

 **Bonfiglioli**
Riduttori

serie VF-W

Riduttori a vite senza fine





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Revisioni

L'indice di revisione del catalogo è riportato a pag. 266 Al sito www.bonfiglioli.com sono disponibili i cataloghi con le revisioni aggiornate.



INFORMAZIONI GENERALI

1 SIMBOLOGIA E UNITÀ DI MISURA

Simbolo	Unità di misura	Descrizione	Simbolo	Unità di misura	Descrizione
$A_{N 1,2}$	[N]	Carico assiale nominale	$n_{1,2}$	[min ⁻¹]	Velocità
f_s	–	Fattore di servizio	$P_{1,2}$	[kW]	Potenza
f_T	–	Fattore termico	$P_{N 1,2}$	[kW]	Potenza nominale
f_{TP}	–	Fattore di temperatura	$P_{R 1,2}$	[kW]	Potenza richiesta
i	–	Rapporto di trasmissione	$R_{C 1,2}$	[N]	Carico radiale di calcolo
I	–	Rapporto di intermittenza	$R_{N 1,2}$	[N]	Carico radiale nominale
J_C	[Kgm ²]	Momento di inerzia carico	S	–	Fattore di sicurezza
J_M	[Kgm ²]	Momento di inerzia motore	t_a	[°C]	Temperatura ambiente
J_R	[Kgm ²]	Momento di inerzia riduttore	t_f	[min]	Tempo di funzionamento a carico costante
K	–	Fattore di accelerazione delle masse	t_r	[min]	Tempo di riposo
K_r	–	Costante di trasmissione	η_d	–	Rendimento dinamico
$M_{1,2}$	[Nm]	Coppia	η_s	–	Rendimento statico
$M_{c 1,2}$	[Nm]	Coppia di calcolo			
$M_{n 1,2}$	[Nm]	Coppia nominale			
$M_{r 1,2}$	[Nm]	Coppia richiesta			

₁ valore riferito all'albero veloce

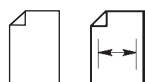
₂ valore riferito all'albero lento



Questo simbolo indica situazioni di grave pericolo che, se trascurate, possono mettere seriamente a rischio la salute e la sicurezza delle persone.



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



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



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.

2 DEFINIZIONI

2.1 COPPIA

Coppia nominale M_{n2} [Nm]

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

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

Coppia richiesta M_{r2} [Nm]

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

Coppia di calcolo M_{c2} [Nm]

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

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

2.2 POTENZA

Potenza nominale in entrata P_{n1} [kW]

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



2.3 RENDIMENTO

Rendimento dinamico [η_d]

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

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

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

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

La temperatura sotto carico è influenzata dal tipo di servizio e dalla temperatura ambiente e può raggiungere valori, misurati sulla carcassa in corrispondenza della vite senza fine, nell'intorno di 80-100 °C, senza che questo pregiudichi la meccanica del riduttore. Se si ha motivo di attendersi temperature di funzionamento nell'estremo superiore, orientativamente 90-100 °C, è opportuno equipaggiare il riduttore di anelli di tenuta in fluoro-elastomero, specificando nell'ordinativo l'opzione **PV**.

Rendimento statico [η_s]

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

2.4 RAPPORTO DI RIDUZIONE [i]

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

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

2.5 MOMENTO D'INERZIA J_r [kgm²]

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



2.6 FATTORE DI SERVIZIO [f_s]

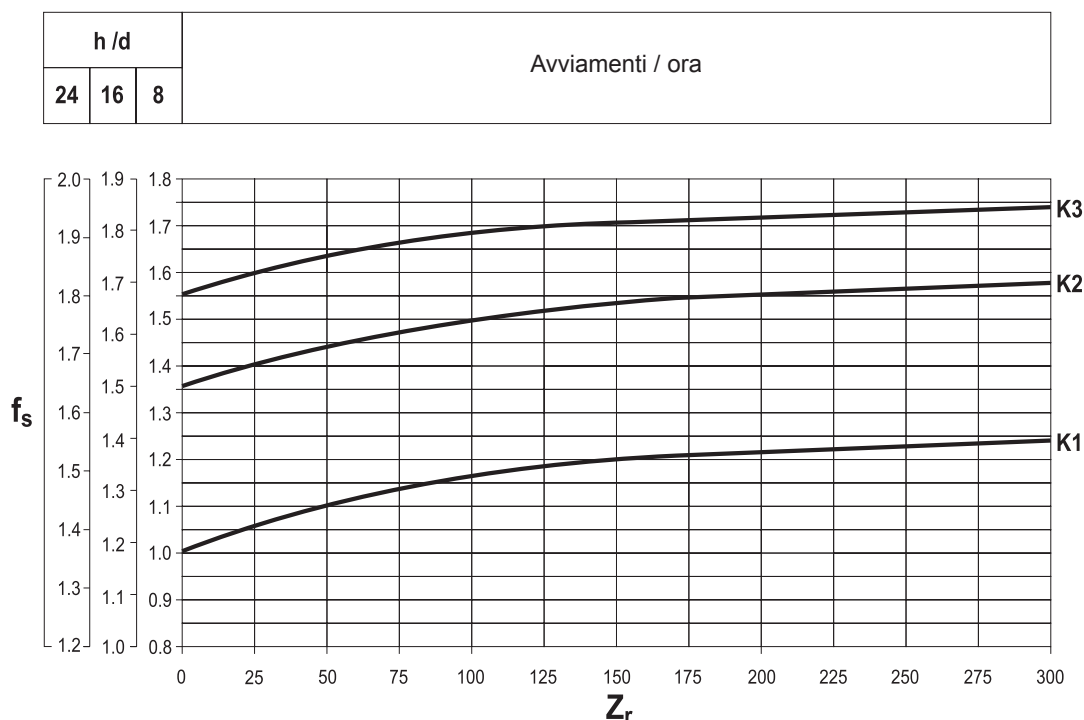
Il fattore di servizio è il parametro che traduce in un valore numerico la gravosità del servizio che il riduttore è chiamato a svolgere, tenendo conto, benché con inevitabile approssimazione, del funzionamento giornaliero, della variabilità del carico e di eventuali sovraccarichi, connessi con la specifica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

Nel grafico seguente riportato il fattore di servizio si ricava, dopo aver selezionato la colonna relativa alle ore di funzionamento 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.



Fattore di accelerazione delle masse, [K]

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

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



$$K = \frac{J_c}{J_m} \rightarrow$$

$J_c =$ Momento d'inerzia delle masse comandate, riferito all'albero motore
 $J_m =$ Momento d'inerzia del motore

$K \leq 0,25$	→ K1	Carico uniforme
$0,25 < K \leq 3$	→ K2	Carico con urti moderati
$3 < K \leq 10$	→ K3	Carico con forti urti
$K > 10$	→	Consultare il Servizio Tecnico di Bonfiglioli

3 MANUTENZIONE

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

Temperatura olio [°C]	Intervallo di lubrificazione [h]	
	Olio minerale	Olio sintetico
< 65	8000	25000
65 - 80	4000	15000
80 - 95	2000	12500

4 SELEZIONE

4.1 Selezione di un motoriduttore

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

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

- Nel capitolo: «Dati tecnici motoriduttori» individuare la tabella relativa ad una potenza motore normalizzata P_n tale che:

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



Se non diversamente indicato, la potenza P_n dei motori riportata a catalogo si riferisce al servizio continuo S1.

Per i motori utilizzati in condizioni diverse da S1, sarà necessario identificare il tipo di servizio previsto con riferimento alle Norme CEI 2-3/IEC 34-1.

In particolare, per i servizi da S2 a S8 e per le grandezze motore uguali o inferiori a 132, è possibile ottenere una maggiorazione della potenza rispetto a quella prevista per il servizio continuo, pertanto la condizione da soddisfare sarà:

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

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

Rapporto di intermittenza

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

t_f =tempo di funzionamento a carico costante

t_r =tempo di riposo

	SERVIZIO						
	S2			S3*			S4 - S8
	Durata del ciclo [min]			Rapporto di intermittenza (I)			
	10	30	60	25%	40%	60%	Interpellare il Servizio Tecnico di Bonfiglioli Riduttori
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.

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 .

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

Il fattore di sicurezza è così definito:

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



Nelle tabelle di selezione motoriduttori gli abbinamenti sono sviluppati con motori a 2, 4 e 6 poli alimentati a 50 Hz.

Per velocità di comando diverse da queste, effettuare la selezione con riferimento ai dati nominali forniti per i riduttori.

4.2 Selezione di un riduttore

a) Determinare il fattore di servizio f_s .

b) Determinare la coppia di calcolo M_{c2} dalla relazione:

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

c) Ricavare il rapporto di trasmissione:

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

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

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

Verificare l'applicabilità del motore selezionato al paragrafo: «Predisposizioni motore».



5 VERIFICHE

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

a) Coppia massima

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

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

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

Coppia di commutazione	
$Mg_2 = 0.5 \times Mg_3$	
Mg_2	Coppia di commutazione alimentando 2 fasi
Mg_3	Coppia di commutazione alimentando 3 fasi

b) Carichi radiali

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

Ricordiamo che tutti i valori indicati nel catalogo si riferiscono a carichi agenti sulla 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 a cui si applica la risultante del carico radiale.

c) Carichi assiali

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

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

d) Avviamenti orari

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

6 INSTALLAZIONE

6.1 Specifiche di carattere Generale

a) Assicurarsi che il fissaggio del riduttore sia stabile onde evitare qualsiasi vibrazione.

Se si prevedono urti, sovraccarichi prolungati o possibili bloccaggi installare giunti idraulici, frizioni, limitatori di coppia, ecc.



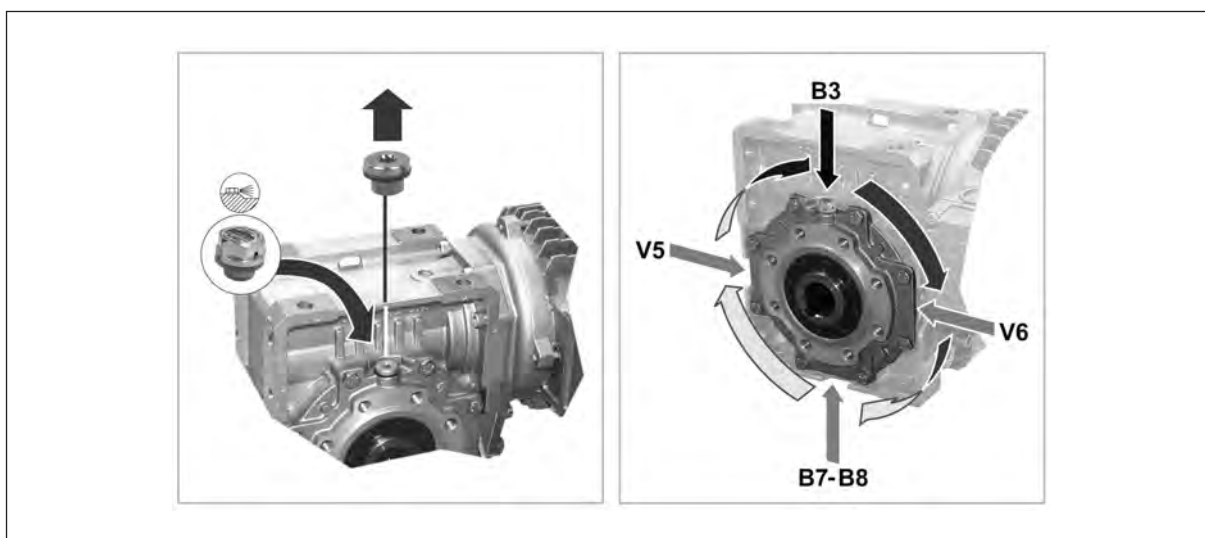
- b) Prima della eventuale verniciatura proteggere le superfici lavorate e il bordo degli anelli di tenuta per evitare che il solvente venga a contatto con la gomma, pregiudicando l'integrità del paraolio stesso.
- c) Gli organi che vanno calettati sugli alberi di uscita del riduttore devono essere lavorati con tolleranza ISO H7 per evitare accoppiamenti troppo bloccati che, in fase di montaggio potrebbero danneggiare irreparabilmente il riduttore stesso. Inoltre, per il montaggio e lo smontaggio di tali organi si consiglia l'uso di adeguati tiranti ed estrattori utilizzando il foro filettato posto in testa alle estremità degli alberi.
- 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.
- 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.
- 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.
- 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.

6.2 Messa in servizio riduttori serie W

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

Prima della messa in servizio dell'apparecchiatura questo deve essere sostituito con il tappo di sfiato che è fornito a corredo.

Vedi figura:



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



7 STOCCAGGIO

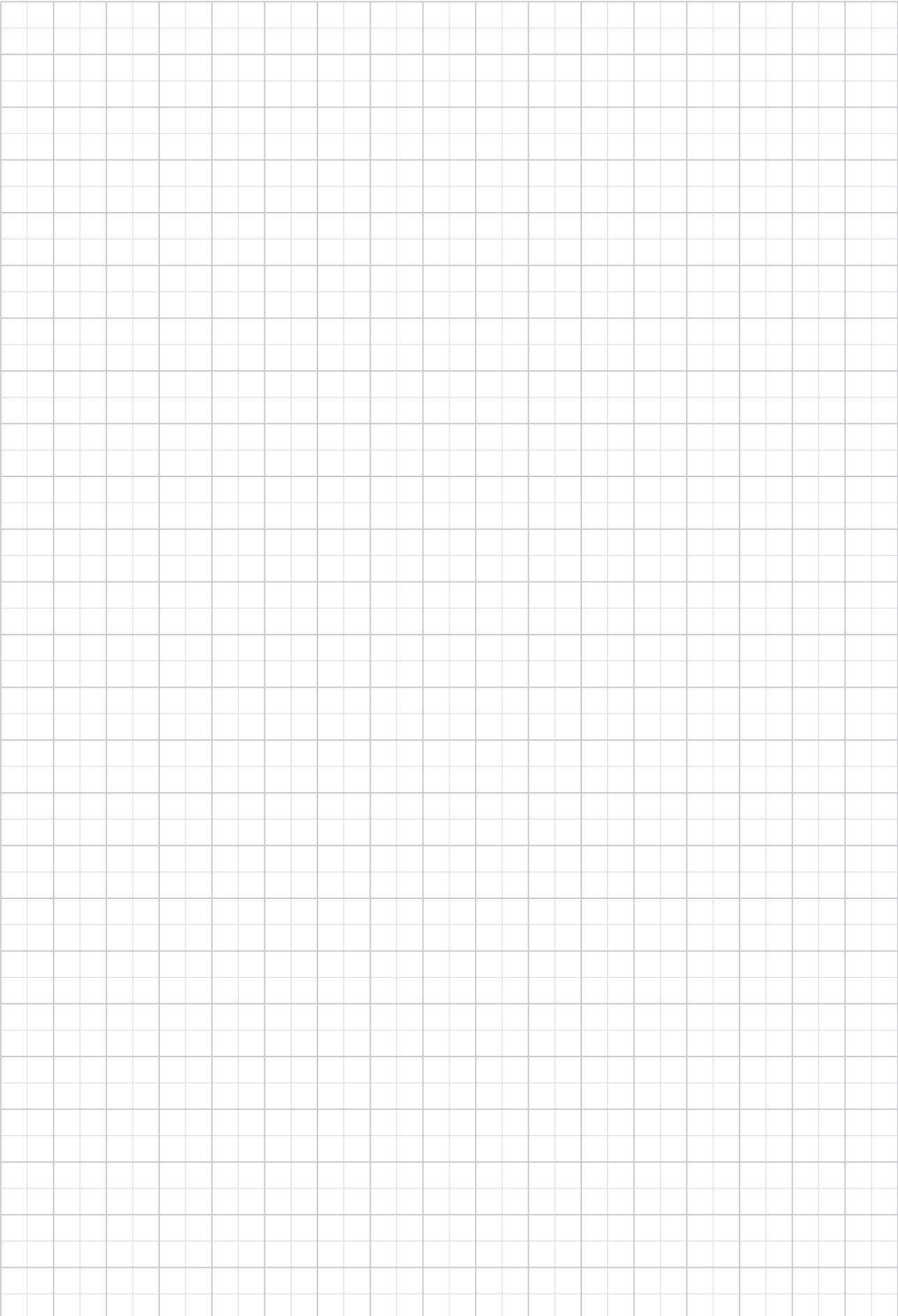
Il corretto stoccaggio dei prodotti richiede l'esecuzione delle seguenti attività:

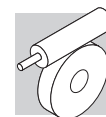
- a) Escludere aree all'aperto, zone esposte alle intemperie o con eccessiva umidità.
 - b) Interporre sempre tra il pavimento ed i prodotti, pianali lignei o di altra natura, atti ad impedire il diretto contatto col suolo.
 - c) Per periodi di stoccaggio e soste prolungate le superfici interessate agli accoppiamenti quali flange, alberi e giunti devono essere protette con idoneo prodotto antiossidante (Mobilarma 248 o equivalente).
- In questo caso i riduttori dovranno essere posizionati con il tappo di sfiato nella posizione più alta e riempiti interamente d'olio.
- Prima della loro messa in servizio nei riduttori dovrà essere ripristinata la corretta quantità, e il tipo di lubrificante.

8 CONDIZIONI DI FORNITURA

I riduttori vengono forniti come Segue:

- a) predisposti per essere installati nella posizione di montaggio come specificato in fase di ordine;
- b) collaudati secondo specifiche Interne;
- c) superfici di accoppiamento non verniciate;
- d) esecuzioni predisposte per l'attacco motore complete di viti e dadi per il fissaggio del motore stesso;
- e) alberi protetti da guaine o cappellotti in plastica per le esigenze del trasporto;
- f) provvisti di golfare di sollevamento (dove previsto).





RIDUTTORI A VITE SENZA FINE

9 CARATTERISTICHE COSTRUTTIVE

9.1 Caratteristiche salienti comuni a tutti i riduttori a vite Bonfiglioli

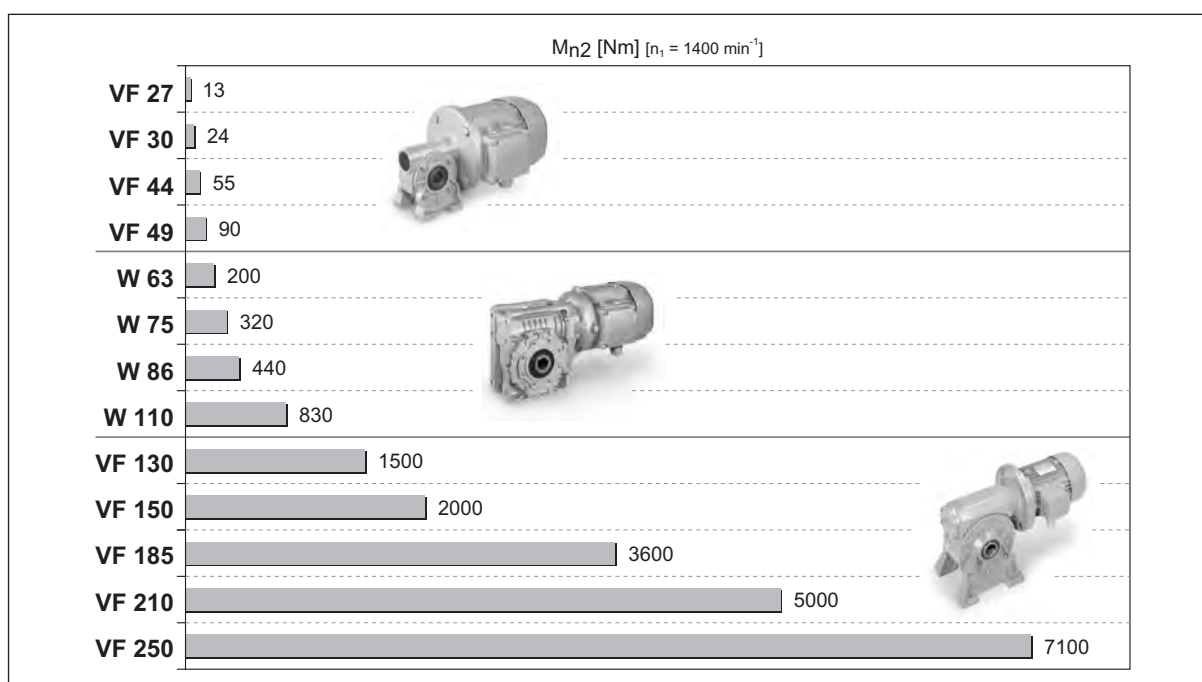
- Albero lento cavo simmetrico per fissaggio bilaterale del riduttore e degli alberi lenti riportati (disponibili come accessorio).
- Ingranaggi a vite senza fine rettificati e lavorazioni meccaniche di precisione consentono elevati rendimenti e grande silenziosità nel funzionamento.
- Numerose opzioni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

9.2 Caratteristiche specifiche dei gruppi tipo VF

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

9.3 Caratteristiche specifiche dei gruppi tipo W

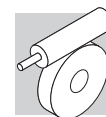
- Cassa monoblocco in Alluminio, rigida e precisa.
- Grande versatilità e flessibilità nell'applicazione, data dalla forma cubica e dalle numerose superfici lavorate e disponibili per il fissaggio del riduttore, o di organi accessori.
- Configurazione motoriduttore integrale particolarmente compatta, leggera ed economica.
- Anello di tenuta su albero veloce dei gruppi W63, W75 e W86 collocato in posizione interna e con mescola in fluoro-elastomero per migliorate condizioni di funzionamento e durata.





10 FORME COSTRUTTIVE

VF_		W_	
	<p>N VF 27 ... VF 250</p> <p>Piedi e vite orizzontale in basso</p>		<p>U W 63 ... W 110</p> <p>Cassa montaggio universale</p>
	<p>A VF 27 ... VF 250</p> <p>Piedi e vite orizzontale in alto</p>		
	<p>V VF 27 ... VF 250</p> <p>Piedi e vite verticale</p>		
<p>F1 F2 FA1 FA2</p>	<p>F VF 27 ... VF 185</p> <p>Flangia standard</p> <p>FA VF 44 ... VF 49</p> <p>Flangia alta</p>	<p>UF1 UF2</p> <p>UF W 63 ... W 110</p> <p>Flangia di montaggio standard</p>	
<p>FC1 FC2 FR1 FR2</p>	<p>FC VF 130 ... VF 185</p> <p>Flangia corta</p> <p>FR VF 130 ... VF 185</p> <p>Flangia corta e cuscinetti rinforzati</p>		
<p>P1 P2 (VF 30...VF 250) (VF 130...VF 185)</p>	<p>P VF 30 ... VF 250</p> <p>Flangia pendolare</p> <p>P1 = P2 VF 30 ... VF 49 VF 210, VF 250</p>	<p>UFC1 UFC2 UFCR1 UFCR2</p> <p>UFC W 63 ... W 110</p> <p>Flangia di lunghezza ridotta</p>	
	<p>U VF 30 ... VF 49</p> <p>Piedi integrati</p>	<p>UFCR W 75</p> <p>Flangia ridotta in lunghezza e diametro</p>	



11 ESECUZIONE DI MONTAGGIO

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

	CW1	CCW1	CW2	CCW2	CW3	CCW3	CW4	CCW4
U								
UF_ UFC_ UFR1_								
N								
A								
V								
F1 FA1 FC1 FR1								
F2 FA2 FC2 FR2								
P1								
P2								

Coperchio per fissaggio pendolare

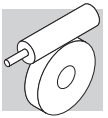


Nella configurazione HS (albero veloce cilindrico) è possibile ottenere tutte le esecuzioni di montaggio raffigurate.

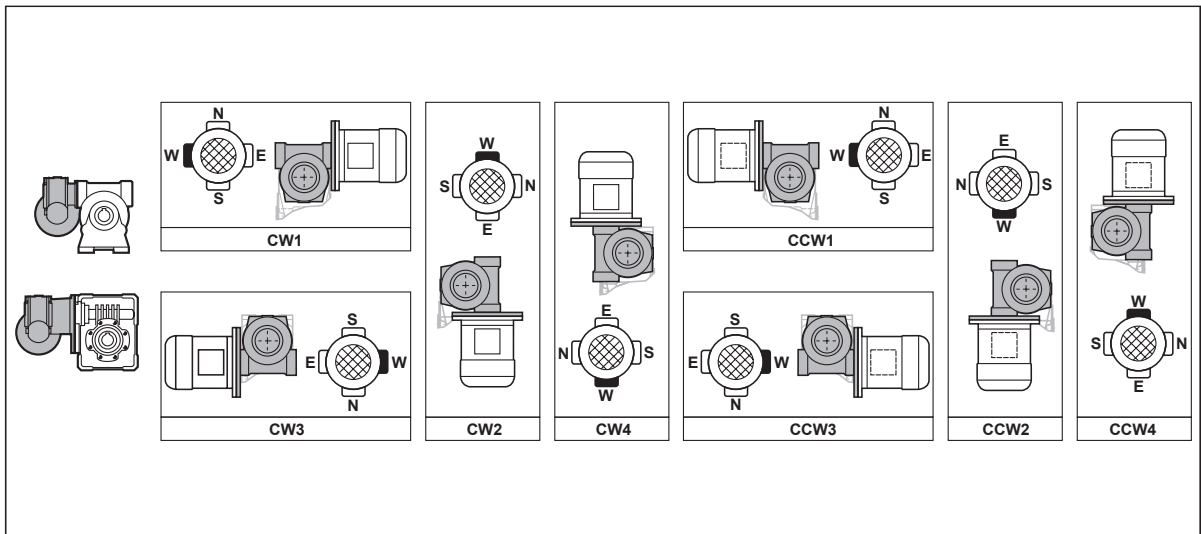
Nella configurazione P (IEC) determinate esecuzioni di montaggio possono essere ottenute solo utilizzando flange IEC (B5 o B14) di grandezza uguale o inferiore a quelle riportate nella tabella seguente.

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

Consultare il ns. servizio Tecnico Commerciale



11.1 Orientamento morsetti





12 DESIGNAZIONE

RIDUTTORE

W 63 L1 UF1 — 24 S2 — B3

OPZIONI


20

ESECUZ. DI MONTAGGIO

VF/VF, VF/W, W/VF	CW (1, 2, 3, 4) CCW (1, 2, 3, 4)
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POSIZIONE DI MONTAGGIO

VF 27...VF 49 VFR 44, VFR 49	B3
W, WR VF 130...VF 250 VFR 130...VFR 250	B3 (default), B6, B7, B8, V5, V6
VF/VF VF/W W/VF	 B3 (default), B6, B7, B8, V5, V6






















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INTERFACCIA MOTORE IEC

B5	(VF 30...VF 250, VFR 49...VFR 250, W, WR)
B14	(VF 30...VF 49, W)

94
95

DESIGNAZIONE INGRESSO

	VF	VFR	W	WR	VF/VF	VF/W	W/VF
P(IEC)	 P27 (VF 27 only), P56...P225	 P63, P80...P160	 P71...P132	 P63...P112	 P56, P63, P90...P132	 P56...P80	 P71...P112
S_		 S44 (VFR 44 only)	 S1...S3				 S1...S3
HS							

94
95

95

169
172

RAPPORTO DI RIDUZIONE

DIAMETRO ALBERO LENTO

W 75 VF/W 44/75	D30 (default), D28 (Su richiesta)
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FORMA COSTRUTTIVA

14

LIMITATORE DI COPPIA

VF, VFR W, WR	L1, L2	VF/VF	LF
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GRANDEZZA RIDUTTORE

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

TIPO RIDUTTORE

VF, W	Riduttore a vite senza fine
VFR, WR	Riduttore con precoppia elicoidale
VF/VF, VF/W, W/VF	Riduttore combinato

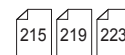


MOTORE

FRENO

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

OPZIONI

ALIMENTAZIONE
FRENOTIPO RADDRIZZATORE
AC/DC
NB, SB, NBR, SBRLEVA DI SBLOCCO FRENO
R, RM

COPPIA FRENANTE

TIPO FRENO
FD, AFD (freno c.c.)
FA (freno c.a.)POSIZIONE MORSETTIERA
W (default), **N, E, S**FORMA COSTRUTTIVA
— (motore integrato)
B5, B14 (motore IEC)CLASSE ISOLAMENTO
CL F standard
CL H optionGRADO DI PROTEZIONE
IP55 standard (IP54 - motore autofrenante)

TENSIONE - FREQUENZA

NUMERO DI POLI
2, 4, 6, 2/4, 2/6, 2/8, 2/12, 4/6, 4/8GRANDEZZA MOTORE
1SC ... 3LC (motore integrato)
56A ... 225M (motore IEC) BN 27, BN 44 (motori speciali)TIPO MOTORE
M = trifase integrato
BN = trifase IEC



13 OPZIONI RIDUTTORE

SO

I riduttori tipo VF 30 ... VF 49, W 63 ... W 86, solitamente riempiti in fabbrica di lubrificante, sono in questo caso forniti privi di olio.

LO

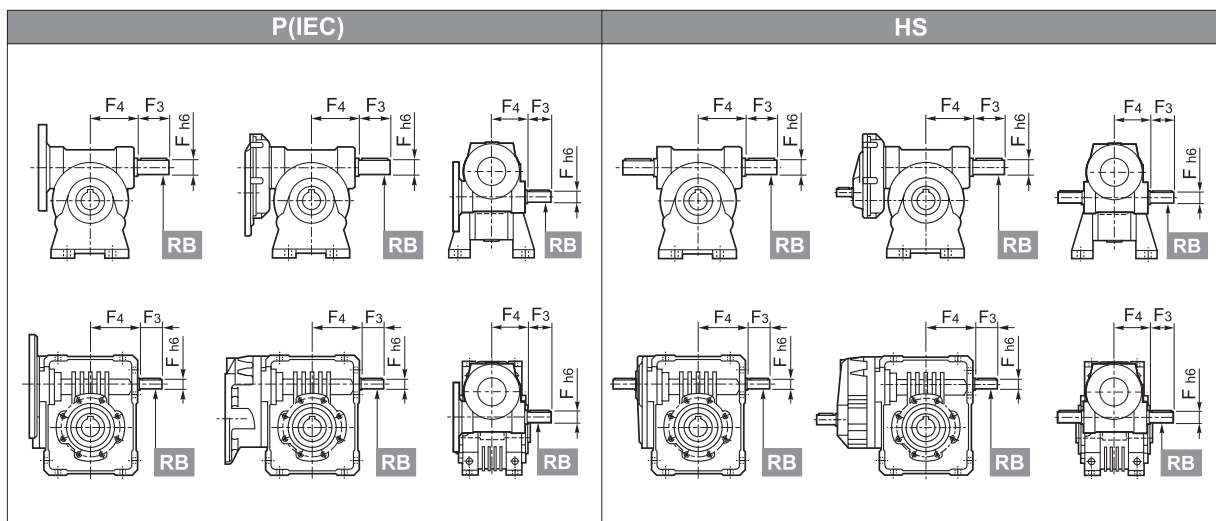
I riduttori delle grandezze da VF 130 a VF 250 e W 110, solitamente sprovvisti di lubrificante, sono richiesti con olio sintetico del tipo correntemente utilizzato da BONFIGLIOLI RIDUTTORI e riempiti in accordo alla posizione di montaggio specificata.

L'applicabilità dell'opzione LO è descritta nella tabella seguente.

	LO					
	Posizione di montaggio					
	B3	B6	B7	B8	V5	V6
W 110 U-UF-UFC	X	X	X	X	●	●
VF 130 A-N-P-F-FC	X	X	X	X	●	●
VF 130 V	●	X	X	●	X	X
VF 130 FR	X	●	●	X	●	●
VF 150 A-N-P-F-FC	X	X	X	X	●	●
VF 150 V	●	X	X	●	X	X
VF 150 FR	X	●	●	X	●	●
VF 185 A-N-P-F-FC	X	X	X	X	●	●
VF 185 V	●	X	X	●	X	X
VF 185 FR	X	●	●	X	●	●
VF 210 A-N-P	X	●	●	X	●	●
VF 210 V	●	●	●	●	X	X
VF 250 A-N-P	X	●	●	X	●	●
VF 250 V	●	●	●	●	X	X

RB

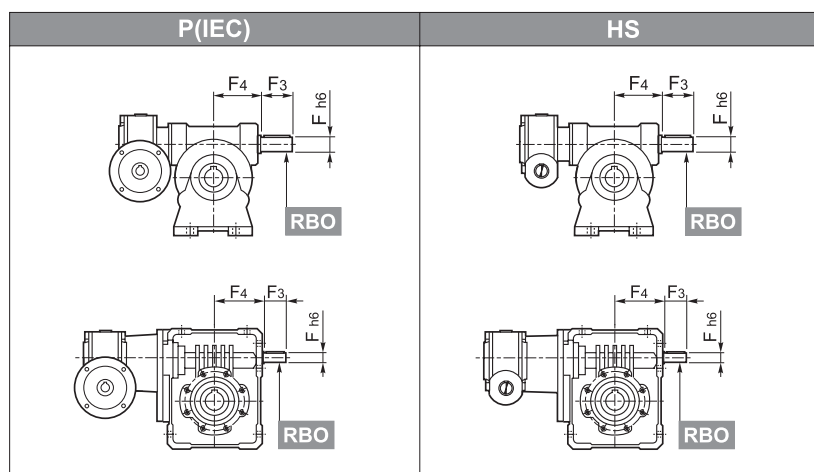
Albero veloce sporgente sul lato opposto comando (escluso VF 27).





RBO

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



Dimensioni albero sporgente (opzioni RB e RBO)							
		F	F1	F2	F3	F4	V
	VF	30	9	10.2	3	20	—
	VFR	44	11	12.5	4	30	—
	VF/VF	49	16	18	5	40	M6
	W	63	18	20.5	6	40	M6
	WR	75	19	21.5	6	40	M6
	VF/W	86	25	28	8	50	M8
		110	25	28	8	60	M8
	VF	130	30	33	8	60	M8
	VFR	150	35	38	10	65	M8
	W/VF	185	40	43	12	70	M8
	210	48	51.5	14	82	M16x40	
	250	55	59	16	82	M16x40	

Per VF 210 e VF 250, nelle forme costruttive **A** e **P**, normalmente viene montata la ventola di raffreddamento; con l'opzione **RB** non è possibile applicarla.

VV

Anello di tenuta in fluoro-elastomero sull'albero veloce. Disponibile per W110 e per gruppi serie VF, ad esclusione di VF 30 con opzione RB e VF 30_HS.

PV

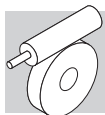
Fornitura di anelli di tenuta in fluoro-elastomero sia sull'albero lento sia sull'albero veloce, ad esclusione di VF 30 con opzione RB, e VF 30_HS.

KA

Kit piedi W 63...W 110 per intercambiabilità con gruppi equivalenti VF_A.

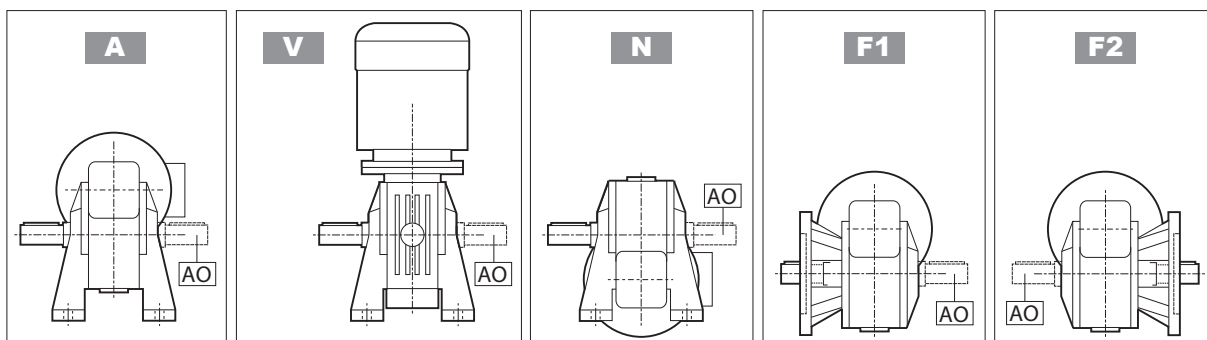
KV

Kit piedi W 63...W 110 per intercambiabilità con gruppi equivalenti VF_V (escluso W con opzione RB).



AO

Albero su lato opposto a standard (VF 27).



PROTEZIONE SUPERFICIALE

I riduttori, che laddove non viene richiesta una classe di protezione specifica, nelle zone verniciate (ferrose) rispettano come requisito minimo la classe di protezione C2 (UNI EN ISO 12944-2), sono forniti con protezione superficiale **C3** e **C4** per una migliore resistenza alla corrosione atmosferica, ottenute mediante verniciatura del gruppo completo.

PROTEZIONE SUPERFICIALE	Ambienti tipici	Temperatura superficiale max.	Classe di corrosività secondo UNI EN ISO 12944-2
C3	Ambienti urbani ed industriali, con umidità relativa dell'aria max. 100% (inquinamento ambientale medio)	120°C	C3
C4	Aree industriali, zone costiere, impianti chimici, con umidità relativa dell'aria max. 100% (inquinamento ambientale alto)	120°C	C4

I riduttori previsti con le protezioni opzionali **C3** e **C4** sono disponibili in diverse tinte.

Se non specificata nessuna tinta (vedere opzione "VERNICIATURA") la fornitura viene eseguita con la tinta RAL7042.

A richiesta sono fornibili riduttori per classe di corrosività **C5** secondo UNI EN ISO 12944-2, contattando il ns. Servizio tecnico-Commerciale.

VERNICIATURA

I riduttori previsti con le protezioni opzionali C3 e C4 sono disponibili in diverse tinte, secondo la tabella seguente.

VERNICIATURA	Colore	Catalogazione RAL
RAL7042*	Grigio traffico A	7042
RAL5010	Blu genziana	5010
RAL9005	Nero intenso	9005
RAL9006	Alluminio brillante	9006
RAL9010	Bianco puro	9010

* Colore di fornitura standard se non specificato diversamente



NOTA - L'opzione "VERNICIATURA" è configurabile esclusivamente in abbinamento con l'opzione "PROTEZIONE SUPERFICIALE".

PROVE DOCUMENTALI

AC - Attestato di conformità

Documento il cui rilascio attesta la conformità del prodotto all'ordinativo e la costruzione dello stesso in conformità alle procedure standard di processo e di controllo previste dal sistema di Qualità Bonfiglioli Riduttori.

CC - Certificato di collaudo

La specifica comporta la conduzione di verifiche di conformità all'ordine, controlli visivi generali e verifiche strumentali delle dimensioni di accoppiamento. Sono inoltre condotti controlli generali di funzionamento a vuoto e verifiche della funzionalità delle guarnizioni di tenuta in modalità statica e in funzionamento. Il collaudo si applica ad un campione statistico del lotto di spedizione.

Opzioni motori

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

14 LUBRIFICAZIONE

14.1 Lubrificazione riduttori W e VF

I gruppi VF 27 ... VF 49, W 63 ... W 86 sono normalmente consegnati con carica di lubrificante del tipo "long life" dalla fabbrica, o dalla rete di vendita ufficiale. Su richiesta gli stessi riduttori possono essere forniti privi di lubrificante, specificando per questi l'opzione **SO**. L'applicabilità dell'opzione è descritta nel capitolo "OPZIONI RIDUTTORE".

I gruppi VF 130 ... VF 250 e W 110 sono normalmente forniti privi di lubrificante e sarà cura dell'utilizzatore riempirli di olio prima della messa in servizio.

Per questi stessi gruppi è disponibile l'opzione **LO** che, qualora specificata in fase di ordinativo, garantisce il primo riempimento in fabbrica con lubrificante sintetico, in quantità dipendente dalla posizione di montaggio. L'applicabilità dell'opzione è descritta nel capitolo "OPZIONI RIDUTTORE".

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

Per le tavole di riferimento della collocazione dei tappi di servizio e delle quantità di lubrificante, riferirsi al Manuale Uso e Manutenzione (disponibile su www.bonfiglioli.com).

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.



14.2 Tipo di lubrificante

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

Per la tabella dei lubrificanti raccomandati/consentiti riferirsi al Manuale Uso e Manutenzione (disponibile su www.bonfiglioli.com).

			Posizione di montaggio	
			B3 - B6 - B7 - B8 - V5	V6
	Precoppia elicoidale	WR 63...WR 86	OMALA S4 WE 320	GADUS S5 V142W 00
		VFR 44...VFR 250 WR 110	OMALA S4 WE 320	
	Riduttori a vite senza fine	W 63...W 110 VF 44...VF 250	OMALA S4 WE 320	
	Riduttore con limitatore di coppia	W 63...W 110 VF 44...VF 49	OMALA S4 WE 460	

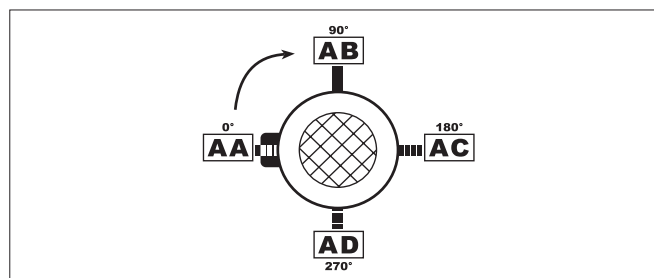
15 POSIZIONI DI MONTAGGIO E ORIENTAMENTO MORSETTIERA

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

Le posizioni morsettieria illustrate non sono valide per VFR 44. Fare riferimento alle pag. 19 e alle pag. 114-115 per la designazione e l'identificazione della forma costruttiva.

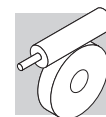
Posizione angolare leva di sblocco freno.

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



Nelle pagine seguenti sono descritte le posizioni di montaggio dei riduttori tipo VF e W.

Per i riduttori combinati tipo VF/VF, VF/W e W/VF le posizioni di montaggio si riferiscono al secondo riduttore (lato macchina), per il primo riduttore (lato ingresso) fare riferimento al capitolo "Esecuzione di montaggio".



VF 27 _ ... VF 49 _ VFR 44 _ , VFR 49 _

				_HS	_S - _P (IEC)		
A	B3	B7	V5				← VF
	B6	B8	V6				← VFR
N	B3	B7	V5				← VF
	B6	B8	V6				← VFR
V	B3	B7	V5				← VF
	B6	B8	V6				← VFR
P	B3	B7	V5				← VF
	B6	B8	V6				← VFR
F	B3	B7	V5				← VF
	B6	B8	V6				← VFR
U	B3	B7	V5				← VF
	B6	B8	V6				← VFR

Posizione di montaggio base.

I riduttori sono targati esclusivamente nella posizione di montaggio base (B3) ma possono essere installati anche nelle posizioni derivate (B6, B7, B8, V5, V6). Dopo l'installazione la posizione di montaggio non può essere variata.



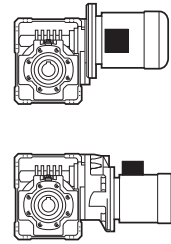
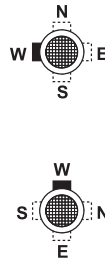
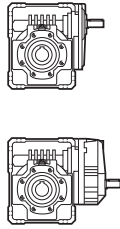
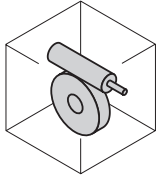
W 63 U ... W 110 U

WR 63 U ... WR 110 U

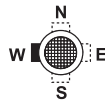
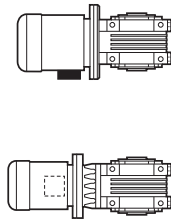
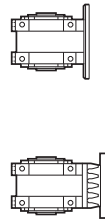
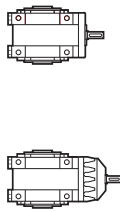
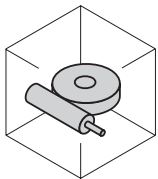
_HS

_S - _P (IEC)

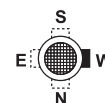
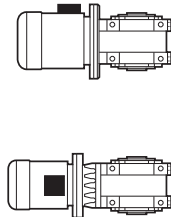
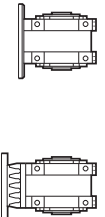
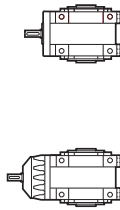
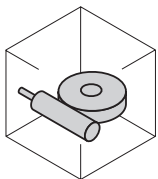
B3



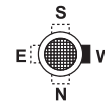
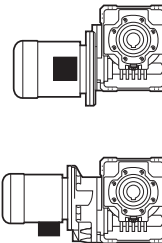
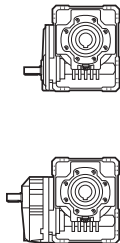
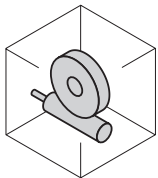
B6



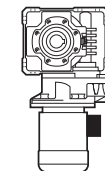
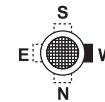
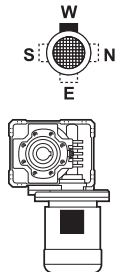
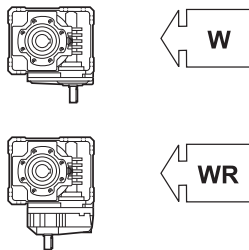
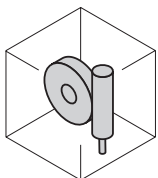
B7



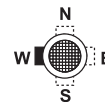
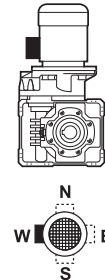
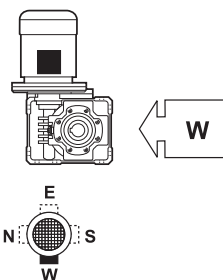
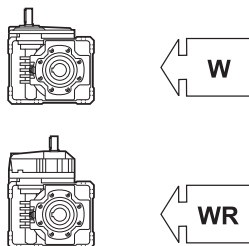
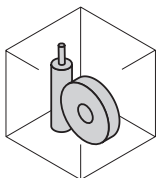
B8

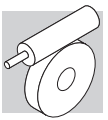


V5



V6



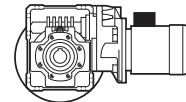
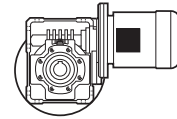
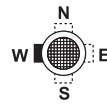
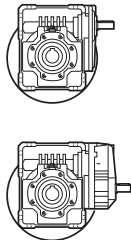
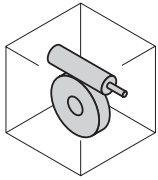


W 63 UF/UFC ... W 110 UF/UFC WR 63 UF/UFC ... WR 110 UF/UFC

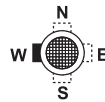
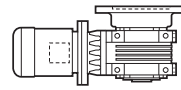
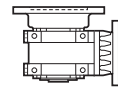
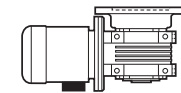
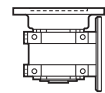
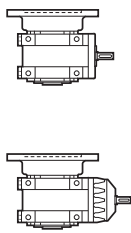
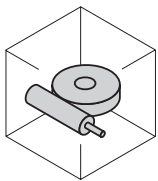
_HS

_S - _P (IEC)

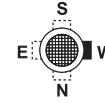
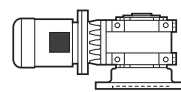
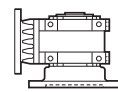
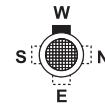
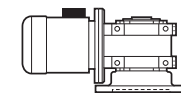
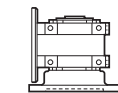
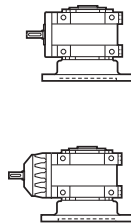
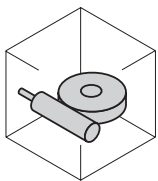
B3



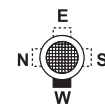
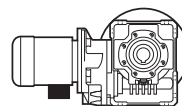
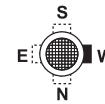
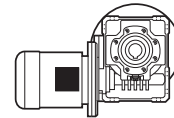
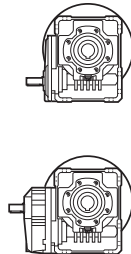
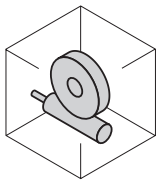
B6



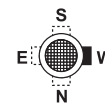
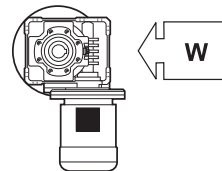
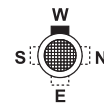
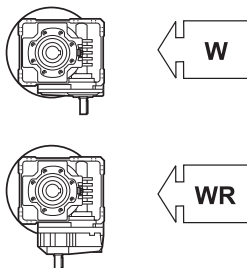
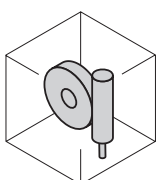
B7



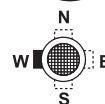
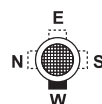
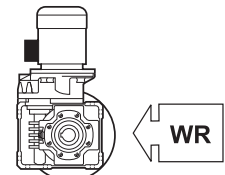
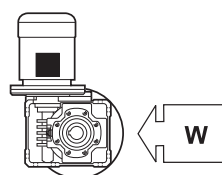
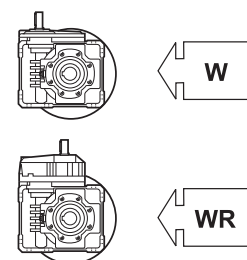
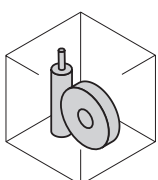
B8



V5



V6





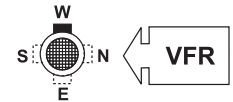
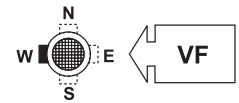
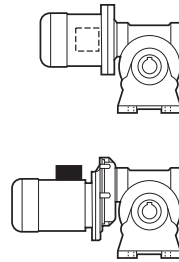
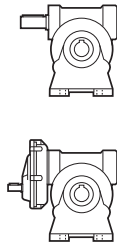
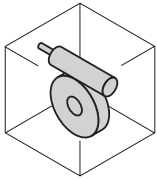
VF 130 A ... VF 250 A

VFR 130 A ... VFR 250 A

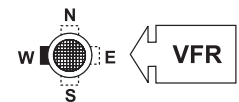
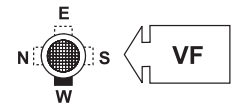
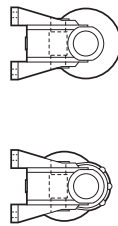
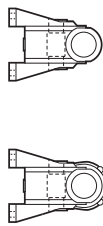
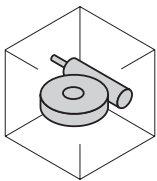
_HS

_P (IEC)

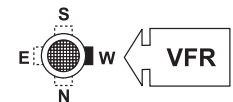
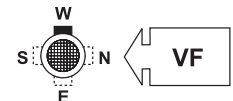
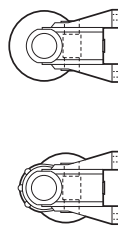
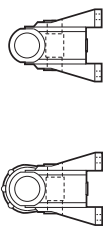
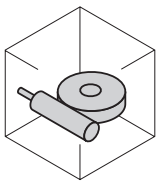
B3



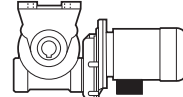
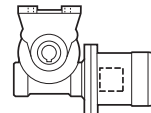
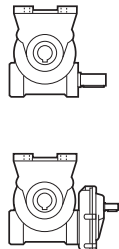
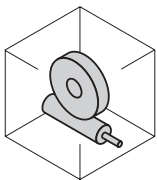
B6



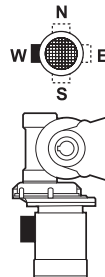
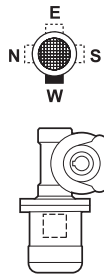
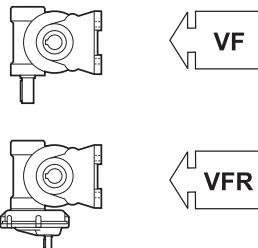
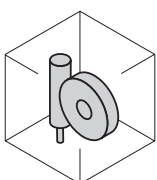
B7



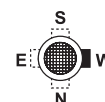
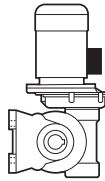
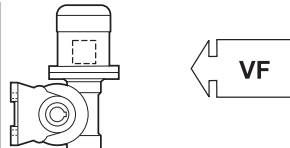
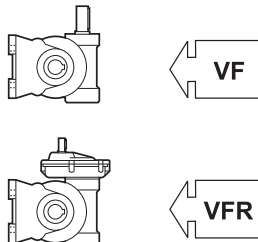
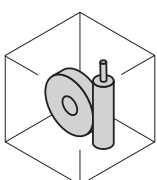
B8

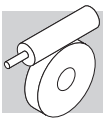


V5



V6





VF 130 N ... VF 250 N VFR 130 N ... VFR 250 N

	_HS		_P (IEC)	
B3				
B6				
B7				
B8				
V5				
V6				



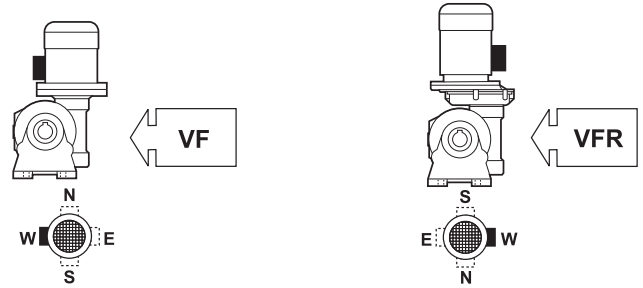
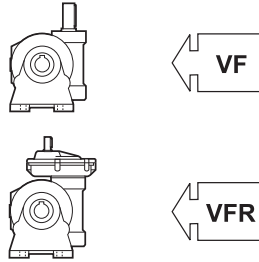
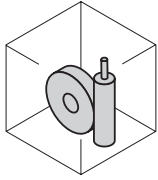
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VFR 130 V ... VFR 250 V

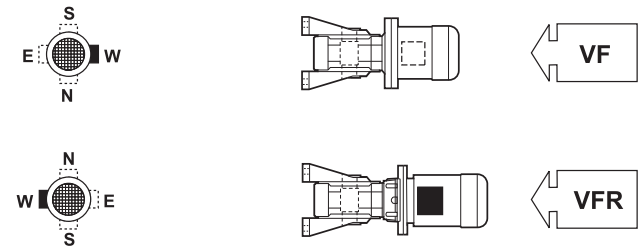
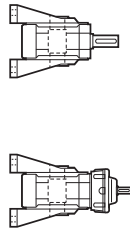
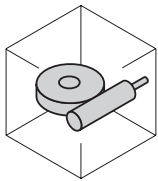
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_P (IEC)

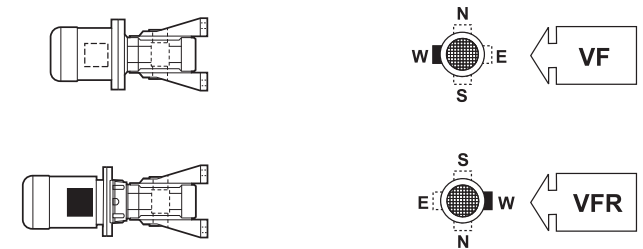
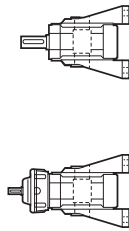
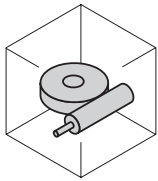
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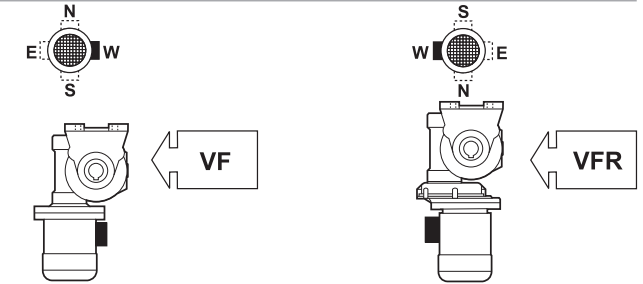
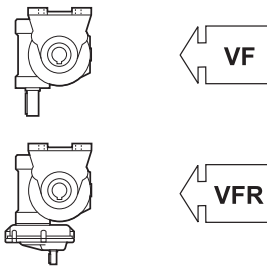
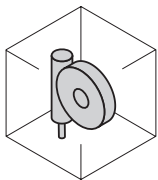
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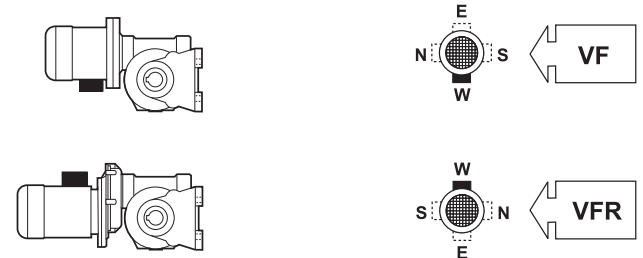
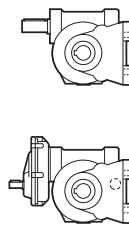
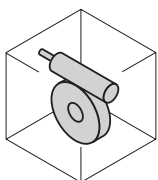
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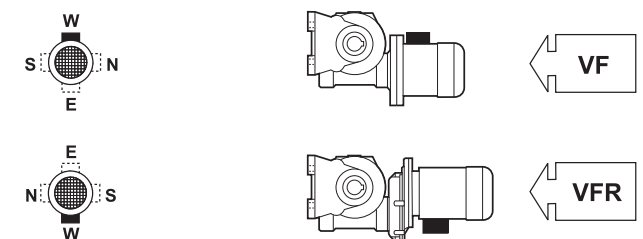
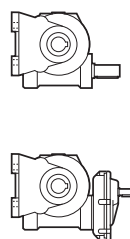
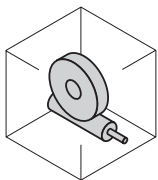
B8



V5



V6



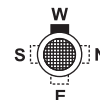
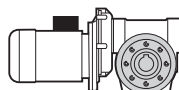
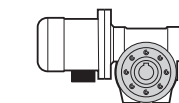
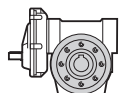
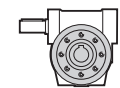
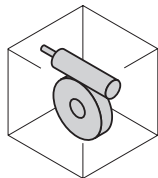


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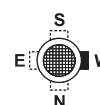
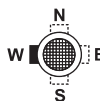
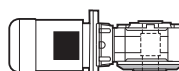
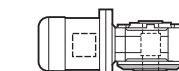
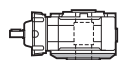
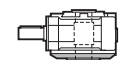
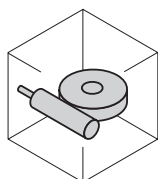
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_P (IEC)

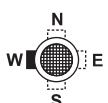
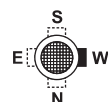
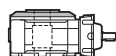
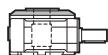
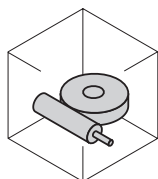
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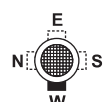
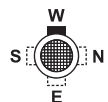
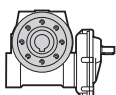
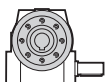
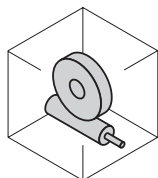
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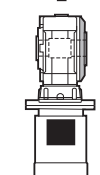
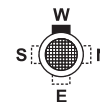
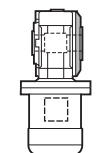
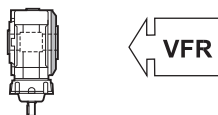
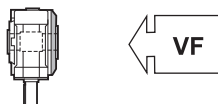
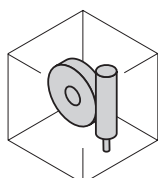
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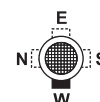
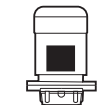
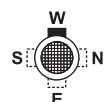
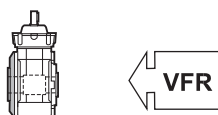
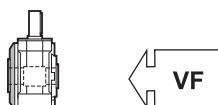
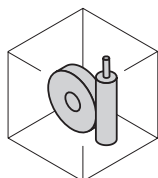
B8



V5



V6





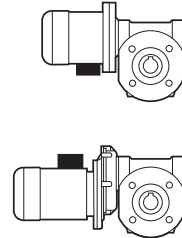
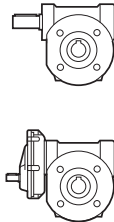
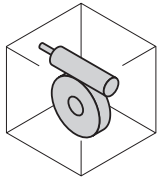
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VFR 130 F ... VFR 250 F

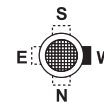
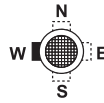
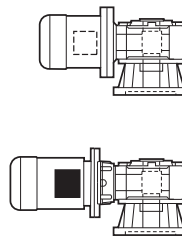
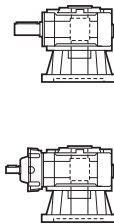
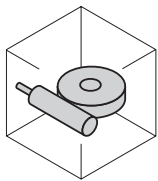
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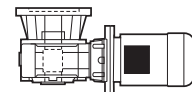
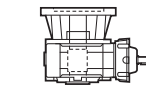
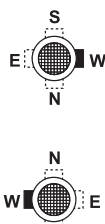
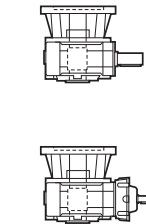
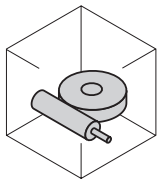
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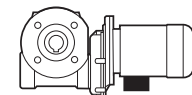
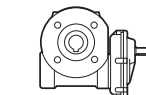
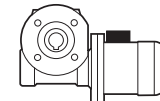
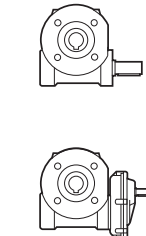
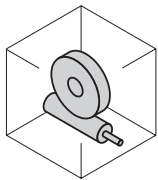
B6



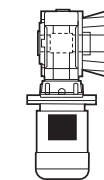
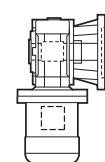
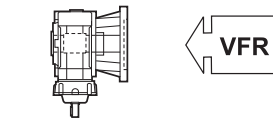
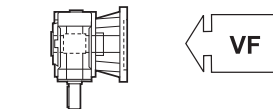
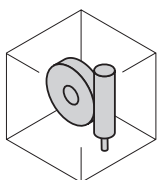
B7



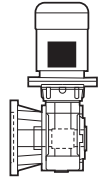
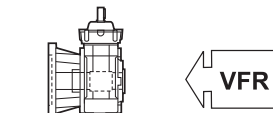
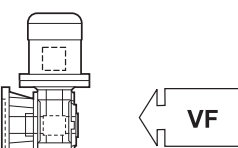
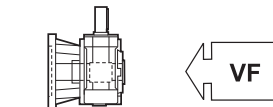
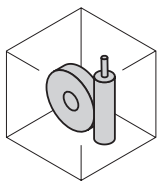
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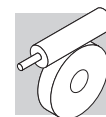


V5



V6





16 CARICHI RADIALI

16.1 Forza risultante sull'albero

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.

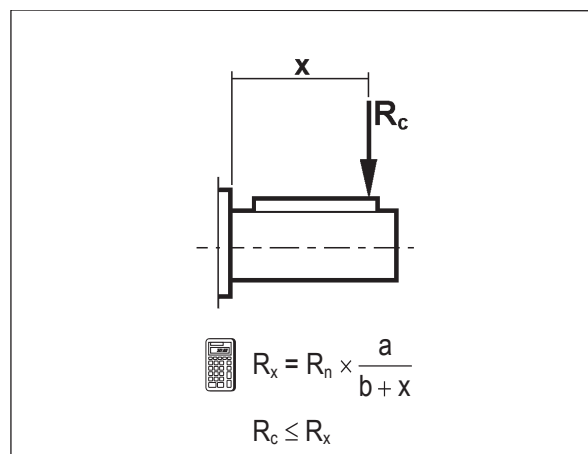
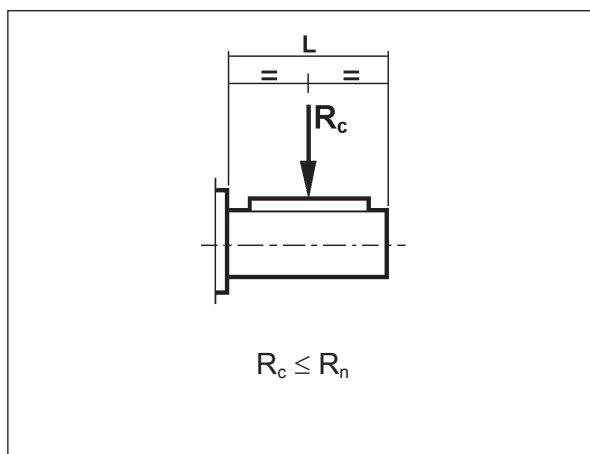
Il procedimento sotto descritto si applica indifferentemente all'albero veloce o all'albero lento avendo l'avvertenza di utilizzare le costanti relative all'albero interessato dal calcolo.

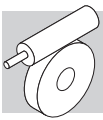
Il carico generato da una trasmissione esterna può essere calcolato, con buona approssimazione, tramite la formula seguente:

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

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

16.2 Verifica sopportazione radiale





16.3 Costanti del riduttore

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

17 CARICHI ASSIALI

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:

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

I valori di carico assiale ammissibile così calcolati si riferiscono al caso di forze assiali agenti contemporaneamente ai carichi radiali nominali.

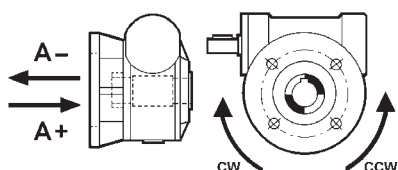
Nel solo caso in cui il valore del carico radiale agente sull'albero del riduttore sia nullo, si può considerare il carico assiale ammissibile $[A_n]$ pari al 50% del valore di carico radiale ammissibile $[R_n]$ sullo stesso albero.

In presenza di carichi assiali eccedenti il valore ammissibile, o di forze assiali fortemente prevalenti sui carichi radiali, è consigliabile contattare il Servizio Tecnico di Bonfiglioli Riduttori per una verifica puntuale.



17.1 Carichi assiali massimi ammissibili nella forma costruttiva FR

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

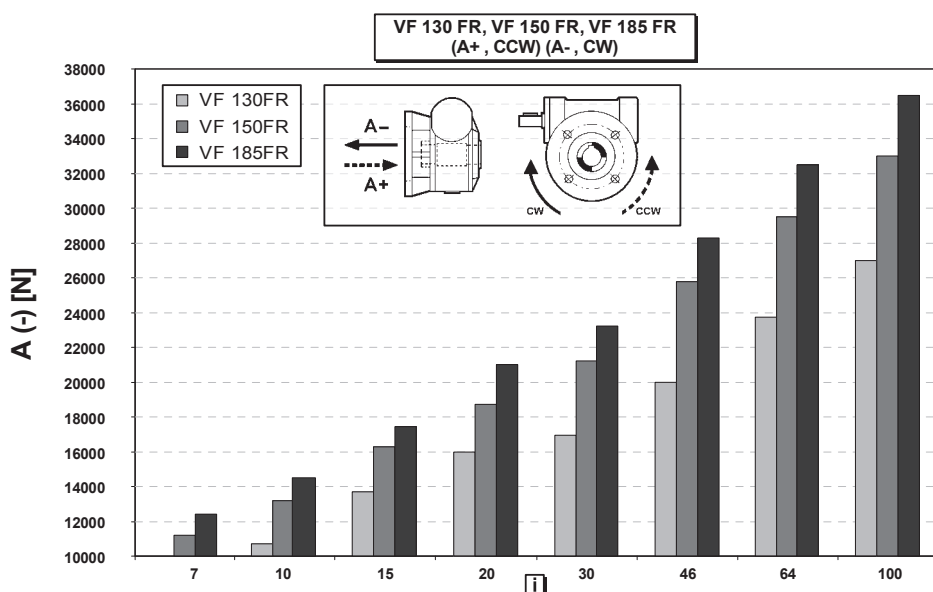
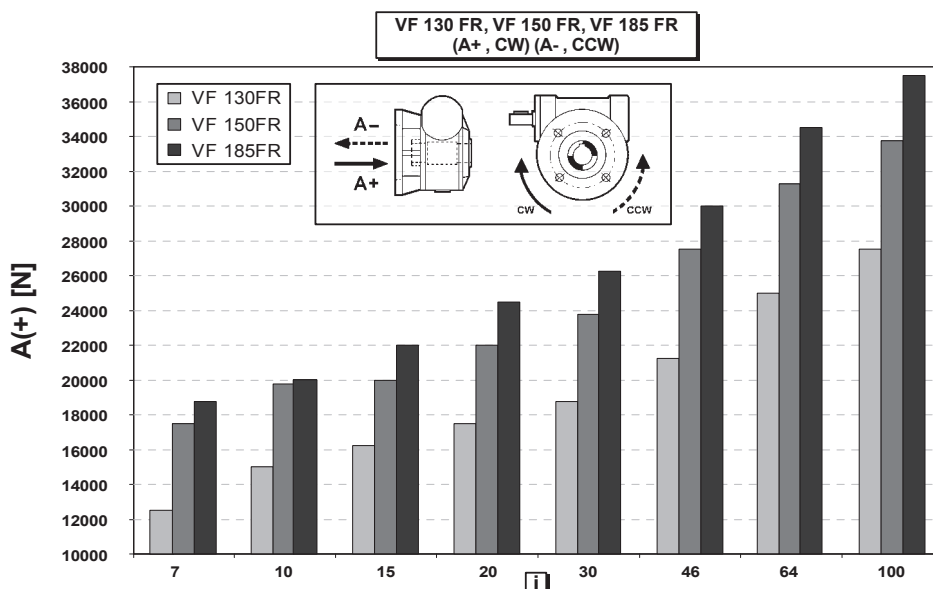


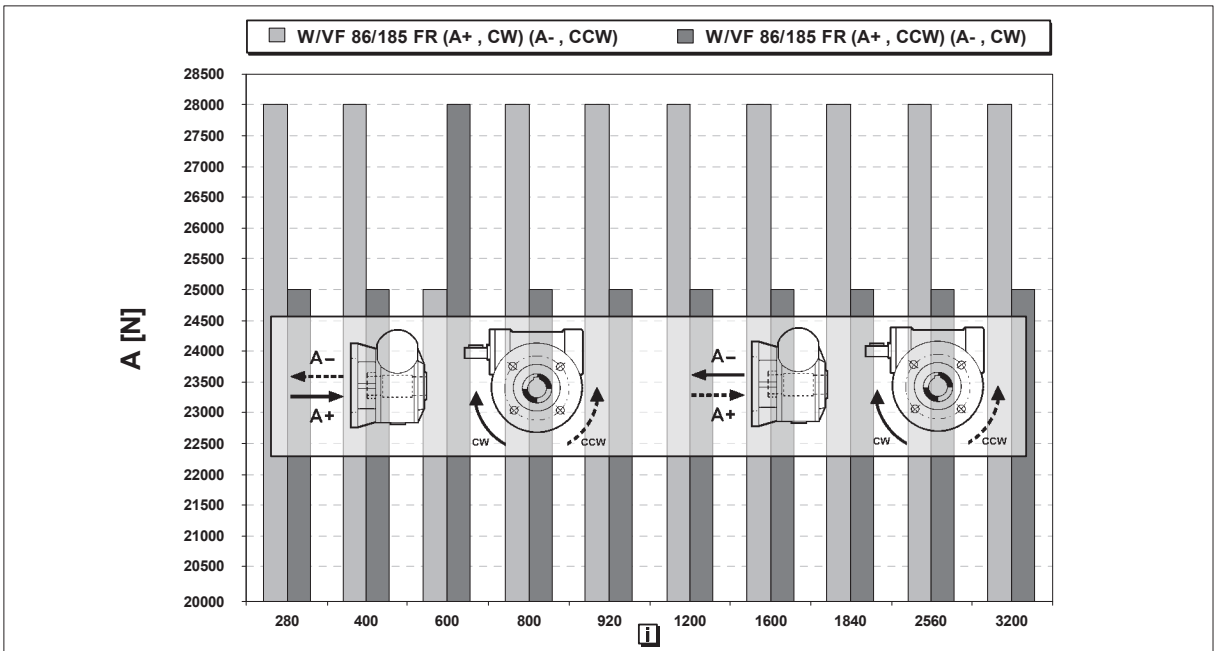
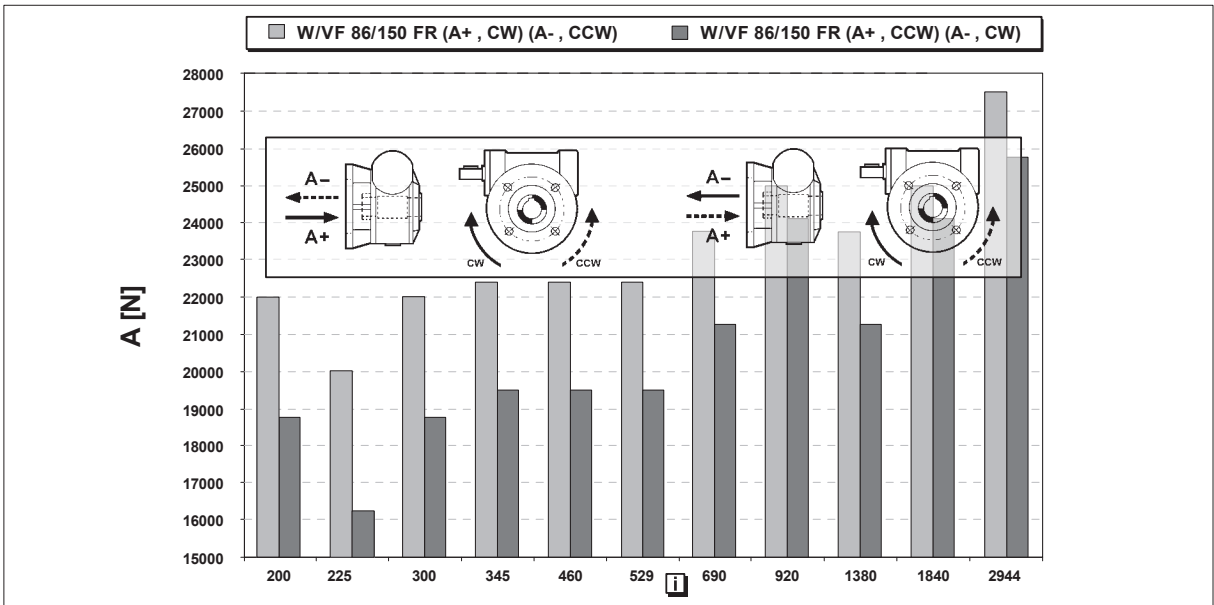
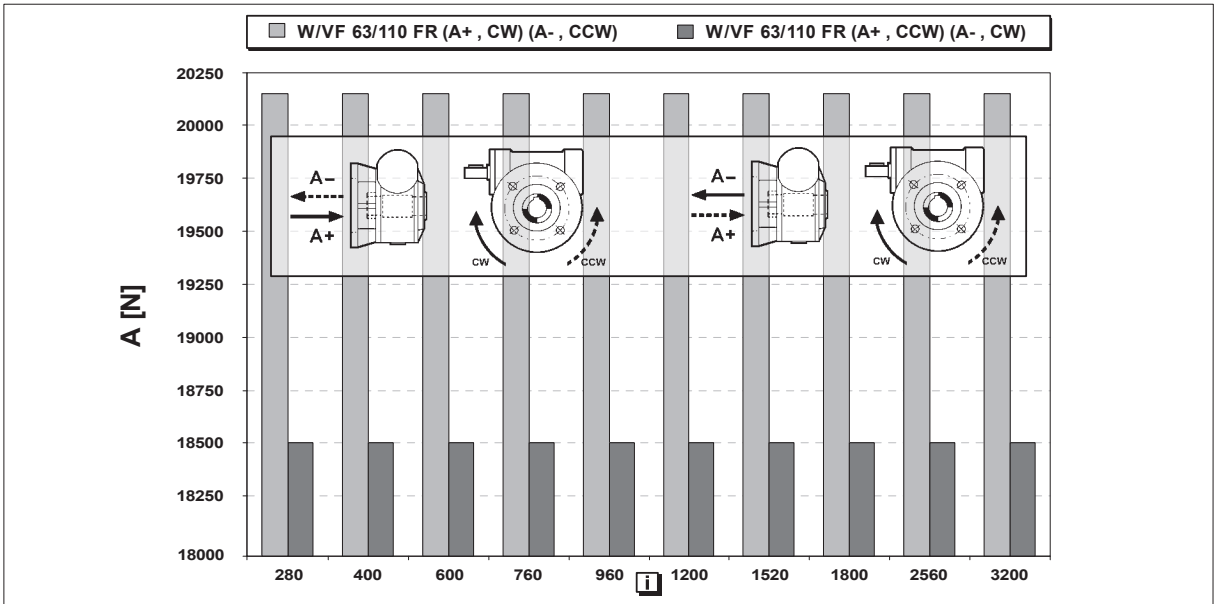
A+ = Carico assiale in compressione

A- = Carico assiale in trazione

CW = Rotazione oraria

CCW = Rotazione antioraria







18 RENDIMENTO

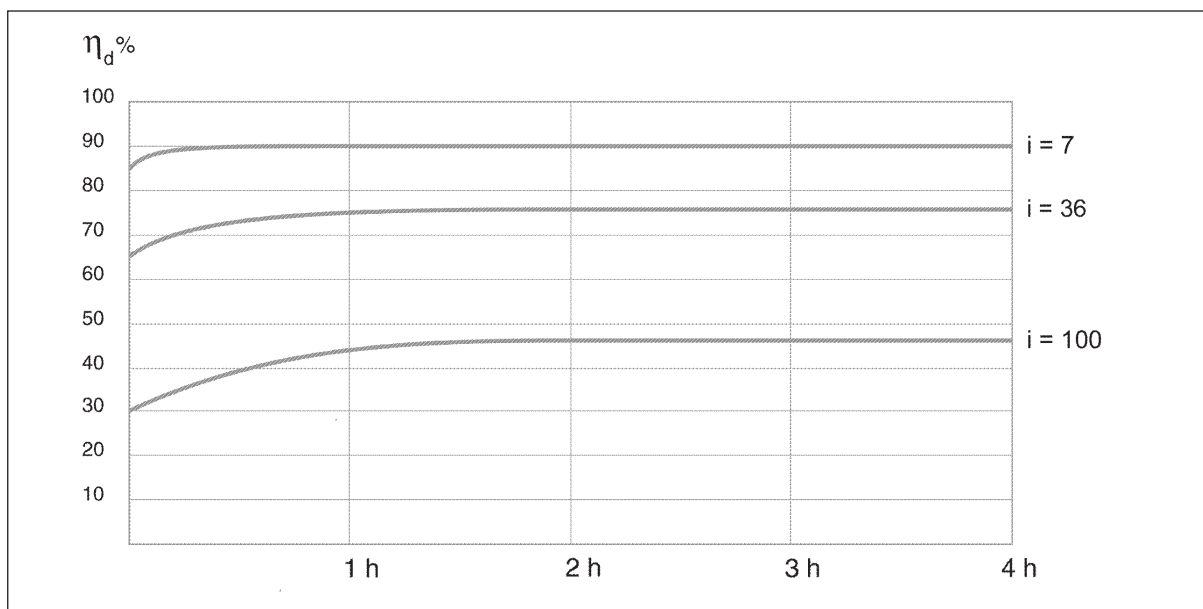
Il rendimento $[\eta]$ dipende dai seguenti parametri:

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

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

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

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



19 IRREVERSIBILITÀ

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

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

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

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



19.1 Irreversibilità statica

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

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

dove η_s rappresenta il rendimento statico (valore riportato nelle tabelle dei dati tecnici dei riduttori). Ovviamente, per soddisfare la condizione inversa, cioè la reversibilità statica, si dovrà verificare che:

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

19.2 Irreversibilità dinamica

La condizione è influenzata direttamente dalla velocità di rotazione, dal rendimento e dalle vibrazioni continue del carico. È caratterizzata da un arresto quasi istantaneo della rotazione quando sull'asse della vite non ci sono più condizioni di moto. Essa è sottoposta alla condizione teorica:

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

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

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

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

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

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



Essendo praticamente impossibile realizzare e garantire una irreversibilità totale è necessario, dove esiste questa esigenza, prevedere un freno esterno sufficiente ad impedire l'avviamento per effetto delle vibrazioni.



		Grado di reversibilità												
		VF				W				VF				
Reversibilità statica	Reversibilità dinamica	27	30	44	49	63	75	86	110	130	150	185	210	250
sì	sì	—	—	7	7	7	7	7	7	7	7	7	7	7
sì	sì	7 10	7 10	10 14	10 14	10 12 15	10 15	10 15 20 23	10 15 20 23	10 15 20 23	10 15 20 23	10 15 20 23	10 15 20 23	10 15 20 23
incerta	sì	15 20 30	15 20 30	20 28 35	18 24 28 36	19 24 30 38	20 25 30 40	30 40 46 56	30 40 46 56	30 40 46 56 64	30 40 46 56 64	30 40 50 60	30 40 50 60	30 40 50 60
no	bassa	40 60	40 60	46 60 70	45 60 70	45 64 80	50 60 80	64 80 100	64 80 100	80 100	80 100	80 100	60 80 100	80 100
no	no	70	70	100	80 100	100	100	—	—	—	—	—	—	—

20 GIOCHI ANGOLARI

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








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

Giochi angolari (albero veloce bloccato)		
	$\Delta\gamma$ [']	$\Delta\gamma$ [rad]
VF 30	33' ± 10'	0.00873 ± 0.00291
VF 44	25' ± 7'	0.00728 ± 0.00145
VFR 44	30' ± 10'	0.00873 ± 0.00291
VF 49	22' ± 7'	0.00728 ± 0.00145
VFR 49	30' ± 10'	0.00873 ± 0.00291
W 63	20' ± 4'	0.00582 ± 0.00145
WR 63	25' ± 5'	0.00728 ± 0.00145
W 75	18' ± 4'	0.00582 ± 0.00145
WR 75	22' ± 5'	0.00640 ± 0.00145
W 86	15' ± 4'	0.00436 ± 0.00145
WR 86	20' ± 5'	0.00582 ± 0.00145
W 110	9' ± 2'	0.00436 ± 0.00145
WR 110	18' ± 5'	0.00524 ± 0.00145
VF 130	12' ± 3'	0.00349 ± 0.00087
VFR 130	15' ± 3'	0.00436 ± 0.00087
VF 150	12' ± 3'	0.00349 ± 0.00087
VFR 150	15' ± 3'	0.00436 ± 0.00087
VF 185	10' ± 3'	0.00291 ± 0.00087
VFR 185	13' ± 3'	0.00378 ± 0.00087
VF 210	Interpellarci	
VFR 210		
VF 250		
VFR 250		










21 DATI TECNICI MOTORIDUTTORI








0.04 kW

n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
19.3	9	1.0	70	600	—	—	—	VF 27_70	P27	BN27A4	109
22.5	8	1.1	60	600	—	—	—	VF 27_60	P27	BN27A4	109
34	6	1.4	40	600	—	—	—	VF 27_40	P27	BN27A4	109
45	5	1.7	30	600	—	—	—	VF 27_30	P27	BN27A4	109
68	4	2.2	20	600	—	—	—	VF 27_20	P27	BN27A4	109
90	3	2.8	15	600	—	—	—	VF 27_15	P27	BN27A4	109
135	2	3.8	10	600	—	—	—	VF 27_10	P27	BN27A4	109
193	2	5.5	7	600	—	—	—	VF 27_7	P27	BN27A4	109

0.06 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
0.59	203	1.0	2280	5000	—	—	—	VF/W 30/63_2280	P56	BN56A4	127
0.89	155	1.4	1520	5000	—	—	—	VF/W 30/63_1520	P56	BN56A4	127
1.1	122	1.7	1200	5000	—	—	—	VF/W 30/63_1200	P56	BN56A4	127
1.5	115	1.8	900	5000	—	—	—	VF/W 30/63_900	P56	BN56A4	127
1.9	113	1.9	720	5000	—	—	—	VF/W 30/63_720	P56	BN56A4	127
2.5	85	1.1	540	3450	—	—	—	VF/VF 30/49_540	P56	BN56A4	122
2.8	50	1.0	500	5000	—	—	—	VFR 44_500	S44	BN44B4	114
3.2	73	1.3	420	3450	—	—	—	VF/VF 30/49_420	P56	BN56A4	122
4.0	54	1.0	350	5000	—	—	—	VFR 44_350	S44	BN44B4	114
4.3	53	1.8	315	3450	—	—	—	VF/VF 30/49_315	P56	BN56A4	122
4.5	59	1.0	300	2500	—	—	—	VFR 44_300	S44	BN44B4	114
5.8	50	1.2	230	2500	—	—	—	VFR 44_230	S44	BN44B4	114
7.7	42	1.5	175	2500	—	—	—	VFR 44_175	S44	BN44B4	114
9.6	36	1.4	140	2500	—	—	—	VFR 44_140	S44	BN44B4	114
13.4	29	1.8	100	2500	—	—	—	VFR 44_100	S44	BN44B4	114
19.1	22	1.8	70	2500	—	—	—	VFR 44_70	S44	BN44B4	114
19.3	14	1.1	70	1600	—	—	—	VF 30_70	P56	BN56A4	110
22.5	13	1.5	60	1600	—	—	—	VF 30_60	P56	BN56A4	110
34	10	0.9	40	600	—	—	—	VF 27_40	P27	BN27B4	109
34	10	1.9	40	1650	—	—	—	VF 30_40	P56	BN56A4	110
45	8	1.1	30	600	—	—	—	VF 27_30	P27	BN27B4	109
45	8	2.4	30	1340	—	—	—	VF 30_30	P56	BN56A4	110
68	6	1.5	20	600	—	—	—	VF 27_20	P27	BN27B4	109
68	6	2.9	20	1180	—	—	—	VF 30_20	P56	BN56A4	110
90	5	1.9	15	600	—	—	—	VF 27_15	P27	BN27B4	109
90	5	3.7	15	1080	—	—	—	VF 30_15	P56	BN56A4	110
135	4	2.6	10	595	—	—	—	VF 27_10	P27	BN27B4	109
135	3	4.7	10	950	—	—	—	VF 30_10	P56	BN56A4	110
193	2	3.6	7	533	—	—	—	VF 27_7	P27	BN27B4	109
193	2	6.4	7	840	—	—	—	VF 30_7	P56	BN56A4	110

0.09 kW

n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
0.31	574	1.8	2800	8000	—	—	—	VF/W 49/110_2800	P63	BN63A6	139
0.42	579	1.0	2116	7000	—	—	—	VF/W 44/86_2116	P63	BN63A6	135
0.43	505	2.1	2070	8000	—	—	—	VF/W 49/110_2070	P63	BN63A6	139
0.48	503	1.1	1840	7000	—	—	—	VF/W 44/86_1840	P63	BN63A6	135
0.53	485	2.2	1656	8000	—	—	—	VF/W 49/110_1656	P63	BN63A6	139
0.64	377	1.5	1380	7000	—	—	—	VF/W 44/86_1380	P63	BN63A6	135
0.65	369	2.8	1350	8000	—	—	—	VF/W 49/110_1350	P63	BN63A6	139










0.09 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
0.73	363	1.1	1200	5750	—	—	—	VF/W 44/75_1200	P63	BN63A6	131
0.81	316	3.3	1080	8000	—	—	—	VF/W 49/110_1080	P63	BN63A6	139
0.89	232	0.9	1520	5000	—	—	—	VF/W 30/63_1520	P56	BN56B4	127
0.96	323	1.2	920	5750	—	—	—	VF/W 44/75_920	P63	BN63A6	131
0.96	332	1.7	920	7000	—	—	—	VF/W 44/86_920	P63	BN63A6	135
0.98	255	0.9	900	5000	—	—	—	VF/W 30/63_900	P63	BN63A6	127
1.1	183	1.1	1200	5000	—	—	—	VF/W 30/63_1200	P56	BN56B4	127
1.2	225	1.0	720	5000	—	—	—	VF/W 30/63_720	P63	BN63A6	127
1.3	267	1.5	700	5750	—	—	—	VF/W 44/75_700	P63	BN63A6	131
1.3	253	2.2	700	7000	—	—	—	VF/W 44/86_700	P63	BN63A6	135
1.5	172	1.2	900	5000	—	—	—	VF/W 30/63_900	P56	BN56B4	127
1.7	210	1.9	525	5750	—	—	—	VF/W 44/75_525	P63	BN63A6	131
1.7	200	2.8	525	7000	—	—	—	VF/W 44/86_525	P63	BN63A6	135
1.9	170	1.2	720	5000	—	—	—	VF/W 30/63_720	P56	BN56B4	127
2.2	164	2.4	400	5750	—	—	—	VF/W 44/75_400	P63	BN63A6	131
2.2	160	3.4	400	7000	—	—	—	VF/W 44/86_400	P63	BN63A6	135
2.4	145	1.4	570	5000	—	—	—	VF/W 30/63_570	P56	BN56B4	127
2.9	111	1.2	300	5000	—	—	—	WR 63_300	P63	BN63A6	126
2.9	120	1.7	300	6200	—	—	—	WR 75_300	P63	BN63A6	130
2.9	132	2.4	300	7000	—	—	—	WR 86_300	P63	BN63A6	134
3.0	117	1.8	450	5000	—	—	—	VF/W 30/63_450	P56	BN56B4	127
3.2	110	0.9	420	3450	—	—	—	VF/VF 30/49_420	P56	BN56B4	122
3.7	101	1.4	240	5000	—	—	—	WR 63_240	P63	BN63A6	126
3.7	105	2.1	240	6200	—	—	—	WR 75_240	P63	BN63A6	130
3.7	117	2.6	240	7000	—	—	—	WR 86_240	P63	BN63A6	134
4.2	84	0.9	210	3450	—	—	—	VFR 49_210	P63	BN63A6	120
4.3	80	1.2	315	3450	—	—	—	VF/VF 30/49_315	P56	BN56B4	122
4.3	84	2.5	315	5000	—	—	—	VF/W 30/63_315	P56	BN56B4	127
4.6	88	1.7	192	5000	—	—	—	WR 63_192	P63	BN63A6	126
4.9	79	0.9	180	3450	—	—	—	VFR 49_180	P63	BN63A6	120
4.9	90	3.1	180	6200	—	—	—	WR 75_180	P63	BN63A6	130
5.2	94	4.2	168	7000	—	—	—	WR 86_168	P63	BN63A6	134
5.5	62	1.0	245	2500	—	—	—	VF/VF 30/44_245	P56	BN56B4	116
6.5	66	1.2	135	3450	—	—	—	VFR 49_135	P63	BN63A6	120
6.5	71	2.5	135	5000	—	—	—	WR 63_135	P63	BN63A6	126
7.7	63	1.0	175	2900	—	—	—	VFR 44_175	S44	BN44C4	114
7.7	65	3.1	114	5000	—	—	—	WR 63_114	P63	BN63A6	126
8.1	58	1.4	108	3450	—	—	—	VFR 49_108	P63	BN63A6	120
8.8	41	1.3	100	3300	—	—	—	VF 49_100	P63	BN63A6	118
9.6	54	0.9	140	2900	—	—	—	VFR 44_140	S44	BN44C4	114
9.8	55	3.8	90	5000	—	—	—	WR 63_90	P63	BN63A6	126
10.5	48	1.9	84	3450	—	—	—	VFR 49_84	P63	BN63A6	120
11.0	37	1.6	80	3300	—	—	—	VF 49_80	P63	BN63A6	118
12.2	45	1.8	72	3450	—	—	—	VFR 49_72	P63	BN63A6	120
12.2	48	4.0	72	5000	—	—	—	WR 63_72	P63	BN63A6	126
12.6	35	1.1	70	2300	—	—	—	VF 44_70	P63	BN63A6	112
12.6	34	1.8	70	3300	—	—	—	VF 49_70	P63	BN63A6	118
13.4	43	1.2	100	2900	—	—	—	VFR 44_100	S44	BN44C4	114
14.7	32	1.4	60	2300	—	—	—	VF 44_60	P63	BN63A6	112
14.7	34	1.7	60	3300	—	—	—	VF 49_60	P63	BN63A6	118
16.3	36	2.2	54	3450	—	—	—	VFR 49_54	P63	BN63A6	120
19.1	33	1.2	70	2900	—	—	—	VFR 44_70	S44	BN44C4	114
19.1	27	1.8	46	2300	—	—	—	VF 44_46	P63	BN63A6	112
19.6	26	2.7	45	3300	—	—	—	VF 49_45	P63	BN63A6	118
21.0	30	2.8	42	3360	—	—	—	VFR 49_42	P63	BN63A6	120
22.0	22	0.9	40	1560	—	—	—	VF 30_40	P63	BN63A6	110
22.5	19	1.0	60	1600	—	—	—	VF 30_60	P56	BN56B4	110
24.4	22	3.4	36	3300	—	—	—	VF 49_36	P63	BN63A6	118
25.1	22	2.2	35	2300	—	—	—	VF 44_35	P63	BN63A6	112
29.3	18	1.2	30	1440	—	—	—	VF 30_30	P63	BN63A6	110
31	18	2.7	28	2300	—	—	—	VF 44_28	P63	BN63A6	112
34	15	1.2	40	1410	—	—	—	VF 30_40	P56	BN56B4	110
44	14	1.5	20	1230	—	—	—	VF 30_20	P63	BN63A6	110
44	14	3.1	20	2300	—	—	—	VF 44_20	P63	BN63A6	112
45	12	1.6	30	1290	—	—	—	VF 30_30	P56	BN56B4	110
59	11	1.8	15	1170	—	—	—	VF 30_15	P63	BN63A6	110
68	9	1.9	20	1140	—	—	—	VF 30_20	P56	BN56B4	110
69	9	1.0	20	600	—	—	—	VF 27_20	P27	BN27C4	109
88	8	2.3	10	1050	—	—	—	VF 30_10	P63	BN63A6	110
90	7	2.5	15	1050	—	—	—	VF 30_15	P56	BN56B4	110
92	7	1.3	15	600	—	—	—	VF 27_15	P27	BN27C4	109

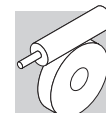


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






n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
126	6	3.2	7	920	—	—	—	VF 30_7	P63	BN63A6	110
135	5	3.1	10	920	—	—	—	VF 30_10	P56	BN56B4	110
138	5	1.7	10	565	—	—	—	VF 27_10	P27	BN27C4	109
193	4	4.3	7	820	—	—	—	VF 30_7	P56	BN56B4	110
197	4	2.5	7	510	—	—	—	VF 27_7	P27	BN27C4	109

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






n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
0.31	775	1.4	2800	8000	—	—	—	VF/W 49/110_2800	P63	BN63B6	139
0.47	588	1.7	2800	8000	—	—	—	VF/W 49/110_2800	P63	BN63A4	139
0.53	654	1.6	1656	8000	—	—	—	VF/W 49/110_1656	P63	BN63B6	139
0.62	518	1.0	2116	7000	—	—	—	VF/W 44/86_2116	P63	BN63A4	135
0.63	507	2.0	2070	8000	—	—	—	VF/W 49/110_2070	P63	BN63A4	139
0.71	483	1.0	1840	7000	—	—	—	VF/W 44/86_1840	P63	BN63A4	135
0.79	435	2.3	1656	8000	—	—	—	VF/W 49/110_1656	P63	BN63A4	139
0.95	386	1.3	1380	7000	—	—	—	VF/W 44/86_1380	P63	BN63A4	135
0.97	354	2.8	1350	8000	—	—	—	VF/W 49/110_1350	P63	BN63A4	139
1.2	293	3.4	1080	8000	—	—	—	VF/W 49/110_1080	P63	BN63A4	139
1.4	322	1.1	920	5750	—	—	—	VF/W 44/75_920	P63	BN63A4	131
1.4	322	1.6	920	7000	—	—	—	VF/W 44/86_920	P63	BN63A4	135
1.5	236	0.9	900	5000	—	—	—	VF/W 30/63_900	P63	BN63A4	127
1.8	233	0.9	720	5000	—	—	—	VF/W 30/63_720	P63	BN63A4	127
1.9	257	1.4	700	5750	—	—	—	VF/W 44/75_700	P63	BN63A4	131
1.9	239	2.1	700	7000	—	—	—	VF/W 44/86_700	P63	BN63A4	135
2.3	199	1.1	570	5000	—	—	—	VF/W 30/63_570	P63	BN63A4	127
2.5	202	1.8	525	5750	—	—	—	VF/W 44/75_525	P63	BN63A4	131
2.5	193	2.6	525	7000	—	—	—	VF/W 44/86_525	P63	BN63A4	135
2.9	150	0.9	300	5000	—	—	—	WR 63_300	P63	BN63B6	126
2.9	162	1.2	300	6200	—	—	—	WR 75_300	P63	BN63B6	130
2.9	178	1.7	300	7000	—	—	—	WR 86_300	P63	BN63B6	134
2.9	161	1.3	450	5000	—	—	—	VF/W 30/63_450	P63	BN63A4	127
3.3	161	2.3	400	5750	—	—	—	VF/W 44/75_400	P63	BN63A4	131
3.3	143	3.5	400	7000	—	—	—	VF/W 44/86_400	P63	BN63A4	135
3.6	136	1.0	240	5000	—	—	—	WR 63_240	P63	BN63B6	126
3.6	142	1.5	240	6200	—	—	—	WR 75_240	P63	BN63B6	130
3.6	142	1.6	240	5000	—	—	—	VF/W 30/63_240	P63	BN63B6	127
3.6	158	2.0	240	7000	—	—	—	WR 86_240	P63	BN63B6	134
4.2	110	0.9	315	3450	—	—	—	VF/VF 30/49_315	P63	BN63A4	122
4.2	116	1.8	315	5000	—	—	—	VF/W 30/63_315	P63	BN63A4	127
4.4	108	1.2	300	5000	—	—	—	WR 63_300	P63	BN63A4	126
4.4	115	1.6	300	6200	—	—	—	WR 75_300	P63	BN63A4	130
4.4	129	2.1	300	7000	—	—	—	WR 86_300	P63	BN63A4	134
4.4	134	2.8	300	5750	—	—	—	VF/W 44/75_300	P63	BN63A4	131
4.8	121	2.3	180	6200	—	—	—	WR 75_180	P63	BN63B6	130
5.2	126	3.1	168	7000	—	—	—	WR 86_168	P63	BN63B6	134
5.2	125	3.0	250	5750	—	—	—	VF/W 44/75_250	P63	BN63A4	131
5.5	94	1.0	240	3450	—	—	—	VF/VF 30/49_240	P63	BN63A4	122
5.5	97	1.4	240	5000	—	—	—	WR 63_240	P63	BN63A4	126
5.5	103	2.1	240	6200	—	—	—	WR 75_240	P63	BN63A4	130
5.5	99	2.1	240	5000	—	—	—	VF/W 30/63_240	P63	BN63A4	127
5.5	111	2.7	240	7000	—	—	—	WR 86_240	P63	BN63A4	134
5.8	109	2.9	150	6200	—	—	—	WR 75_150	P63	BN63B6	130
6.4	89	0.9	135	3300	—	—	—	VFR 49_135	P63	BN63B6	120
6.4	96	1.9	135	5000	—	—	—	WR 63_135	P63	BN63B6	126
6.8	86	1.8	192	5000	—	—	—	WR 63_192	P63	BN63A4	126
7.3	76	0.9	180	3300	—	—	—	VFR 49_180	P63	BN63A4	120
7.3	87	2.7	180	6200	—	—	—	WR 75_180	P63	BN63A4	130
8.7	55	0.9	100	3300	—	—	—	VF 49_100	P63	BN63B6	118
9.7	64	1.4	135	3450	—	—	—	VFR 49_135	P63	BN63A4	120
9.7	68	2.5	135	5000	—	—	—	WR 63_135	P63	BN63A4	126
10.9	50	1.2	80	3300	—	—	—	VF 49_80	P63	BN63B6	118
11.5	61	3.0	114	5000	—	—	—	WR 63_114	P63	BN63A4	126
12.1	55	1.5	108	3450	—	—	—	VFR 49_108	P63	BN63A4	120
13.1	41	1.2	100	3150	—	—	—	VF 49_100	P63	BN63A4	118
14.5	43	1.1	60	2300	—	—	—	VF 44_60	P63	BN63B6	112



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





n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
15.3	53	3.6	57	5000	—	—	—	WR 63_57	P63	BN63B6	126
15.6	46	1.9	84	3450	—	—	—	VFR 49_84	P63	BN63A4	120
16.4	36	1.5	80	3150	—	—	—	VF 49_80	P63	BN63A4	118
18.2	42	1.8	72	3430	—	—	—	VFR 49_72	P63	BN63A4	120
18.7	34	0.9	70	3300	—	—	—	VF 44_70	P63	BN63A4	112
18.7	33	1.7	70	3150	—	—	—	VF 49_70	P63	BN63A4	118
21.8	30	1.3	60	2300	—	—	—	VF 44_60	P63	BN63A4	112
21.8	30	1.9	60	3150	—	—	—	VF 49_60	P63	BN63A4	118
24.3	34	2.2	54	3140	—	—	—	VFR 49_54	P63	BN63A4	120
28.5	25	1.5	46	2300	—	—	—	VF 44_46	P63	BN63A4	112
29.0	24	0.9	30	1360	—	—	—	VF 30_30	P63	BN63B6	110
29.1	25	2.6	45	3040	—	—	—	VF 49_45	P63	BN63A4	118
31	27	2.9	42	2920	—	—	—	VFR 49_42	P63	BN63A4	120
33	21	0.9	40	1360	—	—	—	VF 30_40	P63	BN63A4	110
36	21	3.3	36	2830	—	—	—	VF 49_36	P63	BN63A4	118
37	21	1.9	35	2300	—	—	—	VF 44_35	P63	BN63A4	112
44	17	1.2	30	1250	—	—	—	VF 30_30	P63	BN63A4	110
47	17	2.2	28	2300	—	—	—	VF 44_28	P63	BN63A4	112
58	15	1.4	15	1130	—	—	—	VF 30_15	P63	BN63B6	110
62	14	2.7	14	2150	—	—	—	VF 44_14	P63	BN63B6	112
66	13	1.4	20	1110	—	—	—	VF 30_20	P63	BN63A4	110
66	13	2.9	20	2100	—	—	—	VF 44_20	P63	BN63A4	112
87	10	1.8	15	1020	—	—	—	VF 30_15	P63	BN63A4	110
94	10	2.9	14	1870	—	—	—	VF 44_14	P63	BN63A4	112
124	8	2.4	7	900	—	—	—	VF 30_7	P63	BN63B6	110
131	7	2.3	10	900	—	—	—	VF 30_10	P63	BN63A4	110
138	6	1.1	20	560	—	—	—	VF 27_20	P27	BN27C2	109
138	7	2.2	20	840	—	—	—	VF 30_20	P56	BN56B2	110
183	5	1.4	15	520	—	—	—	VF 27_15	P27	BN27C2	109
187	5	3.1	7	810	—	—	—	VF 30_7	P63	BN63A4	110
275	4	2.0	10	460	—	—	—	VF 27_10	P27	BN27C2	109
275	4	3.4	10	740	—	—	—	VF 30_10	P56	BN56B2	110
393	3	2.8	7	410	—	—	—	VF 27_7	P27	BN27C2	109
393	3	4.7	7	660	—	—	—	VF 30_7	P56	BN56B2	110

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n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
0.28	978	1.9	3200	13800	—	—	—	W/VF 63/130_3200	P71	BN71A6	145
0.28	1345	3.3	3200	19500	—	—	—	W/VF 86/185_3200	P71	BN71A6	157
0.31	1406	1.9	2944	16000	—	—	—	W/VF 86/150_2944	P71	BN71A6	151
0.35	1027	1.8	2560	13800	—	—	—	W/VF 63/130_2560	P71	BN71A6	145
0.35	1320	3.3	2560	19500	—	—	—	W/VF 86/185_2560	P71	BN71A6	157
0.47	875	1.1	2800	8000	—	—	—	VF/W 49/110_2800	P63	BN63B4	139
0.49	1265	2.1	1840	16000	—	—	—	W/VF 86/150_1840	P71	BN71A6	151
0.50	894	2.1	1800	13800	—	—	—	W/VF 63/130_1800	P71	BN71A6	145
0.54	949	1.1	1656	8000	—	—	—	VF/W 49/110_1656	P71	BN71A6	139
0.59	871	2.1	1520	13800	—	—	—	W/VF 63/130_1520	P71	BN71A6	145
0.64	755	1.3	2070	8000	—	—	—	VF/W 49/110_2070	P63	BN63B4	139
0.65	1054	2.6	1380	16000	—	—	—	W/VF 86/150_1380	P71	BN71A6	151
0.75	733	2.5	1200	13800	—	—	—	W/VF 63/130_1200	P71	BN71A6	145
0.80	647	1.5	1656	8000	—	—	—	VF/W 49/110_1656	P63	BN63B4	139
0.94	642	2.9	960	13800	—	—	—	W/VF 63/130_960	P71	BN71A6	145
0.98	527	1.9	1350	8000	—	—	—	VF/W 49/110_1350	P63	BN63B4	139
0.98	756	3.6	920	16000	—	—	—	W/VF 86/150_920	P71	BN71A6	151
1.2	537	3.4	760	13800	—	—	—	W/VF 63/130_760	P71	BN71A6	145
1.2	436	2.3	1080	8000	—	—	—	VF/W 49/110_1080	P63	BN63B4	139
1.4	479	1.0	920	7000	—	—	—	VF/W 44/86_920	P63	BN63B4	135
1.7	391	1.4	525	7000	—	—	—	VF/W 44/86_525	P71	BN71A6	135
1.8	375	2.7	720	8000	—	—	—	VF/W 49/110_720	P63	BN63B4	139
1.9	356	1.4	700	7000	—	—	—	VF/W 44/86_700	P63	BN63B4	135
2.3	321	1.2	400	5750	—	—	—	VF/W 44/75_400	P71	BN71A6	131
2.3	313	1.8	400	7000	—	—	—	VF/W 44/86_400	P71	BN71A6	135
2.3	344	3.1	400	8000	—	—	—	VF/W 49/110_400	P71	BN71A6	139
2.4	288	3.5	540	8000	—	—	—	VF/W 49/110_540	P63	BN63B4	139










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






n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 		
2.5	301	1.2	525	5750	—	—	—	—	VF/W 44/75_525	P63	BN63B4	131
2.5	287	1.7	525	7000	—	—	—	—	VF/W 44/86_525	P63	BN63B4	135
3.0	258	1.2	300	7000	—	—	—	—	WR 86_300	P71	BN71A6	134
3.0	264	1.5	300	5750	—	—	—	—	VF/W 44/75_300	P71	BN71A6	131
3.0	275	2.1	300	8000	—	—	—	—	WR 110_300	P71	BN71A6	138
3.0	241	2.3	300	7000	—	—	—	—	VF/W 44/86_300	P71	BN71A6	135
3.0	269	3.9	300	8000	—	—	—	—	VF/W 49/110_300	P71	BN71A6	139
3.3	240	1.5	400	5750	—	—	—	—	VF/W 44/75_400	P63	BN63B4	131
3.3	214	2.3	400	7000	—	—	—	—	VF/W 44/86_400	P63	BN63B4	135
3.8	206	1.1	240	6200	—	—	—	—	WR 75_240	P71	BN71A6	130
3.8	229	1.4	240	7000	—	—	—	—	WR 86_240	P71	BN71A6	134
3.8	243	2.4	240	8000	—	—	—	—	WR 110_240	P71	BN71A6	138
3.9	233	2.4	230	7000	—	—	—	—	VF/W 44/86_230	P71	BN71A6	135
4.2	172	1.2	315	5000	—	—	—	—	VF/W 30/63_315	P63	BN63B4	127
4.4	172	1.0	300	6200	—	—	—	—	WR 75_300	P63	BN63B4	130
4.4	191	1.4	300	7000	—	—	—	—	WR 86_300	P63	BN63B4	134
4.4	199	1.9	300	5750	—	—	—	—	VF/W 44/75_300	P63	BN63B4	131
4.4	176	2.8	300	7000	—	—	—	—	VF/W 44/86_300	P63	BN63B4	135
4.7	202	1.9	192	7000	—	—	—	—	WR 86_192	P71	BN71A6	134
5.0	175	1.6	180	6200	—	—	—	—	WR 75_180	P71	BN71A6	130
5.3	186	2.0	250	5750	—	—	—	—	VF/W 44/75_250	P63	BN63B4	131
5.4	183	2.1	168	7000	—	—	—	—	WR 86_168	P71	BN71A6	134
5.5	144	0.9	240	5000	—	—	—	—	WR 63_240	P63	BN63B4	126
5.5	153	1.4	240	6200	—	—	—	—	WR 75_240	P63	BN63B4	130
5.5	147	1.4	240	5000	—	—	—	—	VF/W 30/63_240	P63	BN63B4	127
5.5	166	1.8	240	7000	—	—	—	—	WR 86_240	P63	BN63B4	134
5.7	162	3.1	230	7000	—	—	—	—	VF/W 44/86_230	P63	BN63B4	135
6.0	158	2.0	150	6200	—	—	—	—	WR 75_150	P71	BN71A6	130
6.5	161	2.7	138	7000	—	—	—	—	WR 86_138	P71	BN71A6	134
6.9	128	1.2	192	5000	—	—	—	—	WR 63_192	P63	BN63B4	126
6.9	145	2.3	192	7000	—	—	—	—	WR 86_192	P63	BN63B4	134
7.3	129	1.8	180	6200	—	—	—	—	WR 75_180	P63	BN63B4	130
7.5	138	2.4	120	6200	—	—	—	—	WR 75_120	P71	BN71A6	130
7.9	131	2.7	168	7000	—	—	—	—	WR 86_168	P63	BN63B4	134
7.9	126	1.6	114	5000	—	—	—	—	WR 63_114	P71	BN71A6	126
8.8	113	2.3	150	6200	—	—	—	—	WR 75_150	P63	BN63B4	130
9.0	88	1.4	100	5000	W 63_100	S1	M1SC6	124	W 63_100	P71	BN71A6	125
9.0	96	1.7	100	6200	W 75_100	S1	M1SC6	128	W 75_100	P71	BN71A6	129
9.0	105	2.4	100	7000	W 86_100	S1	M1SC6	132	W 86_100	P71	BN71A6	133
9.8	102	1.7	135	5000	—	—	—	—	WR 63_135	P63	BN63B4	126
10.0	107	1.9	90	5000	—	—	—	—	WR 63_90	P71	BN71A6	126
11.0	98	3.1	120	6200	—	—	—	—	WR 75_120	P63	BN63B4	130
11.3	79	1.6	80	5000	W 63_80	S1	M1SC6	124	W 63_80	P71	BN71A6	125
11.3	83	2.4	80	6200	W 75_80	S1	M1SC6	128	W 75_80	P71	BN71A6	129
11.3	90	3.1	80	7000	W 86_80	S1	M1SC6	132	W 86_80	P71	BN71A6	133
11.6	91	2.0	114	5000	—	—	—	—	WR 63_114	P63	BN63B4	126
12.0	100	3.3	75	6200	—	—	—	—	WR 75_75	P71	BN71A6	130
12.2	82	1.0	108	3450	—	—	—	—	VFR 49_108	P63	BN63B4	120
14.7	75	2.5	90	5000	—	—	—	—	WR 63_90	P63	BN63B4	126
15.0	61	1.1	60	3000	—	—	—	—	VF 49_60	P71	BN71A6	118
15.0	60	1.1	180	3300	—	—	—	—	VFR 49_180	P63	BN63A2	120
15.7	68	1.3	84	3420	—	—	—	—	VFR 49_84	P63	BN63B4	120
16.5	54	1.0	80	3150	—	—	—	—	VF 49_80	P63	BN63B4	118
18.3	63	1.2	72	3270	—	—	—	—	VFR 49_72	P63	BN63B4	120
18.3	66	2.8	72	5000	—	—	—	—	WR 63_72	P63	BN63B4	126
18.9	49	1.1	70	3150	—	—	—	—	VF 49_70	P63	BN63B4	118
20.0	50	1.4	135	3280	—	—	—	—	VFR 49_135	P63	BN63A2	120
20.0	54	2.9	45	5000	W63_45	S1	M1SC6	124	W 63_45	P71	BN71A6	125
22.0	45	0.9	60	2300	—	—	—	112	VF 44_60	P63	BN63B4	112
22.0	45	1.3	60	3150	—	—	—	—	VF 49_60	P63	BN63B4	118
23.2	54	3.3	57	4910	—	—	—	—	WR 63_57	P63	BN63B4	126
24.4	50	1.5	54	3010	—	—	—	—	VFR 49_54	P63	BN63B4	120
28.7	38	1.0	46	2500	—	—	—	—	VF 44_46	P63	BN63B4	112
29.3	37	1.8	45	2300	—	—	—	—	VF 49_45	P63	BN63B4	118
31	40	1.9	42	2810	—	—	—	—	VFR 49_42	P63	BN63B4	120
32	36	1.4	28	2290	—	—	—	—	VF 44_28	P71	BN71A6	112
37	31	2.2	36	2760	—	—	—	—	VF 49_36	P63	BN63B4	118
38	31	1.3	35	2430	—	—	—	—	VF 44_35	P63	BN63B4	112
47	26	1.5	28	2270	—	—	—	—	VF 44_28	P63	BN63B4	112



0.18 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
47	26	2.9	28	2560	—	—	—	VF 49_28	P63	BN63B4	118
55	23	2.7	24	2430	—	—	—	VF 49_24	P63	BN63B4	118
66	19	0.9	20	1040	—	—	—	VF 30_20	P63	BN63B4	110
66	20	1.9	20	2040	—	—	—	VF 44_20	P63	BN63B4	112
73	18	3.2	18	2230	—	—	—	VF 49_18	P63	BN63B4	118
77	16	1.8	35	1970	—	—	—	VF 44_35	P63	BN63A2	112
88	15	1.2	15	960	—	—	—	VF 30_15	P63	BN63B4	110
94	15	2.0	14	1830	—	—	—	VF 44_14	P63	BN63B4	112
132	11	1.5	10	860	—	—	—	VF 30_10	P63	BN63B4	110
132	11	2.7	10	1640	—	—	—	VF 44_10	P63	BN63B4	112
189	8	2.1	7	770	—	—	—	VF 30_7	P63	BN63B4	110
193	7	2.9	14	1470	—	—	—	VF 44_14	P63	BN63A2	112
270	5	2.2	10	710	—	—	—	VF 30_10	P63	BN63A2	110
386	4	3.1	7	640	—	—	—	VF 30_7	P63	BN63A2	110

0.25 kW

n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
0.28	1358	1.4	3200	13800	—	—	—	W/VF 63/130_3200	P71	BN71B6	145
0.28	1868	2.4	3200	19500	—	—	—	W/VF 86/185_3200	P71	BN71B6	157
0.31	1952	1.4	2944	16000	—	—	—	W/VF 86/150_2944	P71	BN71B6	151
0.43	945	1.9	3200	13800	—	—	—	W/VF 63/130_3200	P71	BN71A4	145
0.43	1334	3.1	3200	19500	—	—	—	W/VF 86/185_3200	P71	BN71A4	157
0.47	1380	1.9	2944	16000	—	—	—	W/VF 86/150_2944	P71	BN71A4	151
0.49	1562	2.8	1840	19500	—	—	—	W/VF 86/185_1840	P71	BN71B6	157
0.54	1022	1.8	2560	13800	—	—	—	W/VF 63/130_2560	P71	BN71A4	145
0.54	1289	3.3	2560	19500	—	—	—	W/VF 86/185_2560	P71	BN71A4	157
0.65	1464	1.8	1380	16000	—	—	—	W/VF 86/150_1380	P71	BN71B6	151
0.66	1006	1.0	2070	8000	—	—	—	VF/W 49/110_2070	P71	BN71A4	139
0.75	1214	2.1	1840	16000	—	—	—	W/VF 86/150_1840	P71	BN71A4	151
0.75	1019	1.8	1200	13800	—	—	—	W/VF 63/130_1200	P71	BN71B6	145
0.76	875	2.1	1800	13800	—	—	—	W/VF 63/130_1800	P71	BN71A4	145
0.83	863	1.2	1656	8000	—	—	—	VF/W 49/110_1656	P71	BN71A4	139
0.90	845	2.1	1520	13800	—	—	—	W/VF 63/130_1520	P71	BN71A4	145
0.98	1049	2.6	920	16000	—	—	—	W/VF 86/150_920	P71	BN71B6	151
1.0	1006	2.6	1380	16000	—	—	—	W/VF 86/150_1380	P71	BN71A4	151
1.0	703	1.4	1350	8000	—	—	—	VF/W 49/110_1350	P71	BN71A4	139
1.1	708	2.5	1200	13800	—	—	—	W/VF 63/130_1200	P71	BN71A4	145
1.2	746	2.5	760	13800	—	—	—	W/VF 63/130_760	P71	BN71B6	145
1.3	581	1.7	1080	8000	—	—	—	VF/W 49/110_1080	P71	BN71A4	139
1.3	860	3.1	690	16000	—	—	—	W/VF 86/150_690	P71	BN71B6	151
1.4	617	2.9	960	13800	—	—	—	W/VF 63/130_960	P71	BN71A4	145
1.7	544	1.9	540	8000	—	—	—	VF/W 49/110_540	P71	BN71B6	139
1.7	543	1.0	525	7000	—	—	—	VF/W 44/86_525	P71	BN71B6	135
1.8	515	3.5	760	13800	—	—	—	W/VF 63/130_760	P71	BN71A4	145
1.9	500	2.0	720	8000	—	—	—	VF/W 49/110_720	P71	BN71A4	139
2.0	474	1.1	700	7000	—	—	—	VF/W 44/86_700	P71	BN71A4	135
2.5	384	2.6	540	8000	—	—	—	VF/W 49/110_540	P71	BN71A4	139
2.6	383	1.3	525	7000	—	—	—	VF/W 44/86_525	P71	BN71A4	135
3.0	366	1.1	300	5750	—	—	—	VF/W 44/75_300	P71	BN71B6	131
3.0	382	1.5	300	8000	—	—	—	WR 110_300	P71	BN71B6	138
3.0	374	2.8	300	8000	—	—	—	VF/W 49/110_300	P71	BN71B6	139
3.4	319	1.2	400	5750	—	—	—	VF/W 44/75_400	P71	BN71A4	131
3.4	285	1.8	400	7000	—	—	—	VF/W 44/86_400	P71	BN71A4	135
3.4	313	3.2	400	8000	—	—	—	VF/W 49/110_400	P71	BN71A4	139
3.8	318	1.0	240	7000	—	—	—	WR 86_240	P71	BN71B6	134
3.8	337	1.7	240	8000	—	—	—	WR 110_240	P71	BN71B6	138
3.9	323	1.7	230	7000	—	—	—	VF/W 44/86_230	P71	BN71B6	135
3.9	311	3.4	230	8000	—	—	—	VF/W 49/110_230	P71	BN71B6	139
4.6	255	1.1	300	7000	—	—	—	WR 86_300	P71	BN71A4	134
4.6	266	1.4	300	5750	—	—	—	VF/W 44/75_300	P71	BN71A4	131
4.6	266	2.1	300	8000	—	—	—	WR 110_300	P71	BN71A4	138
4.6	234	2.1	300	7000	—	—	—	VF/W 44/86_300	P71	BN71A4	135
4.7	280	1.4	192	7000	—	—	—	WR 86_192	P71	BN71B6	134










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






n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 		
5.5	247	1.5	250	5750	—	—	—	—	VF/W 44/75_250	P71	BN71A4	131
5.7	204	1.1	240	6200	—	—	—	—	WR 75_240	P71	BN71A4	130
5.7	221	1.4	240	7000	—	—	—	—	WR 86_240	P71	BN71A4	134
5.7	233	2.4	240	8000	—	—	—	—	WR 110_240	P71	BN71A4	138
6.0	216	2.3	230	7000	—	—	—	—	VF/W 44/86_230	P71	BN71A4	135
6.0	219	1.4	150	6200	—	—	—	—	WR 75_150	P71	BN71B6	130
6.7	193	0.9	135	5000	—	—	—	—	WR 63_135	P71	BN71B6	126
7.2	193	1.7	192	7000	—	—	—	—	WR 86_192	P71	BN71A4	134
7.2	200	3.1	192	8000	—	—	—	—	WR 110_192	P71	BN71A4	138
7.6	172	1.4	180	6200	—	—	—	—	WR 75_180	P71	BN71A4	130
7.9	175	1.1	114	5000	—	—	—	—	WR 63_114	P71	BN71B6	126
8.2	175	2.0	168	7000	—	—	—	—	WR 86_168	P71	BN71A4	134
9.0	122	1.0	100	5000	W 63_100	S1	M1SD6	124	—	—	—	—
9.0	133	1.2	100	6200	W 75_100	S1	M1SD6	128	W 75_100	P71	BN71B6	129
9.0	146	1.7	100	7000	W 86_100	S1	M1SD6	132	W 86_100	P71	BN71B6	133
9.2	151	1.7	150	6200	—	—	—	—	WR 75_150	P71	BN71A4	130
10.0	151	2.7	138	7000	—	—	—	—	WR 86_138	P71	BN71A4	134
10.0	160	2.3	90	6200	—	—	—	—	WR 75_90	P71	BN71B6	130
10.2	136	1.3	135	5000	—	—	—	—	WR 63_135	P71	BN71A4	126
11.3	110	1.1	80	5000	W 63_80	S1	M1SD6	124	—	—	—	—
11.3	115	1.7	80	6200	W 75_80	S1	M1SD6	128	W 75_80	P71	BN71B6	129
11.3	125	2.2	80	7000	W 86_80	S1	M1SD6	132	W 86_80	P71	BN71B6	133
11.5	131	2.3	120	6200	—	—	—	—	WR 75_120	P71	BN71A4	130
11.5	138	2.8	120	7000	—	—	—	—	WR 86_120	P71	BN71A4	134
12.1	121	1.5	114	5000	—	—	—	—	WR 63_114	P71	BN71A4	126
13.8	89	1.3	100	5000	—	—	—	—	W 63_100	P71	BN71A4	125
13.8	96	1.6	100	6200	—	—	—	—	W 75_100	P71	BN71A4	129
13.8	102	2.2	100	7000	—	—	—	—	W 86_100	P71	BN71A4	133
15.3	100	1.9	90	5000	—	—	—	—	WR 63_90	P71	BN71A4	126
15.3	108	3.0	90	6200	—	—	—	—	WR 75_90	P71	BN71A4	130
17.2	78	1.5	80	5000	—	—	—	—	W 63_80	P71	BN71A4	125
17.2	82	2.2	80	6200	—	—	—	—	W 75_80	P71	BN71A4	129
17.2	89	2.9	80	7000	—	—	—	—	W 86_80	P71	BN71A4	133
18.3	95	3.1	75	6200	—	—	—	—	WR 75_75	P71	BN71A4	130
19.1	88	2.1	72	5000	—	—	—	—	WR 63_72	P71	BN71A4	126
20.0	70	1.0	45	3150	—	—	—	—	—	—	—	—
21.5	68	1.8	64	5000	—	—	—	—	W 63_64	P71	BN71A4	125
22.0	63	0.9	60	3150	—	—	—	—	—	—	—	—
22.9	68	3.0	60	6200	—	—	—	—	W 75_60	P71	BN71A4	129
24.1	72	2.5	57	4780	—	—	—	—	WR 63_57	P71	BN71A4	126
29.3	51	1.3	45	2850	—	—	—	—	—	—	—	—
31	52	2.8	45	4550	—	—	—	—	W 63_45	P71	BN71A4	125
31	59	3.0	45	4460	—	—	—	—	WR 63_45	P71	BN71A4	126
32	50	1.0	28	2300	—	—	—	—	VF 44_28	P71	BN71B6	112
36	46	3.4	38	4320	—	—	—	—	W 63_38	P71	BN71A4	125
37	44	1.6	36	2670	—	—	—	—	VF 49_36	P71	BN71A4	118
38	43	0.9	35	2300	—	—	—	—	VF 44_35	P71	BN71A4	112
38	49	3.3	36	4160	—	—	—	—	WR 63_36	P71	BN71A4	126
45	39	1.1	20	2190	—	—	—	—	VF 44_20	P71	BN71B6	112
47	36	1.1	28	2190	—	—	—	—	VF 44_28	P71	BN71A4	112
47	36	2.1	28	2480	—	—	—	—	VF 49_28	P71	BN71A4	118
55	33	1.9	24	2360	—	—	—	—	VF 49_24	P71	BN71A4	118
64	29	1.3	14	1980	—	—	—	—	VF 44_14	P71	BN71B6	112
64	29	2.5	14	2260	—	—	—	—	VF 49_14	P71	BN71B6	118
66	28	1.4	20	1970	—	—	—	—	VF 44_20	P71	BN71A4	112
73	25	2.3	18	2170	—	—	—	—	VF 49_18	P71	BN71A4	118
77	23	1.3	35	1930	—	—	—	—	VF 44_35	P63	BN63B2	112
90	22	1.8	10	1780	—	—	—	—	VF 44_10	P71	BN71B6	112
90	22	2.9	10	2040	—	—	—	—	VF 49_10	P71	BN71B6	118
94	21	1.4	14	1770	—	—	—	—	VF 44_14	P71	BN71A4	112
94	21	3.2	14	2010	—	—	—	—	VF 49_14	P71	BN71A4	118
113	17	2.8	24	1930	—	—	—	—	VF 49_24	P63	BN63B2	118
129	16	2.5	7	1590	—	—	—	—	VF 44_7	P71	BN71B6	112
132	15	1.9	10	1590	—	—	—	—	VF 44_10	P71	BN71A4	112
135	14	1.0	20	840	—	—	—	—	VF 30_20	P63	BN63B2	110
180	11	1.3	15	780	—	—	—	—	VF 30_15	P63	BN63B2	110
189	11	2.7	7	1420	—	—	—	—	VF 44_7	P71	BN71A4	112
270	8	1.6	10	690	—	—	—	—	VF 30_10	P63	BN63B2	110

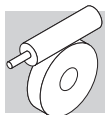


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






n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
270	8	2.9	10	1300	—			VF 44_10		P63 BN63B2	112
386	5	2.2	7	620	—			VF 30_7		P63 BN63B2	110

0.37 kW

n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
0.28	2734	1.6	3200	19500	—			W/VF 86/185_3200	P80	BN80A6	157
0.31	2858	0.9	2944	16000	—			W/VF 86/150_2944	P80	BN80A6	151
0.36	2684	1.6	2560	19500	—			W/VF 86/185_2560	P80	BN80A6	157
0.43	1403	1.3	3200	13800	—			W/VF 63/130_3200	P71	BN71B4	145
0.43	1981	2.1	3200	19500	—			W/VF 86/185_3200	P71	BN71B4	157
0.47	2050	1.3	2944	16000	—			W/VF 86/150_2944	P71	BN71B4	151
0.54	1519	1.2	2560	13800	—			W/VF 63/130_2560	P71	BN71B4	145
0.54	1915	2.2	2560	19500	—			W/VF 86/185_2560	P71	BN71B4	157
0.60	1771	1.0	1520	13800	—			W/VF 63/130_1520	P80	BN80A6	145
0.66	2143	1.3	1380	16000	—			W/VF 86/150_1380	P80	BN80A6	151
0.74	1803	1.4	1840	16000	—			W/VF 86/150_1840	P71	BN71B4	151
0.74	1614	2.6	1840	19500	—			W/VF 86/185_1840	P71	BN71B4	157
0.76	1300	1.4	1800	13800	—			W/VF 63/130_1800	P71	BN71B4	145
0.86	1444	2.9	1600	19500	—			W/VF 86/185_1600	P71	BN71B4	157
0.90	1255	1.4	1520	13800	—			W/VF 63/130_1520	P71	BN71B4	145
0.99	1357	3.2	920	19500	—			W/VF 86/185_920	P80	BN80A6	157
0.99	1495	1.7	1380	16000	—			W/VF 86/150_1380	P71	BN71B4	151
1.0	1045	1.0	1350	8000	—			VF/W 49/110_1350	P71	BN71B4	139
1.1	1052	1.7	1200	13800	—			W/VF 63/130_1200	P71	BN71B4	145
1.3	864	1.2	1080	8000	—			VF/W 49/110_1080	P71	BN71B4	139
1.3	1259	2.1	690	16000	—			W/VF 86/150_690	P80	BN80A6	151
1.4	916	2.0	960	13800	—			W/VF 63/130_960	P71	BN71B4	145
1.5	1068	2.4	920	16000	—			W/VF 86/150_920	P71	BN71B4	151
1.7	797	1.3	540	8000	—			VF/W 49/110_540	P80	BN80A6	139
1.7	1068	2.5	529	16000	—			W/VF 86/150_529	P80	BN80A6	151
1.8	764	2.4	760	13800	—			W/VF 63/130_760	P71	BN71B4	145
1.9	743	1.3	720	8000	—			VF/W 49/110_720	P71	BN71B4	139
2.0	890	2.9	690	16000	—			W/VF 86/150_690	P71	BN71B4	151
2.3	619	2.9	600	13800	—			W/VF 63/130_600	P71	BN71B4	145
2.5	571	1.8	540	8000	—			VF/W 49/110_540	P71	BN71B4	139
2.6	750	3.5	529	16000	—			W/VF 86/150_529	P71	BN71B4	151
3.0	559	1.0	300	8000	—			WR 110_300	P80	BN80A6	138
3.0	571	1.8	300	13800	—			VFR 130_300	P80	BN80A6	142
3.0	547	1.9	300	8000	—			VF/W 49/110_300	P80	BN80A6	139
3.4	423	1.2	400	7000	—			VF/W 44/86_400	P71	BN71B4	135
3.4	464	2.2	400	8000	—			VF/W 49/110_400	P71	BN71B4	139
3.8	494	1.2	240	8000	—			WR 110_240	P80	BN80A6	138
3.8	503	2.4	240	13800	—			VFR 130_240	P80	BN80A6	142
4.0	455	2.3	230	8000	—			VF/W 49/110_230	P80	BN80A6	139
4.6	395	1.4	300	8000	—			WR 110_300	P71	BN71B4	138
4.6	348	1.4	300	7000	—			VF/W 44/86_300	P71	BN71B4	135
4.6	371	2.7	300	8000	—			VF/W 49/110_300	P71	BN71B4	139
4.7	410	1.0	192	7000	—			WR 86_192	P80	BN80A6	134
4.7	425	1.6	192	8000	—			WR 110_192	P80	BN80A6	138
4.7	432	3.0	192	13800	—			VFR 130_192	P80	BN80A6	142
5.4	372	1.0	168	7000	—			WR 86_168	P80	BN80A6	134
5.4	391	2.0	168	8000	—			WR 110_168	P80	BN80A6	138
5.4	391	3.4	168	13800	—			VFR 130_168	P80	BN80A6	142
5.7	328	0.9	240	7000	—			WR 86_240	P71	BN71B4	134
5.7	347	1.6	240	8000	—			WR 110_240	P71	BN71B4	138
6.0	320	1.6	230	7000	—			VF/W 44/86_230	P71	BN71B4	135
6.0	308	3.2	230	8000	—			VF/W 49/110_230	P71	BN71B4	139
6.1	320	1.0	150	6200	—			WR 75_150	P80	BN80A6	130
6.6	327	1.3	138	7000	—			WR 86_138	P80	BN80A6	134
6.6	338	2.4	138	8000	—			WR 110_138	P80	BN80A6	138



0.37 kW

n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 		
7.1	287	1.1	192	7000	—	—	—	—	WR 86_192	P71	BN71B4	134
7.1	297	2.1	192	8000	—	—	—	—	WR 110_192	P71	BN71B4	138
7.6	294	1.5	120	7000	—	—	—	—	WR 86_120	P80	BN80A6	134
7.6	303	2.9	120	8000	—	—	—	—	WR 110_120	P80	BN80A6	138
7.6	255	0.9	180	6200	—	—	—	—	WR 75_180	P71	BN71B4	130
8.2	260	1.4	168	7000	—	—	—	—	WR 86_168	P71	BN71B4	134
8.2	273	2.6	168	8000	—	—	—	—	WR 110_168	P71	BN71B4	138
9.1	214	1.2	100	7000	W 86_100	S1	M1LA6	132	W 86_100	P80	BN80A6	133
9.1	224	1.2	150	6200	—	—	—	—	WR 75_150	P71	BN71B4	130
9.9	224	1.8	138	7000	—	—	—	—	WR 86_138	P71	BN71B4	134
9.9	235	3.0	138	8000	—	—	—	—	WR 110_138	P71	BN71B4	138
10.1	234	1.6	90	6200	—	—	—	—	WR 75_90	P80	BN80A6	130
11.4	168	1.2	80	6200	W 75_80	S1	M1LA6	128	W 75_80	P80	BN80A6	129
11.4	183	1.5	80	7000	W 86_80	S1	M1LA6	132	W 86_80	P80	BN80A6	133
11.4	195	1.6	120	6200	—	—	—	—	WR 75_120	P71	BN71B4	130
11.4	204	1.9	120	7000	—	—	—	—	WR 86_120	P71	BN71B4	134
12.0	179	1.0	114	5000	—	—	—	—	WR 63_114	P71	BN71B4	126
12.1	204	1.6	75	6200	—	—	—	—	WR 75_75	P80	BN80A6	130
13.2	196	2.0	69	7000	—	—	—	—	WR 86_69	P80	BN80A6	134
13.7	142	1.1	100	6200	W 75_100	S1	M1SD4	128	W 75_100	P71	BN71B4	129
13.7	152	1.5	100	7000	W 86_100	S1	M1SD4	132	W 86_100	P71	BN71B4	133
14.2	139	1.0	64	5000	W 63_64	S1	M1LA6	124	W 63_64	P80	BN80A6	125
15.2	140	1.5	60	6200	W 75_60	S1	M1LA6	128	W 75_60	P80	BN80A6	129
15.2	149	1.3	90	5000	—	—	—	—	WR 63_90	P71	BN71B4	126
15.2	160	2.0	90	6200	—	—	—	—	WR 75_90	P71	BN71B4	130
15.2	156	2.8	90	7000	—	—	—	—	WR 86_90	P71	BN71B4	134
16.3	144	2.3	56	7000	W 86_56	S1	M1LA6	132	W 86_56	P80	BN80A6	133
17.1	116	1.0	80	5000	W 63_80	S1	M1SD4	124	W 63_80	P71	BN71B4	125
17.1	122	1.5	80	6200	W 75_80	S1	M1SD4	128	W 75_80	P71	BN71B4	129
17.1	132	1.9	80	7000	W 86_80	S1	M1SD4	132	W 86_80	P71	BN71B4	133
18.3	141	2.1	75	6200	—	—	—	—	WR 75_75	P71	BN71B4	130
19.0	130	1.4	72	4830	—	—	—	—	WR 63_72	P71	BN71B4	126
19.9	133	2.8	69	7000	—	—	—	—	WR 86_69	P71	BN71B4	134
20.2	136	2.6	45	6200	—	—	—	—	WR 75_45	P80	BN80A6	130
21.4	101	1.2	64	4870	W 63_64	S1	M1SD4	124	W 63_64	P71	BN71B4	125
21.4	112	2.5	64	7000	W 86_64	S1	M1SD4	132	W 86_64	P71	BN71B4	133
22.8	101	2.0	60	6200	W 75_60	S1	M1SD4	128	W 75_60	P71	BN71B4	129
22.8	119	2.5	60	6200	—	—	—	—	WR 75_60	P71	BN71B4	130
22.8	119	3.2	60	7000	—	—	—	—	WR 86_60	P71	BN71B4	134
24.0	107	1.7	57	4540	—	—	—	—	WR 63_57	P71	BN71B4	126
24.5	101	3.0	56	7000	W 86_56	S1	M1SD4	132	W 86_56	P71	BN71B4	133
27.4	88	2.5	50	6200	W 75_50	S1	M1SD4	128	W 75_50	P71	BN71B4	129
30	73	0.9	45	2680	—	—	—	—	VF 49_45	P71	BN71B4	118
30	78	1.9	45	4400	W 63_45	S1	M1SD4	124	W 63_45	P71	BN71B4	125
30	88	2.0	45	4250	—	—	—	—	WR 63_45	P71	BN71B4	126
30	93	3.2	45	5885	—	—	—	—	WR 75_45	P71	BN71B4	130
34	74	3.4	40	5820	W 75_40	S1	M1SD4	128	W 75_40	P71	BN71B4	129
36	69	2.3	38	4180	W 63_38	S1	M1SD4	124	W 63_38	P71	BN71B4	125
38	62	1.1	36	2530	—	—	—	—	VF 49_36	P71	BN71B4	118
38	73	2.2	36	3980	—	—	—	—	WR 63_36	P71	BN71B4	126
46	57	2.8	30	3900	W 63_30	S1	M1SD4	124	W 63_30	P71	BN71B4	125
49	51	1.4	28	2360	—	—	—	—	VF 49_28	P71	BN71B4	118
57	46	1.4	24	2250	—	—	—	—	VF 49_24	P71	BN71B4	118
57	48	3.2	24	3650	W 63_24	S1	M1SD4	124	W 63_24	P71	BN71B4	125
65	42	1.7	14	1940	—	—	—	—	VF 49_14	P80	BN80A6	118
69	40	1.0	20	1870	—	—	—	—	VF 44_20	P71	BN71B4	112
72	40	3.8	19	3400	W 63_19	S1	M1SD4	124	W 63_19	P71	BN71B4	125
76	36	1.6	18	2080	—	—	—	—	VF 49_18	P71	BN71B4	118
79	33	0.9	35	1860	—	—	—	—	VF 44_35	P71	BN71A2	112
91	32	2.0	10	1930	—	—	—	—	VF 49_10	P80	BN80A6	118
98	29	1.0	14	1690	—	—	—	—	VF 44_14	P71	BN71B4	112
98	29	2.2	14	1940	—	—	—	—	VF 49_14	P71	BN71B4	118
117	24	2.0	24	1880	—	—	—	—	VF 49_24	P71	BN71A2	118
137	22	1.3	10	1520	—	—	—	—	VF 44_10	P71	BN71B4	112
137	22	2.7	10	1750	—	—	—	—	VF 49_10	P71	BN71B4	118



0.37 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC	
138	21	1.4	20	1570	—	—	—	VF 44_20	P71	BN71A2	112
153	19	2.3	18	1720	—	—	—	VF 49_18	P71	BN71A2	118
196	16	1.9	7	1360	—	—	—	VF 44_7	P71	BN71B4	112
196	16	3.5	7	1570	—	—	—	VF 49_7	P71	BN71B4	118
275	11	2.0	10	1260	—	—	—	VF 44_10	P71	BN71A2	112
393	8	2.8	7	1120	—	—	—	VF 44_7	P71	BN71A2	112

0.55 kW

n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC	
0.29	4019	1.1	3200	19500	—	—	—	W/VF 86/185_3200	P80	BN80B6	157
0.36	3946	1.1	2560	19500	—	—	—	W/VF 86/185_2560	P80	BN80B6	157
0.43	2902	1.4	3200	19500	—	—	—	W/VF 86/185_3200	P80	BN80A4	157
0.47	3004	0.9	2944	16000	—	—	—	W/VF 86/150_2944	P80	BN80A4	151
0.50	3362	1.3	1840	19500	—	—	—	W/VF 86/185_1840	P80	BN80B6	157
0.54	2805	1.5	2560	19500	—	—	—	W/VF 86/185_2560	P80	BN80A4	157
0.76	2642	1.0	1840	16000	—	—	—	W/VF 86/150_1840	P80	BN80A4	151
0.76	2364	1.8	1840	19500	—	—	—	W/VF 86/185_1840	P80	BN80A4	157
0.77	1905	0.9	1800	13800	—	—	—	W/VF 63/130_1800	P80	BN80A4	145
0.87	2116	2.0	1600	19500	—	—	—	W/VF 86/185_1600	P80	BN80A4	157
0.91	1838	1.0	1520	13800	—	—	—	W/VF 63/130_1520	P80	BN80A4	145
1.0	1996	2.2	920	19500	—	—	—	W/VF 86/185_920	P80	BN80B6	157
1.0	2190	1.2	1380	16000	—	—	—	W/VF 86/150_1380	P80	BN80A4	151
1.2	1542	1.2	1200	13800	—	—	—	W/VF 63/130_1200	P80	BN80A4	145
1.2	1542	2.7	1200	19500	—	—	—	W/VF 86/185_1200	P80	BN80A4	157
1.3	1852	1.5	690	16000	—	—	—	W/VF 86/150_690	P80	BN80B6	151
1.4	1342	1.3	960	13800	—	—	—	W/VF 63/130_960	P80	BN80A4	145
1.5	1564	1.7	920	16000	—	—	—	W/VF 86/150_920	P80	BN80A4	151
1.5	1460	2.9	920	19500	—	—	—	W/VF 86/185_920	P80	BN80A4	157
1.5	1473	3.0	600	19500	—	—	—	W/VF 86/185_600	P80	BN80B6	157
1.7	1300	3.2	800	19500	—	—	—	W/VF 86/185_800	P80	BN80A4	157
1.7	1570	1.7	529	16000	—	—	—	W/VF 86/150_529	P80	BN80B6	151
1.8	1120	1.6	760	13800	—	—	—	W/VF 63/130_760	P80	BN80A4	145
2.0	1304	2.0	690	16000	—	—	—	W/VF 86/150_690	P80	BN80A4	151
2.3	1028	1.0	400	8000	—	—	—	VF/W 49/110_400	P80	BN80B6	139
2.3	907	2.0	600	13800	—	—	—	W/VF 63/130_600	P80	BN80A4	145
2.6	837	1.2	540	8000	—	—	—	VF/W 49/110_540	P80	BN80A4	139
2.6	1099	2.4	529	16000	—	—	—	W/VF 86/150_529	P80	BN80A4	151
3.0	956	2.7	460	16000	—	—	—	W/VF 86/150_460	P80	BN80A4	151
3.1	839	1.2	300	13800	—	—	—	VFR 130_300	P80	BN80B6	142
3.1	805	1.3	300	8000	—	—	—	VF/W 49/110_300	P80	BN80B6	139
3.5	680	1.5	400	8000	—	—	—	VF/W 49/110_400	P80	BN80A4	139
3.5	665	2.7	400	13800	—	—	—	W/VF 63/130_400	P80	BN80A4	145
3.8	740	1.6	240	13800	—	—	—	VFR 130_240	P80	BN80B6	142
4.0	670	1.6	230	8000	—	—	—	VF/W 49/110_230	P80	BN80B6	139
4.0	756	3.4	345	16000	—	—	—	W/VF 86/150_345	P80	BN80A4	151
4.6	578	0.9	300	8000	—	—	—	WR 110_300	P80	BN80A4	138
4.6	601	1.5	300	13800	—	—	—	VFR 130_300	P80	BN80A4	142
4.6	544	1.8	300	8000	—	—	—	VF/W 49/110_300	P80	BN80A4	139
4.8	625	1.1	192	8000	—	—	—	WR 110_192	P80	BN80B6	138
5.0	529	3.4	280	13800	—	—	—	W/VF 63/130_280	P80	BN80A4	145
5.8	508	1.1	240	8000	—	—	—	WR 110_240	P80	BN80A4	138
5.8	517	2.2	240	13800	—	—	—	VFR 130_240	P80	BN80A4	142
6.0	452	2.2	230	8000	—	—	—	VF/W 49/110_230	P80	BN80A4	139
6.7	504	3.0	138	13800	—	—	—	VFR 130_138	P80	BN80B6	142
7.2	435	1.4	192	8000	—	—	—	WR 110_192	P80	BN80A4	138
7.2	443	2.7	192	13800	—	—	—	VFR 130_192	P80	BN80A4	142
7.7	432	1.0	120	7000	—	—	—	WR 86_120	P80	BN80B6	134
8.3	381	0.9	168	7000	—	—	—	WR 86_168	P80	BN80A4	134
8.3	400	1.8	168	8000	—	—	—	WR 110_168	P80	BN80A4	138
8.3	406	3.0	168	13800	—	—	—	VFR 130_168	P80	BN80A4	142



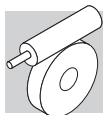
0.55 kW

n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 		
9.2	325	1.5	100	8000	W 110_100	S2	M2SA6	136	W 110_100	P80	BN80B6	137
10.1	329	1.2	138	7000	—	—	—	—	WR 86_138	P80	BN80A4	134
10.1	344	2.1	138	8000	—	—	—	—	WR 110_138	P80	BN80A4	138
10.2	344	1.1	90	6200	—	—	—	—	WR 75_90	P80	BN80B6	130
11.5	269	1.0	80	7000	W 86_80	S2	M2SA6	132	W 86_80	P80	BN80B6	133
11.6	286	1.1	120	6200	—	—	—	—	WR 75_120	P80	BN80A4	130
11.6	299	1.3	120	7000	—	—	—	—	WR 86_120	P80	BN80A4	134
11.6	308	2.6	120	8000	—	—	—	—	WR 110_120	P80	BN80A4	138
12.3	300	1.1	75	6200	—	—	—	—	WR 75_75	P80	BN80B6	130
13.3	288	1.4	69	7000	—	—	—	—	WR 86_69	P80	BN80B6	134
13.3	295	2.5	69	8000	—	—	—	—	WR 110_69	P80	BN80B6	138
13.8	225	1.0	100	7000	W 86_100	S1	M1LA4	132	W 86_100	P80	BN80A4	133
15.4	235	1.4	90	6200	—	—	—	—	WR 75_90	P80	BN80A4	130
15.4	228	1.9	90	7000	—	—	—	—	WR 86_90	P80	BN80A4	134
15.4	238	3.5	90	8000	—	—	—	—	WR 110_90	P80	BN80A4	138
16.4	211	1.5	56	7000	W 86_56	S2	M2SA6	132	W 86_56	P80	BN80B6	133
17.3	180	1.0	80	6200	W 75_80	S1	M1LA4	128	W 75_80	P80	BN80A4	129
17.3	195	1.3	80	7000	W 86_80	S1	M1LA4	132	W 86_80	P80	BN80A4	133
18.5	207	1.4	75	6200	—	—	—	—	WR 75_75	P80	BN80A4	130
20.1	196	1.9	69	7000	—	—	—	—	WR 86_69	P80	BN80A4	134
20.1	201	3.2	69	8000	—	—	—	—	WR 110_69	P80	BN80A4	138
20.4	162	1.0	45	4540	W 63_45	S2	M2SA6	124	W 63_45	P80	BN80B6	125
21.6	166	1.7	64	7000	W 86_64	S1	M1LA4	132	W 86_64	P80	BN80A4	133
23.0	148	1.3	60	6200	W 75_60	S1	M1LA4	128	W 75_60	P80	BN80A4	129
23.0	162	2.2	40	7000	W 86_40	S2	M2SA6	132	W 86_40	P80	BN80B6	133
23.2	175	1.7	60	6040	—	—	—	—	WR 75_60	P80	BN80A4	130
23.2	175	2.2	60	7000	—	—	—	—	WR 86_60	P80	BN80A4	134
24.2	143	1.2	38	4340	W 63_38	S2	M2SA6	124	W 63_38	P80	BN80B6	125
24.6	149	2.0	56	7000	W 86_56	S1	M1LA4	132	W 86_56	P80	BN80A4	133
27.6	129	1.7	50	5960	W 75_50	S1	M1LA4	128	W 75_50	P80	BN80A4	129
30	128	2.7	46	7000	W 86_46	S1	M1LA4	132	W 86_46	P80	BN80A4	133
31	115	1.3	45	4140	W 63_45	S1	M1LA4	124	W 63_45	P80	BN80A4	125
31	136	2.2	45	5580	—	—	—	—	WR 75_45	P80	BN80A4	130
31	133	2.9	45	7000	—	—	—	—	WR 86_45	P80	BN80A4	134
35	110	2.3	40	5610	W 75_40	S1	M1LA4	128	W 75_40	P80	BN80A4	129
35	114	2.9	40	7000	W 86_40	S1	M1LA4	132	W 86_40	P80	BN80A4	133
36	101	1.5	38	3950	W 63_38	S1	M1LA4	124	W 63_38	P80	BN80A4	125
40	105	3.3	23	7000	W 86_23	S2	M2SA6	132	W 86_23	P80	BN80B6	133
46	84	1.9	30	3700	W 63_30	S1	M1LA4	124	W 63_30	P80	BN80A4	125
46	88	3.1	30	5150	W 75_30	S1	M1LA4	128	W 75_30	P80	BN80A4	129
46	95	2.9	30	4950	—	—	—	—	WR 75_30	P80	BN80A4	130
49	76	1.0	28	2170	—	—	—	—	VF 49_28	P80	BN80A4	118
55	76	3.3	25	4880	W 75_25	S1	M1LA4	128	W 75_25	P80	BN80A4	129
58	69	0.9	24	2080	—	—	—	—	VF 49_24	P80	BN80A4	118
58	71	2.2	24	3480	W 63_24	S1	M1LA4	124	W 63_24	P80	BN80A4	125
66	62	1.1	14	1960	—	—	—	—	VF 49_14	P80	BN80B6	118
73	59	2.6	19	3260	W 63_19	S1	M1LA4	124	W 63_19	P80	BN80A4	125
77	53	1.1	18	1930	—	—	—	—	VF 49_18	P80	BN80A4	118
92	47	1.4	10	1800	—	—	—	—	VF 49_10	P80	BN80B6	118
92	47	3.2	15	3050	W 63_15	S1	M1LA4	124	W 63_15	P80	BN80A4	125
99	43	1.5	14	1810	—	—	—	—	VF 49_14	P80	BN80A4	118
115	39	3.6	12	2850	W 63_12	S1	M1LA4	124	W 63_12	P80	BN80A4	125
117	35	1.3	24	1800	—	—	—	—	VF 49_24	P71	BN71B2	118
131	35	3.7	7	2700	W 63_7	S2	M2SA6	124	W 63_7	P80	BN80B6	125
138	32	1.8	10	1650	—	—	—	—	VF 49_10	P80	BN80A4	118
141	30	1.0	20	1490	—	—	—	—	VF 44_20	P71	BN71B2	112
156	28	1.6	18	1650	—	—	—	—	VF 49_18	P71	BN71B2	118
197	23	2.4	7	1480	—	—	—	—	VF 49_7	P80	BN80A4	118
281	16	1.4	10	1210	—	—	—	—	VF 44_10	P71	BN71B2	112
281	16	2.7	10	1390	—	—	—	—	VF 49_10	P71	BN71B2	118
401	12	1.9	7	1080	—	—	—	—	VF 44_7	P71	BN71B2	112



0.75 kW

n ₂ min-1	M ₂ Nm	S	i	R _{n2} N							
0.29	4983	1.3	3200	34500	—	—	—	VF/VF 130/210_3200	P90	BN90S6	162
0.29	4733	1.9	3200	52000	—	—	—	VF/VF 130/250_3200	P90	BN90S6	168
0.36	4783	1.4	2560	34500	—	—	—	VF/VF 130/210_2560	P90	BN90S6	162
0.36	4584	2.0	2560	52000	—	—	—	VF/VF 130/250_2560	P90	BN90S6	168
0.44	3929	1.1	3200	19500	—	—	—	W/VF 86/185_3200	P80	BN80B4	157
0.50	4584	1.0	1840	19500	—	—	—	W/VF 86/185_1840	P90	BN90S6	157
0.50	4011	1.6	1840	34500	—	—	—	VF/VF 130/210_1840	P90	BN90S6	162
0.50	4154	2.2	1840	52000	—	—	—	VF/VF 130/250_1840	P90	BN90S6	168
0.55	3798	1.1	2560	19500	—	—	—	W/VF 86/185_2560	P80	BN80B4	157
0.76	3201	1.3	1840	19500	—	—	—	W/VF 86/185_1840	P80	BN80B4	157
0.88	2865	1.5	1600	19500	—	—	—	W/VF 86/185_1600	P80	BN80B4	157
1.0	2722	1.6	920	19500	—	—	—	W/VF 86/185_920	P90	BN90S6	157
1.2	2087	0.9	1200	13800	—	—	—	W/VF 63/130_1200	P80	BN80B4	145
1.2	2087	2.0	1200	19500	—	—	—	W/VF 86/185_1200	P80	BN80B4	157
1.3	2525	1.1	690	16000	—	—	—	W/VF 86/150_690	P90	BN90S6	151
1.5	1817	1.0	960	13800	—	—	—	W/VF 63/130_960	P80	BN80B4	145
1.5	2118	1.2	920	16000	—	—	—	W/VF 86/150_920	P80	BN80B4	151
1.5	1977	2.1	920	19500	—	—	—	W/VF 86/185_920	P80	BN80B4	157
1.7	2142	1.3	529	16000	—	—	—	W/VF 86/150_529	P90	BN90S6	151
1.8	1760	2.4	800	19500	—	—	—	W/VF 86/185_800	P80	BN80B4	157
1.8	1516	1.2	760	13800	—	—	—	W/VF 63/130_760	P80	BN80B4	145
2.0	1765	1.5	690	16000	—	—	—	W/VF 86/150_690	P80	BN80B4	151
2.3	1228	1.5	600	13800	—	—	—	W/VF 63/130_600	P80	BN80B4	145
2.3	1381	3.0	600	19500	—	—	—	W/VF 86/185_600	P80	BN80B4	157
2.6	1489	1.7	529	16000	—	—	—	W/VF 86/150_529	P80	BN80B4	151
3.0	1294	2.0	460	16000	—	—	—	W/VF 86/150_460	P80	BN80B4	151
3.1	1144	0.9	300	13800	—	—	—	VFR 130_300	P90	BN90S6	142
3.1	1167	1.2	300	16000	—	—	—	VFR 150_300	P90	BN90S6	148
3.1	1168	2.1	300	19500	—	—	—	VFR 185_300	P90	BN90S6	154
3.5	921	1.1	400	8000	—	—	—	VF/W 49/110_400	P80	BN80B4	139
3.5	900	2.0	400	13800	—	—	—	W/VF 63/130_400	P80	BN80B4	145
3.8	1009	1.2	240	13800	—	—	—	VFR 130_240	P90	BN90S6	142
3.8	1009	1.7	240	16000	—	—	—	VFR 150_240	P90	BN90S6	148
3.8	1009	2.8	240	19500	—	—	—	VFR 185_240	P90	BN90S6	154
4.1	1024	2.5	345	16000	—	—	—	W/VF 86/150_345	P80	BN80B4	151
4.7	813	1.1	300	13800	—	—	—	VFR 130_300	P80	BN80B4	142
4.7	737	1.4	300	8000	—	—	—	VF/W 49/110_300	P80	BN80B4	139
4.7	890	2.9	300	16000	—	—	—	W/VF 86/150_300	P80	BN80B4	151
4.8	882	2.2	192	16000	—	—	—	VFR 150_192	P90	BN90S6	148
5.0	716	2.5	280	13800	—	—	—	W/VF 63/130_280	P80	BN80B4	145
5.5	785	1.0	168	8000	—	—	—	WR 110_168	P90	BN90S6	138
5.5	798	2.4	168	16000	—	—	—	VFR 150_168	P90	BN90S6	148
5.8	700	1.6	240	13800	—	—	—	VFR 130_240	P80	BN80B4	142
6.1	612	1.6	230	8000	—	—	—	VF/W 49/110_230	P80	BN80B4	139
6.7	677	1.2	138	8000	—	—	—	WR 110_138	P90	BN90S6	138
6.7	688	2.2	138	13800	—	—	—	VFR 130_138	P90	BN90S6	142
6.7	688	3.2	138	16000	—	—	—	VFR 150_138	P90	BN90S6	148
7.3	589	1.1	192	8000	—	—	—	WR 110_192	P80	BN80B4	138
7.3	599	2.0	192	13800	—	—	—	VFR 130_192	P80	BN80B4	142
8.3	541	1.3	168	8000	—	—	—	WR 110_168	P80	BN80B4	138
8.3	550	2.2	168	13800	—	—	—	VFR 130_168	P80	BN80B4	142
9.2	444	1.1	100	8000	W 110_100 S2	M2SB6	136	W 110_100	P90	BN90S6	137
9.2	459	1.7	100	13200	—	—	—	VF 130_100	P90	BN90S6	140
10.1	445	0.9	138	7000	—	—	—	WR 86_138	P80	BN80B4	134
10.1	466	1.5	138	8000	—	—	—	WR 110_138	P80	BN80B4	138
10.1	473	2.9	138	13800	—	—	—	VFR 130_138	P80	BN80B4	142
11.5	411	1.1	80	8000	W 110_80 S2	M2SB6	136	W 110_80	P90	BN90S6	137
11.5	399	2.4	80	13200	—	—	—	VF 130_80	P90	BN90S6	140
11.7	405	1.0	120	7000	—	—	—	WR 86_120	P80	BN80B4	134
11.7	417	1.9	120	8000	—	—	—	WR 110_120	P80	BN80B4	138
11.7	411	3.4	120	13800	—	—	—	VFR 130_120	P80	BN80B4	142
13.3	403	1.9	69	8000	—	—	—	WR 110_69	P90	BN90S6	138
14.0	317	1.5	100	8000	W 110_100 S2	M2SA4	136	W 110_100	P80	BN80B4	137
14.4	314	1.0	64	7000	W 86_64 S2	M2SB6	132	W 86_64	P90	BN90S6	133
14.4	339	3.1	64	13200	—	—	—	VF 130_64	P90	BN90S6	140



0.75 kW

n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC			
15.6	318	1.0	90	6200	—	—	—	—	—	WR 75_90	P80	BN80B4	130
15.6	308	1.4	90	7000	—	—	—	—	—	WR 86_90	P80	BN80B4	134
15.6	322	2.6	90	8000	—	—	—	—	—	WR 110_90	P80	BN80B4	138
16.4	288	1.1	56	7000	W 86_56	S2	M2SB6	132	—	W 86_56	P90	BN90S6	133
16.4	296	2.2	56	8000	W 110_56	S2	M2SB6	136	—	W 110_56	P90	BN90S6	137
17.5	262	1.0	80	7000	W 86_80	S2	M2SA4	132	—	W 86_80	P80	BN80B4	133
17.5	270	1.7	80	8000	W 110_80	S2	M2SA4	136	—	W 110_80	P80	BN80B4	137
18.4	245	1.0	50	6200	W 75_50	S2	M2SB6	128	—	W 75_50	P90	BN90S6	129
18.7	280	1.1	75	5980	—	—	—	—	—	WR 75_75	P80	BN80B4	130
20.3	265	1.4	69	7000	—	—	—	—	—	WR 86_69	P80	BN80B4	134
20.3	272	2.4	69	8000	—	—	—	—	—	WR 110_69	P80	BN80B4	138
20.4	273	1.3	45	6010	—	—	—	—	—	WR 75_45	P90	BN90S6	130
21.9	223	1.3	64	7000	W 86_64	S2	M2SA4	132	—	W 86_64	P80	BN80B4	133
21.9	229	2.3	64	8000	W 110_64	S2	M2SA4	136	—	W 110_64	P80	BN80B4	137
23.0	212	1.3	40	5930	W 75_40	S2	M2SB6	128	—	W 75_40	P90	BN90S6	129
23.3	200	1.0	60	5960	W 75_60	S2	M2SA4	128	—	W 75_60	P80	BN80B4	129
23.3	236	1.2	60	5640	—	—	—	—	—	WR 75_60	P80	BN80B4	130
23.3	236	1.6	60	7000	—	—	—	—	—	WR 86_60	P80	BN80B4	134
23.3	243	2.8	60	8000	—	—	—	—	—	WR 110_60	P80	BN80B4	138
25.0	201	1.5	56	7000	W 86_56	S2	M2SA4	132	—	W 86_56	P80	BN80B4	133
25.0	206	2.9	56	8000	W 110_56	S2	M2SA4	136	—	W 110_56	P80	BN80B4	137
28.0	174	1.3	50	5670	W 75_50	S2	M2SA4	128	—	W 75_50	P80	BN80B4	129
30	172	2.0	46	7000	W 86_46	S2	M2SA4	132	—	W 86_46	P80	BN80B4	133
30	174	3.4	46	8000	W 110_46	S2	M2SA4	136	—	W 110_46	P80	BN80B4	137
31	154	0.9	45	3860	W 63_45	S2	M2SA4	124	—	W 63_45	P80	BN80B4	125
31	184	1.6	45	5250	—	—	—	—	—	WR 75_45	P80	BN80B4	130
31	180	2.2	45	7000	—	—	—	—	—	WR 86_45	P80	BN80B4	134
35	147	1.7	40	5370	W 75_40	S2	M2SA4	128	—	W 75_40	P80	BN80B4	129
35	153	2.2	40	7000	W 86_40	S2	M2SA4	132	—	W 86_40	P80	BN80B4	133
37	136	1.1	38	3700	W 63_38	S2	M2SA4	124	—	W 63_38	P80	BN80B4	125
40	143	2.4	23	7000	W 86_23	S2	M2SB6	132	—	W 86_23	P90	BN90S6	133
47	114	1.4	30	3490	W 63_30	S2	M2SA4	124	—	W 63_30	P80	BN80B4	125
47	129	2.1	30	4680	—	—	—	—	—	WR 75_30	P80	BN80B4	130
47	118	2.3	30	4950	W 75_30	S2	M2SA4	128	—	W 75_30	P80	BN80B4	129
47	117	3.2	30	7000	W 86_30	S2	M2SA4	132	—	W 86_30	P80	BN80B4	133
56	102	2.4	25	4700	W 75_25	S2	M2SA4	128	—	W 75_25	P80	BN80B4	129
58	96	1.6	24	3290	W 63_24	S2	M2SA4	124	—	W 63_24	P80	BN80B4	125
61	96	3.3	23	7000	W 86_23	S2	M2SA4	132	—	W 86_23	P80	BN80B4	133
70	85	2.9	20	4400	W 75_20	S2	M2SA4	128	—	W 75_20	P80	BN80B4	129
74	79	1.9	19	3100	W 63_19	S2	M2SA4	124	—	W 63_19	P80	BN80B4	125
93	64	2.4	15	2910	W 63_15	S2	M2SA4	124	—	W 63_15	P80	BN80B4	125
100	58	1.1	14	1690	—	—	—	—	—	VF 49_14	P80	BN80B4	118
117	49	1.0	24	1710	—	—	—	—	—	VF 49_24	P80	BN80A2	118
117	52	2.7	12	2740	W 63_12	S2	M2SA4	124	—	W 63_12	P80	BN80B4	125
131	47	2.7	7	2590	W 63_7	S2	M2SB6	124	—	W 63_7	P90	BN90S6	125
140	43	1.4	10	1540	—	—	—	—	—	VF 49_10	P80	BN80B4	118
140	44	3.2	10	2600	W 63_10	S2	M2SA4	124	—	W 63_10	P80	BN80B4	133
187	33	3.8	15	2440	W 63_15	S1	M1LA2	124	—	W 63_15	P80	BN80A2	125
200	31	1.8	7	1400	—	—	—	—	—	VF 49_7	P80	BN80B4	118
200	32	3.8	7	2340	W 63_7	S2	M2SA4	124	—	W 63_7	P80	BN80B4	125
280	22	2.0	10	1340	—	—	—	—	—	VF 49_10	P80	BN80A2	118
400	16	2.6	7	1200	—	—	—	—	—	VF 49_7	P80	BN80A2	118

1.1 kW

n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC			
0.29	7308	0.9	3200	34500	—	—	—	—	—	VF/VF 130/210_3200	P90	BN90L6	162
0.29	6942	1.3	3200	52000	—	—	—	—	—	VF/VF 130/250_3200	P90	BN90L6	168
0.36	7016	0.9	2560	34500	—	—	—	—	—	VF/VF 130/210_2560	P90	BN90L6	162
0.36	6723	1.4	2560	52000	—	—	—	—	—	VF/VF 130/250_2560	P90	BN90L6	168
0.44	5283	1.2	3200	34500	—	—	—	—	—	VF/VF 130/210_3200	P90	BN90S4	162










1.1 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N								
0.44	5042	1.8	3200	52000	—	—	—	—	VF/VF 130/250_3200	P90	BN90S4	168
0.50	7143	0.9	1840	34500	—	—	—	—	VF/VF 130/210_1840	P90	BN90L6	162
0.50	6093	1.5	1840	52000	—	—	—	—	VF/VF 130/250_1840	P90	BN90L6	168
0.55	4610	1.4	2560	34500	—	—	—	—	VF/VF 130/210_2560	P90	BN90S4	162
0.55	4802	1.9	2560	52000	—	—	—	—	VF/VF 130/250_2560	P90	BN90S4	168
0.76	4694	0.9	1840	19500	—	—	—	—	W/VF 86/185_1840	P90	BN90S4	157
0.76	4832	1.3	1840	34500	—	—	—	—	VF/VF 130/210_1840	P90	BN90S4	162
0.76	4280	2.1	1840	52000	—	—	—	—	VF/VF 130/250_1840	P90	BN90S4	168
0.88	4202	1.0	1600	19500	—	—	—	—	W/VF 86/185_1600	P90	BN90S4	157
1.0	3992	1.1	920	19500	—	—	—	—	W/VF 86/185_920	P90	BN90L6	157
1.2	3061	1.4	1200	19500	—	—	—	—	W/VF 86/185_1200	P90	BN90S4	157
1.5	2899	1.4	920	19500	—	—	—	—	W/VF 86/185_920	P90	BN90S4	157
1.8	2581	1.6	800	19500	—	—	—	—	W/VF 86/185_800	P90	BN90S4	157
2.0	2589	1.0	690	16000	—	—	—	—	W/VF 86/150_690	P90	BN90S4	151
2.3	1801	1.0	600	13800	—	—	—	—	W/VF 63/130_600	P90	BN90S4	145
2.3	2026	2.1	600	19500	—	—	—	—	W/VF 86/185_600	P90	BN90S4	157
2.6	2183	1.2	529	16000	—	—	—	—	W/VF 86/150_529	P90	BN90S4	151
3.0	1898	1.4	460	16000	—	—	—	—	W/VF 86/150_460	P90	BN90S4	151
3.1	1713	1.4	300	19500	—	—	—	—	VFR 185_300	P90	BN90L6	154
3.5	1321	1.4	400	13800	—	—	—	—	W/VF 63/130_400	P90	BN90S4	145
3.5	1441	2.9	400	19500	—	—	—	—	W/VF 86/185_400	P90	BN90S4	157
3.8	1480	1.1	240	16000	—	—	—	—	VFR 150_240	P90	BN90L6	148
3.8	1480	1.9	240	19500	—	—	—	—	VFR 185_240	P90	BN90L6	154
4.1	1501	1.7	345	16000	—	—	—	—	W/VF 86/150_345	P90	BN90S4	151
4.7	1222	1.1	300	16000	—	—	—	—	VFR 150_300	P90	BN90S4	148
4.7	1238	1.9	300	19500	—	—	—	—	VFR 185_300	P90	BN90S4	154
4.7	1306	2.0	300	16000	—	—	—	—	W/VF 86/150_300	P90	BN90S4	151
4.8	1272	1.0	192	13800	—	—	—	—	VFR 130_192	P90	BN90L6	142
5.0	1051	1.7	280	13800	—	—	—	—	W/VF 63/130_280	P90	BN90S4	145
5.8	1026	1.1	240	13800	—	—	—	—	VFR 130_240	P90	BN90S4	142
5.8	1044	1.5	240	16000	—	—	—	—	VFR 150_240	P90	BN90S4	148
5.8	1063	2.6	240	19500	—	—	—	—	VFR 185_240	P90	BN90S4	154
6.2	1064	2.4	225	16000	—	—	—	—	W/VF 86/150_225	P90	BN90S4	151
6.7	1008	1.5	138	13800	—	—	—	—	VFR 130_138	P90	BN90L6	142
6.7	1008	2.2	138	16000	—	—	—	—	VFR 150_138	P90	BN90L6	148
7.0	960	2.7	200	16000	—	—	—	—	W/VF 86/150_200	P90	BN90S4	151
7.3	879	1.4	192	13800	—	—	—	—	VFR 130_192	P90	BN90S4	142
7.3	893	1.9	192	16000	—	—	—	—	VFR 150_192	P90	BN90S4	148
7.7	891	1.0	120	8000	—	—	—	—	WR 110_120	P90	BN90L6	138
7.8	878	3.4	180	19500	—	—	—	—	VFR 185_180	P90	BN90S4	154
8.3	807	1.5	168	13800	—	—	—	—	VFR 130_168	P90	BN90S4	142
8.3	819	2.1	168	16000	—	—	—	—	VFR 150_168	P90	BN90S4	148
9.2	674	1.2	100	13200	—	—	—	—	VF 130_100	P90	BN90L6	140
10.1	683	1.0	138	8000	—	—	—	—	WR 110_138	P90	BN90S4	138
10.1	694	1.9	138	13800	—	—	—	—	VFR 130_138	P90	BN90S4	142
10.1	704	2.8	138	16000	—	—	—	—	VFR 150_138	P90	BN90S4	148
10.2	678	1.3	90	8000	—	—	—	—	WR 110_90	P90	BN90L6	138
11.5	585	1.6	80	13200	—	—	—	—	VF 130_80	P90	BN90L6	140
11.7	612	1.3	120	8000	—	—	—	—	WR 110_120	P90	BN90S4	138
11.7	603	2.3	120	13800	—	—	—	—	VFR 130_120	P90	BN90S4	142
11.7	612	3.3	120	16000	—	—	—	—	VFR 150_120	P90	BN90S4	148
14.0	465	1.0	100	8000	W 110_100	S2	M2SB4	136	W 110_100	P90	BN90S4	137
14.0	525	1.1	100	12600	—	—	—	—	VF 130_100	P90	BN90S4	140
15.6	473	1.8	90	8000	—	—	—	—	WR 110_90	P90	BN90S4	138
15.6	479	3.1	90	13800	—	—	—	—	VFR 130_90	P90	BN90S4	142
17.5	396	1.2	80	8000	W 110_80	S2	M2SB4	136	W 110_80	P90	BN90S4	137
17.5	408	2.2	80	12600	—	—	—	—	VF 130_80	P90	BN90S4	140
20.0	362	1.0	46	7000	W 86_46	S3	M3SA6	132	W 86_46	P90	BN90L6	133
20.0	383	3.0	46	13200	—	—	—	—	VF 130_46	P90	BN90L6	140
20.3	388	1.0	69	7000	—	—	—	—	WR 86_69	P90	BN90S4	134
20.3	399	1.6	69	8000	—	—	—	—	WR 110_69	P90	BN90S4	138
20.3	393	3.3	69	13800	—	—	—	—	VFR 130_69	P90	BN90S4	142
21.9	336	1.6	64	8000	W 110_64	S2	M2SB4	136	W 110_64	P90	BN90S4	137
21.9	341	2.7	64	12600	—	—	—	—	VF 130_64	P90	BN90S4	140
23.0	324	1.1	40	7000	W 86_40	S3	M3SA6	132	W 86_40	P90	BN90L6	133



1.1 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 		
23.3	347	1.1	60	7000	—	—	—	WR 86_60	P90	BN90S4	134	
23.3	356	1.9	60	8000	—	—	—	WR 110_60	P90	BN90S4	138	
25.0	294	1.0	56	7000	W 86_56	S2	M2SB4	132	W 86_56	P90	BN90S4	133
25.0	303	2.0	56	8000	W 110_56	S2	M2SB4	136	W 110_56	P90	BN90S4	137
25.0	307	3.1	56	12600	—	—	—	VF 130_56	P90	BN90S4	140	
30	252	1.3	46	7000	W 86_46	S2	M2SB4	132	W 86_46	P90	BN90S4	133
30	255	2.3	46	8000	W 110_46	S2	M2SB4	136	W 110_46	P90	BN90S4	137
31	270	1.1	45	5010	—	—	—	WR 75_45	P90	BN90S4	130	
31	263	1.5	45	7000	—	—	—	WR 86_45	P90	BN90S4	134	
31	270	2.6	45	8000	—	—	—	WR 110_45	P90	BN90S4	138	
35	216	1.2	40	4980	W 75_40	S2	M2SB4	128	W 75_40	P90	BN90S4	129
35	225	1.5	40	7000	W 86_40	S2	M2SB4	132	W 86_40	P90	BN90S4	133
35	228	2.9	40	8000	W 110_40	S2	M2SB4	136	W 110_40	P90	BN90S4	137
37	217	1.2	37.5	4790	—	—	—	WR 75_37.5	P90	BN90S4	130	
40	210	1.6	23	7000	W 86_23	S3	M3SA6	132	W 86_23	P90	BN90L6	133
41	207	1.7	34.5	7000	—	—	—	WR 86_34.5	P90	BN90S4	134	
47	167	1.0	30	3130	W 63_30	S2	M2SB4	124	W 63_30	P90	BN90S4	125
47	189	1.5	30	4530	—	—	—	WR 75_30	P90	BN90S4	130	
47	173	1.6	30	4640	W 75_30	S2	M2SB4	128	W 75_30	P90	BN90S4	129
47	185	1.9	30	7000	—	—	—	WR 86_30	P90	BN90S4	134	
47	171	2.2	30	7000	W 86_30	S2	M2SB4	132	W 86_30	P90	BN90S4	133
56	150	1.7	25	4420	W 75_25	S2	M2SB4	128	W 75_25	P90	BN90S4	129
58	140	1.1	24	2990	W 63_24	S2	M2SB4	124	W 63_24	P90	BN90S4	125
61	142	2.3	23	7000	W 86_23	S2	M2SB4	132	W 86_23	P90	BN90S4	133
70	125	2.0	20	4160	W 75_20	S2	M2SB4	128	W 75_20	P90	BN90S4	129
70	126	2.5	20	7000	W 86_20	S2	M2SB4	132	W 86_20	P90	BN90S4	133
74	115	1.3	19	2840	W 63_19	S2	M2SB4	124	W 63_19	P90	BN90S4	125
93	93	1.6	15	2690	W 63_15	S2	M2SB4	124	W 63_15	P90	BN90S4	125
93	96	2.6	15	3850	W 75_15	S2	M2SB4	128	W 75_15	P90	BN90S4	129
93	96	3.4	15	6820	W 86_15	S2	M2SB4	132	W 86_15	P90	BN90S4	133
117	77	1.8	12	2550	W 63_12	S2	M2SB4	124	W 63_12	P90	BN90S4	125
140	65	2.2	10	2440	W 63_10	S2	M2SB4	124	W 63_10	P90	BN90S4	125
140	66	3.5	10	3420	W 75_10	S2	M2SB4	128	W 75_10	P90	BN90S4	129
187	48	2.6	15	2330	W 63_15	S2	M2SA2	124	W 63_15	P80	BN80B2	125
200	44	1.1	14	1370	—	—	—	VF 49_14	P80	BN80B2	118	
200	46	2.6	7	2210	W 63_7	S2	M2SB4	124	W 63_7	P90	BN90S4	125
233	39	3.2	12	2190	W 63_12	S2	M2SA2	124	W 63_12	P80	BN80B2	125
280	32	1.4	10	1250	—	—	—	VF 49_10	P80	BN80B2	118	
280	33	3.8	10	2080	W 63_10	S2	M2SA2	124	W 63_10	P80	BN80B2	125
400	23	1.8	7	1130	—	—	—	VF 49_7	P80	BN80B2	118	

1.5 kW

n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
0.29	9266	1.0	3200	52000	—	—	—	VF/VF 130/250_3200	P100	BN100LA6	168
0.37	8973	1.0	2560	52000	—	—	—	VF/VF 130/250_2560	P100	BN100LA6	168
0.44	7152	0.9	3200	34500	—	—	—	VF/VF 130/210_3200	P90	BN90LA4	162
0.44	6827	1.3	3200	52000	—	—	—	VF/VF 130/250_3200	P90	BN90LA4	168
0.51	8132	1.1	1840	52000	—	—	—	VF/VF 130/250_1840	P100	BN100LA6	168
0.55	6242	1.0	2560	34500	—	—	—	VF/VF 130/210_2560	P90	BN90LA4	162
0.55	6502	1.4	2560	52000	—	—	—	VF/VF 130/250_2560	P90	BN90LA4	168
0.77	6543	1.0	1840	34500	—	—	—	VF/VF 130/210_1840	P90	BN90LA4	162
0.77	5795	1.6	1840	52000	—	—	—	VF/VF 130/250_1840	P90	BN90LA4	168
1.0	4907	1.3	920	34500	—	—	—	VF/VF 130/210_920	P100	BN100LA6	162
1.0	4907	1.9	920	52000	—	—	—	VF/VF 130/250_920	P100	BN100LA6	168
1.2	4145	1.0	1200	19500	—	—	—	W/VF 86/185_1200	P90	BN90LA4	157
1.2	4633	1.4	800	34500	—	—	—	VF/VF 130/210_800	P100	BN100LA6	162
1.2	4877	1.9	800	52000	—	—	—	VF/VF 130/250_800	P100	BN100LA6	168
1.5	3926	1.1	920	19500	—	—	—	W/VF 86/185_920	P90	BN90LA4	157
1.6	3932	1.7	600	34500	—	—	—	VF/VF 130/210_600	P100	BN100LA6	162
1.6	3932	2.3	600	52000	—	—	—	VF/VF 130/250_600	P100	BN100LA6	168










1.5 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 		
1.8	3495	1.2	800	19500	—	—	—	W/VF 86/185_800	P90	BN90LA4	157	
2.4	2743	1.5	600	19500	—	—	—	W/VF 86/185_600	P90	BN90LA4	157	
2.4	2926	2.2	400	34500	—	—	—	VF/VF 130/210_400	P100	BN100LA6	162	
2.4	2865	3.2	400	52000	—	—	—	VF/VF 130/250_400	P100	BN100LA6	168	
2.7	2956	0.9	529	16000	—	—	—	W/VF 86/150_529	P90	BN90LA4	151	
3.1	2570	1.0	460	16000	—	—	—	W/VF 86/150_460	P90	BN90LA4	151	
3.1	2286	1.0	300	19500	—	—	—	VFR 185_300	P100	BN100LA6	154	
3.1	2240	1.6	300	34500	—	—	—	VFR 210_300	P100	BN100LA6	160	
3.1	2377	2.2	300	52000	—	—	—	VFR 250_300	P100	BN100LA6	166	
3.4	2134	3.0	280	34500	—	—	—	VF/VF 130/210_280	P100	BN100LA6	162	
3.5	1788	1.0	400	13800	—	—	—	W/VF 63/130_400	P90	BN90LA4	145	
3.5	1951	2.2	400	19500	—	—	—	W/VF 86/185_400	P90	BN90LA4	157	
3.9	1975	0.9	240	16000	—	—	—	VFR 150_240	P100	BN100LA6	148	
3.9	1975	1.4	240	19500	—	—	—	VFR 185_240	P100	BN100LA6	154	
3.9	1975	2.2	240	34500	—	—	—	VFR 210_240	P100	BN100LA6	160	
3.9	2048	2.8	240	52000	—	—	—	VFR 250_240	P100	BN100LA6	166	
4.1	2033	1.3	345	16000	—	—	—	W/VF 86/150_345	P90	BN90LA4	151	
4.7	1676	1.4	300	19500	—	—	—	VFR 185_300	P90	BN90LA4	154	
4.7	1768	1.5	300	16000	—	—	—	W/VF 86/150_300	P90	BN90LA4	151	
4.9	1726	1.1	192	16000	—	—	—	VFR 150_192	P100	BN100LA6	148	
5.0	1422	1.3	280	13800	—	—	—	W/VF 63/130_280	P90	BN90LA4	145	
5.0	1479	2.8	280	19500	—	—	—	W/VF 86/185_280	P90	BN90LA4	157	
5.2	1646	2.0	180	19500	—	—	—	VFR 185_180	P100	BN100LA6	154	
5.2	1481	3.3	180	34500	—	—	—	VFR 210_180	P100	BN100LA6	160	
5.6	1536	0.9	168	13800	—	—	—	VFR 130_168	P100	BN100LA6	142	
5.9	1414	1.1	240	16000	—	—	—	VFR 150_240	P90	BN90LA4	148	
5.9	1439	1.9	240	19500	—	—	—	VFR 185_240	P90	BN90LA4	154	
6.3	1440	1.8	225	16000	—	—	—	W/VF 86/150_225	P90	BN90LA4	151	
7.1	1300	2.0	200	16000	—	—	—	W/VF 86/150_200	P90	BN90LA4	151	
7.3	1190	1.0	192	13800	—	—	—	VFR 130_192	P90	BN90LA4	142	
7.3	1209	1.4	192	16000	—	—	—	VFR 150_192	P90	BN90LA4	148	
7.8	1189	2.5	180	19500	—	—	—	VFR 185_180	P90	BN90LA4	154	
8.4	1092	1.1	168	13800	—	—	—	VFR 130_168	P90	BN90LA4	142	
8.4	1109	1.6	168	16000	—	—	—	VFR 150_168	P90	BN90LA4	148	
9.4	930	1.2	100	15500	—	—	—	VF 150_100	P100	BN100LA6	146	
9.4	945	2.1	100	19500	—	—	—	VF 185_100	P100	BN100LA6	152	
9.4	1021	3.2	150	16000	—	—	—	VFR 185_150	P90	BN90LA4	154	
10.2	939	1.4	138	13800	—	—	—	VFR 130_138	P90	BN90LA4	142	
10.2	953	2.1	138	16000	—	—	—	VFR 150_138	P90	BN90LA4	148	
10.4	905	1.0	90	8000	—	—	—	WR 110_90	P100	BN100LA6	138	
10.4	1001	3.2	90	19500	—	—	—	VFR 185_90	P100	BN100LA6	154	
11.8	829	1.0	120	8000	—	—	—	WR 110_120	P90	BN90LA4	138	
11.8	780	1.2	80	13200	—	—	—	VF 130_80	P100	BN100LA6	140	
11.8	792	1.7	80	15500	—	—	—	VF 150_80	P100	BN100LA6	146	
11.8	817	1.7	120	13800	—	—	—	VFR 130_120	P90	BN90LA4	142	
11.8	829	2.4	120	16000	—	—	—	VFR 150_120	P90	BN90LA4	148	
11.8	805	3.0	80	19000	—	—	—	VF 185_80	P100	BN100LA6	152	
13.6	789	1.0	69	8000	—	—	—	WR 110_69	P100	BN100LA6	138	
13.6	778	1.9	69	13800	—	—	—	VFR 130_69	P100	BN100LA6	142	
13.6	778	2.6	69	16000	—	—	—	VFR 150_69	P100	BN100LA6	148	
14.7	673	2.2	64	15500	—	—	—	VF 150_64	P100	BN100LA6	146	
15.7	640	1.3	90	8000	—	—	—	WR 110_90	P90	BN90LA4	138	
15.7	649	2.3	90	13800	—	—	—	VFR 130_90	P90	BN90LA4	142	
15.7	658	3.0	90	16000	—	—	—	VFR 150_90	P90	BN90LA4	148	
16.8	580	1.1	56	8000	W 110_56	S3	M3LA6	136	W 110_56	P100	BN100LA6	137
16.8	597	1.8	56	13200	—	—	—	VF 130_56	P100	BN100LA6	140	
16.8	606	2.5	56	15500	—	—	—	VF 150_56	P100	BN100LA6	146	
17.6	553	1.6	80	12600	—	—	—	VF 130_80	P90	BN90LA4	140	
20.4	540	1.2	69	8000	—	—	—	WR 110_69	P90	BN90LA4	138	
20.4	498	1.3	46	8000	W 110_46	S3	M3LA6	136	W 110_46	P100	BN100LA6	137
20.4	533	2.4	69	13800	—	—	—	VFR 130_69	P90	BN90LA4	142	
20.4	519	3.4	46	15500	—	—	—	VF 150_46	P100	BN100LA6	146	
20.4	540	3.4	69	16000	—	—	—	VFR 150_69	P90	BN90LA4	148	
22.0	455	1.2	64	8000	W 110_64	S3	M3SA4	136	W 110_64	P90	BN90LA4	137
22.0	462	2.0	64	12600	—	—	—	VF 130_64	P90	BN90LA4	140	



1.5 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 		
23.5	482	1.4	60	8000	—	—	—	—	WR 110_60	P90	BN90LA4	138
23.5	445	2.7	40	13200	—	—	—	—	VF 130_40	P100	BN100LA6	140
23.5	475	2.8	60	13800	—	—	—	—	VFR 130_60	P90	BN90LA4	142
25.2	410	1.5	56	8000	W 110_56	S3	M3SA4	136	W 110_56	P90	BN90LA4	137
25.2	415	2.3	56	12600	—	—	—	—	VF 130_56	P90	BN90LA4	140
31	341	1.0	46	7000	W 86_46	S3	M3SA4	132	W 86_46	P90	BN90LA4	133
31	346	1.7	46	8000	W 110_46	S3	M3SA4	136	W 110_46	P90	BN90LA4	137
31	355	3.0	46	12600	—	—	—	—	VF 130_46	P90	BN90LA4	140
31	357	1.1	45	7000	—	—	—	—	WR 86_45	P90	BN90LA4	134
31	366	1.9	45	8000	—	—	—	—	WR 110_45	P90	BN90LA4	138
35	305	1.1	40	7000	W 86_40	S3	M3SA4	132	W 86_40	P90	BN90LA4	133
35	309	2.2	40	8000	W 110_40	S3	M3SA4	136	W 110_40	P90	BN90LA4	137
38	293	0.9	37.5	4330	—	—	—	—	WR 75_37.5	P90	BN90LA4	130
38	293	0.9	25	4330	W 75_25	S3	M3LA6	128	W 75_25	P100	BN100LA6	129
41	280	1.2	34.5	7000	—	—	—	—	WR 86_34.5	P90	BN90LA4	134
41	280	1.2	23	7000	W 86_23	S3	M3LA6	132	W 86_23	P100	BN100LA6	133
47	256	1.1	30	4130	—	—	—	—	WR 75_30	P90	BN90LA4	130
47	235	1.2	30	4270	W 75_30	S3	M3SA4	128	W 75_30	P90	BN90LA4	129
47	250	1.4	30	7000	—	—	—	—	WR 86_30	P90	BN90LA4	134
47	232	1.6	30	7000	W 86_30	S3	M3SA4	132	W 86_30	P90	BN90LA4	133
47	235	3.0	30	8000	W 110_30	S3	M3SA4	136	W 110_30	P90	BN90LA4	137
56	203	1.2	25	4100	W 75_25	S3	M3SA4	128	W 75_25	P90	BN90LA4	129
61	192	1.7	23	7000	W 86_23	S3	M3SA4	132	W 86_23	P90	BN90LA4	133
61	194	2.8	23	8000	W 110_23	S3	M3SA4	136	W 110_23	P90	BN90LA4	137
71	169	1.5	20	3880	W 75_20	S3	M3SA4	128	W 75_20	P90	BN90LA4	129
71	171	1.9	20	7000	W 86_20	S3	M3SA4	132	W 86_20	P90	BN90LA4	133
71	171	3.3	20	8000	W 110_20	S3	M3SA4	136	W 110_20	P90	BN90LA4	137
74	156	1.0	19	2550	—	—	—	—	W 63_19	P90	BN90LA4	125
94	126	1.2	15	2450	—	—	—	—	W 63_15	P90	BN90LA4	125
94	130	1.9	15	3630	W 75_15	S3	M3SA4	128	W 75_15	P90	BN90LA4	129
94	131	2.4	15	6520	—	—	—	—	WR 86_15	P90	BN90LA4	134
94	130	2.5	15	6610	W 86_15	S3	M3SA4	132	W 86_15	P90	BN90LA4	133
118	104	1.4	12	2340	—	—	—	—	W 63_12	P90	BN90LA4	125
134	94	2.2	7	3150	W 75_7	S3	M3LA6	128	W 75_7	P100	BN100LA6	129
141	87	1.6	10	2250	—	—	—	—	W 63_10	P90	BN90LA4	125
141	89	2.6	10	3250	W 75_10	S3	M3SA4	128	W 75_10	P90	BN90LA4	129
141	89	3.2	10	5850	W 86_10	S3	M3SA4	132	W 86_10	P90	BN90LA4	133
187	66	1.9	15	2200	W 63_15	S2	M2SB2	124	W 63_15	P90	BN90SA2	125
187	68	3.3	15	3120	W 75_15	S2	M2SB2	128	W 75_15	P90	BN90SA2	129
201	63	1.9	7	2060	—	—	—	—	W 63_7	P90	BN90LA4	125
201	64	3.0	7	2920	W 75_7	S3	M3SA4	128	W 75_7	P90	BN90LA4	129
201	63	3.9	7	5240	W 86_7	S3	M3SA4	132	W 86_7	P90	BN90LA4	133
233	53	2.3	12	2080	W 63_12	S2	M2SB2	124	W 63_12	P90	BN90SA2	125
280	45	2.8	10	1980	W 63_10	S2	M2SB2	124	W 63_10	P90	BN90SA2	125

1.85 kW

n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 		
0.44	8480	1.1	3200	52000	—	—	—	—	VF/VF 130/250_3200	P90	BN90LB4	168
0.55	8077	1.1	2560	52000	—	—	—	—	VF/VF 130/250_2560	P90	BN90LB4	168
0.76	7198	1.3	1840	52000	—	—	—	—	VF/VF 130/250_1840	P90	BN90LB4	168
1.0	6117	1.1	920	34500	—	—	—	—	VF/VF 130/210_920	P100	BN100LB6	162
1.0	6117	1.5	920	52000	—	—	—	—	VF/VF 130/250_920	P100	BN100LB6	168
1.2	5775	1.1	800	34500	—	—	—	—	VF/VF 130/210_800	P100	BN100LB6	162
1.2	6079	1.5	800	52000	—	—	—	—	VF/VF 130/250_800	P100	BN100LB6	168
1.6	4901	1.3	600	34500	—	—	—	—	VF/VF 130/210_600	P100	BN100LB6	162
1.6	4901	1.9	600	52000	—	—	—	—	VF/VF 130/250_600	P100	BN100LB6	168
1.8	4341	1.0	800	19500	—	—	—	—	W/VF 86/185_800	P90	BN90LB4	157
2.3	3647	1.8	400	34500	—	—	—	—	VF/VF 130/210_400	P100	BN100LB6	162
2.3	3571	2.6	400	52000	—	—	—	—	VF/VF 130/250_400	P100	BN100LB6	168
2.3	3407	1.2	600	19500	—	—	—	—	W/VF 86/185_600	P90	BN90LB4	157










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






n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 		
3.1	2793	1.3	300	34500	—	—	—	VFR 210_300	P100	BN100LB6	160	
3.1	2964	1.8	300	52000	—	—	—	VFR 250_300	P100	BN100LB6	166	
3.3	2660	2.4	280	34500	—	—	—	VF/VF 130/210_280	P100	BN100LB6	162	
3.3	2713	3.4	280	52000	—	—	—	VF/VF 130/250_280	P100	BN100LB6	168	
3.5	2423	1.7	400	19500	—	—	—	W/VF 86/185_400	P90	BN90LB4	157	
3.9	2462	1.1	240	19500	—	—	—	VFR 185_240	P100	BN100LB6	154	
3.9	2462	1.8	240	34500	—	—	—	VFR 210_240	P100	BN100LB6	160	
3.9	2553	2.3	240	52000	—	—	—	VFR 250_240	P100	BN100LB6	166	
4.1	2525	1.0	345	16000	—	—	—	W/VF 86/150_345	P90	BN90LB4	151	
4.7	2082	1.1	300	19500	—	—	—	VFR 185_300	P90	BN90LB4	154	
4.7	2196	1.2	300	16000	—	—	—	W/VF 86/150_300	P90	BN90LB4	151	
4.8	2152	0.9	192	16000	—	—	—	VFR 150_192	P100	BN100LB6	148	
5.0	1767	1.0	280	13800	—	—	—	W/VF 63/130_280	P90	BN90LB4	145	
5.0	1837	2.3	280	19500	—	—	—	W/VF 86/185_280	P90	BN90LB4	157	
5.2	2052	1.6	180	19500	—	—	—	VFR 185_180	P100	BN100LB6	154	
5.2	1847	2.7	180	34500	—	—	—	VFR 210_180	P100	BN100LB6	160	
5.2	2120	3.2	180	52000	—	—	—	VFR 250_180	P100	BN100LB6	166	
5.8	1757	0.9	240	16000	—	—	—	VFR 150_240	P90	BN90LB4	148	
5.8	1787	1.6	240	19500	—	—	—	VFR 185_240	P90	BN90LB4	154	
6.2	1767	3.0	150	34500	—	—	—	VFR 210_150	P100	BN100LB6	160	
6.2	1789	1.5	225	16000	—	—	—	W/VF 86/150_225	P90	BN90LB4	151	
6.7	1678	0.9	138	13800	—	—	—	VFR 130_138	P100	BN100LB6	142	
6.7	1678	1.3	138	16000	—	—	—	VFR 150_138	P100	BN100LB6	148	
7.0	1615	1.6	200	16000	—	—	—	W/VF 86/150_200	P90	BN90LB4	151	
7.3	1502	1.1	192	16000	—	—	—	VFR 150_192	P90	BN90LB4	148	
7.8	1476	2.0	180	19500	—	—	—	VFR 185_180	P90	BN90LB4	154	
8.3	1357	0.9	168	13800	—	—	—	VFR 130_168	P90	BN90LB4	142	
8.3	1378	1.3	168	16000	—	—	—	VFR 150_168	P90	BN90LB4	148	
9.3	1159	1.0	100	15500	—	—	—	VF 150_100	P100	BN100LB6	146	
9.3	1178	1.7	100	19000	—	—	—	VF 185_100	P100	BN100LB6	152	
9.3	1268	2.6	150	19500	—	—	—	VFR 185_150	P90	BN90LB4	154	
10.1	1167	1.2	138	13800	—	—	—	VFR 130_138	P90	BN90LB4	142	
10.1	1184	1.7	138	16000	—	—	—	VFR 150_138	P90	BN90LB4	148	
11.6	973	1.0	80	13200	—	—	—	VF 130_80	P100	BN100LB6	140	
11.6	988	1.4	80	15500	—	—	—	VF 150_80	P100	BN100LB6	146	
11.6	1003	2.4	80	19000	—	—	—	VF 185_80	P100	BN100LB6	152	
11.7	1015	1.4	120	13800	—	—	—	VFR 130_120	P90	BN90LB4	142	
11.7	1030	1.9	120	16000	—	—	—	VFR 150_120	P90	BN90LB4	148	
11.7	1060	3.4	120	19500	—	—	—	VFR 185_120	P90	BN90LB4	154	
13.5	970	1.5	69	13800	—	—	—	VFR 130_69	P100	BN100LB6	142	
13.5	970	2.1	69	16000	—	—	—	VFR 150_69	P100	BN100LB6	148	
14.5	839	1.7	64	15500	—	—	—	VF 150_64	P100	BN100LB6	146	
15.6	795	1.0	90	8000	—	—	—	WR 110_90	P90	BN90LB4	138	
15.6	806	1.9	90	13800	—	—	—	VFR 130_90	P90	BN90LB4	142	
15.6	818	2.4	90	16000	—	—	—	VFR 150_90	P90	BN90LB4	148	
15.6	863	3.2	90	19500	—	—	—	VFR 185_90	P90	BN90LB4	154	
16.6	755	2.0	56	15500	—	—	—	VF 150_56	P100	BN100LB6	146	
17.5	687	1.3	80	12600	—	—	—	VF 130_80	P90	BN90LB4	140	
20.2	647	2.7	46	15500	—	—	—	VF 150_46	P100	BN100LB6	146	
20.3	670	1.0	69	8000	—	—	—	WR 110_69	P90	BN90LB4	138	
20.3	662	2.0	69	13800	—	—	—	VFR 130_69	P90	BN90LB4	142	
20.3	670	2.8	69	16000	—	—	—	VFR 150_69	P90	BN90LB4	148	
21.9	565	0.9	64	8000	—	—	—	W 110_64	P90	BN90LB4	137	
21.9	573	1.6	64	12600	—	—	—	VF 130_64	P90	BN90LB4	140	
23.3	555	1.3	40	8000	W 110_40	S3	M3LB6	136	W 110_40	P100	BN100LB6	137
23.3	562	3.1	40	15500	—	—	—	VF 150_40	P100	BN100LB6	146	
23.3	598	1.1	60	8000	—	—	—	WR 110_60	P90	BN90LB4	138	
23.3	591	2.3	60	13800	—	—	—	VFR 130_60	P90	BN90LB4	142	
23.3	598	3.2	60	16000	—	—	—	VFR 150_60	P90	BN90LB4	148	
25.0	509	1.2	56	8000	—	—	—	W 110_56	P90	BN90LB4	137	
25.0	516	1.9	56	12600	—	—	—	VF 130_56	P90	BN90LB4	140	
30	430	1.4	46	8000	—	—	—	W 110_46	P90	BN90LB4	137	
30	441	2.4	46	12600	—	—	—	VF 130_46	P90	BN90LB4	140	
31	416	1.0	30	7000	W 86_30	S3	M3LB6	132	W 86_30	P100	BN100LB6	133
31	443	0.9	45	7000	—	—	—	WR 86_45	P90	BN90LB4	134	



1.85 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
31	454	1.6	45	8000	—	—	—	—	WR 110_45	P90 BN90LB4	138
35	384	1.7	40	8000	—	—	—	—	W 110_40	P90 BN90LB4	137
40	350	1.0	23	7000	W 86_23	S3 M3LB6	132	—	W 86_23	P100 BN100LB6	133
40	354	3.0	23	13200	—	—	—	—	VF 130_23	P100 BN100LB6	140
41	348	1.0	34.5	7000	—	—	—	—	WR 86_34.5	P90 BN90LB4	134
42	339	3.1	69	13800	—	—	—	—	VFR 130_69	P90 BN90SB2	142
47	308	1.1	20	7000	W 86_20	S3 M3LB6	132	—	W 86_20	P100 BN100LB6	133
47	312	3.4	20	13200	—	—	—	—	VF 130_20	P100 BN100LB6	140
47	292	0.9	30	3960	—	—	—	—	W 75_30	P90 BN90LB4	129
47	310	1.1	30	7000	—	—	—	—	WR 86_30	P90 BN90LB4	134
47	288	1.3	30	7000	—	—	—	—	W 86_30	P90 BN90LB4	133
47	318	2.1	30	8000	—	—	—	—	WR 110_30	P90 BN90LB4	138
47	292	2.4	30	8000	—	—	—	—	W 110_30	P90 BN90LB4	137
56	252	1.0	25	3820	—	—	—	—	W 75_25	P90 BN90LB4	129
61	238	1.3	23	7000	—	—	—	—	W 86_23	P90 BN90LB4	133
61	241	2.2	23	8000	—	—	—	—	W 110_23	P90 BN90LB4	137
62	237	1.1	15	3600	W 75_15	S3 M3LB6	128	—	W 75_15	P100 BN100LB6	129
62	234	1.5	15	7000	W 86_15	S3 M3LB6	132	—	W 86_15	P100 BN100LB6	133
67	228	2.6	21	8000	—	—	—	—	WR 110_21	P90 BN90LB4	138
70	209	1.2	20	3650	—	—	—	—	W 75_20	P90 BN90LB4	129
70	212	1.5	20	6960	—	—	—	—	W 86_20	P90 BN90LB4	133
70	212	2.7	20	8000	—	—	—	—	W 110_20	P90 BN90LB4	137
93	163	1.5	10	3280	W 75_10	S3 M3LB6	128	—	W 75_10	P100 BN100LB6	129
93	157	1.0	15	2230	—	—	—	—	W 63_15	P90 BN90LB4	125
93	161	1.6	15	3440	—	—	—	—	W 75_15	P90 BN90LB4	129
93	161	2.1	15	6450	—	—	—	—	W 86_15	P90 BN90LB4	133
117	129	1.1	12	2150	—	—	—	—	W 63_12	P90 BN90LB4	125
133	117	1.8	7	2970	W 75_7	S3 M3LB6	128	—	W 75_7	P100 BN100LB6	129
133	117	2.3	7	5700	W 86_7	S3 M3LB6	132	—	W 86_7	P100 BN100LB6	133
140	109	1.3	10	2090	—	—	—	—	W 63_10	P90 BN90LB4	125
140	111	2.1	10	3100	—	—	—	—	W 75_10	P90 BN90LB4	129
140	111	2.6	10	5730	—	—	—	—	W 86_10	P90 BN90LB4	133
192	79	1.6	15	2080	—	—	—	—	W 63_15	P90 BN90SB2	125
192	81	2.8	15	3000	—	—	—	—	W 75_15	P90 BN90SB2	129
200	78	1.5	7	1930	—	—	—	—	W 63_7	P90 BN90LB4	125
200	80	2.4	7	2790	—	—	—	—	W 75_7	P90 BN90LB4	129
200	79	3.2	7	5140	—	—	—	—	W 86_7	P90 BN90LB4	133
240	64	2.0	12	1980	—	—	—	—	W 63_12	P90 BN90SB2	125
288	54	2.3	10	1890	—	—	—	—	W 63_10	P90 BN90SB2	125
288	55	3.7	10	2670	—	—	—	—	W 75_10	P90 BN90SB2	129
411	39	2.7	7	1720	—	—	—	—	W 63_7	P90 BN90SB2	125

2.2 kW

n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
0.44	10013	0.9	3200	52000	—	—	—	—	VF/VF 130/250_3200	P100 BN100LA4	168
0.55	9536	0.9	2560	52000	—	—	—	—	VF/VF 130/250_2560	P100 BN100LA4	168
0.77	8499	1.1	1840	52000	—	—	—	—	VF/VF 130/250_1840	P100 BN100LA4	168
0.88	7629	1.2	1600	52000	—	—	—	—	VF/VF 130/250_1600	P100 BN100LA4	168
1.0	7197	0.9	920	34500	—	—	—	—	VF/VF 130/210_920	P112 BN112M6	162
1.0	7197	1.3	920	52000	—	—	—	—	VF/VF 130/250_920	P112 BN112M6	168
1.2	6258	1.0	1200	34500	—	—	—	—	VF/VF 130/210_1200	P100 BN100LA4	162
1.2	6258	1.4	1200	52000	—	—	—	—	VF/VF 130/250_1200	P100 BN100LA4	168
1.5	5072	1.2	920	34500	—	—	—	—	VF/VF 130/210_920	P100 BN100LA4	162
1.5	5072	1.8	920	52000	—	—	—	—	VF/VF 130/250_920	P100 BN100LA4	168
1.8	4887	1.3	800	34500	—	—	—	—	VF/VF 130/210_800	P100 BN100LA4	162
1.8	5007	1.8	800	52000	—	—	—	—	VF/VF 130/250_800	P100 BN100LA4	168
2.4	4023	1.0	600	19500	—	—	—	—	W/VF 86/185_600	P100 BN100LA4	157
2.4	3844	1.6	600	34500	—	—	—	—	VF/VF 130/210_600	P100 BN100LA4	162
2.4	3934	2.3	600	52000	—	—	—	—	VF/VF 130/250_600	P100 BN100LA4	168
3.1	3286	1.1	300	34500	—	—	—	—	VFR 210_300	P112 BN112M6	160










2.2 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 		
3.1	3487	1.5	300	52000	—	—	—	VFR 250_300	P112	BN112M6	166	
3.5	2861	1.5	400	19500	—	—	—	W/VF 86/185_400	P100	BN100LA4	157	
3.5	2980	2.1	400	34500	—	—	—	VF/VF 130/210_400	P100	BN100LA4	162	
3.5	2921	3.1	400	52000	—	—	—	VF/VF 130/250_400	P100	BN100LA4	168	
3.9	2897	1.0	240	19500	—	—	—	VFR 185_240	P112	BN112M6	154	
3.9	2897	1.5	240	34500	—	—	—	VFR 210_240	P112	BN112M6	160	
3.9	3004	1.9	240	52000	—	—	—	VFR 250_240	P112	BN112M6	166	
4.7	2459	0.9	300	19500	—	—	—	VFR 185_300	P100	BN100LA4	154	
4.7	2459	1.4	300	34500	—	—	—	VFR 210_300	P100	BN100LA4	160	
4.7	2548	2.0	300	52000	—	—	—	VFR 250_300	P100	BN100LA4	166	
5.0	2170	1.9	280	19500	—	—	—	W/VF 86/185_280	P100	BN100LA4	157	
5.0	2170	2.9	280	34500	—	—	—	VF/VF 130/210_280	P100	BN100LA4	162	
5.6	2291	0.9	168	16000	—	—	—	VFR 150_168	P112	BN112M6	148	
5.9	2110	1.3	240	19500	—	—	—	VFR 185_240	P100	BN100LA4	154	
5.9	2110	1.8	240	34500	—	—	—	VFR 210_240	P100	BN100LA4	160	
5.9	2181	2.5	240	52000	—	—	—	VFR 250_240	P100	BN100LA4	166	
7.3	1774	1.0	192	16000	—	—	—	VFR 150_192	P100	BN100LA4	148	
7.8	1690	0.9	120	13800	—	—	—	VFR 130_120	P112	BN112M6	142	
7.8	1743	1.7	180	19500	—	—	—	VFR 185_180	P100	BN100LA4	154	
7.8	1717	2.5	180	34500	—	—	—	VFR 210_180	P100	BN100LA4	160	
7.8	1797	3.5	180	52000	—	—	—	VFR 250_180	P100	BN100LA4	166	
8.4	1627	1.1	168	16000	—	—	—	VFR 150_168	P100	BN100LA4	148	
9.4	1386	1.4	100	19000	—	—	—	VF 185_100	P112	BN112M6	152	
9.4	1498	2.2	150	19500	—	—	—	VFR 185_150	P100	BN100LA4	154	
9.4	1498	3.0	150	34500	—	—	—	VFR 210_150	P100	BN100LA4	160	
10.2	1378	1.0	138	13800	—	—	—	VFR 130_138	P100	BN100LA4	142	
10.2	1398	1.4	138	16000	—	—	—	VFR 150_138	P100	BN100LA4	148	
10.4	1468	2.2	90	19500	—	—	—	VFR 185_90	P112	BN112M6	154	
10.4	1448	3.2	90	34500	—	—	—	VFR 210_90	P112	BN112M6	160	
11.8	1162	1.2	80	15500	—	—	—	VF 150_80	P112	BN112M6	146	
11.8	1198	1.2	120	13800	—	—	—	VFR 130_120	P100	BN100LA4	142	
11.8	1216	1.6	120	16000	—	—	—	VFR 150_120	P100	BN100LA4	148	
11.8	1180	2.0	80	19000	—	—	—	VF 185_80	P112	BN112M6	152	
11.8	1252	2.9	120	19500	—	—	—	VFR 185_120	P100	BN100LA4	154	
11.8	1252	4.0	120	34500	—	—	—	VFR 210_120	P100	BN100LA4	160	
13.6	1141	1.3	69	13800	—	—	—	VFR 130_69	P112	BN112M6	142	
13.6	1141	1.8	69	16000	—	—	—	VFR 150_69	P112	BN112M6	148	
14.1	969	1.2	100	14700	—	—	—	VF 150_100	P100	BN100LA4	146	
14.1	969	2.0	100	18000	—	—	—	VF 185_100	P100	BN100LA4	152	
14.7	973	1.1	64	13200	—	—	—	VF 130_64	P112	BN112M6	140	
15.7	952	1.6	90	13800	—	—	—	VFR 130_90	P100	BN100LA4	142	
15.7	966	2.0	90	16000	—	—	—	VFR 150_90	P100	BN100LA4	148	
15.7	952	2.7	60	19000	—	—	—	VF 185_60	P112	BN112M6	152	
15.7	1019	2.7	90	19500	—	—	—	VFR 185_90	P100	BN100LA4	154	
16.8	876	1.2	56	13200	—	—	—	VF 130_56	P112	BN112M6	140	
17.6	811	1.1	80	12600	—	—	—	VF 130_80	P100	BN100LA4	140	
17.6	823	1.5	80	14700	—	—	—	VF 150_80	P100	BN100LA4	146	
17.6	823	2.6	80	18000	—	—	—	VF 185_80	P100	BN100LA4	152	
20.4	751	1.5	46	13200	—	—	—	VF 130_46	P112	BN112M6	140	
20.4	781	1.7	69	13800	—	—	—	VFR 130_69	P100	BN100LA4	142	
20.4	761	2.3	46	15500	—	—	—	VF 150_46	P112	BN112M6	146	
20.4	792	2.3	69	16000	—	—	—	VFR 150_69	P100	BN100LA4	148	
20.9	774	1.1	45	8000	—	—	—	WR 110_45	P112	BN112M6	138	
22.0	677	1.4	64	12600	—	—	—	VF 130_64	P100	BN100LA4	140	
22.0	687	1.9	64	14700	—	—	—	VF 150_64	P100	BN100LA4	146	
23.3	660	1.1	40	8000	W 110_40	S3	M3LC6	136	W 110_40	P112	BN112M6	137
23.5	706	1.0	60	8000	—	—	—	—	WR 110_60	P100	BN100LA4	138
23.5	697	1.9	60	13800	—	—	—	—	VFR 130_60	P100	BN100LA4	142
23.5	706	2.7	60	16000	—	—	—	—	VFR 150_60	P100	BN100LA4	148
23.5	662	3.4	60	18000	—	—	—	—	VF 185_60	P100	BN100LA4	152
25.2	601	1.0	56	8000	W 110_56	S3	M3LA4	136	W 110_56	P100	BN100LA4	137
25.2	609	1.6	56	12600	—	—	—	—	VF 130_56	P100	BN100LA4	140
25.2	617	2.2	56	14200	—	—	—	—	VF 150_56	P100	BN100LA4	146
31	507	1.2	46	8000	W 110_46	S3	M3LA4	136	W 110_46	P100	BN100LA4	137
31	521	2.0	46	12600	—	—	—	—	VF 130_46	P100	BN100LA4	140



2.2 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
31	528	2.9	46	14700	—	—	—	—	VF 150_46	P100 BN100LA4	146
31	536	1.3	45	8000	—	—	—	—	WR 110_45	P100 BN100LA4	138
31	550	3.1	45	16000	—	—	—	—	VFR 150_45	P100 BN100LA4	148
35	453	1.5	40	8000	W 110_40	S3 M3LA4	136	—	W 110_40	P100 BN100LA4	137
35	453	2.4	40	12600	—	—	—	—	VF 130_40	P100 BN100LA4	140
35	459	3.4	40	14700	—	—	—	—	VF 150_40	P100 BN100LA4	146
41	416	2.5	23	13200	—	—	—	—	VF 130_23	P112 BN112M6	140
47	340	1.1	30	7000	W 86_30	S3 M3LA4	132	—	W 86_30	P100 BN100LA4	133
47	344	2.0	30	8000	W 110_30	S3 M3LA4	136	—	W 110_30	P100 BN100LA4	137
47	353	3.0	30	12600	—	—	—	—	VF 130_30	P100 BN100LA4	140
61	281	1.1	23	6990	W 86_23	S3 M3LA4	132	—	W 86_23	P100 BN100LA4	133
61	284	1.9	23	8000	W 110_23	S3 M3LA4	136	—	W 110_23	P100 BN100LA4	137
61	284	3.1	23	12600	—	—	—	—	VF 130_23	P100 BN100LA4	140
71	247	1.0	20	3410	W 75_20	S3 M3LA4	128	—	W 75_20	P100 BN100LA4	129
71	250	1.3	20	6730	W 86_20	S3 M3LA4	132	—	W 86_20	P100 BN100LA4	133
71	250	2.3	20	8000	W 110_20	S3 M3LA4	136	—	W 110_20	P100 BN100LA4	137
94	190	1.3	15	3240	W 75_15	S3 M3LA4	128	—	W 75_15	P100 BN100LA4	129
94	190	1.7	15	6270	W 86_15	S3 M3LA4	132	—	W 86_15	P100 BN100LA4	133
94	188	3.2	15	8000	W 110_15	S3 M3LA4	136	—	W 110_15	P100 BN100LA4	137
133	139	1.5	7	2780	W 75_7	S3 M3LC6	128	—	W 75_7	P112 BN112M6	129
133	139	1.9	7	5540	W 86_7	S3 M3LC6	132	—	W 86_7	P112 BN112M6	133
141	131	1.8	10	2940	W 75_10	S3 M3LA4	128	—	W 75_10	P100 BN100LA4	129
141	131	2.2	10	5590	W 86_10	S3 M3LA4	132	—	W 86_10	P100 BN100LA4	133
187	99	2.3	15	2920	W 75_15	S3 M3SA2	128	—	W 75_15	P90 BN90L2	129
187	98	3.0	15	5290	W 86_15	S3 M3SA2	132	—	W 86_15	P90 BN90L2	133
192	94	1.3	15	1980	—	—	—	—	W 63_15	P90 BN90L2	125
201	94	2.0	7	2660	W 75_7	S3 M3LA4	128	—	W 75_7	P100 BN100LA4	129
201	93	2.7	7	5030	W 86_7	S3 M3LA4	132	—	W 86_7	P100 BN100LA4	133
240	76	1.6	12	1890	—	—	—	—	W 63_12	P90 BN90L2	125
281	67	3.0	10	2610	W 75_10	S3 M3SA2	128	—	W 75_10	P90 BN90L2	129
288	64	1.9	10	1820	—	—	—	—	W 63_10	P90 BN90L2	125
401	48	3.6	7	2350	W 75_7	S3 M3SA2	128	—	W 75_7	P90 BN90L2	129
411	46	2.3	7	1660	—	—	—	—	W 63_7	P90 BN90L2	125

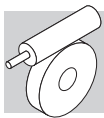
3 kW

n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
0.88	10403	0.9	1600	52000	—	—	—	—	VF/VF 130/250_1600	P100 BN100LB4	168
1.0	9814	0.9	920	52000	—	—	—	—	VF/VF 130/250_920	P132 BN132S6	168
1.2	8534	1.1	1200	52000	—	—	—	—	VF/VF 130/250_1200	P100 BN100LB4	168
1.5	6917	0.9	920	34500	—	—	—	—	VF/VF 130/210_920	P100 BN100LB4	162
1.5	6917	1.3	920	52000	—	—	—	—	VF/VF 130/250_920	P100 BN100LB4	168
1.8	6665	0.9	800	34500	—	—	—	—	VF/VF 130/210_800	P100 BN100LB4	162
1.8	6827	1.3	800	52000	—	—	—	—	VF/VF 130/250_800	P100 BN100LB4	168
2.4	5242	1.2	600	34500	—	—	—	—	VF/VF 130/210_600	P100 BN100LB4	162
2.4	5364	1.7	600	52000	—	—	—	—	VF/VF 130/250_600	P100 BN100LB4	168
3.1	4755	1.1	300	52000	—	—	—	—	VFR 250_300	P132 BN132S6	166
3.5	3901	1.1	400	19500	—	—	—	—	W /VF 86/185_400	P100 BN100LB4	157
3.5	4064	1.6	400	34500	—	—	—	—	VF/VF 130/210_400	P100 BN100LB4	162
3.5	3983	2.3	400	52000	—	—	—	—	VF/VF 130/250_400	P100 BN100LB4	168
3.9	3950	1.1	240	34500	—	—	—	—	VFR 210_240	P132 BN132S6	160
3.9	4096	1.4	240	52000	—	—	—	—	VFR 250_240	P132 BN132S6	166
4.7	3353	1.0	300	34500	—	—	—	—	VFR 210_300	P100 BN100LB4	160
4.7	3475	1.4	300	52000	—	—	—	—	VFR 250_300	P100 BN100LB4	166
5.0	2958	1.4	280	19500	—	—	—	—	W /VF 86/185_280	P100 BN100LB4	157
5.0	2958	2.1	280	34500	—	—	—	—	VF/VF 130/210_280	P100 BN100LB4	162
5.0	3015	3.0	280	52000	—	—	—	—	VF/VF 130/250_280	P100 BN100LB4	168
5.9	2877	1.0	240	19500	—	—	—	—	VFR 185_240	P100 BN100LB4	154
5.9	2877	1.4	240	34500	—	—	—	—	VFR 210_240	P100 BN100LB4	160
5.9	2975	1.8	240	52000	—	—	—	—	VFR 250_240	P100 BN100LB4	166
7.8	2377	1.3	180	19500	—	—	—	—	VFR 185_180	P100 BN100LB4	154










3 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 		
7.8	2341	1.8	180	34500	—	—	—	VFR 210_180	P100	BN100LB4	160	
7.8	2450	2.6	180	52000	—	—	—	VFR 250_180	P100	BN100LB4	166	
9.4	1859	1.6	100	33000	—	—	—	VF 210_100	P132	BN132S6	158	
9.4	2042	1.6	150	19500	—	—	—	VFR 185_150	P100	BN100LB4	154	
9.4	2042	2.2	150	34500	—	—	—	VFR 210_150	P100	BN100LB4	160	
9.4	1920	2.5	100	50000	—	—	—	VF 250_100	P132	BN132S6	164	
9.4	2042	3.2	150	52000	—	—	—	VFR 250_150	P100	BN100LB4	166	
10.2	1907	1.0	138	16000	—	—	—	VFR 150_138	P100	BN100LB4	148	
11.8	1634	0.9	120	13800	—	—	—	VFR 130_120	P100	BN100LB4	142	
11.8	1658	1.2	120	16000	—	—	—	VFR 150_120	P100	BN100LB4	148	
11.8	1609	1.5	80	19000	—	—	—	VF 185_80	P132	BN132S6	152	
11.8	1585	2.1	80	33000	—	—	—	VF 210_80	P132	BN132S6	158	
11.8	1707	2.1	120	19500	—	—	—	VFR 185_120	P100	BN100LB4	154	
11.8	1707	2.9	120	34500	—	—	—	VFR 210_120	P100	BN100LB4	160	
11.8	1634	3.2	80	50000	—	—	—	VF 250_80	P132	BN132S6	164	
11.8	1731	4.0	120	52000	—	—	—	VFR 250_120	P100	BN100LB4	166	
14.1	1321	0.9	100	14700	—	—	—	VF 150_100	P100	BN100LB4	146	
14.1	1321	1.4	100	18000	—	—	—	VF 185_100	P100	BN100LB4	152	
15.7	1298	1.2	90	13800	—	—	—	VFR 130_90	P100	BN100LB4	142	
15.7	1317	1.5	90	16000	—	—	—	VFR 150_90	P100	BN100LB4	148	
15.7	1298	2.0	60	19000	—	—	—	VF 185_60	P132	BN132S6	152	
15.7	1390	2.0	90	19500	—	—	—	VFR 185_90	P100	BN100LB4	154	
15.7	1390	2.9	90	34500	—	—	—	VFR 210_90	P100	BN100LB4	160	
15.7	1280	2.9	60	33000	—	—	—	VF 210_60	P132	BN132S6	158	
17.6	1122	1.1	80	14700	—	—	—	VF 150_80	P100	BN100LB4	146	
17.6	1122	1.9	80	18000	—	—	—	VF 185_80	P100	BN100LB4	152	
20.4	1066	1.2	69	13800	—	—	—	VFR 130_69	P100	BN100LB4	142	
20.4	1080	1.7	69	16000	—	—	—	VFR 150_69	P100	BN100LB4	148	
22.0	923	1.0	64	12600	—	—	—	VF 130_64	P100	BN100LB4	140	
22.0	936	1.4	64	14700	—	—	—	VF 150_64	P100	BN100LB4	146	
23.5	951	1.4	60	13800	—	—	—	VFR 130_60	P100	BN100LB4	142	
23.5	963	2.0	60	16000	—	—	—	VFR 150_60	P100	BN100LB4	148	
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28.2	772	3.2	50	18000	—	—	—	VF 185_50	P100	BN100LB4	152	
31	710	1.5	46	12600	—	—	—	VF 130_46	P100	BN100LB4	140	
31	720	2.2	46	14700	—	—	—	VF 150_46	P100	BN100LB4	146	
31	731	1.0	45	8000	—	—	—	WR 110_45	P100	BN100LB4	138	
31	677	1.1	30	8000	—	—	—	W 110_30	P132	BN132S6	137	
31	750	2.3	45	16000	—	—	—	VFR 150_45	P100	BN100LB4	148	
31	741	3.2	30	19000	—	—	—	VF 185_30	P132	BN132S6	152	
35	618	1.1	40	8000	W 110_40	S3	M3LB4	136	W 110_40	P100	BN100LB4	137
35	618	1.8	40	12600	—	—	—	VF 130_40	P100	BN100LB4	140	
35	626	2.5	40	14700	—	—	—	VF 150_40	P100	BN100LB4	146	
41	568	1.0	23	8000	—	—	—	W 110_23	P132	BN132S6	137	
41	568	1.8	23	13200	—	—	—	VF 130_23	P132	BN132S6	140	
41	575	2.6	23	15500	—	—	—	VF 150_23	P132	BN132S6	146	
47	469	1.5	30	8000	W 110_30	S3	M3LB4	136	W 110_30	P100	BN100LB4	137
47	482	2.2	30	12600	—	—	—	VF 130_30	P100	BN100LB4	140	
47	488	2.8	30	14700	—	—	—	VF 150_30	P100	BN100LB4	146	
47	518	2.9	30	16000	—	—	—	VFR 150_30	P100	BN100LB4	148	
61	388	1.4	23	8000	W 110_23	S3	M3LB4	136	W 110_23	P100	BN100LB4	137
61	388	2.3	23	12600	—	—	—	VF 130_23	P100	BN100LB4	140	
61	388	3.3	23	14700	—	—	—	VF 150_23	P100	BN100LB4	146	
71	341	0.9	20	6240	W 86_20	S3	M3LB4	132	W 86_20	P100	BN100LB4	133
71	341	1.7	20	8000	W 110_20	S3	M3LB4	136	W 110_20	P100	BN100LB4	137
71	341	2.6	20	12600	—	—	—	VF 130_20	P100	BN100LB4	140	
94	259	1.0	15	2800	W 75_15	S3	M3LB4	128	W 75_15	P100	BN100LB4	129
94	259	1.3	15	5890	W 86_15	S3	M3LB4	132	W 86_15	P100	BN100LB4	133
94	256	2.3	15	8000	W 110_15	S3	M3LB4	136	W 110_15	P100	BN100LB4	137
94	262	3.5	15	11800	—	—	—	VF 130_15	P100	BN100LB4	140	
124	198	3.4	23	11000	—	—	—	VF 130_23	P100	BN100L2	140	
141	179	1.3	10	2600	W 75_10	S3	M3LB4	128	W 75_10	P100	BN100LB4	129
141	179	1.6	10	5300	W 86_10	S3	M3LB4	132	W 86_10	P100	BN100LB4	133



3 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 		
141	177	3.1	10	8000	W 110_10	S3	M3LB4	136	W 110_10	P100	BN100LB4	137
191	132	1.7	15	2680	W 75_15	S3	M3LA2	128	W 75_15	P100	BN100L2	129
191	131	2.3	15	5070	W 86_15	S3	M3LA2	132	W 86_15	P100	BN100L2	133
201	128	1.5	7	2380	W 75_7	S3	M3LB4	128	W 75_7	P100	BN100LB4	129
201	127	2.0	7	4780	W 86_7	S3	M3LB4	132	W 86_7	P100	BN100LB4	133
286	90	2.3	10	2430	W 75_10	S3	M3LA2	128	W 75_10	P100	BN100L2	129
286	90	2.9	10	4510	W 86_10	S3	M3LA2	132	W 86_10	P100	BN100L2	133
409	64	2.7	7	2190	W 75_7	S3	M3LA2	128	W 75_7	P100	BN100L2	129
409	64	3.5	7	4040	W 86_7	S3	M3LA2	132	W 86_7	P100	BN100L2	133

4 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
1.5	9157	1.0	920	52000	—	—	—	VF/VF 130/250_920	P112	BN112M4	168
1.8	9039	1.0	800	52000	—	—	—	VF/VF 130/250_800	P112	BN112M4	168
2.4	6941	0.9	600	34500	—	—	—	VF/VF 130/210_600	P112	BN112M4	162
2.4	7102	1.3	600	52000	—	—	—	VF/VF 130/250_600	P112	BN112M4	168
3.6	5380	1.2	400	34500	—	—	—	VF/VF 130/210_400	P112	BN112M4	162
3.6	5273	1.7	400	52000	—	—	—	VF/VF 130/250_400	P112	BN112M4	168
4.0	5404	1.1	240	52000	—	—	—	VFR 250_240	P132	BN132MA6	166
4.7	4600	1.1	300	52000	—	—	—	VFR 250_300	P112	BN112M4	166
5.1	3917	1.1	280	19500	—	—	—	W /VF 86/185_280	P112	BN112M4	157
5.1	3917	1.6	280	34500	—	—	—	VF/VF 130/210_280	P112	BN112M4	162
5.1	3992	2.3	280	52000	—	—	—	VF/VF 130/250_280	P112	BN112M4	168
5.3	3908	1.3	180	34500	—	—	—	VFR 210_180	P132	BN132MA6	160
5.3	4487	1.5	180	52000	—	—	—	VFR 250_180	P132	BN132MA6	166
5.9	3809	1.0	240	34500	—	—	—	VFR 210_240	P112	BN112M4	160
5.9	3938	1.4	240	52000	—	—	—	VFR 250_240	P112	BN112M4	166
7.9	3147	1.0	180	19500	—	—	—	VFR 185_180	P112	BN112M4	154
7.9	3099	1.4	180	34500	—	—	—	VFR 210_180	P112	BN112M4	160
7.9	3244	1.9	180	52000	—	—	—	VFR 250_180	P112	BN112M4	166
9.5	2704	1.2	150	19500	—	—	—	VFR 185_150	P112	BN112M4	154
9.5	2704	1.7	150	34500	—	—	—	VFR 210_150	P112	BN112M4	160
9.5	2704	2.4	150	52000	—	—	—	VFR 250_150	P112	BN112M4	166
9.5	2453	1.2	100	33000	—	—	—	VF 210_100	P132	BN132MA6	158
9.5	2533	1.9	100	50000	—	—	—	VF 250_100	P132	BN132MA6	164
11.8	2195	0.9	120	16000	—	—	—	VFR 150_120	P112	BN112M4	148
11.8	2260	1.6	120	19500	—	—	—	VFR 185_120	P112	BN112M4	154
11.8	2260	2.2	120	34500	—	—	—	VFR 210_120	P112	BN112M4	160
11.8	2292	3.1	120	52000	—	—	—	VFR 250_120	P112	BN112M4	166
11.9	2123	1.1	80	19000	—	—	—	VF 185_80	P132	BN132MA6	152
11.9	2091	1.6	80	33000	—	—	—	VF 210_80	P132	BN132MA6	158
11.9	2155	2.4	80	50000	—	—	—	VF 250_80	P132	BN132MA6	164
14.2	1749	1.1	100	18000	—	—	—	VF 185_100	P112	BN112M4	152
15.8	1719	0.9	90	13800	—	—	—	VFR 130_90	P112	BN112M4	142
15.8	1743	1.1	90	16000	—	—	—	VFR 150_90	P112	BN112M4	148
15.8	1840	1.5	90	19500	—	—	—	VFR 185_90	P112	BN112M4	154
15.8	1840	2.2	90	34500	—	—	—	VFR 210_90	P112	BN112M4	160
15.8	1888	3.2	90	52000	—	—	—	VFR 250_90	P112	BN112M4	166
15.8	1713	1.5	60	19000	—	—	—	VF 185_60	P132	BN132MA6	152
15.8	1689	2.2	60	33000	—	—	—	VF 210_60	P132	BN132MA6	158
15.8	1737	3.2	60	50000	—	—	—	VF 250_60	P132	BN132MA6	164
17.8	1485	1.4	80	18000	—	—	—	VF 185_80	P112	BN112M4	152
20.6	1411	0.9	69	13800	—	—	—	VFR 130_69	P112	BN112M4	142
20.6	1429	1.3	69	16000	—	—	—	VFR 150_69	P112	BN112M4	148
20.7	1369	1.3	46	15500	—	—	—	VF 150_46	P132	BN132MA6	146
21.1	1448	3.4	45	34500	—	—	—	VFR 210_45	P132	BN132MA6	160
22.2	1240	1.1	64	14700	—	—	—	VF 150_64	P112	BN112M4	146
23.7	1259	1.1	60	13800	—	—	—	VFR 130_60	P112	BN112M4	142
23.7	1275	1.5	60	16000	—	—	—	VFR 150_60	P112	BN112M4	148
23.7	1194	1.9	60	18000	—	—	—	VF 185_60	P112	BN112M4	152



4 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 		
23.7	1307	2.5	60	19500	—	—	—	VFR 185_60	P112	BN112M4	154	
23.7	1291	3.6	60	34500	—	—	—	VFR 210_60	P112	BN112M4	160	
23.8	1174	1.0	40	13200	—	—	—	VF 130_40	P132	BN132MA6	140	
23.8	1206	3.6	40	33000	—	—	—	VF 210_40	P132	BN132MA6	158	
25.4	1100	0.9	56	12500	—	—	—	VF 130_56	P112	BN112M4	140	
25.4	1115	1.2	56	14700	—	—	—	VF 150_56	P112	BN112M4	146	
28.4	1022	2.4	50	18000	—	—	—	VF 185_50	P112	BN112M4	152	
31	940	1.1	46	12600	—	—	—	VF 130_46	P112	BN112M4	140	
31	953	1.6	46	14700	—	—	—	VF 150_46	P112	BN112M4	146	
32	993	1.7	45	16000	—	—	—	VFR 150_45	P112	BN112M4	148	
32	1017	2.8	45	19500	—	—	—	VFR 185_45	P112	BN112M4	154	
32	929	1.3	30	13200	—	—	—	VF 130_30	P132	BN132MA6	140	
32	977	2.5	30	19000	—	—	—	VF 185_30	P132	BN132MA6	152	
32	965	3.5	30	33000	—	—	—	VF 210_30	P132	BN132MA6	158	
36	818	1.3	40	12600	—	—	—	VF 130_40	P112	BN112M4	140	
36	829	1.9	40	14700	—	—	—	VF 150_40	P112	BN112M4	146	
36	769	0.9	80	12600	—	—	—	VF 130_80	P112	BN112M2	140	
41	749	1.4	23	13200	—	—	—	VF 130_23	P132	BN132MA6	140	
41	758	2.0	23	13200	—	—	—	VF 150_23	P132	BN132MA6	146	
45	641	1.1	64	12600	—	—	—	VF 130_64	P112	BN112M2	140	
46	635	1.1	30	8000	W 110_30	S3	M3LC4	136	W 110_30	P112	BN112M4	137
47	638	1.6	30	12600	—	—	—	VF 130_30	P112	BN112M4	140	
47	646	2.1	30	14700	—	—	—	VF 150_30	P112	BN112M4	146	
47	686	2.2	30	16000	—	—	—	VFR 150_30	P112	BN112M4	148	
60	525	1.0	23	8000	W 110_23	S3	M3LC4	136	W 110_23	P112	BN112M4	137
62	514	1.7	23	12600	—	—	—	VF 130_23	P112	BN112M4	140	
62	514	2.5	23	14700	—	—	—	VF 150_23	P112	BN112M4	146	
63	485	1.6	46	12600	—	—	—	VF 130_46	P112	BN112M2	140	
70	462	1.2	20	8000	W 110_20	S3	M3LC4	136	W 110_20	P112	BN112M4	137
71	452	2.0	20	12400	—	—	—	VF 130_20	P112	BN112M4	140	
93	350	0.9	15	5410	W 86_15	S3	M3LC4	132	W 86_15	P112	BN112M4	133
93	346	1.7	15	8000	W 110_15	S3	M3LC4	136	W 110_15	P112	BN112M4	137
95	347	2.7	15	11400	—	—	—	VF 130_15	P112	BN112M4	140	
95	350	3.4	10	12700	—	—	—	VF 150_10	P132	BN132MA6	146	
139	242	1.0	10	2160	W 75_10	S3	M3LC4	128	W 75_10	P112	BN112M4	129
139	242	1.2	10	4940	W 86_10	S3	M3LC4	132	W 86_10	P112	BN112M4	133
139	239	2.3	10	7840	W 110_10	S3	M3LC4	136	W 110_10	P112	BN112M4	137
142	237	3.3	10	10100	—	—	—	VF 130_10	P112	BN112M4	140	
191	176	1.3	15	2400	W 75_15	S3	M3LB2	128	W 75_15	P112	BN112M2	129
191	174	1.7	15	4820	W 86_15	S3	M3LB2	132	W 86_15	P112	BN112M2	133
191	174	3.1	15	7380	W 110_15	S3	M3LB2	136	W 110_15	P112	BN112M2	137
199	173	1.1	7	1900	W 75_7	S3	M3LC4	128	W 75_7	P112	BN112M4	129
199	171	1.5	7	4490	W 86_7	S3	M3LC4	132	W 86_7	P112	BN112M4	133
199	171	2.9	7	7040	W 110_7	S3	M3LC4	136	W 110_7	P112	BN112M4	137
287	120	1.7	10	2210	W 75_10	S3	M3LB2	128	W 75_10	P112	BN112M2	129
287	120	2.2	10	4320	W 86_10	S3	M3LB2	132	W 86_10	P112	BN112M2	133
410	85	2.0	7	2010	W 75_7	S3	M3LB2	128	W 75_7	P112	BN112M2	129
410	85	2.7	7	3890	W 86_7	S3	M3LB2	132	W 86_7	P112	BN112M2	133

5.5 kW

n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
2.4	9630	0.9	600	52000	—	—	—	VF/VF 130/250_600	P132	BN132S4	168
3.4	7937	1.2	280	52000	—	—	—	VF/VF 130/250_280	P132	BN132MB6	168
3.6	7295	0.9	400	34500	—	—	—	VF/VF 130/210_400	P132	BN132S4	162
3.6	7149	1.3	400	52000	—	—	—	VF/VF 130/250_400	P132	BN132S4	168
5.1	5311	1.2	280	34500	—	—	—	VF/VF 130/210_280	P132	BN132S4	162
5.1	5413	1.7	280	52000	—	—	—	VF/VF 130/250_280	P132	BN132S4	168
5.3	6203	1.1	180	52000	—	—	—	VFR 250_180	P132	BN132MB6	166
6.3	5169	1.0	150	34500	—	—	—	VFR 210_150	P132	BN132MB6	160
6.3	5253	1.3	150	52000	—	—	—	VFR 250_150	P132	BN132MB6	166










5.5 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
8.0	4202	1.0	180	34500	—	—	—	VFR 210_180	P132	BN132S4	160
8.0	4399	1.4	180	52000	—	—	—	VFR 250_180	P132	BN132S4	166
9.5	3391	0.9	100	33000	—	—	—	VF 210_100	P132	BN132MB6	158
9.5	3502	1.4	100	50000	—	—	—	VF 250_100	P132	BN132MB6	164
9.6	3666	1.2	150	34500	—	—	—	VFR 210_150	P132	BN132S4	160
9.6	3666	1.8	150	52000	—	—	—	VFR 250_150	P132	BN132S4	166
11.8	2890	1.1	80	33000	—	—	—	VF 210_80	P132	BN132MB6	158
11.8	2979	1.7	80	50000	—	—	—	VF 250_80	P132	BN132MB6	164
12.0	3064	1.6	120	34500	—	—	—	VFR 210_120	P132	BN132S4	160
12.0	3108	2.3	120	52000	—	—	—	VFR 250_120	P132	BN132S4	166
14.4	2371	1.1	100	31500	—	—	—	VF 210_100	P132	BN132S4	158
14.4	2590	1.4	100	19500	—	—	—	VFR 185_100	P132	BN132S4	154
14.4	2480	1.5	100	47000	—	—	—	VF 250_100	P132	BN132S4	164
15.8	2368	1.1	60	19000	—	—	—	VF 185_60	P132	BN132MB6	152
15.8	2334	1.6	60	33000	—	—	—	VF 210_60	P132	BN132MB6	158
15.8	2401	2.3	60	50000	—	—	—	VF 250_60	P132	BN132MB6	164
16.0	2495	1.6	90	34500	—	—	—	VFR 210_90	P132	BN132S4	160
16.0	2561	2.3	90	52000	—	—	—	VFR 250_90	P132	BN132S4	166
18.0	2013	1.1	80	18000	—	—	—	VF 185_80	P132	BN132S4	152
18.0	2013	1.4	80	31500	—	—	—	VF 210_80	P132	BN132S4	158
18.0	2072	1.9	80	47000	—	—	—	VF 250_80	P132	BN132S4	164
19.2	2106	1.3	75	19500	—	—	—	VFR 185_75	P132	BN132S4	154
20.5	1892	0.9	46	15500	—	—	—	VF 150_46	P132	BN132MB6	146
21.0	2001	2.4	45	34500	—	—	—	VFR 210_45	P132	BN132MB6	160
21.0	2051	3.3	45	52000	—	—	—	VFR 250_45	P132	BN132MB6	166
23.6	1645	1.1	40	15500	—	—	—	VF 150_40	P132	BN132MB6	146
24.0	1620	1.4	60	18000	—	—	—	VF 185_60	P132	BN132S4	152
24.0	1598	1.9	60	31500	—	—	—	VF 210_60	P132	BN132S4	158
24.0	1751	2.7	60	34500	—	—	—	VFR 210_60	P132	BN132S4	160
24.0	1663	2.7	60	47000	—	—	—	VF 250_60	P132	BN132S4	164
24.0	1773	4.0	60	52000	—	—	—	VFR 250_60	P132	BN132S4	166
28.8	1430	1.3	50	15940	—	—	—	VFR 150_50	P132	BN132S4	148
28.8	1386	1.8	50	18000	—	—	—	VF 185_50	P132	BN132S4	152
28.8	1477	2.2	50	19500	—	—	—	VFR 185_50	P132	BN132S4	154
28.8	1386	2.4	50	31500	—	—	—	VF 210_50	P132	BN132S4	158
28.8	1386	3.2	50	47000	—	—	—	VF 250_50	P132	BN132S4	164
31	1292	1.2	46	14700	—	—	—	VF 150_46	P132	BN132S4	146
32	1284	1.0	30	13200	—	—	—	VF 130_30	P132	BN132MB6	140
32	1362	3.0	45	34500	—	—	—	VFR 210_45	P132	BN132S4	160
36	1109	1.0	40	12600	—	—	—	VF 130_40	P132	BN132S4	140
36	1123	1.4	40	14700	—	—	—	VF 150_40	P132	BN132S4	146
36	1138	2.3	40	18000	—	—	—	VF 185_40	P132	BN132S4	152
36	1138	3.1	40	31500	—	—	—	VF 210_40	P132	BN132S4	158
38	1101	1.5	37.5	15400	—	—	—	VFR 150_37.5	P132	BN132S4	148
38	1149	2.4	37.5	19500	—	—	—	VFR 185_37.5	P132	BN132S4	154
41	1035	1.0	23	13000	—	—	—	VF 130_23	P132	BN132MB6	140
41	1048	1.4	23	15300	—	—	—	VF 150_23	P132	BN132MB6	146
48	864	1.2	30	12600	—	—	—	VF 130_30	P132	BN132S4	140
48	875	1.6	30	14700	—	—	—	VF 150_30	P132	BN132S4	146
48	908	2.2	30	18000	—	—	—	VF 185_30	P132	BN132S4	152
48	908	3.4	30	31500	—	—	—	VF 210_30	P132	BN132S4	158
58	775	1.9	25	13400	—	—	—	VFR 150_25	P132	BN132S4	148
58	784	3.3	25	19500	—	—	—	VFR 185_25	P132	BN132S4	154
63	696	1.3	23	12100	—	—	—	VF 130_23	P132	BN132S4	140
63	696	1.8	23	14000	—	—	—	VF 150_23	P132	BN132S4	146
63	692	0.9	15	8000	—	—	—	W 110_15	P132	BN132MB6	137
72	613	0.9	20	8000	—	—	—	W 110_20	P132	BN132S4	137
72	613	1.5	20	11700	—	—	—	VF 130_20	P132	BN132S4	140
72	613	2.1	20	13500	—	—	—	VF 150_20	P132	BN132S4	146
96	460	1.3	15	8000	—	—	—	W 110_15	P132	BN132S4	137
96	471	2.0	15	12800	—	—	—	VF 130_15	P132	BN132S4	140
96	476	2.4	15	12400	—	—	—	VF 150_15	P132	BN132S4	146
126	359	1.9	23	10400	—	—	—	VF 130_23	P132	BN132SA2	140
126	359	2.7	23	11800	—	—	—	VF 150_23	P132	BN132SA2	146
144	317	1.7	10	7330	—	—	—	W 110_10	P132	BN132S4	137



5.5 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
144	321	2.5	10	9680	—	—	—	VF 130_10	P132	BN132S4	140
144	321	3.3	10	11000	—	—	—	VF 150_10	P132	BN132S4	146
193	237	2.3	15	7060	—	—	—	W 110_15	P132	BN132SA2	137
206	227	2.2	7	6600	—	—	—	W 110_7	P132	BN132S4	137
206	227	3.3	7	8650	—	—	—	VF 130_7	P132	BN132S4	140
289	162	3.0	10	6290	—	—	—	W 110_10	P132	BN132SA2	137
289	164	3.6	10	8110	—	—	—	VF 130_10	P132	BN132SA2	140
413	115	3.9	7	5640	—	—	—	W 110_7	P132	BN132SA2	137
413	116	4.8	7	7230	—	—	—	VF 130_7	P132	BN132SA2	140

7.5 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
3.6	9749	0.9	400	52000	—	—	—	VF/VF 130/250_400	P132	BN132MA4	168
5.1	7242	0.9	280	34500	—	—	—	VF/VF 130/210_280	P132	BN132MA4	162
5.1	7381	1.2	280	52000	—	—	—	VF/VF 130/250_280	P132	BN132MA4	168
6.4	7088	1.0	150	52000	—	—	—	VFR 250_150	P160	BN160M6	166
8.0	5940	1.0	120	34500	—	—	—	VFR 210_120	P160	BN160M6	160
8.0	5999	1.1	180	52000	—	—	—	VFR 250_180	P132	BN132MA4	166
9.6	4725	1.0	100	50000	—	—	—	VF 250_100	P160	BN160M6	164
9.6	4999	1.3	150	52000	—	—	—	VFR 250_150	P132	BN132MA4	166
10.6	4860	0.9	90	34500	—	—	—	VFR 210_90	P160	BN160M6	160
11.9	4020	1.3	80	50000	—	—	—	VF 250_80	P160	BN160M6	164
12.0	4178	1.2	120	34500	—	—	—	VFR 210_120	P132	BN132MA4	160
12.0	4238	1.7	120	52000	—	—	—	VFR 250_120	P132	BN132MA4	166
14.4	3532	1.0	100	19500	—	—	—	VFR 185_100	P132	BN132MA4	154
14.4	3382	1.1	100	47000	—	—	—	VF 250_100	P132	BN132MA4	164
15.9	3150	1.2	60	33000	—	—	—	VF 210_60	P160	BN160M6	158
16.0	3402	1.2	90	34500	—	—	—	VFR 210_90	P132	BN132MA4	160
16.0	3492	1.7	90	52000	—	—	—	VFR 250_90	P132	BN132MA4	166
18.0	2746	1.1	80	31500	—	—	—	VF 210_80	P132	BN132MA4	158
18.0	2825	1.4	80	47000	—	—	—	VF 250_80	P132	BN132MA4	164
19.2	2872	1.0	75	19500	—	—	—	VFR 185_75	P132	BN132MA4	154
21.2	2700	1.8	45	34500	—	—	—	VFR 210_45	P160	BN160M6	160
21.2	2768	2.5	45	52000	—	—	—	VFR 250_45	P160	BN160M6	166
24.0	2208	1.0	60	18000	—	—	—	VF 185_60	P132	BN132MA4	152
24.0	2179	1.4	60	31500	—	—	—	VF 210_60	P132	BN132MA4	158
24.0	2388	2.0	60	31500	—	—	—	VFR 210_60	P132	BN132MA4	160
24.0	2268	2.0	60	47000	—	—	—	VF 250_60	P132	BN132MA4	164
24.0	2417	2.9	60	52000	—	—	—	VFR 250_60	P132	BN132MA4	166
28.8	1950	1.0	50	14100	—	—	—	VFR 150_50	P132	BN132MA4	148
28.8	1890	1.3	50	18000	—	—	—	VF 185_50	P132	BN132MA4	152
28.8	2014	1.6	50	19500	—	—	—	VFR 185_50	P132	BN132MA4	154
28.8	1890	1.7	50	31500	—	—	—	VF 210_50	P132	BN132MA4	158
28.8	1890	2.4	50	47000	—	—	—	VF 250_50	P132	BN132MA4	164
31	1762	0.9	46	14700	—	—	—	VF 150_46	P132	BN132MA4	146
32	1858	2.2	45	34500	—	—	—	VFR 210_45	P132	BN132MA4	160
32	1880	3.4	45	48800	—	—	—	VFR 250_45	P132	BN132MA4	166
36	1532	1.0	40	14700	—	—	—	VF 150_40	P132	BN132MA4	146
36	1552	1.7	40	18000	—	—	—	VF 185_40	P132	BN132MA4	152
36	1552	2.3	40	31500	—	—	—	VF 210_40	P132	BN132MA4	158
36	1572	3.1	40	47000	—	—	—	VF 250_40	P132	BN132MA4	164
38	1501	1.1	37.5	13200	—	—	—	VFR 150_37.5	P132	BN132MA4	148
38	1567	1.8	37.5	18300	—	—	—	VFR 185_37.5	P132	BN132MA4	154
48	1179	0.9	30	11900	—	—	—	VF 130_30	P132	BN132MA4	140
48	1194	1.1	30	14200	—	—	—	VF 150_30	P132	BN132MA4	146
48	1239	1.6	30	18000	—	—	—	VF 185_30	P132	BN132MA4	152
48	1239	2.5	30	31500	—	—	—	VF 210_30	P132	BN132MA4	158
48	1283	3.0	30	33400	—	—	—	VFR 210_30	P132	BN132MA4	160
48	1253	3.2	30	4440	—	—	—	VF 250_30	P132	BN132MA4	164
58	1057	1.4	25	11000	—	—	—	VFR 150_25	P132	BN132MA4	148

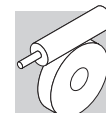


7.5 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
58	1069	2.4	25	16700	—	—	—	VFR 185_25	P132	BN132MA4	154
63	950	0.9	23	11200	—	—	—	VF 130_23	P132	BN132MA4	140
63	950	1.3	23	13200	—	—	—	VF 150_23	P132	BN132MA4	146
64	968	2.3	15	16700	—	—	—	VF 185_15	P160	BN160M6	152
64	968	3.4	15	31500	—	—	—	VF 210_15	P160	BN160M6	158
72	836	1.1	20	10800	—	—	—	VF 130_20	P132	BN132MA4	140
72	836	1.6	20	12700	—	—	—	VF 150_20	P132	BN132MA4	146
96	627	1.0	15	7370	—	—	—	W 110_15	P132	BN132MA4	137
96	642	1.4	15	10200	—	—	—	VF 130_15	P132	BN132MA4	140
96	649	1.8	15	11700	—	—	—	VF 150_15	P132	BN132MA4	146
126	489	1.4	23	9900	—	—	—	VF 130_23	P132	BN132SB2	140
126	489	2.0	23	11400	—	—	—	VF 150_23	P132	BN132SB2	146
136	467	2.5	7	10200	—	—	—	VF 150_7	P160	BN160M6	146
144	433	1.3	10	6720	—	—	—	W 110_10	P132	BN132MA4	137
144	438	1.8	10	9150	—	—	—	VF 130_10	P132	BN132MA4	140
144	438	2.4	10	10500	—	—	—	VF 150_10	P132	BN132MA4	146
193	322	1.7	15	6660	—	—	—	W 110_15	P132	BN132SB2	137
206	310	1.6	7	6100	—	—	—	W 110_7	P132	BN132MA4	137
206	310	2.4	7	8210	—	—	—	VF 130_7	P132	BN132MA4	140
206	313	3.2	7	9400	—	—	—	VF 150_7	P132	BN132MA4	146
290	220	2.2	10	5980	—	—	—	W 110_10	P132	BN132SB2	137
290	222	2.7	10	7840	—	—	—	VF 130_10	P132	BN132SB2	140
414	156	2.9	7	5380	—	—	—	W 110_7	P132	BN132SB2	137
414	157	3.5	7	7010	—	—	—	VF 130_7	P132	BN132SB2	140

9.2 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
5.1	9054	1.0	280	52000	—	—	—	VF/VF 130/250_280	P132	BN132MB4	168
9.6	6132	1.1	150	52000	—	—	—	VFR 250_150	P132	BN132MB4	166
12.0	5198	1.3	120	52000	—	—	—	VFR 250_120	P132	BN132MB4	166
14.4	4149	0.9	100	47000	—	—	—	VF 250_100	P132	BN132MB4	164
16.0	4173	1.0	90	34500	—	—	—	VFR 210_90	P132	BN132MB4	160
16.0	4283	1.4	90	52000	—	—	—	VFR 250_90	P132	BN132MB4	166
18.0	3368	0.9	80	31500	—	—	—	VF 210_80	P132	BN132MB4	158
18.0	3466	1.1	80	47000	—	—	—	VF 250_80	P132	BN132MB4	164
24.0	2672	1.1	60	31500	—	—	—	VF 210_60	P132	BN132MB4	158
24.0	2929	1.6	60	34500	—	—	—	VFR 210_60	P132	BN132MB4	160
24.0	2782	1.6	60	47000	—	—	—	VF 250_60	P132	BN132MB4	164
24.0	2965	2.4	60	51900	—	—	—	VFR 250_60	P132	BN132MB4	166
28.8	2319	1.1	50	18000	—	—	—	VF 185_50	P132	BN132MB4	152
28.8	2471	1.3	50	18600	—	—	—	VFR 185_50	P132	BN132MB4	154
28.8	2319	1.4	50	31500	—	—	—	VF 210_50	P132	BN132MB4	158
28.8	2319	1.9	50	47000	—	—	—	VF 250_50	P132	BN132MB4	164
32	2279	1.8	45	34500	—	—	—	VFR 210_45	P132	BN132MB4	160
32	2306	2.8	45	48000	—	—	—	VFR 250_45	P132	BN132MB4	166
36	1904	1.4	40	18000	—	—	—	VF 185_40	P132	BN132MB4	152
36	1904	1.8	40	31500	—	—	—	VF 210_40	P132	BN132MB4	158
36	1928	2.5	40	47000	—	—	—	VF 250_40	P132	BN132MB4	164
38	1884	0.9	37.5	11900	—	—	—	VFR 150_37.5	P132	BN132MB4	148
38	1922	1.5	37.5	17200	—	—	—	VFR 185_37.5	P132	BN132MB4	154
48	1464	0.9	30	11300	—	—	—	VF 150_30	P132	BN132MB4	146
48	1519	1.3	30	17900	—	—	—	VF 185_30	P132	BN132MB4	152
48	1519	2.0	30	31500	—	—	—	VF 210_30	P132	BN132MB4	158
48	1574	2.4	30	32600	—	—	—	VFR 210_30	P132	BN132MB4	160
48	1538	2.6	30	43900	—	—	—	VF 250_30	P132	BN132MB4	164
48	1574	3.8	30	42800	—	—	—	VFR 250_30	P132	BN132MB4	166
58	1297	1.2	25	11200	—	—	—	VFR 150_25	P132	BN132MB4	148
58	1312	2.0	25	15800	—	—	—	VFR 185_25	P132	BN132MB4	154
63	1165	1.1	23	12500	—	—	—	VF 150_23	P132	BN132MB4	146
72	1025	0.9	20	10100	—	—	—	VF 130_20	P132	BN132MB4	140



9.2 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
72	1025	1.3	20	12100	—	—	—	VF 150_20	P132	BN132MB4	146
72	1037	3.0	20	30400	—	—	—	VF 210_20	P132	BN132MB4	158
96	787	1.2	15	9560	—	—	—	VF 130_15	P132	BN132MB4	140
96	796	1.4	15	11200	—	—	—	VF 150_15	P132	BN132MB4	146
126	599	1.1	23	9510	—	—	—	VF 130_23	P132	BN132M2	140
126	599	1.6	23	11000	—	—	—	VF 150_23	P132	BN132M2	146
144	531	1.0	10	6210	—	—	—	W 110_10	P132	BN132MB4	137
144	537	1.5	10	8690	—	—	—	VF 130_10	P132	BN132MB4	140
144	537	2.0	10	16100	—	—	—	VF 150_10	P132	BN132MB4	146
193	395	1.4	15	6320	—	—	—	W 110_15	P132	BN132M2	137
206	380	1.3	7	5670	—	—	—	W 110_7	P132	BN132MB4	137
206	380	1.9	7	7820	—	—	—	VF 130_7	P132	BN132MB4	140
206	384	2.6	7	9030	—	—	—	VF 150_7	P132	BN132MB4	146
290	270	1.8	10	5720	—	—	—	W 110_10	P132	BN132M2	137
290	273	2.2	10	7620	—	—	—	VF 130_10	P132	BN132M2	140
290	273	2.9	10	8690	—	—	—	VF 150_10	P132	BN132M2	146
414	191	2.3	7	5170	—	—	—	W 110_7	P132	BN132M2	137
414	193	2.9	7	6820	—	—	—	VF 130_7	P132	BN132M2	140

11 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
8.0	8798	0.9	120	52000	—	—	—	VFR 250_120	P160	BN160L6	166
10.7	7288	0.9	90	52000	—	—	—	VFR 250_90	P160	BN160L6	166
12.0	5865	0.9	80	50000	—	—	—	VF 250_80	P160	BN160L6	164
12.0	6215	1.1	120	52000	—	—	—	VFR 250_120	P160	BN160MR4	166
16.0	5056	1.1	60	34500	—	—	—	VFR 210_60	P160	BN160L6	160
16.0	5121	1.2	90	52000	—	—	—	VFR 250_90	P160	BN160MR4	166
16.0	4727	1.2	60	50000	—	—	—	VF 250_60	P160	BN160L6	164
18.0	4144	0.9	80	47000	—	—	—	VF 250_80	P160	BN160MR4	164
19.2	3939	1.0	50	33000	—	—	—	VF 210_50	P160	BN160L6	158
21.3	3939	1.2	45	34500	—	—	—	VFR 210_45	P160	BN160L6	160
21.3	4038	1.7	45	51300	—	—	—	VFR 250_45	P160	BN160L6	166
24.0	3327	0.9	40	18000	—	—	—	VF 185_40	P160	BN160L6	152
24.0	3195	0.9	60	31500	—	—	—	VF 210_60	P160	BN160MR4	158
24.0	3283	1.3	40	33000	—	—	—	VF 210_40	P160	BN160L6	158
24.0	3502	1.3	60	34500	—	—	—	VFR 210_60	P160	BN160MR4	160
24.0	3327	1.4	60	47000	—	—	—	VF 250_60	P160	BN160MR4	164
24.0	3327	2.0	40	50000	—	—	—	VF 250_40	P160	BN160L6	164
24.0	3545	2.0	60	50900	—	—	—	VFR 250_60	P160	BN160MR4	166
28.8	2772	1.2	50	31500	—	—	—	VF 210_50	P160	BN160MR4	158
28.8	2772	1.6	50	47000	—	—	—	VF 250_50	P160	BN160MR4	164
32	2659	0.9	30	18100	—	—	—	VF 185_30	P160	BN160L6	152
32	2725	1.5	45	34500	—	—	—	VFR 210_45	P160	BN160MR4	160
32	2758	2.3	45	47100	—	—	—	VFR 250_45	P160	BN160MR4	166
36	2276	1.2	40	18500	—	—	—	VF 185_40	P160	BN160MR4	152
36	2276	1.5	40	31500	—	—	—	VF 210_40	P160	BN160MR4	158
36	2305	2.1	40	47000	—	—	—	VF 250_40	P160	BN160MR4	164
48	1816	1.1	30	17200	—	—	—	VF 185_30	P160	BN160MR4	152
48	1816	1.7	30	31500	—	—	—	VF 210_30	P160	BN160MR4	158
48	1882	2.0	30	31800	—	—	—	VFR 210_30	P160	BN160MR4	160
48	1838	2.2	30	43400	—	—	—	VF 250_30	P160	BN160MR4	164
48	1882	3.2	30	42100	—	—	—	VFR 250_30	P160	BN160MR4	166
48	1860	3.2	20	43100	—	—	—	VF 250_20	P160	BN160L6	164
64	1395	1.0	15	10900	—	—	—	VF 150_15	P160	BN160L6	146
64	1412	1.6	15	15300	—	—	—	VF 185_15	P160	BN160L6	152
64	1412	2.3	15	30500	—	—	—	VF 210_15	P160	BN160L6	158
72	1226	1.1	20	11400	—	—	—	VF 150_20	P160	BN160MR4	146
72	1240	1.8	20	15600	—	—	—	VF 185_20	P160	BN160MR4	152
72	1240	2.5	20	30000	—	—	—	VF 210_20	P160	BN160MR4	158
96	952	1.2	15	10600	—	—	—	VF 150_15	P160	BN160MR4	146










11 kW

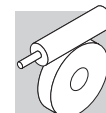
n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
96	963	1.9	15	14200	—	—	—	VF 185_15	P160	BN160MR4	152
96	963	3.0	15	27700	—	—	—	VF 210_15	P160	BN160MR4	158
144	642	1.6	10	9670	—	—	—	VF 150_10	P160	BN160MR4	146
146	635	2.7	20	13300	—	—	—	VF 185_20	P160	BN160MR2	152
194	482	2.9	15	12200	—	—	—	VF 185_15	P160	BN160MR2	152
206	460	2.2	7	8660	—	—	—	VF 150_7	P160	BN160MR4	146
291	325	2.4	10	8440	—	—	—	VF 150_10	P160	BN160MR2	146
416	230	3.3	7	7530	—	—	—	VF 150_7	P160	BN160MR2	146

15 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
16.2	6380	0.9	60	50000	—	—	—	VF 250_60	P180	BN180L6	164
19.4	5390	1.2	50	50000	—	—	—	VF 250_50	P180	BN180L6	164
24.3	4430	1.0	40	33000	—	—	—	VF 210_40	P180	BN180L6	158
24.3	4489	1.4	40	50000	—	—	—	VF 250_40	P180	BN180L6	164
24.3	4474	1.0	60	47000	—	—	—	VF 250_60	P160	BN160L4	164
24.3	4768	1.5	60	48700	—	—	—	VFR 250_60	P160	BN160L4	166
29.2	3728	0.9	50	31500	—	—	—	VF 210_50	P160	BN160L4	158
29.2	3728	1.2	50	47000	—	—	—	VF 250_50	P160	BN160L4	164
32	3665	1.1	45	33200	—	—	—	VFR 210_45	P160	BN160L4	160
32	3709	1.7	45	45200	—	—	—	VFR 250_45	P160	BN160L4	166
37	3061	0.9	40	16600	—	—	—	VF 185_40	P160	BN160L4	152
37	3061	1.1	40	31500	—	—	—	VF 210_40	P160	BN160L4	158
37	3100	1.5	40	45900	—	—	—	VF 250_40	P160	BN160L4	164
49	2481	1.1	20	14800	—	—	—	VF 185_20	P180	BN180L6	152
49	2443	1.2	30	31500	—	—	—	VF 210_30	P160	BN160L4	158
49	2531	1.5	30	30000	—	—	—	VFR 210_30	P160	BN160L4	160
49	2473	1.6	30	42400	—	—	—	VF 250_30	P160	BN160L4	164
49	2531	2.4	30	40600	—	—	—	VFR 250_30	P160	BN160L4	166
65	1905	1.2	15	13600	—	—	—	VF 185_15	P180	BN180L6	152
65	1905	1.7	15	29300	—	—	—	VF 210_15	P180	BN180L6	158
65	1927	2.8	15	38700	—	—	—	VF 250_15	P180	BN180L6	164
73	1668	1.4	20	14300	—	—	—	VF 185_20	P160	BN160L4	152
73	1668	1.9	20	29100	—	—	—	VF 210_20	P160	BN160L4	158
73	1688	2.6	20	38100	—	—	—	VF 250_20	P160	BN160L4	164
97	1280	0.9	15	9360	—	—	—	VF 150_15	P160	BN160L4	146
97	1295	1.4	15	13200	—	—	—	VF 185_15	P160	BN160L4	152
97	1295	2.2	15	27000	—	—	—	VF 210_15	P160	BN160L4	158
97	1295	3.1	15	35100	—	—	—	VF 250_15	P160	BN160L4	164
139	920	2.2	7	11400	—	—	—	VF 185_7	P180	BN180L6	152
146	863	1.2	10	8720	—	—	—	VF 150_10	P160	BN160L4	146
146	873	3.0	10	24000	—	—	—	VF 210_10	P160	BN160L4	158
147	860	2.0	20	12700	—	—	—	VF 185_20	P160	BN160MB2	152
195	653	2.1	15	11600	—	—	—	VF 185_15	P160	BN160MB2	152
195	653	3.3	15	22700	—	—	—	VF 210_15	P160	BN160MB2	158
209	618	1.6	7	7840	—	—	—	VF 150_7	P160	BN160L4	146
293	440	1.8	10	7960	—	—	—	VF 150_10	P160	BN160MB2	146
419	311	2.4	7	7120	—	—	—	VF 150_7	P160	BN160MB2	146

18.5 kW








n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
19.2	6717	0.9	50	50000	—	—	—	VF 250_50	P200	BN200LA6	164
24.0	5595	1.2	40	48700	—	—	—	VF 250_40	P200	BN200LA6	164
29.2	4598	1.0	50	47000	—	—	—	VF 250_50	P180	BN180M4	164
32	4472	1.2	30	45200	—	—	—	VF 250_30	P200	BN200LA6	164










18.5 kW

n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
37	3776	0.9	40	31500	—	—	—	VF 210_40	P180	BN180M4	158
37	3824	1.3	40	44900	—	—	—	VF 250_40	P180	BN180M4	164
49	3013	1.0	30	31200	—	—	—	VF 210_30	P180	BN180M4	158
49	3049	1.3	30	41500	—	—	—	VF 250_30	P180	BN180M4	164
64	2374	1.4	15	28300	—	—	—	VF 210_15	P200	BN200LA6	158
64	2402	2.2	15	37800	—	—	—	VF 250_15	P200	BN200LA6	164
73	2057	1.1	20	13200	—	—	—	VF 185_20	P180	BN180M4	152
73	2057	1.5	20	28300	—	—	—	VF 210_20	P180	BN180M4	158
73	2081	2.1	20	37400	—	—	—	VF 250_20	P180	BN180M4	164
97	1597	1.2	15	12200	—	—	—	VF 185_15	P180	BN180M4	152
97	1597	1.8	15	26200	—	—	—	VF 210_15	P180	BN180M4	158
97	1597	2.5	15	34500	—	—	—	VF 250_15	P180	BN180M4	164
146	1077	1.7	10	11400	—	—	—	VF 185_10	P180	BN180M4	152
146	1077	2.5	10	23400	—	—	—	VF 210_10	P180	BN180M4	158
146	1089	3.4	10	37800	—	—	—	VF 250_10	P180	BN180M4	164
195	805	1.1	15	8260	—	—	—	VF 150_15	P160	BN160L2	146
209	762	2.3	7	10100	—	—	—	VF 185_7	P180	BN180M4	152
209	762	3.0	7	21200	—	—	—	VF 210_7	P180	BN180M4	158
293	543	1.5	10	7550	—	—	—	VF 150_10	P160	BN160L2	146
419	384	2.0	7	6760	—	—	—	VF 150_7	P160	BN160L2	146

22 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
22.5	7097	0.9	40	47100	—	—	—	VF 250_40	P200	BN200L6	164
30	5673	1.0	30	43900	—	—	—	VF 250_30	P200	BN200L6	164
37	4532	1.1	40	43900	—	—	—	VF 250_40	P180	BN180L4	164
49	3571	0.9	30	30200	—	—	—	VF 210_30	P180	BN180L4	158
49	3614	1.1	30	44700	—	—	—	VF 250_30	P180	BN180L4	164
60	3011	1.1	15	27200	—	—	—	VF 210_15	P200	BN200L6	158
60	3046	1.7	15	36900	—	—	—	VF 250_15	P200	BN200L6	164
73	2438	0.9	20	12200	—	—	—	VF 185_20	P180	BN180L4	152
73	2438	1.3	20	27500	—	—	—	VF 210_20	P180	BN180L4	158
73	2467	1.8	20	36700	—	—	—	VF 250_20	P180	BN180L4	164
98	1893	1.0	15	11300	—	—	—	VF 185_15	P180	BN180L4	152
98	1893	1.5	15	25500	—	—	—	VF 210_15	P180	BN180L4	158
98	1893	2.1	15	33900	—	—	—	VF 250_15	P180	BN180L4	164
147	1276	1.4	10	10700	—	—	—	VF 185_10	P180	BN180L4	152
147	1276	2.1	10	22900	—	—	—	VF 210_10	P180	BN180L4	158
147	1291	2.9	10	30300	—	—	—	VF 250_10	P180	BN180L4	164
209	904	1.9	7	9510	—	—	—	VF 185_7	P180	BN180L4	152
209	904	2.5	7	20800	—	—	—	VF 210_7	P180	BN180L4	158
209	914	3.5	7	27500	—	—	—	VF 250_7	P180	BN180L4	164
293	645	2.1	10	9730	—	—	—	VF 185_10	P180	BN180M2	152
293	645	3.1	10	23900	—	—	—	VF 210_10	P180	BN180M2	158
419	457	2.9	7	8660	—	—	—	VF 185_7	P180	BN180M2	152

30 kW








n ₂ min-1	M ₂ Nm	S	i	Rn ₂ N						IEC 	
45	5412	1.1	20	37600	—	—	—	VF 250_20	P225	BN225M6	164
60	4154	1.3	15	35000	—	—	—	VF 250_15	P225	BN225M6	164
74	3313	0.9	20	25800	—	—	—	VF 210_20	P200	BN200L4	158
74	3352	1.3	20	35200	—	—	—	VF 250_20	P200	BN200L4	164
98	2573	1.1	15	24000	—	—	—	VF 210_15	P200	BN200L4	158
98	2573	1.6	15	32600	—	—	—	VF 250_15	P200	BN200L4	164
147	1735	1.5	10	21600	—	—	—	VF 210_10	P200	BN200L4	158










30 kW

n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
147	1754	2.1	10	29200	—	—	—	VF 250_10	P200	BN200L4	164
210	1228	1.9	7	19700	—	—	—	VF 210_7	P200	BN200L4	158
210	1242	2.6	7	26600	—	—	—	VF 250_7	P200	BN200L4	164
295	874	2.3	10	19000	—	—	—	VF 210_10	P200	BN200LA2	158
421	619	2.8	7	17200	—	—	—	VF 210_7	P200	BN200LA2	158

37 kW

n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
74	4107	1.1	20	22800	—	—	—	VF 250_20	P225	BN225S4	164
99	3152	0.9	15	22600	—	—	—	VF 210_15	P225	BN225S4	158
99	3152	1.3	15	31400	—	—	—	VF 250_15	P225	BN225S4	164
148	2125	1.2	10	20500	—	—	—	VF 210_10	P225	BN225S4	158
148	2149	1.7	10	28300	—	—	—	VF 250_10	P225	BN225S4	164
211	1504	1.5	7	18800	—	—	—	VF 210_7	P225	BN225S4	158
211	1521	2.1	7	25800	—	—	—	VF 250_7	P225	BN225S4	164
296	1074	1.9	10	18400	—	—	—	VF 210_10	P200	BN200L2	158
296	1086	2.6	10	24500	—	—	—	VF 250_10	P200	BN200L2	164
423	760	2.3	7	16800	—	—	—	VF 210_7	P200	BN200L2	158

45 kW



n ₂ min-1	M ₂ Nm	S	i	R _{n2} N						IEC 	
74	4994	0.9	20	32300	—	—	—	VF 250_20	P225	BN225M4	164
99	3833	1.0	15	30100	—	—	—	VF 250_15	P225	BN225M4	164
148	2584	1.0	10	19200	—	—	—	VF 210_10	P225	BN225M4	158
148	2613	1.4	10	27300	—	—	—	VF 250_10	P225	BN225M4	164
211	1829	1.3	7	17800	—	—	—	VF 210_7	P225	BN225M4	158
211	1850	1.7	7	25000	—	—	—	VF 250_7	P225	BN225M4	164
296	1307	1.5	10	17800	—	—	—	VF 210_10	P200	BN225M2	158
296	1321	2.1	10	24000	—	—	—	VF 250_10	P200	BN225M2	164
423	925	1.9	7	16200	—	—	—	VF 210_7	P200	BN225M2	158
423	935	2.6	7	21800	—	—	—	VF 250_7	P200	BN225M2	164



22 TABELLE DATI TECNICI RIDUTTORI



VF 27

13 Nm

		i	η_s %	n_2	M_{n2}	P_{n1}	R_{n1}	R_{n2}	η_d	n_2	M_{n2}	P_{n1}	R_{n1}	R_{n2}	η_d	
				min ⁻¹	Nm	kW	N	N	%	min ⁻¹	Nm	kW	N	N	%	
				$n_1 = 2800 \text{ min}^{-1}$					$n_1 = 1400 \text{ min}^{-1}$							
VF 27	VF 27_7	7	67	400	7	0.34	—	330	86	200	9	0.23	35	410	83	169
	VF 27_10	10	62	280	7	0.24	—	400	84	140	9	0.16	30	500	80	
	VF 27_15	15	54	187	7	0.17	—	480	79	93	9	0.12	—	600	75	
	VF 27_20	20	49	140	7	0.14	—	540	76	70	9	0.09	—	600	71	
	VF 27_30	30	38	93	7	0.10	—	600	69	47	9	0.07	—	600	62	
	VF 27_40	40	33	70	7	0.08	—	600	64	35	9	0.06	—	600	57	
	VF 27_60	60	26	47	7	0.06	—	600	56	23.3	9	0.04	—	600	49	
	VF 27_70	70	24	40	7	0.06	—	600	53	20.0	9	0.04	—	600	45	
					$n_1 = 900 \text{ min}^{-1}$					$n_1 = 500 \text{ min}^{-1}$						
	VF 27_7	7	67	129	10	0.17	90	480	81	71	11	0.11	90	600	79	169
	VF 27_10	10	62	90	11	0.13	20	570	78	50	12	0.08	90	600	76	
	VF 27_15	15	54	60	11	0.09	—	600	72	33	12	0.06	90	600	69	
	VF 27_20	20	49	45	11	0.08	—	600	68	25.0	12	0.05	90	600	65	
	VF 27_30	30	38	30.0	11	0.06	—	600	59	16.7	13	0.04	—	600	55	
VF 27_40	40	33	22.5	11	0.05	—	600	54	12.5	13	0.04	—	600	50		
VF 27_60	60	26	15.0	11	0.04	—	600	45	8.3	12	0.02	—	600	41		
VF 27_70	70	24	12.9	10	0.03	—	600	42	7.1	11	0.02	—	600	38		

VF 30

24 Nm

		i	η_s %	n_2	M_{n2}	P_{n1}	R_{n1}	R_{n2}	η_d	n_2	M_{n2}	P_{n1}	R_{n1}	R_{n2}	η_d	
				min ⁻¹	Nm	kW	N	N	%	min ⁻¹	Nm	kW	N	N	%	
				$n_1 = 2800 \text{ min}^{-1}$					$n_1 = 1400 \text{ min}^{-1}$							
VF 30	VF 30_7	7	69	400	12	0.58	120	510	87	200	16	0.41	140	630	84	169
	VF 30_10	10	64	280	12	0.41	70	620	85	140	16	0.30	80	770	81	
	VF 30_15	15	56	187	14	0.34	—	720	81	93	18	0.24	—	910	76	
	VF 30_20	20	51	140	14	0.26	—	820	78	70	18	0.19	—	1030	73	
	VF 30_30	30	41	93	15	0.21	—	960	71	47	20	0.15	—	1200	65	
	VF 30_40	40	36	70	14	0.16	—	1090	66	35	19	0.12	—	1360	60	
	VF 30_60	60	29	47	14	0.12	—	1270	59	23.3	19	0.09	—	1590	51	
	VF 30_70	70	26	40	11	0.08	—	1380	55	20.0	15	0.07	—	1600	48	
					$n_1 = 900 \text{ min}^{-1}$					$n_1 = 500 \text{ min}^{-1}$						
	VF 30_7	7	69	129	18	0.30	150	730	82	71	20	0.19	150	920	81	169
	VF 30_10	10	64	90	18	0.22	150	900	79	50	20	0.14	150	1120	77	
	VF 30_15	15	56	60	20	0.17	—	1060	74	33	22	0.11	150	1320	71	
	VF 30_20	20	51	45	20	0.14	—	1200	70	25.0	22	0.09	150	1490	67	
	VF 30_30	30	41	30	22	0.12	—	1400	61	16.7	24	0.07	—	1700	58	
VF 30_40	40	36	23	20	0.09	—	1590	56	12.5	22	0.06	—	1700	53		
VF 30_60	60	29	15	20	0.07	—	1650	48	8.3	22	0.05	—	1700	44		
VF 30_70	70	26	13	17	0.05	—	1700	45	7.0	19	0.04	—	1700	41		

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



VF 44 - VF/VF 30/44

55 Nm

	i	η _s %	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	η _d %	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	η _d %				
			VF 44	VF 44_7	7	71	400	22	1.1	220	950	88	200	29	0.71	220		1180
VF 44_10	10	66		280	22	0.74	220	1150	87	140	29	0.51	220	1430	84			
VF 44_14	14	60		200	22	0.55	220	1340	84	100	29	0.37	220	1680	81			
VF 44_20	20	55		140	29	0.52	220	1490	81	70	39	0.37	220	1860	77			
VF 44_28	28	45		100	29	0.40	220	1710	76	50	39	0.29	220	2140	71			
VF 44_35	35	42		80	29	0.33	220	1870	73	40	39	0.25	220	2300	68			
VF 44_46	46	37		61	29	0.27	220	2080	69	30.0	39	0.19	220	2300	63			
VF 44_60	60	32		47	29	0.22	220	2290	65	23.3	39	0.16	220	2300	58			
VF 44_70	70	30		40	22	0.15	220	2300	62	20.0	29	0.11	220	2300	55			
VF 44_100	100	24		28	21	0.11	220	2300	55	14.0	28	0.09	220	2300	47			
				n ₁ = 900 min ⁻¹							n ₁ = 500 min ⁻¹							169
VF 44_7	7	71		129	39	0.63	220	1300	85	71	45	0.41	220	1610	83			
VF 44_10	10	66		90	39	0.45	220	1610	82	50	45	0.29	220	1980	80			
VF 44_14	14	60		64	39	0.34	220	1890	78	36	50	0.25	220	2280	76			
VF 44_20	20	55		45	45	0.29	220	2160	74	25.0	50	0.18	220	2500	72			
VF 44_28	28	45		32	49	0.24	220	2300	67	17.9	55	0.16	220	2500	64			
VF 44_35	35	42		25.7	49	0.20	220	2300	64	14.3	55	0.14	220	2500	60			
VF 44_46	46	37		19.6	49	0.17	220	2300	59	10.9	50	0.10	220	2500	55			
VF 44_60	60	32	15.0	45	0.13	200	2300	54	8.3	50	0.09	220	2500	50				
VF 44_70	70	30	12.9	39	0.10	220	2300	51	7.1	45	0.07	220	2500	47				
VF 44_100	100	24	9.0	30	0.06	220	2300	43	5.0	32	0.04	220	2500	39				

70 Nm

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

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



VF 49 - VFR 49

88 Nm

		i	η _s %	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	η _d %	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N		R _{n2} N	η _d %
				VF 49	VF 49_7	7	70	400	41	2.0	400	950	88		200	54
VF 49_10	10	65	280	44	1.5	400	1140	86	140	59	1.0	400	1410	84		
VF 49_14	14	59	200	49	1.2	400	1310	84	100	65	0.90	400	1630	81		
VF 49_18	18	55	156	44	0.87	400	1520	82	78	59	0.60	400	1890	78		
VF 49_24	24	50	117	47	0.73	400	1670	79	58	63	0.50	400	2110	75		
VF 49_28	28	43	100	56	0.78	400	1740	75	50	74	0.55	400	2170	71		
VF 49_36	36	39	78	52	0.59	400	1970	72	39	69	0.42	400	2460	67		
VF 49_45	45	35	62	49	0.46	400	2180	69	31	65	0.33	400	2725	63		
VF 49_60	60	30	47	44	0.34	400	2480	64	23.3	59	0.25	400	3100	58		
VF 49_70	70	28	40	41	0.28	400	2650	61	20.0	55	0.21	400	3150	54		
VF 49_80	80	25	35	41	0.25	400	2780	59	17.5	54	0.19	400	3150	52		
VF 49_100	100	22	28.0	37	0.20	400	3050	54	14.0	49	0.13	400	3150	47		
				n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹							
VF 49_7	7	70	129	61	0.97	400	1370	85	71	74	0.67	400	1670	83	169	
VF 49_10	10	65	90	64	0.75	400	1670	82	50	74	0.49	400	2060	80		
VF 49_14	14	59	64	71	0.61	400	1920	78	36	78	0.39	400	2400	75		
VF 49_18	18	55	50	68	0.47	400	2190	75	27.8	74	0.30	400	2730	72		
VF 49_24	24	50	38	68	0.36	400	2480	71	20.8	74	0.24	400	3090	68		
VF 49_28	28	43	32	82	0.41	400	2540	67	17.9	88	0.26	400	3180	63		
VF 49_36	36	39	25.0	75	0.31	400	2880	63	13.9	80	0.20	400	3450	59		
VF 49_45	45	35	20.0	71	0.25	400	3190	59	11.1	78	0.17	400	3450	55		
VF 49_60	60	30	15.0	64	0.19	400	3300	53	8.3	69	0.12	400	3450	49		
VF 49_70	70	28	12.9	60	0.16	400	3300	50	7.1	69	0.11	400	3450	46		
VF 49_80	80	25	11.3	58	0.14	400	3300	47	6.3	59	0.09	400	3450	43		
VF 49_100	100	22	9.0	52	0.11	400	3300	42	5.0	59	0.08	400	3450	38		



95 Nm

		i	η _s %	n 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	η _d %	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N		R _{n2} N	η _d %
				VFR 49	VFR 49_42	42	58	67	71	0.65	230	1920	76		33	78
VFR 49_54	54	54	52	68	0.50	230	2180	74	25.9	74	0.28	230	2830	71		
VFR 49_72	72	49	39	68	0.40	230	2470	70	19.4	74	0.22	230	3190	67		
VFR 49_84	84	42	33	82	0.44	230	2520	66	16.6	88	0.25	230	3290	62		
VFR 49_108	108	38	25.9	75	0.33	230	2860	62	12.9	80	0.19	230	3450	58		
VFR 49_135	135	34	20.7	71	0.27	230	3160	58	10.3	88	0.18	230	3450	54		
VFR 49_180	180	29	15.6	64	0.20	230	3300	52	7.7	69	0.12	230	3450	48		
VFR 49_210	210	27	13.3	60	0.17	230	3300	49	6.6	69	0.11	230	3450	45		
VFR 49_240	240	25	11.7	58	0.15	230	3300	46	5.8	59	0.09	230	3450	42		
VFR 49_300	300	22	9.3	52	0.12	230	3300	41	4.7	59	0.08	230	3450	37		
				n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹							
VFR 49_42	42	58	21.4	82	0.26	230	2960	72	11.9	90	0.16	230	3450	70	171	
VFR 49_54	54	54	16.7	79	0.20	230	3330	69	9.3	83	0.12	230	3450	67		
VFR 49_72	72	49	12.5	79	0.16	230	3450	64	6.9	83	0.10	230	3450	62		
VFR 49_84	84	42	10.7	91	0.17	230	3450	59	6.0	95	0.10	230	3450	57		
VFR 49_108	108	38	8.3	84	0.13	230	3450	55	4.6	90	0.08	230	3450	52		
VFR 49_135	135	34	6.7	82	0.11	230	3450	50	3.7	90	0.07	230	3450	48		
VFR 49_180	180	29	5.0	75	0.09	230	3450	45	2.8	78	0.05	230	3450	42		
VFR 49_210	210	27	4.3	75	0.08	230	3450	41	2.4	78	0.05	230	3450	39		
VFR 49_240	240	25	3.8	64	0.06	230	3450	39	2.1	68	0.04	230	3450	36		
VFR 49_300	300	22	3.0	63	0.06	230	3450	34	1.7	65	0.04	230	3450	32		

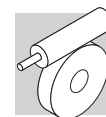


VF/VF 30/49

100 Nm



		i	η _s %	n ₁ = 1400 min ⁻¹						n ₁ = 900 min ⁻¹						
				n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	η _d %	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	η _d %	
VF/VF 30/49	VF/VF 30/49_240	240	32	5.8	95	0.13	80	3450	45	3.8	100	0.09	150	3450	44	172
	VF/VF 30/49_315	315	24	4.4	95	0.11	140	3450	40	2.9	100	0.07	150	3450	43	
	VF/VF 30/49_420	420	24	3.3	95	0.08	—	3450	41	2.1	100	0.06	—	3450	37	
	VF/VF 30/49_540	540	22	2.6	95	0.07	—	3450	37	1.7	100	0.05	—	3450	35	
	VF/VF 30/49_720	720	20	1.9	95	0.05	—	3450	39	1.3	100	0.04	—	3450	33	
	VF/VF 30/49_900	900	18	1.6	95	0.05	—	3450	31	1.0	100	0.04	—	3450	26	
	VF/VF 30/49_1120	1120	15	1.3	95	0.04	—	3450	31	0.80	100	0.03	—	3450	28	
	VF/VF 30/49_1440	1440	14	0.97	95	0.04	—	3450	24	0.63	100	0.03	—	3450	22	
	VF/VF 30/49_2160	2160	11	0.65	95	0.03	—	3450	21	0.42	100	0.02	—	3450	22	
	VF/VF 30/49_2700	2700	10	0.52	95	0.03	—	3450	17	0.33	100	0.02	—	3450	17	

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)

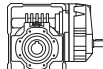



W 63 - WR 63

190 Nm

		i	η_s %	$n_1 = 2800 \text{ min}^{-1}$					$n_1 = 1400 \text{ min}^{-1}$							
				n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N		R_{n2} N	η_d %
				W 63												
	W 63_7	7	70	400	105	4.9	480	1010	90	200	120	2.9	480	1550	88	169
	W 63_10	10	66	280	125	4.2	370	1360	88	140	140	2.4	480	1840	86	
	W 63_12	12	63	233	125	3.5	435	1540	87	117	140	2.0	480	2070	85	
	W 63_15	15	59	187	125	2.8	410	1770	86	93	150	1.8	480	2280	83	
	W 63_19	19	55	147	130	2.4	310	1990	84	74	150	1.4	480	2600	81	
	W 63_24	24	52	117	130	1.9	370	2250	82	58	155	1.2	480	2890	78	
	W 63_30	30	44	93	125	1.6	440	2540	78	47	160	1.1	460	3170	74	
	W 63_38	38	40	74	130	1.3	330	2800	75	37	155	0.85	480	3580	70	
	W 63_45	45	37	62	130	1.2	380	3020	73	31	145	0.71	480	3920	67	
	W 63_64	64	31	44	110	0.75	480	3650	67	21.9	125	0.47	480	4680	61	
	W 63_80	80	27	35	100	0.59	480	4050	62	17.5	115	0.38	480	5000	56	
W 63_100	100	23	28	100	0.51	480	4420	58	14.0	115	0.33	480	5000	51		
				$n_1 = 900 \text{ min}^{-1}$					$n_1 = 500 \text{ min}^{-1}$							
	W 63_7	7	70	129	130	2.0	480	1870	87	71	140	1.2	480	2420	84	169
	W 63_10	10	66	90	150	1.7	480	2220	84	50	165	1.1	480	2830	81	
	W 63_12	12	63	75	150	1.4	480	2480	82	42	165	0.92	480	3140	79	
	W 63_15	15	59	60	160	1.3	480	2740	80	33	180	0.83	480	3430	76	
	W 63_19	19	55	47	160	1.0	480	3100	78	26.3	180	0.68	480	3860	73	
	W 63_24	24	52	38	165	0.86	480	3440	75	20.8	185	0.58	480	4280	70	
	W 63_30	30	44	30	170	0.76	480	3770	70	16.7	190	0.52	480	4690	64	
	W 63_38	38	40	23.7	165	0.62	480	4240	66	13.2	185	0.42	480	5000	61	
	W 63_45	45	37	20.0	155	0.52	480	4630	63	11.1	170	0.34	480	5000	58	
	W 63_64	64	31	14.1	135	0.35	480	5000	56	7.8	150	0.24	480	5000	51	
	W 63_80	80	27	11.3	125	0.28	480	5000	52	6.3	135	0.19	480	5000	46	
W 63_100	100	23	9.0	120	0.25	480	5000	46	5.0	130	0.17	480	5000	41		



220 Nm

		i	η_s %	$n_1 = 2800 \text{ min}^{-1}$					$n_1 = 1400 \text{ min}^{-1}$							
				n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N		R_{n2} N	η_d %
				WR 63												
	WR 63_21	21	69	133	130	2.1	180	1840	87	67	140	1.2	320	2510	84	171
	WR 63_30	30	65	93	150	1.7	300	2180	84	47	165	1.0	320	2920	81	
	WR 63_36	36	62	78	150	1.5	320	2430	82	39	165	0.85	320	3240	79	
	WR 63_45	45	58	62	160	1.3	320	2690	80	31	180	0.77	320	3540	76	
	WR 63_57	57	54	49	160	1.1	320	3050	78	24.6	180	0.63	320	3980	73	
	WR 63_72	72	51	39	165	0.90	320	3390	75	19.4	185	0.54	320	4410	70	
	WR 63_90	90	44	31	170	0.79	320	3710	70	15.6	190	0.48	320	4830	64	
	WR 63_114	114	39	24.6	165	0.62	320	4170	68	12.3	185	0.39	320	5000	61	
	WR 63_135	135	36	20.7	155	0.53	320	4560	63	10.4	170	0.32	320	5000	58	
	WR 63_192	192	30	14.6	135	0.37	320	5000	56	7.3	150	0.22	320	5000	51	
	WR 63_240	240	26	11.7	125	0.29	320	5000	52	5.8	135	0.18	320	5000	46	
WR 63_300	300	22	9.3	120	0.25	320	5000	46	4.7	130	0.15	320	5000	41		
				$n_1 = 900 \text{ min}^{-1}$					$n_1 = 500 \text{ min}^{-1}$							
	WR 63_21	21	69	43	155	0.85	320	2960	82	23.8	170	0.53	320	3750	80	171
	WR 63_30	30	65	30	180	0.72	320	3470	79	16.7	200	0.45	320	4360	77	
	WR 63_36	36	62	25.0	180	0.61	320	3830	77	14.0	200	0.40	320	4790	74	
	WR 63_45	45	58	20.0	190	0.54	320	4230	74	11.1	200	0.33	320	5000	71	
	WR 63_57	57	54	15.8	190	0.44	320	4740	71	8.8	200	0.27	320	5000	68	
	WR 63_72	72	51	12.5	190	0.37	320	5000	68	6.9	190	0.22	320	5000	64	
	WR 63_90	90	44	10.0	205	0.35	320	5000	62	5.6	220	0.22	320	5000	58	
	WR 63_114	114	39	7.9	200	0.29	320	5000	58	4.4	210	0.18	320	5000	54	
	WR 63_135	135	36	6.7	180	0.23	320	5000	54	3.7	190	0.15	320	5000	50	
	WR 63_192	192	30	4.7	150	0.16	320	5000	47	2.6	150	0.10	320	5000	43	
	WR 63_240	240	26	3.8	140	0.13	320	5000	43	2.1	140	0.08	320	5000	39	
WR 63_300	300	22	3.0	130	0.11	320	5000	38	1.7	130	0.07	320	5000	34		



VF/W 30/63

230 Nm

		i	η_s %	$n_1 = 1400 \text{ min}^{-1}$						$n_1 = 900 \text{ min}^{-1}$						
				n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	
				VF/W 30/63	VF/W 30/63_240	240	33	5.8	210	0.27	80	5000	47	3.8	230	
	VF/W 30/63_315	315	26	4.4	210	0.23	140	5000	42	2.9	230	0.17	150	5000	41	
	VF/W 30/63_450	450	25	3.1	210	0.17	—	5000	41	2.0	230	0.11	—	5000	42	
	VF/W 30/63_570	570	22	2.5	210	0.14	—	5000	40	1.6	230	0.11	—	5000	36	
	VF/W 30/63_720	720	21	1.9	210	0.12	—	5000	37	1.3	230	0.09	—	5000	32	
	VF/W 30/63_900	900	18	1.6	210	0.11	—	5000	30	1.0	230	0.08	—	5000	29	
	VF/W 30/63_1200	1200	16	1.2	210	0.11	—	5000	24	0.75	230	0.07	—	5000	25	
	VF/W 30/63_1520	1520	14	0.92	210	0.08	—	5000	24	0.59	230	0.06	—	5000	23	
	VF/W 30/63_2280	2280	12	0.61	210	0.06	—	5000	21	0.39	230	0.04	—	5000	23	
	VF/W 30/63_2700	2700	11	0.52	210	0.05	—	5000	22	0.33	230	0.04	—	5000	19	

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



W 75 - WR 75

320 Nm

		i	η _s %	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	η _d %	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	η _d %	
				W 75	W 75_7	7	71	400	170	7.8	750	700	91	200	190	
W 75_10	10	67	280	205	6.7	750	1610	90	140	230	3.8	750	2240	88		
W 75_15	15	60	187	225	5.0	750	2120	88	93	250	2.9	750	2870	85		
W 75_20	20	56	140	225	3.8	750	2550	86	70	250	2.2	750	3410	83		
W 75_25	25	52	112	225	3.2	750	2900	83	56	250	1.8	750	3840	80		
W 75_30	30	45	93	240	2.9	750	3100	81	47	270	1.7	750	4090	77		
W 75_40	40	40	70	225	2.1	750	3660	77	35	255	1.3	750	4770	72		
W 75_50	50	36	56	195	1.6	750	4180	73	28.0	220	0.95	750	5410	68		
W 75_60	60	33	47	180	1.3	750	4610	70	23.3	200	0.75	750	5960	65		
W 75_80	80	28	35	160	0.90	750	5310	65	17.5	180	0.56	750	6200	59		
W 75_100	100	25	28.0	135	0.65	750	5960	61	14.0	150	0.40	750	6200	55		
				n ₁ = 900 min ⁻¹						n ₁ = 500 min ⁻¹						
	W 75_7	7	71	129	205	3.1	750	2120	88	71	225	2.0	750	2940	86	169
	W 75_10	10	67	90	250	2.7	750	2700	86	50	275	1.7	750	3480	84	
	W 75_15	15	60	60	270	2.0	750	3440	83	33	295	1.3	750	4380	80	
	W 75_20	20	56	45	270	1.6	750	4050	80	25.0	295	1.0	750	5120	77	
	W 75_25	25	52	36	270	1.3	750	4550	77	20.0	295	0.85	750	5720	73	
	W 75_30	30	45	30	290	1.2	750	4860	74	16.7	320	0.81	750	6080	69	
	W 75_40	40	40	22.5	275	1.0	750	5630	68	12.5	305	0.63	750	6200	63	
	W 75_50	50	36	18.0	235	0.70	750	6200	63	10.0	260	0.47	750	6200	58	
	W 75_60	60	33	15.0	215	0.56	750	6200	60	8.3	235	0.37	750	6200	55	
	W 75_80	80	28	11.3	195	0.43	750	6200	54	6.3	215	0.29	750	6200	49	
	W 75_100	100	25	9.0	160	0.30	750	6200	50	5.0	180	0.21	750	6200	44	

420 Nm

		i	η _s %	n 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	η _d %	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N	R _{n2} N	η _d %	
				WR 75	WR 75_21	21	70	133	205	3.3	500	2030	88	67	225	
WR 75_30	30	66	93	250	2.8	500	2640	86	47	275	1.6	500	3610	84		
WR 75_45	45	59	62	270	2.1	500	3380	83	31	295	1.2	500	4530	80		
WR 75_60	60	55	47	270	1.6	500	3980	80	23.3	295	0.94	500	5280	77		
WR 75_75	75	51	37	270	1.4	500	4480	77	18.7	295	0.79	500	5890	73		
WR 75_90	90	44	31	290	1.3	500	4780	74	15.6	320	0.76	500	6200	69		
WR 75_120	120	39	23.3	275	1.0	500	5540	68	11.7	305	0.59	500	6200	63		
WR 75_150	150	35	18.7	235	0.73	500	6200	63	9.3	260	0.44	500	6200	58		
WR 75_180	180	32	15.6	215	0.58	500	6200	60	7.8	235	0.35	500	6200	55		
WR 75_240	240	27	11.7	195	0.44	500	6200	54	5.8	215	0.27	500	6200	49		
WR 75_300	300	24	9.3	160	0.31	500	6200	50	4.7	180	0.20	500	6200	44		
				n ₁ = 900 min ⁻¹						n ₁ = 500 min ⁻¹						
	WR 75_21	21	70	43	245	1.3	500	3660	85	23.8	270	0.82	500	4660	82	171
	WR 75_30	30	66	30	330	1.3	500	4070	82	16.7	370	0.81	500	5160	80	
	WR 75_45	45	59	20.0	350	0.94	500	5180	78	11.1	400	0.62	500	6200	75	
	WR 75_60	60	55	15.0	330	0.69	500	6180	75	8.3	370	0.45	500	6200	71	
	WR 75_75	75	51	12.0	330	0.59	500	6200	70	6.7	350	0.37	500	6200	66	
	WR 75_90	90	44	10.0	370	0.58	500	6200	67	5.6	420	0.39	500	6200	63	
	WR 75_120	120	39	7.5	330	0.43	500	6200	60	4.2	380	0.30	500	6200	56	
	WR 75_150	150	35	6.0	310	0.35	500	6200	55	3.3	350	0.24	500	6200	51	
	WR 75_180	180	32	5.0	280	0.29	500	6200	51	2.8	320	0.20	500	6200	47	
	WR 75_240	240	27	3.8	220	0.19	500	6200	45	2.1	280	0.15	500	6200	41	
	WR 75_300	300	24	3.0	200	0.15	500	6200	41	1.7	260	0.12	500	6200	37	



WR 75 - VF/W 44/75

370 Nm

	i	η_s %	$n_1 = 2800 \text{ min}^{-1}$						$n_1 = 1400 \text{ min}^{-1}$							
			n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %		
			WR 75_P90 B5													
WR 75_P90 B5	WR 75_15	15	66	187	220	4.8	—	1960	89	93	250	2.8	—	2640	86	171
	WR 75_22.5	22.5	59	124	240	3.6	—	2530	86	62	270	2.1	—	3380	83	
	WR 75_30	30	55	93	240	2.8	—	3020	84	47	270	1.6	—	3980	80	
	WR 75_37.5	37.5	51	75	240	2.3	—	3410	81	37	270	1.4	—	4480	77	
	WR 75_45	45	44	62	255	2.1	—	3660	79	31	290	1.3	—	4780	74	
	WR 75_60	60	39	47	240	1.6	—	4290	74	23.3	275	1.0	—	5540	68	
	WR 75_75	75	35	37	210	1.2	—	4860	70	18.7	235	0.73	—	6200	63	
n₁ = 900 min⁻¹ n₁ = 500 min⁻¹																
WR 75_P90 B5	WR 75_15	15	66	60	275	2.1	—	3150	84	33	330	1.4	—	3850	82	171
	WR 75_22.5	22.5	59	40	295	1.5	—	4010	80	22.2	350	1.0	—	4920	78	
	WR 75_30	30	55	30	295	1.2	—	4710	77	16.7	330	0.77	—	5890	75	
	WR 75_37.5	37.5	51	24	295	1.0	—	5280	73	13.3	330	0.66	—	6200	70	
	WR 75_45	45	44	20	320	1.0	—	5610	69	11.1	370	0.64	—	6200	67	
	WR 75_60	60	39	15	305	0.76	—	6200	63	8.3	330	0.48	—	6200	60	
	WR 75_75	75	35	12	260	0.56	—	6200	58	6.7	310	0.39	—	6200	55	

400 Nm

	i	η_s %	$n_1 = 1400 \text{ min}^{-1}$						$n_1 = 900 \text{ min}^{-1}$							
			n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %		
			VF/W 44/75													
VF/W 44/75	VF/W 44/75_250	250	34	5.6	370	0.38	220	4560	57	3.6	400	0.29	220	4660	52	172
	VF/W 44/75_300	300	30	4.7	370	0.35	220	5160	51	3.0	400	0.27	220	5150	46	
	VF/W 44/75_400	400	26	3.5	370	0.29	220	6200	46	2.3	400	0.22	220	6200	42	
	VF/W 44/75_525	525	25	2.7	370	0.23	220	6200	44	1.7	400	0.18	220	6200	41	
	VF/W 44/75_700	700	24	2.0	370	0.18	220	6200	42	1.3	400	0.14	220	6200	39	
	VF/W 44/75_920	920	21	1.5	370	0.15	—	6200	40	1.0	400	0.11	60	6200	36	
	VF/W 44/75_1200	1200	18	1.2	370	0.12	—	6200	37	0.75	400	0.10	220	6200	31	
	VF/W 44/75_1500	1500	17	0.93	370	0.10	220	6200	37	0.60	400	0.09	220	6200	29	
	VF/W 44/75_2100	2100	14	0.67	370	0.09	220	6200	30	0.43	400	0.07	220	6200	24	
	VF/W 44/75_2800	2800	12	0.50	370	0.07	220	6200	26	0.32	400	0.06	220	6200	22	

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



W 86 - WR 86

440 Nm

	i	η _s %	n ₂	M _{n2}	P _{n1}	R _{n1}	R _{n2}	η _d	n ₂	M _{n2}	P _{n1}	R _{n1}	R _{n2}	η _d		
			min ⁻¹	Nm	kW	N	N	%	min ⁻¹	Nm	kW	N	N	%		
			n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹								
W 86	W 86_7	7	71	400	225	10.4	850	2930	91	200	250	5.9	850	3920	89	169
	W 86_10	10	67	280	260	8.5	850	3490	90	140	290	4.8	850	4620	88	
	W 86_15	15	60	187	295	6.6	850	4200	87	93	330	3.8	850	5510	85	
	W 86_20	20	60	140	285	4.9	850	4900	86	70	320	2.8	850	6380	84	
	W 86_23	23	58	122	285	4.3	850	5250	85	61	320	2.5	850	6800	82	
	W 86_30	30	45	93	320	3.9	850	5740	81	47	370	2.4	850	7000	76	
	W 86_40	40	45	70	295	2.7	850	6670	79	35	330	1.6	850	7000	75	
	W 86_46	46	43	61	305	2.5	850	7000	77	30	340	1.5	850	7000	73	
	W 86_56	56	39	50	265	1.8	850	7000	75	25.0	300	1.1	850	7000	70	
	W 86_64	64	37	44	250	1.6	850	7000	73	21.9	280	0.94	850	7000	68	
W 86_80	80	33	35	225	1.2	850	7000	69	17.5	255	0.73	850	7000	64		
W 86_100	100	29	28.0	205	0.92	850	7000	65	14.0	230	0.57	850	7000	59		
			n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹								
W 86	W 86_7	7	71	129	270	4.1	850	4670	88	71	295	2.6	850	5890	85	169
	W 86_10	10	67	90	310	3.4	850	5500	86	50	345	2.2	850	6860	82	
	W 86_15	15	60	60	355	2.7	850	6520	82	33	390	1.7	850	7000	78	
	W 86_20	20	60	45	345	2.0	850	7000	81	25.0	380	1.3	850	7000	77	
	W 86_23	23	58	39	345	1.8	850	7000	80	21.7	380	1.2	850	7000	75	
	W 86_30	30	45	30	400	1.7	850	7000	73	16.7	440	1.1	850	7000	67	
	W 86_40	40	45	22.5	355	1.2	850	7000	71	12.5	390	0.77	850	7000	66	
	W 86_46	46	43	19.6	365	1.1	850	7000	69	10.9	405	0.73	850	7000	63	
	W 86_56	56	39	16.1	325	0.83	850	7000	66	8.9	355	0.55	850	7000	60	
	W 86_64	64	37	14.1	300	0.70	850	7000	63	7.8	330	0.47	850	7000	58	
W 86_80	80	33	11.3	275	0.55	850	7000	59	6.3	305	0.38	850	7000	53		
W 86_100	100	29	9.0	250	0.43	850	7000	55	5.0	275	0.29	850	7000	49		

550 Nm

	i	η _s %	n ₂	M _{n2}	P _{n1}	R _{n1}	R _{n2}	η _d	n ₂	M _{n2}	P _{n1}	R _{n1}	R _{n2}	η _d		
			min ⁻¹	Nm	kW	N	N	%	min ⁻¹	Nm	kW	N	N	%		
			n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹								
WR 86	WR 86_21	21	70	133	270	4.3	500	4590	88	67	295	2.4	500	6070	85	171
	WR 86_30	30	66	93	310	3.5	500	5410	86	47	345	2.1	500	7000	82	
	WR 86_45	45	59	62	355	2.8	500	6420	82	31	390	1.6	500	7000	78	
	WR 86_60	60	59	47	345	2.1	500	7000	81	23.3	380	1.2	500	7000	77	
	WR 86_69	69	57	41	345	1.8	500	7000	80	20.3	380	1.1	500	7000	75	
	WR 86_90	90	44	31	400	1.8	500	7000	73	15.6	440	1.1	500	7000	67	
	WR 86_120	120	44	23.3	355	1.2	500	7000	71	11.7	390	0.72	500	7000	66	
	WR 86_138	138	42	20.3	365	1.1	500	7000	69	10.1	405	0.68	500	7000	63	
	WR 86_168	168	38	16.7	325	0.86	500	7000	66	8.3	355	0.52	500	7000	60	
	WR 86_192	192	36	14.6	300	0.73	500	7000	63	7.3	330	0.43	500	7000	58	
WR 86_240	240	32	11.7	275	0.57	500	7000	59	5.8	305	0.35	500	7000	53		
WR 86_300	300	28	9.3	250	0.44	500	7000	55	4.7	275	0.27	500	7000	49		
			n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹								
WR 86	WR 86_21	21	70	43	325	1.8	500	7000	83	23.8	355	1.1	500	7000	81	171
	WR 86_30	30	66	30	375	1.5	500	7000	81	16.7	415	0.93	500	7000	78	
	WR 86_45	45	59	20.0	450	1.2	500	7000	76	11.1	500	0.80	500	7000	73	
	WR 86_60	60	59	15.0	430	0.90	500	7000	75	8.3	440	0.53	500	7000	72	
	WR 86_69	69	57	13.0	390	0.73	500	7000	73	7.2	400	0.43	500	7000	70	
	WR 86_90	90	44	10.0	500	0.82	500	7000	64	5.6	550	0.53	500	7000	60	
	WR 86_120	120	44	7.5	440	0.55	500	7000	63	4.2	470	0.35	500	7000	59	
	WR 86_138	138	42	6.5	430	0.48	500	7000	61	3.6	440	0.30	500	7000	56	
	WR 86_168	168	38	5.4	390	0.38	500	7000	57	3.0	410	0.24	500	7000	53	
	WR 86_192	192	36	4.7	390	0.35	500	7000	55	2.6	410	0.22	500	7000	50	
WR 86_240	240	32	3.8	310	0.24	500	7000	50	2.1	320	0.15	500	7000	46		
WR 86_300	300	28	3.0	310	0.22	500	7000	45	1.7	320	0.14	500	7000	41		



WR 86 - VF/W 44/86

500 Nm

		i	η_s %	$n_1 = 2800 \text{ min}^{-1}$					$n_1 = 1400 \text{ min}^{-1}$								
				n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N		R_{n2} N	η_d %	
				WR 86_P90_B5													
WR 86_P90_B5	WR 86_15	15	66	187	275	6.1	—	4130	88	93	310	3.5	—	5410	86	171	
	WR 86_22.5	22.5	59	124	315	4.8	—	4920	86	62	355	2.8	—	6420	82		
	WR 86_30	30	59	93	305	3.5	—	5720	85	47	345	2.1	—	7000	81		
	WR 86_34.5	34.5	57	81	305	3.1	—	6110	84	41	345	1.8	—	7000	80		
	WR 86_45	45	44	62	350	3.0	—	6640	77	31	400	1.8	—	7000	73		
	WR 86_60	60	44	47	315	2.0	—	7000	77	23.3	355	1.2	—	7000	71		
	WR 86_69	69	42	41	325	1.8	—	7000	75	20.3	365	1.1	—	7000	69		
	WR 86_84	84	38	33	285	1.4	—	7000	72	16.7	325	0.86	—	7000	66		
					$n_1 = 900 \text{ min}^{-1}$					$n_1 = 500 \text{ min}^{-1}$							
	WR 86_P90_B5	WR 86_15	15	66	60	345	2.6	—	6330	82	33	375	1.6	—	7000	81	171
		WR 86_22.5	22.5	59	40	390	2.1	—	7000	78	22.2	450	1.4	—	7000	76	
		WR 86_30	30	59	30	380	1.6	—	7000	77	16.7	430	1.0	—	7000	75	
		WR 86_34.5	34.5	57	26.1	380	1.4	—	7000	75	14.5	390	0.8	—	7000	73	
		WR 86_45	45	44	20.0	440	1.4	—	7000	67	11.1	500	0.9	—	7000	64	
WR 86_60		60	44	15.0	390	0.93	—	7000	66	8.3	440	0.61	—	7000	63		
WR 86_69		69	42	13.0	405	0.88	—	7000	63	7.2	430	0.53	—	7000	61		
WR 86_84		84	38	10.7	355	0.66	—	7000	60	6.0	390	0.43	—	7000	57		

550 Nm

		i	η_s %	$n_1 = 1400 \text{ min}^{-1}$					$n_1 = 900 \text{ min}^{-1}$							
				n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N		R_{n2} N	η_d %
				VF/W 44/86												
VF/W 44/86	VF/W 44/86_230	230	38	6.1	500	0.59	220	7000	54	3.9	550	0.43	220	7000	53	172
	VF/W 44/86_300	300	30	4.7	500	0.54	220	7000	45	3.0	550	0.41	220	7000	42	
	VF/W 44/86_400	400	30	3.5	500	0.45	220	7000	41	2.3	550	0.32	220	7000	41	
	VF/W 44/86_525	525	25	2.7	500	0.33	220	7000	42	1.7	550	0.25	220	7000	39	
	VF/W 44/86_700	700	25	2.0	500	0.27	220	7000	39	1.3	550	0.20	220	7000	37	
	VF/W 44/86_920	920	22	1.5	500	0.20	220	7000	40	1.0	550	0.15	—	7000	37	
	VF/W 44/86_1380	1380	17	1.0	500	0.17	220	7000	32	0.65	550	0.13	—	7000	28	
	VF/W 44/86_1840	1840	17	0.76	500	0.13	220	7000	30	0.49	550	0.10	—	7000	28	
	VF/W 44/86_2116	2116	16	0.66	500	0.12	220	7000	28	0.43	550	0.09	220	7000	28	
VF/W 44/86_2760	2760	14	0.51	500	0.11	—	7000	24	0.33	550	0.08	220	7000	24		

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



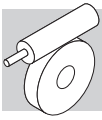
W 110 - WR 110

830 Nm

	i	η_s %	$n_1 = 2800 \text{ min}^{-1}$							$n_1 = 1400 \text{ min}^{-1}$								
			n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %				
W 110	W 110_7	7	71	400	445	20.7	1200	3710	90	200	500	11.8	1200	5020	89	169		
	W 110_10	10	67	280	490	16.1	1200	4650	89	140	550	9.3	1200	6190	87			
	W 110_15	15	60	187	535	12.0	1200	5770	87	93	600	7.0	1200	7590	84			
	W 110_20	20	61	140	510	8.7	1200	6790	86	70	570	5.0	1200	8000	84			
	W 110_23	23	59	122	480	7.1	1200	7430	86	61	540	4.1	1200	8000	83			
	W 110_30	30	45	93	625	7.5	1200	7780	81	47	700	4.4	1200	8000	77			
	W 110_40	40	46	70	595	5.5	1200	8000	80	35	670	3.2	1200	8000	76			
	W 110_46	46	44	61	535	4.3	1200	8000	79	30	600	2.6	1200	8000	74			
	W 110_56	56	41	50	535	3.7	1200	8000	76	25.0	600	2.2	1200	8000	72			
	W 110_64	64	38	44	470	2.9	1200	8000	74	21.9	530	1.7	1200	8000	70			
W 110_80	80	34	35	420	2.2	1200	8000	71	17.5	470	1.3	1200	8000	66				
W 110_100	100	30	28.0	410	1.8	1200	8000	67	14.0	460	1.1	1200	8000	62				
			$n_1 = 900 \text{ min}^{-1}$							$n_1 = 500 \text{ min}^{-1}$								
W 110	W 110_7	7	71	129	540	8.3	1200	6040	88	71	595	5.2	1200	7680	86	169		
	W 110_10	10	67	90	590	6.5	1200	7410	86	50	655	4.1	1200	8000	84			
	W 110_15	15	60	60	645	4.9	1200	8000	83	33	710	3.1	1200	8000	80			
	W 110_20	20	61	45	615	3.5	1200	8000	82	25.0	675	2.2	1200	8000	79			
	W 110_23	23	59	39	580	2.9	1200	8000	81	21.7	640	1.9	1200	8000	77			
	W 110_30	30	45	30	755	3.2	1200	8000	74	16.7	830	2.1	1200	8000	70			
	W 110_40	40	46	22.5	720	2.3	1200	8000	73	12.5	795	1.5	1200	8000	68			
	W 110_46	46	44	19.6	645	1.9	1200	8000	71	10.9	710	1.2	1200	8000	66			
	W 110_56	56	41	16.1	645	1.6	1200	8000	68	8.9	710	1.1	1200	8000	63			
	W 110_64	64	38	14.1	570	1.3	1200	8000	65	7.8	630	0.86	1200	8000	60			
W 110_80	80	34	11.3	505	0.98	1200	8000	61	6.3	560	0.65	1200	8000	56				
W 110_100	100	30	9.0	495	0.82	1200	8000	57	5.0	545	0.56	1200	8000	51				



1000 Nm

	i	η_s %	$n_1 = 2800 \text{ min}^{-1}$							$n_1 = 1400 \text{ min}^{-1}$								
			n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %				
WR 110	WR 110_21	21	70	133	540	8.6	700	5930	88	67	595	4.8	700	7950	86	171		
	WR 110_30	30	66	93	590	6.7	700	7280	86	47	655	3.8	700	8000	84			
	WR 110_45	45	59	62	645	5.1	700	8000	83	31	710	2.9	700	8000	80			
	WR 110_60	60	60	47	615	3.7	700	8000	82	23.3	675	2.1	700	8000	79			
	WR 110_69	69	58	41	580	3.0	700	8000	81	20.3	640	1.8	700	8000	77			
	WR 110_90	90	44	31	755	3.3	700	8000	74	15.6	830	1.9	700	8000	70			
	WR 110_120	120	45	23.3	720	2.4	700	8000	73	11.7	795	1.4	700	8000	68			
	WR 110_138	138	43	20.3	645	1.9	700	8000	71	10.1	710	1.1	700	8000	66			
	WR 110_168	168	40	16.7	645	1.7	700	8000	68	8.3	710	0.98	700	8000	63			
	WR 110_192	192	37	14.6	570	1.3	700	8000	65	7.3	630	0.80	700	8000	60			
WR 110_240	240	33	11.7	505	1.0	700	8000	61	5.8	560	0.61	700	8000	56				
WR 110_300	300	29	9.3	495	0.85	700	8000	57	4.7	545	0.52	700	8000	51				
			$n_1 = 900 \text{ min}^{-1}$							$n_1 = 500 \text{ min}^{-1}$								
WR 110	WR 110_21	21	70	43	645	3.4	700	8000	84	23.8	715	2.2	700	8000	82	171		
	WR 110_30	30	66	30	710	2.8	700	8000	81	16.7	785	1.7	700	8000	79			
	WR 110_45	45	59	20.0	870	2.4	700	8000	77	11.1	950	1.5	700	8000	75			
	WR 110_60	60	60	15.0	800	1.6	700	8000	77	8.3	850	1.0	700	8000	74			
	WR 110_69	69	58	13.0	750	1.4	700	8000	75	7.2	820	0.86	700	8000	72			
	WR 110_90	90	44	10.0	900	1.4	700	8000	66	5.6	1000	0.94	700	8000	62			
	WR 110_120	120	45	7.5	870	1.1	700	8000	65	4.2	950	0.68	700	8000	61			
	WR 110_138	138	43	6.5	800	0.87	700	8000	63	3.6	900	0.58	700	8000	59			
	WR 110_168	168	40	5.4	775	0.72	700	8000	60	3.0	800	0.45	700	8000	55			
	WR 110_192	192	37	4.7	685	0.59	700	8000	57	2.6	720	0.37	700	8000	53			
WR 110_240	240	33	3.8	590	0.44	700	8000	53	2.1	620	0.28	700	8000	48				
WR 110_300	300	29	3.0	570	0.37	700	8000	48	1.7	600	0.24	700	8000	44				



VF/W 49/110

1050 Nm

		i	η_s %	$n_1 = 1400 \text{ min}^{-1}$						$n_1 = 900 \text{ min}^{-1}$						
				n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	
				VF/W 49/110	VF/W 49/110_230	230	38	6.1	1000	1.2	400	8000	52	3.9	1050	
VF/W 49/110_300	300	29	4.7	1000	1.0	400	8000	48	3.0	1050	0.70	400	8000	47		
VF/W 49/110_400	400	30	3.5	1000	0.81	400	8000	45	2.3	1050	0.55	400	8000	45		
VF/W 49/110_540	540	25	2.6	1000	0.66	400	8000	41	1.7	1050	0.48	400	8000	38		
VF/W 49/110_720	720	24	1.9	1000	0.51	400	8000	40	1.3	1050	0.36	400	8000	38		
VF/W 49/110_1080	1080	18	1.3	1000	0.44	400	8000	31	0.83	1050	0.28	400	8000	30		
VF/W 49/110_1350	1350	16	1.0	1000	0.36	400	8000	30	0.67	1050	0.26	400	8000	28		
VF/W 49/110_1656	1656	17	0.85	1000	0.30	400	8000	30	0.54	1050	0.20	400	8000	30		
VF/W 49/110_2070	2070	15	0.68	1000	0.25	400	8000	28	0.43	1050	0.19	400	8000	25		
VF/W 49/110_2800	2800	13	0.50	1000	0.22	400	8000	24	0.32	1050	0.17	400	8000	21		



VF 130 - VFR 130

1500 Nm

		i	η _s %	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	η _d %	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N		R _{n2} N	η _d %
VF 130	VF 130_7	7	71	400	555	25	1500	4930	91	200	740	17.4	1500	5990	89	169
	VF 130_10	10	67	280	593	19.3	1500	6210	90	140	790	13.3	1500	7620	88	
	VF 130_15	15	63	187	690	15.3	1500	7390	88	93	920	10.6	1500	9100	86	
	VF 130_20	20	59	140	675	11.4	1500	8670	87	70	900	8.0	1500	10700	84	
	VF 130_23	23	57	122	668	9.9	1500	9300	86	61	890	6.9	1500	11500	83	
	VF 130_30	30	49	93	788	9.3	1040	10100	83	47	1050	6.6	—	12500	79	
	VF 130_40	40	44	70	825	7.6	—	11400	80	35	1100	5.4	—	12600	76	
	VF 130_46	46	45	61	788	6.3	1290	12200	80	30.0	1050	4.5	—	12600	76	
	VF 130_56	56	42	50	720	4.8	1500	12600	78	25.0	960	3.4	940	12600	73	
	VF 130_64	64	39	44	698	4.2	1500	12600	76	21.9	930	3.0	1220	12600	71	
VF 130_80	80	35	35	660	3.3	1500	12600	73	17.5	880	2.4	1500	12600	68		
VF 130_100	100	31	28	585	2.5	1500	12600	70	14.0	780	1.8	1500	12600	64		
				n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹							
VF 130	VF 130_7	7	71	129	850	13.0	1500	6980	88	71	1000	8.8	1500	8670	86	169
	VF 130_10	10	67	90	900	9.9	1500	8900	87	50	1100	6.9	1500	10800	84	
	VF 130_15	15	63	60	1080	8.1	1500	10490	84	33	1350	5.9	1500	12600	81	
	VF 130_20	20	59	45	1050	6.1	1500	12400	82	25.0	1350	4.6	1500	13800	79	
	VF 130_23	23	57	39	1050	5.4	1500	13200	81	21.7	1300	3.9	1500	13800	77	
	VF 130_30	30	49	30.0	1250	5.2	—	13200	77	16.7	1500	3.7	—	13800	72	
	VF 130_40	40	44	22.5	1200	3.9	—	13200	73	12.5	1400	2.8	—	13800	68	
	VF 130_46	46	45	19.6	1150	3.3	490	13200	73	10.9	1350	2.3	1270	13800	68	
	VF 130_56	56	42	16.1	1080	2.7	1500	13200	70	8.9	1200	1.8	1500	13800	65	
	VF 130_64	64	39	14.1	1050	2.4	1500	13200	68	7.8	1200	1.6	1500	13800	62	
VF 130_80	80	35	11.3	950	1.8	1500	13200	64	6.3	1150	1.3	1500	13800	58		
VF 130_100	100	31	9.0	800	1.3	1500	13200	59	5.0	900	0.91	1500	13800	54		

1800 Nm

		i	η _s %	n 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	η _d %	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N		R _{n2} N	η _d %
VFR 130	VFR 130_60	60	58	47	1050	6.4	1000	12400	81	23.3	1350	4.3	1000	13800	78	171
	VFR 130_69	69	56	41	1050	5.6	1000	13200	80	20.3	1300	3.7	1000	13800	76	
	VFR 130_90	90	48	31	1250	5.4	1000	13200	76	15.6	1500	3.5	1000	13800	71	
	VFR 130_120	120	43	23.3	1200	4.1	1000	13200	72	11.7	1400	2.6	1000	13800	67	
	VFR 130_138	138	44	20.3	1150	3.4	1000	13200	72	10.1	1350	2.2	1000	13800	67	
	VFR 130_168	168	41	16.7	1080	2.7	1000	13200	69	8.3	1200	1.6	1000	13800	64	
	VFR 130_192	192	38	14.6	1050	2.4	1000	13200	67	7.3	1200	1.5	1000	13800	61	
	VFR 130_240	240	34	11.7	950	1.9	1000	13200	63	5.8	1150	1.2	1000	13800	57	
	VFR 130_300	300	30	9.3	800	1.4	1000	13200	58	4.7	900	0.83	1000	13800	53	
					n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹						
VFR 130	VFR 130_60	60	58	15.0	1450	3.1	1000	13800	75	8.3	1600	1.9	1000	13800	74	171
	VFR 130_69	69	56	13.0	1450	2.7	1000	13800	74	7.2	1550	1.6	1000	13800	72	
	VFR 130_90	90	48	10.0	1600	2.5	1000	13800	68	5.6	1800	1.6	1000	13800	66	
	VFR 130_120	120	43	7.5	1600	2.0	1000	13800	63	4.2	1800	1.3	1000	13800	61	
	VFR 130_138	138	44	6.5	1500	1.6	1000	13800	64	3.6	1600	1.0	1000	13800	61	
	VFR 130_168	168	41	5.4	1350	1.3	1000	13800	60	3.0	1450	0.78	1000	13800	58	
	VFR 130_192	192	38	4.7	1300	1.1	1000	13800	58	2.6	1400	0.70	1000	13800	55	
	VFR 130_240	240	34	3.8	1200	0.87	1000	13800	54	2.1	1250	0.54	1000	13800	51	
	VFR 130_300	300	30	3.0	1000	0.64	1000	13800	49	1.7	1100	0.41	1000	13800	47	

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



W/VF 63/130

1850 Nm





W/VF 63/130	i	η_s %	$n_1 = 1400 \text{ min}^{-1}$							$n_1 = 900 \text{ min}^{-1}$					172
			n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	
W/VF 63/130_280	280	31	5.0	1800	1.9	480	13800	50	3.2	1850	1.3	480	13800	48	
W/VF 63/130_400	400	29	3.5	1800	1.5	480	13800	44	2.3	1850	0.99	480	13800	44	
W/VF 63/130_600	600	26	2.3	1800	1.1	480	13800	40	1.5	1850	0.73	480	13800	40	
W/VF 63/130_760	760	24	1.8	1800	0.89	480	13800	39	1.2	1850	0.62	480	13800	37	
W/VF 63/130_960	960	23	1.5	1800	0.74	480	13800	37	0.94	1850	0.52	480	13800	35	
W/VF 63/130_1200	1200	19	1.2	1800	0.65	—	13800	34	0.75	1850	0.45	—	13800	32	
W/VF 63/130_1520	1520	18	0.92	1800	0.55	—	13800	32	0.59	1850	0.38	—	13800	30	
W/VF 63/130_1800	1800	16	0.78	1800	0.52	—	13800	28	0.50	1850	0.37	—	13800	26	
W/VF 63/130_2560	2560	14	0.55	1800	0.45	—	13800	23	0.35	1850	0.32	—	13800	21	
W/VF 63/130_3200	3200	12	0.44	1800	0.49	—	13800	17	0.28	1850	0.34	480	13800	16	

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)





VF 150 - VFR 150

2000 Nm

		i	η _s %	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	η _d %	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N		R _{n2} N	η _d %
				VF 150												
	VF 150_7	7	72	400	750	35	2200	5010	91	200	1000	24	2200	6040	90	169
	VF 150_10	10	68	280	788	25	2200	6630	90	140	1050	17.5	2200	8120	88	
	VF 150_15	15	64	187	863	19.0	2200	8110	89	93	1150	13.1	2200	9990	87	
	VF 150_20	20	59	140	975	16.4	2200	9170	87	70	1300	11.3	2200	11300	84	
	VF 150_23	23	57	122	953	14.1	2200	9940	86	61	1270	9.8	2200	12300	83	
	VF 150_30	30	48	93	1028	12.1	2200	11100	83	47	1370	8.5	2200	13700	80	
	VF 150_40	40	44	70	1155	10.5	2200	12300	81	35	1540	7.4	830	14700	77	
	VF 150_46	46	45	61	1163	9.2	2200	13100	81	30.0	1550	6.5	1400	14700	77	
	VF 150_56	56	42	50	1028	6.8	2200	14600	79	25.0	1370	4.9	2200	14700	74	
	VF 150_64	64	39	44	998	5.9	2200	14700	77	21.9	1330	4.2	2200	14700	72	
	VF 150_80	80	35	35	938	4.6	2200	14700	74	17.5	1250	3.4	2200	14700	69	
	VF 150_100	100	31	28	863	3.6	2200	14700	71	14.0	1150	2.6	2200	14700	65	
				n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹							
	VF 150_7	7	72	129	1150	17.6	2200	7040	89	71	1400	12.2	2200	8560	87	169
	VF 150_10	10	68	90	1200	13.0	2200	9480	87	50	1500	9.4	2200	11400	85	
	VF 150_15	15	64	60	1350	10.0	2200	11500	85	33	1700	7.3	2200	13800	83	
	VF 150_20	20	59	45	1500	8.6	2200	13100	83	25.0	1900	6.4	2200	15700	80	
	VF 150_23	23	57	39	1500	7.6	2200	14200	82	21.7	1850	5.5	2200	16000	78	
	VF 150_30	30	48	30.0	1600	6.5	2200	15500	77	16.7	1950	4.8	2200	16000	73	
	VF 150_40	40	44	22.5	1750	5.6	1150	15500	74	12.5	2000	3.9	2200	16000	69	
	VF 150_46	46	45	19.6	1750	4.9	2100	15500	74	10.9	2000	3.4	2200	16000	69	
	VF 150_56	56	42	16.1	1500	3.7	2200	15500	71	8.9	1750	2.6	2200	16000	66	
	VF 150_64	64	39	14.1	1450	3.2	2200	15500	69	7.8	1700	2.3	2200	16000	63	
	VF 150_80	80	35	11.3	1350	2.5	2200	15500	65	6.3	1550	1.8	2200	16000	59	
	VF 150_100	100	31	9.0	1150	1.8	2200	15500	61	5.0	1300	1.3	2200	16000	55	

2600 Nm

		i	η _s %	n 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	η _d %	n ₂ min ⁻¹	M _{n2} Nm	P _{n1} kW	R _{n1} N		R _{n2} N	η _d %
				VFR 150												
	VFR 150_45	45	63	62	1350	10.6	1500	11600	84	31	1700	6.8	1500	14600	82	171
	VFR 150_60	60	58	47	1500	9.0	1500	13100	82	23.3	1900	5.9	1500	16000	79	
	VFR 150_69	69	56	41	1500	7.9	1500	14100	81	20.3	1850	5.1	1500	16000	77	
	VFR 150_90	90	47	31	1600	6.9	1500	15500	76	15.6	1950	4.4	1500	16000	72	
	VFR 150_120	120	43	23.3	1750	5.9	1500	15500	73	11.7	2000	3.6	1500	16000	68	
	VFR 150_138	138	44	20.3	1750	5.1	1500	15500	73	10.1	2000	3.1	1500	16000	68	
	VFR 150_168	168	41	16.7	1500	3.8	1500	15500	70	8.3	1750	2.4	1500	16000	65	
	VFR 150_192	192	38	14.6	1450	3.3	1500	15500	68	7.3	1700	2.1	1500	16000	62	
	VFR 150_240	240	34	11.7	1350	2.6	1500	15500	64	5.8	1550	1.6	1500	16000	58	
	VFR 150_300	300	30	9.3	1150	1.9	1500	15500	60	4.7	1300	1.2	1500	16000	54	
				n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹							
	VFR 150_45	45	63	20.0	1950	5.2	1500	16000	79	11.1	2100	3.2	1500	16000	78	171
	VFR 150_60	60	58	15.0	2100	4.4	1500	16000	76	8.3	2300	2.7	1500	16000	74	
	VFR 150_69	69	56	13.0	2050	3.8	1500	16000	74	7.2	2200	2.3	1500	16000	72	
	VFR 150_90	90	47	10.0	2200	3.4	1500	16000	69	5.6	2400	2.1	1500	16000	66	
	VFR 150_120	120	43	7.5	2300	2.8	1500	16000	64	4.2	2600	1.8	1500	16000	62	
	VFR 150_138	138	44	6.5	2200	2.4	1500	16000	64	3.6	2400	1.5	1500	16000	62	
	VFR 150_168	168	41	5.4	1950	1.8	1500	16000	61	3.0	2100	1.1	1500	16000	59	
	VFR 150_192	192	38	4.7	1900	1.6	1500	16000	59	2.6	2000	1.0	1500	16000	56	
	VFR 150_240	240	34	3.8	1700	1.2	1500	16000	54	2.1	1800	0.76	1500	16000	52	
	VFR 150_300	300	30	3.0	1350	0.85	1500	16000	50	1.7	1450	0.54	1500	16000	47	



W/VF 86/150

2700 Nm



	<i>i</i>	η_s %	$n_1 = 1400 \text{ min}^{-1}$							$n_1 = 900 \text{ min}^{-1}$						
			n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %		
W/VF 86/150	W/VF 86/150_200	200	29	7.0	2600	3.0	850	16000	64	4.5	2700	2.1	850	16000	61	172
	W/VF 86/150_225	225	26	6.2	2600	2.7	850	16000	63	4.0	2700	1.9	850	16000	60	
	W/VF 86/150_300	300	26	4.7	2600	2.2	850	16000	58	3.0	2700	1.5	850	16000	57	
	W/VF 86/150_345	345	26	4.1	2600	1.9	850	16000	58	2.6	2700	1.3	850	16000	57	
	W/VF 86/150_460	460	26	3.0	2600	1.5	850	16000	55	2.0	2700	1.0	850	16000	55	
	W/VF 86/150_529	529	26	2.6	2600	1.3	850	16000	55	1.7	2700	0.93	850	16000	52	
	W/VF 86/150_690	690	26	2.0	2600	1.1	850	16000	50	1.3	2700	0.78	850	16000	47	
	W/VF 86/150_920	920	26	1.5	2600	0.92	850	16000	45	0.98	2700	0.64	850	16000	43	
	W/VF 86/150_1380	1380	19	1.0	2600	0.66	850	16000	42	0.65	2700	0.46	850	16000	40	
	W/VF 86/150_1840	1840	19	0.76	2600	0.55	850	16000	38	0.49	2700	0.38	850	16000	36	
	W/VF 86/150_2944	2944	16	0.48	2600	0.48	850	16000	27	0.31	2700	0.35	850	16000	25	



VF 185 - VFR 185

3600 Nm

			i	η_s %	$n_1 = 2800 \text{ min}^{-1}$					$n_1 = 1400 \text{ min}^{-1}$							
					n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N		R_{n2} N	η_d %
VF 185	VF 185_7	7	72	400	1313	60	2800	4670	91	200	1750	41	2800	5570	90	169	
	VF 185_10	10	68	280	1365	44	2800	7390	90	140	1820	30	2800	8960	89		
	VF 185_15	15	66	187	1388	30	2800	9460	89	93	1850	21	2800	11600	88		
	VF 185_20	20	59	140	1703	28	2800	10500	88	70	2270	19.6	2800	12900	85		
	VF 185_30	30	54	93	1485	16.9	2800	13700	86	47	1980	11.8	2800	16900	83		
	VF 185_40	40	44	70	1973	17.6	—	14500	82	35	2630	12.4	—	17900	78		
	VF 185_50	50	41	56	1875	13.7	—	16300	80	28.0	2500	9.8	—	18000	76		
	VF 185_60	60	39	47	1703	10.7	2800	18000	78	23.3	2270	7.6	770	18000	74		
	VF 185_80	80	33	35	1590	7.8	2800	18000	75	17.5	2120	5.6	1140	18000	69		
	VF 185_100	100	30	28.0	1425	5.8	2800	18000	72	14.0	1900	4.3	2800	18000	65		
						$n_1 = 900 \text{ min}^{-1}$					$n_1 = 500 \text{ min}^{-1}$						
	VF 185_7	7	72	129	2000	30	2800	7120	89	71	2450	21	2800	8730	88	169	
	VF 185_10	10	68	90	2150	23	2800	10200	88	50	2600	16.0	2800	12500	86		
	VF 185_15	15	66	60	2250	16.4	2800	13100	86	33	2800	11.8	2800	15700	84		
	VF 185_20	20	59	45	2750	15.6	2800	14600	84	25.0	3300	10.9	2800	17900	81		
	VF 185_30	30	54	30.0	2400	9.4	2800	19000	81	16.7	2800	6.5	2800	19500	77		
	VF 185_40	40	44	22.5	3100	9.7	—	19000	76	12.5	3600	6.8	—	19500	71		
	VF 185_50	50	41	18.0	2900	7.6	—	19000	73	10.0	3300	5.2	—	19500	68		
VF 185_60	60	39	15.0	2600	5.8	700	19000	71	8.3	3000	4.2	2800	19500	66			
VF 185_80	80	33	11.3	2400	4.3	1770	19000	66	6.3	2800	3.2	2800	19500	60			
VF 185_100	100	30	9.0	2000	3.0	2800	19000	62	5.0	2300	2.1	2800	19500	56			

4200 Nm

			i	η_s %	$n_1 = 2800 \text{ min}^{-1}$					$n_1 = 1400 \text{ min}^{-1}$							
					n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N		R_{n2} N	η_d %
VFR 185	VFR 185_90	90	53	31	2400	9.9	1700	19000	80	15.6	2800	6.0	1700	19500	76	171	
	VFR 185_120	120	43	23.3	3100	10.2	1700	19000	75	11.7	3600	6.3	1700	19500	70		
	VFR 185_150	150	40	18.7	2900	7.9	1700	19000	72	9.3	3300	4.8	1700	19500	67		
	VFR 185_180	180	38	15.6	2600	6.1	1700	19000	70	7.8	3000	3.8	1700	19500	65		
	VFR 185_240	240	32	11.7	2400	4.5	1700	19000	65	5.8	2800	2.9	1700	19500	59		
	VFR 185_300	300	29	9.3	2000	3.2	1700	19000	61	4.7	2300	2.0	1700	19500	55		
						$n_1 = 900 \text{ min}^{-1}$					$n_1 = 500 \text{ min}^{-1}$						
	VFR 185_90	90	53	10.0	3200	4.6	1700	19500	73	5.6	3500	2.9	1700	19500	71	171	
	VFR 185_120	120	43	7.5	3800	4.5	1700	19500	66	4.2	4200	2.9	1700	19500	63		
	VFR 185_150	150	40	6.0	3400	3.4	1700	19500	63	3.3	3700	2.2	1700	19500	60		
	VFR 185_180	180	38	5.0	3300	2.9	1700	19500	60	2.8	3600	1.8	1700	19500	57		
	VFR 185_240	240	32	3.8	2800	2.0	1700	19500	54	2.1	2900	1.2	1700	19500	53		
	VFR 185_300	300	29	3.0	2400	1.5	1700	19500	50	1.7	2500	0.91	1700	19500	48		

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



W/VF 86/185

4400 Nm



	i	η_s %	$n_1 = 1400 \text{ min}^{-1}$							$n_1 = 900 \text{ min}^{-1}$						
			n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %		
			W/VF 86/185	W/VF 86/185_280	280	31	5.0	4200	4.2	850	19500	52	3.2	4400		3.0
W/VF 86/185_400	400	29	3.5	4200	3.2	850	19500	48	2.3	4400	2.3	850	19500	45		
W/VF 86/185_600	600	26	2.3	4200	2.3	850	19500	45	1.5	4400	1.6	850	19500	43		
W/VF 86/185_800	800	26	1.8	4200	1.8	850	19500	43	1.1	4400	1.3	850	19500	40		
W/VF 86/185_920	920	26	1.5	4200	1.6	850	19500	42	1.0	4400	1.2	850	19500	38		
W/VF 86/185_1200	1200	20	1.2	4200	1.5	850	19500	34	0.75	4400	0.99	850	19500	35		
W/VF 86/185_1600	1600	20	0.88	4200	1.1	850	19500	35	0.56	4400	0.79	850	19500	33		
W/VF 86/185_1840	1840	19	0.76	4200	0.98	850	19500	34	0.49	4400	0.70	850	19500	32		
W/VF 86/185_2560	2560	16	0.55	4200	0.83	850	19500	29	0.35	4400	0.60	850	19500	27		
W/VF 86/185_3200	3200	15	0.44	4200	0.80	850	19500	24	0.28	4400	0.59	850	19500	22		



VF 210 - VFR 210

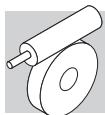
5000 Nm

				n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹							
				n ₂	M _{n2}	P _{n1}	R _{n1}	R _{n2}	η _d	n ₂	M _{n2}	P _{n1}	R _{n1}		R _{n2}	η _d
				min ⁻¹	Nm	kW	N	N	%	min ⁻¹	Nm	kW	N		N	%
VF 210	VF 210_7	7	71	400	1725	79	5300	14000	91	200	2300	54	5300	16700	90	169
	VF 210_10	10	69	280	1988	65	5300	16300	90	140	2650	44	5300	19500	89	
	VF 210_15	15	63	187	2138	47	5300	19700	89	93	2850	32	5300	23700	88	
	VF 210_20	20	57	140	2325	39	4970	22000	87	70	3100	27	1100	26600	85	
	VF 210_30	30	51	93	2288	26	5300	25900	85	47	3050	18.5	1760	31500	83	
	VF 210_40	40	42	70	2625	23	—	28300	81	35	3500	17.0	—	31500	78	
	VF 210_50	50	39	56	2475	18.4	—	31000	79	28.0	3300	13.0	—	31500	76	
	VF 210_60	60	36	47	2363	15.0	—	31500	77	23.3	3015	10.0	—	31500	73	
	VF 210_80	80	31	35	2175	10.9	—	31500	73	17.5	2900	7.7	—	31500	69	
	VF 210_100	100	27	28	2025	8.5	950	31500	70	14.0	2700	6.0	—	31500	65	
				n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹							
VF 210	VF 210_7	7	71	129	2700	41	5300	18800	89	71	3400	29	5300	21800	88	169
	VF 210_10	10	69	90	3150	34	5300	21900	88	50	3800	23	5300	26000	87	
	VF 210_15	15	63	60	3300	24	5300	27000	86	33	4100	17.2	5300	31800	84	
	VF 210_20	20	57	45	3800	22	—	29900	83	25.0	4700	15.4	—	34500	81	
	VF 210_30	30	51	30.0	3400	13.4	3750	33000	80	16.7	4000	9.3	5300	34500	77	
	VF 210_40	40	42	22.5	4300	13.5	—	33000	75	12.5	5000	9.4	—	34500	71	
	VF 210_50	50	39	18.0	4000	10.5	—	33000	72	10.0	4500	7.1	—	34500	68	
	VF 210_60	60	36	15.0	3720	8.5	—	33000	70	8.3	4300	6.0	—	34500	65	
	VF 210_80	80	31	11.3	3300	6.0	—	33000	65	6.3	3900	4.4	—	34500	60	
	VF 210_100	100	27	9.0	3000	4.6	—	33000	61	5.0	3400	3.4	1470	34500	56	

6300 Nm



				n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹							
				n ₂	M _{n2}	P _{n1}	R _{n1}	R _{n2}	η _d	n ₂	M _{n2}	P _{n1}	R _{n1}		R _{n2}	η _d
				min ⁻¹	Nm	kW	N	N	%	min ⁻¹	Nm	kW	N		N	%
VFR 210	VFR 210_30	30	68	93	3150	36	1800	22100	87	47	3800	21.8	2200	27400	86	171
	VFR 210_45	45	62	62	3300	25	1800	27000	85	31	4100	16.2	2200	33200	83	
	VFR 210_60	60	56	47	3800	22	1800	29900	82	23.0	4700	14.5	2200	34500	80	
	VFR 210_90	90	50	31	3400	14.1	1800	33000	79	15.6	4000	8.6	2200	34500	76	
	VFR 210_120	120	41	23.3	4300	14.3	1800	33000	74	11.7	5000	8.8	2200	34500	70	
	VFR 210_150	150	38	18.7	4000	11.1	1800	33000	71	9.3	4500	6.6	2200	34500	67	
	VFR 210_180	180	35	15.6	3720	8.8	1800	33000	69	7.8	4300	5.5	2200	34500	64	
	VFR 210_240	240	30	11.7	3300	6.3	1800	33000	64	5.8	3900	4.1	2200	34500	59	
	VFR 210_300	300	26	9.3	3000	4.9	1800	33000	60	4.7	3400	3.0	2200	34500	55	
					n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹						
VFR 210	VFR 210_30	30	68	30.0	4800	18.1	2300	30100	84	16.7	5500	11.8	2650	34500	82	171
	VFR 210_45	45	62	20.0	4900	12.9	2300	34500	80	11.1	5600	8.4	2650	34500	78	
	VFR 210_60	60	56	15.0	5400	11.1	2300	34500	77	8.3	6000	7.1	2650	34500	74	
	VFR 210_90	90	50	10.0	4600	6.7	2300	34500	72	5.6	5150	4.3	2650	34500	70	
	VFR 210_120	120	41	7.5	5900	7.1	2300	34500	66	4.2	6300	4.4	2650	34500	63	
	VFR 210_150	150	38	6.0	5300	5.4	2300	34500	62	3.3	5900	3.5	2650	34500	59	
	VFR 210_180	180	35	5.0	4900	4.4	2300	34500	59	2.8	5400	2.8	2650	34500	56	
	VFR 210_240	240	30	3.8	4400	3.2	2300	34500	54	2.1	4800	2.1	2650	34500	50	
VFR 210_300	300	26	3.0	3600	2.3	2300	34500	49	1.7	4000	1.5	2650	34500	46		

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



VF/VF 130/210

6500 Nm

		i	η_s %	$n_1 = 1400 \text{ min}^{-1}$					$n_1 = 900 \text{ min}^{-1}$							
				n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	η_d %	n_2 min ⁻¹	M_{n2} Nm	P_{n1} kW	R_{n1} N		R_{n2} N	η_d %
				VF/VF 130/210												
VF/VF 130/210_280		280	30	5.0	6300	6.3	1500	34500	52	3.2	6500	4.4	1500	34500	50	172
VF/VF 130/210_400		400	28	3.5	6300	4.6	1500	34500	50	2.3	6500	3.2	1500	34500	48	
VF/VF 130/210_600		600	26	2.3	6300	3.6	1500	34500	43	1.5	6500	2.4	1500	34500	43	
VF/VF 130/210_800		800	25	1.8	6300	2.8	1500	34500	41	1.1	6500	2.0	1500	34500	38	
VF/VF 130/210_920		920	24	1.5	6300	2.7	1500	34500	37	1.0	6500	1.9	1500	34500	35	
VF/VF 130/210_1200		1200	21	1.2	6300	2.2	—	34500	35	0.75	6500	1.5	—	34500	34	
VF/VF 130/210_1600		1600	18	0.88	6300	1.8	—	34500	32	0.56	6500	1.2	—	34500	32	
VF/VF 130/210_1840		1840	19	0.76	6300	1.7	—	34500	30	0.49	6500	1.2	490	34500	28	
VF/VF 130/210_2560		2560	16	0.55	6300	1.5	1220	34500	24	0.35	6500	1.0	1500	34500	24	
VF/VF 130/210_3200		3200	15	0.44	6300	1.3	1500	34500	22	0.28	6500	0.96	1500	34500	20	

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



VF 250 - VFR 250

7100 Nm

			η_s	i	%	n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹							
						n ₂	M _{n2}	P _{n1}	R _{n1}	R _{n2}	η_d	n ₂	M _{n2}	P _{n1}	R _{n1}		R _{n2}	η_d
						min ⁻¹	Nm	kW	N	N	%	min ⁻¹	Nm	kW	N		N	%
VF 250	VF 250_7	7	71	400	2400	109	7000	18300	92	200	3200	75	7000	21900	91	169		
	VF 250_10	10	69	280	2775	89	7000	21100	91	140	3700	61	7000	25300	90			
	VF 250_15	15	64	187	3000	65	7000	25100	90	93	4000	45	7000	30300	88			
	VF 250_20	20	59	140	3338	56	7000	28000	88	70	4450	38	7000	33900	86			
	VF 250_30	30	53	93	3000	34	7000	33400	86	47	4000	23	7000	40600	84			
	VF 250_40	40	41	70	3600	32	4680	36200	82	35	4800	22	—	44000	79			
	VF 250_50	50	36	56	3375	25	6370	39500	79	28.0	4500	17.0	—	47000	76			
	VF 250_60	60	38	47	3375	20.6	7000	42100	80	23.3	4500	15.0	—	47000	76			
	VF 250_80	80	32	35	2925	14.1	7000	47000	76	17.5	3900	10.0	—	47000	71			
	VF 250_100	100	29	28	2738	11.0	7000	47000	73	14.0	3650	7.8	3010	47000	68			
						n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹							
VF 250	VF 250_7	7	71	129	4150	63	7000	23700	90	71	5200	44	7000	27600	88	169		
	VF 250_10	10	69	90	4800	51	7000	27600	89	50	6000	36	7000	32300	87			
	VF 250_15	15	64	60	5300	39	7000	33200	87	33	6400	27	7000	39500	85			
	VF 250_20	20	59	45	5950	33	1640	37200	85	25.0	7100	24	1910	44400	82			
	VF 250_30	30	53	30.0	5500	21	7000	44900	81	16.7	6000	14.7	7000	52000	79			
	VF 250_40	40	41	22.5	6500	20.0	—	48800	76	12.5	7000	13.6	—	52000	72			
	VF 250_50	50	36	18.0	6200	16.2	—	50000	73	10.0	6500	11.1	—	52000	68			
	VF 250_60	60	38	15.0	5600	12.2	—	50000	72	8.3	6300	8.6	4350	52000	68			
	VF 250_80	80	32	11.3	5200	9.3	—	50000	67	6.3	5400	6.8	7000	52000	62			
	VF 250_100	100	29	9.0	4800	7.2	3010	50000	63	5.0	5000	5.3	4160	52000	58			

9000 Nm



			η_s	i	%	n ₁ = 2800 min ⁻¹					n ₁ = 1400 min ⁻¹							
						n ₂	M _{n2}	P _{n1}	R _{n1}	R _{n2}	η_d	n ₂	M _{n2}	P _{n1}	R _{n1}		R _{n2}	η_d
						min ⁻¹	Nm	kW	N	N	%	min ⁻¹	Nm	kW	N		N	%
VFR 250	VFR 250_30	30	68	93	4800	54	2800	27800	89	47	6000	34	3500	34000	86	171		
	VFR 250_45	45	63	62	5300	41	2800	33300	87	31	6400	25	3500	41300	84			
	VFR 250_60	60	58	47	5950	35	2800	37200	85	23.0	7100	21	3500	46100	81			
	VFR 250_90	90	52	31	5500	22	2800	44700	81	15.6	6000	12.6	3500	52000	78			
	VFR 250_120	120	40	23.3	6500	21.3	2800	48500	76	11.7	7000	12.1	3500	52000	71			
	VFR 250_150	150	35	18.7	6200	16.9	2800	50000	73	9.3	6500	9.5	3500	52000	67			
	VFR 250_180	180	37	15.6	5600	12.9	2800	50000	72	7.8	6300	7.7	3500	52000	67			
	VFR 250_240	240	31	11.7	5200	9.7	2800	50000	67	5.8	5400	5.4	3500	52000	61			
	VFR 250_300	300	28	9.3	4800	7.6	2800	50000	63	4.7	5000	4.3	3500	52000	57			
							n ₁ = 900 min ⁻¹					n ₁ = 500 min ⁻¹						
VFR 250	VFR 250_30	30	68	30.0	6500	24	3700	39600	84	16.7	7600	16.1	4200	47600	83	171		
	VFR 250_45	45	63	20.0	6800	17.5	3700	48000	82	11.1	7900	11.6	3500	52000	80			
	VFR 250_60	60	58	15.0	7600	15.2	3700	52000	79	8.3	8600	9.9	3500	52000	76			
	VFR 250_90	90	52	10.0	6500	9.3	3700	52000	74	5.6	7400	6.1	3500	52000	71			
	VFR 250_120	120	40	7.5	7500	8.8	3700	52000	67	4.2	9000	6.2	3500	52000	64			
	VFR 250_150	150	35	6.0	7000	7.0	3700	52000	63	3.3	8600	5.1	3500	52000	59			
	VFR 250_180	180	37	5.0	6700	5.7	3700	52000	62	2.8	7600	3.8	3500	52000	59			
	VFR 250_240	240	31	3.8	5800	4.1	3700	52000	56	2.1	6500	2.7	3500	52000	52			
VFR 250_300	300	28	3.0	5300	3.2	3700	52000	52	1.7	6000	2.2	3500	52000	48				

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



VF/VF 130/250

9200 Nm

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

(-) Interpellare il ns. servizio tecnico comunicando i dati relativi al carico radiale (senso di rotazione, orientamento, posizione)



23 COMBINAZIONI DEI RAPPORTI NEI RIDUTTORI COMBINATI SERIE VF/VF, VF/W, W/VF

	Rapporti										i max	
	245	350	420	560	700	840	1120	1680	2100			
VF/VF 30/44												6000
VF 30	7	10	15	20	20	30	40	60	60			60
VF 44	35	35	28	28	35	28	28	28	35			100
VF/VF 30/49	240	315	420	540	720	900	1120	1440	2160	2700		6000
VF 30	10	7	15	15	20	20	40	40	60	60		60
VF 49	24	45	28	36	36	45	28	36	36	45		100
VF/W 30/63	240	315	450	570	720	900	1200	1520	2280	2700		7000
VF 30	10	7	15	15	30	30	40	40	60	60		70
W 63	24	45	30	38	24	30	30	38	38	45		100
VF/W 44/75	250	300	400	525	700	920	1200	1500	2100	2800		10000
VF 44	10	10	10	35	35	46	60	60	70	70		100
W 75	25	30	40	15	20	20	20	25	30	40		100
VF/W 44/86	230	300	400	525	700	920	1380	1840	2116	2760		10000
VF 44	10	10	10	35	35	46	46	46	46	60		100
W 86	23	30	40	15	20	20	30	40	46	46		100
VF/W 49/110	230	300	400	540	720	1080	1350	1656	2070	2800		10000
VF 49	10	10	10	18	36	36	45	36	45	70		100
W 110	23	30	40	30	20	30	30	46	46	40		100
W/VF 63/130	280	400	600	760	960	1200	1520	1800	2560	3200		10000
W 63	7	10	15	19	24	30	38	45	64	80		100
VF 130	40	40	40	40	40	40	40	40	40	40		100
W/VF 86/150	200	225	300	345	460	529	690	920	1380	1840	2944	10000
W 86	10	15	15	15	20	23	23	23	46	46	64	100
VF 150	20	15	20	23	23	23	30	40	30	40	46	100
W/VF 86/185	280	400	600	800	920	1200	1600	1840	2560	3200		10000
W 86	7	10	15	20	23	30	40	46	64	80		100
VF 185	40	40	40	40	40	40	40	40	40	40		100
VF/VF 130/210	280	400	600	800	920	1200	1600	1840	2560	3200		10000
VF 130	7	10	15	20	23	30	40	46	64	80		100
VF 210	40	40	40	40	40	40	40	40	40	40		100
VF/VF 130/250	280	400	600	800	920	1200	1600	1840	2560	3200		10000
VF 130	7	10	15	20	23	30	40	46	64	80		100
VF 250	40	40	40	40	40	40	40	40	40	40		100

Le combinazioni dei rapporti rappresentati in tabella sono quelle preferenziali, e suggerite dal costruttore.


Il servizio tecnico di Bonfiglioli potrà eventualmente considerare le richieste di combinazioni di rapporti diverse da quelle proposte, purchè inferiori al valore massimo indicato in tabella.



24 PREDISPOSIZIONI MOTORE

24.1 Motori standard IEC

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

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

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

■ Rapporto della precoppia elicoidale $i = 1.5$


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




IEC		VF/VF 30/44	VF/VF 30/49	VF/W 30/63	VF/W 44/75	VF/W 44/86	VF/W 49/110	W/VF 63/130	W/VF 86/150	W/VF 86/185	VF/VF 130/210	VF/VF 130/250
P56	$\frac{B5}{B14}$	245...2100	240...2700	240...2700	—	—	—	—	—	—	—	—
P63	$\frac{B5}{B14}$	245...2100	240...2700	240...2700	250...2800	230...2760	230...2800	—	—	—	—	—
P71	$\frac{B5}{B14}$	—	—	—	250...700	230...700	230...2400	280...3200	200...2944	280...3200	—	—
P80	$\frac{B5}{B14}$	—	—	—	—	—	230...540	280...3200	200...2944	280...3200	—	—
P90	$\frac{B5}{B14}$	—	—	—	—	—	—	280...1200	200...2944	280...3200	280...3200	280...3200
P100	$\frac{B5}{B14}$	—	—	—	—	—	—	—	200...2944	280...3200	280...3200	280...3200
P112	$\frac{B5}{B14}$	—	—	—	—	—	—	—	200...2944	280...3200	280...3200	280...3200
P132	B5	—	—	—	—	—	—	—	—	—	280...1600 #	280...1600 #

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

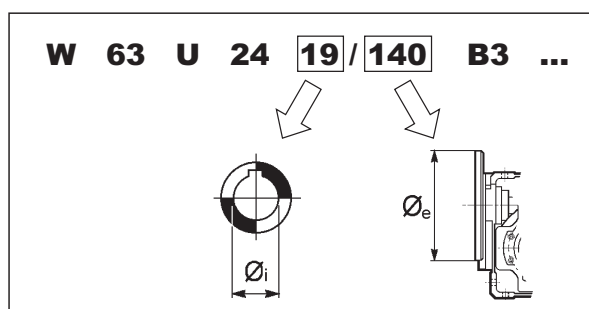
24.2 Motori compatti

	M1	M2	M3
W 63	7 ... 100	7 ... 100	⊖
W 75	7 ... 100	7 ... 100	7 ... 100
W 86	7 ... 100	7 ... 100	7 ... 100
W 110	⊖	7 ... 100	7 ... 100

	M1	M2	M3
W/VF 63/130	280 ... 3200	280 ... 3200	⊖
W/VF 86/150	200 ... 2944	200 ... 2944	200 ... 2944
W/VF 86/185	280 ... 3200	280 ... 3200	280 ... 3200

24.3 Motori non normalizzati

Per l'accoppiamento a motori elettrici non normalizzati, l'interfaccia motore dei riduttori serie VF e W può essere configurata con combinazioni albero veloce/flangia ibride, non corrispondenti cioè alla normativa IEC. La combinazione albero/flangia è esplicitata mediante i rispettivi diametri e qui di seguito esemplificata.





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

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

Abbinamenti standard

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

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

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

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





25 MOMENTO D'INERZIA



Le tabelle tecniche 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:

	<p>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).</p>		<p>I valori relativi a questi simboli sono da attribuire al riduttore predisposto per attacco motore (grandezza IEC...).</p>
			<p>I valori attribuiti al riduttore sono riferiti a questi simboli.</p>

VF 27



		i	J ($\cdot 10^{-4}$) [kgm ²]				
			P27				HS 
VF 27	VF 27_7	7	0.02	—	—	—	0.02
	VF 27_10	10	0.01	—	—	—	0.01
	VF 27_15	15	0.01	—	—	—	0.01
	VF 27_20	20	0.01	—	—	—	0.01
	VF 27_30	30	0.01	—	—	—	0.01
	VF 27_40	40	0.01	—	—	—	0.01
	VF 27_60	60	0.01	—	—	—	0.01
	VF 27_70	70	0.01	—	—	—	0.01

VF 30

		i	J ($\cdot 10^{-4}$) [kgm ²]				
			P56	P63			HS 
VF 30	VF 30_7	7	0.08	0.07	—	—	0.04
	VF 30_10	10	0.07	0.06	—	—	0.03
	VF 30_15	15	0.07	0.06	—	—	0.03
	VF 30_20	20	0.06	0.06	—	—	0.03
	VF 30_30	30	0.06	0.06	—	—	0.03
	VF 30_40	40	0.06	0.06	—	—	0.03
	VF 30_60	60	0.06	0.05	—	—	0.02
	VF 30_70	70	0.06	—	—	—	0.02

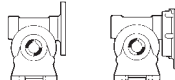
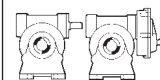


VF 44 - VFR 44

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


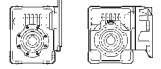
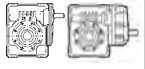


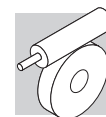
VF 49 - VFR 49

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









W 63 - WR 63

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



W 75 - WR 75






		i	J ($\cdot 10^{-4}$) [kgm ²]									
			 S1 S2 S3			  P63 P71 P80 P90 P100 P112						  HS
W 75	W 75_7	7	6.9	6.6	6.6	—	6.9	7.0	6.9	6.9	6.9	7.3
	W 75_10	10	6.4	6.1	6.1	—	6.4	6.4	6.3	5.7	5.7	6.8
	W 75_15	15	6.1	5.8	5.8	—	6.1	6.1	6.0	5.3	5.3	6.5
	W 75_20	20	5.9	5.6	5.6	—	5.9	5.9	5.9	5.2	5.2	6.3
	W 75_25	25	5.9	5.6	5.6	—	6.0	6.0	5.9	5.2	5.2	6.3
	W 75_30	30	5.9	5.6	5.6	—	5.9	5.9	5.9	5.2	5.2	6.3
	W 75_40	40	5.9	5.6	5.6	—	5.9	5.9	5.8	5.2	5.2	6.3
	W 75_50	50	5.9	5.6	5.6	—	5.9	5.9	5.8	5.1	5.1	6.2
	W 75_60	60	5.8	5.5	5.5	—	5.8	5.9	5.8	5.1	5.1	6.2
	W 75_80	80	5.8	5.5	5.5	—	5.8	5.8	5.8	5.1	5.1	6.2
W 75_100	100	5.8	5.5	5.5	—	5.8	5.8	5.7	5.0	5.0	6.2	
WR 75	WR 75_21	21	—	—	—	1.2	1.2	2.1	—	—	—	1.9
	WR 75_30	30	—	—	—	1.1	1.1	2.1	—	—	—	1.1
	WR 75_45	45	—	—	—	1.1	1.1	2.0	—	—	—	1.1
	WR 75_60	60	—	—	—	1.1	1.1	2.0	—	—	—	1.0
	WR 75_75	75	—	—	—	1.1	1.1	2.0	—	—	—	1.0
	WR 75_90	90	—	—	—	1.1	1.1	2.0	—	—	—	1.0
	WR 75_120	120	—	—	—	1.1	1.1	2.0	—	—	—	1.0
	WR 75_150	150	—	—	—	1.1	1.1	2.0	—	—	—	1.0
	WR 75_180	180	—	—	—	1.1	1.1	2.0	—	—	—	1.0
	WR 75_240	240	—	—	—	1.1	1.1	2.0	—	—	—	1.0
WR 75_300	300	—	—	—	1.1	1.1	2.0	—	—	—	1.0	


		J ($\cdot 10^{-4}$) [kgm ²]	
		i	 P90

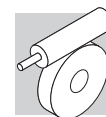
WR 75_P90 B5	WR 75_15	15	6.0
	WR 75_22.5	22.5	5.9
	WR 75_30	30	5.8
	WR 75_37.5	37.5	5.8
	WR 75_45	45	5.8
	WR 75_60	60	5.8
WR 75_75	75	5.8	




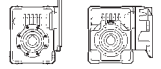
W 86 - WR 86

		i	J ($\cdot 10^{-4}$) [kgm ²]									
			 S1 S2 S3			  P63 P71 P80 P90 P100					  HS	
W 86	W 86_7	7	9.7	9.4	9.4	—	9.7	9.7	9.6	9.6	—	10.1
	W 86_10	10	8.4	8.1	8.1	—	8.4	8.4	8.3	7.7	—	8.9
	W 86_15	15	7.7	7.4	7.4	—	7.7	7.7	7.7	7.0	—	8.2
	W 86_20	20	6.9	6.6	6.6	—	6.9	7.0	6.9	6.2	—	7.4
	W 86_23	23	6.8	6.5	6.5	—	6.8	6.9	6.8	6.1	—	7.3
	W 86_30	30	7.3	7.0	7.0	—	7.3	7.3	7.3	6.6	—	7.8
	W 86_40	40	6.7	6.4	6.4	—	6.7	6.7	6.6	6.0	—	7.2
	W 86_46	46	6.7	6.4	6.4	—	6.7	6.7	6.6	5.9	—	7.1
	W 86_56	56	6.6	6.3	6.3	—	6.6	6.7	6.6	5.9	—	7.1
	W 86_64	64	6.6	6.3	6.3	—	6.6	6.6	6.5	5.9	—	7.1
	W 86_80	80	6.6	6.3	6.3	—	6.6	6.6	6.5	5.9	—	7.1
W 86_100	100	6.4	6.1	6.1	—	6.4	6.5	6.4	5.7	—	6.9	
WR 86	WR 86_21	21	—	—	—	1.5	1.5	2.4	—	—	—	2.2
	WR 86_30	30	—	—	—	1.4	1.3	2.3	—	—	—	1.3
	WR 86_45	45	—	—	—	1.3	1.3	2.2	—	—	—	1.2
	WR 86_60	60	—	—	—	1.2	1.2	2.1	—	—	—	1.2
	WR 86_69	69	—	—	—	1.2	1.2	2.1	—	—	—	1.1
	WR 86_90	90	—	—	—	1.2	1.2	2.2	—	—	—	1.2
	WR 86_120	120	—	—	—	1.2	1.2	2.1	—	—	—	1.1
	WR 86_138	138	—	—	—	1.2	1.2	2.1	—	—	—	1.1
	WR 86_168	168	—	—	—	1.2	1.2	2.1	—	—	—	1.1
	WR 86_192	192	—	—	—	1.2	1.1	2.1	—	—	—	1.1
	WR 86_240	240	—	—	—	1.2	1.1	2.1	—	—	—	1.1
WR 86_300	300	—	—	—	1.1	1.1	2.1	—	—	—	1.1	

		i	J ($\cdot 10^{-4}$) [kgm ²]
			 P90
WR 86_P90 B5	WR 86_15	15	6.9
	WR 86_22.5	22.5	6.6
	WR 86_30	30	6.3
	WR 86_34.5	34.5	6.2
	WR 86_45	45	6.4
	WR 86_60	60	6.2
	WR 86_69	69	6.1
WR 86_84	84	6.1	





W 110 - WR 110

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




VF 130 - VFR 130

		i	J ($\cdot 10^{-4}$) [kgm ²]					HS
			P80	P90	 P100	 P112	P132	
VF 130	VF 130_7	7	—	—	36	36	35	31
	VF 130_10	10	—	—	27	27	25	22
	VF 130_15	15	—	—	20	20	18	15
	VF 130_20	20	—	—	17	17	15	11
	VF 130_23	23	—	—	16	16	14	11
	VF 130_30	30	—	—	17	17	15	12
	VF 130_40	40	—	—	15	15	14	9.9
	VF 130_46	46	—	14	14	—	—	8.2
	VF 130_56	56	—	13	13	—	—	7.8
	VF 130_64	64	—	13	13	—	—	7.4
	VF 130_80	80	—	13	12	—	—	7.0
	VF 130_100	100	—	13	—	—	—	8.9
VFR 130	VFR 130_30	30	5.3	5.3	5.2	5.2	—	5.7
	VFR 130_45	45	4.5	4.5	4.4	4.4	—	4.9
	VFR 130_60	60	4.2	4.1	4.1	4.1	—	4.6
	VFR 130_69	69	4.1	4.0	4.0	4.0	—	4.5
	VFR 130_90	90	4.2	4.1	4.1	4.1	—	4.6
	VFR 130_120	120	4.0	3.9	4.0	4.0	—	4.4
	VFR 130_138	138	3.8	3.8	3.7	3.7	—	4.2
	VFR 130_168	168	3.8	3.7	3.7	3.7	—	4.1
	VFR 130_192	192	3.7	3.7	3.6	3.6	—	4.1
	VFR 130_240	240	3.7	3.6	3.6	3.6	—	4.1
	VFR 130_300	300	3.9	3.8	3.8	3.8	—	4.3





VF 150 - VFR 150

		i	J ($\cdot 10^{-4}$) [kgm ²]					HS
			P80	P90	 P100	P112	P132	
VF 150	VF 150_7	7	—	—	—	—	58	50
	VF 150_10	10	—	—	—	—	44	35
	VF 150_15	15	—	—	—	—	29	21
	VF 150_20	20	—	—	—	—	27	19
	VF 150_23	23	—	—	28	28	26	17
	VF 150_30	30	—	—	31	31	29	21
	VF 150_40	40	—	—	26	26	24	16
	VF 150_46	46	—	—	24	24	22	13
	VF 150_56	56	—	25	24	24	—	13
	VF 150_64	64	—	24	23	23	—	12
	VF 150_80	80	—	23	22	22	—	11
VF 150_100	100	—	23	22	22	—	11	
VFR 150	VFR 150_25	25	—	—	—	15	—	—
	VFR 150_30	30	10	10	10	—	—	11
	VFR 150_37.5	37.5	—	—	—	13	—	—
	VFR 150_45	45	8.8	8.8	8.8	—	—	9.7
	VFR 150_50	50	—	—	—	12	—	—
	VFR 150_60	60	8.4	8.3	8.3	—	—	9.2
	VFR 150_69	69	8.4	8.4	8.4	—	—	9.3
	VFR 150_90	90	8.3	8.7	8.7	—	—	9.7
	VFR 150_120	120	8.3	8.2	8.2	—	—	9.2
	VFR 150_138	138	8.0	7.9	7.9	—	—	8.9
	VFR 150_168	168	7.9	7.9	7.9	—	—	8.9
	VFR 150_192	192	7.9	7.8	7.8	—	—	8.8
	VFR 150_240	240	7.7	7.7	7.7	—	—	8.6
VFR 150_300	300	7.7	7.7	7.7	—	—	8.6	



VF 185 - VFR 185

		i	J ($\cdot 10^{-4}$) [kgm ²]						HS
									
			P90	P100	P112	P132	P160	P180	
VF 185	VF 185_7	7	—	—	—	—	—	146	128
	VF 185_10	10	—	—	—	—	—	108	91
	VF 185_15	15	—	—	—	—	70	88	50
	VF 185_20	20	—	—	—	—	69	66	48
	VF 185_30	30	—	—	—	58	54	—	34
	VF 185_40	40	—	—	—	63	61	—	41
	VF 185_50	50	—	59	59	58	—	—	35
	VF 185_60	60	—	55	55	53	—	—	31
	VF 185_80	80	—	52	52	51	—	—	28
	VF 185_100	100	—	51	51	—	—	—	27
VFR 185	VFR 185_25	25	—	—	—	24	—	—	—
	VFR 185_37.5	37.5	—	—	—	17	—	—	—
	VFR 185_50	50	—	—	—	17	—	—	—
	VFR 185_75	75	—	—	—	15	—	—	—
	VFR 185_100	100	—	—	—	16	—	—	—
	VFR 185_30	30	17	17	17	—	—	—	18
	VFR 185_45	45	12	12	12	—	—	—	13
	VFR 185_60	60	12	12	12	—	—	—	13
	VFR 185_90	90	10	10	10	—	—	—	11
	VFR 185_120	120	11	11	11	—	—	—	12
	VFR 185_150	150	10	10	10	—	—	—	11
	VFR 185_180	180	9.9	9.9	9.9	—	—	—	11
	VFR 185_240	240	9.6	9.6	9.6	—	—	—	11
	VFR 185_300	300	9.5	9.4	9.4	—	—	—	10



VF 210 - VFR 210

		i	J ($\cdot 10^{-4}$) [kgm ²]							HS
			P100	P112	P132	P160	P180	P200	P225	
VF 210	VF 210_7	7	—	—	286	286	286	286	286	286
	VF 210_10	10	—	—	177	177	177	177	177	177
	VF 210_15	15	—	—	120	120	120	120	120	120
	VF 210_20	20	—	—	116	116	116	116	116	116
	VF 210_30	30	—	—	81	81	81	81	81	81
	VF 210_40	40	—	—	98	98	98	98	98	98
	VF 210_50	50	—	—	84	84	84	84	84	84
	VF 210_60	60	—	—	75	75	75	75	75	75
	VF 210_80	80	—	—	68	68	68	68	68	68
	VF 210_100	100	—	—	63	63	63	63	63	63
VFR 210	VFR 210_30	30	48	48	47	47	—	—	—	51
	VFR 210_45	45	41	41	41	41	—	—	—	45
	VFR 210_60	60	41	41	41	40	—	—	—	45
	VFR 210_90	90	37	37	37	36	—	—	—	41
	VFR 210_120	120	39	39	39	38	—	—	—	43
	VFR 210_150	150	37	37	37	37	—	—	—	41
	VFR 210_180	180	36	36	36	36	—	—	—	40
	VFR 210_240	240	36	36	36	35	—	—	—	39
	VFR 210_300	300	35	35	35	34	—	—	—	39



VF 250 - VFR 250

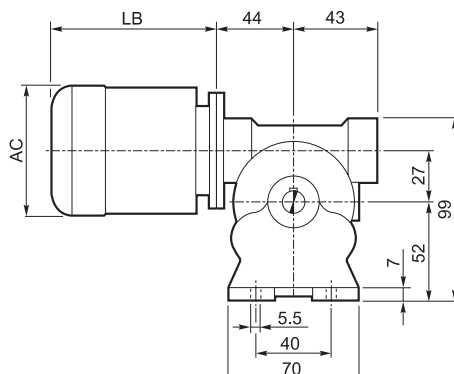
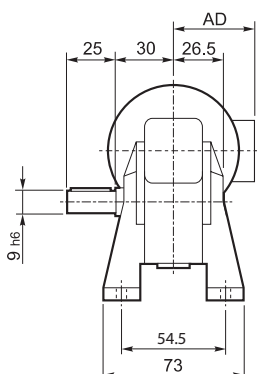
		i	J ($\cdot 10^{-4}$) [kgm ²]							
			P100	P112	P132	P160	P180	P200	P225	HS
VF 250	VF 250_7	7	—	—	620	620	620	620	620	620
	VF 250_10	10	—	—	387	387	387	387	387	387
	VF 250_15	15	—	—	266	266	266	266	266	266
	VF 250_20	20	—	—	242	242	242	242	242	242
	VF 250_30	30	—	—	184	184	184	184	184	184
	VF 250_40	40	—	—	241	241	241	241	241	241
	VF 250_50	50	—	—	240	240	240	240	240	240
	VF 250_60	60	—	—	158	158	158	158	158	158
	VF 250_80	80	—	—	160	160	160	160	160	160
	VF 250_100	100	—	—	149	149	149	149	149	149
VFR 250	VFR 250_30	30	71	71	71	70	—	—	—	75
	VFR 250_45	45	58	58	57	57	—	—	—	61
	VFR 250_60	60	55	55	55	54	—	—	—	58
	VFR 250_90	90	48	48	48	48	—	—	—	52
	VFR 250_120	120	55	55	54	54	—	—	—	58
	VFR 250_150	150	55	55	54	54	—	—	—	58
	VFR 250_180	180	46	46	45	45	—	—	—	49
	VFR 250_240	240	46	46	45	45	—	—	—	49
	VFR 250_300	300	45	45	44	44	—	—	—	48



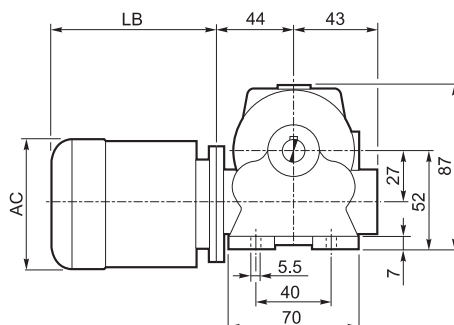
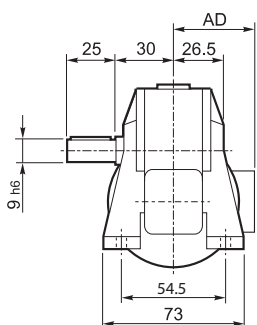
26 DIMENSIONI MOTORIDUTTORI E RIDUTTORI PREDISPOSTI IEC

VF 27...BN27

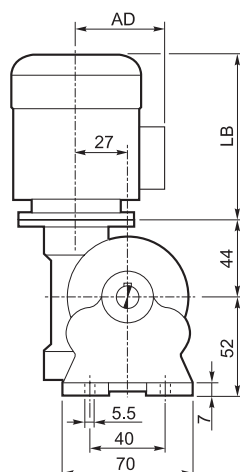
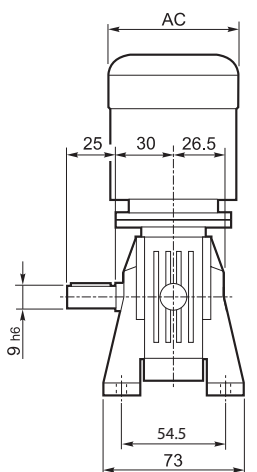
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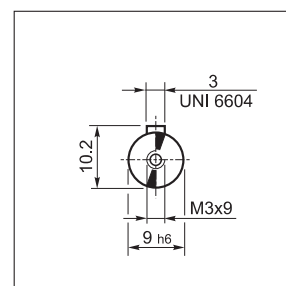
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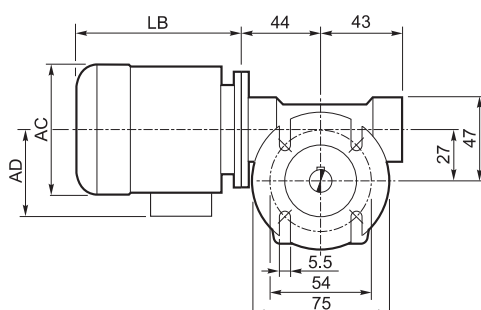
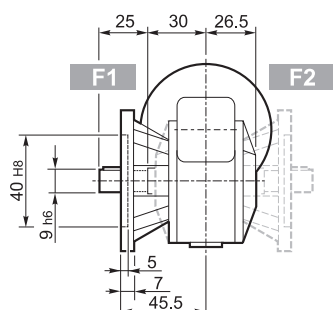
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



OUTPUT



F

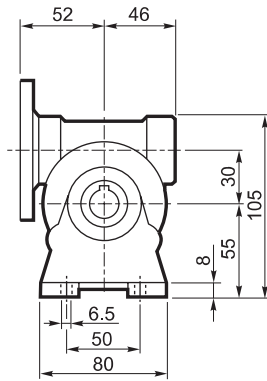
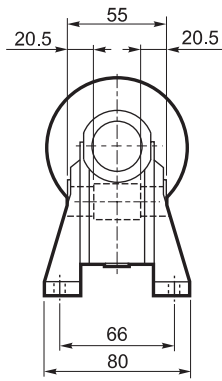


	P_n kW	n min ⁻¹	M_n Nm	η %	$\cos\phi$	I_n A (400V)	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	J_m ($\cdot 10^{-4}$) kgm ²	 Kg	LB	AC	AD
BN 27A4	0.04	1350	0.28	36	0.57	0.28	2.3	2.0	1.8	0.56	2.8	132	103	76
BN 27B4	0.06	1360	0.42	39	0.57	0.39	2.5	2.2	1.9	0.76	3.1	149	103	76
BN 27C4	0.09	1380	0.63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

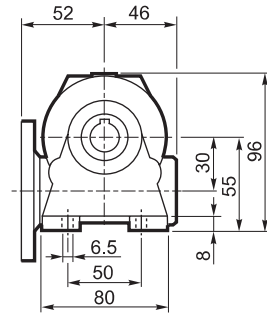
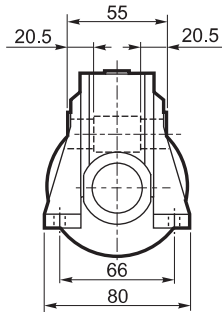


VF 30...P (IEC)

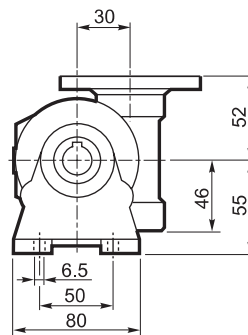
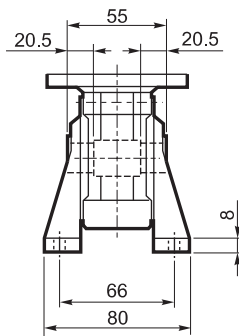
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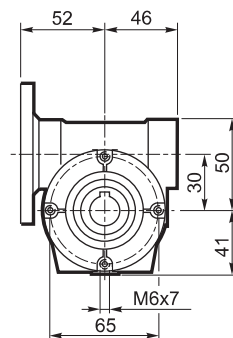
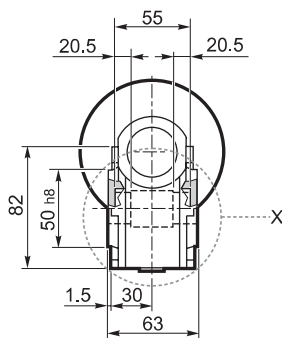
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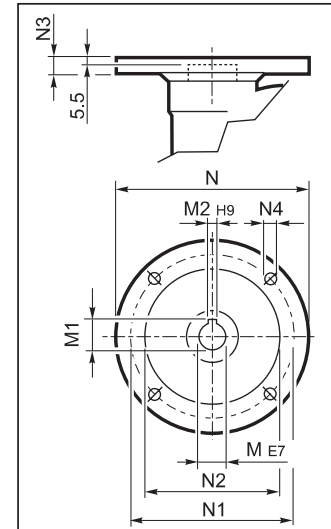
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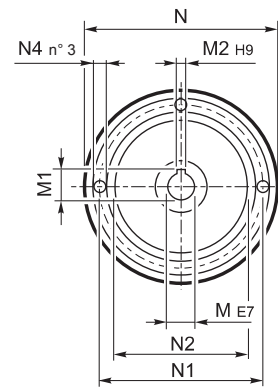
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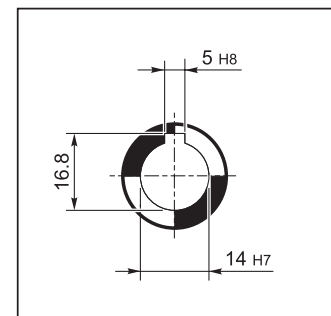
INPUT



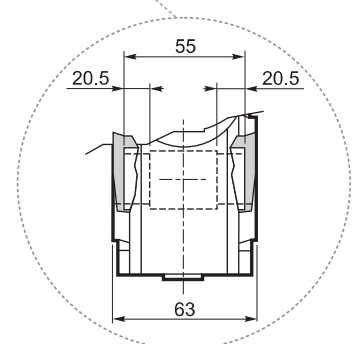
P56 B14



OUTPUT



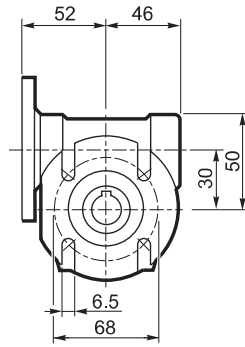
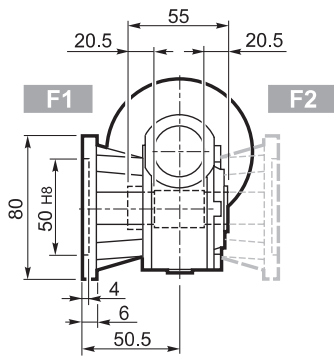
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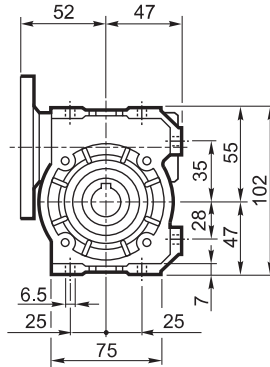
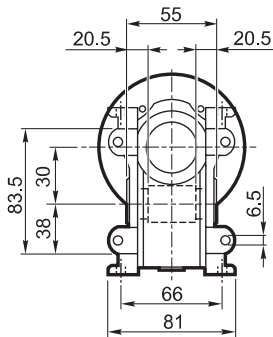


VF 30...P (IEC)

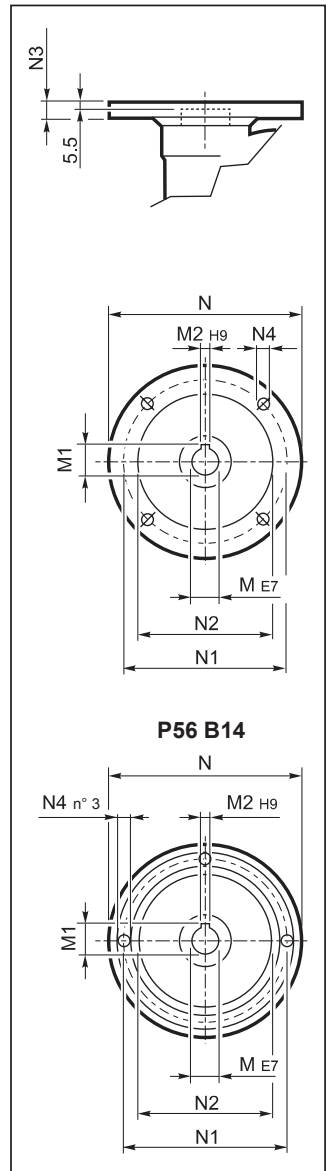
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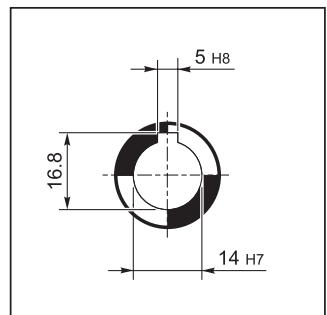
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INPUT



OUTPUT

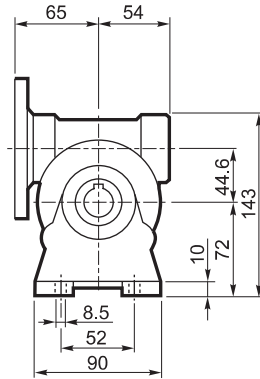
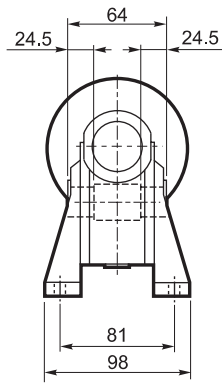


		M	M1	M2	N	N1	N2	N3	N4	
VF 30	P56 B5	9	10.4	3	120	100	80	7	7	1.1
VF 30	P56 B14	9	10.4	3	80	65	50	7	5.5	
VF 30	P63 B5	11	12.8	4	140	115	95	8	9.5	
VF 30	P63 B14	11	12.8	4	90	75	60	6	5.5	

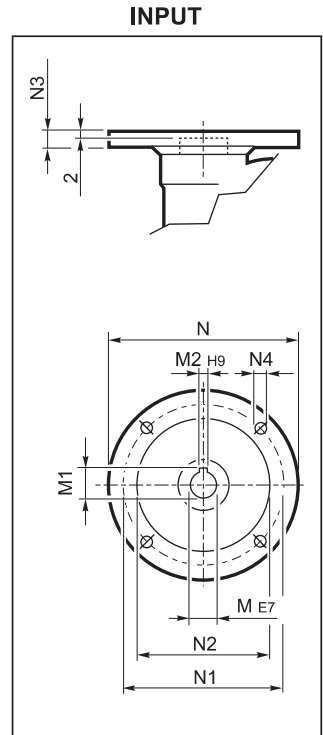
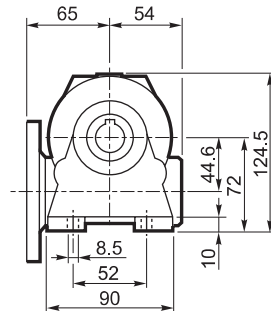
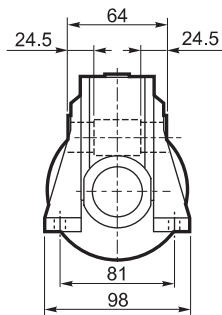


VF 44...P (IEC)

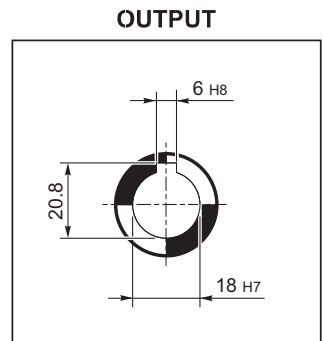
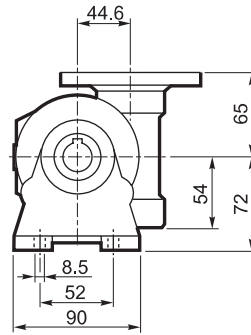
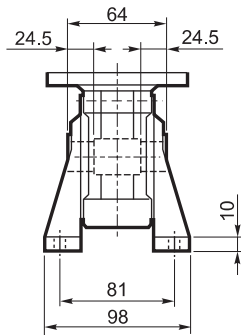
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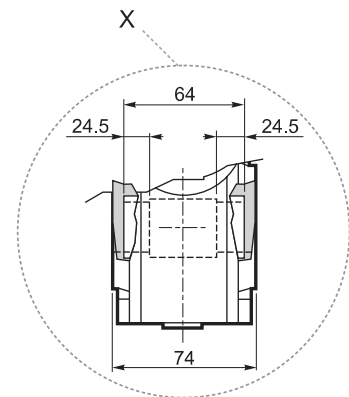
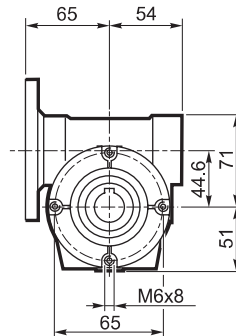
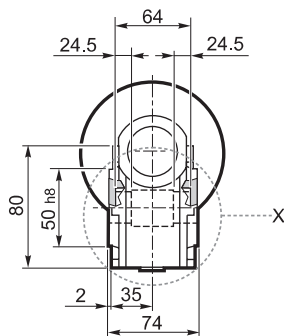
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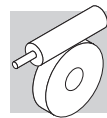


V

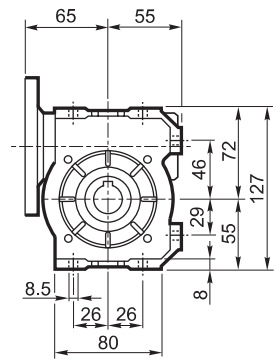
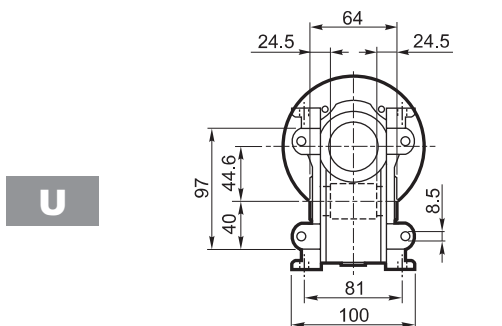
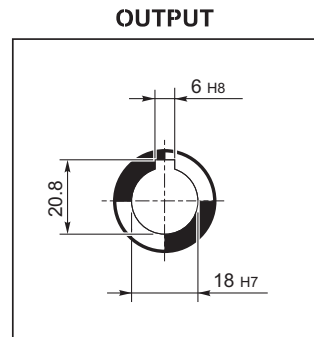
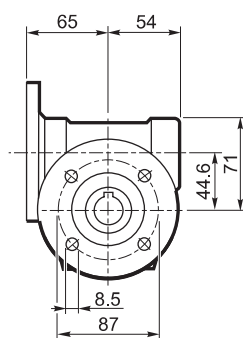
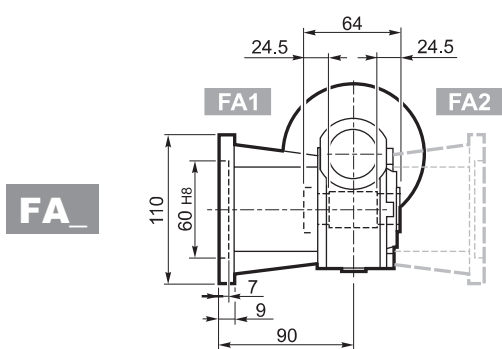
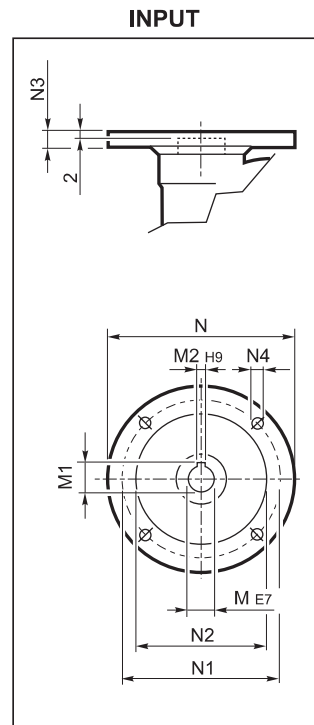
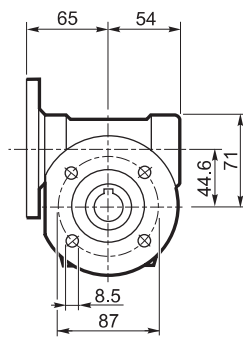
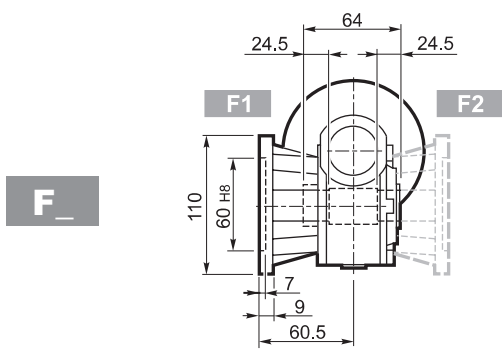


P





VF 44...P (IEC)

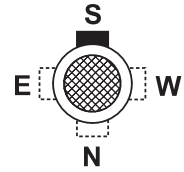
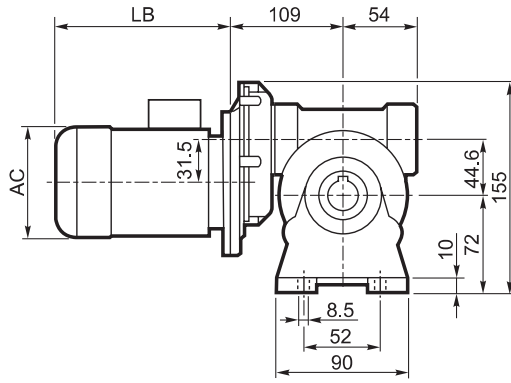
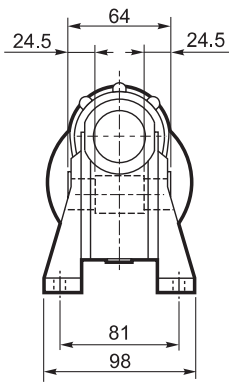


		M	M1	M2	N	N1	N2	N3	N4	
VF 44	P63 B5	11	12.8	4	140	115	95	10	9.5	2.0
VF 44	P71 B5	14	16.3	5	160	130	110	10	9.5	
VF 44	P63 B14	11	12.8	4	90	75	60	8	5.5	
VF 44	P71 B14	14	16.3	5	105	85	70	10	7	

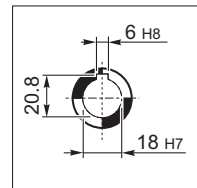


VFR 44...BN 44

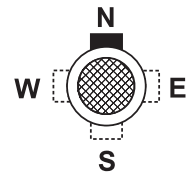
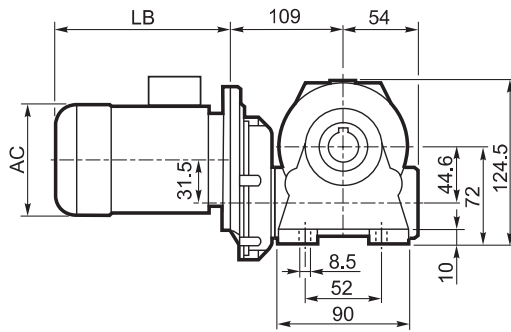
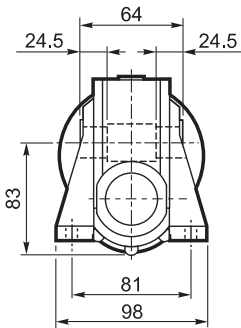
A



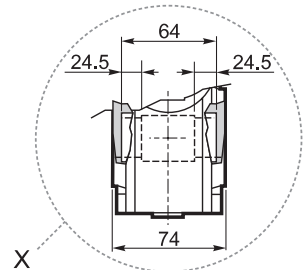
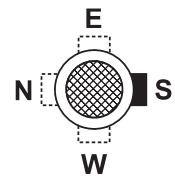
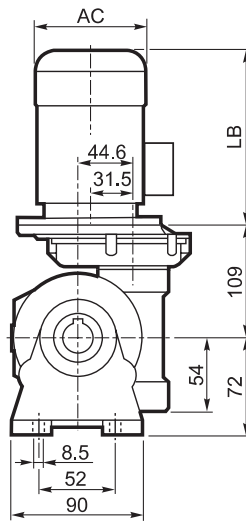
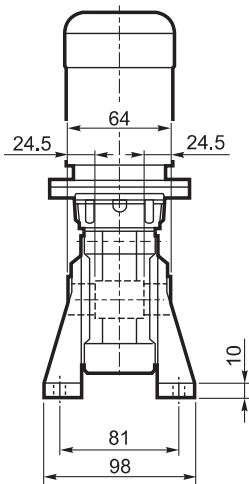
OUTPUT



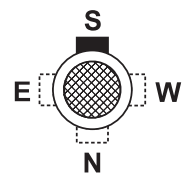
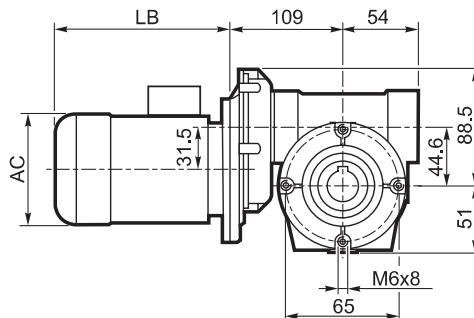
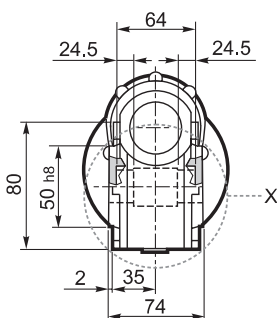
N

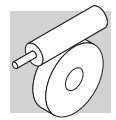


V



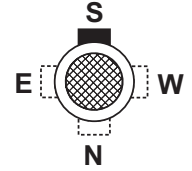
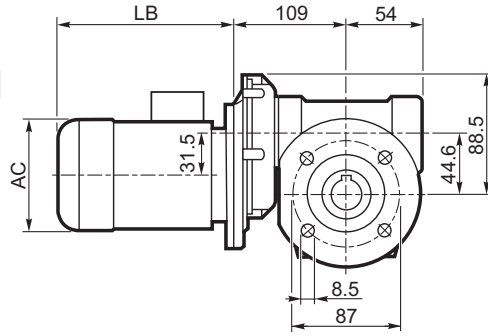
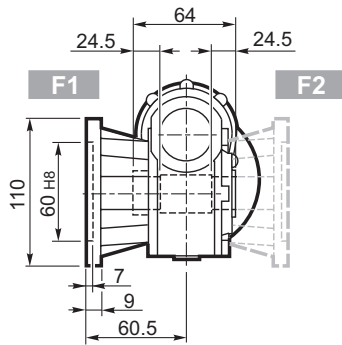
P



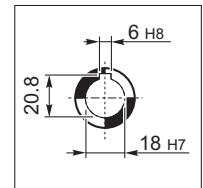


VFR 44...BN 44

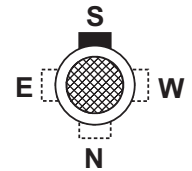
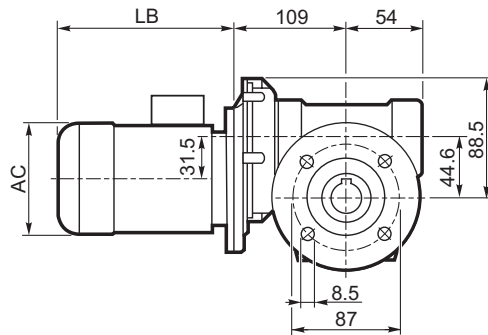
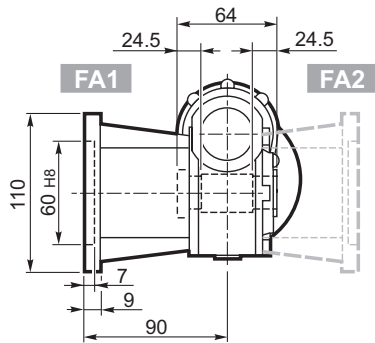
F_



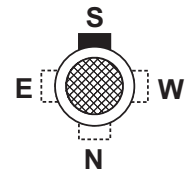
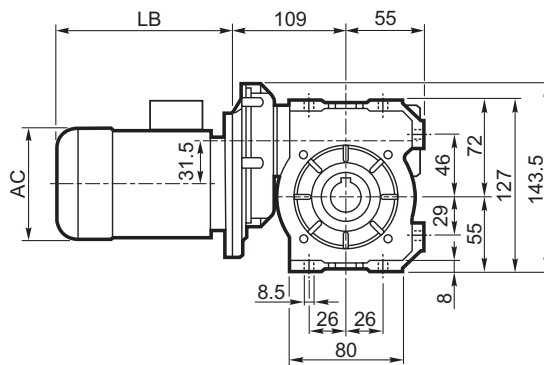
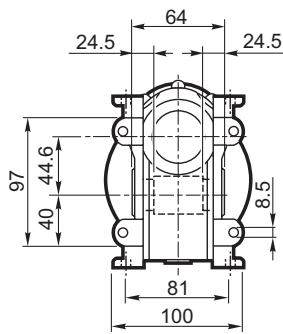
OUTPUT





FA_



U

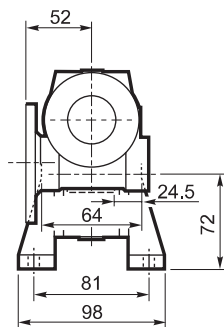
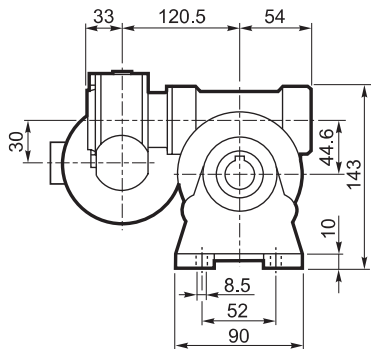


	P_n kW	n min ⁻¹	M_n Nm	η %	$\cos\phi$	I_n A (400V)	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	J_m ($\cdot 10^{-4}$) kgm ²		LB	AC	AD
BN 44B4	0.06	1380	0.42	40	0.58	0.38	2.4	2.3	1.9	1.22	4.7	168	112	94
BN 44C4	0.09	1380	0.63	46	0.65	0.43	2.8	2.3	2	1.49	4.6	168	112	94

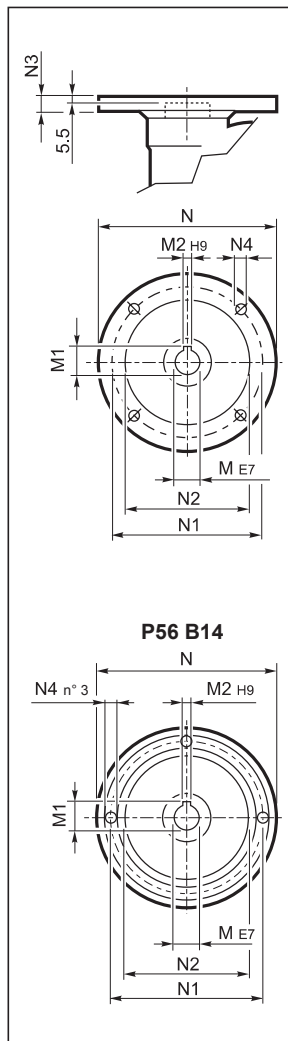


VF/VF 30/44...P (IEC)

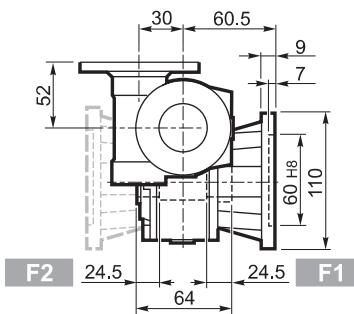
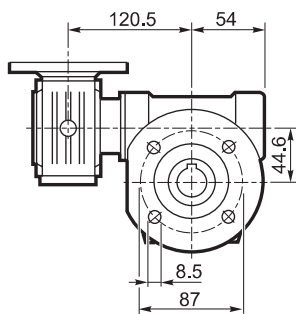
A



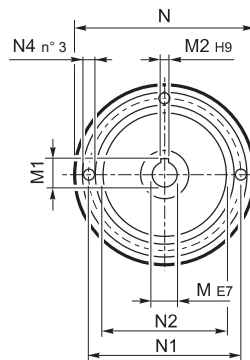
INPUT



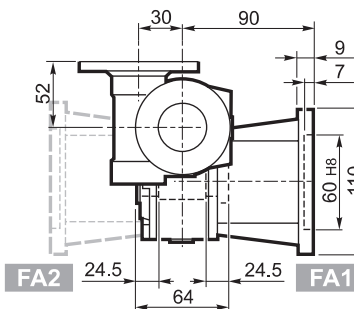
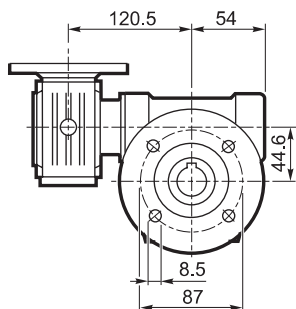
F



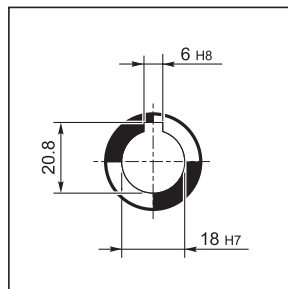
P56 B14



FA



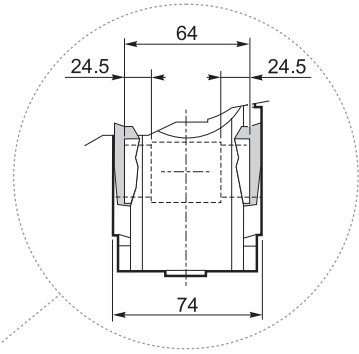
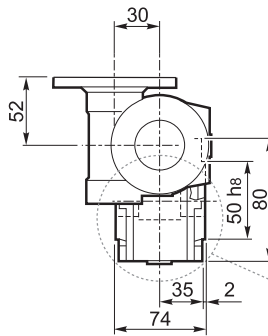
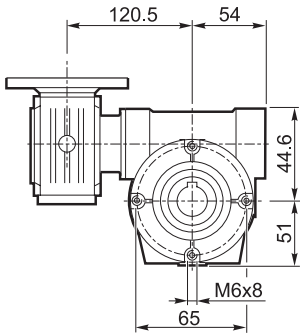
OUTPUT





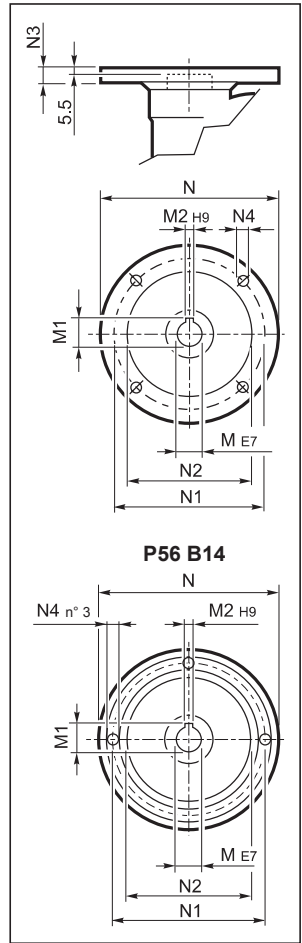
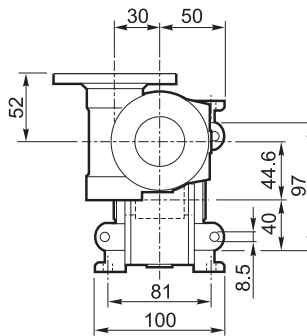
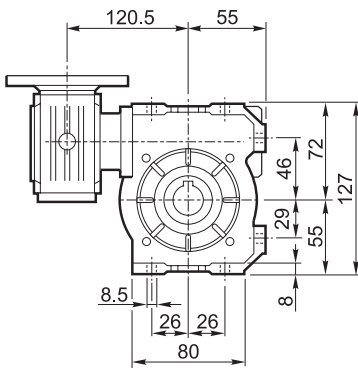
VF/VF 30/44...P (IEC)

P



INPUT

U



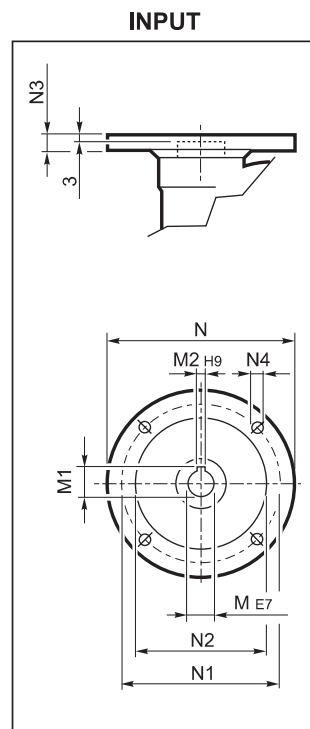
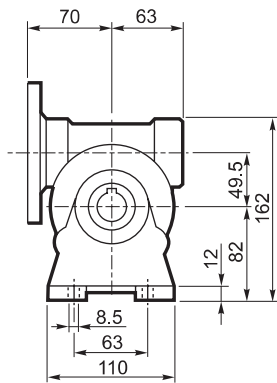
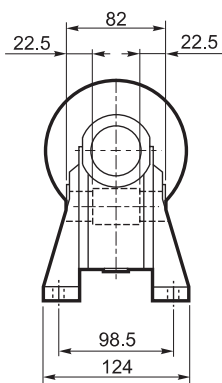
OUTPUT

		M	M1	M2	N	N1	N2	N3	N4	
VF/VF 30/44	P56 B14	9	10.4	3	80	65	50	7	5.5	3.5
VF/VF 30/44	P63 B14	11	12.8	4	90	75	60	6	5.5	

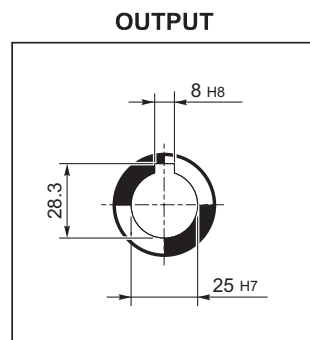
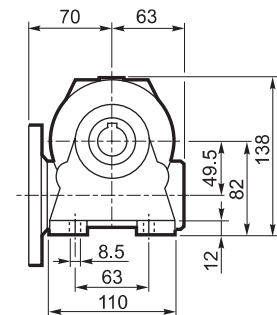
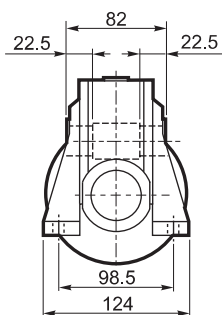


VF 49...P (IEC)

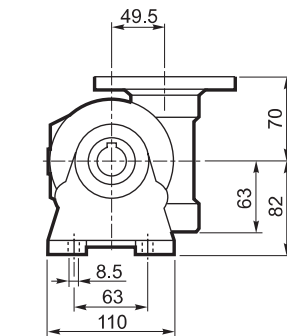
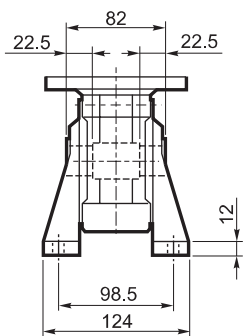
A



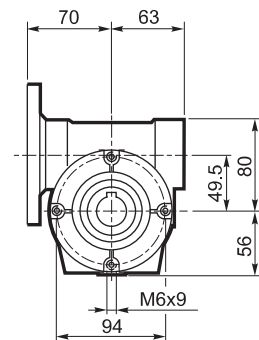
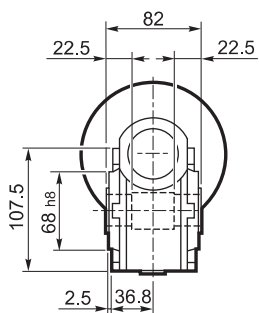
N



V



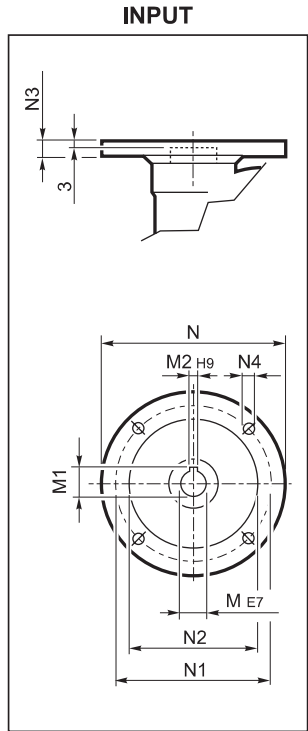
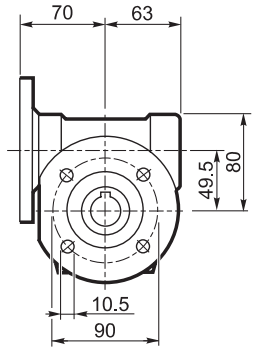
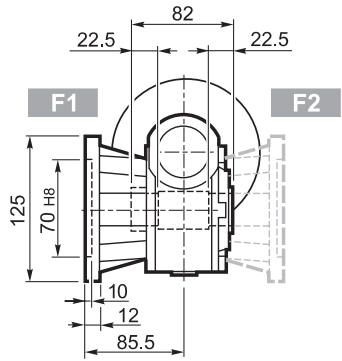
P



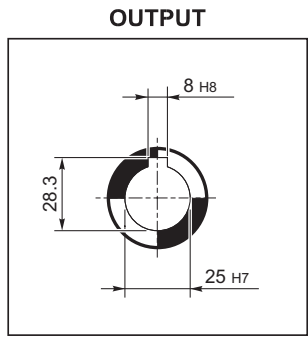
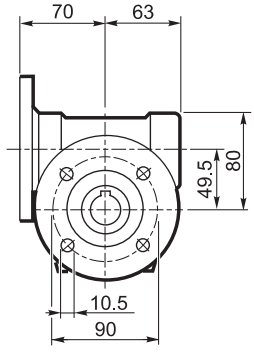
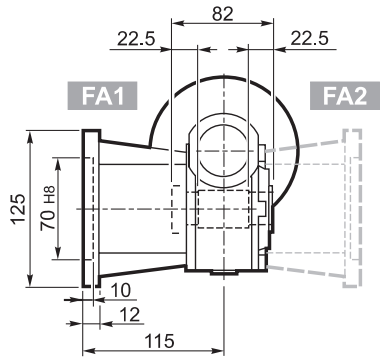


VF 49...P (IEC)

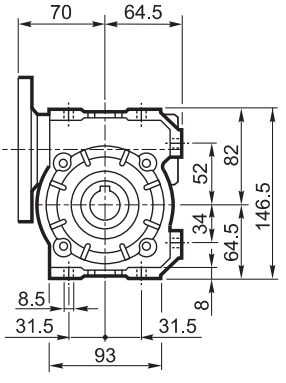
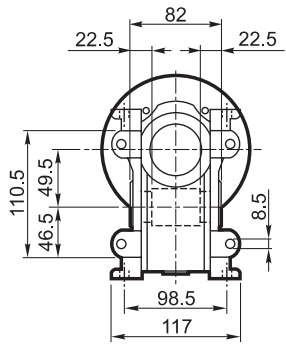
F_



FA_



U

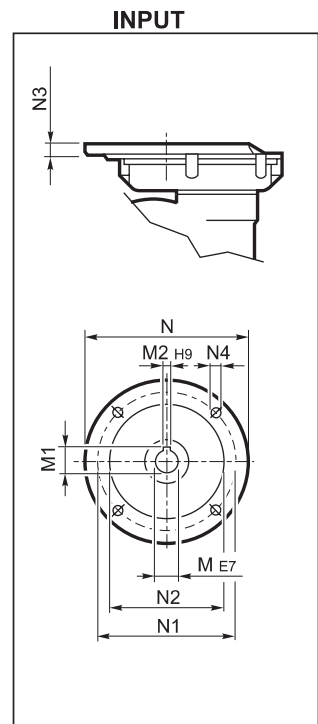
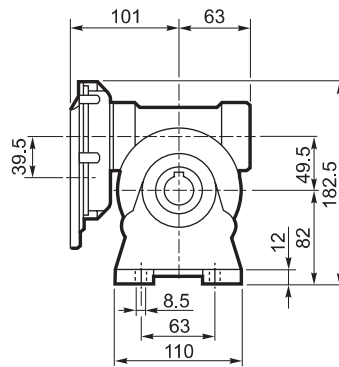
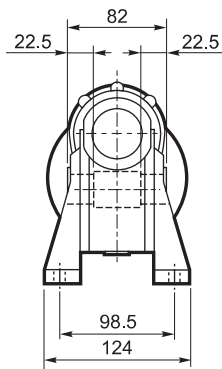


		M	M1	M2	N	N1	N2	N3	N4	kg
		11	12.8	4	140	115	95	10.5	9.5	3.0
		14	16.3	5	160	130	110	10.5	9.5	
		19	21.8	6	200	165	130	10	11.5	
		11	12.8	4	90	75	60	7	6	
		14	16.3	5	105	85	70	10.5	6.5	
		19	21.8	6	120	100	80	10	7	

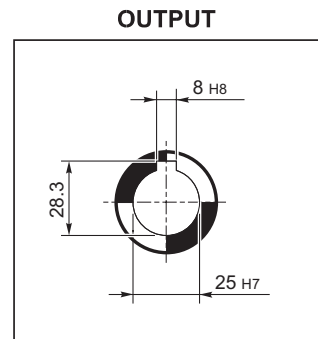
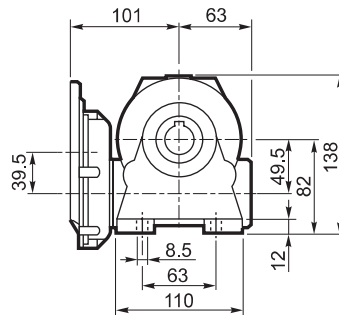
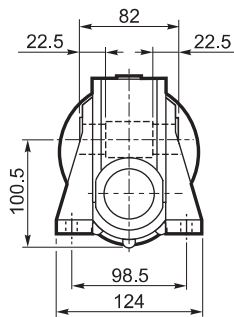


VFR 49...P (IEC)

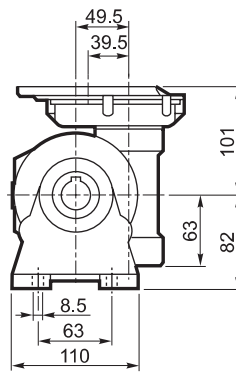
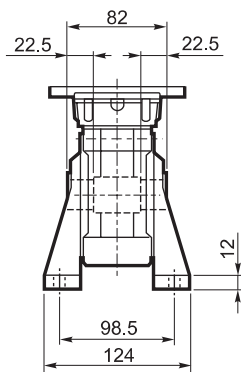
A



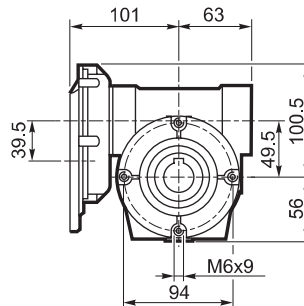
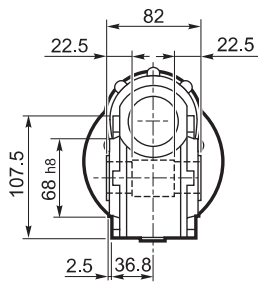
N



V

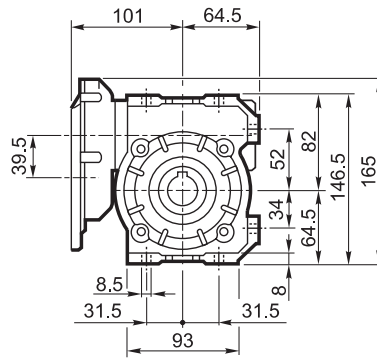
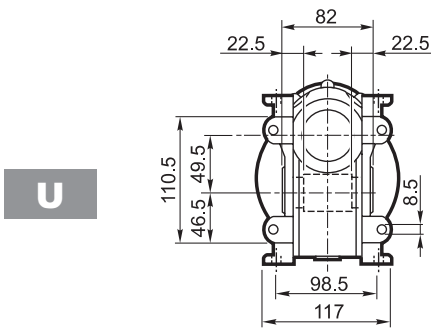
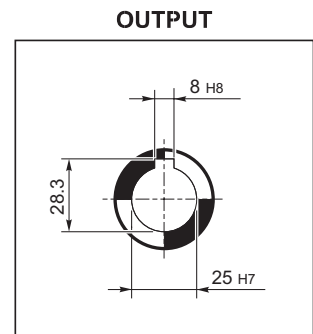
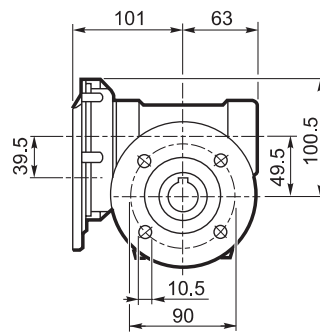
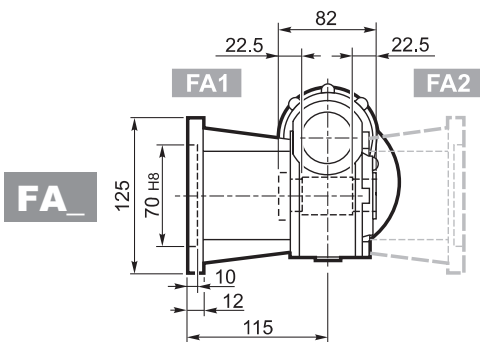
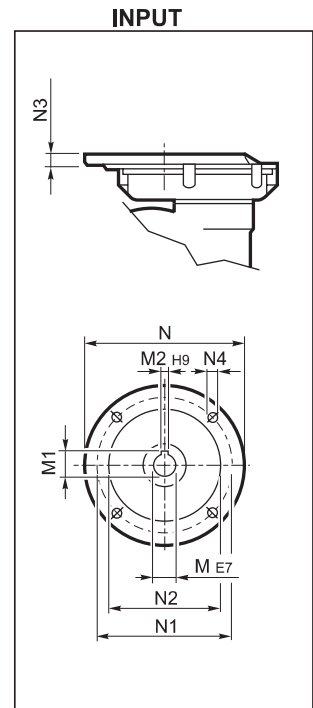
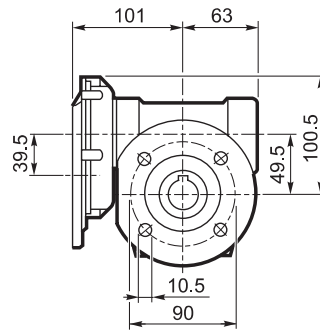
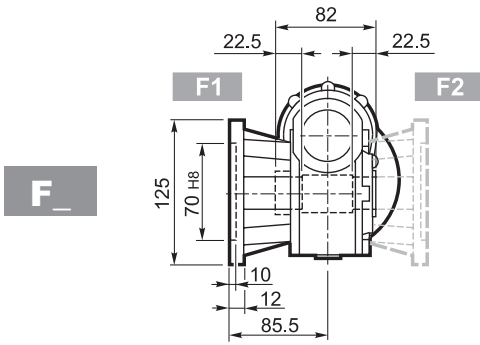


P





VFR 49...P (IEC)

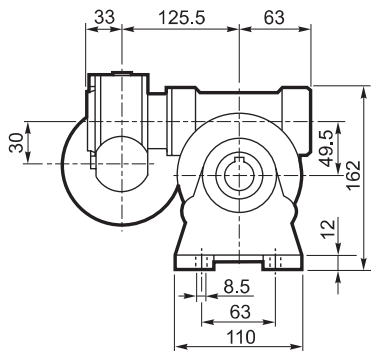


		M	M1	M2	N	N1	N2	N3	N4	
VFR 49	P63 B5	11	12.8	4	140	115	95	11	M8 x 19	5.0

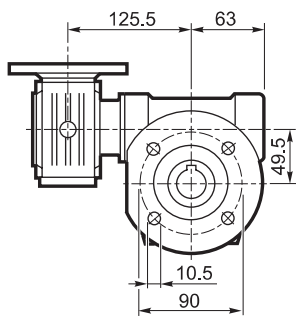


VF/VF 30/49...P (IEC)

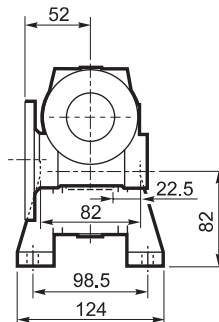
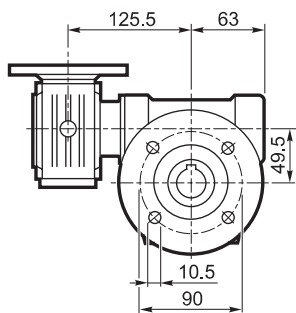
A



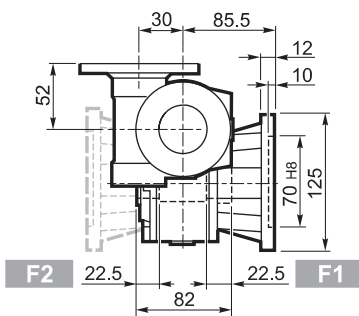
F



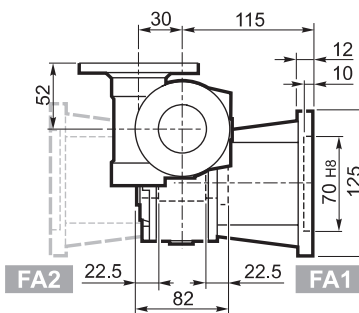
FA



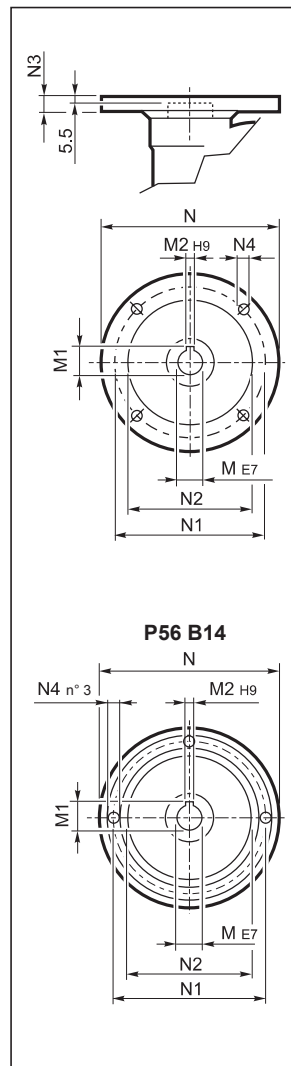
F2 **F1**



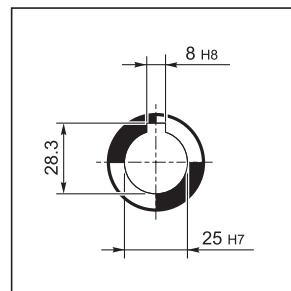
FA2 **FA1**



INPUT



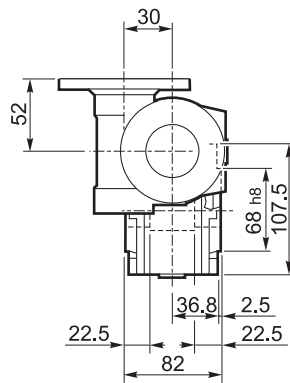
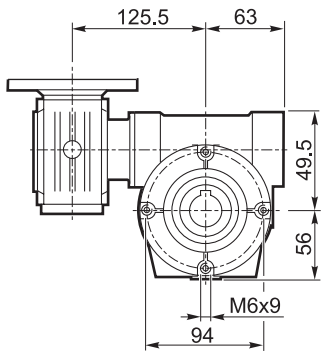
OUTPUT



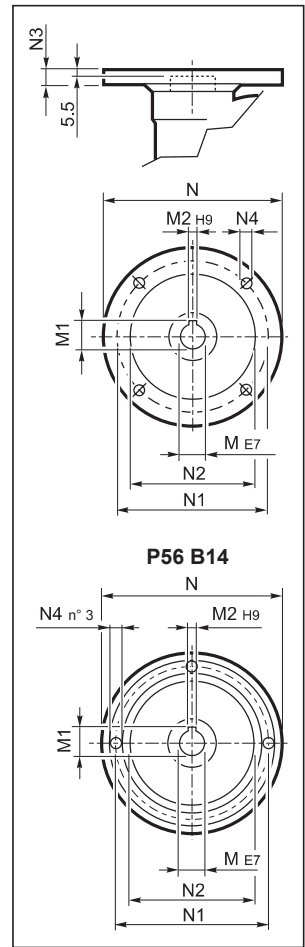


VF/VF 30/49...P (IEC)

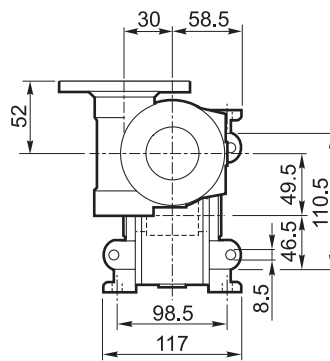
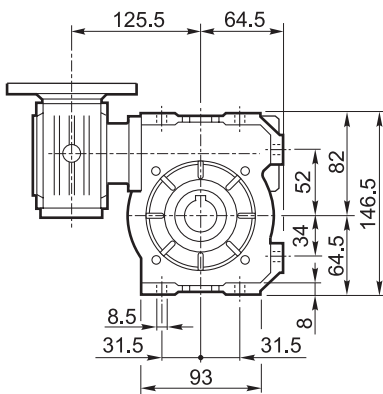
P



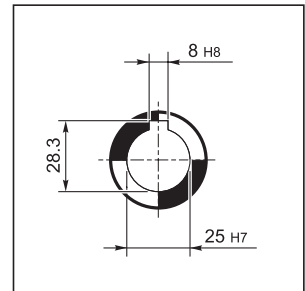
INPUT






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OUTPUT

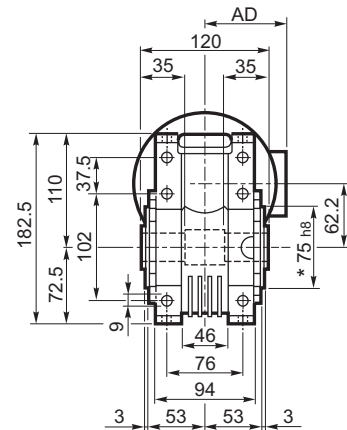
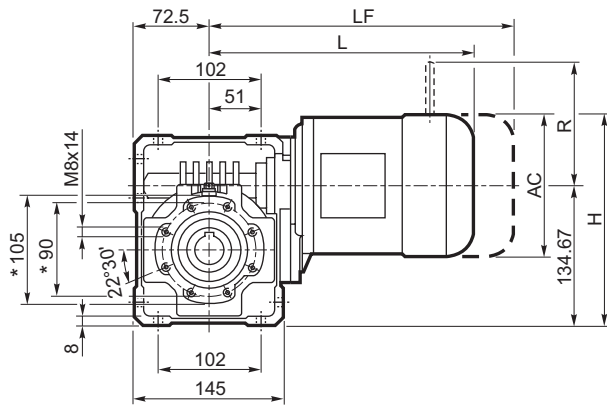


		M	M1	M2	N	N1	N2	N3	N4	
VF/VF 30/49	P56 B14	9	10.4	3	80	65	50	7	5.5	4.5
VF/VF 30/49	P63 B14	11	12.8	4	90	75	60	6	5.5	

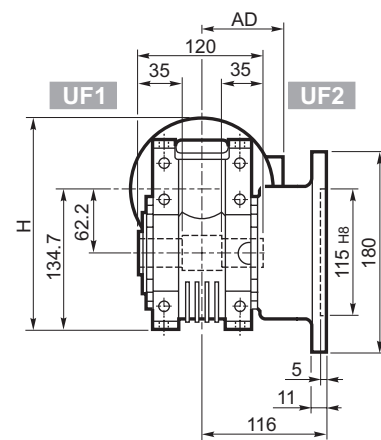
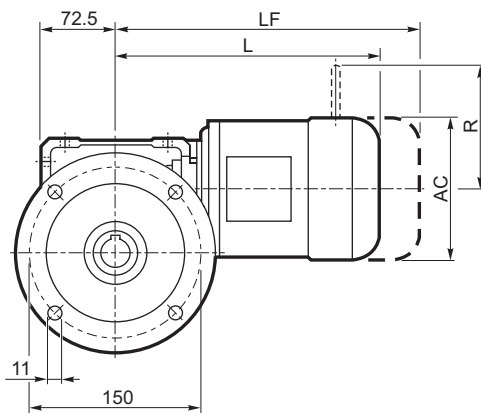


W 63...M

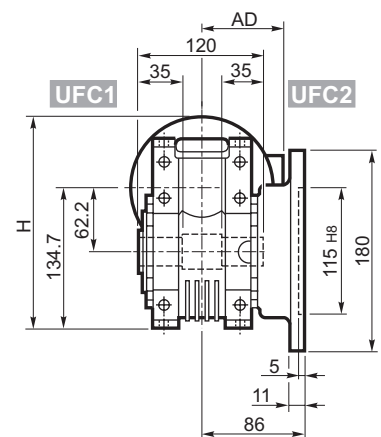
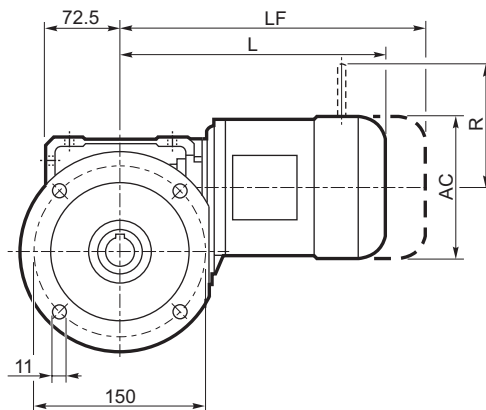
U



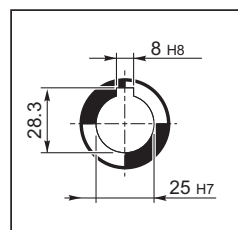
UF_



UFC_



OUTPUT



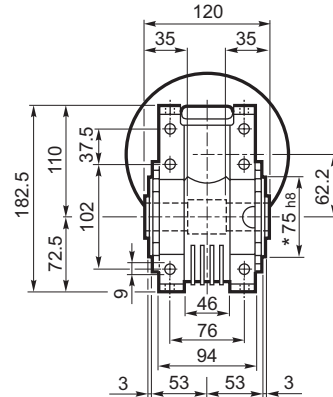
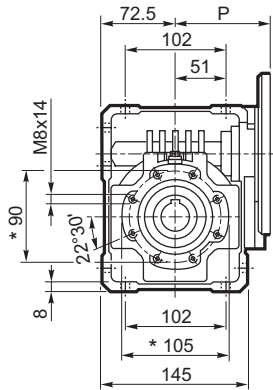
			M_				Kg	M...FD M...FA		M...FD		M...FA	
			AC	H	L	AD		LF	Kg	R	AD	R	AD
W 63	S1	M1	138	204	289	108	13	350	15	103	135	124	108
W 63	S2	M2S	156	213	317	119	17	393	20	129	146	134	119

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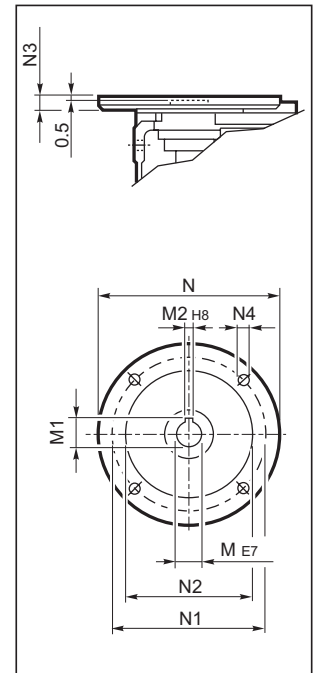


W 63...P (IEC)

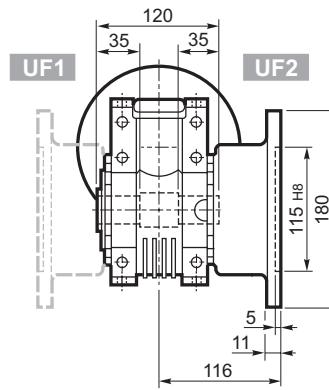
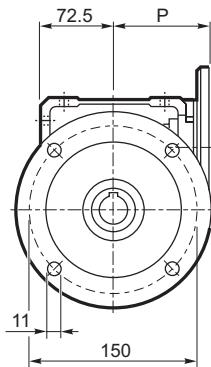
U



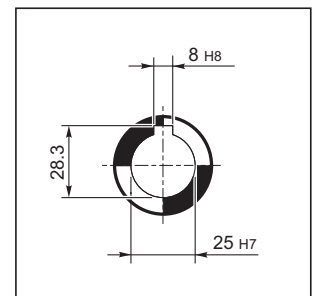
INPUT



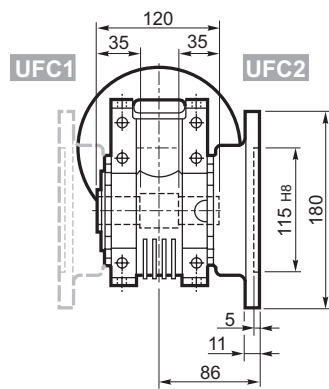
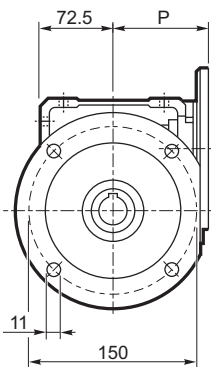
UF_



OUTPUT



UFC_

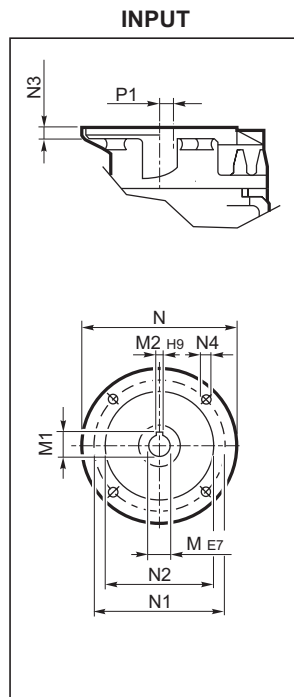
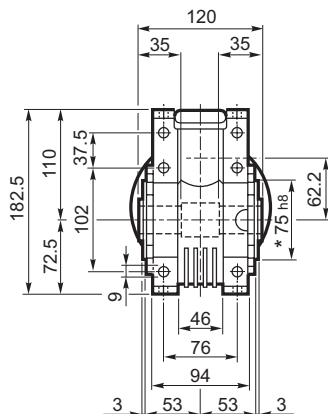
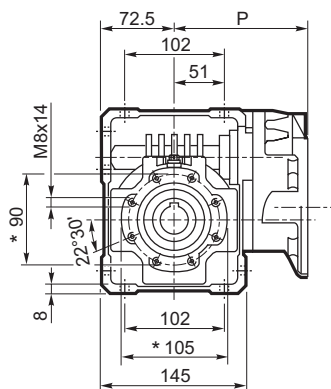


		M	M1	M2	N	N1	N2	N3	N4	P	
W 63	P71 B5	14	16.3	5	160	130	110	11	9	95	6.3
W 63	P80 B5	19	21.8	6	200	165	130	12	11.5	102	6.5
W 63	P90 B5	24	27.3	8	200	165	130	12	11.5	102	6.4
W 63	P71 B14	14	16.3	5	105	85	70	11	6.5	95	6.1
W 63	P80 B14	19	21.8	6	120	100	80	11	6.5	102	6.3
W 63	P90 B14	24	27.3	8	140	115	95	11	8.5	102	6.3

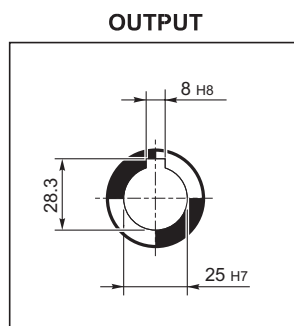
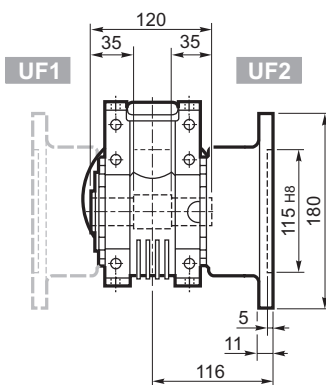
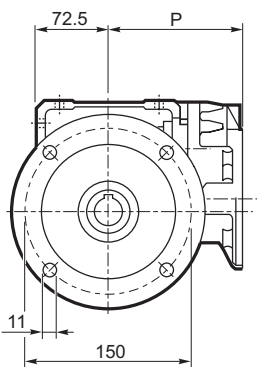


WR 63...P (IEC)

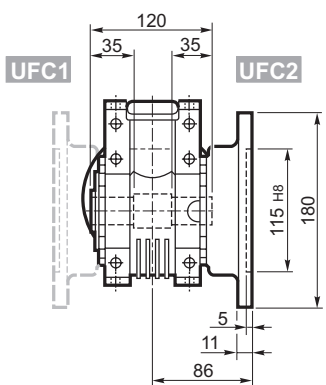
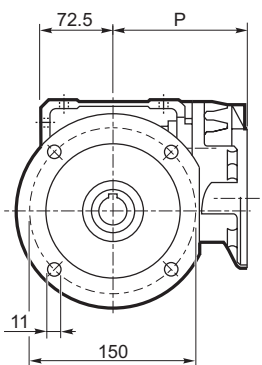
U



UF_

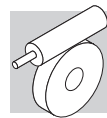


UFC_



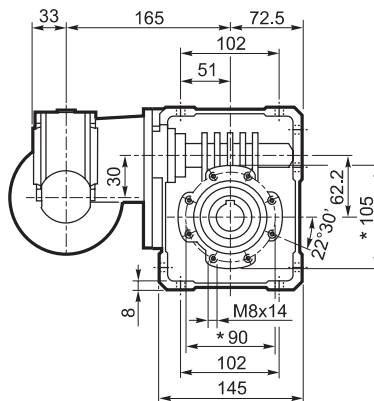
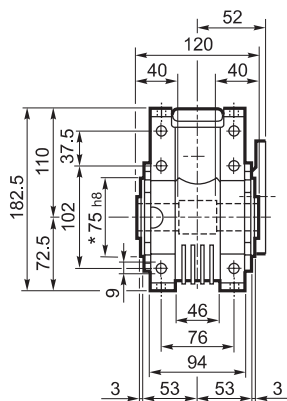
		M	M1	M2	N	N1	N2	N3	N4	P	P1	
WR 63	P63 B5	11	12.8	4	140	115	95	10	M8x10	133.5	11.42	7.1
WR 63	P71 B5	14	16.3	5	160	130	110	10	M8x10	133.5	11.42	

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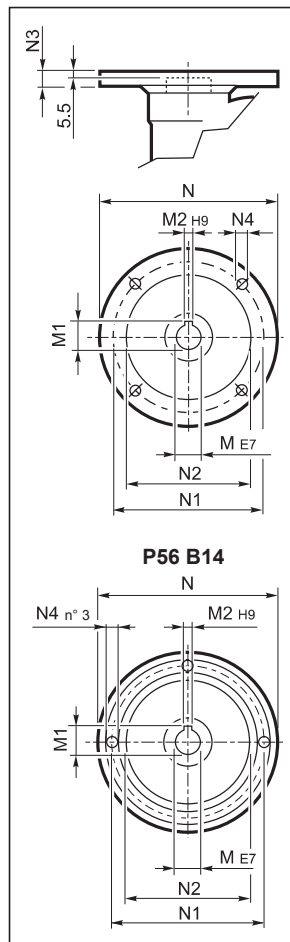


VF/W 30/63...P (IEC)

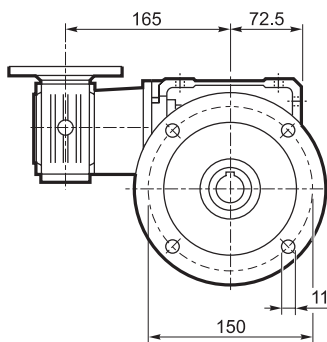
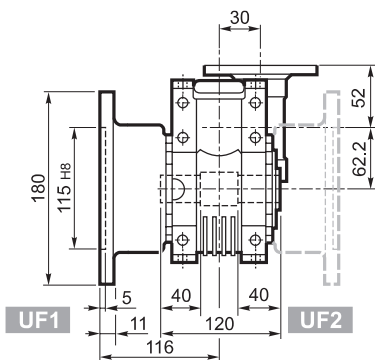
U



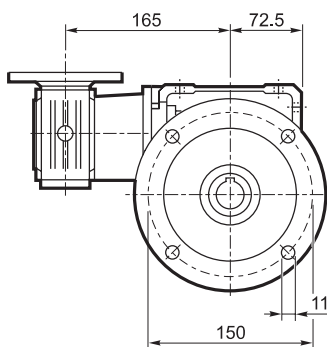
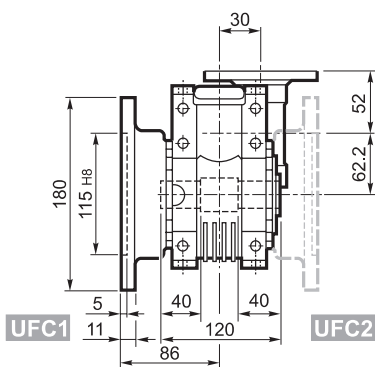
INPUT



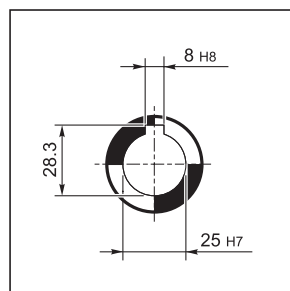
UF



UFC

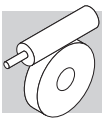


OUTPUT



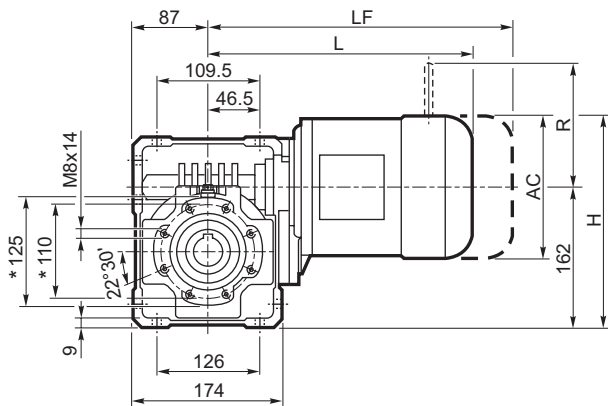
		M	M1	M2	N	N1	N2	N3	N4	
VF/W 30/63	P56 B5	9	10.4	3	120	100	80	7	7	8.0
VF/W 30/63	P63 B5	11	12.8	4	140	115	95	8	9.5	
VF/W 30/63	P56 B14	9	10.4	3	80	65	50	7	5.5	
VF/W 30/63	P63 B14	11	12.8	4	90	75	60	6	5.5	

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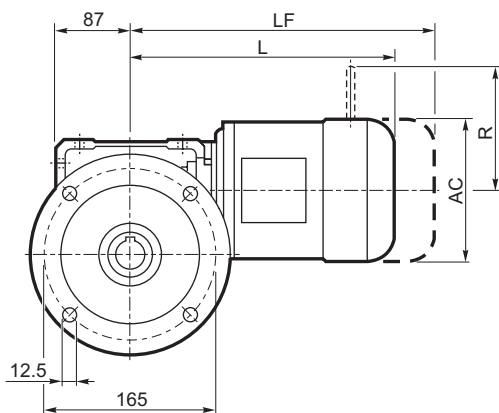


W 75...M

U

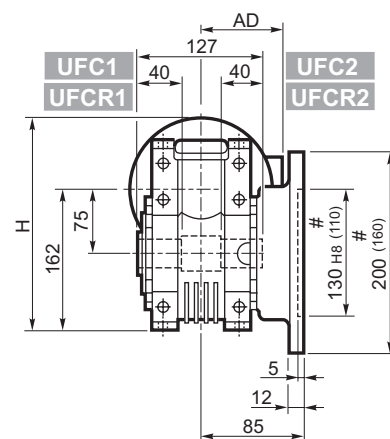
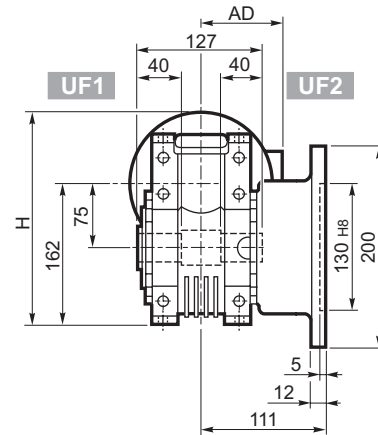
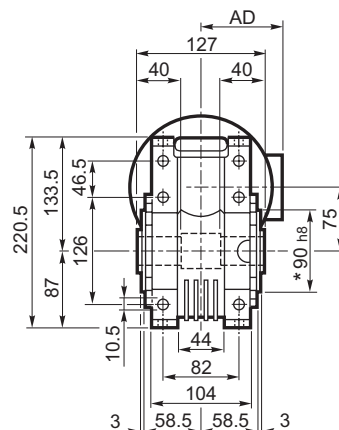
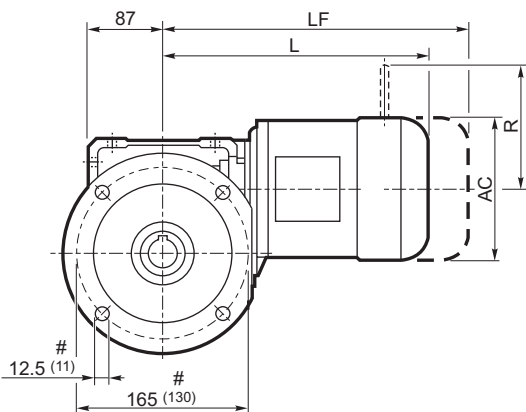


UF_

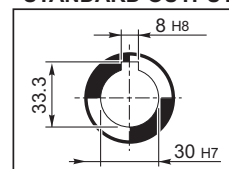


UFC_

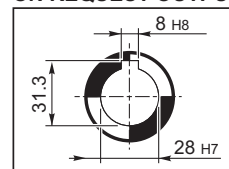
UFCR_#



STANDARD OUTPUT



ON REQUEST OUTPUT



Icon	S	M	M_				Kg	M...FD M...FA		Kg	M...FD		M...FA	
			AC	H	L	AD		LF	R		AD	R	AD	
	W 75	S1	M1	138	231	308	108	16.0	369	18.2	103	135	124	108
	W 75	S2	M2S	153	240	333	119	18.5	409	21.6	129	146	134	119
	W 75	S3	M3S	193	258.5	376	142	25.6	472	31	160	158	160	142
	W 75	S3	M3L	193	258.5	408	142	28.6	499	34	160	158	160	142

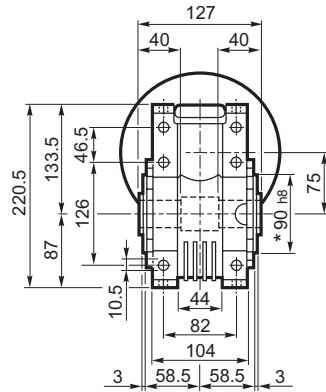
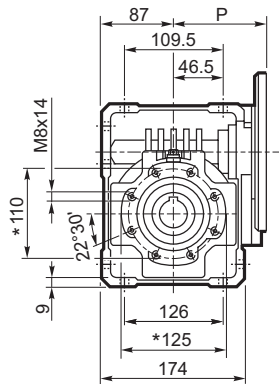
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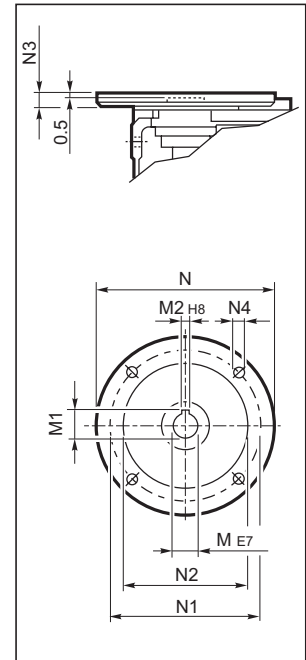


W 75...P (IEC)

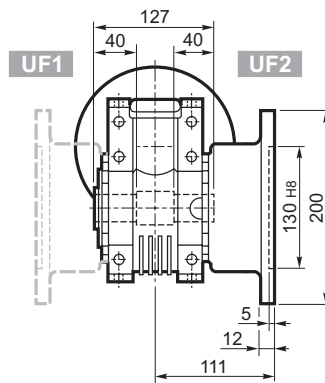
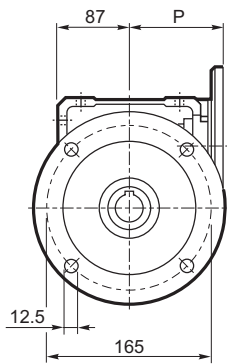
U



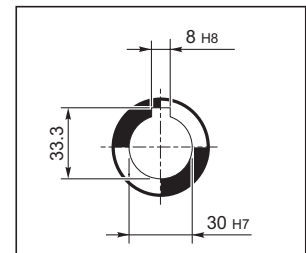
INPUT



UF_

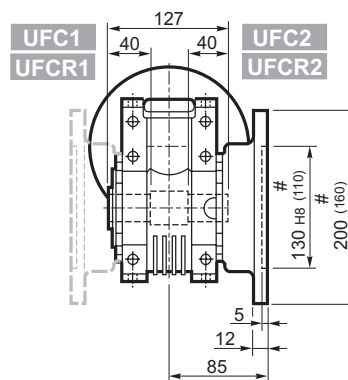
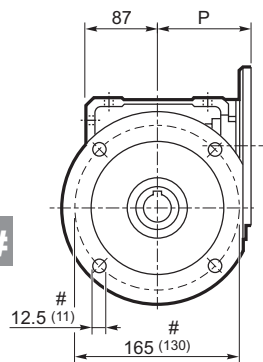


STANDARD OUTPUT

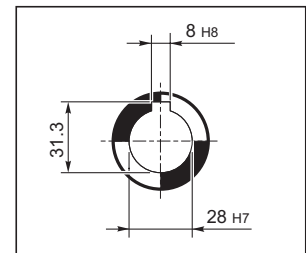


UFC_

UFCR_#



ON REQUEST OUTPUT



		M	M1	M2	N	N1	N2	N3	N4	P	
W 75	P71 B5	14	16.3	5	160	130	110	11	9	112	9.5
W 75	P80 B5	19	21.8	6	200	165	130	12	11.5	112	9.7
W 75	P90 B5	24	27.3	8	200	165	130	12	11.5	112	9.6
W 75	P100 B5	28	31.3	8	250	215	180	13	12.5	120	9.7
W 75	P112 B5	28	31.3	8	250	215	180	13	12.5	120	9.7
W 75	P80 B14	19	21.8	6	120	100	80	7.5	6.5	112	9.4
W 75	P90 B14	24	27.3	8	140	115	95	7.5	8.5	112	9.4
W 75	P100 B14	28	31.3	8	160	130	110	10	8.5	120	9.5
W 75	P112 B14	28	31.3	8	160	130	110	10	8.5	120	9.5

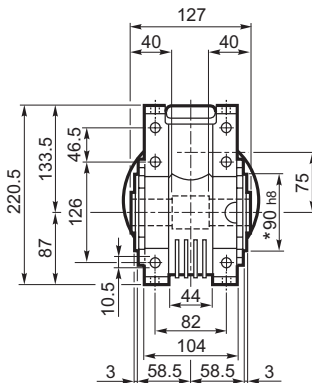
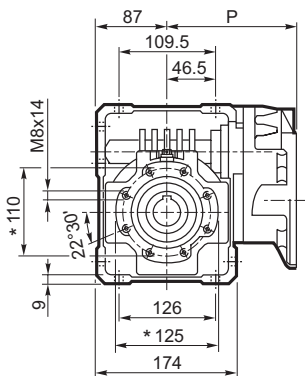
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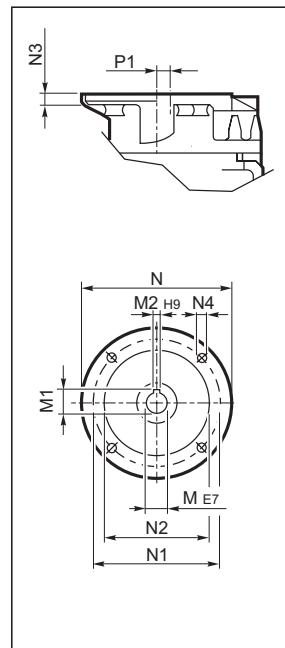


WR 75...P (IEC)

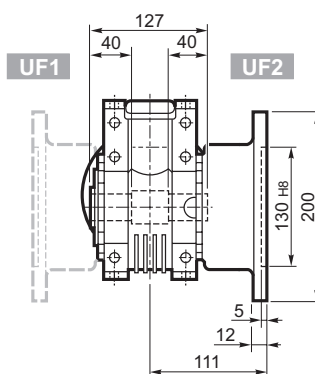
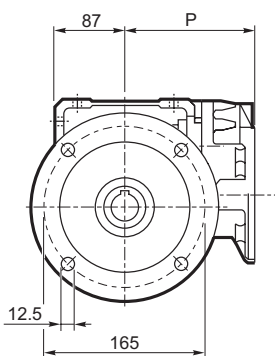
U



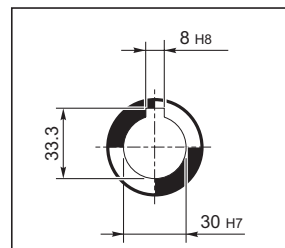
INPUT



UF_

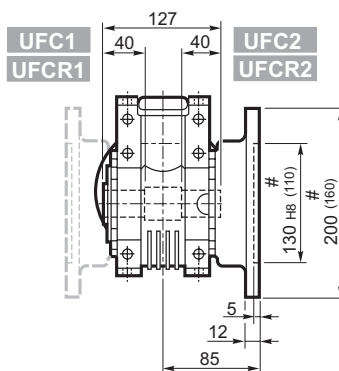
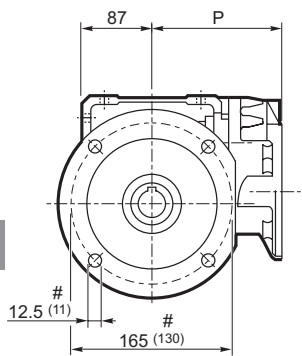


STANDARD OUTPUT

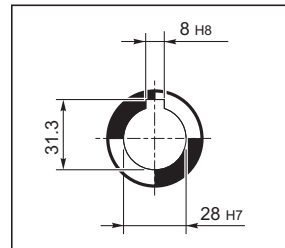


UFC_

UFCR_#



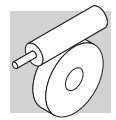
ON REQUEST OUTPUT



		M	M1	M2	N	N1	N2	N3	N4	P	P1	
WR 75	P63 B5	11	12.8	4	140	115	95	10	M8x10	152	23.53	10.6
WR 75	P71 B5	14	16.3	5	160	130	110	10	M8x10	152	23.53	10.7
WR 75	P80 B5	19	21.8	6	200	165	130	12	M10x13	163.5	11	11.5
WR 75	P90 B5	24	27.3	8	200	165	130	12	M10x13	163.5	11	11.6

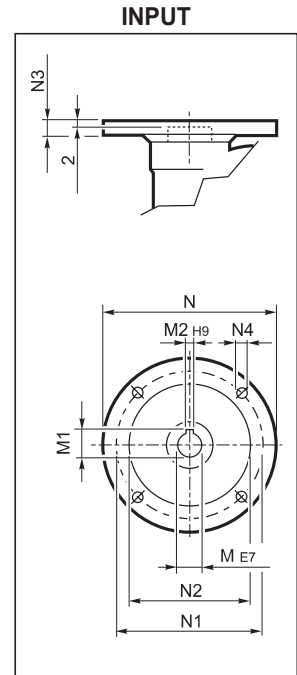
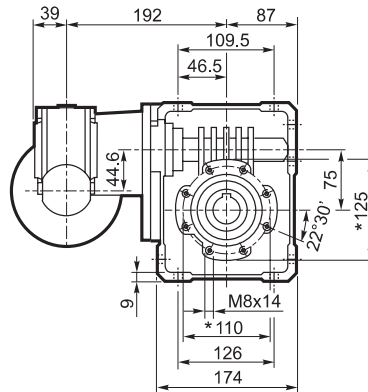
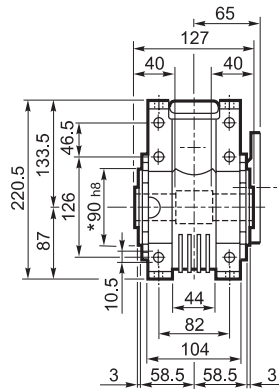
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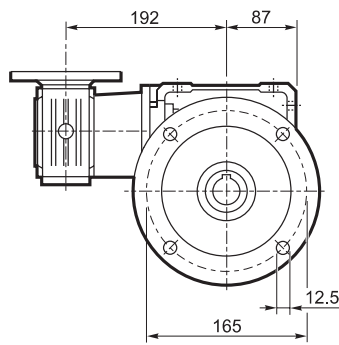
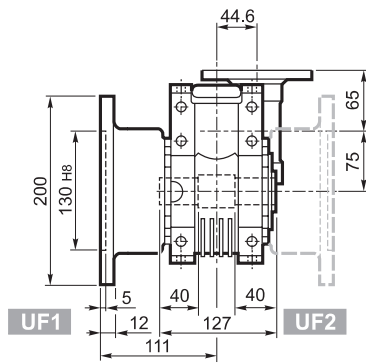


VF/W 44/75...P (IEC)

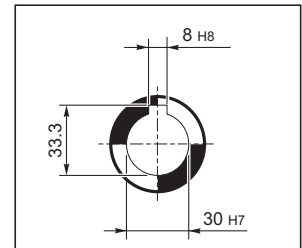
U



UF_

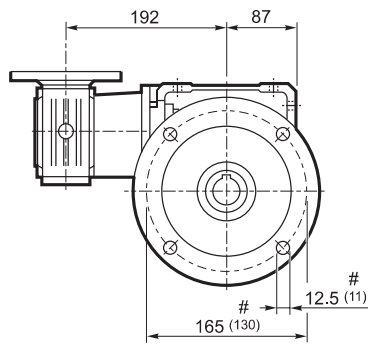
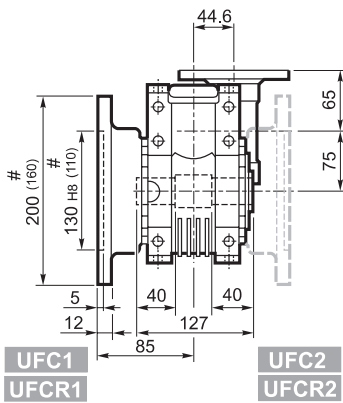


STANDARD OUTPUT

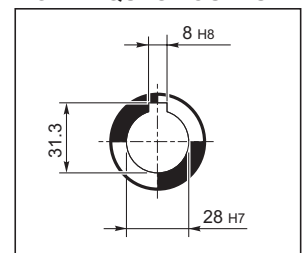


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ON REQUEST OUTPUT



		M	M1	M2	N	N1	N2	N3	N4	Kg
										12.5
VF/W 44/75	P63 B5	11	12.8	4	140	115	95	10	9.5	
VF/W 44/75	P71 B5	14	16.3	5	160	130	110	10	9.5	
VF/W 44/75	P63 B14	11	12.8	4	90	75	60	8	5.5	
VF/W 44/75	P71 B14	14	16.3	5	105	85	70	10	7	

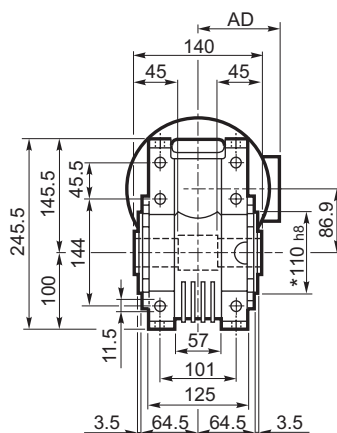
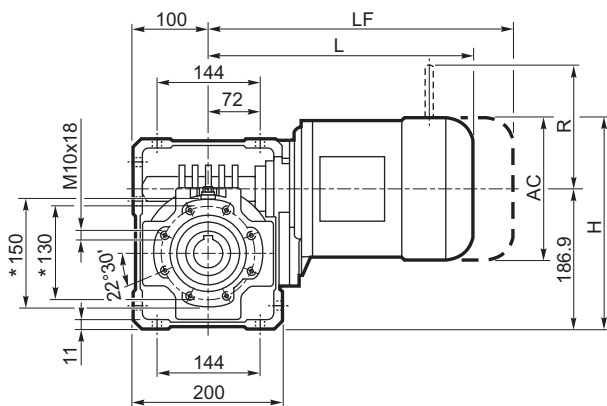
* Da ambo i lati

Flangia ridotta

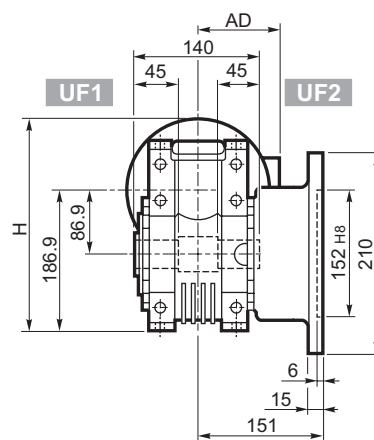
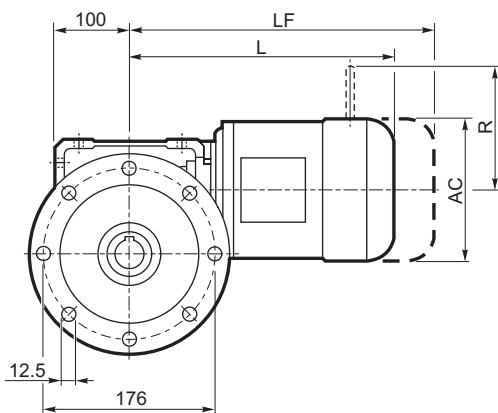


W 86...M

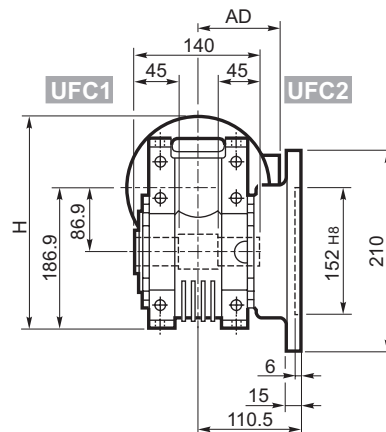
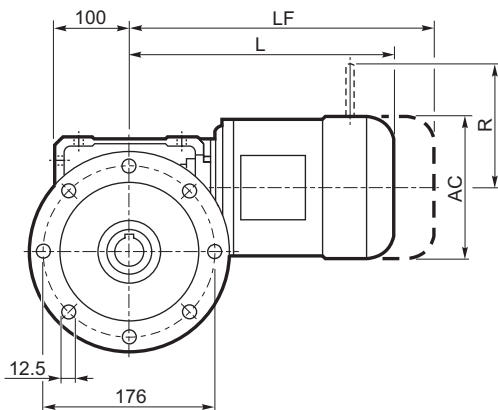
U



UF

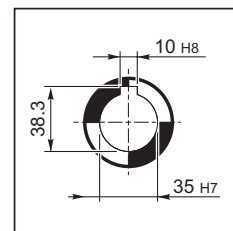


UFC



			M ₋					M...FD M...FA		M...FD		M...FA				
			AC	H	L	AD	Kg	LF	Kg	R	AD	R	AD			
			W 86	S1	M1	138	256	324	108	20.1	385	22.3	103	135	124	108
W 86	S2	M2S	156	265	349	119	22.6	425	25.7	129	146	134	119			
W 86	S3	M3S	193	283.5	392	142	29.7	488	35	160	158	160	142			
W 86	S3	M3L	193	283.5	424	142	33	515	36	160	158	160	142			

OUTPUT

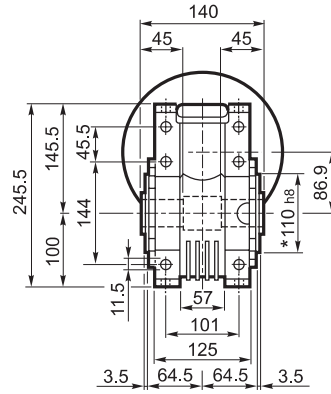
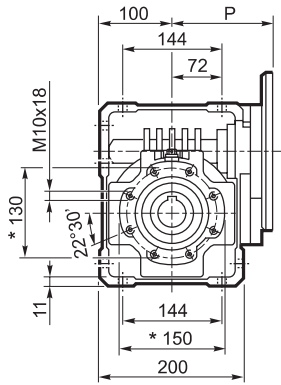


* Da ambo i lati

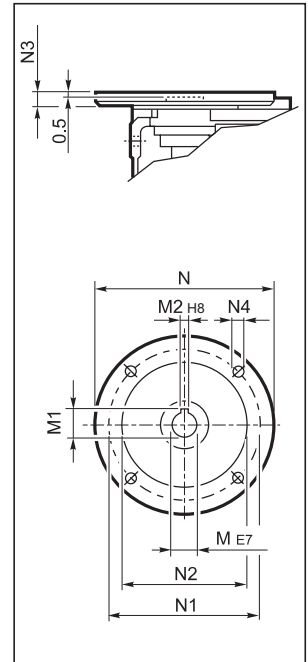


W 86...P (IEC)

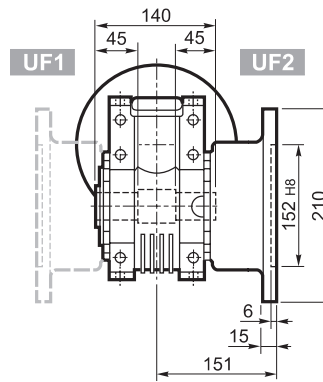
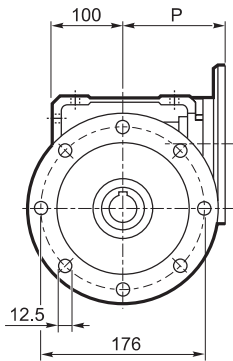
U



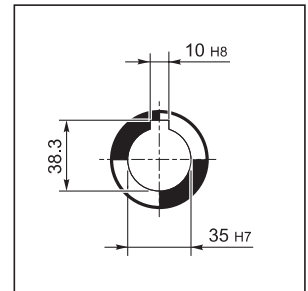
INPUT



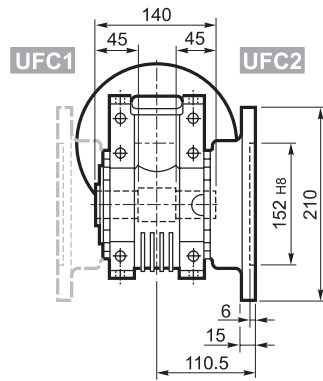
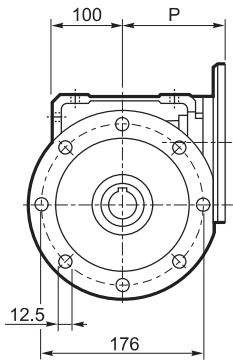
UF



OUTPUT



UFC



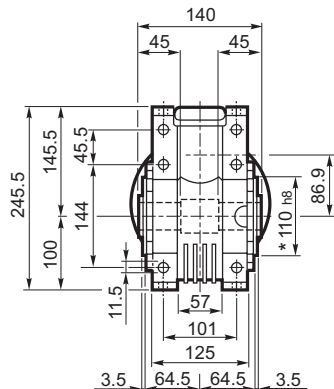
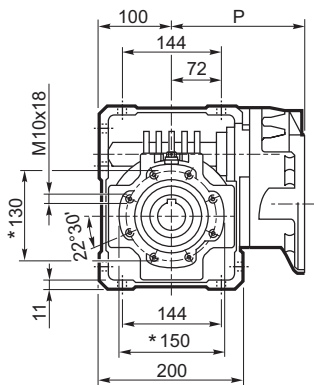
		M	M1	M2	N	N1	N2	N3	N4	P	
W 86	P71 B5	14	16.3	5	160	130	110	11	9	128	13.6
W 86	P80 B5	19	21.8	6	200	165	130	12	11.5	128	13.8
W 86	P90 B5	24	27.3	8	200	165	130	12	11.5	128	13.7
W 86	P100 B5	28	31.3	8	250	215	180	13	12.5	136	13.8
W 86	P112 B5	28	31.3	8	250	215	180	13	12.5	136	13.8
W 86	P80 B14	19	21.8	6	120	100	80	7.5	6.5	128	13.5
W 86	P90 B14	24	27.3	8	140	115	95	7.5	8.5	128	13.5
W 86	P100 B14	28	31.3	8	160	130	110	10	8.5	136	13.6
W 86	P112 B14	28	31.3	8	160	130	110	10	8.5	136	13.6

* Da ambo i lati

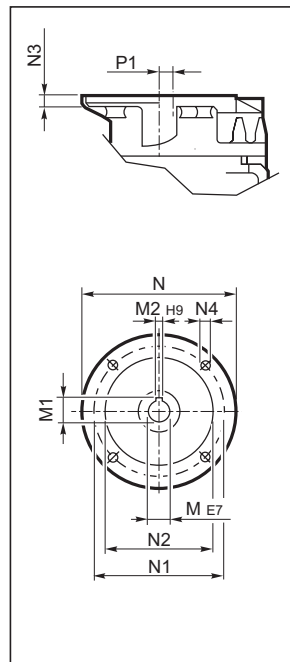


WR 86...P (IEC)

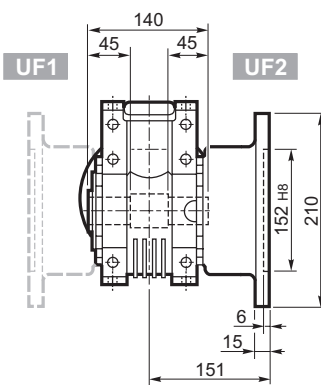
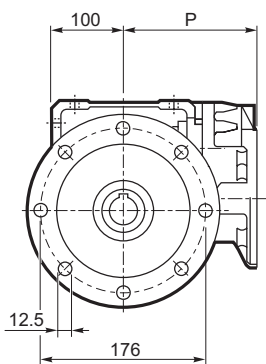
U



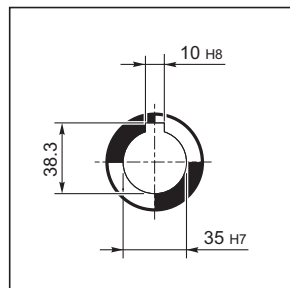
INPUT



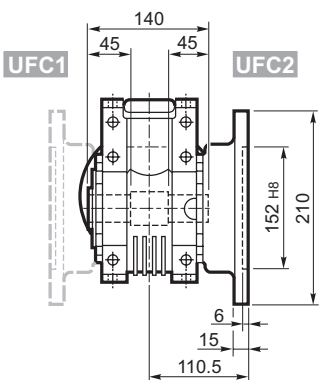
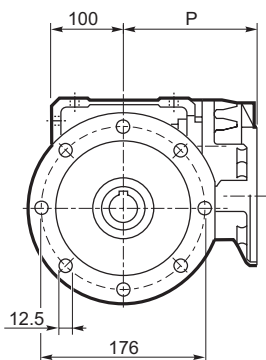
UF



OUTPUT



UFC



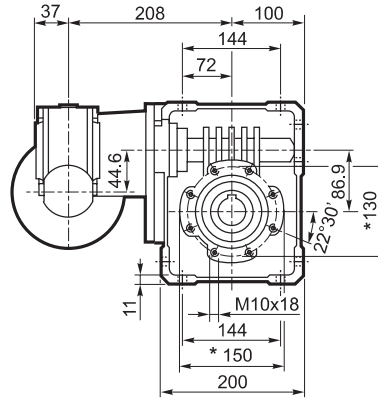
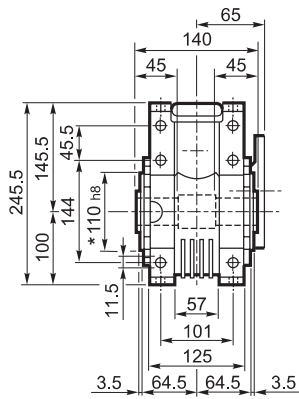
		M	M1	M2	N	N1	N2	N3	N4	P	P1	
WR 86	P63 B5	11	12.8	4	140	115	95	10	M8x10	168	35.4	14.3
WR 86	P71 B5	14	16.3	5	160	130	110	10	M8x10	168	35.4	14.4
WR 86	P80 B5	19	21.8	6	200	165	130	12	M10x13	179.5	22.9	15.2
WR 86	P90 B5	24	27.3	8	200	165	130	12	M10x13	179.5	22.9	15.3

* Da ambo i lati

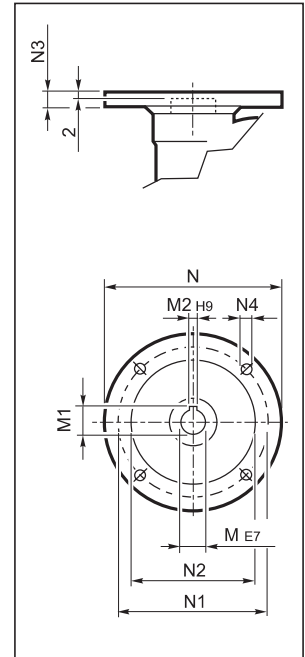


VF/W 44/86... P (IEC)

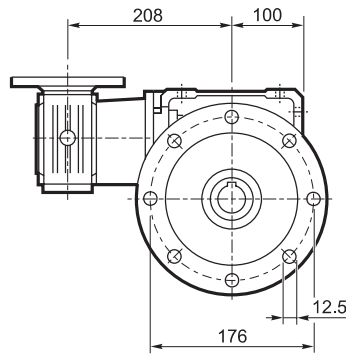
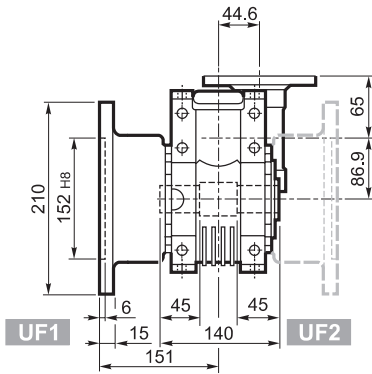
U



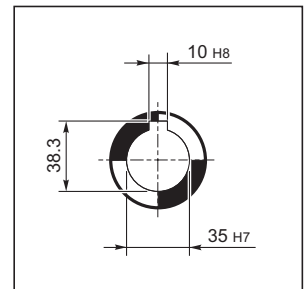
INPUT



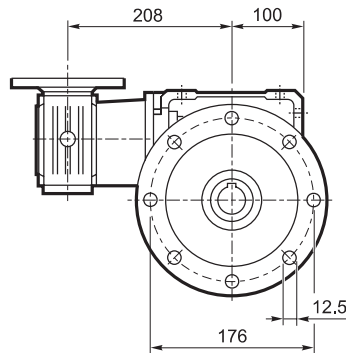
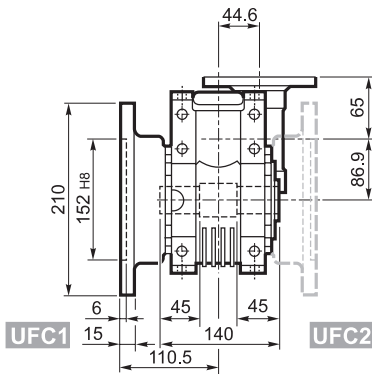
UF_



OUTPUT



UFC_



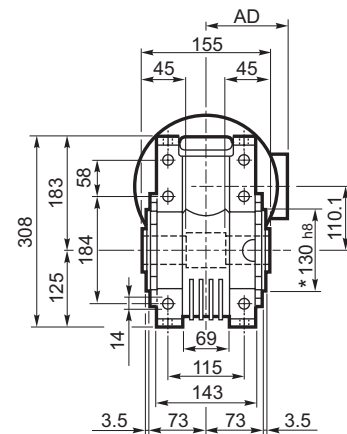
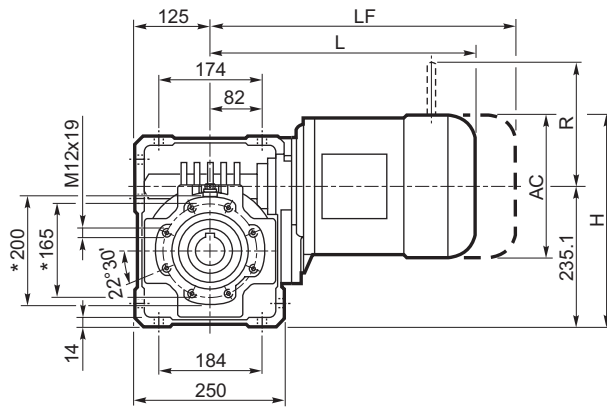
		M	M1	M2	N	N1	N2	N3	N4	Kg
		11	12.8	4	140	115	95	10	9.5	16.6
		14	16.3	5	160	130	110	10	9.5	
		11	12.8	4	90	75	60	8	5.5	
		14	16.3	5	105	85	70	10	7	

* Da ambo i lati

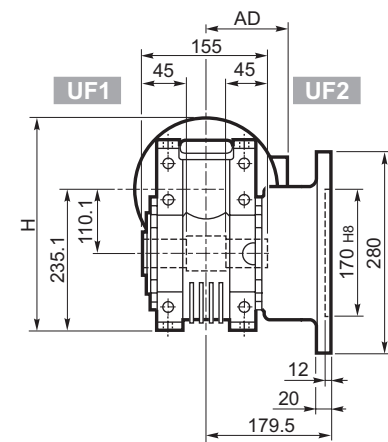
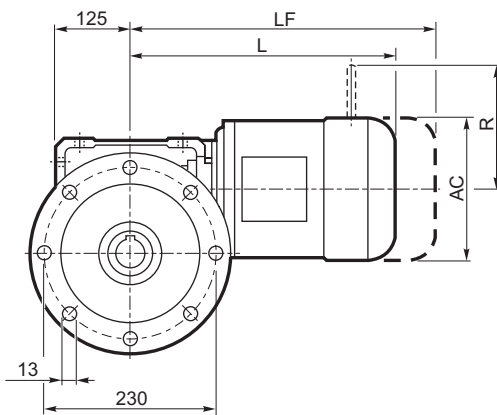


W 110...M

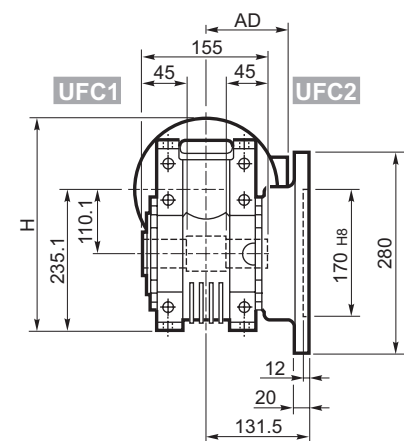
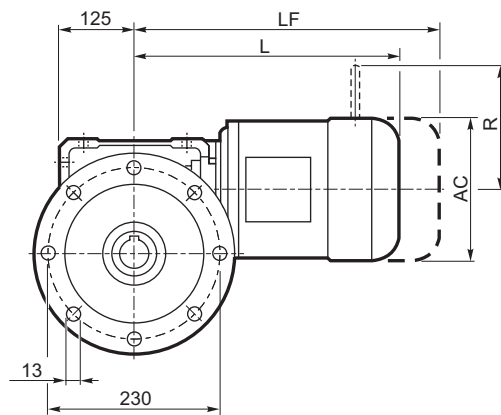
U



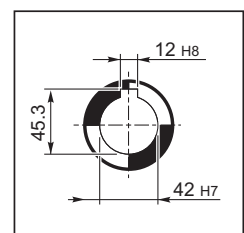
UF_



UFC_



OUTPUT



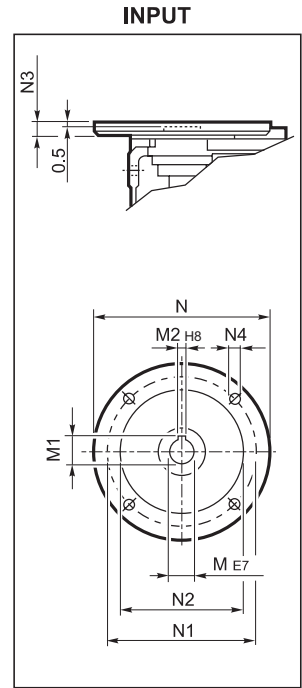
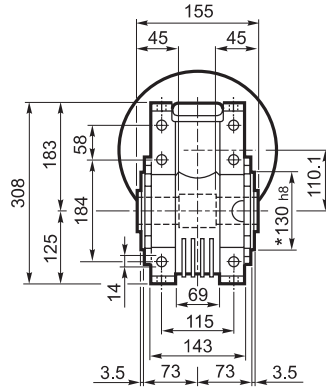
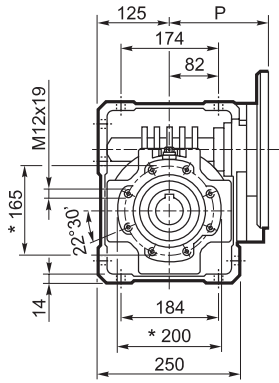
			M_				Kg	M...FD M...FA		Kg	M...FD		M...FA			
			AC	H	L	AD		LF	R		AD	R	AD			
			W 110	S2	M2S	156	313	364	119	38	440	41	129	146	134	119
W 110	S3	M3S	193	332	407	142	46	503	50	160	158	160	142			
W 110	S3	M3L	193	332	439	142	48	530	53	160	158	160	142			

* Da ambo i lati

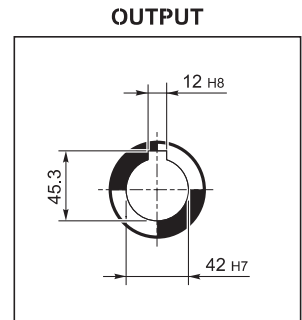
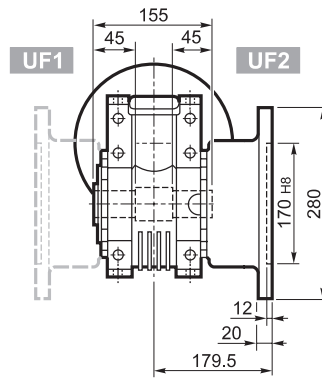
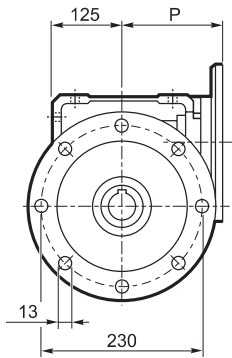


W 110...P (IEC)

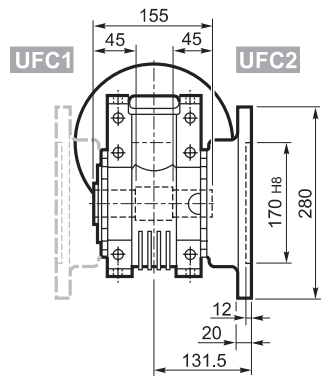
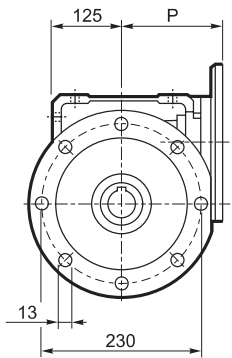
U



UF_



UFC_



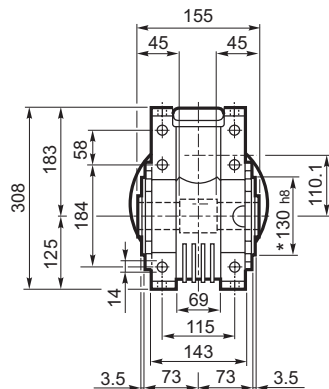
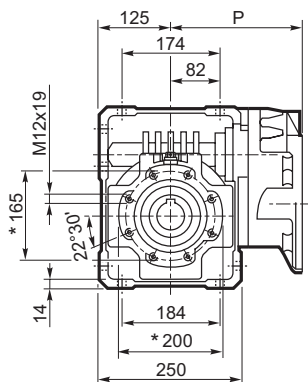
		M	M1	M2	N	N1	N2	N3	N4	P	
W 110	P80 B5	19	21.8	6	200	165	130	—	M10x12	143	28
W 110	P90 B5	24	27.3	8	200	165	130	—	M10x12	143	28
W 110	P100 B5	28	31.3	8	250	215	180	13	13	151	29
W 110	P112 B5	28	31.3	8	250	215	180	13	13	151	29
W 110	P132 B5	38	41.3	10	300	265	230	16	14	226	31
W 110	P80 B14	19	21.8	6	120	100	80	7.5	7	143	27.5
W 110	P90 B14	24	27.3	8	140	115	95	6.5	9	143	27.5
W 110	P100 B14	28	31.3	8	160	130	110	13	9	151	27
W 110	P112 B14	28	31.3	8	160	130	110	13	9	151	27

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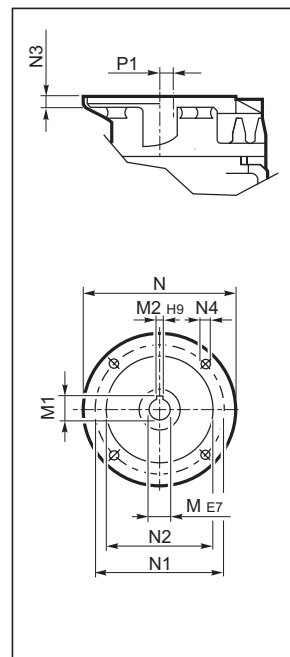


WR 110...P (IEC)

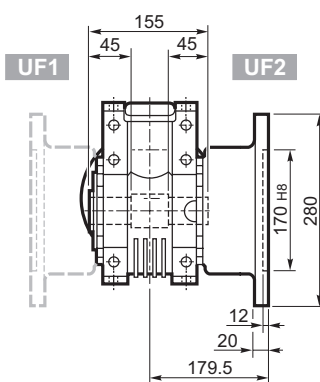
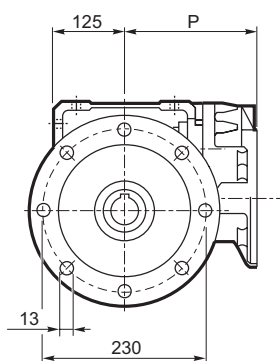
U



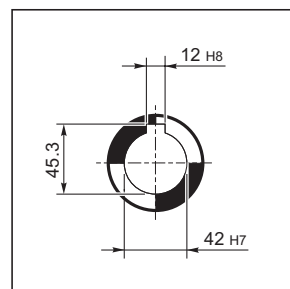
INPUT



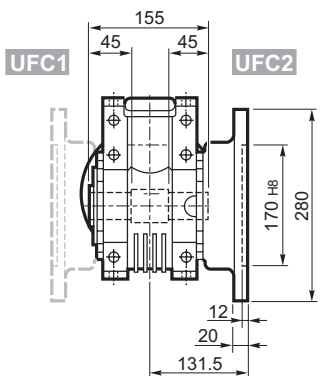
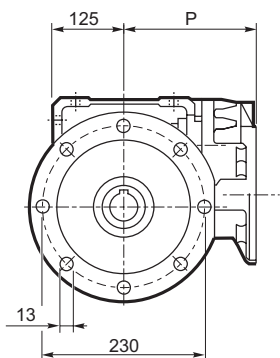
UF



OUTPUT



UFC



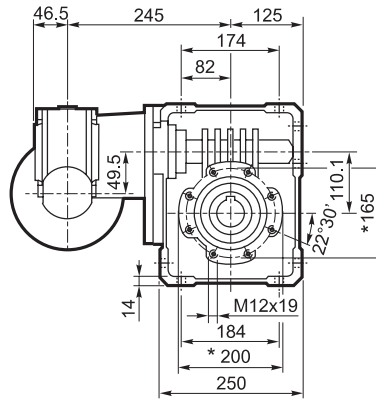
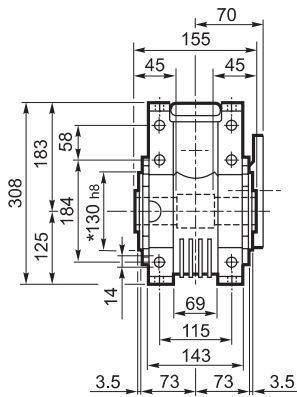
		M	M1	M2	N	N1	N2	N3	N4	P	P1	
WR 110	P71 B5	14	16.3	5	160	130	110	10	M8x14	185	58.6	30.5
WR 110	P80 B5	19	21.8	6	200	165	130	14	M10x15	204	21.1	31
WR 110	P90 B5	24	27.3	8	200	165	130	14	M10x15	204	21.1	31
WR 110	P100 B5	28	31.3	8	250	215	180	14	M12x13	213	21.1	32
WR 110	P112 B5	28	31.3	8	250	215	180	14	M12x13	213	21.1	32

* Da ambo i lati

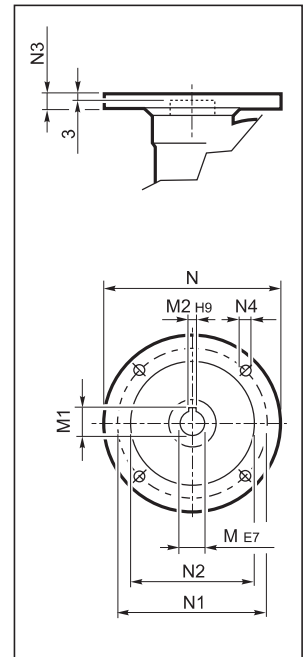


VF/W 49/110...P (IEC)

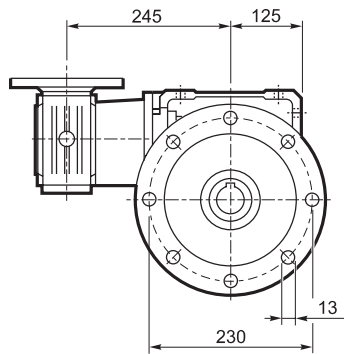
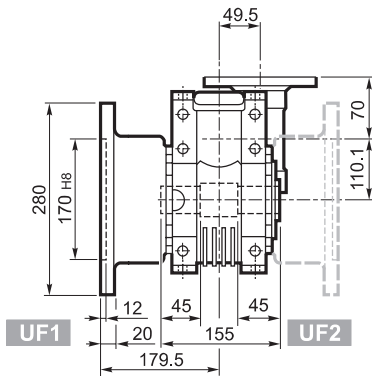
U



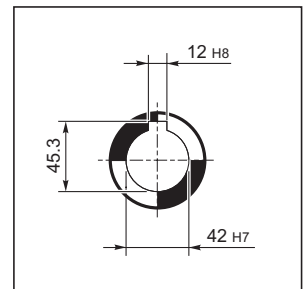
INPUT



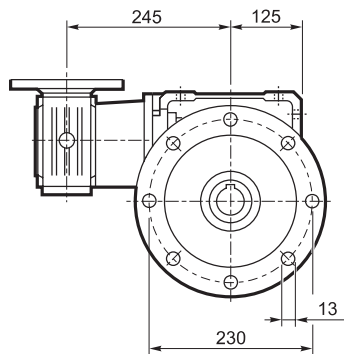
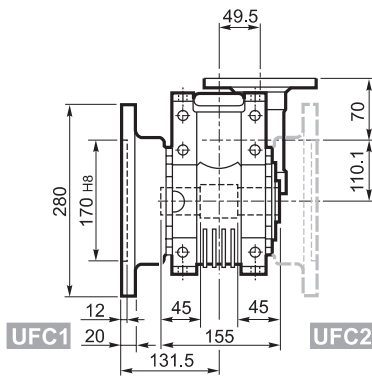
UF



OUTPUT



UFC



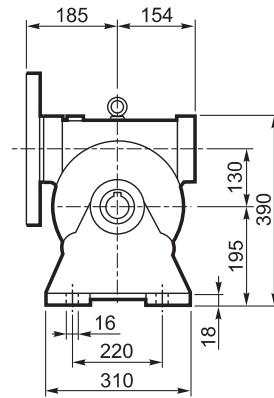
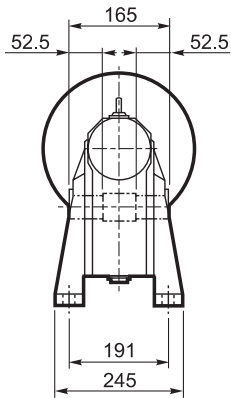
		M	M1	M2	N	N1	N2	N3	N4	
VF/W 49/110	P63 B5	11	12.8	4	140	115	95	10.5	9.5	33
VF/W 49/110	P71 B5	14	16.3	5	160	130	110	10.5	9.5	
VF/W 49/110	P80 B5	19	21.8	6	200	165	130	10	11.5	
VF/W 49/110	P63 B14	11	12.8	4	90	75	60	7	6	
VF/W 49/110	P71 B14	14	16.3	5	105	85	70	10.5	6.5	
VF/W 49/110	P80 B14	19	21.8	6	120	100	80	10	7	

* Da ambo i lati

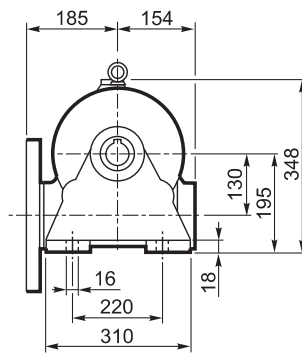
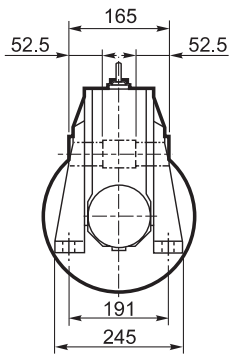


VF 130...P (IEC)

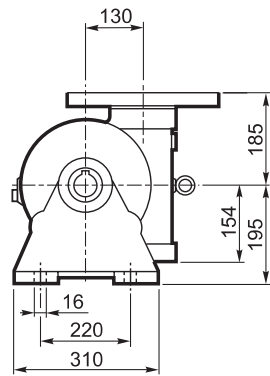
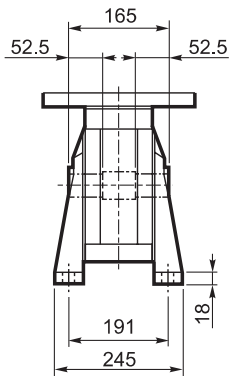
A



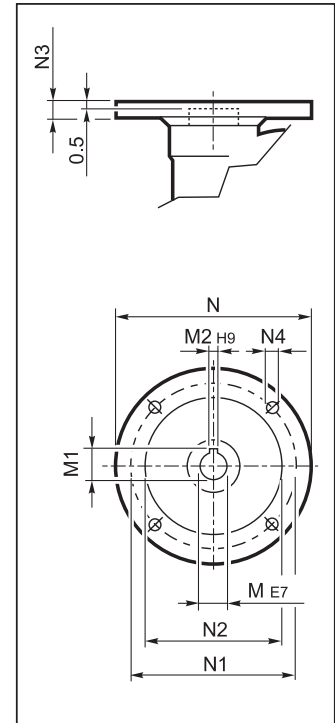
N



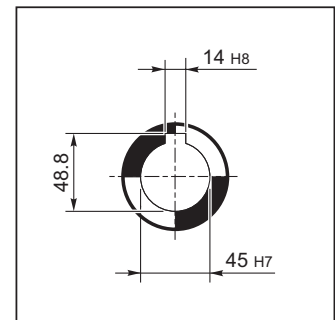
V



INPUT

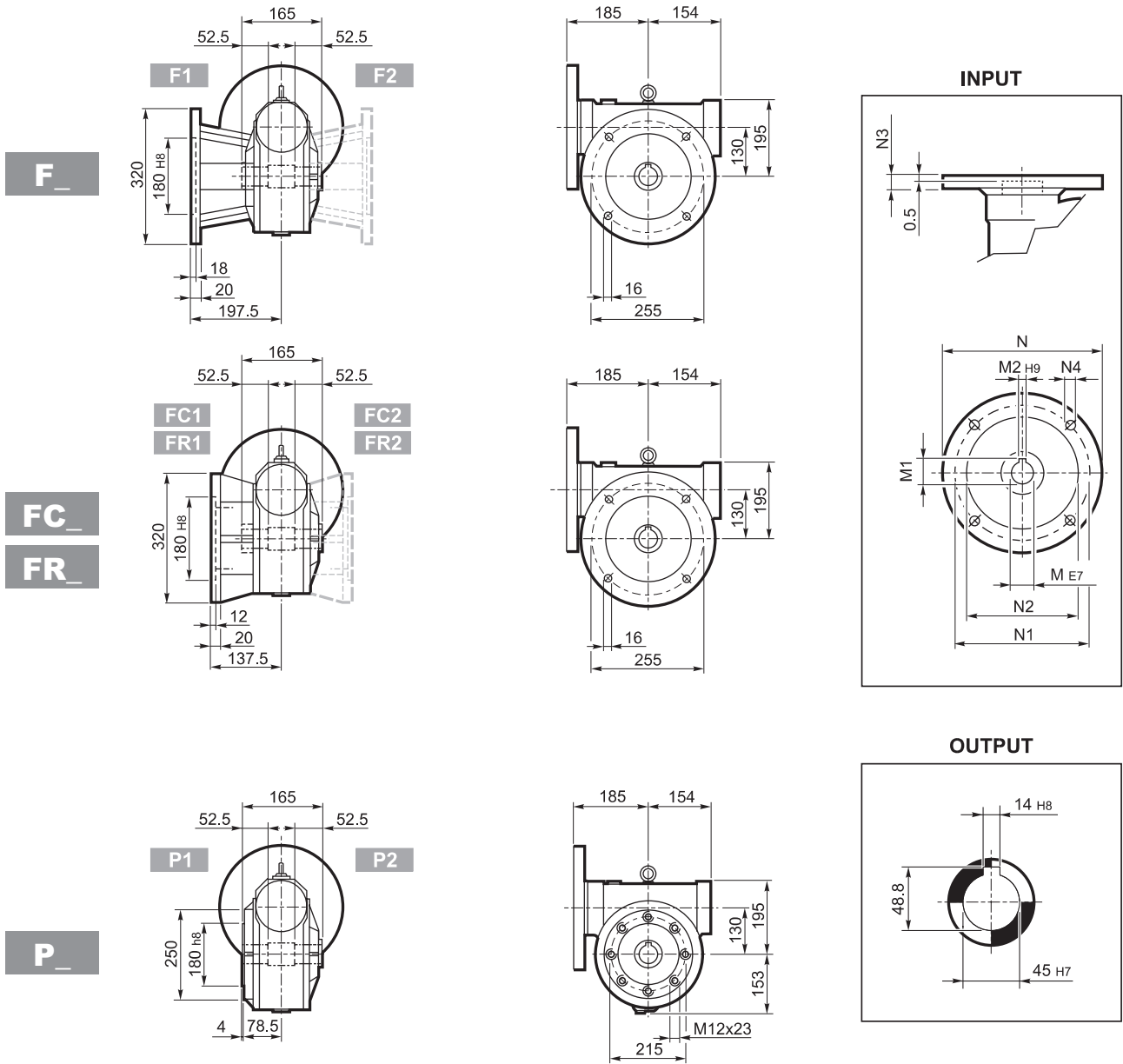


OUTPUT





VF 130...P (IEC)



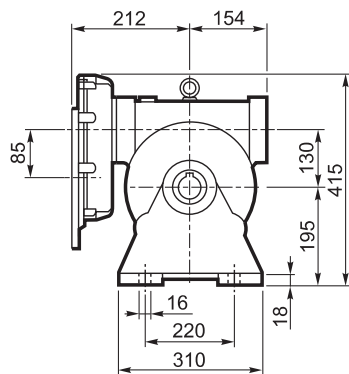
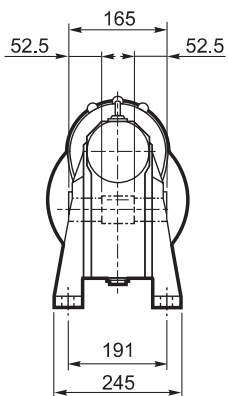
		M	M1	M2	N	N1	N2	N3	N4	
VF130	P90 B5	24	27.3	8	200	165	130	17	11	49
VF130	P100 B5	28	31.3	8	250	215	180	17	13	
VF130	P112 B5	28	31.3	8	250	215	180	17	13	
VF130	P132 B5	38	40.1#	10	300	265	230	17	13	

Linguetta ribassata

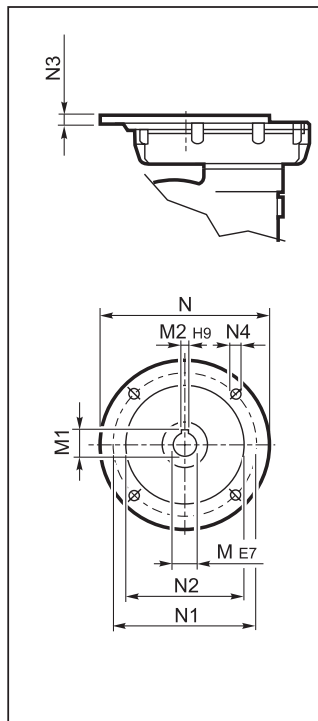


VFR 130...P (IEC)

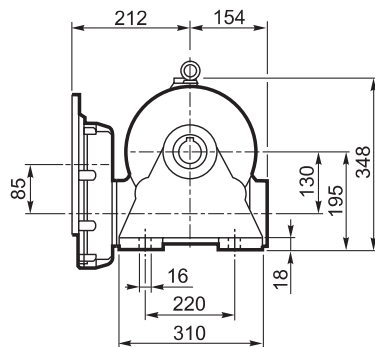
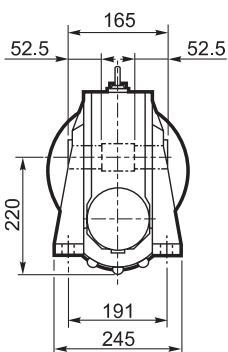
A



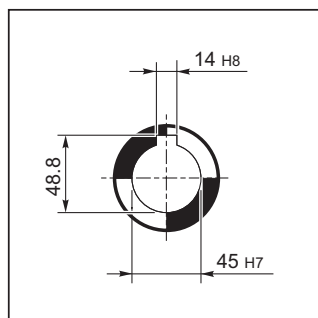
INPUT



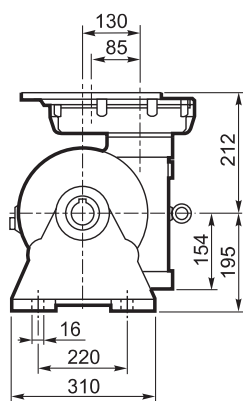
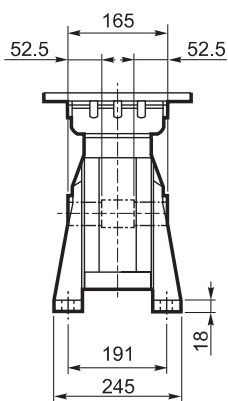
N



OUTPUT

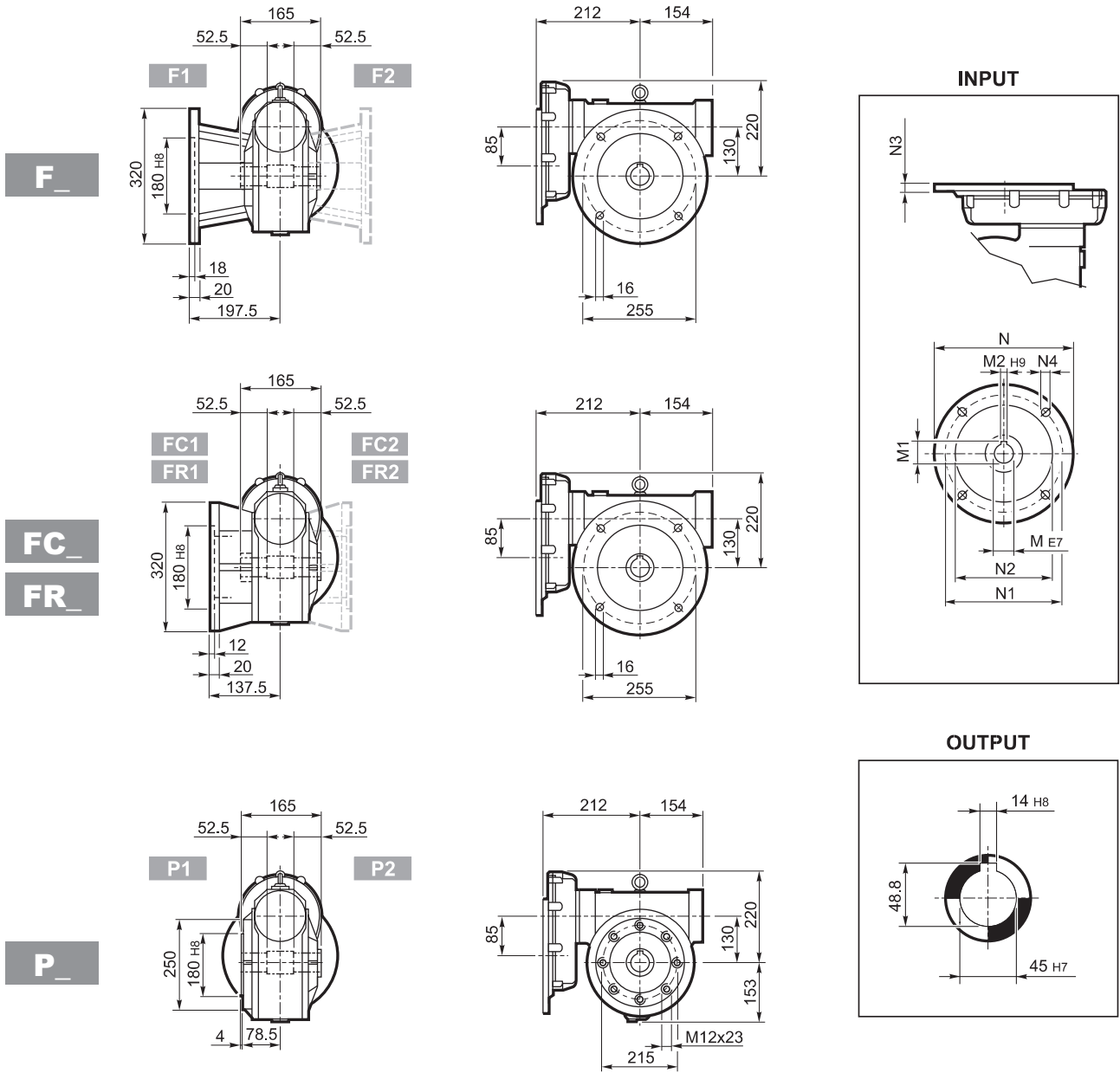


V





VFR 130...P (IEC)



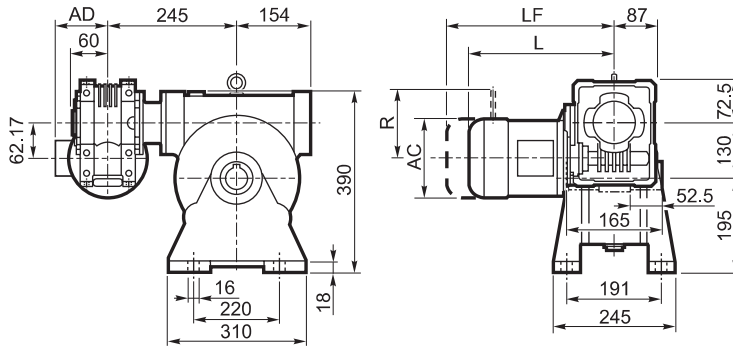
		M	M1	M2	N	N1	N2	N3	N4	
VFR 130	P80 B5	19 K6	21.8	6	200	165	130	12	M10x25	57
VFR 130	P90 B5	24 K6	27.3	8	200	165	130	12	M10x25	
VFR 130	P100 B5	28 J6	29.1#	8	250	215	180	13	M12x35	
VFR 130	P112 B5	28 J6	29.1#	8	250	215	180	13	M12x35	

Linguetta ribassata



W/VF 63/130...M

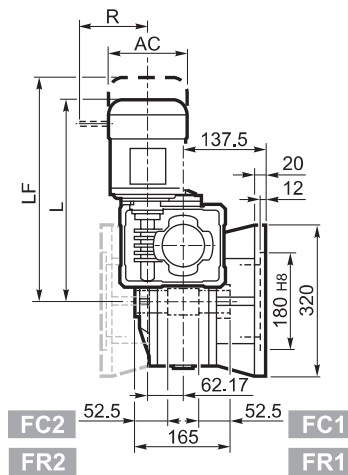
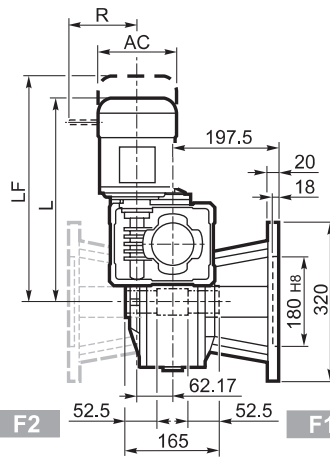
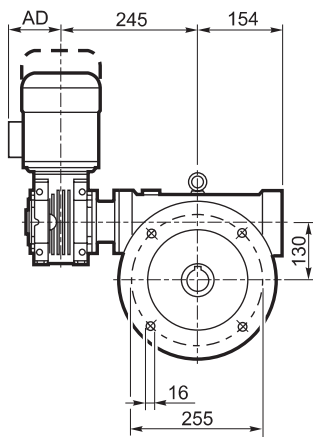
A



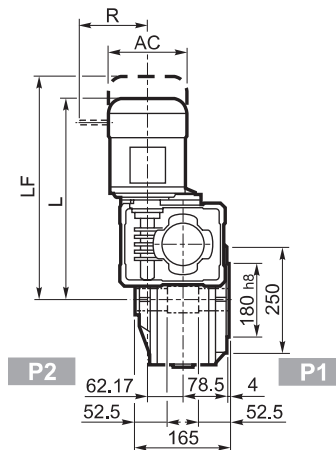
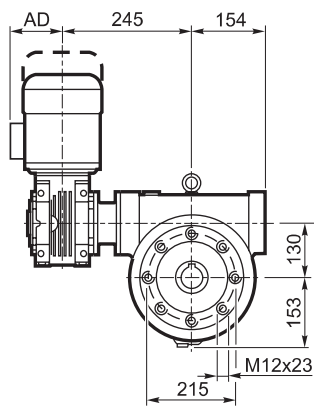
F_

FC_

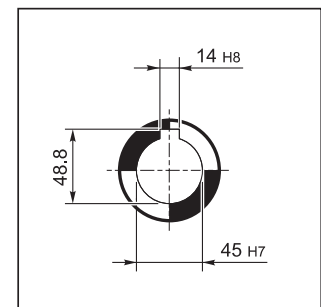
FR_



P_



OUTPUT

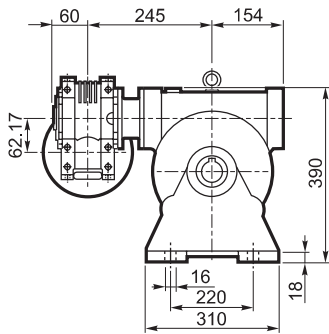


			M_				M...FD M...FA		M...FD		M...FA	
			AC	L	AD	Kg	LF	Kg	R	AD	R	AD
			138	419	108	63	480	65	103	135	124	108
W/VF 63/130	S1	M1	138	419	108	63	480	65	103	135	124	108
W/VF 63/130	S2	M2S	156	447	119	68	523	71	129	146	134	119



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

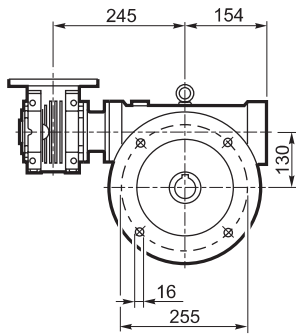
A



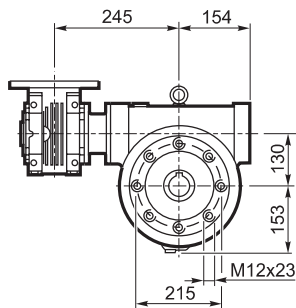
F_

FC_

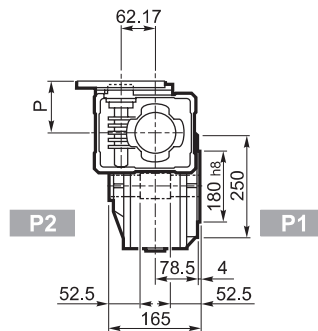
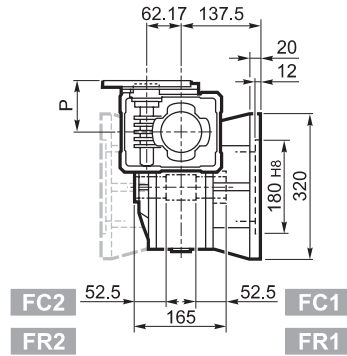
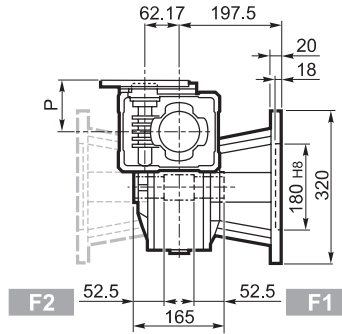
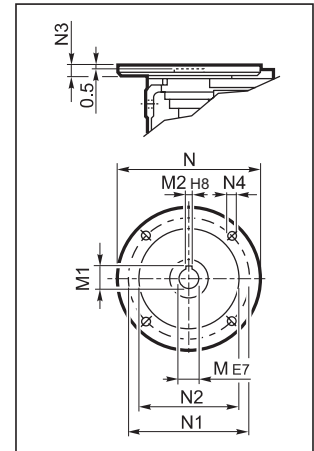
FR_



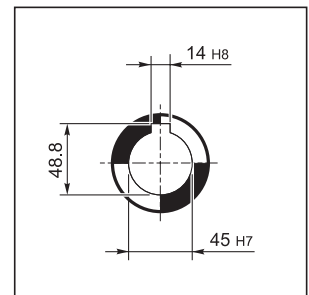
P_



INPUT



OUTPUT

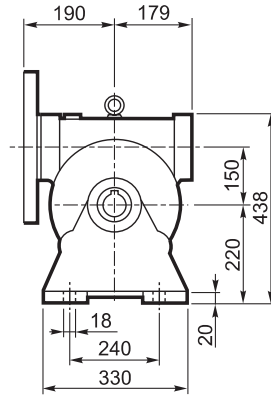
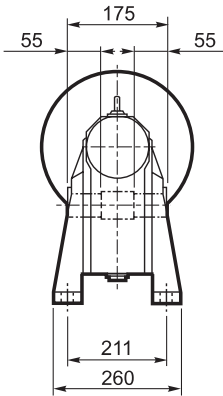


		M	M1	M2	N	N1	N2	N3	N4	P	
W/VF 63/130	P71 B5	14	16.3	5	160	130	110	11	9	95	57
W/VF 63/130	P80 B5	19	21.8	6	200	165	130	12	11.5	102	
W/VF 63/130	P90 B5	24	27.3	8	200	165	130	12	11.5	102	
W/VF 63/130	P71 B14	14	16.3	5	105	85	70	11	6.5	95	
W/VF 63/130	P80 B14	19	21.8	6	120	100	80	11	6.5	102	
W/VF 63/130	P90 B14	24	27.3	8	140	115	95	11	8.5	102	

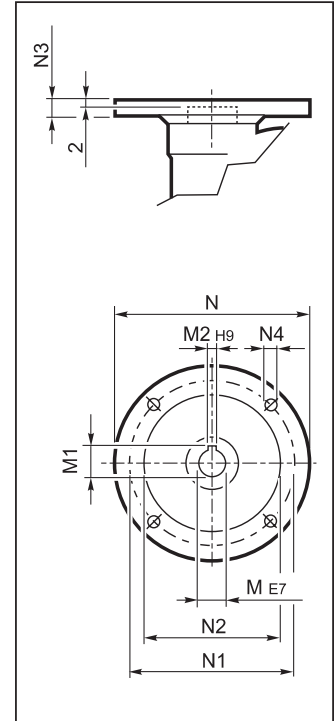


VF 150...P (IEC)

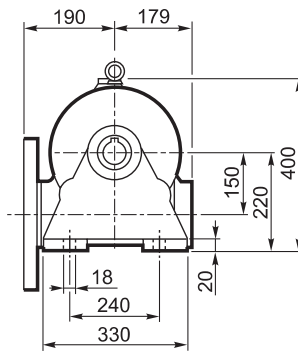
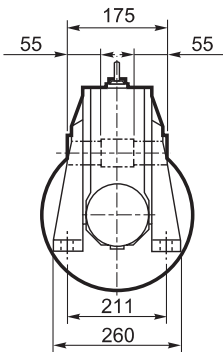
A



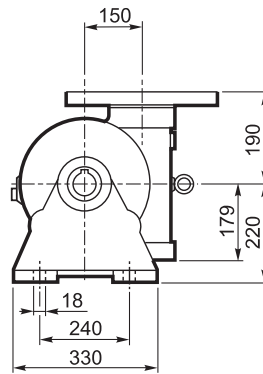
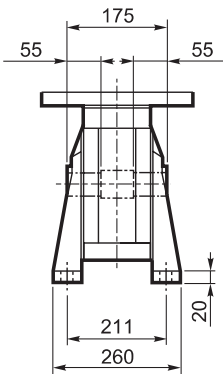
INPUT



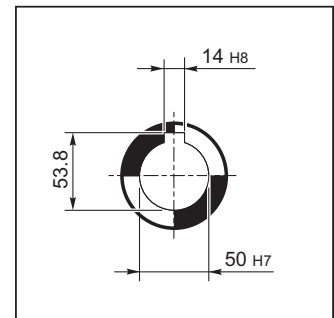
N



V

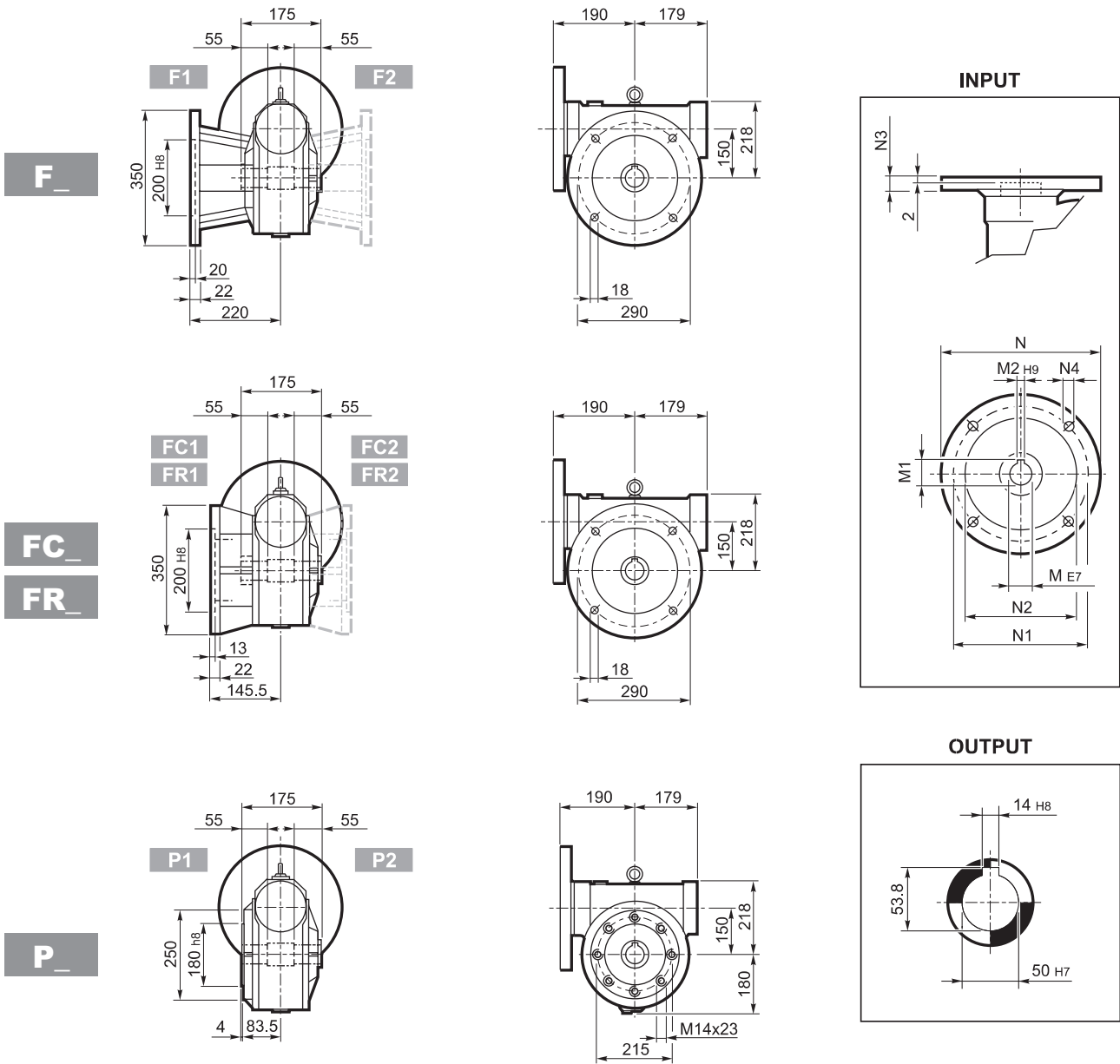


OUTPUT





VF 150...P (IEC)



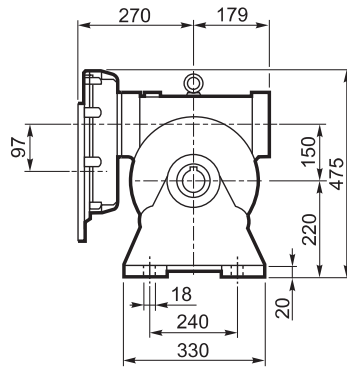
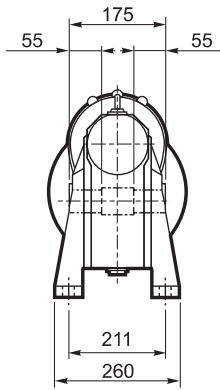
		M	M1	M2	N	N1	N2	N3	N4	
VF 150	P100 B5	28	31.3	8	250	215	180	11	13	60
VF 150	P112 B5	28	31.3	8	250	215	180	11	13	
VF 150	P132 B5	38	41.3	10	300	265	230	16	13	
VF 150	P160 B5	42	44.6#	12	350	300	250	18	18	

Linguetta ribassata

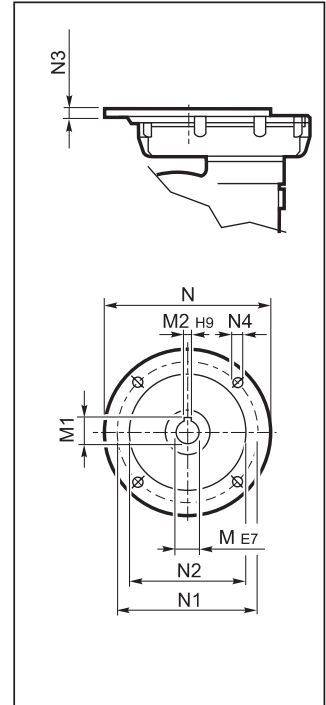


VFR 150...P (IEC)

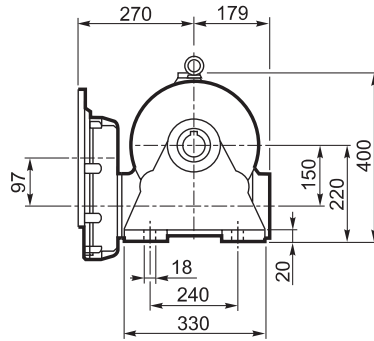
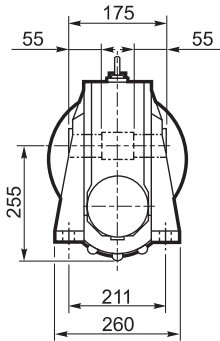
A



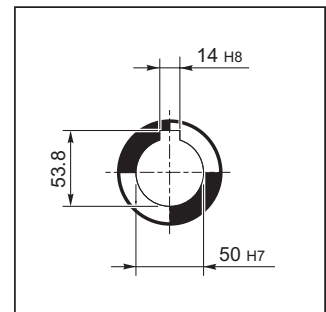
INPUT



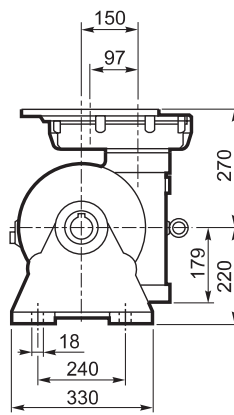
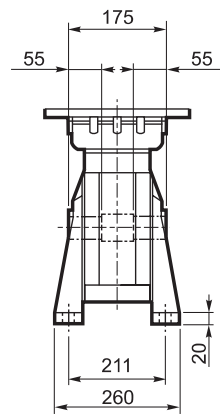
N



OUTPUT

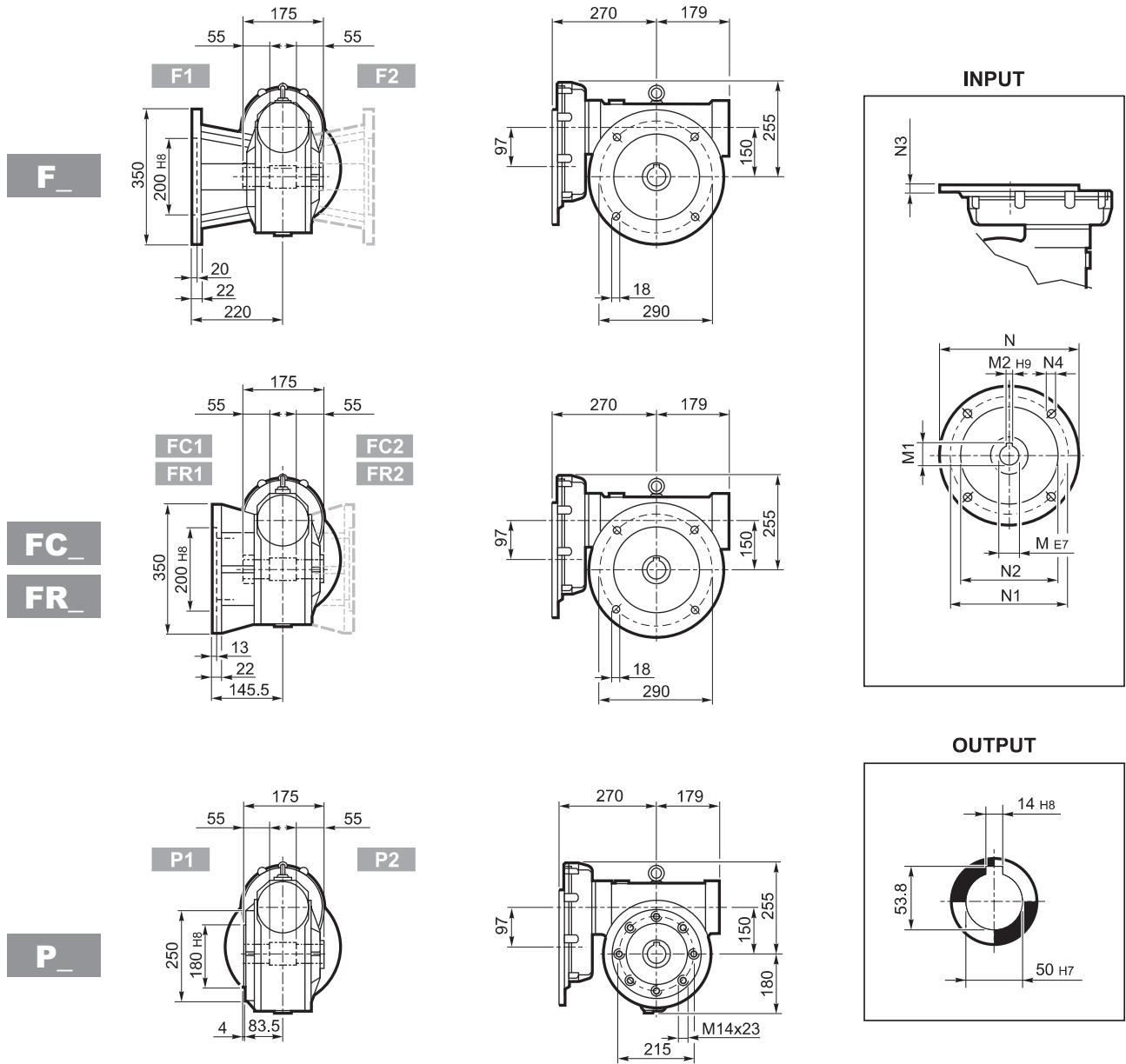


V





VFR 150...P (IEC)

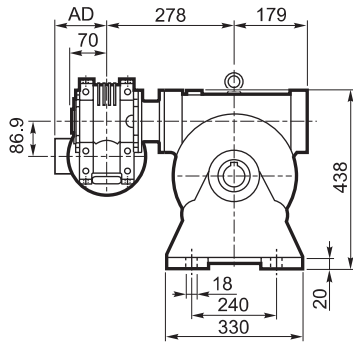


		M	M1	M2	N	N1	N2	N3	N4	
VFR 150	P90 B5	24 K6	27.3	8	200	165	130	13	M10x25	71
VFR 150	P100 B5	28 K6	31.3	8	250	215	180	13	M12x35	
VFR 150	P112 B5	28 J6	31.3	8	250	215	180	13	M12x35	
VFR 150	P132 B5	38 J6	39.6#	10	300	265	230	13	M12x35	

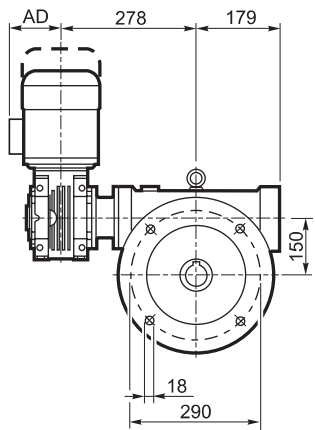
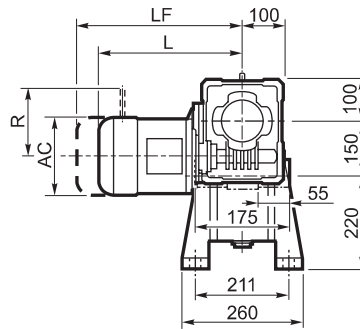
Linguetta ribassata



W/VF 86/150...M



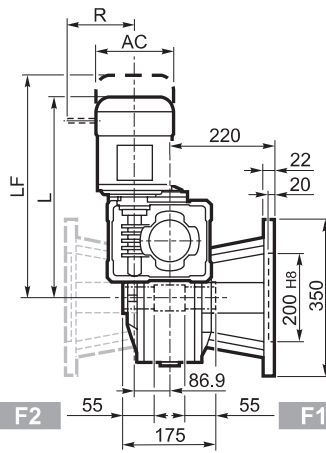
A



F_

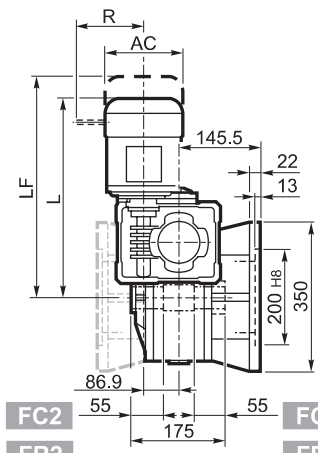
FC_

FR_



F2

F1

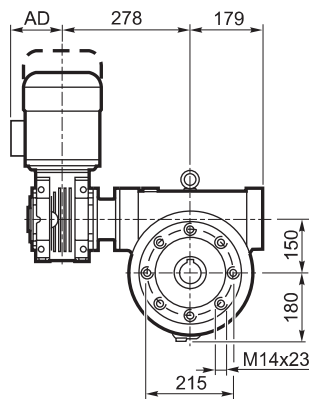


FC2

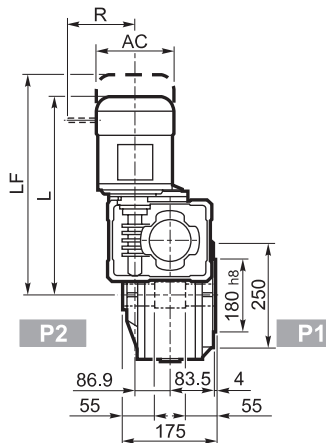
FC1

FR2

FR1

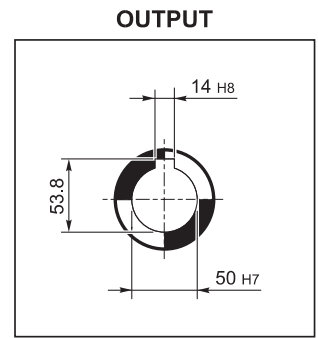


P_



P2

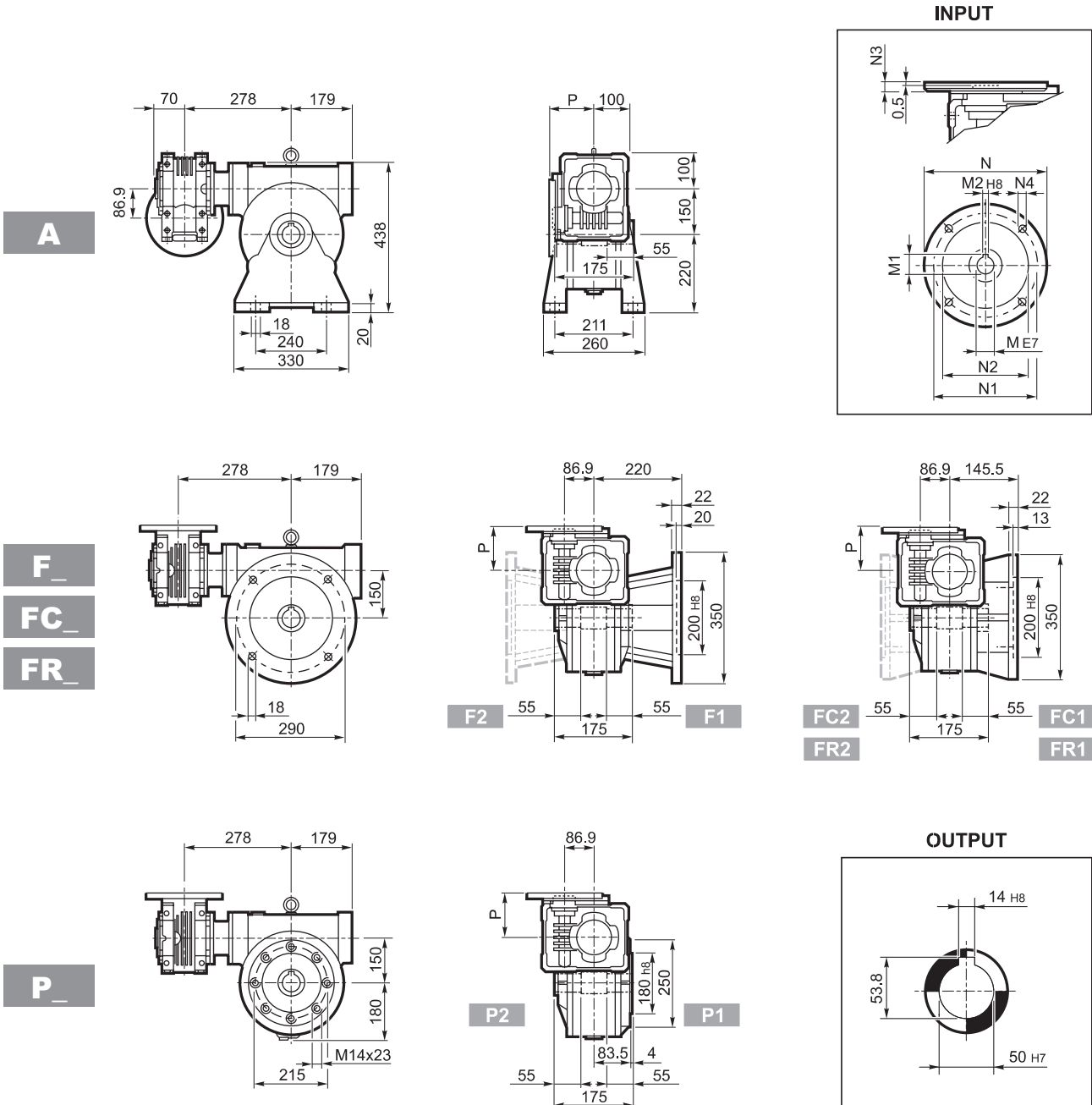
P1



			M_				M...FD M...FA		M...FD		M...FA				
			AC	L	AD		LF		R	AD	R	AD			
			W/VF 86/150	S1	M1	138	474	108	82	385	84	103	135	124	108
			W/VF 86/150	S2	M2S	156	499	119	86	425	89	129	146	134	119
			W/VF 86/150	S3	M3S	193	542	142	91	488	97	160	158	160	142
			W/VF 86/150	S3	M3L	193	574	142	99	515	104	160	158	160	142



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

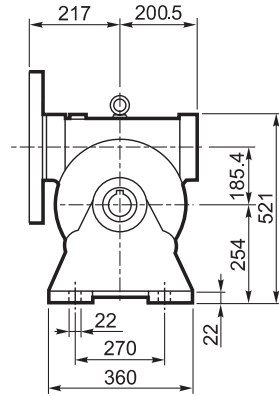
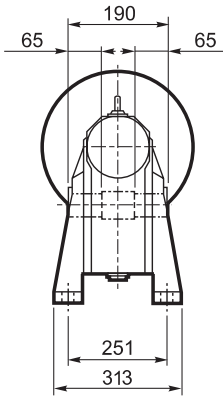


		M	M1	M2	N	N1	N2	N3	N4	P	
W/VF 86/150	P71 B5	14	16.3	5	160	130	110	11	9	128	75
W/VF 86/150	P80 B5	19	21.8	6	200	165	130	12	11.5	128	
W/VF 86/150	P90 B5	24	27.3	8	200	165	130	12	11.5	128	
W/VF 86/150	P100 B5	28	31.3	8	250	215	180	13	12.5	136	
W/VF 86/150	P112 B5	28	31.3	8	250	215	180	13	12.5	136	
W/VF 86/150	P80 B14	19	21.8	6	120	100	80	7.5	6.5	128	
W/VF 86/150	P90 B14	24	27.3	8	140	115	95	7.5	8.5	128	
W/VF 86/150	P100 B14	28	31.3	8	160	130	110	10	8.5	136	
W/VF 86/150	P112 B14	28	31.3	8	160	130	110	10	8.5	136	

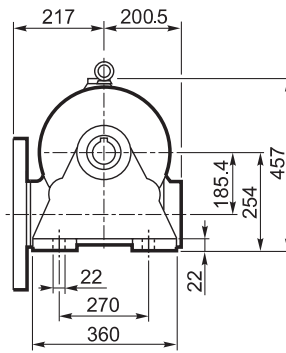
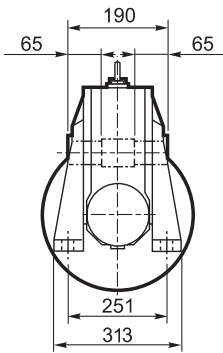


VF 185...P (IEC)

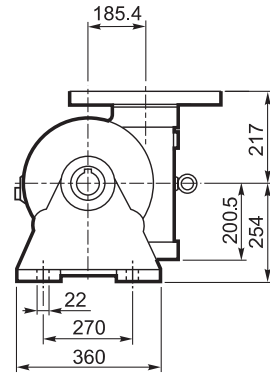
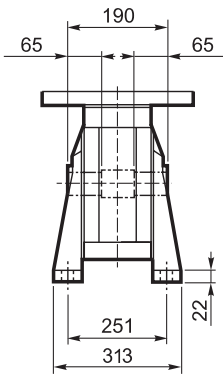
A



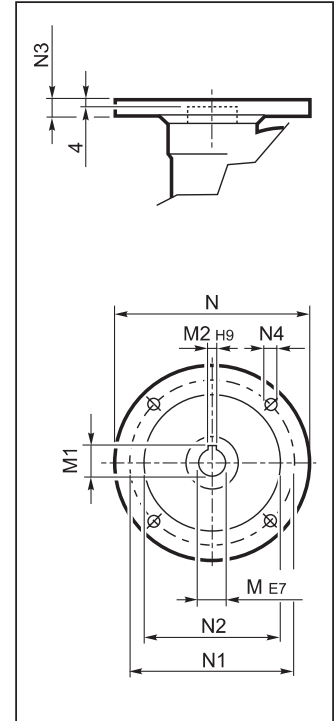
N



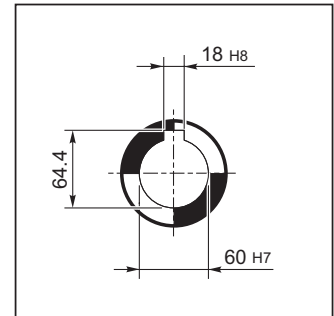
V



INPUT

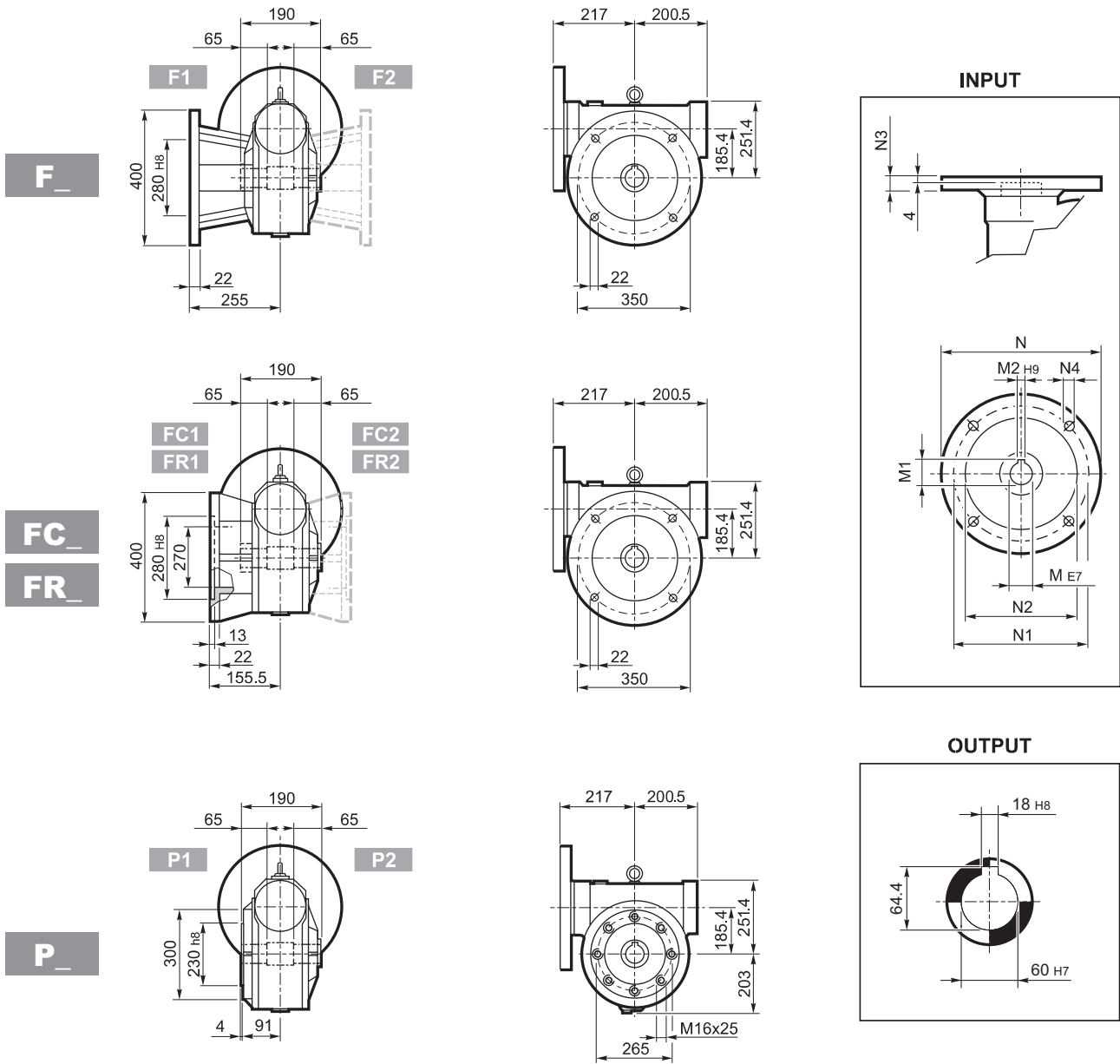


OUTPUT





VF 185...P (IEC)



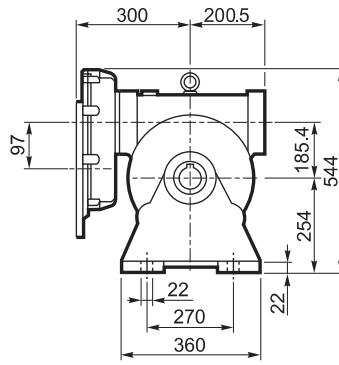
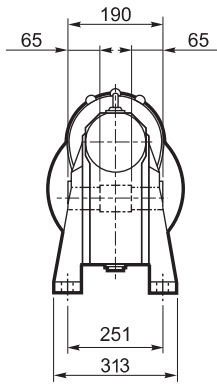
		M	M1	M2	N	N1	N2	N3	N4	
VF 185	P100 B5	28	31.3	8	250	215	180	16	13	94
VF 185	P112 B5	28	31.3	8	250	215	180	16	13	
VF 185	P132 B5	38	41.3	10	300	265	230	16	13	
VF 185	P160 B5	42	45.3	12	350	300	250	18	18	
VF 185	P180 B5	48	51.2#	14	350	300	250	18	18	

Linguetta ribassata

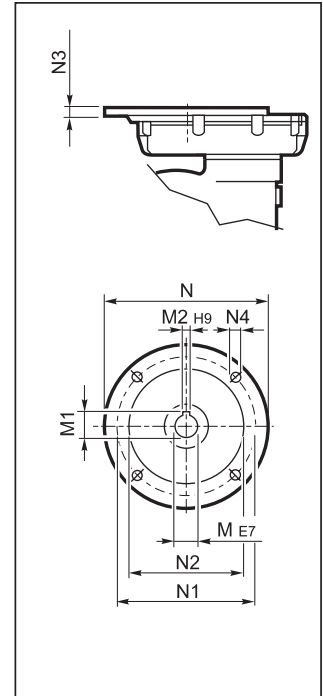


VFR 185...P (IEC)

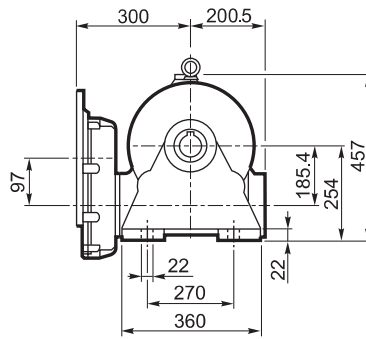
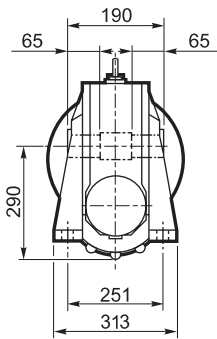
A



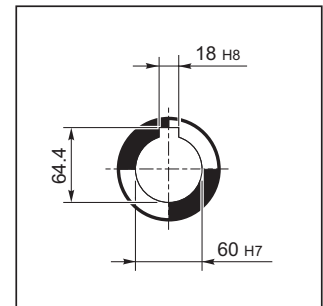
INPUT



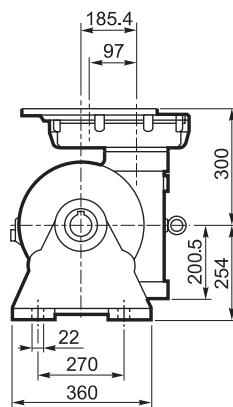
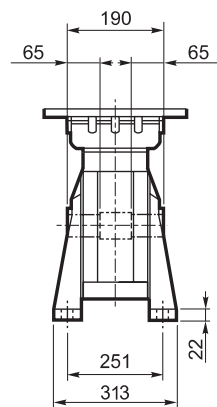
N

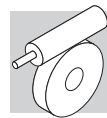


OUTPUT

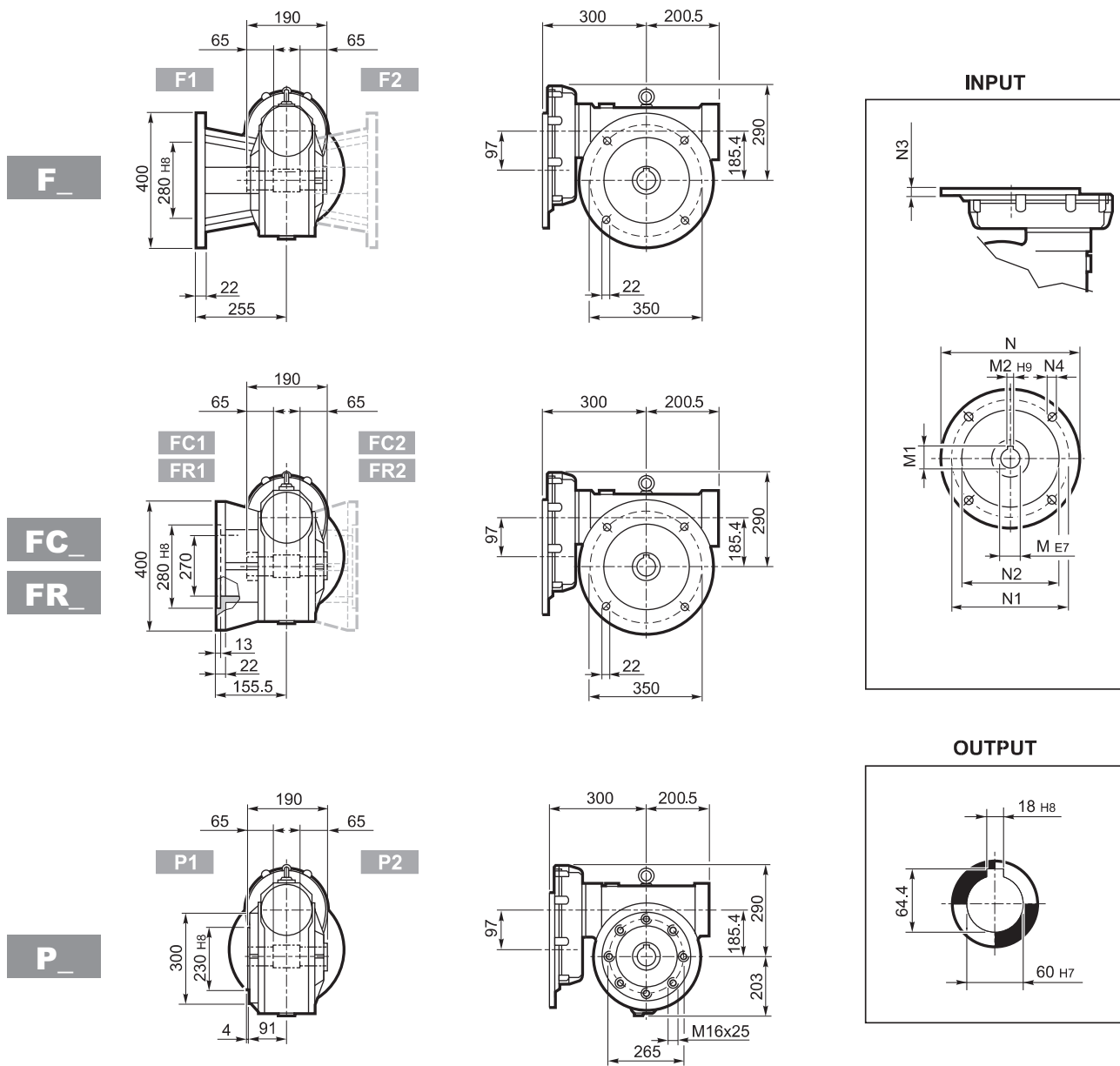


V





VFR 185...P (IEC)

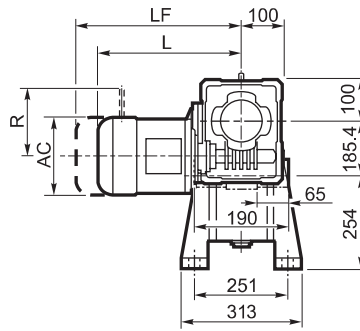
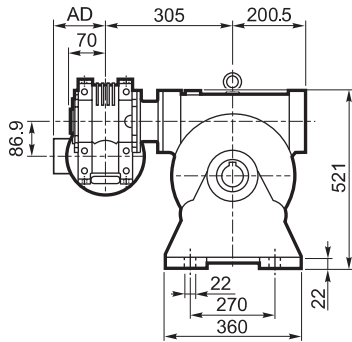


		M	M1	M2	N	N1	N2	N3	N4	
VFR 185	P90 B5	24 K6	27.3	8	200	165	130	13	M10x25	110
VFR 185	P100 B5	28 K6	31.3	8	250	215	180	13	M12x35	
VFR 185	P112 B5	28 K6	31.3	8	250	215	180	13	M12x35	
VFR 185	P132 B5	38 J6	39.6#	10	300	265	230	13	M12x35	

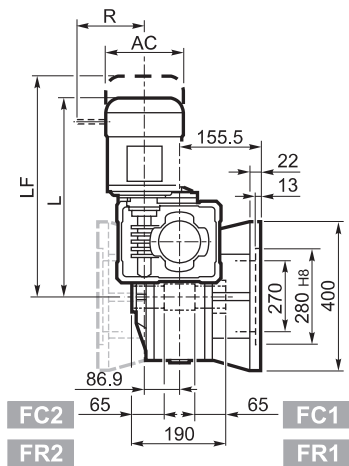
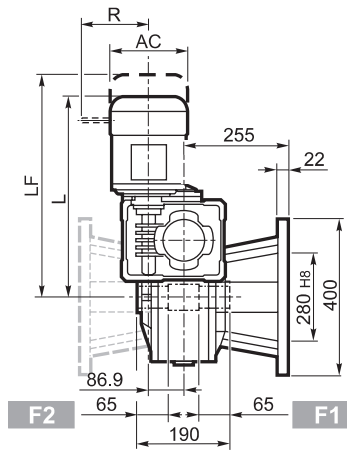
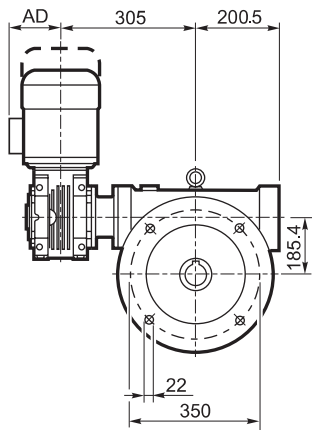
Linguetta ribassata



W/VF 86/185...M



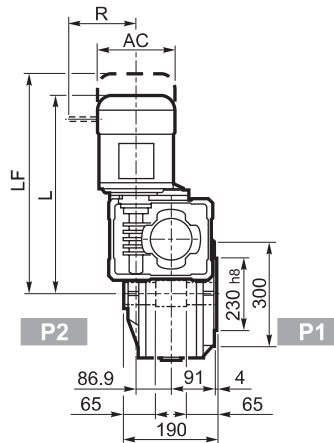
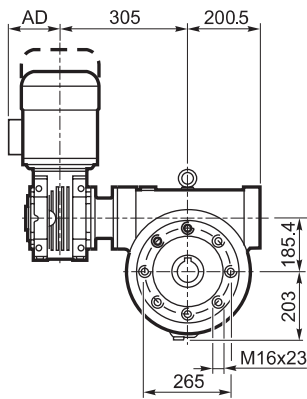
A



F_

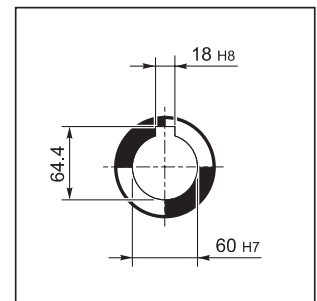
FC_

FR_



P_

OUTPUT

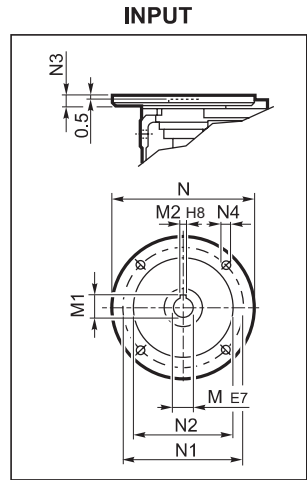
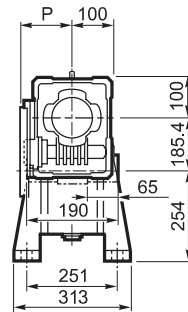
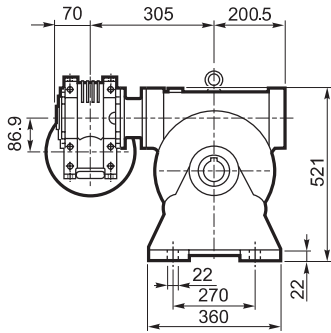


			M_				M...FD M...FA		M...FD		M...FA				
			AC	L	AD		LF		R	AD	R	AD			
			W/VF 86/185	S1	M1	138	509	108	116	570	118	103	135	124	108
			W/VF 86/185	S2	M2S	156	534	119	120	610	123	129	146	134	119
			W/VF 86/185	S3	M3S	193	577	142	125	673	131	160	158	160	142
			W/VF 86/185	S3	M3L	193	609	142	133	700	138	160	158	160	142



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

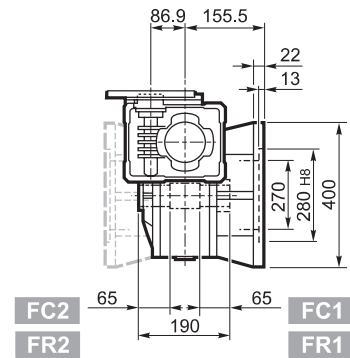
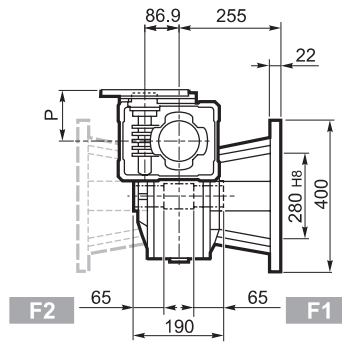
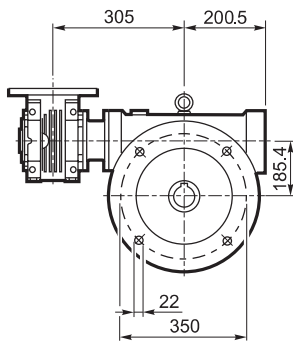
A



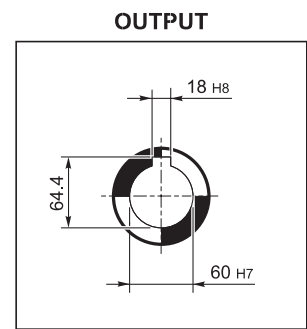
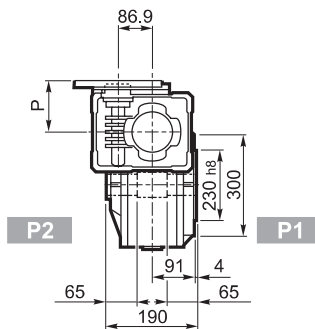
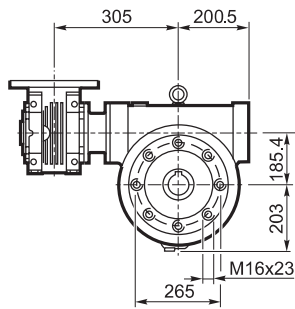
F_

FC_

FR_



P_

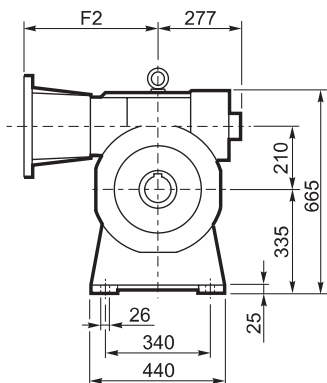
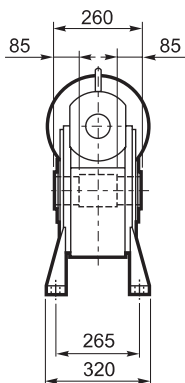


		M	M1	M2	N	N1	N2	N3	N4	P	
W/VF 86/185	P71 B5	14	16.3	5	160	130	110	11	9	128	109
W/VF 86/185	P80 B5	19	21.8	6	200	165	130	12	11.5	128	
W/VF 86/185	P90 B5	24	27.3	8	200	165	130	12	11.5	128	
W/VF 86/185	P100 B5	28	31.3	8	250	215	180	13	12.5	136	
W/VF 86/185	P112 B5	28	31.3	8	250	215	180	13	12.5	136	
W/VF 86/185	P80 B14	19	21.8	6	120	100	80	7.5	6.5	128	
W/VF 86/185	P90 B14	24	27.3	8	140	115	95	7.5	8.5	128	
W/VF 86/185	P100 B14	28	31.3	8	160	130	110	10	8.5	136	
W/VF 86/185	P112 B14	28	31.3	8	160	130	110	10	8.5	136	

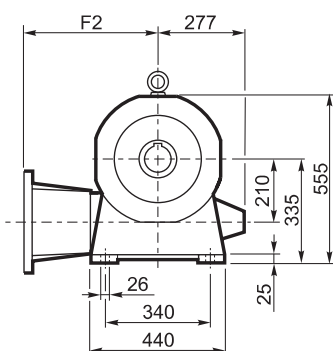
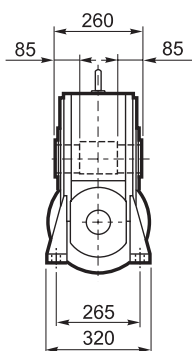


VF 210...P (IEC)

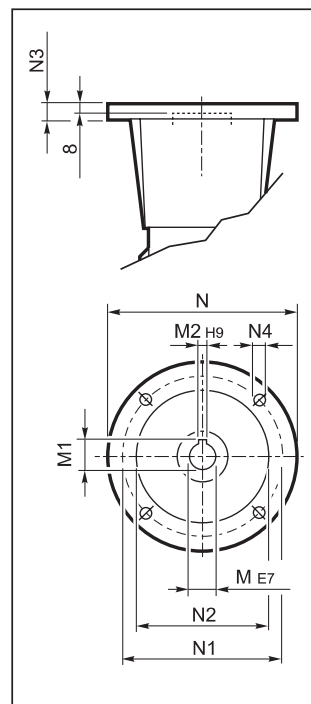
A



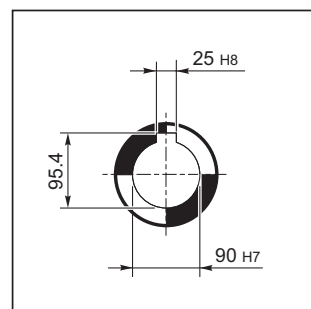
N

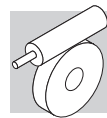


INPUT



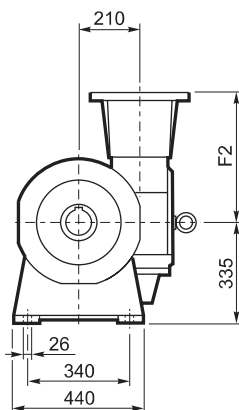
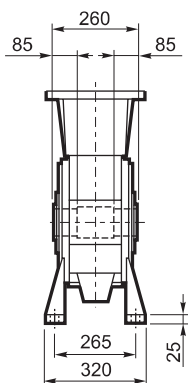
OUTPUT



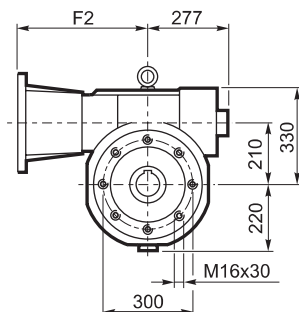
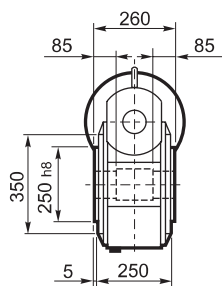


VF 210...P (IEC)

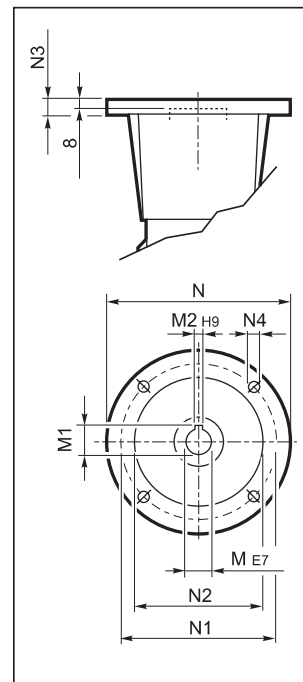
V



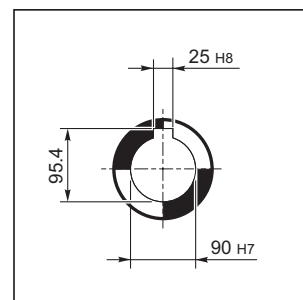
P



INPUT



OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.
 Nell'esecuzione P(IEC) è prevista di serie la fornitura del giunto completo per attacco motore.

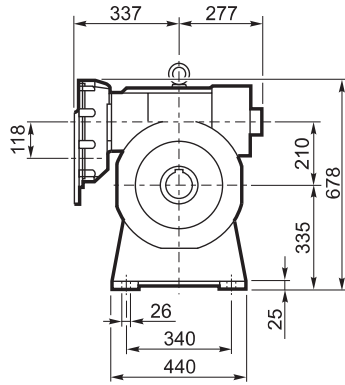
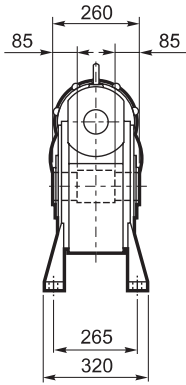
		F2	M	M1	M2	N	N1	N2	N3	N4	
VF 210	P132 B5	485	38	41.3	10	300	265	230	25	M12	210
VF 210	P160 B5	460	42	45.3	12	350	300	250	22	18	
VF 210	P180 B5	460	48	51.8	14	350	300	250	22	18	
VF 210	P200 B5	485	55	59.3	16	400	350	300	25	M16	
VF 210	P225 B5	490	60	64.4	18	450	400	350	22	18 #	

N° 8 fori a 45°

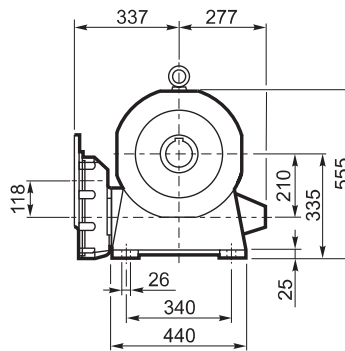
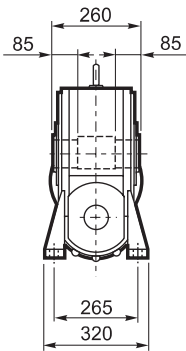


VFR 210...P (IEC)

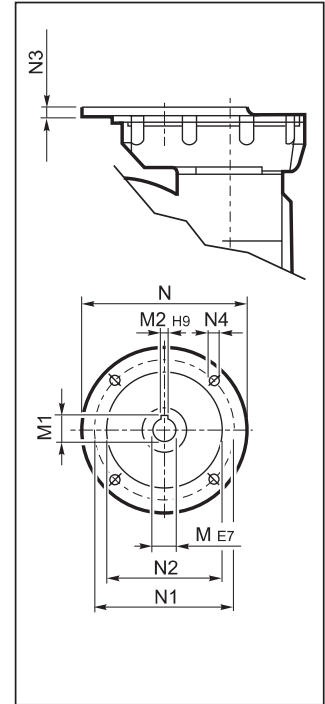
A



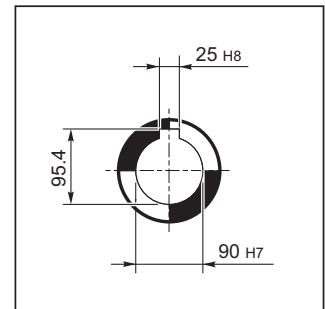
N



INPUT



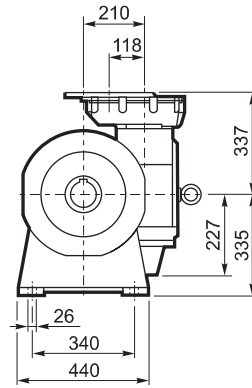
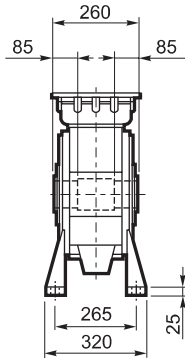
OUTPUT



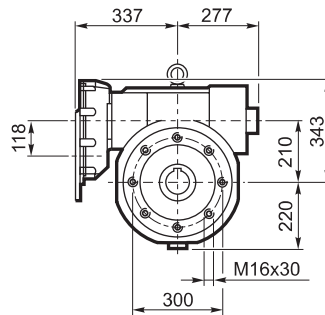
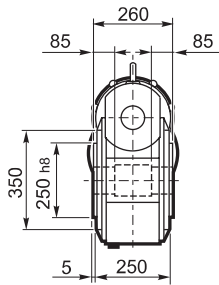


VFR 210...P (IEC)

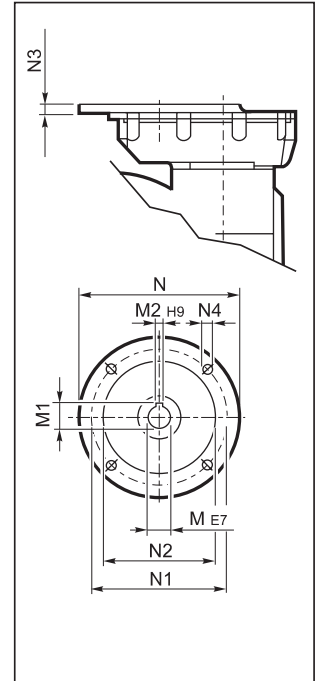
V



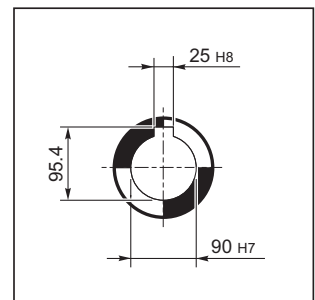
P



INPUT



OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.

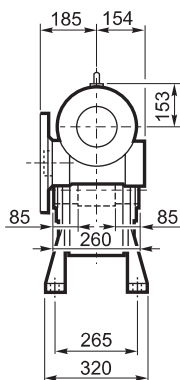
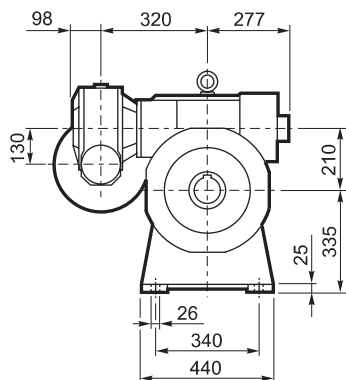
		M	M1	M2	N	N1	N2	N3	N4	
VFR 210	P100 B5	28 K6	31.3	8	250	215	180	13	M12x35	185
VFR 210	P112 B5	28 K6	31.3	8	250	215	180	13	M12x35	
VFR 210	P132 B5	38 J6	41.3	10	300	265	230	13	M12x35	
VFR 210	P160 B5	42 J6	44.3#	12	350	300	250	18	M16x60	

Linguetta ribassata

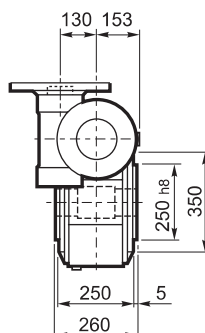
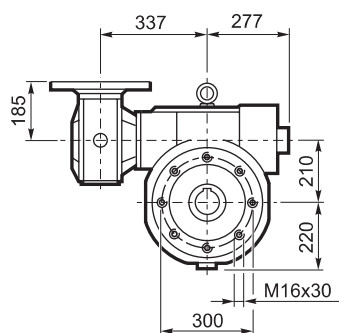


VF/VF 130/210...P (IEC)

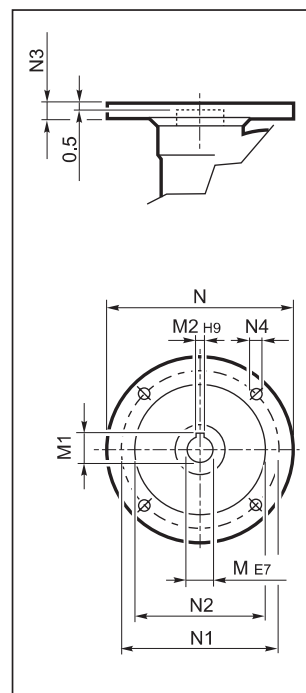
A



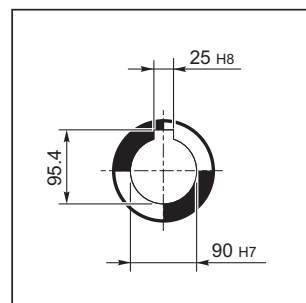
P



INPUT



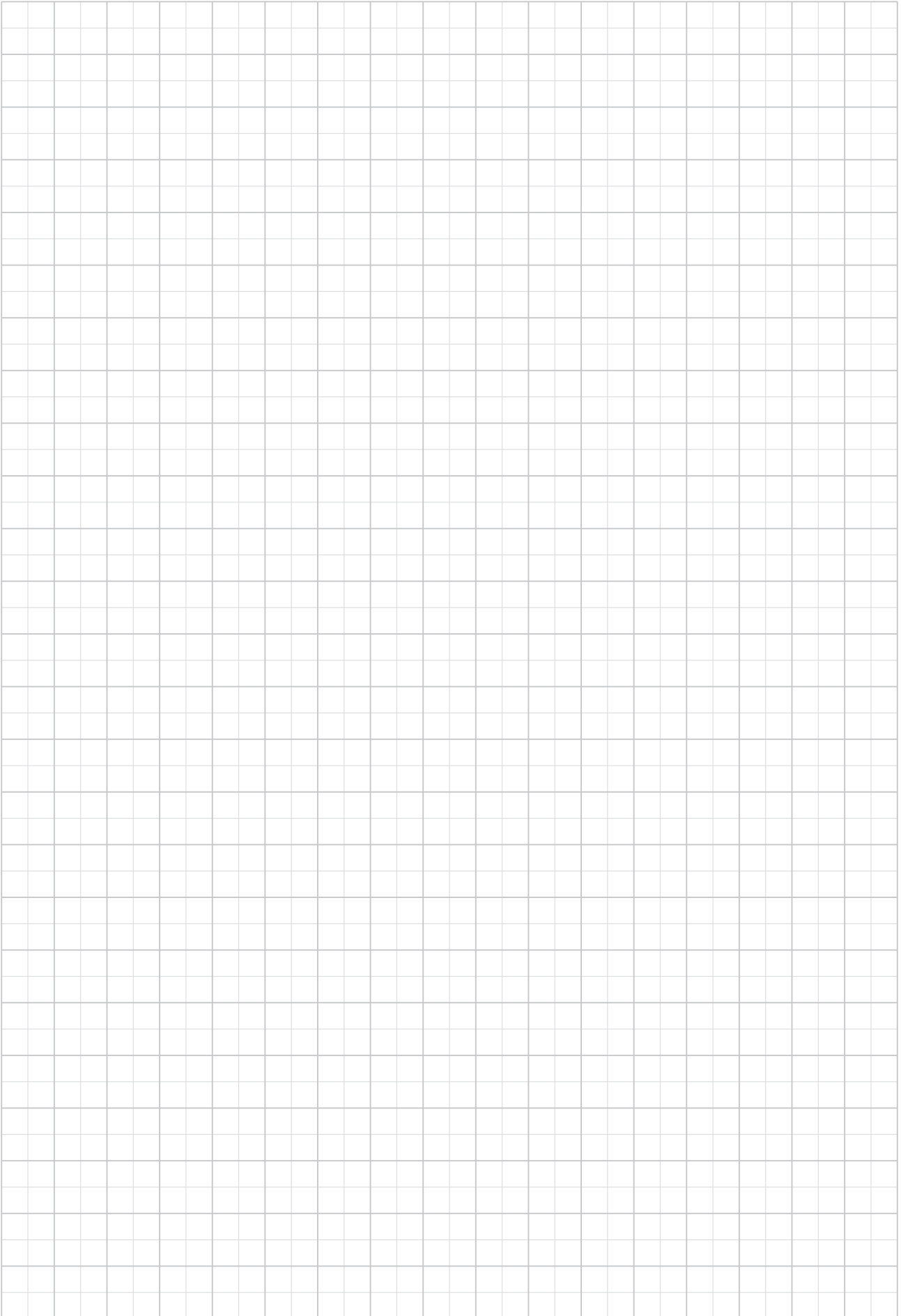
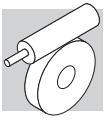
OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.

		M	M1	M2	N	N1	N2	N3	N4	
VF/VF 130/210	P90 B5	24	27.3	8	200	165	130	17	11	225
VF/VF 130/210	P100 B5	28	31.3	8	250	215	180	17	13	
VF/VF 130/210	P112 B5	28	31.3	8	250	215	180	17	13	
VF/VF 130/210	P132 B5	38	40.1#	10	300	265	230	17	13	

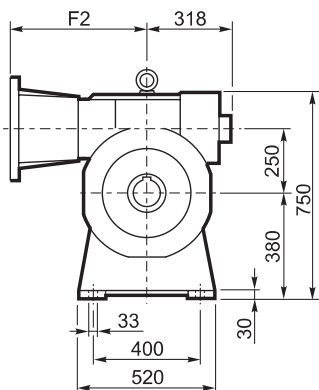
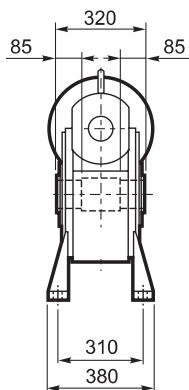
Linguetta ribassata



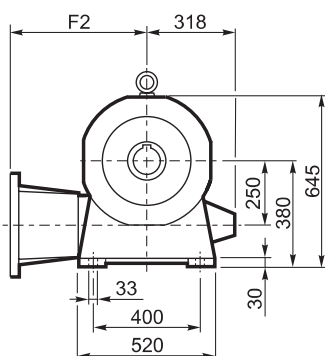
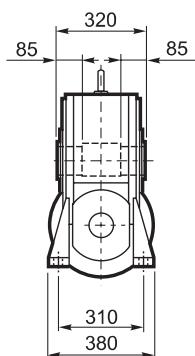


VF 250...P (IEC)

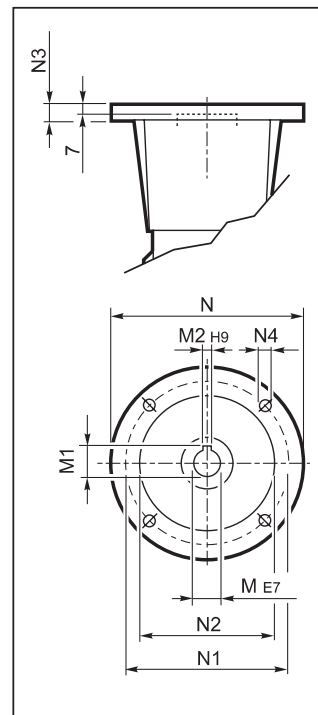
A



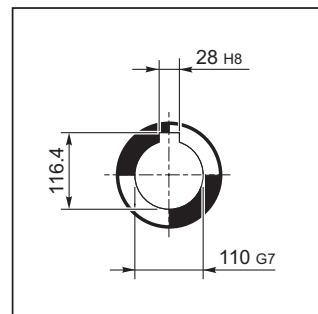
N



INPUT



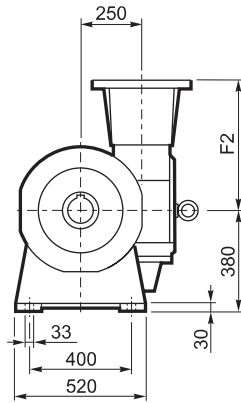
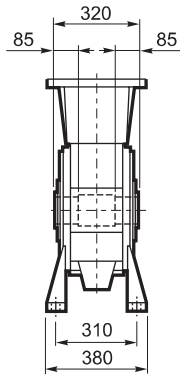
OUTPUT



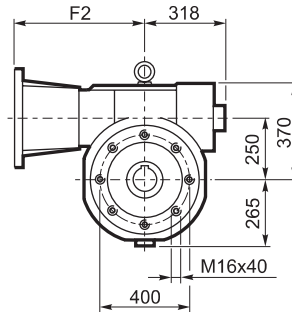
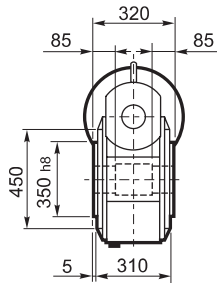


VF 250...P (IEC)

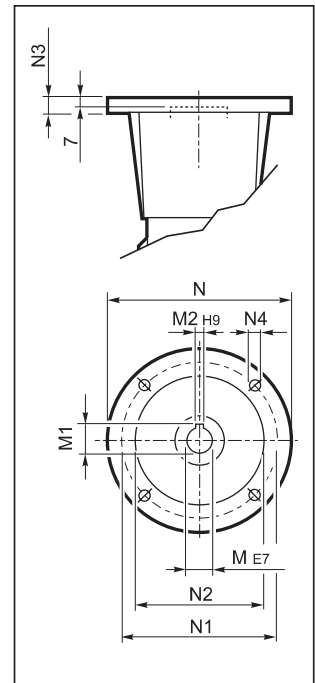
V



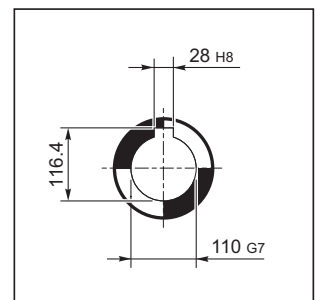
P



INPUT



OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.
Nell'esecuzione P(IEC) è prevista di serie la fornitura del giunto completo per attacco motore.

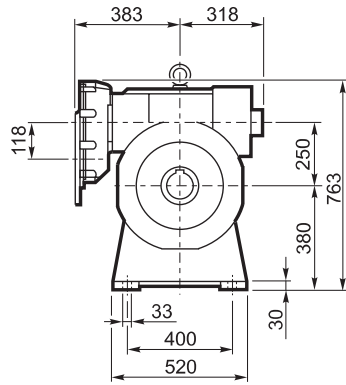
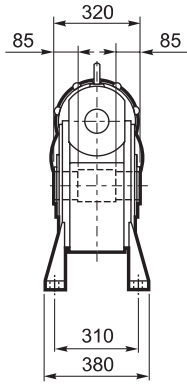
		F2	M	M1	M2	N	N1	N2	N3	N4	
VF 250	P132 B5	531	38	41.3	10	300	265	230	25	M12	310
VF 250	P160 B5	506	42	45.3	12	350	300	250	22	18	
VF 250	P180 B5	506	48	51.8	14	350	300	250	22	18	
VF 250	P200 B5	531	55	59.3	16	400	350	300	25	M16	
VF 250	P225 B5	536	60	64.4	18	450	400	350	22	18#	

N° 8 fori a 45°

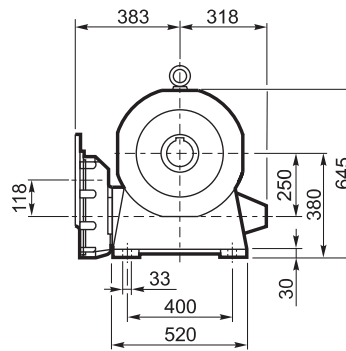
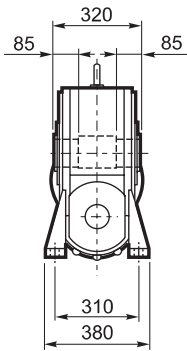


VFR 250...P (IEC)

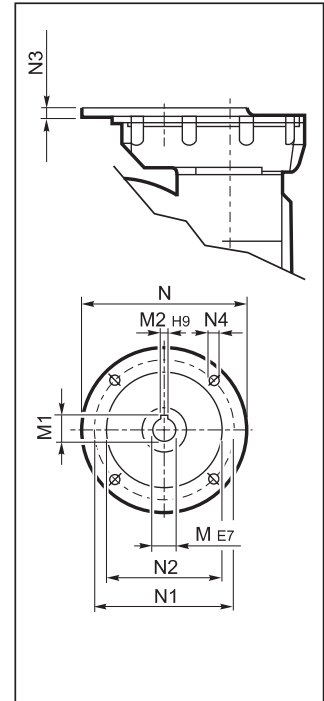
A



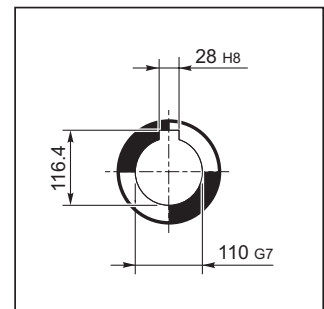
N



INPUT



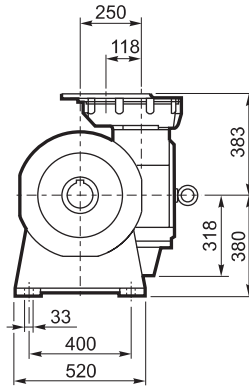
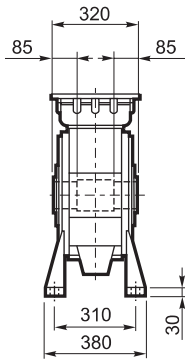
OUTPUT



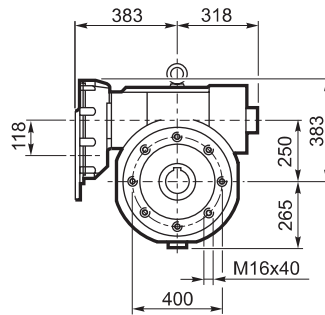
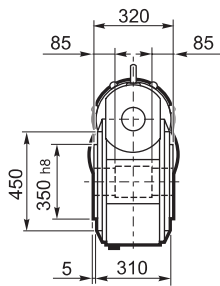


VFR 250...P (IEC)

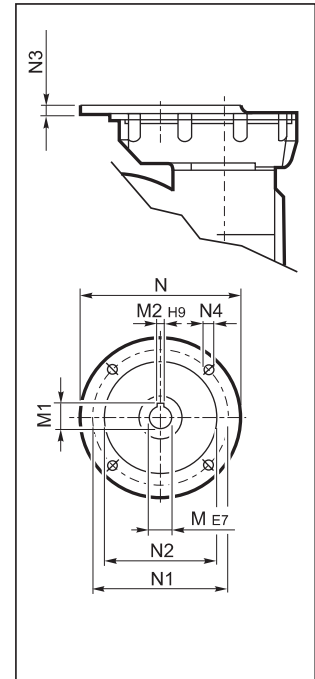
V



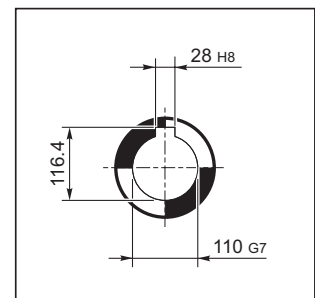
P



INPUT



OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.

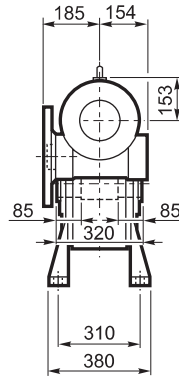
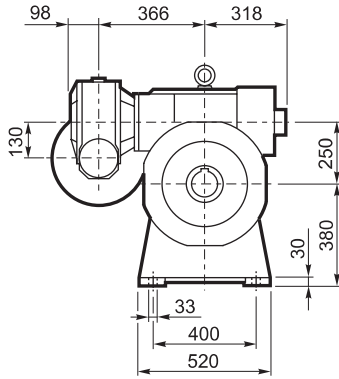
		M	M1	M2	N	N1	N2	N3	N4	
VFR 250	P100 B5	28 K6	31.3	8	250	215	180	13	M12x35	295
VFR 250	P112 B5	28 K6	31.3	8	250	215	180	13	M12x35	
VFR 250	P132 B5	38 J6	41.3	10	300	265	230	13	M12x35	
VFR 250	P160 B5	42 J6	44.3#	12	350	300	250	18	M16x60	

Linguetta ribassata

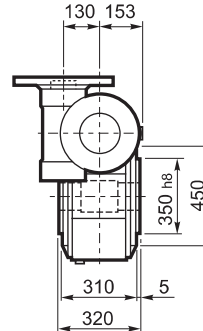
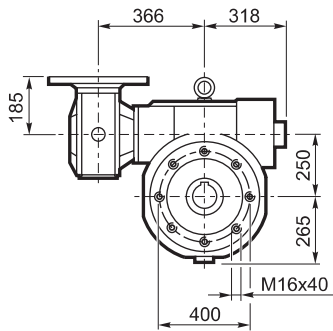


VF/VF 130/250...P (IEC)

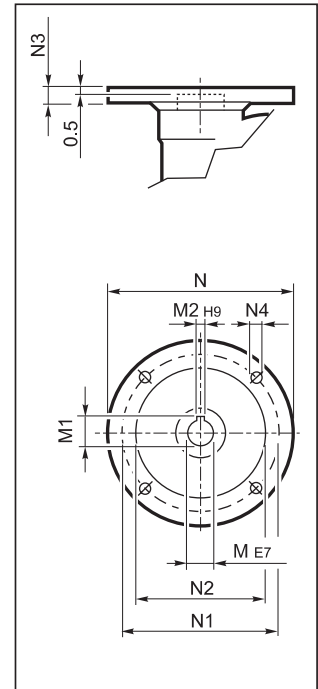
A



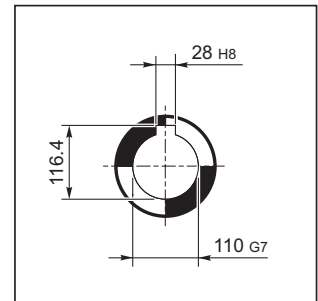
P



INPUT



OUTPUT



Nelle forme costruttive A e P viene montata la ventola di raffreddamento.

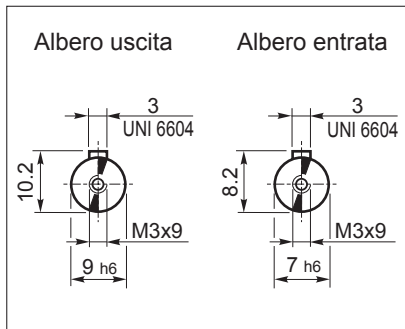
		M	M1	M2	N	N1	N2	N3	N4	
VF/VF 130/250	P 90 B5	24	27.3	8	200	165	130	17	11	325
VF/VF 130/250	P100 B5	28	31.3	8	250	215	180	17	13	
VF/VF 130/250	P112 B5	28	31.3	8	250	215	180	17	13	
VF/VF 130/250	P132 B5	38	40.1#	10	300	265	230	17	13	

Linguetta ribassata

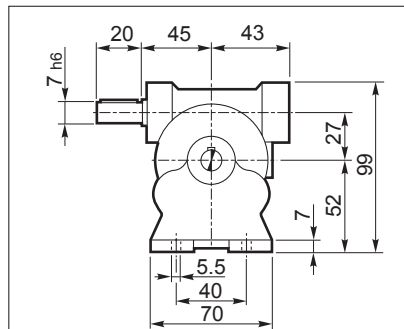


27 DIMENSIONI RIDUTTORI CON INGRESSO HS

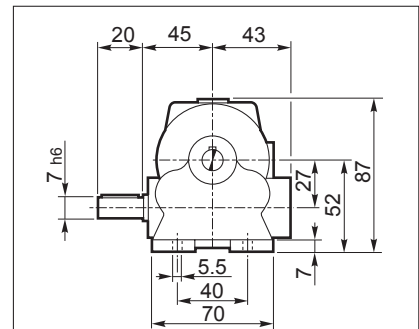
VF 27...HS



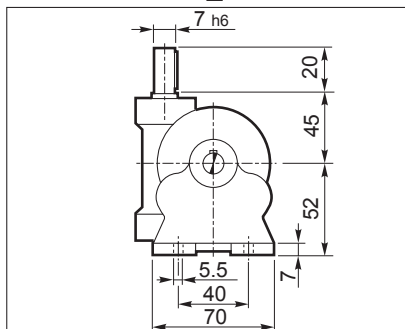
VF 27_A..HS



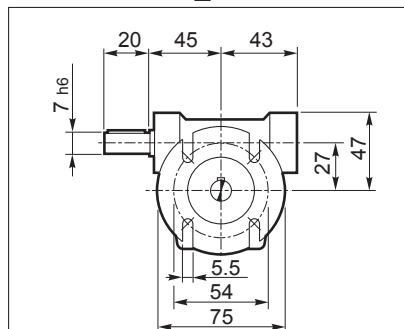
VF 27_N..HS



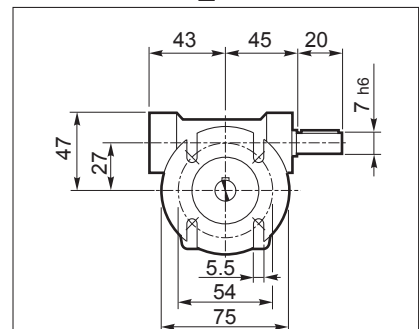
VF 27_V..HS



VF 27_F1..HS



VF 27_F2..HS



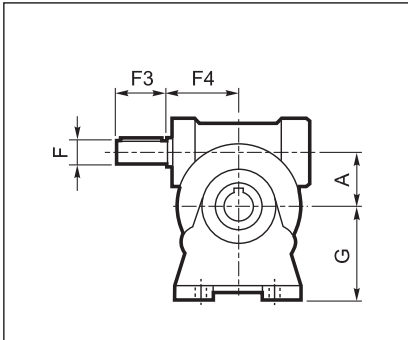
VF 27_HS	0.73

Le dimensioni comuni alle altre configurazioni sono riportate a pag. 109.

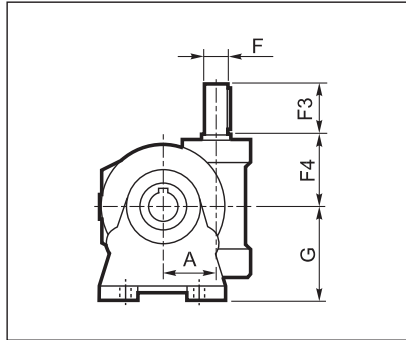


VF...HS - W...HS

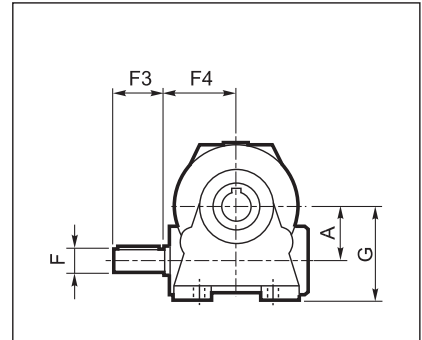
VF_A..HS



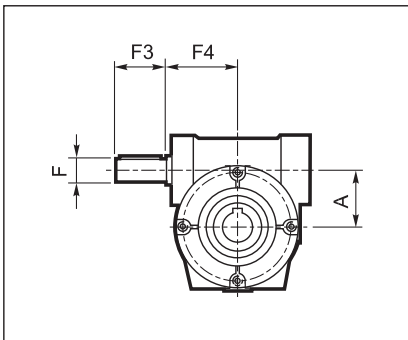
VF_V..HS



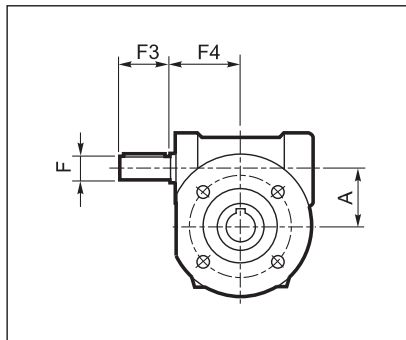
VF_N..HS



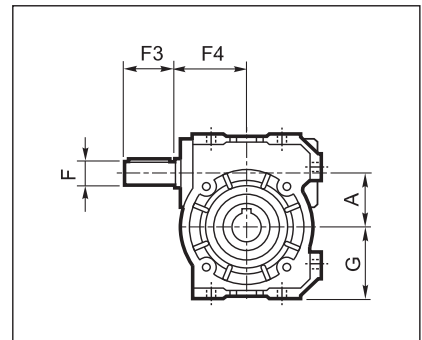
VF_P..HS



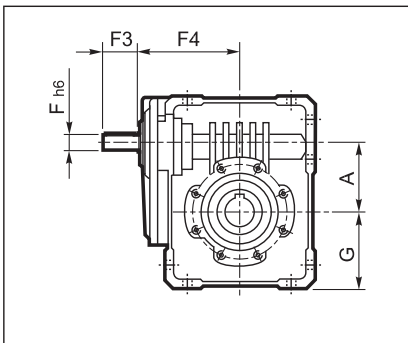
VF_FA/FC/FR/F..HS



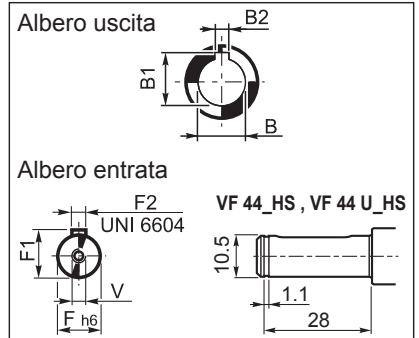
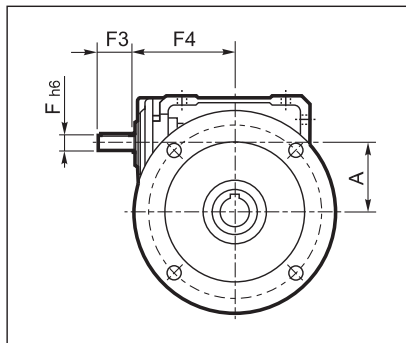
VF_U..HS



W_U..HS



W_UF/UFC/UFCR..HS



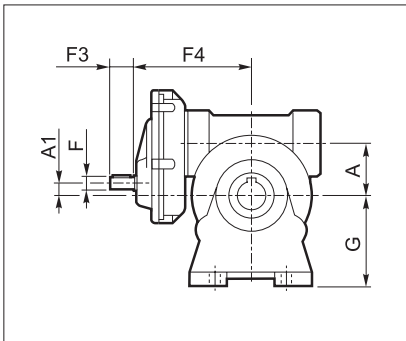
	A	B	B1	B2	F	F1	F2	F3	F4	G	V	kg
VF 30_HS	30	14 H7	16.3	5	9	10.2	3	20	50	55	—	1.1
VF 30_U_HS										47		
VF 44_HS	44.6	18 H7	20.8	6	11	12.5	4	30	54	72	—	2.0
VF 44_U_HS										55		
VF 49_HS	49.5	25 H7	28.3	8	16	18	5	40	65	82	M6x16	3.0
VF 49_U_HS										64.5		
W 63_HS	62.17	25 H7	28.3	8	18	20.5	6	40	110.5	72.5	M6x16	6.4
W 75_HS	75	30(28) H7	33.3(31.3)	8	19	21.5	6	40	128	87	M6x16	10.0
W 86_HS	86.9	35 H7	38.3	10	25	28	8	50	144	100	M8x19	14.1
W 110_HS	110.1	42 H7	45.3	12	25	28	8	60	168	125	M8x19	27
VF 130_HS	130	45 H7	48.8	14	30	33	8	60	160	195	M8x20	49
VF 150_HS	150	50 H7	53.8	14	35	38	10	65	185	220	M8x20	60
VF 185_HS	185.4	60 H7	64.4	18	40	43	12	70	214.5	254	M8x20	94
VF 210_HS	210	90 H7	95.4	25	48	51.5	14	110	230	335	M16x40	175
VF 250_HS	250	110 G7	116.4	28	55	59	16	110	274	380	M16x40	275

Le dimensioni comuni alle altre configurazioni sono riportate da pag.110 a pag. 165.

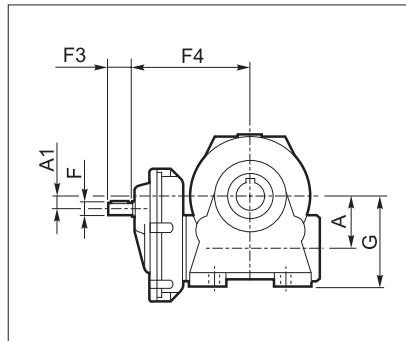


VFR...HS - WR...HS

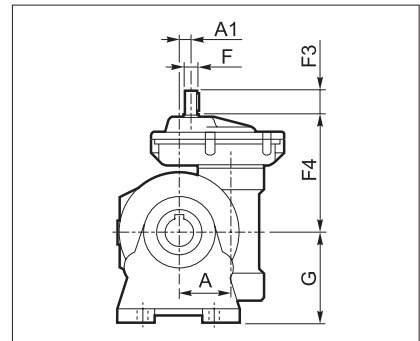
VFR_A..HS



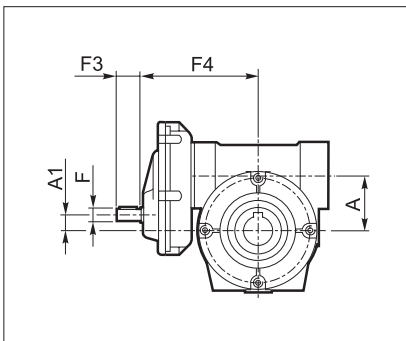
VFR_N..HS



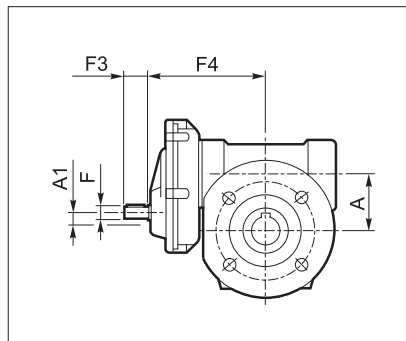
VFR_V..HS



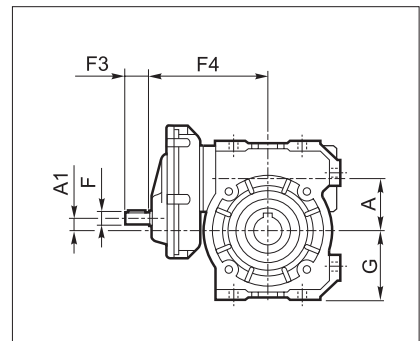
VFR_P..HS



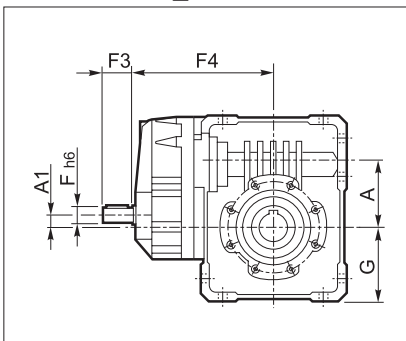
VFR_FA/FC/FR/F..HS



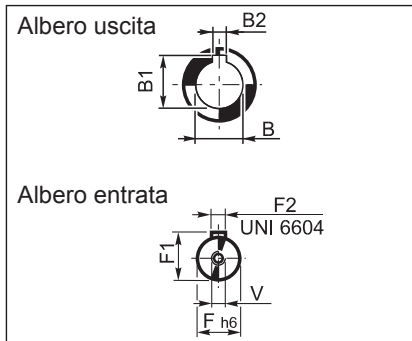
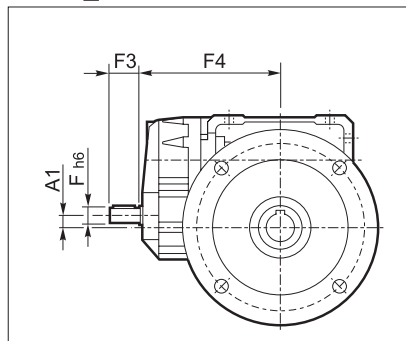
VFR_U..HS



WR_U..HS



WR_UF/UFC/UFCR..HS



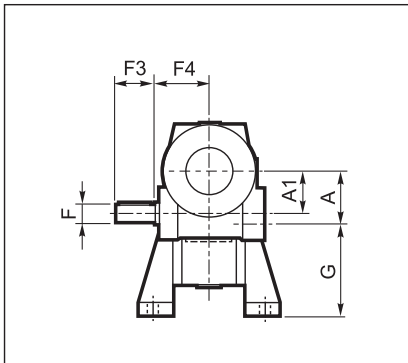
	A	A1	B	B1	B2	F	F1	F2	F3	F4	G	V	
VFR 49_HS	49.5	10	25 H7	28.3	8	11	12.5	4	23	110	82	M4x10	5
VFR 49_U HS											64.5		
WR 63_HS	62.17	11.42	25 H7	28.3	8	14	16	5	30	138	72.5	M5x12.5	7.1
WR 75_HS	75	11	30(28) H7	33.3(31.3)	8	19	21.5	6	40	162	87	M6x16	11.1
WR 86_HS	86.9	22.9	35 H7	38.3	10	19	21.5	6	40	178	100	M6x16	14.7
WR 110_HS	110.1	21.1	42 H7	45.3	12	24	27	8	50	201	125	M8x19	34
VFR 130_HS	130	45	45 H7	48.8	14	24	27	8	50	228	195	M8x20	57
VFR 150_HS	150	53	50 H7	53.8	14	28	31	8	60	280	220	M8x20	71
VFR 185_HS	185.4	88.4	60 H7	64.4	18	28	31	8	60	310	254	M8x20	110
VFR 210_HS	210	92	90 H7	95.4	25	38	41	10	80	335	335	M10x25	185
VFR 250_HS	250	132	110 G7	116.4	28	38	41	10	80	383	380	M10x25	295

Le dimensioni comuni alle altre configurazioni sono riportate da pag.114 a pag. 167.

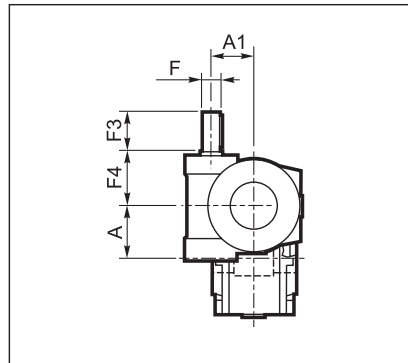


VF/VF...HS - VF/W...HS - W/VF...HS

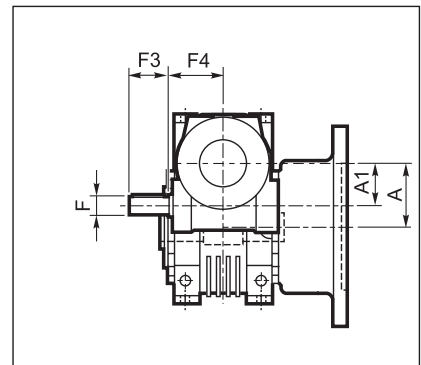
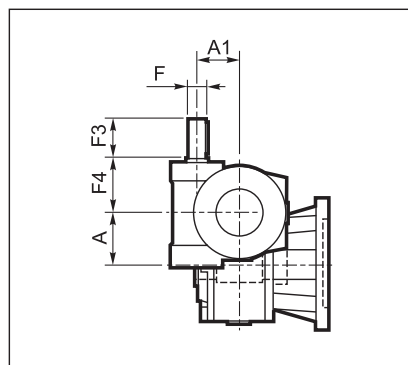
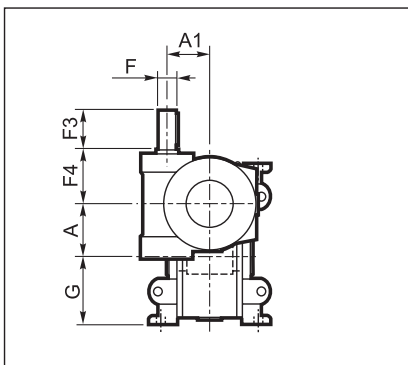
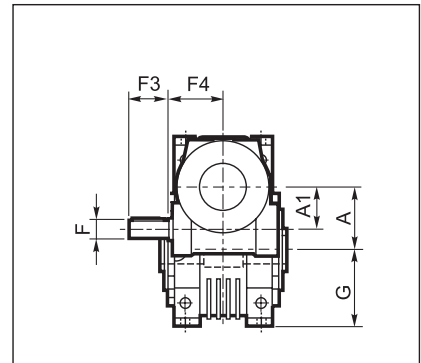
**VF/VF_A..HS
W/VF_A..HS**



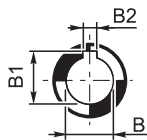
**VF/VF_P..HS
W/VF_P..HS**



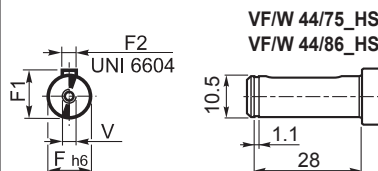
**VF/VF_P..HS
W/VF_P..HS**



Albero uscita

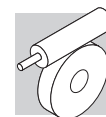


Albero entrata



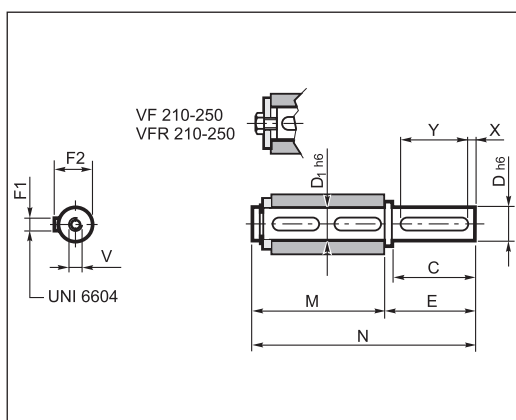
	A	A1	B	B1	B2	F	F1	F2	F3	F4	G	V	Kg
VF/VF 30/44_HS	44.6	30	18 H7	20.8	6	9	10.2	3	20	50	72	—	3.5
VF/VF 30/44 U_HS											55		
VF/VF 30/49_HS	49.5	30	25 H7	28.3	8	9	10.2	3	20	50	82	—	4.5
VF/VF 30/49 U_HS											64.5		
VF/W 30/63_HS	62.17	30	25 H7	28.3	8	9	10.2	3	20	50	100	—	7.5
VF/W 44/75_HS	75	44.6	30 (28) H7	33.3 (31.3)	8	11	12.5	4	30	54	115	—	16.1
VF/W 44/86_HS	86.9	44.6	35 H7	38.3	10	11	12.5	4	30	54	142	—	42
VF/W 49/110_HS	110.0	49.5	42 H7	45.3	12	16	18	5	40	65	170	M6x16	46
W/VF 63/130_HS	130	62.17	45 H7	48.8	14	18	20.5	6	40	110.5	72.5	M6x16	74
W/VF 86/150_HS	150	86.9	50 H7	53.8	14	25	28	8	50	144	100	M8x19	108
W/VF 86/185_HS	185.4	86.9	60 H7	64.4	18	25	28	8	50	144	100	M8x19	109
VF/VF 130/210_HS	210	130	90 H7	95.4	25	30	33	8	60	160	335	M8	225
VF/VF 130/250_HS	250	130	110 G7	116.4	28	30	33	8	60	160	380	M8	325

Le dimensioni comuni alle altre configurazioni sono riportate da pag.116 a pag. 168.

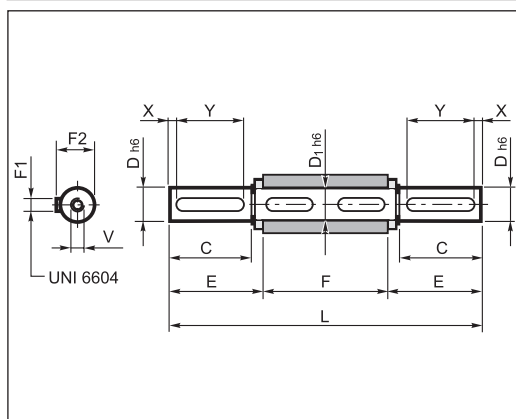


28 ACCESSORI

28.1 Albero lento riportato

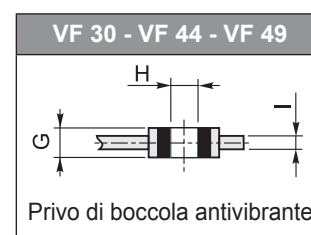
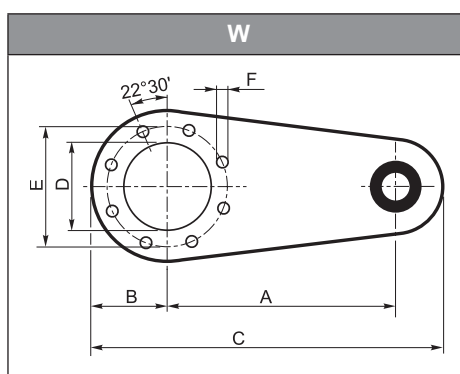
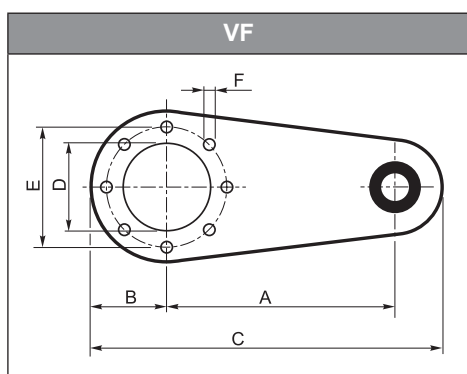


		C	D	D1	E	F1	F2	M	N	V	X	Y
VF	30	30	14	14	35	5	16	61	96	M5x13	5	20
VFR	44	40	18	18	45	6	20.5	70	115	M6x16	5	30
VF/VF	49	60	25	25	65	8	28	89	154	M8x19	5	50
	63	60	25	25	65	8	28	127	192	M8x19	5	50
W	75_D28	60	28	30	65	8	31	134	199	M8x20	5	50
WR	75_D30	60	30	30	65	8	33	134	199	M10x22	5	50
VF/W	86	60	35	35	65	10	38	149	214	M10x22	5	50
	110	75	42	42	80	12	45	164	244	M12x28	7.5	60
	130	80	45	45	85	14	48.5	176	261	M12x32	5	70
VF	150	85	50	50	93	14	53.5	185	278	M16x40	7.5	70
VFR	185	100	60	60	110	18	64	200	310	M16x40	10	80
W/VF	210	130	90	90	140	25	95	255	395	M20x50	5	120
	250	165	110	110	175	28	116	315	490	M24x64	15	140

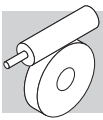


		C	D	D1	E	F	F1	F2	L	V	X	Y
VF	30	30	14	14	32.5	55	5	16	120	M5x13	5	20
VFR	44	40	18	18	42.7	64	6	20.5	149.4	M6x16	5	30
VF/VF	49	60	25	25	63.2	82	8	28	208.4	M8x19	5	50
	63	60	25	25	63.2	120	8	28	246.4	M8x19	5	50
W	75_D28	60	28	30	64	127	8	31	255	M8x20	5	50
WR	75_D30	60	30	30	64	127	8	33	255	M10x22	5	50
VF/W	86	60	35	35	64	140	10	38	268	M10x22	5	50
	110	75	42	42	79.3	155	12	45	313.5	M12x28	7.5	60
	130	80	45	45	84.7	165	14	48.5	334.5	M12x32	5	70
VF	150	85	50	50	90	175	14	53.5	355	M16x40	7.5	70
VFR	185	100	60	60	105	190	18	64	400	M16x40	10	80
W/VF	210	130	90	90	140	260	25	95	540	M20x50	5	120
	250	165	110	110	175	320	28	116	670	M24x64	15	140

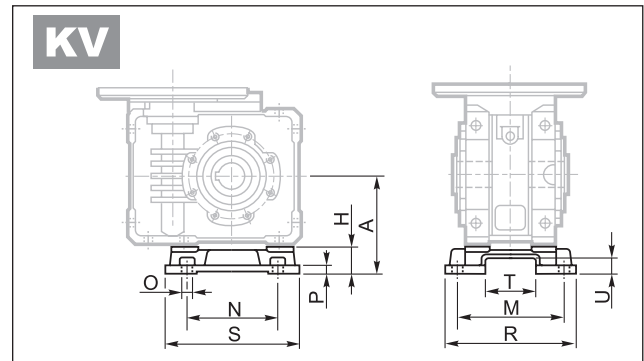
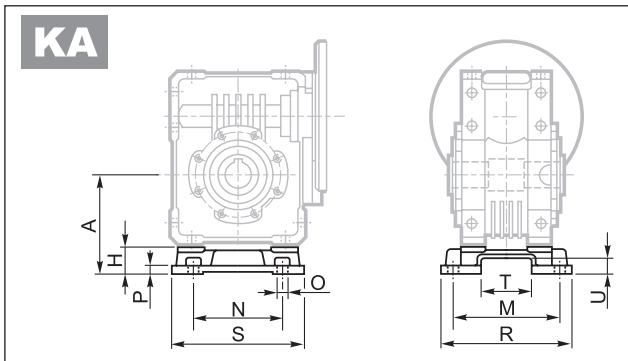
28.2 Braccio di reazione



		A	B	C	D	E	F	G	H	I
VF	30	100	40	157.5	50	65	7	14	8	4
VFR	44	100	40	157.5	50	65	7	14	8	4
VF/VF	49	100	55	172.5	68	94	7	14	8	4
	63	150	55	233	75	90	9	20	10	6
W	75	200	63	300	90	110	9	25	20	6
WR	86	200	80	318	110	130	11	25	20	6
VF/W	110	250	100	388	130	165	13	25	20	6
	130	300	125	470	180	215	13	30	25	6
VF	150	300	125	470	180	215	15	30	25	6
VFR	185	350	150	545	230	265	17	30	25	6
W/VF	210	350	175	625	250	300	19	60	50	8
	250	400	225	725	350	400	19	60	50	10

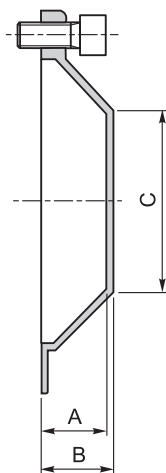


28.3 Kit piedi KA, KV

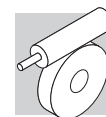


	A	H	M	N	O	P	R	S	T	U
W 63 - WR 63	100	27.5	111	95	11	8	135	145	56.5	15.5
W 75 - WR 75	115	28	115	120	11	9	139	174	56.5	15.5
W 86 - WR 86	142	42	146	140	11	11	170	200	69	20
W 110 - WR 110	170	45	181	200	13	14	210	250	69	20

28.4 Cappello di protezione



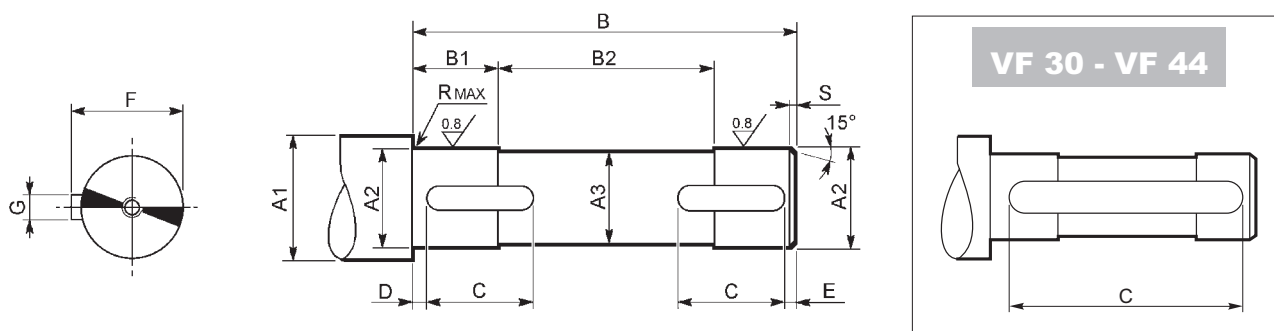
	A	B	C
W 63 - WR 63	26.5	29	Ø35
W 75 - WR 75	24.5	27	Ø54
W 86 - WR 86	26.5	29	Ø71
W 110 - WR110	27.5	30	Ø89




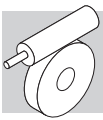
29 ALBERO CLIENTE

Nel realizzare l'albero condotto che si accoppierà con il riduttore consigliamo di utilizzare acciaio di buona qualità e di realizzare le dimensioni come suggerito nello schema seguente.

Si suggerisce inoltre di completare il montaggio con un dispositivo di bloccaggio assiale dell'albero, ad esempio come illustrato nel seguito, avendo cura di verificare e dimensionare i vari componenti in funzione delle diverse esigenze applicative.



	A1	A2	A3	B	B1	B2	C	D	E	F	G	R	S	 UNI 6604
VF 30	≥ 19	14 f7	13	53	18.5	16	40	6.5	6.5	16	5 h9	0.5	1.5	5x5x40 A
VF 44	≥ 23	18 f7	17	62	22.5	17	50	6	6	20.5	6 h9	0.5	1.5	6x6x50 A
VF 49	≥ 30	25 f7	24	80	20.5	39	20	2	2	28	8 h9	1	1.5	8x7x20 A
W 63	≥ 30	25 f7	24	118	38	42	35	2	2	28	8 h9	1	1.5	8x7x35 A
W 75	≥ 35	28 f7	27	125	38	49	40	2	2	31	8 h9	1	1.5	8x7x40 A
	≥ 35	30 f7	29	125	38	49	40	2	2	33	8 h9	1	1.5	8x7x40 A
W 86	≥ 42	35 f7	34	138	43	52	40	2	2	38	10 h9	1.5	1.5	10x8x40 A
W 110	≥ 48	42 f7	41	153	43	67	50	2	2	45	12 h9	1.5	2	12x8x50 A
VF 130	≥ 52	45 f7	44	163	50.5	62	60	2.5	2.5	49.5	14 h9	2.5	2	14x9x60 A
VF 150	≥ 57	50 f7	49	173	53	67	70	2.5	2.5	53.5	14 h9	2.5	2	14x9x70 A
VF 185	≥ 68	60 f7	59	188	63	62	80	2.5	2.5	64	18 h9	2.5	2	18x11x80 A
VF 210	≥ 99	90 f7	89	258	83	92	80	3	3	95	25 h9	2.5	2.5	25x14x80 A
VF 250	≥ 121	110 h7	109	318	83	152	80	3	3	116	28 h9	2.5	2.5	28x16x80 A



30 LIMITATORE DI COPPIA

30.1 Descrizione

Il limitatore di coppia a frizione è studiato e realizzato per i riduttori senza fine **VF44 - VF49** e **W63... W110**, è un dispositivo di protezione atto a salvaguardare la trasmissione da sovraccarichi accidentali che potrebbero danneggiare tutti gli elementi della trasmissione creando seri inconvenienti alla macchina operatrice.

Rispetto ai tradizionali limitatori di coppia montati esternamente al riduttore questa versatile soluzione presenta i seguenti vantaggi:

- nessun ingombro aggiuntivo esterno ai riduttori forniti in versione standard
- lavorando a completo bagno d'olio non richiede nessuna manutenzione
- La coppia di slittamento puo essere facilmente regolata tramite una semplice operazione manuale dall'esterno del riduttore
- lo slittamento, anche continuo, non crea danneggiamenti alla meccanica o consumi anormali, in quanto le superfici di slittamento sono separate da un costante velo d'olio.



Se ne sconsiglia l'utilizzo in meccanismi di sollevamento.

30.2 Modo di funzionamento

Il limitatore di coppia funziona come una frizione biconica con le sedi ricavate direttamente sulla corona in bronzo e sul mozzo in ghisa sferoidale GS400/12 monolitica avente l'albero lento cavo passante, il quale permette di collegare la macchina operatrice direttamente al nostro riduttore.

Le sedi coniche sono strette fra loro per effetto di una forza assiale costante generata da molle a tazza.

La registrazione della coppia di slittamento si effettua in modo semplice tramite la rotazione di una ghiera esterna al riduttore.

30.3 Protezione dell'impianto da sovraccarichi

Il limitatore opportunamente tarato alla coppia necessaria alla macchina operatrice, salvaguarda tutti gli organi meccanici del cinematismo evitando danneggiamenti dovuti a eventuali e ripetuti sovraccarichi.

30.4 Disinserimento in condizioni di irreversibilità

In determinate applicazioni può essere utile ruotare, a macchina ferma, l'albero lento del riduttore. Questa situazione non e sempre possibile nei riduttori a vite senza fine tradizionali. Tramite questo dispositivo, allentando opportunamente la ghiera di registrazione, possiamo eseguire agevolmente questa operazione.



30.5 VF...L, W...L

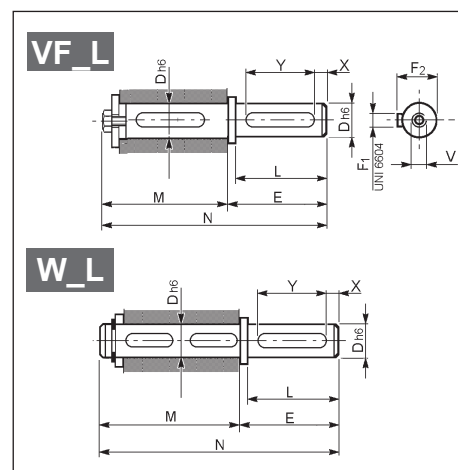
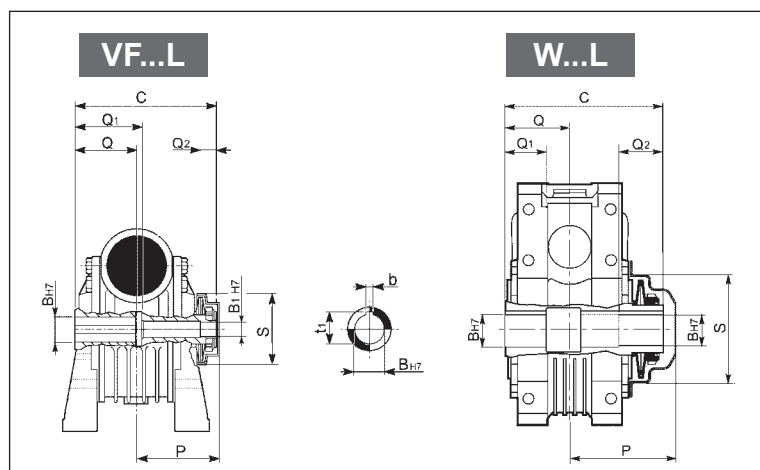
L1								L2								
	N	A	V	U	F1 FC1 FR1 FA1	F2 FC2 FR2 FA2**	P1 P2		N	A	V	U	F1 FC1 FR1 FA1**	F2 FC2 FR2 FA2	P1 P2	
VF VF/VF*									VF VF/VF*							
	U	UF1 UFC1	UF2 UFC2	UFCR1	UFCR2				U	UF1 UFC1	UF2 UFC2	UFCR1	UFCR2			
W VF/W*									W VF/W*							

* Nei riduttori combinati, il limitatore di coppia è installato sul 2° riduttore nelle esecuzioni L1 ed L2; è installato sul 1° riduttore nell'esecuzione LF.

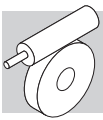
LF				
	VF/W	44/75	44/86	49/110
	W/VF	63/130	86/150	86/185

Se non preventivamente specificato, i riduttori VF...L verranno forniti con la ghiera a sinistra (L1) guardando il motore elettrico in posizione di montaggio B3.

30.6 Dimensioni



	Limitatore di coppia										Albero lento semplice									
	C	Q	Q1	Q2	P	S	B _{H7}	B _{1H7}	t ₁	b	L	D _{h6}	E	F1	F2	M	N	V	X	Y
VF 44L	79	32	32	12	48	42.5	18	11	20.8	6	40	18	45	6	20.5	86	131	M6x16	5	30
VF 49L	105	41	51	15	63.5	66.5	25	14	28.3	8	60	25	65	8	28	114.5	179.5	M8x19	5	40
W 63L	145	60	40	40	100	77	25	-	28.3	8	60	25	65	8	28	152	217	M8x19	5	50
W 75L_D30	154.5	63.5	40	40	104	100	30	-	33.3	8	60	30	65	8	33	161.5	226.5	M10x22	5	50
W 86L	170	70	50	45	113	119	35	-	38.3	10	60	35	65	10	38	179	244	M10x22	5	50
W 110L	191	77.5	55	45	133	134	42	-	45.3	12	75	42	80	12	45	200	280	M12x28	7.5	60



30.7 Registrazione coppia di slittamento

In fabbrica viene eseguita una pretaratura dello slittamento su un momento torcente coincidente col valore di coppia nominale Mn_2 [$n_1=1400$] del riduttore tipo VF o W.

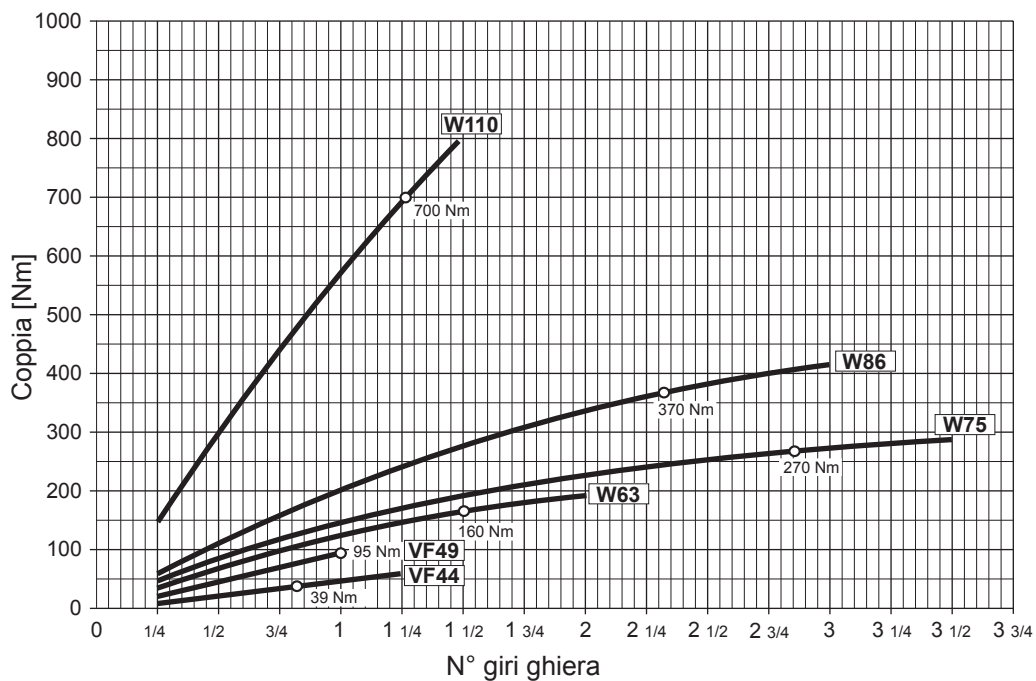
Qui di seguito sono descritte le operazioni eseguite in fabbrica per realizzare la taratura della coppia di slittamento. Le stesse operazioni, a meno del passo (2), dovranno essere ripercorse quando si vuole impostare un valore di coppia diverso dall'originale.

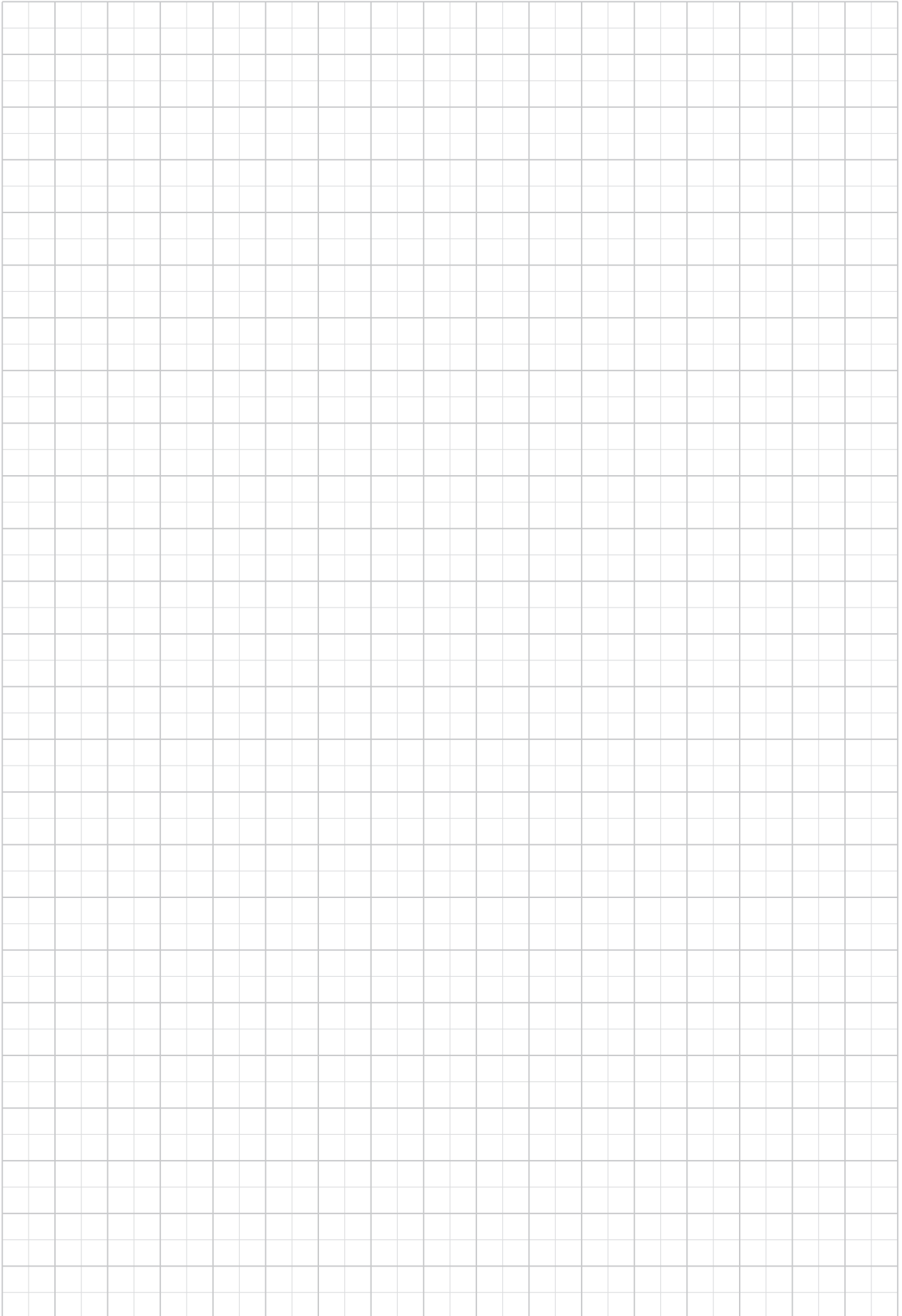
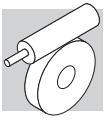
1. La ghiera di registrazione viene avvitata fino a che le molle a tazza non sono sufficientemente caricate da non potere ruotare liberamente, se azionate manualmente.

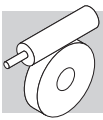
2. Per mezzo di un bulino vengono incise, in identica posizione angolare, due marcature di riferimento, sia sulla ghiera che sulla sporgenza d'albero lento.

Questa posizione di riferimento costituirà il punto iniziale per il conteggio dei successivi giri della ghiera e la conseguente taratura di coppia.

3. Infine la ghiera viene avvitata delle frazioni di giro corrispondenti al valore di coppia nominale Mn_2 del riduttore in oggetto. Il riferimento in questo caso è il diagramma sotto riportato, il quale sarà d'utilità anche per le eventuali nuove impostazioni che si dovessero rendere necessarie nel tempo.







VF-EP / W-EP - RIDUTTORI E MOTORIDUTTORI PER AMBIENTI CORROSIVI E ASETTICI

31 I VANTAGGI DELL'ESECUZIONE EP PER L'INDUSTRIA DI PROCESSO ALIMENTARE

Le industrie dei settori beverage e alimentare oggi hanno a disposizione una gamma di motoriduttori appositamente studiati per le loro specifiche esigenze, normalmente non riscontrabili nelle produzioni di serie.

L'assoluta ermeticità del riduttore e la facile igienizzazione delle sue superfici consentono possibilità d'installazione anche in prossimità del processo di lavorazione, senza la necessità di ulteriori schermi o carterature.

Il sistema epossidico di protezione delle superfici esterne, dello spessore complessivo di ca. 200 µm, fornisce eccezionali doti di resistenza meccanica all'abrasione.


Il gruppo completo, riduttore o motoriduttore, è protetto con un sistema realizzato da una mano di fondo aggrappante e successiva mano di smalto di finitura, esente da piombo e da cromati. Il materiale utilizzato è approvato da FDA e NSF (in funzione della tinta scelta) e certificato da laboratori indipendenti come idoneo per il contatto accidentale con gli alimenti, oltre ad assicurare una protezione specifica all'aggressione di numerosi acidi, alcalini e solventi, spruzzi e i detersivi per pulizia chimica più frequentemente utilizzati. Agli effetti della norma ISO 9223 il sistema di verniciatura adottato risulta idoneo per gli ambienti più aggressivi, classificati cioè in classe C5.

Sono disponibili tre diverse tinte, identificate dalle sigle RAL 9010 (bianco), 5010 (blu) e 9006 (grigio chiaro metallizzato).

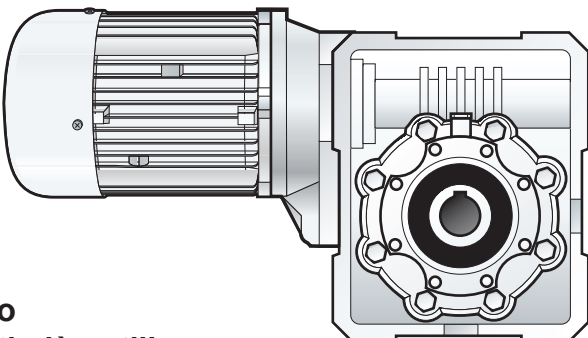

Il prodotto serie **EP** è ulteriormente configurabile con un'ampia dotazione di opzioni e accessori per il montaggio.

Grandezze riduttore: 44 (escluso VFR), 49, 63, 75, 86. Motorizzazioni disponibili: da 0,12 a 4 kW, in esecuzione sia compatta che a standard IEC - 2, 4 e 6 poli


Ideali per le industrie di processo alimentari




Resistenti alla corrosione

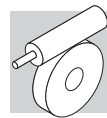


Servizio idoneo per gli ambienti più ostili



Lavabili/sanificabili con i detersivi più comunemente utilizzati

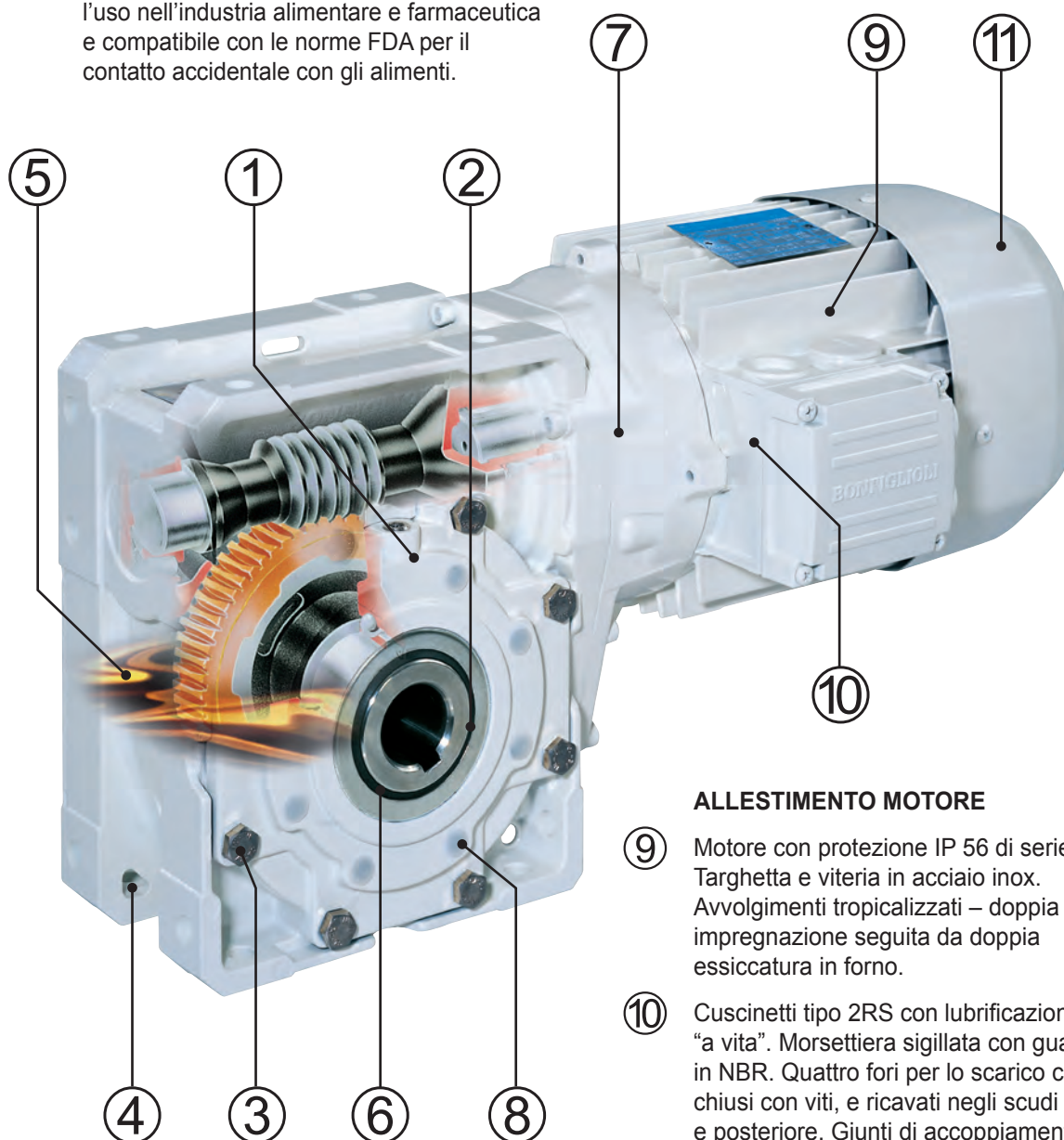




ALLESTIMENTO RIDUTTORE

- ① Il riduttore è completamente sigillato allo scopo di minimizzare ogni possibile contaminazione dell'ambiente esterno.
- ② Albero lento cavo in acciaio inossidabile AISI 316.
- ③ Targhetta e viteria in acciaio inossidabile.
- ④ Fori per drenaggio acqua. Evitano il ristagno dopo il lavaggio.
- ⑤ È disponibile in opzione olio sintetico omologato da NSF quale lubrificante UH1 per l'uso nell'industria alimentare e farmaceutica e compatibile con le norme FDA per il contatto accidentale con gli alimenti.

- ⑥ Anelli di tenuta dotati di molla interna in acciaio inox. Disponibili tenute in PTFE con schermo in inox, resistenti ai lavaggi in pressione.
- ⑦ Trattamento epossidico delle superfici esterne, approvato FDA e NSF (in funzione della tinta scelta) per il contatto accidentale con gli alimenti e altamente resistente alla corrosione.
- ⑧ Chiusura dei fori filettati non utilizzati mediante tappi a pressione.



ALLESTIMENTO MOTORE

- ⑨ Motore con protezione IP 56 di serie. Targhetta e viteria in acciaio inox. Avvolgimenti tropicalizzati – doppia impregnazione seguita da doppia essiccazione in forno.
- ⑩ Cuscinetti tipo 2RS con lubrificazione “a vita”. Morsettiera sigillata con guarnizioni in NBR. Quattro fori per lo scarico condensa, chiusi con viti, e ricavati negli scudi anteriore e posteriore. Giunti di accoppiamento scudi-cassa sigillati.
- ⑪ Ventola di raffreddamento in materiale poliammidico, compatibile con gli alimenti.



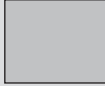


RIDUTTORE

W-EP — 63 U 30 P90 B14 B3 RAL9010

OPZIONI

VERNICE







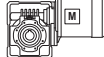

NP vernice assente	
RAL9010	
RAL5010	
RAL9006 (non omologabile per FDA e NSF)	

POSIZIONE DI MONTAGGIO

VF-EP 44 VF-EP 49	B3
W-EP 63 W-EP 75 W-EP 86	B3 (default), B6, B7, B8, V5, V6

FORMA COSTRUTTIVA MOTORE
B5, B14 (IEC standard)

DESIGNAZIONE INGRESSO

	VF-EP	VF-EP R	W-EP	W-EP R
P(IEC)	 P63...P80	 P63	 P71...P112	 P63...P90
s_			 S1...S3	

RAPPORTO DI RIDUZIONE

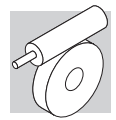
FORMA COSTRUTTIVA

GRANDEZZA RIDUTTORE
VF-EP: **44, 49**
W-EP: **63, 75, 86**

— (blank)
R (precoppia elicoidale  VF-EP 44)

TIPO RIDUTTORE

VF-EP
W-EP







MOTORE

BN-EP 80B 4 B14 230/400-50 CLF ... RAL9010

OPZIONI

VERNICE

NP vernice assente	
RAL9010	
RAL5010	
RAL9006 (non omologabile per FDA e NSF)	

POSIZIONE MORSETTIERA
W (default), **N**, **E**, **S**

CLASSE ISOLAMENTO
CL F standard
CL H option

TENSIONE - FREQUENZA

FORMA COSTRUTTIVA
— (motore integrato)
B5, B14 (motore IEC)

NUMERO DI POLI
2, 4, 6,

GRANDEZZA MOTORE
1SC ... 3LC (motore integrato)
63 ... 112 (motore IEC)

TIPO MOTORE
M-EP = trifase integrato
BN-EP = trifase IEC



33 OPZIONI RIDUTTORE

PX

Opzione Anelli di tenuta albero lento. Gli speciali anelli di tenuta offerti in opzione estendono l'applicabilità dei riduttori ai processi in cui sono frequenti i lavaggi con getti d'acqua in pressione.

Lo schermo esterno in acciaio INOX e la realizzazione a doppio labbro infatti aggiungono alla funzionalità di base anche la resistenza alla pressione esterna, mentre il particolare materiale utilizzato (PTFE) garantisce eccezionale resistenza agli elementi chimici aggressivi, basso coefficiente d'attrito e lunga durata.

PV

Anelli di tenuta in fluoro-elastomero su albero lento. Molla interna in acciaio inox.

UH1

Opzione Olio compatibile con gli alimenti. Il riduttore viene riempito in fabbrica con lubrificante "long life" rispondente ai requisiti delle Normative più diffuse e in particolare è omologato da NSF quale lubrificante UH1 per l'uso nell'industria alimentare e farmaceutica, inoltre soddisfa le norme FDA 21 CFR Sec. 178.3570.

La sua natura sintetica a base di poliglicoli, oltre ad estenderne l'uso ad un ampio campo di temperature (-25° C sino a +150° C), non rende necessarie sostituzioni periodiche e pertanto, in assenza di contaminanti, il lubrificante potrà considerarsi "a vita".

PROVE DOCUMENTALI

AC - Attestato di conformità

Documento il cui rilascio attesta la conformità del prodotto all'ordinativo e la costruzione dello stesso in conformità alle procedure standard di processo e di controllo previste dal sistema di Qualità Bonfiglioli Riduttori.

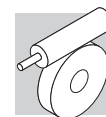
CC - Certificato di collaudo

La specifica comporta la conduzione di verifiche di conformità all'ordine, controlli visivi generali e verifiche strumentali delle dimensioni di accoppiamento. Sono inoltre condotti controlli generali di funzionamento a vuoto e verifiche della funzionalità delle guarnizioni di tenuta in modalità statica e in funzionamento. Il collaudo si applica ad un campione statistico del lotto di spedizione.

34 OPZIONI MOTORI

Le opzioni disponibili per i motori BN-EP e M-EP sono: D3, E3, K1, H1, NH1, RC, RV, ACM, CC, CUS, S2, S3, S9.

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



35 ALTRE INFORMAZIONI SUI RIDUTTORI E I MOTORIDUTTORI

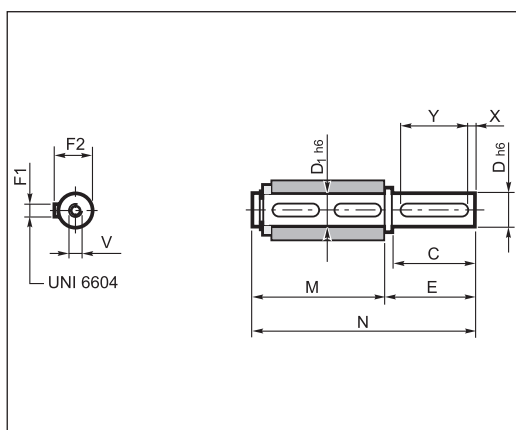
Le posizioni di montaggio, i dati tecnici, le predisposizioni motore, i momenti d'inerzia e le dimensioni dei riduttori **VF-EP** e **W-EP** non cambiano rispetto all'equivalente prodotto delle serie **VF** e **W**. Allo stesso modo le informazioni relative ai motori **M-EP** e **BN-EP** non cambiano rispetto all'equivalente prodotto della serie **M** e **BN**. Tutte queste informazioni possono essere reperite nei relativi capitoli di questo catalogo.

36 GLI ACCESSORI DELLA SERIE EP

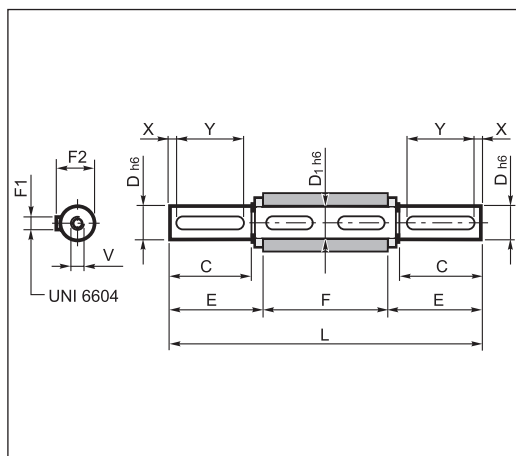
A seconda delle necessità applicative potranno essere richiesti determinati accessori che completano l'architettura del prodotto, e in particolare:

- albero lento, sia semplice che bilaterale, in acciaio INOX tipo 316, completo di chiavette in identico materiale
- braccio di reazione in lamiera verniciata (specificare RAL_)
- coperchio di sicurezza per la zona albero lento (cavo) in plastica (W63, W75 e W86) o lamiera rivestita in gomma NBR (VF 44, VF 49) con viteria in acciaio INOX e grado di protezione complessivo IP56.

36.1 Albero lento riportato



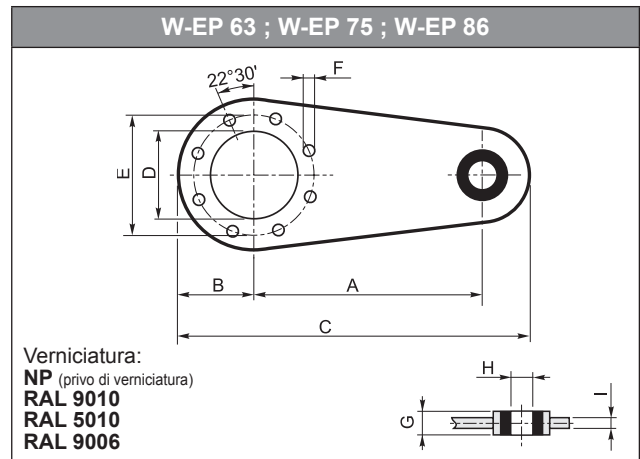
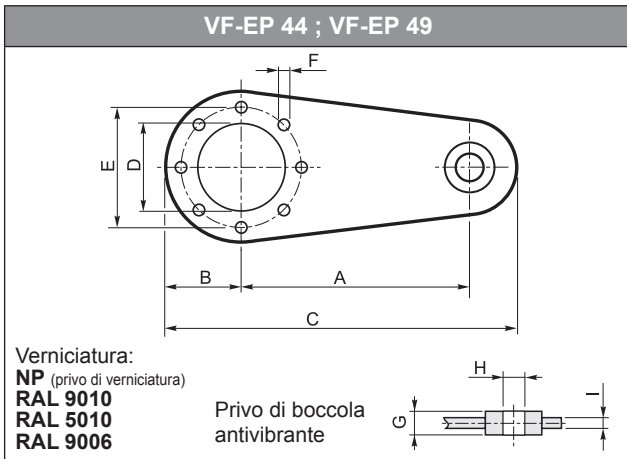
	C	D	D1	E	F1	F2	M	N	V	X	Y
VF-EP 44	40	18	18	45	6	20.5	70	115	M6x16	5	30
VF-EP 49 VF-EP R 49	60	25	25	65	8	28	89	154	M8x19	5	50
W-EP 63 W-EP R 63	60	25	25	65	8	28	127	192	M8x19	5	50
W-EP 75 W-EP R 75	60	30	30	65	8	33	134	199	M10x22	5	50
W-EP 86 W-EP R 86	60	35	35	65	10	38	149	214	M10x22	5	50



	C	D	D1	E	F	F1	F2	L	V	X	Y
VF-EP 44	40	18	18	42.7	64	6	20.5	149.4	M6x16	5	30
VF-EP 49 VF-EP R 49	60	25	25	63.2	82	8	28	208.4	M8x19	5	50
W-EP 63 W-EP R 63	60	25	25	63.2	120	8	28	246.4	M8x19	5	50
W-EP 75 W-EP R 75	60	30	30	64	127	8	33	255	M10x22	5	50
W-EP 86 W-EP R 86	60	35	35	64	140	10	38	268	M10x22	5	50

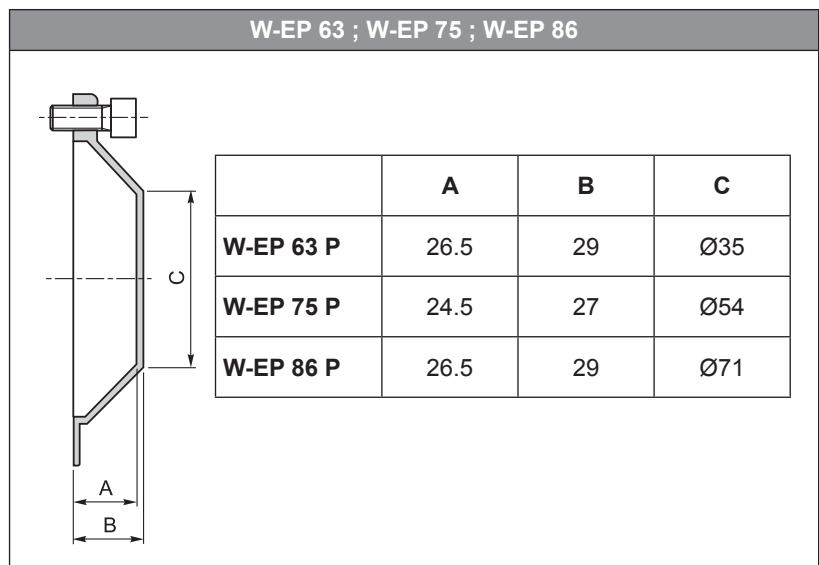
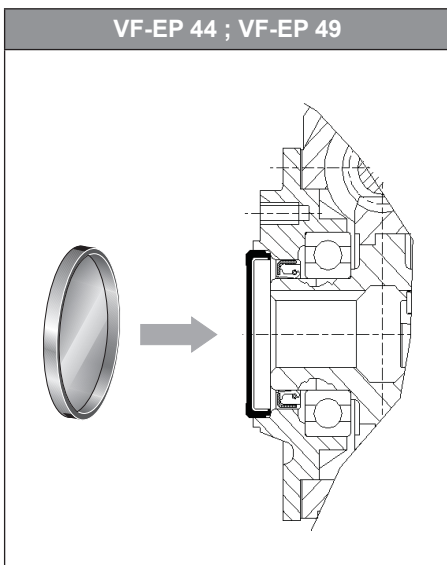


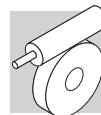
36.2 Braccio di reazione



	A	B	C	D	E	F	G	H	I
VF-EP 44	100	40	157.5	50	65	7	14	8	4
VF-EP 49 VF-EP R 49	100	55	172.5	68	94	7	14	8	4
W-EP 63 W-EP R 63	150	55	233	75	90	9	20	10	6
W-EP 75 W-EP R 75	200	63	300	90	110	9	25	20	6
W-EP 86 W-EP R 86	200	80	318	110	130	11	25	20	6

36.3 Cappello di protezione





DISPOSITIVO FINE-CORSA RVS

37 INFORMAZIONI GENERALI

Il dispositivo fine-corsa, tipo RVS, é progettato per completare ed adattare i motoriduttori a vite senza fine di Bonfiglioli Riduttori all'azionamento di:

- finestre e ombreggi per serre
- cancelli automatici
- finestre a vasistas
- dosatori per granaglie nel settore zootecnico
- valvole a farfalla

I motoriduttori dotati del dispositivo **RVS** sono anche idonei per qualsiasi altra applicazione intermittente, in cui si richieda un moto controllato e preciso.

Per le applicazioni sopra descritte, caratterizzate da un tipo di servizio leggero e intermittente, si raccomanda di effettuare la selezione del gruppo di trasmissione unicamente dalle pagine del paragrafo 40.

Le selezioni così effettuate saranno conformi al particolare tipo di servizio e alle massime velocità compatibili con il regolare funzionamento del dispositivo fine-corsa.

La configurazione completa si ottiene assemblando il dispositivo fine-corsa sul relativo motoriduttore, mediante lo specifico kit di montaggio (disponibile per i gruppi tipo VF 49, W63, W75 e W86), illustrato alla pagina seguente.

Per consentire il montaggio del dispositivo **RVS**, i motoriduttori devono essere nella forma costruttiva flangiata.

37.1 Caratteristiche tecniche

Il funzionamento del dispositivo fine-corsa si basa sul movimento differenziale di due coppie di ruote, dotate di camma, e dal relativo azionamento di microinterruttori di precisione che attraverso relais (a cura dell'installatore) comandano l'arresto e l'inversione del moto.

Le posizioni estreme del moto, tipicamente l'apertura e la chiusura del telaio, sono facilmente impostabili con il motoriduttore già installato e senza l'uso di specifiche attrezzature, al di fuori di una comune chiave a brugola.

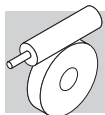
Una volta raggiunta e fissata la regolazione desiderata, questa viene mantenuta costante nel tempo, consentendo una elevata ripetibilità negli azionamenti.

Nella sua esecuzione di base il gruppo fine-corsa **RVS** è fornito con una coppia di cavi, della lunghezza di ca. un metro, pre-cablati internamente.

Il gruppo è inoltre disponibile anche nelle seguenti varianti:

RVS ME: dotato di scatola morsettiera esterna a sei terminali, ai quali allacciare i cavi di collegamento con i relais.

RVS DM: corredato di doppia serie di microinterruttori collegati in serie, per una sicurezza di intervento assoluta e conforme alle Norme che prevedono la ridondanza di questo dispositivo.






RVS ME DM: dispositivo dotato di morsettiera esterna e di doppia serie di microinterruttori, come più sopra descritto.

In tutte le sue varianti il dispositivo fine-corsa si caratterizza come:

- estremamente silenzioso
- di ingombro contenuto
- di facile installazione e regolazione
- dotato di protezione complessiva IP55
- regolabile all'interno di un campo massimo di 43 giri dell'albero Lento

38 CODICI PER L'ORDINATIVO

Individuare il dispositivo, o la sua variante, necessario per l'applicazione e riferirsi alla tabella sottostante per il relativo codice per l'ordinativo:

RVS	RVS ME	RVS DM	RVS ME DM
			
cod. 193312025	cod. 193312026	cod. 193312027	cod. 193312028

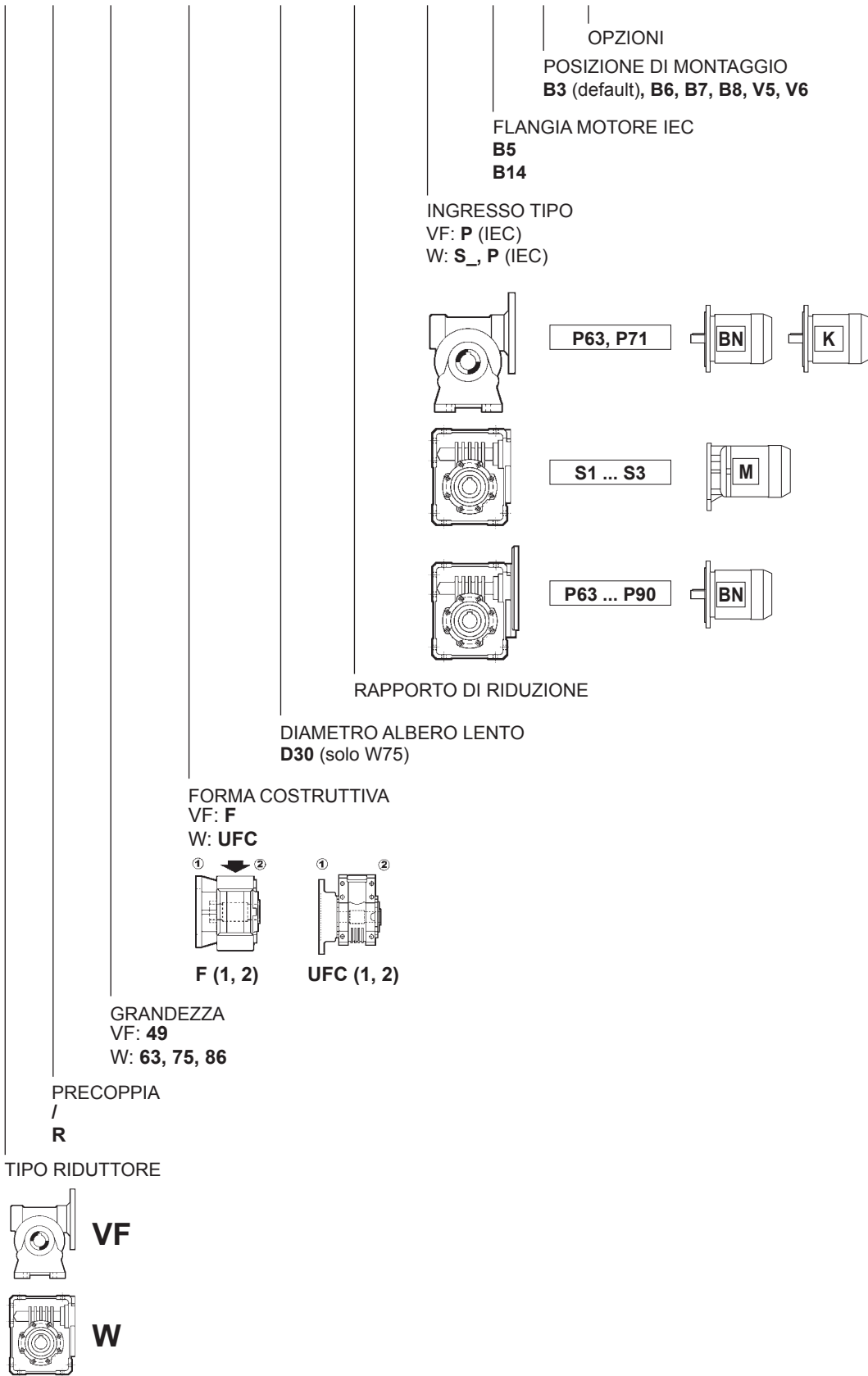
Selezionare inoltre il codice relativo al kit di configurazione per il riduttore sul quale si vuole installare il dispositivo fine-corsa:

			
cod. 192860001	cod. 192860002	cod. 192860003	cod. 192860004
			
VF 49 F - VFR 49 F	W 63 UFC - WR 63 UFC	W 75 UFC - WR 75 UFC	W 86 UFC - WR 86 UFC

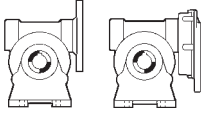

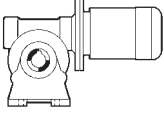
39 DESIGNAZIONE

Designazione **VF** e **W** per accoppiamento al dispositivo fine-corsa.

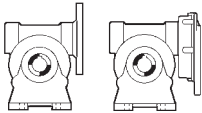

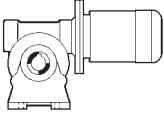
W R 75 UFC1 D30 240 P71 B5 B3



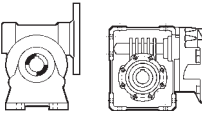

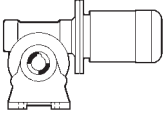
**40 TABELLE DI SELEZIONE MOTORIDUTTORE****0.12 kW**

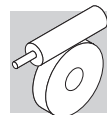
n_2 min ⁻¹	M_2 Nm	i		IEC 	
4.7	98	300	VFR 49_300	P63 BN63A4	
5.8	89	240	VFR 49_240	P63 BN63A4	
6.7	83	210	VFR 49_210	P63 BN63A4	
7.8	76	180	VFR 49_180	P63 BN63A4	
10.4	64	135	VFR 49_135	P63 BN63A4	
14.0	41	100	VF 49_100	P63 BN63A4	VF 49_100 P63 K63A4
17.5	37	80	VF 49_80	P63 BN63A4	VF 49_80 P63 K63A4
20.0	34	70	VF 49_70	P63 BN63A4	VF 49_70 P63 K63A4
23.3	31	60	VF 49_60	P63 BN63A4	VF 49_60 P63 K63A4

0.18 kW

n_2 min ⁻¹	M_2 Nm	i		IEC 	
7.8	112	180	VFR 49_180	P63 BN63B4	
10.4	95	135	VFR 49_135	P63 BN63B4	
14.0	61	100	VF 49_100	P63 BN63B4	
17.5	54	80	VF 49_80	P63 BN63B4	VF 49_80 P63 K63B4
20.0	49	70	VF 49_70	P63 BN63B4	VF 49_70 P63 K63B4
23.3	45	60	VF 49_60	P63 BN63B4	VF 49_60 P63 K63B4

0.25 kW

n_2 min ⁻¹	M_2 Nm	i		IEC 	
4.7	214	300	WR 63_300	P71 BN71A4	
5.8	192	240	WR 63_240	P71 BN71A4	
7.3	170	192	WR 63_192	P71 BN71A4	
10.4	136	135	WR 63_135	P71 BN71A4	
12.3	121	114	WR 63_114	P71 BN71A4	
14.0	82	100	VF 49_100	P71 BN71A4	
17.5	72	80	VF 49_80	P71 BN71A4	
20.0	66	70	VF 49_70	P71 BN71A4	
23.3	61	60	VF 49_60	P71 BN71A4	VF 49_60 P71 K71A4



0.37 kW

n_2 min ⁻¹	M_2 Nm	i		IEC				
4.7	382	300	WR 86_300	P71	BN71B4			
5.8	306	240	WR 75_240	P71	BN71B4			
7.3	290	192	WR 86_192	P71	BN71B4			
7.8	257	180	WR 75_180	P71	BN71B4			
9.3	226	150	WR 75_150	P71	BN71B4			
10.4	204	135	WR 63_135	P71	BN71B4			
12.3	181	114	WR 63_114	P71	BN71B4			
14.0	133	100	W 63_100	P71	BN71B4	W 63_100	S1	M1SD4
17.5	108	80	VF 49_80	P71	BN71B4			
20.0	98.3	70	VF 49_70	P71	BN71B4			
23.3	90.5	60	VF 49_60	P71	BN71B4			

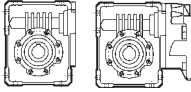

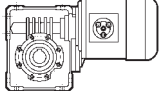
0.55 kW

n_2 min ⁻¹	M_2 Nm	i		IEC				
4.7	559	300	WR 86_300	P80	BN80A4			
5.8	483	240	WR 86_240	P80	BN80A4			
7.3	423	192	WR 86_192	P80	BN80A4			
7.8	376	180	WR 75_180	P80	BN80A4			
8.3	383	168	WR 86_168	P80	BN80A4			
9.3	331	150	WR 75_150	P80	BN80A4			
10.1	330	138	WR 86_138	P80	BN80A4			
11.7	287	120	WR 75_120	P80	BN80A4			
14.0	194	100	W 63_100	P80	BN80A4	W 63_100	S1	M1LA4
17.5	170	80	W 63_80	P80	BN80A4	W 63_80	S1	M1LA4
21.9	148	64	W 63_64	P80	BN80A4	W 63_64	S1	M1LA4
23.3	148	60	W 75_60	P80	BN80A4	W 75_60	S1	M1LA4

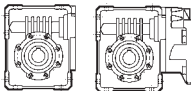

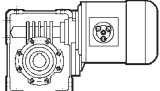
0.75 kW

n_2 min ⁻¹	M_2 Nm	i		IEC				
7.3	568	192	WR 86_192	P80	BN80B4			
8.3	514	168	WR 86_168	P80	BN80B4			
9.3	444	150	WR 75_150	P80	BN80B4			
10.1	443	138	WR 86_138	P80	BN80B4			
11.7	386	120	WR 75_120	P80	BN80B4			
14.0	281	100	W 75_100	P80	BN80B4	W 75_100	S2	M2SA4
17.5	241	80	W 75_80	P80	BN80B4	W 75_80	S2	M2SA4
21.9	199	64	W 63_64	P80	BN80B4	W 63_64	S2	M2SA4
23.3	199	60	W 75_60	P80	BN80B4	W 75_60	S2	M2SA4

**1.1 kW**

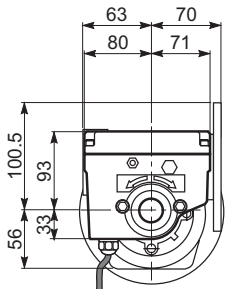
n_2 min ⁻¹	M_2 Nm	i				
10.1	652	138	WR 86_138	P90	BN90S4	
11.7	594	120	WR 86_120	P90	BN90S4	
14.0	443	100	W 86_100	P90	BN90S4	W 86_100 S2 M2SB4
17.5	384	80	W 86_80	P90	BN90S4	W 86_80 S2 M2SB4
21.9	326	64	W 86_64	P90	BN90S4	W 86_60 S2 M2SB4

1.5 kW

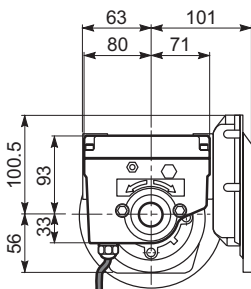
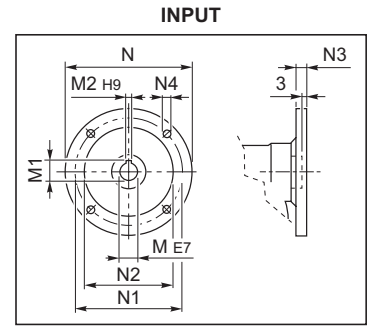
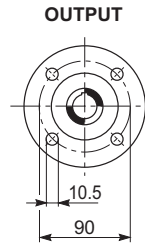
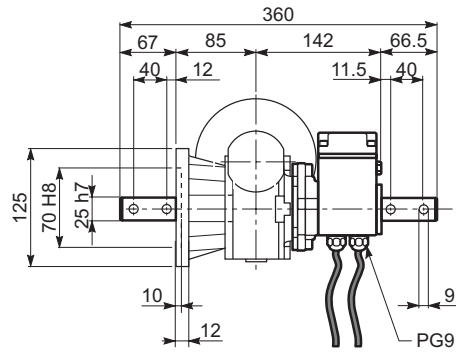
n_2 min ⁻¹	M_2 Nm	i				
11.7	816	120	WR 86_120	P90	BN90LA4	
17.5	527	80	W 86_80	P90	BN90LA4	W 86_80 S3 M3SA4
21.9	448	64	W 86_64	P90	BN90LA4	W 86_60 S3 M3SA4

41 DIMENSIONI

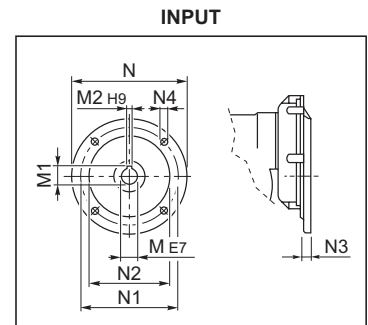
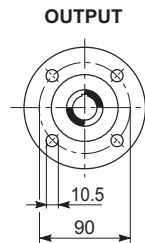
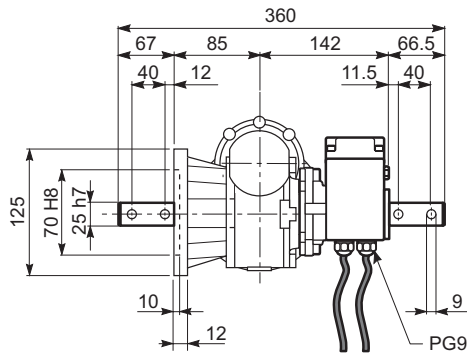
VF 49_F - VFR 49_F



VF 49_F



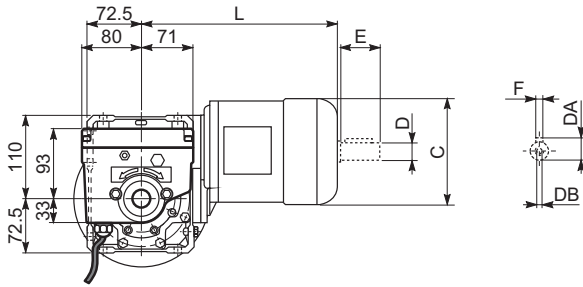
VFR 49_F



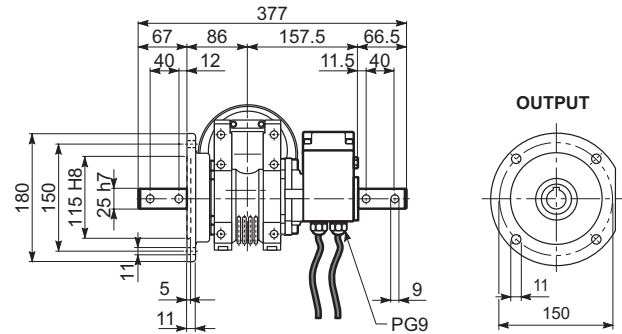
	M	M1	M2	N	N1	N2	N3	N4
VF 49_P 63	11	12.8	4	140	115	95	10.5	9.5
VF 49_P 71	14	16.3	5	160	130	110	10.5	9.5
VFR 49_P 63	11	12.8	4	140	115	95	11	M8x19



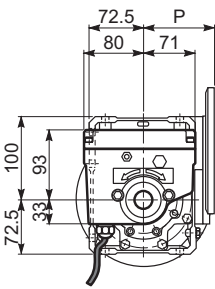
W 63 UFC_M - W 63 UFC - WR 63 UFC



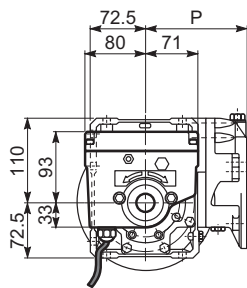
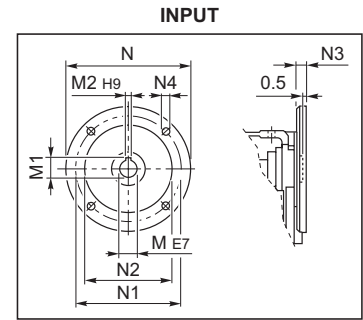
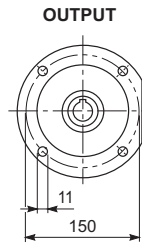
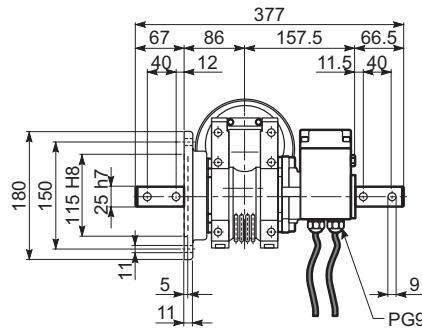
W 63 UFC_M



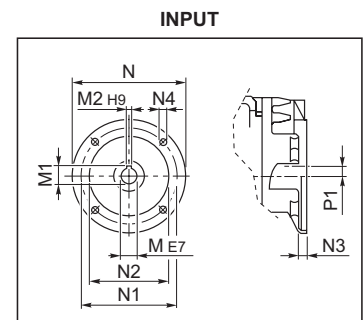
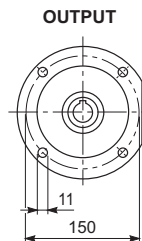
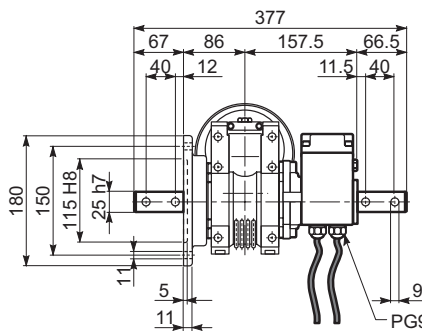
	C	D	DA	DB	E	F	L
W 63_S1 M1L	138	14	16	M5	30	5	289
W 63_S2 M2S	156	19	21.5	M6	40	6	317



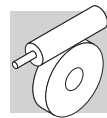
W 63 UFC



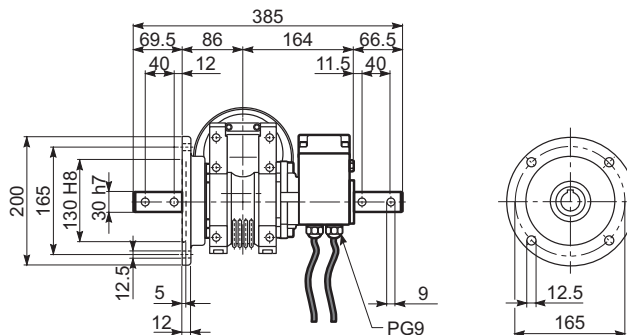
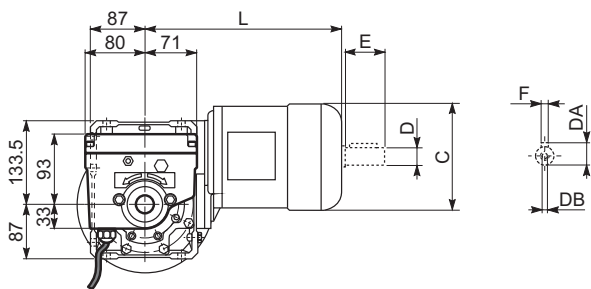
WR 63 UFC



	M	M1	M2	N	N1	N2	N3	N4	P	P1
W 63_P 71	14	16.3	5	160	130	110	11	9	95	-
W 63_P 80	19	21.8	6	200	165	130	12	11.5	102	-
W 63_P 90	24	27.3	8	200	165	130	12	11.5	102	-
WR 63_P 63	11	12.8	4	140	115	95	10	M8x10	133.5	11.42
WR 63_P 71	14	16.3	5	160	130	110	10	M8x10	133.5	11.42

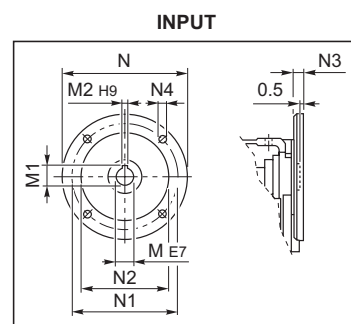
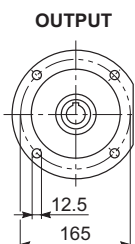
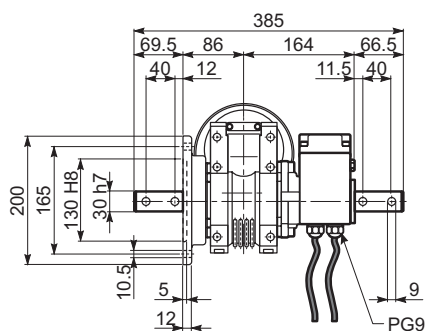
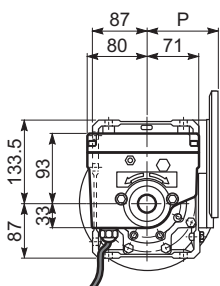


W 75 UFC_M - W 75 UFC - WR 75 UFC

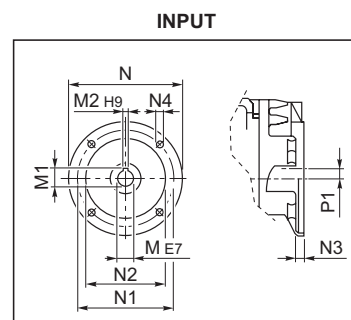
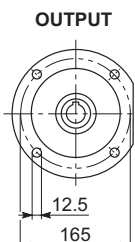
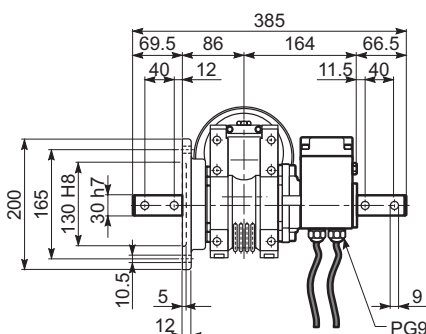
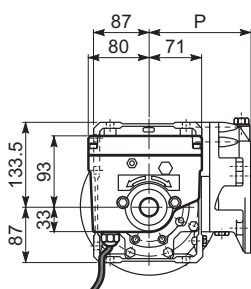


W 75 UFC_M

	C	D	DA	DB	E	F	L
W 75_S1 M1L	138	14	16	M5	30	5	308
W 75_S2 M2S	156	19	21.5	M6	40	6	333
W 75_S3 M3S	193	28	31	M10	60	8	376
W 75_S3 M3L	193	28	31	M10	60	8	408



W 75 UFC

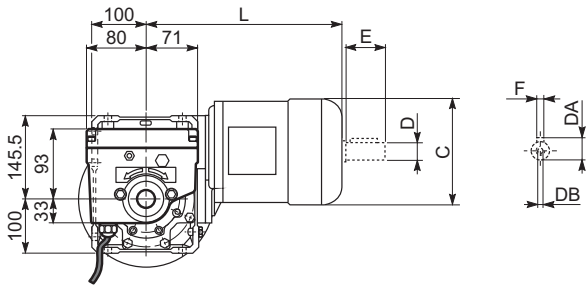


WR 75 UFC

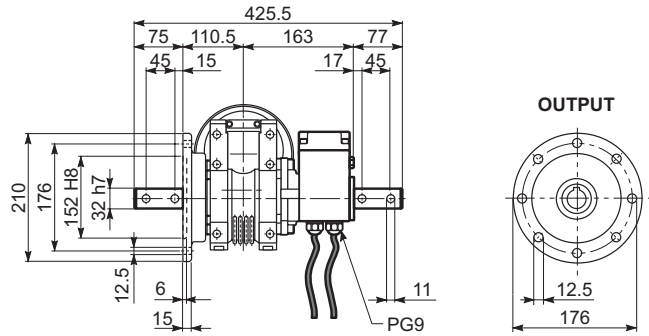
	M	M1	M2	N	N1	N2	N3	N4	P	P1
W 75_P 71	14	16.3	5	160	130	110	11	9	112	-
W 75_P 80	19	21.8	6	200	165	130	12	11.5	112	-
W 75_P 90	24	27.3	8	200	165	130	12	11.5	112	-
WR 75_P 63	11	12.8	4	140	115	95	10	M8x10	152	23.53
WR 75_P 71	14	16.3	5	160	130	110	10	M8x10	152	23.53
WR 75_P 80	19	21.8	6	200	165	130	12	M10x13	163.5	11
WR 75_P 90	24	27.3	8	200	165	130	12	M10x13	163.5	11



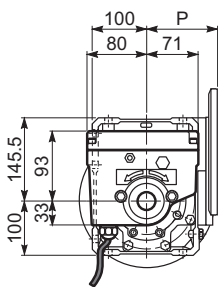
W 86 UFC_M - W 86 UFC - WR 86 UFC



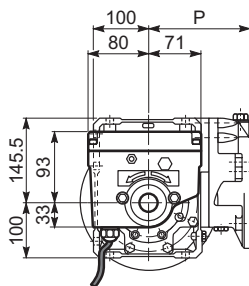
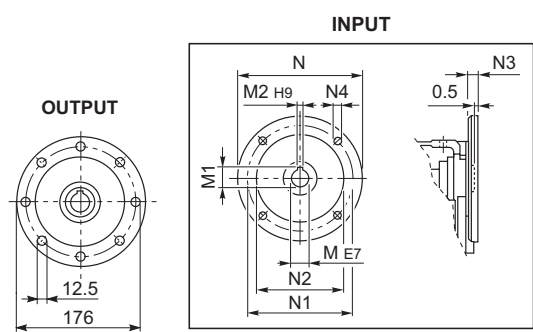
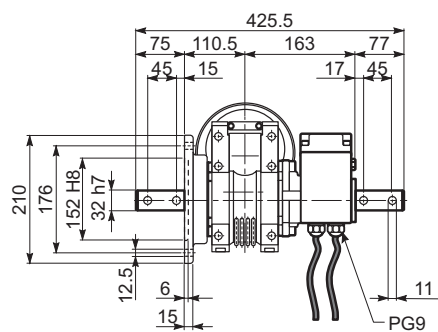
W 86 UFC_M



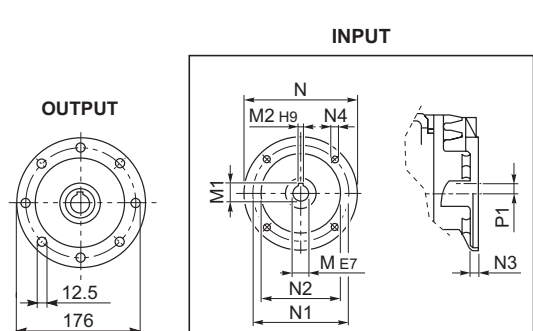
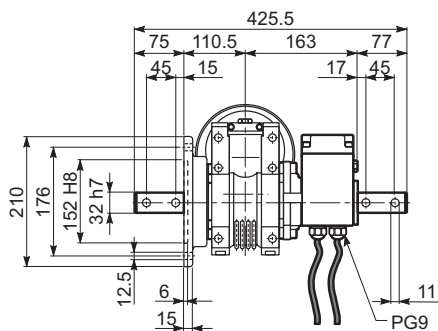
	C	D	DA	DB	E	F	L
W 86_S1 M1L	138	14	16	M5	30	5	324
W 86_S2 M2S	156	19	21.5	M6	40	6	349
W 86_S3 M3S	193	28	31	M10	60	8	392
W 86_S3 M3L	193	28	31	M10	60	8	424



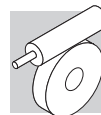
W 86 UFC



WR 86 UFC

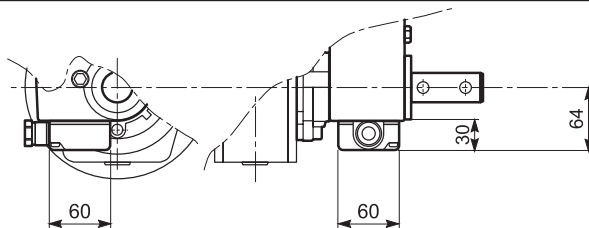


	M	M1	M2	N	N1	N2	N3	N4	P	P1
W 86_P 71	14	16.3	5	160	130	110	11	9	128	-
W 86_P 80	19	21.8	6	200	165	130	12	11.5	128	-
W 86_P 90	24	27.3	8	200	165	130	12	11.5	128	-
WR 86_P 63	11	12.8	4	140	115	95	10	M8x10	168	35.4
WR 86_P 71	14	16.3	5	160	130	110	10	M8x10	168	35.4
WR 86_P 80	19	21.8	6	200	165	130	12	M10x13	179.5	22.9
WR 86_P 90	24	27.3	8	200	165	130	12	M10x13	179.5	22.9

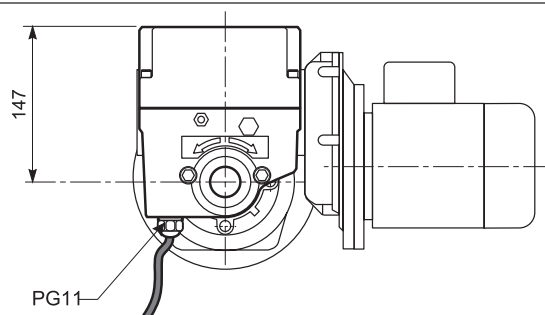


42 OPZIONI

Varianti fine corsa

ME

Versione con morsettiera

DM

Versione con doppi micro



MOTORI ELETTRICI

M1 SIMBOLOGIA E UNITÀ DI MISURA

Simbolo	Unità di misura	Descrizione	Simbolo	Unità di misura	Descrizione
$\cos\varphi$	–	Fattore di potenza	n	[min ⁻¹]	Velocità nominale
η	–	Rendimento	P_B	[W]	Potenza assorbita dal freno a 20°C
f_m	–	Fattore correttivo della potenza	P_n	[kW]	Potenza nominale
I	–	Rapporto di intermittenza	P_r	[kW]	Potenza richiesta
I_N	[A]	Corrente nominale	t_1	[ms]	Ritardo di sblocco del freno con alimentatore a semionda
I_S	[A]	Corrente di spunto	t_{1s}	[ms]	Tempo di sblocco del freno con alimentatore a controllo elettronico
J_C	[Kgm ²]	Momento di inerzia del carico	t_2	[ms]	Ritardo di frenatura con disgiunzione lato c.a.
J_M	[Kgm ²]	Momento di inerzia motore	t_{2c}	[ms]	Ritardo di frenatura con disgiunzione circuito c.a. e c.c.
K_C	–	Fattore di coppia	t_a	[°C]	Temperatura ambiente
K_d	–	Fattore di carico	t_f	[min]	Tempo di funzionamento a carico costante
K_J	–	Fattore di inerzia	t_r	[min]	Tempo di riposo
M_A	[Nm]	Coppia accelerante media	W	[J]	Lavoro di frenatura accumulato tra due regolazioni del traferro
M_B	[Nm]	Coppia frenante	W_{max}	[J]	Energia massima per singola frenatura
M_N	[Nm]	Coppia nominale	Z	[1/h]	N° di avviamenti ammissibili, a carico
M_L	[Nm]	Coppia resistente media	Z_0	[1/h]	N° di avviamenti ammissibili a vuoto (I = 50%)
M_S	[Nm]	Coppia di spunto			



M2 CARATTERISTICHE GENERALI

M2.1 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.

M2.2 Normative

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

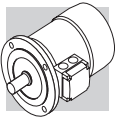
(F 1)

Titolo	CEI	IEC
Prescrizioni generali per macchine elettriche rotanti	CEI EN 60034-1	IEC 60034-1
Marcatura dei terminali e senso di rotazione per macchine elettriche rotanti	CEI 2-8	IEC 60034-8
Metodi di raffreddamento delle macchine elettriche	CEI EN 60034-6	IEC 60034-6
Dimensioni e potenze nominali per macchine elettriche rotanti	EN 50347	IEC 60072
Classificazione dei gradi di protezione delle macchine elettriche rotanti	CEI EN 60034-5	IEC 60034-5
Limiti di rumorosità	CEI EN 60034-9	IEC 60034-9
Sigle di designazione delle forme costruttive e dei tipi di installazione	CEI EN 60034-7	IEC 60034-7
Tensione nominale per i sistemi di distribuzione pubblica dell'energia elettrica a bassa tensione	CEI 8-6	IEC 60038
Grado di vibrazione delle macchine elettriche	CEI EN 60034-14	IEC 60034-14

I motori corrispondono inoltre alle Norme straniere adeguate alle IEC 60034-1 e qui riportate.

(F 2)

DIN VDE 0530	Germania
BS5000 / BS4999	Gran Bretagna
AS 1359	Australia
NBNC 51 - 101	Belgio
NEK - IEC 34	Norvegia
NF C 51	Francia
OEVE M 10	Austria
SEV 3009	Svizzera
NEN 3173	Paesi Bassi
SS 426 01 01	Svezia



M2.3 Motori per USA e Canada

CUS

I motori 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 1004-1 con targhetta riportante entrambi i marchi sotto illustrati, specificare in questo caso l'opzione CUS.



Le tensioni delle reti di distribuzione americane e le corrispondenti tensioni nominali da specificare per il motore sono indicate nella tabella seguente:

(F 3)

Frequenza	Tensione di rete	V _{mot}
60 Hz	208 V	200 V
	240 V	230 V
	480 V	460 V
	600 V	575 V

L'opzione CUS è applicabile anche ai motori a 50 Hz.

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

Per le stesse esecuzioni, e inoltre per l'alimentazione 575V-60Hz, la potenza di targa corrisponde a quella normalizzata a 50Hz.

Per i motori autofrenanti con freno in c.c. tipo BN/M_FD e BN/M_AFD l'alimentazione del raddrizzatore è da morsettiere motore con tensione 230V a.c. monofase.

Per i motori autofrenanti **l'alimentazione del freno** è così predisposta:

(F 4)

BN_FD ; BN_AFD M_FD ; M_AFD	BN_FA M_FA	Specificare
Da morsettiere motore 1~230V c.a.	Alimentazione separata 230V Δ - 60Hz	230SA
	Alimentazione separata 460V Y - 60Hz	460SA

L'opzione CUS non è applicabile ai motori dotati di servoventilazione o ai motori equipaggiati col freno AFD.



M2.4 China Compulsory Certification

CCC

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:



L'opzione CCC non è applicabile ai motori equipaggiati col freno AFD.

L'opzione CCC non è applicabile ai motori dotati di servoventilazione.

M2.5 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 e AFD, se corredati dell'opportuno filtro capacitivo in ingresso al raddrizzatore (opzione **CF**), rientrano nei limiti di emissione previsti dalla Norma EN 61000-6-3:2007 "Compatibilità elettromagnetica - Norma Generica sull'emissione - Parte 6-3: 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.

M2.6 Tolleranze

Secondo le Norme CEI EN 60034-1, per le grandezze garantite sono ammesse le tolleranze qui indicate:

(F 5)

-0.15 (1 - η) $P \leq 50\text{kW}$	Rendimento
$-(1 - \cos\phi)/6$ min 0.02 max 0.07	Fattore di potenza
$\pm 20\%$ *	Scorrimento
+20%	Corrente a rotore bloccato
-15% +25%	Coppia a rotore bloccato
-10%	Coppia max

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



M3 CARATTERISTICHE MECCANICHE

M3.1 Forme costruttive

I motori serie BN sono previsti nelle forme costruttive indicate in tabella (F6) 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, IMV19 (derivate)

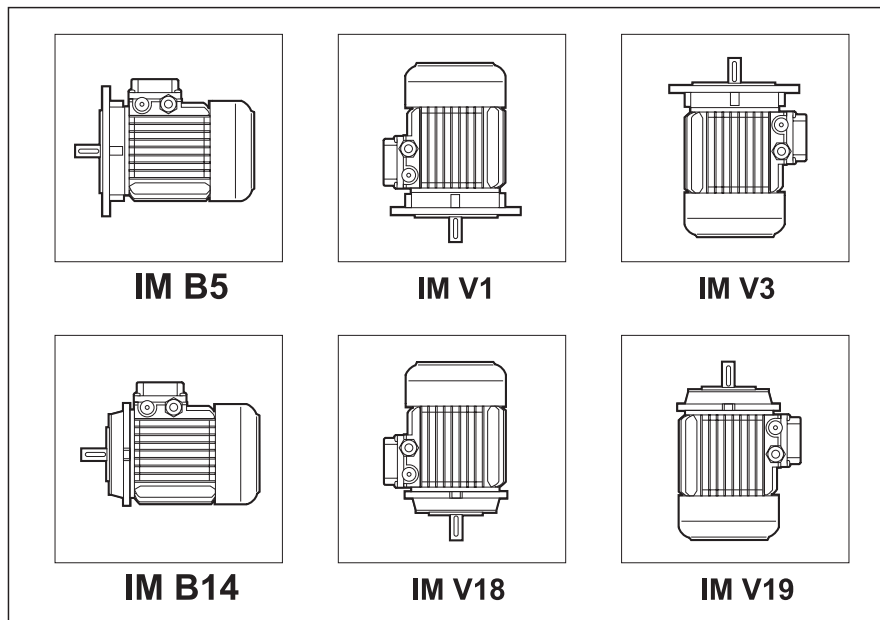
I motori in forma costruttiva IM B5 possono essere installati nelle posizioni IM V1 e IM V3; i motori in forma costruttiva IM B14 possono essere installati nelle posizioni IM V18 e IM V19.

In questi casi, sulla targa del motore sarà indicata la forma costruttiva base IM B5 o IM B14.

Nelle forme costruttive dove il motore assume una posizione verticale con albero in basso, si consiglia di richiedere l'esecuzione con tettuccio parapioggia (da prevedere sempre nel caso di motori autofrenanti).

Tale esecuzione, presente nelle opzioni, va richiesta espressamente in fase di ordine in quanto non è prevista nella versione base.

(F 6)



I motori in forma flangiata possono essere forniti con dimensioni di accoppiamento ridotte, come riportato in tabella (F7) - esecuzioni **B5R**, **B14R**.



(F 7)

	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

(2) flangia con fori filettati

M3.2 Grado di protezione

IP..

La tabella sottostante riassume la disponibilità dei vari gradi di protezione.

Indipendentemente dal grado di protezione specificato, per installazione all'aperto i motori devono essere protetti dall'irraggiamento diretto e, nel caso d'installazione con albero rivolto verso il basso, è necessario specificare ulteriormente il tettuccio di protezione contro l'ingresso di acqua e corpi solidi (opzione **RC**).

(F 8)

		IP 54	IP 55	IP 56
BN	M	●	standard	
BN_FD BN_AFD BN_FA	M_FD M_AFD M_FA	standard		●

M3.3 Ventilazione

I motori sono raffreddati mediante ventilazione esterna (IC 411 secondo CEI EN 60034-6) e sono provvisti di ventola radiale in plastica che funziona in entrambi i sensi di rotazione.

L'installazione deve assicurare una distanza minima dalla calotta copriventola alla parete in modo da non avere impedimenti all'ingresso aria e permettere la possibilità di eseguire l'opportuna manutenzione del motore e, se previsto, del freno.

Su richiesta è possibile prevedere una ventilazione forzata indipendente (opzione U1). Questa soluzione consente di aumentare il fattore di utilizzo del motore nel caso di alimentazione da inverter e funzionamento a giri ridotti.



M3.4 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.

M3.5 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.

M3.6 Vibrazioni ed equilibratura

Tutti i rotor sono equilibrati con mezza linguetta e rientrano nei limiti di intensità di vibrazione previsti dalle Norme CEI EN 60034-14.

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

(F 9)

Grado di vibrazione	Velocità di rotazione n [min ⁻¹]	Limiti della velocità di vibrazione
		[mm/s] BN 56 ≤ H ≤ BN 200 M05 ≤ H ≤ M5
A	600 < n < 3600	1.6
B	600 < n < 3600	0.70

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

M3.7 Morsettiera motore

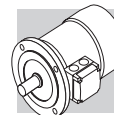
La morsettiera principale è a sei morsetti per collegamento con capicorda. All'interno della scatola è previsto un morsetto per il conduttore di terra.

Le dimensioni dei perni di attacco sono riportate nella tabella seguente.



Per l'alimentazione del freno vedi par. M6, M7 (freno FD e AFD), M8, M9 (freno FA).

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.





(F 10)

		N° terminali	Filettatura terminali	Sezione max. del conduttore 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

M3.8 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.

(F 11)

		Ingresso cavi	Diametro max. cavo allacciabile [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	21
		2 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	28


M3.9 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

(F 12)

	DE		NDE	
	M, M_FD, M_AFD, M_FA		M	M_FD, M_AFD, 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



(F 13)

	DE	NDE	
	BN, BN_FD, BN_AFD, BN_FA	BN	BN_FD, BN_AFD, BN_FA
BN 56	6201 2Z C3	6201 2Z C3	–
BN 63	6201 2Z C3	6201 2Z C3	6201 2RS C3
BN 71	6202 2Z C3	6202 2Z C3	6202 2RS C3
BN 80	6204 2Z C3	6204 2Z C3	6204 2RS C3
BN 90	6205 2Z C3	6205 2Z C3	6305 2RS C3
BN 100	6206 2Z C3	6206 2Z C3	6206 2RS C3
BN 112	6306 2Z C3	6306 2Z C3	6306 2RS C3
BN 132	6308 2Z C3	6308 2Z C3	6308 2RS C3
BN 160MR	6309 2Z C3	6308 2Z C3	6308 2RS C3
BN 160M/L	6309 2Z C3	6309 2Z C3	6309 2RS C3
BN 180M	6310 2Z C3	6309 2Z C3	6309 2RS C3
BN 180L	6310 2Z C3	6310 2Z C3	6310 2RS C3
BN 200L	6312 2Z C3	6310 2Z C3	6310 2RS C3

M4 CARATTERISTICHE ELETTRICHE

M4.1 Tensione



I motori ad una velocità sono previsti nell'esecuzione standard per tensione nominale 230 / 400 V Δ/Y , 50 Hz, o 400 / 690 V Δ/Y , 50 Hz, con tolleranza di tensione $\pm 10\%$, in accordo a quanto specificato nella tabella sottostante.

Per tutti i motori BN ed M, la cui configurazione tensione / frequenza non sia contenuta nella tabella sottostante, la tolleranza di tensione è ridotta al $\pm 5\%$.

Per il funzionamento ai limiti di tolleranza, la temperatura può superare di 10 K il limite previsto dalla classe di isolamento adottata.

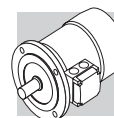
I motori sono idonei per il funzionamento sulla rete di distribuzione europea con tensione in accordo alla pubblicazione IEC 60038.

(F 14)

			V_{mot} $\pm 10\%$ 3 ~	Esecuzione
IE1	BN 56 ... BN 132	M0 ... M4	230 / 400 V - Δ/Y - 50 Hz	standard
			400 / 690 V - Δ/Y - 50 Hz	a richiesta, senza sovrapprezzo
			460 V Y - 60 Hz	standard
	BN 160 ... 200	M5	400 / 690 V - Δ/Y - 50 Hz	standard
			460 V Δ - 60 Hz	standard


¹ solo motori a 4 poli

I motori a due velocità a 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.

(F 15)





Poli		Collegamento avvolgimento
2	BN 63 ... BN 200	$\Delta / Y^{(2)}$
4	BN 56 ... BN 200	
6	BN 63 ... BN 200	
8	BN 71 ... BN 132	
2/4	BN 63 ... BN 132	Δ / YY (Dahlander)
2/6	BN 71 ... BN 132	Y / Y (due avvolgimenti)
2/8	BN 71 ... BN 132	
2/12	BN 80 ... BN 132	
4/6	BN 71 ... BN 132	
4/8	BN 80 ... BN 132	Δ / YY (Dahlander)

⁽²⁾ I motori con tensione in rapporto 2 (es. 230/460-6) saranno dotati di morsetti a 9 perni con collegamento $\Delta\Delta / \Delta$ o YY / Y (eccetto il BN 63 6 poli Δ / Y)

M4.2 Frequenza

La potenza di targa dei motori BN / M a 60 Hz corrisponde a quanto riportato nella tabella seguente.

(F 16)

		2P	4P	6P			2P	4P	6P
		P_n [kW]					P_n [kW]		
BN 56A	–	–	0.06	–	BN 112M	M3LB	4.7	4.7	2.5
BN 56B	M0B	–	0.10	–		M3LC	–	4.7	2.5
BN 63A	M05A	0.21	0.14	0.10	BN 132S	M4SA	–	6.5	3.5
BN 63B	M05B	0.30	0.21	0.14	BN 132SA	M4SA	6.3	–	–
BN 71A	M05C	0.45	0.30	0.21	BN 132SB	M4SB	8.7	–	–
BN 71B	M1SD	0.65	0.45	0.30	BN 132M	M4LA	11	–	–
BN 80A	M1LA	0.90	0.65	0.45	BN 132MA	M4LA	–	8.7	4.6
BN 80B	M2SA	1.30	0.90	0.65	BN 132MB	M4LB	–	11	6.5
BN 90S	M2SB	–	1.30	0.90	BN 160MR	M4LC	12.5	12.5	–
BN 90SA	M2SB	1.8	–	–	BN 160MB	M5SB	17.5	–	–
BN 90L	M3SA	2.5	–	1.3	BN 160M	M5SA	–	–	8.6
BN 90LA	M3SA	–	1.8	–	BN 160L	M5S	21.5	17.5	12.6
BN 100L	M3LA	3.5	–	–	BN 180M	M5LA	24.5	21.5	–
BN 100LA	M3LA	–	2.5	1.8	BN 180L	–	–	25.3	17.5
BN 100LB	M3LB	4.7	3.5	2.2	BN 200L	–	34	34	22

Motori BN / M 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. I motori normalmente avvolti per frequenza 50 Hz possono essere usati in reti a 60 Hz, ma i relativi dati dovranno essere corretti secondo la seguente tabella.



(F 17)

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	1	0.83	1.2
	380 - 415 Y			
400/690 Δ/Y	380 - 415 Δ	1.15	1	1.2
230/400 Δ/Y	265 - 280 Δ			
	440 - 480 Y			
400/690 Δ/Y	440 - 480 Δ			

M4.3 Temperatura ambiente

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.

(F 18)

Temperatura ambiente (°C)	40°	45°	50°	55°	60°
Potenza ammissibile in % della potenza nominale	100%	95%	90%	85%	80%

Quando è richiesto un declassamento del motore superiore al 15%, contattare il ns. Servizio Tecnico.

M4.4 Classe d'isolamento

CL F

I motori di produzione Bonfiglioli impiegano, di serie, materiali isolanti (filo smaltato, isolanti, resine d'impregnazione) in 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.

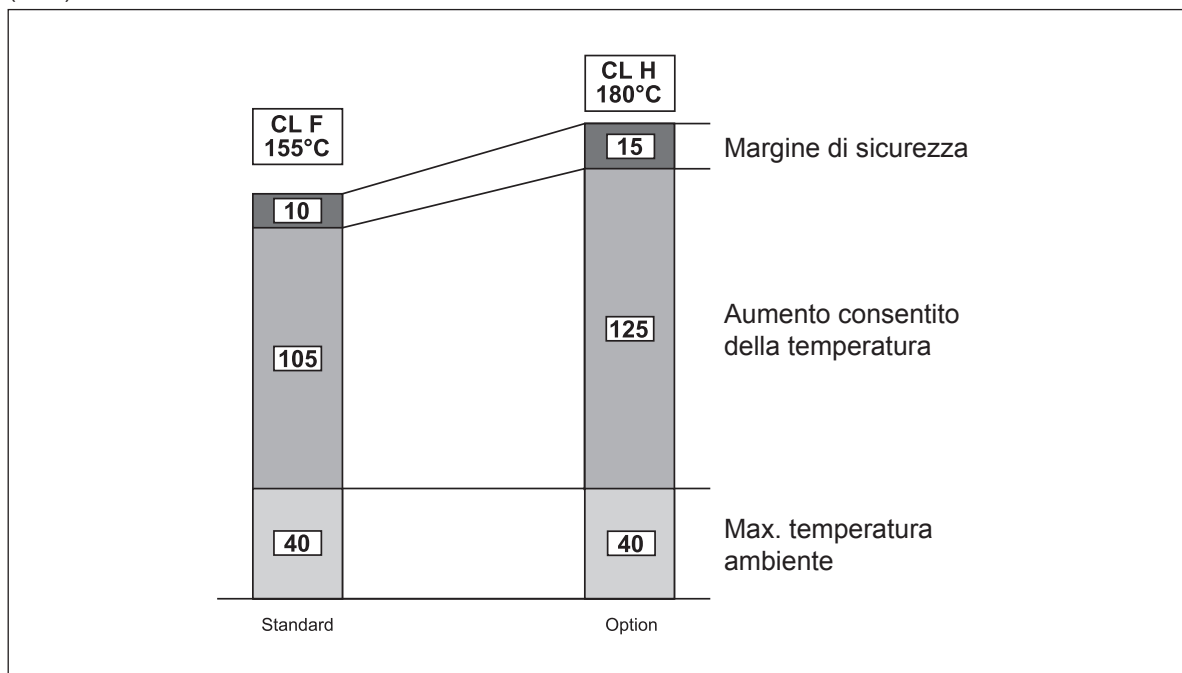
L'accurata scelta dei componenti del sistema isolante consente l'impiego dei motori anche in climi tropicali ed in presenza di vibrazioni normali.

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.

Non disponibile per i motori conformi alle norme CSA e UL (opzione CUS).



(F 19)



M4.5 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 servizi S2 ed S3 è possibile ottenere una maggiorazione della potenza rispetto a quella prevista per il servizio continuo secondo quanto indicato nella tabella che segue, valida per i motori a singola polarità.

In alternativa al servizio continuo S1, in fase di configurazione del prodotto è possibile selezionare uno dei seguenti valori: S2, S3 o S9; la targhetta del motore verrà compilata con potenza aumentata coerentemente al tipo di servizio, dati elettrici dedicati e tipo di servizio rispettivamente S2-30min, S3-70% o S9.

Per ulteriori dettagli è necessario contattare il servizio Tecnico Bonfiglioli.

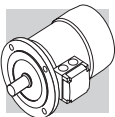
Per le maggiorazioni applicabili a motori a doppia polarità consultare preferibilmente il Servizio Tecnico Bonfiglioli.

(F 20)

	Servizio						
	S2			S3 *			S4 - S9
	Durata del ciclo (min)			Rapporto di intermittenza (I)			Interpellaci
	10	30 (*)	60	25%	40%	70% (*)	
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.

(*) Valori predefiniti dalle opzioni



M4.5.1 Rapporto di intermittenza:

$$I = \frac{t_f}{t_f + t_r} \cdot 100 \quad (23)$$

t_f = tempo di funzionamento a carico costante

t_r = tempo di riposo

M4.5.2 Servizio di durata limitata 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.

M4.5.3 Servizio intermittente periodico 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.

M4.6 Funzionamento con alimentazione da inverter

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. (F30).

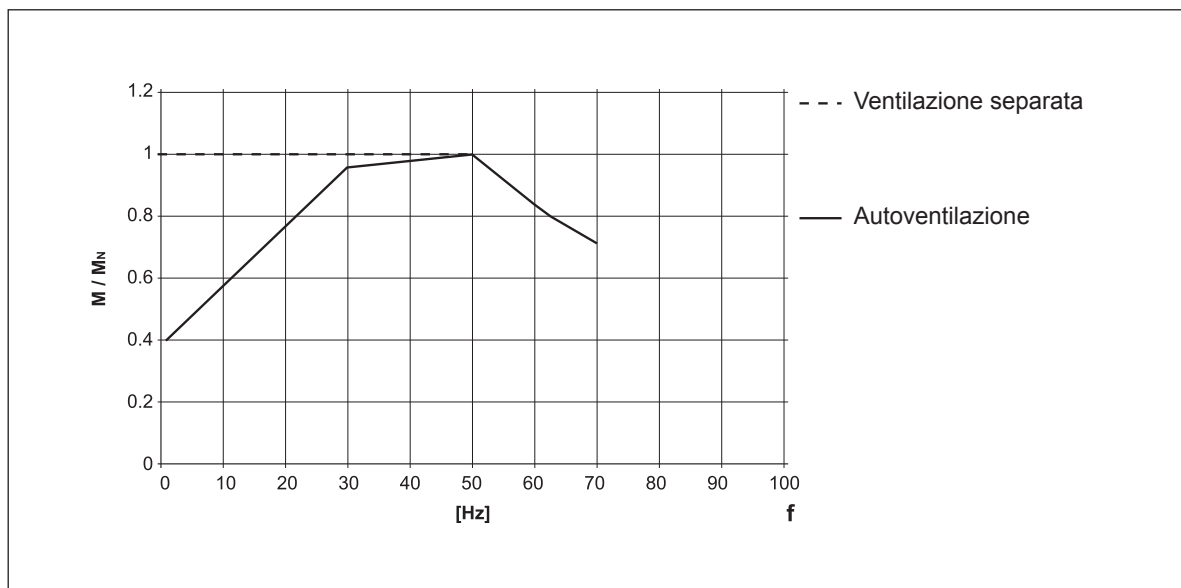
Per frequenze di funzionamento inferiori a circa 30 Hz, a causa della diminuzione della ventilazione, i motori standard autoventilati (IC411) devono essere opportunamente declassati in coppia o, in alternativa, devono essere provvisti di servoventilatore indipendente.

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





(F 21)



Per funzionamento oltre la frequenza nominale, la velocità limite meccanica dei motori è riportata in tabella (F22):

(F 22)

		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.

Il servoventilatore e, se presente, il freno elettromagnetico devono sempre essere alimentati direttamente da rete.

M4.7 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:



$$Z = \frac{Z_0 \cdot K_c \cdot K_d}{K_J} \quad (24)$$

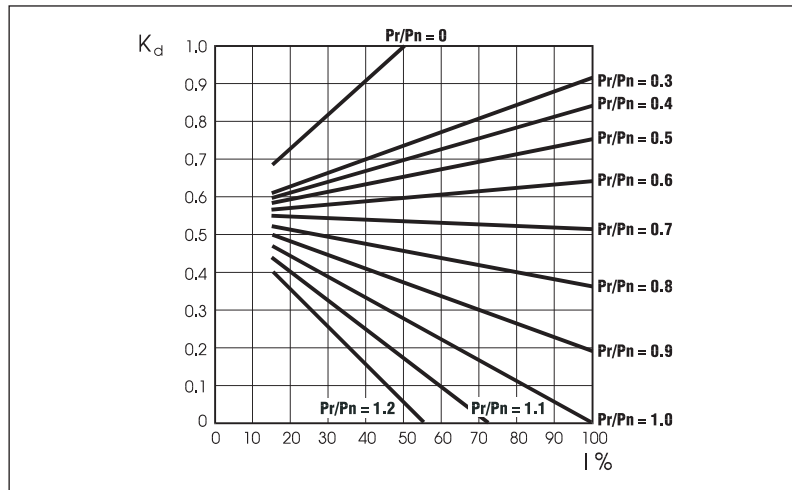
dove:

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

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

$$K_d = \quad \text{fattore di carico vedi tabella seguente}$$

(F 23)



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 (F30), (F40) e (F48).



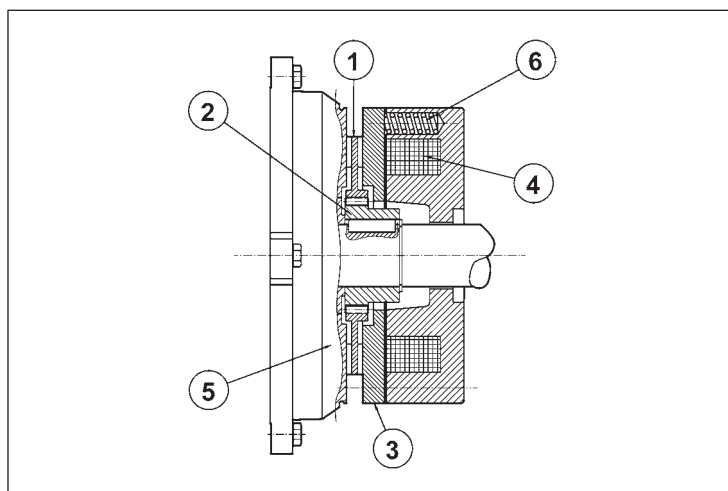
M5 MOTORI ASINCRONI AUTOFRENANTI

M5.1 Funzionamento

L'esecuzione autofrenante prevede l'impiego di freni a pressione di molle alimentati in c.c. (tipo FD, AFD) o in c.a. (tipo FA).

Tutti i freni funzionano secondo il principio di sicurezza, ossia intervengono in seguito alla pressione esercitata dalle molle, in mancanza di alimentazione.

(F 24)



Legenda:

- ① disco
- ② mozzo
- ③ áncora mobile
- ④ bobina
- ⑤ scudo posteriore motore
- ⑥ molle

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.

M5.2 Caratteristiche generali

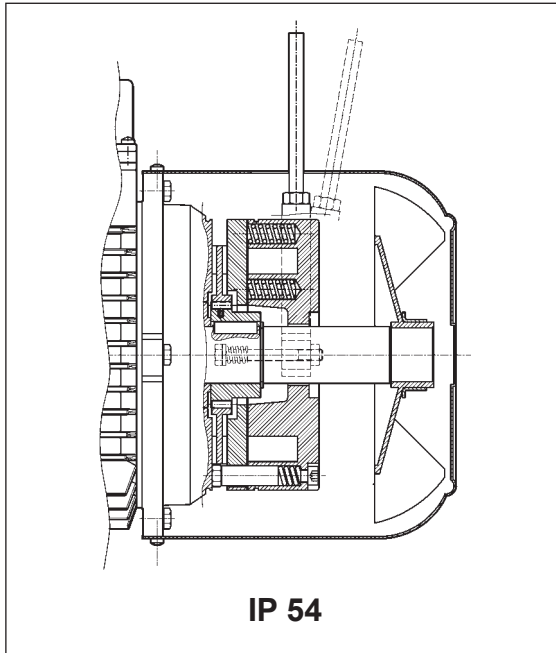
- Coppie frenanti elevate (generalmente $M_b \approx 2 M_n$) e regolabili.
- Disco freno con anima in acciaio a doppia guarnizione d'attrito (materiale a bassa usura, senza amianto).
- Cava esagonale sull'albero motore, lato ventola (NDE), per rotazione manuale (non prevista quando sono presenti le opzioni PS, RC, TC, U1, U2, EN1, EN2, EN3, EN4, EN5, EN6).
- Sblocco meccanico manuale (opzioni **R** e **RM** per BN/M_FD; opzione **R** per BN/M_FA).
- Sblocco meccanico manuale (opzione **R** per BN/M_AFD).
- Trattamento anticorrosivo di tutte la superfici del freno.
- Isolamento in classe F.



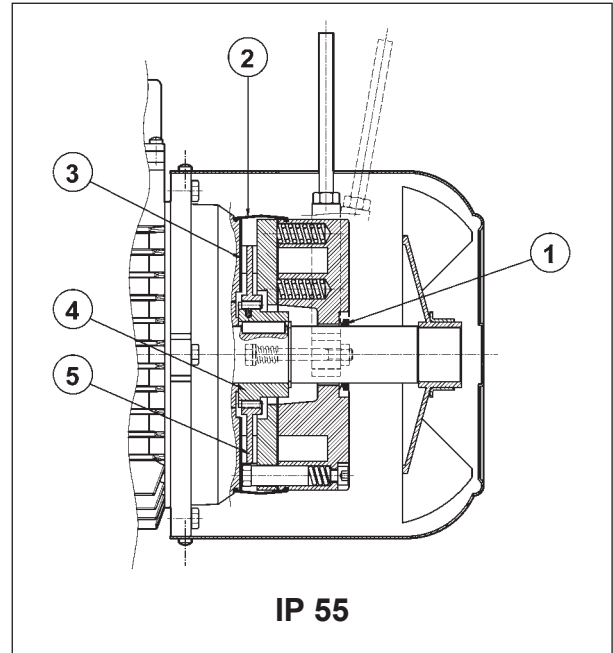
M6 MOTORI AUTOFRENANTI IN C.C., TIPO BN_FD e M_FD

Grandezze: BN 63 ... BN 200L / M05 ... M5

(F 25)



(F 26)



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 dispositivo 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 al paragrafo "SISTEMI DI SBLOCCO FRENO".

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.

Per applicazioni che prevedono sollevamenti e/o elevati valori di lavoro orario smaltibile, contattare il servizio tecnico commerciale.

M6.1 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 **IP55**, 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

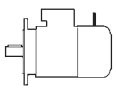



M6.2 Alimentazione freno FD

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 morsetteria motore.

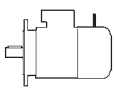


Indipendentemente dalla frequenza di rete, la tensione standard di alimentazione del raddrizzatore V_B ha il valore indicato nella tabella qui di seguito:

(F 27)

2, 4, 6 P		1 speed			
		BN_FD / M_FD		alimentazione freno da morsetteria	alimentazione separata
		$V_{mot} \pm 10\%$ 3 ~	$V_B \pm 10\%$ 1 ~		
BN 63...BN 132	M05...M4LB	230/400 V – 50 Hz	230 V	standard	specificare V_B SA o 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

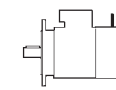


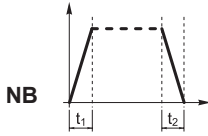
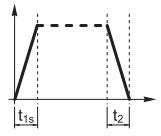
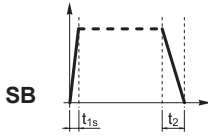
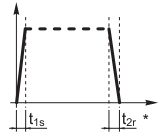
Per i motori a doppia polarità l'alimentazione standard del freno è da linea separata con tensione d'ingresso al raddrizzatore V_B come indicato nella tabella qui di seguito:

(F 28)

2/4, 2/6, 2/8, 2/12, 4/6, 4/8 P		2 speed			
		BN_FD / M_FD		alimentazione freno da morsetteria	alimentazione separata
		$V_{mot} \pm 10\%$ 3 ~	$V_B \pm 10\%$ 1 ~		
BN 63...BN 132	M05...M4LB	400 V – 50 Hz	230 V		specificare V_B SA o 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 seguente:

(F 29)

		freno		
			standard	a richiesta
BN 63	M05	FD 02		
BN 71	M1	FD 03		
		FD 53		
BN 80	M2	FD 04		
BN 90S	—	FD 14		
BN 90L	—	FD 05		
BN 100	M3	FD 15		
—		FD 55		
BN 112	—	FD 06S		
BN 132...160MR	M4	FD 56		
BN 160L - BN 180M	M5	FD 06		
BN 180L - NM 200L	—	FD 07		

(*) $t_{2c} < t_{2r} < t_2$



Il raddrizzatore **SB** a controllo elettronico dell'eccitazione, riduce i tempi di sblocco del freno sovrecitando 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 intervento (ripristino della condizione frenante) del freno sono disponibili a richiesta i raddrizzatori **NBR** o **SBR**.

Questi raddrizzatori completano i tipi **NB** e **SB**, integrando nel circuito elettronico un interruttore statico che interviene diseccitando rapidamente il freno in caso di mancanza di tensione.

Questa soluzione consente di ridurre i tempi di rilascio del freno evitando ulteriori cablaggi e contatti esterni.

Per il migliore utilizzo dei raddrizzatori **NBR** e **SBR** è richiesta l'alimentazione separata del freno.

Tensioni disponibili: 230Vac ±10%, 400Vac ± 10%, 50/60 Hz (con alimentatore); 100Vdc ±10%, 180Vdc ± 10% (con opzione SD).

M6.3 Dati tecnici freni FD

Nella tabella sottostante sono riportati i dati tecnici dei freni in c.c. tipo FD.

(F 30)

Freno	Coppia frenante M_b [Nm]			Rilascio		Frenatura		W_{max} per frenata			W [MJ]	P [W]
	molle			t_1	t_{1s}	t_2	t_{2c}	[J]				
	6	4	2	[ms]	[ms]	[ms]	[ms]	10 s/h	100 s/h	1000 s/h		
FD02	–	3.5	1.75	30	15	80	9	4500	1400	180	15	17
FD03	5	3.5	1.75	50	20	100	12	7000	1900	230	25	24
FD53	7.5	5	2.5	60	30	100	12					
FD04	15	10	5	80	35	140	15	10000	3100	350	30	33
FD14												
FD05	40	26	13	130	65	170	20	18000	4500	500	50	45
FD15	40	26	13	130	65	170	20					
FD55	55	37	18	–	65	170	20					
FD06S	60	40	20	–	80	220	25	20000	4800	550	70	55
FD56	–	75	37	–	90	250	20	29000	7400	800	80	65
FD06		100	50		100	250	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

** valori di coppia frenante ottenuti con n° 12, 9, 6 molle rispettivamente

- 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 tabella sono riferiti al freno tarato alla coppia massima, traferro medio e tensione nominale
- W_{max} = energia max per frenata
- W = energia di frenatura tra due regolazioni successive del traferro
- P_b = potenza assorbita dal freno a 20°C
- M_b = coppia frenante statica (±15%)
- s/h = avviamenti orari



L'usura delle guarnizioni di attrito è funzione delle condizioni operative (temperatura, umidità, velocità di slittamento, pressione specifica); i valori di usura devono pertanto essere considerati come indicativi.

M6.4 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 VB 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 (F31) - 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 (F32) - 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 (F30).

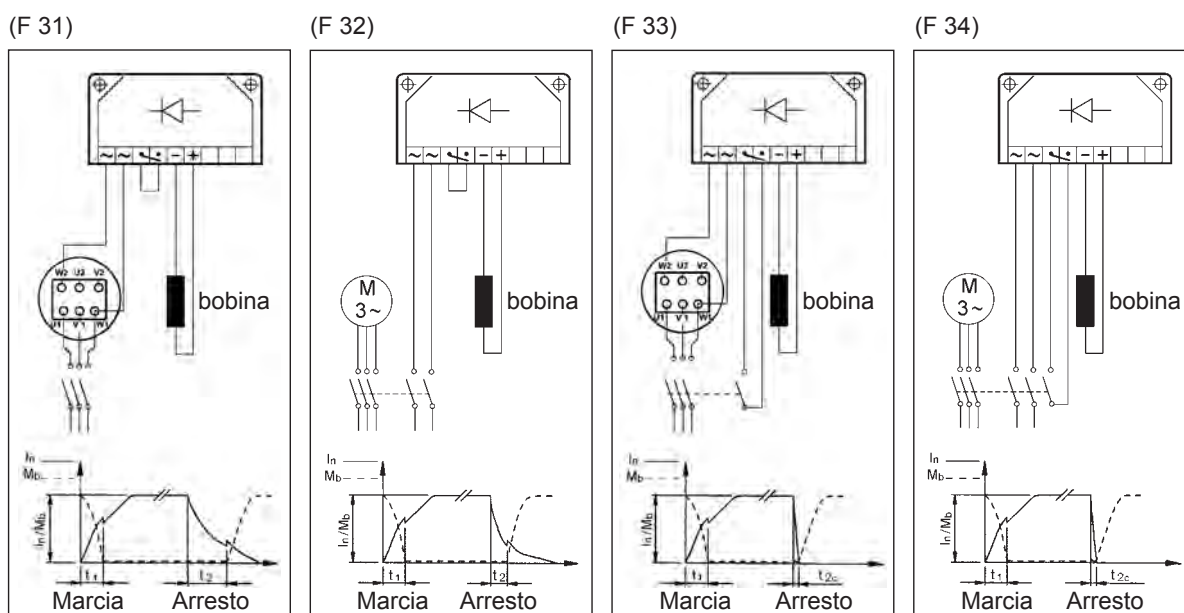
Tabella (F33) - Bobina freno con alimentazione dai morsetti motore ed interruzione lato c.a. e c.c.

Arresto rapido con i tempi d'intervento t_{2c} indicati in tabella (F30).

Tabella (F34) - 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 (F30).

L'alimentazione del freno direttamente dalla morsettiera del motore (da tab. F31 a tab. F34) è possibile solo quando la tensione nominale del freno corrisponde alla tensione minore del motore.

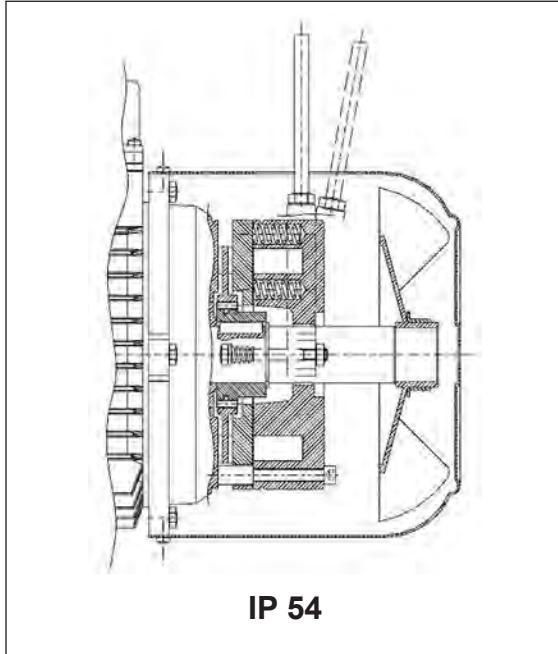




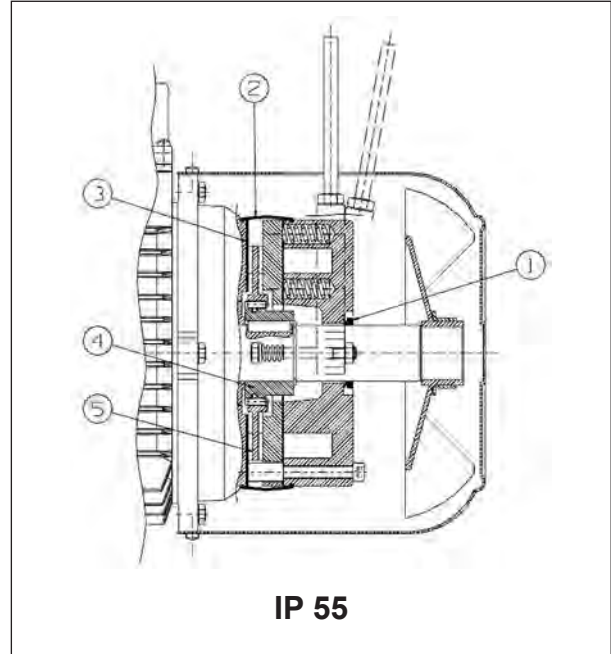
M7 MOTORI AUTOFRENANTI IN C.C., TIPO BN_AFD e M_AFD

Grandezze: BN 63 ... BN 200L / M05 ... M5

(F 35)



(F 36)



Freno a traferro fisso, senza manutenzione fino alla massima usura ammissibile per la garanzia d'attrito. Il traferro è pre-impostato e non deve essere regolato.

Freno elettromagnetico con bobina toroidale in **corrente continua** fissato con viti allo scudo motore. Il disco freno è scorrevole sul mozzo trascinatore in acciaio calettato sull'albero e previsto di dispositivo 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**); per la posizione angolare della leva di sblocco vedi descrizione della relativa variante al paragrafo "SISTEMI DI SBLOCCO FRENO".

Il freno AFD 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.

Il freno AFD è consigliato per applicazioni nelle quali è utilizzato come freno di stazionamento.

Per applicazioni che prevedono sollevamenti e/o elevati valori di lavoro orario smaltibile, contattare il servizio tecnico commerciale.

M7.1 Grado di protezione

L'esecuzione standard prevede il grado di protezione IP54. In opzione il motore autofrenante tipo AFD viene fornito con grado di protezione **IP55**, 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

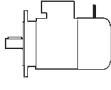



M7.2 Alimentazione freno AFD

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.

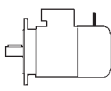

Per motori a singola polarità è inoltre previsto di serie il collegamento del raddrizzatore alla morsetteria motore. Indipendentemente dalla frequenza di rete, la tensione standard di alimentazione del raddrizzatore V_B ha il valore indicato nella tabella qui di seguito:

(F 37)

2, 4, 6 P				1 speed	
		BN_AFD / M_AFD		alimentazione freno da morsetteria	alimentazione separata
		$V_{mot} \pm 10\%$ 3 ~	$V_B \pm 10\%$ 1 ~		
BN 63...BN 132	M05...M4LB	230/400 V – 50 Hz	230 V	standard	specificare V_B SA o V_B SD
BN 160MR	M4LC	400/690 V – 50 Hz	400 V	standard	specificare V_B SA o V_B SD

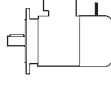
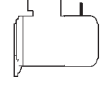

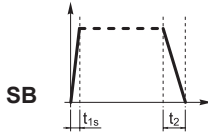
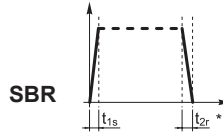
Per i motori a doppia polarità l'alimentazione standard del freno è da linea separata con tensione d'ingresso al raddrizzatore V_B come indicato nella tabella qui di seguito:

(F 38)

2/4, 2/6, 2/8, 2/12, 4/6, 4/8 P				2 speed	
		BN_AFD / M_AFD		alimentazione freno da morsetteria	alimentazione separata
		$V_{mot} \pm 10\%$ 3 ~	$V_B \pm 10\%$ 1 ~		
BN 63...BN 132	M05...M4LB	400 V – 50 Hz	230 V	⊖	specificare V_B SA o 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 **SB** e **SBR**, come dettagliato nella tabella seguente:

(F 39)

		freno	standard	 a richiesta
BN 63	M05	AFD 02		
BN 71	M1	AFD 03		
BN 80	M2	AFD 04		
BN 90S	—	AFD 14		
BN 90L	—	AFD 05		
BN 100	M3	AFD 15		
BN 112	—	AFD 06S		
BN 132...160MR	M4	AFD 06		
		AFD 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 intervento (ripristino della condizione frenante) del freno sono disponibili a richiesta i raddrizzatori **SBR**.

Questi raddrizzatori completano i tipi **SB**, integrando nel circuito elettronico un interruttore statico che interviene diseccitando rapidamente il freno in caso di mancanza di tensione.

Questa soluzione consente di ridurre i tempi di rilascio del freno evitando ulteriori cablaggi e contatti esterni.

Per il migliore utilizzo dei raddrizzatori **SBR** è richiesta l'alimentazione separata del freno.

Tensioni disponibili: 230Vac ±10%, 400Vac ± 10%, 50/60 Hz (con alimentatore); 100Vdc ±10%, 180Vdc ± 10% (con opzione SD).

M7.3 Dati tecnici freni AFD

Nella tabella sottostante sono riportati i dati tecnici dei freni in c.c. tipo AFD.

(F 40)

Freno	Coppia frenante M_b [Nm]			Traferro		Rilascio	Frenatura			W_{max} per frenata			W	P
	molle			tin	tmax	t_{1s}	t_2	t_{2c}	[J]					
	6	4	2	(± 0.1 mm)		[ms]	[ms]	[ms]	10 s/h	100 s/h	1000 s/h	[MJ]		
AFD 02	—	3.5	1.8	0.3	0.7	20	110	10	4500	1400	160	40	15	
AFD 03	7.5	5	2.5	0.3	0.7	35	140	15	7000	1900	210	60	21	
AFD 04	15	10	5	0.4	0.8	55	180	15	11000	3100	350	75	27	
AFD 14														
AFD 05	40	26	13	0.4	0.8	85	240	25	18000	4500	500	125	37	
AFD 15														
AFD 06S	60	40	20	0.45	0.9	110	280	30	25000	6300	700	175	47	
AFD 06	100	75(*) / 62(*)	37	0.45	0.9	130	330	30	29000	7400	800	200	50	
AFD 07	150	100	50	0.45	0.95	170	350	30	40000	9300	1000	320	55	

(*) in funzione della tipologia di molle

t_{in} = traferro iniziale con disco freno nuovo

t_{max} = traferro massimo a cui è necessaria la sostituzione del disco freno

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 tabella sono riferiti al freno tarato alla coppia massima, traferro medio e tensione nominale

W_{max} = energia max per frenata

W = energia di frenatura dissipabile prima della sostituzione del disco freno

P_b = potenza assorbita dal freno a 20°C

M_b = coppia frenante statica (±15%)

s/h = avviamenti orari



L'usura delle guarnizioni di attrito è funzione delle condizioni operative (temperatura, umidità, velocità di slittamento, pressione specifica, presenza dell'anello inox); i valori di usura devono pertanto essere considerati come indicativi.

M7.4 Collegamenti freno AFD

I motori standard ad una velocità sono forniti con il collegamento del raddrizzatore alla morsetteria motore già realizzato in fabbrica.

Per motori a 2 velocità, e dove è richiesta l'alimentazione del freno separata, prevedere il collegamento al raddrizzatore in accordo alla tensione freno VB 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 (F41) - 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 (F42) - 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 (F40).

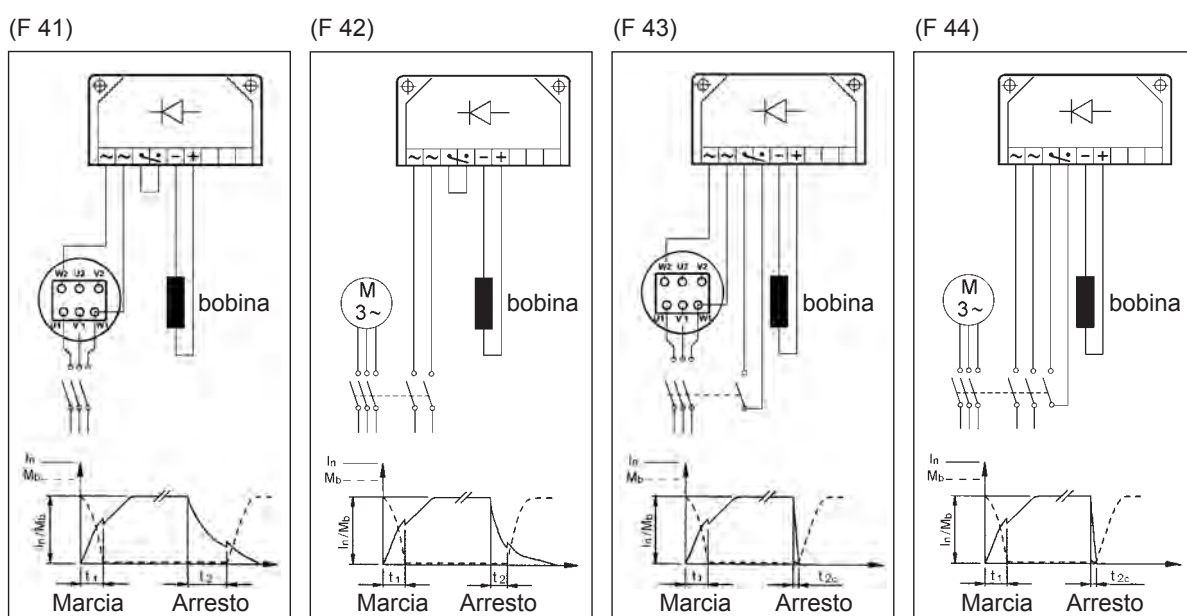
Tabella (F43) - Bobina freno con alimentazione dai morsetti motore ed interruzione lato c.a. e c.c.

Arresto rapido con i tempi d'intervento t_{2c} indicati in tabella (F40).

Tabella (F44) - 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 (F40).

L'alimentazione del freno direttamente dalla morsetteria del motore (da tab. F41 a tab. F44) è possibile solo quando la tensione nominale del freno corrisponde alla tensione minore del motore.

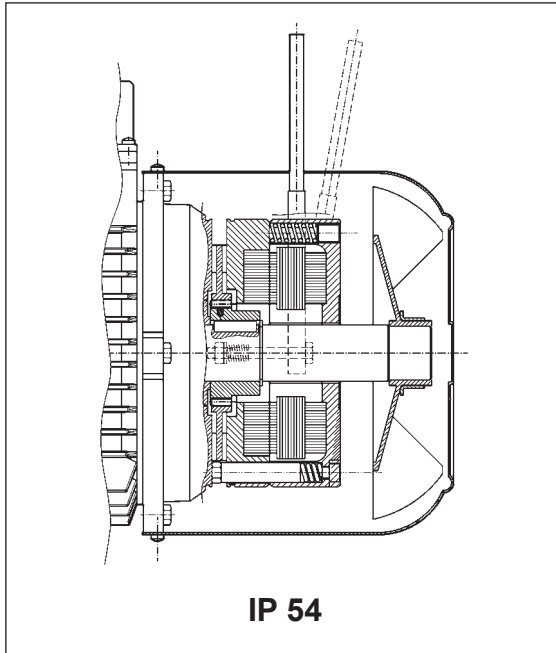




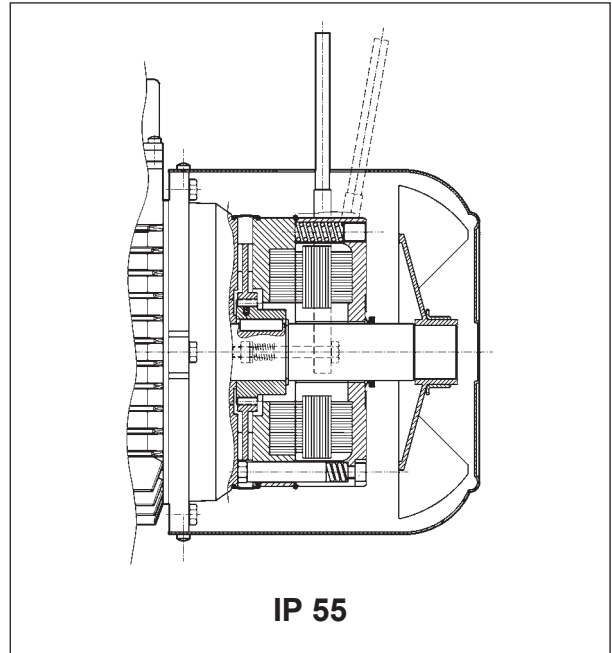
M8 MOTORI AUTOFRENANTI IN C.A., TIPO BN_FA e M_FA

Grandezze: BN 63 ... BN 180M / M05 ... M5

(F 45)



(F 46)



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 dispositivo 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. (F48).

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 posizione angolare della leva di sblocco vedi descrizione della relativa variante al paragrafo "SISTEMI DI SBLOCCO FRENO".

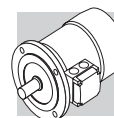
Per applicazioni che prevedono sollevamenti e/o elevati valori di lavoro orario smaltibile, contattare il servizio tecnico commerciale.

M8.1 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 **IP55** prevedendo le seguenti varianti costruttive:

- anello V-ring posizionato sull'albero motore NDE.
- fascia di protezione in gomma
- anello O-ring



M8.2 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:

(F 47)

motori a singola polarità	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)	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.

M8.3 Dati tecnici freni FA

(F 48)

Freno	Coppia frenante M_b [Nm]	Rilascio t_1 [ms]	Frenatura t_2 [ms]	W_{max} [J]			W [MJ]	P [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

M_b = max coppia frenante statica (±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.

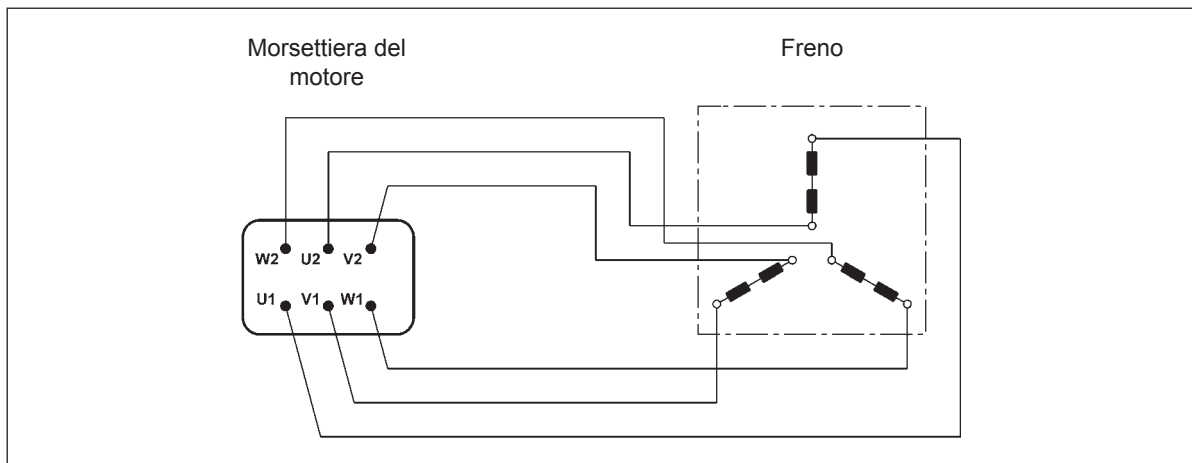


L'usura delle guarnizioni di attrito è funzione delle condizioni operative (temperatura, umidità, velocità di slittamento, pressione specifica); i valori di usura devono pertanto essere considerati come indicativi.

M8.4 Collegamenti freno FA

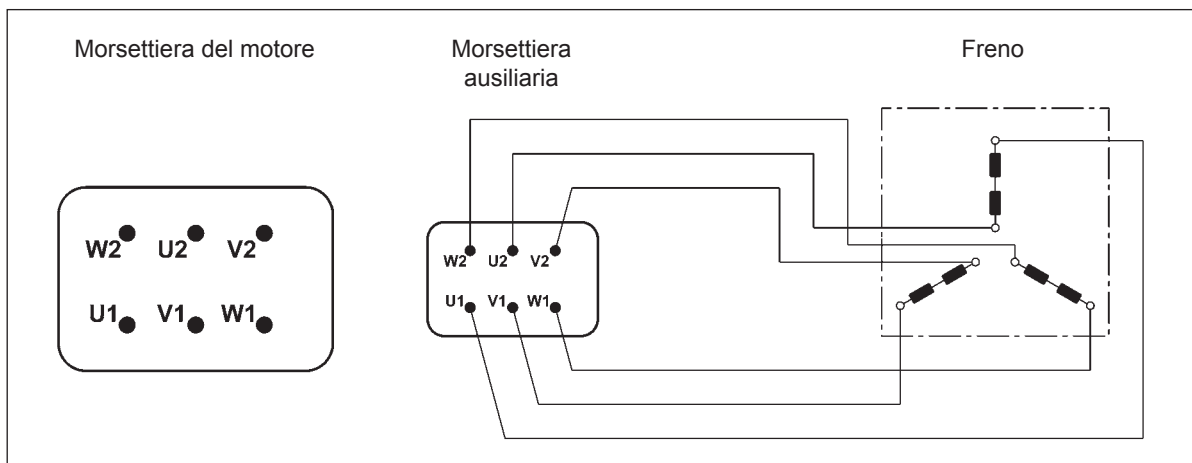
Per i motori con alimentazione del freno derivata direttamente dall'alimentazione motore i collegamenti alla morsettiera corrispondono a quanto riportato nello schema (F49):

(F 49)



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 (F50):

(F 50)



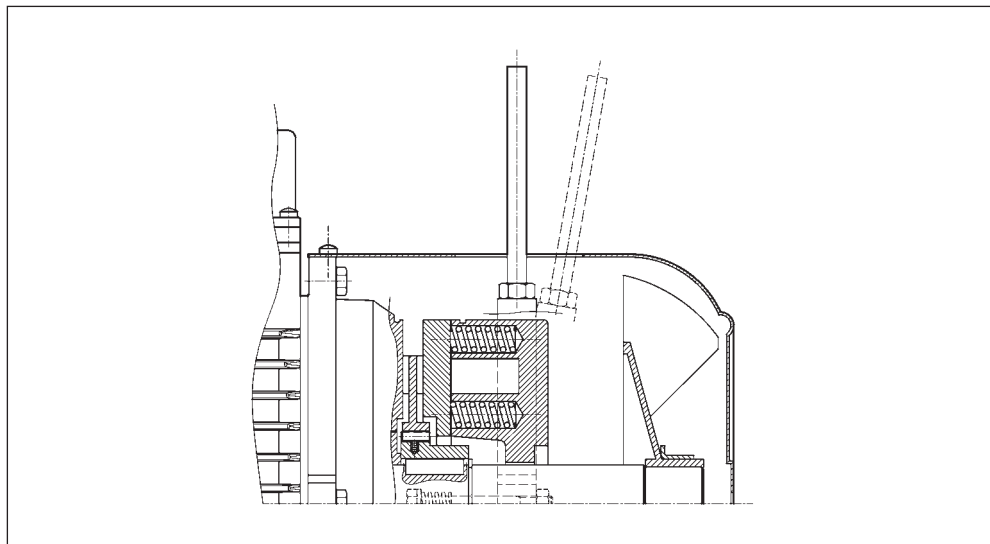


M9 SISTEMI DI SBLOCCO FRENO

I freni a pressione di molle tipo FD, AFD 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.

(F 51)

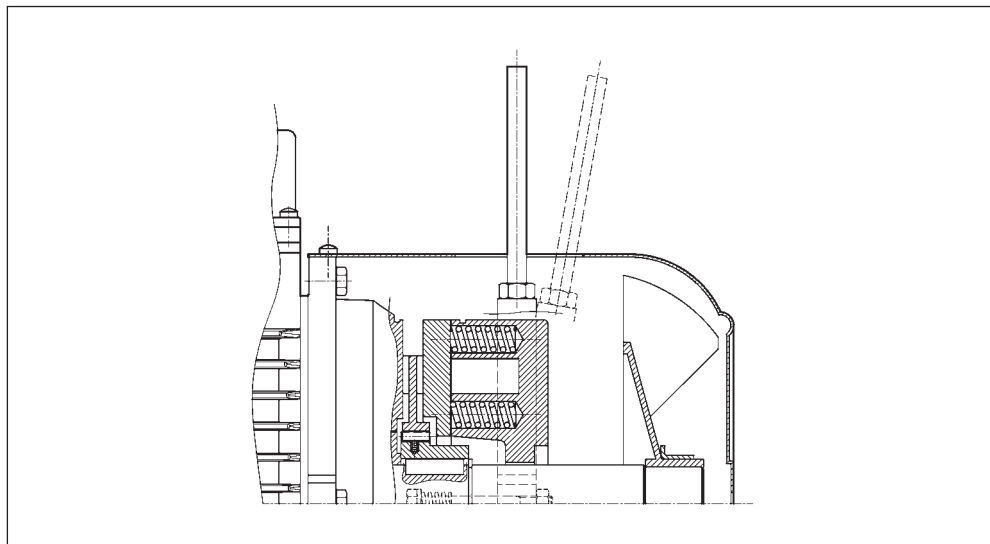
R



La leva di sblocco è dotata di ritorno automatico, tramite dispositivo a molla.

(F 52)

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



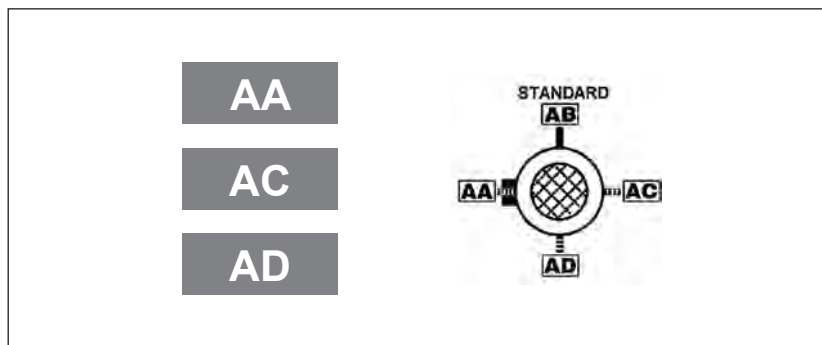
(F 53)

	R	RM
BN_FD	BN 63...BN 200	2p 63A2 ≤ H ≤ 132M2 4p 63A4 ≤ H ≤ 132MA4 6p 63A6 ≤ H ≤ 132MA6
BN_AFD	BN 63...BN 160MR	⊖
M_FD	M 05...M 5	M 05...M 4LA
M_AFD	M 05...M 4LC	⊖
BN_FA	BN 63...BN 180M	⊖
M_FA	M 05...M 5	

M9.1 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:



(F 54)



M9.2 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.

(F 55)

Dati tecnici volano per motori tipo: BN_FD, BN_AFD, M_FD, M_AFD			
		Peso volano [Kg]	Inerzia volano [Kgm ²]
BN 63	M05	0.69	0.00063
BN 71	M1	1.13	0.00135
BN 80	M2	1.67	0.00270
BN 90 S - BN 90 L	-	2.51	0.00530
BN 100	M3	3.48	0.00840
BN 112	-	4.82	0.01483
BN 132 S - BN 132 M	M4	6.19	0.02580



M10 OPZIONI

M10.1 Protezioni termiche

Oltre alla protezione garantita dall'interruttore magnetotermico, i motori possono essere provvisti di sonde termiche incorporate per proteggere l'avvolgimento da eccessivo riscaldamento dovuto a scarsa ventilazione o servizio intermittente.

Questa protezione dovrebbe sempre essere prevista per motori servoventilati (IC416).

M10.2 Filtro capacitivo

CF

Per i soli motori autofrenanti in corrente continua, tipo BN_FD e BN_AFD è disponibile in opzione il filtro capacitivo. Se corredati dell'opportuno filtro capacitivo a monte del raddrizzatore (opzione CF) i motori rientrano nei limiti di emissione previsti dalla Norma EN 61000-6-3:2007 "Compatibilità elettromagnetica – Norma Generica sull'emissione – Parte 6-3: Ambienti residenziali, commerciali e dell'industria leggera".

M10.3 Sonde termiche a termistori

E3

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.

In genere vengono impiegati termistori a coefficiente di temperatura positivo denominati anche "resistori a conduttore freddo" PTC.

I termistori non possono comandare direttamente i relais e devono pertanto essere collegati ad un'adeguata apparecchiatura di sgancio.

Con questa protezione vengono inseriti tre PTC, (collegati in serie), nell'avvolgimento con terminali disponibili in morsettiera ausiliaria.

K1

Sono un sottogruppo dei termistori PTC le cui caratteristiche costruttive ne permettono l'impiego come sensori di temperatura aventi un coefficiente di temperatura positivo funzione della resistenza. La temperatura di esercizio è: 0°C ... +260°C.

I termistori non possono comandare direttamente i relais e devono pertanto essere collegati ad un'adeguata apparecchiatura di sgancio.

I terminali (polarizzati) di n.1 KTY 84-130 sono disponibili in una morsettiera ausiliaria.

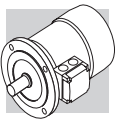
M10.4 Sonde termiche bimetalliche

D3

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.



M10.5 Motore con connettore

CON

Sono disponibili tre tipi di connettori (CON 1, CON 2, CON 3) che possono essere installati in due posizioni di montaggio: lato destro scatola coprimorsettiera (C1D, C2D, C3D); lato sinistro scatola coprimorsettiera (C1S, C2S, C3S).

L'opzione CON è prevista per i motori BN e M a singola polarità (2, 4, 6, 8, poli) nelle grandezze indicate nella tabella seguente. Sono escluse tutte le versioni con doppia polarità. I connettori sono disponibili per i motori BN e M nella versione senza freno e per i motori autofrenanti BN e M dotati di freno in corrente continua FD o AFD, nelle grandezze indicate nella tabella seguente.

Sul motore è fissato il connettore maschio (dotato di pin), il connettore femmina è escluso dalla fornitura.

Con l'opzione CON è sempre previsto il collegamento a Y delle fasi.

Per motori provvisti di servoventilazione (opzione U1) l'alimentazione del ventilatore è prevista nella scatola morsettiera separata fissata al copriventola.

Nei motori dotati di encoder (opzioni EN1...EN6) i terminali della connessione dell'encoder avviene tramite cavo volante non connesso al connettore.

L'opzione CON non è applicabile ai motori dotati di freno in corrente alternata FA.

L'opzione CON non è compatibile con le opzioni U2, CUS, IC.

Dati tecnici

(F 56)

Opzione	CON 1
Grandezza motore	BN63...BN112 / M05...M3
Vista connettore	
Tipo di connettore	Harting Han 10ES
Corpo connettore	Han EMC 10B con 2 leve
Numero di pins - corrente nominale	10 x 16A
Tensione di alimentazione	500 Vac
Tipo di connessione contatti	Terminali con vite



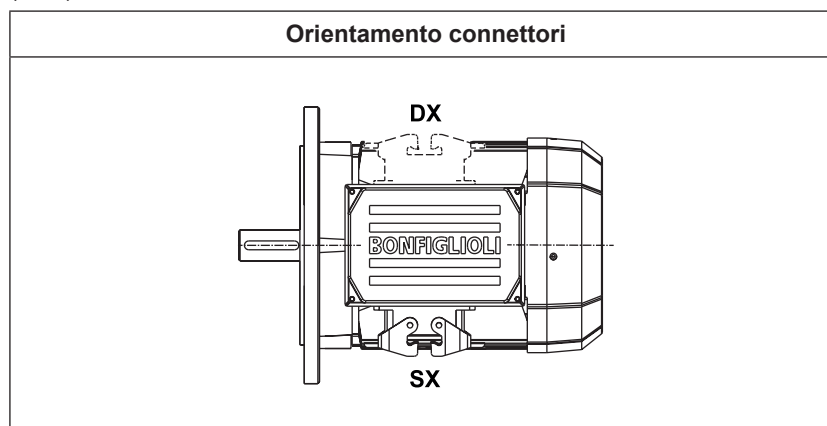
(F 57)

Opzione	CON 2
Grandezza motore	BN63...BN132M / M05...M4L
Vista connettore	
Tipo di connettore	Harting Han Modular
Corpo connettore	Han EMC 10B con 2 leve
Tipo Moduli	Modulo C + Modulo vuoto + Modulo E
Numero di pins - corrente nominale	3 x 36A / 6 x 16A
Tensione di alimentazione	500 Vac
Tipo di connessione contatti	Contatti a crimpare

(F 58)

Opzione	CON 3
Grandezza motore	BN63...BN132M / M05...M4L
Vista connettore	
Tipo di connettore	Harting Han Modular
Corpo connettore	Han EMC 10B con 2 leve
Tipo Moduli	Modulo C + Modulo E + Modulo E
Numero di pins - corrente nominale	3 x 36A / 6 + 6 x 16A
Tensione di alimentazione	500 Vac
Tipo di connessione contatti	Contatti a crimpare

(F 59)





(F 60)

Dimensioni d'ingombro motori senza freno						
		AD (mm)	AF (mm)	AH (mm)	LL (mm)	V ^(*) (mm)
BN63	M05	136	110	45	165	4.5
BN71	M1	149	110	45	165	15.5
BN80	M2	160	110	45	165	16.5
BN90	—	162	110	45	165	31.5
BN100	M3	171	110	45	165	37.5
BN112	—	186	110	45	165	39
BN132	M4	210	140	45	188	45.5
BN160MR	—	210	140	45	188	161

(*) Dimensione valida solo per motori BN.

(F 61)

Dimensioni d'ingombro motori con freno FD						
		AD (mm)	AF (mm)	AH (mm)	LL (mm)	V ^(*) (mm)
BN63	M05	136	110	45	165	4.5
BN71	M1	149	110	45	165	1.5
BN80	M2	160	110	45	165	18.5
BN90	—	162	110	45	165	39.5
BN100	M3	171	110	45	165	63.5
BN112	—	186	110	45	165	75
BN132	M4	210	140	45	188	122
BN160MR	—	210	140	45	188	161

(*) Dimensione valida solo per motori BN.



M10.6 Controllo della funzionalità del freno

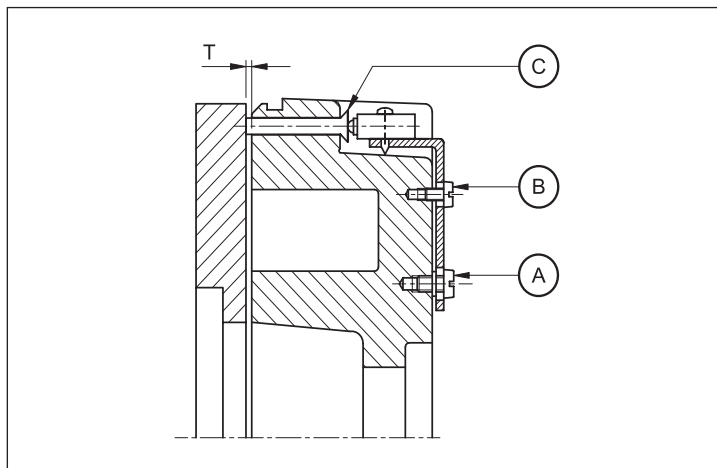
MSW

Il microinterruttore può essere regolato per segnalare l'attrazione/rilascio dell'ancora mobile o per segnalare il raggiungimento del massimo valore ammissibile per il traferro.

L'opzione MSW è disponibile per i freni FD03...FD09 ed AFD03...AFD07.

Il microswitch è dotato di tre terminali NC, NO, COM. Nella figura sottostante sono raffigurati i principali componenti del freno equipaggiato con microswitch.

(F 62)



- A: Viti di fissaggio
- B: Vite di regolazione
- C: Attuatore

M10.7 Ingresso cavi supplementare per motori autofrenanti

IC

Sulla scatola coprimorsettiera dei motori autofrenanti BN63...BN160MR / M05...M4 sono disponibili due ingressi cavo supplementari M16 x 1.5 (uno per lato).

Sulla scatola coprimorsettiera dei motori autofrenanti BN160...BN200 / M5 è disponibile un ingresso cavo supplementare M16 x 1.5 affiancato all'ingresso cavo freno.

M10.8 Riscaldatori anticondensa

H1

NH1

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:



(F 63)

		H1	NH1
		1~ 230V ± 10% P [W]	1~ 115V ± 10% P [W]
BN 56...BN 80	M0...M2	10	10
BN 90...BN 160MR	M3 - M4	25	25
BN 160M...BN 180M	M5	50	50
BN 180L...BN 200L	—		

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

M10.9 Tropicalizzazione

TP

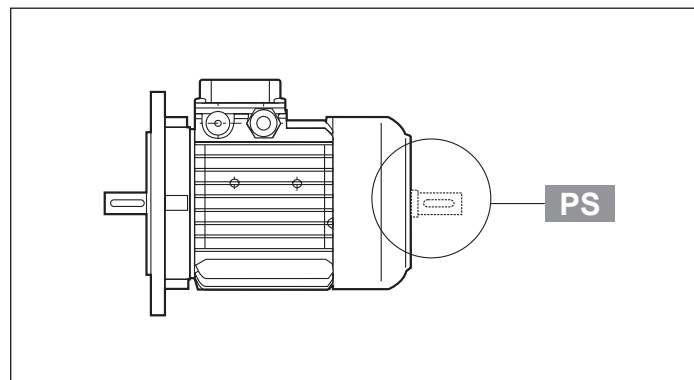
Su richiesta, mediante la specifica dell'opzione **TP**, gli avvolgimenti del motore ottengono una protezione aggiuntiva che li rende idonei al funzionamento in condizioni di elevata temperatura e umidità.

M10.10 Seconda estremità d'albero

PS

L'opzione esclude le varianti RC, TC, U1, U2, EN1, EN2, EN3, EN4, EN5, EN6. Le dimensioni sono reperibili nelle tavole dimensionali dei motori.

(F 64)



M10.11 Dispositivo antiritorno

AL


AR

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.

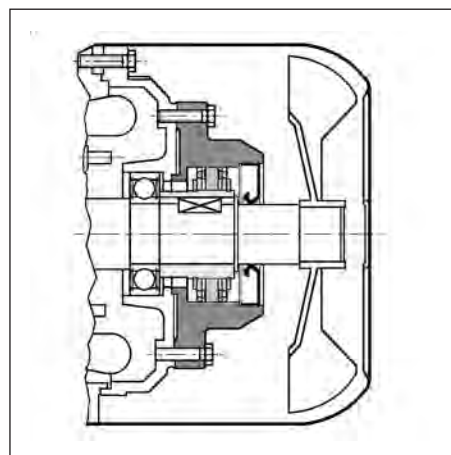
In nessun caso il dispositivo antiritorno dovrà essere utilizzato per impedire la rotazione inversa nel caso di collegamento elettrico errato. Nella tabella (F70) sono indicate le coppie nominale e massima di bloccaggio attribuite ai dispositivi antiritorno utilizzati, mentre la raffigurazione schematica del dispositivo è inserita nella tabella (F71). Le dimensioni sono le stesse del motore autofrenante. Il senso di rotazione libera è descritto nel paragrafo "OPZIONI MOTORI" delle specifiche sezioni dedicate ai riduttori.



(F 65)

	Coppia nominale di bloccaggio	Coppia max. di bloccaggio	Velocità di distacco
	[Nm]	[Nm]	[min ⁻¹]
M1	6	10	750
M2	16	27	650
M3	54	92	520
M4	110	205	430

(F 66)



M10.12 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).

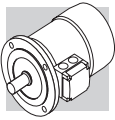
Questa esecuzione è utilizzata in caso di alimentazione del motore tramite inverter allo scopo di estendere il campo di funzionamento a coppia costante anche a bassa velocità, o quando per lo stesso sono richieste elevate frequenze di avviamento.

Da questa opzione sono esclusi tutti i motori con doppia sporgenza d'albero (opzione PS).



(F 67)

Dati di alimentazione					
		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	50	0.26 / 0.15
BN 132S	M4S			110	0.38 / 0.22
BN 132M...BN 160MR	M4L				
BN 160...BN 180M	M5			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.



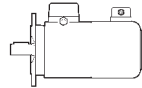
(F 68)

Tabella maggiorazione lunghezze motore			
		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

U1

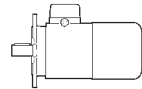


Terminali di alimentazione del ventilatore in scatola morsetti separata.

Nei motori autofrenanti grandezza BN 71...BN 160MR, M1...M4L, 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).

U2



I terminali del ventilatore sono collocati nella scatola morsettiera principale del motore. L'opzione **U2** non è applicabile ai motori da BN 160 a BN 200L, M5, 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).

(F 69)

(*)			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

M10.13 Tettuccio parapiovvia

RC



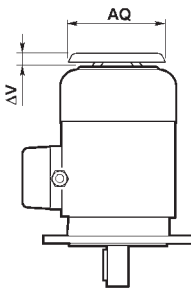
Il dispositivo parapiovvia, che è raccomandato quando il motore è montato verticalmente con l'albero verso il basso, serve a proteggere il motore stesso dall'ingresso di corpi solidi e dallo stillicidio.

Le dimensioni aggiuntive sono indicate nella tabella sottostante.

Il tettuccio esclude le varianti PS, EN1, EN2, EN3, EN4, EN5, EN6.



(F 70)

		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	

M10.14 Tettuccio tessile

TC

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 copriventola, impedendo il regolare flusso dell'aria di raffreddamento.

L'opzione esclude le varianti EN1, EN2, EN3, EN4, EN5, EN6. L'ingombro complessivo è lo stesso del tettuccio tipo RC.

M10.15 Dispositivi di retroazione

I motori possono essere dotati di sei diversi tipi di encoder, qui di seguito descritti.

Il montaggio dell'encoder esclude le esecuzioni con doppia estremità d'albero (PS) e tettuccio di protezione (RC, TC).

EN1

Encoder incrementale, $V_{IN} = 5 V$, uscita line-driver RS 422.

EN2

Encoder incrementale, $V_{IN} = 10-30 V$, uscita line driver RS 422.

EN3

Encoder incrementale, $V_{IN} = 12-30 V$, uscita push-pull 12-30 V



EN4

Encoder sin/cos, $V_{IN} = 4.5-5.5$ V, uscita Sinus $0.5V_{PP}$.

EN5

Encoder assoluto monogiro, interfaccia HIPERFACE®, $V_{IN} = 7-12$ V.

EN6

Encoder assoluto multigiro, interfaccia HIPERFACE®, $V_{IN} = 7-12$ V.

(F 71)

	EN1	EN2	EN3	EN4	EN5	EN6
interfaccia	TTL/RS 422	TTL/RS 422	HTL/push-pull	Sinus 0.5 VPP	HIPERFACE®	HIPERFACE®
tensione alimentazione [V]	4...6	10...30	12...30	4.4...5.5	7...12	7...12
tensione di uscita [V]	5	5	12...30	—	—	—
corrente di esercizio senza carico [mA]	120	100	100	40	80	80
n° di impulsi per giro	1024					
risoluzione	—	—	—	—	15 bit	15 bit
rivoluzioni	—	—	—	—	—	12 bit
n° segnali	6 (A, B, Z + segnali invertiti)			6 (cos-, cos+, sin-, sin+, Z, Z)	—	—
max. frequenza di uscita [kHz]	600			200		
max. velocità [min ⁻¹]	6000 (9000 min ⁻¹ per 10 s)					
campo di temperatura di funzionamento [°C]	-30 ... +100					
grado di protezione	IP 65					



(F 73)

EN1, EN2, EN3, EN4, EN5, EN6	
BN 63...BN 200L	M05...M5
BN 63_FD...BN 200L_FD	M05_FD...M5_FD
BN 63_AFD...BN 160MR_AFD	M05_AFD...M4LC_AFD
BN 63_FA...BN 200L_FA	M05_FA...M5_FA

(F 72)

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

Se l'opzione EN_ è richiesta per motori di grandezza BN71...BN160MR / M1...M4, contemporaneamente all'opzione U1/U2, le variazioni dimensionali coincidono con quelle dell'opzione U1/U2.



M10.16 Protezione superficiale

C_

I motori, che laddove non viene richiesta una classe di protezione specifica, nelle zone verniciate (ferrose) rispettano come requisito minimo la classe di protezione C2 (UNI EN ISO 12944-2), sono forniti con protezione superficiale C3 e C4 per una migliore resistenza alla corrosione atmosferica.

PROTEZIONE SUPERFICIALE	Ambienti tipici	Temperatura superficiale max.	Classe di corrosività secondo UNI EN ISO 12944-2
C3	Ambienti urbani ed industriali, con umidità relativa dell'aria max.100% (inquinamento ambientale medio)	120°C	C3
C4	Aree industriali, zone costiere, impianti chimici, con umidità relativa dell'aria max.100% (inquinamento ambientale alto)	120°C	C4

I motori previsti con le protezioni opzionali C3 e C4 sono disponibili in diverse tinte.

Se non specificata nessuna tinta (vedere opzione "VERNICIATURA") la fornitura viene eseguita con la tinta RAL7042.

A richiesta sono fornibili motori per classe di corrosività C5 secondo UNI EN ISO 12944-2, contattando il ns. Servizio tecnico-Commerciale.

M10.17 Verniciatura

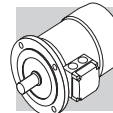
RAL_

I motori previsti con le protezioni opzionali C3 e C4 sono disponibili in diverse tinte, secondo la tabella seguente.

VERNICIATURA	Colore	Catalogazione RAL
RAL7042*	Grigio traffico A	7042
RAL5010	Blu genziana	5010
RAL9005	Nero intenso	9005
RAL9006	Alluminio brillante	9006
RAL9010	Bianco puro	9010

* Colore di fornitura standard se non specificato diversamente

NOTA - L'opzione "VERNICIATURA" è configurabile esclusivamente in abbinamento con l'opzione "PROTEZIONE SUPERFICIALE".



M10.18 Prove documentali

ACM

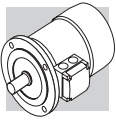
Attestato di conformità motori

Documento il cui rilascio attesta la conformità del prodotto all'ordinativo e la costruzione dello stesso in conformità alle procedure standard di processo e di controllo previste dal sistema di Qualità Bonfiglioli Riduttori.

CC

Certificato di collaudo

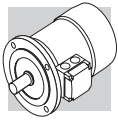
La specifica comporta la conduzione di verifiche di conformità all'ordine, controlli visivi generali e verifiche strumentali delle caratteristiche elettriche di funzionamento a vuoto. Il collaudo è riferito allo specifico motore analizzato ed applicato ad un campione statistico del lotto di spedizione.



M11 DATI TECNICI MOTORI

2P		3000 min ⁻¹ - S1														50 Hz													
		freno c.c.														freno c.c. a traferro fisso					freno c.a.								
		FD														AFD					FA								
P _n		n	M _n	IE1	η (100%)	η (75%)	η (50%)	cosφ	In	Is	Ms	Ma	J _m	IM B5	Mb	Z ₀	J _m	IM B5	Mod	Mb	Z ₀	J _m	IM B5	Mod	Mb	Z ₀	J _m	IM B5	
kW		min ⁻¹	Nm		%	%	%		A	in	in	Min	kgm ²	kg	Nm	1/h	kgm ²	kg		Nm	1/h	kgm ²	kg		Nm	1/h	kgm ²	kg	
0.18	BN 63A	2	2730	0.63	○	59.9	56.9	51.9	0.77	0.56	3.0	2.1	2.0	2.0	1.75	3900	4800	2.6	5.2	FD 02	1.75	4800	2.6	5.0	FA 02	1.75	4800	2.6	5.0
0.25	BN 63B	2	2740	0.87	○	66.0	64.8	64.8	0.76	0.72	3.3	2.3	2.3	3.0	1.75	3900	4800	3.0	5.6	FD 02	1.75	4800	3.0	5.4	FA 02	1.75	4800	3.0	5.4
0.37	BN 63C	2	2800	1.26	○	69.1	66.8	66.8	0.78	0.99	3.9	2.6	2.6	3.3	3.5	3600	4500	3.9	6.8	FD 02	3.5	4500	3.9	6.6	FA 02	3.5	4500	3.9	6.6
0.37	BN 71A	2	2820	1.25	○	73.8	73.0	70.6	0.76	0.95	4.8	2.8	2.6	3.5	3.5	3000	4100	4.6	8.1	FD 03	3.5	4100	4.6	7.8	FA 03	3.5	4200	4.6	7.8
0.55	BN 71B	2	2820	1.86	○	76.0	75.8	74.8	0.76	1.37	5.0	2.9	2.8	4.1	5	2900	4200	5.3	8.9	FD 03	5	4200	5.3	8.6	FA 03	5	4200	5.3	8.6
0.75	BN 71C	2	2810	2.6	○	76.6	76.2	76.2	0.76	1.86	5.1	3.1	2.8	5.0	5	1900	3300	6.1	10.0	FD 03	5	3300	6.1	9.7	FA 03	5	3600	6.1	9.7
0.75	BN 80A	2	2810	2.6	●	76.2	75.5	68.3	0.81	1.75	4.8	2.6	2.2	7.8	5	1700	3200	9.4	12.5	FD 04	5	3200	9.4	12.1	FA 04	5	3200	9.4	12.4
1.1	BN 80B	2	2800	3.8	●	76.4	76.2	75.0	0.81	2.57	4.8	2.8	2.4	9.0	10	1500	3000	10.6	13.4	FD 04	10	3000	10.6	13.0	FA 04	10	3000	10.6	13.3
1.5	BN 80C	2	2800	5.1	●	79.1	79.5	77.2	0.81	3.4	4.9	2.7	2.4	11.4	15	1300	2600	13.0	15.2	FD 04	15	2600	13.0	14.8	FA 04	15	2600	13.0	15.1
1.5	BN 90SA	2	2870	5.0	●	82.0	81.5	78.1	0.80	3.4	5.9	2.7	2.6	12.5	15	900	2200	14.1	16.5	FD 14	15	2200	14.1	16.1	FA 14	15	2200	14.1	16.4
1.85	BN 90SB	2	2880	6.1	●	82.5	82.0	75.4	0.80	4.0	6.2	2.9	2.6	16.7	15	900	2200	18.3	18.2	FD 14	15	2200	18.3	17.8	FA 14	15	2200	18.3	18.1
2.2	BN 90L	2	2880	7.3	●	82.7	82.1	80.8	0.80	4.8	6.3	2.9	2.7	16.7	14	900	2200	21	20	FD 05	26	2200	21	19.4	FA 05	26	2200	21	20.7
3	BN 100L	2	2860	10.0	●	81.5	81.3	77.4	0.79	6.7	5.6	2.6	2.2	31	26	700	1600	35	26	FD 15	26	1600	35	25	FA 15	26	1600	35	27
4	BN 100LB	2	2870	13.3	●	83.1	83.0	77.8	0.80	8.7	5.8	2.7	2.5	39	23	450	900	43	29	FD 15	40	900	43	28	FA 15	40	1000	43	30
4	BN 112M	2	2900	13.2	●	85.5	84.5	83.0	0.82	8.2	6.9	3.0	2.9	57	28	—	950	66	39	FD 06S	40	950	66	38	FA 06S	40	950	66	40
5.5	BN 132SA	2	2890	18.2	●	84.7	84.5	81.2	0.84	11.2	5.9	2.6	2.2	101	35	—	600	112	48	FD 06	62	600	112	47	FA 06	50	600	112	49
7.5	BN 132SB	2	2900	25	●	86.5	86.3	84.4	0.85	14.7	6.4	2.6	2.2	145	42	—	550	154	55	FD 06	62	550	154	54	FA 06	50	550	154	56
9.2	BN 132M	2	2930	30	●	87.0	86.5	83.6	0.86	17.7	6.7	2.8	2.3	178	53	—	430	189	66	FD 06	75	430	189	65	FA 06	75	430	189	67
11	BN 160MR	2	2920	36	●	87.6	87.0	86.0	0.88	20.6	6.9	2.9	2.5	210	65	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15	BN 160MB	2	2930	49	●	89.6	89.4	88.0	0.86	28.1	7.1	2.6	2.3	340	84	—	—	—	—	—	—	—	—	—	—	—	—	—	—
18.5	BN 160L	2	2930	60	●	90.4	90.1	89.0	0.86	34	7.6	2.7	2.3	420	97	—	—	—	—	—	—	—	—	—	—	—	—	—	—
22	BN 180M	2	2930	72	●	89.9	89.7	89.5	0.88	40	7.8	2.6	2.4	490	109	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30	BN 200LA	2	2930	98	●	90.7	90.1	87.6	0.89	54	7.8	2.7	2.9	770	140	—	—	—	—	—	—	—	—	—	—	—	—	—	—

○ = n.a. ● = IE1








6P **1000 min⁻¹ - S1** **50 Hz**

P _n kW		n min ⁻¹	M _n Nm	IE1	η (100%) %	η (75%) %	η (50%) %	cosφ	I _n 400V A	I _s I _n	M _s M _n	I _a I _m	freno c.c.				freno c.c. a traferro fisso				freno c.a.													
													FD		AFD		FA		IM B5 Kg	J _m x 10 ⁻⁴ kgm ²	Z ₀ 1/h	M _b Nm	I _{Mod}	IM B5 Kg	J _m x 10 ⁻⁴ kgm ²	Z ₀ 1/h	M _b Nm	I _{Mod}	IM B5 Kg	J _m x 10 ⁻⁴ kgm ²	Z ₀ 1/h	M _b Nm		
													M _{od}	M _b Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	M _{od}	M _b Nm															Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²
0.09	BN 63A	6	880	○	41.0	41.0	32.9	0.53	0.60	2.1	2.1	1.8	3.4	FD 02	3.5	9000	14000	4.0	4.0	AFD 02	3.5	14000	14000	4.0	4.0	FA 02	3.5	14000	14000	4.0	4.0	IM B5	6.1	6.1
0.12	BN 63B	6	870	○	45.0	44.0	41.8	0.60	0.64	2.1	1.9	1.7	3.7	FD 02	3.5	9000	14000	4.3	4.3	AFD 02	3.5	14000	14000	4.3	4.3	FA 02	3.5	14000	14000	4.3	4.3	IM B5	6.4	6.4
0.18	BN 71A	6	900	○	55.0	55.5	51.0	0.69	0.68	2.6	1.9	1.7	8.4	FD 03	5	8100	13500	9.5	9.5	AFD 03	5	13500	13500	9.5	9.5	FA 03	5.0	13500	13500	9.5	9.5	IM B5	7.9	7.9
0.25	BN 71B	6	900	○	62.0	58.5	51.4	0.71	0.82	2.6	1.9	1.7	10.9	FD 03	5	7800	13000	12	12	AFD 03	5	13000	13000	12	12	FA 03	5.0	13000	13000	12	12	IM B5	9.1	9.1
0.37	BN 71C	6	910	○	66.0	60.0	53.3	0.69	1.17	3.0	2.4	2.0	12.9	FD 53	7.5	5100	9500	14	14	AFD 03	7.5	9500	9500	14	14	FA 03	7.5	9500	9500	14	14	IM B5	10.1	10.1
0.37	BN 80A	6	910	○	68.0	67.4	63.3	0.68	1.15	3.2	2.2	2.0	21	FD 04	10	5200	8500	23	23	AFD 04	10	8500	8500	23	23	FA 04	10	8500	8500	23	23	IM B5	13.7	13.7
0.55	BN 80B	6	920	○	70.0	69.8	64.3	0.68	1.67	3.9	2.6	2.2	25	FD 04	15	4800	7200	27	27	AFD 04	15	7200	7200	27	27	FA 04	15	7200	7200	27	27	IM B5	15.1	15.1
0.75	BN 80C	6	920	●	70.0	70.0	64.4	0.65	2.38	3.8	2.5	2.2	28	FD 04	15	3400	6400	30	30	AFD 04	15	6400	6400	30	30	FA 04	15	6400	6400	30	30	IM B5	16.0	16.0
0.75	BN 90S	6	920	●	70.0	69.0	64.2	0.68	2.27	3.8	2.4	2.2	26	FD 14	15	3400	6500	28	28	AFD 14	15	6500	6500	28	28	FA 14	15	6500	6500	28	28	IM B5	16.7	16.7
1.1	BN 90L	6	920	●	72.9	72.6	69.1	0.69	3.2	3.9	2.3	2.0	33	FD 05	26	2700	5000	37	37	AFD 05	26	5000	5000	37	37	FA 05	26	5000	5000	37	37	IM B5	22	22
1.5	BN 100LA	6	940	●	75.2	74.2	70.3	0.72	4.0	4.1	2.1	2.0	82	FD 15	40	1900	4100	86	86	AFD 15	40	4100	4100	86	86	FA 15	40	4100	4100	86	86	IM B5	29	29
1.85	BN 100LB	6	930	●	76.6	72.8	62.6	0.73	4.8	4.6	2.1	2.0	95	FD 15	40	1700	3600	99	99	AFD 15	40	3600	3600	99	99	FA 15	40	3600	3600	99	99	IM B5	31	31
2.2	BN 112M	6	940	●	78.5	79.0	76.5	0.73	5.5	4.8	2.2	2.0	168	FD 06S	60	—	2100	177	177	AFD 06S	60	2100	2100	177	177	FA 06S	60	2100	2100	177	177	IM B5	44	44
3	BN 132S	6	940	●	79.7	77.0	75.1	0.76	7.1	5.1	1.9	1.8	216	FD 56	75	—	1400	226	226	AFD 06	75	1400	1400	226	226	FA 06	75	1400	1400	226	226	IM B5	50	50
4	BN 132MA	6	950	●	81.4	81.5	79.5	0.77	9.2	5.5	2.0	1.8	295	FD 06	100	—	1200	305	305	AFD 06	100	1200	1200	305	305	FA 07	100	1200	1200	305	305	IM B5	63	63
5.5	BN 132MB	6	945	●	83.1	80.9	79.1	0.78	12.2	6.1	2.1	1.9	383	FD 07	150	—	1050	406	406	AFD 07	150	1050	1050	406	406	FA 07	150	1050	1050	406	406	IM B5	74	74
7.5	BN 160M	6	955	●	85.0	85.0	84.8	0.81	15.7	5.9	2.2	2.0	740	FD 08	170	—	900	815	815	AFD 08	170	900	900	815	815	FA 08	170	900	900	815	815	IM B5	113	113
11	BN 160L	6	960	●	86.4	86.5	85.9	0.81	22.7	6.6	2.5	2.3	970	FD 08	200	—	800	1045	1045	AFD 08	200	800	800	1045	1045	FA 08	200	800	800	1045	1045	IM B5	133	133
15	BN 180L	6	970	●	87.7	88.0	87.3	0.82	30	6.2	2.0	2.4	1550	FD 09	300	—	600	1750	1750	AFD 09	300	600	600	1750	1750	FA 08	170	900	900	815	815	IM B5	170	170
18.5	BN 200LA	6	960	●	88.6	88.0	87.3	0.81	37	5.9	2.0	2.3	1700	FD 09	400	—	450	1900	1900	AFD 09	400	450	450	1900	1900	FA 08	200	800	800	1045	1045	IM B5	185	185

○ = n.a. ● = IE1



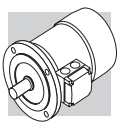
8P **750 min-1 - S1** **50 Hz**

P _n kW		n min ⁻¹	M _n Nm	η %	cosφ	In 400V A	Is In	Ms Mn	Ma Mn	freno c.c.										freno c.c. a traferro fisso							freno c.a.				
										FD					AFD					FA											
										Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 		
0.09	BN 71A	8	1.26	47	0.59	0.47	2.3	2.4	2.3	10.9	6.7	FD 03	3.5	9000	16000	12.0	9.4	AFD 03	5	16000	12.0	9.1	FA 03	3.5	16000	12.0	9.1				
0.12	BN 71B	8	1.69	51	0.59	0.58	2.1	2.3	2.2	12.9	7.7	FD 03	5.0	9000	16000	14.0	10.4	AFD 03	5	16000	14.0	10.1	FA 03	5.0	16000	14.0	10.1				
0.18	BN 80A	8	2.49	51	0.60	0.85	2.4	2.2	2.2	15	8.2	FD 04	5.0	6500	11000	16.6	12.1	AFD 04	5	11000	16.6	11.7	FA 04	5.0	11000	16.6	12.0				
0.25	BN 80B	8	3.51	54	0.63	1.06	2.4	2.0	1.9	20	9.9	FD 04	10.0	6000	10000	22	13.8	AFD 04	10	10000	22	13.4	FA 04	10.0	10000	23	13.7				
0.37	BN 90S	8	5.2	58	0.60	1.53	2.6	2.3	2.1	26	12.6	FD 14	15.0	4800	7500	28	16.8	AFD 14	15	7500	28	16.4	FA 14	15.0	7500	28	16.7				
0.55	BN 90L	8	7.8	62	0.60	2.13	2.6	2.2	2.0	33	15	FD 05	26	4000	6400	37	21	AFD 05	26	6400	37	20.4	FA 05	26	6400	37	22				
0.75	BN 100LA	8	10.2	68	0.63	2.53	3.4	1.9	1.7	82	22	FD 15	26	2800	4800	86	28	AFD 15	26	4800	86	27.4	FA 15	26	4800	86	29				
1.1	BN 100LB	8	15.0	68	0.64	3.65	3.2	1.7	1.7	95	24	FD 15	40	2500	4000	99	30	AFD 15	40	4000	99	29.4	FA 15	40	4000	99	31				
1.5	BN 112M	8	20.2	71	0.66	4.6	3.7	1.8	1.9	168	32	FD 06S	60	—	3000	177	42	AFD 06S	60	3000	177	41	FA 06S	60	3000	177	44				
2.2	BN 132S	8	29.6	75	0.66	6.4	3.8	1.8	2.0	295	45	FD 56	75	—	2300	305	58	AFD 06	75	2300	305	56.8	FA 06	75	2300	305	56				
3	BN 132MA	8	40.4	76	0.69	8.3	3.9	1.6	1.8	370	53	FD 06	100	—	1900	394	69	AFD 06	100	1900	394	67.8	FA 07	100	1900	406	74				



2/6P **3000/1000 min⁻¹ - S3 60/40%** **50 HZ**

P _n kW	n min ⁻¹	M _n Nm	η %	cosφ	I _n 400V A	I _s I _n	M _s M _n	M _a M _n	J _m x 10 ⁻⁴ kgm ²	IM B5 	freno c.c.										freno c.c. a traferro fisso					freno c.a.				
											FD					AFD					FA									
											Mod	Mb Nm	Z ₀ 1/h	NB	SB	Mod	Mb Nm	Z ₀ 1/h	SB	Mod	Mb Nm	Z ₀ 1/h	SB	Mod	Mb Nm	Z ₀ 1/h	SB	Mod	Mb Nm	Z ₀ 1/h
0.25	2850	0.84	60	0.82	0.73	4.3	1.9	1.8	6.9	5.9	1700	1500	1700	8.0	8.6	1700	8.0	8.3	FA 03	2.5	1700	8.0	8.3	FA 03	2.5	1700	8.0	8.3		
0.08	6 910	0.84	43	0.70	0.38	2.1	1.4	1.5	10000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	13000	
0.37	2880	1.23	62	0.80	1.08	4.4	1.9	1.8	9.1	7.3	1000	1300	1300	10.2	10.0	1300	10.2	9.7	AFD 03	5	1300	10.2	9.7	AFD 03	5	1300	10.2	9.7		
0.12	6 900	1.27	44	0.73	0.54	2.4	1.4	1.5	9000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	11000	
0.65	2800	1.88	63	0.86	1.47	4.5	1.9	1.7	20	9.9	1500	1800	1800	22	13.8	1800	22	13.4	AFD 04	5	1800	22	13.4	AFD 04	5	1800	22	13.7		
0.18	6 930	1.85	52	0.65	0.77	3.3	2.0	1.9	4100	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	
0.75	2800	2.6	66	0.87	1.89	4.3	1.8	1.6	25	11.3	1700	1900	1900	27	15.2	1900	27	14.8	AFD 04	5	1900	27	14.8	AFD 04	5	1900	27	15.1		
0.25	6 930	2.6	54	0.67	1.00	3.2	1.7	1.8	3800	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	
1.10	2860	3.7	67	0.84	2.82	4.7	2.1	1.9	28	14.0	1400	1600	1600	32	20	1600	32	19.4	AFD 05	13	1600	32	19.4	AFD 05	13	1600	32	21		
0.37	6 920	3.8	59	0.71	1.27	3.3	1.6	1.6	3400	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	
1.5	2880	5	73	0.84	3.53	5.1	1.9	2.0	40	18.3	1000	1200	1200	44	24	1200	44	23.4	AFD 15	13	1200	44	23.4	AFD 15	13	1200	44	25		
0.55	6 940	5.6	64	0.67	1.85	3.5	1.7	1.8	2900	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	
2.2	2900	7.2	77	0.85	4.9	5.9	2.0	2.0	61	25	700	900	900	65	31	900	65	30	AFD 15	26	900	65	30	AFD 15	26	900	65	32		
0.75	6 950	7.5	67	0.64	2.5	3.3	1.9	1.8	2100	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	
3	2900	9.9	78	0.87	6.4	6.3	2.0	2.1	98	30	—	1000	107	40	40	1000	107	39	AFD 06S	40	1000	107	39	AFD 06S	40	1000	107	32		
1.1	6 950	11.1	72	0.64	3.4	3.9	1.8	1.8	—	—	—	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	
4.5	2910	14.8	78	0.84	9.9	5.8	1.9	1.8	213	44	—	500	223	57	57	500	223	56	AFD 06	37	500	223	56	AFD 06	37	500	223	58		
1.5	6 960	14.9	74	0.67	4.4	4.2	1.9	2.0	—	—	—	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	
5.5	2920	18.0	78	0.87	11.7	6.2	2.1	1.9	270	53	—	400	280	66	66	400	280	65	AFD 06	62	400	280	65	AFD 06	62	400	280	67		
2.2	6 960	22	77	0.71	5.8	4.3	2.1	2.0	—	—	—	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	



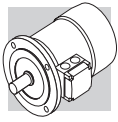
2/8P **3000/750 min⁻¹ - S3 60/40%** **50 HZ**

P _n kW		freno c.c.														freno c.c. a traferro fisso						freno c.a.							
		FD							AFD							FA													
		Mod	Mb	Z ₀ 1/h	NB	SB	J _m x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb	Z ₀ 1/h	SB	J _m x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 					
0.25	BN 71A	2	2790	0.86	61	0.87	3.9	1.8	1.9	10.9	6.7	FD 03	1.75	1300	1400	12	9.4	AFD 03	2.5	1400	1400	12	9.1	FA 03	2.5	1400	12	9.1	
0.06		8	680	0.84	31	0.61	2.0	1.8	1.9					10000	13000														
0.37	BN 71B	2	2800	1.26	63	0.86	3.9	1.8	1.9	12.9	7.7	FD 03	3.5	1200	1300	14	10.4	AFD 03	5	1300	1300	14	10.1	FA 03	3.5	1300	14	10.1	
0.09		8	670	1.28	34	0.75	1.8	1.4	1.5					9500	13000														
0.65	BN 80A	2	2830	1.86	66	0.86	4.4	2.1	2.0	20	9.9	FD 04	5.0	1500	1800	22	13.8	AFD 04	5	1800	1800	22	13.4	FA 04	5.0	1800	22	13.7	
0.13		8	690	1.80	41	0.64	2.3	1.6	1.7					5600	8000														
0.75	BN 80B	2	2800	2.6	68	0.88	4.6	2.1	2.0	25	11.3	FD 04	10	1700	1900	27	15.2	AFD 04	10	1900	1900	27	14.8	FA 04	10	1900	27	15.1	
0.18		8	690	2.5	43	0.66	2.3	1.6	1.7					4800	7300														
1.10	BN 90L	2	2830	3.7	63	0.84	3.00	4.5	2.1	28	14.0	FD 05	13	1400	1600	32	20	AFD 05	13	1600	1600	32	19.4	FA 05	13	1600	32	21	
0.28		8	690	3.9	48	0.63	1.34	2.4	1.8					3400	5100														
1.5	BN 100LA	2	2880	5.0	69	0.85	3.69	4.7	1.9	40	18.3	FD 15	13	1000	1200	44	25	AFD 15	13	1200	1200	44	14.4	FA 15	13	1200	44	25	
0.37		8	690	5.1	46	0.63	1.84	2.1	1.6					3300	5000														
2.4	BN 100LB	2	2900	7.9	75	0.82	5.6	5.4	2.0	61	25	FD 15	26	550	700	65	31	AFD 15	26	700	700	65	30	FA 15	26	700	65	32	
0.65		8	700	7.5	54	0.58	2.5	2.6	1.8					2000	3500														
3	BN 112M	2	2900	9.9	76	0.87	6.5	6.3	2.1	98	30	FD 06S	40	—	900	107	40	AFD 06S	40	900	900	107	39	FA 06S	40	900	107	42	
0.75		8	690	10.4	60	0.65	2.8	2.5	1.6					—	2900														
4	BN 132S	2	2870	13.3	73	0.84	9.4	5.6	2.3	213	44	FD 66	37	—	500	223	57	AFD 06	37	500	500	223	56	FA 06	37	500	223	58	
1		8	690	13.8	66	0.62	3.5	2.9	1.9					—	3500														
5.5	BN 132M	2	2870	18.3	75	0.84	12.6	6.1	2.4	270	53	FD 06	50	—	400	280	66	AFD 06	62	400	400	280	65	FA 06	50	400	280	67	
1.5		8	690	21	68	0.63	5.1	2.9	1.9					—	2400														



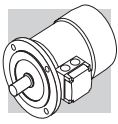
2/12P **3000/500 min⁻¹ - S3 60/40%** **50 Hz**

P _n kW	n min ⁻¹	M _n Nm	η %	cosφ	I _n 400V A	I _s I _n	M _s M _n	M _a M _n	J _m x 10 ⁻⁴ kgm ²	IM B5 	freno c.c.										freno c.c. a traferro fisso				freno c.a.									
											FD					AFD					FA													
											Mod	Mb	Z ₀ 1/h	NB	SB	Mod	Mb	Z ₀ 1/h	SB	IM B5 	J _m x 10 ⁻⁴ kgm ²	Mb	Z ₀ 1/h	SB	Mod	Mb	Z ₀ 1/h	IM B5 	J _m x 10 ⁻⁴ kgm ²	Mb	Z ₀ 1/h	Mod	Mb	Z ₀ 1/h
0.65 0.09	2820 430	1.86 2.0	64 30	0.89 0.63	1.39 0.69	4.2 1.8	1.6 1.9	1.7 1.8	25 12000	11.3	5.0	1300 12000	1000 8000	1300 12000	FD 04	5.0	1300 12000	15.2	5	1300 12000	27	14.8	5	1300 12000	15.2	5	1300 12000	27	14.8	5.0	1300 12000	27	14.8	15.1
0.75 0.12	2790 430	2.6 2.7	56 26	0.89 0.63	2.17 1.06	4.2 1.7	1.8 1.4	1.7 1.6	26 6300	12.6	13	1150 6300	1000 4600	1150 6300	FD 05	13	1150 6300	18.6	13	1150 6300	30	18.0	13	1150 6300	18.6	13	1150 6300	30	18.0	13	1150 6300	30	18.0	19.3
1.10 0.18	2850 430	3.7 4.0	65 26	0.85 0.54	2.87 1.85	4.5 1.5	1.6 1.3	1.8 1.5	40 6000	18.3	13	900 6000	700 4000	900 6000	FD 15	13	900 6000	25	13	900 6000	44	24.4	13	900 6000	25	13	900 6000	44	24.4	13	900 6000	44	24.4	25
1.5 0.25	2900 440	4.9 5.4	67 36	0.86 0.46	3.76 2.18	5.6 1.8	1.9 1.7	1.9 1.8	54 5000	22	13	900 5000	700 3800	900 5000	FD 15	13	900 5000	28	13	900 5000	58	27	13	900 5000	28	13	900 5000	58	27	13	900 5000	58	27	29
2 0.3	2900 460	6.6 6.2	74 46	0.88 0.43	4.43 2.19	6.5 2.0	2.1 2.1	2.0 2.0	98 3400	30	20	800 3400	— —	800 3400	FD 06S	20	800 3400	40	20	800 3400	107	39	20	800 3400	40	20	800 3400	107	39	20	800 3400	107	39	42
3 0.5	2920 470	9.8 10.2	74 51	0.87 0.43	6.7 3.3	6.8 2.0	2.3 1.7	1.9 1.6	213 270	44	37	450 3000	— —	450 3000	FD 56	37	450 3000	57	37	450 3000	223	56	37	450 3000	57	37	450 3000	223	56	37	450 3000	223	56	58
4 0.7	2920 460	13.1 14.5	75 53	0.89 0.44	8.6 4.3	5.9 1.9	2.4 1.7	2.3 1.6	270 2800	53	37	400 2800	— —	400 2800	FD 56	37	400 2800	66	37	400 2800	280	65	37	400 2800	66	37	400 2800	280	65	37	400 2800	280	65	67




4/6P **1500/1000 min-1 - S1** **50 HZ**

P _n kW	n min ⁻¹	M _n Nm	η %	cosφ	I _n 400V A	I _s I _n	M _s M _n	M _a M _n	J _m x 10 ⁻⁴ kgm ²	IM B5 	freno c.c.						freno c.c. a traferro fisso						freno c.a.														
											FD			AFD			FA			FD			AFD			FA			FD			AFD			FA		
											Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 	Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 		
0.22	4	1.5	64	0.74	0.67	3.9	1.8	1.9	9.1	7.3	FD 03	3.5	2500	3500	10.2	10.0	AFD 03	5	3500	9000	10.2	9.7	FA 03	3.5	3500	9000	10.2	9.7									
0.13	6	1.4	43	0.67	0.65	2.3	1.6	1.7					5000	9000																							
0.30	4	2.0	61	0.82	0.87	3.5	1.3	1.5	15	8.2	FD 04	5.0	2500	3100	16.6	12.1	AFD 04	5	3100	6000	16.6	11.7	FA 04	5.0	3100	6000	16.6	12.0									
0.20	6	2.1	54	0.66	0.81	3.2	1.9	2.0					4000	6000																							
0.40	4	1.430	63	0.75	1.22	3.9	1.8	1.8	20	9.9	FD 04	10	1800	2300	22	13.8	AFD 04	10	2300	5500	22	13.4	FA 04	10	2300	5500	22	13.7									
0.26	6	2.7	55	0.70	0.97	2.7	1.5	1.6					3600	5500																							
0.55	4	1.420	70	0.78	1.45	4.5	2.0	1.9	21	12.2	FD 14	10	1500	2100	23	16.1	AFD 14	10	2100	4100	23	15.7	FA 14	10	2100	4100	23	16.3									
0.33	6	3.4	62	0.70	1.10	3.7	2.3	2.0					2500	4100																							
0.75	4	1.420	74	0.78	1.88	4.3	1.9	1.8	28	14	FD 05	13	1400	2000	32	20	AFD 05	13	2000	3600	32	19.4	FA 05	13	2000	3600	32	21									
0.45	6	4.7	66	0.71	1.39	3.3	2.0	1.9					2300	3600																							
1.1	4	1.450	74	0.79	2.72	5.0	1.7	1.9	82	22	FD 15	26	1400	2000	86	28	AFD 15	26	2000	3300	86	27	FA 15	26	2000	3300	86	29									
0.8	6	8.0	65	0.69	2.57	4.1	1.9	2.1					2100	3300																							
1.5	4	1.450	75	0.79	3.65	5.1	1.7	1.9	95	25	FD 15	26	1300	1800	99	31	AFD 15	26	1800	3000	99	30	FA 15	26	1800	3000	99	32									
1.1	6	11.1	72	0.68	3.24	4.3	2.0	2.1					2000	3000																							
2.3	4	1.450	75	0.78	5.7	5.2	1.8	1.9	168	32	FD 06S	40	—	1600	177	42	AFD 06S	40	1600	2400	177	41	FA 06S	40	1600	2400	177	44									
1.5	6	14.9	73	0.72	4.1	4.9	2.0	2.0					—	2400																							
3.1	4	1.460	83	0.83	6.5	5.9	2.1	2.0	213	44	FD 66	37	—	1200	223	57	AFD 06	62	1200	1900	223	56	FA 06	37	1200	1900	223	58									
2	6	20	77	0.75	4.9	4.5	2.1	2.1					—	1900																							
4.2	4	1.460	84	0.82	8.8	5.9	2.1	2.2	270	53	FD 06	50	—	900	280	66	AFD 06	62	900	1500	280	65	FA 06	50	900	1500	280	67									
2.6	6	26	79	0.72	6.6	4.3	2.0	2.0					—	1500																							



2P **3000 min⁻¹ - S1** **50 Hz**

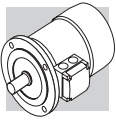
P _n kW		n min ⁻¹	M _n Nm	IE1	η (100%) %	η (75%) %	η (50%) %	cosφ	In 400V A	Is In	Ms Mn	Ma Mn	freno c.c.					freno c.c. a traferro fisso					freno c.a.								
													FD					AFD					FA								
													Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg	Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg	Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg	Mod	Mb Nm	Z ₀ 1/h	J _m x 10 ⁻⁴ kgm ²
0.18	M 05A 2	2730	0.63	○	59.9	56.9	51.9	0.77	0.56	3.0	2.1	2.0	3.2	FD 02	1.75	3900	4800	2.6	4.9	AFD 02	1.75	4800	4800	2.6	4.7	FA 02	1.75	4800	2.6	4.7	
0.25	M 05B 2	2740	0.87	○	66.0	64.8	64.8	0.76	0.72	3.3	2.3	2.3	3.6	FD 02	1.75	3900	4800	3.0	5.3	AFD 02	1.75	4800	4800	3.0	5.1	FA 02	1.75	4800	3.0	5.1	
0.37	M 05C 2	2800	1.26	○	69.1	66.8	66.8	0.78	0.99	3.9	2.6	2.6	4.8	FD 02	3.5	3600	4500	3.9	6.5	AFD 02	3.5	4500	4500	3.9	6.3	FA 02	3.5	4500	3.9	6.3	
0.55	M 15D 2	2820	1.86	○	76.0	75.8	74.8	0.76	1.37	5.0	2.9	2.8	4.1	FD 03	5	2900	4200	5.3	8.5	AFD 03	5	4200	4200	5.3	8.2	FA 03	5	4200	5.3	8.2	
0.75	M 15LA 2	2810	2.6	○	76.6	76.2	76.2	0.76	1.86	5.1	3.1	2.8	5.0	FD 03	5	1900	3300	6.1	9.6	AFD 03	7.5	3300	3300	6.1	9.3	FA 03	5	3300	6.1	9.3	
1.1	M 25A 2	2800	3.8	●	76.4	76.2	75.0	0.81	2.57	4.8	2.8	2.4	9.0	FD 04	10	1500	3000	10.6	11.9	AFD 04	10	3000	3000	10.6	11.5	FA 04	10	3000	10.6	12.6	
1.5	M 25B 2	2800	5.1	●	79.1	79.5	77.2	0.81	3.4	4.9	2.7	2.4	11.4	FD 04	15	1300	2600	13.0	9.9	AFD 04	15	2600	2600	13.0	9.5	FA 04	15	2600	13.0	14.4	
2.2	M 35A 2	2880	7.3	●	82.7	82.1	81.0	0.80	4.8	6.3	2.9	2.7	24	FD 15	26	1100	2400	28	22	AFD 15	26	2400	2400	28	21.4	FA 15	26	2400	28	23	
3	M 35LA 2	2860	10.0	●	81.5	81.3	77.4	0.79	6.7	5.6	2.6	2.2	31	FD 15	26	700	1600	35	25	AFD 15	26	1600	1600	35	24.4	FA 15	26	1600	35	26	
4	M 35LB 2	2870	13.3	●	83.1	83.0	77.8	0.80	8.7	5.8	2.7	2.5	39	FD 15	40	450	900	43	28	AFD 15	40	900	900	43	27	FA 15	40	900	43	29	
5.5	M 45A 2	2890	18.2	●	84.7	84.5	81.2	0.84	11.2	5.9	2.6	2.2	101	FD 06	50	—	600	112	46	46	AFD 06	62	600	600	112	45	FA 06	50	600	112	47
7.5	M 45B 2	2900	25	●	86.5	86.3	84.4	0.85	14.7	6.4	2.6	2.2	145	FD 06	50	—	550	154	53	53	AFD 06	62	550	550	154	52	FA 06	50	550	154	54
9.2	M 45LA 2	2930	30	●	87.0	86.5	83.6	0.86	17.7	6.7	2.8	2.3	178	FD 06	75	—	430	189	64	64	AFD 06	75	430	430	189	63	FA 06	75	430	189	65
11	M 45LC 2	2920	36	●	87.6	87.0	86.0	0.88	20.6	6.9	2.9	2.5	210	FD 06	75	—	—	210	60	60	AFD 06	75	—	—	189	63	FA 06	75	—	—	—
15	M 55B 2	2930	49	●	89.6	89.4	88.0	0.86	28.1	7.1	2.6	2.3	340	FD 06	50	—	—	340	70	70	AFD 06	62	—	—	340	70	FA 06	62	—	—	—
18.5	M 55C 2	2930	60	●	90.4	90.1	89.0	0.86	34	7.6	2.7	2.3	420	FD 06	75	—	—	420	83	83	AFD 06	75	—	—	420	83	FA 06	75	—	—	—
22	M 55LA 2	2930	72	●	89.9	89.7	89.5	0.88	40	7.8	2.6	2.4	490	FD 06	75	—	—	490	95	95	AFD 06	75	—	—	490	95	FA 06	75	—	—	—

○ = n.a. ● = IE1




2/8P **3000/750 min⁻¹ - S3 60/40%** **50 Hz**

P _n kW	n min ⁻¹	M _n Nm	η %	cosφ	In 400V A	Is In	Ms Mn	Ma Mn	J _m x 10 ⁻⁴ kgm ²	freno c.c.						freno c.c. a traferro fisso						freno c.a.														
										FD			AFD			FA			FD			AFD			FA			FD			AFD			FA		
										Mod	Mb Nm	Z _o 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg	Mod	Mb Nm	Z _o 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg	Mod	Mb Nm	Z _o 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg	Mod	Mb Nm	Z _o 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg	Mod	Mb Nm	Z _o 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg		
0.37	M 1LA 2	2800	1.26	63	0.86	3.9	1.8	1.9	12.9	7.3	FD 03	3.5	1200	1300	14	10.0	AFD 03	5	1300	14	9.7	FA 03	3.5	1300	14	1300	13000	9.7								
0.09	8	670	1.28	34	0.75	1.8	1.4	1.5					9500	13000					13000																	
0.55	M 2SA 2	2830	1.86	66	0.86	4.4	2.1	2.0	20	9.2	FD 04	5	1500	1800	22	13.1	AFD 04	5	1800	22	12.7	FA 04	5	1800	22	8000	8000	13.0								
0.13	8	690	1.80	41	0.64	2.3	1.6	1.7					5600	8000					8000																	
0.75	M 2SB 2	2800	2.6	68	0.88	4.6	2.1	2.0	25	10.6	FD 04	10	1700	1900	27	14.5	AFD 04	10	1900	27	14.1	FA 04	10	1900	27	7300	7300	14.4								
0.18	8	690	2.5	43	0.66	2.3	1.6	1.7					4800	7300					7300																	
1.1	M 3SA 2	2870	3.7	69	0.84	4.6	1.8	1.7	34	15.5	FD 15	13	1000	1300	38	22	AFD 15	13	1300	38	21.4	FA 15	13	1300	38	5000	5000	23								
0.28	8	690	3.9	44	0.56	2.3	1.4	1.7					3400	5000					5000																	
1.5	M 3LA 2	2880	5.0	69	0.85	4.7	1.9	1.8	40	17	FD 15	13	1000	1200	44	24	AFD 15	13	1200	44	23.4	FA 15	13	1200	44	5000	5000	24								
0.37	8	690	5.1	46	0.63	2.1	1.6	1.6					3300	5000					5000																	
2.4	M 3LB 2	2900	7.9	75	0.82	5.4	2.1	2.0	61	23	FD 15	26	550	700	65	29	AFD 15	26	700	65	28	FA 15	26	700	65	3500	3500	30								
0.55	8	700	7.5	54	0.58	2.6	1.8	1.8					2000	3500					3500																	
3	M 4SA 2	2920	9.8	72	0.85	7.1	2.0	1.8	162	36	FD 56	37	—	600	182	48	AFD 06	37	600	182	47	FA 06	37	600	182	3400	3400	50								
0.75	8	710	10.1	61	0.64	3.0	1.7	1.8					—	3400				3400																		
4	M 4SB 2	2870	13.3	73	0.84	9.4	2.3	2.4	213	42	FD 56	37	—	500	223	55	AFD 06	37	500	223	54	FA 06	37	500	223	3500	3500	56								
1	8	690	13.8	66	0.62	3.5	1.9	1.8					—	3500				3500																		
5.5	M 4LA 2	2870	18.3	75	0.84	12.6	2.4	2.5	270	51	FD 06	50	—	400	280	64	AFD 06	62	400	280	63	FA 06	50	400	280	2400	2400	65								
1.5	8	690	21	68	0.63	5.1	1.9	1.9					—	2400				2400																		



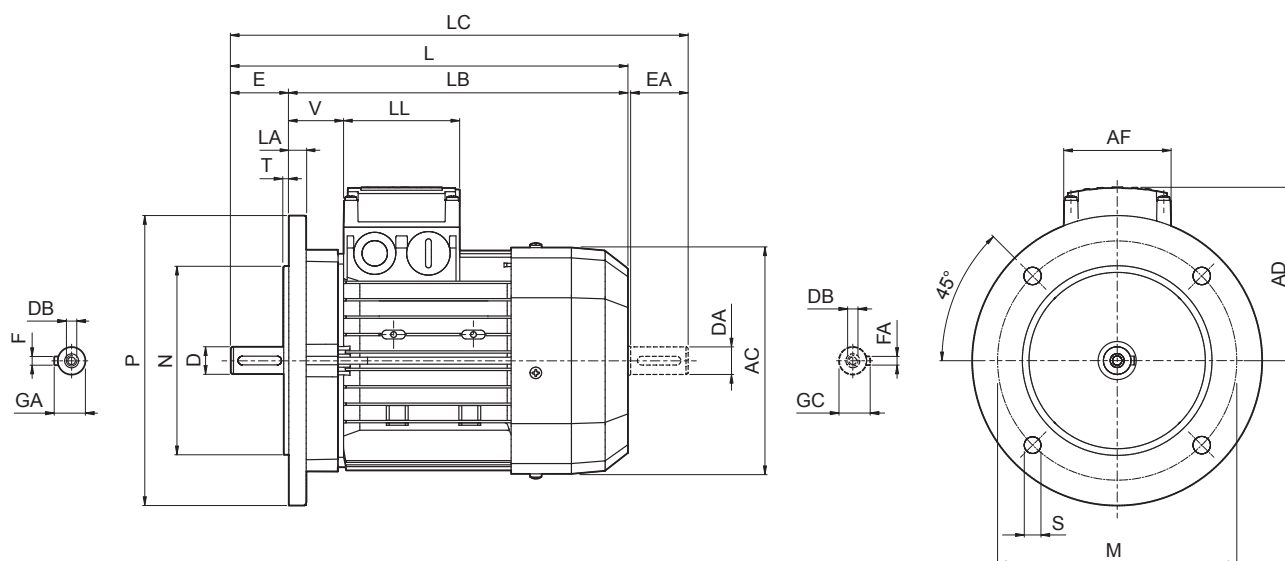
2/12P **3000/500 min⁻¹ - S3 60/40%** **50 Hz**

P _n kW		n min ⁻¹	M _n Nm	η	cosφ	In 400V A	Is In	Ms Mn	Ma Mn	freno c.c.										freno c.c. a traferro fisso						freno C.a.					
										FD					AFD					FA											
										Mod	Mb Nm	Z _o 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg	Mod	Mb Nm	Z _o 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg	Mod	Mb Nm	Z _o 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg	Mod	Mb Nm	Z _o 1/h	J _m x 10 ⁻⁴ kgm ²	IM B5 Kg		
0.55	M 2SA 2	2820	1.86	64	0.89	1.39	4.2	1.6	1.7	25	10.6	FD 04	5	1000	1300	27	14.5	AFD 04	5	1300	27	14.1	FA 04	5	1300	27	14.4				
0.09	12	430	2.0	30	0.63	0.69	1.8	1.9	1.8	8000	12000																				
0.75	M 3SA 2	2900	2.5	65	0.81	2.06	5.2	1.9	2.1	34	15.5	FD 15	13	700	900	38	22	AFD 15	13	900	38	21.4	FA 15	13	900	38	23				
0.12	12	460	2.5	33	0.43	1.22	1.9	1.3	1.6	5000	7000																				
1.1	M 3LA 2	2850	3.7	65	0.85	2.87	4.5	1.6	1.8	40	17	FD 15	13	700	900	44	24	AFD 15	13	900	44	23.4	FA 15	13	900	44	24				
0.18	12	430	4.0	26	0.54	1.85	1.5	1.3	1.5	4000	6000																				
1.5	M 3LB 2	2900	4.9	67	0.86	3.76	5.6	1.9	1.9	54	21	FD 15	13	700	900	58	27	AFD 15	13	900	58	26	FA 15	13	900	58	28				
0.25	12	440	5.4	36	0.46	2.18	1.8	1.7	1.8	3800	5000																				
2	M 3LC 2	2850	6.7	70	0.84	4.9	4.9	1.8	1.7	61	23	FD 55	18	—	700	65	29	AFD 15	26	700	65	28	FA 15	18	700	65	30				
0.3	12	450	6.4	38	0.47	2.4	1.7	1.6	1.7	—	—																				
3	M 4SA 2	2920	9.8	74	0.87	6.7	6.8	2.3	1.9	213	42	FD 56	37	—	450	223	55	AFD 06	37	450	223	54	FA 06	37	450	223	56				
0.5	12	470	10.2	51	0.43	3.3	2.0	1.7	1.6	—	—																				
4	M 4LA 2	2920	13.1	75	0.89	8.6	5.9	2.4	2.3	270	51	FD 56	37	—	400	280	64	AFD 06	37	400	280	63	FA 06	37	400	280	65				
0.7	12	460	14.5	53	0.44	4.3	1.9	1.7	1.6	—	—																				



M12 DIMENSIONI MOTORI

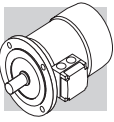
BN - IM B5



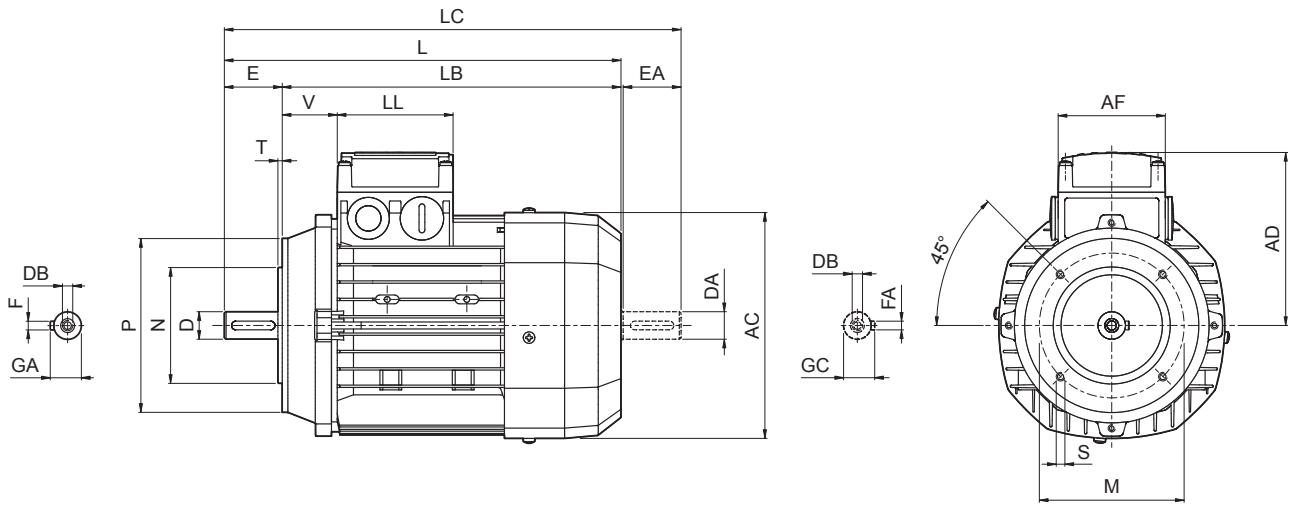
	Albero					Flangia					Motore								
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V
BN 56	9	20	M3	10.2	3	100	80	120	7	3	8	110	185	165	207	91	74	80	34
BN 63	11	23	M4	12.5	4	115	95	140	9.5		10	121	207	184	232	95			26
BN 71	14	30	M5	16	5	130	110	160			10	138	249	219	281	108			37
BN 80	19	40	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						176	326	276	378	133	44			
BN 100	28	60	M10	31	8	215	180	250	14	4	14	195	367	307	429	142	118	118	50
BN 112											15	219	385	325	448	157			52
BN 132											16	258	493	413	576	193			58
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	562	452	645	245	187	187	218	
BN 160 M												310	596	486	680			51	
BN 160 L												310	640	530	724			51	
BN 180 M	48 38 (1)	110 110 (1)	M16 M12 (1)	51.5 41 (1)	14 10 (1)	350	300	400	18.5	5	18	348	708	598	823	261	187	187	52
BN 180 L	42 (1)											722	612	837	66				
BN 200 L	55 42 (1)											M20 M16 (1)	59 45 (1)	16 12 (1)	66				

N.B.:

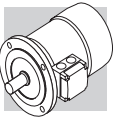
1) Queste dimensioni sono riferite alla seconda estremità d'albero.



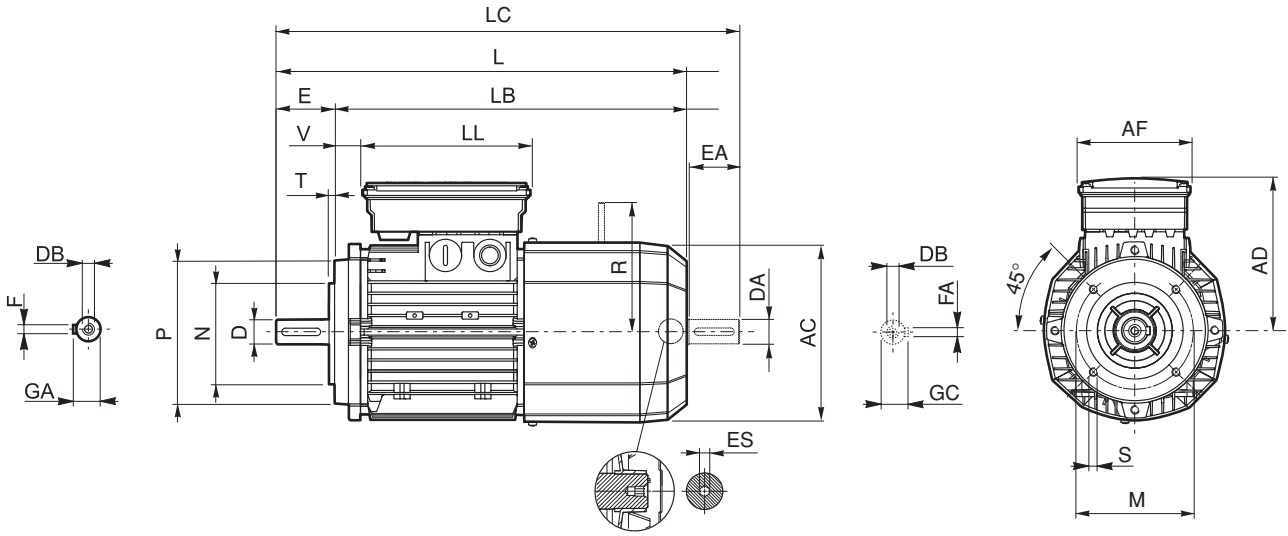
BN - IM B14



	Albero					Flangia					Motore							
	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		3.5	176	326	276	378	133	98	98
BN 100	28	60	M10	31		130	110	160		195		367	307	429	142	50		
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_FD ; BN_AFD - IM B14



	Albero					Flangia					Motore									
	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			156	346	306	388	146			41	129	
BN 90 S	24	50	M8	27	8	115	95	140	M8	3	176	409	359	461	149	110	165	39	129	6
BN 90 L															146				160	
BN 100	28	60	M10	31		130	110	160		3.5	195	458	398	521	158			62	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	46	204 (1)	

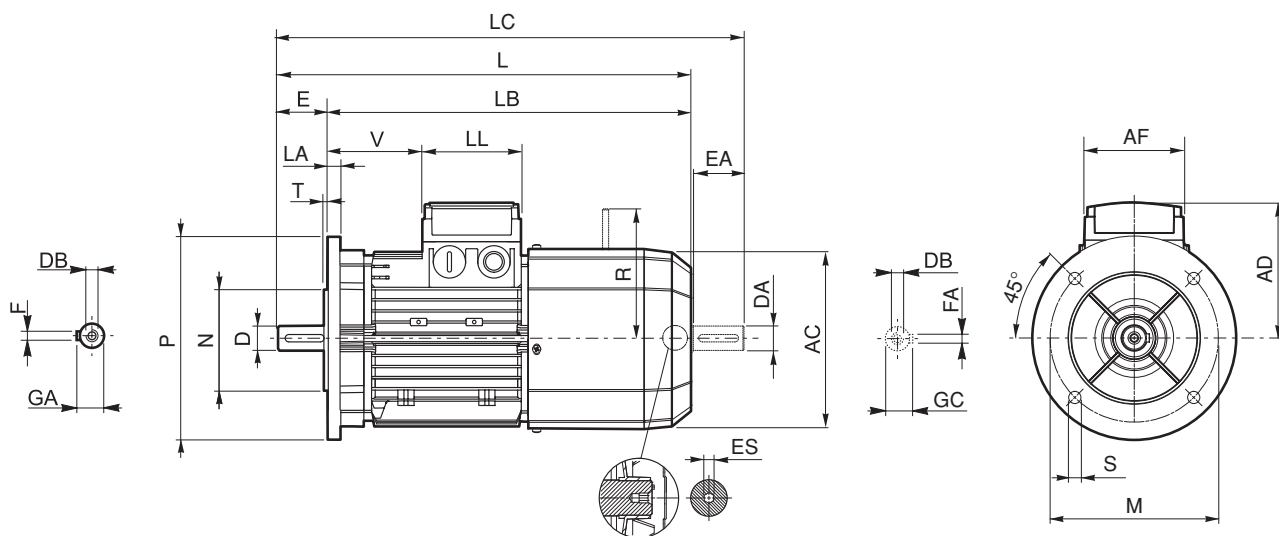
N.B.:

1) Per freno FD07 e AFD07 quota R=226.

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



BN_FA - IM B5



	Albero					Flangia						Motore									
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V	R	ES
BN 63	11	23	M4	12.5	4	115	95	140	9.5	3	10	121	272	249	297	95	74	80	26	116	5
BN 71	14	30	M5	16	5	130	110	160				138	310	280	342	108			68	124	
BN 80	19	40	M6	21.5	6	165	130	200	11.5	3.5	11.5	156	346	306	388	119	98	98	83	134	6
BN 90	24	50	M8	27	8							176	409	359	461	133			95	160	
BN 100	28	60	M10	31	8	215	180	250	14	4	14	195	458	398	521	142	119	128	198	200 (2)	
BN 112												15	219	484	424	547					157
BN 132	38	80	M12	41	10	265	230	300	18.5	5	15	20	258	603	523	686	210	140	188	46	217
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	258	672	562	755	193	118
BN 160 M									310	736	626		820			245	187	187	51	247	—
BN 160 L									310	736	626		820			245	187	187	51	247	—
BN 180 M									310	780	670		864			245	187	187	51	247	—

N.B.:

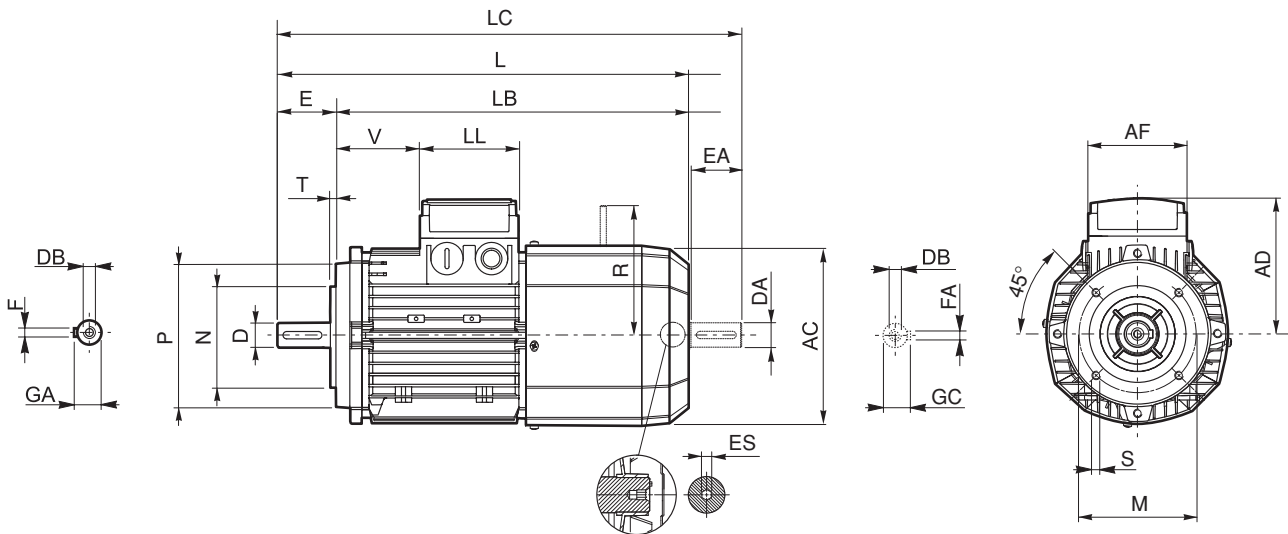
- 1) Queste dimensioni sono riferite alla seconda estremità d'albero.
- 2) Per freno FA07 quota R=217.

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

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



BN_FA - IM B14



	Albero					Flangia					Motore											
	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	134			
BN 90	24	50	M8	27	8	115	95	140	M8	3	176	409	359	461	133	98	98	95	160	6		
BN 100	28	60	M10	31		130	110	160			3.5	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	210			140	188		46	200 (1)

N.B.:

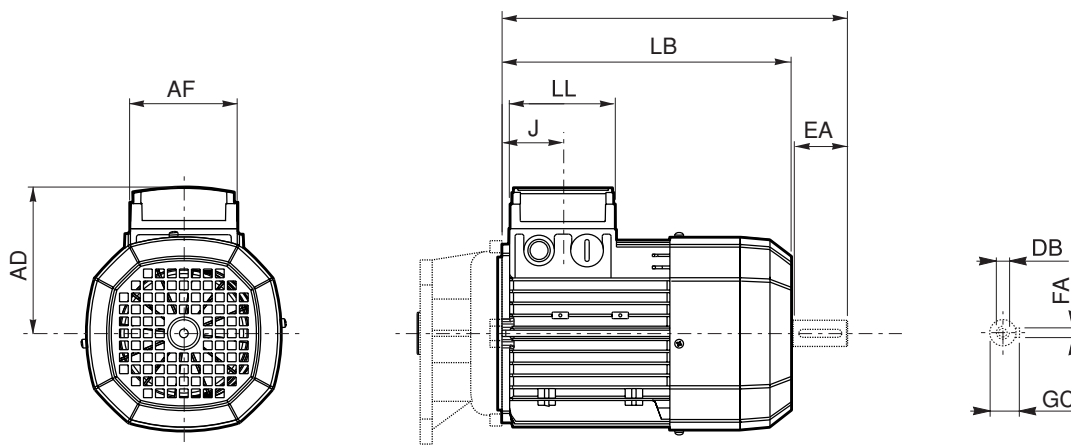
1) Per freno FA07 quota R=217.

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

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



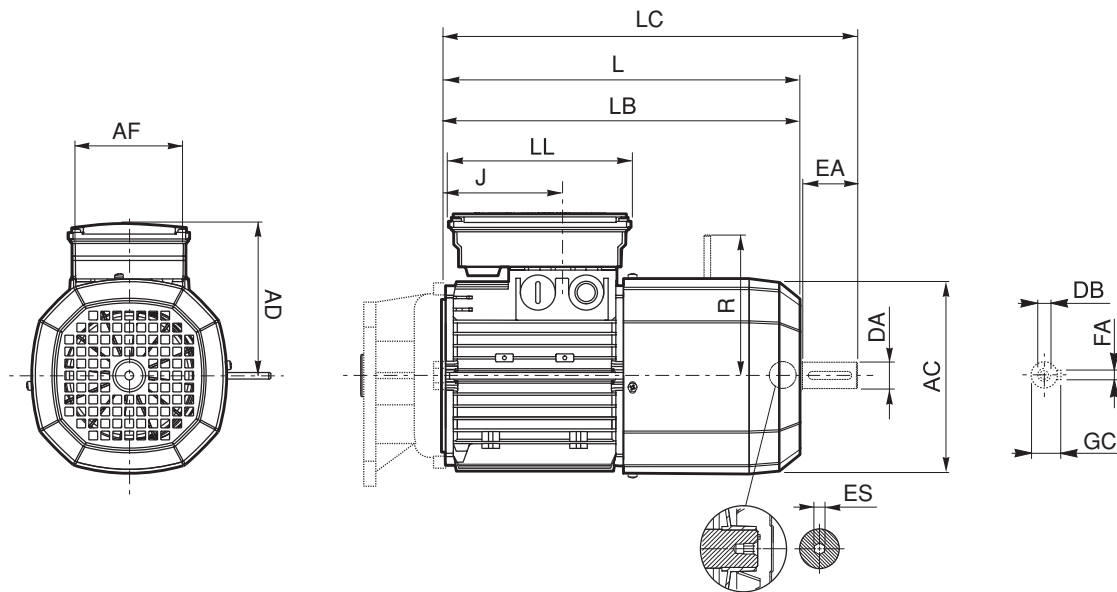
M



	Seconda estremità albero					Motore						
	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 ; M_AFD

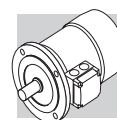


	Seconda estremità albero					Motore								
	DA	EA	DB	FA	GC	AC	LB	LC	AF	LL	J	AD	R	ES
M 05	11	23	M4	4	12.5	121	231	256	98	133	48	122	96	5
M 1	14	30	M5	5	16	138	248	280			73	135	103	
M 2 S	19	40	M6	6	21.5	156	272	314			88	146	129	
M 3 S	28	60	M10	8	31	195	326	389	110	165	124.5	158	160	6
M 3 L							353	416						
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						

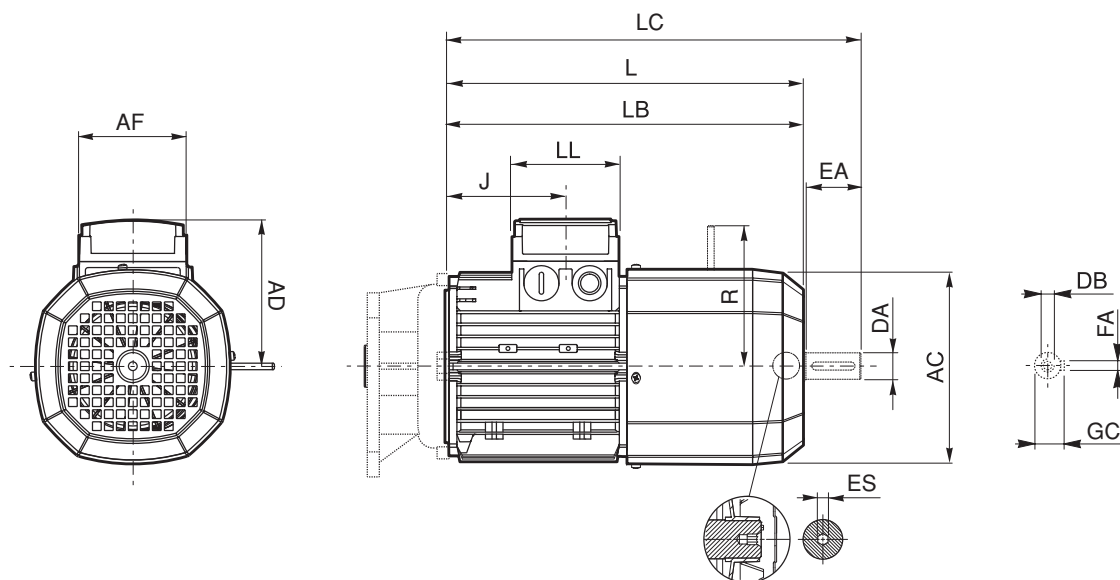
N.B.:

1) Per freno FD07 e AFD07 quota R=226.

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



M_FA



	Seconda estremità albero					Motore									
	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	140	188	185.5	210	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															

N.B.:


1) Per freno FA07 quota R=217.

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

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



INDICE DI REVISIONE

BR_CAT_VFW_STD_ITA_R03_0	
	Descrizione
198...265	Aggiornato sezione "Motori elettrici".

2015 07 06

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HEADQUARTERS

Bonfiglioli Riduttori S.p.A.
Via Giovanni XXIII, 7/A
40012 Lippo di Calderara di Reno
Bologna (Italy)

tel: +39 051 647 3111
fax: +39 051 647 3126
bonfiglioli@bonfiglioli.com
www.bonfiglioli.com

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