



Bonfiglioli

Riduttori

C series

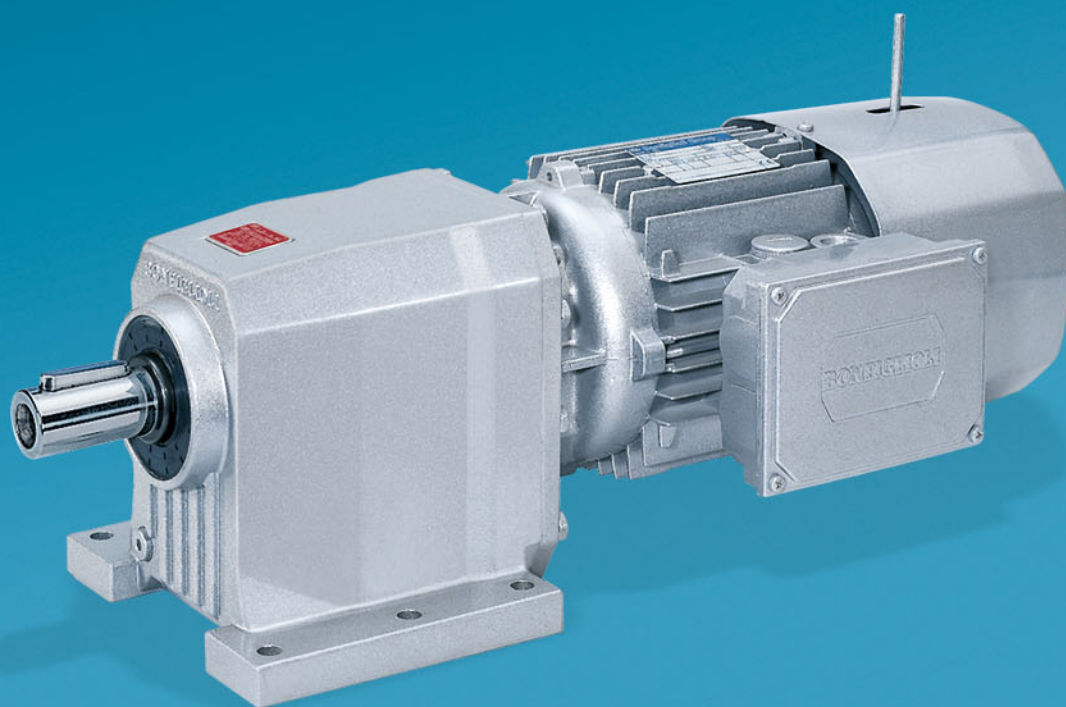
Riduttori coassiali

Helical gear units

Stirnradgetrieben

Réducteurs coaxiaux

IE2



Bonfiglioli

power, control and green solutions



INFORMAZIONI GENERALI
GENERAL INFORMATION
ALLGEMEINE INFORMATIONEN
INFORMATIONS GENERALES

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Revisioni
 L'indice di revisione del catalogo è riportato a pag. 224.
 Al sito www.bonfiglioli.com sono disponibili i cataloghi con le revisioni aggiornate.

Revisions
 Refer to page 224 for the catalog revision index.
 Visit www.bonfiglioli.com to search for catalogues with up-to-date revisions.

Änderungen
 Das Revisionsverzeichnis des Katalogs wird auf Seite 224 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 224.
 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 MEASURE

1 - SYMBOLE UND MAßEINHEITEN

1 - SYMBOLES ET UNITES DE MESURE

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

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).

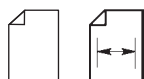


Simbolo riferito al peso dei riduttori e dei motoriduttori.
I valori riportati nelle tabelle dei motoriduttori sono comprensivi sia del peso del motore a 4 poli sia del peso del lubrificante contenuto, qualora previsto da BONFIGLIOLI RIDUTTORI.

*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.*

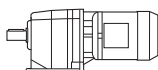


Il simbolo identifica la pagina alla quale può essere reperita l'informazione.

The symbol shows the page the information can be sorted from.

Das Symbol Kennzeichnet die Seite, auf die die Information gefunden werden kann.

Le symbole identifie la page à laquelle l'on peut trouver l'information.



Motoriduttore con motore integrato.

Gearmotor with compact motor.

Getriebemotor mit Kompaktmotor.

Motoréducteur avec moteur compact.



Motoriduttore abbinato con motore a standard IEC.

Gearmotor with IEC motor.

Getriebemotor mit IEC-Motor.

Motoréducteur avec moteur normalisé IEC.

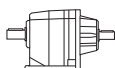


Riduttore predisposto per abbinamento con motore a standard IEC.

Gear unit with IEC motor interface.

Getriebe vorbereitet für IEC-motor.

Réducteur prédisposé pour liaison a moteur IEC.



Riduttore dotato di albero veloce cilindrico.

Speed reducer with solid input shaft.

Getriebe mit cylindrischer Antriebswelle.

Réducteur avec arbre rapide Cylindrique.



INFORMAZIONI GENERALI	GENERAL INFORMATION	ALLGEMEINEINFORMATIONEN	INFORMATIONS GENERALES
2 - 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 $f_s = 1$.	2 - TORQUE Rated torque M_{n2} [Nm] <i>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.</i>	2 - 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.	2 - COUPLE Couple nominal M_{n2} [Nm] <i>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 $f_s = 1$.</i>
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 scelto.	Required torque M_{r2} [Nm] <i>The torque demand based on application requirement. It must always be equal to or less than torque M_{n2} the gearbox under study is rated for.</i>	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.	Couple requis M_{r2} [Nm] <i>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.</i>
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:	Calculated torque M_{c2} [Nm] <i>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 equation here after:</i>	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:	Couple de calcul M_{c2} [Nm] <i>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 :</i>
$M_{c2} = M_{r2} \cdot f_s < M_{n2}$ (1)			
3 - POTENZA Potenza nominale in entrata P_{n1} [kW] Nelle tabelle di selezione dei riduttori è la potenza applicabile in entrata riferita alla velocità n_1, considerando un fattore di servizio $f_s = 1$.	3 - POWER Rated power P_{n1} [kW] <i>In the gearbox selection charts this is the power applicable to input shaft, based on input speed n_1 and corresponding to service factor $f_s = 1$.</i>	3 - LEISTUNG Leistung Antriebswelle P_{n1} [kW] In den Tabellen für die Wahl der Getriebe ist die an der Antriebswelle übertragbare Leistung auf die Drehzahl n_1 bezogen und es wurde ein Betriebsfaktor $f_s = 1$ angenommen.	3 - PUISSANCE Puissance en entrée P_{n1} [kW] <i>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 $f_s = 1$.</i>



4 - POTENZA TERMICA P_t [kW]

P_t è il valore che indica il limite termico del riduttore e rappresenta la potenza trasmissibile in servizio continuo, e alla temperatura ambiente $t_a = 20^\circ\text{C}$, senza che si producano danneggiamenti negli organi del riduttore o degradamenti del lubrificante. Vedi tab. (A1).

Nel caso di servizio intermittente, o di temperatura ambiente diversa da 20°C , il valore di P_t deve essere corretto per mezzo del fattore f_t , espresso dalla tabella (A2), ossia $P_t' = P_t \times f_t$

Infine, per riduttori con più di due riduzioni e/o con rapporto $i > 45$ la verifica della potenza termica non è necessaria in quanto quest'ultima è certamente superiore alla potenza meccanica trasmissibile.

4 - THERMAL CAPACITY P_t [kW]

P_t is the power that can be transmitted through the gear unit, under a continuous duty and an ambient temperature of 20°C , without resulting into damage of the inner parts or degradation of the lubricant properties. Refer to chart (A1) for specific kW ratings.

In case of intermittent duty, or an operating ambient temperature other than the rated 20°C , the P_t value should be adjusted through the factor f_t , obtained from chart (A2), as per the following equation: $P_t' = P_t \times f_t$

Gear units featuring more than 2 reductions and/or a gear ratio greater than $i = 45$ do not normally require the thermal limit to be checked as in these cases the thermal rating usually exceeds the mechanical rating.

4 - THERMISCHE GRENZ- LEISTUNG P_t [kW]

P_t steht für den Wert der Wärmegrenzleistung des Getriebes und gibt die im Dauerbetrieb und bei einer Umgebungstemperatur $t_a = 20^\circ\text{C}$ übertragbare Leistung an, ohne daß sich daraus Schäden an den Getriebeorganen oder ein Verfall des Schmiermittels ergeben. Siehe Tab. (A1). Bei einem Aussetzbetrieb oder bei verschiedener Umgebungstemperatur als 20°C muß der Wert P_t über den Faktor f_t korrigiert werden, der in der Tabelle (A2) aufgeführt wird bzw. $P_t' = P_t \times f_t$

Bei Getrieben mit mehr als zwei Untersetzungsstufen und/oder einem Verhältnis von $i > 45$ ist die Kontrolle der thermischen Leistung nicht erforderlich, da sie sicher oben der mechanisch übertragbaren Leistung liegt.

4 - PUISSANCE THERMIQUE P_t [kW]

P_t est la valeur qui indique la limite thermique du réducteur et représente la puissance transmissible en service continu, et à une température ambiante $t_a = 20^\circ\text{C}$, sans apparition de dommages au niveau des organes du réducteur ou de dégradations du lubrifiant. Voir tab. (A1).

En cas de service intermittent ou de température ambiante différente de 20°C , la valeur de P_t doit être corrigée au moyen du facteur f_t , exprimé dans le tableau (A2), à savoir: $P_t' = P_t \times f_t$

Enfin, pour les réducteurs ayant plus de deux réductions et/ou un rapport $i > 45$, la vérification de la puissance thermique n'est pas nécessaire car elle est certainement supérieure à la puissance mécanique transmissible.

(A1)

P_t [kW] 20°C		
	$n_1 = 1400 \text{ min}^{-1}$	$n_1 = 2800 \text{ min}^{-1}$
C 05 2	—	—
C 11 2	—	—
C 21 2	—	—
C 31 2	—	4.5
C 35 2	6.5	5.0
C 41 2	8.0	6.0
C 51 2	11.0	7.8
C 61 2	14.0	10.0
C 70 2	21	16.0
C 80 2	32	24
C 90 2	43	32
C 100 2	59	42

(A2)

f_t					
t_a [$^\circ\text{C}$]	Servizio continuo Continuous duty Dauerbetrieb Service continu	Servizio intermittente / Intermittent duty / Aussetzbetrieb / Service intermittent			
		Grado di intermittenza / Degree of intermittence / Relative Einschaltdauer / Degré d'intermittence			
		[%]			
		80%	60%	40%	20%
40	0.80	1.1	1.3	1.5	1.6
30	0.85	1.3	1.5	1.6	1.8
20	1.0	1.5	1.6	1.8	2.0
10	1.15	1.6	1.8	2.0	2.3



Il grado di intermittenza (I)% è dato dal rapporto fra il tempo di funzionamento a carico t_f e il tempo totale ($t_f + t_r$), espresso in percentuale.

Where cyclic duration factor (I)% is the relationship of operating time under load t_f to total time ($t_f + t_r$) expressed as a percentage.

Wobei die Einschaltdauer (I)% von dem Verhältnis zwischen Betriebszeit unter Last t_f und der Gesamtbetriebszeit ($t_f + t_r$), ausgedrückt in Prozenten, gegeben wird.

Où le degré d'intermittence (I)% est fourni par le rapport entre le temps de fonction en charge et le temps total ($t_f + t_r$) exprimé en pourcentage.

$$I = \frac{t_f}{t_f + t_r} \cdot 100 \quad (2)$$

La condizione da verificare è:

The condition to be verified is:

Die durchzuführende Kontrolle ist:

La vérification à faire sera la suivante :

$$P_{r1} \leq P_t \times f_t \quad (3)$$

5 - RENDIMENTO

Rendimento dinamico η_d

È dato dal rapporto fra la potenza in uscita P_2 e quella in entrata P_1 secondo la relazione:

5 - EFFICIENCY

Dynamic efficiency η_d

Obtained from the relationship of delivered power P_2 to input power P_1 , according to the following equation:

5 - WIRKUNGSGRAD

Dynamischer Wirkungsgrad η_d

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

5 - RENDEMENT

Rendement dynamique η_d

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

$$\eta_d = \frac{P_2}{P_1} \cdot 100 \quad [\%] \quad (4)$$

(A3)

	2 x 	3 x 	4 x 
η_d	95%	93%	90%

6 - 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:

6 - 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 :

6 - GETRIEBEÜBERSETZUNG i

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

6 - 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 :

$$i = \frac{n_1}{n_2} \quad (5)$$



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 > 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.

7 - VELOCITÀ ANGOLARE

Velocità in entrata
 n_1 [min⁻¹]

È la velocità relativa al tipo di motorizzazione scelta; i valori di catalogo si riferiscono alle velocità dei motori elettrici comunemente usati a singola e doppia polarità.

Se il riduttore riceve il moto da una trasmissione in entrata, è sempre preferibile adottare velocità inferiori a 1400 min⁻¹ al fine di garantire condizioni ottimali di funzionamento.

Velocità in entrata superiori sono ammesse considerando il naturale declassamento della coppia nominale M_{n2} del riduttore.

7 - ANGULAR VELOCITY

Input speed
 n_1 [min⁻¹]

The speed is related to the prime mover selected. Catalogue values refer to speed of either single or double speed motors that are common in the industry.

If the gearbox is driven by an external transmission it is recommended to operate it with a speed of 1400 min⁻¹, or lower, in order to optimise operating conditions and lifetime.

Higher input speeds are permitted, however in this case consider that torque rating M_{n2} is affected adversely.

Please consult a Bonfiglioli representative.

7 - DREHZAHL

Drehzahl Antriebswelle
 n_1 [min⁻¹]

Dies ist die vom gewählten Motortyp abhängige Drehzahl.

Die Katalogangaben beziehen sich auf die Drehzahl von allgemeinüblichen eintourigen Elektromotoren oder von polumschaltbaren Elektromotoren.

Um optimale Betriebsbedingungen zu gewährleisten, ist stets eine Antriebsdrehzahl unter 1400 min⁻¹ zu empfehlen.

Höhere Antriebsdrehzahlen sind zulässig, wobei die zwangsläufige Herabsetzung des Nenn-Abtriebsdrehmoments M_{n2} des Getriebes zu berücksichtigen ist.

7 - VITESSE ANGULAIRE

Vitesse d'entrée
 n_1 [min⁻¹]

C'est la vitesse relative au type de motorisation choisie. Les valeurs de catalogue se réfèrent aux vitesses des moteurs électriques à simple et double polarité communément utilisés.

Si le réducteur reçoit le mouvement d'une transmission en entrée, il est toujours préférable d'adopter des vitesses inférieures à 1400 min⁻¹ afin de garantir des conditions optimales de fonctionnement.

Des vitesses d'entrée supérieures sont admises en considérant le déclassement naturel du couple nominal M_{n2} du réducteur.

Velocità in uscita
 n_2 [min⁻¹]

È in funzione della velocità in entrata n_1 e del rapporto di riduzione i secondo la relazione:

Output speed
 n_2 [min⁻¹]

The output speed value n_2 is calculated from the relationship of input speed n_1 to the gear ratio i , as per the following equation:

Abtriebsdrehzahl
 n_2 [min⁻¹]

Sie ist abhängig von der Antriebsdrehzahl n_1 und dem Übersetzungs i nach folgender Gleichung:

Vitesse en sortie
 n_2 [min⁻¹]

Elle varie en fonction de la vitesse d'entrée n_1 et du rapport de réduction i selon l'équation :

$$n_2 = \frac{n_1}{i} \quad (6)$$

8 - MOMENTO D'INERZIA
 J_r [Kgm²]

I momenti d'inerzia indicati a catalogo sono riferiti all'asse di entrata del riduttore per cui, nel caso di accoppiamento diretto, sono già rapportati alla velocità del motore.

8 - MOMENT OF INERTIA
 J_r [Kgm²]

Moments of inertia specified in the catalogue refer to the gear unit input axis.

They are therefore related to motor speed, in the case of direct motor mounting.

8 - 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.

8 - 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.



9 - 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 (A4) più sotto riportato il fattore di servizio si ricava, dopo aver selezionato la colonna relativa alle ore di funzionamento giornaliero, 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 , legato 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.

9 - SERVICE FACTOR f_s

This factor is the numeric value describing reducer service duty. It takes into consideration, with unavoidable approximation, daily operating conditions, load variations and overloads connected with reducer application.

In the graph (A4) 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 of the value given for the service factor, we would like to remind that in some applications, 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 our Technical Service Department.

9 - 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 (A4) 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 Massen 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.

9 - 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.

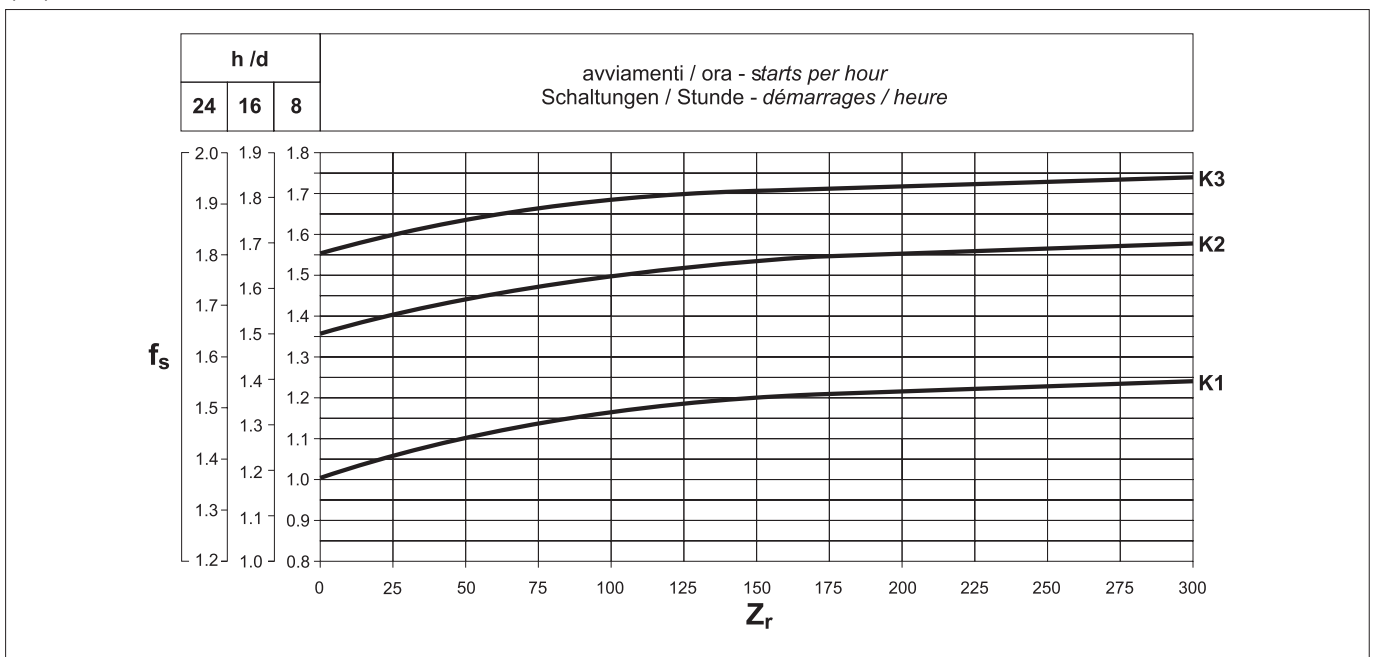
Sur le graphique (A4) ci-dessous, le facteur de service peut être trouvé, après avoir sélectionné la colonne relative aux heures de fonctionnement journalier, à l'intersection entre le nombre de démarrages horaires et l'une des courbes K1, K2 et K3.

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

(A4)





Fattore di accelerazione delle masse, K	Acceleration factor of masses, K	Beschleunigungsfaktor der Massen, K	Facteur d'accélération des masses, K
Il parametro serve a selezionare la curva relativa al particolare tipo di carico. Il valore è dato dal rapporto:	<i>This parameter serves for selecting the right curve for the type of load. The value is given by the following ratio:</i>	Dieser Parameter dient der Wahl der Kurve, die sich auf die jeweilige Belastungsart bezieht. Der Wert ergibt sich aus folgender Formel:	<i>Le paramètre sert à sélectionner la courbe relative au type de charge particulier. La valeur est obtenue par l'équation :</i>

$K = \frac{J_c}{J_m}$	→	$J_c =$ Momento d'inerzia delle masse comandate, riferito all'albero motore	<i>Moment of inertia of driven masses referred to motor drive shaft</i>	Trägheitsmoment der angetriebenen Massen, bezogen auf die Motorwelle	<i>Moment d'inertie des masses commandées se référant à l'arbre du moteur</i>
		$J_m =$ Momento d'inerzia del motore	<i>Motor moment of inertia</i>	Trägheitsmoment des Motors	<i>Moment d'inertie du moteur</i>
$K \leq 0,25$	→ K1	Carico uniforme	<i>Uniform load</i>	Gleichmäßige Belastung	<i>Charge uniform</i>
$0,25 < K \leq 3$	→ K2	Carico con urti moderati	<i>Moderate shock load</i>	Belastung mit mäßigen Stößen	<i>Charge avec chocs modérés</i>
$3 < K \leq 10$	→ K3	Carico con forti urti	<i>Heavy shock load</i>	Belastung mit starken Stößen	<i>Charge avec chocs importants</i>
$K > 10$	→	Consultare il Servizio Tecnico di Bonfiglioli	<i>Please consult Bonfiglioli Technical Service</i>	Bitten wir Sie, sich mit unseren Technischen Kundendienst in Verbindung zu setzen	<i>Contacter le Service Technique du Bonfiglioli</i>

10 - 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 detergenti. Evitare di miscelare olii a base minerale con olii sintetici. Controllare periodicamente il livello del lubrificante effettuando la sostituzione indicativamente agli intervalli riportati nella tabella (A5).

10 - MAINTENANCE

*Life lubricated gearboxes do not require any periodical oil changes.
For other types of gearboxes, the first oil change must take place after about 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 (A5).*

10 - 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 (A5) angegebenen Fristen durchführen.

10 - 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 (A5).*

(A5)

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



11 - SELEZIONE

Per selezionare correttamente un riduttore o un motoriduttore, è necessario disporre di alcuni dati fondamentali che sono sintetizzati nella tabella (A6). In particolare, essa potrà essere compilata ed inviata in copia al ns. Servizio Tecnico che provvederà alla ricerca della motorizzazione più idonea alla applicazione indicata.

(A6)

11 - SELECTION

Some fundamental data are necessary to assist the correct selection of a gearbox or gear-motor. The table below (A6) briefly sums up this information. To simplify selection, fill in the table and send a copy to our Technical Service which will select the most suitable drive unit for your application.

11 - ANTRIEBSAUSWAHL

Um die Getriebe und Getriebemotoren richtig auszuwählen zu können, muß man über einige grundlegende Daten verfügen, die wir in der Tabelle (A6) zusammengefaßt haben. Eine Kopie dieser vom Kunden ausgefüllten Tabelle kann an unseren Technischen Kundendienst geschickt werden, der dann die für die gewünschte Anwendung geeignete Auslegung wählt.

11 - SELECTION

Pour sélectionner correctement un réducteur ou un motoréducteur, il est nécessaire de disposer de certaines données fondamentales que nous avons résumé dans le tableau (A6). En particulier, ce dernier pourra être rempli et retourné à notre service technique qui recherchera la motorisation la plus appropriée à l'application indiquée.

Tipo di applicazione / Type of application / Anwendung / Type d'application			
P _{r2}	Potenza in uscita a n ₂ max Output power at n ₂ max Abtriebsleistung bei n ₂ max Puissance en sortie à n ₂ maxi	kW	Senso di rotazione albero entrata (O-AO) (**) Input shaft rotation direction (CW-CCW) (**) Drehrichtung der Antriebswelle (U-GU) (**) Sens de rotation arbre entrée (H-AH) (**)
P _{r2'}	Potenza in uscita a n ₂ min Output power at n ₂ min Abtriebsleistung bei n ₂ min Puissance en sortie à n ₂ mini	kW	A _{c2} Carico assiale su albero in uscita (+/-)(***) Thrust load on output shaft (+/-)(***) Axialkraft auf Abtriebswelle (+/-)(***) Charge axiale sur arbre de sortie (+/-)(***)
M _{r2}	Momento torcente in uscita a n ₂ max Output torque at n ₂ max Abtriebsdrehmoment bei n ₂ max Moment de torsion en sortie à n ₂ maxi	Nm	A _{c1} Carico assiale su albero in entrata (+/-)(***) Thrust load on input shaft (+/-)(***) Axialkraft auf Antriebswelle (+/-)(***) Charge axiale sur arbre d'entrée (+/-)(***)
n ₂	Velocità di rotazione in uscita max Max.output speed Abtriebsdrehzahl max Vitesse de rotation maxi en sortie	min ⁻¹	J _c Momento d'inerzia del carico Moment of inertia of the load Trägheitsmoment der Last Moment d'inertie de la charge
n _{2'}	Velocità di rotazione in uscita min Min.output speed Abtriebsdrehzahl min Vitesse de rotation mini en sortie	min ⁻¹	t _a Temperatura ambiente Ambient temperature Umgebungstemperatur Température ambiante
n ₁	Velocità di rotazione in entrata max Max.input speed Antriebsdrehzahl max Vitesse de rotation maxi en entrée	min ⁻¹	Altitudine sul livello del mare Altitude above sea level Höhe ü.d.M. Altitude au-dessus du niveau de la mer
n _{1'}	Velocità di rotazione in entrata min Min.input speed Antriebsdrehzahl min Vitesse de rotation mini en entrée	min ⁻¹	Tipo di servizio in accordo a CEI Duty type to IEC norms Relative Einschaltdauer gemäß CEI Type de service selon CEI
R _{c2}	Carico radiale su albero in uscita Radial load on output shaft Radialkraft auf Abtriebswelle Charge radiale sur arbre de sortie	N	Z Frequenza di avviamento Starting frequency Schaltungshäufigkeit Fréquence de démarrage
x ₂	Distanza di applicazione del carico (*) Load application distance (*) Abstand des Kraftangriffspunktes (*) Distance d'application de la charge (*)	mm	Tensione di alimentazione motore Motor voltage Nennspannung des Motors Tension de alimentation moteur
	Orientamento del carico in uscita Load orientation at output Orientierung der Last am Abtrieb Orientation de la charge en sortie		Tensione di alimentazione freno Brake voltage Nennspannung der Bremse Tension de alimentation frein
	Senso di rotazione albero uscita (O-AO) (**) Output shaft rotation direction (CW-CCW) (**) Drehrichtung der Abtriebswelle (U-GU) (**) Sens de rotation arbre sortie (H-AH) (**)		Frequenza Frequency Frequenz Fréquence
R _{c1}	Carico radiale su albero in entrata Radial load on input shaft Radialkraft auf Antriebswelle Charge radiale sur arbre d'entrée	N	M _b Coppia frenante Brake torque Bremsmoment Couple de freinage
x ₁	Distanza di applicazione del carico (*) Load application distance (*) Abstand des Kraftangriffspunktes (*) Distance d'application de la charge (*)	mm	Grado di protezione motore Motor protection degree Schutzart des Motors Degré de protection moteur
	Orientamento del carico in entrata Load orientation at input Orientierung der Last am Antrieb Orientation de la charge en entrée		Classe di isolamento Insulation class Isolierstoffklasse Classe d'isolation

(*) La distanza x₁₋₂ è quella compresa fra il punto di applicazione della forza e la battuta dell'albero (se non indicata, si considererà la forza agente sulla mezzzeria della sporgenza dell'albero).

(**) O = orario
AO = antiorario

(***) + = compression
- = trazione

(*) Distance x₁₋₂ is between force application point and shaft shoulder (if not indicated the force acting at mid-point of the shaft extension will be considered).

(**) CW = clockwise;
CCW = counterclockwise

(***) + = push
- = pull

(*) Der Abstand x₁₋₂ ist der Abstand vom Kraftangriffspunkt zum Wellenansatz (wenn nicht anders angegeben, wird davon ausgegangen, daß die Kraft auf der Mitte des Wellenendes angreift).

(**) U = Uhrzeigersinn;
GU = Gegenurzeigersinn

(***) + = Druck
- = Zug

(*) La distance x₁₋₂ est celle comprise entre le point d'application de la force et l'épaulement de l'arbre (si non précisée l'on considèrera la force agissant au milieu de la saillie de l'arbre).

(**) H = sens horaire;
AH = sens antihoraire

(***) + = compression
- = traction



Scelta dei motoriduttori	Selection of a gearmotor	Wahl des Getriebemotors	Sélection des motoréducteurs
a) Determinare il fattore di servizio f_s in funzione del tipo di carico (fattore K), del numero di inserzioni/ora Z_r e del numero di ore di funzionamento. b) Dalla coppia M_{r2}, conoscendo n_2 e il rendimento dinamico η_d, ricavare la potenza in entrata.	a) <i>Determine service factor f_s according to type of duty (factor K), number of starts per hour Z_r and hours of operation.</i> b) <i>From values of torque M_{r2}, speed n_2 and efficiency η_d the required input power can be calculated from the equation:</i>	a) Den Betriebsfaktor f_s in Abhängigkeit von der Belastungsart (Faktor K), den Schaltungen /Stunde Z_r und den Betriebs stunden bestimmen. b) Aus dem Drehmoment M_{r2} mit ilfe der bekannten Werte für n_2 und dem dynamischen Wirkungsgrad η_d die Antriebsleistung ableiten.	a) <i>Déterminer le facteur de service f_s en fonction du type de charge (facteur K), du nombre d'insertions/heure Z_r et du nombre d'heures de fonctionnement.</i> b) <i>A partir du couple M_{r2}, en connaissant n_2 et le rendement dynamique η_d, calculer la puissance en entrée.</i>
$P_{r1} = \frac{M_{r2} \cdot n_2}{9550 \cdot \eta_d} \text{ [kW]}$ (7)			
Il valore di η_d per lo specifico riduttore può essere ricavato dal paragrafo 5.	<i>Value of η_d for the captioned gear unit can be sorted out from paragraph 5.</i>	Für das spezifische Getriebe kann der Wert η_d unter Paragraph 5 erhoben werden.	<i>Il valeur de η_d pour le réducteur spécifique peut être calculée d'après les indications du paragraphe 5.</i>
c) Ricerare fra le tabelle dei dati tecnici motoriduttori quella corrispondente ad una potenza normalizzata P_n tale che:	c) <i>Consult the gearmotor selection charts and locate the table corresponding to normalised power P_n.</i>	c) Unter den Tabellen mit den Technischen Daten der Getriebemotoren die Tabelle auswählen, die folgender Leistung entspricht:	c) <i>Rechercher parmi les tableaux des caractéristiques techniques des motoréducteurs celui correspondant à une puissance :</i>
$P_n \geq P_{r1}$ (8)			
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:	<i>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.</i> <i>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.</i> <i>Accordingly the following condition must be satisfied:</i>	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:	<i>Sauf indication contraire la puissance P_n des moteurs indiquée dans le catalogue se réfère à un service continu S1.</i> <i>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.</i> <i>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 :</i>
$P_n \geq \frac{P_{r1}}{f_m}$ (9)			
Il fattore di maggiorazione f_m è ricavabile dalla tabella (A7).	<i>The adjusting factor f_m can be obtained from table (A7).</i>	Der Überdimensionierungsfaktor f_m kann der Tabelle (A7) entnommen werden.	<i>Le facteur de majoration f_m peut être obtenu en consultant le tableau (A7).</i>

**Rapporto di intermittenza****Intermittence ratio****Relative Einschaltdauer****Rapport d'intermittence**

$$I = \frac{t_f}{t_f + t_r} \cdot 100 \quad (10)$$

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

(A7)

	SERVIZIO / DUTY / BETRIEB / SERVICE						S4 - S8 Interpellarci Please contact us Rückfrage Nous contacter
	S2			S3*			
	Durata del ciclo / Cycle duration [min] Zyklusdauer / Durée du cycle [min]			Rapporto di intermittenza / Cyclic duration factor (I) Relative Einschaltdauer / Rapport d'intermittence (I)			
	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 Technisch en 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 .

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 :

$$S = \frac{M_{n2}}{M_2} = \frac{P_{n1}}{P_1} \quad (11)$$

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 celles-ci, sélectionner suite aux données nominales fournies par les réducteurs.

Scelta dei riduttori e dei riduttori predisposti per motori IEC**Selection of speed reducer and gearbox with IEC motor adapter****Wahl des Getriebes und Getriebe für IEC-motoren****Sélection des réducteurs et des réducteurs IEC**

- Determinare il fattore di servizio f_s .
- Conoscendo la coppia M_{r2} di uscita richiesta dalla applicazione, si procede alla definizione della coppia di calcolo:

- Determine service factor f_s .
- Assuming the required output torque for the application M_{r2} is known, the calculation torque can be then defined as:

- Den Betriebsfaktor f_s bestimmen.
- Anhand des bekannten von der Anwendung geforderten Abtriebsdrehmoments M_{r2} das Soll-Drehmoment bestimmen:

- Déterminer le facteur de service f_s .
- En connaissant le couple M_{r2} de sortie requis par l'application, l'on procède à la définition du couple de calcul :

$$M_{c2} = M_{r2} \cdot f_s \quad (12)$$



- c) In base alla velocità in uscita n_2 richiesta, e a quella in entrata n_1 disponibile, si calcola il rapporto di riduzione:
- c) *The gear ratio is calculated according to requested output speed n_2 and drive speed n_1 :*
- c) Auf Grundlage der verlangten Abtriebsdrehzahl n_2 und der verfügbaren Antriebsdrehzahl n_1 die Übersetzungs berechnen:
- c) *Suivant la vitesse en sortie n_2 requise et celle en entrée n_1 disponible, l'on calcule le rapport de réduction :*

$$i = \frac{n_1}{n_2} \quad (13)$$

Disponendo dei dati M_{c2} e i , si ricercherà nelle tabelle corrispondenti alla velocità n_1 il riduttore che, in funzione del rapporto $[i]$ più prossimo a quello calcolato, proponga una coppia nominale:

Once values for M_{c2} and i are known consult the rating charts under the appropriate input speed n_1 and locate the gear unit that features the gear ratio closest to $[i]$ and at same time offers a rated torque value M_{n2} so that:

Anhand der Werte für M_{c2} und i in den Tabellen für die Drehzahl n_1 das Getriebe auswählen, das in Abhängigkeit von einer Übersetzung $[i]$, die dem Sollwert möglichst nahe ist, folgendes Nenn-Drehmoment erlaubt:

En disposant des données M_{c2} et i , l'on recherchera dans les tableaux correspondant à la vitesse n_1 le réducteur qui, en fonction du rapport $[i]$ le plus proche de celui calculé, propose un couple nominal :

$$M_{n2} \geq M_{c2} \quad (14)$$

Se al riduttore scelto dovrà essere applicato un motore elettrico verificarne l'applicabilità consultando la tabella delle predisposizioni possibili al paragrafo 26.

If a IEC normalized motor must be fitted check geometrical compatibility with the gear unit at paragraph 26 - Motor availability.

Wenn das Getriebe mit einem Elektromotor verbunden werden soll, die Verträglichkeit anhand der Tabelle der möglichen Anbaumöglichkeiten sicherstellen.

Au cas où il serait nécessaire d'appliquer un moteur électrique normalisé au réducteur choisi, en vérifier la possible adaptation en consultant le tableau des prédispositions possibles présenté.

12 - VERIFICHE

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

Se si è selezionato un riduttore fra i tipi C112, C212 e C312 con rapporto $i > 40$, azionato con un numero di avviamenti orari $Z > 30$, correggere il fattore di servizio ricavato dal grafico (A4) moltiplicandolo per 1,2. Verificare infine nuovamente che per il nuovo valore di f_s la condizione $S \geq f_s$ sia ancora verificata.

a) Potenza termica

Assicurarsi che la potenza termica del riduttore, abbia un valore uguale o maggiore alla potenza richiesta dall'applicazione secondo la relazione (3) a pag. 6, in caso contrario selezionare un riduttore di grandezza superiore oppure provvedere ad applicare un sistema di raffreddamento forzato.

12 - VERIFICATION

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

For gear units type C112, C212 and C312, with ratio $i > 40$, operated with $Z > 30$ switches per hour, adjust the service factor calculated through diagram (A4) and multiply the value by 1.2. Thenafter check that for the revised service factor the condition $S \geq f_s$ still applies.

a) Thermal capacity

Make sure that the thermal capacity of the gearbox is equal to or greater than the power required by the application according to equation (3) on page 6. If this condition is not verified, select a larger gearbox or apply a forced cooling system.

12 - PRÜFUNGEN

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

Für Getriebeeinheiten Type C112, C212 und C312 mit Übersetzung $i > 40$, bei einer drehzahl von Anlaufvorgängen $Z > 30$, korrigiere den Servicefaktor, errechnet aus Diagramm (A4), und multipliziere den Wert mit 1,2. Danach überprüfen für den neu erhaltenen Servicefaktor, ob die Bedingung $S \geq f_s$ noch zutrifft.

a) Thermische Grenzleistung

Sicherstellen, daß die Wärmeleistung des Getriebes größer oder gleich der verlangten Leistung ist, die von der Anwendung nach Gleichung (3) auf S. 6 verlangt wird. Andernfalls ein größer dimensioniertes Getriebe wählen bzw. ein Zwangskühlsystem vorsehen.

12 - VERIFICATIONS

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

Si un réducteur parmi les types C112, C212 et C312 a été sélectionné avec rapport $i > 40$, actionné avec un nombre de démarrages horaires $Z > 30$, corriger le facteur de service tiré du graphique (A4) en le multipliant pour 1,2. Vérifier finalement que pour la nouvelle valeur f_s , la condition $S \geq f_s$ soit encore vérifiée.

a) Puissance thermique

S'assurer que la puissance thermique du réducteur ait une valeur supérieure ou égale à la puissance requise par l'application selon l'équation (3) page 6. Dans le cas contraire, sélectionner un réducteur de taille supérieure ou bien prévoir un système de refroidissement forcé.



b) Coppia massima

Generalmente la coppia massima (intesa come punta di carico istantaneo) applicabile al riduttore non deve superare il 200% 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):

$$M_{g2} = 0.5 \cdot M_{g3}$$

M_{g2} = Coppia di commutazione alimentando 2 fasi

M_{g3} = Coppia di commutazione alimentando 3 fasi

Suggeriamo comunque di contattare il ns. Servizio Tecnico.

c) 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 mezzzeria della sporgenza dell'albero in esame per cui, in fase di verifica, è indispensabile tenere conto di questa condizione provvedendo, se necessario, a determinare con le apposite formule il carico ammissibile alla distanza x_{1-2} desiderata. A tale proposito si rimanda ai paragrafi relativi ai carichi radiali.

b) Maximum torque

The maximum torque (intended as instantaneous peak load) applicable to the gearbox must not, in general, exceed 200% of rated torque M_{n2} . Therefore, check that this limit is not exceeded, using suitable torque limiting devices, if necessary.

For three-phase double speed motors, it is important 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):

$$M_{g2} = 0.5 \cdot M_{g3}$$

M_{g2} = Switching torque with two-phase power-up

M_{g3} = Switching torque with three-phase power-up

We recommend, in any event, to contact our Technical Service.

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

See paragraph 22.

b) Max. Drehmoment

Im allgemeinen darf das max. Drehmoment (verstanden als momentane Lastspitze), das auf das Getriebe eingebracht werden kann, 200% des Nenn Drehmoments 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 Umschalt Drehmoment, 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):

$$M_{g2} = 0.5 \cdot M_{g3}$$

M_{g2} = Umschalt Drehmoment bei Speisung von 2 Phasen;

M_{g3} = Umschalt Drehmoment bei Speisung von 3 Phasen

Wir empfehlen jedoch in jedem Fall, unseren Technischen Kundendienst zu Rate zu ziehen.

c) 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 muß bei der Prüfung unbedingt berücksichtigt werden und nötigenfalls muß mit Hilfe der geeigneten Formeln die zulässige Kraft beim gewünschten Abstand x_{1-2} bestimmt werden. Siehe hierzu die Erläuterungen zu den Radialkräften in diesem Katalog.

b) Couple maximum

Généralement, le couple maximum (à considérer comme une pointe de charge instantanée) applicable au réducteur ne doit pas dépasser les 200% 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) :

$$M_{g2} = 0.5 \cdot M_{g3}$$

M_{g2} = Couple de commutation en alimentant deux phases

M_{g3} = Couple de commutation en alimentant trois phases

Nous suggérons cependant de contacter notre Service Technique.

c) 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 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_{1-2} désirée. Se rapporter à ce propos aux paragraphes relatifs aux charges radiales.



- | | | | |
|---|---|---|--|
| <p>d) Carichi assiali</p> <p>Anche gli eventuali carichi assiali dovranno essere confrontati con i valori ammissibili.</p> <p>Se si è in presenza di carichi assiali molto elevati o combinati con carichi radiali, si consiglia di interpellare il ns. Servizio Tecnico.</p> | <p>d) <i>Thrust loads</i></p> <p><i>Actual thrust load must be found within 20% of the equivalent overhung load capacity.</i></p> <p><i>Should an extremely high, or a combination of radial and axial load apply, consult Bonfiglioli Technical Service.</i></p> | <p>d) Axialkräfte</p> <p>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.</p> | <p>d) <i>Charges axiales</i></p> <p><i>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.</i></p> |
| <p>e) Avviamenti orari</p> <p>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.</p> | <p>e) <i>Starts per hour</i></p> <p><i>For duties featuring a high number of switches the actual starting capability in loaded condition [Z] must be calculated.</i></p> <p><i>Actual number of starts per hour must be lower than value so calculated.</i></p> | <p>e) Schaltungen/Stunde</p> <p>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 Schaltungen für eine bestimmte Anwendung definiert.</p> | <p>e) <i>Démarrages/heure</i></p> <p><i>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.</i></p> |

13 - INSTALLAZIONE

È molto importante, per l'installazione del riduttore, attenersi alle seguenti norme:

- a) Assicurarsi che il fissaggio del riduttore, sia stabile onde evitare qualsiasi vibrazione. Installare (se si prevedono urti, sovraccarichi prolungati o possibili bloccaggi) giunti idraulici, frizioni, limitatori di coppia, ecc.
- b) Durante la verniciatura si dovranno proteggere i piani lavorati e il bordo esterno degli anelli di tenuta per evitare che la vernice ne essichi la gomma, pregiudicando la tenuta del paraolio stesso.
- c) Gli organi che vanno callettati 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.

13 - INSTALLATION

The following installation instructions must be observed:

- a) *Make sure that the gearbox is correctly secured to avoid vibrations.*
- If shocks or overloads are expected, install hydraulic couplings, clutches, torque limiters, etc.*
- b) *Before being paint coated, the 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.*
- 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*

13 - INSTALLATION

Für die Installation des Getriebes ist es äußerst wichtig, daß folgende Normen beachtet werden:

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

13 - INSTALLATION

Il est très important, pour l'installation du réducteur, de se conformer aux règles suivantes :

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



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.

using the tapped hole located at the top of the shaft extension.

gung 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.

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) <i>Mating surfaces must be cleaned and treated with suitable protective products before mounting to avoid oxidation and, as a result, seizure of parts.</i> | 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) <i>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.</i> |
| e) Prima della messa in servizio del riduttore accertarsi che la macchina che lo incorpora sia in regola con le disposizioni della Direttiva Macchine 2006/42/CE e successivi aggiornamenti. | e) <i>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 2006/42/EC.</i> | e) Bevor das Getriebe in Betrieb zu setzen, muß man sich vergewissern daß die das Getriebe einbauende Maschine gemäß den aktuellen Regelungen der Maschinen Richtlinie 2006/42/EG ist. | e) <i>Avant la mise en service du réducteur, vérifier que la machine où il est monté est conforme aux normes de la Directive Machines 2006/42/CE et ses mises à jour.</i> |
| 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 (vedi tabella B3). | f) <i>Before starting up the machine, make sure that oil level conforms to the mounting position specified for the gear unit and the viscosity is adequate (see table B3).</i> | f) Vor Inbetriebnahme der Maschine sicherstellen, daß die Anordnung der Füllstandschraube der Einbaulage angemessen ist, und die Viskosität des Schmiermittels entspricht (siehe Tabelle B3). | f) <i>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 (voir tableau B3).</i> |
| 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) <i>For outdoor installation provide adequate guards in order to protect the drive from rainfalls as well as direct sun radiation.</i> | g) Bei Inbetriebnahme in Frein, muß man geeigneten Schutzgeräte vorsehen, um das Antrieb gegen Regen und direkte Sonnenstrahlung zu schützen. | g) <i>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.</i> |

14 - STOCCAGGIO

Il corretto stoccaggio dei prodotti ricevuti 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, piane lignee 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 protet-

14 - 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*

14 - 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 Kupplungen mit einem geeig-

14 - STOCKAGE

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

- a) *Exclude 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 pro-*



te con idoneo prodotto antiossidante (Mobilarma 248 o equivalente).

In questo caso i riduttori dovranno essere posizionati con il tappo di sfiao 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.

product (Mobilarma 248 or equivalent).

Furthermore gear units must be placed with the fill plug in the highest position and filled up with oil. Before putting the units into operation the appropriate quantity, and type, of oil must be restored.

neten Oxidationsschutzmittel behandelt werden (Mobilarma 248 oder ein äquivalentes Mittel).

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.

duit anti oxydant (Mobilarma 248 ou equivalent).

Dans ce cas les réducteurs devront être placés avec bouchon reniflard vers le 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.

15 - CONDIZIONI DI FORNITURA

I riduttori vengono forniti come segue:

- a) già predisposti per essere installati nella posizione di montaggio come definito in fase di ordine;
- b) collaudati secondo specifiche interne;
- c) le superfici di accoppiamento non sono verniciate;
- d) provvisti di dadi e bulloni per montaggio motori per la versione IEC;
- e) dotati di protezioni in plastica sugli alberi;
- f) provvisti di golfare di sollevamento (dove previsto).

15 - CONDITIONS OF SUPPLY

Gear units are supplied as follows:

- a) *configured for installation in the mounting position specified when ordering;*
- b) *tested to manufacturer specifications;*
- c) *mating machined surfaces come unpainted;*
- d) *nuts and bolts for mounting motors are provided;*
- e) *shafts are protected during transportation by plastic caps;*
- f) *supplied with lifting lug (where applicable).*

15 - LIEFERBEDINGUNGEN

Die Getriebe werden in folgendem Zustand geliefert:

- a) schon bereit für die Montage in der bei Bestellung festgelegten Einbaulage;
- b) nach werksinternen Spezifikationen geprüft;
- c) die Verbindungsflächen sind nicht lackiert;
- d) ausgestattet mit Schrauben und Muttern für die Montage der Motoren (Version mit Adapter für IEC-Motoren);
- e) alle Getriebe werden mit Kunststoffschutz auf den Wellen geliefert;
- f) mit Transportierring zum Anheben (falls vorgesehen).

15 - CONDITIONS DE LIVRAISON

Les réducteurs sont livrés comme suit :

- a) *déjà prédisposés pour être installés dans la position de montage comme défini en phase de commande ;*
- b) *testés selon les spécifications internes ;*
- c) *les surfaces de liaison ne sont pas peintes ;*
- d) *équipés d'écrous et de boulons pour le montage des moteurs normalisés pour la version IEC ;*
- e) *embouts de protections en plastique sur les arbres ;*
- f) *dotés d'un crochet de levage (quand cela est prévu).*

16 - SPECIFICHE DELLA VERNICE

Le specifiche della vernice applicata sui riduttori (dove previsto) potranno essere richieste alle filiali o ai distributori che hanno fornito i gruppi.

16 - PAINT SPECIFICATIONS

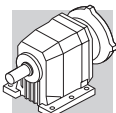
Specifications for paint applied to gearboxes (where applicable) may be obtained from the branches or dealers that supplied the units.

16 - ANGABEN ZU DEN ANSTRICHSTOFFE

Die Spezifikationen des Lackes, der auf den Getriebe (wo erforderlich) verwendet wurde, können bei den Filialen oder Verkaufsstellen, die die Gruppen geliefert haben, angefordert werden.

16 - SPECIFICATIONS DE LA PEINTURE

Les spécification de la peinture appliquée sur les réducteurs pourront, le cas échéant, être demandées aux filiales ou aux distributeurs ayant fourni les groupes.



17 - CARATTERISTICHE COSTRUTTIVE

Le caratteristiche costruttive salienti sono:

- modularità
- compattezza
- montaggi universali
- rendimenti elevati
- basso livello di rumorosità
- ingranaggi in acciaio legato cementati e temprati
- casse in alluminio non verniciate nelle grandezze 05, 11, 21, 31, casse in ghisa ad alta resistenza, verniciate, nelle altre grandezze
- alberi in entrata e uscita in acciaio ad alta resistenza.

17 - DESIGN FEATURES

The main design characteristics are:

- *modularity*
- *space effective*
- *universal mounting*
- *high efficiency*
- *quite operation*
- *gears in hardened and case-hardened steel*
- *bare aluminium housing for sizes 05, 11, 21 and 31. Larger frame sizes come in sturdy cast iron housings*
- *input and output shafts from high grade steel.*

17 - KONSTRUKTIVE EIGENSCHAFTEN

Die wichtigsten konstruktiven Eigenschaften sind:

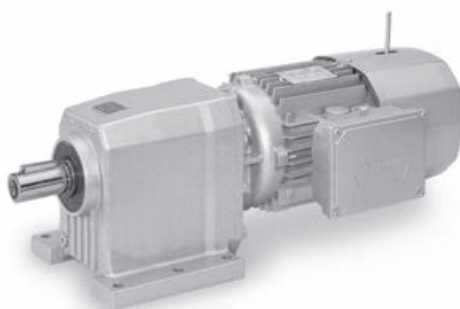
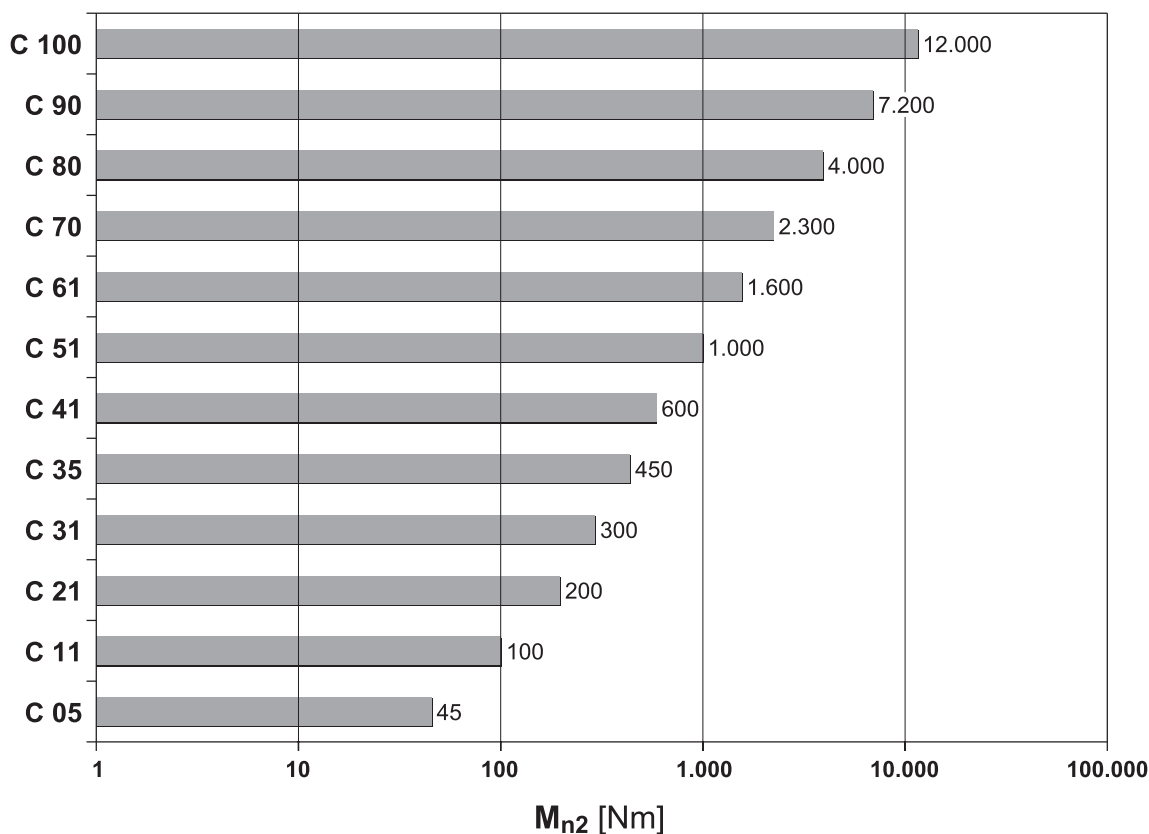
- Baueinheitensystem
- Kompaktheit
- universelle Montage
- hohe Wirkungsgrade
- niedriger Geräuschpegel
- einsatzgehärtete und gehärtete Zahnräder aus legiertem Stahl
- Nicht lackierten Aluminiumgehäuse bei den Größen 05, 11, 21 und 31; hochwiderstandsfähige und lackierte Gußgehäuse bei den anderen Größen
- Antriebs- und Abtriebswellen aus hochwiderstandsfähigem Stahl.

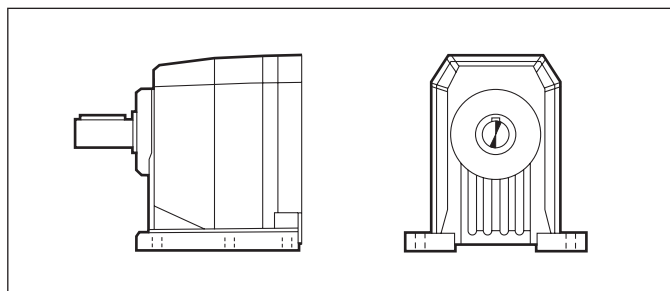
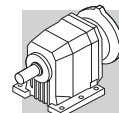
17 - CARACTERISTIQUES DE CONSTRUCTION

Les principales caractéristiques de construction sont :

- *modularité*
- *compacité*
- *montages universels*
- *rendements élevés*
- *faible niveau de bruit*
- *engrenages en acier allié cimentés et trempés*
- *carters en aluminium non peints dans les tailles 05, 11, 21, 31, carters en fonte à haute résistance peints dans les autres tailles*
- *arbres d'entrée et de sortie en acier à haute résistance.*

(B1)

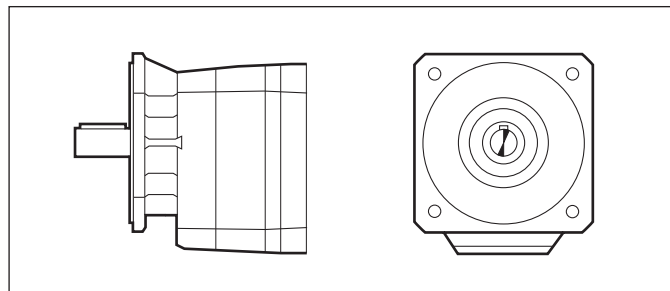




P

Piedi integrali
Foot mount
Mit integrierten Füßen
Carter à pattes monobloc

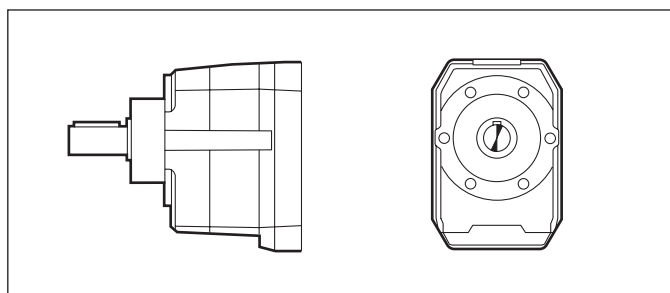
C05...C100



F

Flangia integrale
Flange mount
Mit integriertem Flansch
Carter à bride monobloc

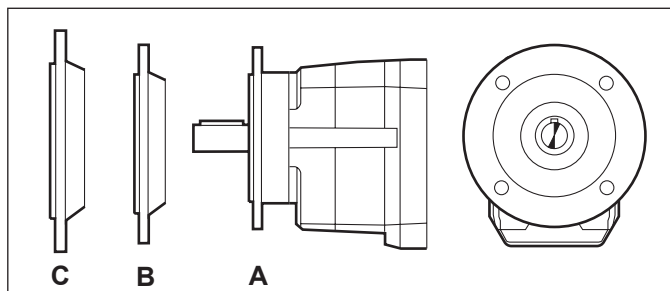
C05...C31
C70...C100



U

Cassa universale UNIBOX
UNIBOX- universal housing
Universalgehäuse UNIBOX
UNIBOX - carter universel

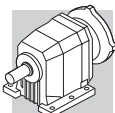
C11...C61



UF

UNIBOX flangia riportata
UNIBOX bolt-on flange
UNIBOX aufgesetztem Flansch
UNIBOX bride rapportée

C11...C61



19 - DESIGNAZIONE

19 - DESIGNATION

19 - BEZEICHNUNG

19 - DESIGNATION

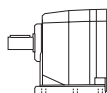
RIDUTTORE / GEAR UNIT / GETRIEBE / REDUCTEUR

C 31 2 F 32.5 S1 B5OPZIONI / OPTIONS
OPTIONEN / OPTIONS

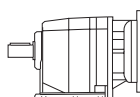
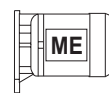
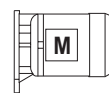
22

POSIZIONE DI MONTAGGIO / MOUNTING POSITION
EINBAULAGEN / POSITION DE MONTAGE

25

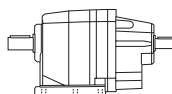
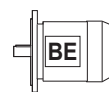
C...P: **B3** (Standard), B6, B7, B8, V5, V6C...F/U/UF: **B5** (Standard), B51, B53, B52, V1, V3DESIGNAZIONE INGRESSO / INPUT CONFIGURATION
BEZEICHNUNG DER ANTRIEBSSEITE / DESIGNATION ENTREE

(C05...C100)

**S0 S3
S05 S4
S1 S5
S2**

(C11...C100)

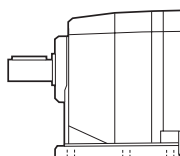
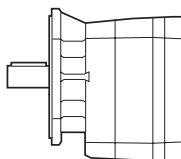
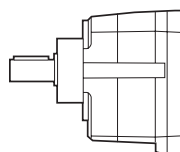
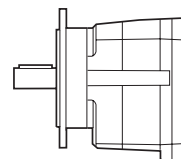
IEC_

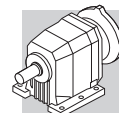
**P63 P112
P71 P132
P80 P160
P90 P180
P100**

(C11...C100)

HSRAPPORTO DI RIDUZIONE / GEAR RATIO
ÜBERSETZUNG / RAPPORT DE REDUCTION

FORMA COSTRUTTIVA / VERSION / BAUFORM / FORME DE CONSTRUCTION

**P**
(C05...C100)**F**
(C05...C31)
(C70...C100)**U**
(C11...C61)**UFA
UFB
UFC**
(C11...C61)STADI DI RIDUZIONE / REDUCTIONS / GETRIEBESTUFEN / ETAGES DE REDUCTION
2, 3, 4GRANDEZZA RIDUTTORE / GEAR FRAME SIZE / GETRIEBEBAUGRÖSSE / TAILLE REDUCTEUR
05, 11, 21, 31, 35, 41, 51, 61, 70, 80, 90, 100TIPO RIDUTTORE: **C** = coassiale
GETRIEBETYP: **C** = StirnradgetriebeGEARBOX TYPE:
TYPE DU REDUCTEUR:**C** = helical in-line
C = coaxial



Designazione motore

Motor designation

Motor bezeichnung

Designation moteur

MOTORE / MOTOR / MOTOR / MOTEUR

FRENO / BRAKE / BREMSE / FREIN

M 1LA 4 230/400-50 IP54 CLF W FD 7.5 R SB 220 SAOPZIONI
OPTIONS
OPTIONEN
OPTIONS

22

ALIMENTAZ. FRENO
BRAKE SUPPLY
BREMSVERSORGUNG
ALIMENTATION FREIN

174

179

183

TIPO RADDRIZZATORE AC/DC
RECTIFIER TYPE
GLEICHRICHTERTYP
TYPE ALIMENTATEUR
NB, SB, NBR, SBR

175

LEVA DI SBLOCCO FRENO
BRAKE HAND RELEASE
BREMSENTHANDLÜFTUNG
LEVIER DE DEBLOCAGE FREIN
R, RM

186

COPPIA FRENANTE / BRAKE TORQUE
BREMSMOMENT/ COUPLE FREIN

176

180

184

TIPO FRENO / BRAKE TYPE
BRESENTYP / TYPE DE FREIN**FD** (freno c.c./ d.c. brake / G.S. Bremse / frein c.c.)

173

178

182

FA, BA (freno c.a./ a.c. brake / W.S. Bremse / frein c.a.)POSIZIONE MORSETTIERA / TERMINAL BOX POSITION
KLEMMENKASTENLAGE / POSITION BOITE A BORNE
W (default), **N, E, S**

25

FORMA COSTRUTTIVA / MOTOR MOUNTING
BAUFORM / FORM DE CONSTRUCTION— (motore integrato / compact motor
kompaktes Motor / moteur compact)**B5** (motore IEC / IEC - motor / IEC Motor / moteur CEI)CLASSE ISOLAMENTO / INSULATION CLASS
ISOLIERUNGSKLASSE / CLASSE ISOLATION**CL F** standard**CL H** option

167

GRADO DI PROTEZIONE / DEGREE OF PROTECTION
SCHUTZART / DEGRE DE PROTECTION**IP55** standard (IP54 - motore autofrenante / brake motor / Bremssmotor / moteur frein)

161

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

165

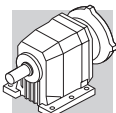
NUMERO DI POLI / POLE NUMBER / POLZAHL / N.bre POLES
2, 4, 6, 2/4, 2/6, 2/8, 2/12, 4/6, 4/8

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

0B - 5LA (motore integrato / compact motor / kompaktes Motor / moteur compact)**63A - 280M** (motore IEC / IEC motor / IEC - motor / moteur CEI)

TIPO MOTORE / MOTOR TYPE / MOTORTYP / TYPE MOTEUR

M = trifase integrato / compact 3-phase / kompaktes Dreiphasen / 3 phasé compact**ME** = trifase integrato, classe IE2 / compact 3-phase, class IE2 / kompaktes Dreiphasen, Klasse IE2 / 3 phasé compact, classe IE2**BN** = trifase IEC / IEC 3-phase / IEC Dreiphasen / 3 phasé CEI**BE** = trifase IEC, classe IE2 / IEC 3-phase, class IE2 / IEC Dreiphasen, Klasse IE2 / 3 phasé CEI, classe IE2



Opzioni riduttori

SO

I riduttori C05, C11, C21, C31, C35, C41, solitamente forniti con lubrificante da BONFIGLIOLI RIDUTTORI, sono forniti privi di lubrificante.

LO

I riduttori C51, C61, C70, C80, C90, C100 solitamente sprovvisti di lubrificante, sono richiesti con olio sintetico del tipo correntemente utilizzato da BONFIGLIOLI RIDUTTORI e riempiti in accordo alla posizione di montaggio richiesta.

DL

L'albero lento è dotato di doppio anello di tenuta.

DV

Due anelli di tenuta sull'albero veloce. (Disponibile solo sui motoriduttori compatti).

VV

Anello di tenuta in fluoro-elastomero sull'albero veloce.

PV

Tutti gli anelli di tenuta in fluoro-elastomero.

Opzioni motori

AA, AC, AD

Posizione angolare leva di sblocco freno rispetto alla posizione morsettiera visto lato ventola. Posizione standard = 90° orari. AA = 0°, AC = 180°, AD = 90° antiorari.

AL, AR

Per i motoriduttori equipaggiati con motore integrale serie M o ME, è disponibile l'opzione antiretro collocata sul motore stesso e descritta nella sezione motori elettrici di questo catalogo. La tabella B2 mostra il senso di rotazione libera del riduttore in base alla quale dovrà essere effettuata la scelta dell'opzione.

Gearbox options

SO

Gear units C05, C11, C21, C31, C35, C41, usually factory filled with oil, to be supplied unlubricated.

LO

Gearboxes C51, C61, C70, C80, C90, C100 usually supplied without oil, to be supplied with synthetic oil currently used by BONFIGLIOLI RIDUTTORI and filled according to the mounting position specified.

DL

The output shaft features a dual oil seal.

DV

Dual oil seals on input shaft. (Only available for integral gearmotors).

VV

Fluoro elastomer oil seal on input shaft.

PV

Both input and output shafts feature Fluoro elastomer oil seals.

Motor options

AA, AC, AD

Mutual position of the brake release lever and terminal box. View is from the fan side. Standard position = 90° clockwise. AA = 0°, AC = 180°, AD = 90° counterclockwise.

AL, AR

A backstop device on the motor itself, as described in the electric motors section of this catalogue, is available for gearmotors with integral M or ME Series motors. Table B2 shows the direction of free rotation of the gearbox, on the basis of which the correct option must be selected.

Getriebe Optionen

SO

Bei Lieferung ohne Schmierstoff (nur bei C05, C11, C21, C31, C35 und C41).

LO

Für Getriebe C51, C61, C70, C80, C90, C100 die gewöhnlich ohne Schmiermittel geliefert werden, in Übereinstimmung mit der Einbaulage gefüllt mit dem normalerweise von BONFIGLIOLI RIDUTTORI verwendeten synthetischen Schmierstoff.

DL

Die Abtriebswelle ist mit Doppeldichtring geliefert.

DV

2 Wellendichtringe auf der eintreibenden Welle. (Nur für Kompaktgetriebemotoren).

VV

Wellendichtringe aus Fluor-Elastomer auf der eintreibenden Welle.

PV

Alle Wellendichtringe aus Fluor-Elastomer.

Optionen Motoren

AA, AC, AD

Geben die Lage des Bremslüfterhebels zum Klemmenkasten an. Standard ist 90° im Uhrzeigersinn beim Ansehen der Lüfterradseite. AA = 0°, AC = 180°, AD = 90° entgegen dem Uhrzeigersinn.

AL, AR

Für Getriebemotoren mit Integralmotor der Baureihe M oder ME steht die Option Rücklaufsperrung zur Verfügung, welche auf dem Motor selbst installiert ist und im Abschnitt über die Elektromotoren in diesem Katalog beschrieben wird. Die Tabelle B2 zeigt die freie Drehrichtung des Getriebemotors, anhand welcher die Option entsprechend gewählt werden muss.

Options réducteurs

SO

Les réducteurs C05, C11, C21, C31, C35, C41, habituellement fourni avec lubrifiant par la société BONFIGLIOLI RIDUTTORI, sont demandés sans lubrifiant.

LO

Les réducteurs C51, C61, C70, C80, C90, C100 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.

DL

L'arbre lent est équipé avec double joint d'étanchéité.

DV

2 bagues d'étanchéité sur l'arbre rapide. (Disponible seulement sur motoréducteurs compacts).

VV

Bague d'étanchéité en Elastomère fluorésur l'arbre rapide.

PV

Toutes les bagues d'étanchéité en Elastomère fluoré.

Options moteurs

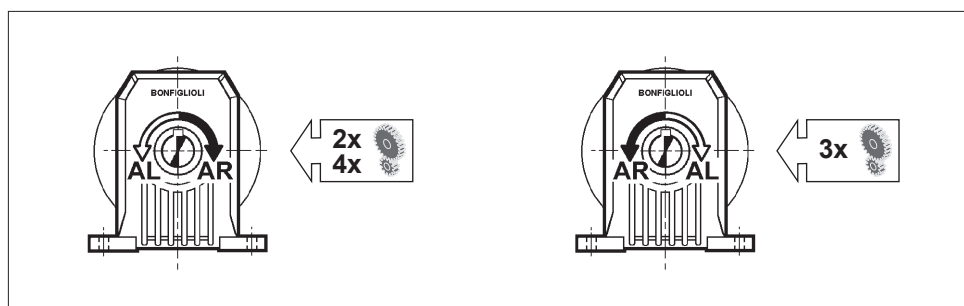
AA, AC, AD

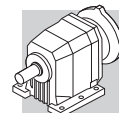
Position angulaire du levier de déblocage du frein par rapport à la position de la boîte à borne en regardant du côté du ventilateur. Position standard = 90° sens horaire. AA = 0°, AC = 180°, AD = 90° sens anti-horaire.

AL, AR

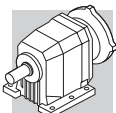
Pour les motoréducteurs équipés d'un moteur intégral de série M ou ME, l'option antirecul située sur le moteur même et décrite dans la section moteurs électriques de ce catalogue est disponible. Le tableau B2 montre le sens de rotation libre du réducteur, sur la base de laquelle devra être effectué le choix de l'option.

(B2)





CF Filtro capacitivo.	CF <i>Capacitive filter.</i>	CF Kapazitive filter.	CF <i>Filtre capacitif.</i>
D3 No. 3 sonde bimetalliche negli avvolgimenti con temperatura 150°C.	D3 <i>3 bimetallic winding temperature sensors, calibrated at 150°C.</i>	D3 3 Bimetallfühler in den Wicklungen mit Temperatur von 150°C.	D3 <i>3 sondes bimétalliques dans les enroulements à une température de 150 °C.</i>
E3 No. 3 termistori negli avvolgimenti con temperatura 150°C.	E3 <i>3 winding temperature thermistors, calibrated at 150°C.</i>	E3 3 Kaltleiterthermistoren in den Wicklungen mit Temperatur von 150°C.	E3 <i>3 thermistances dans les enroulements à une température de 150 °C.</i>
F1 Volano per avviamento progressivo.	F1 <i>Flywheel for soft start and stop.</i>	F1 Schwungrad zum sanften Anfahren.	F1 <i>Volant pour démarrage progressif.</i>
H1 Riscaldatori anticondensa. Alimentazione standard 1~ 230V ±10%.	H1 <i>Anti condensate heaters. Standard voltage 1~ 230V ±10%.</i>	H1 Wicklungsheizung Standardspannung 1~ 230 V ±10%	H1 <i>Réchauffeurs anticondensation. Alimentation standard 1~ 230V ±10%.</i>
PN Potenza a 60 Hz corrispondente alla potenza normalizzata a 50 Hz.	PN <i>60 Hz power corresponding to the normalized 50 Hz power.</i>	PN Die 60 Hz-Leistung wird an der 50 Hz-Normleistung ausgeglichen.	PN <i>Puissance à 60 Hz correspondante à la puissance normalisée à 50 Hz.</i>
PS Doppia estremità d'albero (esclude opzione RC e U1).	PS <i>Double shaft extention (barring RC and U1 options).</i>	PS Zweites Wellenende (schließt die Optionen RC und U1 aus).	PS <i>Double extrémité d'arbre (à l'exclusion de l'option RC et U1).</i>
RC Tettuccio parapioggia (esclude opzione PS).	RC <i>Drip cover (barring option PS).</i>	RC Schutzdach (schließt Option PS aus).	RC <i>Capot protection antipluie (option PS exclue).</i>
RV Bilanciamento rotore in grado di vibrazione B.	RV <i>Rotor balancing in vibration class B.</i>	RV Läufer in Vibrationsgrad B ausgewuchtet.	RV <i>Equilibrage rotor avec degré de vibration B.</i>
TC La variante del tettuccio tipo TC è da specificare quando il motore è installato in ambienti dell'industria tessile. L'opzione esclude le varianti EN1, EN2, EN3 e non è applicabile ai motori con freno tipo BA.	TC <i>Option TC is a rain canopy variant for textile industry environments. This option is not compatible with variants EN1, EN2, EN3 and will not fit motors equipped with a BA brake.</i>	TC Bei dieser Option handelt es sich um ein Schutzdachs mit einem Textilnetz, dessen Einsatz empfohlen wird wenn der Motor in Bereichen der Textilindustrie installiert wird. Diese Option schließt die Möglichkeit der Optionen EN1, EN2, EN3 aus und kann bei Bremsmotoren vom Typ BN_BA nicht montiert werden.	TC <i>La variante du capot type TC est à spécifier lorsque le moteur est installé dans des sites de l'industrie textile. L'option exclue les variantes EN1, EN2, EN3 et n'est pas applicable aux moteurs avec frein type BA.</i>
TP Tropicalizzazione.	TP <i>Tropicalization.</i>	TP Tropenfestigkeit.	TP <i>Tropicalisation.</i>
U1 Servoventilazione (esclude opzioni PS e CUS).	U1 <i>Forced cooling (barring options PS and CUS).</i>	U1 Fremdbelüftung (Nicht anwendbare Gesamtheit an den Optionen PS und CUS).	U1 <i>Servo-ventilateur (Pas applicable ensemble aux options PS et CUS).</i>
U2 Servoventilatore privo di scatola morsettiera, dotato di cavi precablati internamente. Esclude le opzioni PS e CUS.. Disponibile per motori: BN 71, BE 80 ... BE 132, M1, ME2 ... ME4.	U2 <i>Separate supply forced ventilation without terminal box. Cables are pre-wired. Configuration is not compatible with options PS and CUS. Available on motors; BN 71, BE 80 ... BE 132, M1, ME2 ... ME4.</i>	U2 Servoventilator ohne Klemmenkasten, bereits intern verkabelt. Nicht anwendbare Gesamtheit an den Optionen PS und CUS. Verfügbar für folgende Motoren: BN 71, BE 80 ... BE 132, M1, ME2 ... ME4.	U2 <i>Servoventilateur sans boîte à bornes, doté de câbles pré-cablés à l'intérieur. Pas applicable ensemble aux options PS et CUS. Disponible pour moteurs : BN 71, BE 80 ... BE 132, M1, ME2 ... ME4.</i>
Per ulteriori informazioni sulle opzioni, consultare i relativi capitoli nella sezione motori elettrici.	For further information on options, consult the electric motors section.	Siehe die Kapitel im Teil Elektromotoren für weitere Informationen.	Pour de plus amples informations sur les options, consulter la section moteurs électriques.



20 - LUBRIFICAZIONE

Gli organi interni dei riduttori Bonfiglioli sono lubrificati con un sistema misto di immersione e sbattimento dell'olio.

I gruppi C05, C11, C21, C31, C35 e C41 sono normalmente consegnati con carica di lubrificante dalla fabbrica, o dalla rete di vendita ufficiale.

I gruppi di grandezza C51 e superiori sono normalmente forniti privi di lubrificante, e sarà cura dell'utilizzatore riempirli di olio prima della messa in servizio.

In entrambi i casi, a seconda delle versioni, prima della messa in esercizio del riduttore potrebbe essere necessario sostituire il tappo chiuso usato per il trasporto con il tappo di sfianto fornito a corredo.

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; per il corretto riempimento si dovrà fare riferimento tassativamente alla mezzeria del tappo di livello trasparente o all'astina (tacca di riferimento) o allo sfioramento del foro del tappo, quando presenti. 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.

20 - LUBRICATION

The inner parts of Bonfiglioli gear units are oil-bath and splash lubricated.

Frame sizes C05, C11, C21, C31, C35 and C41 are supplied by the factory, or by the authorized dealers, already filled with oil.

Unless otherwise specified, units size C51 and larger are usually supplied unlubricated at it will be the customer care to fill them with oil prior to putting them into operation.

In both cases, depending on the version, prior to putting the gear unit into operation may need to replace the closed plug used for transportation purposes with breather plug supplied with.

The charts here after must be referred to as for the mounting position pattern and the corresponding oil plugs, if applicable, and related lubricant quantity.

These figures are only indicative; to ensure correct filling, always refer to the centreline of the sight glass, the notch on the dipstick, or the spill level of the filler plug hole, whichever is present.

In some cases, discrepancies, occasionally also substantial, versus the oil quantities listed in the chart may be noticed.

The "long life" polyglycol-based lubricant supplied by the factory, in the absence of contamination, does not require periodic oil 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.

20 - SCHMIERUNG

Die Schmierung der Getriebe von Bonfiglioli erfolgt durch eine Kombination aus Ölbad- und Tauchschiemung.

Die Getriebegrößen C05, C11, C21, C31, C35 und C41 sind ab Werk mit einer Lebensdauerschmierung versehen.

Die Getriebe ab der Größe C51 werden ohne Ölfüllung ausgeliefert. Vor der Inbetriebnahme muss deshalb auf das Einfüllen der richtigen Ölfüllmenge geachtet werden!

In beiden Fälle, nach den Ausführungen, vor des Getriebe Inbetriebnahme, könnte notwendig sein, den geschlossenen Pfropfen mit dem Entlüftungspfpfen, der zusammen mit dem Getriebe geliefert ist, zu wechseln.

Bitte beachten Sie dazu auch die nachfolgenden Kapitel über die Positionen der Stopfen und Ölschaugläser und den entsprechenden Ölfüllmengen.

Die Letztgenannten sind Richtwerte; zur korrekten Befüllung ist obligatorisch auf die Mittellinie des durchsichtigen Öleinfüllstopfens, den Messstab (Markierung) oder den Überlaufschutz des Stopfens, sofern vorhanden, Bezug zu nehmen. Auf Abweichungen gegenüber den in der Tabelle angegebenen Ölmengen, gelegentlich nicht unwesentliche, wird hingewiesen.

Die mit Lebensdauerschmierung gelieferten Serien sind mit synthetischem Öl auf Polyglykolbasis gefüllt. Falls dieses Öl nicht verunreinigt wird, ist während der Lebensdauer des Getriebes kein Ölwechsel nötig. 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.

20 - LUBRIFICATION

Les organes internes des réducteurs Bonfiglioli sont lubrifiés avec un système mixte d'immersion et de battement de l'huile.

Les groupes C05, C11, C21, C31, C35 et C41 sont normalement livrés avec charge de lubrifiant de l'usine, ou du réseau de vente officielle.

Les groupes de grandeur C51 et supérieur sont normalement fournis sans lubrifiant, et sera par l'utilisateur le remplissage d'huile avant la mise en service.

Dans les deux cas, selon les versions, avant la mise en service du réducteur, pourrait être nécessaire de remplacer le bouchon fermé utilisé pour le transport par le bouchon d'évent fourni.

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

Ces dernières sont indicatives; pour un remplissage correct, il faut se référer obligatoirement au milieu du bouchon de niveau transparent ou à la jauge (encoche de repère) ou à l'effleurage du trou du bouchon, quand ils existent. Par rapport à cette condition la quantité de lubrifiant indiquée dans le tableau peut présenter des écartement, 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 tout l'arc de vie du réducteur.

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.

(B3)

Viscosità olio ISO VG / Oil viscosity ISO VG / Öl-Viskosität ISO VG / Viscosité de l'huile ISO VG					
	Ta ≤ -20°	-20° < Ta ≤ 10°	0° ≤ Ta ≤ 30°	20° ≤ Ta ≤ 40°	Ta > 40°
Mineral EP	(*)	150	320	460	460 (*)
PAO EP	(*)	150	220	320	460 (*)
PAG	(*)	150	220	320	460 (*)

PAO Oli sintetici polialfaolefine

PAO Polyalphaolefin synthetic oils

PAO Synthetische Poly-Alpha-Olefin-Öle

PAO Huiles synthétiques polyalphaoléfinés

PAG Oli sintetici a base poliglicolica

PAG Polyglycol-based synthetic oils

PAG Synthetische Öl auf Polyglycol basierend

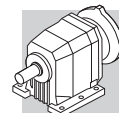
PAG Huiles synthétiques à base de polyglycol

(*) consultare il Servizio Tecnico Commerciale.

(*) consult Bonfiglioli Technical Service.

(*) Bitte wenden Sie sich an die technische Abteilung von Bonfiglioli.

(*) Consulter le service technique Bonfiglioli.



Quantità di lubrificante [l]

Oil quantity [l]

Schmiermittelmenge

Quantité de lubrifiant [l]

(B4)



	P						F						U - UF					
	B3	B6	B7	B8	V5	V6	B5	B51	B53	B52	V1	V3	B5	B51	B53	B52	V1	V3
C 05 2	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	—	—	—	—	—	—
C 11 2	0.50	0.45	0.40	0.60	0.50	0.70	0.45	0.40	0.35	0.55	0.45	0.60	0.45	0.40	0.35	0.55	0.40	0.60
C 21 2	0.70	0.65	0.70	0.80	0.85	1.2	0.65	0.65	0.65	0.75	0.80	1.1	0.65	0.60	0.65	0.75	0.75	0.95
C 21 3	1.0	1.0	1.2	1.2	1.3	1.5	1.0	1.0	1.2	1.2	1.2	1.4	0.95	0.95	1.1	1.1	1.1	1.3
C 31 2	1.0	1.0	1.0	1.2	1.5	1.5	1.0	1.0	1.0	1.2	1.4	1.4	0.95	0.95	0.95	1.2	1.3	1.3
C 31 3	1.0	1.0	1.2	1.2	1.3	1.5	1.0	1.0	1.2	1.2	1.2	1.4	0.95	0.95	1.1	1.1	1.1	1.3
C 35 2	1.6	1.5	1.5	1.3	2.1	2.4	—	—	—	—	—	—	1.6	1.5	1.5	1.3	2.1	2.4
C 35 3	1.5	1.4	1.5	1.3	2.0	2.3	—	—	—	—	—	—	1.5	1.4	1.5	1.3	2.0	2.3
C 35 4	2.3	2.1	2.3	2.1	2.7	3.1	—	—	—	—	—	—	2.3	2.1	2.3	2.1	2.7	3.1
C 41 2	2.2	2.0	2.1	1.9	2.7	3.4	—	—	—	—	—	—	2.2	2.0	2.1	1.9	2.7	3.4
C 41 3	2.1	1.9	2.1	1.9	2.6	3.2	—	—	—	—	—	—	2.1	1.9	2.1	1.9	2.6	3.2
C 41 4	2.8	2.6	2.8	2.6	3.5	3.9	—	—	—	—	—	—	2.8	2.6	2.8	2.6	3.5	3.9
C 51 2	3.1	3.0	3.1	3.0	4.3	5.0	—	—	—	—	—	—	3.1	3.0	3.1	3.0	4.3	5.0
C 51 3	3.0	2.8	3.1	3.0	4.1	4.9	—	—	—	—	—	—	3.0	2.8	3.1	3.0	4.1	4.9
C 51 4	4.3	4.1	4.4	4.2	5.4	6.1	—	—	—	—	—	—	4.3	4.1	4.4	4.2	5.4	6.1
C 61 2	4.2	4.0	4.2	4.1	6.0	6.7	—	—	—	—	—	—	4.2	4.0	4.2	4.1	6.0	6.7
C 61 3	4.2	4.0	4.2	4.1	6.0	6.7	—	—	—	—	—	—	4.2	4.0	4.2	4.1	6.0	6.7
C 61 4	6.1	5.9	6.1	6.0	7.9	8.6	—	—	—	—	—	—	6.1	5.9	6.1	6.0	7.9	8.6
C 70 2	6.5	8.5	8.5	7.5	11	7.5	6.5	8.5	8.5	7.5	11	7.5	—	—	—	—	—	—
C 70 3	6.5	8.5	8.5	7.5	11	7.5	6.5	8.5	8.5	7.5	11	7.5	—	—	—	—	—	—
C 70 4	6.5	8.5	8.5	7.5	11	8	6.5	8.5	8.5	7.5	11	7.5	—	—	—	—	—	—
C 80 2	11	14	14	13	18	13	11	14	14	13	18	13	—	—	—	—	—	—
C 80 3	11	14	14	13	18	13	11	14	14	13	18	13	—	—	—	—	—	—
C 80 4	11	14	14	13	18	13	11	14	14	13	18	13	—	—	—	—	—	—
C 90 2	19	25	25	22	31	22	19	25	25	22	31	22	—	—	—	—	—	—
C 90 3	19	25	25	22	31	22	19	25	25	22	31	22	—	—	—	—	—	—
C 90 4	19	25	25	22	31	22	19	25	25	22	31	22	—	—	—	—	—	—
C 100 2	27	37	37	33	45	33	27	37	37	33	45	33	—	—	—	—	—	—
C 100 3	27	37	37	33	45	33	27	37	37	33	45	33	—	—	—	—	—	—
C 100 4	27	37	37	33	45	33	27	37	37	33	45	33	—	—	—	—	—	—

Lubrificazione permanente

Life lubricated

Dauerschmierung

Lubrification permanente

SHELL OMALA S4 WE 320 (for life)

21 - POSIZIONI DI MONTAGGIO E ORIENTAMENTO MORSETTIERA

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

Posizione angolare leva di sblocco freno.

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

21 - MOUNTING POSITION AND TERMINAL BOX ORIENTATION

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

Angular position 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.

21 - 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).

Winkellage des Handlüfterhebels.

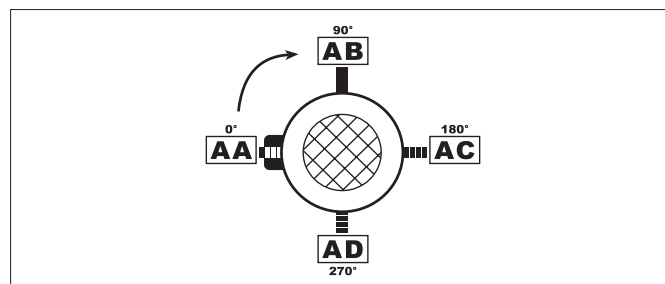
Bei Bremsmotoren wird der Handlüfterhebel (auf Anfrage) standardmäßig auf 90° gegenüber des Klemmkastens (AB-Anordnung) geliefert; wird eine andere Anordnung verlangt, muß dies bei der Bestellung durch das geeignete Option angegeben werden.

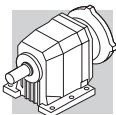
21 - POSITIONS DE MONTAGE ET ORIENTATION BOITE A BORNE

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).

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 / Ablassschraube	Bouchon de event / remplissage
	Tappo di livello	Level plug	Ölstandsschraube	Bouchon de niveau
	Tappo di scarico	Drain plug	Ölablassschraube	Bouchon de vidange
	Tappo in vista	Plug in sight	Sichtbarer Deckel	Bouchon visible
	Tappo non in vista	Plug not in sight	Nicht sichtbarer Deckel	Bouchon non visible

C 11 ... C 41

C_P

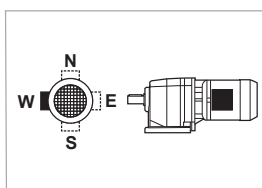
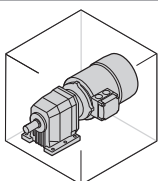
(B5)

_HS

_P (IEC)

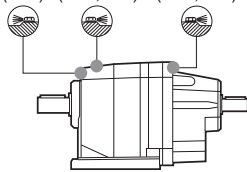
_S

B3

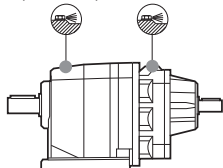


W = Default

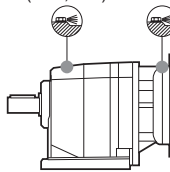
(C11) (C35,C41) (C21,C31)



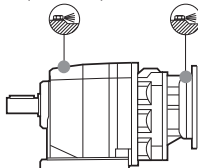
(C35,C41)



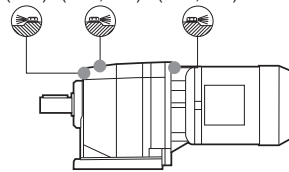
(C35,C41)



(C35,C41)

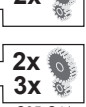


(C11) (C35,C41) (C21,C31)

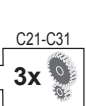


C11-C21-C31

2x



2x



3x



3x

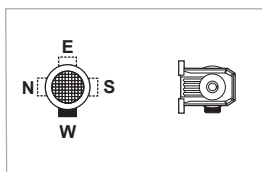
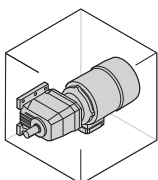


4x



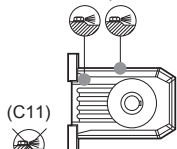
C35-C41

B6



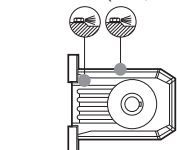
W = Default

(C35,C41)

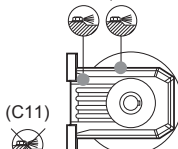


(C11)

(C35,C41)

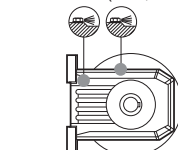


(C35,C41)

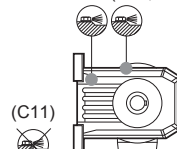


(C11)

(C35,C41)

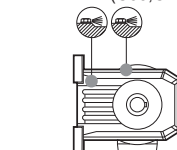


(C35,C41)



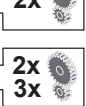
(C11)

(C35,C41)



C11-C21-C31

2x



2x



3x



3x

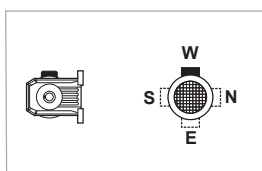
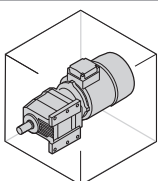


4x



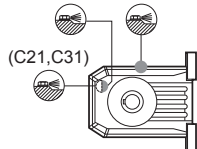
C35-C41

B7



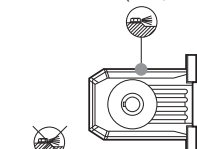
W = Default

(C11) (C35,C41)



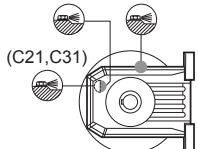
(C21,C31)

(C35,C41)



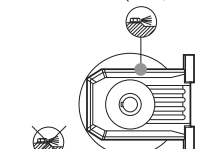
(C21,C31)

(C11) (C35,C41)



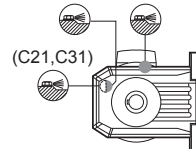
(C21,C31)

(C35,C41)



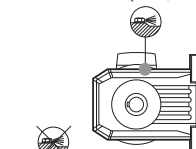
(C21,C31)

(C11) (C35,C41)



(C21,C31)

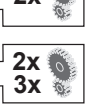
(C35,C41)



(C21,C31)

C11-C21-C31

2x



2x



3x

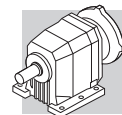


3x



4x





C 11 ... C 41

C_P

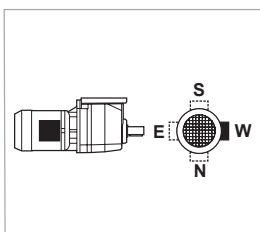
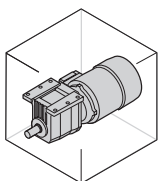
(B6)

_HS

_P (IEC)

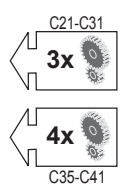
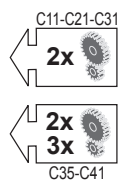
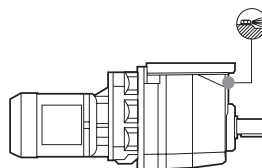
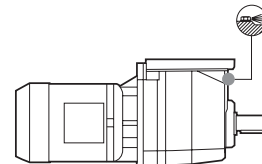
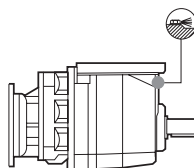
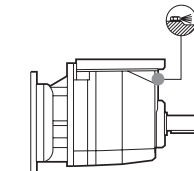
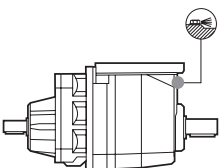
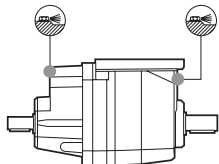
_S

B8

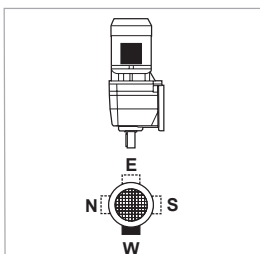
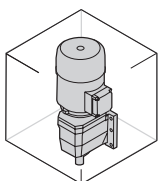


W = Default

(C21,C31) (C11,C35,C41)

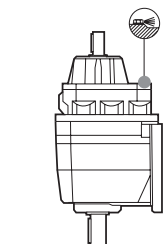
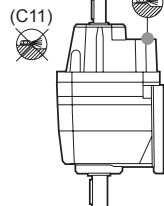


V5

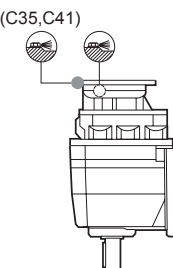
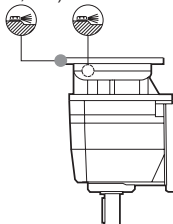


W = Default

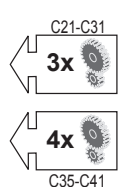
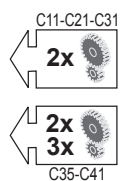
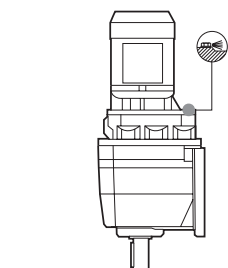
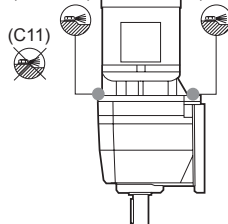
(C21,C31,C35,C41)



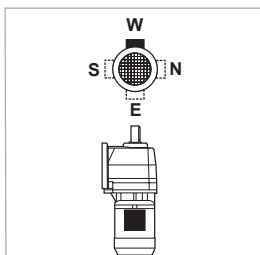
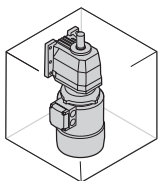
(C35,C41)



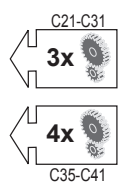
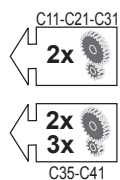
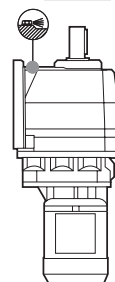
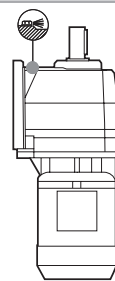
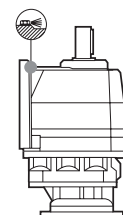
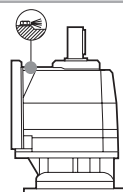
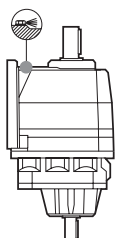
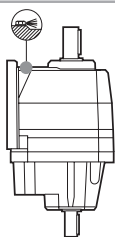
(C21,C31) (C35,C41)

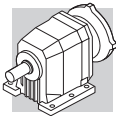


V6



W = Default





C 11 ... C 41

C_F

C_U

C_UF

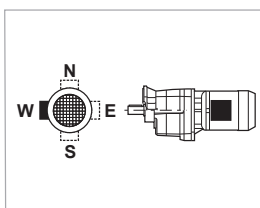
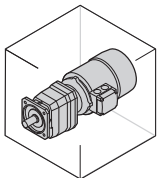
(B7)

_HS

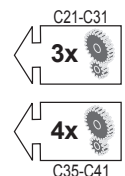
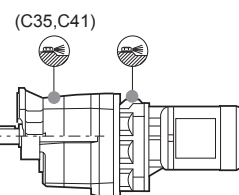
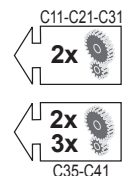
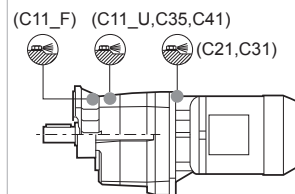
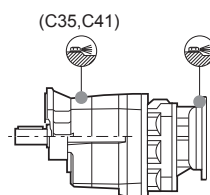
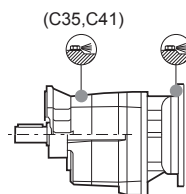
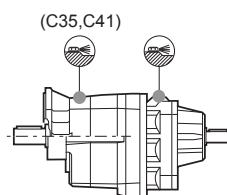
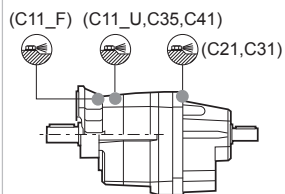
_P (IEC)

_S

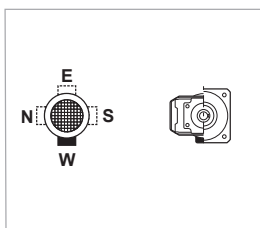
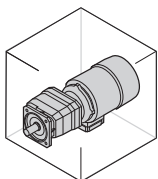
B5



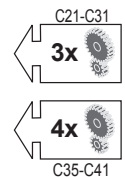
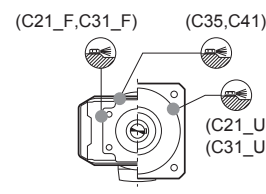
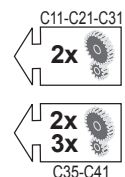
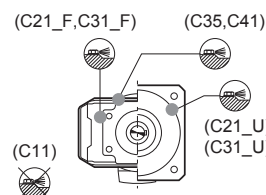
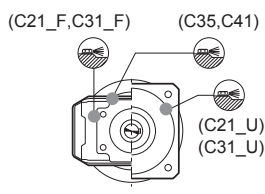
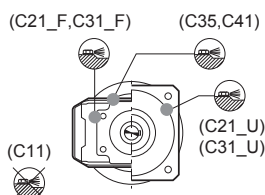
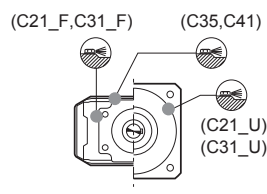
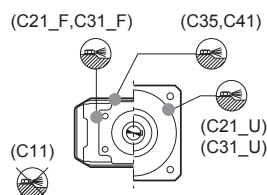
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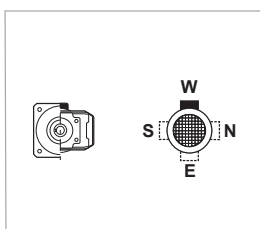
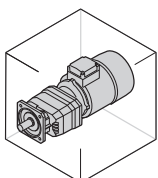
B51



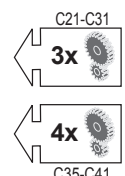
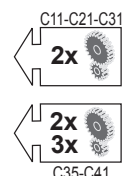
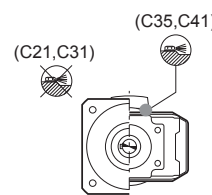
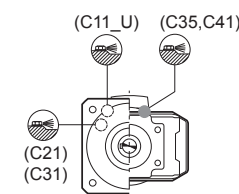
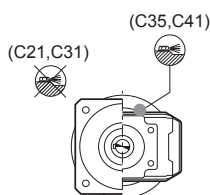
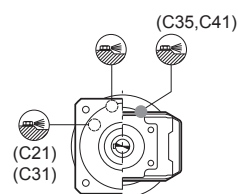
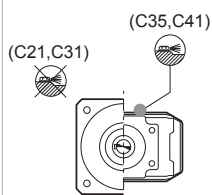
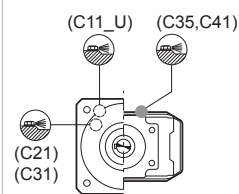
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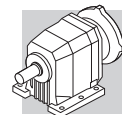


B53



W = Default





C 11 ... C 41

C_F

C_U

C_UF

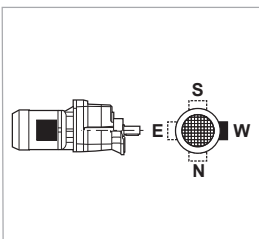
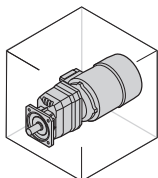
(B8)

_HS

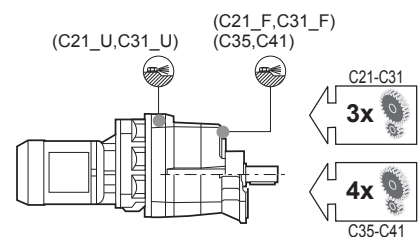
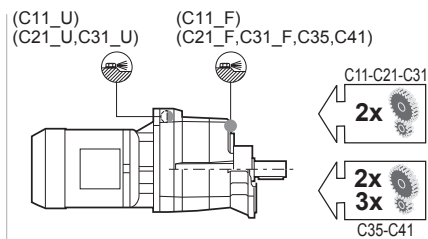
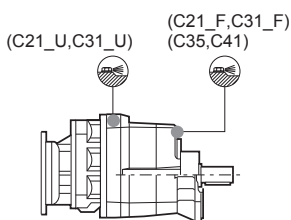
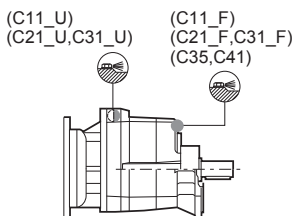
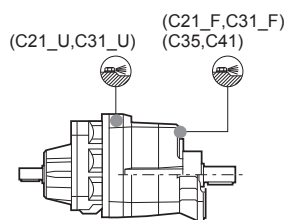
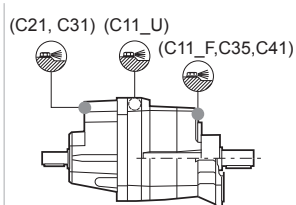
_P (IEC)

_S

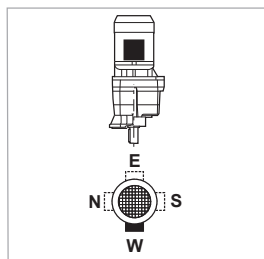
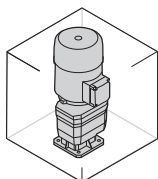
B52



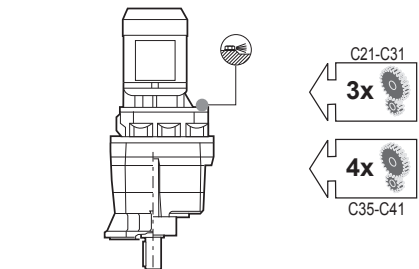
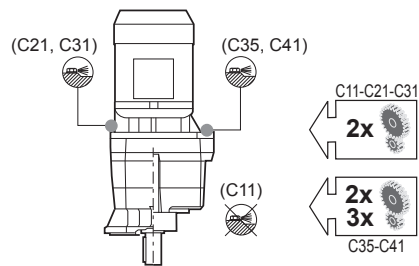
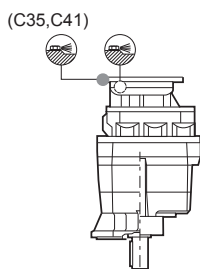
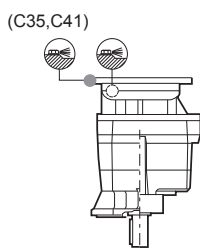
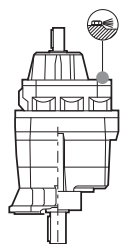
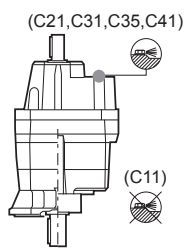
W = Default



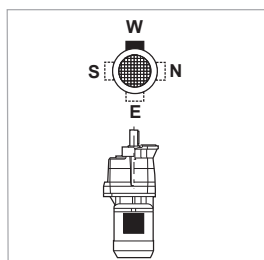
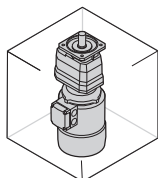
V1



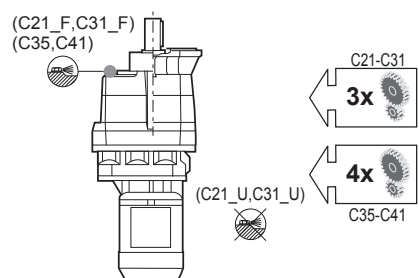
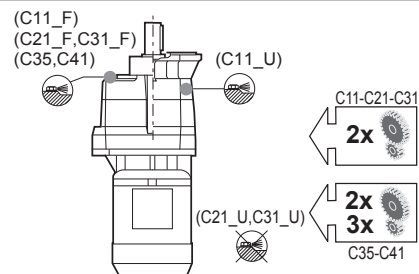
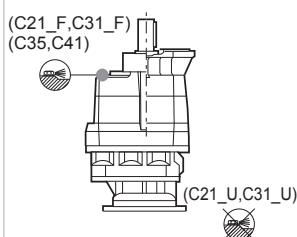
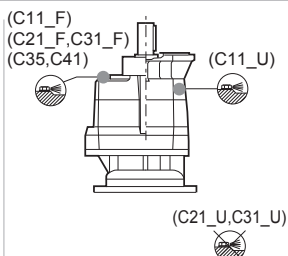
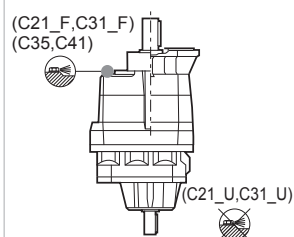
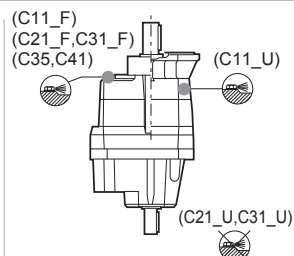
W = Default

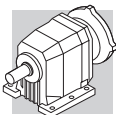


V3



W = Default





C 51 ... C 61

C_P

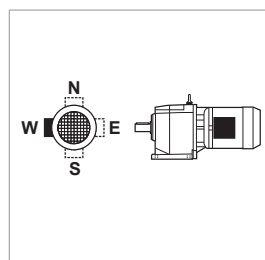
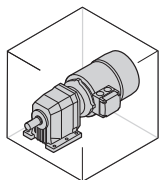
(B9)

_HS

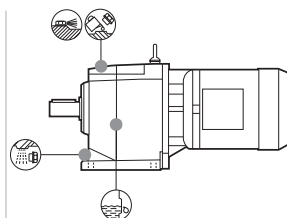
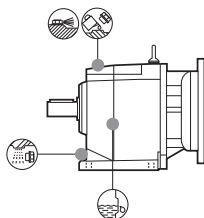
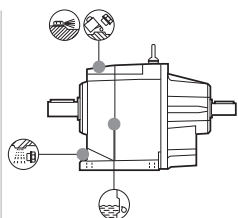
_P (IEC)

_S

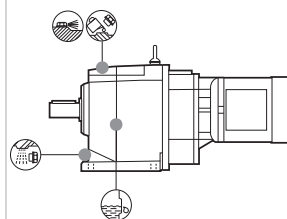
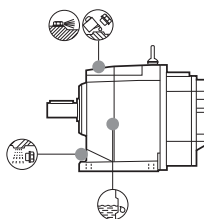
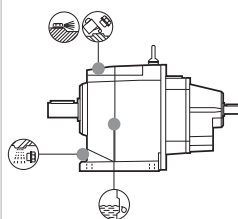
B3



W = Default

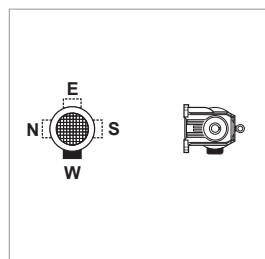
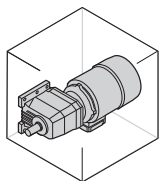


2x
3x

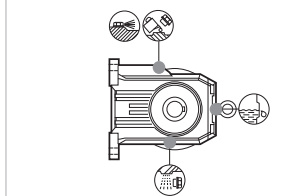
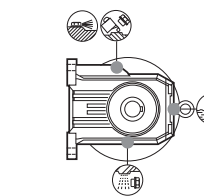
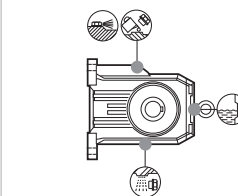


4x

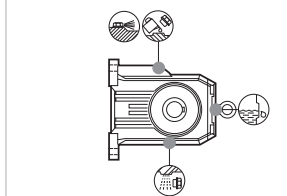
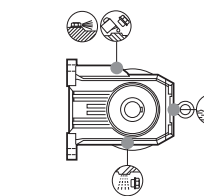
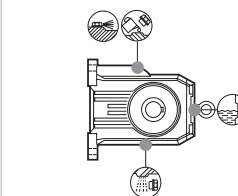
B6



W = Default

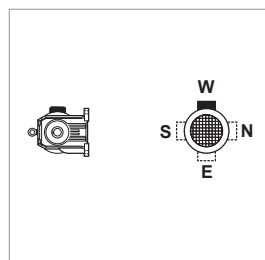
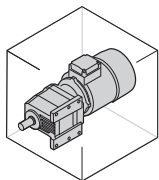


2x
3x

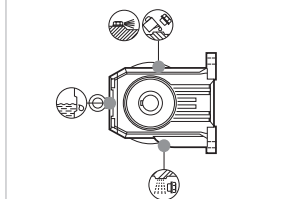
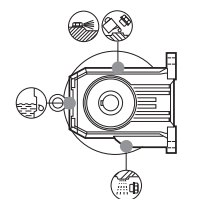
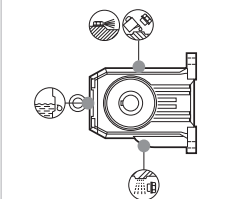


4x

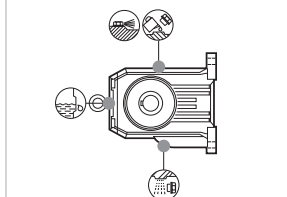
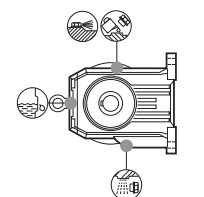
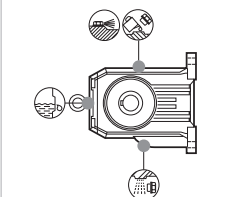
B7



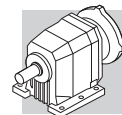
W = Default



2x
3x



4x



C 51 ... C 61

C_P

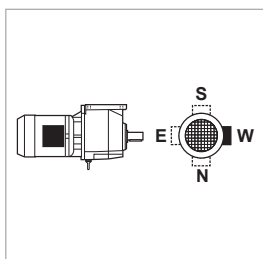
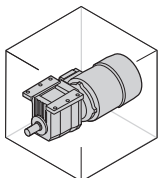
(B10)

_HS

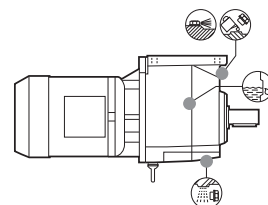
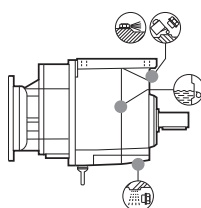
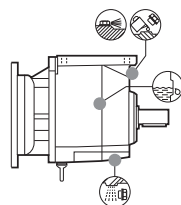
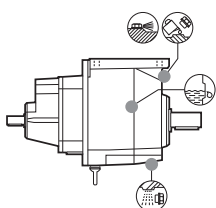
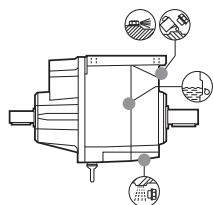
_P (IEC)

_S

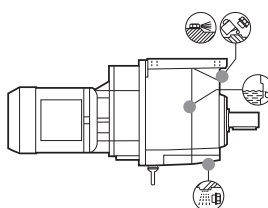
B8



W = Default

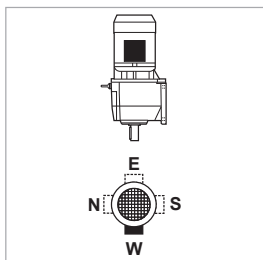
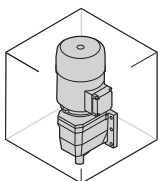


2x
3x

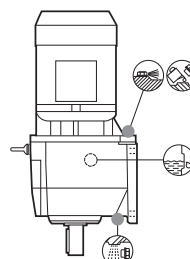
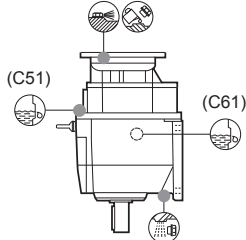
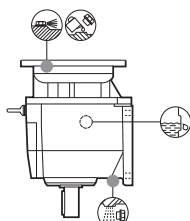
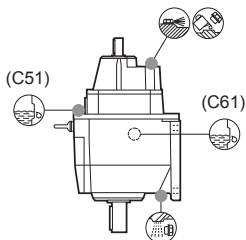
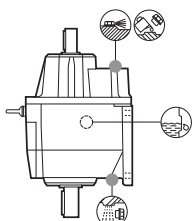


4x

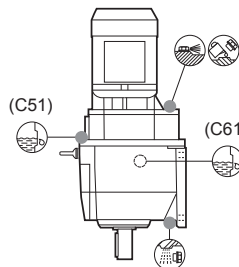
V5



W = Default

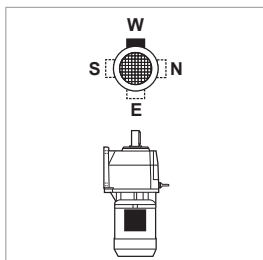
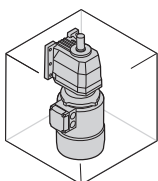


2x
3x

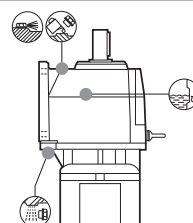
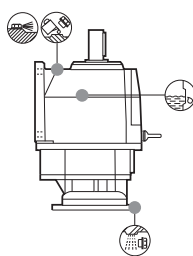
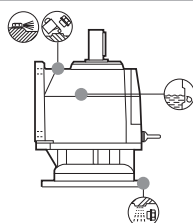
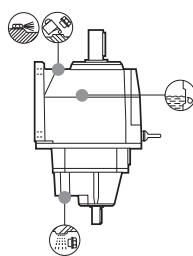
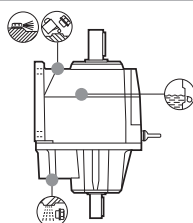


4x

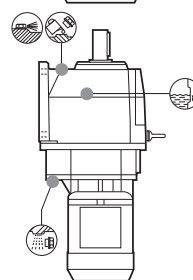
V6



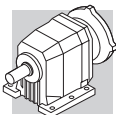
W = Default



2x
3x



4x



C 51 ... C 61

C_F

C_U

C_UF

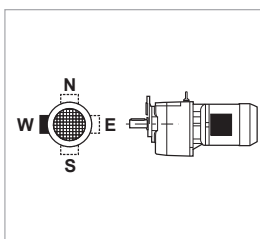
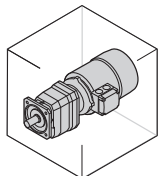
(B11)

_HS

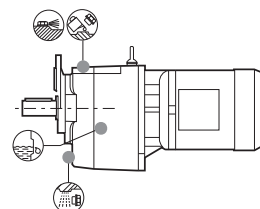
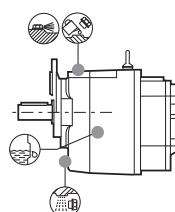
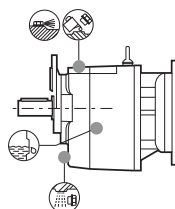
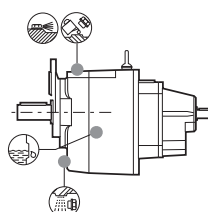
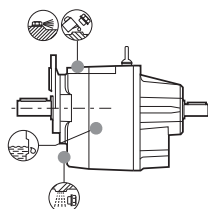
_P (IEC)

_S

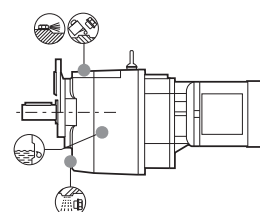
B5



W = Default

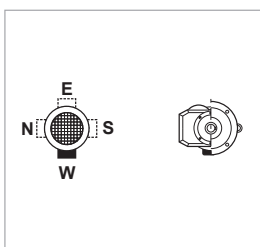
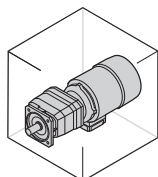


2x
3x

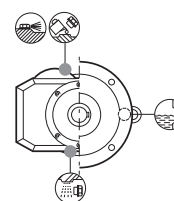
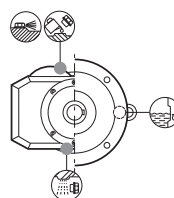
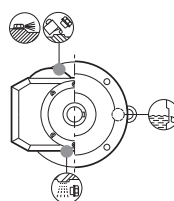
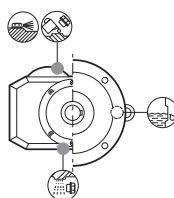
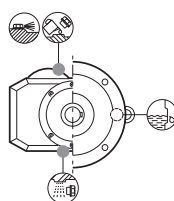


4x

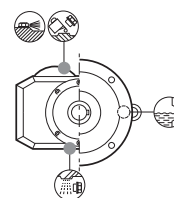
B51



W = Default

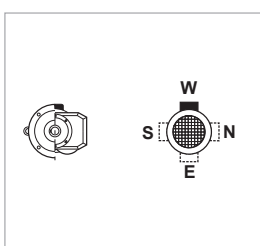
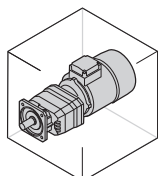


2x
3x

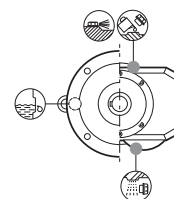
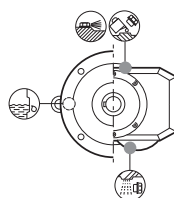
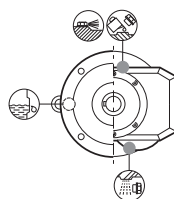
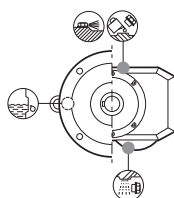
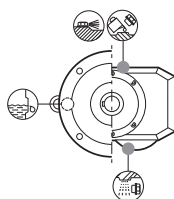


4x

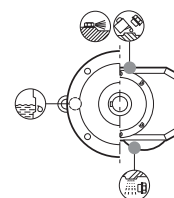
B53



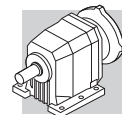
W = Default



2x
3x



4x



C 51 ... C 61

C_F

C_U

C_UF

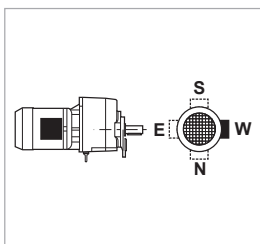
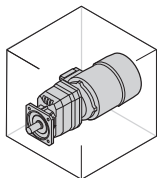
(B12)

_HS

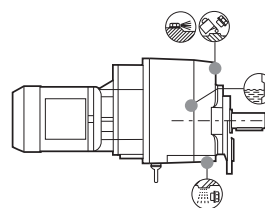
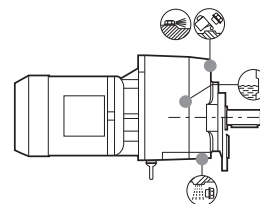
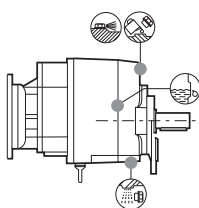
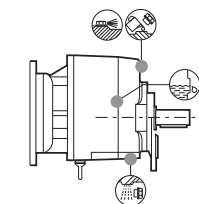
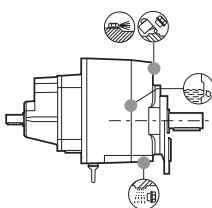
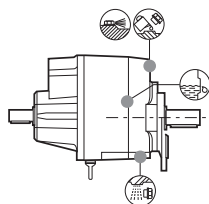
_P (IEC)

_S

B52



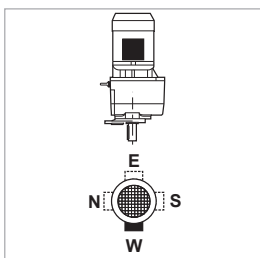
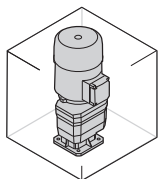
W = Default



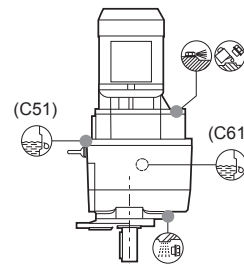
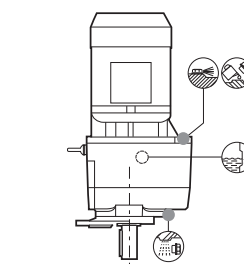
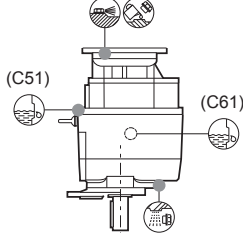
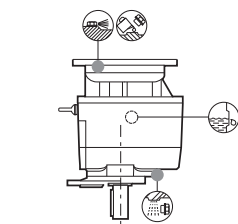
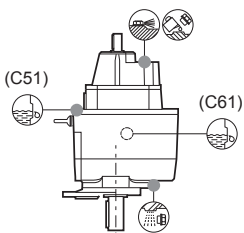
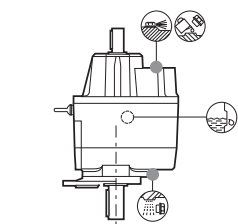
2x
3x

4x

V1



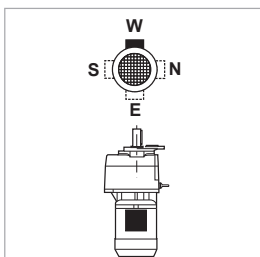
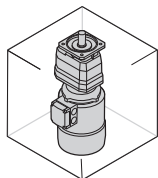
W = Default



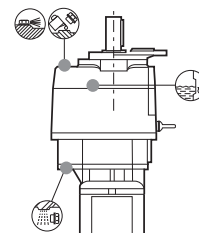
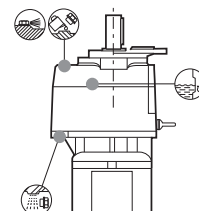
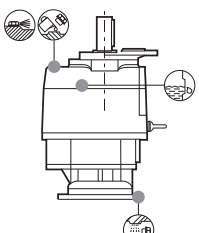
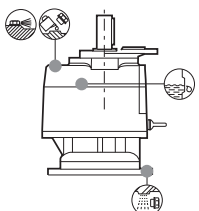
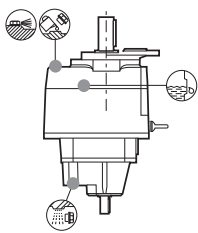
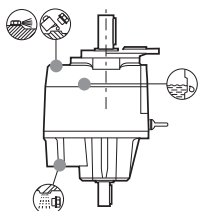
2x
3x

4x

V3

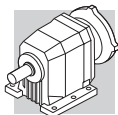


W = Default



2x
3x

4x



C 70 ... C 100

C_P

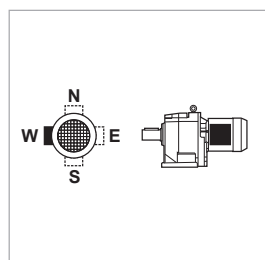
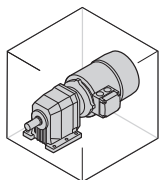
(B13)

_HS

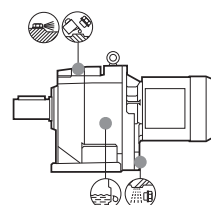
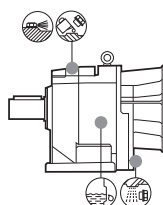
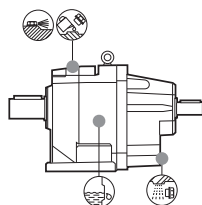
_P (IEC)

_S

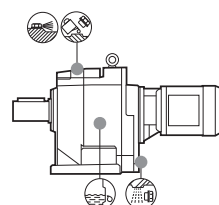
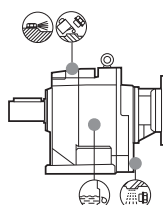
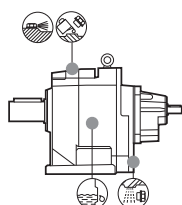
B3



W = Default

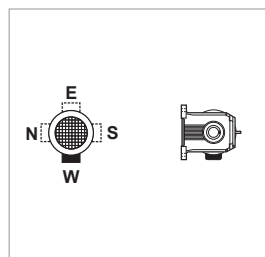
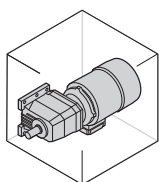


2x
3x

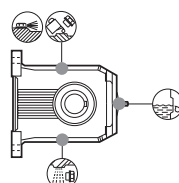
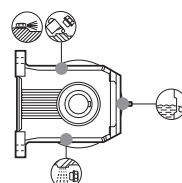
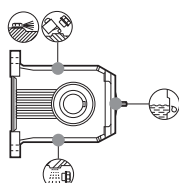


4x

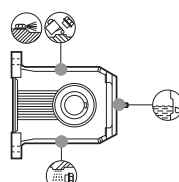
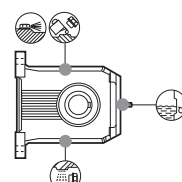
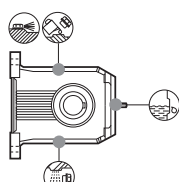
B6



W = Default

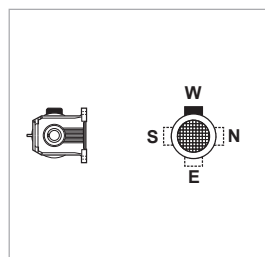
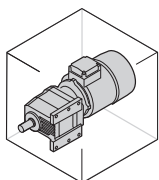


2x
3x

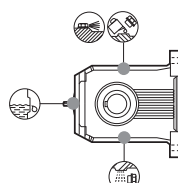
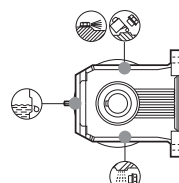
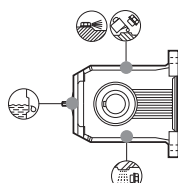


4x

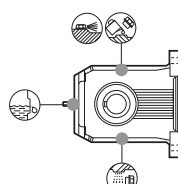
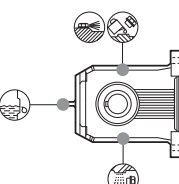
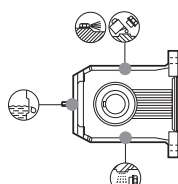
B7



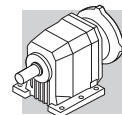
W = Default



2x
3x



4x



C 70 ... C 100

C_P

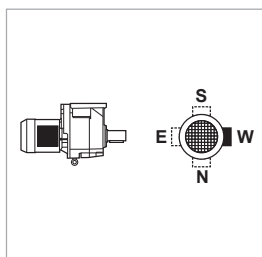
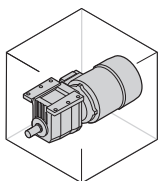
(B14)

_HS

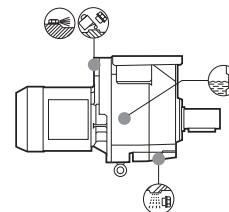
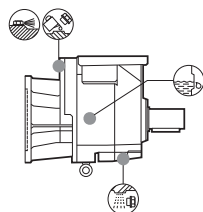
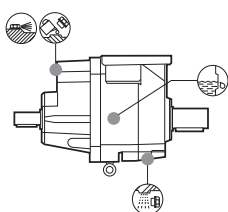
_P (IEC)

_S

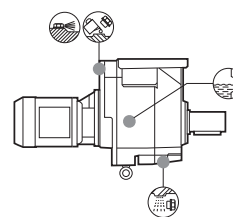
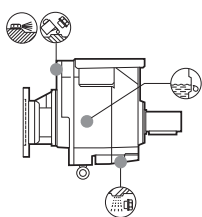
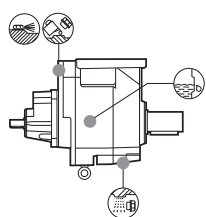
B8



W = Default

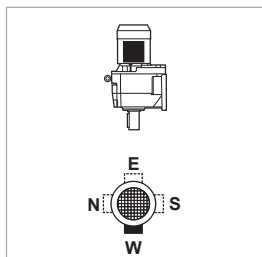
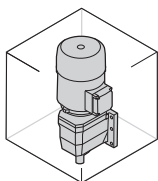


2x
3x

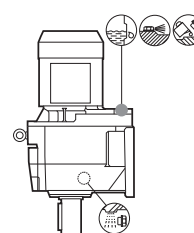
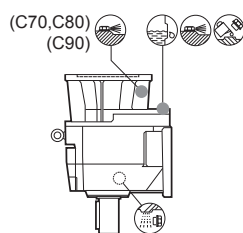
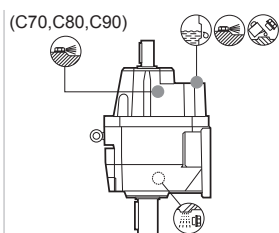


4x

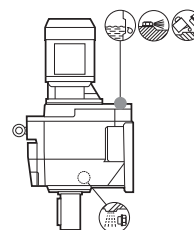
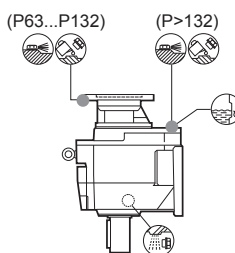
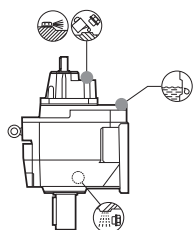
V5



W = Default

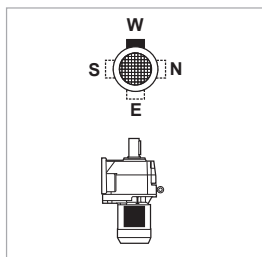
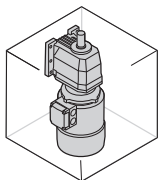


2x
3x

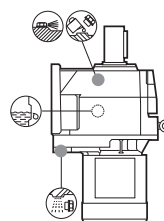
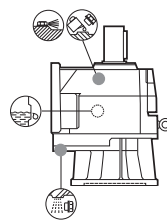
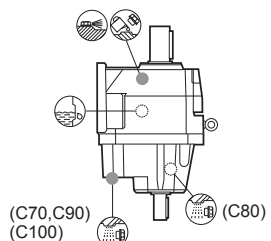


4x

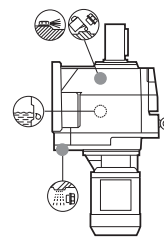
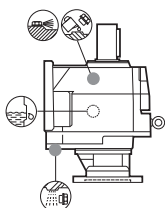
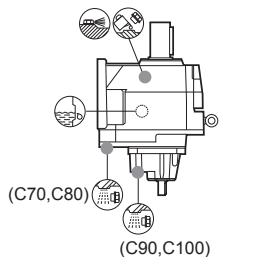
V6



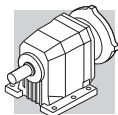
W = Default



2x
3x



4x



C 70 ... C 100

C_F

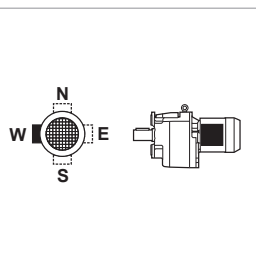
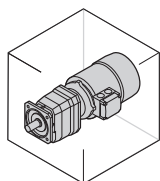
(B15)

_HS

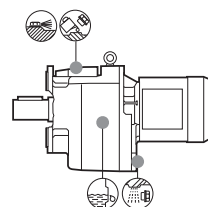
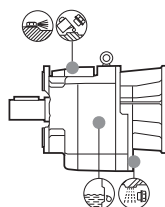
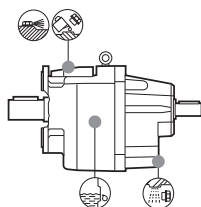
_P (IEC)

_S

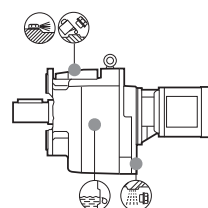
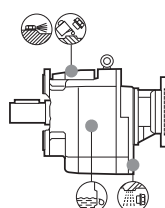
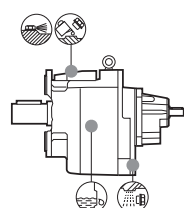
B5



W = Default

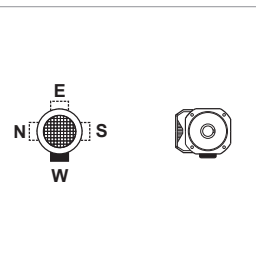
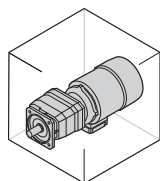


2x
3x

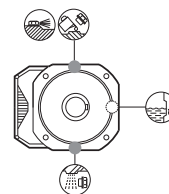
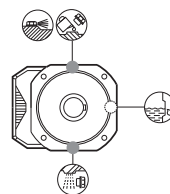
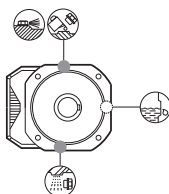


4x

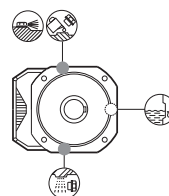
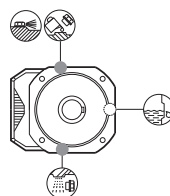
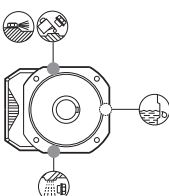
B51



W = Default

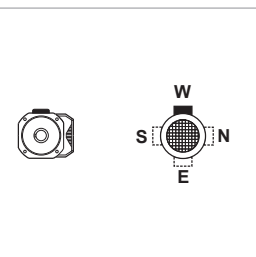
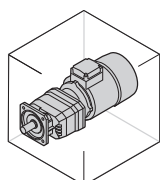


2x
3x

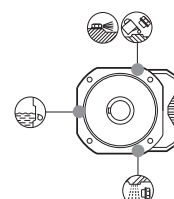
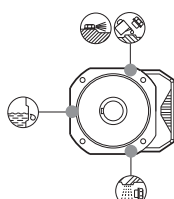
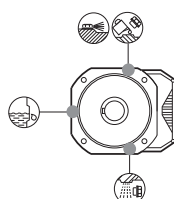


4x

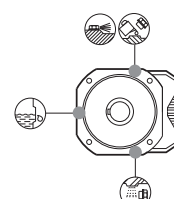
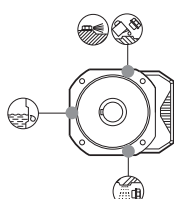
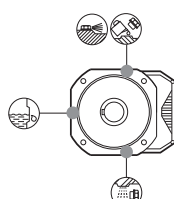
B53



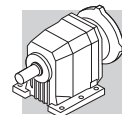
W = Default



2x
3x



4x



C 70 ... C 100

C_F

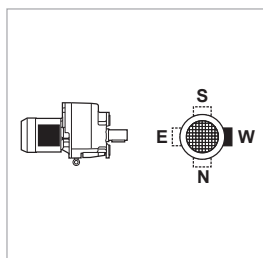
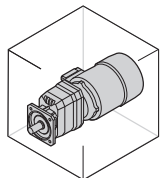
(B16)

_HS

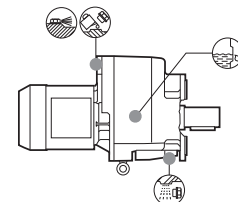
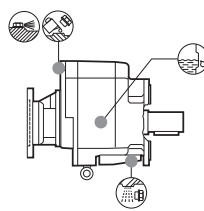
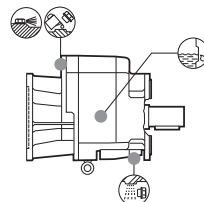
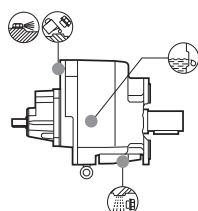
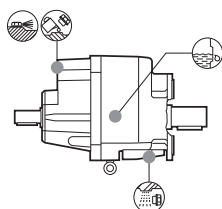
_P (IEC)

_S

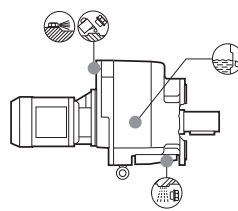
B52



W = Default

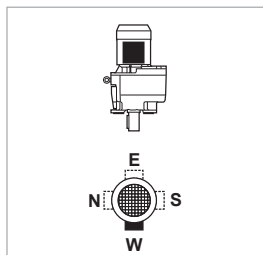
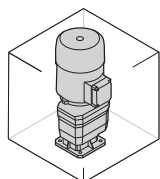


2x
3x

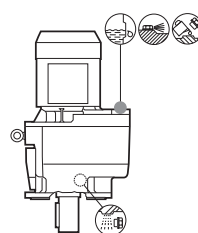
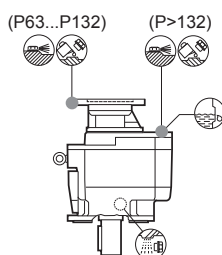
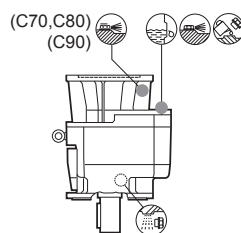
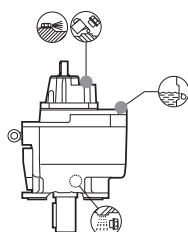
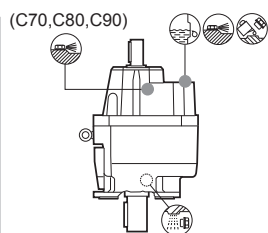


4x

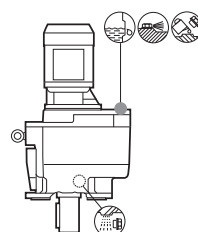
V1



W = Default

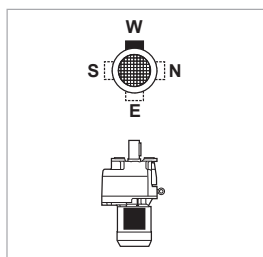
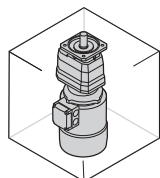


2x
3x

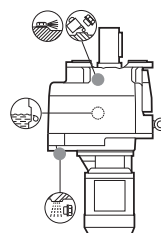
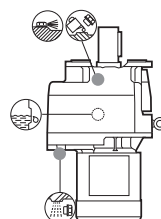
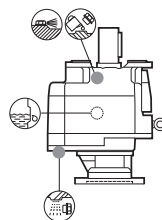
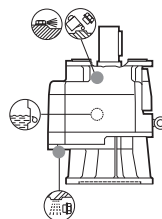
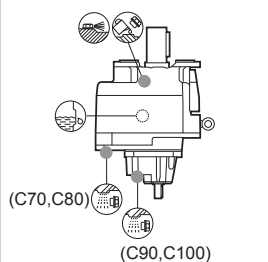
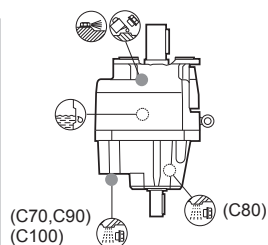


4x

V3

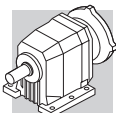


W = Default



2x
3x

4x



22 - CARICHI RADIALI

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 sistema 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.

Nelle formule che seguono l'indice (1) si riferisce a grandezze relative all'albero veloce, l'indice (2) all'albero lento.

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

22 - OVERHUNG LOADS

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 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 equations:

22 - RADIALKRÄFTE

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 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:

22 - CHARGES RADIALES

Les organes de transmission ca-lés 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 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.

Dans 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:

$$R_{c1} [N] = \frac{2000 \cdot M_1 [Nm] \cdot K_r}{d [mm]} ; R_{c2} [N] = \frac{2000 \cdot M_2 [Nm] \cdot K_r}{d [mm]} \quad (15)$$

M₁ [Nm]	Coppia applicata all'albero veloce	<i>Torque applied to input shaft</i>	Drehmoment auf die Antriebswelle	<i>Couple appliqué à l'arbre rapide</i>
M₂ [Nm]	Coppia erogata all'albero lento	<i>Torque drawn at output shaft</i>	Drehmoment auf die Abtriebswelle	<i>Couple délivré par l'arbre lent</i>
d [mm]	Diametro primitivo dell'organo calettato sull'albero	<i>Pitch diameter of element keyed onto shaft</i>	Teilkreisdurchmesser von Bewegungselement, der auf der Abtriebswelle aufgeschrupft ist	<i>Diamètre primitif de l'organe monté sur l'arbre</i>
K_r = 1	Trasmissione con catena	<i>Chain transmission</i>	Kettenantrieb	<i>Transmission à chaîne</i>
K_r = 1,25	Trasmissione con ingranaggio	<i>Gear transmission</i>	Zahnradantrieb	<i>Transmission à engrenage</i>
K_r = 1,5	Trasmissione a cinghia trapezoidale	<i>V-belt transmission</i>	Antrieb über Keilriemen	<i>Transmission à courroie trapézoïdale</i>
K_r = 2,0	Trasmissione a cinghia piatta	<i>Flat belt transmission</i>	Antrieb über Flachriemen	<i>Transmission à courroie plate</i>

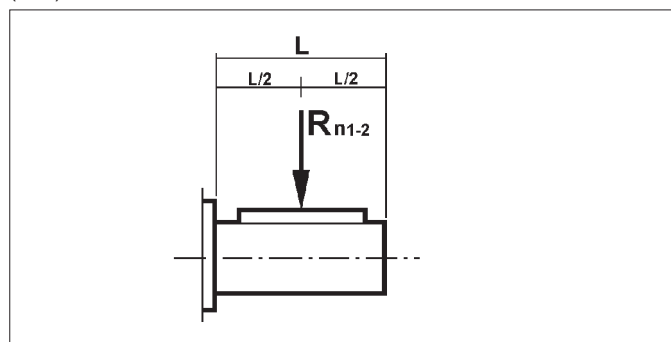
In base al punto di applicazione del carico sull'albero la verifica di compatibilità procederà in modi diversi e in particolare:

Verification of OHL capability varies depending on whether load applies at midpoint of shaft or it is shifted further out:

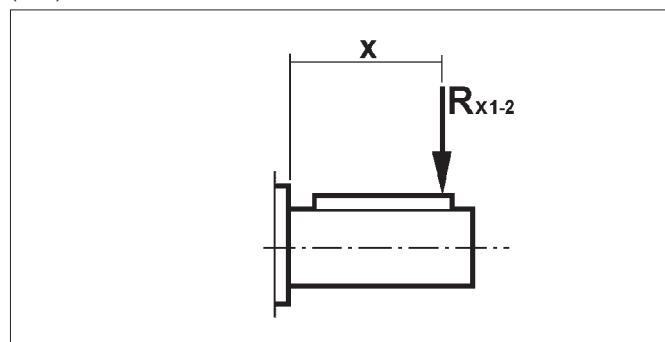
In Abhängigkeit zum Kraftangriffspunkt an der Welle erfolgt die Kontrolle hinsichtlich der Kompatibilität in unterschiedlicher Weise und insbesondere:

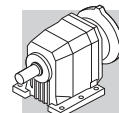
En fonction du point d'application de la charge sur l'arbre, la vérification de la compatibilité sera différente, plus particulièrement:

(B17)



(B18)





a) Applicazione in mezzzeria, tab. (B17)

Il carico precedentemente calcolato si dovrà confrontare con il corrispondente valore nominale esposto a catalogo e dovrà verificarsi:

$$R_{c1} \leq R_{n1} \quad [\text{albero veloce}]$$

oppure

$$R_{c2} \leq R_{n2} \quad [\text{albero lento}]$$

a) Load applied at midpoint of shaft, tab. (B17)

A comparison of shaft loading with catalogue OHL ratings should verify the following condition:

$$R_{c1} \leq R_{n1} \quad [\text{input shaft}]$$

or

$$R_{c2} \leq R_{n2} \quad [\text{output shaft}]$$

a) Kraftangriffspunkt in der Mitte, Tab. (B17)

Der zuvor errechnete Wert muß mit dem im Katalog angegebenen Nennwert verglichen werden. Es muß sich folgendes ergeben:

$$R_{c1} \leq R_{n1} \quad [\text{Antriebswelle}]$$

oder

$$R_{c2} \leq R_{n2} \quad [\text{Abtriebswelle}]$$

a) Application au milieu, tab. (B17)

La charge précédemment calculée doit être comparée avec la valeur nominale correspondante indiquée dans le catalogue, on doit vérifier :

$$R_{c1} \leq R_{n1} \quad [\text{arbre rapide}]$$

ou

$$R_{c2} \leq R_{n2} \quad [\text{arbre lent}]$$

b) Applicazione spostata dalla mezzzeria, tab. (B18)

L'applicazione del carico ad una distanza "x" dalla battuta dell'albero comporta il ricalcolo del valore ammissibile a detta distanza.

Il nuovo valore è individuato con i simboli R_{x1} (ingresso) e R_{x2} (uscita) e si ricava dai valori di catalogo, rispettivamente R_{n1} e R_{n2} , tramite l'elaborazione del fattore:

b) Load off the midpoint tab. (B18)

When load is shifted at an "x" distance from shaft shoulder, permissible load must be calculated for that distance.

Revised permissible overhung loads R_{x1} (input) and R_{x2} (output) are calculated respectively from original rated values R_{n1} and R_{n2} through factor:

b) Von der Mitte versetzter Kraftangriffspunkt Tab.(B18)

Der auf einer Distanz "x" vom Wellenansatz liegende Kraftangriffspunkt fordert eine erneute Berechnung des für diesen Abstand zulässigen Werts.

Der neue Wert wird mit den Symbolen R_{x1} (Antrieb) und R_{x2} (Abtrieb) gekennzeichnet und unter Anwendung der nachstehenden Faktorenberechnung aus den Katalogwerten R_{n1} und R_{n2} :

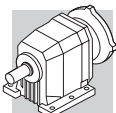
b) Application déplacée du milieu, tab. (B18)

L'application de la charge à une distance "x" de la butée de l'arbre implique un nouveau calcul de la valeur admissible à cette distance. La nouvelle valeur est indiquée par les symboles R_{x1} (entrée) et R_{x2} (sortie) ou peut être calculée d'après les valeurs de catalogue, respectivement R_{n1} et R_{n2} , en élaborant le facteur:

$$\frac{a}{b+x} \quad (16)$$

(B19)

	Costanti del riduttore / Load location factors / Getriebekonstanten / Constantes du réducteur					
	Albero lento / Output shaft Abtriebswelle / Arbre lent			Albero veloce / Input shaft Antriebswelle / Arbre rapide		
	a	b	c	a	b	c
C 05 2	38	18	250	—	—	—
C 11 2	46	26	450	21	1	300
C 21 2	53	28	550	40	20	350
C 21 3	53	28	550	21	1	300
C 31 2	60.5	30.5	750	41.5	21.5	350
C 31 3	60.5	30.5	750	21	1	300
C 35 2 - C 35 3	69.5	34.5	800	51.5	26.5	450
C 35 4	69.5	34.5	800	21	1	300
C 41 2 - C 41 3	69.5	34.5	850	51.5	26.5	450
C 41 4	69.5	34.5	850	40	20	350
C 51 2 - C 51 3	76.5	36.5	900	51.5	26.5	450
C 51 4	76.5	36.5	900	41.5	21.5	350
C 61 2 - C 61 3	95.5	45.5	1000	57.5	27.5	450
C 61 4	95.5	45.5	1000	51.5	26.5	450
C 70 2 - C 70 3	114	54	1200	86	31	1000
C 70 4	114	54	1200	49.5	24.5	450
C 80 2 - C 80 3	131	61	1500	86	31	1000
C 80 4	131	61	1500	49.5	24.5	450
C 90 2 - C 90 3	161	76	2000	116	46	1400
C 90 4	161	76	2000	49.5	24.5	450
C 100 2 - C 100 3	163.5	58.5	2500	116	46	1400
C 100 4	163.5	58.5	2500	49.5	24.5	450



La procedura di verifica comporta passi successivi che sono qui descritti.

Verification procedure is described here after.

Das Kontrollverfahren zieht die nachstehend beschriebenen Schritte nach sich.

La procédure de vérification comporte les pas successifs indiqués ici.

ALBERO VELOCE

INPUT SHAFT

ANTRIEBSWELLE

ARBRE RAPIDE

1. Calcolo di:

1. Calculate:

1. Berechnung von:

1. Calcul de:

$$R_{x1} = R_{n1} \cdot \frac{a}{b+x}$$

(17)

N.B. A condizione che:

N.B. Subject to condition:

HINWEIS unter der Bedingung, daß:

N.B. A condition que:

$$\frac{L}{2} \leq x \leq c$$

(18)

Infine si dovrà verificare che:

Finally, the following condition must be verified:

Dies als Voraussetzung, muß sich folgendes ergeben:

Ensuite, vérifier que:

$$R_{c1} \leq R_{x1}$$

(19)

ALBERO LENTO

OUTPUT SHAFT

ABTRIEBSWELLE

ARBRE LENT

1. Calcolo di:

1. Calculate:

1. Berechnung von:

1. Calcul de:

$$R_{x2} = R_{n2} \cdot \frac{a}{b+x}$$

(20)

N.B. A condizione che:

N.B. Subject to condition:

HINWEIS unter der Bedingung, daß:

N.B. A condition que:

$$\frac{L}{2} \leq x \leq c$$

(21)

Infine si dovrà verificare che:

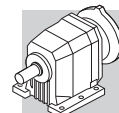
Finally, the following condition must be verified:

Dies als Voraussetzung, muß sich folgendes ergeben:

Ensuite, vérifier que:

$$R_{c2} \leq R_{x2}$$

(22)



23 - 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:

23 - 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:

23 - 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:

23 - 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 :

$$A_{n1} = R_{n1} \cdot 0,2$$

$$A_{n2} = R_{n2} \cdot 0,2$$

(23)

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.

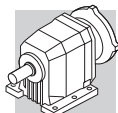
Die so errechneten Werte der zulässigen Axialkräfte beziehen sich auf den Fall, in dem die Axialkräfte gleichzeitig mit den Nennradialkräften einwirken.

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.



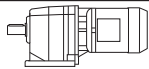
24 - DATI TECNICI MOTORIDUTTORI

24 - GEARMOTOR RATING CHARTS

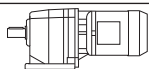
24 - GETRIEBEMOTOREN- AUSWAHLTABELLEN

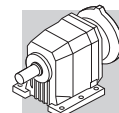
24 - DONNEES TECHNIQUES MOTOREDUCTEURS

0.09 kW

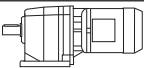
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N				
1.0	760	0.8	855.5	7000	C414_855.5 S05 M05A6	123	C414_855.5 P63 BN63A6	124
1.2	654	0.9	735.9	7000	C414_735.9 S05 M05A6	123	C414_735.9 P63 BN63A6	124
1.3	597	1.0	671.3	7000	C414_671.3 S05 M05A6	123	C414_671.3 P63 BN63A6	124
1.5	511	0.9	574.7	6500	C354_574.7 S05 M05A6	120	C354_574.7 P63 BN63A6	121
1.6	483	1.2	543.5	7000	C414_543.5 S05 M05A6	123	C414_543.5 P63 BN63A6	124
1.9	407	1.1	458.4	6500	C354_458.4 S05 M05A6	120	C354_458.4 P63 BN63A6	121
2.0	400	1.5	450.2	7000	C414_450.2 S05 M05A6	123	C414_450.2 P63 BN63A6	124
2.6	306	1.5	344.3	6500	C354_344.3 S05 M05A6	120	C354_344.3 P63 BN63A6	121
2.6	296	2.0	333.4	7000	C414_333.4 S05 M05A6	123	C414_333.4 P63 BN63A6	124
3.2	250	1.1	274.7	5500	C313_274.7 S05 M05A6	117	C313_274.7 P63 BN63A6	118
3.9	205	1.0	225.8	5000	C213_225.8 S05 M05A6	114	C213_225.8 P63 BN63A6	115
4.1	196	1.5	215.6	5500	C313_215.6 S05 M05A6	117	C313_215.6 P63 BN63A6	118
4.9	162	1.2	178.5	5000	C213_178.5 S05 M05A6	114	C213_178.5 P63 BN63A6	115
5.8	138	1.5	151.7	5000	C213_151.7 S05 M05A6	114	C213_151.7 P63 BN63A6	115
5.9	135	2.2	148.4	5500	C313_148.4 S05 M05A6	117	C313_148.4 P63 BN63A6	118
7.2	111	1.8	122.2	5000	C213_122.2 S05 M05A6	114	C213_122.2 P63 BN63A6	115
7.2	111	2.7	122.4	5500	C313_122.4 S05 M05A6	117	C313_122.4 P63 BN63A6	118
8.0	100	2.0	110.0	5000	C213_110.0 S05 M05A6	114	C213_110.0 P63 BN63A6	115
8.8	91	2.2	100.2	5000	C213_100.2 S05 M05A6	114	C213_100.2 P63 BN63A6	115
10.7	75	2.7	82.6	5000	C213_82.6 S05 M05A6	114	C213_82.6 P63 BN63A6	115
13.3	61	1.5	66.2	2000	C112_66.2 S05 M05A6	111	C112_66.2 P63 BN63A6	112
14.8	55	1.5	59.6	2000	C112_59.6 S05 M05A6	111	C112_59.6 P63 BN63A6	112
16.0	51	1.8	55.2	2000	C112_55.2 S05 M05A6	111	C112_55.2 P63 BN63A6	112
17.7	46	2.2	49.7	2000	C112_49.7 S05 M05A6	111	C112_49.7 P63 BN63A6	112
18.5	44	2.0	47.6	2000	C112_47.6 S05 M05A6	111	C112_47.6 P63 BN63A6	112
19.7	42	1.1	44.7	1170	C052_44.7 S05 M05A6	110	C112_37.0 P63 BN63A6	112
21.8	38	1.2	40.3	1150	C052_40.3 S05 M05A6	110		
23.8	34	2.6	37.0	2000	C112_37.0 S05 M05A6	111		
24.2	34	1.3	36.4	1140	C052_36.4 S05 M05A6	110		
26.8	31	1.5	32.8	1110	C052_32.8 S05 M05A6	110	C112_21.0 P63 BN63A6	112
30	27	1.7	44.7	1170	C052_44.7 S0 M0B4	110		
33	25	1.8	40.3	990	C052_40.3 S0 M0B4	110		
37	22	2.0	36.4	980	C052_36.4 S0 M0B4	110		
41	20	2.3	32.8	960	C052_32.8 S0 M0B4	110	C112_13.4 P63 BN63A6	112
42	19	2.3	21.0	1020	C052_21.0 S05 M05A6	110		
50	16	2.7	27.1	930	C052_27.1 S0 M0B4	110		
56	15	3.1	15.6	950	C052_15.6 S05 M05A6	110		
66	12	6.5	13.4	2000	C112_13.4 S05 M05A6	111	C112_10.1 P63 BN63A6	112
71	12	3.9	12.5	900	C052_12.5 S05 M05A6	110		
78	10	4.3	11.2	880	C052_11.2 S05 M05A6	110		
88	9	7.7	10.1	2000	C112_10.1 S05 M05A6	111		
95	9	5.2	9.3	830	C052_9.3 S05 M05A6	110	C112_6.2 P63 BN63A6	112
119	7	6.5	7.4	780	C052_7.4 S05 M05A6	110		
132	6	7.3	6.7	760	C052_6.7 S05 M05A6	110		
146	6	10.9	6.2	1960	C112_6.2 S05 M05A6	111		
159	5	8.8	5.5	720	C052_5.5 S05 M05A6	110	C112_4.9 P63 BN63A6	112
187	4	12.6	4.9	1810	C112_4.9 S05 M05A6	111		
249	3	15.0	3.7	1650	C112_3.7 S05 M05A6	111		
329	2	17.3	2.8	1510	C112_2.8 S05 M05A6	111		

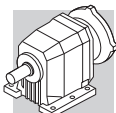
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N				
0.98	1061	0.9	884.9	10000	C414_855.5 S05 M05A4	123	C514_884.9 P63 BN63B6	127
1.2	860	1.2	717.7	10000			C514_717.7 P63 BN63B6	127
1.5	681	0.9	855.5	7000			C414_855.5 P63 BN63A4	124
1.6	643	1.6	808.0	10000			C514_808.0 P63 BN63A4	127
1.7	621	1.0	780.4	7000	C414_780.4 S05 M05A4	123	C414_780.4 P63 BN63A4	124
1.8	586	1.0	735.9	7000	C414_735.9 S05 M05A4	123	C414_735.9 P63 BN63A4	124

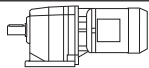


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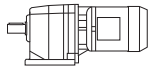
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
2.0	534	1.1	671.3	7000	C414_671.3 S05 M05A4	123	C414_671.3 P63 BN63A4	124
2.0	530	0.8	665.9	6500	C354_665.9 S05 M05A4	120	C354_665.9 P63 BN63A4	121
2.2	483	0.9	606.6	6500	C354_606.6 S05 M05A4	120	C354_606.6 P63 BN63A4	121
2.2	474	1.3	595.8	7000	C414_595.8 S05 M05A4	123	C414_595.8 P63 BN63A4	124
2.3	457	1.0	574.7	6500	C354_574.7 S05 M05A4	120	C354_574.7 P63 BN63A4	121
2.4	433	1.4	543.5	7000	C414_543.5 S05 M05A4	123	C414_543.5 P63 BN63A4	124
2.5	417	1.1	523.5	6500	C354_523.5 S05 M05A4	120	C354_523.5 P63 BN63A4	121
2.7	393	1.5	493.5	7000	C414_493.5 S05 M05A4	123	C414_493.5 P63 BN63A4	124
2.9	365	1.2	458.4	6500	C354_458.4 S05 M05A4	120	C354_458.4 P63 BN63A4	121
2.9	358	1.7	450.2	7000	C414_450.2 S05 M05A4	123	C414_450.2 P63 BN63A4	124
3.1	333	1.8	418.5	7000	C414_418.5 S05 M05A4	123	C414_418.5 P63 BN63A4	124
3.1	332	1.4	417.6	6500	C354_417.6 S05 M05A4	120	C354_417.6 P63 BN63A4	121
3.4	304	2.0	381.8	7000	C414_381.8 S05 M05A4	123	C414_381.8 P63 BN63A4	124
3.5	301	1.5	377.9	6500	C354_377.9 S05 M05A4	120	C354_377.9 P63 BN63A4	121
3.8	274	1.6	344.3	6500	C354_344.3 S05 M05A4	120	C354_344.3 P63 BN63A4	121
3.9	265	2.3	333.4	7000	C414_333.4 S05 M05A4	123	C414_333.4 P63 BN63A4	124
4.1	254	1.8	318.9	6500	C354_318.9 S05 M05A4	120	C354_318.9 P63 BN63A4	121
4.3	242	2.5	304.2	7000	C414_304.2 S05 M05A4	123	C414_304.2 P63 BN63A4	124
4.8	223	1.1	274.7	5500	C313_274.7 S05 M05A4	117	C313_274.7 P63 BN63A4	118
4.9	219	0.9	178.5	5000	C213_178.5 S05 M05B6	114	C213_178.5 P63 BN63B6	115
5.0	209	2.9	263.0	7000	C414_263.0 S05 M05A4	123	C414_263.0 P63 BN63A4	124
5.3	201	1.1	247.3	5500	C313_247.3 S05 M05A4	117	C313_247.3 P63 BN63A4	118
5.4	197	1.0	160.7	5000	C213_160.7 S05 M05B6	114	C213_160.7 P63 BN63B6	115
5.8	184	1.0	225.8	5000	C213_225.8 S05 M05A4	114	C213_225.8 P63 BN63A4	115
6.1	175	1.7	215.6	5500	C313_215.6 S05 M05A4	117	C313_215.6 P63 BN63A4	118
6.4	165	1.0	203.2	5000	C213_203.2 S05 M05A4	114	C213_203.2 P63 BN63A4	115
6.7	158	1.9	194.1	5500	C313_194.1 S05 M05A4	117	C313_194.1 P63 BN63A4	118
7.3	145	1.4	178.5	5000	C213_178.5 S05 M05A4	114	C213_178.5 P63 BN63A4	115
7.8	136	2.2	167.5	5500	C313_167.5 S05 M05A4	117	C313_167.5 P63 BN63A4	118
8.2	131	1.5	160.7	5000	C213_160.7 S05 M05A4	114	C213_160.7 P63 BN63A4	115
8.6	123	1.6	151.7	5000	C213_151.7 S05 M05A4	114	C213_151.7 P63 BN63A4	115
8.8	121	2.5	148.4	5500	C313_148.4 S05 M05A4	117	C313_148.4 P63 BN63A4	118
9.6	111	1.8	136.5	5000	C213_136.5 S05 M05A4	114	C213_136.5 P63 BN63A4	115
9.8	109	2.8	133.6	5500	C313_133.6 S05 M05A4	117	C313_133.6 P63 BN63A4	118
10.7	99	2.0	122.2	5000	C213_122.2 S05 M05A4	114	C213_122.2 P63 BN63A4	115
10.7	100	3.0	122.4	5500	C313_122.4 S05 M05A4	117	C313_122.4 P63 BN63A4	118
11.9	89	2.2	110.0	5000	C213_110.0 S05 M05A4	114	C213_110.0 P63 BN63A4	115
13.1	81	2.5	100.2	5000	C213_100.2 S05 M05A4	114	C213_100.2 P63 BN63A4	115
14.5	73	2.7	90.2	5000	C213_90.2 S05 M05A4	114	C213_90.2 P63 BN63A4	115
15.9	67	3.0	82.6	5000	C213_82.6 S05 M05A4	114	C213_82.6 P63 BN63A4	115
19.8	55	1.6	66.2	2000	C112_66.2 S05 M05A4	111	C112_66.2 P63 BN63A4	112
22.0	50	1.7	59.6	2000	C112_59.6 S05 M05A4	111	C112_59.6 P63 BN63A4	112
23.0	47	2.4	57.0	5000	C212_57.0 S05 M05A4	114	C212_57.0 P63 BN63A4	115
23.7	46	2.0	55.2	2000	C112_55.2 S05 M05A4	111	C112_55.2 P63 BN63A4	112
26.4	41	2.4	49.7	2000	C112_49.7 S05 M05A4	111	C112_49.7 P63 BN63A4	112
27.5	40	2.3	47.6	2000	C112_47.6 S05 M05A4	111	C112_47.6 P63 BN63A4	112
29.3	37	1.2	44.7	1010	C052_44.7 S05 M05A4	110		
31	36	2.8	42.9	2000	C112_42.9 S05 M05A4	111	C112_42.9 P63 BN63A4	112
33	34	1.3	40.3	990	C052_40.3 S05 M05A4	110		
35	31	2.9	37.0	2000	C112_37.0 S05 M05A4	111	C112_37.0 P63 BN63A4	112
36	30	1.5	36.4	980	C052_36.4 S05 M05A4	110		
39	28	3.6	33.4	2000	C112_33.4 S05 M05A4	111	C112_33.4 P63 BN63A4	112
40	27	1.6	32.8	960	C052_32.8 S05 M05A4	110		
48	23	2.0	27.1	930	C052_27.1 S05 M05A4	110		
56	20	2.3	15.6	900	C052_15.6 S05 M05B6	110		
62	18	2.6	21.0	890	C052_21.0 S05 M05A4	110		
69	16	2.5	18.9	860	C052_18.9 S05 M05A4	110		
78	14	3.2	11.2	850	C052_11.2 S05 M05B6	110		
84	13	3.1	15.6	820	C052_15.6 S05 M05A4	110		
105	10	3.8	12.5	780	C052_12.5 S05 M05A4	110		
117	9	4.3	11.2	760	C052_11.2 S05 M05A4	110		
130	8	5.4	6.7	740	C052_6.7 S05 M05B6	110		
141	8	3.9	9.3	720	C052_9.3 S05 M05A4	110		
177	6	4.8	7.4	680	C052_7.4 S05 M05A4	110		
196	6	5.4	6.7	660	C052_6.7 S05 M05A4	110		
225	5	10.9	6.2	1700	C112_6.2 S05 M05A4	111	C112_6.2 P63 BN63A4	112

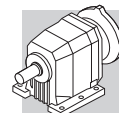


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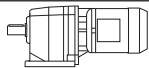
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
288	4	12.7	4.9	1570	C112_4.9 S05 M05A4	111	C112_4.9 P63 BN63A4	112
383	3	14.8	3.7	1430	C112_3.7 S05 M05A4	111	C112_3.7 P63 BN63A4	112
506	2	17.2	2.8	1310	C112_2.8 S05 M05A4	111	C112_2.8 P63 BN63A4	112

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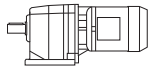
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
0.66	2367	1.0	1362	25000			C704_1362 P71 BN71A6	133
0.84	1858	1.2	1069	25000			C704_1069 P71 BN71A6	133
1.20	1262	1.3	726.3	16000	C614_726.3 S1 M1SC6	129	C614_726.3 P71 BN71A6	130
1.3	1248	0.8	717.7	10000	C514_717.7 S1 M1SC6	126	C514_717.7 P71 BN71A6	127
1.5	1049	1.0	884.9	10000			C514_884.9 P63 BN63B4	127
1.6	958	1.0	808.0	10000			C514_808.0 P63 BN63B4	127
1.6	955	1.0	549.7	10000	C514_549.7 S1 M1SC6	126	C514_549.7 P71 BN71A6	127
1.8	861	1.9	726.3	16000			C614_726.3 P63 BN63B4	130
1.8	851	1.2	717.7	10000			C514_717.7 P63 BN63B4	127
1.9	806	1.2	463.9	10000	C514_463.9 S1 M1SC6	126	C514_463.9 P71 BN71A6	127
1.9	803	2.0	462.0	16000	C614_462.0 S1 M1SC6	129	C614_462.0 P71 BN71A6	130
2.0	796	0.8	671.3	7000	C414_671.3 S05 M05B4	123	C414_671.3 P63 BN63B4	124
2.0	783	0.8	450.2	7000	C414_450.2 S1 M1SC6	123	C414_450.2 P71 BN71A6	124
2.0	777	1.3	655.4	10000			C514_655.4 P63 BN63B4	127
2.2	727	0.8	418.5	7000	C414_418.5 S1 M1SC6	123	C414_418.5 P71 BN71A6	124
2.2	723	1.4	415.7	10000	C514_415.7 S1 M1SC6	126	C514_415.7 P71 BN71A6	127
2.2	706	0.8	595.8	7000	C414_595.8 S05 M05B4	123	C414_595.8 P63 BN63B4	124
2.4	660	1.5	379.6	10000	C514_379.6 S1 M1SC6	126	C514_379.6 P71 BN71A6	127
2.4	644	0.9	543.5	7000	C414_543.5 S05 M05B4	123	C414_543.5 P63 BN63B4	124
2.6	598	0.8	344.3	6500	C354_344.3 S1 M1SC6	120	C354_344.3 P71 BN71A6	121
2.7	585	1.0	493.5	7000	C414_493.5 S05 M05B4	123	C414_493.5 P63 BN63B4	124
2.9	543	0.8	458.4	6500	C354_458.4 S05 M05B4	120	C354_458.4 P63 BN63B4	121
2.9	534	1.1	450.2	7000	C414_450.2 S05 M05B4	123	C414_450.2 P63 BN63B4	124
3.2	496	1.2	418.5	7000	C414_418.5 S05 M05B4	123	C414_418.5 P63 BN63B4	124
3.2	495	0.9	417.6	6500	C354_417.6 S05 M05B4	120	C354_417.6 P63 BN63B4	121
3.5	452	1.3	381.8	7000	C414_381.8 S05 M05B4	123	C414_381.8 P63 BN63B4	124
3.5	448	1.0	377.9	6500	C354_377.9 S05 M05B4	120	C354_377.9 P63 BN63B4	121
3.8	408	1.1	344.3	6500	C354_344.3 S05 M05B4	120	C354_344.3 P63 BN63B4	121
4.0	395	1.5	333.4	7000	C414_333.4 S05 M05B4	123	C414_333.4 P63 BN63B4	124
4.1	378	1.2	318.9	6500	C354_318.9 S05 M05B4	120	C354_318.9 P63 BN63B4	121
4.3	371	1.6	209.1	7000	C413_209.1 S1 M1SC6	123	C413_209.1 P71 BN71A6	124
4.3	360	1.7	304.2	7000	C414_304.2 S05 M05B4	123	C414_304.2 P63 BN63B4	124
4.5	344	1.3	290.6	6500	C354_290.6 S05 M05B4	120	C354_290.6 P63 BN63B4	121
4.7	339	1.8	190.8	7000	C413_190.8 S1 M1SC6	123	C413_190.8 P71 BN71A6	124
4.8	334	1.3	188.0	6500			C353_188.0 P71 BN71A6	121
4.8	330	0.9	186.0	5500	C313_186.0 S1 M1SC6	117	C313_186.0 P71 BN71A6	118
5.0	312	1.9	263.0	7000	C414_263.0 S05 M05B4	123	C414_263.0 P63 BN63B4	124
5.2	302	1.5	255.0	6500	C354_255.0 S05 M05B4	120	C354_255.0 P63 BN63B4	121
5.4	298	1.0	167.5	5500	C313_167.5 S1 M1SC6	117	C313_167.5 P71 BN71A6	118
5.7	275	1.6	232.3	6500	C354_232.3 S05 M05B4	120	C354_232.3 P63 BN63B4	121
6.1	262	1.7	147.6	6500	C353_147.6 S1 M1SC6	120	C353_147.6 P71 BN71A6	121
6.1	261	1.1	215.6	5500	C313_215.6 S05 M05B4	117	C313_215.6 P63 BN63B4	118
6.8	235	1.3	194.1	5500	C313_194.1 S05 M05B4	117	C313_194.1 P63 BN63B4	118
7.4	216	0.9	178.5	5000	C213_178.5 S05 M05B4	114	C213_178.5 P63 BN63B4	115
7.9	203	1.5	167.5	5500	C313_167.5 S05 M05B4	117	C313_167.5 P63 BN63B4	118
8.7	184	1.1	151.7	5000	C213_151.7 S05 M05B4	114	C213_151.7 P63 BN63B4	115
8.9	180	1.7	148.4	5500	C313_148.4 S05 M05B4	117	C313_148.4 P63 BN63B4	118
9.7	165	1.2	136.5	5000	C213_136.5 S05 M05B4	114	C213_136.5 P63 BN63B4	115
9.9	162	1.9	133.6	5500	C313_133.6 S05 M05B4	117	C313_133.6 P63 BN63B4	118
10.8	148	1.4	122.2	5000	C213_122.2 S05 M05B4	114	C213_122.2 P63 BN63B4	115
10.8	148	2.0	122.4	5500	C313_122.4 S05 M05B4	117	C313_122.4 P63 BN63B4	118
12.0	133	1.5	110.0	5000	C213_110.0 S05 M05B4	114	C213_110.0 P63 BN63B4	115
12.0	133	2.2	110.2	5500	C313_110.2 S05 M05B4	117	C313_110.2 P63 BN63B4	118
12.8	125	2.4	103.3	5500	C313_103.3 S05 M05B4	117	C313_103.3 P63 BN63B4	118
13.2	121	1.6	100.2	5000	C213_100.2 S05 M05B4	114	C213_100.2 P63 BN63B4	115

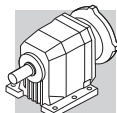


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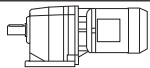
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
14.2	113	2.7	93.0	5500	C313_93.0 S05 M05B4	117	C313_93.0 P63 BN63B4	118
14.6	109	1.8	90.2	5000	C213_90.2 S05 M05B4	114	C213_90.2 P63 BN63B4	115
16.0	100	2.0	82.6	5000	C213_82.6 S05 M05B4	114	C213_82.6 P63 BN63B4	115
16.0	100	3.0	82.6	5500	C313_82.6 S05 M05B4	117	C313_82.6 P63 BN63B4	118
17.8	90	2.2	74.4	5000	C213_74.4 S05 M05B4	114	C213_74.4 P63 BN63B4	115
20.0	82	1.1	66.2	2000	C112_66.2 S05 M05B4	111	C112_66.2 P63 BN63B4	112
20.2	79	2.5	65.3	5000	C213_65.3 S05 M05B4	114	C213_65.3 P63 BN63B4	115
20.9	78	1.7	63.3	5000	C212_63.3 S05 M05B4	114	C212_63.3 P63 BN63B4	115
22.1	74	1.1	59.6	2000	C112_59.6 S05 M05B4	111	C112_59.6 P63 BN63B4	112
22.4	71	2.7	58.8	5000	C213_58.8 S05 M05B4	114	C213_58.8 P63 BN63B4	115
23.2	70	1.6	57.0	5000	C212_57.0 S05 M05B4	114	C212_57.0 P63 BN63B4	115
23.9	68	1.3	55.2	2000	C112_55.2 S05 M05B4	111	C112_55.2 P63 BN63B4	112
24.1	68	2.3	54.7	5000	C212_54.7 S05 M05B4	114	C212_54.7 P63 BN63B4	115
26.6	62	1.6	49.7	2000	C112_49.7 S05 M05B4	111	C112_49.7 P63 BN63B4	112
26.8	61	2.3	49.3	5000	C212_49.3 S05 M05B4	114	C212_49.3 P63 BN63B4	115
27.7	59	1.5	47.6	2000	C112_47.6 S05 M05B4	111	C112_47.6 P63 BN63B4	112
31	53	1.9	42.9	2000	C112_42.9 S05 M05B4	111	C112_42.9 P63 BN63B4	112
33	50	0.9	40.3	850	C052_40.3 S05 M05B4	110		
36	45	1.0	36.4	850	C052_36.4 S05 M05B4	110		
36	46	2.0	37.0	2000	C112_37.0 S05 M05B4	111	C112_37.0 P63 BN63B4	112
40	41	1.1	32.8	840	C052_32.8 S05 M05B4	110		
40	41	2.4	33.4	2000	C112_33.4 S05 M05B4	111	C112_33.4 P63 BN63B4	112
45	37	2.5	29.5	2000	C112_29.5 S05 M05B4	111	C112_29.5 P63 BN63B4	112
49	34	1.3	27.1	820	C052_27.1 S05 M05B4	110		
52	31	2.8	25.4	2000	C112_25.4 S05 M05B4	111	C112_25.4 P63 BN63B4	112
58	28	3.0	22.8	2000	C112_22.8 S05 M05B4	111	C112_22.8 P63 BN63B4	112
63	26	1.7	21.0	810	C052_21.0 S05 M05B4	110		
64	26	3.2	20.6	2000	C112_20.6 S05 M05B4	111	C112_20.6 P63 BN63B4	112
70	23	1.7	18.9	790	C052_18.9 S05 M05B4	110		
71	23	3.4	18.6	2000	C112_18.6 S05 M05B4	111	C112_18.6 P63 BN63B4	112
77	21	3.6	17.2	2000	C112_17.2 S05 M05B4	111	C112_17.2 P63 BN63B4	112
85	19	2.1	15.6	760	C052_15.6 S05 M05B4	110		
106	15	2.6	12.5	740	C052_12.5 S05 M05B4	110		
118	14	2.9	11.2	720	C052_11.2 S05 M05B4	110		
142	11	2.6	9.3	690	C052_9.3 S05 M05B4	110		
178	9	3.3	7.4	650	C052_7.4 S05 M05B4	110		
197	8	3.6	6.7	640	C052_6.7 S05 M05B4	110		
223	7	7.2	6.2	1690	C112_6.2 S05 M05B4	111	C112_6.2 P63 BN63B4	112
223	7	7.3	12.1	1700	C112_12.1 S05 M05A2	111	C112_12.1 P63 BN63A2	112
240	7	4.4	5.5	600	C052_5.5 S05 M05B4	110		
268	6	8.1	10.1	1600	C112_10.1 S05 M05A2	111	C112_10.1 P63 BN63A2	112
286	6	8.4	4.9	1560	C112_4.9 S05 M05B4	111	C112_4.9 P63 BN63B4	112
298	5	8.8	9.1	1550	C112_9.1 S05 M05A2	111	C112_9.1 P63 BN63A2	112
354	5	9.8	7.6	1470	C112_7.6 S05 M05A2	111	C112_7.6 P63 BN63A2	112
381	4	9.8	3.7	1430	C112_3.7 S05 M05B4	111	C112_3.7 P63 BN63B4	112
393	4	10.4	6.9	1420	C112_6.9 S05 M05A2	111	C112_6.9 P63 BN63A2	112
502	3	11.4	2.8	1300	C112_2.8 S05 M05B4	111	C112_2.8 P63 BN63B4	112
577	3	13.4	4.9	1250	C112_4.9 S05 M05A2	111	C112_4.9 P63 BN63A2	112
770	2	16.0	3.7	1140	C112_3.7 S05 M05A2	111	C112_3.7 P63 BN63A2	112
1015	2	18.7	2.8	1040	C112_2.8 S05 M05A2	111	C112_2.8 P63 BN63A2	112

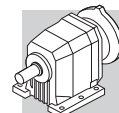
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
0.61	3575	1.1	1481	35000			C804_1481 P71 BN71B6	136
0.77	2820	1.4	1168	35000			C804_1168 P71 BN71B6	136
1.2	1753	0.9	726.3	16000	C614_726.3 S1 M1SD6	129	C614_726.3 P71 BN71B6	130
1.6	1330	0.8	808.0	10000			C514_808.0 P63 BN63C4	127
1.6	1327	0.8	549.7	10000	C514_549.7 S1 M1SD6	126	C514_549.7 P71 BN71B6	127
1.9	1134	0.9	717.7	10000			C514_717.7 P71 BN71A4	127
1.9	1120	0.9	463.9	10000	C514_463.9 S1 M1SD6	126	C514_463.9 P71 BN71B6	127
2.0	1101	1.5	668.8	16000			C614_668.8 P63 BN63C4	130

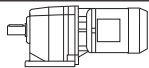


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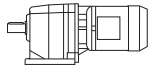
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
2.4	894	1.8	370.1	16000	C614_370.1 S1 M1SD6	129	C614_370.1 P71 BN71B6	130
2.5	869	1.2	549.7	10000			C514_549.7 P71 BN71A4	127
2.9	741	0.8	450.2	7000	C414_450.2 S05 M05C4	123	C414_450.2 P71 BN71A4	124
3.2	689	0.9	418.5	7000	C414_418.5 S05 M05C4	123	C414_418.5 P71 BN71A4	124
3.2	684	1.5	415.7	10000			C514_415.7 P71 BN71A4	127
3.5	628	1.0	381.8	7000	C414_381.8 S05 M05C4	123	C414_381.8 P71 BN71A4	124
3.5	625	1.6	379.6	10000			C514_379.6 P71 BN71A4	127
3.8	567	0.8	344.3	6500	C354_344.3 S05 M05C4	120	C354_344.3 P71 BN71A4	121
4.0	549	1.1	333.4	7000	C414_333.4 S05 M05C4	123	C414_333.4 P71 BN71A4	124
4.0	537	1.9	326.1	10000			C514_326.1 P71 BN71A4	127
4.1	525	0.9	318.9	6500	C354_318.9 S05 M05C4	120	C354_318.9 P71 BN71A4	121
4.3	501	1.2	304.2	7000	C414_304.2 S05 M05C4	123	C414_304.2 P71 BN71A4	124
4.4	490	2.0	297.8	10000			C514_297.8 P71 BN71A4	127
4.5	478	0.9	290.6	6500	C354_290.6 S05 M05C4	120	C354_290.6 P71 BN71A4	121
5.0	434	2.3	263.8	10000			C514_263.8 P71 BN71A4	127
5.0	433	1.4	263.0	7000	C414_263.0 S05 M05C4	123	C414_263.0 P71 BN71A4	124
5.2	420	1.1	255.0	6500	C354_255.0 S05 M05C4	120	C354_255.0 P71 BN71A4	121
5.5	395	1.5	239.9	7000	C414_239.9 S05 M05C4	123	C414_239.9 P71 BN71A4	124
5.7	382	1.2	232.3	6500	C354_232.3 S05 M05C4	120	C354_232.3 P71 BN71A4	121
6.3	350	2.9	216.7	10000			C513_216.7 P71 BN71A4	127
6.7	333	1.4	206.4	6500			C353_206.4 P71 BN71A4	121
6.8	326	0.9	194.1	5500	C313_194.1 S05 M05C4	117	C313_194.1 P71 BN71A4	118
7.2	308	1.9	190.8	7000			C413_190.8 P71 BN71A4	124
7.3	304	1.5	188.0	6500			C353_188.0 P71 BN71A4	121
7.9	282	1.1	167.5	5500	C313_167.5 S05 M05C4	117	C313_167.5 P71 BN71A4	118
8.4	265	2.3	164.1	7000			C413_164.1 P71 BN71A4	124
8.5	262	1.7	162.0	6500			C353_162.0 P71 BN71A4	121
8.9	250	1.2	148.4	5500	C313_148.4 S05 M05C4	117	C313_148.4 P71 BN71A4	118
9.3	238	1.9	147.6	6500			C353_147.6 P71 BN71A4	121
9.7	230	0.9	136.5	5000	C213_136.5 S05 M05C4	114	C213_136.5 P71 BN71A4	115
9.8	226	2.0	139.8	6500			C353_139.8 P71 BN71A4	121
10.3	215	2.8	132.9	7000			C413_132.9 P71 BN71A4	124
10.8	206	2.2	127.3	6500			C353_127.3 P71 BN71A4	121
10.8	206	1.0	122.2	5000	C213_122.2 S05 M05C4	114	C213_122.2 P71 BN71A4	115
10.8	206	1.5	122.4	5500	C313_122.4 S05 M05C4	117	C313_122.4 P71 BN71A4	118
12.0	185	1.1	110.0	5000	C213_110.0 S05 M05C4	114	C213_110.0 P71 BN71A4	115
12.0	185	1.6	110.2	5500	C313_110.2 S05 M05C4	117	C313_110.2 P71 BN71A4	118
12.3	180	2.5	111.5	6500			C353_111.5 P71 BN71A4	121
12.8	174	1.7	103.3	5500	C313_103.3 S05 M05C4	117	C313_103.3 P71 BN71A4	118
13.2	168	1.2	100.2	5000	C213_100.2 S05 M05C4	114	C213_100.2 P71 BN71A4	115
13.5	164	2.7	101.6	6500			C353_101.6 P71 BN71A4	121
14.2	156	1.9	93.0	5500	C313_93.0 S05 M05C4	117	C313_93.0 P71 BN71A4	118
14.6	152	1.3	90.2	5000	C213_90.2 S05 M05C4	114	C213_90.2 P71 BN71A4	115
15.0	148	3.0	91.9	6500			C353_91.9 P71 BN71A4	121
16.0	139	1.4	82.6	5000	C213_82.6 S05 M05C4	114	C213_82.6 P71 BN71A4	115
16.0	139	2.2	82.6	5500	C313_82.6 S05 M05C4	117	C313_82.6 P71 BN71A4	118
17.8	125	1.6	74.4	5000	C213_74.4 S05 M05C4	114	C213_74.4 P71 BN71A4	115
17.8	125	2.4	74.3	5500	C313_74.3 S05 M05C4	117	C313_74.3 P71 BN71A4	118
20.0	114	0.8	66.2	2000	C112_66.2 S05 M05C4	111	C112_66.2 P71 BN71A4	112
20.2	110	1.8	65.3	5000	C213_65.3 S05 M05C4	114	C213_65.3 P71 BN71A4	115
20.9	109	1.2	63.3	5000	C212_63.3 S05 M05C4	114	C212_63.3 P71 BN71A4	115
22.1	102	0.8	59.6	2000	C112_59.6 S05 M05C4	111	C112_59.6 P71 BN71A4	112
22.4	99	1.9	58.8	5000	C213_58.8 S05 M05C4	114	C213_58.8 P71 BN71A4	115
23.2	98	1.2	57.0	5000	C212_57.0 S05 M05C4	114	C212_57.0 P71 BN71A4	115
23.9	95	0.9	55.2	2000	C112_55.2 S05 M05C4	111	C112_55.2 P71 BN71A4	112
24.1	94	1.6	54.7	5000	C212_54.7 S05 M05C4	114	C212_54.7 P71 BN71A4	115
26.6	85	1.2	49.7	2000	C112_49.7 S05 M05C4	111	C112_49.7 P71 BN71A4	112
26.8	85	1.7	49.3	4910	C212_49.3 S05 M05C4	114	C212_49.3 P71 BN71A4	115
27.7	82	1.1	47.6	2000	C112_47.6 S05 M05C4	111	C112_47.6 P71 BN71A4	112
31	74	1.4	42.9	2000	C112_42.9 S05 M05C4	111	C112_42.9 P71 BN71A4	112
31	74	2.6	43.3	4750	C212_43.3 S05 M05C4	114	C212_43.3 P71 BN71A4	115
36	64	1.4	37.0	2000	C112_37.0 S05 M05C4	111	C112_37.0 P71 BN71A4	112
36	63	3.2	36.8	4540	C212_36.8 S05 M05C4	114	C212_36.8 P71 BN71A4	115
45	51	1.8	29.5	2000	C112_29.5 S05 M05C4	111	C112_29.5 P71 BN71A4	112
49	47	1.0	27.1	700	C052_27.1 S05 M05C4	110		
52	44	2.0	25.4	2000	C112_25.4 S05 M05C4	111	C112_25.4 P71 BN71A4	112

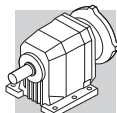


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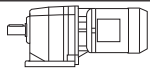
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N				
58	39	2.2	22.8	2000	C112_22.8 S05 M05C4	111	C112_22.8 P71 BN71A4	112
63	36	1.2	21.0	720	C052_21.0 S05 M05C4	110		
64	35	2.3	20.6	2000	C112_20.6 S05 M05C4	111	C112_20.6 P71 BN71A4	112
70	33	1.2	18.9	710	C052_18.9 S05 M05C4	110		
71	32	2.5	18.6	2000	C112_18.6 S05 M05C4	111	C112_18.6 P71 BN71A4	112
77	29	2.6	17.2	2000	C112_17.2 S05 M05C4	111	C112_17.2 P71 BN71A4	112
85	27	1.5	15.6	700	C052_15.6 S05 M05C4	110		
85	27	2.8	15.5	2000	C112_15.5 S05 M05C4	111	C112_15.5 P71 BN71A4	112
98	23	3.0	13.4	2000	C112_13.4 S05 M05C4	111	C112_13.4 P71 BN71A4	112
106	22	1.9	12.5	690	C052_12.5 S05 M05C4	110		
109	21	3.2	12.1	2000	C112_12.1 S05 M05C4	111	C112_12.1 P71 BN71A4	112
118	19	2.1	11.2	670	C052_11.2 S05 M05C4	110		
131	17	3.6	10.1	1980	C112_10.1 S05 M05C4	111	C112_10.1 P71 BN71A4	112
142	16	1.9	9.3	650	C052_9.3 S05 M05C4	110		
157	14	4.2	17.2	1870	C112_17.2 S05 M05B2	111	C112_17.2 P63 BN63B2	112
178	13	2.4	7.4	620	C052_7.4 S05 M05C4	110		
197	12	2.6	6.7	610	C052_6.7 S05 M05C4	110		
221	10	5.2	6.2	1680	C112_6.2 S05 M05C4	111	C112_6.2 P71 BN71A4	112
223	10	5.2	12.1	1680	C112_12.1 S05 M05B2	111	C112_12.1 P63 BN63B2	112
240	9	3.2	5.5	580	C052_5.5 S05 M05C4	110		
268	8	5.8	10.1	1590	C112_10.1 S05 M05B2	111	C112_10.1 P63 BN63B2	112
282	8	6.0	4.9	1550	C112_4.9 S05 M05C4	111	C112_4.9 P71 BN71A4	112
298	8	6.3	9.1	1540	C112_9.1 S05 M05B2	111	C112_9.1 P63 BN63B2	112
354	6	7.0	7.6	1460	C112_7.6 S05 M05B2	111	C112_7.6 P63 BN63B2	112
377	6	7.0	3.7	1420	C112_3.7 S05 M05C4	111	C112_3.7 P71 BN71A4	112
393	6	7.5	6.9	1410	C112_6.9 S05 M05B2	111	C112_6.9 P63 BN63B2	112
497	5	8.1	2.8	1300	C112_2.8 S05 M05C4	111	C112_2.8 P71 BN71A4	112
577	4	9.7	4.9	1240	C112_4.9 S05 M05B2	111	C112_4.9 P63 BN63B2	112
770	3	11.5	3.7	1130	C112_3.7 S05 M05B2	111	C112_3.7 P63 BN63B2	112

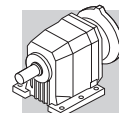
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N				
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0.78	4127	1.0	1168	35000			C804_1168 P80 BN80A6	136
0.93	3476	1.2	1481	35000			C804_1481 P71 BN71B4	136
1.2	2741	1.5	1168	35000			C804_1168 P71 BN71B4	136
1.4	2220	1.8	945.7	35000			C804_945.7 P71 BN71B4	136
1.5	2165	1.1	922.6	25000			C704_922.6 P71 BN71B4	133
1.7	1869	0.9	796.1	16000	C614_796.1 S1 M1SD4	129	C614_796.1 P71 BN71B4	130
2.0	1570	1.0	668.8	16000	C614_668.8 S1 M1SD4	129	C614_668.8 P71 BN71B4	130
2.1	1543	1.5	657.3	25000			C704_657.3 P71 BN71B4	133
2.4	1341	1.2	571.2	16000	C614_571.2 S1 M1SD4	129	C614_571.2 P71 BN71B4	130
2.5	1302	1.8	554.7	25000			C704_554.7 P71 BN71B4	133
2.5	1290	0.8	549.7	10000	C514_549.7 S1 M1SD4	126	C514_549.7 P71 BN71B4	127
2.6	1223	1.3	521.1	16000	C614_521.1 S1 M1SD4	129	C614_521.1 P71 BN71B4	130
3.3	989	1.6	421.5	16000	C614_421.5 S1 M1SD4	129	C614_421.5 P71 BN71B4	130
3.3	976	1.0	415.7	10000	C514_415.7 S1 M1SD4	126	C514_415.7 P71 BN71B4	127
3.3	961	2.4	409.4	25000			C704_409.4 P71 BN71B4	133
3.6	891	1.1	379.6	10000	C514_379.6 S1 M1SD4	126	C514_379.6 P71 BN71B4	127
3.7	869	1.8	370.1	16000	C614_370.1 S1 M1SD4	129	C614_370.1 P71 BN71B4	130
4.1	793	2.0	337.7	16000	C614_337.7 S1 M1SD4	129	C614_337.7 P71 BN71B4	130
4.1	783	0.8	333.4	7000	C414_333.4 S1 M1SD4	123	C414_333.4 P71 BN71B4	124
4.2	765	1.3	326.1	10000	C514_326.1 S1 M1SD4	126	C514_326.1 P71 BN71B4	127
4.6	699	1.4	297.8	10000	C514_297.8 S1 M1SD4	126	C514_297.8 P71 BN71B4	127
5.2	619	1.6	263.8	10000	C514_263.8 S1 M1SD4	126	C514_263.8 P71 BN71B4	127
5.2	617	1.0	263.0	7000	C414_263.0 S1 M1SD4	123	C414_263.0 P71 BN71B4	124
5.4	599	0.8	255.0	6500	C354_255.0 S1 M1SD4	120	C354_255.0 P71 BN71B4	121
5.9	545	0.8	232.3	6500	C354_232.3 S1 M1SD4	120	C354_232.3 P71 BN71B4	121
6.3	520	1.9	216.7	10000	C513_216.7 S1 M1SD4	126	C513_216.7 P71 BN71B4	127
6.6	502	1.2	209.1	7000	C413_209.1 S1 M1SD4	123	C413_209.1 P71 BN71B4	124
6.6	495	0.9	206.4	6500			C353_206.4 P71 BN71B4	121

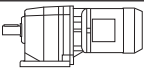


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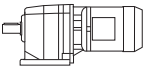
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
6.9	475	2.1	197.9	10000	C513_197.9 S1 M1SD4	126	C513_197.9 P71 BN71B4	127
7.2	458	1.3	190.8	7000	C413_190.8 S1 M1SD4	123	C413_190.8 P71 BN71B4	124
7.3	451	1.0	188.0	6500			C353_188.0 P71 BN71B4	121
7.6	431	1.4	179.9	7000	C413_179.9 S1 M1SD4	123	C413_179.9 P71 BN71B4	124
7.8	422	2.4	175.8	10000	C513_175.8 S1 M1SD4	126	C513_175.8 P71 BN71B4	127
8.3	394	1.5	164.1	7000	C413_164.1 S1 M1SD4	123	C413_164.1 P71 BN71B4	124
8.5	389	1.2	162.0	6500	C353_162.0 S1 M1SD4	120	C353_162.0 P71 BN71B4	121
8.5	385	2.6	160.5	10000	C513_160.5 S1 M1SD4	126	C513_160.5 P71 BN71B4	127
9.3	354	1.3	147.6	6500	C353_147.6 S1 M1SD4	120	C353_147.6 P71 BN71B4	121
9.4	349	1.7	145.6	7000	C413_145.6 S1 M1SD4	123	C413_145.6 P71 BN71B4	124
9.8	335	1.3	139.8	6500	C353_139.8 S1 M1SD4	120	C353_139.8 P71 BN71B4	121
10.3	320	0.9	133.6	5500	C313_133.6 S1 M1SD4	117	C313_133.6 P71 BN71B4	118
10.3	319	1.9	132.9	7000	C413_132.9 S1 M1SD4	123	C413_132.9 P71 BN71B4	124
11.2	293	1.0	122.4	5500	C313_122.4 S1 M1SD4	117	C313_122.4 P71 BN71B4	118
11.4	289	2.1	120.6	7000	C413_120.6 S1 M1SD4	123	C413_120.6 P71 BN71B4	124
12.4	264	1.1	110.2	5500	C313_110.2 S1 M1SD4	117	C313_110.2 P71 BN71B4	118
12.4	264	2.3	110.1	7000	C413_110.1 S1 M1SD4	123	C413_110.1 P71 BN71B4	124
13.3	248	1.2	103.3	5500	C313_103.3 S1 M1SD4	117	C313_103.3 P71 BN71B4	118
13.4	245	2.4	102.3	7000	C413_102.3 S1 M1SD4	123	C413_102.3 P71 BN71B4	124
14.7	224	2.7	93.3	7000	C413_93.3 S1 M1SD4	123	C413_93.3 P71 BN71B4	124
14.7	223	1.3	93.0	5500	C313_93.0 S1 M1SD4	117	C313_93.0 P71 BN71B4	118
15.2	216	0.9	90.2	5000	C213_90.2 S1 M1SD4	114	C213_90.2 P71 BN71B4	115
16.6	198	1.0	82.6	5000	C213_82.6 S1 M1SD4	114	C213_82.6 P71 BN71B4	115
16.6	198	1.5	82.6	5500	C313_82.6 S1 M1SD4	117	C313_82.6 P71 BN71B4	118
16.8	196	3.1	81.5	7000	C413_81.5 S1 M1SD4	123	C413_81.5 P71 BN71B4	124
18.4	178	1.1	74.4	5000	C213_74.4 S1 M1SD4	114	C213_74.4 P71 BN71B4	115
18.4	178	1.7	74.3	5500	C313_74.3 S1 M1SD4	117	C313_74.3 P71 BN71B4	118
18.4	178	3.4	74.4	7000	C413_74.4 S1 M1SD4	123	C413_74.4 P71 BN71B4	124
20.5	164	1.3	66.8	5500			C312_66.8 P71 BN71B4	118
21.0	157	1.3	65.3	5000	C213_65.3 S1 M1SD4	114	C213_65.3 P71 BN71B4	115
22.1	149	3.0	62.0	6500	C353_62.0 S1 M1SD4	120	C353_62.0 P71 BN71B4	121
23.3	141	1.3	58.8	4880	C213_58.8 S1 M1SD4	114	C213_58.8 P71 BN71B4	115
26.1	128	2.3	52.4	5500	C312_52.4 S1 M1SD4	117	C312_52.4 P71 BN71B4	118
27.6	122	0.8	49.7	2000			C112_49.7 P71 BN71B4	112
27.8	121	1.2	49.3	4660			C212_49.3 P71 BN71B4	115
29.0	116	2.6	47.2	5500	C312_47.2 S1 M1SD4	117	C312_47.2 P71 BN71B4	118
32	105	1.0	42.9	2000			C112_42.9 P71 BN71B4	112
32	106	1.8	43.3	4530	C212_43.3 S1 M1SD4	114	C212_43.3 P71 BN71B4	115
34	100	3.0	40.7	5500	C312_40.7 S1 M1SD4	117	C312_40.7 P71 BN71B4	118
35	95	1.8	39.0	4410	C212_39.0 S1 M1SD4	114	C212_39.0 P71 BN71B4	115
37	91	1.0	37.0	2000	C112_37.0 S1 M1SD4	111	C112_37.0 P71 BN71B4	112
37	90	2.2	36.8	4360	C212_36.8 S1 M1SD4	114	C212_36.8 P71 BN71B4	115
38	88	3.4	36.1	5500	C312_36.1 S1 M1SD4	117	C312_36.1 P71 BN71B4	118
41	82	1.2	33.4	2000	C112_33.4 S1 M1SD4	111	C112_33.4 P71 BN71B4	112
41	81	2.5	33.1	4240	C212_33.1 S1 M1SD4	114	C212_33.1 P71 BN71B4	115
42	80	1.1	32.8	2000	C112_32.8 S1 M1SD4	111	C112_32.8 P71 BN71B4	112
46	72	1.3	29.5	2000	C112_29.5 S1 M1SD4	111	C112_29.5 P71 BN71B4	112
46	73	2.8	29.6	4130	C212_29.6 S1 M1SD4	114	C212_29.6 P71 BN71B4	115
51	65	3.1	26.7	4010	C212_26.7 S1 M1SD4	114	C212_26.7 P71 BN71B4	115
54	62	1.4	25.4	2000	C112_25.4 S1 M1SD4	111	C112_25.4 P71 BN71B4	112
56	59	3.4	24.3	3920	C212_24.3 S1 M1SD4	114	C212_24.3 P71 BN71B4	115
60	56	1.5	22.8	2000	C112_22.8 S1 M1SD4	111	C112_22.8 P71 BN71B4	112
66	51	1.6	20.6	2000	C112_20.6 S1 M1SD4	111	C112_20.6 P71 BN71B4	112
74	46	1.7	18.6	2000	C112_18.6 S1 M1SD4	111	C112_18.6 P71 BN71B4	112
80	42	1.8	17.2	2000	C112_17.2 S1 M1SD4	111	C112_17.2 P71 BN71B4	112
88	39	1.0	15.6	580	C052_15.6 S1 M1SD4	110		
89	38	2.0	15.5	2000	C112_15.5 S1 M1SD4	111	C112_15.5 P71 BN71B4	112
102	33	2.1	13.4	2000	C112_13.4 S1 M1SD4	111	C112_13.4 P71 BN71B4	112
110	31	1.3	12.5	600	C052_12.5 S1 M1SD4	110		
113	30	2.3	12.1	2000	C112_12.1 S1 M1SD4	111	C112_12.1 P71 BN71B4	112
122	28	1.4	11.2	590	C052_11.2 S1 M1SD4	110		
136	25	2.6	10.1	1930	C112_10.1 S1 M1SD4	111	C112_10.1 P71 BN71B4	112
147	23	1.3	9.3	580	C052_9.3 S1 M1SD4	110		
151	22	2.7	9.1	1870	C112_9.1 S1 M1SD4	111	C112_9.1 P71 BN71B4	112
164	20	2.2	5.5	570	C052_5.5 S1 M1LA6	110		
180	19	3	7.6	1780	C112_7.6 S1 M1SD4	111	C112_7.6 P71 BN71B4	112

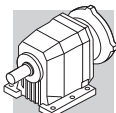


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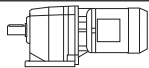
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
185	18	1.6	7.4	570	C052_7.4 S1 M1SD4	110		
199	17	3.2	6.9	1730	C112_6.9 S1 M1SD4	111	C112_6.9 P71 BN71B4	112
204	17	1.8	6.7	560	C052_6.7 S1 M1SD4	110		
220	15	3.5	6.2	1650	C112_6.2 S1 M1SD4	111	C112_6.2 P71 BN71B4	112
228	15	3.6	12.1	1650	C112_12.1 S05 M05C2	111	C112_12.1 P71 BN71A2	112
249	14	2.2	5.5	540	C052_5.5 S1 M1SD4	110		
273	12	4.0	10.1	1570	C112_10.1 S05 M05C2	111	C112_10.1 P71 BN71A2	112
281	12	4.0	4.9	1530	C112_4.9 S1 M1SD4	111	C112_4.9 P71 BN71B4	112
303	11	4.3	9.1	1520	C112_9.1 S05 M05C2	111	C112_9.1 P71 BN71A2	112
361	9	4.8	7.6	1440	C112_7.6 S05 M05C2	111	C112_7.6 P71 BN71A2	112
375	9	4.7	3.7	1400	C112_3.7 S1 M1SD4	111	C112_3.7 P71 BN71B4	112
400	8	5.1	6.9	1390	C112_6.9 S05 M05C2	111	C112_6.9 P71 BN71A2	112
495	7	5.5	2.8	1290	C112_2.8 S1 M1SD4	111	C112_2.8 P71 BN71B4	112
577	6	6.5	4.9	1230	C112_4.9 S05 M05C2	111	C112_4.9 P71 BN71A2	112
770	4	7.8	3.7	1120	C112_3.7 S05 M05C2	111	C112_3.7 P71 BN71A2	112
1015	3	9.1	2.8	1030	C112_2.8 S05 M05C2	111	C112_2.8 P71 BN71A2	112

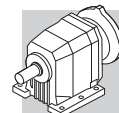
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
0.74	6442	1.1	1240	60000	C904_1240 S2 M2SA6	138	C904_1240 P80 BN80B6	139
0.85	5616	2.1	1081	85000	C1004_1081 S2 M2SA6	141	C1004_1081 P80 BN80B6	142
1.0	4792	1.5	922.3	60000	C904_922.3 S2 M2SA6	138	C904_922.3 P80 BN80B6	139
1.1	4381	0.9	1274	35000	C804_1274 S1 M1LA4	135	C804_1274 P80 BN80A4	136
1.1	4295	1.7	1240	60000	C904_1240 S1 M1LA4	138	C904_1240 P80 BN80A4	139
1.3	3549	1.1	1032	35000	C804_1032 S1 M1LA4	135	C804_1032 P80 BN80A4	136
1.4	3484	2.1	1006	60000	C904_1006 S1 M1LA4	138	C904_1006 P80 BN80A4	139
1.6	2939	1.4	854.6	35000	C804_854.6 S1 M1LA4	135	C804_854.6 P80 BN80A4	136
1.6	2923	2.5	844.0	65000	C904_844.0 S1 M1LA4	138	C904_844.0 P80 BN80A4	139
1.9	2531	0.9	736.0	25000	C704_736.0 S1 M1LA4	132	C704_736.0 P80 BN80A4	133
1.9	2492	1.6	724.7	35000	C804_724.7 S1 M1LA4	135	C804_724.7 P80 BN80A4	136
2.1	2284	1.8	664.3	35000	C804_664.3 S1 M1LA4	135	C804_664.3 P80 BN80A4	136
2.1	2260	1.0	657.3	25000	C704_657.3 S1 M1LA4	132	C704_657.3 P80 BN80A4	133
2.4	1978	0.8	571.2	16000	C614_571.2 S1 M1LA4	129	C614_571.2 P80 BN80A4	130
2.5	1907	1.2	554.7	25000	C704_554.7 S1 M1LA4	132	C704_554.7 P80 BN80A4	133
2.6	1820	2.2	529.3	35000	C804_529.3 S1 M1LA4	135	C804_529.3 P80 BN80A4	136
3.0	1600	1.0	462.0	16000	C614_462.0 S1 M1LA4	129	C614_462.0 P80 BN80A4	130
3.1	1566	2.6	455.4	35000	C804_455.4 S1 M1LA4	135	C804_455.4 P80 BN80A4	136
3.1	1525	1.5	443.5	25000	C704_443.5 S1 M1LA4	132	C704_443.5 P80 BN80A4	133
3.3	1460	1.1	421.5	16000	C614_421.5 S1 M1LA4	129	C614_421.5 P80 BN80A4	130
3.6	1315	0.8	379.6	10000	C514_379.6 S1 M1LA4	126	C514_379.6 P80 BN80A4	127
3.7	1282	1.2	370.1	16000	C614_370.1 S1 M1LA4	129	C614_370.1 P80 BN80A4	130
3.8	1254	3.2	364.7	35000	C804_364.7 S1 M1LA4	135	C804_364.7 P80 BN80A4	136
4.0	1184	1.9	344.3	25000	C704_344.3 S1 M1LA4	132	C704_344.3 P80 BN80A4	133
4.1	1170	1.4	337.7	16000	C614_337.7 S1 M1LA4	129	C614_337.7 P80 BN80A4	130
4.2	1130	0.9	326.1	10000	C514_326.1 S1 M1LA4	126	C514_326.1 P80 BN80A4	127
4.6	1031	1.0	297.8	10000	C514_297.8 S1 M1LA4	126	C514_297.8 P80 BN80A4	127
5.0	953	1.7	275.3	16000	C614_275.3 S1 M1LA4	129	C614_275.3 P80 BN80A4	130
5.1	936	2.5	272.2	25000	C704_272.2 S1 M1LA4	132	C704_272.2 P80 BN80A4	133
5.2	914	1.1	263.8	10000	C514_263.8 S1 M1LA4	126	C514_263.8 P80 BN80A4	127
5.7	834	1.2	240.9	10000	C514_240.9 S1 M1LA4	126	C514_240.9 P80 BN80A4	127
5.8	847	2.7	239.3	25000			C703_239.3 P80 BN80A4	133
5.8	825	1.9	238.3	16000	C614_238.3 S1 M1LA4	129	C614_238.3 P80 BN80A4	130
6.2	782	2.9	220.9	25000			C703_220.9 P80 BN80A4	133
6.3	753	2.1	217.4	16000	C614_217.4 S1 M1LA4	129	C614_217.4 P80 BN80A4	130
6.4	767	1.3	216.7	10000	C513_216.7 S1 M1LA4	126	C513_216.7 P80 BN80A4	127
7.0	700	1.4	197.9	10000	C513_197.9 S1 M1LA4	126	C513_197.9 P80 BN80A4	127
7.0	693	2.3	195.8	16000			C613_195.8 P80 BN80A4	130
7.1	687	3.3	194.1	25000			C703_194.1 P80 BN80A4	133
7.7	637	0.9	179.9	7000	C413_179.9 S1 M1LA4	123	C413_179.9 P80 BN80A4	124
7.7	632	2.5	178.6	16000			C613_178.6 P80 BN80A4	130
7.9	622	1.6	175.8	10000	C513_175.8 S1 M1LA4	126	C513_175.8 P80 BN80A4	127

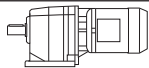


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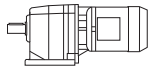
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
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8.4	581	1.0	164.1	7000			C413_164.1 P80 BN80A4	124
8.6	568	1.8	160.5	10000			C513_160.5 P80 BN80A4	127
9.2	531	3.0	150.0	16000	C513_147.4 S1 M1LA4 C413_145.6 S1 M1LA4	126 123	C613_150.0 P80 BN80A4	130
9.4	522	1.9	147.4	10000			C513_147.4 P80 BN80A4	127
9.5	516	1.2	145.6	7000			C413_145.6 P80 BN80A4	124
9.8	497	3.2	140.5	16000	C353_139.8 S1 M1LA4	120	C613_140.5 P80 BN80A4	130
9.9	495	0.9	139.8	6500			C353_139.8 P80 BN80A4	121
10.3	477	2.1	134.6	10000			C513_134.6 P80 BN80A4	127
10.4	470	1.3	132.9	7000	C413_132.9 S1 M1LA4 C353_127.3 S1 M1LA4	123 120	C413_132.9 P80 BN80A4	124
10.8	451	1.0	127.3	6500			C353_127.3 P80 BN80A4	121
11.1	440	2.3	124.4	10000			C513_124.4 P80 BN80A4	127
11.4	427	1.4	120.6	7000	C513_113.6 S1 M1LA4 C353_111.5 S1 M1LA4	126 120	C413_120.6 P80 BN80A4	124
12.1	402	2.5	113.6	10000			C513_113.6 P80 BN80A4	127
12.4	395	1.1	111.5	6500			C353_111.5 P80 BN80A4	121
12.5	390	1.5	110.1	7000	C413_110.1 S1 M1LA4 C413_102.3 S1 M1LA4	123 123	C413_110.1 P80 BN80A4	124
13.5	362	1.7	102.3	7000			C413_102.3 P80 BN80A4	124
13.6	360	2.8	101.8	10000			C513_101.8 P80 BN80A4	127
13.6	360	1.3	101.6	6500	C353_101.6 S1 M1LA4 C413_93.3 S1 M1LA4	120 123	C353_101.6 P80 BN80A4	121
14.8	330	1.8	93.3	7000			C413_93.3 P80 BN80A4	124
14.8	329	0.9	93.0	5500			C313_93.0 P80 BN80A4	118
14.8	329	3.0	93.0	10000	C513_93.0 S1 M1LA4 C353_91.9 S1 M1LA4	126 120	C513_93.0 P80 BN80A4	127
15.0	325	1.4	91.9	6500			C353_91.9 P80 BN80A4	121
16.5	296	1.5	83.8	6500			C353_83.8 P80 BN80A4	121
16.7	292	1.0	82.6	5500	C313_82.6 S1 M1LA4 C413_81.5 S1 M1LA4	117 123	C313_82.6 P80 BN80A4	118
16.9	289	2.1	81.5	7000			C413_81.5 P80 BN80A4	124
17.5	284	1.1	52.4	5500			C312_52.4 P80 BN80B6	118
17.8	275	1.6	77.6	6500	C353_77.6 S1 M1LA4 C413_74.4 S1 M1LA4	120 123	C353_77.6 P80 BN80A4	121
18.6	263	2.3	74.4	7000			C413_74.4 P80 BN80A4	124
18.6	263	1.1	74.3	5500			C313_74.3 P80 BN80A4	118
19.5	256	1.2	47.2	5500	C312_47.2 S2 M2SA6 C353_70.7 S1 M1LA4	117 120	C312_47.2 P80 BN80B6	118
19.5	250	1.8	70.7	6500			C353_70.7 P80 BN80A4	121
21.5	228	2.6	64.3	7000			C413_64.3 P80 BN80A4	124
22.2	220	2.0	62.0	6500	C353_62.0 S1 M1LA4 C312_40.7 S2 M2SA6	120 117	C353_62.0 P80 BN80A4	121
22.6	221	1.4	40.7	5500			C312_40.7 P80 BN80B6	118
23.5	208	0.9	58.8	4420			C213_58.8 P80 BN80A4	115
23.5	208	2.9	58.7	7000	C413_58.7 S1 M1LA4 C353_56.5 S1 M1LA4	123 120	C413_58.7 P80 BN80A4	124
24.4	200	2.2	56.5	6500			C353_56.5 P80 BN80A4	121
26.3	190	1.6	52.4	5500			C312_52.4 P80 BN80A4	118
26.8	182	3.3	51.5	7000	C413_51.5 S1 M1LA4 C212_33.1 S2 M2SA6	123 114	C413_51.5 P80 BN80A4	124
27.8	180	1.1	33.1	4270			C212_33.1 P80 BN80B6	115
28.7	170	2.6	48.2	6500			C353_48.2 P80 BN80A4	121
29.2	171	1.8	47.2	5500	C312_47.2 S1 M1LA4 C412_44.8 S1 M1LA4	117 123	C312_47.2 P80 BN80A4	118
31	162	3.1	44.8	7000			C412_44.8 P80 BN80A4	124
31	155	2.9	43.9	6500			C353_43.9 P80 BN80A4	121
32	156	1.2	43.3	4190	C212_43.3 S1 M1LA4 C312_40.7 S1 M1LA4	114 117	C212_43.3 P80 BN80A4	115
34	147	2	40.7	5500			C312_40.7 P80 BN80A4	118
35	141	1.2	39.0	4100			C212_39.0 P80 BN80A4	115
36	135	3.3	38.1	6500	C353_38.1 S1 M1LA4 C212_36.8 S1 M1LA4	120 114	C353_38.1 P80 BN80A4	121
38	133	1.5	36.8	4070			C212_36.8 P80 BN80A4	115
38	131	2.3	36.1	5500			C312_36.1 P80 BN80A4	118
41	121	0.8	33.4	1550	C112_33.4 S1 M1LA4 C212_33.1 S1 M1LA4	111 114	C112_33.4 P80 BN80A4	112
42	118	1.7	33.1	3970			C212_33.1 P80 BN80A4	115
42	118	2.6	32.5	5500			C312_32.5 P80 BN80A4	118
46	108	2.8	29.8	5500	C312_29.8 S1 M1LA4 C112_29.5 S1 M1LA4	117 111	C312_29.8 P80 BN80A4	118
47	107	0.9	29.5	1820			C112_29.5 P80 BN80A4	112
47	107	1.9	29.6	3890			C212_29.6 P80 BN80A4	115
52	96	2.1	26.7	3800	C212_26.7 S1 M1LA4 C312_26.8 S1 M1LA4	114 117	C212_26.7 P80 BN80A4	115
52	97	3.1	26.8	5500			C312_26.8 P80 BN80A4	118
54	92	1.0	25.4	2000			C112_25.4 P80 BN80A4	112
55	91	3.3	25.1	5500	C312_25.1 S1 M1LA4 C212_24.3 S1 M1LA4	117 114	C312_25.1 P80 BN80A4	118
57	88	2.3	24.3	3720			C212_24.3 P80 BN80A4	115
60	83	1.0	22.8	2000			C112_22.8 P80 BN80A4	112
63	79	2.5	21.9	3630	C212_21.9 S1 M1LA4 C112_20.6 S1 M1LA4	114 111	C212_21.9 P80 BN80A4	115
67	75	1.1	20.6	2000			C112_20.6 P80 BN80A4	112
69	72	2.6	20.0	3560			C212_20.0 P80 BN80A4	115
74	67	1.2	18.6	2000	C112_18.6 S1 M1LA4	111	C112_18.6 P80 BN80A4	112

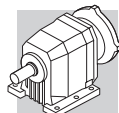


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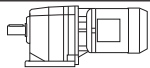
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N				
77	65	2.8	18.0	3460	C212_18.0 S1 M1LA4	114	C212_18.0 P80 BN80A4	115
80	62	1.2	17.2	2000	C112_17.2 S1 M1LA4	111	C112_17.2 P80 BN80A4	112
87	57	3.1	15.8	3350	C212_15.8 S1 M1LA4	114	C212_15.8 P80 BN80A4	115
89	56	1.3	15.5	2000	C112_15.5 S1 M1LA4	111	C112_15.5 P80 BN80A4	112
97	52	3.3	14.3	3260	C212_14.3 S1 M1LA4	114	C212_14.3 P80 BN80A4	115
103	48	1.4	13.4	1990	C112_13.4 S1 M1LA4	111	C112_13.4 P80 BN80A4	112
114	44	1.5	12.1	1930	C112_12.1 S1 M1LA4	111	C112_12.1 P80 BN80A4	112
121	41	1.6	7.6	1910	C112_7.6 S2 M2SA6	111	C112_7.6 P80 BN80B6	112
123	40	1.0	11.2	480	C052_11.2 S1 M1LA4	110		
137	36	1.7	10.1	1850	C112_10.1 S1 M1LA4	111	C112_10.1 P80 BN80A4	112
151	33	3.3	6.1	2860	C212_6.1 S2 M2SA6	114	C212_6.1 P80 BN80B6	115
152	33	1.9	9.1	1800	C112_9.1 S1 M1LA4	111	C112_9.1 P80 BN80A4	112
181	28	2.0	7.6	1720	C112_7.6 S1 M1LA4	111	C112_7.6 P80 BN80A4	112
186	27	1.1	7.4	460	C052_7.4 S1 M1LA4	110		
201	25	2.2	6.9	1670	C112_6.9 S1 M1LA4	111	C112_6.9 P80 BN80A4	112
206	24	1.2	6.7	450	C052_6.7 S1 M1LA4	110		
221	23	2.4	6.2	1590	C112_6.2 S1 M1LA4	111	C112_6.2 P80 BN80A4	112
233	21	2.5	12.1	1610	C112_12.1 S1 M1SD2	111	C112_12.1 P71 BN71B2	112
251	20	1.5	5.5	430	C052_5.5 S1 M1LA4	110		
279	18	2.7	10.1	1530	C112_10.1 S1 M1SD2	111	C112_10.1 P71 BN71B2	112
283	18	2.7	4.9	1490	C112_4.9 S1 M1LA4	111	C112_4.9 P80 BN80A4	112
310	16	3.0	9.1	1480	C112_9.1 S1 M1SD2	111	C112_9.1 P71 BN71B2	112
369	14	3.3	7.6	1410	C112_7.6 S1 M1SD2	111	C112_7.6 P71 BN71B2	112
378	13	3.2	3.7	1370	C112_3.7 S1 M1LA4	111	C112_3.7 P80 BN80A4	112
409	12	3.5	6.9	1370	C112_6.9 S1 M1SD2	111	C112_6.9 P71 BN71B2	112
451	11	3.8	6.2	1300	C112_6.2 S1 M1SD2	111	C112_6.2 P71 BN71B2	112
499	10	3.7	2.8	1260	C112_2.8 S1 M1LA4	111	C112_2.8 P80 BN80A4	112
577	9	4.4	4.9	1210	C112_4.9 S1 M1SD2	111	C112_4.9 P71 BN71B2	112
770	6	5.2	3.7	1110	C112_3.7 S1 M1SD2	111	C112_3.7 P71 BN71B2	112

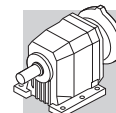
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N				
1.2	5582	1.3	1240	60000	C904_1240 S2 ME2SB4	138	C904_1240 P80 BE80B4	139
1.3	5117	1.4	1137	60000	C904_1137 S2 ME2SB4	138	C904_1137 P80 BE80B4	139
1.3	4865	2.5	1081	85000	C1004_1081 S2 ME2SB4	141	C1004_1081 P80 BE80B4	142
1.4	4528	1.6	1006	60000	C904_1006 S2 ME2SB4	138	C904_1006 P80 BE80B4	139
1.4	4517	2.7	1004	85000	C1004_1004 S2 ME2SB4	141	C1004_1004 P80 BE80B4	142
1.5	4256	0.9	945.7	35000	C804_945.7 S2 ME2SB4	135	C804_945.7 P80 BE80B4	136
1.6	4150	1.7	922.3	60000	C904_922.3 S2 ME2SB4	138	C904_922.3 P80 BE80B4	139
1.6	4087	2.9	908.2	85000	C1004_908.2 S2 ME2SB4	141	C1004_908.2 P80 BE80B4	142
1.7	3846	1.0	854.6	35000	C804_854.6 S2 ME2SB4	135	C804_854.6 P80 BE80B4	136
1.7	3798	1.9	844.0	60000	C904_844.0 S2 ME2SB4	138	C904_844.0 P80 BE80B4	139
1.8	3525	1.1	783.4	35000	C804_783.4 S2 ME2SB4	135	C804_783.4 P80 BE80B4	136
1.8	3481	2.1	773.6	60000	C904_773.6 S2 ME2SB4	138	C904_773.6 P80 BE80B4	139
2.0	3261	1.2	724.7	35000	C804_724.7 S2 ME2SB4	135	C804_724.7 P80 BE80B4	136
2.0	3205	2.2	712.2	60000	C904_712.2 S2 ME2SB4	138	C904_712.2 P80 BE80B4	139
2.2	2989	1.3	664.3	35000	C804_664.3 S2 ME2SB4	135	C804_664.3 P80 BE80B4	136
2.2	2938	2.5	652.8	60000	C904_652.8 S2 ME2SB4	138	C904_652.8 P80 BE80B4	139
2.4	2731	0.8	606.8	25000	C704_606.8 S2 ME2SB4	132	C704_606.8 P80 BE80B4	133
2.5	2623	2.7	582.8	60000	C904_582.8 S2 ME2SB4	138	C904_582.8 P80 BE80B4	139
2.5	2598	1.5	577.4	35000	C804_577.4 S2 ME2SB4	135	C804_577.4 P80 BE80B4	136
2.6	2496	0.9	554.7	25000	C704_554.7 S2 ME2SB4	132	C704_554.7 P80 BE80B4	133
2.7	2404	3.0	534.2	60000	C904_534.2 S2 ME2SB4	138	C904_534.2 P80 BE80B4	139
2.7	2382	1.7	529.3	35000	C804_529.3 S2 ME2SB4	135	C804_529.3 P80 BE80B4	136
2.8	2304	1.0	512.0	25000	C704_512.0 S2 ME2SB4	132	C704_512.0 P80 BE80B4	133
3.1	2057	3.5	457.1	60000	C904_457.1 S2 ME2SB4	138	C904_457.1 P80 BE80B4	139
3.1	2049	2.0	455.4	35000	C804_455.4 S2 ME2SB4	135	C804_455.4 P80 BE80B4	136
3.2	1996	1.2	443.5	25000	C704_443.5 S2 ME2SB4	132	C704_443.5 P80 BE80B4	133
3.4	1897	0.8	421.5	16000	C614_421.5 S2 ME2SB4	129	C614_421.5 P80 BE80B4	130
3.4	1879	2.1	417.5	35000	C804_417.5 S2 ME2SB4	135	C804_417.5 P80 BE80B4	136
3.5	1842	1.2	409.4	25000	C704_409.4 S2 ME2SB4	132	C704_409.4 P80 BE80B4	133

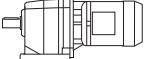


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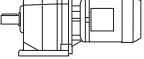
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
3.9	1666	1.0	370.1	16000	C614_370.1 S2 ME2SB4	129	C614_370.1 P80 BE80B4	130
3.9	1641	2.4	364.7	35000	C804_364.7 S2 ME2SB4	135	C804_364.7 P80 BE80B4	136
4.2	1550	1.5	344.3	25000	C704_344.3 S2 ME2SB4	132	C704_344.3 P80 BE80B4	133
4.2	1520	1.1	337.7	16000	C614_337.7 S2 ME2SB4	129	C614_337.7 P80 BE80B4	130
4.3	1504	2.7	334.3	35000	C804_334.3 S2 ME2SB4	135	C804_334.3 P80 BE80B4	136
4.5	1430	1.6	317.9	25000	C704_317.9 S2 ME2SB4	132	C704_317.9 P80 BE80B4	133
4.7	1358	1.2	301.7	16000	C614_301.7 S2 ME2SB4	129	C614_301.7 P80 BE80B4	130
5.2	1239	1.3	275.3	16000	C614_275.3 S2 ME2SB4	129	C614_275.3 P80 BE80B4	130
5.3	1225	1.9	272.2	25000	C704_272.2 S2 ME2SB4	132	C704_272.2 P80 BE80B4	133
5.4	1187	0.8	263.8	10000	C514_263.8 S2 ME2SB4	126	C514_263.8 P80 BE80B4	127
5.9	1084	0.9	240.9	10000	C514_240.9 S2 ME2SB4	126	C514_240.9 P80 BE80B4	127
6.0	1113	2.1	239.3	25000	C703_239.3 S2 ME2SB4	132	C703_239.3 P80 BE80B4	133
6.0	1072	1.5	238.3	16000	C614_238.3 S2 ME2SB4	129	C614_238.3 P80 BE80B4	130
6.5	1027	2.2	220.9	25000	C703_220.9 S2 ME2SB4	132	C703_220.9 P80 BE80B4	133
6.6	978	1.6	217.4	16000	C614_217.4 S2 ME2SB4	129	C614_217.4 P80 BE80B4	130
6.6	1008	1.0	216.7	10000	C513_216.7 S2 ME2SB4	126	C513_216.7 P80 BE80B4	127
7.2	920	1.1	197.9	10000	C513_197.9 S2 ME2SB4	126	C513_197.9 P80 BE80B4	127
7.3	881	1.8	195.8	16000	C613_195.8 S2 ME2SB4	129	C613_195.8 P80 BE80B4	130
7.4	903	2.5	194.1	25000	C703_194.1 S2 ME2SB4	132	C703_194.1 P80 BE80B4	133
8.0	833	2.8	179.2	25000	C703_179.2 S2 ME2SB4	132	C703_179.2 P80 BE80B4	133
8.0	804	2.0	178.6	16000	C613_178.6 S2 ME2SB4	129	C613_178.6 P80 BE80B4	130
8.1	817	1.2	175.8	10000	C513_175.8 S2 ME2SB4	126	C513_175.8 P80 BE80B4	127
8.7	740	2.2	164.5	16000	C613_164.5 S2 ME2SB4	129	C613_164.5 P80 BE80B4	130
8.8	757	3.0	162.8	25000	C703_162.8 S2 ME2SB4	132	C703_162.8 P80 BE80B4	133
8.9	746	1.3	160.5	10000	C513_160.5 S2 ME2SB4	126	C513_160.5 P80 BE80B4	127
9.5	675	2.4	150.0	16000	C613_150.0 S2 ME2SB4	129	C613_150.0 P80 BE80B4	130
9.7	686	1.5	147.4	10000	C513_147.4 S2 ME2SB4	126	C513_147.4 P80 BE80B4	127
10.2	632	2.5	140.5	16000	C613_140.5 S2 ME2SB4	129	C613_140.5 P80 BE80B4	130
10.6	626	1.6	134.6	10000	C513_134.6 S2 ME2SB4	126	C513_134.6 P80 BE80B4	127
10.8	618	1.0	132.9	7000	C413_132.9 S2 ME2SB4	123	C413_132.9 P80 BE80B4	124
11.2	577	2.8	128.1	16000	C613_128.1 S2 ME2SB4	129	C613_128.1 P80 BE80B4	130
11.5	579	1.7	124.4	10000	C513_124.4 S2 ME2SB4	126	C513_124.4 P80 BE80B4	127
11.9	561	1.1	120.6	7000	C413_120.6 S2 ME2SB4	123	C413_120.6 P80 BE80B4	124
12.6	511	3.1	113.6	16000	C613_113.6 S2 ME2SB4	129	C613_113.6 P80 BE80B4	130
12.6	528	1.9	113.6	10000	C513_113.6 S2 ME2SB4	126	C513_113.6 P80 BE80B4	127
13.0	512	1.2	110.1	7000	C413_110.1 S2 ME2SB4	123	C413_110.1 P80 BE80B4	124
13.8	466	3.4	103.6	16000	C613_103.6 S2 ME2SB4	129	C613_103.6 P80 BE80B4	130
14.0	476	1.3	102.3	7000	C413_102.3 S2 ME2SB4	123	C413_102.3 P80 BE80B4	124
14.0	473	2.1	101.8	10000	C513_101.8 S2 ME2SB4	126	C513_101.8 P80 BE80B4	127
14.1	472	1.0	101.6	6500	C353_101.6 S2 ME2SB4	120	C353_101.6 P80 BE80B4	121
15.3	434	1.4	93.3	7000	C413_93.3 S2 ME2SB4	123	C413_93.3 P80 BE80B4	124
15.4	432	2.3	93.0	10000	C513_93.0 S2 ME2SB4	126	C513_93.0 P80 BE80B4	127
15.6	427	1.1	91.9	6500	C353_91.9 S2 ME2SB4	120	C353_91.9 P80 BE80B4	121
17.1	389	1.2	83.8	6500	C353_83.8 S2 ME2SB4	120	C353_83.8 P80 BE80B4	121
17.5	379	1.6	81.5	7000	C413_81.5 S2 ME2SB4	123	C413_81.5 P80 BE80B4	124
17.9	371	2.7	79.9	10000	C513_79.9 S2 ME2SB4	126	C513_79.9 P80 BE80B4	127
18.4	361	1.2	77.6	6500	C353_77.6 S2 ME2SB4	120	C353_77.6 P80 BE80B4	121
19.2	346	1.7	74.4	7000	C413_74.4 S2 ME2SB4	123	C413_74.4 P80 BE80B4	124
19.6	339	2.9	72.9	10000	C513_72.9 S2 ME2SB4	126	C513_72.9 P80 BE80B4	127
20.2	329	1.4	70.7	6500	C353_70.7 S2 ME2SB4	120	C353_70.7 P80 BE80B4	121
22.1	300	3.3	64.6	10000	C513_64.6 S2 ME2SB4	126	C513_64.6 P80 BE80B4	127
22.2	299	2.0	64.3	7000	C413_64.3 S2 ME2SB4	123	C413_64.3 P80 BE80B4	124
23.1	288	1.6	62.0	6500	C353_62.0 S2 ME2SB4	120	C353_62.0 P80 BE80B4	121
24.4	273	2.2	58.7	7000	C413_58.7 S2 ME2SB4	123	C413_58.7 P80 BE80B4	124
25.1	271	2.9	57.0	10000	C512_57.0 S2 ME2SB4	126	C512_57.0 P80 BE80B4	127
25.3	263	1.7	56.5	6500	C353_56.5 S2 ME2SB4	120	C353_56.5 P80 BE80B4	121
27.3	249	1.2	52.4	5500	C312_52.4 S2 ME2SB4	117	C312_52.4 P80 BE80B4	118
27.8	239	2.5	51.5	7000	C413_51.5 S2 ME2SB4	123	C413_51.5 P80 BE80B4	124
27.8	244	2.9	51.4	10000	C512_51.4 S2 ME2SB4	126	C512_51.4 P80 BE80B4	127
29.7	224	2.0	48.2	6500	C353_48.2 S2 ME2SB4	120	C353_48.2 P80 BE80B4	121
29.9	227	3.5	47.8	10000	C512_47.8 S2 ME2SB4	126	C512_47.8 P80 BE80B4	127
30	224	1.3	47.2	5500	C312_47.2 S2 ME2SB4	117	C312_47.2 P80 BE80B4	118
30	218	2.7	47.0	7000	C413_47.0 S2 ME2SB4	123	C413_47.0 P80 BE80B4	124
32	215	1.4	45.3	5500	C312_45.3 S2 ME2SB4	117	C312_45.3 P80 BE80B4	118
32	213	2.4	44.8	7000	C412_44.8 S2 ME2SB4	123	C412_44.8 P80 BE80B4	124
33	204	2.2	43.9	6500	C353_43.9 S2 ME2SB4	120	C353_43.9 P80 BE80B4	121

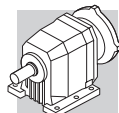


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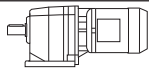
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
33	206	0.9	43.3	3810	C212_43.3 S2 ME2SB4	114	C212_43.3 P80 BE80B4	115
35	194	1.6	40.7	5500	C312_40.7 S2 ME2SB4	117	C312_40.7 P80 BE80B4	118
37	185	0.9	39.0	3770	C212_39.0 S2 ME2SB4	114	C212_39.0 P80 BE80B4	115
38	177	2.5	38.1	6500	C353_38.1 S2 ME2SB4	120	C353_38.1 P80 BE80B4	121
39	176	2.8	37.1	7000	C412_37.1 S2 ME2SB4	123	C412_37.1 P80 BE80B4	124
39	175	1.1	36.8	3750	C212_36.8 S2 ME2SB4	114	C212_36.8 P80 BE80B4	115
40	171	1.7	36.1	5500	C312_36.1 S2 ME2SB4	117	C312_36.1 P80 BE80B4	118
41	161	2.8	34.7	6500	C353_34.7 S2 ME2SB4	120	C353_34.7 P80 BE80B4	121
43	159	3.2	33.4	7000	C412_33.4 S2 ME2SB4	123	C412_33.4 P80 BE80B4	124
43	157	1.3	33.1	3680	C212_33.1 S2 ME2SB4	114	C212_33.1 P80 BE80B4	115
44	154	1.9	32.5	5500	C312_32.5 S2 ME2SB4	117	C312_32.5 P80 BE80B4	118
48	141	2.1	29.8	5500	C312_29.8 S2 ME2SB4	117	C312_29.8 P80 BE80B4	118
48	141	1.4	29.6	3630	C212_29.6 S2 ME2SB4	114	C212_29.6 P80 BE80B4	115
50	134	3.4	28.7	6490	C353_28.7 S2 ME2SB4	120	C353_28.7 P80 BE80B4	121
53	127	2.4	26.8	5500	C312_26.8 S2 ME2SB4	117	C312_26.8 P80 BE80B4	118
54	127	1.6	26.7	3560	C212_26.7 S2 ME2SB4	114	C212_26.7 P80 BE80B4	115
57	119	2.5	25.1	5460	C312_25.1 S2 ME2SB4	117	C312_25.1 P80 BE80B4	118
59	115	1.7	24.3	3510	C212_24.3 S2 ME2SB4	114	C212_24.3 P80 BE80B4	115
63	107	2.8	22.6	5310	C312_22.6 S2 ME2SB4	117	C312_22.6 P80 BE80B4	118
65	104	1.9	21.9	3430	C212_21.9 S2 ME2SB4	114	C212_21.9 P80 BE80B4	115
69	98	0.8	20.6	1450	C112_20.6 S2 ME2SB4	111	C112_20.6 P80 BE80B4	112
71	95	3.1	20.1	5150	C312_20.1 S2 ME2SB4	117	C312_20.1 P80 BE80B4	118
71	95	2.0	20.0	3380	C212_20.0 S2 ME2SB4	114	C212_20.0 P80 BE80B4	115
77	88	0.9	18.6	1580	C112_18.6 S2 ME2SB4	111	C112_18.6 P80 BE80B4	112
79	86	3.3	18.1	5000	C312_18.1 S2 ME2SB4	117	C312_18.1 P80 BE80B4	118
79	86	2.2	18.0	3290	C212_18.0 S2 ME2SB4	114	C212_18.0 P80 BE80B4	115
83	82	0.9	17.2	1750	C112_17.2 S2 ME2SB4	111	C112_17.2 P80 BE80B4	112
90	75	2.3	15.8	3210	C212_15.8 S2 ME2SB4	114	C212_15.8 P80 BE80B4	115
92	73	1.0	15.5	1840	C112_15.5 S2 ME2SB4	111	C112_15.5 P80 BE80B4	112
100	68	2.5	14.3	3120	C212_14.3 S2 ME2SB4	114	C212_14.3 P80 BE80B4	115
107	64	1.1	13.4	1870	C112_13.4 S2 ME2SB4	111	C112_13.4 P80 BE80B4	112
115	59	2.7	12.4	3030	C212_12.4 S2 ME2SB4	114	C212_12.4 P80 BE80B4	115
118	57	1.2	12.1	1830	C112_12.1 S2 ME2SB4	111	C112_12.1 P80 BE80B4	112
128	53	2.9	11.2	2940	C212_11.2 S2 ME2SB4	114	C212_11.2 P80 BE80B4	115
142	48	1.3	10.1	1760	C112_10.1 S2 ME2SB4	111	C112_10.1 P80 BE80B4	112
148	46	3.2	9.6	2840	C212_9.6 S2 ME2SB4	114	C212_9.6 P80 BE80B4	115
158	43	1.4	9.1	1720	C112_9.1 S2 ME2SB4	111	C112_9.1 P80 BE80B4	112
165	41	3.4	8.7	2760	C212_8.7 S2 ME2SB4	114	C212_8.7 P80 BE80B4	115
188	36	1.5	7.6	1650	C112_7.6 S2 ME2SB4	111	C112_7.6 P80 BE80B4	112
208	33	1.7	6.9	1610	C112_6.9 S2 ME2SB4	111	C112_6.9 P80 BE80B4	112
229	30	1.8	6.2	1530	C112_6.2 S2 ME2SB4	111	C112_6.2 P80 BE80B4	112
294	23	2.1	4.9	1440	C112_4.9 S2 ME2SB4	111	C112_4.9 P80 BE80B4	112
392	17.3	2.4	3.7	1330	C112_3.7 S2 ME2SB4	111	C112_3.7 P80 BE80B4	112
517	13.1	2.8	2.8	1230	C112_2.8 S2 ME2SB4	111	C112_2.8 P80 BE80B4	112

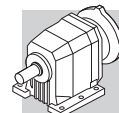
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
1.3	7573	1.0	1137	60000	C904_1137 S3 ME3SA4	138	C904_1137 P90 BE90S4	139
1.3	7200	1.7	1081	85000	C1004_1081 S3 ME3SA4	141	C1004_1081 P90 BE90S4	142
1.4	6701	1.1	1006	60000	C904_1006 S3 ME3SA4	138	C904_1006 P90 BE90S4	139
1.4	6686	1.8	1004	85000	C1004_1004 S3 ME3SA4	141	C1004_1004 P90 BE90S4	142
1.6	6143	1.2	922.3	60000	C904_922.3 S3 ME3SA4	138	C904_922.3 P90 BE90S4	139
1.6	6049	2.0	908.2	85000	C1004_908.2 S3 ME3SA4	141	C1004_908.2 P90 BE90S4	142
1.7	5621	1.3	844.0	60000	C904_844.0 S3 ME3SA4	138	C904_844.0 P90 BE90S4	139
1.7	5617	2.1	843.3	85000	C1004_843.3 S3 ME3SA4	141	C1004_843.3 P90 BE90S4	142
1.8	5166	2.3	775.7	85000	C1004_775.7 S3 ME3SA4	141	C1004_775.7 P90 BE90S4	142
1.8	5152	1.4	773.6	60000	C904_773.6 S3 ME3SA4	138	C904_773.6 P90 BE90S4	139
2.0	4797	2.5	720.3	85000	C1004_720.3 S3 ME3SA4	141	C1004_720.3 P90 BE90S4	142
2.0	4743	1.5	712.2	60000	C904_712.2 S3 ME3SA4	138	C904_712.2 P90 BE90S4	139
2.2	4424	0.9	664.3	35000	C804_664.3 S3 ME3SA4	135	C804_664.3 P90 BE90S4	136
2.2	4348	1.7	652.8	60000	C904_652.8 S3 ME3SA4	138	C904_652.8 P90 BE90S4	139

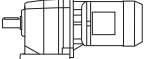


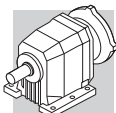
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
2.3	4179	2.9	627.4	85000	C1004_627.4 S3 ME3SA4	141	C1004_627.4 P90 BE90S4	142
2.5	3881	1.9	582.8	60000	C904_582.8 S3 ME3SA4	138	C904_582.8 P90 BE90S4	139
2.5	3845	1.0	577.4	35000	C804_577.4 S3 ME3SA4	135	C804_577.4 P90 BE90S4	136
2.7	3558	2.0	534.2	60000	C904_534.2 S3 ME3SA4	138	C904_534.2 P90 BE90S4	139
2.7	3525	1.1	529.3	35000	C804_529.3 S3 ME3SA4	135	C804_529.3 P90 BE90S4	136
3.1	3045	2.4	457.1	60000	C904_457.1 S3 ME3SA4	138	C904_457.1 P90 BE90S4	139
3.1	3033	1.3	455.4	35000	C804_455.4 S3 ME3SA4	135	C804_455.4 P90 BE90S4	136
3.4	2791	2.6	419.0	60000	C904_419.0 S3 ME3SA4	138	C904_419.0 P90 BE90S4	139
3.4	2780	1.4	417.5	35000	C804_417.5 S3 ME3SA4	135	C804_417.5 P90 BE90S4	136
3.9	2463	2.9	369.8	60000	C904_369.8 S3 ME3SA4	138	C904_369.8 P90 BE90S4	139
3.9	2429	1.6	364.7	35000	C804_364.7 S3 ME3SA4	135	C804_364.7 P90 BE90S4	136
4.2	2293	1.0	344.3	25000	C704_344.3 S3 ME3SA4	132	C704_344.3 P90 BE90S4	133
4.3	2226	1.8	334.3	35000	C804_334.3 S3 ME3SA4	135	C804_334.3 P90 BE90S4	136
4.5	2117	1.1	317.9	25000	C704_317.9 S3 ME3SA4	132	C704_317.9 P90 BE90S4	133
4.7	2010	0.8	301.7	16000	C614_301.7 S3 ME3SA4	129	C614_301.7 P90 BE90S4	130
5.0	1903	2.1	285.7	35000	C804_285.7 S3 ME3SA4	135	C804_285.7 P90 BE90S4	136
5.2	1833	0.9	275.3	16000	C614_275.3 S3 ME3SA4	129	C614_275.3 P90 BE90S4	130
5.3	1813	1.3	272.2	25000	C704_272.2 S3 ME3SA4	132	C704_272.2 P90 BE90S4	133
5.5	1744	2.3	261.9	35000	C804_261.9 S3 ME3SA4	135	C804_261.9 P90 BE90S4	136
5.7	1674	1.4	251.3	25000	C704_251.3 S3 ME3SA4	132	C704_251.3 P90 BE90S4	133
6.0	1647	1.4	239.3	25000	C703_239.3 S3 ME3SA4	132	C703_239.3 P90 BE90S4	133
6.0	1587	1.0	238.3	16000	C614_238.3 S3 ME3SA4	129	C614_238.3 P90 BE90S4	130
6.5	1520	1.5	220.9	25000	C703_220.9 S3 ME3SA4	132	C703_220.9 P90 BE90S4	133
6.6	1448	1.1	217.4	16000	C614_217.4 S3 ME3SA4	129	C614_217.4 P90 BE90S4	130
6.6	1485	2.7	215.8	35000	C803_215.9 S3 ME3SA4	135	C803_215.9 P90 BE90S4	136
7.2	1362	2.8	197.9	35000	C803_197.9 S3 ME3SA4	135	C803_197.9 P90 BE90S4	136
7.3	1304	1.2	195.8	16000	C613_195.8 S3 ME3SA4	129	C613_195.8 P90 BE90S4	130
7.4	1336	1.7	194.1	25000	C703_194.1 S3 ME3SA4	132	C703_194.1 P90 BE90S4	133
8.0	1233	1.9	179.2	25000	C703_179.2 S3 ME3SA4	132	C703_179.2 P90 BE90S4	133
8.0	1189	1.3	178.6	16000	C613_178.6 S3 ME3SA4	129	C613_178.6 P90 BE90S4	130
8.7	1095	1.5	164.5	16000	C613_164.5 S3 ME3SA4	129	C613_164.5 P90 BE90S4	130
8.8	1121	2.1	162.8	25000	C703_162.8 S3 ME3SA4	132	C703_162.8 P90 BE90S4	133
8.9	1105	0.9	160.5	10000	C513_160.5 S3 ME3SA4	126	C513_160.5 P90 BE90S4	127
9.5	1034	2.2	150.3	25000	C703_150.3 S3 ME3SA4	132	C703_150.3 P90 BE90S4	133
9.5	999	1.6	150.0	16000	C613_150.0 S3 ME3SA4	129	C613_150.0 P90 BE90S4	130
9.7	1015	1.0	147.4	10000	C513_147.4 S3 ME3SA4	126	C513_147.4 P90 BE90S4	127
10.2	935	1.7	140.5	16000	C613_140.5 S3 ME3SA4	129	C613_140.5 P90 BE90S4	130
10.4	946	2.4	137.4	25000	C703_137.4 S3 ME3SA4	132	C703_137.4 P90 BE90S4	133
10.6	926	1.1	134.6	10000	C513_134.6 S3 ME3SA4	126	C513_134.6 P90 BE90S4	127
11.2	853	1.9	128.1	16000	C613_128.1 S3 ME3SA4	129	C613_128.1 P90 BE90S4	130
11.3	873	2.6	126.8	25000	C703_126.8 S3 ME3SA4	132	C703_126.8 P90 BE90S4	133
11.5	856	1.2	124.4	10000	C513_124.4 S3 ME3SA4	126	C513_124.4 P90 BE90S4	127
12.6	757	2.1	113.6	16000	C613_113.6 S3 ME3SA4	129	C613_113.6 P90 BE90S4	130
12.6	782	1.3	113.6	10000	C513_113.6 S3 ME3SA4	126	C513_113.6 P90 BE90S4	127
12.7	774	3.0	112.4	25000	C703_112.4 S3 ME3SA4	132	C703_112.4 P90 BE90S4	133
13.8	690	2.3	103.6	16000	C613_103.6 S3 ME3SA4	129	C613_103.6 P90 BE90S4	130
14.0	701	1.4	101.8	10000	C513_101.8 S3 ME3SA4	126	C513_101.8 P90 BE90S4	127
15.3	642	0.9	93.3	7000	C413_93.3 S3 ME3SA4	123	C413_93.3 P90 BE90S4	124
15.4	640	1.6	93.0	10000	C513_93.0 S3 ME3SA4	126	C513_93.0 P90 BE90S4	127
15.7	606	2.6	91.0	16000	C613_91.0 S3 ME3SA4	129	C613_91.0 P90 BE90S4	130
17.2	553	2.9	83.0	16000	C613_83.0 S3 ME3SA4	129	C613_83.0 P90 BE90S4	130
17.5	561	1.1	81.5	7000	C413_81.5 S3 ME3SA4	123	C413_81.5 P90 BE90S4	124
17.9	550	1.8	79.9	10000	C513_79.9 S3 ME3SA4	126	C513_79.9 P90 BE90S4	127
19.2	512	1.2	74.4	7000	C413_74.4 S3 ME3SA4	123	C413_74.4 P90 BE90S4	124
19.3	494	3.2	74.2	16000	C613_74.2 S3 ME3SA4	129	C613_74.2 P90 BE90S4	130
19.6	502	2.0	72.9	10000	C513_72.9 S3 ME3SA4	126	C513_72.9 P90 BE90S4	127
20.2	486	0.9	70.7	6500	C353_70.7 S3 ME3SA4	120	C353_70.7 P90 BE90S4	121
21.1	451	3.5	67.7	16000	C613_67.7 S3 ME3SA4	129	C613_67.7 P90 BE90S4	130
22.1	445	2.2	64.6	10000	C513_64.6 S3 ME3SA4	126	C513_64.6 P90 BE90S4	127
22.2	442	1.4	64.3	7000	C413_64.3 S3 ME3SA4	123	C413_64.3 P90 BE90S4	124
23.1	427	1.1	62.0	6500	C353_62.0 S3 ME3SA4	120	C353_62.0 P90 BE90S4	121
24.2	406	2.5	59.0	10000	C513_59.0 S3 ME3SA4	126	C513_59.0 P90 BE90S4	127
24.4	404	1.5	58.7	7000	C413_58.7 S3 ME3SA4	123	C413_58.7 P90 BE90S4	124
25.1	401	2.0	57.0	10000	C512_57.0 S3 ME3SA4	126	C512_57.0 P90 BE90S4	127
25.3	389	1.2	56.5	6500	C353_56.5 S3 ME3SA4	120	C353_56.5 P90 BE90S4	121
27.8	354	1.7	51.5	7000	C413_51.5 S3 ME3SA4	123	C413_51.5 P90 BE90S4	124

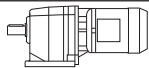


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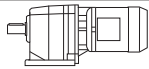
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
27.8	361	1.9	51.4	10000	C512_51.4 S3 ME3SA4	126	C512_51.4 P90 BE90S4	127
27.9	352	2.8	51.2	10000	C513_51.2 S3 ME3SA4	126	C513_51.2 P90 BE90S4	127
29.7	331	1.4	48.2	6500	C353_48.2 S3 ME3SA4	120	C353_48.2 P90 BE90S4	121
29.9	336	2.4	47.8	10000	C512_47.8 S3 ME3SA4	126	C512_47.8 P90 BE90S4	127
30	332	0.9	47.2	5350	C312_47.2 S3 ME3SA4	117	C312_47.2 P90 BE90S4	118
30	323	1.9	47.0	7000	C413_47.0 S3 ME3SA4	123	C413_47.0 P90 BE90S4	124
31	322	3.1	46.7	10000	C513_46.7 S3 ME3SA4	126	C513_46.7 P90 BE90S4	127
32	318	0.9	45.3	5500	C312_45.3 S3 ME3SA4	117	C312_45.3 P90 BE90S4	118
32	315	1.6	44.8	7000	C412_44.8 S3 ME3SA4	123	C412_44.8 P90 BE90S4	124
33	302	1.5	43.9	6500	C353_43.9 S3 ME3SA4	120	C353_43.9 P90 BE90S4	121
33	303	2.5	43.1	10000	C512_43.1 S3 ME3SA4	126	C512_43.1 P90 BE90S4	127
35	286	1.0	40.7	5500	C312_40.7 S3 ME3SA4	117	C312_40.7 P90 BE90S4	118
35	284	2.8	40.4	10000	C512_40.4 S3 ME3SA4	126	C512_40.4 P90 BE90S4	127
35	278	2.2	40.3	7000	C413_40.3 S3 ME3SA4	123	C413_40.3 P90 BE90S4	124
38	262	1.7	38.1	6500	C353_38.1 S3 ME3SA4	120	C353_38.1 P90 BE90S4	121
39	261	1.9	37.1	7000	C412_37.1 S3 ME3SA4	123	C412_37.1 P90 BE90S4	124
39	256	3.1	36.4	10000	C512_36.4 S3 ME3SA4	126	C512_36.4 P90 BE90S4	127
40	254	1.2	36.1	5500	C312_36.1 S3 ME3SA4	117	C312_36.1 P90 BE90S4	118
41	239	1.9	34.7	6430	C353_34.7 S3 ME3SA4	120	C353_34.7 P90 BE90S4	121
43	235	2.1	33.4	7000	C412_33.4 S3 ME3SA4	123	C412_33.4 P90 BE90S4	124
44	228	1.3	32.5	5440	C312_32.5 S3 ME3SA4	117	C312_32.5 P90 BE90S4	118
45	221	2.3	31.4	7000	C412_31.4 S3 ME3SA4	123	C412_31.4 P90 BE90S4	124
48	209	1.4	29.8	5360	C312_29.8 S3 ME3SA4	117	C312_29.8 P90 BE90S4	118
48	208	1.0	29.6	3190	C212_29.6 S3 ME3SA4	114	C212_29.6 P90 BE90S4	115
50	198	2.3	28.7	6190	C353_28.7 S3 ME3SA4	120	C353_28.7 P90 BE90S4	121
51	199	2.5	28.3	7000	C412_28.3 S3 ME3SA4	123	C412_28.3 P90 BE90S4	124
53	188	1.6	26.8	5230	C312_26.8 S3 ME3SA4	117	C312_26.8 P90 BE90S4	118
54	187	1.1	26.7	3160	C212_26.7 S3 ME3SA4	114	C212_26.7 P90 BE90S4	115
55	180	2.5	26.2	5930	C353_26.2 S3 ME3SA4	120	C353_26.2 P90 BE90S4	121
57	177	1.7	25.1	5180	C312_25.1 S3 ME3SA4	117	C312_25.1 P90 BE90S4	118
57	176	2.8	25.0	6950	C412_25.0 S3 ME3SA4	123	C412_25.0 P90 BE90S4	124
59	171	1.2	24.3	3150	C212_24.3 S3 ME3SA4	114	C212_24.3 P90 BE90S4	115
63	159	1.9	22.6	5050	C312_22.6 S3 ME3SA4	117	C312_22.6 P90 BE90S4	118
63	159	3.2	22.6	6810	C412_22.6 S3 ME3SA4	123	C412_22.6 P90 BE90S4	124
65	152	2.8	22.1	5680	C353_22.1 S3 ME3SA4	120	C353_22.1 P90 BE90S4	121
65	154	1.3	21.9	3100	C212_21.9 S3 ME3SA4	114	C212_21.9 P90 BE90S4	115
71	139	2.8	20.2	5630	C353_20.2 S3 ME3SA4	120	C353_20.2 P90 BE90S4	121
71	141	2.1	20.1	4920	C312_20.1 S3 ME3SA4	117	C312_20.1 P90 BE90S4	118
71	141	1.3	20.0	3080	C212_20.0 S3 ME3SA4	114	C212_20.0 P90 BE90S4	115
75	134	2.8	19.0	5580	C352_19.0 S3 ME3SA4	120	C352_19.0 P90 BE90S4	121
79	127	2.2	18.1	4790	C312_18.1 S3 ME3SA4	117	C312_18.1 P90 BE90S4	118
79	127	1.5	18.0	3020	C212_18.0 S3 ME3SA4	114	C212_18.0 P90 BE90S4	115
84	120	3.2	17.1	5420	C352_17.1 S3 ME3SA4	120	C352_17.1 P90 BE90S4	121
90	111	1.6	15.8	2970	C212_15.8 S3 ME3SA4	114	C212_15.8 P90 BE90S4	115
92	110	2.5	15.6	4630	C312_15.6 S3 ME3SA4	117	C312_15.6 P90 BE90S4	118
100	100	1.7	14.3	2910	C212_14.3 S3 ME3SA4	114	C212_14.3 P90 BE90S4	115
102	99	2.6	14.0	4500	C312_14.0 S3 ME3SA4	117	C312_14.0 P90 BE90S4	118
115	87	1.8	12.4	2840	C212_12.4 S3 ME3SA4	114	C212_12.4 P90 BE90S4	115
116	87	2.8	12.3	4350	C312_12.3 S3 ME3SA4	117	C312_12.3 P90 BE90S4	118
128	79	2.0	11.2	2770	C212_11.2 S3 ME3SA4	114	C212_11.2 P90 BE90S4	115
129	78	3.1	11.1	4230	C312_11.1 S3 ME3SA4	117	C312_11.1 P90 BE90S4	118
142	71	0.9	10.1	1400	C112_10.1 S3 ME3SA4	111	C112_10.1 P90 BE90S4	112
148	68	2.1	9.6	2700	C212_9.6 S3 ME3SA4	114	C212_9.6 P90 BE90S4	115
154	65	3.4	9.3	4030	C312_9.3 S3 ME3SA4	117	C312_9.3 P90 BE90S4	118
158	64	1.0	9.1	1480	C112_9.1 S3 ME3SA4	111	C112_9.1 P90 BE90S4	112
165	61	2.3	8.7	2630	C212_8.7 S3 ME3SA4	114	C212_8.7 P90 BE90S4	115
188	54	1.0	7.6	1550	C112_7.6 S3 ME3SA4	111	C112_7.6 P90 BE90S4	112
202	50	2.6	7.1	2510	C212_7.1 S3 ME3SA4	114	C212_7.1 P90 BE90S4	115
208	48	1.1	6.9	1510	C112_6.9 S3 ME3SA4	111	C112_6.9 P90 BE90S4	112
224	45	2.8	6.4	2440	C212_6.4 S3 ME3SA4	114	C212_6.4 P90 BE90S4	115
228	44	3.5	6.3	3560	C312_6.3 S3 ME3SA4	117	C312_6.3 P90 BE90S4	118
229	44	1.2	6.2	1220	C112_6.2 S3 ME3SA4	111	C112_6.2 P90 BE90S4	112
235	43	2.5	6.1	2380	C212_6.1 S3 ME3SA4	114	C212_6.1 P90 BE90S4	115
294	34	1.4	4.9	1370	C112_4.9 S3 ME3SA4	111	C112_4.9 P90 BE90S4	112
300	34	3.0	4.8	2240	C212_4.8 S3 ME3SA4	114	C212_4.8 P90 BE90S4	115
386	26	3.5	3.7	2090	C212_3.7 S3 ME3SA4	114	C212_3.7 P90 BE90S4	115

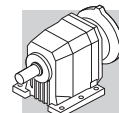


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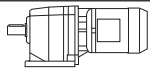
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N				
392	26	1.6	3.7	1280	C112_3.7 S3 ME3SA4	111	C112_3.7 P90 BE90S4	112
517	19	1.9	2.8	1190	C112_2.8 S3 ME3SA4	111	C112_2.8 P90 BE90S4	112

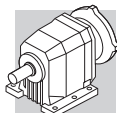
1.5 kW

n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N				
1.3	9730	1.2	1081	85000	C1004_1081 S3 ME3SB4	141	C1004_1081 P90 BE90LA4	142
1.4	9035	1.3	1004	85000	C1004_1004 S3 ME3SB4	141	C1004_1004 P90 BE90LA4	142
1.6	8174	1.5	908.2	85000	C1004_908.2 S3 ME3SB4	141	C1004_908.2 P90 BE90LA4	142
1.7	7596	0.9	844.0	60000	C904_844.0 S3 ME3SB4	138	C904_844.0 P90 BE90LA4	139
1.7	7590	1.6	843.3	85000	C1004_843.3 S3 ME3SB4	141	C1004_843.3 P90 BE90LA4	142
1.8	6981	1.7	775.7	85000	C1004_775.7 S3 ME3SB4	141	C1004_775.7 P90 BE90LA4	142
1.8	6963	1.0	773.6	60000	C904_773.6 S3 ME3SB4	138	C904_773.6 P90 BE90LA4	139
2.0	6483	1.9	720.3	85000	C1004_720.3 S3 ME3SB4	141	C1004_720.3 P90 BE90LA4	142
2.0	6410	1.1	712.2	60000	C904_712.2 S3 ME3SB4	138	C904_712.2 P90 BE90LA4	139
2.2	5875	1.2	652.8	60000	C904_652.8 S3 ME3SB4	138	C904_652.8 P90 BE90LA4	139
2.3	5647	2.1	627.4	85000	C1004_627.4 S3 ME3SB4	141	C1004_627.4 P90 BE90LA4	142
2.5	5245	1.4	582.8	60000	C904_582.8 S3 ME3SB4	138	C904_582.8 P90 BE90LA4	139
2.5	5243	2.3	582.6	85000	C1004_582.6 S3 ME3SB4	141	C1004_582.6 P90 BE90LA4	142
2.7	4808	1.5	534.2	60000	C904_534.2 S3 ME3SB4	138	C904_534.2 P90 BE90LA4	139
2.8	4524	2.7	502.6	85000	C1004_502.6 S3 ME3SB4	141	C1004_502.6 P90 BE90LA4	142
3.1	4201	2.9	466.7	85000	C1004_466.7 S3 ME3SB4	141	C1004_466.7 P90 BE90LA4	142
3.1	4114	1.8	457.1	60000	C904_457.1 S3 ME3SB4	138	C904_457.1 P90 BE90LA4	139
3.1	4099	1.0	455.4	35000	C804_455.4 S3 ME3SB4	135	C804_455.4 P90 BE90LA4	136
3.4	3771	1.9	419.0	60000	C904_419.0 S3 ME3SB4	138	C904_419.0 P90 BE90LA4	139
3.4	3757	1.1	417.5	35000	C804_417.5 S3 ME3SB4	135	C804_417.5 P90 BE90LA4	136
3.9	3328	2.2	369.8	60000	C904_369.8 S3 ME3SB4	138	C904_369.8 P90 BE90LA4	139
3.9	3282	1.2	364.7	35000	C804_364.7 S3 ME3SB4	135	C804_364.7 P90 BE90LA4	136
4.2	3051	2.4	339.0	60000	C904_339.0 S3 ME3SB4	138	C904_339.0 P90 BE90LA4	139
4.3	3008	1.3	334.3	35000	C804_334.3 S3 ME3SB4	135	C804_334.3 P90 BE90LA4	136
4.9	2636	2.7	292.9	60000	C904_292.9 S3 ME3SB4	138	C904_292.9 P90 BE90LA4	139
5.0	2571	1.6	285.7	35000	C804_285.7 S3 ME3SB4	135	C804_285.7 P90 BE90LA4	136
5.3	2450	0.9	272.2	25000	C704_272.2 S3 ME3SB4	132	C704_272.2 P90 BE90LA4	133
5.3	2416	3.0	268.5	60000	C904_268.5 S3 ME3SB4	138	C904_268.5 P90 BE90LA4	139
5.5	2357	1.7	261.9	35000	C804_261.9 S3 ME3SB4	135	C804_261.9 P90 BE90LA4	136
5.7	2262	1.0	251.3	25000	C704_251.3 S3 ME3SB4	132	C704_251.3 P90 BE90LA4	133
6.0	2226	1.0	239.3	25000	C703_239.3 S3 ME3SB4	132	C703_239.3 P90 BE90LA4	133
6.5	2054	1.1	220.9	25000	C703_220.9 S3 ME3SB4	132	C703_220.9 P90 BE90LA4	133
6.6	1957	0.8	217.4	16000	C614_217.4 S3 ME3SB4	129	C614_217.4 P90 BE90LA4	130
6.6	2007	2.0	215.8	35000	C803_215.9 S3 ME3SB4	135	C803_215.9 P90 BE90LA4	136
7.2	1840	2.1	197.9	35000	C803_197.9 S3 ME3SB4	135	C803_197.9 P90 BE90LA4	136
7.3	1762	0.9	195.8	16000	C613_195.8 S3 ME3SB4	129	C613_195.8 P90 BE90LA4	130
7.4	1805	1.3	194.1	25000	C703_194.1 S3 ME3SB4	132	C703_194.1 P90 BE90LA4	133
7.8	1715	2.3	184.4	35000	C803_184.4 S3 ME3SB4	135	C803_184.4 P90 BE90LA4	136
8.0	1666	1.4	179.2	25000	C703_179.2 S3 ME3SB4	132	C703_179.2 P90 BE90LA4	133
8.0	1607	1.0	178.6	16000	C613_178.6 S3 ME3SB4	129	C613_178.6 P90 BE90LA4	130
8.5	1572	2.5	169.0	35000	C803_169.0 S3 ME3SB4	135	C803_169.0 P90 BE90LA4	136
8.7	1480	1.1	164.5	16000	C613_164.5 S3 ME3SB4	129	C613_164.5 P90 BE90LA4	130
8.8	1514	1.5	162.8	25000	C703_162.8 S3 ME3SB4	132	C703_162.8 P90 BE90LA4	133
9.5	1398	1.6	150.3	25000	C703_150.3 S3 ME3SB4	132	C703_150.3 P90 BE90LA4	133
9.5	1350	1.2	150.0	16000	C613_150.0 S3 ME3SB4	129	C613_150.0 P90 BE90LA4	130
9.6	1387	2.9	149.1	35000	C803_149.1 S3 ME3SB4	135	C803_149.1 P90 BE90LA4	136
10.2	1264	1.3	140.5	16000	C613_140.5 S3 ME3SB4	129	C613_140.5 P90 BE90LA4	130
10.4	1278	1.8	137.4	25000	C703_137.4 S3 ME3SB4	132	C703_137.4 P90 BE90LA4	133
10.5	1271	3.1	136.7	35000	C803_136.7 S3 ME3SB4	135	C803_136.7 P90 BE90LA4	136
11.2	1153	1.4	128.1	16000	C613_128.1 S3 ME3SB4	129	C613_128.1 P90 BE90LA4	130
11.3	1180	1.9	126.8	25000	C703_126.8 S3 ME3SB4	132	C703_126.8 P90 BE90LA4	133
12.6	1022	1.6	113.6	16000	C613_113.6 S3 ME3SB4	129	C613_113.6 P90 BE90LA4	130
12.6	1057	0.9	113.6	10000	C513_113.6 S3 ME3SB4	126	C513_113.6 P90 BE90LA4	127
12.7	1046	2.2	112.4	25000	C703_112.4 S3 ME3SB4	132	C703_112.4 P90 BE90LA4	133
13.8	965	2.4	103.8	25000	C703_103.8 S3 ME3SB4	132	C703_103.8 P90 BE90LA4	133
13.8	933	1.7	103.6	16000	C613_103.6 S3 ME3SB4	129	C613_103.6 P90 BE90LA4	130

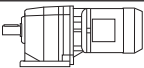


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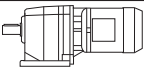
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
14.0	947	1.1	101.8	10000	C513_101.8 S3 ME3SB4	126	C513_101.8 P90 BE90LA4	127
15.4	865	1.2	93.0	10000	C513_93.0 S3 ME3SB4	126	C513_93.0 P90 BE90LA4	127
15.7	819	2.0	91.0	16000	C613_91.0 S3 ME3SB4	129	C613_91.0 P90 BE90LA4	130
16.2	820	2.8	88.2	25000	C703_88.2 S3 ME3SB4	132	C703_88.2 P90 BE90LA4	133
17.2	747	2.1	83.0	16000	C613_83.0 S3 ME3SB4	129	C613_83.0 P90 BE90LA4	130
17.6	757	3.0	81.4	25000	C703_81.4 S3 ME3SB4	132	C703_81.4 P90 BE90LA4	133
17.9	743	1.3	79.9	10000	C513_79.9 S3 ME3SB4	126	C513_79.9 P90 BE90LA4	127
19.3	668	2.4	74.2	16000	C613_74.2 S3 ME3SB4	129	C613_74.2 P90 BE90LA4	130
19.6	678	1.5	72.9	10000	C513_72.9 S3 ME3SB4	126	C513_72.9 P90 BE90LA4	127
20.0	663	3.5	71.3	25000	C703_71.3 S3 ME3SB4	132	C703_71.3 P90 BE90LA4	133
21.1	609	2.6	67.7	16000	C613_67.7 S3 ME3SB4	129	C613_67.7 P90 BE90LA4	130
22.1	601	1.7	64.6	10000	C513_64.6 S3 ME3SB4	126	C513_64.6 P90 BE90LA4	127
22.2	598	1.0	64.3	7000	C413_64.3 S3 ME3SB4	123	C413_64.3 P90 BE90LA4	124
24.2	549	1.8	59.0	10000	C513_59.0 S3 ME3SB4	126	C513_59.0 P90 BE90LA4	127
24.4	545	1.1	58.7	7000	C413_58.7 S3 ME3SB4	123	C413_58.7 P90 BE90LA4	124
24.4	527	3.0	58.6	16000	C613_58.6 S3 ME3SB4	129	C613_58.6 P90 BE90LA4	130
25.1	542	1.4	57.0	10000	C512_57.0 S3 ME3SB4	126	C512_57.0 P90 BE90LA4	127
26.7	481	3.3	53.5	16000	C613_53.5 S3 ME3SB4	129	C613_53.5 P90 BE90LA4	130
27.8	479	1.3	51.5	7000	C413_51.5 S3 ME3SB4	123	C413_51.5 P90 BE90LA4	124
27.8	488	1.4	51.4	10000	C512_51.4 S3 ME3SB4	126	C512_51.4 P90 BE90LA4	127
27.9	476	2.1	51.2	10000	C513_51.2 S3 ME3SB4	126	C513_51.2 P90 BE90LA4	127
29.7	448	1.0	48.2	6290	C353_48.2 S3 ME3SB4	120	C353_48.2 P90 BE90LA4	121
29.9	454	1.8	47.8	10000	C512_47.8 S3 ME3SB4	126	C512_47.8 P90 BE90LA4	127
30	437	1.4	47.0	7000	C413_47.0 S3 ME3SB4	123	C413_47.0 P90 BE90LA4	124
31	435	2.3	46.7	10000	C513_46.7 S3 ME3SB4	126	C513_46.7 P90 BE90LA4	127
32	425	1.2	44.8	7000	C412_44.8 S3 ME3SB4	123	C412_44.8 P90 BE90LA4	124
33	408	1.1	43.9	6190	C353_43.9 S3 ME3SB4	120	C353_43.9 P90 BE90LA4	121
33	410	1.9	43.1	10000	C512_43.1 S3 ME3SB4	126	C512_43.1 P90 BE90LA4	127
35	376	2.7	40.5	10000	C513_40.5 S3 ME3SB4	126	C513_40.5 P90 BE90LA4	127
35	383	2.1	40.4	10000	C512_40.4 S3 ME3SB4	126	C512_40.4 P90 BE90LA4	127
35	375	1.6	40.3	7000	C413_40.3 S3 ME3SB4	123	C413_40.3 P90 BE90LA4	124
38	354	1.3	38.1	6110	C353_38.1 S3 ME3SB4	120	C353_38.1 P90 BE90LA4	121
39	352	1.4	37.1	7000	C412_37.1 S3 ME3SB4	123	C412_37.1 P90 BE90LA4	124
39	344	2.9	37.0	10000	C513_37.0 S3 ME3SB4	126	C513_37.0 P90 BE90LA4	127
39	346	2.3	36.4	10000	C512_36.4 S3 ME3SB4	126	C512_36.4 P90 BE90LA4	127
41	323	1.4	34.7	5990	C353_34.7 S3 ME3SB4	120	C353_34.7 P90 BE90LA4	121
43	317	1.6	33.4	7000	C412_33.4 S3 ME3SB4	123	C412_33.4 P90 BE90LA4	124
43	314	2.5	33.0	10000	C512_33.0 S3 ME3SB4	126	C512_33.0 P90 BE90LA4	127
44	309	1.0	32.5	5000	C312_32.5 S3 ME3SB4	117	C312_32.5 P90 BE90LA4	118
45	299	1.7	31.4	6990	C412_31.4 S3 ME3SB4	123	C412_31.4 P90 BE90LA4	124
48	283	2.8	29.8	10000	C512_29.8 S3 ME3SB4	126	C512_29.8 P90 BE90LA4	127
48	283	1.1	29.8	4970	C312_29.8 S3 ME3SB4	117	C312_29.8 P90 BE90LA4	118
50	267	1.7	28.7	5830	C353_28.7 S3 ME3SB4	120	C353_28.7 P90 BE90LA4	121
51	269	1.9	28.3	6830	C412_28.3 S3 ME3SB4	123	C412_28.3 P90 BE90LA4	124
53	255	1.2	26.8	4870	C312_26.8 S3 ME3SB4	117	C312_26.8 P90 BE90LA4	118
55	243	1.8	26.2	5710	C353_26.2 S3 ME3SB4	120	C353_26.2 P90 BE90LA4	121
55	246	3.2	25.9	10000	C512_25.9 S3 ME3SB4	126	C512_25.9 P90 BE90LA4	127
57	239	1.3	25.1	4840	C312_25.1 S3 ME3SB4	117	C312_25.1 P90 BE90LA4	118
57	238	2.1	25.0	6680	C412_25.0 S3 ME3SB4	123	C412_25.0 P90 BE90LA4	124
63	215	1.4	22.6	4740	C312_22.6 S3 ME3SB4	117	C312_22.6 P90 BE90LA4	118
63	214	2.3	22.6	6510	C412_22.6 S3 ME3SB4	123	C412_22.6 P90 BE90LA4	124
65	206	2.1	22.1	5530	C353_22.1 S3 ME3SB4	120	C353_22.1 P90 BE90LA4	121
65	208	1.0	21.9	2560	C212_21.9 S3 ME3SB4	114	C212_21.9 P90 BE90LA4	115
71	188	2.1	20.2	5410	C353_20.2 S3 ME3SB4	120	C353_20.2 P90 BE90LA4	121
71	191	1.5	20.1	4650	C312_20.1 S3 ME3SB4	117	C312_20.1 P90 BE90LA4	118
71	190	1.0	20.0	2740	C212_20.0 S3 ME3SB4	114	C212_20.0 P90 BE90LA4	115
72	188	2.6	19.8	6330	C412_19.8 S3 ME3SB4	123	C412_19.8 P90 BE90LA4	124
75	181	2.1	19.0	5330	C352_19.0 S3 ME3SB4	120	C352_19.0 P90 BE90LA4	121
79	172	1.7	18.1	4540	C312_18.1 S3 ME3SB4	117	C312_18.1 P90 BE90LA4	118
79	171	1.1	18.0	2710	C212_18.0 S3 ME3SB4	114	C212_18.0 P90 BE90LA4	115
80	169	2.8	17.8	6160	C412_17.8 S3 ME3SB4	123	C412_17.8 P90 BE90LA4	124
84	162	2.3	17.1	5190	C352_17.1 S3 ME3SB4	120	C352_17.1 P90 BE90LA4	121
90	150	1.2	15.8	2700	C212_15.8 S3 ME3SB4	114	C212_15.8 P90 BE90LA4	115
90	150	3.0	15.8	6000	C412_15.8 S3 ME3SB4	123	C412_15.8 P90 BE90LA4	124
92	148	1.8	15.6	4410	C312_15.6 S3 ME3SB4	117	C312_15.6 P90 BE90LA4	118
97	140	2.7	14.8	5030	C352_14.8 S3 ME3SB4	120	C352_14.8 P90 BE90LA4	121

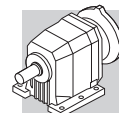


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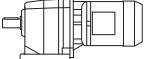
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
100	135	1.3	14.3	2660	C212_14.3 S3 ME3SB4	114	C212_14.3 P90 BE90LA4	115
100	135	3.3	14.2	5830	C412_14.2 S3 ME3SB4	123	C412_14.2 P90 BE90LA4	124
102	133	1.9	14.0	4300	C312_14.0 S3 ME3SB4	117	C312_14.0 P90 BE90LA4	118
108	126	3.0	13.3	4890	C352_13.3 S3 ME3SB4	120	C352_13.3 P90 BE90LA4	121
115	118	1.4	12.4	2630	C212_12.4 S3 ME3SB4	114	C212_12.4 P90 BE90LA4	115
116	117	2.1	12.3	4180	C312_12.3 S3 ME3SB4	117	C312_12.3 P90 BE90LA4	118
123	111	3.4	11.7	4740	C352_11.7 S3 ME3SB4	120	C352_11.7 P90 BE90LA4	121
128	106	1.5	11.2	2580	C212_11.2 S3 ME3SB4	114	C212_11.2 P90 BE90LA4	115
129	105	2.3	11.1	4070	C312_11.1 S3 ME3SB4	117	C312_11.1 P90 BE90LA4	118
148	92	1.6	9.6	2530	C212_9.6 S3 ME3SB4	114	C212_9.6 P90 BE90LA4	115
154	88	2.5	9.3	3900	C312_9.3 S3 ME3SB4	117	C312_9.3 P90 BE90LA4	118
165	82	1.7	8.7	2470	C212_8.7 S3 ME3SB4	114	C212_8.7 P90 BE90LA4	115
171	80	2.7	8.4	3790	C312_8.4 S3 ME3SB4	117	C312_8.4 P90 BE90LA4	118
200	68	2.9	7.2	3640	C312_7.2 S3 ME3SB4	117	C312_7.2 P90 BE90LA4	118
202	67	1.9	7.1	2380	C212_7.1 S3 ME3SB4	114	C212_7.1 P90 BE90LA4	115
222	61	3.2	6.5	3540	C312_6.5 S3 ME3SB4	117	C312_6.5 P90 BE90LA4	118
224	61	2.1	6.4	2330	C212_6.4 S3 ME3SB4	114	C212_6.4 P90 BE90LA4	115
228	60	2.6	6.3	3450	C312_6.3 S3 ME3SB4	117	C312_6.3 P90 BE90LA4	118
229	59	0.9	6.2	600	C112_6.2 S3 ME3SB4	111	C112_6.2 P90 BE90LA4	112
235	58	1.8	6.1	2250	C212_6.1 S3 ME3SB4	114	C212_6.1 P90 BE90LA4	115
289	47	3.3	5.0	3240	C312_5.0 S3 ME3SB4	117	C312_5.0 P90 BE90LA4	118
294	46	1.0	4.9	840	C112_4.9 S3 ME3SB4	111	C112_4.9 P90 BE90LA4	112
300	45	2.2	4.8	2140	C212_4.8 S3 ME3SB4	114	C212_4.8 P90 BE90LA4	115
386	35	2.6	3.7	2020	C212_3.7 S3 ME3SB4	114	C212_3.7 P90 BE90LA4	115
392	35	1.2	3.7	1100	C112_3.7 S3 ME3SB4	111	C112_3.7 P90 BE90LA4	112
517	26	1.4	2.8	1140	C112_2.8 S3 ME3SB4	111	C112_2.8 P90 BE90LA4	112
525	26	3.1	2.7	1870	C212_2.7 S3 ME3SB4	114	C212_2.7 P90 BE90LA4	115

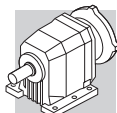
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
1.4	13281	0.9	1003.9	85000	C1004_1004 S3 ME3LA4	141	C1004_1004 P100 BE100LA4	142
1.6	12016	1.0	908.2	85000	C1004_908.2 S3 ME3LA4	141	C1004_908.2 P100 BE100LA4	142
1.7	11157	1.1	843.3	85000	C1004_843.3 S3 ME3LA4	141	C1004_843.3 P100 BE100LA4	142
1.8	10263	1.2	775.7	85000	C1004_775.7 S3 ME3LA4	141	C1004_775.7 P100 BE100LA4	142
2.0	9530	1.3	720.3	85000	C1004_720.3 S3 ME3LA4	141	C1004_720.3 P100 BE100LA4	142
2.3	8301	1.4	627.4	85000	C1004_627.4 S3 ME3LA4	141	C1004_627.4 P100 BE100LA4	142
2.5	7710	0.9	582.8	60000	C904_582.8 S3 ME3LA4	138	C904_582.8 P100 BE100LA4	139
2.5	7708	1.6	582.6	85000	C1004_582.6 S3 ME3LA4	141	C1004_582.6 P100 BE100LA4	142
2.7	7068	1.0	534.2	60000	C904_534.2 S3 ME3LA4	138	C904_534.2 P100 BE100LA4	139
2.8	6650	1.8	502.6	85000	C1004_502.6 S3 ME3LA4	141	C1004_502.6 P100 BE100LA4	142
3.1	6175	1.9	466.7	85000	C1004_466.7 S3 ME3LA4	141	C1004_466.7 P100 BE100LA4	142
3.1	6048	1.2	457.1	60000	C904_457.1 S3 ME3LA4	138	C904_457.1 P100 BE100LA4	139
3.4	5544	1.3	419.0	60000	C904_419.0 S3 ME3LA4	138	C904_419.0 P100 BE100LA4	139
3.5	5421	2.2	409.8	85000	C1004_409.8 S3 ME3LA4	141	C1004_409.8 P100 BE100LA4	142
3.8	5034	2.4	380.5	85000	C1004_380.5 S3 ME3LA4	141	C1004_380.5 P100 BE100LA4	142
3.9	4892	1.5	369.8	60000	C904_369.8 S3 ME3LA4	138	C904_369.8 P100 BE100LA4	139
4.2	4484	1.6	339.0	60000	C904_339.0 S3 ME3LA4	138	C904_339.0 P100 BE100LA4	139
4.3	4422	0.9	334.3	35000	C804_334.3 S3 ME3LA4	135	C804_334.3 P100 BE100LA4	136
4.4	4282	2.8	323.6	85000	C1004_323.6 S3 ME3LA4	141	C1004_323.6 P100 BE100LA4	142
4.9	3875	1.9	292.9	60000	C904_292.9 S3 ME3LA4	138	C904_292.9 P100 BE100LA4	139
5.0	3779	1.1	285.7	35000	C804_285.7 S3 ME3LA4	135	C804_285.7 P100 BE100LA4	136
5.3	3552	2.0	268.5	60000	C904_268.5 S3 ME3LA4	138	C904_268.5 P100 BE100LA4	139
5.5	3464	1.2	261.9	35000	C804_261.9 S3 ME3LA4	135	C804_261.9 P100 BE100LA4	136
6.2	3065	2.3	231.7	60000	C904_231.7 S3 ME3LA4	138	C904_231.7 P100 BE100LA4	139
6.6	2951	1.4	215.8	35000	C803_215.9 S3 ME3LA4	135	C803_215.9 P100 BE100LA4	136
6.7	2810	2.6	212.4	60000	C904_212.4 S3 ME3LA4	138	C904_212.4 P100 BE100LA4	139
7.2	2705	1.4	197.9	35000	C803_197.9 S3 ME3LA4	135	C803_197.9 P100 BE100LA4	136
7.8	2520	1.6	184.4	35000	C803_184.4 S3 ME3LA4	135	C803_184.4 P100 BE100LA4	136
8.0	2450	0.9	179.2	25000	C703_179.2 S3 ME3LA4	132	C703_179.2 P100 BE100LA4	133
8.5	2310	1.7	169.0	35000	C803_169.0 S3 ME3LA4	135	C803_169.0 P100 BE100LA4	136
8.8	2226	1.0	162.8	25000	C703_162.8 S3 ME3LA4	132	C703_162.8 P100 BE100LA4	133

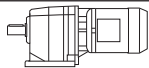


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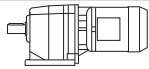
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
9.5	2055	1.1	150.3	25000	C703_150.3 S3 ME3LA4	132	C703_150.3 P100 BE100LA4	133
9.6	2038	2.0	149.1	35000	C803_149.1 S3 ME3LA4	135	C803_149.1 P100 BE100LA4	136
10.4	1878	1.2	137.4	25000	C703_137.4 S3 ME3LA4	132	C703_137.4 P100 BE100LA4	133
10.5	1869	2.1	136.7	35000	C803_136.7 S3 ME3LA4	135	C803_136.7 P100 BE100LA4	136
11.2	1695	0.9	128.1	16000	C613_128.1 S3 ME3LA4	129	C613_128.1 P100 BE100LA4	130
11.3	1734	1.3	126.8	25000	C703_126.8 S3 ME3LA4	132	C703_126.8 P100 BE100LA4	133
12.0	1633	2.4	119.5	35000	C803_119.5 S3 ME3LA4	135	C803_119.5 P100 BE100LA4	136
12.6	1503	1.1	113.6	16000	C613_113.6 S3 ME3LA4	129	C613_113.6 P100 BE100LA4	130
12.7	1537	1.5	112.4	25000	C703_112.4 S3 ME3LA4	132	C703_112.4 P100 BE100LA4	133
13.1	1497	2.7	109.5	35000	C803_109.5 S3 ME3LA4	135	C803_109.5 P100 BE100LA4	136
13.8	1419	1.6	103.8	25000	C703_103.8 S3 ME3LA4	132	C703_103.8 P100 BE100LA4	133
13.8	1371	1.2	103.6	16000	C613_103.6 S3 ME3LA4	129	C613_103.6 P100 BE100LA4	130
14.7	1331	3.0	97.4	35000	C803_97.4 S3 ME3LA4	135	C803_97.4 P100 BE100LA4	136
15.7	1204	1.3	91.0	16000	C613_91.0 S3 ME3LA4	129	C613_91.0 P100 BE100LA4	130
16.0	1220	3.3	89.3	35000	C803_89.3 S3 ME3LA4	135	C803_89.3 P100 BE100LA4	136
16.2	1206	1.9	88.2	25000	C703_88.2 S3 ME3LA4	132	C703_88.2 P100 BE100LA4	133
17.2	1099	1.5	83.0	16000	C613_83.0 S3 ME3LA4	129	C613_83.0 P100 BE100LA4	130
17.6	1113	2.1	81.4	25000	C703_81.4 S3 ME3LA4	132	C703_81.4 P100 BE100LA4	133
17.9	1092	0.9	79.9	10000	C513_79.9 S3 ME3LA4	126	C513_79.9 P100 BE100LA4	127
19.3	982	1.6	74.2	16000	C613_74.2 S3 ME3LA4	129	C613_74.2 P100 BE100LA4	130
19.6	997	1.0	72.9	10000	C513_72.9 S3 ME3LA4	126	C513_72.9 P100 BE100LA4	127
20.0	975	2.4	71.3	25000	C703_71.3 S3 ME3LA4	132	C703_71.3 P100 BE100LA4	133
21.1	896	1.8	67.7	16000	C613_67.7 S3 ME3LA4	129	C613_67.7 P100 BE100LA4	130
21.7	900	2.6	65.9	25000	C703_65.9 S3 ME3LA4	132	C703_65.9 P100 BE100LA4	133
22.1	883	1.1	64.6	10000	C513_64.6 S3 ME3LA4	126	C513_64.6 P100 BE100LA4	127
24.2	806	1.2	59.0	10000	C513_59.0 S3 ME3LA4	126	C513_59.0 P100 BE100LA4	127
24.4	775	2.1	58.6	16000	C613_58.6 S3 ME3LA4	129	C613_58.6 P100 BE100LA4	130
25.1	796	1.0	57.0	10000	C512_57.0 S3 ME3LA4	126	C512_57.0 P100 BE100LA4	127
25.3	773	3.0	56.5	25000	C703_56.5 S3 ME3LA4	132	C703_56.5 P100 BE100LA4	133
26.7	707	2.3	53.5	16000	C613_53.5 S3 ME3LA4	129	C613_53.5 P100 BE100LA4	130
27.8	718	1.0	51.4	10000	C512_51.4 S3 ME3LA4	126	C512_51.4 P100 BE100LA4	127
27.9	700	1.4	51.2	10000	C513_51.2 S3 ME3LA4	126	C513_51.2 P100 BE100LA4	127
29.9	668	1.2	47.8	10000	C512_47.8 S3 ME3LA4	126	C512_47.8 P100 BE100LA4	127
30	630	2.5	47.6	16000	C613_47.6 S3 ME3LA4	129	C613_47.6 P100 BE100LA4	130
30	642	0.9	47.0	6440	C413_47.0 S3 ME3LA4	123	C413_47.0 P100 BE100LA4	124
31	639	1.6	46.7	10000	C513_46.7 S3 ME3LA4	126	C513_46.7 P100 BE100LA4	127
33	575	2.8	43.4	16000	C613_43.4 S3 ME3LA4	129	C613_43.4 P100 BE100LA4	130
33	602	1.3	43.1	10000	C512_43.1 S3 ME3LA4	126	C512_43.1 P100 BE100LA4	127
35	553	1.8	40.5	10000	C513_40.5 S3 ME3LA4	126	C513_40.5 P100 BE100LA4	127
35	564	1.4	40.4	10000	C512_40.4 S3 ME3LA4	126	C512_40.4 P100 BE100LA4	127
35	551	1.1	40.3	6460	C413_40.3 S3 ME3LA4	123	C413_40.3 P100 BE100LA4	124
38	531	2.5	38.0	16000	C612_38.0 S3 ME3LA4	129	C612_38.0 P100 BE100LA4	130
39	518	1.0	37.1	6370	C412_37.1 S3 ME3LA4	123	C412_37.1 P100 BE100LA4	124
39	505	2.0	37.0	10000	C513_37.0 S3 ME3LA4	126	C513_37.0 P100 BE100LA4	127
39	503	1.2	36.8	6390	C413_36.8 S3 ME3LA4	123	C413_36.8 P100 BE100LA4	124
39	508	1.6	36.4	10000	C512_36.4 S3 ME3LA4	126	C512_36.4 P100 BE100LA4	127
41	474	0.9	34.7	5240	C353_34.7 S3 ME3LA4	120	C353_34.7 P100 BE100LA4	121
42	478	2.6	34.2	16000	C612_34.2 S3 ME3LA4	129	C612_34.2 P100 BE100LA4	130
43	466	1.1	33.4	6290	C412_33.4 P100 BE100LA4	123	C412_33.4 P100 BE100LA4	124
43	461	1.7	33.0	10000	C512_33.0 S3 ME3LA4	126	C512_33.0 P100 BE100LA4	127
45	439	1.1	31.4	6290	C412_31.4 S3 ME3LA4	123	C412_31.4 P100 BE100LA4	124
47	425	3.2	30.4	16000	C612_30.4 S3 ME3LA4	129	C612_30.4 P100 BE100LA4	130
48	411	2.4	30.1	10000	C513_30.1 S3 ME3LA4	126	C513_30.1 P100 BE100LA4	127
48	416	1.9	29.8	10000	C512_29.8 S3 ME3LA4	126	C512_29.8 P100 BE100LA4	127
50	393	1.1	28.7	5220	C353_28.7 S3 ME3LA4	120	C353_28.7 P100 BE100LA4	121
51	395	1.3	28.3	6190	C412_28.3 S3 ME3LA4	123	C412_28.3 P100 BE100LA4	124
52	375	2.6	27.4	10000	C513_27.4 S3 ME3LA4	126	C513_27.4 P100 BE100LA4	127
52	383	3.5	27.4	15900	C612_27.4 S3 ME3LA4	129	C612_27.4 P100 BE100LA4	130
55	358	1.3	26.2	5140	C353_26.2 S3 ME3LA4	120	C353_26.2 P100 BE100LA4	121
55	362	2.2	25.9	10000	C512_25.9 S3 ME3LA4	126	C512_25.9 P100 BE100LA4	127
57	350	1.4	25.0	6120	C412_25.0 S3 ME3LA4	123	C412_25.0 P100 BE100LA4	124
61	326	2.5	23.4	10000	C512_23.4 S3 ME3LA4	126	C512_23.4 P100 BE100LA4	127
63	316	1.0	22.6	4220	C312_22.6 S3 ME3LA4	117	C312_22.6 P100 BE100LA4	118
63	315	1.6	22.6	6000	C412_22.6 S3 ME3LA4	123	C412_22.6 P100 BE100LA4	124
65	303	1.4	22.1	5060	C353_22.1 S3 ME3LA4	120	C353_22.1 P100 BE100LA4	121
68	293	2.7	21.0	10000	C512_21.0 S3 ME3LA4	126	C512_21.0 P100 BE100LA4	127

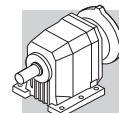


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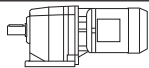
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
71	276	1.4	20.2	4970	C353_20.2 S3 ME3LA4	120	C353_20.2 P100 BE100LA4	121
71	280	1.1	20.1	4200	C312_20.1 S3 ME3LA4	117	C312_20.1 P100 BE100LA4	118
72	276	1.8	19.8	5890	C412_19.8 S3 ME3LA4	123	C412_19.8 P100 BE100LA4	124
75	265	1.4	19.0	4920	C352_19.0 S3 ME3LA4	120	C352_19.0 P100 BE100LA4	121
76	264	3.0	18.9	10000	C512_18.9 S3 ME3LA4	126	C512_18.9 P100 BE100LA4	127
79	252	1.1	18.1	4130	C312_18.1 S3 ME3LA4	117	C312_18.1 P100 BE100LA4	118
80	248	1.9	17.8	5760	C412_17.8 S3 ME3LA4	123	C412_17.8 P100 BE100LA4	124
84	239	1.6	17.1	4810	C352_17.1 S3 ME3LA4	120	C352_17.1 P100 BE100LA4	121
86	232	3.4	16.6	10000	C512_16.6 S3 ME3LA4	126	C512_16.6 P100 BE100LA4	127
90	221	2.0	15.8	5650	C412_15.8 S3 ME3LA4	123	C412_15.8 P100 BE100LA4	124
92	218	1.2	15.6	4060	C312_15.6 S3 ME3LA4	117	C312_15.6 P100 BE100LA4	118
97	206	1.8	14.8	4710	C352_14.8 S3 ME3LA4	120	C352_14.8 P100 BE100LA4	121
100	199	2.2	14.2	5510	C412_14.2 S3 ME3LA4	123	C412_14.2 P100 BE100LA4	124
102	196	1.3	14.0	3980	C312_14.0 S3 ME3LA4	117	C312_14.0 P100 BE100LA4	118
108	185	2.1	13.3	4590	C352_13.3 S3 ME3LA4	120	C352_13.3 P100 BE100LA4	121
115	173	0.9	12.4	2270	C212_12.4 S3 ME3LA4	114	C212_12.4 P100 BE100LA4	115
115	173	2.5	12.4	5360	C412_12.4 S3 ME3LA4	123	C412_12.4 P100 BE100LA4	124
116	172	1.4	12.3	3900	C312_12.3 S3 ME3LA4	117	C312_12.3 P100 BE100LA4	118
123	163	2.3	11.7	4490	C352_11.7 S3 ME3LA4	120	C352_11.7 P100 BE100LA4	121
128	156	1.0	11.2	2250	C212_11.2 S3 ME3LA4	114	C212_11.2 P100 BE100LA4	115
128	156	2.7	11.2	5220	C412_11.2 S3 ME3LA4	123	C412_11.2 P100 BE100LA4	124
129	155	1.5	11.1	3820	C312_11.1 S3 ME3LA4	117	C312_11.1 P100 BE100LA4	118
136	147	2.6	10.5	4370	C352_10.5 S3 ME3LA4	120	C352_10.5 P100 BE100LA4	121
148	135	1.1	9.6	2250	C212_9.6 S3 ME3LA4	114	C212_9.6 P100 BE100LA4	115
149	134	2.9	9.6	5050	C412_9.6 S3 ME3LA4	123	C412_9.6 P100 BE100LA4	124
154	130	1.7	9.3	3690	C312_9.3 S3 ME3LA4	117	C312_9.3 P100 BE100LA4	118
163	123	3.1	8.8	4210	C352_8.8 S3 ME3LA4	120	C352_8.8 P100 BE100LA4	121
165	121	1.2	8.7	2220	C212_8.7 S3 ME3LA4	114	C212_8.7 P100 BE100LA4	115
165	121	3.2	8.6	4850	C412_8.6 S3 ME3LA4	123	C412_8.6 P100 BE100LA4	124
171	117	1.8	8.4	3600	C312_8.4 S3 ME3LA4	117	C312_8.4 P100 BE100LA4	118
181	111	3.4	7.9	4090	C352_7.9 S3 ME3LA4	120	C352_7.9 P100 BE100LA4	121
200	100	2.0	7.2	3480	C312_7.2 S3 ME3LA4	117	C312_7.2 P100 BE100LA4	118
202	99	1.3	7.1	2180	C212_7.1 S3 ME3LA4	114	C212_7.1 P100 BE100LA4	115
222	90	2.2	6.5	3390	C312_6.5 S3 ME3LA4	117	C312_6.5 P100 BE100LA4	118
224	89	1.4	6.4	2140	C212_6.4 S3 ME3LA4	114	C212_6.4 P100 BE100LA4	115
228	87	1.8	6.3	3250	C312_6.3 S3 ME3LA4	117	C312_6.3 P100 BE100LA4	118
235	85	1.2	6.1	2040	C212_6.1 S3 ME3LA4	114	C212_6.1 P100 BE100LA4	115
245	82	2.4	5.8	3710	C352_5.8 S3 ME3LA4	120	C352_5.8 P100 BE100LA4	121
289	69	2.2	5.0	3100	C312_5.0 S3 ME3LA4	117	C312_5.0 P100 BE100LA4	118
300	67	1.5	4.8	1970	C212_4.8 S3 ME3LA4	114	C212_4.8 P100 BE100LA4	115
309	65	3.1	4.6	3490	C352_4.6 S3 ME3LA4	120	C352_4.6 P100 BE100LA4	121
383	52	2.9	3.7	2890	C312_3.7 S3 ME3LA4	117	C312_3.7 P100 BE100LA4	118
386	52	1.7	3.7	1890	C212_3.7 S3 ME3LA4	114	C212_3.7 P100 BE100LA4	115
497	40	3.2	2.9	2700	C312_2.9 S3 ME3LA4	117	C312_2.9 P100 BE100LA4	118
517	39	1.0	2.8	690	C112_2.8 S3 ME3LA4	111	C112_2.8 P100 BE100LA4	112
525	38	2.1	2.7	1770	C212_2.7 S3 ME3LA4	114	C212_2.7 P100 BE100LA4	115

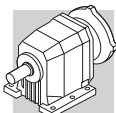
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
2.0	12965	0.9	720.3	85000	C1004_720.3 S3 ME3LB4	141	C1004_720.3 P100 BE100LB4	142
2.3	11293	1.1	627.4	85000	C1004_627.4 S3 ME3LB4	141	C1004_627.4 P100 BE100LB4	142
2.5	10487	1.1	582.6	85000	C1004_582.6 S3 ME3LB4	141	C1004_582.6 P100 BE100LB4	142
2.9	9047	1.3	502.6	85000	C1004_502.6 S3 ME3LB4	141	C1004_502.6 P100 BE100LB4	142
3.1	8401	1.4	466.7	85000	C1004_466.7 S3 ME3LB4	141	C1004_466.7 P100 BE100LB4	142
3.4	7543	1.0	419.0	60000	C904_419.0 S3 ME3LB4	138	C904_419.0 P100 BE100LB4	139
3.5	7376	1.6	409.8	85000	C1004_409.8 S3 ME3LB4	141	C1004_409.8 P100 BE100LB4	142
3.8	6849	1.8	380.5	85000	C1004_380.5 S3 ME3LB4	141	C1004_380.5 P100 BE100LB4	142
3.9	6656	1.1	369.8	60000	C904_369.8 S3 ME3LB4	138	C904_369.8 P100 BE100LB4	139
4.2	6101	1.2	339.0	60000	C904_339.0 S3 ME3LB4	138	C904_339.0 P100 BE100LB4	139
4.4	5825	2.1	323.6	85000	C1004_323.6 S3 ME3LB4	141	C1004_323.6 P100 BE100LB4	142
4.8	5409	2.2	300.5	85000	C1004_300.5 S3 ME3LB4	141	C1004_300.5 P100 BE100LB4	142

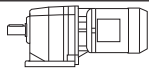


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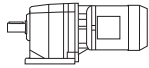
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
4.9	5272	1.4	292.9	60000	C904_292.9 S3 ME3LB4	138	C904_292.9 P100 BE100LB4	139
5.4	4833	1.5	268.5	60000	C904_268.5 S3 ME3LB4	138	C904_268.5 P100 BE100LB4	139
5.5	4734	2.5	263.0	85000	C1004_263.0 S3 ME3LB4	141	C1004_263.0 P100 BE100LB4	142
5.9	4396	2.7	244.2	85000	C1004_244.2 S3 ME3LB4	141	C1004_244.2 P100 BE100LB4	142
6.2	4170	1.7	231.7	60000	C904_231.7 S3 ME3LB4	138	C904_231.7 P100 BE100LB4	139
6.7	4015	1.0	215.8	35000	C803_215.9 S3 ME3LB4	135	C803_215.9 P100 BE100LB4	136
6.8	3823	1.9	212.4	60000	C904_212.4 S3 ME3LB4	138	C904_212.4 P100 BE100LB4	139
7.3	3680	1.0	197.9	35000	C803_197.9 S3 ME3LB4	135	C803_197.9 P100 BE100LB4	136
7.8	3429	1.2	184.4	35000	C803_184.4 S3 ME3LB4	135	C803_184.4 P100 BE100LB4	136
8.4	3201	2.2	172.1	60000	C903_172.1 S3 ME3LB4	138	C903_172.1 P100 BE100LB4	139
8.5	3143	1.3	169.0	35000	C803_169.0 S3 ME3LB4	135	C803_169.0 P100 BE100LB4	136
9.1	2934	2.4	157.8	60000	C903_157.8 S3 ME3LB4	138	C903_157.8 P100 BE100LB4	139
9.7	2773	1.4	149.1	35000	C803_149.1 S3 ME3LB4	135	C803_149.1 P100 BE100LB4	136
9.8	2722	2.6	146.3	60000	C903_146.3 S3 ME3LB4	138	C903_146.3 P100 BE100LB4	139
10.5	2542	1.6	136.7	35000	C803_136.7 S3 ME3LB4	135	C803_136.7 P100 BE100LB4	136
10.7	2495	2.8	134.1	60000	C903_134.1 S3 ME3LB4	138	C903_134.1 P100 BE100LB4	139
11.4	2359	1.0	126.8	25000	C703_126.8 S3 ME3LB4	132	C703_126.8 P100 BE100LB4	133
12.1	2222	1.8	119.5	35000	C803_119.5 S3 ME3LB4	135	C803_119.5 P100 BE100LB4	136
12.3	2171	3.3	116.7	60000	C903_116.7 S3 ME3LB4	138	C903_116.7 P100 BE100LB4	139
12.8	2091	1.1	112.4	25000	C703_112.4 S3 ME3LB4	132	C703_112.4 P100 BE100LB4	133
13.2	2037	2.0	109.5	35000	C803_109.5 S3 ME3LB4	135	C803_109.5 P100 BE100LB4	136
13.9	1931	1.2	103.8	25000	C703_103.8 S3 ME3LB4	132	C703_103.8 P100 BE100LB4	133
14.8	1811	2.2	97.4	35000	C803_97.4 S3 ME3LB4	135	C803_97.4 P100 BE100LB4	136
15.8	1638	1.0	91.0	16000	C613_91.0 S3 ME3LB4	129	C613_91.0 P100 BE100LB4	130
16.1	1660	2.4	89.3	35000	C803_89.3 S3 ME3LB4	135	C803_89.3 P100 BE100LB4	136
16.3	1640	1.4	88.2	25000	C703_88.2 S3 ME3LB4	132	C703_88.2 P100 BE100LB4	133
17.3	1495	1.1	83.0	16000	C613_83.0 S3 ME3LB4	129	C613_83.0 P100 BE100LB4	130
17.7	1514	1.5	81.4	25000	C703_81.4 S3 ME3LB4	132	C703_81.4 P100 BE100LB4	133
18.7	1431	2.8	76.9	35000	C803_76.9 S3 ME3LB4	135	C803_76.9 P100 BE100LB4	136
19.4	1336	1.2	74.2	16000	C613_74.2 S3 ME3LB4	129	C613_74.2 P100 BE100LB4	130
20.2	1327	1.7	71.3	25000	C703_71.3 S3 ME3LB4	132	C703_71.3 P100 BE100LB4	133
20.4	1311	3.1	70.5	35000	C803_70.5 S3 ME3LB4	135	C803_70.5 P100 BE100LB4	136
21.3	1218	1.3	67.7	16000	C613_67.7 S3 ME3LB4	129	C613_67.7 P100 BE100LB4	130
21.9	1225	1.9	65.9	25000	C703_65.9 S3 ME3LB4	132	C703_65.9 P100 BE100LB4	133
24.4	1097	0.9	59.0	10000	C513_59.0 S3 ME3LB4	126	C513_59.0 P100 BE100LB4	127
24.6	1055	1.5	58.6	16000	C613_58.6 S3 ME3LB4	129	C613_58.6 P100 BE100LB4	130
25.5	1051	2.2	56.5	25000	C703_56.5 S3 ME3LB4	132	C703_56.5 P100 BE100LB4	133
26.9	962	1.7	53.5	16000	C613_53.5 S3 ME3LB4	129	C613_53.5 P100 BE100LB4	130
27.6	970	2.4	52.2	25000	C703_52.2 S3 ME3LB4	132	C703_52.2 P100 BE100LB4	133
28.1	952	1.1	51.2	10000	C513_51.2 S3 ME3LB4	126	C513_51.2 P100 BE100LB4	127
30	857	1.9	47.6	16000	C613_47.6 S3 ME3LB4	129	C613_47.6 P100 BE100LB4	130
31	869	1.2	46.7	10000	C513_46.7 S3 ME3LB4	126	C513_46.7 P100 BE100LB4	127
32	831	2.8	44.7	25000	C703_44.7 S3 ME3LB4	132	C703_44.7 P100 BE100LB4	133
33	782	2.0	43.4	16000	C613_43.4 S3 ME3LB4	129	C613_43.4 P100 BE100LB4	130
33	819	0.9	43.1	10000	C512_43.1 S3 ME3LB4	126	C512_43.1 P100 BE100LB4	127
35	767	3.0	41.3	25000	C703_41.3 S3 ME3LB4	132	C703_41.3 P100 BE100LB4	133
36	753	1.3	40.5	10000	C513_40.5 S3 ME3LB4	126	C513_40.5 P100 BE100LB4	127
36	767	1.0	40.4	10000	C512_40.4 S3 ME3LB4	126	C512_40.4 P100 BE100LB4	127
38	722	1.9	38.0	16000	C612_38.0 S3 ME3LB4	129	C612_38.0 P100 BE100LB4	130
39	687	1.5	37.0	10000	C513_37.0 S3 ME3LB4	126	C513_37.0 P100 BE100LB4	127
40	691	1.1	36.4	10000	C512_36.4 S3 ME3LB4	126	C512_36.4 P100 BE100LB4	127
40	651	2.4	36.1	16000	C613_36.1 S3 ME3LB4	129	C613_36.1 P100 BE100LB4	130
42	650	1.9	34.2	16000	C612_34.2 S3 ME3LB4	129	C612_34.2 P100 BE100LB4	130
44	628	1.3	33.0	10000	C512_33.0 S3 ME3LB4	126	C512_33.0 P100 BE100LB4	127
44	594	2.6	33.0	16000	C613_33.0 S3 ME3LB4	129	C613_33.0 P100 BE100LB4	130
46	581	1.0	31.2	5550	C413_31.2 S3 ME3LB4	123	C413_31.2 P100 BE100LB4	124
47	578	2.3	30.4	15900	C612_30.4 S3 ME3LB4	129	C612_30.4 P100 BE100LB4	130
48	559	1.8	30.1	10000	C513_30.1 S3 ME3LB4	126	C513_30.1 P100 BE100LB4	127
48	566	1.4	29.8	10000	C512_29.8 S3 ME3LB4	126	C512_29.8 P100 BE100LB4	127
51	538	0.9	28.3	5460	C412_28.3 S3 ME3LB4	123	C412_28.3 P100 BE100LB4	124
52	511	1.9	27.4	10000	C513_27.4 S3 ME3LB4	126	C513_27.4 P100 BE100LB4	127
53	521	2.6	27.4	15400	C612_27.4 S3 ME3LB4	129	C612_27.4 P100 BE100LB4	130
55	487	0.9	26.2	4500	C353_26.2 S3 ME3LB4	120	C353_26.2 P100 BE100LB4	121
56	492	1.6	25.9	10000	C512_25.9 S3 ME3LB4	126	C512_25.9 P100 BE100LB4	127
57	476	1.1	25.0	5480	C412_25.0 S3 ME3LB4	123	C412_25.0 P100 BE100LB4	124
58	472	2.9	24.8	15100	C612_24.8 S3 ME3LB4	129	C612_24.8 P100 BE100LB4	130

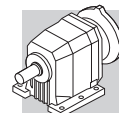


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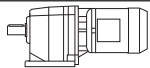
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N				
62	444	1.8	23.4	10000	C512_23.4 S3 ME3LB4	126	C512_23.4 P100 BE100LB4	127
64	429	1.2	22.6	5420	C412_22.6 S3 ME3LB4	123	C412_22.6 P100 BE100LB4	124
64	425	3.2	22.4	14600	C612_22.4 S3 ME3LB4	129	C612_22.4 P100 BE100LB4	130
65	412	1.0	22.1	4530	C353_22.1 S3 ME3LB4	120	C353_22.1 P100 BE100LB4	121
69	398	2.0	21.0	10000	C512_21.0 S3 ME3LB4	126	C512_21.0 P100 BE100LB4	127
71	375	1.1	20.2	4480	C353_20.2 S3 ME3LB4	120	C353_20.2 P100 BE100LB4	121
73	375	1.3	19.8	5390	C412_19.8 S3 ME3LB4	123	C412_19.8 P100 BE100LB4	124
76	361	1.1	19.0	4450	C352_19.0 S3 ME3LB4	120	C352_19.0 P100 BE100LB4	121
76	359	2.2	18.9	10000	C512_18.9 S3 ME3LB4	126	C512_18.9 P100 BE100LB4	127
81	338	1.4	17.8	5300	C412_17.8 S3 ME3LB4	123	C412_17.8 P100 BE100LB4	124
84	325	1.2	17.1	4380	C352_17.1 S3 ME3LB4	120	C352_17.1 P100 BE100LB4	121
87	315	2.5	16.6	9790	C512_16.6 S3 ME3LB4	126	C512_16.6 P100 BE100LB4	127
91	301	1.5	15.8	5240	C412_15.8 S3 ME3LB4	123	C412_15.8 P100 BE100LB4	124
92	296	0.9	15.6	3680	C312_15.6 S3 ME3LB4	117	C312_15.6 P100 BE100LB4	118
96	284	2.8	15.0	9540	C512_15.0 S3 ME3LB4	126	C512_15.0 P100 BE100LB4	127
98	280	1.4	14.8	4340	C352_14.8 S3 ME3LB4	120	C352_14.8 P100 BE100LB4	121
101	271	1.6	14.2	5140	C412_14.2 S3 ME3LB4	123	C412_14.2 P100 BE100LB4	124
103	267	1.0	14.0	3610	C312_14.0 S3 ME3LB4	117	C312_14.0 P100 BE100LB4	118
109	252	1.5	13.3	4260	C352_13.3 S3 ME3LB4	120	C352_13.3 P100 BE100LB4	121
110	249	3.0	13.1	9200	C512_13.1 S3 ME3LB4	126	C512_13.1 P100 BE100LB4	127
116	235	1.8	12.4	5040	C412_12.4 S3 ME3LB4	123	C412_12.4 P100 BE100LB4	124
117	234	1.0	12.3	3580	C312_12.3 S3 ME3LB4	117	C312_12.3 P100 BE100LB4	118
122	225	3.4	11.8	8950	C512_11.8 S3 ME3LB4	126	C512_11.8 P100 BE100LB4	127
123	222	1.7	11.7	4200	C352_11.7 S3 ME3LB4	120	C352_11.7 P100 BE100LB4	121
129	212	2.0	11.2	4930	C412_11.2 S3 ME3LB4	123	C412_11.2 P100 BE100LB4	124
130	211	1.1	11.1	3520	C312_11.1 S3 ME3LB4	117	C312_11.1 P100 BE100LB4	118
137	199	1.9	10.5	4110	C352_10.5 S3 ME3LB4	120	C352_10.5 P100 BE100LB4	121
150	182	2.1	9.6	4800	C412_9.6 S3 ME3LB4	123	C412_9.6 P100 BE100LB4	124
155	177	1.2	9.3	3450	C312_9.3 S3 ME3LB4	117	C312_9.3 P100 BE100LB4	118
164	167	2.3	8.8	3990	C352_8.8 S3 ME3LB4	120	C352_8.8 P100 BE100LB4	121
167	164	2.3	8.6	4600	C412_8.6 S3 ME3LB4	123	C412_8.6 P100 BE100LB4	124
172	159	1.4	8.4	3380	C312_8.4 S3 ME3LB4	117	C312_8.4 P100 BE100LB4	118
182	150	2.5	7.9	3890	C352_7.9 S3 ME3LB4	120	C352_7.9 P100 BE100LB4	121
201	136	1.5	7.2	3300	C312_7.2 S3 ME3LB4	117	C312_7.2 P100 BE100LB4	118
203	135	1.0	7.1	1940	C212_7.1 S3 ME3LB4	114	C212_7.1 P100 BE100LB4	115
204	134	2.6	7.1	4490	C412_7.1 S3 ME3LB4	123	C412_7.1 P100 BE100LB4	124
212	129	2.8	6.8	3780	C352_6.8 S3 ME3LB4	120	C352_6.8 P100 BE100LB4	121
223	123	1.6	6.5	3220	C312_6.5 S3 ME3LB4	117	C312_6.5 P100 BE100LB4	118
226	121	1.0	6.4	1920	C212_6.4 S3 ME3LB4	114	C212_6.4 P100 BE100LB4	115
226	121	2.9	6.4	4370	C412_6.4 S3 ME3LB4	123	C412_6.4 P100 BE100LB4	124
230	119	1.3	6.3	3100	C312_6.3 S3 ME3LB4	117	C312_6.3 P100 BE100LB4	118
236	116	3.0	6.1	3680	C352_6.1 S3 ME3LB4	120	C352_6.1 P100 BE100LB4	121
237	116	0.9	6.1	1600	C212_6.1 S3 ME3LB4	114	C212_6.1 P100 BE100LB4	115
242	113	2.3	6.0	4090	C412_6.0 S3 ME3LB4	123	C412_6.0 P100 BE100LB4	124
246	111	1.8	5.8	3530	C352_5.8 S3 ME3LB4	120	C352_5.8 P100 BE100LB4	121
291	94	1.6	5.0	2950	C312_5.0 S3 ME3LB4	117	C312_5.0 P100 BE100LB4	118
302	91	1.1	4.8	1780	C212_4.8 S3 ME3LB4	114	C212_4.8 P100 BE100LB4	115
309	89	2.9	4.7	3880	C412_4.7 S3 ME3LB4	123	C412_4.7 P100 BE100LB4	124
312	88	2.3	4.6	3270	C352_4.6 S3 ME3LB4	120	C352_4.6 P100 BE100LB4	121
386	71	2.1	3.7	2780	C312_3.7 S3 ME3LB4	117	C312_3.7 P100 BE100LB4	118
388	70	1.3	3.7	1740	C212_3.7 S3 ME3LB4	114	C212_3.7 P100 BE100LB4	115
413	66	3.0	3.5	3130	C352_3.5 S3 ME3LB4	120	C352_3.5 P100 BE100LB4	121
500	55	2.4	2.9	2610	C312_2.9 S3 ME3LB4	117	C312_2.9 P100 BE100LB4	118
529	52	1.5	2.7	1660	C212_2.7 S3 ME3LB4	114	C212_2.7 P100 BE100LB4	115

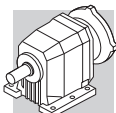
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N				
2.9	12214	1.0	502.6	85000	C1004_502.6 S4 ME4SA4	141	C1004_502.6 P112 BE112M4	142
3.1	11342	1.1	466.7	85000	C1004_466.7 S4 ME4SA4	141	C1004_466.7 P112 BE112M4	142
3.5	9957	1.2	409.8	85000	C1004_409.8 S4 ME4SA4	141	C1004_409.8 P112 BE112M4	142
3.8	9246	1.3	380.5	85000	C1004_380.5 S4 ME4SA4	141	C1004_380.5 P112 BE112M4	142

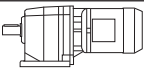


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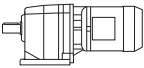
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
4.4	7864	1.5	323.6	85000	C1004_323.6 S4 ME4SA4	141	C1004_323.6 P112 BE112M4	142
4.8	7302	1.6	300.5	85000	C1004_300.5 S4 ME4SA4	141	C1004_300.5 P112 BE112M4	142
4.9	7118	1.0	292.9	60000	C904_292.9 S4 ME4SA4	138	C904_292.9 P112 BE112M4	139
5.4	6524	1.1	268.5	60000	C904_268.5 S4 ME4SA4	138	C904_268.5 P112 BE112M4	139
5.5	6391	1.9	263.0	85000	C1004_263.0 S4 ME4SA4	141	C1004_263.0 P112 BE112M4	142
5.9	5934	2.0	244.2	85000	C1004_244.2 S4 ME4SA4	141	C1004_244.2 P112 BE112M4	142
6.2	5630	1.3	231.7	60000	C904_231.7 S4 ME4SA4	138	C904_231.7 P112 BE112M4	139
6.8	5161	1.4	212.4	60000	C904_212.4 S4 ME4SA4	138	C904_212.4 P112 BE112M4	139
7.2	4851	2.5	199.6	85000	C1004_199.6 S4 ME4SA4	141	C1004_199.6 P112 BE112M4	142
7.8	4504	2.7	185.4	85000	C1004_185.4 S4 ME4SA4	141	C1004_185.4 P112 BE112M4	142
8.4	4322	1.7	172.1	60000	C903_172.1 S4 ME4SA4	138	C903_172.1 P112 BE112M4	139
8.5	4243	0.9	169.0	35000	C803_169.0 S4 ME4SA4	135	C803_169.0 P112 BE112M4	136
9.1	3961	1.8	157.8	60000	C903_157.8 S4 ME4SA4	138	C903_157.8 P112 BE112M4	139
9.7	3744	1.1	149.1	35000	C803_149.1 S4 ME4SA4	135	C803_149.1 P112 BE112M4	136
9.8	3674	2.0	146.3	60000	C903_146.3 S4 ME4SA4	138	C903_146.3 P112 BE112M4	139
10.5	3432	1.2	136.7	35000	C803_136.7 S4 ME4SA4	135	C803_136.7 P112 BE112M4	136
10.7	3368	2.1	134.1	60000	C903_134.1 S4 ME4SA4	138	C903_134.1 P112 BE112M4	139
12.1	3000	1.3	119.5	35000	C803_119.5 S4 ME4SA4	135	C803_119.5 P112 BE112M4	136
12.3	2931	2.5	116.7	60000	C903_116.7 S4 ME4SA4	138	C903_116.7 P112 BE112M4	139
13.2	2750	1.5	109.5	35000	C803_109.5 S4 ME4SA4	135	C803_109.5 P112 BE112M4	136
13.5	2687	2.6	107.0	60000	C903_107.0 S4 ME4SA4	138	C903_107.0 P112 BE112M4	139
14.8	2445	1.6	97.4	35000	C803_97.4 S4 ME4SA4	135	C803_97.4 P112 BE112M4	136
15.0	2417	3.0	96.2	60000	C903_96.2 S4 ME4SA4	138	C903_96.2 P112 BE112M4	139
16.1	2242	1.8	89.3	35000	C803_89.3 S4 ME4SA4	135	C803_89.3 P112 BE112M4	136
16.3	2215	1.0	88.2	25000	C703_88.2 S4 ME4SA4	132	C703_88.2 P112 BE112M4	133
17.7	2044	1.1	81.4	25000	C703_81.4 S4 ME4SA4	132	C703_81.4 P112 BE112M4	133
18.7	1931	2.1	76.9	35000	C803_76.9 S4 ME4SA4	135	C803_76.9 P112 BE112M4	136
20.2	1791	1.3	71.3	25000	C703_71.3 S4 ME4SA4	132	C703_71.3 P112 BE112M4	133
20.4	1770	2.3	70.5	35000	C803_70.5 S4 ME4SA4	135	C803_70.5 P112 BE112M4	136
21.3	1645	1.0	67.7	16000	C613_67.7 S4 ME4SA4	129	C613_67.7 P112 BE112M4	130
21.9	1654	1.4	65.9	25000	C703_65.9 S4 ME4SA4	132	C703_65.9 P112 BE112M4	133
23.0	1570	2.5	62.5	35000	C803_62.5 S4 ME4SA4	135	C803_62.5 P112 BE112M4	136
24.6	1424	1.1	58.6	16000	C613_58.6 S4 ME4SA4	129	C613_58.6 P112 BE112M4	130
25.1	1439	2.8	57.3	35000	C803_57.3 S4 ME4SA4	135	C803_57.3 P112 BE112M4	136
25.5	1419	1.6	56.5	25000	C703_56.5 S4 ME4SA4	132	C703_56.5 P112 BE112M4	133
26.9	1299	1.2	53.5	16000	C613_53.5 S4 ME4SA4	129	C613_53.5 P112 BE112M4	130
27.6	1310	1.8	52.2	25000	C703_52.2 S4 ME4SA4	132	C703_52.2 P112 BE112M4	133
30	1157	1.4	47.6	16000	C613_47.6 S4 ME4SA4	129	C613_47.6 P112 BE112M4	130
30	1191	3.2	47.4	35000	C803_47.4 S4 ME4SA4	135	C803_47.4 P112 BE112M4	136
32	1122	2.0	44.7	25000	C703_44.7 S4 ME4SA4	132	C703_44.7 P112 BE112M4	133
33	1092	3.5	43.5	35000	C803_43.5 S4 ME4SA4	135	C803_43.5 P112 BE112M4	136
33	1056	1.5	43.4	16000	C613_43.4 S4 ME4SA4	129	C613_43.4 P112 BE112M4	130
35	1036	2.2	41.3	25000	C703_41.3 S4 ME4SA4	132	C703_41.3 P112 BE112M4	133
36	1016	1.0	40.5	10000	C513_40.5 S4 ME4SA4	126	C513_40.5 P112 BE112M4	127
38	975	1.4	38.0	16000	C612_38.0 S4 ME4SA4	129	C612_38.0 P112 BE112M4	130
39	928	1.1	37.0	10000	C513_37.0 S4 ME4SA4	126	C513_37.0 P112 BE112M4	127
40	878	1.8	36.1	15700	C613_36.1 S4 ME4SA4	129	C613_36.1 P112 BE112M4	130
41	891	2.4	34.7	23400	C702_34.7 S4 ME4SA4	132	C702_34.7 P112 BE112M4	133
42	878	1.4	34.2	15700	C612_34.2 S4 ME4SA4	129	C612_34.2 P112 BE112M4	130
44	847	0.9	33.0	10000	C512_33.0 S4 ME4SA4	126	C512_33.0 P112 BE112M4	127
44	801	1.9	33.0	15500	C613_33.0 S4 ME4SA4	129	C613_33.0 P112 BE112M4	130
47	781	1.7	30.4	15300	C612_30.4 S4 ME4SA4	129	C612_30.4 P112 BE112M4	130
48	755	1.3	30.1	9880	C513_30.1 S4 ME4SA4	126	C513_30.1 P112 BE112M4	127
48	764	1.0	29.8	10000	C512_29.8 S4 ME4SA4	126	C512_29.8 P112 BE112M4	127
52	711	3.0	27.7	22300	C702_27.7 S4 ME4SA4	132	C702_27.7 P112 BE112M4	133
52	689	1.4	27.4	9550	C513_27.4 S4 ME4SA4	126	C513_27.4 P112 BE112M4	127
53	703	1.9	27.4	14900	C612_27.4 S4 ME4SA4	129	C612_27.4 P112 BE112M4	130
56	665	1.2	25.9	10000	C512_25.9 S4 ME4SA4	126	C512_25.9 P112 BE112M4	127
58	637	2.1	24.8	14600	C612_24.8 S4 ME4SA4	129	C612_24.8 P112 BE112M4	130
60	600	1.5	23.9	9250	C513_23.9 S4 ME4SA4	126	C513_23.9 P112 BE112M4	127
62	599	1.3	23.4	10000	C512_23.4 S4 ME4SA4	126	C512_23.4 P112 BE112M4	127
64	573	2.4	22.4	14200	C612_22.4 S4 ME4SA4	129	C612_22.4 P112 BE112M4	130
69	538	1.5	21.0	9920	C512_21.0 S4 ME4SA4	126	C512_21.0 P112 BE112M4	127
73	507	1.0	19.8	4760	C412_19.8 S4 ME4SA4	123	C412_19.8 P112 BE112M4	124
73	503	2.7	19.6	13800	C612_19.6 S4 ME4SA4	129	C612_19.6 P112 BE112M4	130
76	485	1.7	18.9	9730	C512_18.9 S4 ME4SA4	126	C512_18.9 P112 BE112M4	127

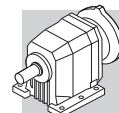


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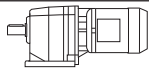
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
81	456	1.1	17.8	4720	C412_17.8 S4 ME4SA4	123	C412_17.8 P112 BE112M4	124
82	453	3.0	17.7	13400	C612_17.7 S4 ME4SA4	129	C612_17.7 P112 BE112M4	130
87	426	1.9	16.6	9440	C512_16.6 S4 ME4SA4	126	C512_16.6 P112 BE112M4	127
90	409	3.3	15.9	13100	C612_15.9 S4 ME4SA4	129	C612_15.9 P112 BE112M4	130
91	406	1.1	15.8	4740	C412_15.8 S4 ME4SA4	123	C412_15.8 P112 BE112M4	124
96	384	2.1	15.0	9230	C512_15.0 S4 ME4SA4	126	C512_15.0 P112 BE112M4	127
98	378	1.0	14.8	3880	C352_14.8 S4 ME4SA4	120	C352_14.8 P112 BE112M4	121
101	365	1.2	14.2	4690	C412_14.2 S4 ME4SA4	123	C412_14.2 P112 BE112M4	124
109	340	1.1	13.3	3840	C352_13.3 S4 ME4SA4	120	C352_13.3 P112 BE112M4	121
110	337	2.2	13.1	8930	C512_13.1 S4 ME4SA4	126	C512_13.1 P112 BE112M4	127
116	318	1.3	12.4	4660	C412_12.4 S4 ME4SA4	123	C412_12.4 P112 BE112M4	124
122	304	2.5	11.8	8720	C512_11.8 S4 ME4SA4	126	C512_11.8 P112 BE112M4	127
123	299	1.3	11.7	3840	C352_11.7 S4 ME4SA4	120	C352_11.7 P112 BE112M4	121
129	286	1.5	11.2	4580	C412_11.2 S4 ME4SA4	123	C412_11.2 P112 BE112M4	124
137	269	1.4	10.5	3780	C352_10.5 S4 ME4SA4	120	C352_10.5 P112 BE112M4	121
148	250	2.7	9.8	8290	C512_9.8 S4 ME4SA4	126	C512_9.8 P112 BE112M4	127
150	246	1.6	9.6	4510	C412_9.6 S4 ME4SA4	123	C412_9.6 P112 BE112M4	124
155	238	0.9	9.3	3150	C312_9.3 S4 ME4SA4	117	C312_9.3 P112 BE112M4	118
164	226	1.7	8.8	3720	C352_8.8 S4 ME4SA4	120	C352_8.8 P112 BE112M4	121
164	225	3.0	8.8	8070	C512_8.8 S4 ME4SA4	126	C512_8.8 P112 BE112M4	127
167	222	1.7	8.6	4420	C412_8.6 S4 ME4SA4	123	C412_8.6 P112 BE112M4	124
172	215	1.0	8.4	3110	C312_8.4 S4 ME4SA4	117	C312_8.4 P112 BE112M4	118
182	203	1.9	7.9	3650	C352_7.9 S4 ME4SA4	120	C352_7.9 P112 BE112M4	121
186	199	3.2	7.8	7800	C512_7.8 S4 ME4SA4	126	C512_7.8 P112 BE112M4	127
201	184	1.1	7.2	3070	C312_7.2 S4 ME4SA4	117	C312_7.2 P112 BE112M4	118
204	181	2.0	7.1	4280	C412_7.1 S4 ME4SA4	123	C412_7.1 P112 BE112M4	124
206	179	3.5	7.0	7580	C512_7.0 S4 ME4SA4	126	C512_7.0 P112 BE112M4	127
212	174	2.0	6.8	3580	C352_6.8 S4 ME4SA4	120	C352_6.8 P112 BE112M4	121
223	165	1.2	6.5	3010	C312_6.5 S4 ME4SA4	117	C312_6.5 P112 BE112M4	118
226	163	2.1	6.4	4180	C412_6.4 S4 ME4SA4	123	C412_6.4 P112 BE112M4	124
230	161	1.0	6.3	2840	C312_6.3 S4 ME4SA4	117	C312_6.3 P112 BE112M4	118
236	156	2.2	6.1	3500	C352_6.1 S4 ME4SA4	120	C352_6.1 P112 BE112M4	121
242	153	1.7	6.0	3840	C412_6.0 S4 ME4SA4	123	C412_6.0 P112 BE112M4	124
246	150	1.3	5.8	3310	C352_5.8 S4 ME4SA4	120	C352_5.8 P112 BE112M4	121
256	144	3.0	5.6	7020	C512_5.6 S4 ME4SA4	126	C512_5.6 P112 BE112M4	127
291	127	1.2	5.0	2760	C312_5.0 S4 ME4SA4	117	C312_5.0 P112 BE112M4	118
309	120	2.2	4.7	3500	C412_4.7 S4 ME4SA4	123	C412_4.7 P112 BE112M4	124
312	119	1.7	4.6	3180	C352_4.6 S4 ME4SA4	120	C352_4.6 P112 BE112M4	121
386	96	1.6	3.7	2640	C312_3.7 S4 ME4SA4	117	C312_3.7 P112 BE112M4	118
388	95	0.9	3.7	1560			C212_3.7 P112 BE112M4	115
399	93	2.8	3.6	3180	C412_3.6 S4 ME4SA4	123	C412_3.6 P112 BE112M4	124
413	89	2.2	3.5	3010	C352_3.5 S4 ME4SA4	120	C352_3.5 P112 BE112M4	121
500	74	1.8	2.9	2500	C312_2.9 S4 ME4SA4	117	C312_2.9 P112 BE112M4	118
529	70	1.1	2.7	1530			C212_2.7 P112 BE112M4	115
536	69	2.9	2.7	2840	C352_2.7 S4 ME4SA4	120	C352_2.7 P112 BE112M4	121

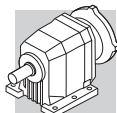
5.5 kW

n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
3.6	13276	0.9	409.8	85000	C1004_409.8 S4 ME4SB4	141	C1004_409.8 P132 BE132S4	142
3.8	12328	1.0	380.5	85000	C1004_380.5 S4 ME4SB4	141	C1004_380.5 P132 BE132S4	142
4.5	10485	1.1	323.6	85000	C1004_323.6 S4 ME4SB4	141	C1004_323.6 P132 BE132S4	142
4.9	9736	1.2	300.5	85000	C1004_300.5 S4 ME4SB4	141	C1004_300.5 P132 BE132S4	142
5.6	8521	1.4	263.0	85000	C1004_263.0 S4 ME4SB4	141	C1004_263.0 P132 BE132S4	142
6.0	7913	1.5	244.2	85000	C1004_244.2 S4 ME4SB4	141	C1004_244.2 P132 BE132S4	142
6.3	7507	1.0	231.7	60000	C904_231.7 S4 ME4SB4	138	C904_231.7 P132 BE132S4	139
6.9	6881	1.0	212.4	60000	C904_212.4 S4 ME4SB4	138	C904_212.4 P132 BE132S4	139
7.3	6468	1.9	199.6	85000	C1004_199.6 S4 ME4SB4	141	C1004_199.6 P132 BE132S4	142
7.9	6006	2.0	185.4	85000	C1004_185.4 S4 ME4SB4	141	C1004_185.4 P132 BE132S4	142
8.5	5762	1.2	172.1	60000	C903_172.1 S4 ME4SB4	138	C903_172.1 P132 BE132S4	139
9.0	5252	2.3	162.1	85000	C1004_162.1 S4 ME4SB4	141	C1004_162.1 P132 BE132S4	142
9.3	5282	1.3	157.8	60000	C903_157.8 S4 ME4SB4	138	C903_157.8 P132 BE132S4	139

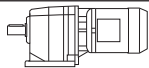


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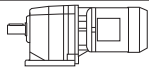
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
9.7	5036	2.4	150.4	85000	C1003_150.4 S4 ME4SB4	141	C1003_150.4 P132 BE132S4	142
10.0	4899	1.5	146.3	60000	C903_146.3 S4 ME4SB4	138	C903_146.3 P132 BE132S4	139
10.5	4677	2.4	139.7	85000	C1003_139.7 S4 ME4SB4	141	C1003_139.7 P132 BE132S4	142
10.9	4491	1.6	134.1	60000	C903_134.1 S4 ME4SB4	138	C903_134.1 P132 BE132S4	139
12.1	4035	3.0	120.5	85000	C1003_120.5 S4 ME4SB4	141	C1003_120.5 P132 BE132S4	142
12.2	3999	1.0	119.5	35000	C803_119.5 S4 ME4SB4	135	C803_119.5 P132 BE132S4	136
12.5	3908	1.8	116.7	60000	C903_116.7 S4 ME4SB4	138	C903_116.7 P132 BE132S4	139
13.3	3666	1.1	109.5	35000	C803_109.5 S4 ME4SB4	135	C803_109.5 P132 BE132S4	136
13.6	3582	2.0	107.0	60000	C903_107.0 S4 ME4SB4	138	C903_107.0 P132 BE132S4	139
15.0	3260	1.2	97.4	35000	C803_97.4 S4 ME4SB4	135	C803_97.4 P132 BE132S4	136
15.2	3222	2.2	96.2	60000	C903_96.2 S4 ME4SB4	138	C903_96.2 P132 BE132S4	139
16.4	2989	1.3	89.3	35000	C803_89.3 S4 ME4SB4	135	C803_89.3 P132 BE132S4	136
16.5	2954	2.4	88.2	60000	C903_88.2 S4 ME4SB4	138	C903_88.2 P132 BE132S4	139
18.0	2719	2.6	81.2	59100	C903_81.2 S4 ME4SB4	138	C903_81.2 P132 BE132S4	139
19.0	2575	1.6	76.9	35000	C803_76.9 S4 ME4SB4	135	C803_76.9 P132 BE132S4	136
19.6	2492	2.8	74.4	58200	C903_74.4 S4 ME4SB4	138	C903_74.4 P132 BE132S4	139
20.5	2388	1.0	71.3	25000	C703_71.3 S4 ME4SB4	132	C703_71.3 P132 BE132S4	133
20.7	2360	1.7	70.5	35000	C803_70.5 S4 ME4SB4	135	C803_70.5 P132 BE132S4	136
22.2	2205	1.0	65.9	25000	C703_65.9 S4 ME4SB4	132	C703_65.9 P132 BE132S4	133
23.4	2093	1.9	62.5	35000	C803_62.5 S4 ME4SB4	135	C803_62.5 P132 BE132S4	136
25.5	1918	2.1	57.3	35000	C803_57.3 S4 ME4SB4	135	C803_57.3 P132 BE132S4	136
25.8	1892	1.2	56.5	25000	C703_56.5 S4 ME4SB4	132	C703_56.5 P132 BE132S4	133
27.3	1732	0.9	53.5	15000	C613_53.5 S4 ME4SB4	129	C613_53.5 P132 BE132S4	130
28.0	1746	1.3	52.2	24700	C703_52.2 S4 ME4SB4	132	C703_52.2 P132 BE132S4	133
31	1543	1.0	47.6	15300	C613_47.6 S4 ME4SB4	129	C613_47.6 P132 BE132S4	130
31	1588	2.4	47.4	35000	C803_47.4 S4 ME4SB4	135	C803_47.4 P132 BE132S4	136
33	1497	1.5	44.7	24100	C703_44.7 S4 ME4SB4	132	C703_44.7 P132 BE132S4	133
34	1456	2.6	43.5	35000	C803_43.5 S4 ME4SB4	135	C803_43.5 P132 BE132S4	136
34	1408	1.1	43.4	15000	C613_43.4 S4 ME4SB4	129	C613_43.4 P132 BE132S4	130
35	1381	1.7	41.3	23800	C703_41.3 S4 ME4SB4	132	C703_41.3 P132 BE132S4	133
37	1338	2.4	39.1	35000	C802_39.1 S4 ME4SB4	135	C802_39.1 P132 BE132S4	136
38	1300	1.0	38.0	14800	C612_38.0 S4 ME4SB4	129	C612_38.0 P132 BE132S4	130
40	1171	1.3	36.1	14800	C613_36.1 S4 ME4SB4	129	C613_36.1 P132 BE132S4	130
42	1188	1.8	34.7	22100	C702_34.7 S4 ME4SB4	132	C702_34.7 P132 BE132S4	133
43	1170	1.0	34.2	14500	C612_34.2 S4 ME4SB4	129	C612_34.2 P132 BE132S4	130
44	1068	1.4	33.0	14500	C613_33.0 S4 ME4SB4	129	C613_33.0 P132 BE132S4	130
47	1072	3.5	31.3	33400	C802_31.3 S4 ME4SB4	135	C802_31.3 P132 BE132S4	136
48	1041	1.3	30.4	14300	C612_30.4 S4 ME4SB4	129	C612_30.4 P132 BE132S4	130
49	1006	1.0	30.1	9610	C513_30.1 S4 ME4SB4	126	C513_30.1 P132 BE132S4	127
53	948	2.2	27.7	21200	C702_27.7 S4 ME4SB4	132	C702_27.7 P132 BE132S4	133
53	919	1.1	27.4	9490	C513_27.4 S4 ME4SB4	126	C513_27.4 P132 BE132S4	127
53	938	1.4	27.4	13900	C612_27.4 S4 ME4SB4	129	C612_27.4 P132 BE132S4	130
56	886	0.9	25.9	9350	C512_25.9 S4 ME4SB4	126	C512_25.9 P132 BE132S4	127
59	849	1.6	24.8	13700	C612_24.8 S4 ME4SB4	129	C612_24.8 P132 BE132S4	130
61	800	1.2	23.9	9540	C513_23.9 S4 ME4SB4	126	C513_23.9 P132 BE132S4	127
63	799	1.0	23.4	9310	C512_23.4 S4 ME4SB4	126	C512_23.4 P132 BE132S4	127
64	782	2.7	22.9	20400	C702_22.9 S4 ME4SB4	132	C702_22.9 P132 BE132S4	133
65	764	1.8	22.4	13400	C612_22.4 S4 ME4SB4	129	C612_22.4 P132 BE132S4	130
70	717	1.1	21.0	9150	C512_21.0 S4 ME4SB4	126	C512_21.0 P132 BE132S4	127
74	670	2.0	19.6	13100	C612_19.6 S4 ME4SB4	129	C612_19.6 P132 BE132S4	130
76	660	3.2	19.3	19700	C702_19.3 S4 ME4SB4	132	C702_19.3 P132 BE132S4	133
77	646	1.2	18.9	9030	C512_18.9 S4 ME4SB4	126	C512_18.9 P132 BE132S4	127
83	604	2.2	17.7	12700	C612_17.7 S4 ME4SB4	129	C612_17.7 P132 BE132S4	130
88	568	1.4	16.6	8810	C512_16.6 S4 ME4SB4	126	C512_16.6 P132 BE132S4	127
92	545	2.5	15.9	12500	C612_15.9 S4 ME4SB4	129	C612_15.9 P132 BE132S4	130
98	512	1.6	15.0	8660	C512_15.0 S4 ME4SB4	126	C512_15.0 P132 BE132S4	127
102	491	2.8	14.3	12100	C612_14.3 S4 ME4SB4	129	C612_14.3 P132 BE132S4	130
102	487	0.9	14.2	4000	C412_14.2 S4 ME4SB4	123	C412_14.2 P132 BE132S4	124
111	449	1.7	13.1	8420	C512_13.1 S4 ME4SB4	126	C512_13.1 P132 BE132S4	127
118	424	1.0	12.4	4060	C412_12.4 S4 ME4SB4	123	C412_12.4 P132 BE132S4	124
121	414	3.3	12.1	11600	C612_12.1 S4 ME4SB4	129	C612_12.1 P132 BE132S4	130
123	405	1.9	11.8	8250	C512_11.8 S4 ME4SB4	126	C512_11.8 P132 BE132S4	127
125	399	1.0	11.7	3380	C352_11.7 S4 ME4SB4	120	C352_11.7 P132 BE132S4	121
131	382	1.1	11.2	4030	C412_11.2 S4 ME4SB4	123	C412_11.2 P132 BE132S4	124
139	359	1.1	10.5	3350	C352_10.5 S4 ME4SB4	120	C352_10.5 P132 BE132S4	121
150	334	2.1	9.8	7890	C512_9.8 S4 ME4SB4	126	C512_9.8 P132 BE132S4	127

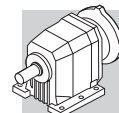


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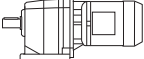
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
152	328	1.2	9.6	4030	C412_9.6 S4 ME4SB4	123	C412_9.6 P132 BE132S4	124
166	301	1.3	8.8	3350	C352_8.8 S4 ME4SB4	120	C352_8.8 P132 BE132S4	121
166	301	2.3	8.8	7700	C512_8.8 S4 ME4SB4	126	C512_8.8 P132 BE132S4	127
169	296	1.3	8.6	3980	C412_8.6 S4 ME4SB4	123	C412_8.6 P132 BE132S4	124
185	271	1.4	7.9	3330	C352_7.9 S4 ME4SB4	120	C352_7.9 P132 BE132S4	121
188	265	2.4	7.8	7460	C512_7.8 S4 ME4SB4	126	C512_7.8 P132 BE132S4	127
207	242	1.5	7.1	3920	C412_7.1 S4 ME4SB4	123	C412_7.1 P132 BE132S4	124
209	239	2.6	7.0	7280	C512_7.0 S4 ME4SB4	126	C512_7.0 P132 BE132S4	127
215	232	1.5	6.8	3820	C352_6.8 S4 ME4SB4	120	C352_6.8 P132 BE132S4	121
229	218	1.6	6.4	3840	C412_6.4 S4 ME4SB4	123	C412_6.4 P132 BE132S4	124
239	209	1.7	6.1	3150	C352_6.1 S4 ME4SB4	120	C352_6.1 P132 BE132S4	121
245	204	1.3	6.0	3430	C412_6.0 S4 ME4SB4	123	C412_6.0 P132 BE132S4	124
250	200	1.0	5.8	3020	C352_5.8 S4 ME4SB4	120	C352_5.8 P132 BE132S4	121
259	193	2.3	5.6	6720	C512_5.6 S4 ME4SB4	126	C512_5.6 P132 BE132S4	127
295	169	0.9	5.0	2480	C312_5.0 S4 ME4SB4	117	C312_5.0 P132 BE132S4	118
313	159	1.6	4.7	3360	C412_4.7 S4 ME4SB4	123	C412_4.7 P132 BE132S4	124
316	158	1.3	4.6	2860	C352_4.6 S4 ME4SB4	120	C352_4.6 P132 BE132S4	121
328	152	2.9	4.5	6330	C512_4.5 S4 ME4SB4	126	C512_4.5 P132 BE132S4	127
391	128	1.2	3.7	2410	C312_3.7 S4 ME4SB4	117	C312_3.7 P132 BE132S4	118
404	123	2.1	3.6	3240	C412_3.6 S4 ME4SB4	123	C412_3.6 P132 BE132S4	124
419	119	1.7	3.5	2750	C352_3.5 S4 ME4SB4	120	C352_3.5 P132 BE132S4	121
507	98	1.3	2.9	2310	C312_2.9 S4 ME4SB4	117	C312_2.9 P132 BE132S4	118
543	92	2.2	2.7	2620	C352_2.7 S4 ME4SB4	120	C352_2.7 P132 BE132S4	121
549	91	2.7	2.7	3070	C412_2.7 S4 ME4SB4	123	C412_2.7 P132 BE132S4	124

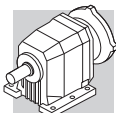
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
4.8	13252	0.9	300.5	85000	C1004_300.5 S4 ME4LA4	141	C1004_300.5 P132 BE132MA4	142
5.5	11598	1.0	263.0	85000	C1004_263.0 S4 ME4LA4	141	C1004_263.0 P132 BE132MA4	142
6.0	10770	1.1	244.2	85000	C1004_244.2 S4 ME4LA4	141	C1004_244.2 P132 BE132MA4	142
7.3	8804	1.4	199.6	85000	C1004_199.6 S4 ME4LA4	141	C1004_199.6 P132 BE132MA4	142
7.8	8175	1.5	185.4	85000	C1004_185.4 S4 ME4LA4	141	C1004_185.4 P132 BE132MA4	142
8.5	7843	0.9	172.1	60000	C903_172.1 S4 ME4LA4	138	C903_172.1 P132 BE132MA4	139
9.0	7149	1.7	162.1	85000	C1004_162.1 S4 ME4LA4	141	C1004_162.1 P132 BE132MA4	142
9.2	7189	1.0	157.8	60000	C903_157.8 S4 ME4LA4	138	C903_157.8 P132 BE132MA4	139
9.7	6855	1.8	150.4	85000	C1003_150.4 S4 ME4LA4	141	C1003_150.4 P132 BE132MA4	142
9.9	6668	1.1	146.3	59600	C903_146.3 S4 ME4LA4	138	C903_146.3 P132 BE132MA4	139
10.4	6365	1.7	139.7	85000	C1003_139.7 S4 ME4LA4	141	C1003_139.7 P132 BE132MA4	142
10.8	6113	1.2	134.1	59400	C903_134.1 S4 ME4LA4	138	C903_134.1 P132 BE132MA4	139
12.1	5492	2.2	120.5	85000	C1003_120.5 S4 ME4LA4	141	C1003_120.5 P132 BE132MA4	142
12.5	5319	1.4	116.7	58600	C903_116.7 S4 ME4LA4	138	C903_116.7 P132 BE132MA4	139
13.0	5100	2.4	111.9	85000	C1003_111.9 S4 ME4LA4	141	C1003_111.9 P132 BE132MA4	142
13.6	4876	1.5	107.0	58200	C903_107.0 S4 ME4LA4	138	C903_107.0 P132 BE132MA4	139
14.6	4548	2.6	99.8	85000	C1003_99.8 S4 ME4LA4	141	C1003_99.8 P132 BE132MA4	142
14.9	4438	0.9	97.4	35000	C803_97.4 S4 ME4LA4	135	C803_97.4 P132 BE132MA4	136
15.1	4386	1.6	96.2	57500	C903_96.2 S4 ME4LA4	138	C903_96.2 P132 BE132MA4	139
15.7	4223	2.8	92.7	85000	C1003_92.7 S4 ME4LA4	141	C1003_92.7 P132 BE132MA4	142
16.3	4068	1.0	89.3	35000	C803_89.3 S4 ME4LA4	135	C803_89.3 P132 BE132MA4	136
16.5	4020	1.8	88.2	56600	C903_88.2 S4 ME4LA4	138	C903_88.2 P132 BE132MA4	139
17.0	3899	3.1	85.6	85000	C1003_85.6 S4 ME4LA4	141	C1003_85.6 P132 BE132MA4	142
17.9	3701	1.9	81.2	56100	C903_81.2 S4 ME4LA4	138	C903_81.2 P132 BE132MA4	139
18.9	3505	1.1	76.9	35000	C803_76.9 S4 ME4LA4	135	C803_76.9 P132 BE132MA4	136
19.5	3392	2.1	74.4	55200	C903_74.4 S4 ME4LA4	138	C903_74.4 P132 BE132MA4	139
20.6	3213	1.2	70.5	35000	C803_70.5 S4 ME4LA4	135	C803_70.5 P132 BE132MA4	136
22.5	2943	2.4	64.6	54000	C903_64.6 S4 ME4LA4	138	C903_64.6 P132 BE132MA4	139
23.3	2848	1.4	62.5	35000	C803_62.5 S4 ME4LA4	135	C803_62.5 P132 BE132MA4	136
24.6	2698	2.6	59.2	53000	C903_59.2 S4 ME4LA4	138	C903_59.2 P132 BE132MA4	139
25.4	2611	1.5	57.3	35000	C803_57.3 S4 ME4LA4	135	C803_57.3 P132 BE132MA4	136
26.5	2501	2.9	54.9	52400	C903_54.9 S4 ME4LA4	138	C903_54.9 P132 BE132MA4	139
27.9	2377	1.0	52.2	22900	C703_52.2 S4 ME4LA4	132	C703_52.2 P132 BE132MA4	133
31	2162	1.8	47.4	35000	C803_47.4 S4 ME4LA4	135	C803_47.4 P132 BE132MA4	136

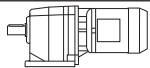


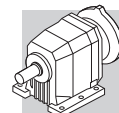
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n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
33	2037	1.1	44.7	22500	C703_44.7 S4 ME4LA4	132	C703_44.7 P132 BE132MA4	133
33	1982	1.9	43.5	35000	C803_43.5 S4 ME4LA4	135	C803_43.5 P132 BE132MA4	136
35	1880	1.2	41.3	22300	C703_41.3 S4 ME4LA4	132	C703_41.3 P132 BE132MA4	133
37	1821	1.8	39.1	33600	C802_39.1 S4 ME4LA4	135	C802_39.1 P132 BE132MA4	136
40	1594	1.0	36.1	13300	C613_36.1 S4 ME4LA4	129	C613_36.1 P132 BE132MA4	130
41	1634	3.3	35.1	47300	C902_35.1 S4 ME4LA4	138	C902_35.1 P132 BE132MA4	139
42	1617	1.3	34.7	20500	C702_34.7 S4 ME4LA4	132	C702_34.7 P132 BE132MA4	133
44	1454	1.0	33.0	13100	C613_33.0 S4 ME4LA4	129	C613_33.0 P132 BE132MA4	130
46	1459	2.5	31.3	32200	C802_31.3 S4 ME4LA4	135	C802_31.3 P132 BE132MA4	136
48	1417	1.0	30.4	13000	C612_30.4 S4 ME4LA4	129	C612_30.4 P132 BE132MA4	130
50	1295	1.1	29.4	13100	C613_29.4 S4 ME4LA4	129	C613_29.4 P132 BE132MA4	130
52	1290	1.6	27.7	20000	C702_27.7 S4 ME4LA4	132	C702_27.7 P132 BE132MA4	133
53	1276	1.1	27.4	12800	C612_27.4 S4 ME4LA4	129	C612_27.4 P132 BE132MA4	130
56	1208	3.1	25.9	31000	C802_25.9 S4 ME4LA4	135	C802_25.9 P132 BE132MA4	136
59	1155	1.2	24.8	12700	C612_24.8 S4 ME4LA4	129	C612_24.8 P132 BE132MA4	130
61	1115	3.2	24.0	30500	C802_24.0 S4 ME4LA4	135	C802_24.0 P132 BE132MA4	136
64	1064	2.0	22.9	19400	C702_22.9 S4 ME4LA4	132	C702_22.9 P132 BE132MA4	133
65	1040	1.3	22.4	12500	C612_22.4 S4 ME4LA4	129	C612_22.4 P132 BE132MA4	130
65	1035	3.6	22.2	30000	C802_22.2 S4 ME4LA4	135	C802_22.2 P132 BE132MA4	136
67	994	0.9	21.8	7200	C513_21.8 S4 ME4LA4	126	C513_21.8 P132 BE132MA4	127
74	912	1.5	19.6	12300	C612_19.6 S4 ME4LA4	129	C612_19.6 P132 BE132MA4	130
75	898	2.3	19.3	18900	C702_19.3 S4 ME4LA4	132	C702_19.3 P132 BE132MA4	133
77	879	0.9	18.9	7100	C512_18.9 S4 ME4LA4	126	C512_18.9 P132 BE132MA4	127
82	822	1.6	17.7	12000	C612_17.7 S4 ME4LA4	129	C612_17.7 P132 BE132MA4	130
87	778	2.6	16.7	18200	C702_16.7 S4 ME4LA4	132	C702_16.7 P132 BE132MA4	133
88	773	1.0	16.6	8070	C512_16.6 S4 ME4LA4	126	C512_16.6 P132 BE132MA4	127
91	742	1.8	15.9	11800	C612_15.9 S4 ME4LA4	129	C612_15.9 P132 BE132MA4	130
95	714	2.9	15.3	18000	C702_15.3 S4 ME4LA4	132	C702_15.3 P132 BE132MA4	133
97	697	1.1	15.0	8000	C512_15.0 S4 ME4LA4	126	C512_15.0 P132 BE132MA4	127
101	668	2.0	14.3	11500	C612_14.3 S4 ME4LA4	129	C612_14.3 P132 BE132MA4	130
111	611	1.2	13.1	7840	C512_13.1 S4 ME4LA4	126	C512_13.1 P132 BE132MA4	127
120	563	2.4	12.1	11100	C612_12.1 S4 ME4LA4	129	C612_12.1 P132 BE132MA4	130
123	551	1.4	11.8	7730	C512_11.8 S4 ME4LA4	126	C512_11.8 P132 BE132MA4	127
134	507	2.7	10.9	10900	C612_10.9 S4 ME4LA4	129	C612_10.9 P132 BE132MA4	130
148	457	3.0	9.8	10600	C612_9.8 S4 ME4LA4	129	C612_9.8 P132 BE132MA4	130
149	454	1.5	9.8	7450	C512_9.8 S4 ME4LA4	126	C512_9.8 P132 BE132MA4	127
152	447	0.9	9.6	3300	C412_9.6 S4 ME4LA4	123	C412_9.6 P132 BE132MA4	124
165	412	3.3	8.8	10300	C612_8.8 S4 ME4LA4	129	C612_8.8 P132 BE132MA4	130
165	410	0.9	8.8	2880	C352_8.8 S4 ME4LA4	120	C352_8.8 P132 BE132MA4	121
166	409	1.7	8.8	7320	C512_8.8 S4 ME4LA4	126	C512_8.8 P132 BE132MA4	127
168	402	1.0	8.6	3430	C412_8.6 S4 ME4LA4	123	C412_8.6 P132 BE132MA4	124
184	368	1.0	7.9	2900	C352_7.9 S4 ME4LA4	120	C352_7.9 P132 BE132MA4	121
188	361	1.8	7.8	7120	C512_7.8 S4 ME4LA4	126	C512_7.8 P132 BE132MA4	127
206	329	1.1	7.1	3470	C412_7.1 S4 ME4LA4	123	C412_7.1 P132 BE132MA4	124
208	325	1.9	7.0	6970	C512_7.0 S4 ME4LA4	126	C512_7.0 P132 BE132MA4	127
215	316	1.1	6.8	2900	C352_6.8 S4 ME4LA4	120	C352_6.8 P132 BE132MA4	121
229	296	1.2	6.4	3440	C412_6.4 S4 ME4LA4	123	C412_6.4 P132 BE132MA4	124
239	284	1.2	6.1	2620	C352_6.1 S4 ME4LA4	120	C352_6.1 P132 BE132MA4	121
242	279	2.4	6.0	9180	C612_6.0 S4 ME4LA4	129	C612_6.0 P132 BE132MA4	130
244	277	0.9	6.0	2920	C412_6.0 S4 ME4LA4	123	C412_6.0 P132 BE132MA4	124
258	262	1.7	5.6	6410	C512_5.6 S4 ME4LA4	126	C512_5.6 P132 BE132MA4	127
312	217	1.2	4.7	2960	C412_4.7 S4 ME4LA4	123	C412_4.7 P132 BE132MA4	124
315	215	0.9	4.6	2600	C352_4.6 S4 ME4LA4	120	C352_4.6 P132 BE132MA4	121
319	212	3.1	4.6	8550	C612_4.6 S4 ME4LA4	129	C612_4.6 P132 BE132MA4	130
327	207	2.1	4.5	6090	C512_4.5 S4 ME4LA4	126	C512_4.5 P132 BE132MA4	127
403	168	1.5	3.6	2930	C412_3.6 S4 ME4LA4	123	C412_3.6 P132 BE132MA4	124
417	162	1.2	3.5	2500	C352_3.5 S4 ME4LA4	120	C352_3.5 P132 BE132MA4	121
440	154	2.7	3.3	5660	C512_3.3 S4 ME4LA4	126	C512_3.3 P132 BE132MA4	127
505	134	1.0	2.9	2100	C312_2.9 S4 ME4LA4	117	C312_2.9 P132 BE132MA4	118
542	125	1.6	2.7	2440	C352_2.7 S4 ME4LA4	120	C352_2.7 P132 BE132MA4	121
547	124	2.0	2.7	2840	C412_2.7 S4 ME4LA4	123	C412_2.7 P132 BE132MA4	124
553	122	3.3	2.6	5330	C512_2.6 S4 ME4LA4	126	C512_2.6 P132 BE132MA4	127

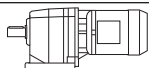


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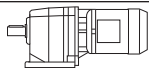
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
5.9	13408	0.9	244.2	85000	C1004_244.2 S4 ME4LB4	141	C1004_244.2 P132 BE132MB4	142
7.3	10960	1.1	199.6	85000	C1004_199.6 S4 ME4LB4	141	C1004_199.6 P132 BE132MB4	142
7.8	10177	1.2	185.4	85000	C1004_185.4 S4 ME4LB4	141	C1004_185.4 P132 BE132MB4	142
8.9	8900	1.3	162.1	85000	C1004_162.1 S4 ME4LB4	141	C1004_162.1 P132 BE132MB4	142
9.6	8534	1.4	150.4	85000	C1003_150.4 S4 ME4LB4	141	C1003_150.4 P132 BE132MB4	142
10.4	7924	1.4	139.7	85000	C1003_139.7 S4 ME4LB4	141	C1003_139.7 P132 BE132MB4	142
10.8	7610	0.9	134.1	54900	C903_134.1 S4 ME4LB4	138	C903_134.1 P132 BE132MB4	139
12.0	6837	1.8	120.5	85000	C1003_120.5 S4 ME4LB4	141	C1003_120.5 P132 BE132MB4	142
12.4	6622	1.1	116.7	54800	C903_116.7 S4 ME4LB4	138	C903_116.7 P132 BE132MB4	139
13.0	6348	1.9	111.9	85000	C1003_111.9 S4 ME4LB4	141	C1003_111.9 P132 BE132MB4	142
13.6	6070	1.2	107.0	54600	C903_107.0 S4 ME4LB4	138	C903_107.0 P132 BE132MB4	139
14.5	5662	2.1	99.8	85000	C1003_99.8 S4 ME4LB4	141	C1003_99.8 P132 BE132MB4	142
15.1	5460	1.3	96.2	54200	C903_96.2 S4 ME4LB4	138	C903_96.2 P132 BE132MB4	139
15.6	5257	2.3	92.7	85000	C1003_92.7 S4 ME4LB4	141	C1003_92.7 P132 BE132MB4	142
16.4	5005	1.4	88.2	53700	C903_88.2 S4 ME4LB4	138	C903_88.2 P132 BE132MB4	139
16.9	4854	2.5	85.6	85000	C1003_85.6 S4 ME4LB4	141	C1003_85.6 P132 BE132MB4	142
17.9	4607	1.6	81.2	53300	C903_81.2 S4 ME4LB4	138	C903_81.2 P132 BE132MB4	139
18.3	4507	2.7	79.4	85000	C1003_79.4 S4 ME4LB4	141	C1003_79.4 P132 BE132MB4	142
18.9	4363	0.9	76.9	33700	C803_76.9 S4 ME4LB4	135	C803_76.9 P132 BE132MB4	136
19.5	4223	1.7	74.4	52700	C903_74.4 S4 ME4LB4	138	C903_74.4 P132 BE132MB4	139
20.6	4000	1.0	70.5	35000	C803_70.5 S4 ME4LB4	135	C803_70.5 P132 BE132MB4	136
22.5	3664	2.0	64.6	51800	C903_64.6 S4 ME4LB4	138	C903_64.6 P132 BE132MB4	139
23.2	3546	1.1	62.5	35000	C803_62.5 S4 ME4LB4	135	C803_62.5 P132 BE132MB4	136
24.5	3358	2.1	59.2	51100	C903_59.2 S4 ME4LB4	138	C903_59.2 P132 BE132MB4	139
25.3	3250	1.2	57.3	35000	C803_57.3 S4 ME4LB4	135	C803_57.3 P132 BE132MB4	136
26.4	3113	2.3	54.9	50500	C903_54.9 S4 ME4LB4	138	C903_54.9 P132 BE132MB4	139
28.8	2854	2.5	50.3	49700	C903_50.3 S4 ME4LB4	138	C903_50.3 P132 BE132MB4	139
31	2692	1.4	47.4	34900	C803_47.4 S4 ME4LB4	135	C803_47.4 P132 BE132MB4	136
32	2536	0.9	44.7	21100	C703_44.7 S4 ME4LB4	132	C703_44.7 P132 BE132MB4	133
33	2467	1.5	43.5	34400	C803_43.5 S4 ME4LB4	135	C803_43.5 P132 BE132MB4	136
34	2439	3.0	43.0	48300	C903_43.0 S4 ME4LB4	138	C903_43.0 P132 BE132MB4	139
35	2341	1.0	41.3	21000	C703_41.3 S4 ME4LB4	132	C703_41.3 P132 BE132MB4	133
37	2266	1.4	39.1	32300	C802_39.1 S4 ME4LB4	135	C802_39.1 P132 BE132MB4	136
41	2034	2.7	35.1	46200	C902_35.1 S4 ME4LB4	138	C902_35.1 P132 BE132MB4	139
42	2014	1.0	34.7	19200	C702_34.7 S4 ME4LB4	132	C702_34.7 P132 BE132MB4	133
46	1816	2.0	31.3	31100	C802_31.3 S4 ME4LB4	135	C802_31.3 P132 BE132MB4	136
49	1706	3.5	29.4	44600	C902_29.4 S4 ME4LB4	138	C902_29.4 P132 BE132MB4	139
49	1612	0.9	29.4	10500	C613_29.4 S4 ME4LB4	129	C613_29.4 P132 BE132MB4	130
52	1606	1.3	27.7	18900	C702_27.7 S4 ME4LB4	132	C702_27.7 P132 BE132MB4	133
54	1470	1.0	26.8	11400	C613_26.8 S4 ME4LB4	129	C613_26.8 P132 BE132MB4	130
56	1504	2.5	25.9	30300	C802_25.9 S4 ME4LB4	135	C802_25.9 P132 BE132MB4	136
58	1438	0.9	24.8	11800	C612_24.8 S4 ME4LB4	129	C612_24.8 P132 BE132MB4	130
61	1388	2.6	24.0	30000	C802_24.0 S4 ME4LB4	135	C802_24.0 P132 BE132MB4	136
63	1324	1.6	22.9	18500	C702_22.9 S4 ME4LB4	132	C702_22.9 P132 BE132MB4	133
65	1295	1.0	22.4	11700	C612_22.4 S4 ME4LB4	129	C612_22.4 P132 BE132MB4	130
65	1289	2.9	22.2	29200	C802_22.2 S4 ME4LB4	135	C802_22.2 P132 BE132MB4	136
71	1190	3.0	20.5	28900	C802_20.5 S4 ME4LB4	135	C802_20.5 P132 BE132MB4	136
74	1136	1.2	19.6	11600	C612_19.6 S4 ME4LB4	129	C612_19.6 P132 BE132MB4	130
75	1118	1.9	19.3	18100	C702_19.3 S4 ME4LB4	132	C702_19.3 P132 BE132MB4	133
82	1023	1.3	17.7	11400	C612_17.7 S4 ME4LB4	129	C612_17.7 P132 BE132MB4	130
87	968	2.1	16.7	17500	C702_16.7 S4 ME4LB4	132	C702_16.7 P132 BE132MB4	133
91	923	1.5	15.9	11200	C612_15.9 S4 ME4LB4	129	C612_15.9 P132 BE132MB4	130
95	889	2.4	15.3	17500	C702_15.3 S4 ME4LB4	132	C702_15.3 P132 BE132MB4	133
97	867	0.9	15.0	7430	C512_15.0 S4 ME4LB4	126	C512_15.0 P132 BE132MB4	127
101	831	1.6	14.3	11000	C612_14.3 S4 ME4LB4	129	C612_14.3 P132 BE132MB4	130
103	817	2.6	14.1	17000	C702_14.1 S4 ME4LB4	132	C702_14.1 P132 BE132MB4	133
110	761	1.0	13.1	7340	C512_13.1 S4 ME4LB4	126	C512_13.1 P132 BE132MB4	127
111	755	2.8	13.0	17000	C702_13.0 S4 ME4LB4	132	C702_13.0 P132 BE132MB4	133
120	701	1.9	12.1	10700	C612_12.1 S4 ME4LB4	129	C612_12.1 P132 BE132MB4	130
123	686	1.1	11.8	7280	C512_11.8 S4 ME4LB4	126	C512_11.8 P132 BE132MB4	127
133	631	2.1	10.9	10500	C612_10.9 S4 ME4LB4	129	C612_10.9 P132 BE132MB4	130
148	569	2.4	9.8	10300	C612_9.8 S4 ME4LB4	129	C612_9.8 P132 BE132MB4	130
149	565	1.2	9.8	7080	C512_9.8 S4 ME4LB4	126	C512_9.8 P132 BE132MB4	127
164	512	2.6	8.8	10000	C612_8.8 S4 ME4LB4	129	C612_8.8 P132 BE132MB4	130
165	509	1.3	8.8	6990	C512_8.8 S4 ME4LB4	126	C512_8.8 P132 BE132MB4	127
187	449	1.4	7.8	6820	C512_7.8 S4 ME4LB4	126	C512_7.8 P132 BE132MB4	127

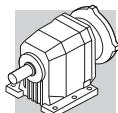


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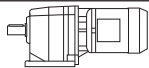
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194	434	3.1	7.5	9670	C612_7.5 S4 ME4LB4	129	C612_7.5 P132 BE132MB4	130
208	405	1.6	7.0	6710	C512_7.0 S4 ME4LB4	126	C512_7.0 P132 BE132MB4	127
215	391	3.5	6.7	9410	C612_6.7 S4 ME4LB4	129	C612_6.7 P132 BE132MB4	130
228	369	0.9	6.4	3100	C412_6.4 S4 ME4LB4	123	C412_6.4 P132 BE132MB4	124
242	348	1.9	6.0	8930	C612_6.0 S4 ME4LB4	129	C612_6.0 P132 BE132MB4	130
258	326	1.3	5.6	6150	C512_5.6 S4 ME4LB4	126	C512_5.6 P132 BE132MB4	127
311	270	1.0	4.7	2620	C412_4.7 S4 ME4LB4	123	C412_4.7 P132 BE132MB4	124
318	264	2.5	4.6	8360	C612_4.6 S4 ME4LB4	129	C612_4.6 P132 BE132MB4	130
326	258	1.7	4.5	5880	C512_4.5 S4 ME4LB4	126	C512_4.5 P132 BE132MB4	127
402	209	1.2	3.6	2670	C412_3.6 S4 ME4LB4	123	C412_3.6 P132 BE132MB4	124
416	202	1.0	3.5	2300	C352_3.5 S4 ME4LB4	120	C352_3.5 P132 BE132MB4	121
438	192	2.2	3.3	5510	C512_3.3 S4 ME4LB4	126	C512_3.3 P132 BE132MB4	127
540	156	1.3	2.7	2280	C352_2.7 S4 ME4LB4	120	C352_2.7 P132 BE132MB4	121
545	154	1.6	2.7	2650	C412_2.7 S4 ME4LB4	123	C412_2.7 P132 BE132MB4	124
552	152	2.6	2.6	5210	C512_2.6 S4 ME4LB4	126	C512_2.6 P132 BE132MB4	127

11 kW

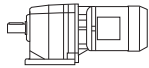
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7.9	12012	1.0	185.4	85000	C1004_185.4 S5 ME5SA4	141	C1004_185.4 P160 BE160M4	142
9.1	10504	1.1	162.1	85000	C1004_162.1 S5 ME5SA4	141	C1004_162.1 P160 BE160M4	142
9.8	10073	1.2	150.4	85000	C1003_150.4 S5 ME5SA4	141	C1003_150.4 P160 BE160M4	142
10.5	9353	1.2	139.7	85000	C1003_139.7 S5 ME5SA4	141	C1003_139.7 P160 BE160M4	142
12.2	8070	1.5	120.5	85000	C1003_120.5 S5 ME5SA4	141	C1003_120.5 P160 BE160M4	142
12.6	7816	0.9	116.7	50800	C903_116.7 S5 ME5SA4	138	C903_116.7 P160 BE160M4	139
13.1	7493	1.6	111.9	85000	C1003_111.9 S5 ME5SA4	141	C1003_111.9 P160 BE160M4	142
13.7	7165	1.0	107.0	51000	C903_107.0 S5 ME5SA4	138	C903_107.0 P160 BE160M4	139
14.7	6683	1.8	99.8	85000	C1003_99.8 S5 ME5SA4	141	C1003_99.8 P160 BE160M4	142
15.3	6444	1.1	96.2	50800	C903_96.2 S5 ME5SA4	138	C903_96.2 P160 BE160M4	139
15.9	6205	1.9	92.7	85000	C1003_92.7 S5 ME5SA4	141	C1003_92.7 P160 BE160M4	142
16.7	5907	1.2	88.2	50700	C903_88.2 S5 ME5SA4	138	C903_88.2 P160 BE160M4	139
17.2	5729	2.1	85.6	85000	C1003_85.6 S5 ME5SA4	141	C1003_85.6 P160 BE160M4	142
18.1	5438	1.3	81.2	50700	C903_81.2 S5 ME5SA4	138	C903_81.2 P160 BE160M4	139
18.5	5320	2.3	79.4	85000	C1003_79.4 S5 ME5SA4	141	C1003_79.4 P160 BE160M4	142
19.7	4985	1.4	74.4	50200	C903_74.4 S5 ME5SA4	138	C903_74.4 P160 BE160M4	139
21.2	4649	2.6	69.4	84800	C1003_69.4 S5 ME5SA4	141	C1003_69.4 P160 BE160M4	142
22.8	4324	1.7	64.6	50000	C903_64.6 S5 ME5SA4	138	C903_64.6 P160 BE160M4	139
22.8	4317	2.8	64.5	83100	C1003_64.5 S5 ME5SA4	141	C1003_64.5 P160 BE160M4	142
23.5	4185	1.0	62.5	33000	C803_62.5 S5 ME5SA4	135	C803_62.5 P160 BE160M4	136
24.8	3964	1.8	59.2	49000	C903_59.2 S5 ME5SA4	138	C903_59.2 P160 BE160M4	139
25.7	3837	1.0	57.3	34200	C803_57.3 S5 ME5SA4	135	C803_57.3 P160 BE160M4	136
26.8	3674	2.0	54.9	48800	C903_54.9 S5 ME5SA4	138	C903_54.9 P160 BE160M4	139
29.2	3368	2.1	50.3	48000	C903_50.3 S5 ME5SA4	138	C903_50.3 P160 BE160M4	139
31	3177	1.2	47.4	33500	C803_47.4 S5 ME5SA4	135	C803_47.4 P160 BE160M4	136
34	2912	1.3	43.5	33100	C803_43.5 S5 ME5SA4	135	C803_43.5 P160 BE160M4	136
34	2878	2.5	43.0	47000	C903_43.0 S5 ME5SA4	138	C903_43.0 P160 BE160M4	139
37	2638	2.7	39.4	46100	C903_39.4 S5 ME5SA4	138	C903_39.4 P160 BE160M4	139
38	2675	1.2	39.1	30900	C802_39.1 S5 ME5SA4	135	C802_39.1 P160 BE160M4	136
42	2401	2.2	35.1	45000	C902_35.1 S5 ME5SA4	138	C902_35.1 P160 BE160M4	139
47	2143	1.7	31.3	30000	C802_31.3 S5 ME5SA4	135	C802_31.3 P160 BE160M4	136
50	2013	2.9	29.4	43400	C902_29.4 S5 ME5SA4	138	C902_29.4 P160 BE160M4	139
53	1896	1.1	27.7	17800	C702_27.7 S5 ME5SA4	132	C702_27.7 P160 BE160M4	133
54	1859	3.0	27.2	42700	C902_27.2 S5 ME5SA4	138	C902_27.2 P160 BE160M4	139
57	1775	2.1	25.9	29200	C802_25.9 S5 ME5SA4	135	C802_25.9 P160 BE160M4	136
61	1638	2.2	24.0	28700	C802_24.0 S5 ME5SA4	135	C802_24.0 P160 BE160M4	136
64	1563	1.3	22.9	17600	C702_22.9 S5 ME5SA4	132	C702_22.9 P160 BE160M4	133
66	1522	2.4	22.2	28400	C802_22.2 S5 ME5SA4	135	C802_22.2 P160 BE160M4	136
72	1404	2.5	20.5	28000	C802_20.5 S5 ME5SA4	135	C802_20.5 P160 BE160M4	136
75	1341	1.0	19.6	10800	C612_19.6 S5 ME5SA4	129	C612_19.6 P160 BE160M4	130
76	1319	1.6	19.3	17300	C702_19.3 S5 ME5SA4	132	C702_19.3 P160 BE160M4	133
81	1235	3.0	18.1	27300	C802_18.1 S5 ME5SA4	135	C802_18.1 P160 BE160M4	136

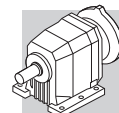


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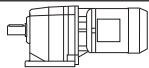
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83	1207	1.1	17.7	10700	C612_17.7 S5 ME5SA4	129	C612_17.7 P160 BE160M4	130
88	1143	1.8	16.7	16800	C702_16.7 S5 ME5SA4	132	C702_16.7 P160 BE160M4	133
88	1140	3.1	16.7	26900	C802_16.7 S5 ME5SA4	135	C802_16.7 P160 BE160M4	136
92	1090	1.2	15.9	10700	C612_15.9 S5 ME5SA4	129	C612_15.9 P160 BE160M4	130
96	1049	2.0	15.3	16800	C702_15.3 S5 ME5SA4	132	C702_15.3 P160 BE160M4	133
102	981	1.4	14.3	10500	C612_14.3 S5 ME5SA4	129	C612_14.3 P160 BE160M4	130
104	964	2.2	14.1	16400	C702_14.1 S5 ME5SA4	132	C702_14.1 P160 BE160M4	133
113	891	2.4	13.0	16400	C702_13.0 S5 ME5SA4	132	C702_13.0 P160 BE160M4	133
122	827	1.6	12.1	10300	C612_12.1 S5 ME5SA4	129	C612_12.1 P160 BE160M4	130
124	810	1.0	11.8	6810	C512_11.8 S5 ME5SA4	126	C512_11.8 P160 BE160M4	127
131	767	2.8	11.2	15800	C702_11.2 S5 ME5SA4	132	C702_11.2 P160 BE160M4	133
135	745	1.8	10.9	10100	C612_10.9 S5 ME5SA4	129	C612_10.9 P160 BE160M4	130
144	698	3.0	10.2	15700	C702_10.2 S5 ME5SA4	132	C702_10.2 P160 BE160M4	133
150	672	2.0	9.8	9910	C612_9.8 S5 ME5SA4	129	C612_9.8 P160 BE160M4	130
151	667	1.0	9.8	6690	C512_9.8 S5 ME5SA4	126	C512_9.8 P160 BE160M4	127
154	651	3.3	9.5	15400	C702_9.5 S5 ME5SA4	132	C702_9.5 P160 BE160M4	133
166	605	2.2	8.8	9690	C612_8.8 S5 ME5SA4	129	C612_8.8 P160 BE160M4	130
167	601	1.1	8.8	6640	C512_8.8 S5 ME5SA4	126	C512_8.8 P160 BE160M4	127
190	530	1.2	7.8	6510	C512_7.8 S5 ME5SA4	126	C512_7.8 P160 BE160M4	127
196	512	2.6	7.5	9390	C612_7.5 S5 ME5SA4	129	C612_7.5 P160 BE160M4	130
210	478	1.3	7.0	6430	C512_7.0 S5 ME5SA4	126	C512_7.0 P160 BE160M4	127
218	461	2.9	6.7	9150	C612_6.7 S5 ME5SA4	129	C612_6.7 P160 BE160M4	130
245	411	1.6	6.0	8670	C612_6.0 S5 ME5SA4	129	C612_6.0 P160 BE160M4	130
261	385	1.1	5.6	5880	C512_5.6 S5 ME5SA4	126	C512_5.6 P160 BE160M4	127
323	312	2.1	4.6	8160	C612_4.6 S5 ME5SA4	129	C612_4.6 P160 BE160M4	130
330	305	1.4	4.5	5660	C512_4.5 S5 ME5SA4	126	C512_4.5 P160 BE160M4	127
397	253	2.6	3.7	7760	C612_3.7 S5 ME5SA4	129	C612_3.7 P160 BE160M4	130
444	226	1.9	3.3	5340	C512_3.3 S5 ME5SA4	126	C512_3.3 P160 BE160M4	127
521	193	3.4	2.8	7240	C612_2.8 S5 ME5SA4	129	C612_2.8 P160 BE160M4	130
559	180	2.2	2.6	5080	C512_2.6 S5 ME5SA4	126	C512_2.6 P160 BE160M4	127

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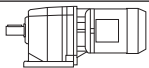
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13.1	10199	1.2	111.9	83300	C1003_111.9 S5 ME5LA4	141	C1003_111.9 P160 BE160L4	142
14.7	9096	1.3	99.8	82700	C1003_99.8 S5 ME5LA4	141	C1003_99.8 P160 BE160L4	142
15.9	8446	1.4	92.7	82400	C1003_92.7 S5 ME5LA4	141	C1003_92.7 P160 BE160L4	142
17.2	7798	1.5	85.6	81500	C1003_85.6 S5 ME5LA4	141	C1003_85.6 P160 BE160L4	142
18.1	7402	1.0	81.2	44300	C903_81.2 S5 ME5LA4	138	C903_81.2 P160 BE160L4	139
18.5	7241	1.7	79.4	81000	C1003_79.4 S5 ME5LA4	141	C1003_79.4 P160 BE160L4	142
19.7	6785	1.0	74.4	44800	C903_74.4 S5 ME5LA4	138	C903_74.4 P160 BE160L4	139
21.2	6328	1.9	69.4	79500	C1003_69.4 S5 ME5LA4	141	C1003_69.4 P160 BE160L4	142
22.8	5886	1.2	64.6	44500	C903_64.6 S5 ME5LA4	138	C903_64.6 P160 BE160L4	139
22.8	5876	2.0	64.5	78600	C1003_64.5 S5 ME5LA4	141	C1003_64.5 P160 BE160L4	142
24.8	5396	1.3	59.2	44400	C903_59.2 S5 ME5LA4	138	C903_59.2 P160 BE160L4	139
25.6	5227	2.3	57.4	77400	C1003_57.4 S5 ME5LA4	141	C1003_57.4 P160 BE160L4	142
26.8	5001	1.4	54.9	44300	C903_54.9 S5 ME5LA4	138	C903_54.9 P160 BE160L4	139
27.6	4854	2.5	53.3	76200	C1003_53.3 S5 ME5LA4	141	C1003_53.3 P160 BE160L4	142
29.2	4584	1.5	50.3	44100	C903_50.3 S5 ME5LA4	138	C903_50.3 P160 BE160L4	139
32	4213	2.8	46.2	74500	C1003_46.2 S5 ME5LA4	141	C1003_46.2 P160 BE160L4	142
34	3964	1.0	43.5	30300	C803_43.5 S5 ME5LA4	135	C803_43.5 P160 BE160L4	136
34	3918	1.8	43.0	44100	C903_43.0 S5 ME5LA4	138	C903_43.0 P160 BE160L4	139
37	3591	2.0	39.4	43000	C903_39.4 S5 ME5LA4	138	C903_39.4 P160 BE160L4	139
38	3641	0.9	39.1	27300	C802_39.1 S5 ME5LA4	135	C802_39.1 P160 BE160L4	136
42	3268	1.7	35.1	42200	C902_35.1 S5 ME5LA4	138	C902_35.1 P160 BE160L4	139
47	2917	1.3	31.3	27500	C802_31.3 S5 ME5LA4	135	C802_31.3 P160 BE160L4	136
50	2740	2.2	29.4	41100	C902_29.4 S5 ME5LA4	138	C902_29.4 P160 BE160L4	139
54	2530	2.2	27.2	40700	C902_27.2 S5 ME5LA4	138	C902_27.2 P160 BE160L4	139
57	2416	1.5	25.9	27100	C802_25.9 S5 ME5LA4	135	C802_25.9 P160 BE160L4	136
59	2311	2.9	24.8	40000	C902_24.8 S5 ME5LA4	138	C902_24.8 P160 BE160L4	139
61	2230	1.6	24.0	26900	C802_24.0 S5 ME5LA4	135	C802_24.0 P160 BE160L4	136

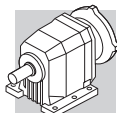


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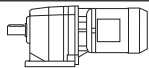
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64	2134	2.9	22.9	39500	C902_22.9 S5 ME5LA4	138	C902_22.9 P160 BE160L4	139
64	2128	1.0	22.9	15400	C702_22.9 S5 ME5LA4	132	C702_22.9 P160 BE160L4	133
66	2071	1.8	22.2	26600	C802_22.2 S5 ME5LA4	135	C802_22.2 P160 BE160L4	136
72	1912	1.9	20.5	26200	C802_20.5 S5 ME5LA4	135	C802_20.5 P160 BE160L4	136
76	1795	1.2	19.3	15600	C702_19.3 S5 ME5LA4	132	C702_19.3 P160 BE160L4	133
81	1681	2.2	18.1	25800	C802_18.1 S5 ME5LA4	135	C802_18.1 P160 BE160L4	136
88	1555	1.3	16.7	15400	C702_16.7 S5 ME5LA4	132	C702_16.7 P160 BE160L4	133
88	1551	2.3	16.7	25500	C802_16.7 S5 ME5LA4	135	C802_16.7 P160 BE160L4	136
92	1483	0.9	15.9	9350	C612_15.9 S5 ME5LA4	129	C612_15.9 P160 BE160L4	130
96	1428	1.5	15.3	15400	C702_15.3 S5 ME5LA4	132	C702_15.3 P160 BE160L4	133
99	1388	2.7	14.9	25000	C802_14.9 S5 ME5LA4	135	C802_14.9 P160 BE160L4	136
102	1336	1.0	14.3	9280	C612_14.3 S5 ME5LA4	129	C612_14.3 P160 BE160L4	130
104	1312	1.6	14.1	15300	C702_14.1 S5 ME5LA4	132	C702_14.1 P160 BE160L4	133
107	1281	2.7	13.8	25000	C802_13.8 S5 ME5LA4	135	C802_13.8 P160 BE160L4	136
113	1213	1.7	13.0	15200	C702_13.0 S5 ME5LA4	132	C702_13.0 P160 BE160L4	133
122	1126	1.2	12.1	9270	C612_12.1 S5 ME5LA4	129	C612_12.1 P160 BE160L4	130
122	1119	3.3	12.0	24000	C802_12.0 S5 ME5LA4	135	C802_12.0 P160 BE160L4	136
131	1044	2.1	11.2	14700	C702_11.2 S5 ME5LA4	132	C702_11.2 P160 BE160L4	133
135	1014	1.3	10.9	9140	C612_10.9 S5 ME5LA4	129	C612_10.9 P160 BE160L4	130
144	950	2.2	10.2	14600	C702_10.2 S5 ME5LA4	132	C702_10.2 P160 BE160L4	133
150	914	1.5	9.8	9090	C612_9.8 S5 ME5LA4	129	C612_9.8 P160 BE160L4	130
154	887	2.4	9.5	14400	C702_9.5 S5 ME5LA4	132	C702_9.5 P160 BE160L4	133
166	823	1.6	8.8	8930	C612_8.8 S5 ME5LA4	129	C612_8.8 P160 BE160L4	130
184	745	2.8	8.0	14200			C702_8.0 P160 BE160L4	133
196	697	1.9	7.5	8760	C612_7.5 S5 ME5LA4	129	C612_7.5 P160 BE160L4	130
197	695	3.0	7.5	14000	C702_7.5 S5 ME5LA4	132	C702_7.5 P160 BE160L4	133
210	650	1.0	7.0	5810	C512_7.0 S5 ME5LA4	126	C512_7.0 P160 BE160L4	127
218	628	2.2	6.7	8570	C612_6.7 S5 ME5LA4	129	C612_6.7 P160 BE160L4	130
245	559	1.2	6.0	8130	C612_6.0 S5 ME5LA4	129	C612_6.0 P160 BE160L4	130
323	424	1.6	4.6	7690	C612_4.6 S5 ME5LA4	129	C612_4.6 P160 BE160L4	130
330	415	1.0	4.5	5170	C512_4.5 S5 ME5LA4	126	C512_4.5 P160 BE160L4	127
397	344	1.9	3.7	7370	C612_3.7 S5 ME5LA4	129	C612_3.7 P160 BE160L4	130
444	308	1.4	3.3	4970	C512_3.3 S5 ME5LA4	126	C512_3.3 P160 BE160L4	127
521	263	2.5	2.8	6940	C612_2.8 S5 ME5LA4	129	C612_2.8 P160 BE160L4	130
559	245	1.6	2.6	4780	C512_2.6 S5 ME5LA4	126	C512_2.6 P160 BE160L4	127

18.5 kW

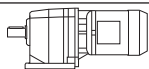
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13.1	12489	1.0	111.9	76600			C1003_111.9 P180 BE180M4	142
14.7	11138	1.1	99.8	76700			C1003_99.8 P180 BE180M4	142
15.9	10342	1.2	92.7	76700			C1003_92.7 P180 BE180M4	142
17.2	9548	1.3	85.6	76400			C1003_85.6 P180 BE180M4	142
18.5	8866	1.4	79.4	76100			C1003_79.4 P180 BE180M4	142
21.2	7748	1.5	69.4	75400			C1003_69.4 P180 BE180M4	142
22.8	7207	1.0	64.6	40300			C903_64.6 P180 BE180M4	139
22.8	7195	1.7	64.5	74800			C1003_64.5 P180 BE180M4	142
24.8	6607	1.1	59.2	40500			C903_59.2 P180 BE180M4	139
25.6	6400	1.9	57.4	73700			C1003_57.4 P180 BE180M4	142
26.8	6124	1.2	54.9	40700			C903_54.9 P180 BE180M4	139
27.6	5943	2.0	53.3	73100			C1003_53.3 P180 BE180M4	142
29.2	5614	1.3	50.3	40700			C903_50.3 P180 BE180M4	139
32	5159	2.3	46.2	71600			C1003_46.2 P180 BE180M4	142
34	4797	1.5	43.0	40600			C903_43.0 P180 BE180M4	139
34	4790	2.5	42.9	70800			C1003_42.9 P180 BE180M4	142
37	4397	1.6	39.4	40500			C903_39.4 P180 BE180M4	139
40	4122	2.9	36.9	69000			C1003_36.9 P180 BE180M4	142
42	4001	1.3	35.1	39800			C903_35.1 P180 BE180M4	139
43	3828	3.1	34.3	68100			C1003_34.3 P180 BE180M4	142
47	3572	1.0	31.3	25000			C802_31.3 P180 BE180M4	136
50	3298	2.8	29.6	65800			C1002_29.6 P180 BE180M4	142
50	3356	1.8	29.4	39100			C902_29.4 P180 BE180M4	139

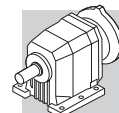


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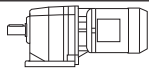
n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
54	3098	1.8	27.2	38800			C902_27.2 P180 BE180M4	139
57	2958	1.3	25.9	25300			C802_25.9 P180 BE180M4	136
59	2830	2.3	24.8	38400			C902_24.8 P180 BE180M4	139
61	2731	1.3	24.0	25000			C802_24.0 P180 BE180M4	136
64	2613	2.4	22.9	37200			C902_22.9 P180 BE180M4	139
66	2536	1.5	22.2	25100			C802_22.2 P180 BE180M4	136
72	2341	1.5	20.5	24900			C802_20.5 P180 BE180M4	136
73	2307	2.9	20.2	36700			C902_20.2 P180 BE180M4	139
76	2198	1.0	19.3	14100			C702_19.3 P180 BE180M4	133
79	2130	2.9	18.7	36200			C902_18.7 P180 BE180M4	139
81	2058	1.8	18.1	24700			C802_18.1 P180 BE180M4	136
88	1904	1.1	16.7	13800			C702_16.7 P180 BE180M4	133
88	1900	1.8	16.7	24400			C802_16.7 P180 BE180M4	136
96	1748	1.2	15.3	13800			C702_15.3 P180 BE180M4	133
99	1700	2.2	14.9	24000			C802_14.9 P180 BE180M4	136
104	1607	1.3	14.1	13900			C702_14.1 P180 BE180M4	133
107	1569	2.2	13.8	23700			C802_13.8 P180 BE180M4	136
113	1485	1.4	13.0	13800			C702_13.0 P180 BE180M4	133
122	1378	1.0	12.1	8420			C612_12.1 P180 BE180M4	130
122	1370	2.7	12.0	23500			C802_12.0 P180 BE180M4	136
131	1278	1.7	11.2	13800			C702_11.2 P180 BE180M4	133
133	1265	2.8	11.1	22900			C802_11.1 P180 BE180M4	136
135	1241	1.1	10.9	8360			C612_10.9 P180 BE180M4	130
144	1164	1.8	10.2	13700			C702_10.2 P180 BE180M4	133
150	1119	1.2	9.8	8400			C612_9.8 P180 BE180M4	130
153	1095	3.4	9.6	20000			C802_9.6 P180 BE180M4	136
154	1086	2.0	9.5	13600			C702_9.5 P180 BE180M4	133
166	1008	1.3	8.8	8300			C612_8.8 P180 BE180M4	130
184	912	2.3	8.0	13500			C702_8.0 P180 BE180M4	133
196	853	1.6	7.5	8230			C612_7.5 P180 BE180M4	130
197	850	2.4	7.5	13400			C702_7.5 P180 BE180M4	133
218	768	1.8	6.7	8090			C612_6.7 P180 BE180M4	130
235	713	2.7	6.3	13100			C702_6.3 P180 BE180M4	133
245	684	1.0	6.0	7550			C612_6.0 P180 BE180M4	130
251	667	2.8	5.9	12800			C702_5.9 P180 BE180M4	133
322	521	3.3	4.6	12300			C702_4.6 P180 BE180M4	133
323	519	1.3	4.6	7300			C612_4.6 P180 BE180M4	130
397	422	1.6	3.7	7060			C612_3.7 P180 BE180M4	130
444	377	1.1	3.3	4660			C512_3.3 P180 BE180M4	127
521	321	2.1	2.8	6700			C612_2.8 P180 BE180M4	130
559	300	1.3	2.6	4540			C512_2.6 P180 BE180M4	127

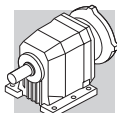
22 kW

n ₂ min ⁻¹	M ₂ Nm	S	i	R _{n2} N			 IEC 	
14.7	13273	0.9	99.8	70600			C1003_99.8 P180 BE180L4	142
15.9	12325	1.0	92.7	70900			C1003_92.7 P180 BE180L4	142
17.2	11378	1.1	85.6	71100			C1003_85.6 P180 BE180L4	142
18.5	10565	1.1	79.4	71200			C1003_79.4 P180 BE180L4	142
21.2	9233	1.3	69.4	71000			C1003_69.4 P180 BE180L4	142
22.8	8574	1.4	64.5	70800			C1003_64.5 P180 BE180L4	142
24.8	7873	0.9	59.2	36700			C903_59.2 P180 BE180L4	139
25.6	7627	1.6	57.4	70300			C1003_57.4 P180 BE180L4	142
26.8	7298	1.0	54.9	36000			C903_54.9 P180 BE180L4	139
27.6	7082	1.7	53.3	69800			C1003_53.3 P180 BE180L4	142
29.2	6690	1.1	50.3	37400			C903_50.3 P180 BE180L4	139
32	6147	2.0	46.2	68800			C1003_46.2 P180 BE180L4	142
34	5716	1.3	43.0	37500			C903_43.0 P180 BE180L4	139
34	5708	2.1	42.9	68100			C1003_42.9 P180 BE180L4	142
37	5240	1.4	39.4	37500			C903_39.4 P180 BE180L4	139
40	4912	2.4	36.9	66700			C1003_36.9 P180 BE180L4	142
42	4768	1.1	35.1	37400			C902_35.1 P180 BE180L4	139



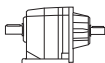
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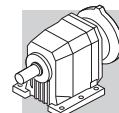
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43	4561	2.6	34.3	65900			C1003_34.3 P180 BE180L4	142
50	3931	2.3	29.6	64100			C1002_29.6 P180 BE180L4	142
50	3999	1.5	29.4	37100			C902_29.4 P180 BE180L4	139
54	3691	1.5	27.2	36900			C902_27.2 P180 BE180L4	139
57	3525	1.0	25.9	23000			C802_25.9 P180 BE180L4	136
59	3373	2.0	24.8	36600			C902_24.8 P180 BE180L4	139
61	3254	1.1	24.0	23700			C802_24.0 P180 BE180L4	136
64	3113	2.0	22.9	36400			C902_22.9 P180 BE180L4	139
66	3022	1.2	22.2	23500			C802_22.2 P180 BE180L4	136
72	2789	1.3	20.5	23400			C802_20.5 P180 BE180L4	136
73	2749	2.4	20.2	35800			C902_20.2 P180 BE180L4	139
79	2538	2.4	18.7	35400			C902_18.7 P180 BE180L4	139
81	2452	1.5	18.1	23300			C802_18.1 P180 BE180L4	136
85	2352	2.8	17.3	34900			C902_17.3 P180 BE180L4	139
88	2269	0.9	16.7	12400			C702_16.7 P180 BE180L4	133
88	2264	1.5	16.7	23100			C802_16.7 P180 BE180L4	136
92	2171	2.9	16.0	34600			C902_16.0 P180 BE180L4	139
96	2083	1.0	15.3	12400			C702_15.3 P180 BE180L4	133
99	2026	1.8	14.9	22900			C802_14.9 P180 BE180L4	136
104	1915	1.1	14.1	12700			C702_14.1 P180 BE180L4	133
106	1882	3.2	13.9	33700			C902_13.9 P180 BE180L4	139
107	1870	1.9	13.8	22700			C802_13.8 P180 BE180L4	136
113	1770	1.2	13.0	12700			C702_13.0 P180 BE180L4	133
122	1633	2.3	12.0	22500			C802_12.0 P180 BE180L4	136
131	1523	1.4	11.2	12900			C702_11.2 P180 BE180L4	133
133	1507	2.3	11.1	22100			C802_11.1 P180 BE180L4	136
135	1479	0.9	10.9	7580			C612_10.9 P180 BE180L4	130
144	1387	1.5	10.2	12800			C702_10.2 P180 BE180L4	133
150	1334	1.0	9.8	7710			C612_9.8 P180 BE180L4	130
153	1305	2.8	9.6	21900			C802_9.6 P180 BE180L4	136
154	1294	1.7	9.5	12800			C702_9.5 P180 BE180L4	133
166	1204	2.9	8.9	21300			C802_8.9 P180 BE180L4	136
166	1201	1.1	8.8	7660			C612_8.8 P180 BE180L4	130
184	1087	1.9	8.0	12700			C702_8.0 P180 BE180L4	133
193	1036	3.3	7.6	20000			C802_7.6 P180 BE180L4	136
196	1017	1.3	7.5	7690			C612_7.5 P180 BE180L4	130
197	1013	2.0	7.5	12700			C702_7.5 P180 BE180L4	133
218	916	1.5	6.7	7600			C612_6.7 P180 BE180L4	130
235	850	2.3	6.3	12500			C702_6.3 P180 BE180L4	133
251	795	2.4	5.9	12300			C702_5.9 P180 BE180L4	133
322	621	2.7	4.6	11900			C702_4.6 P180 BE180L4	133
323	619	1.1	4.6	6910			C612_4.6 P180 BE180L4	130
397	503	1.3	3.7	6740			C612_3.7 P180 BE180L4	130
444	449	0.9	3.3	4350			C512_3.3 P180 BE180L4	127
521	383	1.7	2.8	6450			C612_2.8 P180 BE180L4	130
559	357	1.1	2.6	4290			C512_2.6 P180 BE180L4	127



C 11

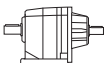
100 Nm

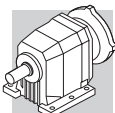
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		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 11 2_2.8	2.8	1011	30	3.3	750	600	505	37	2.1	990	790	113
C 11 2_3.7	3.7	767	34	2.9	720	610	384	42	1.8	960	800	
C 11 2_4.9	4.9	575	38	2.4	710	640	287	48	1.5	880	800	
C 11 2_6.2	6.2	449	42	2.1	650	660	225	53	1.3	810	830	
C 11 2_6.9	6.9	408	43	1.9	1120	1170	204	54	1.2	1300	1480	
C 11 2_7.6	7.6	367	45	1.8	1140	1220	184	56	1.1	1300	1540	
C 11 2_9.1	9.1	309	48	1.6	1120	1280	155	61	1.0	1300	1610	
C 11 2_10.1	10.1	278	49	1.5	1150	1340	139	63	0.97	1300	1680	
C 11 2_12.1	12.1	232	53	1.4	1120	1410	116	67	0.86	1300	1780	
C 11 2_13.4	13.4	209	55	1.3	1140	1460	104	70	0.81	1300	1840	
C 11 2_15.5	15.5	181	58	1.2	1100	1520	90	74	0.74	1300	1880	
C 11 2_17.2	17.2	163	60	1.1	1130	1590	82	76	0.68	1300	2000	
C 11 2_18.6	18.6	151	63	1.0	1090	1570	75	79	0.66	1300	1990	
C 11 2_20.6	20.6	136	65	0.97	1110	1670	68	82	0.61	1300	2000	
C 11 2_22.8	22.8	123	67	0.90	1080	1700	61	85	0.57	1300	2000	
C 11 2_25.4	25.4	110	69	0.84	1110	1800	55	88	0.54	1300	2000	
C 11 2_29.5	29.5	95	74	0.77	1060	1810	47	93	0.49	1300	2000	
C 11 2_32.8	32.8	85	75	0.71	1090	1970	43	90	0.42	1300	2000	
C 11 2_33.4	33.4	84	77	0.71	1030	1890	42	100	0.46	1286	2000	
C 11 2_37.0	37.0	76	79	0.66	1070	2000	38	90	0.38	1300	2000	
C 11 2_42.9	42.9	65	84	0.60	1010	2000	33	100	0.36	1300	2000	
C 11 2_47.6	47.6	59	85	0.55	1050	2000	29.4	90	0.29	1300	2000	
C 11 2_49.7	49.7	56	88	0.55	990	2000	28.2	100	0.31	1300	2000	
C 11 2_55.2	55.2	51	89	0.50	1030	2000	25.4	90	0.25	1300	2000	
C 11 2_59.6	59.6	47	78	0.40	1060	2000	23.5	82	0.21	1300	2000	
C 11 2_66.2	66.2	42	86	0.40	1060	2000	21.2	90	0.21	1300	2000	



C 11

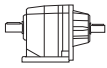
100 Nm

	i	n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 11 2_2.8	2.8	325	43	1.5	1140	910	187	53	1.1	1300	1080	113
C 11 2_3.7	3.7	247	49	1.3	1090	920	137	60	0.91	1300	1100	
C 11 2_4.9	4.9	185	55	1.1	1050	960	103	67	0.76	1280	1160	
C 11 2_6.2	6.2	144	61	0.97	960	980	80	70	0.62	1300	1390	
C 11 2_6.9	6.9	131	62	0.90	1300	1720	73	76	0.61	1300	2000	
C 11 2_7.6	7.6	118	65	0.85	1300	1780	66	79	0.57	1300	2000	
C 11 2_9.1	9.1	99	70	0.77	1300	1870	55	85	0.52	1300	2000	
C 11 2_10.1	10.1	89	72	0.71	1300	1950	50	88	0.48	1300	2000	
C 11 2_12.1	12.1	75	78	0.64	1300	2000	41	95	0.43	1300	2000	
C 11 2_13.4	13.4	67	81	0.60	1300	2000	37	90	0.37	1300	2000	
C 11 2_15.5	15.5	58	86	0.55	1300	2000	32	99	0.35	1300	2000	
C 11 2_17.2	17.2	52	88	0.51	1300	2000	29.1	90	0.29	1300	2000	
C 11 2_18.6	18.6	48	91	0.49	1300	2000	26.9	99	0.29	1300	2000	
C 11 2_20.6	20.6	44	89	0.43	1300	2000	24.2	89	0.24	1300	2000	
C 11 2_22.8	22.8	39	99	0.43	1300	2000	21.9	99	0.24	1300	2000	
C 11 2_25.4	25.4	35	89	0.35	1300	2000	19.7	89	0.19	1300	2000	
C 11 2_29.5	29.5	30	100	0.34	1300	2000	16.9	100	0.19	1300	2000	
C 11 2_32.8	32.8	27.5	90	0.27	1300	2000	15.3	90	0.15	1300	2000	
C 11 2_33.4	33.4	27.0	100	0.30	1300	2000	15.0	100	0.17	1300	2000	
C 11 2_37.0	37.0	24.3	90	0.24	1300	2000	13.5	90	0.13	1300	2000	
C 11 2_42.9	42.9	21.0	100	0.23	1300	2000	11.7	100	0.13	1300	2000	
C 11 2_47.6	47.6	18.9	90	0.19	1300	2000	10.5	90	0.10	1300	2000	
C 11 2_49.7	49.7	18.1	100	0.20	1300	2000	10.1	100	0.11	1300	2000	
C 11 2_55.2	55.2	16.3	90	0.16	1300	2000	9.1	90	0.09	1300	2000	
C 11 2_59.6	59.6	15.1	85	0.14	1300	2000	8.4	88	0.08	1300	2000	
C 11 2_66.2	66.2	13.6	90	0.13	1300	2000	7.6	90	0.07	1300	2000	

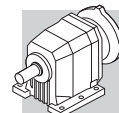


C 21

200 Nm

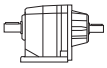
	i	n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 21 2_2.7	2.7	1029	65	7.4	—	1150	515	80	4.5	—	1460	116
C 21 2_3.7	3.7	755	70	5.8	—	1290	377	90	3.7	—	1610	
C 21 2_4.8	4.8	587	80	5.2	—	1370	294	100	3.2	—	1730	
C 21 2_6.1	6.1	460	85	4.3	—	1500	230	105	2.7	—	1900	
C 21 2_6.4	6.4	439	100	4.8	960	1510	219	125	3.0	1230	1910	
C 21 2_7.1	7.1	395	105	4.6	1090	1570	198	130	2.8	1420	1990	
C 21 2_8.7	8.7	323	110	3.9	1030	1680	161	140	2.5	1260	2110	
C 21 2_9.6	9.6	290	115	3.7	1160	1750	145	145	2.3	1460	2200	
C 21 2_11.2	11.2	251	125	3.5	930	1790	125	155	2.1	1220	2280	
C 21 2_12.4	12.4	226	125	3.1	1160	1900	113	160	2.0	1420	2380	
C 21 2_14.3	14.3	196	135	2.9	870	1950	98	170	1.8	1100	2460	
C 21 2_15.8	15.8	177	140	2.7	1030	2030	88	175	1.7	1320	2570	
C 21 2_18.0	18.0	155	145	2.5	840	2120	78	185	1.6	1010	2650	
C 21 2_20.0	20.0	140	150	2.3	1000	2210	70	190	1.5	1250	2770	
C 21 2_21.9	21.9	128	155	2.2	800	2250	64	200	1.4	940	2810	
C 21 2_24.3	24.3	115	160	2.0	980	2350	58	200	1.3	1250	2970	
C 21 2_26.7	26.7	105	170	2.0	660	2380	52	200	1.2	1040	3090	
C 21 2_29.6	29.6	95	175	1.8	850	2490	47	200	1.0	1350	3270	
C 21 2_33.1	33.1	85	180	1.7	550	2570	42	200	0.93	1100	3420	
C 21 2_36.8	36.8	76	185	1.6	750	2690	38	200	0.84	1400	3610	
C 21 2_39.0	39.0	72	165	1.3	860	2880	36	170	0.67	1630	3880	
C 21 2_43.3	43.3	65	185	1.3	830	2910	32	190	0.68	1610	3950	
C 21 2_49.3	49.3	57	135	0.85	1320	3410	28.4	140	0.44	1770	4490	
C 21 2_54.7	54.7	51	150	0.85	1320	3470	25.6	155	0.44	1770	4600	
C 21 2_57.0	57.0	49	110	0.60	1410	3780	24.6	115	0.31	1830	4920	
C 21 2_63.3	63.3	44	125	0.61	1400	3860	22.1	130	0.32	1820	5000	
C 21 3_58.8	58.8	48	180	0.96	880	3390	23.8	190	0.24	1240	4510	
C 21 3_65.3	65.3	43	200	0.97	880	3440	21.4	200	0.48	1270	4670	
C 21 3_74.4	74.4	38	200	0.85	960	3630	18.8	200	0.42	1300	4920	
C 21 3_82.6	82.6	34	200	0.76	1010	3820	16.9	200	0.38	1300	5000	
C 21 3_90.2	90.2	31	200	0.70	1050	3960	15.5	200	0.35	1300	5000	
C 21 3_100.2	100.2	28.0	200	0.63	1090	4160	14.0	200	0.31	1300	5000	
C 21 3_110.0	110.0	25.5	200	0.57	1130	4320	12.7	200	0.29	1300	5000	
C 21 3_122.2	122.2	22.9	200	0.52	1160	4540	11.5	200	0.26	1300	5000	
C 21 3_136.5	136.6	20.5	200	0.46	1190	4740	10.3	200	0.23	1300	5000	
C 21 3_151.7	151.7	18.5	200	0.42	1220	4980	9.2	200	0.21	1300	5000	
C 21 3_160.7	160.7	17.4	195	0.38	1240	5000	8.7	200	0.20	1300	5000	
C 21 3_178.5	178.5	15.7	200	0.35	1260	5000	7.8	200	0.18	1300	5000	
C 21 3_203.2	203.2	13.8	160	0.25	1300	5000	6.9	165	0.13	1300	5000	
C 21 3_225.8	225.8	12.4	180	0.25	1300	5000	6.2	185	0.13	1300	5000	
C 21 3_235.0	235.0	11.9	130	0.17	1300	5000	6.0	140	0.09	1300	5000	
C 21 3_261.0	261.0	10.7	145	0.18	1300	5000	5.4	155	0.09	1300	5000	

(—) 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, orientation, position)
 (—) 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)

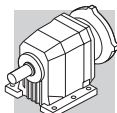


C 21

200 Nm

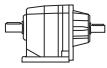
	i	n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 21 2_2.7	2.7	331	95	3.5	—	1670	184	100	2.0	400	2150	116
C 21 2_3.7	3.7	243	105	2.8	—	1850	135	105	1.6	800	2430	
C 21 2_4.8	4.8	189	105	2.2	170	2090	105	105	1.2	1200	2710	
C 21 2_6.1	6.1	148	110	1.8	200	2290	82	116	1.0	980	2930	
C 21 2_6.4	6.4	141	145	2.3	1420	2220	78	175	1.5	1760	2700	
C 21 2_7.1	7.1	127	150	2.1	1650	2310	71	180	1.4	2060	2820	
C 21 2_8.7	8.7	104	165	1.9	1410	2430	58	200	1.3	1730	2960	
C 21 2_9.6	9.6	93	170	1.7	1650	2530	52	200	1.1	2130	3130	
C 21 2_11.2	11.2	81	180	1.6	1400	2640	45	200	0.99	2060	3330	
C 21 2_12.4	12.4	73	185	1.5	1650	2760	40	200	0.89	2200	3520	
C 21 2_14.3	14.3	63	195	1.4	1310	2860	35	200	0.77	2200	3730	
C 21 2_15.8	15.8	57	200	1.3	1580	2990	32	200	0.70	2200	3920	
C 21 2_18.0	18.0	50	200	1.1	1420	3170	27.7	200	0.61	2200	4140	
C 21 2_20.0	20.0	45	200	0.99	1750	3340	25.0	200	0.55	2200	4350	
C 21 2_21.9	21.9	41	200	0.91	1590	3460	22.9	200	0.50	2200	4500	
C 21 2_24.3	24.3	37	200	0.82	1900	3650	20.6	200	0.45	2200	4720	
C 21 2_26.7	26.7	34	200	0.74	1700	3790	18.7	200	0.41	2200	4900	
C 21 2_29.6	29.6	30	200	0.67	1980	3990	16.9	200	0.37	2200	5000	
C 21 2_33.1	33.1	27.2	200	0.60	1750	4170	15.1	200	0.33	2200	5000	
C 21 2_36.8	36.8	24.5	200	0.54	1990	4390	13.6	200	0.30	2200	5000	
C 21 2_39.0	39.0	23.1	170	0.43	2020	4680	12.8	170	0.24	2200	5000	
C 21 2_43.3	43.3	20.8	190	0.44	2020	4770	11.6	190	0.24	2200	5000	
C 21 2_49.3	49.3	18.3	145	0.29	2080	5000	10.1	155	0.17	2200	5000	
C 21 2_54.7	54.7	16.4	160	0.29	2090	5000	9.1	170	0.17	2200	5000	
C 21 2_57.0	57.0	15.8	120	0.21	2140	5000	8.8	125	0.12	2200	5000	
C 21 2_63.3	63.3	14.2	135	0.21	2140	5000	7.9	140	0.12	2200	5000	
C 21 3_58.8	58.8	15.3	200	0.34	1300	5000	8.5	200	0.19	1300	5000	
C 21 3_65.3	65.3	13.8	200	0.31	1300	5000	7.7	200	0.17	1300	5000	
C 21 3_74.4	74.4	12.1	200	0.27	1300	5000	6.7	200	0.15	1300	5000	
C 21 3_82.6	82.6	10.9	200	0.25	1300	5000	6.1	200	0.14	1300	5000	
C 21 3_90.2	90.2	10.0	200	0.22	1300	5000	5.5	200	0.12	1300	5000	
C 21 3_100.2	100.2	9.0	200	0.20	1300	5000	5.0	200	0.11	1300	5000	
C 21 3_110.0	110.0	8.2	200	0.18	1300	5000	4.5	200	0.10	1300	5000	
C 21 3_122.2	122.2	7.4	200	0.17	1300	5000	4.1	200	0.09	1300	5000	
C 21 3_136.5	136.6	6.6	200	0.15	1300	5000	3.7	200	0.08	1300	5000	
C 21 3_151.7	151.7	5.9	200	0.13	1300	5000	3.3	200	0.07	1300	5000	
C 21 3_160.7	160.7	5.6	200	0.13	1300	5000	3.1	200	0.07	1300	5000	
C 21 3_178.5	178.5	5.0	200	0.11	1300	5000	2.8	200	0.06	1300	5000	
C 21 3_203.2	203.2	4.4	170	0.08	1300	5000	2.5	180	0.05	1300	5000	
C 21 3_225.8	225.8	4.0	195	0.09	1300	5000	2.2	200	0.05	1300	5000	
C 21 3_235.0	235.0	3.8	140	0.06	1300	5000	2.1	150	0.04	1300	5000	
C 21 3_261.0	261.0	3.4	160	0.06	1300	5000	1.9	165	0.04	1300	5000	

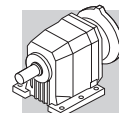
(—) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (—) Contact our technical service department advising radial load data (rotation direction, orientation, position)
 (—) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst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



C 31

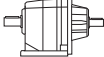
300 Nm

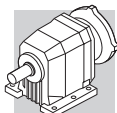
	i	n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 31 2_2.9	2.9	972	105	11.3	670	1710	486	130	7.0	940	2170	119
C 31 2_3.7	3.7	749	120	9.9	560	1830	374	150	6.2	750	2310	
C 31 2_5.0	5.0	566	135	8.4	470	1990	283	155	4.8	1100	2600	
C 31 2_6.3	6.3	447	150	7.4	300	2130	224	155	3.8	1450	2890	
C 31 2_6.5	6.5	434	155	7.4	1860	2270	217	195	4.7	2200	2870	
C 31 2_7.2	7.2	391	160	6.9	1890	2370	196	200	4.3	2200	2990	
C 31 2_8.4	8.4	335	170	6.3	1870	2480	167	215	4.0	2200	3110	
C 31 2_9.3	9.3	301	175	5.8	1910	2580	151	220	3.7	2200	3260	
C 31 2_11.1	11.1	252	190	5.3	1880	2700	126	240	3.3	2200	3400	
C 31 2_12.3	12.3	227	195	4.9	1910	2820	114	245	3.1	2200	3560	
C 31 2_14.0	14.0	199	205	4.5	1880	2930	100	260	2.9	2200	3680	
C 31 2_15.6	15.6	180	215	4.3	1900	3030	90	270	2.7	2200	3820	
C 31 2_18.1	18.1	155	225	3.8	1870	3170	77	285	2.4	2200	3990	
C 31 2_20.1	20.1	139	235	3.6	1900	3290	70	295	2.3	2200	4160	
C 31 2_22.6	22.6	124	245	3.3	1850	3410	62	300	2.0	2200	4330	
C 31 2_25.1	25.1	111	250	3.1	1890	3560	56	300	1.8	2200	4570	
C 31 2_26.8	26.8	105	260	3.0	1840	3600	52	300	1.7	2200	4680	
C 31 2_29.8	29.8	94	265	2.7	1880	3770	47	300	1.6	2200	4920	
C 31 2_32.5	32.5	86	275	2.6	1760	3850	43	300	1.4	2200	5090	
C 31 2_36.1	36.1	78	280	2.4	1870	4030	39	300	1.3	2200	5350	
C 31 2_40.7	40.7	69	295	2.2	1620	4160	34	300	1.1	2200	5500	
C 31 2_45.3	45.3	62	300	2.0	1860	4360	31	300	1.0	2200	5500	
C 31 2_47.2	47.2	59	300	2.0	1610	4420	29.7	300	0.98	2200	5500	
C 31 2_52.4	52.4	53	300	1.8	1860	4650	26.7	300	0.88	2200	5500	
C 31 2_60.2	60.2	47	180	0.92	2030	5500	23.3	190	0.49	2200	5500	
C 31 2_66.8	66.8	42	205	0.95	2020	5500	21.0	215	0.50	2200	5500	
C 31 3_74.3	74.3	38	275	1.2	790	5500	18.8	300	0.64	1170	5500	
C 31 3_82.6	82.6	34	300	1.1	820	5500	17.0	300	0.57	1240	5500	
C 31 3_93.0	93.0	30	290	0.98	940	5500	15.1	300	0.51	1300	5500	
C 31 3_103.3	103.3	27.1	300	0.92	980	5500	13.6	300	0.46	1300	5500	
C 31 3_110.2	110.2	25.4	300	0.86	1010	5500	12.7	300	0.43	1300	5500	
C 31 3_122.4	122.4	22.9	300	0.77	1060	5500	11.4	300	0.39	1300	5500	
C 31 3_133.6	133.6	21.0	300	0.71	1090	5500	10.5	300	0.35	1300	5500	
C 31 3_148.4	148.4	18.9	300	0.64	1130	5500	9.4	300	0.32	1300	5500	
C 31 3_167.5	167.5	16.7	300	0.56	1170	5500	8.4	300	0.28	1300	5500	
C 31 3_186.0	186.0	15.1	300	0.51	1200	5500	7.5	300	0.25	1300	5500	
C 31 3_194.1	194.1	14.4	280	0.45	1230	5500	7.2	295	0.24	1300	5500	
C 31 3_215.6	215.6	13.0	300	0.44	1240	5500	6.5	300	0.22	1300	5500	
C 31 3_247.3	247.3	11.3	215	0.27	1300	5500	5.7	225	0.14	1300	5500	
C 31 3_274.7	274.7	10.2	240	0.28	1300	5500	5.1	255	0.15	1300	5500	



C 31

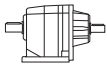
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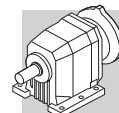
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		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 31 2_2.9	2.9	313	150	5.2	1120	2510	174	155	3.0	2200	3220	119
C 31 2_3.7	3.7	241	155	4.1	1570	2790	134	175	2.6	2200	3480	
C 31 2_5.0	5.0	182	162	3.2	1870	3120	101	198	2.2	2200	3790	
C 31 2_6.3	6.3	144	178	2.8	1730	3350	80	200	1.8	2200	4180	
C 31 2_6.5	6.5	140	225	3.5	2200	3330	78	275	2.3	2200	4040	
C 31 2_7.2	7.2	126	235	3.3	2200	3450	70	285	2.2	2200	4200	
C 31 2_8.4	8.4	108	250	3.0	2200	3600	60	300	2.0	2200	4410	
C 31 2_9.3	9.3	97	260	2.8	2200	3750	54	300	1.8	2200	4640	
C 31 2_11.1	11.1	81	280	2.5	2200	3930	45	300	1.5	2200	4990	
C 31 2_12.3	12.3	73	285	2.3	2200	4120	41	300	1.3	2200	5250	
C 31 2_14.0	14.0	64	300	2.1	2200	4270	36	300	1.2	2200	5500	
C 31 2_15.6	15.6	58	300	1.9	2200	4500	32	300	1.1	2200	5500	
C 31 2_18.1	18.1	50	300	1.6	2200	4780	27.7	300	0.91	2200	5500	
C 31 2_20.1	20.1	45	300	1.5	2200	5030	24.9	300	0.82	2200	5500	
C 31 2_22.6	22.6	40	300	1.3	2200	5270	22.1	300	0.73	2200	5500	
C 31 2_25.1	25.1	36	300	1.2	2200	5500	19.9	300	0.66	2200	5500	
C 31 2_26.8	26.8	34	300	1.1	2200	5500	18.7	300	0.62	2200	5500	
C 31 2_29.8	29.8	30	300	1.0	2200	5500	16.8	300	0.56	2200	5500	
C 31 2_32.5	32.5	27.7	300	0.92	2200	5500	15.4	300	0.51	2200	5500	
C 31 2_36.1	36.1	24.9	300	0.82	2200	5500	13.9	300	0.46	2200	5500	
C 31 2_40.7	40.7	22.1	300	0.73	2200	5500	12.3	300	0.41	2200	5500	
C 31 2_45.3	45.3	19.9	300	0.66	2200	5500	11.0	300	0.37	2200	5500	
C 31 2_47.2	47.2	19.1	300	0.63	2200	5500	10.6	300	0.35	2200	5500	
C 31 2_52.4	52.4	17.2	300	0.57	2200	5500	9.5	300	0.32	2200	5500	
C 31 2_60.2	60.2	15.0	200	0.33	2200	5500	8.3	205	0.19	2200	5500	
C 31 2_66.8	66.8	13.5	220	0.33	2200	5500	7.5	230	0.19	2200	5500	
C 31 3_74.3	74.3	12.1	300	0.41	1300	5500	6.7	300	0.23	1300	5500	
C 31 3_82.6	82.6	10.9	300	0.37	1300	5500	6.1	300	0.20	1300	5500	
C 31 3_93.0	93.0	9.7	300	0.33	1300	5500	5.4	300	0.18	1300	5500	
C 31 3_103.3	103.3	8.7	300	0.29	1300	5500	4.8	300	0.16	1300	5500	
C 31 3_110.2	110.2	8.2	300	0.28	1300	5500	4.5	300	0.15	1300	5500	
C 31 3_122.4	122.4	7.4	300	0.25	1300	5500	4.1	300	0.14	1300	5500	
C 31 3_133.6	133.6	6.7	300	0.23	1300	5500	3.7	300	0.13	1300	5500	
C 31 3_148.4	148.4	6.1	300	0.20	1300	5500	3.4	300	0.11	1300	5500	
C 31 3_167.5	167.5	5.4	300	0.18	1300	5500	3.0	300	0.10	1300	5500	
C 31 3_186.0	186.0	4.8	300	0.16	1300	5500	2.7	300	0.09	1300	5500	
C 31 3_194.1	194.1	4.6	300	0.16	1300	5500	2.6	300	0.09	1300	5500	
C 31 3_215.6	215.6	4.2	300	0.14	1300	5500	2.3	300	0.08	1300	5500	
C 31 3_247.3	247.3	3.6	235	0.10	1300	5500	2.0	245	0.06	1300	5500	
C 31 3_274.7	274.7	3.3	260	0.10	1300	5500	1.8	275	0.06	1300	5500	



C 35

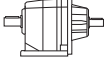
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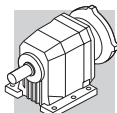
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C 35 2_2.7	2.7	1037	140	16.0	670	1750	519	170	9.7	1150	2240	122
C 35 2_3.5	3.5	800	150	13.2	910	1920	400	185	8.2	1320	2440	
C 35 2_4.6	4.6	609	165	11.1	920	2110	304	200	6.7	1470	2700	
C 35 2_5.8	5.8	483	170	9.0	1160	2330	241	200	5.3	1990	3020	
C 35 2_6.1	6.1	459	275	13.9	1580	2040	230	345	8.7	2020	2570	
C 35 2_6.8	6.8	412	285	12.9	1750	2130	206	355	8.1	2220	2710	
C 35 2_7.9	7.9	354	305	11.9	1590	2200	177	380	7.4	2090	2790	
C 35 2_8.8	8.8	318	310	10.9	1780	2330	159	380	6.7	2270	3000	
C 35 2_10.5	10.5	267	335	9.8	1610	2410	133	380	5.6	2270	3250	
C 35 2_11.7	11.7	239	340	9.0	1790	2560	120	380	5.0	2370	3460	
C 35 2_13.3	13.3	211	355	8.2	1660	2650	105	380	4.4	2340	3660	
C 35 2_14.8	14.8	189	360	7.5	1800	2810	95	380	4.0	2440	3890	
C 35 2_17.1	17.1	164	380	6.9	1640	2910	82	380	3.4	2410	4150	
C 35 2_19.0	19.0	147	380	6.2	1820	3110	74	380	3.1	2500	4400	
C 35 3_20.2	20.2	139	315	4.9	2300	3500	69	395	3.1	2900	4420	
C 35 3_22.1	22.1	127	340	4.9	2300	3570	63	430	3.1	2900	4490	
C 35 3_26.2	26.2	107	355	4.3	2300	3760	53	450	2.7	2890	4730	
C 35 3_28.7	28.7	98	385	4.2	2300	3820	49	450	2.5	2930	4980	
C 35 3_34.7	34.7	81	395	3.6	2300	4110	40	450	2.0	2930	5410	
C 35 3_38.1	38.1	73	435	3.6	2300	4140	37	450	1.9	2970	5690	
C 35 3_43.9	43.9	64	430	3.1	2300	4430	32	450	1.6	2960	6030	
C 35 3_48.2	48.2	58	450	2.9	2310	4580	29.0	450	1.5	2990	6330	
C 35 3_56.5	56.5	50	450	2.5	2300	4910	24.8	450	1.3	2990	6500	
C 35 3_62.0	62.0	45	450	2.3	2330	5170	22.6	450	1.1	3000	6500	
C 35 3_70.7	70.7	40	450	2.0	2320	5460	19.8	450	1.0	3000	6500	
C 35 3_77.6	77.6	36	450	1.8	2350	5740	18.0	450	0.91	3000	6500	
C 35 3_83.8	83.8	33	450	1.7	2330	5910	16.7	450	0.85	3000	6500	
C 35 3_91.9	91.9	30	450	1.5	2360	6200	15.2	450	0.77	3000	6500	
C 35 3_101.6	101.6	27.6	450	1.4	2340	6450	13.8	450	0.70	3000	6500	
C 35 3_111.5	111.5	25.1	450	1.3	2360	6500	12.6	450	0.64	3000	6500	
C 35 3_127.3	127.3	22.0	450	1.1	2350	6500	11.0	450	0.56	3000	6500	
C 35 3_139.8	139.8	20.0	450	1.0	2370	6500	10.0	450	0.51	3000	6500	
C 35 3_147.6	147.6	19.0	450	0.96	2350	6500	9.5	450	0.48	3000	6500	
C 35 3_162.0	162.0	17.3	450	0.88	2380	6500	8.6	450	0.44	3000	6500	
C 35 3_188.0	188.0	14.9	450	0.75	2360	6500	7.4	450	0.38	3000	6500	
C 35 3_206.4	206.4	13.6	450	0.69	2380	6500	6.8	450	0.34	3000	6500	
C 35 4_232.3	232.3	12.1	450	0.62	1170	6500	6.0	450	0.31	1300	6500	
C 35 4_255.0	255.0	11.0	450	0.57	1190	6500	5.5	450	0.28	1300	6500	
C 35 4_290.6	290.6	9.6	450	0.50	1220	6500	4.8	450	0.25	1300	6500	
C 35 4_318.9	318.9	8.8	450	0.45	1230	6500	4.4	450	0.23	1300	6500	
C 35 4_344.3	344.3	8.1	450	0.42	1240	6500	4.1	450	0.21	1300	6500	
C 35 4_377.9	377.9	7.4	450	0.38	1260	6500	3.7	450	0.19	1300	6500	
C 35 4_417.6	417.6	6.7	450	0.35	1270	6500	3.4	450	0.17	1300	6500	
C 35 4_458.4	458.4	6.1	450	0.32	1280	6500	3.1	450	0.16	1300	6500	
C 35 4_523.5	523.5	5.3	450	0.28	1290	6500	2.7	450	0.14	1300	6500	
C 35 4_574.7	574.7	4.9	450	0.25	1300	6500	2.4	450	0.13	1300	6500	
C 35 4_606.6	606.6	4.6	450	0.24	1300	6500	2.3	450	0.12	1300	6500	
C 35 4_665.9	665.9	4.2	450	0.22	1300	6500	2.1	450	0.11	1300	6500	
C 35 4_773.0	773.0	3.6	450	0.19	1300	6500	1.8	450	0.09	1300	6500	
C 35 4_848.5	848.5	3.3	450	0.17	1300	6500	1.6	450	0.09	1300	6500	



C 35

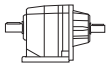
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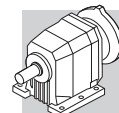
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		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 35 2_2.7	2.7	333	190	7.0	1670	2640	185	200	4.1	3000	3390	122
C 35 2_3.5	3.5	257	200	5.7	2160	2920	143	200	3.1	3000	3810	
C 35 2_4.6	4.6	196	200	4.3	2590	3320	109	200	2.4	3000	4300	
C 35 2_5.8	5.8	155	200	3.4	2680	3690	86	200	1.9	3000	4740	
C 35 2_6.1	6.1	148	380	6.2	2530	3080	82	380	3.4	3000	4150	
C 35 2_6.8	6.8	132	380	5.5	2660	3290	74	380	3.1	3000	4400	
C 35 2_7.9	7.9	114	380	4.8	2680	3530	63	380	2.7	3000	4690	
C 35 2_8.8	8.8	102	380	4.3	2790	3750	57	380	2.4	3000	4960	
C 35 2_10.5	10.5	86	380	3.6	2790	4060	48	380	2.0	3000	5340	
C 35 2_11.7	11.7	77	380	3.2	2900	4300	43	380	1.8	3000	5630	
C 35 2_13.3	13.3	68	380	2.8	2870	4540	38	380	1.6	3000	5930	
C 35 2_14.8	14.8	61	380	2.5	2970	4800	34	380	1.4	3000	6240	
C 35 2_17.1	17.1	53	380	2.2	2940	5110	29.2	380	1.2	3000	6500	
C 35 2_19.0	19.0	47	380	2.0	3000	5390	26.3	380	1.1	3000	6500	
C 35 3_20.2	20.2	45	450	2.3	3000	5160	24.8	450	1.3	3000	6500	
C 35 3_22.1	22.1	41	450	2.1	3000	5430	22.6	450	1.1	3000	6500	
C 35 3_26.2	26.2	34	450	1.7	3000	5830	19.1	450	0.97	3000	6500	
C 35 3_28.7	28.7	31	450	1.6	3000	6120	17.4	450	0.88	3000	6500	
C 35 3_34.7	34.7	25.9	450	1.3	3000	6500	14.4	450	0.73	3000	6500	
C 35 3_38.1	38.1	23.6	450	1.2	3000	6500	13.1	450	0.66	3000	6500	
C 35 3_43.9	43.9	20.5	450	1.0	3000	6500	11.4	450	0.58	3000	6500	
C 35 3_48.2	48.2	18.7	450	0.95	3000	6500	10.4	450	0.53	3000	6500	
C 35 3_56.5	56.5	15.9	450	0.81	3000	6500	8.8	450	0.45	3000	6500	
C 35 3_62.0	62.0	14.5	450	0.74	3000	6500	8.1	450	0.41	3000	6500	
C 35 3_70.7	70.7	12.7	450	0.64	3000	6500	7.1	450	0.36	3000	6500	
C 35 3_77.6	77.6	11.6	450	0.59	3000	6500	6.4	450	0.33	3000	6500	
C 35 3_83.8	83.8	10.7	450	0.54	3000	6500	6.0	450	0.30	3000	6500	
C 35 3_91.9	91.9	9.8	450	0.50	3000	6500	5.4	450	0.28	3000	6500	
C 35 3_101.6	101.6	8.9	450	0.45	3000	6500	4.9	450	0.25	3000	6500	
C 35 3_111.5	111.5	8.1	450	0.41	3000	6500	4.5	450	0.23	3000	6500	
C 35 3_127.3	127.3	7.1	450	0.36	3000	6500	3.9	450	0.20	3000	6500	
C 35 3_139.8	139.8	6.4	450	0.33	3000	6500	3.6	450	0.18	3000	6500	
C 35 3_147.6	147.6	6.1	450	0.31	3000	6500	3.4	450	0.17	3000	6500	
C 35 3_162.0	162.0	5.6	450	0.28	3000	6500	3.1	450	0.16	3000	6500	
C 35 3_188.0	188.0	4.8	450	0.24	3000	6500	2.7	450	0.13	3000	6500	
C 35 3_206.4	206.4	4.4	450	0.22	3000	6500	2.4	450	0.12	3000	6500	
C 35 4_232.3	232.3	3.9	450	0.20	1300	6500	2.2	450	0.11	1300	6500	
C 35 4_255.0	255.0	3.5	450	0.18	1300	6500	2.0	450	0.10	1300	6500	
C 35 4_290.6	290.6	3.1	450	0.16	1300	6500	1.7	450	0.09	1300	6500	
C 35 4_318.9	318.9	2.8	450	0.15	1300	6500	1.6	450	0.08	1300	6500	
C 35 4_344.3	344.3	2.6	450	0.14	1300	6500	1.5	450	0.08	1300	6500	
C 35 4_377.9	377.9	2.4	450	0.12	1300	6500	1.3	450	0.07	1300	6500	
C 35 4_417.6	417.6	2.2	450	0.11	1300	6500	1.2	450	0.06	1300	6500	
C 35 4_458.4	458.4	2.0	450	0.10	1300	6500	1.1	450	0.06	1300	6500	
C 35 4_523.5	523.5	1.7	450	0.09	1300	6500	1.0	450	0.05	1300	6500	
C 35 4_574.7	574.7	1.6	450	0.08	1300	6500	0.87	450	0.05	1300	6500	
C 35 4_606.6	606.6	1.5	450	0.08	1300	6500	0.82	450	0.04	1300	6500	
C 35 4_665.9	665.9	1.4	450	0.07	1300	6500	0.75	450	0.04	1300	6500	
C 35 4_773.0	773.0	1.2	450	0.06	1300	6500	0.65	450	0.03	1300	6500	
C 35 4_848.5	848.5	1.1	450	0.05	1300	6500	0.59	450	0.03	1300	6500	



C 41

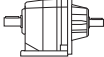
600 Nm

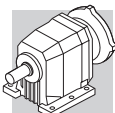
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		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 41 2_2.7	2.7	1037	245	28	980	1290	519	245	14.0	1390	2060	125
C 41 2_3.6	3.6	778	255	22	1070	1540	389	255	10.9	1650	2390	
C 41 2_4.7	4.7	596	260	17.1	1170	1800	298	260	8.5	2010	2730	
C 41 2_6.0	6.0	467	260	13.4	1290	2100	233	260	6.7	2400	3110	
C 41 2_6.4	6.4	438	275	13.3	2270	2590	219	345	8.3	2860	3260	
C 41 2_7.1	7.1	394	285	12.4	2360	2700	197	355	7.7	2980	3420	
C 41 2_8.6	8.6	326	305	10.9	2300	2860	163	385	6.9	2900	3600	
C 41 2_9.6	9.6	292	310	10.0	2410	3010	146	390	6.3	3030	3800	
C 41 2_11.2	11.2	250	335	9.2	2310	3100	125	420	5.8	2910	3920	
C 41 2_12.4	12.4	226	340	8.5	2440	3270	113	425	5.3	3070	4140	
C 41 2_14.2	14.2	197	355	7.7	2330	3410	99	445	4.8	2980	4300	
C 41 2_15.8	15.8	177	360	7.0	2460	3590	89	450	4.4	3120	4540	
C 41 2_17.8	17.8	157	380	6.6	2330	3680	79	480	4.2	3050	4630	
C 41 2_19.8	19.8	141	385	6.0	2460	3880	71	485	3.8	3180	4890	
C 41 2_22.6	22.6	124	410	5.6	2320	3990	62	500	3.4	3110	5110	
C 41 2_25.0	25.0	112	415	5.1	2460	4210	56	500	3.1	3230	5420	
C 41 2_28.3	28.3	99	445	4.9	2310	4290	49	500	2.7	3180	5710	
C 41 2_31.4	31.4	89	445	4.4	2440	4550	45	500	2.5	3300	6040	
C 41 2_33.4	33.4	84	465	4.3	2390	4560	42	500	2.3	3220	6170	
C 41 2_37.1	37.1	75	470	3.9	2440	4810	38	500	2.1	3320	6520	
C 41 2_44.8	44.8	63	500	3.4	2660	5130	31	500	1.7	3500	7000	
C 41 3_28.5	28.5	98	445	4.9	3060	4300	49	560	3.1	3500	5420	
C 41 3_31.2	31.2	90	450	4.5	3090	4510	45	570	2.9	3500	5670	
C 41 3_36.8	36.8	76	480	4.1	3070	4710	38	600	2.6	3500	5960	
C 41 3_40.3	40.3	69	485	3.8	3100	4940	35	600	2.3	3500	6280	
C 41 3_47.0	47.0	60	515	3.5	3070	5140	29.8	600	2.0	3500	6720	
C 41 3_51.5	51.5	54	525	3.2	3090	5360	27.2	600	1.8	3500	7000	
C 41 3_58.7	58.7	48	550	3.0	3070	5550	23.9	600	1.6	3500	7000	
C 41 3_64.3	64.3	44	560	2.7	3090	5800	21.8	600	1.5	3500	7000	
C 41 3_74.4	74.4	38	590	2.5	3060	6040	18.8	600	1.3	3500	7000	
C 41 3_81.5	81.5	34	600	2.3	3090	6310	17.2	600	1.2	3500	7000	
C 41 3_93.3	93.3	30	600	2.0	3080	6700	15.0	600	1.0	3500	7000	
C 41 3_102.3	102.3	27.4	600	1.8	3110	7000	13.7	600	0.92	3500	7000	
C 41 3_110.1	110.1	25.4	600	1.7	3090	7000	12.7	600	0.86	3500	7000	
C 41 3_120.6	120.6	23.2	600	1.6	3110	7000	11.6	600	0.78	3500	7000	
C 41 3_132.9	132.9	21.1	600	1.4	3090	7000	10.5	600	0.71	3500	7000	
C 41 3_145.6	145.6	19.2	600	1.3	3120	7000	9.6	600	0.65	3500	7000	
C 41 3_164.1	164.1	17.1	600	1.2	3100	7000	8.5	600	0.58	3500	7000	
C 41 3_179.9	179.9	15.6	600	1.1	3120	7000	7.8	600	0.53	3500	7000	
C 41 3_190.8	190.8	14.7	600	0.99	3110	7000	7.3	600	0.50	3500	7000	
C 41 3_209.1	209.1	13.4	600	0.90	3130	7000	6.7	600	0.45	3500	7000	
C 41 4_239.9	239.9	11.7	600	0.81	1480	7000	5.8	600	0.40	1910	7000	
C 41 4_263.0	263.0	10.6	600	0.74	1500	7000	5.3	600	0.37	1920	7000	
C 41 4_304.2	304.2	9.2	600	0.64	1520	7000	4.6	600	0.32	1950	7000	
C 41 4_333.4	333.4	8.4	600	0.58	1530	7000	4.2	600	0.29	1960	7000	
C 41 4_381.8	381.8	7.3	600	0.51	1540	7000	3.7	600	0.25	1970	7000	
C 41 4_418.5	418.5	6.7	600	0.46	1550	7000	3.3	600	0.23	1980	7000	
C 41 4_450.2	450.2	6.2	600	0.43	1560	7000	3.1	600	0.21	1990	7000	
C 41 4_493.5	493.5	5.7	600	0.39	1570	7000	2.8	600	0.20	2000	7000	
C 41 4_543.5	543.5	5.2	600	0.36	1570	7000	2.6	600	0.18	2000	7000	
C 41 4_595.8	595.8	4.7	600	0.32	1580	7000	2.3	600	0.16	2010	7000	
C 41 4_671.3	671.3	4.2	600	0.29	1590	7000	2.1	600	0.14	2020	7000	
C 41 4_735.9	735.9	3.8	600	0.26	1590	7000	1.9	600	0.13	2020	7000	
C 41 4_780.4	780.4	3.6	600	0.25	1600	7000	1.8	600	0.12	2030	7000	
C 41 4_855.5	855.5	3.3	600	0.23	1600	7000	1.6	600	0.11	2030	7000	



C 41

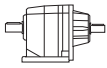
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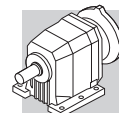
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		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 41 2_2.7	2.7	333	245	9.0	2560	2650	185	245	5.0	3500	3590	125
C 41 2_3.6	3.6	250	255	7.0	2710	3050	139	255	3.9	3500	4090	
C 41 2_4.7	4.7	191	260	5.5	2900	3440	106	260	3.0	3500	4570	
C 41 2_6.0	6.0	150	260	4.3	3080	3890	83	260	2.4	3500	5110	
C 41 2_6.4	6.4	141	400	6.2	3310	3780	78	490	4.2	3500	4580	
C 41 2_7.1	7.1	127	415	5.8	3460	3940	70	500	3.9	3500	4820	
C 41 2_8.6	8.6	105	445	5.1	3360	4180	58	500	3.2	3500	5290	
C 41 2_9.6	9.6	94	450	4.7	3500	4410	52	500	2.9	3500	5600	
C 41 2_11.2	11.2	80	490	4.3	3500	4520	45	500	2.5	3500	5980	
C 41 2_12.4	12.4	73	495	4.0	3500	4780	40	500	2.2	3500	6320	
C 41 2_14.2	14.2	63	500	3.5	3500	5060	35	500	1.9	3500	6700	
C 41 2_15.8	15.8	57	500	3.1	3500	5370	32	500	1.7	3500	7000	
C 41 2_17.8	17.8	51	500	2.8	3500	5650	28.1	500	1.5	3500	7000	
C 41 2_19.8	19.8	45	500	2.5	3500	5970	25.3	500	1.4	3500	7000	
C 41 2_22.6	22.6	40	500	2.2	3500	6320	22.1	500	1.2	3500	7000	
C 41 2_25.0	25.0	36	500	2.0	3500	6670	20.0	500	1.1	3500	7000	
C 41 2_28.3	28.3	32	500	1.8	3500	7000	17.7	500	0.97	3500	7000	
C 41 2_31.4	31.4	28.7	500	1.6	3500	7000	15.9	500	0.88	3500	7000	
C 41 2_33.4	33.4	26.9	500	1.5	3500	7000	15.0	500	0.83	3500	7000	
C 41 2_37.1	37.1	24.3	500	1.3	3500	7000	13.5	500	0.74	3500	7000	
C 41 2_44.8	44.8	20.1	500	1.1	3500	7000	11.2	500	0.62	3500	7000	
C 41 3_28.5	28.5	32	600	2.1	3500	6530	17.5	600	1.2	3500	7000	
C 41 3_31.2	31.2	28.8	600	1.9	3500	6870	16.0	600	1.1	3500	7000	
C 41 3_36.8	36.8	24.5	600	1.7	3500	7000	13.6	600	0.92	3500	7000	
C 41 3_40.3	40.3	22.3	600	1.5	3500	7000	12.4	600	0.84	3500	7000	
C 41 3_47.0	47.0	19.1	600	1.3	3500	7000	10.6	600	0.72	3500	7000	
C 41 3_51.5	51.5	17.5	600	1.2	3500	7000	9.7	600	0.66	3500	7000	
C 41 3_58.7	58.7	15.3	600	1.0	3500	7000	8.5	600	0.58	3500	7000	
C 41 3_64.3	64.3	14.0	600	0.95	3500	7000	7.8	600	0.53	3500	7000	
C 41 3_74.4	74.4	12.1	600	0.82	3500	7000	6.7	600	0.45	3500	7000	
C 41 3_81.5	81.5	11.0	600	0.75	3500	7000	6.1	600	0.41	3500	7000	
C 41 3_93.3	93.3	9.6	600	0.65	3500	7000	5.4	600	0.36	3500	7000	
C 41 3_102.3	102.3	8.8	600	0.59	3500	7000	4.9	600	0.33	3500	7000	
C 41 3_110.1	110.1	8.2	600	0.55	3500	7000	4.5	600	0.31	3500	7000	
C 41 3_120.6	120.6	7.5	600	0.50	3500	7000	4.1	600	0.28	3500	7000	
C 41 3_132.9	132.9	6.8	600	0.46	3500	7000	3.8	600	0.25	3500	7000	
C 41 3_145.6	145.6	6.2	600	0.42	3500	7000	3.4	600	0.23	3500	7000	
C 41 3_164.1	164.1	5.5	600	0.37	3500	7000	3.0	600	0.21	3500	7000	
C 41 3_179.9	179.9	5.0	600	0.34	3500	7000	2.8	600	0.19	3500	7000	
C 41 3_190.8	190.8	4.7	600	0.32	3500	7000	2.6	600	0.18	3500	7000	
C 41 3_209.1	209.1	4.3	600	0.29	3500	7000	2.4	600	0.16	3500	7000	
C 41 4_239.9	239.9	3.8	600	0.26	2200	7000	2.1	600	0.14	2200	7000	
C 41 4_263.0	263.0	3.4	600	0.24	2200	7000	1.9	600	0.13	2200	7000	
C 41 4_304.2	304.2	3.0	600	0.20	2200	7000	1.6	600	0.11	2200	7000	
C 41 4_333.4	333.4	2.7	600	0.19	2200	7000	1.5	600	0.10	2200	7000	
C 41 4_381.8	381.8	2.4	600	0.16	2200	7000	1.3	600	0.09	2200	7000	
C 41 4_418.5	418.5	2.2	600	0.15	2200	7000	1.2	600	0.08	2200	7000	
C 41 4_450.2	450.2	2.0	600	0.14	2200	7000	1.1	600	0.08	2200	7000	
C 41 4_493.5	493.5	1.8	600	0.13	2200	7000	1.0	600	0.07	2200	7000	
C 41 4_543.5	543.5	1.7	600	0.11	2200	7000	0.92	600	0.06	2200	7000	
C 41 4_595.8	595.8	1.5	600	0.10	2200	7000	0.84	600	0.06	2200	7000	
C 41 4_671.3	671.3	1.3	600	0.09	2200	7000	0.74	600	0.05	2200	7000	
C 41 4_735.9	735.9	1.2	600	0.08	2200	7000	0.68	600	0.05	2200	7000	
C 41 4_780.4	780.4	1.2	600	0.08	2200	7000	0.64	600	0.04	2200	7000	
C 41 4_855.5	855.5	1.1	600	0.07	2200	7000	0.58	600	0.04	2200	7000	



C 51

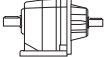
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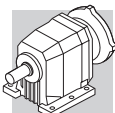
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C 51 2_2.6	2.6	1077	315	37	980	3340	538	400	24	1390	4200	128
C 51 2_3.3	3.3	848	340	32	1070	3610	424	420	19.6	1650	4580	
C 51 2_4.5	4.5	622	370	25	1170	4010	311	435	14.9	2010	5180	
C 51 2_5.6	5.6	500	390	21	1290	4380	250	435	12.0	2400	5760	
C 51 2_7.0	7.0	400	500	22	2270	4760	200	630	13.9	2860	6000	
C 51 2_7.8	7.8	359	510	20	2360	4940	179	640	12.7	2980	6230	
C 51 2_8.8	8.8	318	545	19.1	2300	5120	159	685	12.0	2900	6450	
C 51 2_9.8	9.8	286	545	17.2	2410	5350	143	685	10.8	3030	6750	
C 51 2_11.8	11.8	237	610	16.0	2310	5620	119	770	10.1	2910	7080	
C 51 2_13.1	13.1	214	595	14.0	2440	5930	107	750	8.8	3070	7470	
C 51 2_15.0	15.0	187	660	13.6	2330	6080	93	800	8.2	2980	7770	
C 51 2_16.6	16.6	169	640	11.9	2460	6420	84	795	7.4	3120	8130	
C 51 2_18.9	18.9	148	695	11.3	2330	6630	74	800	6.5	3050	8620	
C 51 2_21.0	21.0	133	675	9.9	2460	7000	67	795	5.8	3180	9020	
C 51 2_23.4	23.4	120	735	9.7	2320	7160	60	800	5.3	3110	9460	
C 51 2_25.9	25.9	108	715	8.5	2460	7550	54	795	4.7	3230	9890	
C 51 2_29.8	29.8	94	795	8.2	2310	7770	47	800	4.1	3180	10000	
C 51 2_33.0	33.0	85	775	7.2	2440	8190	42	795	3.7	3300	10000	
C 51 2_36.4	36.4	77	750	6.4	2390	8660	38	790	3.3	3220	10000	
C 51 2_40.4	40.4	69	795	6.1	2440	8870	35	795	3.0	3320	10000	
C 51 2_43.1	43.1	65	730	5.2	2450	9380	32	770	2.8	3280	10000	
C 51 2_47.8	47.8	59	800	5.2	2460	9530	29.3	800	2.6	3350	10000	
C 51 2_51.4	51.4	54	665	4.0	2550	10000	27.2	700	2.1	3390	10000	
C 51 2_57.0	57.0	49	745	4.0	2540	10000	24.6	785	2.1	3380	10000	
C 51 3_21.8	21.8	128	720	10.4	2870	6940	64	905	6.5	3500	8750	
C 51 3_23.9	23.9	117	730	9.6	2910	7230	59	920	6.1	3500	9110	
C 51 3_27.4	27.4	102	770	8.9	2890	7510	51	970	5.6	3500	9470	
C 51 3_30.1	30.1	93	780	8.2	2930	7830	47	1000	5.2	3500	9810	
C 51 3_37.0	37.0	76	840	7.2	2910	8330	38	1000	4.3	3500	10000	
C 51 3_40.5	40.5	69	855	6.7	2940	8670	35	1000	3.9	3500	10000	
C 51 3_46.7	46.7	60	905	6.1	2920	9020	30	1000	3.4	3500	10000	
C 51 3_51.2	51.2	55	920	5.7	2950	9390	27.3	1000	3.1	3500	10000	
C 51 3_59.0	59.0	47	970	5.2	2910	9780	23.7	1000	2.7	3500	10000	
C 51 3_64.6	64.6	43	1000	4.9	2940	10000	21.7	1000	2.4	3500	10000	
C 51 3_72.9	72.9	38	1000	4.3	2920	10000	19.2	1000	2.2	3500	10000	
C 51 3_79.9	79.9	35	1000	3.9	2960	10000	17.5	1000	2.0	3500	10000	
C 51 3_93.0	93.0	30	1000	3.4	2950	10000	15.1	1000	1.7	3500	10000	
C 51 3_101.8	101.8	27.5	1000	3.1	2990	10000	13.8	1000	1.5	3500	10000	
C 51 3_113.6	113.6	24.6	1000	2.8	2960	10000	12.3	1000	1.4	3500	10000	
C 51 3_124.4	124.4	22.5	1000	2.5	3000	10000	11.3	1000	1.3	3500	10000	
C 51 3_134.6	134.6	20.8	1000	2.3	2970	10000	10.4	1000	1.2	3500	10000	
C 51 3_147.4	147.4	19.0	1000	2.1	3010	10000	9.5	1000	1.1	3500	10000	
C 51 3_160.5	160.5	17.4	1000	2.0	2980	10000	8.7	1000	0.98	3500	10000	
C 51 3_175.8	175.8	15.9	1000	1.8	3020	10000	8.0	1000	0.90	3500	10000	
C 51 3_197.9	197.9	14.1	1000	1.6	2980	10000	7.1	1000	0.80	3500	10000	
C 51 3_216.7	216.7	12.9	1000	1.5	3020	10000	6.5	1000	0.73	3500	10000	
C 51 4_240.9	240.9	11.6	1000	1.3	2100	10000	5.8	1000	0.67	2200	10000	
C 51 4_263.8	263.8	10.6	1000	1.2	2120	10000	5.3	1000	0.61	2200	10000	
C 51 4_297.8	297.8	9.4	1000	1.1	2140	10000	4.7	1000	0.54	2200	10000	
C 51 4_326.1	326.1	8.6	1000	0.99	2160	10000	4.3	1000	0.49	2200	10000	
C 51 4_379.6	379.6	7.4	1000	0.85	2190	10000	3.7	1000	0.42	2200	10000	
C 51 4_415.7	415.7	6.7	1000	0.78	2200	10000	3.4	1000	0.39	2200	10000	
C 51 4_463.9	463.9	6.0	1000	0.69	2200	10000	3.0	1000	0.35	2200	10000	
C 51 4_508.0	508.0	5.5	1000	0.63	2200	10000	2.8	1000	0.32	2200	10000	
C 51 4_549.7	549.7	5.1	1000	0.59	2200	10000	2.5	1000	0.29	2200	10000	
C 51 4_602.0	602.0	4.7	1000	0.54	2200	10000	2.3	1000	0.27	2200	10000	
C 51 4_655.4	655.4	4.3	1000	0.49	2200	10000	2.1	1000	0.25	2200	10000	
C 51 4_717.7	717.7	3.9	1000	0.45	2200	10000	2.0	1000	0.22	2200	10000	
C 51 4_808.0	808.0	3.5	1000	0.40	2200	10000	1.7	1000	0.20	2200	10000	
C 51 4_884.9	884.9	3.2	1000	0.36	2200	10000	1.6	1000	0.18	2200	10000	



C 51

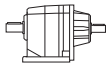
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	i	n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 51 2_2.6	2.6	346	400	15.3	2560	5130	192	400	8.5	3500	6620	128
C 51 2_3.3	3.3	273	420	12.6	2710	5590	152	420	7.0	3500	7200	
C 51 2_4.5	4.5	200	435	9.6	2900	6300	111	435	5.3	3500	8070	
C 51 2_5.6	5.6	161	435	7.7	3080	6970	89	435	4.3	3500	8880	
C 51 2_7.0	7.0	129	730	10.3	3310	6950	71	800	6.3	3500	8760	
C 51 2_7.8	7.8	115	740	9.4	3460	7220	64	800	5.7	3500	9140	
C 51 2_8.8	8.8	102	795	9.0	3360	7470	57	800	5.0	3500	9680	
C 51 2_9.8	9.8	92	800	8.1	3500	7790	51	800	4.5	3500	10000	
C 51 2_11.8	11.8	76	800	6.7	3500	8530	42	800	3.7	3500	10000	
C 51 2_13.1	13.1	69	800	6.1	3500	8900	38	800	3.4	3500	10000	
C 51 2_15.0	15.0	60	800	5.3	3500	9450	33	800	2.9	3500	10000	
C 51 2_16.6	16.6	54	800	4.8	3500	9850	30	800	2.7	3500	10000	
C 51 2_18.9	18.9	48	800	4.2	3500	10000	26.5	800	2.3	3500	10000	
C 51 2_21.0	21.0	43	800	3.8	3500	10000	23.8	800	2.1	3500	10000	
C 51 2_23.4	23.4	38	800	3.4	3500	10000	21.4	800	1.9	3500	10000	
C 51 2_25.9	25.9	35	800	3.1	3500	10000	19.3	800	1.7	3500	10000	
C 51 2_29.8	29.8	30	800	2.7	3500	10000	16.8	800	1.5	3500	10000	
C 51 2_33.0	33.0	27.3	800	2.4	3500	10000	15.2	800	1.3	3500	10000	
C 51 2_36.4	36.4	24.7	800	2.2	3500	10000	13.7	800	1.2	3500	10000	
C 51 2_40.4	40.4	22.3	800	2.0	3500	10000	12.4	800	1.1	3500	10000	
C 51 2_43.1	43.1	20.9	800	1.8	3500	10000	11.6	800	1.0	3500	10000	
C 51 2_47.8	47.8	18.8	800	1.7	3500	10000	10.5	800	0.92	3500	10000	
C 51 2_51.4	51.4	17.5	725	1.4	3500	10000	9.7	755	0.81	3500	10000	
C 51 2_57.0	57.0	15.8	795	1.4	3500	10000	8.8	795	0.77	3500	10000	
C 51 3_21.8	21.8	41	1000	4.6	3500	10000	22.9	1000	2.6	3500	10000	
C 51 3_23.9	23.9	38	1000	4.2	3500	10000	20.9	1000	2.4	3500	10000	
C 51 3_27.4	27.4	33	1000	3.7	3500	10000	18.2	1000	2.1	3500	10000	
C 51 3_30.1	30.1	29.9	1000	3.4	3500	10000	16.6	1000	1.9	3500	10000	
C 51 3_37.0	37.0	24.3	1000	2.7	3500	10000	13.5	1000	1.5	3500	10000	
C 51 3_40.5	40.5	22.2	1000	2.5	3500	10000	12.3	1000	1.4	3500	10000	
C 51 3_46.7	46.7	19.3	1000	2.2	3500	10000	10.7	1000	1.2	3500	10000	
C 51 3_51.2	51.2	17.6	1000	2.0	3500	10000	9.8	1000	1.1	3500	10000	
C 51 3_59.0	59.0	15.3	1000	1.7	3500	10000	8.5	1000	0.95	3500	10000	
C 51 3_64.6	64.6	13.9	1000	1.6	3500	10000	7.7	1000	0.87	3500	10000	
C 51 3_72.9	72.9	12.3	1000	1.4	3500	10000	6.9	1000	0.77	3500	10000	
C 51 3_79.9	79.9	11.3	1000	1.3	3500	10000	6.3	1000	0.70	3500	10000	
C 51 3_93.0	93.0	9.7	1000	1.1	3500	10000	5.4	1000	0.61	3500	10000	
C 51 3_101.8	101.8	8.8	1000	1.0	3500	10000	4.9	1000	0.55	3500	10000	
C 51 3_113.6	113.6	7.9	1000	0.89	3500	10000	4.4	1000	0.50	3500	10000	
C 51 3_124.4	124.4	7.2	1000	0.81	3500	10000	4.0	1000	0.45	3500	10000	
C 51 3_134.6	134.6	6.7	1000	0.75	3500	10000	3.7	1000	0.42	3500	10000	
C 51 3_147.4	147.4	6.1	1000	0.69	3500	10000	3.4	1000	0.38	3500	10000	
C 51 3_160.5	160.5	5.6	1000	0.63	3500	10000	3.1	1000	0.35	3500	10000	
C 51 3_175.8	175.8	5.1	1000	0.58	3500	10000	2.8	1000	0.32	3500	10000	
C 51 3_197.9	197.9	4.5	1000	0.51	3500	10000	2.5	1000	0.28	3500	10000	
C 51 3_216.7	216.7	4.2	1000	0.47	3500	10000	2.3	1000	0.26	3500	10000	
C 51 4_240.9	240.9	3.7	1000	0.43	2200	10000	2.1	1000	0.24	2200	10000	
C 51 4_263.8	263.8	3.4	1000	0.39	2200	10000	1.9	1000	0.22	2200	10000	
C 51 4_297.8	297.8	3.0	1000	0.35	2200	10000	1.7	1000	0.19	2200	10000	
C 51 4_326.1	326.1	2.8	1000	0.32	2200	10000	1.5	1000	0.18	2200	10000	
C 51 4_379.6	379.6	2.4	1000	0.27	2200	10000	1.3	1000	0.15	2200	10000	
C 51 4_415.7	415.7	2.2	1000	0.25	2200	10000	1.2	1000	0.14	2200	10000	
C 51 4_463.9	463.9	1.9	1000	0.22	2200	10000	1.1	1000	0.12	2200	10000	
C 51 4_508.0	508.0	1.8	1000	0.20	2200	10000	1.0	1000	0.11	2200	10000	
C 51 4_549.7	549.7	1.6	1000	0.19	2200	10000	0.91	1000	0.10	2200	10000	
C 51 4_602.0	602.0	1.5	1000	0.17	2200	10000	0.83	1000	0.10	2200	10000	
C 51 4_655.4	655.4	1.4	1000	0.16	2200	10000	0.76	1000	0.09	2200	10000	
C 51 4_717.7	717.7	1.3	1000	0.14	2200	10000	0.70	1000	0.08	2200	10000	
C 51 4_808.0	808.0	1.1	1000	0.13	2200	10000	0.62	1000	0.07	2200	10000	
C 51 4_884.9	884.9	1.0	1000	0.12	2200	10000	0.57	1000	0.07	2200	10000	

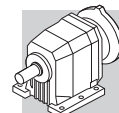


C 61

1600 Nm

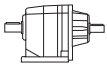
	i	n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 61 2_2.8	2.8	1000	445	49	—	4670	500	550	30	770	5930	131
C 61 2_3.7	3.7	757	530	44	—	4950	378	575	24	1730	6600	
C 61 2_4.6	4.6	609	575	39	—	5280	304	600	20	2150	7130	
C 61 2_6.0	6.0	467	575	30	—	6000	233	625	16.1	2700	7950	
C 61 2_6.7	6.7	418	900	41	2230	5600	209	1130	26	2850	7060	
C 61 2_7.5	7.5	373	1000	41	2220	5620	187	1250	26	2900	7110	
C 61 2_8.8	8.8	318	1000	35	2290	6080	159	1250	22	2980	7690	
C 61 2_9.8	9.8	286	1100	35	2380	6140	143	1350	21	3330	7850	
C 61 2_10.9	10.9	257	1050	30	2530	6590	128	1350	19.1	2940	8210	
C 61 2_12.1	12.1	231	1150	29	2670	6670	116	1350	17.2	3600	8730	
C 61 2_14.3	14.3	196	1150	25	2450	7220	98	1350	14.6	3590	9430	
C 61 2_15.9	15.9	176	1250	24	2660	7350	88	1350	13.1	3780	9990	
C 61 2_17.7	17.7	158	1200	21	2540	7850	79	1350	11.8	3700	10400	
C 61 2_19.6	19.6	143	1300	20	2780	8000	71	1350	10.6	3890	11000	
C 61 2_22.4	22.4	125	1250	17.2	2630	8650	63	1350	9.3	3810	11600	
C 61 2_24.8	24.8	113	1350	16.8	2840	8840	56	1350	8.4	3980	12300	
C 61 2_27.4	27.4	102	1300	14.6	2600	9390	51	1350	7.6	3880	12800	
C 61 2_30.4	30.4	92	1350	13.7	2900	9770	46	1350	6.9	4050	13500	
C 61 2_34.2	34.2	82	1165	10.5	3020	10900	41	1225	5.5	4090	14500	
C 61 2_38.0	38.0	74	1280	10.4	3030	11100	37	1350	5.5	4100	14800	
C 61 3_26.8	26.8	104	1140	13.4	3740	9810	52	1435	8.4	4700	12400	
C 61 3_29.4	29.4	95	1160	12.4	3780	10200	48	1465	7.9	4700	12900	
C 61 3_33.0	33.0	85	1210	11.6	3750	10600	42	1525	7.3	4700	13300	
C 61 3_36.1	36.1	78	1235	10.8	3800	11000	39	1555	6.8	4700	13800	
C 61 3_43.4	43.4	65	1315	9.6	3760	11600	32	1600	5.8	4700	14800	
C 61 3_47.6	47.6	59	1340	8.9	3810	12100	29.4	1600	5.3	4700	15500	
C 61 3_53.5	53.5	52	1400	8.2	3760	12500	26.2	1600	4.7	4700	16000	
C 61 3_58.6	58.6	48	1430	7.7	3810	13000	23.9	1600	4.3	4700	16000	
C 61 3_67.7	67.7	41	1505	7.0	3750	13500	20.7	1600	3.7	4700	16000	
C 61 3_74.2	74.2	38	1535	6.5	3800	14100	18.9	1600	3.4	4700	16000	
C 61 3_83.0	83.0	34	1600	6.1	3740	14500	16.9	1600	3.0	4700	16000	
C 61 3_91.0	91.0	31	1600	5.5	3800	15200	15.4	1600	2.8	4700	16000	
C 61 3_103.6	103.6	27.0	1600	4.9	3760	16000	13.5	1600	2.4	4700	16000	
C 61 3_113.6	113.6	24.6	1600	4.4	3820	16000	12.3	1600	2.2	4700	16000	
C 61 3_128.1	128.1	21.9	1600	3.9	3790	16000	10.9	1600	2.0	4700	16000	
C 61 3_140.5	140.5	19.9	1600	3.6	3840	16000	10.0	1600	1.8	4700	16000	
C 61 3_150	150.0	18.7	1600	3.4	3800	16000	9.3	1600	1.7	4700	16000	
C 61 3_164.5	164.5	17.0	1600	3.1	3850	16000	8.5	1600	1.5	4700	16000	
C 61 3_178.6	178.6	15.7	1600	2.8	3800	16000	7.8	1600	1.4	4700	16000	
C 61 3_195.8	195.8	14.3	1600	2.6	3860	16000	7.2	1600	1.3	4700	16000	
C 61 4_217.4	217.4	12.9	1600	2.4	3020	16000	6.4	1600	1.2	3500	16000	
C 61 4_238.3	238.3	11.7	1600	2.2	3060	16000	5.9	1600	1.1	3500	16000	
C 61 4_275.3	275.3	10.2	1600	1.9	3100	16000	5.1	1600	0.94	3500	16000	
C 61 4_301.7	301.7	9.3	1600	1.7	3130	16000	4.6	1600	0.85	3500	16000	
C 61 4_337.7	337.7	8.3	1600	1.5	3160	16000	4.1	1600	0.76	3500	16000	
C 61 4_370.1	370.1	7.6	1600	1.4	3180	16000	3.8	1600	0.70	3500	16000	
C 61 4_421.5	421.5	6.6	1600	1.2	3200	16000	3.3	1600	0.61	3500	16000	
C 61 4_462.0	462.0	6.1	1600	1.1	3220	16000	3.0	1600	0.56	3500	16000	
C 61 4_521.1	521.1	5.4	1600	0.99	3240	16000	2.7	1600	0.49	3500	16000	
C 61 4_571.2	571.2	4.9	1600	0.90	3250	16000	2.5	1600	0.45	3500	16000	
C 61 4_610.1	610.1	4.6	1600	0.84	3260	16000	2.3	1600	0.42	3500	16000	
C 61 4_668.8	668.8	4.2	1600	0.77	3280	16000	2.1	1600	0.39	3500	16000	
C 61 4_726.3	726.3	3.9	1600	0.71	3290	16000	1.9	1600	0.35	3500	16000	
C 61 4_796.1	796.1	3.5	1600	0.65	3300	16000	1.8	1600	0.32	3500	16000	

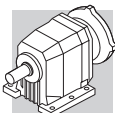
(—) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (—) Contact our technical service department advising radial load data (rotation direction, orientation, position)
 (—) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst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



C 61

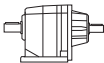
1600 Nm

	i	n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 61 2_2.8	2.8	321	565	20	2840	7150	179	665	13.1	4050	8790	131
C 61 2_3.7	3.7	243	625	16.8	3000	7800	135	665	9.9	4700	9860	
C 61 2_4.6	4.6	196	665	14.3	3170	8380	109	665	8.0	4700	10760	
C 61 2_6.0	6.0	150	665	11.0	4120	9440	83	665	6.1	4700	12000	
C 61 2_6.7	6.7	134	1350	20	2850	8050	75	1350	11.1	4700	10800	
C 61 2_7.5	7.5	120	1350	17.9	4010	8560	67	1350	9.9	4700	11400	
C 61 2_8.8	8.8	102	1350	15.2	4070	9240	57	1350	8.5	4700	12200	
C 61 2_9.8	9.8	92	1350	13.7	4310	9790	51	1350	7.6	4700	12900	
C 61 2_10.9	10.9	83	1350	12.3	4270	10200	46	1350	6.8	4700	13400	
C 61 2_12.1	12.1	74	1350	11.1	4480	10800	41	1350	6.1	4700	14100	
C 61 2_14.3	14.3	63	1350	9.4	4470	11600	35	1350	5.2	4700	15100	
C 61 2_15.9	15.9	57	1350	8.4	4660	12300	31	1350	4.7	4700	15900	
C 61 2_17.7	17.7	51	1350	7.6	4580	12800	28.2	1350	4.2	4700	16000	
C 61 2_19.6	19.6	46	1350	6.8	4700	13500	25.5	1350	3.8	4700	16000	
C 61 2_22.4	22.4	40	1350	6.0	4690	14200	22.3	1350	3.3	4700	16000	
C 61 2_24.8	24.8	36	1350	5.4	4700	14900	20.2	1350	3.0	4700	16000	
C 61 2_27.4	27.4	33	1350	4.9	4700	15500	18.2	1350	2.7	4700	16000	
C 61 2_30.4	30.4	29.6	1350	4.4	4700	16000	16.4	1350	2.4	4700	16000	
C 61 2_34.2	34.2	26.3	1265	3.7	4700	16000	14.6	1325	2.1	4700	16000	
C 61 2_38.0	38.0	23.7	1350	3.5	4700	16000	13.2	1350	2.0	4700	16000	
C 61 3_26.8	26.8	34	1600	6.0	4700	14500	18.7	1600	3.4	4700	16000	
C 61 3_29.4	29.4	31	1600	5.5	4700	15200	17.0	1600	3.1	4700	16000	
C 61 3_33.0	33.0	27.3	1600	4.9	4700	15900	15.2	1600	2.7	4700	16000	
C 61 3_36.1	36.1	24.9	1600	4.5	4700	16000	13.9	1600	2.5	4700	16000	
C 61 3_43.4	43.4	20.7	1600	3.7	4700	16000	11.5	1600	2.1	4700	16000	
C 61 3_47.6	47.6	18.9	1600	3.4	4700	16000	10.5	1600	1.9	4700	16000	
C 61 3_53.5	53.5	16.8	1600	3.0	4700	16000	9.3	1600	1.7	4700	16000	
C 61 3_58.6	58.6	15.4	1600	2.8	4700	16000	8.5	1600	1.5	4700	16000	
C 61 3_67.7	67.7	13.3	1600	2.4	4700	16000	7.4	1600	1.3	4700	16000	
C 61 3_74.2	74.2	12.1	1600	2.2	4700	16000	6.7	1600	1.2	4700	16000	
C 61 3_83.0	83.0	10.8	1600	2.0	4700	16000	6.0	1600	1.1	4700	16000	
C 61 3_91.0	91.0	9.9	1600	1.8	4700	16000	5.5	1600	0.99	4700	16000	
C 61 3_103.6	103.6	8.7	1600	1.6	4700	16000	4.8	1600	0.87	4700	16000	
C 61 3_113.6	113.6	7.9	1600	1.4	4700	16000	4.4	1600	0.79	4700	16000	
C 61 3_128.1	128.1	7.0	1600	1.3	4700	16000	3.9	1600	0.70	4700	16000	
C 61 3_140.5	140.5	6.4	1600	1.2	4700	16000	3.6	1600	0.64	4700	16000	
C 61 3_150	150.0	6.0	1600	1.1	4700	16000	3.3	1600	0.60	4700	16000	
C 61 3_164.5	164.5	5.5	1600	0.99	4700	16000	3.0	1600	0.55	4700	16000	
C 61 3_178.6	178.6	5.0	1600	0.91	4700	16000	2.8	1600	0.50	4700	16000	
C 61 3_195.8	195.8	4.6	1600	0.83	4700	16000	2.6	1600	0.46	4700	16000	
C 61 4_217.4	217.4	4.1	1600	0.76	3500	16000	2.3	1600	0.42	3500	16000	
C 61 4_238.3	238.3	3.8	1600	0.70	3500	16000	2.1	1600	0.39	3500	16000	
C 61 4_275.3	275.3	3.3	1600	0.60	3500	16000	1.8	1600	0.33	3500	16000	
C 61 4_301.7	301.7	3.0	1600	0.55	3500	16000	1.7	1600	0.31	3500	16000	
C 61 4_337.7	337.7	2.7	1600	0.49	3500	16000	1.5	1600	0.27	3500	16000	
C 61 4_370.1	370.1	2.4	1600	0.45	3500	16000	1.4	1600	0.25	3500	16000	
C 61 4_421.5	421.5	2.1	1600	0.39	3500	16000	1.2	1600	0.22	3500	16000	
C 61 4_462.0	462.0	1.9	1600	0.36	3500	16000	1.1	1600	0.20	3500	16000	
C 61 4_521.1	521.1	1.7	1600	0.32	3500	16000	1.0	1600	0.18	3500	16000	
C 61 4_571.2	571.2	1.6	1600	0.29	3500	16000	0.88	1600	0.16	3500	16000	
C 61 4_610.1	610.1	1.5	1600	0.27	3500	16000	0.82	1600	0.15	3500	16000	
C 61 4_668.8	668.8	1.3	1600	0.25	3500	16000	0.75	1600	0.14	3500	16000	
C 61 4_726.3	726.3	1.2	1600	0.23	3500	16000	0.69	1600	0.13	3500	16000	
C 61 4_796.1	796.1	1.1	1600	0.21	3500	16000	0.63	1600	0.12	3500	16000	

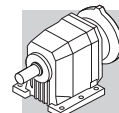


C 70

2300 Nm

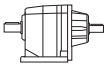
	i	n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 70 2_4.6	4.6	613	1400	95	—	5590	306	1700	57	—	7100	134
C 70 2_5.9	5.9	479	1550	82	—	5610	239	1900	50	—	6990	
C 70 2_6.3	6.3	448	1600	79	1980	6570	224	1950	48	2630	8250	
C 70 2_7.5	7.5	375	1550	64	—	7130	188	1950	40	—	8400	
C 70 2_8.0	8.0	350	1750	68	1760	6840	175	2100	41	2670	8880	
C 70 2_9.5	9.5	294	1600	52	770	8260	147	2000	32	620	9910	
C 70 2_10.2	10.2	274	1900	57	2000	7200	137	2100	32	4470	10800	
C 70 2_11.2	11.2	250	1600	44	1130	9350	125	2000	28	1070	11300	
C 70 2_13.0	13.0	215	2050	49	1860	7700	107	2100	25	5600	12900	
C 70 2_14.1	14.1	199	1700	37	1100	10100	99	2100	23	1280	12400	
C 70 2_15.3	15.3	183	2100	42	1810	8540	91	2100	21	5860	14300	
C 70 2_16.7	16.7	168	1700	31	1570	11400	84	2050	18.9	2350	14300	
C 70 2_19.3	19.3	145	2100	34	2730	10400	73	2100	16.8	6000	16300	
C 70 2_22.9	22.9	123	2100	28	3160	11800	61	2100	14.2	6060	18000	
C 70 2_27.7	27.7	101	2100	23	3570	13400	51	2100	11.7	6120	19900	
C 70 2_34.7	34.7	81	2100	18.7	3960	15400	40	2100	9.3	6180	22200	
C 70 3_41.3	41.3	68	1900	14.5	5670	18400	34	2300	8.8	7000	22800	
C 70 3_44.7	44.7	63	1900	13.4	5700	19100	31	2300	8.1	7000	23800	
C 70 3_52.2	52.2	54	2050	12.4	5680	19600	26.8	2300	7.0	7000	25000	
C 70 3_56.5	56.5	50	2050	11.4	5710	20400	24.8	2300	6.4	7000	25000	
C 70 3_65.9	65.9	43	2200	10.5	5670	21000	21.3	2300	5.5	7000	25000	
C 70 3_71.3	71.3	39	2200	9.7	5710	21900	19.6	2300	5.1	7000	25000	
C 70 3_81.4	81.4	34	2300	8.9	5680	22700	17.2	2300	4.5	7000	25000	
C 70 3_88.2	88.2	32	2300	8.2	5710	23600	15.9	2300	4.1	7000	25000	
C 70 3_103.8	103.8	27.0	2300	7.0	5700	25000	13.5	2300	3.5	7000	25000	
C 70 3_112.4	112.4	24.9	2300	6.4	5740	25000	12.5	2300	3.2	7000	25000	
C 70 3_126.8	126.8	22.1	2300	5.7	5720	25000	11.0	2300	2.9	7000	25000	
C 70 3_137.4	137.4	20.4	2300	5.3	5750	25000	10.2	2300	2.6	7000	25000	
C 70 3_150.3	150.3	18.6	2300	4.8	5730	25000	9.3	2300	2.4	7000	25000	
C 70 3_162.8	162.8	17.2	2300	4.5	5760	25000	8.6	2300	2.2	7000	25000	
C 70 3_179.2	179.2	15.6	2300	4.0	5740	25000	7.8	2300	2.0	7000	25000	
C 70 3_194.1	194.1	14.4	2300	3.7	5770	25000	7.2	2300	1.9	7000	25000	
C 70 3_220.9	220.9	12.7	2250	3.2	5750	25000	6.3	2250	1.6	7000	25000	
C 70 3_239.3	239.3	11.7	2300	3.0	5770	25000	5.8	2300	1.5	7000	25000	
C 70 4_251.3	251.3	11.1	2300	2.9	2000	25000	5.6	2300	1.5	2620	25000	
C 70 4_272.2	272.2	10.3	2300	2.7	2030	25000	5.1	2300	1.4	2650	25000	
C 70 4_317.9	317.9	8.8	2300	2.3	2030	25000	4.4	2300	1.2	2650	25000	
C 70 4_344.3	344.3	8.1	2300	2.2	2050	25000	4.1	2300	1.1	2670	25000	
C 70 4_409.4	409.4	6.8	2300	1.8	2050	25000	3.4	2300	0.90	2670	25000	
C 70 4_443.5	443.5	6.3	2300	1.7	2070	25000	3.2	2300	0.80	2700	25000	
C 70 4_512.0	512.0	5.5	2300	1.4	2070	25000	2.7	2300	0.70	2680	25000	
C 70 4_554.7	554.7	5.0	2300	1.3	2090	25000	2.5	2300	0.70	2710	25000	
C 70 4_606.8	606.8	4.6	2300	1.2	2080	25000	2.3	2300	0.60	2700	25000	
C 70 4_657.3	657.3	4.3	2300	1.1	2100	25000	2.1	2300	0.60	2720	25000	
C 70 4_736.0	736.0	3.8	2300	1.0	2090	25000	1.9	2300	0.50	2700	25000	
C 70 4_797.3	797.3	3.5	2300	0.90	2110	25000	1.8	2300	0.50	2720	25000	
C 70 4_922.6	922.6	3.0	2300	0.80	2100	25000	1.5	2300	0.40	2710	25000	
C 70 4_999.5	999.5	2.8	2300	0.70	2110	25000	1.4	2300	0.40	2730	25000	
C 70 4_1069	1069	2.6	2300	0.70	2100	25000	1.3	2300	0.30	2720	25000	
C 70 4_1158	1158	2.4	2300	0.60	2100	25000	1.2	2300	0.30	2800	25000	
C 70 4_1362	1362	2.1	2300	0.50	2100	25000	1.0	2300	0.30	2800	25000	
C 70 4_1476	1476	1.9	2300	0.50	2100	25000	0.90	2300	0.30	2800	25000	

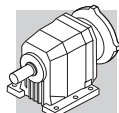
(—) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)
 (—) Contact our technical service department advising radial load data (rotation direction, orientation, position)
 (—) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst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



C 70

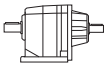
2300 Nm

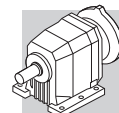
	i	n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 70 2_4.6	4.6	197	1800	39	650	9360	109	1800	22	5500	13900	134
C 70 2_5.9	5.9	154	1950	33	560	9980	85	2150	20	2890	13400	
C 70 2_6.3	6.3	144	2100	33	4260	10400	80	2100	18.5	7000	15500	
C 70 2_7.5	7.5	121	2100	28	1120	10800	67	2150	15.9	5400	15600	
C 70 2_8.0	8.0	113	2100	26	5800	12500	63	2100	14.5	7000	17800	
C 70 2_9.5	9.5	95	2150	22	2140	12400	53	2150	12.4	6990	18100	
C 70 2_10.2	10.2	88	2100	20	6870	14600	49	2100	11.3	7000	20200	
C 70 2_11.2	11.2	80	2150	19.0	2620	14000	45	2150	10.6	7000	19800	
C 70 2_13.0	13.0	69	2100	16.0	7000	16900	38	2100	8.9	7000	22800	
C 70 2_14.1	14.1	64	2150	15.1	3900	16000	35	2150	8.4	7000	22300	
C 70 2_15.3	15.3	59	2100	13.6	7000	18400	33	2100	7.5	7000	24600	
C 70 2_16.7	16.7	54	2050	12.2	5470	18500	29.9	2050	6.8	7000	25000	
C 70 2_19.3	19.3	47	2100	10.8	7000	20700	25.9	2100	6.0	7000	25000	
C 70 2_22.9	22.9	39	2100	9.1	7000	22500	21.9	2100	5.1	7000	25000	
C 70 2_27.7	27.7	32	2100	7.5	7000	24600	18.0	2100	4.2	7000	25000	
C 70 2_34.7	34.7	25.9	2100	6.0	7000	25000	14.4	2100	3.3	7000	25000	
C 70 3_41.3	41.3	21.8	2300	5.6	7000	25000	12.1	2300	3.1	7000	25000	
C 70 3_44.7	44.7	20.1	2300	5.2	7000	25000	11.2	2300	2.9	7000	25000	
C 70 3_52.2	52.2	17.3	2300	4.5	7000	25000	9.6	2300	2.5	7000	25000	
C 70 3_56.5	56.5	15.9	2300	4.1	7000	25000	8.8	2300	2.3	7000	25000	
C 70 3_65.9	65.9	13.7	2300	3.5	7000	25000	7.6	2300	2.0	7000	25000	
C 70 3_71.3	71.3	12.6	2300	3.3	7000	25000	7.0	2300	1.8	7000	25000	
C 70 3_81.4	81.4	11.1	2300	2.9	7000	25000	6.1	2300	1.6	7000	25000	
C 70 3_88.2	88.2	10.2	2300	2.6	7000	25000	5.7	2300	1.5	7000	25000	
C 70 3_103.8	103.8	8.7	2300	2.2	7000	25000	4.8	2300	1.2	7000	25000	
C 70 3_112.4	112.4	8.0	2300	2.1	7000	25000	4.4	2300	1.2	7000	25000	
C 70 3_126.8	126.8	7.1	2300	1.8	7000	25000	3.9	2300	1.0	7000	25000	
C 70 3_137.4	137.4	6.6	2300	1.7	7000	25000	3.6	2300	0.90	7000	25000	
C 70 3_150.3	150.3	6.0	2300	1.6	7000	25000	3.3	2300	0.90	7000	25000	
C 70 3_162.8	162.8	5.5	2300	1.4	7000	25000	3.1	2300	0.80	7000	25000	
C 70 3_179.2	179.2	5.0	2300	1.3	7000	25000	2.8	2300	0.70	7000	25000	
C 70 3_194.1	194.1	4.6	2300	1.2	7000	25000	2.6	2300	0.70	7000	25000	
C 70 3_220.9	220.9	4.1	2250	1.0	7000	25000	2.3	2250	0.60	7000	25000	
C 70 3_239.3	239.3	3.8	2300	1.0	7000	25000	2.1	2300	0.50	7000	25000	
C 70 4_251.3	251.3	3.6	2300	0.90	2000	25000	2.0	2300	0.50	2620	25000	
C 70 4_272.2	272.2	3.3	2300	0.90	2030	25000	1.8	2300	0.50	2650	25000	
C 70 4_317.9	317.9	2.8	2300	0.70	2030	25000	1.6	2300	0.40	2650	25000	
C 70 4_344.3	344.3	2.6	2300	0.70	2050	25000	1.5	2300	0.40	2670	25000	
C 70 4_409.4	409.4	2.2	2300	0.60	2050	25000	1.2	2300	0.30	2670	25000	
C 70 4_443.5	443.5	2.0	2300	0.50	2070	25000	1.1	2300	0.30	2700	25000	
C 70 4_512.0	512.0	1.8	2300	0.50	2070	25000	1.0	2300	0.30	2680	25000	
C 70 4_554.7	554.7	1.6	2300	0.40	2090	25000	0.90	2300	0.20	2710	25000	
C 70 4_606.8	606.8	1.5	2300	0.40	2080	25000	0.80	2300	0.20	2700	25000	
C 70 4_657.3	657.3	1.4	2300	0.40	2100	25000	0.80	2300	0.20	2720	25000	
C 70 4_736.0	736.0	1.2	2300	0.30	2090	25000	0.70	2300	0.20	2700	25000	
C 70 4_797.3	797.3	1.1	2300	0.30	2110	25000	0.60	2300	0.20	2720	25000	
C 70 4_922.6	922.6	1.0	2300	0.30	2100	25000	0.50	2300	0.10	2710	25000	
C 70 4_999.5	999.5	0.90	2300	0.20	2110	25000	0.50	2300	0.10	2730	25000	
C 70 4_1069	1069	0.80	2300	0.20	2100	25000	0.50	2300	0.10	2720	25000	
C 70 4_1158	1158	0.80	2300	0.20	2100	25000	0.40	2300	0.10	2800	25000	
C 70 4_1362	1362	0.70	2300	0.20	2100	25000	0.40	2300	0.10	2800	25000	
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C 80

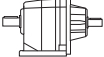
4000 Nm

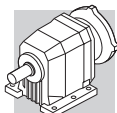
	i	n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
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C 80 2_6.1	6.1	458	2450	124	890	11000	229	3150	80	1380	12700	
C 80 2_7.0	7.0	398	2650	116	350	11000	199	3350	73	910	12900	
C 80 2_7.6	7.6	367	2700	109	890	11300	183	3400	69	1600	13300	
C 80 2_8.9	8.9	316	2800	98	420	12100	158	3500	61	1120	14500	
C 80 2_9.6	9.6	292	3000	96	520	11300	146	3700	59	1380	13900	
C 80 2_11.1	11.1	252	2800	78	1110	14200	126	3500	49	1950	17100	
C 80 2_12.0	12.0	233	3000	77	1200	13500	116	3700	48	2190	16600	
C 80 2_13.8	13.8	203	2800	63	1420	16400	102	3500	39	2330	19800	
C 80 2_14.9	14.9	188	3000	62	1510	15800	94	3700	38	2560	19300	
C 80 2_16.7	16.7	168	2800	52	1840	18500	84	3500	32	2840	22300	
C 80 2_18.1	18.1	155	3000	50	1930	17900	78	3700	32	3060	22000	
C 80 2_20.5	20.5	136	2850	43	2000	20500	68	3550	27	3060	24800	
C 80 2_22.2	22.2	126	3000	42	2210	20300	63	3700	26	3400	24900	
C 80 2_24.0	24.0	117	2850	37	2090	22400	58	3550	23	3180	27000	
C 80 2_25.9	25.9	108	3000	36	2300	22300	54	3700	22	3510	27200	
C 80 2_31.3	31.3	89	3000	30	2480	24700	45	3700	18.2	3730	30000	
C 80 2_39.1	39.1	72	2500	19.7	3820	31000	36	3200	12.6	5060	35000	
C 80 3_43.5	43.5	64	3100	23	5610	28700	32	3800	13.8	7000	34800	
C 80 3_47.4	47.4	59	3100	21	5660	30000	29.5	3800	12.6	7000	35000	
C 80 3_57.3	57.3	49	3400	18.7	5620	30500	24.4	4000	11.0	7000	35000	
C 80 3_62.5	62.5	45	3400	17.1	5670	31800	22.4	4000	10.1	7000	35000	
C 80 3_70.5	70.5	40	3650	16.3	5620	32200	19.9	4000	8.9	7000	35000	
C 80 3_76.9	76.9	36	3600	14.8	5670	33900	18.2	4000	8.2	7000	35000	
C 80 3_89.3	89.3	31	3900	13.8	5620	34700	15.7	4000	7.1	7000	35000	
C 80 3_97.4	97.4	28.7	3900	12.6	5670	35000	14.4	4000	6.5	7000	35000	
C 80 3_109.5	109.5	25.5	4000	11.5	5630	35000	12.8	4000	5.8	7000	35000	
C 80 3_119.5	119.5	23.4	4000	10.6	5680	35000	11.7	4000	5.3	7000	35000	
C 80 3_136.7	136.7	20.5	4000	9.2	5660	35000	10.2	4000	4.6	7000	35000	
C 80 3_149.1	149.1	18.8	4000	8.5	5700	35000	9.4	4000	4.2	7000	35000	
C 80 3_169.0	169.0	16.6	4000	7.5	5680	35000	8.3	4000	3.7	7000	35000	
C 80 3_184.4	184.4	15.2	4000	6.8	5720	35000	7.6	4000	3.4	7000	35000	
C 80 3_197.9	197.9	14.2	3800	6.1	5710	35000	7.1	3800	3.0	7000	35000	
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C 80 4_285.7	285.7	9.8	4000	4.5	1890	35000	4.9	4000	2.3	2510	35000	
C 80 4_334.3	334.3	8.4	4000	3.9	1880	35000	4.2	4000	1.9	2500	35000	
C 80 4_364.7	364.7	7.7	4000	3.5	1920	35000	3.8	4000	1.8	2540	35000	
C 80 4_417.5	417.5	6.7	4000	3.1	1910	35000	3.4	4000	1.5	2530	35000	
C 80 4_455.4	455.4	6.1	4000	2.8	1950	35000	3.1	4000	1.4	2570	35000	
C 80 4_529.3	529.3	5.3	4000	2.4	1940	35000	2.6	4000	1.2	2550	35000	
C 80 4_577.4	577.4	4.8	4000	2.2	1970	35000	2.4	4000	1.1	2590	35000	
C 80 4_664.3	664.3	4.2	4000	1.9	1960	35000	2.1	4000	1.0	2570	35000	
C 80 4_724.7	724.7	3.9	4000	1.8	1990	35000	1.9	4000	0.90	2610	35000	
C 80 4_783.4	783.4	3.6	4000	1.6	1970	35000	1.8	4000	0.80	2590	35000	
C 80 4_854.6	854.6	3.3	4000	1.5	2000	35000	1.6	4000	0.80	2620	35000	
C 80 4_945.7	945.7	3.0	4000	1.4	1980	35000	1.5	4000	0.70	2600	35000	
C 80 4_1032	1032	2.7	4000	1.2	2010	35000	1.4	4000	0.60	2630	35000	
C 80 4_1168	1168	2.4	4000	1.1	1980	35000	1.2	4000	0.60	2600	35000	
C 80 4_1274	1274	2.2	4000	1.0	2020	35000	1.1	4000	0.50	2640	35000	
C 80 4_1358	1358	2.1	4000	0.90	1990	35000	1.0	4000	0.50	2610	35000	
C 80 4_1481	1481	1.9	4000	0.90	2030	35000	0.90	4000	0.40	2640	35000	



C 80

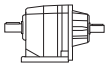
4000 Nm

	i	n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 80 2_5.6	5.6	160	3500	62	1480	14400	89	3500	34	4970	21600	137
C 80 2_6.1	6.1	147	3600	58	2100	14400	82	3700	33	5270	21200	
C 80 2_7.0	7.0	128	3500	49	2630	17000	71	3500	27	6130	24600	
C 80 2_7.6	7.6	118	3650	47	3060	16800	66	3650	26	6550	24600	
C 80 2_8.9	8.9	102	3500	39	3330	19900	56	3500	22	6800	27800	
C 80 2_9.6	9.6	94	3700	38	3590	19400	52	3700	21	7000	27700	
C 80 2_11.1	11.1	81	3500	31	4160	22800	45	3500	17.4	7000	31200	
C 80 2_12.0	12.0	75	3700	31	4400	22500	42	3700	17.0	7000	31200	
C 80 2_13.8	13.8	65	3500	25	4540	25700	36	3500	14.0	7000	34700	
C 80 2_14.9	14.9	60	3700	25	4770	25500	34	3700	13.7	7000	34700	
C 80 2_16.7	16.7	54	3500	21	5050	28500	30	3500	11.6	7000	35000	
C 80 2_18.1	18.1	50	3700	20	5280	28400	27.7	3700	11.3	7000	35000	
C 80 2_20.5	20.5	44	3550	17.2	5270	31400	24.4	3550	9.5	7000	35000	
C 80 2_22.2	22.2	40	3700	16.5	5610	31600	22.5	3700	9.2	7000	35000	
C 80 2_24.0	24.0	38	3550	14.7	5390	33800	20.9	3550	8.2	7000	35000	
C 80 2_25.9	25.9	35	3700	14.1	5730	34200	19.3	3700	7.9	7000	35000	
C 80 2_31.3	31.3	28.7	3700	11.7	5940	35000	16.0	3700	6.5	7000	35000	
C 80 2_39.1	39.1	23.0	3200	8.1	7000	35000	12.8	3200	4.5	7000	35000	
C 80 3_43.5	43.5	20.7	4000	9.3	7000	35000	11.5	4000	5.2	7000	35000	
C 80 3_47.4	47.4	19.0	4000	8.5	7000	35000	10.5	4000	4.7	7000	35000	
C 80 3_57.3	57.3	15.7	4000	7.1	7000	35000	8.7	4000	3.9	7000	35000	
C 80 3_62.5	62.5	14.4	4000	6.5	7000	35000	8.0	4000	3.6	7000	35000	
C 80 3_70.5	70.5	12.8	4000	5.7	7000	35000	7.1	4000	3.2	7000	35000	
C 80 3_76.9	76.9	11.7	4000	5.3	7000	35000	6.5	4000	2.9	7000	35000	
C 80 3_89.3	89.3	10.1	4000	4.5	7000	35000	5.6	4000	2.5	7000	35000	
C 80 3_97.4	97.4	9.2	4000	4.2	7000	35000	5.1	4000	2.3	7000	35000	
C 80 3_109.5	109.5	8.2	4000	3.7	7000	35000	4.6	4000	2.1	7000	35000	
C 80 3_119.5	119.5	7.5	4000	3.4	7000	35000	4.2	4000	1.9	7000	35000	
C 80 3_136.7	136.7	6.6	4000	3.0	7000	35000	3.7	4000	1.6	7000	35000	
C 80 3_149.1	149.1	6.0	4000	2.7	7000	35000	3.4	4000	1.5	7000	35000	
C 80 3_169.0	169.0	5.3	4000	2.4	7000	35000	3.0	4000	1.3	7000	35000	
C 80 3_184.4	184.4	4.9	4000	2.2	7000	35000	2.7	4000	1.2	7000	35000	
C 80 3_197.9	197.9	4.5	3800	1.9	7000	35000	2.5	3800	1.1	7000	35000	
C 80 3_215.9	215.9	4.2	4000	1.9	7000	35000	2.3	4000	1.0	7000	35000	
C 80 4_261.9	261.9	3.4	4000	1.6	2950	35000	1.9	4000	0.90	3500	35000	
C 80 4_285.7	285.7	3.2	4000	1.4	2990	35000	1.8	4000	0.80	3500	35000	
C 80 4_334.3	334.3	2.7	4000	1.2	2980	35000	1.5	4000	0.70	3500	35000	
C 80 4_364.7	364.7	2.5	4000	1.1	3020	35000	1.4	4000	0.60	3500	35000	
C 80 4_417.5	417.5	2.2	4000	1.0	3000	35000	1.2	4000	0.60	3500	35000	
C 80 4_455.4	455.4	2.0	4000	0.90	3050	35000	1.1	4000	0.50	3500	35000	
C 80 4_529.3	529.3	1.7	4000	0.80	3030	35000	0.90	4000	0.40	3500	35000	
C 80 4_577.4	577.4	1.6	4000	0.70	3070	35000	0.90	4000	0.40	3500	35000	
C 80 4_664.3	664.3	1.4	4000	0.60	3050	35000	0.80	4000	0.30	3500	35000	
C 80 4_724.7	724.7	1.2	4000	0.60	3090	35000	0.70	4000	0.30	3500	35000	
C 80 4_783.4	783.4	1.1	4000	0.50	3060	35000	0.60	4000	0.30	3500	35000	
C 80 4_854.6	854.6	1.1	4000	0.50	3100	35000	0.60	4000	0.30	3500	35000	
C 80 4_945.7	945.7	1.0	4000	0.40	3070	35000	0.50	4000	0.20	3500	35000	
C 80 4_1032	1032	0.90	4000	0.40	3110	35000	0.50	4000	0.20	3500	35000	
C 80 4_1168	1168	0.80	4000	0.40	3080	35000	0.40	4000	0.20	3500	35000	
C 80 4_1274	1274	0.70	4000	0.30	3110	35000	0.40	4000	0.20	3500	35000	
C 80 4_1358	1358	0.70	4000	0.30	3090	35000	0.40	4000	0.20	3500	35000	
C 80 4_1481	1481	0.60	4000	0.30	3120	35000	0.30	4000	0.20	3500	35000	



C 90

7200 Nm

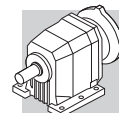
	i	n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 90 2_5.2	5.2	542	3500	209	1700	12800	271	4300	128	2170	15800	140
C 90 2_5.6	5.6	500	3600	198	3240	12800	250	4400	121	4250	16000	
C 90 2_6.8	6.8	414	3850	176	1860	13400	207	4750	108	2210	16400	
C 90 2_7.3	7.3	383	3950	167	3470	13500	191	4850	102	4360	16700	
C 90 2_8.3	8.3	336	4150	154	2010	13800	168	5100	94	2540	17100	
C 90 2_9.0	9.0	310	4250	145	3660	14000	155	5200	89	4720	17500	
C 90 2_10.4	10.4	270	4500	134	990	14200	135	5550	83	1150	17400	
C 90 2_11.2	11.2	249	4600	126	2750	14400	125	5650	78	3460	17800	
C 90 2_12.8	12.8	219	4850	117	580	14700	109	5950	72	840	18200	
C 90 2_13.9	13.9	202	4900	109	2700	15300	101	6050	67	3220	18700	
C 90 2_16.0	16.0	175	5050	98	690	16800	88	6200	60	950	20800	
C 90 2_17.3	17.3	162	5300	94	1670	15900	81	6500	58	2200	19800	
C 90 2_18.7	18.7	150	5050	83	1140	19600	75	6200	51	1500	24300	
C 90 2_20.2	20.2	138	5400	82	1540	17900	69	6600	50	2160	22500	
C 90 2_22.9	22.9	122	5050	68	2110	22400	61	6200	42	2700	27600	
C 90 2_24.8	24.8	113	5400	67	2500	21900	56	6600	41	3340	27300	
C 90 2_27.2	27.2	103	4500	51	6160	26000	52	5500	31	7820	32200	
C 90 2_29.4	29.4	95	4800	50	6560	26000	48	5900	31	8130	32000	
C 90 2_35.1	35.1	80	4400	39	8090	29400	40	5400	24	11100	36300	
C 90 3_39.4	39.4	71	6350	51	10800	23900	36	7100	28	13700	32900	
C 90 3_43.0	43.0	65	6500	48	10800	24700	33	7200	26	13800	34000	
C 90 3_50.3	50.3	56	6800	43	10800	26000	27.8	7100	22	13800	37000	
C 90 3_54.9	54.9	51	7000	40	10900	26500	25.5	7200	21	13900	38300	
C 90 3_59.2	59.2	47	7100	38	10800	27700	23.6	7100	18.9	13900	40000	
C 90 3_64.6	64.6	43	7200	35	10900	29100	21.7	7200	17.6	14000	41300	
C 90 3_74.4	74.4	38	7100	30	10900	31900	18.8	7100	15.0	14000	44400	
C 90 3_81.2	81.2	34	7200	28	10900	33000	17.2	7200	14.0	14100	45900	
C 90 3_88.2	88.2	32	7100	25	11000	34800	15.9	7100	12.7	14000	47900	
C 90 3_96.2	96.2	29.1	7200	24	11000	35900	14.5	7200	11.8	14100	49400	
C 90 3_107.0	107.0	26.2	7100	21	11000	38100	13.1	7100	10.5	14100	52100	
C 90 3_116.7	116.7	24.0	7200	19.4	11000	39400	12.0	7200	9.7	14100	53700	
C 90 3_134.1	134.1	20.9	7100	16.7	11000	42400	10.4	7100	8.3	14100	57300	
C 90 3_146.3	146.3	19.1	7200	15.5	11000	43800	9.6	7200	7.8	14200	59000	
C 90 3_157.8	157.8	17.7	7100	14.2	11000	45600	8.9	7100	7.1	14100	60000	
C 90 3_172.1	172.1	16.3	7200	13.2	11000	47100	8.1	7200	6.6	14200	60000	
C 90 4_212.4	212.4	13.2	7200	10.9	—	60000	6.6	7200	5.5	1180	60000	
C 90 4_231.7	231.7	12.1	7200	10.0	—	60000	6.0	7200	5.0	1560	60000	
C 90 4_268.5	268.5	10.4	7200	8.6	—	60000	5.2	7200	4.3	1540	60000	
C 90 4_292.9	292.9	9.6	7200	7.9	—	60000	4.8	7200	4.0	1880	60000	
C 90 4_339.0	339.0	8.3	7200	6.8	—	60000	4.1	7200	3.4	1720	60000	
C 90 4_369.8	369.8	7.6	7200	6.3	—	60000	3.8	7200	3.1	2050	60000	
C 90 4_419.0	419.0	6.7	7200	5.5	—	60000	3.3	7200	2.8	1890	60000	
C 90 4_457.1	457.1	6.1	7200	5.1	—	60000	3.1	7200	2.5	2210	60000	
C 90 4_534.2	534.2	5.2	7200	4.3	—	60000	2.6	7200	2.2	2090	60000	
C 90 4_582.8	582.8	4.8	7200	4.0	—	60000	2.4	7200	2.0	2270	60000	
C 90 4_652.8	652.8	4.3	7200	3.6	—	60000	2.1	7200	1.8	2160	60000	
C 90 4_712.2	712.2	3.9	7200	3.3	—	60000	2.0	7200	1.6	2290	60000	
C 90 4_773.6	773.6	3.3	7200	3.0	—	60000	1.8	7200	1.5	2250	60000	
C 90 4_844.0	844.0	3.0	7200	2.7	—	60000	1.7	7200	1.4	2310	60000	
C 90 4_922.3	922.3	2.8	7200	2.5	—	60000	1.5	7200	1.3	2260	60000	
C 90 4_1006	1006	2.5	7200	2.3	—	60000	1.4	7200	1.2	2320	60000	
C 90 4_1137	1137	2.3	7200	2.0	—	60000	1.2	7200	1.0	2270	60000	
C 90 4_1240	1240	2.2	7200	1.9	—	60000	1.1	7200	0.90	2230	60000	

(—) 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, orientation, position)

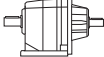
(—) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)

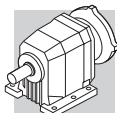
(—) Consulter notre service technique en donnant les dEtails concernant la charge radiale (sens de rotation, indexage, position)



C 90

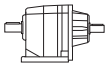
7200 Nm

	i	n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 90 2_5.2	5.2	174	4900	94	2560	18200	97	5850	62	3010	21600	140
C 90 2_5.6	5.6	161	5050	89	4640	18100	89	6000	59	5720	21800	
C 90 2_6.8	6.8	133	5450	80	2310	18500	74	6200	51	5130	24600	
C 90 2_7.3	7.3	123	5550	75	4890	18900	68	6550	49	6340	23200	
C 90 2_8.3	8.3	108	5850	70	2700	19300	60	6200	41	8870	27800	
C 90 2_9.0	9.0	100	5950	65	5300	19800	55	6600	40	9660	27600	
C 90 2_10.4	10.4	87	6200	59	2250	21000	48	6200	33	11000	31000	
C 90 2_11.2	11.2	80	6450	57	3960	20400	45	6600	32	11700	30800	
C 90 2_12.8	12.8	70	6250	48	4500	25300	39	6250	27	13200	34100	
C 90 2_13.9	13.9	65	6550	47	5830	24400	36	6550	26	14600	34300	
C 90 2_16.0	16.0	56	6200	38	6570	28700	31	6200	21	15000	38000	
C 90 2_17.3	17.3	52	6550	38	7530	28600	28.9	6550	21	15000	38100	
C 90 2_18.7	18.7	48	6200	33	7120	31000	26.7	6200	18.3	15000	40700	
C 90 2_20.2	20.2	44	6600	32	7780	30800	24.8	6600	18.0	15000	40700	
C 90 2_22.9	22.9	39	6200	27	8310	34200	21.8	6200	14.9	15000	44500	
C 90 2_24.8	24.8	36	6600	26	8950	34100	20.2	6600	14.6	15000	44600	
C 90 2_27.2	27.2	33	5500	20	13400	39200	18.4	5500	11.2	15000	50000	
C 90 2_29.4	29.4	31	5900	19.9	13700	39100	17.0	5900	11.0	15000	50200	
C 90 2_35.1	35.1	25.6	5400	15.3	14100	43800	14.2	5400	8.5	15000	55500	
C 90 3_39.4	39.4	22.8	7100	18.3	15000	40600	12.7	7100	10.1	15000	40600	
C 90 3_43.0	43.0	20.9	7200	17.0	15000	42000	11.6	7200	9.4	15000	42000	
C 90 3_50.3	50.3	17.9	7100	14.3	15000	45400	9.9	7100	7.9	15000	45400	
C 90 3_54.9	54.9	16.4	7200	13.3	15000	46900	9.1	7200	7.4	15000	46900	
C 90 3_59.2	59.2	15.2	7100	12.2	15000	48800	8.4	7100	6.8	15000	48800	
C 90 3_64.6	64.6	13.9	7200	11.3	15000	50400	7.7	7200	6.3	15000	50400	
C 90 3_74.4	74.4	12.1	7100	9.7	15000	53800	6.7	7100	5.4	15000	53800	
C 90 3_81.2	81.2	11.1	7200	9.0	15000	55500	6.2	7200	5.0	15000	55500	
C 90 3_88.2	88.2	10.2	7100	8.2	15000	57800	5.7	7100	4.5	15000	57800	
C 90 3_96.2	96.2	9.4	7200	7.6	15000	59600	5.2	7200	4.2	15000	59600	
C 90 3_107.0	107.0	8.4	7100	6.7	15000	60000	4.7	7100	3.7	15000	60000	
C 90 3_116.7	116.7	7.7	7200	6.3	15000	60000	4.3	7200	3.5	15000	60000	
C 90 3_134.1	134.1	6.7	7100	5.4	15000	60000	3.7	7100	3.0	15000	60000	
C 90 3_146.3	146.3	6.2	7200	5.0	15000	60000	3.4	7200	2.8	15000	60000	
C 90 3_157.8	157.8	5.7	7100	4.6	15000	60000	3.2	7100	2.5	15000	60000	
C 90 3_172.1	172.1	5.2	7200	4.2	15000	60000	2.9	7200	2.4	15000	60000	
C 90 4_212.4	212.4	4.2	7200	3.5	2090	60000	2.4	7200	2.0	3210	60000	
C 90 4_231.7	231.7	3.9	7200	3.2	2460	60000	2.2	7200	1.8	3290	60000	
C 90 4_268.5	268.5	3.4	7200	2.8	2440	60000	1.9	7200	1.5	3300	60000	
C 90 4_292.9	292.9	3.1	7200	2.5	2620	60000	1.7	7200	1.4	3370	60000	
C 90 4_339.0	339.0	2.7	7200	2.2	2590	60000	1.5	7200	1.2	3340	60000	
C 90 4_369.8	369.8	2.4	7200	2.0	2660	60000	1.4	7200	1.1	3420	60000	
C 90 4_419.0	419.0	2.1	7200	1.8	2630	60000	1.2	7200	1.0	3390	60000	
C 90 4_457.1	457.1	2.0	7200	1.6	2700	60000	1.1	7200	0.90	3460	60000	
C 90 4_534.2	534.2	1.7	7200	1.4	2680	60000	0.90	7200	0.80	3380	60000	
C 90 4_582.8	582.8	1.5	7200	1.3	2750	60000	0.90	7200	0.70	3500	60000	
C 90 4_652.8	652.8	1.4	7200	1.1	2700	60000	0.80	7200	0.60	3450	60000	
C 90 4_712.2	712.2	1.3	7200	1.0	2760	60000	0.70	7200	0.60	3500	60000	
C 90 4_773.6	773.6	1.2	7200	1.0	2720	60000	0.60	7200	0.50	3480	60000	
C 90 4_844.0	844.0	1.1	7200	0.90	2790	60000	0.60	7200	0.50	3500	60000	
C 90 4_922.3	922.3	1.0	7200	0.80	2730	60000	0.50	7200	0.40	3490	60000	
C 90 4_1006	1006	0.90	7200	0.70	2800	60000	0.50	7200	0.40	3500	60000	
C 90 4_1137	1137	0.80	7200	0.70	2740	60000	0.40	7200	0.40	3500	60000	
C 90 4_1240	1240	0.70	7200	0.60	2800	60000	0.40	7200	0.30	3500	60000	

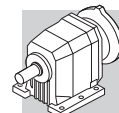


C 100

12000 Nm

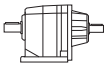
	i	n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 100 2_4.9	4.9	569	5500	345	1900	20600	285	6800	213	3790	25300	143
C 100 2_5.3	5.3	525	5650	327	2790	21000	263	6950	201	4940	25800	
C 100 2_6.5	6.5	429	6150	291	1920	21800	215	7550	179	3950	27000	
C 100 2_7.1	7.1	396	6200	271	3100	22700	198	7650	167	5270	27900	
C 100 2_8.4	8.4	335	6700	248	1870	22800	168	8200	152	3970	28500	
C 100 2_9.0	9.0	309	6800	232	2950	23500	155	8350	142	5190	29200	
C 100 2_10.1	10.1	278	7100	217	1930	24100	139	8750	134	3900	29500	
C 100 2_10.9	10.9	256	7100	200	3240	25700	128	8750	124	5460	31600	
C 100 2_12.5	12.5	225	7650	190	1360	24900	112	9400	117	3260	30800	
C 100 2_13.5	13.5	208	7700	176	2600	26300	104	9500	109	4680	32100	
C 100 2_15.2	15.2	184	8100	164	1270	26600	92	10000	101	2680	32500	
C 100 2_16.5	16.5	170	8250	154	2320	27200	85	10150	95	4420	33600	
C 100 2_18.7	18.7	150	8200	136	1500	30800	75	10000	83	3600	38000	
C 100 2_20.2	20.2	138	8100	124	3047	32200	69	10000	76	5210	39600	
C 100 2_22.2	22.2	126	7500	104	3570	35800	63	9200	64	5960	44100	
C 100 2_24.1	24.1	116	8100	104	3620	35200	58	10000	64	5900	43300	
C 100 2_29.6	29.6	95	6900	72	6380	42400	47	8500	44	9220	52200	
C 100 3_34.3	34.3	82	10350	95	9790	33300	41	11700	54	13000	46400	
C 100 3_36.9	36.9	76	10650	91	10200	34500	38	11800	50	13100	48000	
C 100 3_42.9	42.9	65	11350	83	9640	33200	33	12000	44	13100	51200	
C 100 3_46.2	46.2	61	11700	80	10100	33100	30	12000	41	13300	53100	
C 100 3_53.3	53.3	53	12000	71	9450	36400	26.3	12000	36	13200	56900	
C 100 3_57.4	57.4	49	12000	66	10200	39500	24.4	12000	33	13400	59000	
C 100 3_64.5	64.5	43	12000	59	9950	44100	21.7	12000	29	13400	62300	
C 100 3_69.4	69.4	40	12000	54	10400	45900	20.2	12000	27	13500	64500	
C 100 3_79.4	79.4	35	12000	48	10300	49200	17.6	12000	24	13500	68600	
C 100 3_85.6	85.6	33	12000	44	10400	51100	16.4	12000	22	13600	70900	
C 100 3_92.7	92.7	30	12000	41	10400	53200	15.1	12000	20	13500	73500	
C 100 3_99.8	99.8	28.1	12000	38	10500	55200	14.0	12000	19.0	13600	75900	
C 100 3_111.9	111.9	25.0	12000	34	10400	58300	12.5	12000	16.9	13500	79800	
C 100 3_120.5	120.5	23.2	12000	31	10500	60400	11.6	12000	15.7	13700	82400	
C 100 3_139.7	139.7	20.0	11050	25	10600	67400	10.0	11050	12.5	13700	85000	
C 100 3_150.4	150.4	18.6	12000	25	10600	66900	9.3	12000	12.6	13700	85000	
C 100 4_162.1	162.1	17.3	12000	24	—	85000	8.6	12000	11.9	—	85000	
C 100 4_185.4	185.4	15.1	12000	21	—	85000	7.6	12000	10.4	—	85000	
C 100 4_199.6	199.6	14.0	12000	19.4	—	85000	7.0	12000	9.7	—	85000	
C 100 4_244.2	244.2	11.5	12000	15.8	—	85000	5.7	12000	7.9	—	85000	
C 100 4_263.0	263.0	10.6	12000	14.7	—	85000	5.3	12000	7.4	—	85000	
C 100 4_300.5	300.5	9.3	12000	12.9	—	85000	4.7	12000	6.4	—	85000	
C 100 4_323.6	323.6	8.7	12000	11.9	—	85000	4.3	12000	6.0	—	85000	
C 100 4_380.5	380.5	7.4	12000	10.2	—	85000	3.7	12000	5.1	—	85000	
C 100 4_409.8	409.8	6.8	12000	9.4	—	85000	3.4	12000	4.7	—	85000	
C 100 4_466.7	466.7	6.0	12000	8.3	—	85000	3.0	12000	4.1	—	85000	
C 100 4_502.6	502.6	5.6	12000	7.7	—	85000	2.8	12000	3.8	—	85000	
C 100 4_582.6	582.6	4.8	12000	6.6	—	85000	2.4	12000	3.3	—	85000	
C 100 4_627.4	627.4	4.5	12000	6.2	—	85000	2.2	12000	3.1	—	85000	
C 100 4_720.3	720.3	3.9	12000	5.4	—	85000	1.9	12000	2.7	—	85000	
C 100 4_775.7	775.7	3.6	12000	5.0	—	85000	1.8	12000	2.5	—	85000	
C 100 4_843.3	843.3	3.3	12000	4.6	—	85000	1.7	12000	2.3	—	85000	
C 100 4_908.2	908.2	3.1	12000	4.3	—	85000	1.5	12000	2.1	830	85000	
C 100 4_1004	1004	2.8	12000	3.9	—	85000	1.4	12000	1.9	—	85000	
C 100 4_1081	1081	2.6	12000	3.6	—	85000	1.3	12000	1.8	870	85000	

(—) 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, orientation, position)
 (—) Nehmen Sie bitte Kontakt mit unserem Applikationsdienst und Querkraftsdaten angeben (Drehrichtung, Orientierung, Anordnung)
 (—) Consulter notre service technique en donnant les dEtails concernant la charge radiale (sens de rotation, indexage, position)



C 100

12000 Nm

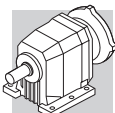
	i	n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹					
		n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	
C 100 2_4.9	4.9	183	7800	157	5310	28800	102	9300	104	6720	34400	143
C 100 2_5.3	5.3	169	7950	148	6680	29500	94	9450	98	9740	35200	
C 100 2_6.5	6.5	138	8600	131	5670	31000	77	10250	87	7540	37000	
C 100 2_7.1	7.1	127	8750	123	7050	31800	71	10450	81	10100	37800	
C 100 2_8.4	8.4	108	9350	111	5670	32600	60	10950	72	8530	40100	
C 100 2_9.0	9.0	99	9500	104	7080	33600	55	11350	69	10100	39900	
C 100 2_10.1	10.1	89	10000	98	5540	33600	50	10900	60	10600	44500	
C 100 2_10.9	10.9	82	10150	92	6980	34700	46	11500	58	11300	44300	
C 100 2_12.5	12.5	72	10700	85	3910	35400	40	10850	48	11700	49600	
C 100 2_13.5	13.5	67	10850	80	6440	36700	37	11450	47	12300	49500	
C 100 2_15.2	15.2	59	10800	70	5940	40800	33	10800	39	13000	54700	
C 100 2_16.5	16.5	55	11500	69	6320	39100	30	11500	38	13400	54500	
C 100 2_18.7	18.7	48	10900	58	6310	45100	26.8	10900	32	13400	59800	
C 100 2_20.2	20.2	45	11500	56	6890	45000	24.7	11500	31	14000	60100	
C 100 2_22.2	22.2	40	9850	44	9170	52200	22.5	9850	24	15000	67800	
C 100 2_24.1	24.1	37	10800	44	8930	51200	20.7	10800	25	15000	67200	
C 100 2_29.6	29.6	30	9100	31	12600	61400	16.9	9100	17.0	15000	78300	
C 100 3_34.3	34.3	26.2	11700	35	15000	57800	14.6	11700	19.2	15000	75500	
C 100 3_36.9	36.9	24.4	11800	32	15000	59600	13.5	11800	18.0	15000	77700	
C 100 3_42.9	42.9	21.0	12000	28	15000	63400	11.6	12000	15.7	15000	82300	
C 100 3_46.2	46.2	19.5	12000	26	15000	65600	10.8	12000	14.6	15000	84900	
C 100 3_53.3	53.3	16.9	12000	23	15000	69900	9.4	12000	12.7	15000	85000	
C 100 3_57.4	57.4	15.7	12000	21	15000	72300	8.7	12000	11.8	15000	85000	
C 100 3_64.5	64.5	14.0	12000	18.6	15000	76100	7.8	12000	10.5	15000	85000	
C 100 3_69.4	69.4	13.0	12000	17.5	15000	78600	7.2	12000	9.7	15000	85000	
C 100 3_79.4	79.4	11.3	12000	15.3	15000	83300	6.3	12000	8.5	15000	85000	
C 100 3_85.6	85.6	10.5	12000	14.2	15000	85000	5.8	12000	7.9	15000	85000	
C 100 3_92.7	92.7	9.7	12000	13.1	15000	85000	5.4	12000	7.3	15000	85000	
C 100 3_99.8	99.8	9.0	12000	12.2	15000	85000	5.0	12000	6.8	15000	85000	
C 100 3_111.9	111.9	8.0	12000	10.9	15000	85000	4.5	12000	6.0	15000	85000	
C 100 3_120.5	120.5	7.5	12000	10.1	15000	85000	4.1	12000	5.6	15000	85000	
C 100 3_139.7	139.7	6.4	11500	8.0	15000	85000	3.6	11050	4.5	15000	85000	
C 100 3_150.4	150.4	6.0	12000	8.1	15000	85000	3.3	12000	4.5	15000	85000	
C 100 4_162.1	162.1	5.6	12000	7.7	—	85000	3.1	12000	4.3	—	85000	
C 100 4_185.4	185.4	4.9	12000	6.7	—	85000	2.7	12000	3.7	920	85000	
C 100 4_199.6	199.6	4.5	12000	6.2	—	85000	2.5	12000	3.5	1430	85000	
C 100 4_244.2	244.2	3.7	12000	5.1	—	85000	2.0	12000	2.8	1490	85000	
C 100 4_263.0	263.0	3.4	12000	4.7	—	85000	1.9	12000	2.6	1950	85000	
C 100 4_300.5	300.5	3.0	12000	4.1	—	85000	1.7	12000	2.3	1840	85000	
C 100 4_323.6	323.6	2.8	12000	3.8	850	85000	1.5	12000	2.1	2280	85000	
C 100 4_380.5	380.5	2.4	12000	3.3	700	85000	1.3	12000	1.8	2130	85000	
C 100 4_409.8	409.8	2.2	12000	3.0	1120	85000	1.2	12000	1.7	2550	85000	
C 100 4_466.7	466.7	1.9	12000	2.7	910	85000	1.1	12000	1.5	2340	85000	
C 100 4_502.6	502.6	1.8	12000	2.5	1320	85000	1.0	12000	1.4	2740	85000	
C 100 4_582.6	582.6	1.5	12000	2.1	1100	85000	0.90	12000	1.2	2520	85000	
C 100 4_627.4	627.4	1.4	12000	2.0	1490	85000	0.80	12000	1.1	2910	85000	
C 100 4_720.3	720.3	1.2	12000	1.7	1270	85000	0.70	12000	1.0	2700	85000	
C 100 4_775.7	775.7	1.2	12000	1.6	1650	85000	0.60	12000	0.90	3070	85000	
C 100 4_843.3	843.3	1.1	12000	1.5	1360	85000	0.60	12000	0.80	2790	85000	
C 100 4_908.2	908.2	1.0	12000	1.4	1730	85000	0.60	12000	0.80	3160	85000	
C 100 4_1004	1004	0.90	12000	1.2	1400	85000	0.50	12000	0.70	2830	85000	
C 100 4_1081	1081	0.90	12000	1.1	1770	85000	0.50	12000	0.60	3170	85000	

(—) 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, orientation, position)

(—) 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)



26 - PREDISPOSIZIONI MOTORE

Nelle tabelle (B20) e (B21) vengono riportati gli abbinamenti motore possibili in termini puramente geometrici.

La scelta del motoriduttore deve essere effettuata seguendo le istruzioni specificate al paragrafo 11, rispettando in particolare la condizione $S \geq f_s$.

26 - MOTOR AVAILABILITY

Please be aware that motor-gearbox combinations resulting from charts (B20) and (B21) are purely based on geometrical compatibility.

When selecting a gearmotor, refer to procedure specified at paragraph 11 and observe particularly the condition $S \geq f_s$.

26 - BAUMÖGLICHKEITEN

In den Tabellen (B20) und (B21) werden die von den Größen her gesehenen möglichen Passungen angegeben.

Die angemessene Getriebewahl muss unter Befolgung der im Paragraph 11 gegebenen Anleitungen und auf der Grundlage der Auswahltafel der technischen Daten erfolgen.

26 - PREDISPOSITIONS MOTEUR

Dans les tableaux (B20) et (B21) sont indiqués les accouplements possibles en termes des dimensions.

Le choix le plus approprié du motoréducteur à utiliser doit être effectué selon les indications du paragraphe 11, ainsi qu'en fonction des tableaux de sélection, respectant en particulier la condition $S \geq f_s$.

(B20)

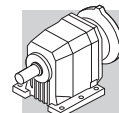
		IEC_  (IM B5)									
		P63 P71	P80 P90	P100 P112	P132	P160	P180	P200	P225	P250	P280
C 11 2	i =	2.8_66.2	2.8_47.6	2.8_47.6							
C 21 2		3.7_63.3 ● (6.4_7.1)	2.7_54.7	2.7_54.7							
C 21 3		58.8_261.0	58.8_261.0	58.8_261.0							
C 31 2		5.0_66.8 ● (6.5_9.3)	2.9_66.8	2.9_66.8	2.9_25.1						
C 31 3		74.3_274.7	74.3_274.7	74.3_274.7							
C 35 2		4.6_19.0 ● (6.1_8.8)	2.7_19.0	2.7_19.0	2.7_19.0						
C 35 3		34.7_206.4	20.2_206.4	20.2_206.4	20.2_77.6						
C 35 4		232.3_848.5	232.3_848.5	232.3_848.5							
C 41 2		14.2_44.8	2.7_44.8	2.7_44.8	2.7_31.4						
C 41 3		47.0_209.1	28.5_209.1	28.5_209.1	28.5_102.3						
C 41 4		239.9_855.5	239.9_855.5	239.9_855.5							
C 51 2		18.9_57.0	2.6_57.0	2.6_57.0	2.6_40.4	2.6_40.4	2.6_40.4				
C 51 3		59.0_216.7	21.8_216.7	21.8_216.7	21.8_124.4	21.8_124.4	21.8_124.4				
C 51 4		240.9_884.9	240.9_884.9	240.9_884.9	240.9_508.0						
C 61 2		22.4_38.0	3.7_38.0 ● (6.7_7.5)	3.7_38.0 ● (6.7_7.5)	2.8_38.0	2.8_38.0	2.8_38.0				
C 61 3		67.7_195.8	26.8_195.8	26.8_195.8	26.8_140.5	26.8_140.5	26.8_140.5				
C 61 4		217.4_796.1	217.4_796.1	217.4_796.1							
C 70 2			14.1_34.7 ● (15.3)	14.1_34.7 ● (15.3)	7.5_34.7 ● (8.0)	4.6_34.7	4.6_34.7*	4.6_10.2* ● (9.5)			
C 70 3			41.3_239.3	41.3_239.3	41.3_137.4	41.3_137.4	41.3_137.4*				
C 70 4		251.3_1476	251.3_1476	251.3_1476	251.3_554.7						
C 80 2			20.5_39.1	20.5_39.1	11.1_39.1	7.0_39.1	5.6_39.1	5.6_25.9*	5.6_25.9*		
C 80 3			43.5_215.9	43.5_215.9	43.5_184.4	43.5_184.4	43.5_184.4				
C 80 4		334.3_1481	261.9_1481	261.9_1481	261.9_724.7						
C 90 2			22.9_35.1	22.9_35.1	12.8_35.1	10.4_35.1	10.4_35.1	5.2_29.4	5.2_29.4*	5.2_29.4*	
C 90 3			74.4_172.1	74.4_172.1	39.4_172.1	39.4_172.1	39.4_172.1	39.4_96.2	39.4_96.2*	39.4_96.2*	
C 90 4		339.0_1240	212.4_1240	212.4_1240	212.4_712.2	212.4_712.2	212.4_712.2				
C 100 2				29.6	15.2_29.6	12.5_29.6	12.5_29.6	4.9_29.6	4.9_29.6	4.9_29.6*	4.9_29.6*
C 100 3				79.4_150.4	42.9_150.4	34.3_150.4	34.3_150.4	34.3_99.8	34.3_99.8*	34.3_99.8	34.3_99.8*
C 100 4		380.5_1081	162.1_1081	162.1_1081	162.1_775.7	162.1_775.7	162.1_775.7				

I motori nelle grandezze contrassegnate con * vengono previsti in forma costruttiva B3/B5 nelle posizioni di montaggio B3-B5-B6-B7-B8.

*For mounting position B3-B5 B6-B7-B8 the motor marked with * will be supplied in B3/B5.*

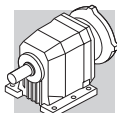
Für die Einbaulagen B3, B5 B6, B7, B8 werden die mit * gekennzeichneten Motoren in Bauform B3/B5 geliefert.

*Pour les positions de montage B3, B5, B6, B7, B8 les moteurs repérés par * son livrés en B3/B5.*



(B21)

		 						
		M0	M05	M1	M2 - ME2	ME3	ME4	ME5
C 05 2	i =	27.1_44.7	5.5_44.7	5.5_44.7				
C 11 2			2.8_66.2	2.8_37.0	2.8_47.7	2.8_47.7		
C 21 2			3.7_63.3 ⊖ (6.4_7.1)	3.7_43.3 ⊖ (6.4_7.1)	2.7_54.7	2.7_54.7		
C 21 3			58.8_261.0	58.8_261.0	58.8_261.0	58.8_261.0		
C 31 2				5.0_52.4 ⊖ (6.5_9.3)	2.9_66.8	2.9_66.8	2.9_25.1	
C 31 3			74.3_274.7	74.3_274.7	74.3_274.7	74.3_274.7		
C 35 2				4.6_19.0 ⊖ (6.1_8.8)	2.7_19.0	2.7_19.0	2.7_19.0	
C 35 3				34.7_162.0	20.2_206.4	20.2_206.4	20.2_77.6	
C 35 4			232.3_848.5	232.3_848.5	232.3_848.5	232.3_848.5		
C 41 2				14.2_44.8	2.7_44.8	2.7_44.8	2.7_31.4	
C 41 3				47.0_209.1	28.5_209.1	28.5_209.1	28.5_102.3	
C 41 4			239.9_855.5	239.9_855.5	239.9_855.5	239.9_855.5		
C 51 2				18.9_57.0	2.6_57.0	2.6_57.0	2.6_40.4	2.6_40.4
C 51 3				59.0_216.7	21.8_216.7	21.8_216.7	21.8_124.4	21.8_124.4
C 51 4				240.9_884.9	240.9_884.9	240.9_884.9	240.9_508.0	
C 61 2					3.7_38.0 ⊖ (6.7_7.5)	3.7_38.0 ⊖ (6.7_7.5)	2.8_38.0	2.8_38.0
C 61 3					26.8_195.8	26.8_195.8	26.8_140.5	26.8_140.5
C 61 4				217.4_796.1	217.4_796.1	217.4_796.1		
C 70 2					14.1_34.7 ⊖ (15.3)	14.1_34.7 ⊖ (15.3)	7.5_34.7 ⊖ (8.0)	7.5_34.7 ⊖ (8.0)
C 70 3					41.3_239.3	41.3_239.3	41.3_137.4	41.3_137.4
C 70 4				251.3_1476	251.3_1476	251.3_1476	251.3_554.7	
C 80 2						20.5_39.1	11.1_39.1	11.1_39.1
C 80 3						43.5_215.8	43.5_184.4	43.5_184.4
C 80 4				334.3_1481	261.9_1481	261.9_1481	261.9_724.7	
C 90 2						22.9_35.1	12.8_35.1	12.8_35.1
C 90 3						74.4_172.1	39.4_172.1	39.4_172.1
C 90 4				339.0_1240	212.4_1240	212.4_1240	212.4_712.2	
C 100 2							15.2_29.6	15.2_29.6
C 100 3							42.9_150.4	42.9_150.4
C 100 4				380.5_1081	162.1_1081	162.1_1081	162.1_775.7	



27 - MOMENTO D'INERZIA

Le tabelle seguenti indicano i valori del momento d'inerzia J_r [kgm²] riferiti all'asse veloce del riduttore; per una migliore facilità di lettura riportiamo le definizioni dei simboli usati.

27 - MOMENT OF INERTIA

The following charts indicate moment of inertia values J_r [kgm²] referred to the gear unit high speed shaft. A key to the symbols used follows:

27 - TRÄGHEITSMOMENT

Die In den folgenden Tabellen angegebenen Trägheitsmomente J_r [kgm²] beziehen sich auf die Getriebeantriebsachse. Um das Lesen der Tabellen zu erleichtern, werden folgende Symbole verwendet:

27 - MOMENT D'INERTIE

Les tableaux suivants indiquent les valeurs du moment d'inertie J_r [kgm²] 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.

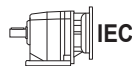


I valori riferiti a questo simbolo sono da attribuire al riduttore compatto senza motore. In questo caso, per avere il momento d'inerzia complessivo del motoriduttore, si dovrà sommare il valore corrispondente al riduttore compatto, a quello del motore da applicare (dato reperibile nelle tabelle delle caratteristiche tecniche dei motori elettrici).

Values under this icon refer to compact gear units, without motor. To obtain the overall moment of inertia for the gearmotor just add the value of the inertia for the specific compact motor, given in the relevant rating chart.

Kompaktgetriebe ohne Motor. In diesem Fall muß man, um das Gesamtträgheitsmoment des Getriebemotors zu erhalten, den dem Kompaktgetriebe mit der gewählten Übersetzung entsprechenden Wert mit dem Wert des anzuschließenden Motors addieren (dieser Wert kann den Elektromotorenauswahltabellen entnommen werden).

Les valeurs liées à symbole sont à assigner au réducteur compact sans moteur. Dans ce cas, afin d'avoir le moment d'inertie total du motoréducteur, on devra additionner la valeur correspondant au réducteur compact, à celle du moteur à assembler (donnée que l'on peut repérer dans les tableaux des caractéristiques techniques des moteurs électriques).

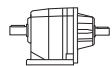


I valori relativi a questi simboli sono da attribuire al riduttore predisposto per attacco motore (grandezza IEC...).

Values under this symbol refer to gearboxes with IEC motor adaptor (IEC size...).

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.

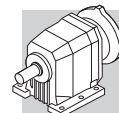
This symbol refers to gearbox values.

Dieses Symbol bezieht sich auf Getriebewerte.

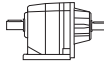
Les valeurs liées au réducteur sont assignées à ce symbole.

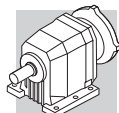
C 05

	i	J (•10 ⁻⁴) [kgm ²]							
			IEC						
			63	71	80	90	100	112	
C 05_5.5	5.5	0.29	—	—	—	—	—	—	—
C 05_6.7	6.7	0.29	—	—	—	—	—	—	—
C 05_7.4	7.4	0.28	—	—	—	—	—	—	—
C 05_9.3	9.3	0.17	—	—	—	—	—	—	—
C 05_11.2	11.2	0.16	—	—	—	—	—	—	—
C 05_12.5	12.5	0.16	—	—	—	—	—	—	—
C 05_15.6	15.6	0.09	—	—	—	—	—	—	—
C 05_18.9	18.9	0.09	—	—	—	—	—	—	—
C 05_21.0	21.0	0.08	—	—	—	—	—	—	—
C 05_27.1	27.1	0.04	—	—	—	—	—	—	—
C 05_32.8	32.8	0.04	—	—	—	—	—	—	—
C 05_36.4	36.4	0.04	—	—	—	—	—	—	—
C 05_40.3	40.3	0.03	—	—	—	—	—	—	—
C 05_44.7	44.7	0.03	—	—	—	—	—	—	—

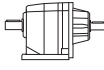


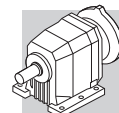
C 11

	i	J (•10 ⁻⁴) [kgm ²]							
			 IEC						
			63	71	80	90	100	112	
C 11 2_2.8	2.8	0.44	1.9	1.9	3.3	3.2	4.5	4.5	1.3
C 11 2_3.7	3.7	0.29	1.8	1.7	3.1	3.1	4.4	4.4	1.2
C 11 2_4.9	4.9	0.19	1.7	1.7	3.0	3.0	4.3	4.3	1.1
C 11 2_6.2	6.2	0.12	1.6	1.6	3.0	2.9	4.2	4.2	1.0
C 11 2_6.9	6.9	0.34	1.8	1.8	3.2	3.1	4.4	4.4	1.2
C 11 2_7.6	7.6	0.33	1.8	1.8	3.2	3.1	4.4	4.4	1.2
C 11 2_9.1	9.1	0.23	1.7	1.7	3.1	3.0	4.3	4.3	1.1
C 11 2_10.1	10.1	0.23	1.7	1.7	3.1	3.0	4.3	4.3	1.1
C 11 2_12.1	12.1	0.16	1.6	1.6	3.0	3.0	4.2	4.2	1.1
C 11 2_13.4	13.4	0.16	1.6	1.6	3.0	2.9	4.2	4.2	1.1
C 11 2_15.5	15.5	0.10	1.6	1.6	2.9	2.9	4.2	4.2	1.0
C 11 2_17.2	17.2	0.10	1.6	1.6	2.9	2.9	4.2	4.2	1.0
C 11 2_18.6	18.6	0.08	1.5	1.5	2.9	2.9	4.2	4.2	1.0
C 11 2_20.6	20.6	0.08	1.5	1.5	2.9	2.9	4.2	4.2	1.0
C 11 2_22.8	22.8	0.06	1.5	1.5	2.9	2.8	4.1	4.1	1.0
C 11 2_25.4	25.4	0.06	1.5	1.5	2.9	2.8	4.1	4.1	1.0
C 11 2_29.5	29.5	0.04	1.5	1.5	2.9	2.8	4.1	4.1	0.90
C 11 2_32.8	32.8	0.04	1.5	1.5	2.9	2.8	4.1	4.1	0.90
C 11 2_33.4	33.4	0.03	1.5	1.5	2.9	2.8	4.1	4.1	0.90
C 11 2_37.0	37.0	0.03	1.5	1.5	2.9	2.8	4.1	4.1	0.90
C 11 2_42.9	42.9	0.02	1.5	1.5	1.9	1.8	4.1	4.1	0.90
C 11 2_47.6	47.6	0.02	1.5	1.5	2.9	2.8	4.1	4.1	0.90
C 11 2_49.7	49.7	0.02	1.5	1.5	—	—	—	—	0.90
C 11 2_55.2	55.2	0.02	1.5	1.5	—	—	—	—	0.90
C 11 2_59.6	59.6	0.01	1.5	1.5	—	—	—	—	0.90
C 11 2_66.2	66.2	0.01	1.5	1.5	—	—	—	—	0.90

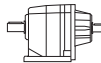


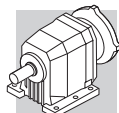
C 21

	i	J (•10 ⁻⁴) [kgm ²]							
			IEC 						
			63	71	80	90	100	112	
C 21 2_2.7	2.7	1.2	—	—	4.0	4.0	5.3	5.3	3.1
C 21 2_3.7	3.7	0.72	2.2	2.2	3.6	3.5	4.8	4.8	2.6
C 21 2_4.8	4.8	0.48	2.0	1.9	3.3	3.3	4.6	4.6	2.4
C 21 2_6.1	6.1	0.29	1.8	1.7	3.1	3.1	4.4	4.4	2.2
C 21 2_6.4	6.4	0.79	—	—	3.6	3.6	4.9	4.9	2.7
C 21 2_7.1	7.1	0.77	—	—	3.6	3.6	4.8	4.8	2.6
C 21 2_8.7	8.7	0.51	2.0	2.0	3.4	3.3	4.6	4.6	2.4
C 21 2_9.6	9.6	0.50	2.0	2.0	3.3	3.3	4.6	4.6	2.4
C 21 2_11.2	11.2	0.36	1.8	1.8	3.2	3.1	4.4	4.4	2.2
C 21 2_12.4	12.4	0.35	1.8	1.8	3.2	3.1	4.4	4.4	2.2
C 21 2_14.3	14.3	0.21	1.7	1.7	3.1	3.0	4.3	4.3	2.1
C 21 2_15.8	15.8	0.20	1.7	1.7	3.1	3.0	4.3	4.3	2.1
C 21 2_18.0	18.0	0.15	1.6	1.6	3.0	2.9	4.2	4.2	2.0
C 21 2_20.0	20.0	0.15	1.6	1.6	3.0	2.9	4.2	4.2	2.0
C 21 2_21.9	21.9	0.12	1.6	1.6	3.0	2.9	4.2	4.2	2.0
C 21 2_24.3	24.3	0.12	1.6	1.6	3.0	2.9	4.2	4.2	2.0
C 21 2_26.7	26.7	0.09	1.6	1.5	2.9	2.9	4.2	4.2	2.0
C 21 2_29.6	29.6	0.09	1.6	1.5	2.9	2.9	4.2	4.2	2.0
C 21 2_33.1	33.1	0.06	1.5	1.5	2.9	2.8	4.1	4.1	1.9
C 21 2_36.8	36.8	0.06	1.5	1.5	2.9	2.8	4.1	4.1	1.9
C 21 2_39.0	39.0	0.05	1.5	1.5	2.9	2.8	4.1	4.1	1.9
C 21 2_43.3	43.3	0.05	1.5	1.5	2.9	2.8	4.1	4.1	1.9
C 21 2_49.3	49.3	0.03	1.5	1.5	2.9	2.8	4.1	4.1	1.9
C 21 2_54.7	54.7	0.03	1.5	1.5	2.9	2.8	4.1	4.1	1.9
C 21 2_57.0	57.0	0.02	1.5	1.5	—	—	—	—	1.9
C 21 2_63.3	63.3	0.02	1.5	1.5	—	—	—	—	1.9
C 21 3_74.4	74.4	0.03	1.5	1.5	2.9	2.8	4.1	4.1	0.93
C 21 3_82.6	82.6	0.03	1.5	1.5	2.9	2.8	4.1	4.1	0.93
C 21 3_90.2	90.2	0.03	1.5	1.5	2.9	2.8	4.1	4.1	0.93
C 21 3_100.2	100.2	0.03	1.5	1.5	2.9	2.8	4.1	4.1	0.93
C 21 3_110.0	110.0	0.03	1.5	1.5	2.9	2.8	4.1	4.1	0.93
C 21 3_122.2	122.2	0.03	1.5	1.5	2.9	2.8	4.1	4.1	0.93
C 21 3_136.5	136.5	0.02	1.5	1.5	2.9	2.8	4.1	4.1	0.92
C 21 3_151.7	151.7	0.02	1.5	1.5	2.9	2.8	4.1	4.1	0.92
C 21 3_160.7	160.7	0.02	1.5	1.5	2.9	2.8	4.1	4.1	0.92
C 21 3_178.5	178.5	0.02	1.5	1.5	2.9	2.8	4.1	4.1	0.92
C 21 3_203.2	203.2	0.02	1.5	1.5	2.9	2.8	4.1	4.1	0.92
C 21 3_225.8	225.8	0.02	1.5	1.5	2.9	2.8	4.1	4.1	0.92
C 21 3_235.0	235.0	0.02	1.5	1.5	2.9	2.8	4.1	4.1	0.92
C 21 3_261.0	261.0	0.02	1.5	1.5	2.9	2.8	4.1	4.1	0.92

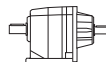


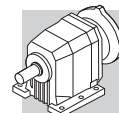
C 31

	i	J (•10 ⁻⁴) [kgm ²]								
			IEC 							
			63	71	80	90	100	112	132	
C 31 2_2.9	2.9	2.3	—	—	5.2	5.1	6.4	6.4	19	4.6
C 31 2_3.7	3.7	1.6	—	—	4.4	4.3	5.6	5.6	18	3.8
C 31 2_5.0	5.0	0.87	2.3	2.3	3.7	3.7	5.0	5.0	18	3.1
C 31 2_6.3	6.3	0.63	2.1	2.1	3.5	3.4	4.7	4.7	17	2.8
C 31 2_6.5	6.5	1.6	—	—	4.4	4.4	5.7	5.7	18	3.8
C 31 2_7.2	7.2	1.5	—	—	4.4	4.3	5.6	5.6	18	3.7
C 31 2_8.4	8.4	1.1	—	—	3.9	3.9	5.2	5.2	18	3.3
C 31 2_9.3	9.3	1.1	—	—	3.9	3.8	5.1	5.1	18	3.3
C 31 2_11.1	11.1	0.62	2.1	2.1	3.5	3.4	4.7	4.7	17	2.8
C 31 2_12.3	12.3	0.60	2.1	2.1	3.5	3.4	4.7	4.7	17	2.8
C 31 2_14.0	14.0	0.47	1.9	1.9	3.3	3.3	4.5	4.5	17	2.7
C 31 2_15.6	15.6	0.46	1.9	1.9	3.3	3.3	4.5	4.5	17	2.7
C 31 2_18.1	18.1	0.34	1.8	1.8	3.2	3.1	4.4	4.4	17	2.6
C 31 2_20.1	20.1	0.34	1.8	1.8	3.2	3.1	4.4	4.4	17	2.6
C 31 2_22.6	22.6	0.25	1.7	1.7	3.1	3.0	4.3	4.3	17	2.5
C 31 2_25.1	25.1	0.25	1.7	1.7	3.1	3.0	4.3	4.3	17	2.5
C 31 2_26.8	26.8	0.20	1.7	1.7	3.0	3.0	4.3	4.3	—	2.4
C 31 2_29.8	29.8	0.19	1.7	1.7	3.0	3.0	4.3	4.3	—	2.4
C 31 2_32.5	32.5	0.14	1.6	1.6	3.0	2.9	4.2	4.2	—	2.4
C 31 2_36.1	36.1	0.14	1.6	1.6	3.0	2.9	4.2	4.2	—	2.4
C 31 2_40.7	40.7	0.10	1.6	1.6	3.0	2.9	4.2	4.2	—	2.3
C 31 2_45.3	45.3	0.10	1.6	1.6	3.0	2.9	4.2	4.2	—	2.3
C 31 2_47.2	47.2	0.08	1.6	1.5	2.9	2.9	4.2	4.2	—	2.3
C 31 2_52.4	52.4	0.08	1.6	1.5	2.9	2.9	4.2	4.2	—	2.3
C 31 2_60.2	60.2	0.05	1.5	1.5	2.9	2.8	4.1	4.1	—	2.3
C 31 2_66.8	66.8	0.05	1.5	1.5	2.9	2.8	4.1	4.1	—	2.3
C 31 3_74.3	74.3	0.06	1.5	1.5	2.9	2.8	4.1	4.1	—	0.96
C 31 3_82.6	82.6	0.06	1.5	1.5	2.9	2.8	4.1	4.1	—	0.96
C 31 3_93.0	93.0	0.05	1.5	1.5	2.9	2.8	4.1	4.1	—	0.95
C 31 3_103.3	103.3	0.05	1.5	1.5	2.9	2.8	4.1	4.1	—	0.95
C 31 3_110.2	110.2	0.05	1.5	1.5	2.9	2.8	4.1	4.1	—	0.95
C 31 3_122.4	122.4	0.05	1.5	1.5	2.9	2.8	4.1	4.1	—	0.95
C 31 3_133.6	133.6	0.05	1.5	1.5	2.9	2.8	4.1	4.1	—	0.95
C 31 3_148.4	148.4	0.05	1.5	1.5	2.9	2.8	4.1	4.1	—	0.95
C 31 3_167.5	167.5	0.04	1.5	1.5	2.9	2.8	4.1	4.1	—	0.94
C 31 3_186.0	186.0	0.04	1.5	1.5	2.9	2.8	4.1	4.1	—	0.94
C 31 3_194.1	194.1	0.04	1.5	1.5	2.9	2.8	4.1	4.1	—	0.94
C 31 3_215.6	215.6	0.04	1.5	1.5	2.9	2.8	4.1	4.1	—	0.94
C 31 3_247.3	247.3	0.04	1.5	1.5	2.9	2.8	4.1	4.1	—	0.94
C 31 3_274.7	274.7	0.04	1.5	1.5	2.9	2.8	4.1	4.1	—	0.94

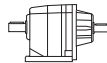


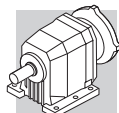
C 35

	i	J (•10-4) [kgm²]								
			 IEC							
			63	71	80	90	100	112	132	
C 35 2_2.7	2.7	3.6	—	—	6.5	6.4	7.7	7.7	20	14
C 35 2_3.5	3.5	2.4	—	—	5.3	5.2	6.5	6.5	19	13
C 35 2_4.6	4.6	1.5	3.0	3.0	4.4	4.3	5.6	5.6	18	12
C 35 2_5.8	5.8	1.0	2.5	2.5	3.9	3.8	5.1	5.1	18	12
C 35 2_6.1	6.1	2.3	—	—	5.2	5.1	6.4	6.4	19	13
C 35 2_6.8	6.8	2.2	—	—	5.1	5.0	6.3	6.3	19	13
C 35 2_7.9	7.9	1.6	—	—	4.5	4.4	5.7	5.7	18	12
C 35 2_8.8	8.8	1.5	—	—	4.4	4.3	5.6	5.6	18	12
C 35 2_10.5	10.5	1.1	2.6	2.6	4.0	3.9	5.2	5.2	18	12
C 35 2_11.7	11.7	1.0	2.5	2.5	3.9	3.8	5.1	5.1	18	12
C 35 2_13.3	13.3	0.70	2.2	2.2	3.6	3.5	4.8	4.8	18	11
C 35 2_14.8	14.8	0.59	2.1	2.1	3.5	3.4	4.7	4.7	17	11
C 35 2_17.1	17.1	0.49	2.0	2.0	3.4	3.3	4.6	4.6	17	11
C 35 2_19.0	19.0	0.47	2.0	2.0	3.4	3.3	4.6	4.6	17	11
C 35 3_20.2	20.2	1.7	—	—	4.6	4.5	5.8	5.8	19	12
C 35 3_22.1	22.1	1.7	—	—	4.6	4.5	5.8	5.8	19	12
C 35 3_26.2	26.2	1.2	—	—	4.1	4.0	5.3	5.3	18	12
C 35 3_28.7	28.7	1.2	—	—	4.1	4.0	5.3	5.3	18	12
C 35 3_34.7	34.7	0.80	2.3	2.3	3.7	3.6	4.9	4.9	18	11
C 35 3_38.1	38.1	0.80	2.3	2.3	3.7	3.6	4.9	4.9	18	11
C 35 3_43.9	43.9	0.50	2.0	2.0	3.4	3.3	4.6	4.6	17	11
C 35 3_48.2	48.2	0.50	2.0	2.0	3.4	3.3	4.6	4.6	17	11
C 35 3_56.5	56.5	0.38	1.9	1.9	3.3	3.2	4.5	4.5	17	11
C 35 3_62.0	62.0	0.41	1.9	1.9	3.3	3.2	4.5	4.5	17	11
C 35 3_70.7	70.7	0.28	1.8	1.8	3.2	3.1	4.4	4.4	17	11
C 35 3_77.6	77.6	0.28	1.8	1.8	3.2	3.1	4.4	4.4	17	11
C 35 3_83.8	83.8	0.21	1.7	1.7	3.1	3.0	4.3	4.3	—	11
C 35 3_91.9	91.9	0.21	1.7	1.7	3.1	3.0	4.3	4.3	—	11
C 35 3_101.6	101.6	0.16	1.7	1.7	3.1	3.0	4.3	4.3	—	11
C 35 3_111.5	111.5	0.16	1.7	1.7	3.1	3.0	4.3	4.3	—	11
C 35 3_127.3	127.3	0.11	1.6	1.6	3.0	2.9	4.2	4.2	—	11
C 35 3_139.8	139.8	0.11	1.6	1.6	3.0	2.9	4.2	4.2	—	11
C 35 3_147.6	147.6	0.09	1.6	1.6	3.0	2.9	4.2	4.2	—	11
C 35 3_162.0	162.0	0.09	1.6	1.6	3.0	2.9	4.2	4.2	—	11
C 35 3_188.0	188.0	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	11
C 35 3_206.4	206.4	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	11
C 35 4_232.3	232.3	0.08	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_255.0	255.0	0.08	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_290.6	290.6	0.07	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_318.9	318.9	0.07	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_344.3	344.3	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_377.9	377.9	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_417.6	417.6	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_458.4	458.4	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_523.5	523.5	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_574.7	574.7	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_606.6	606.6	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_665.9	665.9	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_773.0	773.0	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90
C 35 4_848.5	848.5	0.06	1.6	1.6	3.0	2.9	4.2	4.2	—	0.90



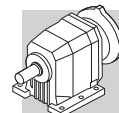
C 41

	i	J (•10 ⁻⁴) [kgm ²]								
			 IEC							
			63	71	80	90	100	112	132	
C 41 2_2.7	2.7	10	—	—	13	13	14	14	29	21
C 41 2_3.6	3.6	6.0	—	—	8.9	8.8	10	10	25	17
C 41 2_4.7	4.7	3.7	—	—	6.6	6.5	7.8	7.8	23	14
C 41 2_6.0	6.0	2.5	—	—	5.4	5.3	6.6	6.6	21	13
C 41 2_6.4	6.4	4.3	—	—	7.2	7.1	8.4	8.4	23	15
C 41 2_7.1	7.1	4.1	—	—	7.0	6.9	8.2	8.2	23	15
C 41 2_8.6	8.6	2.9	—	—	5.8	5.7	7.0	7.0	22	13
C 41 2_9.6	9.6	2.8	—	—	5.7	5.6	6.9	6.9	22	13
C 41 2_11.2	11.2	1.8	—	—	4.7	4.6	5.9	5.9	21	12
C 41 2_12.4	12.4	1.8	—	—	4.7	4.6	5.9	5.9	21	12
C 41 2_14.2	14.2	1.4	2.9	2.9	4.3	4.2	5.5	5.5	20	12
C 41 2_15.8	15.8	1.3	2.8	2.8	4.2	4.1	5.4	5.4	20	12
C 41 2_17.8	17.8	1.0	2.5	2.5	3.9	3.8	5.1	5.1	20	12
C 41 2_19.8	19.8	0.98	2.5	2.5	3.9	3.8	5.1	5.1	20	12
C 41 2_22.6	22.6	0.60	2.1	2.1	3.5	3.4	4.7	4.7	20	11
C 41 2_25.0	25.0	0.60	2.1	2.1	3.5	3.4	4.7	4.7	20	11
C 41 2_28.3	28.3	0.44	1.9	1.9	3.3	3.2	4.5	4.5	19	11
C 41 2_31.4	31.4	0.43	1.9	1.9	3.3	3.2	4.5	4.5	19	11
C 41 2_33.4	33.4	0.34	1.8	1.8	3.2	3.1	4.4	4.4	—	11
C 41 2_37.1	37.1	0.33	1.8	1.8	3.2	3.1	4.4	4.4	—	11
C 41 2_44.8	44.8	0.27	1.8	1.8	3.2	3.1	4.4	4.4	—	11
C 41 3_28.5	28.5	2.5	—	—	5.4	5.3	6.6	6.6	21	13
C 41 3_31.2	31.2	2.5	—	—	5.4	5.3	6.6	6.6	21	13
C 41 3_36.8	36.8	1.6	—	—	4.5	4.4	5.7	5.7	21	12
C 41 3_40.3	40.3	1.6	—	—	4.5	4.4	5.7	5.7	21	12
C 41 3_47.0	47.0	1.2	2.7	2.7	4.1	4.0	5.3	5.3	20	12
C 41 3_51.5	51.5	1.2	2.7	2.7	4.1	4.0	5.3	5.3	20	12
C 41 3_58.7	58.7	0.90	2.4	2.4	3.8	3.7	5.0	5.0	20	11
C 41 3_64.3	64.3	0.90	2.4	2.4	3.8	3.7	5.0	5.0	20	11
C 41 3_74.4	74.4	0.60	2.1	2.1	3.5	3.4	4.7	4.7	20	11
C 41 3_81.5	81.5	0.60	2.1	2.1	3.5	3.4	4.7	4.7	20	11
C 41 3_93.9	93.9	0.40	1.9	1.9	3.3	3.2	4.5	4.5	19	11
C 41 3_102.3	102.3	0.40	1.9	1.9	3.3	3.2	4.5	4.5	19	11
C 41 3_110.1	110.1	0.30	1.8	1.8	3.2	3.1	4.4	4.4	—	11
C 41 3_120.6	120.6	0.30	1.8	1.8	3.2	3.1	4.4	4.4	—	11
C 41 3_132.9	132.9	0.30	1.8	1.8	3.2	3.1	4.4	4.4	—	11
C 41 3_145.6	145.6	0.30	1.8	1.8	3.2	3.1	4.4	4.4	—	11
C 41 3_164.1	164.1	0.20	1.7	1.7	3.1	3.0	4.3	4.3	—	11
C 41 3_179.9	179.9	0.20	1.7	1.7	3.1	3.0	4.3	4.3	—	11
C 41 3_190.8	190.8	0.10	1.6	1.6	3.0	2.9	4.2	4.2	—	11
C 41 3_209.1	209.1	0.10	1.6	1.6	3.0	2.9	4.2	4.2	—	11
C 41 4_239.9	239.9	0.15	1.7	1.7	3.1	3.0	4.3	4.3	—	2.1
C 41 4_263.0	263.0	0.15	1.7	1.7	3.1	3.0	4.3	4.3	—	2.1
C 41 4_304.2	304.2	0.13	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_333.4	333.4	0.13	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_382.0	382.0	0.12	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_419.0	419.0	0.12	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_450.2	450.2	0.12	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_493.5	493.5	0.12	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_543.5	543.5	0.12	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_595.8	595.8	0.12	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_671.3	671.3	0.10	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_735.9	735.9	0.10	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_780.4	780.4	0.10	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0
C 41 4_855.5	855.5	0.10	1.6	1.6	3.0	2.9	4.2	4.2	—	2.0



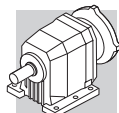
C 51

	i	J (•10-4) [kgm2]										
			 IEC									
			63	71	80	90	100	112	132	160	180	
C 51 2_2.6	2.6	15	—	—	17	17	19	19	33	79	76	25
C 51 2_3.3	3.3	10	—	—	13	13	14	14	29	75	72	21
C 51 2_4.5	4.5	6.3	—	—	9.2	9.1	10	10	25	71	68	17
C 51 2_5.6	5.6	4.1	—	—	7.0	6.9	8.2	8.2	23	69	66	15
C 51 2_7.0	7.0	8.1	—	—	11	11	12	12	27	73	70	19
C 51 2_7.8	7.8	7.8	—	—	11	11	12	12	27	73	70	18
C 51 2_8.8	8.8	6.0	—	—	8.9	8.8	10	10	25	71	68	17
C 51 2_9.8	9.8	5.8	—	—	8.7	8.6	9.9	9.9	25	71	68	16
C 51 2_11.8	11.8	4.1	—	—	7.0	6.9	8.2	8.2	23	69	66	15
C 51 2_13.1	13.1	4.0	—	—	6.9	6.8	8.1	8.1	23	69	66	15
C 51 2_15.0	15.0	2.7	—	—	5.6	5.5	6.8	6.8	22	68	65	13
C 51 2_16.6	16.6	2.6	—	—	5.5	5.4	6.7	6.7	22	68	65	13
C 51 2_18.9	18.9	2.0	3.5	3.5	4.9	4.8	6.1	6.1	21	67	64	13
C 51 2_21.0	21.0	1.9	3.4	3.4	4.8	4.7	6.0	6.0	21	67	64	12
C 51 2_23.4	23.4	1.5	3.0	3.0	4.4	4.3	5.6	5.6	20	66	63	12
C 51 2_25.9	25.9	1.4	2.9	2.9	4.3	4.2	5.5	5.5	20	66	63	12
C 51 2_29.8	29.8	0.90	2.4	2.4	3.8	3.7	5.0	5.0	20	66	63	11
C 51 2_33.0	33.0	0.90	2.4	2.4	3.8	3.7	5.0	5.0	20	66	63	11
C 51 2_36.4	36.4	0.70	2.2	2.2	3.6	3.5	4.8	4.8	20	66	63	11
C 51 2_40.4	40.4	0.70	2.2	2.2	3.6	3.5	4.8	4.8	20	66	63	11
C 51 2_43.1	43.1	0.50	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 51 2_47.8	47.8	0.50	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 51 2_51.4	51.4	0.40	1.9	1.9	3.3	3.2	4.5	4.5	—	—	—	11
C 51 2_57.0	57.0	0.40	1.9	1.9	3.3	3.2	4.5	4.5	—	—	—	11
C 51 3_21.8	21.8	6.8	—	—	9.7	9.6	11	11	26	72	69	17
C 51 3_23.9	23.9	6.8	—	—	9.7	9.6	11	11	26	72	69	17
C 51 3_27.4	27.4	5.2	—	—	8.1	8.0	9.3	9.3	24	70	67	16
C 51 3_30.1	30.1	5.2	—	—	8.1	8.0	9.3	9.3	24	70	67	16
C 51 3_37.0	37.0	3.6	—	—	6.5	6.4	7.7	7.7	23	69	66	14
C 51 3_40.5	40.5	3.6	—	—	6.5	6.4	7.7	7.7	23	69	66	14
C 51 3_46.7	46.7	2.4	—	—	5.3	5.2	6.5	6.5	21	67	64	13
C 51 3_51.2	51.2	2.4	—	—	5.3	5.2	6.5	6.5	21	67	64	13
C 51 3_59.0	59.0	1.8	3.3	3.3	4.7	4.6	5.9	5.9	21	67	64	12
C 51 3_64.6	64.6	1.8	3.3	3.3	4.7	4.6	5.9	5.9	21	67	64	12
C 51 3_72.9	72.9	1.3	2.8	2.8	4.2	4.1	5.4	5.4	20	66	63	12
C 51 3_79.9	79.9	1.3	2.8	2.8	4.2	4.1	5.4	5.4	20	66	63	12
C 51 3_93.0	93.0	0.80	2.3	2.3	3.7	3.6	4.9	4.9	20	66	63	11
C 51 3_101.8	101.8	0.80	2.3	2.3	3.7	3.6	4.9	4.9	20	66	63	11
C 51 3_113.6	113.6	0.60	2.1	2.1	3.5	3.4	4.7	4.7	20	66	63	11
C 51 3_124.4	124.4	0.60	2.1	2.1	3.5	3.4	4.7	4.7	20	66	63	11
C 51 3_134.6	134.6	0.50	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 51 3_147.4	147.4	0.50	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 51 3_160.5	160.5	0.40	1.9	1.9	3.3	3.2	4.5	4.5	—	—	—	11
C 51 3_175.8	175.8	0.40	1.9	1.9	3.3	3.2	4.5	4.5	—	—	—	11
C 51 3_197.9	197.9	0.30	1.8	1.8	3.2	3.1	4.4	4.4	—	—	—	11
C 51 3_216.7	216.7	0.30	1.8	1.8	3.2	3.1	4.4	4.4	—	—	—	11
C 51 4_240.9	240.9	0.30	1.8	1.8	3.2	3.1	4.4	4.4	17	—	—	1.2
C 51 4_263.8	263.8	0.30	1.8	1.8	3.2	3.1	4.4	4.4	17	—	—	1.2
C 51 4_297.8	297.8	0.30	1.8	1.8	3.2	3.1	4.4	4.4	17	—	—	1.2
C 51 4_326.1	326.1	0.30	1.8	1.8	3.2	3.1	4.4	4.4	17	—	—	1.2
C 51 4_380.0	380.0	0.20	1.7	1.7	3.1	3.0	4.3	4.3	17	—	—	1.1
C 51 4_416.0	416.0	0.20	1.7	1.7	3.1	3.0	4.3	4.3	17	—	—	1.1
C 51 4_463.9	463.9	0.20	1.7	1.7	3.1	3.0	4.3	4.3	17	—	—	1.1
C 51 4_508.0	508.0	0.20	1.7	1.7	3.1	3.0	4.3	4.3	17	—	—	1.1
C 51 4_549.7	549.7	0.20	1.7	1.7	3.1	3.0	4.3	4.3	—	—	—	1.1
C 51 4_602.0	602.0	0.20	1.7	1.7	3.1	3.0	4.3	4.3	—	—	—	1.1
C 51 4_655.4	655.4	0.20	1.7	1.7	3.1	3.0	4.3	4.3	—	—	—	1.1
C 51 4_717.7	717.7	0.20	1.7	1.7	3.1	3.0	4.3	4.3	—	—	—	1.1
C 51 4_808.0	808.0	0.20	1.7	1.7	3.1	3.0	4.3	4.3	—	—	—	1.1
C 51 4_884.9	884.9	0.20	1.7	1.7	3.1	3.0	4.3	4.3	—	—	—	1.1

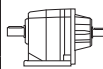


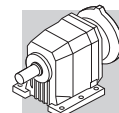
C 61

	i	J (•10-4) [kgm2]										
			 IEC 									
			63	71	80	90	100	112	132	160	180	
C 61 2_2.8	2.8	30	—	—	—	—	—	—	49	78	76	52
C 61 2_3.7	3.7	19	—	—	22	22	23	23	38	78	76	41
C 61 2_4.6	4.6	14	—	—	17	17	18	18	33	78	76	36
C 61 2_6.0	6.0	8.8	—	—	12	12	13	13	28	78	76	31
C 61 2_6.7	6.7	14	—	—	—	—	—	—	33	78	76	36
C 61 2_7.5	7.5	13	—	—	—	—	—	—	32	78	76	35
C 61 2_8.8	8.8	13	—	—	16	16	17	17	32	78	76	35
C 61 2_9.8	9.8	12	—	—	15	15	16	16	31	78	76	34
C 61 2_10.9	10.9	9.6	—	—	13	12	14	14	29	78	76	31
C 61 2_12.1	12.1	9.2	—	—	12	12	13	13	28	78	76	31
C 61 2_14.3	14.3	5.8	—	—	8.7	8.6	9.9	9.9	25	78	76	28
C 61 2_15.9	15.9	5.6	—	—	8.5	8.4	9.7	9.7	25	78	76	27
C 61 2_17.7	17.7	4.4	—	—	7.3	7.2	8.5	8.5	23	78	76	26
C 61 2_19.6	19.6	4.3	—	—	7.2	7.1	8.4	8.4	23	78	76	26
C 61 2_22.4	22.4	3.2	4.7	4.7	6.1	6.0	7.3	7.3	22	78	76	25
C 61 2_24.8	24.8	3.1	4.6	4.6	6.0	5.9	7.2	7.2	22	78	76	25
C 61 2_27.4	27.4	2.1	3.6	3.6	5.0	4.9	6.2	6.2	21	78	76	24
C 61 2_30.4	30.4	2.2	3.7	3.7	5.1	5.0	6.3	6.3	21	78	76	24
C 61 2_34.2	34.2	1.5	3.0	3.0	4.4	4.3	5.6	5.6	20	78	76	23
C 61 2_38.0	38.0	1.5	3.0	3.0	4.4	4.3	5.6	5.6	20	78	76	23
C 61 3_26.8	26.8	10	—	—	13	13	14	14	29	78	76	32
C 61 3_29.4	29.4	10	—	—	13	13	14	14	29	78	76	32
C 61 3_33.0	33.0	8.1	—	—	11	11	12	12	27	78	76	30
C 61 3_36.1	36.1	8.1	—	—	11	11	12	12	27	78	76	30
C 61 3_43.4	43.4	5.0	—	—	7.9	7.8	9.1	9.1	24	78	76	27
C 61 3_47.6	47.6	5.0	—	—	7.9	7.8	9.1	9.1	24	78	76	27
C 61 3_53.5	53.5	3.9	—	—	6.8	6.7	8.0	8.0	23	78	76	26
C 61 3_58.6	58.6	3.8	—	—	6.7	6.6	7.9	7.9	23	78	76	26
C 61 3_67.7	67.7	2.8	4.3	4.3	5.7	5.6	6.9	6.9	22	78	76	25
C 61 3_74.2	74.2	2.8	4.3	4.3	5.7	5.6	6.9	6.9	22	78	76	25
C 61 3_83.0	83.0	1.9	3.4	3.4	4.8	4.7	6.0	6.0	21	78	76	24
C 61 3_91.0	91.0	1.9	3.4	3.4	4.8	4.7	6.0	6.0	21	78	76	24
C 61 3_103.6	103.6	1.3	2.8	2.8	4.2	4.1	5.4	5.4	20	78	76	23
C 61 3_113.6	113.6	1.3	2.8	2.8	4.2	4.1	5.4	5.4	20	78	76	23
C 61 3_128.1	128.1	1.0	2.5	2.5	3.9	3.8	5.1	5.1	20	78	76	23
C 61 3_140.5	140.5	1.0	2.5	2.5	3.9	3.8	5.1	5.1	20	78	76	23
C 61 3_150.0	150.0	0.70	2.2	2.2	3.6	3.5	4.8	4.8	—	—	—	23
C 61 3_164.5	164.5	0.70	2.2	2.2	3.6	3.5	4.8	4.8	—	—	—	23
C 61 3_178.6	178.6	0.60	2.1	2.1	3.5	3.4	4.7	4.7	—	—	—	22
C 61 3_195.8	195.8	0.60	2.1	2.1	3.5	3.4	4.7	4.7	—	—	—	22
C 61 4_217.4	217.4	0.67	2.2	2.2	3.6	3.5	4.8	4.8	—	—	—	11
C 61 4_238.3	238.3	0.67	2.2	2.2	3.6	3.5	4.8	4.8	—	—	—	11
C 61 4_275.3	275.3	0.81	2.3	2.3	3.7	3.6	4.9	4.9	—	—	—	11
C 61 4_301.7	301.7	0.81	2.3	2.3	3.7	3.6	4.9	4.9	—	—	—	11
C 61 4_337.7	337.7	0.56	2.1	2.1	3.5	3.4	4.7	4.7	—	—	—	11
C 61 4_370.1	370.1	0.56	2.1	2.1	3.5	3.4	4.7	4.7	—	—	—	11
C 61 4_421.5	421.5	0.53	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 61 4_462.0	462.0	0.53	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 61 4_521.1	521.1	0.51	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 61 4_571.2	571.2	0.51	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 61 4_610.1	610.1	0.49	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 61 4_668.8	668.8	0.49	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 61 4_726.3	726.3	0.48	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
C 61 4_796.1	796.1	0.48	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11



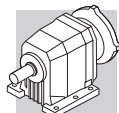
C 70

	i	J (•10-4) [kgm²]													
			 IEC												
			63	71	80	90	100 112	132	160	180	200	225	250		280
C 70 2_4.6	4.6	—	—	—	—	—	—	—	136	133	143	—	—	—	99
C 70 2_5.9	5.9	—	—	—	—	—	—	—	119	117	126	—	—	—	32
C 70 2_6.3	6.3	—	—	—	—	—	—	—	129	127	136	—	—	—	93
C 70 2_7.5	7.5	26	—	—	—	—	—	45	105	102	112	—	—	—	68
C 70 2_8.0	8.0	—	—	—	—	—	—	—	115	113	122	—	—	—	78
C 70 2_9.5	9.5	19	—	—	—	—	—	38	97	95	—	—	—	—	60
C 70 2_10.2	10.2	24	—	—	—	—	—	43	102	100	109	—	—	—	65
C 70 2_11.2	11.2	15	—	—	—	—	—	34	94	91	—	—	—	—	56
C 70 2_13.0	13.0	17	—	—	—	—	—	36	95	93	—	—	—	—	58
C 70 2_14.1	14.1	9.9	—	—	12	12	14	29	88	86	—	—	—	—	51
C 70 2_15.3	15.3	14	—	—	—	—	—	33	93	90	—	—	—	—	55
C 70 2_16.7	16.7	6.9	—	—	9.5	9.4	11	26	85	83	—	—	—	—	48
C 70 2_19.3	19.3	9.1	—	—	12	12	13	28	87	85	—	—	—	—	50
C 70 2_22.9	22.9	6.4	—	—	9.0	8.9	10	25	85	83	—	—	—	—	48
C 70 2_27.7	27.7	5.2	—	—	8.0	7.9	9.2	24	84	81	—	—	—	—	46
C 70 2_34.7	34.7	3.2	—	—	6.1	6.0	7.3	22	82	79	—	—	—	—	44
C 70 3_41.3	41.3	4.4	—	—	7.2	7.2	8.5	23	83	80	—	—	—	—	46
C 70 3_44.7	44.7	4.2	—	—	7.0	7.0	8.2	23	83	80	—	—	—	—	45
C 70 3_52.2	52.2	3.0	—	—	5.8	5.8	7.0	22	81	79	—	—	—	—	44
C 70 3_56.5	56.5	2.8	—	—	5.7	5.6	6.9	22	81	79	—	—	—	—	44
C 70 3_65.9	65.9	2.0	—	—	4.9	4.8	6.1	21	80	78	—	—	—	—	43
C 70 3_71.3	71.3	2.0	—	—	4.8	4.8	6.0	21	80	78	—	—	—	—	43
C 70 3_81.4	81.4	1.5	—	—	4.3	4.3	5.6	20	80	78	—	—	—	—	43
C 70 3_88.2	88.2	1.4	—	—	4.3	4.2	5.5	20	80	76	—	—	—	—	43
C 70 3_103.8	103.8	1.0	—	—	3.8	3.8	5.1	20	79	77	—	—	—	—	42
C 70 3_112.4	112.4	0.90	—	—	3.8	3.7	5.0	20	79	77	—	—	—	—	42
C 70 3_126.8	126.8	0.70	—	—	3.5	3.5	4.8	20	79	77	—	—	—	—	42
C 70 3_137.4	137.4	0.70	—	—	3.5	3.5	4.7	20	79	77	—	—	—	—	42
C 70 3_150.3	150.3	0.50	—	—	3.4	3.4	9.6	—	—	—	—	—	—	—	42
C 70 3_162.8	162.8	0.50	—	—	3.4	3.4	4.6	—	—	—	—	—	—	—	42
C 70 3_179.2	179.2	0.40	—	—	3.2	3.3	4.5	—	—	—	—	—	—	—	42
C 70 3_194.1	194.1	0.40	—	—	3.2	3.2	4.5	—	—	—	—	—	—	—	42
C 70 3_220.9	220.9	0.30	—	—	3.1	3.1	4.3	—	—	—	—	—	—	—	41
C 70 3_239.3	239.3	0.30	—	—	3.1	3.1	4.3	—	—	—	—	—	—	—	41
C 70 4_251.3	251.3	0.70	2.2	2.2	3.5	3.5	4.8	20	—	—	—	—	—	—	11
C 70 4_272.2	272.2	0.70	2.2	2.1	3.5	3.5	4.8	20	—	—	—	—	—	—	11
C 70 4_317.9	317.9	0.50	2.0	2.0	3.4	3.3	4.6	19	—	—	—	—	—	—	11
C 70 4_344.3	344.3	0.50	2.0	2.0	3.4	3.3	4.6	19	—	—	—	—	—	—	11
C 70 4_409.4	409.4	0.40	1.8	1.8	3.2	3.2	4.5	19	—	—	—	—	—	—	7.9
C 70 4_443.5	443.5	0.40	1.8	1.8	3.2	3.2	4.5	19	—	—	—	—	—	—	7.9
C 70 4_512.0	512.0	0.30	1.7	1.7	3.1	3.1	4.4	19	—	—	—	—	—	—	7.8
C 70 4_554.7	554.7	0.30	1.7	1.7	3.1	3.1	4.4	19	—	—	—	—	—	—	7.8
C 70 4_606.8	606.8	0.20	1.7	1.7	3.1	3.0	4.3	—	—	—	—	—	—	—	7.8
C 70 4_657.3	657.3	0.20	1.7	1.7	3.1	3.0	4.3	—	—	—	—	—	—	—	7.7
C 70 4_736.0	736.0	0.20	1.6	1.6	3.0	2.9	4.3	—	—	—	—	—	—	—	7.7
C 70 4_797.3	797.3	0.20	1.6	1.6	3.0	2.9	4.3	—	—	—	—	—	—	—	7.7
C 70 4_922.6	922.6	0.10	1.6	1.6	3.0	2.9	4.2	—	—	—	—	—	—	—	7.7
C 70 4_999.5	999.5	0.10	1.6	1.6	3.0	2.9	4.2	—	—	—	—	—	—	—	7.6
C 70 4_1069	1069	0.80	1.6	1.5	2.9	2.9	4.2	—	—	—	—	—	—	—	7.6
C 70 4_1158	1158	0.80	1.6	1.5	2.9	2.9	4.2	—	—	—	—	—	—	—	7.6
C 70 4_1362	1362	0.60	1.5	1.5	2.9	2.9	4.1	—	—	—	—	—	—	—	7.6
C 70 4_1476	1476	0.60	1.5	1.5	2.9	2.9	4.1	—	—	—	—	—	—	—	7.6

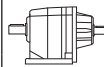


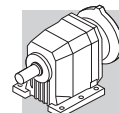
C 80

	i	J (•10-4) [kgm ²]													
			 IEC												
			63	71	80	90	100 112	132	160	180	200	225	250		280
C 80 2_5.6	5.6	—	—	—	—	—	—	—	—	197	211	489	—	—	164
C 80 2_6.1	6.1	—	—	—	—	—	—	—	—	193	210	485	—	—	159
C 80 2_7.0	7.0	—	—	—	—	—	—	—	160	161	174	452	—	—	127
C 80 2_7.6	7.6	—	—	—	—	—	—	—	158	158	172	449	—	—	124
C 80 2_8.9	8.9	—	—	—	—	—	—	—	137	135	146	429	—	—	101
C 80 2_9.6	9.6	—	—	—	—	—	—	—	136	133	144	427	—	—	99
C 80 2_11.1	11.1	38	—	—	—	—	—	56	116	113	124	408	—	—	79
C 80 2_12.0	12.0	36	—	—	—	—	—	55	115	112	123	407	—	—	78
C 80 2_13.8	13.8	28	—	—	—	—	—	47	106	104	135	398	—	—	69
C 80 2_14.9	14.9	27	—	—	—	—	—	46	106	103	134	397	—	—	69
C 80 2_16.7	16.7	21	—	—	—	—	—	40	100	97	127	391	—	—	63
C 80 2_18.1	18.1	21	—	—	—	—	—	40	99	97	127	390	—	—	62
C 80 2_20.5	20.5	14	—	—	17	17	18	33	93	90	120	383	—	—	55
C 80 2_22.2	22.2	14	—	—	16	16	18	33	92	90	120	383	—	—	55
C 80 2_24.0	24.0	13	—	—	16	16	17	32	91	89	119	382	—	—	54
C 80 2_25.9	25.9	13	—	—	16	15	17	32	91	89	118	382	—	—	54
C 80 2_31.3	31.3	8.7	—	—	12	11	13	28	87	85	—	—	—	—	50
C 80 2_39.1	39.1	5.2	—	—	8.0	8.0	9.2	24	84	81	—	—	—	—	46
C 80 3_43.5	43.5	9.6	—	—	12	12	14	29	88	86	—	—	—	—	51
C 80 3_47.4	47.4	9.1	—	—	12	12	13	28	87	85	—	—	—	—	50
C 80 3_57.3	57.3	5.7	—	—	8.5	8.5	9.7	25	84	82	—	—	—	—	47
C 80 3_62.5	62.5	5.4	—	—	8.2	8.2	9.5	24	84	82	—	—	—	—	47
C 80 3_70.5	70.5	4.3	—	—	7.1	7.0	8.3	23	83	80	—	—	—	—	45
C 80 3_76.9	76.9	4.1	—	—	7.0	6.9	8.2	23	82	80	—	—	—	—	45
C 80 3_89.3	89.3	3.0	—	—	5.9	5.8	7.1	22	81	79	—	—	—	—	44
C 80 3_97.4	97.4	2.9	—	—	5.8	5.7	7.0	22	81	79	—	—	—	—	44
C 80 3_109.5	109.5	2.0	—	—	4.8	4.8	6.1	21	80	78	—	—	—	—	43
C 80 3_119.5	119.5	1.9	—	—	4.8	4.7	6.0	21	80	79	—	—	—	—	43
C 80 3_136.7	136.7	1.4	—	—	4.3	4.2	5.5	20	80	78	—	—	—	—	43
C 80 3_149.1	149.1	1.4	—	—	4.2	4.2	5.5	20	80	77	—	—	—	—	43
C 80 3_169.0	169.0	1.0	—	—	3.9	3.8	5.1	20	80	77	—	—	—	—	42
C 80 3_184.4	184.4	1.0	—	—	3.9	3.8	5.1	20	80	77	—	—	—	—	42
C 80 3_197.9	197.9	0.80	—	—	3.7	3.6	4.9	—	—	—	—	—	—	—	42
C 80 3_215.8	215.8	0.80	—	—	3.6	3.6	4.9	—	—	—	—	—	—	—	42
C 80 4_261.9	261.9	1.7	—	—	4.6	4.5	5.8	21	—	—	—	—	—	—	12
C 80 4_285.7	285.7	1.7	—	—	4.6	4.5	5.8	21	—	—	—	—	—	—	12
C 80 4_334.3	334.3	1.2	2.7	2.7	4.0	4.0	5.3	20	—	—	—	—	—	—	11
C 80 4_364.7	364.7	1.2	2.7	2.6	4.0	4.0	5.3	20	—	—	—	—	—	—	11
C 80 4_417.5	417.5	0.90	2.4	2.3	3.7	3.7	5.0	20	—	—	—	—	—	—	11
C 80 4_455.4	455.4	0.90	2.3	2.3	3.7	3.7	5.5	20	—	—	—	—	—	—	11
C 80 4_529.3	529.3	0.50	2.0	2.0	3.4	3.3	4.6	19	—	—	—	—	—	—	11
C 80 4_577.4	577.4	0.50	2.0	2.0	3.4	3.3	4.6	19	—	—	—	—	—	—	11
C 80 4_664.3	664.3	0.40	2.0	1.9	3.3	3.2	4.5	19	—	—	—	—	—	—	11
C 80 4_724.7	724.7	0.40	2.0	1.9	3.3	3.2	4.5	19	—	—	—	—	—	—	11
C 80 4_783.4	783.4	0.30	2.0	1.8	3.2	3.1	4.4	—	—	—	—	—	—	—	9.4
C 80 4_854.6	854.6	0.30	2.0	1.8	3.2	3.1	4.4	—	—	—	—	—	—	—	9.4
C 80 4_945.7	945.7	0.20	1.7	1.7	3.1	3.0	4.3	—	—	—	—	—	—	—	9.3
C 80 4_1032	1032	0.20	1.7	1.7	3.1	3.0	4.3	—	—	—	—	—	—	—	9.3
C 80 4_1168	1168	0.20	1.6	1.6	3.0	3.0	4.2	—	—	—	—	—	—	—	9.2
C 80 4_1274	1274	0.20	1.6	1.6	3.0	3.0	4.2	—	—	—	—	—	—	—	9.2
C 80 4_1358	1358	0.10	1.6	1.6	3.0	2.9	4.2	—	—	—	—	—	—	—	9.2
C 80 4_1481	1481	0.10	1.6	1.6	3.0	2.9	4.2	—	—	—	—	—	—	—	9.2



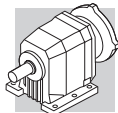
C 90

	i	J (•10-4) [kgm ²]													
			 IEC												
			63	71	80	90	100 112	132	160	180	200	225	250		280
C 90 2_5.2	5.2	—	—	—	—	—	—	—	—	—	332	610	637	—	619
C 90 2_5.6	5.6	—	—	—	—	—	—	—	—	—	321	599	626	—	609
C 90 2_6.8	6.8	—	—	—	—	—	—	—	—	—	252	530	557	—	540
C 90 2_7.3	7.3	—	—	—	—	—	—	—	—	—	246	524	551	—	533
C 90 2_8.3	8.3	—	—	—	—	—	—	—	—	—	212	490	517	—	499
C 90 2_9.0	9.0	—	—	—	—	—	—	—	—	—	208	485	513	—	495
C 90 2_10.4	10.4	—	—	—	—	—	—	—	167	164	175	458	484	—	461
C 90 2_11.2	11.2	—	—	—	—	—	—	—	164	162	173	455	482	—	458
C 90 2_12.8	12.8	65	—	—	—	—	—	84	143	141	152	436	462	—	439
C 90 2_13.9	13.9	63	—	—	—	—	—	82	141	139	200	434	460	—	437
C 90 2_16.0	16.0	47	—	—	—	—	—	66	125	123	154	417	443	—	420
C 90 2_17.3	17.3	46	—	—	—	—	—	65	124	122	153	416	442	—	419
C 90 2_18.7	18.7	42	—	—	—	—	—	61	121	119	148	412	433	—	415
C 90 2_20.2	20.2	41	—	—	—	—	—	61	199	118	147	411	438	—	414
C 90 2_22.9	22.9	28	—	—	30	30	31	47	106	104	133	397	423	—	400
C 90 2_24.8	24.8	27	—	—	29	29	31	46	105	103	133	396	422	—	399
C 90 2_27.2	27.2	22	—	—	25	25	26	41	101	99	128	391	418	—	394
C 90 2_29.4	29.4	22	—	—	25	24	26	41	100	98	127	391	417	—	394
C 90 2_35.1	35.1	14	—	—	17	17	18	33	93	90	—	—	—	—	386
C 90 3_39.4	39.4	27	—	—	—	—	—	46	105	103	112	398	424	—	412
C 90 3_43.0	43.0	26	—	—	—	—	—	45	104	102	111	396	422	—	410
C 90 3_50.3	50.3	19	—	—	—	—	—	38	98	95	126	389	415	—	403
C 90 3_54.9	54.9	19	—	—	—	—	—	37	97	95	125	389	415	—	401
C 90 3_59.2	59.2	16	—	—	—	—	—	35	94	92	122	385	411	—	398
C 90 3_64.6	64.6	15	—	—	—	—	—	34	94	91	121	384	410	—	398
C 90 3_74.4	74.4	10	—	—	13	13	14	29	88	86	116	379	405	—	393
C 90 3_81.2	81.2	9.8	—	—	12	12	13	29	88	86	115	379	405	—	392
C 90 3_88.2	88.2	7.1	—	—	9.7	9.6	11	26	85	83	113	376	402	—	389
C 90 3_96.2	96.2	6.9	—	—	9.4	9.4	11	26	85	83	112	376	402	—	389
C 90 3_107.0	107.0	5.7	—	—	8.4	8.4	9.6	25	84	82	—	—	—	—	388
C 90 3_116.7	116.7	5.5	—	—	8.3	8.2	9.5	24	84	82	—	—	—	—	388
C 90 3_134.1	134.1	3.5	—	—	6.4	6.3	7.6	22	82	80	—	—	—	—	386
C 90 3_146.3	146.3	3.4	—	—	6.3	6.2	7.5	22	82	80	—	—	—	—	386
C 90 3_157.8	157.8	2.5	—	—	5.4	5.3	6.6	21	81	79	—	—	—	—	385
C 90 3_172.1	172.1	2.4	—	—	5.3	5.2	6.5	21	81	79	—	—	—	—	385
C 90 4_212.4	212.4	4.2	—	—	7.0	7.0	8.3	23	83	80	—	—	—	—	14
C 90 4_231.7	231.7	4.1	—	—	7.0	6.9	8.2	23	82	80	—	—	—	—	14
C 90 4_268.5	268.5	2.8	—	—	5.7	5.6	6.9	22	81	79	—	—	—	—	13
C 90 4_292.9	292.9	2.8	—	—	5.7	2.6	6.9	22	81	79	—	—	—	—	13
C 90 4_339.0	339.0	2.0	3.4	3.4	4.8	4.8	6.0	21	80	78	—	—	—	—	12
C 90 4_369.8	369.8	2.0	3.4	3.4	4.8	4.8	6.0	21	80	78	—	—	—	—	12
C 90 4_419.0	419.0	1.4	2.9	2.9	4.3	4.2	5.5	20	80	78	—	—	—	—	12
C 90 4_457.1	457.1	1.4	2.9	2.9	4.3	4.2	5.5	20	80	78	—	—	—	—	12
C 90 4_534.2	534.2	0.90	2.4	2.4	3.8	3.7	5.0	20	79	77	—	—	—	—	11
C 90 4_582.8	582.8	0.90	2.4	2.4	3.8	3.7	5.0	20	79	77	—	—	—	—	11
C 90 4_652.8	652.8	0.70	2.1	2.1	3.5	3.5	4.7	20	79	77	—	—	—	—	11
C 90 4_712.2	712.2	0.70	2.1	2.1	3.5	3.5	4.7	20	79	77	—	—	—	—	11
C 90 4_773.6	773.6	0.50	2.0	2.0	3.4	3.3	4.6	—	—	—	—	—	—	—	9.7
C 90 4_844.0	844.0	0.50	2.0	2.0	3.4	3.3	4.6	—	—	—	—	—	—	—	9.6
C 90 4_922.3	922.3	0.40	1.8	1.8	3.2	3.2	4.5	—	—	—	—	—	—	—	9.5
C 90 4_1006	1006	0.40	1.8	1.8	3.2	3.2	4.5	—	—	—	—	—	—	—	9.4
C 90 4_1137	1137	0.30	1.7	1.7	3.1	3.0	4.3	—	—	—	—	—	—	—	9.3
C 90 4_1240	1240	0.30	1.7	1.7	3.1	3.0	4.3	—	—	—	—	—	—	—	9.3



C 100

	i	J (•10-4) [kgm ²]												
			 IEC											
			63	71	80	90	100 112	132	160	180	200	225	250	280
C 100 2_4.9	4.9	—	—	—	—	—	—	—	—	—	674	960	987	970
C 100 2_5.3	5.3	—	—	—	—	—	—	—	—	—	647	933	960	943
C 100 2_6.5	6.5	—	—	—	—	—	—	—	—	—	481	767	794	777
C 100 2_7.1	7.1	—	—	—	—	—	—	—	—	—	465	751	778	761
C 100 2_8.4	8.4	—	—	—	—	—	—	—	—	—	365	651	678	660
C 100 2_9.0	9.0	—	—	—	—	—	—	—	—	—	355	641	668	651
C 100 2_10.1	10.1	—	—	—	—	—	—	—	—	—	291	577	604	587
C 100 2_10.9	10.9	—	—	—	—	—	—	—	—	—	285	570	597	580
C 100 2_12.5	12.5	—	—	—	—	—	—	224	222	233	521	550	539	529
C 100 2_13.5	13.5	—	—	—	—	—	—	220	218	228	517	545	532	524
C 100 2_15.2	15.2	122	—	—	—	—	—	82	141	200	199	472	499	528
C 100 2_16.5	16.5	119	—	—	—	—	—	138	197	195	206	496	525	511
C 100 2_18.7	18.7	97	—	—	—	—	—	116	175	173	203	474	501	488
C 100 2_20.2	20.2	95	—	—	—	—	—	114	173	171	201	471	499	486
C 100 2_22.2	22.2	73	—	—	—	—	—	92	102	150	179	448	477	463
C 100 2_24.1	24.1	72	—	—	—	—	—	91	150	148	178	447	476	462
C 100 2_29.6	29.6	50	—	—	—	—	54	69	129	127	156	425	454	440
C 100 3_34.3	34.3	—	—	—	—	—	—	—	148	146	155	439	465	471
C 100 3_36.9	36.9	—	—	—	—	—	—	—	145	143	152	436	462	468
C 100 3_42.9	42.9	44	—	—	—	—	—	63	123	120	130	415	441	451
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C 100 3_53.3	53.3	33	—	—	—	—	—	51	111	109	139	403	429	432
C 100 3_57.4	57.4	31	—	—	—	—	—	50	110	107	138	401	427	431
C 100 3_64.5	64.5	24	—	—	—	—	—	43	103	101	130	394	420	422
C 100 3_69.4	69.4	24	—	—	—	—	—	43	102	100	129	393	419	421
C 100 3_79.4	79.4	16	—	—	—	—	20	35	95	92	122	385	411	413
C 100 3_85.6	85.6	16	—	—	—	—	19	35	94	92	121	385	411	413
C 100 3_92.7	92.7	15	—	—	—	—	18	34	93	91	120	384	410	412
C 100 3_99.8	99.8	14	—	—	—	—	18	33	93	90	119	383	409	411
C 100 3_111.9	111.9	9.9	—	—	—	—	14	29	88	86	—	—	—	—
C 100 3_120.5	120.5	9.6	—	—	—	—	14	29	88	86	—	—	—	—
C 100 3_139.7	139.7	6.0	—	—	—	—	10	25	84	82	—	—	—	—
C 100 3_150.4	150.4	5.8	—	—	—	—	9.8	25	84	82	—	—	—	—
C 100 4_162.1	162.1	13	—	—	16	16	17	32	100	89	—	—	—	—
C 100 4_185.4	185.4	9.6	—	—	13	12	14	29	88	86	—	—	—	—
C 100 4_199.6	199.6	8.5	—	—	12	12	14	28	88	86	—	—	—	—
C 100 4_244.2	244.2	5.7	—	—	8.5	8.5	9.8	25	84	82	—	—	—	—
C 100 4_263.0	263.0	5.6	—	—	8.5	8.4	9.7	25	84	82	—	—	—	—
C 100 4_300.5	300.5	4.2	—	—	7.1	7.1	8.4	23	83	80	—	—	—	—
C 100 4_323.6	323.6	4.2	—	—	7.1	7.0	8.3	23	83	80	—	—	—	—
C 100 4_380.5	380.5	3.1	4.5	4.5	5.9	5.5	7.1	22	81	79	—	—	—	—
C 100 4_409.8	409.8	3.0	4.5	4.5	5.9	5.5	7.1	22	81	79	—	—	—	—
C 100 4_466.7	466.7	2.0	3.5	3.5	4.9	4.8	6.1	20	80	78	—	—	—	—
C 100 4_502.6	502.6	2.0	3.5	3.4	4.8	4.8	6.1	20	80	78	—	—	—	—
C 100 4_582.6	582.6	1.4	2.9	2.9	4.3	4.2	5.5	20	80	77	—	—	—	—
C 100 4_627.4	627.4	1.4	2.9	2.9	4.3	4.2	5.5	20	80	77	—	—	—	—
C 100 4_720.3	720.3	1.0	2.5	2.5	3.9	3.4	5.1	20	79	77	—	—	—	—
C 100 4_775.7	775.7	1.0	2.5	2.5	3.9	3.4	5.1	20	79	77	—	—	—	—
C 100 4_843.3	843.3	0.80	2.3	2.3	3.7	3.6	4.9	—	—	—	—	—	—	—
C 100 4_908.2	908.2	0.80	2.3	2.3	3.7	3.6	4.9	—	—	—	—	—	—	—
C 100 4_1004	1004	0.60	2.1	2.0	3.4	3.4	4.7	—	—	—	—	—	—	—
C 100 4_1081	1081	0.60	2.1	2.0	3.4	3.4	4.7	—	—	—	—	—	—	—



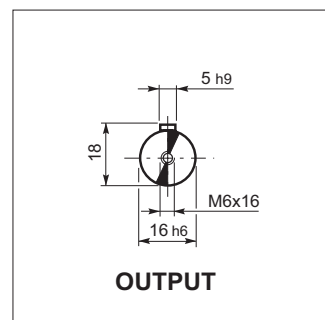
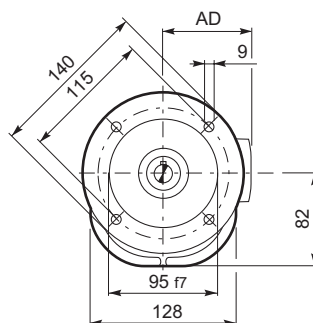
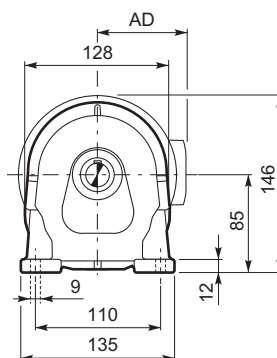
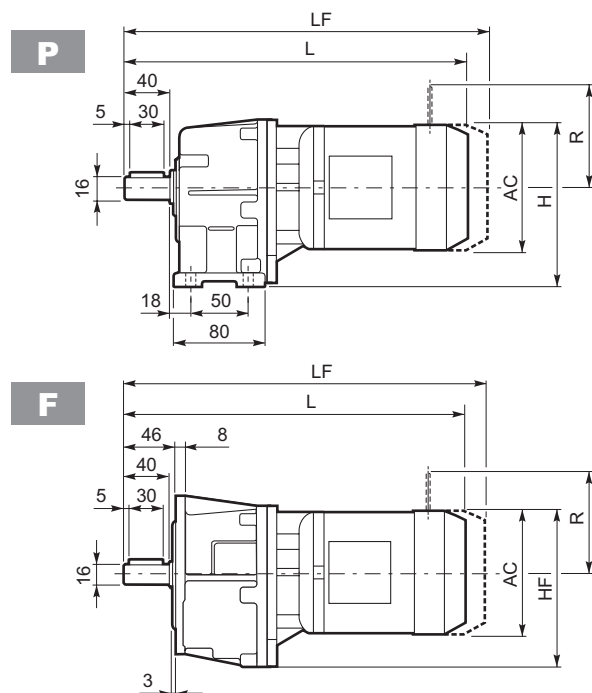
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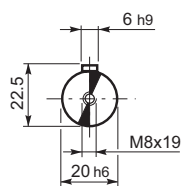
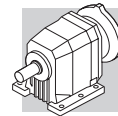
28 - DIMENSIONS

28 - ABMESSUNGEN

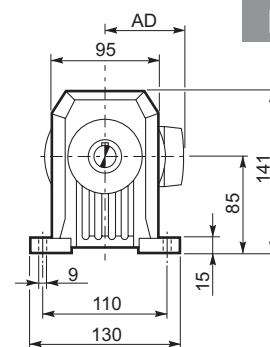
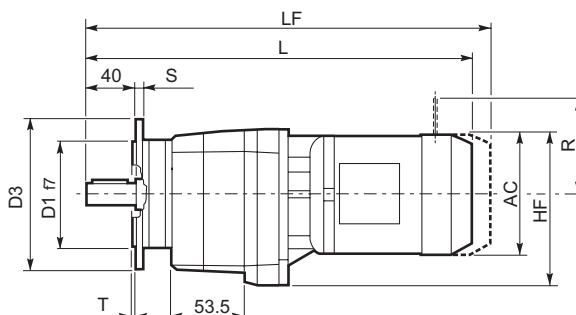
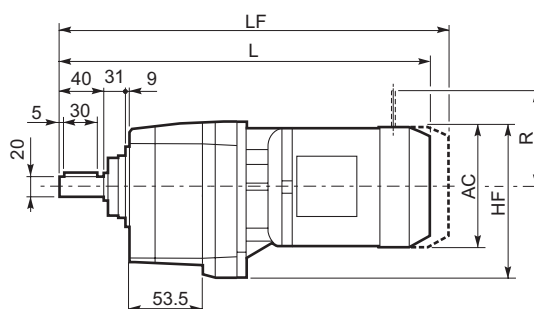
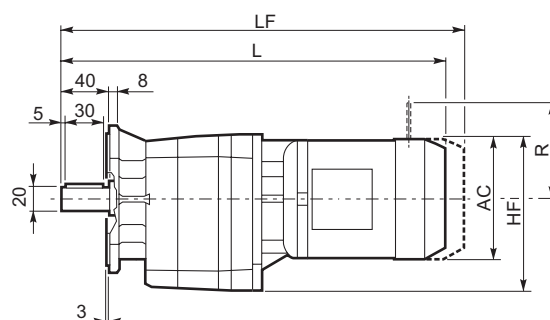
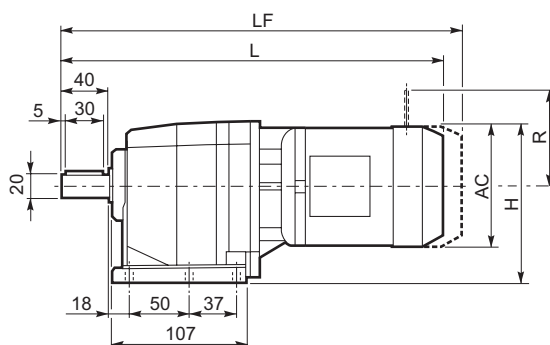
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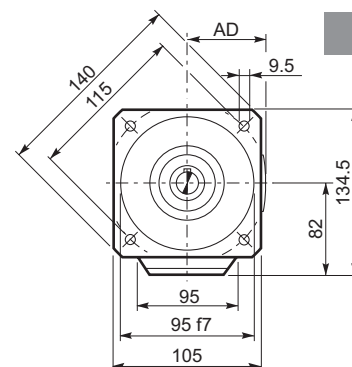
C 05														
  									M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	AD		LF		R	AD	R	AD
C 05 2	S0	M0	110	140	137	287	91	7	—	—	—	—	—	—
C 05 2	S05	M05	121	145.5	142.5	332	95	8	398	10	96	122	116	95
C 05 2	S1	M1	138	154	151	360.5	108	11	423	13	103	135	124	108



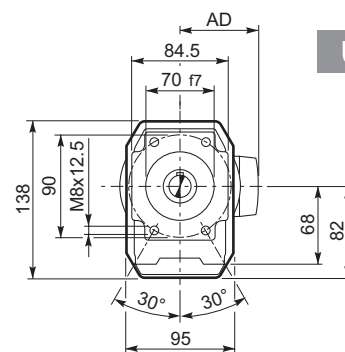
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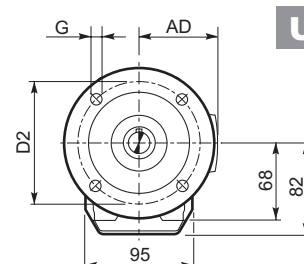
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F



U



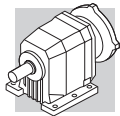
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C 11 2 U

	D1	D2	D3	G	T	S
FA	80	100	120	7	3	8
FB	95	115	140	9	3	10
FC	110	130	160	9	3	10

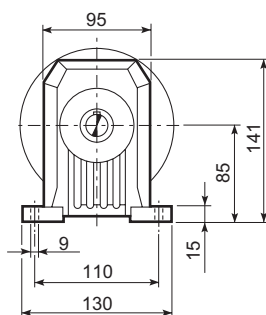
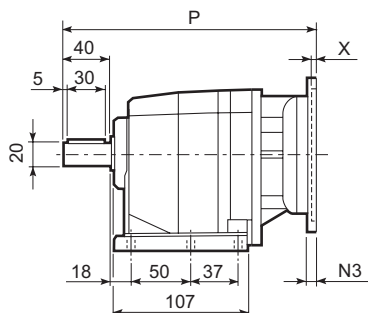
C 11

										M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	AD	Kg		LF	Kg	R	AD	R	AD
C 11 2	S05	M05	121	145.5	142.5	370.5	95	9		436.5	10	96	122	116	95
C 11 2	S1	M1	138	154	151	404.5	108	11		460.5	13	103	135	124	108
C 11 2	S2	M2S	156	163	160	428.5	119	15		498.5	18	129	146	134	119
C 11 2	S2	ME2S	156	163	160	428.5	119	15		—	—	—	—	—	—
C 11 2	S3	ME3S	195	182.5	179.5	471.5	142	21.5		—	—	—	—	—	—
C 11 2	S3	ME3L	195	182.5	179.5	503.5	142	22		—	—	—	—	—	—

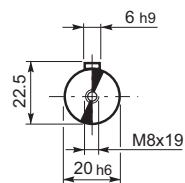


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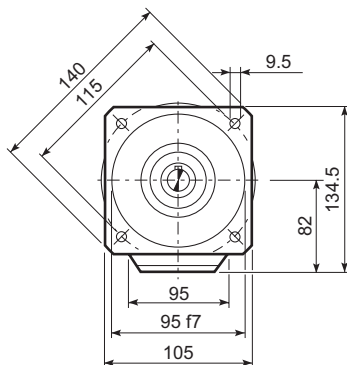
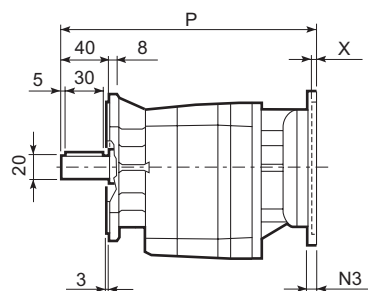
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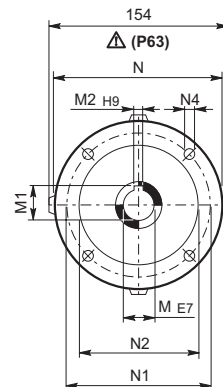
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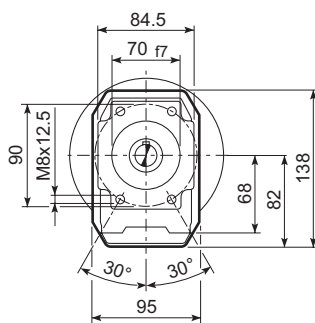
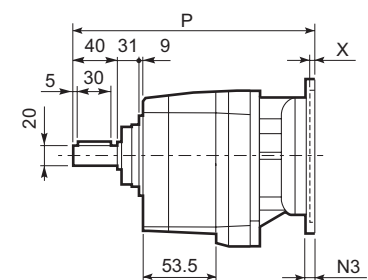
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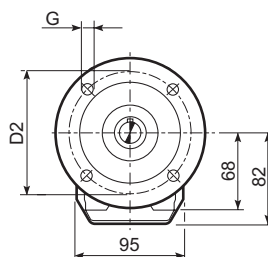
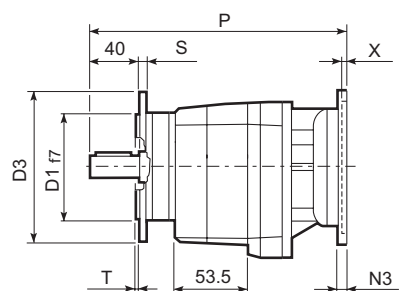


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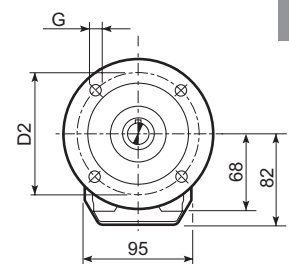
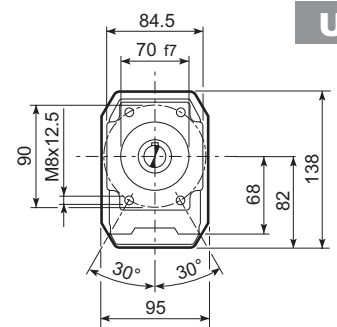
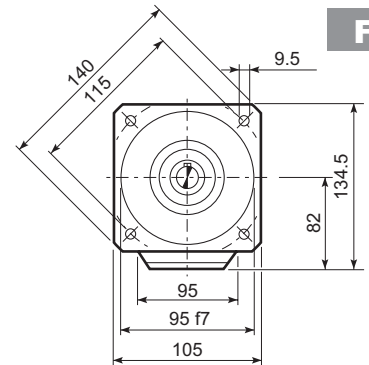
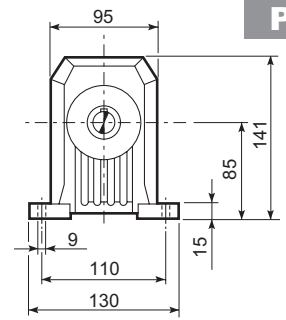
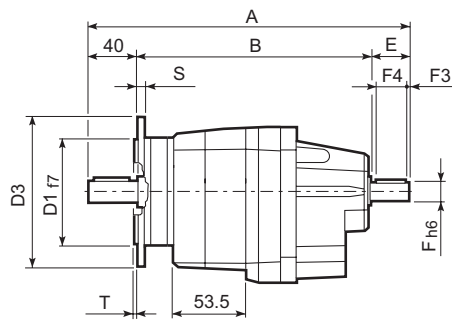
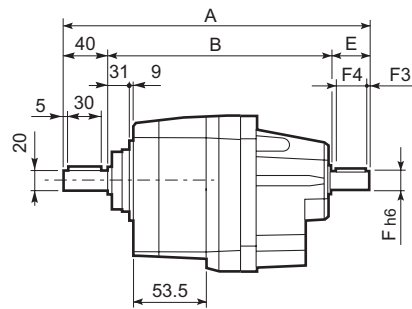
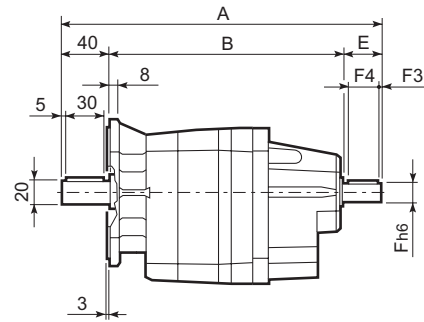
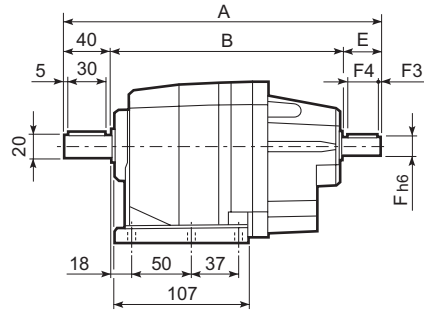
C 11 2 U

	D1	D2	D3	G	T	S
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FB	95	115	140	9	3	10
FC	110	130	160	9	3	10



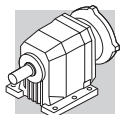
C 11

		M	M1	M2	N	N1	N2	N3	N4	X	P	Kg
C 11 2	P63	11	12.8	4	140	115	95	—	M8x19	4	244.5	6
C 11 2	P71	14	16.3	5	160	130	110	—	M8x16	4.5	244.5	6
C 11 2	P80	19	21.8	6	200	165	130	—	M10x12	4	264	7
C 11 2	P90	24	27.3	8	200	165	130	—	M10x12	4	264	7
C 11 2	P100	28	31.3	8	250	215	180	—	M12x16	4.5	274	11
C 11 2	P112	28	31.3	8	250	215	180	—	M12x16	4.5	274	11



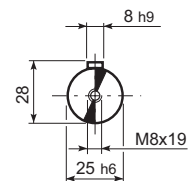
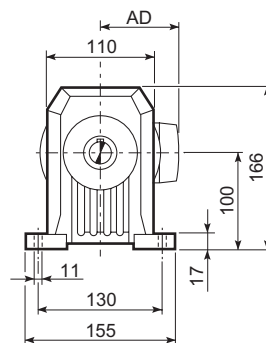
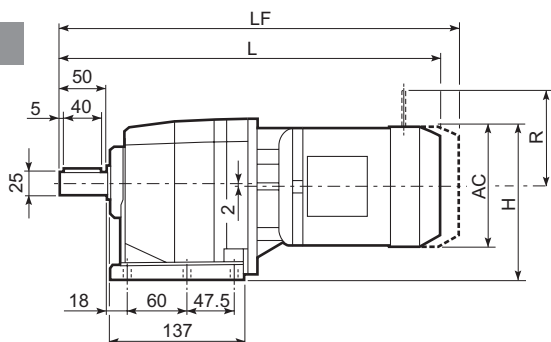
C 11 2_U						
	D1	D2	D3	G	T	S
FA	80	100	120	7	3	8
FB	95	115	140	9	3	10
FC	110	130	160	9	3	10

C 11											
		A	B	E	F	F1	F2	F3	F4	V	
C 11 2	HS	251.5	171.5	40	16	18	5	2.5	35	M6x16	7.8



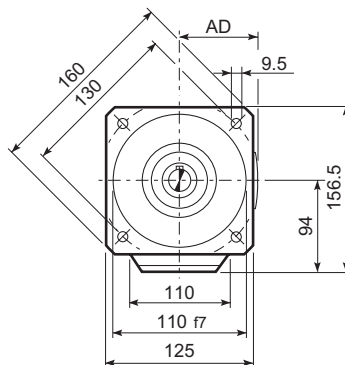
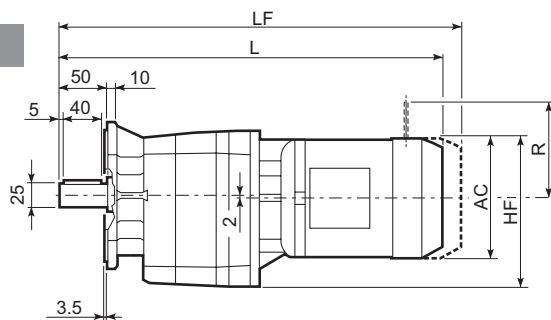
C 21...M/ME

P

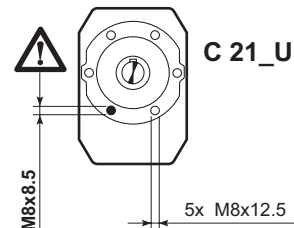
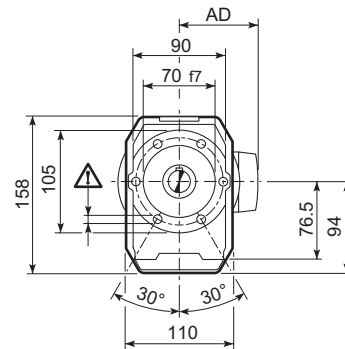
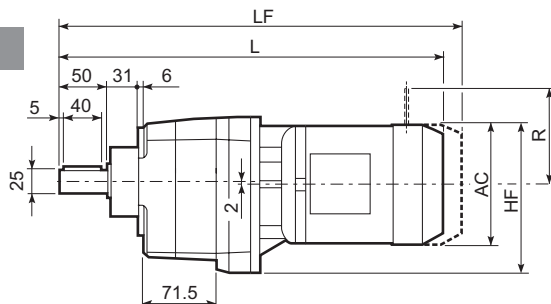


OUTPUT

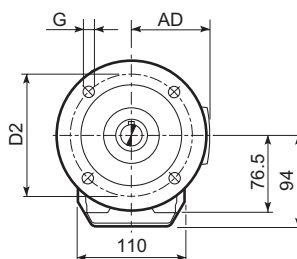
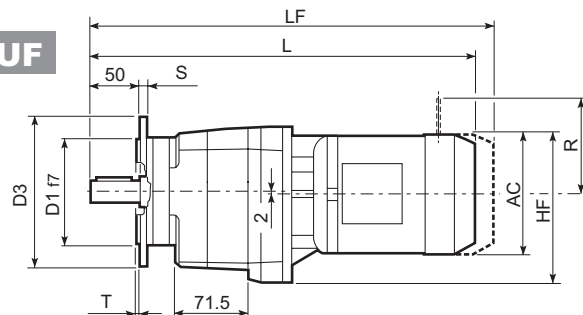
F



U



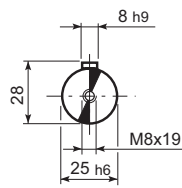
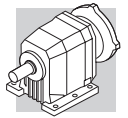
UF



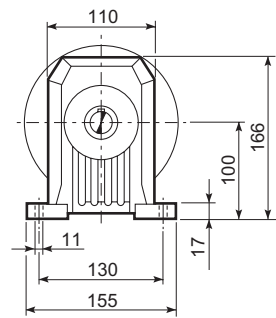
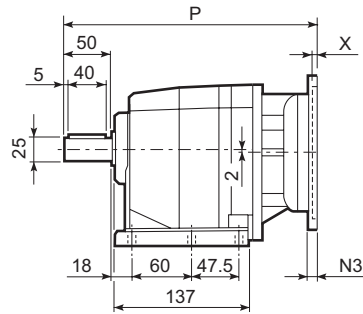
C 21_U						
	D1	D2	D3	G	T	S
FA	95	115	140	9	3	10
FB	110	130	160	9	3	10
FC	130	165	200	11	3.5	11

C 21

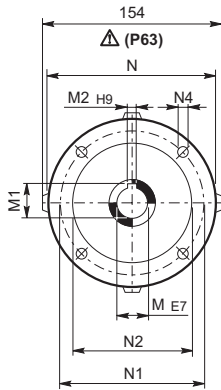
										M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	AD			LF		R	AD	R	AD
C 21 2	S1	M1	138	169	163	428	108	11		489	14	103	135	124	108
C 21 2	S2	M2S	156	178	170	456	119	16		527	19	129	146	134	119
C 21 2	S2	ME2S	156	178	170	456	119	16		—	—	—	—	—	—
C 21 2	S3	ME3S	195	197.5	191.5	500	142	22.5		—	—	—	—	—	—
C 21 2	S3	ME3L	195	197.5	191.5	532	142	27		—	—	—	—	—	—
C 21 3	S05	M05	121	160.5	154.5	454.5	95	11		520.5	12	96	122	116	95
C 21 3	S1	M1	138	169	163	483.5	108	13		544.5	15	103	135	124	108



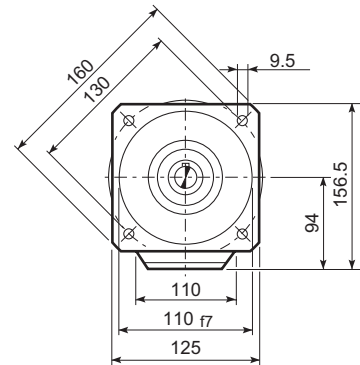
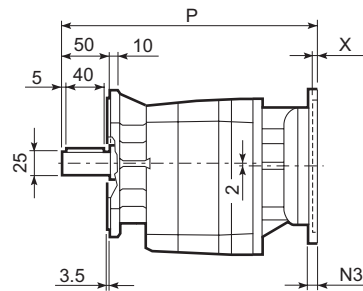
OUTPUT



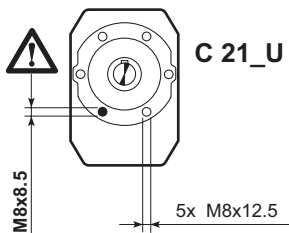
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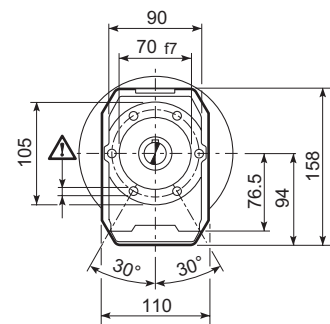
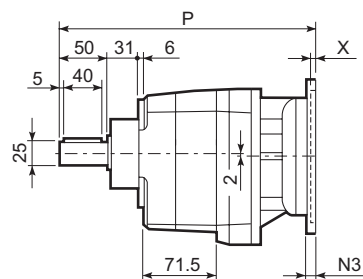
INPUT



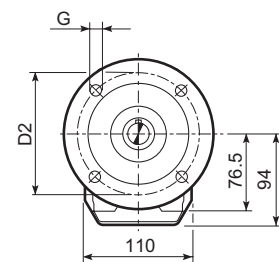
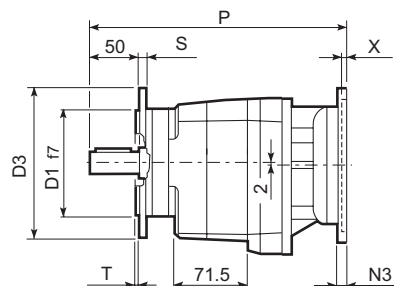
F



C 21_U



U



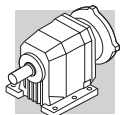
UF

C 21_U

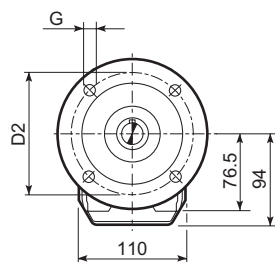
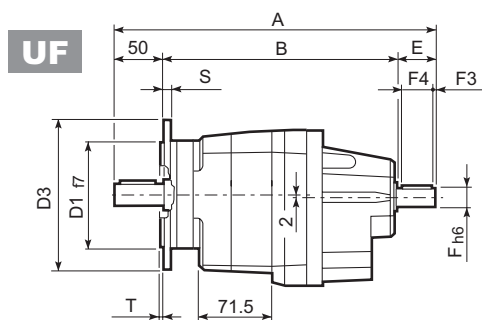
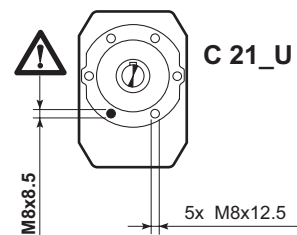
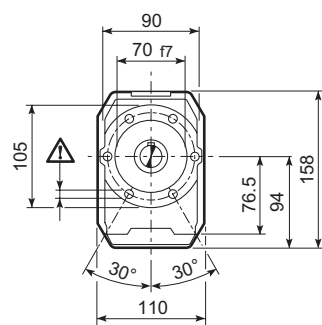
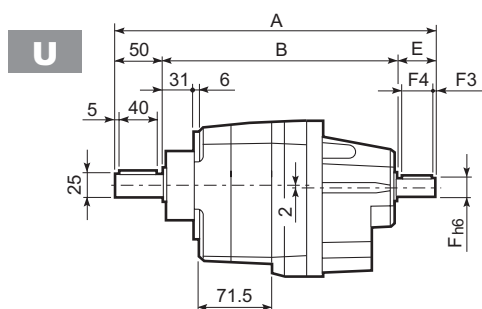
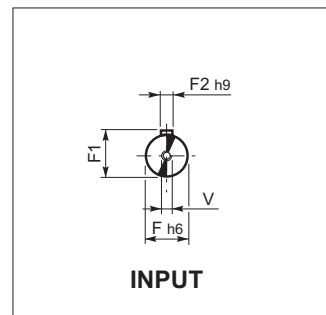
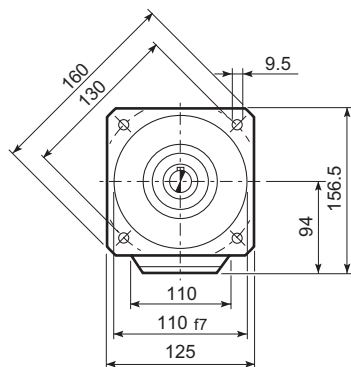
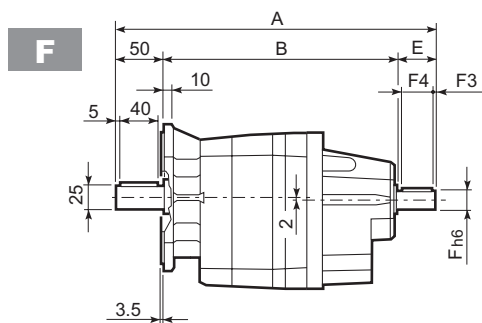
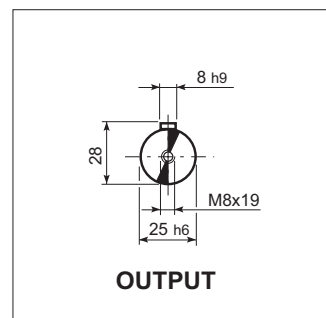
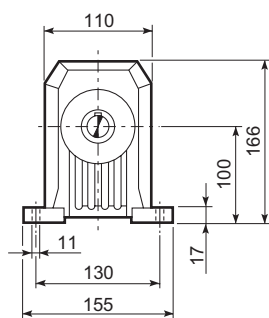
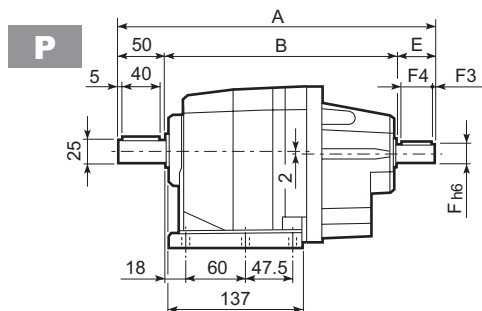
	D1	D2	D3	G	T	S
FA	95	115	140	9	3	10
FB	110	130	160	9	3	10
FC	130	165	200	11	3.5	11

C 21

		M	M1	M2	N	N1	N2	N3	N4	X	P	Kg
C 21 2	P63	11	12.8	4	140	115	95	—	M8x19	4	273	7
C 21 2	P71	14	16.3	5	160	130	110	—	M8x16	4.5	273	7
C 21 2	P80	19	21.8	6	200	165	130	—	M10x12	4	292.5	8
C 21 2	P90	24	27.3	8	200	165	130	—	M10x12	4	292.5	8
C 21 2	P100	28	31.3	8	250	215	180	—	M12x16	4.5	302.5	12
C 21 2	P112	28	31.3	8	250	215	180	—	M12x16	4.5	302.5	12
C 21 3	P63	11	12.8	4	140	115	95	—	M8x19	4	328.5	8
C 21 3	P71	14	16.3	5	160	130	110	—	M8x16	4.5	328.5	8
C 21 3	P80	19	21.8	6	200	165	130	—	M10x12	4	348	9
C 21 3	P90	24	27.3	8	200	165	130	—	M10x12	4	348	9
C 21 3	P100	28	31.3	8	250	215	180	—	M12x16	4.5	358	13
C 21 3	P112	28	31.3	8	250	215	180	—	M12x16	4.5	358	13

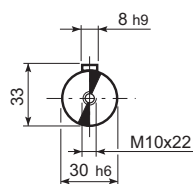
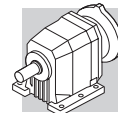


C 21...HS

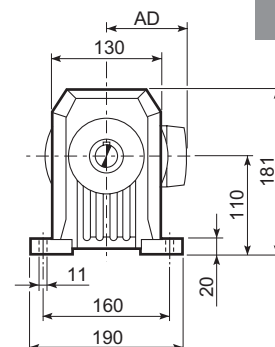
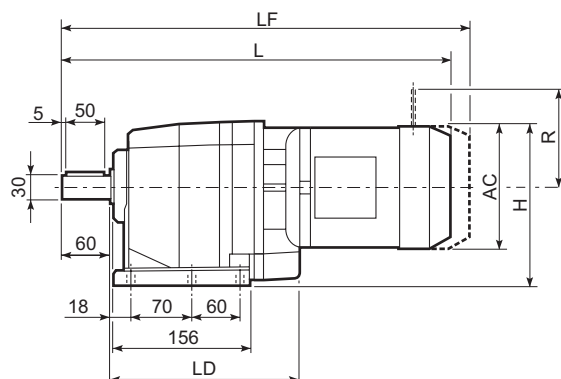


C 21_U						
	D1	D2	D3	G	T	S
FA	95	115	140	9	3	10
FB	110	130	160	9	3	10
FC	130	165	200	11	3.5	11

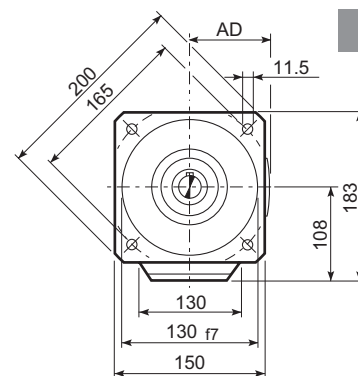
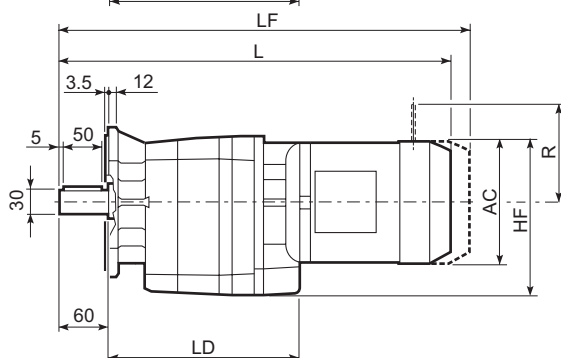
C 21											
		A	B	E	F	F1	F2	F3	F4	V	kg
C 21 2	HS	323	233	40	19	21.5	6	2.5	35	M6x16	7.2
C 21 3		335.5	245.5	40	16	18	6	2.5	36	M6x16	7.5



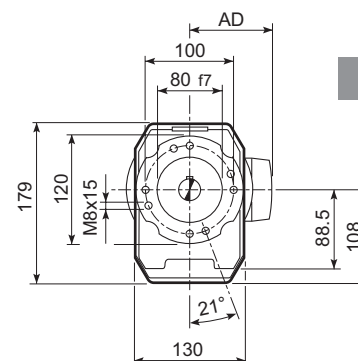
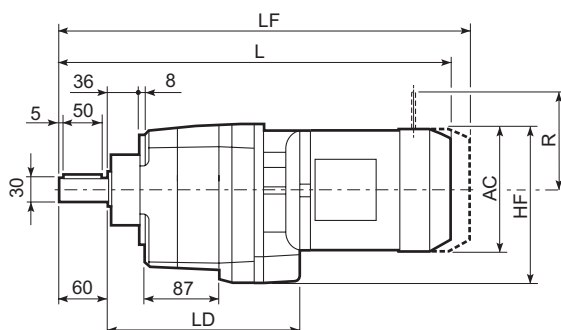
OUTPUT



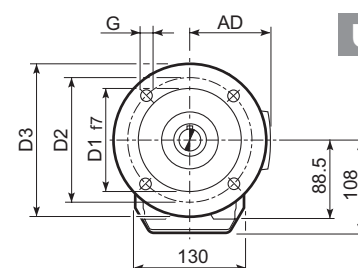
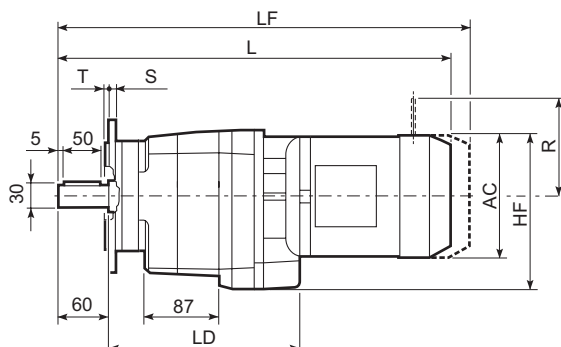
P



F



U



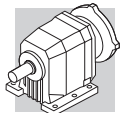
UF

C 31_U

	D1	D2	D3	G	T	S
FA	110	130	160	9	3	10
FB	130	165	200	11	3.5	11
FC	180	215	250	14	4	13

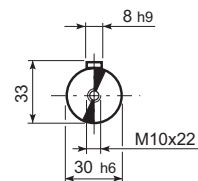
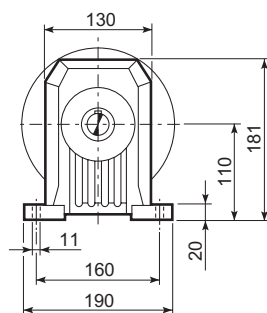
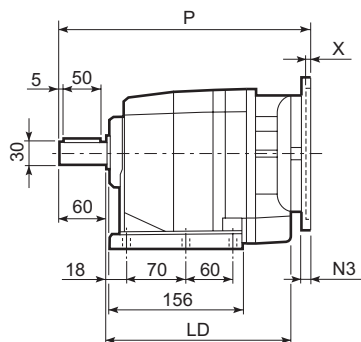
C 31

										M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	LD	AD	kg	LF	kg	R	AD	R	AD
C 31 2	S1	M1	138	179	177	462.5	205.5	108	14	523.5	16	103	135	124	108
C 31 2	S2	M2S	156	188	186	490.5	217.5	119	18	561.5	21	129	146	134	119
C 31 2	S2	ME2S	156	188	186	490.5	217.5	119	18	—	—	—	—	—	—
C 31 2	S3	ME3S	195	207.5	205.5	534.5	227.5	142	24.5	—	—	—	—	—	—
C 31 2	S3	ME3L	195	207.5	205.5	566.5	227.5	142	32	—	—	—	—	—	—
C 31 2	S4	ME4	258	239	237	674.5	—	193	66	—	—	—	—	—	—
C 31 2	S4	ME4LB	258	239	237	709.5	—	193	74	—	—	—	—	—	—
C 31 3	S05	M05	121	170.5	168.5	491	—	95	13	557	15	96	122	116	95
C 31 3	S1	M1	138	179	177	520	—	108	15	581	17	103	135	124	108
C 31 3	S2	ME2S	156	188	186	548	—	119	18	—	—	—	—	—	—



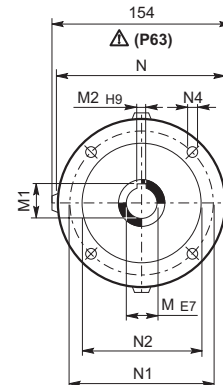
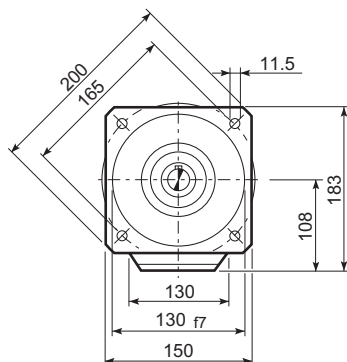
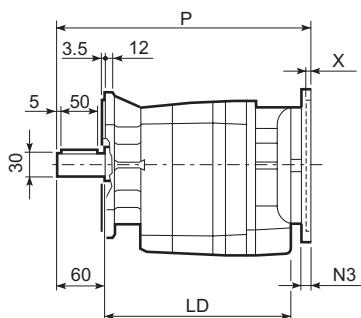
C 31...P(IEC)

P



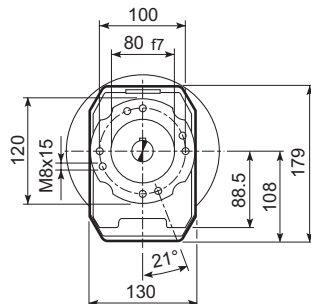
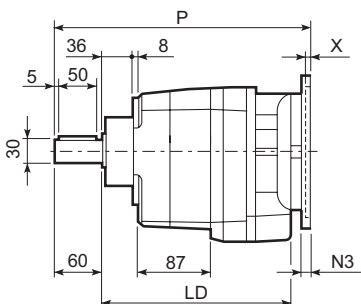
OUTPUT

F

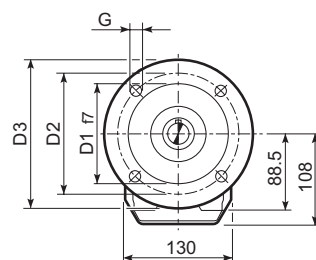
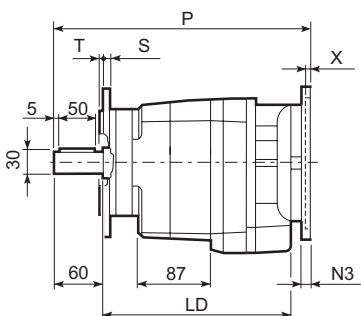


INPUT

U



UF

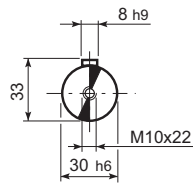
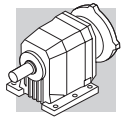


C 31 _U

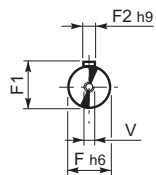
	D1	D2	D3	G	T	S
FA	110	130	160	9	3	10
FB	130	165	200	11	3.5	11
FC	180	215	250	14	4	13

C 31

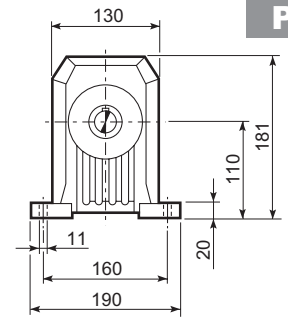
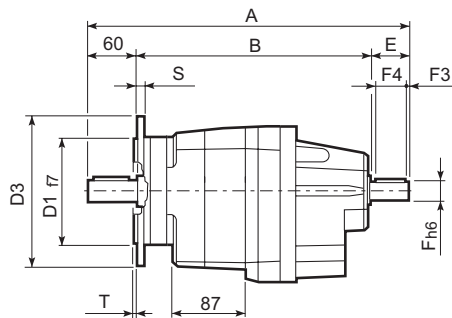
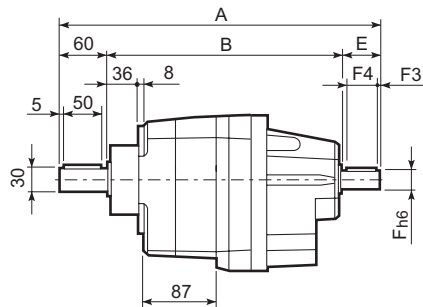
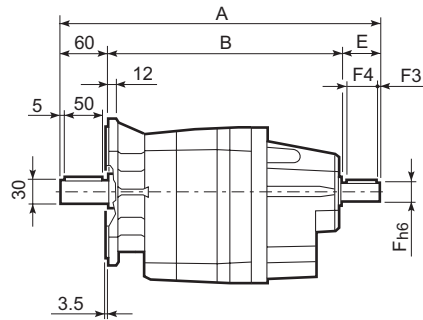
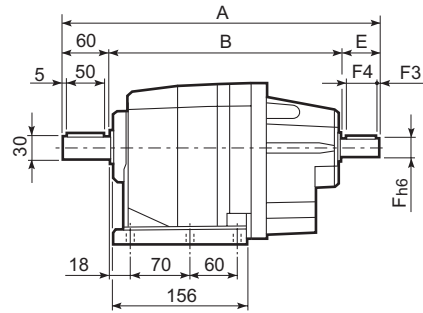
		LD	M	M1	M2	N	N1	N2	N3	N4	X	P	kg
C 31 2	P63	217.5	11	12.8	4	140	115	95	—	M8x19	4	307.5	9
C 31 2	P71	217.5	14	16.3	5	160	130	110	—	M8x16	4.5	307.5	9
C 31 2	P80	227.5	19	21.8	6	200	165	130	—	M10x12	4	327	10
C 31 2	P90	227.5	24	27.3	8	200	165	130	—	M10x12	4	327	10
C 31 2	P100	227.5	28	31.3	8	250	215	180	—	M12x16	4.5	337	14
C 31 2	P112	227.5	28	31.3	8	250	215	180	—	M12x16	4.5	337	14
C 31 2	P132	—	38	41.3	10	300	265	230	16	14	5	373	17
C 31 3	P63	—	11	12.8	4	140	115	95	—	M8x19	4	365	10
C 31 3	P71	—	14	16.3	5	160	130	110	—	M8x16	4.5	365	10
C 31 3	P80	—	19	21.8	6	200	165	130	—	M10x12	4	384.5	11
C 31 3	P90	—	24	27.3	8	200	165	130	—	M10x12	4	384.5	11
C 31 3	P100	—	28	31.3	8	250	215	180	—	M12x16	4.5	394.5	15
C 31 3	P112	—	28	31.3	8	250	215	180	—	M12x16	4.5	394.5	15



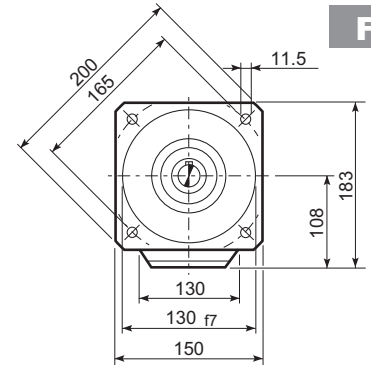
OUTPUT



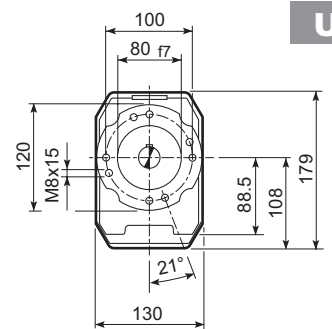
INPUT



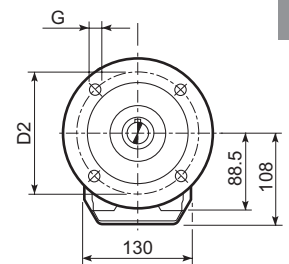
P



F



U



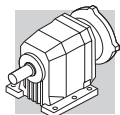
UF

C 31_U

	D1	D2	D3	G	T	S
FA	110	130	160	9	3	10
FB	130	165	200	11	3.5	11
FC	180	215	250	14	4	13

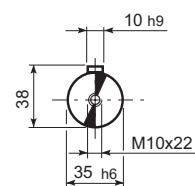
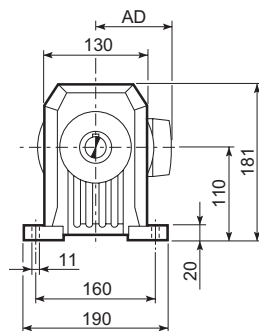
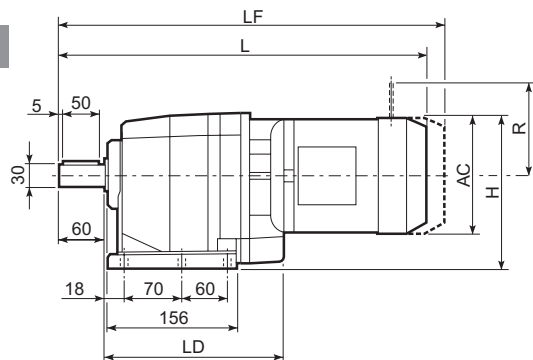
C 31

		A	B	E	F	F1	F2	F3	F4	V	kg
C 31 2	HS	357.5	257.5	40	19	21.5	6	2.5	35	M6x16	11.1
C 31 3		372	272	40	16	18	5	2.5	36	M6x16	10.6



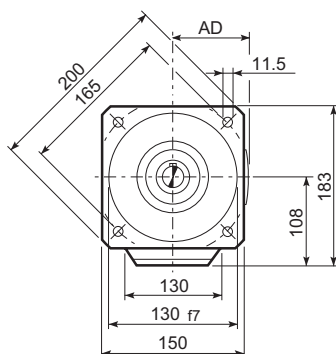
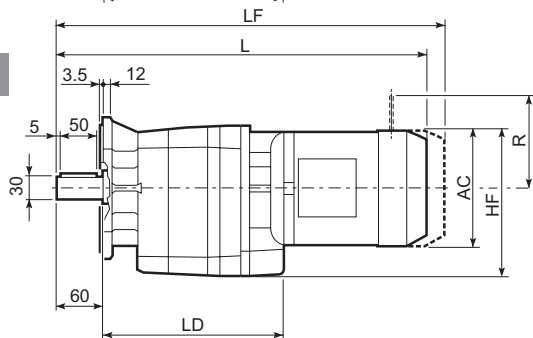
C 35...M/ME

P



OUTPUT

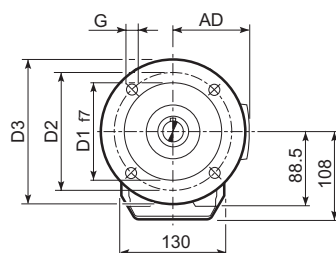
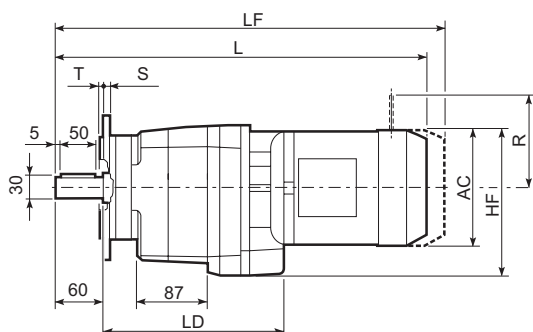
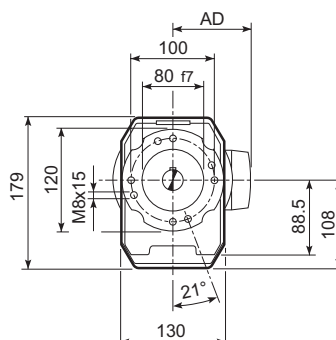
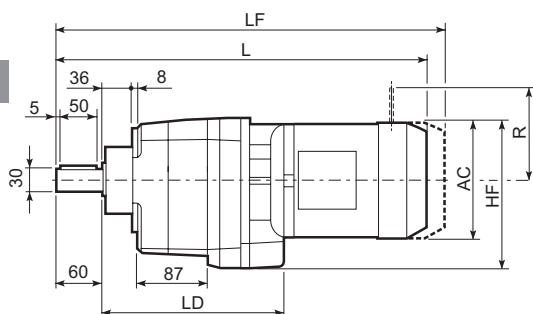
U



C 35 U

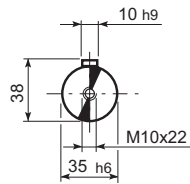
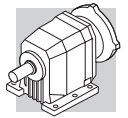
	D1	D2	D3	G	T	S
FA	130	165	200	11	3.5	11
FB	180	215	250	14	4	14

UF

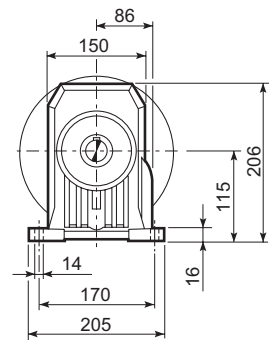
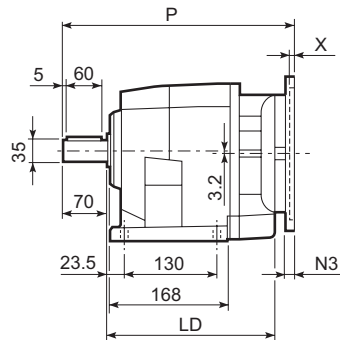


C 35

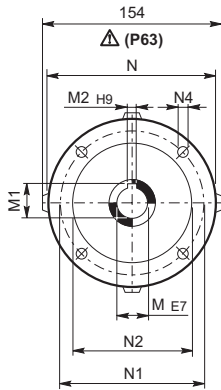
										M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	LD	AD	Kg	LF	Kg	R	AD	R	AD
C 35 2/3	S1	M1	138	184	177	481	214	108	20	542	21	103	135	124	108
C 35 2/3	S2	ME2S	156	193	186	509	226	119	23	—	—	—	—	—	—
C 35 2/3	S3	ME3S	195	212.5	205.5	553	236	142	29.5	—	—	—	—	—	—
C 35 2/3	S3	ME3L	195	212.5	205.5	585	236	142	37	—	—	—	—	—	—
C 35 2/3	S4	ME4	258	244	240	693.5	—	193	71	—	—	—	—	—	—
C 35 2/3	S4	ME4LB	258	244	240	728.5	—	193	79	—	—	—	—	—	—
C 35 4	S05	M05	121	175.5	168.5	509.5	—	95	19	575.5	20	96	122	116	95
C 35 4	S1	M1	138	184	177	538.5	—	108	21	599.5	22	103	135	124	108
C 35 4	S2	ME2S	156	193	186	566.5	—	119	24	—	—	—	—	—	—
C 35 4	S3	ME3S	195	212.5	205.5	610.5	—	142	30.5	—	—	—	—	—	—
C 35 4	S3	ME3L	195	212.5	205.5	642.5	—	142	38	—	—	—	—	—	—



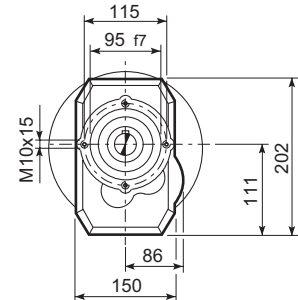
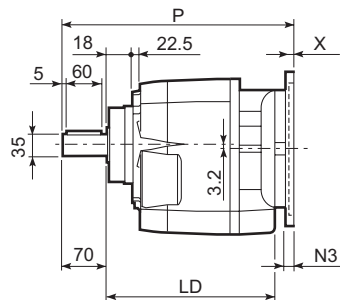
OUTPUT



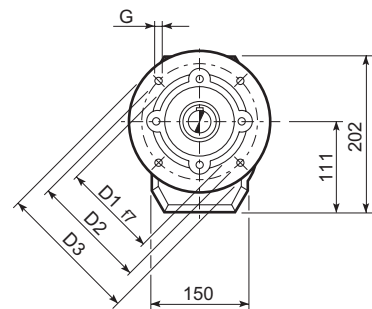
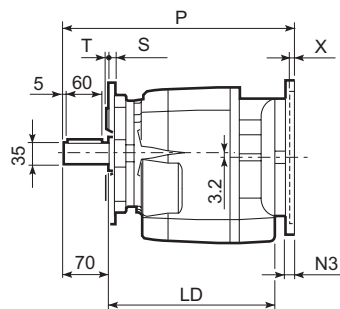
P



INPUT



U



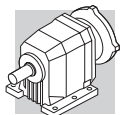
UF

C 35_U

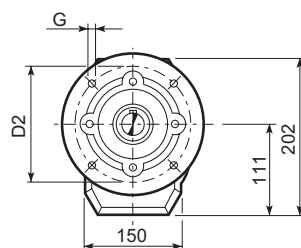
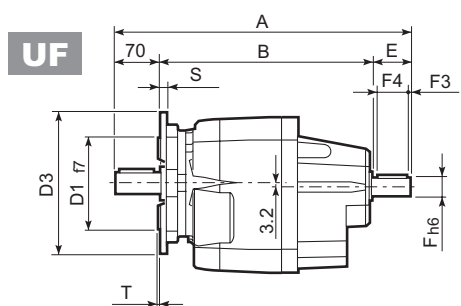
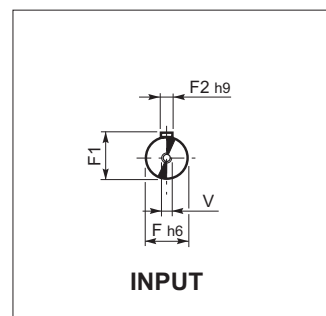
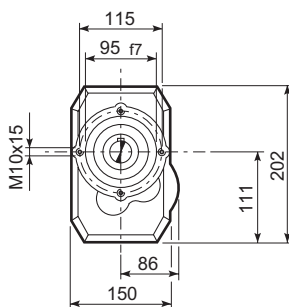
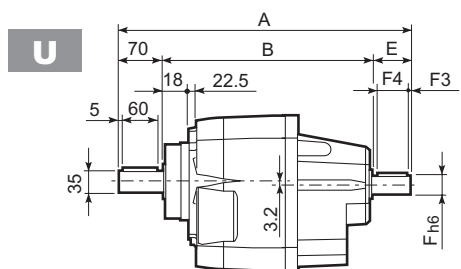
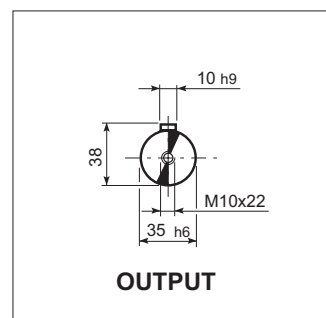
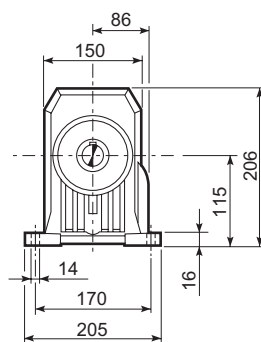
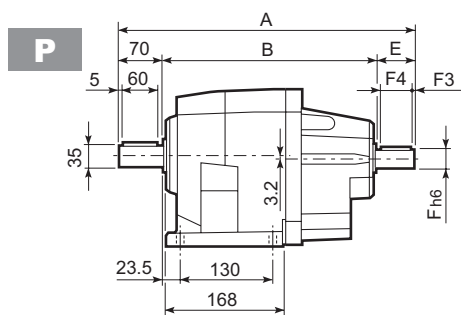
	D1	D2	D3	G	T	S
FA	130	165	200	11	3.5	11
FB	180	215	250	14	4	14

C 35

		LD	M	M1	M2	N	N1	N2	N3	N4	X	P	kg
C 35 2/3	P63	226	11	12.8	4	140	115	95	—	M8x19	4	326	17
C 35 2/3	P71	226	14	16.3	5	160	130	110	—	M8x16	4.5	326	17
C 35 2/3	P80	236	19	21.8	6	200	165	130	—	M10x12	4	345.5	18
C 35 2/3	P90	236	24	27.3	8	200	165	130	—	M10x12	4	345.5	18
C 35 2/3	P100	236	28	31.3	8	250	215	180	—	M12x16	4.5	355.5	22
C 35 2/3	P112	236	28	31.3	8	250	215	180	—	M12x16	4.5	355.5	22
C 35 2/3	P132	—	38	41.3	10	300	265	230	16	14	5	392.5	25
C 35 4	P63	—	11	12.8	4	140	115	95	—	M8x19	4	383.5	20
C 35 4	P71	—	14	16.3	5	160	130	110	—	M8x16	4.5	383.5	20
C 35 4	P80	—	19	21.8	6	200	165	130	—	M10x12	4	403	21
C 35 4	P90	—	24	27.3	8	200	165	130	—	M10x12	4	403	21
C 35 4	P100	—	28	31.3	8	250	215	180	—	M12x16	4.5	413	25
C 35 4	P112	—	28	31.3	8	250	215	180	—	M12x16	4.5	413	25

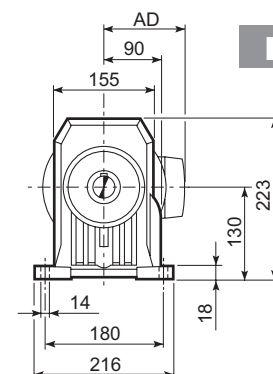
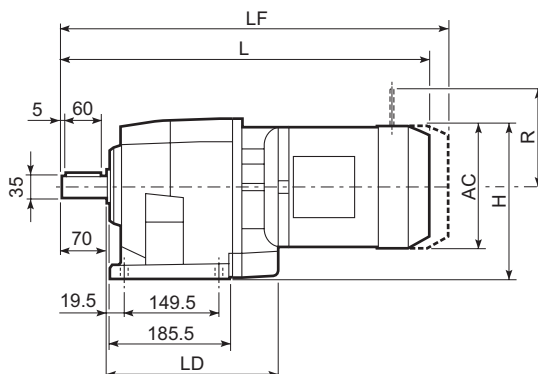
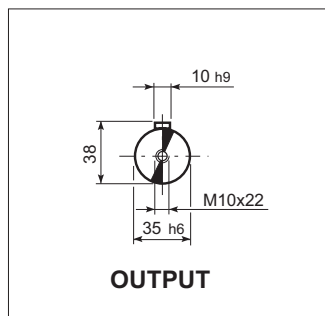
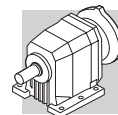


C 35...HS

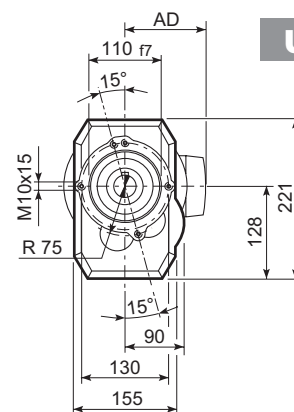
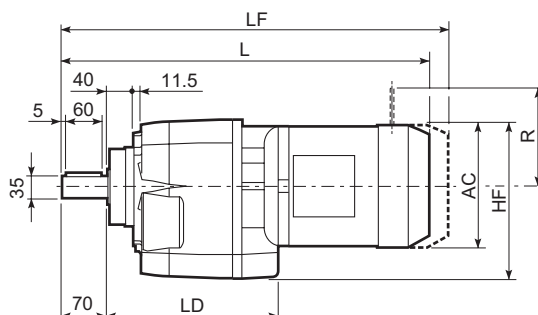


C 35_U						
	D1	D2	D3	G	T	S
FA	130	165	200	11	3.5	11
FB	180	215	250	14	4	14

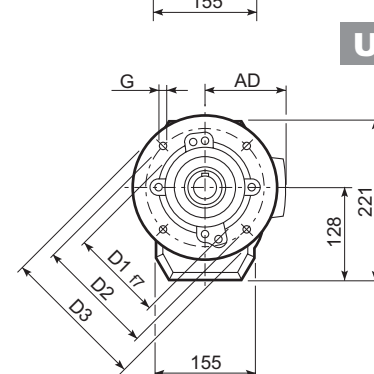
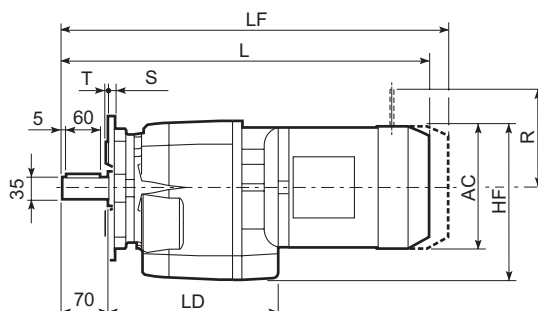
C 35											
		A	B	E	F	F1	F2	F3	F4	V	kg
C 35 2	HS	415.5	295.5	50	24	27	8	2.5	45	M8x19	25.5
C 35 3		415.5	295.5	50	24	27	8	2.5	45	M8x19	25.5
C 35 4		390.5	280.5	40	16	18	5	2.5	36	M6x16	26.5



P



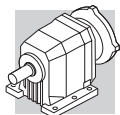
U



UF

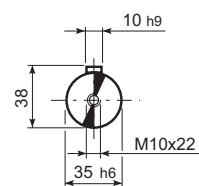
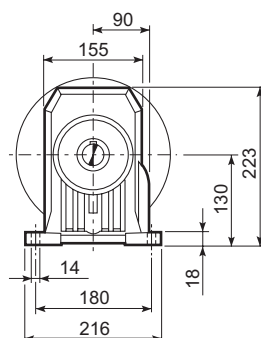
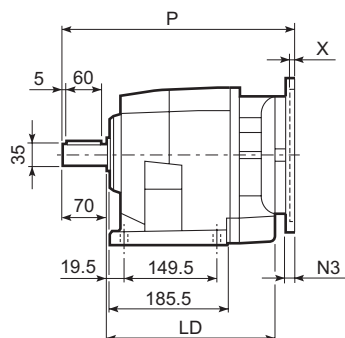
C 41_U						
	D1	D2	D3	G	T	S
FA	130	165	200	11	3.5	11
FB	180	215	250	14	4	13

C 41															
										M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	LD	AD		LF		R	AD	R	AD
C 41 2/3	S1	M1	138	199	197	491.5	220	108	25	552.5	28	103	135	124	108
C 41 2/3	S2	ME2S	156	208	206	519.5	235.5	119	31	—	—	—	—	—	—
C 41 2/3	S3	ME3S	195	227.5	225.5	563.5	251.5	142	37.5	—	—	—	—	—	—
C 41 2/3	S3	ME3L	195	227.5	225.5	595.5	251.5	142	45	—	—	—	—	—	—
C 41 2/3	S4	ME4	258	259	257	703.5	—	193	71	—	—	—	—	—	—
C 41 2/3	S4	ME4LB	258	259	257	739	—	193	78	—	—	—	—	—	—
C 41 4	S05	M05	231	245.5	243.5	524	—	95	27	590	28	96	122	116	95
C 41 4	S1	M1	138	199	197	553	—	108	28	614	31	103	135	124	108
C 41 4	S2	ME2S	156	208	206	581	—	119	34	—	—	—	—	—	—
C 41 4	S3	ME3S	195	227.5	225.5	625	—	142	40.5	—	—	—	—	—	—
C 41 4	S3	ME3L	195	227.5	225.5	657	—	142	48	—	—	—	—	—	—



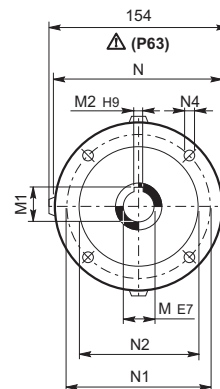
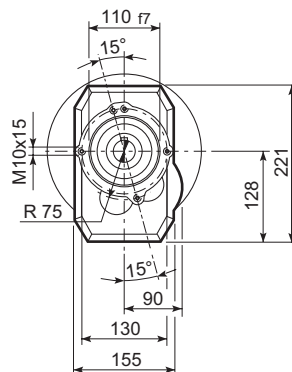
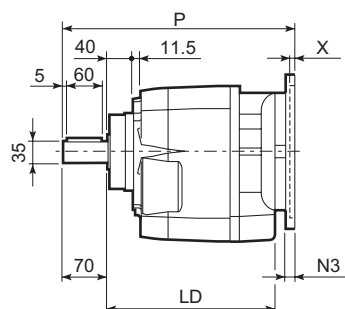
C 41...P(IEC)

P



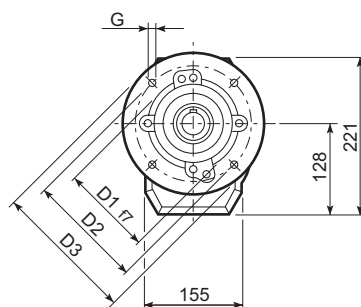
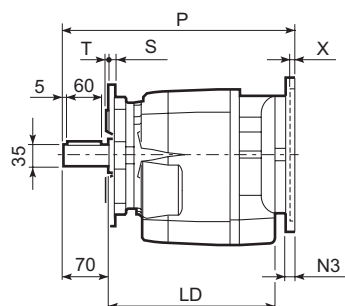
OUTPUT

U



INPUT

UF

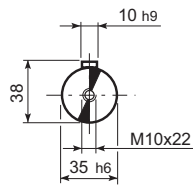
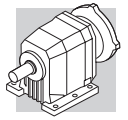


C 41 U

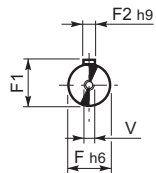
	D1	D2	D3	G	T	S
FA	130	165	200	11	3.5	11
FB	180	215	250	14	4	13

C 41

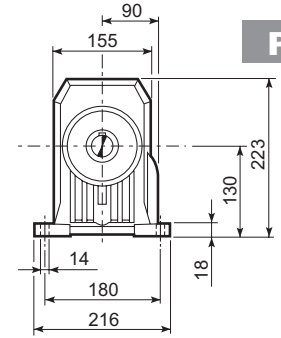
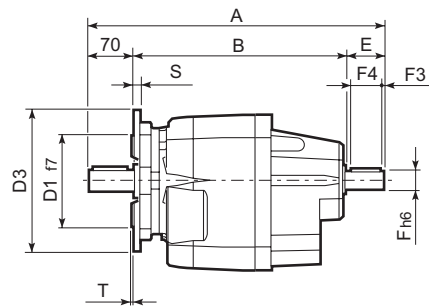
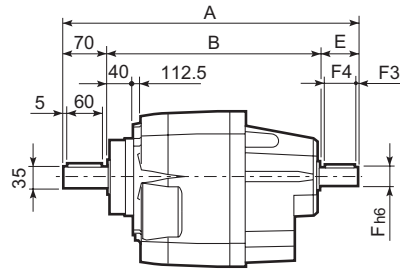
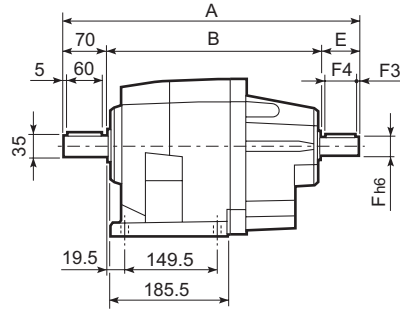
		LD	M	M1	M2	N	N1	N2	N3	N4	X	P	kg
C 41 2/3	P63	235.5	11	12.8	4	140	115	95	—	M8x19	4	336.5	27
C 41 2/3	P71	235.5	14	16.3	5	160	130	110	—	M8x16	4.5	336.5	28
C 41 2/3	P80	251.5	19	21.8	6	200	165	130	—	M10x12	4	356	29
C 41 2/3	P90	251.5	24	27.3	8	200	165	130	—	M10x12	4	356	29
C 41 2/3	P100	—	28	31.3	8	250	215	180	—	M12x16	4.5	366	33
C 41 2/3	P112	—	28	31.3	8	250	215	180	—	M12x16	4.5	366	33
C 41 2/3	P132	—	38	41.3	10	300	265	230	16	14	5	402.5	35
C 41 4	P63	—	11	12.8	4	140	115	95	—	M8x19	4	395	30
C 41 4	P71	—	14	16.3	5	160	130	110	—	M8x16	4.5	395	31
C 41 4	P80	—	19	21.8	6	200	165	130	—	M10x12	4	414.5	32
C 41 4	P90	—	24	27.3	8	200	165	130	—	M10x12	4	414.5	32
C 41 4	P100	—	28	31.3	8	250	215	180	—	M12x16	4.5	424.5	36
C 41 4	P112	—	28	31.3	8	250	215	180	—	M12x16	4.5	424.5	36



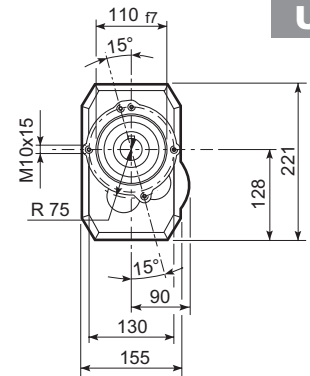
OUTPUT



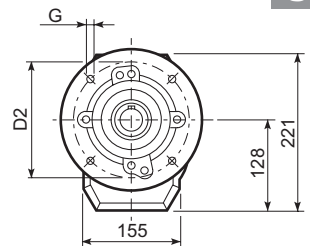
INPUT



P



U



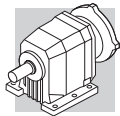
UF

C 41_U

	D1	D2	D3	G	T	S
FA	130	165	200	11	3.5	11
FB	180	215	250	14	4	13

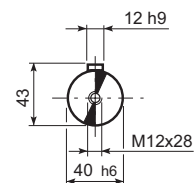
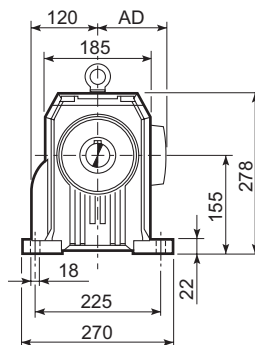
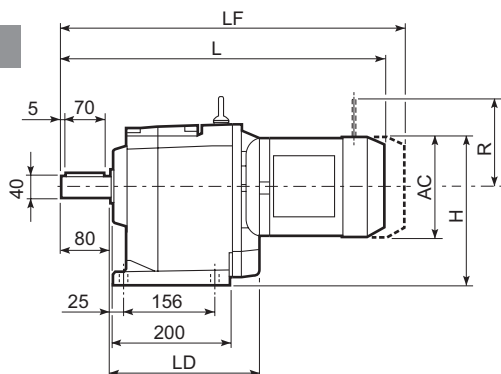
C 41

		A	B	E	F	F1	F2	F3	F4	V	kg
C 41 2	HS	425.5	305.5	50	24	27	8	2.5	45	M8x19	30
C 41 3		425.5	305.5	50	24	27	8	2.5	45	M8x19	30
C 41 4		448	338	40	19	21.5	6	2.5	35	M6x16	33



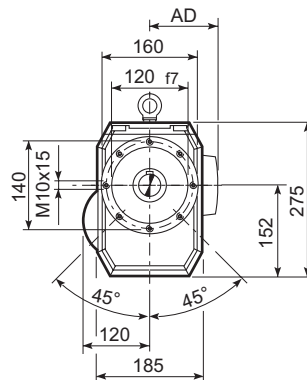
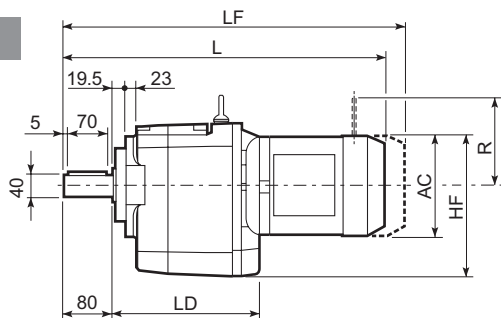
C 51...M/ME

P

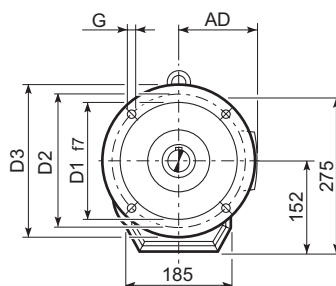
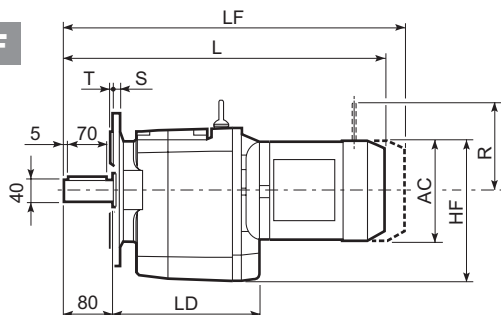


OUTPUT

U



UF

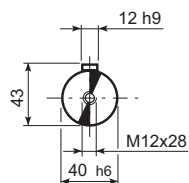
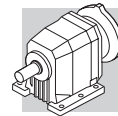


C 51 U

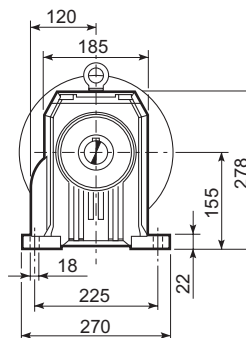
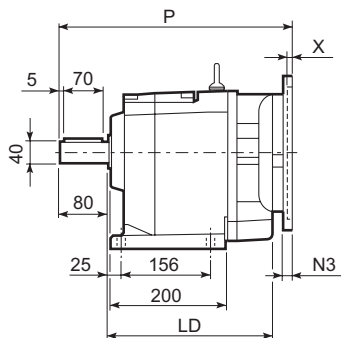
	D1	D2	D3	G	T	S
FA	180	215	250	14	4	13
FB	230	265	300	14	4	16

C 51

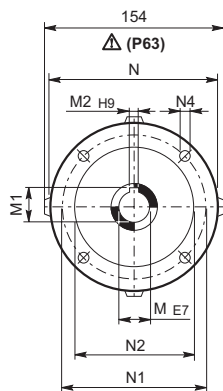
										M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	LD	AD	Kg	LF	Kg	R	AD	R	AD
C 51 2/3	S1	M1	138	224	221	517.5	—	108	49	578.5	52	103	135	124	108
C 51 2/3	S2	ME2S	156	233	230	545.5	252.5	119	53	—	—	—	—	—	—
C 51 2/3	S3	ME3S	195	252.5	249.5	589.5	267.5	142	59.5	—	—	—	—	—	—
C 51 2/3	S3	ME3L	195	252.5	249.5	621.5	267.5	142	65	—	—	—	—	—	—
C 51 2/3	S4	ME4	258	284	281	729.5	—	193	99	—	—	—	—	—	—
C 51 2/3	S4	ME4LB	258	284	281	764.5	—	193	107	—	—	—	—	—	—
C 51 2/3	S5	ME5S	310	310	307	816	—	245	127	—	—	—	—	—	—
C 51 2/3	S5	ME5L	310	310	307	860	—	245	143	—	—	—	—	—	—
C 51 4	S1	M1	138	224	221	589	—	108	52	650	55	103	135	124	108
C 51 4	S2	ME2S	156	233	230	617	—	119	56	—	—	—	—	—	—
C 51 4	S3	ME3S	195	252.5	249.5	661	—	142	62.5	—	—	—	—	—	—
C 51 4	S3	ME3L	195	252.5	249.5	693	—	142	68	—	—	—	—	—	—
C 51 4	S4	ME4	258	284	281	801	—	193	98	—	—	—	—	—	—
C 51 4	S4	ME4LB	258	284	281	836	—	193	112	—	—	—	—	—	—



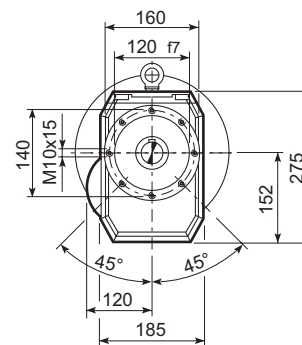
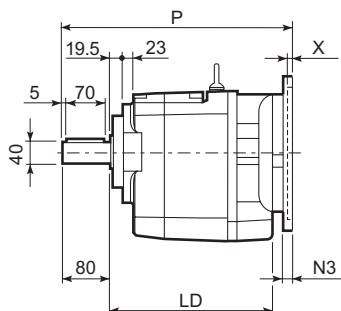
OUTPUT



P



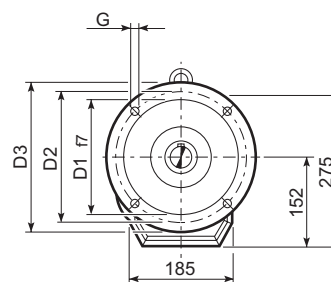
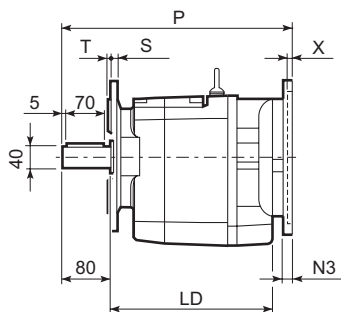
INPUT



U

C 51 U

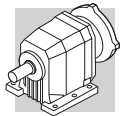
	D1	D2	D3	G	T	S
FA	180	215	250	14	4	13
FB	230	265	300	14	4	16



UF

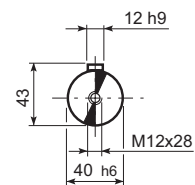
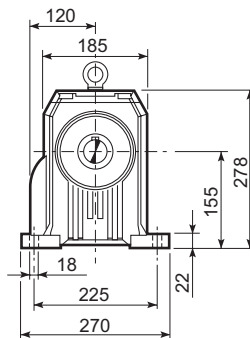
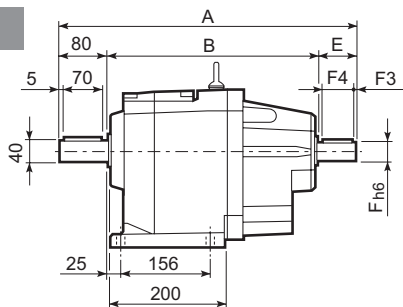
C 51

		LD	M	M1	M2	N	N1	N2	N3	N4	X	P	kg
C 51 2/3	P63	252.5	11	12.8	4	140	115	95	—	M8x19	4	362.5	45
C 51 2/3	P71	252.5	14	16.3	5	160	130	110	—	M8x16	4.5	362.5	45
C 51 2/3	P80	267.5	19	21.8	6	200	165	130	—	M10x12	4	382	47
C 51 2/3	P90	267.5	24	27.3	8	200	165	130	—	M10x12	4	382	47
C 51 2/3	P100	252.5	28	31.3	8	250	215	180	—	M12x16	4.5	392	51
C 51 2/3	P112	252.5	28	31.3	8	250	215	180	—	M12x16	4.5	392	51
C 51 2/3	P132	252.5	38	41.3	10	300	265	230	16	14	5	428.5	54
C 51 2/3	P160	—	42	45.3	12	350	300	250	23	18	5.5	479	58
C 51 2/3	P180	—	48	51.8	14	350	300	250	23	18	5.5	479	58
C 51 4	P63	—	11	12.8	4	140	115	95	—	M8x19	4	434	47
C 51 4	P71	—	14	16.3	5	160	130	110	—	M8x16	4.5	434	47
C 51 4	P80	—	19	21.8	6	200	165	130	—	M10x12	4	453.5	49
C 51 4	P90	—	24	27.3	8	200	165	130	—	M10x12	4	463.5	49
C 51 4	P100	—	28	31.3	8	250	215	180	—	M12x16	4.5	463.5	53
C 51 4	P112	—	28	31.3	8	250	215	180	—	M12x16	4.5	463.5	53
C 51 4	P132	—	38	41.3	10	300	265	230	16	14	5	500	62



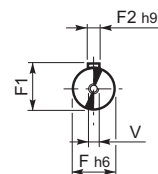
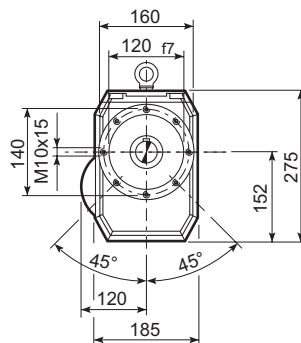
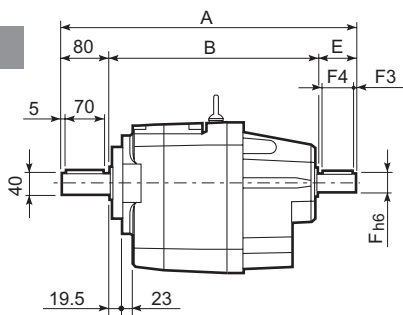
C 51...HS

P



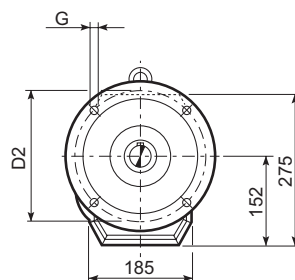
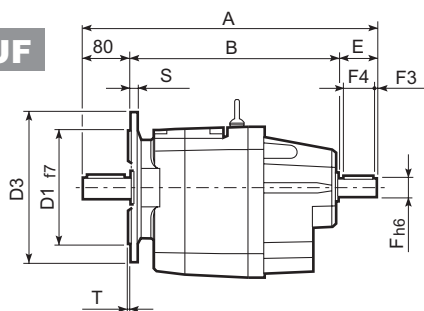
OUTPUT

U



INPUT

UF

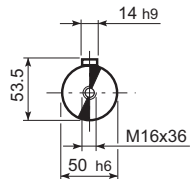
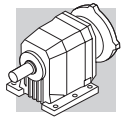


C 51 U

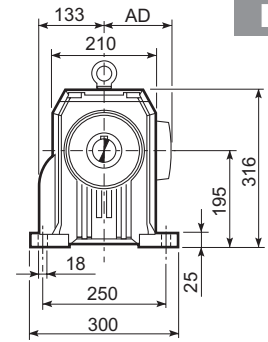
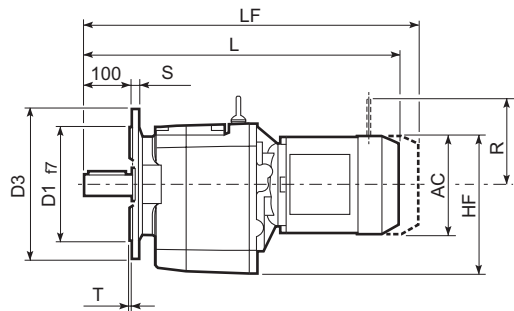
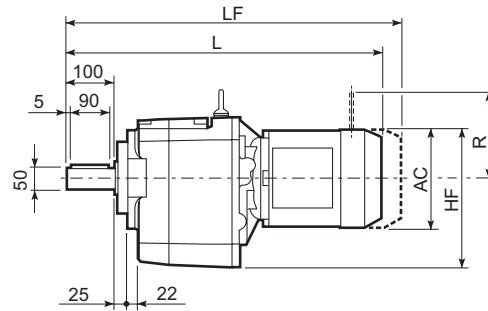
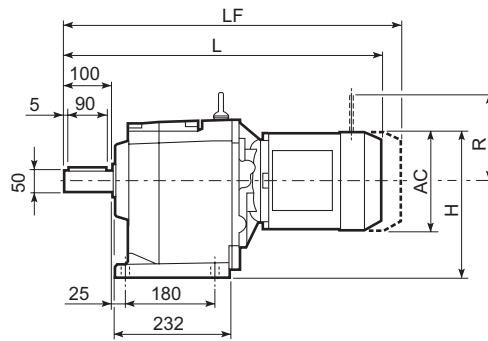
	D1	D2	D3	G	T	S
FA	180	215	250	14	4	13
FB	230	265	300	14	4	16

C 51

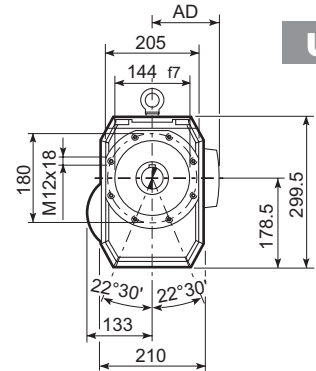
		A	B	E	F	F1	F2	F3	F4	V	kg
C 51 2	HS	451.5	322	50	24	24	8	2.5	45	M8x19	45
C 51 3		451.5	322	50	24	24	8	2.5	45	M8x19	45
C 51 4		484	364	40	19	21.5	6	2.5	35	M6x16	48



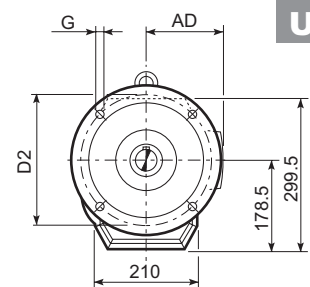
OUTPUT



P



U



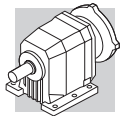
UF

C 61_U

	D1	D2	D3	G	T	S
FA	230	265	300	14	4	16
FB	250	300	350	18	5	18

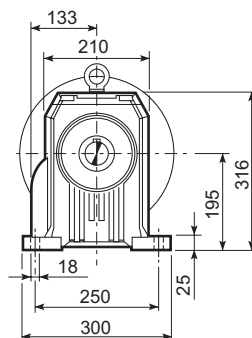
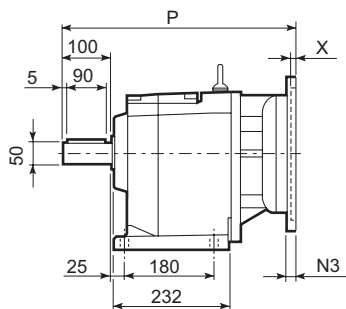
C 61

										M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	AD	Kg		LF	Kg	R	AD	R	AD
C 61 2/3	S2	ME2S	156	273	256.5	598.5	119	61		—	—	—	—	—	—
C 61 2/3	S3	ME3S	195	292.5	276	642.5	142	67.5		—	—	—	—	—	—
C 61 2/3	S3	ME3L	195	292.5	276	674.5	142	74		—	—	—	—	—	—
C 61 2/3	S4	ME4	258	324	307.5	782.5	193	108		—	—	—	—	—	—
C 61 2/3	S4	ME4LB	258	324	307.5	817.5	193	116		—	—	—	—	—	—
C 61 2/3	S5	ME5S	310	350	333.5	869	245	136		—	—	—	—	—	—
C 61 2/3	S5	ME5L	310	350	333.5	913	245	152		—	—	—	—	—	—
C 61 4	S1	M1	138	264	247.5	641	108	71	702	74	103	135	124	108	
C 61 4	S2	ME2S	156	273	256.5	669	119	75	—	—	—	—	—	—	—
C 61 4	S3	ME3S	195	292.5	276	713	142	80.5	—	—	—	—	—	—	—
C 61 4	S3	ME3L	195	292.5	276	745	142	87	—	—	—	—	—	—	—

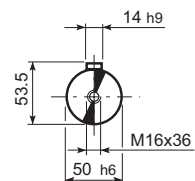


C 61...P(IEC)

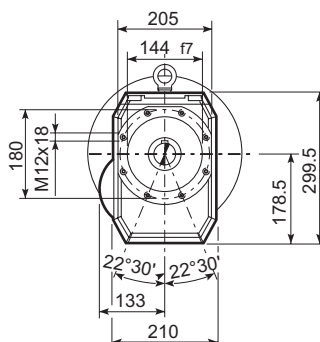
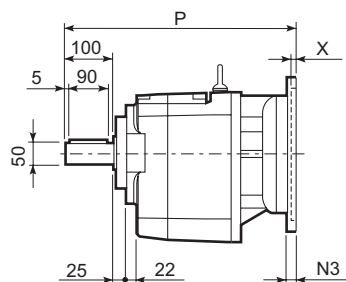
P



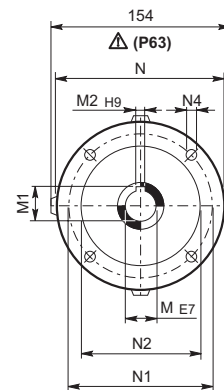
OUTPUT



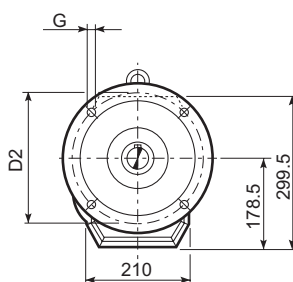
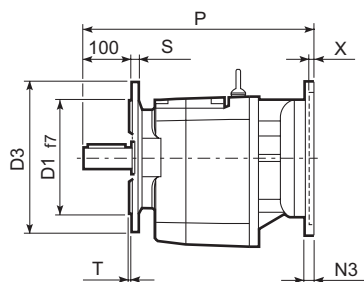
U



INPUT



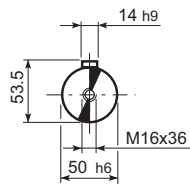
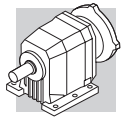
UF



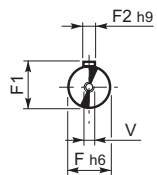
C 61_U

	D1	D2	D3	G	T	S
FA	230	265	300	14	4	16
FB	250	300	350	18	5	18

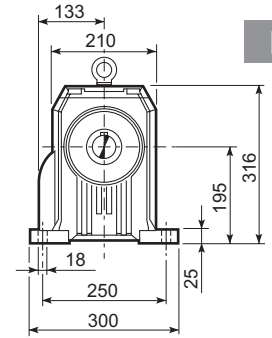
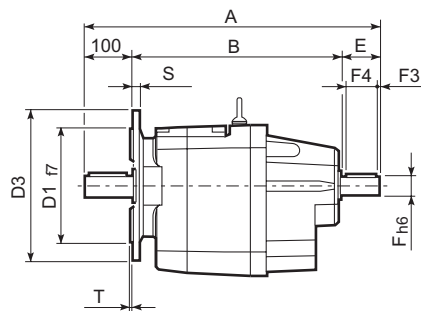
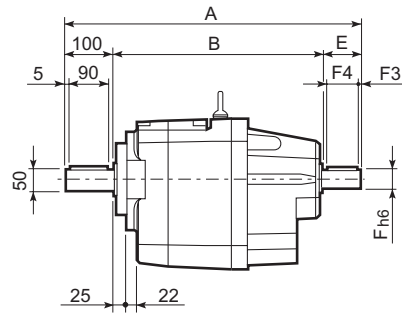
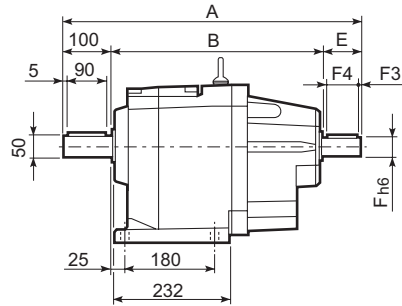
C 61												
		M	M1	M2	N	N1	N2	N3	N4	X	P	kg
C 61 2/3	P63	11	12.8	4	140	115	95	—	M8x19	4	415.5	55
C 61 2/3	P71	14	16.3	5	160	130	110	—	M8x16	4.5	415.5	57
C 61 2/3	P80	19	21.8	6	200	165	130	—	M10x12	4	435	61
C 61 2/3	P90	24	27.3	8	200	165	130	—	M10x12	4	435	61
C 61 2/3	P100	28	31.3	8	250	215	180	—	M12x16	4.5	444	65
C 61 2/3	P112	28	31.3	8	250	215	180	—	M12x16	4.5	444	65
C 61 2/3	P132	38	41.3	10	300	265	230	16	14	5	481.5	68
C 61 2/3	P160	42	45.3	12	350	300	250	23	18	5.5	532	73
C 61 2/3	P180	48	51.8	14	350	300	250	23	18	5.5	532	73
C 61 4	P63	11	12.8	4	140	115	95	—	M8x19	4	486	61
C 61 4	P71	14	16.3	5	160	130	110	—	M8x16	4.5	489	63
C 61 4	P80	19	21.8	6	200	165	130	—	M10x12	4	505.5	67
C 61 4	P90	24	27.3	8	200	165	130	—	M10x12	4	505.5	67
C 61 4	P100	28	31.3	8	250	215	180	—	M12x16	4.5	515.5	71
C 61 4	P112	28	31.3	8	250	215	180	—	M12x16	4.5	515.5	71



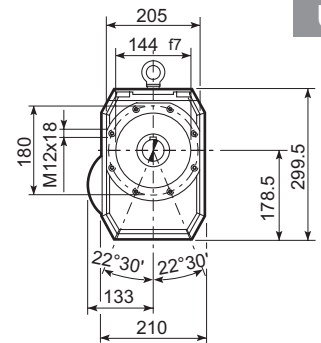
OUTPUT



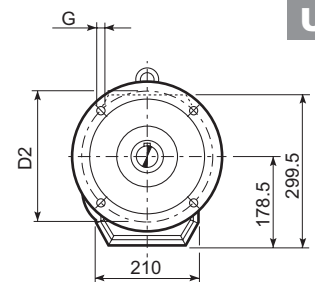
INPUT



P



U



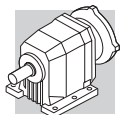
UF

C 61_U

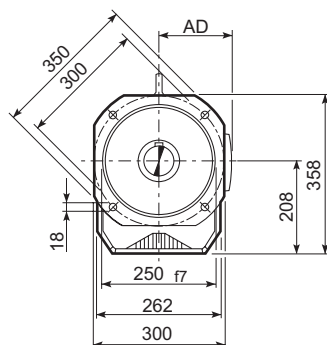
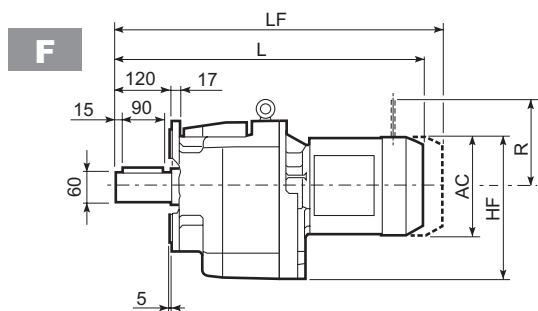
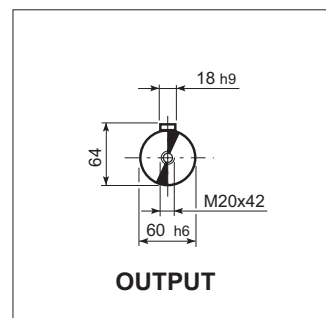
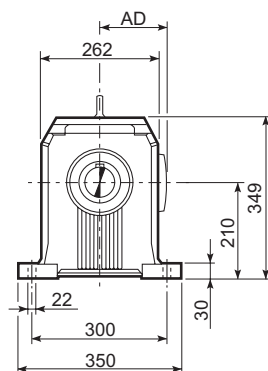
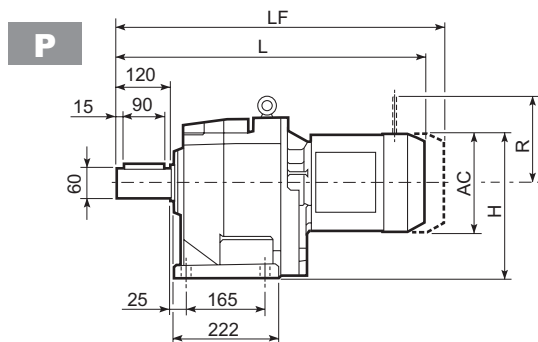
	D1	D2	D3	G	T	S
FA	230	265	300	14	4	16
FB	250	300	350	18	5	18

C 61

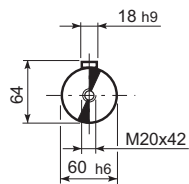
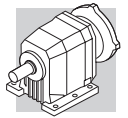
		A	B	E	F	F1	F2	F3	F4	V	kg
C 61 2	HS	532	372	60	28	31	8	5	50	M10x22	66
C 61 3		532	372	60	28	31	8	5	50	M10x22	66
C 61 4		575	425	50	24	27	8	2.5	45	M8x19	72



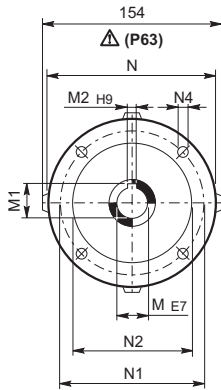
C 70...M/ME



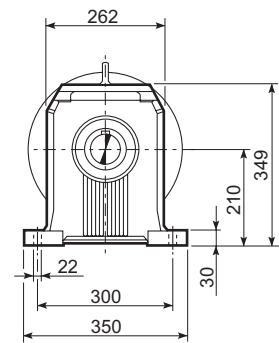
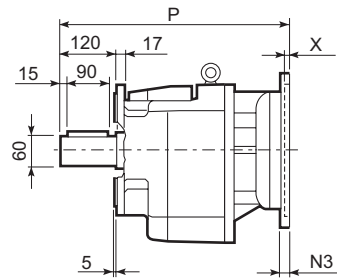
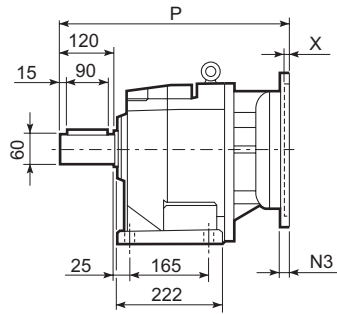
C 70														
									M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	AD		LF		R	AD	R	AD
C 70 2/3	S2	ME2S	156	288	286	636.5	119	88	—	—	—	—	—	—
C 70 2/3	S3	ME3S	195	307.5	305.5	680.5	142	94.5	—	—	—	—	—	—
C 70 2/3	S3	ME3L	195	307.5	305.5	712.5	142	101	—	—	—	—	—	—
C 70 2/3	S4	ME4	258	339	337	820.5	193	135	—	—	—	—	—	—
C 70 2/3	S4	ME4LB	258	339	337	855.5	193	143	—	—	—	—	—	—
C 70 2/3	S5	ME5S	310	365	363	907	245	163	—	—	—	—	—	—
C 70 2/3	S5	ME5L	310	365	363	951	245	179	—	—	—	—	—	—
C 70 4	S1	M1	138	279	277	659.5	108	88	720.5	91	103	135	124	108
C 70 4	S2	ME2S	156	288	286	687.5	119	92	—	—	—	—	—	—
C 70 4	S3	ME3S	195	307.5	305.5	731.5	142	98.5	—	—	—	—	—	—
C 70 4	S3	ME3L	195	307.5	305.5	763.5	142	104	—	—	—	—	—	—
C 70 4	S4	ME4	258	339	337	871.5	193	138	—	—	—	—	—	—
C 70 4	S4	ME4LB	258	339	337	906.5	193	146	—	—	—	—	—	—



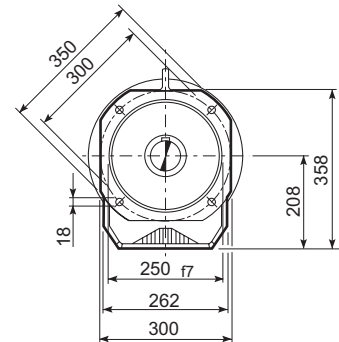
OUTPUT



INPUT



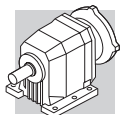
P



F

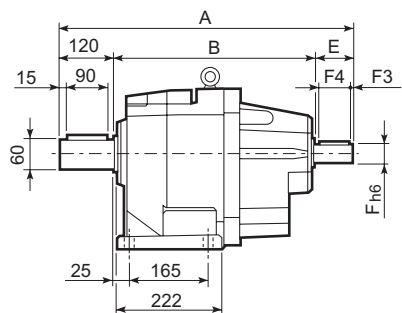
C 70

		M	M1	M2	N	N1	N2	N3	N4	X	P	Kg
C 70 2/3	P80	19	21.8	6	200	165	130	—	M10x12	4	473	88
C 70 2/3	P90	24	27.3	8	200	165	130	—	M10x12	4	473	88
C 70 2/3	P100	28	31.3	8	250	215	180	—	M12x16	4.5	483	92
C 70 2/3	P112	28	31.3	8	250	215	180	—	M12x16	4.5	483	92
C 70 2/3	P132	38	41.3	10	300	265	230	16	14	5	519.5	95
C 70 2/3	P160	42	45.3	12	350	300	250	23	18	6	575	107
C 70 2/3	P180	48	51.8	14	350	300	250	23	18	6	575	107
C 70 2	P200	55	59.3	16	400	350	300	—	M16x25	7	600	129
C 70 4	P63	11	12.8	4	140	115	95	—	M8x19	4	504.5	91
C 70 4	P71	14	16.3	5	160	130	110	—	M8x16	4.5	504.5	91
C 70 4	P80	19	21.8	6	200	165	130	—	M10x12	4	524	92
C 70 4	P90	24	27.3	8	200	165	130	—	M10x12	4	524	92
C 70 4	P100	28	31.3	8	250	215	180	—	M12x16	4.5	534	96
C 70 4	P112	28	31.3	8	250	215	180	—	M12x16	4.5	534	96
C 70 4	P132	38	41.3	10	300	265	230	16	14	5	570.5	98

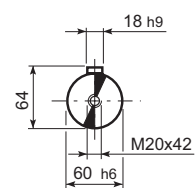
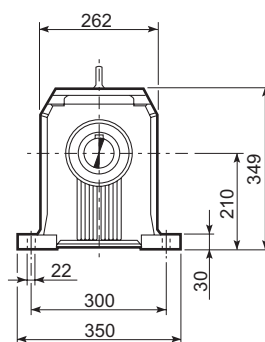
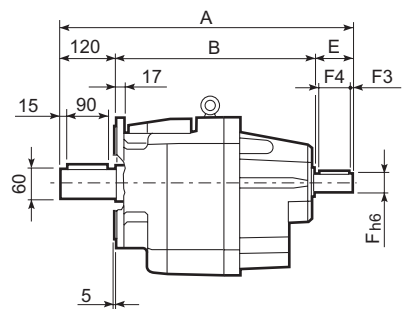


C 70...HS

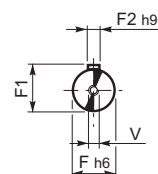
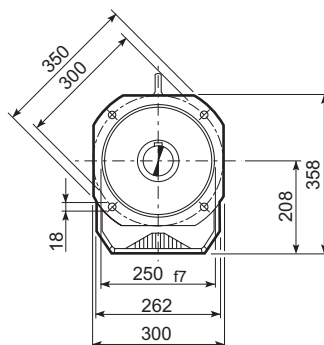
P



F



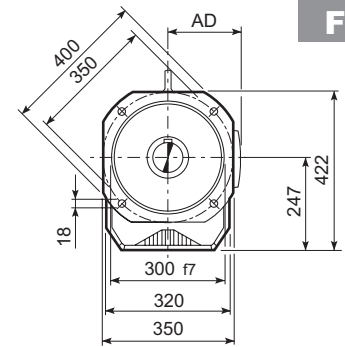
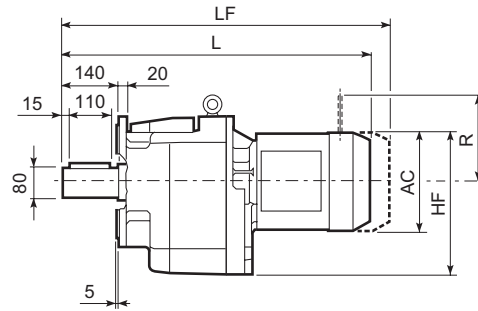
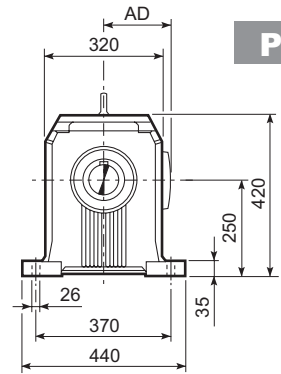
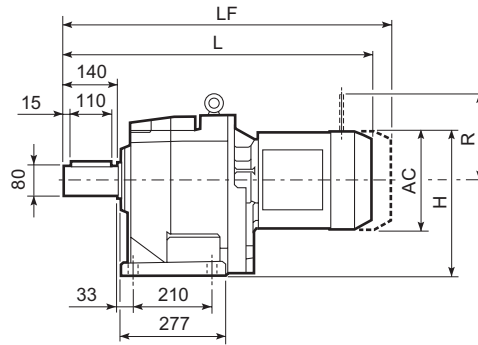
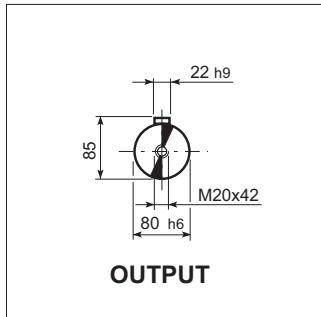
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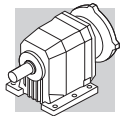
INPUT

C 70

		A	B	E	F	F1	F2	F3	F4	V	Kg
											
C 70 2	HS	657.5	427.5	110	42	45	12	10	90	M12x28	108
C 70 3		657.5	427.5	110	42	45	12	10	90	M12x28	108
C 70 4		593.5	423.5	50	24	27	8	2.5	45	M8x19	94

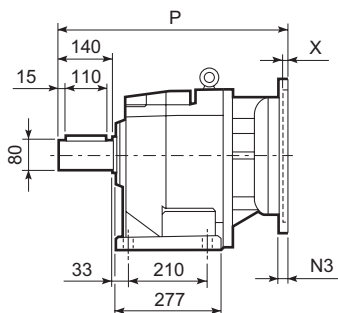


C 80															
									M...FD M...FA		M...FD		M...FA		
			AC	H	HF	L	AD		LF		R	AD	R	AD	
C 80 2/3	S3	ME3S	195	347.5	344.5	742.5	142	140.5	—	—	—	—	—	—	
C 80 2/3	S3	ME3L	195	347.5	344.5	774.5	142	146	—	—	—	—	—	—	
C 80 2/3	S4	ME4	258	379	376	882.5	193	180	—	—	—	—	—	—	
C 80 2/3	S4	ME4LB	258	379	376	917.5	193	188	—	—	—	—	—	—	
C 80 2/3	S5	ME5S	310	405	402	969	245	208	—	—	—	—	—	—	
C 80 2/3	S5	ME5L	310	405	402	1013	245	224	—	—	—	—	—	—	
C 80 4	S1	M1	138	319	316	733.5	108	133	794.5	136	103	135	124	108	
C 80 4	S2	ME2S	156	328	325	761.5	119	137	—	—	—	—	—	—	
C 80 4	S3	ME3S	195	347.5	344.5	805.5	142	143.5	—	—	—	—	—	—	
C 80 4	S3	ME3L	195	347.5	344.5	837.5	142	149	—	—	—	—	—	—	
C 80 4	S4	ME4	258	379	376	945.5	193	183	—	—	—	—	—	—	
C 80 4	S4	ME4LB	258	379	376	980.5	193	191	—	—	—	—	—	—	

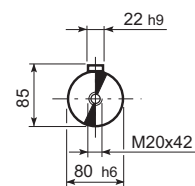
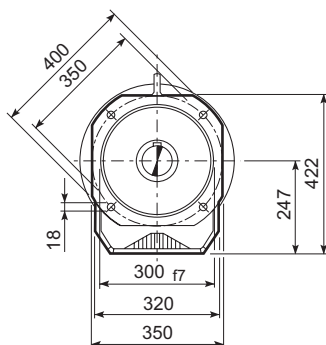
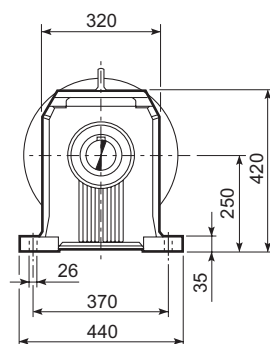
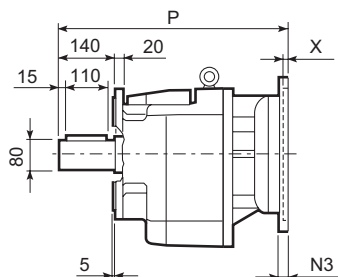


C 80...P(IEC)

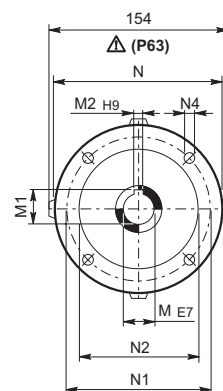
P



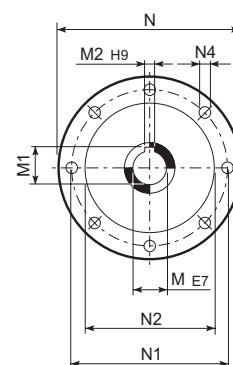
F



OUTPUT

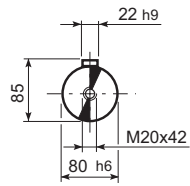
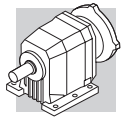


**INPUT
P63...P200**

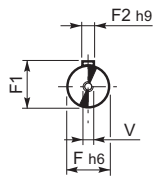


**INPUT
P225**

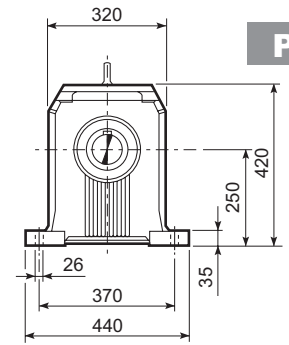
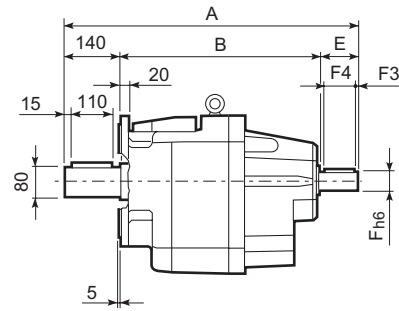
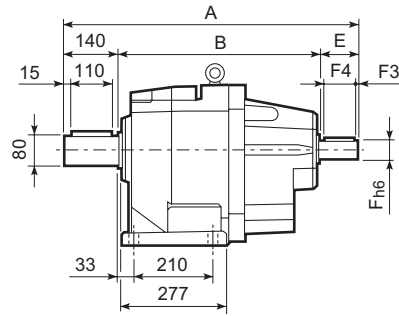
C 80												
		M	M1	M2	N	N1	N2	N3	N4	X	P	Kg
C 80 2/3	P80	19	21.8	6	200	165	130	—	M10x12	4	533	135
C 80 2/3	P90	24	27.3	8	200	165	130	—	M10x12	4	533	135
C 80 2/3	P100	28	31.3	8	250	215	180	—	M12x16	4.5	543	139
C 80 2/3	P112	28	31.3	8	250	215	180	—	M12x16	4.5	543	139
C 80 2/3	P132	38	41.3	10	300	265	230	16	14	5	579.5	141
C 80 2/3	P160	42	45.3	12	350	300	250	23	18	6	635	154
C 80 2/3	P180	48	51.8	14	350	300	250	23	18	6	635	154
C 80 2	P200	55	59.3	16	400	350	300	—	M16x25	7	660	176
C 80 2	P225	60	64.4	18	450	400	350	25	18	6	705.5	178
C 80 4	P63	11	12.8	4	140	115	95	—	M8x19	4	576.5	138
C 80 4	P71	14	16.3	5	160	130	110	—	M8x16	4.5	576.5	138
C 80 4	P80	19	21.8	6	200	165	130	—	M10x12	4	596	140
C 80 4	P90	24	27.3	8	200	165	130	—	M10x12	4	596	140
C 80 4	P100	28	31.3	8	250	215	180	—	M12x16	4.5	606	144
C 80 4	P112	28	31.3	8	250	215	180	—	M12x16	4.5	606	144
C 80 4	P132	38	41.3	10	300	265	230	16	M12x16	5	642.5	146



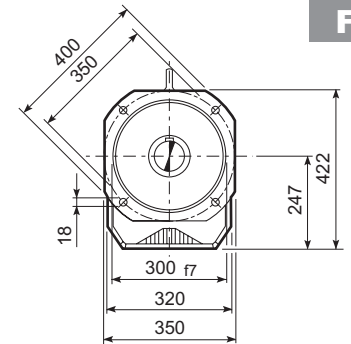
OUTPUT



INPUT



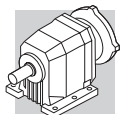
P



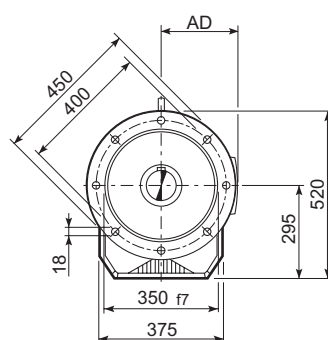
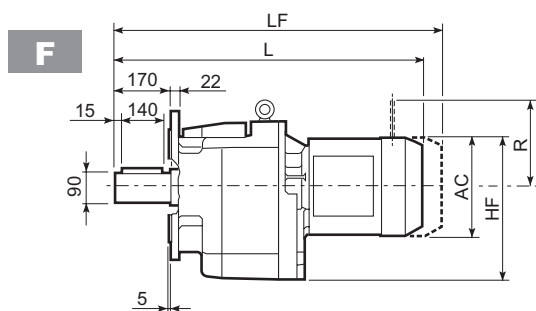
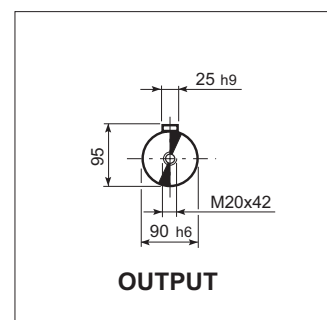
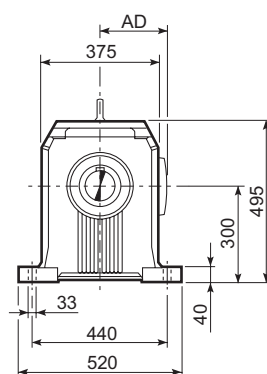
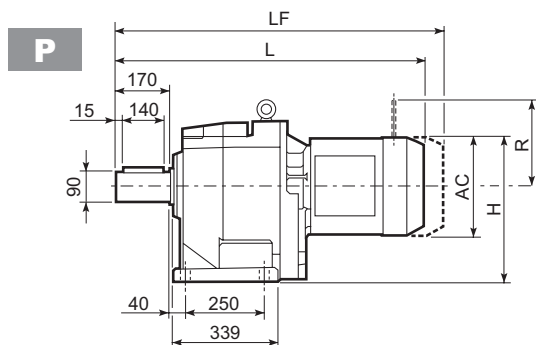
F

C 80

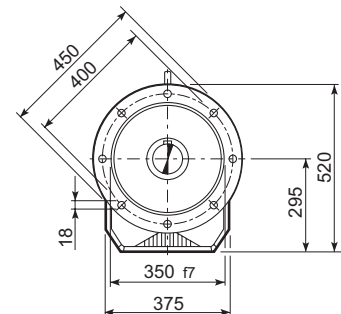
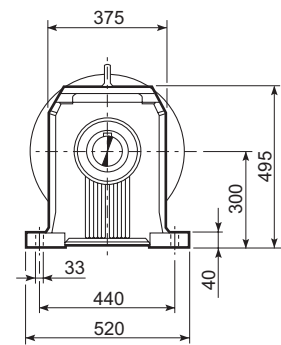
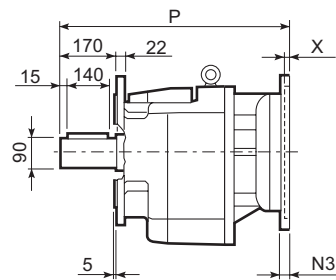
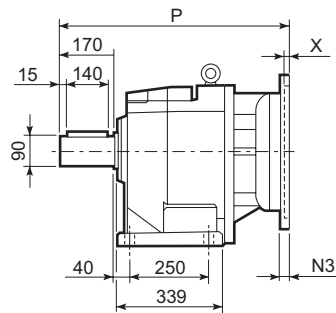
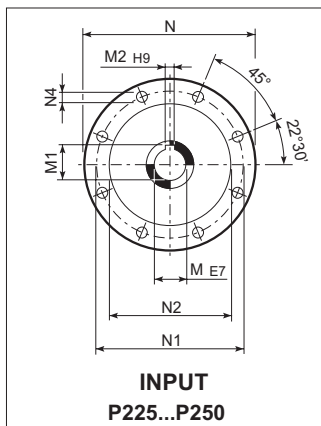
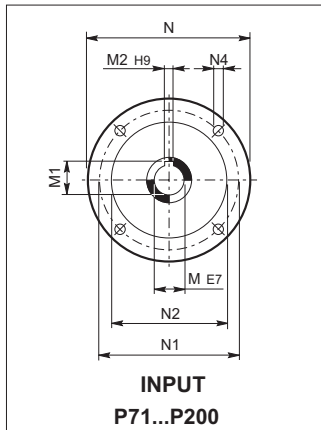
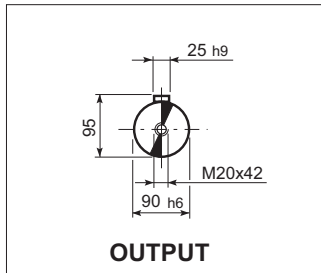
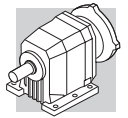
		A	B	E	F	F1	F2	F3	F4	V	kg
											
C 80 2	HS	718.5	468.5	110	42	45	12	10	90	M12x28	154
C 80 3		718.5	468.5	110	42	45	12	10	90	M12x28	154
C 80 4		666.5	476.5	50	24	27	8	2.5	45	M8x19	141



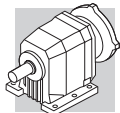
C 90...M/ME



C 90														
									M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	AD		LF		R	AD	R	AD
C 90 2/3	S3	ME3S	195	397.5	392.5	852	142	229.5	—	—	—	—	—	—
C 90 2/3	S3	ME3L	195	397.5	392.5	884	142	236	—	—	—	—	—	—
C 90 2/3	S4	ME4	258	429	424	992	193	270	—	—	—	—	—	—
C 90 2/3	S4	ME4LB	258	429	424	1027	193	278	—	—	—	—	—	—
C 90 2/3	S5	ME5S	310	455	450	1078.5	245	298	—	—	—	—	—	—
C 90 2/3	S5	ME5L	310	455	450	1122.5	245	314	—	—	—	—	—	—
C 90 4	S2	M2S	156	378	373	891	119	234	962	238	129	146	134	119
C 90 4	S2	ME2S	156	378	373	891	119	234	—	—	—	—	—	—
C 90 4	S3	ME3S	195	397.5	392.5	935	142	240.5	—	—	—	—	—	—
C 90 4	S3	ME3L	195	397.5	392.5	967	142	246	—	—	—	—	—	—
C 90 4	S4	ME4	258	429	424	1075	193	280	—	—	—	—	—	—
C 90 4	S4	ME4LB	258	429	424	1126.5	193	288	—	—	—	—	—	—

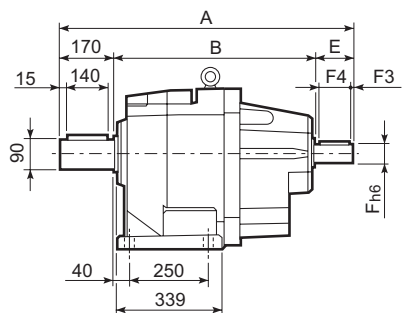


C 90												
		M	M1	M2	N	N1	N2	N3	N4	X	P	kg
C 90 2/3	P80	19	21.8	6	200	165	130	—	M10x12	4	644.5	229
C 90 2/3	P90	24	27.3	8	200	165	130	—	M10x12	4	644.5	229
C 90 2/3	P100	28	31.3	8	250	215	180	—	M12x16	4.5	654.5	234
C 90 2/3	P112	28	31.3	8	250	215	180	—	M12x16	4.5	654.5	234
C 90 2/3	P132	38	41.3	10	300	265	230	16	14	5	691	236
C 90 2/3	P160	42	45.3	12	350	300	250	23	18	6	746.5	251
C 90 2/3	P180	48	51.8	14	350	300	250	23	18	6	746.5	251
C 90 2/3	P200	55	59.3	16	400	350	300	—	M16x25	7	771.5	272
C 90 2/3	P225	60	64.4	18	450	400	350	30	18	6	817	273
C 90 2/3	P250	65	69.4	18	550	500	450	30	18	6	847	295
C 90 4	P63	11	12.8	4	140	115	95	—	M8x19	4	707.5	236
C 90 4	P71	14	16.3	5	160	130	110	—	M8x16	4.5	707.5	236
C 90 4	P80	19	21.8	6	200	165	130	—	M10x12	4	727	238
C 90 4	P90	24	27.3	8	200	165	130	—	M10x12	4	727	238
C 90 4	P100	28	31.3	8	250	215	180	—	M12x16	4.5	737	242
C 90 4	P112	28	31.3	8	250	215	180	—	M12x16	4.5	737	242
C 90 4	P132	38	41.3	10	300	265	230	16	14	5	773.5	244
C 90 4	P160	42	45.3	12	350	300	250	23	18	5.5	824	248
C 90 4	P180	48	51.8	14	350	300	250	23	18	5.5	824	248

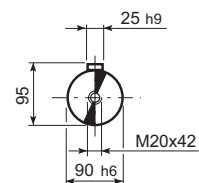
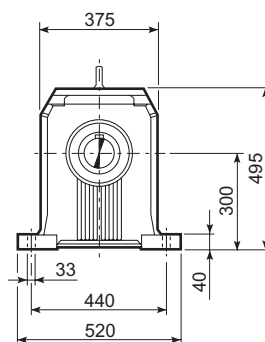
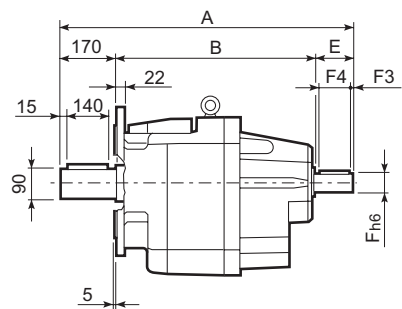


C 90...HS

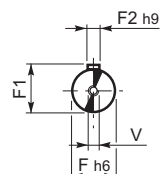
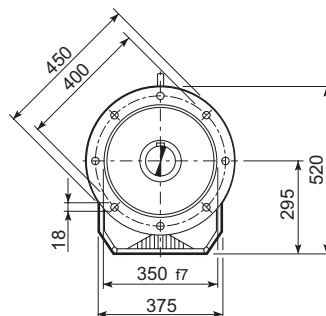
P



F



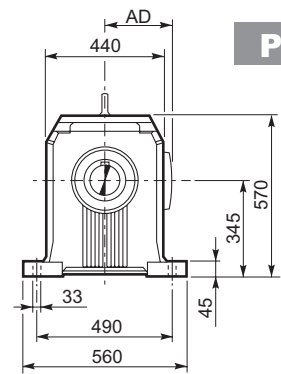
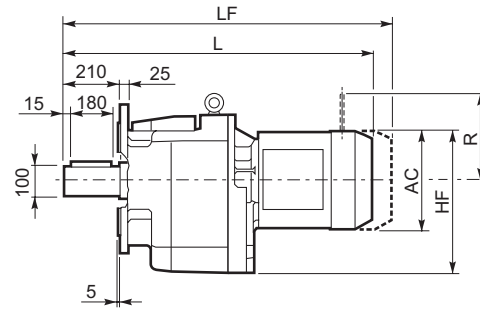
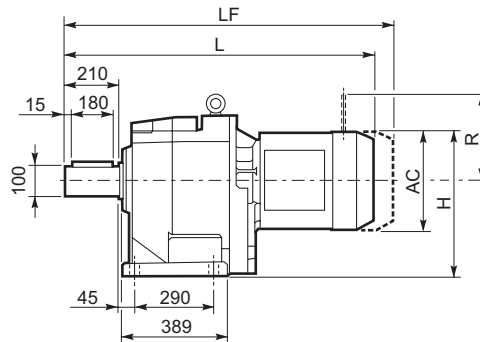
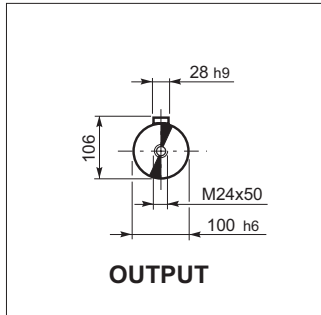
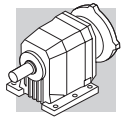
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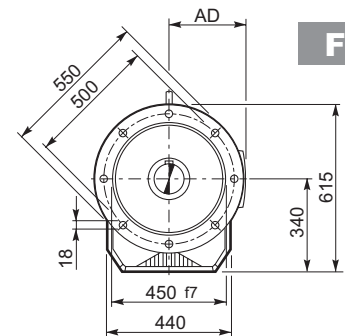
INPUT

C 90

		A	B	E	F	F1	F2	F3	F4	V	kg
	HS	930.5	620.5	140	60	64	18	10	120	M16x36	273
		930.5	620.5	140	60	64	18	10	120	M16x36	273
		797	577	50	24	27	8	2.5	45	M8x19	240

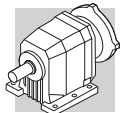


P



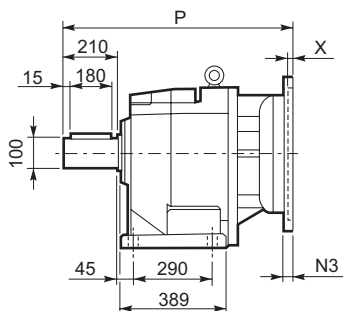
F

C 100															
										M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	AD	Kg		LF	Kg	R	AD	R	AD
C 100 2/3	S4	ME4	258	474	469	1087	193	392	—	—	—	—	—	—	—
C 100 2/3	S4	ME4LB	258	474	469	1122	193	400	—	—	—	—	—	—	—
C 100 2/3	S5	ME5S	310	500	495	1173.5	245	420	—	—	—	—	—	—	—
C 100 2/3	S5	ME5L	310	500	495	1217.5	245	436	—	—	—	—	—	—	—
C 100 4	S2	M2S	156	423	418	985.5	119	354	1056.5	357	129	146	134	119	
C 100 4	S2	ME2S	156	423	418	985.5	119	354	—	—	—	—	—	—	—
C 100 4	S3	ME3S	195	442.5	437.5	1029.5	142	359.5	—	—	—	—	—	—	—
C 100 4	S3	ME3L	195	442.5	437.5	1061.5	142	366	—	—	—	—	—	—	—
C 100 4	S4	ME4	258	474	469	1169.5	193	400	—	—	—	—	—	—	—
C 100 4	S4	ME4LB	258	474	469	1204.5	245	408	—	—	—	—	—	—	—

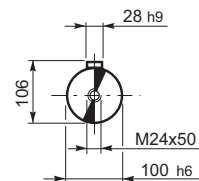
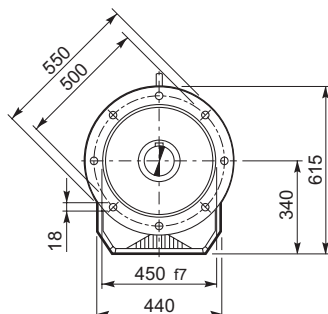
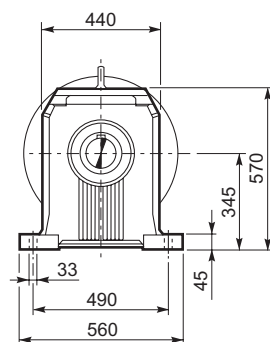
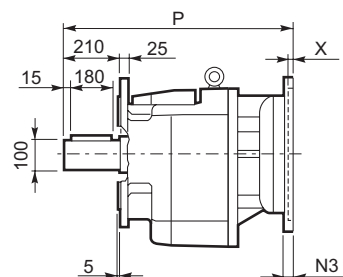


C 100...P(IEC)

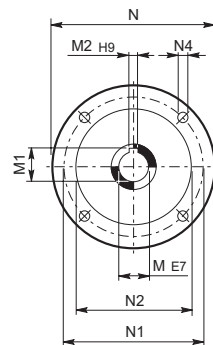
P



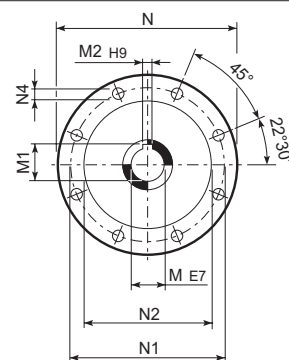
F



OUTPUT



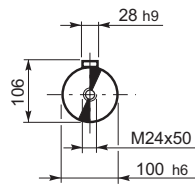
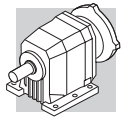
**INPUT
P80...P200**



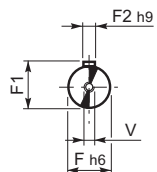
**INPUT
P225...P280**

C 100

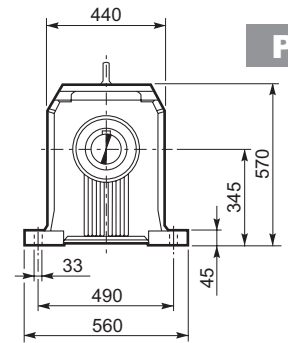
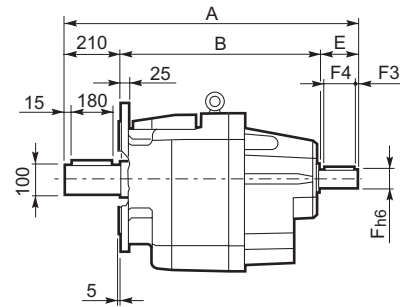
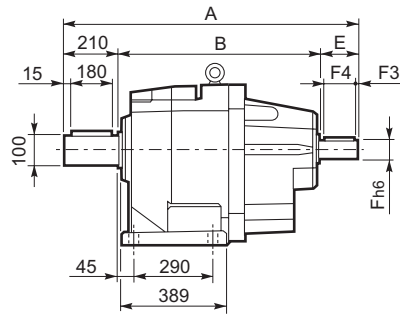
		M	M1	M2	N	N1	N2	N3	N4	X	P	kg
C 100 2/3	P100	28	31.3	8	250	215	180	—	M12x16	4.5	749.5	364
C 100 2/3	P112	28	31.3	8	250	215	180	—	M12x16	4.5	749.5	364
C 100 2/3	P132	38	41.3	10	300	265	230	16	14	5	786	367
C 100 2/3	P160	42	45.3	12	350	300	250	23	18	6	841.5	382
C 100 2/3	P180	48	51.8	14	350	300	250	23	18	6	841.5	382
C 100 2/3	P200	55	59.3	16	400	350	300	—	M16x25	7	866.5	403
C 100 2/3	P225	60	64.4	18	450	400	350	30	18	7	912	403
C 100 2/3	P250	65	69.4	18	550	500	450	30	18	7	942	426
C 100 2/3	P280	75	79.9	20	550	500	450	30	18	6	942	426
C 100 4	P63	11	12.8	4	140	115	95	—	M8x19	4	803	369
C 100 4	P71	14	16.3	5	160	130	110	—	M8x16	4.5	803	369
C 100 4	P80	19	21.8	6	200	165	130	—	M10x12	4	822.5	371
C 100 4	P90	24	27.3	8	200	165	130	—	M10x12	4	822.5	371
C 100 4	P100	28	31.3	8	250	215	180	—	M12x16	4.5	832.5	375
C 100 4	P112	28	31.3	8	250	215	180	—	M12x16	4.5	832.5	375
C 100 4	P132	38	41.3	10	300	265	230	16	14	5	869	377
C 100 4	P160	42	45.3	12	350	300	250	23	18	5.5	919.5	381
C 100 4	P180	48	51.8	14	350	300	250	23	18	5.5	919.5	381



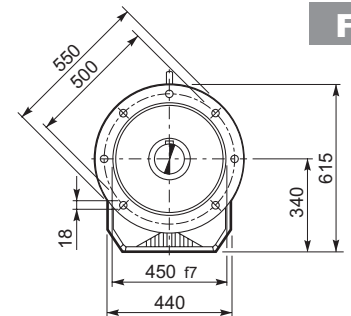
OUTPUT



INPUT



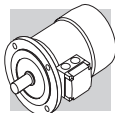
P



F

C 100

		A	B	E	F	F1	F2	F3	F4	V	kg
		1025.5	676	140	60	64	18	10	120	M16x36	409
C 100 2											
C 100 3		1025.5	676	140	60	64	18	10	120	M16x36	409
C 100 4		892	632	50	24	27	8	2.5	45	M8x19	372



MOTORI ELETTRICI

ELECTRIC MOTORS

ELEKTROMOTOREN

MOTEURS ELECTRIQUES

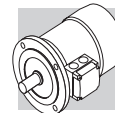
SIMBOLOGIA E UNITÀ DI MISURA

SYMBOLS AND UNITS OF MEASUREMENT

SYMBOLE UND MAßEINHEITEN

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	Nenndrehzahl	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	Schalthäufigkeit 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. Schalthäufigkeit im Leerlauf (relative Einschalt-dauer I = 50%)	Nombre de démarrages admissible à vide (I = 50%)



M1 - MOTORI AD ALTA EFFICIENZA

M1.1 - INTRODUZIONE

Classi di rendimento e metodo di prova

Il rendimento descrive l'efficienza con la quale il motore elettrico trasforma l'energia elettrica in meccanica.

In Europa il sistema di classificazione energetica dei motori in bassa tensione avveniva su base volontaria con riferimento alle classi Eff1/Eff2/Eff3; altri paesi si riferivano ai propri sistemi nazionali spesso molto diversi da quello Europeo. Questa incertezza normativa ha spinto i costruttori a promuovere un'armonizzazione internazionale e l'emissione della Norma IEC (International Electrotechnical Commission) IEC 60034-30:2008 "Classi di rendimento dei motori asincroni trifase a gabbia ad una sola velocità (codice IE)".

La nuova Norma:

- definisce le nuove classi di efficienza
IE1 (rendimento standard)
IE2 (alto rendimento)
IE3 (rendimento premium)
- fornisce un riferimento comune internazionale per la classificazione dei motori elettrici come pure per le attività legislative nazionale
- introduce il nuovo metodo di misura del rendimento in accordo alla Norma IEC 60034-1-2:2007

Nella tabella seguente è evidenziata la corrispondenza tra le principali classificazioni.

M1 - HIGH EFFICIENCY MOTORS

M1.1 - INTRODUCTION

Efficiency classes and test methods

Efficiency classes characterise the efficiency with which an electric motor converts electrical energy into mechanical energy. In Europe, the energy efficiency of low voltage electric motors used to be classified using the voluntary Eff1/Eff2/Eff3 system. Outside Europe, other countries used to apply their own national systems, often very different to the European system. This uncertainty in standards led manufacturers to develop a harmonised international standard, and push for the issue of IEC (International Electrotechnical Commission) standard IEC 60034-30:2008 "Efficiency classes of single-speed, three-phase, cage-induction motors (IE code)".

This new standard:

- defines new classes of efficiency
IE1 (standard efficiency)
IE2 (high efficiency)
IE3 (premium efficiency)
- provides a common, international reference system for the classification of electric motors and for national legislation
- introduces a new efficiency measurement method in conformity with standard IEC 60034-1-2:2007

The following table shows the correspondence among the main classes.

M1 - MOTOREN MIT HOHEM WIRKUNGSGRAD

M1.1 - EINFÜHRUNG

Wirkungsgradklassen und Prüfverfahren

Der Wirkungsgrad beschreibt die Effizienz, mit der ein Elektromotor elektrische in mechanische Energie umwandelt. In Europa erfolgte die Energieklassifizierung von Niederspannungsmotoren auf freiwilliger Basis unter Bezugnahme auf die Klassen Eff1/Eff2/Eff3; andere Länder wandten eigene Systeme an, die nicht selten stark vom europäischen System abwichen. Diese normative Unsicherheit hat die Hersteller dazu bewogen, eine internationale Harmonisierung anzustreben, die zur Ausgabe der IEC-Norm (International Electrotechnical Commission) IEC 60034-30:2008 "Wirkungsgradklassen für eintourige Drehstrom-Käfigläufer-Asynchronmotoren (IE-Code)" führte.

Die neue Norm:

- definiert die neuen Wirkungsgradklassen;
IE1 (Standard-Wirkungsgrad)
IE2 (hoher Wirkungsgrad)
IE3 (Premium-Wirkungsgrad)
- liefert einen gemeinsamen internationalen Bezug für die Klassifizierung von Elektromotoren wie auch für die gesetzgebenden Aktivitäten der Länder;
- führt ein neues Messverfahren des Wirkungsgrads in Übereinstimmung mit der Norm IEC 60034-1-2:2007 ein.

In der nachfolgenden Tabelle ist die Entsprechung zwischen den wesentlichen Klassifikationen aufgeführt.

M1 - MOTEURS À HAUT RENDEMENT

M1.1 - INTRODUCTION

Classes de rendement et méthode d'essai

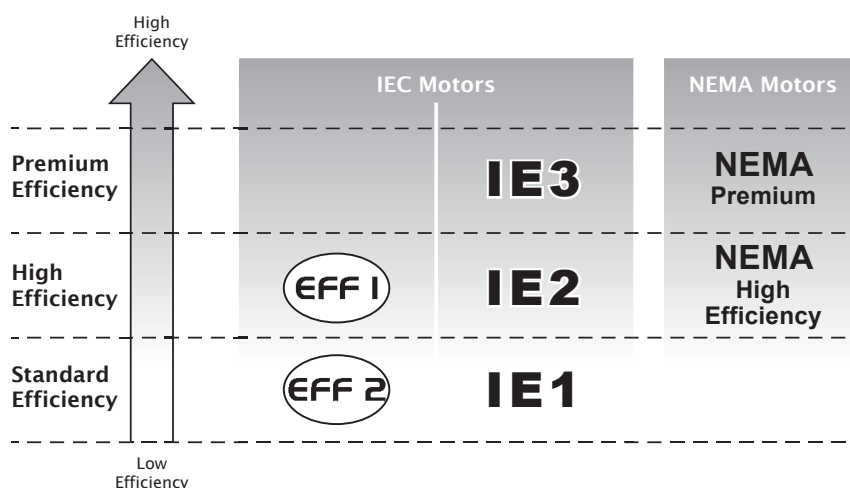
Le rendement décrit l'efficacité avec laquelle le moteur électrique transforme l'énergie électrique en énergie mécanique.

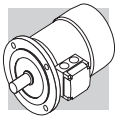
En Europe, le système de classification énergétique des moteurs à basse tension se faisait sur une base volontaire en se référant aux classes Eff1/Eff2/Eff3 ; d'autres pays se référaient à leurs propres systèmes nationaux souvent très différents du système européen.

Cette incertitude normative a poussé les constructeurs à promouvoir une harmonisation internationale et à émettre la Norme IEC (International Electrotechnical Commission) IEC 60034-30:2008 « Classes de rendement des moteurs asynchrones triphasés à cage à vitesse unique (code IE) ».

La nouvelle Norme :

- définit les nouvelles classes de rendement
IE1 (rendement standard)
IE2 (haut rendement)
IE3 (rendement premium)
 - fournit une référence internationale commune pour la classification des moteurs électriques comme pour les activités législatives nationales
 - introduit la nouvelle méthode de mesure du rendement conformément à la Norme IEC 60034-1-2:2007
- Le tableau suivant met en évidence la correspondance entre les principales classifications.*





Regolamento CE N° 640/2009 della Commissione

La Norma IEC 60034-30 fornisce le linee guida tecniche ma non stabilisce in termini legali i requisiti richiesti per l'adozione di una certa classe di rendimento; questi requisiti sono specificati dalle Direttive e dalle Leggi nazionali.

Il regolamento di applicazione della Direttiva 2005/32/CE, adottato il 22 Luglio 2009, stabilisce questi requisiti e specifica i criteri per la progettazione ecocompatibile dei motori elettrici, fissando i limiti di rendimento secondo le seguenti scadenze:

- **16/06/2011:** I motori elettrici devono avere un livello minimo di efficienza corrispondente a **IE2**
- **01/01/2015:** I motori elettrici con una potenza nominale compresa tra 7.5 kW e 375 kW devono avere un livello minimo di efficienza corrispondente a **IE3**, oppure a **IE2** se dotati di un convertitore di frequenza.
- **01/01/2017:** I motori elettrici con una potenza nominale compresa tra 0.75 kW e 375 kW devono avere un livello minimo di efficienza corrispondente a **IE3**, oppure a **IE2** se dotati di un convertitore di frequenza.

Scopo ed esclusioni

Il Regolamento (CE) N. 640/2009 si applica ai motori a induzione, a gabbia di scoiattolo a 2, 4 e 6 poli, singola velocità, trifase 50 Hz o 60 Hz, con potenza output tra 0.75 kW a 375 kW, tensione nominale fino a 1000 V, e che abbiano caratteristiche basate su di un funzionamento continuo (S1).

Sono esclusi dall'applicazione di questo regolamento:

- I motori autofrenanti.
- I motori progettati per funzionare completamente immersi in un liquido.

European Commission regulation 640/2009

IEC standard 60034-30 establishes technical guidelines for efficiency classification but does not impose any legal requirements for the adoption of any particular efficiency class. These are laid down by European Directives and national laws. The EC Regulation applying Directive 2005/32/EC was adopted on the 22nd July 2009. This establishes the legal requirements and eco-compatible design criteria for electric motors, and imposes minimum efficiency limits according to the following schedule:

- **16/06/2011:** *Electric motors must have a minimum efficiency level equivalent to class IE2*
- **01/01/2015:** *Electric motors with a rated power output between 7.5 kW and 375 kW must have a minimum efficiency level corresponding to IE3, or to IE2 if controlled by an inverter.*
- **01/01/2017:** *Electric motors with a rated power output between 0.75 kW and 375 kW must have a minimum efficiency level corresponding to IE3, or to IE2 if controlled by an inverter.*

Scope and exclusions

EC Regulation 640/2009 applies to 2, 4, and 6 pole, single-speed, three-phase, 50 Hz or 60 Hz, cage-induction motors with rated outputs of 0.75 kW to 375 kW, and rated voltage up to 1000 V, designed for continuous duty (S1).

The regulation does not apply to:

- *self-braking motors*
- *motors designed to function immersed in liquid*
- *motors that are fully integrated in a product (like a gearbox, pump, fan), so that it is not possible to test the performance of the motor*

Verordnung EG Nr. 640/2009 der Kommission

Die Norm IEC 60034-30 liefert die technischen Leitlinien, bestimmt aber nicht die gesetzlichen Vorgaben bezüglich der Anforderungen für die Anwendung einer bestimmten Wirkungsgradklasse; diese Anforderungen sind durch die Richtlinien und nationalen Gesetze spezifiziert. Die Verordnung vom 22. Juli 2009 zur Durchführung der Richtlinie 2005/32/EG legt diese Anforderungen fest, spezifiziert die Kriterien für die umweltgerechte Gestaltung der Elektromotoren und bestimmt das Wirkungsgradniveau nach folgendem Zeitplan:

- **16.06.2011:** Die Elektromotoren müssen mindestens ein Effizienzniveau in Entsprechung zu **IE2**
- **01.01.2015:** Die Elektromotoren mit einer Nennausgangsleistung zwischen 7.5 kW und 375 kW müssen mindestens ein Effizienzniveau in Entsprechung zu **IE3** aufweisen, oder in Entsprechung zu **IE2**, sollten sie mit einem Frequenzumrichter ausgestattet sein.
- **01.01.2017:** Die Elektromotoren mit einer Nennausgangsleistung zwischen 0.75 kW und 375 kW müssen mindestens ein Effizienzniveau in Entsprechung zu **IE3** aufweisen, oder in Entsprechung zu **IE2**, sollten sie mit einem Frequenzumrichter ausgestattet sein.

Gegenstand und Geltungsbereich

Die Verordnung (EG) Nr. 640/2009 gilt für eintourige, 2-, 4- bzw. 6-polige Dreiphasen-50-Hz- oder -60-Hz-Käfigläufer-Induktionsmotoren mit Nennausgangsleistungen zwischen 0,75 kW und 375 kW, Nennspannung bis 1000 V und entsprechender Auslegung für Dauerbetrieb (S1).

Diese Verordnung gilt nicht für:

- Bremsmotoren.
- Motoren, die dafür ausgelegt sind, ganz in eine Flüssigkeit eingetaucht betrieben zu werden.
- vollständig in ein Produkt

Règlement CE N° 640/2009 de la Commission

La Norme IEC 60034-30 donne les directives techniques mais n'établit pas en termes légaux les conditions requises pour l'adoption d'une certaine classe de rendement ; ces conditions requises sont spécifiées par les Directives et par les Lois nationales. Le règlement d'application de la Directive 2005/32/CE, adopté le 22 juillet 2009, établit ces conditions requises et spécifie les critères pour la conception éco-compatible des moteurs électriques, en fixant les limites de rendement selon les échéances suivantes :

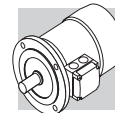
- **16/06/2011 :** *Les moteurs électriques doivent avoir un niveau minimum de rendement correspondant à IE2*
- **01/01/2015 :** *Les moteurs électriques ayant une puissance nominale comprise entre 7.5 kW et 375 kW doivent avoir un niveau minimum de rendement correspondant à IE3, ou bien à IE2 s'ils sont dotés d'un convertisseur de fréquence.*
- **01/01/2017 :** *Les moteurs électriques ayant une puissance nominale comprise entre 0.75 kW et 375 kW doivent avoir un niveau minimum de rendement correspondant à IE3, ou bien à IE2 s'ils sont dotés d'un convertisseur de fréquence.*

Objectif et exclusions

Le Règlement (CE) N° 640/2009 s'applique aux moteurs à induction, à cage d'écureuil à 2, 4 et 6 pôles, à vitesse unique, triphasés 50 Hz ou 60 Hz, avec puissance émise entre 0,75 kW et 375 kW, tension nominale jusqu'à 1000 V et qui aient des caractéristiques basées sur un fonctionnement continu (S1).

Sont exclus de l'application de ce règlement :

- *Les moteurs auto-freinants.*
- *Les moteurs conçus pour fonctionner totalement immergés dans un liquide.*
- *Les moteurs totalement inté-*



- I motori completamente integrati in un prodotto (ad esempio riduttore, pompe, ventilatori), rendendo impossibile testarne le prestazioni in modo indipendente dal prodotto.
- I motori espressamente progettati per funzionare:
 - ad altitudini superiori a 1000 metri slm;
 - dove la temperatura ambiente supera i 40 °C;
 - a temperature massime di esercizio superiori a 400 °C;
 - dove la temperatura ambiente è inferiore a -15 °C (qualsiasi motore) o inferiore a 0 °C (per i motori raffreddati ad aria);
 - dove la temperatura del liquido refrigerante in entrata è inferiore a 5 °C o supera i 25 °C;
 - in atmosfere potenzialmente esplosive come definite dalla direttiva 94/9/CE.
- independently of that of the product.*
- *motors expressly designed to function:*
 - *at altitudes above 1000 metres a.s.l.;*
 - *in ambient temperatures above 40 °C;*
 - *at maximum operating temperatures above 400 °C;*
 - *in ambient temperatures below -15 °C (all motors) or below 0 °C (air-cooled motors);*
 - *with incoming liquid coolants at temperatures below 5 °C or above 25 °C;*
 - *in potentially explosive atmospheres as defined by Directive 94/9/EC.*
- (z.B. Getriebe, Pumpen, Ventilatoren) eingebaute Motoren, deren Energieeffizienz nicht unabhängig von diesem Produkt erfasst werden kann.
- Motoren, die speziell für den Betrieb unter folgenden Bedingungen ausgelegt sind:
 - in Höhen über 1000 Meter über dem Meeresspiegel;
 - bei Umgebungstemperaturen über 40 °C;
 - bei Betriebshöchsttemperaturen über 400 °C;
 - bei Umgebungstemperaturen unter -15 °C (beliebiger Motor) oder unter 0 °C (luftgekühlte Motoren);
 - bei Kühlflüssigkeitstemperaturen am Einlass eines Produkts unter 5 °C oder über 25 °C;
 - in explosionsgefährdeten Bereichen im Sinne der Richtlinie 94/9/EG.
- grés dans un produit (par exemple réducteur, pompes, ventilateurs), ce qui ne permet pas de tester les performances de façon indépendante du produit.*
- *Les moteurs expressément conçus pour fonctionner :*
 - *à des altitudes supérieures à 1000 mètres au dessus du niveau de la mer ;*
 - *où la température ambiante dépasse 40 °C ;*
 - *à des températures maximales de fonctionnement supérieures à 400 °C ;*
 - *où la température ambiante est inférieure à -15 °C (n'importe quel moteur) ou inférieure à 0 °C (pour les moteurs refroidis à l'air) ;*
 - *où la température du liquide de refroidissement à l'entrée est inférieure à 5 °C ou dépasse 25 °C ;*
 - *dans des atmosphères potentiellement explosives telles que définies par la directive 94/9/CE.*

M1.2 - I MOTORI BONFIGLIOLI SERIE BE - ME

I nuovi motori asincroni trifase a 4 poli serie **BE** (BE 80B ... BE 180L) e **ME** (ME 2S ... ME 5L), prodotti da BONFIGLIOLI RIDUTTORI sono del tipo chiuso con ventilazione esterna e rotore a gabbia di scoiattolo, con potenze disponibili da 0.75 a 22 kW e sono classificati **IE2** (alta efficienza).

I motori **BE** e **ME** sono previsti, nell'esecuzione standard, per tensione nominale 230/400V Δ/Y (400/690V Δ/Y per le grandezze BE160, BE 180 e ME 5) 50 Hz con tolleranza ±10%.

I motori serie **BE** e **ME** sono conformi ai requisiti della Direttiva 2006/95/CE (direttiva Bassa Tensione) e 2004/108/CE (Direttiva Compatibilità Elettromagnetica).

Inoltre i motori serie **BE** e **ME** sono costruiti in accordo alle Norme riportate nella tabella seguente.

M1.2 - BONFIGLIOLI SERIES BE - ME MOTORS

BONFIGLIOLI RIDUTTORI's new BE Series motors (BE 80B ... BE 180L) and ME (ME 2S ... ME 5L), are IE2 class (high efficiency), 4 pole, three phase, asynchronous, enclosed, externally ventilated, cage-induction motors, available in rated power outputs from 0.75 to 22 kW. Standard versions of BE and ME motors are 230/400V Δ/Y (400/690V Δ/Y in sizes BE 160, BE 180 and ME 5), 50 Hz motors, with a tolerance of ±10%. BE and ME Series motors conform to the requirements of Directive 2006/95/EC (Low Voltage Directive) and Directive 2004/108/EC (Electromagnetic Compatibility Directive).

BE and ME Series motors are constructed according to the standards specified in the following table.

M1.2 - DIE BONFIGLIOLI MOTOREN DER BAUREIHE BE - ME

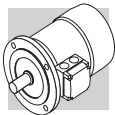
Die neuen 4-poligen Drehstrom-Asynchronmotoren von BONFIGLIOLI RIDUTTORI der Baureihe **BE** (BE 80B ... BE 180L) und **ME** (ME 2S ... ME 5L), sind in geschlossener Ausführung mit Fremdlüftung und Käfigläufer-Rotor hergestellt; sie werden mit Leistungen zwischen 0.75 und 22 kW angeboten und sind **IE2** klassifiziert (hoher Wirkungsgrad). Die BE-Motoren sind in der Standardausführung für die Nennspannungen 230/400 V Δ/Y (400/690 V Δ/Y für die Größen BE 160, BE 180 und ME 5), 50 Hz, mit einer Toleranz von ±10% vorgesehen. Die Motoren der Baureihe **BE** und **ME** erfüllen die Anforderungen der Richtlinien 2006/95/EG (Niederspannungsrichtlinie) und 2004/108/EG (Richtlinie der elektromagnetischen Verträglichkeit). Zudem sind die Motoren der Baureihe **BE** und **ME** in Übereinstimmung mit den Vorgaben der in der nachfolgenden Tabelle aufgeführten Normen hergestellt.

M1.2 - LES MOTEURS BONFIGLIOLI SÉRIE BE - ME

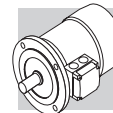
Les nouveaux moteurs asynchrones triphasés à 4 pôles série BE (BE 80B ... BE 180L) et ME (ME 2S ... ME 5L) produits par BONFIGLIOLI RIDUTTORI sont du type fermé avec ventilation externe et rotor à cage d'écureuil, avec des puissances disponibles de 0.75 à 22 kW et sont classés IE2 (haut rendement). Les moteurs BE et ME sont prévus, dans l'exécution standard, pour une tension nominale de 230/400V Δ/Y (400/690V Δ/Y pour les grandeurs BE 160, BE 180 et ME 5) 50 Hz avec une tolérance de ±10%.

Les moteurs série BE et ME sont conformes aux conditions requises de la Directive 2006/95/CE (Directive Basse Tension) et 2004/108/CE (Directive Compatibilité Électromagnétique).

En outre, les moteurs de la série BE et ME sont construits conformément aux Normes indiquées dans le tableau suivant.



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 EN 60034-8	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
Classi di rendimento dei motori asincroni trifase con rotore a gabbia ad una sola velocità (Codice IE) <i>Efficiency classes of single-speed, three-phase, cage-induction motors (IE code)</i> Wirkungsgradklassen der eintourigen Drehstrom-Asynchronmotoren mit Käfigläufer-Rotor (IE-Code) <i>Classes de rendement des moteurs asynchrones triphasés avec rotor à cage à vitesse unique (Code IE)</i>	CEI EN 60034-30	IEC 60034-30
Metodi normalizzati per la determinazione, mediante prove, delle perdite e del rendimento <i>Standard method for determining losses and efficiency from tests</i> Genormte Verfahren zur Bestimmung der Verluste und des Wirkungsgrads anhand von Tests <i>Méthodes normalisées pour la détermination, par le biais d'essais, des pertes et du rendement</i>	CEI EN 60034-2-1	IEC 60034-2-1



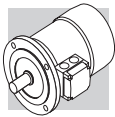
**M1.3 - DESIGNAZIONE
MOTORE**

**M1.3 - MOTOR
DESIGNATION**

**M1.3 - MOTORBEZEICH-
NUNG**

**M1.3 - DESIGNATION
MOTEUR**

BE	90LA	4	230/400-50	IP55	CLF	B5	...	...
								OPZIONI / OPTIONS / OPTIONEN / OPTIONS
								POSIZIONE MORSETTIERA TERMINAL BOX POSITION KLEMMENKASTENLAGE POSITION BOITE A BORNE W (default), N , E , S
								FORMA COSTRUTTIVA / MOTOR MOUNTING / BAUFORM / FORM DE CONSTRUCTION — (motore integrato / compact motor / kompaktes Motor / moteur compact) IM B5 - IM V1, IM V3 IM B14 - IM V18, IM V19
								CLASSE ISOLAMENTO / INSULATION CLASS / ISOLIERUNGSKLASSE / CLASSE ISOLATION CL F , CL H
								GRADO DI PROTEZIONE / DEGREE OF PROTECTION / SCHUTZART / DEGRE DE PROTECTION IP55
								TENSIONE - FREQUENZA / VOLTAGE - FREQUENCY / SPANNUNG - FREQUENZ / TENSION - FREQUENCE 230/400 V Δ/Y - 50 Hz (BE 80 ... BE 132) 460 V Y - 60 Hz (BE 80 ... BE 132) 400/690 V Δ/Y - 50 Hz (BE 160 - BE 180) 460 V Δ - 60 Hz (BE 160 - BE 180)
								NUMERO DI POLI / POLE NUMBER / POLZAHL / N.bre POLES 4
								GRANDEZZA MOTORE / MOTOR SIZE / MOTOR-BAUGRÖSSE / TAILLE MOTEUR BE 80B ... BE 180L ME 2S ... ME 5L
								TIPO MOTORE / MOTOR TYPE / MOTORTYP / TYPE MOTEUR BE trifase IEC, classe IE2 / IEC 3-phase, class IE2 / IEC Dreiphasen, Klasse IE2 / 3 phase CEI, classe IE2 ME trifase integrato, classe IE2 / compact 3-phase, class IE2 / kompaktes Dreiphasen, Klasse IE2 / 3 phase compact, classe IE2



IE2

1	IEC EN 60034		 Bonfiglioli Riduttori				4
	3~Mot BE 90LA 4			Cod. 8U09030001			
2	No 1003001 - 6954785		S 1	IM B 5 15,1 kg			
	kW 1,5		CL F IP 55		Amb	40 °C	5
	Hz	V ± 10%	A	min ⁻¹	cos φ		
	50 	230/400 Δ/Y	6.1/3.5	1430	0.74		
3	60	265/460 Δ/Y	5.4/3.1	1730	0.73		
	50Hz-IE2	83.5(100%) - 83.0(75%) - 80.0(50%)					6
	60Hz-IE2	84.5(100%) - 83.9(75%) - 80.7(50%)					

- ① Identificativo motore BONFIGLIOLI
- ② Numero di serie
- ③ Tensione nominale
- ④ Codice motore
- ⑤ Tipo di servizio: S1 servizio continuo
- ⑥ Classe di efficienza IE a: 4/4 - 3/4 - 2/4 del carico

- ① *BONFIGLIOLI* Motor type
- ② *Serial number*
- ③ *Rated voltage*
- ④ *Motor code*
- ⑤ *Type of duty: S1 Continuous duty*
- ⑥ *IE Class, Efficiency at: 4/4 - 3/4 - 2/4 load*

- ① Identifikationscode BONFIGLIOLI Motor
- ② Seriennummer
- ③ Nennspannung
- ④ Motor-Codenummer
- ⑤ Betriebsart: S1 Dauerbetrieb
- ⑥ Wirkungsgradklasse IE bei: 4/4 - 3/4 - 2/4 der Last

- ① *Identifiant moteur BONFIGLIOLI*
- ② *Numéro de série*
- ③ *Tension nominale*
- ④ *Code moteur*
- ⑤ *Type de service : S1 service continu*
- ⑥ *Classe de rendement IE a: 4/4 - 3/4 - 2/4 de la charge*

M1.4 - OPZIONI

M1.4 - OPTIONS

M1.4 - OPTIONEN

M1.4 - OPTIONS

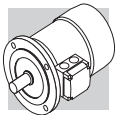
Descrizione / Description Beschreibung / Description	Valori / Catalogue numbers Werte / Valeurs		
Protezioni termiche / <i>Thermal protective devices</i> Thermische Wicklungsschutz / <i>Protections thermiques</i>	D3	E3	
Dispositivi di retroazione / <i>Feedback devices</i> Signalrückführungen (Drehgeber) / <i>Dispositifs de rétroaction</i>	EN1	EN2	EN3
Riscaldatori anticondensa / <i>Anti-condensate heaters</i> Wicklungsheizung / <i>Réchauffeurs anticondensation</i>	H1		
Tropicalizzazione avvolgimenti / <i>Tropicalized windings</i> Tropenschutz der Motorwicklungen / <i>Tropicalisation bobinages</i>	TP		
Doppia estremità d'albero / <i>Double-extended shaft</i> Zweites Wellenende / <i>Arbre à double extrémité</i>	PS		
Equilibratura rotore in grado B / <i>Rotor balancing grade B</i> Rotorauswuchtung mit Grad B / <i>Equilibrage rotor en degré B</i>	RV		
Protezioni meccaniche esterne / <i>External mechanical protections</i> Schutzdächer / <i>Protections mécaniques extérieures</i>	RC	TC	
Ventilazione forzata / <i>Forced ventilation</i> Fremdlüfter / <i>Ventilation forcée</i>	U1	U2	

4 P		1500 min ⁻¹ - S1											50 Hz
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P _n		n	M _n	In 400V	η%			cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	J _m x 10 ⁻⁴	IM B5 	
kW		min ⁻¹	Nm	A	100%	75%	50%					kgm ²		
0.75	BE 80B	4	1430	5.0	1.65	81.0	80.5	78.0	0.81	6.1	3.2	3.0	28	12.2
1.1	BE 90S	4	1430	7.4	2.53	82.5	82.0	79.5	0.76	6.3	2.9	2.8	28	13.6
1.5	BE 90LA	4	1430	10.0	3.50	83.5	83.0	80.0	0.74	5.9	3.1	3.0	34	15.1
2.2	BE 100LA	4	1430	14.7	4.89	85.4	85.0	84.0	0.76	5.8	3.0	2.8	54	22
3	BE 100LB	4	1420	20	6.58	85.5	86.0	85.5	0.77	5.9	2.8	2.6	61	24
4	BE 112M	4	1440	27	8.30	87.0	87.0	86.0	0.80	6.5	2.8	2.8	105	32
5.5	BE 132S	4	1460	36	11.07	88.5	88.5	87.5	0.81	7.3	2.9	2.9	270	53
7.5	BE 132MA	4	1460	49	14.83	89.0	89.0	88.5	0.82	6.9	2.9	2.8	319	59
9.2	BE 132MB	4	1460	60	18.09	89.5	89.5	88.5	0.82	6.9	2.9	3.0	360	70
11	BE 160M	4	1465	72	21.54	91.0	91.3	90.5	0.81	6.5	2.8	2.6	650	99
15	BE 160L	4	1465	98	28.73	90.8	91.0	90.5	0.83	6.5	2.6	2.3	790	115
18.5	BE 180M	4	1465	121	35.12	91.6	92.0	91.3	0.83	6.5	2.6	2.5	1250	135
22	BE 180L	4	1465	143	41.27	91.6	91.8	91.4	0.84	6.8	2.7	2.6	1650	157

4 P		1500 min ⁻¹ - S1											50 Hz
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P _n		n	M _n	I _n 400V	η%			cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	J _m x 10 ⁻⁴	IM B9 	
kW		min ⁻¹	Nm	A	100%	75%	50%					kgm ²		
0.75	ME 2SB	4	1430	5.0	1.65	81.0	80.5	78.0	0.81	6.1	3.2	3	28	10.9
1.1	ME 3SA	4	1430	7.4	2.60	82.5	82.0	79.0	0.74	5.5	2.5	2.8	34	15.5
1.5	ME 3SB	4	1420	10.1	3.48	84.0	84.0	83.0	0.74	6.2	2.9	2.9	40	17
2.2	ME 3LA	4	1430	14.7	4.89	85.4	85.0	84.0	0.76	5.8	3	2.8	54	21
3	ME 3LB	4	1420	20	6.58	85.5	86.0	85.5	0.77	5.9	2.8	2.6	61	23
4	ME 4SA	4	1440	27	8.25	87.5	86.8	84.0	0.80	7.1	3.0	3.1	213	42
5.5	ME 4SB	4	1460	36	11.07	88.5	88.5	87.5	0.81	7.3	2.9	2.9	270	51
7.5	ME 4LA	4	1460	49	14.83	89.0	89.0	88.5	0.82	6.9	2.9	2.8	319	57
9.2	ME 4LB	4	1460	60	18.09	89.5	89.5	88.5	0.82	6.9	2.9	3	360	65
11	ME 5SA	4	1465	72	21.54	91.0	91.3	90.5	0.81	6.5	2.8	2.6	650	85
15	ME 5LA	4	1465	98	28.73	90.8	91.0	90.5	0.83	6.5	2.6	2.3	790	101



IE2

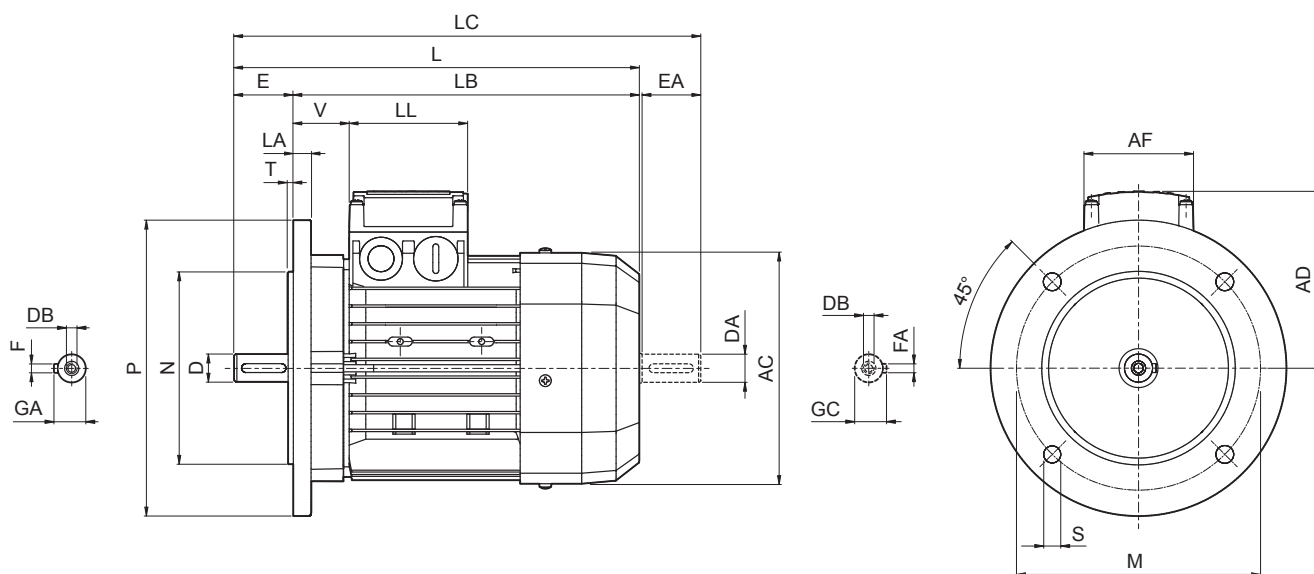
M1.6 - DIMENSIONI

M1.6 - DIMENSIONS

M1.6 - ABMESSUNGEN

M1.6 - DIMENSIONS

BE - IM B5



	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Flange						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
BE 80	19	40	M6	21.5	6							156	274	234	315	119	74	80	38
BE 90 S	24	50	M8	27	8	165	130	200	11.5	3.5	11.5	176	326	276	378	133	98	98	44
BE 90 L																			
BE 100	28	60	M10	31	8	215	180	250	14	4	14	195	367	307	429	142	98	98	50
BE 112											15	219	385	325	448	157			52
BE 132 S	38	80	M12	41	10	265	230	300	14	4	16	258	493	413	576	193	118	118	58
BE 132 MA													528	448	611				
BE 132 MB																			
BE 160 M	42	110	M16	45	12	300	250	350	18.5	5	15	310	596	486	680	245	187	187	51
BE 160 L	38(1)	80(1)	M12(1)	41(1)	10(1)								640	530	724				
BE 180 M	48	110	M16	51.5	14	300	250	350	18.5	5	18	348	708	598	823	261	187	187	52
BE 180 L	42(1)	110(1)	M16(1)	45(1)	12(1)														

NB:

(1) Queste dimensioni sono riferite alla seconda estremità d'albero.

NOTE:

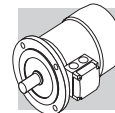
(1) These values refer to the rear shaft end.

HINWEIS:

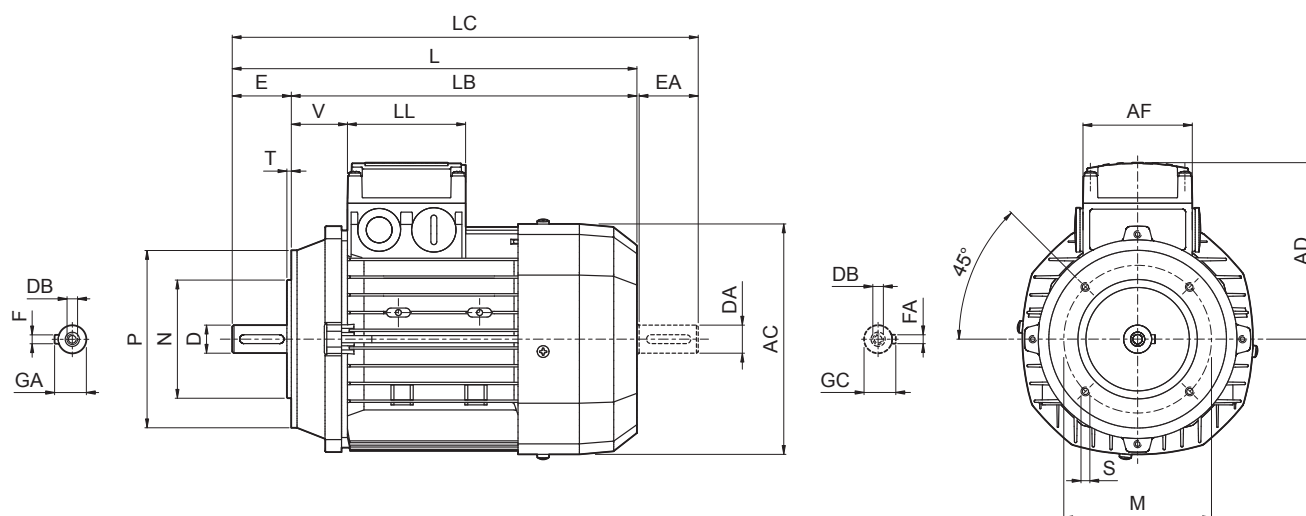
(1) Diese Masse betreffen das zweite Wellenende.

REMARQUE :

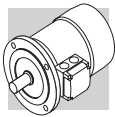
(1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.



BE - IM B14

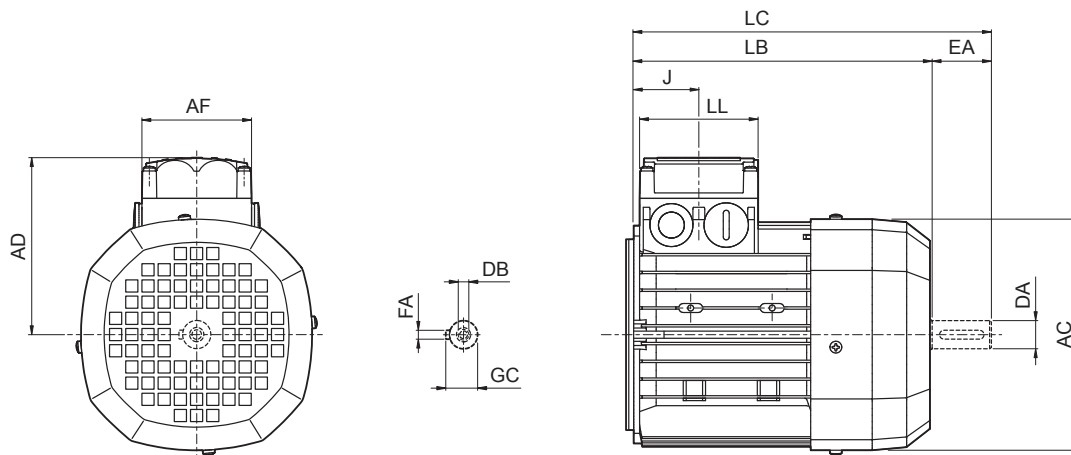


	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Flange					Motore / Motor / Motor / Moteur							
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	AC	L	LB	LC	AD	AF	LL	V
BE 80	19	40	M6	21.5	6	100	80	120	M6	3	156	274	234	315	119	74	80	38
BE 90 S	24	50	M8	27	8	115	95	140	M8		176	326	276	378	133	98	98	44
BE 90 L											195	367	307	429	142			
BE 100	28	60	M10	31	8	130	110	160		3.5	219	385	325	448	157			
BE 112										219	385	325	448	157	52			
BE 132 S	38	80	M12	41	10	165	130	200	M10	4	258	493	413	576	193	118	118	58
BE 132 MA												528	448	611				
BE 132 MB												528	448	611				

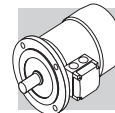


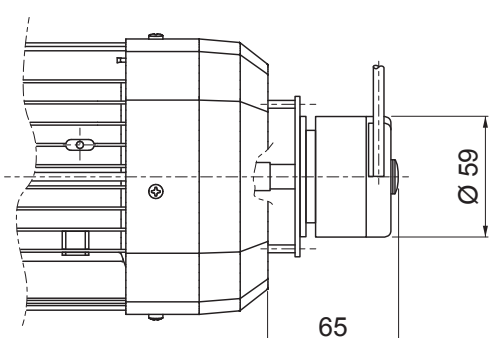
IE2

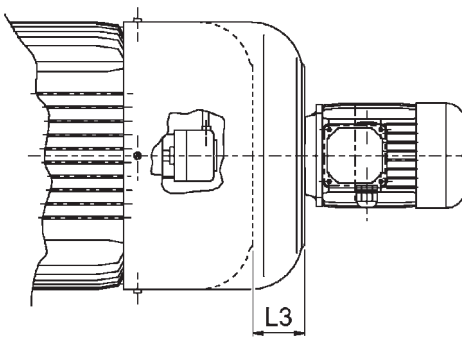
ME



	Albero / Shaft / Welle / Arbre					Motore / Motor / Motor / Moteur						
	DA	EA	DB	FA	GC	AC	LB	LC	AF	LL	J	AD
ME 2S	19	40	M6	6	21.5	156	202	245	74	80	44	119
ME 3S	28	60	M10	8	31	195	230	293	98	98	53.5	142
ME 3L							262	325				
ME 4S	38	80	M12	10	41	258	361	444	118	118	64.5	193
ME 4L							396	479				
ME 4LB							418	502				
ME 5S	38	80	M12	10	41	310	462	546	187	187	77	245
ME 5L												


M1.7 - VARIAZIONI DIMENSIONALI
M1.7 - DIMENSIONAL CHANGES
M1.7 - MASSÄNDERUNGEN
M1.7 - VARIATIONS DIMENSIONNELLES
M1.7.1 - Dispositivi di retroazione
M1.7.1 - Feedback units
M1.7.1 - Encoder / Inkrementalgeber
M1.7.1 - Dispositifs de retroaction

EN1, EN2, EN3	
	
BE 80B ... BE 180L	ME 2S ... ME 5L

EN_ + U1		
		
		L3
BE 160	ME 5	72
BE 180	—	82

Se l'opzione EN_ è richiesta per motori di grandezza BE80B...BE132MB, contemporaneamente all'opzione U1/U2, le variazioni dimensionali coincidono con quelle dell'opzione U1/U2.

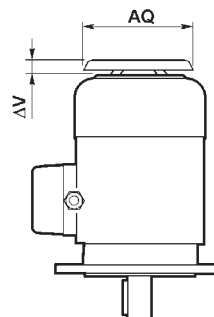
If the encoder device (options EN1, EN2, EN3) is specified on motors BE80B...BE132MB, along with the independent fan cooling (options U1, U2), the extra length of motor is coincident with that of the correspondent U1 and U2 execution.

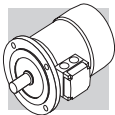
Wenn der Encoder (Optionen EN1, EN2, EN3) für Motoren der Baugrößen BE80B...BE132MB zusammen mit Fremdlüftung (Optionen U1, U2) ausgelegt ist, stimmen die Massänderungen des Motors mit jenen der entsprechenden Ausführungen U1 und U2 überein.

Si un codeur (option EN1, EN2, EN3) est nécessaire sur les moteurs de tailles BE80B...BE132MB, en association avec la ventilation forcée (options U1, U2), la variation de dimensions du moteur coïncide avec celle des exécutions U1 et U2 correspondantes.

M1.7.2 - Protezioni meccaniche esterne
M1.7.2 - External mechanical protections
M1.7.2 - Mechanische Schutzvorrichtungen
M1.7.2 - Protéctions mécaniques extérieures

RC			
		AQ	ΔV
BE 80	ME 2	152	25
BE 90	—	168	30
BE 100	ME 3	190	28
BE 112	—	211	32
BE 132	ME 4	254	32
BE 160	ME 5	302	36
BE 180	—	340	36





M1.7.3 - Motori con ventilazione indipendente

M1.7.3 - Motors with independent ventilation

M1.7.3 - Motoren mit unabhängigen Zwangsbelüftung

M1.7.3 - Moteurs avec ventilation indépendante

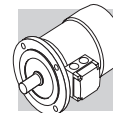
U1, U2		
		ΔL_1 [mm]
BE 80	ME 2	127
BE 90	—	131
BE 100	ME 3	119
BE 112	—	130
BE 132	ME 4	161
BE 160, BE 180	ME 5	184

ΔL_1 = variazione dimensionale rispetto alla lunghezza LB del motore standard corrispondente.

ΔL_1 = dimension variation compared to length LB of the 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.



M2 - MOTORI ELETTRICI STANDARD

M2 - STANDARD ELECTRIC MOTORS

M2 - STANDARD ELEKTROMOTOREN

M2 - MOTEURS ELECTRIQUES STANDARD

M2.1 - CARATTERISTICHE GENERALI

M2.1 - GENERAL CHARACTERISTICS

M2.1 - ALLGEMEINE EIGENSCHAFTEN

M2.1 - CARACTERISTIQUES GENERALES

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.

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.

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.

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.

Normative

I motori descritti in questo catalogo sono costruiti in accordo alle Norme ed unificazioni applicabili evidenziate nella tabella seguente.

Standards

The motors described in this catalogue are manufactured to the applicable standards shown in the following table.

Normen

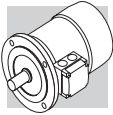
Die in diesem Katalog beschriebenen Motoren sind in Übereinstimmung mit den in der folgenden Tabelle angegebenen einschlägigen Normen und Vereinheitlichungsrichtlinien konstruiert worden.

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

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.

MOTORS FOR USA AND CANADA

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.

MOTOREN FÜR DIE USA UND KANADA

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.

MOTEURS POUR ETATS-UNIS ET CANADA

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)

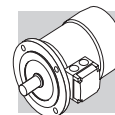
Frequenza / Frequency Frequenz / Fréquence	Tensione di rete / Mains voltage Netzspannung / Tension de réseau	V _{mot}
60 Hz	208 V	200 V
	240 V	230 V
	480 V	460 V
	600 V	575 V

I motori dotati di collegamento YY/Y (es. 230/460-60; 220/440-60) presentano di serie una morsettiera a 9 terminali.

Motors with YY/Y connection (e.g. 230/460-60; 220/440-60) feature, as standard, a 9-stud terminal board. For same execu-

Motoren mit YY/Y-Anschluss (z.B. 230/460-60; 220/440-60) sind standardmäßig mit 9 Pins auf dem Klemmbrett ausgeführt. Für glei-

Les moteurs avec connexion YY/Y (ex. 230/460-60; 220/440-60) présentent, en standard, une plaque à borne avec 9 bornes. Pour les me-



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:

tions, 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:

che 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 Motorklemmenkasten mit einer Spannung von 230V (einphasiger Wechselstrom). Bei Bremsmotoren stellt sich die **Versorgung der Bremse** wie folgt dar:

mes executions, et aussi pour l'alimentation 575V-60Hz, la puissance de plaque correspond à celle normalisé 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. monophasée. 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 morsetteria 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.

CCC

CHINA COMPULSORY CERTIFICATION

I motori elettrici destinati ad essere commercializzati nella Repubblica Popolare Cinese rientrano nell'applicabilità del sistema di certificazione CCC (China Compulsory Certification). I motori BN con coppia nominale fino a 7Nm sono disponibili con certificazione CCC e targhetta speciale riportante il marchio sotto illustrato:

CHINA COMPULSORY CERTIFICATION

Electric motors destined for sale in the People's Republic of China have to be certified under the CCC (China Compulsory Certification) system. BN motors of up to 7 Nm in rated torque are available with CCC certification and a special nameplate bearing the mark shown below:

CHINA COMPULSORY CERTIFICATION

Die für den Vertrieb in der Volksrepublik China vorgesehenen Elektromotoren fallen unter den Geltungsbereich des Zertifizierungssystems CCC (China Compulsory Certification). Die Motoren der Serie BN mit Nenndrehmoment bis 7 Nm sind mit CCC-Zertifizierung und Sondertypenschild mit der unten dargestellten Marke erhältlich:

CHINA COMPULSORY CERTIFICATION

Les moteurs électriques destinés à être commercialisés dans la République Populaire de Chine rentrent dans le cadre du système de certification CCC (China Compulsory Certification). Les moteurs BN ayant un couple nominal pouvant atteindre 7 Nm sont disponibles avec une certification CCC et une plaque spéciale sur laquelle figure la marque illustrée ci-dessous :



Direttive 2006/95/CE (LVD) e 2004/108/CE (EMC)

I motori delle serie BN ed M sono conformi ai requisiti delle Direttive 2006/95/CE (Direttiva Bassa Tensione) e 2004/108/CE (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, EN 61000-6-2, EN 61000-6-4.

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 61000-6-3 "Compa-

Directives 2006/95/EC (LVD) and 2004/108/EC (EMC)

BN and M motors meet the requirements of Directives 2006/95/EC (Low Voltage Directive) and 2004/108/EC (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, EN 61000-6-2, EN 61000-6-4.

Motors with FD brakes, when fitted with the suitable capacitive filter at rectifier input (option CF), meet the emission limits required by Standard EN 61000-6-3 "Electromagnetic compatibility - Generic Emission Standard - Part 1:

Richtlinien 2006/95/EG (LVD) und 2004/108/EG (EMC)

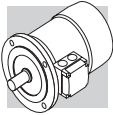
Die Motoren der Serie BN und M entsprechen den Anforderungen der Richtlinien 2006/95/EG (Richtlinie - Niederspannung) und 2004/108/EG (Richtlinie - elektromagnetische Kompatibilität) und sind mit dem CE-Zeichen ausgestattet. Im Hinblick auf die Richtlinie EMC entspricht die Konstruktion den Normen CEI EN 60034-1, EN 61000-6-2, EN 61000-6-4.

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

Directives 2006/95/CE (LVD) et 2004/108/CE (EMC)

Les moteurs de la série BN et M sont conformes aux conditions requises par les Directives 2006/95/CE (Directive Basse Tension) et 2004/108/CE (Directive Compatibilité Electromagnétique), et le marquage CE est indiqué sur la plaquette signalétique. En ce qui concerne la Directive EMC, la fabrication répond aux Normes CEI EN 60034-1, EN 61000-6-2, EN 61000-6-4.

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



bilità 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.

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.

Norm EN 61000-6-3 "Elektromagnetische Kompatibilität - Allgemeine Norm für Emissionen - Teil 1: Wohngebiete, Handels- und Leichtinduszriezonen" vorgesehen werden. Die Motoren entsprechen darüber hinaus den von der Norm CEI EN 60204-1 "Elektrische Maschinenausstattung" 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.

Norme EN 61000-6-3 "Compatibilité électromagnétique - Norme Générale 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 "Équipement 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.

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) $P \leq 50\text{kW}$	Rendimento	<i>Efficiency</i>	Wirkungsgrad	<i>Rendement</i>
$-(1 - \cos\phi)/6$ min 0.02 max 0.07	Fattore di potenza	<i>Power factor</i>	Leistungsfaktor	<i>Facteur de puissance</i>
$\pm 20\%$ *	Scorrimento	<i>Slip</i>	Schlupf	<i>Glissement</i>
+20%	Corrente a rotore bloccato	<i>Locked rotor current</i>	Strom bei blockiertem Läufer	<i>Courant à rotor bloqué</i>
-15% +25%	Coppia a rotore bloccato	<i>Locked rotor torque</i>	Drehmoment bei blockiertem Läufer	<i>Couple à rotor bloqué</i>
-10%	Coppia max	<i>Max. torque</i>	Max. Drehmoment	<i>Couple max</i>

* $\pm 30\%$ per motori con $P_n < 1\text{ kW}$

** $\pm 30\%$ for motors with $P_n < 1\text{ kW}$*

* $\pm 30\%$ für Motoren mit $P_n < 1\text{ kW}$

** $\pm 30\%$ pour moteurs avec $P_n < 1\text{ kW}$*

M2.2 - 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 co-

M2.2 - 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.

M2.2 - 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 Lei-

M2.2 - CARACTERISTIQUES MECANQUES

Formes de construction

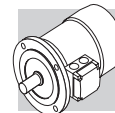
Les moteurs série BN sont prévus dans les formes de construction indiquées sur le tableau (A30) selon les normes CEI EN 60034-14.

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 cons-



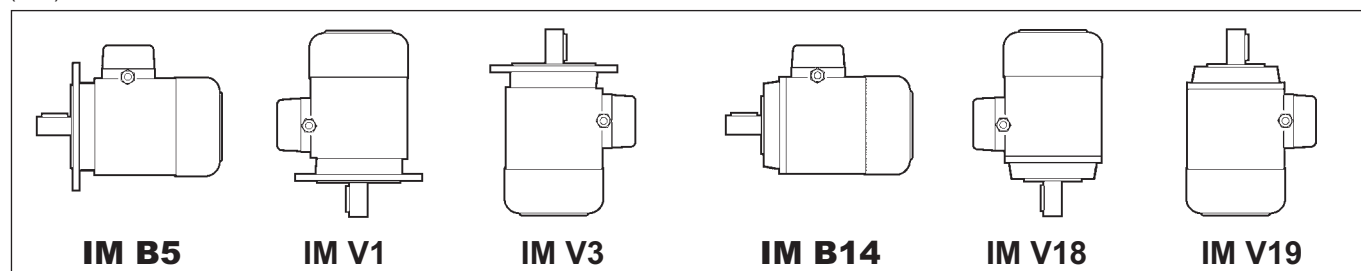
struttiva base IM B5 o IM B14. Nelle forme costruttive dove il motore assume una posizione verticale con albero in basso, si consiglia di richiedere l'esecuzione con tettuccio parapiooggia (da prevedere sempre nel caso di motori autofrenanti). Tale esecuzione, pressente nelle opzioni, va richiesta espressamente in fase di ordine in quanto non è prevista nella versione base.

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.

stungsschild des Motors die Bauform IM B5 oder IM B 14 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.

truction 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

The following chart provides an overview of the degrees of protection available.

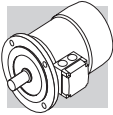
In addition to the degree of protection specified when ordering, motors to be installed outdoors require protection against direct sunlight and also – when they are to be installed vertically down – a drip cover to prevent

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

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



specificare ulteriormente il tettuccio di protezione contro l'ingresso di acqua e corpi solidi (opzione **RC**).

*the ingress of water and solid particles (option **RC**).*

gerichtet ist, sollte darüber hinaus das Schutzdach bestellt werden, das vor dem Eindringen von Wasser und festen Fremdkörpern schützt (Option **RC**).

*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	

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.

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.

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 Luft-eintritt 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 niedrigen Geschwindigkeit betrieben.

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.

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.

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.

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.

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.

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.

Noise

Noise levels, measured using the method prescribed by ISO 1680 Standards, are within the maximum levels specified by Standards CEI EN 60034-9.

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.

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.

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 silenzio-

Vibrations and balancing

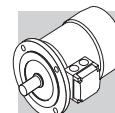
Rotor shafts are balanced with half key fitted and fall within the vibration class N, as per Standard CEI EN 60034-14. If a further reduced noise level is

Schwingungen und Ausgleich

Alle Rotoren werden durch einen halben Federkeil ausgeglichen und fallen somit unter die, von den Normen CEI EN 60034-14 vorgesehene Schwingungsgradgrenzen.

Vibrations et équilibrage

Tous les rotors sont équilibrés avec une demi languette et rentret dans les limites d'intensité de vibration prévues par les Normes CEI EN 60034-14.



sità potrà essere previsto, a richiesta, un'esecuzione antivibrante in grado ridotto B. La tabella seguente riporta i valori della velocità efficace di vibrazione per equilibratura standard (A) e incrementata (B).

required improved balancing can be optionally requested (class B). Table below shows the value for the vibration velocity for standard (A) and improved (B) balancing.

Bei besonderen Anforderungen an die Laufruhe kann auf Anfrage eine schwingungsdämpfende Ausführung in der reduzierten Klasse (B) geliefert werden. Die folgende Tabelle führt die Werte der Ist-Schwingungsgeschwindigkeit für einen normalen (A) und verbesserten (B) Ausgleich auf.

En cas d'exigences particulière concernant le niveau de bruit, sur demande, il est possible de réaliser une exécution anti-vibrante, de degré réduit (B). Le tableau ci-dessous indique les valeurs de la vitesse efficace de vibration pour un équilibrage standard (A) et améliorée (B).

(A33)

Grado di vibrazione <i>Vibration class</i> Schwingungsklasse <i>Degré de vibration</i>	Velocità di rotazione <i>Angular velocity</i> Drehungsgeschwindigkeit <i>Viitesse 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]
	$n \text{ [min}^{-1}\text{]}$	BN 56 ≤ H ≤ BN 200 M05 ≤ H ≤ M5
A	$600 \leq n \leq 3600$	1.6
B	$600 \leq n \leq 3600$	0.70

I valori si riferiscono a misure con motore liberamente sospeso e funzionamento a vuoto.

Values refer to measures with freely suspended motor in unloaded conditions.

Die Werte beziehen sich auf die Abmessungen mit stehendem Motor, ohne Getriebe und Leerlauf.

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 <i>No. of terminals</i> Klemmen <i>N° bornes</i>	Filettatura terminali <i>Terminal threads</i> Gewinde <i>Filetage bornes</i>	Sezione max del conduttore <i>Wire max cross section area</i> Max. leiterquerschnitt <i>Section max du conducteur</i> 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

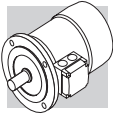
The holes used to bring cables to terminal boxes use metric threads in accordance with standard EN 50262 as indicated in the table here after.

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

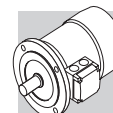
NDE = côté ventilateur

(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



M2.3- 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 $\pm 10\%$ (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 $\pm 5\%$.

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. 460V, 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 $\pm 10\%$.

La tabella seguente riporta le tensioni previste per i motori.

M2.3 - ELECTRICAL CHARACTERISTICS

Voltage

Single speed motors are rated for 230/400 V - 50 Hz.

A tolerance of $\pm 10\%$ 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 $\pm 5\%$ 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 $\pm 10\%$ single phase.

Chart below shows standard and optional wiring of motors.

M2.3 - 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 $\pm 10\%$ gespeist werden (Type M3LC4 und M3LC6 ausgenommen).

Auf dem Schild werden die Nennspannung hinaus, auch die zulässigen Ansprehbereiche 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 $\pm 5\%$ 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 $\pm 10\%$.

Die folgende Tabelle für die Motoren vorgesehenen Spannungen auf.

M2.3 - 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 $\pm 10\%$ (sauf les types M3LC4 et M3LC6).

Outre la tension nominale, les plages de fonctionnement permises sont indiquées sur la plaque signalétique, à savoir:

220-240V Δ

380-415V Y/50 Hz.

Selon les normes CEI EN 60034-1 les moteurs peuvent fonctionner aux tension indiquées ci-dessus avec une tolérance de $\pm 5\%$.

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 $\pm 10\%$.

Le 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} $\pm 10\%$ 3~	V _{mot} $\pm 10\%$ 3~	V _B $\pm 10\%$ 1~	V _{mot} $\pm 10\%$ 3~	V _B $\pm 10\%$ 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.

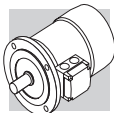
Auf die folgende Tabelle werden die verschiedenen für die Motoren vorgesehenen Anschlußtypen angegeben.

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

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:

Frequency

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.

Frequenz

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):

Fréquence

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

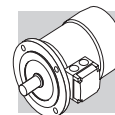
Für polumschaltbare Motoren mit 60 Hz Spannungsversorgung ist die vorgesehene Leistungserhöhung gemäß den Datenblätter von 15%.

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 par 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 (A41) 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 (A41). 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 _a /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**.*

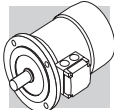
CL H

Su richiesta può venire specificata la classe di isolamento **H**.
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.

*Motors manufactured in insulation class **H** are available at request. In standard motors, stator windings over temperature normally stays below the 80 K limit corresponding to class B over temperature.*

Auf Anfrage können sie auch in der Klasse **H** geliefert werden.
Allgemein hält sich die Übertemperatur der Motoren in der Standardausführung innerhalb des Grenzwerts von 80 K, der einer Übertemperatur der Klasse B entspricht.

*Sur demande, la classe d'isolation **H** peut être spécifiée. 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.

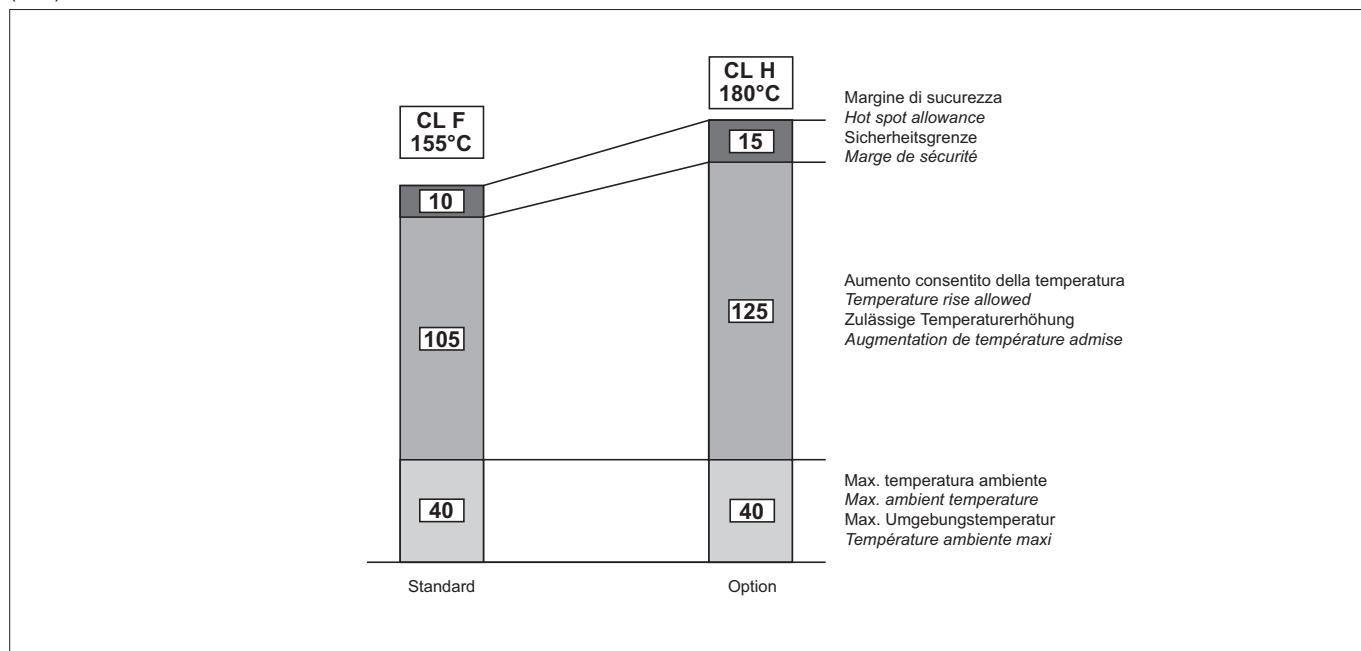
Die sorgfältig Wahl der Komponenten des Isoliersystem gestatten den Einsatz dieser Motoren auch unter tropischen Klimabedingungen und bei Vorliegen normaler Schwingungen.

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)

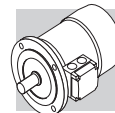
	Servizio / Duty / Betriebsart / Service					
	S2			S3 *		
	Durata del ciclo (min) / Cycle duration (min) Zyklusdauer (min) / Durée du cycle (min)			Rapporto di intermittenza (I) / Cyclic duration factor (I) Relative Einschaltdauer (I) / Rapport d'intermittence (I)		
	10	30	60	25%	40%	60%
f _m	1.35	1.15	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:**

$$I = \frac{t_f}{t_f + t_r} \cdot 100$$

(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.

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'impregnazione 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).

Le caratteristiche tipiche coppia/velocità in servizio S1 per motore con frequenza base $f_b = 50$ Hz sono riportate in tab. (A54). Per frequenze di funzionamento inferiori a circa 30 Hz, a causa della diminuzione della ventilazione, i motori standard autoventilati (IC411) devono essere opportunamente declassati in coppia o, in alternativa, devono essere provvisti di servoventilatore indipendente.

Per frequenze maggiori alla frequenza base, raggiunto il valore massimo di tensione di uscita dell'inverter, il motore lavora in un

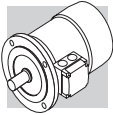
The electric motors of series BN and M may be used in combination with PWM inverters with rated voltage at transformer input up to 500 V. Standard motors use a phase insulating system with separators, class 2 enamelled wire and class H impregnation resins (1600V peak-to-peak voltage pulse capacity and 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.

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) .

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 Emailldraht mit Grad 2 und Imprägnierungsharze 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 émaillé niveau 2 et résines d'impregnation 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).

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



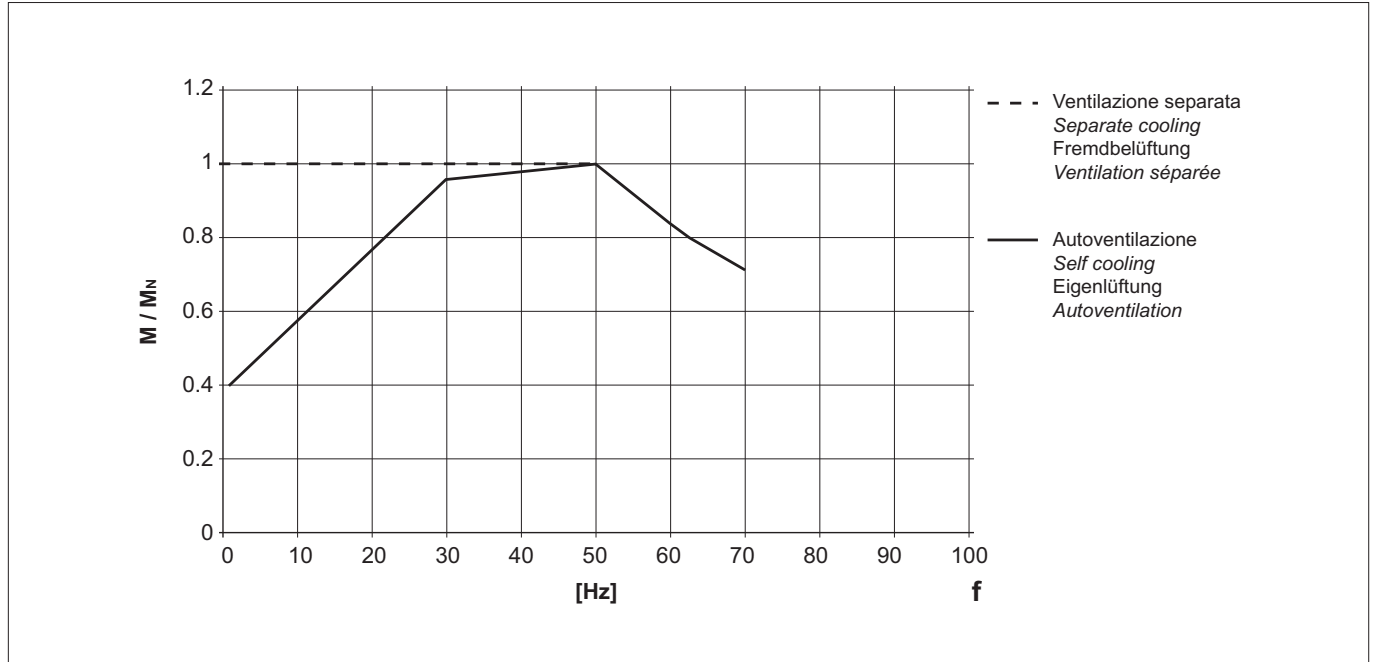
campo di funzionamento a potenza costante, con coppia all'albero che si riduce ca. con il rapporto (f/f_b) . Poiché la coppia massima del motore decresce ca. con $(f/f_b)^2$, il margine di sovraccarico ammesso dovrà essere progressivamente ridotto.

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 B e l'eventuale montaggio del servoventilatore indipendente.

Above rated speed, motors generate increased mechanical vibration and fan noise. Class B 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 B und eine eventuelle Montage des unabhängig funktionierenden Servoventilators empfohlen.

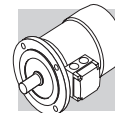
A des vitesses supérieures à la vitesse nominale, les moteurs présentent plus de vibrations mécaniques et de bruit de ventilation ; pour ces applications, il est conseillé d'effectuer un équilibrage du rotor en niveau B et de monter éventuellement un servoventilateur indépendant.

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 $I = 50\%$ 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 $I = 50\%$ 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 $I = 50\%$ 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:

$$K_j = \frac{J_m + J_c}{J_m} = \text{fattore di inerzia}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{fattore di coppia}$$

$$K_d = \text{fattore di carico}$$

vedi tabella (A47)

where:

$$K_j = \frac{J_m + J_c}{J_m} = \text{inertia factor}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{torque factor}$$

$$K_d = \text{load factor}$$

see table (A47)

wobei gilt:

$$K_j = \frac{J_m + J_c}{J_m} = \text{Trägheitsfaktor}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{Drehmomentsfaktor}$$

$$K_d = \text{Lastfaktor}$$

siehe Tabelle (A47)

où:

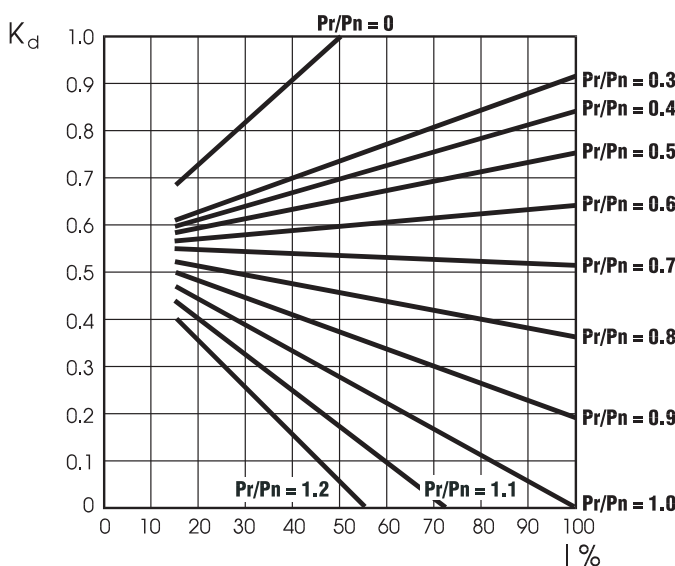
$$K_j = \frac{J_m + J_c}{J_m} = \text{facteur d'inertie}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{facteur de couple}$$

$$K_d = \text{facteur de charge}$$

voir tableau (A47)

(A47)

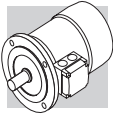


Con il numero di avviamenti così ottenuto si dovrà in seguito verificare che il massimo lavoro di frenatura sia compatibile con la capacità termica del freno W_{max} indicata nella tabella (A54).

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).



M2.4 - MOTORI ASINCRONI AUTOFRENANTI

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.

M2.4 - ASYNCHRONOUS BRAKE MOTORS

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.

M2.4 - DREHSTROMBREMS-MOTOREN

Betriebsweise

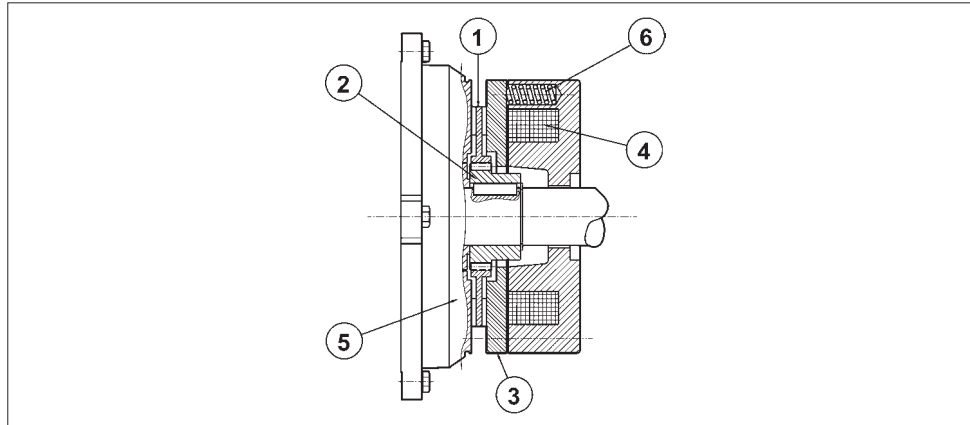
Die selbstbremsende Ausführung der Motoren sieht den Einsatz von Federdruckbremsen vor, die mit Gleichstrom (Typ FD) oder mit Wechselstrom (Typ FA, BA) gespeist werden. Alle Bremsen arbeiten gemäß dem Sicherheitsprinzip, d.h. sie greifen, im Fall eines Stromausfalls in Folge eines auf die Feder ausgeübten Drucks ein.

M2.4 - MOTEURS FREIN ASYNCHRONES

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 áncora 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 scheibe
- 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 en 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

- 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 (N.D.E.), 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

Most significant features

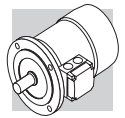
- High braking torques (normally $M_b \approx 2 M_n$), braking torque adjustment.
- Steel brake disc with double friction lining (low-wear, asbestos-free lining).
- Hexagonal seat on motor shaft fan end (N.D.E.) for manual rotation (not compatible with options PS, RC, TC, U1, U2, EN1, EN2, EN3).
- Manual release lever.
- Corrosion-proof treatment on all brake surfaces.
- Insulation class F

Allgemeine Eigenschaften

- 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

Caractéristiques générales

- 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



**M2.5 - MOTORI AUTOFRENANTI
IN C.C., TIPO BN_FD**

**M2.5 - DC BRAKE MOTORS
TYPE BN_FD**

**M2.5 - DREHSTROMBREMS-
MOTOREN MIT GLEICH-
STROMBREMSE: TYP
BN_FD**

**M2.5 - MOTEURS FREIN EN
C.C., TYPE BN_FD**

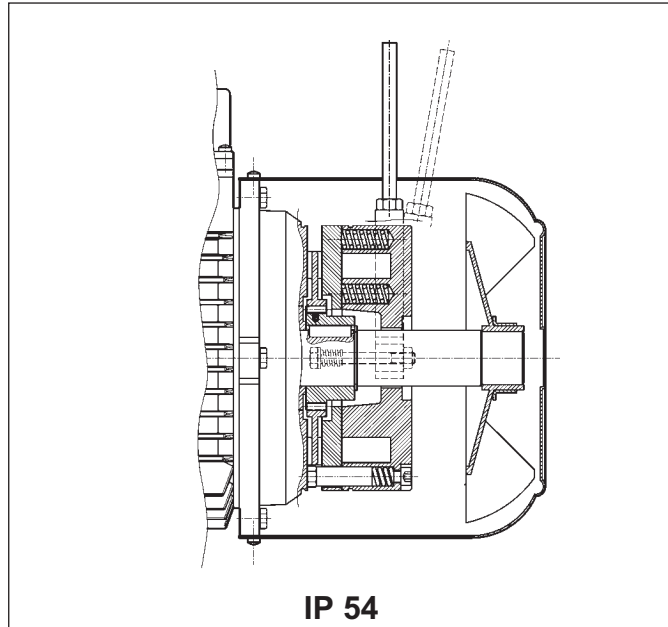
Grandezze: BN 63 ... BN 200L

Frame sizes: BN 63 ... BN 200L

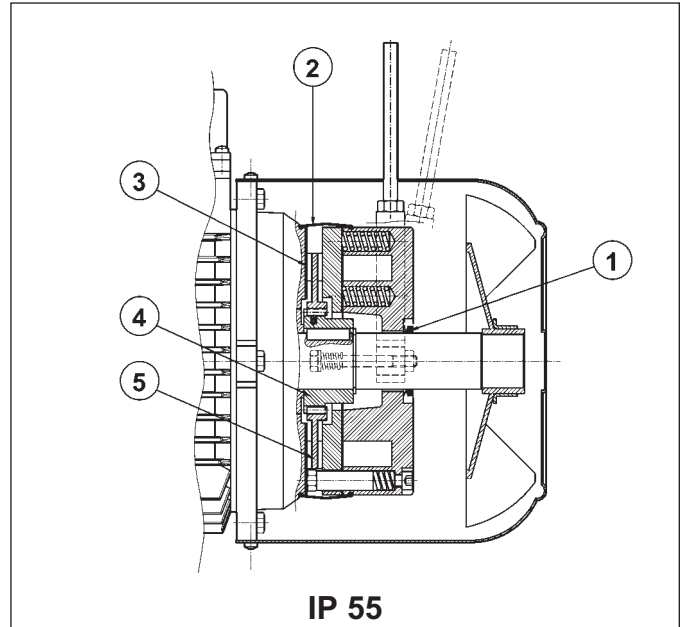
Baugrößen: BN 63 ... BN 200L

Tailles : BN 63 ... BN 200L

(A49)



(A50)



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 trascinatore 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. 186.

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 186 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 186.

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.

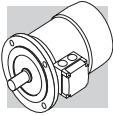
Frein électromagnétique avec bobine toroïdale en **courant continu**, fixé avec des vis au bouclier moteur; les ressorts de précharge réalisent le positionnement axial de la bobine.

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 186.

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 Gleichstrombremsspule 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				1 speed	
		BN_FD / M_FD $V_{mot} \pm 10\%$ 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):

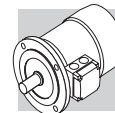
Switch-pole motors feature a separate power supply line for the brake with rectifier input voltage V_B as indicated in the table (A52):

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				2 speed	
		BN_FD / M_FD $V_{mot} \pm 10\%$ 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



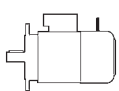
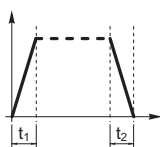
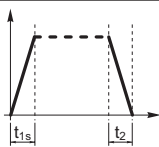
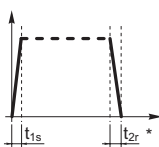
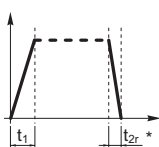
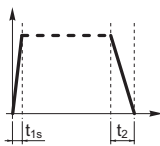
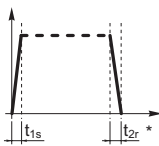
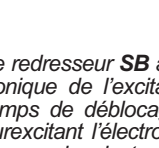
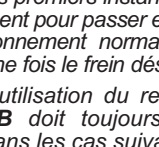
Il raddrizzatore è del tipo a diodi a semionda ($V_{c.c} \approx 0,45 \times V_{c.a.}$) ed è disponibile nelle versioni **NB**, **SB**, **NBR** e **SBR**, come dettagliato nella tabella (A53) seguente:

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 Brems frein		
standard	a richiesta at request auf Anfrage Sur demande			
BN 63	M05	FD 02		
BN 71	M1	FD 03		SB
BN 80	M2	FD 04		
BN 90S	—	FD 14		SBR
BN 90L	—	FD 05		
BN 100	M3	FD 15		NBR
—		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.

L'impiego del raddrizzatore tipo **SB** è sempre da prevedere nei casi di:

- elevato numero di interventi orari
- tempi di sblocco freno ridotti
- elevate sollecitazioni termiche del freno

Per applicazioni dove è richiesto un rapido rilascio del freno sono disponibili a richiesta i raddrizzatori **NBR** o **SBR**. Questi raddrizzatori completano i tipi **NB** e **SB**, integrando nel cir-

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.

Use of the **SB** rectifier is mandatory in the event of:

- high number of operations per hour
- reduced brake release response time
- brake is exposed to extreme thermal stress

Rectifiers **NBR** or **SBR** are available for applications requiring quick brake release response. These rectifiers complement the **NB** and **SB** types as their elec-

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.

Der Einsatz eines Gleichrichters vom Typ **SB** wird in folgenden Fällen empfohlen:

- hohe Anzahl von Schaltungen pro Stunde
- schnelle Bremsansprechzeiten
- starke thermische Beanspruchungen der Bremse

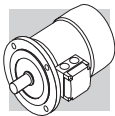
Für die Anwendungen, bei denen eine schnelle Ansprechzeit der Bremse gefordert wird, können auf Anfrage die Gleichrichter **NBR** oder **SBR** geliefert werden. Diese Gleichrichter erweitern die

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'utilisation du redresseur type **SB** doit toujours être prévue dans les cas suivants :

- nombre d'interventions horaires élevé
- temps de déblocage frein réduits
- sollicitations thermiques du frein élevées

Pour les applications nécessitant un déblocage rapide du frein, sur demande les redresseurs **NBR** ou **SBR** sont disponibles. Ces redresseurs complètent les types **NB** et **SB**, 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 radrizzatori **NBR** e **SBR** è richiesta l'alimentazione separata del freno. Tensioni disponibili: 230V $\pm$ 10%, 400V $\pm$ 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 $\pm$ 10%, 400V $\pm$ 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 $\pm$ 10%, 400V $\pm$ 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 $\pm$ 10%, 400V $\pm$ 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 Bremsen 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	P
	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	[MJ]	[W]
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	150	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 ($\pm 15\%$)
s/h = avviamenti orari

Key:

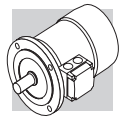
t_1 = brake release time with half-wave rectifier
 t_{1s} = brake release time with over-energizing rectifier
 t_2 = brake engagement time with AC line interruption and separate power supply
 t_{2c} = brake engagement time with AC and DC line interruption — Values for t_1 , t_{1s} , t_2 , t_{2c} indicated 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 ($\pm 15\%$)
s/h = starts per hour

Zeichenerklärung:

t_1 = Ansprechzeit der Bremse mit Halbwellengleichrichter
 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 ($\pm 15\%$)
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 étaloné 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 ($\pm 15\%$)
s/h = démarrages horaires



Collegamenti freno FD

I motori standard ad una velocità sono forniti con il collegamento del raddrizzatore alla morsettiera 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 (A58) - 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 angeschlossenem 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 interruption côté c.a.

Temps d'arrêt normal et indépendant du moteur. Les temps d'arrêts t_2 sont ceux indiqués dans le tableau (A54).

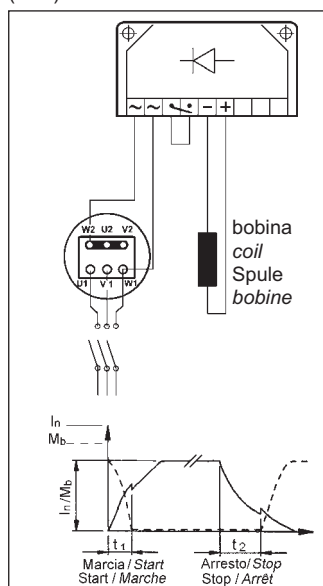
Tableau (A57) - Bobine de frein avec alimentation depuis les bornes moteur et interruption côté c.a. et c.c.

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.

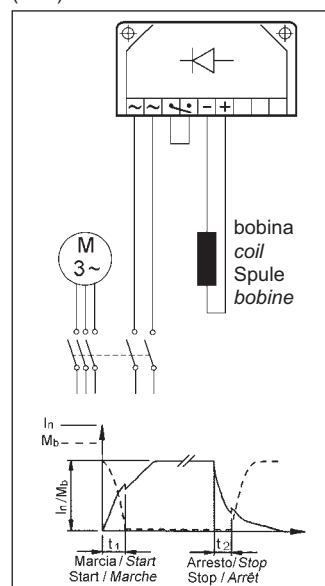
Temps d'arrêt réduit selon les valeurs t_{2c} indiquées dans le tableau (A54).

(A55)



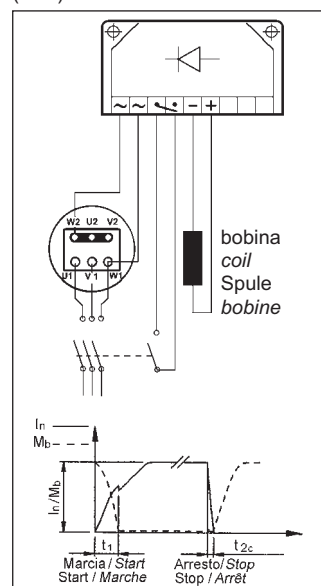
Le tabelle da (A55) a (A58) riportano gli schemi tipici di collegamento per alimentazione 400 V, motori 230/400V collegati a stella e freno 230 V.

(A56)



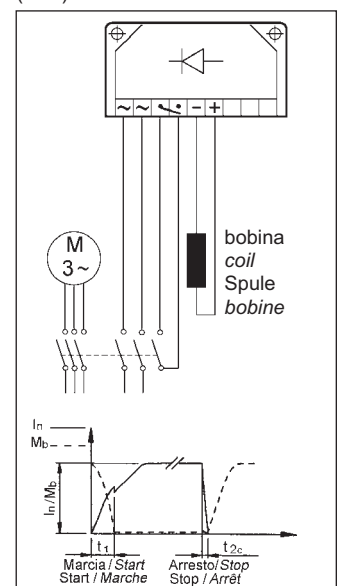
Tables (A55) through (A58) show the typical connection diagrams for 400 V power supply, star-connected 230/400V motors and 230 V brake.

(A57)

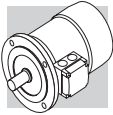


In den Tabellen (A55) bis (A58) werden die typischen Schaltungen für Versorgung mit 400 V, Motoren 230/400V mit Sternschaltung und einer Bremsspannung von 230 V wiedergegeben.

(A58)



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.



**M2.6 - MOTORI AUTOFRENANTI
IN C.A., TIPO BN_FA**

**M2.6 - AC BRAKE MOTORS
TYPE BN_FA**

**M2.6 - WECHSELSTROM-
BREMSMOTOREN-TYP
BN_FA**

**M2.6 - MOTEURS FREIN EN
C.A., TYPE BN_FA**

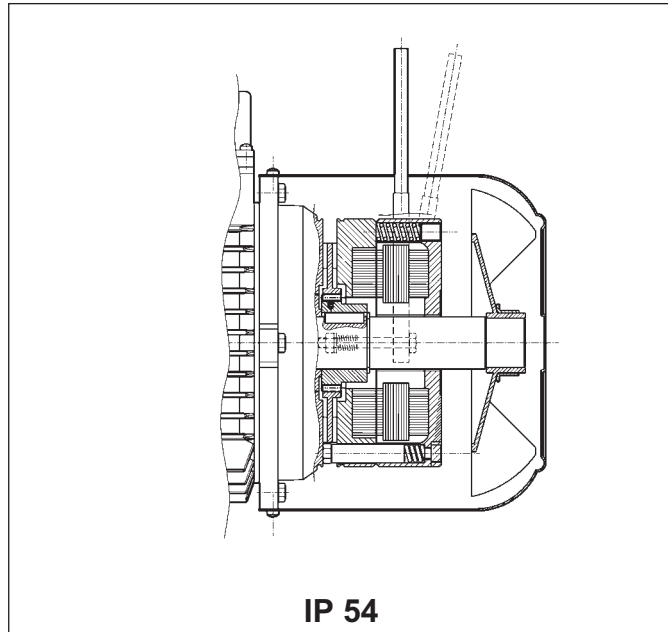
Grandezze: BN 63 ... BN 180M

Frame sizes: BN 63 ... BN 180M

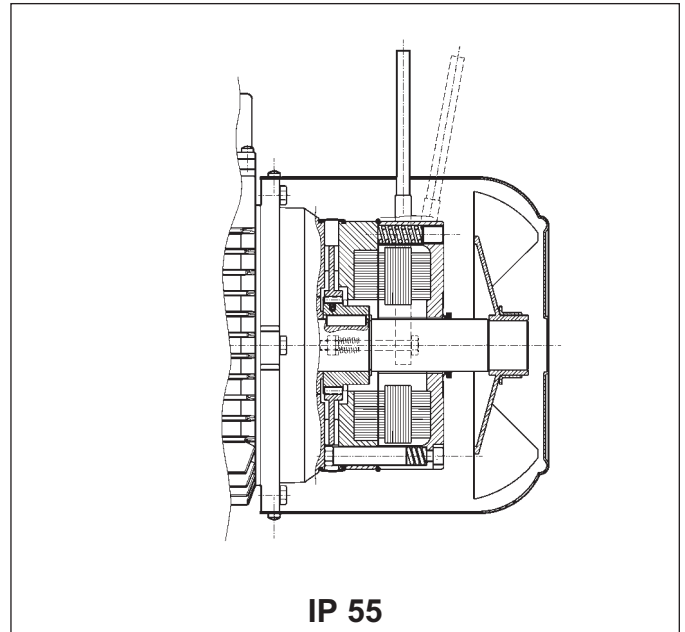
Baugrößen: BN 63 ... BN 180M

Tailles : BN 63 ... BN 180M

(A59)



(A60)



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 trascinatore in acciaio calettato sull'albero e provvisto di molla 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. 186.

*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 186 for available lever locations.

Elektomagnetische Bremse mit **Drehstromversorgung**, die mittels Schrauben am hinteren Motorschild befestigt ist. Die Federn sorgen dabei für die axiale Ausrichtung des Magnetkörpers.

Die Bremscheibe (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 186.

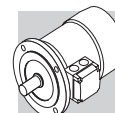
Frein électromagnétique avec alimentation en **courant alternatif** triphasé, fixé avec des vis au bouclier; les ressorts de précharge réalisent le positionnement axial de la bobine.

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 186.



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 NDE.
- 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.

Su richiesta, sono disponibili tensioni speciali, nel campo 24...690 V, 50-60 Hz.

Unless otherwise specified, standard brake power supply is 230Δ / 400Y V - 50 Hz.

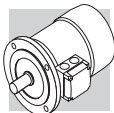
Special voltages in the 24...690 V, 50-60 Hz range are available at request.

Falls nicht anderweitig angegeben, beträgt die Standardversorgung der Bremse 230Δ / 400Y V - 50 Hz.

Auf Anfrage können Sonderspannungen von 24...690 V, 50-60 Hz geliefert werden.

Sauf spécification contraire, l'alimentation standard du frein est 230Δ / 400Y V - 50 Hz.

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 Bremse 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]
				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	40	8	90	18000	4500	500	50	250
FA 15								
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

Per i motori con alimentazione del freno derivata direttamente dall'alimentazione motore i collegamenti alla morsettiera corrispondono a quanto riportato nello schema (A63):

FA brake connections

The diagram (A63) shows the wiring when brake is connected directly to same power supply of the motor:

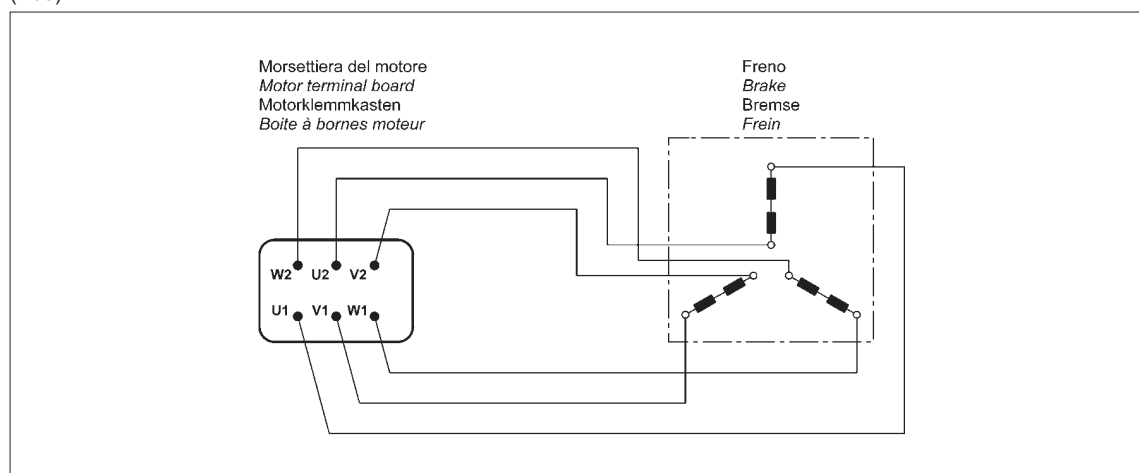
Abschlüsse - Bremstyp FA

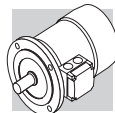
Bei den Motoren mit direkter Bremsspannungsversorgung müssen die Anschlüsse im Klemmenkasten entsprechend den Angaben im Schema (A63) angeschlossen werden:

Raccordements frein FA

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)





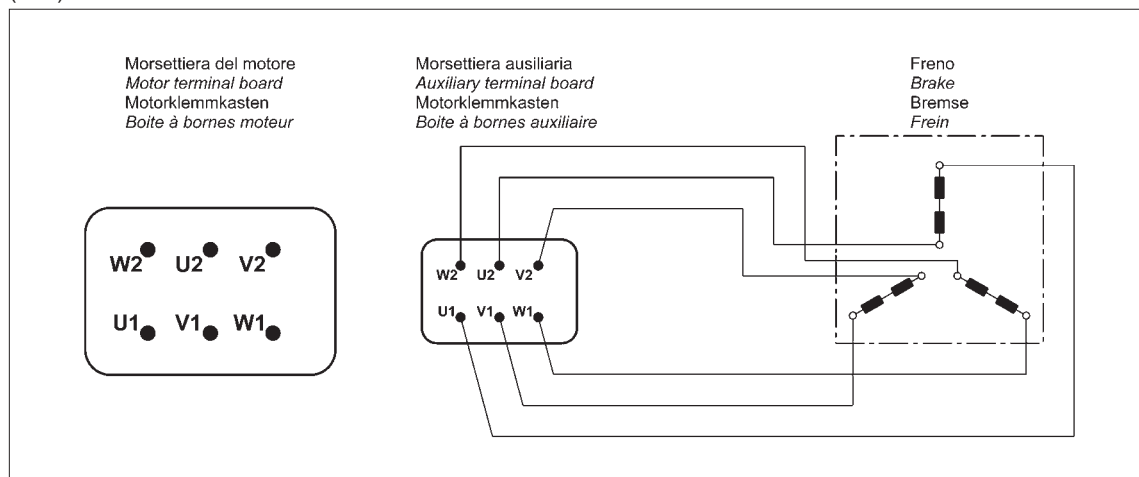
Per i motori a doppia polarità e, quando richiesto, per i motori ad una velocità con alimentazione da linea separata è prevista una morsettiera ausiliaria a 6 morsetti per il collegamento del freno; in questa esecuzione i motori prevedono la scatola coprimorsetti maggiorata. Vedi schema (A64):

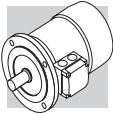
Switch-pole motors and, at request, single-pole motors with separate power supply are equipped with an auxiliary terminal board with 6 terminals for brake connection.
In this version, motors feature a larger terminal box. See diagram (A64):

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)





M2.7 - MOTORI AUTOFRENANTI IN C.A., TIPO BN_BA

M2.7 - AC BRAKE MOTORS TYPE BN_BA

M2.7 - DREHSTROM-BREMS- MOTOREN MIT WECH- SELS- TROMBREMSE VOM TYP BN_BA

M2.7 - MOTEURS FREIN EN C.A., TYPE BN_BA

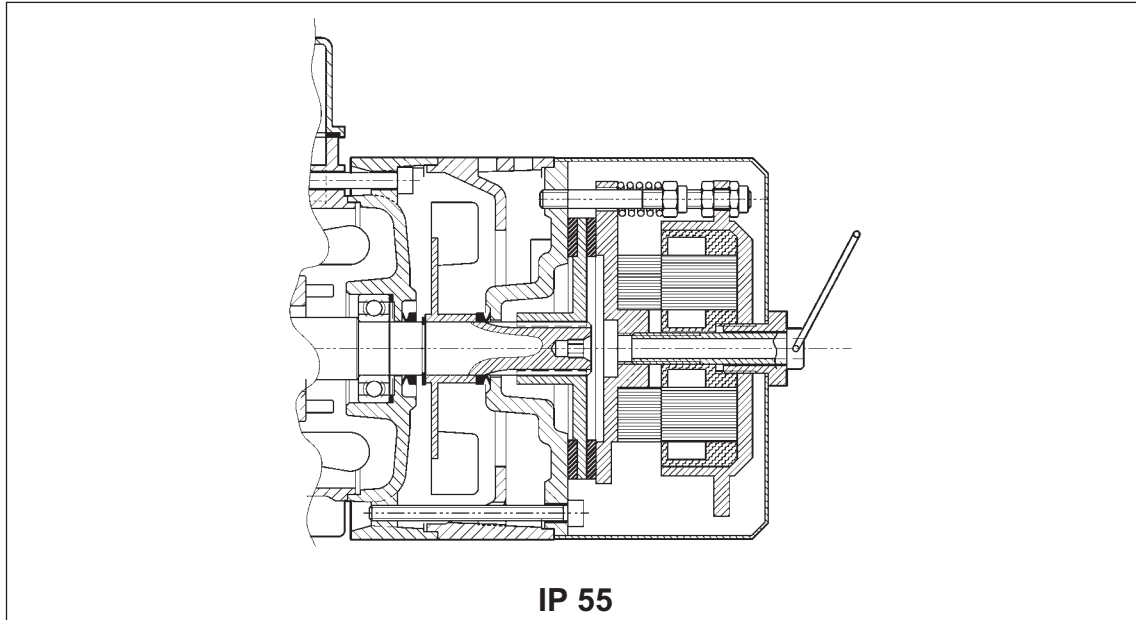
Grandezze: BN 63 ... BN 132M

Frame sizes: BN 63 ... BN 132M

Baugrößen: BN 63 ... BN 132M

Tailles : BN 63 ... BN 132M

(A65)



IP 55

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 Bremsscheibe (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).

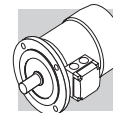
Les moteurs sont fournis avec frein étalonné au couple maximal.

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	Protection class	Schutzart	Degré de protection
È disponibile un'unica esecuzione, con grado di protezione IP55.	Only available in protection class IP55.	Es ist eine nur die Ausführung in Schutzklasse IP55 verfügbar.	Il est disponible en une exécution unique, avec degré de protection IP55.

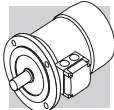
Alimentazione freno BA	BA brake power supply	Stromversorgung - Bremstyp BA	Alimentation frein BA
Nei motori a singola polarità l'alimentazione della bobina freno è derivata direttamente dalla morsettiera motore e la tensione del freno quindi coincide con la tensione del motore. In questo caso la tensione 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:	<i>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.</i> <i>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:</i>	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.	<i>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.</i> <i>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.</i> <i>Le tableau suivant indique les conditions d'alimentation standard du frein en c.a. pour les moteurs à simple et double polarité :</i>

(A65)

motori a singola polarità single-pole motor Einpolige Motoren Moteurs à simple polarité	BN 63 ... BN 132
	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	BA brake technical specifications	Technische Daten der Bremsen vom Typ BA	Caractéristiques techniques freins BA
Nella tabella (A66) sottostante sono riportati i dati tecnici dei freni in c.a., tipo BA.	The table (A66) below reports the technical specifications for AC brakes type BA.	In der nachstehenden Tabelle (A66) werden die technischen Daten der Wechselstrombremsen vom Typ BA angegeben:	Le tableau (A66) ci-dessous indique les caractéristiques techniques des freins en c.a., type BA.



(A66)

Freno Brake Bremse Frein	Coppia frenante Brake torque Bremsmoment Couple de freinage	Rilascio Release Ansprchzeit D��blocage	Frenatura Braking Bremsung Freinage	Wmax			W	P _b
				[J]				
				10 s/h	100 s/h	1000 s/h		
				M _b [Nm]	t ₁ [ms]	t ₂ [ms]		
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 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 BA

Per i motori con alimentazione del freno derivata direttamente dall'alimentazione motore i collegamenti alla morsettiera 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:

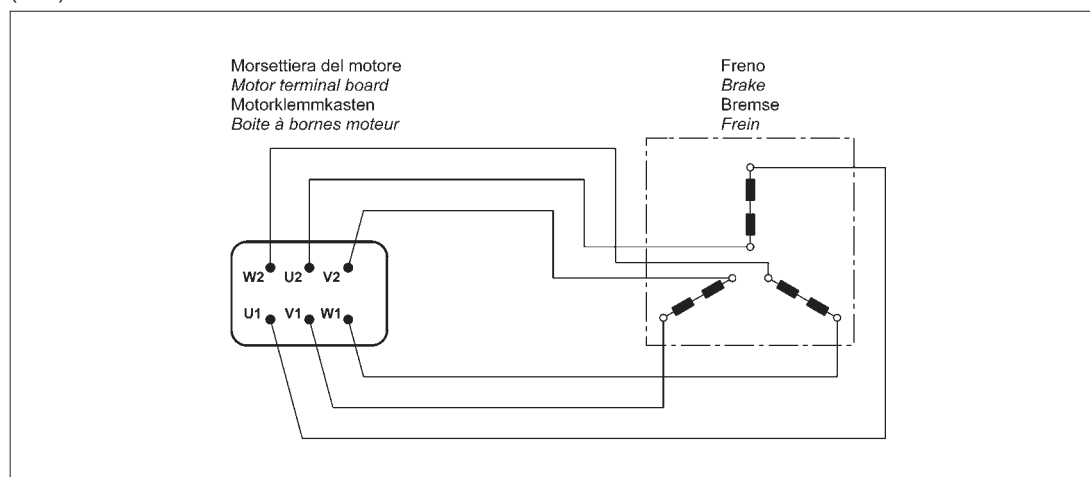
Abschlüsse - Bremstyp BA

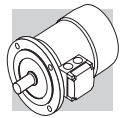
Bei den Motoren mit direkter Bremsspannungsversorgung müssen die Anschlüsse im Klemmenkasten entsprechend den Angaben im Schema (A67) angeschlossen werden:

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)





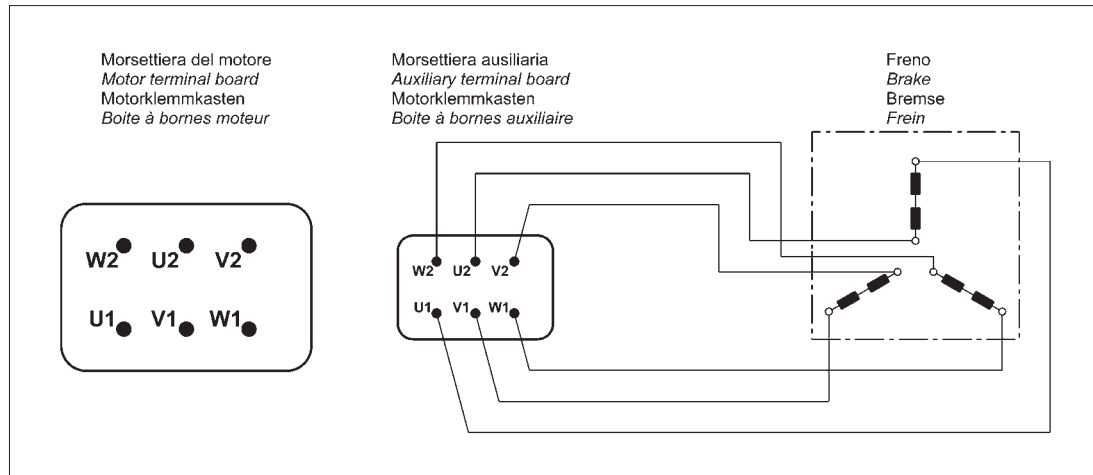
Per i motori a doppia polarità e, quando richiesto, per i motori ad una velocità con alimentazione da linea separata è prevista una morsettiera ausiliaria a 6 morsetti per il collegamento del freno; in questa esecuzione i motori prevedono la scatola coprimorsetti maggiorata. Vedi schema (A68):

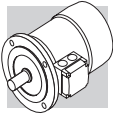
Switch-pole motors and, at request, single-pole motors with separate power supply line are equipped with an auxiliary terminal board with 6 terminals for brake connection. In this version, motors feature a larger terminal box. See diagram (A68):

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)





M2.8 - 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.

M2.8 - 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.*

M2.8 - BREMSLÜFTHEBEL

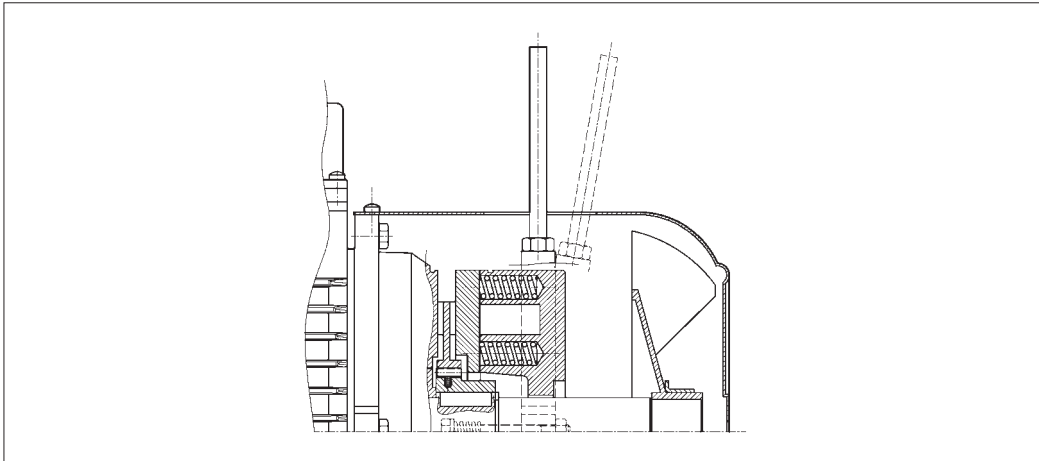
Die Federdruckbremsen vom Typ **FD** und **FA** können Optional mit Bremslüfthebeln geliefert werden, die ein manuelles Lüften der Bremse ermöglichen. Diese Lüftungseinrichtungen können bei Instandhaltungsarbeiten an vom Motor betriebenen Maschinen- oder Anlagenteilen verwendet werden.

M2.8 - 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.

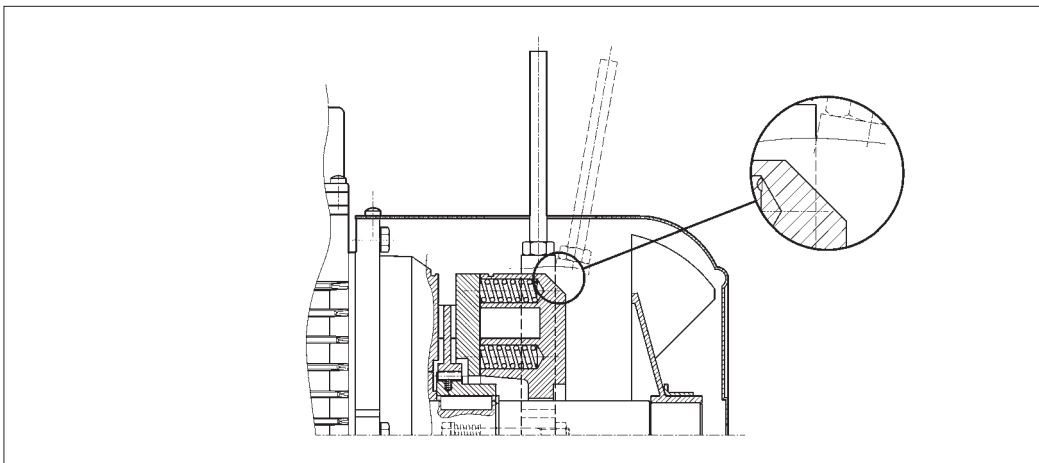
A return spring brings the release lever back in the original position.

Bremslüfthebel mit automatischer Rückstellung durch Federkraft.

Le levier de déblocage est doté de retour automatique, au moyen d'un dispositif à ressort.

(A70)

RM

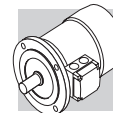


Sui motori tipo BN_FD la leva di sblocco può essere temporaneamente bloccata in posizione di rilascio del freno, avvitando la stessa fino ad impegnarne l'estremità in un risalto del corpo del freno.

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 Bremslüftposition 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

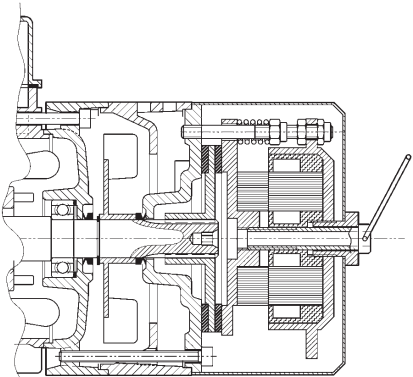


La disponibilità dei sistemi di sblocco freno è diversa per i vari tipi di motore, ed è descritta dalla tabella seguente:

The availability for the various disengagement devices is charted here below:

typen sind ebenso verschiedene Bremslüftsysteme 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	 di serie std. supply serienmäßig de série	

Orientamento della leva di sblocco

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 morsetteria - riferimento **[AB]** nel disegno sottostante.

Orientamenti alternativi, tipo **[AA]**, **[AC]** e **[AD]** possono essere richiesti citandone la relativa specifica:

Release lever orientation

*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:*

Ausrichtung des Bremslüfthebels

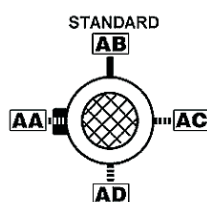
Bei beiden Optionen, **R** und **RM**, wird der Bremslüfthebel, falls nicht anderweitig festgelegt, um 90° im Uhrzeigersinn zur Position des Klemmenkastens montiert (Position **[AB]** in der nachfolgenden Zeichnung).

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:

Orientation du levier de déblocage

*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 :*

(A72)	AA AC AD 
-------	--

Caratteristiche volani (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.

Fly-wheel data (F1)

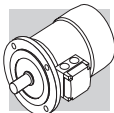
The table below shows values of weight and inertia of flywheel (option F1). Overall dimensions of motors remain unchanged.

Eigenschaften der Schwungräder (F1)

Die folgende Tabelle gibt das Gewicht und das Trägheitsmoment der Zusatzschwungräder an (Option F1). Die Gesamtmaße bleiben unverändert.

Caractéristiques volants (F1)

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

M2.9 - OPZIONI

M2.9 - OPTIONS

M2.9 - OPTIONEN

M2.9 - OPTIONS

Protezioni termiche

Thermal protective devices

Thermische Schutzeinrichtungen

Protections thermiques

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 servovenilati (IC416).

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 servovenilated motors (IC416).

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).

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 servovenilés (IC416).

E3

Sonde termiche a termistori

Thermistors

Temperaturfühler und Thermistoren

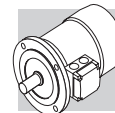
Sondes thermométriques

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 morsettiera ausiliaria.

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.

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 Schutzvorrichtung werden drei in Reihe geschaltete PTC-Widerstände in die Wicklung eingesetzt, deren Endanschlüsse an einer Zusatzklemmleiste verfügbar sind.

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

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 morsettiera ausiliaria.

Bimetallic thermostates

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.

Bimetall-Temperaturfühler

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.

Sondes thermiques bimétalliques

Les protecteurs de ce type contiennent, dans une enveloppe interne, un disque bimétallique qui, lorsque la température nominale d'intervention (150 °C) est atteinte, commute 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 bimétalliques en série avec contacts normalement fermés et extrémités disponibles dans un bornier auxiliaire.

H1

Riscaldatori anticondensa

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 morsettiera ausiliaria posta nella scatola principale. Le potenze assorbite dalla resistenza elettrica sono elencate qui di seguito:

Anti-condensation heaters

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:

Wicklungsheizung

Die Motoren, die in besonders feuchten Umgebungen und/oder unter starken Temperaturschwankungen eingesetzt werden, können mit einem Heizelement als Kondenwasserschutz ausgestattet werden. Die einphasige Versorgung erfolgt über eine Zusatzklemmleiste, die sich im Klemmenkasten befindet. Werte fuer die Leistungsaufnahme sind in folgender Tabelle aufgeführt.

Rechauffeurs anticondensation

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	—	50

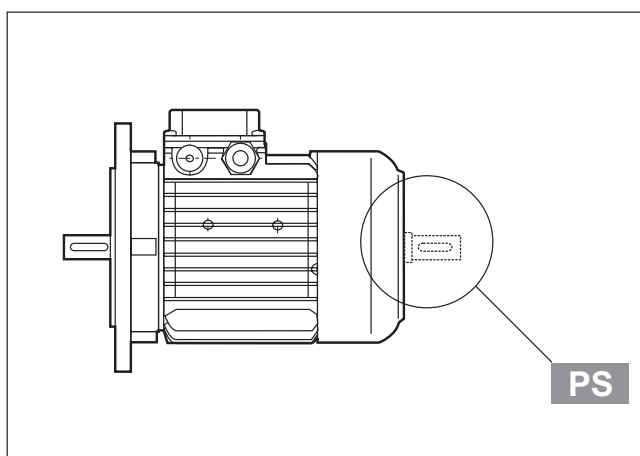
Importante!
Durante il funzionamento del motore la resistenza anticondensa non deve mai essere inserita.

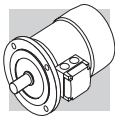
Warning!
Always remove power supply to the anti-condensate heater before operating the motor.

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.

Il senso di rotazione libera è descritto nel paragrafo 19 (opzioni motori).

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.

The direction of free rotation is specified in section 19 (motor options).

Overall dimensions are same as the corresponding brake motor.

The direction of free rotation is specified in section 19 (motor options).

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 Rücklaufsperren angegeben; Abbildung (A76) zeigt eine schematische Darstellung der Vorrichtung.

Die Abmessungen sind ähnlich denen der Bremsmotoren.

Im Abschnitt 19 (Motoroptionen) wird die freie Drehrichtung eingehend beschrieben.

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).

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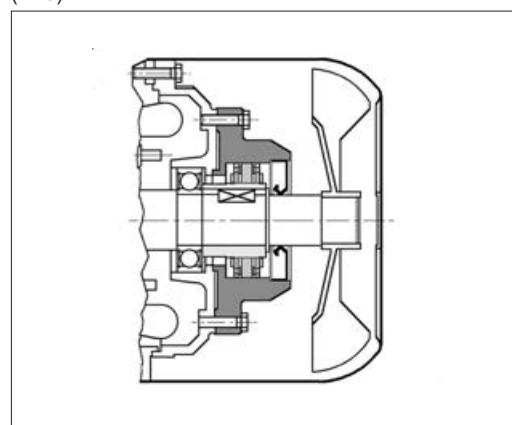
Le tableau (A75) indique le couple nominal et le couple maximum de blocage attribués aux dispositifs anti-retour utilisés alors que la représentation schématique du dispositif se trouve dans le tableau (A76).

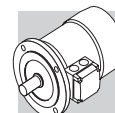
Le tableau (A75) indique le couple nominal et le couple maximum de blocage attribués aux dispositifs anti-retour utilisés alors que la représentation schématique du dispositif se trouve dans le tableau (A76).

(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 Anlauf Frequenzen.

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)

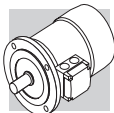
Dati di alimentazione / Power supply / Daten der Stromversorgung / Données d'alimentation					
		V a.c. ± 10%	Hz	P [W]	I [A]
BN 71	M1	1~ 230	50 / 60	22	0.12
BN 80	M2			22	0.12
BN 90	—			40	0.30
BN 100 (*)	M3			50	0.25
BN 112	—	3~ 230 Δ / 400Y		50	0.26 / 0.15
BN 132S	M4S		110	0.38 / 0.22	
BN 132M...BN 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 servoventilated 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_2 = variazione dimensionale rispetto alla quota LB del motore autofrenante corrispondente

ΔL_1 = extra length to LB value of corresponding standard motor

ΔL_2 = extra length to LB value of corresponding brake motor

ΔL_1 = Maßänderung gegenüber Maß LB des entsprechenden Standardmotors

ΔL_2 = Maßänderung gegenüber Maß LB des entsprechenden Bremsmotors

ΔL_1 = variation de dimension par rapport à la cote LB du moteur standard correspondant

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 morsetti 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	0.12 / 0.09

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

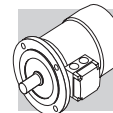
The drip cover protects the motor from dripping and avoids the ingress of solid bodies. It is recommended when motor is installed in a vertical position with the shaft downwards.

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.



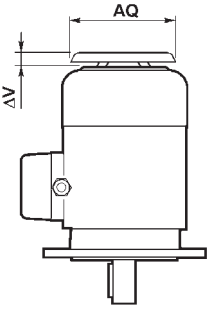
Le dimensioni aggiuntive sono indicate nella tabella (A80). Il tettuccio esclude le varianti PS, EN1, EN2, EN3 e non è applicabile ai motori con freno tipo BA

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 copriven-tola, 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 spezifi-ziert werden, wenn der Motor in Bereichen der Textilindustrie in-stalliert wird, in denen Stofffusseln das Lüfterradgitter verstopfen und so einen regulären Kühlluftfluss verhindern könnten. Diese Option schließt die Mög-lichkeit der Varianten EN1, EN2, EN3 aus und kann bei Motoren mit ei-ner Bremse vom Typ BA nicht ap- pliziert werden. Die Gesamtmaße entsprechen den- nen 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'in- dustrie textile, où sont présents des filaments qui pourraient obs- truer la grille du cache-ventila- teur et empêcher le flux régulier de l'air de refroidissement. L'option exclue les variantes EN1, EN2, EN3 et n'est pas ap- plicable aux moteurs avec frein type BA. L'encombrement total est iden- tique 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 esclu- de le esecuzioni con doppia estremità d'albero (PS) e tettuc- cio di protezione (RC, TC). Il di- spositivo 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-ex- tended shaft (PS) and rain cano- py (RC, TC) are not compatible with encoder installation. Also not compatible are motors equipped with a.c. brakes, type BA.

Geber-anschluß

Die Motoren können mit drei un- terschiedlichen Encodertypen ausgestattet werden. Nachste- hend finden Sie die entspre- chenden Beschreibungen. Die Montage des Encoders schließt die Version mit zweitem Wellenende (PS) und Schutz- dach (RC, TC) aus. Die Vorrichtung kann an Moto- ren mit Bremse vom Typ BA nicht angebaut werden.

Dispositifs de retroaction

Pour moteurs peuvent être do- tés de trois types de codeurs dif- férents, 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.

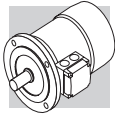
EN2

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)

(A81)	EN1	EN2	EN3
interfaccia / <i>Interface</i> Schnittstelle / <i>interface</i>	RS 422	RS 422	push-pull
tensione alimentazione / <i>Power supply voltage</i> Versorgungsspannung / <i>tension d'alimentation</i> [V]	4...6	10...30	12...30
tensione di uscita / <i>Output voltage</i> Ausgangsspannung / <i>tension de sortie</i> [V]	5	5	12...30
corrente di esercizio senza carico / <i>No-load operating current</i> Betriebsstrom ohne Belastung / <i>courant d'utilisation sans charge</i> [mA]	120	100	100
n° di impulsi per giro / <i>No. of pulses per revolution</i> Impulse pro Drehung / <i>nbre d'impulsions par tour</i>	1024		
n° segnali / <i>No. of signals</i> Signale / <i>nbre de signaux</i>	6 (A, B, C + segnali invertiti / <i>inverted signals</i> invertierte Signale / <i>signaux inversés</i>)		
max. frequenza di uscita / <i>Max. output frequency</i> Max. Ausgangsfrequenz / <i>fréquence max. de sortie</i> [kHz]	600		
max. velocità / <i>Max. speed</i> Max. Drehzahl / <i>vitesse max.</i> [min ⁻¹]	6000 (9000 min ⁻¹) x 10s		
campo di temperatura / <i>Temperature range</i> Temperaturbereich / <i>plage de température</i> [°C]	-30...+100		
grado di protezione / <i>Protection class</i> Schutzgrad / <i>degré de protection</i>	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 EN_ 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.

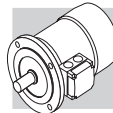
EN_ + U1		
		L3
BN 160M...BN 180M	M5	72
BN 180L...BN 200L	-	82
BN 160M_FD...BN 180M_FD	M5_FD	35
BN 180L_FD...BN 200L_FD	-	41

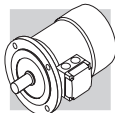
Wenn der Encoder (Optionen EN1, EN2, EN3) für Motoren der Baugrößen BN71...BN160MR und M1...M4 zusammen mit Fremdlüftung (Optionen U1, U2) ausgelegt ist, stimmen die Maßänderungen des Motors mit jenen der entsprechenden Ausführungen U1 und U2 überein.

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			
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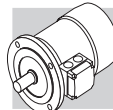
freno c.c. / d.c. brake G.S.-bremse / frein c.c.															freno c.a. / a.c. brake W.S.-bremse / frein c.a.																
FD															FA						BA										
Pn		n	Mn	IE1	η (100%)	η (75%)	η (50%)	$\cos \varphi$	In	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	$J_m \times 10^{-4}$ kgm ²	IM B5 	Mod.	Mb Nm	Z _o 1/h	NB	SB	$J_m \times 10^{-4}$ Kgm ²	IM B5 	Mb	Z _o 1/h	$J_m \times 10^{-4}$ kgm ²	IM B5 	Mod.	Mb max	Z _o	$J_m \times 10^{-4}$ kgm ²	IM B5 	
0.18	BN 63A	2	2730		59.9	56.9	51.9	0.77	0.56	3.0	2.1	2.0	2.0	3.5	FD 02	1.75	3900	4800		4800	2.6	5.2	1.75	4800	2.6	5.0	BA 60	5	3500	4.0	5.8
0.25	BN 63B	2	2740		66.0	64.8	64.8	0.76	0.72	3.3	2.3	2.3	2.3	3.9	FD 02	1.75	3900	4800		4800	3.0	5.6	1.75	4800	3.0	5.4	BA 60	5	3600	4.3	6.2
0.37	BN 63C	2	2800		69.1	66.8	66.8	0.78	0.99	3.9	2.6	2.6	3.3	5.1	FD 02	3.5	3600	4500		4500	3.9	6.8	3.5	4500	3.9	6.6	BA 60	5	3500	5.3	7.4
0.37	BN 71A	2	2820		73.8	73.0	70.6	0.76	0.95	4.8	2.8	2.6	3.5	5.4	FD 03	3.5	3000	4100		4100	4.6	8.1	3.5	4200	4.6	7.8	BA 70	8	3500	5.5	9.3
0.55	BN 71B	2	2820		76.0	75.8	74.8	0.76	1.37	5.0	2.9	2.8	4.1	6.2	FD 03	5	2900	4200		4200	5.3	8.9	5	4200	5.3	8.6	BA 70	8	3600	6.1	10.1
0.75	BN 71C	2	2810		76.6	76.2	76.2	0.76	1.86	5.1	3.1	2.8	5.0	7.3	FD 03	5	1900	3300		3300	6.1	10	5	3600	6.1	9.7	BA 70	8	3200	7.0	11.2
0.75	BN 80A	2	2810	●	76.2	75.5	68.3	0.81	1.75	4.8	2.6	2.2	7.8	8.6	FD 04	5	1700	3200		3200	9.4	12.5	5	3200	9.4	12.4	BA 80	18	2800	10.8	13.9
1.1	BN 80B	2	2800	●	76.4	76.2	75.0	0.81	2.57	4.8	2.8	2.4	9.0	9.5	FD 04	10	1500	3000		3000	10.6	13.4	10	3000	10.6	13.3	BA 80	18	2700	12.0	14.8
1.5	BN 80C	2	2800	●	79.1	79.5	77.2	0.81	3.4	4.9	2.7	2.4	11.4	11.3	FD 04	15	1300	2600		2600	13.0	15.2	15	2600	13.0	15.1	BA 80	18	2400	14.4	16.6
1.5	BN 90SA	2	2870	●	82.0	81.5	78.1	0.80	3.4	5.9	2.7	2.6	12.5	12.3	FD 14	15	900	2200		2200	14.1	16.5	15	2200	14.1	16.4	BA 90	35	1600	19.5	19.6
1.85	BN 90SB	2	2880	●	82.5	82.0	75.4	0.80	4.0	6.2	2.9	2.6	16.7	14	FD 14	15	900	2200		2200	18.3	18.2	15	2200	18.3	18.1	BA 90	35	1700	23.7	21.3
2.2	BN 90L	2	2880	●	82.7	82.1	80.8	0.80	4.8	6.3	2.9	2.7	16.7	14	FD 05	26	900	2200		2200	21	20	26	2200	21	20.7	BA 90	35	1700	24	21.3
3	BN 100L	2	2860	●	81.5	81.3	77.4	0.79	6.7	5.6	2.6	2.2	31	20	FD 15	26	700	1600		1600	35	26	26	1600	35	27	BA 100	50	1300	43	30
4	BN 100LB	2	2870	●	83.1	83.0	77.8	0.80	8.7	5.8	2.7	2.5	39	23	FD 15	40	450	900		900	43	29	40	1000	43	30	BA 100	50	850	51	33
4	BN 112M	2	2900	●	85.5	84.5	83.0	0.82	8.2	6.9	3.0	2.9	57	28	FD 06S	40	—	950		950	66	39	40	950	66	40	BA 110	75	850	73	41
5.5	BN 132SA	2	2890	●	84.7	84.5	81.2	0.84	11.2	5.9	2.6	2.2	101	35	FD 06	50	—	600		600	112	48	50	600	112	49	BA 140	150	500	151	67
7.5	BN 132SB	2	2900	●	86.5	86.3	84.4	0.85	14.7	6.4	2.6	2.2	145	42	FD 06	50	—	550		550	154	55	50	550	154	56	BA 140	150	450	195	74
9.2	BN 132M	2	2930	●	87.0	86.5	83.6	0.86	17.7	6.7	2.8	2.3	178	53	FD 56	75	—	430		430	189	66	75	430	189	67	BA 140	150	400	228	85
11	BN 160MR	2	2920	●	87.6	87.0	86.0	0.88	20.6	6.9	2.9	2.5	210	65																	
15	BN 160MB	2	2930	●	89.6	89.4	88.0	0.86	28.1	7.1	2.6	2.3	340	84																	
18.5	BN 160L	2	2930	●	90.4	90.1	89.0	0.86	34	7.6	2.7	2.3	420	97																	
22	BN 180M	2	2930	●	89.9	89.7	89.5	0.88	40	7.8	2.6	2.4	490	109																	
30	BN 200LA	2	2930	●	90.7	90.1	87.6	0.89	54	7.8	2.7	2.9	770	140																	

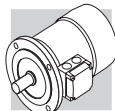




freno c.c. / d.c. brake G.S.-bremse / frein c.c.														freno c.a. / a.c. brake W.S.-bremse / frein c.a.																	
FD														FA														BA			
Pn		n	Mn	IE1	η (100%)	η (75%)	η (50%)	cos φ	In	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb	Zo	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb	Zo	Jm x 10 ⁻⁴ kgm ²	IM B5 							
0.06	BN 56A	4	0.43		46.8	44.2	41.3	0.65	0.28	2.6	2.3	2.0	1.5	3.1																	
0.09	BN 56B	4	0.64		51.7	47.6	42.9	0.60	0.42	2.6	2.5	2.4	1.5	3.1																	
0.12	BN 63A	4	0.85		59.8	56.2	47.0	0.62	0.47	2.6	1.9	1.8	2.0	3.5	FD 02	1.75	10000	13000	2.6	5.2	FA 02	1.75	13000	2.6	5.0	BA 60	5	9000	4.0	5.8	
0.18	BN 63B	4	1.30		54.8	52.9	52.5	0.67	0.71	2.6	2.2	2.0	2.3	3.9	FD 02	3.5	10000	13000	3.0	5.6	FA 02	3.5	13000	3.0	5.4	BA 60	5	9000	4.3	6.2	
0.25	BN 63C	4	1.78		65.3	65.0	57.9	0.69	0.80	2.7	2.1	1.9	3.3	5.1	FD 02	3.5	7800	10000	3.9	6.8	FA 02	3.5	10000	3.9	6.6	BA 60	5	8500	5.3	7.4	
0.25	BN 71A	4	1.73		63.7	62.2	59.1	0.73	0.78	3.3	1.9	1.7	5.8	5.1	FD 03	3.5	7700	11000	6.9	7.8	FA 03	3.5	11000	6.9	7.5	BA 70	8	9700	7.8	9.0	
0.37	BN 71B	4	2.6		66.8	66.7	63.0	0.76	1.05	3.7	2.0	1.9	6.9	5.9	FD 03	5.0	6000	9400	8.0	8.6	FA 03	5.0	9400	8.0	8.3	BA 70	8	8500	8.9	9.8	
0.55	BN 71C	4	3.8		69.0	68.9	68.8	0.74	1.55	4.1	2.3	2.3	9.1	7.3	FD 53	7.5	4300	8700	10.2	10	FA 03	7.5	8700	10.2	9.7	BA 70	8	8000	11.1	11.2	
0.55	BN 80A	4	3.8		72.0	71.3	69.7	0.77	1.43	4.1	2.3	2.0	15	8.2	FD 04	10	4100	8000	16.6	12.1	FA 04	10	8000	16.6	12.0	BA 80	18	7400	18	13.5	
0.75	BN 80B	4	5.1	●	75.0	74.5	69.3	0.78	1.85	4.9	2.7	2.5	20	9.9	FD 04	15	4100	7800	22	13.8	FA 04	15	7800	22	13.7	BA 80	18	7400	23	15.2	
1.1	BN 80C	4	7.5	●	75.5	76.2	70.4	0.78	2.70	5.1	2.8	2.5	25	11.3	FD 04	15	2600	5300	27	15.2	FA 04	15	5300	27	15.1	BA 80	18	5100	28	16.6	
1.1	BN 90S	4	7.6	●	76.5	76.2	72.2	0.77	2.70	4.6	2.6	2.2	21	12.2	FD 14	15	4800	8000	23	16.4	FA 14	15	8000	23	16.3	BA 90	35	6500	28	19.5	
1.5	BN 90LA	4	10.2	●	78.7	78.5	74.9	0.77	3.6	5.3	2.8	2.4	28	13.6	FD 05	26	3400	6000	32	19.6	FA 05	26	6000	32	20.3	BA 90	35	5400	35	21	
1.85	BN 90LB	4	13.90	●	78.6	78.9	77.2	0.79	4.3	5.1	2.8	2.6	30	15.1	FD 05	26	3200	5900	34	21.1	FA 05	26	5900	34	21.8	BA 90	35	5400	37	22.5	
2.2	BN 100LA	4	14.9	●	81.1	81.4	79.9	0.75	5.2	4.5	2.2	2.0	40	18.3	FD 15	40	2600	4700	44	25	FA 15	40	4700	44	25	BA 100	50	4000	52	29	
3	BN 100LB	4	20	●	82.6	83.8	83.7	0.77	6.8	5.0	2.3	2.2	54	22	FD 15	40	2400	4400	58	28	FA 15	40	4400	58	29	BA 100	50	3800	66	32	
4	BN 112M	4	27	●	84.4	84.2	81.6	0.81	8.4	5.6	2.7	2.5	98	30	FD 06S	60	—	1400	107	40	FA 06S	60	2100	107	42	BA 110	75	2000	114	43	
5.5	BN 132S	4	36	●	84.7	84.8	82.5	0.81	11.6	5.5	2.3	2.2	213	44	FD 56	75	—	1050	223	57	FA 06	75	1200	223	58	BA 140	150	1200	263	76	
7.5	BN 132MA	4	50	●	86.0	86.3	85.3	0.81	15.5	5.7	2.5	2.4	270	53	FD 06	100	—	950	280	66	FA 07	100	1000	280	71	BA 140	150	1000	320	85	
9.2	BN 132MB	4	61	●	88.4	88.6	87.5	0.80	18.8	5.9	2.7	2.5	319	59	FD 07	150	—	900	342	75	FA 07	150	900	342	77	BA 140	150	900	369	91	
11	BN 160MR	4	73	●	87.6	87.8	86.0	0.81	22.4	6.0	2.7	2.5	360	70	FD 07	150	—	850	382	86	FA 07	150	850	382	88						
15	BN 160L	4	98	●	88.7	88.5	88.4	0.81	30	6.0	2.3	2.1	650	99	FD 08	200	—	750	725	129	FA 08	200	750	710	128						
18.5	BN 180M	4	121	●	89.3	89.5	89.2	0.81	37	6.2	2.6	2.5	790	115	FD 08	250	—	700	865	145	FA 08	250	700	850	144						
22	BN 180L	4	144	●	89.9	90.0	90.0	0.80	44	6.4	2.5	2.5	1250	135	FD 09	300	—	400	1450	175											
30	BN 200L	4	196	●	91.4	91.7	91.0	0.80	59	7.1	2.7	2.8	1650	157	FD 09	400	—	300	1850	197											

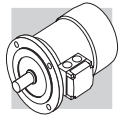
freno c.c. / d.c. brake G.S.-bremse / frein c.c.															freno c.a. / a.c. brake W.S.-bremse / frein c.a.																			
FD															FA															BA				
Pn		n	Mn	IE1	η (100%)	η (75%)	η (50%)	cos φ	In	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	$J_m \times 10^{-4}$ kgm ²	IM B5  Kg	Mod.	Mb	Z _o	NB	SB	$J_m \times 10^{-4}$ kgm ²	IM B5  Kg	Mod.	Mb	Z _o	$J_m \times 10^{-4}$ kgm ²	IM B5  Kg								
kW		min ⁻¹	Nm		%	%	%		A				kgm ²			Nm					kgm ²			Nm	1/h	1/h	kgm ²							
0.09	BN 63A	6	0.98		41.0	41.0	32.9	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	44.0	41.8	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		55.0	55.5	51.0	0.69	0.68	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	58.5	51.4	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	60.0	53.3	0.69	1.17	3.0	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	67.4	63.3	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	69.8	64.3	0.68	1.67	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	70.0	64.4	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	●	70.0	69.0	64.2	0.68	2.27	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	●	72.9	72.6	69.1	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	●	75.2	74.2	70.3	0.72	4.0	4.1	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	●	76.6	72.8	62.6	0.73	4.8	4.6	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	●	78.5	79.0	76.5	0.73	5.5	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	●	79.7	77.0	75.1	0.76	7.1	5.1	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	●	81.4	81.5	79.5	0.77	9.2	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	●	83.1	80.9	79.1	0.78	12.2	6.1	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	●	85.0	85.0	84.8	0.81	15.7	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	●	86.4	86.5	85.9	0.81	22.7	6.6	2.5	2.3	970	103	FD 08	200	—	800	1045	133	FA 08	200	800	1045	133									
15	BN 180L	6	148	●	87.7	88.0	87.3	0.82	30	6.2	2.0	2.4	1550	130	FD 09	300	—	600	1750	170														
18.5	BN 200LA	6	184	●	88.6	88.0	87.3	0.81	37	5.9	2.0	2.3	1700	145	FD 09	400	—	450	1900	185														

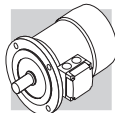




freno c.c. / d.c. brake G.S.-bremse / frein c.c.														freno c.a. / a.c. brake W.S.-bremse / frein c.a.																	
FD														FA														BA			
Pn		n	Mn	η	cos φ	In	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb	Z _o	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb	Z _o	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb max	Z _o	Jm x 10 ⁻⁴ kgm ²	IM B5 					
kW		min ⁻¹	Nm	%	A								Nm	1/h	kgm ²			Nm	1/h	kgm ²			Nm	1/h	kgm ²						
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	3.5	5.9	BA 60	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	5.8	6.8	BA 70	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	6.9	7.5	BA 70	8	1800	7.8	9.0				
0.25		4	1.90	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	8.0	8.3	BA 70	8	1800	8.9	9.8				
0.30		4	2.00	63	0.73	0.94	3.6	2.0	1.9				2900	4200						4200				3600							
0.55	BN 80A	2	2.800	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	16.6	12.0	BA 80	18	2100	18	13.5				
0.37		4	4.00	67	0.79	1.01	4.1	1.8	1.9				3000	4000						4000				3700							
0.75	BN 80B	2	2.780	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	22	13.7	BA 80	18	1500	22	15.2				
0.55		4	4.00	68	0.81	1.44	3.9	1.7	1.7				2700	3600						3600				3300							
1.1	BN 90S	2	2.790	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	23	16.3	BA 90	35	1300	28	19.5				
0.75		4	4.390	66	0.79	2.08	4.6	2.4	2.2				2300	2800						2800				2300							
1.5	BN 90L	2	2.780	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	32	21	BA 90	35	1100	35	21				
1.1		4	4.390	73	0.81	2.69	4.7	2.5	2.2				1600	2000						2000				1800							
2.2	BN 100LA	2	2.800	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	44	25	BA 100	50	750	51	29				
1.5		4	4.140	73	0.79	3.8	4.7	2.0	2.0				1300	2300						2300				1900							
3.5	BN 100LB	2	2.850	80	0.84	7.5	5.4	2.2	2.1	61	25	FD 15	40	500	900	65	31	FA 15	40	900	65	32	BA 100	50	750	72	35				
2.5		4	4.140	82	0.80	5.5	5.2	2.2	2.2				1000	2100						2100				1800							
4	BN 112M	2	2.880	79	0.83	8.8	6.1	2.4	2.0	98	30	FD 06S	60	—	700	107	40	FA 06S	60	700	107	42	BA 110	75	600	114	43				
3.3		4	4.140	80	0.80	7.4	5.1	2.1	2.0				—	—	1200					1200				1100							
5.5	BN 132S	2	2.890	80	0.87	11.4	5.9	2.4	2.0	213	44	FD 56	75	—	350	223	57	FA 06	75	350	223	58	BA 140	150	300	263	76				
4.4		4	4.140	82	0.84	9.2	5.3	2.2	2.0				—	—	900					900				750							
7.5	BN 132MA	2	2.900	82	0.87	15.2	6.5	2.4	2.0	270	53	FD 06	100	—	350	280	66	FA 07	100	350	293	71	BA 140	150	300	320	85				
6		4	4.140	84	0.85	12.1	5.8	2.3	2.1				—	—	900					900				800							
9.2	BN 132MB	2	2.920	83	0.86	18.6	6.0	2.6	2.2	319	59	FD 07	150	—	300	342	75	FA 07	150	300	342	77	BA 140	150	300	369	91				
7.3		4	4.140	85	0.85	14.6	5.5	2.3	2.1				—	—	800					800				750							

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		n	Mn	η	cos φ	In	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb	Zo	1/h	SB	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb	Zo	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	10000	8.0	8.6	FA 03	2.5	1700	13000	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																				
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	9000	10.2	10.0	FA 03	3.5	1300	11000	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																				
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	4100	22	13.8	FA 04	5	1800	6300	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																				
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	3800	27	15.2	FA 04	5	1900	6000	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																				
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	3400	32	20	FA 05	13	1600	5200	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																				
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	2900	44	24	FA 15	13	1200	4000	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																				
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	2100	65	31	FA 15	26	900	3000	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																				
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	2600	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																				
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	2100	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																				
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	1900	280	67	BA 140	150	350	320	85
2.2	6	960	22	77	0.71	5.8	4.3	2.1	2.0																				





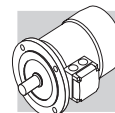
Pn kW		freno c.c. / d.c. brake G.S.-bremse / frein c.c.												freno c.a. / a.c. brake W.S.-bremse / frein c.a.					
		FD												FA					
		Mod.	Mb	Z _o	Jm x 10 ⁻⁴	IM B5 Kg	cos φ	In	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴	IM B5 Kg	Mod.	Mb	Z _o	Jm x 10 ⁻⁴	IM B5 Kg	Mod.
		n min ⁻¹	Mn	η	cos φ	In	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴	IM B5 Kg	Z _o	NB	SB	Mb	Z _o	Jm x 10 ⁻⁴	IM B5 Kg	Mb max
0.25	BN 71A	2	0.86	61	0.87	0.68	3.9	1.8	1.9	10.9	6.7	1300	1400	12	9.4	1400	12	9.1	8
0.06		8	0.84	31	0.61	0.46	2	1.8	1.9			10000	13000			13000			12000
0.37	BN 71B	2	1.26	63	0.86	0.99	3.9	1.8	1.9	12.9	7.7	1200	1300	14	10.4	1300	14	10.1	8
0.09		8	1.28	34	0.75	0.51	1.8	1.4	1.5			9500	13000			13000			12000
0.55	BN 80A	2	1.86	66	0.86	1.40	4.4	2.1	2.0	20	9.9	1500	1800	22	13.8	1800	22	13.7	18
0.13		8	1.80	41	0.64	0.72	2.3	1.6	1.7			5600	8000			8000			7500
0.75	BN 80B	2	2.6	68	0.88	1.81	4.6	2.1	2.0	25	11.3	1700	1900	27	15.2	1900	27	15.1	18
0.18		8	2.5	43	0.66	0.92	2.3	1.6	1.7			4800	7300			7300			7000
1.1	BN 90L	2	3.7	63	0.84	3.00	4.5	2.1	1.9	28	14	1400	1600	32	20	1600	32	21	35
0.28		8	3.9	48	0.63	1.34	2.4	1.8	1.9			3400	5100			5100			4500
1.5	BN 100LA	2	5.0	69	0.85	3.69	4.7	1.9	1.8	40	18.3	1000	1200	44	25	1200	44	25	50
0.37		8	5.1	46	0.63	1.84	2.1	1.6	1.6			3300	5000			5000			4200
2.4	BN 100LB	2	7.9	75	0.82	5.6	5.4	2.1	2.0	61	25	550	700	65	31	700	65	32	50
0.55		8	7.5	54	0.58	2.5	2.6	1.8	1.8			2000	3500			3500			3100
3	BN 112M	2	9.9	76	0.87	6.5	6.3	2.1	1.9	98	30	—	900	107	40	900	107	42	75
0.75		8	10.4	60	0.65	2.8	2.5	1.6	1.6			—	2900			2900			2700
4	BN 132S	2	13.3	73	0.84	9.4	5.6	2.3	2.4	213	44	500	500	223	57	500	223	58	150
1		8	13.8	66	0.62	3.5	2.9	1.9	1.8			—	3500			3500			3000
5.5	BN 132M	2	18.3	75	0.84	12.6	6.1	2.4	2.5	270	53	400	400	280	66	400	280	67	150
1.5		8	21	68	0.63	5.1	2.9	1.9	1.9			—	2400			2400			2100

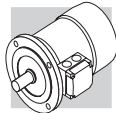
2/12 P

3000/500 min⁻¹ - S3 60/40%

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		n	Mn	η	cos φ	In	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb	Z _o	NB	SB	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb	Z _o	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb max	Z _o	Jm x 10 ⁻⁴ kgm ²	IM B5 			
0.55	BN 80B	2	1.86	64	0.89	1.39	4.2	1.6	1.7	25	11.3	FD 04	5	1000	1300	27	15.2	15.1	FA 04	5	1300	27	15.1	BA 80	18	1200	28	16.6			
0.09		12	430	30	0.63	0.69	1.8	1.9	1.8	8000	12000		8000	12000			12000				11000										
0.75	BN 90L	2	2.790	56	0.89	2.17	4.2	1.8	1.7	26	12.6	FD 05	13	1000	1150	30	18.6	19.3	FA 05	13	1150	30	19.3	BA 90	35	1050	33	19.9			
0.12		12	430	2.7	26	0.63	1.06	1.7	1.4	1.6	4600	6300		4600	6300			6300				5700									
1.1	BN 100LA	2	2850	3.7	0.85	2.87	4.5	1.6	1.8	40	18.3	FD 15	13	700	900	44	25	25	FA 15	13	900	44	25	BA 100	50	750	52	29			
0.18		12	430	4.0	26	0.54	1.85	1.5	1.3	1.5	54	22		4000	6000			6000				5000									
1.5	BN 100LB	2	2900	4.9	0.86	3.76	5.6	1.9	1.9	54	22	FD 15	13	700	900	58	28	29	FA 15	13	900	58	29	BA 100	50	800	66	32			
0.25		12	440	5.4	36	0.46	2.18	1.8	1.7	1.8				3800	5000			5000				4300									
2	BN 112M	2	2900	6.6	0.88	4.43	6.5	2.1	2	98	30	FD 06S	20	—	800	107	40	42	FA 06S	20	800	107	42	BA 110	75	750	114	43			
0.3		12	460	6.2	46	0.43	2.19	2	2.1	2					3400			3200				3200									
3	BN 132S	2	2920	9.8	0.87	6.7	6.8	2.3	1.9	213	44	FD 56	37	—	450	223	57	58	BA 140	150	380	263	76								
0.5		12	470	10.2	51	0.43	3.3	2	1.7	1.6					3000			2500				2500									
4	BN 132M	2	2920	13.1	0.89	8.6	5.9	2.4	2.3	270	53	FD 56	37	—	400	280	66	67	BA 140	150	350	320	85								
0.7		12	460	14.5	53	0.44	4.3	1.9	1.7	1.6					2800			2500				2500									





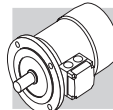
4/6 P

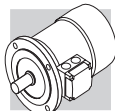
1500/1000 min⁻¹ - S1

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		n	Mn	η	cos φ	In	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb	Z _o	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mod.	Mb	Z _o	Jm x 10 ⁻⁴ kgm ²	IM B5 	Mb max	Z _o	Jm x 10 ⁻⁴ kgm ²	IM B5 						
kW		min ⁻¹	Nm	%		A							Nm	1/h				Mod.	Nm	1/h			Nm	1/h							
0.22	BN 71B	4	1410	1.5	64	0.74	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	8	3200	11.1	11.2					
0.13		6	920	1.4	43	0.67	0.65	2.3	1.6	1.7			5000	9000					8200					8200							
0.30	BN 80A	4	1410	2.0	61	0.82	0.87	3.5	1.3	1.5	8.2	FD 04	5	2500	3100	16.6	12.1	FA 04	5	3100	16.6	12.0	18	2800	18	13.5					
0.20		6	930	2.1	54	0.66	0.81	3.2	1.9	2.0			4000	6000					5500					5500							
0.40	BN 80B	4	1430	2.7	63	0.75	1.22	3.9	1.8	1.8	9.9	FD 04	10	1800	2300	22	13.8	FA 04	10	2300	22	13.7	18	2200	23	15.2					
0.26		6	930	2.7	55	0.70	0.97	2.7	1.5	1.6			3600	5500					5200					5200							
0.55	BN 90S	4	1420	3.7	70	0.78	1.45	4.5	2.0	1.9	21	FD 14	10	1500	2100	23	16.1	FA 14	10	2100	23	16.3	35	1700	28	19.5					
0.33		6	930	3.4	62	0.70	1.10	3.7	2.3	2.0			2500	4100					3300					3300							
0.75	BN 90L	4	1420	5.0	74	0.78	1.88	4.3	1.9	1.8	28	FD 05	13	1400	2000	32	20	FA 05	13	2000	32	21	35	1800	35	21					
0.45		6	920	4.7	66	0.71	1.39	3.3	2.0	1.9			2300	3600					3600					3600							
1.1	BN 100LA	4	1450	7.2	74	0.79	2.72	5.0	1.7	1.9	82	FD 15	26	1400	2000	86	28	FA 15	26	2000	86	29	50	1800	94	32					
0.8		6	950	8.0	65	0.69	2.57	4.1	1.9	2.1			2100	3300					3300					3000							
1.5	BN 100LB	4	1450	9.9	75	0.79	3.65	5.1	1.7	1.9	95	FD 15	26	1300	1800	99	31	FA 15	26	1800	99	32	50	1600	107	34					
1.1		6	950	11.1	72	0.68	3.24	4.3	2.0	2.1			2000	3000					3000					2800							
2.3	BN 112M	4	1450	15.2	75	0.78	5.7	5.2	1.8	1.9	168	FD 06S	40	—	1600	177	42	FA 06S	40	1600	177	44	75	1500	184	45					
1.5		6	960	14.9	73	0.72	4.1	4.9	2.0	2.0				—	2400				2400					2300							
3.1	BN 132S	4	1460	20	83	0.83	6.5	5.9	2.1	2.0	213	FD 56	37	—	1200	223	57	FA 06	37	1200	223	58	150	1000	263	76					
2		6	960	20	77	0.75	4.9	4.5	2.1	2.1				—	1900				1900					1600							
4.2	BN 132MA	4	1460	27	84	0.82	8.8	5.9	2.1	2.2	270	FD 06	50	—	900	280	66	FA 06	50	900	280	67	150	800	320	85					
2.6		6	960	26	79	0.72	6.6	4.3	2.0	2.0				—	1500				1500					1300							

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		n	Mn	η	cos φ	In	Is	Ms	Ma	Jm	IM B5	Mod.	Mb	Zo	Jm	IM B5	Mod.	Mb	Zo	Jm	IM B5	Mod.	Mb	Zo	Jm	IM B5	
kW		min ⁻¹	Nm	%		A				kgm ²			Nm	1/h	kgm ²			Nm	1/h	kgm ²			Nm	1/h	kgm ²		
0.37	BN 80A	4	1400	2.5	63	0.82	1.03	3.3	1.4	1.4	15	8.2	10	2300	3500	16.6	12.1	FA 04	10	3500	16.6	12.0	BA 80	18	3200	18	13.5
0.18		8	690	2.5	44	0.60	0.98	2.2	1.5	1.6				4500	7000					7000				6500			
0.55	BN 80B	4	1390	3.8	65	0.86	1.42	3.8	1.7	1.6	20	9.9	10	2200	2900	22	13.8	FA 04	10	2900	22	13.7	BA 80	18	2500	23	15.2
0.30		8	670	4.3	49	0.65	1.36	2.3	1.7	1.8				4200	6500					6500				5600			
0.65	BN 90S	4	1390	4.5	73	0.85	1.51	4.0	1.9	1.9	28	13.6	15	2300	2800	30	17.8	FA 14	15	2800	30	17.7	BA 90	35	2400	35	21
0.35		8	690	4.8	49	0.57	1.81	2.5	2.1	2.2				3500	6000					6000				5100			
0.9	BN 90L	4	1370	6.3	73	0.87	2.05	3.8	1.8	1.8	30	15.1	26	1700	2100	34	21	FA 05	26	2100	34	22	BA 90	35	1900	37	22
0.5		8	670	7.1	57	0.62	2.04	2.4	2.1	2				2500	4200					4200				3800			
1.3	BN 100LA	4	1420	8.7	72	0.83	3.14	4.3	1.7	1.8	82	22	40	1300	1700	86	28	FA 15	40	1700	86	29	BA 100	50	1500	94	32
0.7		8	700	9.6	58	0.64	2.72	2.8	1.8	1.8				2000	3400					3400				3100			
1.8	BN 100LB	4	1420	12.1	69	0.87	4.3	4.2	1.6	1.7	95	25	40	1200	1700	99	31	FA 15	40	1700	99	32	BA 100	50	1500	107	34
0.9		8	700	12.3	62	0.63	3.3	3.2	1.7	1.8				1600	2600					2600				2400			
2.2	BN 112M	4	1440	14.6	77	0.85	4.9	5.3	1.8	1.8	168	32	60	—	—	177	42	FA 06S	60	1200	177	43	BA 110	75	1100	184	45
1.2		8	710	16.1	70	0.63	3.9	3.3	1.9	1.8				—	—	2000				2000				1900			
3.6	BN 132S	4	1440	24	80	0.82	7.9	6.5	2.1	1.9	295	45	75	—	—	305	58	FA 06	75	1000	305	59	BA 140	150	900	345	77
1.8		8	720	24	72	0.55	6.6	4.6	1.9	2				—	—	1400				1400				1200			
4.6	BN 132M	4	1450	30	81	0.83	9.9	6.5	2.2	1.9	383	56	100	—	—	393	69	FA 07	100	1000	406	74	BA 140	150	900	433	88
2.3		8	720	31	73	0.54	8.4	4.4	2.3	2				—	—	1300				1300				1200			





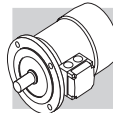
freno c.c. / d.c. brake G.S.-bremse / frein c.c.															freno c.a. / a.c. brake W.S.-bremse / frein c.a.				
FD															FA				
Pn		n	Mn	IE1	η (100%)	η (75%)	η (50%)	cos φ	In [400V]	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴ kgm ²	IM B9 	Mod.	Mb	Z _o 1/h	Jm x 10 ⁻⁴ kgm ²	IM B9 
0.18	M 05A 2	2730	0.63		59.9	56.9	51.9	0.77	0.56	3.0	2.1	2.0	2.0	3.2	FD 02	1.75	3900	4800	4.9
0.25	M 05B 2	2740	0.87		66.0	64.8	64.8	0.76	0.72	3.3	2.3	2.3	2.3	3.6	FD 02	1.75	3900	4800	5.3
0.37	M 05C 2	2800	1.26		69.1	66.8	66.8	0.78	0.99	3.9	2.6	2.6	3.3	4.8	FD 02	3.5	3600	4500	6.5
0.55	M 1SD 2	2820	1.86		76.0	75.8	74.8	0.76	1.37	5.0	2.9	2.8	4.1	5.8	FD 03	5	2900	4200	8.5
0.75	M 1LA 2	2810	2.6		76.6	76.2	76.2	0.76	1.86	5.1	3.1	2.8	5.0	6.9	FD 03	5	1900	3300	9.6
1.1	M 2SA 2	2800	3.8	●	76.4	76.2	75.0	0.81	2.57	4.8	2.8	2.4	9.0	8.8	FD 04	10	1500	3000	11.9
1.5	M 2SB 2	2800	5.1	●	79.1	79.5	77.2	0.81	3.4	4.9	2.7	2.4	11.4	10.6	FD 04	15	1300	2600	9.9
2.2	M 3SA 2	2880	7.3	●	82.7	82.1	81.0	0.80	4.8	6.3	2.9	2.7	24	15.5	FD 15	26	1100	2400	22
3	M 3LA 2	2860	10.0	●	81.5	81.3	77.4	0.79	6.7	5.6	2.6	2.2	31	18.7	FD 15	26	700	1600	25
4	M 3LB 2	2870	13.3	●	83.1	83.0	77.8	0.80	8.7	5.8	2.7	2.5	39	22	FD 15	40	450	900	28
5.5	M 4SA 2	2890	18.2	●	84.7	84.5	81.2	0.84	11.2	5.9	2.6	2.2	101	33	FD 06	50	—	600	46
7.5	M 4SB 2	2900	25	●	86.5	86.3	84.4	0.85	14.7	6.4	2.6	2.2	145	40	FD 06	50	—	550	53
9.2	M 4LA 2	2930	30	●	87.0	86.5	83.6	0.86	17.7	6.7	2.8	2.3	178	51	FD 56	75	—	430	64
11	M 4LC 2	2920	36	●	87.6	87.0	86.0	0.88	20.6	6.9	2.9	2.5	210	60					
15	M 5SB 2	2930	49	●	89.6	89.4	88.0	0.86	28.1	7.1	2.6	2.3	340	70					
18.5	M 5SC 2	2930	60	●	90.4	90.1	89.0	0.86	34	7.6	2.7	2.3	420	83					
22	M 5LA 2	2930	72	●	89.9	89.7	89.5	0.88	40	7.8	2.6	2.4	490	95					

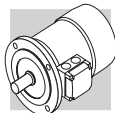
4 P

1500 min⁻¹ - S1

50 Hz

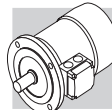
freno c.c. / d.c. brake G.S.-bremse / frein c.c.															freno c.a. / a.c. brake W.S.-bremse / frein c.a.											
FD															FA											
Pn		n	Mn	IE1	η (100%)	η (75%)	η (50%)	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴ kgm ²	IM B9 	Mod	Mb Nm	Zo 1/h NB	Sb	Jm x 10 ⁻⁴ kgm ²	IM B9 	Mod.	Mb Nm	Zo 1/h	Jm x 10 ⁻⁴ kgm ²	IM B9 	
0.09	M 0B 4	1350	0.64		51.7	47.6	42.9	0.60	0.42	2.6	2.5	2.4	1.5	2.9												
0.12	M 05A 4	1350	0.85		59.8	56.2	47.0	0.62	0.47	2.6	1.9	1.8	2.0	3.2		FD 02	1.75	10000	13000	2.6	4.9	FA 02	1.75	13000	2.6	4.7
0.18	M 05B 4	1320	1.30		54.8	52.9	52.5	0.67	0.71	2.6	2.2	2.0	2.3	3.6		FD 02	3.5	10000	13000	3.0	5.3	FA 02	3.5	13000	3.0	5.1
0.25	M 05C 4	1340	1.78		65.3	65.0	57.9	0.69	0.80	2.7	2.1	1.9	3.3	4.8		FD 02	3.5	7800	10000	3.9	6.5	FA 02	3.5	10000	3.9	6.3
0.37	M 1SD 4	1370	2.6		66.8	66.7	63.0	0.76	1.05	3.7	2.0	1.9	6.9	5.5		FD 03	5	6000	9400	8.0	8.2	FA 03	5	9400	8.0	7.9
0.55	M 1LA 4	1380	3.8		69.0	68.9	68.8	0.74	1.55	4.1	2.3	2.3	9.1	6.9		FD 53	7.5	4300	8700	10.2	9.6	FA 03	7.5	8700	10.2	9.3
0.75	M 2SA 4	1400	5.1	●	75.0	74.5	69.3	0.78	1.85	4.9	2.7	2.5	20	9.2		FD 04	15	4100	7800	22	13.1	FA 04	15	7800	22	13
1.1	M 2SB 4	1400	7.5	●	76.4	76.2	70.4	0.78	2.66	5.1	2.8	2.5	25	10.6		FD 04	15	2600	5300	27	14.5	FA 04	15	5300	27	14.4
1.5	M 3SA 4	1410	10.2	●	79.6	80.5	79.3	0.77	3.5	4.6	2.1	2.1	34	15.5		FD 15	26	2800	4900	38	22	FA 15	26	4900	38	23
2.2	M 3LA 4	1410	14.9	●	81.1	81.4	79.9	0.75	5.2	4.5	2.2	2.0	40	17		FD 15	40	2600	4700	44	24	FA 15	40	4700	44	24
3	M 3LB 4	1410	20	●	82.6	83.8	83.7	0.77	6.8	5.0	2.3	2.2	54	21		FD 15	40	2400	4400	58	27	FA 15	40	4400	58	28
4	M 3LC 4	1400	27		82.7	83.1	80.5	0.78	9.0	4.7	2.3	2.2	61	23		FD 55	55	—	1300	65	29	FA 15	40	1300	65	30
5.5	M 4SA 4	1440	36	●	84.7	84.8	82.5	0.81	11.6	5.5	2.3	2.2	213	42		FD 56	75	—	1050	223	55	FA 06	75	1050	223	56
7.5	M 4LA 4	1440	50	●	86.0	86.3	85.3	0.81	15.5	5.7	2.5	2.4	270	51		FD 06	100	—	950	280	64	FA 07	100	950	280	65
9.2	M 4LB 4	1440	61	●	88.4	88.6	87.5	0.80	18.8	5.9	2.7	2.5	319	57		FD 07	150	—	900	342	73	FA 07	150	900	342	75
11	M 4LC 4	1440	73	●	87.6	87.8	86.0	0.81	22.4	6.0	2.7	2.5	360	65		FD 07	150	—	850	382	81	FA 07	150	850	382	83
15	M 5SB 4	1460	98	●	88.7	88.5	88.4	0.81	30.1	6.0	2.3	2.1	650	85		FD 08	200	—	750	725	115	FA 08	200	750	710	114
18.5	M 5LA 4	1460	121	●	89.3	89.5	89.2	0.81	37	6.2	2.6	2.5	790	101		FD 08	250	—	700	865	131	FA 08	250	700	850	130

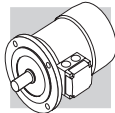




freno c.c. / d.c. brake G.S.-bremse / frein c.c.															freno c.a. / a.c. brake W.S.-bremse / frein c.a.														
FD															FA														
Pn		n	Mn	IE1	η (100%)	η (75%)	η (50%)	cos φ	In	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	$\frac{J_m}{\text{kgm}^2}$	IM B9 	Mod.	Mb	Z _o	$\frac{J_m}{\text{kgm}^2}$	Z _o	Mb	Mod.	IM B9 							
kW		min ⁻¹	Nm		%	%	%		A				kgm ²			Nm	1/h	kgm ²	1/h	Nm									
0.09	M 05A 6	880	0.98		41.0	41.0	32.9	0.53	0.60	2.1	2.1	1.8	3.4	4.3	FD 02	3.5	9000	4.0	14000	3.5	FA 02	6.0							
0.12	M 05B 6	870	1.32		45.0	44.0	41.8	0.60	0.64	2.1	1.9	1.7	3.7	4.6	FD 02	3.5	9000	4.3	14000	3.5	FA 02	6.3							
0.18	M 15C 6	900	1.91		55.0	55.5	51.0	0.69	0.68	2.6	1.9	1.7	8.4	5.1	FD 03	5	8100	9.5	13500	5	FA 03	7.8							
0.25	M 15D 6	900	2.7		62.0	58.5	51.4	0.71	0.82	2.6	1.9	1.7	10.9	6.3	FD 03	5	7800	12	13000	5	FA 03	9							
0.37	M 1LA 6	910	3.9		66.0	60.0	53.3	0.69	1.17	3.0	2.4	2.0	12.9	7.3	FD 53	7.5	5100	14	9500	7.5	FA 03	10							
0.55	M 25A 6	920	5.7		70.0	69.8	64.3	0.68	1.67	3.9	2.6	2.2	25	10.6	FD 04	15	4800	27	7200	15	FA 04	14.5							
0.75	M 25B 6	920	7.8	●	70.0	70.0	64.4	0.65	2.38	3.8	2.5	2.2	28	11.5	FD 04	15	3400	30	6400	15	FA 04	15.4							
1.1	M 35A 6	920	11.4	●	75.0	74.0	72.0	0.72	2.9	4.3	2.0	1.8	33	17	FD 15	26	2700	37	5000	26	FA 15	23							
1.5	M 3LA 6	940	15.2	●	75.2	74.2	70.3	0.72	4.0	4.1	2.1	2.0	82	21	FD 15	40	1900	86	4100	40	FA 15	27							
1.85	M 3LB 6	930	19.0	●	76.6	72.8	62.6	0.73	4.8	4.6	2.1	2.0	95	23	FD 15	40	1700	99	3600	40	FA 15	29							
2.2	M 3LC 6	930	23	●	77.7	76.8	72.4	0.71	5.8	4.7	2.3	2.1	95	23	FD 55	55	—	99	1900	55	FA 15	29							
3	M 45A 6	940	30	●	79.7	77.0	75.1	0.76	7.1	5.1	1.9	1.8	216	34	FD 56	75	—	226	1400	75	FA 06	47							
4	M 4LA 6	950	40	●	81.4	81.5	79.5	0.77	9.2	5.5	2.0	1.8	295	43	FD 06	100	—	305	1200	100	FA 07	56							
5.5	M 4LB 6	945	56	●	83.1	80.9	79.1	0.78	12.2	6.1	2.1	1.9	383	54	FD 07	150	—	406	1050	150	FA 07	70							
7.5	M 55A 6	955	75	●	85.0	85.0	84.8	0.81	15.7	5.9	2.2	2.0	740	69	FD 08	170	—	815	900	170	FA 08	98							
11	M 55B 6	960	109	●	86.4	86.5	85.9	0.81	22.7	6.6	2.5	2.3	970	89	FD 08	200	—	1045	800	200	FA 08	119							

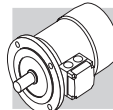
freno c.c. / d.c. brake G.S.-bremse / frein c.c.																			freno c.a. / a.c. brake W.S.-bremse / frein c.a.																		
FD																			FA																		
Pn		n	Mn	η	cos φ	In	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴ kgm ²	IM B9 	Mod.	Mb	Zo 1/h NB	SB	Jm x 10 ⁻⁴ kgm ²	IM B9 	Mod.	Mb	Zo	Jm x 10 ⁻⁴ kgm ²	IM B9 															
0.20	M 05A	2	2700	55	0.82	0.64	3.5	2.1	1.9	2.9	4.1	FD 02	3.5	2200	2600	2600	3.5	5.8	FA 02	3.5	2600	3.5	5.6														
0.15	4	4	1350	49	0.67	0.66	2.6	1.8	1.7					4000	5100	5100				5100																	
0.28	M 1SB	2	2700	56	0.82	0.88	2.9	1.9	1.7	4.7	4	FD 03	3.5	2100	2400	2400	5.8	6.7	FA 03	3.5	2400	5.8	6.4														
0.20	4	4	1370	59	0.68	1.02	3.1	1.8	1.7					3800	4800	4800				4800																	
0.37	M 1SC	2	2740	56	0.82	1.16	3.5	1.8	1.8	5.8	4.7	FD 03	5	1400	2100	2100	6.9	7.4	FA 03	5	2100	6.9	7.1														
0.25	4	4	1390	60	0.73	0.82	3.3	2	1.9					2900	4200	4200				4200																	
0.45	M 1SD	2	2780	63	0.85	1.21	3.8	1.8	1.8	6.9	5.5	FD 03	5	1400	2100	2100	8	8.2	FA 03	5	2100	8	7.9														
0.30	4	4	1400	63	0.74	0.93	3.8	2.1	1.9					2900	4200	4200				4200																	
0.55	M 1LA	2	2800	73	0.79	1.38	4.2	2	1.8	9.1	6.9	FD 03	5	1600	2200	2200	10.2	9.6	FA 03	5	2200	10.2	9.3														
0.37	4	4	1400	68	0.72	1.09	3.9	2.2	2					3300	4600	4600				4600																	
0.75	M 2SA	2	2780	65	0.85	1.96	3.8	1.9	1.8	20	9.2	FD 04	10	1400	1600	1600	22	13.1	FA 04	10	1600	22	13														
0.55	4	4	1400	68	0.81	1.44	3.9	1.7	1.7					2700	3600	3600				3600																	
1.1	M 2SB	2	2730	65	0.86	2.84	3.9	2	1.9	25	10.7	FD 04	10	1200	1500	1500	27	14.5	FA 04	10	1500	27	14.5														
0.75	4	4	1410	75	0.81	1.78	4.5	2.1	2					2300	3100	3100				3100																	
1.5	M 3SA	2	2830	74	0.83	3.5	4.7	2.1	2	34	15.5	FD 15	26	700	1000	1000	38	22	FA 15	26	1000	38	23														
1.1	4	4	1420	77	0.78	2.6	4.3	2.1	2					1600	2600	2600				2600																	
2.2	M 3LA	2	2800	72	0.85	5.2	4.5	2	1.9	40	17	FD 15	26	600	900	900	44	24	FA 15	26	900	44	24														
1.5	4	4	1410	73	0.79	3.8	4.7	2	2					1300	2300	2300				2300																	
3.5	M 3LB	2	2850	80	0.84	7.5	5.4	2.2	2.1	61	23	FD 15	40	500	900	900	65	29	FA 15	40	900	65	30														
2.5	4	4	1420	82	0.80	5.5	5.2	2.2	2.2					1000	2100	2100				2100																	
4.8	M 4 SA	2	2900	81	0.88	9.7	6	2	1.9	213	42	FD 06	50	—	—	—	233	55	FA 06	50	400	233	56														
3.8	4	4	1430	81	0.84	8.1	5.2	2.1	2.1					—	—	—				950																	
5.5	M 4SB	2	2890	80	0.87	11.4	5.9	2.4	2	213	42	FD 56	75	—	—	—	223	55	FA 06	75	350	223	56														
4.4	4	4	1440	82	0.84	9.2	5.3	2.2	2					900	900	900				900																	
7.5	M 4LA	2	2900	82	0.87	15.2	6.5	2.4	2	270	51	FD 06	100	—	—	—	280	64	FA 07	100	350	280	65														
6	4	4	1430	84	0.85	12.1	5.8	2.3	2.1					—	—	—				950																	
9.2	M 4LB	2	2920	83	0.86	18.6	6	2.6	2.2	319	57	FD 07	150	—	—	—	342	73	FA 07	150	300	342	75														
7.3	4	4	1440	85	0.85	14.6	5.5	2.3	2.1					—	—	—				800																	





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					
Pn		n	Mn	η	cos φ	In	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴ kgm ²	IM B9 	Mod.	Mb	Z _o 1/h NB SB	Jm x 10 ⁻⁴ kgm ²	IM B9 						
kW		min ⁻¹	Nm	%		A							Nm									
0.25	M 1SA	2	0.84	60	0.82	0.73	4.3	1.9	1.8	6.9	5.5	FD 03	1.75	1500 10000	8	8.2						
0.08	6	910	0.84	43	0.70	0.38	2.1	1.4	1.5					13000								
0.37	M 1LA	2	1.23	62	0.80	1.08	4.4	1.9	1.8	9.1	6.9	FD 03	3.5	1000 9000	10.2	9.6						
0.12	6	900	1.27	44	0.73	0.54	2.4	1.4	1.5					11000								
0.55	M 2SA	2	1.88	63	0.86	1.47	4.5	1.9	1.7	20	9.2	FD 04	5	1500 4100	22	13.1						
0.18	6	930	1.85	52	0.65	0.77	3.3	2.0	1.9					6300								
0.75	M 2SB	2	2.6	66	0.87	1.89	4.3	1.8	1.6	25	10.6	FD 04	5	1700 3800	27	14.5						
0.25	6	930	2.6	54	0.67	1.00	3.2	1.7	1.8					6000								
1.1	M 3SA	2	3.7	71	0.82	2.73	4.9	1.8	1.9	34	15.5	FD 15	13	1000 3500	38	22						
0.37	6	930	3.8	63	0.70	1.21	3.1	1.5	1.8					5000								
1.5	M 3LA	2	5.0	73	0.84	3.53	5.1	1.9	2.0	40	17	FD 15	13	1000 2900	44	24						
0.55	6	940	5.6	64	0.67	1.85	3.5	1.7	1.8					4000								
2.2	M 3LB	2	7.2	77	0.85	4.9	5.9	2.0	2.0	61	23	FD 15	26	700 2100	65	29						
0.75	6	950	7.5	67	0.64	2.5	3.3	1.9	1.8					3000								
3	M 4SA	2	9.9	74	0.88	6.6	5.6	2.0	2.1	170	36	FD 56	37	— —	182	48						
1.1	6	960	10.9	73	0.68	3.2	4.5	2.2	2					2200								
4.5	M 4SB	2	14.8	78	0.84	9.9	5.8	1.9	1.8	213	42	FD 56	37	— —	223	55						
1.5	6	960	14.9	74	0.67	4.4	4.2	1.9	2.0					2100								
5.5	M 4LA	2	18.0	78	0.87	11.7	6.2	2.1	1.9	270	51	FD 06	50	— —	280	64						
2.2	6	960	22	77	0.71	5.8	4.3	2.1	2.0					1900								

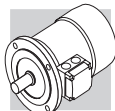
freno c.c. / d.c. brake G.S.-bremse / frein c.c.														freno c.a. / a.c. brake W.S.-bremse / frein c.a.									
FD														FA									
Pn		n	Mn	η	cos φ	In	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴ kgm ²	IM B9 	Mod.	Mb	Zo	1/h	SB	Jm x 10 ⁻⁴ kgm ²	IM B9 	Mod.	Mb	Zo	Jm x 10 ⁻⁴ kgm ²	IM B9 
0.37	M 1LA	2	1.26	63	0.86	0.99	3.9	1.8	1.9	12.9	7.3	FD 03	3.5	1200	1300		14	10	FA 03	3.5	1300	14	9.7
0.09	8	8	1.28	34	0.75	0.51	1.8	1.4	1.5					9500	13000							13000	
0.55	M 2SA	2	1.86	66	0.86	1.40	4.4	2.1	2	20	9.2	FD 04	5	1500	1800		22	13.1	FA 04	5	1800	22	13
0.13	8	8	1.80	41	0.64	0.72	2.3	1.6	1.7					5600	8000							8000	
0.75	M 2SB	2	2.6	68	0.88	1.81	4.6	2.1	2	25	10.6	FD 04	10	1700	1900		27	14.5	FA 04	10	1900	27	14.4
0.18	8	8	2.5	43	0.66	0.92	2.3	1.6	1.7					4800	7300							7300	
1.1	M 3SA	2	3.7	69	0.84	2.74	4.6	1.8	1.7	34	15.5	FD 15	13	1000	1300		38	22	FA 15	13	1300	38	23
0.28	8	8	3.9	44	0.56	1.64	2.3	1.4	1.7					3400	5000							5000	
1.5	M 3LA	2	5.0	69	0.85	3.69	4.7	1.9	1.8	40	17	FD 15	13	1000	1200		44	24	FA 15	13	1200	44	24
0.37	8	8	5.1	46	0.63	1.84	2.1	1.6	1.6					3300	5000							5000	
2.4	M 3LB	2	7.9	75	0.82	5.6	5.4	2.1	2	61	23	FD 15	26	550	700		65	29	FA 15	26	700	65	30
0.55	8	8	7.5	54	0.58	2.5	2.6	1.8	1.8					2000	3500							3500	
3	M 4SA	2	9.8	72	0.85	7.1	5.6	2	1.8	162	36	FD 56	37	—	600		182	48	FA 06	37	600	182	50
0.75	8	8	10.1	61	0.64	2.8	3	1.7	1.8					—	3400							3400	
4	M 4SB	2	13.3	73	0.84	9.4	5.6	2.3	2.4	213	42	FD 56	37	—	500		223	55	FA 06	37	500	223	56
1	8	8	13.8	66	0.62	3.5	2.9	1.9	1.8					—	3500							3500	
5.5	M 4LA	2	18.3	75	0.84	12.6	6.1	2.4	2.5	270	51	FD 06	50	—	400		280	64	FA 06	50	400	280	65
1.5	8	8	21	68	0.63	5.1	2.9	1.9	1.9					—	2400							2400	



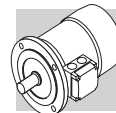
2/12 P

3000/500 min⁻¹ - S3 60/40%

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														
Pn		n	Mn	η	cos φ	In	Is In	Ms Mn	Ma Mn	Jm x 10 ⁻⁴ kgm ²	IM B9 	Mod.	Mb	Zo 1/h NB SB	Jm x 10 ⁻⁴ kgm ²	IM B9 	Mod.	Mb	Zo	Jm x 10 ⁻⁴ kgm ²	IM B9 								
kW		min ⁻¹	Nm	%		A				kgm ²			Nm	1/h	kgm ²			Nm	1/h	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 8000	27	14.5	FA 04	5	1300 12000	27	14.4								
0.09	12	430	2.0	30	0.63	0.69	1.8	1.9	1.8																				
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 5000	38	22	FA 15	13	900 7000	38	23								
0.12	12	460	2.5	33	0.43	1.22	1.9	1.3	1.6																				
1.1	M 3LA	2850	3.7	65	0.85	2.87	4.5	1.6	1.8	40	17	FD 15	13	700 4000	44	24	FA 15	13	900 6000	44	24								
0.18	12	430	4.0	26	0.54	1.85	1.5	1.3	1.5																				
1.5	M 3LB	2900	4.9	67	0.86	3.76	5.6	1.9	1.9	54	21	FD 15	13	700 3800	58	27	FA 15	13	900 5000	58	28								
0.25	12	440	5.4	36	0.46	2.18	1.8	1.7	1.8																				
2	M 3LC	2850	6.7	70	0.84	4.9	4.9	1.8	1.7	61	23	FD 55	18	— —	65	29	FA 15	18	700 3500	65	30								
0.3	12	450	6.4	38	0.47	2.4	1.7	1.6	1.7																				
3	M 4SA	2920	9.8	74	0.87	6.7	6.8	2.3	1.9	213	42	FD 56	37	— —	223	55	FA 06	37	450 3000	223	56								
0.5	12	470	10.2	51	0.43	3.3	2	1.7	1.6																				
4	M 4LA	2920	13.1	75	0.89	8.6	5.9	2.4	2.3	270	51	FD 56	37	— —	280	64	FA 06	37	400 2800	280	65								
0.7	12	460	14.5	53	0.44	4.3	1.9	1.7	1.6																				

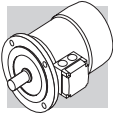


**M2.11 - DIMENSIONI
MOTORI**

***M2.11 - MOTORS
DIMENSIONS***

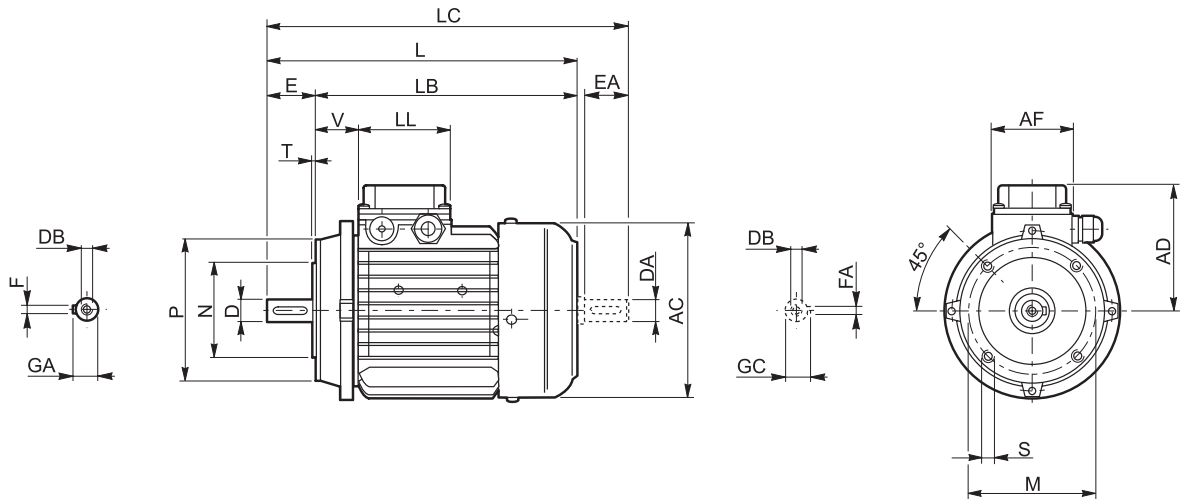
**M2.11 - MOTORENABMES-
SUNGEN**

***M2.11 - DIMENSIONS
MOTEURS***

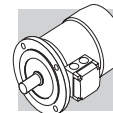


BN

IM B14

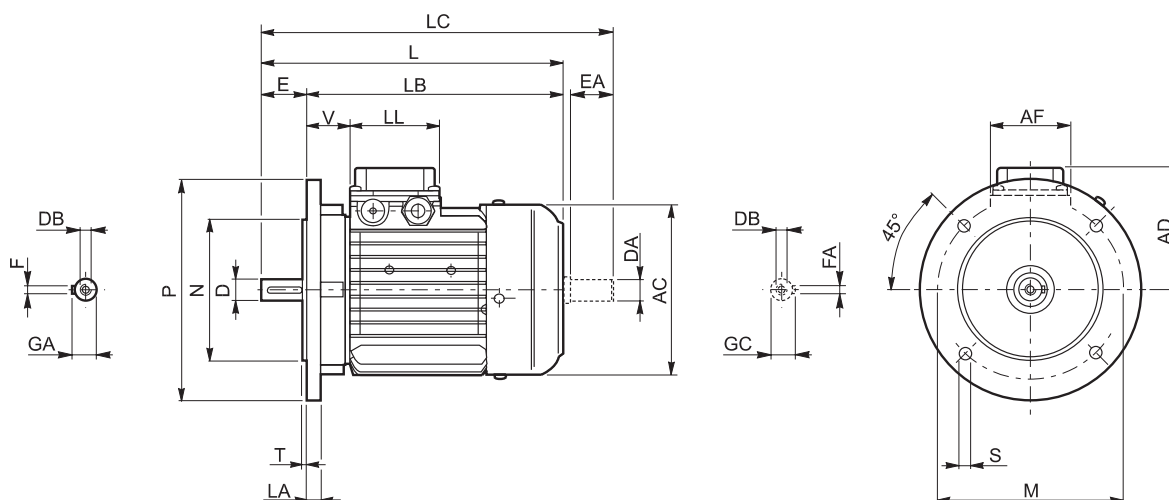


	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Bride					Motore / Motor / Motor / Moteur							
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	AC	L	LB	LC	AD	AF	LL	V
BN 56	9	20	M3	10.2	3	65	50	80	M5	2.5	110	185	165	207	91	74	80	34
BN 63	11	23	M4	12.5	4	75	60	90			121	207	184	232	95			26
BN 71	14	30	M5	16	5	85	70	105	M6		138	249	219	281	108			37
BN 80	19	40	M6	21.5	6	100	80	120		3	156	274	234	315	119	38		
BN 90	24	50	M8	27	8	115	95	140	M8		176	326	276	378	133	98	98	44
BN 100	28	60	M10	31		130	110	160			3.5	195	367	307	429			142
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	91	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				138	249	219	281	108			37	
BN 80	19	40	M6	21.5	6	165	130	200	11.5	3.5	11.5	156	274	234	315	119	98	98	38	
BN 90	24	50	M8	27	8							215	180	250	14	4			176	326
BN 100	28	60	M10	31		14	15	195	367	307	429								142	50
BN 112					219			385	325	448	157	52								
BN 132	38	80	M12	41	10	265	230	300	18.5	5	20	258	493	413	576	193	118	118	58	
BN 160 MR	42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350			15		562	452	645				245	218
BN 160 M												310	596	486	680	187	187	51		
BN 160 L									640	530			724							
BN 180 M	48 38 (1)	110 110 (1)	M16 M16 (1)	51.5 41 (1)	14 10 (1)	350	300	400	18	348	708	598	823	261	66					
BN 180 L	48 42 (1)			M20 M16 (1)	51.5 45 (1)						14 12 (1)	722	612			837				
BN 200 L	55 42 (1)		59 45 (1)		16 12 (1)															

N.B.:

1) Queste dimensioni sono riferite alla seconda estremità d'albero.

NOTE:

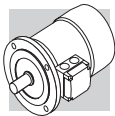
1) These values refer to the rear shaft end.

HINWEIS:

1) Diese Maße betreffen das zweite Wellenende.

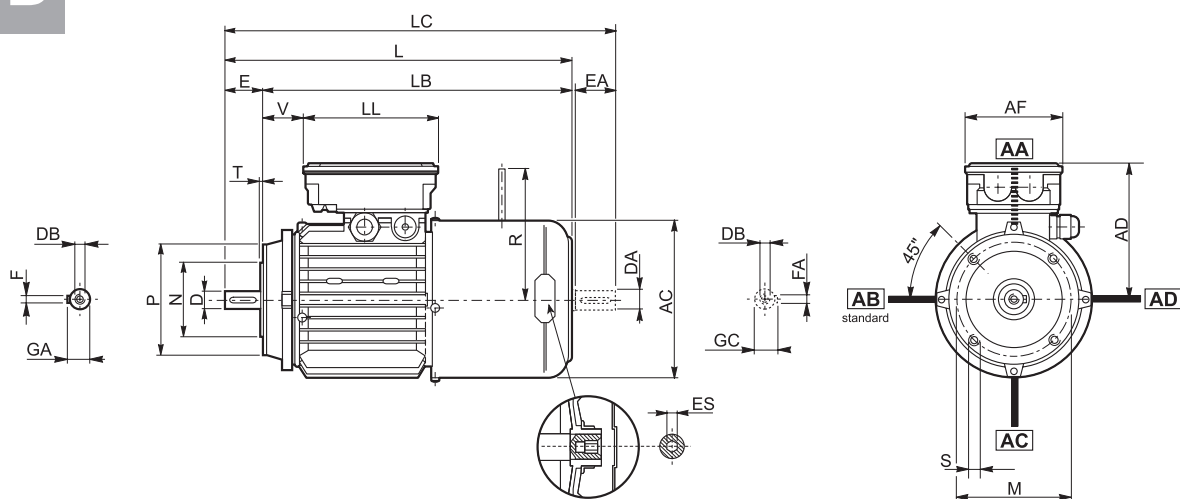
REMARQUE :

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	122	98	133	14	96	5
BN 71	14	30	M5	16	5	85	70	105	M6		138	310	280	342	135			25	103	
BN 80	19	40	M6	21.5	6	100	80	120		3	156	346	306	388	146			41	129	
BN 90 S	24	50	M8	27	8	115	95	140	M8		176	409	359	461	149	110	165	39	160	
BN 90 L										3.5	195	458	398	521	158			62	160	
BN 100	28	60	M10	31		130	110	160	219		484	424	547	173	73			199		
BN 112									219	484	424	547	173	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 :

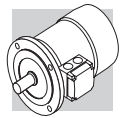
1) Pour frein FD07 valeur R=226.

L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

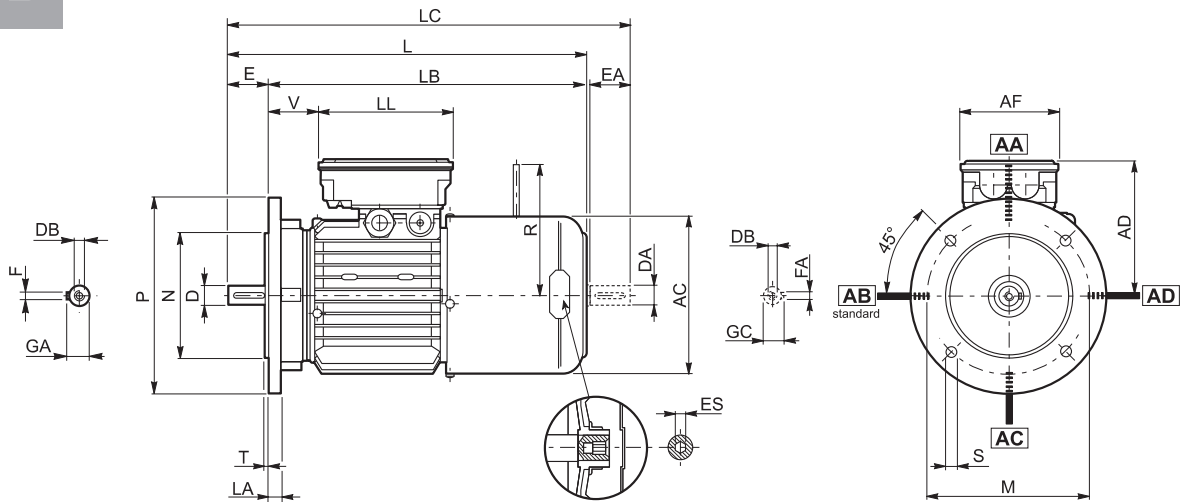
Der Sechskant ES ist bei der Option PS nicht vorhanden.

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	122	98	133	14	96	5						
BN 71	14	30	M5	16	5	130	110	160		138		310	280	342	135	25			103								
BN 80	19	40	M6	21.5	6	165	130	200	11.5	3.5	11.5	156	346	306	388	146			41	129		6					
BN 90 S	24	50	M8	27	8							215	180	250	14	4	14	176	409	359	461		149	39	160		
BN 90 L																		28	60	M10	31		15	219		484	424
BN 100	38	80	M12	41		10	265	230	300	20	258											603					
BN 112												42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350	18.5	5	15			310		
BN 160 MR	48 38 (1)	M16 M16 (1)	51.5 45 (1)	14 10 (1)	350	300	400	18	348	736	626												820	245		51	266
BN 160 M										48 38 (1)	M20 M16 (1)												59 45 (1)	16 12 (1)		350	300
BN 160 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	64										
BN 180 M										55 42 (1)	110 110 (1)		M20 M16 (1)	59 45 (1)	16 12 (1)	350	300	400	18	348	878	768	993	261	64		
BN 180 L	55 42 (1)	110 110 (1)	M20 M16 (1)	59 45 (1)	16 12 (1)	350	300	400	18			348									878	768	993	261	64		
BN 200 L										55 42 (1)	110 110 (1)		M20 M16 (1)	59 45 (1)	16 12 (1)	350	300	400	18	348	878	768	993	261	64		

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.

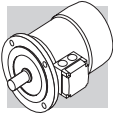
2) Pour frein FD07 valeur R=226.

L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

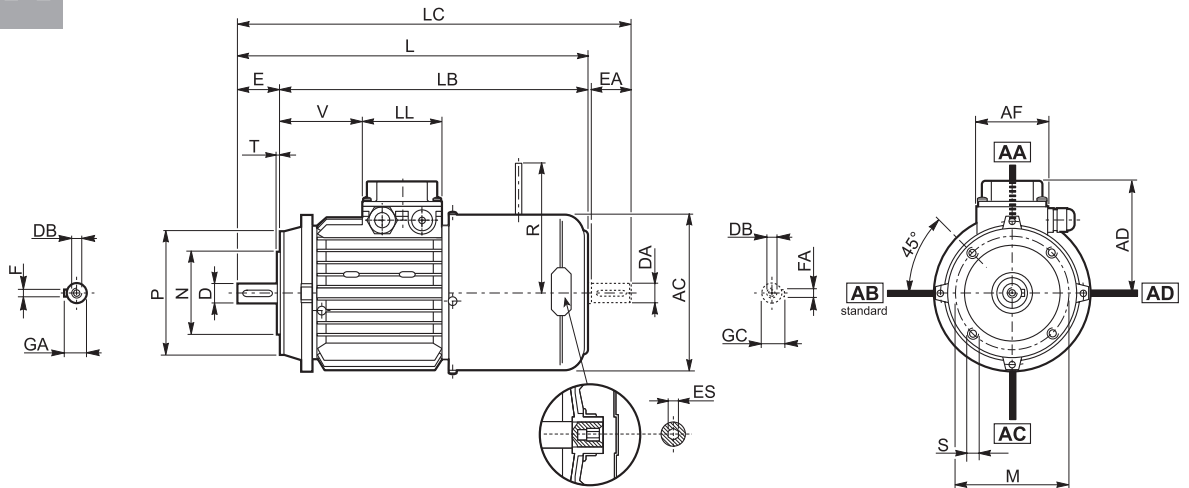
Der Sechskant ES ist bei der Option PS nicht vorhanden.

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			68	124	
BN 80	19	40	M6	21.5	6	100	80	120			3	156	346	306	388			119	83	
BN 90	24	50	M8	27	8	115	95	140	M8	3.5		176	409	359	461	133	98	98	95	160
BN 100	28	60	M10	31		130	110	160			195	458	398	521	142	119			198	
BN 112											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 FA07 quota R=217.

Per la versione BN..FA le dimensioni della scatola morsettieria AD, AF, LL, V sono uguali al tipo BN..FD.

L'esagono ES non è presente con l'opzione PS.

NOTE:

1) For FA07 brake value R=217.

For motors type BN..FA, the terminal box sizes AD, AF, LL, V are the same as for BN..FD.

ES hexagon is not supplied with PS option.

HINWEIS:

1) Für Bremse FA07, Maß R=217.

Bei der Motor typ BN..FA sind die Maße des Klemmenkastens AD, AF, LL, V denen der Version BN..FD gleich.

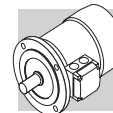
Der Sechskant ES ist bei der Option PS nicht vorhanden.

REMARQUE :

1) Pour frein FA07 valeur R=217.

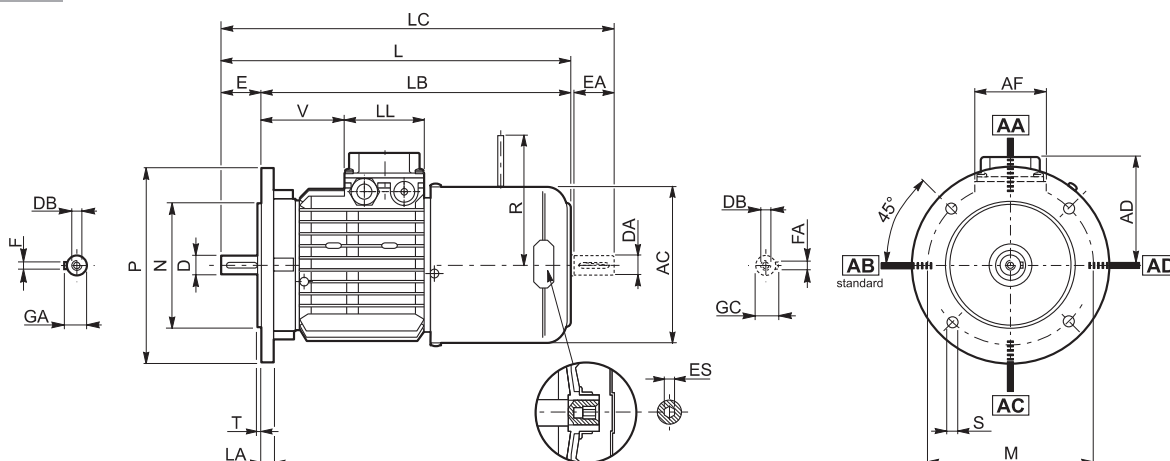
Pour moteurs type BN..FA les dimensions de la boîte à bornes AD, AF, LL, V sont les mêmes de BN..FD.

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		3.5		11.5	138	310	280	342			108	68		124						
BN 80	19	40	M6	21.5	6	165	130	200					11.5	156	346	306			388	119		83	134					
BN 90	24	50	M8	27	8	215	180	250	14		4		15	176	409	359	461	133	98	98	95	160	6					
BN 100	28	60	M10	31						10		265		230	300	18.5	5	15			195	458		398	521	142	119	128
BN 112																					219	484		424	547	157	180	200 (2)
BN 132	38	80	M12	41	10	265	230	300	11.5	3.5	11.5	258	603	523	686	193	118	118	180	200 (2)	—							
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	245	187	187		218	217					
BN 160 M															310	736	626					820	51	247				
BN 160 L															780	670	864											
BN 180 M	48 38 (1)			51.5 41 (1)	14 10 (1)																							

N.B.:

- 1) Queste dimensioni sono riferite alla seconda estremità d'albero.
- 2) Per freno FA07 quota R=217.

NOTE:

- 1) These values refer to the rear shaft end.
- 2) For FA07 brake value R=217.

HINWEIS:

- 1) Diese Maße betreffen das zweite Wellenende.
- 2) Für Bremse FA07, Maß R=217.

REMARQUE :

- 1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.
- 2) Pour frein FA07 valeur R=217.

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.

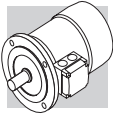
Les dimensions AD, AF, LL et V relatives à la boîte à borne des moteurs BN...FA équipés d'alimentation séparée du frein (option SA) sont identiques à celles des moteurs BN...FD de la même taille.

L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

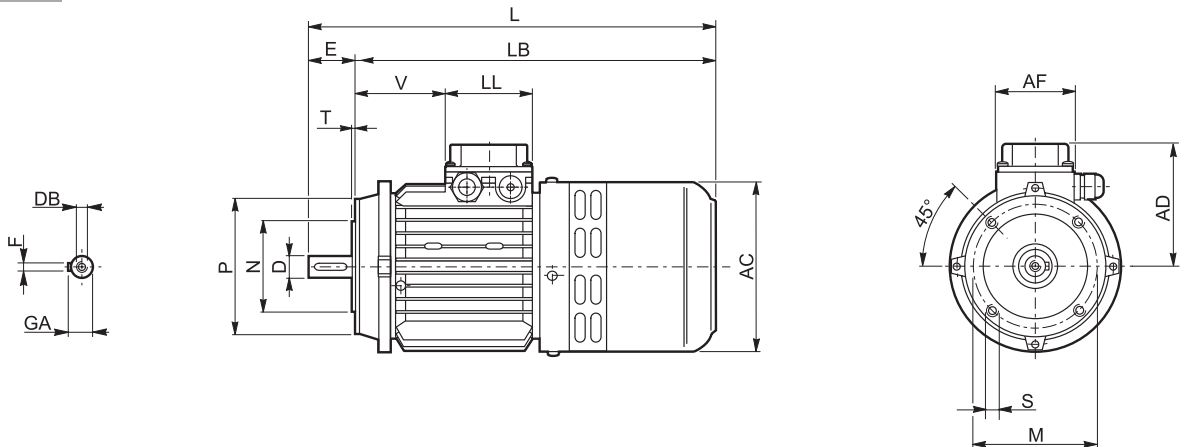
Der Sechskant ES ist bei der Option PS nicht vorhanden.

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		3	156	372	332	119			83
BN 90	24	50	M8	27	8	115	95	140	M8		3.5	176	425	375	133	98	98
BN 100	28	60	M10	31		130	110	160		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 morsetti dei motori BN...BA dotati di alimentazione separata del freno (opzione SA) coincidono con quelle dei motori BN...FD di pari taglia.

NOTE:

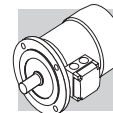
Dimensions AD, AF, LL and V, relevant to terminal box of motors BN...BA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size BN...FD motors

HINWEIS:

Die Abmessungen des Klemmkastens 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.

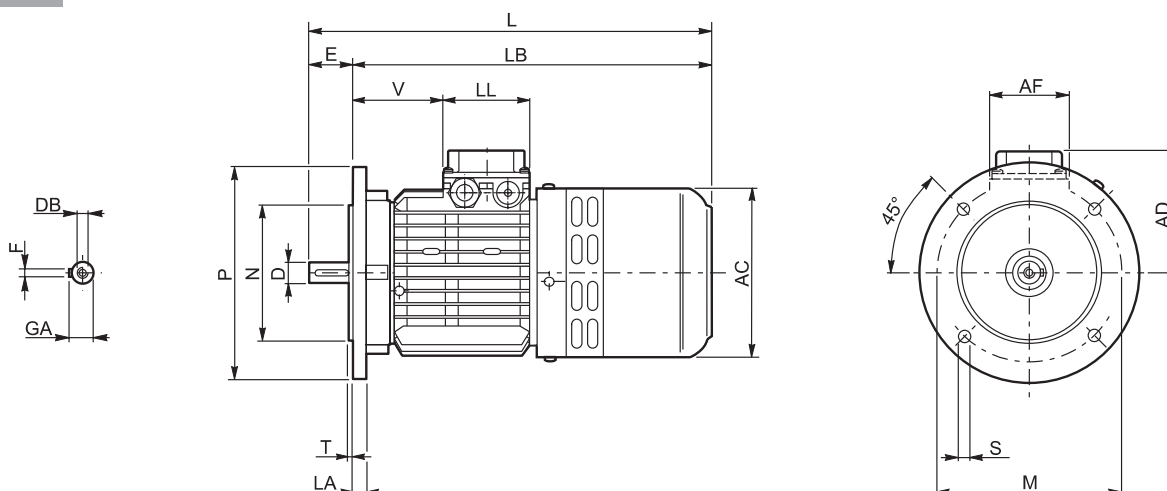
REMARQUE :

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		3.5		11.5	138	327	297			108	68
BN 80	19	40	M6	21.5	6	165	130	200	11.5		4		11.5	156	372	332	119	98	98
BN 90	24	50	M8	27	8					215		180		250	14	195	477		
BN 100	28	60	M10	31		14	4	15	219		500		440		157	128			
BN 112					20			258	638	558	193	118	118	180					
BN 132	38	80	M12	41	10	265	230	300											

N.B.:

Le dimensioni AD, AF, LL e V relative alla scatola morsettiera dei motori BN...BA dotati di alimentazione separata del freno (opzione SA) coincidono con quelle dei motori BN...FD di pari taglia.

NOTE:

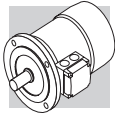
Dimensions AD, AF, LL and V, relevant to terminal box of motors BN...BA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size BN...FD motors

HINWEIS:

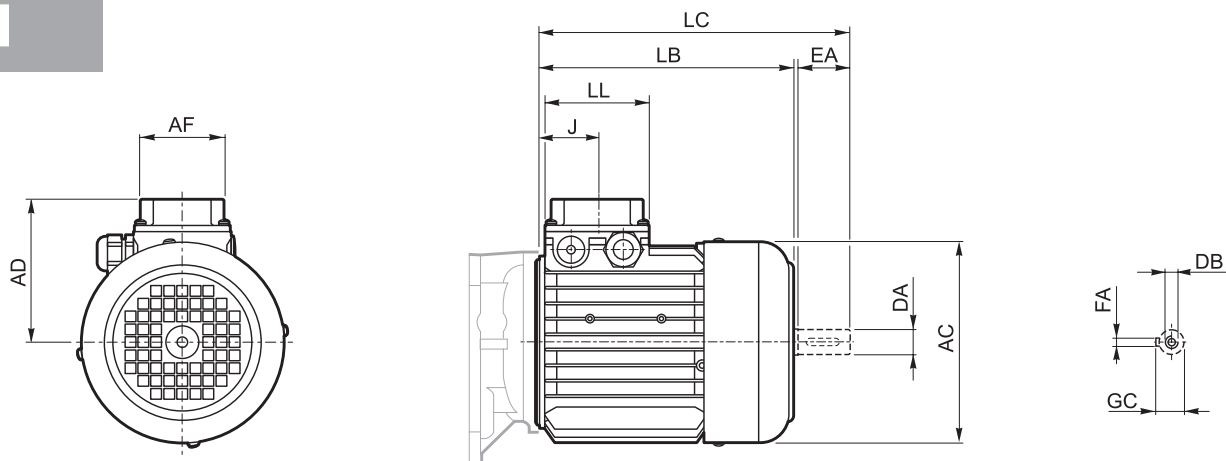
Die Abmessungen des Klemmkastens der Motoren BN ... BA AD, AF, LL und V in Bezug auf die separate Spannungsversorgung (Option SA) stimmen mit den Abmessungen der entsprechenden Motoren BN...FD überein.

REMARQUE :

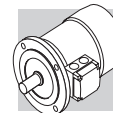
Les dimensions AD, AF, LL et V relatives à la boîte à borne des moteurs BN...BA équipés d'alimentation séparée du frein (option SA) sont identiques à celles des moteurs BN...FD de la même taille.



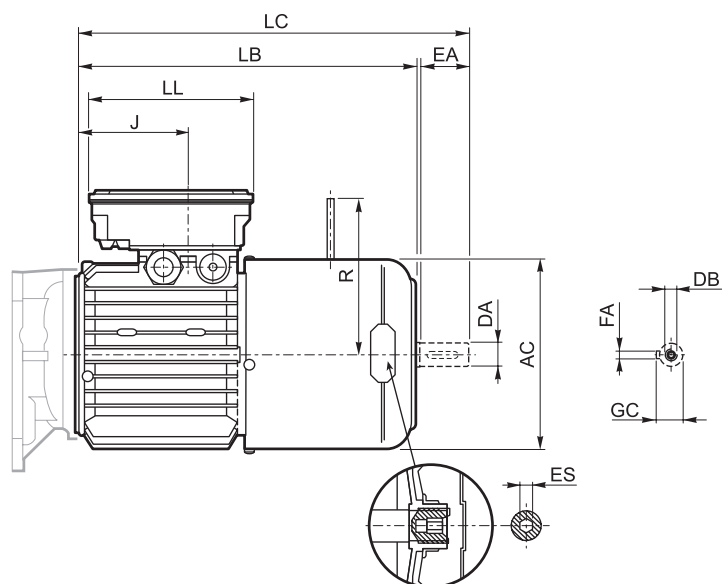
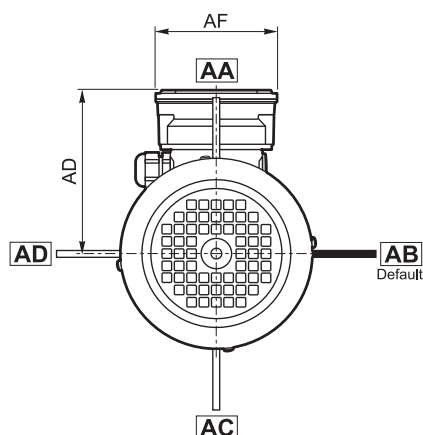
M



	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	14	30	M5	5	16	138	187	219			45	108
M 2 S	19	40	M6	6	21.5	156	202	245			44	119
M 3 S	28	60	M10	8	31	195	230	293	98	98	53.5	142
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	122	96	5
M 1	14	30	M5	5	16	138	248	280			73	135	103	
M 2 S	19	40	M6	6	21.5	156	272	314			88	146	129	
M 3 S	28	60	M10	8	31	195	326	389	110	165	124.5	158	160	6
M 3 L							353	416			124.5	158	160	
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	558	642	187	187	77	245	266	—
M 5 L							602	686					266	

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:

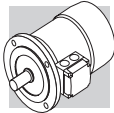
1) Für Bremse FD07, Maß R=226.

Der Sechskant ES ist bei der Option PS nicht vorhanden.

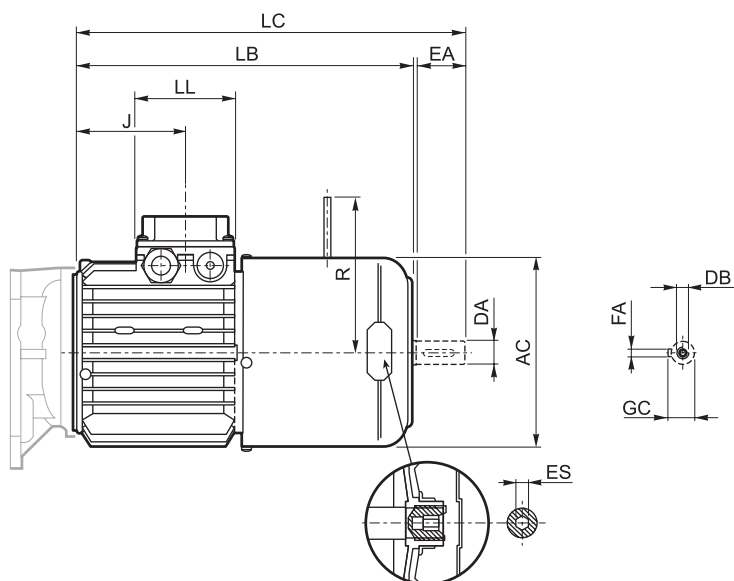
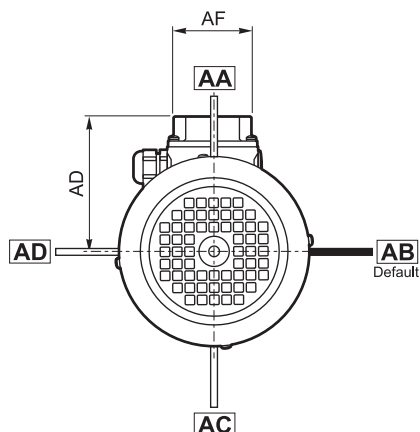
REMARQUE :

1) Pour frein FD07 valeur R=226.

L'hexagone ES n'est pas disponible avec l'option PS.



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	14	30	M5	5	16	138	248	280			73	108	124		
M 2 S	19	40	M6	6	21.5	156	272	314			88	119	134		
M 3 S	28	60	M10	8	31	195	326	389	98	98	124.5	142	160	6	
M 3 L							353	416							
M 4	38	80	M14	10	41	258	470	553	118	118	185.5	193	200 (1)		
M 4 LC							495	578			64.5		217		
M 5 S			M12			310	558	642	187	187	77	245	247		—
M 5 L							602	686							

N.B.:

1) Per freno FA07 quota R=217.

L'esagono ES non è presente con l'opzione PS.

NOTE:

1) For FA07 brake value R=217.

ES hexagon is not supplied with PS option.

HINWEIS:

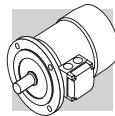
1) Für Bremse FA07, Maß R=217.

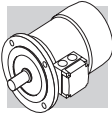
Der Sechskant ES ist bei der Option PS nicht vorhanden.

REMARQUE :

1) Pour frein FA07 valeur R=217.

L'hexagone ES n'est pas disponible avec l'option PS.





R1				
	Descrizione	Description	Beschreibung	Description
96 97	Aggiornato capitolo "Predisposizioni motori".	"Motor availability" section updated.	Kapitel "Baumöglichkeiten" aktualisiert.	Mise à jour du chapitre «Prédispositions moteurs».
98 ... 109	Aggiornato capitolo "Momento d'inerzia".	"Moment of inertia" section updated.	Kapitel "Trägheitsmoment" aktualisiert.	Mise à jour du chapitre «Moment d'inertie».
110 ... 143	Aggiornato capitolo "Dimensioni".	"Dimensions" section updated.	Kapitel "Abmessungen" aktualisiert.	Mise à jour du chapitre «Dimensions».

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