | | BN 180L | 598 | 348 | 756 | 348 |
| VF 250 | P200 B5 | 531 | 55 | 59.3 | 16 | 400 | 350 | 300 | 25 | M16 | | BN 200 | 612 | 348 | 768 | 348 |
| VF 250 | P225 B5 | 536 | 60 | 64.4 | 18 | 450 | 400 | 350 | 22 | 18# | | BN 225 | | | | |

N° 8 fori a 45° / N° 8 holes at 45° / N. 8 Bohrungen 45° / N. 8 trous 45°

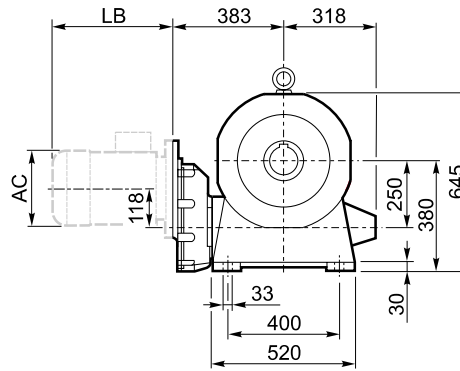
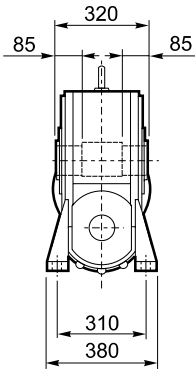


VFR 250 □ ...P(IEC)

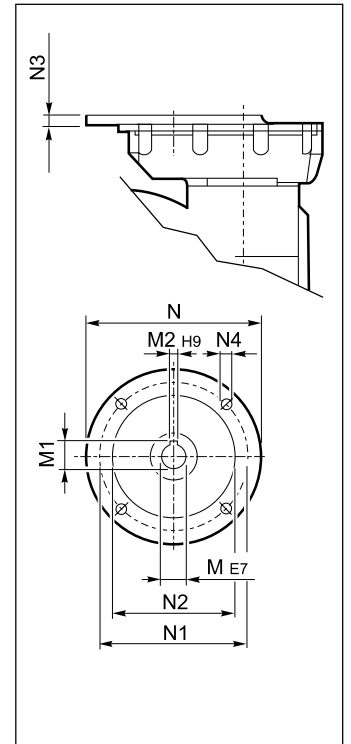
A



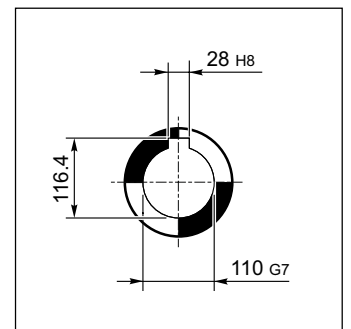
N



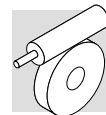
INPUT



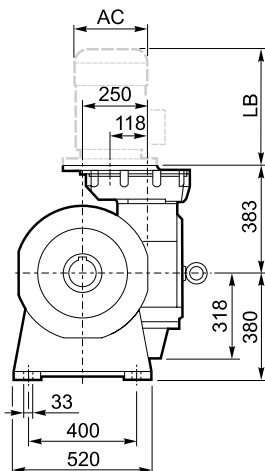
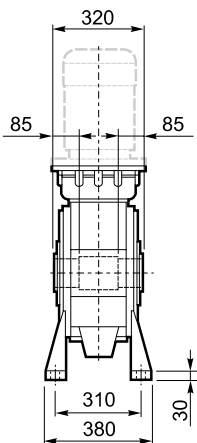
OUTPUT



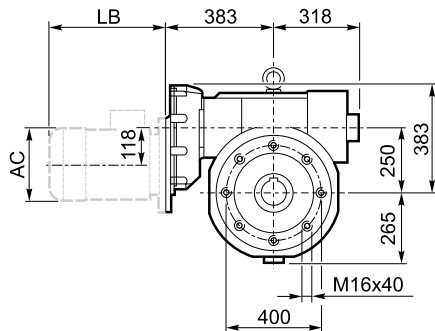
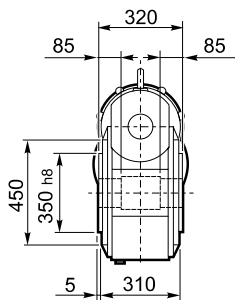
VFR 250 □...P(IEC)



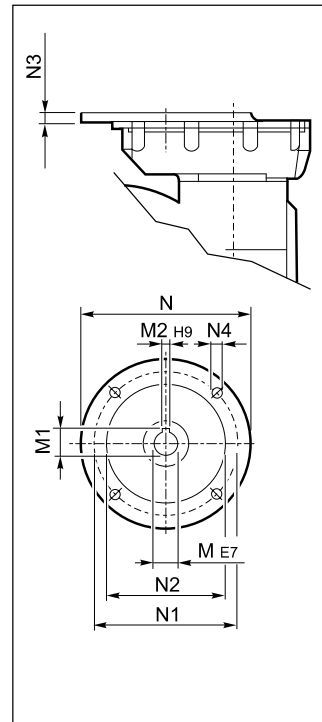
V



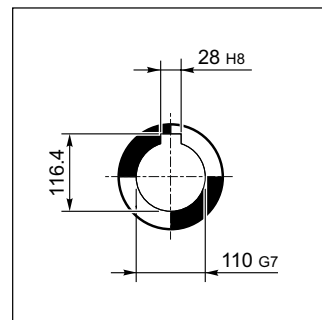
P



INPUT



OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.

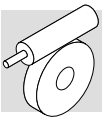
Fan cooling as standard on versions A and P.

In den Ausführungen A und P wird das Lüferrad eingebaut.

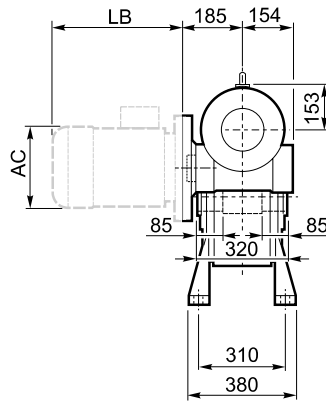
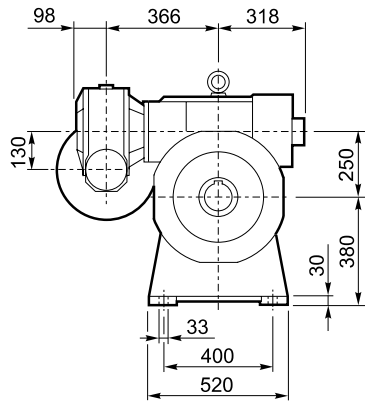
Dans les formes de construction A et P, il est prévu un ventilateur de refroidissement.

| VFR 250 _ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|-----------|---------|-------|-------|----|-----|-----|-----|----|--------|-----|-----------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VRF 250 | P100 B5 | 28 K6 | 31.3 | 8 | 250 | 215 | 180 | 13 | M12x35 | 295 | BN 100 | 307 | 195 | 398 | 195 |
| VRF 250 | P112 B5 | 28 K6 | 31.3 | 8 | 250 | 215 | 180 | 13 | M12x35 | | BN 112 | 325 | 219 | 424 | 219 |
| VFR 250 | P132 B5 | 38 J6 | 41.3 | 10 | 300 | 265 | 230 | 13 | M12x35 | | BN 132 | 413 | 258 | 523 | 258 |
| VFR 250 | P160 B5 | 42 J6 | 44.3# | 12 | 350 | 300 | 250 | 18 | M16x60 | | BN 160MR | 452 | 258 | 562 | 258 |
| | | | | | | | | | | | BN 160M/L | 486 | 310 | 626 | 310 |

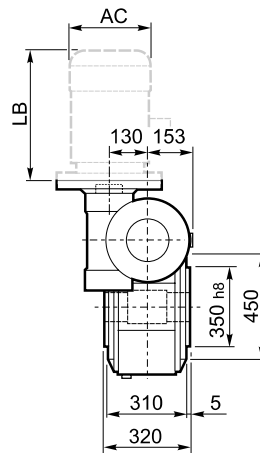
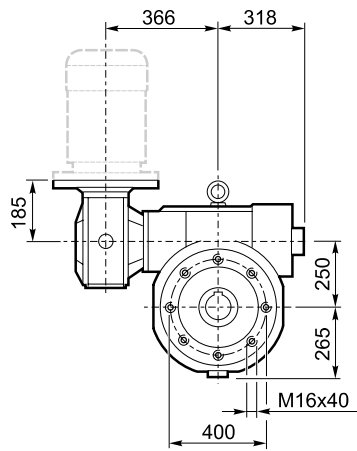
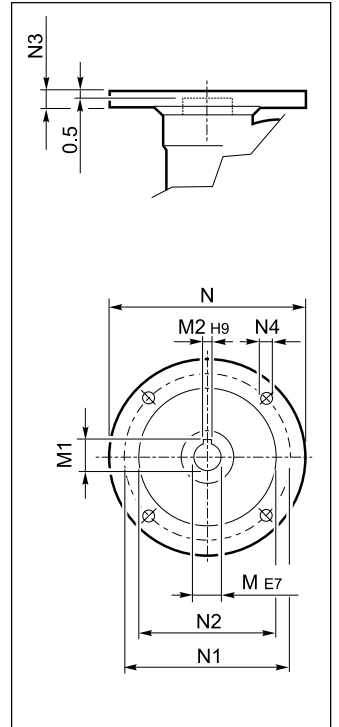
Linguetta ribassata / Lowered key / Verkleinertes Paßfeder / Clavette à hauteur réduite



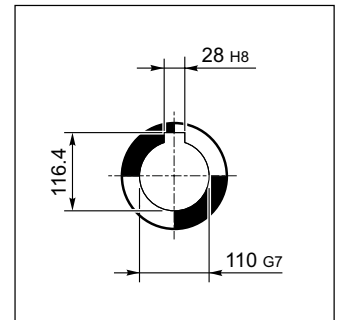
VF/VF 130/250...P(IEC)



INPUT



OUTPUT



A

P

Nelle forme costruttive A e P viene montata la ventola di raffreddamento.

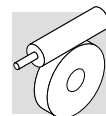
Fan cooling as standard on versions A and P.

In den Ausführungen A und P wird das Lüfterrad eingebaut.

Dans les formes de construction A et P, il est prévu un ventilateur de refroidissement.

| VF/VF 130/250_ | | | | | | | | | | | BN | | BN...FD BN...FA | | |
|----------------|---------|----|-------|----|-----|-----|-----|----|----|-----|--------|-----|--------------------|-----|-----|
| | | M | M1 | M2 | N | N1 | N2 | N3 | N4 | | | LB | AC | LB | AC |
| VF/VF 130/250 | P 90 B5 | 24 | 27.3 | 8 | 200 | 165 | 130 | 17 | 11 | 325 | BN 90 | 276 | 176 | 359 | 176 |
| VF/VF 130/250 | P100 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 17 | 13 | | BN 100 | 307 | 195 | 398 | 195 |
| VF/VF 130/250 | P112 B5 | 28 | 31.3 | 8 | 250 | 215 | 180 | 17 | 13 | | BN 112 | 325 | 219 | 424 | 219 |
| VF/VF 130/250 | P132 B5 | 38 | 40.1# | 10 | 300 | 265 | 230 | 17 | 13 | | BN 132 | 413 | 258 | 523 | 258 |

Linguetta ribassata / Lowered key / Verkleinertes Paßfeder / Clavette à hauteur réduite



25 - DIMENSIONI
RIDUTTORI

25 - SPEED REDUCER
DIMENSIONS

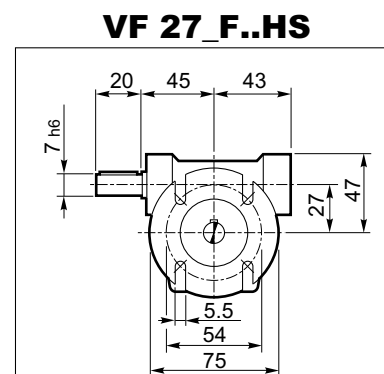
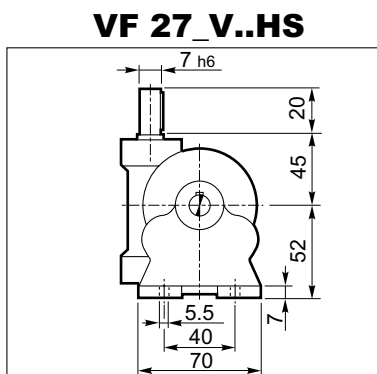
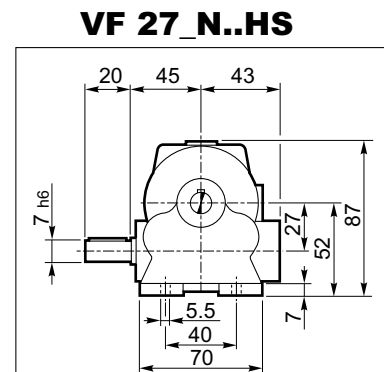
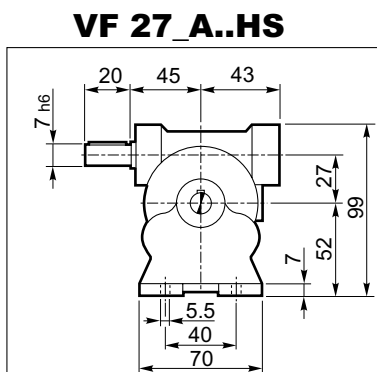
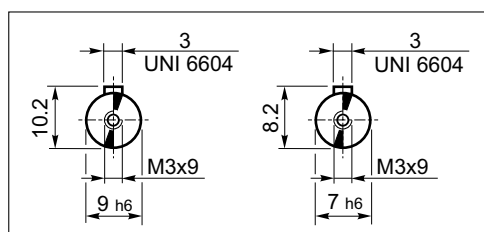
25 - GETRIEBE -
ABMESSUNGEN


25 - DIMENSIONS
REDUCTEURS

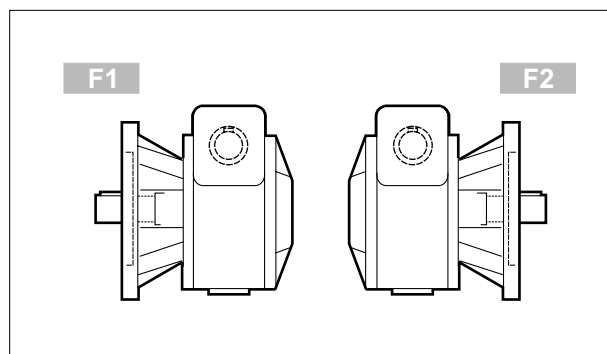
VF 27_HS

Albero uscita
Output shaft
Abtriebswelle
Arbre lent

Albero entrata
Input shaft
Antriebswelle
Arbre rapide



| | |
|----------|---|
| |  |
| VF 27_HS | 0.73 |

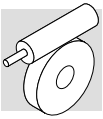


Le dimensioni comuni alle altre configurazioni sono riportate a pag. 120.

Dimensions common to the other configurations can be found at page 120.

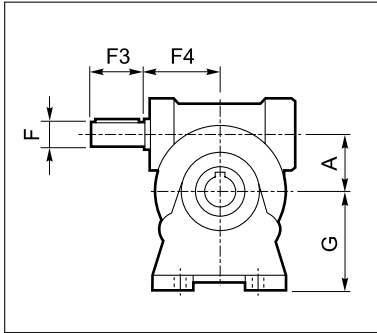
Die mit den anderen Konfigurationen gemeinsamen Abmessungen sind auf Seiten 120.

Les dimensions communes à toutes les autres configurations sont indiquées à la page 120.

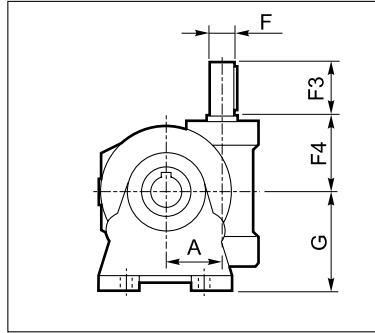


VF_HS_W_HS

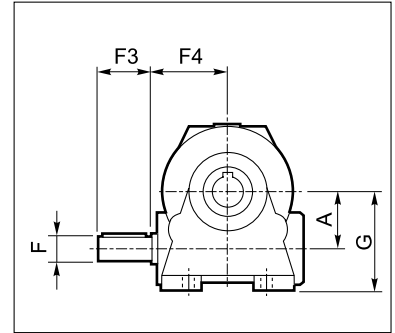
VF_A..HS



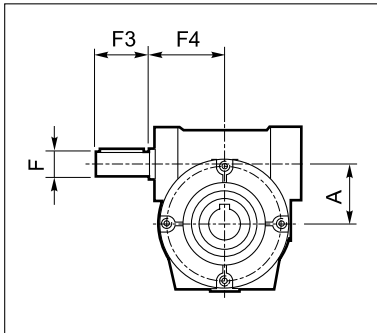
VF_V..HS



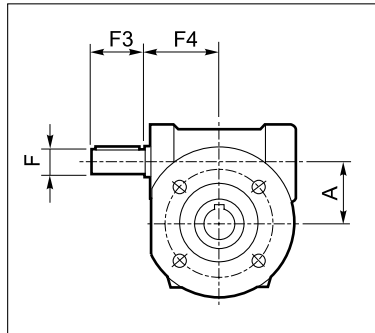
VF_N..HS



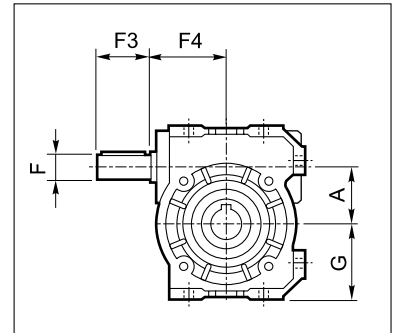
VF_P..HS



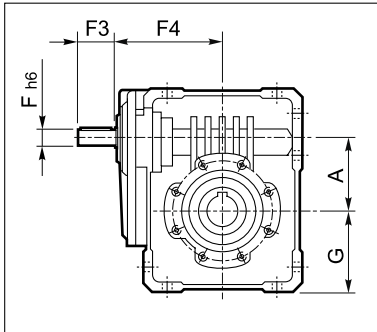
**VF_FA/FC/FCR/
FR/F..HS**



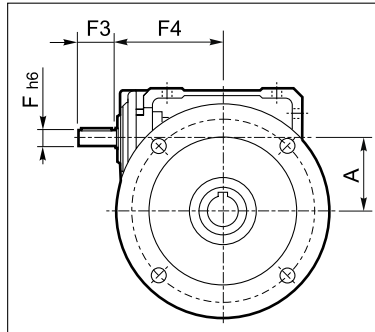
VF_U..HS



W_U..HS

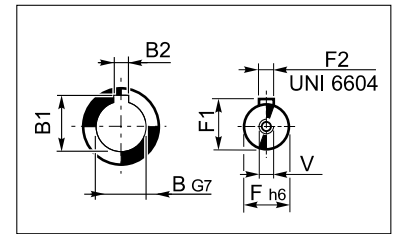


**W_UF..HS
W_UFC..HS**



Albero uscita
Output shaft
Abtriebswelle
Arbre lent

Albero entrata
Input shaft
Antriebswelle
Arbre rapide



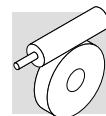
| | A | B | B1 | B2 | F | F1 | F2 | F3 | F4 | G | V | Kg |
|------------------|-------|--------|------------|----|----|------|----|-----|-------|------|--------|------|
| VF 30 HS | 30 | 14 | 16.3 | 5 | 9 | 10.2 | 3 | 20 | 50 | 47 | — | 1.1 |
| VF 44 HS | 44.6 | 18 | 20.8 | 6 | 11 | 12.5 | 4 | 30 | 54 | 55 | — | 2.0 |
| VF 49 HS | 49.5 | 25 | 28.3 | 8 | 16 | 18 | 5 | 40 | 65 | 64.5 | M6x16 | 3.0 |
| W 63 HS | 62.17 | 25 | 28.3 | 8 | 18 | 20.5 | 6 | 40 | 110.5 | 72.5 | M6x16 | 6.4 |
| W 75 HS | 75 | 30(28) | 33.3(31.3) | 8 | 19 | 21.5 | 6 | 40 | 128 | 87 | M6x16 | 10.0 |
| W 86 HS | 86.9 | 35 | 38.3 | 10 | 25 | 28 | 8 | 50 | 144 | 100 | M8x19 | 14.1 |
| W 110 HS | 110.1 | 42 | 45.3 | 12 | 25 | 28 | 8 | 60 | 168 | 125 | M8x19 | 27 |
| VF 130 HS | 130 | 45 | 48.8 | 14 | 30 | 33 | 8 | 60 | 160 | 195 | M8x20 | 49 |
| VF 150 HS | 150 | 50 | 53.8 | 14 | 35 | 38 | 10 | 65 | 185 | 220 | M8x20 | 60 |
| VF 185 HS | 185.4 | 60 | 64.4 | 18 | 40 | 43 | 12 | 70 | 214.5 | 254 | M8x20 | 94 |
| VF 210 HS | 210 | 90 | 95.4 | 25 | 48 | 51.5 | 14 | 110 | 230 | 335 | M16x40 | 175 |
| VF 250 HS | 250 | 110 | 116.4 | 28 | 55 | 59 | 16 | 110 | 274 | 380 | M16x40 | 275 |

Le dimensioni comuni alle altre configurazioni sono riportate da pag. 122 a pag. 177.

Dimensions common to the other configurations can be found from page 122 to 177.

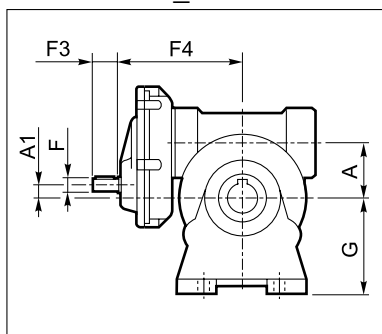
Die mit den anderen Konfigurationen gemeinsamen Abmessungen sind auf Seiten 122 - 177 angegeben.

Les dimensions communes à toutes les autres configurations sont indiquées de la page 122 jusqu'à 177.

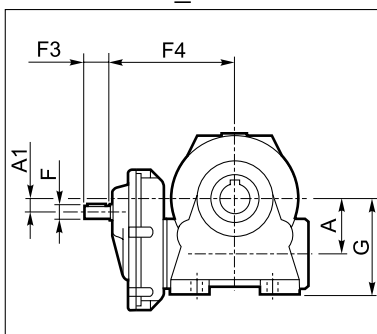


VFR_HS_WR_HS

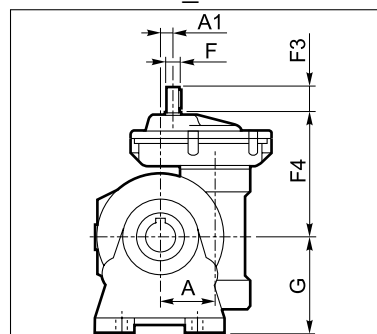
VFR_A..HS



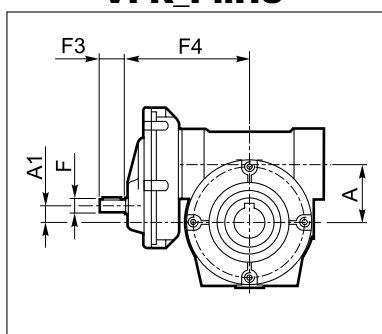
VFR_N..HS



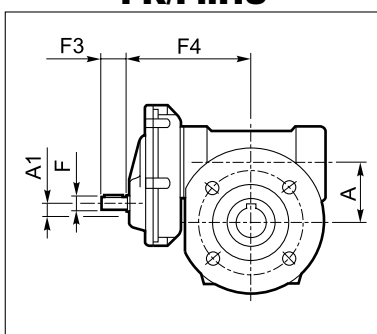
VFR_V..HS



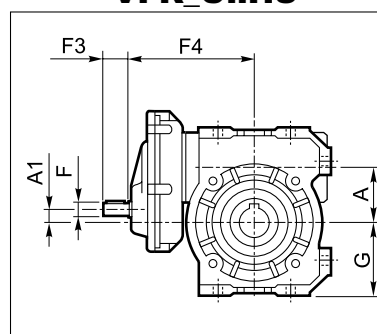
VFR_P..HS



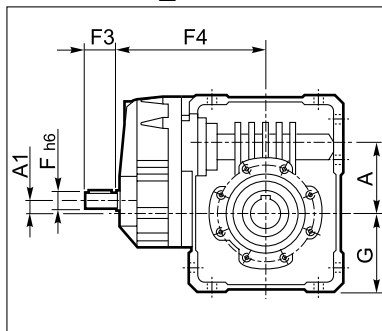
**VFR FA/FC/FCR/
FR/F..HS**



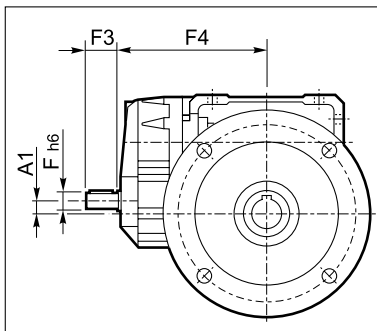
VFR_U..HS



WR_U..HS

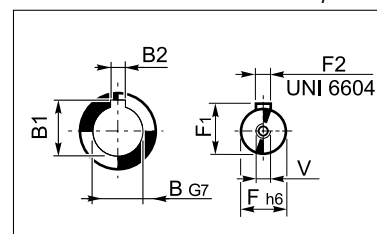


**WR UF..HS
WR UFC..HS**



Albero uscita
Output shaft
Abtriebswelle
Arbre lent

Albero entrata
Input shaft
Antriebswelle
Arbre rapide



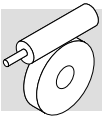
| | A | A1 | B | B1 | B2 | F | F1 | F2 | F3 | F4 | G | V | Kg |
|-------------------|-------|-------|--------|------------|----|----|------|----|----|-----|------|---------|------|
| VFR 49_HS | 49.5 | 10 | 25 | 28.3 | 8 | 11 | 12.5 | 4 | 23 | 110 | 82 | M4x10 | 5 |
| WR 63_HS | 62.17 | 11.42 | 25 | 28.3 | 8 | 14 | 16 | 5 | 30 | 138 | 72.5 | M5x12.5 | 7.1 |
| WR 75_HS | 75 | 11 | 30(28) | 33.3(31.3) | 8 | 19 | 21.5 | 6 | 40 | 162 | 87 | M6x16 | 11.1 |
| WR 86_HS | 86.9 | 22.9 | 35 | 38.3 | 10 | 19 | 21.5 | 6 | 40 | 178 | 142 | M6x16 | 14.7 |
| WR 110_HS | 110.1 | 21.1 | 42 | 45.3 | 12 | 24 | 27 | 8 | 50 | 201 | 125 | M8x19 | 34 |
| VFR 130_HS | 130 | 45 | 45 | 48.8 | 14 | 24 | 27 | 8 | 50 | 228 | 195 | M8x20 | 57 |
| VFR 150_HS | 150 | 53 | 50 | 53.8 | 14 | 28 | 31 | 8 | 60 | 280 | 220 | M8x20 | 71 |
| VFR 185_HS | 185.4 | 88.4 | 60 | 64.4 | 18 | 28 | 31 | 8 | 60 | 310 | 254 | M8x20 | 110 |
| VFR 210_HS | 210 | 92 | 90 | 95.4 | 25 | 38 | 41 | 10 | 80 | 337 | 335 | M10x25 | 185 |
| VFR 250_HS | 250 | 132 | 110 | 116.4 | 28 | 38 | 41 | 10 | 80 | 383 | 380 | M10x25 | 295 |

Le dimensioni comuni alle altre configurazioni sono riportate da pag. 132 a pag. 179.

Dimensions common to the other configurations can be found from page 132 to 179.

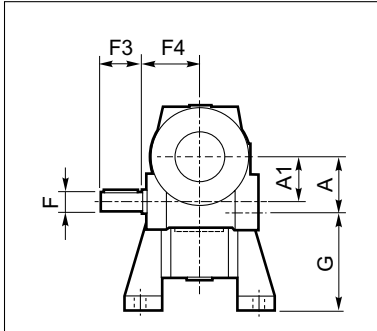
Die mit den anderen Konfigurationen gemeinen Abmessungen sind auf Seiten 132 - 179 angegeben.

Les dimensions communes à toutes les autres configurations sont indiquées de la page 132 jusqu'à 179.

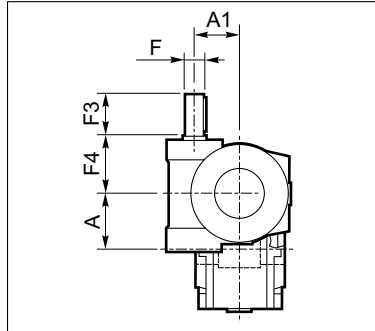


VF/VF_HS_VF/W_HS - W/VF_HS

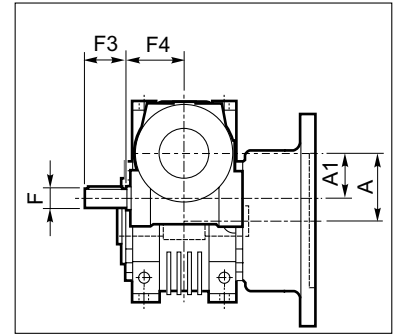
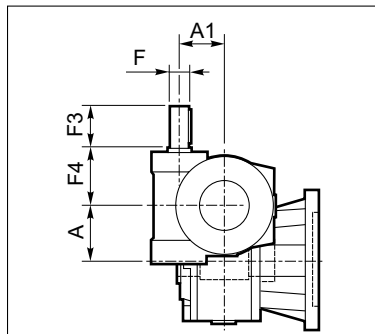
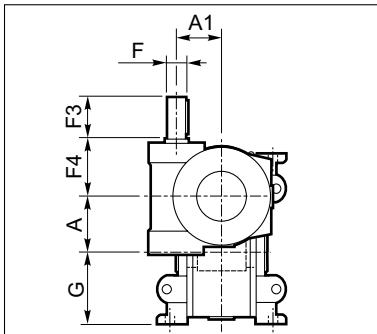
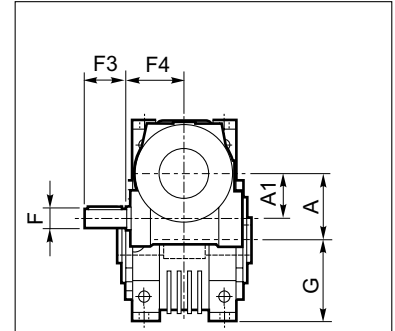
VF/VF_A..HS W/VF_A..HS



VF/VF_P..HS W/VF_P..HS

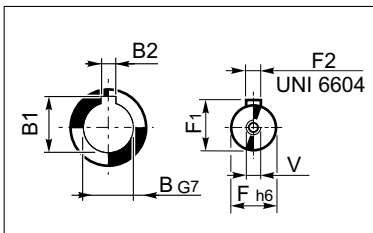


VF/VF_P..HS W/VF_P..HS



Albero uscita
Output shaft
Abtriebswelle
Arbre lent

Albero entrata
Input shaft
Antriebswelle
Arbre rapide



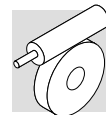
| | A | A1 | B | B1 | B2 | F | F1 | F2 | F3 | F4 | G | V | Kg |
|-------------------------|-------|-------|---------|-------------|----|----|------|----|----|-------|------|-------|------|
| VF/VF 30/44_HS | 44.6 | 30 | 18 | 20.8 | 6 | 9 | 10.2 | 3 | 20 | 50 | 72 | — | 3.5 |
| VF/VF 30/49_HS | 49.5 | 30 | 25 | 28.3 | 8 | 9 | 10.2 | 3 | 20 | 50 | 82 | — | 4.5 |
| VF/W 30/63_HS | 62.17 | 30 | 25 | 28.3 | 8 | 9 | 10.2 | 3 | 20 | 50 | 100 | — | 7.5 |
| VF/W 44/75_HS | 75 | 44.6 | 30 (28) | 33.3 (31.3) | 8 | 11 | 12.5 | 4 | 30 | 54 | 115 | — | 16.1 |
| VF/W 44/86_HS | 86.9 | 44.6 | 35 | 38.3 | 10 | 11 | 12.5 | 4 | 30 | 54 | 142 | — | 42 |
| VF/W 49/110_HS | 110.0 | 49.5 | 42 | 45.3 | 12 | 16 | 18 | 5 | 40 | 65 | 170 | M6x16 | 46 |
| W/VF 63/130_HS | 130 | 62.17 | 45 | 48.8 | 14 | 18 | 20.5 | 6 | 40 | 110.5 | 72.5 | M6x16 | 74 |
| W/VF 86/150_HS | 150 | 86.9 | 50 | 53.8 | 14 | 25 | 28 | 8 | 50 | 144 | 100 | M8x19 | 108 |
| W/VF 86/185_HS | 185.4 | 86.9 | 60 | 64.4 | 18 | 25 | 28 | 8 | 50 | 144 | 100 | M8x19 | 109 |
| VF/VF 130/210_HS | 210 | 130 | 90 | 95.4 | 25 | 30 | 33 | 8 | 60 | 160 | 335 | M8 | 225 |
| VF/VF 130/250_HS | 250 | 130 | 110 | 116.4 | 28 | 30 | 33 | 8 | 60 | 160 | 380 | M8 | 325 |

Le dimensioni comuni alle altre configurazioni sono riportate da pag. 128 a pag. 180.

Dimensions common to the other configurations can be found from page 128 to 180.

Die mit den anderen Konfigurationen gemeinsamen Abmessungen sind auf Seiten 128 - 180 angegeben.

Les dimensions communes à toutes les autres configurations sont indiquées de la page 128 jusqu'à 180.



26 - OPZIONI

RB RBO

I riduttori a vite senza fine (escluso VF 27) possono essere forniti, a richiesta, con l'albero veloce sporgente sul lato opposto comando specificando nell'ordinativo l'opzione **RB**, oppure **RBO** (solo per gruppi in esecuzione combinata).

26 - OPTION

RB RBO

*Worm gears (with the exception of VF 27) can be optionally requested with extended wormshaft at NDE by specifying the option **RB** or **RBO** (for double worm combined units) at the time of order.*

32 - OPTIONEN

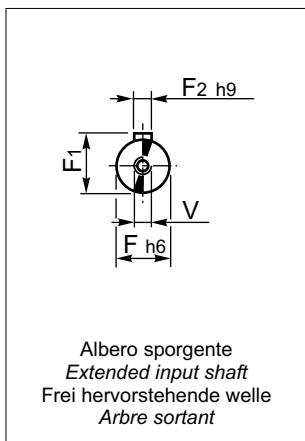
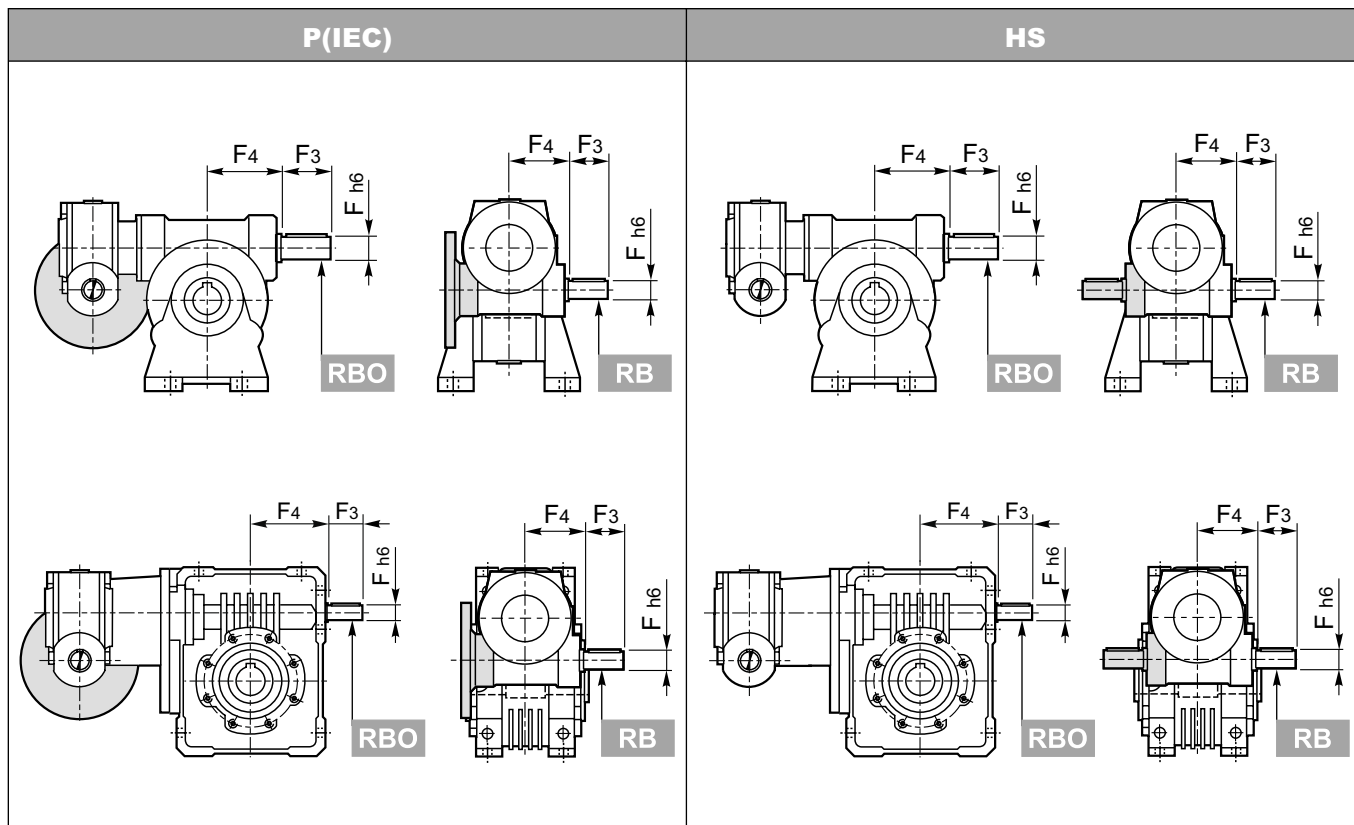
RB RBO

Alle Schneckengetriebe (außer VF 27) können auf Anfrage bzw. unter Angabe des Optionswunsches **RB** oder **RBO** (nur für Doppelschneckengetriebe) mit einer frei hervorstehenden Schneckenwelle geliefert werden.

32 - OPTIONS

RB RBO

*Les réducteurs à vis sans fin (sauf VF 27) peuvent être fournis, sur demande, avec la vis sortante, en indiquant l'option **RB** ou **RBO** (réducteur combiné seulement).*



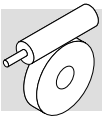
| | F | F1 | F2 | F3 | F4 | V |
|--------------|------------|----|------|----|----|--------|
| VF | 30 | 9 | 10.2 | 3 | 20 | - |
| VFR | 44 | 11 | 12.5 | 4 | 30 | - |
| VF/VF | 49 | 16 | 18 | 5 | 40 | M6 |
| | 63 | 18 | 20.5 | 6 | 40 | M6 |
| W | 75 | 19 | 21.5 | 6 | 40 | M6 |
| WR | 86 | 25 | 28 | 8 | 50 | M8 |
| VF/W | 110 | 25 | 28 | 8 | 60 | M8 |
| | 130 | 30 | 33 | 8 | 60 | M8 |
| VF | 150 | 35 | 38 | 10 | 65 | M8 |
| VFR | 185 | 40 | 43 | 12 | 70 | M8 |
| W/VF | 210 | 48 | 51.5 | 14 | 82 | M16x40 |
| | 250 | 55 | 59 | 16 | 82 | M16x40 |

Per VF 210 e VF 250, nelle forme costruttive A e P, normalmente viene montata la ventola di raffreddamento; con l'opzione RB non è possibile applicarla.

A and P versions of VF 210 and VF 250 feature the fan cooling as a standard, however forced ventilation is not feasible should the RB option be specified.

Für VF 210-250, in den Baumodellen A und P, wird in der Regel ein Kühlungsgebläse montiert; mit der Option RB kann dieses nicht montiert werden.

Sur les projets A et P on monte d'habitude les ventilateurs de refroidissement qui n'est pas prévue avec l'option RB.



27 - ACCESSORI

27 - ACCESSORIES

27 - ZUBEHÖR

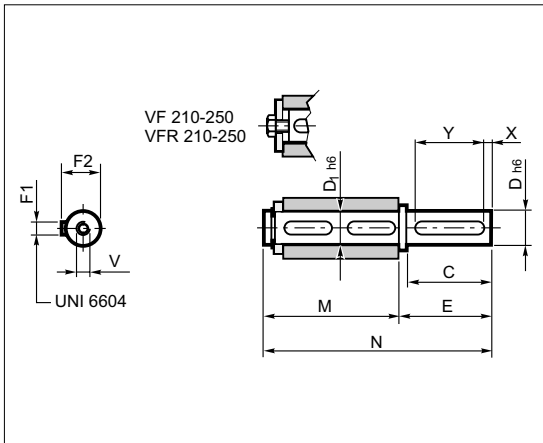
27 - ACCESSORIES

27.1 Albero lento riportato

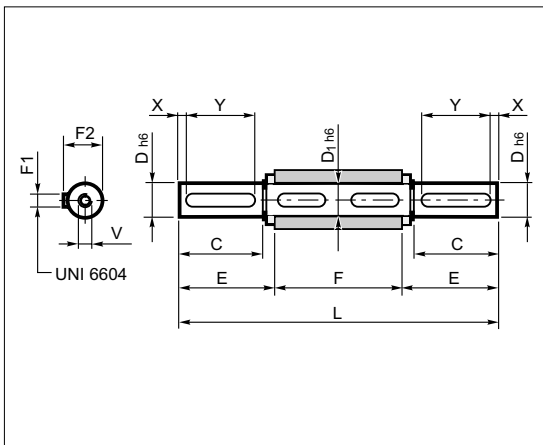
27.1 Plug-in output shaft

27.1 Ausgangsteckwelle

27.1 Arbre lent rapporté



| | | C | D | D1 | E | F1 | F2 | M | N | V | X | Y | |
|----|-------|--------|-----|-----|-----|----|-----|------|-----|--------|--------|-----|----|
| VF | 30 | 30 | 14 | 14 | 35 | 5 | 16 | 61 | 96 | M5x13 | 5 | 20 | |
| | VFR | 44 | 40 | 18 | 18 | 45 | 6 | 20.5 | 70 | M6x16 | 5 | 30 | |
| | VF/VF | 49 | 60 | 25 | 25 | 65 | 8 | 28 | 89 | M8x19 | 5 | 50 | |
| W | 63 | 60 | 25 | 25 | 65 | 8 | 28 | 127 | 192 | M8x19 | 5 | 50 | |
| | VF/W | 75_D28 | 60 | 28 | 30 | 65 | 8 | 31 | 134 | M8x20 | 5 | 50 | |
| | WR | 75_D30 | 60 | 30 | 30 | 65 | 8 | 33 | 134 | M10x22 | 5 | 50 | |
| | VF/W | 86 | 60 | 35 | 35 | 65 | 10 | 38 | 149 | M10x22 | 5 | 50 | |
| | 110 | 75 | 42 | 42 | 80 | 12 | 45 | 164 | 244 | M12x28 | 7.5 | 60 | |
| VF | VFR | 130 | 80 | 45 | 45 | 85 | 14 | 48.5 | 176 | 261 | M12x32 | 5 | 70 |
| | W/VF | 150 | 85 | 50 | 50 | 93 | 14 | 53.5 | 185 | 278 | M16x40 | 7.5 | 70 |
| | 185 | 100 | 60 | 60 | 110 | 18 | 64 | 200 | 310 | M16x40 | 10 | 80 | |
| | 210 | 130 | 90 | 90 | 140 | 25 | 95 | 255 | 395 | M20x50 | 5 | 120 | |
| | 250 | 165 | 110 | 110 | 175 | 28 | 116 | 315 | 490 | M24x64 | 15 | 140 | |



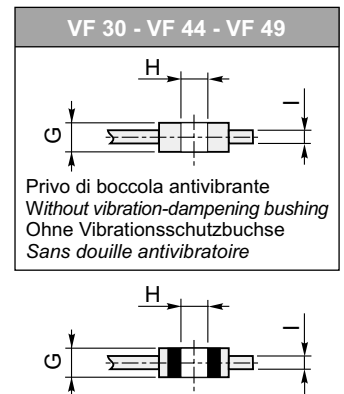
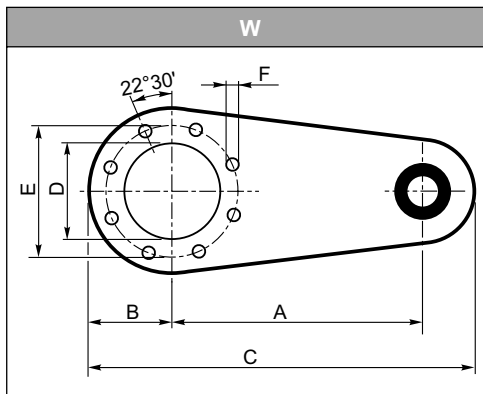
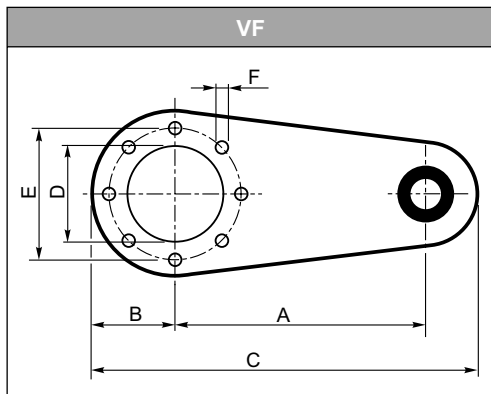
| | | C | D | D1 | E | F | F1 | F2 | L | V | X | Y | |
|----|-------|--------|-----|-----|------|------|-----|-----|-------|--------|--------|-----|----|
| VF | 30 | 30 | 14 | 14 | 32.5 | 55 | 5 | 16 | 120 | M5x13 | 5 | 20 | |
| | VFR | 44 | 40 | 18 | 18 | 42.7 | 64 | 6 | 20.5 | 149.4 | M6x16 | 5 | 30 |
| | VF/VF | 49 | 60 | 25 | 25 | 63.2 | 82 | 8 | 28 | 208.4 | M8x19 | 5 | 50 |
| W | 63 | 60 | 25 | 25 | 63.2 | 120 | 8 | 28 | 246.4 | M8x19 | 5 | 50 | |
| | VF/W | 75_D28 | 60 | 28 | 30 | 64 | 127 | 8 | 31 | 255 | M8x20 | 5 | 50 |
| | WR | 75_D30 | 60 | 30 | 30 | 64 | 127 | 8 | 33 | 255 | M10x22 | 5 | 50 |
| | VF/W | 86 | 60 | 35 | 35 | 64 | 140 | 10 | 38 | 268 | M10x22 | 5 | 50 |
| | 110 | 75 | 42 | 42 | 79.3 | 155 | 12 | 45 | 313.5 | M12x28 | 7.5 | 60 | |
| VF | VFR | 130 | 80 | 45 | 45 | 84.7 | 165 | 14 | 48.5 | 334.5 | M12x32 | 5 | 70 |
| | W/VF | 150 | 85 | 50 | 50 | 90 | 175 | 14 | 53.5 | 355 | M16x40 | 7.5 | 70 |
| | 185 | 100 | 60 | 60 | 105 | 190 | 18 | 64 | 400 | M16x40 | 10 | 80 | |
| | 210 | 130 | 90 | 90 | 140 | 260 | 25 | 95 | 540 | M20x50 | 5 | 120 | |
| | 250 | 165 | 110 | 110 | 175 | 320 | 28 | 116 | 670 | M24x64 | 15 | 140 | |

27.2 Braccio di reazione

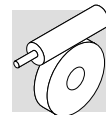
27.2 Torque arm

27.2 Drehmomentstütze

27.2 Bras de réaction



| | | A | B | C | D | E | F | G | H | I |
|----|-------|-----|-----|-------|-------|-----|-----|----|----|----|
| VF | 30 | 100 | 40 | 157.5 | 50 | 65 | 7 | 14 | 8 | 4 |
| | VFR | 44 | 100 | 40 | 157.5 | 50 | 65 | 7 | 8 | 4 |
| | VF/VF | 49 | 100 | 55 | 172.5 | 68 | 94 | 7 | 8 | 4 |
| W | 63 | 150 | 55 | 233 | 75 | 90 | 9 | 20 | 10 | 6 |
| | VF/W | 75 | 200 | 63 | 300 | 90 | 110 | 9 | 20 | 6 |
| | WR | 86 | 200 | 80 | 318 | 110 | 130 | 11 | 20 | 6 |
| | 110 | 250 | 100 | 388 | 130 | 165 | 13 | 25 | 20 | 6 |
| VF | VFR | 130 | 300 | 125 | 470 | 180 | 215 | 13 | 30 | 6 |
| | W/VF | 150 | 300 | 125 | 470 | 180 | 215 | 15 | 30 | 6 |
| | 185 | 350 | 150 | 545 | 230 | 265 | 17 | 30 | 25 | 6 |
| | 210 | 350 | 175 | 625 | 250 | 300 | 19 | 60 | 50 | 8 |
| | 250 | 400 | 225 | 725 | 350 | 400 | 19 | 60 | 50 | 10 |

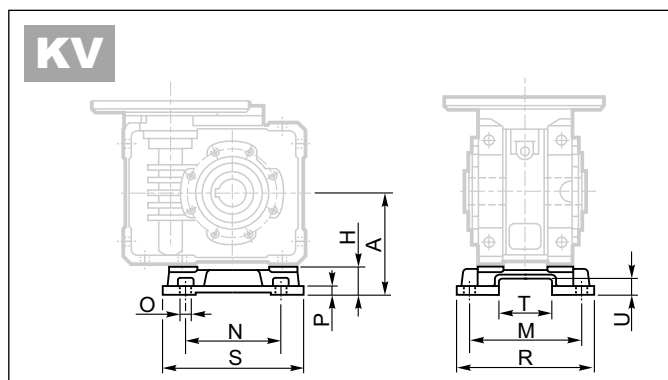
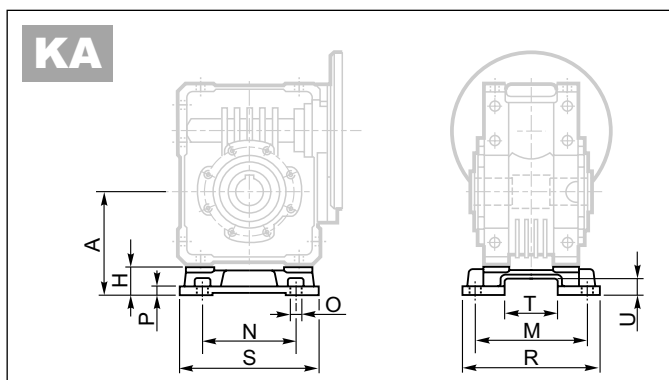


27.3 Kit piedi KA, KV

27.3 VF-interchangeable foot kits KA, KV

27.3 Satz - Stützfüße

27.3 Kit pieds KA, KV

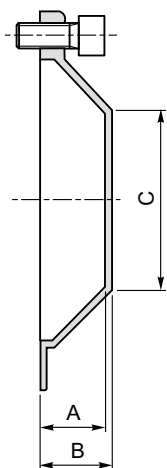


| | A | H | M | N | O | P | R | S | T | U |
|----------------|-----|------|-----|-----|----|----|-----|-----|------|------|
| W 63 - WR 63 | 100 | 27.5 | 111 | 95 | 11 | 8 | 135 | 145 | 56.5 | 15.5 |
| W 75 - WR 75 | 115 | 28 | 115 | 120 | 11 | 9 | 139 | 174 | 56.5 | 15.5 |
| W 86 - WR 86 | 142 | 42 | 146 | 140 | 11 | 11 | 170 | 200 | 69 | 20 |
| W 110 - WR 110 | 170 | 45 | 181 | 200 | 13 | 14 | 210 | 250 | 69 | 20 |

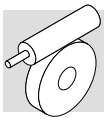
27.4 Cappellotto di protezione 27.4 Safety cover

27.4 Schutzdeckel

27.4 Capuchon de protection



| | A | B | C |
|---------------|------|----|-----|
| W 63 - WR 63 | 26.5 | 29 | Ø35 |
| W 75 - WR 75 | 24.5 | 27 | Ø54 |
| W 86 - WR 86 | 26.5 | 29 | Ø71 |
| W 110 - WR110 | 27.5 | 30 | Ø89 |



28 - ALBERO CLIENTE

28 - CUSTOMER'S SHAFT

28 - KUNDENSEITIGE WELLEN

28 - ARBRE MACHINE

28.1 Istruzioni per la realizzazione

Nel realizzare l'albero condotto che si accoppierà con il riduttore consigliamo di utilizzare acciaio di buona qualità e di realizzare le dimensioni come suggerito nello schema seguente. Sugeriamo inoltre di completare il montaggio con un dispositivo che realizza il bloccaggio assiale dell'albero (non illustrato). Il numero e la dimensione dei relativi fori filettati all'estremità dell'albero saranno determinati dalle diverse esigenze applicative.

28.1 Manufacturing instructions

Pivot of driven equipment should be made from high grade alloy steel.

Table below shows recommended dimensions for the Customer to consider when designing mating shaft.

A device retaining the shaft axially is also recommended (not shown).

The number and size of relative tapped holes at shaft end depend on application requirements.

28.1 Konstruktionsrichtlinien

Für die mit dem Getriebe verbundene Antriebswelle, wird empfohlen, hochwertigen Stahl zu verwenden und die im folgenden Schema enthaltenen Abmessungen zu beachten. Es wird außerdem empfohlen, die Montage mit Hilfe einer Vorrichtung, die die Welle axial blockiert (nicht abgebildet), vorzunehmen.

Die Anzahl und die Abmessung des/der Gewindebohrungen an den Wellenenden werden den Einsatzbedingungen gemäß festgelegt.

28.1 Instructions pour la réalisation

Pour la réalisation de l'arbre mené d'accouplement avec le réducteur, nous conseillons d'utiliser de l'acier de bonne qualité et de respecter les dimensions indiquées sur le schéma suivant.

Il est recommandé de compléter le montage par un dispositif de blocage axial de l'arbre (non illustré).

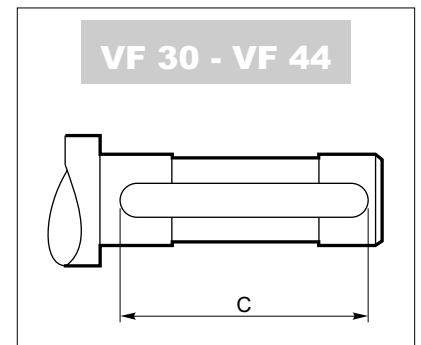
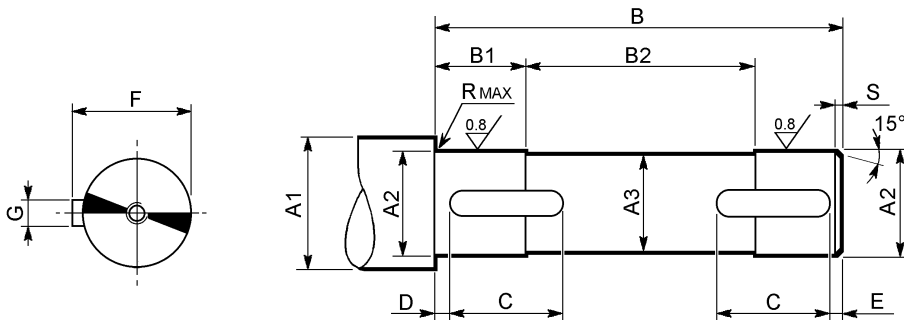
Le nombre et les dimensions de (s) l'orifice (s) fileté (s) correspondant(s) à l'extrémité de l'arbre sont déterminés par les différentes exigences d'application.

28.2 Serie VF e W

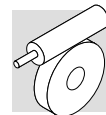
28.2 Series VF and W

28.2 Series VF und W

28.2 Série VF et W



| | A1 | A2 | A3 | B | B1 | B2 | C | D | E | F | G | R | S | UNI 6604 |
|---------------|-------|--------|-----|-----|------|-----|----|-----|-----|------|-------|-----|-----|------------|
| VF 30 | ≥ 19 | 14 f7 | 13 | 53 | 18.5 | 16 | 40 | 6.5 | 6.5 | 16 | 5 h9 | 0.5 | 1.5 | 5x5x40 A |
| VF 44 | ≥ 23 | 18 f7 | 17 | 62 | 22.5 | 17 | 50 | 6 | 6 | 20.5 | 6 h9 | 0.5 | 1.5 | 6x6x50 A |
| VF 49 | ≥ 30 | 25 f7 | 24 | 80 | 20.5 | 39 | 20 | 2 | 2 | 28 | 8 h9 | 1 | 1.5 | 8x7x20 A |
| W 63 | ≥ 30 | 25 f7 | 24 | 118 | 38 | 42 | 35 | 2 | 2 | 28 | 8 h9 | 1 | 1.5 | 8x7x35 A |
| W 75 | ≥ 35 | 28 f7 | 27 | 125 | 38 | 49 | 40 | 2 | 2 | 31 | 8 h9 | 1 | 1.5 | 8x7x40 A |
| | ≥ 35 | 30 f7 | 29 | 125 | 38 | 49 | 40 | 2 | 2 | 33 | 8 h9 | 1 | 1.5 | 8x7x40 A |
| W 86 | ≥ 42 | 35 f7 | 34 | 138 | 43 | 52 | 40 | 2 | 2 | 38 | 10 h9 | 1.5 | 1.5 | 10x8x40 A |
| W110 | ≥ 48 | 42 f7 | 41 | 153 | 43 | 67 | 50 | 2 | 2 | 45 | 12 h9 | 1.5 | 2 | 12x8x50 A |
| VF 130 | ≥ 52 | 45 f7 | 44 | 163 | 50.5 | 62 | 60 | 2.5 | 2.5 | 49.5 | 14 h9 | 2.5 | 2 | 14x9x60 A |
| VF 150 | ≥ 57 | 50 f7 | 49 | 173 | 53 | 67 | 70 | 2.5 | 2.5 | 53.5 | 14 h9 | 2.5 | 2 | 14x9x70 A |
| VF 185 | ≥ 68 | 60 f7 | 59 | 188 | 63 | 62 | 80 | 2.5 | 2.5 | 64 | 18 h9 | 2.5 | 2 | 18x11x80 A |
| VF 210 | ≥ 99 | 90 f7 | 89 | 258 | 83 | 92 | 80 | 3 | 3 | 95 | 25 h9 | 2.5 | 2.5 | 25x14x80 A |
| VF 250 | ≥ 121 | 110 h7 | 109 | 318 | 83 | 152 | 80 | 3 | 3 | 116 | 28 h9 | 2.5 | 2.5 | 28x16x80 A |



29 - LIMITATORE DI COPPIA

29 - TORQUE LIMITER

29 - RUTSCHKUPPLUNG

29 - LIMITER DE COUPLE

29.1 Descrizione

Il limitatore di coppia a frizione è studiato e realizzato per i riduttori senza fine **VF44 - VF49** e **W63...W110**, è un dispositivo di protezione atto a salvaguardare la trasmissione da sovraccarichi accidentali che potrebbero danneggiare tutti gli elementi della trasmissione creando seri inconvenienti alla macchina operatrice.

Rispetto ai tradizionali limitatori di coppia montati esternamente al riduttore questa versatile soluzione presenta i seguenti vantaggi:

- nessun ingombro aggiuntivo esterno ai riduttori forniti in versione standard
- lavorando a completo bagno d'olio non richiede nessuna manutenzione
- la coppia di slittamento può essere facilmente regolata tramite una semplice operazione manuale dall'esterno del riduttore
- lo slittamento, anche continuo, non crea danneggiamenti alla meccanica o consumi anormali, in quanto le superfici di slittamento sono separate da un costante velo d'olio.

29.1 Description

*The friction-based torque limiter, available for wormgears type **VF44 - VF49** and **W63...W110**, is designed to protect the transmission from accidental overloads which could damage the drive elements.*

Against conventional external torque limiters, this versatile solution lends the following advantages:

- *unchanged external dimensions against standard same model standard units*
- *maintenance-free, as the system is permanently lubed*
- *slip torque can be easily adjusted by means of a simple manual operation from the outside of the gearbox*
- *slipping, even if continuous, does not create any damage or wear to the mechanical parts, since slipping parts are constantly separated by an oil film.*

29.1 Beschreibung

Die Rutschkupplung, die für Schneckengetriebe **VF44 - VF49** und **W63...W110**, entwickelt wurde, dient dem Schutz des Getriebes vor zufälligen Überlastungen, welche die Antriebselemente zerstören könnten.

Bezüglich traditioneller Rutschkupplungen, welche extern an das Getriebe angeschlossen werden, bietet diese Lösung folgende Vorteile:

- gleiche Aussen-Abmessungen des Getriebes wie das Standard Gehäuse
- wartungsfrei, da das System in Ölbad arbeitet
- das maximal übertragbare Moment kann einfach, per Hand, von aussen eigenstellt werden
- ständiges Rutschen verursacht keinen Schaden, da die mechanischen Teile im Ölbad laufen.

29.1 Description

*Le limiteur de couple à friction, étudié et réalisé pour les réducteurs à vis sans fin, type **VF44 - VF49** et **W63...W110**, est un dispositif de sécurité qui a pour but de protéger la chaîne cinématique des surcharges accidentelles qui pourraient endommager tous les éléments de la transmission.*

Par rapport au montage du limiteur de couple traditionnel à l'extérieur du réducteur, cette solution, d'une grande souplesse d'emploi, offre les avantages suivants:

- *aucune différence des cotes d'encombrement par rapport au réducteur standard*
- *aucun entretien, car le système fonctionne en bain d'huile*
- *le couple maximum transmissible peut être facilement ajusté par une manoeuvre simple à l'extérieur du réducteur*
- *le glissement, même continu, ne crée aucun dommage ni usure aux parties mécaniques, du fait de la séparation des surfaces en glissement par un film d'huile d'épaisseur constante.*



Se ne sconsiglia l'utilizzo in meccanismi di sollevamento.



We advise against installing this device to lifting equipment.



**Von einer Montage in Hebe-
mechanismen wird abgeraten.**



Son utilisation dans des mécanismes de levage est déconseillée.

29.2 Modo di funzionamento

Il limitatore di coppia funziona come una frizione biconica con le sedi ricavate direttamente sulla corona in bronzo e sul mozzo in ghisa sferoidale GS400/12 monolitica avente l'albero lento cavo passante, il quale permette di collegare la macchina operatrice direttamente al nostro riduttore.

Le sedi coniche sono strette fra loro per effetto di una forza assiale costante generata da molle a tazza.

La registrazione della coppia di slittamento si effettua in modo semplice tramite la rotazione di una ghiera esterna al riduttore.

29.2 Operating principle

The torque limiter basically consists of a double tapered clutch with active surfaces machined on (bronze) worm wheel and hub of output shaft (nodular cast iron GS400/12). Bore of output shaft allows shaft mounting of gear unit onto driven machine.

Active surfaces of the torque limiter are pressed against each other by thrust generated by adequately proportioned spring washers. Transmissible torque is proportional to axial force applied by the springs and adjustment of torque setting is easily conducted manually through an external ring nut.

29.2 Funktionsweise

Die Rutschkupplung arbeitet wie eine doppelkonische Reibfläche, die direkt auf einen aus Sphäroguss bestehenden Innenring GS 400/12 des Bronzeschneckenrades wirkt.

Die axiale Anpresskraft, die die konischen Reibflächen zusammendrückt, wird von Tellerfedern erzeugt.

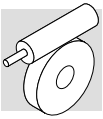
Die Einstellung des Rutschmomentes kann in einer einfachen Weise durch Drehen einer Verstellmutter, ausserhalb des Getriebes, erreicht werden.

29.2 Mode de fonctionnement

Le limiteur de couple fonctionne comme une friction bi-conique entre des surfaces de contact obtenues directement sur la couronne en bronze, un moyeu en fonte à graphite sphéroidal GS400/12 monolithique et un arbre de sortie creux traversant, permettant une liaison directe à la machine.

Les surfaces coniques sont maintenues en pression par un effort axial constant, généré par les rondelles élastiques.

Le réglage du couple de glissement s'effectue d'une façon simple à travers le serrage d'un écrou extérieur au réducteur.



29.3 Protezione dell'impianto da sovraccarichi

Il limitatore opportunamente tarato alla coppia necessaria alla macchina operatrice, salvaguarda tutti gli organi meccanici del cinematismo evitando danneggiamenti dovuti a eventuali e ripetuti sovraccarichi.

29.3 Protection of the machine from overloads

The torque limiter, properly adjusted in function of the torque necessary for the driven equipment, protects all mechanical components of the transmission avoiding any damage due to overloads.

29.3 Schutz der Arbeitsmaschine vor Überlastungen:

Die Rutschkupplung ist eingestellt auf das notwendige Moment der Arbeitsmaschine und schützt alle mechanischen Teile der Übertragungseinheit. Weiter vermeidet sie Beschädigungen hervorgeannten durch mögliche Überlastungen.

29.3 Protection de l'installation contre les surcharges:

Le limiteur, correctement réglé au couple nécessaire pour la machine protège tous les organes mécaniques de la chaîne cinématique, en évitant des endommagements dus à d'éventuelles et répétitives surcharges.

29.4 Disinserimento in condizioni di irreversibilità

In determinate applicazioni può essere utile ruotare, a macchina ferma, l'albero lento del riduttore. Questa situazione non è sempre possibile nei riduttori a vite senza fine tradizionali. Tramite questo dispositivo, allentando opportunamente la ghiera di registrazione, possiamo eseguire agevolmente questa operazione.

29.4 Reversing of a self-locking unit

In some applications it may be desired to rotate the output shaft while machine is not operating. Such a situation is not always possible with high-ratio self-locking worm gears. Using the torque limiter it is possible to conduct such operation untightening the ring nut.

29.4 Auskuppeln bei Selbsthemmung

In einigen Anwendungsfällen ist es nötig die Ausgangswelle des Getriebes zu drehen während die Arbeitsmaschine steht: Dies ist bei einem normalen Schneckengetriebe nicht möglich. Die Verwendung der Rutschkupplung macht es möglich, wenn vorher die Verstellmutter gelöst wird.

29.4 Décrabotage en cas d'irréversibilité

Dans certains applications, il peut être utile de faire tourner, machine arrêtée, l'arbre lent du réducteur. Cette solution n'est pas toujours possible avec les réducteurs à roue est vis sans fin traditionnels. A l'aide de ce dispositif, en desserrant l'écrou de réglage, il est possible de procéder facilement à cette opération.

29.5 VF...L, W...L

29.5 VF...L, W...L

29.5 VF...L, W...L

29.5 VF...L, W...L

| L1 | | | | | | | |
|--------------|---|-------------|-------------|-------|-------------------------|---------------------------|----------|
| | N | A | V | U | F1 FC1 FR1 FA1 | F2 FC2 FR2 FA2** | P1 P2 |
| VF VF/VF* | | | | | | | |
| | | | | | | ** ⚙ VF 49 | |
| | U | UF1 UFC1 | UF2 UFC2 | UFCR1 | UFCR2 | | |
| W VF/W* | | | | | | | |

* Nei riduttori combinati, il limitatore di coppia è installato sul 2° riduttore nelle esecuzioni L1 ed L2; è installato sul 1° riduttore nell'esecuzione LF.

* On double worm gear units the torque limiter is fitted on 2nd reducer (larger size) for the L1 or L2 configurations. Same is fitted on 1st reducer (smaller) when the LF configuration is specified.

| L2 | | | | | | | |
|--------------|---|-------------|-------------|-------|---------------------------|-------------------------|----------|
| | N | A | V | U | F1 FC1 FR1 FA1** | F2 FC2 FR2 FA2 | P1 P2 |
| VF VF/VF* | | | | | | | |
| | | | | | | ** ⚙ VF 49 | |
| | U | UF1 UFC1 | UF2 UFC2 | UFCR1 | UFCR2 | | |
| W VF/W* | | | | | | | |

* In den Doppelschneckengetrieben Typ VF/VF ist das Drehmomentstütz auf das 2te Getriebe für die Ausführungen L1 oder L2 installiert; es ist auf das 1te Getriebe für Ausführung LF installiert.

* Dans les réducteurs combinés VF/VF, le limiteur de couple en position L1 et L2 est monté sur le 2me réducteur, en position LF il est monté sur le 1er réducteur.

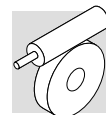
| LF | | | | |
|----|------|--------|--------|--------|
| | VF/W | 44/75 | 44/86 | 49/110 |
| | W/VF | 63/130 | 86/150 | 86/185 |

Se non preventivamente specificato, i riduttori VF...L verranno forniti con la ghiera a sinistra (L1) guardando il motore elettrico in posizione di montaggio B3.

Unless otherwise specified VF...L gear units are supplied with ring nut on the left hand side (L1), viewing from the electric motor and gearbox in the B3 mounting position.

Wenn nicht anders angegeben, werden die Getriebe VF...L geliefert mit der Verstellmutter links (L1), mit Sicht auf den E-Motor.

En standard et en l'absence d'information précise, les réducteurs VF...L seront livrés avec le système de décrabotage à gauche (L1), vue se plaçant du côté du moteur électrique.

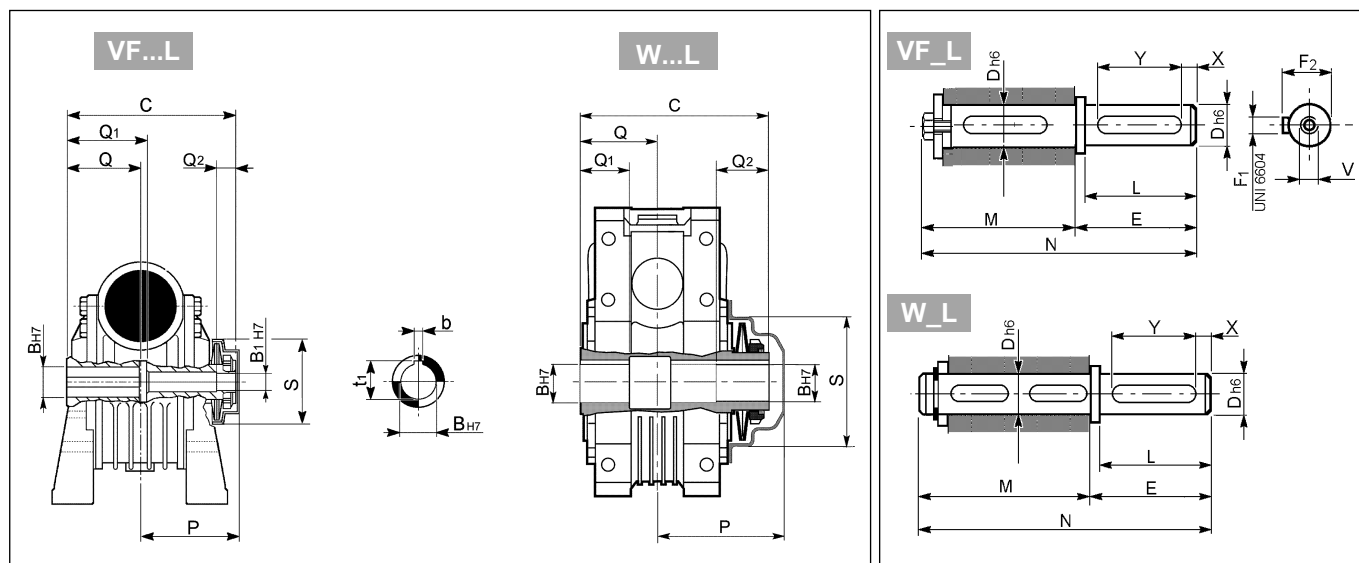


29.6 Dimensioni

29.6 Dimensions

29.6 Abmessungen

29.6 Dimensions



| | Limitatore di coppia / Torque limiter Rutschkupplung / Limiteur de couple | | | | | | | | | | Albero lento semplice / Single output shaft Ein freies Wellenende / Arbre lent unilatéral | | | | | | | | | |
|-----------|--|------|----|----|------|------|------|-------|------|----|--|------|----|----|------|-------|-------|--------|-----|----|
| | C | Q | Q1 | Q2 | P | S | B H7 | B1 H7 | t1 | b | L | D h6 | E | F1 | F2 | M | N | V | X | Y |
| VF 44L | 79 | 32 | 32 | 12 | 48 | 42.5 | 18 | 11 | 20.8 | 6 | 40 | 18 | 45 | 6 | 20.5 | 86 | 131 | M6x16 | 5 | 30 |
| VF 49L | 105 | 41 | 51 | 15 | 63.5 | 66.5 | 25 | 14 | 28.3 | 8 | 60 | 25 | 65 | 8 | 28 | 114.5 | 179.5 | M8x19 | 5 | 40 |
| W 63L | 145 | 60 | 40 | 40 | 100 | 77 | 25 | - | 28.3 | 8 | 60 | 25 | 65 | 8 | 28 | 152 | 217 | M8x19 | 5 | 50 |
| W 75L_D30 | 154.5 | 63.5 | 40 | 40 | 104 | 100 | 30 | - | 33.3 | 8 | 60 | 30 | 65 | 8 | 33 | 161.5 | 226.5 | M10x22 | 5 | 50 |
| W 86L | 170 | 70 | 50 | 45 | 113 | 119 | 35 | - | 38.3 | 10 | 60 | 35 | 65 | 8 | 38 | 179 | 244 | M10x22 | 5 | 50 |
| W 110L | 191 | 77.5 | 55 | 45 | 133 | 134 | 42 | - | 45.3 | 12 | 75 | 42 | 80 | 10 | 45 | 200 | 280 | M12x28 | 7.5 | 60 |

29.7 Registrazione coppia di slittamento

In fabbrica viene eseguita una pretaratura dello slittamento su un momento torcente coincidente col valore di coppia nominale $Mn_2 [n_1=1400]$ del riduttore tipo VF o W.

Qui di seguito sono descritte le operazioni eseguite in fabbrica per realizzare la taratura della coppia di slittamento. Le stesse operazioni, a meno del passo (2), dovranno essere ripercorse quando si vuole impostare un valore di coppia diverso dall'originale.

1. La ghiera di registrazione viene avvitata fino a che le molle a tazza non sono sufficientemente caricate da non potere ruotare liberamente, se azionate manualmente.

29.7 Slip torque setting

A preliminary slip torque setting is conducted at the factory. Reference is made to torque rating $Mn_2 [n_1=1400]$ of the captioned VF or W gear unit.

Here below the operations performed at the factory for the initial adjustment are listed.

Same steps, with the exception of step (2), must be followed when a different torque setting is required.

1. Ring nut is tightened until spring washers are sufficiently loaded that manual rotation is hardly possible.

29.7 Rutschmomenteinstellung

Eine Voreinstellung des Rutschmoments wird im werk durchgeführt.

Das voreingestellte Moment entspricht dem im Katalog angegebenen Nennmoment $Mn_2 [n_1=1400]$ des Getriebes Typ VF oder W.

Nachfolgend werden die im Werk durchgeführten Operationen zur Einstellung des Rutschmoments beschrieben.

Die gleichen Schritte, mit Ausnahme des Schrittes Nr. 2, müssen wiederholt werden, wenn ein anderer Momentwert benötigt wird.

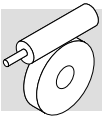
1. Die Verstellmutter so weit anziehen, daß sich die Tellerfedern nicht mehr von Hand drehen lassen.

29.7 Réglage du couple de glissement

Un pré-tarage du couple de glissement sur la base d'un moment de torsion coincident avec la valeur du couple nominal $Mn_2 [n_1=1400]$ du réducteur type VF o W est effectué en usine.

Ci-après sont décrites les opérations effectuées en usine pour réaliser le tarage du couple de glissement. Les mêmes opérations, sauf l'étape 2, devront être effectuées si l'on veut obtenir un couple différent de celui prévu à l'origine.

1. L'écrou de réglage est vissé jusqu'à ce que les rondelles élastiques soient suffisamment précontraintes et ne puissent plus tourner librement par une action manuelle.



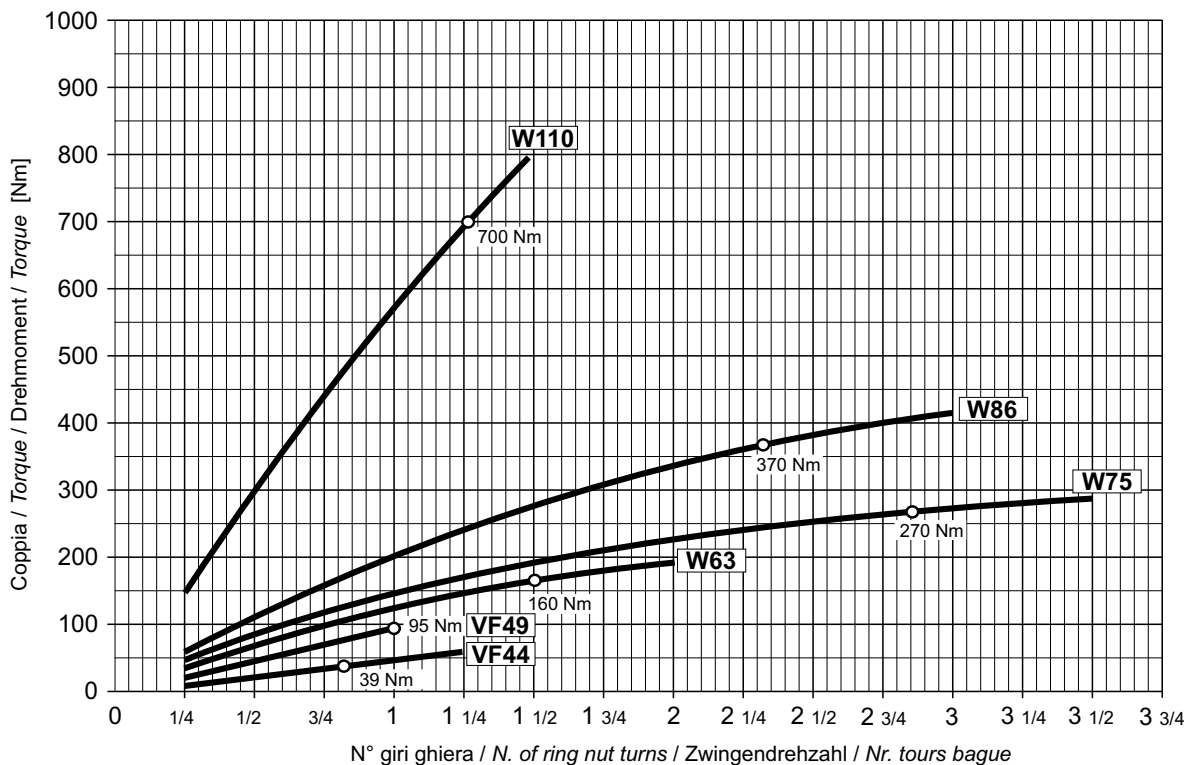
2. Per mezzo di un bulino vengono incise, in identica posizione angolare, due marcature di riferimento, sia sulla ghiera che sulla sporgenza d'albero lento. Questa posizione di riferimento costituirà il punto iniziale per il conteggio dei successivi giri della ghiera e la conseguente taratura di coppia.

2. By means of an engraver marks are made, in identical (angular) position, on both the ring nut and the hollow shaft. Setting will then be referred to as the zero-point for the consequent slip torque adjustment, through turning of the ring nut.
2. Es werden 2 Bezugsmarkierungen unter dem gleichen Winkel sowohl auf der Verstellmutter als auch auf der Hohlwelle angebracht. Die hiermit gekennzeichnete Stellung ist der Ausgangspunkt für jede weitere Rutschmenteinstellung durch die Verdrehung der Verstellmutter.

2. Au moyen d'un marqueur on réalise deux repères dans la même position angulaire, l'un sur l'écrou et l'autre sur la saillie de l'arbre lent. Cette position de référence constituera le point de départ pour le décompte des tours successifs de la bague et en conséquence le tarage du couple.
3. Infine la ghiera viene avvitata delle frazioni di giro corrispondenti al valore di coppia nominale Mn_2 del riduttore in oggetto. Il riferimento in questo caso è il diagramma sotto riportato, il quale sarà d'utilità anche per le eventuali nuove impostazioni che si dovessero rendere necessarie nel tempo.

3. Ring nut is then turned of the number of turns, or fraction of, corresponding to nominal torque rating Mn_2 of the captioned gear unit. In this case the diagram shown here under refers as to the proportion between number of turns and transmissible torque. Same diagram comes handy for customised torque adjustments, should these be required with time.
3. Die Verstellmutter wird soweit angezogen, bis das gewünschte Nennmoment Mn_2 des Getriebes erreicht ist. Sollte ein anderes Rutschmoment erforderlich sein, ist gemäß folgendem Diagramm (ausgehend von Punkt 2.) die Verstellmutter um den angegebenen Wert gegenüber der Hohlwelle zu drehen ($\frac{1}{4}$ bis 2 Umdrehungen).

3. En final, la bague est vissée des fractions de tours correspondant à la valeur du couple nominal Mn_2 du réducteur concerné. La référence dans ce cas est le diagramme ci-dessous, lequel servira également pour les éventuels réglages qui s'avèreraient nécessaires dans le temps.



30 - Dispositivo fine-corsa RVS

Il dispositivo fine-corsa, tipo RVS, è progettato per completare ed adattare i motoriduttori a vite senza fine di Bonfiglioli Riduttori all'azionamento di:

- finestre e ombreggi per serre
- cancelli automatici
- finestre a vasistas
- dosatori per granaglie nel settore zootecnico
- valvole a farfalla

I motoriduttori dotati del dispositivo RVS sono anche idonei per qualsiasi altra applicazione intermittente, in cui si richieda un moto controllato e preciso.

Per le applicazioni sopra descritte, caratterizzate da un tipo di servizio leggero e intermittente, si raccomanda di effettuare la selezione del gruppo di trasmissione unicamente dalle pagine del paragrafo 36.

Le selezioni così effettuate saranno conformi al particolare tipo di servizio e alle massime velocità compatibili con il regolare funzionamento del dispositivo fine-corsa.

La configurazione completa si ottiene assemblando il dispositivo fine-corsa sul relativo motoriduttore, mediante lo specifico kit di montaggio (disponibile per i gruppi tipo VF 49, W63, W75 e W86), illustrato alla pag. 194

Per consentire il montaggio del dispositivo RVS, i motoriduttori devono essere nella forma costruttiva flangiata.

30.1 Caratteristiche tecniche

Il funzionamento del dispositivo fine-corsa si basa sul movimento differenziale di due coppie di ruote, dotate di camma, e dal relativo azionamento di microinterruttori di precisione che attraverso relai (a cura dell'installatore) comandano l'arresto e l'inversione del moto.

Le posizioni estreme del moto, tipicamente l'apertura e la chiusura del telaio, sono facilmente impostabili con il motoriduttore già installato e senza l'uso di specifiche attrezzature, al di fuori di una comune chiave a brugola.

Una volta raggiunta e fissata la regolazione desiderata, questa viene mantenuta costante nel tempo, consentendo una elevata ripetibilità negli azionamenti.

Nella sua esecuzione di base il gruppo fine-corsa RVS è fornito con una coppia di cavi, della lunghezza di ca. un metro, pre-cablati internamente. Il gruppo è inoltre disponibile anche nelle seguenti varianti:

30 - RVS Limit-stop device

The limit-stop device type RVS has been designed to fit Bonfiglioli Riduttori worm gearmotors to operate:

- Green house windows and shades
- Remote-controlled gates
- Hopper frame windows
- Dosing devices for the livestock farming industry
- Butterfly valves

Worm gearmotors equipped with the RVS limit switch device are suitable for linear and rotary intermittent duty applications requiring accurate and repetitive positioning.

For the applications listed above, typically light duty, worm gearmotors should only be selected from relevant selection charts, given at paragraph 36.

The drive selection will then comply with both the application duty and the max. peripheral speed constraints of the limit-switch device.

The configuration is complete when the limit-switch device RVS is flanged onto the gearmotor through the relevant assembly kit (see page 194).

Configuration kits are available for worm gears type VF 49, W 63, W 75, and W 86 only.

Please note that RVS devices only fit F-flanged VF 49 and FC-flanged W worm gears.

RVS mounting side is opposite to flange.

30.1 Technical features

The working principle of the limit-stop device is based on the differential movement of two pairs of wheels – each equipped with a cam – and the relative operation of precision micro-switches that stop and reverse motion through relays (to be fitted by the installer). Travel end positions, normally the open and closed positions of application frame, are easily set using a common Allen key after gearmotor installation.

Once adjusted, the unit will retain its settings over time for guaranteed motion repeatability. In its basic version, the RVS limit-stop unit comes with a pair of approx. 1-m long cables. Internal wiring is made at the factory.

The RVS unit is available in the following variants:

30 - Endschalter-Vorrichtung RVS

Die Endschalter-Vorrichtung Typ RVS wurde entwickelt, um die Getriebemotoren mit Schnecke von Bonfiglioli Riduttori bei der Betätigung von:

- Fenstern und Vorrichtungen zur Schattenerzeugung für Treibhäuser
- automatischen Toren
- Klappfenstern
- Dosieranlagen für Getreide im Zooteknik-Sektor
- Drosselventilen zu vervollständigen und an diese anzupassen.

Die mit der Vorrichtung RVS ausgestatteten Getriebemotoren sind auch für alle anderen Schritt-Anwendungen geeignet, bei denen eine kontrollierte und genaue Bewegung erforderlich ist.

Für die oben beschriebenen Anwendungen, die durch einen leichten Schritt-Service charakterisiert sind, empfiehlt es sich, die Wahl der Übertragungsgruppen ausschließlich, wie auf den Seiten des Paragraphen 36 angegeben, durchzuführen. Die so durchgeführten Wahlen sind konform zu dem bestimmten Servicetyp und zu den Höchstgeschwindigkeiten, die mit dem regulären Betrieb der Endschalter-Vorrichtung verträglich sind. **Die vollständige Konfiguration wird durch die Montage der Endschalter-Vorrichtung auf das entsprechende Motorgetriebe mittels des spezifischen (auch für die Gruppen Typ VF 49, W63, W75 und W86 verfügbaren), auf S. 194 gezeigten Montage-Sets erhalten.**

Für die Montage der Vorrichtung RVS müssen die Getriebemotoren in der geflanschten Herstellungsform sein.

30.1 Technische eigenschaften

Der Betrieb der Endschalter-Vorrichtung gründet auf einer Differentialbewegung von zwei mit Nocken ausgestatteten Räderpaaren und auf die entsprechende Betätigung der Präzisions-Mikroschalter, die durch Relais (vom Installateur eingebaut) den Bewegungsstopp und die Bewegungsumkehr steuern. Die Extrem-Positionen der Bewegung, die Öffnung und das Schließen des Rahmens, können leicht mit dem bereits installierten Getriebemotor und ohne Verwendung von spezifischen Ausrüstungen, sondern nur mit einem herkömmlichen Inbuschlüssel eingestellt werden.

Ist die gewünschte Einstellung erreicht und fixiert, wird diese in der Zeit konstant gehalten, wodurch die Betätigungen oft wiederholt werden können. In der Grundausführung wird die Endschalter-Gruppe RVS mit einem innen verkabelten und ungefähr ein Meter langen Kabelpaar geliefert.

Die Gruppe ist außerdem in folgenden Varianten erhältlich:

30 - Dispositif de fin de course RVS

Le dispositif de fin de course type RVS est conçu pour compléter et adapter les motoréducteurs à vis sans fin Bonfiglioli Riduttori à l'actionnement de:

- fenêtres et dispositifs d'ombrage pour serres
- grilles automatiques
- fenêtre à vasistas
- doseurs pour grenailles dans le secteur zootecnique
- vannes papillon

Les motoréducteurs équipés du dispositif RVS sont aussi adaptés pour toute autre application intermittente nécessitant un mouvement contrôlé et précis.

En ce qui concerne les applications susmentionnées, caractérisées par un type de service léger et intermittent, il est recommandé d'effectuer la sélection du groupe de transmission uniquement depuis les pages du paragraphe 36. Les sélections ainsi effectuées seront conformes au type de service particulier ainsi qu'aux vitesses maximales compatibles avec le fonctionnement régulier du dispositif de fin de course.

Pour obtenir la configuration complète, assembler le dispositif de fin de course sur le motoréducteur correspondant au moyen du kit de montage spécifique (disponible pour les groupes types VF 49, W63, W75 et W86), illustré à la page 194.

Afin de permettre le montage du dispositif RVS, les motoréducteurs doivent être de forme de construction à bride.

30.1 Caracteristiques techniques

Le fonctionnement du dispositif de fin de course est basé sur le mouvement différentiel de deux couples de roues, dotées de came, et de l'actionnement correspondant de microrupteurs de précision, qui, à travers des relais (à la charge de l'installateur) commandent l'arrêt et l'inversion du mouvement.

Les positions extrêmes du mouvement, généralement l'ouverture et la fermeture du bâti, sont facilement définissables avec le motoréducteur déjà installé et sans utilisation d'outils spécifiques autre qu'une clé à six pans ordinaire.

Une fois le réglage désiré obtenu et fixé, ce dernier est constant dans le temps, ce qui permet une répétitivité élevée des actionnements.

Dans son exécution de base, le groupe de fin de course RVS est fourni avec une paire de câbles, d'une longueur d'environ un mètre, pré-cablés à l'intérieur.

Le groupe est aussi disponible dans les variantes suivantes :

RVS ME: dotato di scatola morsettiera esterna a sei terminali, ai quali allacciare i cavi di collegamento con i relais.

RVS DM: corredato di doppia serie di microinterruttori collegati in serie, per una sicurezza di intervento assoluta e conforme alle Norme che prevedono la ridondanza di questo dispositivo.

RVS ME DM: dispositivo dotato di morsettiera esterna e di doppia serie di microinterruttori, come più sopra descritto.

In tutte le sue varianti il dispositivo fine-corsa si caratterizza come:

- estremamente silenzioso
- di ingombro contenuto
- di facile installazione e regolazione
- dotato di protezione complessiva IP55
- regolabile all'interno di un campo massimo di 43 giri dell'albero lento

RVS ME: the limit switch features a 6-stud terminal box for external wiring of cables wiring of cables to main relais.

RVS DM: features a double set of micro-switches, connected in series, for absolute reliability where applicable regional standards or regulations call for a redundant design.

RVS ME DM: features the combination of the two options described above.

Regardless to the variant the RVS limit switch device offers the following features:

- Extremely quite operation
- Space efficiency
- Ease of installation and setting
- Overall protection IP55
- Adjustment range within a maximum of 43 revolutions of drive shaft.

RVS ME: ist mit einem äußeren Klemmenkasten mit sechs Endverschlüssen ausgestattet, an die die Verbindungskabel mit den Relais angeschlossen werden.

RVS DM: ist mit einer doppelten, serienverbundenen Mikroschalter-Serie für eine vollkommene Eingriffssicherheit und entsprechend der Normen ausgestattet, die die Redundanz dieser Vorrichtung vorsehen.

RVS ME DM: mit einer äußeren und doppelten Mikroschalter-Serie, wie oben beschrieben, ausgestattet-tete Vorrichtung.

Alle Varianten der Endschalter-Vorrichtungen sind wie folgt charakterisiert:

- äußerst leise
- gemäßiger Raumbedarf
- leicht zu installieren und einzustellen
- mit Gesamtschutz IP55 ausgestattet
- innerhalb eines Höchstbereichs von 43 Umdrehungen der Abtriebswelle einstellbar

RVS ME: dotée de boîte à bornes extérieure à six bornes auxquelles seront reliés les câbles de raccordement avec les relais.

RVS DM: équipée d'une double série de microrupteurs reliés en série, pour une sécurité d'intervention absolue et conforme aux normes prévoyant la redondance de ce dispositif.

RVS ME DM: dispositif équipé de boîte à bornes extérieure et d'une double série de microrupteurs, comme décrit plus haut.

Quelles que soient les variantes, les caractéristiques du dispositif de fin de course sont les suivantes:

- extrêmement silencieux
- encombrement limité
- facile à installer et à régler
- doté de protection IP55
- réglable à l'intérieur d'une plage de 43 tours de l'arbre de sortie

31 - CODICI PER L'ORDINATIVO

Individuare il dispositivo, o la sua variante, necessario per l'applicazione e riferirsi alla tabella sottostante per il relativo codice per l'ordinativo:

31 - ORDERING CODES


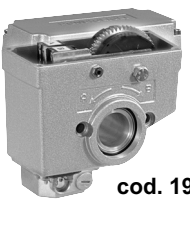
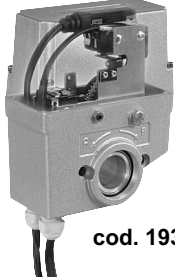
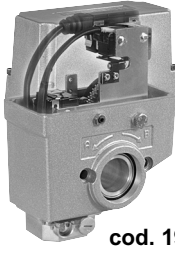
Determine which device or variant best suits the specific application and locate the part number in the table below:

31 - ART.-NR. FÜR DIE BESTELLUNG

Die für die Anwendung notwendige Vorrichtung oder ihre Variante bestimmen und dabei auf die unterstehende Tabelle für die entsprechende Art.-Nr. für die Bestellung Bezug nehmen.

31 - REFERENCES POUR LA COMMANDE

Repérer le dispositif, ou sa variante, nécessaire pour l'application et se référer au tableau ci-dessous pour trouver la référence correspondante pour effectuer la commande :




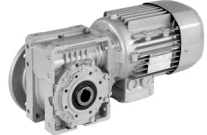




| RVS | RVS ME | RVS DM | RVS ME DM |
|---|---|--|---|
|  |  |  |  |
| cod. 193312025 | cod. 193312026 | cod. 193312027 | cod. 193312028 |

Selezionare inoltre il codice relativo al kit di configurazione per il riduttore sul quale si vuole installare il dispositivo fine-corsa:

Select also the part number of the specific configuration kit for the speed reducer the limit-stop device is to be installed to:

Außerdem die entsprechende Art.-Nr. des Konfigurations-Sets für das Getriebe auswählen, auf das die Endschalter-Vorrichtung installiert werden soll.

Sélectionner aussi la référence relative au kit de configuration pour le réducteur sur lequel le dispositif de fin de course sera installé:

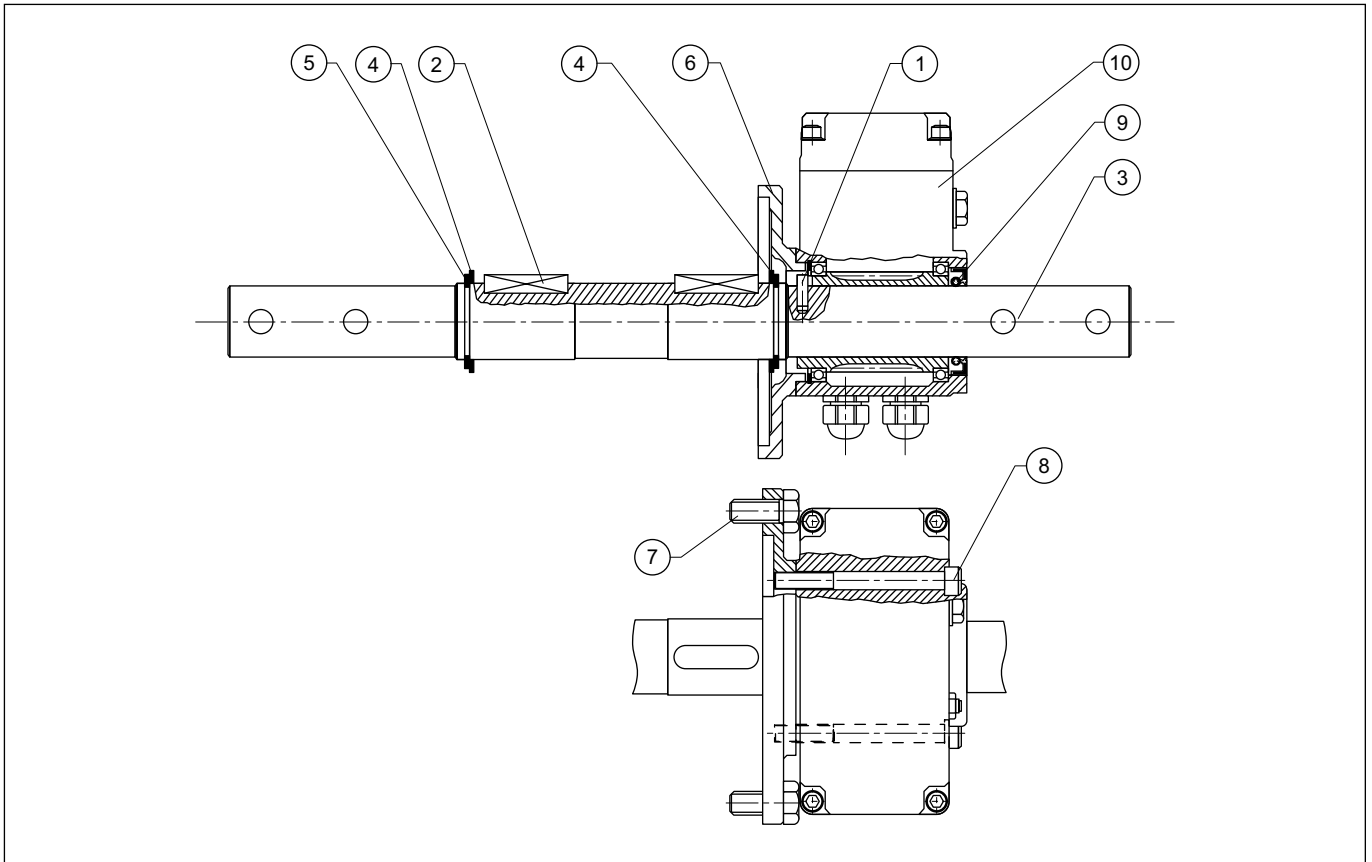
| | | | |
|---|---|--|---|
|  |  |  |  |
| cod. 192860001 | cod. 192860002 | cod. 192860003 | cod. 192860004 |
|  |  |  |  |
| VF 49 F - VFR 49 F | W 63 UFC - WR 63 UFC | W 75 UFC - WR 75 UFC | W 86 UFC - WR 86 UFC |

32 - ISTRUZIONI PER IL MONTAGGIO DEL DISPOSITIVO FINE-CORSA SUL RIDUTTORE

32 - INSTRUCTIONS FOR THE ASSEMBLY OF THE LIMIT-SWITCH DEVICE ONTO GEARBOX

32 - ANWEISUNGEN FÜR DIE MONTAGE DER ENDSCHALTER-VORRICHTUNG AUF DAS GETRIEBE

32 - INSTRUCTIONS DE MONTAGE DU DISPOSITIF DE FIN DE COURSE SUR LE REDUCTEUR



1. Accertarsi di disporre del dispositivo fine-corsa (10) nell'esecuzione richiesta, e del relativo kit di montaggio, specifico per il tipo di riduttore che si deve configurare.

1. *Make sure that the limit-switch device (10), as well as the mounting kit for the specific gearbox, is available in the required configuration.*

1. Sicherstellen, dass Sie über die Endschalter-Vorrichtung (10) in der geforderten Ausführung und über das entsprechende Montage-Set verfügen, das für das zu konfigurierende Getriebe spezifisch ist.

1. Vérifier que le dispositif de fin de course (10), dans l'exécution demandée, ainsi que le kit de montage correspondant spécifique pour le type de réducteur à monter sont corrects.

2. Iniziare l'assemblaggio con i componenti del kit di configurazione. Verificare dapprima che la spina elastica (1) e le chiavette (2) siano correttamente collocate nelle rispettive sedi. Inserire quindi l'albero cilindrico (3) nell'albero cavo del riduttore. La posizione della spina elastica (1) definirà il lato di accoppiamento con il dispositivo fine-corsa (10).

2. *Start assembling the components of the mounting kit first. Insert the dowel pin (1) and keys (2) into their sites. Then slide shaft (3) into the hollow shaft of the gearbox. The position of the dowel pin (1) will define the side the limit-switch (10) fits onto.*

2. Die Montage mit den Bestandteilen des Konfigurations-Sets beginnen. Zuerst überprüfen, dass der Spannstift (1) und die Schlüssel (2) richtig in den entsprechenden Sitzen angeordnet sind. Die Zylinderwelle (3) in die hohle Welle des Getriebes einfügen. Die Position des Spannstifts (1) bestimmt die Verbindungsseite zur Endschalter-Vorrichtung (10).

2. Commencer l'assemblage avec les composants du kit de configuration. Vérifier tout d'abord que le goujon élastique (1) et les clavettes (2) sont correctement positionnés dans leur logement respectif. Ensuite, introduire l'arbre cylindrique (3) dans l'arbre creux du réducteur. La position du goujon élastique (1) définira le côté d'assemblage avec le dispositif de fin de course (10).

3. Bloccare l'albero assialmente inserendo prima le ralle (4) e poi gli anelli elastici (5) nelle gole appositamente ricavate per questi ultimi.

3. *Retain shaft axially inserting the washers (4) first and then snap rings (5) into their grooves*

3. Die Welle axial blockieren, indem zuerst die Scheiben (4) eingefügt und dann die Sprengringe (5) in die aus diesen eigens dafür gewonnenen Kehlen einfügen.

3. Bloquer l'arbre axialement en introduisant tout d'abord les crapaudines (4) puis les bagues élastiques (5) dans les rainures prévues à cet effet sur ces derniers.

4. Applicare la flangia di collegamento (6) sul riduttore, utilizzando le due viti a testa esagonale (7).

4. *Fit connecting flange (6) onto the gearbox and lock it with the two bolts (7)*

4. Den Verbindungsflansch (6) auf das Getriebe unter Verwendung von den zwei Sechskantschrauben (7) montieren.

4. Appliquer la bride de raccord (6) sur le réducteur, en utilisant les deux vis à 6 pans (7).

- | | | | |
|--|---|---|--|
| <p>5. Montare il gruppo RVS (10) sulla flangia di collegamento (6), facendo uso delle viti TCEI (8). In questa fase avere cura di inserire la spina elastica (1), destinata al trascinamento del dispositivo fine-corsa, nell'asola appositamente ricavata nel manicotto interno dello stesso.</p> | <p>5. <i>Mount limit-switch (10) onto connecting flange (6) and secure it with the two socket head bolts (8). Whilst performing this, make sure that the dowel pin (1) is located in the groove machined into the bush trailing the entire limit-switch device.</i></p> | <p>5. Die Gruppe RVS (10) auf den Verbindungsflansch (6) unter Verwendung der Schrauben TCEI (8) montieren. In dieser Phase den für die Mitnahme der Endschalter-Vorrichtung bestimmten Spannstift (1) in den eigens dafür in dessen Muffe gewonnenen Schlitz einfügen.</p> | <p>5. <i>Monter le groupe RVS (10) sur la bride de raccord (6), en utilisant des vis (8). Durant cette phase, prendre soin d'introduire le goujon élastique (1) destiné à l'entraînement du dispositif de fin de course dans l'orifice présent à cet effet dans le fourreau à l'intérieur de ce dernier.</i></p> |
| <p>6. Inserire infine con cura l'anello parapolvere (9) nel suo alloggiamento. Vedi figura.</p> | <p>6. <i>Finally insert the dust proof contact seal (9) carefully into its site. See figure for reference.</i></p> | <p>6. Zum Schluss sorgfältig den Staubschutzring (9) in sein Gehäuse einfügen. Siehe Abbildung.</p> | <p>6. <i>Enfin, introduire soigneusement la bague pare-poussière (9) dans son logement. Voir figure.</i></p> |

33 - REGOLAZIONE DELLE POSIZIONI DI APERTURA E CHIUSURA

33 - SETTING OF THE LIMIT-SWITCH DEVICE RVS

33 - EINSTELLUNGEN DER ÖFFNUNGS- UND SCHLIESSPOSITIONEN

33 - REGLAGE DES POSITIONS D'OUVERTURE ET DE FERMETURE



Quando si eseguono interventi sul dispositivo fine-corsa deve essere isolata l'alimentazione del motore elettrico.



For your safety, when operating on the device the electrical supply must be disconnected.



Bei der Durchführung von Eingriffen auf der Endschalter-Vorrichtung muss die Speisung des Elektromotors isoliert sein.



En cas d'intervention sur le dispositif de fin de course, il est nécessaire d'isoler l'alimentation du moteur électrique.



Le operazioni di installazione, allacciamento, regolazione e manutenzione devono essere eseguite solo da personale qualificato, nel rispetto di:

- queste ed altre istruzioni o schemi forniti insieme, o separatamente, dal dispositivo
- le normative applicabili nel paese o regione.



Installation, wiring and repair works may only be carried out by qualified specialists in accordance with:

- *this as well as any other schemes or instructions supplied with the device or separately*
- *national and regional regulation governing safety and the prevention of accidents.*



Die Installations-, Verbindungs-, Einstellungs- und Instandhaltungsarbeiten dürfen nur von Fachpersonal durchgeführt werden, das

- die vorliegenden und andere, getrennt oder zusammen mit der Vorrichtung gelieferten Anweisungen oder Schemata sowie
- die im Land oder in der Region anwendbaren Richtlinien befolgt.



Les opérations d'installation, de branchement, de réglage et d'entretien doivent être effectuées uniquement par du personnel qualifié en respectant :

- *les présentes instructions et autres ainsi que les schémas fournis avec le dispositif ou séparément.*
- *Les règlements applicables dans le pays ou la région d'installation.*

I microinterruttori che intervengono arrestando la rotazione del motoriduttore nei versi corrispondenti alle frecce (A) e (B) sono identificati dalla lettera corrispondente.

Per la regolazione delle funzioni di apertura e di chiusura realizzate dal dispositivo fine-corsa, installare dapprima il motoriduttore sul telaio che deve essere azionato ed impegnare il pignone con la relativa cremagliera.

Successivamente, rimuovere il coperchio superiore del dispositivo e procedere come segue:

The micro switches carry the letters (A) or (B) which refer to the direction of rotation of the drive shaft.

To set the "open" and "close" positions of the equipment, first install the gearmotor onto the framework.

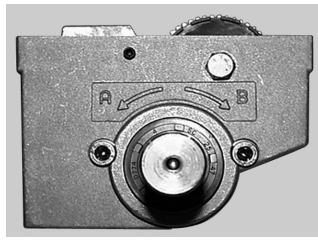
Allow the drive pinion to mesh with the relative rack.

Thereafter, remove the lid from the top and follow the procedure, as described below:

Die Mikroschalter, die eingreifen und die Drehung des Getriebemotors in den den Pfeilen (A) und (B) entsprechenden Richtungen anhalten, sind durch den jeweiligen Buchstaben gekennzeichnet. Für die Einstellung der von der Endschalter-Vorrichtung durchgeführten Öffnungs- und Schließfunktionen zuerst den zu betätigenden Getriebemotor auf dem Rahmen installieren und dann das Ritzel mit der entsprechenden Zahnstange einsetzen. Danach den oberen Deckel der Vorrichtung entfernen und, wie folgt, vorgehen:

Les microrupteurs qui interviennent en arrêtant la rotation du motoréducteur dans les sens correspondant aux flèches (A) et (B) sont identifiés par la lettre correspondante. En ce qui concerne le réglage des fonctions d'ouverture et de fermeture effectuées par le dispositif de fin de course, installer tout d'abord le motoréducteur sur le bâti qui doit être actionné puis engager la crémaillère correspondante sur le pignon.

Ensuite, enlever le couvercle supérieur du dispositif et procéder comme suit :



Fase 1

Azionare il motoriduttore fino a portare l'albero lento in una delle due posizioni d'estremità (apertura o chiusura) desiderate. Con riferimento alle frecce ricavate sulla scatola, prendere nota del corrispondente verso di rotazione dell'albero (A) o (B).

Phase 1

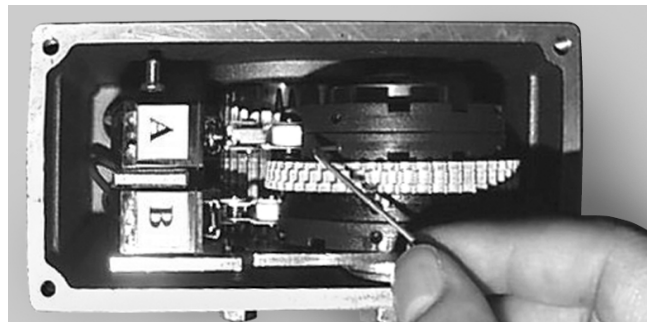
Drive the gearmotor until either one of the two end positions is reached. Disconnect power. While performing this, observe which direction the shaft is rotating, whether (A) or (B). Refer to raised arrows on side of the housing.

Phase 1

Das Motorgetriebe solange betätigen, bis sich die Abtriebswelle in einer der zwei gewünschten Extrempositionen (Öffnung oder Schließung) befindet. Mit Bezug auf die auf dem Kasten ersichtlichen Pfeile die entsprechende Drehrichtung der Welle (A) oder (B) zur Kenntnis nehmen.

Phase 1

Actionner le motoréducteur jusqu'à porter l'arbre de sortie dans l'une des deux positions d'extrémité (ouverture ou fermeture) désirées. En se référant aux flèches présentes sur la boîte, prendre note du sens de rotation correspondant de l'arbre (A) ou (B).



Fase 2

Svincolare le ruote in nylon relative al microinterruttore corrispondente al verso di rotazione (A) o (B), utilizzando la chiave a brugola di 1,5 mm, fornita a corredo. Affiancare le scanalature presenti sulle ruote e ruotare manualmente le stesse fino ad ottenere lo scatto (udibile) del microinterruttore. Bloccare infine le ruote nella posizione così ottenuta, serrando i grani di fissaggio con la stessa chiave. Per la regolazione dell'altra posizione d'estremità azionare il motoriduttore fino a raggiungerla. Ripetere poi le operazioni più sopra descritte, operando in identica maniera sull'altro microinterruttore. Al termine, richiudere il coperchio e serrare le quattro viti con la testa a brugola.

N.B. Con riferimento all'albero lento del riduttore, il campo di regolazione del dispositivo finecorsa è compreso fra 0 e 43 giri.

Phase 2

Loosen the pair of nylon wheels in relation to the micro switch which corresponds to the direction of rotation previously observed (carrying the letter A in the example alongside). Use the 1.5 mm Allen key supplied with the device. Set the two grooves side by side and rotate both wheels manually until the roller of the switch snaps into the grooves and a click can be heard. Then lock both the wheels in that position by screwing down the respective grub screws. To set the other end position, drive the gearmotor in the opposite direction until that end position is reached. Follow same procedure described above, operating on the correspondent micro-switch. At the end, close the lid and lock it with the 4 nos. socket head screws.

N.B. With reference to the revolutions of the output shaft, the limit switch range is 0 – 43 turns.

Phase 2

Die Nylon-Räder des Mikroschalters entsprechend der Drehrichtung mit dem mitgelieferten Inbusschlüssel von 1,5 mm lösen. Die auf den Rädern vorhandenen Nuten Seite an Seite stellen und manuell drehen, bis ein Geräusch des Mikroschalters zu hören ist. Schließlich die Räder in der so erhaltenen Position blockieren und dafür die Feststellstifte mit dem gleichen Schlüssel anziehen. Für die Einstellung der anderen Extremposition den Getriebemotor betätigen, bis diese erreicht ist. Danach die oben beschriebenen Arbeiten wiederholen und dabei auf die gleiche Weise auf dem anderen Mikroschalter vorgehen. Zum Schluss den Deckel schließen und die vier Inbusschrauben anziehen.

HINWEIS Mit Bezug auf die Abtriebswelle des Getriebes beträgt der Einstellungsbereich der Endschalter-Vorrichtung zwischen 0 und 43 Umdrehungen.

Phase 2

Dégager les roues en nylon relatives au microrupteur correspondant au sens de rotation (A) ou (B), en utilisant la clé à six pans de 1,5 mm fournie en dotation. Rapprocher les rainures présentes sur les roues puis tourner manuellement ces dernières jusqu'à l'obtention du déclic (audible) du microrupteur. Enfin, bloquer les roues dans la position ainsi obtenue en serrant les vis de fixation sans tête avec la même clé. En ce qui concerne le réglage de l'autre position d'extrémité, actionner le motoréducteur jusqu'à ce qu'elle soit atteinte. Répéter ensuite les opérations décrites plus haut en opérant de façon identique sur l'autre microrupteur. A la fin, refermer le couvercle et serrer les quatre vis à six pans.

REMARQUE En référence à l'arbre de sortie du réducteur, la plage de réglage du dispositif de fin de course est comprise entre 0 et 43 tours.

34 - DESIGNAZIONE

34 - DESIGNATION

34 - BEZEICHNUNG

34 - DESIGNATION

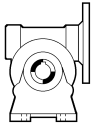

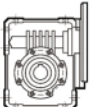
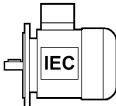
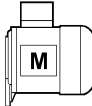
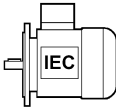
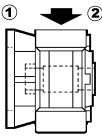
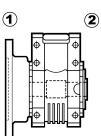
Designazione **VF** e **W** per accoppiamento al dispositivo fine-corsa.

Ordering code for RVS acceptable **VF** and **W** gear units.

Einsatz der **VF** und **W** für Pasung an Anlaufvorrichtung.

Désignation **VF** et **W** pour accouplement dispositif fin de course.

RIDUTTORE / GEAR UNIT / GETRIEBE / REDUCTEUR

| | | | | | | | | | |
|----------|----------|-----------|-------------|------------|------------|---|---|---|--|
| W | R | 75 | UFC1 | D30 | 240 | P71 | B5 | B3 | |
| | | | | | | | | | OPZIONI / OPTIONS OPTIONEN / OPTIONS |
| | | | | | | | | | POSIZIONE DI MONTAGGIO / MOUNTING POSITION EINBAULAGEN / POSITION DE MONTAGE B3 (default), B6 , B7 , B8 , V5 , V6 |
| | | | | | | | | | FLANGIA MOTORE IEC / IEC MOTOR MOUNTING MOTORFLANSCH IEC / BRIDE MOTEUR IEC B5 B14 |
| | | | | | | | | | INGRESSO TIPO / INPUT TYPE BEZEICHNUNG DER ANTRIEBSSEITE / DESIGNATION ENTREE VF: P (IEC) W: S , P (IEC) |
| | | | | | |  |  |  |    |
| | | | | | | | | | RAPPORTO DI RIDUZIONE / GEAR RATIO ÜBERSETZUNG / RAPPORT DE REDUCTION |
| | | | | | | | | | DIAMETRO ALBERO LENTO / SHAFT BORE ABTRIEBSWELLEDURCHMESSER / DIAMETRE ARBRE LENT D30 (solo W75; W75 alone; nür für W75; seulement pour W75) |
| | | | | | | | | | FORMA COSTRUTTIVA / VERSION / BAUFORM / FORME DE CONSTRUCTION VF: F W: UFC |
| | | | | | |  |  | | |
| | | | | | | | | | GRANDEZZA / FRAME SIZE / BAUGRÖSSE / TAILLE VF: 49 W: 63, 75, 86 |
| | | | | | | | | | PRECOPIA / HELICAL REDUCTION / VORSTUFE / PRE-ETAGE R |

TIPO RIDUTTORE / GEAR TYPE / GETRIEBE TYP / TYPE REDUCTEUR

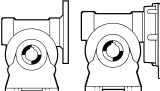
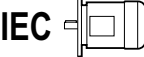
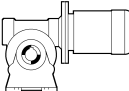


VF

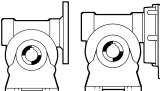
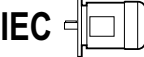
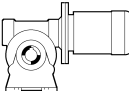


W

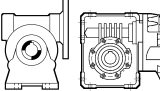

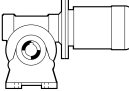
0.12 kW

| n_2 min ⁻¹ | M_2 Nm | i |   |  |
|----------------------------|-------------|-----|---|---|
| 4.7 | 98 | 300 | VFR 49_300 P63 BN 63A 4 | |
| 5.8 | 89 | 240 | VFR 49_240 P63 BN 63A 4 | |
| 6.7 | 83 | 210 | VFR 49_210 P63 BN 63A 4 | |
| 7.8 | 76 | 180 | VFR 49_180 P63 BN 63A 4 | |
| 10.4 | 64 | 135 | VFR 49_135 P63 BN 63A 4 | |
| 14.0 | 41 | 100 | VF 49_100 P63 BN 63A 4 | VF 49_100 P63 K 63A 4 |
| 17.5 | 37 | 80 | VF 49_80 P63 BN 63A 4 | VF 49_80 P63 K 63A 4 |
| 20.0 | 34 | 70 | VF 49_70 P63 BN 63A 4 | VF 49_70 P63 K 63A 4 |
| 23.3 | 31 | 60 | VF 49_60 P63 BN 63A 4 | VF 49_60 P63 K 63A 4 |

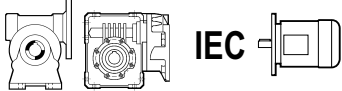

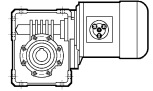
0.18 kW

| n_2 min ⁻¹ | M_2 Nm | i |   |  |
|----------------------------|-------------|-----|---|---|
| 7.8 | 112 | 180 | VFR 49_180 P63 BN 63B 4 | |
| 10.4 | 95 | 135 | VFR 49_135 P63 BN 63B 4 | |
| 14.0 | 61 | 100 | VF 49_100 P63 BN 63B 4 | |
| 17.5 | 54 | 80 | VF 49_80 P63 BN 63B 4 | VF 49_80 P63 K 63B 4 |
| 20.0 | 49 | 70 | VF 49_70 P63 BN 63B 4 | VF 49_70 P63 K 63B 4 |
| 23.3 | 45 | 60 | VF 49_60 P63 BN 63B 4 | VF 49_60 P63 K 63B 4 |



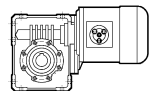
0.25 kW

| n_2 min ⁻¹ | M_2 Nm | i |   |  |
|----------------------------|-------------|-----|---|---|
| 4.7 | 214 | 300 | WR 63_300 P71 BN 71A 4 | |
| 5.8 | 192 | 240 | WR 63_240 P71 BN 71A 4 | |
| 7.3 | 170 | 192 | WR 63_192 P71 BN 71A 4 | |
| 10.4 | 136 | 135 | WR 63_135 P71 BN 71A 4 | |
| 12.3 | 121 | 114 | WR 63_114 P71 BN 71A 4 | |
| 14.0 | 82 | 100 | VF 49_100 P71 BN 71A 4 | |
| 17.5 | 72 | 80 | VF 49_80 P71 BN 71A 4 | |
| 20.0 | 66 | 70 | VF 49_70 P71 BN 71A 4 | |
| 23.3 | 61 | 60 | VF 49_60 P71 BN 71A 4 | VF 49_60 P71 K 71A 4 |



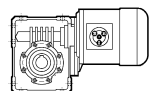
0.37 kW

| n_2 min ⁻¹ | M_2 Nm | i |  IEC  |  |
|----------------------------|-------------|-----|---|---|
| 4.7 | 382 | 300 | WR 86_300 P71 BN 71B 4 | |
| 5.8 | 306 | 240 | WR 75_240 P71 BN 71B 4 | |
| 7.3 | 290 | 192 | WR 86_192 P71 BN 71B 4 | |
| 7.8 | 257 | 180 | WR 75_180 P71 BN 71B 4 | |
| 9.3 | 226 | 150 | WR 75_150 P71 BN 71B 4 | |
| 10.4 | 204 | 135 | WR 63_135 P71 BN 71B 4 | |
| 12.3 | 181 | 114 | WR 63_114 P71 BN 71B 4 | |
| 14.0 | 133 | 100 | W 63_100 P71 BN 71B 4 | W 63_100 S1 M1SD 4 |
| 17.5 | 108 | 80 | VF 49_80 P71 BN 71B 4 | |
| 20.0 | 98.3 | 70 | VF 49_70 P71 BN 71B 4 | |
| 23.3 | 90.5 | 60 | VF 49_60 P71 BN 71B 4 | |



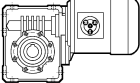
0.55 kW

| n_2 min ⁻¹ | M_2 Nm | i |  IEC  |  |
|----------------------------|-------------|-----|---|--|
| 4.7 | 559 | 300 | WR 86_300 P80 BN 80A 4 | |
| 5.8 | 483 | 240 | WR 86_240 P80 BN 80A 4 | |
| 7.3 | 423 | 192 | WR 86_192 P80 BN 80A 4 | |
| 7.8 | 376 | 180 | WR 75_180 P80 BN 80A 4 | |
| 8.3 | 383 | 168 | WR 86_168 P80 BN 80A 4 | |
| 9.3 | 331 | 150 | WR 75_150 P80 BN 80A 4 | |
| 10.1 | 330 | 138 | WR 86_138 P80 BN 80A 4 | |
| 11.7 | 287 | 120 | WR 75_120 P80 BN 80A 4 | |
| 14.0 | 194 | 100 | W 63_100 P80 BN 80A 4 | W 63_100 S1 M1LA 4 |
| 17.5 | 170 | 80 | W 63_80 P80 BN 80A 4 | W 63_80 S1 M1LA 4 |
| 21.9 | 148 | 64 | W 63_64 P80 BN 80A 4 | W 63_64 S1 M1LA 4 |
| 23.3 | 148 | 60 | W 75_60 P80 BN 80A 4 | W 75_60 S1 M1LA 4 |



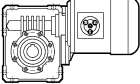
0.75 kW

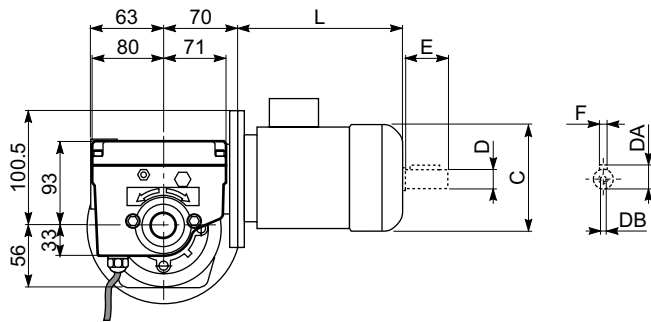
| n_2 min ⁻¹ | M_2 Nm | i |  IEC  |  |
|----------------------------|-------------|-----|---|---|
| 7.3 | 568 | 192 | WR 86_192 P80 BN 80B 4 | |
| 8.3 | 514 | 168 | WR 86_168 P80 BN 80B 4 | |
| 9.3 | 444 | 150 | WR 75_150 P80 BN 80B 4 | |
| 10.1 | 443 | 138 | WR 86_138 P80 BN 80B 4 | |
| 11.7 | 386 | 120 | WR 75_120 P80 BN 80B 4 | |
| 14.0 | 281 | 100 | W 75_100 P80 BN 80B 4 | W 75_100 S2 M2SA 4 |
| 17.5 | 241 | 80 | W 75_80 P80 BN 80B 4 | W 75_80 S2 M2SA 4 |
| 21.9 | 199 | 64 | W 63_64 P80 BN 80B 4 | W 63_64 S2 M2SA 4 |
| 23.3 | 199 | 60 | W 75_60 P80 BN 80B 4 | W 75_60 S2 M2SA 4 |

1.1 kW

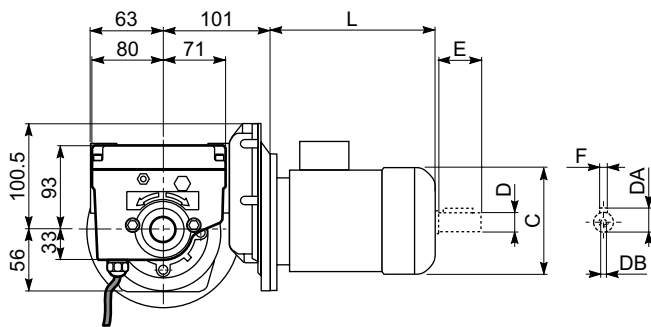
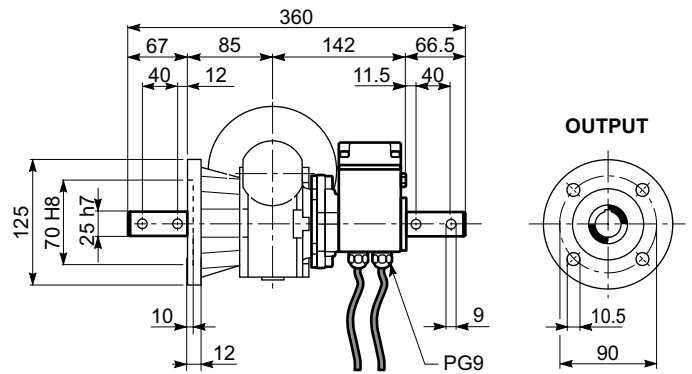
| n_2 min ⁻¹ | M_2 Nm | i |  IEC  |  |
|----------------------------|-------------|-----|---|---|
| 10.1 | 652 | 138 | WR 86_138 P90 BN 90S 4 | |
| 11.7 | 594 | 120 | WR 86_120 P90 BN 90S 4 | |
| 14.0 | 443 | 100 | W 86_100 P90 BN 90S 4 | W 86_100 S2 M2SB 4 |
| 17.5 | 384 | 80 | W 86_80 P90 BN 90S 4 | W 86_80 S2 M2SB 4 |
| 21.9 | 326 | 60 | W 86_60 P90 BN 90S 4 | W 86_60 S2 M2SB 4 |

1.5 kW

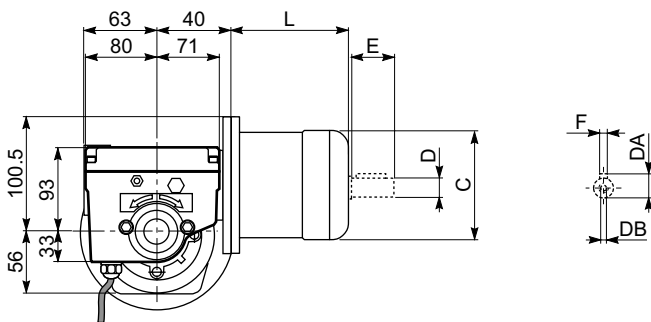
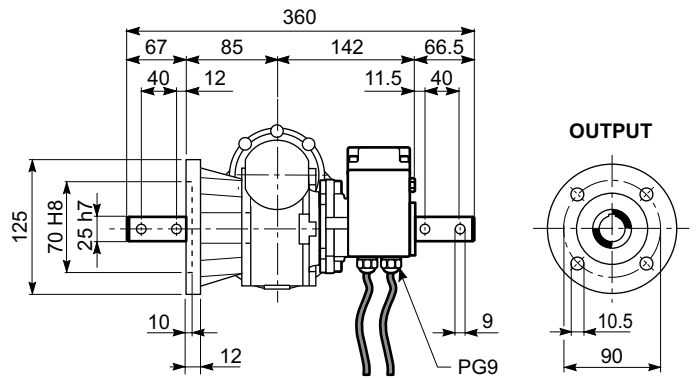
| n_2 min ⁻¹ | M_2 Nm | i |  IEC  |  |
|----------------------------|-------------|-----|---|---|
| 11.7 | 816 | 120 | WR 86_120 P90 BN 90LA 4 | |
| 17.5 | 527 | 80 | W 86_80 P90 BN 90LA 4 | W 86_80 S3 M3SA 4 |
| 21.9 | 448 | 60 | W 86_60 P90 BN 90LA 4 | W 86_60 S3 M3SA 4 |



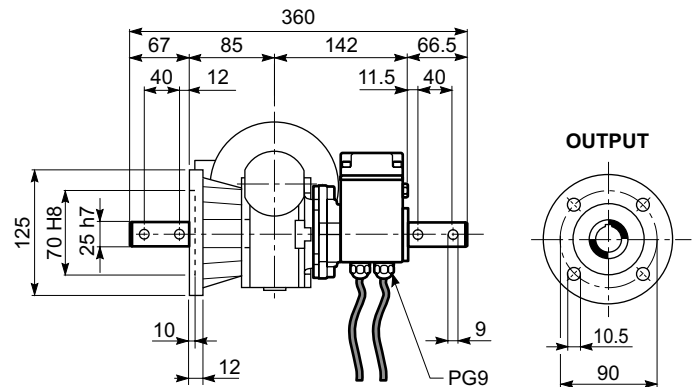
VF 49_F



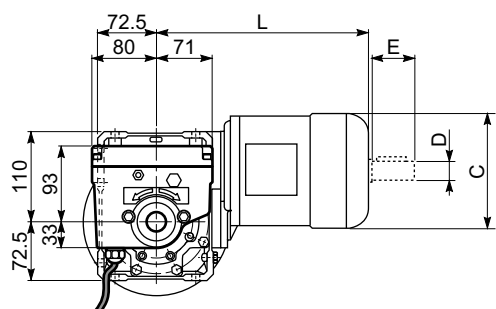
VFR 49_F



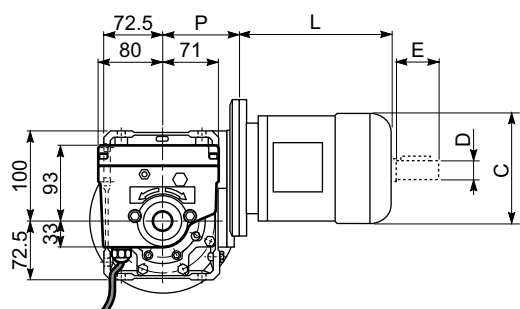
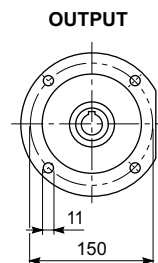
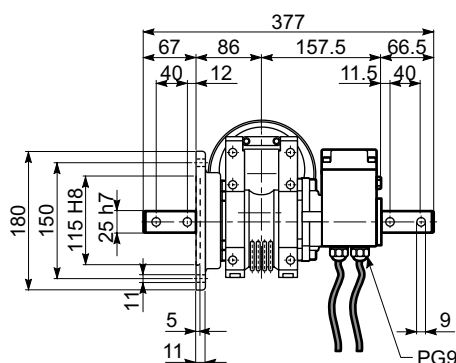
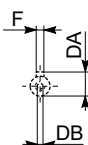
VF 49_K



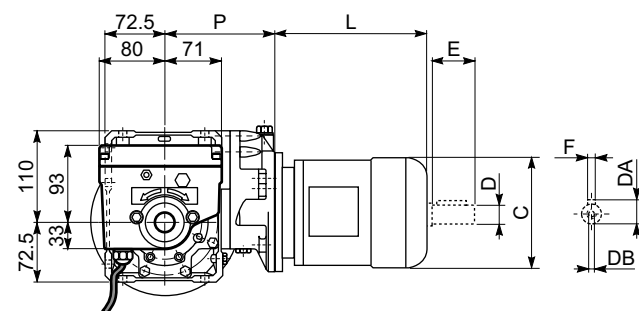
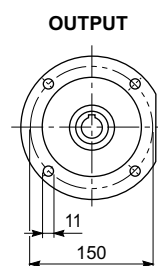
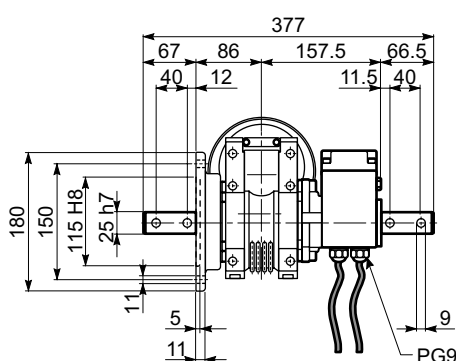
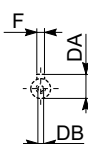
| | C | D | DA | DB | E | F | L |
|----------------|-----|----|------|----|----|---|-----|
| VF 49_P 63 | 124 | 11 | 12.5 | M4 | 23 | 4 | 190 |
| VF 49_P 71 | 138 | 14 | 16 | M5 | 30 | 5 | 219 |
| VFR 49_P 63 B5 | 124 | 11 | 12.5 | M4 | 23 | 4 | 190 |
| VF 49_K 63 | 122 | 11 | 12.5 | M4 | 23 | 4 | 165 |
| VF 49_K 71 | 139 | 14 | 16 | M5 | 30 | 5 | 186 |



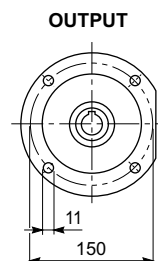
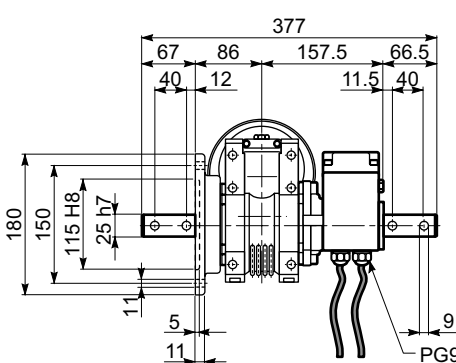
W 63 UFC_S



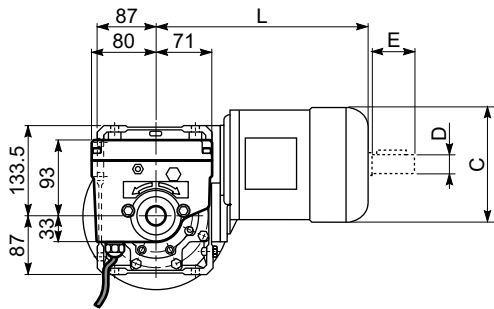
W 63 UFC



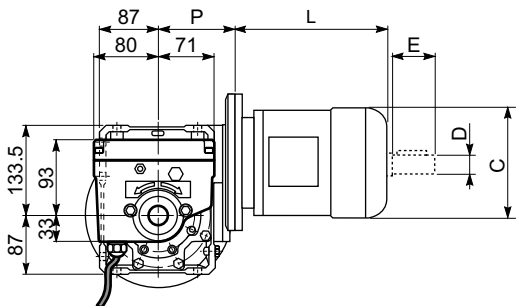
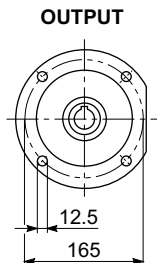
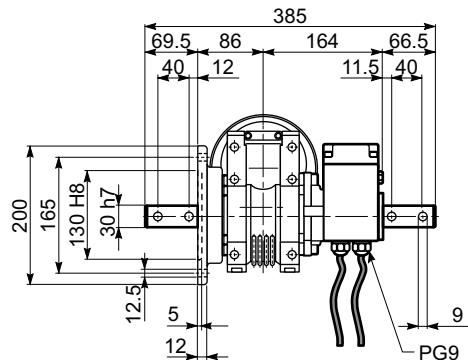
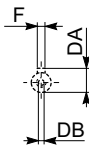
WR 63 UFC



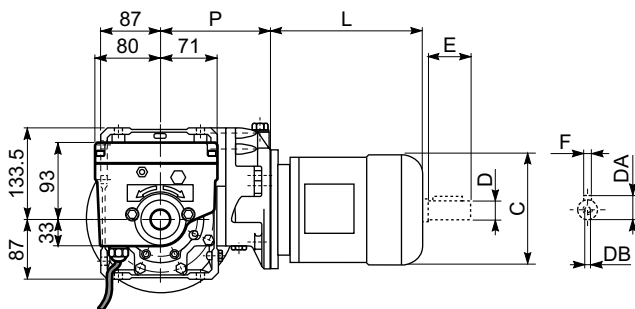
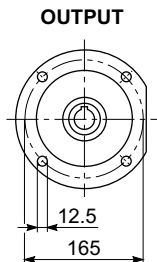
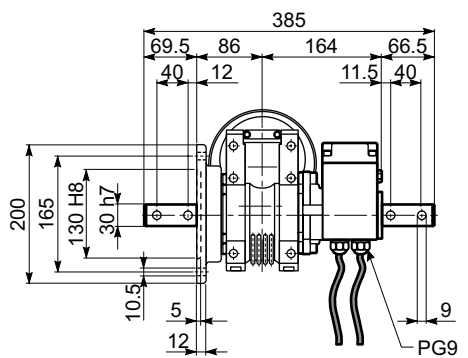
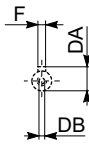
| | C | D | DA | DB | E | F | L | P |
|---------------|-----|----|------|----|----|---|-----|-------|
| W 63_S1 M1L | 138 | 14 | 16 | M5 | 30 | 5 | 289 | — |
| W 63_S2 M2S | 156 | 19 | 21.5 | M6 | 40 | 6 | 317 | — |
| W 63_P 71 | 138 | 14 | 16 | M5 | 30 | 5 | 219 | 95 |
| W 63_P 80 | 156 | 19 | 21.5 | M6 | 40 | 6 | 233 | 102 |
| W 63_P 90 | 176 | 24 | 27 | M8 | 50 | 8 | 252 | 102 |
| WR 63_P 63 B5 | 124 | 11 | 12.5 | M4 | 23 | 4 | 190 | 133.5 |
| WR 63_P 71 B5 | 138 | 14 | 16 | M5 | 30 | 5 | 219 | 133.5 |



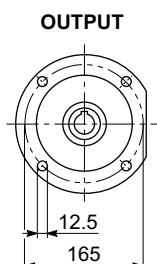
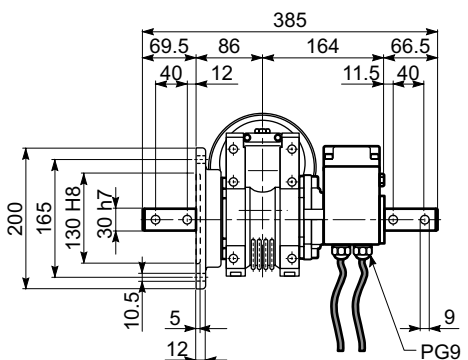
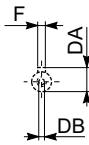
W 75 UFC_S



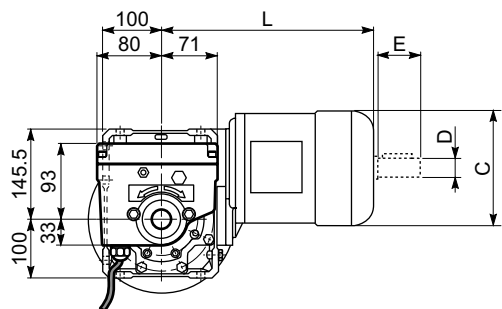
W 75 UFC



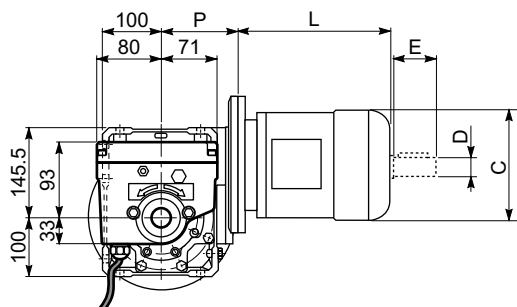
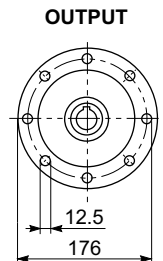
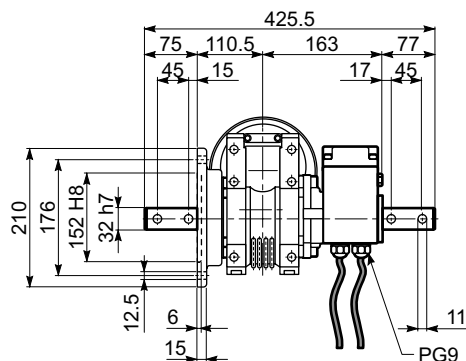
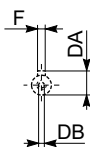
WR 75 UFC



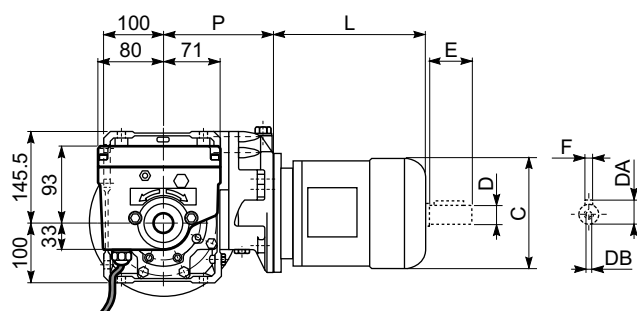
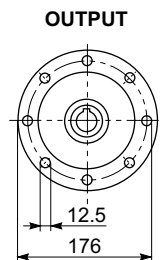
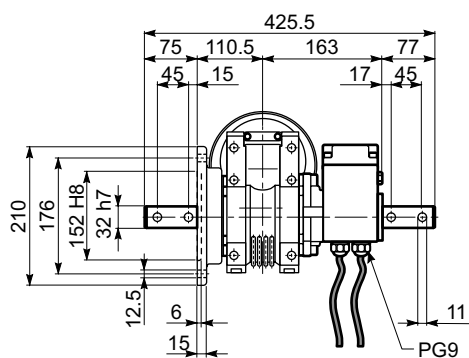
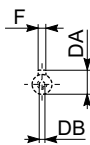
| | C | D | DA | DB | E | F | L | P |
|-------------|-----|----|------|-----|----|---|-----|-------|
| W 75_S1 M1L | 138 | 14 | 16 | M5 | 30 | 5 | 308 | — |
| W 75_S2 M2S | 156 | 19 | 21.5 | M6 | 40 | 6 | 333 | — |
| W 75_S3 M3S | 193 | 28 | 31 | M10 | 60 | 8 | 376 | — |
| W 75_S3 M3L | 193 | 28 | 31 | M10 | 60 | 8 | 408 | — |
| W 75_P 71 | 138 | 14 | 16 | M5 | 30 | 5 | 219 | 112 |
| W 75_P 80 | 156 | 19 | 21.5 | M6 | 40 | 6 | 233 | 112 |
| W 75_P 90 | 176 | 24 | 27 | M8 | 50 | 8 | 252 | 112 |
| WR 75_P 63 | 124 | 11 | 12.5 | M4 | 23 | 4 | 190 | 152 |
| WR 75_P 71 | 138 | 14 | 16 | M5 | 30 | 5 | 219 | 152 |
| WR 75_P 80 | 156 | 19 | 21.5 | M6 | 40 | 6 | 233 | 163.5 |
| WR 75_P 90 | 176 | 24 | 27 | M8 | 50 | 8 | 252 | 163.5 |



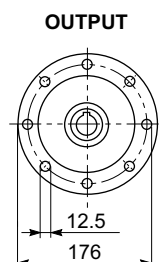
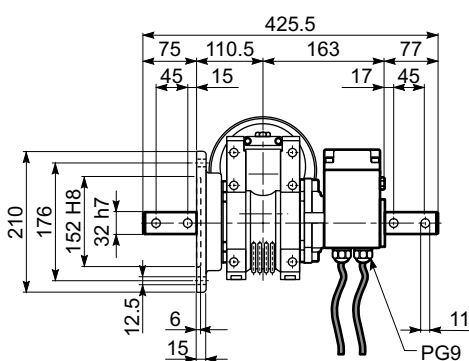
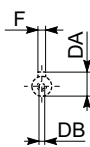
W 86 UFC_S



W 86 UFC



WR 86 UFC



| | C | D | DA | DB | E | F | L | P |
|-------------|-----|----|------|-----|----|---|-----|-------|
| W 86_S1 M1L | 138 | 14 | 16 | M5 | 30 | 5 | 324 | — |
| W 86_S2 M2S | 156 | 19 | 21.5 | M6 | 40 | 6 | 349 | — |
| W 86_S3 M3S | 193 | 28 | 31 | M10 | 60 | 8 | 392 | — |
| W 86_S3 M3L | 193 | 28 | 31 | M10 | 60 | 8 | 424 | — |
| W 86_P 71 | 138 | 14 | 16 | M5 | 30 | 5 | 219 | 128 |
| W 86_P 80 | 156 | 19 | 21.5 | M6 | 40 | 6 | 233 | 128 |
| W 86_P 90 | 176 | 24 | 27 | M8 | 50 | 8 | 252 | 128 |
| WR 86_P 63 | 124 | 11 | 12.5 | M4 | 23 | 4 | 190 | 168 |
| WR 86_P 71 | 138 | 14 | 16 | M5 | 30 | 5 | 219 | 168 |
| WR 86_P 80 | 156 | 19 | 21.5 | M6 | 40 | 6 | 233 | 179.5 |
| WR 86_P 90 | 176 | 24 | 27 | M8 | 50 | 8 | 252 | 179.5 |

37 - OPZIONI

Varianti fine corsa

37 - OPTIONS

Limit switch modifications

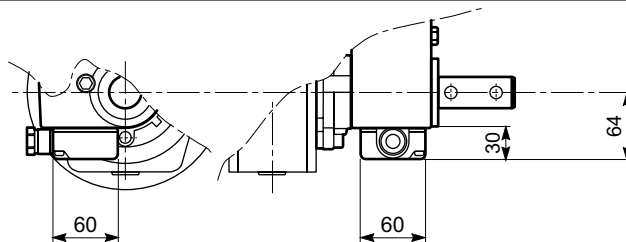
37 - OPTIONEN

Endschalter-Varianten

37 - OPTIONS

Variantes fin de course

ME



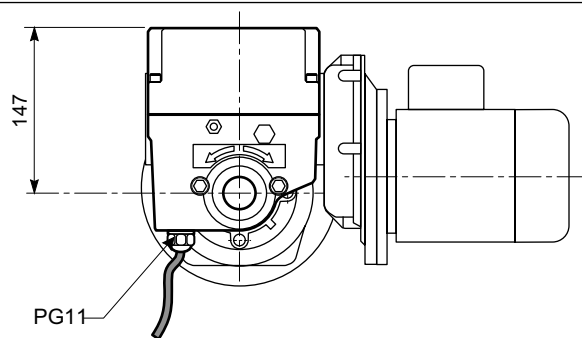
Versione con morsetteria

Version with terminal box

Version mit Klemmenkasten

Version avec boîte à bornes

DM

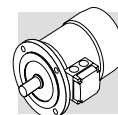


Versione con doppi micro

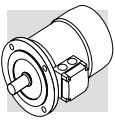
Four microswitch version

Version mit vier
Mikroschaltern

Version équipée
de quatre microrupteurs


MOTORI ELETTRICI
ELECTRIC MOTORS
ELEKTROMOTOREN
**MOTEURS
ELECTRIQUES**
**M1 - SIMBOLOGIA E
UNITÀ DI MISURA**
**M1 - SYMBOLS AND UNITS
OF MEASUREMENT**
**M1 - SYMBOLE UND
MAßEINHEITEN**
**M1 - SYMBOLES ET UNITES
DE MESURE**

| Simb. Symb. | U.m. Einheit | Descrizione | Description | Beschreibung | Description |
|----------------|----------------------|---|--|---|---|
| $\cos\varphi$ | – | Fattore di potenza | Power factor | Leistungsfaktor | Facteur de puissance |
| η | – | Rendimento | Efficiency | Wirkungsgrad | Rendement |
| f_m | – | Fattore correttivo della potenza | Power adjusting factor | Leistungskorrekturfaktor | Facteur de correction de la puissance |
| I | – | Rapporto di intermittenza | Cyclic duration factor | Relative Einschaltdauer | Rapport d'intermittence |
| I_N | [A] | Corrente nominale | Rated current | Nennstrom | Courant nominal |
| I_S | [A] | Corrente di spunto | Locked rotor current | Kurzschlußstrom | Courant de démarrage |
| J_C | [Kgm ²] | Momento di inerzia del carico | Load moment of inertia | Massenträgheitsmoment der externen Massen | Moment d'inertie de la charge |
| J_M | [Kgm ²] | Momento di inerzia motore | Moment of inertia | Trägheitsmoment | Moment d'inertie du moteur |
| K_C | – | Fattore di coppia | Torque factor | Drehmomentfaktor | Facteur de couple |
| K_d | – | Fattore di carico | Load factor | Lastfaktor | Facteur de charge |
| K_J | – | Fattore di inerzia | Inertia factor | Trägheitsfaktor | Facteur d'inertie |
| M_A | [Nm] | Coppia accelerante media | Mean breakaway torque | Losbrechmoment | Couple d'accélération moyen |
| M_B | [Nm] | Coppia frenante | Brake torque | Bremsemoment | Couple du frein |
| M_N | [Nm] | Coppia nominale | Rated torque | Nennmoment | Couple nominal |
| M_L | [Nm] | Coppia resistente media | Counter-torque during acceleration | Lastmoment | Couple résistant moyen |
| M_S | [Nm] | Coppia di spunto | Starting torque | Startmoment | Couple de démarrage |
| n | [min ⁻¹] | Velocità nominale | Rated speed | Nennzahl | Vitesse nominale |
| P_B | [W] | Potenza assorbita dal freno a 20°C | Power drawn by the brake at 20°C | Leistungsaufnahme der Bremse bei 20°C | Puissance absorbée par le frein à 20°C |
| P_n | [kW] | Potenza nominale | Motor rated power | Nennleistung | Puissance nominale |
| P_r | [kW] | Potenza richiesta | Required power | Benötigte Leistung | Puissance nécessaire |
| t_1 | [ms] | Ritardo di sblocco del freno con alimentatore a semionda | Brake response time with one-way rectifier | Ansprechzeit Bremse mit Einweg-Gleichrichter | Temps de déblocage du frein avec alimentation à demi-onde |
| t_{1s} | [ms] | Tempo di sblocco del freno con alimentatore a controllo elettronico | Brake response time with electronic-controlled rectifier | Ansprechzeit Bremse mit elektronisch gesteuertem Gleichrichter | Temps de déblocage du frein avec alimentation à contrôle électronique |
| t_2 | [ms] | Ritardo di frenatura con disgiunzione lato c.a. | Brake reaction time with a.c. disconnect | Einfallzeit Bremse bei Unterbrechung der Stromversorgung WS | Retard de freinage avec coupure coté c.a. |
| t_{2c} | [ms] | Ritardo di frenatura con disgiunzione circuito c.a. e c.c. | Brake reaction time with a.c. and d.c. disconnect | Einfallzeit Bremse bei Unterbrechung der Stromversorgung WS und GS | Retard de freinage avec coupure coté c.a. et c.c. |
| t_a | [°C] | Temperatura ambiente | Ambient temperature | Umgebungstemperatur | Température ambiante |
| t_f | [min] | Tempo di funzionamento a carico costante | Work time at constant load | Betriebsdauer unter Nennbelastung | Temps de fonctionnement à charge constante |
| t_r | [min] | Tempo di riposo | Rest time | Aussetzzeit | Temps de repos |
| W | [J] | Lavoro di frenatura accumulato tra due regolazioni del traferro | Braking work between service interval | Bremsenergie zwischen zwei Einstellungen | Energie de freinage accumulée entre deux réglages de l'entrefer |
| W_{max} | [J] | Energia massima per singola frenatura | Maximum brake work for each braking | Max. Bremsarbeit pro Bremsvorgang | Energie maxi par freinage |
| Z | [1/h] | N° di avviamenti ammissibili, a carico | Permissible starting frequency, loaded | Schalhäufigkeit Nennbetrieb | Nombre de démarrages admissibles en charge |
| Z_0 | [1/h] | N° di avviamenti ammissibili a vuoto (I = 50%) | Max. permissible unloaded starting frequency (I = 50%) | Max. Schalhäufigkeit im Leerlauf (relative Einschalt-dauer I = 50%) | Nombre de démarrages admissible à vide (I = 50%) |



M2 - CARATTERISTICHE GENERALI

Programma di produzione

I motori elettrici asincroni trifase del programma di produzione della BONFIGLIOLI RIDUTTORI sono previsti nelle forme costruttive base IMB5, IMB14 e loro derivate con le seguenti polarità: 2, 4, 6, 2/4, 2/6, 2/8, 2/12. Nel presente catalogo sono evidenziate inoltre, le caratteristiche tecniche dei motori in versione integrata, tipo M.

Normative

I motori descritti in questo catalogo sono costruiti in accordo alle Norme ed unificazioni applicabili evidenziate nella tabella seguente.

M2 - GENERAL CHARACTERISTICS

Production range

The asynchronous three-phase electric motors of BONFIGLIOLI RIDUTTORI's production, are available in basic designs IMB5 and IMB14 and derived versions, with the following polarities: 2, 4, 6, 2/4, 2/6, 2/8, 2/12. The technical characteristics of compact motors, M type, are also supplied in this manual.

Standards

The motors described in this catalogue are manufactured to the applicable standards shown in the following table.

M2 - ALLGEMEINE EIGENSCHAFTEN

Produktprogramm

Die Dreiphasen-Asynchronmotoren aus dem Produktprogramm von BONFIGLIOLI RIDUTTORI gibt es in den Grundbauformen IMB5, IMB14 und deren Ableitungen mit folgenden Polzahlen: 2, 4, 6, 2/4, 2/6, 2/8 und 2/12. Im vorliegenden Katalog sind außerdem die technischen Eigenschaften der Motoren in Kompaktausführung hervorgehoben.

Normen

Die in diesem Katalog beschriebenen Motoren sind in Übereinstimmung mit den in der folgenden Tabelle angegebenen einschlägigen Normen und Vereinheitlichungsrichtlinien konstruiert worden.

M2 - CARACTERISTIQUES GENERALES

Programme de production

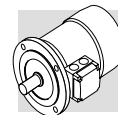
Les moteurs électriques asynchrones triphasés du programme de production de BONFIGLIOLI RIDUTTORI sont prévus dans les formes de construction de base IMB5, IMB14 et leur dérivés avec les polarités suivantes: 2, 4, 6, 2/4, 2/6, 2/8, 2/12. Dans le présent catalogue sont également mises en évidence les caractéristiques techniques des moteurs en version compacte, type M.

Réglementations

Les moteurs décrits dans ce catalogue sont construits en accord avec les Normes et standardisations applicables mises en évidence dans le tableau ci-dessous.

(A26)

| Titolo / Title / Titel / Titre | CEI | IEC |
|--|-----------------|--------------|
| Prescrizioni generali per macchine elettriche rotanti <i>General requirements for rotating electrical machines</i> Allgemeine Vorschriften für umlaufende elektrische Maschinen <i>Prescriptions générales pour machines électriques tournantes</i> | CEI EN 60034-1 | IEC 60034-1 |
| Marcatura dei terminali e senso di rotazione per macchine elettriche rotanti <i>Terminal markings and direction of rotation of rotating machines</i> Kennzeichnung der Anschlußklemmen und Drehrichtung von umlaufenden elektrischen Maschinen <i>Définitions des bornes et sens de rotation pour machines électriques tournantes</i> | CEI 2-8 | IEC 60034-8 |
| Metodi di raffreddamento delle macchine elettriche <i>Methods of cooling for electrical machines</i> Verfahren zur Kühlung von elektrischen Maschinen <i>Méthodes de refroidissement des machines électriques</i> | CEI EN 60034-6 | IEC 60034-6 |
| Dimensioni e potenze nominali per macchine elettriche rotanti <i>Dimensions and output ratings for rotating electrical machines</i> Auslegung der Nennleistung von umlaufenden elektrischen Maschinen <i>Dimensions, puissances nominales pour machines électriques tournantes</i> | EN 50347 | IEC 60072 |
| Classificazione dei gradi di protezione delle macchine elettriche rotanti <i>Classification of degree of protection provided by enclosures for rotating machines</i> Klassifizierung der Schutzart von umlaufenden elektrischen Maschinen <i>Classification des degrés de protection des machines électriques tournantes</i> | CEI EN 60034-5 | IEC 60034-5 |
| Limiti di rumorosità <i>Noise limits</i> Geräuschgrenzwerte <i>Limites de bruit</i> | CEI EN 60034-9 | IEC 60034-9 |
| Sigle di designazione delle forme costruttive e dei tipi di installazione <i>Classification of type of construction and mounting arrangements</i> Abkürzungen zur Kennzeichnung der Bauform und der Einbaulagen <i>Sigles de dénomination des formes de construction et des types d'installation</i> | CEI EN 60034-7 | IEC 60034-7 |
| Tensione nominale per i sistemi di distribuzione pubblica dell'energia elettrica a bassa tensione <i>Rated voltage for low voltage mains power</i> Nennspannung für öffentliche NS-Stromverteilungssysteme <i>Tension nominale pour les systèmes de distribution publique de l'énergie électrique en basse tension</i> | CEI 8-6 | IEC 60038 |
| Grado di vibrazione delle macchine elettriche <i>Vibration level of electric machines</i> Schwingstärke bei elektrischen Maschinen <i>Degré de vibration des machines électriques</i> | CEI EN 60034-14 | IEC 60034-14 |



I motori corrispondono inoltre alle Norme straniere adeguate alle IEC 60034-1 e qui riportate.

The motors also comply with foreign standards adapted to IEC 60034-1 as shown here below.

Die Motoren entsprechen außerdem den an die IEC-Norm 60034-1 angepaßten ausländischen Normen, die in der folgenden Tabelle genannt werden.

En outre, les moteurs correspondent aux Normes étrangères adaptées aux IEC 60034-1 indiquées dans le tableau ci-dessous.

(A27)

| | | | | |
|-----------------|---------------|---------------|----------------|-----------------|
| DIN VDE 0530 | Germania | Germany | Deutschland | Allemagne |
| BS5000 / BS4999 | Gran Bretagna | Great Britain | Großbritannien | Grande Bretagne |
| AS 1359 | Australia | Australia | Australien | Australie |
| NBNC 51 - 101 | Belgio | Belgium | Belgien | Belgique |
| NEK - IEC 34 | Norvegia | Norway | Norwegen | Norvège |
| NF C 51 | Francia | France | Frankreich | France |
| OEVE M 10 | Austria | Austria | Österreich | Autriche |
| SEV 3009 | Svizzera | Switzerland | Schweiz | Suisse |
| NEN 3173 | Paesi Bassi | Netherlands | Niederlande | Pays Bas |
| SS 426 01 01 | Svezia | Sweden | Schweden | Suède |

CUS

MOTORI PER USA E CANADA

MOTORS FOR USA AND CANADA

MOTOREN FÜR DIE USA UND KANADA

MOTEURS POUR ETATS-UNIS ET CANADA

I motori BN ed M sono disponibili in esecuzione NEMA Design C (per le caratteristiche elettriche), certificata in conformità alle norme CSA (Canadian Standard) C22.2 N° 100 e UL (Underwriters Laboratory) UL 1004 con targhetta riportante entrambi i marchi sotto illustrati, specificare in questo caso l'opzione CUS.

BN and M motors are available in NEMA Design C configuration (concerning electrical characteristics), certified to CSA (Canadian standard) C22.2 No. 100 and UL (Underwriters Laboratory) UL 1004. By specifying the option CUS the name plate is marked with both symbols shown here below.

Die BN/M-Motoren sind in der Ausführung NEMA, Design C (aufgrund der elektrischen Eigenschaften), den Normen CSA (Canadian Standard) C22.2 Nr 100 und UL (Underwriters Laboratory) UL 1004 gemäß zertifiziert. Durch Spezifizieren der Option CUS wird das Typenschild mit den nachstehend aufgeführten Symbolen gekennzeichnet.

Les moteurs BN et M sont disponibles en exécution NEMA Design C (pour les caractéristiques électriques), certifiée conforme aux normes CSA (Canadian Standard) C22.2 N°100 et UL (Underwriters Laboratory) UL 1004 avec une plaque signalétique indiquant chacun des symboles ci-dessous, dans ce cas, spécifier l'option CUS.



Le tensioni delle reti di distribuzione americane e le corrispondenti tensioni nominali da specificare per il motore sono indicate nella tabella seguente:

US power mains voltages and the corresponding rated voltages to be specified for the motor are indicated in the following table:

Die Spannungen der amerikanischen Verteilernetze und die entsprechenden tens-Nennspannungen, die bei den Motoren angegeben werden müssen, können der folgenden Tabelle entnommen werden:

Les tensions des réseaux de distribution américains ainsi que les tensions nominales à spécifier par le moteur sont indiquées dans le tableau suivant :

(A28)

| Frequenza / Frequency Frequenz / Fréquence | Tensione di rete / Mains voltage Netzspannung / Tension de réseau | V _{mot} |
|---|--|------------------|
| 60 Hz | 208 V | 200 V |
| | 240 V | 230 V |
| | 480 V | 460 V |
| | 600 V | 575 V |

I motori dotati di collegamento YYY (es. 230/460-60; 220/440-60) presentano di serie una morsetteria a 9 terminali.

Per le stesse esecuzioni, e inoltre per l'alimentazione 575V-60Hz, la potenza di targa corrisponde a quella normalizzata a 50Hz.

Per i motori autofrenanti con freno in c.c. tipo BN_FD l'alimentazione del raddrizzatore è da morsetteria motore con tensione 230V a.c. monofase.

Per i motori autofrenanti l'alimentazione del freno è così predisposta:

Motors with YYY connection (e.g. 230/460-60; 220/440-60) feature, as standard, a 9-stud terminal board. For same executions, as well as for 575V-60Hz supply, the nominal rating is coincident with the correspondent 50Hz rating.

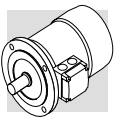
For DC brake motors type BN_FD, the rectifier is connected to a single-phase 230 VAC supply voltage in the motor terminal box.

Brake power supply for brake motors is as follows:

Motoren mit YYY-Anschluss (z.B. 230/460-60; 220/440-60) sind standardmäßig mit 9 Pins auf dem Klemmbrett ausgeführt. Für gleiche Ausführungen, ebenso wie für 575V-60Hz, die Nennleistung ist gleich mit der entsprechenden 50 Hz-Leistung. Für Bremsmotoren mit Gleichstrombremse vom Typ BN_FD erfolgt die Versorgung des Gleichrichters über den Motor-Klemmenkasten mit einer Spannung von 230V (einphasiger Wechselstrom). Bei Bremsmotoren stellt sich die **Versorgung der Bremse** wie folgt dar:

Les moteurs avec connexion YYY (ex. 230/460-60; 220/440-60) présentent, en standard, une plaque à borne avec 9 bornes. Pour les memes executions, et aussi pour l'alimentation 575V-60Hz, la puissance de plaque correspond à celle normalisée à 50Hz.

Pour les moteurs frein avec frein en c.c. type BN_FD, l'alimentation du redresseur provient de la boîte à bornes moteur avec une tension 230V c.a. monphasée. Pour les moteurs frein l'alimentation du frein est la suivante :



| BN_FD M_FD | BN_FA ; BN_BA M_FA | Specificare / Specify Bitte angeben / Spécifier |
|---|---|--|
| Da morsetti motore 1~230V c.a. Wired to terminal box 1~230V a.c. Vom Motorklemmenkasten 1~230V W.S. Depuis boîte à bornes moteur 1~230V c.a. | Alimentazione separata / Separate power supply Fremdversorgung / Alimentation séparée 230V Δ - 60Hz | 230SA |
| | Alimentazione separata / Separate power supply Fremdversorgung / Alimentation séparée 460V Y - 60Hz | 460SA |

L'opzione CUS non è applicabile ai motori dotati di servoventilazione.

The option CUS does not apply to servo-ventilated motors.

Die CUS-Option ist für die Fremdlüftermotoren nicht anwendbar.

L'option CUS n'est pas applicable aux moteurs doués de ventilation forcée.

Direttive CEE 73/23 (LVD) e CEE 89/336 (EMC)

I motori delle serie BN ed M sono conformi ai requisiti delle Direttive CEE 73/23 (Direttiva Bassa Tensione) e CEE 89/336 (Direttiva Compatibilità Elettromagnetica), e riportano in targa la marcatura CE.

Per quanto riguarda la Direttiva EMC, la costruzione è in accordo alle Norme CEI EN 60034-1 sez. 12, EN 50081, EN 50082. I motori con freno in c.c. tipo FD, se corredati dell'opportuno filtro capacitivo in ingresso al raddrizzatore (opzione CF), rientrano nei limiti di emissione previsti dalla Norma EN 50081-1 "Compatibilità elettromagnetica - Norma Generica sull'emissione - Parte 1: Ambienti residenziali, commerciali e dell'industria leggera". I motori soddisfano inoltre le prescrizioni della Norma CEI EN 60204-1 "Equipaggiamento elettrico delle macchine".

È responsabilità del costruttore o dell'assemblatore dell'apparecchiatura che incorpora i motori come componenti garantire la sicurezza e la conformità alle direttive del prodotto finale.

Directives 73/23/EEC (LVD) and 89/336/EEC (EMC)

BN motors meet the requirements of Directives 73/23/EEC (Low Voltage Directive) and 89/336/EEC (Electromagnetic Compatibility Directive) and their name plates bear the CE mark.

As for the EMC Directive, construction is in accordance with standards CEI EN 60034-1 Sect. 12, EN 50081, EN 50082.

Motors with FD brakes, when fitted with the suitable capacitive filter at rectifier input (option CF), meet the emission limits required by Standard EN 50081-1 "Electromagnetic compatibility - Generic Emission Standard - Part 1: Residential, commercial and light industrial environment". Motors also meet the requirements of standard CEI EN 60204-1 "Electrical equipment of machines".

The responsibility for final product safety and compliance with applicable directives rests with the manufacturer or the assembler who incorporate the motors as component parts.

Richtlinien EWG 73/23 (LVD) und EWG 89/336 (EMC)

Die Motoren der Serie BN entsprechen den Anforderungen der Richtlinien EWG 73/23 (Richtlinie - Niederspannung) und CEE 89/336 (Richtlinie - elektromagnetische Kompatibilität) und sind mit dem CE-Zeichen ausgestattet.

Im Hinblick auf die Richtlinie EMC entspricht die Konstruktion den Normen CEI EN 60034-1, Abschn. 12, EN 50081, EN 50082.

Die Motoren mit dem Bremstyp FD fallen, falls mit dem entsprechenden kapazitiven Filter am Eingang des Gleichrichters ausgestattet (Option CF), unter die Emissionsgrenzwerte, die von der Norm EN 50081-1 "Elektromagnetische Kompatibilität - Allgemeine Norm für Emissionen - Teil 1: Wohngebiete, Handels- und Leichtindustriestellen" vorgesehen werden. Die Motoren entsprechen darüber hinaus den von der Norm CEI EN 60204-1 "Elektrische Maschinenausrüstung" gegebenen Vorschriften. Es liegt in der Verantwortung des Herstellers oder es Monteurs der Ausrüstung, in der die Motoren als Komponenten montiert werden, die Sicherheit und die Übereinstimmung mit den Richtlinien des Endprodukts zu gewährleisten.

Directives CEE 73/23 (LVD) et CEE 89/336 (EMC)

Les moteurs de la série BN sont conformes aux conditions requises par les Directives CEE 73/23 (Directive Basse Tension) et CEE 89/336 (Directive Compatibilité Electromagnétique), et le marquage CE est indiqué sur la plaque signalétique.

En ce qui concerne la Directive EMC, la fabrication répond aux Normes CEI EN 60034-1 Sect. 12, EN 50081, EN 50082.

Les moteurs avec frein FD, s'ils sont équipés du frein capacitif approprié en entrée du redresseur (option CF), rentrent dans les limites d'émission prévues par la Norme EN 50081-1 "Compatibilité électromagnétique - Norme Générique sur l'émission - Partie 1 : Milieux résidentiels, commerciaux et de l'industrie légère". Les moteurs répondent aussi aux prescriptions de la Norme CEI EN 60204-1 "Equipement électrique des machines".

Le fabricant ou le monteur de la machine qui comprend les moteurs comme composant est responsable et doit se charger de garantir la sécurité et la conformité aux directives du produit final.

Rendimento - Accordo CEMEP

Con l'obiettivo di ridurre significativamente il consumo europeo di energia elettrica mediante la sensibilizzazione degli utenti all'uso di motori maggiormente efficienti, la Commissione Europea per l'Energia e il CEMEP hanno concordato le condizioni ricorrenti per la classificazione dei motori elettrici in classi di rendimento denominate, in senso decrescente, **eff1**, **eff2** ed **eff3**.

Oggetto di questo accordo sono solamente i motori trifase standard in c.a. a 2 e 4 poli, costruzione chiusa con rotore a gabbia di scoiattolo, ventilazione esterna e potenza all'albero compresa fra 1,1 e 90 kW, alimentazione a 400V - 50 Hz in servizio continuo S1.

È facoltà dei costruttori di motori elettrici decidere di classificare volontariamente i propri prodotti in una delle tre classi di rendimento sopra citate. In questo caso essi devono apporre sulla targa il marchio relativo alla classe di rendimento applicabile ed inserire, fra i dati tecnici, i valori

Efficiency - the CEMEP agreement

CEMEP, the European Committee of Manufacturers of Electrical Machines and Power Electronics hopes to reduce electrical energy consumption in Europe by informing users of the efficiency of electrical motors. As a contribution in this direction, CEMEP has recently published an agreement stating the specifications for electric motor energy efficiency classes **eff1**, **eff2** and **eff3** (listed in order of decreasing efficiency).

The CEMEP agreement covers only standard, 2 and 4 pole, three phase, AC motors, of closed rotor and squirrel cage construction, with external ventilation and rated power at the output shaft of 1.1 to 90 kW, for use with a 400V - 50 Hz power supply under S1 continuous duty conditions.

It is left up to individual electric motor manufacturers to classify their products in one of the three above classes. If they decide to do so, they must apply the relevant efficiency mark to the motor and include, together with all the

Wirkungsgrad - die CEMEP Vereinbarung

CEMEP, der europäische Herstellerverband von elektrischen Maschinen und Leistungs-Elektronik hofft, den elektrischen Energieverbrauch in Europa, durch Informationen über die Wirkungsgrade von elektrischen Motoren an die Benutzer, zu reduzieren. Als Beitrag in dieser Richtung, hat die CEMEP vor kurzem eine Vereinbarung veröffentlicht, die die Energie-Effizienz-Klassen **eff1**, **eff2** und **eff3** für Elektromotoren spezifiziert. (Aufgelistet nach abnehmendem Wirkungsgrad).

Die CEMEP Vereinbarung beinhaltet nur 2 und 4 polige Drehstrommotoren mit geschlossenem Rotor als Kurzschlussläufer, integriertem Lüfter, Nennleistungen an der Abtriebswelle von 1.1 - 90 kW, mit einer Energieversorgung von 400V - 50Hz und der Betriebsart S1 (Dauerbetrieb).

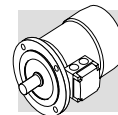
Es bleibt den einzelnen Elektromotoren Herstellern überlassen, ihre Produkte nach einer der drei oben benannten Effizienz-Klassen zu klassifizieren. Wenn sie sich dazu entscheiden, müssen sie die relevante Markierung auf dem Motor anbringen und zusammen mit allen anderen relevanten techni-

Rendement - L'accord CEMEP

La Commission Européenne sur l'Energie et le CEMEP (European Committee of Manufacturers of Electrical Machines and Power Electronics), espère réduire de façon sensible la consommation européenne d'énergie électrique à travers l'information sur l'efficacité des moteurs électriques. Pour ce faire, ils ont fixés une classification des moteurs électriques en « classes de rendement » appelée, en sens décroissant d'efficacité : **eff1**, **eff2** et **eff3**.

Font partie de cet accord seulement les moteurs triphasés standard en c.a. à 2 et 4 pôles, de type fermé et rotor à cage, ventilation extérieure et puissance à l'arbre comprise entre 1,1 et 90 KW, alimentation à 400V - 50 Hz en service continu S1.

C'est au choix de chaque constructeur de moteurs électriques de décider de classer ces produits dans une des trois classes de rendement ci-dessus. Dans ce cas, le constructeur doit faire apparaître le logo de la classe de rendement sur la plaque marque



di rendimento a pieno carico ed a $\frac{3}{4}$ del carico nominale.

I motori Bonfiglioli ricompresi nell'oggetto di questo accordo sono conformi alla classe di rendimento **eff2** e sono pertanto chiaramente identificati in targa tramite il logo sotto riportato:

other relevant technical specifications, the measured efficiency figures for full rated load and $\frac{3}{4}$ rated load.

*Under the terms of this agreement, Bonfiglioli's electric motors conform to efficiency class **eff2** and are clearly identified as such by the following mark on the data plate:*



schon Einzelheiten, die gemessenen Wirkungsgradangaben bei Voll- und Dreiviertellast ausweisen. Unter den Bedingungen dieser Vereinbarung entsprechen die elektrischen Motoren von Bonfiglioli der Effizienz-Klasse **eff2** und werden als solche durch die folgende Markierung auf dem Typenschild deutlich gekennzeichnet:

et introduire, dans les caractéristiques techniques, les valeurs de rendement à pleine charge et à $\frac{3}{4}$ de la charge nominale.

*Le moteurs Bonfiglioli concernées dans cet accord, sont conformes à la classe de rendement **eff2** et de conséquence ils présentent, sur la plaque marque, le logo suivant :*

Tolleranze

Secondo le Norme sono ammesse le tolleranze indicate nella tabella seguente sulle grandezze garantite.

Tolerances

As per the Norms applicable the tolerances here below apply to the following quantities.

Toleranzen

Die Normen lassen die in folgenden Tabelle genannten Toleranzen bei den garantierten Größen zu.

Tolérances

Selon les Normes, les tolérances indiquées dans le tableau ci-dessous sont admises sur les tailles garanties.

(A29)

| -0.15 (1 - η) P \leq 50kW | Rendimento | Efficiency | Wirkungsgrad | Rendement |
|---------------------------------------|----------------------------|----------------------|-----------------------------------|------------------------|
| $-(1 - \cos\phi)/6$ min 0.02 max 0.07 | Fattore di potenza | Power factor | Leistungsfaktor | Facteur de puissance |
| $\pm 20\%$ * | Scorrimento | Slip | Schlupf | Glissement |
| +20% | Corrente a rotore bloccato | Locked rotor current | Strom bei blockiertem Läufer | Courant à rotor bloqué |
| -15% +25% | Coppia a rotore bloccato | Locked rotor torque | Drehmoment bei blockiertem Läufer | Couple à rotor bloqué |
| -10% | Coppia max | Max. torque | Max. Drehmoment | Couple max |

* \pm 30% per motori con Pn < 1 kW

* \pm 30% for motors with Pn < 1 kW

* \pm 30% für Motoren mit Pn < 1 kW

* \pm 30% pour moteurs avec Pn < 1 kW

M3 - CARATTERISTICHE MECCANICHE

Forme costruttive

I motori serie BN sono previsti nelle forme costruttive indicate in tabella (A30) secondo le Norme CEI EN 60034-14.

Le forme costruttive sono le seguenti:

IM B5 (base)
IM V1, IM V3 (derivate)

IM B14 (base)
IM V18, IM V19 (derivate)

I motori in forma costruttiva IM B5 possono essere installati nelle posizioni IM V1 e IM V3; i motori in forma costruttiva IM B14 possono essere installati nelle posizioni IM V18 e IM V19.

In questi casi, sulla targa del motore sarà indicata la forma costruttiva base IM B5 o IM B14.

Nelle forme costruttive dove il motore assume una posizione verticale con albero in basso, si consiglia di richiedere l'esecuzione con tettuccio parapioggia (da prevedere sempre nel caso di motori autofrenanti). Tale esecuzione, presente nelle opzioni, va richiesta espressamente in fase di ordine in quanto non è prevista nella versione base.

M3 - MECHANICAL FEATURES

Versions

IEC-normalised BN motors are available in the design versions indicated in table (A30) as per Standards CEI EN 60034-14.

Mounting versions are:

IM B5 (basic)
IM V1, IM V3 (derived)

IM B14 (basic)
IM V18, IM V19 (derived)

IM B5 design motors can be installed in positions IM V1 and IM V3; IM B14 design motors can be installed in positions IM V18 and IM V19.

In such cases, the basic design IM B5 or IM B14 is indicated on the motor name plate.

In design versions with a vertically located motor and shaft downwards, it is recommended to request the drip cover (always necessary for brake motors). This facility, included in the option list should be specified when ordering as it does not come as a standard device.

M3 - MECHANISCHE EIGENSCHAFTEN

Bauformen

Die Motoren der Serie BN weisen die in der Abbildung (A30) angegebene Bauform gemäß den Normen CEI EN 60034-14 auf.

Die Bauformen sind:

IM B5 (Grundmodell)
IM V1, IM V3 (Ableitungen)

IM B14 (Grundmodell)
IM V18, IM V19 (Ableitungen)

Die Motoren mit der Bauform IM B5 können mit den Einbaulagen IM V1 und IM V3 eingebaut werden; die Motoren mit der Bauform IM B14 können mit den Einbaulagen IM V18 und IM V19 eingebaut werden.

In diesen Fällen ist auf dem Leistungsschild des Motors die Bauform IM B5 oder IM B14 angegeben.

Bei Bauformen mit vertikaler Lage des Motors und nach unten gerichteter Welle wird die Ausführung mit Regenschutzabdeckung empfohlen (bei Bremsmotoren stets vorzusehen). Dieses wahlweise Zubehör muß ausdrücklich zum Zeitpunkt der Bestellung verlangt werden, da es bei der Grundausführung nicht vorgesehen ist.

M3 - CARACTERISTIQUES MECANIKES

Formes de construction

Les moteurs série BN sont prévus dans les formes de construction indiquées sur le tableau (A30) selon les normes CEI EN 60034-14.

Les formes de construction sont les suivantes:

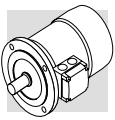
IM B5 (base)
IM V1, IM V3 (dérivées)

IM B14 (base)
IM V18, IM V19 (dérivées)

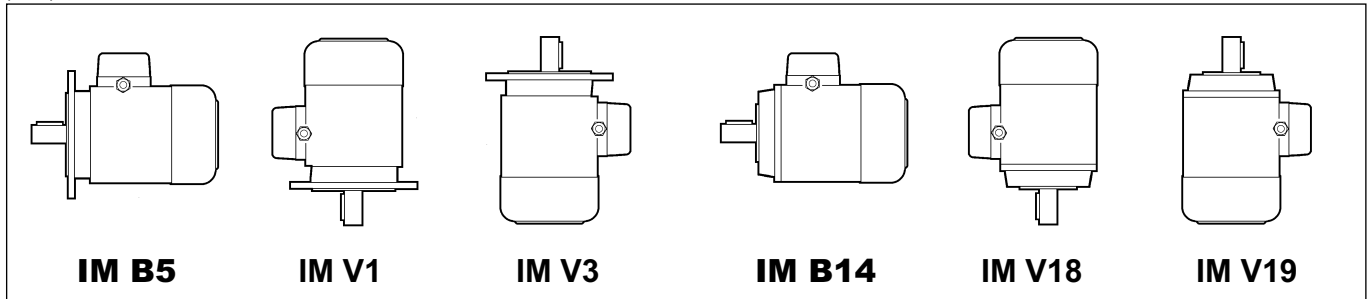
Les moteurs en forme de construction IM B5 peuvent être installés dans les positions IM V1 et IM V3; les moteurs en forme de construction IM B14 peuvent être installés dans les positions IM V18 et IM V19.

Dans ces cas, la forme de construction base IM B5 ou IM B14 sera indiquée sur la plaque du moteur.

Dans les formes de construction où le moteur présente une position verticale avec arbre vers le bas, nous conseillons de demander l'exécution avec capot de protection contre la pluie (à prévoir toujours dans le cas de moteurs freins). Cette exécution, prévue dans les options, doit être expressément demandée en phase de commande étant donné qu'elle n'est pas prévue dans la version de base.



(A30)



I motori in forma flangiata possono essere forniti con dimensioni di accoppiamento ridotte, come riportato in tabella (A31) - esecuzioni **B5R**, **B14R**.

Flanged motors can be supplied with a reduced mounting interface, as shown in chart (A31) below.

Die Motoren in der Auslegung mit Flansch können mit reduzierten Passmassen gemäß Tabelle (A31) - Versionen **B5R**, **B14R** geliefert werden.

*Les moteurs avec forme à bride peuvent être fournis avec des tailles d'accouplement réduites, comme indiqué dans le tableau (A31) - exécutions **B5R**, **B14R**.*

(A31)

| | BN 71 | BN 80 | BN 90 | BN 100 | BN 112 | BN 132 |
|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | DxE - Ø | | | | | |
| B5R ⁽¹⁾ | 11x23 - 140 | 14x30 - 160 | 19x40 - 200 | 24x50 - 200 | 24x50 - 200 | 28x60 - 250 |
| B14R ⁽²⁾ | 11x23 - 90 | 14x30 - 105 | 19x40 - 120 | 24x50 - 140 | — | — |

⁽¹⁾ flangia con fori passanti

⁽¹⁾ flange with through holes

⁽¹⁾ Flansch mit durchgehenden Bohrungen

⁽¹⁾ bride avec orifices passants

⁽²⁾ flangia con fori filettati

⁽²⁾ flange with threaded holes

⁽²⁾ Flansch mit Gewindebohrungen

⁽²⁾ bride avec orifices filetés

IP..

Grado di protezione

Degree of protection

Schutzart

Degré de protection

La tabella sottostante riassume la disponibilità dei vari gradi di protezione.

Indipendentemente dal grado di protezione specificato, per installazione all'aperto i motori devono essere protetti dall'irraggiamento diretto e, nel caso d'installazione con albero rivolto verso il basso, è necessario specificare ulteriormente il tettuccio di protezione contro l'ingresso di acqua e corpi solidi (opzione **RC**).

The following chart provides an overview of the degrees of protection available.

*In addition to the degree of protection specified when ordering, motors to be installed outdoors require protection against direct sunlight and also – when they are to be installed vertically down – a drip cover to prevent the ingress of water and solid particles (option **RC**).*

In der nachstehenden Tabelle werden die jeweils zur Verfügung stehenden Schutzarten zusammengefasst.

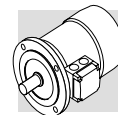
Unabhängig von der spezifischen Schutzart müssen die im Freien installierten Motoren vor direkten Strahlungen geschützt werden. Im Fall einer senkrechten Montage, in der die Welle nach unten gerichtet ist, sollte darüber hinaus das Schutzdach bestellt werden, das vor dem Eindringen von Wasser und festen Fremdkörpern schützt (Option **RC**).

Le tableau ci-dessous résume la disponibilité des différents degrés de protection.

*Indépendamment du degré de protection spécifié, en cas d'installation en plein air, les moteurs doivent être protégés des rayons directs du soleil et, en cas d'installation avec l'arbre dirigé vers le bas, il est nécessaire de spécifier ultérieurement le capot de protection contre la pénétration de l'eau et des corps solides (option **RC**).*

(A32)

| | | IP 54 | IP 55 | IP 56 |
|------------------------------|----------------------------|----------|----------|-------|
| BN | M | | standard | |
| BN_FD BN_FA | M_FD M_FA | standard | | |
| BN_BA | — | | standard | |



Ventilazione

I motori sono raffreddati mediante ventilazione esterna (IC 411 secondo CEI EN 60034-6) e sono provvisti di ventola radiale in plastica che funziona in entrambi i sensi di rotazione. L'installazione deve assicurare una distanza minima dalla calotta copriventola alla parete in modo da non avere impedimenti all'ingresso aria e permettere la possibilità di eseguire l'opportuna manutenzione del motore e, se previsto, del freno. Su richiesta è possibile prevedere una ventilazione forzata indipendente (opzione U1). Questa soluzione consente di aumentare il fattore di utilizzo del motore nel caso di alimentazione da inverter e funzionamento a giri ridotti.

Senso di rotazione

È possibile il funzionamento in entrambi i sensi di rotazione. Con collegamento dei morsetti U1, V1, W1 alle fasi di linea L1, L2, L3 si ha rotazione oraria vista dal lato accoppiamento, mentre la marcia antioraria si ottiene scambiando fra loro due fasi.

Rumorosità

I valori di rumorosità, rilevati secondo il metodo previsto dalle Norme ISO 1680, sono contenuti entro i livelli massimi previsti dalle Norme CEI EN 60034-9.

Vibrazioni ed equilibratura

Tutti i rotori sono equilibrati con mezza linguetta e rientrano nei limiti di intensità di vibrazione previsti dalle Norme CEI EN 60034-14. Per particolari esigenze di silenziosità potrà essere previsto, a richiesta, un'esecuzione antivibrante in grado ridotto R. La tabella seguente riporta i valori della velocità efficace di vibrazione per equilibratura standard (N) e incrementata (R).

(A33)

| Grado di vibrazione <i>Vibration class</i> Schwingungsklasse <i>Degré de vibration</i> | Velocità di rotazione <i>Angular velocity</i> Drehungsgeschwindigkeit <i>Vitesse de rotation</i> | Limiti della velocità di vibrazione <i>Limits of the vibration velocity</i> Grenzen der Schwingungsgeschwindigkeit <i>Limites de la vitesse de vibration</i> [mm/s] | |
|---|---|---|-------------------------|
| | | BN 56...BN 132 M05...M4 | BN 160MR...BN 200 M5 |
| N | 600 ≤ n ≤ 3600 | 1.8 | 2.8 |
| | 1800 < n ≤ 3600 | 1.12 | 1.8 |
| R | 600 ≤ n ≤ 1800 | 0.71 | 1.12 |
| | 1800 < n ≤ 3600 | 1.12 | 1.8 |

I valori si riferiscono a misure con motore liberamente sospeso e funzionamento a vuoto.

Cooling

The motors are externally ventilated (IC 411 to CEI EN 60034-6) and are equipped with a plastic fan working in both directions. The motors must be installed allowing sufficient space between fan cowl and the nearest wall to ensure free air intake and allow access for maintenance purposes on motor and brake, if supplied. Independent, forced air ventilation (IC 416) can be supplied on request (option U1). This solution enables to increase the motor duty factor when driven by an inverter and operating at reduced speed.

Direction of rotation

Rotation is possible in both directions. If terminals U1, V1, and W1 are connected to line phases L1, L2 and L3, clockwise rotation (looking from drive end) is obtained. For counterclockwise rotation, switch two phases.

Noise

Noise levels, measured using the method prescribed by ISO 1680 Standards, are within the maximum levels specified by Standards CEI EN 60034-9.

Vibrations and balancing

Rotor shafts are balanced with half key fitted and fall within the vibration class N, as per Standard CEI EN 60034-14. If a further reduced noise level is required improved balancing can be optionally requested (class R). Table below shows the value for the vibration velocity for standard (N) and improved (R) balancing.

Values refer to measures with freely suspended motor in unloaded conditions.

Lüftung

Die Motoren sind eigenbelüftet (IC 411 gemäß CEI EN 60034-6) und verfügen über ein Radiallüfterrad aus Kunststoff, das in beiden Drehrichtungen arbeiten kann. Bei der Installation muß sichergestellt werden, daß die Lüfterradabdeckung soweit von der Wand entfernt ist, daß der Lufttritt nicht behindert wird, und daß der Motor und (falls vorhanden) die Bremse problemlos gewartet werden können. Auf Wunsch können die Motoren mit Fremdbelüftung geliefert werden (Option U1). Diese Lösung ermöglicht das Motorbetriebsfaktor zu erhöhen, wenn vom Frequenzumrichter gesteuert und zu niedriger Geschwindigkeit betrieben.

Drehrichtung

Der Betrieb in beiden Drehrichtungen ist möglich. Schließt man die Klemmen U1, V1, W1 an die Phasen L1, L2, L3 an, dreht sich der Motor im Uhrzeigersinn (von der Verbindungsseite her betrachtet); die Drehung im Gegenuhrzeigersinn erhält man, indem man zwei Phasen vertauscht.

Geräuschpegel

Die mit der von der ISO-Norm 1680 vorgesehenen Methoden gemessenen Lärmstärkewerte liegen innerhalb der gemäß den Normen CEI EN 60034-9 zulässigen Höchstgrenzen.

Schwingungen und Ausgleich

Alle Rotoren werden durch einen halben Federkeil ausgeglichen und fallen somit unter die, von den Normen CEI EN 60034-14 vorgesehenen Schwingungsgradgrenzen. Bei besonderen Anforderungen an die Laufruhe kann auf Anfrage eine schwingungsdämpfende Ausführung in der reduzierten Klasse (R) geliefert werden. Die folgende Tabelle führt die Werte der Ist-Schwingungsgeschwindigkeit für einen normalen (N) und verbesserten (R) Ausgleich auf.

Die Werte beziehen sich auf die Abmessungen mit stehendem Motor, ohne Getriebe und Leerlauf.

Ventilation

Les moteurs sont refroidis à l'aide d'une ventilation extérieure (IC 411 selon CEI EN 60034-6) et sont dotés d'un ventilateur à ailettes en plastique qui fonctionne dans les deux sens de rotation. L'installation doit assurer une distance minimum entre le capot de protection du ventilateur et la paroi afin de permettre une bonne circulation de l'air et rendre plus aisé l'entretien du moteur et si prévu, du frein. Sur demande, il est possible de prévoir une ventilation forcée indépendante (option U1). Cette solution permet d'augmenter le facteur d'utilisation du moteur en cas d'alimentation, via un variateur de fréquence, et pour un fonctionnement à faible vitesse.

Sens de rotation

Un fonctionnement dans les deux sens de rotation est possible. Avec raccordement des bornes U1, V1, W1 aux phases de ligne L1, L2, L3, on a la rotation dans le sens des aiguilles d'une montre vue du côté liaison alors que le sens inverse s'obtient en intervertissant les deux phases entre elles.

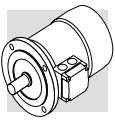
Niveau de bruit

Les valeurs relevées selon la méthode prévue par les normes ISO 1680 sont situées sous les niveaux maximums prévus par les normes CEI EN 60034-9.

Vibrations et équilibrage

Tous les rotors sont équilibrés avec une demi languette et rentrent dans les limites d'intensité de vibration prévues par les Normes CEI EN 60034-14. En cas d'exigences particulière concernant le niveau de bruit, sur demande, il est possible de réaliser une exécution anti-vibrante, de degré réduit (R). Le tableau ci-dessous indique les valeurs de la vitesse efficace de vibration pour un équilibrage standard (N) et améliorée (R).

Les valeurs se réfèrent à des mesures avec moteur librement suspendu et fonctionnement à vide.



Morsettiera motore

La morsettiera principale è a sei morsetti per collegamento con capicorda. All'interno della scatola è previsto un morsetto per il conduttore di terra.

Le dimensioni dei perni di attacco sono riportate nella tabella seguente.

Nel caso di motori autofrenanti, il raddrizzatore per l'alimentazione del freno è fissato all'interno della scatola e provvisto di adeguati morsetti di collegamento.

Eseguire i collegamenti secondo gli schemi riportati all'interno della scatola coprimorsetti o nei manuali d'uso.

Terminal box

Terminal board features 6 studs for eyelet terminal connection. A ground terminal is also supplied for earthing of the equipment.

Terminals number and type are shown in the following table.

Brakemotors house the a.c./d.c. rectifier (factory pre-wired) inside the terminal box.

Wiring instructions are provided either in the box or in the user manual.

Motorklemmenkasten

Die Hauptklemmleiste hat 6 Klemmen für den Anschluß mit Kabelschuhen. Im Innern des Klemmenkastens befindet sich eine Klemme für den Erdleiter.

Die Abmessungen der Ausschüsse sind in der folgenden Tabelle angegeben.

Bei den Bremsmotoren befindet sich auch der mit den erforderlichen Anschlußklemmen ausgestattete Gleichrichter für die Stromversorgung der Bremse im Klemmenkasten.

Die Anschlüsse müssen gemäß den Diagrammen im Klemmkasten oder in den Betriebsanweisungen durchgeführt werden.

Bornier moteur



Le bornier principal prévoit six bornes pour raccordement avec cosses. Dans le boîtier se trouve une borne pour le conducteur de terre.

Les dimensions des axes de fixation sont reportées dans le tableau ci-dessous.

Dans le cas de moteurs freins, le redresseur pour l'alimentation du frein est fixé à l'intérieur du boîtier et est doté de bornes de raccordement.

Effectuer les connexions selon les schémas indiqués à l'intérieur du bornier, ou dans les manuels d'utilisation.

(A34)

|  |  | N° terminali No. of terminals Klemmen N° bornes | Filettatura terminali Terminal threads Gewinde Filetage bornes | Sezione max del conduttore Wire max cross section area Max. leiterquerschnitt Section max du conducteur mm ² |
|---|---|--|---|---|
| BN 56...BN 71 | M05, M1 | 6 | M4 | 2.5 |
| BN 80, BN 90 | M2 | 6 | M4 | 2.5 |
| BN 100...BN 112 | M3 | 6 | M5 | 6 |
| BN 132...BN 160MR | M4 | 6 | M5 | 6 |
| BN 160M...BN 180M | M5 | 6 | M6 | 16 |
| BN 180L...BN 200L | — | 6 | M8 | 25 |

Ingresso cavi

Nel rispetto della Norma EN 50262, i fori di ingresso cavi nelle scatole morsettiera presentano filettature metriche della misura indicata nella tabella seguente.

Cable entry

The holes used to bring cables to terminal boxes use metric threads in accordance with standard EN 50262 as indicated in the table here after.



Kabeleingang

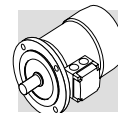
Unter Berücksichtigung der Norm EN 50262 verfügen die Kabeleingänge in die Klemmenkästen über metrische Gewinde, deren Maße, der nachstehenden Tabelle entnommen werden können.

Entrée câbles

Dans le respect de la Norme EN 50262, les orifices d'entrée câbles dans les boîtes à bornes présentent des filetages métriques de la taille indiquée dans le tableau ci-dessous.

(A35)

|  |  | Ingresso cavi / Cable entry kabeldurchführung / Entrée câbles | Diametro max. cavo allacciabile / Max. cable diameter allowed Max. zulässiger Kabeldurchmesser / Diam. maxi câble [mm] |
|---|---|--|--|
| BN 63 | M05 | 2 x M20 x 1.5 | 13 |
| BN 71 | M1 | 2 x M25 x 1.5 | 17 |
| BN 80 - BN 90 | M2 | 2 x M25 x 1.5 | 17 |
| BN 100 | M3 | 2 x M32 x 1.5 | 21 |
| | | 2 x M25 x 1.5 | 17 |
| BN 112 | — | 2 x M32 x 1.5 4 x M25 x 1.5 | 17 |
| BN 132...BN 160MR | M4 | 4 x M32 x 1.5 | 21 |
| BN 160M...BN 200L | M5 | 2 x M40 x 1.5 | 29 |



Cuscinetti

I cuscinetti previsti sono del tipo radiale a sfere con lubrificazione permanente precaricati assialmente.

I tipi utilizzati sono indicati nelle tabelle seguenti. La durata nominale a fatica L_{10h} dei cuscinetti, in assenza di carichi esterni applicati è superiore a 40.000 ore, calcolata secondo ISO 281.

DE = lato comando

NDE = lato opposto comando

Bearings

Life lubricated preloaded radial ball bearings are used, types are shown in the chart here under.

Calculated endurance lifetime L_{10h} , as per ISO 281, in unloaded condition, exceeds 40000 hrs.

DE = drive end

NDE = non drive end

Lager

Bei den Lagern handelt es sich um Radialkugellager mit Dauerschmierung.

Die verwendeten Typen sind in den folgenden Tabellen angegeben.

Die Lebensdauer der Lager bei einer Beanspruchung L_{10h} ist, sofern keine externen Kräfte wirken, über 40.000 Stunden (Berechnung gemäß ISO 281).

DE = Wellenseite

NDE = Lüfterseite

Roulements

Les roulements prévus sont du type radial à billes avec lubrification permanente.


Les types utilisés sont indiqués dans les tableaux ci-dessous.

La résistance à la déformation L_{10h} des roulements en absence de charges extérieures appliquées est supérieure à 40.000 heures calculée selon ISO 281.

DE = sortie arbre

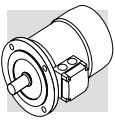
NDE = côté ventilateur

(A36)

|  | DE | NDE | |
|---|----------------------|------------|-------------------|
| | M, M_FD, M_FA | M | M_FD; M_FA |
| M05 | 6004 2Z C3 | 6201 2Z C3 | 6201 2RS C3 |
| M1 | 6004 2Z C3 | 6202 2Z C3 | 6202 2RS C3 |
| M2 | 6007 2Z C3 | 6204 2Z C3 | 6204 2RS C3 |
| M3 | 6207 2Z C3 | 6206 2Z C3 | 6206 2RS C3 |
| M4 | 6309 2Z C3 | 6308 2Z C3 | 6308 2RS C3 |
| M5 | 6309 2Z C3 | 6309 2Z C3 | 6309 2RS C3 |

(A37)

|  | DE | NDE | |
|---|--------------------------------|------------------|---------------------|
| | BN, BN_FD, BN_FA, BN_BA | BN, BN_BA | BN_FD; BN_FA |
| BN 56 | 6201 2Z C3 | 6201 2Z C3 | – |
| BN 63 | 6201 2Z C3 | 6201 2Z C3 | 6201 2RS C3 |
| BN 71 | 6202 2Z C3 | 6202 2Z C3 | 6202 2RS C3 |
| BN 80 | 6204 2Z C3 | 6204 2Z C3 | 6204 2RS C3 |
| BN 90 | 6205 2Z C3 | 6205 2Z C3 | 6305 2RS C3 |
| BN 100 | 6206 2Z C3 | 6206 2Z C3 | 6206 2RS C3 |
| BN 112 | 6306 2Z C3 | 6306 2Z C3 | 6306 2RS C3 |
| BN 132 | 6308 2Z C3 | 6308 2Z C3 | 6308 2RS C3 |
| BN 160MR | 6309 2Z C3 | 6308 2Z C3 | 6308 2RS C3 |
| BN 160M/L | 6309 2Z C3 | 6309 2Z C3 | 6309 2RS C3 |
| BN 180M | 6310 2Z C3 | 6309 2Z C3 | 6309 2RS C3 |
| BN 180L | 6310 2Z C3 | 6310 2Z C3 | 6310 2RS C3 |
| BN 200L | 6312 2Z C3 | 6310 2Z C3 | 6310 2RS C3 |



M4 - CARATTERISTICHE ELETTRICHE

Tensione

I motori a una velocità sono previsti nell'esecuzione normale per tensione nominale 230V Δ / 400V Y, 50 Hz con tolleranza di tensione ± 10% (escluso i tipi M3LC4 e M3LC6).

In targa sono indicati oltre alla tensione nominale i campi di funzionamento consentiti, p.e.:

220 - 240V Δ

380 - 415V Y / 50 Hz.

In accordo alle Norme CEI EN 60034-1 i motori possono funzionare alle tensioni sopra indicate con tolleranza del ± 5%.

Per funzionamento ai limiti di tolleranza la temperatura può superare di 10 K il limite previsto dalla classe di isolamento adottata.

Ad eccezione dei motori autofrenanti tipo BN_FD in targa vengono indicati anche i valori corrispondenti al funzionamento a 60 Hz (p.e. 460Y, 60 Hz) ed il relativo campo di tensione:

440 - 480VY, 60 Hz.

Per i motori autofrenanti con freno tipo FD le tensioni standard sono:

220V - 240V Δ - 50 Hz

380V - 415V Y - 50 Hz

con tensione di alimentazione freno 230V ± 10%.

La tabella seguente riporta le tensioni previste per i motori.

M4 - ELECTRICAL CHARACTERISTICS

Voltage

Single speed motors are rated for 230/400 V - 50 Hz.

A tolerance of ±10% applies to nominal voltage, with the exception of motors type M3LC4 and M3LC6.

In addition to nominal voltage-frequency values the name plate also shows voltage ranges the motor can operate under, e.g.:

220-240V Δ - 50 Hz

380-415V Y - 50 Hz

As per Norms CEI EN 60034-1 on above voltage values the ±5% tolerance applies.

When operating close to the tolerance limit values the winding temperature can exceed by 10 K the rated temperature for the given insulation class.

With the exception of BN_FD brakemotors, the rated voltage values for operation under 60 Hz mains are also shown on the nameplate, e.g. 460Y-60 Hz along with related tolerance field, e.g. 440-480V Y-60 Hz.

For brakemotors, FD type, rated voltage is:

220-240V Δ - 50 Hz

380-415V Y - 50 Hz

Brake supply is a.c. 230V ±10% single phase.

Chart below shows standard and optional wiring of motors.

M4 - ELEKTRISCHE EIGENSCHAFTEN

Spannung

Die eintourigen Motoren müssen in der Standardausführung mit einer Spannung von 230 V Δ / 400 V Y, 50 Hz mit einer Toleranz von ± 10% gespeist werden (Type M3LC4 und M3LC6 ausgenommen).

Auf dem Schild werden die Nennspannung hinaus, auch die zulässigen Ansprechbereiche angegeben, z.B.:

220-240V Δ

380-415V Y/50 Hz.

Gemäß den Normen CEI EN 60034-1 können die Motoren auf die oben genannten Spannungen mit Toleranzen von ± 5% arbeiten. Bei Betrieb an den Spannungsgrenzen, kann die Temperatur bis zum 10K die für die verwendeten Isolierstoffklasse angegebenen Grenze überschreiten.

Darüber hinaus wird auf den Typenschild die dem 60 Hz-Betrieb entsprechenden Werte angegeben (d.h. 460 Y, 60 Hz) und das entsprechende Spannungsfeld, 440-480VY, 60 Hz.

Für die selbstbremsenden Motoren mit dem Bremstyp FD sind die Standardspannungen folgende:

220V - 240V Δ - 50 Hz

380V - 415V Y - 50 Hz

mit Bremsspannungsversorgung von 230V ± 10%.

Die folgende Tabelle für die Motoren vorgesehenen Spannungen auf.

M4 - CARACTERISTIQUES ELECTRIQUES

Tension

Les moteurs à polarité unique sont prévus dans l'exécution normale pour tension 230V Δ / 400V Y, 50 Hz avec tolérance de tension ± 10% (sauf les types M3LC4 et M3LC6).

Outre la tension nominale, les plages de fonctionnement permises sont indiquées sur la plaquette signalétique, à savoir:

220-240V Δ

380-415V Y/50 Hz.

Selon les normes CEI EN 60034-1 les moteurs peuvent fonctionner aux tensions indiquées ci-dessus avec une tolérance de ± 5%.

Pour un fonctionnement à la limite de tolérance, la température peut dépasser les 10K, la limite prévue de la classe d'isolation choisie.

Sur la plaque marque sont de plus indiqués les valeurs correspondantes au fonctionnement en 60 Hz (ex.460Y, 60 Hz) et la relative plage de tension: 440 - 480VY, 60 Hz.

En ce qui concerne les moteurs autofrenants avec frein de type FD, les tensions standard sont les suivantes :

220V - 240V Δ - 50 Hz

380V - 415V Y - 50 Hz

avec tension d'alimentation du frein 230V ± 10%.

La tableau ci-dessous indique les tensions prévues pour les moteurs.

(A38)

| | | BN M | | | BN_FD M_FD | | BN_FA / BN_BA M_FA | | Esecuzione Configuration Version Execution |
|-----------------|----------|-------------------------------|-------------------------------|-----------------------------|---------------------------------------|---------------------------------------|--|--|--|
| | | V _{mot} ± 10 % 3~ | V _{mot} ± 10 % 3~ | V _B ± 10 % 1~ | V _{mot} ± 10 % 3~ | V _B ± 10 % 3~ | | | |
| BN 56 - BN 132 | M05...M4 | 230/400 - 50Hz 460 - 60Hz | 230/400V Δ/Y - 50 Hz | 230V | 230/400V Δ/Y - 50 Hz 460V Y - 60Hz | 230/400V Δ/Y - 50 Hz 460V Y - 60Hz | Standard | | |
| BN 100 - BN 132 | M3 - M4 | 400/690 - 50Hz 460 - 60Hz | 400/690V Δ/Y - 50 Hz | 400V | 400/690V Δ/Y - 50 Hz 460V Y - 60Hz | 400/690V Δ/Y - 50 Hz 460V Y - 60Hz | A richiesta, senza sovrapprezzo On request at no extra charge Auf Anfrage, ohne Aufpreis Sur demande, sans majoration de prix | | |

I motori a due velocità 400V/50Hz, sono previsti per tensione nominale standard 400V; tolleranze applicabili secondo CEI EN 60034-1.

Nella tabella seguente sono indicati i vari tipi di collegamenti previsti per i motori in funzione della polarità.

The only rated voltage for motors type 400V/50Hz and all double speed motors is 400V. Applicable tolerances as per CEI EN 60034-1.

The table below shows the wiring options available.

Alle polumschaltbaren Motoren, die Typen 400V/50Hz, sind nicht umschaltbar, standard-mäßig nur für ein Spannung 400V vorgesehen; geltenden Toleranzen gemäß CEI EN 60034-1.

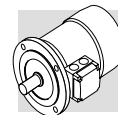
Auf die folgende Tabelle werden die verschiedenen für die Motoren vorgesehenen Anschlußtypen angegeben.

Tous les moteur à deux vitesses, les types 400V/50Hz, sont prévus pour une tension nominale standard de 400V; tolérances applicables selon CEI EN 60034-1.

Dans le tableau ci-dessous sont indiqués les différents types de connexion prévus pour les moteurs.

(A39)

| | | Poli / Pole / Polig / Pôles | | Collegamento avvolgimento / Wiring options Wicklungsanschluß / Connexion du bobinage | |
|----------------|----------|-----------------------------|--|---|--|
| | | | | | |
| BN 56...BN 200 | M05...M5 | 2, 4, 6 | | Δ / Y | |
| | | 2/4 | | Δ / YY (Dahlander) | |
| | | 2/6, 2/8, 2/12 | | Y / Y (due avvolgimenti / Two windings zwei Wicklungen / Deux bobinage) | |



Frequenza

Frequency

Frequenz

Fréquence

I motori ad una velocità nell'esecuzione standard riportano in targa oltre alle tensioni del funzionamento a 50 Hz il campo di tensione 440 - 480V 60 Hz (escluso motori autofrenanti con freno FD) con potenza aumentata di circa il 20%

La potenza di targa dei motori a 60Hz corrisponde a quanto riportato nella tabella (A40) seguente:

With the exception of brakemotors, name plate of standard single speed motors shows, besides the 50 Hz voltage ratings, also the rated power output for 60 Hz operation in the 440-480 V range.



*Power output is increased by approx 20%.
Rated output power for 60 Hz operation is shown in the following diagram.*

Bei eintourigen Motoren in der Standardausführung wird außer den 50 Hz-Betriebsspannungen auch den Spannungsfeld 440 - 480V 60 Hz angegeben (mit Ausnahme von Bremsmotoren mit Bremsentyp FD) mit einer erhöhten Leistung von ungefähr 20%. Die Leistung auf das Namensschild von 60 Hz-Motoren entspricht den Daten aus der folgenden Tabelle (A40):

Les moteurs à une vitesse en exécution standard reportent sur la plaque marque en plus des tension du fonctionnement à 50 Hz la plage de tension 440 - 480V 60 Hz (moteurs freins avec frein FD exclus) avec puissance augmentée de 20% env.

La puissance sur la plaque marque des moteurs à 60 Hz correspond à celle indiquée au tableau (A40) suivant:

(A40)

|  |  | 2P | 4P | 6P |
|---|---|---------------------|------|------|
| | | P _n [kW] | | |
| BN 56A | - | - | 0.06 | - |
| BN 56B | M0B | - | 0.10 | - |
| BN 63A | M05A | 0.21 | 0.14 | 0.10 |
| BN 63B | M05B | 0.30 | 0.21 | 0.14 |
| BN 71A | M05C | 0.45 | 0.30 | 0.21 |
| BN 71B | M1SD | 0.65 | 0.45 | 0.30 |
| BN 80A | M1LA | 0.90 | 0.65 | 0.45 |
| BN 80B | M2SA | 1.30 | 0.90 | 0.65 |
| BN 90S | M2SB | - | 1.30 | 0.90 |
| BN 90SA | M2SB | 1.8 | - | - |
| BN 90L | M3SA | 2.5 | - | 1.3 |
| BN 90LA | M3SA | - | 1.8 | - |
| BN 100L | M3LA | 3.5 | - | - |
| BN 100LA | M3LA | - | 2.5 | 1.8 |
| BN 100LB | M3LB | 4.7 | 3.5 | 2.2 |
| BN 112M | M3LB | 4.7 | 4.7 | 2.5 |
| | M3LC | - | 4.7 | 2.5 |
| BN 132S | M4SA | - | 6.5 | 3.5 |
| BN 132SA | M4SA | 6.3 | - | - |
| BN 132SB | M4SB | 8.7 | - | - |
| BN 132M | M4LA | 11 | - | - |
| BN 132MA | M4LA | - | 8.7 | 4.6 |
| BN 132MB | M4LB | - | 11 | 6.5 |
| BN 160MR | M4LC | 12.5 | 12.5 | - |
| BN 160MB | M5SB | 17.5 | - | - |
| BN 160M | M5SA | - | - | 8.6 |
| BN 160L | M5S | 21.5 | 17.5 | 12.6 |
| BN 180M | M5LA | 24.5 | 21.5 | - |
| BN 180L | - | - | 25.3 | 17.5 |
| BN 200L | - | 34 | 34 | 22 |

Motori a doppia polarità alimentati a 60 Hz avranno un aumento della potenza nominale, riferita a 50 Hz, pari al 15%.

Qualora sulla targhetta di un motore destinato ad essere alimentato a 60 Hz sia richiesto un valore di potenza nominale pari a quello normalizzato a 50 Hz specificare in designazione l'opzione PN.

For two-speed motors operated under 60 Hz supply the rated power output is increased by 15% as compared to same motor with 50 Hz supply.

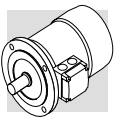
*If same IEC-normalised 50 Hz power rating value is desired on name plate of a 60 Hz operated motor specify option PN in the ordering code.
Standard motors wound for 50*

Für polumschaltbare Motoren mit 60 Hz Spannungsversorgung ist die vorgesehene Leistungserhöhung gemäß den Datenblätter von 15%.

Wenn die angefragte 60 Hz-Leistung der normierten 50 Hz-Leistung entspricht, geben bei der Bezeichnung das Option PN an. Die Motoren mit einer Wicklung für eine Frequenz von 50 Hz

Pour les moteurs à deux vitesses avec alimentation 60 Hz l'augmentation de puissance prévue per rapport aux valeurs indiquées dans les tableaux techniques, sera de 15%.

*Si la puissance requise à 60 Hz correspond à la puissance normalisée à 50 Hz on devra indiquer l'option PN.
Les moteurs bobinés pour fré-*



I motori normalmente avvolti per frequenza 50 Hz possono essere usati in reti a 60 Hz con i loro dati che saranno corretti come da tabella seguente.
I freni, se presenti, dovranno sempre essere alimentati alla tensione V_b , riportata in targa.

Hz supply can be operated under 60 Hz with main data corrected as per chart below: Brakes, if fitted, must be supplied with the voltage value V_b that is stated on the nameplate.

können entsprechend den Angaben von Tabelle (A40) an Netze mit 60 Hz angeschlossen werden.
Die Bremse muss, falls angebaut, mit der auf dem Typenschild angegebenen Spannung V_b betrieben werden.

quence 50 Hz peuvent être utilisés sur réseau à 60 Hz selon les indications du tableau (A40). Les freins, si présents, devront toujours être alimentés avec la tension V_b rapportée sur la plaque.

(A41)

| 50 Hz | | 60 Hz | | |
|-------------|----------------------------|------------------------|---|--------------------------------|
| V - 50 Hz | V - 60 Hz | P _n - 60 Hz | M _n , M _g /M _n - 60 Hz | n [min ⁻¹] - 60 Hz |
| 230/400 Δ/Y | 220 - 240 Δ 380 - 415 Y | 1 | 0.83 | 1.2 |
| 400/690 Δ/Y | 380 - 415 Δ | | | |
| 230/400 Δ/Y | 265 - 280 Δ 440 - 480 Y | 1.15 | 1 | 1.2 |
| 400/690 Δ/Y | 440 - 480 Δ | | | |

Potenza nominale

Le tabelle dei dati tecnici del catalogo riportano le caratteristiche funzionali a 50 Hz in condizioni ambientali standard secondo le Norme CEI EN 60034-1 (temperatura 40 °C e altitudine <1000 m s.l.m.).
I motori possono essere impiegati a temperature comprese tra 40 °C e 60 °C applicando i declassamenti di potenza indicati nelle tabelle seguenti.

Rated power

Catalogue rating values are calculated for 50 Hz operation and for standard ambient conditions (temperature 40 °C; elevation <1000 m a.s.l.) as per the CEI EN 60034-1 Standards. The motors can be used within the 40 - 60 °C temperature range with rated power output adjusted by factors given in the following charts.

Nennleistung

Die Betriebsdatentabellen des Katalogs enthalten die technischen Daten bei einer Frequenz von 50 Hz bei normalen Umgebungsbedingungen gemäß den Normen CEI EN 60034-1 (Temperatur 40°C und Höhe <1000 m ü.d.M.). Die Motoren können in größeren Temperaturen zwischen 40°C und 60°C betrieben werden, wenn man die in den Tabellen (A41) angegebenen Rückstufungen anwendet.

Puissance nominale

Les tableaux fonctionnels du catalogue présentent les caractéristiques techniques à 50 Hz dans des conditions ambiantes standard selon les normes CEI EN 60034-1 (température 40°C et altitude <1000 m). Les moteurs peuvent être employés à des températures comprises entre 40°C et 60°C en appliquant les déclassements de puissance indiqués dans les tableaux suivantes.

(A42)

| Temperatura ambiente / Ambient temperature / Umgebungstemperatur / Température ambiante(°C) | 40° | 45° | 50° | 55° | 60° |
|--|------|-----|-----|-----|-----|
| Potenza ammissibile in % della potenza nominale / Permitted power as a % of rated power Zulässige Leistung in % der Nennleistung / Puissance admissible en % de la puissance nominale | 100% | 95% | 90% | 85% | 80% |

Quando è richiesto un declassamento del motore superiore al 15%, contattare il ns. Servizio Tecnico.

Should a derating factor higher than 15% apply please consult factory.

Wenn eine Motordeklassierung höher als 15% gefragt ist, wir bitten um Rückfrage.

Si un déclassement du moteur supérieur à 15% est requis, on devra contacter notre Service Technique.

Classe d'isolamento

Insulation class

Isolationsklasse

Classes d'isolation

CL F

I motori di produzione Bonfiglioli impiegano, di serie, materiali isolanti (filo smaltato, isolanti, resine d'impregnazione) in classe F.

Bonfiglioli motors use class F insulating materials (enamelled wire, insulators, impregnation resins) as compare to the standard motor.

Die Motoren von Bonfiglioli sind serienmäßig mit Isolierstoffen (Emaildraht, Isolierstoffen, Imprägnierharzen) der Klasse F ausgestattet.

De série, les moteurs fabriqués par Bonfiglioli utilisent des matériaux isolants (fil émaillé, isolants, résines d'impregnation) en classe F.

CL H

Su richiesta può venire specificata la classe di isolamento H.

Motors manufactured in insulation class H are available at request.

Auf Anfrage können sie auch in der Klasse H geliefert werden.

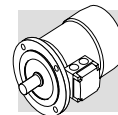
Sur demande, la classe d'isolation H peut être spécifiée.

In genere, per i motori in esecuzione standard la sovratemperatura dell'avvolgimento statore è contenuta entro il limite di 80 K, corrispondente alla sovratemperatura di classe B.

In standard motors, stator windings over temperature normally stays below the 80 K limit corresponding to class B over temperature.

Allgemein hält sich die Übertemperatur der Motoren in der Standardausführung innerhalb des Grenzwerts von 80 K, der einer Übertemperatur der Klasse B entspricht.

En général, pour les moteurs en exécution standard, l'échauffement de l'enroulement du stator se situe dans la limite de 80 K, correspondant à un échauffement de classe B.



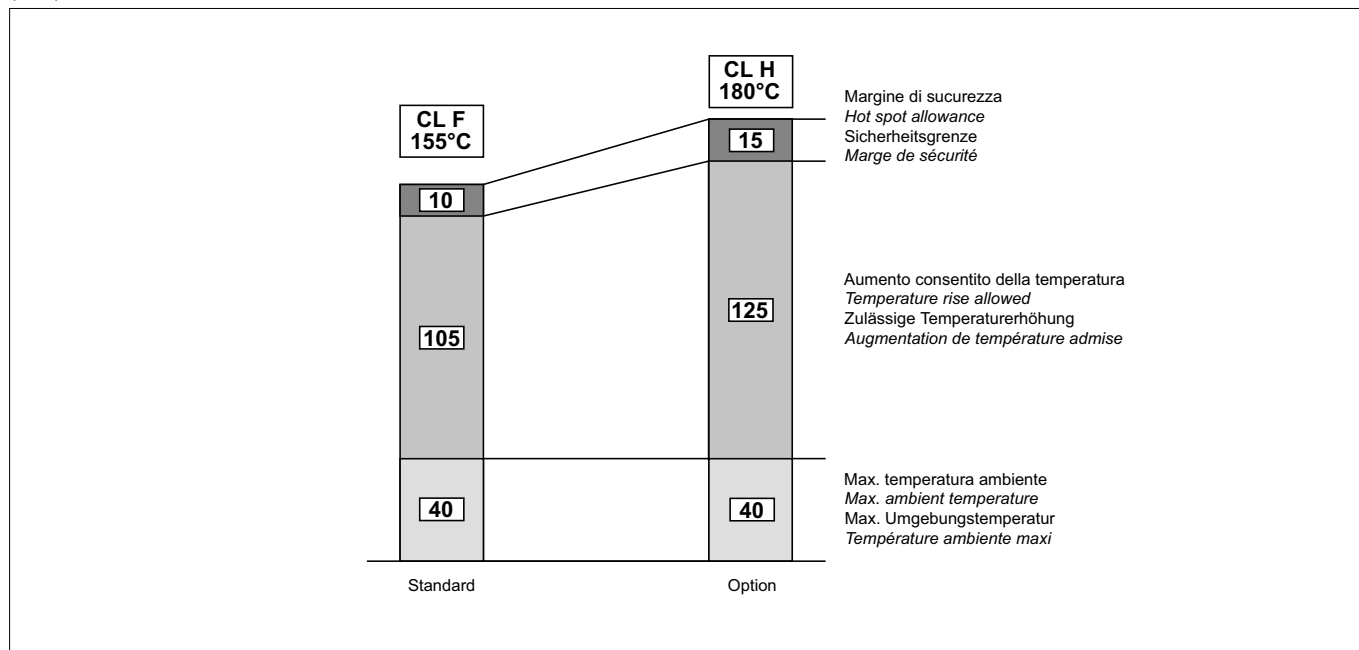
L'accurata scelta dei componenti del sistema isolante consente l'impiego dei motori anche in climi tropicali ed in presenza di vibrazioni normali. Per applicazioni in presenza di sostanze chimiche aggressive, o di elevata umidità, è consigliabile contattare il Servizio Tecnico Bonfiglioli per la selezione del prodotto più idoneo.

A careful selection of insulating components makes the motors compatible with tropical climates and normal vibration. For applications involving the presence of aggressive chemicals or high humidity, contact Bonfiglioli Engineering for assistance with product selection.

Die sorgfältig Wahl der Komponenten des Isoliersystem gestatten den Einsatz dieser Motoren auch unter tropischen Klimabedingungen und bei Vorliegen normaler Schwingungen. Für den Einsatz in in der Nähe aggressiv wirkenden chemischen Substanzen oder bei hoher Luftfeuchtigkeit, wird empfohlen sich zur Wahl eines passenden Produktes mit unserem Technischen Kundendienst in Verbindung zu setzen.

Le choix soigné des composants du système d'isolation permet d'utiliser également les moteurs dans des climats tropicaux et en présence de vibrations normales. Pour des applications en présence de substances chimiques agressives, ou d'humidité élevée, il est conseillé de contacter le Service Technique Bonfiglioli pour sélectionner le produit le plus adapté.

(A43)



Tipo di servizio

Se non indicato diversamente la potenza dei motori riportata a catalogo si riferisce al servizio continuo S1. Per i motori utilizzati in condizioni diverse da S1 sarà necessario identificare il tipo di servizio previsto con riferimento alle Norme CEI EN 60034-1. In particolare, per i servizi S2 ed S3, è possibile ottenere una maggiorazione della potenza termica rispetto a quella prevista per il servizio continuo secondo quanto indicato nella tabella (A44) valida per motori ad una velocità. Per motori a doppia polarità interpellare il nostro Servizio Tecnico.

Type of duty

Unless otherwise indicated, the power of motors specified in the catalogue refers to continuous duty S1. For motors used under conditions other than S1, the type of duty required must be adjusted with reference to CEI EN 60034-1 Standards. In particular, for duties S2 and S3, power can be adjusted with respect to continuous duty according to data in table (A44) applicable to single speed motors. For double speed motors, contact our Technical Service.

Betriebsart

Sofern nicht anders angegeben, bezieht sich die im Katalog angegebene Motorleistung auf den Dauerbetrieb S1. Bei den Motoren, die für eine andere Betriebsart als S1 vorgesehen sind, muß man die Betriebsart unter Bezugnahme auf die Normen CEI EN 60034-1 identifizieren. Insbesondere kann man für die Betriebsarten S2 und S3 nach der für Motoren mit einer Drehzahl. Gültigen Tabelle (A44) eine Überdimensionierung der Leistung für den Dauerbetrieb im Vergleich zur vorgesehenen Betriebsart erreichen. Für polumschaltbaren Motoren, bitte Rückfrage.

Type de service

Sauf indication contraire, la puissance des moteurs reportée dans le catalogue se réfère au service continu S1. Pour les moteurs utilisés dans des conditions différentes de S1, il sera nécessaire d'identifier le type de service prévu en se référant aux normes CEI EN 60034-1. En particulier, pour les services S2 et S3, il est possible d'obtenir une majoration de la puissance par rapport à celle prévue pour le service continu selon ce qui est indiqué dans le tableau (A44) valable pour les moteurs à une vitesse. Pour les moteurs à double polarité, contacter notre Service Technique.

(A44)

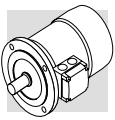
| | Servizio / Duty / Betriebsart / Service | | | | | | |
|----------------|---|------|------|---|------|-----|---|
| | S2 | | | S3 * | | | S4 - S9 |
| | Durata del ciclo (min) / Cycle duration (min) Zyklusdauer (min) / Durée du cycle (min) | | | Rapporto di intermittenza (I) / Cyclic duration factor (I) Relative Einschaltdauer (I) / Rapport d'intermittence (I) | | | |
| | 10 | 30 | 60 | 25% | 40% | 60% | Interpellarci Consult factory Rückfrage Nous contacter |
| f _m | 1.35 | 1.15 | 1.05 | 1.25 | 1.15 | 1.1 | |

* La durata del ciclo dovrà comunque essere uguale o inferiore a 10 minuti; se superiore interpellare il nostro Servizio Tecnico.

** Cycle duration must, in any event, be equal to or less than 10 minutes; if this time is exceeded, please contact our Technical Service.*

* Die Zyklusdauer muß in jedem Fall kleiner oder gleich 10 Minuten sein. Wenn sie darüber liegt, unseren Technischen Kundendienst zu Rate ziehen.

** La durée du cycle devra être inférieure ou égale à 10 minutes. Si supérieure, contacter notre Service Technique.*



Rapporto di intermittenza:

Cyclic duration factor:

Relative Einschaltdauer:

Rapport d'intermittence:

$$I = \frac{t_f}{t_f + t_r} \cdot 100 \quad (23)$$

t_f = tempo di funzionamento a carico costante
 t_r = tempo di riposo

t_f = work time under constant load
 t_r = rest time

t_f = Betriebszeit mit konstanter Last
 t_r = Aussetzzeit

t_f = temps de fonctionnement à charge constante
 t_r = temps de repos

Servizio di durata limitata S2

Limited duration duty S2

Kurzzeitbetrieb S2

Service de durée limitée S2

Caratterizzato da un funzionamento a carico costante per un periodo di tempo limitato, inferiore a quello richiesto per raggiungere l'equilibrio termico, seguito da un periodo di riposo di durata sufficiente a ristabilire, nel motore, la temperatura ambiente.

This type of duty is characterized by operation at constant load for a limited time, which is shorter than the time required to reach thermal equilibrium, followed by a rest period of sufficient duration to restore ambient temperature in the motor.

Betrieb mit konstanter Last für eine begrenzte Zeit, die unter der Zeit liegt, die zum Erreichen des thermischen Gleichgewichts benötigt wird, gefolgt von einer Aussetzzeit, die so lang ist, daß der Motor wieder auf die Umgebungstemperatur abkühlen kann.

Caractérisé par un fonctionnement à charge constante pour une période de temps limitée, inférieure à celle nécessaire pour atteindre l'équilibre thermique, suivie par une période de repos de durée suffisante pour rétablir, dans le moteur, la température ambiante.

Servizio intermittente periodico S3:

Periodical intermittent duty S3:

Periodische Einschaltsdauer S3:

Service intermittent périodique S3

Caratterizzato da una sequenza di cicli di funzionamento identici, ciascuno comprendente un periodo di funzionamento a carico costante ed un periodo di riposo. In questo servizio, la corrente di avviamento non influenza la sovratemperatura in modo significativo.

This type of duty is characterized by a sequence of identical operation cycles, each including a constant load operation period and a rest period. For this type of duty, the starting current does not significantly influence overtemperature.

Betrieb mit aufeinanderfolgenden identischen Betriebszyklen, die alle einen kurzzeitigen Betrieb mit konstanter Belastung und eine Aussetzzeit einschließen. Bei dieser Betriebsart beeinflusst der Anlaufstrom die Übertemperatur nicht in signifikanter Weise.

Caractérisé par une séquence de cycles de fonctionnement identiques, comprenant chacun une période de fonctionnement à charge constante et une période de repos. Dans ce service, le courant de démarrage n'influence pas l'excès de température de façon significative.

Funzionamento con alimentazione da inverter

Inverter-controlled motors

Betrieb mit Versorgung über Inverter

Fonctionnement avec alimentation par variateur de vitesse

I motori elettrici della serie BN ed M possono essere utilizzati con alimentazione da inverter PWM, e tensione nominale all'ingresso del convertitore fino a 500 V.

The electric motors of series BN and M may be used in combination with PWM inverters with rated voltage at transformer input up to 500 V. Standard motors use a phase insulating system with separators, class 2 enamelled wire and class H impregnation resins (1600V peak-to-peak voltage pulse capacity and rise edge $t_s > 0.1\mu s$ at motor terminals). Table (A54) shows the typical torque/speed curves referred to S1 duty for motors with base frequency $f_b = 50$ Hz.

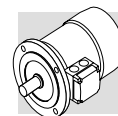
Die Elektromotoren der Serie BN und M können über einen Inverter PWM und mit einer Nennspannung am Wandlereingang bis zu 500 V versorgt werden. Das an den Serienmotoren angewendete System sieht eine Phasenisolierung mittels Trennvorrichtungen vor, ebenso wie einen Emaildraht mit Grad 2 und Imprägnierharze in der Klasse H vor (Abdichtungsgrenze bei Spannungsimpuls 1600V Spitze-Spitze und Anstiegsfront $t_s > 0.1\mu s$ an den Motorklemmen). Die typischen Merkmale von Drehmoment/Geschwindigkeit im Betrieb S1 für Motoren mit einer Grundfrequenz $f_b = 50$ Hz werden in der Tab. (A54) angegeben. Bei Betriebsfrequenzen unter ungefähr 30 Hz müssen die selbstlüftenden Standardmotoren (IC411) aufgrund der in diesem Fall abnehmenden Belüftung entsprechend paarweise deklassiert, oder in Alternative, mit unabhängigen Servoventilatoren ausgestattet werden. Bei über der Grundfrequenz liegenden Frequenzen arbeitet der Motor,

Les moteurs électriques de la série BN et M peuvent être utilisés avec alimentation par variateur PWM, et tension nominale en entrée du convertisseur jusqu'à 500V. Le système adopté sur les moteurs de série prévoit l'isolation de phase avec des séparateurs, l'utilisation de fil émailé niveau 2 et résines d'imprégnation de classe H (limite de maintien à l'impulsion de tension 1600V pic-pic et front de montée $t_s > 0.1\mu s$ aux bornes moteur). Les caractéristiques typiques couple/vitesse en service S1 pour moteur avec fréquence de base $f_b = 50$ Hz sont indiquées dans le tab. (A54).

Il sistema isolante sui motori di serie prevede l'isolamento di fase con separatori, l'utilizzo di filo smaltato in grado 2 e resine d'imprégnazione in classe H (limite di tenuta all'impulso di tensione 1600V picco-picco e fronte di salita $t_s > 0.1\mu s$ ai morsetti motore).

Because ventilation is somewhat impaired in operation at lower frequencies (about 30 Hz), standard motors with incorporated fan (IC411) require adequate torque derating or - alternately - the addition of a separate supply fan cooling. Above base frequency, upon reaching the maximum output voltage of the inverter, the motor enters a steady-power field of operation, and shaft torque drops with ratio (f/f_b) .

Pour des fréquences de fonctionnement inférieures à environ 30 Hz, à cause de la diminution de la ventilation, les moteurs standards autoventilés (IC411) doivent être opportunément déclassés au niveau du couple ou, en alternative, doivent être équipés de servoventilateur indépendant. Pour des fréquences supérieures à la fréquence de base, une fois



campo di funzionamento a potenza costante, con coppia all'albero che si riduce ca. con il rapporto (f/f_b) .

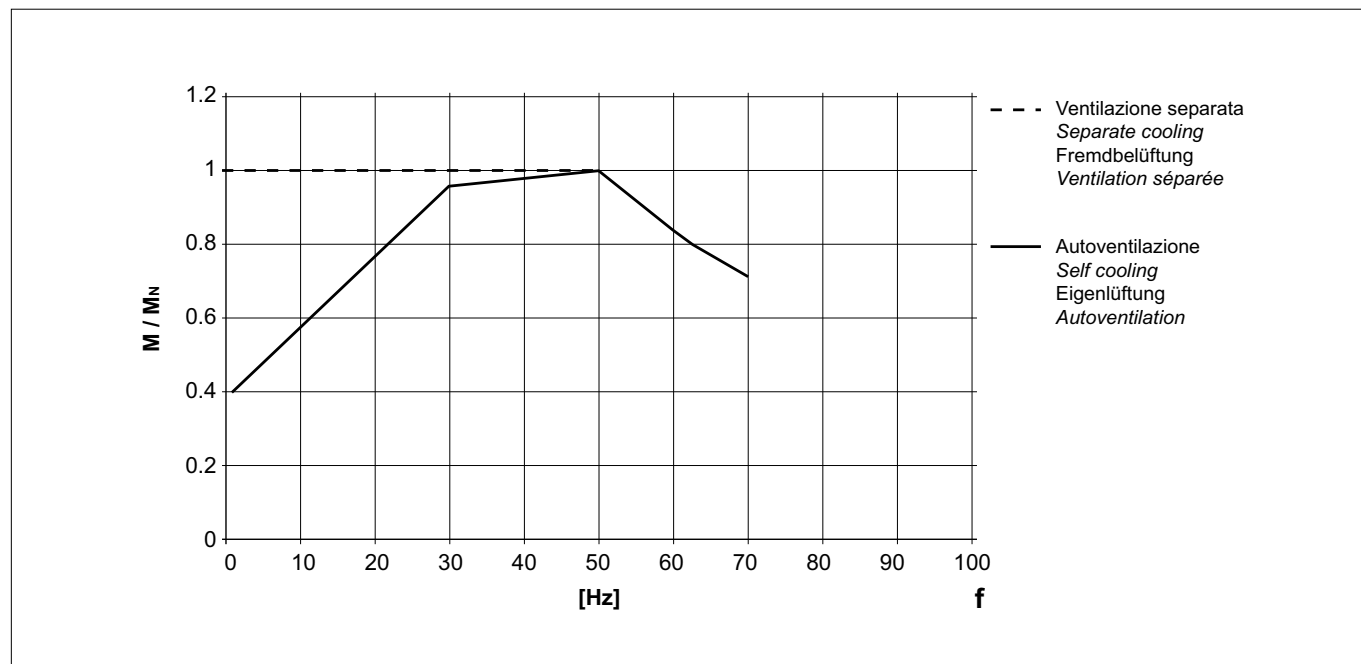
Poiché la coppia massima del motore decresce ca. con $(f/f_b)^2$, il margine di sovraccarico ammesso dovrà essere progressivamente ridotto.

As motor maximum torque decreases with $(f/f_b)^2$, the allowed overloading must be reduced progressively.

nach Erreichen des max. Spannungswerts am Inverterausgang in einem Betriebsbereich unter konstanter Leistung mit einem Drehmoment an der Welle, der sich ungefähr im Verhältnis (f/f_b) reduziert. Da das max. Drehmoment des Motors mit ungefähr $(f/f_b)^2$ abnimmt, muss auch der zulässige Überbelastungsgrenzwert progressiv reduziert werden.

la valeur maximale de tension de sortie du variateur atteinte, le moteur fonctionne dans une plage de fonctionnement à puissance constante, avec couple à l'arbre qui se réduit avec le rapport (f/f_b) . Dans la mesure où le couple maximal du moteur diminue avec $(f/f_b)^2$, la marge de surcharge admise doit être progressivement réduite.

(A45)





Per funzionamento oltre la frequenza nominale, la velocità limite meccanica dei motori è riportata in tabella (A46):

Table (A46) reports the mechanical limit speed for motor operation above rated frequency:

Für einen Betrieb, der über die Nennfrequenz hinausgeht, wird die Geschwindigkeitsbegrenzung der Motoren in der Tabelle (A46) angegeben:

En cas de fonctionnement au-delà de la fréquence nominale, la vitesse limite mécanique des moteurs est indiquée dans le tableau (A46):

(A46)

|  |  | n [min ⁻¹] | | |
|---|---|------------------------|------|------|
| | | 2p | 4p | 6p |
| ≤ BN 112 | M05...M3 | 5200 | 4000 | 3000 |
| BN 132...BN 200L | M4, M5 | 4500 | 4000 | 3000 |

A velocità superiori alla nominale i motori presentano maggiori vibrazioni meccaniche e rumorosità di ventilazione; è consigliabile, per queste applicazioni, un bilanciamento del rotore in grado R e l'eventuale montaggio del servoventilatore indipendente.

Above rated speed, motors generate increased mechanical vibration and fan noise. Class R rotor balancing is highly recommended in these applications. Installing a separate supply fan cooling may also be advisable.

Bei Geschwindigkeiten über die Nennwerte hinaus, weisen die Motoren höhere mechanische Schwingungen und mehr Funktionsgeräusche bei der Belüftung auf. Bei diesen Applikationen wird ein Auswuchten des Rotors im Grad R und eine eventuelle Montage des unabhängig funktionierenden Servoventilators empfohlen.

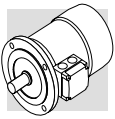
A des vitesses supérieures à la vitesse nominale, les moteurs présentent plus de vibrations mécaniques et de bruit de ventilation ; pour ces applications, il est conseillé d'effectuer un équilibrage du rotor en niveau R et de monter éventuellement un servoventilateur indépendant.

Il servoventilatore e, se presente, il freno elettromagnetico devono sempre essere alimentati direttamente da rete.

Remote-controlled fan and brake (if fitted) must always be connected direct to mains power supply.

Der Servoventilator und, falls vorhanden, die elektromagnetische Bremse müssen immer direkt über das Netz gespeist werden.

Le servoventilateur et, si présent, le frein électromagnétique doivent toujours être alimentés directement par le réseau.



Frequenza massima di avviamento Z

Nelle tabelle dei dati tecnici motori è indicata la max frequenza di inserzione a vuoto Z_0 con $l = 50\%$ riferita alla versione autofrenante. Questo valore definisce il numero max di avviamenti orari a vuoto che il motore può sopportare senza superare la max temperatura ammessa dalla classe di isolamento F. Nel caso pratico di motore accoppiato ad un carico esterno con potenza assorbita P_r , massa inerziale J_c e coppia resistente media durante l'avviamento M_L , il numero di avviamenti ammissibile si può calcolare in modo approssimato con la seguente formula:

Permissible starts per hour, Z

The rating charts of brakemotors lend the permitted number of starts Z_0 , based on 50% intermittence and for unloaded operation.

The catalogue value represents the maximum number of starts per hour for the motor without exceeding the rated temperature for the insulation class F.

To give a practical example for an application characterized by inertia J_c , drawing power P_r and requiring mean torque at start-up M_L the actual number of starts per hour for the motor can be calculated approximately through the following equation:

Maximale Schaltungshäufigkeit Z

In den Tabellen mit den Technischen Daten der Motoren ist die maximale Schaltungshäufigkeit im Leerlauf Z_0 bei relativer Einschaltdauer $l = 50\%$ bezüglich auf die Bremsausführung. Dieser Wert definiert die maximale Anzahl von Anfahrten im Leerlauf pro Stunde, die der Motor ertragen kann, ohne die durch die Isolierstoffklasse F festgelegte maximal zulässige Temperatur zu überschreiten.

Im praktischen Fall eines mit einer externen Last verbundenen Motors mit einer Leistungsaufnahme von P_r , Trägheitsmasse J_c und mittlerem Gegenmoment während des Anfahrens von M_L kann die zulässige Anzahl Anfahrten mit folgender Formel approximativ berechnet werden:

Fréquence maximum de démarrage Z

Dans les tableaux des caractéristiques techniques des moteurs se trouve la fréquence maximum d'insertion à vide Z_0 avec intermittence $l = 50\%$ référée à la version frein. Cette valeur définit un nombre maximum de démarrages horaires à vide que le moteur peut supporter sans dépasser la température maximum admise par la classe d'isolation F.

Dans le cas pratique de moteur accouplé à une charge extérieure avec puissance absorbée P_r , masse inertielle J_c et couple résistant moyen pendant le démarrage M_L , le nombre de démarrages admissible peut se calculer de façon approximative avec la formule suivante:

$$Z = \frac{Z_0 \cdot K_c \cdot K_d}{K_J}$$

dove:

$$K_J = \frac{J_m + J_c}{J_m} = \text{fattore di inerzia}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{fattore di coppia}$$

K_d = fattore di carico
vedi tabella (A47)

where:

$$K_J = \frac{J_m + J_c}{J_m} = \text{inertia factor}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{torque factor}$$

K_d = load factor
see table (A47)

wobei gilt:

$$K_J = \frac{J_m + J_c}{J_m} = \text{Trägheitsfaktor}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{Drehmomentfaktor}$$

K_d = Lastfaktor
siehe Tabelle (A47)

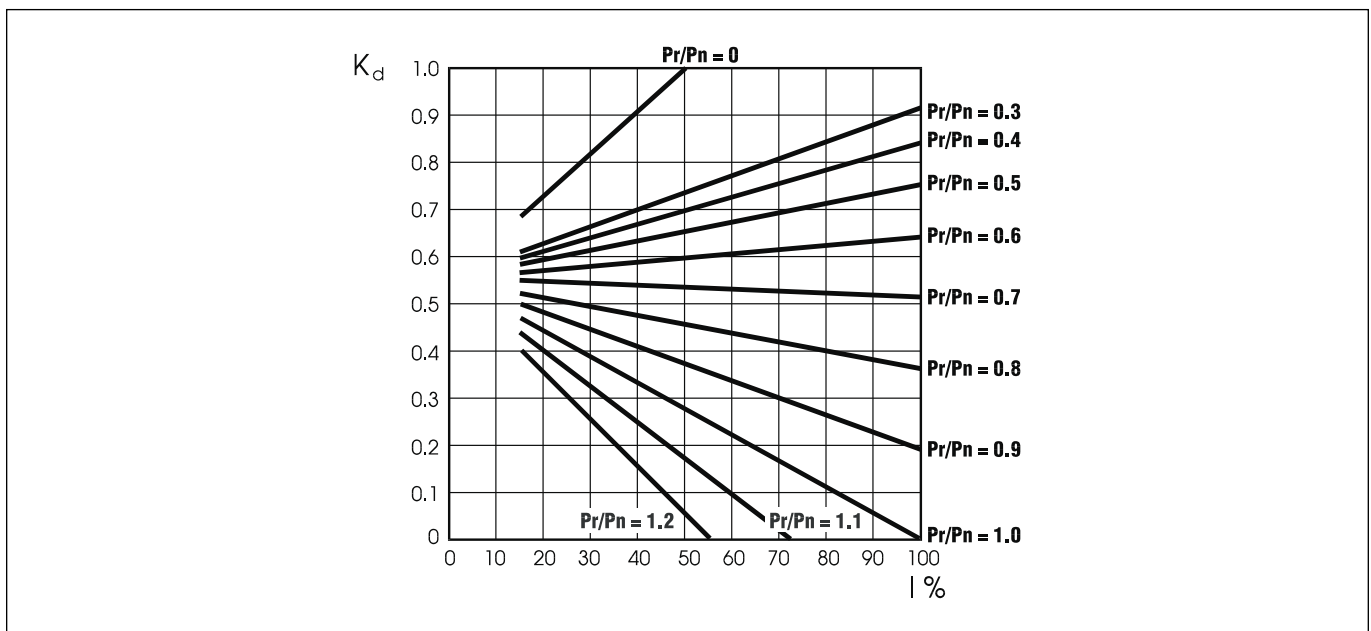
où:

$$K_J = \frac{J_m + J_c}{J_m} = \text{facteur d'inertie}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{facteur de couple}$$

K_d = facteur de charge
voir tableau (A47)

(A47)

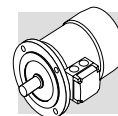


Con il numero di avviamenti così ottenuto si dovrà in seguito verificare che il massimo lavoro di frenatura sia compatibile con la capacità termica del freno W_{max} indicata nella tabella (A54).

If actual starts per hour is within permitted value (Z) it may be worth checking that braking work is compatible with brake (thermal) capacity W_{max} also given in table (A54) and dependent on the number of switches (c/h).

Auf Grundlage der so berechneten Anzahl Schaltungen muß man dann prüfen, ob die maximale Bremsarbeit mit der Wärmegrenzleistung der Bremse W_{max} kompatibel ist, die in die Tabelle (A54) angegeben ist.

Avec le nombre de démarrages ainsi obtenu, il faudra ensuite vérifier que le travail maximum de freinage soit compatible avec la capacité thermique du frein W_{max} indiquée dans le table (A54).



M5 - MOTORI ASINCRONI AUTOFRENANTI

M5 - ASYNCHRONOUS BRAKE MOTORS

M5 - DREHSTROMBREMSMOTOREN

M5 - MOTEURS FREIN ASYNCHRONES

Funzionamento

L'esecuzione autofrenante prevede l'impiego di freni a pressione di molle alimentati in c.c. (tipo FD) o in c.a. (tipo FA, BA). Tutti i freni funzionano secondo il principio di sicurezza, ossia intervengono in seguito alla pressione esercitata dalle molle, in mancanza di alimentazione.

Operation

Versions with incorporated brake use spring-applied DC (FD option) or AC (FA, BA options) brakes. All brakes are designed to provide fail-safe operation, meaning that they are applied by spring-action in the event of power failure.

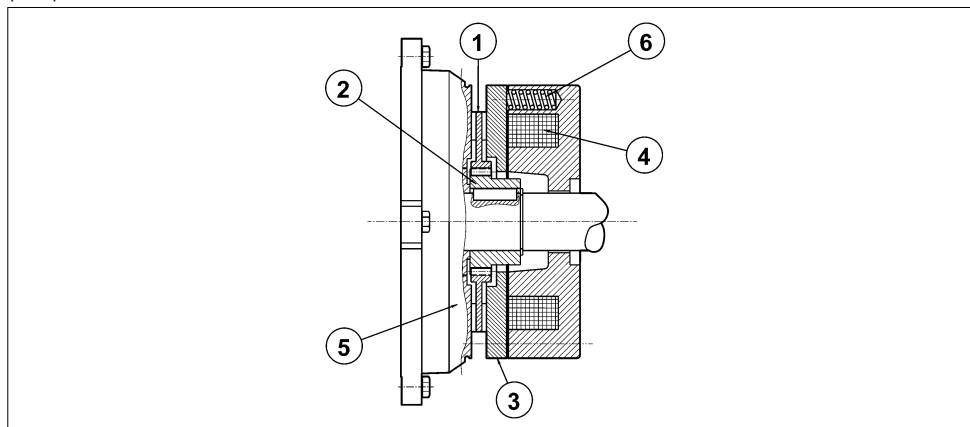
Betriebsweise

Die selbstbremsende Ausführung der Motoren sieht den Einsatz von Federdruckbremsen vor, die mit Gleichstrom (Typ FD) oder mit Wechselstrom (Typ FA, BA) gespeist werden. Alle Bremsen arbeiten gemäß dem Sicherheitsprinzip, d.h. sie greifen, im Fall eines Stromausfalls in Folge eines auf die Feder ausgeübten Drucks ein.

Fonctionnement

L'exécution avec frein prévoit l'utilisation de freins à pression de ressorts alimentés en c.c. (type FD) ou en c.a. (type FA, BA). Tous les freins fonctionnent selon le principe de sécurité, c'est-à-dire qu'ils interviennent suite à la pression exercée par les ressorts, en cas de coupure d'alimentation.

(A48)



Legenda:

- ① disco
- ② mozzo
- ③ ancora mobile
- ④ bobina
- ⑤ scudo post.motore
- ⑥ molle

Key:

- ① brake disc
- ② disc carrier
- ③ pressure plate
- ④ brake coil
- ⑤ motor rear shield
- ⑥ brake springs

Zeichenerklärung:

- ① Brems scheinbe
- ② Nabe
- ③ Beweglicher Anker
- ④ Ringspule
- ⑤ Motorschild
- ⑥ Schußfedern

Légende:

- ① disque
- ② moyeu d'entraînement
- ③ disque de freinage
- ④ bobine de frein
- ⑤ flasque-frein
- ⑥ ressort de frein

In mancanza di tensione, l'ancora mobile spinta dalle molle di pressione blocca il disco freno tra la superficie dell'ancora stessa e lo scudo motore impedendo la rotazione dell'albero. Quando la bobina viene eccitata, l'attrazione magnetica esercitata sull'ancora mobile vince la reazione elastica delle molle e libera il disco freno, e conseguentemente l'albero motore con esso solidale.

When voltage is interrupted, pressure springs push the armature plate against the brake disc. The disc becomes trapped between the armature plate and motor shield and stops the shaft from rotation. When the coil is energized, a magnetic field strong enough to overcome spring action attracts the armature plate, so that the brake disc – which is integral with the motor shaft – is released.

Wenn die Spannungsversorgung abfällt, sorgt der bewegliche, von den Druckfedern geschobene Anker für die Blockierung der Bremsscheibe zwischen der Ankerfläche und dem Motorschild und blockiert damit den Rotor. Wird die Spule erregt, kommt es durch den magnetischen auf den beweglichen Anker wirkenden Anzug zur Überwindung der elastischen Federkraft und zum Lösen der Bremsscheibe, wodurch der rotor wieder freigegeben wird.

En cas de coupure de courant, l'armature mobile, poussée par les ressorts, bloque le disque de frein entre la surface de l'armature et le bouclier moteur empêchant la rotation de l'arbre. Lorsque la bobine est excitée, l'attraction magnétique exercée sur l'armature mobile annule la réaction élastique des ressorts et libère le disque de frein, et par conséquent l'arbre moteur, qui est solidaire.

Caratteristiche generali

Most significant features

Allgemeine Eigenschaften

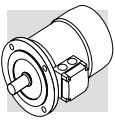
Caractéristiques générales

- Coppie frenanti elevate (generalmente $M_b \approx 2 M_n$) e regolabili.
- Disco freno con anima in acciaio a doppia guarnizione d'attrito (materiale a bassa usura, senza amianto).
- Cava esagonale sull'albero motore, lato ventola (NDE), per rotazione manuale (non prevista quando sono presenti le opzioni PS, RC, TC, U1, U2, EN1, EN2, EN3).
- Sblocco meccanico manuale.
- Trattamento anticorrosivo di tutte le superfici del freno.
- Isolamento in classe F

- High braking torques (normally $M_b \approx 2 M_n$), braking torque adjustment.
- Steel brake disc with double friction lining (low-wear, asbestos-free lining).
- Hexagonal seat on motor shaft fan end (N.D.E.) for manual rotation (not compatible with options PS, RC, TC, U1, U2, EN1, EN2, EN3).
- Manual release lever.
- Corrosion-proof treatment on all brake surfaces.
- Insulation class F

- Hohe und regulierbare Bremsmomente (allgemein $M_b \approx 2 M_n$).
- Bremsscheibe mit Stahlkern und doppeltem Bremsbelag (Material mit geringem Verschleiß, asbestfrei).
- Sechskant hinten an der Motorwelle, auf Lüfterradseite (N.D.E.), für eine manuelle Drehung des Rotors mit einem Inbusschlüssel. (nicht lieferbar, wenn die Optionen PS, RC, TC, U1, U2, EN1, EN2, EN3) bestellt wurden.
- Manuell zu betätigende, mechanische Bremslüftvorrichtung.
- Korrosionsschutzbehandlung an allen Flächen der Bremse.
- Isolierung in Klasse F

- Couples de freinage élevés (généralement $M_b \approx 2 M_n$) et réglables.
- Disque de frein avec structure en acier à double garniture de frottement (matière à faible usure, sans amiante).
- Empreinte hexagonale sur l'arbre moteur, côté ventilateur (N.D.E.), pour la rotation manuelle (non prévue en cas de présence des options PS, RC, TC, U1, U2, EN1, EN2, EN3).
- Déblocage mécanique manuel.
- Traitement anticorrosion sur toute la surface du frein.
- Isolation en classe F



**M6 - MOTORI AUTOFRENANTI
IN C.C., TIPO BN_FD**

**M6 - DC BRAKE MOTORS
TYPE BN_FD**

**M6 - DREHSTROMBREMSMO-
TOREN MIT GLEICH-
STROMBREMSE: TYP
BN_FD**

**M6 - MOTEURS FREIN EN C.C.,
TYPE BN_FD**

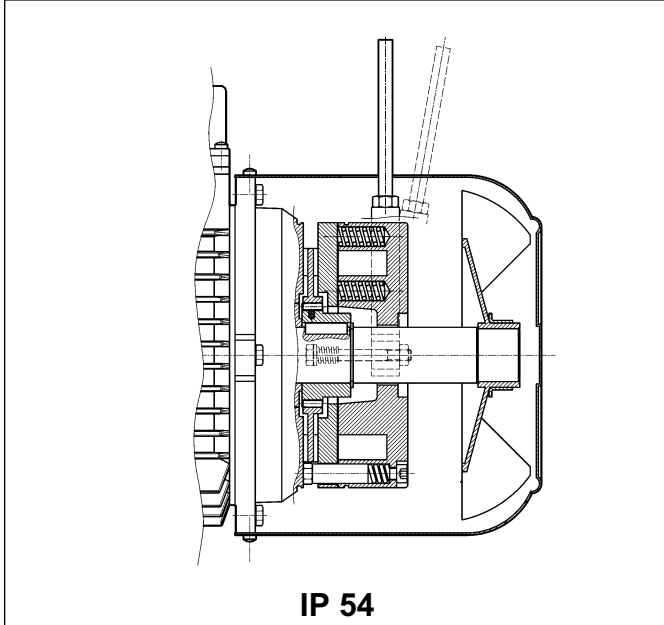
Grandezze: BN 63 ... BN 200L

Frame sizes: BN 63 ... BN 200L

Baugrößen: BN 63 ... BN 200L

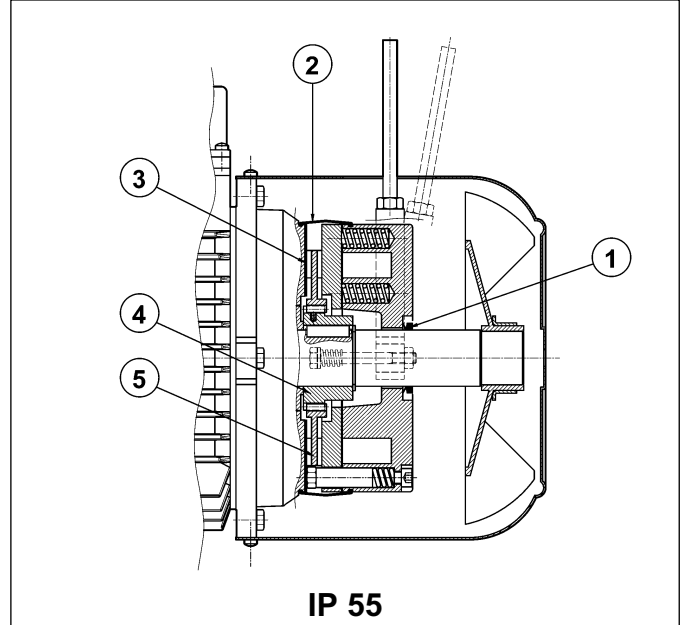
Tailles : BN 63 ... BN 200L

(A49)



IP 54

(A50)



IP 55

Freno elettromagnetico con bobina toroidale in **corrente continua** fissato con viti allo scudo motore; le molle di precarico realizzano il posizionamento assiale del corpo magnete.

Il disco freno è scorrevole sul mozzo trascinate in acciaio calettato sull'albero e previsto di molla antivibrazione.

I motori sono forniti con freno tarato in fabbrica al valore di coppia riportato nelle tabelle dati tecnici; la coppia frenante può essere regolata modificando il tipo e/o il numero delle molle.

A richiesta, i motori possono essere previsti di leva per lo sblocco manuale con ritorno automatico (**R**) o con mantenimento della posizione di rilascio freno (**RM**); per la posizione angolare della leva di sblocco vedi descrizione della relativa variante alla pag. 237.

Il freno FD garantisce elevate prestazioni dinamiche e bassa rumorosità; le caratteristiche d'intervento del freno in corrente continua possono essere ottimizzate in funzione dell'applicazione, utilizzando i vari tipi di alimentatore disponibili e/o realizzando l'opportuno cablaggio.

Direct current toroidal-coil electromagnetic brake bolted onto motor shield. Preloading springs provide axial positioning of magnet body.

Brake disc slides axially on steel hub shrunk onto motor shaft with anti-vibration spring.

Brake torque factory setting is indicated in the corresponding motor rating charts. Braking torque may be modified by changing the type and/or number of springs.

*At request, motors may be equipped with manual release lever with automatic return (**R**) or system for holding brake in the released position (**RM**).*

See variant at page 237 for available release lever locations.

FD brakes ensure excellent dynamic performance with low noise. DC brake operating characteristics may be optimized to meet application requirements by choosing from the various rectifier/power supply and wiring connection options available.

Elektromagnetische Bremse mit Ringwicklungsspule für **Gleichstromspannung**, die mittels Schrauben am hinteren Motorschild befestigt ist. Die Federn sorgen für die axiale Ausrichtung des Magnetkörpers.

Die Bremsscheibe gleitet axial auf der Mitnehmernabe aus Stahl, die über eine Paßfeder mit der Motorwelle verbunden und mit einer Schwingungsdämpfung ausgestattet ist.

Die Motoren werden vom Hersteller auf den in der Tabelle der technischen Daten angegebenen Bremsmoment eingestellt; das Bremsmoment kann durch das Ändern des Typs und/oder der Anzahl der Federn reguliert werden.

Auf Anfrage können die Motoren mit einem Bremslüfthebel für die manuelle Lüftung der Bremse mit selbstständiger Rückstellung (**R**) ohne Arretierung oder mit arretierbarem Lüfthebel (**RM**) geliefert werden. Die Festlegung der Position des Bremslüfthebel in Abhängigkeit von der Klemmkastenlage erfolgt durch die Option auf Seite 237.

Die Bremse vom Typ FD garantiert hohe dynamische Leistungen und niedrige Laufgeräusche. Die Ansprechigenschaften der Bremse unter Gleichstrom können in Abhängigkeit zur jeweiligen Anwendung durch den Einsatz der verschiedenen verfügbaren Gleichrichter oder durch eine entsprechenden Anschluß der Bremse optimiert werden.

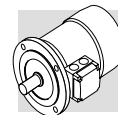
Frein électromagnétique avec bobine toroïdale en courant continu, fixé avec des vis au bouclier moteur; les ressorts de précharge réalisent le positionnement axial de la bobine.

Le disque frein coulisse de façon axiale sur le moyeu d'entraînement en acier calé sur l'arbre et doté de ressort antivibration.

Les moteurs sont fournis avec frein pré réglé en usine à la valeur de couple indiquée dans les tableaux des caractéristiques techniques; le couple de freinage peut être réglé en modifiant le type et/ou le nombre de ressorts.

*Sur demande, les moteurs peuvent être équipés de levier pour le déblocage manuel avec retour automatique (**R**) ou avec maintien de la position de déblocage frein (**RM**); pour la position angulaire du levier de déblocage, voir description de la variante correspondante à la page 237.*

Le frein FD garantit des performances dynamiques élevées et un faible niveau de bruit; les caractéristiques d'intervention du frein en courant continu peuvent être optimisées en fonction de l'application en utilisant les différents types de dispositifs d'alimentation disponibles et/ou en réalisant un câblage approprié.



Grado di protezione

L'esecuzione standard prevede il grado di protezione IP54. In opzione il motore autofrenante tipo FD viene fornito con grado di protezione **IP 55**, prevedendo le seguenti varianti costruttive:

- ① anello V-ring posizionato sull'albero motore N.D.E.
- ② fascia di protezione in gomma
- ③ anello in acciaio inox interposto tra scudo motore e disco freno
- ④ mozzo trascinatore in acciaio inox
- ⑤ disco freno in acciaio inox

Degree of protection

Standard protection class is IP54. Brake motor FD is also available in protection class **IP 55**, which mandates the following variants:

- ① V-ring at N.D.E. of motor shaft
- ② dust and water-proof rubber boot
- ③ stainless steel ring placed between motor shield and brake disc
- ④ stainless steel hub
- ⑤ stainless steel brake disc

Schutzart

Die Standardausführung ist Schutzart IP54 vor. Optional kann der Bremsmotor vom Typ FD in der Schutzart **IP 55** geliefert werden, wobei sind folgende Komponenten eingesetzt werden:

- ① V-Ring an der Motorwelle N.D.E.
- ② Schutzring aus Gummi
- ③ Ring aus rostfreiem Stahl zwischen Motorschild und
- ④ Bremsscheibe Mitnehmer-nabe aus rostfreiem Stahl
- ⑤ Bremsscheibe aus rostfreiem Stahl

Degré de protection

L'exécution standard prévoit le degré de protection IP54. En option, le moteur frein type FD est fourni avec degré de protection **IP 55**, en prévoyant les variantes de construction suivantes :

- ① bague V-ring positionnées sur l'arbre moteur N.D.E.
- ② bande de protection en caoutchouc
- ③ bague en acier inox interposée entre le bouclier moteur et le disque de frein
- ④ moyeu d'entraînement en acier inox
- ⑤ disque frein en acier inox

Alimentazione freno FD

L'alimentazione della bobina freno in c.c. è prevista per mezzo di opportuno raddrizzatore montato all'interno della scatola coprimorsetti e già cablato alla bobina del freno. Per motori a singola polarità è inoltre previsto di serie il collegamento del raddrizzatore alla morsettiera motore. Indipendentemente dalla frequenza di rete, la tensione standard di alimentazione del raddrizzatore V_B ha il valore indicato nella tabella (A51) qui di seguito:

FD brake power supply

A rectifier accommodated inside the terminal box feeds the DC brake coil. Wiring connection across rectifier and brake coil is performed at the factory. On all single-pole motors, rectifier is connected to the motor terminal board. Rectifier standard power supply voltage V_B is as indicated in the following table (A51), regardless of mains frequency:

Spannungsversorgung der Bremse FD

Die Versorgung der Gleichstrombremsenspule erfolgt über einen Gleichrichter im Klemmenkasten der bei Lieferung, wenn nicht anders bestellt, bereits mit der Bremsspule verkabelt ist. Bei den einpoligen Motoren ist serienmäßig der Anschluss des Gleichrichters an die Motorspannung vorgesehen. Unabhängig von der Netzfrequenz erfolgt die Versorgung des Gleichrichters V_B über die in der nachstehenden Tabelle (A51) angegebenen Standardspannung:

Alimentation frein FD

L'alimentation de la bobine de frein en c.c. est prévue au moyen d'un redresseur approprié monté à l'intérieur de la boîte à bornes et déjà câblé à la bobine de frein. De plus, pour les moteurs à simple polarité, le raccordement du redresseur au bornier moteur est prévu de série. Indépendamment de la fréquence du réseau, la tension standard d'alimentation du redresseur V_B correspond à la valeur indiquée dans le tableau (A51) ci-dessous :

(A51)

| 2, 4, 6 P | | BN_FD / M_FD | | 1 speed | |
|-----------------|------------|---------------------------|-----------------------|--|---|
| | | $V_{mot} \pm 10\%$ 3 ~ | $V_B \pm 10\%$ 1 ~ | alimentazione freno da morsettiera brake connected to terminal board power supply Bremsversorgung über die Motorspannung Alimentation frein depuis boîte à bornes | alimentazione separata separate power supply Separate Versorgung Alimentation séparée |
| BN 63...BN 132 | M05...M4LB | 230/400 V – 50 Hz | 230 V | standard | specificare $V_B SA$ o $V_B SD$ specify $V_B SA$ or $V_B SD$ $V_B SA$ oder $V_B SD$ angeben spécifier $V_B SA$ ou $V_B SD$ |
| BN 160...BN 200 | M4LC...M5 | 400/690 V – 50 Hz | 400 V | standard | specificare $V_B SA$ o $V_B SD$ specify $V_B SA$ or $V_B SD$ $V_B SA$ oder $V_B SD$ angeben spécifier $V_B SA$ ou $V_B SD$ |

Per i motori a doppia polarità l'alimentazione standard del freno è da linea separata con tensione d'ingresso al raddrizzatore V_B come indicato in tabella (A52):

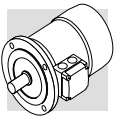
Switch-pole motors feature a separate power supply line for the brake with rectifier input voltage V_B as indicated in the table (A52):

Die polumschaltbaren Motoren müssen immer mit separater Bremsversorgungsspannung betrieben werden, deshalb erfolgt die Lieferung standardmäßig ohne Anschluß der Bremse an die Motorspannung, da diese mit einer am Eingang des Gleichrichters V_B anliegenden Spannung versorgt werden muß, entsprechend Werte in der nachstehenden Tabelle (A52):

Pour les moteurs à double polarité, l'alimentation standard du frein dérive d'une ligne séparée avec tension d'entrée au redresseur V_B comme indiqué dans le tableau (A52):

(A52)

| 2/4, 2/6, 2/8, 2/12, 4/6, 4/8 P | | BN_FD / M_FD | | 2 speed | |
|---------------------------------|------------|---------------------------|-----------------------|--|---|
| | | $V_{mot} \pm 10\%$ 3 ~ | $V_B \pm 10\%$ 1 ~ | alimentazione freno da morsettiera brake powered via terminal board Bremsversorgung über die Motorspannung Alimentation frein depuis boîte à bornes | alimentazione separata separate power supply Separate Versorgung Alimentation séparée |
| BN 63...BN 132 | M05...M4LB | 400 V – 50 Hz | 230 V | | specificare $V_B SA$ o $V_B SD$ specify $V_B SA$ or $V_B SD$ $V_B SA$ oder $V_B SD$ angeben spécifier $V_B SA$ ou $V_B SD$ |



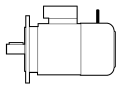


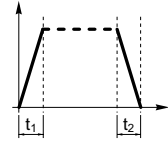
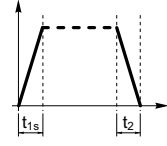
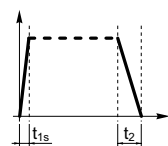
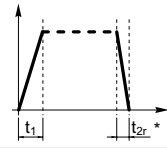
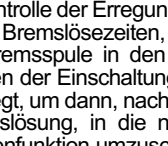
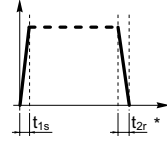
Il raddrizzatore è del tipo a diodi a semionda ($V_{c.c} \approx 0,45 \times V_{c.a.}$) ed è disponibile nelle versioni **NB**, **SB**, **NBR** e **SBR**, come dettagliato nella tabella (A53) seguente:

The diode half-wave rectifier ($V_{DC} \approx 0,45 \times V_{AC}$) is available in versions **NB**, **SB**, **NBR** e **SBR**, as detailed in the table (A53) below:

Bei dem Gleichrichter handelt es sich um einen Typ mit Halbwel-lendioden ($V_{c.c} \approx 0,45 V_{c.a.}$). Er ist in den Versionen **NB**, **SB**, **NBR** und **SBR**, gemäß den Details in der nachstehenden Tabelle (A53), verfügbar:

Le redresseur est du type à diodes à demi-onde ($V_{c.c} \approx 0,45 \times V_{c.a.}$) et il est disponible dans les versions **NB**, **SB**, **NBR** et **SBR**, comme indiqué de façon détaillée dans le tableau (A53) suivant :

(A53)

|  |  | freno brake Bremsen frein |  | | | |
|---|---|------------------------------------|---|---|--|---|
| | | | standard | a richiesta at request auf Anfrage Sur demande | | |
| BN 63 | M05 | FD 02 |  |  | | |
| BN 71 | M1 | FD 03 | | | | |
| | | FD 53 | | | | |
| BN 80 | M2 | FD 04 | | |  |  |
| BN 90S | — | FD 14 | | | | |
| BN 90L | — | FD 05 | | | | |
| BN 100 | M3 | FD 15 | | |  |  |
| — | | FD 55 | | | | |
| BN 112 | — | FD 06S | | | | |
| BN 132...160MR | M4 | FD 56 | | | | |
| BN 160L - BN 180M | M5 | FD 06 | | | | |
| BN 180L - NM 200L | — | FD 07 | | | | |

(*) $t_{2c} < t_{2r} < t_2$

Il raddrizzatore **SB** a controllo elettronico dell'eccitazione, riduce i tempi di sblocco del freno sovraccitando l'elettromagnete nei primi istanti d'inserzione, per passare poi al normale funzionamento a semionda a distacco del freno avvenuto.

Rectifier **SB** with electronic energizing control over-energizes the electromagnet upon power-up to cut brake release response time and then switches to normal half-wave operation once the brake has been released.

Der Gleichrichter **SB** mit elektronischer Kontrolle der Erregung reduziert die Bremslösezeiten, indem er die Bremsspule in den ersten Momenten der Einschaltung übermäßig erregt, um dann, nach erfolgter Bremslösung, in die normale Halbwellenfunktion umzuschalten.

Le redresseur **SB** à contrôle électronique de l'excitation réduit les temps de déblocage du frein en surexcitant l'électro-aimant durant les premiers instants d'enclenchement pour passer ensuite au fonctionnement normal à demi-onde une fois le frein désactivé.

L'impiego del raddrizzatore tipo **SB** è sempre da prevedere nei casi di:

Use of the **SB** rectifier is mandatory in the event of:

Der Einsatz eines Gleichrichters vom Typ **SB** wird in folgenden Fällen empfohlen:

L'utilisation du redresseur type **SB** doit toujours être prévue dans les cas suivants :

- elevato numero di interventi orari
- tempi di sblocco freno ridotti
- elevate sollecitazioni termiche del freno

- high number of operations per hour
- reduced brake release response time
- brake is exposed to extreme thermal stress

- hohe Anzahl von Schaltungen pro Stunde
- schnelle Bremsansprechzeiten
- starke thermische Beanspruchungen der Bremse

- nombre d'interventions horaires élevé
- temps de déblocage frein réduits
- sollicitations thermiques du frein élevées

Per applicazioni dove è richiesto un rapido rilascio del freno sono disponibili a richiesta i raddrizzatori **NBR** o **SBR**.

Rectifiers **NBR** or **SBR** are available for applications requiring quick brake release response.

Für die Anwendungen, bei denen eine schnelle Ansprechzeit der Bremse gefordert wird, können auf Anfrage die Gleichrichter **NBR** oder **SBR** geliefert werden.

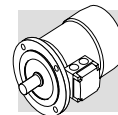
Pour les applications nécessitant un déblocage rapide du frein, sur demande les redresseurs **NBR** ou **SBR** sont disponibles.

Questi raddrizzatori completano i tipi **NB** e **SB**, integrando nel cir-

These rectifiers complement the **NB** and **SB** types as their elec-

Diese Gleichrichter erweitern die

en intégrant



cuito elettronico un interruttore statico che interviene diseccando rapidamente il freno in caso di mancanza di tensione. Questa soluzione consente di ridurre i tempi di rilascio del freno evitando ulteriori cablaggi e contatti esterni.

Per il migliore utilizzo dei raddrizzatori **NBR** e **SBR** è richiesta l'alimentazione separata del freno.

Tensioni disponibili: 230V ± 10%, 400V ± 10%, 50/60 Hz.

tronic circuit incorporates a static switch that de-energizes the brake quickly in the event voltage is missing.

This arrangement ensures short brake release response time with no need for additional external wiring and contacts.

*Optimum performance of rectifiers **NBR** and **SBR** is achieved with separate brake power supply.*

Available voltages: 230V ± 10%, 400V ± 10%, 50/60 Hz.

Funktion der Typen **NB** und **SB**, indem in dem elektronischen Schaltkreis ein statischen Schalter integriert ist, durch dessen Auslösen die Bremse im Fall eines Spannungsausfalls schnell abgeregt wird.

Diese Lösung ermöglicht eine Verringerung der Ansprechzeiten der Bremse, wodurch weitere Schaltungen und externe Sensoren vermieden werden können. Im Hinblick auf einen besseren Einsatz der Gleichrichter **NBR** und **SBR** ist bei der Bremse eine separate Versorgung erforderlich. Verfügbare Spannungen: 230V ± 10%, 400V ± 10%, 50/60 Hz.

dans le circuit électronique un interrupteur statique qui intervient en désexcitant rapidement le frein en cas de coupure de tension.

Cette solution permet de réduire les temps de déblocage du frein en évitant d'autres câblages et contacts extérieurs.

*Pour une meilleure utilisation des redresseurs **NBR** et **SBR** l'alimentation séparée du frein est nécessaire.*

Tensions disponibles : 230V ± 10%, 400V ± 10%, 50/60 Hz.

Dati tecnici freni FD

Nella tabella (A54) sottostante sono riportati i dati tecnici dei freni in c.c. tipo FD.

(A54)

FD brake technical specifications

The table (A54) below reports the technical specifications of DC brakes FD.

Technische Daten - Bremstyp FD

In der nachstehenden Tabelle (A54) werden die technischen Daten der Gleichstrombremsen vom Typ FD angegeben.

Caractéristiques techniques freins FD

Le tableau (A54) suivant indique les caractéristiques techniques des freins en c.c. type FD.

| Freno Brake Frein | Coppia frenante M_b [Nm] Brake torque M_b [Nm] Bremsmoment M_b [Nm] Couple de freinage M_b [Nm] | | | Rilascio Release Ansprechzeit Déblocage | | Frenatura Braking Bremsung Freinage | | Wmax per frenata Wmax per brake operation Wmax pro Bremsung Wmax par freinage | | | W [MJ] | P [W] |
|-------------------------|--|-----|------|--|----------|--|----------|--|---------|----------|-----------|----------|
| | molle / springs feder / ressorts | | | t_1 | t_{1s} | t_2 | t_{2c} | [J] | | | | |
| | 6 | 4 | 2 | [ms] | [ms] | [ms] | [ms] | 10 s/h | 100 s/h | 1000 s/h | | |
| FD02 | – | 3.5 | 1.75 | 30 | 15 | 80 | 9 | 4500 | 1400 | 180 | 15 | 17 |
| FD03 | 5 | 3.5 | 1.75 | 50 | 20 | 100 | 12 | 7000 | 1900 | 230 | 25 | 24 |
| FD53 | 7.5 | 5 | 2.5 | 60 | 30 | 100 | 12 | | | | | |
| FD04 | 15 | 10 | 5 | 80 | 35 | 140 | 15 | 10000 | 3100 | 350 | 30 | 33 |
| FD14 | | | | | | | | | | | | |
| FD05 | 40 | 26 | 13 | 130 | 65 | 170 | 20 | 18000 | 4500 | 500 | 50 | 45 |
| FD15 | 40 | 26 | 13 | 130 | 65 | 170 | 20 | | | | | |
| FD55 | 55 | 37 | 18 | – | 65 | 170 | 20 | | | | | |
| FD06S | 60 | 40 | 20 | – | 80 | 220 | 25 | 20000 | 4800 | 550 | 70 | 55 |
| FD56 | – | 75 | 37 | – | 90 | 150 | 20 | 29000 | 7400 | 800 | 80 | 65 |
| FD06 | | 100 | 50 | | 100 | 20 | | | | | | |
| FD07 | 150 | 100 | 50 | – | 120 | 200 | 25 | 40000 | 9300 | 1000 | 130 | 65 |
| FD08* | 250 | 200 | 170 | – | 140 | 350 | 30 | 60000 | 14000 | 1500 | 230 | 100 |
| FD09** | 400 | 300 | 200 | – | 200 | 450 | 40 | 70000 | 15000 | 1700 | 230 | 120 |

* valori di coppia frenante ottenuti con n° 9, 7, 6 molle rispettivamente

* *brake torque values obtained with 9, 7 and 6 springs, respectively*

* Werte, der durch den Einsatz von jeweils 9, 7, 6 Federn erreichten Bremsmomente

* *valeurs de couple de freinage obtenues respectivement avec n° 9, 7, 6 ressorts*

** valori di coppia frenante ottenuti con n° 12, 9, 6 molle rispettivamente

** *brake torque values obtained with 12, 9 and 6 springs, respectively*

** Werte, der durch den Einsatz von jeweils 12, 9, 6 Federn erreichten Bremsmomente

** *valeurs de couple de freinage obtenues respectivement avec n° 12, 9, 6 ressorts*

Legenda:

t_1 = tempo di rilascio del freno con alimentatore a semionda
 t_{1s} = tempo di rilascio del freno con alimentatore a controllo elettronico dell'eccitazione
 t_2 = ritardo di frenatura con interruzione lato c.a. e alimentazione separata
 t_{2c} = ritardo di frenatura con interruzione lato c.a. e c.c. – I valori di t_1 , t_{1s} , t_2 , t_{2c} indicati nella tab. (A54) sono riferiti al freno tarato alla coppia massima, trafero medio e tensione nominale
 W_{max} = energia max per frenata
 W = energia di frenatura tra due regolazioni successive del trafero
 P_b = potenza assorbita dal freno a 20°C
 M_b = coppia frenante statica (±15%)
s/h = avviamenti orari

Key:

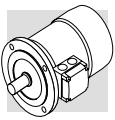
t_1 = *brake release time with half-wave rectifier*
 t_{1s} = *brake release time with over-energizing rectifier*
 t_2 = *brake engagement time with AC line interruption and separate power supply*
 t_{2c} = *brake engagement time with AC and DC line interruption – Values for t_1 , t_{1s} , t_2 , t_{2c} indicated in the tab. (A54) are referred to brake set at maximum torque, medium air gap and rated voltage*
 W_{max} = *max energy per brake operation*
 W = *braking energy between two successive air gap adjustments*
 P_b = *brake power absorption at 20°C*
 M_b = *static braking torque (±15%)*
s/h = *starts per hour*

Zeichenerklärung:

t_1 = *Ansprechzeit der Bremse mit Halwellengleichrichter*
 t_{1s} = *Ansprechzeit der Bremse mit elektronisch gesteuerten Erregungsgleichrichter*
 t_2 = *Bremsverzögerung mit Unterbrechung auf Wechselstromseite und Fremdversorgung*
 t_{2c} = *Bremsverzögerung mit Unterbrechung auf Wechselstrom- und Gleichstromseite – Die in der Tab. (A54) angegebenen Werte t_1 , t_{1s} , t_2 , t_{2c} beziehen sich auf eine auf das max. Bremsmoment geeichte Bremse, mit mittlerem Luftspalt und Nennspannung*
 W_{max} = *max. Energie pro Bremsung*
 W = *Bremsenergie zwischen zwei Einstellungen des Luftspalts*
 P_b = *bei 20°C von der Bremse aufgenommene Leistung (50 Hz)*
 M_b = *statisches Bremsmoment (±15%)*
s/h = *Einschaltungen pro stunde*

Légende:

t_1 = *temps de déblocage du frein avec dispositif d'alimentation à demi-onde*
 t_{1s} = *temps de déblocage du frein avec dispositif d'alimentation à contrôle électronique de l'excitation*
 t_2 = *retard de freinage avec interruption côté c.a. et alimentation séparée*
 t_{2c} = *retard de freinage avec interruption côté c.a. et c.c. – Les valeurs de t_1 , t_{1s} , t_2 , t_{2c} indiquées dans le tab. (A54) se réfèrent au frein étalonné au couple maximal, entrefer moyen et tension nominale*
 W_{max} = *énergie max. par freinage*
 W = *énergie de freinage entre deux réglages successifs de l'entrefer*
 P_b = *puissance absorbée par le frein à 20°C*
 M_b = *couple de freinage statique (±15%)*
s/h = *démarrages horaires*



Collegamenti freno FD

I motori standard ad una velocità sono forniti con il collegamento del raddrizzatore alla morsetteria motore già realizzato in fabbrica. Per motori a 2 velocità, e dove è richiesta l'alimentazione del freno separata, prevedere il collegamento al raddrizzatore in accordo alla tensione freno V_B indicata nella targhetta del motore. **Data la natura induttiva del carico, per il comando del freno e per l'interruzione lato corrente continua devono essere utilizzati contatti con categoria d'impiego AC-3 secondo IEC 60947-4-1.**

Tabella (A55) - Alimentazione freno dai morsetti motore ed interruzione lato a.c.

Tempo di arresto t_2 ritardato e funzione delle costanti di tempo del motore. Da prevedere quando sono richiesti avviamenti/arresti progressivi.

Tabella (A56) - Bobina freno con alimentazione separata ed interruzione lato c.a.

Tempo di arresto normale ed indipendente dal motore. Si realizzano i tempi di arresto t_2 indicati nella tabella (A54).

Tabella (A57) - Bobina freno con alimentazione dai morsetti motore ed interruzione lato c.a. e c.c.

Arresto rapido con i tempi d'intervento t_{2c} indicati in tabella (A54).

Tabella (A87) - Bobina freno con alimentazione separata ed interruzione lato c.a. e c.c.

Tempo di arresto ridotto secondo i valori t_{2c} indicati in tabella (A54).

FD brake connections

On standard single-pole motors, the rectifier is connected to the motor terminal board at the factory.

For switch-pole motors and where a separate brake power supply is required, connection to rectifier must comply with brake voltage V_B stated in motor name plate.

Because the load is of the inductive type, brake control and DC line interruption must use contacts from the usage class AC-3 to IEC 60947-4-1.

Table (A55) – Brake power supply from motor terminals and AC line interruption

Delayed stop time t_2 and function of motor time constants. Mandatory when soft-start/stops are required.

Table (A56) – Brake coil with separate power supply and AC line interruption

Normal stop time independent of motor.

Achieved stop times t_2 are indicated in the table (A54).

Table (A57) – Brake coil power supply from motor terminals and AC/DC line interruption.

Quick stop with operation times t_{2c} as per table (A54).

Table (A58) – Brake coil with separate power supply and AC/DC line interruption.

Stop time decreases by values t_{2c} indicated in the table (A54).

Anschlüsse - Bremstyp FD

Die einpoligen Motoren werden vom Werk ab mit an die Motorspannung angeschlossenen Gleichrichter geliefert.

Für die polumschaltbaren Motoren, und Bremse mit separater Versorgung, wird in Übereinstimmung mit der auf dem Typenschild des Motors angegebenen Bremsspannung V_B der Anschluss an den Gleichrichter vorgesehen.

Da es sich bei der Bremsleistung um eine induktive Kraft handelt, müssen gemäß IEC 60947-4-1 für die Steuerung der Bremse und die Unterbrechung der Gleichstromseite Kontakte der Kategorie AC-3 verwendet werden.

Tabelle (A55) – Bremsversorgung über die Motorspannung und Unterbrechung der Wechselstromseite.

Verzögerter und von den Zeitkonstanten des Motors abhängige Haltezeit t_2 .

Vorzusehen, wenn progressive Starts/Stops erforderlich sind.

Tabelle (A56) – Bremsspule mit separater Spannungsversorgung und Unterbrechung der Wechselstromseite.

Normale und vom Motor unabhängige Stoppzeiten. Es werden die in der Tabelle (A54) angegebenen Stoppzeiten t_2 realisiert.

Tabelle (A57) – Bremsspule mit Versorgung über die Motorspannung und Unterbrechung der Gleich- und der Wechselstromseite. Schneller Stopp mit den in der Tabelle (A54) angegebenen Ansprechzeiten t_{2c} .

Tabelle (A58) – Bremsspule mit separater Spannungsversorgung und Unterbrechung der Gleich- und der Wechselstromseite. Reduzierte Stoppzeiten der in der Tabelle (A54) angegebenen Werte t_{2c} .

Raccordements frein FD

Les moteurs standard à une vitesse sont fournis avec le raccordement du redresseur au bornier moteur déjà réalisé en usine.

Pour les moteurs à 2 vitesses, et lorsqu'une alimentation séparée du frein est requise, prévoir le raccordement au redresseur conformément à la tension frein V_B indiquée sur la plaque signalétique du moteur.

Etant donné la nature inductive de la charge, pour la commande du frein et l'interruption côté courant continu, il est nécessaire d'utiliser des contacts avec catégorie d'utilisation AC-3 selon la norme IEC 60947-4-1.

Tableau (A55) - Alimentation frein depuis bornes moteur et interruption côté c.a.

Temps d'arrêt t_2 retardé et fonction des constantes de temps du moteur.

A prévoir lorsque des démarrages/arrests progressifs sont requis.

Tableau (A56) - Bobine de frein avec alimentation séparée et interrupteur côté c.a.

Temps d'arrêt normal et indépendant du moteur.

Les temps d'arrêts t_2 sont ceux indiqués dans le tableau (A54).

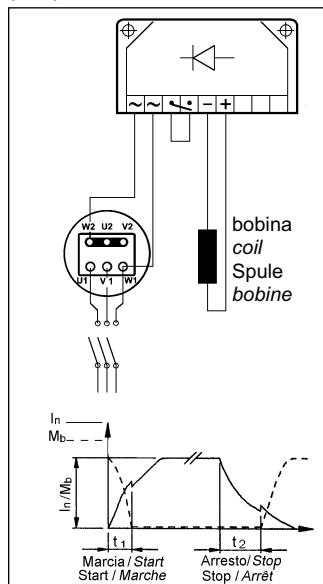
Tableau (A57) - Bobine de frein avec alimentation depuis les bornes moteur et interruption côté c.a. et c.c.

Arrêt rapide avec les temps d'intervention t_{2c} indiqués dans le tableau (A54).

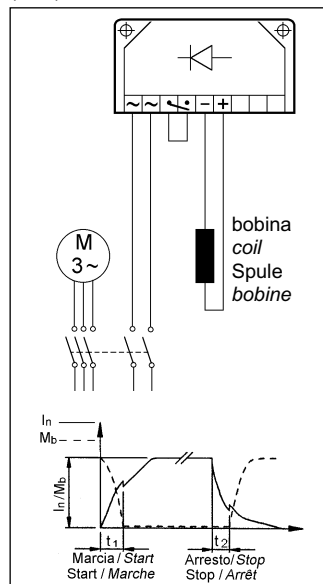
Tableau (A58) - Bobine de frein avec alimentation séparée et interruption côté c.a. et c.c.

Temps d'arrêt réduit selon les valeurs t_{2c} indiquées dans le tableau (A54).

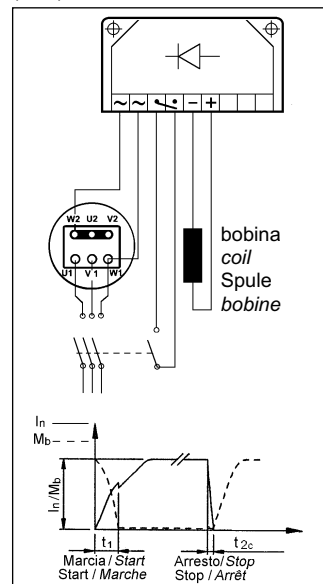
(A55)



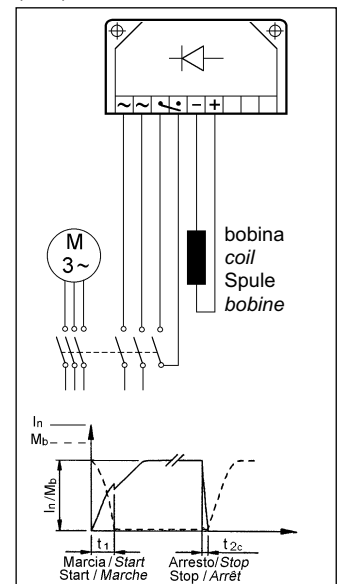
(A56)



(A57)



(A58)

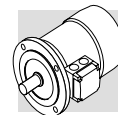


Le tabelle da (A55) a (A58) riportano gli schemi tipici di collegamento per alimentazione 400 V, motori 230/400V collegati a stella e freno 230 V.

Tables (A55) through (A58) show the typical connection diagrams for 400 V power supply, star-connected 230/400V motors and 230 V brake.

In den Tabellen (A55) bis (A58) werden die typischen Schaltungen für Versorgung mit 400 V, Motoren 230/400V mit Sternschaltung und einer Bremsspannung von 230 V wiedergegeben.

Les tableaux de (A55) à (A58) indiquent les schémas typiques de branchement pour une alimentation de 400 V, moteurs 230/400V raccordés en étoile et frein 230 V.



**M7 - MOTORI AUTOFRENANTI
IN C.A., TIPO BN_FA**

**M7 - AC BRAKE MOTORS
TYPE BN_FA**

**M7 - WECHSELSTROM-
BREMSMOTOREN-TYP
BN_FA**

**M7 - MOTEURS FREIN EN C.A.,
TYPE BN_FA**

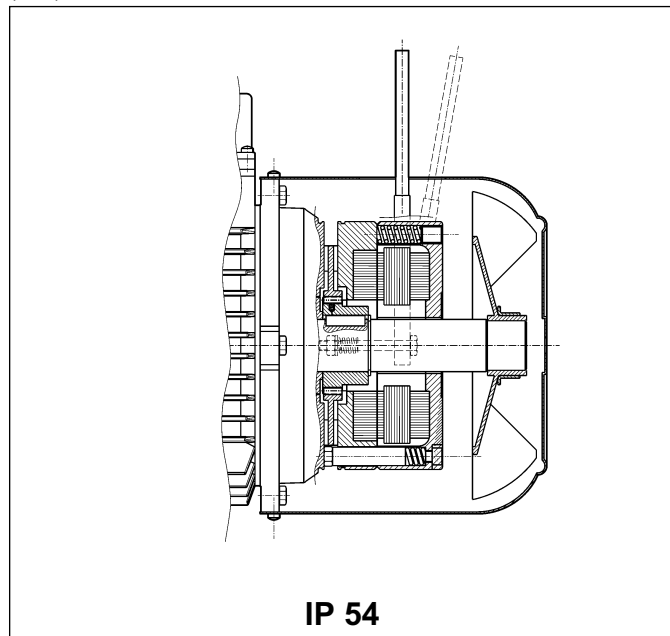
Grandezze: BN 63 ... BN 180M

Frame sizes: BN 63 ... BN 180M

Baugrößen: BN 63 ... BN 180M

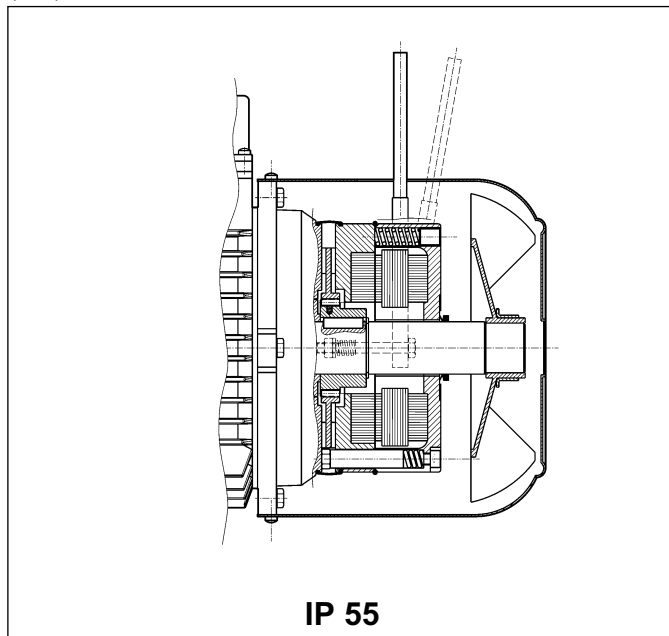
Tailles : BN 63 ... BN 180M

(A59)



IP 54

(A60)



IP 55

Freno elettromagnetico con alimentazione in **corrente alternata** trifase, fissato con viti allo scudo motore; le molle di precarico realizzano il posizionamento assiale del corpo magnete.

Il disco freno è scorrevole assialmente sul mozzo trascinateore in acciaio calettato sull'albero e provvisto di molle antivibrazione. La coppia frenante è pre-impostata in fabbrica su valori che sono indicati nelle tabelle dati tecnici dei relativi motori.

L'azione del freno è inoltre modulabile, regolando con continuità la coppia frenante, tramite le viti che realizzano il precarico delle molle; il campo di regolazione della coppia è: $30\% M_{bMAX} < M_b < M_{bMAX}$ (M_{bMAX} è il momento frenante max riportato in tab. (A62).

Il freno tipo FA presenta dinamiche molto elevate che lo rendono idoneo in applicazioni dove sono richieste frequenze di avviamento elevate con tempi d'intervento molto rapidi.

A richiesta, i motori possono essere previsti di leva per lo sblocco manuale con ritorno automatico (R). Per la specifica della posizione angolare della leva vedi relativa variante alla pag. 237.

*Electromagnetic brake operates from three-phase **alternated current** power supply and is bolted onto conveyor shield. Preloading springs provide axial positioning of magnet body.*

Steel brake disc slides axially on steel hub shrunk onto motor shaft with anti-vibration spring. Brake torque factory setting is indicated in the corresponding motor rating charts.

Spring preloading screws provide stepless braking torque adjustment.

Torque adjustment range is $30\% M_{bMAX} < M_b < M_{bMAX}$ (where M_{bMAX} is maximum braking torque as shown in tab. (A62).

Thanks to their high dynamic characteristics, FA brakes are ideal for heavy-duty applications as well as applications requiring frequent stop/starts and very fast response time.

Motors may be equipped with manual release lever with automatic return (R) at request. See variants at page 237 for available lever locations.

Elektromagnetische Bremse mit **Drehstromversorgung**, die mittels Schrauben am hinteren Motorschild befestigt ist. Die Federn sorgen dabei für die axiale Ausrichtung des Magnetkörpers.

Die Bremsscheibe (Stahl) gleitet axial auf dem sich auf dem Rotor befindlichen Mitnehmer, der über eine Paßfeder mit Motorwelle verbunden und mit einer Schwingungsdämpffeder ausgestattet ist.

Das Bremsmoment wird auf das entsprechende Motormoment eingestellt (siehe Tabelle der technischen Daten der entsprechenden Motoren).

Das Bremsmoment ist stufenlos durch über die Schrauben die die Federvorspannung einstellbar. Der Einstellbereich beträgt $30\% M_{bMAX} < M_b < M_{bMAX}$ (M_{bMAX} steht für den max. Bremsmoment, der in der Tab (A62) angegeben wird).

Die Bremse vom Typ FA zeichnet sich durch ihre hohen Dynamik aus, weshalb sie für Anwendungen geeignet sind, in denen hohe Schaltfrequenzen und schnelle Ansprechzeiten gefordert werden.

Auf Anfrage können die Motoren mit einem Lüfterhebel für die manuelle Lüftung der Bremse mit automatischer Rückstellung (R) geliefert werden. Die Angabe der Montageposition erfolgt über die Angabe der Option auf Seite 237.

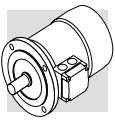
*Frein électromagnétique avec alimentation en **courant alternatif** triphasé, fixé avec des vis au bouclier; les ressorts de précharge réalisent le positionnement axial de la bobine.*

Le disque frein coulisse de façon axiale sur le moyeu d'entraînement en acier, calé sur l'arbre et doté de ressort antivibration.

Le couple de freinage est pré-réglé en usine aux valeurs qui sont indiquées dans les tableaux des caractéristiques techniques des moteurs correspondants. De plus, l'action du frein est modulable, en réglant le couple de freinage en continu au moyen des vis qui réalisent la précharge des ressorts; la plage de réglage du couple est de $30\% M_{bMAX} < M_b < M_{bMAX}$ (M_{bMAX} est le couple de freinage maximum indiqué dans le tab. (A62).

Le frein type FA présente des caractéristiques dynamiques très élevées, il est donc adapté pour des applications nécessitant des fréquences de démarrage élevées et des temps d'intervention très rapides.

Sur demande, les moteurs peuvent être prévus avec levier pour le déblocage manuel avec retour automatique (R). Pour la spécification de la position angulaire du levier, voir variante page 237.



Grado di protezione

L'esecuzione standard prevede il grado di protezione IP54. In opzione, il motore autofrenante BN_FA viene fornito con grado di protezione **IP 55** prevedendo le seguenti varianti costruttive:

- anello V-ring posizionato sull'albero motore N.D.E.
- fascia di protezione in gomma
- anello O-ring

Degree of protection

Standard protection class is IP54. Brake motor BN_FA is also available in protection class **IP 55**, which mandates the following variants:

- V-ring at N.D.E. of motor shaft
- rubber protection sleeve
- O-ring

Schutzart

Die Standardausführung ist Schutzart IP54 vor. Optional kann der Bremsmotor BN_FA auch in der Schutzart **IP 55** geliefert werden, was durch die folgenden zusätzlichen Bauteile erreicht wird:

- V-Ring an der Motorwelle N.D.E.
- Schutzring aus Gummi
- O-Ring

Degré de protection

L'exécution standard prévoit le degré de protection IP54. En option, le moteur frein BN_FA est fourni avec degré de protection **IP 55**, les variations de construction suivantes sont prévues :

- bague V-ring positionné sur l'arbre moteur N.D.E.
- bande de protection en caoutchouc
- joint torique

Alimentazione freno FA

Nei motori a singola polarità l'alimentazione della bobina freno è derivata direttamente dalla morsettiera motore e la tensione del freno quindi coincide con la tensione del motore. In questo caso la tensione del freno può essere omessa dalla designazione

Per i motori a doppia polarità, e per i motori con alimentazione separata del freno, è presente una morsettiera ausiliaria con 6 terminali per il collegamento alla linea del freno. In entrambi i casi il valore di tensione del freno dovrà essere specificato in designazione.

Nella tabella seguente sono riportate le condizioni di alimentazione standard del freno in c.a. per i motori a singola e doppia polarità:

FA brake power supply

In single speed motors, power supply is brought to the brake coil direct from the motor terminal box. As a result, brake voltage and motor voltage are the same. In this case, brake voltage indication may be omitted in the designation.

Switch-pole motors and motors with separate brake power supply feature an auxiliary terminal board with 6 terminals for connection to brake line. In both cases, brake voltage indication in the designation is mandatory. The following table reports standard AC brake power supply ratings for single- and switch-pole motors:

Stromversorgung - Bremstyp FA

Bei den einpoligen Motoren wird die Versorgung der Bremsspule direkt vom Motorklemmenkasten abgenommen, das bedeutet, dass die Spannung der Bremse mit der Motorspannung übereinstimmt. In diesem Fall braucht die Bremsenspannung nicht extra angegeben werden.

Für die polumschaltbaren Motoren und für eine separate Bremsversorgung ist eine Hilfsklemmenleiste mit 6 Anschlüssen vorgesehen, die einen Anschluß der Bremse ermöglichen. In beiden Fällen muss die Bremsenspannung in der Bestellung angegeben werden.

In der nachstehenden Tabelle werden für die einpoligen und die polumschaltbaren Motoren die Standardspannungen der Wechselstrombremsen angegeben.

Alimentation frein FA

Sur les moteurs à simple polarité, l'alimentation de la bobine frein dérive directement du bornier moteur, par conséquent, la tension du frein coïncide avec la tension du moteur. Dans ce cas, la tension du frein peut être omise de la désignation.

Pour les moteurs à double polarité et les moteurs avec alimentation séparée du frein, une boîte à bornes auxiliaire avec 6 bornes pour le raccordement à la ligne du frein, est présente. Dans les deux cas, la valeur de tension du frein doit être spécifiée dans la désignation.

Le tableau suivant indique les conditions d'alimentation standard du frein en c.a. pour les moteurs à simple et double polarité :

(A61)

| motori a singola polarità single-pole motor Einpolige Motoren Moteurs à simple polarité | BN 63...BN 132 | BN 160...BN 180 |
|--|----------------------------|---------------------------|
| | M05...M4LB | M4LC...M5 |
| | 230Δ / 400Y V ±10% – 50 Hz | 400Δ/ 690Y V ±10% – 50 Hz |
| | 265Δ / 460Y ±10% - 60 Hz | 460Y – 60 Hz |

| motori a doppia polarità (alimentazione da linea separata) switch-pole motors (separate power supply line) Polumschaltbare Motoren (separate Versorgung) Moteurs à double polarité (alimentation depuis ligne séparée) | BN 63...BN 132 |
|---|----------------------------|
| | M05...M4 |
| | 230Δ / 400Y V ±10% – 50 Hz |
| | 460Y - 60 Hz |

Se non diversamente specificato, l'alimentazione standard del freno è 230Δ /400Y V - 50 Hz.

Unless otherwise specified, standard brake power supply is 230Δ /400Y V - 50 Hz.

Falls nicht anderweitig angegeben, beträgt die Standardversorgung der Bremse 230Δ/400Y V - 50 Hz.

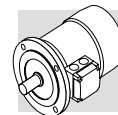
Sauf spécification contraire, l'alimentation standard du frein est 230Δ /400Y V - 50 Hz.

Su richiesta, sono disponibili tensioni speciali, nel campo 24...690 V, 50-60 Hz.

Special voltages in the 24...690 V, 50-60 Hz range are available at request.

Auf Anfrage können Sonderspannungen von 24...690 V, 50-60 Hz geliefert werden.

Sur demande, des tensions spéciales sont disponibles dans la plage 24...690 V, 50-60 Hz.



Dati tecnici freni FA

Technical specifications of FA brakes

Technische Daten der Bremsen vom Typ FA

Caractéristiques techniques freins FA

(A62)

| Freno Brake Bremsen Frein | Coppia frenante Brake torque Bremsmoment Couple de freinage M_b [Nm] | Rilascio Release Ansprechzeit Déblocage t_1 [ms] | Frenatura Braking Bremsung Freinage t_2 [ms] | Wmax | | | W [MJ] | P_b [VA] |
|------------------------------------|---|---|---|--------|---------|----------|-----------|---------------|
| | | | | [J] | | | | |
| | | | | 10 s/h | 100 s/h | 1000 s/h | | |
| FA 02 | 3.5 | 4 | 20 | 4500 | 1400 | 180 | 15 | 60 |
| FA 03 | 7.5 | 4 | 40 | 7000 | 1900 | 230 | 25 | 80 |
| FA 04 | 15 | 6 | 60 | 10000 | 3100 | 350 | 30 | 110 |
| FA 14 | | | | | | | | |
| FA 05 | | | | | | | | |
| FA 15 | 40 | 8 | 90 | 18000 | 4500 | 500 | 50 | 250 |
| FA 06S | 60 | 16 | 120 | 20000 | 4800 | 550 | 70 | 470 |
| FA 06 | 75 | 16 | 140 | 29000 | 7400 | 800 | 80 | 550 |
| FA 07 | 150 | 16 | 180 | 40000 | 9300 | 1000 | 130 | 600 |
| FA 08 | 250 | 20 | 200 | 60000 | 14000 | 1500 | 230 | 1200 |

Legenda:

M_b = max coppia frenante statica ($\pm 15\%$)

t_1 = tempo di rilascio freno

t_2 = ritardo di frenatura

W_{max} = energia max per frenata (capacità termica del freno)

W = energia di frenatura tra due regolazioni successive del traferro

P_b = potenza assorbita dal freno a 20° (50 Hz)

s/h = avviamenti orari

N.B.

I valori di t_1 e t_2 riportati in tabella sono riferiti al freno tarato alla coppia nominale, traferro medio e tensione nominale.

Key:

M_b = max static braking torque ($\pm 15\%$)

t_1 = brake release time

t_2 = brake engagement time

W_{max} = max energy per brake operation (brake thermal capacity)

W = braking energy between two successive air gap adjustments

P_b = power drawn by brake at 20° (50 Hz)

s/h = starts per hour

NOTE

Values t_1 and t_2 in the table refer to a brake set at rated torque, medium air gap and rated voltage.

Legende:

M_b = statisches max. Bremsmoment ($\pm 15\%$)

t_1 = Bremsenansprechzeit

t_2 = Bremsverzögerung

W_{max} = max. Energie pro Bremsung (Wärmeleistung der Bremse)

W = Bremsenergie zwischen zwei Einstellungen des Luftspalts

P_b = bei 20° von der Bremse aufgenommene Leistung (50 Hz)

s/h = Einschaltungen pro Stunde

HINWEIS:

Die in der Tabelle angegebenen Werte t_1 und t_2 beziehen sich auf eine Bremse, die auf das Nenndrehmoment, einen mittleren Luftspalt und die Standardspannung eingestellt ist.

Légende:

M_b = couple de freinage statique max ($\pm 15\%$)

t_1 = temps de déblocage frein

t_2 = retard de freinage

W_{max} = énergie max par freinage (capacité thermique du frein)

W = énergie de freinage entre deux réglages successifs de l'entrefer

P_b = puissance absorbée par le frein à 20° (50 Hz)

s/h = démarrages horaires

N.B.

Les valeurs de t_1 et t_2 indiquées dans le tableau se réfèrent au frein étalonné au couple nominal, entrefer moyen et tension nominale.

Collegamenti freno FA

FA brake connections

Abschlüsse - Bremstyp FA

Raccordements frein FA

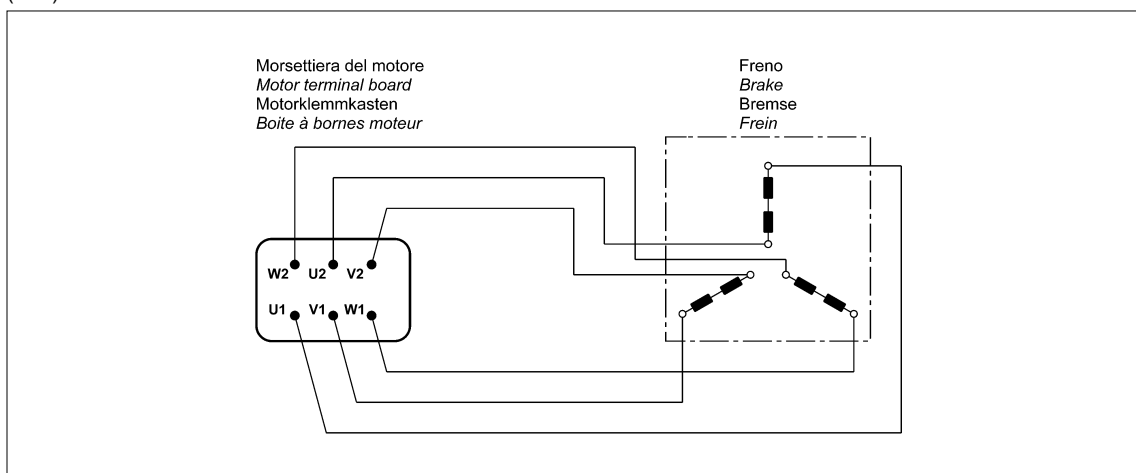
Per i motori con alimentazione del freno derivata direttamente dall'alimentazione motore i collegamenti alla morsetteria corrispondono a quanto riportato nello schema (A63):

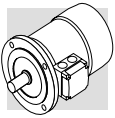
The diagram (A63) shows the wiring when brake is connected directly to same power supply of the motor:

Bei den Motoren mit direkter Bremsspannungsversorgung müssen die Anschlüsse im Klemmenkasten entsprechend den Angaben im Schema (A63) angeschlossen werden:

Pour les moteurs avec alimentation du frein dérivant directement de l'alimentation moteur, les raccordements à la boîte à bornes correspondent aux indications du schéma (A63) :

(A63)





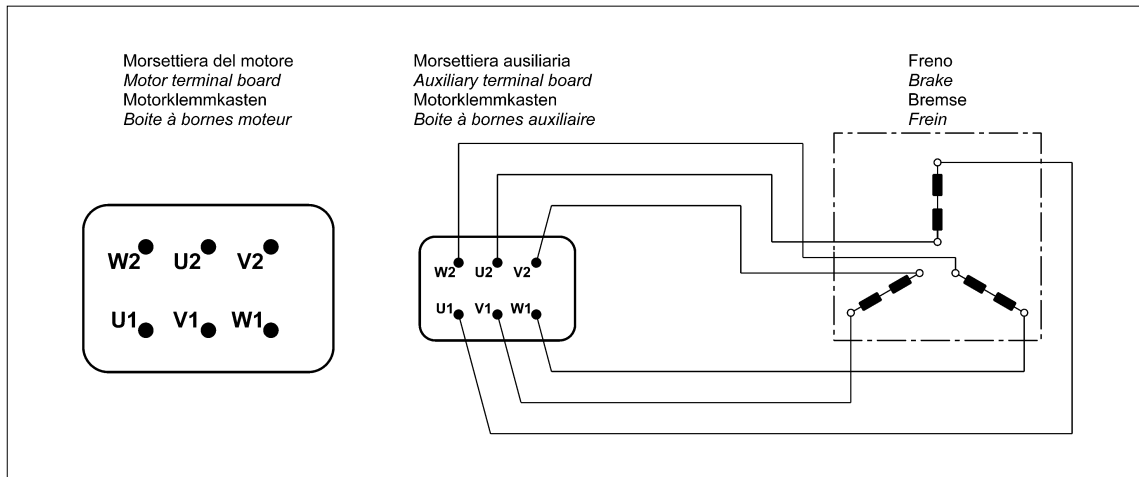
Per i motori a doppia polarità e, quando richiesto, per i motori ad una velocità con alimentazione da linea separata è prevista una morsettiera ausiliaria a 6 morsetti per il collegamento del freno; in questa esecuzione i motori prevedono la scatola coprimorsetti maggiorata. Vedi schema (A64):

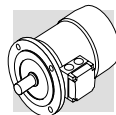
Switch-pole motors and, at request, single-pole motors with separate power supply are equipped with an auxiliary terminal board with 6 terminals for brake connection. In this version, motors feature a larger terminal box. See diagram (A64):

Bei den polumschaltbaren Motoren und, auf Anfrage, auch bei den einpoligen Motoren mit separater Bremsversorgung ist für den Anschluss der Bremse ein Hilfsklemmenkasten mit 6 Klemmen vorgesehen. In diesen Ausführungen haben die Motoren einen größeren Klemmenkasten. Siehe Schema (A64):

Pour les moteurs à double polarité et, lorsque cela est requis, pour les moteurs à une vitesse avec alimentation depuis ligne séparée, une boîte à bornes auxiliaire à 6 bornes est prévue pour le raccordement du frein ; dans cette exécution les moteurs prévoient un couvercle bornier majoré. Voir schéma (A64) :

(A64)





**M8 - MOTORI AUTOFRENANTI
IN C.A., TIPO BN_BA**

**M8 - AC BRAKE MOTORS
TYPE BN_BA**

**M8 - DREHSTROM-BREMS-
MOTOREN MIT WECH-
SELS- TROMBREMSE
VOM TYP BN_BA**

**M8 - MOTEURS FREIN EN C.A.,
TYPE BN_BA**

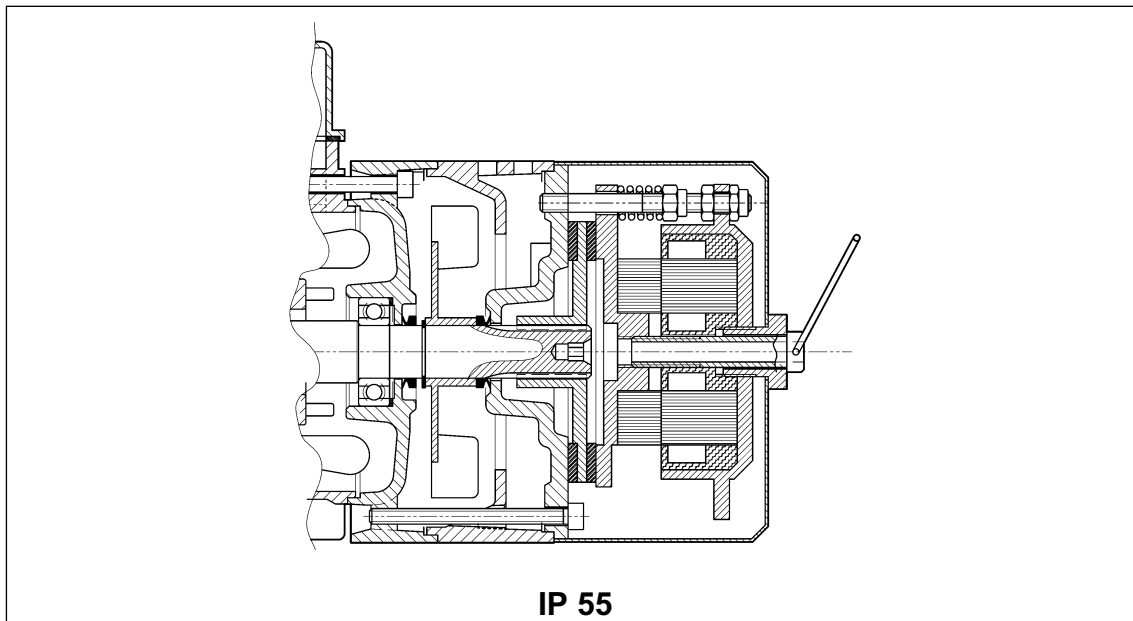
Grandezze: BN 63 ... BN 132M

Frame sizes: BN 63 ... BN 132M

Baugrößen: BN 63 ... BN 132M

Tailles : BN 63 ... BN 132M

(A65)



Freno elettromagnetico con alimentazione in **corrente alternata** trifase, fissato con viti allo scudo convogliatore.

Disco freno in acciaio scorrevole assialmente sull'albero motore scanalato (mozzo trascinatore in acciaio calettato sull'albero per grandezza 244).

I motori sono forniti con freno tarato alla massima coppia.

La coppia freno è regolabile con continuità agendo sulle viti di compressione delle molle; il campo di regolazione consentito è $30\% M_{bMAX} < M_b < M_{bMAX}$ (M_{bMAX} è il momento frenante massimo riportato in tab. (A66)). Di serie i motori sono forniti completi di vite per lo sblocco manuale del freno, con mantenimento della posizione di rilascio per consentire la rotazione dell'albero motore.

La vite di sblocco deve essere smontata dopo l'utilizzo per assicurare il corretto funzionamento del freno, ed evitare situazioni potenzialmente pericolose.

Il freno BA, oltre alle elevate caratteristiche dinamiche tipiche dei freni in corrente alternata, presenta una costruzione robusta con energia di frenatura aumentata che lo rendono particolarmente idoneo a servizi pesanti, oltre che in applicazioni dove sono richieste frequenze di manovra elevate e tempi d'intervento molto rapidi.

*Electromagnetic brake operates from three-phase **alternated current** power supply and is bolted onto conveyor shield.*

Steel brake disc slides axially on splined motor shaft (steel drive hub is shrunk onto shaft on frame size 244).

Factory setting is maximum brake torque.

Step less braking torque adjustment by screws which compress the brake springs. Allowed adjustment range is $30\% M_{bMAX} < M_b < M_{bMAX}$ (where M_{bMAX} is maximum braking torque as shown in tab. (A66)).

Motors are supplied complete with manual brake release screw as standard. Screw may be locked in the release position to allow for motor shaft rotation.

The brake release screw must be removed after use to ensure proper brake operation and avoid potentially dangerous conditions.

In addition to the high dynamic characteristics typical of AC brakes, a sturdy design and increased braking energy make the BA brake ideal for heavy-duty applications as well as applications requiring frequent stop/starts and very fast response time.

Elektromagnetische Bremse mit **Drehstromversorgung**, die mittels Schrauben am Motorschild des Motors befestigt ist.

Die Brems Scheibe (Stahl) gleitet axial auf der Rotorwelle (bei Baugröße 244 über einem auf die Welle aufgezogenem Mitnehmer aus Stahl).

Die Motoren werden mit einer auf das maximale Drehmoment des Motors eingestellten Bremse geliefert.

Das Bremsdrehmoment ist durch Betätigen der Federdruckschrauben stufenlos regelbar. Der zulässige Einstellbereich beträgt $30\% M_{bMAX} < M_b < M_{bMAX}$ (M_{bMAX} steht für den max. Bremsmoment, das in der Tab. (A66) angegeben wird).

Die Motoren werden serienmäßig mit einer Schraube zur manuelle Bremslüftung geliefert; die arretierbar ist, um ein Drehen der Motorwelle zu ermöglichen.

Diese Schraube muss im Betrieb des Motors wieder abmontiert werden, damit die korrekte Funktion der Bremse gesichert ist.

Die Bremse vom Typ BA zeichnet sich durch ihre dynamischen Eigenschaften und die robuste Bauweise aus, durch die sie eine erhöhte Bremsenergie abzugeben kann. Diese Bremstypen eignen sich besonders für einen Einsatz unter harten Bedingungen und überall dort, wo häufige Schaltfrequenzen und schnelle Ansprechzeiten gefordert werden.

*Frein électromagnétique avec alimentation en **courant alternatif** triphasé, fixé avec des vis au bouclier.*

Disque frein en acier coulissant de façon axiale sur l'arbre moteur rainuré (moyeu d'entraînement en acier calé sur l'arbre pour la taille 244).

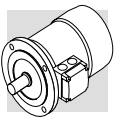
Les moteurs sont fournis avec frein étalonné au couple maximal.

Le couple de freinage est réglable en continu en intervenant sur les vis de compression des ressorts; la plage de réglage autorisé est de $30\% M_{bMAX} < M_b < M_{bMAX}$ (M_{bMAX} étant le couple de freinage maximum indiqué dans le tab. (A66)).

De série, les moteurs sont fournis avec vis de déblocage manuel du frein, avec maintien de la position de relâchement afin de permettre la rotation de l'arbre moteur.

La vis de déblocage doit être démontée après utilisation afin de garantir le fonctionnement correct du frein et d'éviter les situations potentiellement dangereuses.

Le frein BA, outre les caractéristiques dynamiques élevées typiques des freins en courant alternatif, est de fabrication robuste avec énergie de freinage majorée, ce qui le rend particulièrement adapté pour les services difficiles ainsi que pour les applications nécessitant des fréquences de manœuvre élevées et des temps d'intervention très rapides.



Grado di protezione

È disponibile un'unica esecuzione, con grado di protezione IP55.

Protection class

Only available in protection class IP55.

Schutzart

Es ist eine nur die Ausführung in Schutzklasse IP55 verfügbar.

Degré de protection

Il est disponible en une exécution unique, avec degré de protection IP55.

Alimentazione freno BA

Nei motori a singola polarità l'alimentazione della bobina freno è derivata direttamente dalla morsettiera motore e la tensione del freno quindi coincide con la tensione del motore. In questo caso la tensione del freno può essere omessa dalla designazione

Per i motori a doppia polarità, e per i motori con alimentazione separata del freno, è presente una morsettiera ausiliaria con 6 terminali per il collegamento alla linea del freno. In entrambi i casi il valore di tensione del freno dovrà essere specificato in designazione.

Nella tabella seguente sono riportate le condizioni di alimentazione standard del freno in c.a. per i motori a singola e doppia polarità:

BA brake power supply

In single speed motors, power supply is brought to the brake coil direct from the motor terminal box. As a result, brake voltage and motor voltage are the same. In this case, brake voltage indication may be omitted in the designation.

Switch-pole motors and motors with separate brake power supply feature an auxiliary terminal board with 6 terminals for connection to brake line. In both cases, brake voltage indication in the designation is mandatory. The following table reports standard AC brake power supply ratings for single- and switch-pole motors:

Stromversorgung - Bremstyp BA

Bei den einpoligen Motoren wird die Versorgung der Bremsspule direkt vom Motorklemmenkasten abgezweigt, das bedeutet also, dass die Spannung der Bremse mit der Motorspannung übereinstimmt. In diesem Fall braucht die Bremsenspannung nicht extra angegeben werden.

Für polumschaltbaren Motoren und für eine separate Bremsversorgung ist eine Hilfsklemmenleiste mit 6 Anschlüssen vorgesehen, die einen Anschluss der Bremse ermöglichen. In beiden Fällen muss die Bremsspannung bei der Bestellung angegeben werden.

In der nachstehenden Tabelle werden für die einpoligen und die polumschaltbaren Motoren die Standardversorgung der Wechselstrombremsen angegeben.

Alimentation frein BA

Sur les moteurs à simple polarité, l'alimentation de la bobine frein dérive directement du bornier moteur, par conséquent, la tension du frein coïncide avec la tension du moteur. Dans ce cas, la tension du frein peut être omise de la désignation.

Pour les moteurs à double polarité et les moteurs avec alimentation séparée du frein, un boîte à bornes auxiliaire avec 6 bornes pour le raccordement au réseau du frein, est présente. Dans les deux cas, la valeur de tension du frein doit être spécifiée dans la désignation.

Le tableau suivant indique les conditions d'alimentation standard du frein en c.a. pour les moteurs à simple et double polarité :

(A65)

| | BN 63 ... BN 132 |
|---|----------------------------|
| motori a singola polarità single-pole motor Einpolige Motoren Moteurs à simple polarité | 230Δ / 400Y V ±10% – 50 Hz |
| | 265Δ / 460Y ±10% - 60 Hz |
| motori a doppia polarità (alimentazione da linea separata) switch-pole motors (separate power supply line) Polumschaltbare Motoren (separate Versorgung) Moteurs à double polarité (alimentation depuis ligne séparée) | BN 63 ... BN 132 |
| | 230Δ / 400Y V ±10% – 50 Hz |
| | 460Y - 60 Hz |

Se non diversamente specificato, l'alimentazione standard del freno è 230Δ /400Y V - 50 Hz.

Unless otherwise specified, standard brake power supply is 230Δ /400Y V - 50 Hz.

Falls nicht anderweitig angegeben, beträgt die Standardversorgung der Bremse 230Δ /400Y V - 50 Hz.

Sauf spécification contraire, l'alimentation standard du frein est 230Δ /400Y V - 50 Hz.

Su richiesta, sono disponibili tensioni speciali, nel campo 24...690 V, 50-60 Hz.

Special voltages in the 24...690 V, 50-60 Hz range are available at request.

Auf Anfrage können Sonderspannungen von 24...690 V, 50-60 Hz geliefert werden.

Sur demande, des tensions spéciales sont disponibles dans la plage 24...690 V, 50-60 Hz.

Dati tecnici freni BA

Nella tabella (A66) sottostante sono riportati i dati tecnici dei freni in c.a., tipo BA.

BA brake technical specifications

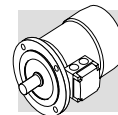
The table (A66) below reports the technical specifications for AC brakes type BA.

Technische Daten der Bremsen vom Typ BA

In der nachstehenden Tabelle (A66) werden die technischen Daten der Wechselstrombremsen vom Typ BA angegeben:

Caractéristiques techniques freins BA

Le tableau (A66) ci-dessous indique les caractéristiques techniques des freins en c.a., type BA.



(A66)

| Freno Brake Bremsen Frein | Coppia frenante Brake torque Bremsmoment Couple de freinage M_b [Nm] | Rilascio Release Anspruchzeit Déblocage t_1 [ms] | Frenatura Braking Bremsung Freinage t_2 [ms] | Wmax | | | W [MJ] | P_b [VA] |
|------------------------------------|---|---|---|--------|---------|----------|-----------|---------------|
| | | | | [J] | | | | |
| | | | | 10 s/h | 100 s/h | 1000 s/h | | |
| BA 60 | 5 | 5 | 20 | 4000 | 1500 | 180 | 30 | 60 |
| BA 70 | 8 | 6 | 25 | 7000 | 2700 | 300 | 60 | 75 |
| BA 80 | 18 | 6 | 25 | 10000 | 3100 | 350 | 80 | 110 |
| BA 90 | 35 | 8 | 35 | 13000 | 3600 | 400 | 88 | 185 |
| BA 100 | 50 | 8 | 35 | 18000 | 4500 | 500 | 112 | 225 |
| BA 110 | 75 | 8 | 35 | 28000 | 6800 | 750 | 132 | 270 |
| BA 140 | 150 | 15 | 60 | 60000 | 14000 | 1500 | 240 | 530 |

Legenda:

M_b = max coppia frenante statica ($\pm 15\%$)
 t_1 = tempo di rilascio freno
 t_2 = ritardo di frenatura
 W_{max} = energia max per frenata (capacità termica del freno)
 W = energia di frenatura tra due regolazioni successive del traferro
 P_b = potenza assorbita dal freno a 20° (50 Hz)

s/h = avviamenti orari

N.B.

I valori di t_1 e t_2 riportati in tabella sono riferiti al freno tarato alla coppia nominale, traferro medio e tensione nominale.

Key:

M_b = max static braking torque ($\pm 15\%$)
 t_1 = brake release time
 t_2 = brake engagement time
 W_{max} = max energy per brake operation (brake thermal capacity)
 W = braking energy between two successive air gap adjustments
 P_b = brake power absorption at 20° (50 Hz)

s/h = starts per hour

NOTE

Values t_1 and t_2 in the table refer to a brake set at rated torque, medium air gap and rated voltage.

Legende:

M_b = statisches max. Bremsmoment ($\pm 15\%$)
 t_1 = Bremsenansprechzeit
 t_2 = Bremsverzögerung
 W_{max} = max. Energie pro Bremsung (Wärmeleistung der Bremse)
 W = Bremsenergie zwischen zwei Einstellungen des Luftspalts
 P_b = bei 20° von der Bremse aufgenommene Leistung (50 Hz)

s/h = Einschaltungen pro stunde

HINWEIS:

Die in der Tabelle angegebenen Werte t_1 und t_2 beziehen sich auf eine Bremse, die auf das Nenn Drehmoment, einen mittleren Luftspalt und die Standardspannung eingestellt ist.

Légende:

M_b = couple de freinage statique max ($\pm 15\%$)
 t_1 = temps de déblocage frein
 t_2 = retard de freinage
 W_{max} = énergie max par freinage (capacité thermique du frein)
 W = énergie de freinage entre deux réglages successifs de l'entrefer
 P_b = puissance absorbée par le frein à 20° (50 Hz)

s/h = démarrages horaires

N.B.

Les valeurs de t_1 et t_2 indiquées dans le tableau se réfèrent au frein étalonné au couple nominal, entrefer moyen et tension nominale.

Collegamenti freno BA

Per i motori con alimentazione del freno derivata direttamente dall'alimentazione motore i collegamenti alla morsetteria corrispondono a quanto riportato nello schema (A67):

BA brake connections

The diagram (A67) shows the required connections to terminal box when brake is to be connected directly to motor power supply:

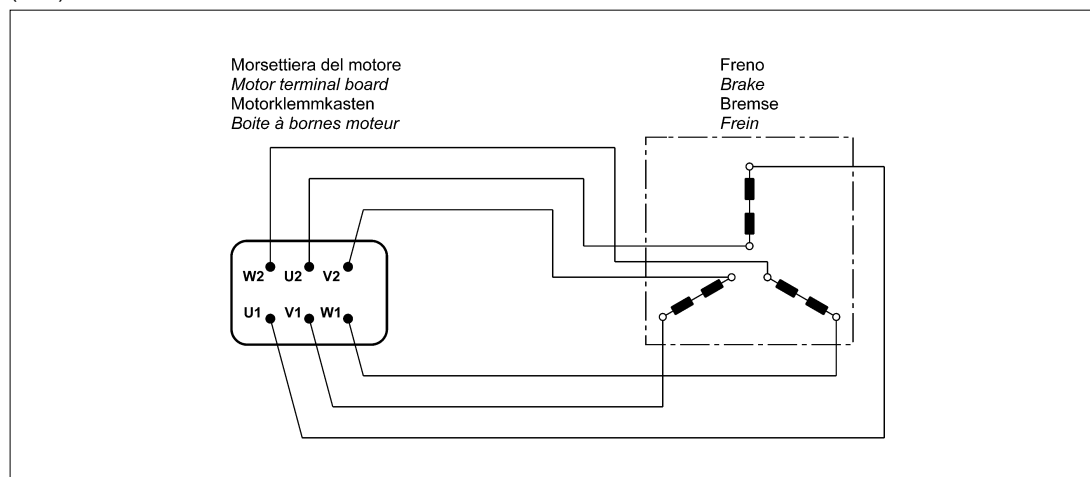
Abschlüsse - Bremstyp BA

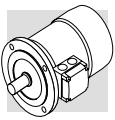
Bei den Motoren mit direkter Bremsspannungsversorgung müssen die Anschlüsse im Klemmenkasten entsprechend den Angaben im Schema (A67) angeschlossen werden:

Raccordements frein BA

Pour les moteurs avec alimentation du frein dérivant directement de l'alimentation moteur, les raccordements à la boîte à bornes correspondent aux indications du schéma (A67) :

(A67)





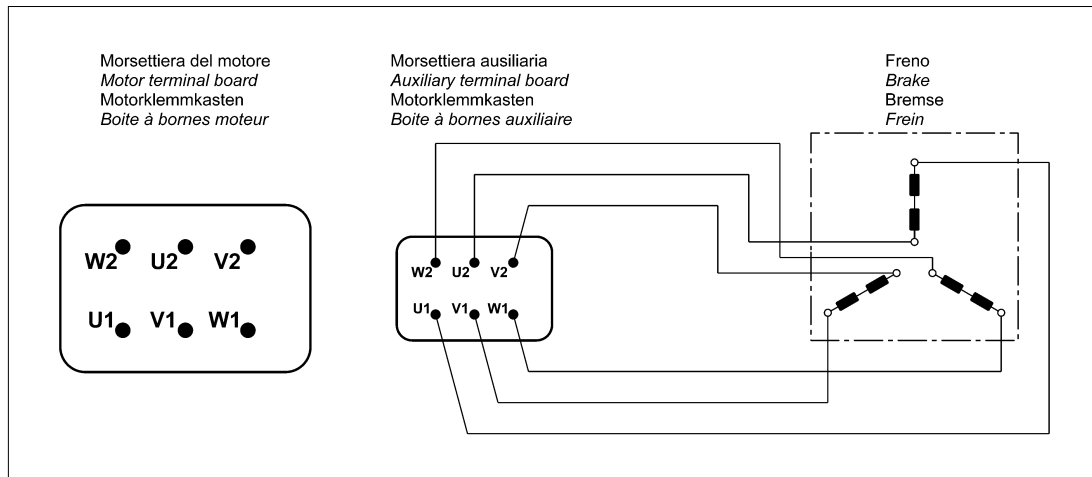
Per i motori a doppia polarità e, quando richiesto, per i motori ad una velocità con alimentazione da linea separata è prevista una morsettiera ausiliaria a 6 morsetti per il collegamento del freno; in questa esecuzione i motori prevedono la scatola coprimorsetti maggiorata. Vedi schema (A68):

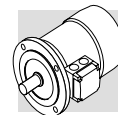
Switch-pole motors and, at request, single-pole motors with separate power supply line are equipped with an auxiliary terminal board with 6 terminals for brake connection. In this version, motors feature a larger terminal box. See diagram (A68):

Bei den polumschaltbaren Motoren und, auf Anfrage, auch bei den einpoligen Motoren mit separater Bremsversorgung ist für den Anschluss der Bremse ein Hilfsklemmenkasten mit 6 Klemmen vorgesehen. In diesen Ausführungen haben die Motoren einen größeren Klemmenkasten. Siehe Schema (A68):

Pour les moteurs à double polarité et, lorsque cela est requis, pour les moteurs à une vitesse avec alimentation depuis ligne séparée, une boîte à bornes auxiliaire à 6 bornes est prévue pour le raccordement du frein ; dans cette exécution les moteurs prévoient un couvercle bornier majoré. Voir schéma (A68) :

(A68)





M9 - SISTEMI DI SBLOCCO FRENO

I freni a pressione di molle tipo **FD** e **FA** possono essere dotati opzionalmente di dispositivi per lo sblocco manuale del freno, normalmente utilizzati per condurre interventi di manutenzione sulle parti di macchina, o dell'impianto, comandate dal motore.

M9 - BRAKE RELEASE SYSTEMS

*Spring-applied brakes type **FD** and **FA** may be equipped with optional manual release devices. These are typically used for manually releasing the brake before servicing any machine or plant parts operated by the motor.*

M9 - BREMSLÜFTHEBEL

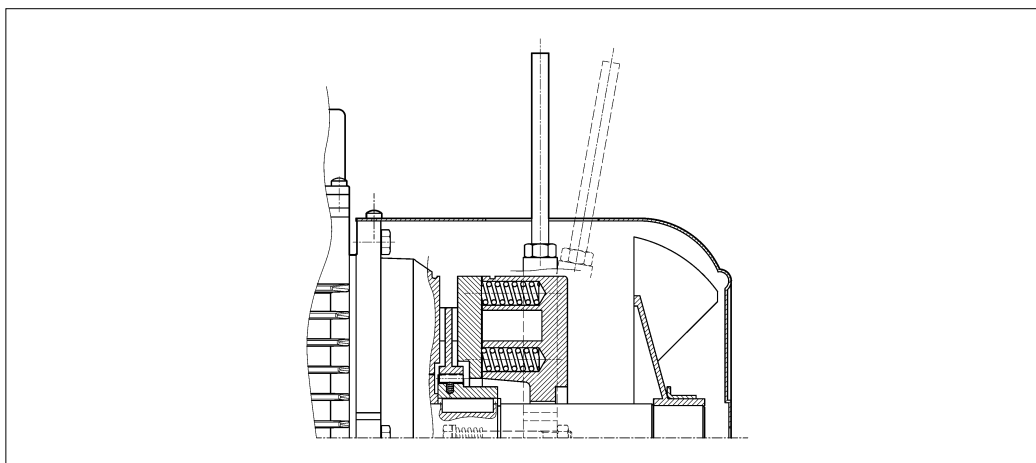
Die Federdruckbremsen vom Typ **FD** und **FA** können Optional mit Bremslüfthebeln geliefert werden, die ein manuelles Lüften der Bremse ermöglichen. Diese Lüftungseinrichtungen können bei Instandhaltungsarbeiten an vom Motor betriebenen Maschinen- oder Anlagenteilen verwendet werden.

M9 - SYSTEMES DE DEBLOCAGE FREIN

*Les freins à pression de ressorts type **FD** et **FA** peuvent, en option, être dotés de dispositifs de déblocage manuel du frein, normalement utilisés pour effectuer des interventions d'entretien sur les composants de la machine, ou de l'installation commandée par le moteur.*

(A69)

R



La leva di sblocco è dotata di ritorno automatico, tramite dispositivo a molla.

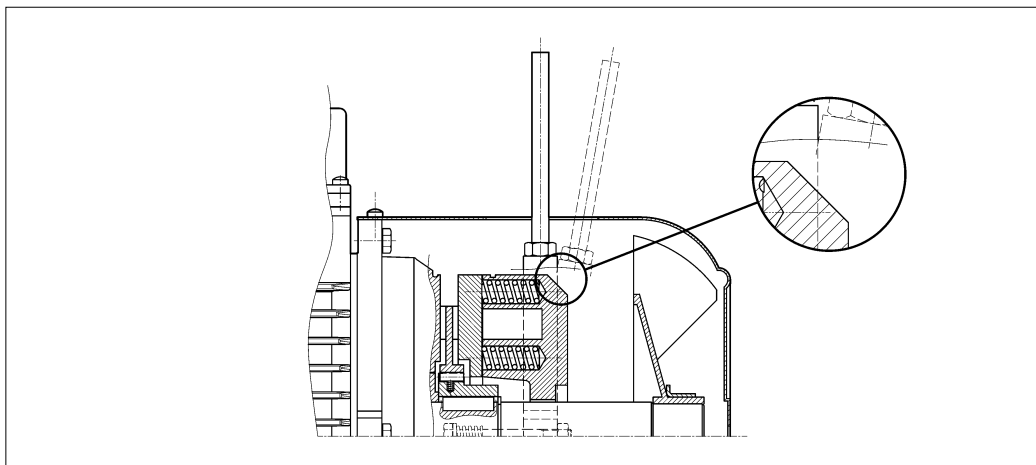
A return spring brings the release lever back in the original position.

Bremslüfthebel mit automatischer Rückstellung durch Federkraft.

Le levier de déblocage est doté de retour automatique, au moyen d'un dispositif à ressort.

(A70)

RM

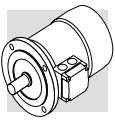


Sui motori tipo **BN_FD** la leva di sblocco può essere temporaneamente bloccata in posizione di rilascio del freno, avvitando la stessa fino ad impegnarne l'estremità in un risalto del corpo del freno.

*On motors type **BN_FD**, if the option **RM** is specified, the release device may be locked in the "release" position by tightening the lever until its end becomes engaged with a brake housing projection.*

Der Bremslüfthebel kann zeitweise in der Bremslüfthebel position arretiert werden, indem man ihn so lange einschraubt, bis die Bremse arretiert ist. Für die unterschiedlichen Motor-

Levier de déblocage peut être temporairement bloqué en position de déblocage du frein en le vissant jusqu'à engager l'extrémité dans une saillie du corps du frein. La disponibilité des systèmes de


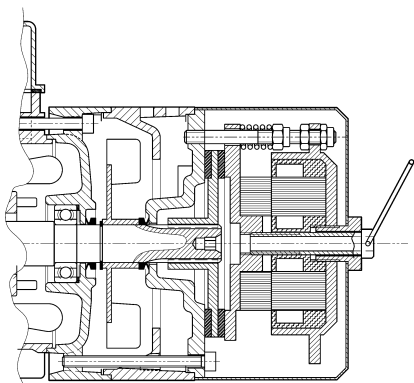


La disponibilità dei sistemi di sblocco freno è diversa per i vari tipi di motore, ed è descritta dalla tabella seguente:

The availability for the various disengagement devices is charted here below:

typen sind ebenso verschiedene Bremslüftsyste me verfügbar, die Sie der folgenden Tabelle entnehmen können:

débloccage du frein est différente en fonction des types de moteur et figure dans le tableau suivant :

| (A71) | R | RM |
|--------------|--|--|
| BN_FD | BN 63...BN 200 | 2p 63A2 ≤ H ≤ 132M2 4p 63A4 ≤ H ≤ 132MA4 6p 63A6 ≤ H ≤ 132MA6 |
| M_FD | M 05...M 5 | M 05...M 4LA |
| BN_FA | BN 63...BN 180M |  |
| M_FA | M 05...M 5 | |
| BN_BA |  <p>di serie std. supply serienmäßig de série</p> | |

Orientamento della leva di sblocco

Release lever orientation

Ausrichtung des Bremslüfthebel

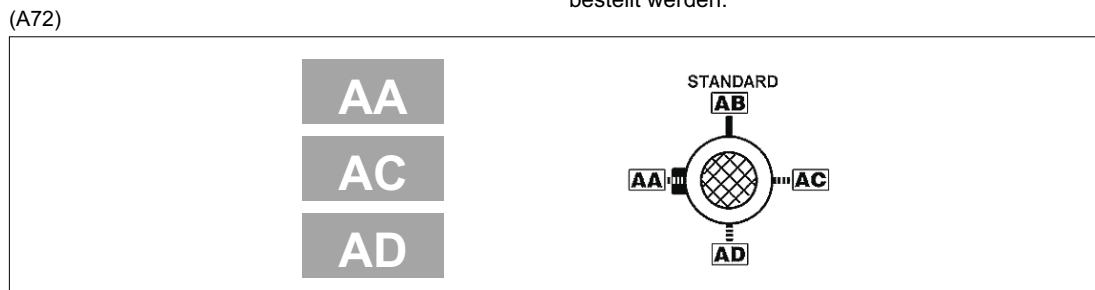
Orientation du levier de déblocage

Per entrambe le opzioni **R** e **RM**, la leva di sblocco del freno viene collocata, se non diversamente specificato, con orientamento di 90° in senso orario, rispetto alla posizione della morsettiera - riferimento **[AB]** nel disegno sottostante. Orientamenti alternativi, tipo **[AA]**, **[AC]** e **[AD]** possono essere richiesti citandone la relativa specifica:

Unless otherwise specified, the release lever is located 90° away from the terminal box – identified by letters **[AB]** in the diagram below – in a clockwise direction on both options **R** and **RM**. Alternative lever positions **[AA]**, **[AC]** and **[AD]** are also possible when the corresponding option is specified:

Bei beiden Optionen, **R** und **RM**, wird der Bremslüfthebel, falls nicht anderweitig festgelegt, um 90° im Uhrzeigersinn zur Position des Klemmenkastens montiert (Position **[AB]** in der nachfolgenden Zeichnung). Andere Positionen: **AA** (0° zum Klemmenkasten), **AC** (180° zum Klemmenkasten) oder **AD** (270° zum Klemmenkasten, im Uhrzeigersinn vom Lüfter aus gesehen) können unter Angabe der entsprechenden Spezifikation bestellt werden:

Pour les deux options **R** et **RM**, le levier de déblocage du frein est positionné, sauf spécification contraire, avec une orientation de 90° dans le sens des aiguilles d'une montre par rapport à la position de la boîte à bornes - référence **[AB]** sur le dessin ci-dessous. Des orientations différentes, type **[AA]**, **[AC]** et **[AD]** peuvent être demandées à condition de préciser la position correspondante :



Caratteristiche volani (F1)

Fly-wheel data (F1)

Eigenschaften der Schwungräder (F1)

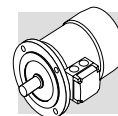
Caractéristiques volants (F1)

La tabella seguente riporta il peso e l'inerzia aggiuntiva del volani che possono essere richiesti tramite l'opzione F1. Le dimensioni complessive rimangono invariate.



The table below shows values of weight and inertia of flywheel (option F1). Overall dimensions of motors remain unchanged.

Die folgende Tabelle gibt das Gewicht und das Trägheitsmoment der Zusatzschwungräder an (Option F1). Die Gesamtabmessungen bleiben unverändert.

Le tableau suivante indique le poids et l'inertie des volants supplémentaires sans variations de l'encombrement moteur.



(A73)

| Dati tecnici volano per motori tipo: / Main data for flywheel of motore type: / Eigenschaften der Schwungräder für Motoren typ: / Données volant pour moteurs type: BN_FD, M_FD | | | |
|--|---|---|--|
|  |  | Peso volano / Fly-wheel weight Gewicht Schwungrad / Poids volant [Kg] | Inerzia volano / Fly-wheel inertia Trägheitsmoment Schwungrad / Inertie volant [Kgm ²] |
| BN 63 | M05 | 0.69 | 0.00063 |
| BN 71 | M1 | 1.13 | 0.00135 |
| BN 80 | M2 | 1.67 | 0.00270 |
| BN 90 S - BN 90 L | – | 2.51 | 0.00530 |
| BN 100 | M3 | 3.48 | 0.00840 |
| BN 112 | – | 4.82 | 0.01483 |
| BN 132 S - BN 132 M | M4 | 6.19 | 0.02580 |

M10 - OPZIONI**Protezioni termiche**

Oltre alla protezione garantita dall'interruttore magnetotermico, i motori possono essere provvisti di sonde termiche incorporate per proteggere l'avvolgimento da eccessivo riscaldamento dovuto a scarsa ventilazione o servizio intermittente.

Questa protezione dovrebbe sempre essere prevista per motori servoventilati (IC416).

M10 - OPTIONS**Thermal protective devices**

In addition to the standard protection provided by the magneto-thermal device, motors can be supplied with built-in thermal probes to protect the winding against overheating caused, by insufficient ventilation or by an intermittent duty.

This additional protection should always be specified for servoventilated motors (IC416).

M10 - OPTIONEN**Thermische Schutzeinrichtungen**

Abgesehen von den Motorschutzschaltern mit thermischem und elektromagnetischem Auslöser können die Motoren mit integrierten Temperaturfühlern zum Schutz der Wicklung vor Überhitzung z.B. wegen unzureichender Lüftung oder Aussetzbetriebs ausgestattet werden.

Diese Schutzeinrichtung muß bei fremdbelüfteten Motoren stets vorgesehen werden (IC416).

M10 - OPTIONS**Protections thermiques**

Outre la protection garantie par l'interrupteur magnétothermique, les moteurs peuvent être équipés de sondes thermiques incorporées pour protéger le bobinage contre une surchauffe excessive due par exemple à une ventilation insuffisante ou un service intermittent.

Cette protection devrait toujours être prévue pour les moteurs servoventilés (IC416).

E3**Sonde termiche a termistori**

Sono dei semiconduttori che presentano una rapida variazione di resistenza in prossimità della temperatura nominale di intervento (150 °C).

L'andamento della caratteristica $R = f(T)$ è normalizzato dalle Norme DIN 44081, IEC 34-11.

Questi sensori presentano il vantaggio di avere ingombri ridotti, un tempo di risposta molto contenuto e, dato che il funzionamento avviene senza contatti, sono completamente esenti da usura.

In genere vengono impiegati termistori a coefficiente di temperatura positivo denominati anche "resistori a conduttore freddo" PTC.

A differenza delle sonde termiche bimetalliche, non possono intervenire direttamente sulle correnti delle bobine di eccitazione e devono pertanto essere collegati ad una speciale unità di controllo (apparecchio di sgancio) da interfacciare alle connessioni esterne.

Con questa protezione vengono inseriti tre PTC, (collegati in serie), nell'avvolgimento con terminali disponibili in morsetteria ausiliaria.

Thermistors

These are semi-conductors having rapid resistance variation when they are close to the rated switch off temperature (150 °C). Variations of the $R = f(T)$ characteristic are specified under DIN 44081, IEC 34-11 Standards.

These elements feature several advantages: compact dimensions, rapid response time and, being contact-free, absolutely no wear.

Positive temperature coefficient thermistors are normally used (also known as PTC "cold conductor resistors").

Contrary to bimetallic thermostats, they cannot directly intervene on currents of energizing coils, and must therefore be connected to a special control unit (triggering apparatus) to be interfaced with the external connections.

Thus protected, three PTCs connected in series are installed in the winding, the terminals of which are located on the auxiliary terminal-board.

Temperaturfühler und Thermistoren

Hierbei handelt es sich um Halbleiter, die eine schnelle Änderung des Widerstands in der Nähe der Nennansprechtemperatur (150 °C) zeigen.

Der Verlauf der Kennlinie $R = f(T)$ ist durch die DIN-Normen 44081 und IEC 34-11 festgelegt.

Diese Sensoren haben folgende Vorteile: sie weisen geringe Außenmaße und eine äußerst kurze Ansprechzeit auf und sind vollkommen verschleißfrei, da sie berührungslos arbeiten.

Im allgemeinen werden Thermistoren mit positivem Temperaturkoeffizienten verwendet, die auch als "Kaltleiter" (PTC-Widerstände) bezeichnet werden.

Im Unterschied zu Bimetall-Temperaturfühlern können sie nicht direkt auf die Erregungsströme der Spulen wirken, sondern müssen an eine spezielle Steuereinheit (Auslösegerät) angeschlossen werden, die mit den externen Anschlüssen kompatibel ist.

Mit dieser Schutzeinrichtung werden drei in Reihe geschaltete PTC-Widerstände in die Wicklung eingesetzt, deren Endanschlüsse an einer Zusatzklemmleiste verfügbar sind.

Sondes thermométriques

Ce sont des semiconducteurs qui présentent une variation rapide de résistance à proximité de la température nominale d'intervention (150 °C).

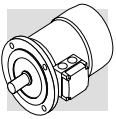
L'évolution de la caractéristique $R = f(T)$ est défini par les Normes DIN 44081, IEC 34-11.

Ces capteurs présentent l'avantage d'avoir des encombrements réduits, un temps de réponse très bref et, du fait que le fonctionnement a lieu sans contact, il sont exempts d'usure.

En général, on utilise des thermistors à coefficient de température positif dénommés également "résistors à conducteur froid" PTC.

Contrairement aux sondes thermiques bimétalliques, ils ne peuvent intervenir directement sur les courants des bobines d'excitation et doivent par conséquent être reliés à une unité spéciale de contrôle (appareil de déconnexion) à interfacer aux connexions extérieures.

Avec cette protection, trois sondes, (reliées en série), sont insérées dans le bobinage avec extrémités disponibles dans le bornier auxiliaire.



D3

Sonde termiche bimetalliche

Bimetallic thermostates

Bimetall-Temperaturfühler

Sondes thermiques biméalliques

I protettori di questo tipo contengono all'interno di un involucro un disco bimetallico che, raggiunta la temperatura nominale di intervento (150 °C), commuta i contatti dalla posizione di riposo. Con la diminuzione della temperatura, il disco e i contatti riprendono automaticamente la posizione di riposo. Normalmente si impiegano tre sonde bimetalliche in serie con contatti normalmente chiusi e terminali disponibili in una morsettiere ausiliaria.

These types of protective devices house a bimetal disk. When the rated switch off temperature (150 °C) is reached, the disk switches the contacts from their initial rest position. As temperature falls, the disk and the contacts automatically return to rest position. Three bimetallic thermostates connected in series are usually employed, with normally closed contacts. The terminals are located on an auxiliary terminal-board.

Diese Schutzeinrichtungen bestehen aus einer Kapsel, in der sich eine Bimetallscheibe befindet, die bei Erreichen der Nennansprechtemperatur (150 °C) anspricht. Nach Absenkung der Temperatur geht der Schaltkontakt automatisch in Ruhestellung zurück. Normalerweise werden drei in Reihe geschaltete Bimetallfühler mit Öffnern verwendet, deren Endverschlüsse an einer Zusatzklemmleiste verfügbar sind.

Les protecteurs de ce type contiennent, dans une enveloppe interne, un disque bimétallique qui, lorsque la température nominale d'intervention (150 °C) est atteinte, commutent les contacts de la position de repos. Avec la diminution de la température, le disque et les contacts reprennent automatiquement la position de repos. Normalement, on utilise trois sondes biméalliques en série avec contacts normalement fermés et extrémités disponibles dans un bornier auxiliaire.

H1

Riscaldatori anticondensa

Anti-condensation heaters

Wicklungsheizung

Rechauffeurs anticondensation



I motori funzionanti in ambienti molto umidi e/o in presenza di forti escursioni termiche, possono essere equipaggiati con una resistenza anti-condensa. L'alimentazione monofase è prevista da morsettiere ausiliaria posta nella scatola principale. Le potenze assorbite dalla resistenza elettrica sono elencate qui di seguito:

Where an application involves high humidity or extreme temperature fluctuation, motors may be equipped with an anti-condensate heater. A single-phase power supply is available in the auxiliary terminal board inside the main terminal box. Values for the absorbed power are listed here below:

Die Motoren, die in besonders feuchten Umgebungen und/oder unter starken Temperaturschwankungen eingesetzt werden, können mit einem Heizelement als Kondenswasserschutz ausgestattet werden. Die einphasige Versorgung erfolgt über eine Zusatzklemmleiste, die sich im Klemmenkasten befindet. Werte fuer die Leistungsaufnahme sind in folgender Tabelle aufgeführt.

Les moteurs fonctionnant dans des milieux très humides et/ou en présence de fortes plages thermiques peuvent être équipés d'une résistance anticondensation. L'alimentation monophasée est prévue par l'intermédiaire d'une boîte à bornes auxiliaire située dans la boîte principale. Les puissances absorbées sont indiqués de suite :

(A74)

| | | H1 |
|---|---|------------------------|
|  |  | 1~ 230V ± 10% P [W] |
| BN 56...BN 80 | M0...M2 | 10 |
| BN 90...BN 160MR | M3 - M4 | 25 |
| BN 160M...BN 180M | M5 | 50 |
| BN 180L...BN 200L | — | 65 |

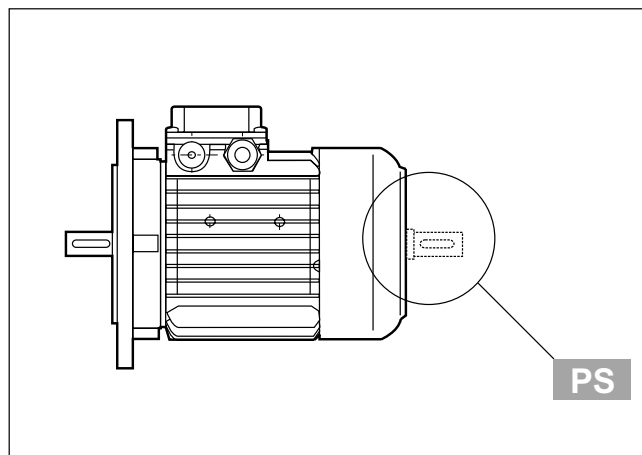
Importante!
Durante il funzionamento del motore la resistenza anticondensa non deve mai essere inserita.

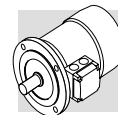
Warning!
Always remove power supply to the anti-condensate heater before operating the motor.

Warnung!
Während des Motorbetriebs darf die Wicklungsheizung nie gespeist werden.

Avertissement!
Durant le fontionnement du moteur, la résistance anticondensation ne doit jamais être alimentée.

PS





Seconda estremità d'albero

L'opzione esclude le varianti RC, TC, U1, U2, EN1, EN2, EN3 – non applicabile ai motori con freno tipo BA.

Le dimensioni sono reperibili nelle tavole dimensionali dei motori.

Second shaft extension

This option is not compatible with variants RC, TC, U1, U2, EN1, EN2, EN3 – and is not feasible on motors equipped with BA brake.

For shaft dimensions please see motor dimensions tables.

Zweites Wellenende

Diese Option schließt die Optionen RC, TC, U1, U2, EN1, EN2, EN3 aus – sie kann nicht außerdem nicht an Motoren, die mit einer Bremse vom Typ BA ausgestattet sind, angebaut werden. Die entsprechenden Maße können den Maßtabellen der Motoren entnommen werden.

Arbre à double extrémité

L'option exclut les variantes RC, TC, U1, U2, EN1, EN2, EN3 – non applicables aux moteurs avec frein type BA.

Les dimensions figurent sur les planches de dimensions des moteurs.

AL

AR

Dispositivo antiritorno

Nelle applicazioni dove è necessario impedire la rotazione inversa del motore dovuta all'azione del carico, è possibile impiegare motori provvisti di un dispositivo antiritorno (disponibile solo sulla serie M). Questo dispositivo, pur consentendo la libera rotazione nel senso di marcia, interviene istantaneamente in caso di mancanza di alimentazione bloccando la rotazione dell'albero nel senso inverso.

Il dispositivo antiritorno è lubrificato a vita con grasso specifico per questa applicazione.

In fase di ordine dovrà essere indicato chiaramente il senso di marcia previsto.

In nessun caso il dispositivo antiritorno dovrà essere utilizzato per impedire la rotazione inversa nel caso di collegamento elettrico errato.

Nella tabella (A75) sono indicate le coppie nominale e massima di bloccaggio attribuite ai dispositivi antiritorno utilizzati, mentre la raffigurazione schematica del dispositivo è inserita nella tabella (A76).

Le dimensioni sono le stesse del motore autofrenante.

Backstop device

For applications where backdriving must be avoided, motors equipped with an anti run-back device can be used (available for the M series only). While allowing rotation in the direction required, this device operates instantaneously in case of a power failure, preventing the shaft from running back.

The anti run-back device is life lubricated with special grease for this specific application.

When ordering, customers should indicate the required rotation direction, AL or AR.

Never use the anti run-back device to prevent reverse rotation caused by faulty electrical connection.

Table (A75) shows rated and maximum locking torques for the anti run-back devices.

A diagram of the device can be seen in Table (A76).

Overall dimensions are same as the corresponding brake motor.

Rücklaufsperre

Für Anwendungen, bei denen ein durch die Last verursachtes Rücklaufen des Motors verhindert werden soll, können Motoren installiert werden, die über eine Rücklaufsperre verfügen (nur bei Serie M verfügbar).

Diese Vorrichtung, die eine völlig unbehinderte Drehung des Motors in Laufrichtung gestattet, greift sofort ein, wenn die Spannung fehlt, und verhindert die Drehung der Welle in die Gegenrichtung.

Die Rücklaufsperre verfügt über eine Dauer - Schmierung mit einem speziell für diese Anwendung geeigneten Fett.

Bei der Bestellung muß die vorgesehene Drehrichtung des Motors genau angegeben werden.

Die Rücklaufsperre darf keinesfalls verwendet werden, um im Falle eines fehlerhaften elektrischen Anschlusses die Drehung in die Gegenrichtung zu verhindern. In Tabelle (A75) sind die Nenndrehmomente und Höchst Drehmomente für die verwendeten Rücklaufsperrungen angegeben; Abbildung (A76) zeigt eine schematische Darstellung der Vorrichtung.

Die abmessungen sind ähnlich denen der Bremsmotoren.

Dispositif anti-retour

Pour les applications où il est nécessaire d'empêcher la rotation inverse du moteur à cause de l'action de la charge, il est possible d'utiliser des moteurs dotés d'un dispositif anti-retour (disponible seulement sur la série M).

Ce dispositif, bien que permettant la libre rotation dans le sens de marche, intervient instantanément en cas de manque d'alimentation en bloquant la rotation de l'arbre dans le sens inverse.


Le dispositif anti-retour est lubrifié à vie avec une graisse spécifique pour cette application.

En phase de commande, il faudra indiquer clairement le sens de marche prévu. En aucun cas, le dispositif anti-retour ne devra être utilisé pour empêcher la rotation inverse en cas de branchement électrique erroné.

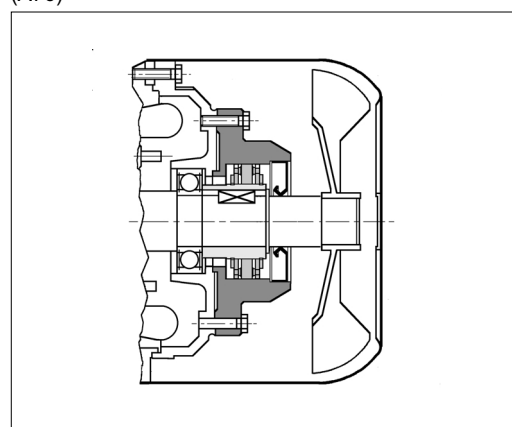
Le tableau (A75) indique le couple nominal et le couple maximum de blocage attribués aux dispositifs anti-retour utilisés alors que la représentation schématique du dispositif se trouve dans le tableau (A76).

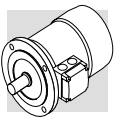
Les dimensions sont le même du moteur frein.

(A75)

|  | Coppia nominale di bloccaggio <i>Rated locking torque</i> Nenndrehmoment der Sperre <i>Couple nominal de blocage</i> | Coppia max. di bloccaggio <i>Max. locking torque</i> Max. Drehmoment der Sperre <i>Couple maxi. de blocage</i> | Velocità di distacco <i>Release speed</i> Ausrückgeschwindigkeit <i>Vitesse de décollement</i> |
|---|---|---|---|
| | [Nm] | [Nm] | [min ⁻¹] |
| M1 | 6 | 10 | 750 |
| M2 | 16 | 27 | 650 |
| M3 | 54 | 92 | 520 |
| M4 | 110 | 205 | 430 |

(A76)





Ventilazione

I motori sono raffreddati mediante ventilazione esterna (IC 411 secondo CEI EN 60034-6) e sono provvisti di ventola radiale in plastica, funzionante in entrambi i versi di rotazione.

L'installazione dovrà assicurare una distanza minima della calotta copriventola dalla parete più vicina, in modo da non creare impedimento alla circolazione dell'aria, oltre che permettere l'esecuzione della manutenzione ordinaria del motore e, se presente, del freno.

Su richiesta, a partire dalle grandezze BN 71, oppure M1, i motori possono essere forniti con ventilazione forzata ad alimentazione indipendente. Il raffreddamento è realizzato per mezzo di un ventilatore assiale con alimentazione indipendente, montato sulla calotta copriventola (metodo di raffreddamento IC 416).

Questa esecuzione è utilizzata in caso di alimentazione del motore tramite inverter allo scopo di estendere il campo di funzionamento a coppia costante anche a bassa velocità, o quando per lo stesso sono richieste elevate frequenze di avviamento.

Da questa opzione sono esclusi i motori autofrenanti tipo BN_BA e tutti i motori con doppia sporgenza d'albero (opzione PS).

Ventilation

Motors are cooled through outer air blow (IC 411 according to CEI EN 60034-6) and are equipped with a plastic radial fan, which operates in both directions.

Ensure that fan cover is installed at a suitable distance from the closest wall so to allow air circulation and servicing of motor and brake, if fitted.

On request, motors can be supplied with independently power-supplied forced ventilation system starting from BN 71 or M1 size.

Motor is cooled by an axial fan with independent power supply and fitted on the fan cover (IC 416 cooling system).

This version is used in case of motor driven by inverter so that steady torque operation is possible even at low speed or when high starting frequencies are needed.

Brake motors of BN_BA type and all motors with rear shaft projection (PS option) are excluded.

Belüftung

Die Motoren werden mittels Fremdbelüftung gekühlt (IC 411 gemäß CEI EN 60034-6) und sind mit einem Radiallüfterrad aus Kunststoff ausgestattet, das in beide Richtungen dreht.

Die Installation muss zwischen Lüfterradkappe und der nächstliegenden Wand einen Mindestabstand berücksichtigen, so dass der Luftumlauf nicht behindert werden kann. Dieser Abstand ist jedoch ebenso für die regelmäßige Instandhaltung des Motors und, falls vorhanden, der Bremse erforderlich.

Ab der Baugröße BN 71 oder M1 können die Motoren auf Anfrage mit einer unabhängig gespeisten Zwangsbelüftung geliefert werden. Die Kühlung erfolgt hierdurch einen unabhängig gespeisten Axialventilator, der auf die Lüfterradkappe (Kühlmethode IC 416) montiert wird.

Diese Ausführung wird im Fall eines über einen Frequenzumrichter versorgten Motor verwendet, so dass der Betriebsbereich bei konstantem Drehmoment auch auf die niedrige Drehzahl ausgedehnt wird, oder im Fall von hohen Anlauffrequenzen.

Von dieser Option ausgeschlossen sind die Bremsmotoren BN_BA und Motoren mit beidseitig herausragender Welle (Option PS).

Ventilation

Les moteurs sont refroidis par ventilation externe (IC 411 selon CEI EN 60034-6) et sont équipés de ventilateur radial en plastique fonctionnant dans les deux sens de rotation.



L'installation doit garantir une distance minimum de la calotte cache-ventilateur par rapport au mur le plus proche de façon à ne pas créer d'empêchement à la circulation de l'air ainsi que pour permettre les interventions d'entretien ordinaire du moteur et, si présent, du frein.

Sur demande, à partir de la taille BN 71, ou M1, les moteurs peuvent être fournis avec ventilation forcée à alimentation indépendante. Le refroidissement est réalisé au moyen d'un ventilateur axial avec alimentation indépendante monté sur la calotte cache-ventilateur (méthode de refroidissement IC 416).

Cette exécution est utilisée en cas d'alimentation du moteur par variateur dans le but d'étendre aussi la plage de fonctionnement à couple constant aux faibles vitesses ou lorsque des fréquences de démarrage élevées sont nécessaire à celui-ci.

Les moteurs frein type BN_BA et les moteurs avec arbre sortant des deux côtés (option PS) SP sont exclus de cette option.

(A77)

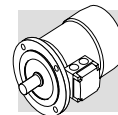
| Dati di alimentazione / Power supply / Daten der Stromversorgung / Données d'alimentation | | | | | |
|---|---|-----------------|---------|-------|-------------|
|  |  | V a.c. ± 10% | Hz | P [W] | I [A] |
| BN 71 | M1 | 1~ 230 | 50 / 60 | 22 | 0.14 |
| BN 80 | M2 | | | 22 | 0.14 |
| BN 90 | — | | | 40 | 0.25 |
| BN 100 (*) | M3 | | | 50 | 0.25 |
| BN 112 | — | 3~ 230 Δ / 400Y | 50 | 50 | 0.26 / 0.15 |
| BN 132S | M4S | | | 110 | 0.38 / 0.22 |
| BN 132M...BN 160MR | M4L | | | | |
| BN 160...BN 180M | M5 | | 50 | 180 | 1.25 / 0.72 |

Per la variante sono disponibili due esecuzioni alternative, denominate **U1** e **U2**, aventi lo stesso ingombro in senso longitudinale. Per entrambe le esecuzioni, la maggiore lunghezza della calotta copriventola (ΔL) è riportata nella tabella che segue. Dimensioni complessive ricavabili dalle tavole dimensionali dei motori.



*This variant has two different models, called **U1** and **U2**, having the same longitudinal size. Longer side of fan cover (ΔL) is specified for both models in the table below. Overall dimension can be reckoned from motor size table.*

Für die Varianten sind als Alternative zwei Ausführungen verfügbar: **U1** und **U2** mit dem gleichen Längsmaßen. Für beide Ausführungen wird die Verlängerung der Lüfterradkappe (ΔL) in der nachstehenden Tabelle wiedergegeben. Gesamtmaße können den Tabellen entnommen werden, in denen die Motormaße angegeben werden.

*Pour la variante sont disponibles deux exécutions alternatives, dénommées **U1** et **U2**, ayant le même encombrement dans le sens longitudinal. Pour les deux exécutions, la majoration de la longueur de la calotte cache-ventilateur (ΔL) est indiquée dans le tableau suivant. Dimensions totales à calculer d'après les planches de dimensions des moteurs.*



(A78)

| Tabella maggiorazione lunghezze motore / Extra length for servoveilated motors Tabelle - Motorverlängerung / Tableau majoration longueurs moteur | | | |
|---|---|--------------|--------------|
|  |  | ΔL_1 | ΔL_2 |
| BN 71 | M1 | 93 | 32 |
| BN 80 | M2 | 127 | 55 |
| BN 90 | — | 131 | 48 |
| BN 100 | M3 | 119 | 28 |
| BN 112 | — | 130 | 31 |
| BN 132S | M4S | 161 | 51 |
| BN 132M | M4L | 161 | 51 |

ΔL_1 = variazione dimensionale rispetto alla quota LB del motore standard corrispondente

ΔL_1 = extra length to LB value of corresponding standard motor

ΔL_1 = Maßänderung gegenüber Maß LB des entsprechenden Standardmotors

ΔL_1 = variation de dimension par rapport à la cote LB du moteur standard correspondant

ΔL_2 = variazione dimensionale rispetto alla quota LB del motore autofrenante corrispondente

ΔL_2 = extra length to LB value of corresponding brake motor

ΔL_2 = Maßänderung gegenüber Maß LB des entsprechenden Bremsmotors

ΔL_2 = variation de dimension par rapport à la cote LB du moteur frein correspondant

U1



Terminali di alimentazione del ventilatore in scatola morsetti separata.

Nei motori autofrenanti grandezza BN 71...BN 160MR, con variante **U1**, la leva di sblocco non è collocabile nella posizione AA. L'opzione non è disponibile per i motori conformi alle norme CSA e UL (opzione CUS).

Fan wiring terminals are housed in a separate terminal box.

*In brake motors of size BN 71...BN 160MR, with **U1** model, the release lever cannot be positioned to AA. The option is not applicable to motors compliant with the CSA and UL norms (option CUS).*

Versorgungsanschlüsse des Ventilators im Zusatzklemmenkasten.

Bei den Bremsmotoren in der Baugröße BN 71...BN 160MR, mit Variante **U1** kann der Bremslösehebel nicht in der Position AA. Die Option ist nicht anwendbar für die Motoren entsprechend den Normen CSA und UL (Option CUS).

Bornes d'alimentation du ventilateur dans un bornier séparé.

*Pour les moteurs frein taille BN 71...BN 160MR, avec variante **U1**, le levier de déblocage ne peut être installé en position AA. L'option n'est pas disponible pour les moteurs conformes aux normes CSA et UL (option CUS).*

U2



I terminali del ventilatore sono collocati nella scatola morsettiera principale del motore.

L'opzione U2 non è applicabile ai motori da BN 160 a BN 200L, con eccezione dei motori BN 160MR, per i quali l'opzione è disponibile e ai motori con opzione CUS (conformi alle norme CSA e UL).

Fan terminals are wired in the motor terminal box.

The U2 option does not apply to motors BN 160 through BN 200L, with the only exception of motor BN 160MR for which the option is available instead and to motors with option CUS (compliant to norms CSA and UL).



Versorgungsanschlüsse des Ventilators befinden sich im Hauptklemmenkasten des Motors.

Die Option U2 ist nicht anwendbar bei den Motoren BN160M...BN200L, außer den Motoren BN160MR wofür die Option verfügbar ist, und bei den Motoren mit der CUS-Option (entsprechend den Normen CSA und UL).

Bornes d'alimentation du ventilateur dans le bornier principal du moteur.

L'option n'est pas applicable aux moteurs BN 160...BN 200L, sauf pour les moteurs BN 160MR, pour lesquels l'option est disponible et aux moteurs avec l'option CUS (conforme aux normes CSA et UL).

(A79)

| (*) |  |  | V a.c. \pm 10% | Hz | P [W] | I [A] |
|-----|---|---|------------------------|---------|-------|-------------|
| | BN 100_U2 | M3 | 3~ 230 Δ / 400Y | 50 / 60 | 40 | 0.24 / 0.14 |

RC

Tettuccio parapigioggia

Il dispositivo parapigioggia, che è raccomandato quando il motore è montato verticalmente con l'albero verso il basso, serve a proteggere il motore stesso dall'ingresso di corpi solidi e dallo stillicidio.

Drip cover

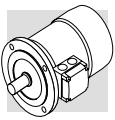
The drip cover protects the motor from dripping and avoids the ingress of solid bodies. It is recommended when motor is installed in a vertical position with the shaft downwards.

Schutzdach

Das Schutzdach, dessen Montage dann empfohlen wird, wenn der Motor senkrecht mit einer nach unten gerichteten Welle ausgerichtet wird, dient dem Schutz des Motors vor einem Eindringen von festen Fremdkörpern und Tropfwasser.

Capot de protection anti-pluie

Le capot de protection anti-pluie est recommandé lorsque le moteur est monté verticalement avec l'arbre vers le bas, il sert à protéger le moteur contre l'introduction de corps solides et le suintement.





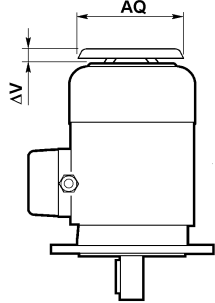
Le dimensioni aggiuntive sono indicate nella tabella (A80).
Il tettuccio esclude le varianti PS, EN1, EN2, EN3 e non è applicabile ai motori con freno tipo BA

*Relevant dimensions are indicated in the table (A80).
The drip cover is not compatible with variants PS, EN1, EN2, EN3 and will not fit motors equipped with a BA brake.*

Die Maßerweiterungen werden in der Tabelle (A80) angegeben. Das Schutzdach schließt die Möglichkeit der Varianten PS, EN1, EN2, EN3 und kann bei Motoren mit dem Bremstyp BA nicht montiert werden.

*Les dimensions à ajouter sont indiquées dans le tableau (A80).
Le capot antipluie exclue les variantes PS, EN1, EN2, EN3 et n'est pas applicable aux moteurs avec frein type BA.*

(A80)

|  |  | AQ | ΔV |  |
|---|---|-----|----|---|
| BN 63 | M05 | 118 | 24 | |
| BN 71 | M1 | 134 | 27 | |
| BN 80 | M2 | 152 | 25 | |
| BN 90 | — | 168 | 30 | |
| BN 100 | M3 | 190 | 28 | |
| BN 112 | — | 211 | 32 | |
| BN 132...BN 160MR | M4 | 254 | 32 | |
| BN 160M...BN 180M | M5 | 302 | 36 | |
| BN 180L...BN 200L | — | 340 | 36 | |

TC

Tettuccio tessile

La variante del tettuccio tipo TC è da specificare quando il motore è installato in ambienti dell'industria tessile, dove sono presenti filamenti che potrebbero ostruire la griglia del coprивentola, impedendo il regolare flusso dell'aria di raffreddamento. L'opzione esclude le varianti EN1, EN2, EN3 e non è applicabile ai motori con freno tipo BA. L'ingombro complessivo è lo stesso del tettuccio tipo RC.

Textile canopy

Option TC is a cover variant for textile industry environments, where lint may obstruct the fan grid and prevent a regular flow of cooling air. This option is not compatible with variants EN1, EN2, EN3 and will not fit motors equipped with a BA brake. Overall dimensions are the same as drip cover type RC.

Schutzdach

Die Variante des Schutzdachs vom Typ TC muss dann spezifiziert werden, wenn der Motor in Bereichen der Textilindustrie installiert wird, in denen Stofffusseln das Lüfterradgitter verstopfen und so einen regulären Kühlluftfluss verhindern könnten. Diese Option schließt die Möglichkeit der Varianten EN1, EN2, EN3 aus und kann bei Motoren mit einer Bremse vom Typ BA nicht appliziert werden. Die Gesamtmaße entsprechen denen des Schutzdachs vom Typ RC.

Capot textile

La variante du capot type TC est à spécifier lorsque le moteur est installé dans des sites de l'industrie textile, où sont présents des filaments qui pourraient obstruer la grille du cache-ventilateur et empêcher le flux régulier de l'air de refroidissement. L'option exclue les variantes EN1, EN2, EN3 et n'est pas applicable aux moteurs avec frein type BA. L'encombrement total est identique à celui du capot type RC.

Dispositivi di retroazione

I motori possono essere dotati di tre diversi tipi di encoder, qui di seguito descritti. Il montaggio dell'encoder esclude le esecuzioni con doppia estremità d'albero (PS) e tettuccio di protezione (RC, TC). Il dispositivo non è applicabile ai motori dotati del freno im c.a., tipo BA.

Feedback units

Motors may be combined with three different types of encoders to achieve feedback circuits. Configurations with double-extended shaft (PS) and rain canopy (RC, TC) are not compatible with encoder installation. Also not compatible are motors equipped with a.c. brakes, type BA.

Geber-an-schluß

Die Motoren können mit drei unterschiedlichen Encodertypen ausgestattet werden. Nachstehend finden Sie die entsprechenden Beschreibungen. Die Montage des Encoders schließt die Version mit zweitem Wellenende (PS) und Schutzdach (RC, TC) aus. Die Vorrichtung kann an Motoren mit Bremse vom Typ BA nicht angebaut werden.

Dispositifs de retroaction

Pour moteurs peuvent être dotés de trois types de codeurs différents, décrits ci-après. Le montage du codeur exclu les exécutions avec arbre à double extrémité (PS) et le capot de protection (RC, TC). Le dispositif n'est pas applicable aux moteurs avec frein en c.a., type BA.

EN1

Encoder incrementale, $V_{IN}=5\text{ V}$, uscita line-driver RS 422.

Incremental encoder, $V_{IN}=5\text{ V}$, line-driver output RS 422.

Inkremental-Encoder, $V_{IN}=5\text{ V}$, Ausgang „line-driver“ RS 422.

Codeur incrémental, $V_{IN}=5\text{ V}$, sortie line-driver RS 422.

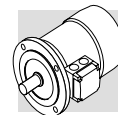
EN2

Encoder incrementale, $V_{IN}=10-30\text{ V}$, uscita line driver RS 422.

Incremental encoder, $V_{IN}=10-30\text{ V}$, line-driver output RS 422.

Inkremental-Encoder, $V_{IN}=10-30\text{ V}$, Ausgang „line driver“ RS 422.

Codeur incrémental, $V_{IN}=10-30\text{ V}$, sortie line-driver RS 422.



EN3

Encoder incrementale, $V_{IN}=12-30$ V, uscita push-pull 12-30 V

Incremental encoder, $V_{IN}=12-30$ V, push-pull output 12-30 V

Inkremental-Encoder, $V_{IN}=12-30$ V, Ausgang „push-pull“ 12-30 V

Codeur incrémental, $V_{IN}=12-30$ V, sortie push-pull 12-30 V

(A81)

| | EN1 | EN2 | EN3 |
|--|--|--------------------------------------|-----------|
| interfaccia / Interface Schnittstelle / interface | RS 422 | RS 422 | push-pull |
| tensione alimentazione / Power supply voltage Versorgungsspannung / tension d'alimentation | [V] 4...6 | 10...30 | 12...30 |
| tensione di uscita / Output voltage Ausgangsspannung / tension de sortie | [V] 5 | 5 | 12...30 |
| corrente di esercizio senza carico / No-load operating current Betriebsstrom ohne Belastung / courant d'utilisation sans charge | [mA] 120 | 100 | 100 |
| n° di impulsi per giro / No. of pulses per revolution Impulse pro Drehung / nbre d'impulsions par tour | 1024 | | |
| n° segnali / No. of signals Signale / nbre de signaux | 6 (A, B, C + segnali invertiti / inverted signals invertierte Signale / signaux inversés) | | |
| max. frequenza di uscita / Max. output frequency Max. Ausgangsfrequenz / fréquence max. de sortie | [kHz] 300 | 300 | 200 |
| max. velocità / Max. speed Max. Drehzahl / vitesse max. | [min ⁻¹] | 6000 (9000 min ⁻¹) x 10s | |
| campo di temperatura / Temperature range Temperaturbereich / plage de température | [°C] | -20...+70 | |
| grado di protezione / Protection class Schutzgrad / degré de protection | IP 65 | | |

| EN1, EN2, EN3 | |
|-----------------------|----------------|
| | |
| BN 63...BN 200L | M05...M5 |
| BN 63_FD...BN 200L_FD | M05_FD...M5_FD |
| BN 63_FA...BN 200L_FA | M05_FA...M5_FA |

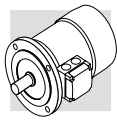
Se l'opzione EN₁ è richiesta per motori di grandezza BN71...BN160MR e M1...M4, contemporaneamente all'opzione U1/U2, le variazioni dimensionali coincidono con quelle dell'opzione U1/U2.

If the encoder device (options EN1, EN2, EN3) is specified on motors BN71...BN160MR and M1...M4, along with the independent fan cooling (options U1, U2), the extra length of motor is coincident with that of the correspondent U1 and U2 execution.

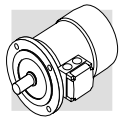
| EN ₁ + U1 | | |
|-------------------------|-------|-----------|
| | | |
| | | L3 |
| BN 160M...BN 180M | M5 | 72 |
| BN 180L...BN 200L | - | 82 |
| BN 160M_FD...BN 180M_FD | M5_FD | 35 |
| BN 180L_FD...BN 200L_FD | - | 41 |

Wenn der Encoder (Optionen EN1, EN2, EN3) für Motoren der Baugrößen BN71...BN160MR und M1...M4 zusammen mit Fremdlüftung (Optionen U1, U2) ausgelegt ist, stimmen die Maßänderungen des Motors mit jenen der entsprechenden Ausführungen U1 und U2 überein.

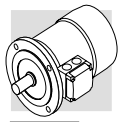
Si un codeur (option EN1, EN2, EN3) est nécessaire sur les moteurs de tailles BN71...BN160MR et M1...M4, en association avec la ventilation forcée (options U1, U2), la variation de dimensions du moteur coïncide avec celle des exécutions U1 et U2 correspondantes.



| 2 P | | 3000 min ⁻¹ - S1 | | | | | | | | | | | | | | | | | | 50 Hz | | | | |
|------|----------|---|-------------------|------|-------------------|---------------|--------------|---------------|------|-----|-------------------|---|----------------------------|-------|--------|------|----------------|----------------|--------|--------|----------------|-----------------------|-------|------|
| | | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | | | | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | | | | | | | | |
| | | FD | | | | | FA | | | | | BA | | | | | | | | | | | | |
| Pn | kw | | n | Mn | $\text{EFF} \geq$ | η (100%) | η (75%) | cos φ | In | Is | $\frac{M_s}{M_n}$ | $\frac{M_a}{M_n}$ | $\frac{J_m}{\text{kgm}^2}$ | IM B5 | Mod. | Mb | Z ₀ | Z ₀ | Mb max | Mod. | Z ₀ | Jm x 10 ⁻⁴ | IM B5 | |
| | | | min ⁻¹ | Nm | | % | % | A | A | | | | kgm ² | kg | | Nm | 1/h | 1/h | Nm | | 1/h | kgm ² | kg | |
| 0.18 | BN 63A | 2 | 2730 | 0.63 | $\text{EFF} \geq$ | 59.9 | 56.9 | 0.77 | 0.56 | 3.0 | 2.1 | 2 | 2.0 | 3.5 | FD 02 | 1.75 | 3900 | 4800 | 1.75 | FA 02 | 4800 | 2.6 | 5.2 | 5.0 |
| 0.25 | BN 63B | 2 | 2740 | 0.87 | $\text{EFF} \geq$ | 66.0 | 64.8 | 0.76 | 0.72 | 3.3 | 2.3 | 2.3 | 2.3 | 3.9 | FD 02 | 1.75 | 3900 | 4800 | 1.75 | FA 02 | 4800 | 3.0 | 5.6 | 5.4 |
| 0.37 | BN 63C | 2 | 2800 | 1.26 | $\text{EFF} \geq$ | 69.1 | 66.8 | 0.78 | 0.99 | 3.9 | 2.6 | 2.6 | 3.3 | 5.1 | FD 02 | 3.5 | 3600 | 4500 | 3.5 | FA 02 | 4500 | 3.9 | 6.8 | 6.6 |
| 0.37 | BN 71A | 2 | 2820 | 1.25 | $\text{EFF} \geq$ | 73.8 | 73.0 | 0.76 | 0.95 | 4.8 | 2.8 | 2.6 | 3.5 | 5.4 | FD 03 | 3.5 | 3000 | 4100 | 3.5 | FA 03 | 4200 | 4.6 | 8.1 | 7.8 |
| 0.55 | BN 71B | 2 | 2820 | 1.86 | $\text{EFF} \geq$ | 76.0 | 75.8 | 0.76 | 1.37 | 5.0 | 2.9 | 2.8 | 4.1 | 6.2 | FD 03 | 5 | 2900 | 4200 | 5 | FA 03 | 4200 | 5.3 | 8.9 | 8.6 |
| 0.75 | BN 71C | 2 | 2810 | 2.6 | $\text{EFF} \geq$ | 76.6 | 76.2 | 0.76 | 1.86 | 5.1 | 3.1 | 2.8 | 5.0 | 7.3 | FD 03 | 5 | 1900 | 3300 | 5 | FA 03 | 3600 | 6.1 | 10 | 9.7 |
| 0.75 | BN 80A | 2 | 2810 | 2.6 | $\text{EFF} \geq$ | 76.2 | 75.5 | 0.81 | 1.75 | 4.8 | 2.6 | 2.2 | 7.8 | 8.6 | FD 04 | 5 | 1700 | 3200 | 5 | FA 04 | 3200 | 9.4 | 12.5 | 12.4 |
| 1.1 | BN 80B | 2 | 2800 | 3.8 | $\text{EFF} \geq$ | 76.4 | 76.2 | 0.81 | 2.57 | 4.8 | 2.8 | 2.4 | 9.0 | 9.5 | FD 04 | 10 | 1500 | 3000 | 10 | FA 04 | 3000 | 10.6 | 13.4 | 13.3 |
| 1.5 | BN 80C | 2 | 2800 | 5.1 | $\text{EFF} \geq$ | 79.1 | 79.5 | 0.81 | 3.4 | 4.9 | 2.7 | 2.4 | 11.4 | 11.3 | FD 04 | 15 | 1300 | 2600 | 15 | FA 04 | 2600 | 13.0 | 15.2 | 15.1 |
| 1.5 | BN 90SA | 2 | 2870 | 5.0 | $\text{EFF} \geq$ | 82.0 | 81.5 | 0.80 | 3.3 | 5.9 | 2.7 | 2.6 | 12.5 | 12.3 | FD 14 | 15 | 900 | 2200 | 15 | FA 14 | 2200 | 14.1 | 16.5 | 16.4 |
| 1.85 | BN 90SB | 2 | 2880 | 6.1 | $\text{EFF} \geq$ | 82.5 | 82.0 | 0.80 | 4.0 | 6.2 | 2.9 | 2.6 | 16.7 | 14 | FD 14 | 15 | 900 | 2200 | 15 | FA 14 | 2200 | 18.3 | 18.2 | 18.1 |
| 2.2 | BN 90L | 2 | 2880 | 7.3 | $\text{EFF} \geq$ | 82.7 | 82.1 | 0.80 | 4.8 | 6.3 | 2.9 | 2.7 | 16.7 | 14 | FD 05 | 26 | 900 | 2200 | 21 | FA 05 | 2200 | 21 | 20 | 20.7 |
| 3 | BN 100L | 2 | 2860 | 10.0 | $\text{EFF} \geq$ | 82.8 | 82.6 | 0.79 | 6.6 | 5.7 | 2.6 | 2.2 | 31 | 20 | FD 15 | 26 | 700 | 1600 | 26 | FA 15 | 1600 | 35 | 27 | 27 |
| 4 | BN 100LB | 2 | 2870 | 13.3 | $\text{EFF} \geq$ | 84.3 | 84.4 | 0.80 | 8.6 | 5.9 | 2.7 | 2.5 | 39 | 23 | FD 15 | 40 | 450 | 900 | 40 | FA 15 | 1000 | 43 | 30 | 30 |
| 4 | BN 112M | 2 | 2900 | 13.2 | $\text{EFF} \geq$ | 85.5 | 84.5 | 0.82 | 8.2 | 6.9 | 3 | 2.9 | 57 | 28 | FD 06S | 40 | — | 950 | 40 | FA 06S | 950 | 66 | 39 | 40 |
| 5.5 | BN 132SA | 2 | 2890 | 18.2 | $\text{EFF} \geq$ | 86.1 | 85.7 | 0.84 | 11.0 | 6 | 2.6 | 2.2 | 101 | 35 | FD 06 | 50 | — | 600 | 50 | FA 06 | 600 | 112 | 48 | 49 |
| 7.5 | BN 132SB | 2 | 2900 | 25 | $\text{EFF} \geq$ | 87.2 | 87.1 | 0.85 | 14.6 | 6.4 | 2.6 | 2.2 | 145 | 42 | FD 06 | 50 | — | 550 | 50 | FA 06 | 550 | 154 | 56 | 56 |
| 9.2 | BN 132M | 2 | 2930 | 30 | $\text{EFF} \geq$ | 89.0 | 88.5 | 0.86 | 17.3 | 6.9 | 2.8 | 2.3 | 178 | 53 | FD 56 | 75 | — | 430 | 75 | FA 06 | 430 | 189 | 67 | 67 |
| 11 | BN 160MR | 2 | 2920 | 36 | $\text{EFF} \geq$ | 89.1 | 88.9 | 0.88 | 20.2 | 7.0 | 2.9 | 2.5 | 210 | 65 | | | | | | | | | | |
| 15 | BN 160MB | 2 | 2930 | 49 | $\text{EFF} \geq$ | 89.6 | 89.4 | 0.86 | 28.1 | 7.1 | 2.6 | 2.3 | 340 | 84 | | | | | | | | | | |
| 18.5 | BN 160L | 2 | 2930 | 60 | $\text{EFF} \geq$ | 90.4 | 90.1 | 0.86 | 34 | 7.6 | 2.7 | 2.3 | 420 | 97 | | | | | | | | | | |
| 22 | BN 180M | 2 | 2930 | 72 | $\text{EFF} \geq$ | 91.3 | 91.3 | 0.88 | 40 | 7.8 | 2.6 | 2.4 | 490 | 109 | | | | | | | | | | |
| 30 | BN 200LA | 2 | 2930 | 98 | $\text{EFF} \geq$ | 91.9 | 91.4 | 0.89 | 53 | 7.9 | 2.7 | 2.9 | 770 | 140 | | | | | | | | | | |








| Pn kW | n min ⁻¹ | Mn Nm | EFF ₂ | η (100%) % | η (75%) % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B5 Kg | freno c.c. / d.c. brake G.S.-bremse / fein c.c. | | | | freno c.a. / a.c. brake W.S.-bremse / fein c.a. | | | | | | | | |
|----------|------------------------|----------|------------------|------------------|-----------------|-------|-------------------|----------|----------|----------|--|-------------|--|------|-----------------|-----------------------|--|-------------|------|-----------------|-----------------------|--|-------------|--|--|
| | | | | | | | | | | | | | FD | | FA | | BA | | FA | | BA | | | | |
| | | | | | | | | | | | | | | Mod. | Mb max Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5 Kg | Mod. | Mb max Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5 Kg | | |
| 0.06 | 1340 | 0.43 | | 46.8 | 44.2 | 0.65 | 0.28 | 2.6 | 2.3 | 2.0 | 1.5 | 3.1 | | | | | | | | | | | | | |
| 0.09 | 1350 | 0.64 | | 51.7 | 47.6 | 0.60 | 0.42 | 2.6 | 2.5 | 2.4 | 1.5 | 3.1 | | | | | | | | | | | | | |
| 0.12 | 1350 | 0.85 | | 59.8 | 56.2 | 0.62 | 0.47 | 2.6 | 1.9 | 1.8 | 2.0 | 3.5 | | | | | | | | | | | | | |
| 0.18 | 1320 | 1.30 | | 54.8 | 52.9 | 0.67 | 0.71 | 2.6 | 2.2 | 2.0 | 2.3 | 3.9 | | | | | | | | | | | | | |
| 0.25 | 1340 | 1.78 | | 65.3 | 65.0 | 0.69 | 0.80 | 2.7 | 2.1 | 1.9 | 3.3 | 5.1 | | | | | | | | | | | | | |
| 0.25 | 1380 | 1.73 | | 63.7 | 62.2 | 0.73 | 0.78 | 3.3 | 1.9 | 1.7 | 5.8 | 5.1 | | | | | | | | | | | | | |
| 0.37 | 1370 | 2.6 | | 66.8 | 66.7 | 0.76 | 1.05 | 3.7 | 2.0 | 1.9 | 6.9 | 5.9 | | | | | | | | | | | | | |
| 0.55 | 1380 | 3.8 | | 69.0 | 68.9 | 0.74 | 1.55 | 4.1 | 2.3 | 2.3 | 9.1 | 7.3 | | | | | | | | | | | | | |
| 0.55 | 1390 | 3.8 | | 72.0 | 71.3 | 0.77 | 1.43 | 4.1 | 2.3 | 2.0 | 15 | 8.2 | | | | | | | | | | | | | |
| 0.75 | 1400 | 5.1 | | 75.0 | 74.5 | 0.78 | 1.85 | 4.9 | 2.7 | 2.5 | 20 | 9.9 | | | | | | | | | | | | | |
| 1.1 | 1400 | 7.5 | | 76.4 | 76.2 | 0.78 | 2.66 | 5.1 | 2.8 | 2.5 | 25 | 11.3 | | | | | | | | | | | | | |
| 1.1 | 1400 | 7.5 | | 76.5 | 76.2 | 0.77 | 2.70 | 4.6 | 2.6 | 2.2 | 21 | 12.2 | | | | | | | | | | | | | |
| 1.5 | 1390 | 10.3 | | 78.7 | 78.5 | 0.77 | 3.6 | 5.3 | 2.8 | 2.4 | 28 | 13.6 | | | | | | | | | | | | | |
| 1.85 | 1390 | 12.7 | | 81.0 | 81.4 | 0.78 | 4.2 | 5.2 | 2.8 | 2.6 | 30 | 15.1 | | | | | | | | | | | | | |
| 2.2 | 1410 | 14.9 | | 81.1 | 81.4 | 0.75 | 5.2 | 4.5 | 2.2 | 2.0 | 40 | 18.3 | | | | | | | | | | | | | |
| 3 | 1410 | 20 | | 82.6 | 83.8 | 0.77 | 6.8 | 5 | 2.3 | 2.2 | 54 | 22 | | | | | | | | | | | | | |
| 4 | 1430 | 27 | | 84.4 | 84.2 | 0.81 | 8.4 | 5.6 | 2.7 | 2.5 | 98 | 30 | | | | | | | | | | | | | |
| 5.5 | 1440 | 36 | | 86.3 | 86.4 | 0.80 | 11.5 | 5.5 | 2.3 | 2.2 | 213 | 44 | | | | | | | | | | | | | |
| 7.5 | 1440 | 50 | | 87.0 | 87.1 | 0.80 | 15.6 | 5.7 | 2.5 | 2.4 | 270 | 53 | | | | | | | | | | | | | |
| 9.2 | 1440 | 61 | | 88.4 | 88.6 | 0.80 | 18.8 | 5.9 | 2.7 | 2.5 | 319 | 59 | | | | | | | | | | | | | |
| 11 | 1440 | 73 | | 88.4 | 88.8 | 0.81 | 22.2 | 5.9 | 2.7 | 2.5 | 360 | 70 | | | | | | | | | | | | | |
| 15 | 1460 | 98 | | 89.9 | 89.4 | 0.81 | 29.7 | 5.9 | 2.3 | 2.1 | 650 | 99 | | | | | | | | | | | | | |
| 18.5 | 1460 | 121 | | 90.0 | 90.1 | 0.81 | 37 | 6.2 | 2.6 | 2.5 | 790 | 115 | | | | | | | | | | | | | |
| 22 | 1460 | 144 | | 90.7 | 91.1 | 0.81 | 43 | 6.5 | 2.5 | 2.5 | 1250 | 135 | | | | | | | | | | | | | |
| 30 | 1460 | 196 | | 91.4 | 91.7 | 0.80 | 59 | 7.1 | 2.7 | 2.8 | 1650 | 157 | | | | | | | | | | | | | |

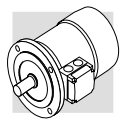







6 P

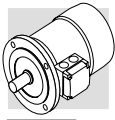
1000 min⁻¹ - S1

50 Hz

| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B5  | freno c.c. / d.c. brake G.S. -bremse / frein c.c. | | | | freno c.a. / a.c. brake W.S. -bremse / frein c.a. | | | | | | | | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|--|----------|--------------------------------|--|--|------|----------|-----------------------|--|--|------|-----------------|-----------------------|--|---|------|
| | | | | | | | | | | | | FD | | FA | | BA | | FA | | BA | | | | | | | |
| | | | | | | | | | | | | Mod. | Mb Nm | Z ₀ 1/h NB SB | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb max Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | |
| 0.09 | BN 63A | 6 | 0.98 | 41 | 0.53 | 0.60 | 2.1 | 2.1 | 1.8 | 3.4 | 4.6 | FD 02 | 3.5 | 9000 | 14000 | 4.0 | 6.3 | FA 02 | 3.5 | 14000 | 4.0 | 6.1 | BA 60 | 5 | 12000 | 5.4 | 6.9 |
| 0.12 | BN 63B | 6 | 1.32 | 45 | 0.60 | 0.64 | 2.1 | 1.9 | 1.7 | 3.7 | 4.9 | FD 02 | 3.5 | 9000 | 14000 | 4.3 | 6.6 | FA 02 | 3.5 | 14000 | 4.3 | 6.4 | BA 60 | 5 | 12000 | 5.7 | 7.2 |
| 0.18 | BN 71A | 6 | 1.91 | 56 | 0.69 | 0.67 | 2.6 | 1.9 | 1.7 | 8.4 | 5.5 | FD 03 | 5.0 | 8100 | 13500 | 9.5 | 8.2 | FA 03 | 5.0 | 13500 | 9.5 | 7.9 | BA 70 | 8 | 12300 | 10.4 | 9.4 |
| 0.25 | BN 71B | 6 | 2.7 | 62 | 0.71 | 0.82 | 2.6 | 1.9 | 1.7 | 10.9 | 6.7 | FD 03 | 5.0 | 7800 | 13000 | 12 | 9.4 | FA 03 | 5.0 | 13000 | 12 | 9.1 | BA 70 | 8 | 12000 | 12.9 | 10.6 |
| 0.37 | BN 71C | 6 | 3.9 | 66 | 0.69 | 1.17 | 3 | 2.4 | 2.0 | 12.9 | 7.7 | FD 53 | 7.5 | 5100 | 9500 | 14 | 10.4 | FA 03 | 7.5 | 9500 | 14 | 10.1 | BA 70 | 8 | 8900 | 14.9 | 11.6 |
| 0.37 | BN 80A | 6 | 3.9 | 68 | 0.68 | 1.15 | 3.2 | 2.2 | 2.0 | 21 | 9.9 | FD 04 | 10 | 5200 | 8500 | 23 | 13.8 | FA 04 | 10 | 8500 | 23 | 13.7 | BA 80 | 18 | 8000 | 24 | 15.2 |
| 0.55 | BN 80B | 6 | 5.7 | 70 | 0.69 | 1.64 | 3.9 | 2.6 | 2.2 | 25 | 11.3 | FD 04 | 15 | 4800 | 7200 | 27 | 15.2 | FA 04 | 15 | 7200 | 27 | 15.1 | BA 80 | 18 | 6800 | 28 | 16.6 |
| 0.75 | BN 80C | 6 | 7.8 | 70 | 0.65 | 2.38 | 3.8 | 2.5 | 2.2 | 28 | 12.2 | FD 04 | 15 | 3400 | 6400 | 30 | 16.1 | FA 04 | 15 | 6400 | 30 | 16.0 | BA 80 | 18 | 6100 | 31 | 17.5 |
| 0.75 | BN 90S | 6 | 7.8 | 69 | 0.68 | 2.31 | 3.8 | 2.4 | 2.2 | 26 | 12.6 | FD 14 | 15 | 3400 | 6500 | 28 | 16.8 | FA 14 | 15 | 6500 | 28 | 16.7 | BA 90 | 35 | 5500 | 33 | 19.9 |
| 1.1 | BN 90L | 6 | 11.4 | 72 | 0.69 | 3.2 | 3.9 | 2.3 | 2.0 | 33 | 15 | FD 05 | 26 | 2700 | 5000 | 37 | 21 | FA 05 | 26 | 5000 | 37 | 22 | BA 90 | 35 | 4600 | 40 | 22 |
| 1.5 | BN 100LA | 6 | 15.2 | 73 | 0.72 | 4.1 | 4 | 2.1 | 2.0 | 82 | 22 | FD 15 | 40 | 1900 | 4100 | 86 | 28 | FA 15 | 40 | 4100 | 86 | 29 | BA 100 | 50 | 3800 | 94 | 32 |
| 1.85 | BN 100LB | 6 | 19.0 | 75 | 0.73 | 4.9 | 4.5 | 2.1 | 2.0 | 95 | 24 | FD 15 | 40 | 1700 | 3600 | 99 | 30 | FA 15 | 40 | 3600 | 99 | 31 | BA 100 | 50 | 3400 | 107 | 34 |
| 2.2 | BN 112M | 6 | 22 | 78 | 0.73 | 5.6 | 4.8 | 2.2 | 2.0 | 168 | 32 | FD 06S | 60 | — | 2100 | 177 | 42 | FA 06S | 60 | 2100 | 177 | 44 | BA 110 | 75 | 2000 | 184 | 45 |
| 3 | BN 132S | 6 | 30 | 76 | 0.76 | 7.5 | 4.8 | 1.9 | 1.8 | 216 | 36 | FD 56 | 75 | — | 1400 | 226 | 49 | FA 06 | 75 | 1400 | 226 | 50 | BA 140 | 150 | 1200 | 266 | 68 |
| 4 | BN 132MA | 6 | 40 | 78 | 0.77 | 9.6 | 5.5 | 2.0 | 1.8 | 295 | 45 | FD 06 | 100 | — | 1200 | 305 | 58 | FA 07 | 100 | 1200 | 318 | 63 | BA 140 | 150 | 1050 | 345 | 77 |
| 5.5 | BN 132MB | 6 | 56 | 80 | 0.78 | 12.7 | 5.9 | 2.1 | 1.9 | 383 | 56 | FD 07 | 150 | — | 1050 | 406 | 72 | FA 07 | 150 | 1050 | 406 | 74 | BA 140 | 150 | 1000 | 433 | 88 |
| 7.5 | BN 160M | 6 | 75 | 84 | 0.81 | 15.9 | 5.9 | 2.2 | 2.0 | 740 | 83 | FD 08 | 170 | — | 900 | 815 | 112 | FA 08 | 170 | 900 | 815 | 113 | | | | | |
| 11 | BN 160L | 6 | 109 | 87 | 0.81 | 22.5 | 6.5 | 2.5 | 2.3 | 970 | 103 | FD 08 | 200 | — | 800 | 1045 | 133 | FA 08 | 200 | 800 | 1045 | 133 | | | | | |
| 15 | BN 180L | 6 | 148 | 88 | 0.82 | 30 | 6.2 | 2.0 | 2.4 | 1550 | 130 | FD 09 | 300 | — | 600 | 1750 | 170 | | | | | | | | | | |
| 18.5 | BN 200LA | 6 | 184 | 88 | 0.81 | 37 | 5.9 | 2.0 | 2.3 | 1700 | 145 | FD 09 | 400 | — | 450 | 1900 | 185 | | | | | | | | | | |








| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B5  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | | | | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|---|----------|--------------------------------|--|--|------|---|-----------------------|--|--|------|----------|-----------------------|--|---|----|--|--|
| | | | | | | | | | | | | FD | | | FA | | | BA | | | FD | | | FA | | | BA | | |
| | | | | | | | | | | | | Mod. | Mb Nm | Z _o 1/h NB SB | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb Nm | Z _o 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb Nm | Z _o 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | | | |
| 0.20 | BN 63B | 2 | 0.71 | 55 | 0.82 | 0.64 | 3.5 | 2.1 | 1.9 | 2.9 | 4.4 | FD 02 | 3.5 | 2200 | 2600 | 3.5 | 6.1 | FA 02 | 3.5 | 2600 | 5 | 2000 | 4.9 | 6.7 | | | | | |
| 0.15 | | 4 | 1.06 | 49 | 0.67 | 0.66 | 2.6 | 1.8 | 1.7 | | | 4000 | 5100 | | | | | | | 5100 | 4000 | | | | | | | | |
| 0.28 | BN 71A | 2 | 0.99 | 56 | 0.82 | 0.88 | 2.9 | 1.9 | 1.7 | 4.7 | 4.4 | FD 03 | 3.5 | 2100 | 2400 | 5.8 | 7.1 | FA 03 | 3.5 | 2400 | 8 | 2100 | 5.6 | 8.3 | | | | | |
| 0.20 | | 4 | 1.39 | 59 | 0.72 | 0.68 | 3.1 | 1.8 | 1.7 | | | 3800 | 4800 | | | | | | | 4800 | 4200 | | | | | | | | |
| 0.37 | BN 71B | 2 | 1.29 | 56 | 0.82 | 1.16 | 3.5 | 1.8 | 1.8 | 5.8 | 5.1 | FD 03 | 5 | 1400 | 2100 | 6.9 | 7.8 | FA 03 | 5 | 2100 | 8 | 1800 | 7.8 | 9.0 | | | | | |
| 0.25 | | 4 | 1.72 | 60 | 0.73 | 0.82 | 3.3 | 2.0 | 1.9 | | | 2900 | 4200 | | | | | | | 4200 | 3600 | | | | | | | | |
| 0.45 | BN 71C | 2 | 1.55 | 63 | 0.85 | 1.21 | 3.8 | 1.8 | 1.8 | 6.9 | 5.9 | FD 03 | 5 | 1400 | 2100 | 8.0 | 8.6 | FA 03 | 5 | 2100 | 8 | 1800 | 8.9 | 9.8 | | | | | |
| 0.30 | | 4 | 2.0 | 63 | 0.73 | 0.94 | 3.6 | 2.0 | 1.9 | | | 2900 | 4200 | | | | | | | 4200 | 3600 | | | | | | | | |
| 0.55 | BN 80A | 2 | 1.9 | 63 | 0.85 | 1.48 | 3.9 | 1.7 | 1.7 | 15 | 8.2 | FD 04 | 5 | 1600 | 2300 | 16.6 | 12.1 | FA 04 | 5 | 2300 | 18 | 2100 | 18 | 13.5 | | | | | |
| 0.37 | | 4 | 2.5 | 67 | 0.79 | 1.01 | 4.1 | 1.8 | 1.9 | | | 3000 | 4000 | | | | | | | 4000 | 3700 | | | | | | | | |
| 0.75 | BN 80B | 2 | 2.6 | 65 | 0.85 | 1.96 | 3.8 | 1.9 | 1.8 | 20 | 9.9 | FD 04 | 10 | 1400 | 1600 | 22 | 13.8 | FA 04 | 10 | 1600 | 18 | 1500 | 22 | 15.2 | | | | | |
| 0.55 | | 4 | 3.8 | 68 | 0.81 | 1.44 | 3.9 | 1.7 | 1.7 | | | 2700 | 3600 | | | | | | | 3600 | 3300 | | | | | | | | |
| 1.1 | BN 90S | 2 | 3.8 | 71 | 0.82 | 2.73 | 4.7 | 2.3 | 2.0 | 21 | 12.2 | FD 14 | 10 | 1500 | 1600 | 23 | 16.4 | FA 14 | 10 | 1600 | 35 | 1300 | 28 | 19.5 | | | | | |
| 0.75 | | 4 | 5.2 | 66 | 0.79 | 2.08 | 4.6 | 2.4 | 2.2 | | | 2300 | 2800 | | | | | | | 2800 | 2300 | | | | | | | | |
| 1.5 | BN 90L | 2 | 5.2 | 70 | 0.85 | 3.64 | 4.5 | 2.4 | 2.1 | 28 | 14.0 | FD 05 | 26 | 1050 | 1200 | 32 | 20 | FA 05 | 26 | 1200 | 35 | 1100 | 35 | 21 | | | | | |
| 1.1 | | 4 | 7.6 | 73 | 0.81 | 2.69 | 4.7 | 2.5 | 2.2 | | | 1600 | 2000 | | | | | | | 2000 | 1800 | | | | | | | | |
| 2.2 | BN 100LA | 2 | 7.5 | 72 | 0.85 | 5.2 | 4.5 | 2.0 | 1.9 | 40 | 18.3 | FD 15 | 26 | 600 | 900 | 44 | 25 | FA 15 | 26 | 900 | 50 | 750 | 51 | 29 | | | | | |
| 1.5 | | 4 | 10.2 | 73 | 0.79 | 3.8 | 4.7 | 2.0 | 2.0 | | | 1300 | 2300 | | | | | | | 2300 | 1900 | | | | | | | | |
| 3.5 | BN 100LB | 2 | 11.7 | 80 | 0.84 | 7.5 | 5.4 | 2.2 | 2.1 | 61 | 25 | FD 15 | 40 | 500 | 900 | 65 | 31 | FA 15 | 40 | 900 | 50 | 750 | 72 | 35 | | | | | |
| 2.5 | | 4 | 16.8 | 82 | 0.80 | 5.5 | 5.2 | 2.2 | 2.2 | | | 1000 | 2100 | | | | | | | 2100 | 1800 | | | | | | | | |
| 4 | BN 112M | 2 | 13.3 | 79 | 0.83 | 8.8 | 6.1 | 2.4 | 2.0 | 98 | 30 | FD 06S | 60 | — | 700 | 107 | 40 | FA 06S | 60 | 700 | 75 | 600 | 114 | 43 | | | | | |
| 3.3 | | 4 | 22.2 | 80 | 0.80 | 7.4 | 5.1 | 2.1 | 2.0 | | | — | — | | | | | | | 1200 | 1100 | | | | | | | | |
| 5.5 | BN 132S | 2 | 18.2 | 80 | 0.87 | 11.4 | 5.9 | 2.4 | 2.0 | 213 | 44 | FD 56 | 75 | — | 350 | 223 | 57 | FA 06 | 75 | 350 | 150 | 300 | 263 | 76 | | | | | |
| 4.4 | | 4 | 29 | 82 | 0.84 | 9.2 | 5.3 | 2.2 | 2.0 | | | — | — | | | | | | | 900 | 750 | | | | | | | | |
| 7.5 | BN 132MA | 2 | 25 | 82 | 0.87 | 15.2 | 6.5 | 2.4 | 2.0 | 270 | 53 | FD 06 | 100 | — | 350 | 280 | 66 | FA 07 | 100 | 350 | 150 | 300 | 320 | 85 | | | | | |
| 6 | | 4 | 40 | 84 | 0.85 | 12.1 | 5.8 | 2.3 | 2.1 | | | — | — | | | | | | | 900 | 800 | | | | | | | | |
| 9.2 | BN 132MB | 2 | 30 | 83 | 0.86 | 18.6 | 6.0 | 2.6 | 2.2 | 319 | 59 | FD 07 | 150 | — | 300 | 342 | 75 | FA 07 | 150 | 300 | 150 | 300 | 369 | 91 | | | | | |
| 7.3 | | 4 | 48 | 85 | 0.85 | 14.6 | 5.5 | 2.3 | 2.1 | | | — | — | | | | | | | 800 | 750 | | | | | | | | |








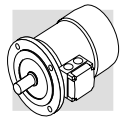
2/6 P

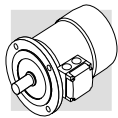
3000/1000 min⁻¹ - S3 60/40%

50 Hz

| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B5  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | | | | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|---|------|--------------------------------|--|--|------|---|-----------------------|--|--|------|---------------|-----------------------|--|--|------|--|--|
| | | | | | | | | | | | | FD | | | FA | | | BA | | | FD | | | FA | | | BA | | |
| | | | | | | | | | | | | Mod. | Nm | Z ₀ 1/h NB SB | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | | | |
| 0.25 | BN 71A | 2 | 0.84 | 60 | 0.82 | 0.73 | 4.3 | 1.9 | 1.8 | 6.9 | 5.9 | FD 03 | 1.75 | 1500 | 1700 | 8.0 | 8.6 | FA 03 | 2.5 | 1700 | 8.0 | 8.3 | BA 70 | 8 | 1500 | 8.9 | 9.8 | | |
| 0.08 | 6 | 910 | 0.84 | 43 | 0.70 | 0.38 | 2.1 | 1.4 | 1.5 | 10000 | 13000 | | | | | | | | | | | | | | | | | | |
| 0.37 | BN 71B | 2 | 1.23 | 62 | 0.80 | 1.08 | 4.4 | 1.9 | 1.8 | 9.1 | 7.3 | FD 03 | 3.5 | 1000 | 1300 | 10.2 | 10.0 | FA 03 | 3.5 | 1300 | 10.2 | 9.7 | BA 70 | 8 | 1200 | 11.1 | 11.2 | | |
| 0.12 | 6 | 900 | 1.27 | 44 | 0.73 | 0.54 | 2.4 | 1.4 | 1.5 | 9000 | 11000 | | | | | | | | | | | | | | | | | | |
| 0.55 | BN 80A | 2 | 1.88 | 63 | 0.86 | 1.47 | 4.5 | 1.9 | 1.7 | 20 | 9.9 | FD 04 | 5 | 1500 | 1800 | 22 | 13.8 | FA 04 | 5 | 1800 | 22 | 13.7 | BA 80 | 18 | 1700 | 23 | 15.2 | | |
| 0.18 | 6 | 930 | 1.85 | 52 | 0.65 | 0.77 | 3.3 | 2 | 1.9 | 4100 | 6300 | | | | | | | | | | | | | | | | | | |
| 0.75 | BN 80B | 2 | 2.6 | 66 | 0.87 | 1.89 | 4.3 | 1.8 | 1.6 | 25 | 11.3 | FD 04 | 5 | 1700 | 1900 | 27 | 15.2 | FA 04 | 5 | 1900 | 27 | 15.1 | BA 80 | 18 | 1800 | 28 | 16.6 | | |
| 0.25 | 6 | 930 | 2.6 | 54 | 0.67 | 1.00 | 3.2 | 1.7 | 1.8 | 3800 | 6000 | | | | | | | | | | | | | | | | | | |
| 1.1 | BN 90L | 2 | 3.7 | 67 | 0.84 | 2.82 | 4.7 | 2.1 | 1.9 | 28 | 14.0 | FD 05 | 13 | 1400 | 1600 | 32 | 20 | FA 05 | 13 | 1600 | 32 | 21 | BA 90 | 35 | 1500 | 35 | 21 | | |
| 0.37 | 6 | 920 | 3.8 | 59 | 0.71 | 1.27 | 3.3 | 1.6 | 1.6 | 3400 | 5200 | | | | | | | | | | | | | | | | | | |
| 1.5 | BN 100LA | 2 | 5.0 | 73 | 0.84 | 3.53 | 5.1 | 1.9 | 2.0 | 40 | 18.3 | FD 15 | 13 | 1000 | 1200 | 44 | 24 | FA 15 | 13 | 1200 | 44 | 25 | BA 100 | 50 | 1050 | 51 | 29 | | |
| 0.55 | 6 | 940 | 5.6 | 64 | 0.67 | 1.85 | 3.5 | 1.7 | 1.8 | 2900 | 4000 | | | | | | | | | | | | | | | | | | |
| 2.2 | BN 100LB | 2 | 7.2 | 77 | 0.85 | 4.9 | 5.9 | 2.0 | 2.0 | 61 | 25 | FD 15 | 26 | 700 | 900 | 65 | 31 | FA 15 | 26 | 900 | 65 | 32 | BA 100 | 50 | 800 | 72 | 36 | | |
| 0.75 | 6 | 950 | 7.5 | 67 | 0.64 | 2.5 | 3.3 | 1.9 | 1.8 | 2100 | 3000 | | | | | | | | | | | | | | | | | | |
| 3 | BN 112M | 2 | 9.9 | 78 | 0.87 | 6.4 | 6.3 | 2.0 | 2.1 | 98 | 30 | FD 06S | 40 | — | 1000 | 107 | 40 | FA 06S | 40 | 1000 | 107 | 32 | BA 110 | 75 | 930 | 114 | 43 | | |
| 1.1 | 6 | 950 | 11.1 | 72 | 0.64 | 3.4 | 3.9 | 1.8 | 1.8 | 2600 | 2600 | | | | | | | | | | | | | | | | | | |
| 4.5 | BN 132S | 2 | 14.8 | 78 | 0.84 | 9.9 | 5.8 | 1.9 | 1.8 | 213 | 44 | FD 56 | 37 | — | 500 | 223 | 57 | FA 06 | 37 | 500 | 223 | 58 | BA 140 | 150 | 400 | 263 | 76 | | |
| 1.5 | 6 | 960 | 14.9 | 74 | 0.67 | 4.4 | 4.2 | 1.9 | 2.0 | 2100 | 2100 | | | | | | | | | | | | | | | | | | |
| 5.5 | BN 132M | 2 | 18.0 | 78 | 0.87 | 11.7 | 6.2 | 2.1 | 1.9 | 270 | 53 | FD 56 | 50 | — | 400 | 280 | 66 | FA 06 | 50 | 400 | 280 | 67 | BA 140 | 150 | 350 | 320 | 85 | | |
| 2.2 | 6 | 960 | 22 | 77 | 0.71 | 5.8 | 4.3 | 2.1 | 2.0 | 1900 | 1900 | | | | | | | | | | | | | | | | | | |

| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B5  | freno c.c. / d.c. brake G.S.-bremse / fein c.c. | | | | | | freno c.a. / a.c. brake W.S.-bremse / fein c.a. | | | | | | | | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|--|-------|--------------------------------|--|--|------|--|-----------------------|--|--|------|---------------|-----------------------|--|--|------|--|--|
| | | | | | | | | | | | | FD | | | FA | | | BA | | | FD | | | FA | | | BA | | |
| | | | | | | | | | | | | Mod. | Nm | Z ₀ 1/h NB SB | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | | | |
| 0.25 | BN 71A | 2 | 0.86 | 61 | 0.87 | 0.68 | 3.9 | 1.8 | 1.9 | 10.9 | 6.7 | FD 03 | 1.75 | 1300 | 1400 | 12 | 9.4 | FA 03 | 2.5 | 1400 | 12 | 9.1 | BA 70 | 8 | 1300 | 12.9 | 10.6 | | |
| 0.06 | | 8 | 0.84 | 31 | 0.61 | 0.46 | 2 | 1.8 | 1.9 | | | 10000 | 13000 | | | | | | | | | | | 12000 | | | | | |
| 0.37 | BN 71B | 2 | 1.26 | 63 | 0.86 | 0.99 | 3.9 | 1.8 | 1.9 | 12.9 | 7.7 | FD 03 | 3.5 | 1200 | 1300 | 14 | 10.4 | FA 03 | 3.5 | 1300 | 14 | 10.1 | BA 70 | 8 | 1200 | 14.9 | 11.6 | | |
| 0.09 | | 8 | 1.28 | 34 | 0.75 | 0.51 | 1.8 | 1.4 | 1.5 | | | 9500 | 13000 | | | | | | | | | | | 12000 | | | | | |
| 0.55 | BN 80A | 2 | 1.86 | 66 | 0.86 | 1.40 | 4.4 | 2.1 | 2.0 | 20 | 9.9 | FD 04 | 5 | 1500 | 1800 | 22 | 13.8 | FA 04 | 5 | 1800 | 22 | 13.7 | BA 80 | 18 | 1700 | 23 | 15.2 | | |
| 0.13 | | 8 | 1.80 | 41 | 0.64 | 0.72 | 2.3 | 1.6 | 1.7 | | | 5600 | 8000 | | | | | | | | | | | 7500 | | | | | |
| 0.75 | BN 80B | 2 | 2.6 | 68 | 0.88 | 1.81 | 4.6 | 2.1 | 2.0 | 25 | 11.3 | FD 04 | 10 | 1700 | 1900 | 27 | 15.2 | FA 04 | 10 | 1900 | 27 | 15.1 | BA 80 | 18 | 1800 | 28 | 16.6 | | |
| 0.18 | | 8 | 2.5 | 43 | 0.66 | 0.92 | 2.3 | 1.6 | 1.7 | | | 4800 | 7300 | | | | | | | | | | | 7000 | | | | | |
| 1.1 | BN 90L | 2 | 3.7 | 63 | 0.84 | 3.00 | 4.5 | 2.1 | 1.9 | 28 | 14 | FD 05 | 13 | 1400 | 1600 | 32 | 20 | FA 05 | 13 | 1600 | 32 | 21 | BA 90 | 35 | 1400 | 35 | 21 | | |
| 0.28 | | 8 | 3.9 | 48 | 0.63 | 1.34 | 2.4 | 1.8 | 1.9 | | | 3400 | 5100 | | | | | | | | | | | 4500 | | | | | |
| 1.5 | BN 100LA | 2 | 5.0 | 69 | 0.85 | 3.69 | 4.7 | 1.9 | 1.8 | 40 | 18.3 | FD 15 | 13 | 1000 | 1200 | 44 | 25 | FA 15 | 13 | 1200 | 44 | 25 | BA 100 | 50 | 1000 | 52 | 29 | | |
| 0.37 | | 8 | 5.1 | 46 | 0.63 | 1.84 | 2.1 | 1.6 | 1.6 | | | 3300 | 5000 | | | | | | | | | | | 4200 | | | | | |
| 2.4 | BN 100LB | 2 | 7.9 | 75 | 0.82 | 5.6 | 5.4 | 2.1 | 2.0 | 61 | 25 | FD 15 | 26 | 550 | 700 | 65 | 31 | FA 15 | 26 | 700 | 65 | 32 | BA 100 | 50 | 600 | 72 | 36 | | |
| 0.55 | | 8 | 7.5 | 54 | 0.58 | 2.5 | 2.6 | 1.8 | 1.8 | | | 2000 | 3500 | | | | | | | | | | | 3100 | | | | | |
| 3 | BN 112M | 2 | 9.9 | 76 | 0.87 | 6.5 | 6.3 | 2.1 | 1.9 | 98 | 30 | FD 06S | 40 | — | 900 | 107 | 40 | FA 06S | 40 | 900 | 107 | 42 | BA 110 | 75 | 800 | 114 | 43 | | |
| 0.75 | | 8 | 10.4 | 60 | 0.65 | 2.8 | 2.5 | 1.6 | 1.6 | | | — | 2900 | | | | | | | | | | | 2700 | | | | | |
| 4 | BN 132S | 2 | 13.3 | 73 | 0.84 | 9.4 | 5.6 | 2.3 | 2.4 | 213 | 44 | FD 56 | 37 | — | 500 | 223 | 57 | FA 06 | 37 | 500 | 223 | 58 | BA 140 | 150 | 400 | 263 | 76 | | |
| 1 | | 8 | 13.8 | 66 | 0.62 | 3.5 | 2.9 | 1.9 | 1.8 | | | — | 3500 | | | | | | | | | | | 3000 | | | | | |
| 5.5 | BN 132M | 2 | 18.3 | 75 | 0.84 | 12.6 | 6.1 | 2.4 | 2.5 | 270 | 53 | FD 06 | 50 | — | 400 | 280 | 66 | FA 06 | 50 | 400 | 280 | 67 | BA 140 | 150 | 350 | 320 | 85 | | |
| 1.5 | | 8 | 21 | 68 | 0.63 | 5.1 | 2.9 | 1.9 | 1.9 | | | — | 2400 | | | | | | | | | | | 2100 | | | | | |















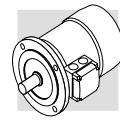
2/12 P

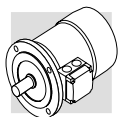
3000/500 min⁻¹ - S3 60/40%

50 Hz

| Pn kW |  | n min ⁻¹ | Mh Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B5  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | | | | | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|---|----------|--------------------------------|--|--|------|---|-----------------------|--|--|------|----------|-----------------------|--|--|------|-----------------|-----------------------|--|
| | | | | | | | | | | | | FD | | | FA | | | BA | | | FD | | | FA | | | BA | | | |
| | | | | | | | | | | | | Mod. | Mb Nm | Z _e 1/h NB SB | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb max Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² |
| 0.55 | BN 80B | 2820 | 1.86 | 64 | 0.89 | 1.39 | 4.2 | 1.6 | 1.7 | 25 | 11.3 | FD 04 | 5 | 1000 | 1300 | 1300 | 27 | 15.2 | FA 04 | 5 | 1300 | 1300 | 27 | 15.1 | BA 80 | 18 | 1200 | 28 | 16.6 | |
| 0.09 | | 430 | 2.0 | 30 | 0.63 | 0.69 | 1.8 | 1.9 | 1.8 | | | | 8000 | 12000 | 12000 | | | | | | | | | | | | | | | |
| 0.75 | BN 90L | 2790 | 2.6 | 56 | 0.89 | 2.17 | 4.2 | 1.8 | 1.7 | 26 | 12.6 | FD 05 | 13 | 1000 | 1150 | 1150 | 30 | 18.6 | FA 05 | 13 | 1150 | 1150 | 30 | 19.3 | BA 90 | 35 | 1050 | 33 | 19.9 | |
| 0.12 | | 430 | 2.7 | 26 | 0.63 | 1.06 | 1.7 | 1.4 | 1.6 | | | | 4600 | 6300 | 6300 | | | | | | | | | | | | | | | |
| 1.1 | BN 100LA | 2850 | 3.7 | 65 | 0.85 | 2.87 | 4.5 | 1.6 | 1.8 | 40 | 18.3 | FD 15 | 13 | 700 | 900 | 900 | 44 | 25 | FA 15 | 13 | 900 | 900 | 44 | 25 | BA 100 | 50 | 750 | 52 | 29 | |
| 0.18 | | 430 | 4.0 | 26 | 0.54 | 1.85 | 1.5 | 1.3 | 1.5 | | | | 4000 | 6000 | 6000 | | | | | | | | | | | | | | | |
| 1.5 | BN 100LB | 2900 | 4.9 | 67 | 0.86 | 3.76 | 5.6 | 1.9 | 1.9 | 54 | 22 | FD 15 | 13 | 700 | 900 | 900 | 58 | 28 | FA 15 | 13 | 900 | 900 | 58 | 29 | BA 100 | 50 | 800 | 66 | 32 | |
| 0.25 | | 440 | 5.4 | 36 | 0.46 | 2.18 | 1.8 | 1.7 | 1.8 | | | | 3800 | 5000 | 5000 | | | | | | | | | | | | | | | |
| 2 | BN 112M | 2900 | 6.6 | 74 | 0.88 | 4.43 | 6.5 | 2.1 | 2 | 98 | 30 | FD 06S | 20 | — | 800 | 800 | 107 | 40 | FA 06S | 20 | 800 | 800 | 107 | 42 | BA 110 | 75 | 750 | 114 | 43 | |
| 0.3 | | 460 | 6.2 | 46 | 0.43 | 2.19 | 2 | 2.1 | 2 | | | | — | 3400 | 3400 | | | | | | | | | | | | | | | |
| 3 | BN 132S | 2920 | 9.8 | 74 | 0.87 | 6.7 | 6.8 | 2.3 | 1.9 | 213 | 44 | FD 56 | 37 | — | 450 | 450 | 223 | 57 | FA 06 | 37 | 450 | 450 | 223 | 58 | BA 140 | 150 | 380 | 263 | 76 | |
| 0.5 | | 470 | 10.2 | 51 | 0.43 | 3.3 | 2 | 1.7 | 1.6 | | | | — | 3000 | 3000 | | | | | | | | | | | | | | | |
| 4 | BN 132M | 2920 | 13.1 | 75 | 0.89 | 8.6 | 5.9 | 2.4 | 2.3 | 270 | 53 | FD 56 | 37 | — | 400 | 400 | 280 | 66 | FA 06 | 37 | 400 | 400 | 280 | 67 | BA 140 | 150 | 350 | 320 | 85 | |
| 0.7 | | 460 | 14.5 | 53 | 0.44 | 4.3 | 1.9 | 1.7 | 1.6 | | | | — | 2800 | 2800 | | | | | | | | | | | | | | | |

| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B5  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | | | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|---|----------|--------------------|--|--|------|---|-----------|--|--|------|-----------------|-----------|--|---|------|--|
| | | | | | | | | | | | | FD | | | FA | | | BA | | | FA | | | BA | | | | |
| | | | | | | | | | | | | Mod. | Mb Nm | Zo 1/h NB SB | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb Nm | Zo 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb max Nm | Zo 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | | |
| 0.22 | BN 71B | 4 | 1.5 | 64 | 0.74 | 0.67 | 3.9 | 1.8 | 1.9 | 9.1 | 7.3 | FD 03 | 3.5 | 2500 | 3500 | 10.2 | 10 | FA 03 | 3.5 | 3500 | 10.2 | 9.7 | BA 70 | 8 | 3200 | 11.1 | 11.2 | |
| 0.13 | | 6 | 1.4 | 43 | 0.67 | 0.65 | 2.3 | 1.6 | 1.7 | | | | 5000 | 9000 | | | | | | 9000 | | | | 8200 | | | | |
| 0.30 | BN 80A | 4 | 2.0 | 61 | 0.82 | 0.87 | 3.5 | 1.3 | 1.5 | 15 | 8.2 | FD 04 | 5 | 2500 | 3100 | 16.6 | 12.1 | FA 04 | 5 | 3100 | 16.6 | 12.0 | BA 80 | 18 | 2800 | 18 | 13.5 | |
| 0.20 | | 6 | 2.1 | 54 | 0.66 | 0.81 | 3.2 | 1.9 | 2.0 | | | | 4000 | 6000 | | | | | | 6000 | | | | 5500 | | | | |
| 0.40 | BN 80B | 4 | 2.7 | 63 | 0.75 | 1.22 | 3.9 | 1.8 | 1.8 | 20 | 9.9 | FD 04 | 10 | 1800 | 2300 | 22 | 13.8 | FA 04 | 10 | 2300 | 22 | 13.7 | BA 80 | 18 | 2200 | 23 | 15.2 | |
| 0.26 | | 6 | 2.7 | 55 | 0.70 | 0.97 | 2.7 | 1.5 | 1.6 | | | | 3600 | 5500 | | | | | | 5500 | | | | 5200 | | | | |
| 0.55 | BN 90S | 4 | 3.7 | 70 | 0.78 | 1.45 | 4.5 | 2.0 | 1.9 | 21 | 12.2 | FD 14 | 10 | 1500 | 2100 | 23 | 16.1 | FA 14 | 10 | 2100 | 23 | 16.3 | BA 90 | 35 | 1700 | 28 | 19.5 | |
| 0.33 | | 6 | 3.4 | 62 | 0.70 | 1.10 | 3.7 | 2.3 | 2.0 | | | | 2500 | 4100 | | | | | | 4100 | | | | 3300 | | | | |
| 0.75 | BN 90L | 4 | 5.0 | 74 | 0.78 | 1.88 | 4.3 | 1.9 | 1.8 | 28 | 14 | FD 05 | 13 | 1400 | 2000 | 32 | 20 | FA 05 | 13 | 2000 | 32 | 21 | BA 90 | 35 | 1800 | 35 | 21 | |
| 0.45 | | 6 | 4.7 | 66 | 0.71 | 1.39 | 3.3 | 2.0 | 1.9 | | | | 2300 | 3600 | | | | | | 3600 | | | | 3300 | | | | |
| 1.1 | BN 100LA | 4 | 7.2 | 74 | 0.79 | 2.72 | 5.0 | 1.7 | 1.9 | 82 | 22 | FD 15 | 26 | 1400 | 2000 | 86 | 28 | FA 15 | 26 | 2000 | 86 | 29 | BA 100 | 50 | 1800 | 94 | 32 | |
| 0.8 | | 6 | 8.0 | 65 | 0.69 | 2.57 | 4.1 | 1.9 | 2.1 | | | | 2100 | 3300 | | | | | | 3300 | | | | 3000 | | | | |
| 1.5 | BN 100LB | 4 | 9.9 | 75 | 0.79 | 3.65 | 5.1 | 1.7 | 1.9 | 95 | 25 | FD 15 | 26 | 1300 | 1800 | 99 | 31 | FA 15 | 26 | 1800 | 99 | 32 | BA 100 | 50 | 1600 | 107 | 34 | |
| 1.1 | | 6 | 11.1 | 72 | 0.68 | 3.24 | 4.3 | 2.0 | 2.1 | | | | 2000 | 3000 | | | | | | 3000 | | | | 2800 | | | | |
| 2.3 | BN 112M | 4 | 15.2 | 75 | 0.78 | 5.7 | 5.2 | 1.8 | 1.9 | 168 | 32 | FD 06S | 40 | — | 1600 | 177 | 42 | FA 06S | 40 | 1600 | 177 | 44 | BA 110 | 75 | 1500 | 184 | 45 | |
| 1.5 | | 6 | 14.9 | 73 | 0.72 | 4.1 | 4.9 | 2.0 | 2.0 | | | | — | 2400 | | | | | | 2400 | | | | 2300 | | | | |
| 3.1 | BN 132S | 4 | 20 | 83 | 0.83 | 6.5 | 5.9 | 2.1 | 2.0 | 213 | 44 | FD 56 | 37 | — | 1200 | 223 | 57 | FA 06 | 37 | 1200 | 223 | 58 | BA 140 | 150 | 1000 | 263 | 76 | |
| 2 | | 6 | 20 | 77 | 0.75 | 4.9 | 4.5 | 2.1 | 2.1 | | | | — | 1900 | | | | | | 1900 | | | | 1600 | | | | |
| 4.2 | BN 132MA | 4 | 27 | 84 | 0.82 | 8.8 | 5.9 | 2.1 | 2.2 | 270 | 53 | FD 06 | 50 | — | 900 | 280 | 66 | FA 06 | 50 | 900 | 280 | 67 | BA 140 | 150 | 800 | 320 | 85 | |
| 2.6 | | 6 | 26 | 79 | 0.72 | 6.6 | 4.3 | 2.0 | 2.0 | | | | — | 1500 | | | | | | 1500 | | | | 1300 | | | | |


























4/8 P

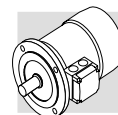
1500/750 min⁻¹ - S1

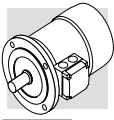
50 Hz

| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B5  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | | | | | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|---|----------|-----------------------|--|--|------|----------|-----------------------|--|--|------|----------|-----------------------|--|---|-----|------|
| | | | | | | | | | | | | FD | | FA | | BA | | FA | | BA | | | | | | | | |
| | | | | | | | | | | | | Mod. | Mb Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | Mod. | Mb Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B5  | | |
| 0.37 | BN 80A | 4 | 2.5 | 63 | 0.82 | 1.03 | 3.3 | 1.4 | 1.4 | 15 | 8.2 | FD 04 | 10 | 2300 | 3500 | 16.6 | 12.1 | FA 04 | 10 | 3500 | 7000 | 16.6 | 12.0 | BA 80 | 18 | 3200 | 18 | 13.5 |
| 0.18 | BN 80B | 8 | 2.5 | 44 | 0.60 | 0.98 | 2.2 | 1.5 | 1.6 | 20 | 9.9 | FD 04 | 10 | 2200 | 2900 | 22 | 13.8 | FA 04 | 10 | 2900 | 6500 | 22 | 13.7 | BA 80 | 18 | 2500 | 23 | 15.2 |
| 0.55 | BN 80B | 4 | 3.8 | 65 | 0.86 | 1.42 | 3.8 | 1.7 | 1.6 | 28 | 13.6 | FD 14 | 15 | 2300 | 2800 | 30 | 17.8 | FA 14 | 15 | 2800 | 6000 | 30 | 17.7 | BA 90 | 35 | 2400 | 35 | 21 |
| 0.30 | BN 90S | 8 | 4.3 | 49 | 0.65 | 1.36 | 2.3 | 1.7 | 1.8 | 28 | 13.6 | FD 14 | 15 | 2300 | 2800 | 30 | 17.8 | FA 14 | 15 | 2800 | 6000 | 30 | 17.7 | BA 90 | 35 | 2400 | 35 | 21 |
| 0.65 | BN 90S | 4 | 4.5 | 73 | 0.85 | 1.51 | 4.0 | 1.9 | 1.9 | 30 | 15.1 | FD 05 | 26 | 1700 | 2100 | 34 | 21 | FA 05 | 26 | 2100 | 4200 | 34 | 22 | BA 90 | 35 | 1900 | 37 | 22 |
| 0.35 | BN 90L | 8 | 4.8 | 49 | 0.57 | 1.81 | 2.5 | 2.1 | 2.2 | 30 | 15.1 | FD 05 | 26 | 1700 | 2100 | 34 | 21 | FA 05 | 26 | 2100 | 4200 | 34 | 22 | BA 90 | 35 | 1900 | 37 | 22 |
| 0.9 | BN 90L | 4 | 6.3 | 73 | 0.87 | 2.05 | 3.8 | 1.8 | 1.8 | 30 | 15.1 | FD 05 | 26 | 1700 | 2100 | 34 | 21 | FA 05 | 26 | 2100 | 4200 | 34 | 22 | BA 90 | 35 | 1900 | 37 | 22 |
| 0.5 | BN 100L | 8 | 7.1 | 57 | 0.62 | 2.04 | 2.4 | 2.1 | 2 | 30 | 15.1 | FD 05 | 26 | 1700 | 2100 | 34 | 21 | FA 05 | 26 | 2100 | 4200 | 34 | 22 | BA 90 | 35 | 1900 | 37 | 22 |
| 1.3 | BN 100LA | 4 | 8.7 | 72 | 0.83 | 3.14 | 4.3 | 1.7 | 1.8 | 82 | 22 | FD 15 | 40 | 1300 | 1700 | 86 | 28 | FA 15 | 40 | 1700 | 3400 | 86 | 29 | BA 100 | 50 | 1500 | 94 | 32 |
| 0.7 | BN 100LB | 8 | 9.6 | 58 | 0.64 | 2.72 | 2.8 | 1.8 | 1.8 | 82 | 22 | FD 15 | 40 | 1300 | 1700 | 86 | 28 | FA 15 | 40 | 1700 | 3400 | 86 | 29 | BA 100 | 50 | 1500 | 94 | 32 |
| 1.8 | BN 100LB | 4 | 12.1 | 69 | 0.87 | 4.3 | 4.2 | 1.6 | 1.7 | 95 | 25 | FD 15 | 40 | 1200 | 1700 | 99 | 31 | FA 15 | 40 | 1700 | 3400 | 99 | 32 | BA 100 | 50 | 1500 | 107 | 34 |
| 0.9 | BN 112M | 8 | 12.3 | 62 | 0.63 | 3.3 | 3.2 | 1.7 | 1.8 | 95 | 25 | FD 15 | 40 | 1200 | 1700 | 99 | 31 | FA 15 | 40 | 1700 | 3400 | 99 | 32 | BA 100 | 50 | 1500 | 107 | 34 |
| 2.2 | BN 112M | 4 | 14.6 | 77 | 0.85 | 4.9 | 5.3 | 1.8 | 1.8 | 168 | 32 | FD 06S | 60 | 1600 | 2600 | 177 | 42 | FA 06S | 60 | 2600 | 5100 | 177 | 43 | BA 110 | 75 | 1100 | 184 | 45 |
| 1.2 | BN 132M | 8 | 16.1 | 70 | 0.63 | 3.9 | 3.3 | 1.9 | 1.8 | 168 | 32 | FD 06S | 60 | 1600 | 2600 | 177 | 42 | FA 06S | 60 | 2600 | 5100 | 177 | 43 | BA 110 | 75 | 1100 | 184 | 45 |
| 3.6 | BN 132S | 4 | 24 | 80 | 0.82 | 7.9 | 6.5 | 2.1 | 1.9 | 295 | 45 | FD 56 | 75 | 1000 | 1400 | 305 | 58 | FA 06 | 75 | 1400 | 2800 | 305 | 59 | BA 140 | 150 | 900 | 345 | 77 |
| 1.8 | BN 132M | 8 | 24 | 72 | 0.55 | 6.6 | 4.6 | 1.9 | 2 | 295 | 45 | FD 56 | 75 | 1000 | 1400 | 305 | 58 | FA 06 | 75 | 1400 | 2800 | 305 | 59 | BA 140 | 150 | 900 | 345 | 77 |
| 4.6 | BN 132M | 4 | 30 | 81 | 0.83 | 9.9 | 6.5 | 2.2 | 1.9 | 383 | 56 | FD 06 | 100 | 1000 | 1300 | 393 | 69 | FA 07 | 100 | 1300 | 2600 | 393 | 74 | BA 140 | 150 | 900 | 433 | 88 |
| 2.3 | BN 132M | 8 | 31 | 73 | 0.54 | 8.4 | 4.4 | 2.3 | 2 | 383 | 56 | FD 06 | 100 | 1000 | 1300 | 393 | 69 | FA 07 | 100 | 1300 | 2600 | 393 | 74 | BA 140 | 150 | 900 | 433 | 88 |

2 P**3000 min⁻¹ - S1****50 Hz**

| Pn kW |  | n min ⁻¹ | Mn Nm |  | η (100%) % | η (75%) % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B9  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | | | |
|----------|---|------------------------|----------|---|------------------|-----------------|-------|-------------------|----------|----------|----------|--|--|---|----------|-----------|----------|---|--|--------------|----------|-----------|--|--|--|
| | | | | | | | | | | | | | | Mod. | Mb Nm | Zo 1/h | NB SB | Jm x 10 ⁻⁴ kgm ² | IM B9  | Mod. | Mb Nm | Zo 1/h | Jm x 10 ⁻⁴ kgm ² | IM B9  | |
| 0.18 | M 05A 2 | 2730 | 0.63 | | 59.9 | 56.9 | 0.77 | 0.56 | 3.0 | 2.1 | 2.0 | 2.0 | 3.2 | FD 02 | 1.75 | 3900 | 4800 | 2.6 | 4.9 | FA 02 | 1.75 | 4800 | 2.6 | 4.7 | |
| 0.25 | M 05B 2 | 2740 | 0.87 | | 66.0 | 64.8 | 0.76 | 0.72 | 3.3 | 2.3 | 2.3 | 2.3 | 3.6 | FD 02 | 1.75 | 3900 | 4800 | 3.0 | 5.3 | FA 02 | 1.75 | 4800 | 3.0 | 5.1 | |
| 0.37 | M 05C 2 | 2800 | 1.26 | | 69.1 | 66.8 | 0.78 | 0.99 | 3.9 | 2.6 | 2.6 | 3.3 | 4.8 | FD 02 | 3.5 | 3600 | 4500 | 3.9 | 6.5 | FA 02 | 3.5 | 4500 | 3.9 | 6.3 | |
| 0.55 | M 1SD 2 | 2820 | 1.86 | | 76.0 | 75.8 | 0.76 | 1.37 | 5 | 2.9 | 2.8 | 4.1 | 5.8 | FD 03 | 5 | 2900 | 4200 | 5.3 | 8.5 | FA 03 | 5 | 4200 | 5.3 | 8.2 | |
| 0.75 | M 1LA 2 | 2810 | 2.6 | | 76.6 | 76.2 | 0.76 | 1.86 | 5.1 | 3.1 | 2.8 | 5.0 | 6.9 | FD 03 | 5 | 1900 | 3300 | 6.1 | 9.6 | FA 03 | 5 | 3300 | 6.1 | 9.3 | |
| 1.1 | M 2SA 2 | 2800 | 3.8 |  | 76.4 | 76.2 | 0.81 | 2.57 | 4.8 | 2.8 | 2.4 | 9.0 | 8.8 | FD 04 | 10 | 1500 | 3000 | 10.6 | 11.9 | FA 04 | 10 | 3000 | 10.6 | 12.6 | |
| 1.5 | M 2SB 2 | 2800 | 5.1 |  | 79.1 | 79.5 | 0.81 | 3.4 | 4.9 | 2.7 | 2.4 | 11.4 | 10.6 | FD 04 | 15 | 1300 | 2600 | 13.0 | 9.9 | FA 04 | 15 | 2600 | 13.0 | 14.4 | |
| 2.2 | M 3SA 2 | 2850 | 7.4 | | 80.2 | 80.9 | 0.78 | 5.1 | 5.2 | 2.1 | 1.8 | 24 | 15.5 | FD 15 | 26 | 1100 | 2400 | 28 | 22 | FA 15 | 26 | 2400 | 28 | 23 | |
| 3 | M 3LA 2 | 2860 | 10.0 |  | 82.8 | 82.6 | 0.79 | 6.6 | 5.7 | 2.6 | 2.2 | 31 | 18.7 | FD 15 | 26 | 700 | 1600 | 35 | 25 | FA 15 | 26 | 1600 | 35 | 26 | |
| 4 | M 3LB 2 | 2870 | 13.3 |  | 84.3 | 84.4 | 0.80 | 8.6 | 5.9 | 2.7 | 2.5 | 39 | 22 | FD 15 | 40 | 450 | 900 | 43 | 28 | FA 15 | 40 | 900 | 43 | 29 | |
| 5.5 | M 4SA 2 | 2890 | 18.2 |  | 86.1 | 85.7 | 0.84 | 11.0 | 6 | 2.6 | 2.2 | 101 | 33 | FD 06 | 50 | — | 600 | 112 | 46 | FA 06 | 50 | 600 | 112 | 47 | |
| 7.5 | M 4SB 2 | 2900 | 25 |  | 87.2 | 87.1 | 0.85 | 14.6 | 6.4 | 2.6 | 2.2 | 145 | 40 | FD 06 | 50 | — | 550 | 154 | 53 | FA 06 | 50 | 550 | 154 | 54 | |
| 9.2 | M 4LA 2 | 2930 | 30 |  | 89.0 | 88.5 | 0.86 | 17.3 | 6.9 | 2.8 | 2.3 | 178 | 51 | FD 56 | 75 | — | 430 | 189 | 64 | FA 06 | 75 | 430 | 189 | 65 | |
| 11 | M 4LC 2 | 2920 | 36 |  | 89.1 | 88.9 | 0.88 | 20.2 | 7 | 2.9 | 2.5 | 210 | 60 | | | | | | | | | | | | |
| 15 | M 5SB 2 | 2930 | 49 |  | 89.6 | 89.4 | 0.86 | 28.1 | 7.1 | 2.6 | 2.3 | 340 | 70 | | | | | | | | | | | | |
| 18.5 | M 5SC 2 | 2930 | 60 |  | 90.4 | 90.1 | 0.86 | 34 | 7.6 | 2.7 | 2.3 | 420 | 83 | | | | | | | | | | | | |
| 22 | M 5LA 2 | 2930 | 72 |  | 91.3 | 91.3 | 0.88 | 40 | 7.8 | 2.6 | 2.4 | 490 | 95 | | | | | | | | | | | | |









4 P

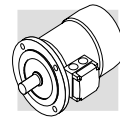
1500 min⁻¹ - S1

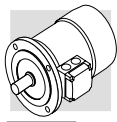
50 Hz

| Pn kW | IM B9 Kg | n min ⁻¹ | Mn Nm | EFF 2 | η (100%) % | η (75%) % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm ₄ x 10 ⁻⁴ kgm ² | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | | | |
|----------|-------------|------------------------|----------|-------|------------------|-----------------|-------|-------------------|----------|----------|----------|---|---|----------|-----------------------|---|---|------|----------|-----------|---|-------------|------|------|
| | | | | | | | | | | | | | Mod | Mb Nm | Zo 1/h NB SB | Jm ₄ x 10 ⁻⁴ Kgm ² | IM B9 Kg | Mod. | Mb Nm | Zo 1/h | Jm ₄ x 10 ⁻⁴ kgm ² | IM B9 Kg | | |
| 0.09 | M 0B | 4 | 1350 | 0.64 | 51.7 | 47.6 | 0.60 | 0.42 | 2.6 | 2.5 | 2.4 | 1.5 | 2.9 | FD 02 | 1.75 | 10000 | 13000 | 2.6 | 4.9 | FA 02 | 1.75 | 13000 | 2.6 | 4.7 |
| 0.12 | M 05A | 4 | 1350 | 0.85 | 59.8 | 56.2 | 0.62 | 0.47 | 2.6 | 1.9 | 1.8 | 2.0 | 3.2 | FD 02 | 3.5 | 10000 | 13000 | 3.0 | 5.3 | FA 02 | 3.5 | 13000 | 3.0 | 5.1 |
| 0.18 | M 05B | 4 | 1320 | 1.30 | 54.8 | 52.9 | 0.67 | 0.71 | 2.6 | 2.2 | 2.0 | 2.3 | 3.6 | FD 02 | 3.5 | 7800 | 10000 | 3.9 | 6.5 | FA 02 | 3.5 | 10000 | 3.9 | 6.3 |
| 0.25 | M 05C | 4 | 1340 | 1.78 | 65.3 | 65.0 | 0.69 | 0.80 | 2.7 | 2.1 | 1.9 | 3.3 | 4.8 | FD 03 | 5 | 6000 | 9400 | 8.0 | 8.2 | FA 03 | 5 | 9400 | 8.0 | 7.9 |
| 0.37 | M 1SD | 4 | 1370 | 2.6 | 66.8 | 66.7 | 0.76 | 1.05 | 3.7 | 2 | 1.9 | 6.9 | 5.5 | FD 53 | 7.5 | 4300 | 8700 | 10.2 | 9.6 | FA 03 | 7.5 | 8700 | 10.2 | 9.3 |
| 0.55 | M 1LA | 4 | 1380 | 3.8 | 69.0 | 68.9 | 0.74 | 1.55 | 4.1 | 2.3 | 2.3 | 9.1 | 6.9 | FD 04 | 15 | 4100 | 7800 | 22 | 13.1 | FA 04 | 15 | 7800 | 22 | 13 |
| 0.75 | M 2SA | 4 | 1400 | 5.1 | 75.0 | 74.5 | 0.78 | 1.85 | 4.9 | 2.7 | 2.5 | 20 | 9.2 | FD 04 | 15 | 2600 | 5300 | 27 | 14.5 | FA 04 | 15 | 5300 | 27 | 14.4 |
| 1.1 | M 2SB | 4 | 1400 | 7.5 | 76.4 | 76.2 | 0.78 | 2.66 | 5.1 | 2.8 | 2.5 | 25 | 10.6 | FD 15 | 26 | 2800 | 4900 | 38 | 22 | FA 15 | 26 | 4900 | 38 | 23 |
| 1.5 | M 3SA | 4 | 1410 | 10.2 | 79.6 | 80.5 | 0.77 | 3.5 | 4.6 | 2.1 | 2.1 | 34 | 15.5 | FD 15 | 40 | 2600 | 4700 | 44 | 24 | FA 15 | 40 | 4700 | 44 | 24 |
| 2.2 | M 3LA | 4 | 1410 | 14.9 | 81.1 | 81.4 | 0.75 | 5.2 | 4.5 | 2.2 | 2 | 40 | 17 | FD 15 | 40 | 2400 | 4400 | 58 | 27 | FA 15 | 40 | 4400 | 58 | 28 |
| 3 | M 3LB | 4 | 1410 | 20 | 82.6 | 83.8 | 0.77 | 6.8 | 5 | 2.3 | 2.2 | 54 | 21 | FD 55 | 55 | — | 1300 | 65 | 29 | FA 15 | 40 | 1300 | 65 | 30 |
| 4 | M 3LC | 4 | 1400 | 27 | 82.7 | 83.1 | 0.78 | 9.0 | 4.7 | 2.3 | 2.2 | 61 | 23 | FD 56 | 75 | — | 1050 | 223 | 55 | FA 06 | 75 | 1050 | 223 | 56 |
| 5.5 | M 4SA | 4 | 1440 | 36 | 86.3 | 86.4 | 0.80 | 11.5 | 5.5 | 2.3 | 2.2 | 213 | 42 | FD 06 | 100 | — | 950 | 280 | 64 | FA 07 | 100 | 950 | 280 | 65 |
| 7.5 | M 4LA | 4 | 1440 | 50 | 87 | 87.1 | 0.80 | 15.6 | 5.7 | 2.5 | 2.4 | 270 | 51 | FD 07 | 150 | — | 900 | 342 | 73 | FA 07 | 150 | 900 | 342 | 75 |
| 9.2 | M 4LB | 4 | 1440 | 61 | 88.4 | 88.6 | 0.80 | 18.8 | 5.9 | 2.7 | 2.5 | 319 | 57 | FD 07 | 150 | — | 850 | 382 | 81 | FA 07 | 150 | 850 | 382 | 83 |
| 11 | M 4LC | 4 | 1440 | 73 | 88.4 | 88.8 | 0.81 | 22.2 | 5.9 | 2.7 | 2.5 | 360 | 65 | FD 08 | 200 | — | 750 | 725 | 115 | FA 08 | 200 | 750 | 710 | 114 |
| 15 | M 5SB | 4 | 1460 | 98 | 89.9 | 89.4 | 0.81 | 29.7 | 5.9 | 2.3 | 2.1 | 650 | 85 | FD 08 | 250 | — | 700 | 865 | 131 | FA 08 | 250 | 700 | 850 | 130 |
| 18.5 | M 5LA | 4 | 1460 | 121 | 90.0 | 90.1 | 0.81 | 37 | 6.2 | 2.6 | 2.5 | 790 | 101 | | | | | | | | | | | |

6 P**1000 min⁻¹ - S1****50 Hz**

| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B9  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|---|----------|-----------------------|--|--|------|--------------|-----------------------|--|--|------|
| | | | | | | | | | | | | FD | | FA | | FD | | FA | | | | |
| | | | | | | | | | | | | Mod. | Mb Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B9  | Mod. | Mb Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B9  | |
| 0.09 | M 05A | 880 | 0.98 | 41 | 0.53 | 0.60 | 2.1 | 2.1 | 1.8 | 3.4 | 4.3 | FD 02 | 3.5 | 9000 | 14000 | 4.0 | 6.0 | FA 02 | 3.5 | 14000 | 4.0 | 6.0 |
| 0.12 | M 05B | 870 | 1.32 | 45 | 0.60 | 0.64 | 2.1 | 1.9 | 1.7 | 3.7 | 4.6 | FD 02 | 3.5 | 9000 | 14000 | 4.3 | 6.3 | FA 02 | 3.5 | 14000 | 4.3 | 6.3 |
| 0.18 | M 15C | 900 | 1.91 | 56 | 0.69 | 0.67 | 2.6 | 1.9 | 1.7 | 8.4 | 5.1 | FD 03 | 5 | 8100 | 13500 | 9.5 | 7.8 | FA 03 | 5 | 13500 | 9.5 | 7.5 |
| 0.25 | M 15D | 900 | 2.7 | 62 | 0.71 | 0.82 | 2.6 | 1.9 | 1.7 | 10.9 | 6.3 | FD 03 | 5 | 7800 | 13000 | 12 | 9 | FA 03 | 5 | 13000 | 12 | 8.7 |
| 0.37 | M 15A | 910 | 3.9 | 66 | 0.69 | 1.17 | 3 | 2.4 | 2 | 12.9 | 7.3 | FD 53 | 7.5 | 5100 | 9500 | 14 | 10 | FA 03 | 7.5 | 9500 | 14 | 9.7 |
| 0.55 | M 25A | 920 | 5.7 | 70 | 0.69 | 1.64 | 3.9 | 2.6 | 2.2 | 25 | 10.6 | FD 04 | 15 | 4800 | 7200 | 27 | 14.5 | FA 04 | 15 | 7200 | 27 | 14.4 |
| 0.75 | M 25B | 920 | 7.8 | 70 | 0.65 | 2.38 | 3.8 | 2.5 | 2.2 | 28 | 11.5 | FD 04 | 15 | 3400 | 6400 | 30 | 15.4 | FA 04 | 15 | 6400 | 30 | 15.3 |
| 1.1 | M 35A | 920 | 11.4 | 72 | 0.69 | 3.2 | 3.9 | 2.3 | 2 | 33 | 17 | FD 05 | 26 | 2700 | 5000 | 37 | 23 | FA 15 | 26 | 5000 | 37 | 24 |
| 1.5 | M 35A | 940 | 15.2 | 73 | 0.72 | 4.1 | 4 | 2.1 | 2 | 82 | 21 | FD 15 | 40 | 1900 | 4100 | 86 | 27 | FA 15 | 40 | 4100 | 86 | 28 |
| 1.85 | M 35B | 930 | 19.0 | 75 | 0.73 | 4.9 | 4.5 | 2.1 | 2 | 95 | 23 | FD 15 | 40 | 1700 | 3600 | 99 | 29 | FA 15 | 40 | 3600 | 99 | 30 |
| 2.2 | M 35C | 930 | 23 | 75 | 0.71 | 6.0 | 4.6 | 2 | 1.9 | 95 | 23 | FD 55 | 55 | — | 1900 | 99 | 29 | FA 15 | 55 | 1900 | 99 | 30 |
| 3 | M 45A | 940 | 30 | 76 | 0.76 | 7.5 | 4.8 | 1.9 | 1.8 | 216 | 34 | FD 56 | 75 | — | 1400 | 226 | 47 | FA 06 | 75 | 1400 | 226 | 48 |
| 4 | M 45A | 950 | 40 | 78 | 0.77 | 9.6 | 5.5 | 2 | 1.8 | 295 | 43 | FD 06 | 100 | — | 1200 | 305 | 56 | FA 07 | 100 | 1200 | 305 | 57 |
| 5.5 | M 45B | 945 | 56 | 80 | 0.78 | 12.7 | 5.9 | 2.1 | 1.9 | 383 | 54 | FD 07 | 150 | — | 1050 | 406 | 70 | FA 07 | 150 | 1050 | 406 | 72 |
| 7.5 | M 55A | 955 | 75 | 84 | 0.81 | 15.9 | 5.9 | 2.2 | 2 | 740 | 69 | FD 08 | 170 | — | 900 | 815 | 98 | FA 08 | 170 | 900 | 800 | 98 |
| 11 | M 55B | 960 | 109 | 87 | 0.81 | 22.5 | 6.5 | 2.5 | 2.3 | 970 | 89 | FD 08 | 200 | — | 800 | 1045 | 119 | FA 08 | 200 | 800 | 1030 | 118 |













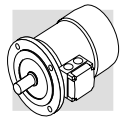
2/4 P

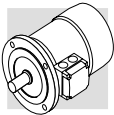
3000/1500 min⁻¹ - S1

50 Hz

| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B9  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|---|----------|-----------------------|--|--|------|----------|-----------------------|--|--|------|------|
| | | | | | | | | | | | | FD | | FA | | FD | | FA | | | | | |
| | | | | | | | | | | | | Mod. | Mb Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B9  | Mod. | Mb Nm | Z ₀ 1/h | Jm x 10 ⁻⁴ kgm ² | IM B9  | | |
| 0.20 | M 05A | 2 2700 | 0.71 | 55 | 0.82 | 0.64 | 3.5 | 2.1 | 1.9 | 2.9 | 4.1 | FD 02 | 3.5 | 2200 | 2600 | 3.5 | 5.8 | FA 02 | 3.5 | 2600 | 5100 | 3.5 | 5.6 |
| 0.15 | | 4 1350 | 1.06 | 49 | 0.67 | 0.66 | 2.6 | 1.8 | 1.7 | | | | 4000 | 5100 | | | | | | | | | |
| 0.28 | M 1SB | 2 2700 | 0.99 | 56 | 0.82 | 0.88 | 2.9 | 1.9 | 1.7 | 4.7 | 4 | FD 03 | 3.5 | 2100 | 2400 | 5.8 | 6.7 | FA 03 | 3.5 | 2400 | 4800 | 5.8 | 6.4 |
| 0.20 | | 4 1370 | 1.39 | 59 | 0.68 | 1.02 | 3.1 | 1.8 | 1.7 | | | | 3800 | 4800 | | | | | | | | | |
| 0.37 | M 1SC | 2 2740 | 1.29 | 56 | 0.82 | 1.16 | 3.5 | 1.8 | 1.8 | 5.8 | 4.7 | FD 03 | 5 | 1400 | 2100 | 6.9 | 7.4 | FA 03 | 5 | 2100 | 4200 | 6.9 | 7.1 |
| 0.25 | | 4 1390 | 1.72 | 60 | 0.73 | 0.82 | 3.3 | 2 | 1.9 | | | | 2900 | 4200 | | | | | | | | | |
| 0.45 | M 1SD | 2 2780 | 1.55 | 63 | 0.85 | 1.21 | 3.8 | 1.8 | 1.8 | 6.9 | 5.5 | FD 03 | 5 | 1400 | 2100 | 8 | 8.2 | FA 03 | 5 | 2100 | 4200 | 8 | 7.9 |
| 0.30 | | 4 1400 | 2.0 | 63 | 0.74 | 0.93 | 3.8 | 2.1 | 1.9 | | | | 2900 | 4200 | | | | | | | | | |
| 0.55 | M 1LA | 2 2800 | 1.9 | 73 | 0.79 | 1.38 | 4.2 | 2 | 1.8 | 9.1 | 6.9 | FD 03 | 5 | 1600 | 2200 | 10.2 | 9.6 | FA 03 | 5 | 2200 | 4600 | 10.2 | 9.3 |
| 0.37 | | 4 1400 | 2.5 | 68 | 0.72 | 1.09 | 3.9 | 2.2 | 2 | | | | 3300 | 4600 | | | | | | | | | |
| 0.75 | M 2SA | 2 2780 | 2.6 | 65 | 0.85 | 1.96 | 3.8 | 1.9 | 1.8 | 20 | 9.2 | FD 04 | 10 | 1400 | 1600 | 22 | 13.1 | FA 04 | 10 | 1600 | 3600 | 22 | 13 |
| 0.55 | | 4 1400 | 3.8 | 68 | 0.81 | 1.44 | 3.9 | 1.7 | 1.7 | | | | 2700 | 3600 | | | | | | | | | |
| 1.1 | M 2SB | 2 2730 | 3.9 | 65 | 0.86 | 2.84 | 3.9 | 2 | 1.9 | 25 | 10.7 | FD 04 | 10 | 1200 | 1500 | 27 | 14.5 | FA 04 | 10 | 1500 | 3100 | 27 | 14.5 |
| 0.75 | | 4 1410 | 5.1 | 75 | 0.81 | 1.78 | 4.5 | 2.1 | 2 | | | | 2300 | 3100 | | | | | | | | | |
| 1.5 | M 3SA | 2 2830 | 5.1 | 74 | 0.83 | 3.5 | 4.7 | 2.1 | 2 | 34 | 15.5 | FD 15 | 26 | 700 | 1000 | 38 | 22 | FA 15 | 26 | 1000 | 2600 | 38 | 23 |
| 1.1 | | 4 1420 | 7.4 | 77 | 0.78 | 2.6 | 4.3 | 2.1 | 2 | | | | 1600 | 2600 | | | | | | | | | |
| 2.2 | M 3LA | 2 2800 | 7.5 | 72 | 0.85 | 5.2 | 4.5 | 2 | 1.9 | 40 | 17 | FD 15 | 26 | 600 | 900 | 44 | 24 | FA 15 | 26 | 900 | 2300 | 44 | 24 |
| 1.5 | | 4 1410 | 10.2 | 73 | 0.79 | 3.8 | 4.7 | 2 | 2 | | | | 1300 | 2300 | | | | | | | | | |
| 3.5 | M 3LB | 2 2850 | 11.7 | 80 | 0.84 | 7.5 | 5.4 | 2.2 | 2.1 | 61 | 23 | FD 15 | 40 | 500 | 900 | 65 | 29 | FA 15 | 40 | 900 | 2100 | 65 | 30 |
| 2.5 | | 4 1420 | 16.8 | 82 | 0.80 | 5.5 | 5.2 | 2.2 | 2.2 | | | | 1000 | 2100 | | | | | | | | | |
| 4.8 | M 4 SA | 2 2900 | 15.8 | 81 | 0.88 | 9.7 | 6 | 2 | 1.9 | 213 | 42 | FD 06 | 50 | — | — | 233 | 55 | FA 06 | 50 | 400 | 233 | 233 | 56 |
| 3.8 | | 4 1430 | 25.4 | 81 | 0.84 | 8.1 | 5.2 | 2.1 | 2.1 | | | | — | — | — | — | | | | | | | |
| 5.5 | M 4SB | 2 2890 | 18.2 | 80 | 0.87 | 11.4 | 5.9 | 2.4 | 2 | 213 | 42 | FD 06 | 75 | — | — | 223 | 55 | FA 06 | 75 | 350 | 223 | 223 | 56 |
| 4.4 | | 4 1440 | 29 | 82 | 0.84 | 9.2 | 5.3 | 2.2 | 2 | | | | — | — | — | — | | | | | | | |
| 7.5 | M 4LA | 2 2900 | 25 | 82 | 0.87 | 15.2 | 6.5 | 2.4 | 2 | 270 | 51 | FD 06 | 100 | — | — | 280 | 64 | FA 07 | 100 | 350 | 280 | 280 | 65 |
| 6 | | 4 1430 | 40 | 84 | 0.85 | 12.1 | 5.8 | 2.3 | 2.1 | | | | — | — | — | — | | | | | | | |
| 9.2 | M 4LB | 2 2920 | 30 | 83 | 0.86 | 18.6 | 6 | 2.6 | 2.2 | 319 | 57 | FD 07 | 150 | — | — | 342 | 73 | FA 07 | 150 | 300 | 342 | 342 | 75 |
| 7.3 | | 4 1440 | 48 | 85 | 0.85 | 14.6 | 5.5 | 2.3 | 2.1 | | | | — | — | — | — | | | | | | | |

| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B9  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|---|----------|-----------------------|--|--|--------------|---|-----------------------|--|--|------|--|
| | | | | | | | | | | | | FD | | | FA | | | | | | | | |
| | | | | | | | | | | | | Mod. | Mb Nm | Z _o 1/h | Jm x 10 ⁻⁴ kgm ² | IM B9  | Mod. | Mb Nm | Z _o 1/h | Jm x 10 ⁻⁴ kgm ² | IM B9  | | |
| 0.25 | M 1SA | 2850 | 0.84 | 60 | 0.82 | 0.73 | 4.3 | 1.9 | 1.8 | 6.9 | 5.5 | FD 03 | 1.75 | 1500 | 8 | 8.2 | FA 03 | 1.75 | 1700 | 8 | 8 | 7.9 | |
| 0.08 | 6 | 910 | 0.84 | 43 | 0.70 | 0.38 | 2.1 | 1.4 | 1.5 | | | | | 10000 | | | | | 13000 | | | | |
| 0.37 | M 1LA | 2880 | 1.23 | 62 | 0.80 | 1.08 | 4.4 | 1.9 | 1.8 | 9.1 | 6.9 | FD 03 | 3.5 | 1000 | 10.2 | 9.6 | FA 03 | 3.5 | 1300 | 10.2 | 10.2 | 9.3 | |
| 0.12 | 6 | 900 | 1.27 | 44 | 0.73 | 0.54 | 2.4 | 1.4 | 1.5 | | | | | 9000 | | | | | 11000 | | | | |
| 0.55 | M 2SA | 2800 | 1.88 | 63 | 0.86 | 1.47 | 4.5 | 1.9 | 1.7 | 20 | 9.2 | FD 04 | 5 | 1500 | 22 | 13.1 | FA 04 | 5 | 1800 | 22 | 22 | 13 | |
| 0.18 | 6 | 930 | 1.85 | 52 | 0.65 | 0.77 | 3.3 | 2.0 | 1.9 | | | | | 4100 | | | | | 6300 | | | | |
| 0.75 | M 2SB | 2800 | 2.6 | 66 | 0.87 | 1.89 | 4.3 | 1.8 | 1.6 | 25 | 10.6 | FD 04 | 5 | 1700 | 27 | 14.5 | FA 04 | 5 | 1900 | 27 | 27 | 14.4 | |
| 0.25 | 6 | 930 | 2.6 | 54 | 0.67 | 1.00 | 3.2 | 1.7 | 1.8 | | | | | 3800 | | | | | 6000 | | | | |
| 1.1 | M 3SA | 2870 | 3.7 | 71 | 0.82 | 2.73 | 4.9 | 1.8 | 1.9 | 34 | 15.5 | FD 15 | 13 | 1000 | 38 | 22 | FA 15 | 13 | 1300 | 38 | 38 | 23 | |
| 0.37 | 6 | 930 | 3.8 | 63 | 0.70 | 1.21 | 3.1 | 1.5 | 1.8 | | | | | 3500 | | | | | 5000 | | | | |
| 1.5 | M 3LA | 2880 | 5.0 | 73 | 0.84 | 3.53 | 5.1 | 1.9 | 2.0 | 40 | 17 | FD 15 | 13 | 1000 | 44 | 24 | FA 15 | 13 | 1200 | 44 | 44 | 24 | |
| 0.55 | 6 | 940 | 5.6 | 64 | 0.67 | 1.85 | 3.5 | 1.7 | 1.8 | | | | | 2900 | | | | | 4000 | | | | |
| 2.2 | M 3LB | 2900 | 7.2 | 77 | 0.85 | 4.9 | 5.9 | 2.0 | 2.0 | 61 | 23 | FD 15 | 26 | 700 | 65 | 29 | FA 15 | 26 | 900 | 65 | 65 | 30 | |
| 0.75 | 6 | 950 | 7.5 | 67 | 0.64 | 2.5 | 3.3 | 1.9 | 1.8 | | | | | 2100 | | | | | 3000 | | | | |
| 3 | M 4SA | 2910 | 9.9 | 74 | 0.88 | 6.6 | 5.6 | 2.0 | 2.1 | 170 | 36 | FD 56 | 37 | — | 182 | 48 | FA 06 | 37 | 600 | 182 | 182 | 50 | |
| 1.1 | 6 | 960 | 10.9 | 73 | 0.68 | 3.2 | 4.5 | 2.2 | 2 | | | | | — | | | | | 2200 | | | | |
| 4.5 | M 4SB | 2910 | 14.8 | 78 | 0.84 | 9.9 | 5.8 | 1.9 | 1.8 | 213 | 42 | FD 56 | 37 | — | 223 | 55 | FA 06 | 37 | 500 | 223 | 223 | 56 | |
| 1.5 | 6 | 960 | 14.9 | 74 | 0.67 | 4.4 | 4.2 | 1.9 | 2.0 | | | | | — | | | | | 2100 | | | | |
| 5.5 | M 4LA | 2920 | 18.0 | 78 | 0.87 | 11.7 | 6.2 | 2.1 | 1.9 | 270 | 51 | FD 06 | 50 | — | 280 | 64 | FA 06 | 50 | 400 | 280 | 280 | 65 | |
| 2.2 | 6 | 960 | 22 | 77 | 0.71 | 5.8 | 4.3 | 2.1 | 2.0 | | | | | — | | | | | 1900 | | | | |












2/8 P

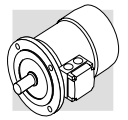
3000/750 min⁻¹ - S3 60/40%

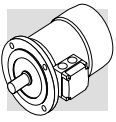
50 Hz

| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B9  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|---|----------|-----------------------|--|--|-------|---|-----------------------|--|--|------|
| | | | | | | | | | | | | FD | | FD | | FD | | FD | | FA | | FA |
| | | | | | | | | | | | | Mod. | Mb Nm | Z _o 1/h | Jm x 10 ⁻⁴ kgm ² | IM B9  | Mod. | Mb Nm | Z _o 1/h | Jm x 10 ⁻⁴ kgm ² | IM B9  | |
| 0.37 | M 1LA | 2800 | 1.26 | 63 | 0.86 | 0.99 | 3.9 | 1.8 | 1.9 | 12.9 | 7.3 | FD 03 | 3.5 | 1200 | 14 | 10 | FA 03 | 3.5 | 1300 | 14 | 14 | 9.7 |
| 0.09 | M 2SA | 670 | 1.28 | 34 | 0.75 | 0.51 | 1.8 | 1.4 | 1.5 | 13000 | 13000 | FD 04 | 5 | 9500 | 22 | 13.1 | FA 04 | 5 | 1800 | 22 | 22 | 13 |
| 0.55 | M 2SA | 2830 | 1.86 | 66 | 0.86 | 1.40 | 4.4 | 2.1 | 2 | 20 | 9.2 | FD 04 | 5 | 1500 | 22 | 13.1 | FA 04 | 5 | 1800 | 22 | 22 | 13 |
| 0.13 | M 2SB | 690 | 1.80 | 41 | 0.64 | 0.72 | 2.3 | 1.6 | 1.7 | 5600 | 8000 | FD 04 | 10 | 5600 | 27 | 14.5 | FA 04 | 10 | 1900 | 27 | 27 | 14.4 |
| 0.75 | M 2SB | 2800 | 2.6 | 68 | 0.88 | 1.81 | 4.6 | 2.1 | 2 | 25 | 10.6 | FD 04 | 10 | 1700 | 27 | 14.5 | FA 04 | 10 | 1900 | 27 | 27 | 14.4 |
| 0.18 | M 3SA | 690 | 2.5 | 43 | 0.66 | 0.92 | 2.3 | 1.6 | 1.7 | 4800 | 7300 | FD 15 | 13 | 4800 | 38 | 22 | FA 15 | 13 | 1300 | 38 | 38 | 23 |
| 1.1 | M 3SA | 2870 | 3.7 | 69 | 0.84 | 2.74 | 4.6 | 1.8 | 1.7 | 34 | 15.5 | FD 15 | 13 | 1000 | 38 | 22 | FA 15 | 13 | 1300 | 38 | 38 | 23 |
| 0.28 | M 3LA | 690 | 3.9 | 44 | 0.56 | 1.64 | 2.3 | 1.4 | 1.7 | 3400 | 5000 | FD 15 | 13 | 3400 | 44 | 24 | FA 15 | 13 | 5000 | 44 | 44 | 24 |
| 1.5 | M 3LA | 2880 | 5.0 | 69 | 0.85 | 3.69 | 4.7 | 1.9 | 1.8 | 40 | 17 | FD 15 | 13 | 1000 | 44 | 24 | FA 15 | 13 | 1200 | 44 | 44 | 24 |
| 0.37 | M 3LB | 690 | 5.1 | 46 | 0.63 | 1.84 | 2.1 | 1.6 | 1.6 | 3300 | 5000 | FD 15 | 26 | 3300 | 65 | 29 | FA 15 | 26 | 700 | 65 | 65 | 30 |
| 2.4 | M 3LB | 2900 | 7.9 | 75 | 0.82 | 5.6 | 5.4 | 2.1 | 2 | 61 | 23 | FD 15 | 26 | 550 | 65 | 29 | FA 15 | 26 | 700 | 65 | 65 | 30 |
| 0.55 | M 4SA | 700 | 7.5 | 54 | 0.58 | 2.5 | 2.6 | 1.8 | 1.8 | 2000 | 3500 | FD 15 | 37 | 2000 | 182 | 48 | FA 06 | 37 | 3500 | 182 | 182 | 50 |
| 3 | M 4SA | 2920 | 9.8 | 72 | 0.85 | 7.1 | 5.6 | 2 | 1.8 | 162 | 36 | FD 56 | 37 | — | 182 | 48 | FA 06 | 37 | 600 | 182 | 182 | 50 |
| 0.75 | M 4SB | 710 | 10.1 | 61 | 0.64 | 2.8 | 3 | 1.7 | 1.8 | 3400 | 5000 | FD 56 | 37 | — | 3400 | 55 | FA 06 | 37 | 3400 | 3400 | 3400 | 56 |
| 4 | M 4SB | 2870 | 13.3 | 73 | 0.84 | 9.4 | 5.6 | 2.3 | 2.4 | 213 | 42 | FD 56 | 37 | — | 223 | 55 | FA 06 | 37 | 500 | 223 | 223 | 56 |
| 1 | M 4LA | 690 | 13.8 | 66 | 0.62 | 3.5 | 2.9 | 1.9 | 1.8 | 3500 | 5000 | FD 06 | 50 | — | 280 | 64 | FA 06 | 50 | 400 | 280 | 280 | 65 |
| 5.5 | M 4LA | 2870 | 18.3 | 75 | 0.84 | 12.6 | 6.1 | 2.4 | 2.5 | 270 | 51 | FD 06 | 50 | — | 2400 | 64 | FA 06 | 50 | 400 | 2400 | 2400 | 65 |
| 1.5 | M 4LA | 690 | 21 | 68 | 0.63 | 5.1 | 2.9 | 1.9 | 1.9 | — | — | FD 06 | 50 | — | — | — | FA 06 | 50 | 400 | — | — | — |

2/12 P**3000/500 min⁻¹ - S3 60/40%****50 Hz**

| Pn kW |  | n min ⁻¹ | Mn Nm | η % | cos φ | In [400V] A | Is In | Ms Mn | Ma Mn | Jm x 10 ⁻⁴ kgm ² | IM B9  | freno c.c. / d.c. brake G.S.-bremse / frein c.c. | | | | | | freno c.a. / a.c. brake W.S.-bremse / frein c.a. | | | | |
|----------|---|------------------------|----------|--------|-------|-------------------|----------|----------|----------|--|--|---|------|----------|-----------------------|----------|--|--|------|----------|-----------------------|--|
| | | | | | | | | | | | | Mod. | | Mb Nm | Z _o 1/h | NB SB | Jm x 10 ⁻⁴ kgm ² | IM B9  | Mod. | Mb Nm | Z _o 1/h | Jm x 10 ⁻⁴ kgm ² |
| 0.55 | M 2SA | 2820 | 1.86 | 64 | 0.89 | 1.39 | 4.2 | 1.6 | 1.7 | 25 | 10.6 | FD 04 | 5 | 1000 | 1300 | 27 | 14.5 | FA 04 | 5 | 1300 | 27 | 14.4 |
| 0.09 | 12 | 430 | 2.0 | 30 | 0.63 | 0.69 | 1.8 | 1.9 | 1.8 | | | | 8000 | 12000 | | | | | | 12000 | | |
| 0.75 | M 3SA | 2900 | 2.5 | 65 | 0.81 | 2.06 | 5.2 | 1.9 | 2.1 | 34 | 15.5 | FD 15 | 13 | 700 | 900 | 38 | 22 | FA 15 | 13 | 900 | 38 | 23 |
| 0.12 | 12 | 460 | 2.5 | 33 | 0.43 | 1.22 | 1.9 | 1.3 | 1.6 | | | | 5000 | 7000 | | | | | 7000 | | | |
| 1.1 | M 3LA | 2850 | 3.7 | 65 | 0.85 | 2.87 | 4.5 | 1.6 | 1.8 | 40 | 17 | FD 15 | 13 | 700 | 900 | 44 | 24 | FA 15 | 13 | 900 | 44 | 24 |
| 0.18 | 12 | 430 | 4.0 | 26 | 0.54 | 1.85 | 1.5 | 1.3 | 1.5 | | | | 4000 | 6000 | | | | | 6000 | | | |
| 1.5 | M 3LB | 2900 | 4.9 | 67 | 0.86 | 3.76 | 5.6 | 1.9 | 1.9 | 54 | 21 | FD 15 | 13 | 700 | 900 | 58 | 27 | FA 15 | 13 | 900 | 58 | 28 |
| 0.25 | 12 | 440 | 5.4 | 36 | 0.46 | 2.18 | 1.8 | 1.7 | 1.8 | | | | 3800 | 5000 | | | | | 5000 | | | |
| 2 | M 3LC | 2850 | 6.7 | 70 | 0.84 | 4.9 | 4.9 | 1.8 | 1.7 | 61 | 23 | FD 55 | 18 | — | 700 | 65 | 29 | FA 15 | 18 | 700 | 65 | 30 |
| 0.3 | 12 | 450 | 6.4 | 38 | 0.47 | 2.4 | 1.7 | 1.6 | 1.7 | | | | — | 3500 | | | | | 3500 | | | |
| 3 | M 4SA | 2920 | 9.8 | 74 | 0.87 | 6.7 | 6.8 | 2.3 | 1.9 | 213 | 42 | FD 56 | 37 | — | 450 | 223 | 55 | FA 06 | 37 | 450 | 223 | 56 |
| 0.5 | 12 | 470 | 10.2 | 51 | 0.43 | 3.3 | 2 | 1.7 | 1.6 | | | | — | 3000 | | | | | 3000 | | | |
| 4 | M 4LA | 2920 | 13.1 | 75 | 0.89 | 8.6 | 5.9 | 2.4 | 2.3 | 270 | 51 | FD 56 | 37 | — | 400 | 280 | 64 | FA 06 | 37 | 400 | 280 | 65 |
| 0.7 | 12 | 460 | 14.5 | 53 | 0.44 | 4.3 | 1.9 | 1.7 | 1.6 | | | | — | 2800 | | | | | 2800 | | | |





M12 - DIMENSIONI MOTORI

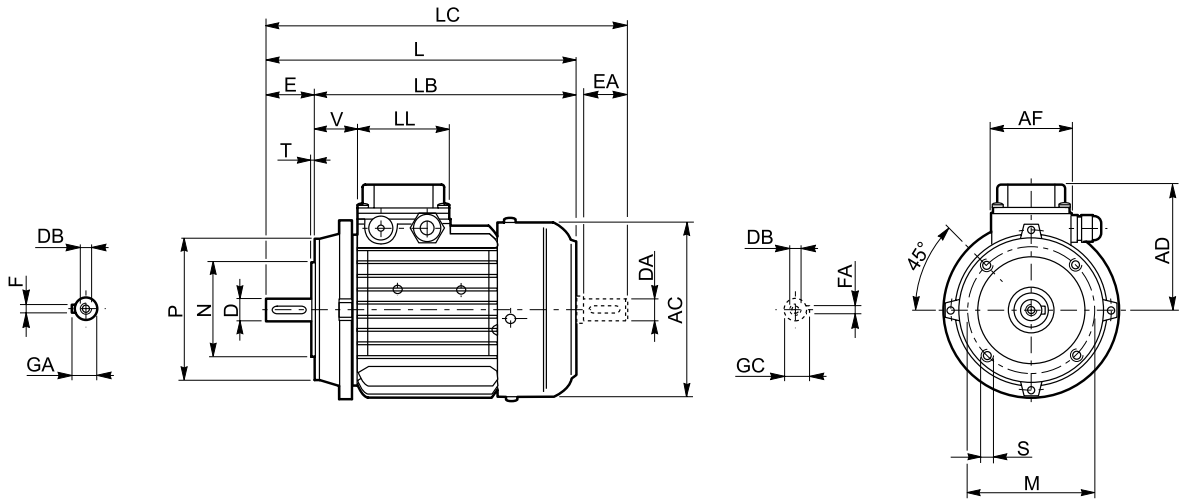
M12 - MOTORS DIMENSIONS

M12 - MOTORENABMESSUN-
GEN

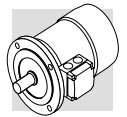
M12 - DIMENSIONS
MOTEURS

BN

IM B14

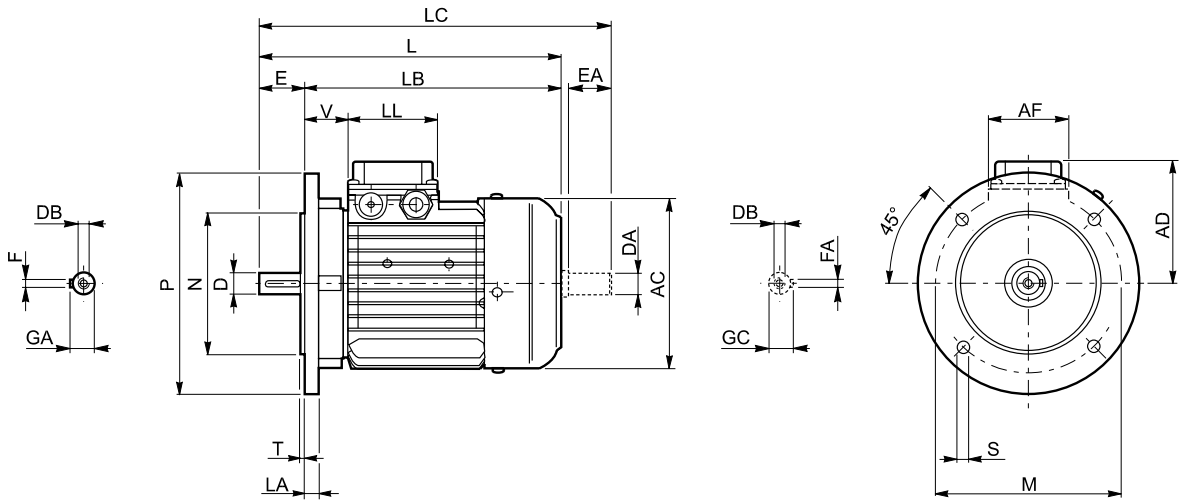


| | Albero / Shaft / Welle / Arbre | | | | | Flangia / Flange / Flansch / Bride | | | | | Motore / Motor / Motor / Moteur | | | | | | | |
|---------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|---------------------------------|-----|-----|-----|-----|-----|-----|----|
| | D DA | E EA | DB | GA GC | F FA | M | N | P | S | T | AC | L | LB | LC | AD | AF | LL | V |
| BN 56 | 9 | 20 | M3 | 10.2 | 3 | 65 | 50 | 80 | M5 | 2.5 | 110 | 185 | 165 | 207 | 91 | 74 | 80 | 34 |
| BN 63 | 11 | 23 | M4 | 12.5 | 4 | 75 | 60 | 90 | | | 121 | 207 | 184 | 232 | 95 | | | 26 |
| BN 71 | 14 | 30 | M5 | 16 | 5 | 85 | 70 | 105 | M6 | 3 | 138 | 249 | 219 | 281 | 108 | 98 | 98 | 37 |
| BN 80 | 19 | 40 | M6 | 21.5 | 6 | 100 | 80 | 120 | | | 156 | 274 | 234 | 315 | 119 | | | 38 |
| BN 90 | 24 | 50 | M8 | 27 | 8 | 115 | 95 | 140 | M8 | 3.5 | 176 | 326 | 276 | 378 | 133 | 118 | 118 | 44 |
| BN 100 | 28 | 60 | M10 | 31 | | 130 | 110 | 160 | | | 195 | 366 | 306 | 429 | 142 | | | 98 |
| BN 112 | | | | | 219 | 385 | 325 | 448 | 157 | 52 | | | | | | | | |
| BN 132 | 38 | 80 | M12 | 41 | 10 | 165 | 130 | 200 | M10 | 4 | 258 | 493 | 413 | 576 | 193 | 118 | 118 | 58 |



BN

IM B5



| | Albero / Shaft / Welle / Arbre | | | | | Flangia / Flange / Flansch / Bride | | | | | | Motore / Motor / Motor / Moteur | | | | | | | |
|------------------|--------------------------------|---------------|----------------|--------------|--------------|------------------------------------|-----|-----|--------------|----------------|----------------|---------------------------------|--------------|-----|-----|-----|-----|-----|-----|
| | D DA | E EA | DB | GA GC | F FA | M | N | P | S | T | LA | AC | L | LB | LC | AD | AF | LL | V |
| BN 56 | 9 | 20 | M3 | 10.2 | 3 | 100 | 80 | 120 | 7 | 3 | 8 | 110 | 185 | 165 | 207 | 74 | 80 | 34 | |
| BN 63 | 11 | 23 | M4 | 12.5 | 4 | 115 | 95 | 140 | 9.5 | | 10 | 121 | 207 | 184 | 232 | | | 95 | 26 |
| BN 71 | 14 | 30 | M5 | 16 | 5 | 130 | 110 | 160 | 11.5 | | 3.5 | 11.5 | 138 | 249 | 219 | | | 281 | 108 |
| BN 80 | 19 | 40 | M6 | 21.5 | 6 | 165 | 130 | 200 | 14 | 4 | 14 | 156 | 274 | 234 | 315 | 119 | 98 | 98 | 38 |
| BN 90 | 24 | 50 | M8 | 27 | 8 | | | | | | | 176 | 326 | 276 | 378 | 133 | | | 44 |
| BN 100 | 28 | 60 | M10 | 31 | 8 | 215 | 180 | 250 | 18.5 | 5 | 15 | 195 | 367 | 307 | 429 | 142 | 118 | 118 | 50 |
| BN 112 | | | | | | | | | | | | 15 | 219 | 385 | 325 | 448 | | | 157 |
| BN 132 | 38 | 80 | M12 | 41 | 10 | 265 | 230 | 300 | 18.5 | 5 | 16 | 258 | 493 | 413 | 576 | 193 | 187 | 187 | 58 |
| BN 160 MR | 42 38 (1) | 110 80 (1) | M16 M12 (1) | 45 41 (1) | 12 10 (1) | 300 | 250 | 350 | | | | 310 | 596 | 486 | 680 | 245 | | | 218 |
| BN 160 M | | | | | | | | | | | | 640 | 530 | 724 | 51 | | | | |
| BN 180 M | | | | | | | | | 48 38 (1) | 110 110 (1) | M16 M16 (1) | 51.5 45 (1) | 14 12 (1) | 350 | 300 | 400 | 348 | 708 | 598 |
| BN 180 L | 48 42 (1) | 722 | 612 | 837 | 66 | | | | | | | | | | | | | | |
| BN 200 L | 55 42 (1) | | M20 M16 (1) | 59 45 (1) | 16 12 (1) | | | | | | | | | | | | | | |

N.B.:

1) Queste dimensioni sono riferite alla seconda estremità d'albero.

NOTE:

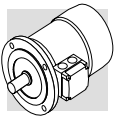
1) These values refer to the rear shaft end.

HINWEIS:

1) Diese Maße betreffen das zweite Wellenende.

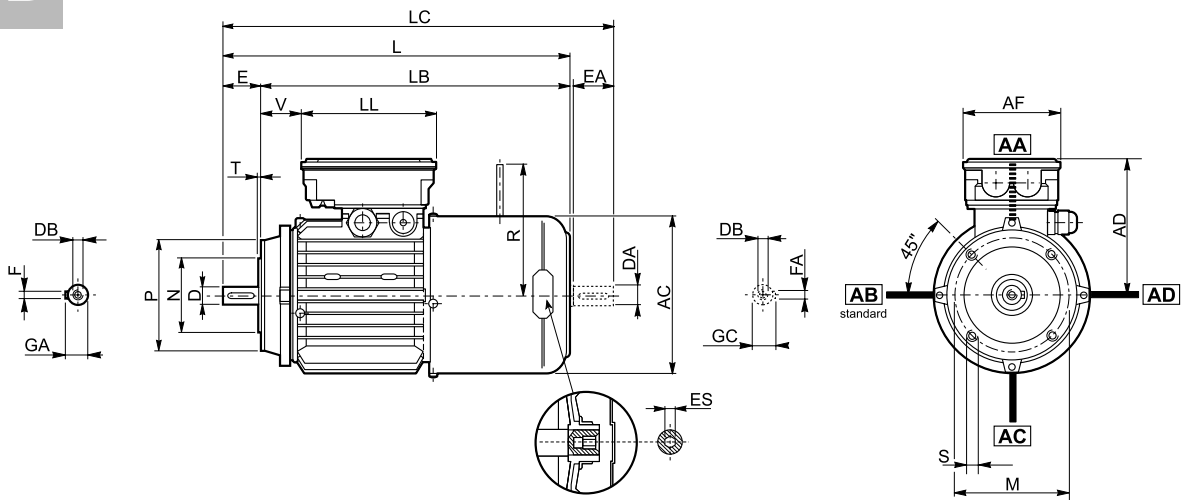
REMARQUE :

1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.



BN_FD

IM B14



| | Albero / Shaft / Welle / Arbre | | | | | Flangia / Flange / Flansch / Bride | | | | | Motore / Motor / Motor / Moteur | | | | | | | | | |
|----------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|---------|----|
| | D DA | E EA | DB | GA GC | F FA | M | N | P | S | T | AC | L | LB | LC | AD | AF | LL | V | R | ES |
| BN 63 | 11 | 23 | M4 | 12.5 | 4 | 75 | 60 | 90 | M5 | 2.5 | 121 | 272 | 249 | 297 | 119 | 98 | 133 | 14 | 96 | 5 |
| BN 71 | 14 | 30 | M5 | 16 | 5 | 85 | 70 | 105 | M6 | | 138 | 310 | 280 | 342 | 132 | | | 25 | 103 | |
| BN 80 | 19 | 40 | M6 | 21.5 | 6 | 100 | 80 | 120 | M8 | 3 | 156 | 346 | 306 | 388 | 143 | 110 | 165 | 41 | 129 | 6 |
| BN 90 S | 24 | 50 | M8 | 27 | 8 | 115 | 95 | 140 | | | 176 | 409 | 359 | 461 | 146 | | | 39 | 160 | |
| BN 90 L | 28 | 60 | M10 | 31 | | 130 | 110 | 160 | M10 | 3.5 | 195 | 458 | 398 | 521 | 155 | 62 | 160 | | | |
| BN 112 | | | | | 219 | | | | | | 484 | 424 | 547 | 170 | 73 | 199 | | | | |
| BN 132 | 38 | 80 | M12 | 41 | 10 | 165 | 130 | 200 | M10 | 4 | 258 | 603 | 523 | 686 | 210 | 140 | 188 | 122 | 204 (1) | |

N.B.:

1) Per freno FD07 quota R=226.

NOTE:

1) For FD07 brake value R=226.

HINWEIS:

1) Für Bremse FD07, Maß R=226.

REMARQUE :

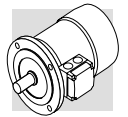
1) Pour frein FD07 valeur R=226.

L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

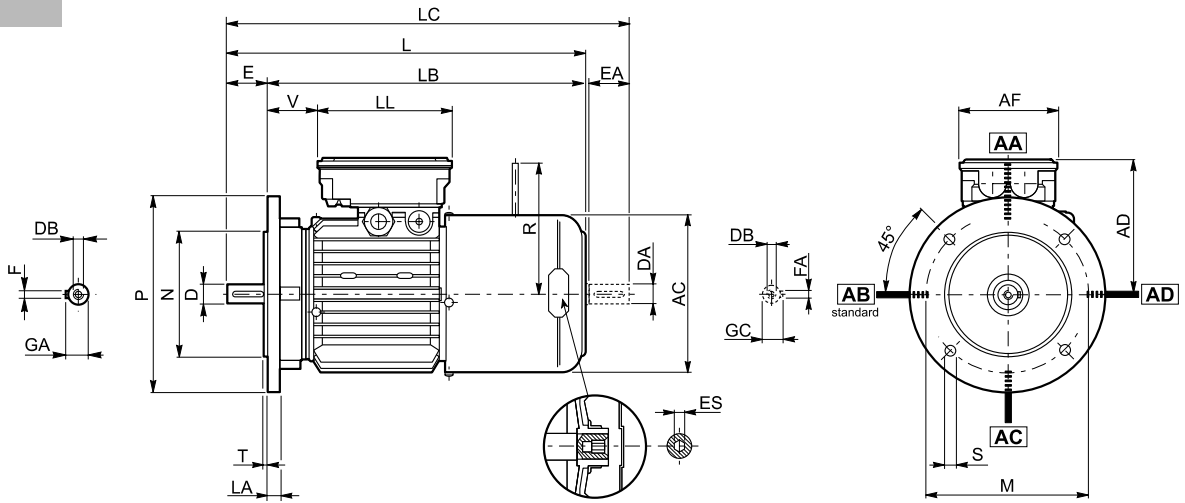
Der Sechskant ES ist bei der Option PS nicht vorhanden.

L'hexagone ES n'est pas disponible avec l'option PS.



BN_FD

IM B5



| | Albero / Shaft / Welle / Arbre | | | | | Flangia / Flange / Flansch / Bride | | | | | | Motore / Motor / Motor / Moteur | | | | | | | | | |
|------------------|--------------------------------|----------------|----------------|----------------|--------------|------------------------------------|-----|-----|--------------|----------------|--------------|---------------------------------|-----|-----|-----|-----|-----|-----|-----|---------|----|
| | D DA | E EA | DB | GA GC | F FA | M | N | P | S | T | LA | AC | L | LB | LC | AD | AF | LL | V | R | ES |
| BN 63 | 11 | 23 | M4 | 12.5 | 4 | 115 | 95 | 140 | 9.5 | 3 | 10 | 121 | 272 | 249 | 297 | 119 | 98 | 133 | 14 | 96 | 5 |
| BN 71 | 14 | 30 | M5 | 16 | 5 | 130 | 110 | 160 | | | | 138 | 310 | 280 | 342 | 132 | | | 25 | 103 | |
| BN 80 | 19 | 40 | M6 | 21.5 | 6 | 165 | 130 | 200 | 11.5 | 3.5 | 11.5 | 156 | 346 | 306 | 388 | 143 | 110 | 165 | 41 | 129 | 6 |
| BN 90 S | 24 | 50 | M8 | 27 | 8 | | | | | | | 176 | 409 | 359 | 461 | 146 | | | 39 | 160 | |
| BN 90 L | | | | | | 62 | 199 | | | | | | | | | | | | | | |
| BN 100 | 28 | 60 | M10 | 31 | 215 | 180 | 250 | 14 | 4 | 14 | 195 | 458 | 398 | 521 | 155 | 210 | 140 | 188 | 73 | 199 | |
| BN 112 | | | | | | | | | | 15 | 219 | 484 | 424 | 547 | 170 | | | | 62 | 199 | |
| BN 132 | 38 | 80 | M12 | 41 | 10 | 265 | 230 | 300 | 18.5 | 5 | 16 | 258 | 603 | 523 | 686 | 245 | 187 | 187 | 122 | 204 (2) | — |
| BN 160 MR | 42 38 (1) | 110 80 (1) | M16 M12 (1) | 45 41 (1) | 12 10 (1) | 300 | 250 | 350 | | | 15 | 310 | 736 | 626 | 820 | | | | 245 | 51 | |
| BN 160 M | | | | | | | | | 18 | 348 | 866 | 756 | 981 | 261 | 52 | 305 | | | | | |
| BN 180 M | | | | | | | | | 48 38 (1) | 51.5 41 (1) | 14 10 (1) | 780 | 670 | 864 | 64 | 305 | | | | | |
| BN 180 L | 48 42 (1) | 110 110 (1) | M16 M16 (1) | 51.5 45 (1) | 14 12 (1) | 350 | 300 | 400 | 18 | 348 | 866 | 756 | 981 | 261 | 52 | 305 | | | | | |
| BN 200 L | 55 42 (1) | M20 M16 (1) | 59 45 (1) | 16 12 (1) | 878 | | | | | | 768 | 993 | 64 | 305 | | | | | | | |

N.B.:

1) Queste dimensioni sono riferite alla seconda estremità d'albero.

2) Per freno FD07 quota R=226.

NOTE:

1) These values refer to the rear shaft end.

2) For FD07 brake value R=226.

HINWEIS:

1) Diese Maße betreffen das zweite Wellenende.

2) Für Bremse FD07, Maß R=226.

REMARQUE :

1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.

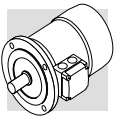
2) Pour frein FD07 valeur R=226.

L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

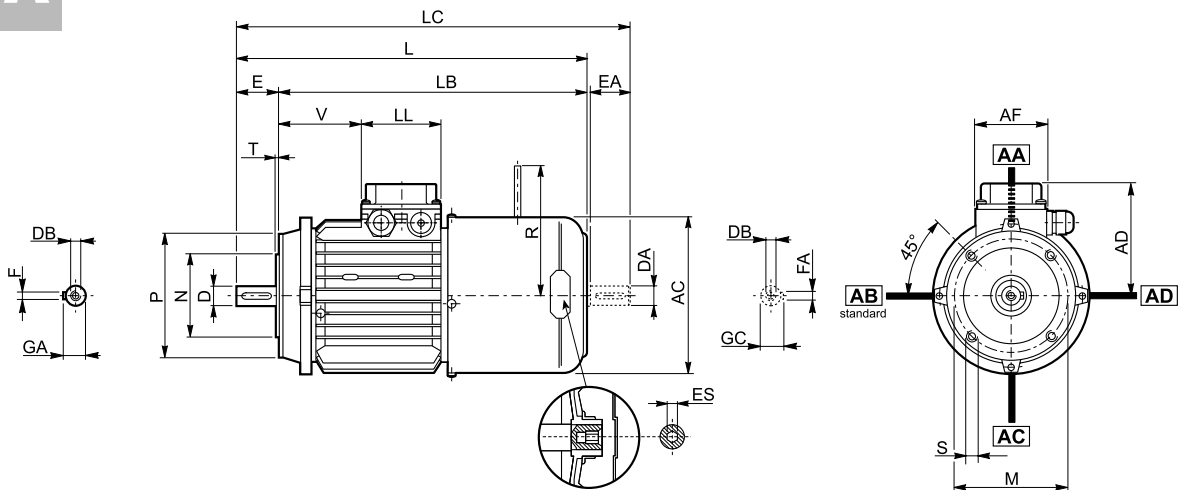
Der Sechskant ES ist bei der Option PS nicht vorhanden.

L'hexagone ES n'est pas disponible avec l'option PS.



BN_FA

IM B14



| | Albero / Shaft / Welle / Arbre | | | | | Flangia / Flange / Flansch / Bride | | | | | Motore / Motor / Motor / Moteur | | | | | | | | | |
|---------------|--------------------------------|---------|-----|----------|---------|------------------------------------|-----|-----|-----|-----|---------------------------------|-----|-----|-----|-----|-----|-----|-----|---------|-----|
| | D DA | E EA | DB | GA GC | F FA | M | N | P | S | T | AC | L | LB | LC | AD | AF | LL | V | R | ES |
| BN 63 | 11 | 23 | M4 | 12.5 | 4 | 75 | 60 | 90 | M5 | 2.5 | 121 | 272 | 249 | 119 | 95 | 74 | 80 | 26 | 116 | 5 |
| BN 71 | 14 | 30 | M5 | 16 | 5 | 85 | 70 | 105 | M6 | | 138 | 310 | 280 | 342 | 108 | | | 95 | 68 | |
| BN 80 | 19 | 40 | M6 | 21.5 | 6 | 100 | 80 | 120 | M8 | 3 | 156 | 346 | 306 | 388 | 119 | 98 | 98 | 83 | 134 | 6 |
| BN 90 | 24 | 50 | M8 | 27 | 8 | 115 | 95 | 140 | | 3 | 176 | 409 | 359 | 461 | 133 | | | 95 | 160 | |
| BN 100 | 28 | 60 | M10 | 31 | | 10 | 130 | 110 | 160 | M10 | 4 | 3.5 | 195 | 458 | 398 | 521 | 142 | 118 | 118 | 119 |
| BN 112 | | | | | 3.5 | | | | | | | 219 | 484 | 424 | 547 | 157 | 128 | | | 198 |
| BN 132 | 38 | 80 | M12 | 41 | 10 | 165 | 130 | 200 | M10 | 4 | 258 | 603 | 523 | 686 | 193 | 118 | 118 | 180 | 200 (1) | |

N.B.:

1) Per freno FD07 quota R=226.

NOTE:

1) For FD07 brake value R=226.

HINWEIS:

1) Für Bremse FD07, Maß R=226.

REMARQUE :

1) Pour frein FD07 valeur R=226.

Per la versione BN..FA le dimensioni della scatola morsetti AD, AF, LL, V sono uguali al tipo BN..FD.

For motors type BN..FA, the terminal box sizes AD, AF, LL, V are the same as for BN..FD.

Bei der Motor typ BN..FA sind die Maße des Klemmenkastens AD, AF, LL, V denen der Version BN..FD gleich.

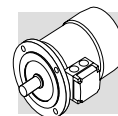
Pour moteurs type BN..FA les dimensions de la boîte à bornes AD, AF, LL, V sont les mêmes de BN..FD.

L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

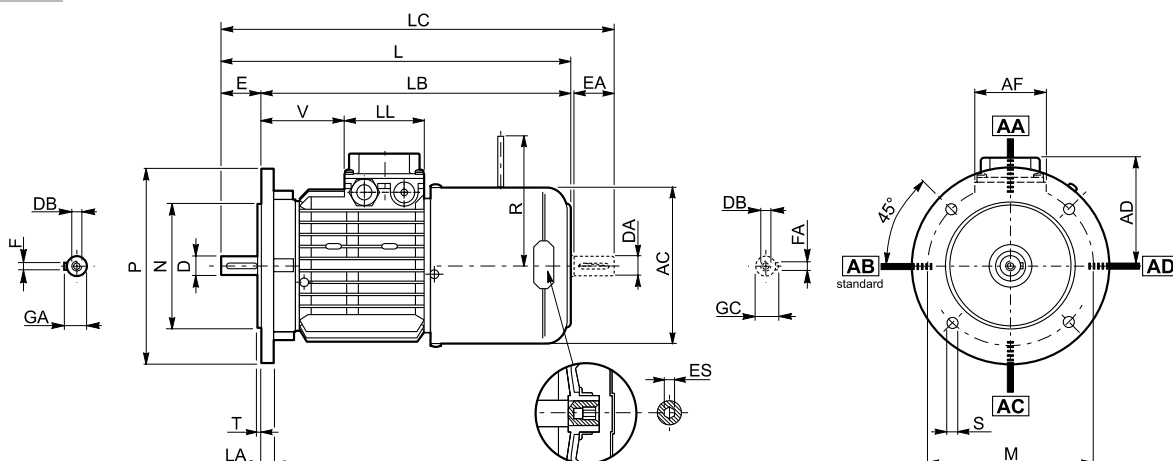
Der Sechskant ES ist bei der Option PS nicht vorhanden.

L'hexagone ES n'est pas disponible avec l'option PS.



BN_FA

IM B5



| | Albero / Shaft / Welle / Arbre | | | | | Flangia / Flange / Flansch / Bride | | | | | | Motore / Motor / Motor / Moteur | | | | | | | | | |
|------------------|--------------------------------|---------------|----------------|--------------|--------------|------------------------------------|-----|-----|--------------|----------------|------|---------------------------------|-----|--------------|-----|-----|-----|-----|-----|---------|-----|
| | D DA | E EA | DB | GA GC | F FA | M | N | P | S | T | LA | AC | L | LB | LC | AD | AF | LL | V | R | ES |
| BN 63 | 11 | 23 | M4 | 12.5 | 4 | 115 | 95 | 140 | 9.5 | 3 | 10 | 121 | 272 | 249 | 297 | 95 | 74 | 80 | 26 | 116 | 5 |
| BN 71 | 14 | 30 | M5 | 16 | 5 | 130 | 110 | 160 | | | | 138 | 310 | 280 | 342 | 108 | | | 68 | 124 | |
| BN 80 | 19 | 40 | M6 | 21.5 | 6 | 165 | 130 | 200 | 11.5 | 3.5 | 11.5 | 156 | 346 | 306 | 388 | 119 | 98 | 98 | 83 | 134 | 6 |
| BN 90 | 24 | 50 | M8 | 27 | 176 | | | | | | | 409 | 359 | 461 | 133 | 95 | | | 160 | | |
| BN 100 | 28 | 60 | M10 | 31 | 8 | 215 | 180 | 250 | 14 | 4 | 14 | 195 | 458 | 398 | 521 | 142 | 118 | 118 | 119 | 198 | 6 |
| BN 112 | | | | | | | | | | | 15 | 219 | 484 | 424 | 547 | 157 | | | 128 | | |
| BN 132 | 38 | 80 | M12 | 41 | 10 | 265 | 230 | 300 | 14 | 4 | 16 | 258 | 603 | 523 | 686 | 193 | 118 | 118 | 180 | 200 (2) | 6 |
| BN 160 MR | 42 38 (1) | 110 80 (1) | M16 M12 (1) | 45 41 (1) | 12 10 (1) | 300 | 250 | 350 | | | 18.5 | 5 | 15 | 672 | 562 | 755 | | | 218 | 217 | |
| BN 160 M | | | | | | | | | 48 38 (1) | 51.5 41 (1) | | | | 14 10 (1) | 310 | 736 | 626 | 820 | 245 | 187 | 187 |
| BN 160 L | 780 | 670 | 864 | 245 | 187 | 187 | 51 | 247 | | | — | | | | | | | | | | |
| BN 180 M | | | | 780 | 670 | 864 | 245 | 187 | 187 | 51 | 247 | — | | | | | | | | | |

N.B.:

- 1) Queste dimensioni sono riferite alla seconda estremità d'albero.
- 2) Per freno FD07 quota R=226.

NOTE:

- 1) These values refer to the rear shaft end.
- 2) For FD07 brake value R=226.

HINWEIS:

- 1) Diese Maße betreffen das zweite Wellenende.
- 2) Für Bremse FD07, Maß R=226.

REMARQUE :

- 1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.
- 2) Pour frein FD07 valeur R=226.

Le dimensioni AD, AF, LL e V relative alla scatola morsetti dei motori BN...FA dotati di alimentazione separata del freno (opzione SA) coincidono con quelle dei motori BN...FD di pari taglia.

Dimensions AD, AF, LL and V, relevant to terminal box of motors BN...FA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size BN...FD motors.

Die Abmessungen des Klemmenkastens der Motoren BN ... FA AD, AF, LL und V in bezug auf die separate Spannungsversorgung (Option SA) stimmen mit den Abmessungen der entsprechenden Motoren BN...FD überein.

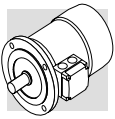
Les dimensions AD, AF, LL et V relatives à la boîte à borne des moteurs BN...FA équipés d'alimentation séparée du frein (option SA) sont identiques à celles des moteurs BN...FD de la même taille.

L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

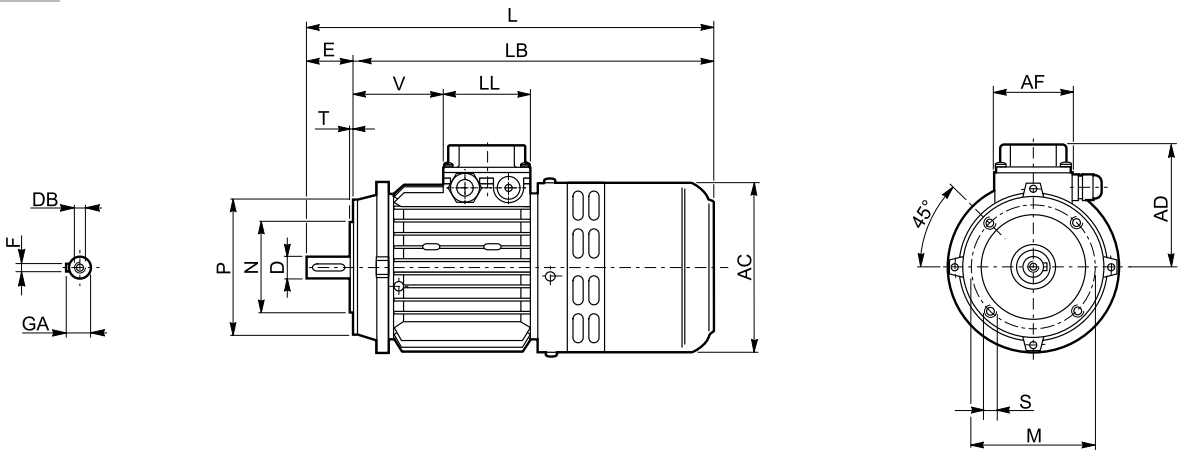
Der Sechskant ES ist bei der Option PS nicht vorhanden.

L'hexagone ES n'est pas disponible avec l'option PS.



BN_BA

IM B14



| | Albero / Shaft / Welle / Arbre | | | | | Flangia / Flange / Flansch / Bride | | | | | Motore / Motor / Motor / Moteur | | | | | | |
|---------------|--------------------------------|----|-----|------|-----|------------------------------------|-----|-----|-----|-----|---------------------------------|-----|-----|-----|-----|-----|-----|
| | D | E | DB | GA | F | M | N | P | S | T | AC | L | LB | AD | AF | LL | V |
| BN 63 | 11 | 23 | M4 | 12.5 | 4 | 75 | 60 | 90 | M5 | 2.5 | 124 | 298 | 275 | 95 | 74 | 80 | 28 |
| BN 71 | 14 | 30 | M5 | 16 | 5 | 85 | 70 | 105 | M6 | | 138 | 327 | 297 | 108 | | | 68 |
| BN 80 | 19 | 40 | M6 | 21.5 | 6 | 100 | 80 | 120 | | M8 | 3 | 156 | 372 | 332 | 119 | 98 | 98 |
| BN 90 | 24 | 50 | M8 | 27 | 8 | 115 | 95 | 140 | M8 | | 3.5 | 176 | 425 | 375 | 133 | | |
| BN 100 | 28 | 60 | M10 | 31 | | 130 | 110 | 160 | | M10 | 4 | 195 | 477 | 417 | 142 | 119 | |
| BN 112 | | | | | 219 | 500 | 440 | 157 | 128 | | | | | | | | |
| BN 132 | 38 | 80 | M12 | 41 | 10 | 165 | 130 | 200 | M10 | 4 | 258 | 638 | 558 | 193 | 118 | 118 | 180 |

N.B.:

Le dimensioni AD, AF, LL e V relative alla scatola morsetteria dei motori BN...BA dotati di alimentazione separata del freno (opzione SA) coincidono con quelle dei motori BN...FD di pari taglia.

NOTE:

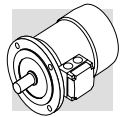
Dimensions AD, AF, LL and V, relevant to terminal box of motors BN...BA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size BN...FD motors

HINWEIS:

Die Abmessungen des Klemmenkastens der Motoren BN ... BA AD, AF, LL und V in bezug auf die separate Spannungsversorgung (Option SA) stimmen mit den Abmessungen der entsprechenden Motoren BN...FD überein.

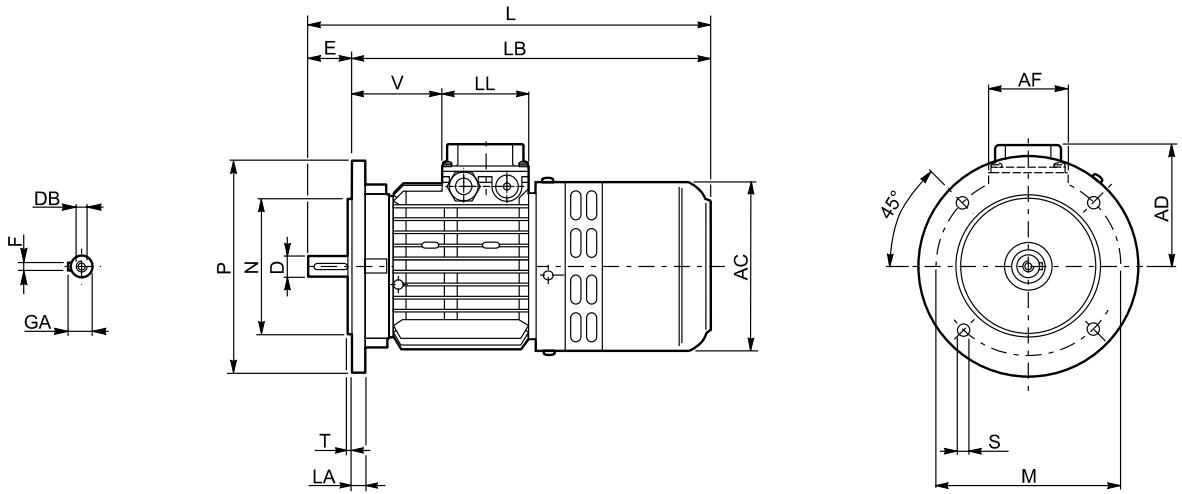
REMARQUE :

Les dimensions AD, AF, LL et V relatives à la boîte à borne des moteurs BN...BA équipés d'alimentation séparée du frein (option SA) sont identiques à celles des moteurs BN...FD de la même taille.



BN_BA

IM B5



| | Albero / Shaft / Welle / Arbre | | | | | Flangia / Flange / Flansch / Bride | | | | | | Motore / Motor / Motor / Moteur | | | | | | |
|---------------|--------------------------------|----|-----|------|-----|------------------------------------|-----|-----|------|-----|------|---------------------------------|-----|-----|-----|-----|-----|-----|
| | D | E | DB | GA | F | M | N | P | S | T | LA | AC | L | LB | AD | AF | LL | V |
| BN 63 | 11 | 23 | M4 | 12.5 | 4 | 115 | 95 | 140 | 9.5 | 3 | 10 | 124 | 298 | 275 | 95 | 74 | 80 | 28 |
| BN 71 | 14 | 30 | M5 | 16 | 5 | 130 | 110 | 160 | | | | 138 | 327 | 297 | 108 | | | 68 |
| BN 80 | 19 | 40 | M6 | 21.5 | 6 | 165 | 130 | 200 | 11.5 | 3.5 | 11.5 | 156 | 372 | 332 | 119 | 98 | 98 | 83 |
| BN 90 | 24 | 50 | M8 | 27 | 176 | | | | | | | 425 | 375 | 133 | 95 | | | |
| BN 100 | 28 | 60 | M10 | 31 | 8 | 215 | 180 | 250 | 14 | 4 | 14 | 195 | 477 | 417 | 142 | 98 | 98 | 119 |
| BN 112 | | | | | | | | | | | 15 | 219 | 500 | 440 | 157 | | | 128 |
| BN 132 | 38 | 80 | M12 | 41 | 10 | 265 | 230 | 300 | | | 16 | 258 | 638 | 558 | 193 | 118 | 118 | 180 |

N.B.:

Le dimensioni AD, AF, LL e V relative alla scatola morsetti dei motori BN...BA dotati di alimentazione separata del freno (opzione SA) coincidono con quelle dei motori BN...FD di pari taglia.

NOTE:

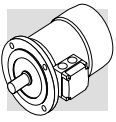
Dimensions AD, AF, LL and V, relevant to terminal box of motors BN...BA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size BN...FD motors

HINWEIS:

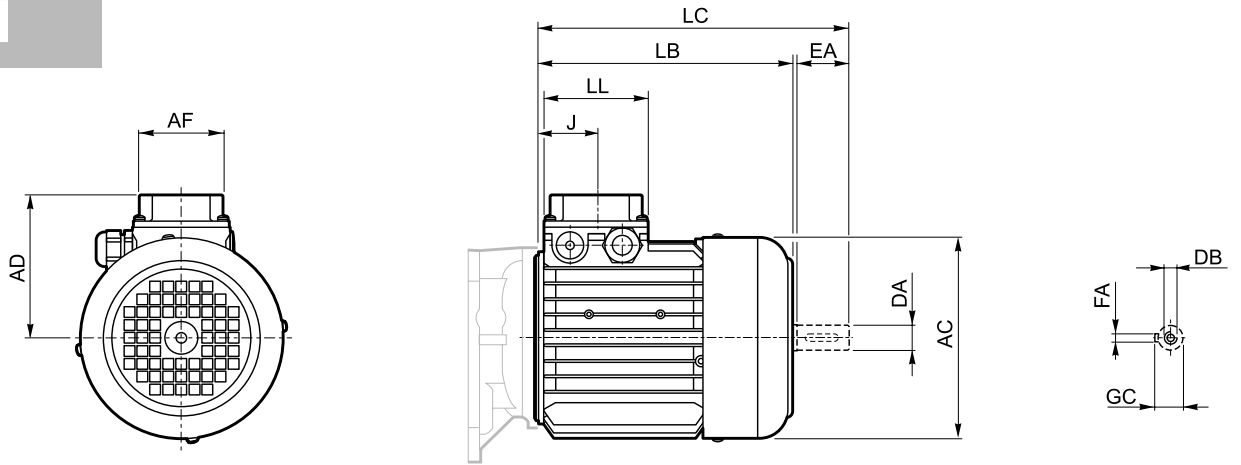
Die Abmessungen des Klemmenkastens der Motoren BN ... BA AD, AF, LL und V in bezug auf die separate Spannungsversorgung (Option SA) stimmen mit den Abmessungen der entsprechenden Motoren BN...FD überein.

REMARQUE :

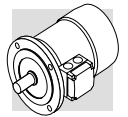
Les dimensions AD, AF, LL et V relatives à la boîte à borne des moteurs BN...BA équipés d'alimentation séparée du frein (option SA) sont identiques à celles des moteurs BN...FD de la même taille.



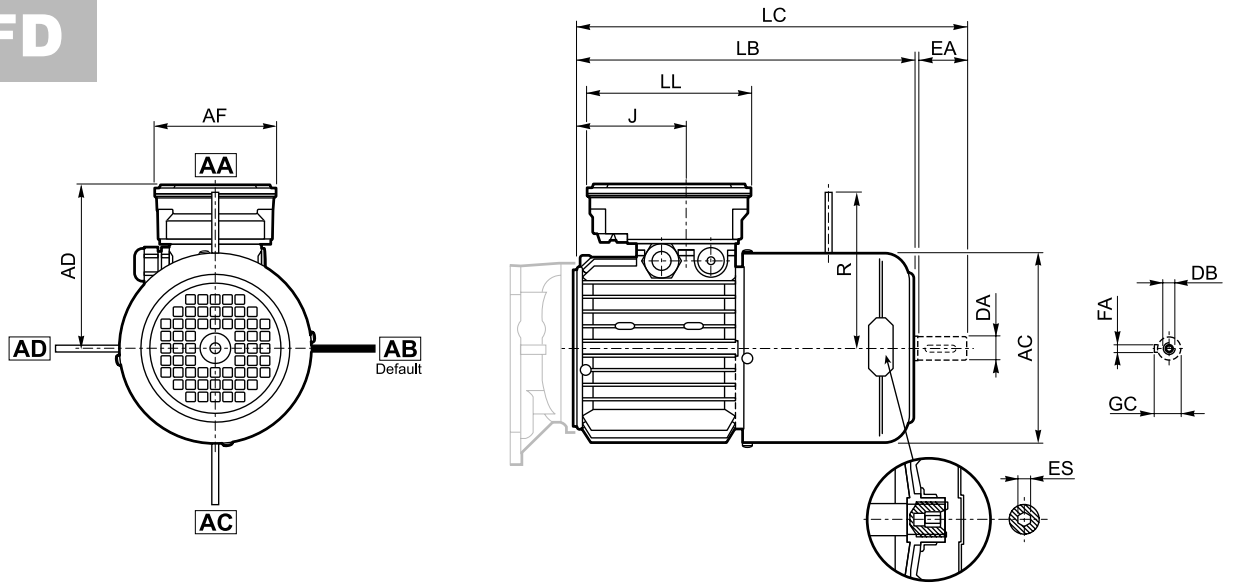
M



| | Seconda estremità albero / Rear shaft end Zweite Wellenende / Deuxième extrémité de l'arbre | | | | | Motore / Motor / Motor / Moteur | | | | | | |
|---------------|--|----|-----|----|------|---------------------------------|-----|-----|-----|-----|------|-----|
| | DA | EA | DB | FA | GC | AC | LB | LC | AF | LL | J | AD |
| M 0 | 9 | 20 | M3 | 3 | 10.2 | 110 | 133 | 155 | 74 | 80 | 42 | 91 |
| M 05 | 11 | 23 | M4 | 4 | 12.5 | 121 | 165 | 191 | | | 48 | 95 |
| M 1 S | 14 | 30 | M5 | 5 | 16 | 138 | 163 | 195 | | | 45 | 108 |
| M 1 L | | | | | | | 187 | 219 | | | 44 | 119 |
| M 2 S | 19 | 40 | M6 | 6 | 21.5 | 156 | 202 | 245 | 98 | 98 | 53.5 | 142 |
| M 3 S | 28 | 60 | M10 | 8 | 31 | 195 | 230 | 293 | | | | |
| M 3 L | | | | | | | 262 | 325 | | | | |
| M 4 | 38 | 80 | M12 | 10 | 41 | 258 | 361 | 444 | 118 | 118 | 64.5 | 193 |
| M 4 LC | | | | | | | 396 | 479 | | | | |
| M 5 S | | | | | | 310 | 418 | 502 | 187 | 187 | 77 | 245 |
| M 5 L | | | | | | | 462 | 546 | | | | |



M_FD



| | Seconda estremità albero / Rear shaft end Zweite Wellenende / Deuxième extrémité de l'arbre | | | | | Motore / Motor / Motor / Moteur | | | | | | | | |
|---------------|--|----|-----|----|------|---------------------------------|-----|-----|-----|-----|-------|-----|---------|----|
| | DA | EA | DB | FA | GC | AC | LB | LC | AF | LL | J | AD | R | ES |
| M 05 | 11 | 23 | M4 | 4 | 12.5 | 121 | 231 | 256 | 98 | 133 | 48 | 119 | 96 | 5 |
| M 1 S | 14 | 30 | M5 | 5 | 16 | 138 | 226 | 258 | | | | | | |
| M 1 L | | | | | | | 248 | 280 | | | | | | |
| M 2 S | 19 | 40 | M6 | 6 | 21.5 | 156 | 272 | 314 | | | 88 | 143 | 129 | |
| M 3 S | 28 | 60 | M10 | 8 | 31 | 195 | 326 | 389 | 110 | 165 | 124.5 | 155 | 160 | 6 |
| M 3 L | | | | | | | 353 | 416 | | | | | | |
| M 4 | 38 | 80 | M12 | 10 | 41 | 258 | 470 | 553 | 140 | 188 | 185.5 | 210 | 204 (1) | |
| M 4 LC | | | | | | | 495 | 578 | | | 64.5 | | 226 | |
| M 5 S | | | | | | | 310 | 602 | | | 686 | 187 | 187 | |
| M 5 L | | | | | | | | | | | | | | |

N.B.:

1) Per freno FD07 quota R=226.

NOTE:

1) For FD07 brake value R=226.

HINWEIS:

1) Für Bremse FD07, Maß R=226.

REMARQUE :

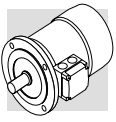
1) Pour frein FD07 valeur R=226.

L'esagono ES non è presente con l'opzione PS.

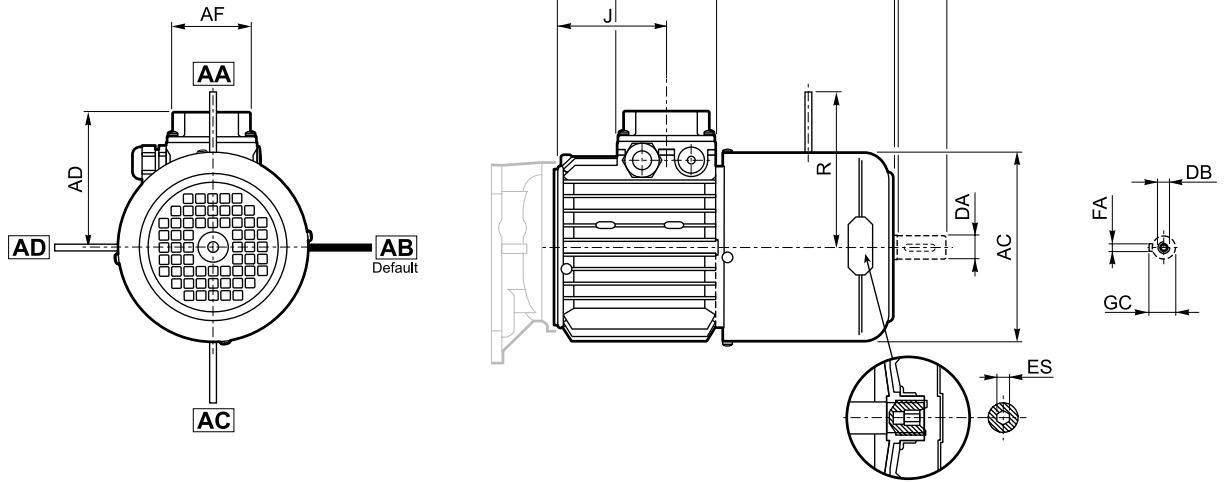
ES hexagon is not supplied with PS option.

Der Sechskant ES ist bei der Option PS nicht vorhanden.

L'hexagone ES n'est pas disponible avec l'option PS.



M_FA



| | Seconda estremità albero / Rear shaft end Zweite Wellenende / Deuxième extrémité de l'arbre | | | | | Motore / Motor / Motor / Moteur | | | | | | | | |
|---------------|--|----|-----|----|------|---------------------------------|-----|-----|-----|-----|-------|-----|---------|----|
| | DA | EA | DB | FA | GC | AC | LB | LC | AF | LL | J | AD | R | ES |
| M 05 | 11 | 23 | M4 | 4 | 12.5 | 121 | 231 | 256 | 74 | 80 | 48 | 95 | 116 | 5 |
| M 1 S | 14 | 30 | M5 | 5 | 16 | 138 | 226 | 258 | | | | | | |
| M 1 L | | | | | | | 248 | 280 | | | | | | |
| M 2 S | 19 | 40 | M6 | 6 | 21.5 | 156 | 272 | 314 | 98 | 98 | 88 | 119 | 134 | 6 |
| M 3 S | 28 | 60 | M10 | 8 | 31 | 195 | 326 | 389 | 118 | 118 | 124.5 | 142 | 160 | |
| M 3 L | | | | | | | 353 | 416 | | | 64.5 | 217 | | |
| M 4 | 38 | 80 | M14 | 10 | 41 | 258 | 470 | 553 | 187 | 187 | 185.5 | 193 | 200 (1) | — |
| M 4 LC | | | | | | | 495 | 578 | | | 64.5 | | 217 | |
| M 5 S | | | M12 | | | 310 | 602 | 686 | 187 | 187 | 77 | 245 | 247 | |
| M 5 L | | | | | | | | | | | | | | |

N.B.:

1) Per freno FD07 quota R=226.

L'esagono ES non è presente con l'opzione PS.

NOTE:

1) For FD07 brake value R=226.

ES hexagon is not supplied with PS option.

HINWEIS:

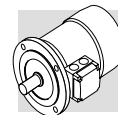
1) Für Bremse FD07, Maß R=226.

Der Sechskant ES ist bei der Option PS nicht vorhanden.

REMARQUE :

1) Pour frein FD07 valeur R=226.

L'hexagone ES n'est pas disponible avec l'option PS.



M13 - MOTORI ELETTRICI SERIE K

Caratteristiche

I motori serie K sono del tipo asincrono trifase, progettati per operare in applicazioni industriali con alimentazione sia da rete sia tramite inverter.

Sono previsti in versione compatta per impiego unicamente su riduttori tipo VF 30, VF 44, VF 49.

NOTE ESPLICATIVE MOTORI

Tensione - frequenza

Da indicare sempre nell'ordinativo.

Grado di protezione

IP 55 motore esecuzione standard.
IP 54 motore esecuzione autofrenante.

Classe di isolamento

Classe di isolamento F standard (classe H a richiesta).

Tipo di freno

Freno in c.c. per servizio non gravoso, tipo FC.

Per diverso tipo di freno consultare il Servizio Tecnico di Bonfiglioli Riduttori.

Alimentatore (solo per motore autofrenante)

Fornito di serie e normalmente pre-cablato alla bobina del freno.

Alimentazione freno

Tensione di alimentazione standard 230V a.c. (via raddrizzatore).

Per alimentazione freno separata indicare:

- il valore di tensione richiesto seguito da SA (es. 110SA)
- nel caso di alimentazione diretta del freno in c.c. indicare il valore di tensione seguito da SD (es. 24SD); in questo caso il raddrizzatore è escluso dalla fornitura.

M13 - ELECTRIC MOTORS SERIES K

Characteristics

The asynchronous three-phase electric motors of series K are designed for use in industrial applications, powered by factory mains or inverter.

In the compact version, they are compatible with gearbox types VF 30, VF 44 and VF 49 only.

NOTES ON MOTORS

Voltage - Frequency

Please always specify voltage and frequency on order.

Protection class

*Standard motors: IP 55
Brake motors: IP 54.*

Insulation class

Standard insulation class: F (Class H available on request).

Brake type

DC brake type FC for light and medium duty.

Please contact Bonfiglioli Riduttori Customer Service if you wish another type of brake.

Rectifier (for brake motors only)

Included in supply scope, normally pre-wired to brake coil at the factory.

Brake supply

*Standard power supply is 230 VAC (via rectifier).
For separate power supply, please state:*

- the voltage followed by SA (e.g. 110SA);*
- in case of direct power supply of D.C. brake, state voltage followed by SD (e.g. 24SD); in this case the rectifier will be not supplied.*

M13 - ELEKTROMOTOREN SERIE K

Eigenschaften

Die Motoren der Serie K gehören zu den asynchron laufenden Drehstrommotoren, die für den industriellen Einsatz entworfen wurden und die sowohl über das Stromnetz als auch über Inverter versorgt werden können.

Sie werden in einer kompakten Version angeboten und sind ausschließlich für den Einsatz auf Getrieben vom Typ VF 30, VF 44 und VF 49 vorgesehen.

HINWEISE ZU DEN MOTOREN

Spannung - Frequenz

Ist immer im Auftrag anzugeben.

Schutzgrad

IP 55 für Motoren in der Standardausführung.
IP 54 für Motoren in der selbstbremsenden Version.

Isolationsklasse

Isolationsklasse F Standard (auf Anfrage auch Klasse H).

Bremsentyp

Gleichstrom-Bremse für normalen Einsatz, Typ FC. Sollte ein anderweitiger Bremsentyp erforderlich sein, ist Verbindung zum Technischen Kundendienst der Bonfiglioli Riduttori aufzunehmen.

Speisegerät (nur für selbstbremsende Motoren)

Speisegerät (nur für selbstbremsende Motoren).

Bremsenversorgung

Standard-Spannungsversorgung mit 230V WS (über Gleichrichter).

Für die getrennte Bremsenversorgung sind folgende Angaben erforderlich:

- der erforderliche Spannungswert gefolgt von SA (z.B. 110SA);
- im Fall einer direkten Versorgung der Gleichstrombremsen, ist der Spannungswert gefolgt von SD (z.B. 24SD) anzuführen. In diesem Fall gehört der Gleichrichter nicht zum Lieferumfang.

M13 - MOTEURS ELECTRIQUES SERIE K

Caractéristiques

Les moteurs série K sont du type asynchrone triphasé, conçus pour opérer dans des applications industrielles alimentées par variateur de vitesse ou au réseau directement.

Ces moteurs sont disponibles en version compacte à employer uniquement sur les réducteurs de type VF 30, VF 44 et VF 49.

SPECIFICATIONS MOTEURS

Tension - fréquence

A préciser dans la commande en tout cas.

Degré de protection

*IP 55 moteur exécution standard.
IP 54 moteur exécution à freinage automatique.*

Classe d'isolation

Classe d'isolation F standard (classe H sur demande).

Type de frein

Frein FC (en c.c.) pour service non lourd.

S'adresser au Service Après-Vente de Bonfiglioli Riduttori pour des freins différents.

Alimentateur (uniquement pour les moteurs à freinage automatique)

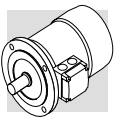
Fourni en standard, déjà câblé sur la bobine du frein.

Alimentation du frein

Tension d'alimentation standard de 230V c.a. (à l'aide d'un redresseur).

Pour une alimentation séparée du frein, indiquer :

- la valeur de tension requise suivie de SA (ex. 110SA) ;*
- En cas d'alimentation directe du frein en courant continu, indiquer la valeur de tension à la suite de SD (ex. 24SD) ; dans ce cas le redresseur est exclu de la fourniture.*



CARATTERISTICHE MECCANICHE

Ventilazione

I motori sono raffreddati mediante ventilazione esterna e sono provvisti di ventola radiale in plastica, funzionante in entrambi i sensi di rotazione. L'installazione deve assicurare una distanza minima fra la calotta copriventola e la parete più vicina in modo da non ostacolare il flusso d'aria necessario per il raffreddamento, nonché consentire le operazioni di ispezione periodica e di manutenzione. Sul motore tipo K71 può essere richiesto un sistema di ventilazione forzata ad alimentazione separata (IC 416) così da garantire il raffreddamento del motore anche nel caso di funzionamento prolungato a basso numero di giri.

Morsettiera

La morsettiera principale è a 6 morsetti per collegamento con capocorda. All'interno della scatola è previsto un morsetto per il conduttore di terra. Eseguire i cablaggi dell'alimentazione e degli eventuali accessori secondo gli schemi riportati nei fogli di istruzione contenuti all'interno della scatola morsettiera, o nei manuali.

Ingresso cavi

L'ingresso cavi è previsto per pressacavo metrici in accordo alla Norma EN 60262, con dimensioni secondo la tabella seguente:

MECHANICAL CHARACTERISTICS

Ventilation

The motors are cooled by external ventilation and are equipped with a radial fan in plastic working in both directions. The motors must be installed allowing sufficient space between fan cover and nearest wall to ensure unimpeded air intake and allow access for routine inspections and maintenance. Independent, forced air ventilation (IC 416) available on request for motor type K71 to ensure proper cooling when operating continuously at low speed.

Terminal box

The main terminal board has six studs for connection to the lead-in wire. A terminal for the ground conductor is provided inside the box. All connections must be carried out according to the diagrams inside the terminal box or in the instruction manuals.

Cable entry

Cable entry will accommodate metric-size cable glands as per standard EN 60262, according to the dimensions shown in table:

MECHANISCHE EIGENSCHAFTEN

Belüftung

Die Motoren werden über eine externe Belüftung gekühlt und sind mit einem Radiallüfterrad aus Kunststoff ausgestattet, das in beide Richtungen drehen kann. Bei der Installation muß ein Mindestabstand zwischen der Lüfterradabdeckung und der nächstliegenden Wand gewährleistet werden, so daß der für die Kühlung erforderliche Luftfluss gewährleistet und die Durchführung der regelmäßigen Inspektions und Instandhaltungsarbeiten ermöglicht werden können. Am Motor des Typs K71 kann auch ein Zwangskühlsystem mit getrennter Versorgung (IC 416) angefordert werden, so daß eine Kühlung des Motors auch im Fall eines längeren Einsatzes bei niedriger Drehzahl garantiert werden kann.

Klemmenkasten

Der Hauptklemmenkasten sieht für die Verbindung mit den Kabelschuhen 6 Klemmen vor. Im Kasteninneren ist eine Klemme für den Erdleiter angeordnet. Die Speisekabel und die Kabel der eventuell vorhandenen Zubehörteile müssen den Plänen gemäß verlegt werden, die auf den Anleitungsblättern, die im Klemmenkasten selbst oder in den entsprechenden Handbüchern enthalten sind.

Kabeleingang

Der Kabeleingang ist für metrische Kabelführungen in Übereinstimmung der Norm EN 60262 mit Maßen vorgesehen, die den Angaben in der nachstehenden Tabelle entsprechen:

CARACTERISTIQUES MECANIQUES

Ventilation

Les moteurs sont refroidis à l'aide d'une ventilation extérieure et sont dotés d'un ventilateur à ailettes en plastique qui fonctionne dans les deux sens de rotation. L'installation doit assurer une distance minimale entre le cache de protection du ventilateur et la paroi, afin d'assurer la circulation d'air nécessaire au refroidissement et rendre plus aisé toute opération d'inspection et d'entretien. Sur les moteurs de type K71, il est possible de prévoir une ventilation forcée indépendante (IC 416). Cette solution permet d'augmenter le facteur de refroidissement du moteur en cas de fonctionnement prolongé à faible vitesse.

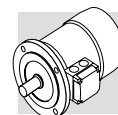
Bornier

Le bornier principal se compose de six bornes pour raccordement avec cosses. Dans le boîtier se trouve une borne pour le conducteur de terre. Effectuer les connexions de l'alimentation et des accessoires selon les schémas indiqués dans les instructions à l'intérieur du bornier, ou dans les manuels d'utilisation.

Entrée câbles

L'entrée des câbles est prévue selon les dimensions indiquées dans le tableau qui suit et en utilisant des presse-câbles métriques selon la Norme EN 60262 :

| | filettatura / thread / Gewinde / filet | | diam. max del cavo / max cable diam. Max. Kabeldurchmesser / diam. maxi du câble |
|-------------|--|--|---|
| K 63 | M20 x 1.5 | n° 1 foro per lato / 1 hole on each side Bohrung pro Seite / 1 orifice pour chaque côté | 13 mm |
| K 71 | M25 x 1.5 | n° 1 foro per lato / 1 hole on each side Bohrung pro Seite / 1 orifice pour chaque côté | 17 mm |



Sono disponibili, separatamente e come accessorio, confezioni di 10 pressacavi di tipo metrico.
Codici come da tabella seguente:

Metric cable glands are available separately and as accessories in 10-pcs. packages. Please see the codes in the table below:

Separat bzw. als Zubehör sind Packungen mit 10 metrischen Kabelführungen und solche.
Die Bestellnummern sind der folgenden Tabelle zu entnehmen:

Des jeux de 10 presse-câbles métriques sont disponibles séparément comme accessoires. Voir le tableau qui suit pour les références.

| Pressacavi tipo metrico / Metric cable glands metrische Kabelführung / presse-étoupe de type métrique | |
|--|--------------|
| K 63 | PM 20 |
| K 71 | PM 25 |

CARATTERISTICHE ELETTRICHE

Tensione

I motori ad una velocità sono previsti nell'esecuzione normale con alimentazione 230Δ/400Y V, 50Hz con tolleranza di tensione ± 10% (Eurotensione).

In targa sono indicati, oltre alla tensione 230/400 V, i campi di funzionamento consentiti e cioè: 220-240 Δ/380-415 Y, 50Hz. In targa vengono inoltre indicati i valori corrispondenti al funzionamento a 60Hz (es. 460Y, 60Hz) ed il relativo campo di tensione 440 - 480V Y, 60Hz (escluso motori autofrenanti). I motori a due velocità sono previsti per tensione nominale standard 400V; tolleranze applicabili secondo CEI EN 60034-1, IEC 60034-1.

Nella tabella sono indicati i collegamenti previsti in funzione della polarità.

ELECTRIC CHARACTERISTICS

Voltage

Single speed motors are supplied in the normal version for voltage values 230Δ/400Y V, 50 Hz ± 10% voltage tolerance (Eurovoltage).

The plate indicates rated voltage 230/400 V and the allowed operating ranges as well, e.g.: 220-240 Δ/380-415 Y, 50 Hz.

The name plate also reports the equivalent values for 60 Hz operation (i.e. 460 Y, 60 Hz) and the relevant voltage range, 440 - 480V Y, 60 Hz. (This does not apply to brake motors).

Double-speed motors are rated for 400V standard voltage. Applicable tolerances are as per standards CEI EN 60034-1, IEC 60034-1.

Table below reports the different connection types depending on motor polarity.

ELEKTRISCHE EIGENSCHAFTEN

Spannung

Die eintourigen Motoren sehen in der normalen Version eine Versorgung mit 230Δ/400Y V, 50 Hz mit einer Spannungstoleranz von 10% (Euro-Spannung) vor. Auf dem Datenschild werden über die Spannung von 230/400 V hinaus auch die zulässigen Betriebsbereiche angegeben, d.h.: 220-240 Δ/380-415 Y, 50 Hz. Darüber hinaus werden auf dem Schild die 60 Hz entsprechenden Betriebswerte (z.B. 460Y, 60 Hz) und das entsprechende Spannungsfeld 440 - 480V Y, 60 Hz (selbstbremsende Motoren ausgenommen) angegeben.

Die zweitourigen Motoren sind für eine standardmäßige Nennspannung von 400V ausgelegt; applizierbare Toleranzen gemäß CEI EN 60034-1, IEC 60034-1. In der Tabelle werden die in Abhängigkeit zur Polarität vorgesehenen Anschlüsse angegeben:

CARACTERISTIQUES ELECTRIQUES

Tension

Les moteurs à une seule vitesse sont prévus dans l'exécution standard pour une tension d'alimentation de 230Δ/400Y V, 50Hz avec une tolérance de tension de ± 10% (Eurotension).

La plaquette indique la tension de 230/400 V, les plages de fonctionnement admises, c'est-à-dire 220-240 Δ/380-415 Y, 50Hz. La plaquette indique également les valeurs correspondantes au fonctionnement à 60Hz (ex. 460Y, 60Hz) et la plage de tension correspondante de 440 - 480V Y, 60Hz (à l'exception des moteurs freins).

Les moteurs à deux vitesses sont prévus pour une tension nominale standard de 400V ; tolérances applicables selon CEI EN 60034-1, IEC 60034-1.

Le tableau indique les différentes connexions prévues pour les moteurs selon leur polarité.

| Motore / Motor / Motor / Moteur | Poli / Pole / Polig / Pôles | Collegamento avvolgimento / Wiring options Wicklungsanschluß / Connexion du bobinage |
|---------------------------------|-----------------------------|---|
| K 63 - K 71 | 2, 4, 6 | Δ / Y |
| | 2/4 | Δ / YY (Dahlander) |
| | 2/6, 2/8 | Y / Y (due avvolgimenti / Two windings / zwei Wicklungen / Deux bobinages) |

Per le tensioni 230/460V 60 Hz è previsto di serie il collegamento YY/Y con morsettiera a 9 morsetti per questa tensione, così come per 330/575V Δ/Y 60 Hz la potenza riportata in targa è quella normalizzata a 50 Hz.

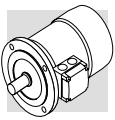
For operation on 230/460V 60 Hz, a standard YY/Y connection with 9-stud terminal box is provided.

For this as well as for 330/575V Δ/Y 60 Hz supply, the name plate states normalized 50 Hz power rating.

Bei Spannungswerten von 230/460V, 60Hz wird serienmäßig die Anschlussart YY/Y mit einem 9-Klemmenkasten vorgesehen.

Für diese Spannung sowie für 330/575V Δ/Y, 60 Hz handelt es sich bei der auf dem Datenschild angegebenen Spannung um die auf 50 Hz normalisierte.

Pour les tensions de 230/460V 60Hz on préconise en standard la connexion YY/Y avec bornier à 9 bornes. Pour cette tension et pour une tension de 330/575V Δ/Y 60 Hz la puissance indiquée sur la plaquette de signalisation est celle normalisée à 50 Hz.



Frequenza

I motori ad una velocità nell'esecuzione standard riportano in targa, oltre ai dati per funzionamento a 50 Hz, i valori per alimentazione da rete 440 - 480V 60Hz con potenza aumentata di circa il 20% (escluso motori autofrenanti).

La potenza di targa dei motori a 60Hz corrisponde a quanto riportato nella tabella seguente:

Frequency

The name plate of single-speed motors in the standard version reports, besides the operating voltages at 50 Hz, the voltage range for motors powered by 440 - 480V 60 Hz mains with power increased by about 20% (except for brake motors).

Power rating reported in the name plate of 60 Hz motors is as shown in the following table:

Frequenz

Bei den eintourigen Motoren in der Standardausführung werden auf dem Schild über die sich auf 50 Hz beziehenden Betriebsdaten hinaus, auch die Werte für die Netzversorgung 440-480V, 60 Hz mit einer um 20% erhöhten Leistung (selbstbremsende Motoren ausgenommen) angegeben. Die auf dem Schild angeführte Motorenleistung bei 60Hz entspricht den Angaben der nachstehenden Tabelle:

Fréquence

La plaquette des moteurs à une seule vitesse en exécution standard indique les tensions de fonctionnement à 50 Hz, ainsi que les valeurs pour alimentation au réseau, 440 -480V 60Hz avec puissance augmentée de 20% environ (à l'exclusion des moteurs à freinage automatique). La puissance marquée sur la plaquette des moteurs à 60Hz correspond à celle indiquée au tableau suivant :

| Motore / Motor Motoren / Moteur | 2 poli / pole polig / pôles P _n [kW] | 4 poli / pole polig / pôles P _n [kW] | 6 poli / pole polig / pôles P _n [kW] |
|------------------------------------|---|---|---|
| K 63A | 0.21 | 0.14 | 0.10 |
| K 63B | 0.30 | 0.21 | 0.14 |
| K 63C | 0.45 | 0.30 | - |
| K 71A | 0.45 | 0.30 | 0.21 |
| K 71B | 0.65 | 0.45 | 0.30 |
| K 71C | 0.90 | 0.65 | 0.45 |

Per i motori a due velocità con alimentazione 60 Hz l'incremento di potenza previsto sarà del 15%.

Specificare l'opzione **PN** se si desidera mantenere in targa la potenza richiesta a 60Hz corrispondente alla potenza normalizzata a 50 Hz.

I motori avvolti per 230/400V Δ/Y 50 Hz possono essere utilizzati in reti a 60 Hz secondo quanto riportato in tabella:

*For double-speed motors operating on 60 Hz, power increase will be 15%. If the required 60 Hz power corresponds to the normalized 50 Hz power, please specify option **PN** on order.*

Motors wound for 230/400 V Δ/Y 50 Hz can be used with 60 Hz power grids according the values shown in the table below:

Für die zweifourigen Motoren mit einer Versorgung von 60 Hz liegt die vorgesehene Leistungssteigerung 15% vor. Will man auf dem Schild die erforderliche Leistung auf 60 Hz, die einer normalisierten Leistung von 50 Hz entspricht, beibehalten, muß man im Auftrag die Option **PN** angeben.

Die für 230/400V Δ/Y, 50 Hz gewickelten Motoren können den Angaben in der folgenden Tabelle gemäß in Netzen von 60 Hz verwendet werden:

Pour les moteurs à deux vitesses avec alimentation 60 Hz, l'augmentation de puissance prévue sera de 15%.

*Indiquer l'option **PN** pour maintenir sur la plaquette la puissance requise à 60Hz, qui correspond à la puissance normalisée à 50 Hz.*

Les moteurs bobinés pour 230/400V Δ/Y 50 Hz peuvent être utilisés sur réseau à 60 Hz selon les indications du tableau ci-dessous.

| 50 Hz | 60 Hz | | | | |
|---------------|----------------|----------------|----------------|---------------------------------|-----|
| | V | P _n | M _n | M _a / M _n | n |
| 230 / 400 Δ/Y | 230 / 400 Δ/Y | 100 | 83 | 85 | 120 |
| 230 / 400 Δ/Y | 265 / 460 Δ/Y* | 120 | 100 | 100 | 120 |

* Escluso motori autofrenanti con freno FC.

* Not including brake motors with FC brake.

* Selbstbremsende Motoren mit FC-Bremse ausgenommen

* A l'exclusion des moteurs à freinage automatique avec frein FC.

MOTORI AUTOFRENANTI

Generalità

L'esecuzione autofrenante prevede l'impiego di freni a pressione di molle con bobina in c.c., tipo FC.

Il freno funziona secondo il principio negativo, ossia interviene in seguito all'azione delle molle quando manca l'alimentazione. Le caratteristiche elettriche e meccaniche dei motori autofrenanti (escluso dimensioni d'ingombro) corrispondono a quelle dei corrispondenti motori trifasi.

BRAKE MOTORS

General information

Brake motors use spring pressure brakes with DC coil, type FC. The brake is negative type brake, operated by spring action in the event of a power failure.

The electric and mechanical characteristics (excepting overall dimensions) are as for three-phase motors.

BREMSMOTOREN

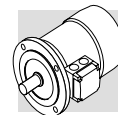
Allgemeine Informationen

Bei selbstbremsenden Motoren sind Federdruckbremsen mit Gleichstromspulen Typ FC vorgesehen. Die Bremse arbeitet dem Negativprinzip entsprechen bzw. greift nach Betätigung der Federn ein, wenn es zu einem Versorgungsausfall kommt. Die elektrischen und mechanischen Eigenschaften der selbstbremsenden Motoren (unter Ausnahme der Außenmaße) entsprechen denen der Drehstrommotoren.

MOTEURS FREIN

Généralités

L'exécution à freinage automatique prévoit l'utilisation de freins à pression de ressort alimentés en c.c., type FC. Le frein fonctionne selon le principe négatif, c'est-à-dire qu'il intervient à la suite de l'action des ressorts lorsque l'alimentation est coupée. Les caractéristiques électriques et mécaniques des moteurs à freinage automatique (sauf dimensions d'encombrement) correspondent à celles des moteurs tri-



Le caratteristiche principali sono:

Main characteristics:

Die Haupteigenschaften sind folgende:

phases correspondants.

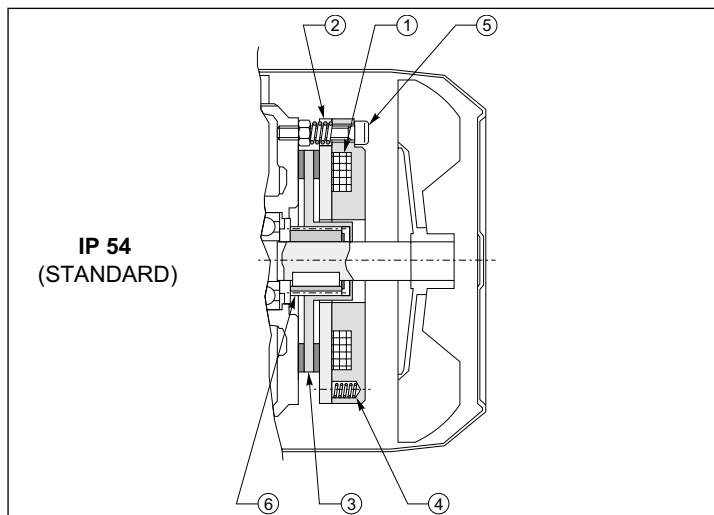
Les principales caractéristiques sont les suivantes :

- Coppie frenanti, non regolabili, e dimensionate sulla coppia nominale del motore
- Disco freno con doppia garanzia d'attrito (materiale a bassa usura, privo di amianto)
- Leva di sblocco meccanico con ritorno automatico per le operazioni manuali (a richiesta, opzione R)
- Elemento elastico di compensazione per assorbire le vibrazioni meccaniche durante la rotazione
- Trattamento anticorrosione di tutte la superfici del freno
- Isolamento elettrico in classe F
- Intervento graduale, per servizio non gravoso

- *Non-adjustable braking torques preset for motor rated torque.*
- *Brake disk with double friction lining (low wear, asbestos-free material).*
- *Mechanical hand release lever automatic fold-back mechanism for manual operations (on request, option R).*
- *Compensation spring to absorb mechanical vibration during rotation.*
- *Corrosion preventative treatment on all brake surfaces.*
- *Electric insulation to class F.*
- *Brake applies progressively and is suitable for light duty operation.*

- nicht regulierbare und für den Nenn Drehmoment des Motors ausgelegte Bremsmomente
- Bremsscheibe mit doppeltem Bremsbelag (Material mit geringem Verschleiß, asbestfrei)
- mechanischer Auslösehebel mit automatischem Rückzug für manuelle Arbeiten (auf Anfrage, Option R)
- elastisches Ausgleichselement für die Aufnahme der während der Drehung entstehenden mechanischen Schwingungen.
- Rostschutzbehandlung auf allen Oberflächen der Bremse.
- Elektrische Isolation in Klasse F
- Schrittweises Einschreiten für normalen Einsatz.

- *Couples de freinage non réglables, dimensionnés sur la couple nominal du moteur*
- *Disque de frein avec double garniture de friction (matériau à faible usure, sans amiante)*
- *Levier de déblocage mécanique avec retour automatique pour les opérations manuelles (sur demande, option R).*
- *Élément élastique de compensation pour absorber les vibrations mécaniques durant la rotation.*
- *Traitement anticorrosion de toutes les surfaces du frein.*
- *Isolation électrique en classe F*
- *Intervention graduelle, pour service non lourd*



FRENO

BRAKE

BREMSE

FREIN

Costruzione e funzionamento

Construction and operation

Konstruktions- und Funktionsweise

Fabrication et fonctionnement

Il freno è montato sulla sporgenza posteriore dell'albero motore, ed è protetto dalla calotta copriventola, come illustrato in figura.

The brake is installed at non-drive end and enclosed under the fan cowl as shown in diagram.

Die Bremse ist auf den hinteren Vorsprung der Kurbelwelle montiert und wird von der Lüfterradabdeckung gemäß Abbildung geschützt.

Le frein est monté sur la partie en saillie à l'arrière de l'arbre moteur, et il est protégé par le cache du ventilateur, comme illustré dans la figure.

Il freno è costituito da:

Brake consists of:

Die Bremse stellt sich wie folgt dar:

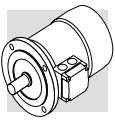
Le frein se compose de:

- ① elettromagnete che contiene la bobina toroidale
- ② ancora mobile
- ③ disco freno libero assialmente e collegato all'albero dal mozzo trascinatore
- ④ molle di spinta dell'ancora mobile
- ⑤ viti per la registrazione del tra ferro
- ⑥ mozzo trascinatore del disco freno

- ① *electro-magnet housing the toroidal coil*
- ② *mobile armature*
- ③ *axially independent brake disk connected to the shaft by the trailing hub*
- ④ *brake springs*
- ⑤ *screw for adjustment of the air gap*
- ⑥ *disc trailing hub*

- ① elettromagnet, der die Ringspule enthält
- ② beweglicher Anker
- ③ axial freie und über die Mitnehmernabe mit der Welle verbundene Bremsscheibe
- ④ Schubfedern des beweglichen Ankers
- ⑤ Schrauben für die Luftspalteinstellung
- ⑥ Verführemabe der Brems-scheibe

- ① *électro-aimant contenant la bobine torique*
- ② *armature mobile*
- ③ *disque de frein libre axialement, relié à l'arbre par le moyeu d'entraînement*
- ④ *ressorts de poussée de l'armature mobile*
- ⑤ *vis pour le réglage de l'entrefer*
- ⑥ *moyeu frein*



In caso di mancanza di tensione, l'ancora mobile, spinta dalle molle, blocca il disco freno tra la superficie dell'ancora stessa e lo scudo motore.

Quando la bobina viene eccitata, l'attrazione magnetica dell'ancora mobile vince la reazione elastica delle molle e sblocca il freno.

In the event of a power failure, the brake springs push the armature plate against the motor end shield, locking the brake disk between the two.

When the coil is energized, the mobile armature is magnetized and overcomes spring action so that the brake is released.

Solte es zu einem Spannungsausfall kommen, sorgt der von den Federn geschobene Anker die Bremsscheibe zwischen der Oberfläche des Ankers selbst und dem Motorschild.

Wird die Spule erregt, überwindet die magnetische Anzugskraft des beweglichen Ankers die elastische Reaktion der Federn und sorgt für das Lösen der Bremse.

En cas d'absence de tension, l'armature mobile, poussée par les ressorts, bloque le disque du frein entre la surface de l'armature et le couvercle moteur.

Lorsque la bobine est excitée, l'attraction magnétique de l'armature mobile compense l'action élastique des ressorts et débloque le frein.

Alimentazione freno

L'alimentazione della bobina freno in c.c. è prevista per mezzo di opportuno raddrizzatore.

Il raddrizzatore è alloggiato all'interno della scatola morsettiera ed è già collegato alla bobina del freno.

Per motori ad una velocità, il raddrizzatore è collegato alla morsettiera motore (tensione stellata o di fase).

Per i motori a doppia polarità, o quando specificatamente richiesto per i motori ad una velocità, l'alimentazione freno può essere separata e corrispondente al valore indicato in designazione. Per il cablaggio sono previsti due morsetti ausiliari sulla morsettiera principale.

La tensione standard in ingresso al raddrizzatore è 230V ± 10% 50/60 Hz.

Brake power supply

The DC brake coil is fed by a rectifier accommodated in the terminal box.

The rectifier is wired to the brake coil at the factory.

On single speed motors, the rectifier is connected to the motor terminal box (star or phase voltage).

On double speed motors or also on single speed when expressly required, the brake can be fed separately with voltage value specified on the order.

Two auxiliary terminals are provided in the main conduit box for the wiring.

Standard input voltage to rectifier is 230V ± 10% 50/60 Hz.

Versorgung der Bremse

Für die Versorgung der Bremsenspule im Gleichstrom ist ein angemessener Gleichrichter vorgesehen. Der Gleichrichter befindet sich im Klemmenkasten und ist bereits mit der Bremsenspule verbunden. Bei den eintourigen Motoren ist der Gleichrichter an den Klemmenkasten des Motors geschlossen (Stern- oder Phasenspannung). Bei Motoren mit doppelter Polarität oder falls spezifisch für die eintourigen Motoren angefordert, kann die Bremsversorgung separat bzw. dem in der Zuordnung angegebenen Wert entsprechend ausfallen. Für die Verkabelung sind am Hauptklemmenkasten zwei Hilfsklemmen vorgesehen.

Die Standardspannung am Gleichrichtereingang beträgt 230V 10 %, 50/60 Hz.

Alimentation frein

L'alimentation de la bobine de frein en c.c. est assurée par un redresseur spécialement conçu à cet effet. Il est logé dans la boîte à bornes et il est déjà connecté à la bobine de frein.

Pour les moteurs à une seule vitesse, le redresseur est relié au bornier du moteur (tension en étoile ou de phase).

Pour les moteurs à deux polarités, ou sur demande pour les moteurs à une vitesse, l'alimentation de frein peut être séparée et correspond à la valeur indiquée sur la plaquette de signalisation.

Il est possible de monter deux bornes auxiliaires sur le bornier principal pour le câblage. La tension standard à l'entrée du redresseur est de 230V ± 10% 50/60 Hz.

Dati tecnici freno FC

FC brakes technical specifications

Technische Daten - Bremse FC

Caractéristiques techniques freins FC

| Freno Brake Bremse Frein | Motore Motor Moteur | Coppia frenante Brake torque Bremsmoment Couple de freinage | Rilascio Release Schubetrieb Déblocage | Frenatura Braking Bremsung Freinage | | W _{max} [J] | | | W [MJ] | P _b [W] |
|-----------------------------------|---------------------------|--|---|--|------------------------|-------------------------|-------------------------|---|-----------|-----------------------|
| | | | | M _b [Nm] | t ₁ [ms] | t ₂ [ms] | t _{2c} [ms] | Cicli/ora / starts per hour Zyklen/Stunde / cycles/h | | |
| FC02 | K 63 | 3.5 | 30 | 90 | 10 | 3500 | 2000 | 200 | 30 | 18 |
| FC12 | K 71 | 7.5 | 50 | 80 | 8 | | | | | |

Legenda:

M_b = coppia frenante statica (±15%)
 t₁ = ritardo nel rilascio del freno
 t₂ = ritardo di frenatura con interruzione lati c.a. e alimentazione separata
 t_{2c} = ritardo di frenatura con interruzione lato c.a. e c.c.
 W = energia di frenatura tra due regolazioni successive
 W_{max} = energia max per singola frenata
 P_b = potenza assorbita dalla bobina a 20°C

Key:

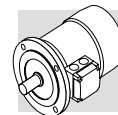
M_b = static braking torque (± 15%)
 t₁ = brake release delay
 t₂ = engagement delay with a.c. disconnect and separate brake supply
 t_{2c} = engagement delay with a.c. and d.c. disconnect. Separate supplied brake
 W = braking work between two successive air-gap adjustments
 W_{max} = max work for each braking
 P_b = coil absorbed power at 20°C ambient temp.

Zeichenerklärung:

M_b = statiche Bremsmoment (± 15%)
 t₁ = Verzögerung in der Bremslösung
 t₂ = Bremsverzögerung mit Unterbrechung der WS-Seiten und Fremdversorgung
 t_{2c} = Bremsverzögerung mit Unterbrechung der WS- und der GS-Seite
 W = Bremsenergie zwischen zwei aufeinander folgenden Einstellungen
 W_{max} = max. Energie für jede einzelne Bremsung
 P_b = von der Spule bei 20°C aufgenommene Leistung

Légende:

M_b = couple freinant statique (± 15%)
 t₁ = retard de déblocage du frein
 t₂ = retard de freinage avec interruption côté c.a. et alimentation séparée
 t_{2c} = etard de freinage avec interruption côté c.a. et c.c.
 W = énergie de freinage entre deux réglages successifs
 W_{max} = énergie maxi par freinage
 P_b = absorption de la bobine à 20°C



ESECUZIONI SPECIALI

SPECIAL EXECUTIONS

SONDERAUSFÜHRUNGEN

EXECUTIONS SPECIALES

Sonde termiche a termistori, E3

Semiconduttori che presentano una rapida variazione di resistenza in prossimità della temperatura nominale d'intervento. Questi sensori hanno ingombri ridotti, un tempo di risposta piuttosto breve, ed essendo privi di contatti, sono completamente esenti da usura.

A differenza delle sonde termiche bimetalliche non possono intervenire direttamente sulle correnti delle bobine di eccitazione e devono pertanto essere collegati ad una speciale unità di controllo (apparecchio di sgancio) da interfacciare alle connessioni esterne.

Con questa protezione vengono inseriti tre PTC, collegati in serie, nell'avvolgimento con terminali disponibili in morsettiera ausiliaria.

Thermistors, E3

These are semi-conductors having rapid resistance variation when they are close to the rated intervention temperature.

These elements have several advantages: compact dimensions, rapid response time and, being contact-free, absolutely no wear.

Unlike bimetallic thermostats, they cannot directly intervene on currents of energizing coils, and must therefore be connected to a special control unit (triggering apparatus) to be interfaced with the external connections.

Thus protected, three PTCs connected in series are installed in the winding, the terminals of which are located on the auxiliary terminal board.

Thermistor-Temperaturfühler E3

Sind Halbleiter, die eine schnelle Änderung des Widerstands in der Nähe der Nennansprechtemperatur vorweisen. Diese Fühler sind von geringem Ausmaß, eine rechts kurze Ansprechzeit und sind, da sie keinen Kontakten unterliegen, vollkommen frei von Verschleifen. Abweichend von den bimetalischen Temperaturfühler können sie nicht direkt auf die Stromflüsse der Erregungsspulen einwirken und müssen daher an eine spezielle Kontrolleinheit (Auslösegerät) geschlossen werden, das mit den externen Anschlüssen gekoppelt werden muß. Bei dieser Schutzeinrichtung werden in die Wicklung drei, in Serie verbundene PTC eingefügt, deren Enden an einer Zusatzklemmleiste verfügbar sind.

Sondes thermométriques, E3

Il s'agit de semi-conducteurs qui présentent une variation rapide de résistance à proximité de la température nominale d'intervention. Ces capteurs offrent l'avantage d'un encombrement réduit, un temps de réponse très bref et, du fait que le fonctionnement a lieu sans contact, il sont exempts d'usure. Contrairement aux sondes thermiques bimetaliques, ils ne peuvent pas intervenir directement sur les courants des bobines d'excitation et, par conséquent, doivent être reliés à une unité spéciale de contrôle (appareil de déconnexion) à interfacer aux connexions extérieures. Avec cette protection, trois PTC (reliées en série) sont insérées dans le bobinage avec extrémités disponibles dans le bornier auxiliaire.

Sonde termiche bimetalliche, D3

I protettori di questo tipo contengono all'interno di un involucro un disco bimetallico che, raggiunta la temperatura nominale d'intervento commuta i contatti dalla posizione di riposo.

Con la diminuzione della temperatura il disco e i contatti riprendono automaticamente la posizione di riposo.

Bimetallic thermostats, D3

These types of protective devices contain a bimetal disk inside a housing. When the rated intervention temperature is reached, the disk switches the contacts from their initial rest position.

As temperature falls, disk and contacts automatically return to rest position.

Bimetalliche Temperaturfühler D3

Die Schutzeinrichtungen beinhalten in einer Kapsel eine bimetalliche Scheibe, die bei einem Erreichen der Nennansprechtemperatur die Kontakte aus der Ruheposition schaltet.

Bei Sinken der Temperatur kehren die Scheibe und die Kontakte automatisch in die Ruheposition zurück.

Sondes thermiques bimetaliques, D3

A l'intérieur d'une enveloppe interne, les protecteurs de ce type contiennent un disque bimetalique qui, lorsque la température nominale d'intervention est atteinte, commute les contacts de la position de repos. Au fur et à mesure que la température diminue, le disque et les contacts reviennent automatiquement à la position de repos.

Servoventilazione U1

Il motore tipo K71 può essere equipaggiato con un sistema di ventilazione assiale indipendente.

Il raffreddamento è realizzato mediante un ventilatore installato all'interno della calotta copri-ventola e dotato di alimentazione indipendente come segue:

1 x 230 V – 50/60 hz

A richiesta può essere applicato un encoder o una dinamo tachimetrica.

Contattare per questo il Servizio Tecnico di Bonfiglioli Riduttori.

Servo-ventilation U1

Motor K71 can be supplied with independent axial ventilation. It is cooled by an independently powered fan mounted inside the fan cover. Power supply is as follows:

1 x 230 V – 50/60 Hz

An encoder or tacho-generator can be fitted on request.

When this is the case, please contact Bonfiglioli Riduttori Customer Service.

Servobelüftung U1

Der Motor vom Typ K71 kann mit einem unabhängigen axialen Belüftungssystem ausgestattet werden.

Die Kühlung wird über einen in der Lüfterradkappe installiertem Ventilator gegeben und wird wie folgt durch eine Fremdspeisung versorgt:

1 x 230V – 50/60 Hz

Auf Anfrage kann auch ein Encoder oder ein Tacho-Dynamo angebracht werden.

Diesbezüglich muß man sich mit dem Technischen Kundendienst der Bonfiglioli in Verbindung setzen.

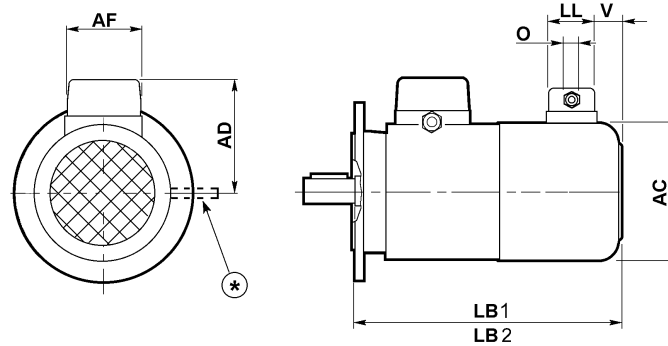
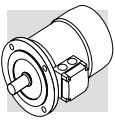
Servo-ventilation U1

Le moteur de type K71 peut être équipé d'un système de ventilation axiale indépendante. Le refroidissement est réalisé par un ventilateur installé à l'intérieur du cache du ventilateur, avec alimentation indépendante comme indiqué par la suite :

1 x 230 V – 50/60 Hz

Sur demande, il est possible d'appliquer un encodeur ou une dynamo tachymétrique.

Contactez le Service Technique de Bonfiglioli Riduttori.



| | LB1 | LB2 | AC | AD | AF | LL | V | O | V - Hz | In (50/60 Hz) [A] |
|-------------|-----|-----|-----|-----|----|----|----|------|--------------------|----------------------|
| K 71 | 310 | 251 | 138 | 112 | 70 | 70 | 36 | Pg11 | 1x230 V - 50/60 Hz | 0.14 |

Legenda:

La quota LB1 si riferisce al motore standard mentre LB2 si applica al motore autofrenante.

* N.B. Nel motore autofrenante con leva di sblocco, la leva verrà collocata lateralmente.

Key:

Overall length LB1 applies to standard motor, whilst LB2 to brake motor.

* On brake motor equipped with the manual disengagement the lever is side located.

Zeichenerklärung:

Der Wert LB1 betrifft den Standardmotor, während LB2 beim selbstbremsenden Motor angewendet wird.

* HINWEIS. Beim selbstbremsenden Motor mit Lüftungshebel, wird letzterer seitlich angebracht.

Légende:

La dimension LB1 se Réfère au moteur standard, LB2 se réfère au moteur à freinage automatique.

* N.B. Pour le moteur à freinage automatique avec levier de déblocage, le levier sera placé latéralement.

Tettuccio parapigioggia (RC)

Specificando l'opzione RC un tettuccio parapigioggia è applicato al motore quando questo è installato verticalmente con l'albero verso il basso. Il tettuccio serve ad impedire l'ingresso di corpi solidi e a proteggere il motore dallo stillicidio.

La tabella riporta l'ingombro del tettuccio stesso.

Drip cover (RC)

Through the option RC a drip cover is supplied to the motor when this is mounted vertically down.

The cover protects the motor from solid bodies and dripping water.

The table below shows overall dimensions for the drip cover.

Schutzdach (RC)

Bei der Option RC wird eine Schutzvorrichtung am Motor angebracht, wenn der Motor mit der Welle nach unten montiert wird und von Feststoffen und Tropfwasser geschützt werden muß.

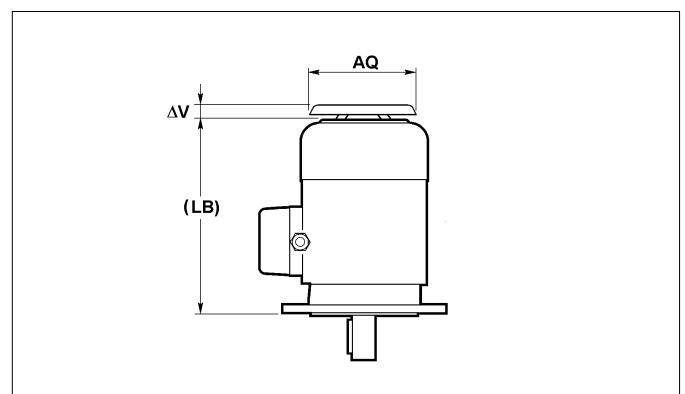
In der Tabelle werden die Maße des Schutzdachs angegeben.

Capot de protection anti-pluie (RC)

L'option RC permet d'appliquer une protection au moteur, lorsque ce dernier est monté à la verticale, avec l'arbre tourné vers le bas. Cette protection est utilisée pour protéger le moteur contre la pénétration de solides ou de la stillation.

Le tableau présente l'encombrement maximum du capot de protection anti-pluie.

| | AQ | ΔV | LB |
|-------------|-----|----|-----|
| K 63 | 118 | 24 | 190 |
| K 71 | 134 | 27 | 219 |



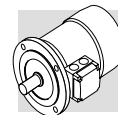


TABELLE DATI TECNICI MO- MOTOR RATING CHARTS
TORI

MOTORENAUSWAHLTABEL-
LEN

DONNÉES TECHNIQUES MO-
TEURS

2 Poli / Pole / Polig / Pôles - 3000 min⁻¹ - S1

| | Pn kW | n min ⁻¹ | Mn Nm | η % | cosφ | In A (400V) | Is In | Ms Mn | Ma Mn | Freno Brake Brems Frein | Mb Nm | Senza freno Without brake Ohne Bremse Sans frein | | Con freno With brake mit Bremse Avec frein | |
|--------|----------|------------------------|----------|--------|------|-------------------|----------|----------|----------|----------------------------------|----------|---|------------|---|------------|
| | | | | | | | | | | | | Jm (• 10 ⁻⁴) kgm ² | Kg IMB5 | Jm (• 10 ⁻⁴) kgm ² | Kg IMB5 |
| K 63A2 | 0.18 | 2700 | 0.64 | 53 | 0.78 | 0.63 | 3.0 | 2.1 | 2.0 | FC02 | 3.5 | 2.0 | 3.4 | 2.6 | 4.4 |
| K 63B2 | 0.25 | 2700 | 0.88 | 62 | 0.78 | 0.75 | 3.3 | 2.3 | 2.3 | FC02 | 3.5 | 2.3 | 3.8 | 2.9 | 4.8 |
| K 63C2 | 0.37 | 2750 | 1.29 | 64 | 0.79 | 1.06 | 3.9 | 2.6 | 2.6 | FC02 | 3.5 | 3.3 | 5.0 | 3.9 | 6.0 |
| K 71A2 | 0.37 | 2810 | 1.26 | 70 | 0.78 | 0.98 | 4.8 | 2.8 | 2.6 | FC12 | 7.5 | 3.5 | 5.4 | 4.1 | 6.4 |
| K 71B2 | 0.55 | 2810 | 1.87 | 73 | 0.77 | 1.41 | 5.0 | 2.9 | 2.8 | FC12 | 7.5 | 4.1 | 6.2 | 4.7 | 7.2 |
| K 71C2 | 0.75 | 2800 | 2.6 | 74 | 0.77 | 1.90 | 5.1 | 3.1 | 2.8 | FC12 | 7.5 | 5.0 | 7.3 | 5.7 | 8.3 |

4 Poli / Pole / Polig / Pôles - 1500 min⁻¹ - S1

| | | | | | | | | | | | | | | | |
|--------|------|------|------|----|------|------|-----|-----|-----|------|-----|-----|-----|-----|-----|
| K 63A4 | 0.12 | 1310 | 0.88 | 51 | 0.68 | 0.50 | 2.6 | 1.9 | 1.8 | FC02 | 3.5 | 2.0 | 3.3 | 2.6 | 4.3 |
| K 63B4 | 0.18 | 1320 | 1.30 | 53 | 0.68 | 0.72 | 2.6 | 2.2 | 2.0 | FC02 | 3.5 | 2.3 | 3.7 | 2.9 | 4.7 |
| K 63C4 | 0.25 | 1320 | 1.81 | 60 | 0.69 | 0.87 | 2.7 | 2.1 | 1.9 | FC02 | 3.5 | 3.3 | 4.9 | 3.9 | 5.9 |
| K 71A4 | 0.25 | 1375 | 1.74 | 62 | 0.77 | 0.76 | 3.3 | 1.9 | 1.7 | FC12 | 7.5 | 5.8 | 4.9 | 6.4 | 5.9 |
| K 71B4 | 0.37 | 1370 | 2.6 | 65 | 0.77 | 1.07 | 3.7 | 2.0 | 1.9 | FC12 | 7.5 | 6.9 | 5.7 | 7.5 | 6.7 |
| K 71C4 | 0.55 | 1380 | 3.8 | 69 | 0.74 | 1.55 | 4.1 | 2.3 | 2.3 | FC12 | 7.5 | 9.1 | 7.1 | 9.7 | 8.1 |

6 Poli / Pole / Polig / Pôles - 1000 min⁻¹ - S1

| | | | | | | | | | | | | | | | |
|--------|------|-----|------|----|------|------|-----|-----|-----|------|-----|------|-----|------|-----|
| K 63A6 | 0.09 | 880 | 0.98 | 41 | 0.53 | 0.60 | 2.1 | 2.1 | 1.8 | FC02 | 3.5 | 3.4 | 4.5 | 4.0 | 5.5 |
| K 63B6 | 0.12 | 870 | 1.32 | 45 | 0.60 | 0.64 | 2.1 | 1.9 | 1.7 | FC02 | 3.5 | 3.7 | 4.7 | 4.3 | 5.7 |
| K 71A6 | 0.18 | 900 | 1.91 | 56 | 0.69 | 0.67 | 2.6 | 1.9 | 1.7 | FC12 | 7.5 | 8.4 | 5.2 | 9.0 | 6.2 |
| K 71B6 | 0.25 | 900 | 2.7 | 62 | 0.71 | 0.82 | 2.6 | 1.9 | 1.7 | FC12 | 7.5 | 10.9 | 6.5 | 11.5 | 7.5 |
| K 71C6 | 0.37 | 910 | 3.9 | 66 | 0.69 | 1.17 | 3.0 | 2.4 | 2.0 | FC12 | 7.5 | 12.9 | 7.5 | 14.0 | 8.5 |

2/4 Poli / Pole / Polig / Pôles - 3000/1500 min⁻¹ - S1

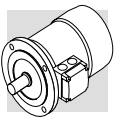
| | | | | | | | | | | | | | | | | |
|-------|---|------|------|------|----|------|------|-----|-----|-----|------|-----|-----|-----|-----|-----|
| K 63B | 2 | 0.20 | 2700 | 0.71 | 56 | 0.79 | 0.65 | 3.5 | 2.1 | 1.9 | FC02 | 3.5 | 2.7 | 4.2 | 3.3 | 5.2 |
| | 4 | 0.15 | 1350 | 1.06 | 49 | 0.64 | 0.69 | 2.6 | 1.8 | 1.9 | | | | | | |
| K 71A | 2 | 0.28 | 2700 | 0.99 | 56 | 0.82 | 0.88 | 2.9 | 1.9 | 1.7 | FC12 | 7.5 | 4.7 | 4.1 | 5.3 | 5.1 |
| | 4 | 0.20 | 1370 | 1.39 | 59 | 0.72 | 0.68 | 3.1 | 1.8 | 1.7 | | | | | | |
| K 71B | 2 | 0.37 | 2780 | 1.27 | 62 | 0.82 | 1.05 | 3.5 | 1.8 | 1.8 | FC12 | 7.5 | 5.8 | 4.9 | 6.4 | 5.9 |
| | 4 | 0.25 | 1400 | 1.71 | 60 | 0.73 | 0.82 | 3.3 | 2.0 | 1.9 | | | | | | |
| K 71C | 2 | 0.45 | 2780 | 1.55 | 63 | 0.85 | 1.21 | 3.8 | 1.8 | 1.8 | FC12 | 7.5 | 6.9 | 5.7 | 7.5 | 6.7 |
| | 4 | 0.30 | 1400 | 2.00 | 61 | 0.75 | 0.95 | 3.6 | 2.0 | 1.9 | | | | | | |

2/6 Poli / Pole / Polig / Pôles - 3000/1000 min⁻¹ - S3 60/40%

| | | | | | | | | | | | | | | | | |
|-------|---|------|------|------|----|------|------|-----|-----|-----|------|-----|-----|-----|-----|-----|
| K 71A | 2 | 0.25 | 2830 | 0.84 | 60 | 0.82 | 0.73 | 4.5 | 1.7 | 1.6 | FC12 | 7.5 | 6.9 | 5.7 | 7.5 | 6.7 |
| | 6 | 0.08 | 910 | 0.84 | 43 | 0.70 | 0.38 | 2.1 | 1.4 | 1.4 | | | | | | |
| K 71B | 2 | 0.37 | 2880 | 1.23 | 62 | 0.81 | 1.06 | 4.6 | 2.0 | 2.3 | FC12 | 7.5 | 9.1 | 7.1 | 9.7 | 8.1 |
| | 6 | 0.12 | 900 | 1.27 | 44 | 0.73 | 0.54 | 2.3 | 1.4 | 1.5 | | | | | | |

2/8 Poli / Pole / Polig / Pôles - 3000/750 min⁻¹ - S3 60/40%

| | | | | | | | | | | | | | | | | |
|-------|---|------|------|------|----|------|------|-----|-----|-----|------|-----|------|-----|------|-----|
| K 71A | 2 | 0.25 | 2790 | 0.86 | 60 | 0.86 | 0.70 | 3.3 | 1.8 | 2.0 | FC12 | 7.5 | 10.9 | 6.5 | 11.5 | 7.5 |
| | 8 | 0.06 | 680 | 0.84 | 28 | 0.64 | 0.48 | 2.0 | 1.9 | 1.9 | | | | | | |
| K 71B | 2 | 0.37 | 2800 | 1.26 | 62 | 0.85 | 1.01 | 4.0 | 1.8 | 1.9 | FC12 | 7.5 | 12.9 | 7.5 | 13.5 | 8.5 |
| | 8 | 0.09 | 670 | 1.28 | 32 | 0.73 | 0.56 | 1.8 | 1.4 | 1.5 | | | | | | |



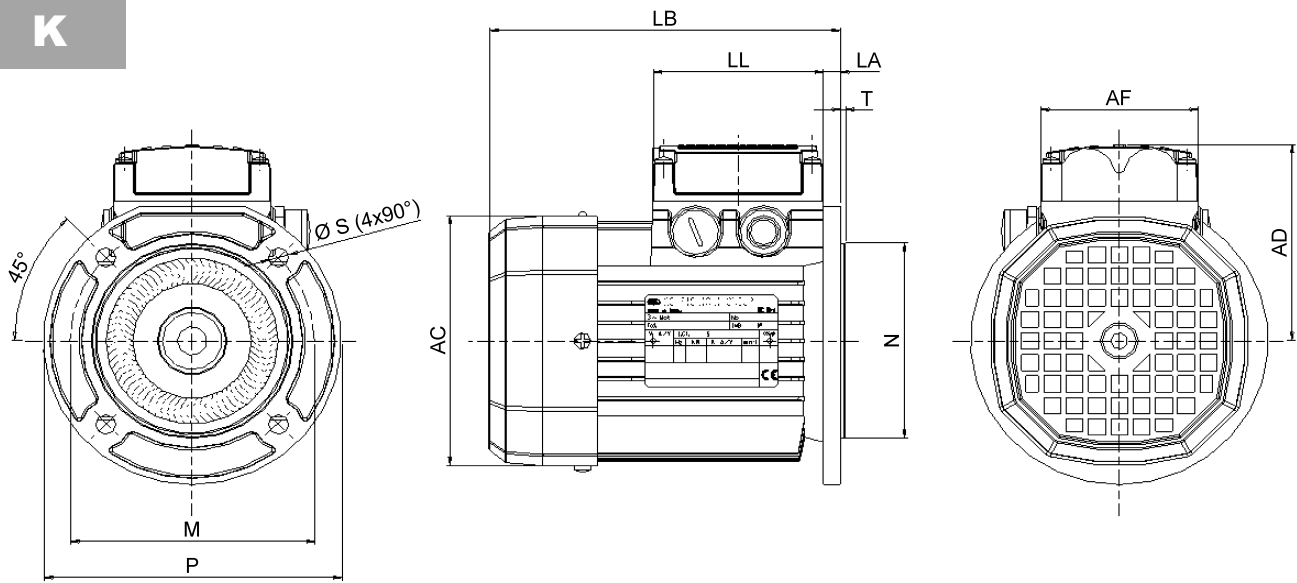
DIMENSIONI MOTORE

MOTORS DIMENSIONS

MOTORENABMESSUNGEN

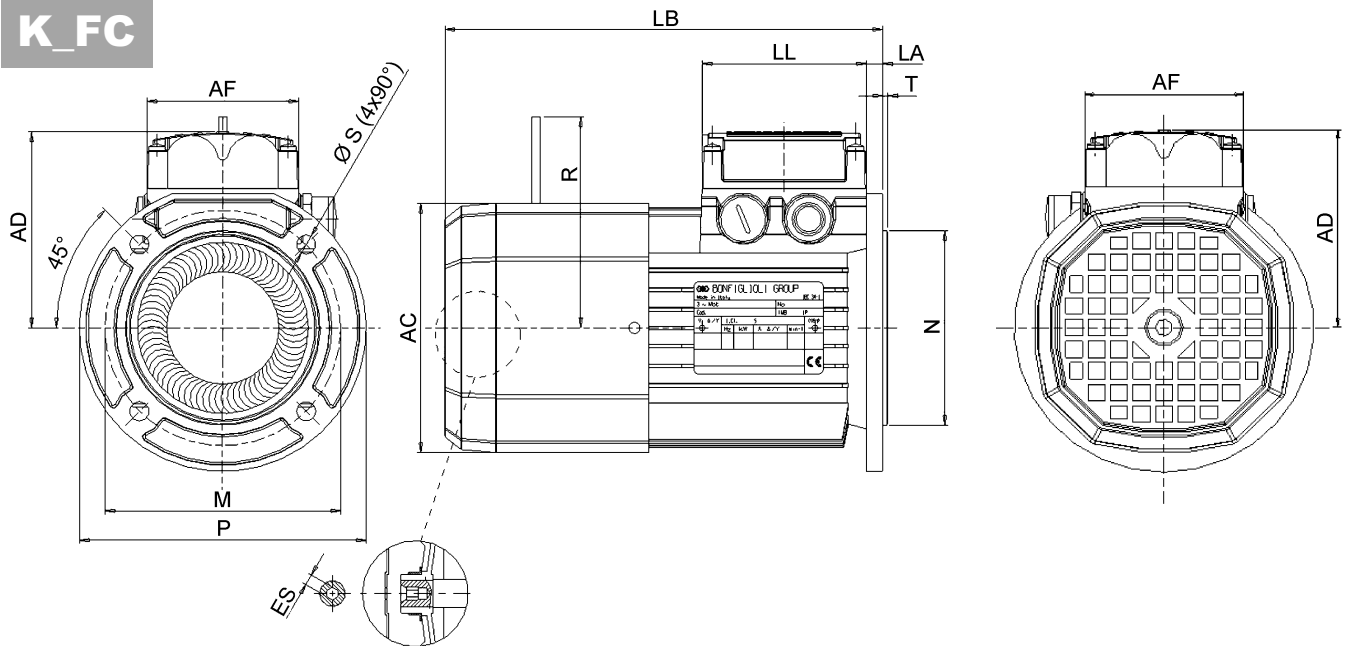
DIMENSIONS MOTEURS

K

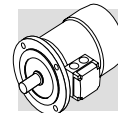


| | Flangia / Flange / Flansch / Bride | | | | | Motore / Motor / Motor / Moteur | | | | | |
|-------------|------------------------------------|-----|-----|-----|-----|---------------------------------|-----|-----|-----|----|----|
| | M | N | P | S | T | LA | AC | LB | AD | AF | LL |
| K 63 | 115 | 95 | 140 | 9.5 | 2.5 | 8 | 122 | 165 | 95 | 74 | 80 |
| K 71 | 130 | 110 | 160 | 9.5 | 3.5 | 7.5 | 139 | 186 | 108 | 74 | 80 |

K_FC



| | Flangia / Flange / Flansch / Bride | | | | | | Motore / Motor / Motor / Moteur | | | | | | |
|-------------|------------------------------------|-----|-----|-----|-----|-----|---------------------------------|-------|-----|----|----|-----|----|
| | M | N | P | S | T | LA | AC | LB | AD | AF | LL | R | ES |
| K 63 | 115 | 95 | 140 | 9.5 | 2.5 | 8 | 122 | 213.5 | 95 | 74 | 80 | 103 | 5 |
| K 71 | 130 | 110 | 160 | 9.5 | 3.5 | 7.5 | 139 | 219 | 108 | 74 | 80 | 103 | 5 |



BONFIGLIOLI RIDUTTORI S.p.A.

Via Giovanni XXIII, 7/a
40012 Lippo di Calderara di Reno
Bologna (Italy)

Tel. +39 051 6473111
Fax +39 051 6473126
bonfiglioli@bonfiglioli.com
www.bonfiglioli.com

Company Certified UNI EN ISO 9001:2000



Bologna, 20/06/2008

**DICHIARAZIONE DI CONFORMITÀ RoHS
DECLARATION OF CONFORMITY RoHS
KONFORMITÄTSEKTLÄRUNG RoHS
DECLARATION DE CONFORMITE RoHS**

Si dichiara che i prodotti elencati in questo catalogo sono costruiti secondo i requisiti della Direttiva 2002/95 CE con particolare riferimento alla limitazione delle seguenti sostanze pericolose:

We hereby declare that products listed in this catalogue are manufactured as per the requirements of Directive 2002/95 EC with reference to the restriction of the following hazardous substances:

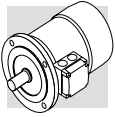
Hiermit erklären wir, dass die Produkte, die in diesem Katalog aufgeführt werden, in Übereinstimmung mit den Anforderung der Richtlinie 2002/95/EG gefertigt werden bezogen auf die Restriktion der folgenden gefährlichen Substanzen:


Nous certifions que les produits présentés dans ce catalogue sont fabriqués selon les conditions indiquées dans la Directive 2002/95 CE en référence à la limitation des substances dangereuses indiquées ci-dessous :

| | | | | |
|------------------------|---------------------------------|-------------------------|----------------------------|-----------|
| Piombo | <i>Lead</i> | Blei | <i>Plomb</i> | [Pb] |
| Mercurio | <i>Mercury</i> | Quecksilber | <i>Mercure</i> | [Hg] |
| Cadmio | <i>Cadmium</i> | Cadmium | <i>Cadmium</i> | [Cd] |
| Cromo esavalente | <i>Hexavalent Chromium</i> | sechswertiges Chrom | <i>Chrome hexavalent</i> | [Cr (VI)] |
| Bifenile polibromurati | <i>Polybrominated biphenyls</i> | polybromiertes Biphenyl | <i>Diphényle polybromé</i> | [PBB] |
| Eteri di difenili | <i>Polybrominated</i> | polybromierte | <i>Ether diphénylique</i> | |
| polibromurati | <i>Diphenyl Ethers</i> | Diphenylether | <i>polybromé</i> | [PBDE] |

Direzione Ricerca e Sviluppo

Gestione Sistema Qualità



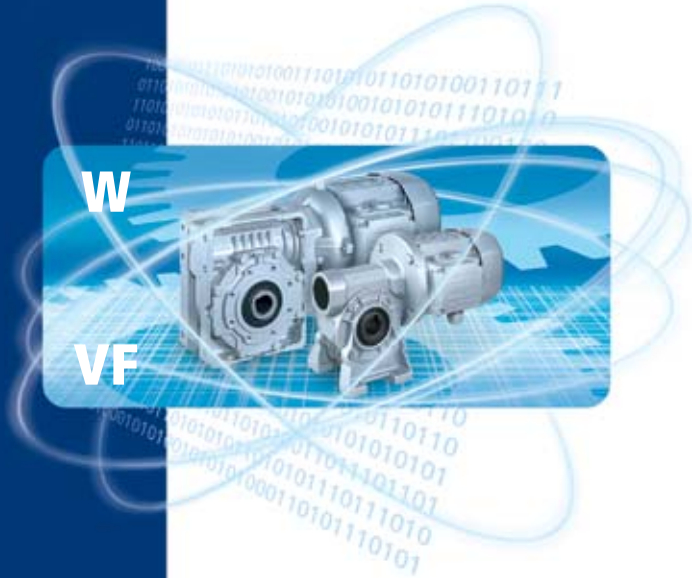
| R6 | | | | |
|---|--|---|---|--|
|  | Descrizione | Description | Beschreibung | Description |
| ... | Aggiornato quantità di lubrificante e pesi per il riduttore W110, in relazione alla nuova cassa realizzata in alluminio. | <i>Updated oil quantity and weight relevant to W110, now featuring an Aluminium gear case.</i> | Ölmenge und Gewicht auf W 110, in Verbindung mit neuem Gehäuse aus Aluminium, aktualisiert. | <i>Mise à jour de la quantité d'huile et du poids pour le réducteur W110 , suite à sa nouvelle version avec carter en aluminium.</i> |
| 26 ... 35 | Aggiornato posizioni tappi per i riduttori in posizione di montaggio B3. | <i>Refined the information on location of oil plugs for units laying in the B3 mounting position.</i> | Pfropfenposition für die Bauform B3 aktualisiert. | <i>Mise à jour des positions des bouchons pour les réducteurs en position de montage B3</i> |
| 107 | Corretto il valore i_{max} per le combinazioni di VF44 con W75 e W86 e di VF49 con W110. | <i>Corrected value of i_{max} for the combination of VF 44 with W75 and W86 and VF49 with W110.</i> | Genaue Untersetzung für die Kombieinheitsgetriebe VF 44 mit W 75 und W 86; VF 49 mit W 110. | <i>Correction de la valeur de i_{max} pour les combinaisons de VF44 avec W75 et W86 et de VF49 avec W110</i> |
| 108 | Rimossa la grandezza motore P80 fra le predisposizioni disponibili per WR 63. | <i>Removed P80 from the list of available motor adapters for WR 63.</i> | Weggeräumt die Motorbaugrosse P 80 vom WR 63. | <i>Suppression de la taille moteur P80 parmi les prédispositions disponibles pour le WR 63</i> |
| 144 ... 151 | Aggiornato disegni dimensionali W86 e W110 nelle versioni UF e UFC (n° fori flangia di fissaggio). | <i>Corrected assembly drawing of W86 and W110 with UF and UFC mounting flanges (holes of the mounting flange)</i> | Zeichnungen für W 86 und W 110, Ausführungen UF und UFC, aktualisiert. (Bohrungszahl auf dem Flansch) | <i>Mise à jour des plans pour le W86 et le W110 en version UF et UFC (nombre de trous de la bride de fixation).</i> |
| 264 265 271 | Aggiornato dimensioni scatola morsettiere BN 132 e M4 autofrenanti | <i>Adjourned dimensions of terminal box of BN 132 and M4 brake motors</i> | Abmessungen des Klemmkasten für BN 132 und M4 FD aktualisiert | <i>Ont été mises à jour les dimensions de la boîte à bornes pour le BN 132 et M4 avec frein.</i> |

Questa pubblicazione annulla e sostituisce ogni precedente edizione o revisione. Ci riserviamo il diritto di apportare modifiche senza preavviso. È vietata la produzione anche parziale senza autorizzazione.

This publication supersedes and replaces any previous edition and revision. We reserve the right to implement modifications without notice. This catalogue cannot be reproduced, even partially, without prior consent.

Diese Veröffentlichung annulliert und ersetzt jeder hergehende Edition oder Revision. BONFIGLIOLI behält sich das Recht vor, Änderungen ohne vorherige Informationen durchzuführen.

Cette publication annule et remplace toutes les autres précédentes. Nous nous réservons le droit d'apporter toutes modifications à nos produits. La reproduction et la publication partielle ou totale de ce catalogue est interdite sans notre autorisation.



www.bonfiglioli.com

 **BONFIGLIOLI**