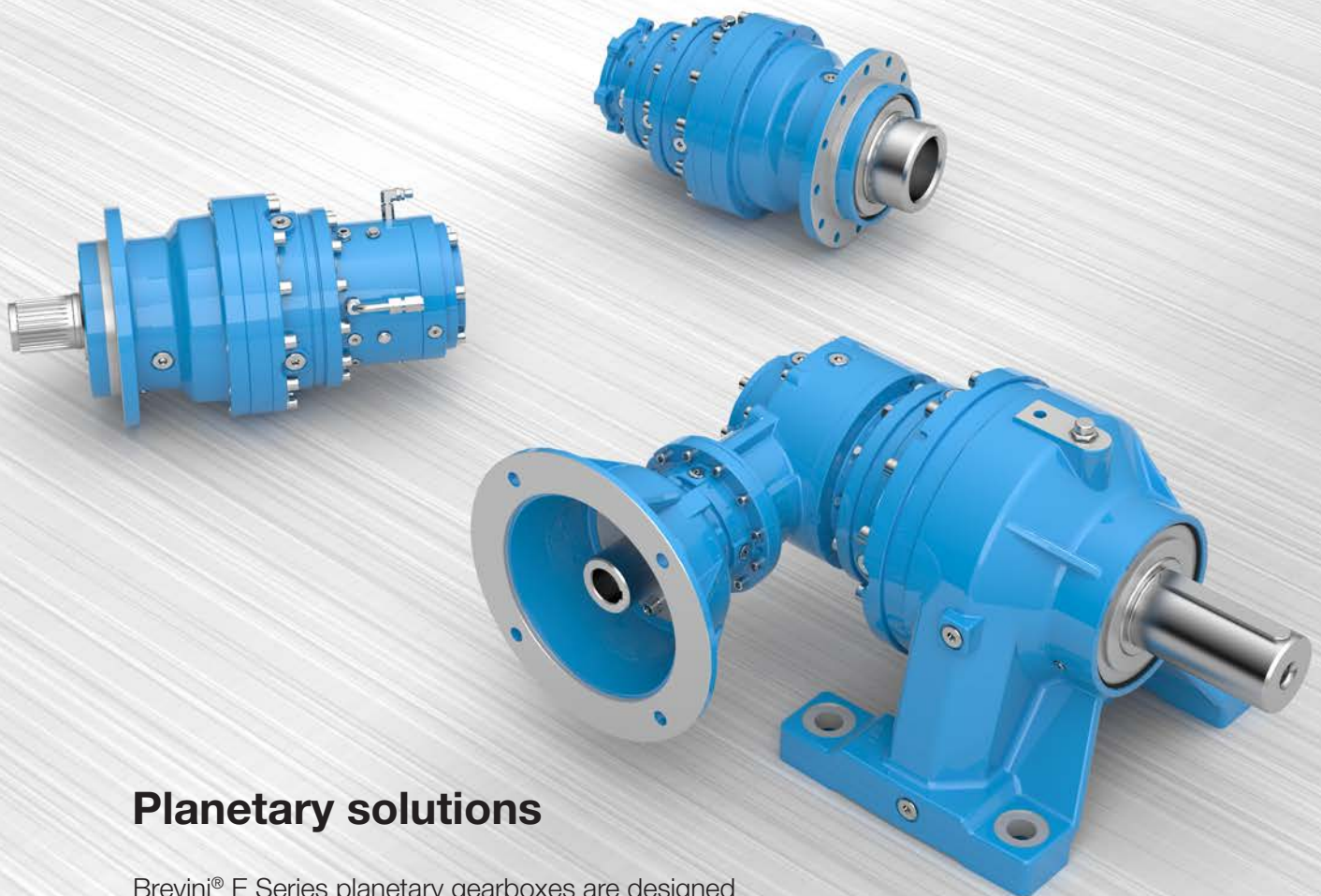




Brevini[®] Planetary Gearboxes **E Series**

Torques from 230 Nm to 36.600 Nm



Planetary solutions

Brevini[®] E Series planetary gearboxes are designed for industrial applications answering to the needs of more performances in compact and limited spaces.

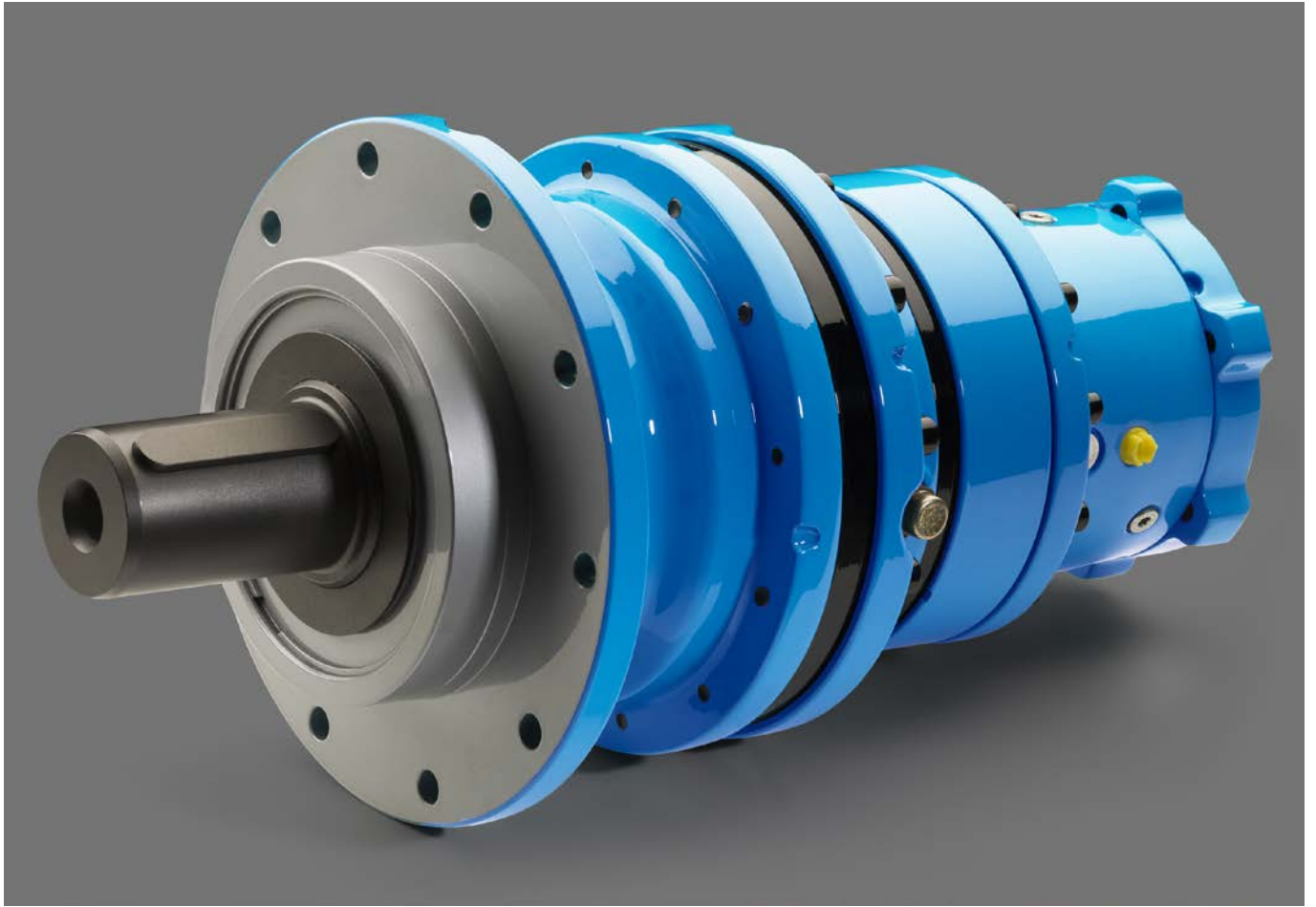
e SERIES



BREVINI[®]

Motion Systems





NUOVA SERIE E

Eccellenza tecnologica, **Efficienza** meccanica, **Economie** di esercizio e funzionamento, **Esperienza** industriale DANA. Questi sono i pregi della nuova **Serie E**: la soluzione ideale per l'industria del terzo millennio.

Infatti questa innovativa serie di riduttori epicicloidali, perfetta per applicazioni industriali con coppie e potenze intermedie, è la risposta DANA alle esigenze di clienti globalizzati, che richiedono più prestazioni in spazi compatti e limitati.

La nuova **Serie E** rilancia il concetto di modularità, di cui DANA è alfiera da mezzo secolo, amplificandolo con sostanziose innovazioni tecnologiche: perni a sbalzo, stadi di riduzione a quattro satelliti, ingranaggi rettificati con profilo ottimizzato.

DANA ha progettato le grandezze (e suddiviso i rapporti di riduzione) seguendo una logica matematica scalare e coerente, per fornire la soluzione più adatta alle diverse necessità applicative dei Clienti.

La nuova **Serie E** regala concreti benefici in termini di performance e di processo produttivo:

- **Incremento della vita utile e della durata** dei riduttori, grazie alla maggiore capacità di carico dei cuscinetti, dei satelliti e dei porta-satelliti.
- **Massima silenziosità di funzionamento**, grazie agli ingranaggi rettificati a perfetto ingranamento, con positivi miglioramenti della potenza termica e dell'affidabilità dei riduttori.
- **Dimensioni e ingombri ulteriormente ridotti**, che sono un vantaggio concreto per i clienti e i progettisti, sia di impianti industriali che di macchine se-moventi.
- **Minore peso dei riduttori** a parità di prestazioni.
- **Compatibilità** con la precedente gamma epicicloidale DANA, che rende la nuova **Serie E** spesso intercambiabile in diverse soluzioni applicative.

NEW E-SERIES

Technological Excellence, Mechanical Efficiency, Operating Economies, DANA industrial Expertise.

These are the qualities of the new E Series: the ideal solution for industry in the third millennium.

In fact this innovative series of planetary gear units, perfect for industrial applications with intermediate powers and torques, is the DANA answer to the needs of globalized customers who require more performance in compact and limited spaces.

The new E Series relaunches the concept of modularity, championed by DANA for half a century, enhancing it with substantial technological innovations: overhung pins, reduction stages with four planetary gears, ground gears with optimized profile.

DANA has designed the sizes (and subdivided reduction ratios) following a scalar and coherent mathematical logic, to provide the best solution for the various application needs of Customers.

The new E Series delivers tangible benefits in terms of performance and production process:

- *Longer duration and service life of the gear units, thanks to increased load capacity of the bearings, planetary gears and planetary carriers.*
- *Very quiet operation, due to ground gears with perfect meshing, with positive improvements in thermal rating and reliability of the reduction gear units.*
- *Sizes and overall dimensions further reduced, offering a real advantage for customers and designers of industrial systems as well as self-propelled machines.*
- *Lighter weight of the reduction gear units at equivalent performance.*
- *Compatibility with the previous DANA planetary range, which makes the new E Series often interchangeable in various application solutions.*

NEU E-SERIE

Technologische **Exzellenz**, mechanische **Effizienz**, **wirtschaftlicher** Betrieb, **Erfahrung** in der Industrie: DANA.

Das sind die Vorzüge der neuen **Serie E**: Die ideale Lösung für die Industrie im dritten Jahrtausend.

Diese innovative Serie Planetengetriebe, ausgezeichnet geeignet für industrielle Anwendungen mit mittleren Drehmomenten und Leistungen ist die Antwort von DANA auf die Anforderungen der Kunden in einer globalisierten Welt, die höhere Leistung, kompaktere Ausführungen mit wenig Platzbedarf verlangen.

Die neue **Serie E** ist wieder ein Baukastensystem, dessen Verfechter DANA bereits seit einem halben Jahrhundert ist. Erweitert wird die Serie durch wesentliche technologische Innovationen: Planetenträgerbolzen, Übersetzungsstufen mit vier Planetenradrädern, Zahnräder mit optimiertem Profil.

DANA hat die Baugrößen (unterteilt in Übersetzungsstufen) in passende Gruppen ausgelegt, um den Kunden für die unterschiedlich benötigten Anwendungen besser geeignete Lösungen anbieten zu können.

Die neue **Serie E** bringt Vorteile bei der Leistung und für den Produktionsprozess:

- **Längere Betriebszeiten und Lebensdauer** der Getriebe dank erhöhter Lastkapazitäten bei Lager, Umlaufrädern und Planetenradträger.
- **Besonders ruhiger Betrieb** dank perfektem Zahneingriff, mit Verbesserung der Wärmeleistung und der Zuverlässigkeit der Getriebe.
- **Weitere Verringerung in den Abmaßen** und des Platzbedarfs sind konkrete Vorteile für die Kunden und die Planer, sowohl bei Industrieanlagen als auch bei Arbeitsmaschinen.
- **Geringeres Gewicht** bei gleichen Leistungen.
- **Kompatibilität** mit den Vorgängermodellen der Planetengetriebe von DANA ermöglicht einen Austausch gegen die neue Serie E bei den unterschiedlichen Anwendungslösungen.

- **Integrazione** con la Serie S DANA per applicazioni "heavy duty" e cicli di lavoro gravosi.
- **Tempi di consegna veloci**, grazie a razionali processi manifatturieri e di logistica industriale.

In dettaglio, la **Serie E** è articolata su 9 grandezze armonicamente scalari, con una coppia che si sviluppa da 1'200 Nm a 26'000 Nm.

Disponibile sia in esecuzione in linea che in esecuzione ortogonale, offre a catalogo fino a 4 stadi di riduzione (su richiesta del cliente può salire fino a 6 stadi). I rapporti di riduzione coprono un orizzonte molto ampio, da 1:3 fino a 1:3'000 ed oltre.

La flessibile e modulare struttura del riduttore si abbina a numerose versioni in uscita: flangiato ad albero femmina, con femmina pendolare, flangiato ad albero maschio, supporto con piedi.

La nuova **Serie E** offre le versatili configurazioni in ingresso con albero veloce ed è predisposta per motori elettrici e oleodinamici. Ci sono ampie disponibilità di freni, per le più svariate necessità applicative. Inoltre è dotata di una completa gamma di accessori, sia in ingresso che in uscita.

- **Integration with the DANA S Series** for "heavy duty" applications and heavy work cycles.
- **Prompt delivery times**, thanks to rational manufacturing processes and industrial logistics.

In detail, the E Series comprises 9 harmonically developed sizes, with torque from 1'200 Nm to 26'000 Nm.

Available in in-line and right-angle execution, and up to 4 reduction stages (up to 6 stages on customer request). The reduction ratios cover a very wide range, from 1:3 to 1:3'000 and over.

The gear unit's flexible and modular structure comes with many output versions: flanged shaft female, with hollow shaft mounting, flanged male shaft, support with feet.

The new E Series offers versatile input configurations with input shaft and is arranged for electric and hydraulic motors. Wide availability of brakes, for the most varied application needs. There is also a complete range of input and output accessories.

- **Integrierung** in die Serie S von DANA für „Heavy-Duty-Anwendungen“ und bei erschwerten Arbeitszyklen.
- **Kurze Lieferzeiten**, dank rationaler Fertigungsprozesse und industrieller Logistik.

Im Detail, die **Serie E** besteht aus 9 aufeinander stufenweise abgestimmten Größen, mit einem Drehmoment zwischen 1'200 Nm und 26'000 Nm.

Erhältlich sowohl als In-Line-Ausführung als auch als Winkelgetriebe mit dem Katalog bis zu 4 angebotenen Übersetzungsstufen (auf Kundenwunsch bis zu 6 Stufen möglich). Die Übersetzungsverhältnisse decken einen großen Bereich ab, von 1:3 bis zu 1:3'000 und mehr.

Zum flexiblen und modularen Aufbau des Getriebes kommen noch zahlreiche Abtriebsausführungen hinzu: Flanschgetriebe mit Hohlwelle, Aufsteckhohlwelle, Flanschgetriebe mit Vollwelle, Fußleisten montierte Getriebe.

Die neue **Serie E** bietet zahlreiche Konfigurationen für Ausführungen mit antriebsseitiger schnell laufender Welle und Vorrüstung für Elektro- und Hydraulikmotoren. Angeboten wird ein breites Angebot an Bremsen, für die unterschiedlichsten Anwendungsanforderungen. Darüber hinaus bieten wir sowohl antriebs- als auch abtriebsseitig ein weit gefächertes Angebot an Zubehör.



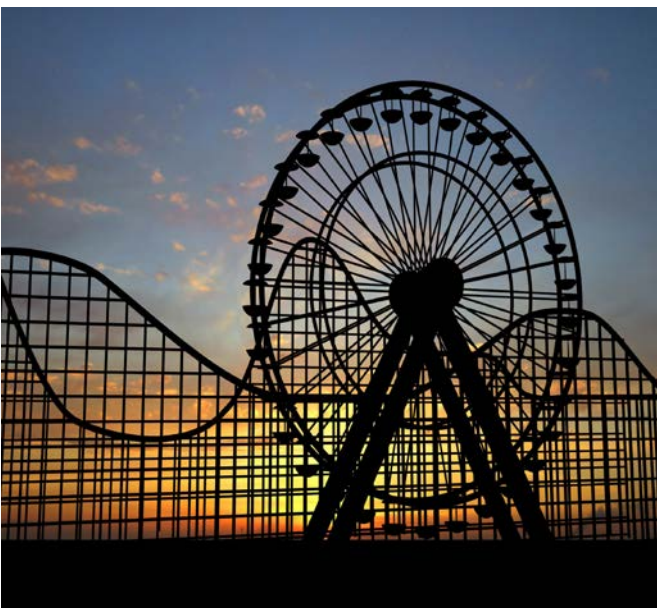
Energie rinnovabili / *Green Energy* / Erneuerbare Energie



Settore Minerario / *Mining Quarrying* / Bergbau Gewinnung



Impianti Industriali / *Industrial Equipment* / Industrieanlagen



Applicazioni Speciali / *Custom Applications* / Individuelle Anwendungen



Industria Alimentare / *Food and Beverage* / Lebensmittelindustrie





BREVINI[®]

Motion Systems

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E160

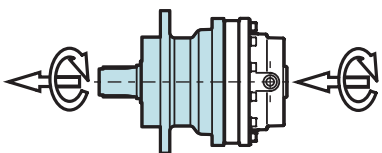
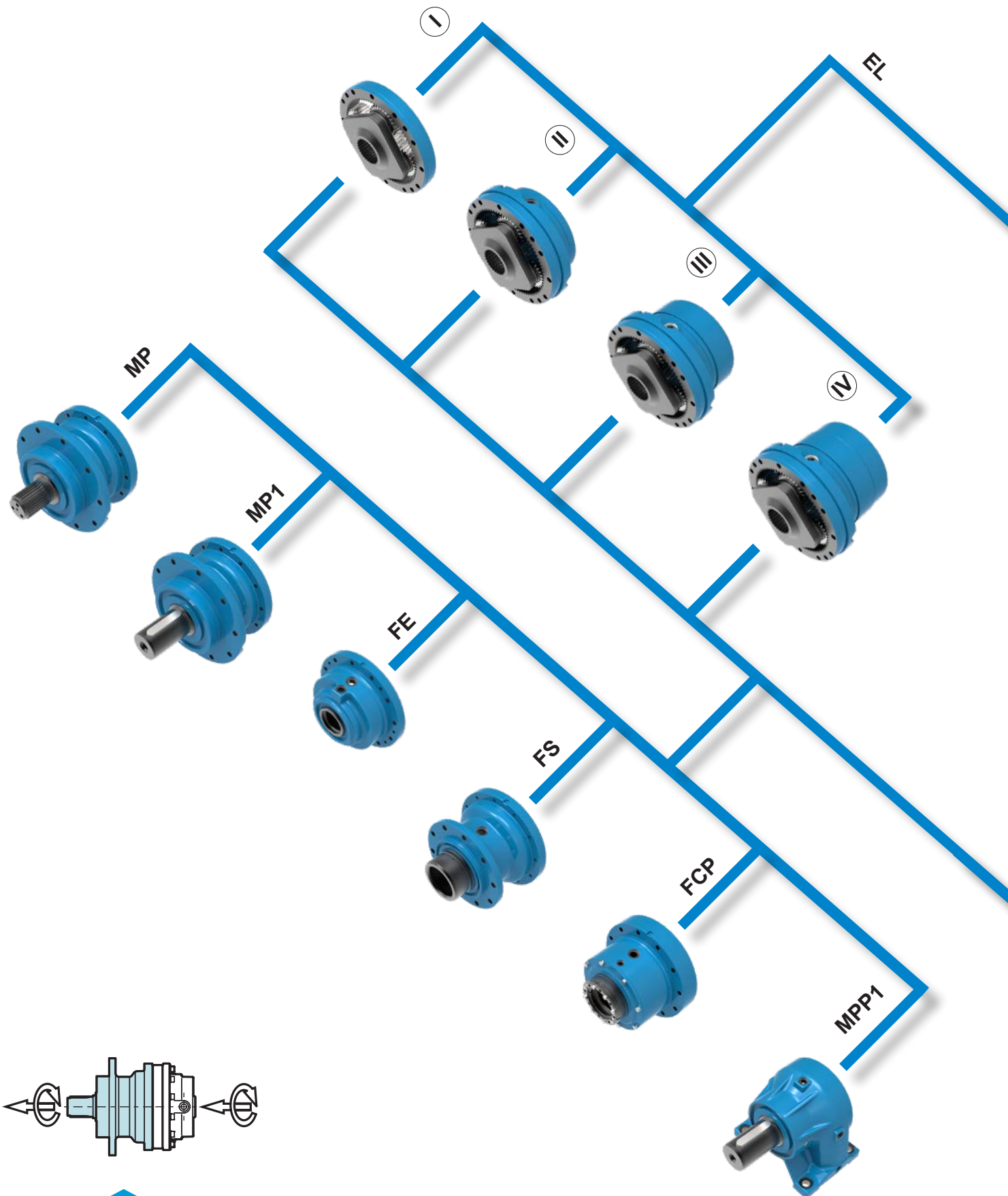
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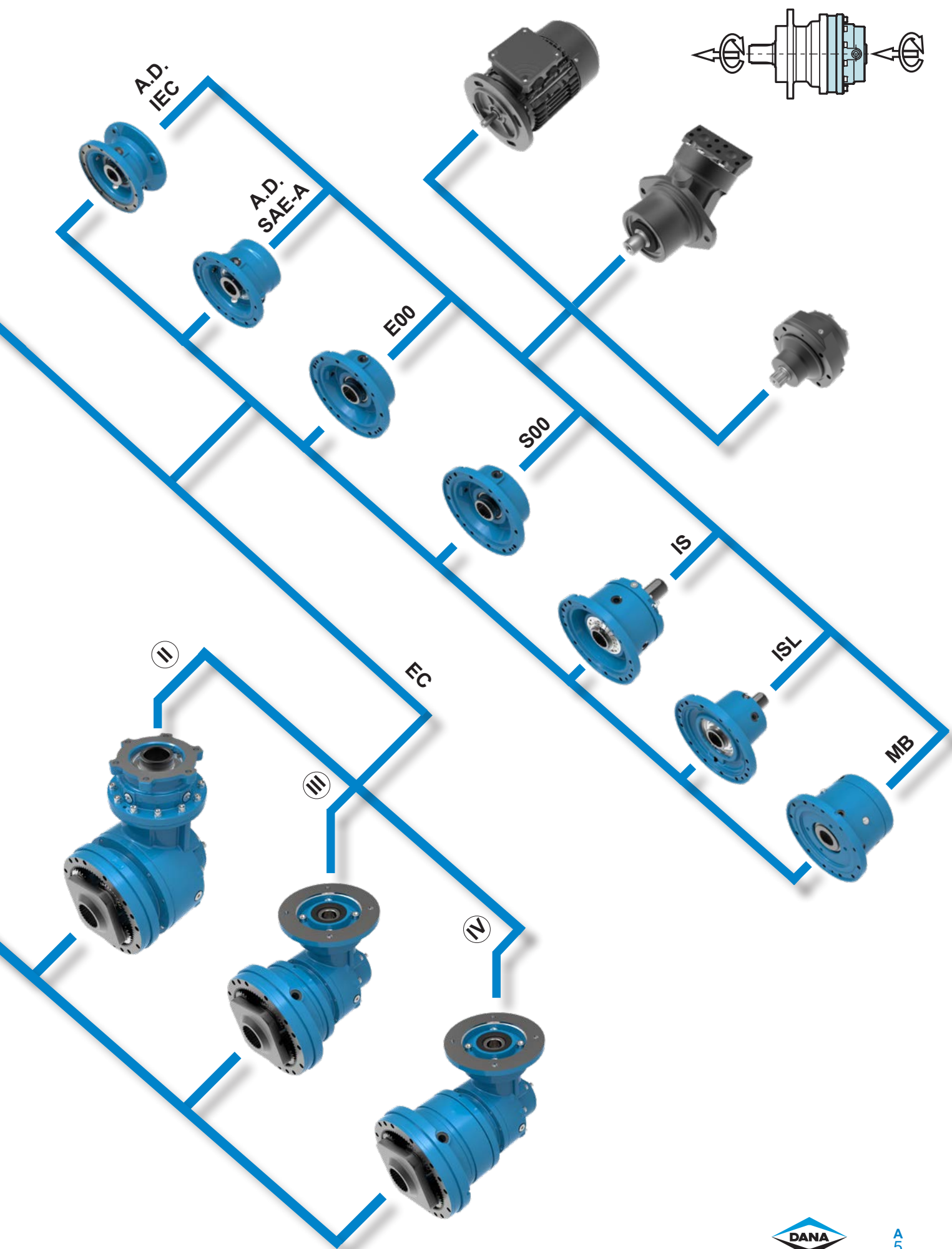
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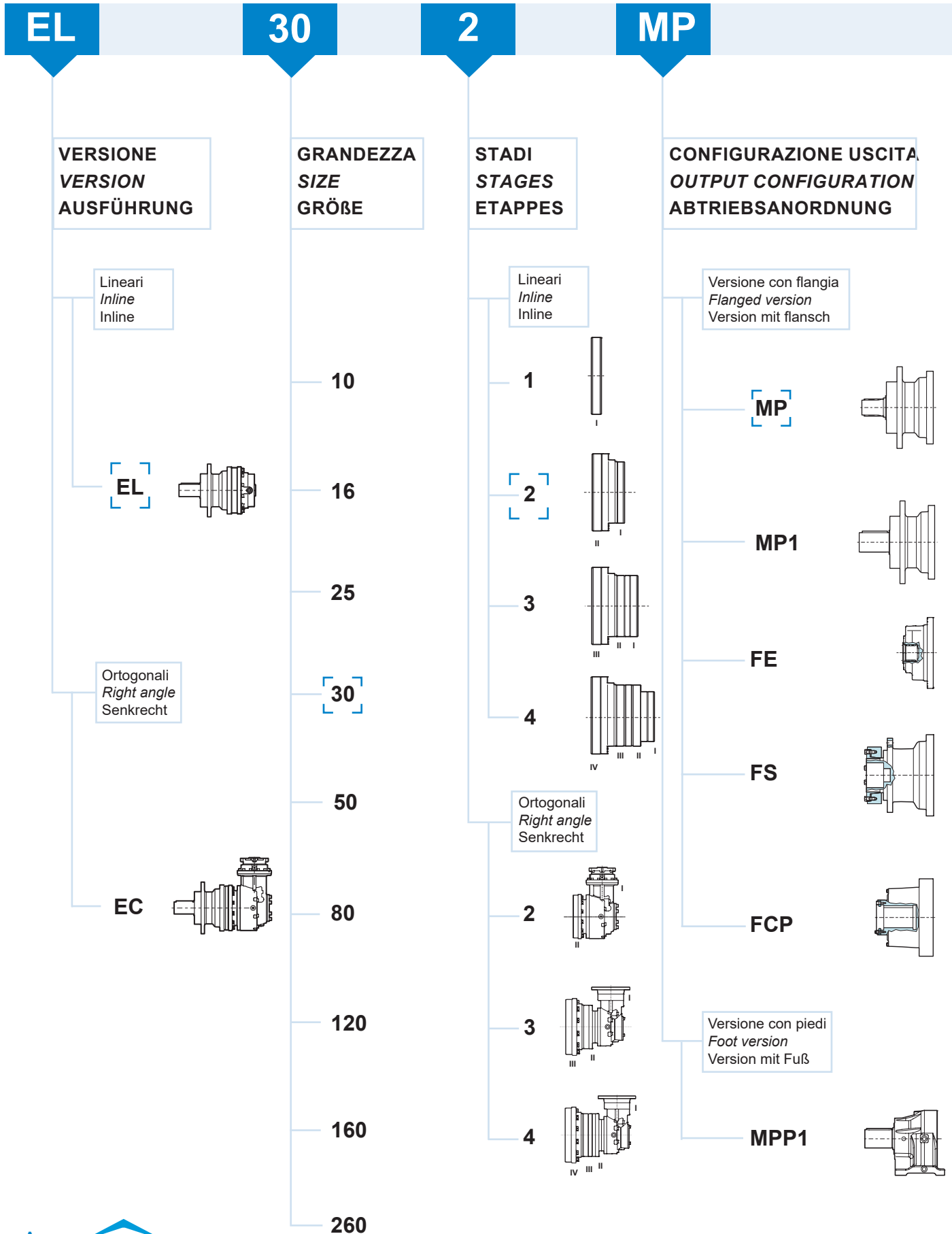
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 Designation example:
 Beispiel der bezeichnung:

EL302 / MP / 12.4 / ISL10 / B3

12.4

ISL10

B3

RAPPORTO EFFETTIVO EFFECTIVE RATIO EFFEKTIVES ÜBERSETZungsverhältnis

Lineari
Inline
Inline

3.52

7.39

12.4

75.5

43.4

444

182

3'041

Ortogonal
Right angle
Senkrecht

10.5

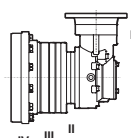
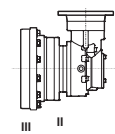
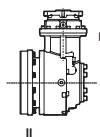
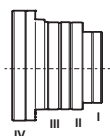
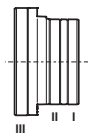
50.0

37.1

236

130

3'003



CONFIGURAZIONE ENTRATA INPUT CONFIGURATION ANTRIEBSANORDNUNG

Supporti maschio in entrata
Cylindrical male input shaft
Antriebswellenstümpfe

ISL10

ISL260

IS30

IS260

Freni lamellari
Multidisc brakes
Lamellenbremsen

MB3

MB5

MB6

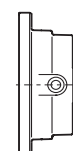
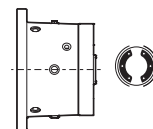
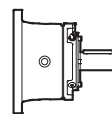
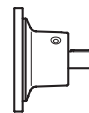
Entrata universale
Universal input
Universalantriebe

E00

S00

A.D. SAE-A

A.D. IEC



POSIZIONI DI MONTAGGIO MOUNTING POSITION EINBAULAGE

Lineari
Inline
Inline

B3

V5

V6

...

Ortogonal
Right angle
Senkrecht

V6A

V6B

B3A

B3B

...











3. SIMBOLOGIA

3. SYMBOLOGY

3. SYMBOLOGIE

Descrizione / Description / Beschreibung				
Costante del carico radiale	Constant of radial load	Radiallastkonstante	c	
Diametro elemento montato sull'albero	Diameter of element mounted on shaft	Durchmesser des an der Welle montierten Elements	d	[mm]
Carico assiale ammissibile in uscita	Permissible axial load on output shaft	Zulässige Axiallast abtriebsseitig	F _{a2}	[N]
Carico assiale richiesto in uscita	Required axial load on output shaft	Geforderte Axiallast abtriebsseitig	F _{aR2}	[N]
Carico radiale ammissibile ingresso/uscita	Permissible radial load on input / output shaft	Zulässige Radiallast antriebs-/abtriebsseitig	F _{r1,2}	[N]
Carico radiale richiesto ingresso / uscita	Required radial load on input / output shaft	Geforderte Radiallast antriebs-/abtriebsseitig	F _{rR1,2}	[N]
Fattore d'incremento della potenza	Power increase factor	Leistungssteigerungsfaktor	f _l	
Fattore termico	Thermal factor	Wärmefaktor	f _K	
Fattore ambiente	Environmental factor	Umweltfaktor	f _R	
Fattore di servizio	Duty factor	Betriebsfaktor	f _S	
Fattore di velocità	Speed factor	Drehzahlfaktor	f _V	
Durata di funzionamento	Operating life	Betriebsdauer	h	[h]
Durata di funzionamento richiesta	Required operating life	Geforderte Betriebsdauer	h _R	[h]
Fattore d'intermittenza	Duty cycle	Anwendungsfaktor	l	
Rapporto di riduzione	Reduction ratio	Übersetzungsverhältnis	i	
Fattore di durata ingresso/uscita	Input / output duration factor	Lebensdauerfaktor antriebs-/abtriebsseitig	L _{h1,2}	
Numero di avviamenti orari	Number of starts per hour	Anzahl Starts pro Stunde	N	[1/h]
Velocità in ingresso	Input speed	Antriebsdrehzahl	n ₁	[rpm]
Velocità massima in ingresso	Max input speed	Max. Antriebsdrehzahl	n _{1MAX}	[rpm]
Velocità in uscita	Output speed	Abtriebsdrehzahl	n ₂	[rpm]
Pressione d'esercizio motore idraulico	Hydraulic motor operating pressure	Betriebsdruck Hydraulikmotor	p _A	[bar]
Potenza in ingresso	Input power	Antriebsleistung	P ₁	[kW]
Potenza in uscita	Output power	Abtriebsleistung	P ₂	[kW]
Potenza termica da dissipare	Thermal power to be dissipated	Abzuführende Wärmeleistung	P _C	[kW]
Potenza nominale motore elettrico	Electric motor nominal power	Nennleistung Elektromotor	P _n	[kW]
Potenza termica	Thermal power	Wärmeleistung	P _T	[kW]
Potenza termica corretta	Corrected thermal power	Korrigierte Wärmeleistung	P _{T1}	[kW]
Portata alimentazione motore idraulico	Hydraulic motor capacity	Durchflussmenge Hydraulikmotor-Versorgung	q	[l/min]
Fattore di sicurezza sul freno	Brake safety factor	Bremse-Sicherheitsfaktor	S _f	
Coppia in ingresso richiesta	Required input torque	Gefordertes Antriebsdrehmoment	T _{1R}	[Nm]
Coppia trasmissibile in uscita	Transmissible output torque	Übertragbares Abtriebsdrehmoment	T ₂	[Nm]
Coppia frenante in uscita	Output braking torque	Abtriebsbremsmoment	T _{2B}	[Nm]
Coppia massima in uscita	Max output torque	Max. Abtriebsmoment	T _{2MAX}	[Nm]
Coppia nominale in uscita	Nominal output torque	Abtriebsnennmoment	T _{2N}	[Nm]
Coppia richiesta in uscita	Required output torque	Gefordertes Abtriebsmoment	T _{2R}	[Nm]
Coppia massima richiesta in uscita	Required max output torque	Gefordertes max. Abtriebsmoment	T _{2RMAX}	[Nm]
Coppia frenante in ingresso	Input braking torque	Antriebsbremsmoment	T _B	[Nm]
Coppia frenante richiesta in ingresso	Required input braking torque	Gefordertes Antriebsbremsmoment	T _{BR}	[Nm]
Temperatura ambiente di lavoro	Work environment temperature	Temperatur Arbeitsumgebung	t _a	[°C]
Tempo di funzionamento	Operating time	Betriebstemperatur	t _f	[s]
Tempo di arresto	Stopping time	Abschaltzeit	t _r	[s]
Cilindrata effettiva motore idraulico	Hydraulic motor displacement	Effektiver Hubraum Hydraulikmotor	V	[cm ³]
Cilindrata richiesta motore idraulico	Required hydraulic motor displacement	Geforderter Hubraum Hydraulikmotor	V _R	[cm ³]
Distanza applicazione del carico radiale ingresso / uscita	Input / output radial load application distance	Abstand Radiallast antriebs-/abtriebsseitig	X _{1,2}	[mm]
Rendimento dinamico	Dynamic efficiency	Dynamischer Wirkungsgrad	η _d	
Rendimento meccanico motore idraulico	Hydraulic motor mechanical efficiency	Mechanischer Wirkungsgrad Hydraulikmotor	η _{mh}	
Rendimento volumetrico motore idraulico	Hydraulic motor volumetric efficiency	Volummetrischer Wirkungsgrad Hydraulikmotor	η _v	

Unità di misura / Unit of measure / Maßeinheit
Simbolo / Symbol / Symbol

	Riduttori in linea	<i>In-line gear units</i>	In-Line-Getriebe		
	Riduttori ortogonali	<i>Right-angle gear units</i>	Winkelgetriebe		
Uscite / Output / Antriebe	Albero maschio scanalato	<i>Male splined shaft</i>	Wellenstumpf mit Keilnut		MP ML
	Albero femmina scanalato	<i>Female splined shaft</i>	Hohlwelle mit Keilnut		FE
	Albero maschio cilindrico con linguetta	<i>Solid shaft with key</i>	Wellenstuf zylindrisch mit der Feder		MP1 ML1 MPP1
	Albero femmina cilindrico con sede linguetta	<i>Female cylindrical shaft with keyway</i>	Hohlwelle zylindrisch mit der Federsitz		FCP
	Albero femmina cilindrico per giunto ad attrito	<i>Female cylindrical shaft with shrink disc</i>	Hohlwelle zylindrisch für Reibkupplung		FS
Ingressi / Input / Abtriebe	Attacco universale	<i>Universal connection</i>	Universalanschluss		
	Attacchi diretti IEC / SAE	<i>IEC / SAE direct connections</i>	Direkt Anschlüsse IEC / SAE		
	Supporto maschio	<i>Male support</i>	Wellenstumpf		IS
	Supporto maschio leggero	<i>Light male support</i>	Wellenstumpf leichte Ausführung		ISL
	Flange per motori elettrici ed idraulici	<i>Adaptor for electric and hydraulic motors</i>	Flansche für Elektro- und Hydraulik motoren		
	Freni	<i>Brakes</i>	Bremsen		
	Coppia di serraggio	<i>Tightening torque</i>	Anzugsmoment		
	Lubrificazione	<i>Lubrication</i>	Schmierung		
	Rimando a pagina	<i>Refer to page</i>	Siehe Seite		123

4. DESCRIZIONI TECNICHE

4. TECHNICAL DESCRIPTION

4. TECHNISCHE BESCHREIBUNGEN

Coppia nominale in uscita

T_{2N} [Nm]

Rappresenta la coppia in uscita convenzionale che identifica la grandezza del riduttore.

Coppia trasmissibile in uscita

T_2 [Nm]

Rappresenta la coppia trasmissibile in uscita dal riduttore con carico continuo e uniforme (fattore di servizio $f_s=1$), per diversi valori del fattore di durata n_2xh .

I valori di T_2 sono calcolati secondo gli standard ISO 6336 per gli ingranaggi e ISO 281 per i cuscinetti e sono riportati nelle tabelle di selezione delle grandezze.

Coppia massima in uscita

T_{2MAX} [Nm]

Rappresenta la coppia massima trasmissibile in uscita dal riduttore come valore di punta o per brevi durate. Per azionamenti che comportano un elevato numero di avviamenti o inversioni, anche la coppia massima di impiego deve essere opportunamente limitata in relazione alla resistenza degli ingranaggi o degli alberi. I valori di T_{2MAX} sono riportati nelle tabelle di selezione delle grandezze.

Coppia richiesta in uscita

T_{2R} [Nm]

Rappresenta la coppia richiesta in uscita dall'applicazione e dovrà essere sempre inferiore alla coppia trasmissibile T_2 in uscita del riduttore selezionato.

Coppia massima richiesta in uscita

T_{2RMAX} [Nm]

Rappresenta la coppia in uscita massima richiesta dall'applicazione e dovrà essere sempre inferiore alla coppia massima in uscita trasmissibile T_{2MAX} del riduttore selezionato.

Coppia frenante in ingresso

T_B [Nm]

Rappresenta la coppia frenante statica erogata dal freno lamellare che può essere installato in ingresso al riduttore. I valori di T_B sono riportati, per le varie configurazioni di freno, al capitolo "Freni lamellari a bagno d'olio".

Nominale output torque

T_{2N} [Nm]

The conventional output torque that identifies the size of the gear unit.

Transmissible output torque

T_2 [Nm]

The transmissible gear unit output torque with uniform and continuous load (duty factor $f_s=1$), for different values of the duration factor n_2xh .

The T_2 values are calculated according to ISO 6336 standards for the gears and ISO 281 for the bearings, and are given in the size selection tables.

Max output torque

T_{2MAX} [Nm]

The transmissible gear unit output torque as the peak value or for short periods. For drives involving a high number of starts or reversals, also the max. operational torque must be opportunely limited according to the fatigue resistance of the gears or shafts. The T_{2MAX} values are given in the size selection tables.

Required output torque

T_{2R} [Nm]

The output torque required by the application; it must always be less than the transmissible output torque T_2 of the selected gear unit.

Required max. output torque

T_{2RMAX} [Nm]

The maximum output torque required by the application; it must always be less than the maximum transmissible output torque T_{2MAX} of the selected gear unit.

Input braking torque

T_B [Nm]

The static braking torque delivered by the multi-disc brake that can be installed on the gear unit input. The T_B values, for the various brake configurations, are given in the section "Oil bath multi-disc brakes".

Abtriebsnennmoment

T_{2N} [Nm]

Ist das konventionelle Abtriebsmomentals Kennzeichnung der Größe.

Übertragbares Abtriebsdrehmoment

T_2 [Nm]

Ist das übertragbare Abtriebsdrehmoment bei kontinuierlicher und uniformer Last (Betriebsfaktor $f_s=1$), bei verschiedenen Werten des Lebensdauerfaktors n_2xh .

Die Werte T_2 werden nach dem Standards ISO 6336 für Getriebe und ISO 281 für Lager berechnet. Sie sind in der Tabelle für die Größenauswahl angegeben.

Max. Abtriebsmoment

T_{2MAX} [Nm]

Ist das maximal übertragbare Abtriebsmoment des Getriebesals Spitze und kurzzeitig. Bei Antrieben mit einer hohen Anzahl von Starts oder Umsteuerungen muss auch das maximale Betriebsdrehmoment entsprechend der Ermüdungsbeständigkeit der Zahnräder oder Wellen begrenzt werden.

Die Werte für T_{2MAX} sind in der Tabelle für die Auswahl der Größe aufgeführt.

Gefordertes Abtriebsmoment

T_{2R} [Nm]

Ist das erforderliche Abtriebsmoment für die Anwendung. Muss immer unter dem übertragbaren Abtriebsmoment T_2 des ausgewählten Getriebes liegen.

Gefordertes max. Abtriebsmoment

T_{2RMAX} [Nm]

Ist das erforderliche maximale Abtriebsmoment für die Anwendung. Muss immer unter dem übertragbaren max. Abtriebsmoment T_{2MAX} des ausgewählten Getriebes liegen.

Antriebsbremsmoment

T_B [Nm]

Ist das statische Bremsmoment der Lamellenbremse, die antriebsseitig am Getriebe eingebaut werden kann.

Die Werte für T_B sind für die unterschiedlichen Bremskonfigurationen unter dem Abschnitt „Ölbad-Lamellenbremsen“ angegeben.

Coppia frenante richiesta in ingresso

T_{BR} [Nm]

Rappresenta la coppia frenante richiesta in ingresso al riduttore qualora l'applicazione preveda l'utilizzo di un freno in ingresso.

E' calcolabile con la seguente relazione:

$$T_{BR} = \frac{S_f \times T_{2R}}{i} \quad [\text{Nm}] \quad (1)$$

in cui

- S_f rappresenta un fattore di sicurezza sul freno
- T_{2R} la coppia richiesta in uscita
- i il rapporto di riduzione

Il fattore di sicurezza sul freno S_f dipende dal tipo di applicazione e deve essere indicato dal Cliente: talvolta il suo valore minimo è indicato da regolamenti specifici rilevanti per l'applicazione.

Velocità in ingresso

n_1 [rpm]

Rappresenta la velocità del motore collegato al riduttore o, in generale, la velocità dell'organo in ingresso al riduttore: nel caso di azionamenti con pulegge e cinghie, ad esempio, il valore deve tener conto del relativo rapporto di riduzione.

Velocità massima in ingresso

n_{1MAX} [rpm]

Rappresenta la velocità massima in ingresso al riduttore per brevi periodi oppure in condizioni di servizio intermittente. E' consentita la permanenza alla velocità n_{1MAX} per un tempo massimo di 1 minuto seguito da un periodo di raffreddamento del riduttore. Nel caso in cui siano previsti periodi di permanenza più lunghi a tale velocità, si consiglia di contattare il referente DANA di zona.

I valori di n_{1MAX} sono riportati nelle tabelle di selezione.

Velocità in uscita

n_2 [rpm]

Rappresenta la velocità in uscita al riduttore. E' calcolabile con la seguente formula:

$$n_2 = \frac{n_1}{i} \quad [\text{rpm}] \quad (2)$$

in cui n_1 rappresenta la velocità in ingresso e i il rapporto di riduzione del riduttore.

Required input braking torque

T_{BR} [Nm]

The required gear unit input braking torque if the application involves the use of an input brake.

It can be calculated with the following equation:

where

- S_f a brake safety factor
- T_{2R} the required output torque
- i the reduction ratio

The brake safety factor S_f depends on the type of application and must be specified by the Customer: sometimes its minimum value is indicated by the specific regulations relevant to the application.

Input speed

n_1 [rpm]

The speed of the motor connected to the gear unit or, in general, the speed of the gear unit input part: in case of drives with pulleys and belts, for example, the value must take into account the relevant reduction ratio.

Max input speed

n_{1MAX} [rpm]

The maximum gear unit input speed for short periods or in conditions of intermittent duty. Staying at the speed n_{1MAX} for a maximum time of 1 minute followed by a gear unit cooling period is allowed. If longer periods at that speed are foreseen, it is advisable to consult the DANA area contact person.

The n_{1MAX} values are given in the selection tables.

Output speed

n_2 [rpm]

The gear unit output speed. It can be calculated with the following formula:

where n_1 is the input speed and i the gear unit reduction ratio.

Gefordertes Antriebsbremsmoment

T_{BR} [Nm]

Ist das geforderte Antriebsbremsmoment für das Getriebe, wenn die Anwendung den Einsatz einer Antriebsbremse fordert.

Kann mit folgender Formel berechnet werden:

Dabei ist

- S_f Sicherheitsfaktor der Bremse
- T_{2R} Gefordertes Abtriebsmoment
- i Übersetzungsverhältnis

Der Sicherheitsfaktor der Bremse S_f ist abhängig von der Anwendung und ist vom Kunden anzugeben: Manchmal wird der Mindestwert in spezifischen Vorschriften der Anwendung angegeben.

Antriebsdrehzahl

n_1 [rpm]

Ist die Drehzahl des an das Getriebe angeschlossenen Motors oder allgemein, Drehzahl des antriebsseitigen Organs: Bei Antrieben mit Scheiben oder Riemen zum Beispiel muss der Wert die entsprechende Übersetzung berücksichtigen.

Max. Antriebsdrehzahl

n_{1MAX} [rpm]

Ist die maximale Antriebsdrehzahl des Getriebes für kurze Zeiträume oder bei Aussetzbetrieb. Erlaubt ist die Laufzeit mit der Drehzahl n_{1MAX} für maximal 1 Minute mit nachfolgender Abkühlzeit des Getriebes. Sollten längere Laufzeiten mit dieser Drehzahl vorgesehen sein, raten wir, sich an die DANA Kontaktperson der zone zu wenden.

Die Werte für n_{1MAX} sind in der Auswahl-tabelle aufgeführt.

Abtriebsdrehzahl

n_2 [rpm]

Ist die Abtriebsdrehzahl am Getriebe. Kann mit folgender Formel berechnet werden:

dabei ist n_1 die Antriebsdrehzahl und i das Übersetzungsverhältnis des Getriebes.

Rapporto di riduzione

i

Rappresenta la relazione fra la velocità in ingresso n_1 ed uscita n_2 .

Reduction ratio

i

The ratio between the input speed n_1 and output speed n_2 .

$$i = \frac{n_1}{n_2}$$

Übersetzungsverhältnis

i

Stellt das Verhältnis zwischen Antriebsdrehzahl n_1 und Abtriebsdrehzahl n_2 dar.

(3)

Potenza in ingresso

P_1 [kW]

Rappresenta la potenza applicata all'ingresso del riduttore. E' calcolabile con la seguente formula:

Input power

P_1 [kW]

The power applied at the input of the gear unit. It can be calculated with the following formula:

$$P_1 = \frac{P_2}{\eta_d} \quad \text{[kW]}$$

Antriebsleistung

P_1 [kW]

Ist die angelegte Leistung antriebsseitig vom Getriebe. Kann mit folgender Formel berechnet werden:

(4)

in cui

- P_2 rappresenta la potenza in uscita
- η_d rappresenta il rendimento dinamico del riduttore, il cui valore è riportato nella tabella (4)

where

- P_2 is the output power
- η_d is the dynamic efficiency of the gear unit, whose value is given in the table (4)

Dabei ist

- P_2 die Abtriebsleistung
- η_d ist der dynamische Wirkungsgrad des Getriebes, dessen Wert in der Tabelle (4) angegeben ist

Potenza in uscita

P_2 [kW]

Rappresenta la potenza trasmessa all'uscita del riduttore. E' calcolabile con la seguente formula:

Output power

P_2 [kW]

The power transmitted at the output of the gear unit. It can be calculated with the following formula:

$$P_2 = \frac{T_{2R} \times n_2}{9 \cdot 550} \quad \text{[kW]}$$

Abtriebsleistung

P_2 [kW]

Ist die abtriebsseitig vom Getriebe übertragene Leistung. Kann mit folgender Formel berechnet werden:

(5)

in cui T_{2R} rappresenta la coppia richiesta in uscita e n_2 la velocità in uscita.

where T_{2R} is the required output torque and n_2 the output speed.

dabei ist T_{2R} das geforderter Abtriebsmoment und n_2 die Abtriebsdrehzahl.

Potenza termica

P_T [kW]

Rappresenta la potenza che il riduttore può trasmettere in modo continuativo nelle seguenti condizioni:

- con lubrificazione a sbattimento e in assenza di un circuito ausiliario di raffreddamento
- con montaggio in posizione orizzontale
- ad una velocità di ingresso di 1'500 rpm
- per una temperatura massima dell'olio di 80 °C (olio con viscosità ISO VG150)
- ad una temperatura ambiente di 20 °C
- nella condizione di impiego "ambiente grande"

I valori di P_T sono riportati nelle tabelle di selezione delle varie grandezze.

Qualora il tipo di funzionamento, la posizione di montaggio, la velocità in ingresso, la temperatura ambiente oppure l'ambiente di impiego siano diversi da quelli sopra indicati, è opportuno correggere il valore della potenza termica attraverso i fattori f_K , f_V e f_R di seguito indicati.

Thermal power

P_T [kW]

The power that the gear unit can transmit continuously in the following conditions:

- with splash lubrication and in the absence of an auxiliary cooling circuit
- with mounting in a horizontal position
- at an input speed of 1'500 rpm
- for a max. oil temperature of 80 °C (oil with viscosity ISO VG150)
- at an ambient temperature of 20 °C
- in the "large environment" condition of use

The P_T values are given in the tables for selection of the various sizes.

If the type of operation, the mounting position, the input speed, the ambient temperature or the operating environment are different from those indicated above, it is advisable to correct the thermal power value through the factors f_K , f_V and f_R indicated below.

Wärmeleistung

P_T [kW]

Ist die Leistung, die vom Getriebe kontinuierlich unter folgenden Bedingungen übertragen werden kann:

- mit Tauchschnierung und ohne zusätzliche Kühlkreis
- waagrecht montiert
- Antriebsdrehzahl 1'500 rpm
- Höchsttemperatur des Öls 80 °C (Viskosität des Öls ISO VG150)
- Umgebungstemperatur von 20 °C
- Einsatzbedingung „große Halle“

Die Werte für P_T sind in der Tabelle für die Auswahl bei den verschiedenen Größen aufgeführt.

Sind der Betriebstyp, die Einbauposition, die Antriebsdrehzahl, die Umgebungstemperatur oder die Einsatz Umgebung anders als oben angegeben, sollten die Werte für die Wärmeleistung mittels der Faktoren f_K , f_V und f_R , die nachstehend angegeben sind, korrigiert werden.

Fattore termico

f_K

Nel caso di cicli di lavoro che prevedono un impiego intermittente del riduttore e/o una temperatura ambiente diversa da 20 °C, la potenza termica del riduttore può essere adeguata all'applicazione specifica tramite il fattore f_K riportato nella tabella seguente.

Thermal factor

f_K

With work cycles requiring an intermittent use of the gear unit and/or the presence of an ambient temperature different from 20 °C, the gear unit thermal rating can be adjusted to the specific application by means of the factor f_K given in the following table.

Wärmefaktor

f_K

Bei Arbeitszyklen des Getriebes mit Aussetzbetrieb und/oder bei Umgebungstemperaturen, die von 20 °C abweichen, kann die Wärmeleistung des Getriebes mithilfe des in der nachstehenden Tabelle aufgeführten Faktors f_K an die spezifische Anwendung angepasst werden.

f_K	Fattore d'intermittenza I Duty cycle I Anwendungsfaktor I [%]	Temperatura ambiente / Ambient temperature / Umgebungstemperatur [°C]				
		10°	20°	30°	40°	50°
	100	1.15	1	0.85	0.7	0.6
80	1.25	1.1	1	0.85	0.7	
60	1.4	1.25	1.1	1	0.85	
40	1.6	1.4	1.25	1.1	1	
20	1.8	1.6	1.4	1.25	1.1	

Tab. (1)

Il fattore d'intermittenza I può essere calcolato come segue:

The duty cycle I can be calculated as follows:

Der Anwendungsfaktor I kann wie folgt berechnet werden:

$$I = \frac{t_f}{t_r + t_f} \times 100 \tag{6}$$

dove t_f rappresenta il tempo di funzionamento a potenza costante e t_r il tempo a riposo.

where t_f is the time of operation at constant power and t_r the rest time.

dabei ist t_f die Betriebszeit mit konstanter Leistung und t_r die Ruhezeit.

Fattore di velocità

f_V

Nel caso in cui la velocità in ingresso sia diversa da 1'500 rpm, l'adeguamento della potenza termica alla situazione specifica può avvenire tramite l'impiego del fattore f_V riportato nella tabella seguente. La tabella fa riferimento alle diverse posizioni di montaggio del riduttore.

Speed factor

f_V

If the input speed is different from 1'500 rpm, the adjustment of thermal power to the specific situation can occur through the use of the factor f_V given in the following table. The table refers to the different gear unit mounting positions.

Drehzahlfaktor

f_V

Bei einer anderen Antriebsdrehzahl als 1'500 rpm kann die Anpassung der Wärmeleistung an die spezifische Situation mit dem Faktor f_V , der in der folgenden Tabelle angegeben ist, erfolgen. Die Tabelle bezieht sich auf die unterschiedlichen Einbaupositionen des Getriebes.

f_V	Posizioni di montaggio Mounting positions Montagepositionen	n_1 [rpm]					
		3'000	2'500	2'000	1'500	1'000	700
f_V	Montaggio orizzontale Horizontal mounting Horizontale Montage	0.50	0.65	0.80	1.00	1.15	1.30
	Montaggio verticale Vertical mounting Vertikale Montage	0.40	0.48	0.58	0.71	0.88	1.00

Tab. (2)

Fattore ambiente

f_R

Nel caso in cui il riduttore sia collocato in un ambiente ristretto oppure all'aperto, la potenza termica può essere adeguata con l'ausilio del fattore f_R riportato nella tabella a pagina seguente.

Environmental factor

f_R

If the gear unit is located in a limited space or outdoors, the thermal power can be modified with the aid of the factor f_R given in the table on the next page.

Umweltfaktor

f_R

Falls das Getriebe in einer engen Umgebung oder im Freien aufgestellt ist, kann die Wärmeleistung mithilfe des Faktors f_R , der in der Tabelle auf der folgenden Seite, aufgeführt ist, angepasst werden.

	Ambiente ristretto <i>Small space</i> Kleiner Raum	Ambiente grande <i>Large space</i> Großer Raum	All'aperto <i>Outdoors</i> Im Freien
f_R	0.70	1.00	1.35

Tab. (3)

Nel caso più generale, la potenza termica corretta del riduttore risulterà

In general, the corrected thermal power of the gear unit will be

Ganz allgemein kann die richtige Wärmeleistung mit folgender Formel berechnet werden

$$P_{T1} = P_T \times f_K \times f_V \times f_R \quad [\text{kW}] \quad (7)$$

La potenza P_1 applicata al riduttore deve risultare sempre inferiore alla potenza termica corretta P_{T1} .

The power P_1 applied to the gear unit must always be less than the corrected thermal power P_{T1} .

Die am Getriebe angelegte Leistung P_1 muss immer unter der korrigierten Wärmeleistung P_{T1} liegen.

$$P_1 \leq P_{T1} \quad (8)$$

Nel caso in cui la potenza termica corretta risulti inferiore alla potenza applicata, anche solo in una condizione dell'eventuale ciclo di impiego, occorre prevedere la presenza di un circuito ausiliario di raffreddamento. In tali condizioni la potenza termica da dissipare P_C è calcolabile con la seguente relazione:

If the thermal power of the gear unit is less than the power applied, even in just one condition of the possible operating cycle, an auxiliary cooling circuit must be provided. In such conditions, the thermal power to be dissipated P_C can be calculated with the following equation:

Falls die korrigierte Wärmeleistung unter der zu übertragende Leistung liegt, selbst für eine einzige Bedingung des möglichen Einsatzzyklus, muss ein zusätzliches Kühlsystem installiert werden. In solchen Fällen kann die abzuleitende Wärmeleistung P_C nach folgender Formel berechnet werden:

$$P_C = (P_1 - P_{T1}) \times (1 - \eta_d) \quad [\text{kW}] \quad (9)$$

essendo η_d il rendimento dinamico del riduttore ricavabile dalla tabella (4).

η_d being the dynamic efficiency of the gear unit obtainable from the table (4).

dabei ist η_d der dynamische Wirkungsgrad des Getriebes, entnehmbar aus der Tabelle (4).

Temperatura

[°C]

La temperatura ambiente raccomandata è compresa nell'intervallo -20°C / +40°C. La temperatura di funzionamento ideale del riduttore è compresa tra 50°C e 70°C, cui corrispondono una temperatura dell'olio fra 60°C e 80°C all'incirca. Per brevi periodi, la temperatura dell'olio può raggiungere 90°C.

Il sistema migliore per tenere sotto controllo la temperatura è quello di ricorrere ad un sistema ausiliario di scambio termico.

Per basse temperature ambiente, oppure per applicazioni caratterizzate da elevate temperature di funzionamento, è necessario selezionare lubrificanti adeguati e guarnizioni realizzate in materiali opportuni.

A questo scopo sono disponibili guarnizioni in diversi tipi di elastomero, come nitrilbutadiene (NB), fluorato (FP) e siliconico (SI).

Contattare il referente DANA di zona per le indicazioni del caso. Al capitolo "Lubrificazione" sono riportati consigli sulla scelta del lubrificante più adeguato per le diverse condizioni.

Temperature

[°C]

The recommended ambient temperature is in the range -20°C / +40°C. The ideal gear unit operating temperature is between 50°C and 70°C, which corresponds to an oil temperature of approx. between 60°C and 80°C. For short periods, the oil temperature can reach 90°C.

The best system to keep the temperature under control is to use an auxiliary heat exchange system.

For low ambient temperatures, or for applications characterized by high operating temperatures, it is necessary to select appropriate lubricants and seals made of suitable materials.

Seals in different types of elastomer, such as nitrile butadiene (NB), fluoride (PF) and silicone (SI) are available for this purpose.

Consult the DANA area contact person for the relevant indications. The section "Lubrication" gives advice on choosing the most appropriate lubricant for the different conditions.

Temperatur

[°C]

Die empfohlene Umgebungstemperatur liegt zwischen -20 °C / +40 °C. Die ideale Betriebstemperatur des Getriebes liegt zwischen 50 °C und 70 °C, entsprechend einer Öltemperatur zwischen etwa 60 °C und 80 °C. Kurzzeitig kann die Öltemperatur 90 °C erreichen.

Die beste Methode, die Temperatur unter Kontrolle zu halten, besteht in einem zusätzlichen Wärmetauschersystem.

Bei niedrigen Umgebungstemperaturen oder bei Anwendungen mit erhöhten Betriebstemperaturen müssen entsprechende Schmiermittel und Dichtungen aus geeignetem Material gewählt werden.

Zu diesem Zweck bieten wir Dichtungen aus unterschiedlichen Elastomeren, wie Nitril-Butadien-Kautschuk (NB), Fluorat (FP) und Silikon (SI) an.

Nehmen Sie dazu Kontakt sich an die DANA Kontaktperson der zone zu wenden. Unter dem Abschnitt „Schmierung“ finden Sie Ratschläge über die geeignetsten Schmiermittel für unterschiedliche Bedingungen.

Rendimento dinamico

η_d
E' dato dal rapporto fra la potenza P_2 trasmessa in uscita dal riduttore e quella P_1 applicata in ingresso ed è calcolabile con la seguente formula:

Il suo valore dipende da numerosi fattori, fra i quali: la potenza trasmessa, la velocità in ingresso, la viscosità del lubrificante, la temperatura di funzionamento e il rapporto di riduzione. I valori indicativi del rendimento dinamico sono riportati nella tabella seguente.

Dynamic efficiency

η_d
This is given by the ratio between the output power P_2 transmitted by the gear unit and that of P_1 applied at the input and can be calculated with the following formula:

$$\eta_d = \frac{P_2}{P_1}$$

Its value depends on many factors, including: transmitted power, input speed, lubricant viscosity, operating temperature and the reduction ratio. The approximate dynamic efficiency values are given in the following table.

Dynamischer Wirkungsgrad

η_d
Gegeben durch das Verhältnis von Abtriebsleistung P_2 des Getriebes zu P_1 , antriebsseitig angelegt. Er kann mit folgender Formel berechnet werden:

(10)

Der Wert hängt von zahlreichen Faktoren ab, unter anderem: übertragene Leistung, antriebseitige Drehzahl, Viskosität des Schmiermittels, Betriebstemperatur und Übersetzungsverhältnis. Richtwerte des dynamischen Wirkungsgrades sind in der folgenden Tabelle angegeben.

	Stadi di riduzione / Reduction stages / Reduktionsstufen			
	1	2	3	4
	EL	EL - EC	EL - EC	EL - EC
η_d	0.98	0.96	0.94	0.92

Tab. (4)

Fattore di servizio

f_s
Il fattore di servizio dipende dal tipo di motore primo e dal tipo di macchina azionata dal riduttore. Si tratta di un valore empirico, stabilito attraverso l'esperienza storica delle diverse applicazioni e tiene conto delle variazioni di carico, degli urti della trasmissione e dell'incertezza relativa alla variazione dei parametri che concorrono alla trasmissione della potenza.

La tabella sotto riportata indica i valori del fattore di servizio in funzione della natura del carico, del tipo di azionamento (motore elettrico, idraulico ed endotermico) e del numero di avviamenti orari della macchina azionata.

Duty factor

f_s
The duty factor depends on the type of prime mover and the type of machine driven by the gear unit. This is an empirical value drawn from experience with the various applications and takes into account the variations of load, transmission impacts and uncertainty relevant to the variation of parameters involved in the transmission of power.

The table below gives the duty factor values according to the nature of the load, the type of drive (electric, hydraulic and endothermic motor) and the number of starts per hour of the driven machine.

Betriebsfaktor

f_s
Der Betriebsfaktor hängt vom Typ des Primärmotors und der Art der vom Getriebe angetriebenen Maschine ab. Es handelt sich um einen empirischen Wert, der auf der Erfahrung mit verschiedenen Anwendungen beruht und der die Laständerungen, die Übertragungswucht und die Ungewissheit der Parameteränderung bei der Leistungsübertragung einbezieht.

In der nachstehenden Tabelle sind die Werte für den Betriebsfaktor entsprechend der Lastart, der Antriebsart (Elektro-, Hydraulik- und endothermischer Motor) und der Anzahl der Starts pro Stunde der angetriebenen Maschine, angegeben.

	Natura del carico Type of load Belastungsart	Tipologia di azionamento Type of drive Antriebsart	N° avviamenti /h N° of starts /hour Schaltungen /Std				
			16	32	63	125	250
f_s	a Uniforme Uniform load Gleichmäßig	Mot. elettrico / Electric motor / Elektromotor	1.05	1.10	1.15	1.25	1.40
		Mot. idraulico / Hydraulic motor / Hydraulikmotor	1.05	1.05	1.10	1.15	1.20
		Mot. endotermico / Endothermic engine / Endotermischer Motor	1.25	--	--	--	--
	b Variabile con urti moderati Moderate shock load Variable mit mäßigen Stößen	Mot. elettrico / Electric motor / Elektromotor	1.10	1.15	1.20	1.40	1.60
		Mot. idraulico / Hydraulic motor / Hydraulikmotor	1.05	1.00	1.10	1.20	1.30
		Mot. endotermico / Endothermic engine / Endotermischer Motor	1.50	--	--	--	--
	c Variabile con urti forti Heavy shock load Variable mit starken Stößen	Mot. elettrico / Electric motor / Elektromotor	1.20	1.30	1.40	1.60	1.80
		Mot. idraulico / Hydraulic motor / Hydraulikmotor	1.10	1.20	1.25	1.35	1.50
		Mot. endotermico / Endothermic engine / Endotermischer Motor	2.00	--	--	--	--

Tab. (5)

Per quanto riguarda la natura del carico, la seguente tabella (6) fornisce una classificazione delle macchine più diffuse secondo i tre livelli **a**, **b** e **c** indicati nella precedente tabella (5).

*Regarding the nature of the load, the following table (6) provides a classification of the most common machines according to the three levels **a**, **b** and **c** given in the previous table (5).*

Mit Bezug auf die Lastart werden in folgender Tabelle (6) die Maschinen, die am weitesten verbreitet sind, in drei Gruppen eingeteilt **a**, **b** e **c**, wie in der vorausgehenden Tabelle (5) angegeben.

SETTORE DI APPLICAZIONE <i>FIELD OF APPLICATION</i> ANWENDUNGSGEBIET		MACCHINA COMANDATA <i>DRIVEN MACHINE</i> ANGETRIEBENE MASCHINE		
Natura del carico <i>Type of load</i> Belastungsart	Agitatori/Mescolatori <i>Agitators/Mixer</i> Rühr-Mischwerke	Sostanze liquide <i>Pure liquids</i> Flüssige Stoffe	a	
		Sostanze semi-liquide <i>Liquid and solids</i> Halbfüssige Stoffe	b	
		Liquido non omogeneo <i>Liquid- variable density</i> Nicht homogene Flüssigkeiten	b	
	Lavorazione pietra ed argilla <i>Clay working machine</i> Stein- und Tonverarbeitung	Presse per mattoni <i>Brick press</i> Ziegelpressen	b	
		Macchina per mattonelle <i>Briquette machine</i> Maschinen zur Fliesenherstellung	b	
		Compattatori <i>Compactors</i> Müllverdichter	c	
	Convogliatori <i>Conveyors-general purpose</i> Förderer	A vite <i>Worm conveyor</i> Schneckenförderer	a	
		Alimentati uniformemente <i>Uniformly loaded or fed</i> Gleichmäßige Beschickung	a	
	Per ciclo continuo <i>Heavy duty</i> Dauerbetrieb	Non uniformemente alimentati <i>Not uniform fed</i> Ungleichmäßige Beschickung	b	
		Con inversione del moto <i>Reciprocating or shaker</i> mit Bewegungsumsteuerung	b	
	Gru <i>Cranes</i> Kran	Da porto <i>Dry dock</i> Hafenkran	Sollevamento carico <i>Main Hoist</i> Lastenheben	c
			Sollevamento ausiliario <i>Auxiliary Hoist</i> Hilfskran	c
			Sollevamento braccio <i>Boom Hoist</i> Auslegerhub	c
			Rotazione braccio <i>Slewing Drive</i> Auslegerdrehung	c
			Traslazione gru <i>Traction Drive</i> Kranbewegung	c
Sollevamento container <i>Main Hoist</i> Container - Heben			c	
Container <i>Container</i> Container		Sollevamento braccio <i>Boom Hoist</i> Auslegerhub	c	
		Applicazioni industriali <i>Industrial duty</i> Industrieanwendung	Sollevamento principale <i>Main</i> Haupthebezeuge	c
			Sollevamento ausiliario <i>Auxiliary</i> Hilfshebezeuge	c
		Bridge <i>Bridge</i> Brückenkran	c	
		Movimentazione carrello <i>Trolley Travel</i> Laufkatzen	c	
Trituratori <i>Crusher</i> Schredderanlagen		Pietre e metalli <i>Stone or ore</i> Steine und Metall	b	

Tab. (6)

		SETTORE DI APPLICAZIONE <i>FIELD OF APPLICATION</i> ANWENDUNGSGEBIET	MACCHINA COMANDATA <i>DRIVEN MACHINE</i> ANGETRIEBENE MASCHINE		
		Natura del carico <i>Type of load</i> Belastungsart	Draghe <i>Dredges</i> Nassbagger		Avvolgicavo <i>Cable reel</i> Kabelaufwickler
	Convogliatore <i>Conveyors</i> Förderer			b	
	Testa portafresa <i>Cutter head drives</i> Fräskopf			c	
	Setacci <i>Screen drives</i> Siebe			b	
	Convogliatore a tazze <i>Stackers</i> Eimerförderer			b	
	Verricelli di manovra <i>Winches</i> Winden			b	
	Elevatori <i>Elevators</i>			A tazze <i>Bucket</i> Becherwerke	b
	Hebwerke		Scala mobile <i>Escalators</i> Rolltreppe	a	
	Estrusori <i>Extruders</i> Strangpressen			In generale <i>General</i> Allgemein	b
			Plastica <i>Plastics</i>	A velocità variabile <i>Variable speed drive</i> Mit regelbarer Drehzahl	b
			Kunststoff	A velocità fissa <i>Fixed speed drive</i> Mit fester Drehzahl	b
			Gomma <i>Rubber</i>	Ciclo continuo- a vite <i>Continuous screw operation</i> Kontinuierlicher Schneckenbetrieb	b
			Gummi	Ciclo intermittente- a vite <i>Intermittent screw operation</i> Schnecken - Aussetzbetrieb	b
			Alimentari <i>Feeders</i>	A piastre <i>Apron</i> Platten	b
			Beschickungseinrichtungen	A nastro <i>Belt</i> Band	b
				A vite <i>Screw</i> Schnecken	b
			Industria alimentare <i>Food industry</i>	Lavorazione cereali <i>Cereal cooker</i> Getreideverarbeitung	a
			Lebensmittelindustrie	mescolatori per pasta <i>Dough mixer</i> Teigmischer	b
			Triturazione carne <i>Meat grinders</i> Fleischmühlen	b	

Tab. (6)

Natura del carico Type of load Belastungsart	SETTORE DI APPLICAZIONE FIELD OF APPLICATION ANWENDUNGSGEBIET	MACCHINA COMANDATA DRIVEN MACHINE ANGETRIEBENE MASCHINE	
	Sollevatori/Elevatori <i>Hoists</i> Hebewerke	Ciclo continuo <i>Heavy duty</i> Dauerbetrieb	b
		Ciclo intermittente <i>Medium duty</i> Aussetzbetrieb	b
		Sollevamento cassonetto Skip hoist Kippvorrichtungen	b
	Macchine di lavaggio <i>Laundry</i> Wäschereien	Bottali <i>Tumblers</i> Tumbler	b
		Lavatrice Washers Waschmaschinen	b
	Lavorazione metalli <i>Metal mills</i> Metallverarbeitung	Ribaltatori <i>Reversing</i> Kipper	c
		Spingitore lingotti <i>Slab pushers</i> Barrenandrücker	b
		Tranciatrici <i>Shears</i> Schneidpressen	c
		Trafila <i>Wire drawing</i> Drahtziehmaschine	b
Aspo <i>Wire Winding machine</i> Haspel		b	
Convogliatori <i>Conveyors-burner</i> Förderer		b	
Macchine per legno <i>Lumber industry</i> Holzbearbeitungsmaschinen	A ciclo continuo <i>Main or heavy duty</i> Dauerbetrieb	b	
	Lavorazione tronco <i>Main log</i> Verarbeitung von Baumstämmen	b	
	Piallatrice <i>Slab</i> Hobelmaschine	b	
	Trasbordatore <i>Transfer</i> Umlader	b	
	Scortecciatrice <i>Debarking drums</i> Rindenschälmaschine	b	
	Alimentazione piallatrice <i>Planer feed</i> Hobelmaschinen - Zuführer	b	
	Trasbordatore a catena <i>Transfers -chain</i> Kettenumlader	b	
	Impianti di dosatura <i>batchers</i> Dosieranlagen	b	
	Calandre <i>calenders</i> Kalanders	b	
	Essicatoi <i>Dryers</i> Trockenofen	b	

Tab. (6)

Natura del carico Type of load Belastungsart	SETTORE DI APPLICAZIONE <i>FIELD OF APPLICATION</i> ANWENDUNGSGEBIET	MACCHINA COMANDATA <i>DRIVEN MACHINE</i> ANGETRIEBENE MASCHINE		
	Lavorazione nastri <i>Metal strip processing machinery</i> Bearbeitung von Metallbändern	Nastratrici <i>Bridles</i> Bandwickler		b
		Avvolgitrice. Svolgitrice <i>Coilers & uncoilers</i> Aufwickler. Abwickler		a
		Rifilatrice <i>Edge trimmers</i> Beschneidemaschine		b
		Spianatrice <i>Flatteners</i> Planiermaschine		b
		Regolazione cilindri <i>Pinch rolls</i> Andrückrollen		b
		Trattamento rottami <i>Scrap choppers</i> Abfallschere		b
		Tranciatrici <i>Shears</i> Schneidpressen		c
		Tranciatrici a striscia <i>Slitters</i> Streifenscheren		b
		Lavorazione cemento <i>Mills rotary type</i> Zementverarbeitung	Forno per cemento <i>Cement Kilns</i> Zementofen	
Essicatoi <i>Dryers & coolers</i> Trockenofen			b	
Mescolatori <i>Mixer concrete</i> Misch-/Knetmaschinen			b	
Lavorazione plastica <i>Plastic industry</i> Kunststoffverarbeitung	Mescolatore per lotti <i>Batch mixers</i> Chargenmischer			b
	Mescolatore a ciclo continuo <i>Continuous mixers</i> HD - Mischer		b	
	Calandre <i>Calenders</i> Kalander		b	
Lavorazione gomma <i>Rubber industry</i> Gummiverarbeitung	Mescolatore per lotti <i>Batch mixers</i> Chargenmischer		b	
	Mescolatore a ciclo continuo <i>Continuous mixers</i> HD - Mischer		b	
	Calandre <i>Calenders</i> Kalander		b	
	Riscaldamento sabbia <i>Sand muller</i> Formsandaufbereiter		b	

Tab. (6)

SETTORE DI APPLICAZIONE <i>FIELD OF APPLICATION</i> ANWENDUNGSGEBIET		MACCHINA COMANDATA <i>DRIVEN MACHINE</i> ANGETRIEBENE MASCHINE			
Natura del carico <i>Type of load</i> Belastungsart	Lavorazione carta <i>Paper mills</i> Papierhersyellung		Agitatori. mescolatori <i>Agitator (mixer)</i> Rührwerke Mischer	b	
			Agitatori sostanze liquide <i>Agitator for pure liquors</i> Rührwerke für flüssige Stoffe	b	
			Calandre <i>Calender</i> Kalander	b	
			Sminuzzatrice <i>Chipper</i> Brechanlage	c	
			Alimentatore sminuzzatrice <i>Chip feeder</i> Beschicker der Brechanlage	b	
			Rulli di lucidatura <i>Coating rolls</i> Polierwalzen	b	
			Convogliatori <i>Conveyor</i> Förderer	Truciolli. corteccia <i>Chip. bark. chemical</i> Späne Rinde	b
				Tronchi <i>Log (including slab)</i> Baumstämme	c
			Essicatoi <i>Dryers</i> Trockenofen	Tagliatrice <i>Paper machine</i> Schneidemaschine	b
				Convogliatori <i>Conveyor type</i> Förderer	b
				Estrusori <i>Extruder</i> Strangpressen	b
			Vagli <i>Screen</i> Siebanlagen	Truciolli <i>Chip</i> Späne	b
				Rotativi <i>Rotary</i> Drehend	b
				Vibranti <i>Vibrating</i> Rüttler	c
				Size press <i>Size press</i> Size Press	b
				Super calendar <i>Super calender</i> Super-Kalender	b
				Ispessitrice (motore in a.c.) <i>Thickener (AC motor)</i> Eindickungsmaschine (GS-Motor)	b
				Ispessitrice (motore in corrente cont.) <i>Thickener (DC motor)</i> Eindickungsmaschine (WS-Motor)	b
				Lavatrice (motore in c.a.) <i>Washer (AC motor)</i> Waschmaschine (GS-Motor)	b
				Lavatrice (DC motore in corr. cont.) <i>Washer (DC motor)</i> Waschmaschine (WS-Motor)	b

Tab. (6)

Natura del carico Type of load Belastungsart		SETTORE DI APPLICAZIONE FIELD OF APPLICATION ANWENDUNGSGEBIET	MACCHINA COMANDATA DRIVEN MACHINE ANGETRIEBENE MASCHINE	
		Trattamento acque <i>Sewage disposal equipment</i> Wasseraufbereitung		Schermo a barre <i>Bar screens</i> Stabsiebrost
	Alimentatori sostanze chimiche <i>Chemical feeders</i> Chemikalien - Beschicker			b
	Schermi disidratatori <i>Dewatering screens</i> Entwässerungsfilter			b
	Separatore parti pesanti <i>Scum breakers</i> Abscheider schwerer Partikel			b
	Mescolatore <i>Slow or rapid mixers</i> Mischer			b
	Collettore dei fanghi <i>Sludge collectors</i> Schlammssammler			b
	Ispessitore <i>Thickeners</i> Eindicker			b
	Filtri a vuoto <i>Vacuum filters</i> Vakuumfilter			b
Schermi	Lavaggio ad aria <i>Air washing</i> Luftwaschen			a
Screens	Rotativi per ghiaia <i>Rotary-stone or gravel</i> Kiesmaschinen			b
Schirme				
Lavorazione zucchero <i>Sugar industry</i> Zuckerindustrie			Affettatrice barbabietole <i>Beet slicer</i> Zuckerrübenschnitzelmaschine	
		Frantoi per canna <i>Cane knives</i> Zuckerrohrmühle		b
		Trituratori <i>Crushers</i> Zerkleinerer		b
		Macinatori <i>Mills (low speed end)</i> Mahlmaschinen		b

Tab. (6)

Fattore di durata

L_{h1}, L_{h2}

Rappresenta il prodotto fra la velocità in ingresso n_1 oppure in uscita n_2 al riduttore e le ore di funzionamento richieste dall'applicazione h_R :

Lifetime factor

L_{h1}, L_{h2}

The product of input speed n_1 or output speed n_2 at the gear unit and the hours of operation required by the application h_R :

Lebensdauerfaktor

L_{h1}, L_{h2}

Ergibt sich aus dem Produkt aus Antriebsdrehzahl n_1 bzw. der Abtriebsdrehzahl n_2 des Getriebes und den von der Anwendung geforderten Betriebsstunden h_R :

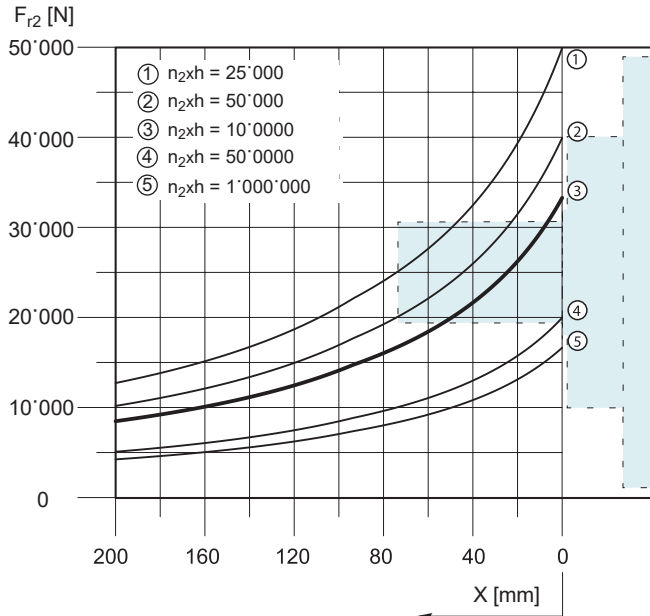
$$L_{h1} = n_1 \times h_R \tag{11}$$

$$L_{h2} = n_2 \times h_R \tag{12}$$

Carichi radiali ammissibili sugli alberi in uscita / ingresso

F_{r2}, F_{r1} [N]

Per ogni grandezza di riduttore vengono riportati, nelle tabelle di selezione, i diagrammi dei carichi radiali F_{r2} e F_{r1} ammessi rispettivamente sugli alberi in uscita e in ingresso in funzione della distanza X tra il punto di applicazione del carico e la battuta dell'albero: i valori sono indicati per diversi valori del fattore di durata n_2xh dei cuscinetti.



Permissible radial loads on output / input shafts

F_{r2}, F_{r1} [N]

For each gear unit size, the selection tables give the diagrams of permissible radial loads F_{r2} and F_{r1} on the output and input shafts respectively as a function of the distance X between the point of load application and the shaft shoulder: the values are given for various bearing duration factor n_2xh values.

Zulässige Radiallasten abtriebsseitig/antriebsseitig

F_{r2}, F_{r1} [N]

Für jede Größe werden in der Auswahl-tabelle die Diagramme der zulässigen Radiallasten F_{r2} und F_{r1} bzw. jeweils an den Abtriebs- und Antriebswellen entsprechend dem Abstand X zwischen Lastangriffspunkt und Wellenanschlag, angegeben: Die angegebenen Werte gelten für die unterschiedlichen Lebensdauerfaktoren n_2xh der Lager.

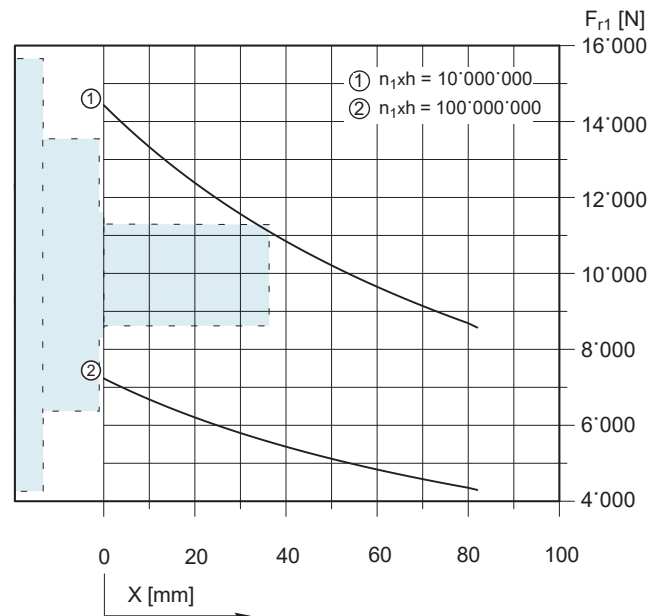


Fig. (1)

Per fattori di durata $n_2xh < 25'000$ cicli, contattare il referente DANA di zona.

For duration factor $n_2xh < 25'000$ cycles, please consult the DANA area contact person.

Per le grandezze E160 e E260 i valori dei carichi radiali dei supporti uscita MP-MP1 e ML-ML1 sono validi soltanto se sono utilizzati entrambi i centraggi supporto sulla struttura del cliente. In caso di non utilizzo del secondo centraggio contattare il referente DANA di zona.

For sizes E160 and E260 the values of radial loads of output supports MP-MP1 and ML-ML1 are valid only if they are used both spigots on the support structure of the customer; in case of non-use of the second spigot consult the DANA area contact person.

Für Lebensdauerfaktoren $n_2xh < 25'000$ arbeitszyklen, bitte sich an die DANA Kontaktperson der zone zu wenden. Für Größen E160 und E260 die Werte der Radiallasten der Ausgangslagerung MP-MP1 und ML-ML1 sind nur gültig, wenn beide Zentrierungen an der Tragstruktur des Kunden verwendet werden; falls die zweite Zentrierung nicht verwendet wird, wenden sie sich an die DANA Kontaktperson der zone zu wenden.

Carichi assiali ammissibili sugli alberi in uscita

F_{a2} [N]

Per ogni grandezza di riduttore vengono riportati, nelle tabelle di selezione, i valori dei carichi assiali F_{a2} ammissibili sugli alberi in uscita: i valori sono indicati per diversi valori del fattore di durata n_2xh dei cuscinetti.

Nel caso in cui si abbiano contemporaneamente sull'albero in uscita sia carichi radiali che assiali, si consiglia di contattare il referente DANA di zona.

I riduttori con albero femmina in uscita, versione FE, sono impiegati normalmente per la trasmissione di sola coppia e non sono adatti a sopportare carichi radiali e/o carichi assiali.

Nel caso di riduttori con albero femmina cavo, versioni FS e FCP, in cui siano presenti carichi assiali, si prega di contattare il referente DANA di zona.

Permissible output shaft axial loads

F_{a2} [N]

The selection tables give the permissible axial loads F_{a2} on the output shafts for each gear unit size: the values are given for various bearing duration factor n_2xh values.

If there are radial and axial loads on the output shaft at the same time, it is advisable to consult the DANA area contact person.

FE version gear units with female output shaft gear units are normally used for the transmission of torque only and are not designed to withstand radial and/or axial loads.

In case of FS and FCP versions gear units with hollow shaft, where there are axial loads, please consult the DANA area contact person.

Zulässige Radiallasten abtriebsseitig

F_{a2} [N]

Für jede Größe sind in der Auswahl-tabelle die Werte für die zulässigen Axiallasten F_{a2} an den Abtriebswellen angegeben: die angegebenen Werte gelten für unterschiedliche Lebensdauerfaktoren n_2xh der Lager.

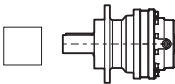
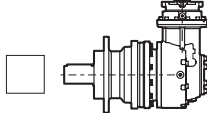
Liegen an der Abtriebswellen sowohl Radial- als auch Axiallasten an raten wir Ihnen, sich an die DANA Kontaktperson der zone zu wenden.

Die Getriebe mit Hohlwellenabtrieb, Ausführung FE, werden normalerweise nur für die Übertragung von Drehmomenten eingesetzt und sind nicht für die Aufnahme von Radial- und/oder Axiallasten geeignet.

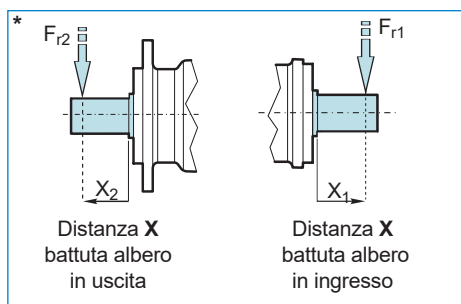
Bei Getrieben mit Hohlwelle, Ausführungen FS und FCP, bei denen Axiallasten Anliegen, sich an die DANA Kontaktperson der zone zu wenden.

5. SELEZIONE DEL RIDUTTORE

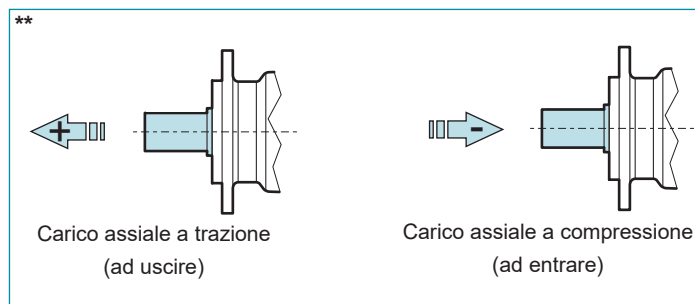
Per la selezione del riduttore è necessaria la raccolta dei dati caratteristici dell'applicazione: a tal fine si può utilizzare la scheda di seguito riportata.

Tipologia di applicazione:			
	Descrizione	Valore	
T_{2R}	Coppia richiesta in uscita		[Nm]
T_{2RMAX}	Coppia massima richiesta in uscita		[Nm]
n_2	Velocità in uscita		[rpm]
n_1	Velocità in ingresso		[rpm]
P_2	Potenza in uscita		[kW]
F_{rR2}	Carico radiale richiesto sull'albero in uscita		[N]
X_2^*	Distanza applicazione carico radiale F_{rR2}		[mm]
F_{aR2}^{**}	Carico assiale richiesto sull'albero in uscita		[N]
F_{rR1}	Carico radiale richiesto sull'albero in ingresso		[N]
X_1^*	Distanza applicazione carico radiale F_{rR1}		[mm]
h_R	Durata richiesta		[h]
I	Fattore d'intermittenza		[%]
N	Numero di avviamenti orari previsti		[1/h]
t_a	Temperatura ambiente di lavoro		[°C]
Tipologia di configurazione richiesta: <input type="checkbox"/>  In linea <input type="checkbox"/>  Ortogonale			
Tipologia supporto in uscita:			
Freno di stazionamento: <input type="checkbox"/> Sì <input type="checkbox"/> No			
T_{BR}	Coppia frenante richiesta:		[Nm]
Posizione di montaggio:			
Tipologia di motore:			
<input type="checkbox"/> Idraulico <input type="checkbox"/> Elettrico <input type="checkbox"/> Endotermico <input type="checkbox"/> Altro			
Ambiente di lavoro:			
<input type="checkbox"/> Ristretto <input type="checkbox"/> Grande <input type="checkbox"/> All'aperto			

* X rappresenta la distanza fra il punto di applicazione del carico e la battuta dell'albero (vedere i diagrammi riportati nelle tabelle di selezione)

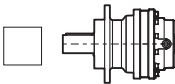
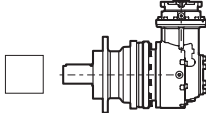


** indicare con “+” i carichi ad uscire dal riduttore e con “-” i carichi ad entrare nel riduttore.



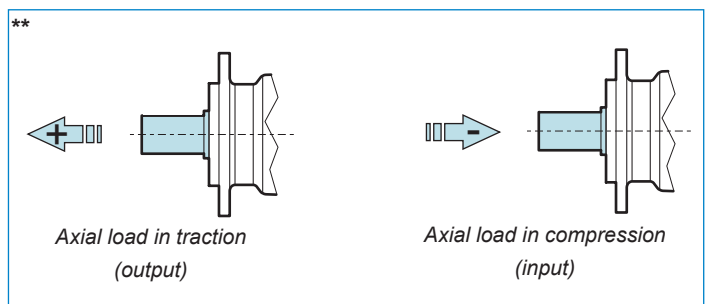
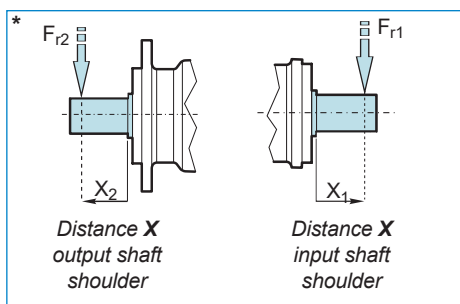
5. SELECTING GEAR UNIT

The characteristic data of the application are required for selection of the gear unit: the following list can be used for that purpose.

Type of application:			
	Description	Value	
T_{2R}	Required output torque		[Nm]
T_{2RMAX}	Required max output torque		[Nm]
n_2	Output speed		[rpm]
n_1	Input speed		[rpm]
P_2	Output power		[kW]
F_{rR2}	Required output shaft radial load		[N]
X_2^*	Radial load F_{rR2} application distance		[mm]
F_{aR2}^{**}	Required output shaft axial load		[N]
F_{rR1}	Required input shaft radial load		[N]
X_1^*	Radial load F_{rR1} application distance		[mm]
h_R	Required duration		[h]
l	Duty cycle		[%]
N	Number of starts per hour		[1/h]
t_a	Work environment temperature		[°C]
Type of configuration required: <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <input type="checkbox"/>  In line </div> <div style="text-align: center;"> <input type="checkbox"/>  Right-angle </div> </div>			
Type of output support:			
Parking brake: <input type="checkbox"/> Yes <input type="checkbox"/> No			
T_{BR}	Required braking torque:		[Nm]
Mounting position:			
Type of motor:			
<input type="checkbox"/> Hydraulic <input type="checkbox"/> Electric <input type="checkbox"/> Endothermic <input type="checkbox"/> Other			
Work environment:			
<input type="checkbox"/> Limited <input type="checkbox"/> Large <input type="checkbox"/> Outdoor			

* X is the distance between the point of load application and the shaft shoulder (see diagrams in the selection tables)

** indicate the gear unit output loads with “+” and the input loads with “-”.



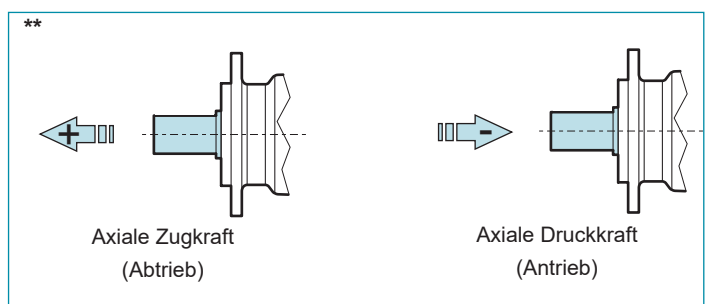
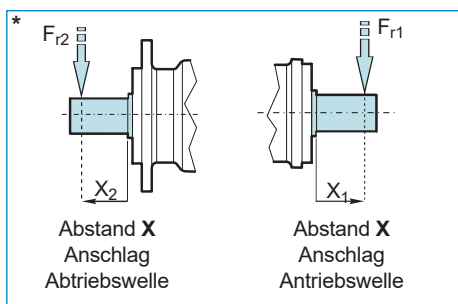
5. GETRIEBEAUSWAHL

Um ein Getriebe auswählen zu können, müssen alle charakteristischen Daten der Anwendung gesammelt werden: dazu können Sie folgende Unterlage benutzen.

Anwendungsart:			
	Beschreibung	Wert	
T_{2R}	Gefordertes Abtriebsmoment		[Nm]
T_{2RMAX}	Gefordertes max. Abtriebsmoment		[Nm]
n_2	Abtriebsdrehzahl		[rpm]
n_1	Antriebsdrehzahl		[rpm]
P_2	Abtriebsleistung		[kW]
F_{rR2}	An der Abtriebswelle geforderte Radiallast		[N]
X_2^*	Distanza applicazione carico radiale F_{rR2}		[mm]
F_{aR2}^{**}	An der Abtriebswelle geforderte Radiallast		[N]
F_{rR1}	An der Antriebswelle geforderte Radiallast		[N]
X_1^*	Abstand Angriffspunkt der Radiallast F_{rR1}		[mm]
h_R	Geforderte Dauer		[h]
I	Anwendungsfaktor		[%]
N	Vorgesehene Anzahl Starts pro Stunde		[1/h]
t_a	Temperatur Arbeitsumgebung		[°C]
Geforderte Konfiguration: <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <input type="checkbox"/> <p>Koaxialgetriebe</p> </div> <div style="text-align: center;"> <input type="checkbox"/> <p>Winkelgetriebe</p> </div> </div>			
Abtriebswellen Typ:			
Feststellbremse: <input type="checkbox"/> Ja <input type="checkbox"/> Nein			
T_{BR}	Gefordertes Bremsmoment:		[Nm]
Einbaulage:			
Motortyp: <input type="checkbox"/> Hydraulisch <input type="checkbox"/> Elektrisch <input type="checkbox"/> Endothermisch <input type="checkbox"/> Anderer			
Arbeitsumfeld: <input type="checkbox"/> Kleiner Raum <input type="checkbox"/> Große Hallen <input type="checkbox"/> Im Freien			

* X ist der Abstand zwischen dem Angriffspunkt der Last und dem Wellenanschlag (siehe Diagramm in der Auswahltable)

** mit "+" die abtriebsseitigen Lasten am Getriebe und mit "-" die antriebsseitigen Lasten am Getriebe angeben.



Procedere alla selezione come di seguito indicato:

- sulla base dell'applicazione, del tipo di azionamento e del numero di avviamenti previsti, selezionare, dalle precedenti tabelle (5) e (6), il fattore di servizio adeguato f_S ;
- dalla durata richiesta h_R e dalla velocità in uscita n_2 , calcolare il fattore di durata richiesto;

$$L_{h2} = n_2 \times h_R$$

- calcolare il rapporto di riduzione richiesto;

$$i = \frac{n_1}{n_2}$$

- dalle tabelle di selezione, scegliere il riduttore nella configurazione desiderata (in linea o angolare), le cui caratteristiche soddisfino alle relazioni;

$$T_{2R} \times f_S \leq T_2$$

$$L_{h2} \leq n_2 \times h$$

Il riduttore prescelto dovrà avere un rapporto di riduzione il più prossimo possibile al rapporto di riduzione richiesto.

Si consideri che questo tipo di selezione è adeguato quando la coppia richiesta e la velocità di rotazione sono pressoché costanti durante l'impiego: qualora si disponesse di un ciclo di impiego con carichi e velocità fortemente variabili, è necessario effettuare una selezione che consenta di individuare la taglia di riduttore più adeguata per l'applicazione. A tale fine, si consiglia di contattare il referente DANA di zona.

Qualora sia necessario un freno lamellare in ingresso al riduttore, procedere come segue:

- calcolare la coppia frenante richiesta T_{BR} secondo la formula (1) di pag. A11;
- dalle tabelle di selezione dei freni (vedere capitolo "Freni lamellari a bagno d'olio"), scegliere il freno con coppia frenante T_B tale da soddisfare la relazione:

$$T_{BR} \leq T_B$$

Make the selection as indicated below:

- on the basis of the application, the type of drive and the number of starts foreseen, select the appropriate duty factor f_S from the above tables (5) and (6);
- from the required duration h_R and the output speed n_2 , calculate the required duration factor required;

- calculate the required reduction ratio;

- from the selection tables, choose the gear unit in the desired configuration (in-line or angle), whose characteristics satisfy the equations;

The gear unit chosen must have a reduction ratio as close as possible to that required.

This type of selection is suitable when the required torque and the rotation speed are almost constant during use: for a cycle of use with highly variable loads and speeds, it is necessary to make a selection allowing the identification of a gear unit size best for the application.

For this purpose, it is advisable to consult the DANA area contact person.

If a gear unit input multi-disc brake is necessary, proceed as follows:

- calculate the required braking torque T_{BR} according to the formula (1) pag. A11;
- from the brake selection tables (see the section "Oil bath multi-disc brakes"), choose the brake with braking torque T_B that satisfies the equation:

Die Getriebeauswahl wie folgt durchführen:

- je nach Anwendung, Antriebsart und der vorgesehenen Anzahl Starts den entsprechenden Betriebsfaktor f_S aus den voranstehenden Tabellen (5) und (6) entnehmen;
- anhand der geforderten Betriebsstundenanzahl h_R und der Abtriebsdrehzahl n_2 , geforderten Lebensdauerfaktor berechnen;

$$(13)$$

- gefordertes Übersetzungsverhältnis berechnen;

$$(14)$$

- aus der Auswahltable das Getriebe in der gewünschten Konfiguration (Inline oder Winkelgetriebe) und entsprechend den Merkmalen des Übersetzungsverhältnisses auswählen;

$$(15)$$

$$(16)$$

Das gewählte Getriebe sollte ein Übersetzungsverhältnis haben, dass so weit wie möglich dem geforderten Übersetzungsverhältnis entspricht.

Als richtige Auswahl gilt, wenn das verlangte Drehmoment und die Drehzahl beim Einsatz fast konstant bleiben: bei Anwendungszyklen mit stark schwankenden Lasten und Drehzahlen ist eine Auswahl zu treffen, die es ermöglicht, die Getriebegröße zu bestimmen, die für die Anwendung am geeignetsten ist.

Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.

Ist antriebsseitig am Getriebe eine Lamellenbremse notwendig, wie folgt vorgehen:

- gefordertes Bremsmoment T_{BR} anhand der Formel (1) auf Seite A11 berechnen;
- aus der Auswahltable für Bremsen (siehe Kapitel „Ölbad-Lamellenbremsen“) Bremse mit dem Bremsmoment T_B auswählen, sodass folgendes Formel erfüllt ist:

$$(17)$$

6. VERIFICA DEL RIDUTTORE

6. VERIFICATION GEAR UNIT

6. GETRIEBEAUSWAHL

Una volta effettuata la selezione del riduttore è necessario eseguire le seguenti verifiche:

- verificare che la velocità in ingresso n_1 prevista dall'applicazione risulti inferiore al valore massimo ammissibile n_{1MAX} riportato nella tabella di selezione del riduttore
- verificare che la coppia massima richiesta dall'applicazione T_{2RMAX} risulti inferiore al valore di coppia massima trasmissibile T_{2MAX} riportato nella tabella di selezione del riduttore
- verificare che i carichi radiali agenti sugli alberi F_{rR1} ed F_{rR2} risultino inferiori a quelli riportati nella tabella di selezione dei supporti del riduttore. I carichi radiali sull'albero di uscita possono essere calcolati come segue:

After selecting the gear unit, carry out the following checks:

- check that the input speed n_1 required by the application is lower than the maximum permissible value n_{1MAX} given in the gear unit selection table
- check that the maximum torque required by the application T_{2RMAX} is lower than the maximum permissible torque value T_{2MAX} given in the gear unit selection table
- check that the radial loads acting on the shafts F_{rR1} and F_{rR2} are lower than those given in the gear unit support selection table. The radial loads on the output shaft can be calculated as follows:

$$F_{rR2} = \frac{2'000 \times T_{2R} \times f_S \times c}{d} \quad [N] \quad (18)$$

I carichi radiali sull'albero di ingresso possono essere calcolati come segue:

The radial loads on the input shaft can be calculated as follows:

$$F_{rR1} = \frac{2'000 \times T_{2R} \times f_S \times c}{d \times i \times \eta_d} \quad [N] \quad (19)$$

Essendo T_{2R} la coppia in uscita richiesta, f_S il fattore di servizio, i il rapporto di riduzione e η_d il rendimento dinamico del riduttore.

T_{2R} being the required output torque, f_S the duty factor, i the reduction ratio and η_d the dynamic efficiency of the gear unit.

Inoltre

Also

- c costante che dipende dal tipo di elemento di trasmissione montato sull'albero. I valori della costante sono i seguenti:
- c = 1 pignoni per catena
 - c = 1.06 ruote dentate
 - c = 2 pulegge per cinghia
- d diametro (mm) dell'elemento di trasmissione montato sull'albero.

- c constant that depends on the type of transmission element mounted on the shaft. The values of the constant are:
- c = 1 pinions for chain
 - c = 1.06 gear wheels
 - c = 2 pulleys for belt
- d diameter (mm) of the transmission element mounted on the shaft.

Utilizzando il valore X_2 , entrare nelle tabelle di selezione dei supporti di uscita per il riduttore selezionato, individuare il carico radiale ammissibile F_{r2} in corrispondenza di un fattore di durata $n_2 x h \geq L_{h2}$ e verificare che si abbia:

Using the value X_2 , enter the selection tables of the output supports for the selected gear unit, locate the permissible radial load F_{r2} at a duration factor $n_2 x h \geq L_{h2}$ and check:

$$F_{rR2} \leq F_{r2} \quad (20)$$

In modo analogo, utilizzando il valore X_1 , entrare nelle tabelle di selezione dei supporti in ingresso per il riduttore selezionato, individuare il carico radiale ammissibile F_{r1} in corrispondenza di un fattore di durata $n_1 x h \geq L_{h1}$ e verificare che si abbia:

Similarly, using the value X_1 , enter the selection tables of the input supports for the selected gear unit, locate the permissible radial load F_{r1} at a duration factor $n_1 x h \geq L_{h1}$ and check:

$$F_{rR1} \leq F_{r1} \quad (21)$$

Nach der Auswahl des Getriebes müssen folgende Prüfungen vorgenommen werden:

- Antriebsdrehzahl n_1 prüfen, ob sie unter dem maximal zulässigen Wert n_{1MAX} der Auswahltable des Getriebes liegt
- prüfen ob das von der Anwendung geforderte maximale Drehmoment T_{2RMAX} unter dem Wert für das maximal übertragbare Moment T_{2MAX} in der Auswahltable des Getriebes liegt
- prüfen ob die auf die Wellen F_{rR1} und F_{rR2} wirkenden Radiallasten unterhalb denen liegen, die in der Auswahltable für die Wellen aufgeführt sind. Die Radiallasten der Abtriebswelle können wie folgt berechnet werden:

Die Radiallasten der Abtriebswelle können wie folgt berechnet werden:

Dabei ist T_{2R} das verlangte Abtriebsdrehmoment, f_S der Betriebsfaktor, i das Übersetzungsverhältnis und η_d der dynamische Wirkungsgrad des Getriebes. Darüber hinaus

- c Konstante, in Abhängigkeit vom auf der Welle montierten Antriebselement. Die Werte der Konstante sind:
- c = 1 Kettenritzel
 - c = 1.06 Zahnräder
 - c = 2 Riemenscheiben
- d Durchmesser (mm) des auf der Welle montierten Antriebselements.

In der Tabelle für die Auswahl der Abtriebswelle des gewählten Getriebes anhand des Wertes X_2 die zulässige Radiallast F_{r2} für einen Lebensdauer von Lauerfaktor $n_2 x h \geq L_{h2}$ ermitteln und überprüfen, dass:

Auf die gleiche Weise in der Tabelle für die Auswahl der Abtriebswelle des gewählten Getriebes anhand des Wertes X_1 die zulässige Radiallast F_{r1} für einen Lebensdauer von Lauerfaktor $n_1 x h \geq L_{h1}$ ermitteln und überprüfen, dass:

- verificare che i carichi assiali agenti sugli alberi in uscita F_{aR2} risultino inferiori a quelli riportati nelle tabelle di selezione dei supporti in uscita. A tale scopo, entrare nelle tabelle di selezione dei supporti per il riduttore selezionato, individuare il carico assiale ammissibile F_{a2} in corrispondenza di un fattore di durata $n_2xh \geq L_{h2}$ e verificare che si abbia:

$$F_{aR2} \leq F_{a2}$$

(22)

Qualora i carichi radiali e assiali presentino significative variazioni durante l'impiego, oppure l'applicazione sia caratterizzata da numerose inversioni del moto, contattare il referente DANA di zona, per una verifica più approfondita.

Tenere in considerazione le raccomandazioni riportate al paragrafo "Carichi assiali ammissibili sugli alberi in uscita" (pag. A22).

- Verificare che la potenza applicata P_1 risulti sempre inferiore alla potenza termica corretta P_{T1} secondo quanto indicato dalla formula (8). Nel caso in cui la potenza termica corretta del riduttore risulti inferiore alla potenza da trasmettere, anche solo in una condizione dell'eventuale ciclo di impiego, occorre prevedere la presenza di un circuito ausiliario di raffreddamento. Per la selezione di tale circuito, si prega di contattare il referente DANA di zona.

Qualora, per il riduttore in oggetto, sia stato selezionato un freno in ingresso è necessario verificare che la coppia frenante calcolata in uscita al riduttore risulti inferiore alla coppia massima in uscita T_{2MAX} trasmissibile dal riduttore:

1. calcolare la coppia frenante in uscita al riduttore

2. verificare che si abbia

$$T_{2B} = T_B \times i \quad [\text{Nm}]$$

(23)

$$T_{2B} \leq T_{2MAX}$$

(24)

- check that the axial loads on the output shafts F_{aR2} are lower than those given in the output support selection tables. Enter the selection tables of supports for the selected gear unit, and identify the permissible axial load F_{a2} at a duration factor $n_2xh \geq L_{h2}$ and check:

If the radial and axial loads show significant variations during use, or the application is characterized by numerous reversals, consult the DANA area contact person for a more thorough check.

Take into account the recommendations given in the section "Permissible loads on output shafts" (pag. A22).

- Check that the applied power P_1 is always lower than the corrected thermal power P_{T1} as indicated by the formula (8). *If the corrected thermal power of the gear unit is less than the power to be transmitted, even in just one condition of the possible operating cycle, an auxiliary cooling circuit must be provided.*

For the selection of this circuit, please consult the DANA area contact person.

If an input brake has been selected for the gear unit in question, it is necessary to check that the calculated gear unit output braking torque is less than the maximum output torque T_{2MAX} transmissible by the gear unit:

1. calculate the gear unit output braking torque

- die auf die Wellen F_{rR2} wirkenden Radiallasten unter denen liegen, die in der Auswahltable für Abtriebswellen aufgeführt sind. Zu diesem Zweck in der Tabelle für die Auswahl der Wellen des gewählten Getriebes die zulässige Axiallast F_{r2} für einen Lebensdauer von Lauerfaktor $n_2xh \geq L_{h2}$ ermitteln und überprüfen, dass:

Ergeben sich im Betrieb größere Schwankungen bei den Radial- und Axiallasten oder beim Betrieb werden zahlreiche Drehrichtungsänderungen ausgeführt bitten wir, für eine tiefgreifende Überprüfung Kontakt mit dem Technischen Vertriebsnendienst von Bevisi aufzunehmen. Beachten Sie die Empfehlung im Abschnitt „Zulässige Axiallasten an den Abtriebswellen“ (Seite A22).

- Sicherstellen, dass die angelegte Last P_1 immer unter der korrigierten Wärmeleistung P_{T1} entsprechend der Formel (8) liegt. Falls die korrigierte Wärmeleistung des Getriebes niedriger als die zu übertragende Leistung ist, selbst in einer einzigen Bedingung des Zyklus, muss ein zusätzliches Kühlsystem installiert werden.

Für die Auswahl eines solchen Kühlkreises wenden Sie sich an die DANA Kontaktperson der zone zu wenden.

Wurde für das betreffende Getriebe eine antriebsseitige Bremse gewählt muss überprüft werden, dass das berechnete Bremsmoment abtriebsseitig des Getriebes niedriger als das maximal übertragbare Abtriebsdrehmoment T_{2MAX} des Getriebes liegt:

1. Berechnung des abtriebsseitigen Bremsmoments

7. SCELTA DEL MOTORE

7. CHOICE OF MOTOR

7. MOTORAUSWAHL

In questa sezione vengono fornite alcune indicazioni di massima utili alla selezione del motore per l'azionamento del riduttore.

Motore idraulico

Sulla base dell'applicazione, scegliere il tipo di motore più adeguato secondo la tabella seguente. I valori riportati sono indicativi

This section provides some general information useful for selecting the gear unit drive motor.

Hydraulic motor

Based on the application, choose the most appropriate type of motor according to the following table. The values are only a guide

In diesem Abschnitt werden einige Höchstangaben gemacht, die bei der Auswahl des Motors zum Antrieb des Getriebes hilfreich sind.

Hydraulikmotor

Je nach Anwendung den am besten geeigneten Motor aus folgender Tabelle auswählen. Die angegebenen Werte sind Richtwerte

Tipo di applicazione <i>Type of application</i> Anwendungsart	Leggero <i>Light</i> Leicht		Medio <i>Medium</i> Mittel		Pesante <i>Heavy</i> Schwer	
Pressione d'esercizio <i>Operating pressure</i> Betriebsdruck p_A [bar]	< 175		175 - 250		250 - 450	
Tipologia di motore <i>Type of motor</i> Motortyp	Orbitale <i>Orbital</i> Orbital	A ingranaggi <i>Gear</i> Mit Getriebe	A pistoni radiali <i>Radial piston</i> Mit Radialkolben	A pistoni assiali <i>Axial piston</i> Mit Axialkolben	A camme <i>Cam</i> Mit Nacken	A pistoni assiali <i>Axial piston</i> Mit Axialkolben
Velocità <i>Speed</i> Drehzahl n_1 [rpm]	< 700	< 3'000	< 500	< 4'000	< 200	< 4'000
Rendimento meccanico <i>Mechanical efficiency</i> Mechanischer Wirkungsgrad η_{mh}	0.80	0.85	0.95	0.93	0.93	0.93
Rendimento volumetrico <i>Volumetric efficiency</i> Volumetrischer Wirkungsgrad η_v	0.90	0.87	0.95	0.95	0.95	0.95

Tab. (7)

Determinare la coppia richiesta in ingresso al riduttore con la formula:

Determine the required gear unit input torque with the formula:

Berechnung des antriebsseitig geforderten Drehmoments nach der Formel:

$$T_{1R} = \frac{T_{2R}}{i \times \eta_d} \quad [\text{Nm}] \quad (25)$$

In cui T_{2R} rappresenta la coppia in uscita richiesta, i il rapporto di riduzione e η_d il rendimento dinamico del riduttore (tab. 4).

Where T_{2R} is the required output torque, i the reduction ratio and η_d is the dynamic efficiency of the gear unit (table 4).

Dabei ist T_{2R} Das abtriebsseitig geforderte Drehmoment, i das Übersetzungsverhältnis und η_d der dynamische Wirkungsgrad des Getriebes (Tab. 4).

Calcolare la cilindrata teorica richiesta per il motore idraulico con la seguente formula:

Calculate the theoretical displacement required for the hydraulic motor with the following formula:

Berechnung des geforderten theoretischen Hubraums des Hydraulikmotors mit folgender Formel:

$$V_R = \frac{62.8 \times T_{1R}}{p_A \times \eta_{mh}} \quad [\text{cm}^3] \quad (26)$$

in cui η_{mh} rappresenta il rendimento meccanico del motore idraulico prescelto (tab. 7) e p_A rappresenta la pressione d'esercizio del motore. La cilindrata effettiva del motore V dovrà essere tale per cui:

where η_{mh} is the mechanical efficiency of the selected hydraulic motor (table 7) and p_A is the operating pressure of the motor. The actual displacement of the motor V must be such that:

dabei ist η_{mh} der mechanische Wirkungsgrad des ausgewählten (Tab. 7) Hydraulikmotors und p_A der Betriebsdruck des Motors. Das ist der effektive Hubraum des V Motors daher:

$$V_R \leq V \quad (27)$$

Calcolare infine la portata q necessaria per l'alimentazione del motore:

Lastly, calculate the required flow q for the motor feed:

Schließlich ist der Volumenstrom q zur Versorgung des Motors zu berechnen:

$$q = \frac{V \times n_1}{1'000 \times \eta_v} \quad [\text{l/min}] \quad (28)$$

essendo n_1 la velocità in ingresso del riduttore e η_v il rendimento volumetrico del motore prescelto (tab. 7).

Consultare il catalogo DANA, oppure le schede tecniche degli altri costruttori per la scelta finale del motore.

Motore elettrico

Calcolare la potenza in ingresso al riduttore tramite la formula:

Essendo P_2 la potenza in uscita e η_d il rendimento dinamico del riduttore prescelto (tab.4).

Dalle tabelle dati tecnici dei costruttori di motori elettrici, selezionare un motore la cui potenza nominale P_n sia tale per cui:

La potenza P_n , se non diversamente specificato, si riferisce al servizio continuo S1. Qualora le condizioni di impiego dei motori siano diverse da S1, è necessario individuare il tipo di servizio corrispondente secondo le normative CEI EN 60034-1 (CEI 2-3)/IEC 34-1.

Per i servizi S2 e S3, per motori di grandezza inferiore o uguale a 132, è possibile ottenere un incremento di potenza rispetto al servizio continuo S1, secondo un opportuno fattore f_i .

Il fattore di incremento della potenza f_i può essere ricavato dalla tabella seguente:

n_1 being the gear unit input speed and η_v the volumetric efficiency of the chosen motor (table 7).

Refer to the DANA catalog, or the technical data sheets of other manufacturers for the final choice of motor.

Electric motor

Calculate the gear unit input power with the formula:

$$P_1 = \frac{P_2}{\eta_d} \text{ [kW]}$$

P_2 being the output power and η_d the dynamic efficiency of the chosen gear unit (table 4).

From the technical data tables of the manufacturers of electric motors, select a motor whose nominal power P_n is such that:

$$P_1 \leq P_n$$

Unless otherwise specified, the power P_n refers to continuous duty S1. If the operating conditions of the motors are different from S1, it is necessary to identify the corresponding type of duty according to standards CEI EN 60034-1 (CEI 2-3)/IEC 34-1.

For S2 and S3, for motor sizes smaller than or equal to 132, it is possible to obtain a power increase with respect to continuous duty S1, according to a suitable factor f_i .

The power increase factor f_i can be obtained from the following table:

es gilt: n_1 ist die Antriebsgeschwindigkeit des Getriebes und η_v der volumetrische Wirkungsgrad des ausgewählten Motors (Tab. 7).

Für die endgültige Auswahl des Motors DANA Katalog einsehen oder die technischen Datenblätter anderer Hersteller.

Elektromotor

Antriebsleistung des Getriebes nach folgender Formel berechnen:

(29)

Dabei ist P_2 die Abtriebsleistung und η_d der dynamische Wirkungsgrad des ausgewählten Getriebes (Tab. 4).

Entsprechend den Datenblättern der Hersteller der Elektromotoren einen Motor mit der Nennleistung P_n auswählen, daher ergibt sich:

(30)

Die Leistung P_n , wenn nicht anders angegeben, bezieht sich auf einen kontinuierlichen Betrieb S1. Sind die Einsatzbedingungen der Motore anders als S1, muss die entsprechende Art des Betriebs anhand der Norm CEI EN 60034-1 (CEI 2-3)/IEC 34-1 bestimmt werden.

Für den Betrieb S2 und S3 ist es möglich, bei Motorgrößen kleiner oder gleich 132 eine Leistungssteigerung mit Faktor f_i gegenüber Dauerbetrieb S1 zu bekommen.

Der Leistungssteigerungsfaktor f_i kann aus folgender Tabelle entnommen werden:

Tipo di servizio / Type of duty / Betriebsart								
S2					S3			
	Durata del ciclo / Cycle duration / Zyklusdauer [min]				Fattore d'intermittenza I / Duty cycle I / Anwendungsfaktor I [%]			
	10	30	60	90	15%	25%	40%	60%
f_i	1.4	1.2	1.1	1.05	1.4	1.25	1.13	1.07

Tab. (8)

Per la definizione del fattore di intermittenza I, fare riferimento alla formula (6) di pag. A13.

Nel caso di servizi S2 e S3, selezionare quindi un motore elettrico la cui potenza nominale P_n sia tale da soddisfare la seguente relazione:

For the definition of the duty cycle I, refer to the formula (6) pag. A13.

In the case of S2 and S3, select an electric motor whose nominal power P_n is such as to satisfy the following equation:

Zur Bestimmung des Anwendungsfaktors I siehe Formel (6) Seite A13.

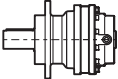
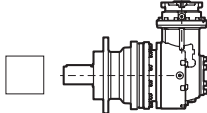
Bei den Betriebsarten S2 und S3 ist demzufolge ein Elektromotor mit einer Nennleistung P_n auszuwählen, entsprechend folgender Formel:

$$P_1 \leq P_n \times f_i$$

(31)

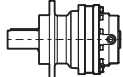
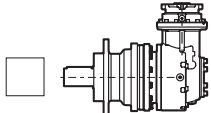
8. ESEMPIO DI SELEZIONE DEL RIDUTTORE

Si deve selezionare un riduttore per la seguente applicazione:

Tipologia di applicazione:		Convogliatore non uniformemente alimentato	
	Descrizione	Valore	
T_{2R}	Coppia richiesta in uscita	5'500	[Nm]
T_{2RMAX}	Coppia massima richiesta in uscita	10'000	[Nm]
n_2	Velocità in uscita	12	[rpm]
n_1	Velocità in ingresso	1'500	[rpm]
P_2	Potenza in uscita	-	[kW]
F_{rR2}	Carico radiale richiesto sull'albero in uscita	40'000	[N]
X_2	Distanza applicazione carico radiale F_{rR2}	40	[mm]
F_{aR2}	Carico assiale richiesto sull'albero in uscita	-	[N]
F_{rR1}	Carico radiale richiesto sull'albero in ingresso	-	[N]
X_1	Distanza applicazione carico radiale F_{rR1}	-	[mm]
h_R	Durata richiesta	25'000	[h]
I	Fattore d'intermittenza	100	[%]
N	Numero di avviamenti orari previsti	3	[1/h]
t_a	Temperatura ambiente di lavoro	20	[°C]
Tipologia di configurazione richiesta: <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <input checked="" type="checkbox"/>  In linea </div> <div style="text-align: center;"> <input type="checkbox"/>  Ortagonale </div> </div>			
Tipologia supporto in uscita:		Albero maschio scanalato	
Freno di stazionamento:		<input type="checkbox"/> Si	<input checked="" type="checkbox"/> No
T_{BR}	Coppia frenante richiesta:		[Nm]
Posizione di montaggio:		Orizzontale	
Tipologia di motore:			
<input type="checkbox"/> Idraulico <input checked="" type="checkbox"/> Elettrico <input type="checkbox"/> Endotermico <input type="checkbox"/> Altro			
Ambiente di lavoro:			
<input type="checkbox"/> Ristretto <input checked="" type="checkbox"/> Grande <input type="checkbox"/> All'aperto			

8. EXAMPLE OF GEAR UNIT SELECTION

A gear unit must be selected for the following application:

Type of application: Conveyor not uniformly fed			
	Description	Value	
T_{2R}	Required output torque	5'500	[Nm]
T_{2RMAX}	Required max output torque	10'000	[Nm]
n_2	Output speed	12	[rpm]
n_1	Input speed	1'500	[rpm]
P_2	Output power	-	[kW]
F_{rR2}	Required output shaft radial load	40'000	[N]
X_2^*	Radial load F_{rR2} application distance	40	[mm]
F_{aR2}^{**}	Required output shaft axial load	-	[N]
F_{rR1}	Required input shaft radial load	-	[N]
X_1^*	Radial load F_{rR1} application distance	-	[mm]
h_R	Required duration	25'000	[h]
l	Duty cycle	100	[%]
N	Number of starts per hour	3	[1/h]
t_a	Work environment temperature	20	[°C]
<p>Type of configuration required:</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <input checked="" type="checkbox"/>  In line </div> <div style="text-align: center;"> <input type="checkbox"/>  Right-angle </div> </div>			
Type of output support: Male splined shaft			
Parking brake: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
T_{BR}	Required braking torque:		[Nm]
Mounting position: Horizontal			
Type of motor: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Hydraulic <input checked="" type="checkbox"/> Electric <input type="checkbox"/> Endothermic <input type="checkbox"/> Other </div>			
Work environment: <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input type="checkbox"/> Limited <input checked="" type="checkbox"/> Large <input type="checkbox"/> Outdoor </div>			

8. BEISPIEL FÜR GETRIEBEAUSWAHL

Es soll ein Getriebe für die nachstehende Anwendung ausgewählt werden:

Anwendungsart: Ungleichmäßig beschickter Förderer			
	Beschreibung	Wert	
T_{2R}	Gefordertes Abtriebsmoment	5'500	[Nm]
T_{2RMAX}	Gefordertes max. Abtriebsmoment	10'000	[Nm]
n_2	Abtriebsdrehzahl	12	[rpm]
n_1	Antriebsdrehzahl	1'500	[rpm]
P_2	Abtriebsleistung	-	[kW]
F_{rR2}	An der Abtriebswelle geforderte Radiallast	40'000	[N]
X_2^*	Distanza applicazione carico radiale F_{rR2}	40	[mm]
F_{aR2}^{**}	An der Abtriebswelle geforderte Radiallast	-	[N]
F_{rR1}	An der Antriebswelle geforderte Radiallast	-	[N]
X_1^*	Abstand Angriffspunkt der Radiallast F_{rR1}	-	[mm]
h_R	Geforderte Dauer	25'000	[h]
I	Anwendungsfaktor	100	[%]
N	Vorgesehene Anzahl Starts pro Stunde	3	[1/h]
t_a	Temperatur Arbeitsumgebung	20	[°C]
Geforderte Konfiguration: <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <input checked="" type="checkbox"/> <p style="font-size: small;">Koaxialgetriebe</p> </div> <div style="text-align: center;"> <input type="checkbox"/> <p style="font-size: small;">Winkelgetriebe</p> </div> </div>			
Abtriebswellen Typ: Wellenstumpf mit Keilnut			
Feststellbremse: <input type="checkbox"/> Ja <input checked="" type="checkbox"/> Nein			
T_{BR}	Gefordertes Bremsmoment:		[Nm]
Einbaulage: Waagrecht			
Motortyp: <input type="checkbox"/> Hydraulisch <input checked="" type="checkbox"/> Elektrisch <input type="checkbox"/> Endothermisch <input type="checkbox"/> Anderer			
Arbeitsumfeld: <input type="checkbox"/> Kleiner Raum <input checked="" type="checkbox"/> Große Hallen <input type="checkbox"/> Im Freien			

Selezione del riduttore

Si calcola il fattore di durata L_{h2} secondo la formula (12):

$$L_{h2} = 12 \times 25'000 = 300'000$$

Si calcola il rapporto di riduzione richiesto secondo la formula (3)

$$i = \frac{1'500}{12} = 125$$

Dalla tabella (6), per "Convogliatori non uniformemente alimentati", si ricava la "Natura del carico", che in questo caso è "b".

Successivamente, dalla tabella (5), utilizzando la natura del carico "b", il numero di avviamenti/ora $N < 16$ e la tipologia di motore "elettrico", si ottiene il fattore di servizio, $f_s = 1.10$

Dalle tabelle di selezione, si sceglie il riduttore nella configurazione in linea le cui caratteristiche soddisfano le relazioni (15) e (16):

Gear unit selection

Calculates the lifetime factor L_{h2} according to the formula (12):

Calculate the required reduction ratio according to the formula (3)

From the table (6), for "Conveyors not uniformly fed", the "Nature of load" is obtained, which in this case is "b".

Then, from the table (5), using the nature of the load "b", the number of starts/hour $N < 16$ and the type of "electric" motor, the duty factor $f_s = 1.10$ is obtained

From the selection tables, choose the gear unit in the in-line configuration whose characteristics satisfy the equations (15) and (16):

$$T_{2R} \times f_s = 5'500 \times 1.1 = 6'050 \text{ Nm} \rightarrow 6'050 \leq T_2$$

$$L_{h2} = 300'000 \rightarrow 300'000 \leq n_2 \times h$$

Il riduttore prescelto dovrà inoltre avere un rapporto di riduzione il più prossimo possibile a $i = 125$ precedentemente calcolato.

Dalla tabella (9), si individua la grandezza del riduttore con coppia nominale T_{2N} immediatamente superiore al valore precedentemente calcolato $T_{2R} \times f_s = 6'050 \text{ Nm}$:

The chosen gear unit should also have a reduction ratio as close as possible to $i = 125$ previously calculated.

From the table (9), identify the size of the gear unit with nominal torque T_{2N} immediately higher than the value previously calculated $T_{2R} \times f_s = 6'050 \text{ Nm}$:

Getriebeauswahl

Man berechnet den Lebensdauerfaktor L_{h2} nach der folgenden Formel (12):

Man berechnet das Übersetzungsverhältnis nach folgender Formel (3)

Aus der Tabelle(6), für "Förderer mit nicht unformer Beschickung", entnimmt man die "Lastart", in diesem Fall ist das "b".

Dann erhält man aus der Tabelle (5) unter Verwendung von der Lastart "b", die Anzahl der Starts/Stunde $N < 16$ und der Motorart "elektrisch" den Betriebsfaktor $f_s = 1.10$

Aus der Auswahltable wählt man das Getriebe mit In-Line- Konfiguration dessen Eigenschaften den Verhältnissen (15) und (16) entsprechen:

Das gewählte Getriebe sollte darüber hinaus ein Übersetzungsverhältnis haben, dass so weit wie möglich dem vorher berechneten Übersetzungsverhältnis $i = 125$ entspricht.

Aus der Tabelle (9) entnimmt man die Größe des Getriebes mit dem Nennmoment T_{2N} gleich über dem Wert, der vorher berechnet wurde $T_{2R} \times f_s = 6'050 \text{ Nm}$:

	T_{2N} [Nm]								
	1'200	1'800	2'900	3'800	5'000	8'500	13'000	18'000	26'000
Grandezza Size Größe	E10	E16	E25	E30	E50	E80	E120	E160	E260

Tab. (9)

Tali valori sono riportati per tutte le grandezze, nella tabella riepilogativa tab.(14) al termine della sezione A (pag.A43).

These values are given for all sizes, in the summary table (14) at the end of section A (page A43).

Diese Werte finden sich für alle Größen in der Übersichtstabelle (14) am Ende von Abschnitt A (S. A43).

Si considera quindi la grandezza **E80** e la relativa tabella delle prestazioni conforme alla tipologia prescelta di riduttore (nel presente caso **in linea** → **EL80**).

Dalla colonna *i*, individuare il rapporto di riduzione più prossimo a quello richiesto ***i* = 125**, precedentemente calcolato:

Therefore consider the size **E80** and the relevant performance table according to the selected type of gear unit (in this case **in line** → **EL80**).

From the column *i*, identify the reduction ratio closest to that required ***i* = 125**, previously calculated:

Man sieht also die Größe **E80** in Betracht und die entsprechende Tabelle für die Leistungen für den ausgewählten Getriebetyp (im vorliegenden Fall **In-Line** → **EL80**).

Aus der Spalte *i*, das Übersetzungsverhältnis wählen, das dem geforderten Verhältnis von ***i* = 125**, am nächsten kommt, das vorher berechnet wurde:

<i>i</i>	T_2 [Nm]						n_{1MAX} [rpm]	T_{2MAX} [Nm]	P_t [kW]
	$n_2 \times h$ 10'000	$n_2 \times h$ 25'000	$n_2 \times h$ 50'000	$n_2 \times h$ 100'000	$n_2 \times h$ 500'000	$n_2 \times h$ 1'000'000			
EL801									
3.52	11'200	10'200	9'000	8'050	6'400	5'200	3'000	10'500	18
4.07	10'350	9'600	9'400	8'600	6'800	5'500	3'000	12'500	18
4.95	9'650	8'450	7'450	7'000	6'200	5'400	3'000	12'500	18
5.88	8'100	6'850	6'100	5'800	5'050	4'800	3'000	12'500	18
EL802									
12.4	11'200	10'200	9'000	8'050	6'250	5'050	3'800	10'500	12
14.3	10'350	9'600	9'400	8'600	6'800	5'500	3'800	12'500	12
16.6	10'350	9'600	9'400	8'600	6'800	5'500	3'800	12'500	12
20.2	10'350	9'600	9'400	8'600	6'800	5'500	3'800	12'500	12
24.0	10'350	9'550	9'000	8'450	6'800	5'500	3'800	12'500	12
26.6	7'700	6'900	6'500	6'100	5'250	4'600	3'800	12'500	12
29.1	9'650	8'450	7'450	7'000	6'200	5'400	3'800	12'500	12
32.4	8'950	8'250	7'450	7'000	6'200	5'250	3'800	12'500	12
34.6	8'100	6'850	6'100	5'800	5'050	4'800	3'800	12'500	12
38.4	8'100	6'850	6'100	5'800	5'050	4'800	3'800	12'500	12
EL803									
43.4	11'200	10'200	9'000	8'100	6'000	4'900	4'000	10'500	8
50.3	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	8
58.3	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
67.6	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
70.9	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
82.2	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
86.2	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	8
97.6	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
102	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	8
119	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
140	10'400	9'600	9'000	8'600	6'800	5'500	4'000	12'500	8
166	10'400	9'600	9'000	8'500	6'800	5'500	4'000	12'500	8
202	9'700	8'500	7'500	7'000	6'200	5'400	4'000	12'500	8
224	9'000	8'300	7'500	7'000	6'200	5'300	4'000	12'500	8
240	8'100	6'900	6'100	5'800	5'100	4'800	4'000	12'500	8
266	8'100	6'900	6'100	5'800	5'100	4'800	4'000	12'500	8
298	7'200	6'800	6'500	6'200	6'000	5'400	4'000	12'500	8
331	7'900	7'500	7'200	6'900	6'200	5'300	4'000	12'500	8
354	8'100	6'900	6'100	5'800	5'100	4'800	4'000	12'500	8
393	8'100	6'900	6'100	5'800	5'100	4'800	4'000	12'500	8
EL804									
360	11'200	10'200	9'000	8'100	6'400	5'200	4'000	12'500	6
398	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
424	11'200	10'200	9'000	8'100	6'400	5'200	4'000	12'500	6
469	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
514	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	6
570	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
625	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	6
676	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
725	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
822	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6

Tab. (10)

Si identifica quindi la colonna relativa al valore $n_2 \times h$ immediatamente superiore a quello precedentemente calcolato di $L_{h2} = 300'000$.

Nel caso in esame si considera quindi la colonna $n_2 \times h = 500'000 \geq 300'000$ (in accordo alla relazione (16)) e si verifica che la coppia trasmissibile T_2 sia superiore alla coppia richiesta $T_{2R} \times f_S = 6'050 \text{ Nm}$ precedentemente calcolata (in accordo alla formula (15)).

Dalla tabella delle prestazioni si legge un valore di $T_2 = 6'800 \geq 6'050 \text{ Nm}$ confermando l'idoneità del riduttore prescelto a lavorare alle condizioni richieste.

Il riduttore prescelto è quindi del tipo in linea a tre stadi di riduzione **EL803** con rapporto di riduzione ***i* = 119**.

Then identify the column relevant to the value $n_2 \times h$ immediately higher than the previously calculated $L_{h2} = 300'000$.

In the present case, consider the column $n_2 \times h = 500'000 \geq 300'000$ (according to the equation (16)) and note that the transmissible torque T_2 is higher than the required torque $T_{2R} \times f_S = 6'050 \text{ Nm}$ previously calculated (according to the formula (15)).

The performance table gives a value of $T_2 = 6'800 \geq 6'050 \text{ Nm}$ confirming the suitability of the chosen gear unit to work at the required conditions.

The chosen gear unit is therefore the in-line type with three reduction stages **EL803** with reduction ratio ***i* = 119**.

Man sucht nach der Spalte für den Wert $n_2 \times h$, der direkt über dem vorher berechnete Wert $L_{h2} = 300'000$ liegt.

Im vorliegenden Fall berücksichtigt man also die Spalte $n_2 \times h = 500'000 \geq 300'000$ (Entsprechend dem Verhältnis (16)) und man überprüft, ob das übertragbare Drehmoment T_2 über dem geforderten Drehmoment $T_{2R} \times f_S = 6'050 \text{ Nm}$ liegt, das vorher berechnet wurde (entsprechend der Formel (15)).

In der Leistungstabelle findet man den Wert $T_2 = 6'800 \geq 6'050 \text{ Nm}$, der bestätigt, dass das vorher ausgewählte Getriebe für den Einsatz unter dem geforderten Bedingungen geeignet ist.

Das vor gewählte Getriebe ist also vom Typ In-Line, hat drei Übersetzungsstufen **EL803** mit einem Übersetzungsverhältnis ***i* = 119**.

Verifica della coppia massima

Dalla tabella delle prestazioni, si ricava per il riduttore selezionato EL803 con rapporto di riduzione $i = 119$, una coppia massima trasmissibile $T_{2MAX} = 12'500 \text{ Nm}$.

Tale valore è superiore a quello massimo richiesto dall'applicazione T_{2RMAX} , che è di $10'000 \text{ Nm}$. Il riduttore selezionato è quindi adeguato a trasmettere la coppia massima richiesta.

Verifica dei carichi sugli alberi

Dalle tabelle dei supporti in uscita di tipo "Albero maschio scanalato" per la taglia E80 (vedi pag. E80), si evidenzia che esistono due tipologie di supporto maschio disponibili:

- MP
- MP090

Si supponga che il tipo MP sia quello selezionato.

Utilizzando la distanza $X_2 = 40 \text{ mm}$ (come riportata nei dati iniziali di pag. A31), si entra nel diagramma dei carichi radiali per la tipologia di uscita prescelta (MP) sino ad intersecare la curva relativa al valore $n_2xh = 500'000$ (precedentemente individuato e soddisfacente la $n_2xh \geq L_{h2} = 300'000$).

Da tale curva, sull'asse delle ordinate, si ricava il valore del carico radiale ammissibile che risulta essere $F_{r2} = 52'000 \text{ N}$.

Check of maximum torque

From the performance table, a maximum transmissible torque $T_{2MAX} = 12'500 \text{ Nm}$ is obtained for the selected gear unit EL803 with reduction ratio $i = 119$.

This value is higher than the maximum required by the application T_{2RMAX} , which is $10'000 \text{ Nm}$.

The selected gear unit is therefore suitable to transmit the required maximum torque.

Check of loads on shafts

The tables of "Male splined shaft" type output supports for size E80 (see page E80), show that two types of male support are available:

- MP
- MP090

Assuming the MP type is selected.

Using the distance $X_2 = 40 \text{ mm}$ (as given in the initial data p. A32), enter the diagram of radial loads for the type of output chosen (MP) until intersecting the curve relevant to the value $n_2xh = 500'000$ (previously identified and satisfying $n_2xh \geq L_{h2} = 300'000$).

From this curve, on the axis of ordinates, the permissible radial load value is obtained, which is $F_{r2} = 52'000 \text{ N}$.

Überprüfung des maximalen Drehmoments

Aus der Leistungstabelle ergibt sich für das ausgewählte Getriebe EL803 bei einem Übersetzungsverhältnis $i = 119$, ein maximal übertragbares Drehmoment $T_{2MAX} = 12'500 \text{ Nm}$.

Dieser Wert liegt höher als der geforderte Höchstwert bei der Anwendung T_{2RMAX} von 10.000 Nm .

Das ausgewählte Getriebe eignet sich demzufolge für die Übertragung des geforderten max. Drehmoments.

Überprüfung der Wellenlasten

Aus den Tabelle der Abtriebswellen vom Typ "Wellenstumpf" für die Größe E80 (Siehe S. E80), ergeben sich zwei Arten von Wellenstüpfen:

- MP
- MP090

Wir nehmen an, dass Typ MP ausgewählt wurde.

Anhand des Abstands $X_2 = 40 \text{ mm}$ (entsprechend den Ausgangsdaten S. A33), sucht man im Radiallast-Diagramm für den ausgewählten Typ der Abtriebswelle (MP) den Schnittpunkt der Kurve mit dem Wert $n_2xh = 500'000$ (vorher bestimmt und passend für $n_2xh \geq L_{h2} = 300'000$).

Anhand dieser Kurve entnimmt man am Schnittpunkt mit der zulässigen Radiallast den Wert $F_{r2} = 52'000 \text{ N}$.

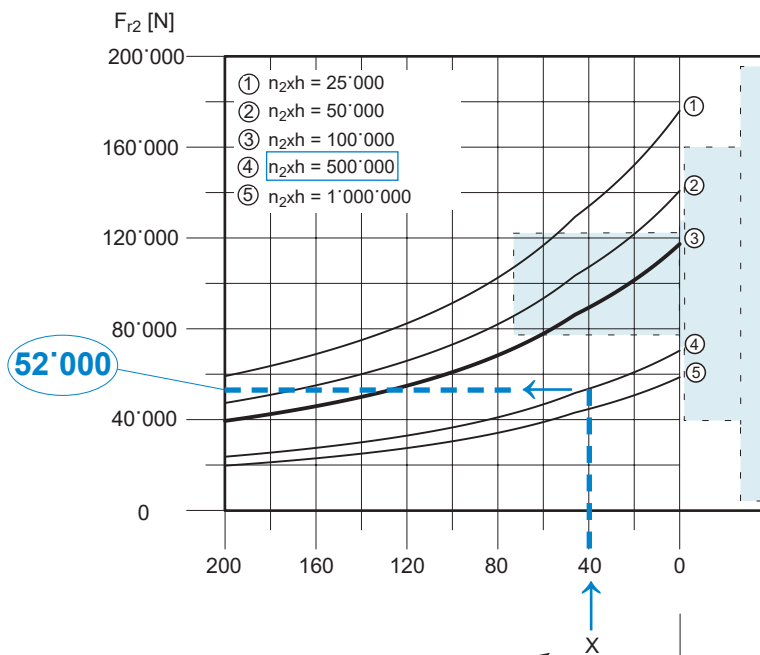


Fig. (2)

Per fattori di durata $n_2xh < 25'000$ cicli, contattare il referente DANA di zona.

For duration factor $n_2xh < 25'000$ cycles, please consult the DANA area contact person.

Für Lebensdauerfaktoren $n_2xh < 25'000$ arbeitszyklen, bitte sich an die DANA Kontaktperson der zone zu wenden.

Poiché il valore del carico radiale ammissibile appena definito F_{r2} , risulta essere maggiore del carico radiale richiesto F_{rR2} in accordo alla formula (20), il supporto selezionato è idoneo ad operare nelle condizioni richieste.

Since the permissible radial load value just defined F_{r2} , is greater than the required radial load F_{rR2} according to the formula (20), the selected support is suitable to operate in the required conditions.

Da der Wert für die gerade definierte zulässige Radiallast F_{r2} , höher ist als die geforderte Radiallast F_{rR2} nach der Formel (20), ist die ausgewählte Welle für den Einsatz unter den geforderten Bedingungen geeignet.

$$F_{rR2} = 40'000 \text{ N} < F_{r2} = 52'000 \text{ N}$$

Verifica della potenza termica

Dalla formula (5), è possibile calcolare la potenza trasmessa in uscita:

Check of thermal power

From the formula (5), it is possible to calculate the transmitted output power:

$$P_2 = \frac{5'500 \times 12}{9'550} = 6.9 \text{ kW}$$

Überprüfung der Wärmeleistung

Nach der Formel (5), kann die abtriebseitig übertragene Wärmeleistung berechnet werden:

Dalla formula (4), considerando il rendimento dinamico $\eta_d = 0.94$ del riduttore EL803, ricavato dalla tabella (4), è possibile calcolare la potenza applicata in ingresso al riduttore:

From the formula (4), assuming the dynamic efficiency $\eta_d = 0.94$ of the gear unit EL803, obtained from the table (4), it is possible to calculate the gear unit input power applied:

Nach Formel (4), unter Berücksichtigung des dynamischen Wirkungsgrads $\eta_d = 0.94$ des Getriebes EL803, entnommen aus Tabelle (4), kann die antriebsseitig am Getriebe angelegte Leistung berechnet werden:

$$P_1 = \frac{6.9}{0.94} = 7.4 \text{ kW}$$

Dalla tabella dei dati di selezione, per il riduttore EL803 selezionato, si ha una potenza termica dissipabile pari a $P_T = 8.0 \text{ kW}$.

A dissipatable thermal power equal to $P_T = 8.0 \text{ kW}$ is obtained from the table of selection data, for the selected gear unit EL803.

Aus der Tabelle der Auswahldaten für das gewählte Getriebe EL803 ergibt sich eine abführbare Wärmeleistung von $P_T = 8.0 \text{ kW}$.

Dalla tabella (1) di pag. A13, considerando un fattore d'intermittenza $I = 100 \%$ ed una temperatura ambiente di 20°C (come riportato nei dati iniziali di pag. A31), si ottiene un fattore termico $f_K = 1.0$.

Assuming a duty cycle $I = 100 \%$ and an ambient temperature of 20°C (as given in the initial data p. A32), a thermal factor $f_K = 1.0$ is obtained from the table (1) p. A13.

Aus Tabelle (1) S. A13 erhält man unter Berücksichtigung eines Anwendungsfaktors $I = 100 \%$ und einer Umgebungstemperatur von 20°C (entsprechend den Ausgangsdaten von S. A33) den Wärmefaktor $f_K = 1.0$.

Con velocità in ingresso $n_1 = 1'500 \text{ rpm}$ e posizione di montaggio orizzontale, dalla tabella (2) si ottiene un fattore di velocità $f_V = 1.0$.

With input speed $n_1 = 1'500 \text{ rpm}$ and horizontal mounting position, a speed factor $f_V = 1.0$ is obtained from the table (2).

Bei einer Antriebsdrehzahl $n_1 = 1'500 \text{ rpm}$ und einer waagerechten Einbauposition, ergibt sich aus der Tabelle (2) ein Drehzahlfaktor von $f_V = 1.0$.

Infine, dalla tabella (3), per ambiente di lavoro "grande", si ottiene un fattore ambiente $f_R = 1.0$.

Lastly, for a "large" work environment, an environmental factor $f_R = 1.0$ is obtained from the table (3).

Schließlich erhält man aus der Tabelle (3) für die Arbeitsumgebung "groß" einen Umgebungsfaktor $f_R = 1.0$.

Secondo la formula (7), la potenza termica corretta risulterà essere pari a:

According to the formula (7), the corrected thermal power is equal to:

Nach Formel (7) ergibt sich eine korrigierte Wärmeleistung von:

$$P_{T1} = 8 \times 1.0 \times 1.0 \times 1.0 = 8.0 \text{ kW}$$

La potenza applicata P_1 risulta essere inferiore alla potenza termica corretta P_{T1} , secondo la formula (8):

The applied power P_1 is lower than the corrected thermal power P_{T1} , according to the formula (8):

Die angelegte Last P_1 liegt unter der korrigierten Wärmeleistung P_{T1} nach Formel (8):

$$P_1 = 7.4 \text{ kW} \leq P_{T1} = 8.0 \text{ kW}$$

Il riduttore selezionato risulta idoneo al funzionamento senza che si debba prevedere un circuito ausiliario di raffreddamento.

The gear unit selected is suitable for operation without the need to provide for an auxiliary circuit cooling.

Daraus folgt, dass das gewählte Getriebe für den Betrieb geeignet ist ohne einen zusätzlichen Kühlkreis vorsehen zu müssen.

9. ESEMPIO DI SELEZIONE DEL CIRCUITO DI RAFFREDDAMENTO 9. EXAMPLE OF COOLING CIRCUIT SELECTION 9. BEISPIEL FÜR DIE AUSWAHL DES KÜHLKREISES

Un riduttore **EL1202/FE** con rapporto di riduzione $i = 24.5$ deve funzionare alle seguenti condizioni:

- velocità in ingresso $n_1 = 1'500 \text{ rpm}$;
- potenza applicata in ingresso $P_1 = 20 \text{ kW}$;
- posizione di montaggio orizzontale;
- temperatura ambiente $t_a = 30^\circ\text{C}$;
- fattore d'intermittenza $I = 100\%$
- ambiente di lavoro: **ristretto**

Dalla tabella dei dati di selezione dei riduttori EL1202 si ricava il valore di potenza termica dissipabile $P_t = 17 \text{ kW}$ del riduttore in oggetto.

A gear unit **EL1202/FE** with reduction ratio $i = 24.5$ must operate in the following conditions:

- input speed $n_1 = 1'500 \text{ rpm}$;
- applied input power $P_1 = 20 \text{ kW}$;
- horizontal mounting position;
- ambient temperature $t_a = 30^\circ\text{C}$;
- duty cycle $I = 100\%$
- work environment: **limited**

The dissipatable thermal power $P_t = 17 \text{ kW}$ of the gear unit in question is obtained from the data table for the selection of gear units EL1202.

Ein Getriebe **EL1202/FE** mit einem Übersetzungsverhältnis $i = 24.5$ soll unter folgenden Bedingungen eingesetzt werden:

- Antriebsdrehzahl $n_1 = 1'500 \text{ rpm}$;
- Angelegte Antriebsleistung $P_1 = 20 \text{ kW}$;
- Einbauposition waagerecht;
- Umgebungstemperatur $t_a = 30^\circ\text{C}$;
- Anwendungsfaktor $I = 100\%$
- Arbeitsumfeld: **klein**

Aus der Auswahltable für die Getriebe EL1202 entnimmt man den Wert für die abführte Wärmeleistung $P_t = 17 \text{ kW}$ des betreffenden Getriebes.

i	T ₂ [Nm]						n _{1max} [rpm]	T _{2max} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EL1201									
4.07	16'800	15'600	14'800	13'600	11'400	9'200	2'500	20'000	23
4.95	15'600	13'200	11'700	11'000	9'800	9'000	2'500	20'000	23
5.88	12'700	10'800	9'600	9'100	8'100	7'600	2'500	20'000	23
EL1202									
14.3	16'800	15'600	14'800	13'600	9'700	7'900	3'800	20'000	17
16.6	16'800	15'600	14'800	13'600	10'000	8'200	3'800	20'000	17
20.2	16'800	15'600	14'800	13'600	9'800	8'000	3'800	20'000	17
24.5							3'800	20'000	17
29.1	15'600	13'200	11'700	11'000	9'800	9'000	3'800	20'000	17
32.4	11'400	10'500	9'900	9'300	8'000	6'700	3'800	20'000	17
34.6	12'700	10'800	9'600	9'100	8'100	7'600	3'800	20'000	17
38.4	12'700	10'800	9'600	9'100	8'100	7'500	3'800	20'000	17
EL1203									
50.3	16'800	15'600	14'800	13'500	8'300	6'800	4'000	20'000	11
58.3	16'800	15'600	14'800	13'600	9'200	7'500	4'000	20'000	11
67.6	16'800	15'600	14'800	13'600	10'000	8'200	4'000	20'000	11
82.2	16'800	15'600	14'800	13'600	10'000	8'100	4'000	20'000	11
88.6	15'700	14'400	13'500	12'700	8'900	7'200	4'000	20'000	11
99.9	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	11
108	15'600	13'200	11'700	11'000	9'800	8'300	4'000	20'000	11
119	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	11
125	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	11
144	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	11
152	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	11
171	12'700	10'800	9'600	9'100	8'100	7'600	4'000	20'000	11
180	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	11
200	11'400	10'500	9'900	9'300	8'000	6'700	4'000	20'000	11
215	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	11

Tab. (11)

Dalla tabella (1) di pag. A13, considerando un fattore d'intermittenza $I = 100\%$ ed una temperatura ambiente di 30°C , si ottiene un fattore termico $f_K = 0.85$.

Con velocità in ingresso $n_1 = 1'500 \text{ rpm}$ e posizione di montaggio orizzontale, dalla tabella (2), si ottiene un fattore di velocità $f_V = 1.0$.

Infine, dalla tabella (3), per ambiente di lavoro "ristretto", si ottiene un fattore ambiente $f_R = 0.70$. Secondo la formula (7), la potenza termica corretta risulterà essere pari a:

Assuming a duty cycle $I = 100\%$ and an ambient temperature of 30°C , a thermal factor $f_K = 0.85$ is obtained from the table (1) p. A13.

With input speed $n_1 = 1'500 \text{ rpm}$ and horizontal mounting position, a speed factor $f_V = 1.0$ is obtained from the table (2).

Lastly, for a "limited" work environment, an environmental factor $f_R = 0.70$ is obtained from the table (3). According to the formula (7), the corrected thermal power is equal to:

Aus Tabelle (1) S. A13 erhält man unter Berücksichtigung eines Anwendungsfaktors $I = 100\%$ und einer Umgebungstemperatur von 30°C den Wärmefaktor $f_K = 0.85$.

Bei einer Antriebsdrehzahl $n_1 = 1'500 \text{ rpm}$ und einer waagerechten Einbauposition, ergibt sich aus der Tabelle (2) ein Drehzahlfaktor von $f_V = 1.0$.

Schließlich erhält man aus der Tabelle (3) für die Arbeitsumgebung "klein" einen Umgebungsfaktor $f_R = 0.70$. Nach Formel (7) ergibt sich eine korrigierte Wärmeleistung von:

$$P_{T1} = 17 \times 0.85 \times 1.0 \times 0.70 = 10 \text{ kW}$$

La potenza applicata P_1 risulta non essere inferiore alla potenza termica corretta P_{T1} , secondo la formula (8):

The applied power P_1 is not lower than the corrected thermal power P_{T1} , according to the formula (8):

Die angelegte Last P_1 liegt nicht unter der korrigierten Wärmeleistung P_{T1} nach Formel (8):

$$P_1 = 20 \text{ kW} \leq P_{T1} = 10 \text{ kW} \quad \longrightarrow$$

Condizione non verificata!
Condition not verified!
Bedingung wird nicht überprüft!

Pertanto, per il riduttore in oggetto, è necessario prevedere un circuito ausiliario di raffreddamento.

Therefore, for the gear unit in question, it is necessary to provide for an auxiliary circuit cooling.

Daher ist für das betreffende Getriebe ein zusätzlicher Kühlkreis notwendig.

Si calcola quindi la potenza termica da dissipare, secondo la formula (9). Per fare questo è necessario ricavare, dalla tabella (4), per il riduttore EL1202, il rendimento dinamico $\eta_d = 0.96$.

Then calculate the thermal power to be dissipated, according to the formula (9). To do this, the dynamic efficiency $\eta_d = 0.96$ must be obtained from the table (4), for the gear unit EL1202.

Man berechnet also die abzuführende Wärmeleistung nach der Formel (9). Dazu muss man aus der Tabelle (4) für das Getriebe EL1202, den dynamischen Wirkungsgrad $\eta_d = 0.96$ entnehmen.

Si ha quindi che la potenza termica da dissipare è

The thermal power to be dissipated is

Daraus ergibt sich die abzuführende Wärmeleistung von

$$P_C = (20 - 10) \times (1 - 0.96) = 0.4 \text{ kW}$$

Definita la potenza termica da dissipare P_C , contattare il referente DANA di zona per la selezione del circuito di raffreddamento più adeguato fra quelli a disposizione.

After establishing the thermal power to be dissipated P_C , consult the DANA area contact person to select the most suitable cooling circuit from those available.

Nach der Bestimmung der abzuführenden Wärmeleistung P_C , bitten wir Sie, für die Auswahl des geeigneten Kühlkreislaufs aus dem Angebot sich an die DANA Kontaktperson der zone zu wenden.

10. ESEMPIO DI SELEZIONE DEL FRENO LAMELLARE 10. EXAMPLE OF MULTI-DISC BRAKE SELECTION 10. BEISPIEL FÜR DIE AUSWAHL DER LAMELLENBREMSE

Un riduttore **EL503/FE** con rapporto di riduzione $i = 85.6$ deve funzionare alle seguenti condizioni:

- coppia in uscita richiesta
 $T_{2R} = 4'500 \text{ Nm}$
- fattore di sicurezza sul freno
 $S_f = 1.2$

Dalla relazione (1) di pag. A11, si calcola la coppia frenante richiesta:

A gear unit EL503/FE with reduction ratio $i = 85.6$ must work in the following conditions:

- *required output torque*
 $T_{2R} = 4'500 \text{ Nm}$
- *brake safety factor*
 $S_f = 1.2$

By the equation (1) p. A11, calculate the required braking torque:

$$T_{BR} = \frac{1.2 \times 4'500}{85.6} = 63.1 \text{ Nm}$$

Dalle tabelle dimensionali del riduttore EL503/FE, si ricava che la tipologia di freno lamellare prevista è la "MB3".

From the dimensional tables of the gear unit EL503/FE, the type of multi-disc disk brake provided for is "MB3".

Ein Getriebe **EL503/FE** mit einem Übersetzungsverhältnis $i = 85.6$ soll unter folgenden Bedingungen eingesetzt werden:

- gefordertes Antriebsdrehmoment
 $T_{2R} = 4'500 \text{ Nm}$
- Bremsen-Sicherheitsfaktor
 $S_f = 1.2$

Mit der Formel (1) von Seite A11 wird das geforderte Bremsmoments berechnet:

Aus der Tabelle mit den Maßen des Getriebes EL503/FE, entnimmt man, dass der vorgesehene Lamellen Bremstyp „MB3“ heißt.

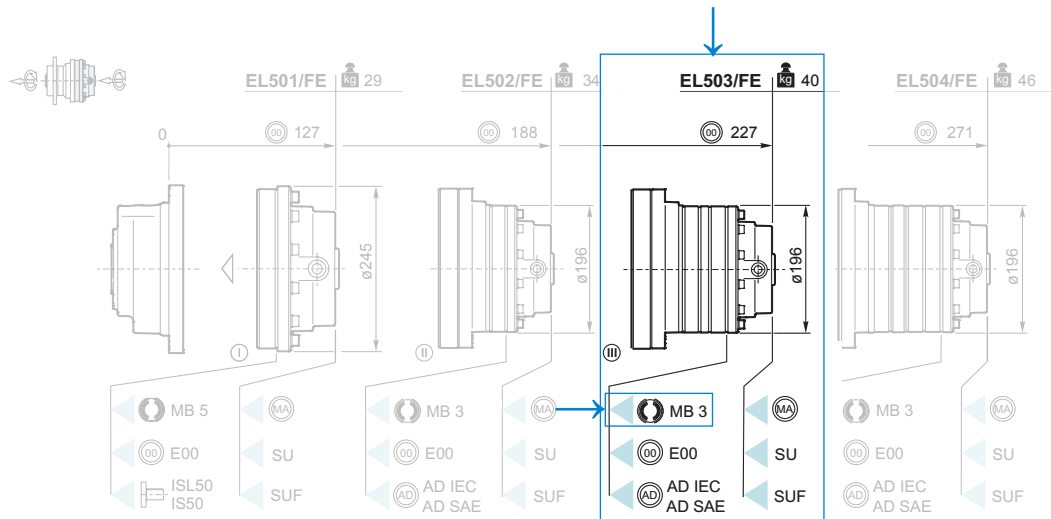


Fig. (3)

Al capitolo "Freni lamellari a bagno d'olio", nella tabella corrispondente alla tipologia MB3, si seleziona il freno che presenta una coppia frenante T_B immediatamente superiore alla coppia T_{BR} appena calcolata.

In the section "Oil-bath multi-disc disk brakes", in the table corresponding to type MB3, select the brake which has a braking torque T_B immediately higher than the torque T_{BR} just calculated.

Unter dem Kapitel „Ölbad-Lamellenbremsen“ wählt man in der entsprechenden Tabelle für den Typ MB3 die Bremse aus, die ein Bremsmoment aufweist von T_B , das etwas über dem soeben berechneten Bremsmoment T_{BR} liegt.

	T_B [Nm]	p [bar]	P_{MAX} [bar]	V_s [cm ³] lamelle nuove new discs Neue Lamellen
MB306.2C	33	13.5	300	15
MB309.2C	50	20.3	300	15
MB312.2C	66	27.1	300	15
MB309.4C	99	20.3	300	15
MB312.4C	132	27.1	300	15
MB310.6C	165	22.5	300	15
MB312.6C	198	27.1	300	15
MB315.6C	248	33.8	300	15
MB310.10C	275	22.5	300	15
MB315.8C	330	33.8	300	15

Tab. (12)

Si identifica quindi il freno tipo **MB312.2C**, con coppia frenante statica $T_B = 66 \text{ Nm}$.

Then identify the brake type MB312.2C, with static braking torque $T_B = 66 \text{ Nm}$.

Man findet dann die Bremse Typ **MB312.2C**, mit einem statischen Bremsmoments von $T_B = 66 \text{ Nm}$.

Dalla formula (23) di pag. A28, è possibile calcolare la coppia frenante in uscita al riduttore:

From the formula (23) p. A28, it is possible to calculate the gear unit output braking torque:

Anhand der Formel (23) auf Seite A28 kann man das abtriebsseitige Bremsmoment für das Getriebe berechnen:

$$T_{2B} = 66 \times 85.6 = 5'650 \text{ Nm}$$

Dalla tabella di selezione dei riduttori EL503, si ricava la coppia massima trasmissibile T_{2MAX} per il rapporto $i = 85.6$, che risulta $T_{2MAX} = 6'500 \text{ Nm}$

The maximum transmissible torque T_{2MAX} for the ratio $i = 85.6$, which is $T_{2MAX} = 6'500 \text{ Nm}$, is obtained from the table for selecting gear units EL503

Aus der Auswahltable für die Getriebe EL503 Entnimmt man das max. übertragbare Drehmoment T_{2MAX} für das Übersetzungsverhältnis $i = 85.6$, also $T_{2MAX} = 6.500 \text{ Nm}$

i	T_2 [Nm]						n_{1MAX} [rpm]	T_{2MAX} [Nm]	P_t [kW]
	$n_2 \times h$ 10'000	$n_2 \times h$ 25'000	$n_2 \times h$ 50'000	$n_2 \times h$ 100'000	$n_2 \times h$ 500'000	$n_2 \times h$ 1'000'000			
EL501									
3.52	6'300	5'950	5'200	4'650	3'650	2'950	3'800	6'500	13
4.07	5'800	5'400	5'300	5'000	3'750	3'050	3'800	7'500	13
4.95	5'450	4'900	4'250	4'000	3'500	3'000	3'800	7'500	13
5.88	4'450	3'750	3'300	3'150	2'700	2'550	3'800	7'500	13
6.53	3'200	2'650	2'300	2'200	1'900	1'800	3'800	5'600	13
EL502									
12.4	6'300	5'950	5'200	4'650	3'150	2'550	4'000	6'500	8
14.3	6'300	5'950	5'200	4'650	3'450	2'800	4'000	6'500	8
16.6	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	8
20.2	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	8
24.5	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	8
30.6	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	8
36.6	4'200	3'850	3'600	3'350	2'800	2'700	4'000	7'500	8
40.4	3'200	2'650	2'300	2'200	1'900	1'800	4'000	7'500	8
43.4	4'450	3'750	3'300	3'150	2'700	2'550	4'000	7'500	8
48.2	3'200	2'650	2'300	2'200	1'900	1'800	4'000	5'600	8
EL503									
43.4	6'300	5'950	5'200	4'650	3'150	2'550	4'000	6'500	7
50.3	6'300	5'950	5'200	4'650	3'450	2'800	4'000	6'500	7
61.2	6'300	5'500	5'150	4'650	3'400	2'750	4'000	6'500	7
70.9	6'300	5'950	5'200	4'650	3'450	2'800	4'000	6'500	7
85.6	6'300	5'950	5'200	4'650	3'150	2'550	4'000	6'500	7
102	6'300	5'500	5'150	4'650	3'400	2'750	4'000	6'500	7
119	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	7
140	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	7
152	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	7
180	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	7
212	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	7
251	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	7
313	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	7
374	4'200	3'850	3'600	3'350	2'800	2'700	4'000	7'500	7

Tab. (13)

La coppia frenante in uscita al riduttore T_{2B} risulta inferiore alla coppia massima trasmissibile dal riduttore, secondo la relazione (24) di pag. A28:

The gear unit output braking torque T_{2B} is lower than the maximum torque transmitted by the gear unit, according to the equation (24) p. A28:

Das abtriebsseitige Bremsmoment des Getriebes T_{2B} liegt unter dem max. übertragbaren Drehmoment des Getriebes nach der Formel (24) S. A28:

$$T_{2B} = 5'650 \text{ Nm} \leq T_{2MAX} = 6'500 \text{ Nm}$$

Il freno selezionato risulta quindi essere adeguato al riduttore in oggetto.

The brake selected is therefore suitable for the gear unit in question.

Die ausgewählte Bremsen ist also für das betreffende Getriebe geeignet.



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Motion Systems

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11. DATI TECNICI E DIMENSIONALI

11. TECHNICAL AND DIMENSIONAL DATA

11. TECHNISCHE UND MASSBILDER DATEN

Grandezza Size Größe	i		T _{2N} [Nm]	Pag. Page Seiten
				
E10	3.52 ÷ 2'949	10.5 ÷ 3'003	1'200	
E16	3.52 ÷ 2'949	10.5 ÷ 1'197	1'800	
E25	3.52 ÷ 3'041	10.5 ÷ 1'052	2'900	
E30	3.52 ÷ 3'041	10.5 ÷ 1'455	3'800	
E50	3.52 ÷ 2'561	10.5 ÷ 1'121	5'000	
E80	3.52 ÷ 3'042	10.5 ÷ 1'096	8'500	
E120	4.07 ÷ 2'430	12.2 ÷ 1'387	13'000	
E160	4.18 ÷ 2'479	12.5 ÷ 1'415	18'000	
E260	4.18 ÷ 2'356	12.5 ÷ 1'050	26'000	

Tab. (14)



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






























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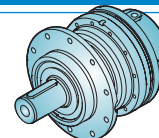


GRANDEZZA E10

E10 SIZE

E10 GRÖÖE

	Disponibilità Availability Verfügbarkeit	Albero - Shaft - Getriebewelle		Pagina Page Seite		
		Tipologia Type Typ	Dimensioni Dimensions Abmessungen [mm]			
USCITE OUTPUTS AUSGÄNGE	MP - ML 		MP B40x36 DIN 5482	ML B40x36 DIN 5482		
	MP1 - ML1 		MP1 ø42	ML1 ø42		
	FE 		A40x36 DIN 5482			
	FS 		ø50			
	FCP 		ø35			
	MPP1 		ø42			
ENTRATE INPUTS EINNAHMEN	ISL 		ISL ISL10 ø28			
	E00 		A50x45 DIN 5482			
FLANGED'INGRESSO INPUT FLANGE FLANSCH EINGANG	AD 					
	MA 					
FRENI BRAKES BREMSEN		MB3				
		T _B [Nm] 33 + 495				



i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			

EL101

3.52	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	6
4.07	1'370	1'260	1'235	1'210	1'015	825	4'000	2'200	6
4.95	1'285	1'165	1'105	990	845	785	4'000	2'200	6
5.88	1'185	965	815	745	625	580	4'000	2'200	6
6.93	935	755	635	590	490	450	4'000	2'000	6
10.2	335	295	275	265	240	230	4'000	1'000	6

EL102

12.4	1480	1'380	1'355	1'330	1'030	835	4'000	2200	5
14.3	1480	1'380	1'355	1'330	1'030	835	4'000	2200	5
17.4	1480	1'380	1'355	1'330	1'030	835	4'000	2200	5
20.2	1370	1'260	1'235	1'210	1'015	825	4'000	2200	5
24.4	1480	1'380	1'355	1'330	1'030	835	4'000	2200	5
28.2	1370	1'260	1'235	1'210	1'015	825	4'000	2200	5
34.3	1285	1'165	1'105	990	845	785	4'000	2200	5
41.6	1130	1'070	1'025	980	890	825	4'000	2200	5
50.6	1285	1'165	1'105	990	845	785	4'000	2200	5
60.1	1185	965	815	745	625	580	4'000	2200	5

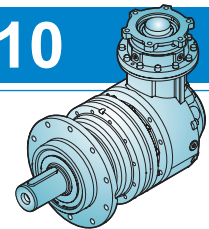
EL103

50.3	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
61.2	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
72.6	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
85.6	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
102	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
115	1'370	1'260	1'235	1'210	1'015	825	4'000	2'200	4
126	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
146	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
178	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
196	1'370	1'260	1'235	1'210	1'015	825	4'000	2'200	4
211	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
249	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
289	1'370	1'260	1'235	1'210	1'015	825	4'000	2'200	4
351	1'285	1'165	1'105	990	845	785	4'000	2'200	4
426	1'130	1'070	1'025	980	890	825	4'000	2'200	4

EL104

360	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
404	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
444	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
491	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
514	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
593	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
625	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
742	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
836	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
993	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
1046	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
1170	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
1233	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
1290	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
1496	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
1725	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
2000	1'370	1'260	1'235	1'210	1'015	825	4'000	2'200	4
2159	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
2544	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
2949	1'370	1'260	1'235	1'210	1'015	825	4'000	2'200	4

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich



i	T ₂ [Nm]						n ₁ MAX [rpm]	T ₂ MAX [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			

EC102

10.5	1'480	1'380	1'355	1'120	655	520	4'000	2'200	5
12.2	1'370	1'260	1'235	1'210	720	575	4'000	2'200	5
14.9	1'285	1'165	1'105	990	820	655	4'000	2'200	5
17.2	1'435	1'250	1'130	925	540	430	4'000	2'200	5
19.9	1'370	1'260	1'235	1'020	600	475	4'000	2'200	5
24.2	1'285	1'165	1'105	990	680	540	4'000	2'200	5
28.7	1'185	965	815	745	625	580	4'000	2'200	5
30.7	335	295	275	265	240	230	4'000	1'000	5
50.0	335	295	275	265	240	230	4'000	1'000	5

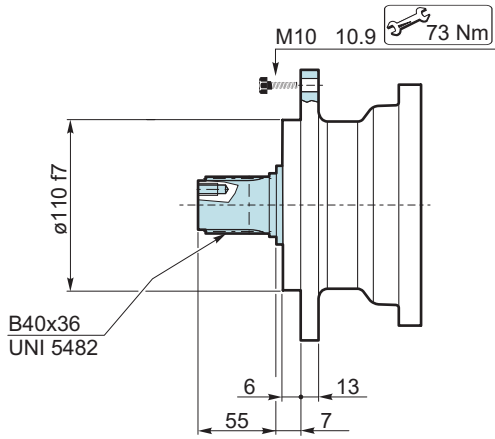
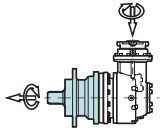
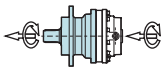
EC103

37.1	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
43.0	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
52.2	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
60.4	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
70.0	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
73.1	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
85.1	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
101	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	4
125	1'130	1'070	1'025	980	890	825	4'000	2'200	4
142	1'285	1'165	1'105	990	845	785	4'000	2'200	4
152	1'285	1'165	1'105	990	845	785	4'000	2'200	4
176	985	930	890	855	775	745	4'000	2'200	4
204	1'130	1'070	1'025	980	890	825	4'000	2'200	4
247	1'285	1'165	1'105	990	845	785	4'000	2'200	4

EC104

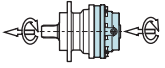
130	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
151	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
175	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
184	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
212	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
246	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
257	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
285	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
307	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
347	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
379	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
412	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
439	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
500	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
534	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
634	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
716	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
747	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
870	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
1033	1'480	1'380	1'355	1'330	1'030	835	4'000	2'200	3
1455	1'285	1'165	1'105	990	845	785	4'000	2'200	3
1552	1'285	1'165	1'105	990	845	785	4'000	2'200	3
2080	1'130	1'070	1'025	980	890	735	4'000	2'200	3
2529	1'285	1'165	1'105	990	845	700	4'000	2'200	3
3003	1'185	965	815	745	625	520	4'000	2'200	3

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich



Accessori
Accessories
Zubehör

E10
12

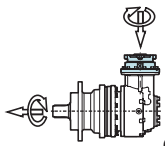
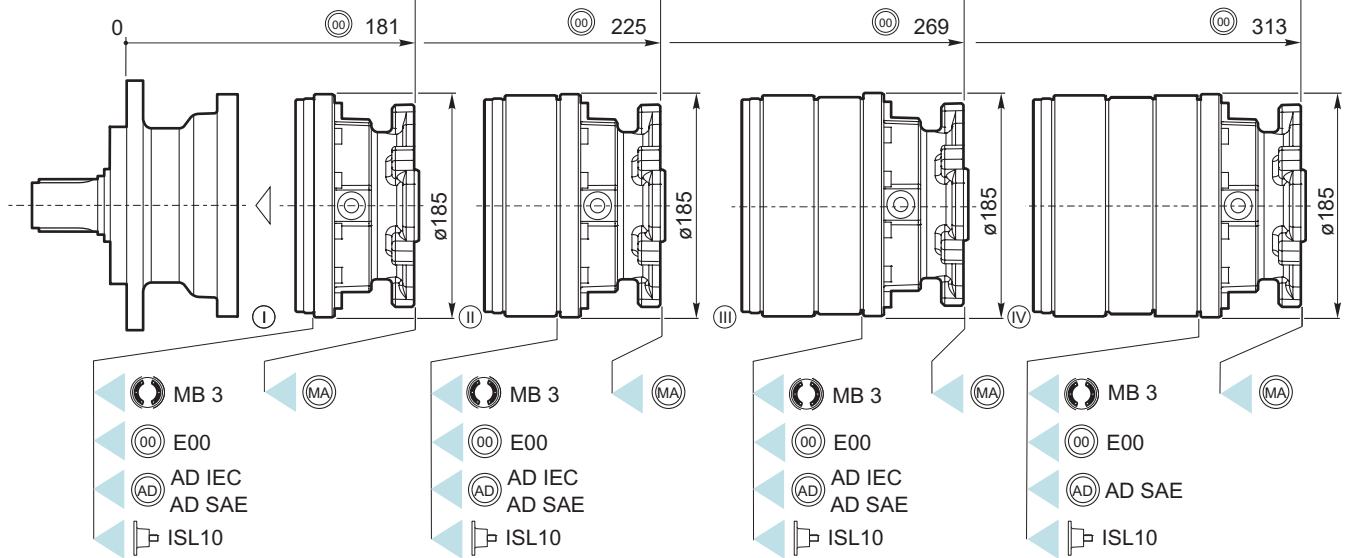


EL101/MP 18

EL102/MP 24

EL103/MP 29

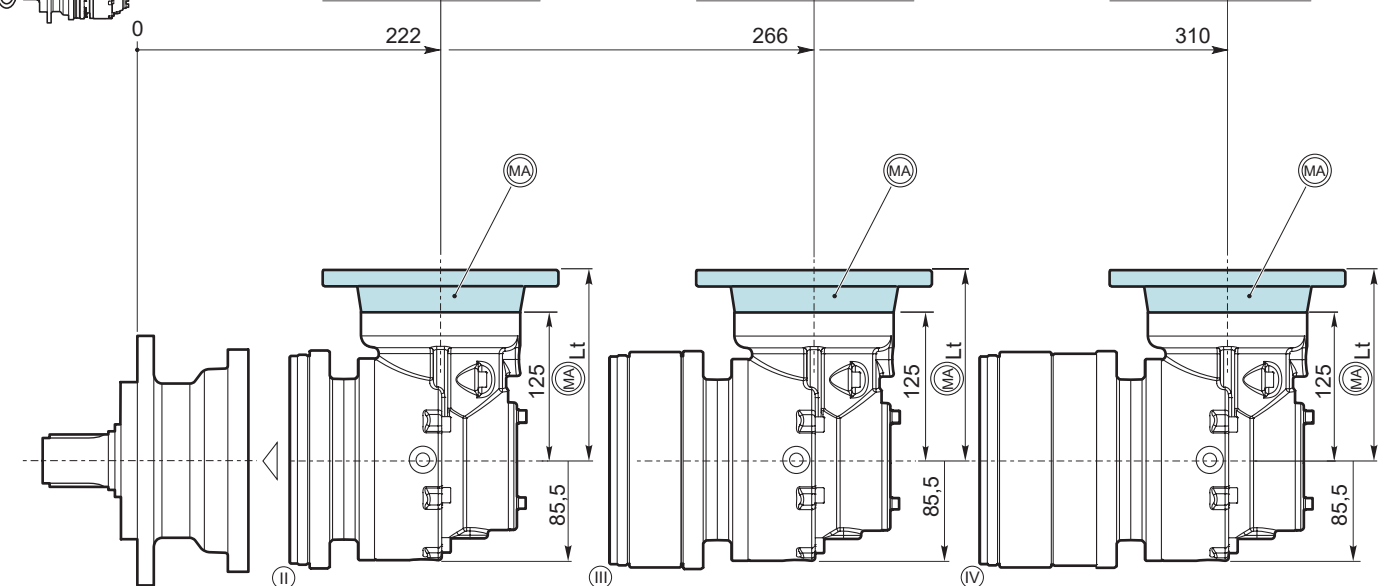
EL104/MP 35

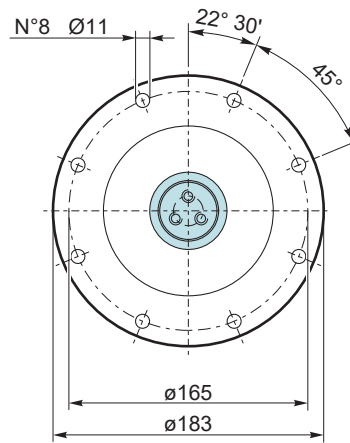
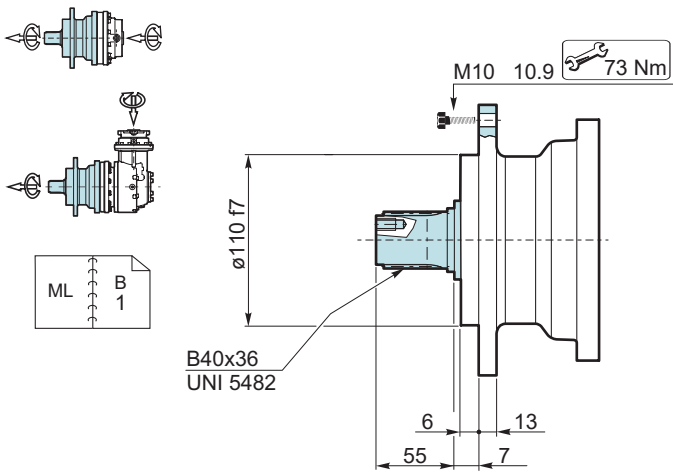


EC102/MP 30

EC103/MP 35

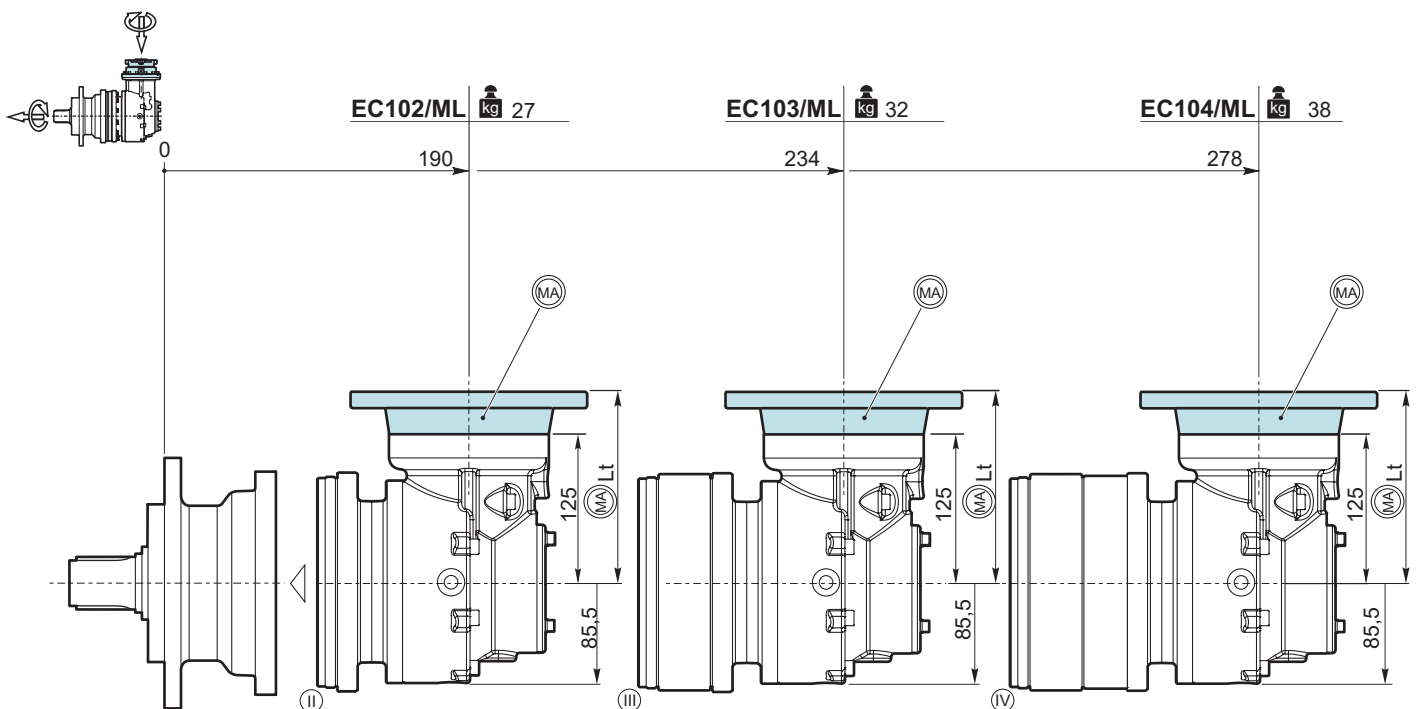
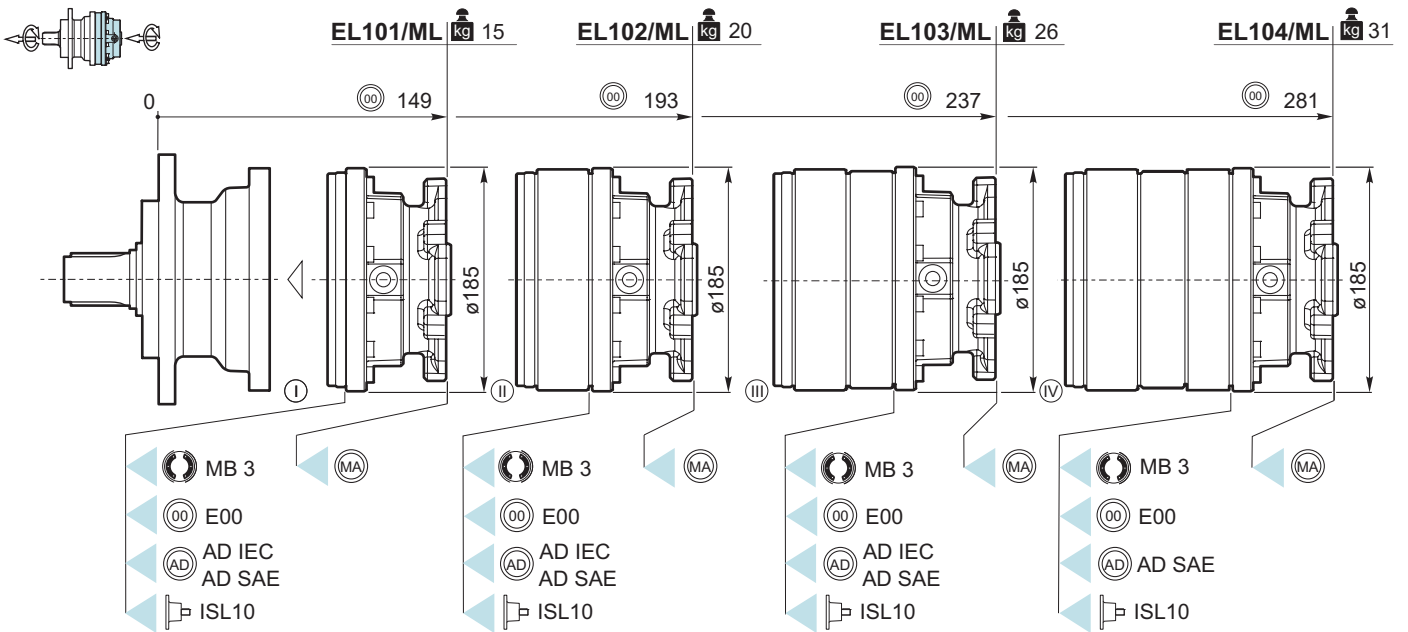
EC104/MP 41



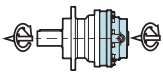
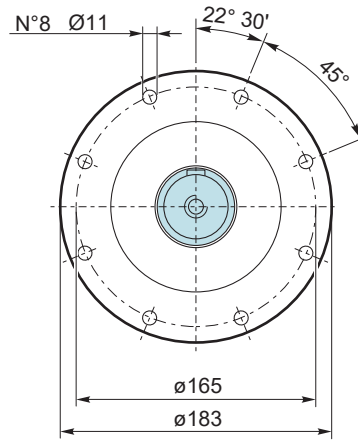
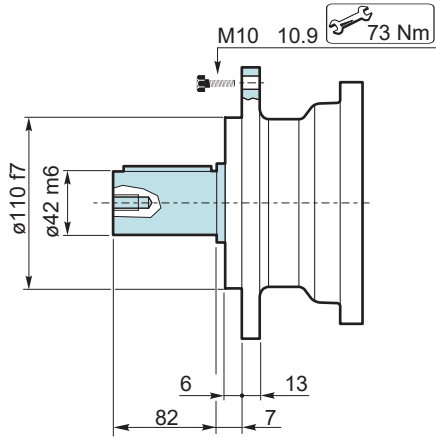
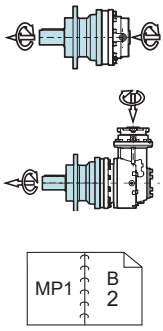


Accessori
Accessories
Zubehör

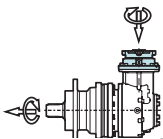
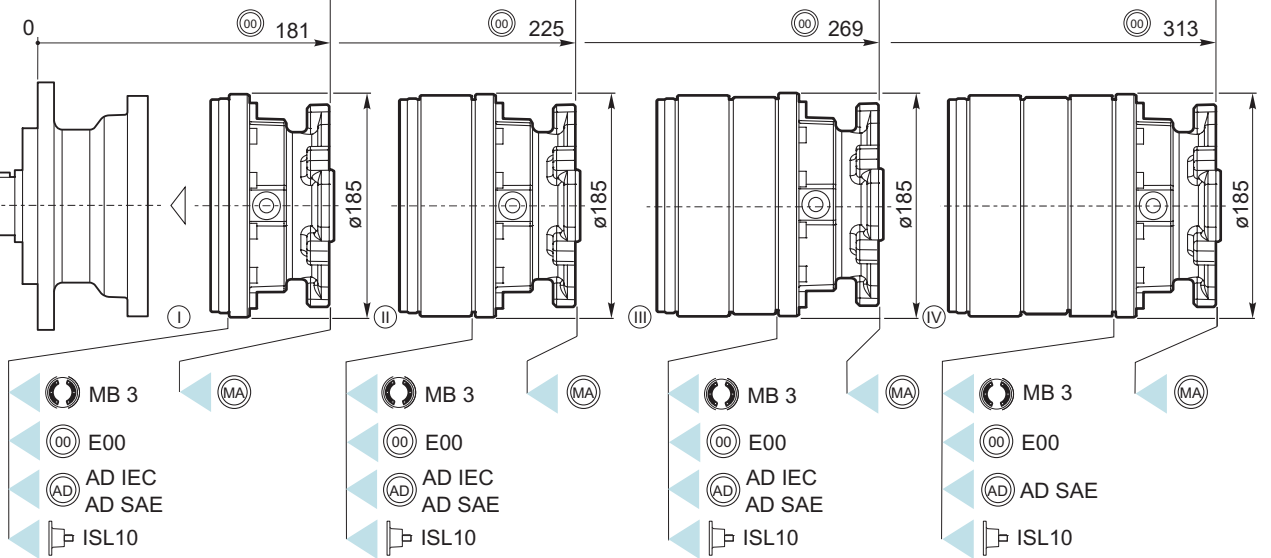
E10
12



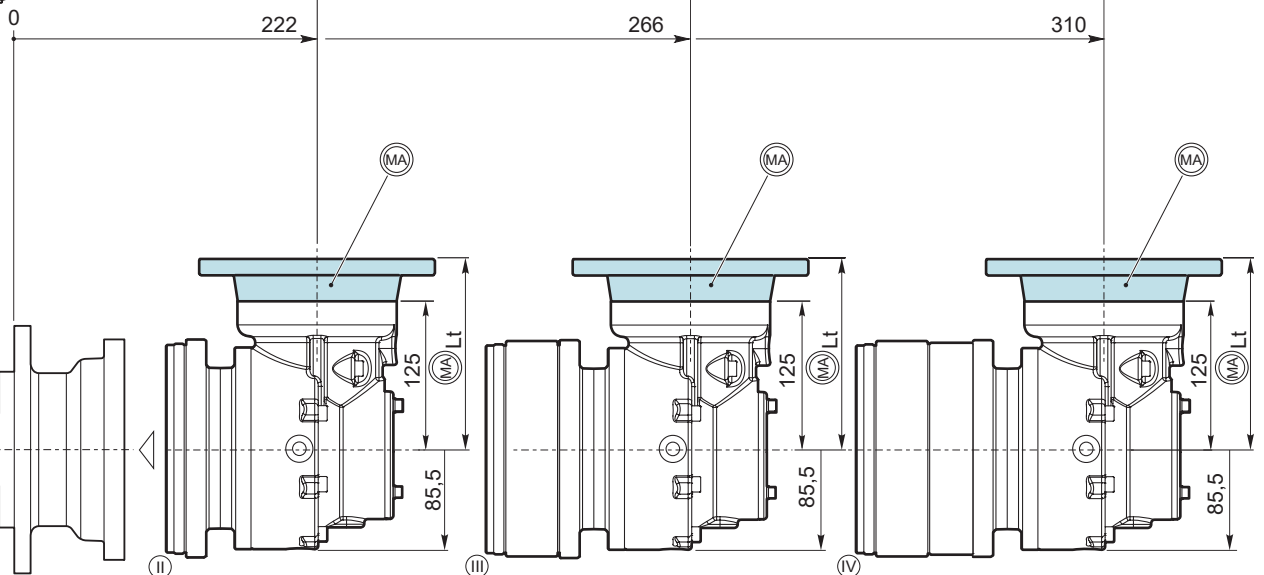
B 11 **E10 16** **E10 15** **E10 14** **B 24** **E10 13**

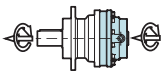
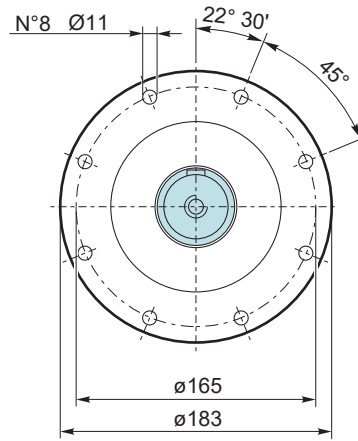
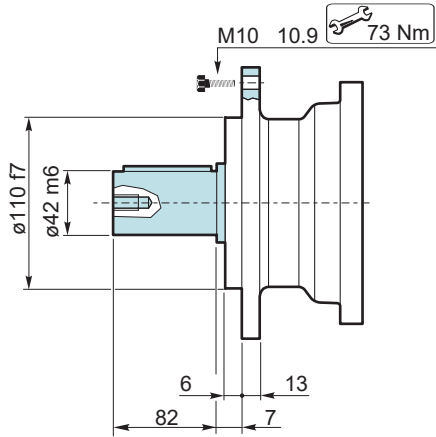
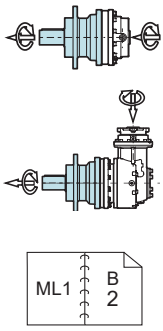


EL101/MP1 19 **EL102/MP1** 24 **EL103/MP1** 30 **EL104/MP1** 35

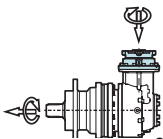
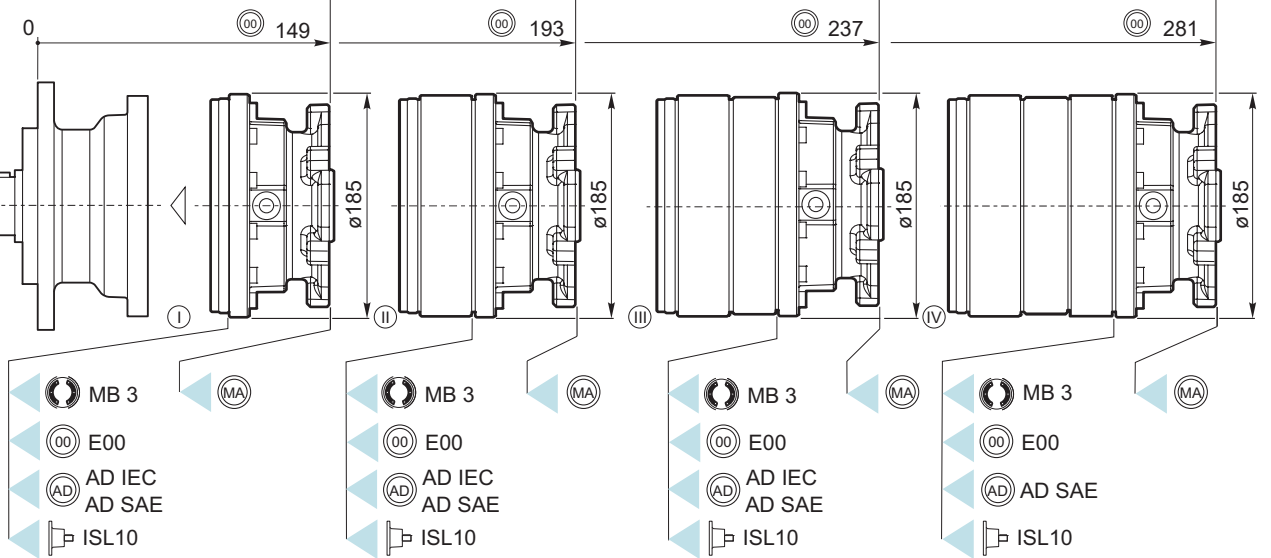


EC102/MP1 30 **EC103/MP1** 35 **EC104/MP1** 41

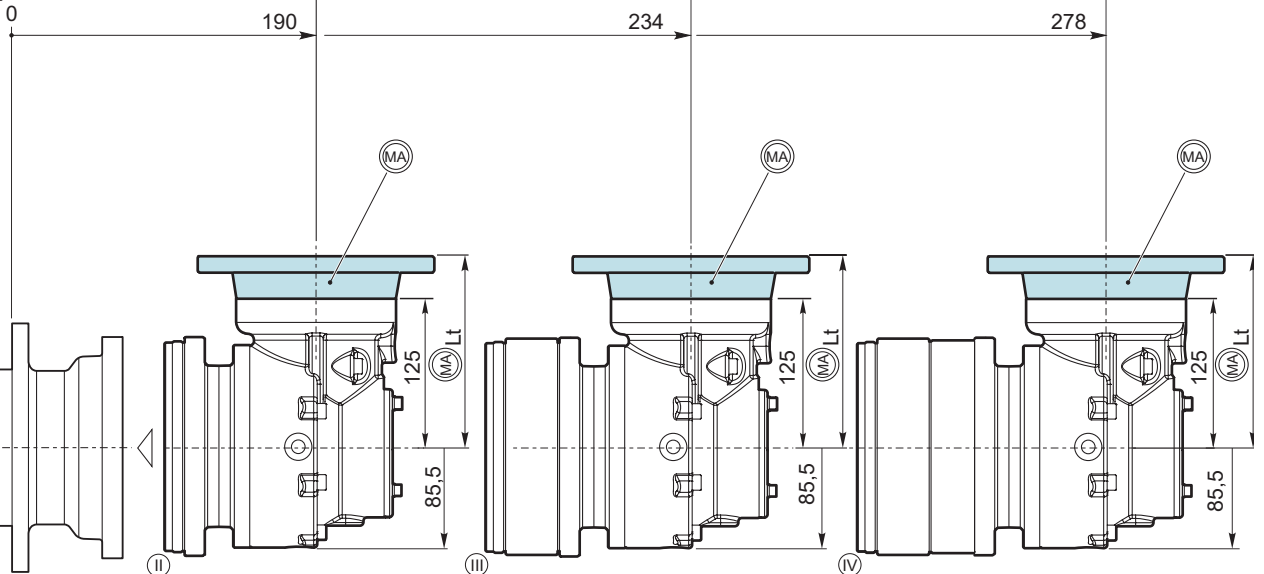


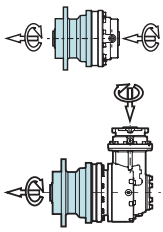


EL101/ML1 15 **EL102/ML1** 21 **EL103/ML1** 26 **EL104/ML1** 32

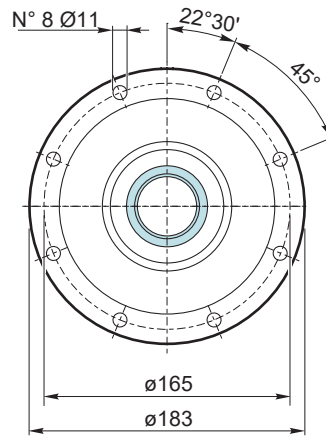
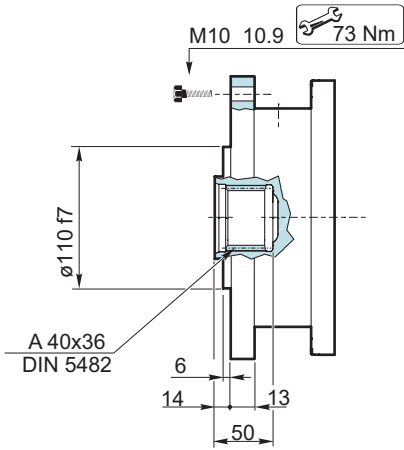


EC102/ML1 27 **EC103/ML1** 32 **EC104/ML1** 38



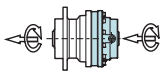


FE B 3



Accessori
Accessories
Zubehör

E10
12

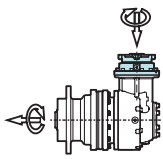
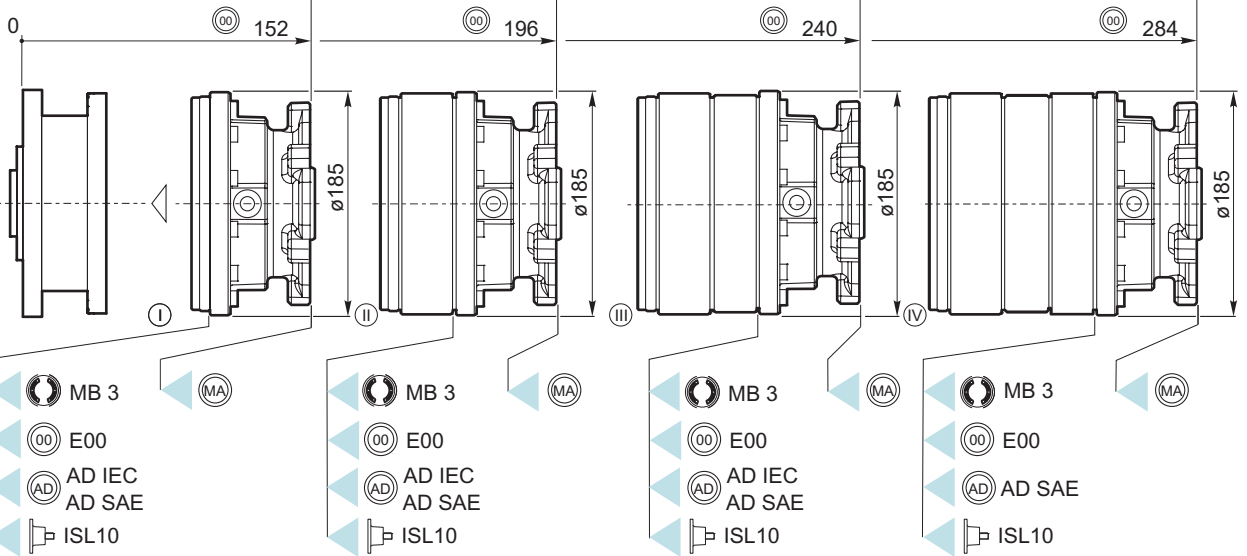


EL101/FE kg 15

EL102/FE kg 21

EL103/FE kg 26

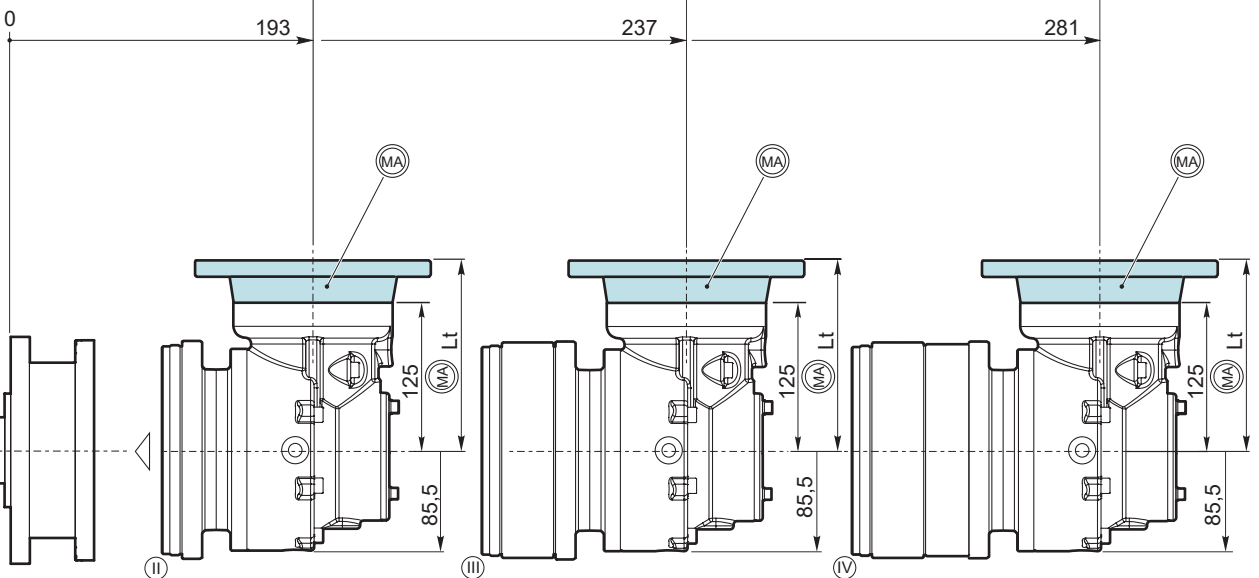
EL104/FE kg 32

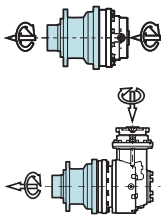


EC102/FE kg 27

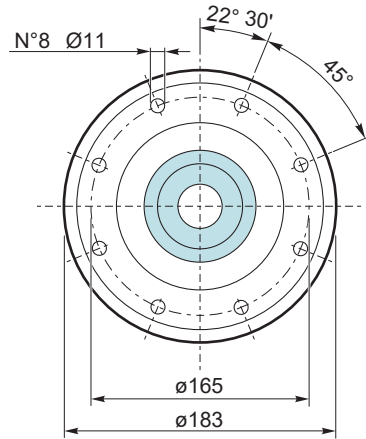
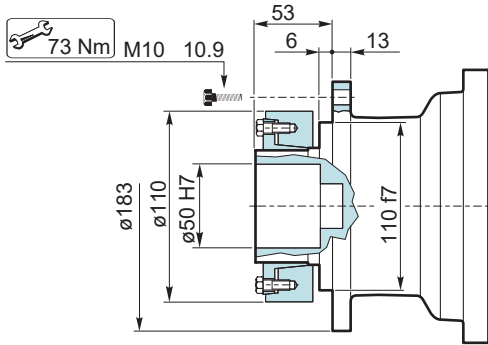
EC103/FE kg 32

EC104/FE kg 38





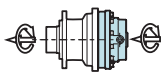
FS
B
4



Giunto ad attrito
Shrink disc
Reibungskupplung



B
18

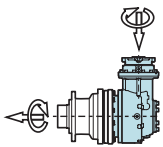
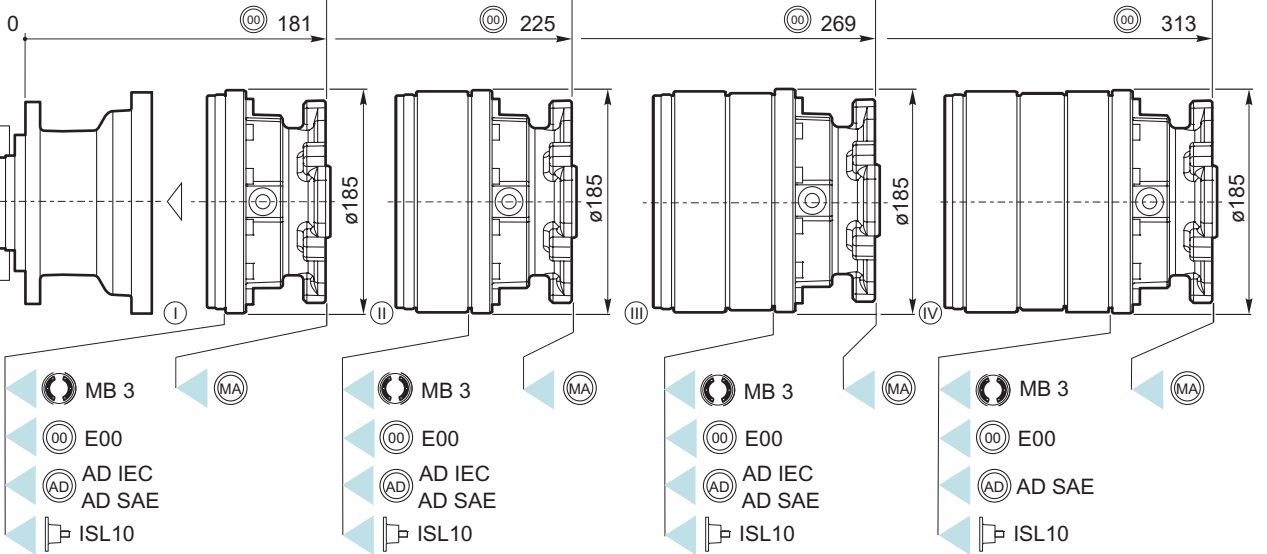


EL101/FS **kg** 18

EL102/FS **kg** 24

EL103/FS **kg** 29

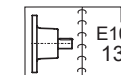
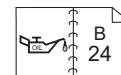
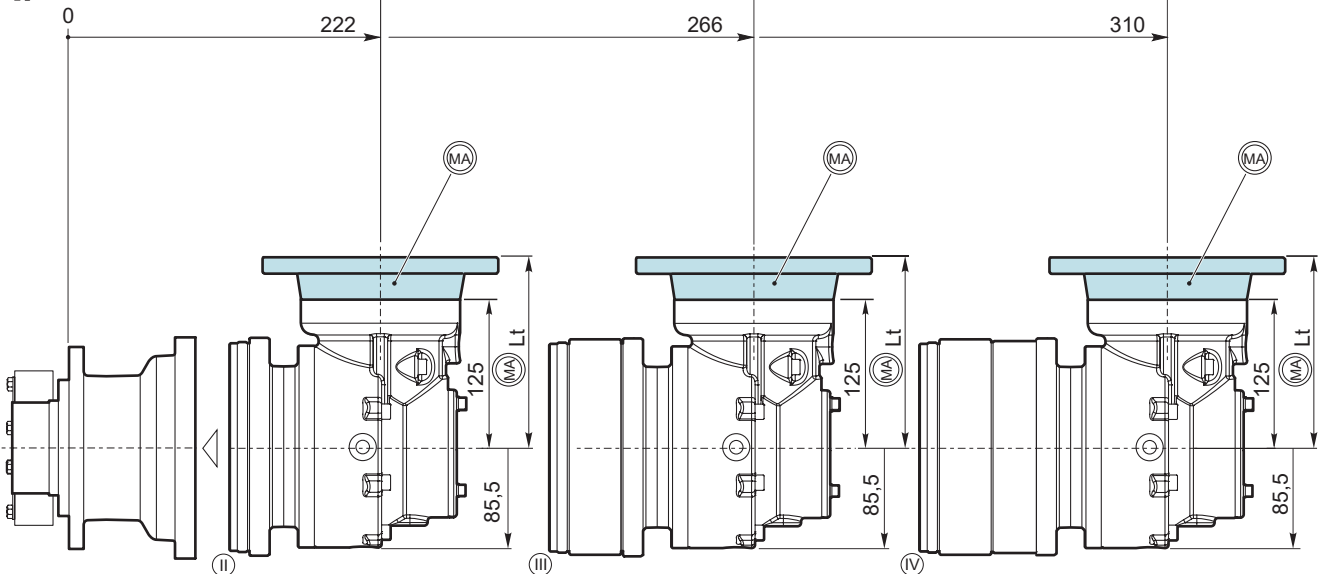
EL104/FS **kg** 35

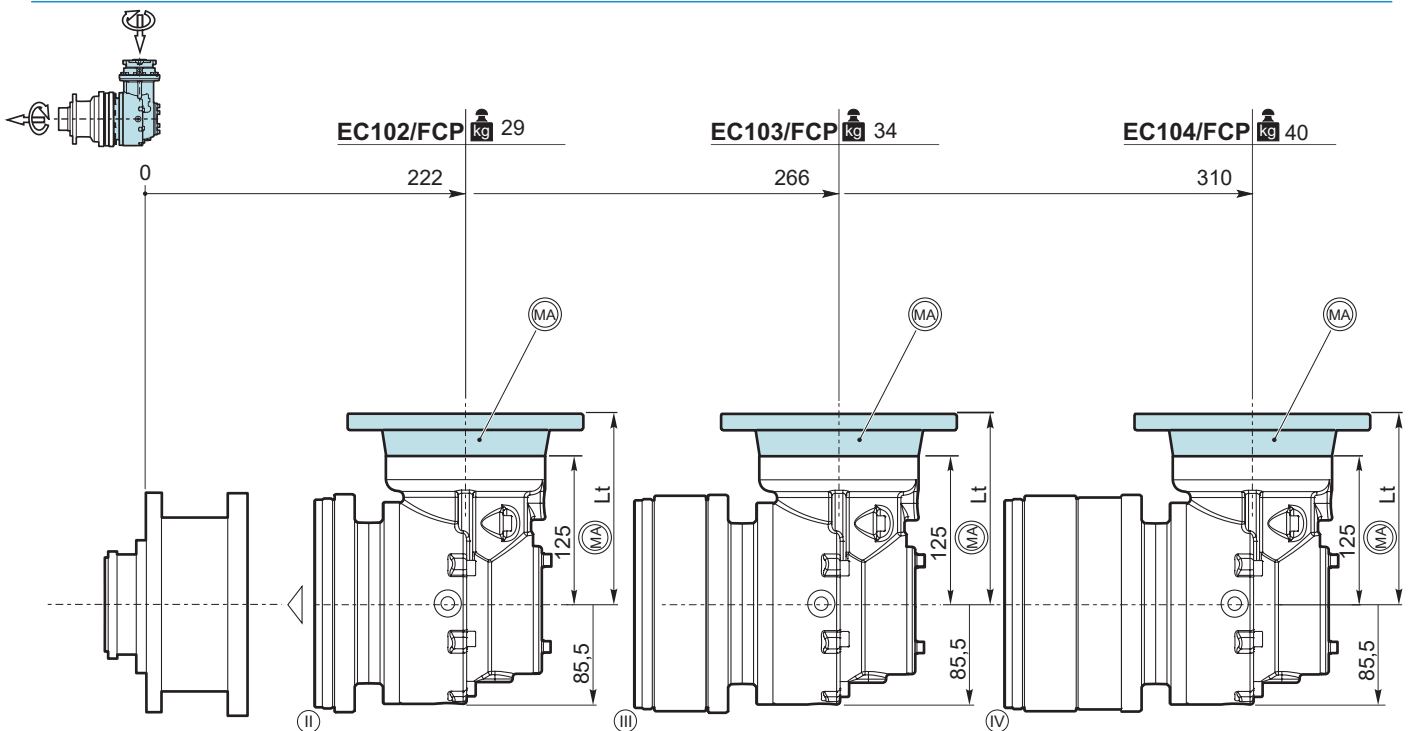
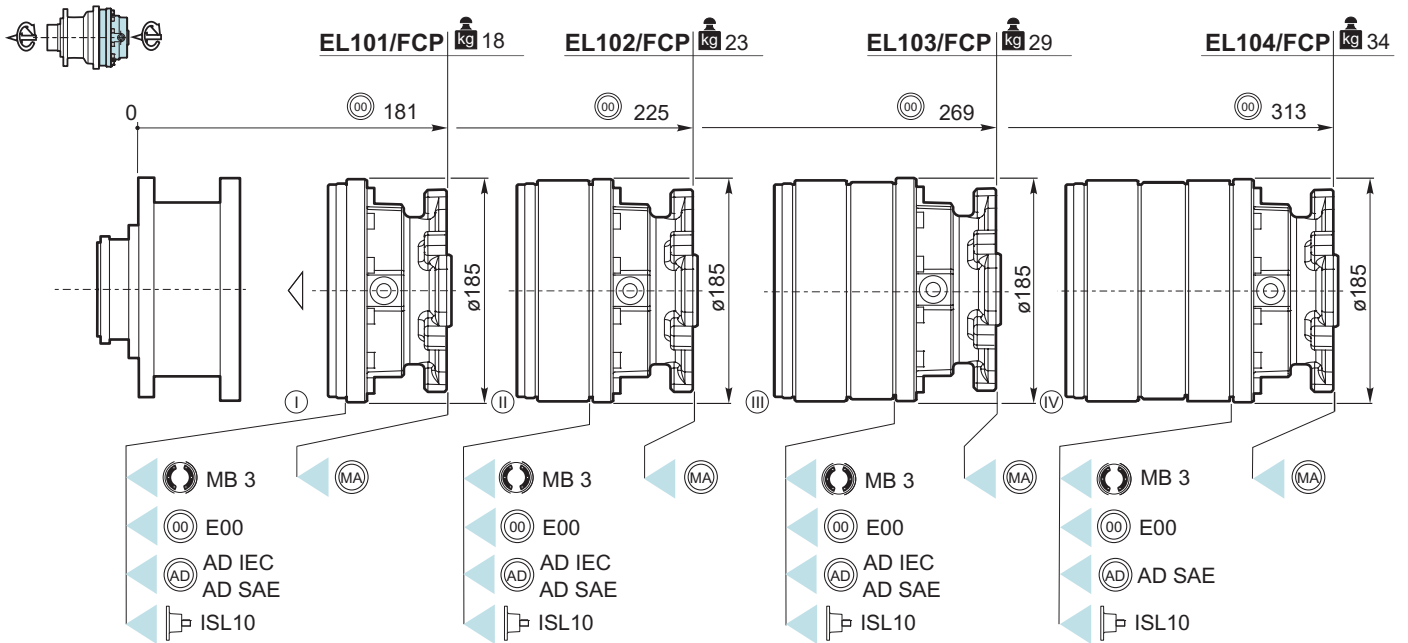
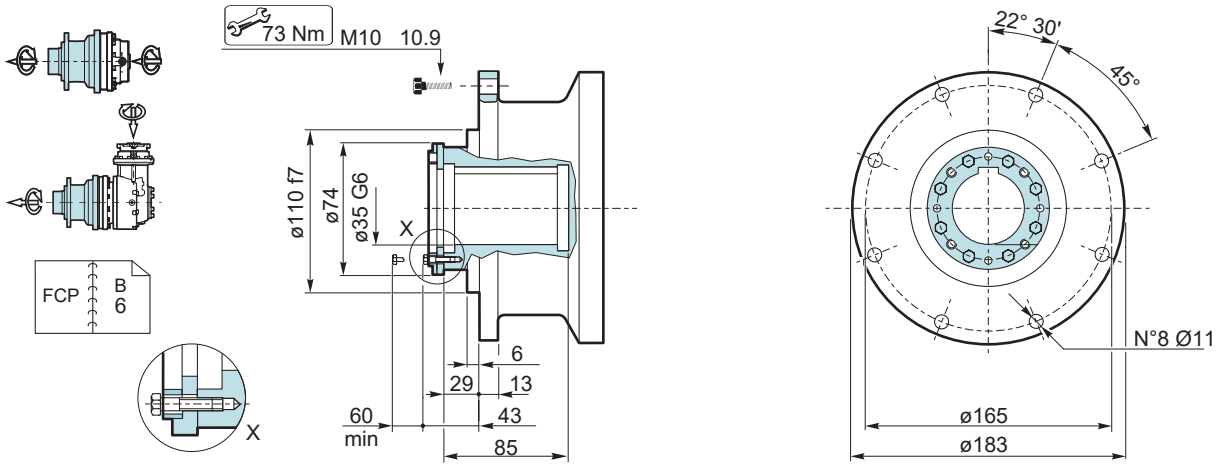


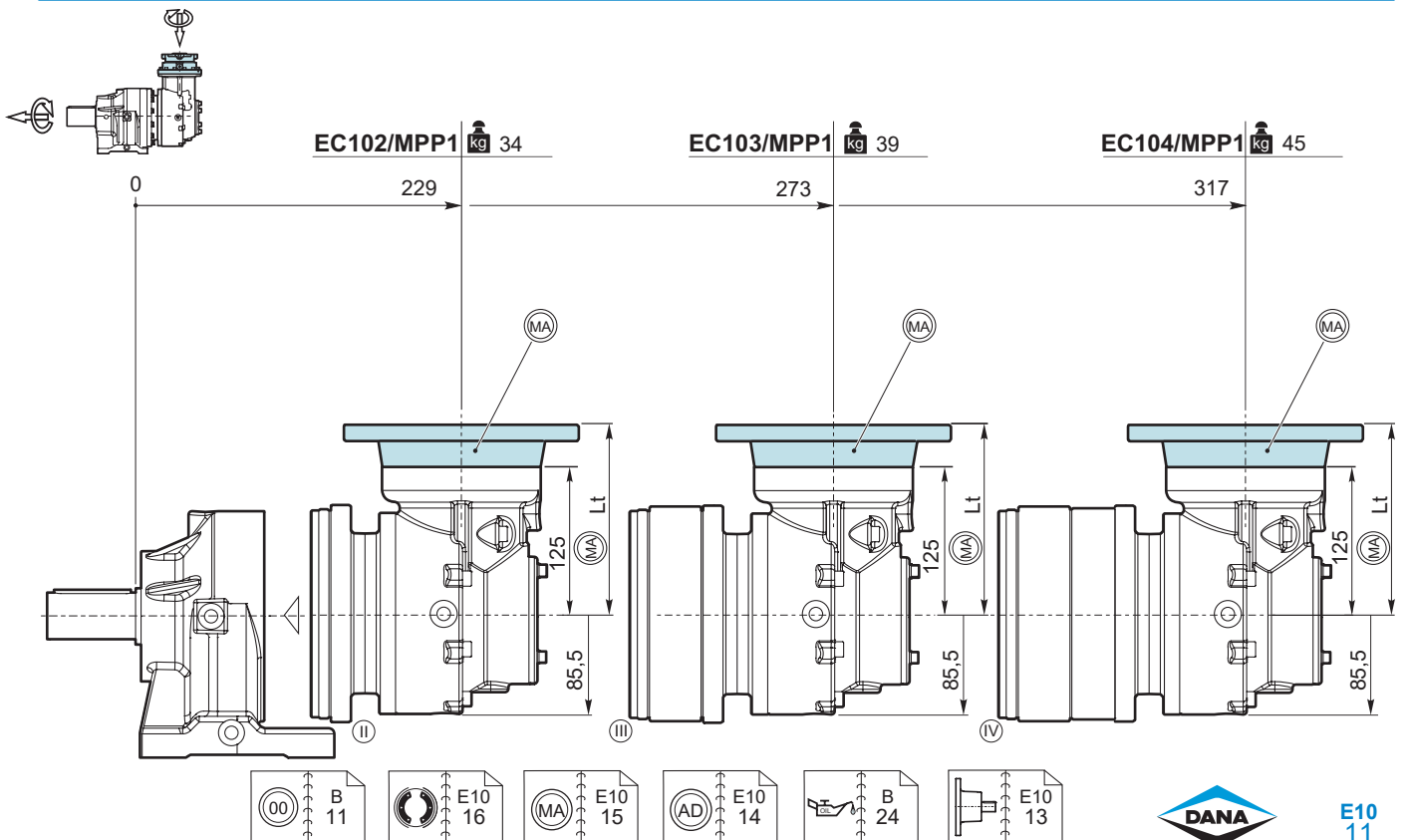
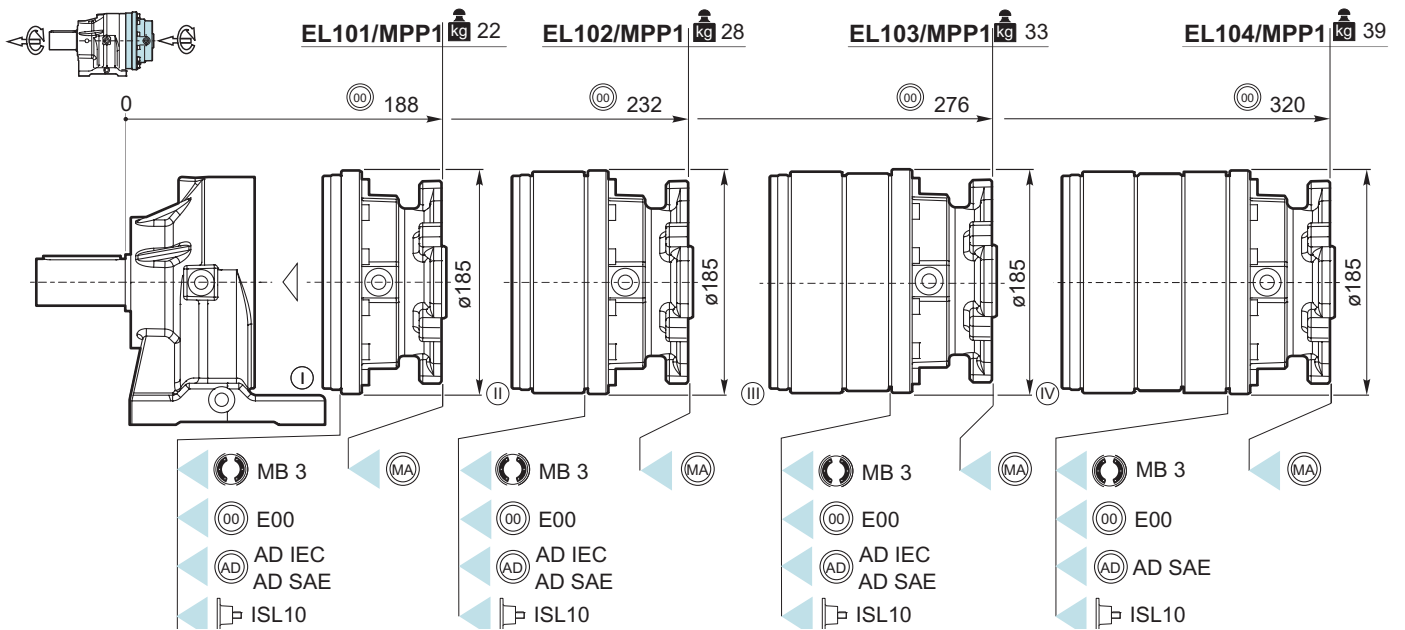
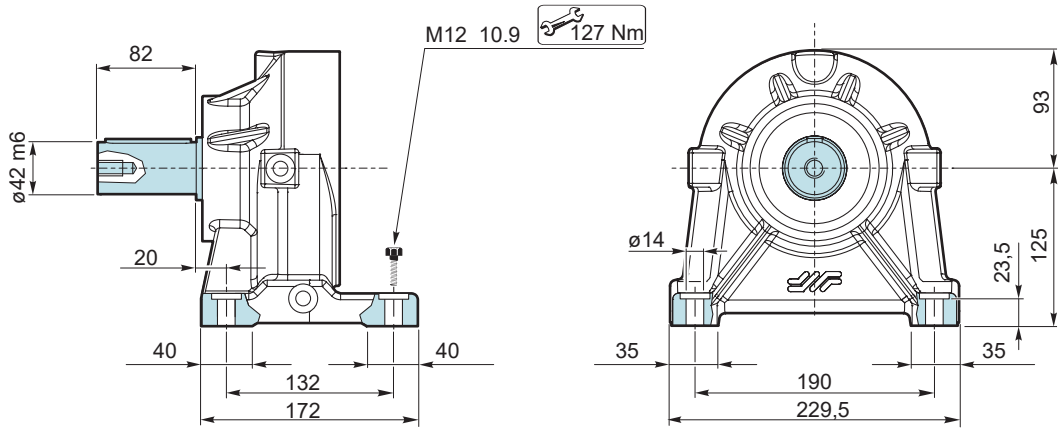
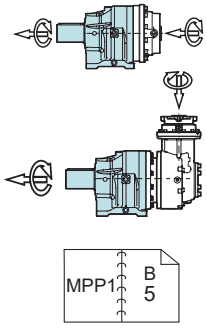
EC102/FS **kg** 30

EC103/FS **kg** 35

EC104/FS **kg** 41







ACCESSORI

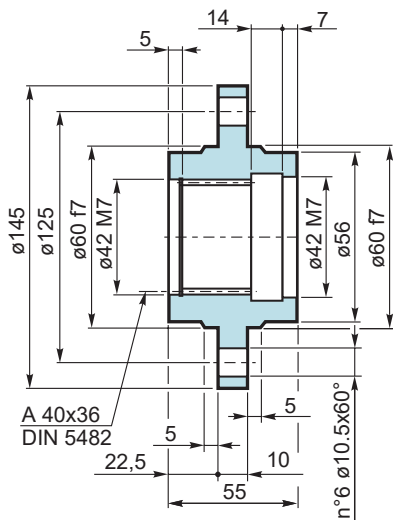
ACCESSORIES

ZUBEHÖR



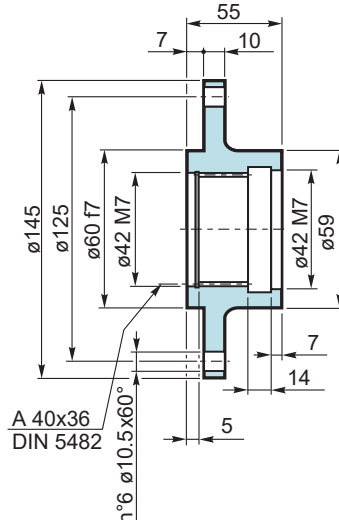
Flangia ruota
Driving flange
Radnabehflansch

FA 010 Mat. C40 EN 10083
Cod: 347.0023.0800



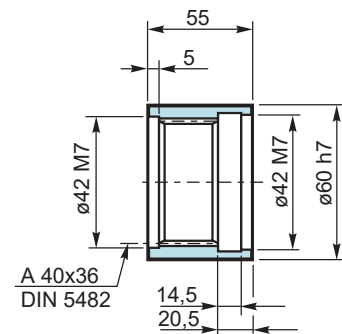
Flangia ruota
Driving flange
Radnabehflansch

FR 010 Mat. C40 EN 10083
Cod: 347.0033.1800



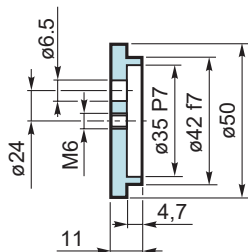
Manicotto scanalato
Splined bush
Manchon cannelée

MS 010 Mat. 42CrMo4 EN 10083
Cod: 391.0274.0600



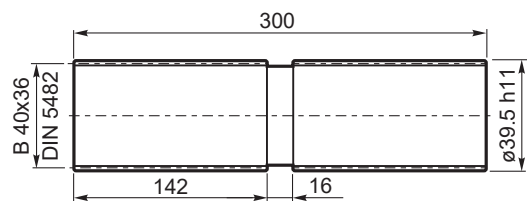
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 010 Mat. C40 EN 10083
Cod: 340.4214.0000

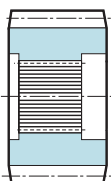


Barra scanalata
Splined bar
Zugspindel

BS 010 Mat. 16NiCr4 EN 10084
Cod: 391.2673.0100



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

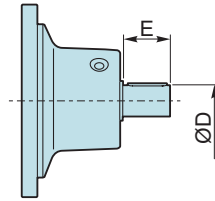
Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

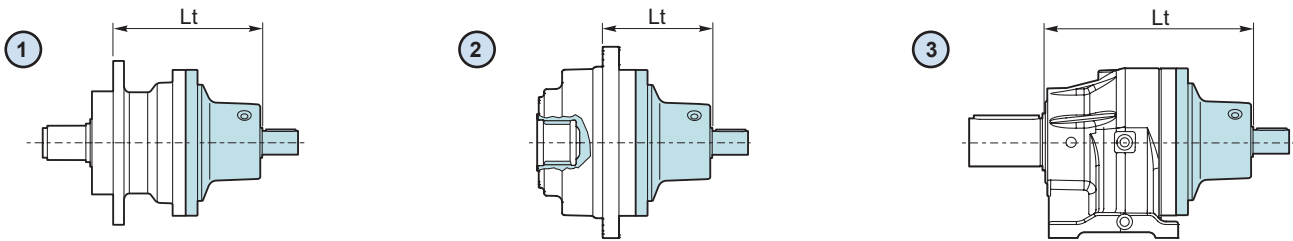
Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

ISL



ISL

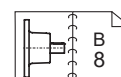


① = MP - MP1 - FS

② = FE - FCP

③ = MPP1

		øD	E	Lt [mm] 1					Lt [mm] 2		Lt [mm] 3
				MP	ML	MP1	ML1	FS	FE	FCP	MPP1
EL101	ISL10	28 k6	50	235	202	235	202	235	206	235	242
EL102	ISL10	28 k6	50	279	247	279	247	279	250	279	286
EL103	ISL10	28 k6	50	323	291	323	291	323	294	323	330
EL104	ISL10	28 k6	50	367	335	367	335	367	338	367	374

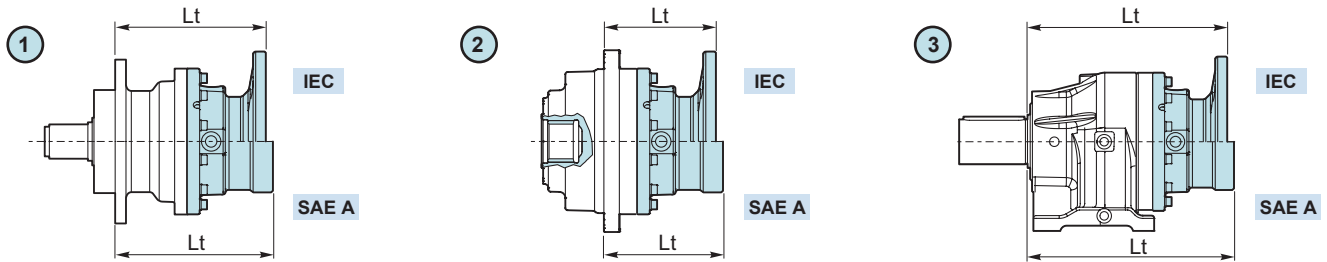


ADATTATORI IEC/SAE A

ADAPTERS IEC/SAE A

ADAPTER IEC/SAE A

EL



- ① = MP - MP1 - ML - ML1 - FS
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]			
		IEC			SAE A
		80-90	100-112	132	
EL101	MP - MP1	193	201	237	223
	ML - ML1	161	169	205	191
	FE	164	172	208	194
	FS - FCP	193	201	237	223
	MPP1	200	208	244	230
EL102	MP - MP1	237	245	281	267
	ML - ML1	205	213	249	235
	FE	208	216	252	238
	FS - FCP	237	245	281	267
	MPP1	244	252	288	274
EL103	MP - MP1	281	289	325	311
	ML - ML1	249	257	293	279
	FE	252	260	296	282
	FS - FCP	281	289	325	311
	MPP1	288	296	332	318
EL104	MP - MP1	-	-	-	355
	ML - ML1	-	-	-	323
	FE	-	-	-	326
	FS - FCP	-	-	-	355
	MPP1	-	-	-	362

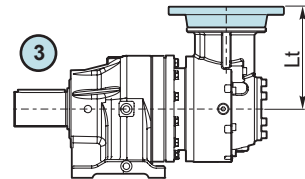
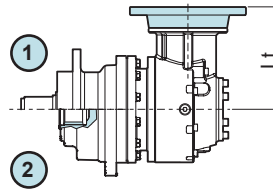
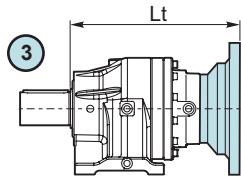
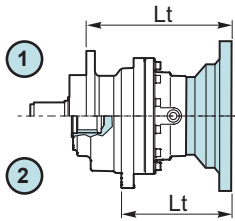
FLANGE MOTORI IEC/NEMA

MOTOR FLANGES IEC/NEMA

MOTORFLANSCHEN IEC/NEMA

EL

EC



- ① = MP - MP1 - ML - ML1 - FS
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]										
		IEC						NEMA				
		63	71	80-90	100-112	132	160-180	143/145 TD	182/184 TC	182/184 TD	210 TD	213/215 TC
EL101	MP - MP1	201	203	-	-	-	307	211	211	211	211	227
	ML - ML1	169	171	-	-	-	275	179	179	179	179	195
	FE	172	174	-	-	-	278	182	182	182	182	198
	FS - FCP	201	203	-	-	-	307	211	211	211	211	227
	MPP1	208	210	-	-	-	314	218	218	218	218	234
EL102	MP - MP1	245	247	-	-	-	351	255	255	255	255	271
	ML - ML1	213	215	-	-	-	319	223	223	223	223	239
	FE	216	218	-	-	-	322	226	226	226	226	242
	FS - FCP	245	247	-	-	-	351	255	255	255	255	271
	MPP1	252	254	-	-	-	358	262	262	262	262	278
EL103	MP - MP1	289	291	-	-	-	395	299	299	299	299	315
	ML - ML1	257	259	-	-	-	363	267	267	267	267	283
	FE	260	262	-	-	-	366	270	270	270	270	286
	FS - FCP	289	291	-	-	-	395	299	299	299	299	315
	MPP1	296	298	-	-	-	402	306	306	306	306	322
EL104	MP - MP1	333	335	340	341	408	439	343	343	343	343	359
	ML - ML1	301	303	308	309	376	407	311	311	311	311	327
	FE	304	306	311	312	379	410	314	314	314	314	330
	FS - FCP	333	335	340	341	408	439	343	343	343	343	359
	MPP1	340	342	347	348	415	446	350	350	350	350	366
EC102	MP - MP1	155	155	155	155	242	-	-	-	-	-	-
EC103	ML - ML1	123	123	123	123	210	-	-	-	-	-	-
EC104	FE	155	155	155	155	242	-	-	-	-	-	-
	FS - FCP	155	155	155	155	242	-	-	-	-	-	-
	MPP1	155	155	155	155	242	-	-	-	-	-	-



A richiesta altre configurazioni disponibili. Contattare il referente DANA di zona.

More configurations are available on request. Consult the DANA area contact person.

Auf Wunsch sind weitere Konfigurationen verfügbar. Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.



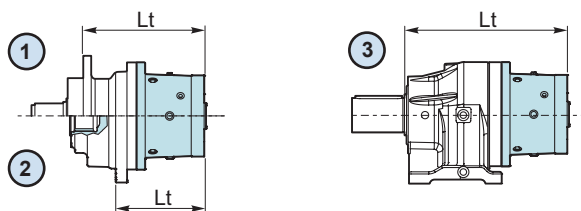
FRENI

BRAKES

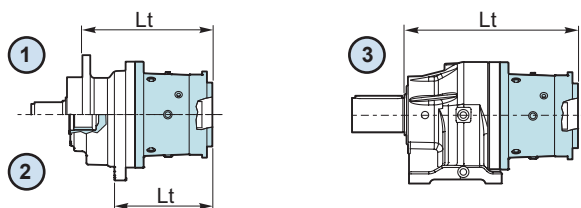
BREMSEN

EL

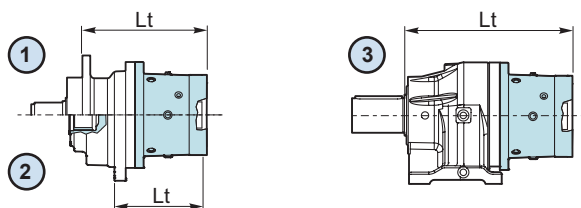
MB3 - E00



MB3 - SAE A



MB3 - BRZV



① = MP - MP1 - ML - ML1 - FS

② = FE - FCP

③ = MPP1

		Lt [mm]							
		ML	ML1	MP	MP1	FE	FS	FCP	MPP1
MB3 E00	EL101	210	210	242	242	213	242	242	249
	EL102	254	254	286	286	257	286	286	293
	EL103	298	298	330	330	301	330	330	337
	EL104	342	342	374	374	345	374	374	381
MB3 SAE - A	EL101	239	239	271	271	242	271	271	278
	EL102	283	283	315	315	286	315	315	322
	EL103	327	327	359	359	330	359	359	366
	EL104	371	371	403	403	374	403	403	410
MB3 BRZV	EL101	207.5	207.5	239.5	239.5	210.5	239.5	239.5	246.5
	EL102	251.5	251.5	283.5	283.5	254.5	283.5	283.5	290.5
	EL103	295.5	295.5	327.5	327.5	298.5	327.5	327.5	334.5
	EL104	339.5	339.5	371.5	371.5	342.5	371.5	371.5	378.5

CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

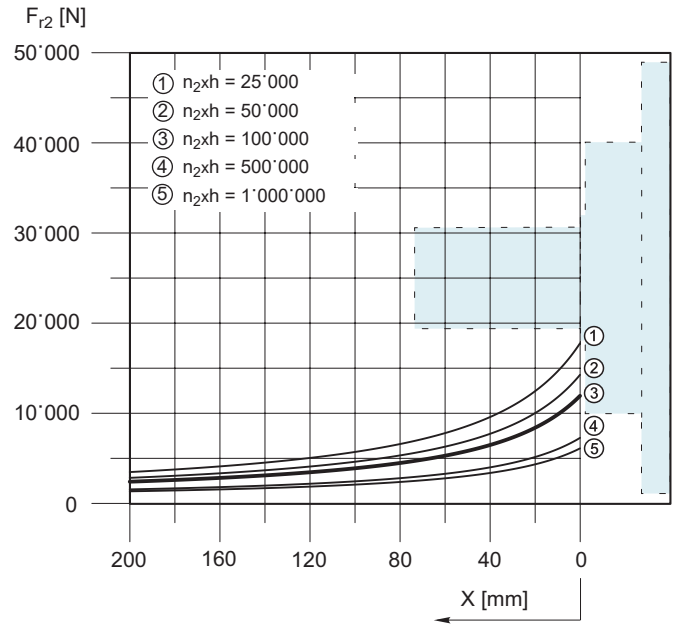
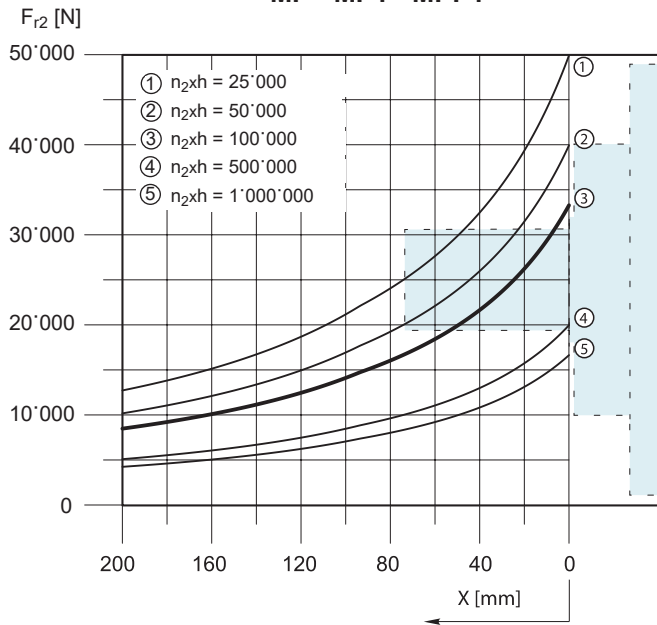
Alberi in uscita

Output shaft

Ausgangswellen

MP - MP1 - MPP1

ML - ML1



CARICHI ASSIALI

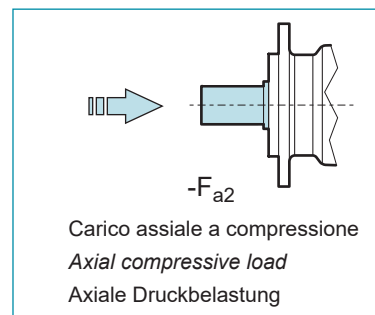
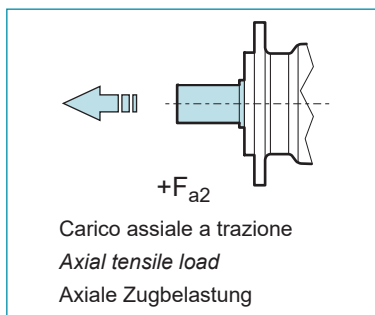
AXIAL LOADS

AXIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



E10 MP - MP1 - MPP1		
n_2xh	$-F_{a2}$ [N]	$+F_{a2}$ [N]
10'000	56'000	44'000
25'000	42'560	33'440
50'000	34'440	27'060
100'000	28'000	22'000
500'000	17'360	13'640
1'000'000	14'000	11'000

E10 ML - ML1		
n_2xh	$-F_{a2}$ [N]	$+F_{a2}$ [N]
10'000	40'000	40'000
25'000	29'000	29'000
50'000	23'000	23'000
100'000	18'000	18'000
500'000	10'900	10'900
1'000'000	8'700	8'700

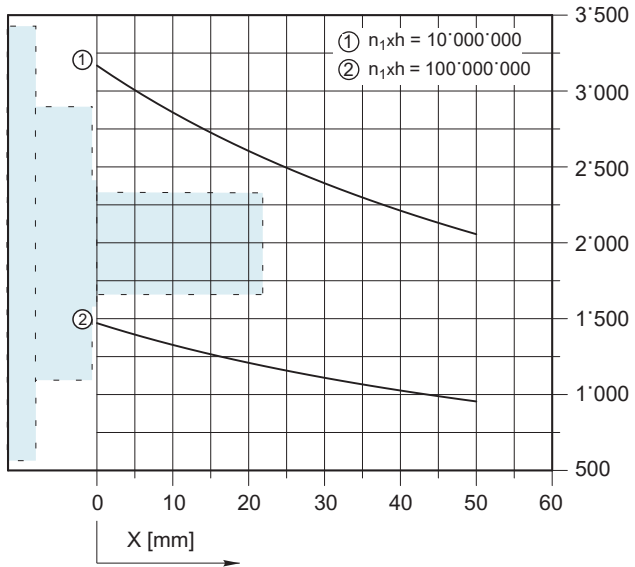
Alberi in ingresso

Input shaft

Eingangswellen

ISL10




































F_{r1} [N]

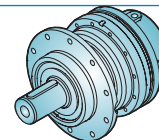


GRANDEZZA E16

E16 SIZE

E16 GRÖÖE

	Disponibilità Availability Verfügbarkeit	Albero - Shaft - Getriebewelle			Pagina Page Seite				
		Tipologia Type Typ	Dimensioni Dimensions Abmessungen [mm]						
USCITE OUTPUTS AUSGÄNGE	MP 		MP B48x44 DIN 5482	MP 010 B40x36 DIN 5482	MP 020 B58x53 DIN 5482				
	MP1 		MP1 ø50	MP1 010 ø42	MP1 020 ø65				
	FE 		A58x53 DIN 5482						
	FS 		ø52						
	FCP 		ø50						
	MPP1 		ø50						
ENTRATE INPUTS EINNAHMEN	ISL 		ISL ISL10 ø28 ISL16 ø28						
	E00 		A50x45 DIN 5482						
FLANGE D'INGRESSO INPUT FLANGE FLANSCH EINGANG	Disponibilità Availability Verfügbarkeit						Pagina Page Seite		
	AD 								
MA 									
FRENI BRAKES BREMSEN	Disponibilità Availability Verfügbarkeit	T_B [Nm]					Pagina Page Seite		
	 	MB3	33 ÷ 495						



i	T ₂ [Nm]						n ₁ MAX [rpm]	T ₂ MAX [Nm]	P _t [kW]
	n ₂ X h 10'000	n ₂ X h 25'000	n ₂ X h 50'000	n ₂ X h 100'000	n ₂ X h 500'000	n ₂ X h 1'000'000			

EL161

3.52	2'365	2'210	1'925	1'665	1'290	1'045	4'000	2'600	7
4.07	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	7
4.95	2'075	1'895	1'700	1'540	1'340	1'135	4'000	*3'400	7
6.19	1'690	1'405	1'215	1'130	975	915	4'000	*3'000	7
7.39	1'195	975	845	790	670	620	4'000	2'400	7

EL162

12.4	2'365	2'210	1'925	1'665	1'290	1'045	4'000	2'600	6
14.3	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	6
16.6	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	6
20.2	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	6
24.0	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	6
28.2	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	6
36.4	1'690	1'405	1'215	1'130	975	915	4'000	*3'000	6
42.9	1'690	1'405	1'215	1'130	975	915	4'000	*3'000	6
50.6	1'355	1'285	1'230	1'180	1'070	1'025	4'000	*3'400	6
63.2	1'670	1'405	1'215	1'130	975	915	4'000	*3'000	6

EL163

50.3	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
58.3	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
70.9	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
84.2	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
99.2	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
119	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
126	2'365	2'210	1'925	1'665	1'290	1'045	4'000	2'600	5
140	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
146	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
170	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
196	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
206	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
245	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
289	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	5
351	2'075	1'895	1'700	1'540	1'340	1'135	4'000	*3'400	5
372	1'690	1'405	1'215	1'130	975	915	4'000	*3'000	5
438	1'690	1'405	1'215	1'130	975	915	4'000	*3'000	5

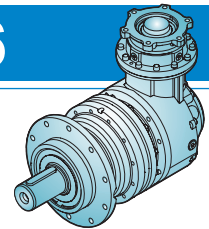
EL164

417	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
469	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
491	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
570	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
688	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
797	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
861	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
969	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
1014	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
1176	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
1212	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
1356	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
1496	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
1697	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
2000	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
2107	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
2502	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
2949	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4

*Per versione con uscita FS considerare / For FS output version consider / Für die Ausgabe Version FS betrachten T₂MAX = 2'850 Nm

*Per versione con uscita MP 010 considerare / For MP 010 output version consider / Für die Ausgabe Version MP 010 betrachten T₂MAX = 2'600 Nm

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich

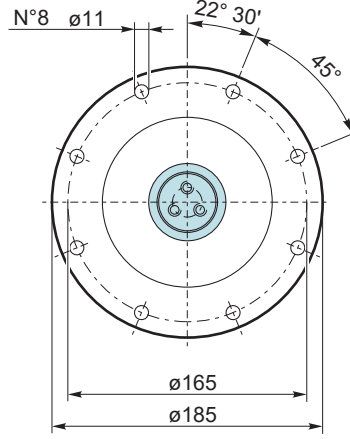
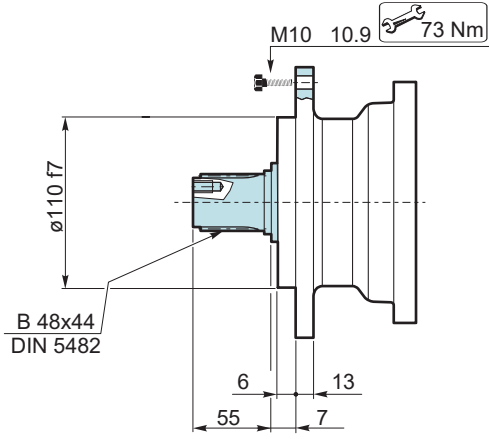
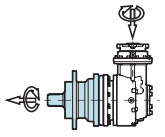
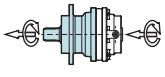


i	T ₂ [Nm]						n ₁ MAX [rpm]	T ₂ MAX [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EC162									
10.5	2'090	1'775	1'410	1'120	655	520	4'000	2'200	6
12.2	2'220	1'955	1'555	1'235	720	575	4'000	2'200	6
14.9	2'075	1'895	1'700	1'405	820	655	4'000	*3'400	6
18.6	1'690	1'405	1'215	1'130	955	755	4'000	*3'000	6
19.9	1'625	1'415	1'285	1'020	600	475	4'000	*3'400	6
24.2	1'915	1'670	1'465	1'160	680	540	4'000	*3'400	6
30.3	1'690	1'405	1'215	1'130	790	625	4'000	*3'000	6
36.1	1'195	975	845	790	670	620	4'000	2'400	6
EC163									
37.1	2'365	2'210	1'925	1'665	1'290	1'045	4'000	*3'400	4
43.0	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
49.8	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
60.5	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
70.0	2'220	2'050	2'015	1'910	1'380	1'095	4'000	*3'400	4
81.1	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
84.7	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
98.6	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
117	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
138	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	4
142	2'075	1'895	1'700	1'540	1'340	1'135	4'000	*3'400	4
150	1'690	1'405	1'215	1'130	975	915	4'000	*3'000	4
178	1'690	1'405	1'215	1'130	975	915	4'000	*3'000	4
EC164									
130	2'365	2'210	1'925	1'665	1'290	1'045	4'000	*3'400	3
151	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
175	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
203	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
213	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
246	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
257	2'365	2'210	1'925	1'665	1'290	1'045	4'000	*3'400	3
285	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
307	2'365	2'210	1'925	1'665	1'290	1'045	4'000	*3'400	3
331	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
345	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
379	2'365	2'210	1'925	1'665	1'290	1'045	4'000	*3'400	3
402	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
419	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
439	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
477	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
509	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
580	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
619	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
716	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
829	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
866	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
1008	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3
1197	2'220	2'050	2'015	1'910	1'430	1'160	4'000	*3'400	3

*Per versione con uscita FS considerare / For FS output version consider / Für die Ausgabe Version FS betrachten T₂MAX = 2'850 Nm

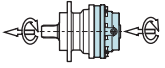
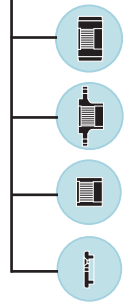
*Per versione con uscita MP 010 considerare / For MP 010 output version consider / Für die Ausgabe Version MP 010 betrachten T₂MAX = 2'600 Nm

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich

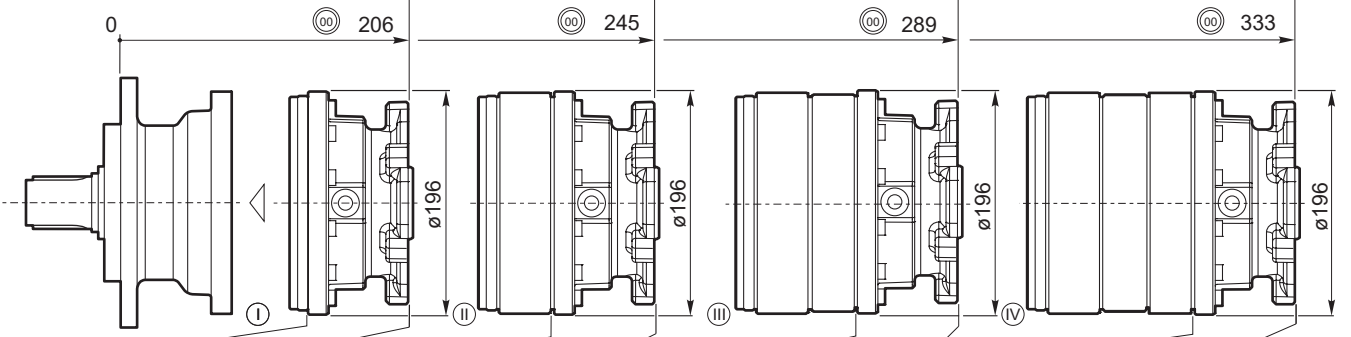


Accessori
Accessories
Zubehör

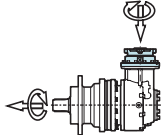
E16
14



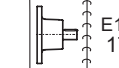
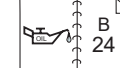
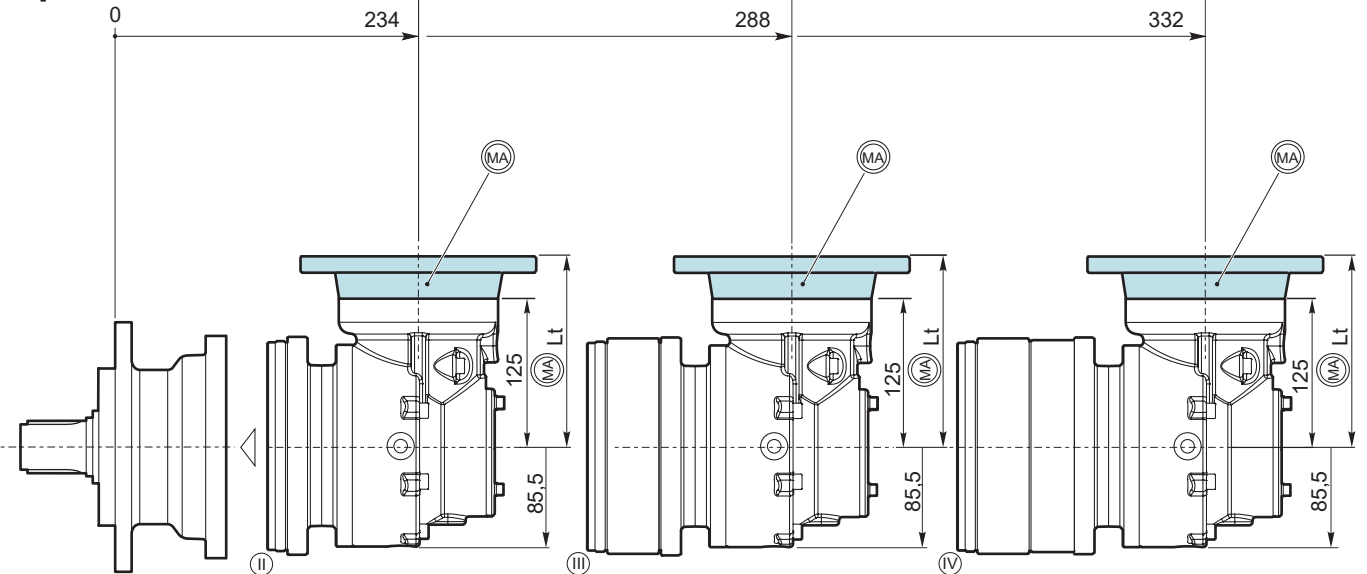
EL161/MP $\overset{\text{kg}}{\uparrow}$ 22 EL162/MP $\overset{\text{kg}}{\uparrow}$ 28 EL163/MP $\overset{\text{kg}}{\uparrow}$ 34 EL164/MP $\overset{\text{kg}}{\uparrow}$ 40

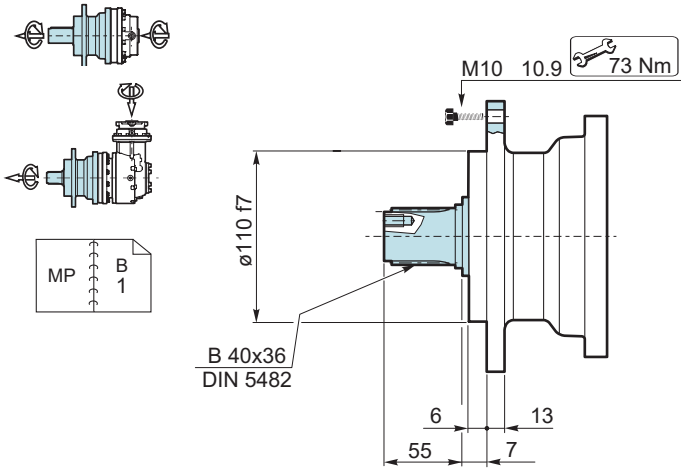


- ⊕ MB 3
- ⊕ E00
- ⊕ AD IEC
AD SAE
- ⊕ ISL16
- ⊕ MA
- ⊕ MB 3
- ⊕ E00
- ⊕ AD IEC
AD SAE
- ⊕ ISL10
- ⊕ MA
- ⊕ MB 3
- ⊕ E00
- ⊕ AD IEC
AD SAE
- ⊕ ISL10
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- ⊕ MB 3
- ⊕ E00
- ⊕ AD SAE
- ⊕ ISL10



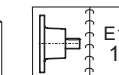
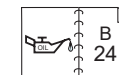
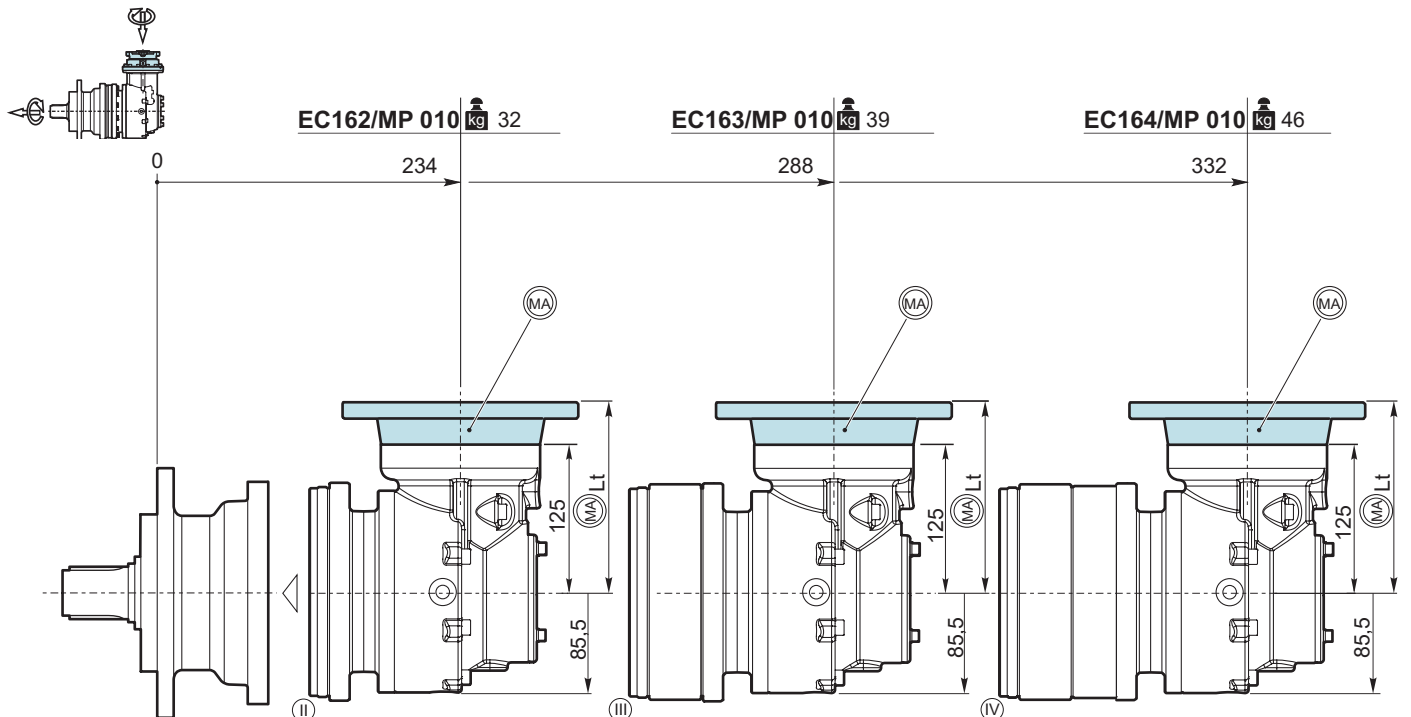
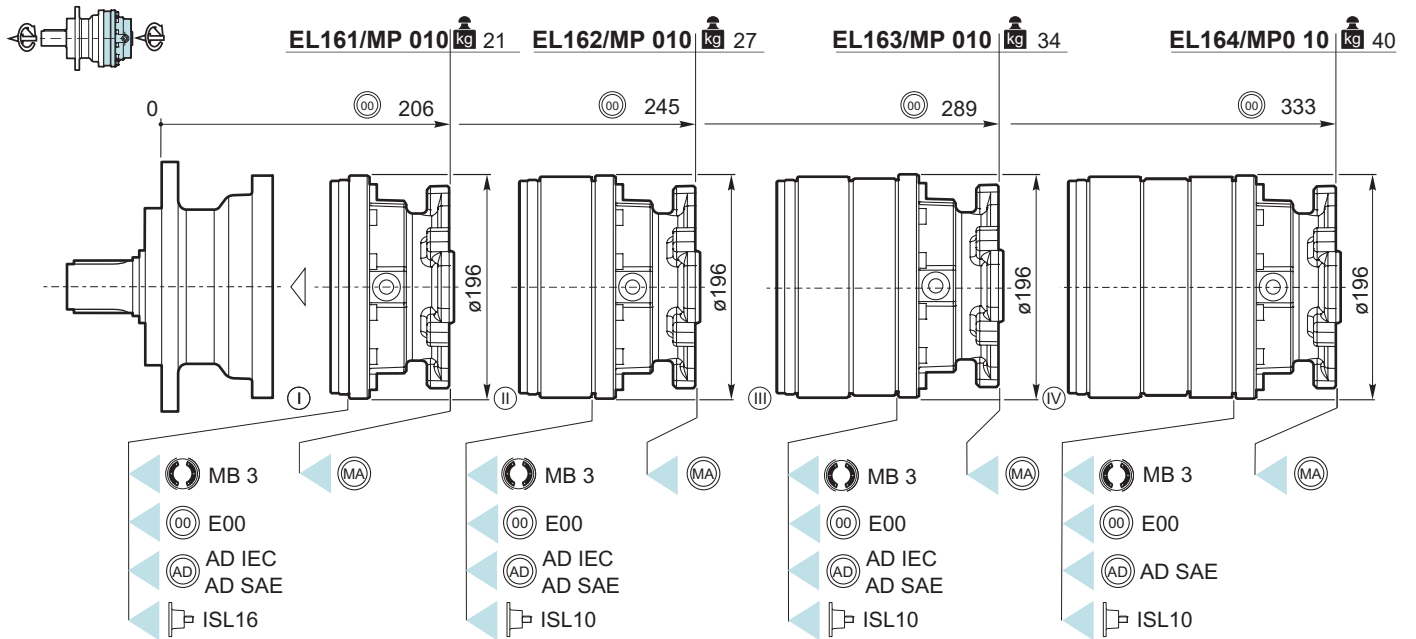
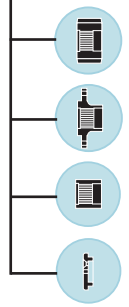
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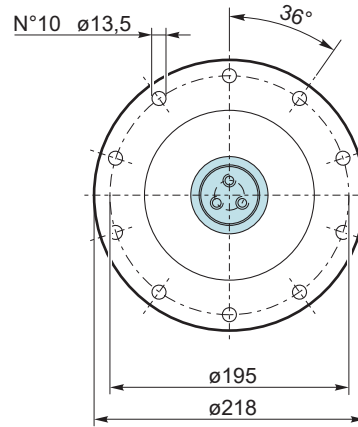
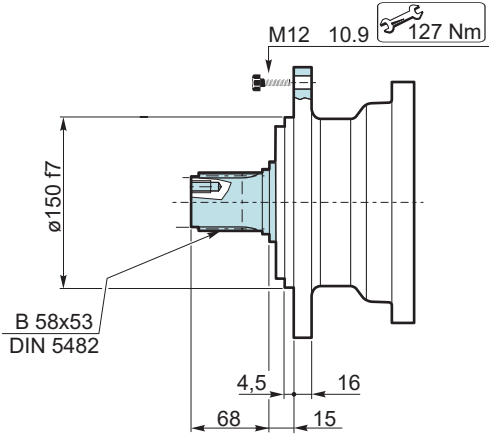
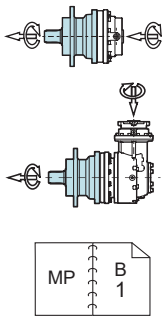




Accessori
Accessories
Zubehör

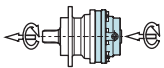
E16
15



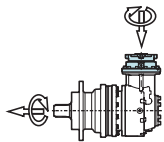
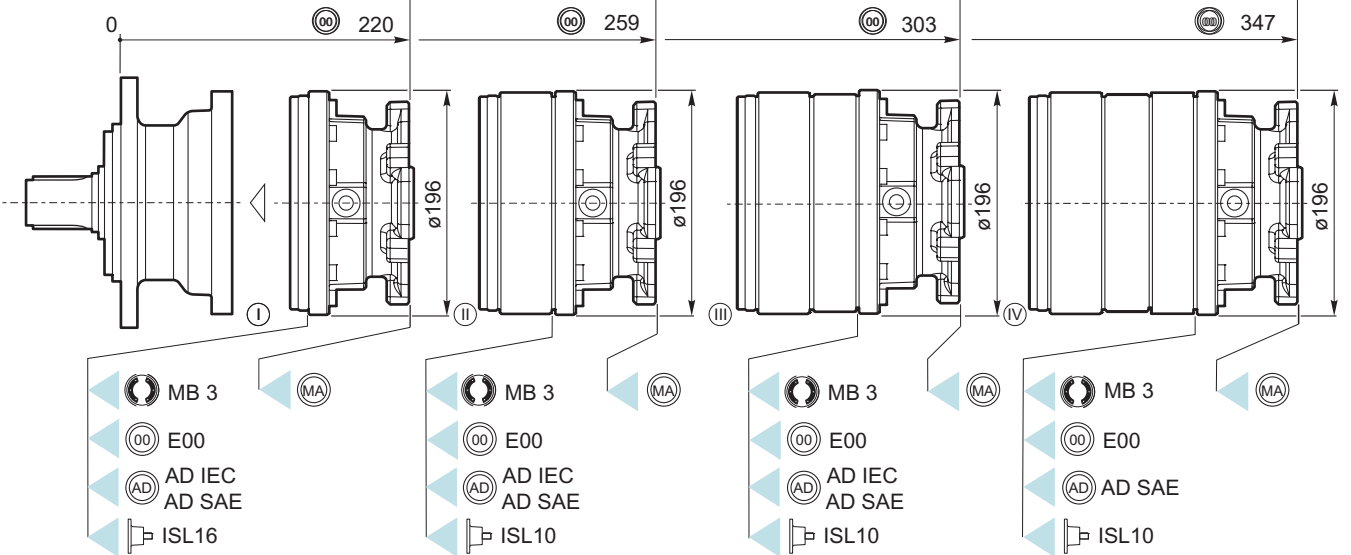


Accessori
Accessories
Zubehör

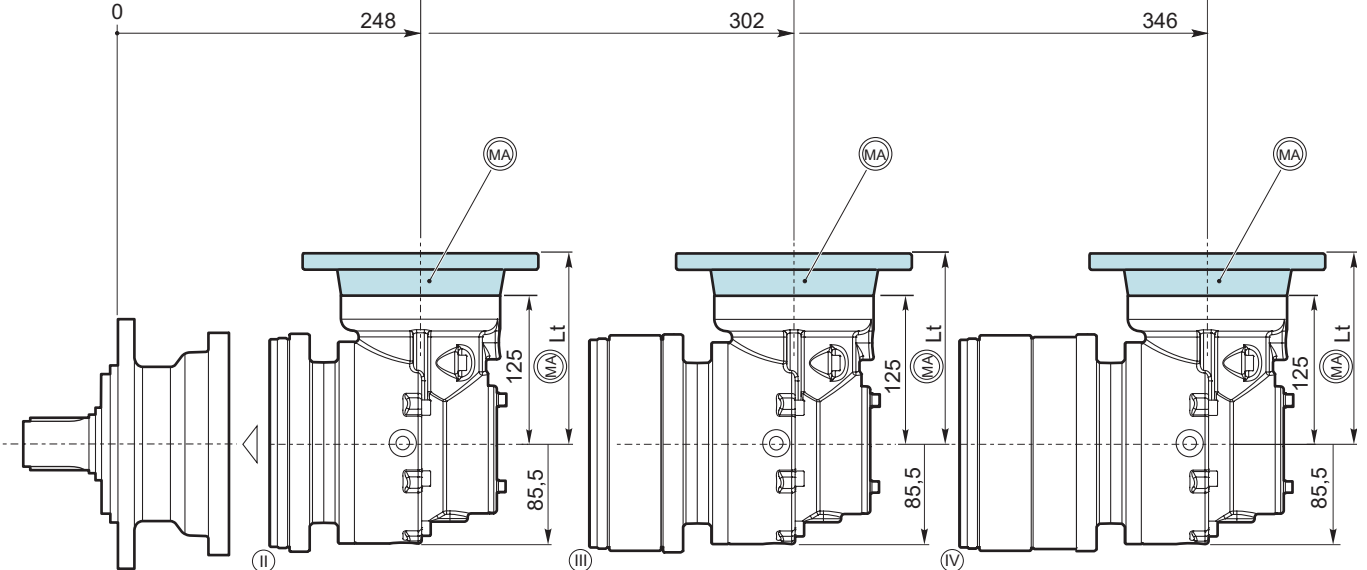
E16
16

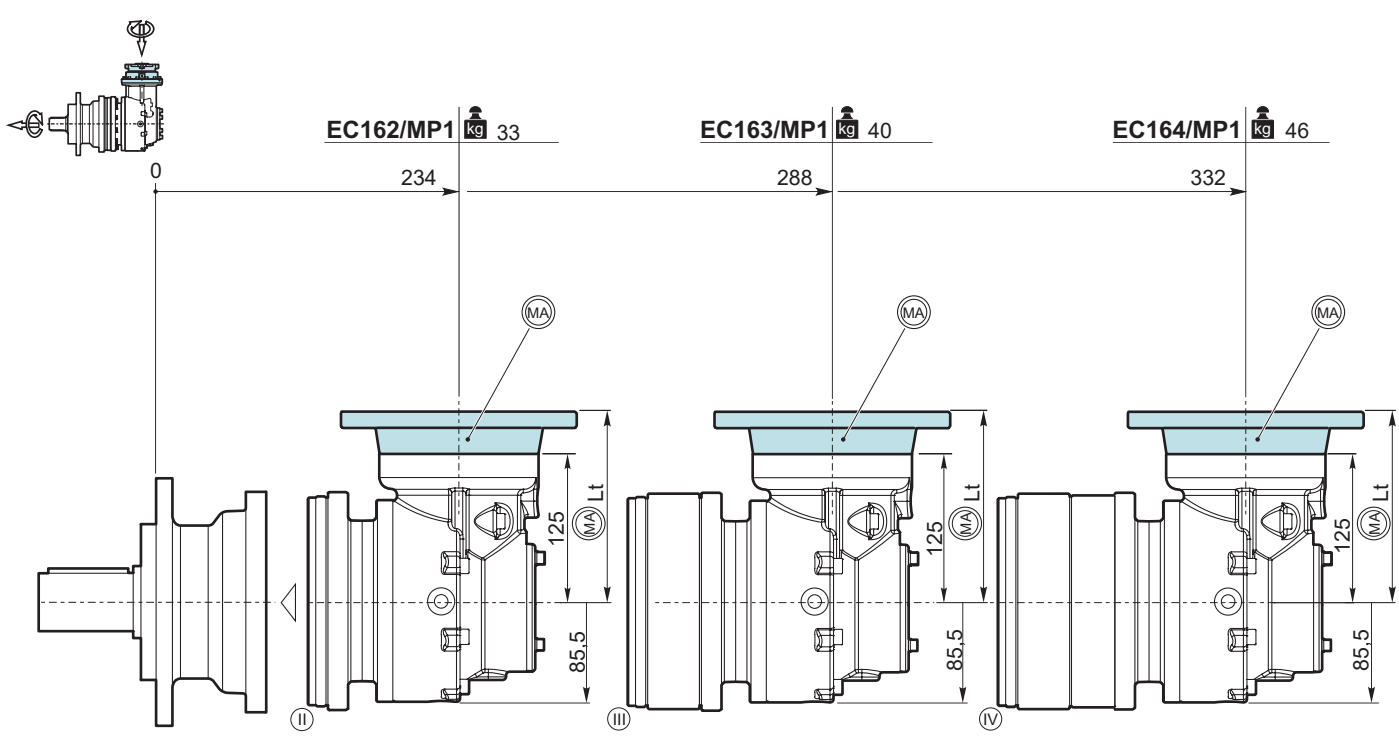
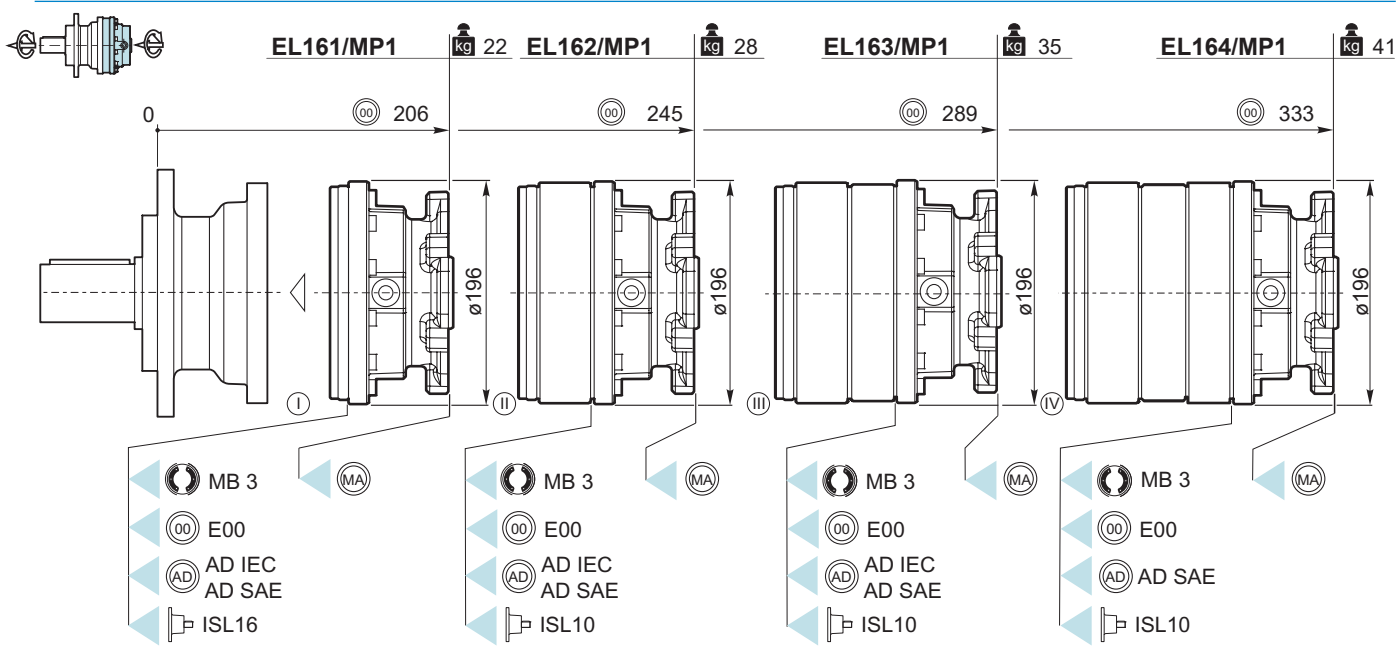
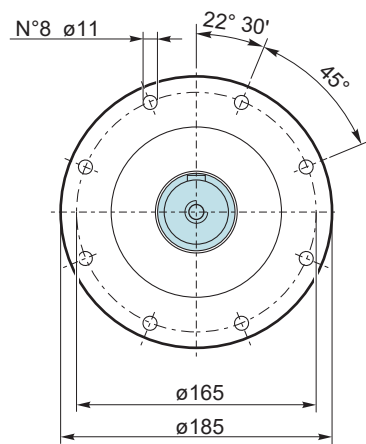
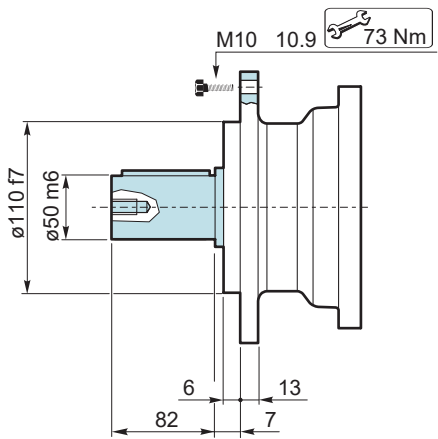
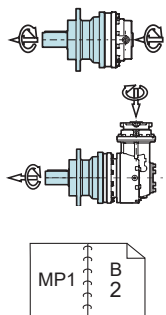


EL161/MP 020 26 **EL162/MP 020** 32 **EL163/MP 020** 39 **EL164/MP 020** 45



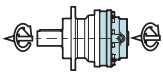
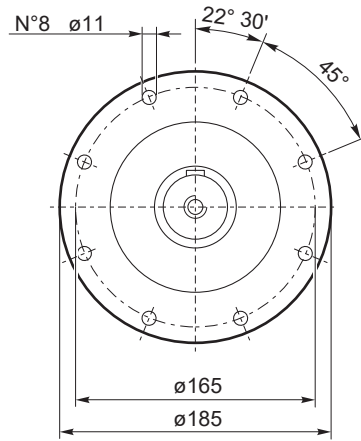
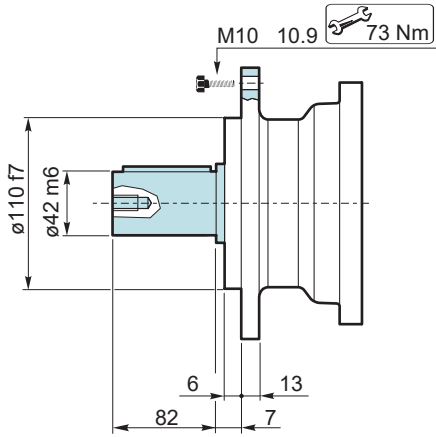
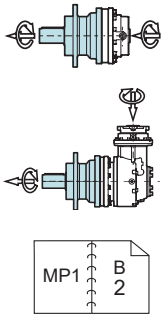
EC162/MP 020 37 **EC163/MP 020** 44 **EC164/MP 020** 51



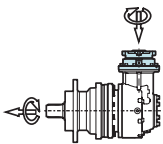
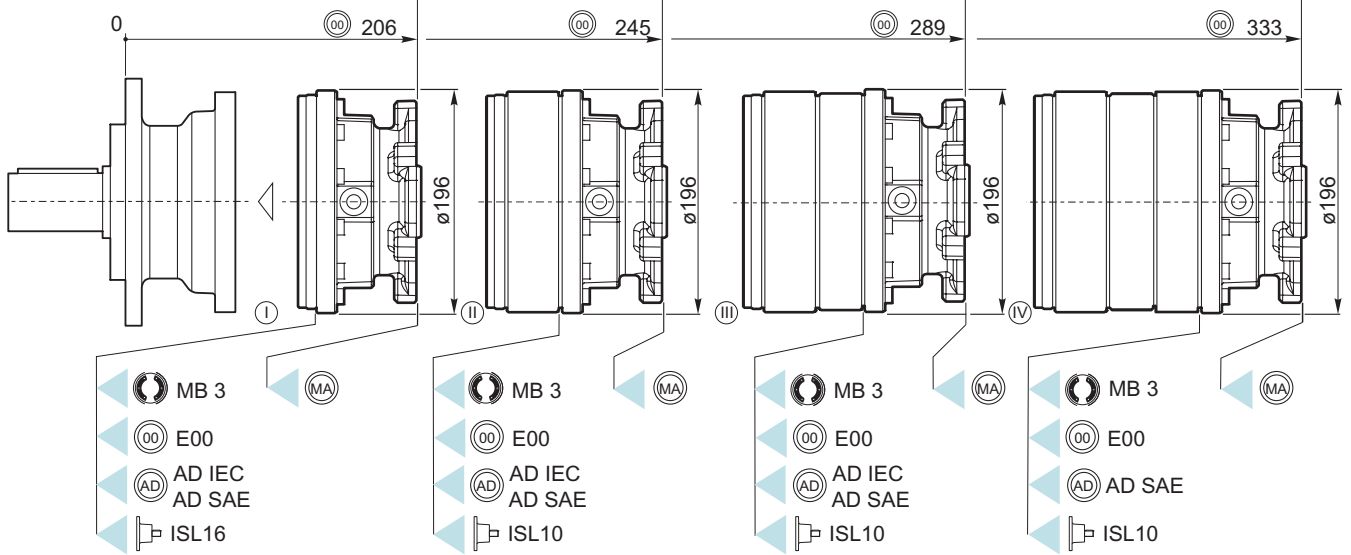


- B 11
- E16 20
- E16 19
- E16 18
- B 24
- E16 17

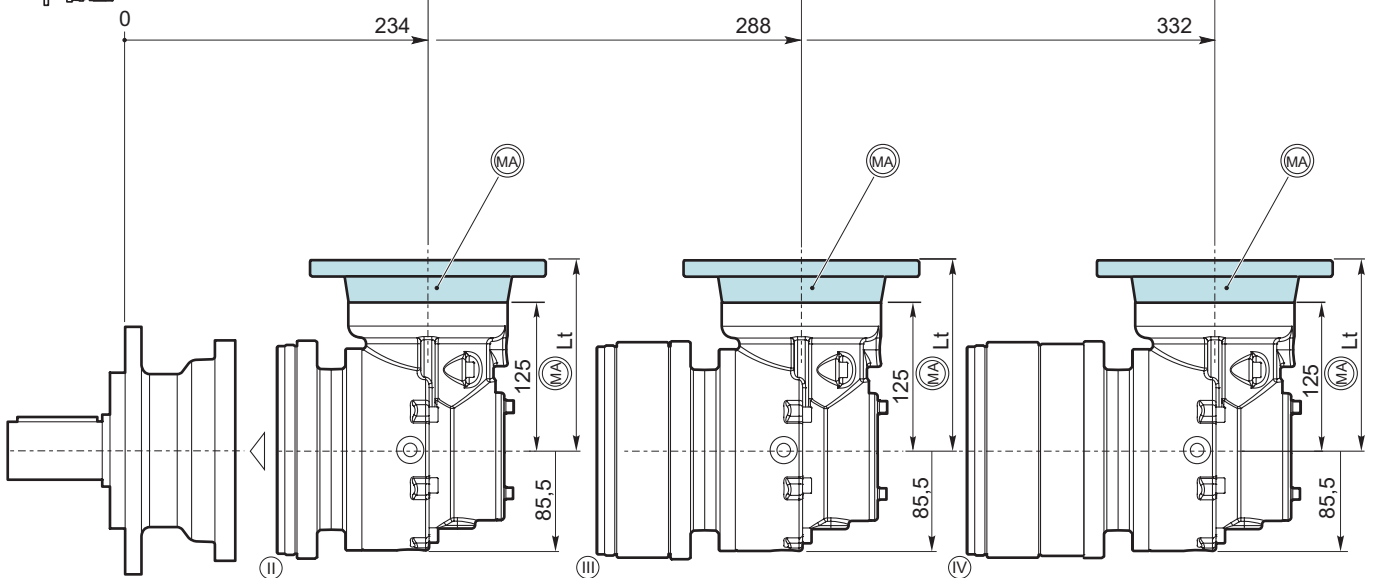


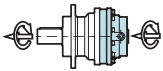
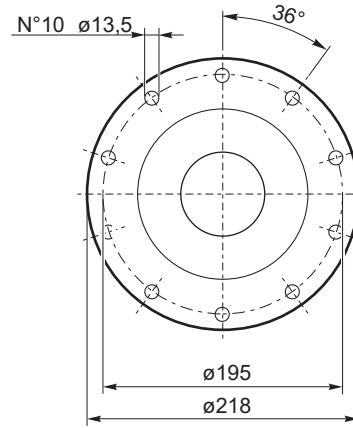
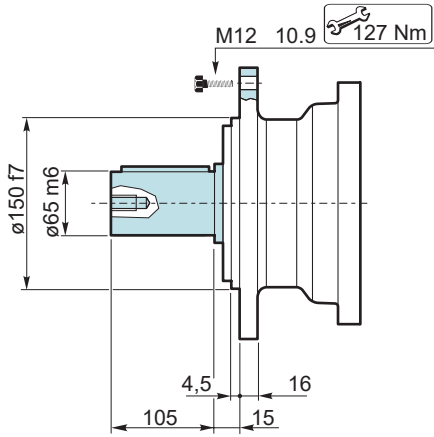
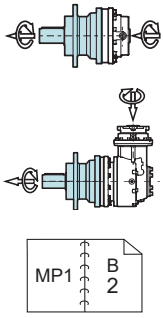


EL161/MP1 010 22 **EL162/MP1 010** 28 **EL163/MP1 010** 34 **EL164/MP1 010** 41

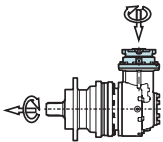
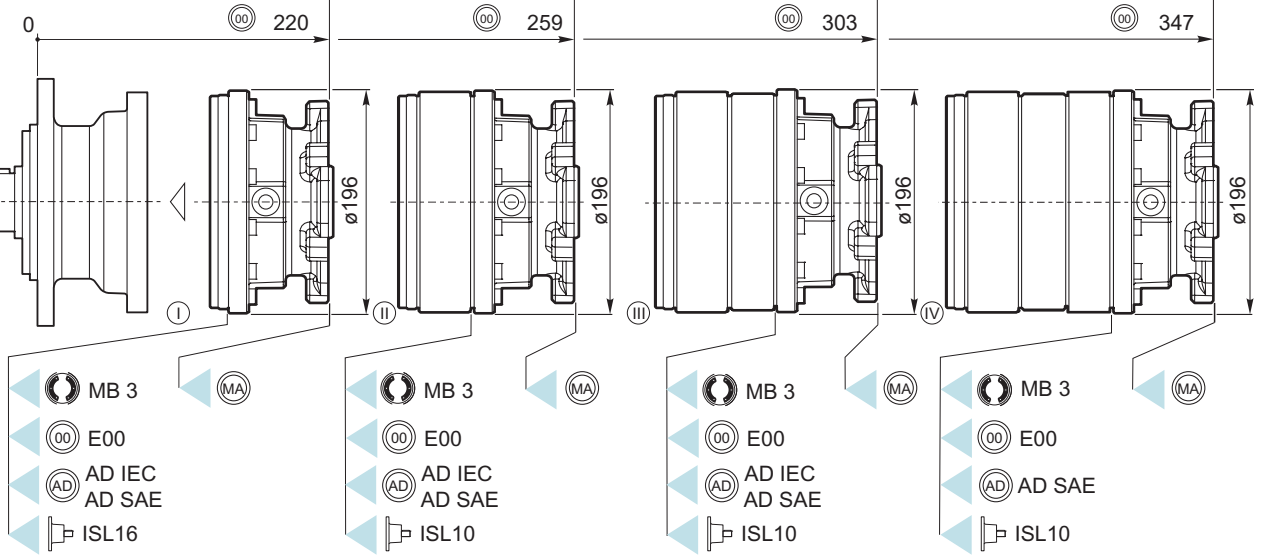


EC162/MP1 010 33 **EC163/MP1 010** 40 **EC164/MP1 010** 46

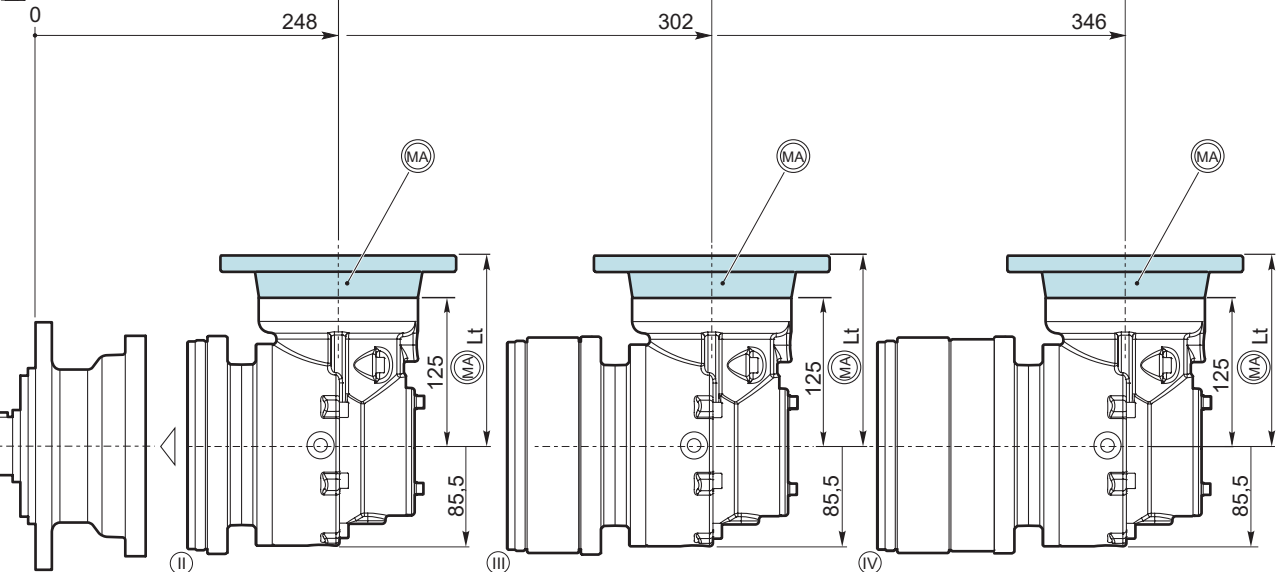


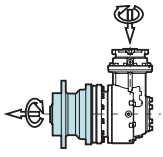
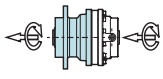


EL161/MP1 020 28 **EL162/MP1 020** 34 **EL163/MP1 020** 40 **EL164/MP1 020** 46

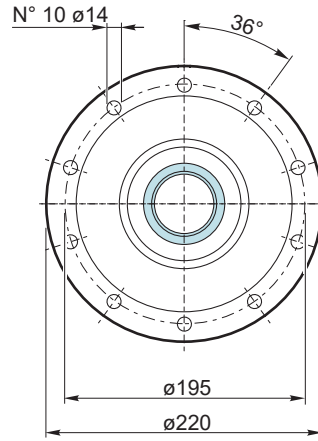
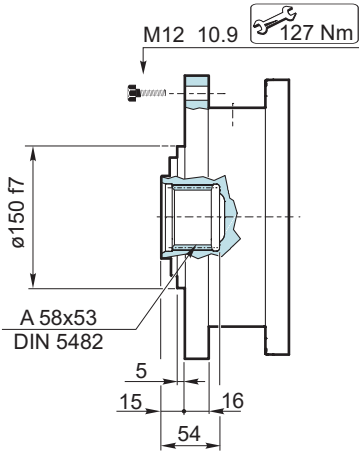


EC162/MP1 020 38 **EC163/MP1 020** 45 **EC164/MP1 020** 52





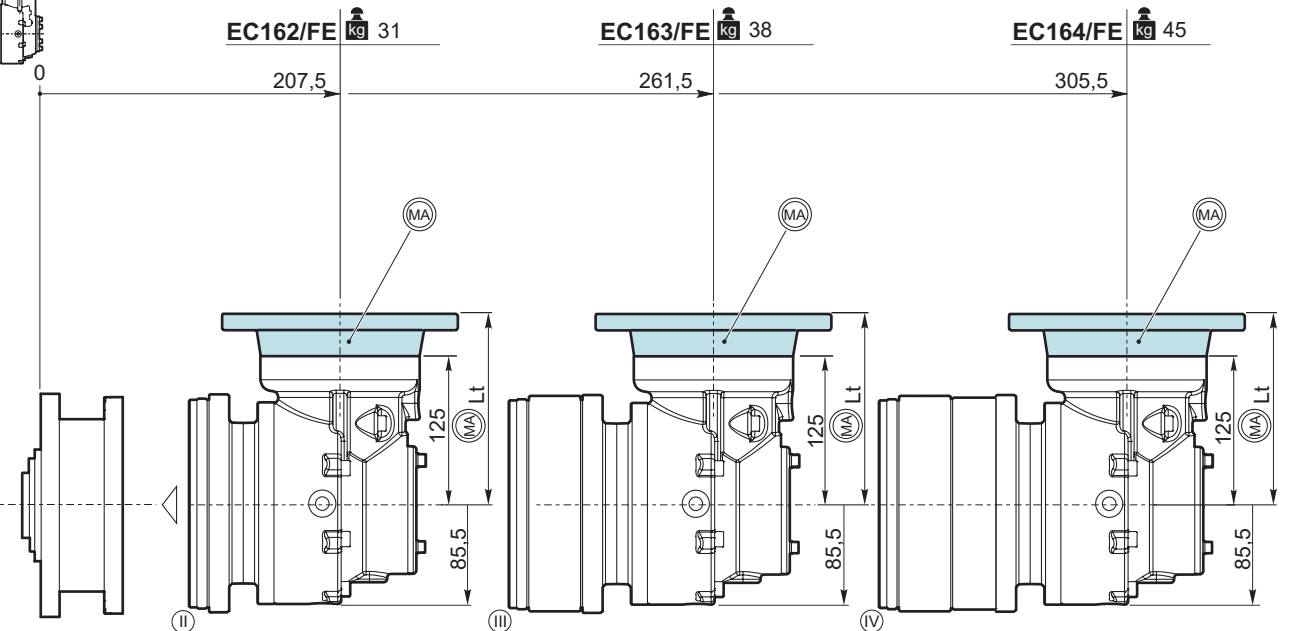
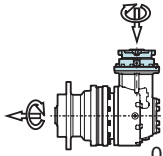
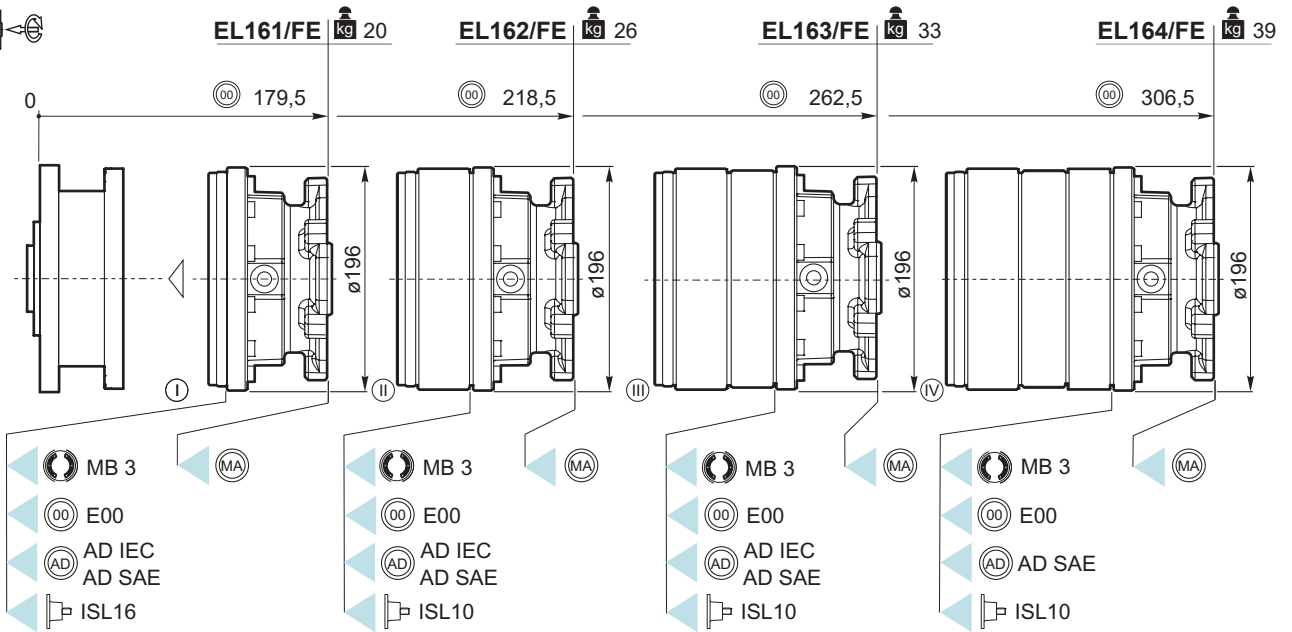
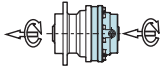
FE B 3

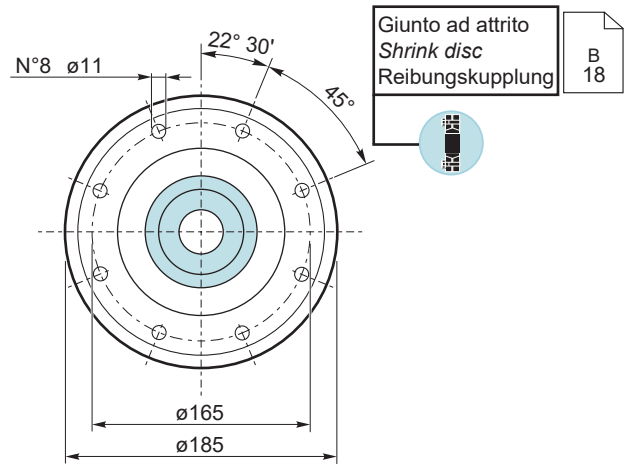
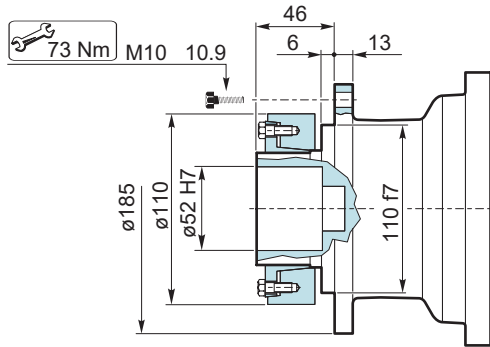
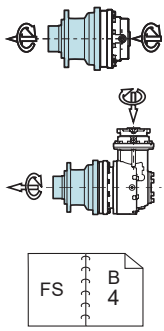


Accessori
Accessories
Zubehör



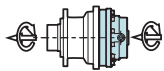
E16
14





Giunto ad attrito
Shrink disc
Reibungskupplung

B 18

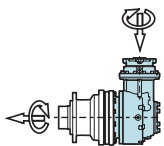
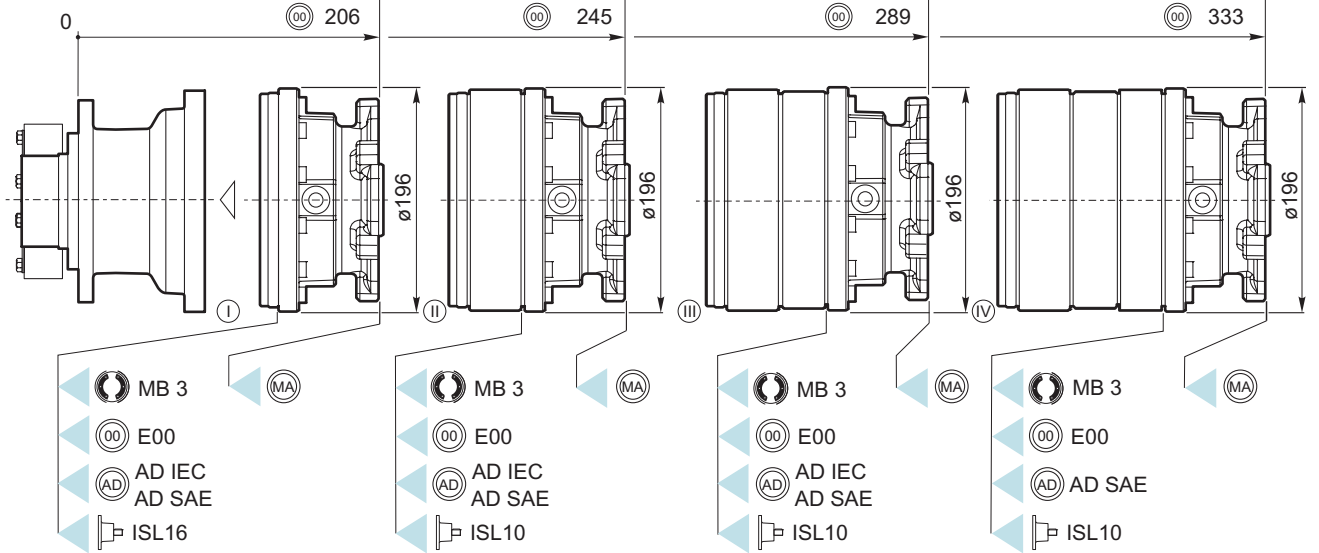


EL161/FS $\frac{kg}{21}$

EL162/FS $\frac{kg}{27}$

EL163/FS $\frac{kg}{34}$

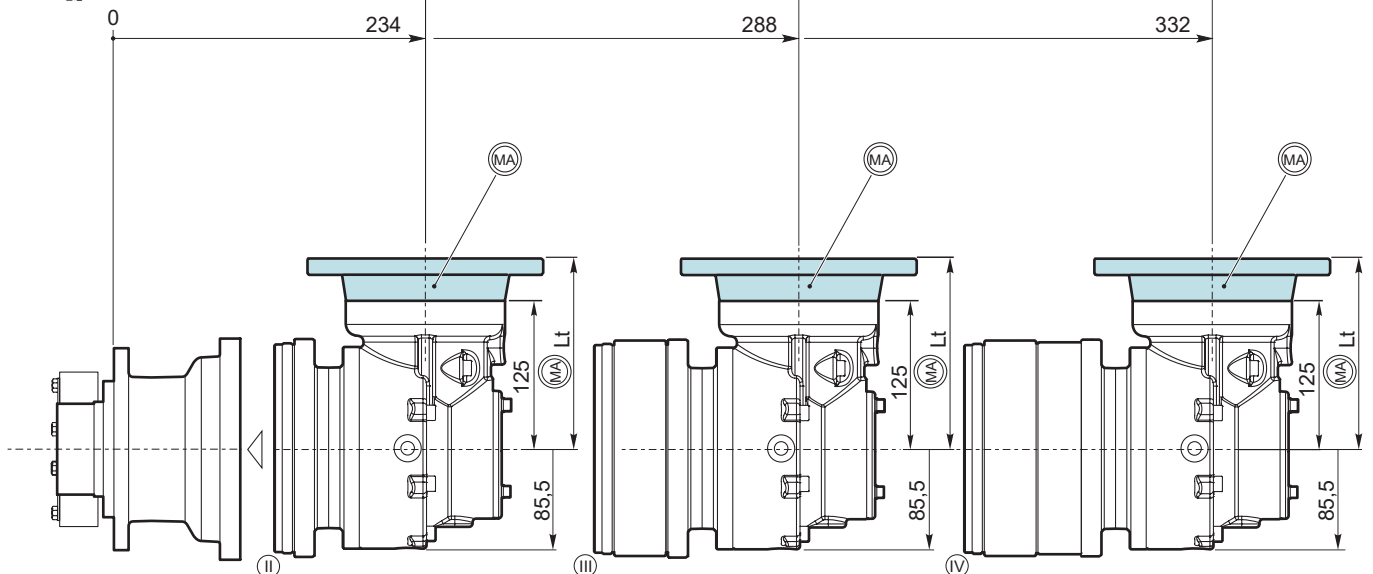
EL164/FS $\frac{kg}{40}$



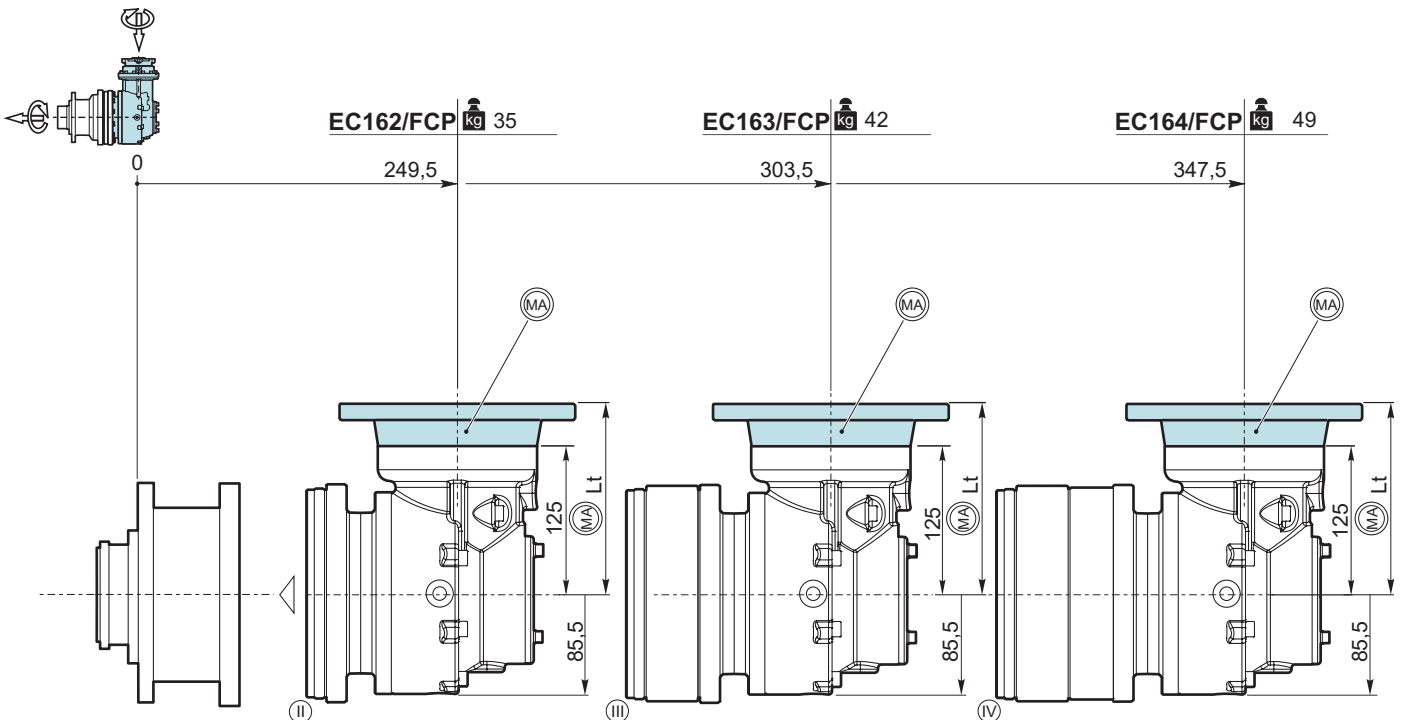
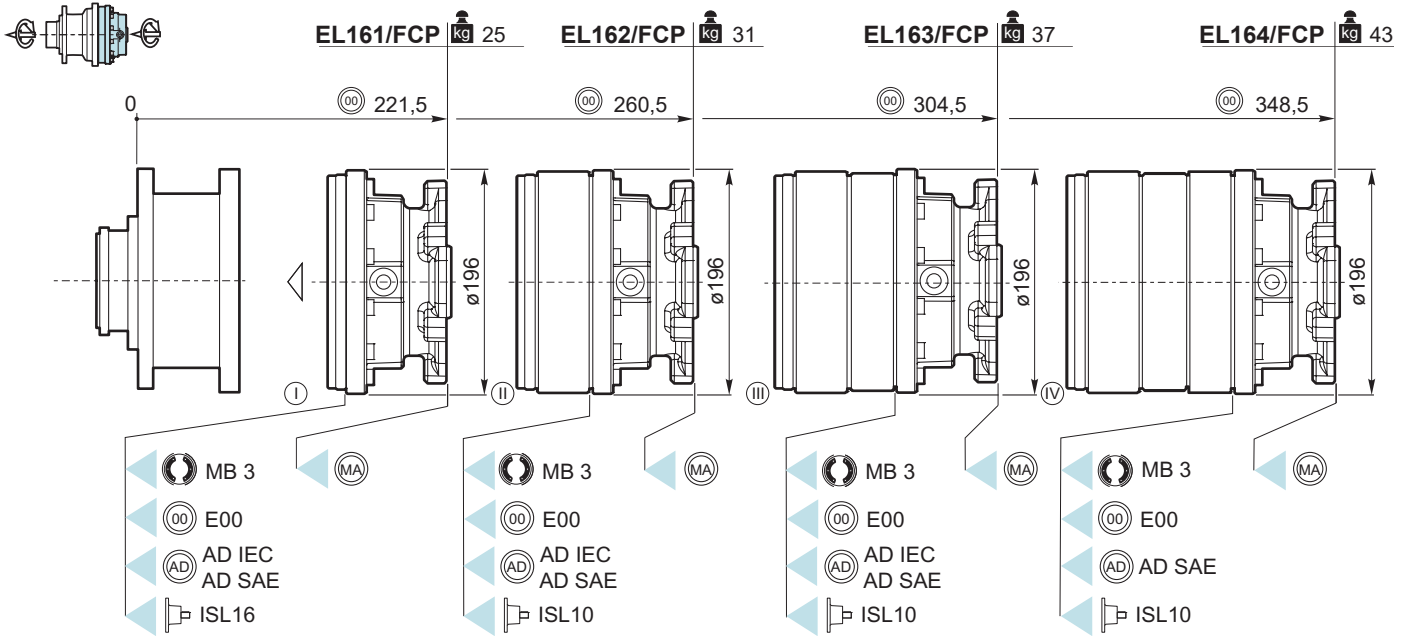
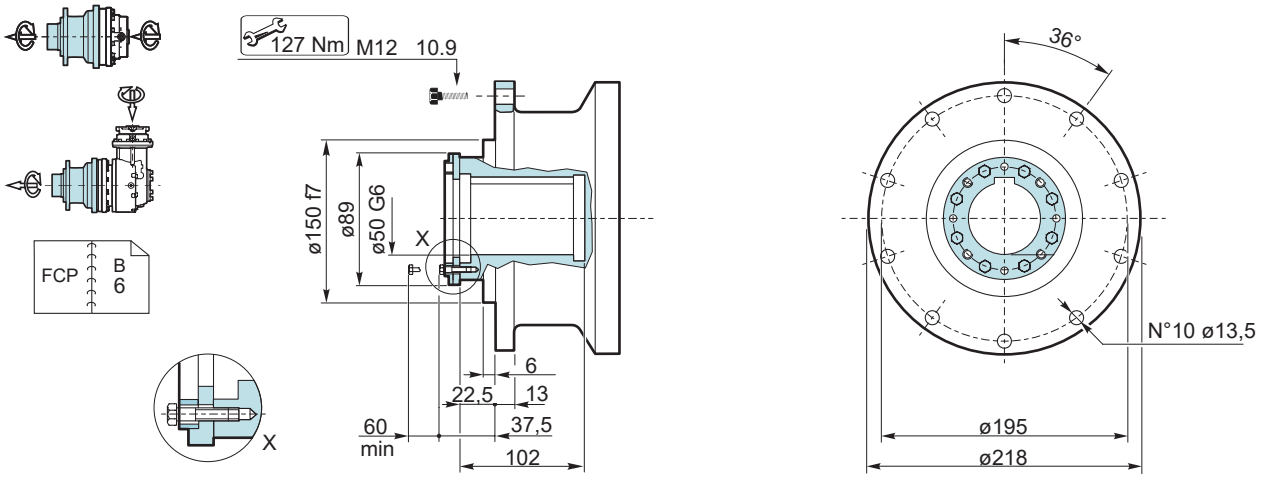
EC162/FS $\frac{kg}{32}$

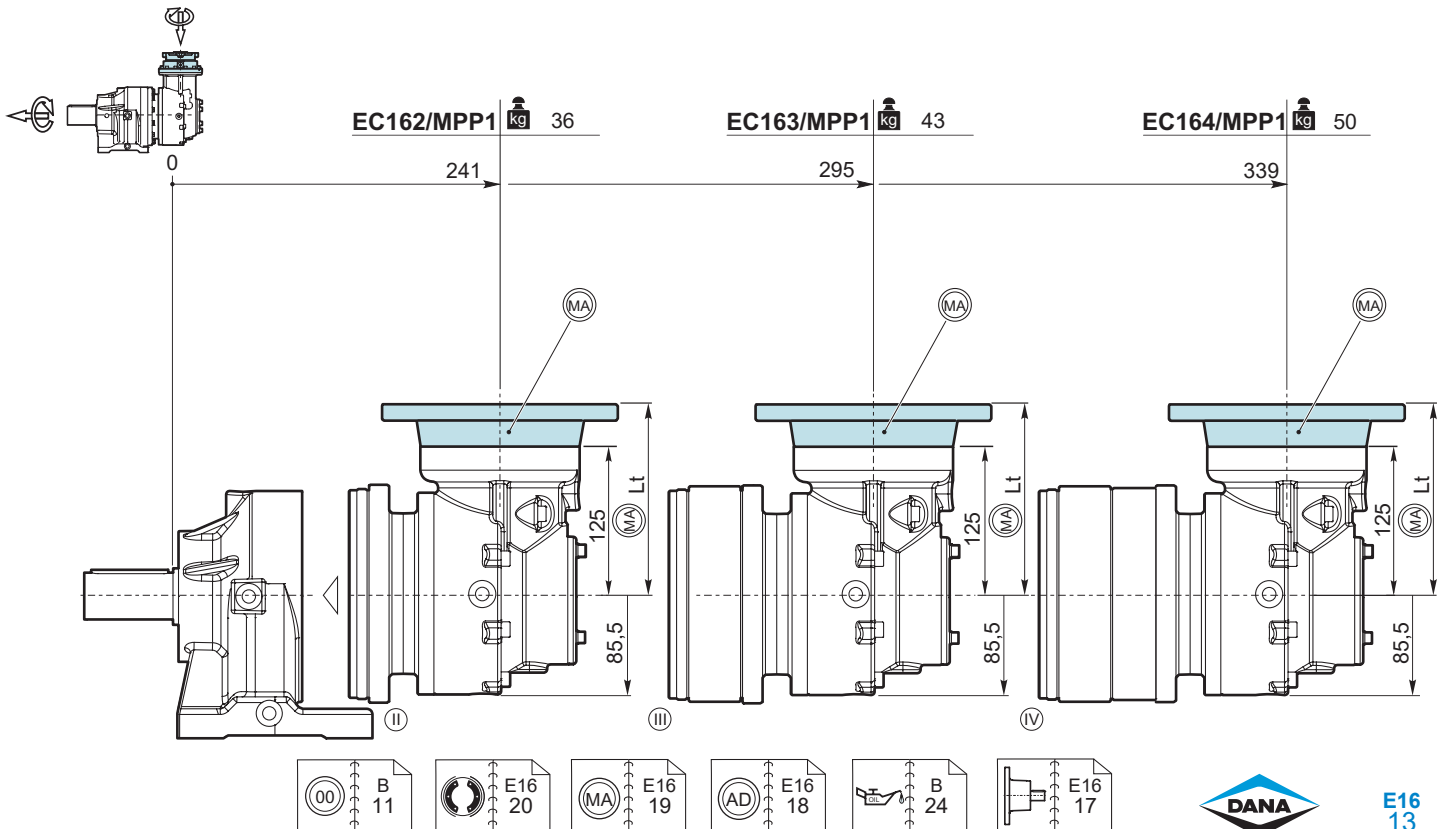
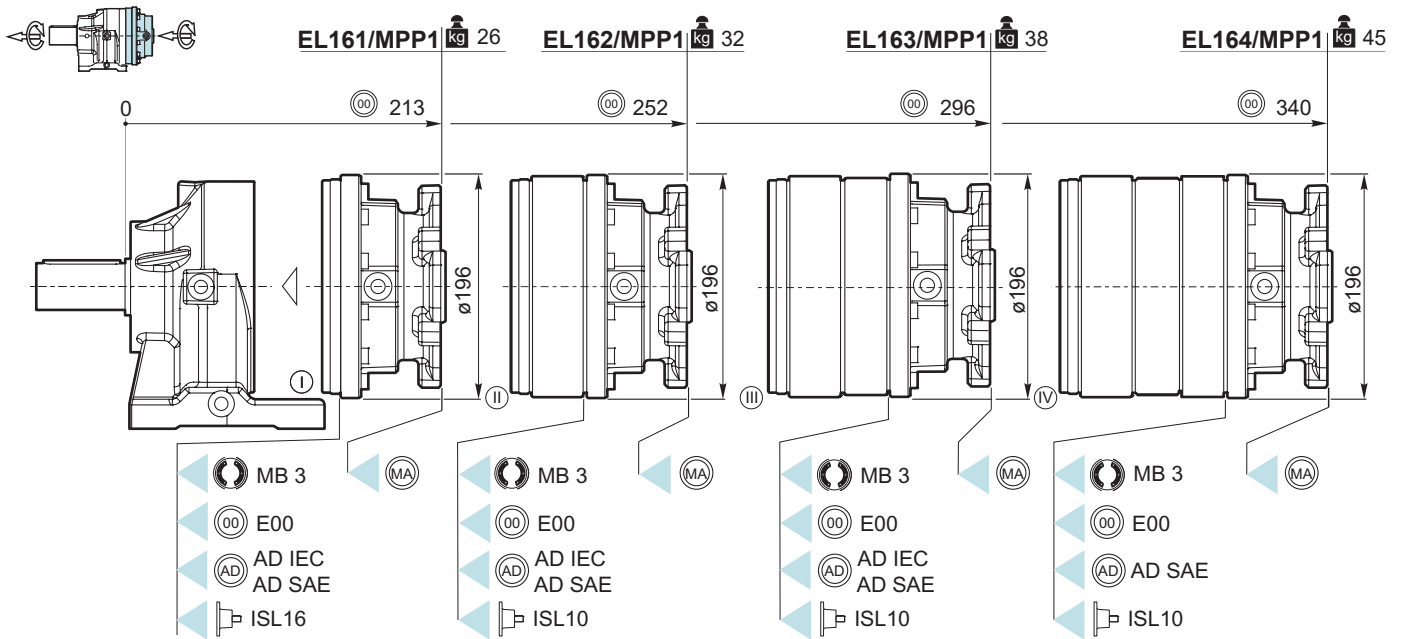
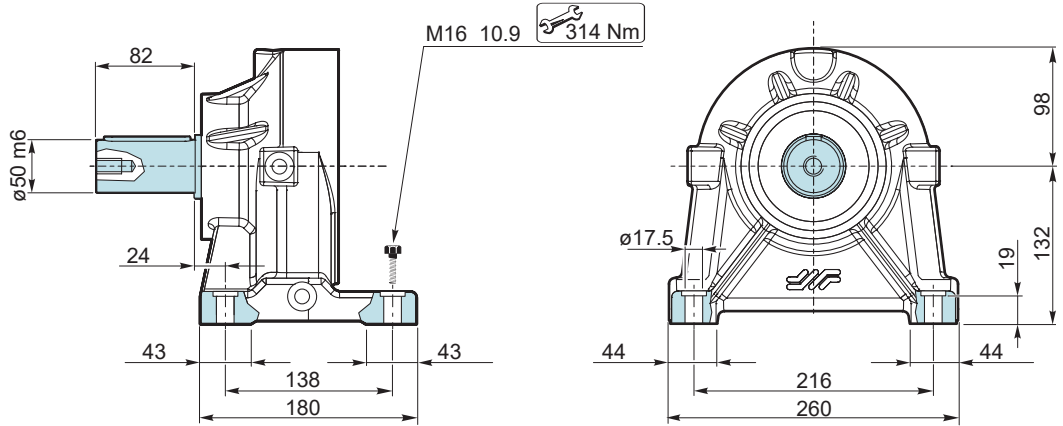
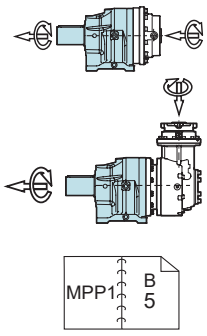
EC163/FS $\frac{kg}{39}$

EC164/FS $\frac{kg}{46}$



- B 11
- E16 20
- E16 19
- E16 18
- B 24
- E16 17





ACCESSORI

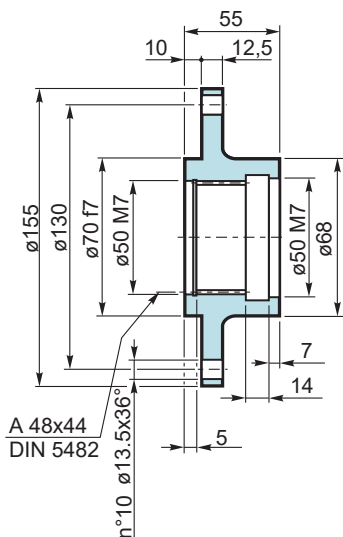
ACCESSORIES

ZUBEHÖR



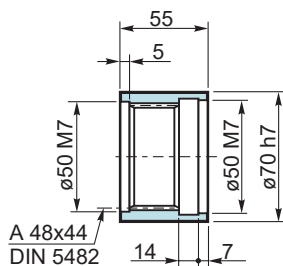
Flangia ruota
Driving flange
Radnabehflansch

FR E16 Mat. C40 EN 10083
Cod: 9023399



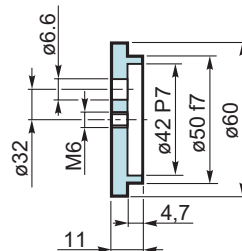
Manicotto scanalato
Splined bush
Manchon cannelée

MS E16 Mat. 42CrMo4 EN 10083
Cod: 9023378



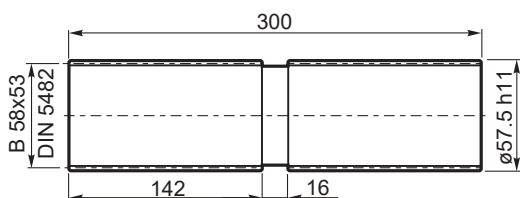
Rondella di fermo
Shaft cover
Gegenscheibe

RDF E16 Mat. C40 EN 10083
Cod: 1306519

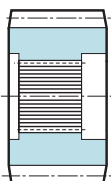


Barra scanalata
Splined bar
Zugspindel

BS 020 Mat. 16NiCr4 EN 10084
Cod: 391.2703.0100



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

ACCESSORI

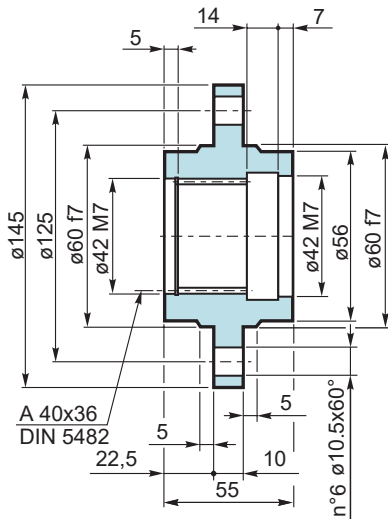
ACCESSORIES

ZUBEHÖR



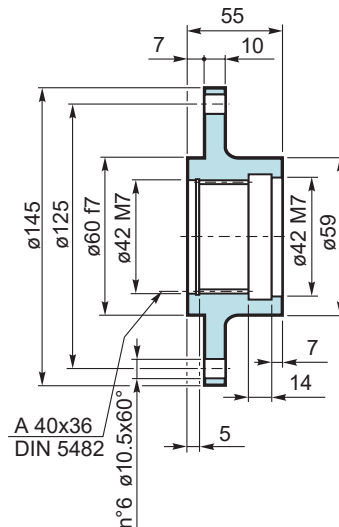
Flangia ruota
Driving flange
Radnabehflansch

FA 010 Mat. C40 EN 10083
Cod: 347.0023.0800



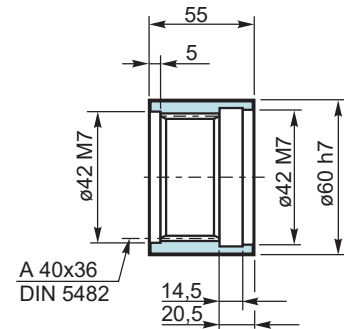
Flangia ruota
Driving flange
Radnabehflansch

FR 010 Mat. C40 EN 10083
Cod: 347.0033.1800



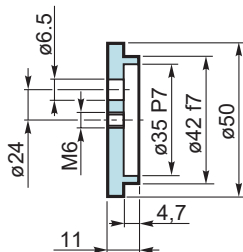
Manicotto scanalato
Splined bush
Manchon cannelée

MS 010 Mat. 42CrMo4 EN 10083
Cod: 391.0274.0600

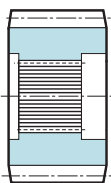


Rondella di fermo
Shaft cover
Gegenscheibe

RDF 010 Mat. C40 EN 10083
Cod: 340.4214.0000



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

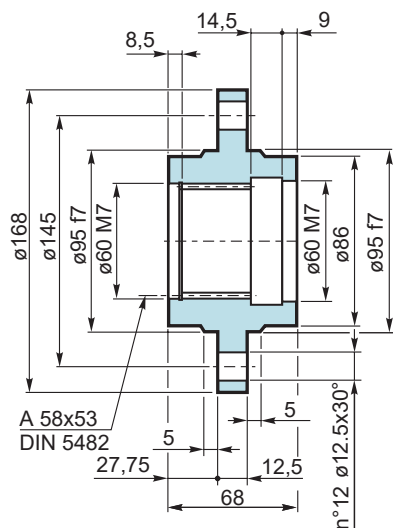
ACCESSORI



Flangia ruota
Driving flange
Radnabehflansch

FA 020

Mat. C40 EN 10083
Cod: 347.0064.1800



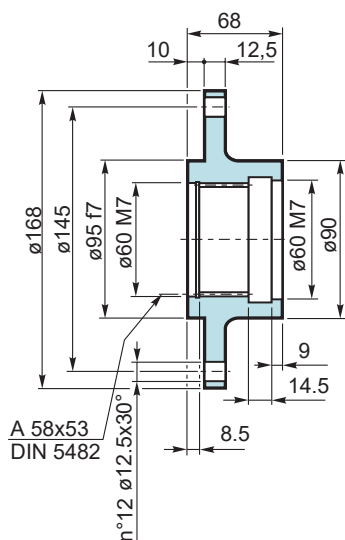
ACCESSORIES



Flangia ruota
Driving flange
Radnabehflansch

FR 020

Mat. C40 EN 10083
Cod: 347.0013.1800



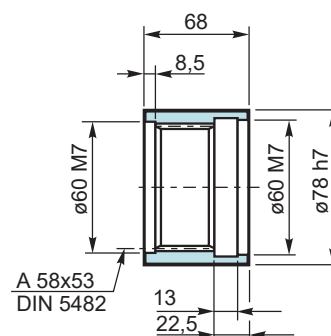
ZUBEHÖR



Manicotto scanalato
Splined bush
Manchon cannelée

MS 020

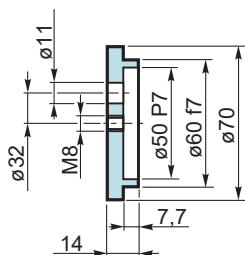
Mat. 42CrMo4 EN 10083
Cod: 391.02848.500



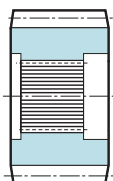
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 020

Mat. C40 EN 10083
Cod: 340.4224.0000



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

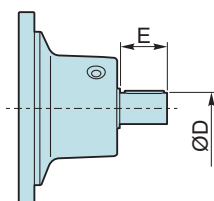
Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

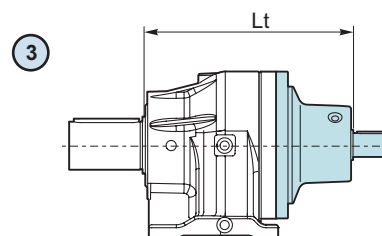
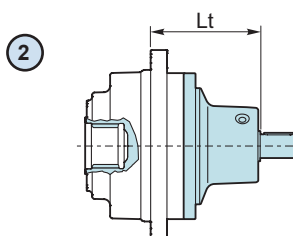
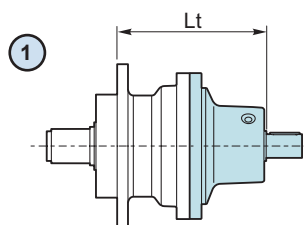
Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

ISL



ISL

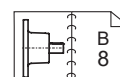


① = MP - MP1 - MP1 010 - MP1 020 - MP 010 - MP 020 - FS

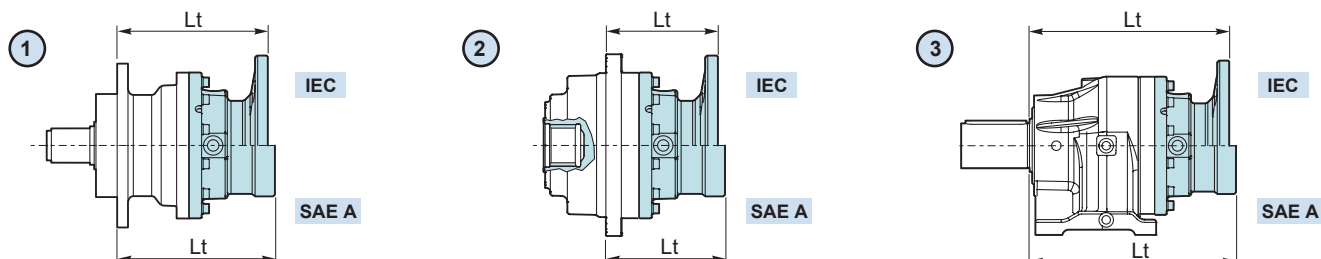
② = FE - FCP

③ = MPP1

		øD	E	Lt [mm] ①							Lt [mm] ②		Lt [mm] ③
				MP	MP1	MP1 010	MP1 020	MP 010	MP020	FS	FE	FCP	MPP1
EL161	ISL16	28 k6	50	245	245	245	259	245	259	245	218.5	260.5	252
EL162	ISL10	28 k6	50	299	299	299	313	299	313	299	272.5	314.5	306
EL163	ISL10	28 k6	50	343	343	343	357	343	357	343	316.5	358.5	350
EL164	ISL10	28 k6	50	387	387	387	401	387	401	387	360.5	402.5	394



EL



① = MP - MP1 - MP1 010 - MP1 020 - MP 010 - MP 020 - FS

② = FE - FCP

③ = MPP1

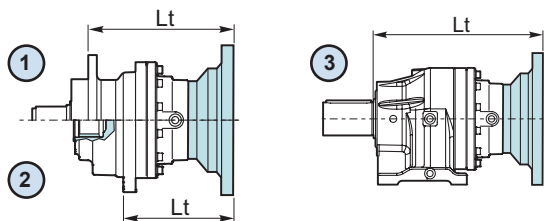
		Lt [mm]			
		IEC			SAE A
		80-90	100-112	132	
EL161	MP - MP1	218	226	247	235
	MP 010 - MP1 010	218	226	247	235
	MP 020 - MP1 020	232	240	261	249
	FE	191.5	199.5	220.5	208.5
	FS	218	226	247	235
	FCP	233.5	241.5	262.5	250.5
	MPP1	225	233	254	242
EL162	MP - MP1	257	265	301	289
	MP 010 - MP1 010	257	265	301	289
	MP 020 - MP1 020	271	279	315	303
	FE	230.5	238.5	274.5	262.5
	FS	257	265	301	289
	FCP	272.5	280.5	316.5	304.5
	MPP1	264	272	308	296
EL163	MP - MP1	301	309	345	333
	MP 010 - MP1 010	301	309	345	333
	MP 020 - MP1 020	315	323	359	347
	FE	274.5	282.5	318.5	306.5
	FS	301	309	345	333
	FCP	316.5	324.5	360.5	348.5
	MPP1	308	316	352	340
EL164	MP - MP1	-	-	-	377
	MP 010 - MP1 010	-	-	-	377
	MP 020 - MP1 020	-	-	-	391
	FE	-	-	-	350.5
	FS	-	-	-	377
	FCP	-	-	-	392.5
	MPP1	-	-	-	384

FLANGE MOTORI IEC/NEMA

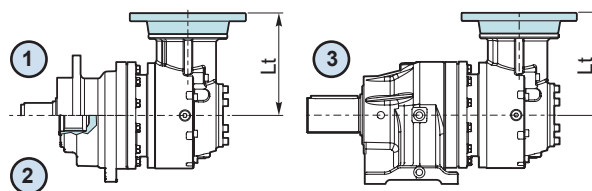
MOTOR FLANGES IEC/NEMA

MOTORFLANSCHEN IEC/NEMA

EL



EC



① = MP - MP1 - MP1 010 - MP1 020 - MP 010 - MP 020 - FS

② = FE - FCP

③ = MPP1

		Lt [mm]										
		IEC						NEMA				
		63	71	80-90	100-112	132	160-180	143/145 TD	182/184 TC	182/184 TD	210 TD	213/215 TC
EL161	MP - MP1	226	228	-	-	-	332	236	236	236	236	252
	MP 010 - MP1 010	226	228	-	-	-	332	236	236	236	236	252
	MP 020 - MP1 020	240	242	-	-	-	346	250	250	250	250	266
	FE	199.5	201.5	-	-	-	305.5	209.5	209.5	209.5	209.5	225.5
	FS	226	228	-	-	-	332	236	236	236	236	252
	FCP	241.5	243.5	-	-	-	347.5	251.5	251.5	251.5	251.5	267.5
	MPP1	233	235	-	-	-	339	243	243	243	243	259
EL162	MP - MP1	265	267	-	-	-	371	275	275	275	275	291
	MP 010 - MP1 010	265	267	-	-	-	371	275	275	275	275	291
	MP 020 - MP1 020	279	281	-	-	-	385	289	289	289	289	305
	FE	238.5	240.5	-	-	-	344.5	248.5	248.5	248.5	248.5	264.5
	FS	265	267	-	-	-	371	275	275	275	275	291
	FCP	280.5	282.5	-	-	-	386.5	290.5	290.5	290.5	290.5	306.5
	MPP1	272	274	-	-	-	378	282	282	282	282	298
EL163	MP - MP1	309	311	-	-	-	415	319	319	319	319	335
	MP 010 - MP1 010	309	311	-	-	-	415	319	319	319	319	335
	MP 020 - MP1 020	323	325	-	-	-	429	333	333	333	333	349
	FE	282.5	284.5	-	-	-	388.5	292.5	292.5	292.5	292.5	308.5
	FS	309	311	-	-	-	415	319	319	319	319	335
	FCP	324.5	326.5	-	-	-	430.5	334.5	334.5	334.5	334.5	350.5
	MPP1	316	318	-	-	-	422	326	326	326	326	342
EL164	MP - MP1	353	355	360	361	428	459	363	363	363	363	379
	MP 010 - MP1 010	353	355	360	361	428	459	363	363	363	363	379
	MP 020 - MP1 020	367	369	374	375	442	473	377	377	377	377	393
	FE	326.5	328.5	333.5	334.5	401.5	432.5	336.5	336.5	336.5	336.5	352.5
	FS	353	355	360	361	428	459	363	363	363	363	379
	FCP	368.5	370.5	375.5	376.5	443.5	474.5	378.5	378.5	378.5	378.5	394.5
	MPP1	360	362	367	368	435	466	370	370	370	370	386
EC162	MP - MP1	155	155	155	155	242	-	-	-	-	-	-
	MP 010 - MP1 010	155	155	155	155	242	-	-	-	-	-	-
	MP 020 - MP1 020	155	155	155	155	242	-	-	-	-	-	-
EC163	FE	155	155	155	155	242	-	-	-	-	-	-
EC164	FS	155	155	155	155	242	-	-	-	-	-	-
	FCP	155	155	155	155	242	-	-	-	-	-	-
	MPP1	155	155	155	155	242	-	-	-	-	-	-

A richiesta altre configurazioni disponibili. Contattare il referente DANA di zona.

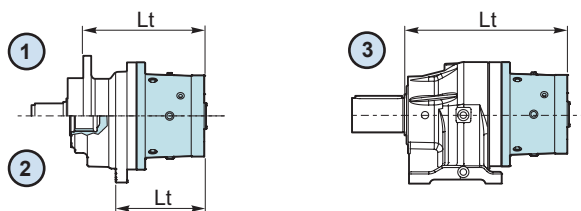
More configurations are available on request. Consult the DANA area contact person.

Auf Wunsch sind weitere Konfigurationen verfügbar. Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.

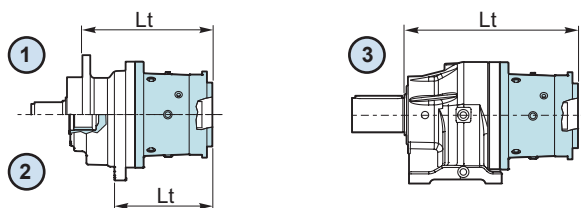


EL

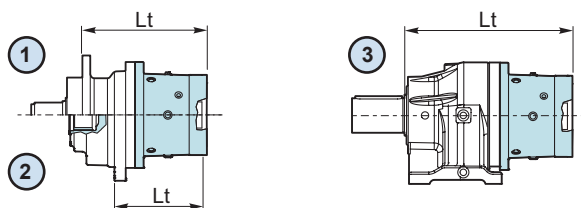
MB3 - E00



MB3 - SAE A



MB3 - BRZV



① = MP - MP1 - MP1 010 - MP1 020 - MP 010 - MP 020 - FS

② = FE - FCP

③ = MPP1

		Lt [mm]									
		MP	MP 010	MP 020	MP1	MP1 010	MP1 020	FE	FS	FCP	MPP1
MB3 E00	EL161	252	252	266	252	252	266	225.5	252	267.5	259
	EL162	306	306	320	306	306	320	279.5	306	321.5	313
	EL163	350	350	364	350	350	364	323.5	350	365.5	357
	EL164	394	394	408	394	394	408	367.5	394	409.5	401
MB3 SAE - A	EL161	281	281	295	281	281	295	254.5	281	296.5	288
	EL162	335	335	349	335	335	349	308.5	335	350.5	342
	EL163	379	379	393	379	379	393	352.5	379	394.5	386
	EL164	423	423	437	423	423	437	396.5	423	438.5	430
MB3 BRZV	EL161	249.5	249.5	263.5	249.5	249.5	263.5	223	249.5	265	256.5
	EL162	303.5	303.5	317.5	303.5	303.5	317.5	277	303.5	319	310.5
	EL163	347.5	347.5	361.5	347.5	347.5	361.5	321	347.5	363	354.5
	EL164	391.5	391.5	405.5	391.5	391.5	405.5	365	391.5	407	398.5

CARICHI RADIALI

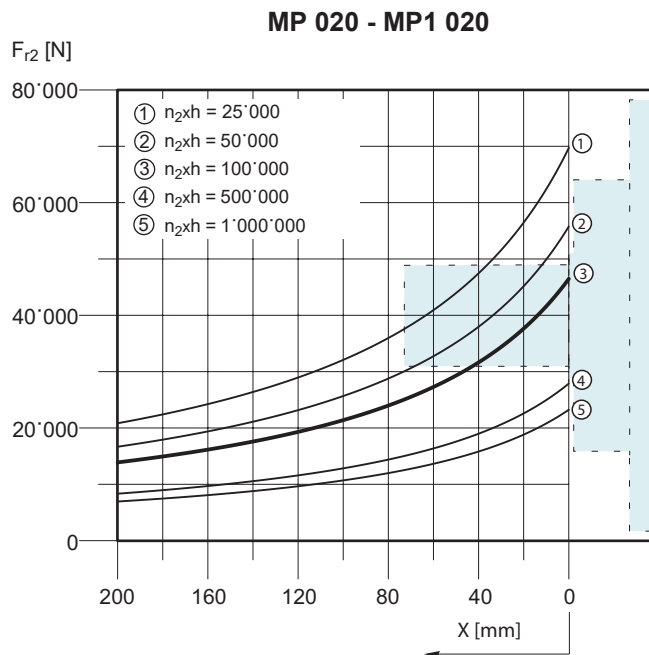
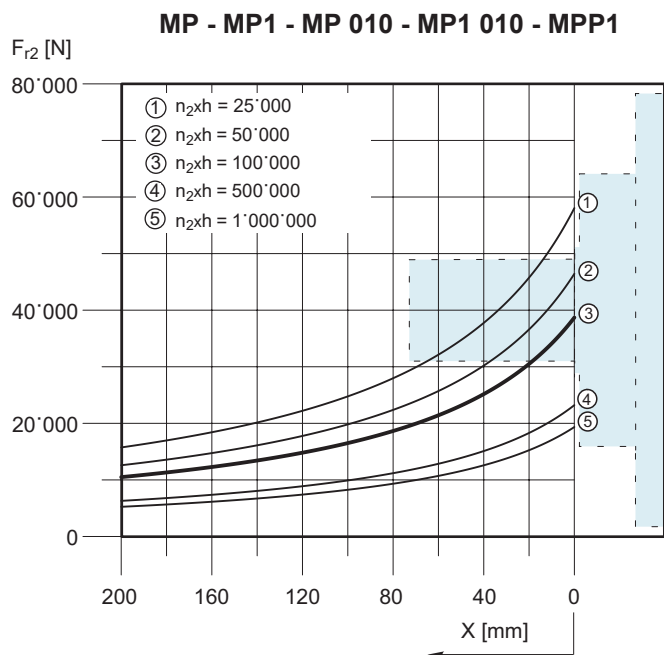
RADIAL LOADS

RADIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



CARICHI ASSIALI

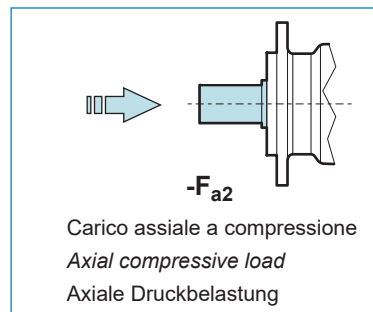
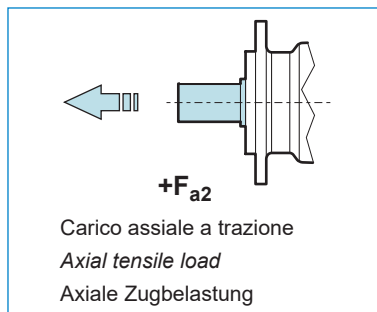
AXIAL LOADS

AXIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



E16 MP - MP1 - MP 010 - MP1 010 - MPP1		
n_{2xh}	$-F_{a2}$ [N]	$+F_{a2}$ [N]
10'000	70'000	64'000
25'000	53'200	48'640
50'000	43'050	39'360
100'000	35'000	32'000
500'000	21'700	19'840
1'000'000	17'500	16'000

E16 MP 020 - MP1 020		
n_{2xh}	$-F_{aa2}$ [N]	$+F_{aa2}$ [N]
10'000	80'000	80'000
25'000	60'800	60'800
50'000	49'200	49'200
100'000	40'000	40'000
500'000	24'800	24'800
1'000'000	20'000	20'000

CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

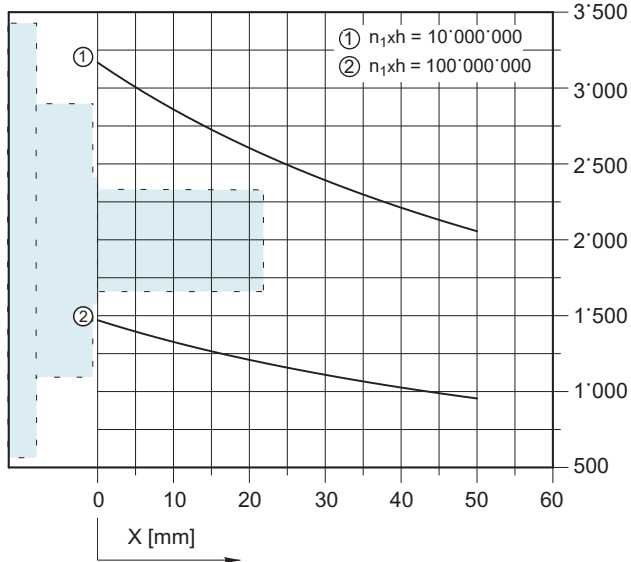
Alberi in ingresso

Input shaft

Eingangswellen

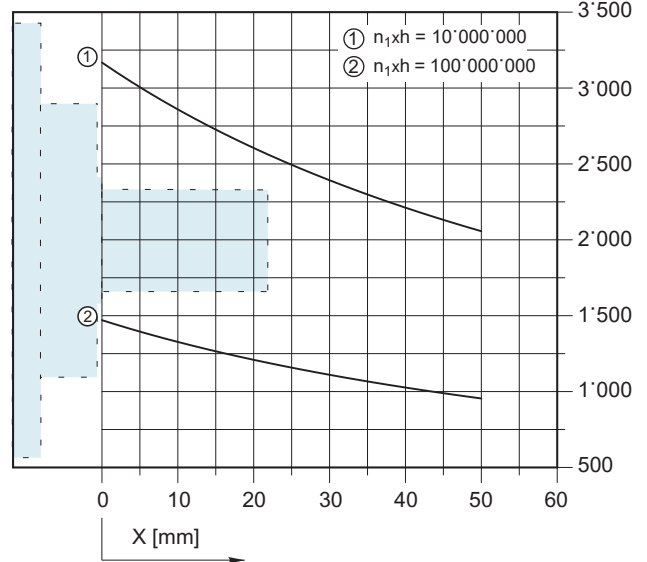
ISL16

F_{r1} [N]



ISL10


























F_{r1} [N]












GRANDEZZA E25

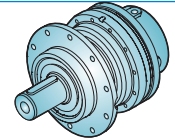
E25 SIZE

E25 GRÖÖE

	Disponibilità Availability Verfügbarkeit	Albero - Shaft - Getriebewelle		Pagina Page Seite
		Tipologia Type Typ	Dimensioni Dimensions Abmessungen [mm]	
USCITE OUTPUTS AUSGÄNGE			B58x53 DIN 5482	
			ø65	
			A58x53 DIN 5482	
			ø75	
			ø50	
			ø65	
ENTRATE INPUTS EINNAHMEN			IS IS30 ø48	
	 		ISL ISL10 ø28 ISL30 ø40	
			A50x45 DIN 5482	

	Disponibilità Availability Verfügbarkeit		Pagina Page Seite
FLANGED'INGRESSO INPUT FLANGE FLANSCH EINGANG	 		
	 		

	Disponibilità Availability Verfügbarkeit	T _B [Nm]		Pagina Page Seite
FRENI BRAKES BREMSEN	 	MB3 33 + 495	MB5 173 + 1'173	



i	T ₂ [Nm]						n ₁ MAX [rpm]	T ₂ MAX [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			

EL251

3.52	3'970	3'580	3'130	2'720	1'940	1'570	3'800	4'500	10
4.07	3'650	3'380	3'320	2'990	2'230	1'810	3'800	5'200	10
4.95	3'420	3'060	2'680	2'430	2'120	1'770	3'800	5'200	10
5.88	2'830	2'370	2'060	1'910	1'660	1'560	3'800	5'200	10
7.39	1'880	1'550	1'360	1'270	1'090	1'020	3'800	3'750	10

EL252

12.4	3'970	3'580	3'130	2'720	1'940	1'570	4'000	4'500	7
14.3	3'650	3'380	3'320	2'990	2'230	1'800	4'000	5'200	7
16.6	3'650	3'380	3'320	2'990	2'230	1'800	4'000	5'200	7
20.2	3'650	3'380	3'320	2'990	2'230	1'800	4'000	5'200	7
24.0	3'490	3'020	2'810	2'600	2'160	1'800	4'000	5'200	7
29.1	3'420	3'060	2'680	2'430	2'120	1'760	4'000	5'200	7
34.3	3'150	2'850	2'630	2'420	2'100	1'760	4'000	5'200	7
40.8	2'830	2'370	2'060	1'910	1'660	1'550	4'000	5'200	7
43.4	1'880	1'550	1'360	1'270	1'090	1'020	4'000	3'750	7
51.2	1'880	1'550	1'360	1'270	1'090	1'020	4'000	3'750	7
60.1	1'600	1'510	1'450	1'390	1'260	1'210	4'000	5'200	7
75.5	1'880	1'550	1'360	1'270	1'090	1'020	4'000	3'750	7

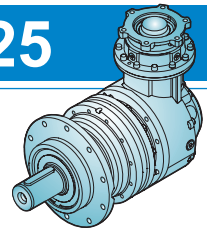
EL253

58.3	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	6
61.2	3'970	3'580	3'130	2'720	1'940	1'570	4'000	4'500	6
67.6	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	6
70.9	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	6
84.2	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	6
99.2	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	6
115	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	6
140	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	6
146	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	6
170	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	6
206	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	6
245	3'490	3'020	2'810	2'600	2'160	1'810	4'000	5'200	6
298	3'420	3'060	2'680	2'430	2'120	1'770	4'000	5'200	6
351	3'150	2'850	2'630	2'420	2'100	1'770	4'000	5'200	6
417	2'830	2'370	2'060	1'910	1'660	1'560	4'000	5'200	6

EL254

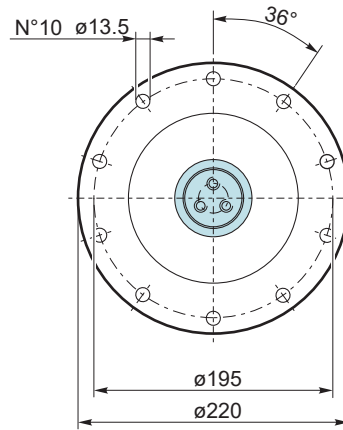
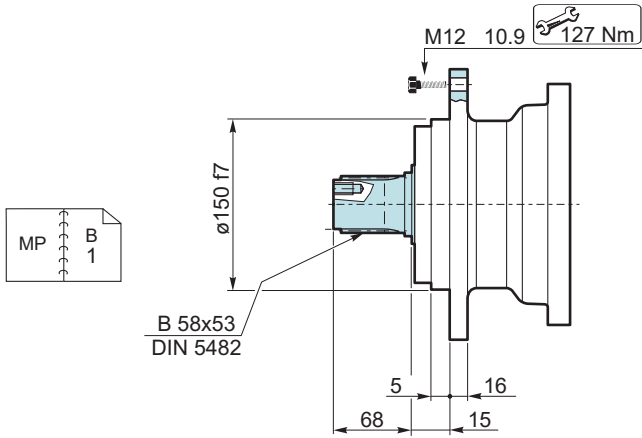
349	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
404	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
417	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
469	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
491	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
514	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
570	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
596	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
688	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
725	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
797	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
861	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
969	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
997	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
1176	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
1212	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
1429	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
1496	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
1734	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
1818	3'970	3'510	3'130	2'720	1'940	1'570	4'000	4'500	4
2107	3'650	3'380	3'320	2'990	2'230	1'810	4'000	5'200	4
2561	3'420	3'060	2'680	2'430	2'120	1'770	4'000	5'200	4
3041	3'420	3'060	2'680	2'430	2'120	1'770	4'000	5'200	4

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich

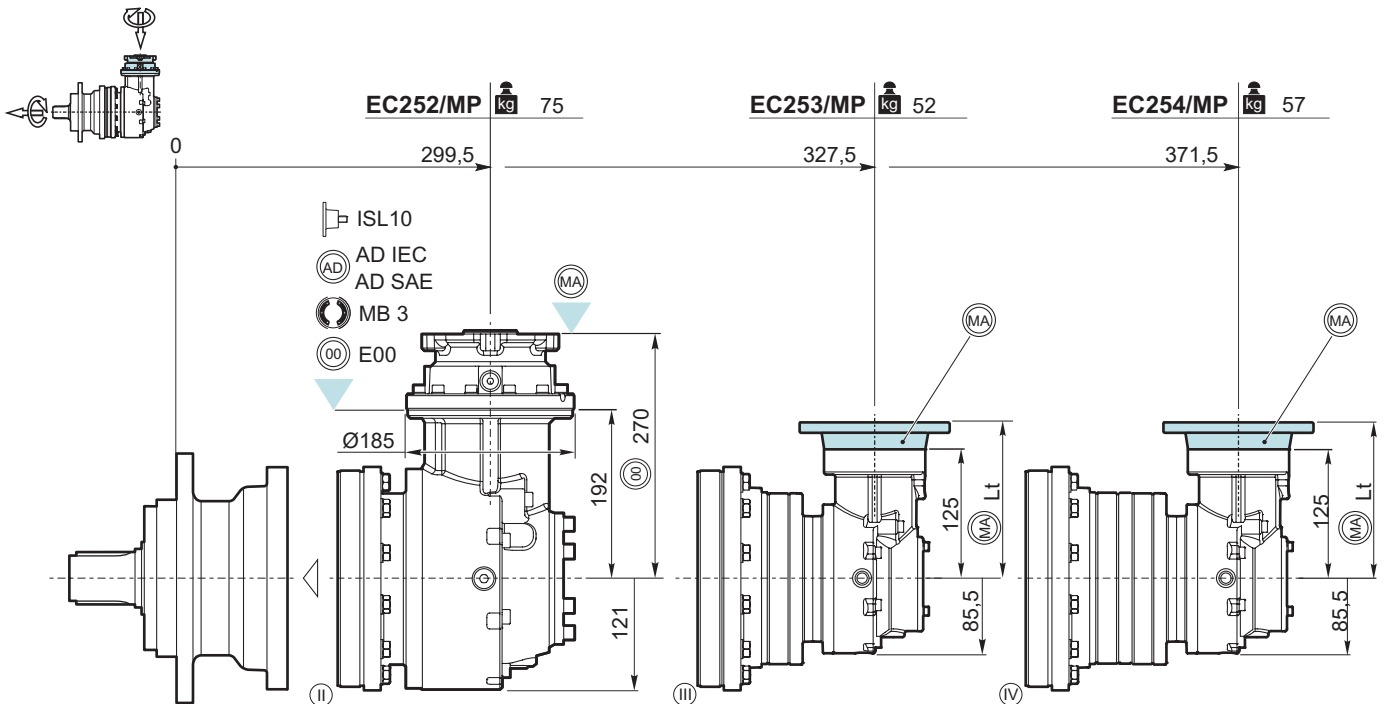
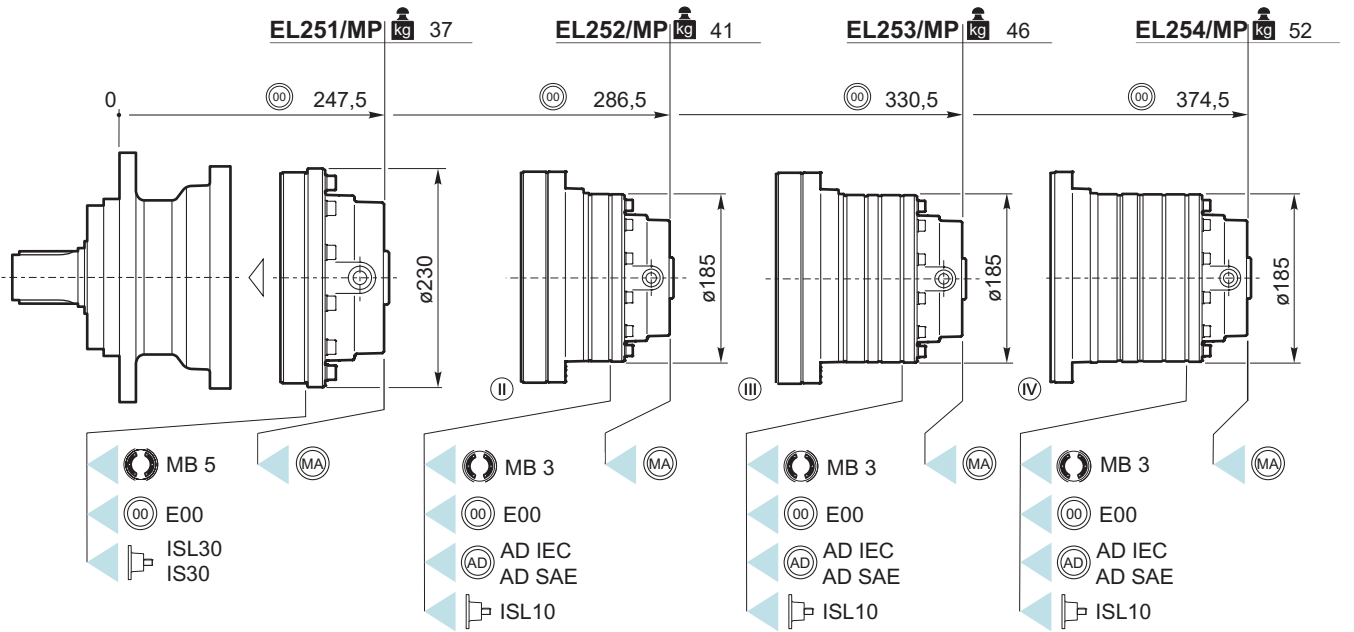


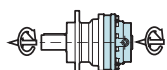
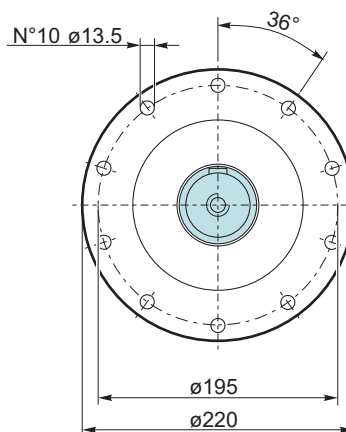
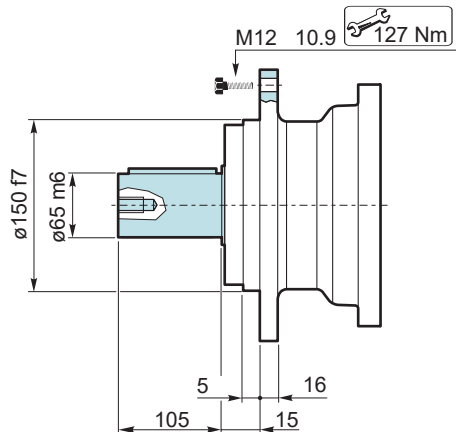
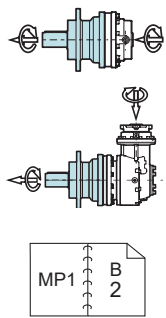
i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EC252									
10.5	3'970	3'580	3'130	2'720	1'935	1'570	3'000	4'500	8
12.2	3'650	3'380	3'320	2'985	2'225	1'805	3'000	5'200	8
14.9	3'420	3'060	2'675	2'425	2'120	1'765	3'000	5'200	8
16.0	3'970	3'580	3'130	2'720	1'935	1'570	3'000	4'500	8
18.6	3'650	3'380	3'320	2'985	2'225	1'805	3'000	5'200	8
22.6	3'420	3'060	2'675	2'425	2'120	1'765	3'000	5'200	8
26.8	2'830	2'365	2'055	1'905	1'655	1'555	3'000	5'200	8
33.6	1'880	1'550	1'355	1'270	1'085	1'015	3'000	3'750	8
EC253									
37.1	3'970	3'580	3'130	2'580	1'510	1'200	4'000	4'500	5
43.0	3'970	3'580	3'130	2'720	1'665	1'325	4'000	4'500	5
49.8	3'650	3'380	3'320	2'985	1'840	1'460	4'000	5'200	5
60.5	3'650	3'380	3'320	2'985	2'095	1'660	4'000	5'200	5
71.9	3'490	3'020	2'805	2'600	2'155	1'805	4'000	5'200	5
81.1	3'650	3'380	3'280	2'600	1'520	1'205	4'000	5'200	5
85.1	3'970	3'510	3'130	2'680	1'570	1'245	4'000	4'500	5
98.6	3'650	3'380	3'320	2'960	1'730	1'375	4'000	5'200	5
103	3'150	2'845	2'630	2'420	2'095	1'765	4'000	5'200	5
117	3'490	3'020	2'805	2'600	1'940	1'540	4'000	5'200	5
142	3'420	3'060	2'675	2'425	2'120	1'755	4'000	5'200	5
168	3'150	2'845	2'630	2'420	2'095	1'765	4'000	5'200	5
212	1'880	1'550	1'355	1'270	1'085	1'015	4'000	3'750	5
EC254									
130	3'970	3'580	3'130	2'720	1'935	1'570	4'000	4'500	4
151	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
175	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
184	3'970	3'580	3'130	2'720	1'935	1'570	4'000	4'500	4
203	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
213	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
218	3'970	3'580	3'130	2'720	1'935	1'570	4'000	4'500	4
247	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
253	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
285	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
298	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
307	3'970	3'510	3'130	2'720	1'935	1'570	4'000	4'500	4
331	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
362	3'970	3'510	3'130	2'720	1'935	1'570	4'000	4'500	4
402	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
419	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
439	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
477	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
509	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
534	3'970	3'510	3'130	2'720	1'935	1'570	4'000	4'500	4
580	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
619	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
716	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
752	3'420	3'060	2'675	2'425	2'120	1'765	4'000	5'200	4
829	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
870	3'970	3'510	3'130	2'720	1'935	1'570	4'000	5'200	4
1008	3'650	3'380	3'320	2'985	2'225	1'805	4'000	5'200	4
1052	3'150	2'845	2'630	2'420	2'095	1'765	4'000	5'200	4

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich



Accessori Accessories Zubehör	E25 10



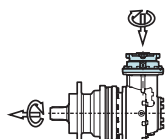
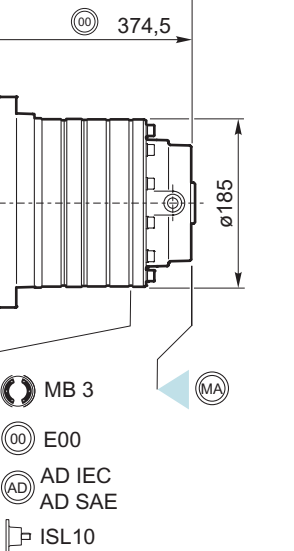
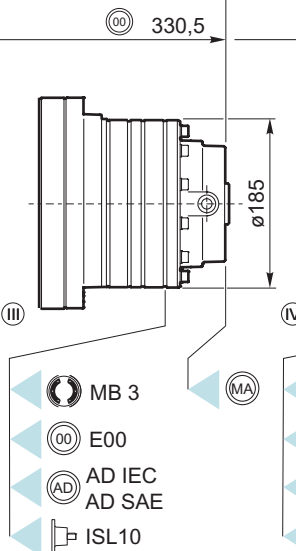
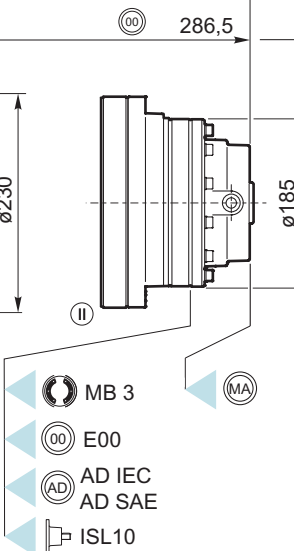
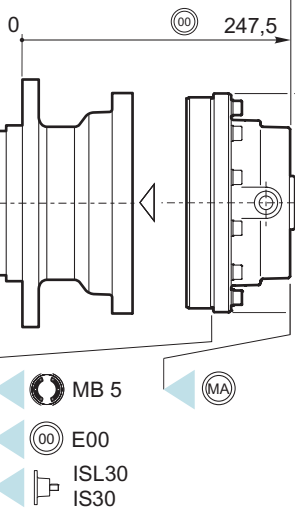


EL251/MP1 38

EL252/MP1 42

EL253/MP1 47

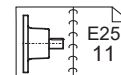
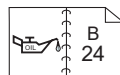
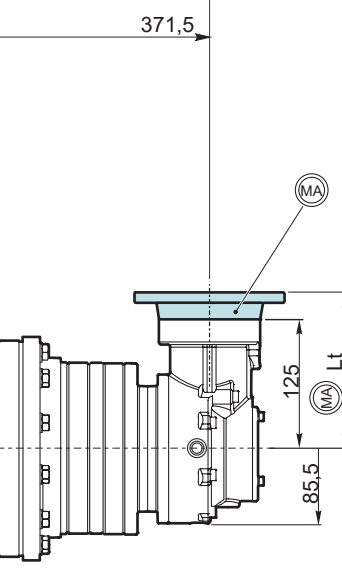
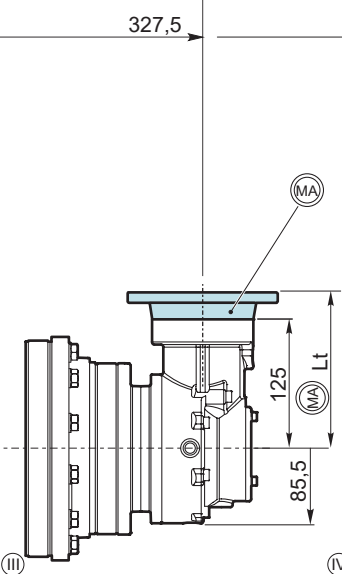
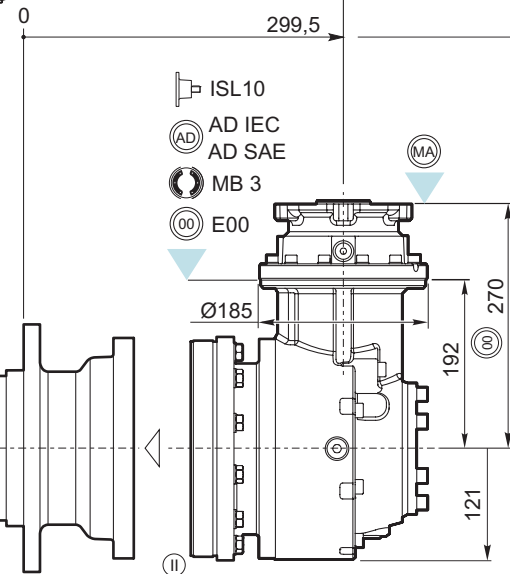
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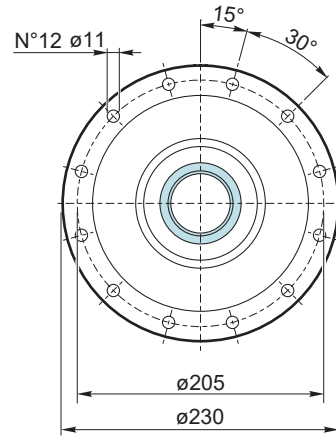
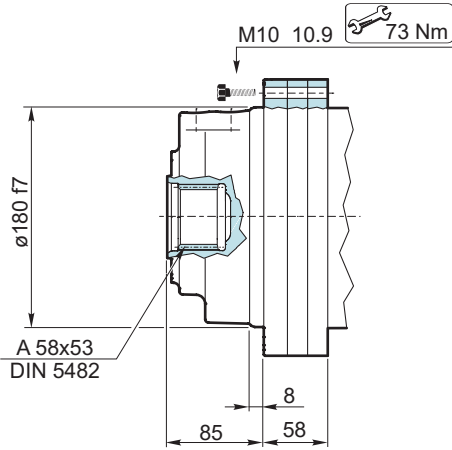
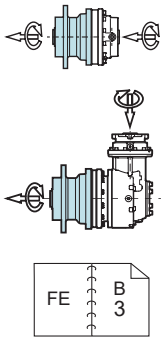


EC252/MP1 76

EC253/MP1 53

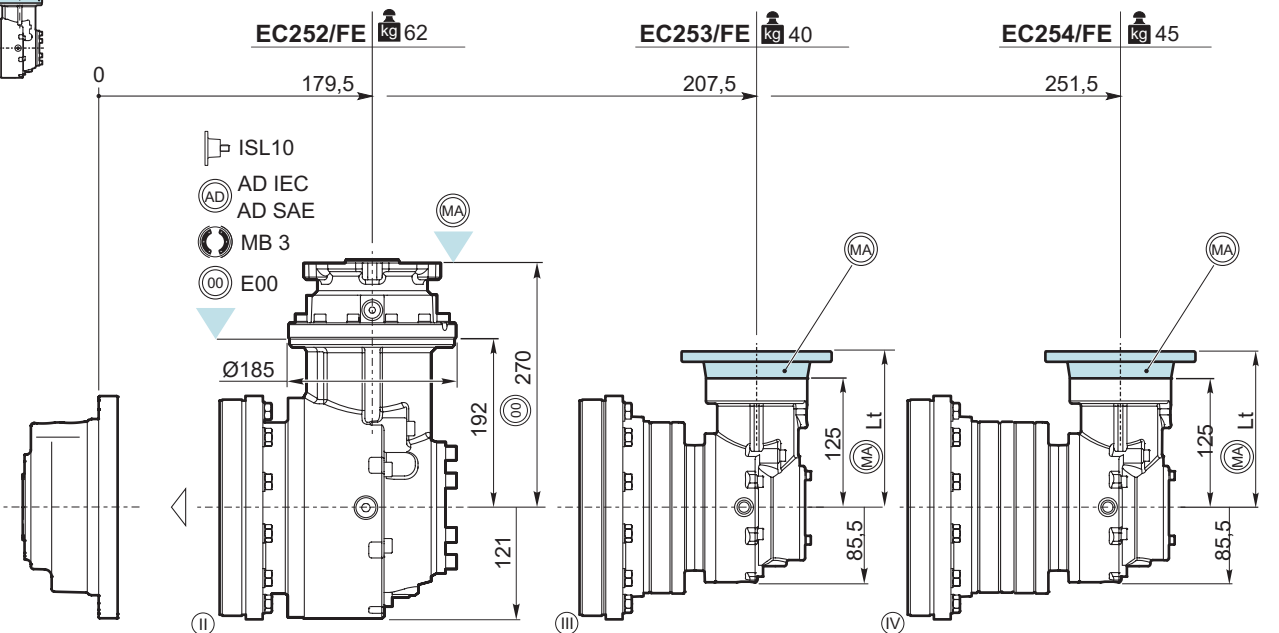
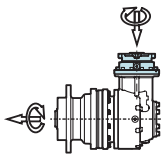
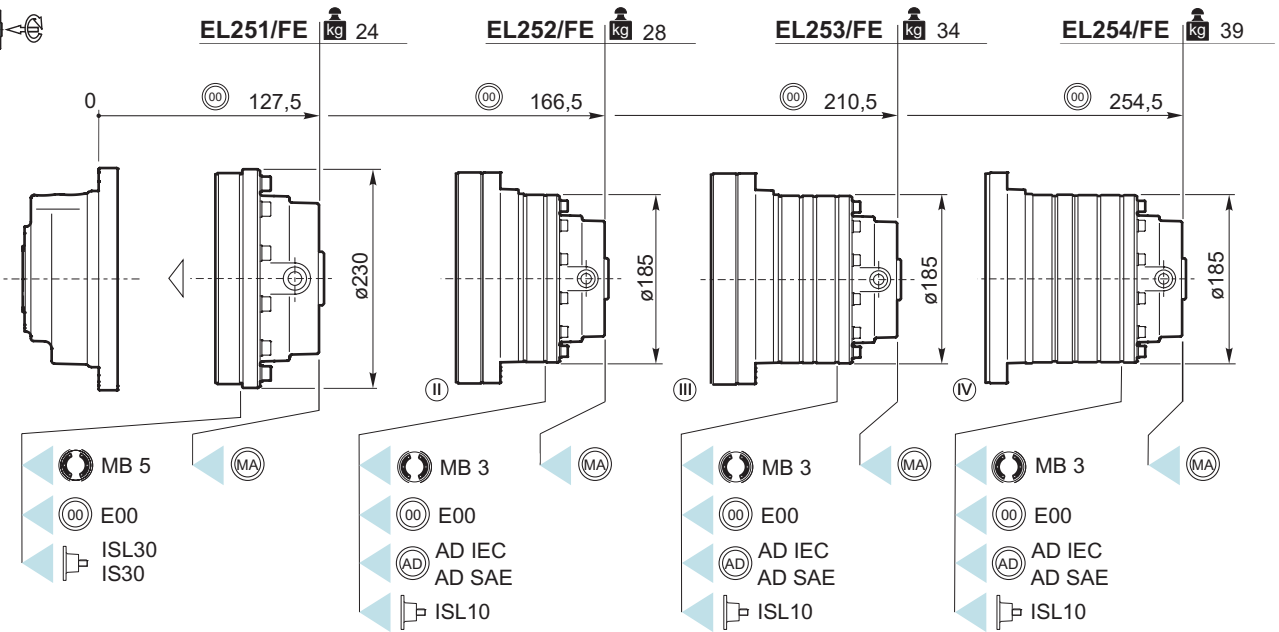
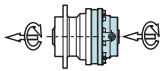
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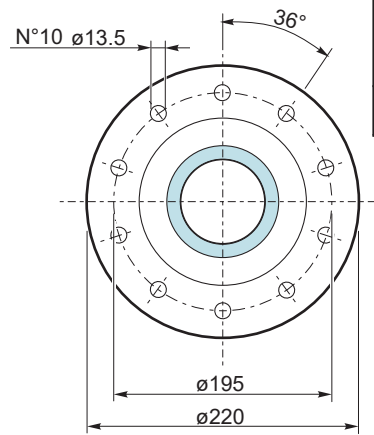
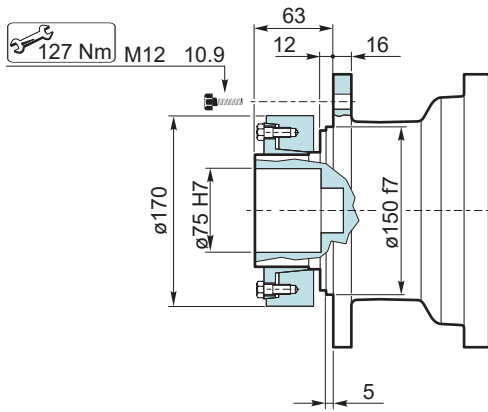
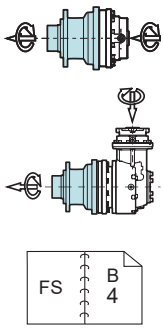




Accessori
Accessories
Zubehör

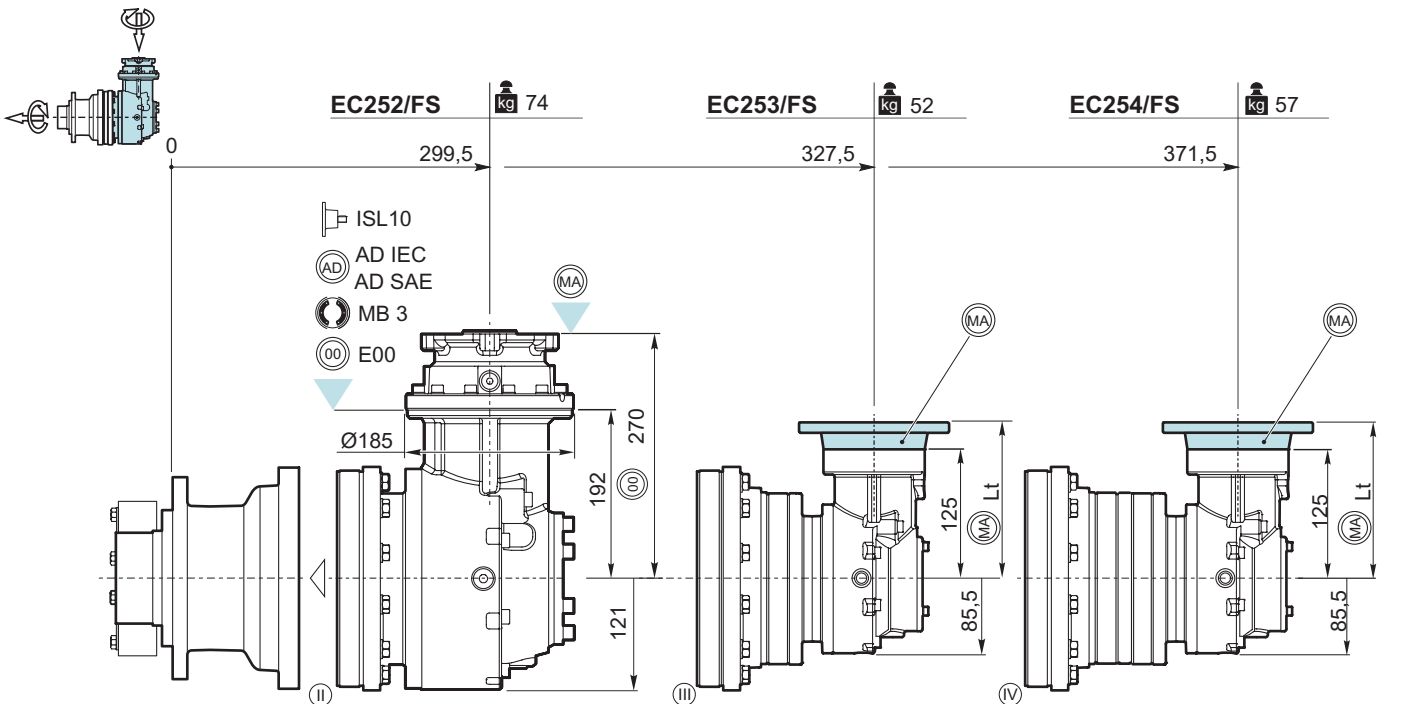
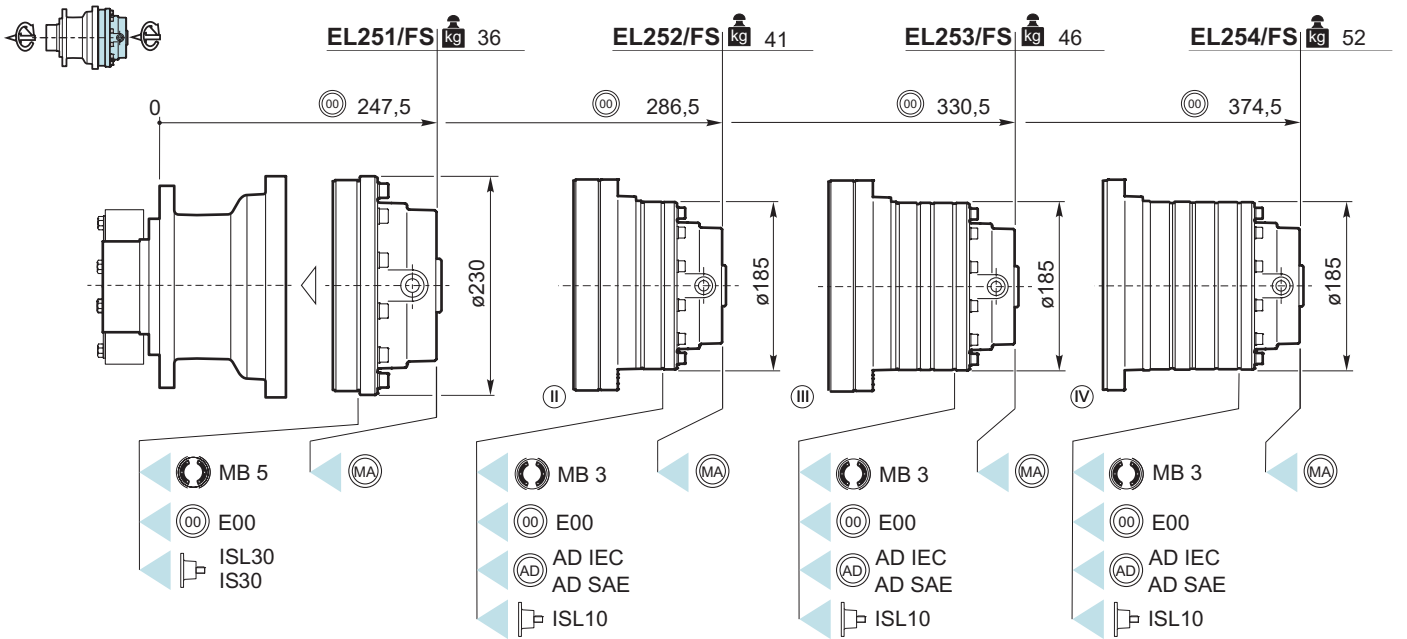
E25
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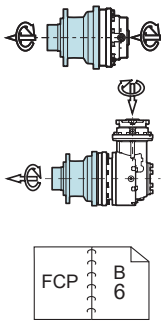




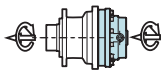
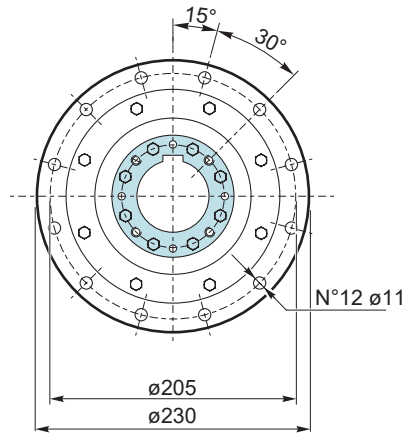
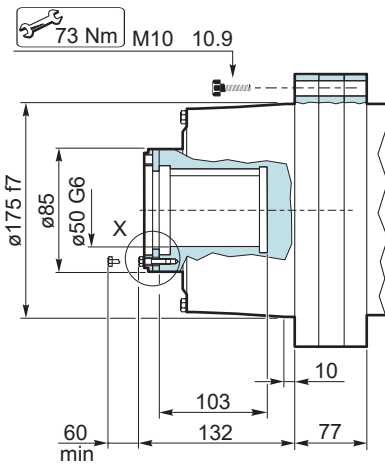
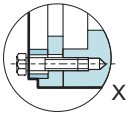
Giunto ad attrito
Shrink disc
Reibungskupplung

B 18

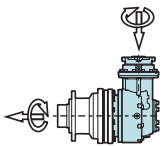
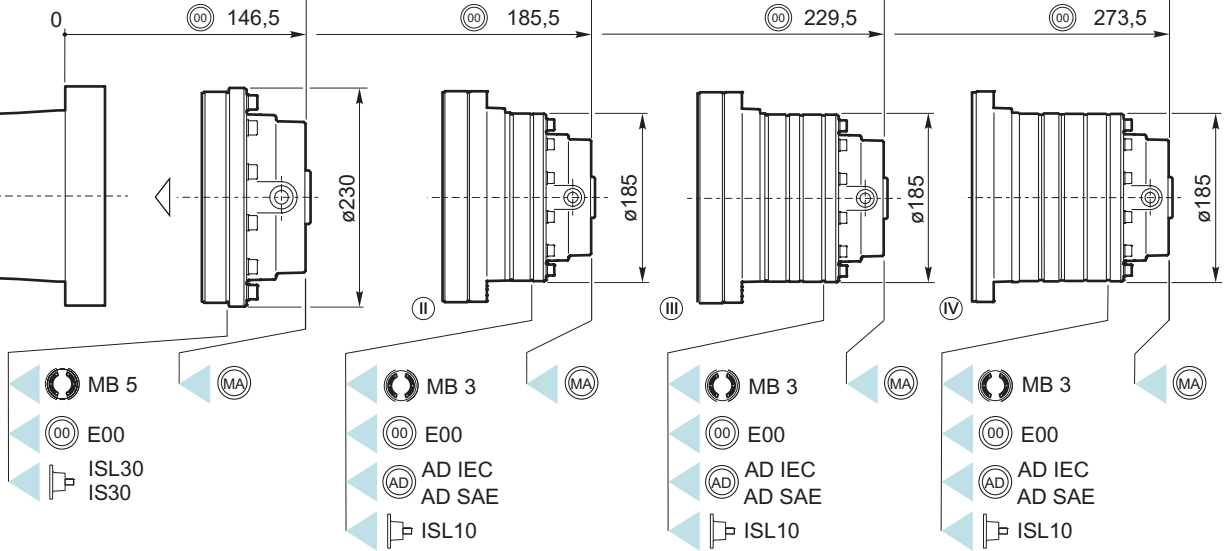




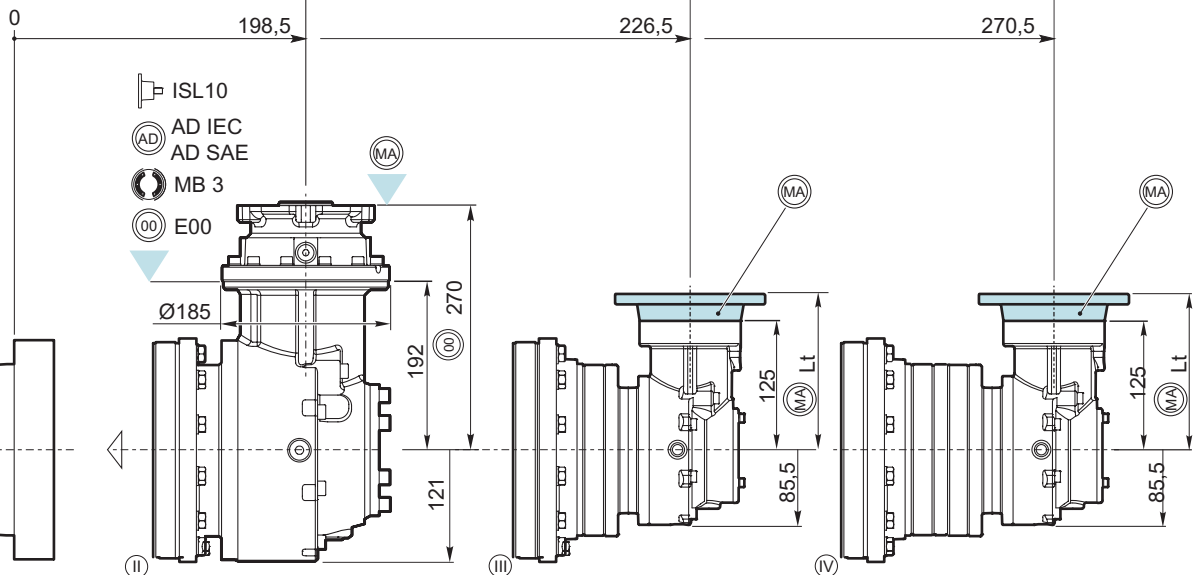
FCP B 6

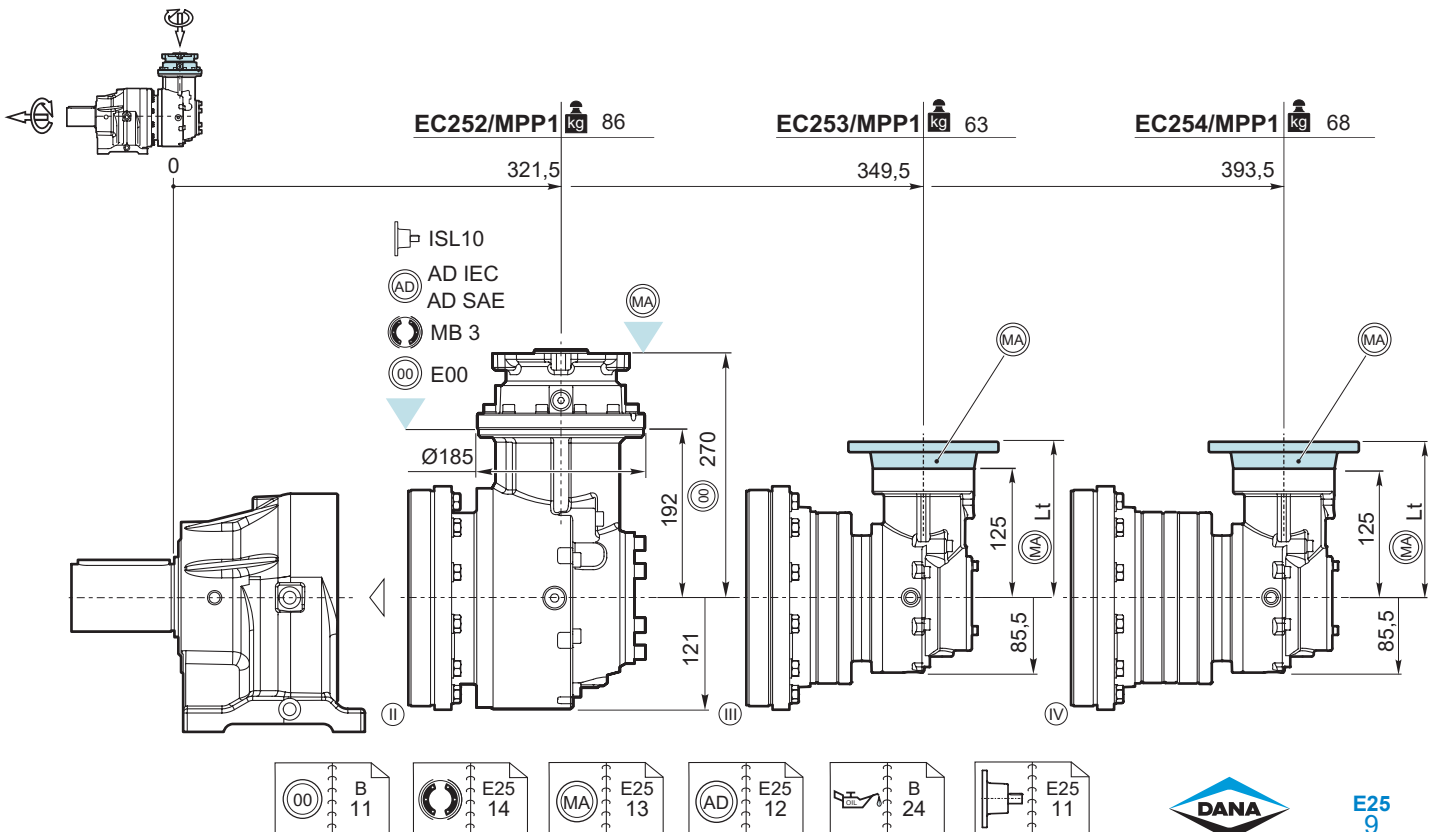
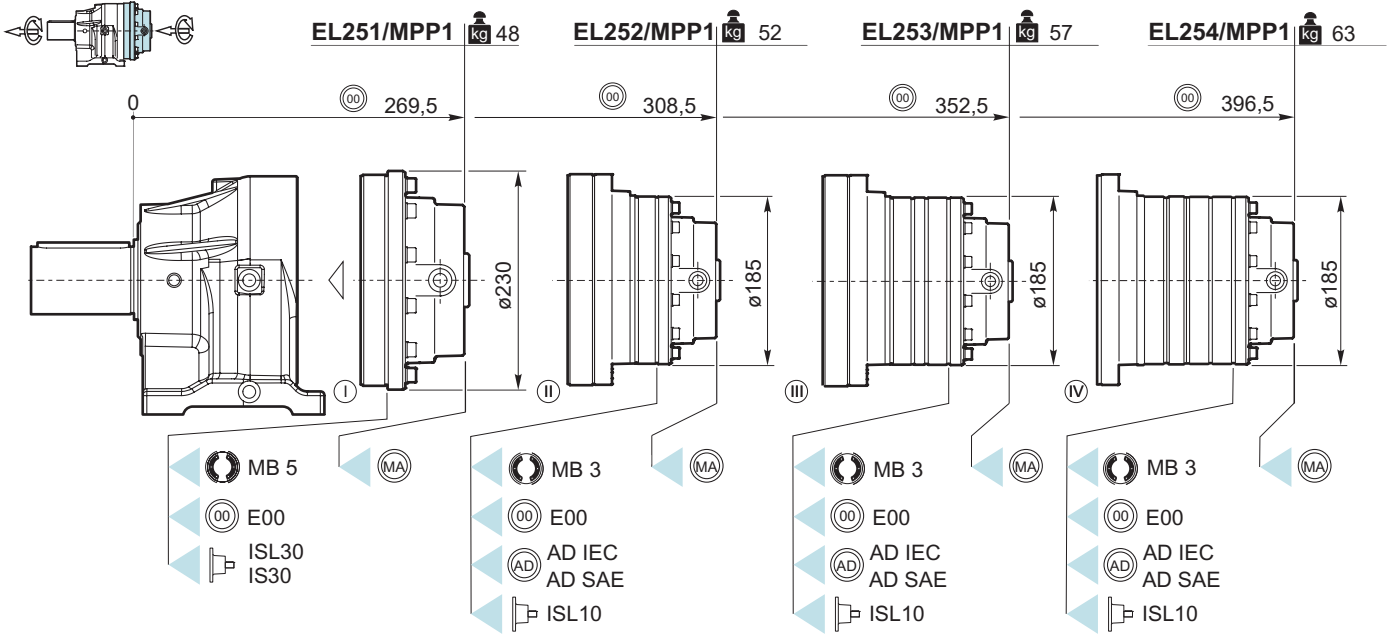
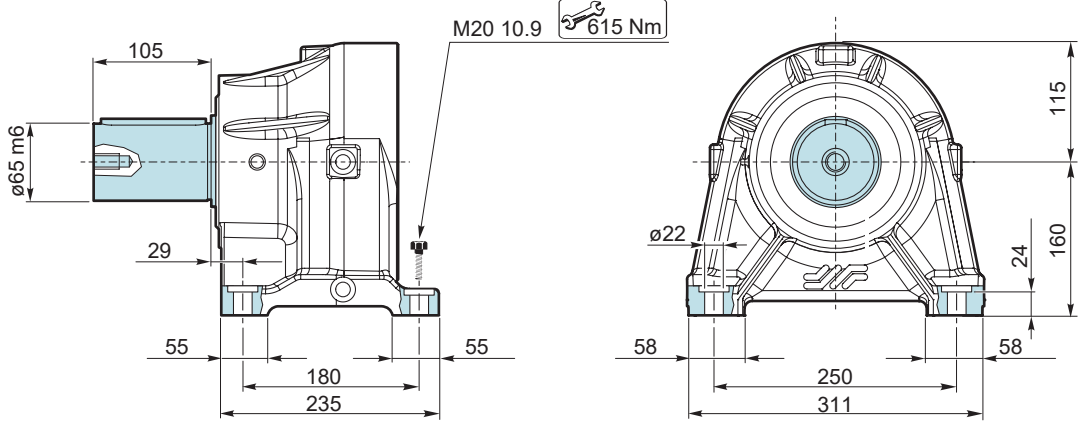
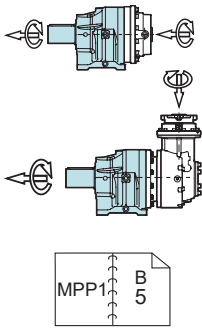


EL251/FCP 31 **EL252/FCP** 35 **EL253/FCP** 41 **EL254/FCP** 46



EC252/FCP 69 **EC253/FCP** 47 **EC254/FCP** 52







ACCESSORI

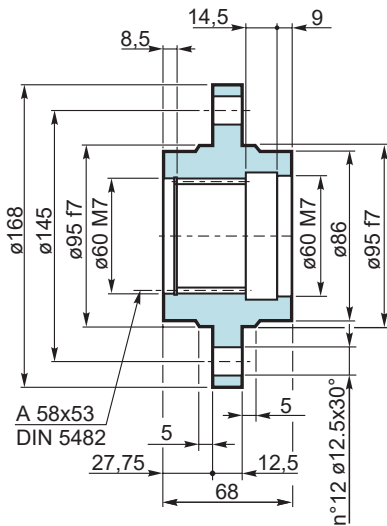
ACCESSORIES

ZUBEHÖR



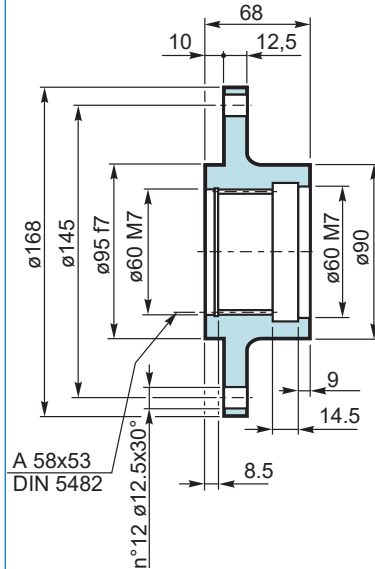
Flangia ruota
Driving flange
Radnabehflansch

FA 020 Mat. C40 EN 10083
Cod: 347.0064.1800



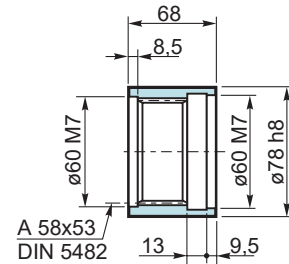
Flangia ruota
Driving flange
Radnabehflansch

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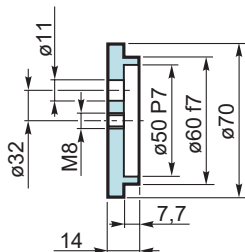
Manicotto scanalato
Splined bush
Manchon cannelée

MS 020 Mat. 42CrMo4 EN 10083
Cod: 391.0284.8500



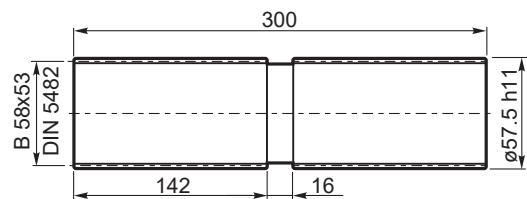
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 020 Mat. C40 EN 10083
Cod: 340.4224.0000

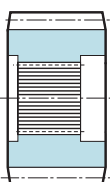


Barra scanalata
Splined bar
Zugspindel

BS 020 Mat. 16NiCr4 EN 10084
Cod: 391.2703.0100



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

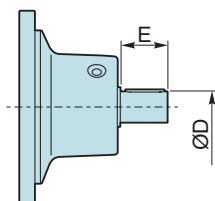
Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

SUPPORTI MASCHIO IN INGRESSO

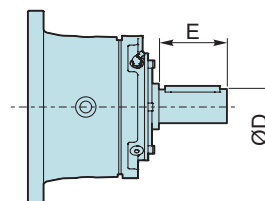
MALE INPUT SUPPORTS

ANTRIEBS- WELLENSTÜMPFE

ISL

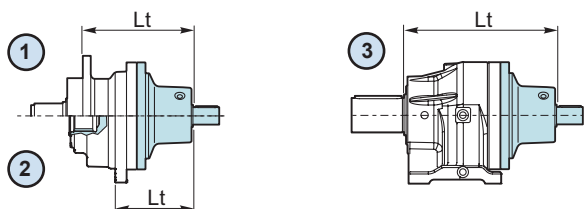


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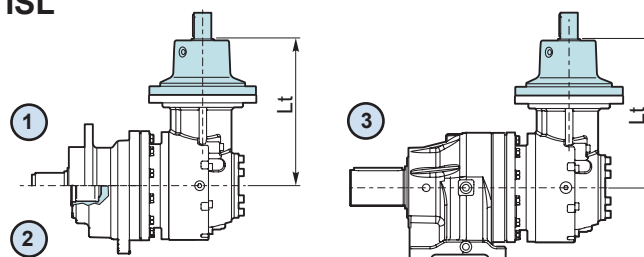
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ISL

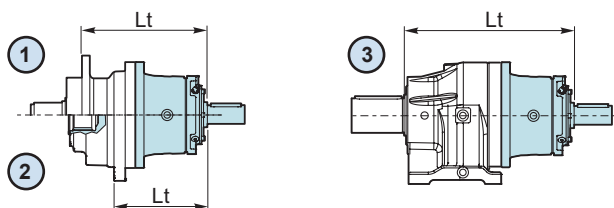


EC

ISL



IS

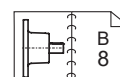


① = MP - MP1 - FS

② = FE - FCP

③ = MPP1

		øD	E	Lt [mm] ①			Lt [mm] ②		Lt [mm] ③
				MP	MP1	FS	FE	FCP	MPP1
EL251	IS30	48 k6	82	326	326	326	206	225	348
EL251	ISL30	40 k6	58	286.5	286.5	286.5	166.5	185.5	308.5
EL252	ISL10	28 k6	50	340.5	340.5	340.5	220.5	239.5	362.5
EL253	ISL10	28 k6	50	384.5	384.5	384.5	264.5	283.5	406.5
EL254	ISL10	28 k6	50	428.5	428.5	428.5	308.5	327.5	450.5
EC252	ISL10	28 k6	50	311	311	311	311	311	311

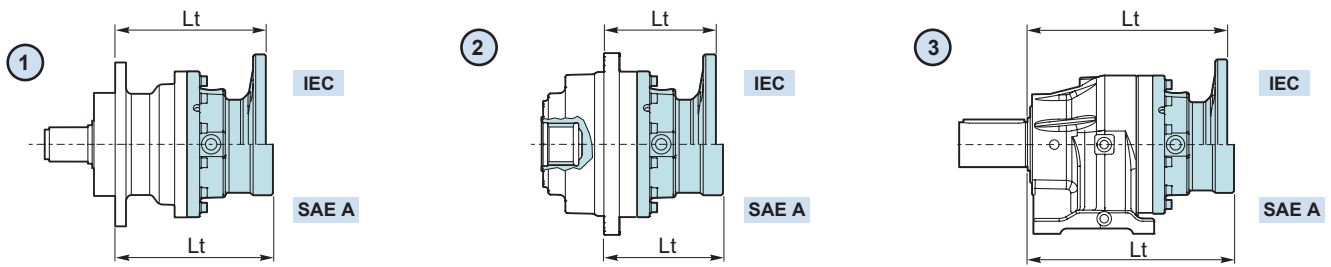


ADATTATORI IEC/SAE A

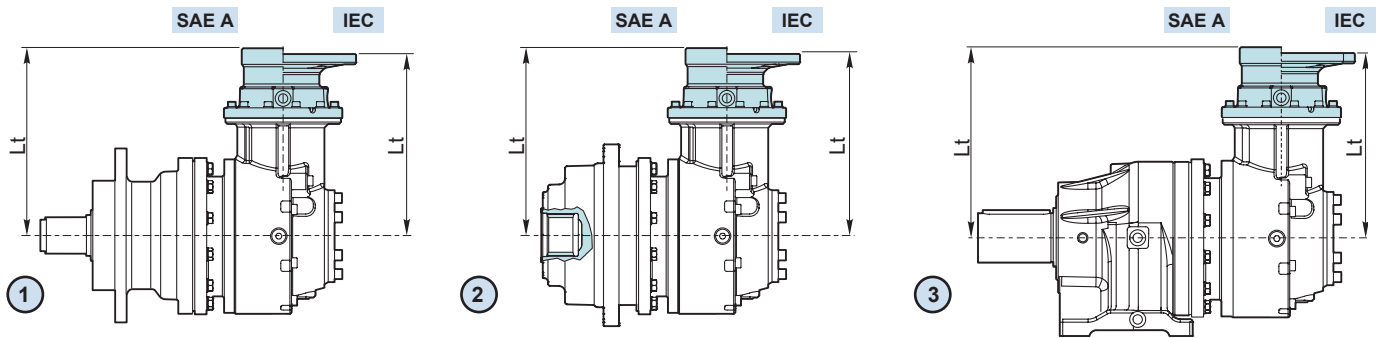
ADAPTERS IEC/SAE A

ADAPTER IEC/SAE A

EL



EC



- ① = MP - MP1 - FS
- ② = FE - FCP
- ③ = MPP1

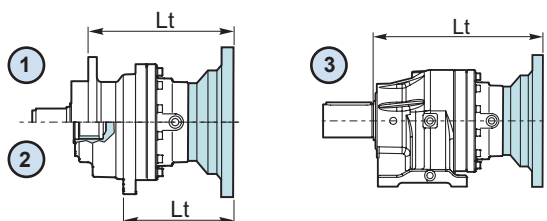
		Lt [mm]			
		IEC			SAE A
		80-90	100-112	132	
EL252	MP	298.5	306.5	342.5	328.5
	MP1	298.5	306.5	342.5	328.5
	FE	178.5	186.5	222.5	208.5
	FS	298.5	306.5	342.5	328.5
	FCP	197.5	205.5	241.5	227.5
	MPP1	320.5	328.5	364.5	350.5
EL253	MP	342.5	350.5	386.5	372.5
	MP1	342.5	350.5	386.5	372.5
	FE	222.5	230.5	266.5	252.5
	FS	342.5	350.5	386.5	372.5
	FCP	241.5	249.5	285.5	271.5
	MPP1	364.5	372.5	408.5	394.5
EL254	MP	386.5	394.5	430.5	416.5
	MP1	386.5	394.5	430.5	416.5
	FE	266.5	274.5	310.5	296.5
	FS	386.5	394.5	430.5	416.5
	FCP	285.5	293.5	329.5	315.5
	MPP1	408.5	416.5	452.5	438.5
EC252	MP	282	290	313	301
	MP1	282	290	313	301
	FE	282	290	313	301
	FS	282	290	313	301
	FCP	282	290	313	301
	MPP1	282	290	313	301

FLANGE MOTORI IEC/NEMA

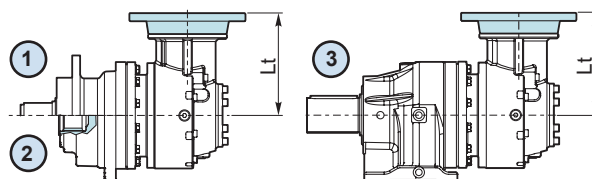
MOTOR FLANGES IEC/NEMA

MOTORFLANSCHEN IEC/NEMA

EL



EC



- ① = MP - MP1 - FS
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]										
		IEC						NEMA				
		63	71	80-90	100-112	132	160-180	143/145 TD	182/184 TC	182/184 TD	210 TD	213/215 TC
EL251	MP	267.5	269.5	274.5	275.5	342.5	373.5	277.5	277.5	277.5	277.5	293.5
	MP1	267.5	269.5	274.5	275.5	342.5	373.5	277.5	277.5	277.5	277.5	293.5
	FE	147.5	149.5	154.5	155.5	222.5	253.5	157.5	157.5	157.5	157.5	173.5
	FS	267.5	269.5	274.5	275.5	342.5	373.5	277.5	277.5	277.5	277.5	293.5
	FCP	166.5	168.5	173.5	174.5	241.5	272.5	176.5	176.5	176.5	176.5	192.5
	MPP1	289.5	291.5	296.5	297.5	364.5	395.5	299.5	299.5	299.5	299.5	315.5
EL252	MP	306.5	308.5	-	-	-	412.5	316.5	316.5	316.5	316.5	332.5
	MP1	306.5	308.5	-	-	-	412.5	316.5	316.5	316.5	316.5	332.5
	FE	186.5	188.5	-	-	-	292.5	196.5	196.5	196.5	196.5	212.5
	FS	306.5	308.5	-	-	-	412.5	316.5	316.5	316.5	316.5	332.5
	FCP	205.5	207.5	-	-	-	311.5	215.5	215.5	215.5	215.5	231.5
	MPP1	328.5	330.5	-	-	-	434.5	338.5	338.5	338.5	338.5	354.5
EL253	MP	350.5	352.5	-	-	-	456.5	360.5	360.5	360.5	360.5	376.5
	MP1	350.5	352.5	-	-	-	456.5	360.5	360.5	360.5	360.5	376.5
	FE	230.5	232.5	-	-	-	336.5	240.5	240.5	240.5	240.5	256.5
	FS	350.5	352.5	-	-	-	456.5	360.5	360.5	360.5	360.5	376.5
	FCP	249.5	251.5	-	-	-	355.5	259.5	259.5	259.5	259.5	275.5
	MPP1	372.5	374.5	-	-	-	478.5	382.5	382.5	382.5	382.5	398.5
EL254	MP	394.5	396.5	-	-	-	500.5	404.5	404.5	404.5	404.5	420.5
	MP1	394.5	396.5	-	-	-	500.5	404.5	404.5	404.5	404.5	420.5
	FE	274.5	276.5	-	-	-	380.5	284.5	284.5	284.5	284.5	300.5
	FS	394.5	396.5	-	-	-	500.5	404.5	404.5	404.5	404.5	420.5
	FCP	293.5	295.5	-	-	-	399.5	303.5	303.5	303.5	303.5	319.5
	MPP1	416.5	418.5	-	-	-	522.5	426.5	426.5	426.5	426.5	442.5
EC252	MP	290	292	297	298	365	396	300	300	300	300	316
	MP1	290	292	297	298	365	396	300	300	300	300	316
	FE	290	292	297	298	365	396	300	300	300	300	316
	FS	290	292	297	298	365	396	300	300	300	300	316
	FCP	290	292	297	298	365	396	300	300	300	300	316
	MPP1	290	292	297	298	365	396	300	300	300	300	316
EC253	MP	155	155	155	155	242	-	-	-	-	-	-
	MP1	155	155	155	155	242	-	-	-	-	-	-
EC254	FE	155	155	155	155	242	-	-	-	-	-	-
	FS	155	155	155	155	242	-	-	-	-	-	-
	FCP	155	155	155	155	242	-	-	-	-	-	-
	MPP1	155	155	155	155	242	-	-	-	-	-	-



A richiesta altre configurazioni disponibili. Contattare il referente DANA di zona.

More configurations are available on request. Consult the DANA area contact person.

Auf Wunsch sind weitere Konfigurationen verfügbar. Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.





FRENI

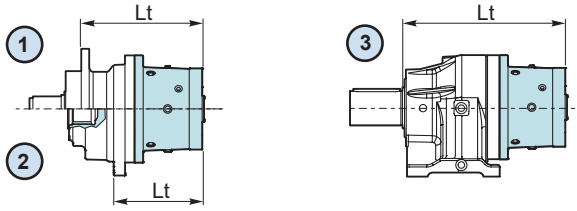
BRAKES

BREMSEN

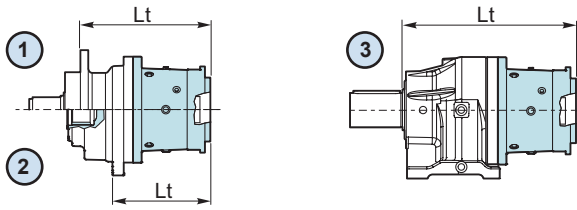
EL

MB3 - E00

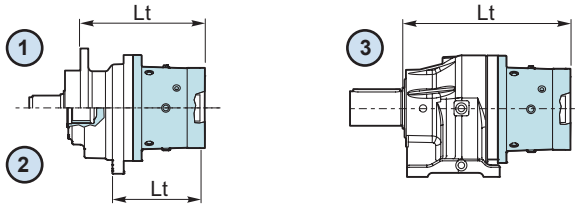
MB5 - E00



MB3 - SAE A



MB3 - BRZV



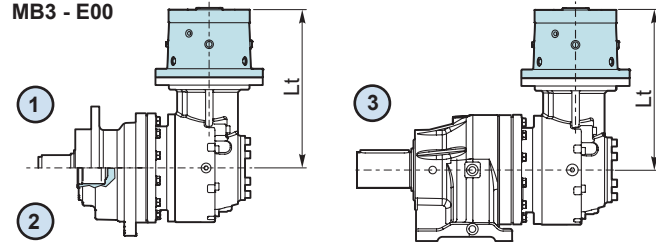
① = MP - MP1 - FS

② = FE - FCP

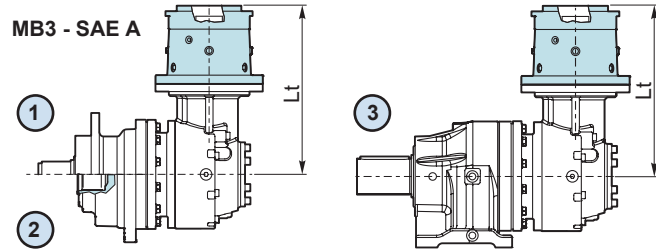
③ = MPP1

EC

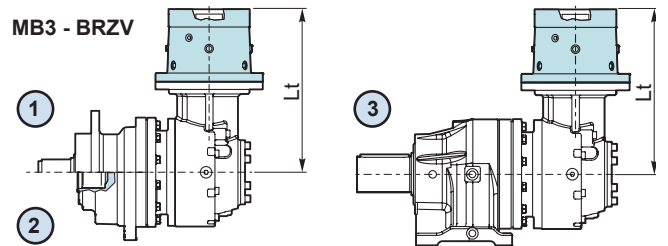
MB3 - E00



MB3 - SAE A



MB3 - BRZV



		Lt [mm]					
		MP	MP1	FE	FS	FCP	MPP1
MB3 E00	EL252	347.5	347.5	227.5	347.5	246.5	369.5
	EL253	391.5	391.5	271.5	391.5	290.5	413.5
	EL254	435.5	435.5	315.5	435.5	334.5	457.5
	EC252	318	318	318	318	318	318
MB3 SAE - A	EL252	376.5	376.5	256.5	376.5	275.5	398.5
	EL253	420.5	420.5	300.5	420.5	319.5	442.5
	EL254	464.5	464.5	344.5	464.5	363.5	486.5
	EC252	347	347	347	347	347	347
MB3 BRZV	EL252	345	345	225	345	244	367
	EL253	389	389	269	389	288	411
	EL254	433	433	313	433	332	455
	EC252	315.5	315.5	315.5	315.5	315.5	315.5
MB5 E00	EL251	313	313	193	313	212	335

CARICHI RADIALI

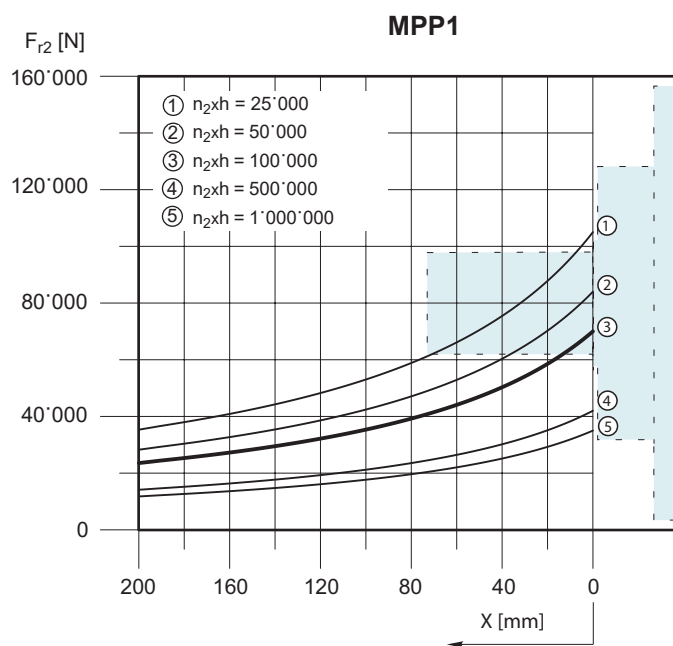
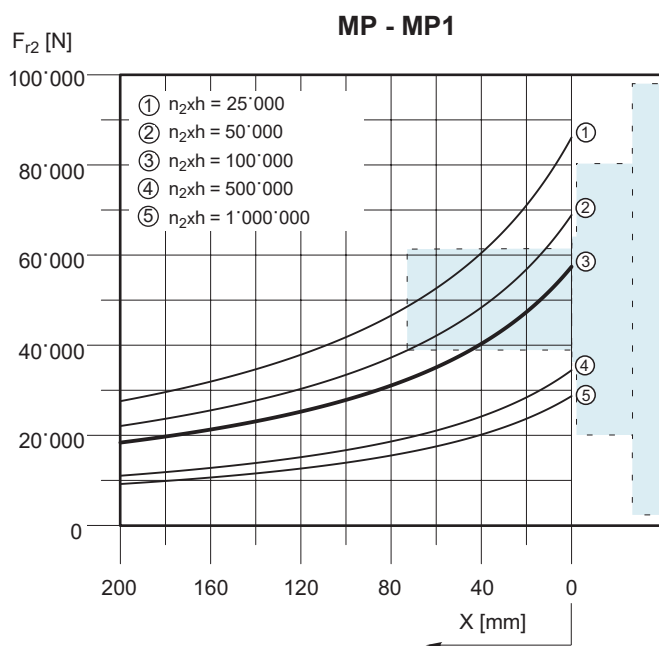
RADIAL LOADS

RADIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



CARICHI ASSIALI

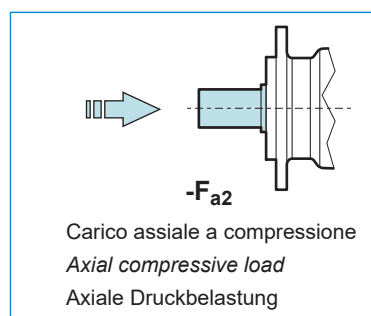
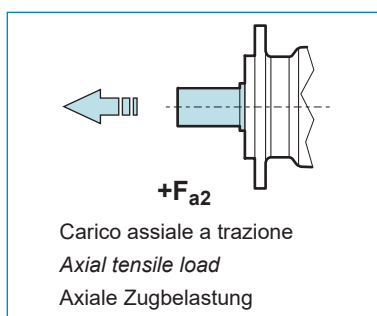
AXIAL LOADS

AXIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



E25 MP - MP1		
n_{2xh}	- F_{a2} [N]	+ F_{a2} [N]
10'000	106'000	86'000
25'000	80'560	65'360
50'000	65'190	52'890
100'000	53'000	43'000
500'000	32'860	26'660
1'000'000	26'500	21'500

E25 MPP1		
n_{2xh}	- F_{a2} [N]	+ F_{a2} [N]
10'000	133'200	106'000
25'000	101'232	80'560
50'000	81'918	65'190
100'000	66'600	53'000
500'000	41'292	32'860
1'000'000	33'300	26'500

CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

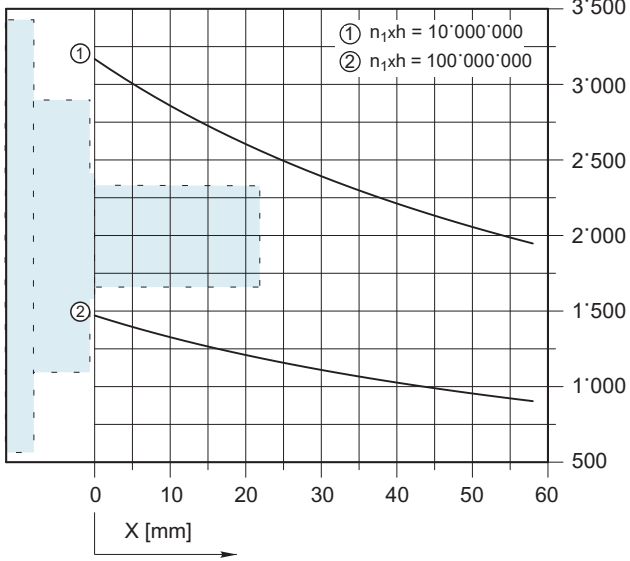
Alberi in ingresso

Input shaft

Eingangswellen

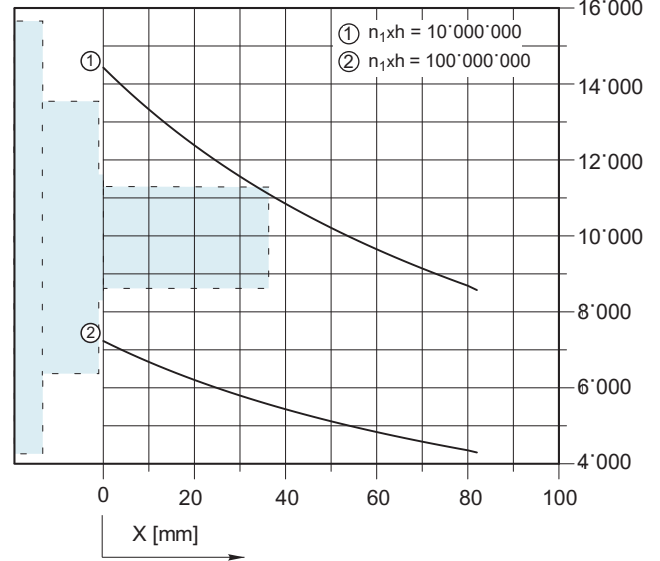
ISL30

F_{r1} [N]



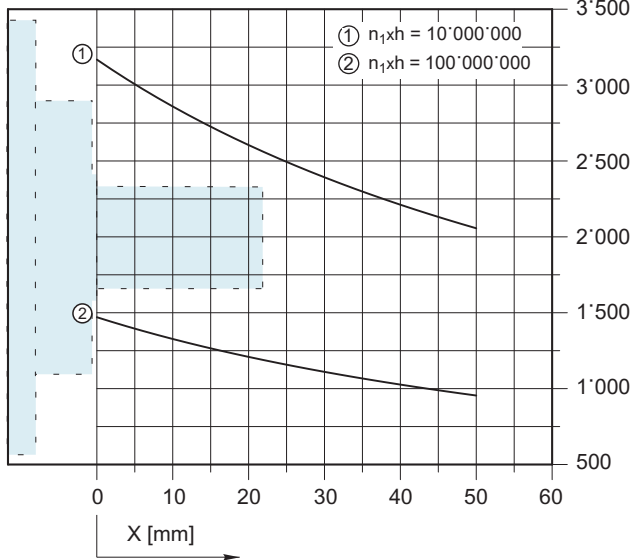
IS30
























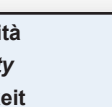












F_{r1} [N]

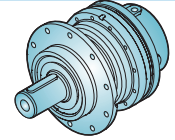


ISL10

F_{r1} [N]

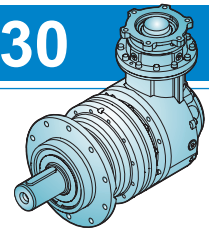


	Disponibilità Availability Verfügbarkeit	Albero - Shaft - Getriebewelle		Pagina Page Seite
		Tipologia Type Typ	Dimensioni Dimensions Abmessungen [mm]	
USCITE OUTPUTS AUSGÄNGE			B58x53 DIN 5482	
			ø65	
			A58x53 DIN 5482	
			ø75	
			ø50	
			ø65	
ENTRATE INPUTS EINNAHMEN			IS ISL	
			IS30 ø48 ISL10 ø28 ISL30 ø40	
FLANGE D'INGRESSO INPUT FLANGE FLANSCH EINGANG			A50x45 DIN 5482	
				
FRENI BRAKES BREMSEN				
				
	Disponibilità Availability Verfügbarkeit		T _B [Nm]	Pagina Page Seite
		MB3 33 ÷ 495	MB5 173 ÷ 1'173	



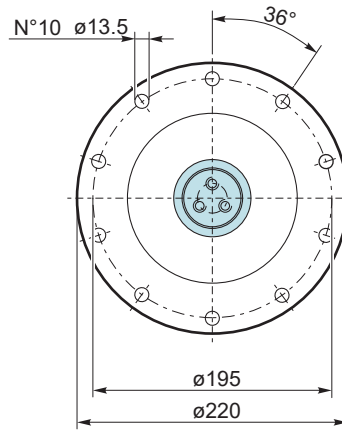
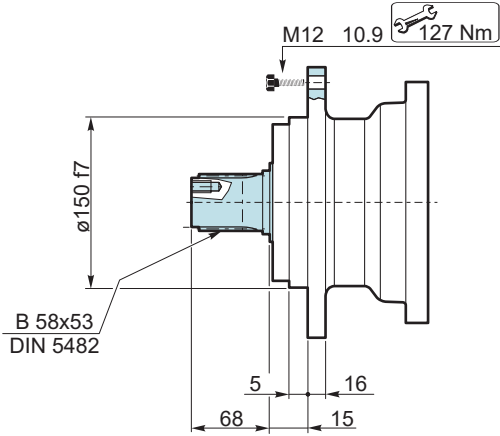
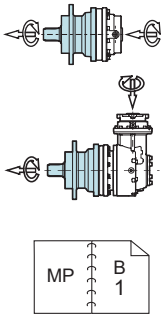
i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EL301									
3.52	4'880	4'570	4'000	3'560	2'580	2'090	3'800	5'500	10
4.07	4'490	4'150	4'080	3'860	2'970	2'410	3'800	6'500	10
4.95	4'200	3'760	3'270	3'070	2'680	2'350	3'800	6'500	10
5.88	3'400	2'830	2'490	2'350	2'030	1'900	3'800	6'500	10
6.53	2'500	2'090	1'810	1'700	1'470	1'380	3'800	4'450	10
EL302									
12.4	4'800	4'570	4'000	3'560	2'480	2'020	4'000	5'500	7
14.3	4'490	4'150	4'080	3'860	2'750	2'240	4'000	6'500	7
16.6	4'490	4'150	4'080	3'860	2'710	2'210	4'000	6'500	7
20.2	4'490	4'020	3'750	3'500	2'650	2'160	4'000	6'500	7
24.5	4'200	3'760	3'270	3'070	2'680	2'350	4'000	6'500	7
29.1	4'040	3'600	3'270	3'070	2'560	2'340	4'000	6'500	7
34.3	3'150	2'850	2'630	2'420	2'100	2'010	4'000	6'500	7
40.8	3'400	2'830	2'490	2'350	2'030	1'900	4'000	6'500	7
45.3	2'500	2'090	1'810	1'700	1'470	1'380	4'000	4'450	7
50.6	1'360	1'290	1'230	1'180	1'070	1'030	4'000	6'500	7
60.1	1'600	1'510	1'450	1'390	1'260	1'210	4'000	6'500	7
66.8	1'760	1'670	1'600	1'530	1'390	1'340	4'000	4'450	7
EL303									
43.4	4'800	4'570	4'000	3'560	2'480	2'020	4'000	5'500	6
50.3	4'490	4'150	4'080	3'860	2'750	2'240	4'000	6'500	6
58.3	4'490	4'150	4'080	3'860	2'750	2'240	4'000	6'500	6
67.6	4'490	4'150	4'080	3'860	2'710	2'210	4'000	6'500	6
72.6	4'800	4'570	4'000	3'560	2'480	2'020	4'000	5'500	6
84.2	4'490	4'150	4'080	3'860	2'750	2'240	4'000	6'500	6
99.2	4'490	4'150	4'080	3'860	2'750	2'240	4'000	6'500	6
115	4'490	4'150	4'080	3'860	2'710	2'210	4'000	6'500	6
140	4'490	4'020	3'750	3'500	2'650	2'160	4'000	6'500	6
170	4'220	3'990	3'820	3'660	2'710	2'210	4'000	6'500	6
178	4'200	3'760	3'270	3'070	2'680	2'350	4'000	6'500	6
206	4'490	4'020	3'750	3'500	2'650	2'160	4'000	6'500	6
251	4'200	3'760	3'270	3'070	2'680	2'350	4'000	6'500	6
298	4'040	3'600	3'270	3'070	2'560	2'340	4'000	6'500	6
351	3'150	2'850	2'630	2'420	2'100	2'010	4'000	6'500	6
417	3'400	2'830	2'490	2'350	2'030	1'900	4'000	6'500	6
EL304									
360	4'800	4'570	4'000	3'560	2'480	2'020	4'000	5'500	4
404	4'500	4'150	4'100	3'900	2'750	2'240	4'000	6'500	4
424	4'800	4'570	4'000	3'560	2'480	2'020	4'000	5'500	4
444	4'800	4'570	4'000	3'560	2'480	2'020	4'000	5'500	4
491	4'500	4'150	4'100	3'900	2'750	2'240	4'000	6'500	4
514	4'500	4'150	4'100	3'900	2'750	2'240	4'000	6'500	4
596	4'500	4'150	4'100	3'900	2'750	2'240	4'000	6'500	4
625	4'800	4'570	4'000	3'560	2'480	2'020	4'000	5'500	4
688	4'500	4'150	4'100	3'900	2'750	2'240	4'000	6'500	4
725	4'500	4'150	4'100	3'900	2'750	2'240	4'000	6'500	4
797	4'500	4'150	4'100	3'900	2'710	2'210	4'000	6'500	4
861	4'500	4'150	4'100	3'900	2'750	2'240	4'000	6'500	4
997	4'500	4'150	4'100	3'900	2'710	2'210	4'000	6'500	4
1176	4'500	4'150	4'100	3'900	2'710	2'210	4'000	6'500	4
1212	4'500	4'050	3'750	3'500	2'650	2'160	4'000	6'500	4
1429	4'500	4'050	3'750	3'500	2'650	2'160	4'000	6'500	4
1734	4'250	4'000	3'850	3'700	2'710	2'210	4'000	6'500	4
1818	4'200	3'800	3'300	3'100	2'680	2'350	4'000	6'500	4
2107	4'500	4'050	3'750	3'500	2'650	2'160	4'000	6'500	4
2561	4'200	3'800	3'300	3'100	2'680	2'350	4'000	6'500	4
3041	4'050	3'600	3'300	3'100	2'560	2'340	4'000	6'500	4

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich



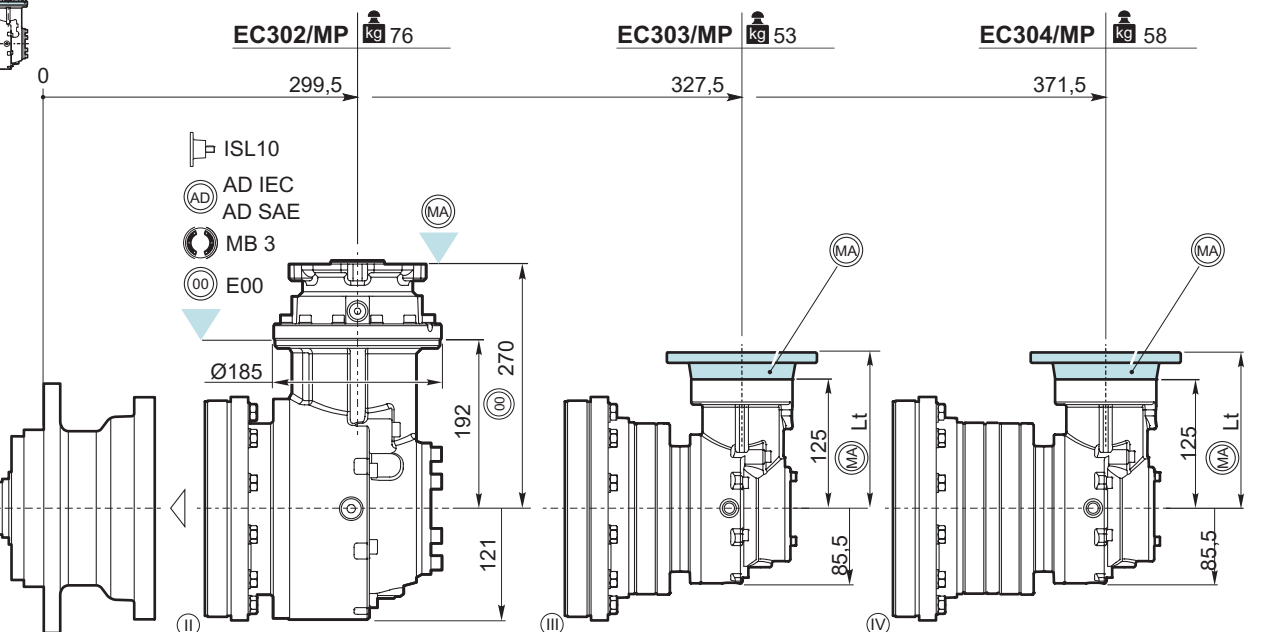
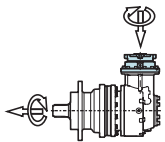
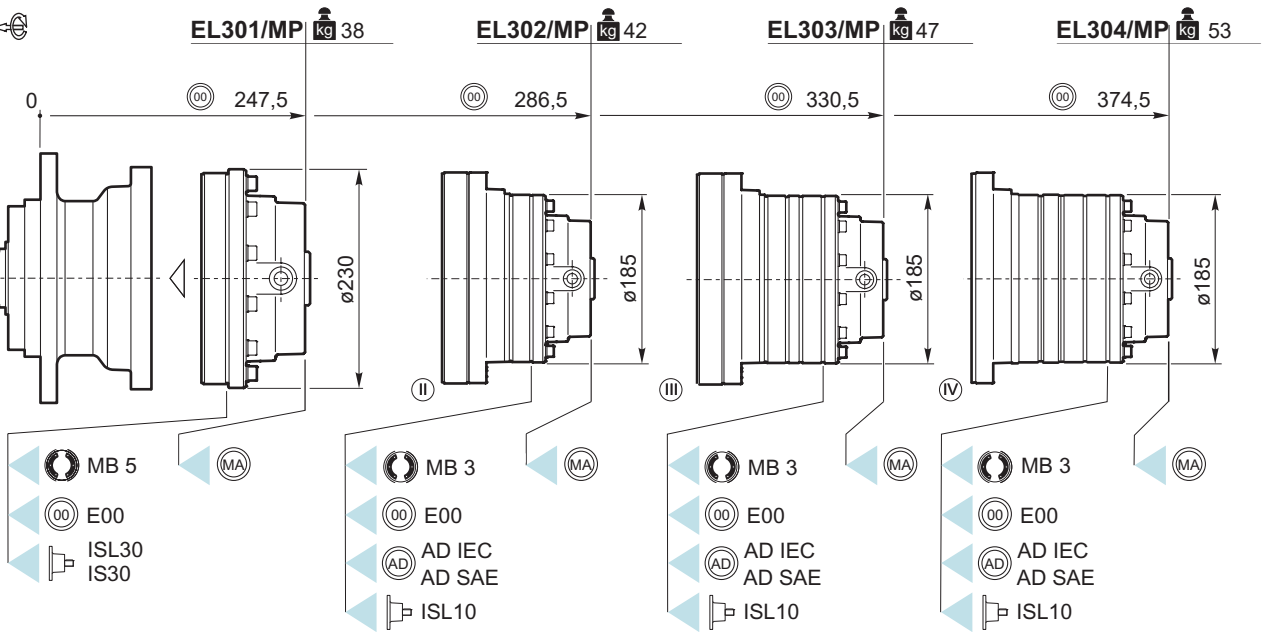
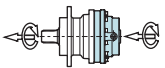
i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EC302									
10.5	4'880	4'570	4'000	3'560	2'575	2'090	3'000	5'500	8
12.2	4'490	4'150	4'080	3'860	2'965	2'405	3'000	6'500	8
14.9	4'200	3'760	3'270	3'070	2'680	2'350	3'000	6'500	8
16.0	4'430	3'860	3'470	3'320	2'575	2'090	3'000	5'500	8
18.6	4'490	4'150	3'970	3'810	2'965	2'405	3'000	6'500	8
22.6	4'200	3'760	3'270	3'070	2'680	2'350	3'000	6'500	8
26.8	3'400	2'825	2'490	2'345	2'030	1'900	3'000	6'500	8
29.8	2'500	2'085	1'805	1'695	1'470	1'380	3'000	4'450	8
EC303									
37.1	4'800	4'100	3'250	2'580	1'510	1'200	4'000	5'500	5
43.0	4'380	4'270	3'590	2'850	1'665	1'325	4'000	5'500	5
49.8	4'490	4'150	3'960	3'150	1'840	1'460	4'000	6'500	5
60.5	4'490	4'020	3'750	3'500	2'095	1'660	4'000	6'500	5
70.0	4'490	3'740	2'965	2'355	1'380	1'095	4'000	6'500	5
73.6	4'200	3'760	3'270	3'070	2'385	1'895	4'000	6'500	5
81.1	4'490	4'120	3'280	2'600	1'520	1'205	4'000	6'500	5
87.4	4'040	3'600	3'270	3'070	2'555	2'125	4'000	6'500	5
98.6	4'490	4'020	3'730	2'960	1'730	1'375	4'000	6'500	5
120	4'200	3'760	3'270	3'070	1'970	1'565	4'000	6'500	5
142	4'040	3'600	3'270	3'070	2'210	1'755	4'000	6'500	5
EC304									
130	4'800	4'570	4'000	3'560	2'480	2'015	4'000	5'500	4
151	4'490	4'150	4'080	3'860	2'750	2'235	4'000	6'500	4
175	4'490	4'150	4'080	3'860	2'750	2'235	4'000	6'500	4
184	4'800	4'570	4'000	3'560	2'480	2'015	4'000	5'500	4
203	4'490	4'150	4'080	3'860	2'710	2'205	4'000	6'500	4
213	4'490	4'150	4'080	3'860	2'750	2'235	4'000	6'500	4
218	4'800	4'570	4'000	3'560	2'480	2'015	4'000	5'500	4
246	4'490	4'150	4'080	3'860	2'750	2'235	4'000	6'500	4
257	4'800	4'570	4'000	3'560	2'480	2'015	4'000	5'500	4
285	4'490	4'150	4'080	3'860	2'750	2'235	4'000	6'500	4
298	4'490	4'150	4'080	3'860	2'750	2'235	4'000	6'500	4
331	4'490	4'150	4'080	3'860	2'710	2'205	4'000	6'500	4
347	4'490	4'150	4'080	3'860	2'750	2'235	4'000	6'500	4
362	4'200	3'760	3'270	3'070	2'680	2'350	4'000	6'500	4
402	4'490	4'150	4'080	3'860	2'710	2'205	4'000	6'500	4
433	4'200	3'760	3'270	3'070	2'680	2'350	4'000	6'500	4
477	4'490	4'150	4'080	3'860	2'710	2'205	4'000	6'500	4
509	4'220	3'990	3'820	3'660	2'710	2'205	4'000	6'500	4
534	4'200	3'760	3'270	3'070	2'680	2'350	4'000	6'500	4
619	4'490	4'020	3'750	3'500	2'650	2'155	4'000	6'500	4
705	4'200	3'760	3'270	3'070	2'680	2'350	4'000	6'500	4
752	4'200	3'760	3'270	3'070	2'680	2'350	4'000	6'500	4
829	4'220	3'990	3'820	3'660	2'710	2'205	4'000	6'500	4
870	4'200	3'760	3'270	3'070	2'680	2'350	4'000	6'500	4
1008	4'490	4'020	3'750	3'500	2'650	2'155	4'000	6'500	4
1225	4'200	3'760	3'270	3'070	2'680	2'350	4'000	6'500	4
1455	4'040	3'600	3'270	3'070	2'555	2'340	4'000	6'500	4

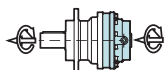
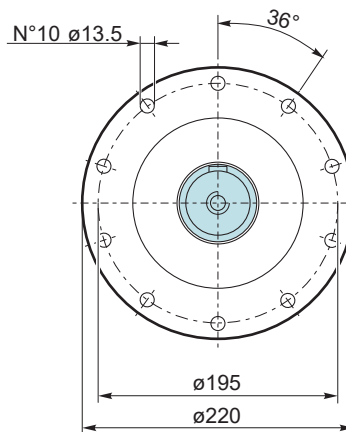
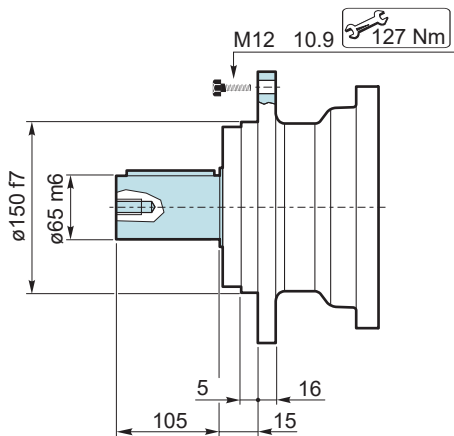
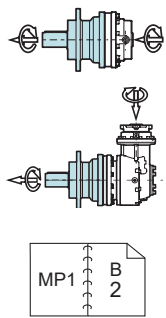
Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich



Accessori
Accessories
Zubehör

E30
10



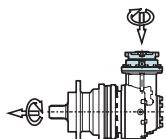
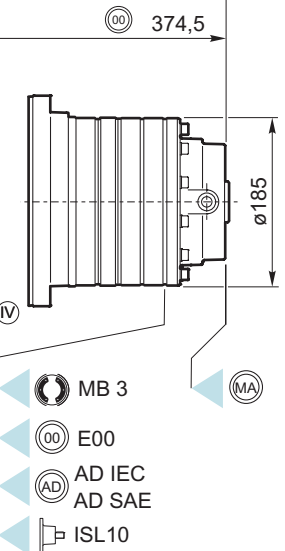
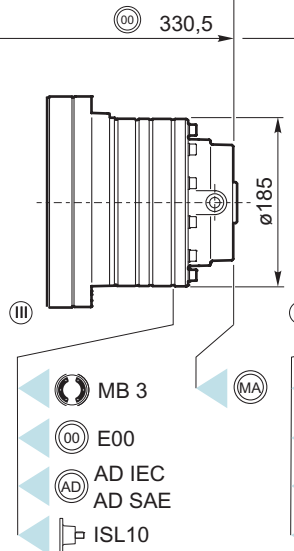
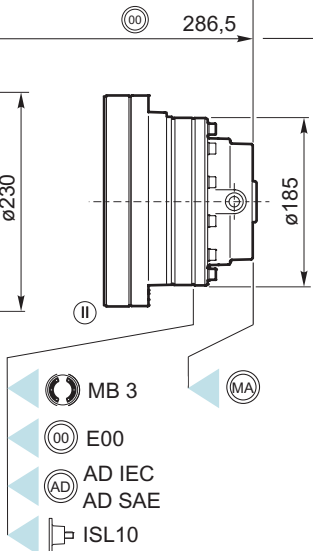
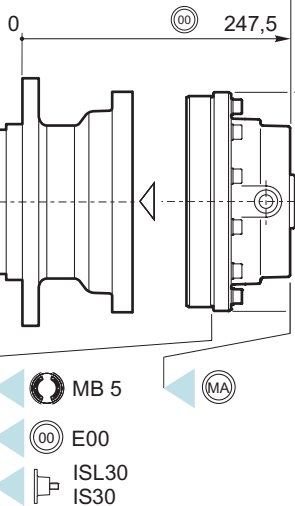


EL301/MP1 39

EL302/MP1 43

EL303/MP1 48

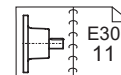
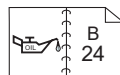
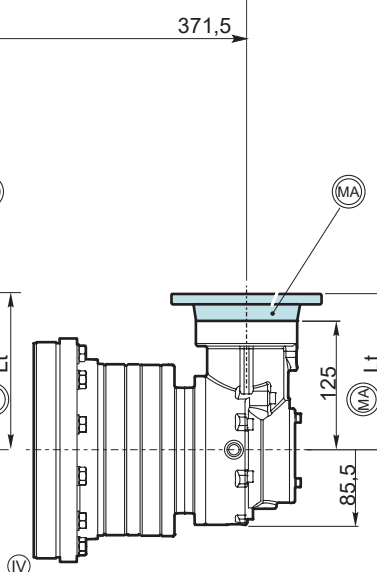
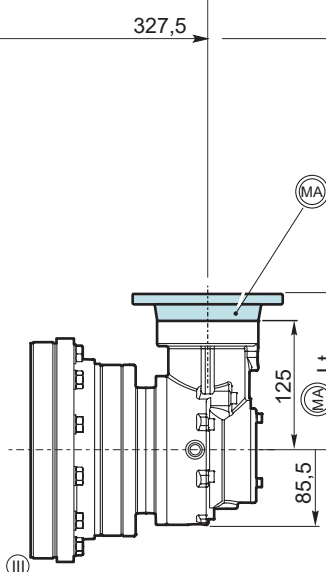
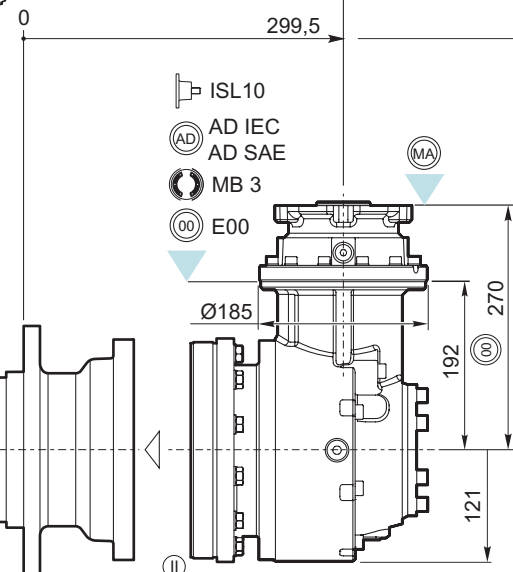
EL304/MP1 54

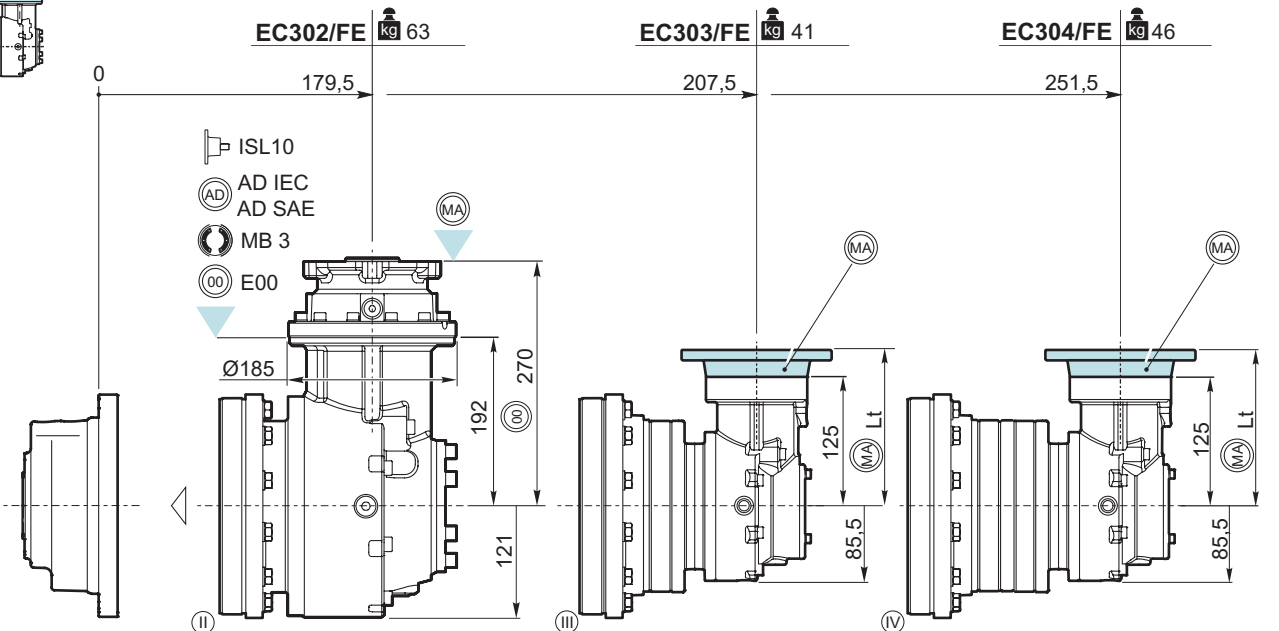
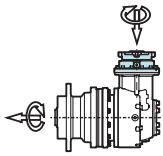
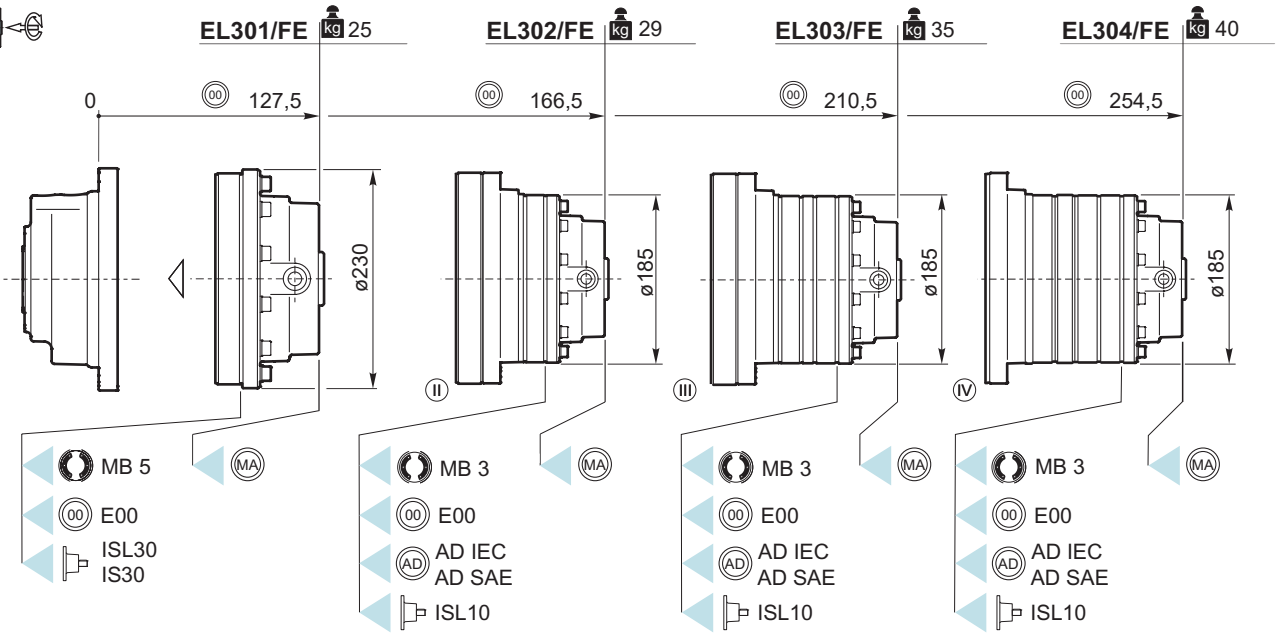
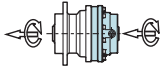
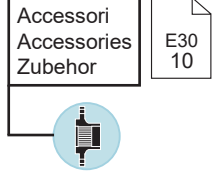
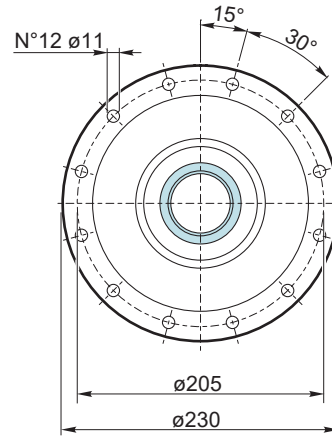
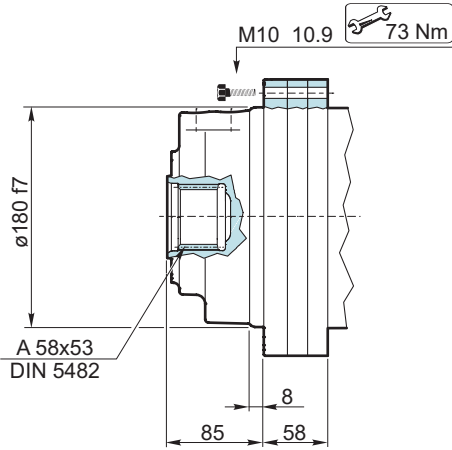
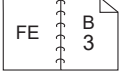
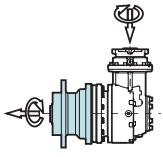
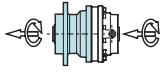


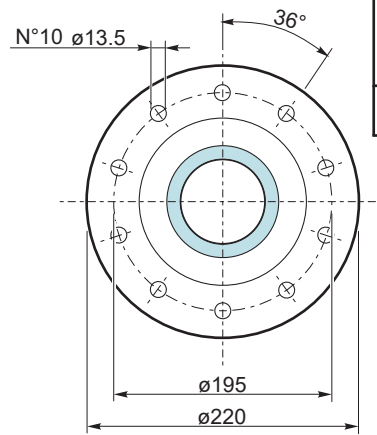
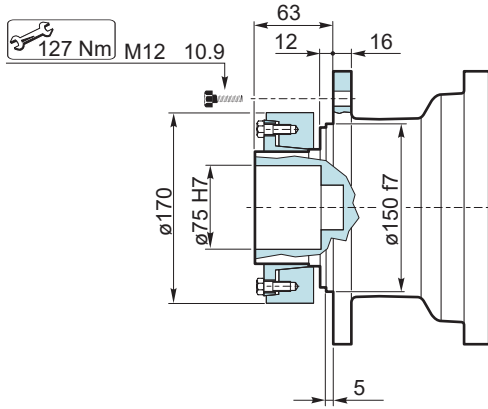
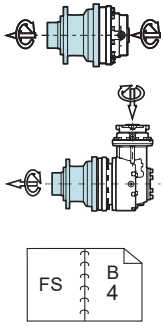
EC302/MP1 77

EC303/MP1 54

EC304/MP1 60

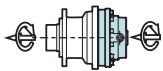






Giunto ad attrito
Shrink disc
Reibungskupplung

B 18

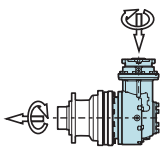
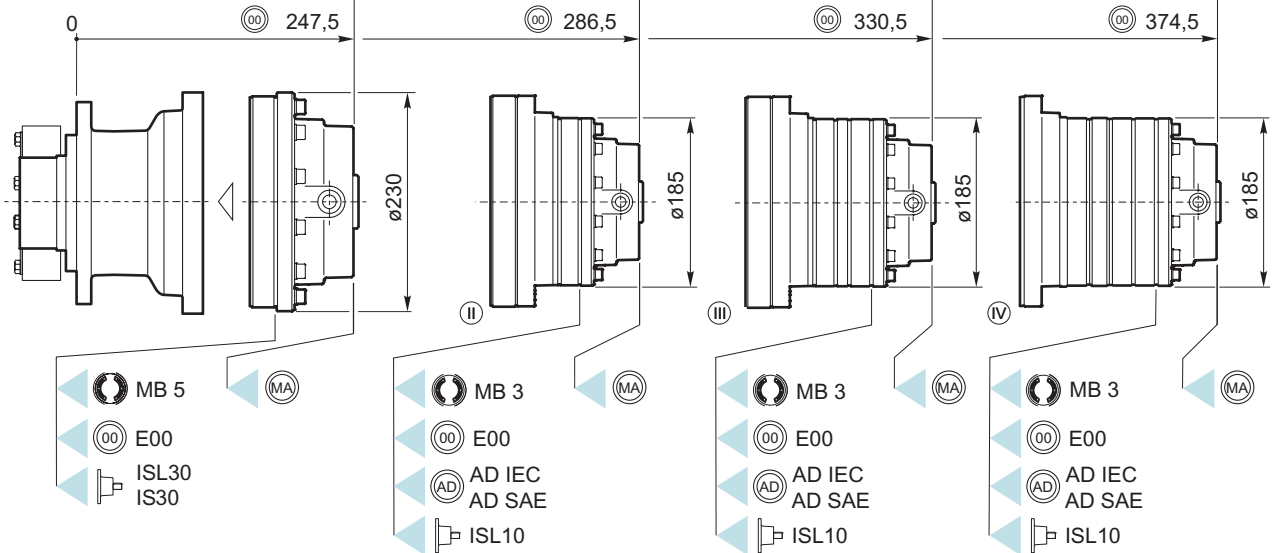


EL301/FS 37

EL302/FS 42

EL303/FS 47

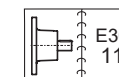
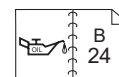
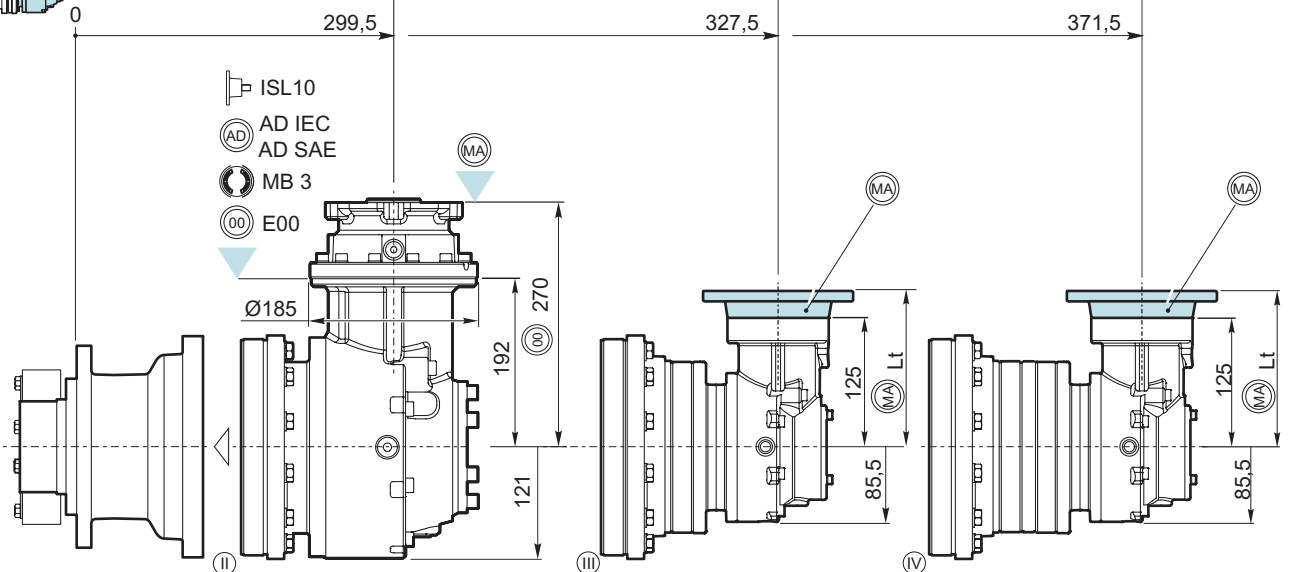
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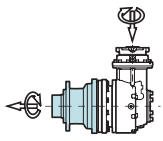
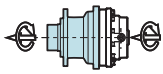


EC302/FS 75

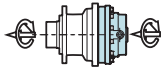
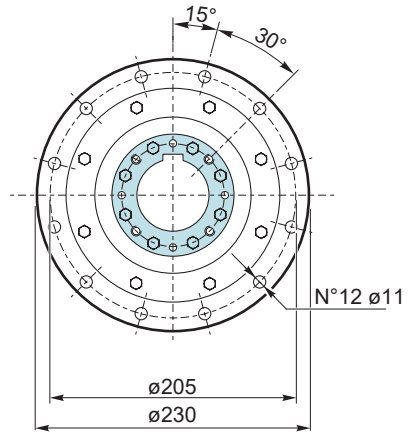
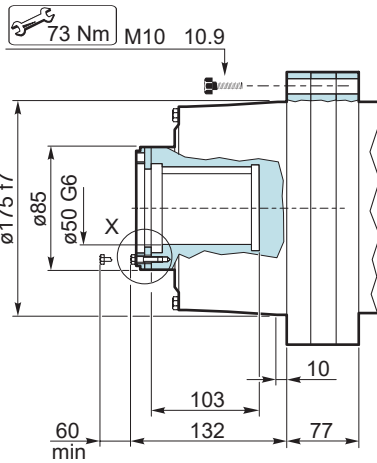
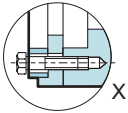
EC303/FS 53

EC304/FS 58





FCP B 6

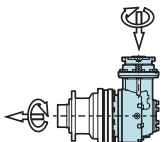
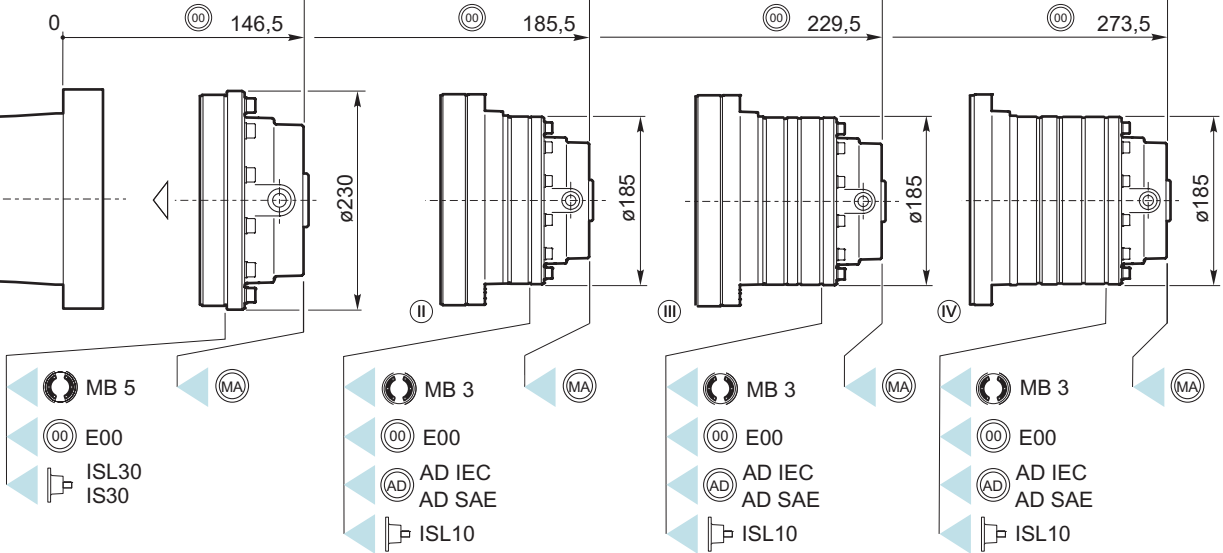


EL301/FCP **kg** 32

EL302/FCP **kg** 36

EL303/FCP **kg** 42

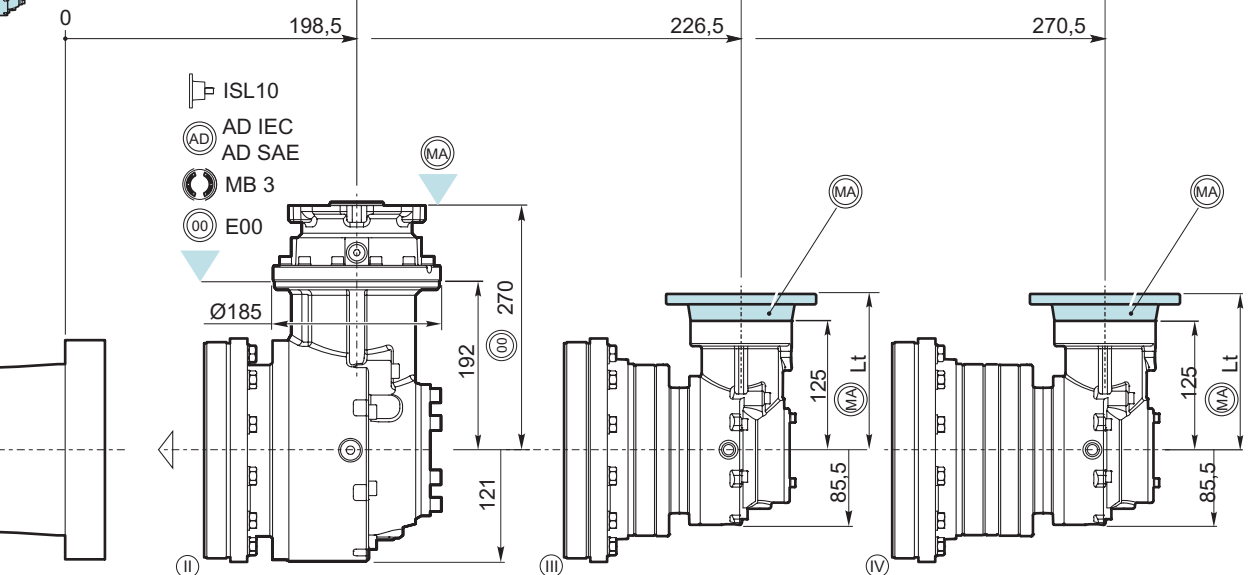
EL304/FCP **kg** 47

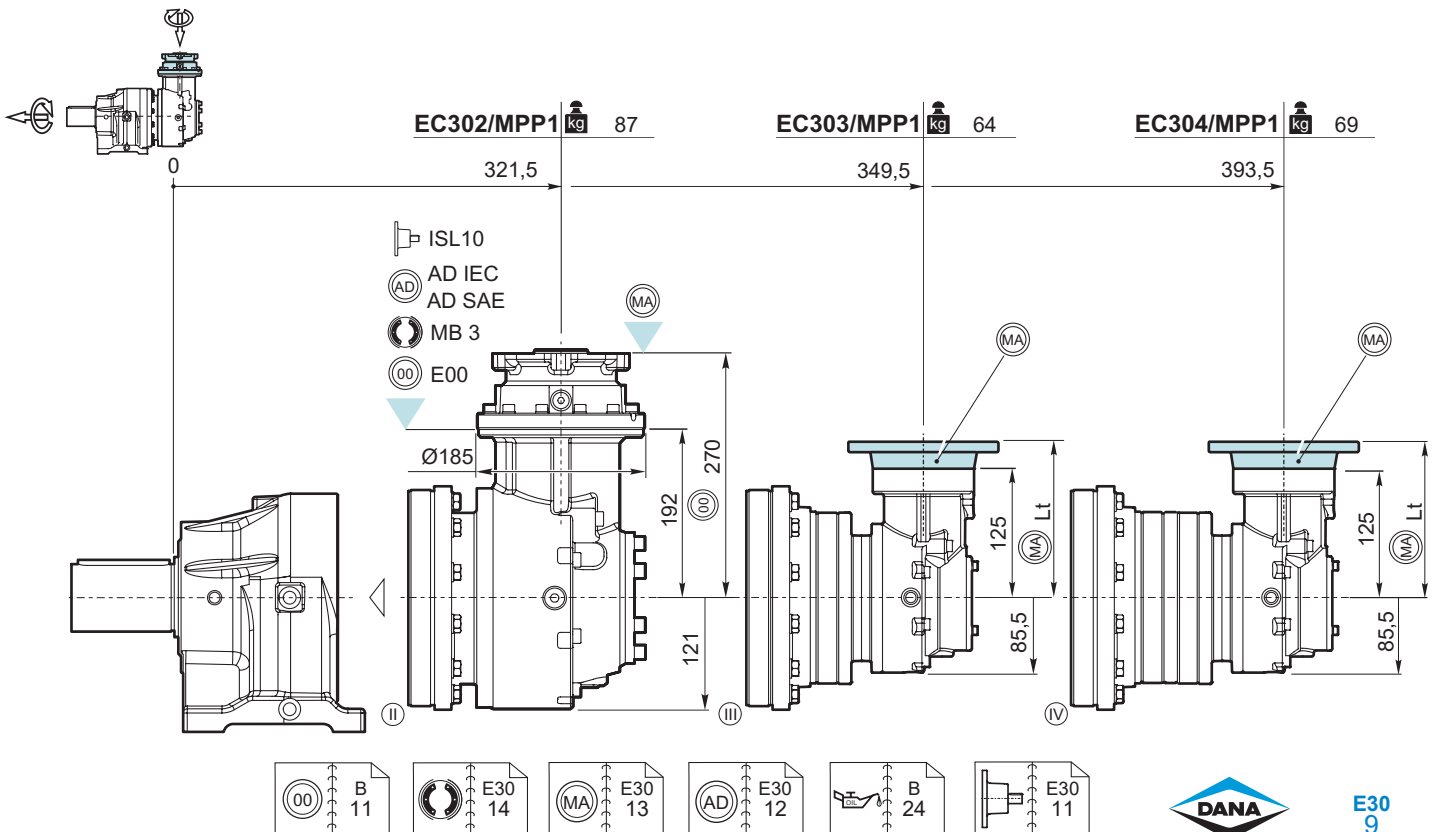
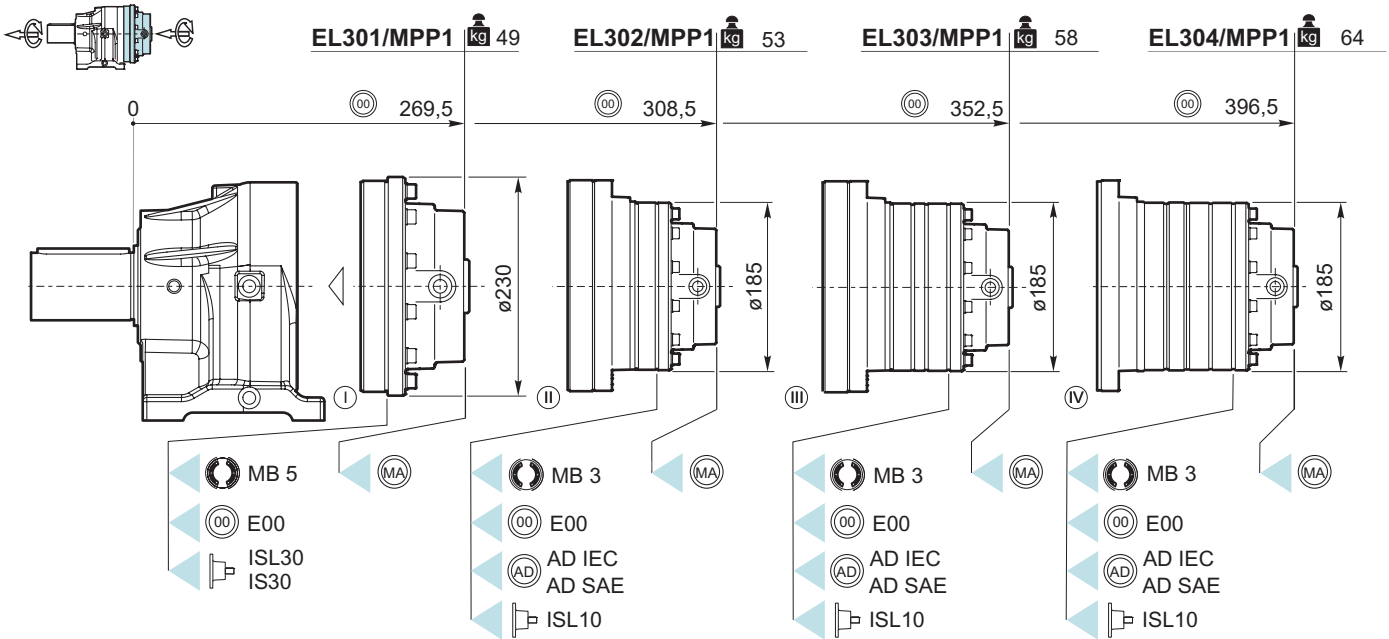
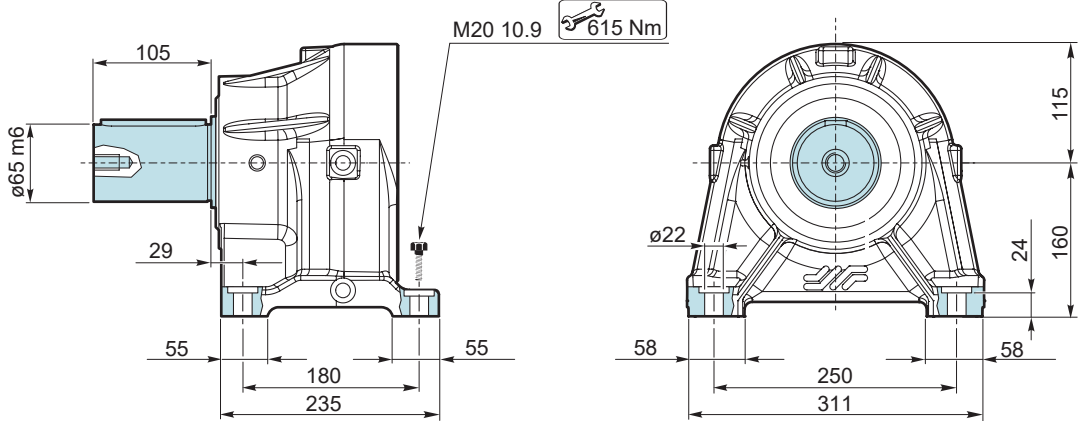
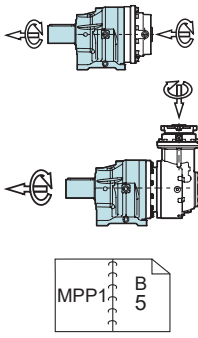


EC302/FCP **kg** 70

EC303/FCP **kg** 48

EC304/FCP **kg** 53







ACCESSORI

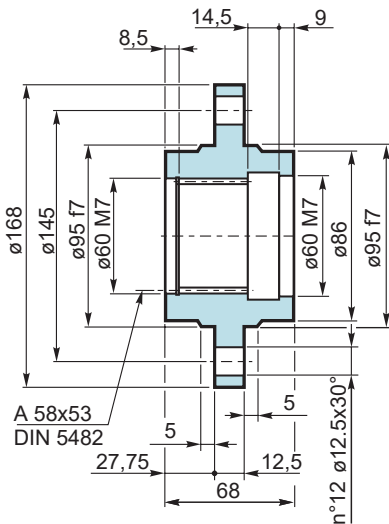
ACCESSORIES

ZUBEHÖR



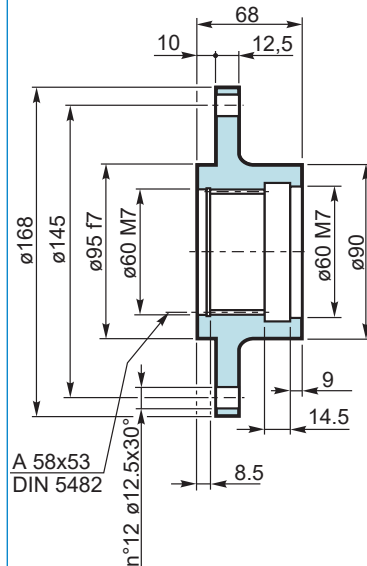
Flangia ruota
Driving flange
Radnabehflansch

FA 020 Mat. C40 EN 10083
Cod: 347.0064.1800



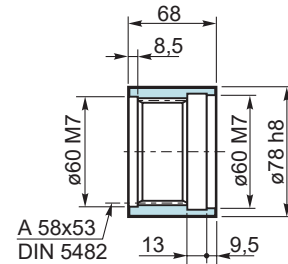
Flangia ruota
Driving flange
Radnabehflansch

FR 020 Mat. C40 EN 10083
Cod: 347.0013.1800



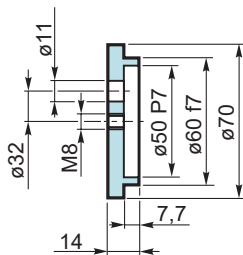
Manicotto scanalato
Splined bush
Manchon cannelée

MS 020 Mat. 42CrMo4 EN 10083
Cod: 391.0284.8500



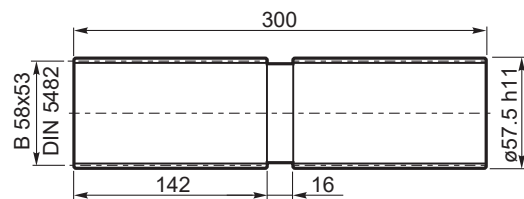
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 020 Mat. C40 EN 10083
Cod: 340.4224.0000

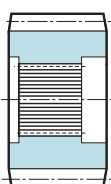


Barra scanalata
Splined bar
Zugspindel

BS 020 Mat. 16NiCr4 EN 10084
Cod: 391.2703.0100



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

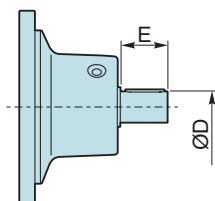
Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

SUPPORTI MASCHIO IN INGRESSO

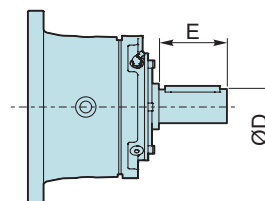
MALE INPUT SUPPORTS

ANTRIEBS- WELLENSTÜMPFE

ISL

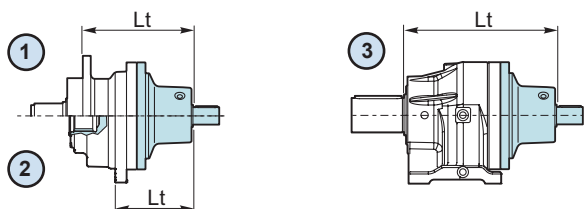


IS



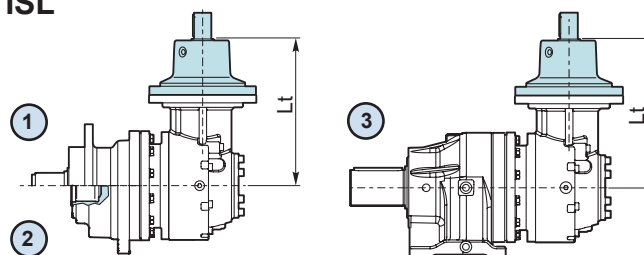
EL

ISL

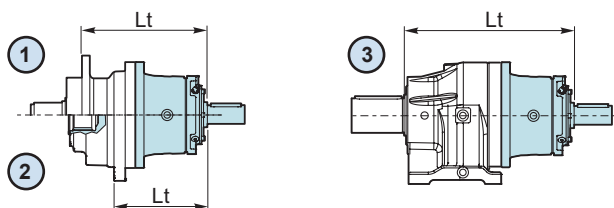


EC

ISL



IS

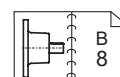


1 = MP - MP1 - FS

2 = FE - FCP

3 = MPP1

		øD	E	Lt [mm] 1			Lt [mm] 2		Lt [mm] 3
				MP	MP1	FS	FE	FCP	MPP1
EL301	IS30	48 k6	82	326	326	326	206	225	348
EL301	ISL30	40 k6	58	286.5	286.5	286.5	166.5	185.5	308.5
EL302	ISL10	28 k6	50	340.5	340.5	340.5	220.5	239.5	362.5
EL303	ISL10	28 k6	50	384.5	384.5	384.5	264.5	283.5	406.5
EL304	ISL10	28 k6	50	428.5	428.5	428.5	308.5	327.5	450.5
EC302	ISL10	28 k6	50	311	311	311	311	311	311

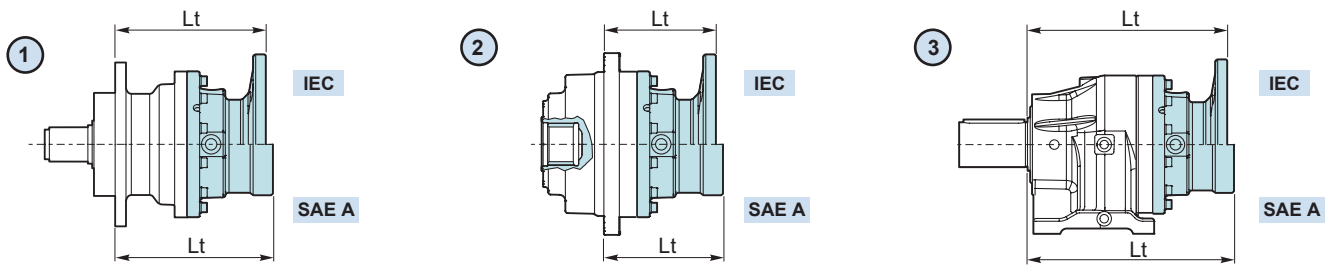


ADATTATORI IEC/SAE A

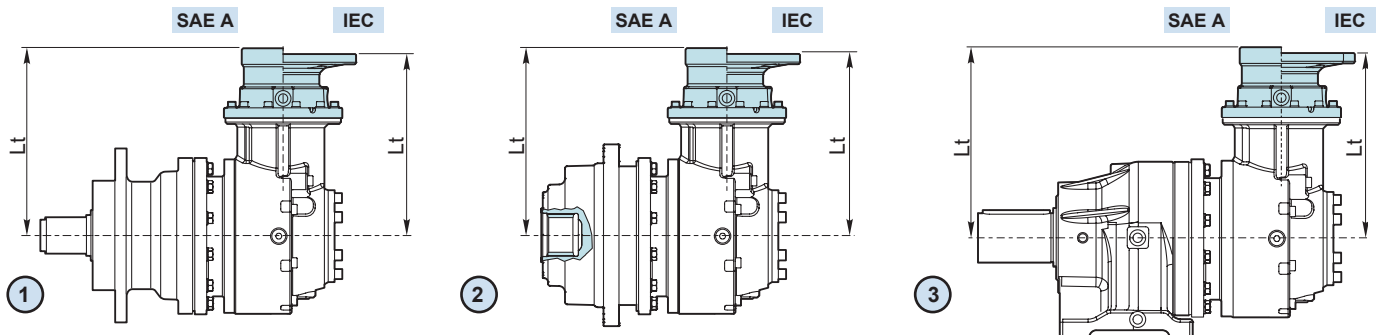
ADAPTERS IEC/SAE A

ADAPTER IEC/SAE A

EL

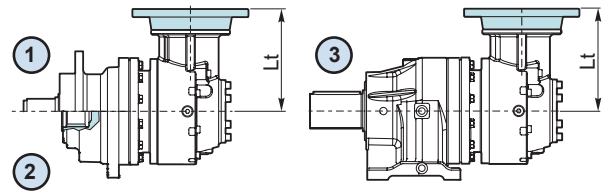
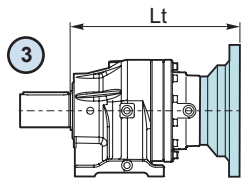
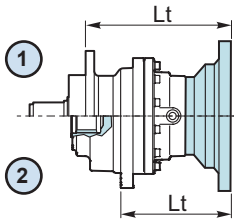


EC



- ① = MP - MP1 - FS
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]			
		IEC			SAE A
		80-90	100-112	132	
EL302	MP	298.5	306.5	342.5	328.5
	MP1	298.5	306.5	342.5	328.5
	FE	178.5	186.5	222.5	208.5
	FS	298.5	306.5	342.5	328.5
	FCP	197.5	205.5	241.5	227.5
	MPP1	320.5	328.5	364.5	350.5
EL303	MP	342.5	350.5	386.5	372.5
	MP1	342.5	350.5	386.5	372.5
	FE	222.5	230.5	266.5	252.5
	FS	342.5	350.5	386.5	372.5
	FCP	241.5	249.5	285.5	271.5
	MPP1	364.5	372.5	408.5	394.5
EL304	MP	386.5	394.5	430.5	416.5
	MP1	386.5	394.5	430.5	416.5
	FE	266.5	274.5	310.5	296.5
	FS	386.5	394.5	430.5	416.5
	FCP	285.5	293.5	329.5	315.5
	MPP1	408.5	416.5	452.5	438.5
EC302	MP	282	290	313	301
	MP1	282	290	313	301
	FE	282	290	313	301
	FS	282	290	313	301
	FCP	282	290	313	301
	MPP1	282	290	313	301

**FLANGE MOTORI
IEC/NEMA**
**MOTOR FLANGES
IEC/NEMA**
**MOTORFLANSCHEN
IEC/NEMA**
EL
EC


- 1** = MP - MP1 - FS
- 2** = FE - FCP
- 3** = MPP1

		Lt [mm]										
		IEC						NEMA				
		63	71	80-90	100-112	132	160-180	143/145 TD	182/184 TC	182/184 TD	210 TD	213/215 TC
EL301	MP	267.5	269.5	274.5	275.5	342.5	373.5	277.5	277.5	277.5	277.5	293.5
	MP1	267.5	269.5	274.5	275.5	342.5	373.5	277.5	277.5	277.5	277.5	293.5
	FE	147.5	149.5	154.5	155.5	222.5	253.5	157.5	157.5	157.5	157.5	173.5
	FS	267.5	269.5	274.5	275.5	342.5	373.5	277.5	277.5	277.5	277.5	293.5
	FCP	166.5	168.5	173.5	174.5	241.5	272.5	176.5	176.5	176.5	176.5	192.5
	MPP1	289.5	291.5	296.5	297.5	364.5	395.5	299.5	299.5	299.5	299.5	315.5
EL302	MP	306.5	308.5	-	-	-	412.5	316.5	316.5	316.5	316.5	332.5
	MP1	306.5	308.5	-	-	-	412.5	316.5	316.5	316.5	316.5	332.5
	FE	186.5	188.5	-	-	-	292.5	196.5	196.5	196.5	196.5	212.5
	FS	306.5	308.5	-	-	-	412.5	316.5	316.5	316.5	316.5	332.5
	FCP	205.5	207.5	-	-	-	311.5	215.5	215.5	215.5	215.5	231.5
	MPP1	328.5	330.5	-	-	-	434.5	338.5	338.5	338.5	338.5	354.5
EL303	MP	350.5	352.5	-	-	-	456.5	360.5	360.5	360.5	360.5	376.5
	MP1	350.5	352.5	-	-	-	456.5	360.5	360.5	360.5	360.5	376.5
	FE	230.5	232.5	-	-	-	336.5	240.5	240.5	240.5	240.5	256.5
	FS	350.5	352.5	-	-	-	456.5	360.5	360.5	360.5	360.5	376.5
	FCP	249.5	251.5	-	-	-	355.5	259.5	259.5	259.5	259.5	275.5
	MPP1	372.5	374.5	-	-	-	478.5	382.5	382.5	382.5	382.5	398.5
EL304	MP	394.5	396.5	-	-	-	500.5	404.5	404.5	404.5	404.5	420.5
	MP1	394.5	396.5	-	-	-	500.5	404.5	404.5	404.5	404.5	420.5
	FE	274.5	276.5	-	-	-	380.5	284.5	284.5	284.5	284.5	300.5
	FS	394.5	396.5	-	-	-	500.5	404.5	404.5	404.5	404.5	420.5
	FCP	293.5	295.5	-	-	-	399.5	303.5	303.5	303.5	303.5	319.5
	MPP1	416.5	418.5	-	-	-	522.5	426.5	426.5	426.5	426.5	442.5
EC302	MP	290	292	-	-	-	396	300	300	300	300	316
	MP1	290	292	-	-	-	396	300	300	300	300	316
	FE	290	292	-	-	-	396	300	300	300	300	316
	FS	290	292	-	-	-	396	300	300	300	300	316
	FCP	290	292	-	-	-	396	300	300	300	300	316
	MPP1	290	292	-	-	-	396	300	300	300	300	316
EC303	MP	155	155	155	155	242	-	-	-	-	-	-
	MP1	155	155	155	155	242	-	-	-	-	-	-
EC304	FE	155	155	155	155	242	-	-	-	-	-	-
	FS	155	155	155	155	242	-	-	-	-	-	-
	FCP	155	155	155	155	242	-	-	-	-	-	-
	MPP1	155	155	155	155	242	-	-	-	-	-	-

A richiesta altre configurazioni disponibili. Contattare il referente DANA di zona.

More configurations are available on request. Consult the DANA area contact person.

Auf Wunsch sind weitere Konfigurationen verfügbar. Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.





FRENI

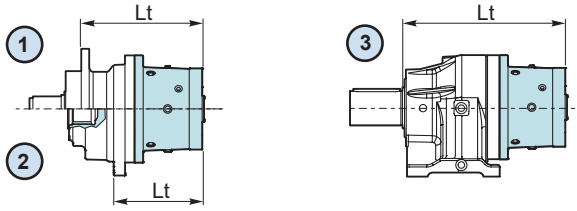
BRAKES

BREMSEN

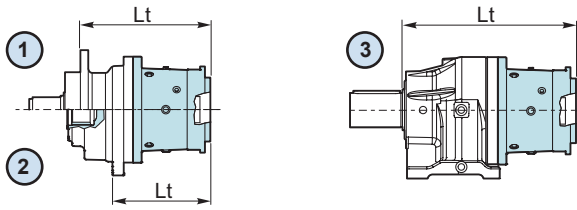
EL

MB3 - E00

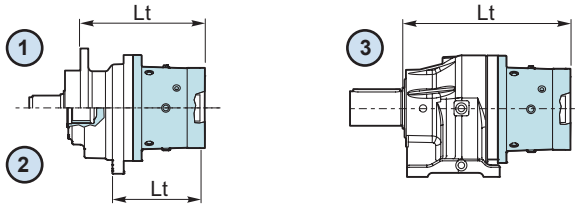
MB5 - E00



MB3 - SAE A



MB3 - BRZV



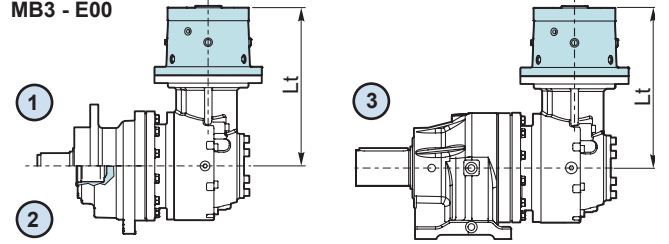
① = MP - MP1 - FS

② = FE - FCP

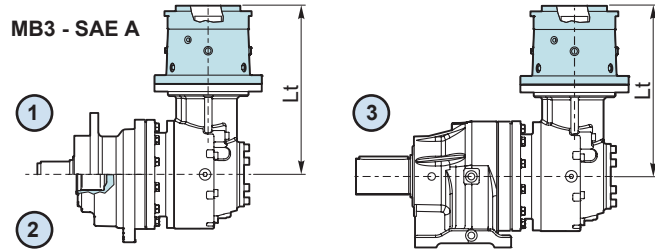
③ = MPP1

EC

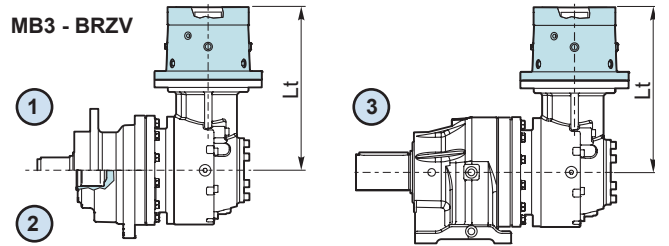
MB3 - E00



MB3 - SAE A



MB3 - BRZV



		Lt [mm]					
		MP	MP1	FE	FS	FCP	MPP1
MB3 E00	EL302	347.5	347.5	227.5	347.5	246.5	369.5
	EL303	391.5	391.5	271.5	391.5	290.5	413.5
	EL304	435.5	435.5	315.5	435.5	334.5	457.5
	EC302	318	318	318	318	318	318
MB3 SAE - A	EL302	376.5	376.5	256.5	376.5	275.5	398.5
	EL303	420.5	420.5	300.5	420.5	319.5	442.5
	EL304	464.5	464.5	344.5	464.5	363.5	486.5
	EC302	347	347	347	347	347	347
MB3 BRZV	EL302	345	345	225	345	244	367
	EL303	389	389	269	389	288	411
	EL304	433	433	313	433	332	455
	EC302	315.5	315.5	315.5	315.5	315.5	315.5
MB5 E00	EL301	313	313	193	313	212	335

CARICHI RADIALI

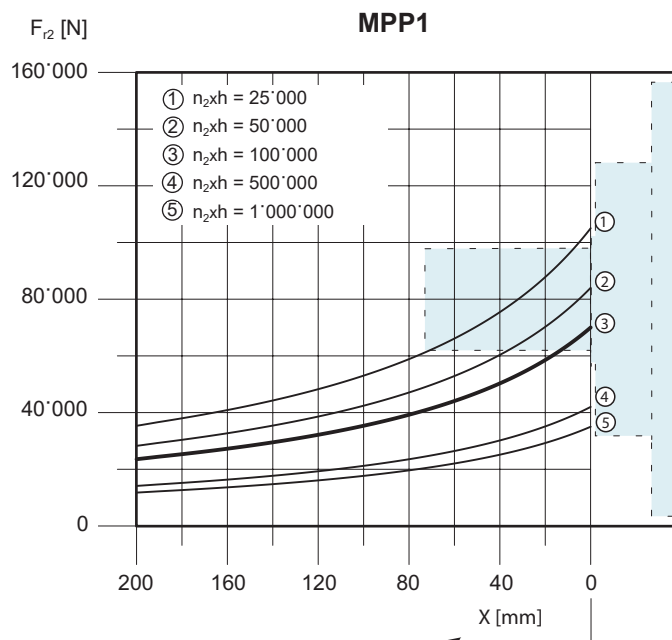
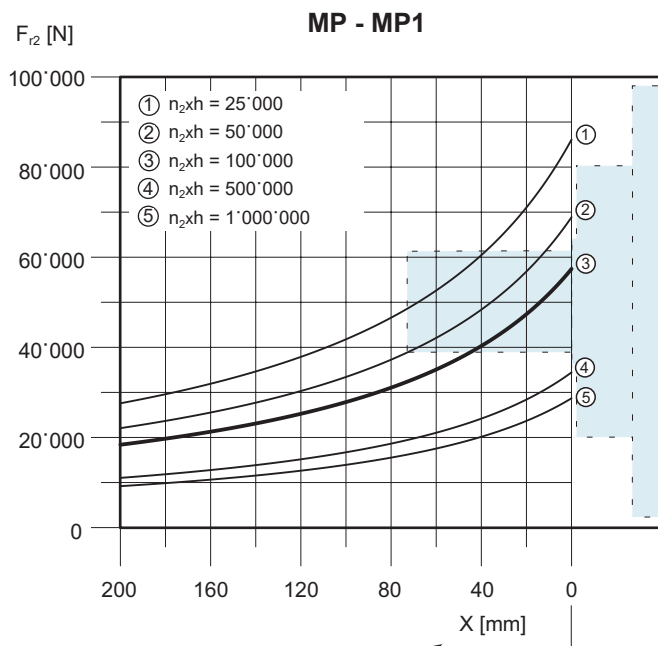
RADIAL LOADS

RADIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



CARICHI ASSIALI

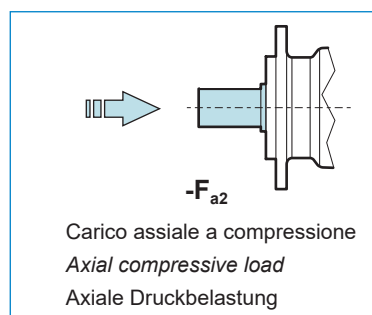
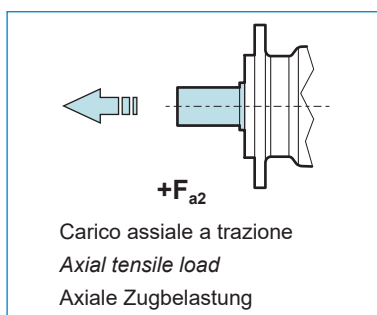
AXIAL LOADS

AXIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



E30 MP - MP1		
$n_2 \cdot x_h$	$-F_{a2}$ [N]	$+F_{a2}$ [N]
10'000	106'000	86'000
25'000	80'560	65'360
50'000	65'190	52'890
100'000	53'000	43'000
500'000	32'860	26'660
1'000'000	26'500	21'500

E30 MPP1		
$n_2 \cdot x_h$	$-F_{a2}$ [N]	$+F_{a2}$ [N]
10'000	133'200	106'000
25'000	101'232	80'560
50'000	81'918	65'190
100'000	66'600	53'000
500'000	41'292	32'860
1'000'000	33'300	26'500

CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

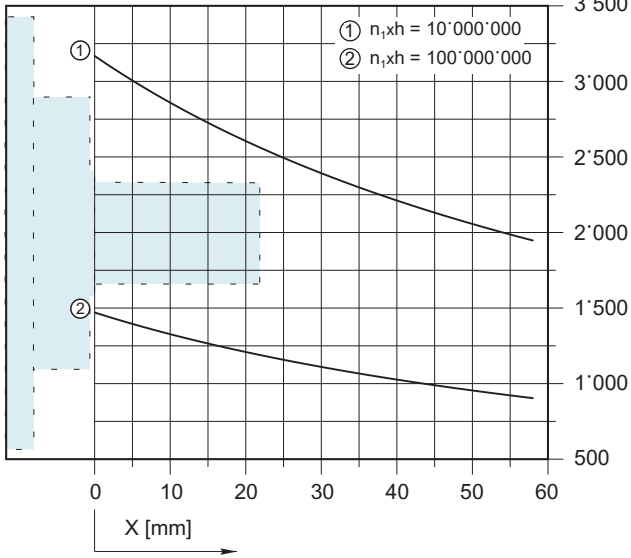
Alberi in ingresso

Input shaft

Eingangswellen

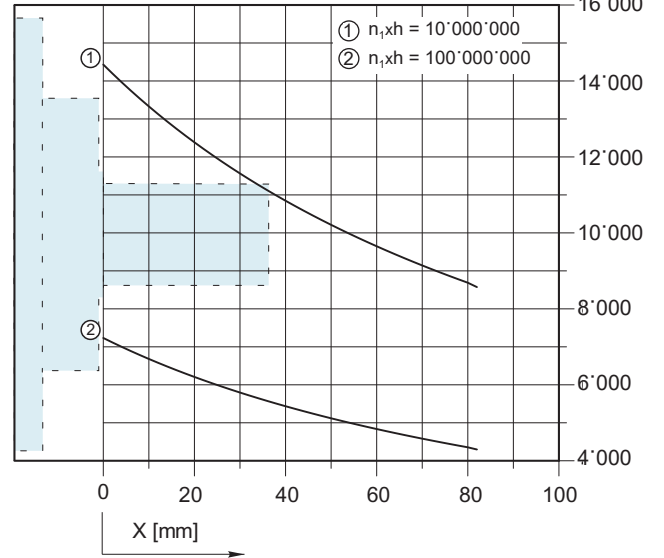
ISL30

F_{r1} [N]



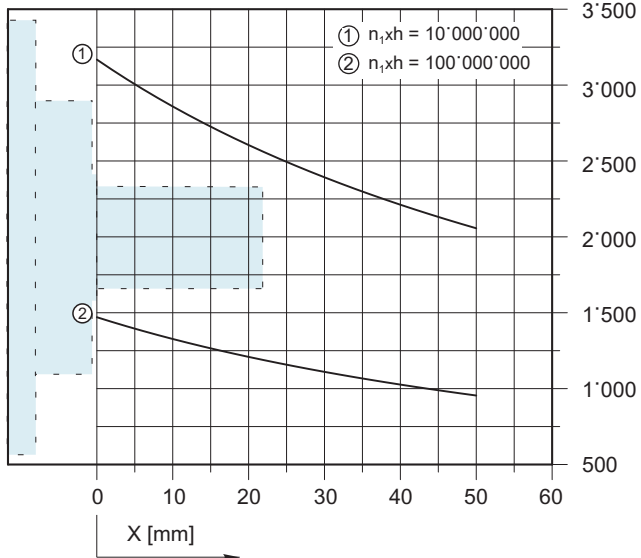
IS30

















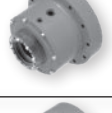

















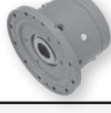


F_{r1} [N]

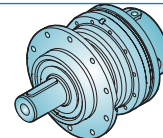


ISL10

F_{r1} [N]



	Disponibilità Availability Verfügbarkeit	Albero - Shaft - Getriebewelle			Pagina Page Seite			
		Tipologia Type Typ	Dimensioni Dimensions Abmessungen [mm]					
USCITE OUTPUTS AUSGÄNGE	 MP		MP B58x53 DIN 5482	MP 045 B58x53 DIN 5482	MP 065 B70x64 DIN 5482			
	 MP1		MP1 ø65	MP1 045 ø65	MP1 065 ø80			
	 FE		A58x53 DIN 5482					
	 FS 045		ø75					
	 FCP		ø65					
	 MPP1		ø80					
ENTRATE INPUTS EINNAHMEN	 IS - ISL		IS IS50 ø48	ISL ISL10 ø28 ISL16 ø28 ISL50 ø40				
	 E00		A50x45 DIN 5482					
FLANGED'INGRESSO INPUT FLANGE FLANSCH EINGANG	 							
	 							
FRENI BRAKES BREMSEN	 	MB3 33 ÷ 495	T_B [Nm]		MB5 173 ÷ 1'173			



i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			

EL501

3.52	6'300	5'950	5'200	4'650	3'650	2'950	3'800	6'500	13
4.07	5'800	5'400	5'300	5'000	3'750	3'050	3'800	7'500	13
4.95	5'450	4'900	4'250	4'000	3'500	3'000	3'800	7'500	13
5.88	4'450	3'750	3'300	3'150	2'700	2'550	3'800	7'500	13
6.53	3'200	2'650	2'300	2'200	1'900	1'800	3'800	5'600	13

EL502

12.4	6'300	5'950	5'200	4'650	3'150	2'550	4'000	6'500	8
14.3	6'300	5'950	5'200	4'650	3'450	2'800	4'000	6'500	8
16.6	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	8
20.2	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	8
24.5	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	8
30.6	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	8
36.6	4'200	3'850	3'600	3'350	2'800	2'700	4'000	7'500	8
40.4	3'200	2'650	2'300	2'200	1'900	1'800	4'000	7'500	8
43.4	4'450	3'750	3'300	3'150	2'700	2'550	4'000	7'500	8
48.2	3'200	2'650	2'300	2'200	1'900	1'800	4'000	5'600	8

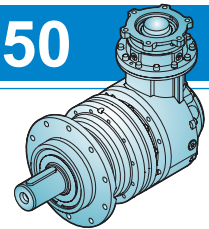
EL503

43.4	6'300	5'950	5'200	4'650	3'150	2'550	4'000	6'500	7
50.3	6'300	5'950	5'200	4'650	3'450	2'800	4'000	6'500	7
61.2	6'300	5'500	5'150	4'650	3'400	2'750	4'000	6'500	7
70.9	6'300	5'950	5'200	4'650	3'450	2'800	4'000	6'500	7
85.6	6'300	5'950	5'200	4'650	3'150	2'550	4'000	6'500	7
102	6'300	5'500	5'150	4'650	3'400	2'750	4'000	6'500	7
119	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	7
140	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	7
152	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	7
180	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	7
212	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	7
251	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	7
313	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	7
374	4'200	3'850	3'600	3'350	2'800	2'700	4'000	7'500	7
444	4'450	3'750	3'300	3'150	2'700	2'550	4'000	7'500	7

EL504

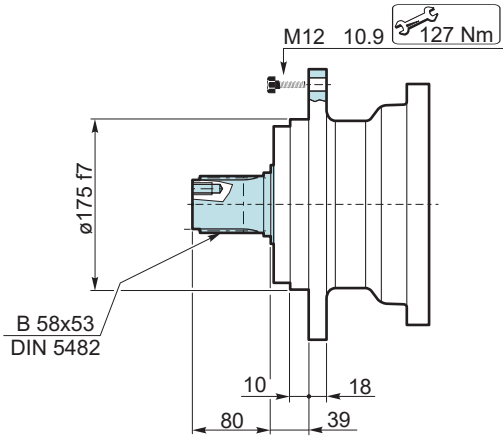
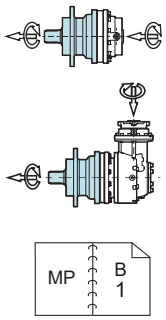
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398	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	5
417	6'300	5'950	5'200	4'650	3'450	2'800	4'000	6'500	5
444	6'300	5'950	5'200	4'650	3'150	2'550	4'000	6'500	5
483	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	5
514	6'300	5'950	5'200	4'650	3'450	2'800	4'000	6'500	5
570	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	5
625	6'300	5'500	5'150	4'650	3'400	2'750	4'000	6'500	5
676	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	5
725	6'300	5'950	5'200	4'650	3'450	2'800	4'000	6'500	5
822	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	5
997	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	5
1046	6'300	5'500	5'150	4'650	3'400	2'750	4'000	6'500	5
1176	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	5
1233	6'300	5'500	5'150	4'650	3'400	2'750	4'000	6'500	5
1429	5'800	5'400	5'300	5'000	3'750	3'050	4'000	7'500	5
1551	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	5
1737	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	5
1841	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	5
2107	5'100	4'800	4'600	4'400	3'750	3'050	4'000	7'500	5
2170	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	5
2561	5'450	4'900	4'250	4'000	3'500	3'000	4'000	7'500	5

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich



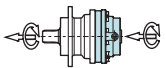
i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EC502									
10.5	6'200	5'910	5'170	4'610	3'240	2'630	3'000	6'500	10
12.2	5'790	5'360	5'270	4'970	3'590	2'915	3'000	7'500	10
14.9	5'440	4'860	4'240	3'990	3'490	2'970	3'000	7'500	10
16.0	4'430	3'860	3'470	3'320	2'945	2'390	3'000	6'500	10
18.6	5'020	4'370	3'970	3'810	3'270	2'650	3'000	7'500	10
22.6	5'440	4'860	4'240	3'990	3'490	2'970	3'000	7'500	10
26.8	4'450	3'720	3'290	3'110	2'695	2'535	3'000	7'500	10
29.8	3'170	2'645	2'295	2'160	1'875	1'760	3'000	5'600	10
EC503									
37.1	5'560	4'100	3'250	2'580	1'510	1'200	4'000	6'500	6
43.0	6'150	4'520	3'590	2'850	1'665	1'325	4'000	6'500	6
49.8	5'790	4'990	3'960	3'150	1'840	1'460	4'000	7'500	6
52.2	6'300	5'150	4'090	3'250	1'900	1'505	4'000	6'500	6
60.5	5'790	5'360	4'510	3'580	2'095	1'660	4'000	7'500	6
65.3	4'590	4'020	3'780	3'550	2'200	1'750	4'000	6'500	6
73.6	5'440	4'860	4'240	3'990	2'385	1'895	4'000	7'500	6
87.4	4'450	3'720	3'290	3'110	2'675	2'125	4'000	7'500	6
98.6	5'790	4'700	3'730	2'960	1'730	1'375	4'000	7'500	6
110	4'180	3'820	3'560	3'310	2'795	2'470	4'000	7'500	6
120	5'440	4'860	4'240	3'370	1'970	1'565	4'000	7'500	6
130	4'450	3'720	3'290	3'110	2'695	2'535	4'000	7'500	6
150	5'440	4'860	4'240	3'910	2'285	1'815	4'000	7'500	6
158	3'170	2'645	2'295	2'160	1'875	1'760	4'000	7'500	6
179	4'180	3'820	3'560	3'310	2'575	2'040	4'000	7'500	6
198	3'170	2'645	2'295	2'160	1'875	1'760	4'000	5'600	6
212	4'450	3'720	3'290	3'110	2'695	2'290	4'000	7'500	6
236	3'170	2'645	2'295	2'160	1'875	1'760	4'000	5'600	6
EC504									
203	5'790	5'360	5'270	4'970	3'740	3'040	4'000	7'500	5
213	6'300	5'910	5'170	4'610	3'450	2'795	4'000	6'500	5
247	5'790	5'360	5'270	4'970	3'740	3'040	4'000	7'500	5
257	6'300	5'910	5'170	4'610	3'110	2'520	4'000	6'500	5
285	6'300	5'910	5'170	4'610	3'450	2'790	4'000	6'500	5
298	6'300	5'910	5'170	4'610	3'450	2'795	4'000	6'500	5
307	6'300	5'460	5'150	4'610	3'370	2'730	4'000	6'500	5
323	5'440	4'860	4'240	3'990	3'490	2'970	4'000	7'500	5
345	5'790	5'360	5'270	4'970	3'740	3'040	4'000	7'500	5
356	5'790	5'360	5'270	4'970	3'730	3'030	4'000	7'500	5
375	5'440	4'860	4'240	3'990	3'490	2'970	4'000	7'500	5
402	5'790	5'360	5'270	4'970	3'740	3'040	4'000	7'500	5
419	5'790	5'360	5'270	4'970	3'730	3'030	4'000	7'500	5
477	5'790	5'360	5'270	4'970	3'740	3'040	4'000	7'500	5
562	5'790	5'360	5'270	4'970	3'740	3'040	4'000	7'500	5
580	5'790	5'360	5'270	4'970	3'730	3'030	4'000	7'500	5
619	5'060	4'790	4'590	4'400	3'730	3'030	4'000	7'500	5
684	5'790	5'360	5'270	4'970	3'730	3'030	4'000	7'500	5
705	5'440	4'860	4'240	3'990	3'490	2'970	4'000	7'500	5
752	5'440	4'860	4'240	3'990	3'490	2'970	4'000	7'500	5
831	5'440	4'860	4'240	3'990	3'490	2'970	4'000	7'500	5
881	5'440	4'860	4'240	3'990	3'490	2'970	4'000	7'500	5
940	5'440	4'860	4'240	3'990	3'490	2'970	4'000	7'500	5
1008	5'060	4'790	4'590	4'400	3'730	3'030	4'000	7'500	5
1038	5'440	4'860	4'240	3'990	3'490	2'970	4'000	7'500	5
1121	4'180	3'820	3'560	3'310	2'795	2'675	4'000	7'500	5

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich



Accessori
Accessories
Zubehör

E50
14

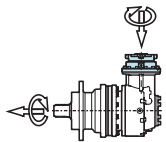
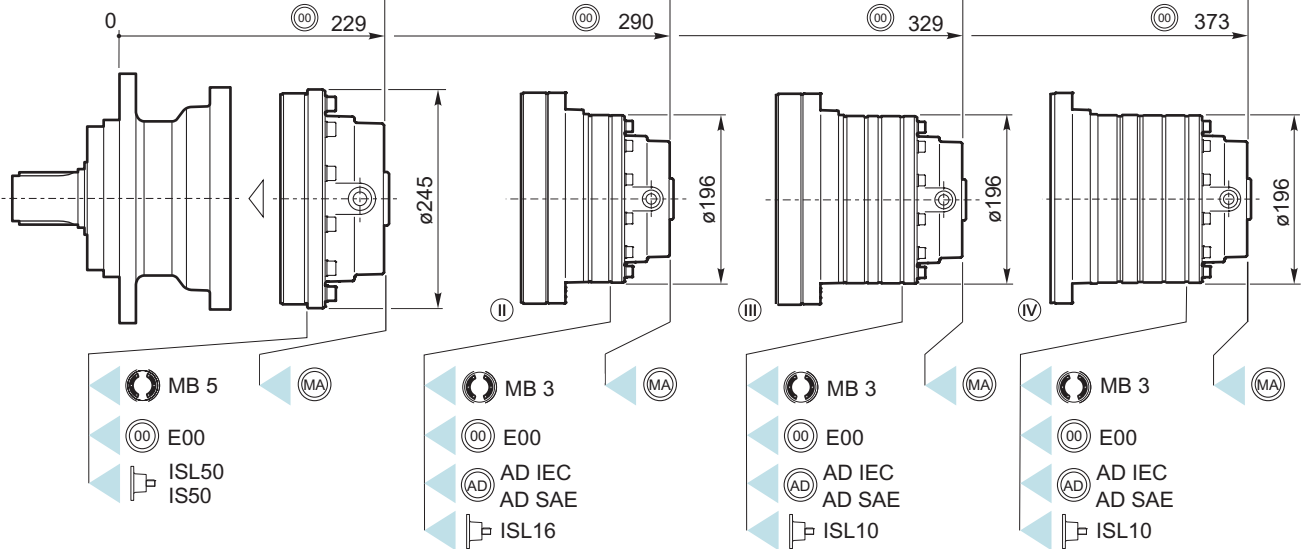


EL501/MP 47

EL502/MP 52

EL503/MP 58

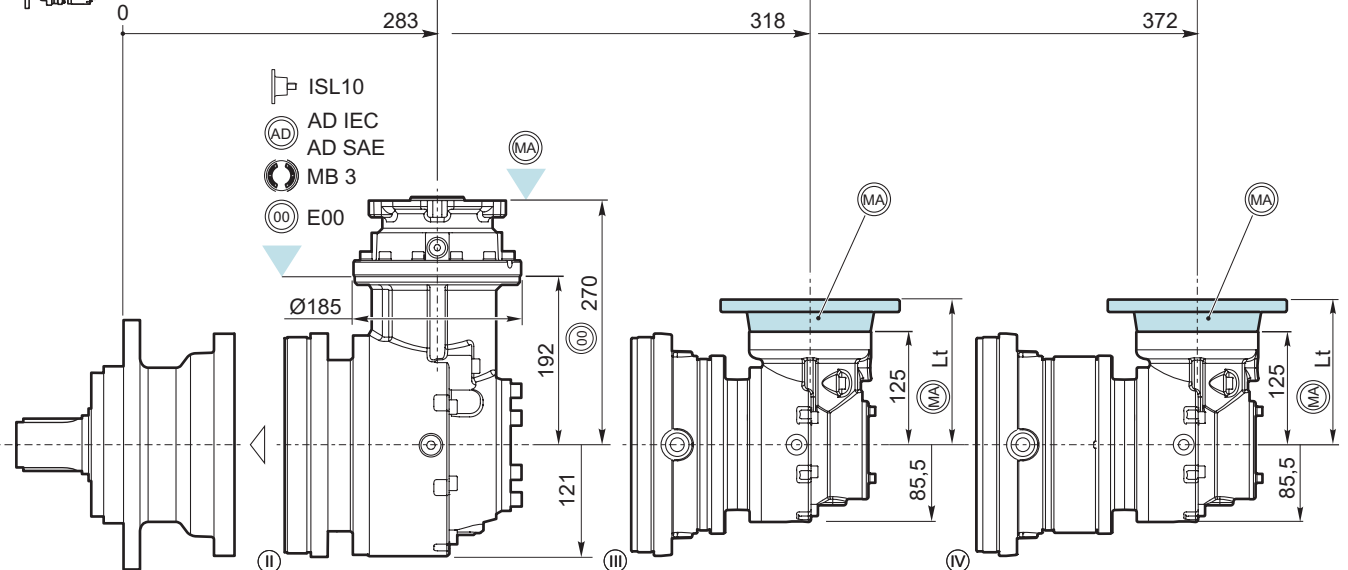
EL504/MP 64

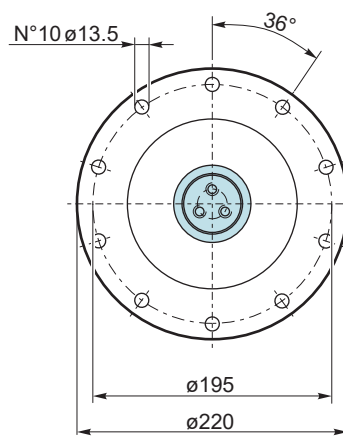
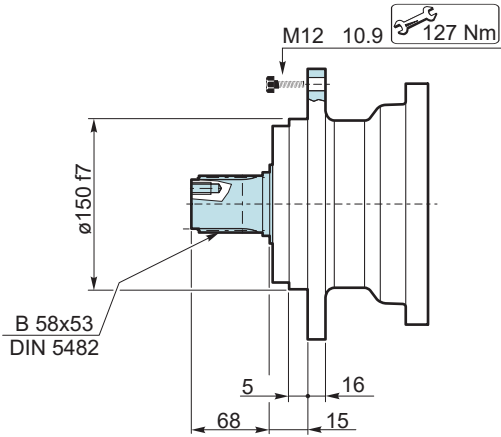
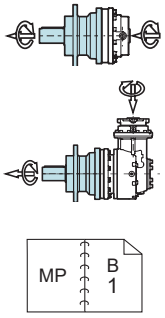


EC502/MP 85

EC503/MP 64

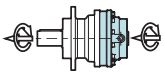
EC504/MP 70





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Accessories
Zubehör

E50
15

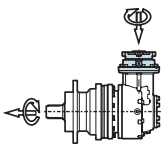
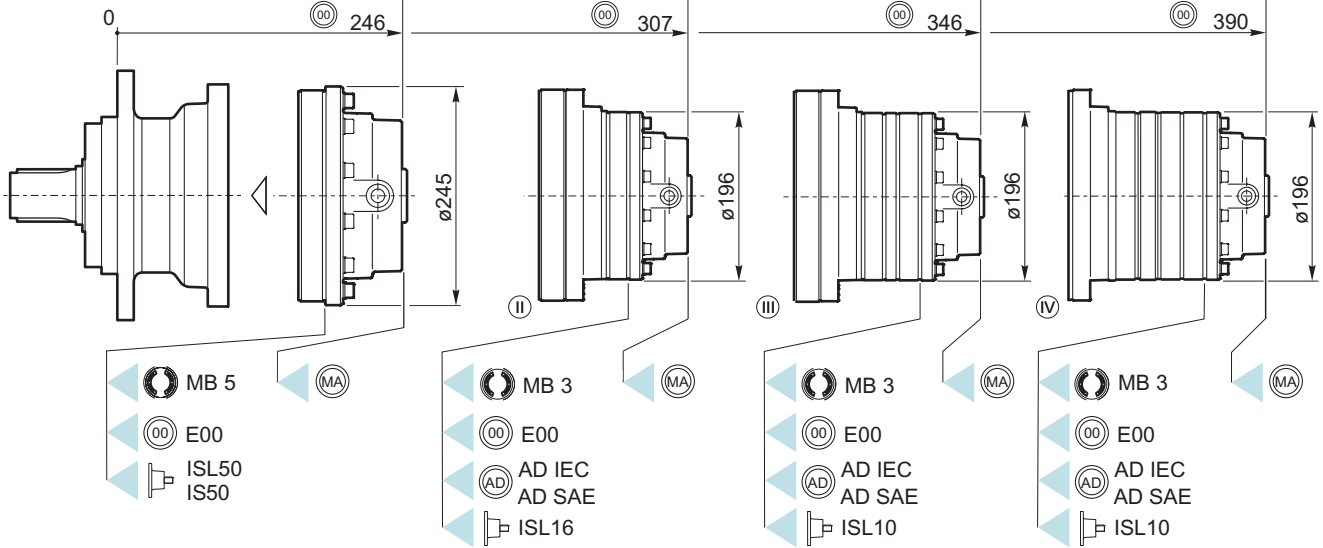


EL501/MP045 41 kg

EL502/MP045 46 kg

EL503/MP045 52 kg

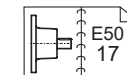
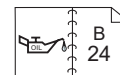
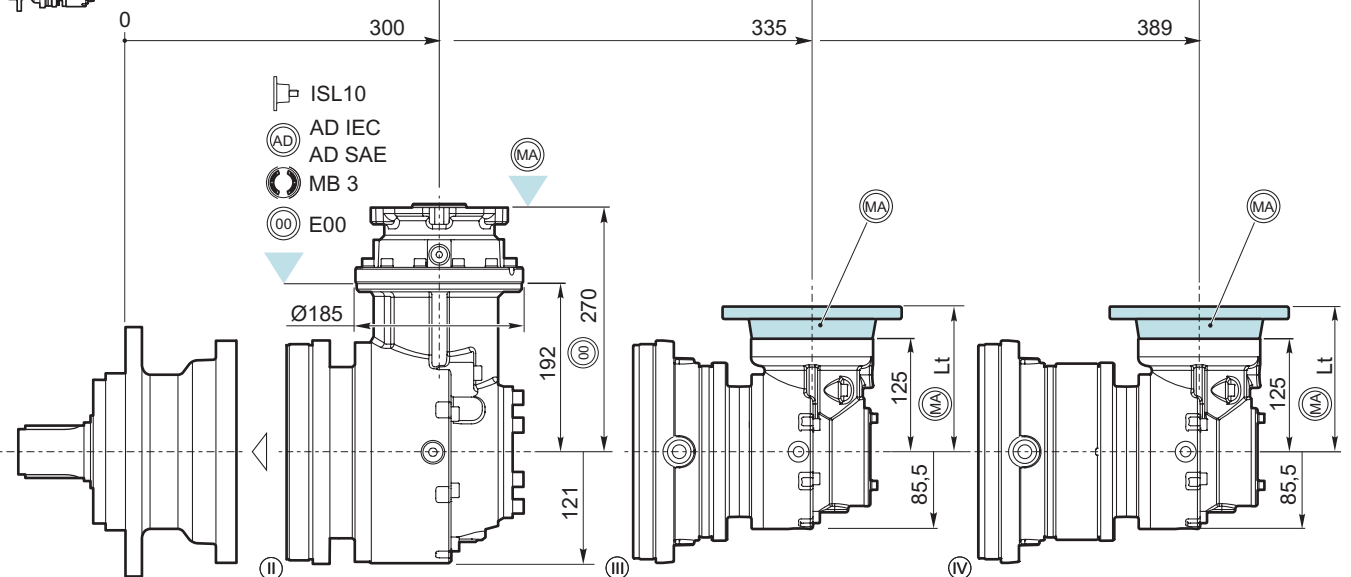
EL504/MP045 59 kg

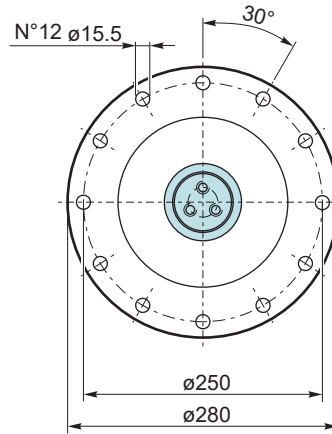
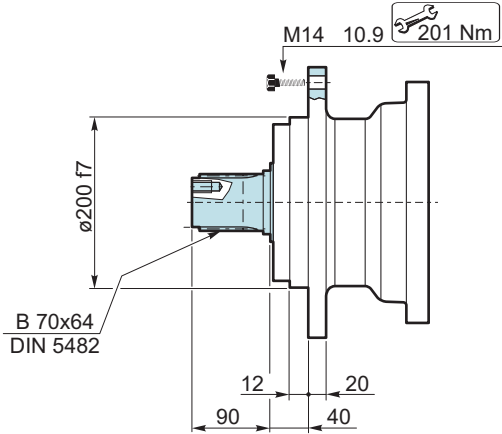
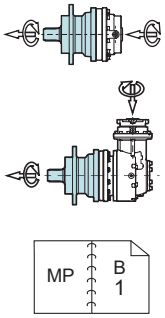


EC502/MP045 78 kg

EC503/MP045 57 kg

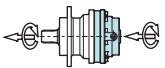
EC504/MP045 64 kg





Accessori
Accessories
Zubehör

E50
16

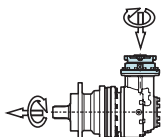
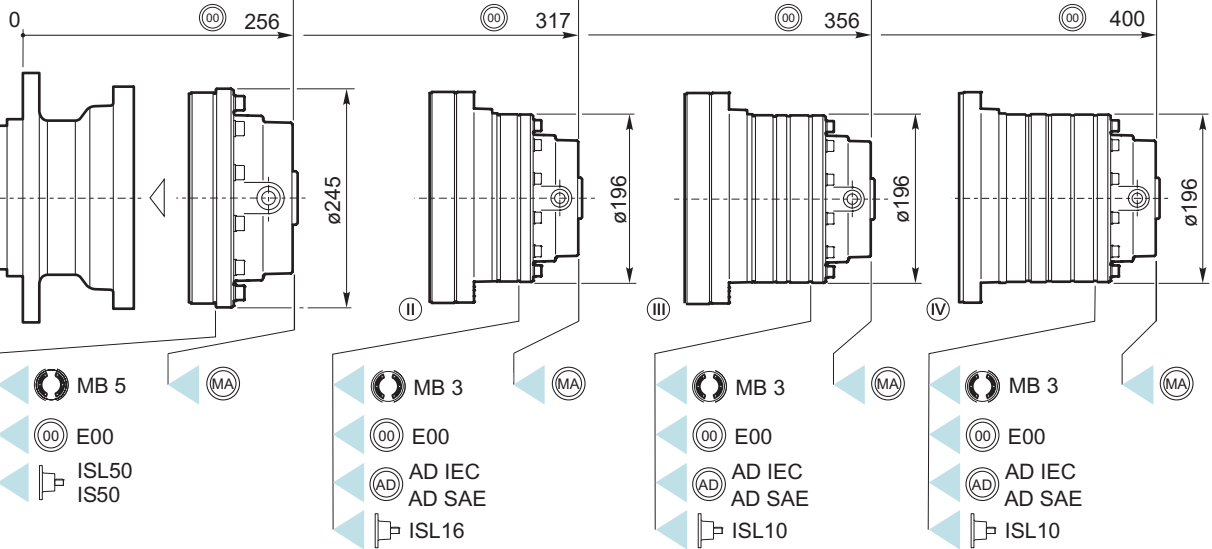


EL501/MP065 55

EL502/MP065 60

EL503/MP065 66

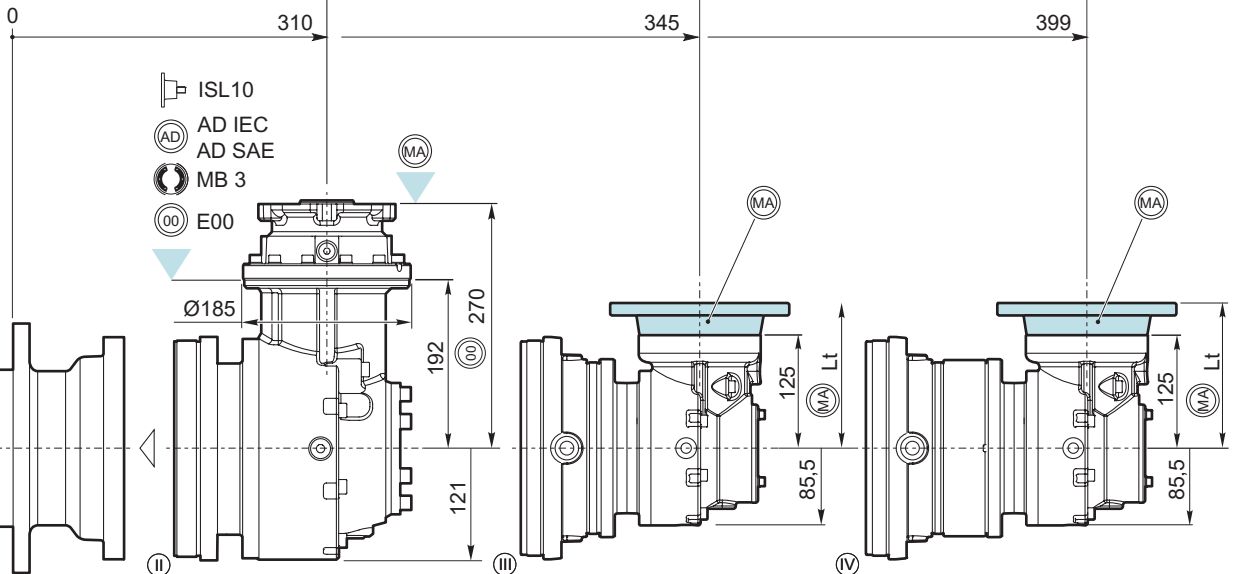
EL504/MP065 73

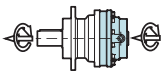
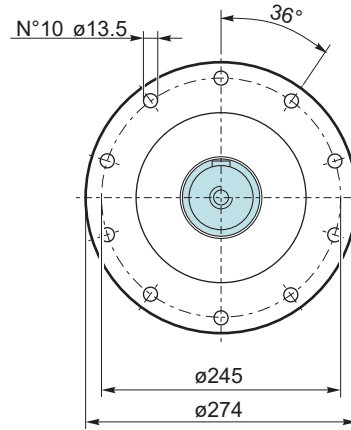
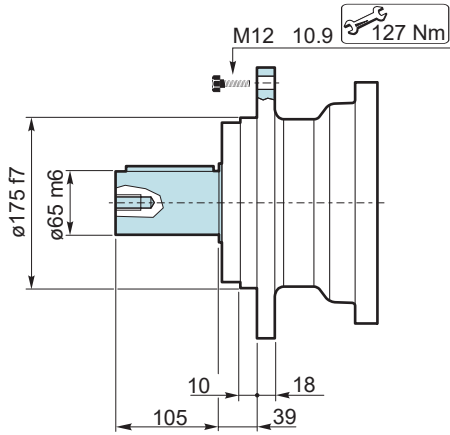
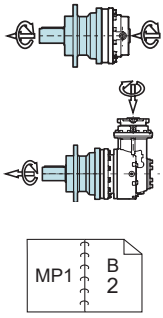


EC502/MP065 94

EC503/MP065 72

EC504/MP065 78



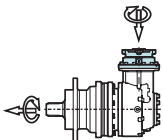
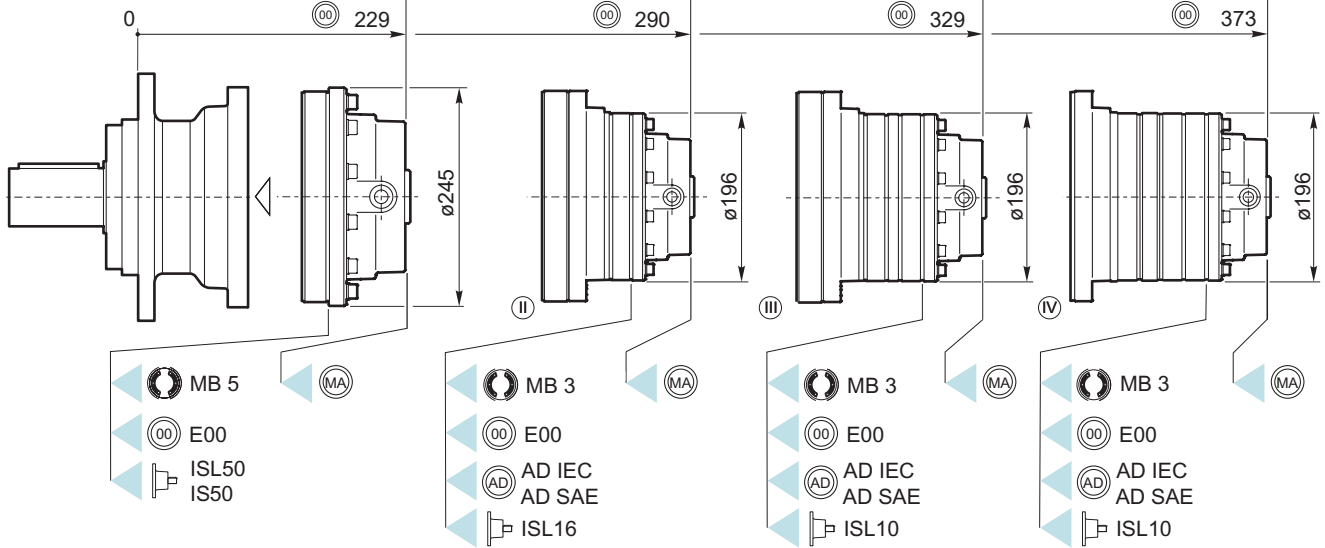


EL501/MP1 48 kg

EL502/MP1 53 kg

EL503/MP1 59 kg

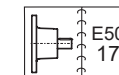
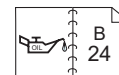
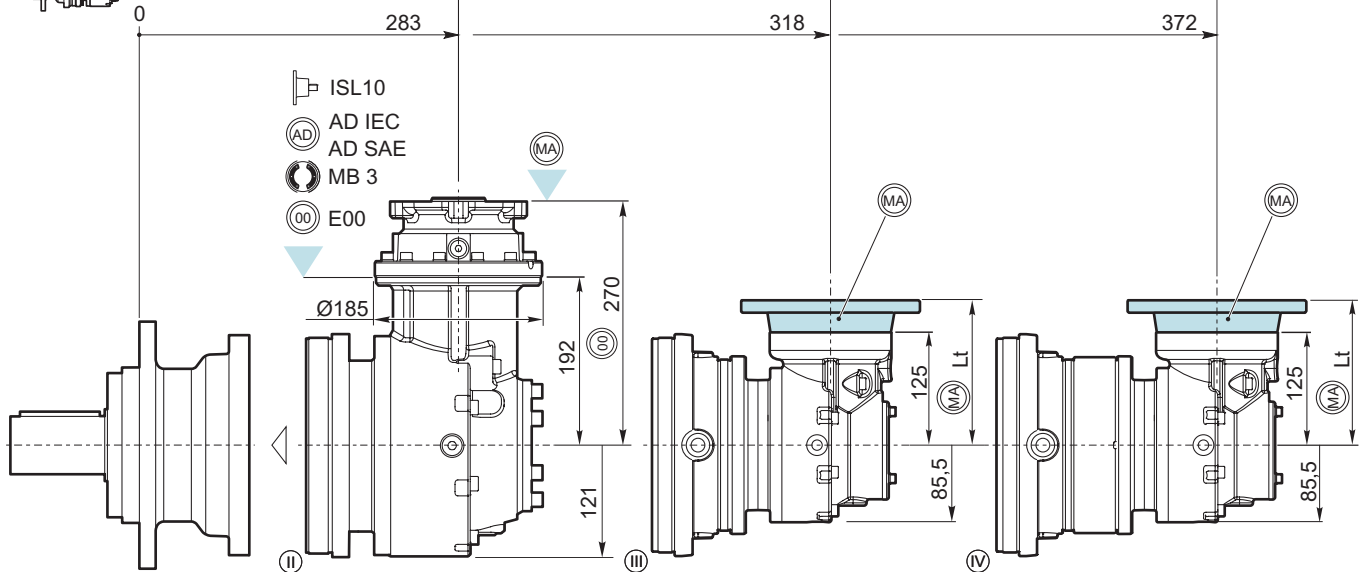
EL504/MP1 66 kg

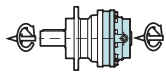
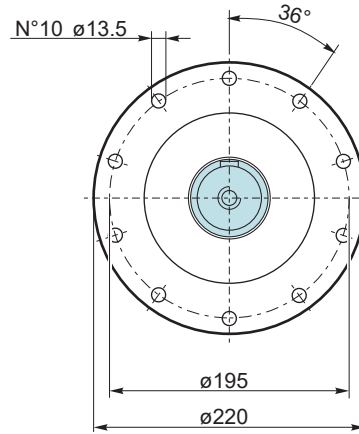
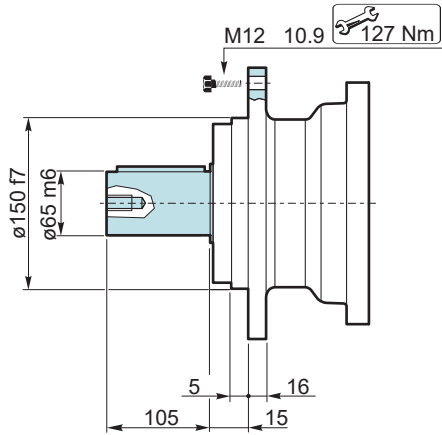
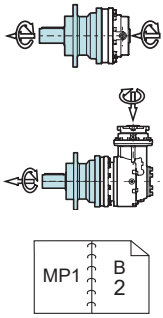


EC502/MP1 86 kg

EC503/MP1 65 kg

EC504/MP1 71 kg



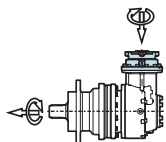
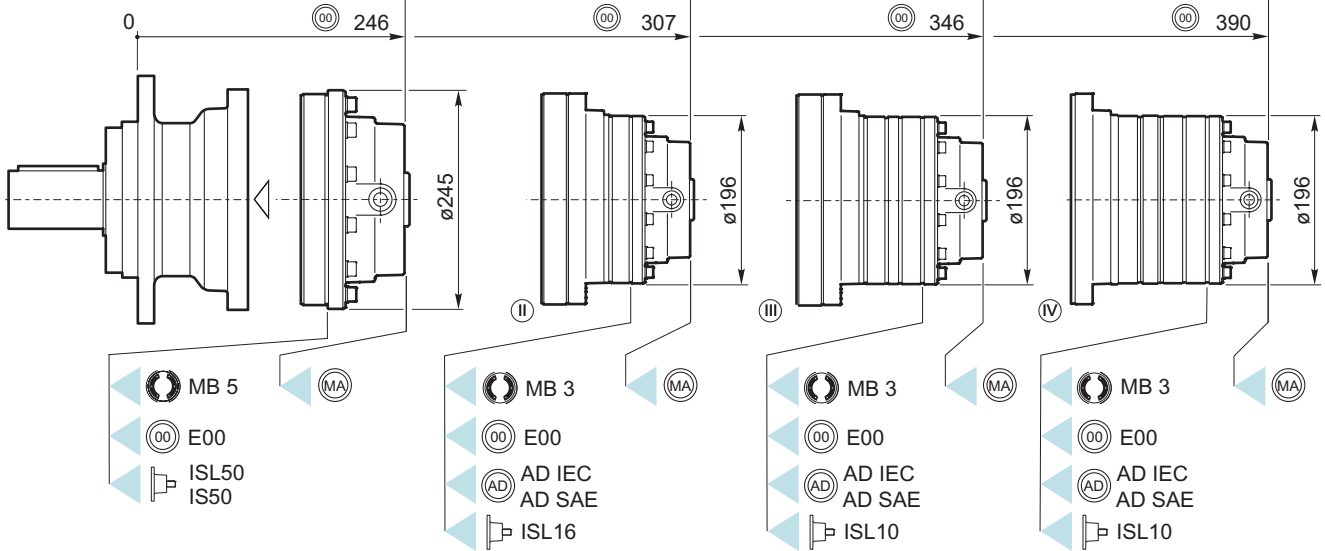


EL501/MP1 045 42

EL502/MP1 045 47

EL503/MP1 045 53

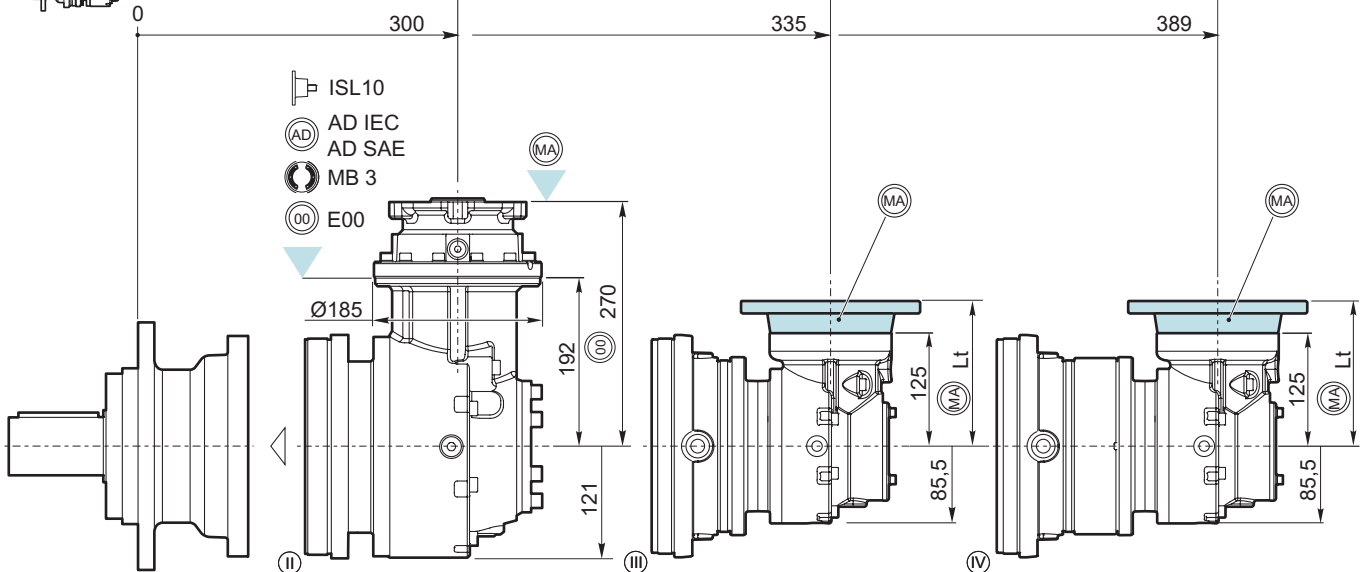
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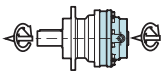
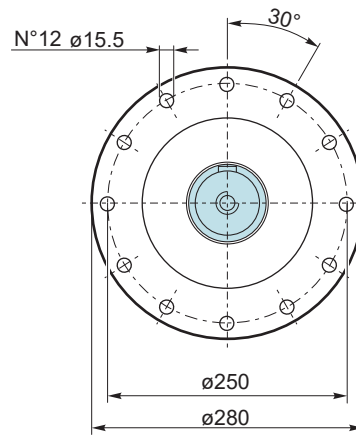
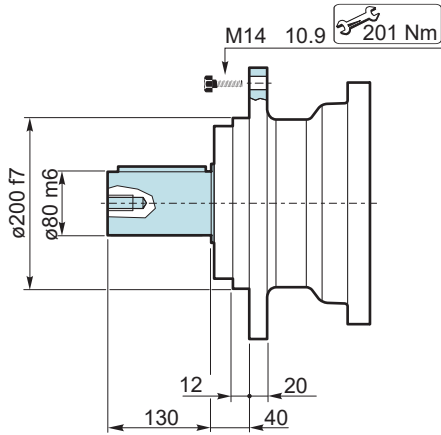
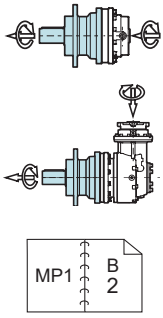


EC502/MP1 045 80

EC503/MP1 045 59

EC504/MP1 045 65



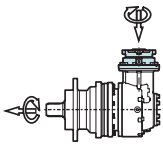
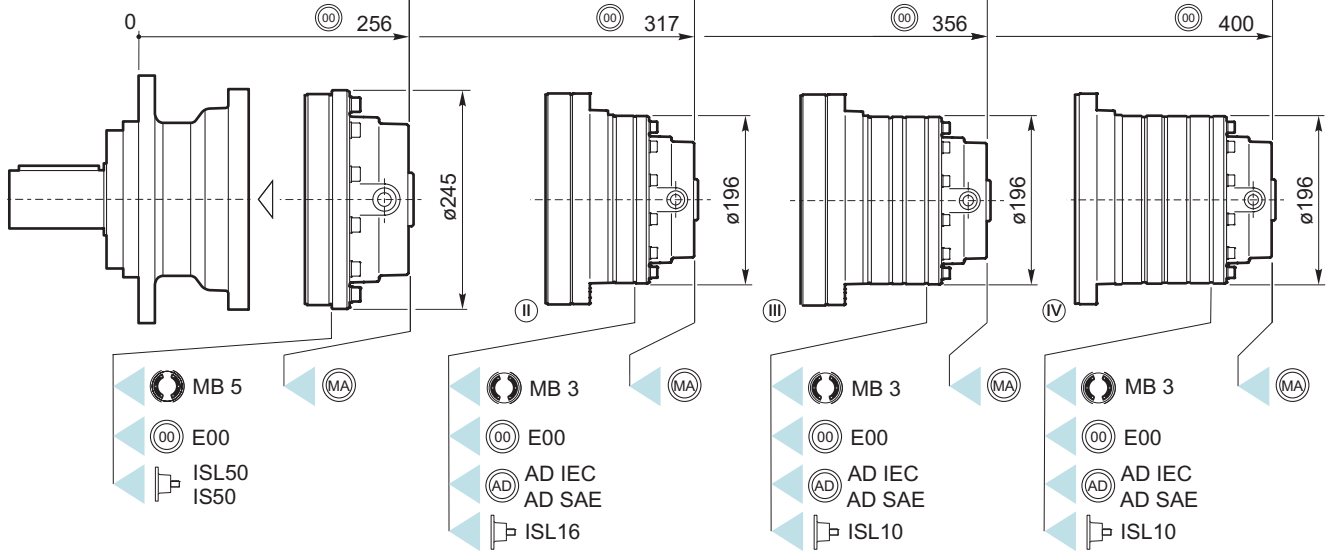


EL501/MP1 065 57 kg

EL502/MP1 065 62 kg

EL503/MP1 065 68 kg

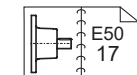
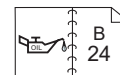
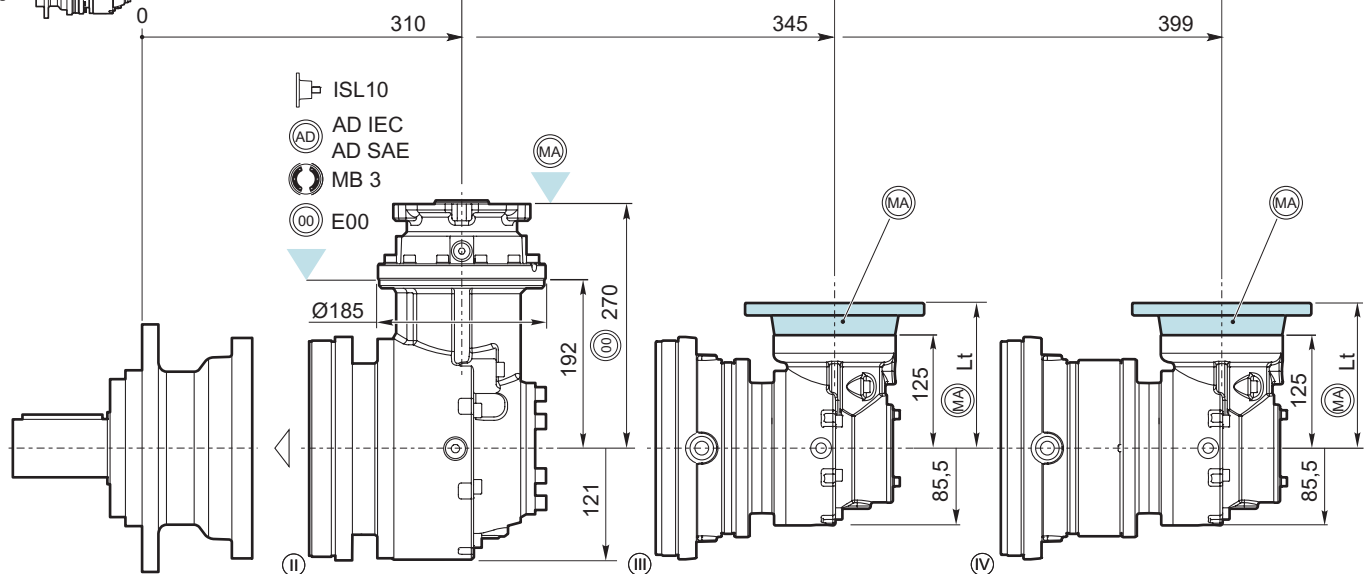
EL504/MP1 065 75 kg

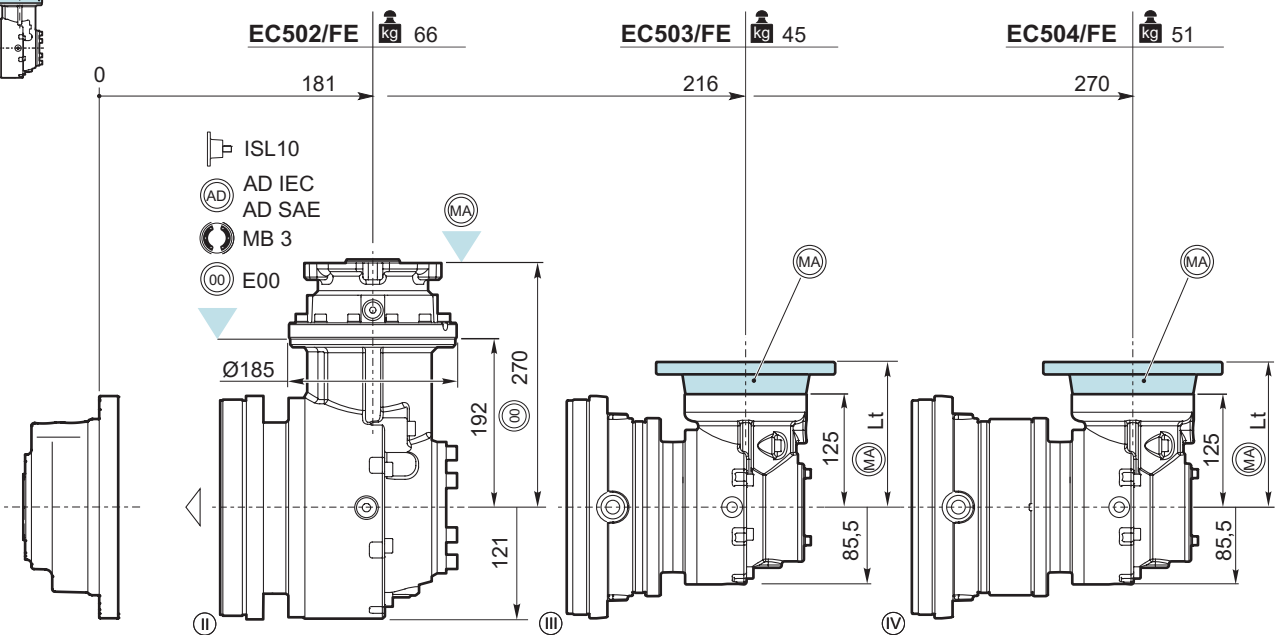
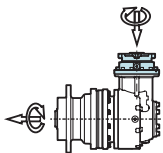
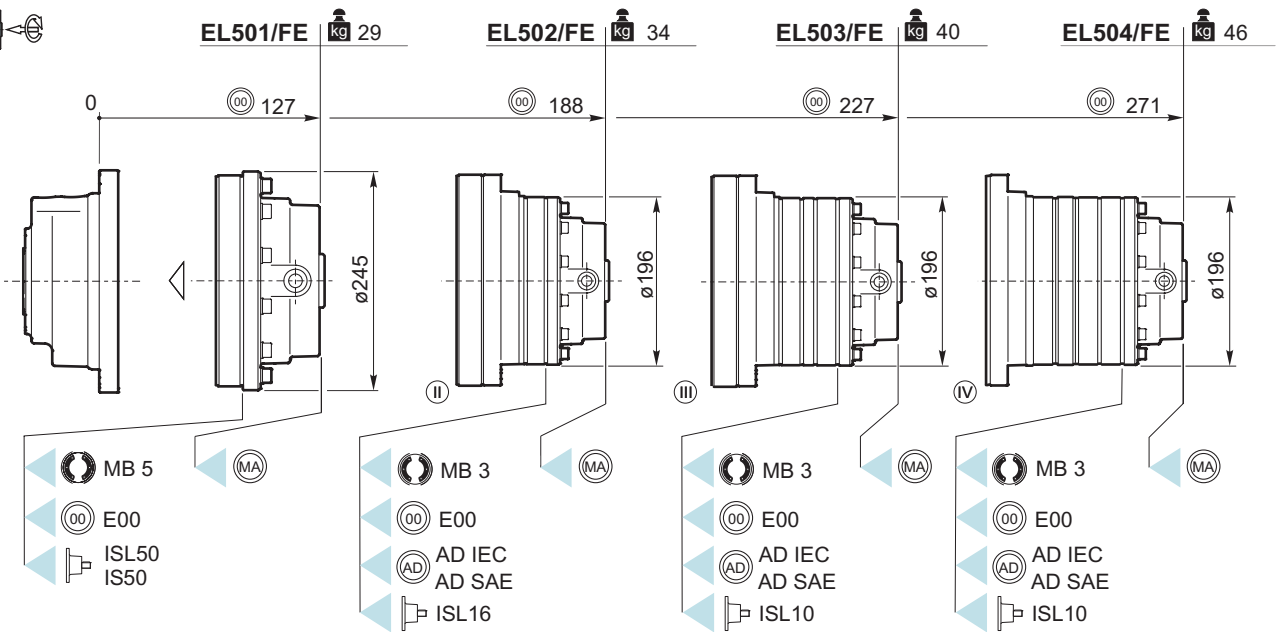
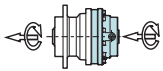
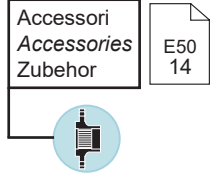
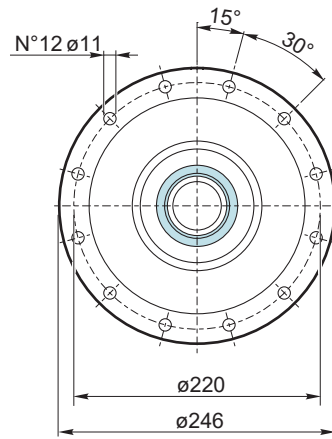
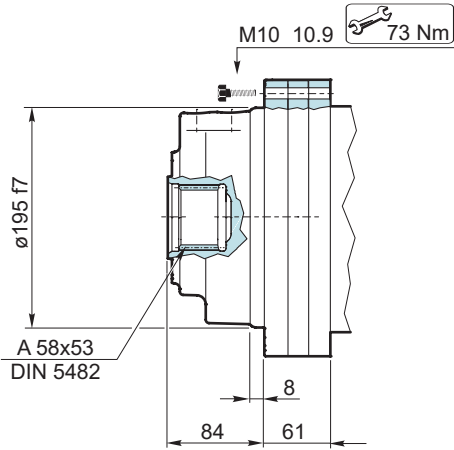
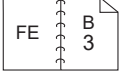
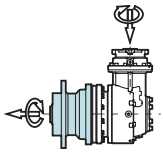
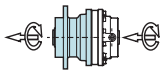


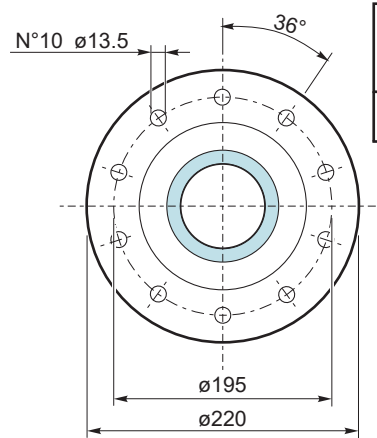
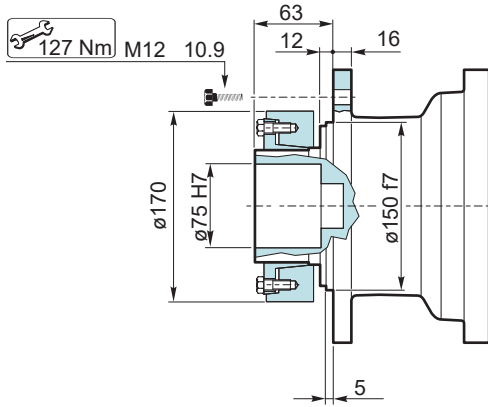
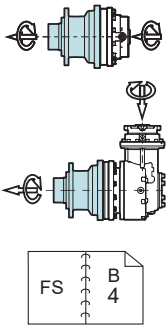
EC502/MP1 065 95 kg

EC503/MP1 065 74 kg

EC504/MP1 065 80 kg

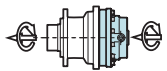






Giunto ad attrito
Shrink disc
Reibungskupplung

B 18

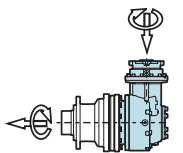
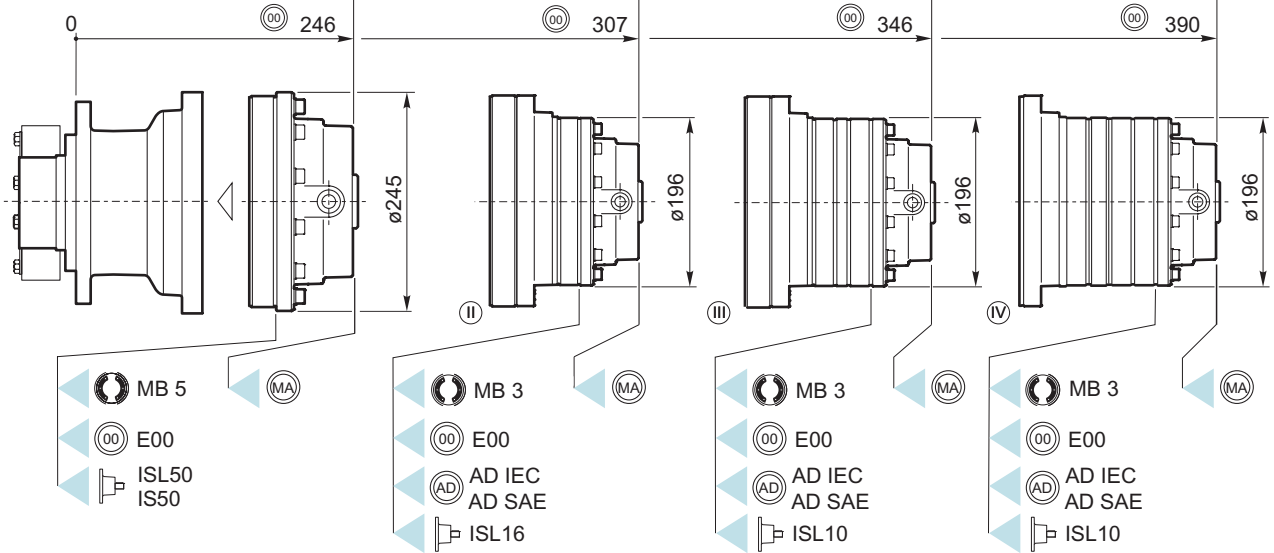


EL501/FS 045 41

EL502/FS 045 46

EL503/FS 045 52

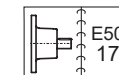
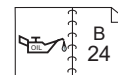
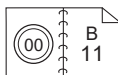
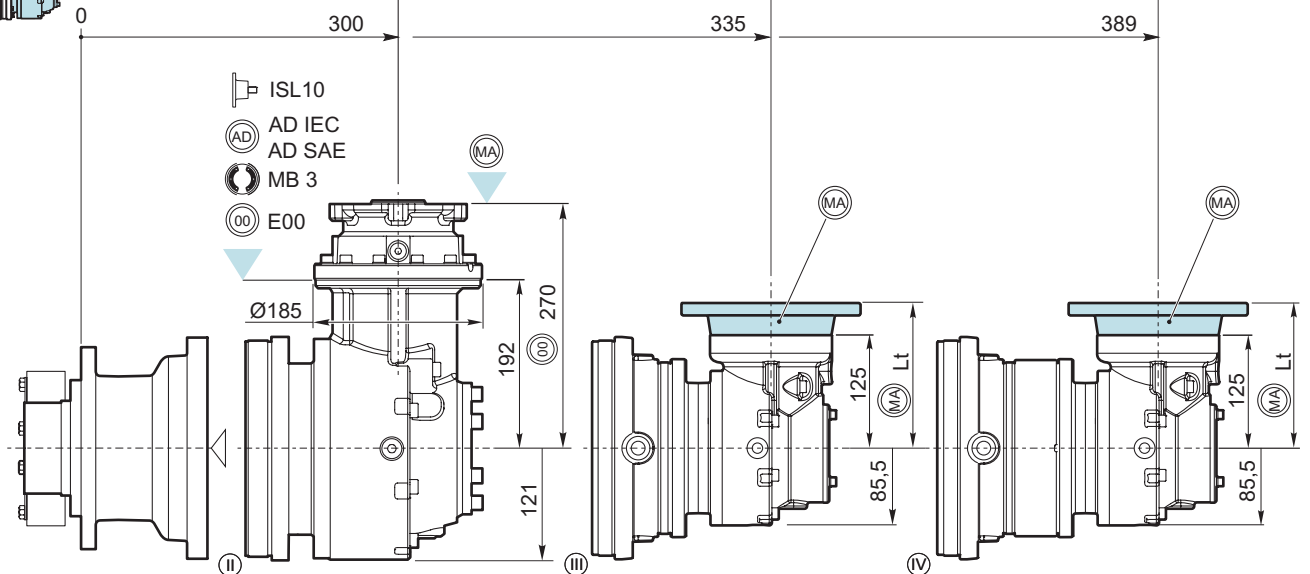
EL504/FS 045 58

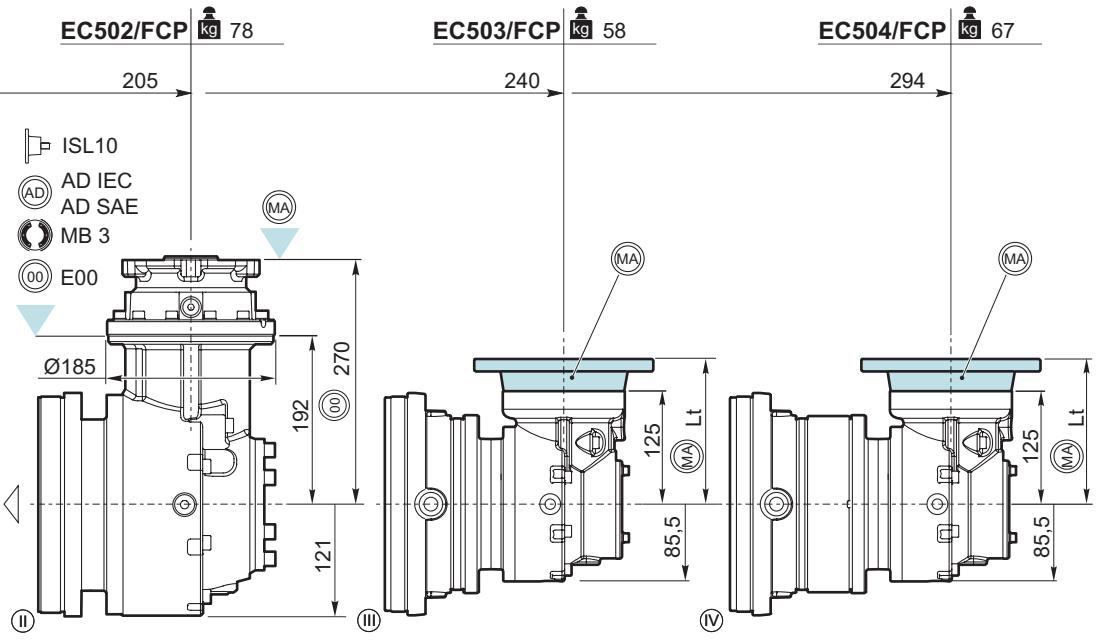
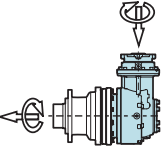
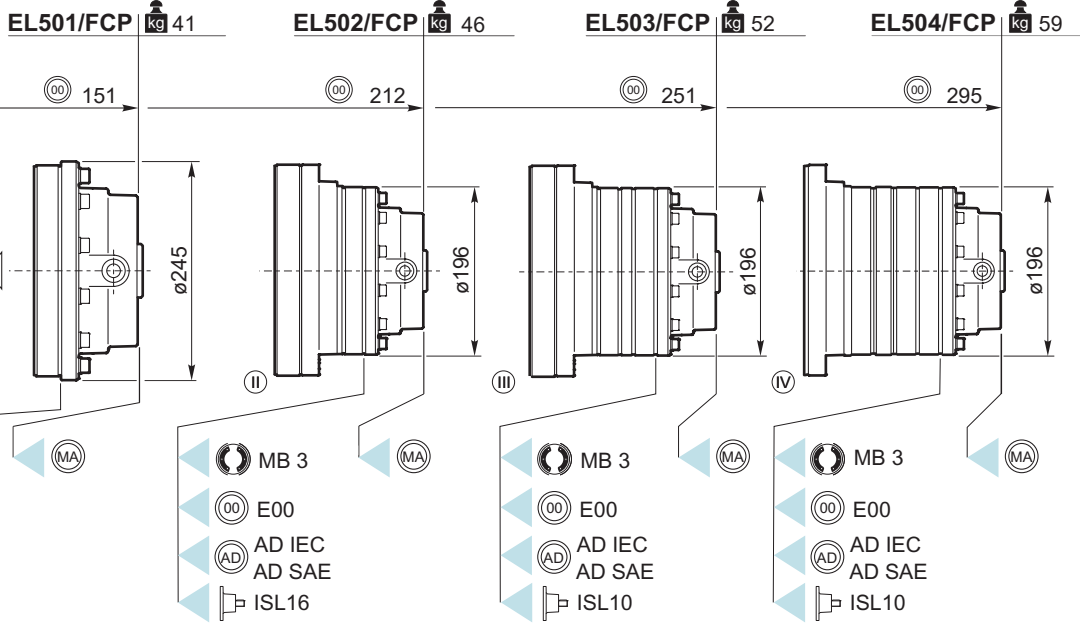
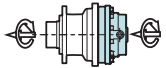
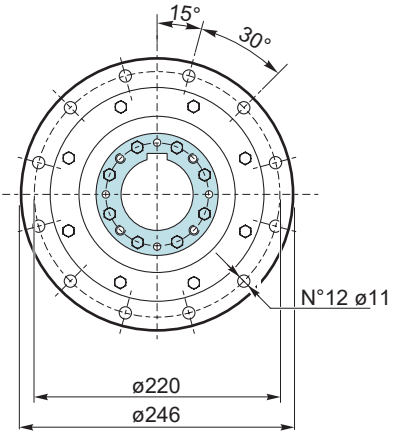
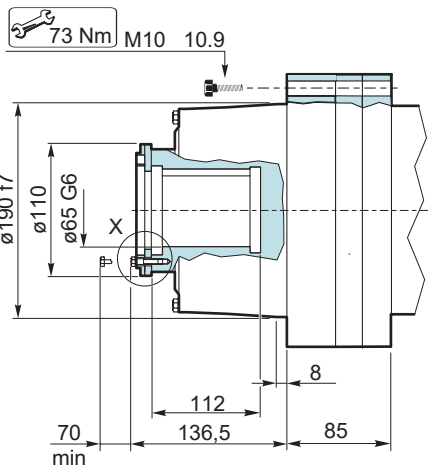
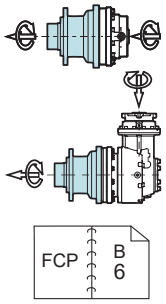


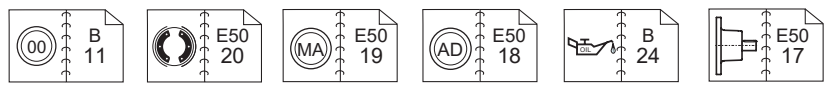
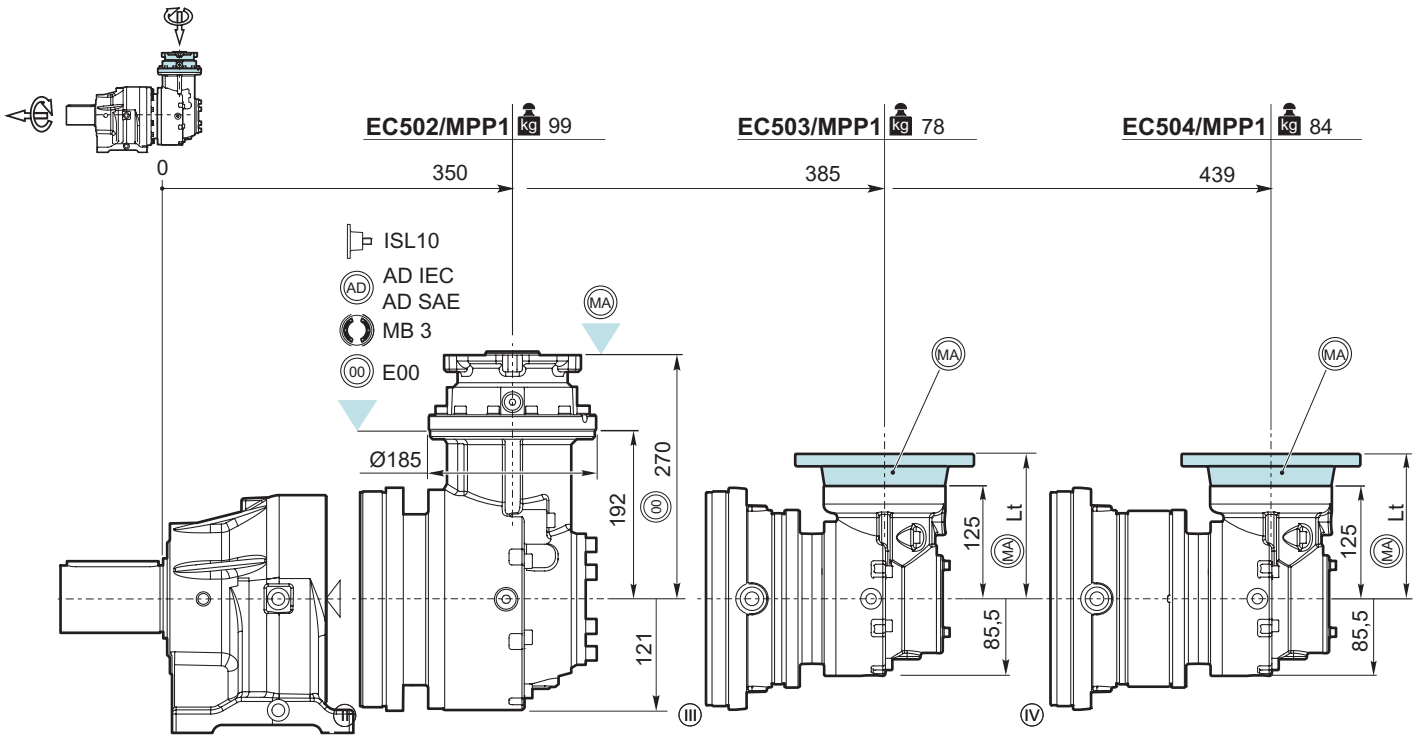
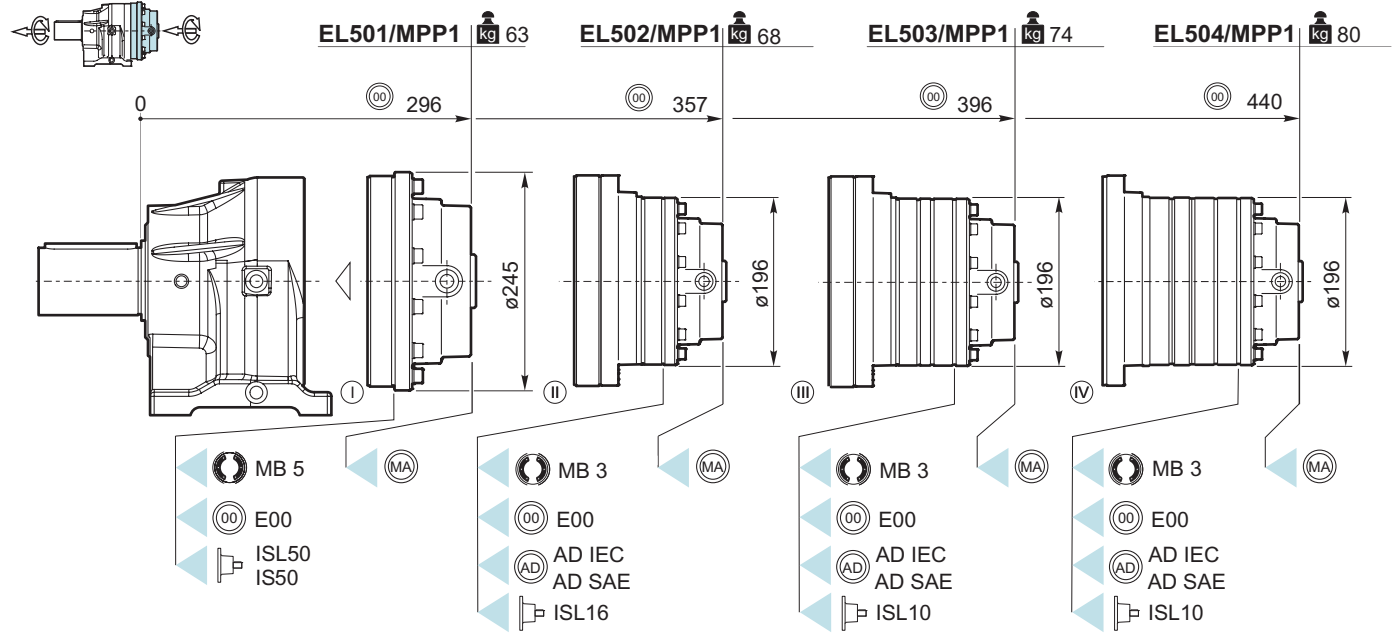
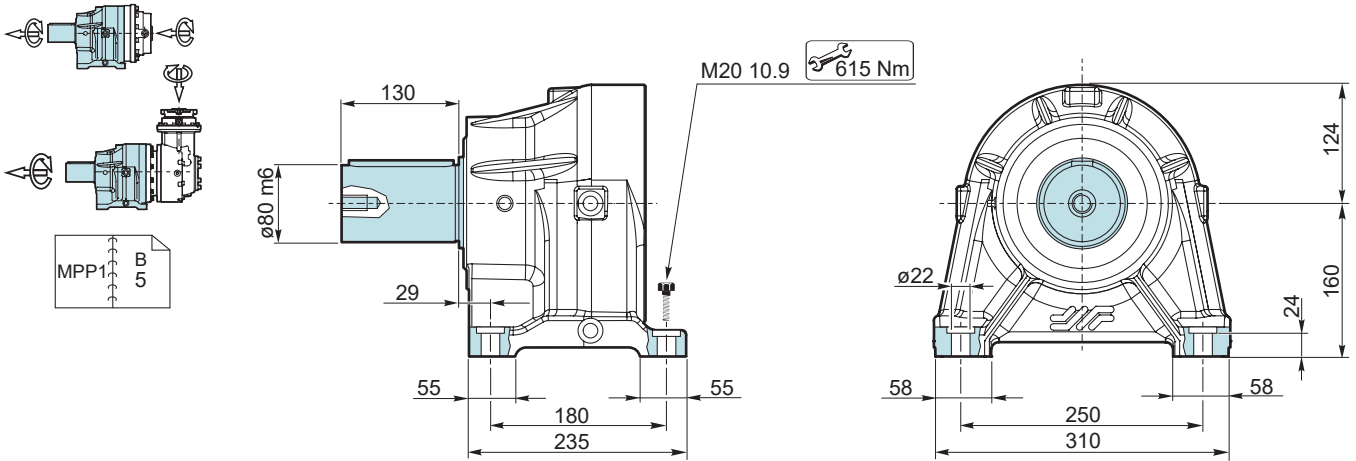
EC502/FS 045 78

EC503/FS 045 57

EC504/FS 045 63







ACCESSORI

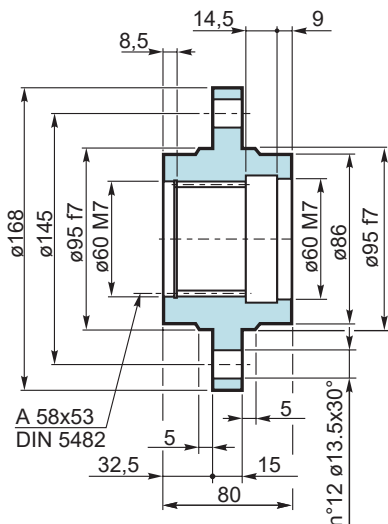
ACCESSORIES

ZUBEHÖR



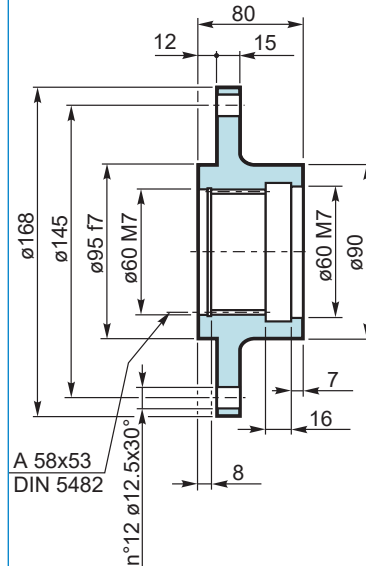
Flangia ruota
Driving flange
Radnabehflansch

FA 046 Mat. C40 EN 10083
Cod: 347.0124.1800



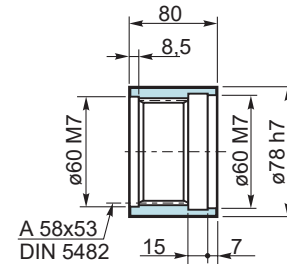
Flangia ruota
Driving flange
Radnabehflansch

FR 046 Mat. C40 EN 10083
Cod: 347.0114.1800



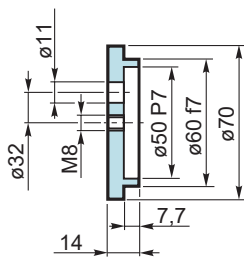
Manicotto scanalato
Splined bush
Manchon cannelée

MS 046 Mat. 42CrMo4 EN 10083
Cod: 391.0294.8500



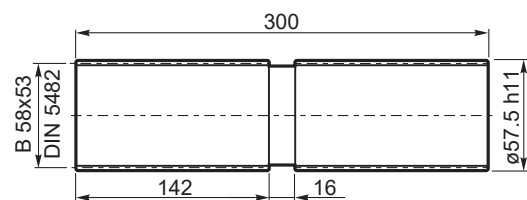
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 046 Mat. C40 EN 10083
Cod: 340.4224.0000

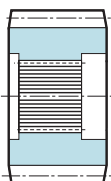


Barra scanalata
Splined bar
Zugspindel

BS 020 Mat. 16NiCr4 EN 10084
Cod: 391.2703.0100



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)



ACCESSORI

ACCESSORIES

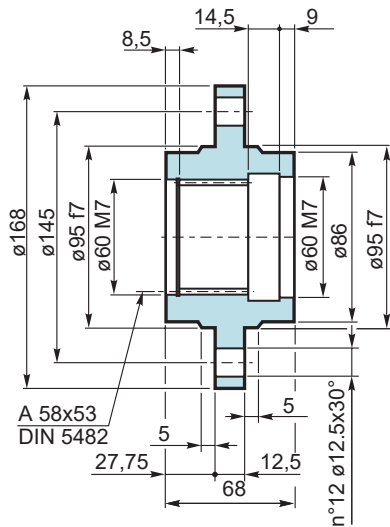
ZUBEHÖR



Flangia ruota
Driving flange
Radnabehflansch

FA 045

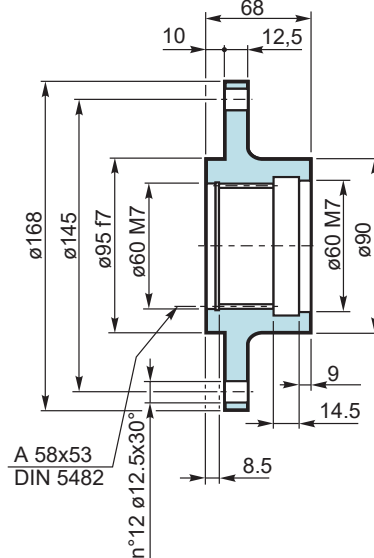
Mat. C40 EN 10083
Cod: 347.0064.1800



Flangia ruota
Driving flange
Radnabehflansch

FR 045

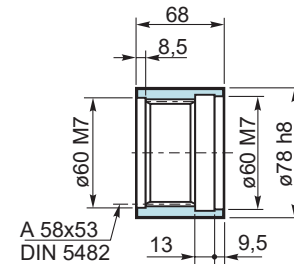
Mat. C40 EN 10083
Cod: 347.0013.1800



Manicotto scanalato
Splined bush
Manchon cannelée

MS 045

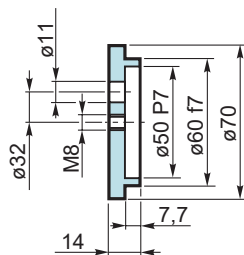
Mat. 42CrMo4 EN 10083
Cod: 391.0284.8500



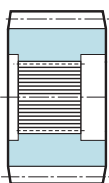
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 045

Mat. C40 EN 10083
Cod: 340.4224.0000



Pignone
Pinion
Ritzel



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Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

ACCESSORI

ACCESSORIES

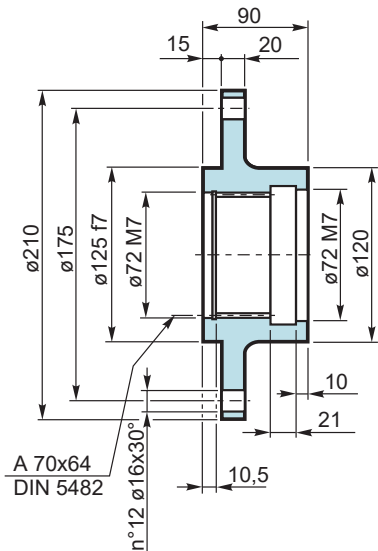
ZUBEHÖR



Flangia ruota
Driving flange
Radnabehflansch

FR 065

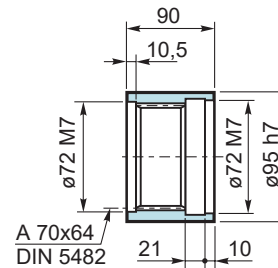
Mat. C40 UNI EN 10083
Cod: 347.0203.1800



Manicotto scanalato
Splined bush
Manchon cannelée

MS 065

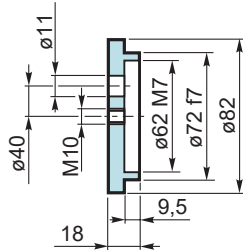
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Cod: 391.0244.0600



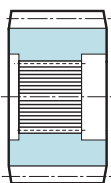
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 065

Mat. C40 UNI EN 10083
Cod: 340.4224.0000



Pignone
Pinion
Ritzel



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Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

SUPPORTI MASCHIO IN INGRESSO

MALE INPUT SUPPORTS

ANTRIEBS- WELLENSTÜMPFE

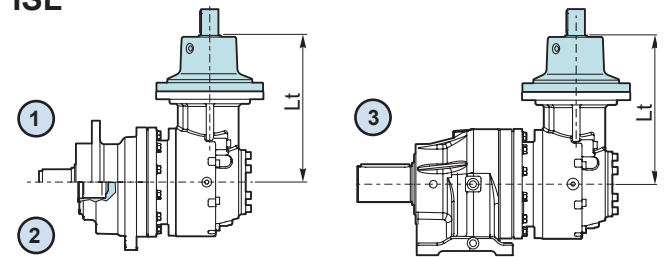
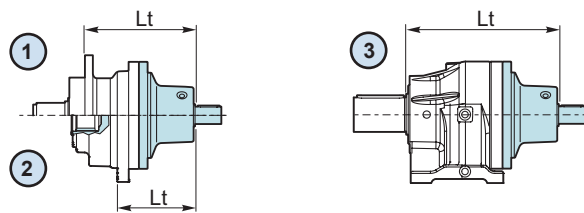


EL

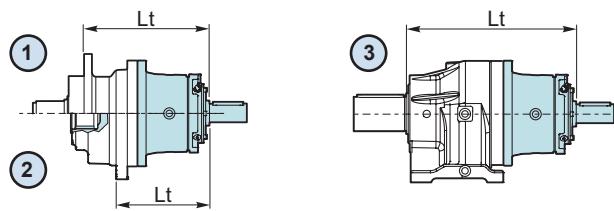
EC

ISL

ISL



IS

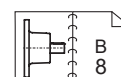


① = MP - MP 045 - MP 065 - MP1 - MP1 045 - MP1 065 - FS045

② = FE - FCP

③ = MPP1

		ØD	E	Lt [mm] ①							Lt [mm] ②		Lt [mm] ③
				MP	MP 045	MP 065	MP1	MP1 045	MP1 065	FS 045	FE	FCP	MPP1
EL501	IS50	48 m6	82	304	321	331	304	321	331	321	202	226	371
EL501	ISL50	40 k6	58	274.5	291.5	301.5	274.5	291.5	301.5	291.5	172.5	196.5	341.5
EL502	ISL16	28 k6	50	329	346	356	329	346	356	346	227	251	396
EL503	ISL10	28 k6	50	383	400	410	383	400	410	400	281	305	450
EL504	ISL10	28 k6	50	427	444	454	427	444	454	444	325	349	494
EC502	ISL10	28 k6	50	311	311	311	311	311	311	311	311	311	311

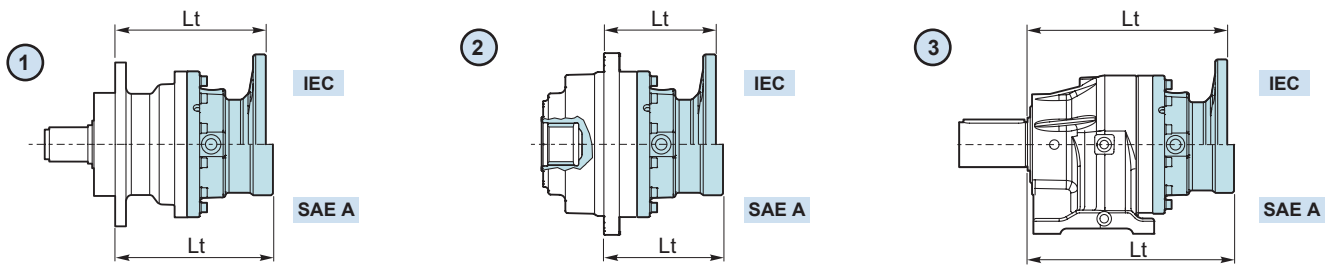


ADATTATORI IEC/SAE A

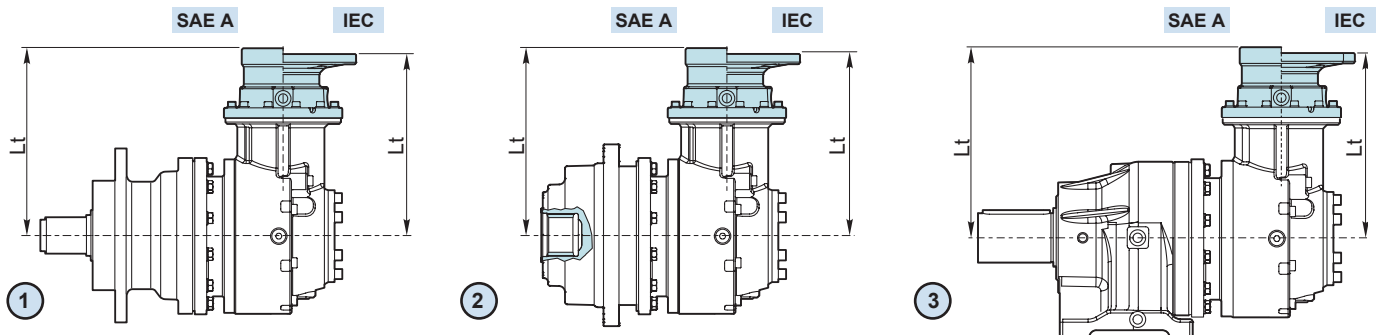
ADAPTERS IEC/SAE A

ADAPTER IEC/SAE A

EL

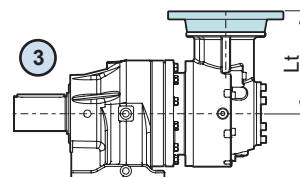
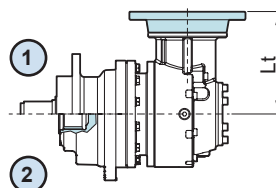
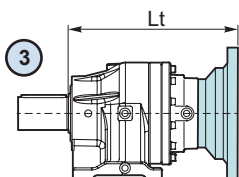
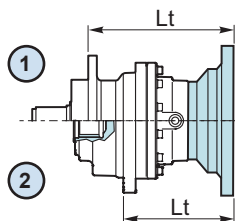


EC



- ① = MP - MP 045 - MP 065 - MP1 - MP1 045 - MP1 065 - FS 045
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]			
		IEC			SAE A
		80-90	100-112	132	
EL502	MP - MP1	302	310	331	319
	MP 045 - MP1 045	319	325	348	336
	MP 065 - MP1 065	329	335	358	346
	FE	200	206	229	217
	FS 045	319	325	348	336
	FCP	224	230	253	241
EL503	MPP1	369	375	398	386
	MP - MP1	341	349	385	373
	MP 045 - MP1 045	358	366	402	390
	MP 065 - MP1 065	368	376	412	400
	FE	239	247	283	271
	FS 045	358	366	402	390
EL504	FCP	263	271	307	295
	MPP1	408	416	452	440
	MP - MP1	385	393	429	417
	MP 045 - MP1 045	402	410	446	434
	MP 065 - MP1 065	412	420	456	444
	FE	283	291	327	315
EC502	FS 045	402	410	446	434
	FCP	307	315	351	339
	MPP1	452	460	496	484
	MP - MP1	282	290	313	301
	MP 045 - MP1 045	282	290	313	301
	MP 065 - MP1 065	282	290	313	301
EC502	FE	282	290	313	301
	FS 045	282	290	313	301
	FCP	282	290	313	301
	MPP1	282	290	313	301

**FLANGE MOTORI
IEC/NEMA**
**MOTOR FLANGES
IEC/NEMA**
**MOTORFLANSCHEN
IEC/NEMA**
EL
EC

1 = MP - MP 045 - MP 065 - MP1 - MP1 045 - MP1 065 - FS 045

2 = FE - FCP

3 = MPP1

		Lt [mm]										
		IEC						NEMA				
		63	71	80-90	100-112	132	160-180	143/145 TD	182/184 TC	182/184 TD	210 TD	213/215 TC
EL501	MP - MP1	249	251	256	257	324	355	259	259	259	259	275
	MP 045 - MP1 045	266	268	273	274	341	372	276	276	276	276	292
	MP 065 - MP1 065	276	278	283	284	351	382	286	286	286	286	302
	FE	147	149	154	155	222	253	157	157	157	157	173
	FS 045	266	268	273	274	341	372	276	276	276	276	292
	FCP	171	173	178	179	246	277	181	181	181	181	197
	MPP1	316	318	323	324	391	422	326	326	326	326	342
EL502	MP - MP1	310	312	-	-	-	416	320	320	320	320	336
	MP 045 - MP1 045	327	329	-	-	-	433	337	337	337	337	353
	MP 065 - MP1 065	337	339	-	-	-	443	347	347	347	347	363
	FE	208	210	-	-	-	314	218	218	218	218	234
	FS 045	327	329	-	-	-	433	337	337	337	337	353
	FCP	232	234	-	-	-	338	242	242	242	242	258
	MPP1	377	379	-	-	-	483	387	387	387	387	403
EL503	MP - MP1	349	351	-	-	-	455	359	359	359	359	375
	MP 045 - MP1 045	366	368	-	-	-	472	376	376	376	376	392
	MP 065 - MP1 065	376	378	-	-	-	482	386	386	386	386	402
	FE	247	249	-	-	-	353	257	257	257	257	273
	FS 045	366	368	-	-	-	472	376	376	376	376	392
	FCP	271	273	-	-	-	377	281	281	281	281	297
	MPP1	416	418	-	-	-	522	426	426	426	426	442
EL504	MP - MP1	393	395	-	-	-	499	403	403	403	403	419
	MP 045 - MP1 045	410	412	-	-	-	516	420	420	420	420	436
	MP 065 - MP1 065	420	422	-	-	-	526	430	430	430	430	446
	FE	291	293	-	-	-	397	301	301	301	301	317
	FS 045	410	412	-	-	-	516	420	420	420	420	436
	FCP	315	317	-	-	-	421	325	325	325	325	341
	MPP1	460	462	-	-	-	566	470	470	470	470	486
EC502	MP - MP1	290	292	-	-	-	396	300	300	300	300	316
	MP 045 - MP1 045	290	292	-	-	-	396	300	300	300	300	316
	MP 065 - MP1 065	290	292	-	-	-	396	300	300	300	300	316
	FE	290	292	-	-	-	396	300	300	300	300	316
	FS 045	290	292	-	-	-	396	300	300	300	300	316
	FCP	290	292	-	-	-	396	300	300	300	300	316
	MPP1	290	292	-	-	-	396	300	300	300	300	316
EC503 EC504	MP - MP1	155	155	155	155	242	-	-	-	-	-	-
	MP 045 - MP1 045	155	155	155	155	242	-	-	-	-	-	-
	MP 065 - MP1 065	155	155	155	155	242	-	-	-	-	-	-
	FE	155	155	155	155	242	-	-	-	-	-	-
	FS 045	155	155	155	155	242	-	-	-	-	-	-
	FCP	155	155	155	155	242	-	-	-	-	-	-
	MPP1	155	155	155	155	242	-	-	-	-	-	-

A richiesta altre configurazioni disponibili. Contattare il referente DANA di zona.

More configurations are available on request. Consult the DANA area contact person.

Auf Wunsch sind weitere Konfigurationen verfügbar. Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.



FRENI

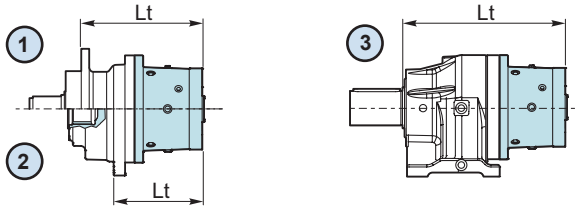
BRAKES

BREMSEN

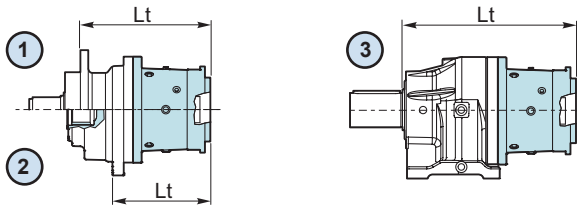
EL

MB3 - E00

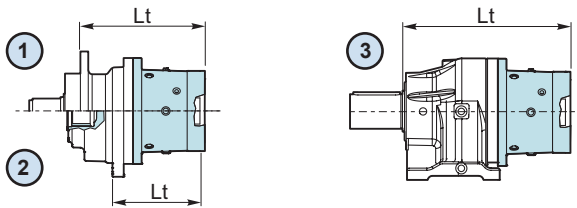
MB5 - E00



MB3 - SAE A

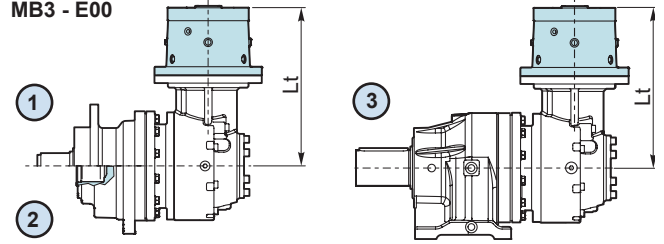


MB3 - BRZV

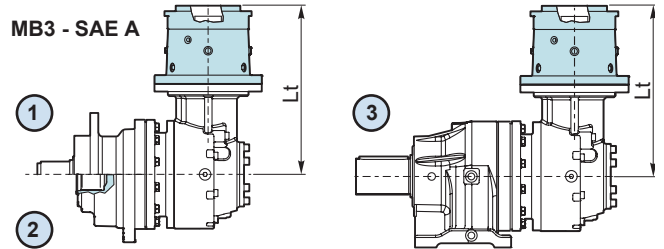


EC

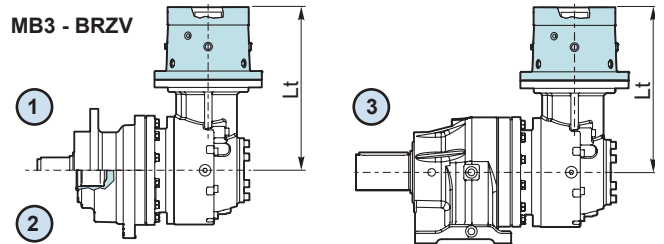
MB3 - E00



MB3 - SAE A



MB3 - BRZV



① = MP - MP 045 - MP 065 - MP1 - MP1 045 - MP1 065 - FS 045

② = FE - FCP

③ = MPP1

		Lt [mm]									
		MP	MP 045	MP 065	MP1	MP1 045	MP1 065	FE	FS 045	FCP	MPP1
MB3 E00	EL502	336	353	363	336	353	363	234	353	258	403
	EL503	390	407	417	390	407	417	288	407	312	457
	EL504	434	451	461	434	451	461	332	451	356	501
	EC502	318	318	318	318	318	318	318	318	318	318
MB3 SAE - A	EL502	365	382	392	365	382	392	263	382	287	432
	EL503	419	436	446	419	436	446	317	436	341	486
	EL504	463	480	490	463	480	490	361	480	385	530
	EC502	347	347	347	347	347	347	347	347	347	347
MB3 BRZV	EL502	333.5	350.5	360.5	333.5	350.5	360.5	231.5	350.5	255.5	400.5
	EL503	387.5	404.5	414.5	387.5	404.5	414.5	285.5	404.5	309.5	454.5
	EL504	431.5	448.5	458.5	431.5	448.5	458.5	329.5	448.5	353.5	498.5
	EC502	315.5	315.5	315.5	315.5	315.5	315.5	315.5	315.5	315.5	315.5
MB5 E00	EL501	298.5	315.5	325.5	298.5	315.5	325.5	196.5	315.5	220.5	365.5

CARICHI RADIALI

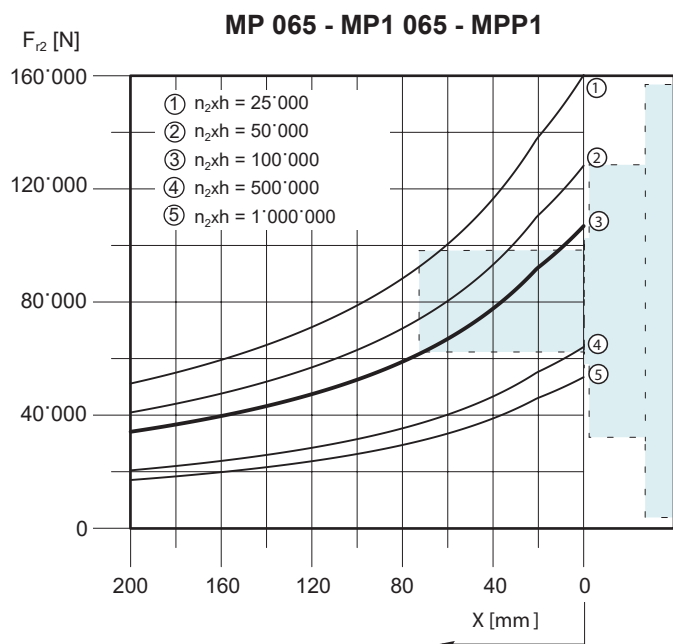
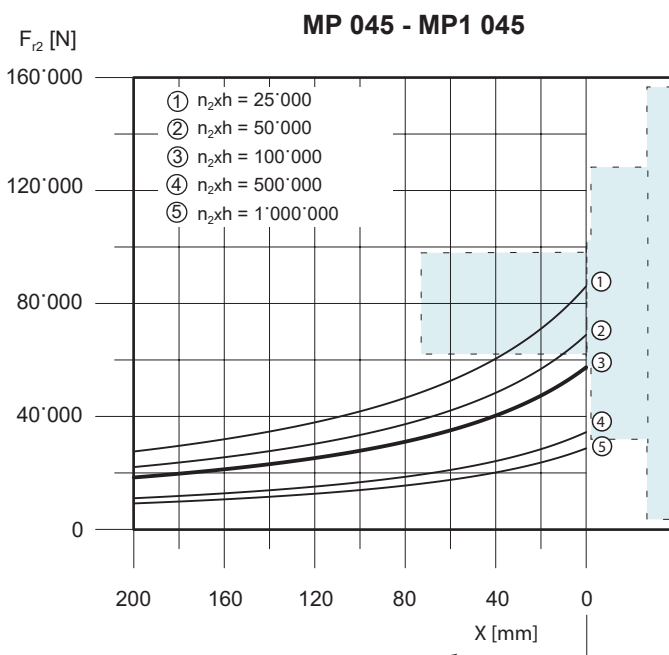
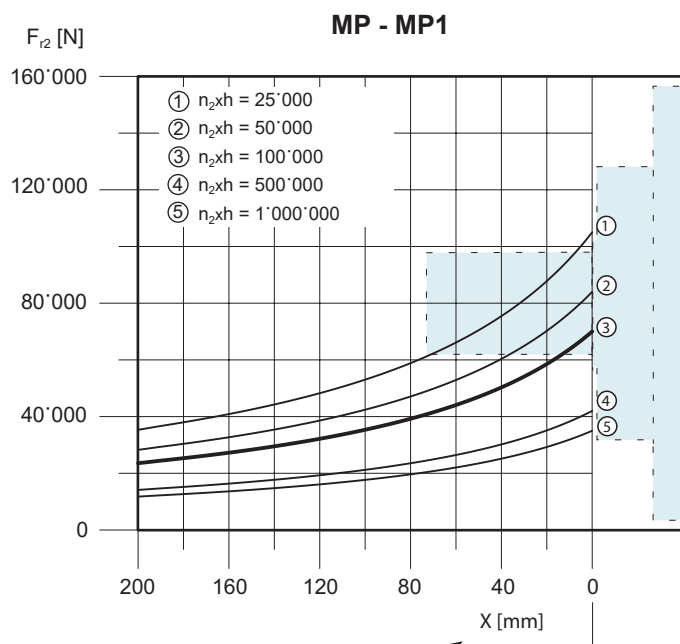
RADIAL LOADS

RADIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



CARICHI ASSIALI

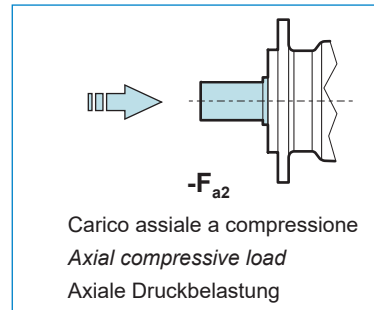
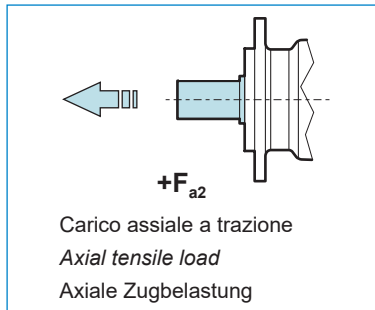
AXIAL LOADS

AXIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



E50 MP - MP1		
$n_2 \times h$	$-F_{a2}$ [N]	$+F_{a2}$ [N]
10'000	133'200	106'000
25'000	101'232	80'560
50'000	81'918	65'190
100'000	66'600	53'000
500'000	41'292	32'860
1'000'000	33'300	26'500

E50 MP 045 - MP1 045		
$n_2 \times h$	$-F_{a2}$ [N]	$+F_{a2}$ [N]
10'000	106'000	86'000
25'000	80'560	65'360
50'000	65'190	52'890
100'000	53'000	43'000
500'000	32'860	26'660
1'000'000	26'500	21'500

E50 MP 065 - MP1 065 - MPP1		
$n_2 \times h$	$-F_{a2}$ [N]	$+F_{a2}$ [N]
10'000	206'000	132'000
25'000	156'560	100'320
50'000	126'690	81'180
100'000	103'000	66'000
500'000	63'860	40'920
1'000'000	51'500	33'000

CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

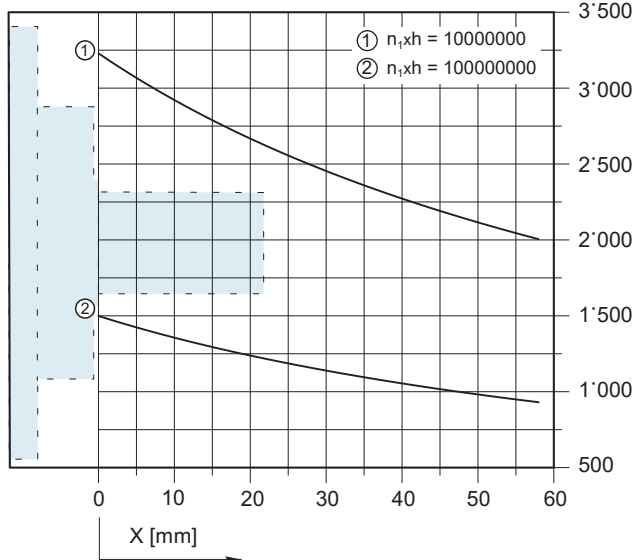
Alberi in ingresso

Input shaft

Eingangswellen

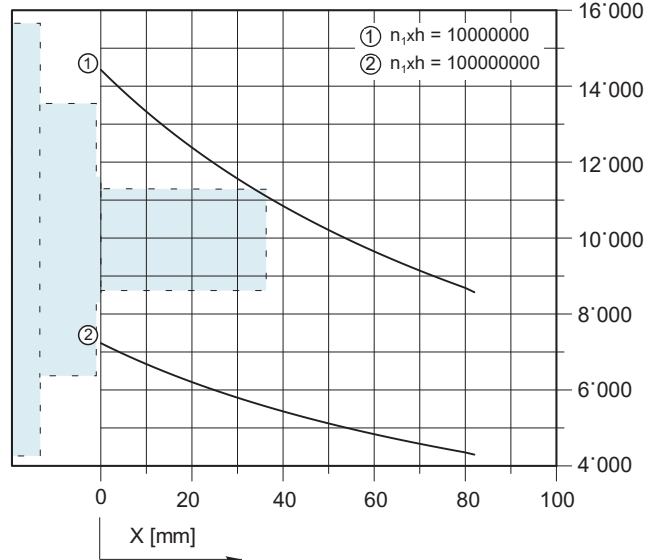
ISL50

F_{r1} [N]



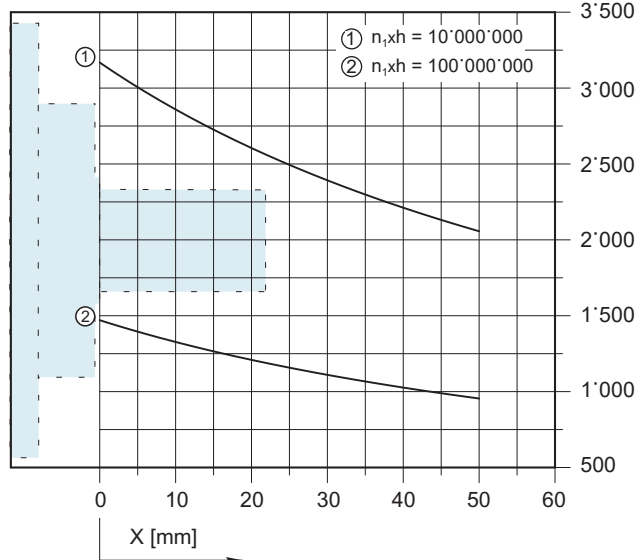
IS50

F_{r1} [N]



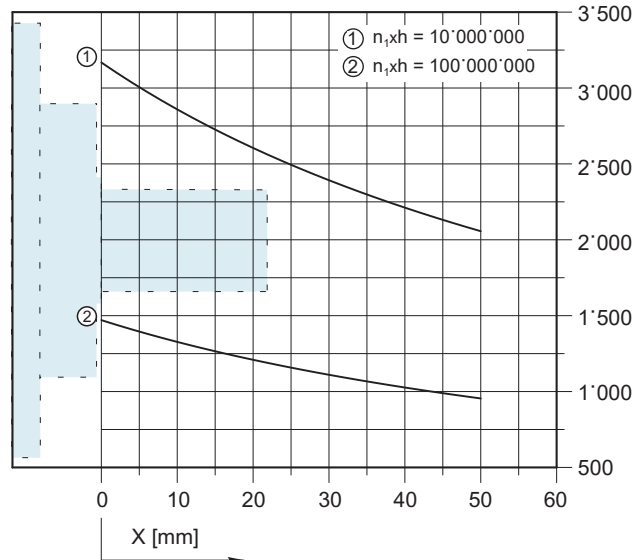
ISL16

F_{r1} [N]



ISL10

F_{r1} [N]





BREVINI[®]















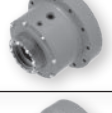




















Motion Systems

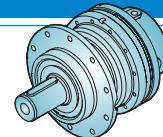
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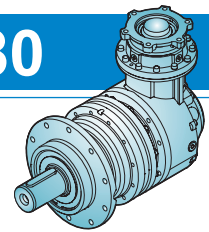


	Disponibilità Availability Verfügbarkeit	Albero - Shaft - Getriebewelle			Pagina Page Seite	
		Tipologia Type Typ	Dimensioni Dimensions Abmessungen [mm]			
USCITE OUTPUTS AUSGÄNGE	MP 		MP B70x64 DIN 5482	MP 090 B80x74 DIN 5482		
	MP1 		MP1 ø80	MP1 090 ø90		
	FE 		A70x64 DIN 5482			
	FS 		ø90			
	FCP 		ø80			
	MPP1 		ø90			
ENTRATE INPUTS EINNAHMEN	IS - ISL 		IS IS30 ø48 IS80 ø65	ISL ISL10 ø28 ISL30 ø40 ISL80 ø48		
	E00 		A50x45 DIN 5482			
FLANGED'INGRESSO INPUT FLANGE FLANSCH EINGANG	Disponibilità Availability Verfügbarkeit				Pagina Page Seite	
	 					
 						
FRENI BRAKES BREMSEN	Disponibilità Availability Verfügbarkeit	T_B [Nm]			Pagina Page Seite	
	 	MB3 33 ÷ 495	MB5 173 ÷ 1'173	MB6 658 ÷ 2'220		



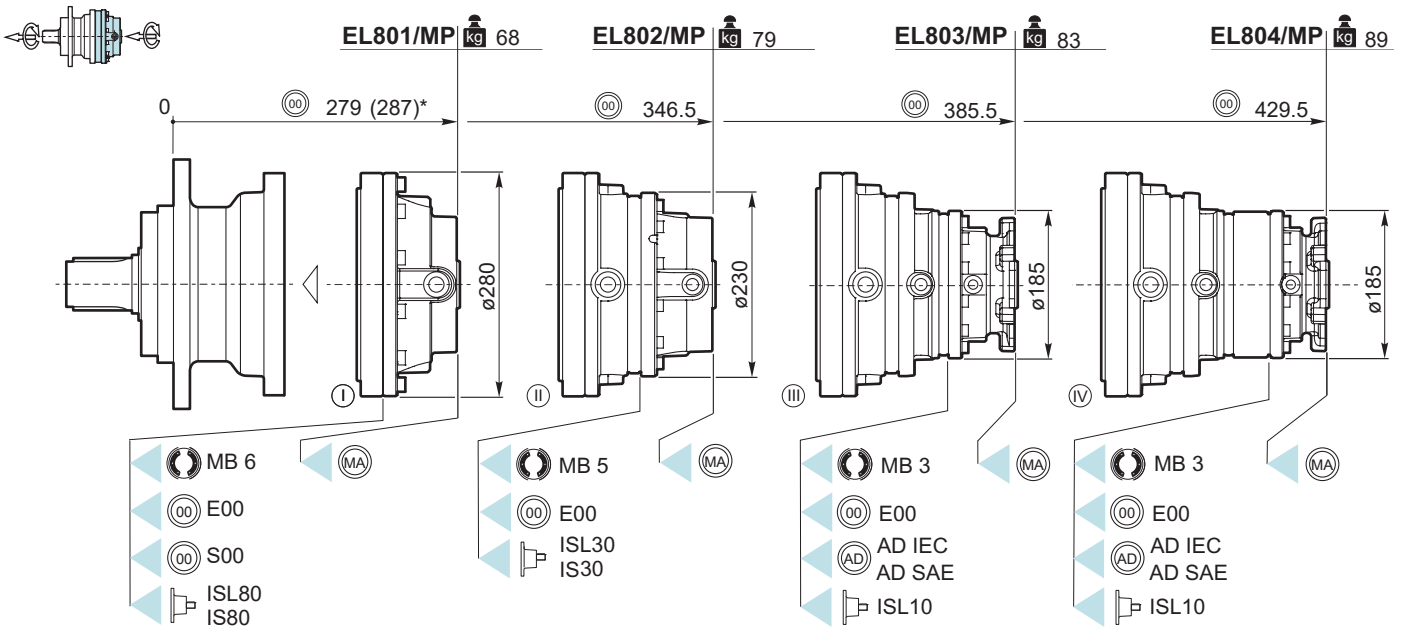
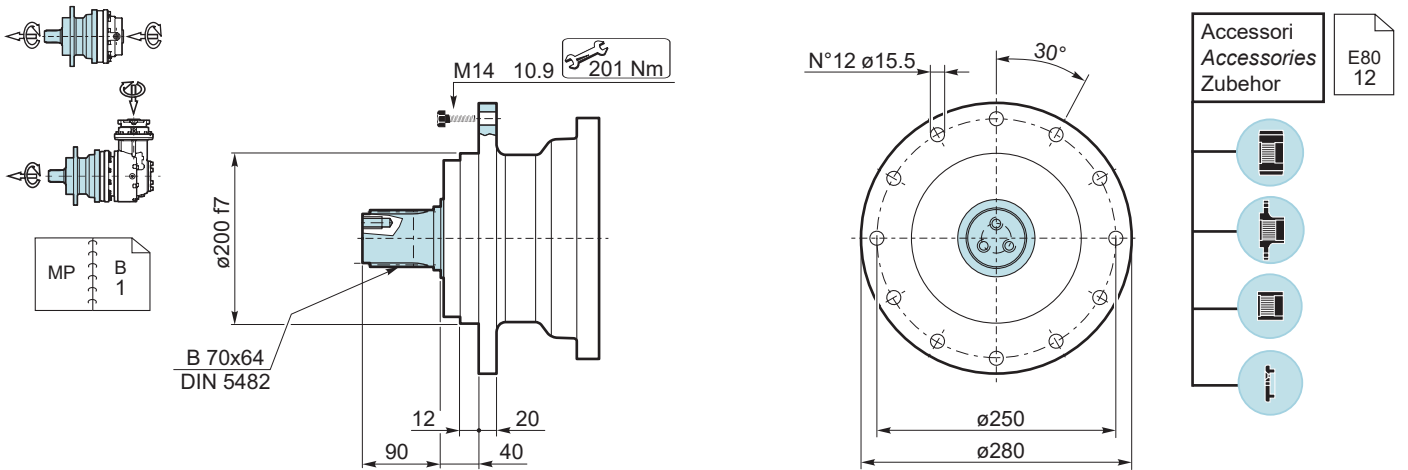
i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EL801									
3.52	11'200	10'200	9'000	8'050	6'400	5'200	3'000	10'500	18
4.07	10'350	9'600	9'400	8'600	6'800	5'500	3'000	12'500	18
4.95	9'650	8'450	7'450	7'000	6'200	5'400	3'000	12'500	18
5.88	8'100	6'850	6'100	5'800	5'050	4'800	3'000	12'500	18
EL802									
12.4	11'200	10'200	9'000	8'050	6'250	5'050	3'800	10'500	12
14.3	10'350	9'600	9'400	8'600	6'800	5'500	3'800	12'500	12
16.6	10'350	9'600	9'400	8'600	6'800	5'500	3'800	12'500	12
20.2	10'350	9'600	9'400	8'600	6'800	5'500	3'800	12'500	12
24.0	10'350	9'550	9'000	8'450	6'800	5'500	3'800	12'500	12
26.6	7'700	6'900	6'500	6'100	5'250	4'600	3'800	12'500	12
29.1	9'650	8'450	7'450	7'000	6'200	5'400	3'800	12'500	12
32.4	8'950	8'250	7'450	7'000	6'200	5'250	3'800	12'500	12
34.6	8'100	6'850	6'100	5'800	5'050	4'800	3'800	12'500	12
38.4	8'100	6'850	6'100	5'800	5'050	4'800	3'800	12'500	12
EL803									
43.4	11'200	10'200	9'000	8'100	6'000	4'900	4'000	10'500	8
50.3	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	8
58.3	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
67.6	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
70.9	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
82.2	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
86.2	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	8
97.6	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
102	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	8
119	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	8
140	10'400	9'600	9'000	8'600	6'800	5'500	4'000	12'500	8
166	10'400	9'600	9'000	8'500	6'800	5'500	4'000	12'500	8
202	9'700	8'500	7'500	7'000	6'200	5'400	4'000	12'500	8
224	9'000	8'300	7'500	7'000	6'200	5'300	4'000	12'500	8
240	8'100	6'900	6'100	5'800	5'100	4'800	4'000	12'500	8
266	8'100	6'900	6'100	5'800	5'100	4'800	4'000	12'500	8
298	7'200	6'800	6'500	6'200	6'000	5'400	4'000	12'500	8
331	7'900	7'500	7'200	6'900	6'200	5'300	4'000	12'500	8
354	8'100	6'900	6'100	5'800	5'100	4'800	4'000	12'500	8
393	8'100	6'900	6'100	5'800	5'100	4'800	4'000	12'500	8
EL804									
360	11'200	10'200	9'000	8'100	6'400	5'200	4'000	12'500	6
398	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
424	11'200	10'200	9'000	8'100	6'400	5'200	4'000	12'500	6
469	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
514	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	6
570	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
625	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	6
676	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
725	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
822	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
881	11'200	10'200	9'000	8'100	6'400	5'200	4'000	10'500	6
969	10'400	9'600	9'000	8'600	6'800	5'500	4'000	12'500	6
1046	11'200	10'200	9'000	8'100	6'400	5'200	4'000	12'500	6
1151	10'400	9'600	9'000	8'500	6'800	5'500	4'000	12'500	6
1212	10'400	9'600	9'400	8'600	6'800	5'500	4'000	12'500	6
1429	10'400	9'600	9'000	8'600	6'800	5'500	4'000	12'500	6
1637	9'000	8'300	7'500	7'000	6'200	5'300	4'000	12'500	6
1737	9'700	8'500	7'500	7'000	6'200	5'400	4'000	12'500	6
1944	9'000	8'300	7'500	7'000	6'200	5'300	4'000	12'500	6
2291	9'000	8'300	7'500	7'000	6'200	5'300	4'000	12'500	6
2450	8'100	6'900	6'100	5'800	5'100	4'800	4'000	12'500	6
2722	8'100	6'900	6'100	5'800	5'100	4'800	4'000	12'500	6
3042	7'200	6'800	6'500	6'200	6'000	5'400	4'000	12'500	6

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich

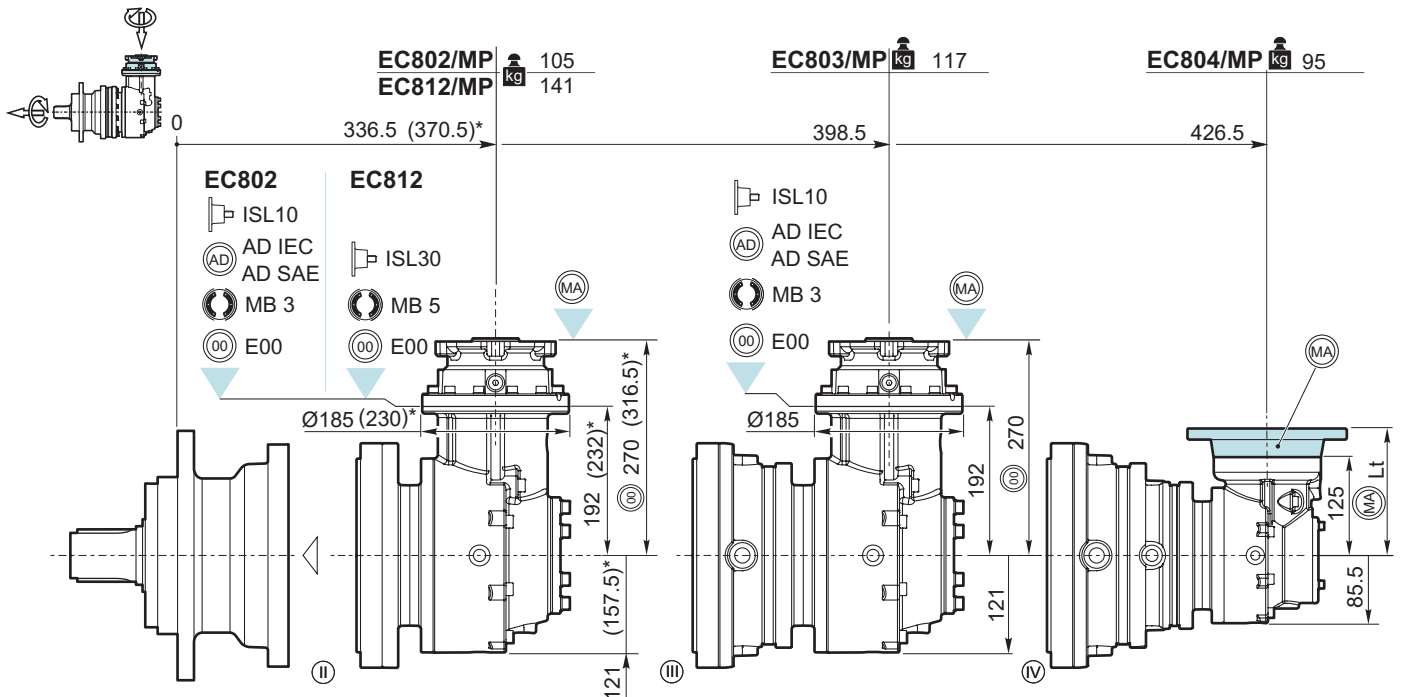


i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EC802									
10.5	6'200	6'100	5'740	5'240	3'240	2'630	3'000	10'500	12
12.2	7'150	7'000	6'500	5'810	3'590	2'915	3'000	12'500	12
14.9	8'650	8'450	7'450	6'700	4'110	3'340	3'000	12'500	12
17.6	8'100	6'850	6'100	5'760	4'640	3'770	3'000	12'500	12
18.6	5'020	4'370	3'970	3'810	3'270	2'650	3'000	12'500	12
22.6	5'910	5'150	4'770	4'570	3'740	3'040	3'000	12'500	12
26.8	6'850	5'960	5'600	5'360	4'220	3'430	3'000	12'500	12
EC812									
10.5	11'200	10'200	9'000	8'050	6'400	5'190	2'500	10'500	14
12.2	10'350	9'600	9'400	8'600	6'800	5'500	2'500	12'500	14
14.9	9'650	8'450	7'450	7'000	6'200	5'370	2'500	12'500	14
16.0	10'950	9'550	8'600	8'050	6'050	4'900	2'500	10'500	14
18.6	10'350	9'600	9'400	8'600	6'700	5'430	2'500	12'500	14
22.6	9'650	8'450	7'450	7'000	6'200	5'370	2'500	12'500	14
26.8	8'100	6'850	6'100	5'760	5'050	4'770	2'500	12'500	14
EC803									
37.1	11'200	10'200	9'000	8'050	6'250	5'040	3'000	10'500	8
43.0	10'350	9'600	9'400	8'600	6'800	5'500	3'000	12'500	8
49.8	10'350	9'600	9'400	8'600	6'800	5'500	3'000	12'500	8
56.3	11'200	10'200	9'000	8'050	6'250	5'040	3'000	10'500	8
60.5	10'350	9'600	9'400	8'600	6'800	5'500	3'000	12'500	8
65.2	10'350	9'600	9'400	8'600	6'800	5'500	3'000	12'500	8
71.9	10'350	9'550	9'000	8'450	6'800	5'500	3'000	12'500	8
75.6	10'350	9'600	9'400	8'600	6'800	5'500	3'000	12'500	8
79.3	11'200	10'200	9'000	8'050	6'400	5'190	3'000	10'500	8
91.9	10'350	9'600	9'400	8'600	6'800	5'500	3'000	12'500	8
109	10'350	9'550	9'000	8'450	6'800	5'500	3'000	12'500	8
121	7'700	6'900	6'500	6'100	5'240	4'570	3'000	12'500	8
133	9'650	8'450	7'450	7'000	6'200	5'370	3'000	12'500	8
147	8'950	8'250	7'450	7'000	6'200	5'240	3'000	12'500	8
158	8'100	6'850	6'100	5'760	5'050	4'770	3'000	12'500	8
175	8'100	6'850	6'100	5'760	5'050	4'770	3'000	12'500	8
EC804									
151	11'200	10'200	8'300	6'600	3'850	3'060	4'000	10'500	6
175	11'200	10'200	9'000	7'300	4'250	3'370	4'000	10'500	6
184	11'200	10'200	9'000	7'500	4'390	3'480	4'000	10'500	6
203	10'350	9'600	9'400	8'050	4'690	3'720	4'000	12'500	6
213	11'200	10'200	9'000	8'050	4'840	3'840	4'000	10'500	6
247	10'350	9'600	9'400	8'600	5'340	4'240	4'000	12'500	6
259	11'200	10'200	9'000	8'050	5'510	4'380	4'000	10'500	6
293	10'350	9'600	9'400	8'600	5'990	4'750	4'000	12'500	6
307	11'200	10'200	9'000	8'050	6'200	4'910	4'000	10'500	6
356	10'350	9'600	9'400	8'600	6'800	5'410	4'000	12'500	6
395	8'950	8'250	7'450	7'000	6'200	5'240	4'000	12'500	6
419	10'350	9'600	9'000	8'600	6'800	5'500	4'000	12'500	6
477	10'350	9'600	9'400	8'500	4'950	3'930	4'000	12'500	6
498	10'350	9'550	9'000	8'450	6'800	5'500	4'000	12'500	6
580	10'350	9'600	9'400	8'600	5'640	4'470	4'000	12'500	6
606	9'650	8'450	7'450	7'000	6'200	5'370	4'000	12'500	6
684	10'350	9'600	9'000	8'600	6'300	4'990	4'000	12'500	6
812	10'350	9'550	9'000	8'450	6'800	5'500	4'000	12'500	6
930	8'950	8'250	7'450	7'000	6'200	5'240	4'000	12'500	6
987	9'650	8'450	7'450	7'000	6'200	5'370	4'000	12'500	6
1096	8'950	8'250	7'450	7'000	6'200	5'240	4'000	12'500	6

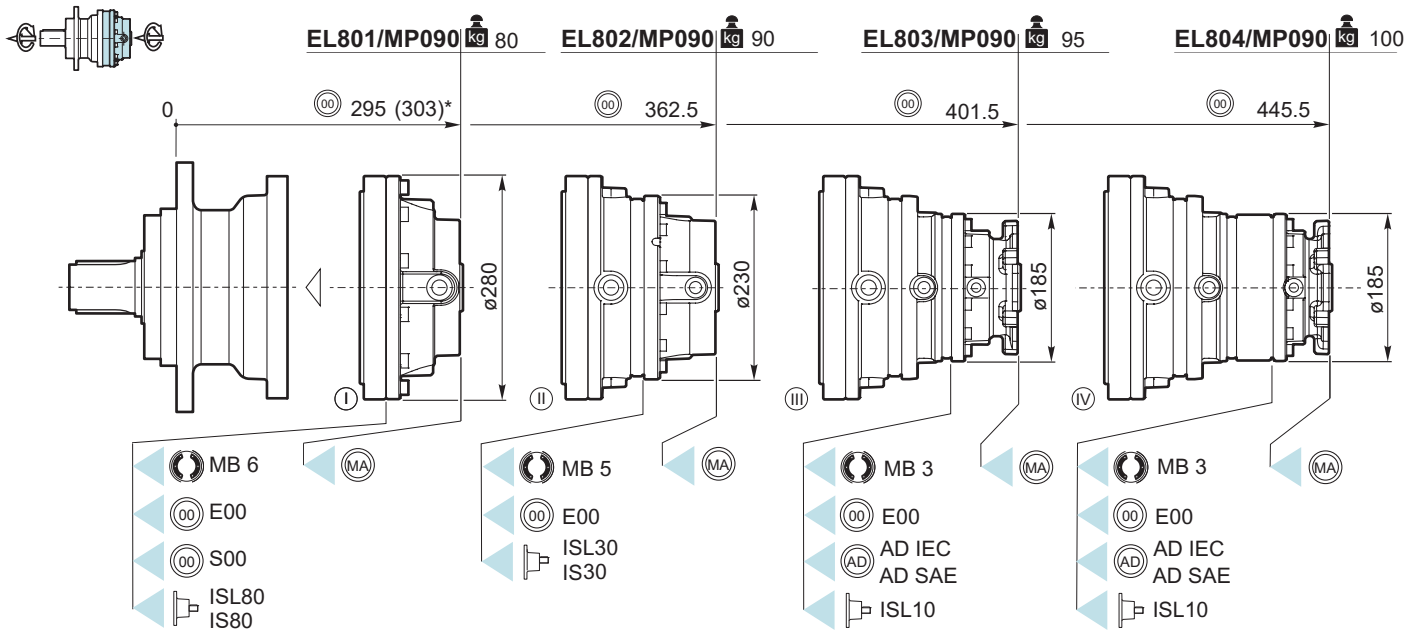
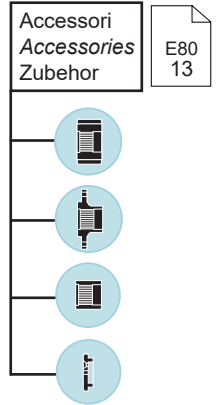
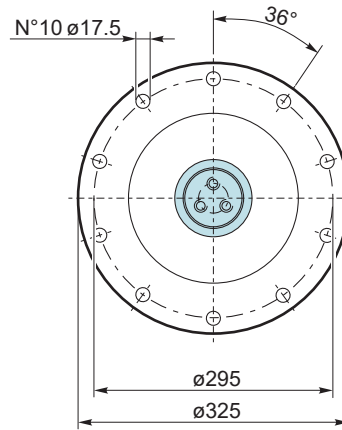
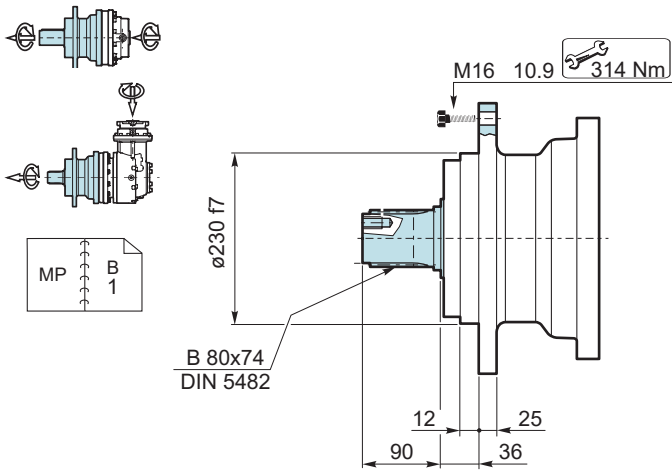
Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich



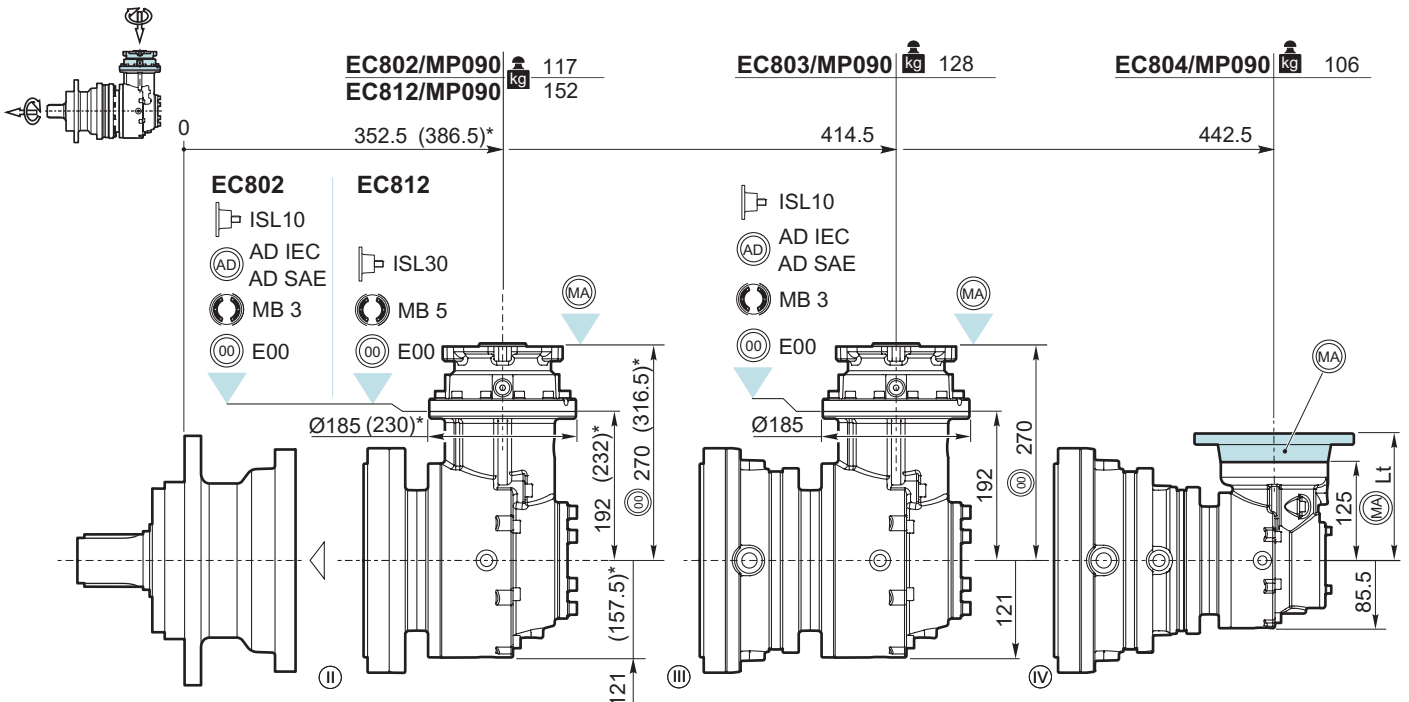
* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite



* Valori validi solo per EC812 / Value only for EC812 / Gültig nur für EC812

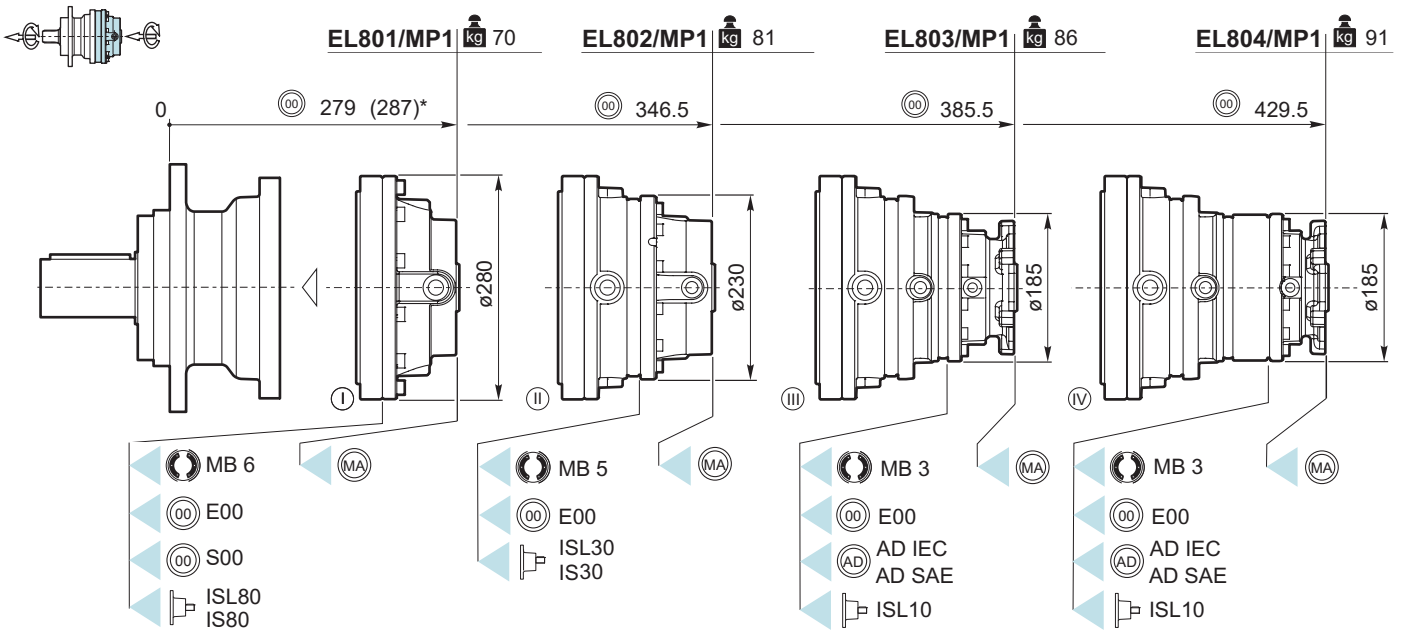
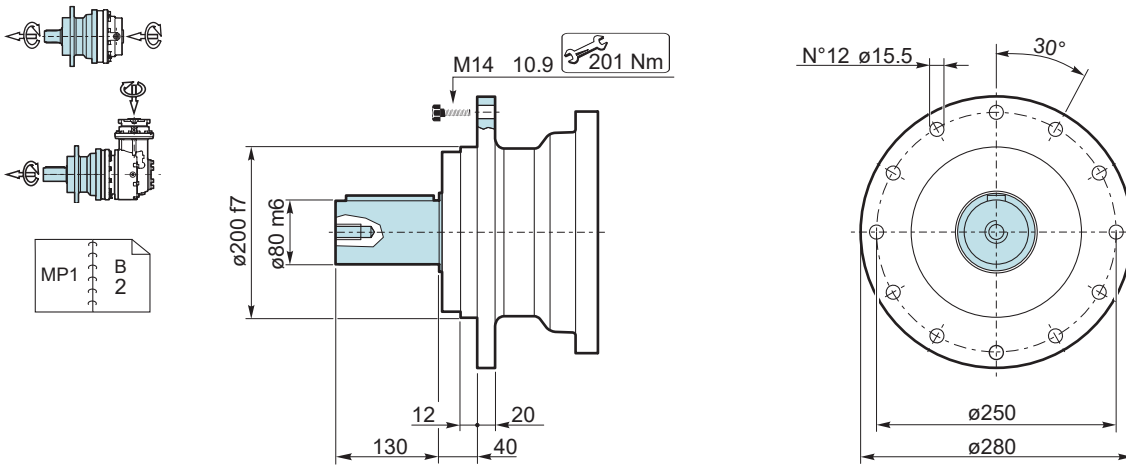


* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite

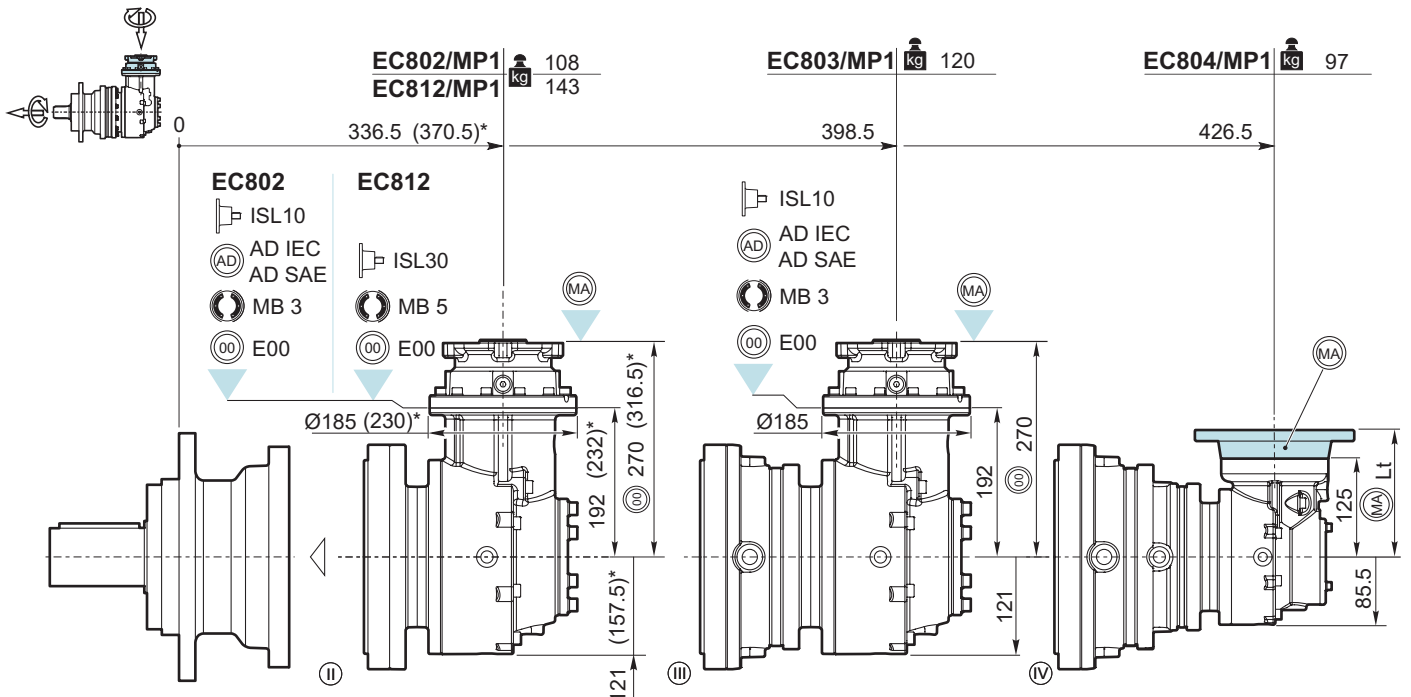


* Valori validi solo per EC812 / Value only for EC812 / Gültig nur für EC812

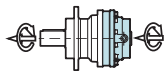
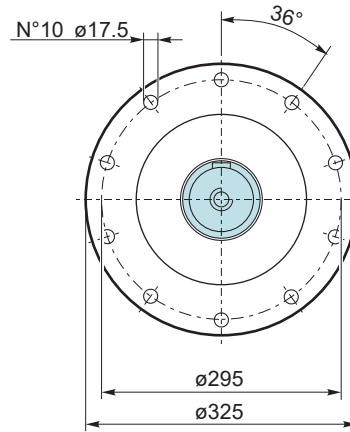
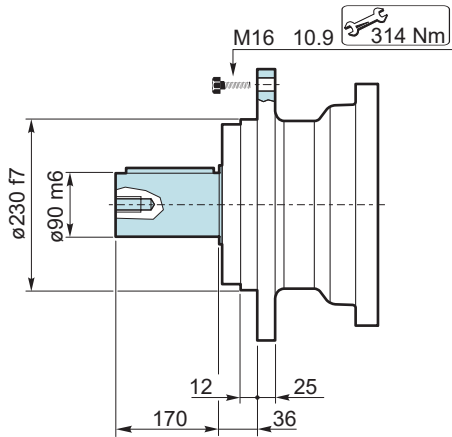
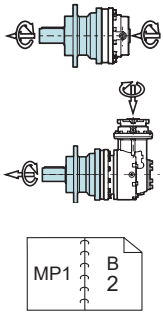




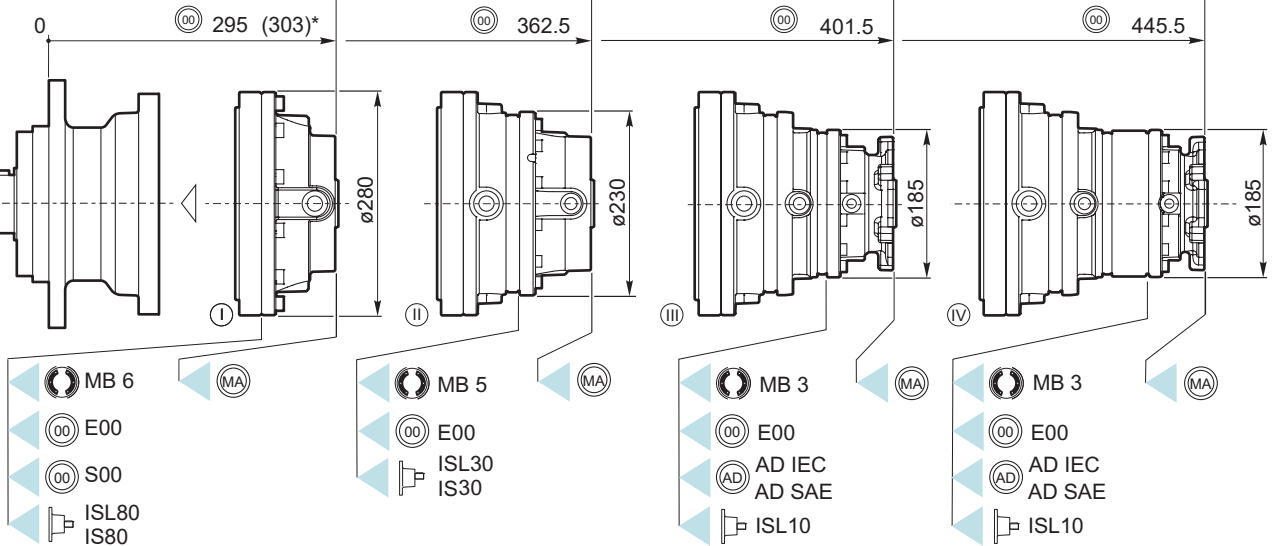
* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite



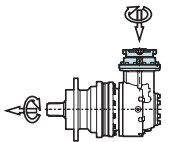
* Valori validi solo per EC812 / Value only for EC812 / Gültig nur für EC812



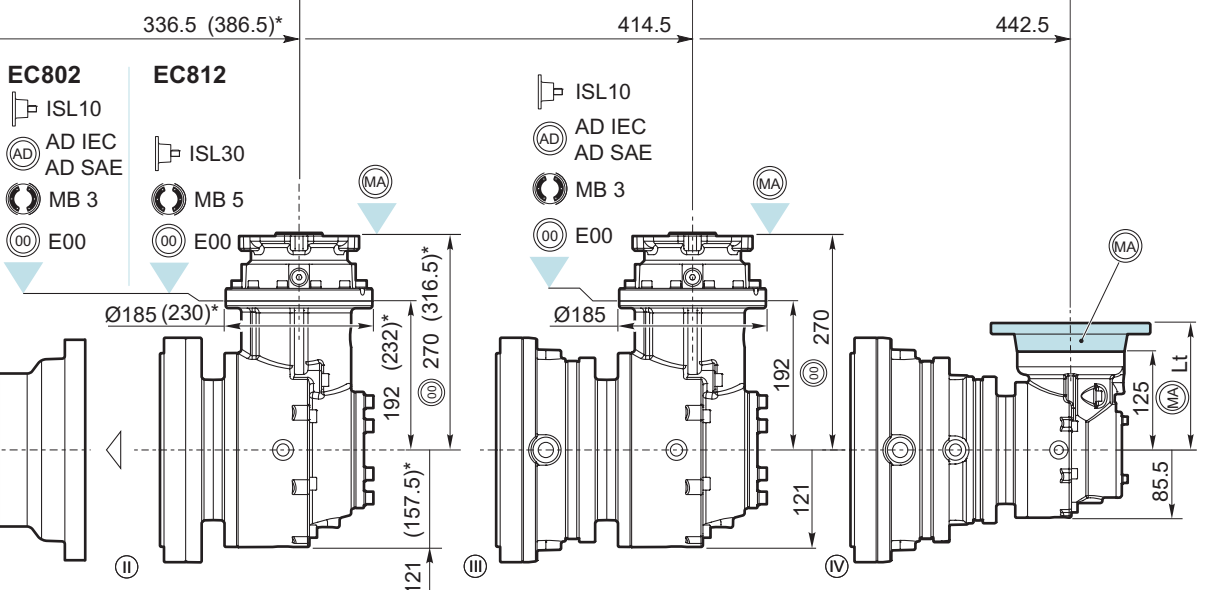
EL801/MP1 090 84 **EL802/MP1 090** 95 **EL803/MP1 090** 99 **EL804/MP1 090** 105



* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite

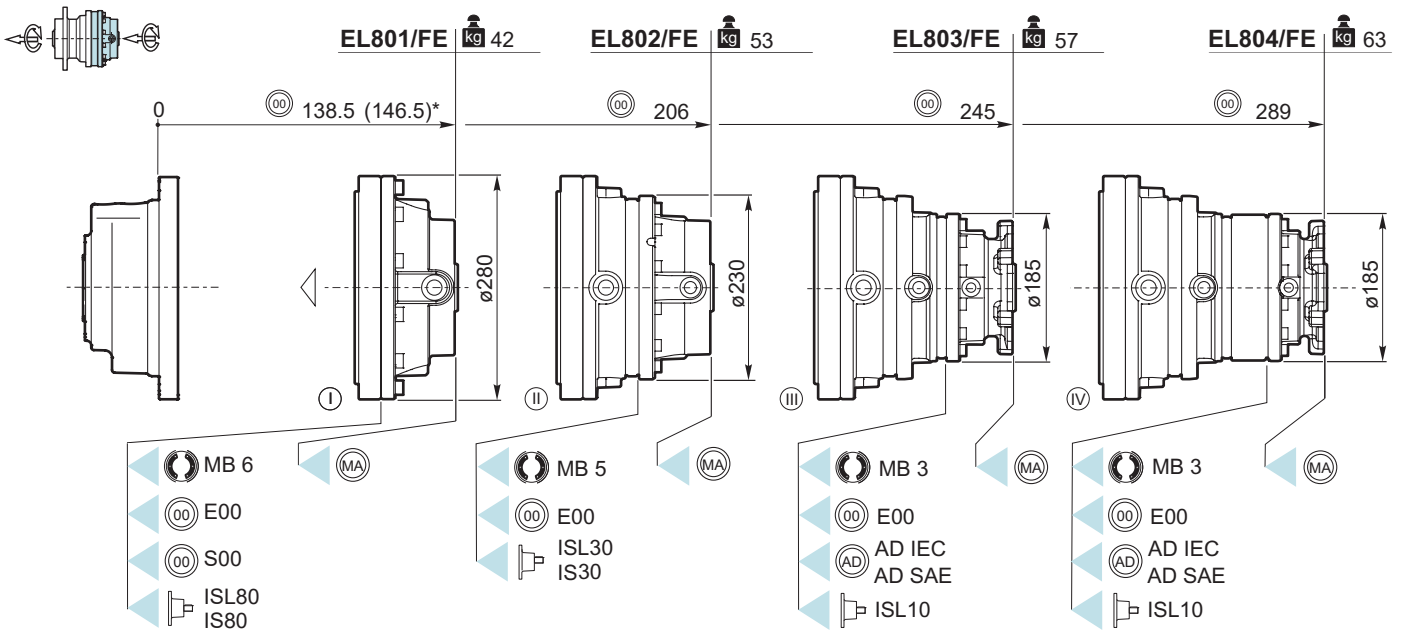
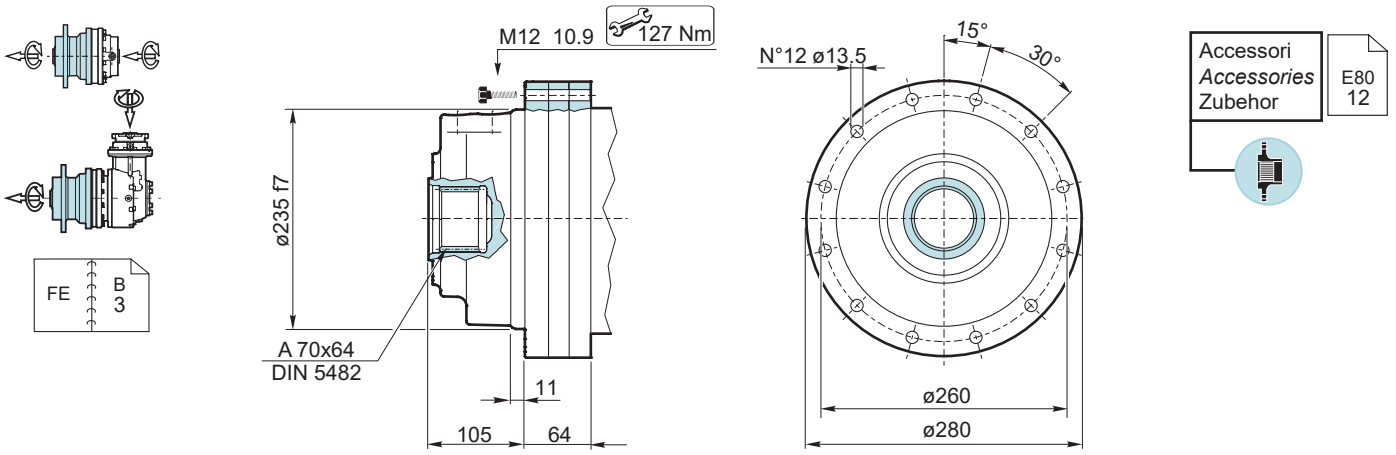


EC802/MP1 090 121 **EC812/MP1 090** 157 **EC803/MP1 090** 133 **EC804/MP1 090** 111

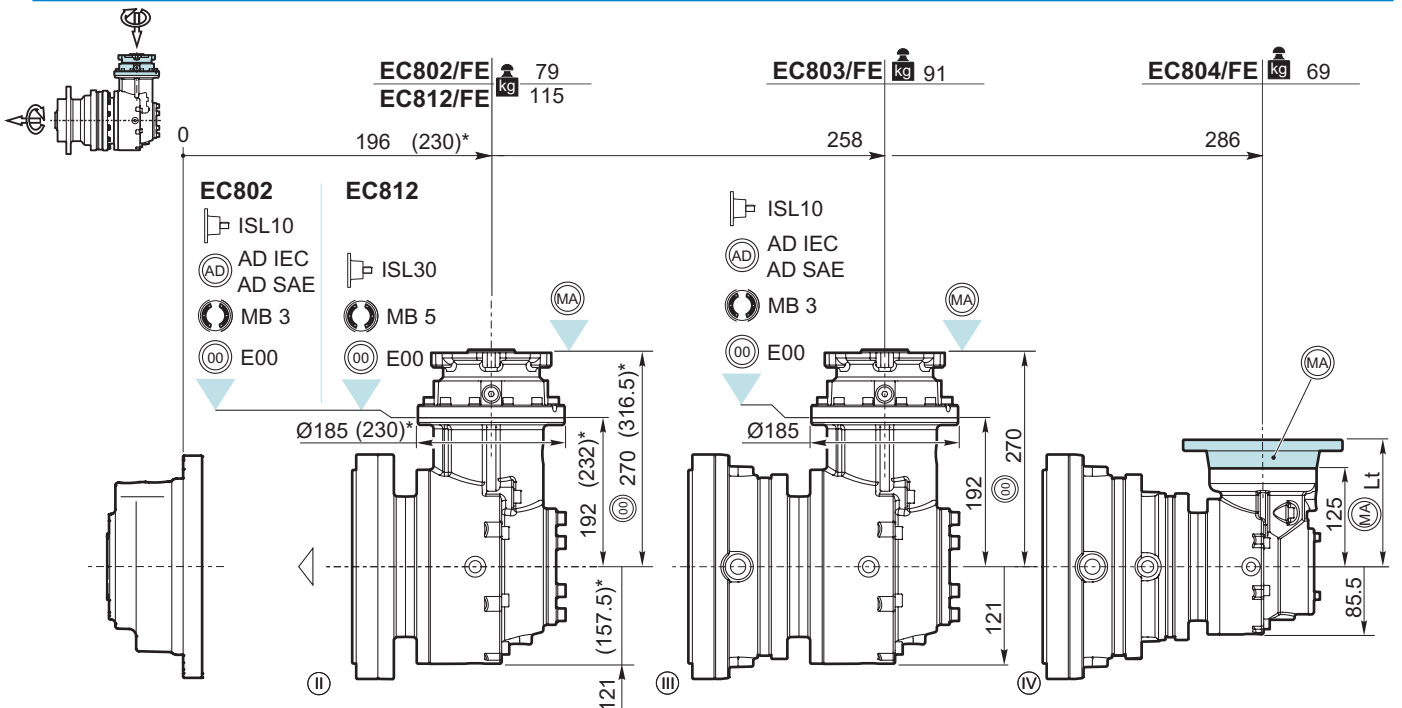


* Valori validi solo per EC812 / Value only for EC812 / Gültig nur für EC812

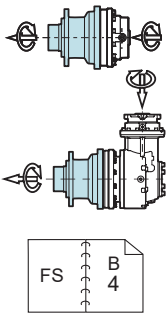




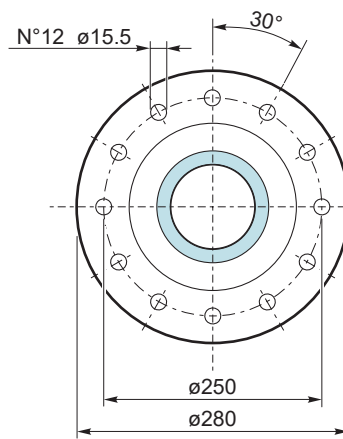
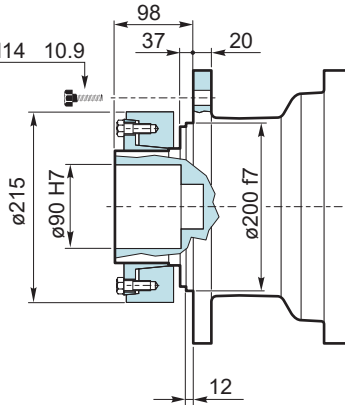
* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite



* Valori validi solo per EC812 / Value only for EC812 / Gültig nur für EC812

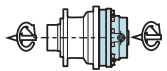


201 Nm M14 10.9



Giunto ad attrito
Shrink disc
Reibungskupplung

B 18

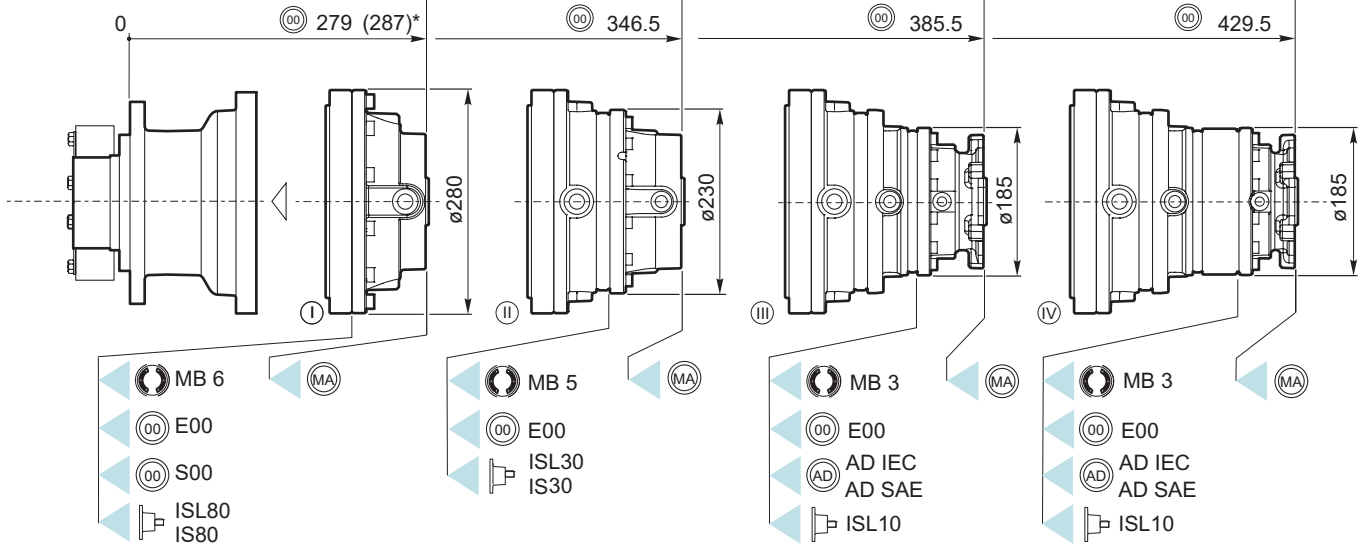


EL801/FS 68

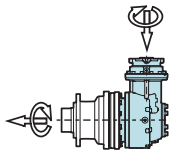
EL802/FS 79

EL803/FS 83

EL804/FS 89



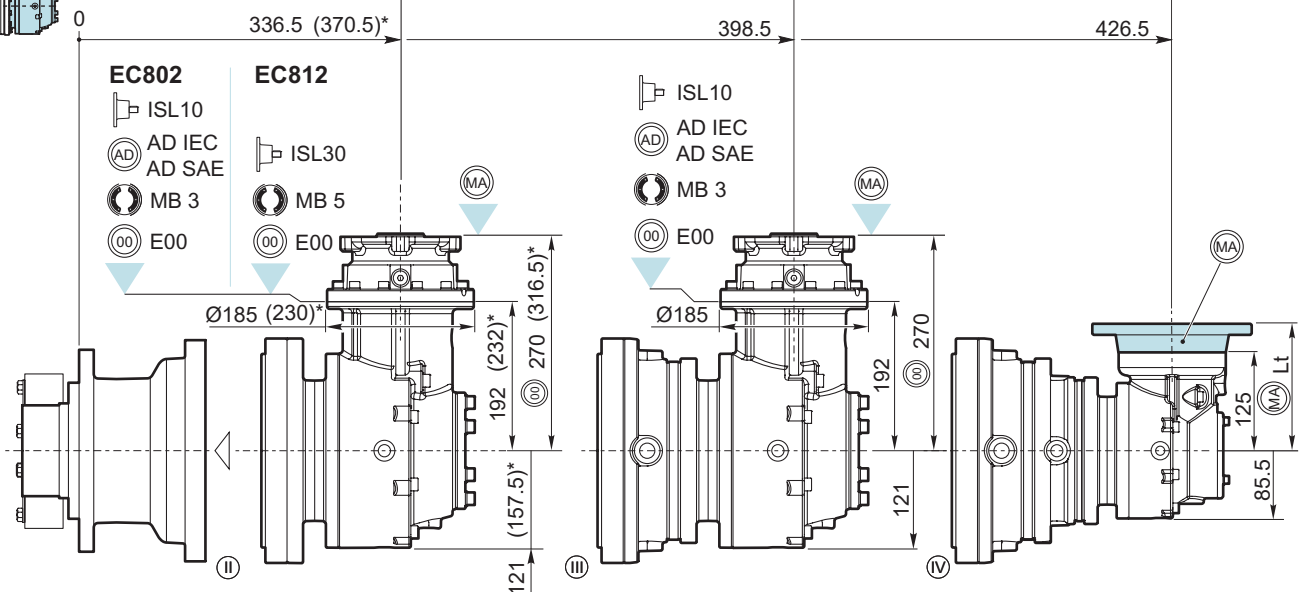
* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite



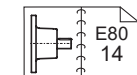
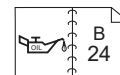
EC802/FS 105
EC812/FS 141

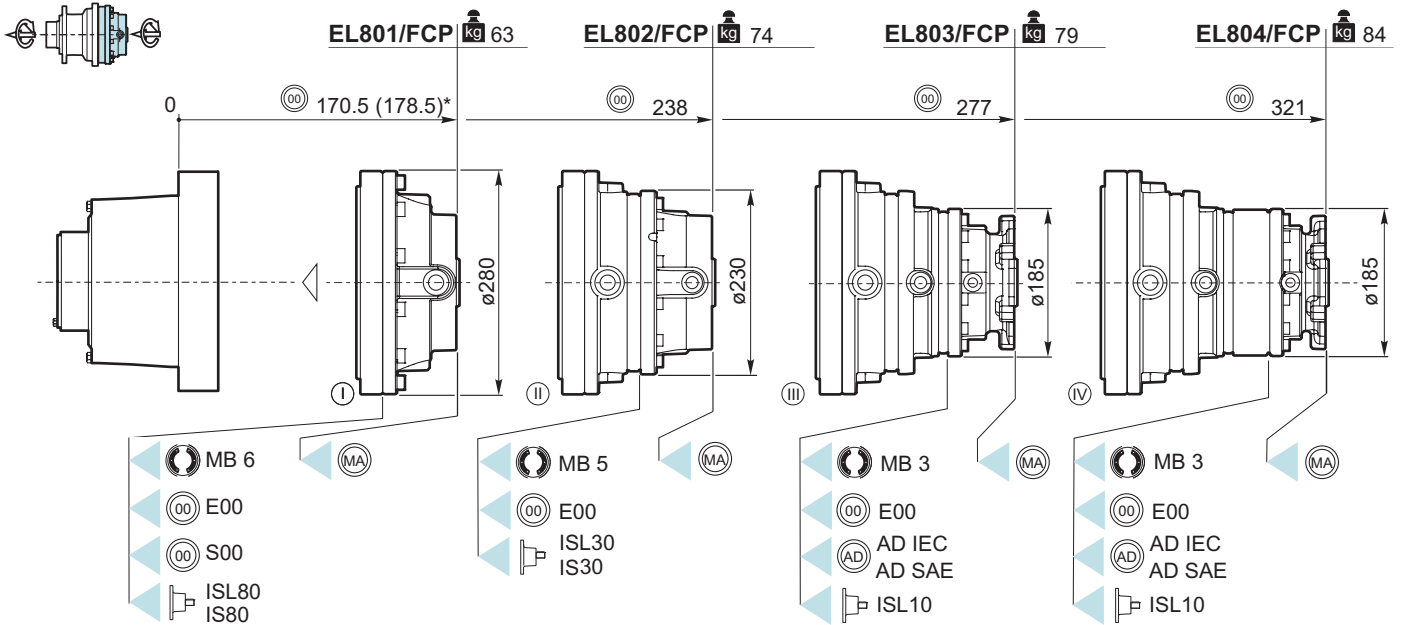
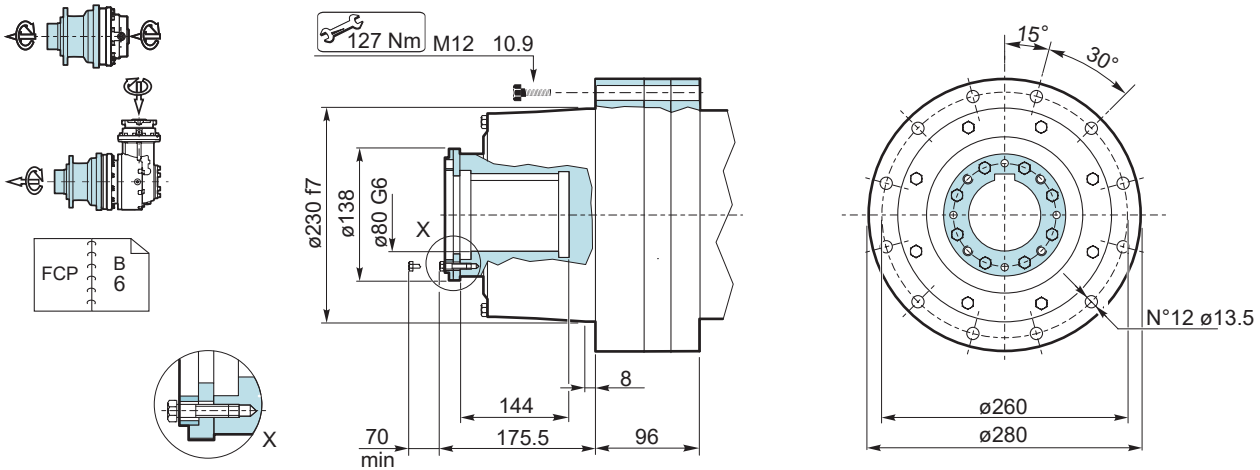
EC803/FS 117

EC804/FS 95

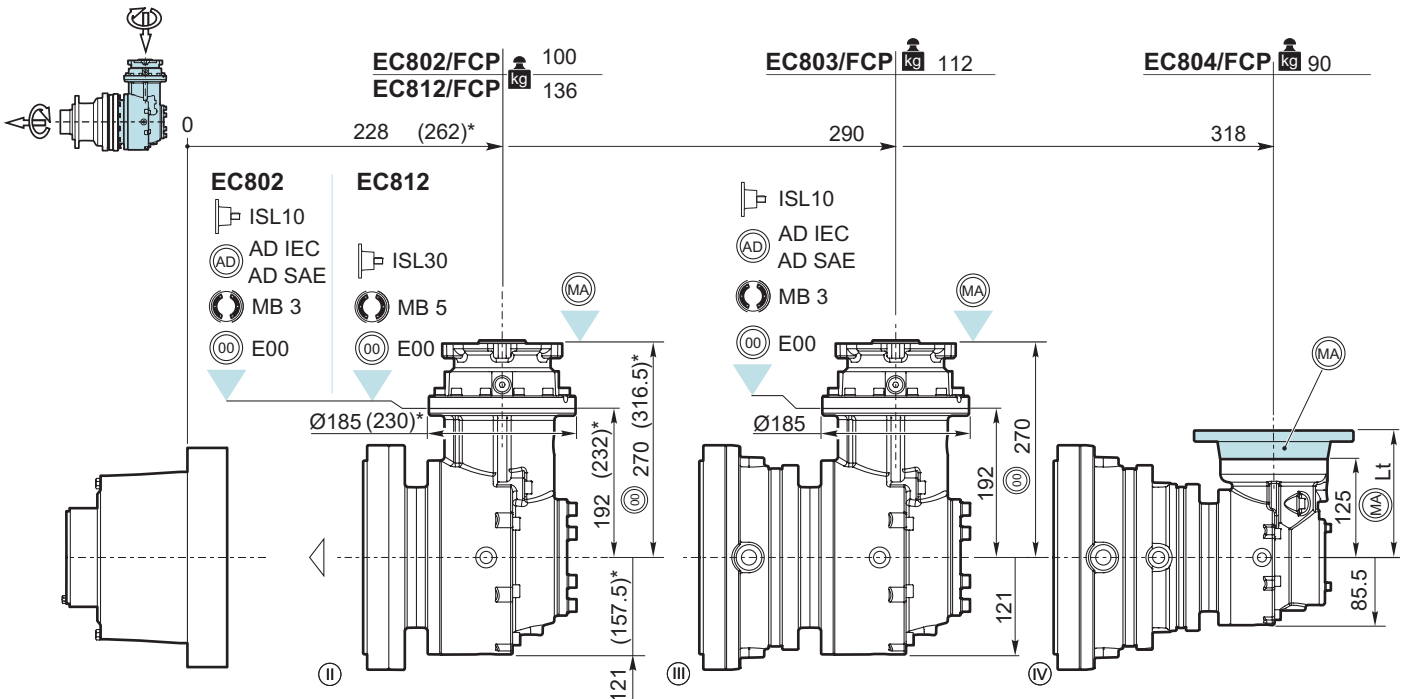


* Valori validi solo per EC812 / Value only for EC812 / Gültig nur für EC812

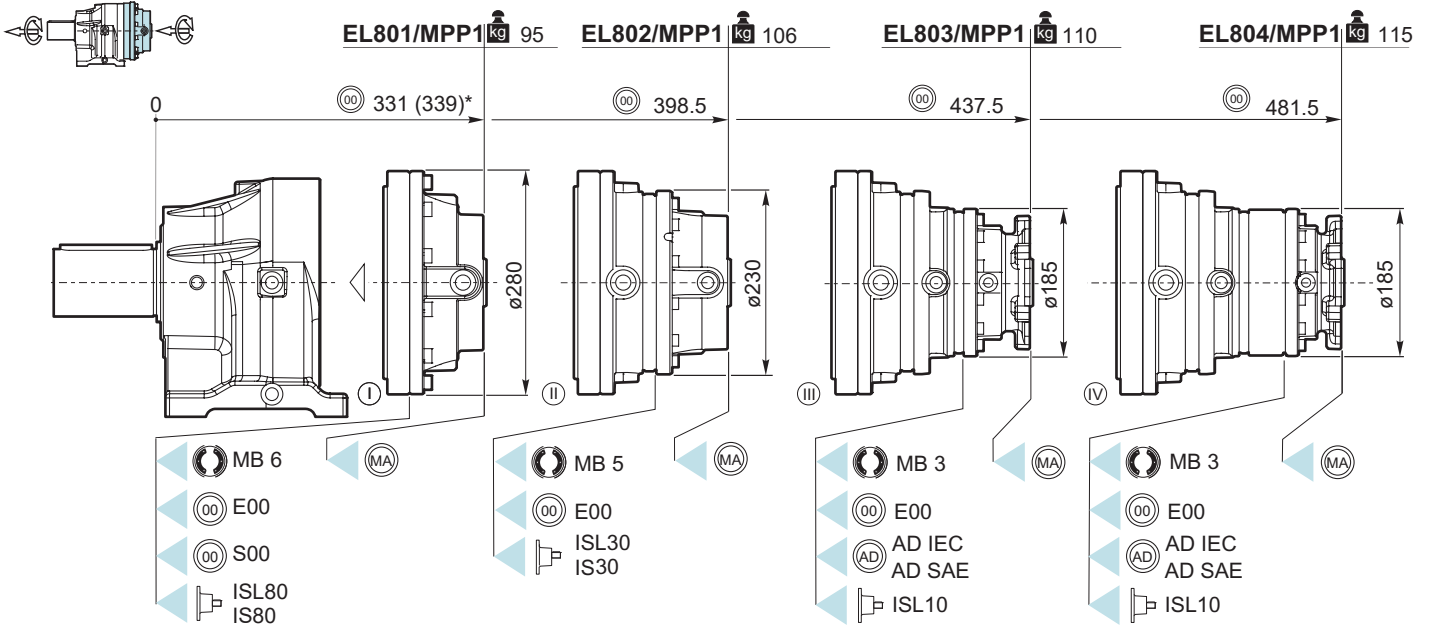
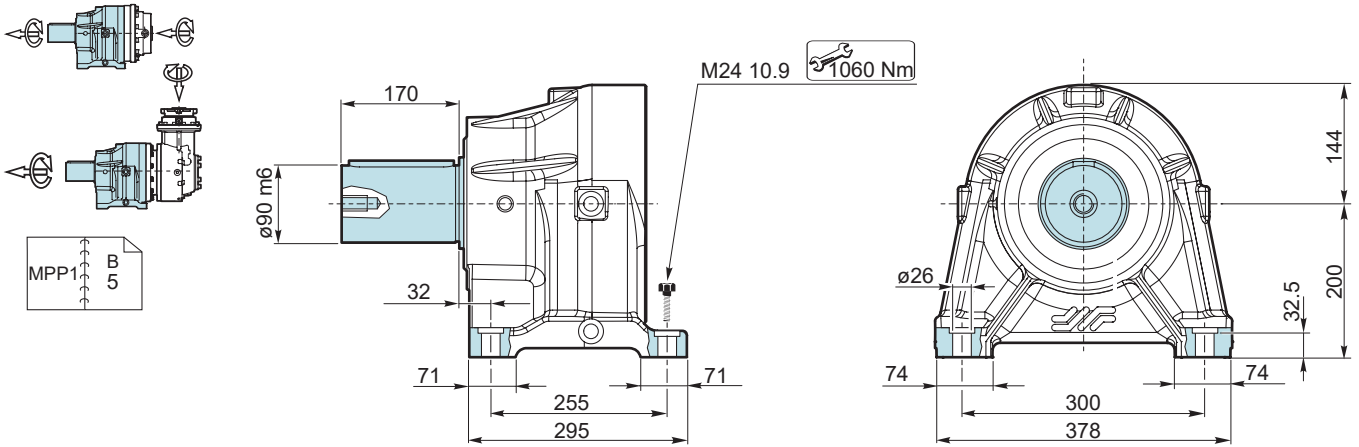




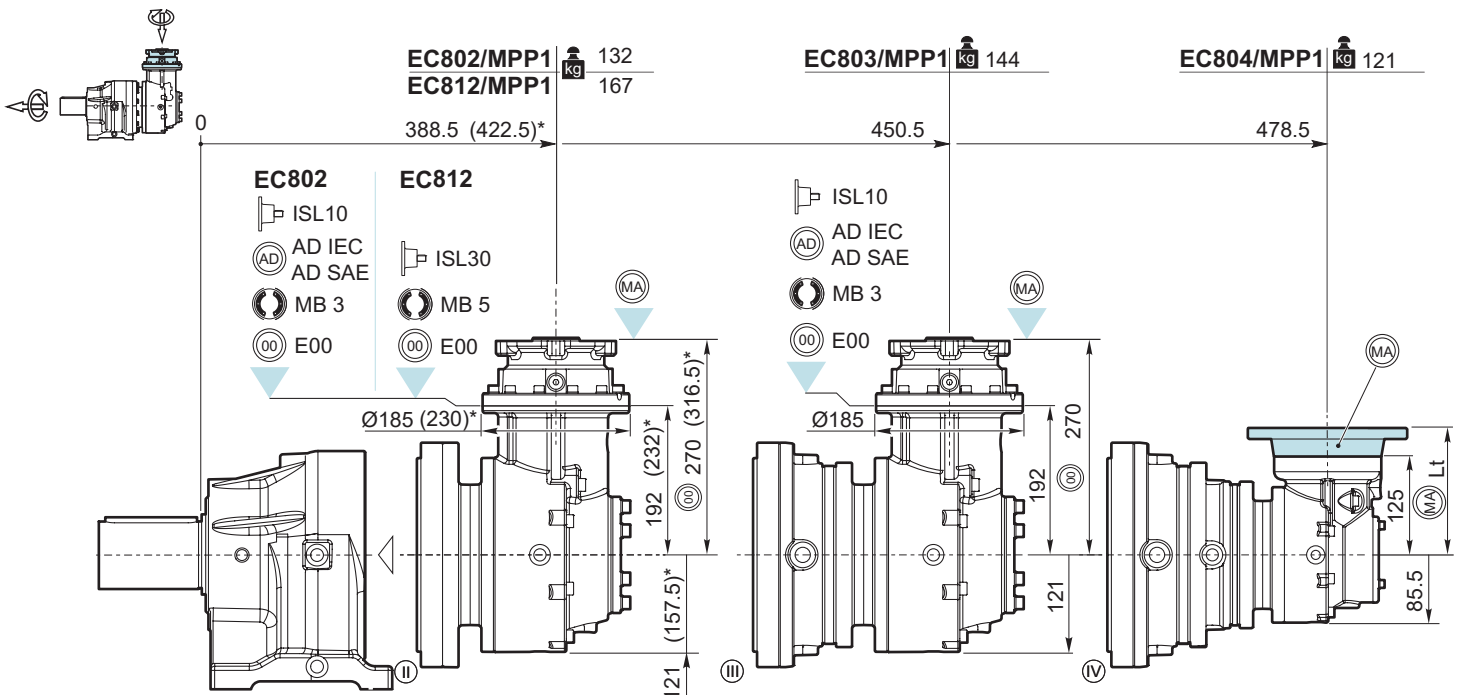
* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite



* Valori validi solo per EC812 / Value only for EC812 / Gültig nur für EC812



* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite



* Valori validi solo per EC812 / Value only for EC812 / Gültig nur für EC812



ACCESSORI

ACCESSORIES

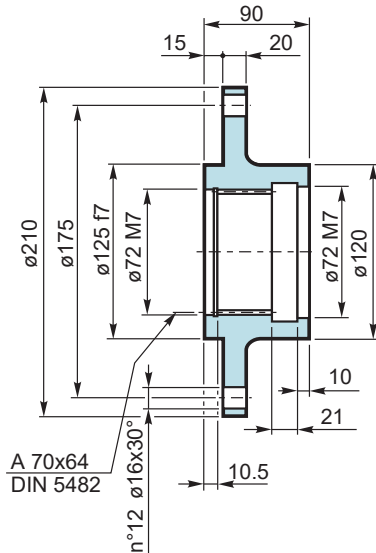
ZUBEHÖR



Flangia ruota
Driving flange
Radnabehflansch

FR 065

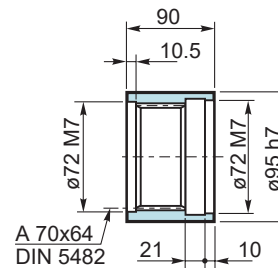
Mat. C40 EN 10083
Cod: 347.0203.1800



Manicotto scanalato
Splined bush
Manchon cannelée

MS 065

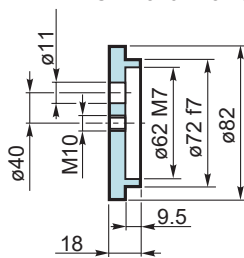
Mat. 42CrMo4 EN 10083
Cod: 391.0244.0600



Rondella di fermo
Shaft cover
Gegenscheibe

RDF 065

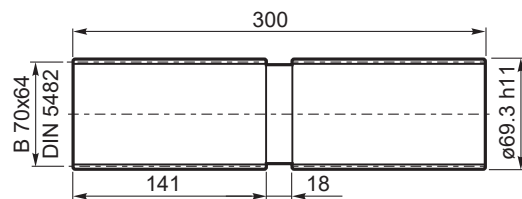
Mat. C40 EN 10083
Cod: 340.4234.0000



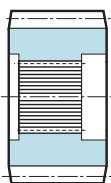
Barra scanalata
Splined bar
Zugspindel

BS 090

Mat. 16NiCr4 EN 10084
Cod: 391.2713.0100



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)



ACCESSORI

ACCESSORIES

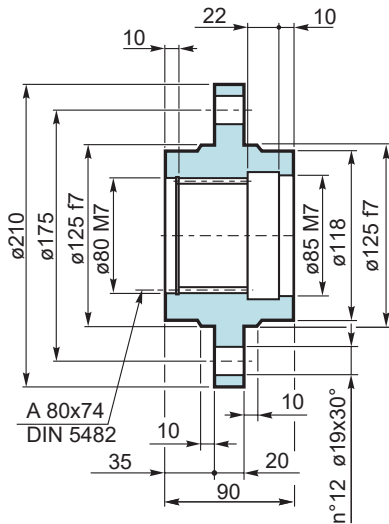
ZUBEHÖR



Flangia ruota
Driving flange
Radnabehflansch

FA 090

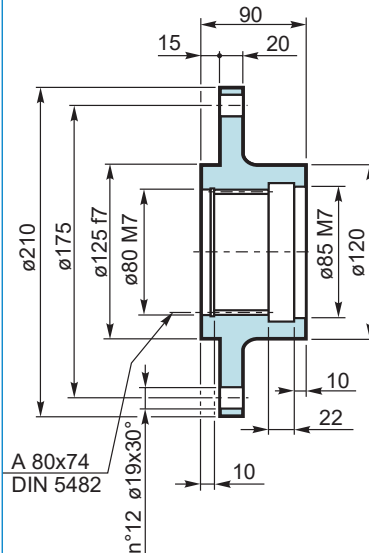
Mat. C40 EN 10083
Cod: 347.0152.1800



Flangia ruota
Driving flange
Radnabehflansch

FR 090

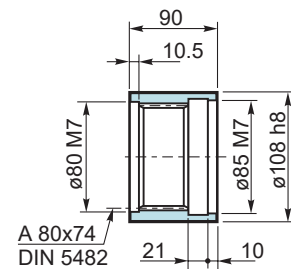
Mat. C40 EN 10083
Cod: 347.0142.1800



Manicotto scanalato
Splined bush
Manchon cannelée

MS 090

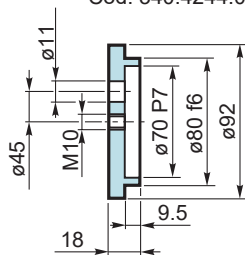
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Cod: 391.0304.0600



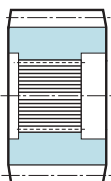
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 090

Mat. C40 EN 10083
Cod: 340.4244.0000



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

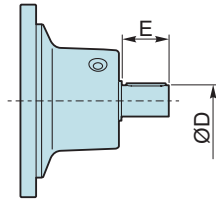
Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

SUPPORTI MASCHIO IN INGRESSO

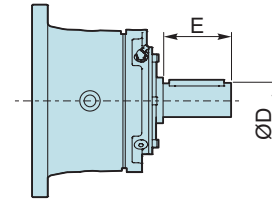
MALE INPUT SUPPORTS

ANTRIEBS- WELLENSTÜMPFE

ISL

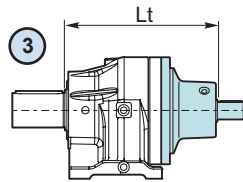
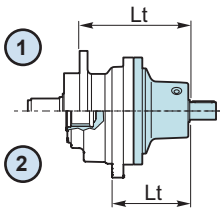


IS



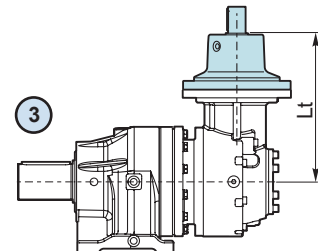
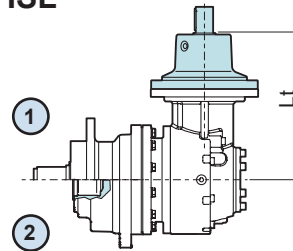
EL

ISL

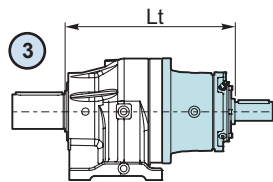
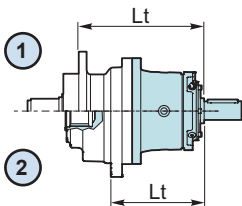


EC

ISL



IS



① = MP - MP090 - MP1 - MP1 090 - FS

② = FE - FCP

③ = MPP1

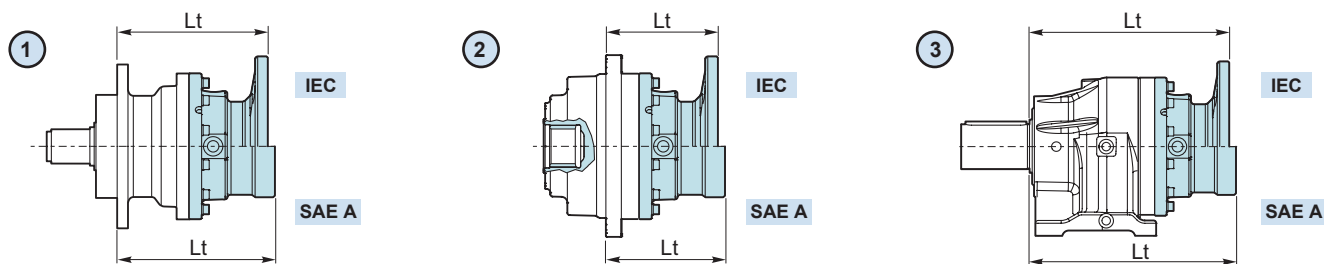
		ØD	E	Lt [mm] ①					Lt [mm] ②		Lt [mm] ③
				MP	MP 090	MP1	MP1 090	FS	FE	FCP	MPP1
EL801	IS80	65 m6	105	400.5	416.5	400.5	416.5	400.5	260	292	447.5
EL801	ISL80	48 k6	82	334.5	350.5	334.5	350.5	334.5	194	226	381.5
EL802	IS30	48 k6	82	425	441	425	441	425	284.5	316.5	472
EL802	ISL30	40 k6	58	385.5	401.5	385.5	401.5	385.5	245	277	432.5
EL803	ISL10	28 k6	50	439.5	455.5	439.5	455.5	439.5	299	331	491.5
EL804	ISL10	28 k6	50	483.5	499.5	483.5	499.5	483.5	343	375	535.5
EC802	ISL10	28 k6	50	311	311	311	311	311	311	311	311
EC812	ISL30	40 k6	58	355.5	355.5	355.5	355.5	355.5	355.5	355.5	355.5
EC803	ISL10	28 k6	50	311	311	311	311	311	311	311	311

ADATTATORI
IEC/SAE A

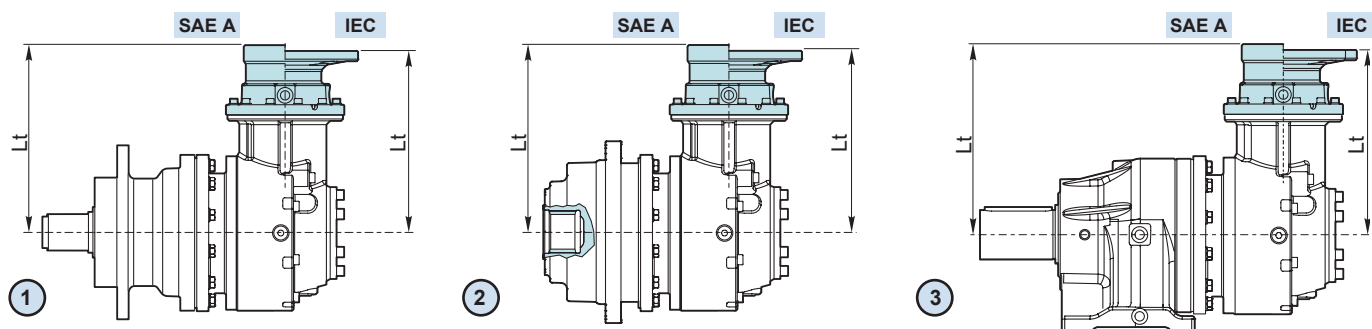
ADAPTERS IEC/SAE A

ADAPTER IEC/SAE A

EL



EC



① = MP - MP090 - MP1 - MP1 090 - FS

② = FE - FCP

③ = MPP1

		Lt [mm]			
		IEC			SAE A
		80-90	100-112	132	
EL803	MP	397.5	405.5	441.5	427.5
	MP 090	413.5	421.5	457.5	443.5
	MP1	397.5	405.5	441.5	427.5
	MP1 090	413.5	421.5	457.5	443.5
	FE	257	265	301	287
	FS	397.5	405.5	441.5	427.5
	FCP	289	297	333	319
EL804	MPP1	449.5	457.5	493.5	479.5
	MP	441.5	449.5	485.5	471.5
	MP 090	457.5	465.5	501.5	487.5
	MP1	441.5	449.5	485.5	471.5
	MP1 090	457.5	465.5	501.5	487.5
	FE	301	309	345	331
	FS	441.5	449.5	485.5	471.5
EC802	FCP	333	341	377	363
	MPP1	493.5	501.5	537.5	523.5
	MP	282	290	313	301
	MP 090	282	290	313	301
	MP1	282	290	313	301
	MP1 090	282	290	313	301
	FE	282	290	313	301
EC803	FS	282	290	313	301
	FCP	282	290	313	301
	MPP1	282	290	313	301
	MP	282	290	313	301
	MP 090	282	290	313	301
	MP1	282	290	313	301
	MP1 090	282	290	313	301

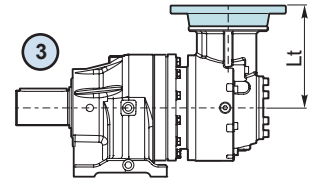
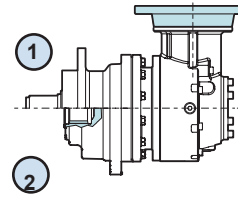
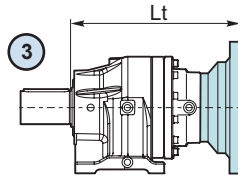
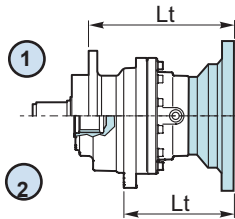
FLANGE MOTORI IEC/NEMA

MOTOR FLANGES IEC/NEMA

MOTORFLANSCHEN IEC/NEMA

EL

EC



① = MP - MP090 - MP1 - MP1 090 - FS

② = FE - FCP

③ = MPP1

		Lt [mm]										
		IEC					NEMA					
		63	71	80-90	100-112	132	160-180	143/145 TD	182/184 TC	182/184 TD	210 TD	213/215 TC
EL801	MP - MP1	299	301	306	307	374	405	309	309	309	309	325
	MP 090 - MP1 090	315	317	322	323	390	421	325	325	325	325	341
	FE	158.5	160.5	165.5	166.5	233.5	264.5	168.5	168.5	168.5	168.5	184.5
	FS	299	301	306	307	374	405	309	309	309	309	325
	FCP	190.5	192.5	197.5	198.5	265.5	296.5	200.5	200.5	200.5	200.5	216.5
	MPP1	346	348	353	354	421	452	356	356	356	356	372
EL802	MP - MP1	366.5	368.5	373.5	374.5	441.5	472.5	376.5	376.5	376.5	376.5	392.5
	MP 090 - MP1 090	382.5	384.5	389.5	390.5	457.5	488.5	392.5	392.5	392.5	392.5	408.5
	FE	226	228	233	234	301	332	236	236	236	236	252
	FS	366.5	368.5	373.5	374.5	441.5	472.5	376.5	376.5	376.5	376.5	392.5
	FCP	258	260	265	266	333	364	268	268	268	268	284
	MPP1	413.5	415.5	420.5	421.5	488.5	519.5	423.5	423.5	423.5	423.5	439.5
EL803	MP - MP1	405.5	407.5	-	-	-	511.5	415.5	415.5	415.5	415.5	431.5
	MP 090 - MP1 090	421.5	423.5	-	-	-	527.5	431.5	431.5	431.5	431.5	447.5
	FE	265	267	-	-	-	371	275	275	275	275	291
	FS	405.5	407.5	-	-	-	511.5	415.5	415.5	415.5	415.5	431.5
	FCP	297	299	-	-	-	403	307	307	307	307	323
	MPP1	457.5	459.5	-	-	-	563.5	467.5	467.5	467.5	467.5	483.5
EL804	MP - MP1	449.5	451.5	-	-	-	555.5	459.5	459.5	459.5	459.5	475.5
	MP 090 - MP1 090	465.5	467.5	-	-	-	571.5	475.5	475.5	475.5	475.5	491.5
	FE	309	311	-	-	-	415	319	319	319	319	335
	FS	449.5	451.5	-	-	-	555.5	459.5	459.5	459.5	459.5	475.5
	FCP	341	343	-	-	-	447	351	351	351	351	367
	MPP1	501.5	503.5	-	-	-	607.5	511.5	511.5	511.5	511.5	527.5
EC802	MP - MP1	290	292	-	-	-	396	300	300	300	300	316
	MP 090 - MP1 090	290	292	-	-	-	396	300	300	300	300	316
	FE	290	292	-	-	-	396	300	300	300	300	316
	FS	290	292	-	-	-	396	300	300	300	300	316
	FCP	290	292	-	-	-	396	300	300	300	300	316
	MPP1	290	292	-	-	-	396	300	300	300	300	316
EC812	MP - MP1	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	MP 090 - MP1 090	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	FE	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	FS	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	FCP	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	MPP1	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
EC803	MP - MP1	290	292	-	-	-	396	300	300	300	300	316
	MP 090 - MP1 090	290	292	-	-	-	396	300	300	300	300	316
	FE	290	292	-	-	-	396	300	300	300	300	316
	FS	290	292	-	-	-	396	300	300	300	300	316
	FCP	290	292	-	-	-	396	300	300	300	300	316
	MPP1	290	292	-	-	-	396	300	300	300	300	316
EC804	MP - MP1	155	155	155	155	242	-	-	-	-	-	-
	MP 090 - MP1 090	155	155	155	155	242	-	-	-	-	-	-
	FE	155	155	155	155	242	-	-	-	-	-	-
	FS	155	155	155	155	242	-	-	-	-	-	-
	FCP	155	155	155	155	242	-	-	-	-	-	-
	MPP1	155	155	155	155	242	-	-	-	-	-	-



A richiesta altre configurazioni disponibili. Contattare il referente DANA di zona.

More configurations are available on request. Consult the DANA area contact person.

Auf Wunsch sind weitere Konfigurationen verfügbar. Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.



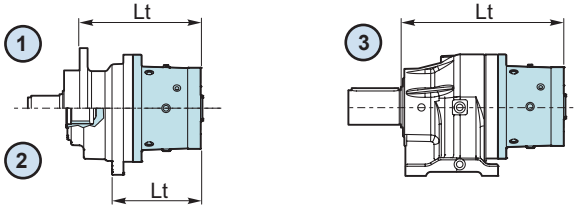
FRENI

BRAKES

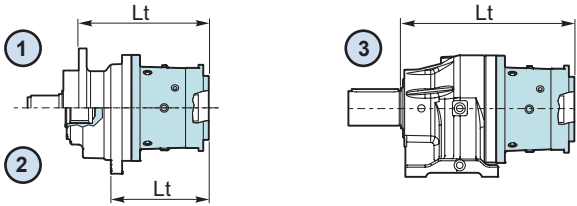
BREMSEN

EL

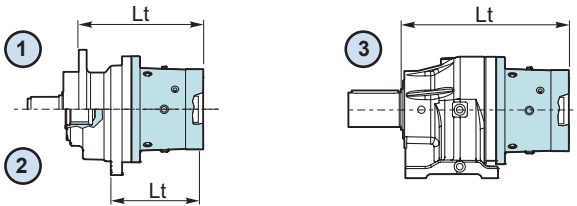
MB3 - E00
 MB5 - E00
 MB6 - E00



MB3 - SAE A

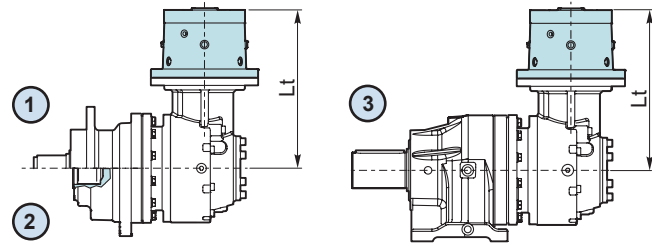


MB3 - BRZV

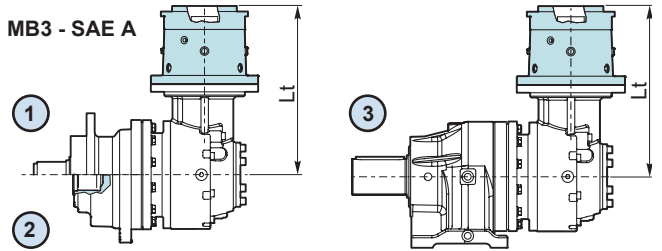


EC

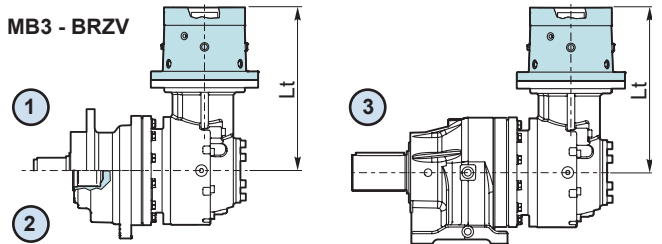
MB3 - E00



MB3 - SAE A



MB3 - BRZV



- ① = MP - MP 090 - MP1 - MP1 090 - FS
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]							
		MP	MP 090	MP1	MP1 090	FE	FS	FCP	MPP1
MB3 E00	EL803	446.5	462.5	446.5	462.5	306	446.5	338	498.5
	EL804	490.5	506.5	490.5	506.5	350	490.5	382	542.5
	EC802	318	318	318	318	318	318	318	318
	EC803	318	318	318	318	318	318	318	318
MB3 SAE - A	EL803	475.5	491.5	475.5	491.5	335	475.5	367	527.5
	EL804	519.5	535.5	519.5	535.5	379	519.5	411	571.5
	EC802	347	347	347	347	347	347	347	347
	EC803	347	347	347	347	347	347	347	347
MB3 BRZV	EL803	444	460	444	460	303.5	444	335.5	496
	EL804	488	504	488	504	347.5	488	379.5	540
	EC802	315.5	315.5	315.5	315.5	315.5	315.5	315.5	315.5
	EC803	315.5	315.5	315.5	315.5	315.5	315.5	315.5	315.5
MB5 E00	EL802	412	428	412	428	271.5	412	303.5	459
	EC812	382	382	382	382	382	382	382	382
MB6 E00	EL801	359.5	375.5	359.5	375.5	219	359.5	251	406.5



CARICHI RADIALI

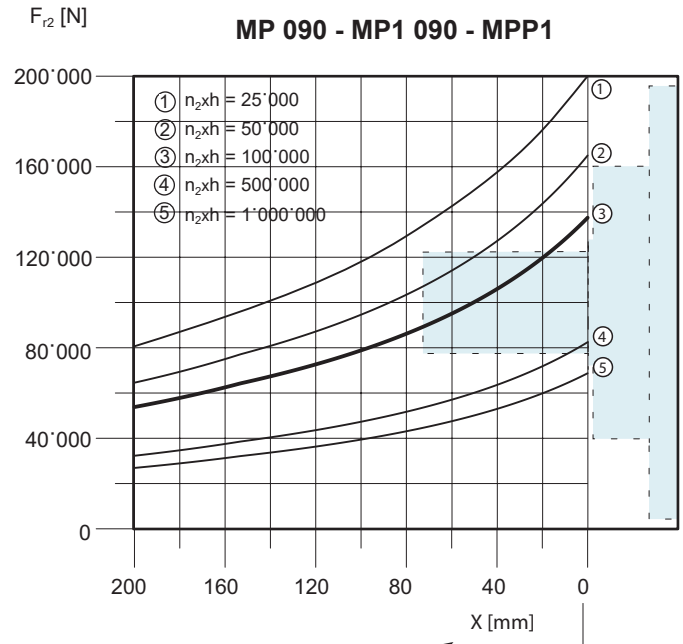
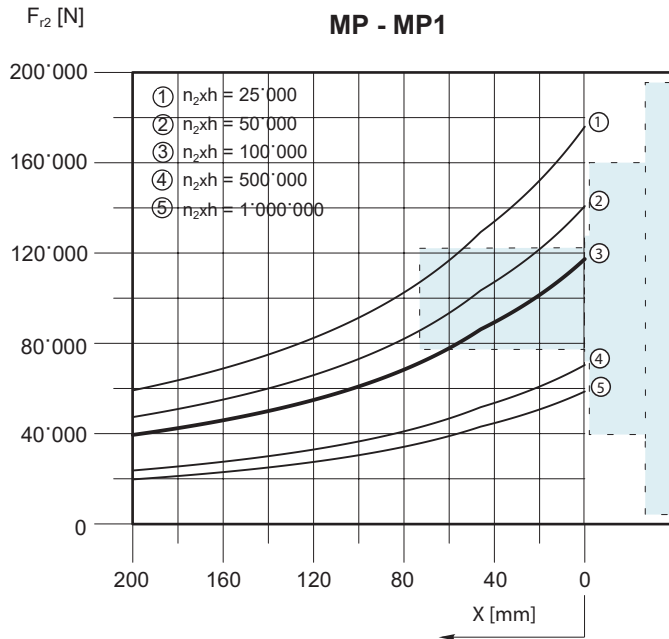
RADIAL LOADS

RADIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



CARICHI ASSIALI

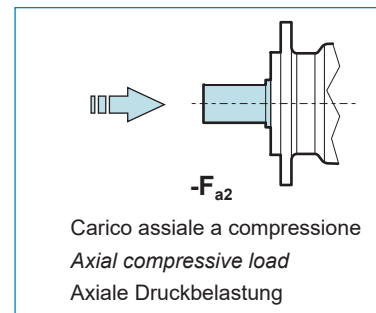
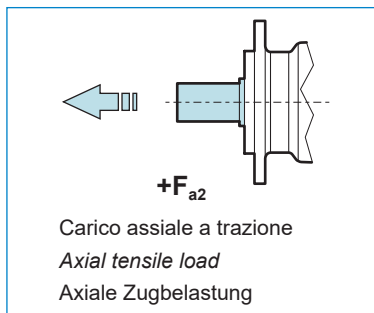
AXIAL LOADS

AXIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



E80 MP - MP1		
$n_2 \cdot x_h$	-F _{a2} [N]	+F _{a2} [N]
10'000	212'000	142'000
25'000	161'120	107'920
50'000	130'380	87'330
100'000	106'000	71'000
500'000	65'720	44'020
1'000'000	53'000	35'500

E80 MP 090 - MP1 090 - MPP1		
$n_2 \cdot x_h$	-F _{a2} [N]	+F _{a2} [N]
10'000	244'000	184'000
25'000	185'440	139'840
50'000	150'060	113'160
100'000	122'000	92'000
500'000	75'640	57'040
1'000'000	61'000	46'000

CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

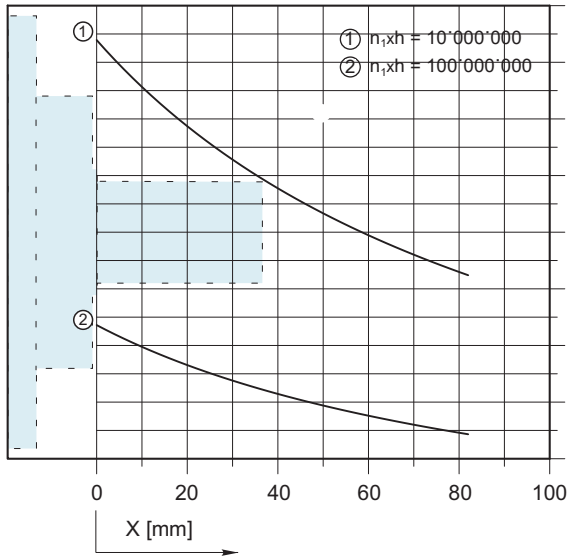
Alberi in ingresso

Input shaft

Eingangswellen

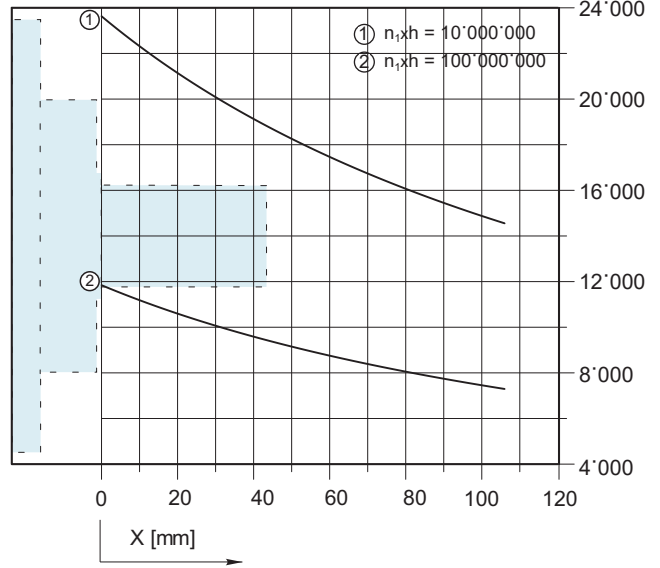
ISL80

F_{r1} [N]



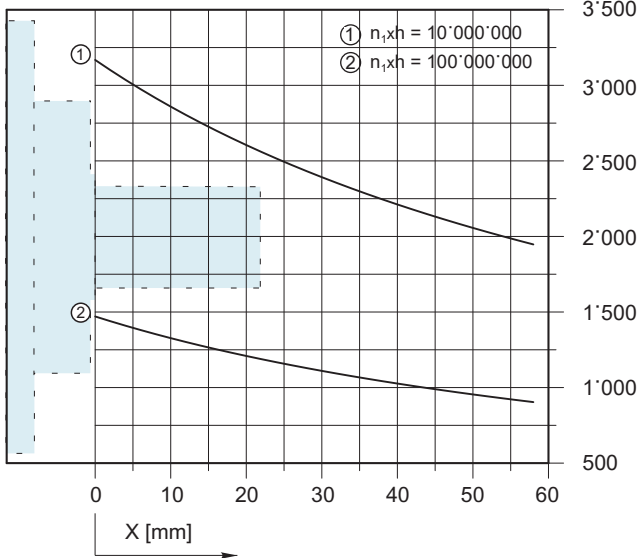
IS80

F_{r1} [N]



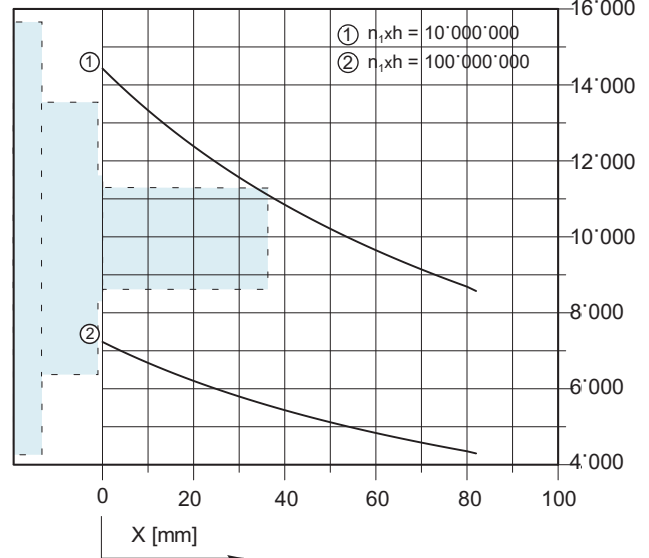
ISL30

F_{r1} [N]



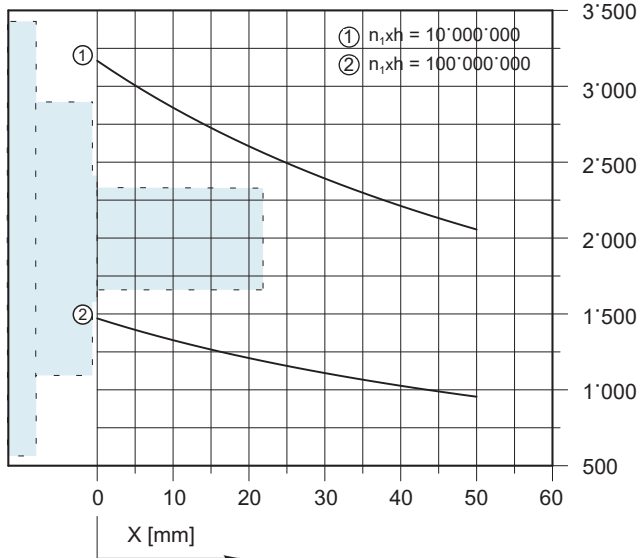
IS30

F_{r1} [N]



ISL10

F_{r1} [N]





BREVINI[®]

Motion Systems

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































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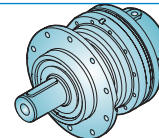


GRANDEZZA E120

E120 SIZE

E120 GRÖÖE

	Disponibilità Availability Verfügbarkeit	Albero - Shaft - Getriebewelle			Pagina Page Seite
		Tipologia Type Typ	Dimensioni Dimensions Abmessungen [mm]		
USCITE OUTPUTS AUSGÄNGE	MP 		B80x74 DIN 5482		
	MP1 		ø90		
	FE 		A80x74		
	FS 		ø100		
	FCP 		ø90		
	MPP1 		ø90		
ENTRATE INPUTS EINNAHMEN	IS - ISL 		IS IS50 ø48 IS120 ø65	ISL ISL10 ø28 ISL16 ø28 ISL30 ø40 ISL50 ø40 ISL120 ø65	
	E00 		A50x45 DIN 5482		
FLANGE D'INGRESSO INPUT FLANGE FLANSCH EINGANG	Disponibilità Availability Verfügbarkeit				Pagina Page Seite
	 				
 					
FRENI BRAKES BREMSEN	Disponibilità Availability Verfügbarkeit	T_B [Nm]			Pagina Page Seite
	 	MB3 33 ÷ 495	MB5 173 ÷ 1'173	MB6 658 ÷ 2'220	



i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			

EL1201

4.07	16'800	15'600	14'800	13'600	11'400	9'200	2'500	20'000	23
4.95	15'600	13'200	11'700	11'000	9'800	9'000	2'500	20'000	23
5.88	12'700	10'800	9'600	9'100	8'100	7'600	2'500	20'000	23

EL1202

14.3	16'800	15'600	14'800	13'600	9'700	7'900	3'800	20'000	17
16.6	16'800	15'600	14'800	13'600	10'000	8'200	3'800	20'000	17
20.2	16'800	15'600	14'800	13'600	9'800	8'000	3'800	20'000	17
24.5	15'600	13'200	11'700	11'000	9'800	9'000	3'800	20'000	17
29.1	15'600	13'200	11'700	11'000	9'800	9'000	3'800	20'000	17
32.4	11'400	10'500	9'900	9'300	8'000	6'700	3'800	20'000	17
34.6	12'700	10'800	9'600	9'100	8'100	7'600	3'800	20'000	17
38.4	12'700	10'800	9'600	9'100	8'100	7'500	3'800	20'000	17

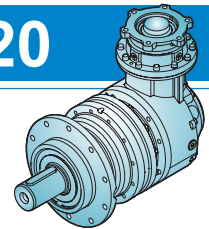
EL1203

50.3	16'800	15'600	14'800	13'500	8'300	6'800	4'000	20'000	11
58.3	16'800	15'600	14'800	13'600	9'200	7'500	4'000	20'000	11
67.6	16'800	15'600	14'800	13'600	10'000	8'200	4'000	20'000	11
82.2	16'800	15'600	14'800	13'600	10'000	8'100	4'000	20'000	11
88.6	15'700	14'400	13'500	12'700	8'900	7'200	4'000	20'000	11
99.9	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	11
108	15'600	13'200	11'700	11'000	9'800	8'300	4'000	20'000	11
119	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	11
125	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	11
144	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	11
152	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	11
171	12'700	10'800	9'600	9'100	8'100	7'600	4'000	20'000	11
180	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	11
200	11'400	10'500	9'900	9'300	8'000	6'700	4'000	20'000	11
215	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	11
238	12'700	10'800	9'600	9'100	8'100	7'500	4'000	20'000	11
256	12'700	10'800	9'600	9'100	8'100	7'600	4'000	20'000	11
284	12'700	10'800	9'600	9'100	8'100	7'500	4'000	20'000	11

EL1204

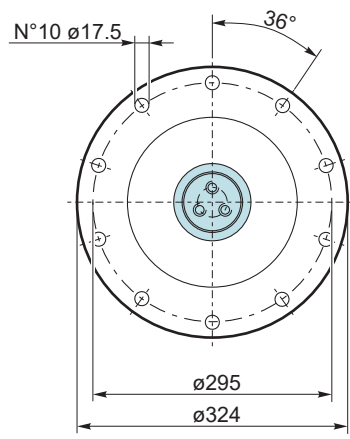
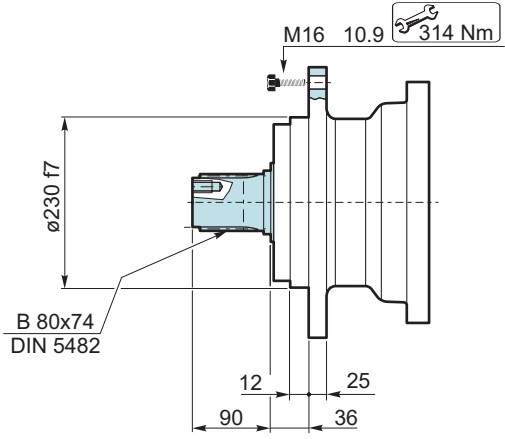
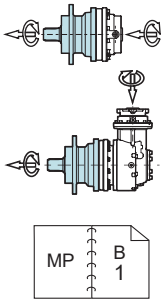
249	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	7
275	16'800	15'600	14'800	13'600	10'000	8'200	4'000	20'000	7
296	16'800	15'600	14'800	13'500	8'300	6'800	4'000	20'000	7
335	16'800	15'600	14'800	13'600	10'000	8'200	4'000	20'000	7
361	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	7
398	16'800	15'600	14'800	13'600	10'000	8'200	4'000	20'000	7
417	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	7
439	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	7
469	16'800	15'600	14'800	13'600	10'000	8'200	4'000	20'000	7
509	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	7
570	16'800	15'600	14'800	13'600	10'000	8'100	4'000	20'000	7
618	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	7
692	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	7
734	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	7
840	16'800	15'600	14'800	13'600	10'000	8'100	4'000	20'000	7
906	15'700	14'400	13'500	12'700	8'900	7'200	4'000	20'000	7
1021	16'800	15'600	14'800	13'600	9'800	8'000	4'000	20'000	7
1101	15'600	13'200	11'700	11'000	9'800	8'300	4'000	20'000	7
1213	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	7
1314	13'000	11'800	11'000	10'100	9'100	8'100	4'000	20'000	7
1474	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	7
1551	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	7
1809	13'800	12'700	11'900	11'200	9'600	7'800	4'000	20'000	7
2198	15'600	13'200	11'700	11'000	9'800	9'000	4'000	20'000	7
2430	12'700	10'800	9'600	9'100	8'100	7'500	4'000	20'000	7

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich



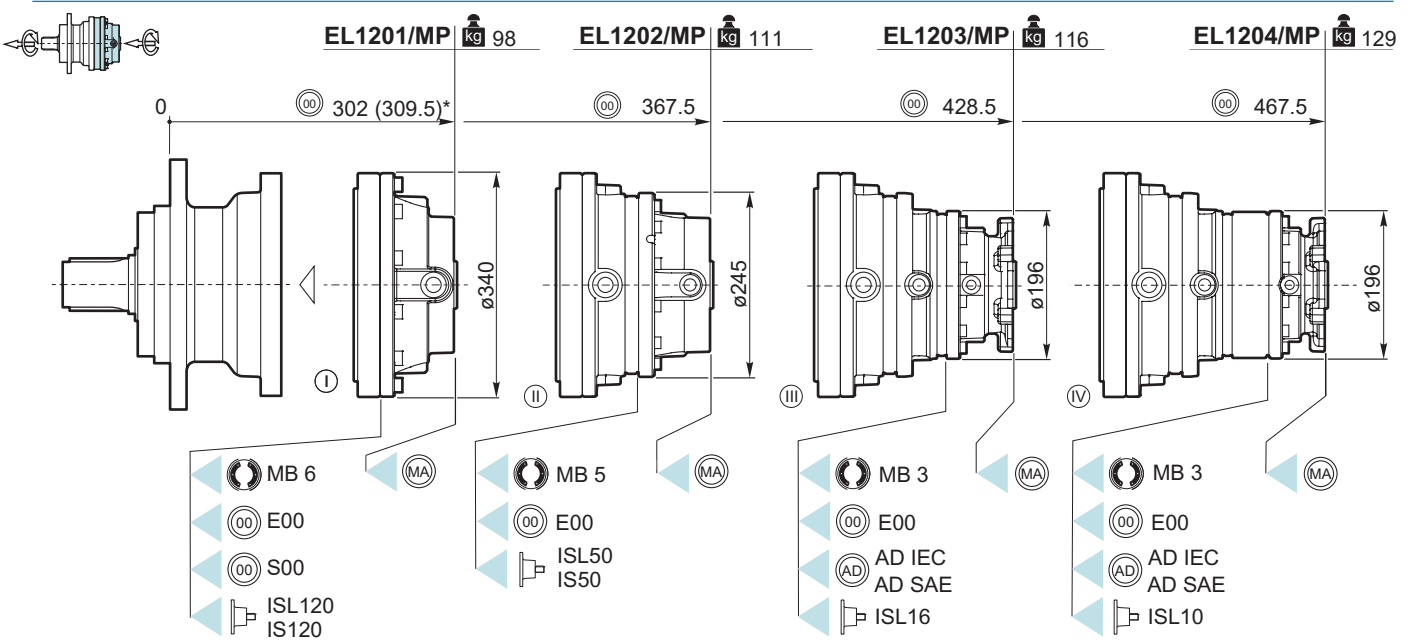
i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EC1202									
12.2	16'750	15'600	14'550	11'800	7'300	5'910	2'500	20'000	17
14.9	15'550	13'200	11'650	11'000	8'350	6'800	2'500	20'000	17
17.6	12'700	10'750	9'600	9'100	8'050	7'600	2'500	20'000	17
22.6	14'650	12'750	11'650	11'000	7'700	6'250	2'500	20'000	17
26.8	12'700	10'750	9'600	9'100	8'050	7'050	2'500	20'000	17
EC1203									
43.0	16'750	15'600	14'750	13'550	8'650	7'050	3'000	20'000	11
49.8	16'750	15'600	14'750	13'550	9'600	7'800	3'000	20'000	11
60.5	16'750	15'600	14'750	13'550	9'800	7'950	3'000	20'000	11
65.2	14'500	13'400	12'850	12'300	7'900	6'400	3'000	20'000	11
73.6	15'550	13'200	11'650	11'000	9'750	9'000	3'000	20'000	11
87.4	15'550	13'200	11'650	11'000	9'750	8'950	3'000	20'000	11
91.9	16'750	15'600	14'750	13'550	9'800	7'950	3'000	20'000	11
112	15'550	13'200	11'650	11'000	9'750	9'000	3'000	20'000	11
133	15'550	13'200	11'650	11'000	9'750	8'950	3'000	20'000	11
147	11'400	10'500	9'900	9'300	8'000	6'650	3'000	20'000	11
158	12'700	10'750	9'600	9'100	8'050	7'600	3'000	20'000	11
175	12'700	10'750	9'600	9'100	8'050	7'500	3'000	20'000	11
EC1204									
151	14'200	10'450	8'300	6'600	3'850	3'060	4'000	20'000	8
175	15'650	11'550	9'150	7'300	4'250	3'370	4'000	20'000	8
184	15'550	11'900	9'450	7'500	4'390	3'480	4'000	20'000	8
203	16'750	12'750	10'100	8'050	4'690	3'720	4'000	20'000	8
213	16'750	13'150	10'450	8'300	4'840	3'840	4'000	20'000	8
247	16'750	14'500	11'500	9'150	5'340	4'240	4'000	20'000	8
266	15'650	14'400	12'100	9'600	5'610	4'460	4'000	20'000	8
308	16'750	15'600	13'350	10'600	6'200	4'920	4'000	20'000	8
364	15'550	13'200	11'650	11'000	6'950	5'500	4'000	20'000	8
433	15'550	13'200	11'650	11'000	7'800	6'200	4'000	20'000	8
455	15'550	13'200	11'650	11'000	8'050	6'400	4'000	20'000	8
531	13'750	12'650	11'900	11'200	8'900	7'100	4'000	20'000	8
610	16'750	15'600	12'600	10'000	5'830	4'630	4'000	20'000	8
645	15'550	13'200	11'650	11'000	9'750	8'050	4'000	20'000	8
705	15'550	13'200	11'650	11'000	6'450	5'100	4'000	20'000	8
767	12'700	10'750	9'600	9'100	8'050	7'600	4'000	20'000	8
865	13'750	12'650	11'900	11'200	7'400	5'840	4'000	20'000	8
979	11'400	10'500	9'900	9'300	8'000	6'350	4'000	20'000	8
1052	15'550	13'200	11'650	11'000	8'400	6'650	4'000	20'000	8
1163	12'700	10'750	9'600	9'100	8'050	7'150	4'000	20'000	8
1249	12'700	10'750	9'600	9'100	8'050	7'500	4'000	20'000	8
1387	12'700	10'750	9'600	9'100	8'050	7'500	4'000	20'000	8

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich

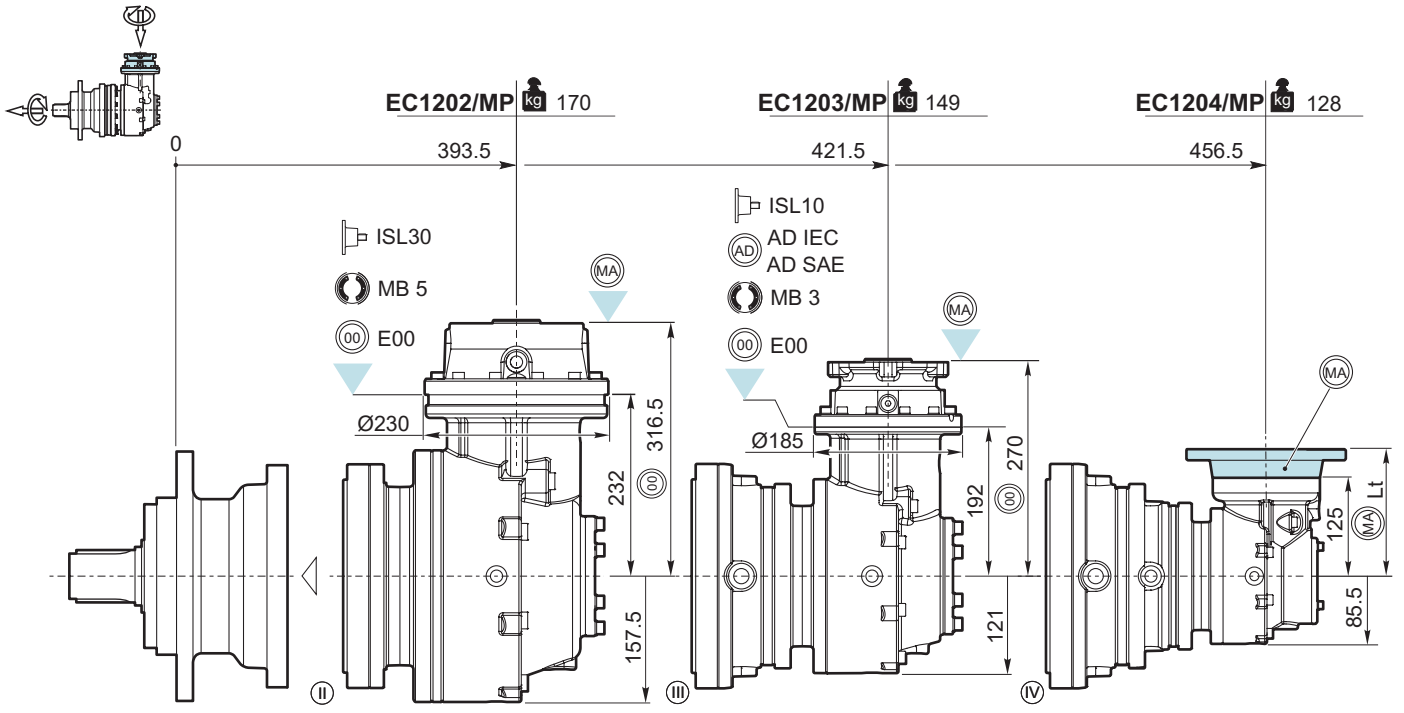


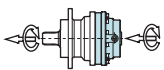
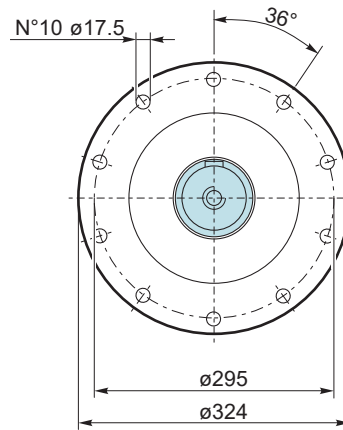
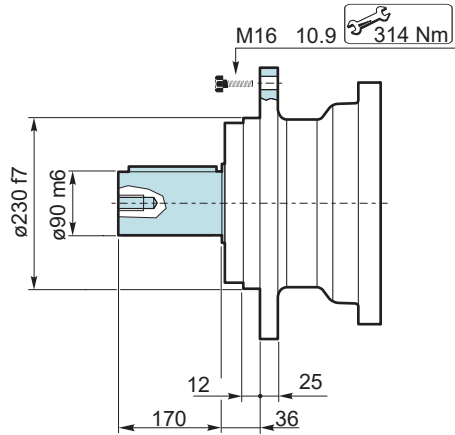
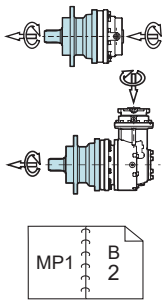
Accessori
Accessories
Zubehör

E120
10

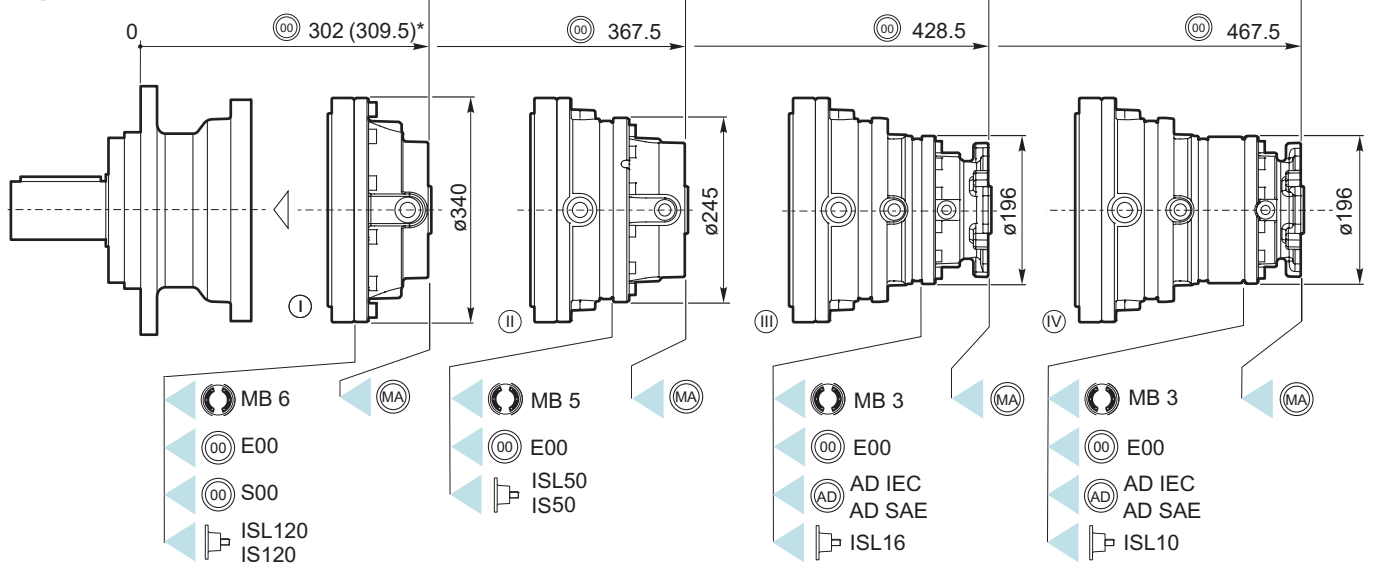


* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite

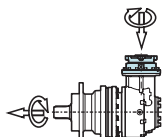




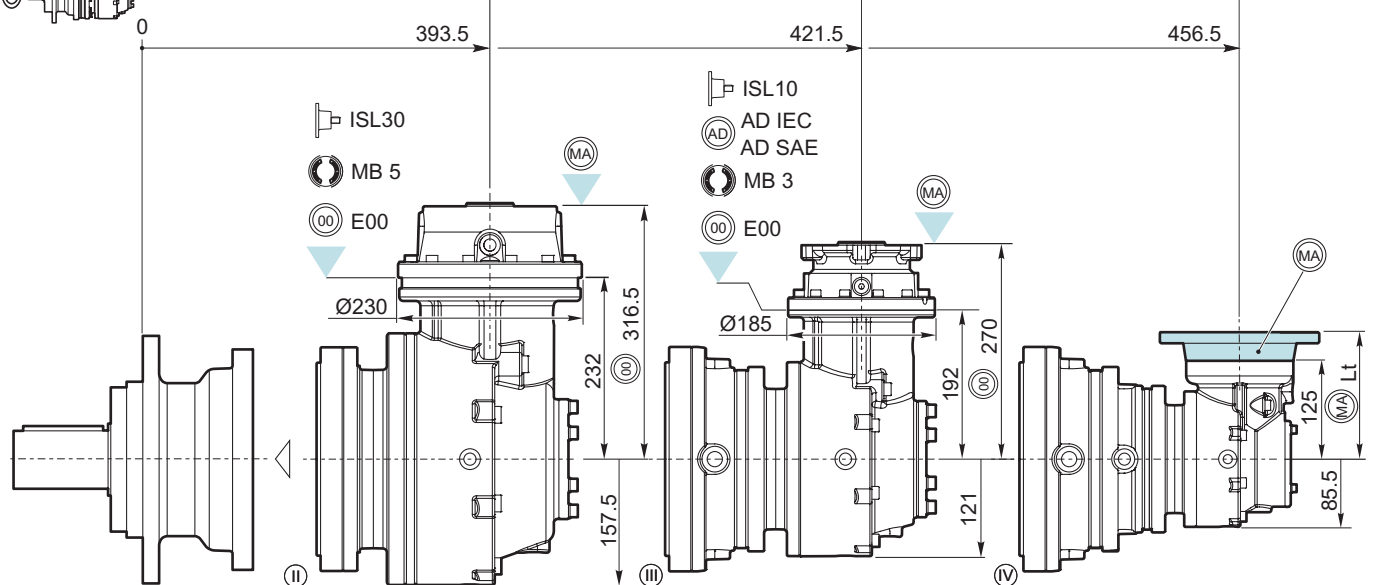
EL1201/MP1 104 **EL1202/MP1** 117 **EL1203/MP1** 122 **EL1204/MP1** 135

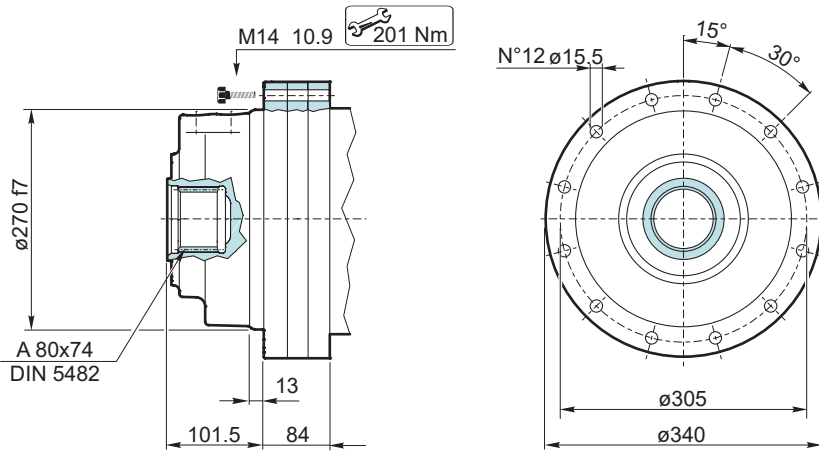
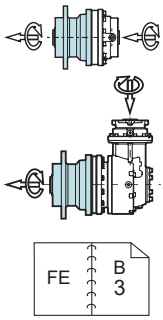


* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite



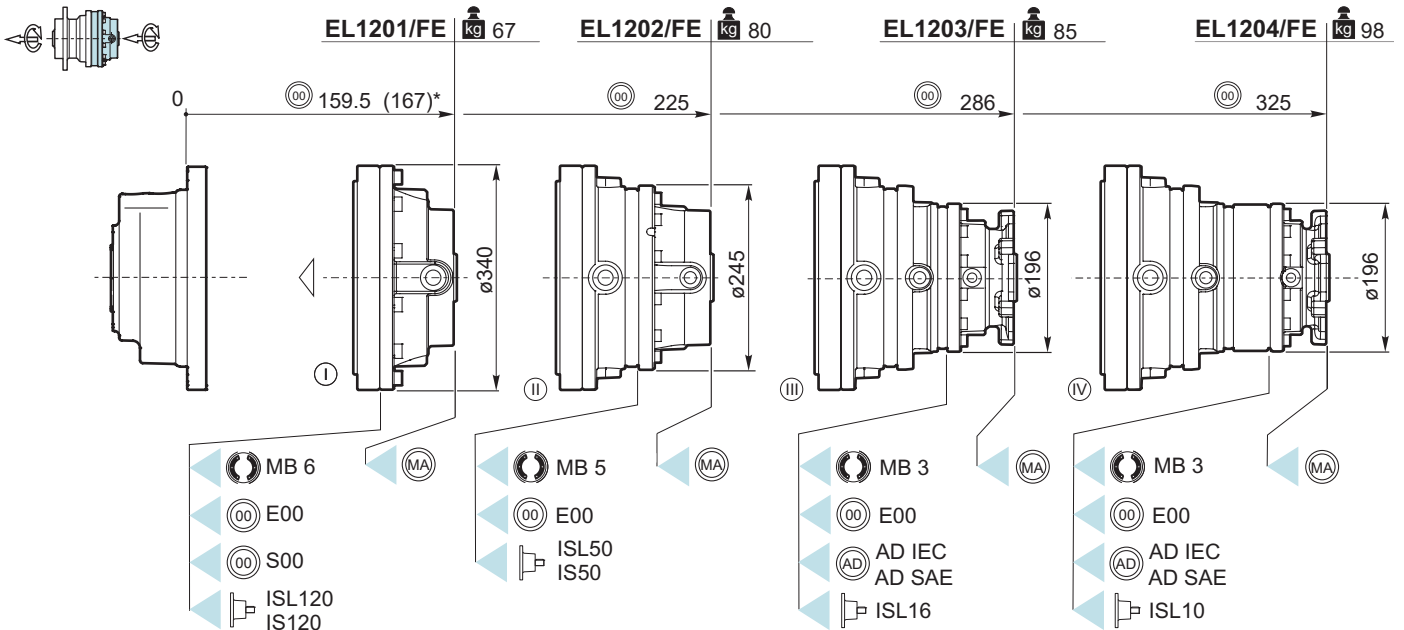
EC1202/MP1 175 **EC1203/MP1** 154 **EC1204/MP1** 133



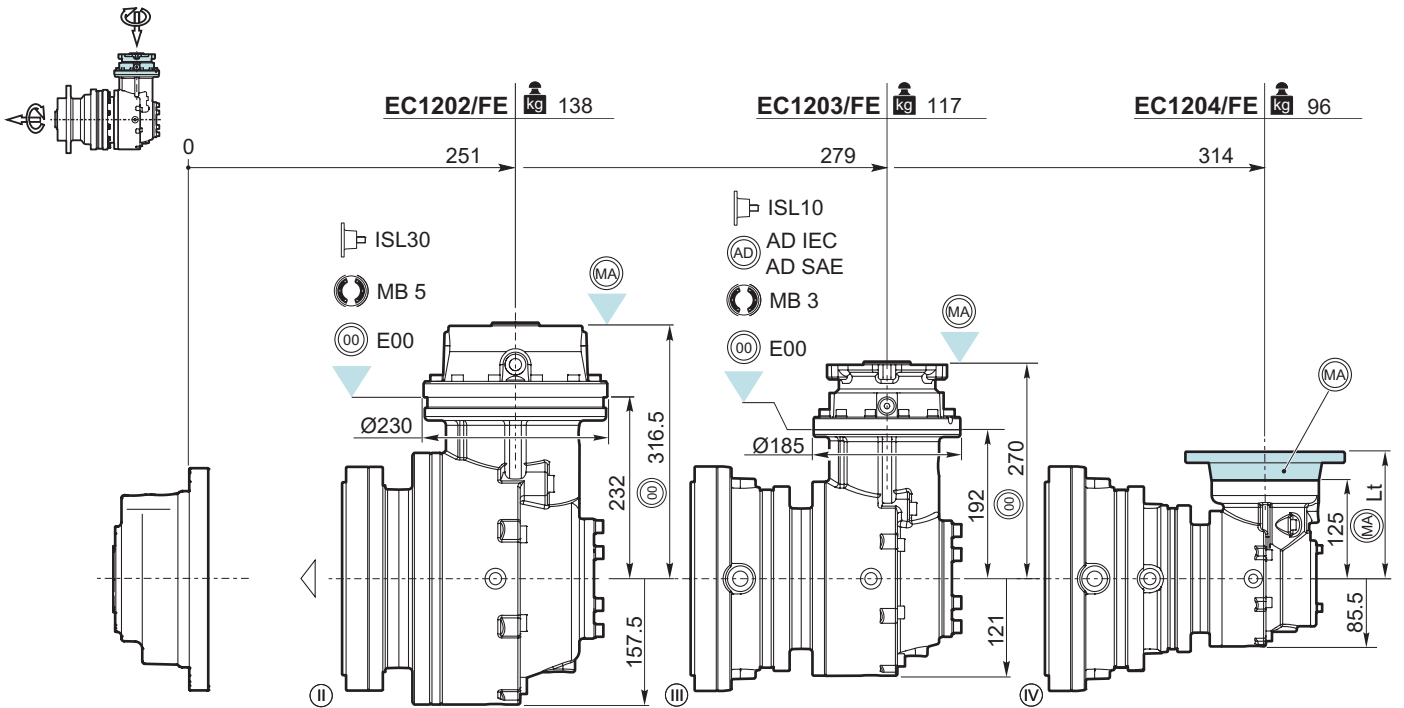


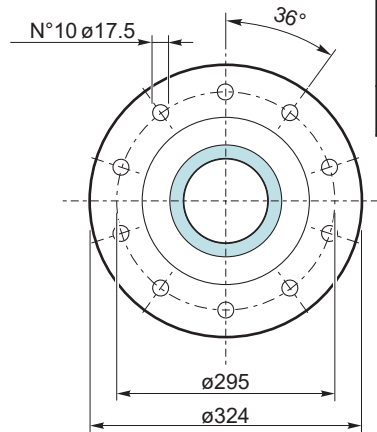
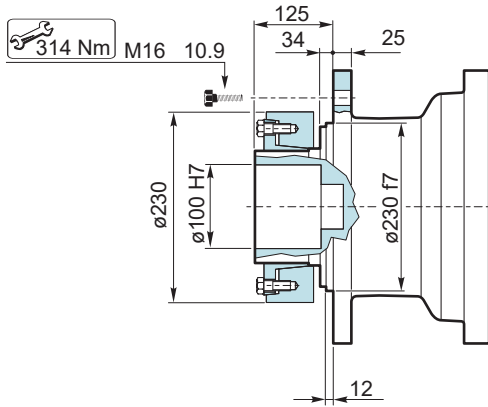
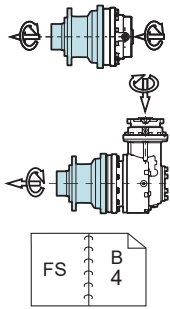
Accessori
Accessories
Zubehör

E120
10



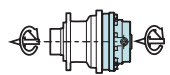
* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite





Giunto ad attrito
Shrink disc
Reibungskupplung

B 18

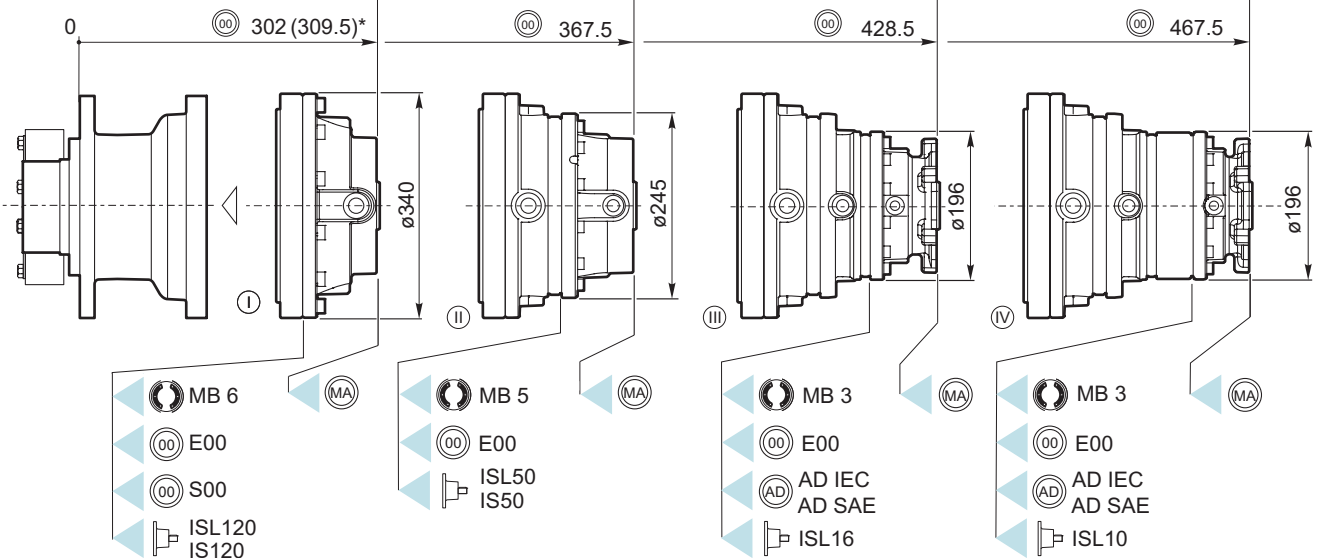


EL1201/FS 100

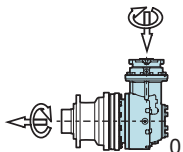
EL1202/FS 112

EL1203/FS 118

EL1204/FS 131



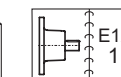
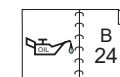
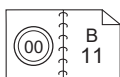
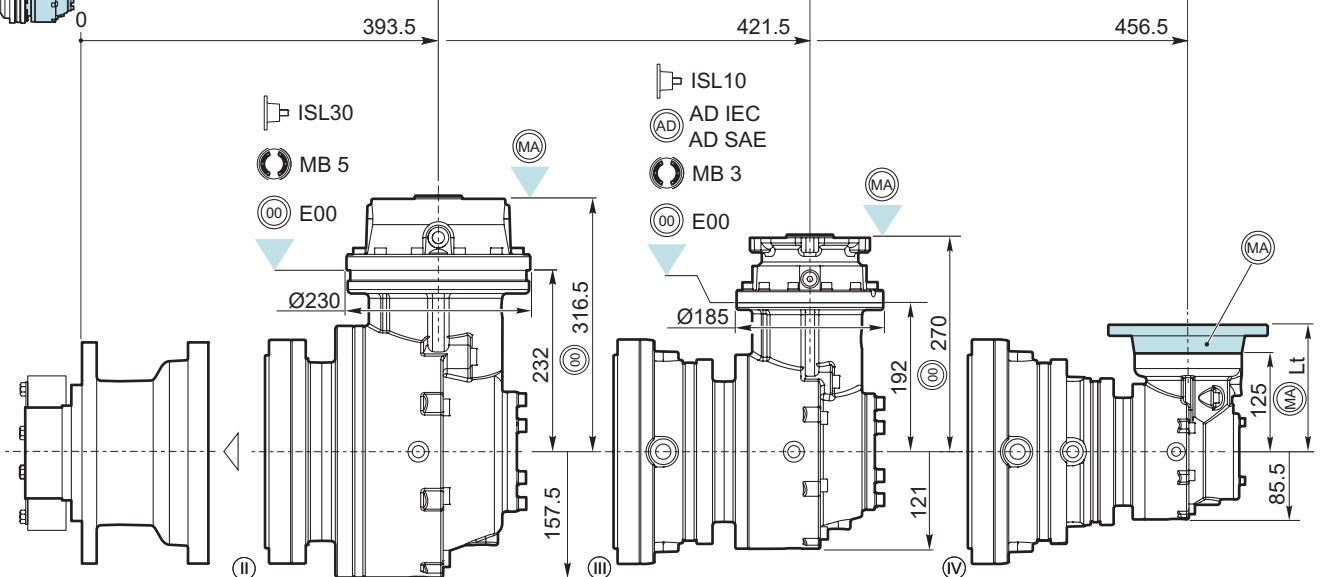
* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite

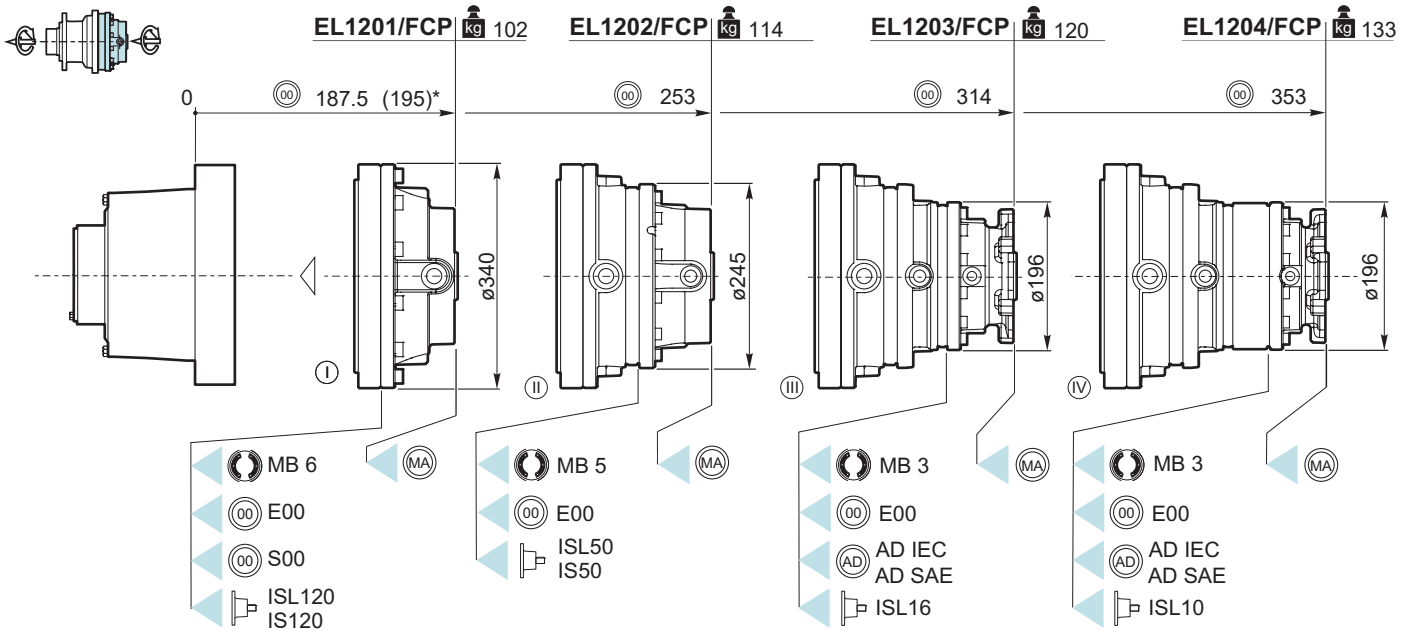
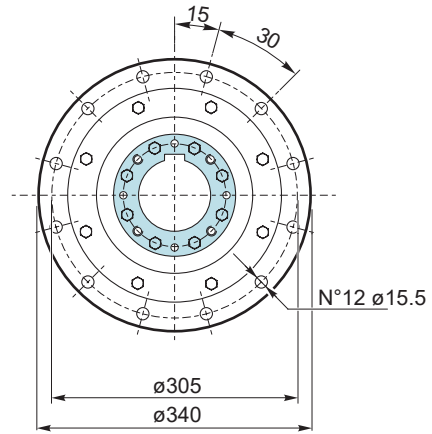
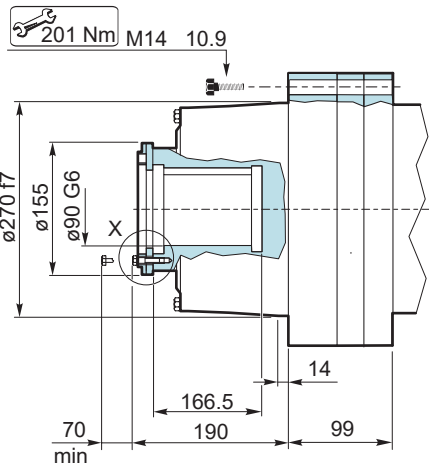
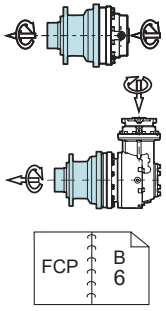


EC1202/FS 172

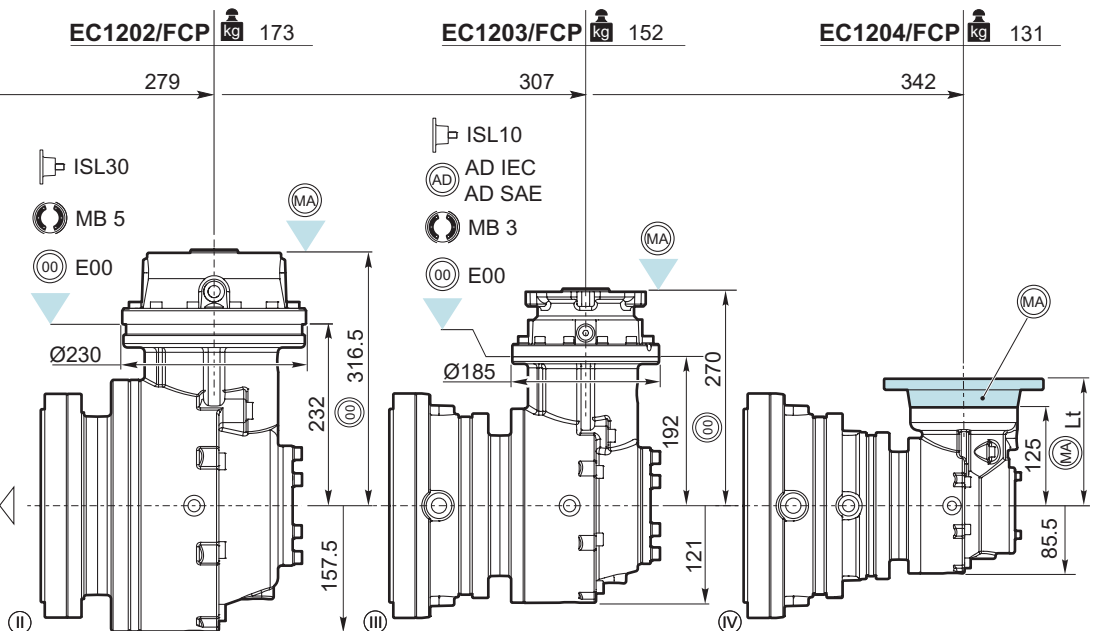
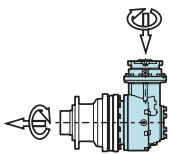
EC1203/FS 151

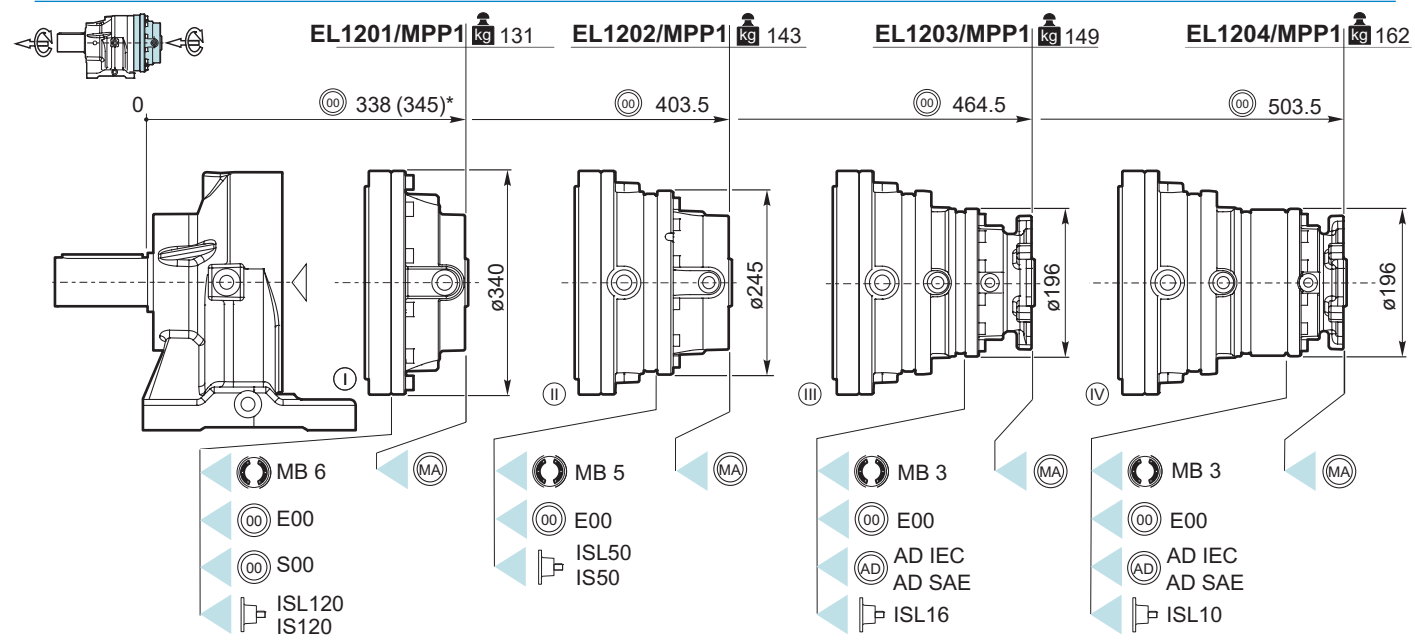
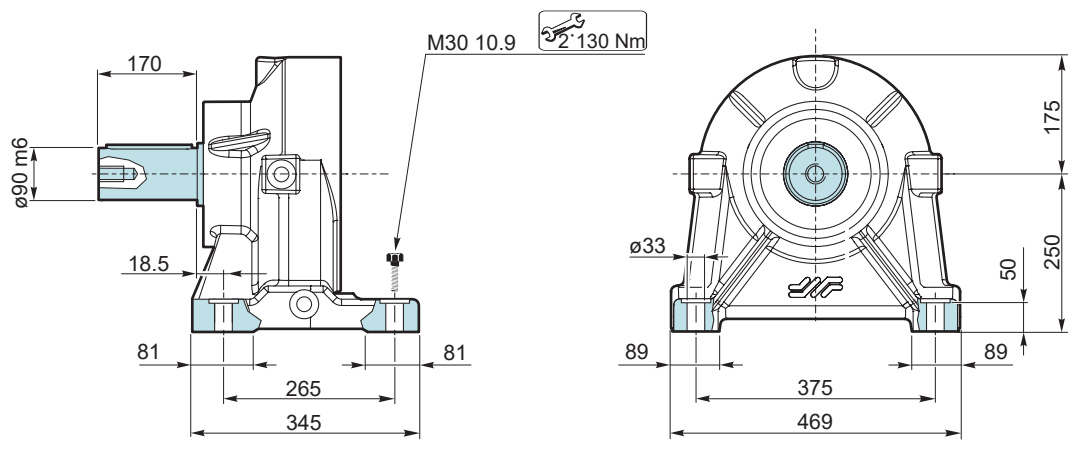
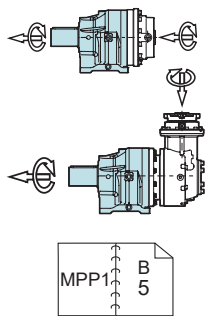
EC1204/FS 130



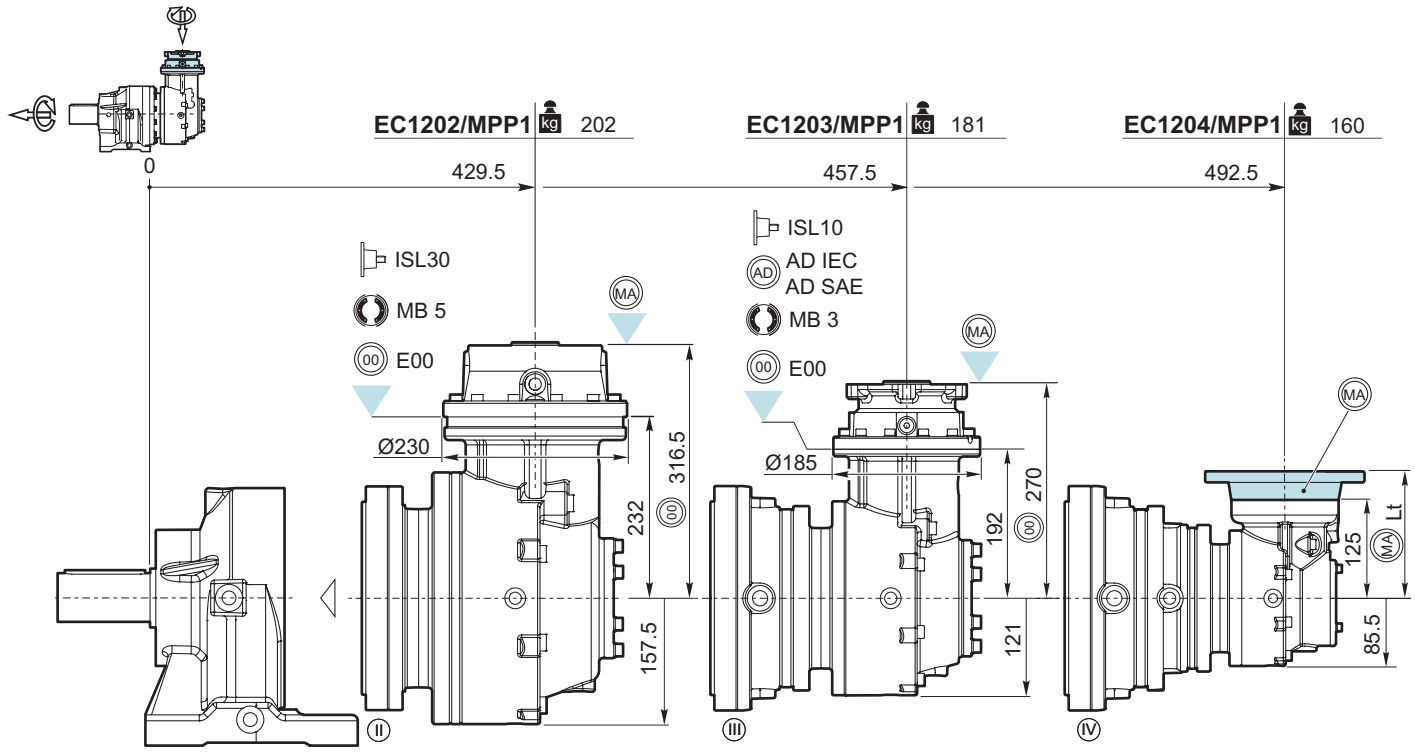


* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite





* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite



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ACCESSORI

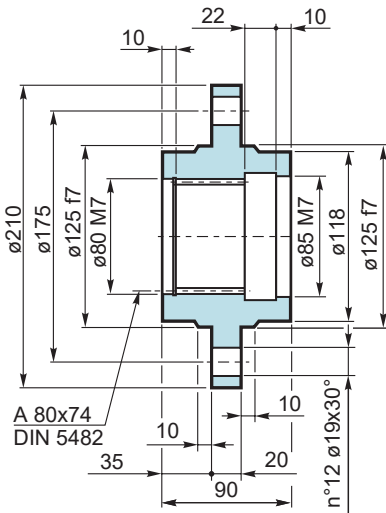
ACCESSORIES

ZUBEHÖR



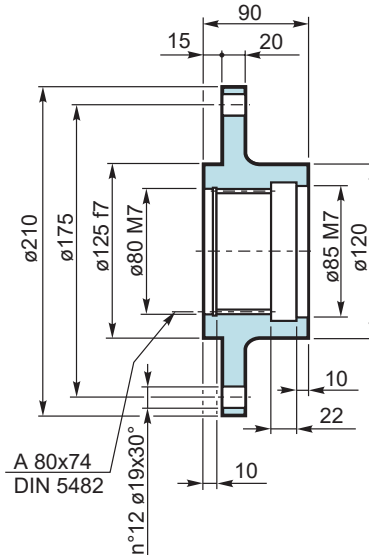
Flangia ruota
Driving flange
Radnabehflansch

FA 090 Mat. C40 UNI 10083
Cod: 347.0152.1800



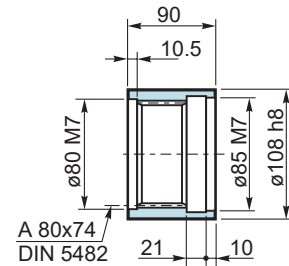
Flangia ruota
Driving flange
Radnabehflansch

FR 090 Mat. C40 UNI 10083
Cod: 347.0142.1800



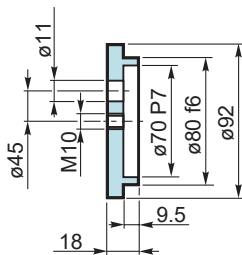
Manicotto scanalato
Splined bush
Manchon cannelée

MS 090 Mat. 42CrMo4 EN 10083
Cod: 391.0304.0600



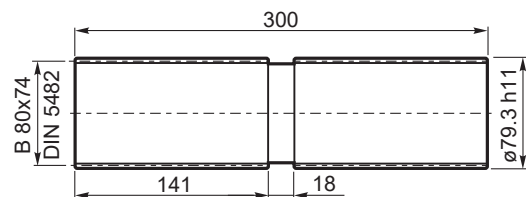
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 090 Mat. C40 EN 10083
Cod: 340.4244.0000

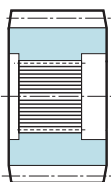


Barra scanalata
Splined bar
Zugspindel

BS 150 Mat. 16NiCr4 EN 10084
Cod: 391.2723.0100



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

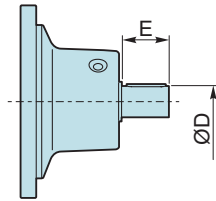
Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

SUPPORTI MASCHIO IN INGRESSO

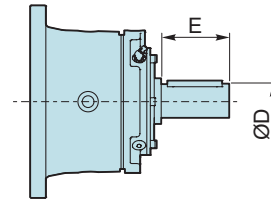
MALE INPUT SUPPORTS

ANTRIEBSWELLENSTÜMPFE

ISL

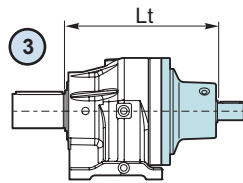
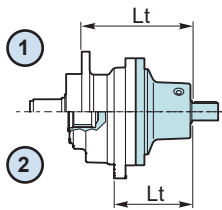


IS



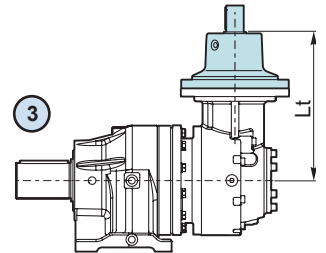
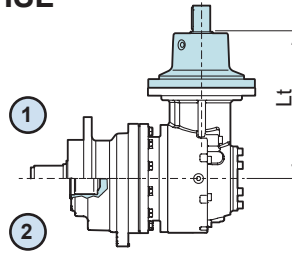
EL

ISL

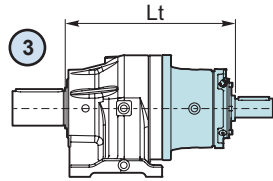
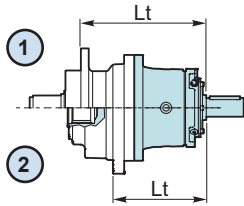


EC

ISL



IS

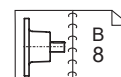


① = MP - MP1 - FS

② = FE - FCP

③ = MPP1

		øD	E	Lt [mm] ①			Lt [mm] ②		Lt [mm] ③
				MP	MP1	FS	FE	FCP	MPP1
EL1201	IS120	65 m6	105	423	423	423	280.5	308.5	459
EL1201	ISL120	65 m6	105	375.5	375.5	375.5	233	261	411.5
EL1202	IS50	48 m6	82	442.5	442.5	442.5	300	328	478.5
EL1202	ISL50	40 k6	58	413	413	413	270.5	298.5	449
EL1203	ISL16	28 k6	50	467.5	467.5	467.5	325	353	503.5
EL1204	ISL10	28 k6	50	521.5	521.5	521.5	379	407	557.5
EC1202	ISL30	40 k6	58	355.5	355.5	355.5	355.5	355.5	355.5
EC1203	ISL10	28 k6	50	311	311	311	311	311	311

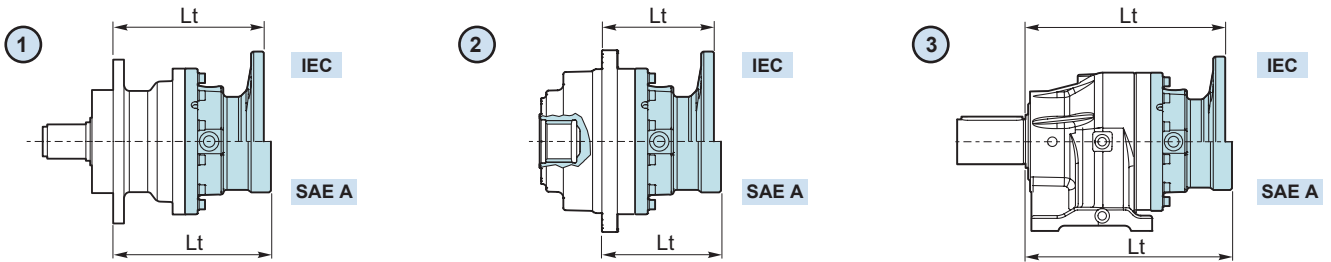


ADATTATORI IEC/SAE A

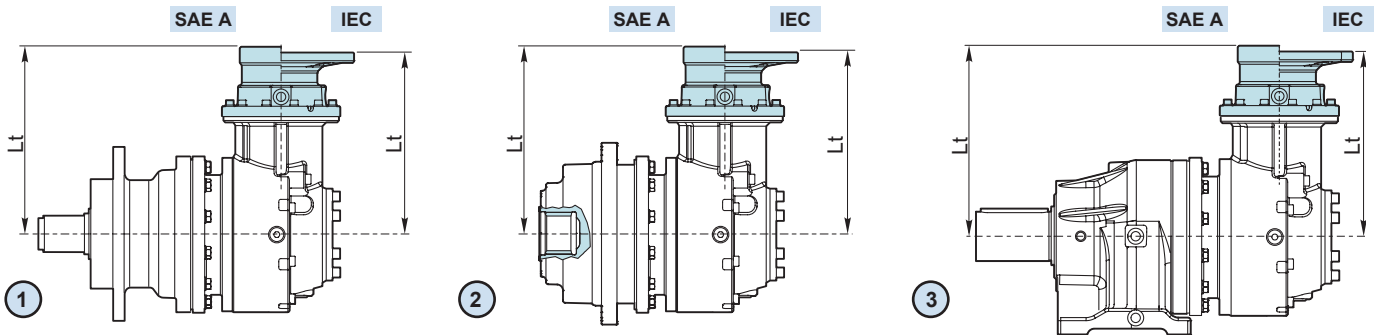
ADAPTERS IEC/SAE A

ADAPTER IEC/SAE A

EL



EC



- ① = MP - MP1 - FS
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]			
		IEC			SAE A
		80-90	100-112	132	
EL1203	MP	440.5	448.5	484.5	457.5
	MP1	440.5	448.5	484.5	457.5
	FE	298	306	342	315
	FS	440.5	448.5	484.5	457.5
	FCP	326	334	370	343
EL1204	MPP1	476.5	484.5	520.5	493.5
	MP	479.5	487.5	523.5	511.5
	MP1	479.5	487.5	523.5	511.5
	FE	337	345	381	369
	FS	479.5	487.5	523.5	511.5
EC1203	FCP	365	373	409	397
	MPP1	515.5	523.5	559.5	547.5
	MP	282	290	313	301
	MP1	282	290	313	301
	FE	282	290	313	301
	FS	282	290	313	301
	FCP	282	290	313	301
	MPP1	282	290	313	301

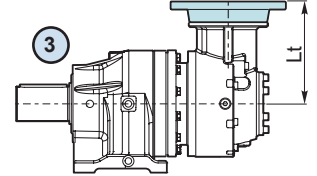
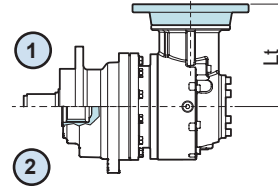
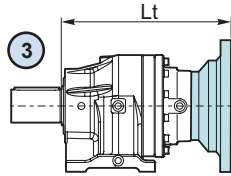
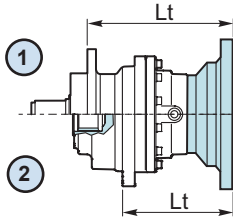
FLANGE MOTORI IEC/NEMA

MOTOR FLANGES IEC/NEMA

MOTORFLANSCHEN IEC/NEMA

EL

EC



① = MP - MP1 - FS

② = FE - FCP

③ = MPP1

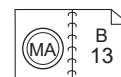
		Lt [mm]										
		IEC						NEMA				
		63	71	80-90	100-112	132	160-180	143/145 TD	182/184 TC	182/184 TD	210 TD	213/215 TC
EL1201	MP - MP1	322	324	329	330	397	428	332	332	332	332	348
	FE	179.5	181.5	186.5	187.5	254.5	285.5	189.5	189.5	189.5	189.5	205.5
	FS	322	324	329	330	397	428	332	332	332	332	348
	FCP	207.5	209.5	214.5	215.5	282.5	313.5	217.5	217.5	217.5	217.5	233.5
	MPP1	358	360	365	366	433	464	368	368	368	368	384
EL1202	MP - MP1	387.5	389.5	394.5	395.5	462.5	493.5	397.5	397.5	397.5	397.5	413.5
	FE	245	247	252	253	320	351	255	255	255	255	271
	FS	387.5	389.5	394.5	395.5	462.5	493.5	397.5	397.5	397.5	397.5	413.5
	FCP	273	275	280	281	348	379	283	283	283	283	299
	MPP1	423.5	425.5	430.5	431.5	498.5	529.5	433.5	433.5	433.5	433.5	449.5
EL1203	MP - MP1	448.5	450.5	-	-	-	554.5	458.5	458.5	458.5	458.5	474.5
	FE	306	308	-	-	-	412	316	316	316	316	332
	FS	448.5	450.5	-	-	-	554.5	458.5	458.5	458.5	458.5	474.5
	FCP	334	336	-	-	-	440	344	344	344	344	360
	MPP1	484.5	486.5	-	-	-	590.5	494.5	494.5	494.5	494.5	510.5
EL1204	MP - MP1	487.5	489.5	-	-	-	593.5	497.5	497.5	497.5	497.5	513.5
	FE	345	347	-	-	-	451	355	355	355	355	371
	FS	487.5	489.5	-	-	-	593.5	497.5	497.5	497.5	497.5	513.5
	FCP	373	375	-	-	-	479	383	383	383	383	399
	MPP1	523.5	525.5	-	-	-	629.5	533.5	533.5	533.5	533.5	549.5
EC1202	MP - MP1	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	FE	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	FS	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	FCP	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	MPP1	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
EC1203	MP - MP1	290	292	-	-	-	396	300	300	300	300	316
	FE	290	292	-	-	-	396	300	300	300	300	316
	FS	290	292	-	-	-	396	300	300	300	300	316
	FCP	290	292	-	-	-	396	300	300	300	300	316
	MPP1	290	292	-	-	-	396	300	300	300	300	316
EC1204	MP - MP1	155	155	155	155	242	-	-	-	-	-	-
	FE	155	155	155	155	242	-	-	-	-	-	-
	FS	155	155	155	155	242	-	-	-	-	-	-
	FCP	155	155	155	155	242	-	-	-	-	-	-
	MPP1	155	155	155	155	242	-	-	-	-	-	-



A richiesta altre configurazioni disponibili. Contattare il referente DANA di zona.

More configurations are available on request. Consult the DANA area contact person.

Auf Wunsch sind weitere Konfigurationen verfügbar. Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.





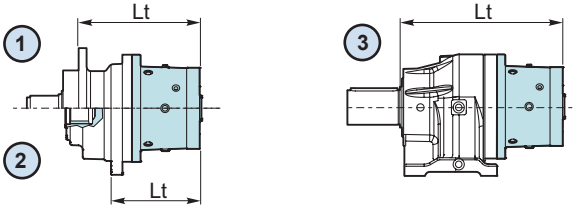
FRENI

BRAKES

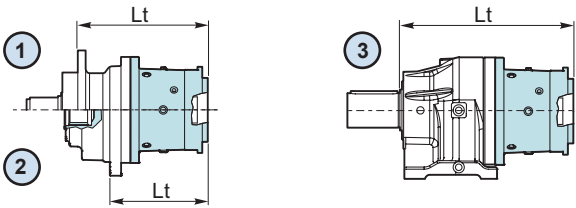
BREMSEN

EL

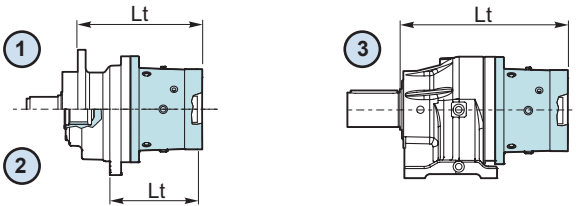
MB3 - E00
MB5 - E00
MB6 - E00



MB3 - SAE A



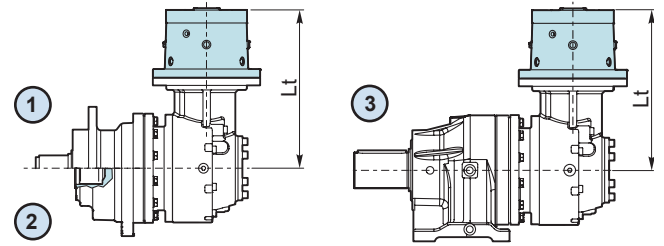
MB3 - BRZV



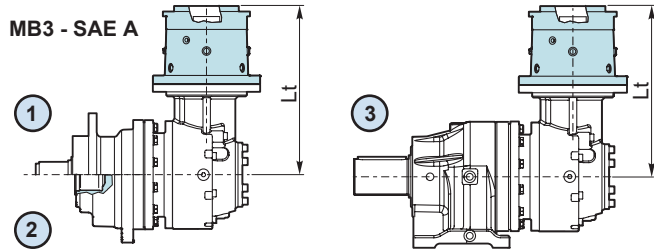
- ① = MP - MP1 - FS
- ② = FE - FCP
- ③ = MPP1

EC

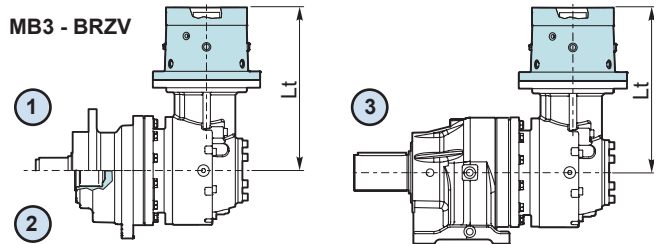
MB3 - E00



MB3 - SAE A



MB3 - BRZV



		Lt [mm]					
		MP	MP1	FE	FS	FCP	MPP1
MB3 E00	EL1203	474.5	474.5	332	474.5	360	510.5
	EL1204	528.5	528.5	386	528.5	414	564.5
	EC1203	318	318	318	318	318	318
MB3 SAE - A	EL1203	503.5	503.5	361	503.5	389	539.5
	EL1204	557.5	557.5	415	557.5	443	593.5
	EC1203	347	347	347	347	347	347
MB3 BRZV	EL1203	472	472	329.5	472	357.5	508
	EL1204	526	526	383.5	526	411.5	562
	EC1203	315.5	315.5	315.5	315.5	315.5	315.5
MB5 E00	EL1202	437	437	294.5	437	322.5	473
	EC1202	382	382	382	382	382	382
MB6 E00	EL1201	378	378	235.5	378	263.5	414

CARICHI RADIALI

RADIAL LOADS

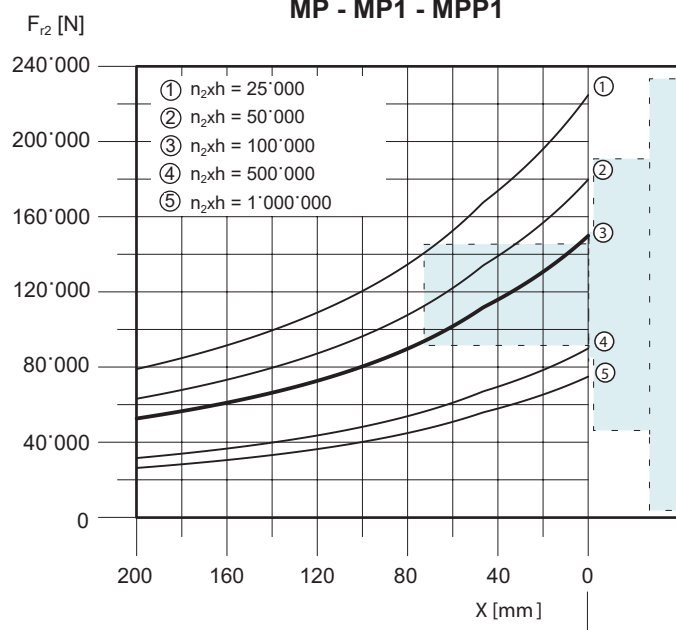
RADIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen

MP - MP1 - MPP1



CARICHI ASSIALI

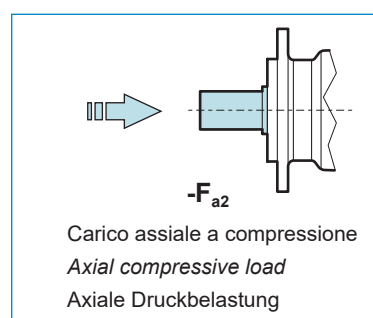
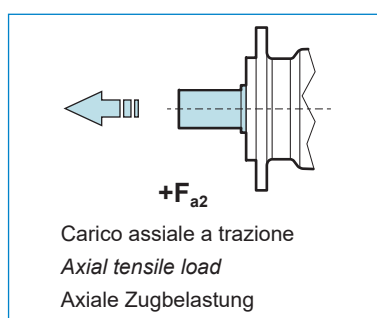
AXIAL LOADS

AXIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



$n_2 \cdot x_h$	E120 MP - MP1 - MPP1	
	-F _{a2} [N]	+F _{a2} [N]
10'000	272'000	182'000
25'000	206'720	138'320
50'000	167'280	111'930
100'000	136'000	91'000
500'000	84'320	56'420
1'000'000	68'000	45'500

CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

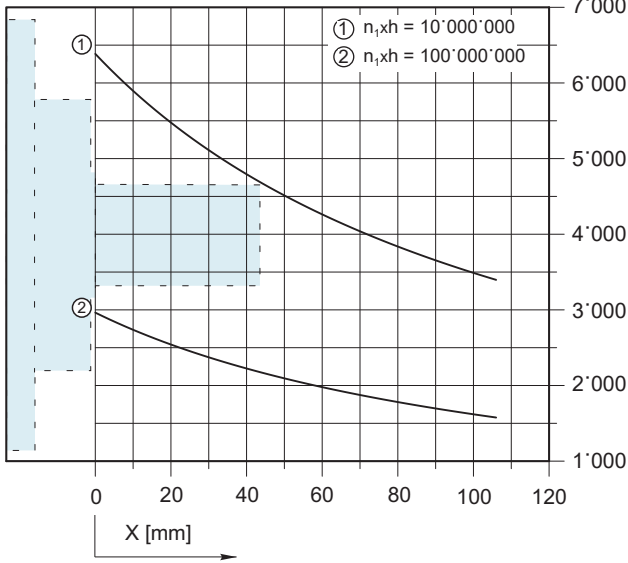
Alberi in ingresso

Input shaft

Eingangswellen

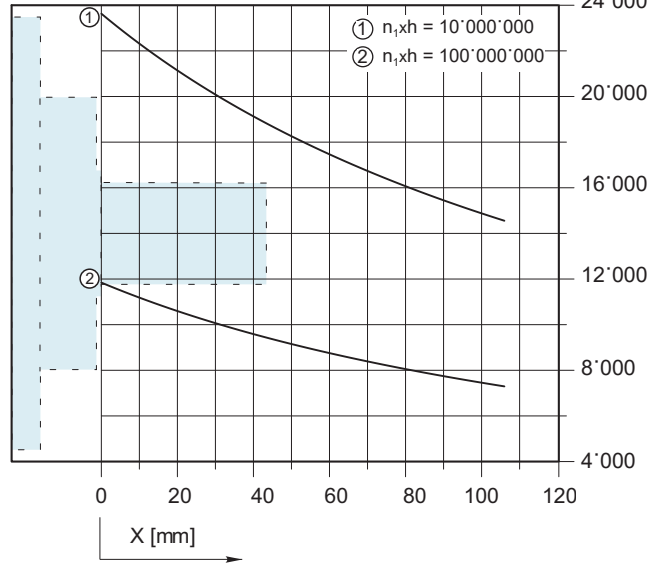
ISL120

F_{r1} [N]



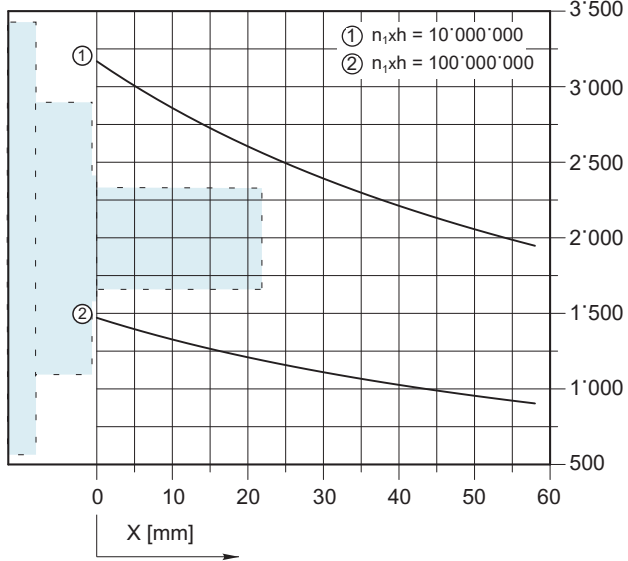
IS120

F_{r1} [N]



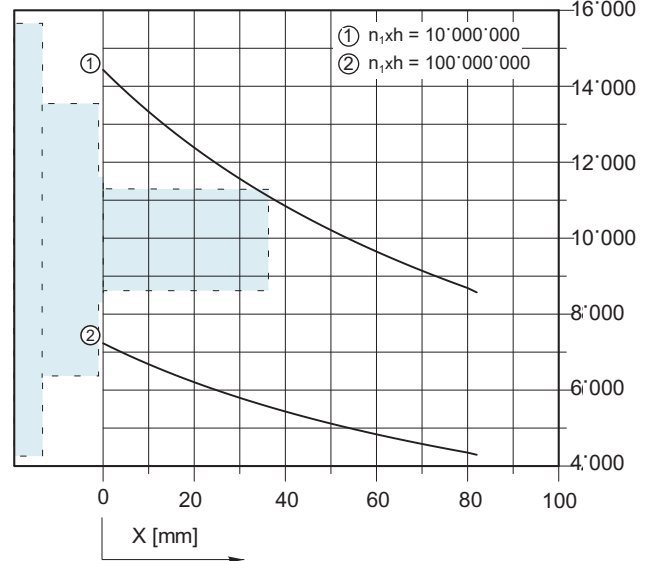
ISL50

F_{r1} [N]



IS50

F_{r1} [N]



CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

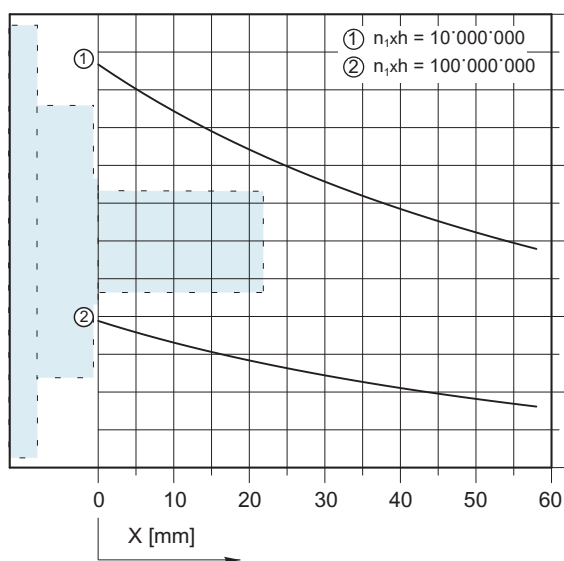
Alberi in ingresso

Input shaft

Eingangswellen

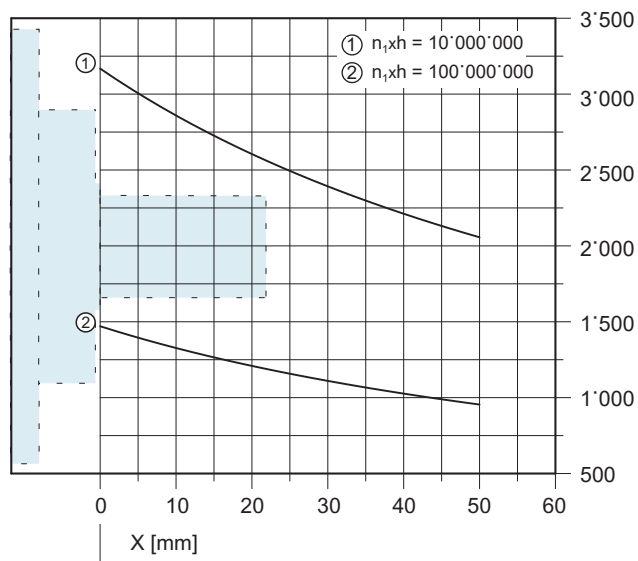
ISL30

F_{r1} [N]



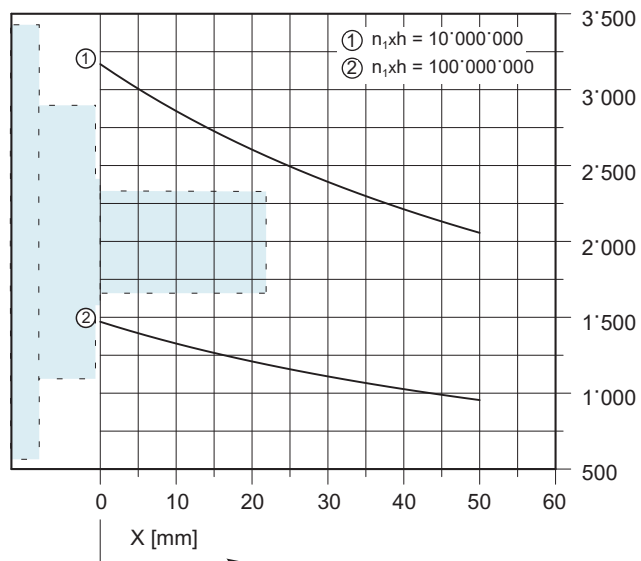
ISL16

F_{r1} [N]



ISL10

F_{r1} [N]





BREVINI[®]




































Motion Systems

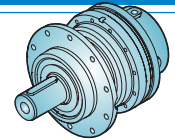
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	Disponibilità Availability Verfügbarkeit	Albero - Shaft - Getriebewelle			Pagina Page Seite	
		Tipologia Type Typ	Dimensioni Dimensions Abmessungen [mm]			
USCITE OUTPUTS AUSGÄNGE	MP - ML 		MP B100x94 DIN 5482	ML B80x74 DIN 5482		
	MP1 - ML1 		MP1 ø100	ML1 ø100		
	FE 		A80x74 DIN 5482			
	FS 		ø80			
	FCP 		ø100			
	MPP1 		ø100			
ENTRATE INPUTS EINNAHMEN	IS - ISL 		IS IS50 ø48 IS160 ø80	ISL ISL10 ø28 ISL16 ø28 ISL30 ø40 ISL50 ø40 ISL160 ø65		
	E00 - S00 		E00 A50x45 DIN 5482	S00 N100x3 z32 DIN 5480		
FLANGED'INGRESSO INPUT FLANGE FLANSCH EINGANG	Disponibilità Availability Verfügbarkeit				Pagina Page Seite	
	 					
 						
FRENI BRAKES BREMSEN	Disponibilità Availability Verfügbarkeit	T_B [Nm]			Pagina Page Seite	
	 	MB3 33 ÷ 495	MB5 173 ÷ 1'173	MB6 658 ÷ 2'220		



i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			

EL1601

4.18	24'200	20'900	18'400	17'000	11'500	9'300	2'000	34'000	25
4.89	20'400	17'300	15'200	14'300	11'300	9'200	2'000	34'000	25
6.00	15'100	12'700	11'400	10'700	9'400	8'900	2'000	28'200	25

EL1602

14.7	22'400	19'200	18'200	16'000	9'900	8'000	3'800	30'000	18
17.0	22'200	20'700	18'400	16'500	10'200	8'300	3'800	30'000	18
19.9	20'400	17'300	15'200	14'300	11'300	9'200	3'800	34'000	18
24.2	20'400	17'300	15'200	14'300	11'100	9'100	3'800	34'000	18
28.8	16'200	14'900	14'100	13'200	10'900	8'900	3'800	34'000	18
35.3	15'100	12'700	11'400	10'700	9'400	8'900	3'800	28'200	18
39.2	13'600	12'500	11'400	10'700	9'400	7'600	3'800	28'200	18

EL1603

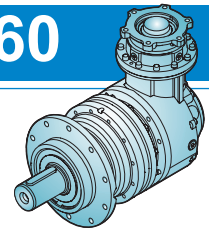
51.7	22'400	19'200	16'900	13'700	8'500	6'900	4'000	30'000	11
59.9	22'200	20'700	18'400	15'200	9'400	7'700	4'000	30'000	11
69.4	22'200	20'700	18'400	16'500	10'200	8'300	4'000	30'000	11
81.1	20'400	17'300	15'200	14'300	11'300	9'200	4'000	34'000	11
91.0	16'100	14'800	13'900	13'000	9'000	7'400	4'000	30'000	11
98.6	20'400	17'300	15'200	14'300	11'300	9'200	4'000	34'000	11
105	18'400	16'900	15'800	14'800	10'000	8'100	4'000	30'000	11
120	20'400	17'300	15'200	14'300	11'100	9'100	4'000	34'000	11
131	15'100	12'700	11'400	10'700	9'400	8'900	4'000	28'200	11
138	13'600	12'500	11'400	10'700	9'400	7'600	4'000	28'200	11
150	20'400	17'300	15'200	14'300	11'100	9'100	4'000	34'000	11
179	17'400	15'800	14'700	13'700	11'100	9'100	4'000	34'000	11
212	16'200	14'900	14'100	13'200	10'900	8'900	4'000	34'000	11
243	13'600	12'500	11'400	10'700	9'400	7'600	4'000	28'200	11
261	15'100	12'700	11'400	10'700	9'400	8'900	4'000	28'200	11
289	13'600	12'500	11'400	10'700	9'400	7'600	4'000	28'200	11

EL1604

244	22'200	20'700	18'400	16'500	10'200	8'300	4'000	30'000	8
256	21'900	19'200	18'200	14'900	9'200	7'500	4'000	30'000	8
283	22'200	20'700	18'400	16'500	10'200	8'300	4'000	30'000	8
297	22'200	20'700	18'400	16'500	10'200	8'300	4'000	30'000	8
344	22'200	20'700	18'400	16'500	10'200	8'300	4'000	30'000	8
360	21'900	19'200	18'200	14'900	9'200	7'500	4'000	30'000	8
408	22'200	20'700	18'400	16'500	10'200	8'300	4'000	30'000	8
428	21'900	19'200	18'200	14'900	9'200	7'500	4'000	30'000	8
481	22'200	20'700	18'400	16'500	10'200	8'300	4'000	30'000	8
504	21'900	19'200	18'200	14'900	9'200	7'500	4'000	30'000	8
527	20'400	17'300	15'200	14'300	11'100	9'100	4'000	34'000	8
585	22'200	20'700	18'400	16'500	10'200	8'300	4'000	30'000	8
610	20'400	17'300	15'200	14'300	11'200	9'100	4'000	34'000	8
684	20'400	17'300	15'200	14'300	11'300	9'200	4'000	34'000	8
742	20'400	17'300	15'200	14'300	11'100	9'100	4'000	34'000	8
881	20'400	17'300	15'200	14'300	11'100	9'100	4'000	34'000	8
1008	20'400	17'300	15'200	14'300	11'300	9'200	4'000	34'000	8
1077	18'400	16'900	15'800	14'800	10'000	8'100	4'000	30'000	8
1225	20'400	17'300	15'200	14'300	11'100	9'100	4'000	34'000	8
1455	16'200	14'900	14'100	13'200	10'900	8'900	4'000	34'000	8
1531	20'400	17'300	15'200	14'300	11'100	9'100	4'000	34'000	8
1681	13'600	12'500	11'400	10'700	9'400	7'600	4'000	28'200	8
1786	15'100	12'700	11'400	10'700	9'400	8'900	4'000	28'200	8
1879	15'100	12'700	11'400	10'700	9'400	8'900	4'000	34'000	8
2170	16'200	14'900	14'100	13'200	10'900	8'900	4'000	34'000	8
2479	13'600	12'500	11'400	10'700	9'400	7'600	4'000	28'200	8

Per versione con uscita ML considerare / For ML output version consider / Für die Ausgabe Version ML betrachten T_{2MAX} = 24'000 Nm

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich



i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			

EC1602

12.5	17'700	17'350	14'800	12'000	7'450	6'050	2'500	34'000	18
14.7	20'350	17'250	15'200	13'400	8'300	6'750	2'500	34'000	18
18.0	15'050	12'650	11'350	10'700	9'400	7'750	2'500	28'200	18
22.3	14'450	12'600	11'650	11'150	7'600	6'200	2'500	34'000	18
27.3	15'050	12'650	11'350	10'700	8'800	7'150	2'500	28'200	18

EC1603

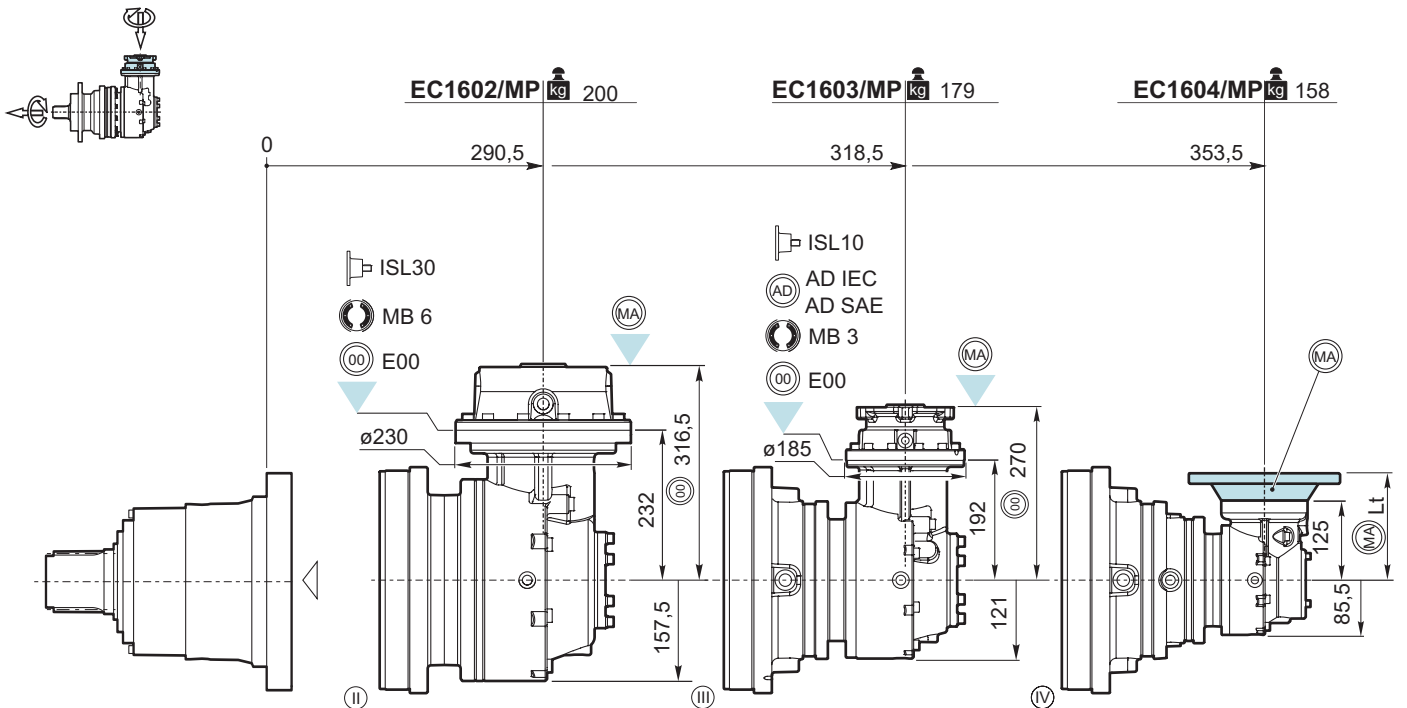
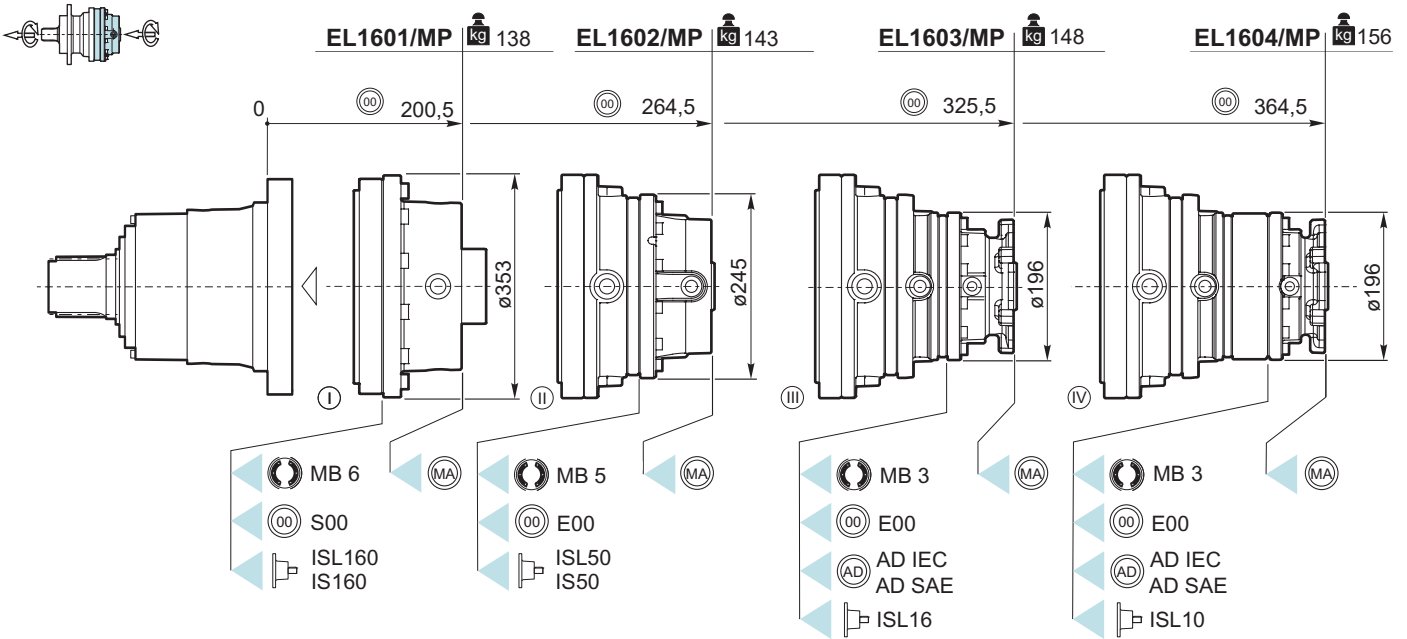
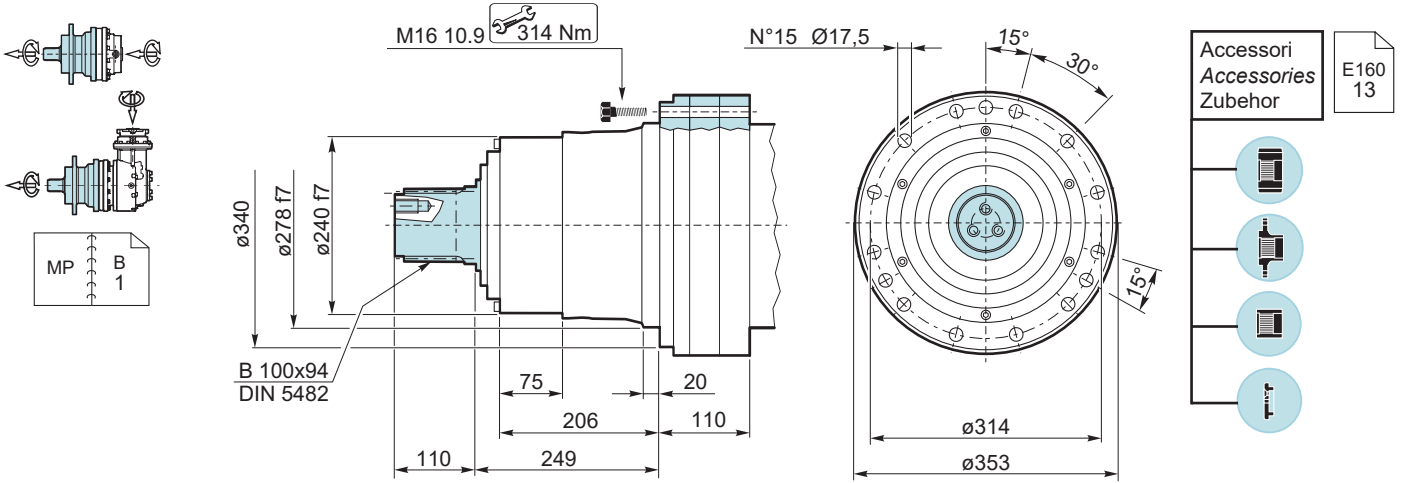
44.1	22'400	19'200	17'600	14'300	8'800	7'150	3'000	30'000	12
51.1	22'150	20'700	18'400	15'850	9'800	7'950	3'000	30'000	12
59.8	20'350	17'250	15'200	14'300	10'900	8'850	3'000	34'000	12
67.0	14'850	13'750	13'150	12'650	8'050	6'550	3'000	30'000	12
72.6	20'350	17'250	15'200	14'300	11'100	9'050	3'000	34'000	12
77.6	16'800	15'750	15'100	14'400	8'900	7'250	3'000	30'000	12
86.3	16'150	14'900	14'050	13'200	10'900	8'850	3'000	34'000	12
90.7	19'300	17'250	15'200	14'300	9'950	8'050	3'000	34'000	12
94.4	18'400	16'600	15'700	14'800	9'950	8'100	3'000	30'000	12
106	15'050	12'650	11'350	10'700	9'400	8'900	3'000	28'200	12
110	20'350	17'250	15'200	14'300	11'100	9'050	3'000	34'000	12
131	16'150	14'900	14'050	13'200	10'900	8'850	3'000	34'000	12
161	15'050	12'650	11'350	10'700	9'400	8'900	3'000	28'200	12
179	13'550	12'500	11'350	10'700	9'350	7'600	3'000	28'200	12

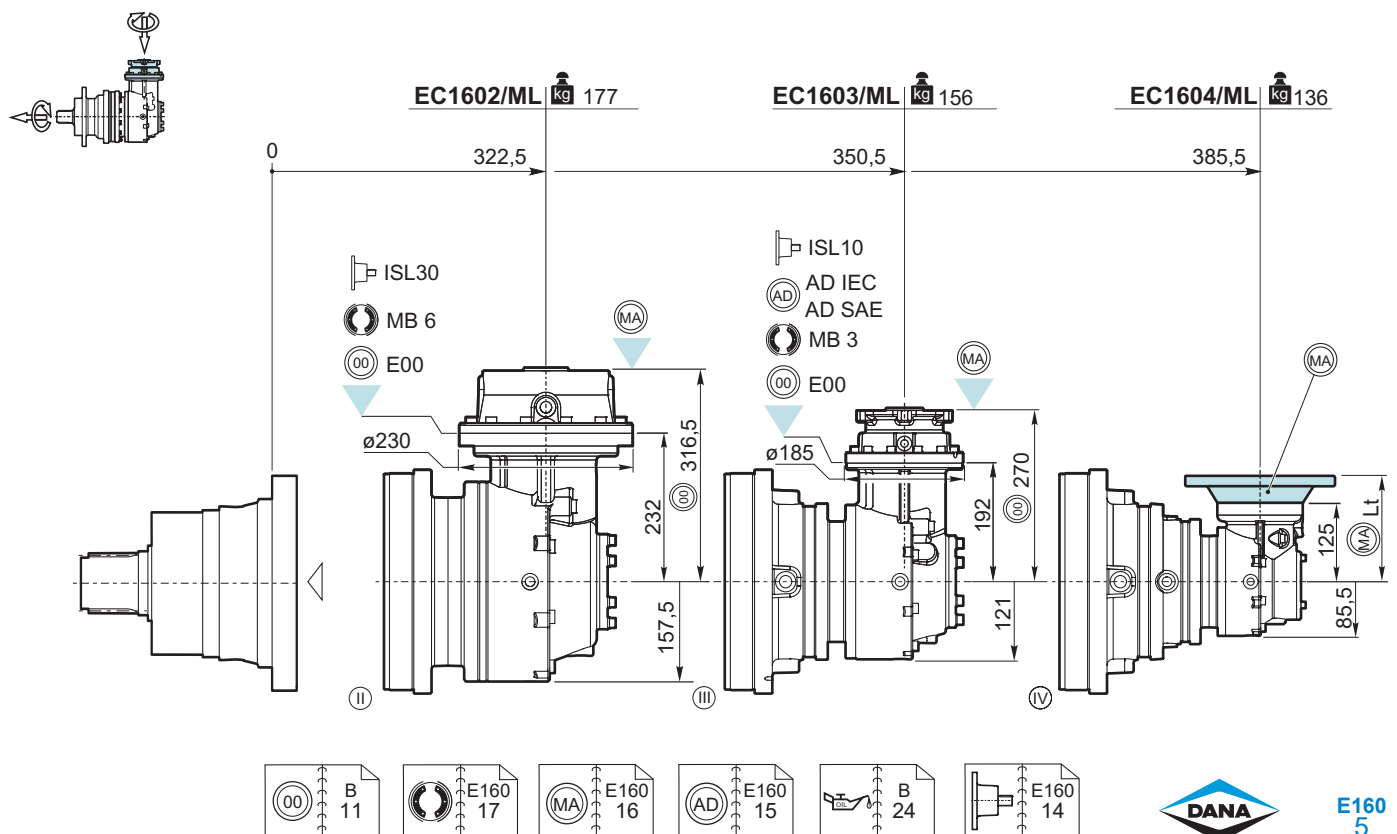
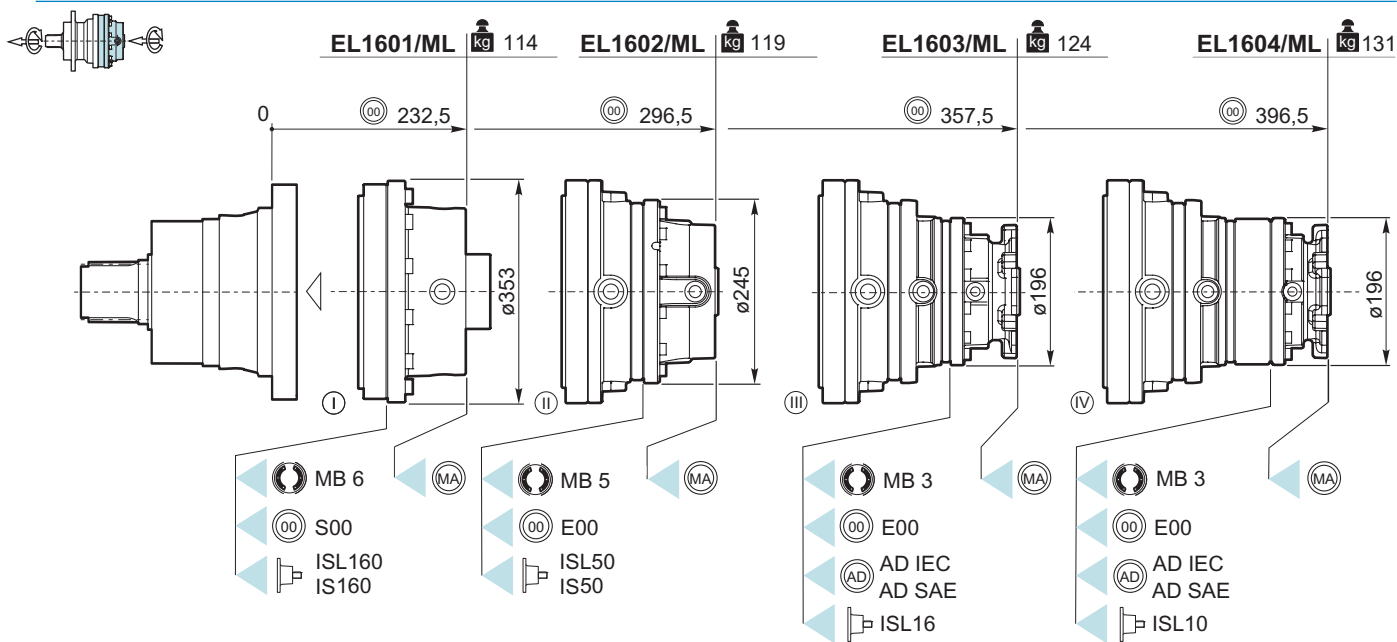
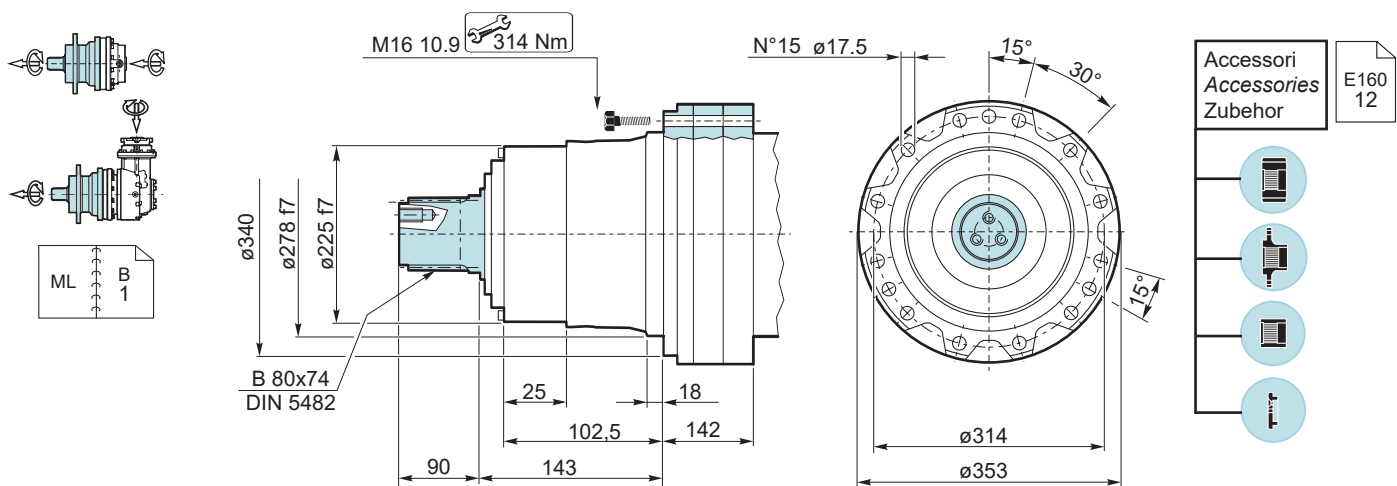
EC1604

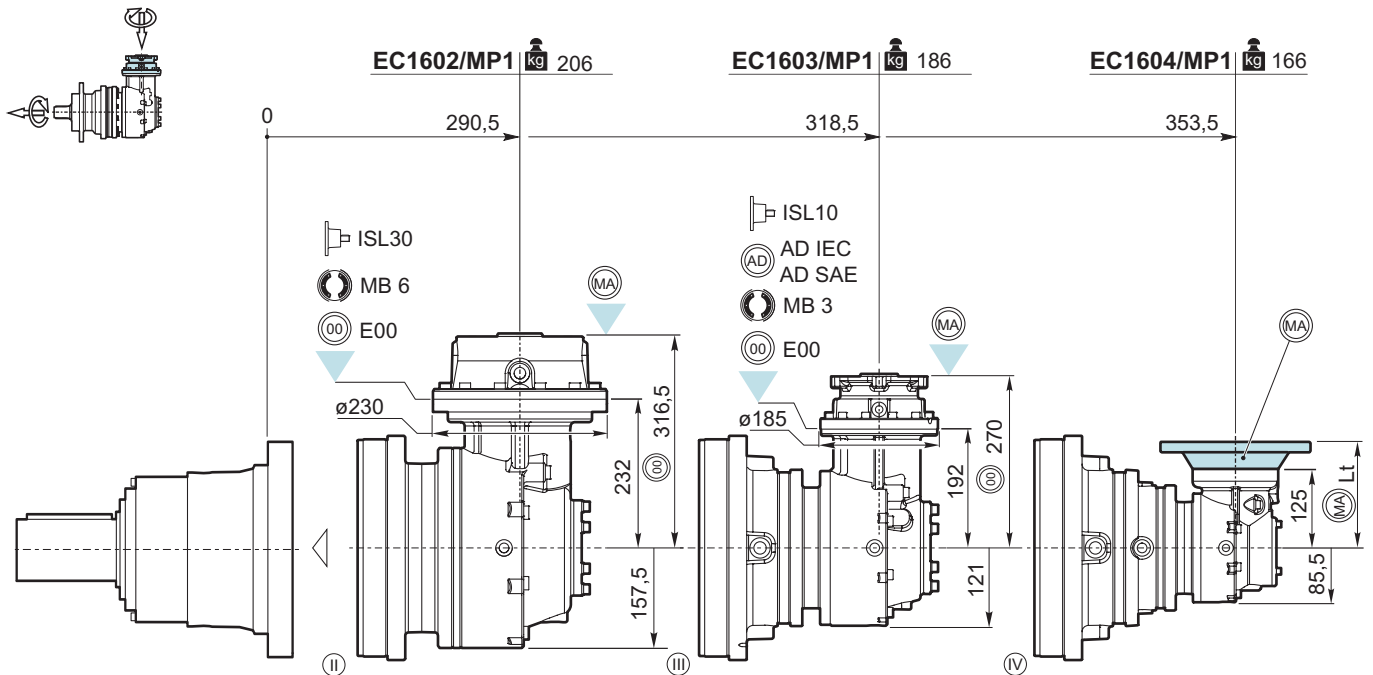
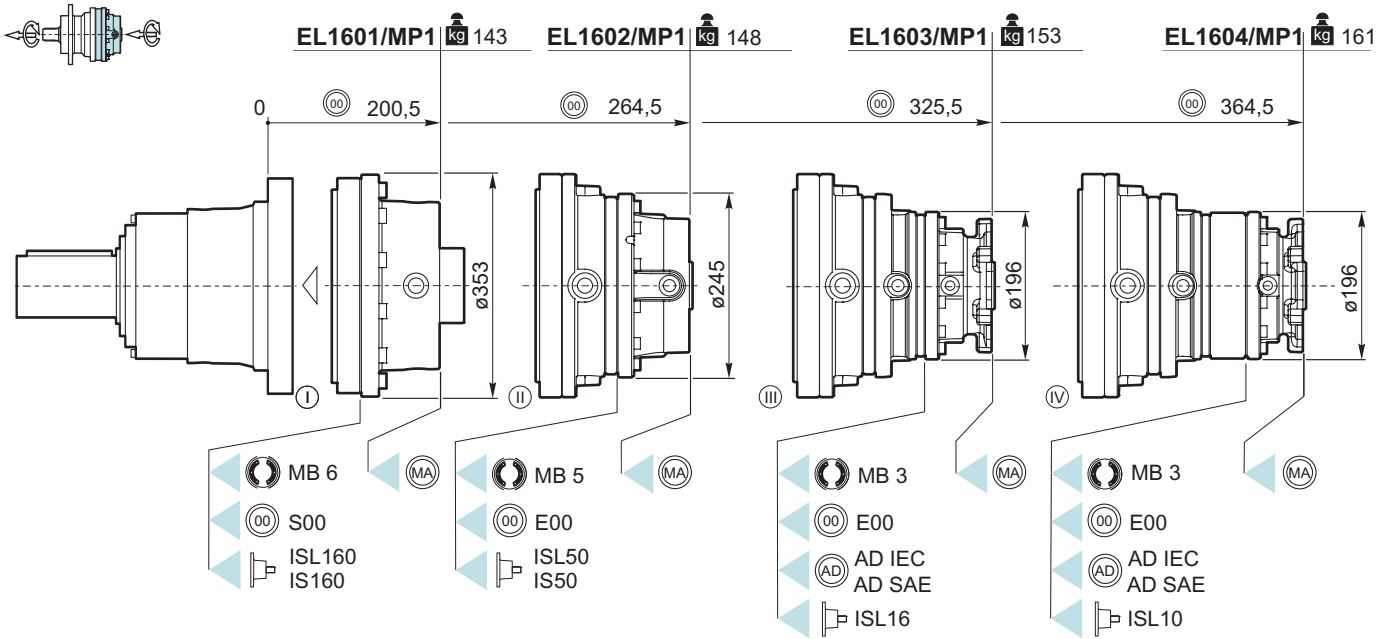
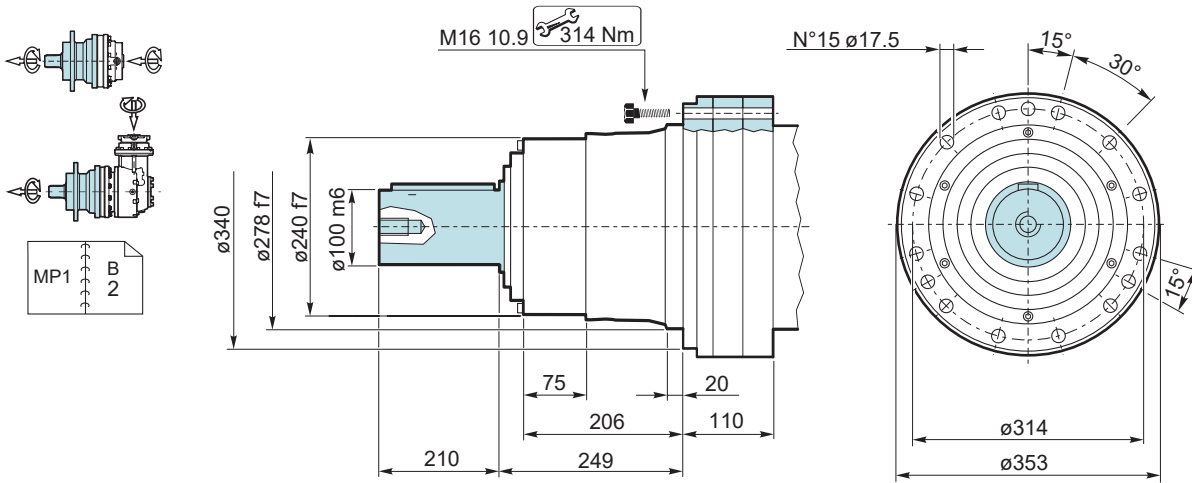
155	14'450	10'650	8'450	6'700	3'920	3'110	4'000	30'000	9
180	15'950	11'750	9'350	7'400	4'320	3'430	4'000	30'000	9
208	17'600	12'950	10'300	8'200	4'770	3'790	4'000	30'000	9
218	18'150	13'400	10'600	8'450	4'930	3'910	4'000	30'000	9
243	19'500	14'400	11'400	9'050	5'290	4'200	4'000	34'000	9
253	20'000	14'750	11'700	9'300	5'430	4'310	4'000	30'000	9
273	16'050	14'750	12'300	9'800	5'710	4'540	4'000	30'000	9
296	20'350	16'400	13'000	10'350	6'050	4'790	4'000	34'000	9
308	18'400	16'600	13'350	10'600	6'200	4'910	4'000	30'000	9
319	18'500	17'000	13'650	10'850	6'350	5'030	4'000	34'000	9
360	20'350	17'250	14'800	11'750	6'900	5'450	4'000	34'000	9
384	18'400	16'600	15'500	12'300	7'200	5'700	4'000	30'000	9
427	16'150	14'900	14'050	13'200	7'700	6'150	4'000	34'000	9
449	20'350	17'250	15'200	13'650	8'000	6'350	4'000	34'000	9
479	13'550	12'500	11'350	10'700	8'350	6'600	4'000	28'200	9
536	17'400	15'800	14'650	13'650	9'000	7'150	4'000	34'000	9
637	16'150	14'900	14'050	13'200	10'050	8'000	4'000	34'000	9
696	16'150	14'900	13'750	10'900	6'400	5'050	4'000	34'000	9
732	20'350	17'250	14'200	11'300	6'600	5'230	4'000	34'000	9
782	15'050	12'650	11'350	10'700	9'400	8'900	4'000	28'200	9
874	17'400	15'800	14'650	12'700	7'450	5'880	4'000	34'000	9
949	13'550	12'500	11'350	10'700	7'850	6'250	4'000	28'200	9
1068	15'050	12'650	11'350	10'700	8'500	6'750	4'000	28'200	9
1186	13'550	12'500	11'350	10'700	9'100	7'250	4'000	28'200	9
1274	15'050	12'650	11'350	10'700	9'400	7'600	4'000	28'200	9
1415	13'550	12'500	11'350	10'700	9'350	7'600	4'000	28'200	9

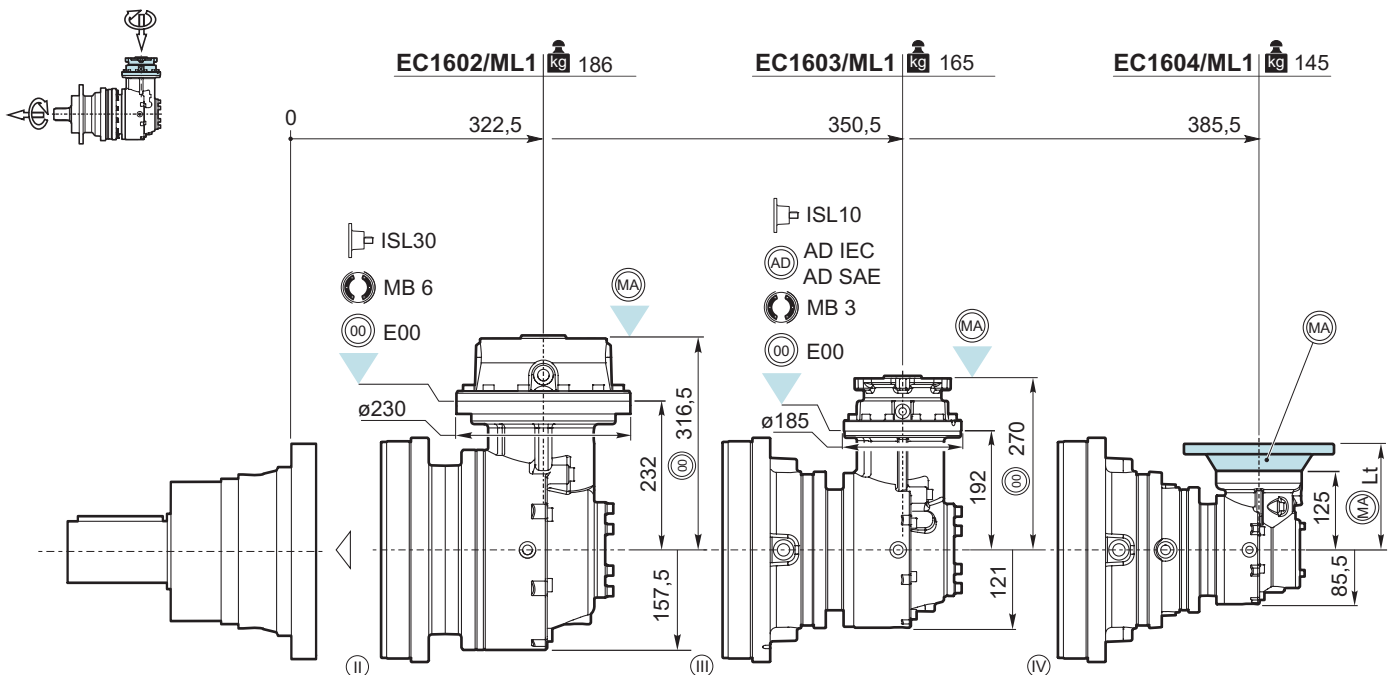
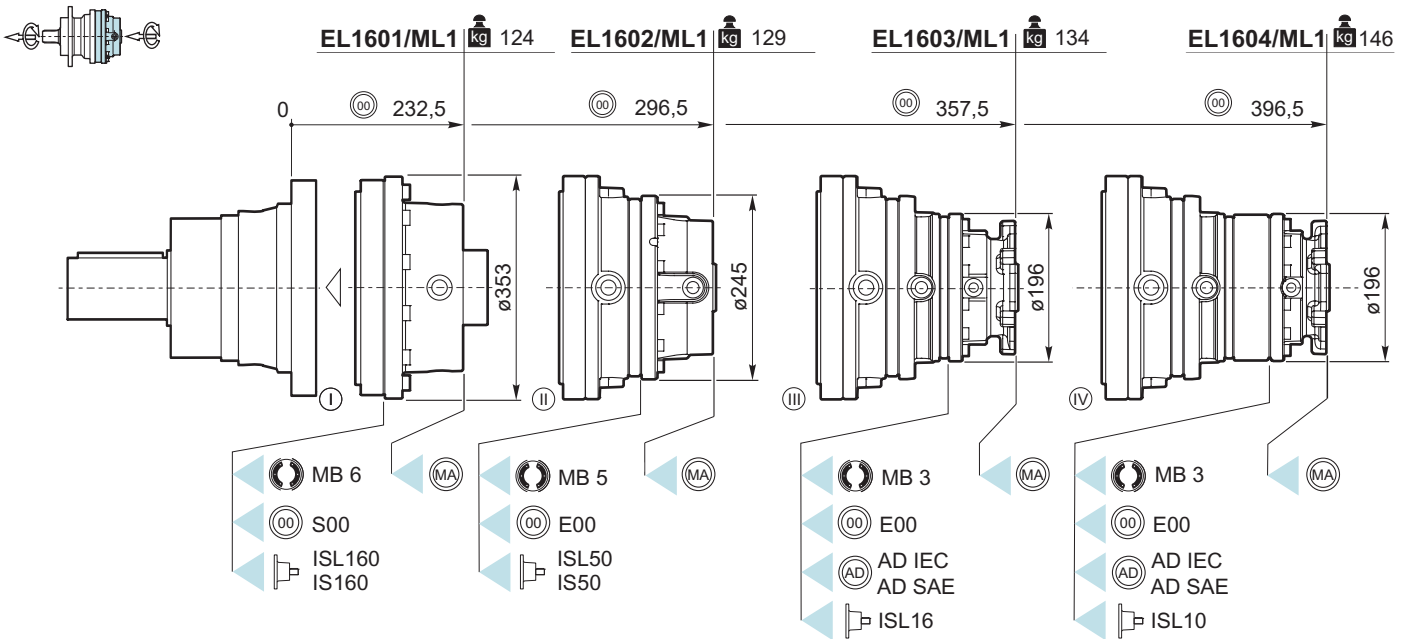
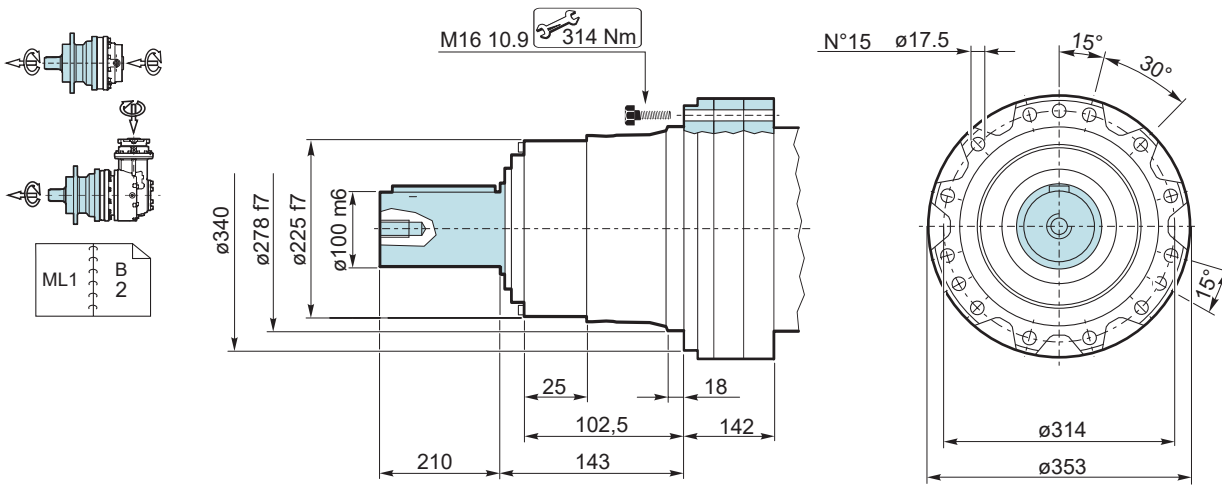
Per versione con uscita ML considerare / For ML output version consider / Für die Ausgabe Version ML betrachten T_{2MAX} = 24'000 Nm

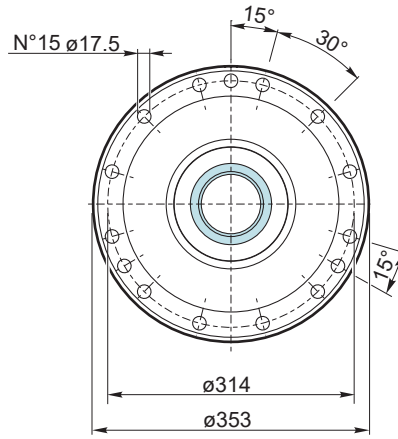
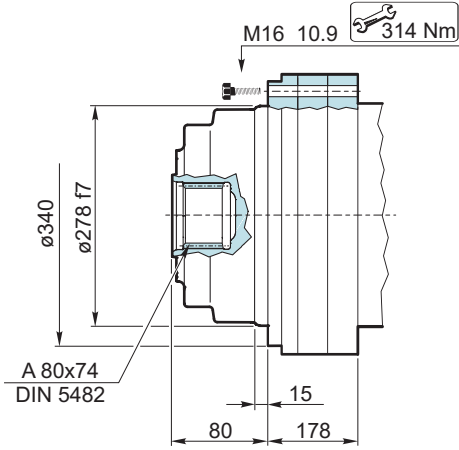
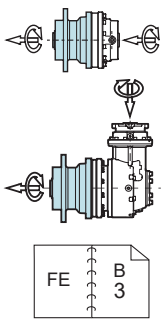
Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich





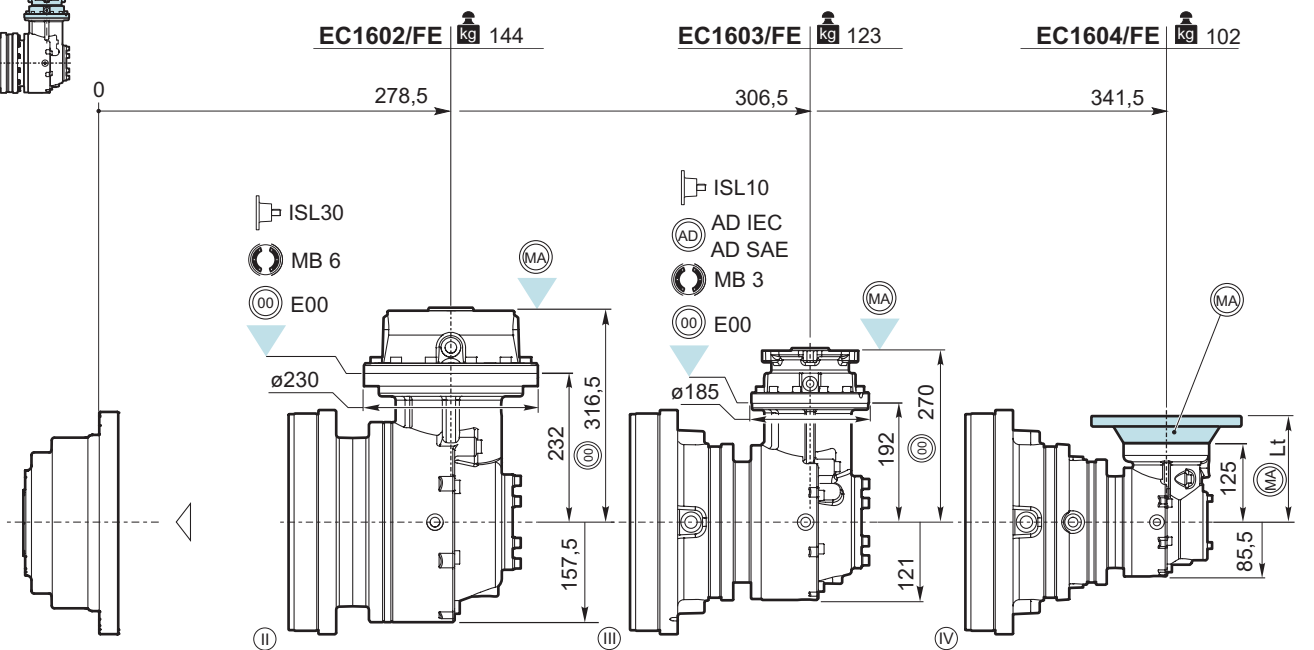
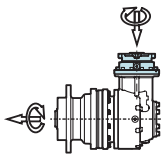
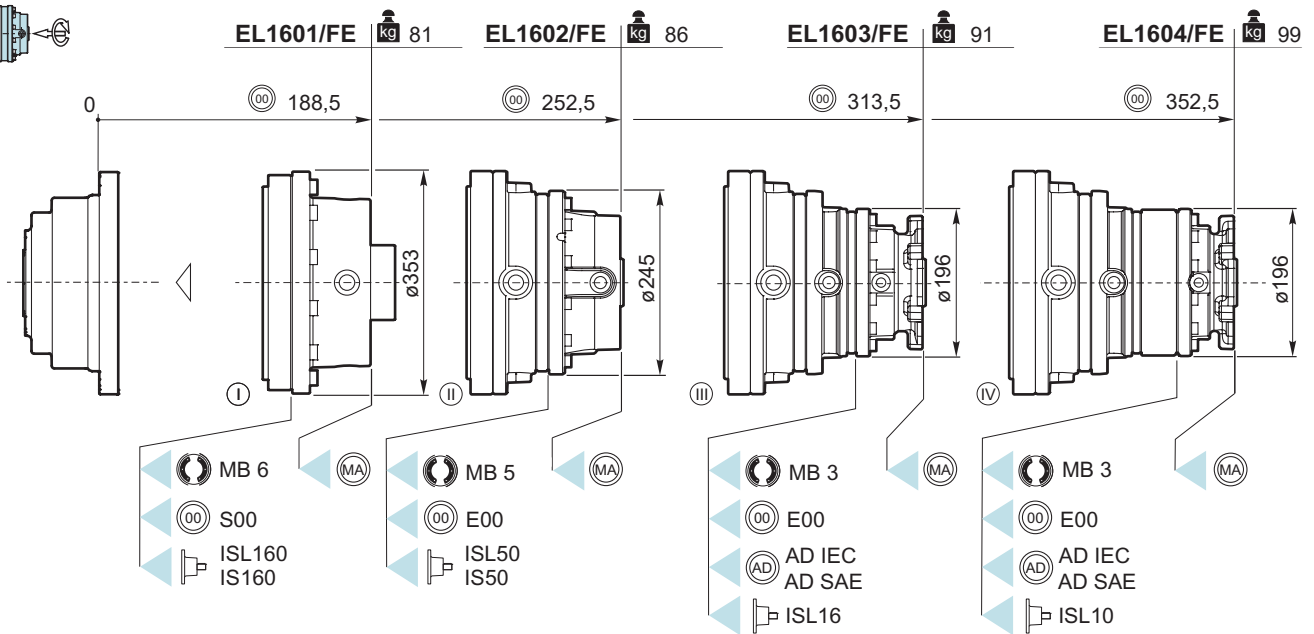
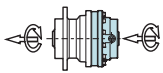


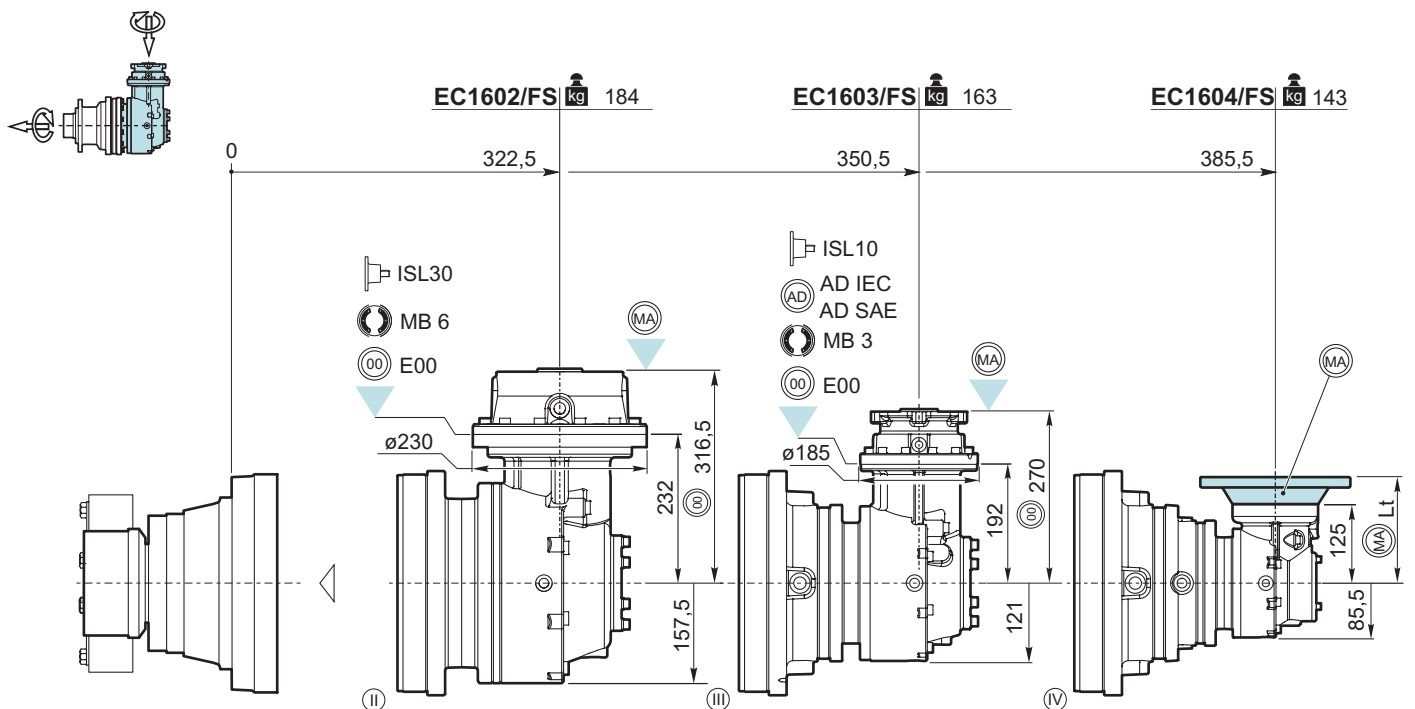
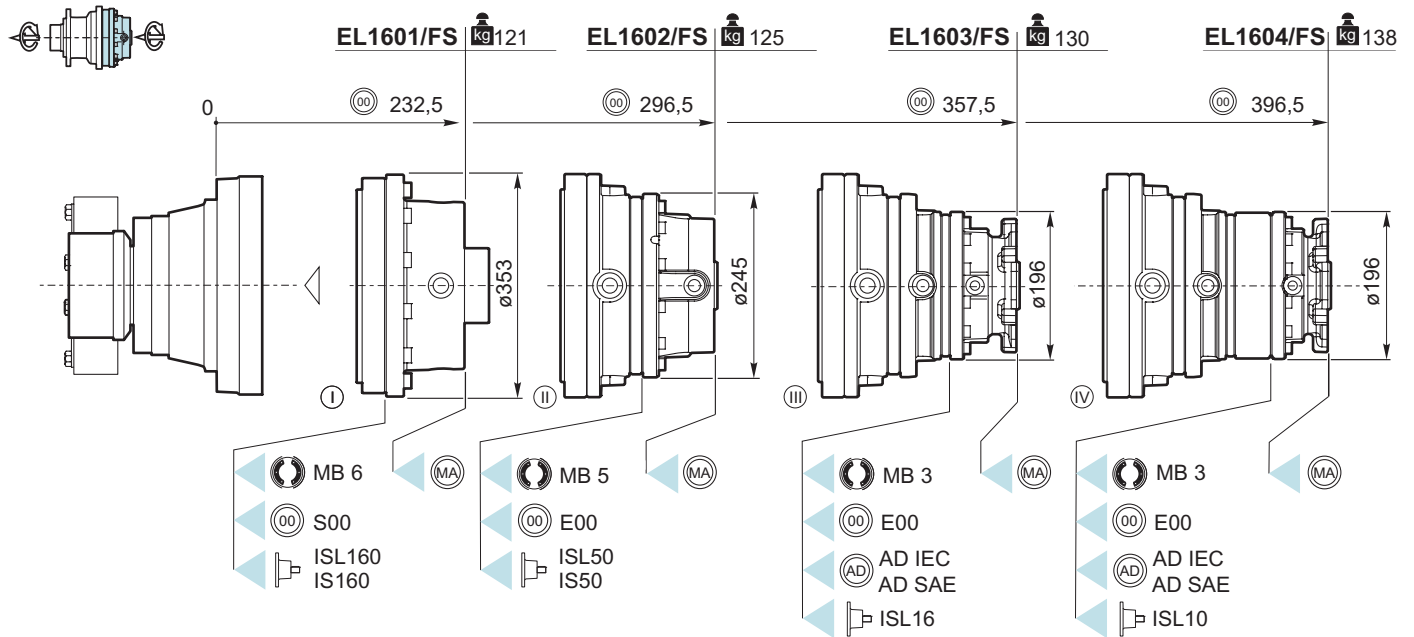
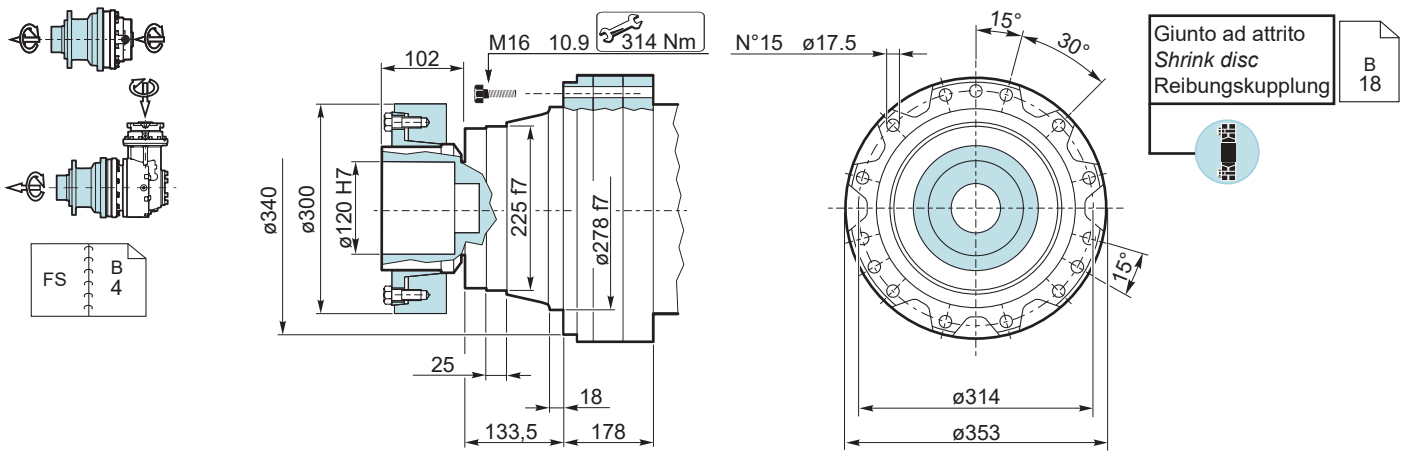


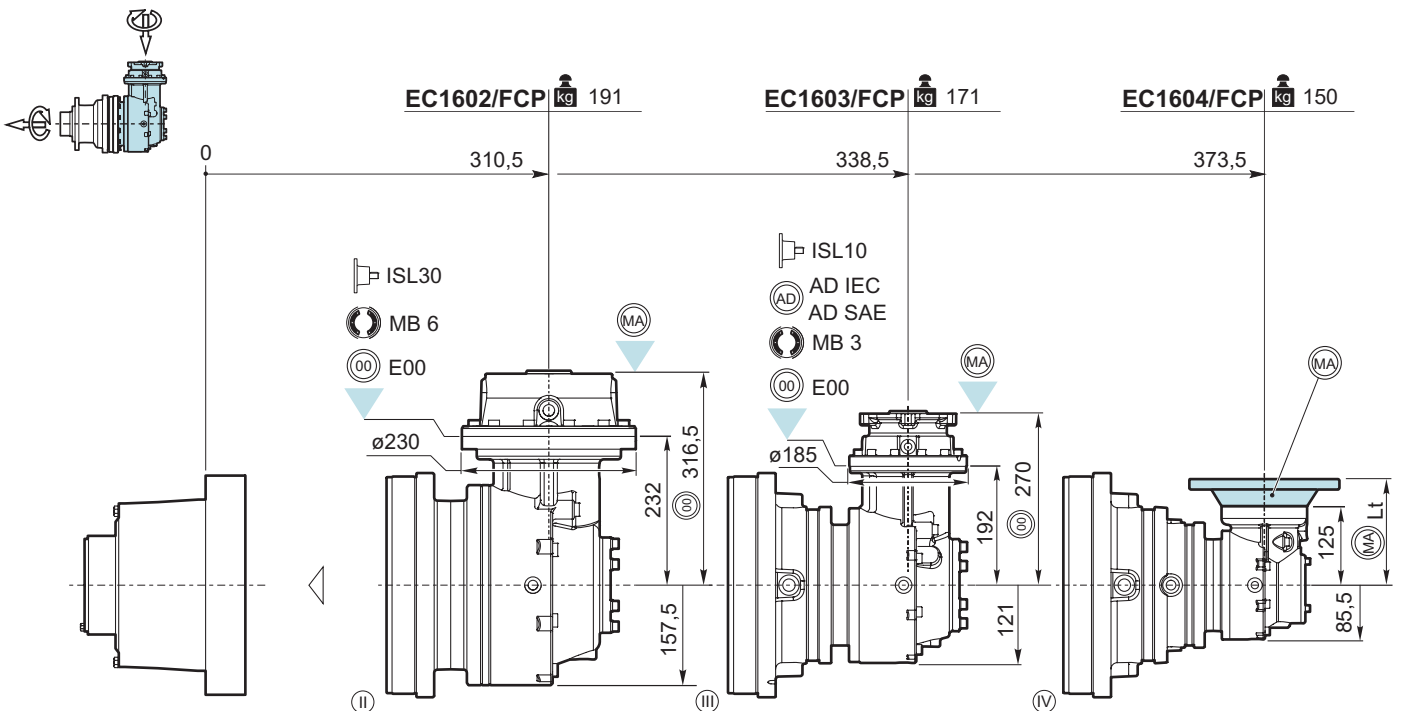
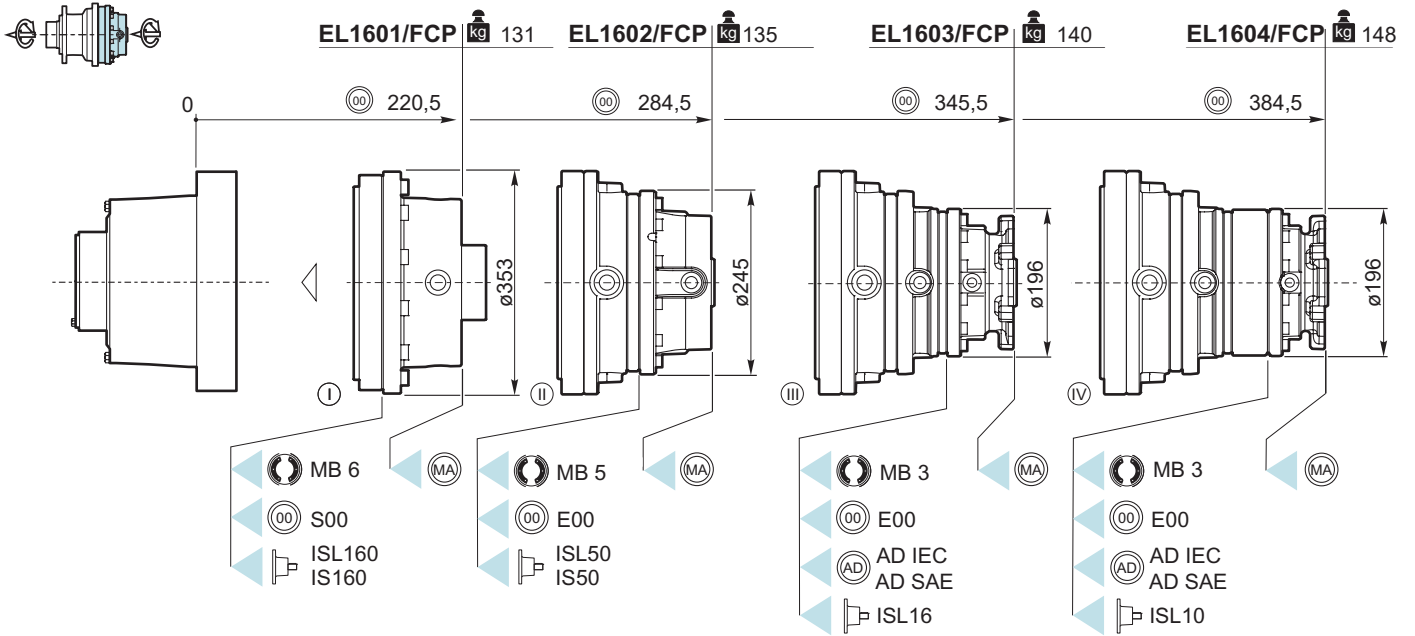
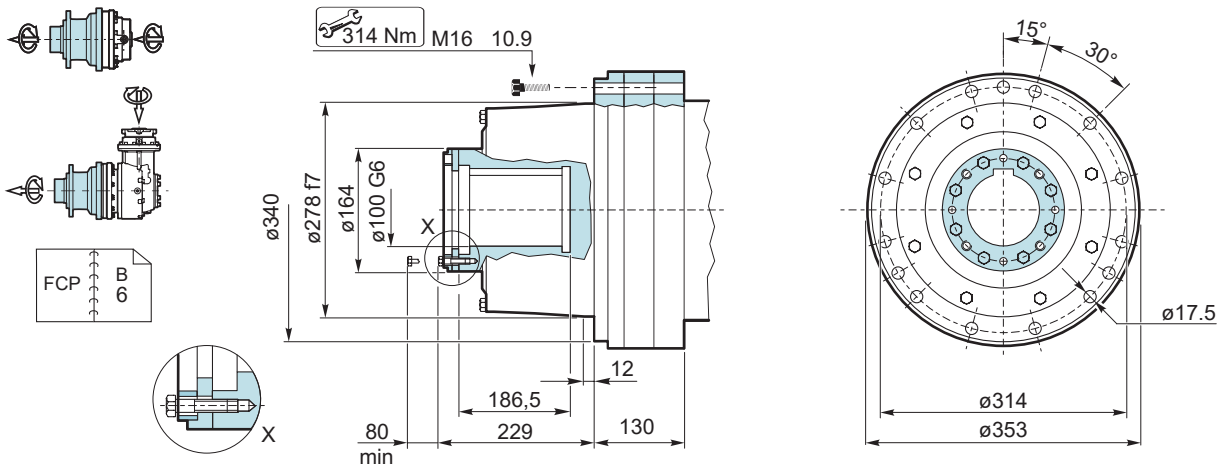


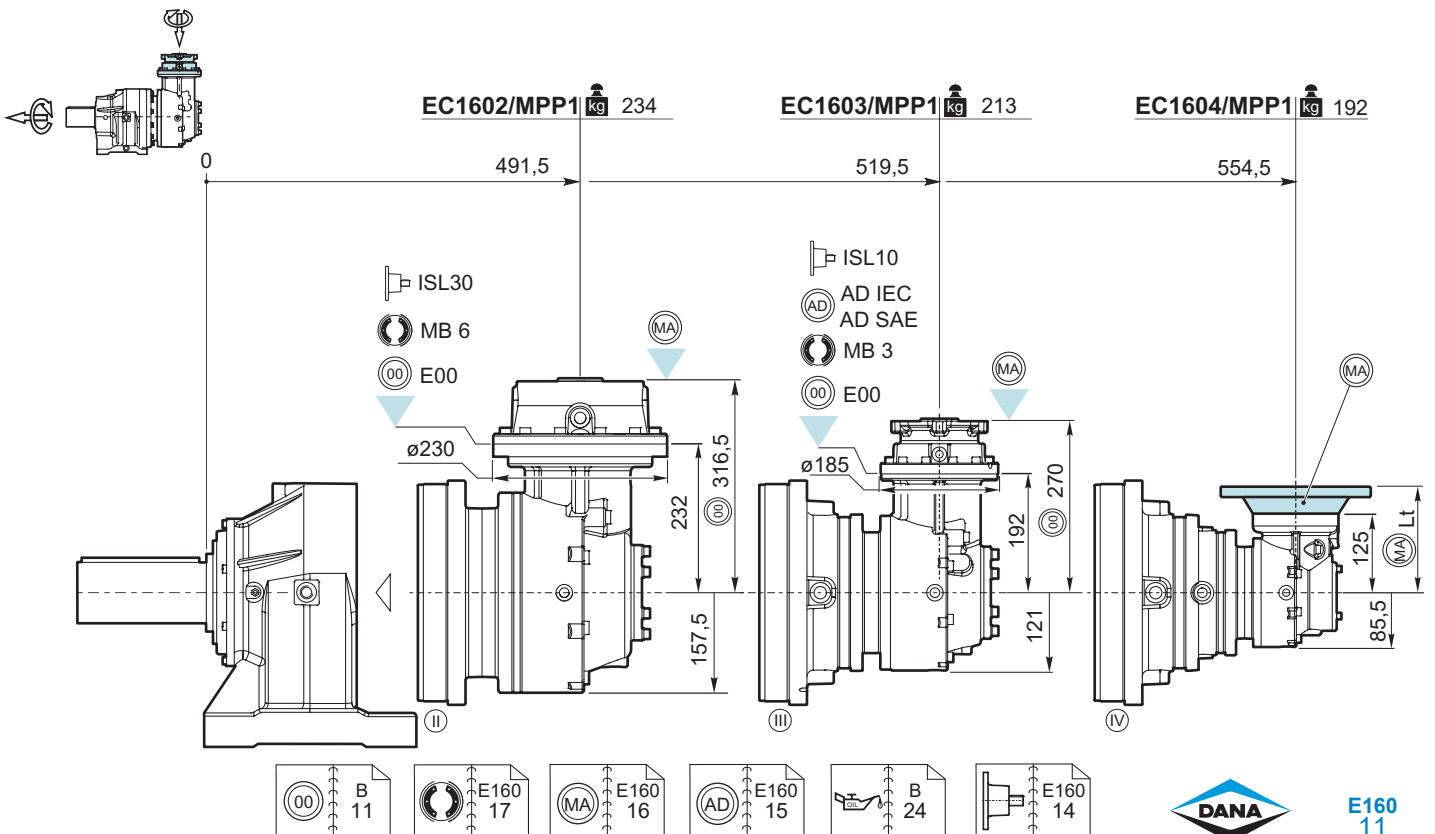
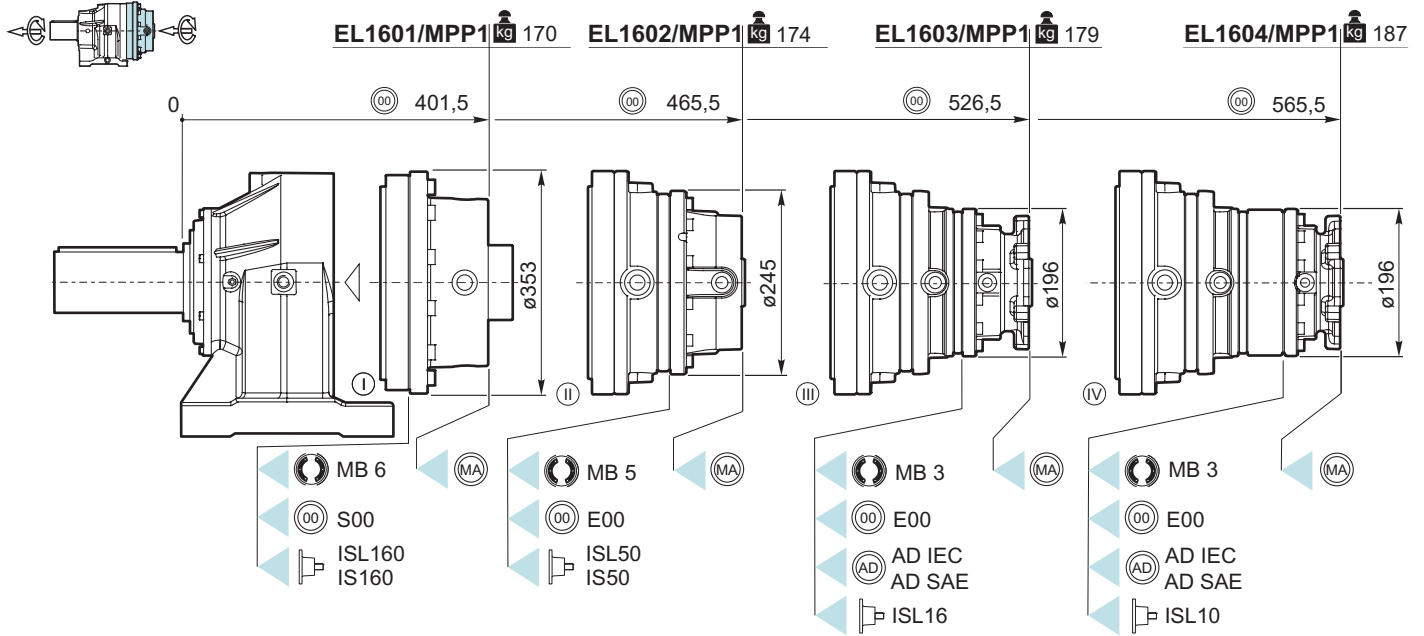
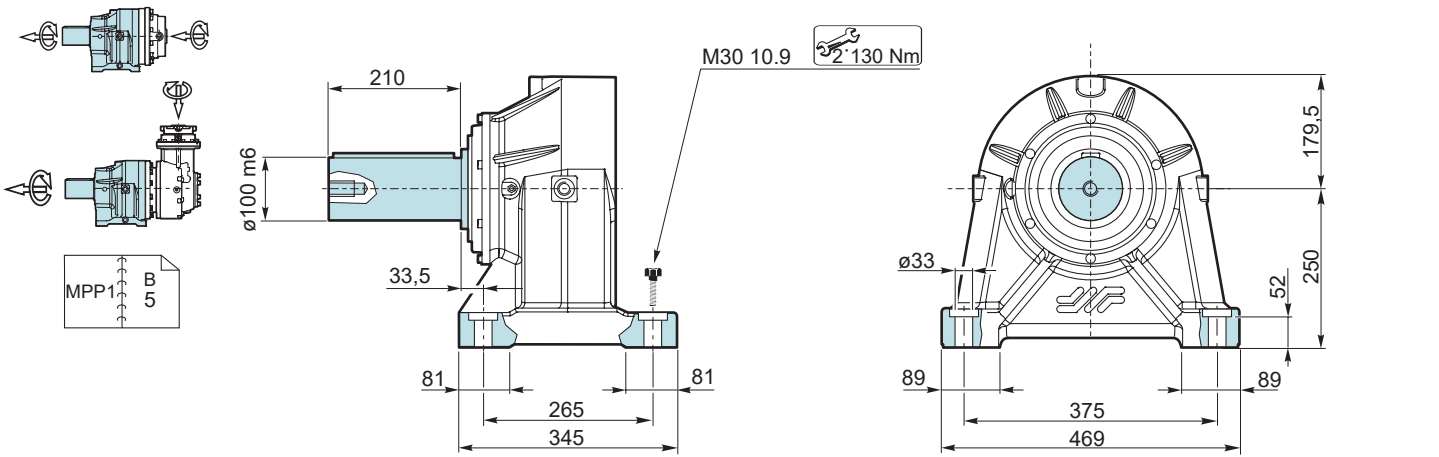
Accessori
Accessories
Zubehör

E160
12











ACCESSORI

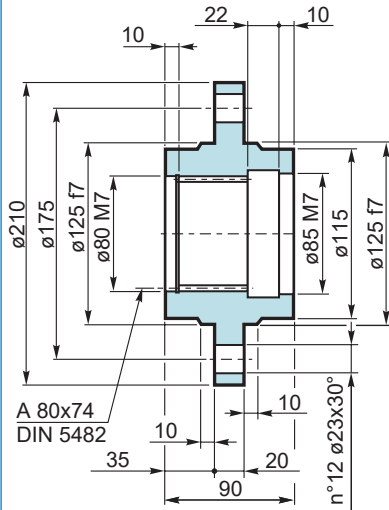
ACCESSORIES

ZUBEHÖR



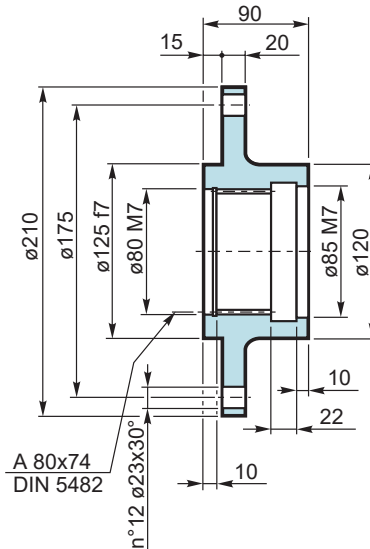
Flangia ruota
Driving flange
Radnabehflansch

FA E160 Mat. C40 EN 10083
Cod: 9024541



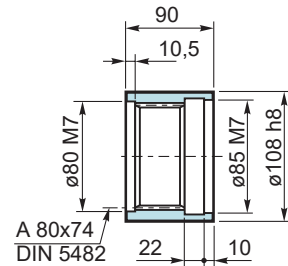
Flangia ruota
Driving flange
Radnabehflansch

FR E160 Mat. C40 EN 10083
Cod: 9024542



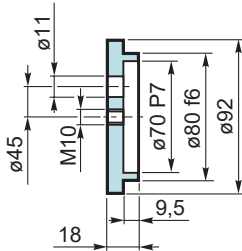
Manicotto scanalato
Splined bush
Manchon cannelée

MS 150 Mat. 42CrMo4 EN 10083
Cod: 391.0304.0600



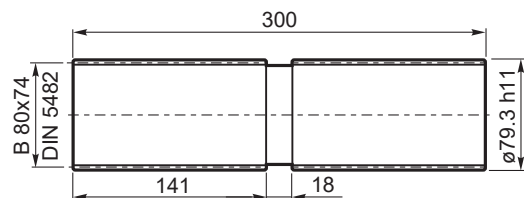
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 150 Mat. C40 EN 10083
Cod: 340.4244.0000

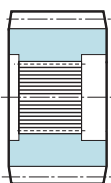


Barra scanalata
Splined bar
Zugspindel

BS 150 Mat. 16NiCr4 EN 10084
Cod: 391.2723.0100



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

ACCESSORI

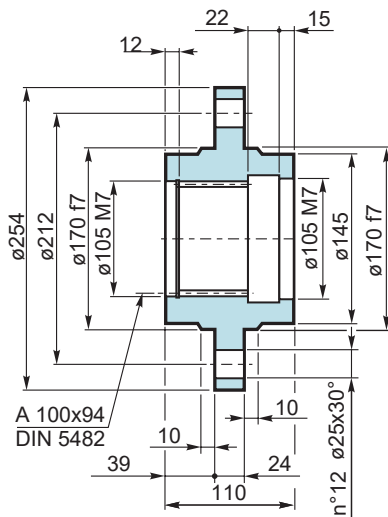
ACCESSORIES

ZUBEHÖR



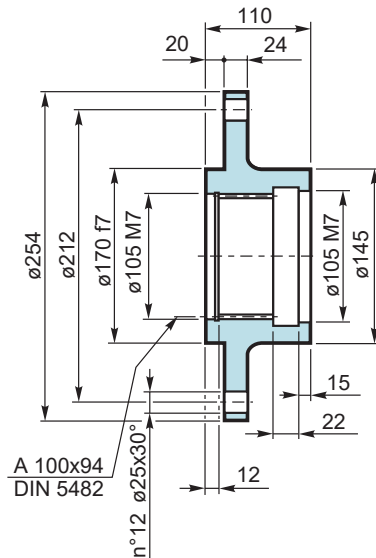
Flangia ruota
Driving flange
Radnabehflansch

FA E260 Mat. C40 EN 10083
Cod: 9024543



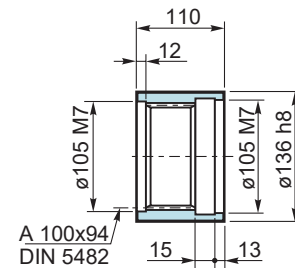
Flangia ruota
Driving flange
Radnabehflansch

FR E260 Mat. C40 EN 10083
Cod: 9024544



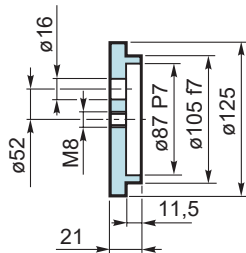
Manicotto scanalato
Splined bush
Manchon cannelée

MS 250 Mat. 42CrMo4 EN 10083
Cod: 391.0514.0600

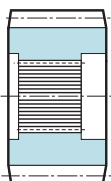


Rondella di fermo
Shaft cover
Gegenscheibe

RDF 250 Mat. C40 EN 10083
Cod: 340.4274.0000



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

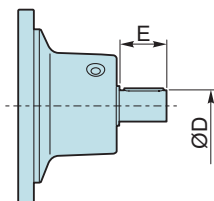


SUPPORTI MASCHIO IN INGRESSO

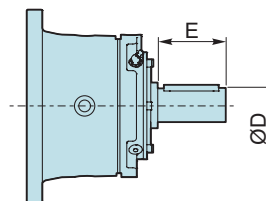
MALE INPUT SUPPORTS

ANTRIEBS- WELLENSTÜMPFE

ISL



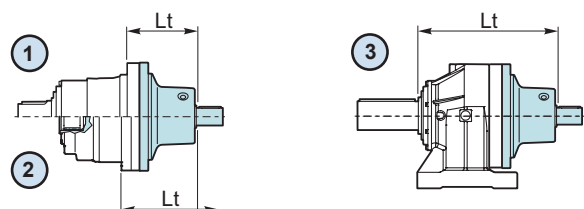
IS



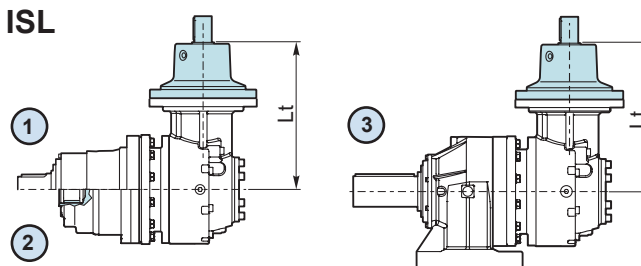
EL

EC

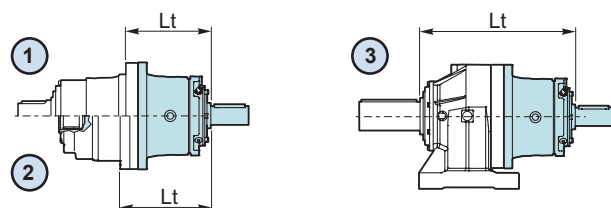
ISL



ISL



IS



① = MP - MP1 - ML - ML1 - FS

② = FE - FCP

③ = MPP1

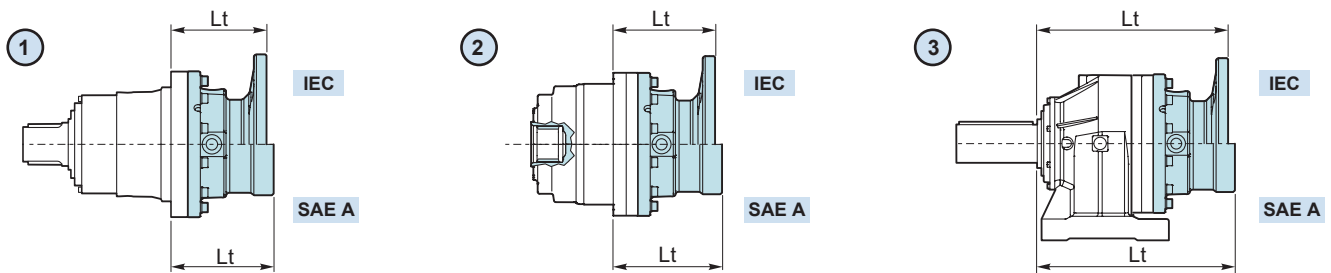
		øD	E	Lt [mm] ①					Lt [mm] ②		Lt [mm] ③
				MP	MP1	ML	ML1	FS	FE	FCP	MPP1
EL1601	IS160	80 m6	130	327	327	359	359	359	315	347	528
EL1601	ISL160	65 m6	105	259	259	291	291	291	247	279	460
EL1602	IS50	48 m6	82	339.5	339.5	371.5	371.5	371.5	327.5	359.5	540.5
EL1602	ISL50	40 k6	58	310	310	342	342	342	298	330	511
EL1603	ISL16	28 k6	50	364.5	364.5	396.5	396.5	396.5	352.5	384.5	565.5
EL1604	ISL10	28 k6	50	462.5	462.5	494.5	494.5	494.5	450.5	482.5	663.5
EC1602	ISL30	40 k6	58	355.5	355.5	355.5	355.5	355.5	355.5	355.5	355.5
EC1603	ISL10	28 k6	50	311	311	311	311	311	311	311	311

**ADATTATORI
IEC/SAE A**

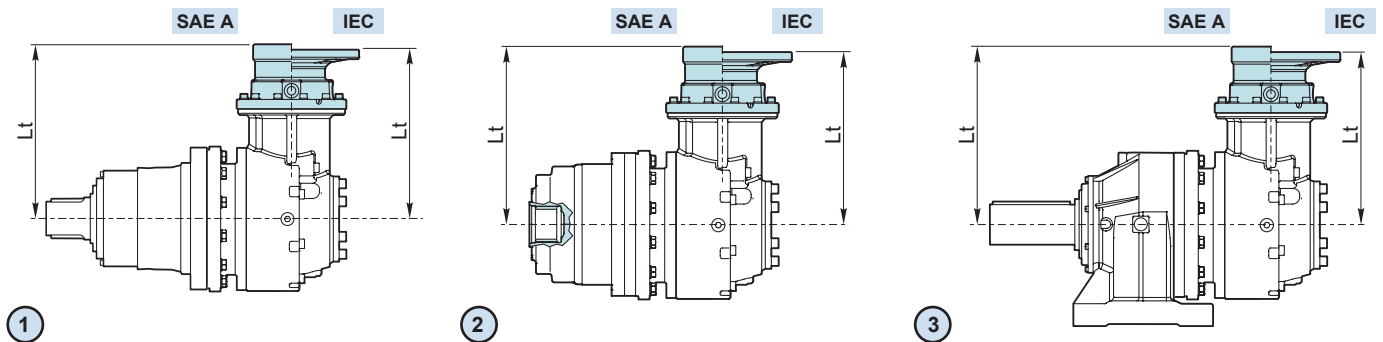
ADAPTERS IEC/SAE A

ADAPTER IEC/SAE A

EL



EC



- ① = MP - MP1 - ML - ML1 - FS
- ② = FE - FCP
- ③ = MPP1

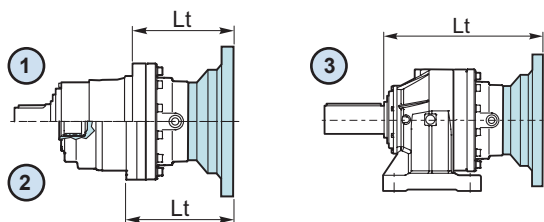
		Lt [mm]			
		IEC			SAE A
		80-90	100-112	132	
EL1603	MP	337.5	345.5	366.5	354.5
	MP1	337.5	345.5	366.5	354.5
	ML	369.5	377.5	398.5	386.5
	ML1	369.5	377.5	398.5	386.5
	FE	325.5	333.5	354.5	342.5
	FS	369.5	377.5	398.5	386.5
	FCP	357.5	365.5	386.5	374.5
	MPP1	538.5	548.5	567.5	555.5
EL1604	MP	391.5	399.5	435.5	408.5
	MP1	391.5	399.5	435.5	408.5
	ML	423.5	431.5	467.5	440.5
	ML1	423.5	431.5	467.5	440.5
	FE	379.5	387.5	423.5	396.5
	FS	423.5	431.5	467.5	440.5
	FCP	411.5	419.5	455.5	428.5
	MPP1	592.5	600.5	636.5	609.5
EC1603	MP	282	290	313	301
	MP1	282	290	313	301
	ML	282	290	313	301
	ML1	282	290	313	301
	FE	282	290	313	301
	FS	282	290	313	301
	FCP	282	290	313	301
	MPP1	282	290	313	301

FLANGE MOTORI IEC/NEMA

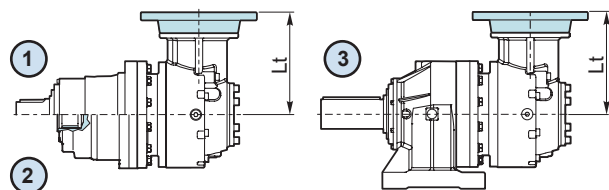
MOTOR FLANGES IEC/NEMA

MOTORFLANSCHEN IEC/NEMA

EL



EC



- ① = MP - MP1 - ML - ML1 - FS
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]										
		IEC						NEMA				
		63	71	80-90	100-112	132	160-180	143/145 TD	182/184 TC	182/184 TD	210 TD	213/215 TC
EL1602	MP - MP1	284.5	286.5	291.5	292.5	359.5	390.5	294.5	294.5	294.5	294.5	310.5
	ML - ML1	316.5	318.5	323.5	324.5	391.5	422.5	326.5	326.5	326.5	326.5	342.5
	FE	272.5	274.5	279.5	280.5	347.5	378.5	282.5	282.5	282.5	282.5	298.5
	FS	316.5	318.5	323.5	324.5	391.5	422.5	326.5	326.5	326.5	326.5	342.5
	FCP	304.5	306.5	311.5	312.5	379.5	410.5	314.5	314.5	314.5	314.5	330.5
	MPP1	485.5	487.5	492.5	493.5	560.5	591.5	495.5	495.5	495.5	495.5	511.5
EL1603	MP - MP1	345.5	347.5	-	-	-	451.5	355.5	355.5	355.5	355.5	371.5
	ML - ML1	377.5	379.5	-	-	-	483.5	387.5	387.5	387.5	387.5	403.5
	FE	333.5	335.5	-	-	-	439.5	343.5	343.5	343.5	343.5	359.5
	FS	377.5	379.5	-	-	-	483.5	387.5	387.5	387.5	387.5	403.5
	FCP	365.5	367.5	-	-	-	471.5	375.5	375.5	375.5	375.5	391.5
	MPP1	546.5	548.5	-	-	-	652.5	556.5	556.5	556.5	556.5	572.5
EL1604	MP - MP1	384.5	386.5	-	-	-	490.5	394.5	394.5	394.5	394.5	410.5
	ML - ML1	416.5	418.5	-	-	-	522.5	426.5	426.5	426.5	426.5	442.5
	FE	372.5	374.5	-	-	-	478.5	382.5	382.5	382.5	382.5	398.5
	FS	416.5	418.5	-	-	-	522.5	426.5	426.5	426.5	426.5	442.5
	FCP	404.5	406.5	-	-	-	510.5	414.5	414.5	414.5	414.5	430.5
	MPP1	585.5	587.5	-	-	-	691.5	595.5	595.5	595.5	595.5	611.5
EC1602	MP - MP1	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	ML - ML1	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	FE	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	FS	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	FCP	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
	MPP1	336.5	338.5	343.5	344.5	411.5	442.5	346.5	346.5	346.5	346.5	362.5
EC1603	MP - MP1	290	292	-	-	-	396	300	300	300	300	316
	ML - ML1	290	292	-	-	-	396	300	300	300	300	316
	FE	290	292	-	-	-	396	300	300	300	300	316
	FS	290	292	-	-	-	396	300	300	300	300	316
	FCP	290	292	-	-	-	396	300	300	300	300	316
	MPP1	290	292	-	-	-	396	300	300	300	300	316
EC1604	MP - MP1	155	155	155	155	242	-	-	-	-	-	-
	ML - ML1	155	155	155	155	242	-	-	-	-	-	-
	FE	155	155	155	155	242	-	-	-	-	-	-
	FS	155	155	155	155	242	-	-	-	-	-	-
	FCP	155	155	155	155	242	-	-	-	-	-	-
	MPP1	155	155	155	155	242	-	-	-	-	-	-



A richiesta altre configurazioni disponibili. Contattare il referente DANA di zona.

More configurations are available on request. Consult the DANA area contact person.

Auf Wunsch sind weitere Konfigurationen verfügbar. Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.



FRENI

BRAKES

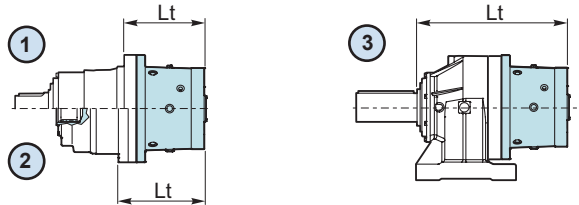
BREMSEN

EL

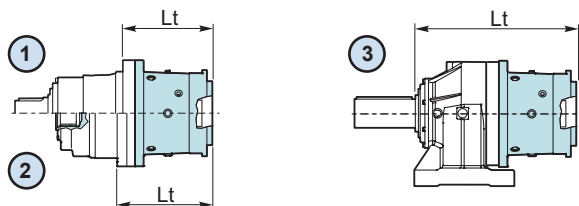
MB3 - E00

MB5 - E00

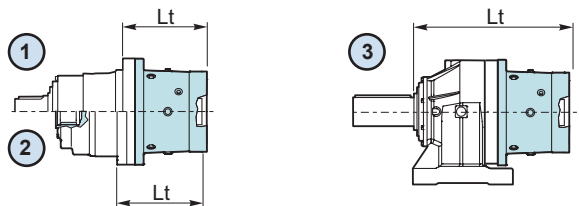
MB6 - E00



MB3 - SAE A



MB3 - BRZV

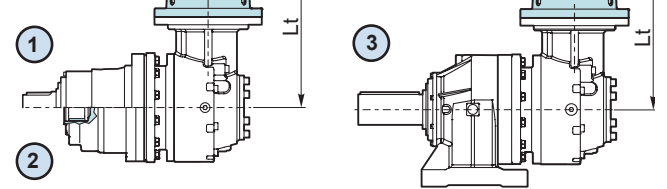


EC

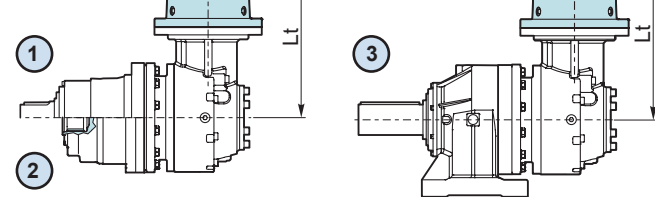
MB3 - E00

MB6 - E00

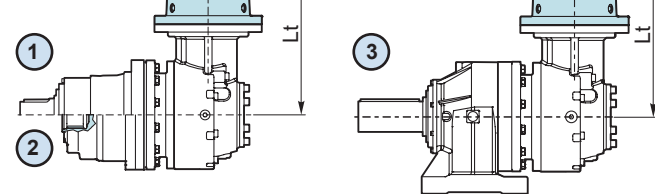
MB6 - E00



MB3 - SAE A



MB3 - BRZV



- ① = MP - MP1 - ML - ML1 - FS
- ② = FE - FCP
- ③ = MPP1

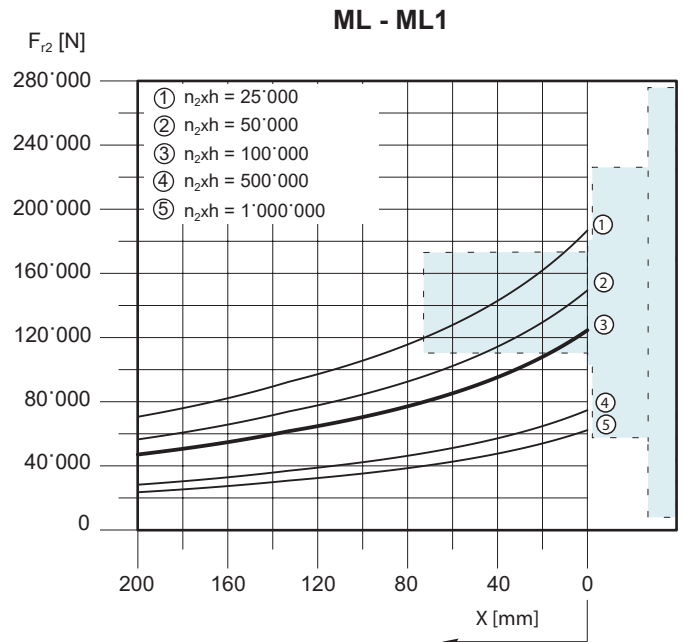
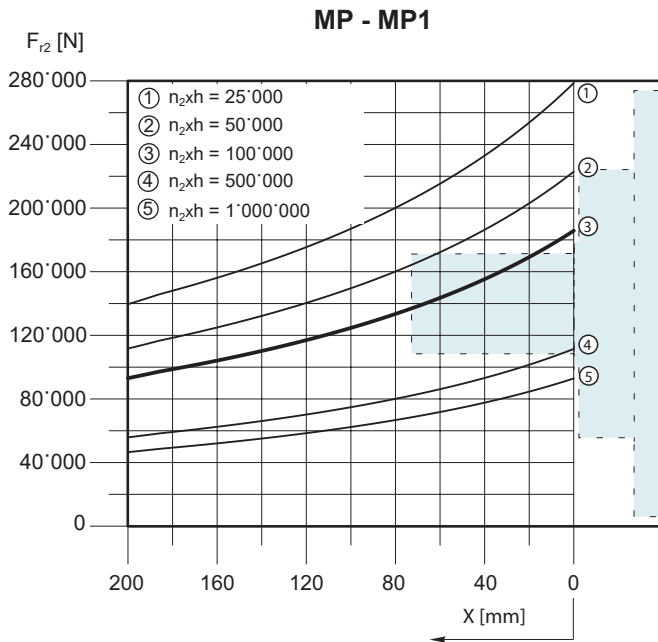
		Lt [mm]							
		MP	MP1	ML	ML1	FE	FS	FCP	MPP1
MB3 E00	EL1603	371.5	371.5	403.5	403.5	359.5	403.5	391.5	572.5
	EL1604	425.5	425.5	457.5	457.5	413.5	457.5	445.5	625.5
	EC1603	318	318	318	318	318	318	318	318
MB3 SAE - A	EL1603	400.5	400.5	432.5	432.5	388.5	432.5	420.5	601.5
	EL1604	454.5	454.5	486.5	486.5	442.5	486.5	474.5	655.5
	EC1603	347	347	347	347	347	347	347	347
MB3 BRZV	EL1603	369	369	401	401	357	401	389	570
	EL1604	423	423	455	455	411	455	443	624
	EC1603	315.5	315.5	315.5	315.5	315.5	315.5	315.5	315.5
MB5 E00	EL1602	334	334	366	366	322	366	354	535
MB6 E00	EL1601	279.5	279.5	311.5	311.5	267.5	311.5	299.5	480.5
	EC1602	423	423	423	423	423	423	423	423



Alberi in uscita

Output shaft

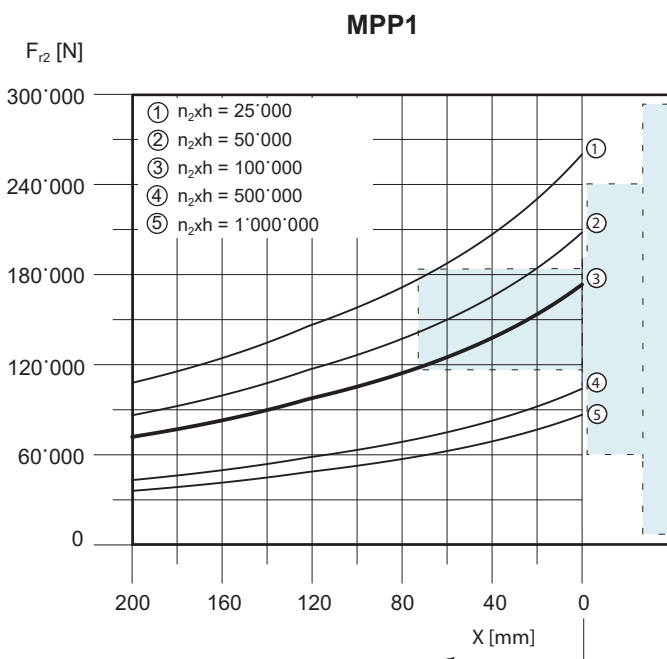
Ausgangswellen



I valori dei carichi radiali dei supporti uscita MP-MP1 e ML-ML1 sono validi soltanto se sono utilizzati entrambi i centraggi supporto sulla struttura del cliente. In caso di non utilizzo del secondo centraggio contattare il referente DANA di zona.

The values of radial loads of output supports MP-MP1 and ML-ML1 are valid only if they are used both spigots on the support structure of the customer; in case of non-use of the second spigot consult the DANA area contact person.

Die Werte der Radiallasten der Ausgangslagerung MP-MP1 und ML-ML1 sind nur gültig, wenn beide Zentrierungen an der Tragstruktur des Kunden verwendet werden; falls die zweite Zentrierung nicht verwendet wird, wenden Sie sich an die DANA Kontaktperson der zone zu wenden.



CARICHI ASSIALI

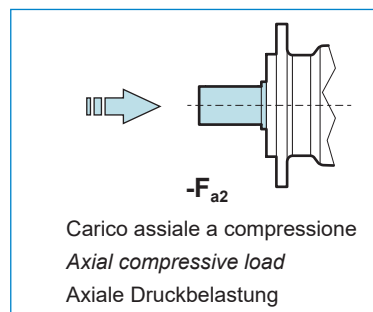
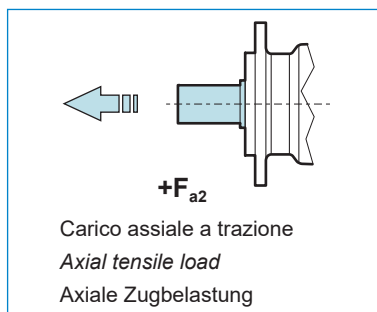
AXIAL LOADS

AXIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



E160 MP - MP1 - MPP1		
n ₂ xh	-F _{a2} [N]	+F _{a2} [N]
10'000	314'000	228'000
25'000	238'640	173'280
50'000	193'110	140'220
100'000	157'000	114'000
500'000	97'340	70'680
1'000'000	78'500	57'000

E160 ML - ML1		
n ₂ xh	-F _{a2} [N]	+F _{a2} [N]
10'000	228'000	164'000
25'000	173'280	124'640
50'000	140'220	100'860
100'000	114'000	82'000
500'000	70'680	50'840
1'000'000	57'000	41'000

CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

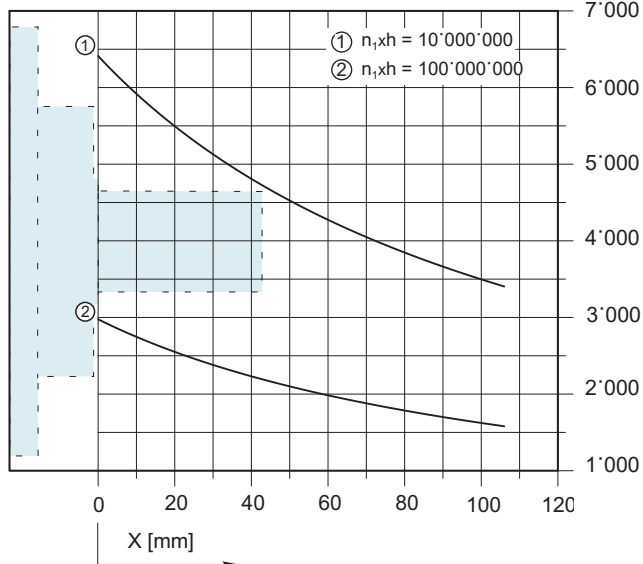
Alberi in ingresso

Input shaft

Eingangswellen

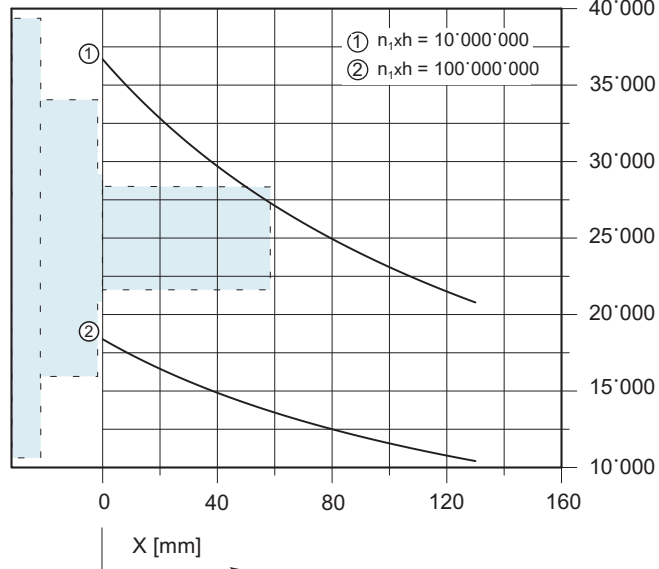
ISL160

F_{r1} [N]



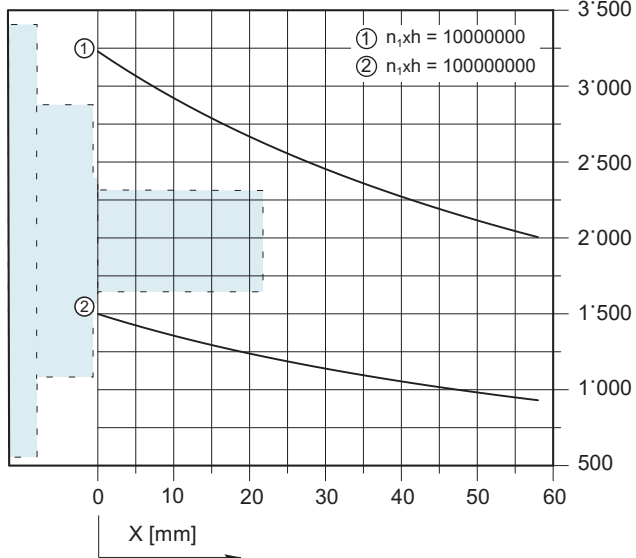
IS160

F_{r1} [N]



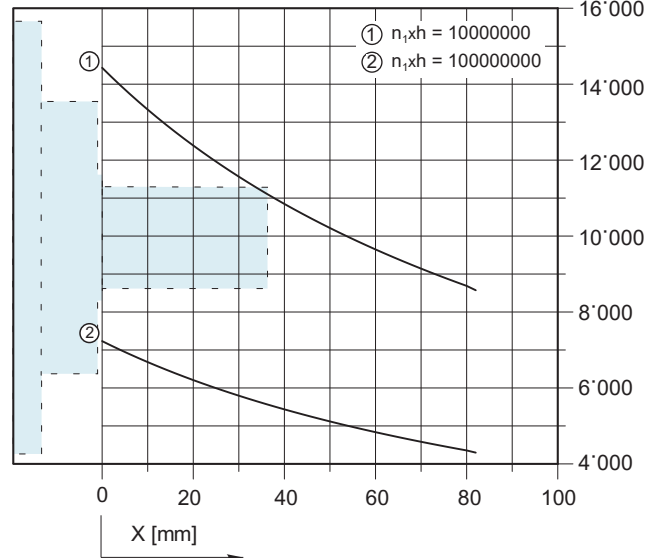
ISL50

F_{r1} [N]



IS50

F_{r1} [N]



CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

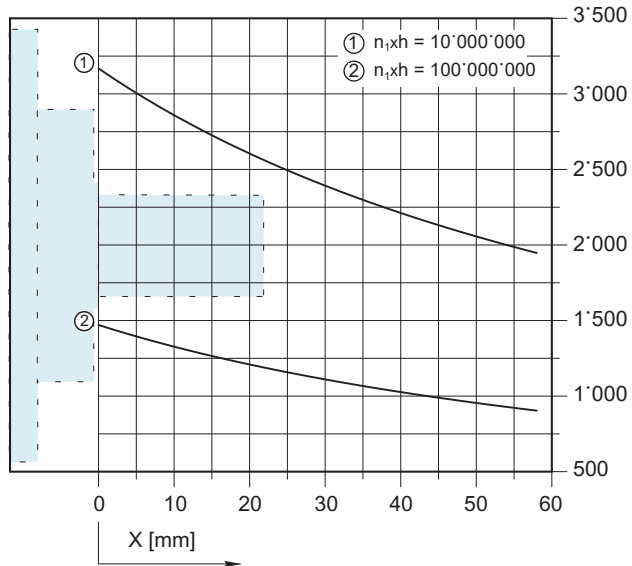
Alberi in ingresso

Input shaft

Eingangswellen

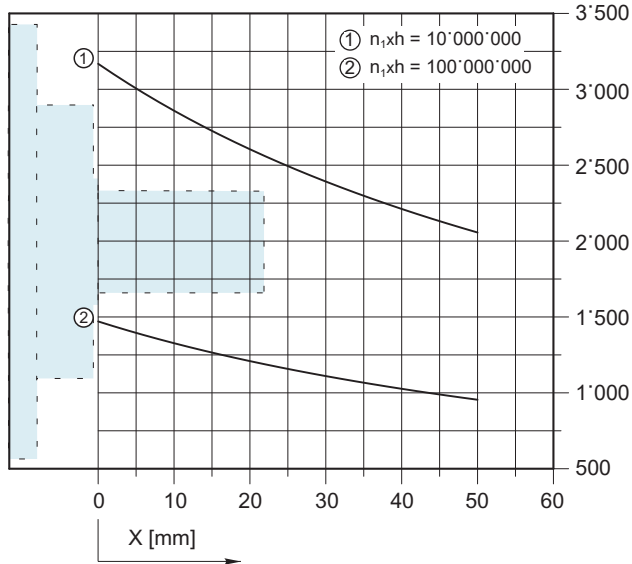
ISL30

F_{r1} [N]



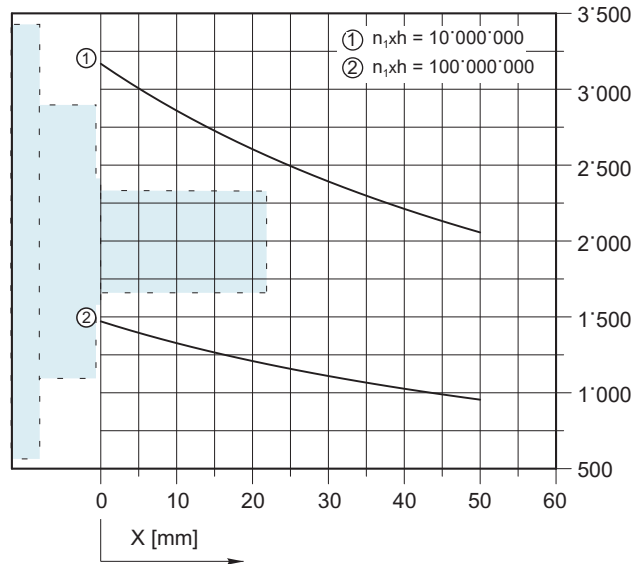
ISL16

F_{r1} [N]



ISL10

F_{r1} [N]





BREVINI[®]

Motion Systems

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































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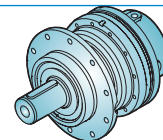


GRANDEZZA E260

E260 SIZE

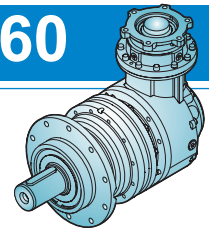
E260 GRÖÖE

	Disponibilità Availability Verfügbarkeit	Albero - Shaft - Getriebewelle			Pagina Page Seite
		Tipologia Type Typ	Dimensioni Dimensions Abmessungen [mm]		
USCITE OUTPUTS AUSGÄNGE	MP 		B100x94 DIN 5482		
	MP1 		ø110		
	FE 		A100x94 DIN 5482		
	FS 		ø130		
	FCP 		ø80		
	MPP1 		ø110		
ENTRATE INPUTS EINNAHMEN	IS - ISL 		IS IS30 ø48 IS80 ø65 IS260 ø80	ISL ISL10 ø28 ISL30 ø40 ISL80 ø48 ISL260 ø80	
	E00 - S00 		E00 A50x45 DIN 5482	S00 N100x3 z32 DIN 5480	
FLANGED'INGRESSO INPUT FLANGE FLANSCH EINGANG	Disponibilità Availability Verfügbarkeit				Pagina Page Seite
	 				
 					
FRENI BRAKES BREMSEN	Disponibilità Availability Verfügbarkeit		T_B [Nm]		Pagina Page Seite
	 	MB3 33 ÷ 495	MB5 173 ÷ 1'173	MB6 658 ÷ 2'220	



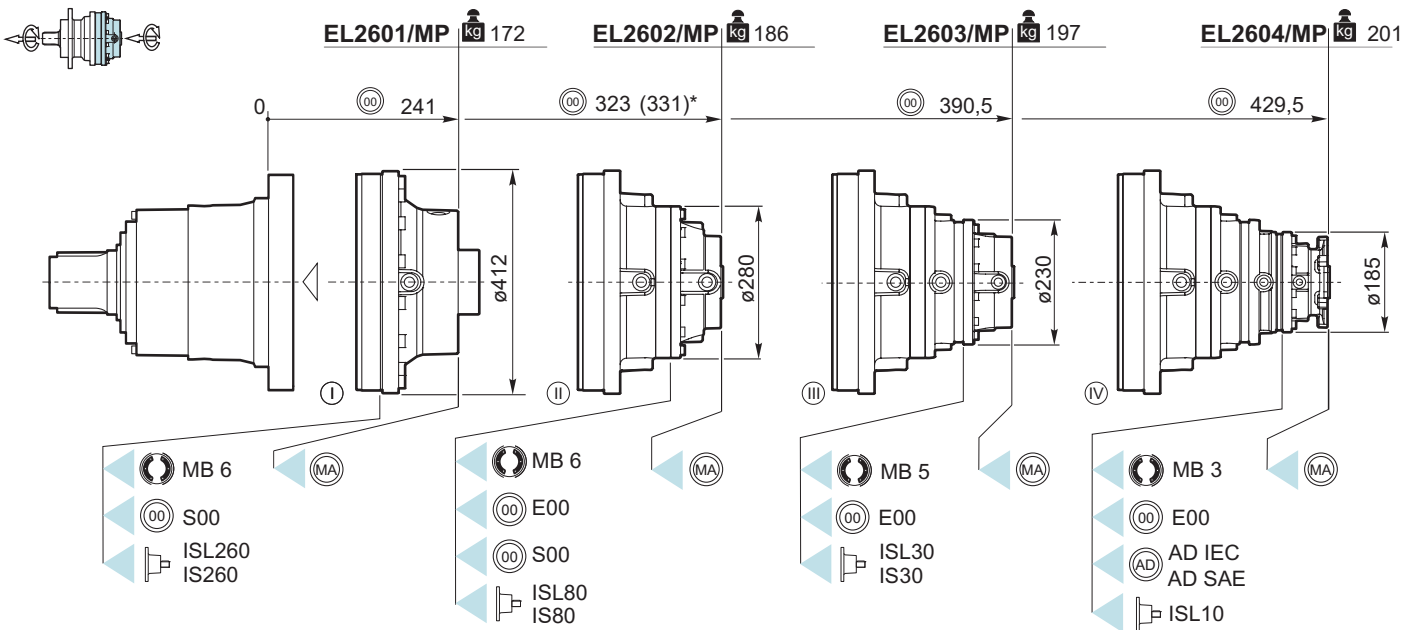
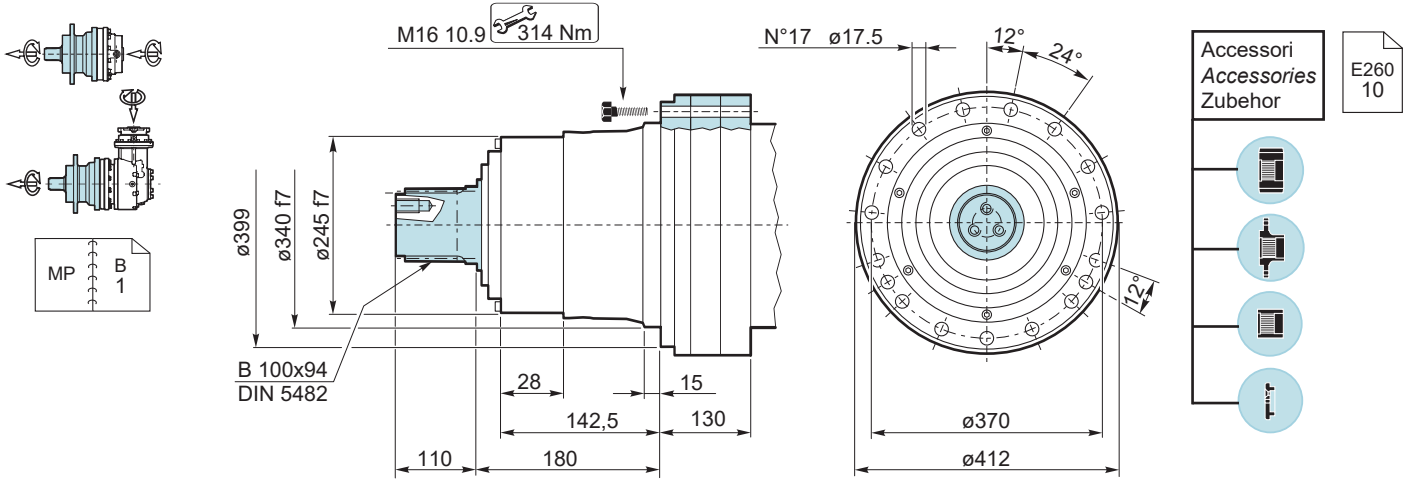
i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EL2601									
4.18	36'600	31'200	27'600	25'600	18'700	15'200	1'800	45'000	41
4.89	30'400	25'900	22'900	21'600	18'300	14'900	1'800	45'000	41
6.00	22'900	19'400	17'500	16'600	14'600	13'900	1'800	43'400	41
EL2602									
14.7	36'600	31'200	27'600	25'600	17'400	14'200	3'000	45'000	25
17.0	36'600	31'200	27'600	25'600	18'500	15'000	3'000	45'000	25
20.7	32'100	29'200	27'600	25'600	18'000	14'700	3'000	45'000	25
24.2	30'400	25'900	22'900	21'600	18'300	14'900	3'000	45'000	25
28.8	29'800	25'900	22'900	21'600	18'300	14'900	3'000	45'000	25
35.3	22'900	19'400	17'500	16'600	14'600	13'900	3'000	43'400	25
EL2603									
51.7	36'600	31'200	27'600	25'600	16'900	13'800	3'800	45'000	20
59.9	36'600	31'200	27'600	25'600	18'500	15'000	3'800	45'000	20
69.4	36'600	31'200	27'600	25'600	18'500	15'000	3'800	45'000	20
84.4	36'600	31'200	27'600	25'600	18'500	15'000	3'800	45'000	20
100	36'600	31'200	27'600	25'600	18'500	15'000	3'800	45'000	20
103	32'100	29'200	27'600	25'600	18'000	14'700	3'800	45'000	20
111	27'600	25'400	23'800	22'300	15'400	12'500	3'800	45'000	20
117	30'400	25'900	22'900	21'600	18'300	14'900	3'800	45'000	20
122	32'100	29'200	27'600	25'600	18'000	14'700	3'800	45'000	20
130	30'400	25'900	22'900	21'600	17'100	13'900	3'800	45'000	20
135	32'100	29'200	27'600	25'600	17'600	14'300	3'800	45'000	20
145	25'900	24'000	22'700	21'500	17'700	14'400	3'800	45'000	20
158	30'400	25'900	22'900	21'600	18'300	14'900	3'800	45'000	20
169	29'800	25'900	22'900	21'600	18'300	14'900	3'800	45'000	20
188	29'800	25'900	22'900	21'600	18'300	14'900	3'800	45'000	20
208	22'900	19'400	17'500	16'600	14'600	13'900	3'800	43'400	20
231	22'900	19'400	17'500	16'600	14'600	13'900	3'800	43'400	20
EL2604									
182	36'600	31'200	27'600	25'600	16'300	13'300	4'000	45'000	12
211	36'600	31'200	27'600	25'600	18'100	14'700	4'000	45'000	12
244	36'600	31'200	27'600	25'600	18'500	15'000	4'000	45'000	12
256	36'600	31'200	27'600	25'600	17'400	14'200	4'000	45'000	12
283	36'600	31'200	27'600	25'600	18'500	15'000	4'000	45'000	12
297	36'600	31'200	27'600	25'600	18'500	15'000	4'000	45'000	12
344	36'600	31'200	27'600	25'600	18'500	15'000	4'000	45'000	12
360	36'600	31'200	27'600	25'600	17'400	14'200	4'000	45'000	12
408	36'600	31'200	27'600	25'600	18'500	15'000	4'000	45'000	12
428	36'600	31'200	27'600	25'600	17'400	14'200	4'000	45'000	12
496	36'600	31'200	27'600	25'600	18'500	15'000	4'000	45'000	12
551	32'100	29'200	27'600	25'600	17'600	14'300	4'000	45'000	12
585	36'600	31'200	27'600	25'600	18'500	15'000	4'000	45'000	12
670	32'100	29'200	27'600	25'600	17'600	14'300	4'000	45'000	12
711	32'100	29'200	27'600	25'600	18'000	14'700	4'000	45'000	12
796	32'100	29'200	27'600	25'600	17'600	14'300	4'000	45'000	12
844	32'100	29'200	27'600	25'600	18'000	14'700	4'000	45'000	12
938	32'100	29'200	27'600	25'600	17'600	14'300	4'000	45'000	12
987	30'400	25'900	22'900	21'600	18'300	14'900	4'000	45'000	12
1096	30'400	25'900	22'900	21'600	18'300	14'900	4'000	45'000	12
1172	29'800	25'900	22'900	21'600	18'300	14'900	4'000	45'000	12
1245	27'200	25'700	24'700	24'700	18'000	14'700	4'000	45'000	12
1302	29'800	25'900	22'900	21'600	18'300	14'900	4'000	45'000	12
1383	30'000	28'400	27'400	25'600	17'600	14'300	4'000	45'000	12
1455	30'400	25'900	22'900	21'600	18'300	14'900	4'000	45'000	12
1616	30'400	25'900	22'900	21'600	18'300	14'900	4'000	45'000	12
1729	29'800	25'900	22'900	21'600	18'300	14'900	4'000	45'000	12
1920	29'800	25'900	22'900	21'600	18'300	14'900	4'000	45'000	12
2122	22'900	19'400	17'500	16'600	14'600	13'900	4'000	43'400	12
2356	22'900	19'400	17'500	16'600	14'600	13'900	4'000	43'400	12

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich

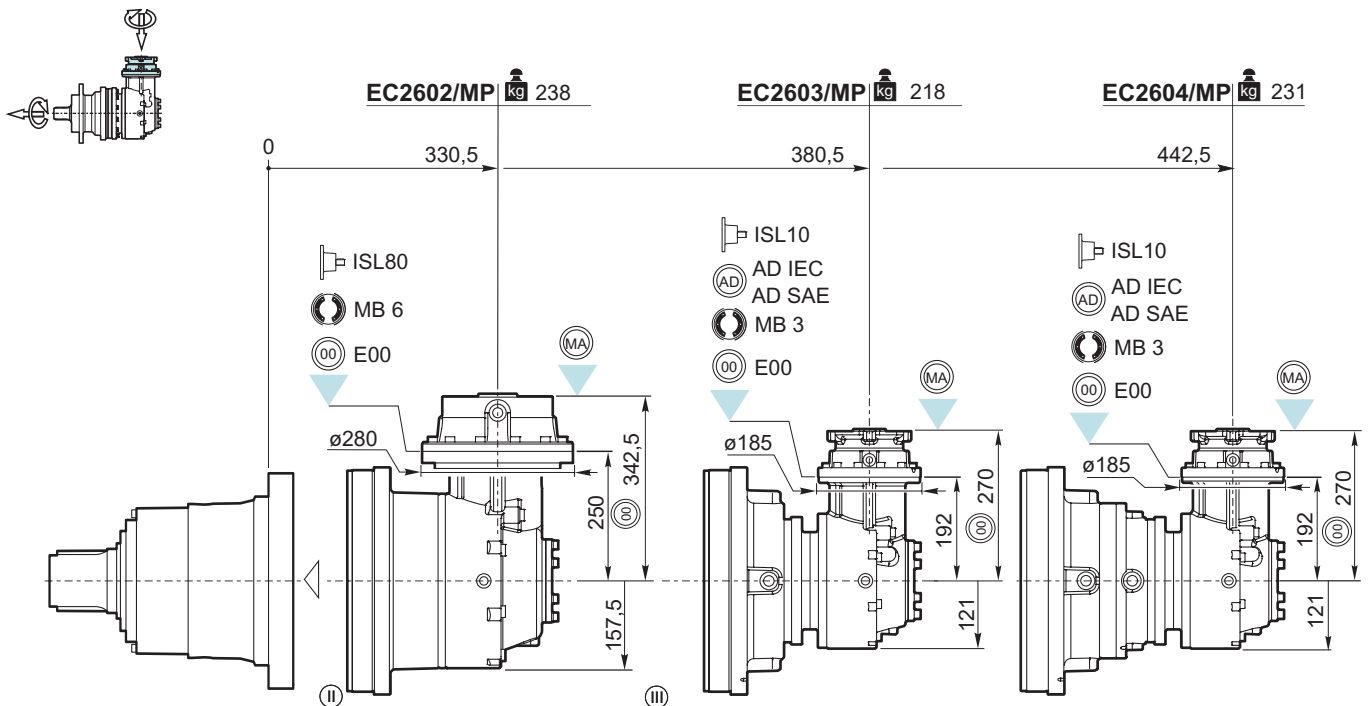


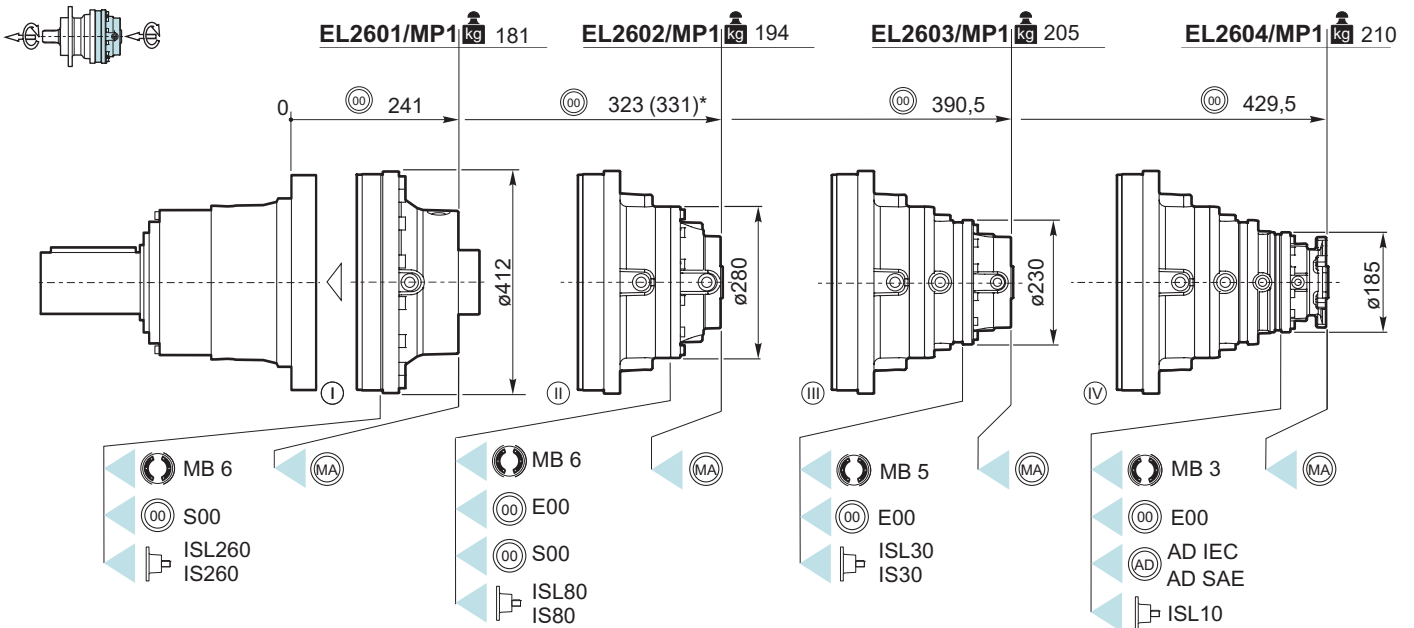
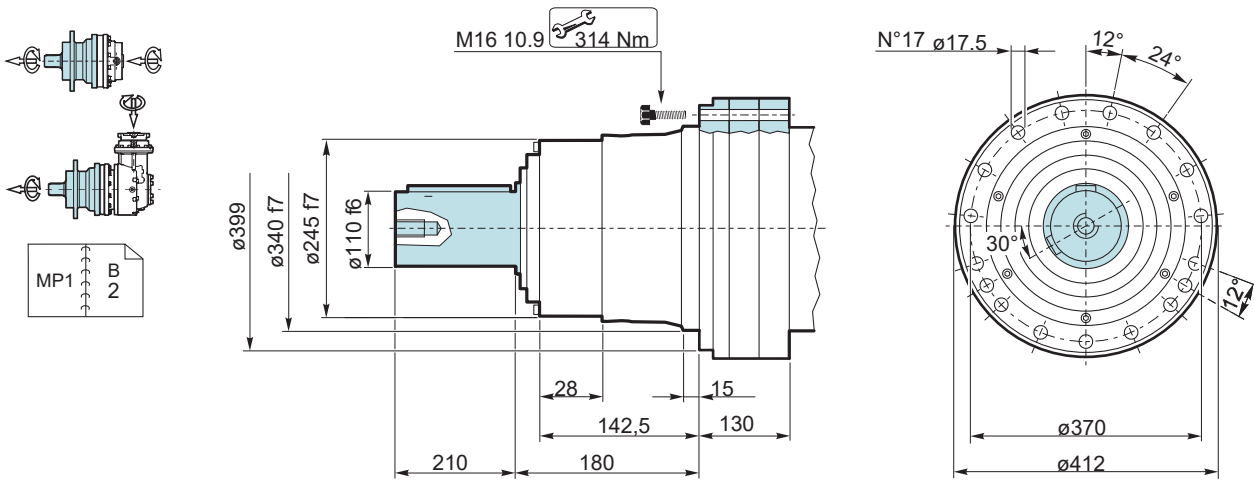
i	T ₂ [Nm]						n _{1MAX} [rpm]	T _{2MAX} [Nm]	P _t [kW]
	n ₂ x h 10'000	n ₂ x h 25'000	n ₂ x h 50'000	n ₂ x h 100'000	n ₂ x h 500'000	n ₂ x h 1'000'000			
EC2602									
12.5	17'700	17'350	14'800	12'000	7'450	6'050	2'500	45'000	35
14.7	20'600	20'250	16'500	13'400	8'300	6'750	2'500	45'000	35
18.0	22'900	19'400	17'450	15'450	9'550	7'750	2'500	43'400	35
22.3	14'450	12'600	11'650	11'150	7'600	6'200	2'500	45'000	35
27.3	17'200	15'000	14'100	13'500	8'800	7'150	2'500	43'400	35
EC2603									
44.1	24'500	21'650	17'600	14'300	8'800	7'150	3'000	45'000	16
51.1	27'750	24'000	19'500	15'850	9'800	7'950	3'000	45'000	16
62.1	32'100	27'500	22'350	18'150	11'200	9'100	3'000	45'000	16
72.6	30'350	25'850	22'850	20'250	12'500	10'150	3'000	45'000	16
86.3	29'800	25'850	22'850	21'550	14'100	11'450	3'000	45'000	16
96.1	20'350	19'250	17'450	16'550	10'350	8'400	3'000	43'400	16
106	22'900	19'400	17'450	16'550	14'600	13'200	3'000	43'400	16
112	23'450	22'200	21'250	18'650	11'500	9'350	3'000	45'000	16
131	27'150	25'650	22'850	20'800	12'850	10'450	3'000	45'000	16
161	22'900	19'400	17'450	16'550	14'600	12'050	3'000	43'400	16
EC2604									
155	36'550	31'200	27'600	25'550	16'900	13'750	3'000	45'000	11
180	36'550	31'200	27'600	25'550	18'450	14'950	3'000	45'000	11
208	36'550	31'200	27'600	25'550	18'450	14'950	3'000	45'000	11
218	36'550	31'200	27'600	25'550	17'400	14'150	3'000	45'000	11
235	36'550	31'200	27'600	25'550	16'900	13'750	3'000	45'000	11
253	36'550	31'200	27'600	25'550	18'450	14'950	3'000	45'000	11
273	36'550	31'200	27'600	25'550	18'450	14'950	3'000	45'000	11
301	36'550	31'200	27'600	25'550	18'450	14'950	3'000	45'000	11
316	36'550	31'200	27'600	25'550	18'450	14'950	3'000	45'000	11
332	36'550	31'200	27'600	25'550	17'400	14'150	3'000	45'000	11
365	32'100	29'150	27'600	25'550	18'000	14'650	3'000	45'000	11
384	36'550	31'200	27'600	25'550	18'450	14'950	3'000	45'000	11
406	32'100	29'150	27'600	25'550	17'600	14'300	3'000	45'000	11
457	36'550	31'200	27'600	25'550	18'450	14'950	3'000	45'000	11
507	29'800	25'850	22'850	21'550	18'300	14'900	3'000	45'000	11
555	32'100	29'150	27'600	25'550	18'000	14'650	3'000	45'000	11
616	32'100	29'150	27'600	25'550	17'600	14'300	3'000	45'000	11
649	30'350	25'850	22'850	21'550	18'300	14'900	3'000	45'000	11
721	30'350	25'850	22'850	21'550	18'300	14'900	3'000	45'000	11
771	29'800	25'850	22'850	21'550	18'300	14'900	3'000	45'000	11
856	29'800	25'850	22'850	21'550	18'300	14'900	3'000	45'000	11
946	22'900	19'400	17'450	16'550	14'600	13'850	3'000	43'400	11
1050	22'900	19'400	17'450	16'550	14'600	13'850	3'000	43'400	11

Altri rapporti disponibili a richiesta / More ratios available on request / Weitere Übersetzungsverhältnisse auf Wunsch möglich

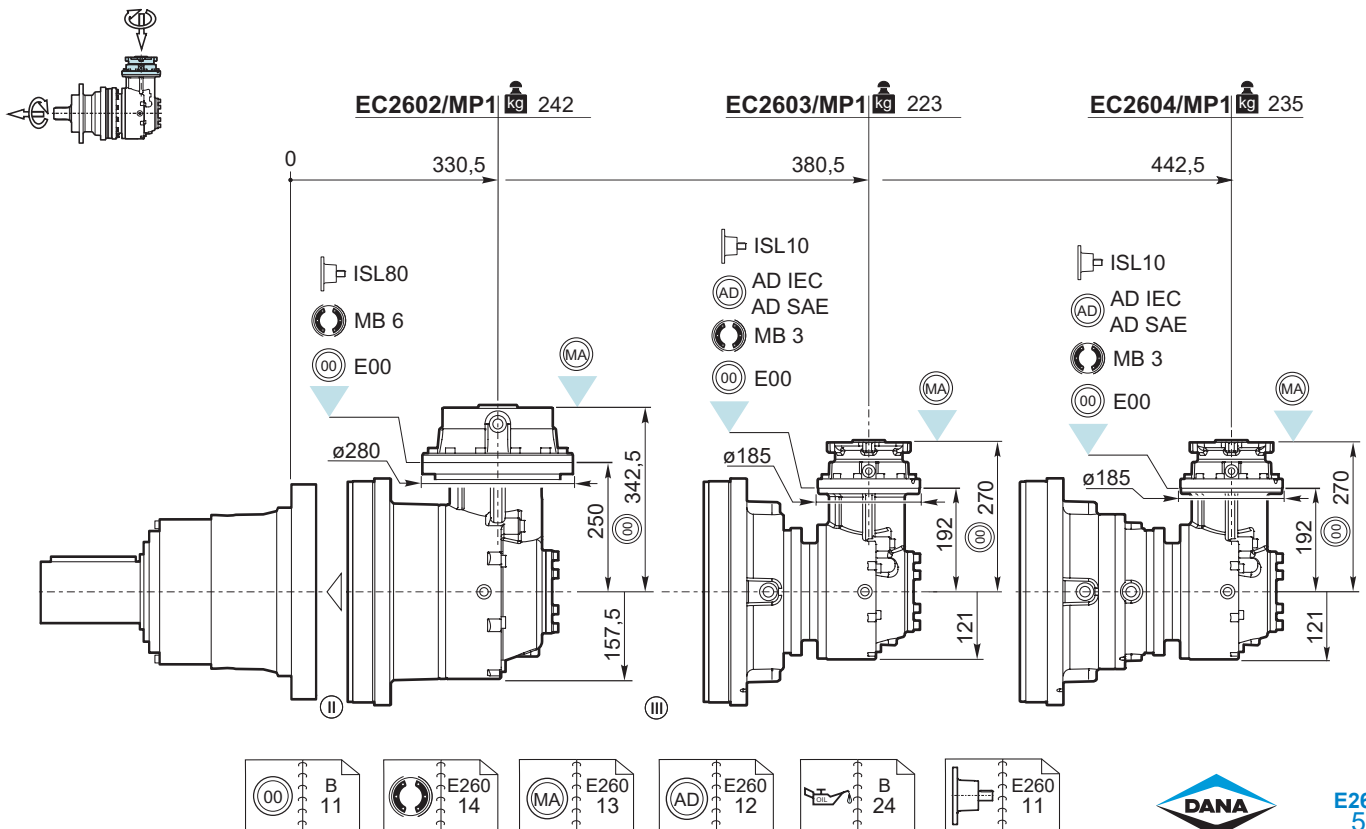


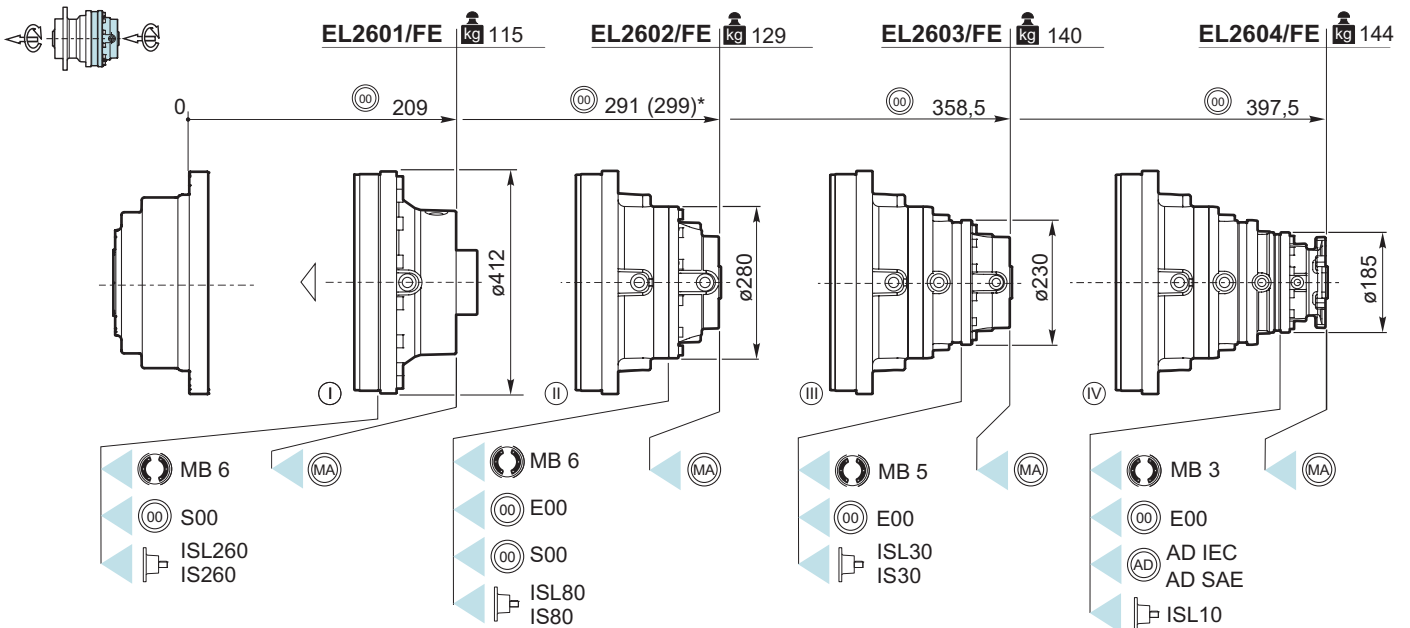
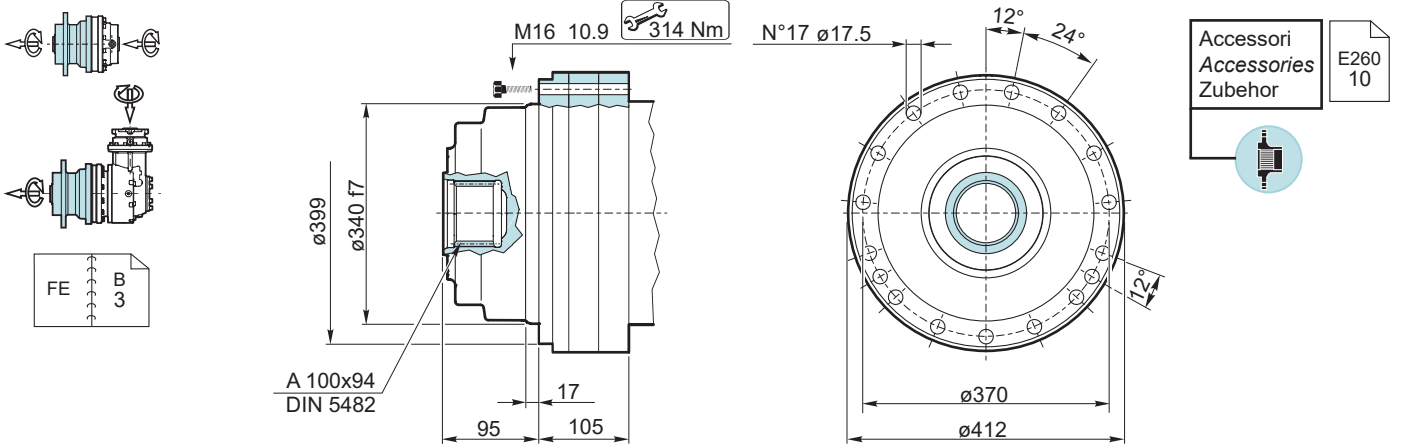
* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite



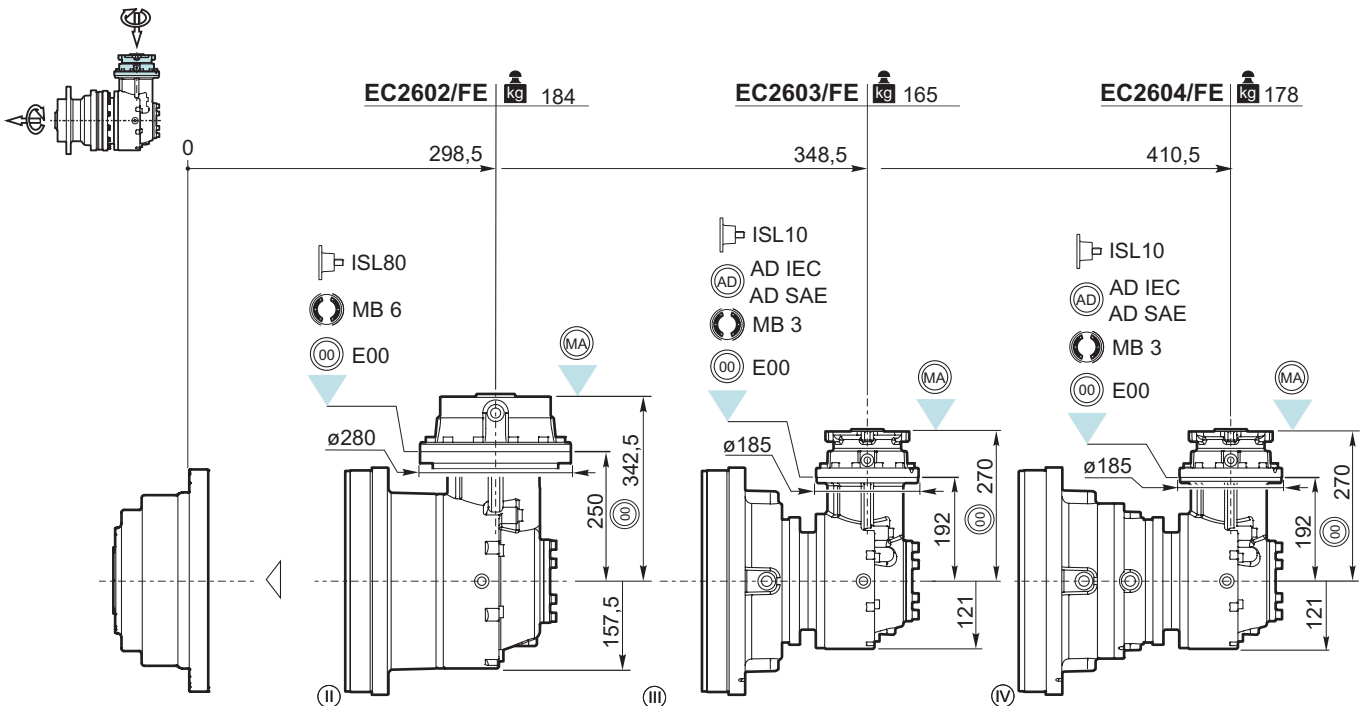


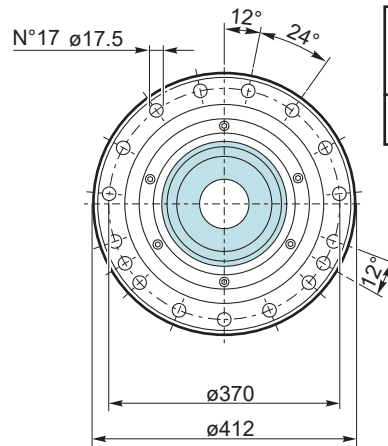
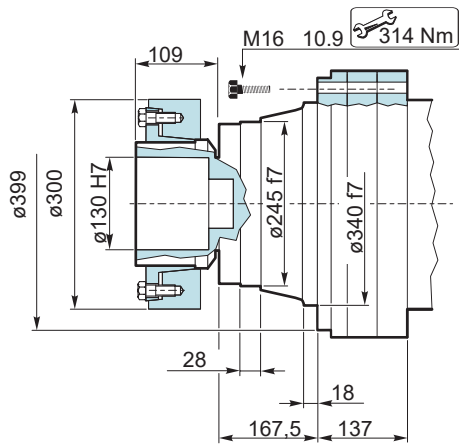
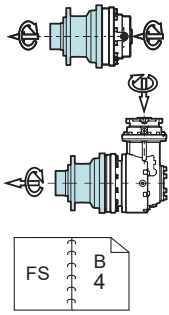
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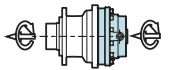
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Giunto ad attrito
Shrink disc
Reibungskupplung

B 18

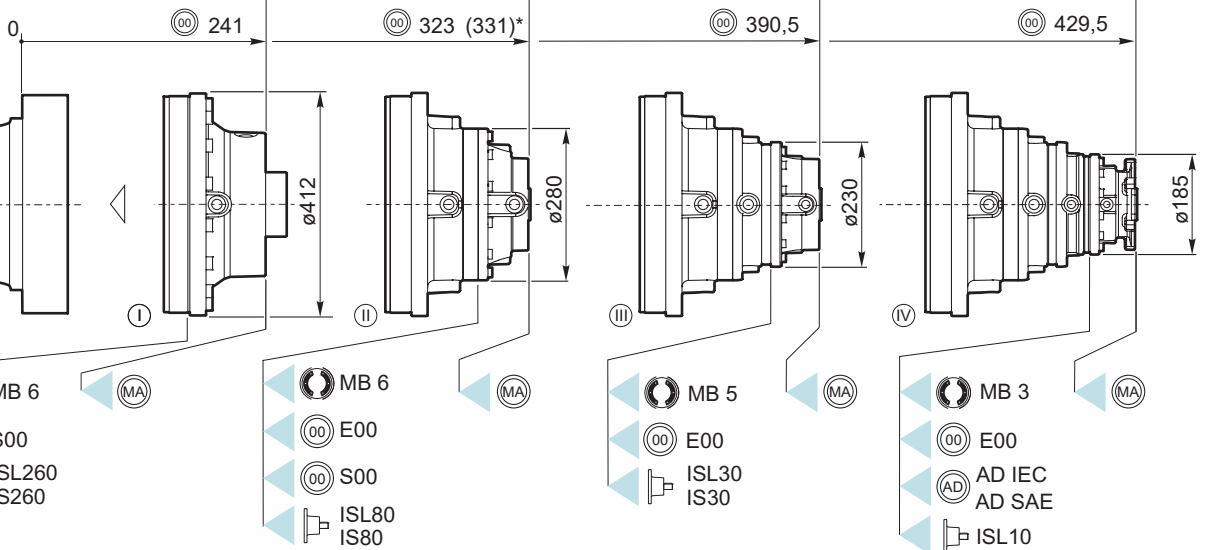


EL2601/FS **kg** 173

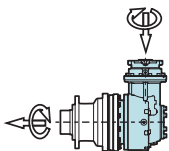
EL2602/FS **kg** 187

EL2603/FS **kg** 198

EL2604/FS **kg** 202



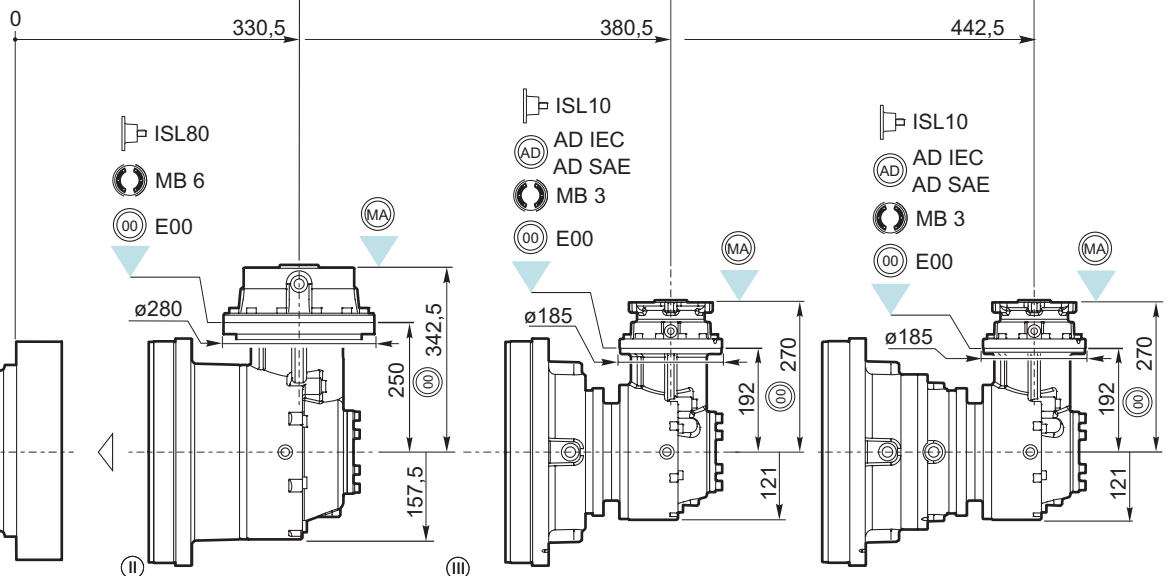
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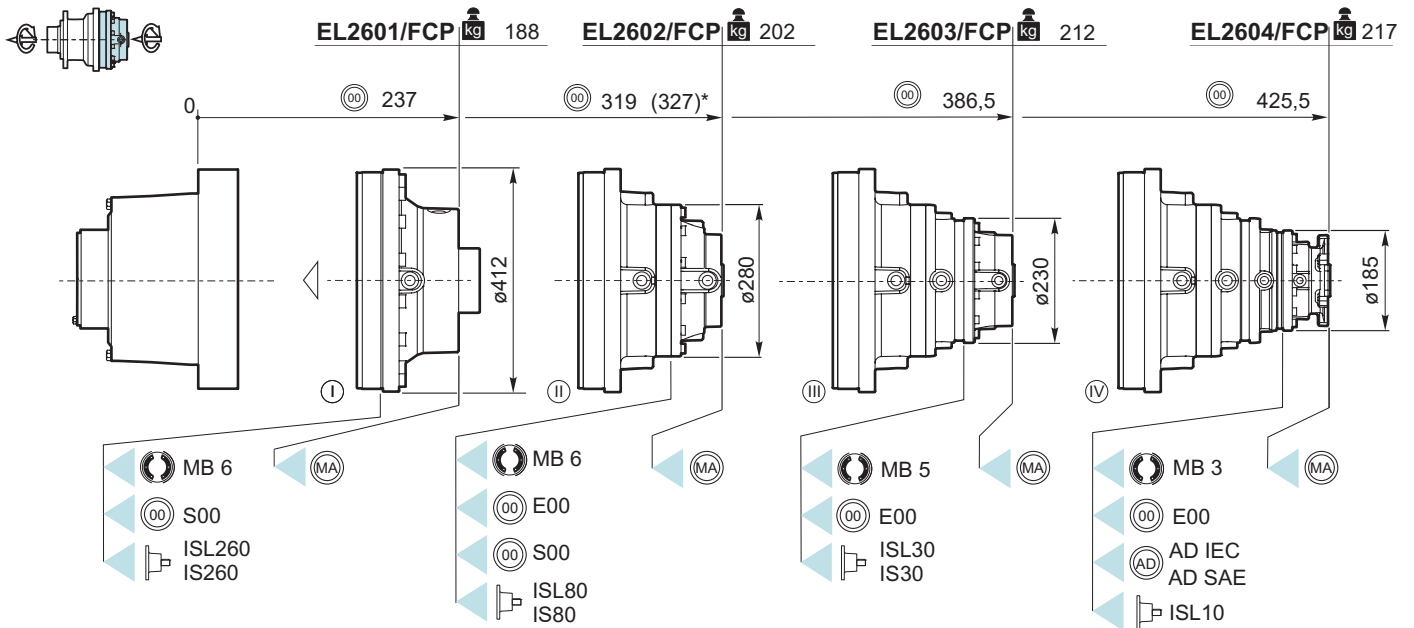
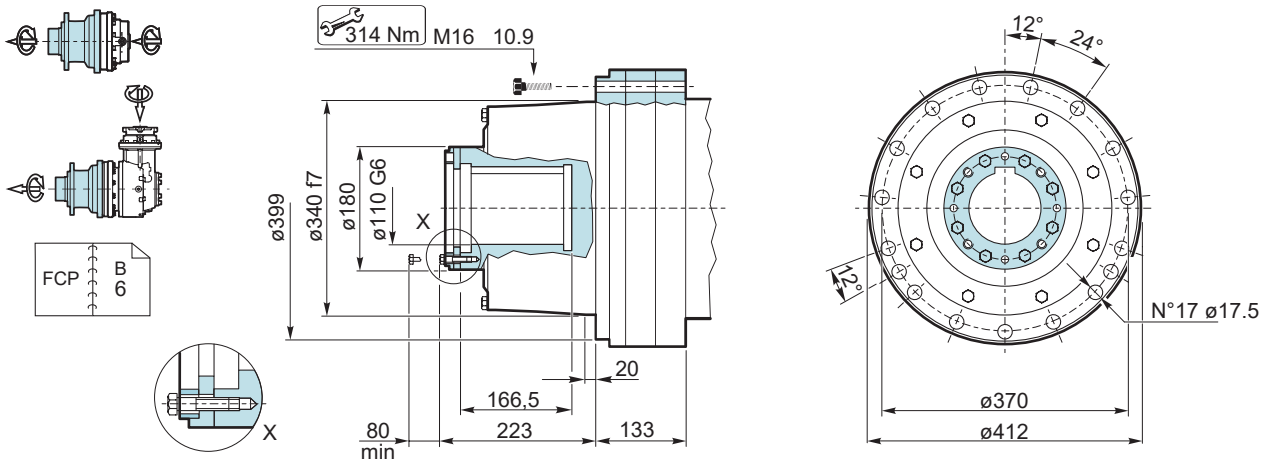


EC2602/FS **kg** 239

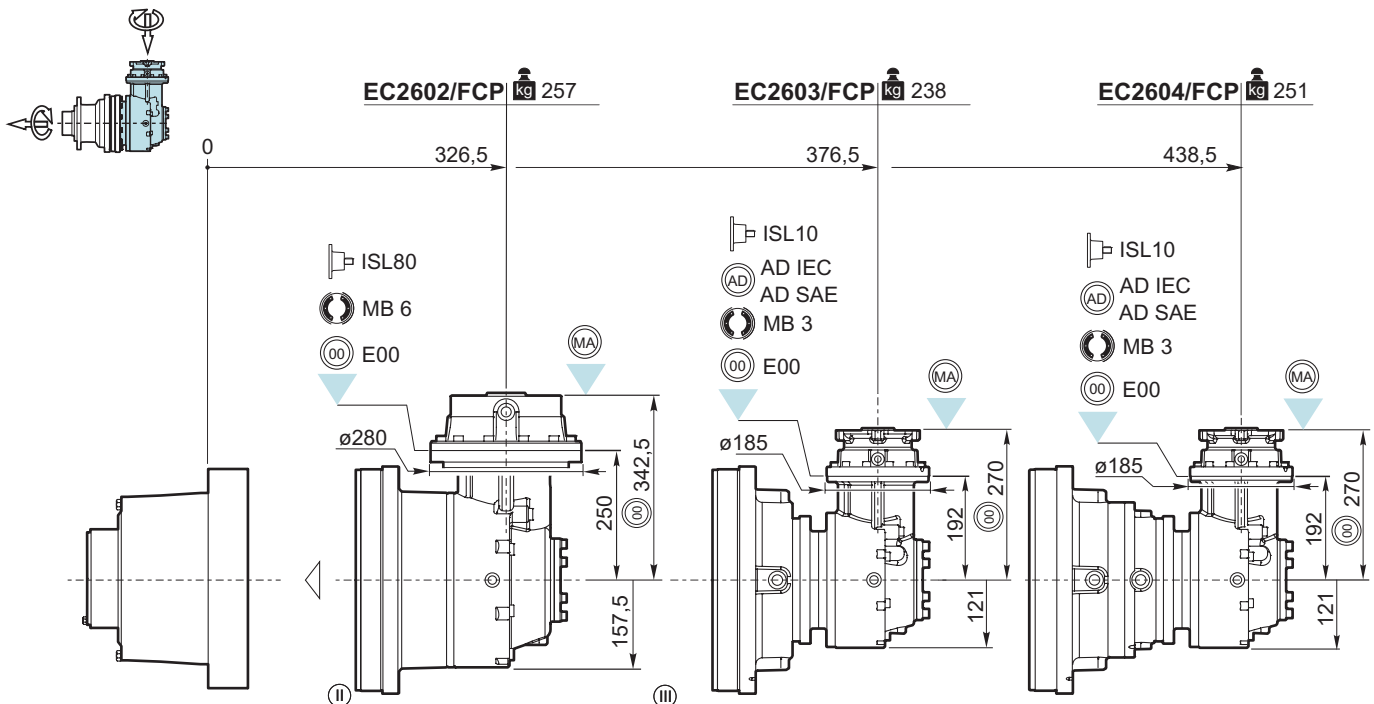
EC2603/FS **kg** 220

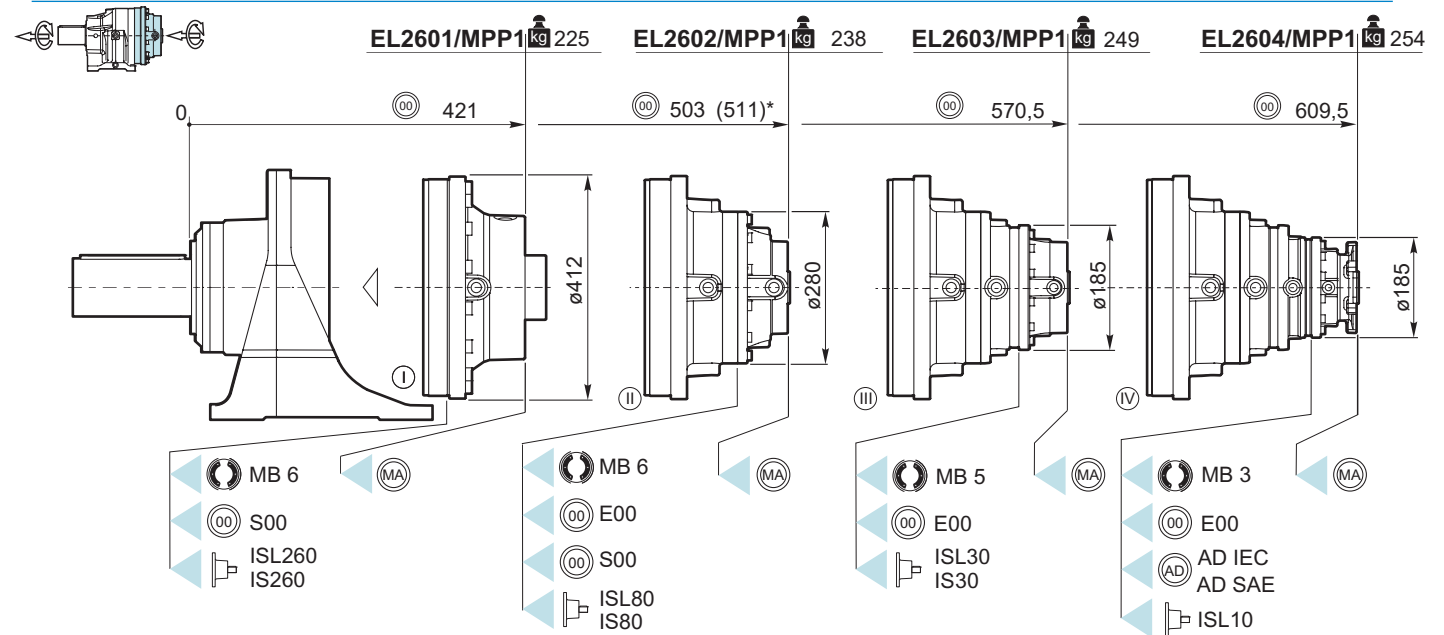
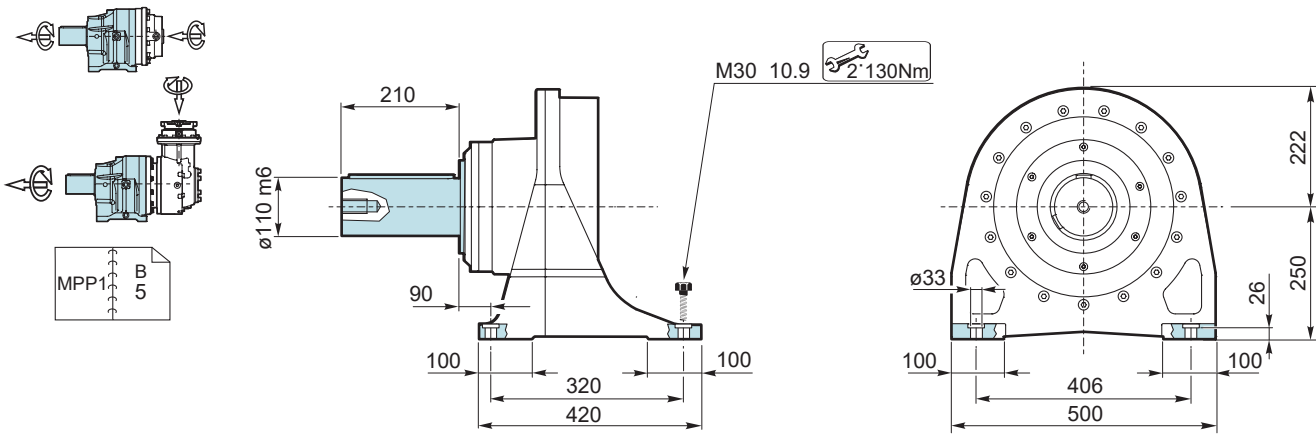
EC2604/FS **kg** 232



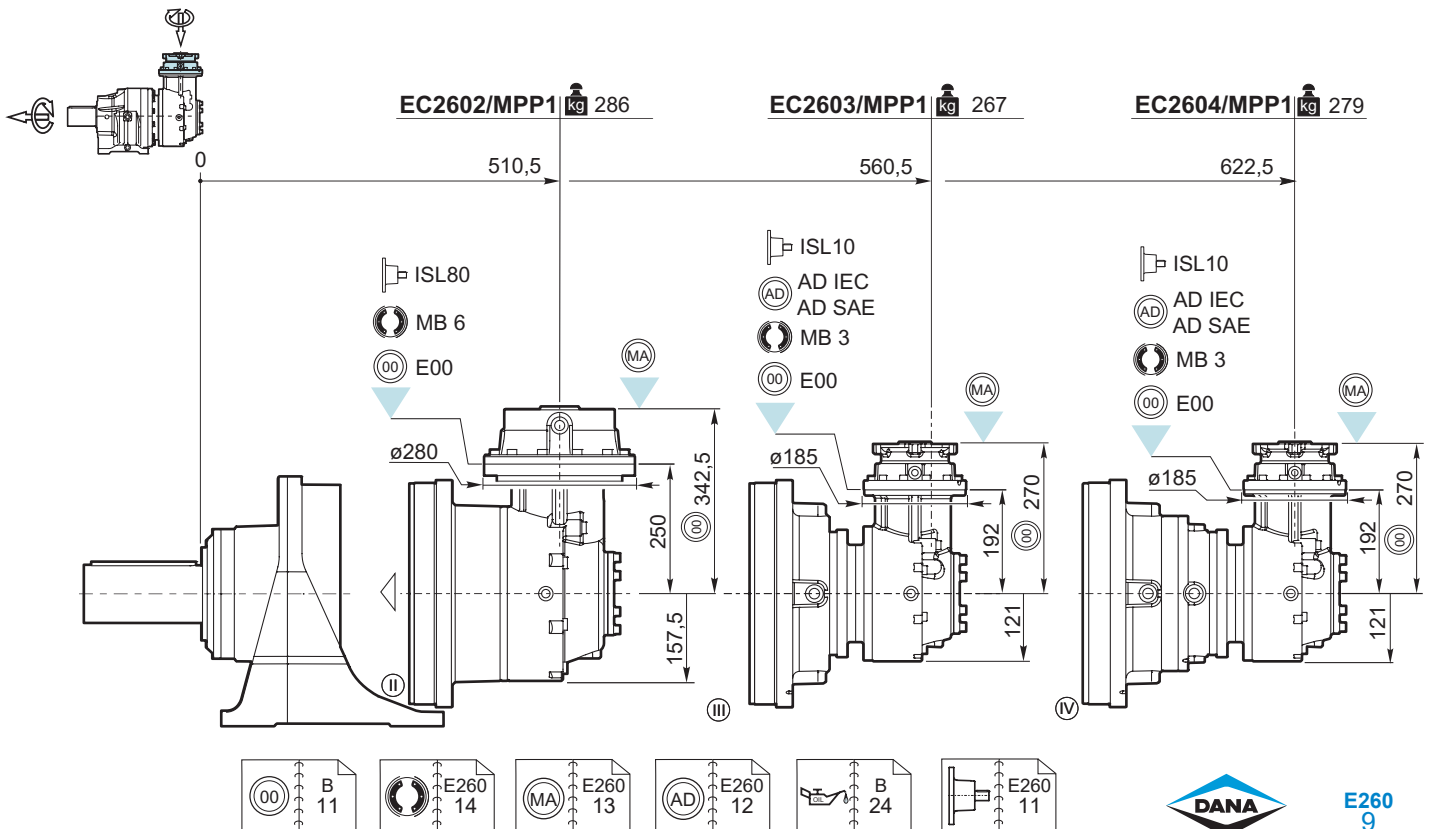


* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite





* Valore valido solo con configurazione S00 in ingresso / Value only for S00 input configuration / Gültig nur mit S00 an Antriebsseite





ACCESSORI

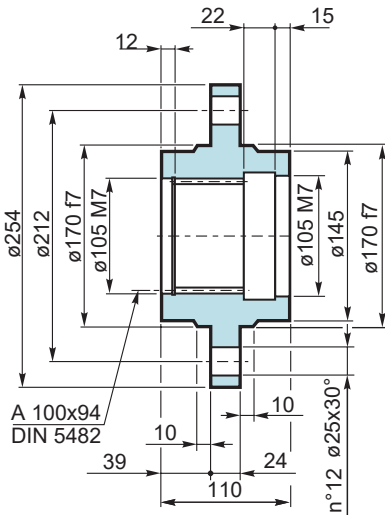
ACCESSORIES

ZUBEHÖR



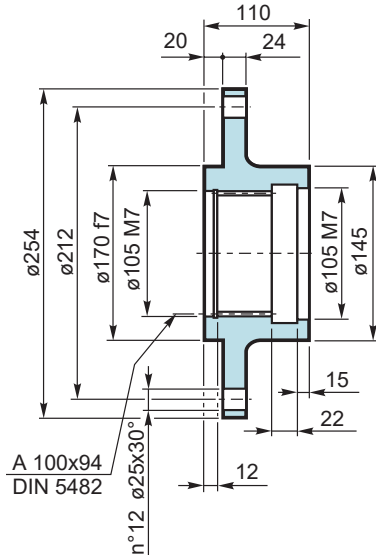
Flangia ruota
Driving flange
Radnabehflansch

FA E260 Mat. C40 EN 10083
Cod: 9024543



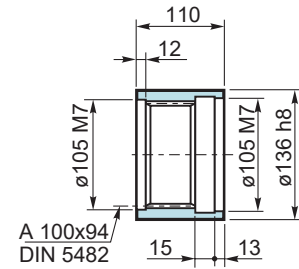
Flangia ruota
Driving flange
Radnabehflansch

FR E260 Mat. C40 EN 10083
Cod: 9024544



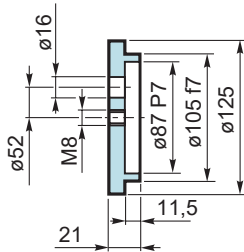
Manicotto scanalato
Splined bush
Manchon cannelée

MS 250 Mat. 42CrMo4 EN 10083
Cod: 391.0514.0600



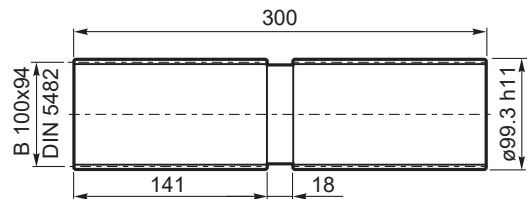
Rondella di fermo
Shaft cover
Gegenscheibe

RDF 250 Mat. C40 EN 10083
Cod: 340.4274.0000

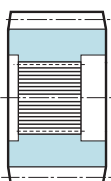


Barra scanalata
Splined bar
Zugspindel

BS 250 Mat. 16NiCr4 EN 10084
Cod: 391.2733.0100



Pignone
Pinion
Ritzel



Pignoni sono disponibili a richiesta.

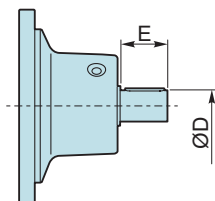
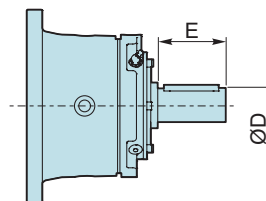
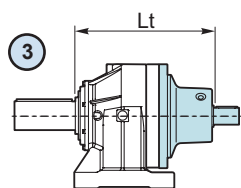
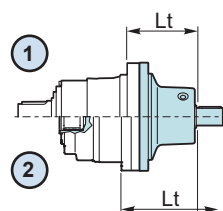
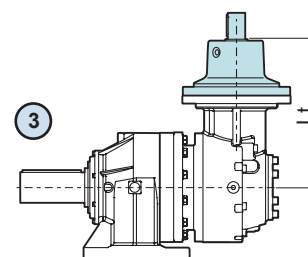
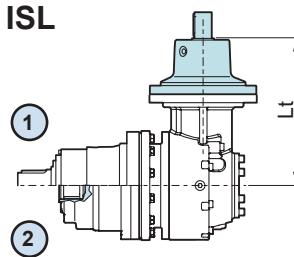
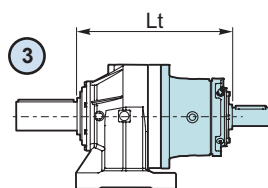
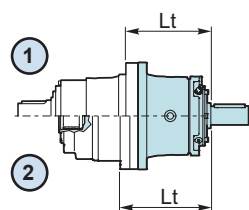
Salvo diversa esigenza, sono induriti superficialmente (tempra ad induzione o cementazione)

Pinions are available on request.

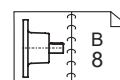
Unless otherwise required, they are surface hardened (induction hardening or casehardening)

Ritzel auf Wunsch verfügbar.

Außer bei anderen Anforderungen oberflächengehärtet (Induktionshärten oder Einsatzhärten)

**SUPPORTI MASCHIO IN
INGRESSO**
MALE INPUT SUPPORTS
**ANTRIEBS-
WELLENSTÜMPFE**
ISL

IS

EL
EC
ISL

ISL

IS

① = MP - MP1 - FS
② = FE - FCP
③ = MPP1

		øD	E	Lt [mm] ①			Lt [mm] ②		Lt [mm] ③
				MP	MP1	FS	FE	FCP	MPP1
EL2601	IS260	80 m6	130	370	370	370	338	366	556
EL2601	ISL260	80 m6	130	302	302	302	270	298	488
EL2602	IS80	65 m6	105	444.5	444.5	444.5	412.5	440.5	624.5
EL2602	ISL80	48 k6	82	378.5	378.5	378.5	346.5	374.5	558.5
EL2603	IS30	48 k6	82	469	469	469	437	465	649
EL2603	ISL30	40 k6	58	429.5	429.5	429.5	397.5	425.5	609.5
EL2604	ISL10	28 k6	50	483.5	483.5	483.5	451.5	496.5	663.5
EC2602	ISL80	48 k6	82	398	398	398	398	398	398
EC2603	ISL10	28 k6	50	311	311	311	311	311	311
EC2604	ISL10	28 k6	50	311	311	311	311	311	311

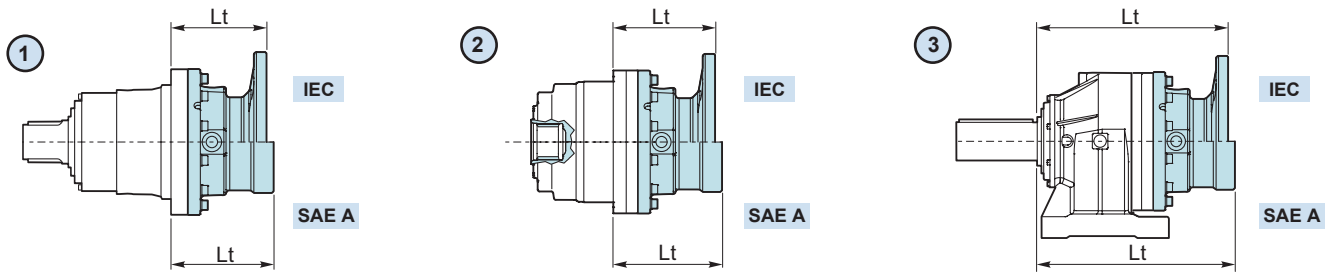


ADATTATORI IEC/SAE A

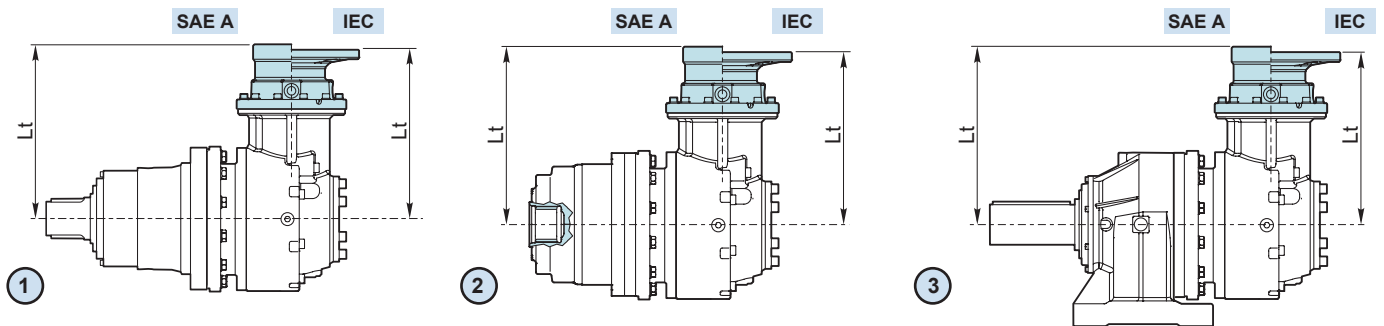
ADAPTERS IEC/SAE A

ADAPTER IEC/SAE A

EL



EC



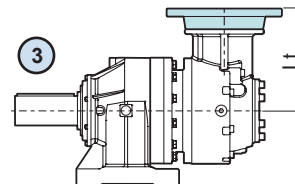
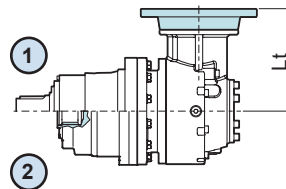
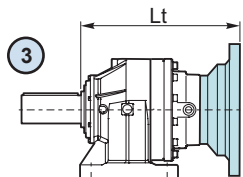
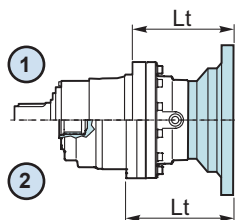
- ① = MP - MP1 - FS
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]			
		IEC			SAE A
		80-90	100-112	132	
EL2604	MP	441.5	449.5	485.5	488.5
	MP1	441.5	449.5	485.5	488.5
	FE	409.5	417.5	453.5	439.5
	FS	441.5	449.5	485.5	488.5
	FCP	437.5	445.5	481.5	484.5
	MPP1	621.5	629.5	665.5	666.5
EC2603	MP	282	290	313	301
	MP1	282	290	313	301
	FE	282	290	313	301
	FS	282	290	313	301
	FCP	282	290	313	301
	MPP1	282	290	313	301
EC2604	MP	282	290	313	301
	MP1	282	290	313	301
	FE	282	290	313	301
	FS	282	290	313	301
	FCP	282	290	313	301
	MPP1	282	290	313	301

FLANGE MOTORI IEC/NEMA

MOTOR FLANGES IEC/NEMA

MOTORFLANSCHEN IEC/NEMA

EL
EC


- ① = MP - MP1 - FS
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]										
		IEC						NEMA				
		63	71	80-90	100-112	132	160-180	143/145 TD	182/184 TC	182/184 TD	210 TD	213/215 TC
EL2602	MP - MP1	343	345	350	351	418	449	353	353	353	353	369
	FE	311	313	318	319	386	417	321	321	321	321	337
	FS	343	345	350	351	418	449	353	353	353	353	369
	FCP	339	341	346	347	414	445	349	349	349	349	365
	MPP1	523	525	530	531	598	629	533	533	533	533	549
EL2603	MP - MP1	410.5	412.5	417.5	418.5	485.5	516.5	420.5	420.5	420.5	420.5	436.5
	FE	378.5	380.5	385.5	386.5	453.5	484.5	388.5	388.5	388.5	388.5	404.5
	FS	410.5	412.5	417.5	418.5	485.5	516.5	420.5	420.5	420.5	420.5	436.5
	FCP	406.5	408.5	413.5	414.5	481.5	512.5	416.5	416.5	416.5	416.5	432.5
	MPP1	590.5	592.5	597.5	598.5	665.5	696.5	600.5	600.5	600.5	600.5	616.5
EL2604	MP - MP1	449.5	451.5	-	-	-	555.5	459.5	459.5	459.5	459.5	475.5
	FE	417.5	419.5	-	-	-	523.5	427.5	427.5	427.5	427.5	443.5
	FS	449.5	451.5	-	-	-	555.5	459.5	459.5	459.5	459.5	475.5
	FCP	445.5	447.5	-	-	-	551.5	455.5	455.5	455.5	455.5	471.5
	MPP1	629.5	631.5	-	-	-	735.5	639.5	639.5	639.5	639.5	655.5
EC2602	MP - MP1	362.5	364.5	369.5	370.5	437.5	468.5	372.5	372.5	372.5	372.5	388.5
	FE	362.5	364.5	369.5	370.5	437.5	468.5	372.5	372.5	372.5	372.5	388.5
	FS	362.5	364.5	369.5	370.5	437.5	468.5	372.5	372.5	372.5	372.5	388.5
	FCP	362.5	364.5	369.5	370.5	437.5	468.5	372.5	372.5	372.5	372.5	388.5
	MPP1	362.5	364.5	369.5	370.5	437.5	468.5	372.5	372.5	372.5	372.5	388.5
EC2603	MP - MP1	290	292	-	-	-	396	300	300	300	300	316
	FE	290	292	-	-	-	396	300	300	300	300	316
	FS	290	292	-	-	-	396	300	300	300	300	316
	FCP	290	292	-	-	-	396	300	300	300	300	316
	MPP1	290	292	-	-	-	396	300	300	300	300	316
EC2604	MP - MP1	290	292	-	-	-	396	300	300	300	300	316
	FE	290	292	-	-	-	396	300	300	300	300	316
	FS	290	292	-	-	-	396	300	300	300	300	316
	FCP	290	292	-	-	-	396	300	300	300	300	316
	MPP1	290	292	-	-	-	396	300	300	300	300	316



A richiesta altre configurazioni disponibili. Contattare il referente DANA di zona.

More configurations are available on request. Consult the DANA area contact person.

Auf Wunsch sind weitere Konfigurationen verfügbar. Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.





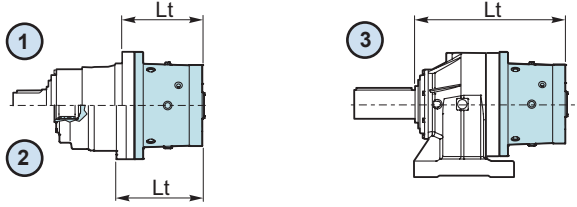
FRENI

BRAKES

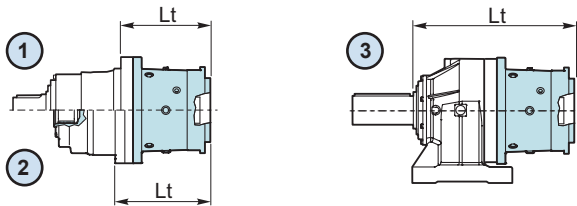
BREMSEN

EL

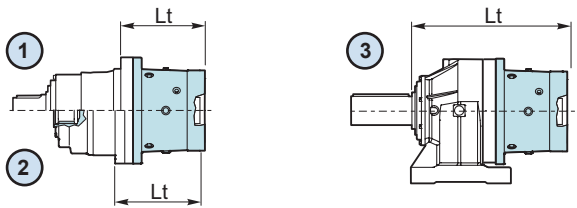
MB3 - E00
MB5 - E00
MB6 - E00



MB3 - SAE A

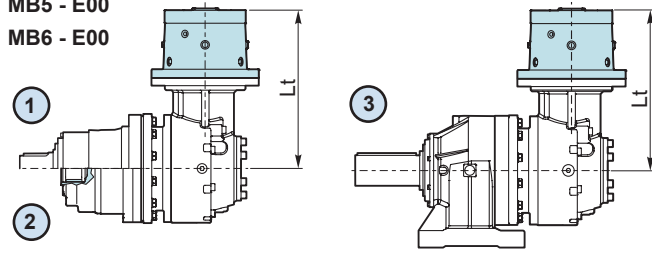


MB3 - BRZV

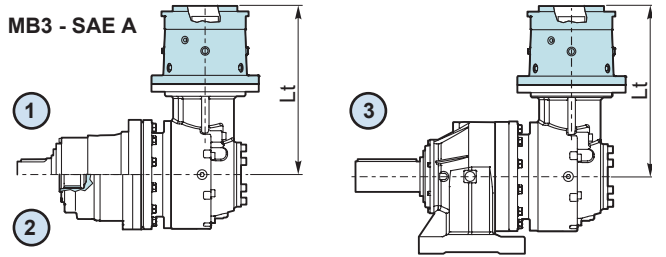


EC

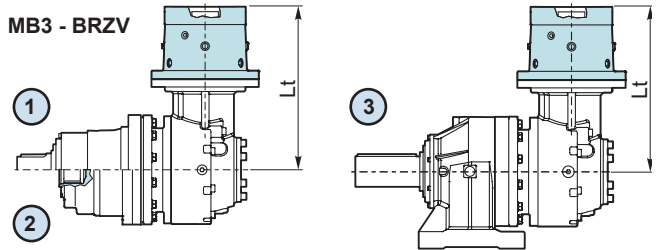
MB3 - E00
MB5 - E00
MB6 - E00



MB3 - SAE A



MB3 - BRZV



- ① = MP - MP1 - FS
- ② = FE - FCP
- ③ = MPP1

		Lt [mm]					
		MP	MP1	FE	FS	FCP	MPP1
MB3 E00	EL2604	490.5	490.5	458.5	490.5	486.5	670.5
	EC2603	318	318	318	318	318	318
	EC2604	318	318	318	318	318	318
MB3 SAE A	EL2604	519.5	519.5	487.5	519.5	515.5	699.5
	EC2603	347	347	347	347	347	347
	EC2604	347	347	347	347	347	347
MB3 BRZV	EL2604	488	488	456	488	484	668
	EC2603	315.5	315.5	315.5	315.5	315.5	315.5
	EC2604	315.5	315.5	315.5	315.5	315.5	315.5
MB5 E00	EL2603	456	456	424	456	452	636
MB6 E00	EL2601	303	303	271	303	299	483
	EL2602	403.5	403.5	371.5	403.5	399.5	583.5
	EC2602	423	423	423	423	423	423

CARICHI RADIALI

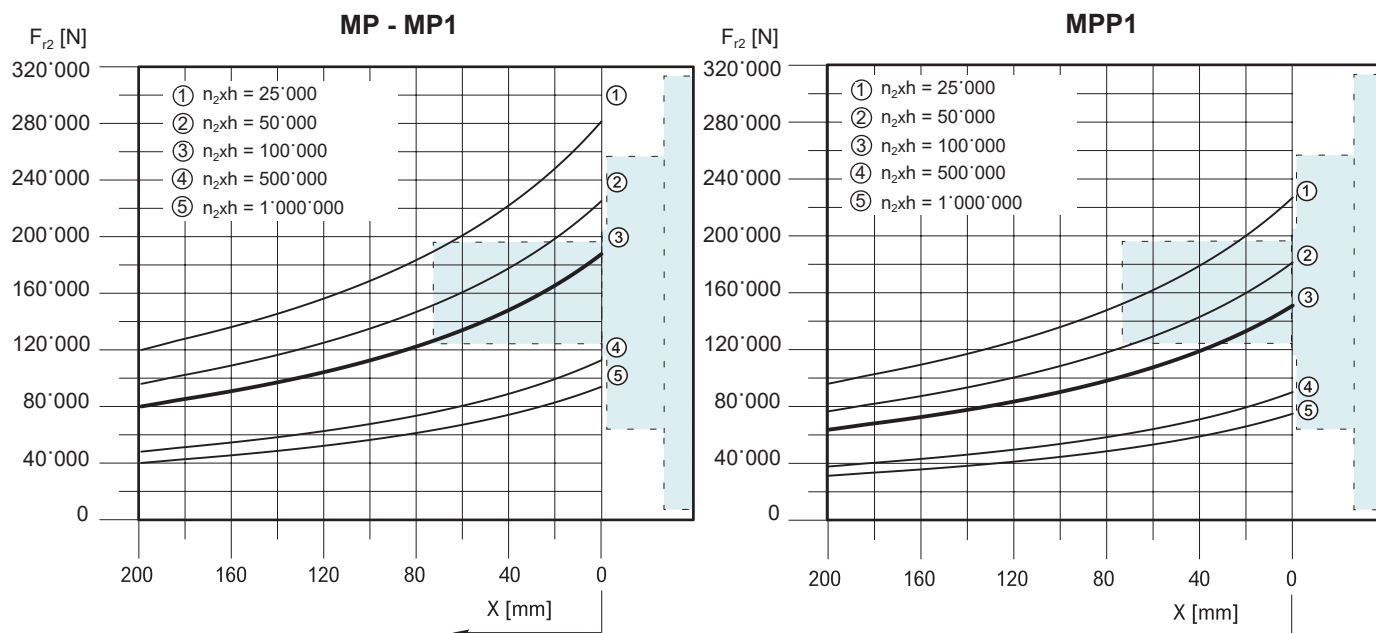
RADIAL LOADS

RADIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



I valori dei carichi radiali dei supporti uscita MP-MP1 sono validi soltanto se sono utilizzati entrambi i centraggi supporto sulla struttura del cliente. In caso di non utilizzo del secondo centraggio contattare il referente DANA di zona.

The values of radial loads of output supports MP-MP1 are valid only if they are used both spigots on the support structure of the customer; in case of non-use of the second spigot consult the DANA area contact person.

Die Werte der Radiallasten der Ausgangslagerung MP-MP1 sind nur gültig, wenn beide Zentrierungen an der Tragstruktur des Kunden verwendet werden; falls die zweite Zentrierung nicht verwendet wird, wenden Sie sich an die DANA Kontaktperson der zone zu wenden.

CARICHI ASSIALI

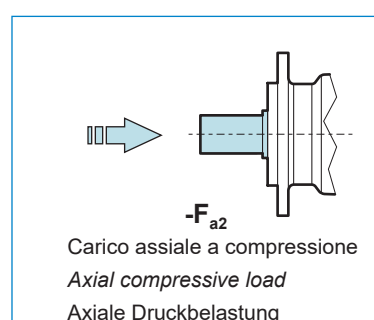
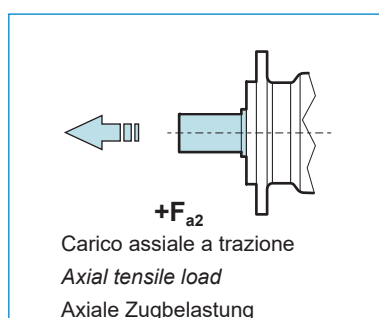
AXIAL LOADS

AXIALLASTEN

Alberi in uscita

Output shaft

Ausgangswellen



n ₂ xh	E260 MP - MP1 - MPP1	
	-F _{a2} [N]	+F _{a2} [N]
10'000	338'000	256'000
25'000	256'880	194'560
50'000	207'870	157'440
100'000	169'000	128'000
500'000	104'780	79'360
1'000'000	84'500	64'000

CARICHI RADIALI

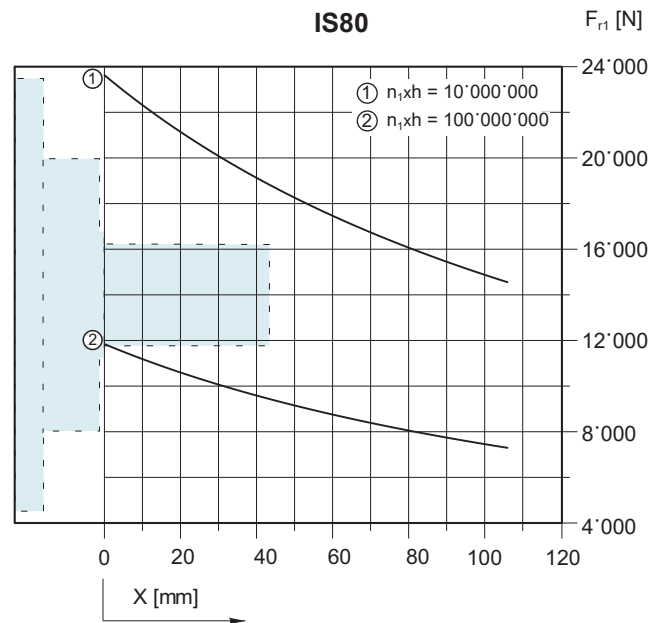
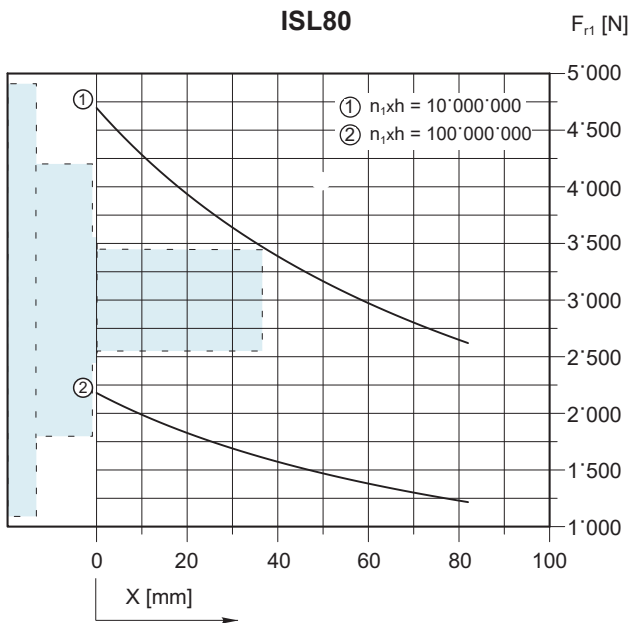
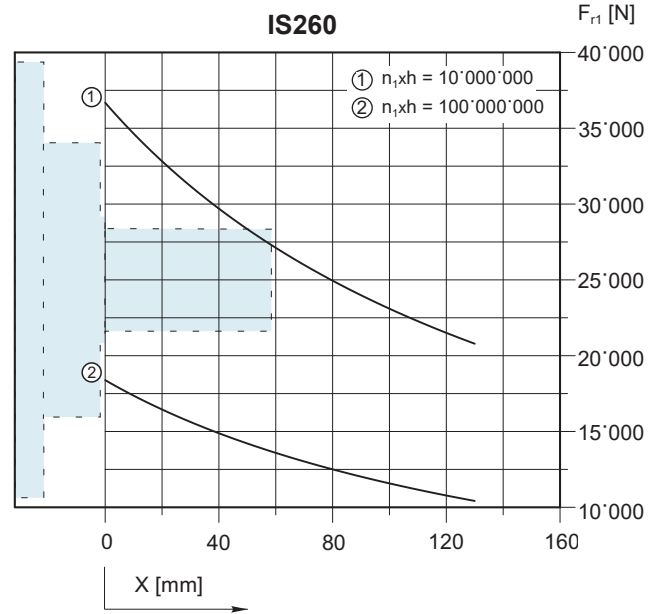
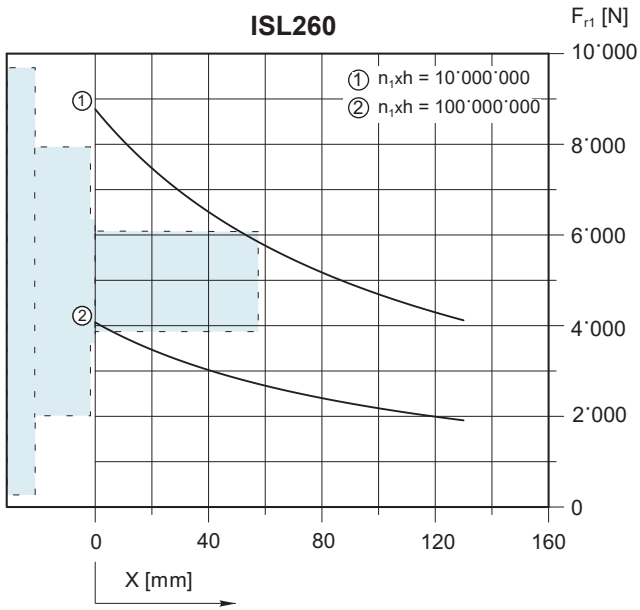
RADIAL LOADS

RADIALLASTEN

Alberi in ingresso

Input shaft

Eingangswellen



CARICHI RADIALI

RADIAL LOADS

RADIALLASTEN

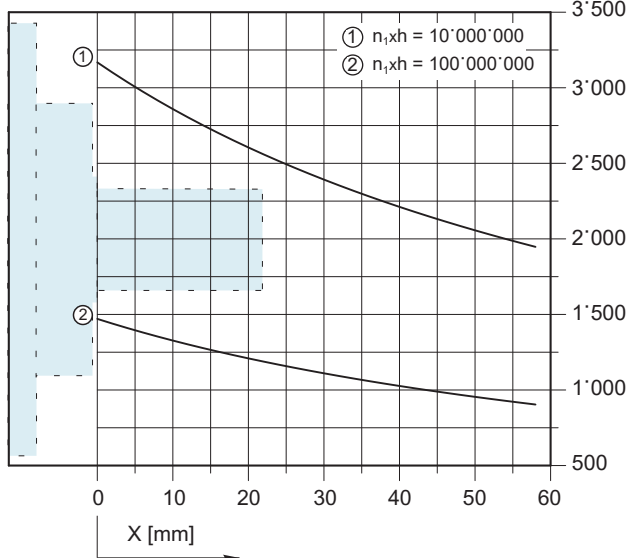
Alberi in ingresso

Input shaft

Eingangswellen

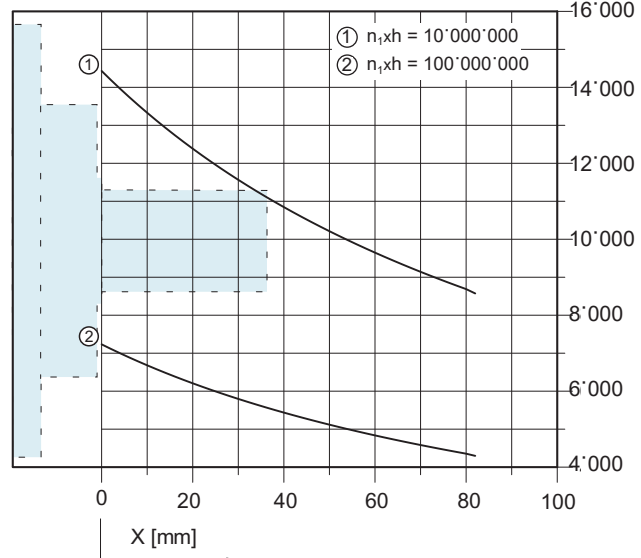
ISL30

F_{r1} [N]



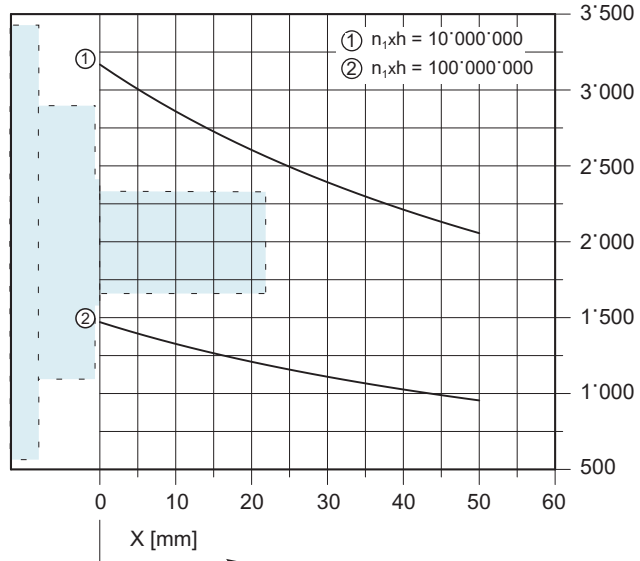
IS30

F_{r1} [N]



ISL10

F_{r1} [N]





BREVINI[®]

Motion Systems

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12. USCITE

12. OUTPUT

12. ABTRIEBE

MP - ML

ALBERO MASCHIO
SCANALATO

MALE SPLINED
SHAFT

KEILNUT
ABTRIEBSWELLENSTUMPF

Supporto uscita

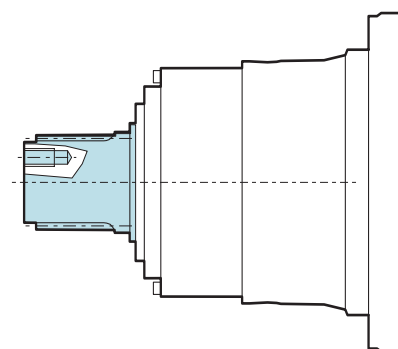
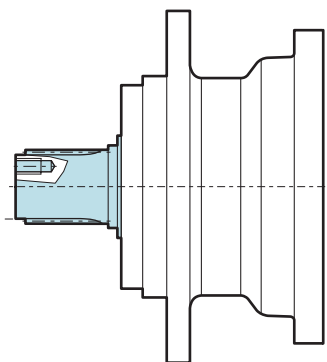
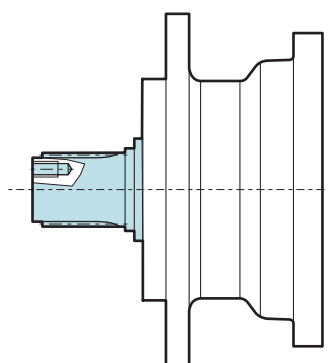
Output support

Abtriebswelle

E10 - E16

E25 - E30 - E50 - E80 -E120

E160 - E260



Dimensioni albero

Shaft dimensions

Wellenabmaße

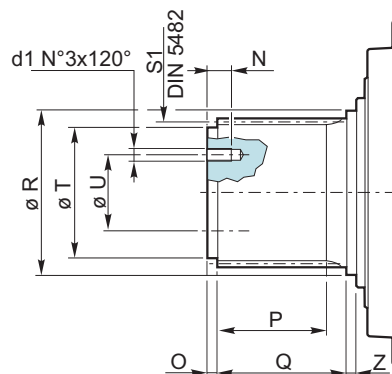
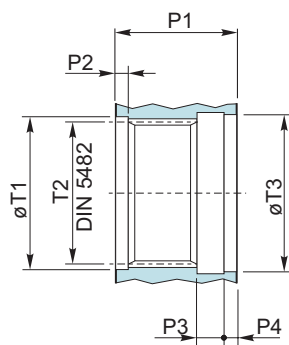


Fig. (4)

		T1	T2	T3	P1	P2	P3	P4	R	T	U	d1	S1	N	O	P	Q	Z
E10	MP - ML	42 M7	A40x36	42 M7	55	5	14	7	42 f6	35 f6	24	M6	B40x36 c9	16	5	30	43	7
E16	MP	50 M7	A48x44	50 M7	55	5	14	7	50 f6	42 f6	32	M6	B48x44 c9	16	5	28	43	7
	MP 010	42 M7	A40x36	42 M7	55	5	14	7	42 f6	35 f6	24	M6	B40x36 c9	16	5	30	43	7
	MP 020	60 M7	A58x53	60 M7	68	8	13	10	60 f6	50 f6	32	M10	B58x53 c9	20	8	38	50	8
E25	MP	60 M7	A58x53	60 M7	68	8	13	10	60 f6	50 f7	32	M10	B58x53 c9	20	8	38	50	10
E30	MP	60 M7	A58x53	60 M7	68	8	13	10	60 f6	50 f7	32	M10	B58x53 c9	20	8	38	50	10
E50	MP 045	60 M7	A58x53	60 M7	68	8	13	10	60 f6	50 f7	32	M10	B58x53 c9	20	8	38	50	10
	MP	60 M7	A58x53	60 M7	80	8	16	7	60 f6	50 f7	32	M10	B58x53 c9	20	8	50	65	7
	MP 065	72 M7	A70x64	72 M7	90	10,5	21	10	72 f6	62 f7	40	M10	B70x64 c9	20	10	50	70	10
E80	MP	72 M7	A70x64	72 M7	90	10,5	21	10	72 f6	62 f7	40	M10	B70x64 c9	20	10	50	70	10
	MP 090	85 M7	A80x74	85 M7	90	10,5	22	10	85 f6	70 f6	45	M10	B80x74 c9	20	10	50	80	10
E120	MP	85 M7	A80x74	85 M7	90	10,5	22	10	85 f6	70 f6	45	M10	B80x74 c9	25	10	50	80	10
E160	ML	85 M7	A80x74	85 M7	90	10,5	22	10	85 f6	70 f6	45	M10	B80x74 c9	25	10	50	70	10
	MP	105 M7	A100x94	105 M7	110	12	22	15	105 f6	85 f6	52	M14	B100x94 c9	30	12	65	85	13
E260	MP	105 M7	A100x94	105 N7	110	12	22	15	105 f6	85 f6	52	M14	B100x94 c9	30	12	65	85	13

Tab. (15)

MP1 - ML1

ALBERO MASCHIO
CILINDRICO CON LINGUETTA

SOLID SHAFT
WITH KEY

WELLENSTUMPF
ZYLINDRISCH MIT FEDER

Supporto uscita

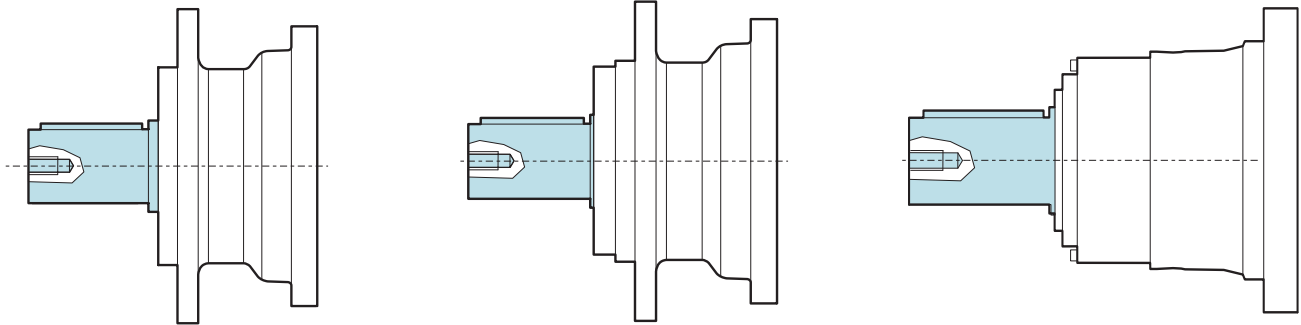
Output support

Abtriebswelle

E10 - E16

E25 - E30 - E50 - E80 - E120

E160 - E260



Dimensioni albero

Shaft dimensions

Wellenabmaße

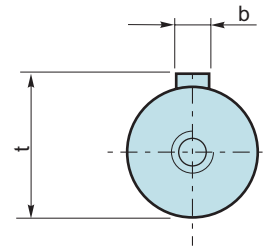
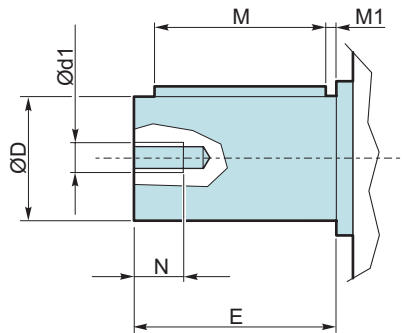


Fig. (5)

		D	d1	E	N	M	M1	b	t
E10	MP1 - ML1	ø42 m6	M16	82	36	70	6	12	45
	MP1	ø50 m6	M16	82	36	70	5	14	53.5
E16	MP1 010	ø42 m6	M16	82	36	70	6	12	45
	MP1 020	ø65 m6	M20	105	42	90	5	18	69
E25	MP1	ø65 m6	M20	105	42	90	5	18	69
E30	MP1	ø65 m6	M20	105	42	90	5	18	69
E50	MP1	ø65 m6	M20	105	42	90	5	18	69
	MP1 045	ø65 m6	M20	105	42	90	5	18	69
E80	MP1	ø80 m6	M20	130	57	110	5	22	85
	MP1 090	ø90 m6	M24	170	50	160	5	25	95
E120	MP1	ø90 m6	M24	170	50	160	5	25	95
E160	MP1	ø100 m6	M24	210	50	200	5	28	106
	ML1	ø100 m6	M24	210	50	180	10	28	106
E260	MP1	ø110 m6	M24	210	50	200	5	28	116

Tab. (16)

FE

ALBERO FEMMINA
SCANALATO

FEMALE SPLINED
SHAFT

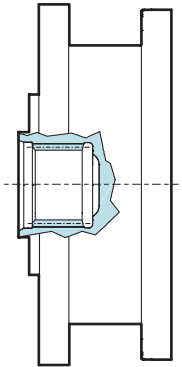
VERZAHNTE
HOHLWELLE

Supporto uscita

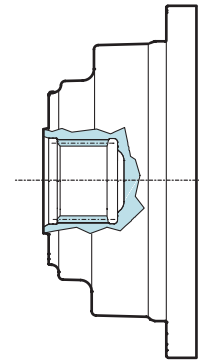
Output support

Abtriebswelle

E10 - E16



E25 - E30 - E50 - E80 - E120 - E160 - E260



Dimensioni albero

Shaft dimensions

Wellenabmaße

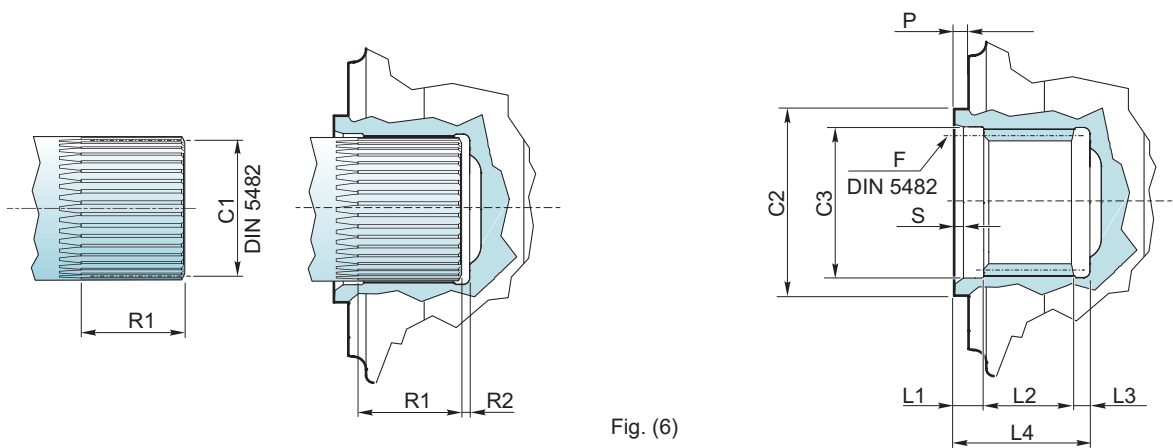


Fig. (6)

		R1	C1	R2	C2	C3	P	F	S	L1	L2	L3	L4
E10	FE	37	B40x36 c9	8	50 f8	42 H7	8	A40x36 H11	1	5	39	6	50
E16	FE	31	B58x53 c9	8	70 f8	60 H8	2.5	A58x53 H11	2	15	33	6	54
E25	FE	34	B58x53 c9	8	75 f8	60 H7	2	A58x53 H11	2	8	36	6	50
E30	FE	34	B58x53 c9	8	75 f8	60 H7	2	A58x53 H11	2	8	36	6	50
E50	FE	34	B58x53 c9	8	75 f8	60 H7	2	A58x53 H11	2	8	36	6	50
E80	FE	50	B70x64 c9	8	95 f8	72 H7	5	A70x64 H11	2	9	52	6	67
E120	FE	46	B80x74 c9	10	105 f8	82 H7	3	A80x74 H11	1.5	8	48	8	64
E160	FE	68	B80x74 c9	4	110 f8	88 H7	1	A80x74 H11	1	7	72	-	79
E260	FE	83	B100x94 c9	4	140 f8	102 H7	1	A100x94 H11	1	7	87	-	94

Tab. (17)

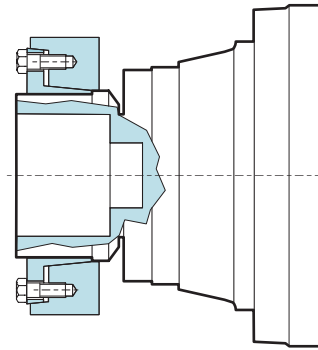
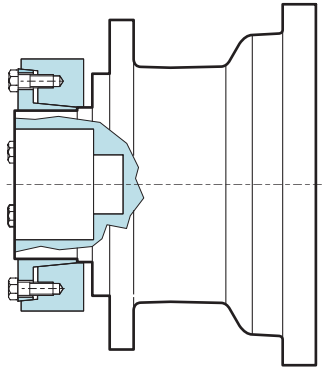
Supporto uscita

Output support

Abtriebswelle

E10 - E16 - E25 - E30 - E50 - E80 - E120

E160 - E260



Dimensioni albero

Shaft dimensions

Wellenabmaße

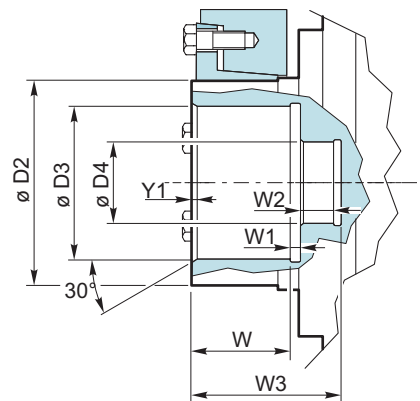
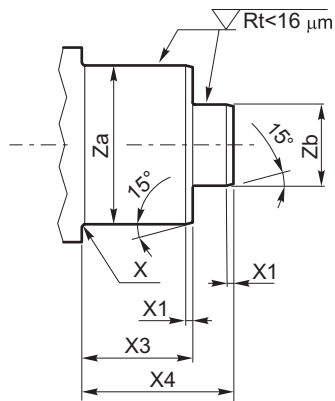


Fig. (7)

		Za	Zb	X _{MAX}	X1	X3	X4	D2	D3	D4	Y1	W	W1	W2	W3
E10	FS	50 g6	30 g6	R2	3	33	48	62 f7	50 H7	30 F7	2	29	9	9.5	50
E16	FS	52 g6	35 g6	R2	3	33	48	62 f7	52 H7	35 F7	2	29	9	9.5	50
E25	FS	75 g6	40 g6	R2	3	48	69	100 f7	75 H7	40 F7	4	44	8	14	72
E30	FS	75 g6	40 g6	R2	3	48	69	100 f7	75 H7	40 F7	4	44	8	14	72
E50	FS 045	75 g6	40 g6	R2	3	48	69	100 f7	75 H7	40 F7	4	44	8	14	72
E80	FS	90 g6	50 g6	R2	3	59	80	125 f7	90 H7	50 F7	5	55	8	14	83
E120	FS	100 g6	60 g6	R2	3	79	105	140 f7	100 H7	60 F7	5	75	10	19	110
E160	FS	120 g6	80 g6	R2	3	74	100	165 f7	120 H7	80 F7	5	70	10	19	105
E260	FS	130 g6	80 g6	R2	3	77	110	175 f7	130 H7	80 F7	6	73	12	24	115

Tab. (18)

MPP1

ALBERO MASCHIO CILINDRICO
CON SUPPORTO

SOLID SHAFT WITH
SUPPORT

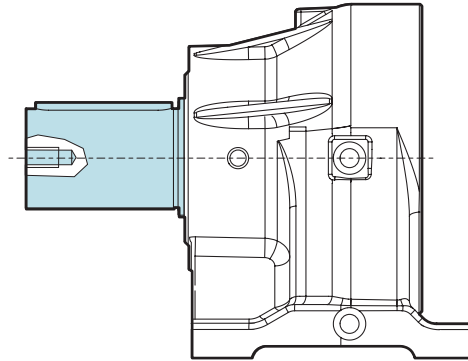
WELLENSTUMPF ZYLINDRISCH
MIT DER FEDER

Supporto uscita

Output support

Abtriebswelle

E10 - E16 - E25 - E30 - E50 - E80 - E120 - E160 - E260



Dimensioni albero

Shaft dimensions

Wellenabmaße

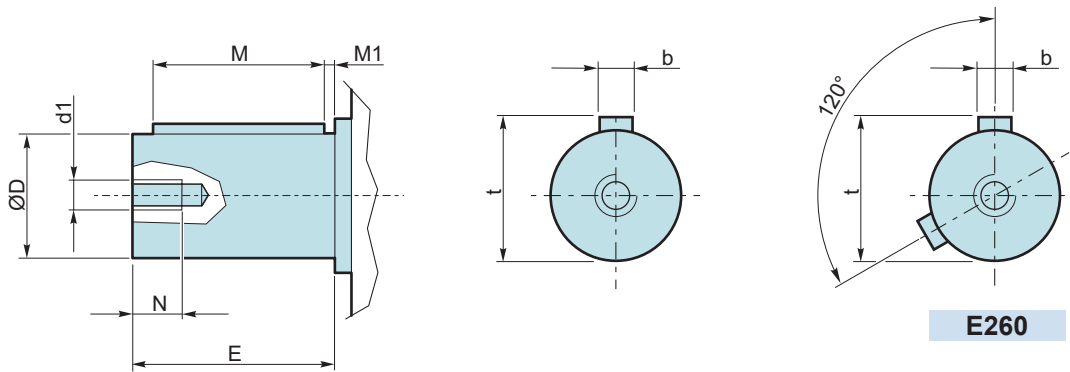


Fig. (8)

		D	d1	E	N	M	M1	b	t
E10	MPP1	ø42 m6	M16	82	36	70	6	12	45
E16	MPP1	ø50 m6	M16	82	36	70	5	14	53.5
E25	MPP1	ø65 m6	M20	105	42	90	5	18	69
E30	MPP1	ø65 m6	M20	105	42	90	5	18	69
E50	MPP1	ø80 m6	M20	130	57	110	5	22	85
E80	MPP1	ø90 m6	M24	170	50	160	5	25	95
E120	MPP1	ø90 m6	M24	170	50	160	5	25	95
E160	MPP1	ø100 m6	M24	210	50	200	5	28	106
E260	*MPP1	ø110 m6	M24	210	50	200	5	28	116

Tab. (19)

* 2 linguette a 120° / 2 keys 120° / 2 Passfedern 120°

FCP

ALBERO FEMMINA CILINDRICO
CON SEDE LINGUETTA

CYLINDRICAL HOLLOW
SHAFT WITH KEYWAY

HOHLWELLE ZYLINDRISCH
MIT DER FEDERSITZ

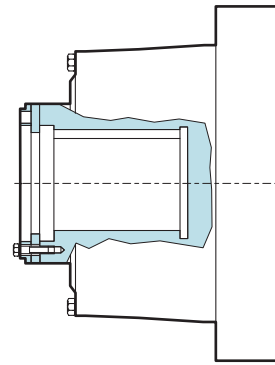
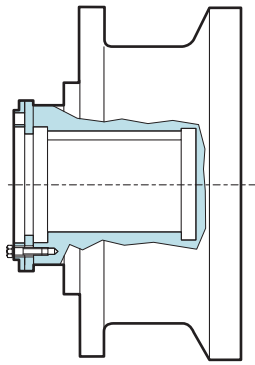
Supporto uscita

Output support

Abtriebswelle

E10 - E16

E25 - E30 - E50 - E80 -E120 - E160 -E260



Dimensioni albero

Shaft dimensions

Wellenabmaße

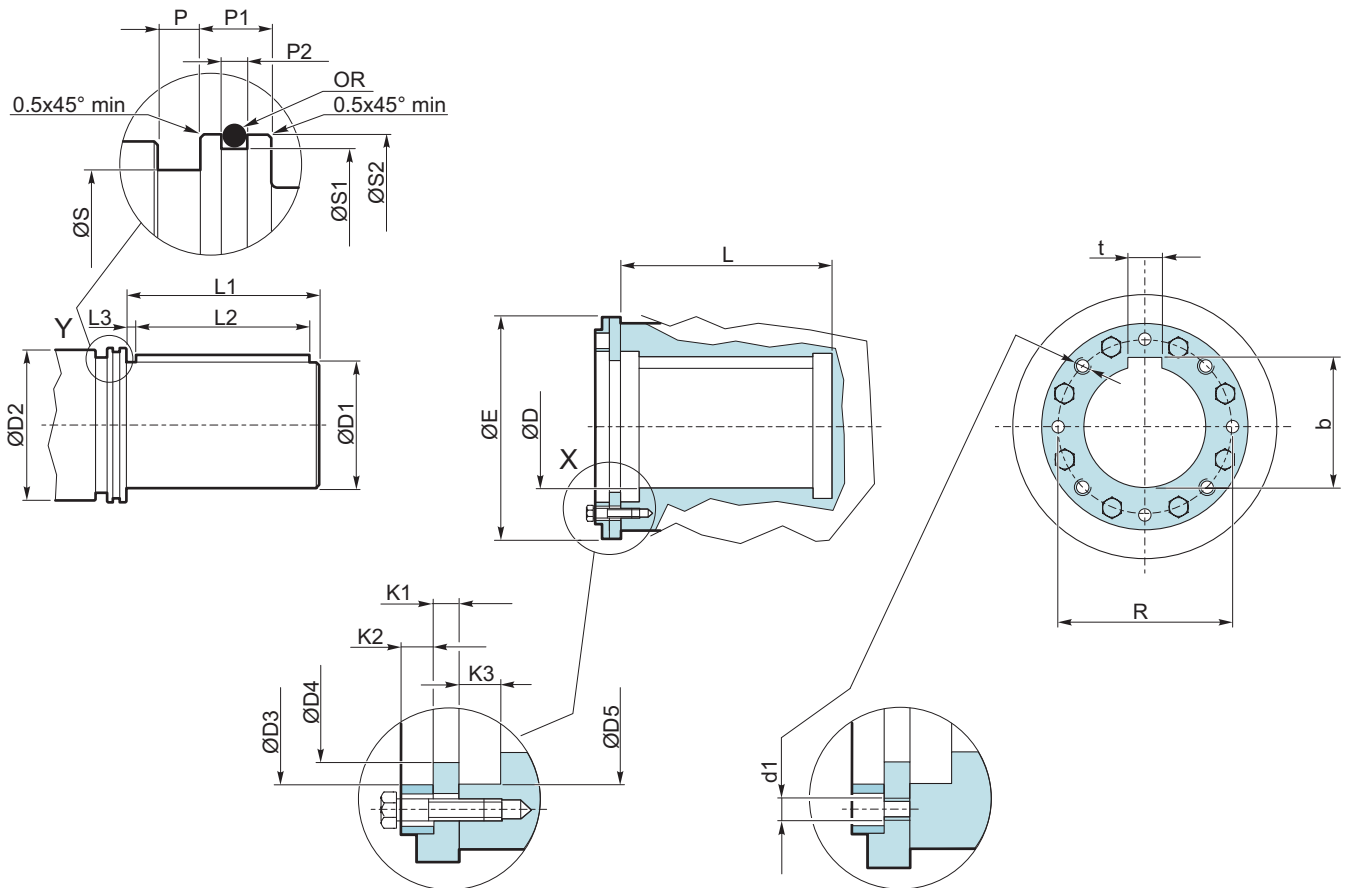


Fig. (9)

		D1	D2	L1 ⁰ _{-0.5}	L2	L3	P ^{+0.3} _{+0.2}	P1 ⁰ _{-0.1}	P2 ^{+0.2} ₀	S ⁰ _{-0.1}	S1	S2	OR
E10	FCP	ø35 j6	ø44	73	63	5	5	10	3.6	ø37.5	ø40.8 h9	ø45 e8	2-130
E16	FCP	ø50 j6	ø60	90	80	5	5	10	3.6	ø53	ø57.8 h9	ø62 e8	2-140
E25	FCP	ø50 j6	ø56	90	80	5	6	12	4.8	ø49	ø54.4 h9	ø60 e8	2-227
E30	FCP	ø50 j6	ø56	90	80	5	6	12	4.8	ø49	ø54.4 h9	ø60 e8	2-227
E50	FCP	ø65 j6	ø78	100	90	5	6	10	3.6	ø70	ø75.8 h9	ø80 e8	2-151
E80	FCP	ø80 j6	ø93	130	110	5	8	12	3.6	ø85	ø90.8 h9	ø95 e8	2-153
E120	FCP	ø90 j6	ø108	150	140	5	8	14.5	4.8	ø100	ø104.4 h9	ø110 e8	2-243
E160	FCP	ø100 j6	ø116	170	160	5	8	14.5	4.8	ø108	ø112.4 h9	ø118 e8	2-245
E260	FCP	ø110 j6	ø128	150	125	5	8	14.5	4.8	ø120	ø124.4 h9	ø130 e8	2-249

		D	E	L	D3	D4	D5	K1	K2	K3	d1	b	t	R
E10	FCP	ø35 G6	ø74	85	ø46	ø38.5	ø45 H8	5	5	10	M6	38.3	10	ø57
E16	FCP	ø50 G6	ø89	102	ø62.5	ø54	ø62 H8	6	5	10	M6	53.8	14	ø73
E25	FCP	ø50 G6	ø85	103	ø60.2	ø50	ø60 H8	6	5	12	M6	53.8	14	ø70
E30	FCP	ø50 G6	ø85	103	ø60.2	ø50	ø60 H8	6	5	12	M6	53.8	14	ø70
E50	FCP	ø65 G6	ø110	112	ø80.5	ø71	ø80 H8	6	5	10	M6	64.4	18	ø92
E80	FCP	ø80 G6	ø138	132	ø96	ø86	ø95 H8	8	6	12	M8	85.4	22	ø113
E120	FCP	ø90 G6	ø155	166.5	ø110.5	ø101	ø110 H8	8	6	14.5	M8	95.4	25	ø130
E160	FCP	ø100 G6	ø164	186.5	ø118.5	ø109	ø118 H8	8	6	14.5	M8	106.4	28	ø140
E260	FCP	ø110 G6	ø180	166.5	ø130.5	ø121	ø130 H8	8	6	14.5	M8	116.4	28	ø152

Tab. (20)



13. SUPPORTI MASCHIO IN INGRESSO

13. INPUT MALE SHAFT

13. ANTRIEBSWELLENSTÜMPFE

I supporti in ingresso descritti di seguito sono utilizzati quando il motore di azionamento, generalmente elettrico, è collegato all'albero di ingresso mediante giunto elastico, o puleggia e cinghie.

La normale posizione di montaggio è con l'asse orizzontale e la lubrificazione è comune al riduttore. Per altre posizioni di montaggio, occorre adeguare la lubrificazione. Si prega di contattare il referente DANA di zona per maggiori dettagli.

La velocità massima di lavoro è generalmente 1'800 rpm.

Supporti maschio tipo ISL/IS

I supporti di tipo ISL sono specifici per utilizzo con giunto elastico o, in generale, quando la componente di carico radiale è molto ridotta: in tutti gli altri casi è consigliato l'utilizzo di supporti di tipo IS.

Consultare le tabelle di selezione per quanto riguarda le dimensioni dei supporti e i carichi ammissibili.

The input supports described below are used when the driving motor, which is usually electric, is connected to the input shaft by a flexible coupling or belts and pulleys.

The normal mounting position is with the horizontal axis and lubrication is common with the gear unit. For other mounting positions, the lubrication must be adapted. Please consult the DANA area contact person for more details.

Max. working speed is generally 1'800 rpm.

ISL/IS type male supports

ISL type supports are specific for use with flexible coupling or, in general, when the radial load component is very small: in all other cases it is advisable to use IS type.

Consult the selection tables with regard to the sizes of the supports and the permissible loads.

Die im Folgenden beschriebenen Antriebswellen werden eingesetzt, wenn der normalerweise elektrische Antriebsmotor mittels einer elastische Kupplung oder mithilfe von Riemenscheiben und Riemen angeschlossen wird.

Die normale Einbaulage ist koaxial und die Schmierung erfolgt gemeinsam mit dem Getriebe. Bei anderen Einbaulagen ist die Schmierung entsprechend anzupassen. Wenden Sie sich für weitere Einzelheiten an sich an die DANA Kontaktperson der zone zu wenden.

Die max. Betriebsdrehzahl beträgt im allgemeinen 1'800 rpm.

Wellenstümpfe Typ ISL/IS

Die Wellen vom Typ ISL sind spezifisch für den Einsatz mit elastischen Kupplungen vorgesehen bzw. im Allgemeinen bei sehr geringer Radiallast-Komponente: in allen anderen Fällen wird zur Verwendung der Welle Typ IS geraten.

Für die Wellen Abmaße und die zulässigen Lasten siehe Auswahltabelle.

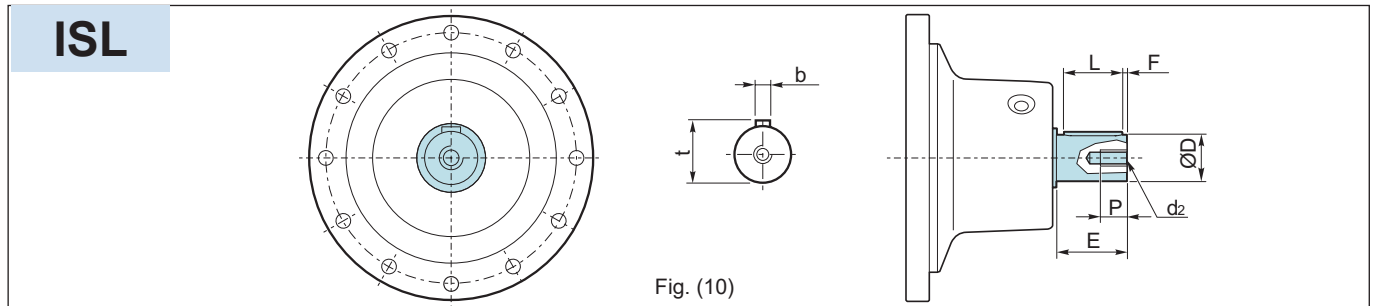


Fig. (10)

ISL	D	E	F	L	b	d ₂ DIN332	P	t
ISL10	ø28 k6	50	5	40	8	M10	22	31
ISL16	ø28 k6	50	5	40	8	M10	22	31
ISL30	ø40 k6	58	4	50	12	M10	22	43
ISL50	ø40 k6	58	4	50	12	M10	22	43
ISL80	ø48 k6	82	6	70	14	M16	36	51.5
ISL120	ø65 m6	105	8	90	18	M20	42	69
ISL160	ø65 m6	105	8	90	18	M20	42	69
ISL260	ø80 m6	130	10	110	22	M20	42	85

Tab. (21)

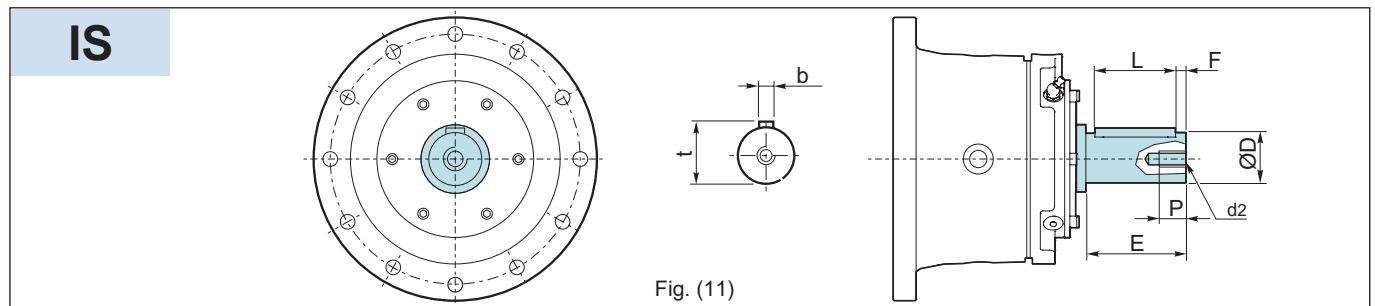


Fig. (11)

IS	D	E	F	L	b	d ₂ DIN332	P	t
IS30	ø48 k6	82	7	70	14	M16	36	51.5
IS50	ø48 k6	82	7	70	14	M16	36	51.5
IS80	ø65 m6	105	10	90	18	M20	42	69
IS120	ø65 m6	105	10	90	18	M20	42	69
IS160	ø80 m6	130	10	110	22	M20	42	85
IS260	ø80 m6	130	10	110	22	M20	42	85

Tab. (22)

14. FRENI LAMELLARI A BAGNO D'OLIO

I riduttori possono essere equipaggiati in entrata con freno a dischi multipli in bagno d'olio ad apertura idraulica.

Questi freni contengono un pistone che agisce, sotto la spinta di una serie di molle, su coppie di dischi alternati fissi e mobili: lo sbloccaggio del pistone avviene per effetto della pressione idraulica di comando.

Questi freni hanno quindi un funzionamento negativo, in quanto si inseriscono automaticamente in assenza di pressione di comando, mentre si aprono al raggiungimento della pressione minima di apertura: sono da impiegare esclusivamente come freni di stazionamento e non per la frenatura dinamica.

Le prestazioni riportate nelle tabelle seguenti sono calcolate con un margine di accuratezza di +/- 10% e in assenza di contropressione; nel caso in cui sia presente una contropressione, la coppia frenante viene percentualmente ridotta nel rapporto contropressione/pressione di apertura.

Si ricorda che le alte velocità di rotazione, oppure prolungati periodi di funzionamento con asse verticale, possono generare elevati aumenti di temperatura: in questi casi, contattare il referente DANA di zona.

La lubrificazione dei freni è comune a quella dei riduttori. Per il comando freno, si consigliano oli minerali o sintetici resistenti al calore e all'invecchiamento, con viscosità ISO VG 32 e indice di viscosità pari o superiore a 95: gli oli idraulici sono generalmente idonei.

Nel capitolo "Lubrificazione" sono riportati alcuni tipi di olio consigliati.

14. MULTIDISC BRAKE IN OIL

The gear unit inputs can be equipped with hydraulically released oil-bath multi-disc brakes.

These brakes have a piston which acts, under the thrust of a series of springs, on pairs of alternating fixed and mobile discs: piston release occurs through the control hydraulic pressure.

These brakes therefore have negative operation, as they are applied automatically in the absence of control pressure, whereas they open when the minimum release pressure is reached: they are only used as parking brakes and not for dynamic braking.

The performance values given in the following tables are calculated with a margin of accuracy of +/- 10% and in the absence of back pressure; if there is a back pressure, the braking torque is reduced in percentage according to back pressure/release pressure.

High rotation speeds, or prolonged operation with vertical axis, can generate considerable temperature increases; in such cases, consult the DANA area contact person.

Lubrication of the brakes is common with that of the gear units. For the brake control, it is advisable to use mineral or synthetic oils resistant to heat and aging, with ISO VG 32 viscosity and viscosity index greater than or equal to 95: hydraulic oils are generally suitable.

The section "Lubrication" gives some recommended types of oils.

14. LAMELLENBREMSEN IM ÖLBAD

Die Getriebe können antriebsseitig mit im Ölbad-Lamellenbremsen mit hydraulischer Entlüftung ausgestattet werden.

Die Bremsen sind mit einem Kolben ausgerüstet, der unter dem Druck einer Reihe von Federn abwechselnd auf fixe und bewegliche Scheibenpaare wirkt; das Lösen der Bremse wird hydraulisch gesteuert.

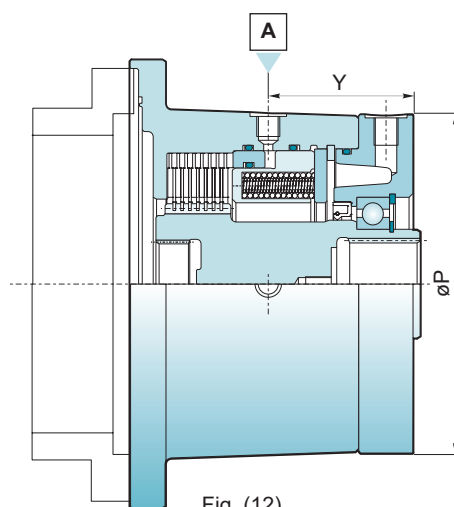
Diese Bremsen haben demzufolge eine „negative“ Funktion, da sie automatisch wirken, wenn kein Steuerdruck anliegt und werden bei Erreichen eines Mindestdrucks entlüftet: sie können ausschließlich als Feststellbremse eingesetzt werden und nicht für den dynamischen Bremsvorgang.

Die in den folgenden Tabellen aufgeführten Leistungen wurden mit einer Genauigkeitsspanne von +/- 10 % ohne anstehenden Gegendruck berechnet; bei anstehendem Gegendruck verringert sich das Bremsmoment prozentual im Verhältnis von Gegebdruck/Öffnungsdruck.

Es wird daran erinnert, dass hohe Drehzahlen und lange Betriebszeiten mit vertikaler Achse zu starken Temperaturerhöhungen führen können: in diesen Fällen nehmen Sie bitte sich an die DANA Kontaktperson der zone zu wenden.

Die Schmierung der Bremsen erfolgt wie bei den Getrieben. Für die Steuerung der Bremse sollten wärme- und alterungsbeständige Mineralöle mit Viskosität ISO VG 32 verwendet werden mit einem Viskositätsindex gleich oder höher als 95: Hydrauliköle sind im allgemeinen dafür geeignet.

Im Abschnitt „Schmierung“ werden einige Ölsorten aufgeführt.



A Attacco comando apertura freno
Brake releasing plug
Anschluss zum Lösen der Bremse

	øP [mm]	Y [mm]	A	kg
MB3	172	69.5	R 1/8"	13
MB5	186	79.5	M12X1.5	25
MB6	234	81.5	R 1/4"	40

Tab. (23)

		T _B [Nm]	p [bar]	P _{MAX} [bar]	V _a [cm ³]
					lamelle nuove new discs Neue Lamellen
MB3	MB306.2C	33	13.5	300	15
	MB309.2C	50	20.3	300	15
	MB312.2C	66	27.1	300	15
	MB309.4C	99	20.3	300	15
	MB312.4C	132	27.1	300	15
	MB310.6C	165	22.5	300	15
	MB312.6C	198	27.1	300	15
	MB315.6C	248	33.8	300	15
	MB310.10C	275	22.5	300	15
	MB315.8C	330	33.8	300	15
	MB315.10C	413	33.8	300	15
	MB315.12C	495	33.8	300	15
MB5	MB512.4C	173	16.0	300	26
	MB512D.4C	223	20.6	300	26
	MB518.4C	259	24.0	300	26
	MB512D.6C	335	20.6	300	26
	MB518.6C	389	24.0	300	26
	MB512D.8C	447	20.6	300	26
	MB518D.6C	503	30.9	300	26
	MB512D.10C	559	20.6	300	26
	MB512.14C	605	16.0	300	26
	MB518D.8C	670	30.9	300	26
	MB518.12C	778	24.0	300	26
	MB518D.10C	838	30.9	300	26
	MB518.14C	907	24.0	300	26
	MB518D.12C	1'006	30.9	300	26
	MB518D.14C	1'173	30.9	300	26
	MB6	MB616D.8C	658	15.5	300
MB620D.8C		822	19.4	300	60
MB624D.8C		987	23.3	300	60
MB618D.12C		1'110	17.4	300	60
MB618D.14C		1'295	17.4	300	60
MB624D.12C		1'480	23.3	300	60
MB618D.18C		1'665	17.4	300	60
MB620D.18C		1'850	19.4	300	60
MB622D.18C		2'035	21.3	300	60
MB624D.18C	2'220	23.3	300	60	

Tab. (24)

T_B: Valore medio di coppia frenante statica / Average value of the static braking torque / Durchschnittlich Bremsmoment
 p: Pressione apertura freno / Brake release pressure / Bremsöffnungsdruck
 P_{MAX}: Pressione massima apertura freno / Brake release maximum pressure / Max. Bremsentlüftungsdruck
 V_a: Volume olio per comando apertura freno / Oil quantity for brake release control / Bremsölmenge zum Lösen der Bremse

15. ENTRATE UNIVERSALI

15. UNIVERSAL INPUTS

15. UNIVERSAL-ANTRIEBE

L'entrata universale è una configurazione che, montata in ingresso ai riduttori, permette di accoppiare le più diverse tipologie di motorizzazioni tramite una flangia e un manicotto di adattamento appositi.

Esistono due diverse dimensioni di entrata universale, in funzione delle grandezze montate come stadio in ingresso sui riduttori.

L'applicabilità può essere dedotta dalle tavole dimensionali delle varie grandezze.

The universal joint is a configuration mounted on the gear unit input, enabling the coupling of various types of motorizations by means of a special flange and adapter coupling.

Two different universal joint sizes are available according to the sizes mounted as input stage on the gear units.

Applicability can be obtained from the dimensional tables of the various sizes.

Der Universalantrieb ist eine Anordnung, die am Getriebeeingang montiert wird und die ermöglicht, die unterschiedlichsten Motortypen mithilfe eines Flansches oder einer Adapterhülse anzukoppeln.

Je nach der auf den Getrieben montierten Antriebsstufen stehen drei verschiedene Größen des Universalantriebs zur Verfügung.

Die Eignung kann den Maßbildern der einzelnen Baugrößen entnommen werden.

E00

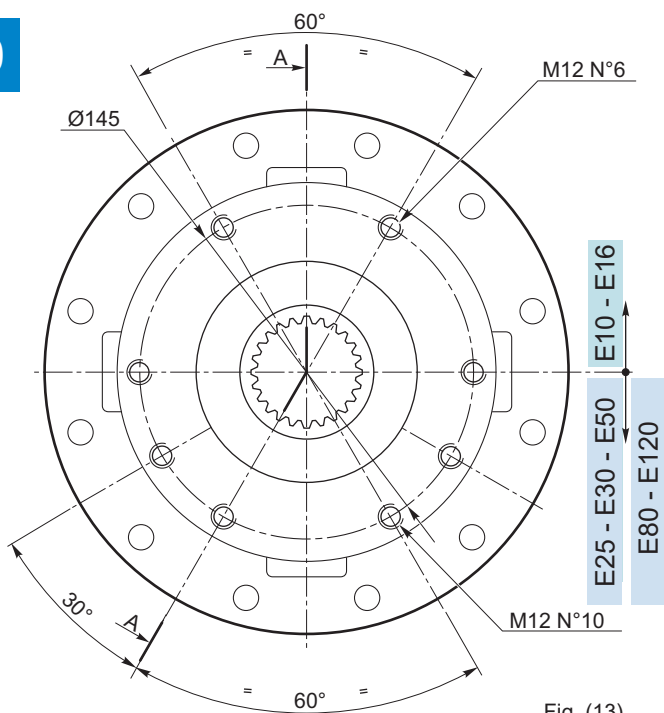
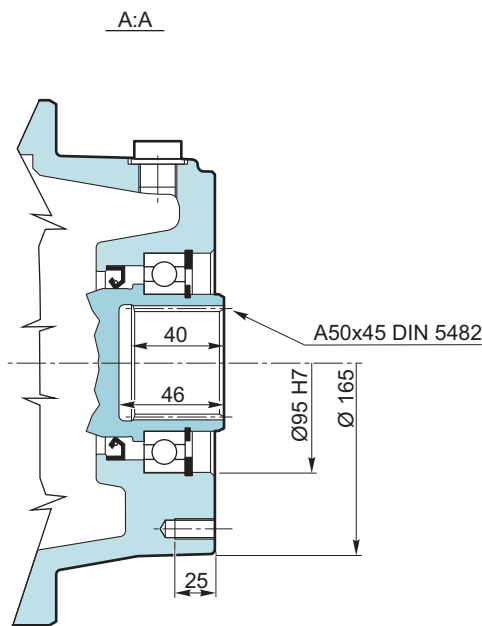


Fig. (13)



S00

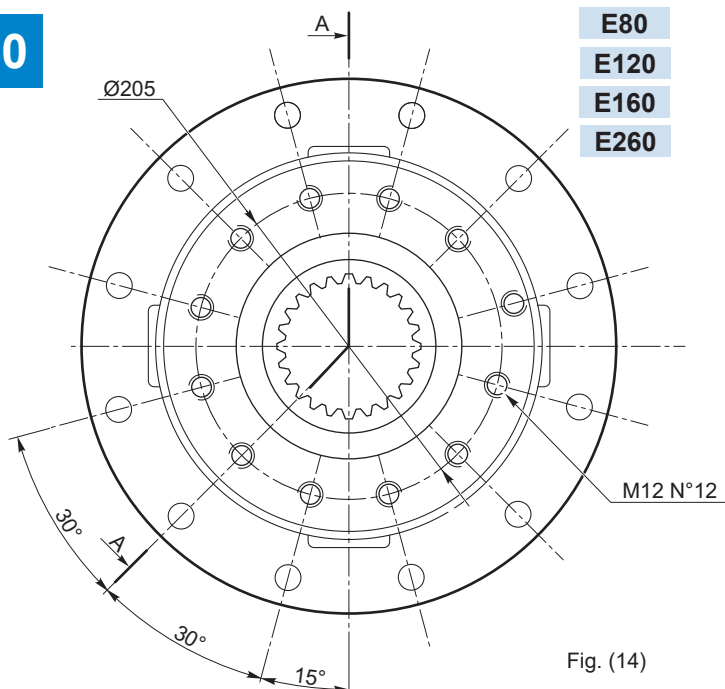
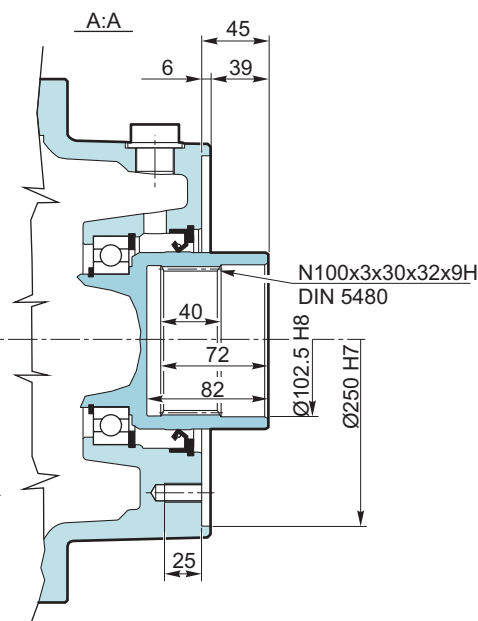


Fig. (14)



Le grandezze indicate sono relative allo stadio di ingresso

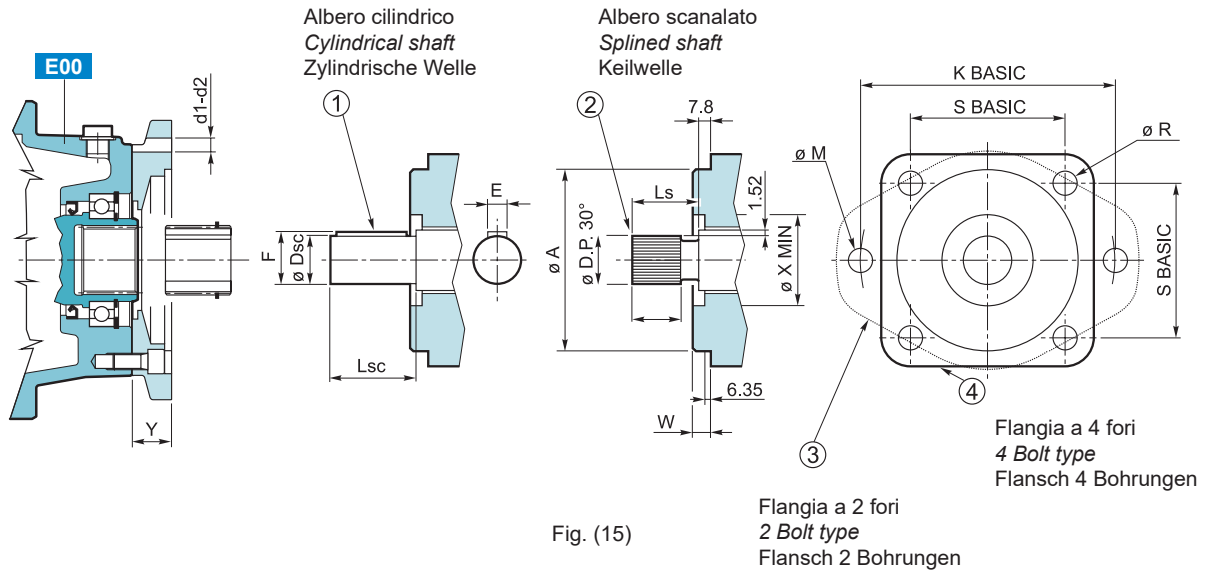
The sizes indicated refer to the input stage

Die angegebenen Größen beziehen sich auf die Antriebsstufe

16. FLANGE MOTORI
SAE J 744C

16. MOTOR FLANGES
SAE J 744C

16. MOTORFLANSCH
SAE J 744C



SAE	Ø A	W	Ø X min	K basic	Ø M	S basic	Ø R	Albero scanalato Splined shaft Keilwelle				Albero cilindrico Cylindrical shaft Zylindrischewelle			
								Nr.Denti No. Teeth Anz. Zähne	30° D.P.	LS	LA min.	Ø DSC	LSC	F	E
A	82.55	6.35	—	106.4	13	75.22	—	9	16/32	24	7.6	15.88	24	17.6	4
B	101.6	9.65	50.8	146	14.3	89.8	14.3	13	16/32	33.3	10.2	22.22	33.3	24.95	6.35
B-B	101.6	9.65	50.8	146	14.3	89.8	14.3	15	16/32	38.1	12.7	25.4	38.1	28.1	6.35
C	127.0	12.7	63.5	181	17.5	114.5	14.3	14	12/24	47.6	15.2	31.75	47.6	35.2	7.8
C-C	127.0	12.7	63.5	181	17.5	114.5	14.3	17	12/24	54	17.8	38.1	54	42.25	9.525
D	152.4	12.7	70	228.6	20.6	161.6	20.6	13	8/16	66.67	20.3	44.45	66.67	49.3	11.1
E	165.1	15.87	70	317.5	27	224.5	20.6	13	8/16	66.67	20.3	44.45	66.67	49.3	11.1

Tab. (25)

SAE	Y	No. Bolt	CODICE DI ORDINAZIONE ORDERING CODE BESTELLNUMMER				CODICE DI ORDINAZIONE ORDERING CODE BESTELLNUMMER			
			Flangia con d1 / Flange with d1 / Flansch mit d1				Flangia con d2 / Flange with d2 / Flansch mit d2			
			d1 Metric Metric Metrisch	Albero scanalato Splined shaft Keilwelle	Albero cilindrico Cylindrical shaft Zylindrische Welle	d2 Pollici Inch Zoll	Albero scanalato Splined shaft Keilwelle	Albero cilindrico Cylindrical shaft Zylindrische Welle		
A	25	2 - 4	M10 T.U. 15	*	*	3/8 0.59 Min Full Thread	*	*		
B	25	2 - 4	M12 T.U. 25	*	*	1/2 - 13 1.00 Min Full Thread	*	*		
B-B	25	2 - 4	M12 T.U. 25	*	*	1/2 - 13 1.00 Min Full Thread	*	*		
C	28	2	M16 T.U. 20	*	*	5/8-11 0.78 Min F.T.	*	*		
		4	M14 T.U. 20	*	*	1/2-13 0.78 Min F.T.	*	*		
C-C	80	2	M16 T.U. 20	*	*	5/8-11 0.78 Min F.T.	*	*		
		4	M14 T.U. 20	*	*	1/2-13 0.78 Min F.T.	*	*		
D	93	2 - 4	M18 T.U. 20	*	*	3/4 - 10 1.00 Min Full Thread	*	*		
E	93	2 - 4	Ø 22 T.U. 30	*	*	Ø 0.875 1.11 Min	*	*		

Tab. (26)

* Per informazioni contattare il referente DANA di zona.

For information, consult the DANA area contact person.

Für informationen, bitte sich an die DANA Kontaktperson der zone zu wenden.

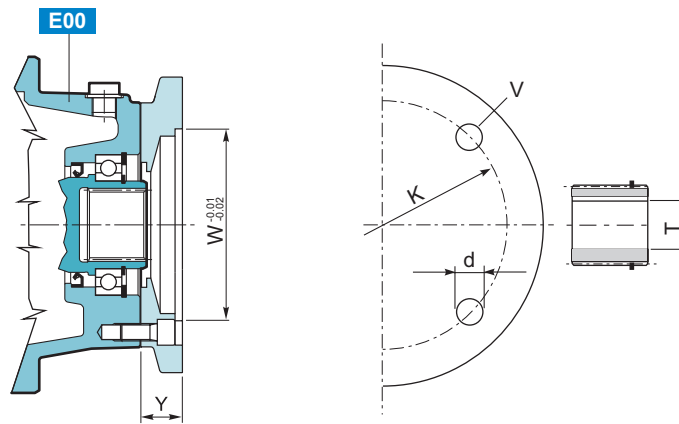
**17. FLANGE MOTORI
NEMA**
**17. MOTOR FLANGES
NEMA**
**17. MOTORFLANSCH
NEMA**


Fig. (16)

 Dimensioni in pollici / *Inch dimensions* / Abmessungen in Zoll

NEMA Grandezza motore Motor size Motorgroße	Flange attacco motore Input flange adapter Motoranbauflansch					Manicotto Coupling Kupplung		Codice di ordinazione Ordering code Bestellnummer
	W	V	d	K	Y	T		
						Diametro Diameter Durchmesser	Linguetta Key Passfeder	
143/145 TD	9	4	0.55	10	1.18	0.875	0.187	*
182/184 TC	8.5	4	0.55	7.25	1.18	1.125	0.25	*
182/184 TD	9	4	0.55	10	1.18	1.25	0.25	*
210 TD	9	4	0.55	10	1.18	1.375	0.312	*
213/215 TC	8.5	4	0.55	7.25	1.81	1.375	0.312	*

Tab. (27)

* Per informazioni contattare il referente DANA di zona.
For information, consult the DANA area contact person.
 Für Informationen, bitte sich an die DANA Kontaktperson der zone zu wenden.

18. STATO DI FORNITURA

Salvo diverse disposizioni contrattuali, i riduttori sono verniciati esternamente con fondo anticorrosivo bicomponente, a base di resine epossidiche idrosolubili, blu RAL 5012. La protezione è idonea a resistere a normali ambienti industriali anche esterni e consente ulteriori finiture con smalti sintetici, nitro-sintetici o bicomponente. Nel caso si prevedano condizioni ambientali particolarmente aggressive, è necessario utilizzare cicli di verniciatura speciali, eseguibili a richiesta.

Le parti esterne lavorate del riduttore, come le estremità degli alberi, i piani di appoggio i centraggi ecc., vengono protette con olio antiossidante (Tectyl). Le pareti interne delle carcasse del riduttore sono verniciate con vernice antioleo e i cinematismi sono protetti con olio antiossidante.

Tutti i riduttori, salvo diverse disposizioni contrattuali, vengono forniti senza lubrificante, come indicato da un'apposita etichetta adesiva applicata al riduttore stesso per evidenziarne lo stato.

Alcuni supporti di uscita prevedono la lubrificazione a grasso del cuscinetto lato uscita: in tal caso, i supporti sono già lubrificati e pronti ad entrare in servizio al momento della fornitura. Nel caso di supporti con lubrificazione a grasso del cuscinetto lato uscita, non è necessario prevedere l'ingrassaggio periodico, in quanto la loro lubrificazione è da intendersi "a vita".

I riduttori vengono imballati e spediti in casse o su pallets idonei a resistere in normali ambienti industriali.

Ogni riduttore viene fornito corredato di "Manuale di Installazione e Manutenzione", "Dichiarazione del Fabbricante" e "Attestato di Conformità" 2.1 secondo UNI EN10204.

18. SUPPLY CONDITION

Unless otherwise specified in the contract, the gear units are painted externally with anticorrosive 2-component water-soluble epoxy resin based primer, blue RAL 5012. The protection is suitable for withstanding normal industrial environments (also external) and can be finished with synthetic, nitro-synthetic or 2-component paints. In case of particularly aggressive environmental conditions, it is necessary to use special painting cycles, carried out on request.

The machined external parts of the gear unit, such as the shaft ends, support surfaces, spigots, etc., must be protected with antioxidant oil (Tectyl). The inside walls of the gear unit casings are painted with oil-proof paint and the kinematic mechanisms are protected with antioxidant oil.

Unless otherwise specified in the contract, all the gear units are supplied without lubricant: as specified by a special sticker placed on the gear unit to indicate its condition.

Some output supports provide for grease lubrication of the output side bearing: in this case, the supports are already lubricated and ready to enter service at the time of delivery. In case of supports with grease-lubricated output side bearing, periodical greasing is not required, as lubrication is long-life.

The gear units are packed and shipped in crates or on pallets suitable to withstand normal industrial environments.

Each gear unit comes with an "Installation and Maintenance Manual", "Manufacturer's Declaration" and "Certificate of Conformity" 2.1 according to UNI EN10204.

18. LIEFERBEDIINGUNGEN

Außer, wenn vertraglich anders festgelegt, werden die Getriebe außen mit einer zweikomponenten Rostschutzgrundierung auf wasserlöslicher Epoxidharzbasis versehen, blau RAL 5012. Der Schutz ist für normale Industrieumgebungen und Außenbereiche geeignet und gestattet zusätzliche Überlackierung mit Synthetiklacken, nitrosynthetischen Lacken oder 2K-Lacken. Beim Einsatz in besonders aggressiven Umgebungen müssen mehrere Schichten mit Speziallack aufgetragen werden. Das ist auf Wunsch ausführbar.

Die bearbeiteten Außenteile des Getriebes wie die Stümpfe der Wellen, die Stützflächen, Zentrieransätze usw. werden mit einem Film oxidationshemmenden Öls (Tectyl) geschützt. Die Innenteile der Getriebegehäuse werden mit schmierölfesten Lacken lackiert und die Getriebe sind durch oxidationshemmendes Öl geschützt.

Alle Getriebe, soweit vertraglich nicht anders vereinbart, werden ohne Schmiermittel geliefert. Ein Aufkleber auf dem Getriebe weist auf diesen Umstand hin. Einige Abtriebskonfigurationen sehen die Schmierung der abtriebsseitigen Lager mit Fett vor: in diesen Fällen sind die Wellen bereits geschmiert und zum Lieferzeitpunkt einsatzbereit. Im Fall von Abtriebskonfigurationen mit abtriebsseitigen geschmiertem Lager ist eine periodische Schmierung nicht notwendig, da es sich um eine Lebensdauerschmierung handelt.

Alle Getriebe werden verpackt und in geeigneten Kisten oder auf Paletten für normale Industrieumgebungen versandt. Alle Getriebe DANA sind mit einem spezifischen „Installations- und Wartungshandbuch“, mit „Herstellererklärung“ und „Konformitätsbescheinigung“ – 2.1 nach UNI EM10204 versehen.

19. CONDIZIONI DI STOCCAGGIO

Nel caso occorra immagazzinare il prodotto per un periodo superiore a 2 mesi, attenersi a quanto segue:

- proteggere alberi e centraggi con una pellicola di grasso o con prodotti protettivi anticorrosione
- riempire completamente il riduttore con il lubrificante previsto per l'applicazione
- immagazzinare in luogo asciutto e con temperatura compresa fra i -5 °C e +30 °C
- proteggere il riduttore da sporcizia, polvere e umidità
- interporre sempre, fra il riduttore e il suolo, un supporto in legno o di altra natura, in modo da evitare il contatto diretto con il suolo

Per immagazzinamento prolungato oltre 1 anno, decade l'efficienza delle tenute rotanti. In tal caso, si consiglia un controllo periodico facendo ruotare gli ingranaggi tramite l'azionamento manuale dell'albero in entrata.

19. STORING CONDITION

If the product is to be stored for more than 2 months:

- *protect shafts and spigots with a film of grease or anti-corrosion protective products*
- *completely fill the gear unit with the lubricant provided for the application*
- *store in a dry place with temperature of between -5°C and +30°C*
- *protect the gear unit from dirt, dust and damp*
- *always place a support in wood or other material between the gear unit and the ground to prevent direct contact with the ground*

When storing for more than 1 year, the rotating seals will lose efficiency. In this case, it is advisable to do a periodical check, rotating the gears by manually operating the input shaft.

19. LANGERBEDIINGUNGEN

Gehen Sie bei einer Lagerung des Produktes für einen Zeitraum von mehr als 2 Monaten wie folgt vor:

- Wellen und Zentrieransätze mit einem Fettfilm oder mit einem Frostschutzmittel schützen
- Getriebe vollständig mit dem für die Anwendung vorgesehenen Schmiermittel füllen
- Lagern Sie die Getriebe an einem trockenen Ort mit einer Temperatur zwischen -5 °C und +30 °C
- Getriebe vor Schmutz, Staub und Feuchtigkeit schützen
- Getriebe auf einer Unterlage aus Holz oder aus sonstigem Material lagern, sodass direkter Kontakt mit dem Boden vermieden wird

Bei Lagerung von mehr als 1 Jahr verlieren die Wellendichtungen ihre Wirksamkeit. In diesem Fall wird zu einer periodischen Überprüfung geraten, bei der das Getriebe antriebsseitig von Hand gedreht wird.

In presenza di freno lamellare negativo, è necessario sbloccare il freno con pompa idraulica o similare (per pressione di apertura freno vedere capitolo "Freni lamellari a bagno d'olio"). All'atto dell'avviamento è consigliata la sostituzione delle guarnizioni.

In case of negative multi-disc brake, it is necessary to release the brake with hydraulic pump or similar (for brake opening pressure, see the section "Oil bath multi-disc brakes"). On starting, it is advisable to replace the seals.

Ist eine Lamellenbremse eingebaut, muss diese mithilfe einer Hydraulikpumpe oder ähnlichem entlüftet werden (für den Entlüftungsdruck siehe Kapitel „Ölbad-Lamellenbremsen“). Bei der Inbetriebnahme sollten die Dichtungen ersetzt werden.

20. INSTALLAZIONE

20. INSTALLATION

20. INSTALLATION

Generale

L'installazione dei riduttori deve essere effettuata con cura e professionalità, impiegando personale adeguatamente istruito e tecnicamente preparato.

La predisposizione al funzionamento deve avvenire rispettando tutte le indicazioni tecniche contenute nel Disegno Dimensionale di riferimento.

Tutte le operazioni di installazione debbono essere ispirate ai massimi livelli di sicurezza:

1. nei confronti dell'incolumità degli operatori e di terzi
2. nei confronti del corretto funzionamento del riduttore
3. nei confronti della sicurezza di esercizio

A questo proposito ricordiamo che:

- è assolutamente vietata ogni manipolazione arbitraria al riduttore e a tutti gli accessori eventualmente predisposti all'origine
- tutte le operazioni di sollevamento e trasporto debbono essere effettuate evitando gli urti alle estremità d'albero ed utilizzando apposite cinghie di sospensione o i golfari opportunamente predisposti e verificando che i mezzi di sollevamento siano dotati di sufficiente portata
- è assolutamente vietato eseguire lavori di saldatura sui riduttori
- qualsiasi lavoro di installazione o manutenzione deve essere eseguito con il riduttore fermo. Quindi è buona norma assicurarsi che non possano verificarsi inserimenti non intenzionali della forza motrice
- per quanto riguarda l'entrata del riduttore, i motori elettrici od idraulici sono frequentemente applicati con il sistema di flangiatura Universale E00 DANA (vedere il capitolo "Entrate Universali"). Si ricorda che la flangiatura E00 viene normalmente impiegata per motori di massa fino a 100 kg circa e coppia di 1'000 Nm massimo. Nel caso di motori più pesanti si può ricorrere a flangiature specifiche: a tal fine si prega di contattare il referente DANA di zona.
- nel caso di collegamenti che implicano l'impiego di parti rotanti come alberi, giunti o pulegge con cinghie, è obbligatorio prevedere adeguate protezioni antinfortunistiche

General

The gear units must be carefully installed by suitably trained technical personnel.

Preparation for operation must occur in compliance with all the technical specifications given on the reference Dimensional Drawing.

All installation operations must ensure:

1. *safety of operators and third parties*
2. *correct operation of the gear unit*
3. *safe operation*

In this respect:

- *any arbitrary tampering with the gear unit and with any accessories originally arranged is strictly prohibited*
- *all lifting and carrying operations must be carried out avoiding impacts on the shaft ends, using special lifting straps or the specially arranged eye-bolts, making sure that the lifting equipment is of adequate capacity*
- *welding work on the gear units is absolutely prohibited*
- *any installation or maintenance work must be carried out with the gear unit stopped. Therefore it is advisable to ensure the prevention of unintentional activation of the driving force*
- *regarding the gear unit input, the electric or hydraulic motors are often mounted with the DANA E00 Universal adapter system (see the section "Universal Joint"). It should be noted that the adapter E00 is normally used for motors weighing up to approx. 100 kg and 1'000 Nm max. torque. With heavier motors, specific adapters can be used: please consult the DANA area contact person.*
- *with connections involving the use of revolving parts such as shafts, couplings or pulleys with belts, adequate accident-prevention devices must be provided*

Allgemeine Hinweise

Die Installation der Getriebe muss sorgfältig und professionell durch technisch ausgebildete Fachkräfte ausgeführt werden.

Die Vorbereitung zur Inbetriebnahme muss entsprechend den technischen Angaben der betreffenden Maßbilder erfolgen.

Bei allen Installationsarbeiten sind immer die erforderlichen Sicherheitsmaßnahmen zu ergreifen:

1. Sicherheit für Techniker und Dritte
2. ordentlicher Betrieb des Getriebes
3. Betriebssicherheit

Diesbezüglich wird daran erinnert, dass:

- jede willkürliche Veränderung der Getriebe und des eventuell werkseitig vorgerüsteten Zubehörs ist strengstens untersagt
- Beim Anheben und Transport sind Stöße gegen die Wellenstümpfe zu vermeiden und Transportgurte oder die eigens vorgerüsteten Ösensrauben zu verwenden. Kontrollieren Sie immer, dass das Hebezeug eine ausreichende Tragfähigkeit aufweist
- Es ist strengsten verboten, an den Getrieben Schweißarbeiten auszuführen
- Sämtliche Installations- oder Instandhaltungsarbeiten sind bei stehendem Getriebe durchzuführen. Es hat sich daher bewährt, sich zuvor immer zu vergewissern, dass der Antrieb nicht unvorhergesehen anlaufen kann
- Antriebsseitig werden die Elektro- oder Hydraulikmotoren oft mit dem DANA - der Universalsystem für Flanschverbindungen E00 angebaut (siehe Kapitel "Universalantriebe"). Es wird daran erinnert, dass die Flanschverbindung E00 gewöhnlich für Motoren bis zu einem Gewicht von ca. 100 kg und mit maximalem Drehmoment von 1'000 Nm eingesetzt wird. Bei schwereren Motoren stehen spezielle Flanschverbindungen zur Verfügung: wenden Sie sich an die DANA Kontaktperson der zone zu wenden.
- Bei Verbindung mithilfe von rotierenden Teilen wie Wellen, Kupplungen und Riemenscheiben ist die Installation von Unfallschutzverkleidungen gesetzlich vorgeschrieben

Montaggio dell'albero

Prima del montaggio, pulire accuratamente le superfici di accoppiamento e lubrificarle con adeguati prodotti anti-seizure (ad eccezione delle versioni con albero cavo tipo FS, per le quali si rimanda al capitolo "Giunto ad attrito").

E' necessario che le operazioni di installazione e rimozione vengano eseguite con attrezzature adeguate, come estrattori e viti di estrazione, utilizzando i fori filettati previsti sugli alberi: in ogni caso, evitare impatti o urti che potrebbero danneggiare in modo irreparabile i componenti interni del riduttore.

Per le dimensioni dell'albero condotto, fare riferimento al capitolo "Uscite".

Shaft assembly

Before assembly, carefully clean the mating surfaces and lubricate them with suitable anti-seizure products (except for versions with hollow shaft type FS - see the section "Shrink disc").

Installation and removal operations must be done with suitable equipment, such as extractors and extraction screws, using the threaded holes provided on the shafts: in any case, avoid any impacts or knocking that could cause permanent damage to the internal parts of the gear unit.

For the sizes of the driven shaft, refer to the section "Outputs".

Einbau der Welle

Vor dem Einbau Kontaktflächen sorgfältig reinigen und mit geeignetem Verschleißhemmer schmieren (ausgenommen Ausführungen mit Hohlwelle Typ TS. Hierfür verweisen wir auf das Kapitel "Reibungskupplung").

Ein- und Ausbaurbeiten müssen mit geeignetem Werkzeug ausgeführt werden, wie Abzieher und Abziehschrauben. Dabei sind die Gewindebohrungen in den Wellen zu benutzen: auf alle Fälle sind Schläge und Stöße zu vermeiden, die zu irreparablen Schäden an den Innenteilen des Getriebes führen können.

Für die Abmaße der Abtriebswelle siehe Kapitel "Abtriebswellen".

Montaggio dei supporti a flangia e con piede

Le superfici di accoppiamento devono essere lavorate con un grado di finitura adeguato a garantire il coefficiente di attrito richiesto (indicativamente Ra 3.2 µm). Per garantire l'allineamento fra il riduttore, il motore e la macchina azionata, attenersi alle tolleranze indicate negli schemi riportati sotto.

Flange and foot mounting of supports

The mating surfaces must be machined with a degree of finish that ensures the required coefficient of friction (indicatively Ra 3.2 µm). To ensure alignment between the gear unit, motor and the driven machine, respect the tolerances given in the diagrams below.

Einbau der Flansch montierten und Fußleisten montierten Konfigurationen

Die Kontaktflächen sind mit einem Feinheitsgrad zu bearbeiten, dass der geforderte Abriebkoeffizient (Richtwert Ra 3.2 µm) sichergestellt ist. Zur Sicherstellung der Ausrichtung von Getriebe, Motor und angetriebener Maschine sind die in den nachstehenden Zeichnungen angegebenen Toleranzen einzuhalten.

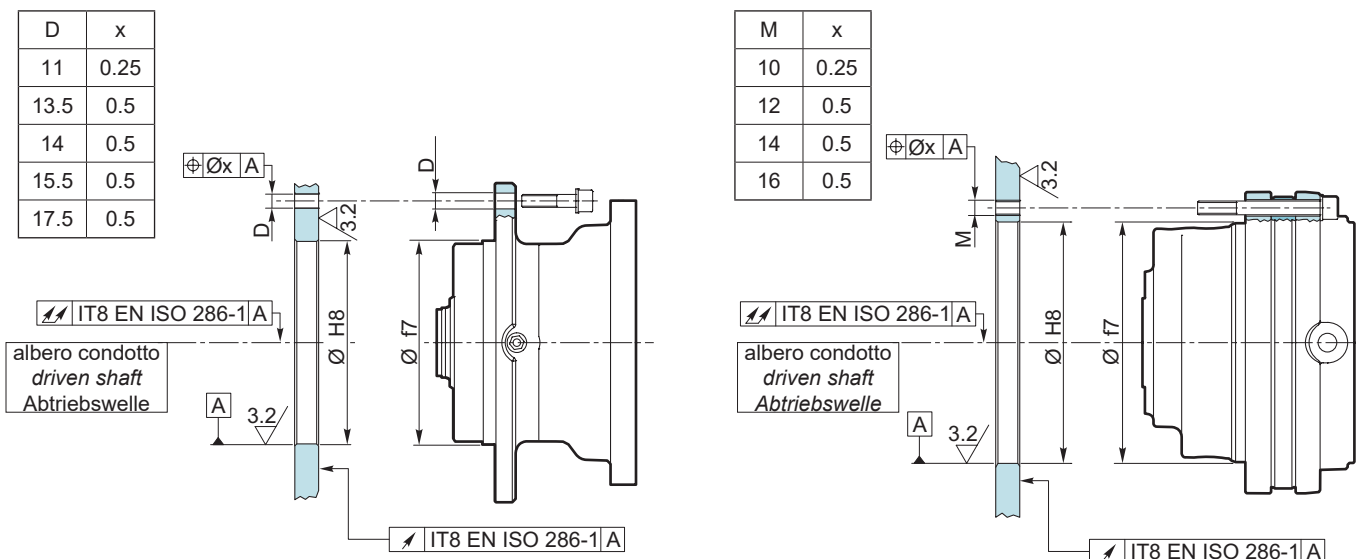


Fig. (17)

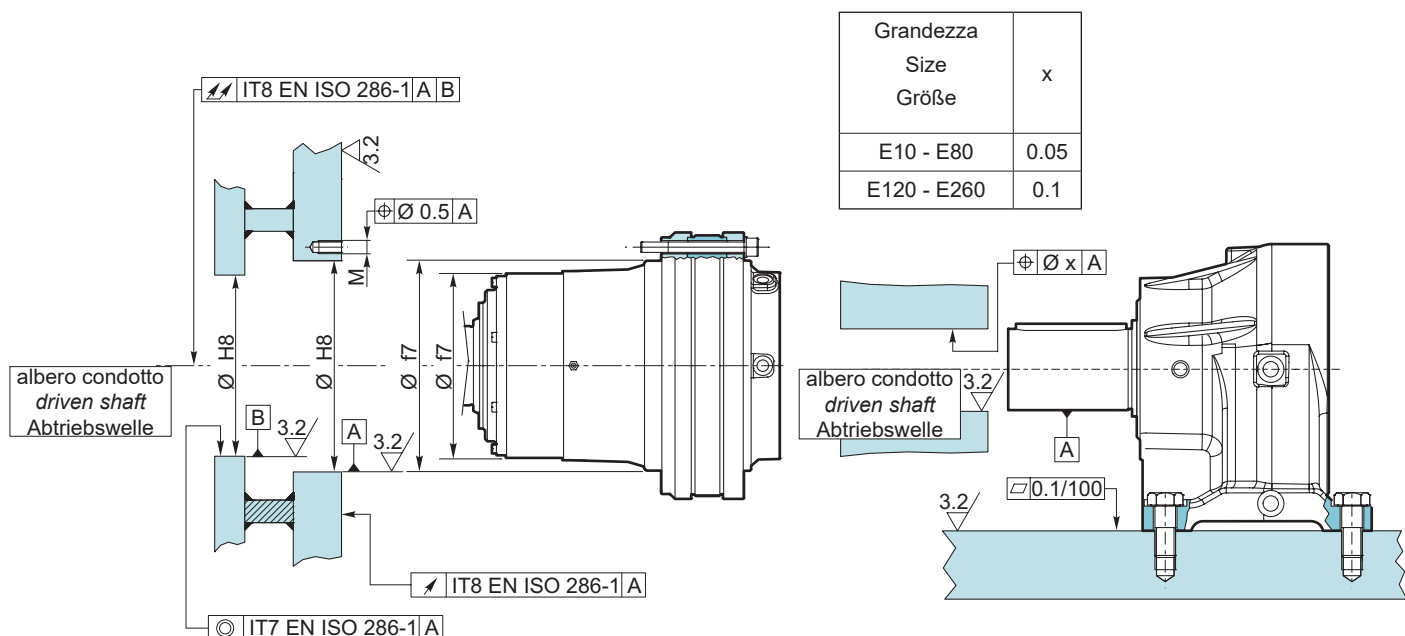


Fig. (18)

Prima dell'installazione pulire e sgrassare adeguatamente le superfici di accoppiamento, eliminando eventuali tracce di vernice. Nel caso in cui la coppia massima da trasmettere sia maggiore di $0.7 \times T_{2MAX}$, oppure nel caso in cui siano previste frequenti inversioni del moto, applicare sulle superfici di accoppiamento un prodotto adesivo adeguato per il bloccaggio.

L'installazione deve essere eseguita in modo da curare l'allineamento tra il riduttore e l'albero da comandare, oppure tra il riduttore e il motore in tutti i casi in cui il motore non sia direttamente flangiato al riduttore stesso.

Un accorgimento molto importante, al fine di evitare che le flange di sostegno dei riduttori vengano messe in tensione già in fase di montaggio, consiste nell'assicurarsi che la controflangia di fissaggio aderisca perfettamente alla flangia del riduttore prima del serraggio delle viti di fissaggio.

Sui riduttori E160 ed E260 Versioni maschile, è raccomandato l'utilizzo di entrambi i centraggi sul supporto uscita; in caso contrario contattare il referente DANA di zona.

Viti di fissaggio

Utilizzare, per il fissaggio dei riduttori, viti di classe 10.9 con rosette ISO 7089 (300 HV min.)

Le viti devono essere serrate, in funzione delle loro dimensioni, secondo le coppie indicate nelle tabella dimensionali delle diverse grandezze: i valori delle coppie di serraggio sono riferite a viti nelle condizioni di fornitura, ovvero con rivestimento superficiale di fosfatazione.

Evitare di lubrificare le viti prima del serraggio in quanto la conseguente variazione di coefficiente di attrito superficiale potrebbe causare un sovraccarico delle viti al momento del serraggio

Verificare sempre la coppia di serraggio delle viti dopo le prime ore di funzionamento della macchina.

Before installation, clean and degrease the mating surfaces thoroughly, removing any traces of paint. If the maximum torque to be transmitted is higher than $0.7 \times T_{2MAX}$, or if frequent reversals are foreseen, apply a suitable adhesive product for clamping on the coupling surfaces.

Installation must ensure the alignment of the gear unit and the shaft to be controlled, or the gear unit and the motor whenever the motor is not directly flanged to the gear unit itself.

A particularly important measure, to prevent stress on the support flanges of the gear units even in the assembly phase, is to ensure that the mounting counter-flange adheres perfectly to the gear unit flange before tightening the fixing screws.

For E160 and E260 male versions gearboxes it is recommended to use both the spigots on the output support; otherwise consult the DANA area contact person.

Fixing screws

Use class 10.9 screws with washers ISO 7089 (300 HV min.) for mounting the gear units

The screws must be tightened (depending on their size) according to the torque values given in the dimensional table of the various sizes: the tightening torque values refer to screws in the conditions of supply, or with phosphate coating.

Do not lubricate the screws before tightening, as the consequent variation in coefficient of surface friction could cause an overload on tightening.

Always check the tightening torque of the screws after the first hours of machine operation.

Vor der Installation Kontaktflächen reinigen und entfetten, eventuelle Lackspuren entfernen. Liegt das zu übertragende Drehmoment über $0.7 \times T_{2MAX}$ oder sind häufige Änderungen der Drehrichtung des Motors vorgesehen, geeignetes Haftmittel für die Befestigung auf die Kontaktflächen aufbringen.

Ist der Motor nicht direkt am Getriebe angeflanscht, besonders auf die Ausrichtung von Getriebe und der zu steuernden Welle bzw. von Getriebe und Motor achten.

Wichtiger Hinweis: Um zu vermeiden, dass die Befestigungsflange der Getriebe schon beim Einbau unter Spannung stehen darauf achten, dass die Gegenflange für die Befestigung korrekt am Getriebeflansch vor dem Anziehen der Befestigungsschrauben anliegen.

Für die Getriebe E160 und die männliche Version von E260 ist es empfohlen beide Zentrierungen der Ausgangslagerung zu verwenden; andernfalls wenden sie sich an die DANA Kontaktperson der zone zu wenden.

Befestigungsschrauben

Für die Befestigung der Getriebe Schraubenklasse 10.9 mit Unterlegscheiben ISO 7089 (300 HV min.) verwenden

Die Schrauben sind entsprechend ihrer Abmaße nach den in den Größen Tabellen der verschiedenen Baugrößen angegebenen Anzugsmomenten anzuziehen: Die angegebenen Werte für das Anzugsmoment beziehen sich auf Schrauben im Lieferzustand bzw. auf phosphatisierte Schrauben.

Schrauben vor dem Anziehen nicht schmieren, da die sich daraus ergebende Änderung des Abriebskoeffizienten zu einer Überbelastung beim Anziehen der Schrauben führen können.

Immer nach einigen Betriebsstunden das Anzugsmoment der Schrauben überprüfen.

21. GIUNTO AD ATTRITO

21. SHRINK DISC

21. REIBUNGSKUPPLUNG

I giunti ad attrito sono montati sull'albero di uscita dei supporti tipo FS. Riportiamo di seguito le caratteristiche e gli accorgimenti da considerare per un corretto montaggio e smontaggio di questi organi ai quali è affidata la trasmissione del moto.

The shrink discs are fitted on the output shaft of FS type supports. Given below are the characteristics and measures to be considered for correct assembly and disassembly of these parts used for the transmission of motion.

Die Reibungskupplungen sind auf den Abtriebskonfigurationen FS montiert. Im Folgenden werden die Merkmale und die Anweisungen aufgeführt, die beim Ein- und Ausbau dieser Organe zur Bewegungsübertragung zu berücksichtigen sind.

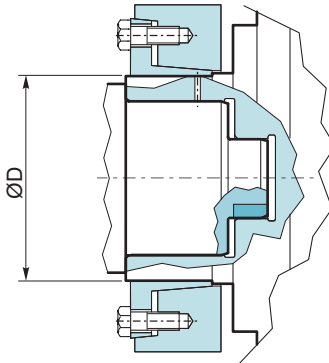


Fig. (19)

	T _{2N} [Nm]	D [mm]	*T _{GN} [Nm]	Tipo di giunto Coupling Type Kupplungsart	Codice DANA DANA code Code DANA
E10	1'200	ø62	2'710	3009 62x110	9019090
E16	1'800	ø62	2'870	3009 62x110	9019090
E25	2'900	ø100	9'930	3009 100x170	9019152
E30	3'800	ø100	9'930	3009 100x170	9019152
E50	5'000	ø100	9'930	3009 100x170	9019152
E80	8'500	ø125	18'100	3009 125x215	9020528
E120	13'000	ø140	24'100	3208 140x230	9020611
E160	18'000	ø165	44'000	3009 165x290	9021668
E260	26'000	ø175	54'800	3009 175x300	9022752

Tab. (28)

T_{2N} = Coppia nominale riduttore / Gear unit nominal torque / Nenndrehmoment Getriebe

* T_{GN} = Coppia massima del giunto / Maximum torque of the coupling / Max. Drehmoment der Kupplung

D = Diametro giunto d'attrito / Hub diameter / Wellendurchmesser

* In presenza di carichi assiali la coppia trasmissibile T_{GN} dovrà essere ridotta. Contattare il referente DANA di zona.

* In case of axial loads, the transmissible torque T_{GN} should be reduced. Consult the DANA area contact person.

* Bei Axiallasten muss das übertragbare Drehmoment T_{GN} verringert werden. Wenden Sie sich an die DANA Kontaktperson der zone zu wenden.

Montaggio

Assembly

Einbau

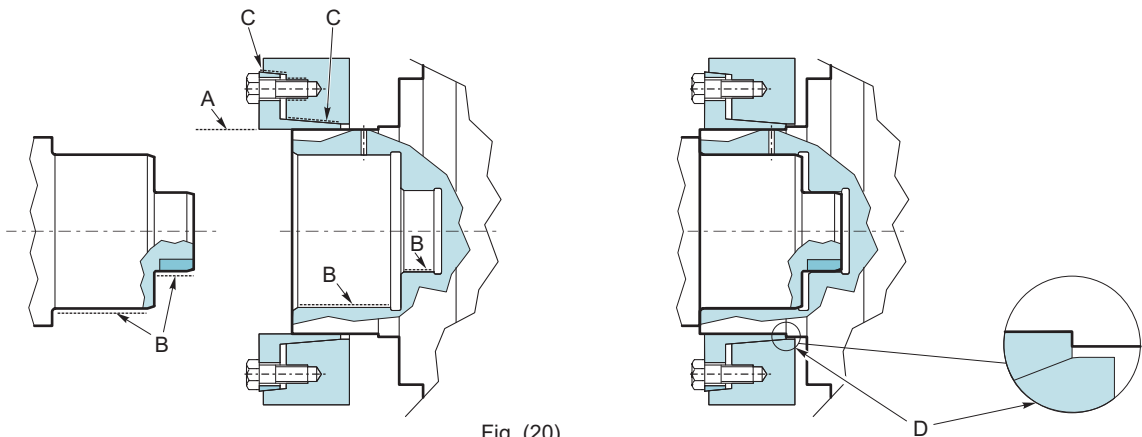


Fig. (20)

1. Pulire e sgrassare accuratamente l'albero e la sua sede (Fig.20 punti B). Per facilitare i successivi smontaggi, è consigliabile realizzare il centraggio piccolo dell'albero mediante una bronzina opportunamente lavorata (Fig. 20).
2. Lubrificare la sede del giunto (Fig.20 punto A) con grasso al bisolfuro di molibdeno (MoS₂). Quando è nuovo, non occorre smontare il giunto per ingrassarlo. Solo in caso di ripristino di un giunto usato, è consigliabile ingrassare le zone C.
3. Montare il giunto sul riduttore senza serrare le viti. Se la posizione di montaggio è verticale ed il relativo albero è rivolto verso il basso, assicurarsi che il giunto non possa sfilarsi e cadere. In tutti i casi, non serrare mai le viti prima di avere infilato l'albero nella sua sede.

1. Thoroughly clean and degrease the shaft and its seat (Fig.20 B). To facilitate subsequent disassembly, it is advisable to create the shaft's small spigot by means of a suitably machined bushing (Fig. 20).
2. Lubricate the seat of the coupling (Fig.20 A) with molybdenum disulfide grease (MoS₂). When new, the coupling does not have to be disassembled for greasing. Greasing of areas C is advisable only when reinstalling a used coupling.
3. Fit the coupling on the gear unit without tightening the screws. If the mounting position is vertical and the respective shaft is facing downward, make sure the coupling cannot slip off and fall. In all cases, never tighten the screws before fitting the shaft in its seat.

1. Die Welle und ihre Aufnahme sorgfältig reinigen und entfetten (Abb.20 Punkt B). Um den späteren Ausbau zu erleichtern, sollte die Welle mittels eines passend bearbeiteten Gleitlagers zentriert werden (Abb. 20).
2. Sitz der Kupplung (Abb. 20 Punkt A) mit Molybdändisulfid-Fett schmieren (MoS₂). Eine neue Kupplung braucht zum Einfetten nicht ausgebaut zu werden. Nur bei Überholung einer gebrauchten Kupplung muss der Bereich C geschmiert werden.
3. Kupplung an das Getriebe bauen ohne dabei in die Schrauben anzuziehen. Bei vertikalem Einbau mit nach unten gerichteter Welle ist sicher zu stellen, dass die Kupplung fest sitzt und nicht herausfallen kann. Auf keinen Fall die Schrauben festziehen, bevor die Welle in die eigene Aufnahme eingeführt ist.

4. Inserire l'albero nella sua sede. Il montaggio deve avvenire senza interferenza alcuna e questo è possibile solo con un preciso allineamento fra riduttore e albero realizzabile mediante l'ausilio di opportune attrezzature di sollevamento.

ATTENZIONE!

Il montaggio deve essere effettuato senza applicare forze assiali, colpi o urti che potrebbero danneggiare i cuscinetti del riduttore.

5. Posizionare il giunto fino all'arresto contro lo spallamento appositamente previsto sull'albero (Fig.20 punto D) prima di iniziare a serrare le viti.

6. Avvitare progressivamente le viti in sequenza, secondo uno schema circolare, con opportuna chiave dinamometrica, scelta secondo la distanza "X" di progettazione (Fig. 21) e tarata alla coppia di serraggio indicata nella tabella sottostante. Effettuare l'ultima ripresa tarando la chiave ad una coppia più alta del 3-5% rispetto a quella indicata.

Tarare nuovamente la chiave alla coppia indicata in tabella ed assicurarsi che nessuna vite possa essere ulteriormente avvitata, in caso contrario ripetere la procedura dal punto 5. Il montaggio è completo e corretto se le superfici frontali dell'anello interno ed esterno si trovano sullo stesso piano (Fig.21 punto W).

Non è necessario ricontrrollare la coppia di serraggio dopo l'entrata in servizio del giunto.

7. Proteggere la zona del giunto con opportuno carter in lamiera, (Fig.21 punto P) se si prevede che pietre, sabbia o altro materiale possano danneggiare il giunto o le guarnizioni di tenuta del riduttore.

4. *Fit the shaft in its seat. Assembly must occur without any interference, and this is only possible with exact gear unit/shaft alignment, carried out with the aid of suitable lifting equipment.*

CAUTION!

Assembly must be carried out without applying axial forces, blows or impacts that could damage the gear unit bearings.

5. *Position the coupling until it stops against the shoulder on the shaft (Fig.20 D) before tightening the screws.*

6. *Tighten the screws gradually in a circular order, using a suitable torque wrench chosen according to design distance "X" (Fig. 21) and adjusted to the torque given in the table below. Carry out final tightening, setting the wrench to a torque of 3-5% higher than that indicated.*

Set the wrench to the torque specified in the table and make sure that no screws can be further tightened, otherwise repeat the procedure from point 5. Assembly is complete and correct if the front surfaces of the inner and outer ring are on the same level (Fig.21 W).

The tightening torque does not have to be rechecked after the coupling is put into service.

7. *Protect the coupling area with the special sheet casing, (Fig.21 P) if there is the risk of stones, sand or other material that damaging the coupling or the gear unit seals.*

4. Die Welle in ihren Sitz einsetzen. Der Einbau muss problemlos erfolgen, Getriebe – und Welle müssen dazu perfekt ausgerichtet sein. Das ist nur mit geeignetem Hubmittel möglich.

ACHTUNG!

Bei der Montage keine Axialkräfte oder Schläge und Stöße anwenden, die die Getriebelager beschädigen können.

5. Kupplung in den auf der Welle ausgeführten Absatz (Abb. 20 Punkt D) vor dem Anziehen der Schrauben drücken.

6. Die Schrauben nacheinander reihum mit einem Drehmomentschlüssel anziehen, der je nach dem Abstand der Projektvorgaben "X" (Abb. 21) auszuwählen und auf das in der nachstehenden Tabelle angegebene Anzugsmoment einzustellen ist. Noch einmal nachziehen und dafür den Schlüssel auf ein Anzugsmoment einstellen, das 3-5% höher als das angegebene ist.

Den Schlüssel wieder auf das in der Tabelle angeführte Anzugsmoment einstellen und sich vergewissern, dass es danach nicht möglich ist, die Schrauben weiter anzuziehen; andernfalls ist das Verfahren ab Punkt 5 zu wiederholen. Der Einbau ist vorschriftsmäßig ausgeführt, wenn sich die gegenüberliegenden Flächen des Innen- und Außenringes auf derselben Ebene befinden (Abb. 21 Punkt W).

Nach der Inbetriebnahme der Kupplung braucht das Anziehmoment nicht erneut kontrolliert zu werden.

7. Falls Gefahr besteht, dass Steine, Sand oder anderes Material die Kupplung oder die Getriebedichtungen beschädigen können, ist der Kupplungsbereich durch eine geeignete Blechverkleidung zu schützen (Abb. 21, Punkt P).

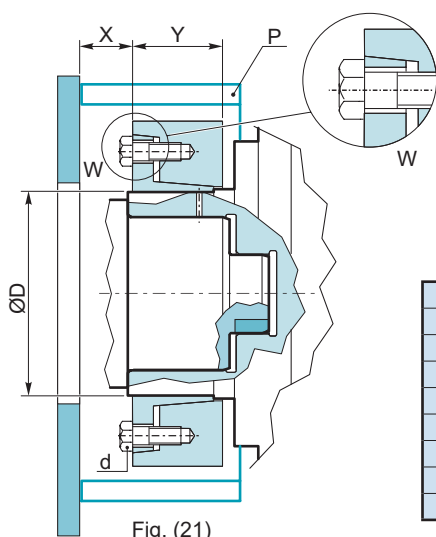


Fig. (21)

	Tipo giunto Coupling type Kupplungsart	Y [mm]	D [mm]	Screw		X [mm] per tipo di chiave for type of wrench für Schlüsseltyp		
				d	T [Nm]	Circle	Hex	Wrench
E10	3009 62x110	29	ø62	M8	35	20	70	-
E16	3009 62x110	29	ø62	M8	35	20	70	-
E25	3009 100x170	43	ø100	M10	70	25	90	-
E30	3009 100x170	43	ø100	M10	70	25	90	-
E50	3009 100x170	43	ø100	M10	70	25	90	-
E80	3009 125x215	53	ø125	M12	121	25	90	-
E120	3208 140x230	74	ø140	M16	240	50	100	58
E160	3009 165x290	68	ø165	M16	295	50	100	58
E260	3009 175x300	68	ø175	M16	295	50	100	58

Tab. (29)

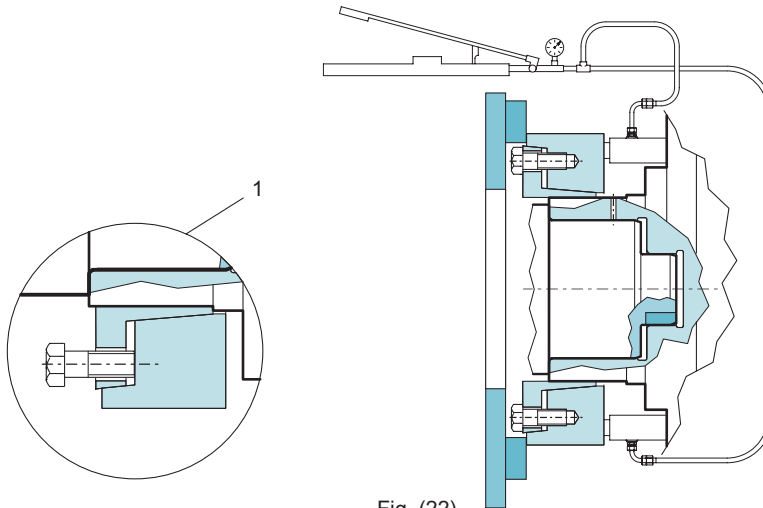


Fig. (22)

1. Allentare le viti in sequenza e in più riprese, fino a che il giunto si possa muovere sul mozzo.

1. Loosen the screws gradually and in order, until the coupling can move on the hub.

1. Die Schrauben nacheinander in mehreren Durchgängen lockern, bis die Kupplung auf der Nabe bewegt werden kann.

ATTENZIONE!

Non svitare completamente le viti fino a quando gli anelli non si siano separati spontaneamente. Le elevate forze assiali potrebbero causare uno smontaggio violento, con conseguente pericolo per gli operatori.

CAUTION!

Do not undo the screws completely until the rings separate on their own. High axial forces could cause a violent removal, with subsequent danger for operators.

ACHTUNG!

Die Schrauben erst völlig herausdrehen, wenn sich die Ringe selbstständig trennen. Die beträchtlichen Axialkräfte können zu einem heftigen und für die Arbeitskräfte gefährlichen Ablösen führen.

2. Nel caso gli anelli non si separassero spontaneamente dopo avere allentato le viti, trasferirne alcune nei fori di estrazione dell'anello interno (Fig. 22 dettaglio 1) e avvitandole, separare quest'ultimo dall'anello esterno.

2. If the rings do not separate on their own after loosening the screws, fit some of them in the extraction holes of the inner ring (Fig. 22 detail 1) and, screwing them, separate the inner ring from the outer ring.

2. Falls sich die Kupplungsringe nach dem Entfernen der Schrauben nicht von selbst lösen sollten, einige Schrauben in die Abzugsbohrungen des Innenrings einsetzen (Abb. 22, Ausschnitt 1) und durch Festziehen derselben den Innen- vom Außenring trennen.

3. Utilizzando adeguate attrezzature per il sostegno del riduttore, separare il riduttore dall'albero della macchina. Se tale metodo non fosse sufficiente a liberare il riduttore, si consiglia di utilizzare appositi spintori idraulici, che agiscano fra il supporto e la struttura della macchina (Fig. 22). E' necessario che la forza esercitata dagli spintori non sia superiore ai valori riportati nella tabella sottostante:

3. Using appropriate equipment to support the gear unit, separate the gear unit from the shaft of the machine. If this method is not sufficient to free the gear unit, it is advisable to use special hydraulic pushers that act between the support and the structure of the machine (Fig. 22). The force exerted by the pusher must not exceed the values given in the table below:

3. Zur Halterung des Getriebes geeignete Werkzeuge benutzen, Getriebe von der Welle der Maschine trennen. Sollte dieses Verfahren nicht ausreichen, um das Getriebe freizubekommen, wird zum Einsatz eines Hydraulikschiebers geraten, der zwischen Halterung und Maschinengehäuse (Abb. 22) wirkt. Dabei darf die Kraft des Schiebers nicht über den in der nachstehenden Tabelle aufgeführten Werten liegen:

Carico assiale / Axial load / Achslast [N]								
E10	E16	E25	E30	E50	E80	E120	E160	E260
15'000	24'000	42'000	42'000	42'000	57'000	72'000	90'000	105'000

Tab. (30)

4. Se lo smontaggio del riduttore avviene dopo diverso tempo dalla messa in funzione, è necessario rimuovere il giunto dal mozzo, separare gli anelli conici e togliere eventuali residui di sporco o ruggine da tutte le superfici interessate al calettamento. Prima di installare nuovamente l'unità di bloccaggio, pulirla accuratamente e ripristinare la lubrificazione come indicato nella fig. 20 (punti C).

4. If the gear unit is disassembled quite some time after putting into service, it is necessary to remove the coupling from the hub, separate the tapered rings and clean any residuals of dirt or rust from all the surfaces involved in fitting. Before refitting the clamping unit, carefully clean it and lubricate as shown in fig. 20 (C).

4. Erfolgt der Ausbau des Getriebes sehr lange nach der Inbetriebnahme, müssen die Kupplung von der Nabe abgezogen und die Kegelringen getrennt werden; anschließend sorgfältig die Oberflächen der drehfesten Verbindung reinigen und eventuellen Schmutz, Rost usw. entfernen. Vor dem Wiedereinbau der Verkeilung dieselbe sorgfältig reinigen und schmieren, wie in der Abbildung 20 (Punkt C) gezeigt wird.

22. BRACCIO DI REAZIONE

Per i riduttori con supporto FS e FCP è previsto il montaggio pendolare sull'estremità dell'albero della macchina azionata. In tal caso il riduttore deve essere ancorato al suolo mediante un braccio di reazione che impedisca la rotazione della carcassa del riduttore attorno al suo asse.

La soluzione ideale prevede l'utilizzo di un braccio di reazione simmetrico che annulla la risultante dei carichi radiali dovuti alla coppia di reazione. Per dettagli circa l'esecuzione di questo tipo di fissaggio, contattare il referente DANA di zona.

Nel caso in cui sia necessario ricorrere ad un braccio di reazione semplice, di seguito vengono indicate le dimensioni consigliate dei bracci di reazione da utilizzare in funzione della grandezza del riduttore.

22. TORQUE ARM

Mounting on the end of the shaft of the driven machine is foreseen for gear units with FS and FCP supports. In this case the gear unit must be secured to the ground by means of a torque arm preventing the gear unit housing from rotating around its axis.

The ideal solution would be a symmetrical torque arm that cancels the resultant of the radial loads due to the reaction torque. For details about the execution of this type of mounting, consult the DANA area contact person.

If a single torque arm is required, given below are the recommended dimensions of the torque arm to be used depending on the size of the gear unit.

22. DREHMOMENTSTÜTZE

Die Getriebe mit Wellenkonfiguration FS und FCP werden auf die Welle der angetriebenen Maschine aufgesteckt. In diesem Falle muss das Getriebe am Boden mit einer Drehmomentstütze befestigt werden, die verhindert, dass sich das Gehäuse des Getriebes um seine eigene Achse dreht.

Bei dieser Lösung ist eine symmetrische Drehmomentstütze vorgesehen, die die Resultierende aus Radiallasten und Reaktionsmomente aufnimmt. Einzelheiten mit Bezug auf diese Befestigungsart erfragen sich an die DANA Kontaktperson der zone zu wenden.

Sollte eine einfache Drehmomentstütze notwendig sein, werden nachstehend die empfohlenen Abmaße der Drehmomentstütze entsprechend der Größe des Getriebes angegeben.

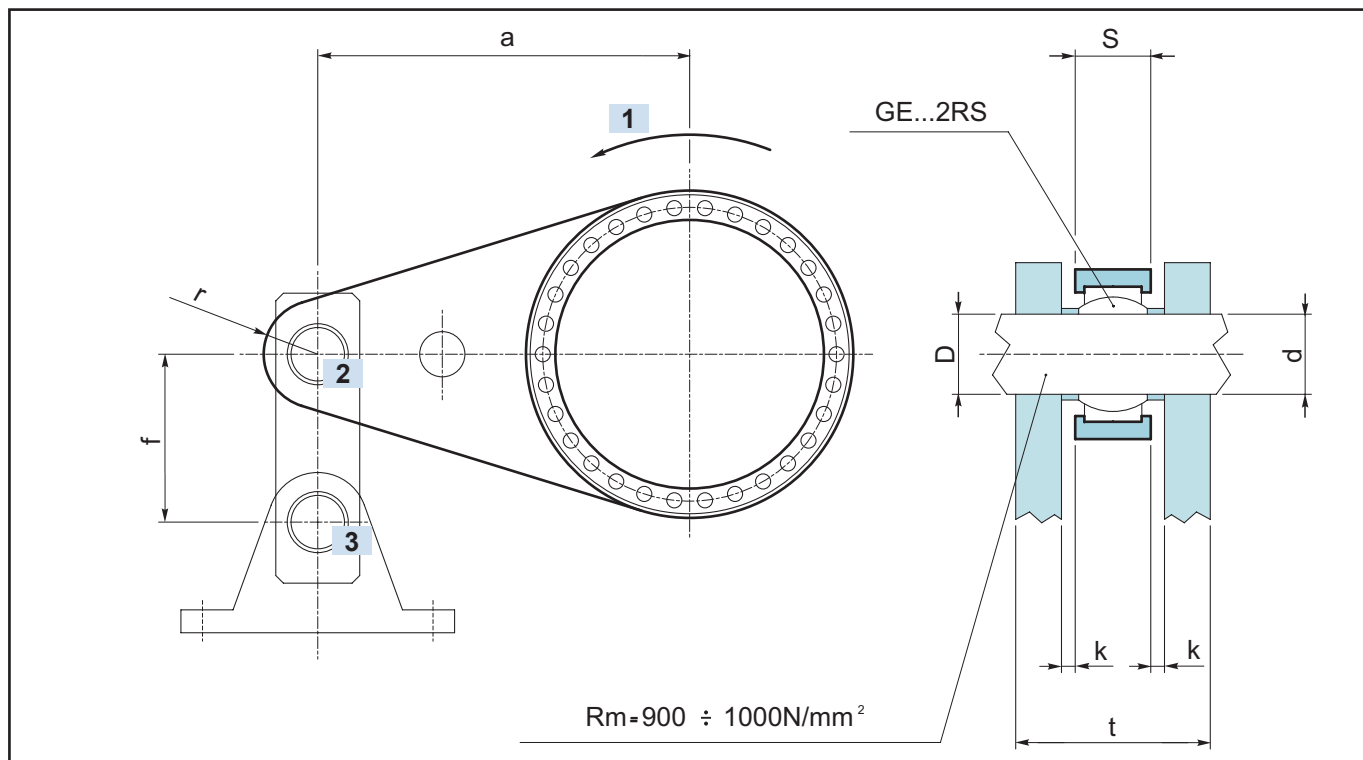


Fig. (23)

1
Senso di rotazione preferenziale lato albero uscita

1
Output shaft side preferential direction of rotation

1
Bevorzugte Drehrichtung der Abtriebswelle

2 - 3
GE...2RS nelle posizioni 2 e 3

2 - 3
GE...2RS in positions 2 and 3

2 - 3
GE...2RS in den Positionen 2 und 3

	a min [mm]	s [mm]	r min [mm]	f min [mm]	GE...2RS	D [mm]	d [mm]	k [mm]	t min [mm]
E10 - E16	200	15	30	80	20	20 G7	20 js6	2	35
E25	300	15	30	80	20	20 G7	20 js6	2	35
E30 - E50	300	20	35	100	25	25 G7	25 js6	3	46
E80	400	20	35	100	25	25 G7	25 js6	3	46
E120	500	25	40	150	30	30 G7	30 js6	3	55
E160	600	25	40	150	30	30 G7	30 js6	3	55
E260	700	30	45	150	35	35 G7	35 js6	4	66

Tab. (31)

Montaggio del braccio di reazione

1. Il braccio di reazione deve avere libertà di movimento in direzione assiale e gioco sufficiente negli accoppiamenti per consentire al riduttore piccole oscillazioni, sempre presenti, senza nel contempo causare sovraccarichi al riduttore stesso. Quindi si raccomanda l'impiego di snodi sferici in tutti i collegamenti.
2. Si consiglia l'impiego di snodi sferici tipo "long life" con superfici d'attrito protette con PTFE. In alternativa possono essere usati giunti del tipo "acciaio su acciaio", prevedendo la possibilità di una operazione di ingrassaggio periodica.
3. La biella di ancoraggio deve essere parallela al braccio di reazione per garantire, a vuoto, il gioco laterale "k" che garantisce libertà di movimento alla struttura in caso di deformazione.
4. Il supporto fisso a cui è collegata la seconda estremità della biella deve garantire un ancoraggio adeguato al carico.
5. Il braccio di reazione e la relativa biella possono avere soluzioni di progetto diverse da quelle proposte, ma è tassativo rispettare i seguenti accorgimenti:

- Il braccio di reazione deve essere perfettamente dritto
- Se si prevedono pezzi saldati, occorre sabbare, normalizzare e correggere di macchina utensile eventuali deformazioni
- La superficie di contatto del braccio di reazione in corrispondenza della flangiatura al riduttore deve essere perfettamente piana
- Prima di collegare il braccio di reazione al riduttore, eliminare accuratamente ogni traccia di grasso dalle superfici a contatto.

ATTENZIONE!

Non eseguire alcun lavoro di saldatura che coinvolga il riduttore nemmeno come messa a terra.

6. Usare sempre la chiave dinamometrica per serrare le viti di collegamento.

Torque arm assembly

1. *The torque arm must be free to move axially and have enough play in the couplings to allow small oscillations (always present) of the gear unit, but without causing overloads on the gear unit. Therefore ball joints must be used in all connections.*
2. *It is advisable to use long-life ball joints, protecting the rubbing surfaces with PTFE. Alternatively, "steel to steel" type joints can be used, providing for the possibility of periodical greasing.*
3. *The anchorage connecting rod must be parallel to the torque arm in order to ensure (unloaded) the side clearance "k" which ensures free movement of the structure in case of deformation.*
4. *The fixed support to which the second end of the connecting rod is connected must ensure adequate anchorage for the load.*
5. *The torque arm and relevant connecting rod can have different design solutions from those proposed, but the following arrangements must be respected:*

- *The torque arm must be perfectly straight*
- *If welded parts are provided for, any deformations must be sanded, normalized and machine tool corrected*
- *The contact area of the torque arm at the adapter on the gear unit must be perfectly flat*
- *Before connecting the torque arm to the gear unit, carefully remove all traces of grease from the contact surfaces.*

CAUTION!

Do not carry out any welding work involving the gear unit, or even grounding.

6. Always use a torque wrench to tighten the connection screws.

Montage der Drehmomentstütze

1. Die Drehmomentstütze muss sich in axialer Richtung frei bewegen können und ausreichend Spiel in den Passungen haben, damit kleine Schwankungen beim Getriebe möglich sind, jedoch ohne das Getriebe zu überlasten. Daher wird der Einsatz von Kugelgelenken empfohlen.
2. Am besten geeignet sind "langlebige" Kugelgelenke mit durch PTFE geschützten Reibungsflächen. Alternativ können Gelenke des Typs "Stahl auf Stahl" verwendet werden, die jedoch regelmäßig geschmiert werden müssen.
3. Die Verbindungsstange muss parallel zur Drehmomentstütze liegen, damit lastfrei das seitliche Spiel „k“ gegeben ist, das die Bewegungsfreiheit der Struktur bei Verformung gewährleistet.
4. Die feste Lagerung des anderen Endes der Verbindungsstange muss eine angemessene Lastverankerung garantieren.
5. Die Drehmomentstütze und die Verbindungsstange können andere rojektlösungen als die beschriebene aufweisen, müssen jedoch in jedem Fall die folgenden Bedingungen einhalten:

- Die Drehmomentstütze muss perfekt gerade sein
- Bei Schweißstellen müssen eventuelle Verformungen sandgestrahlt, normalisiert und mit Werkzeugmaschinen nachgearbeitet werden
- Die Kontaktfläche der Drehmomentstütze auf Höhe der Flanschverbindung mit dem Getriebe muss perfekt eben sein
- Vor der Verbindung der Drehmomentstütze mit dem Getriebe sorgfältig alle Fettrückstände von den Kontaktflächen entfernen.

ACHTUNG!

Keine Schweißarbeiten am Getriebe ausführen, nicht einmal für die Erdung.

6. Verwenden Sie beim Anziehen der Schrauben immer den Drehmomentschlüssel.

7. La fig. 23 fornisce un esempio indicativo, poiché la configurazione corretta dipende dal senso di rotazione del riduttore. Infatti, durante il lavoro, è consigliabile che la biella risulti in trazione e non in compressione: la figura di pag. B21 indica, a tale proposito, il senso di rotazione preferenziale affinché tale condizione sia verificata.

Se necessario, eseguire il montaggio del braccio di reazione dal lato opposto a quello riportato in Fig. 23.

In caso di necessità, a causa di ingombri specifici, la biella può essere montata verso l'alto.

8. Quando si esegue un montaggio di tipo pendolare, occorre ricordare che i pesi del riduttore, del braccio di reazione e di tutti gli elementi ad essi collegati, inducono carichi e momenti ribaltanti che vengono sopportati dai cuscinetti del supporto d'uscita.

Quindi la posizione relativa di tutte le masse che concorrono alla trasmissione della potenza deve essere valutata in sede di progetto al fine di rendere minimo il valore delle risultanti su detti cuscinetti.

Per le stesse ragioni è chiaro che si deve limitare al massimo il peso dei componenti collegati al riduttore, valutando accuratamente gli spessori delle strutture effettivamente necessarie a reggere gli sforzi e decentrando tutti gli elementi che non sono funzionali alla trasmissione di potenza.

Una progettazione impropria, può ridurre la vita dei riduttori causando cedimenti prematuri dei cuscinetti e degli ingranaggi a causa di eccessive deformazioni elastiche degli stadi e determinare la possibilità di slittamento e grippaggio del giunto ad attrito.

7. *Fig. 23 is given only by way of example, since the correct configuration depends on the gear unit rotation direction. In fact, during the work, it is advisable for the connecting rod to be in traction and not compression: the figure on p. B21 shows the preferential direction of rotation so that this condition is met.*

If necessary, mount the torque arm on the opposite side to that shown in Fig. 23.

If necessary, due to specific encumbrance, the connecting rod can be assembled upward.

8. *When doing a shaft mounting type assembly, remember that the weights of the gear unit, the torque arm and all the elements connected to them create loads and tipping moments that are supported by the output support bearings.*

Therefore the relative position of all the masses involved in transmitting power must be appraised in the design phase, in order to minimize the resultant value on the bearings.

Likewise, the weight of the components connected to the gear unit must be limited as much as possible, carefully appraising the thicknesses of the structures actually necessary for supporting the stresses, and decentralizing all the elements not involved in power transmission.

An incorrect design can shorten the life of the gear units, causing early giving of the bearings and gears due to excessive elastic deformation of the stages, with the possibility of the shrink disc slipping and seizing.

7. Abb. 23 stellt nur ein Beispiel vor, da die genaue Konfiguration immer von der Drehrichtung des Getriebes abhängt. Bei der Ausführung der Arbeiten sollte die Verbindungsstange immer zugbelastet und nicht druckbelastet sein: die Abbildung auf Seite B21 gibt in diesem Zusammenhang die bevorzugte Drehrichtung an, damit sich diese Bedingung einstellt.

Nötigenfalls die Drehmomentstütze auf der gegenüberliegenden Seite der in Abb. 23 gezeigten Position anbringen Abb.23.

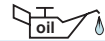
Bei Bedarf infolge besonderer Abmessungen kann die Schubstrebe in nach oben gerichteter Stellung montiert werden.

8. In der Aufsteckausführung darf nicht vergessen werden, dass das Gewicht des Getriebes, der Drehmomentstütze und aller damit verbundenen Bauteile Lasten und Kippmomente verursachen, die abtriebsseitig auf den Lagern lasten.

Die Anordnung aller Gewichte, die an der Leistungsübertragung beteiligt sind, muss daher bei der Planung genau bewertet werden, um die Auswirkungen auf die genannten Lager zu minimieren.

Aus denselben Gründen muss das Gewicht der mit dem Getriebe verbundenen Bauteile so weit wie möglich begrenzt werden; dabei ist die Stärke der Strukturen, die effektiv erforderlich ist, um den anfallenden Kräften standzuhalten, zu berücksichtigen und sind alle Elemente, die für die Leistungsübertragung nicht unerlässlich sind, zu verlagern.

Eine schlechte Planung kann die Lebensdauer der Getriebe verkürzen, zu frühzeitigem Nachgeben der Lager und Zahnräder führen infolge von außergewöhnlichen Verformungen der Stufen und das Durchrutschen und Festfressen der Reibungskupplung verursachen.



23. LUBRIFICAZIONE

23. LUBRICATION

23. SCHMIERUNG

I riduttori DANA vengono forniti privi di lubrificante; l'utilizzatore è tenuto ad effettuare il corretto riempimento prima della messa in moto della macchina.

Caratteristiche fondamentali degli oli

I parametri importanti da considerare quando si sceglie il tipo di olio sono:

- la viscosità alle condizioni nominali di funzionamento
- gli additivi

Lo stesso olio deve lubrificare sia i cuscinetti che gli ingranaggi e tutti questi componenti coesistono all'interno della stessa scatola, in condizioni di funzionamento diverse.

Viscosità

La viscosità nominale è riferita ad una temperatura di 40 °C, ma diminuisce velocemente all'aumentare della temperatura. Se la temperatura di funzionamento del riduttore è compresa tra 50 °C e 70 °C, si può scegliere una viscosità nominale secondo la seguente tabella indicativa, adottando la viscosità più elevata quando si prevede la temperatura di lavoro più elevata.

Velocità in uscita Output speed Abtriebsdrehzahl n ₂ [rpm]	Temperatura di lavoro Operating temperature Betriebstemperatur	
	50° C	70° C
n ₂ ≥ 20	VG 150	VG 220
5 < n ₂ < 20	VG 220	VG 320
n ₂ ≤ 5	VG 320	VG 460

Tab. (32)

Particolare attenzione bisogna fare agli stadi in uscita molto caricati e con velocità molto basse (< 1 rpm). In questi casi bisogna ricorrere sempre ad oli con viscosità elevata e con una buona carica di additivazione Extreme Pressure (EP).

Additivi

Oltre ai normali additivi antischiuma ed antiossidanti, è importante utilizzare oli lubrificanti con additivi in grado di conferire proprietà EP (extreme pressure) ed anti-usura, secondo ISO 6743-6 L-CKC o DIN 51517-3 CLP. Occorre ricercare prodotti con caratteristiche EP tanto più marcate quanto più ridotta è la velocità in uscita del riduttore. È opportuno ricordare che i composti chimici sostitutivi della lubrificazione idrodinamica si formano a scapito della carica EP originale.

Quindi, in presenza di velocità molto basse e carichi elevati, è importante rispettare gli intervalli di manutenzione per non deprimere eccessivamente le caratteristiche lubrificanti dell'olio.

DANA gear units are supplied without lubricant; therefore the user must carry out correct filling before starting the machine.

Fundamental characteristics of the oils

The important parameters to consider when choosing the type of oil are:

- viscosity at nominal operating conditions
- additives

The same oil must lubricate the bearings and the gears and all these components work inside the same box, in different operating conditions.

Viscosity

Nominal viscosity refers to a temperature of 40°C, but rapidly decreases as the temperature increases. If the gear unit operating temperature is between 50°C and 70°C, a nominal viscosity can be chosen according to the following guide table, choosing the highest viscosity if the highest operating temperature is foreseen.

Special attention must be paid to very loaded output stages and with very low speeds (<1 rpm). In such cases, always use high viscosity oils and with a good amount of Extreme Pressure (EP) additive.

Additives

In addition to the normal antifoaming and antioxidant additives, it is important to use lubricating oils with additives that provide EP (extreme pressure) and antiwear properties, according to ISO 6743-6 L-CKC or DIN 51517-3 CLP. The lower the gear unit output speed the more marked the EP characteristics of the products have to be. It should be remembered that the chemical compounds replacing hydrodynamic lubrication are formed to the detriment of the original EP load.

Therefore, with very low speeds and high loads it is important to respect the maintenance intervals so as not to excessively diminish the lubricating characteristics of the oil.

Die DANA - Getriebe werden ohne Schmieröl geliefert; der Benutzer muss dieselben vor der Inbetriebnahme der Maschine mit der vorschrittmäßigen Schmierölmenge füllen.

Grundlegende Schmieröleigenschaften

Bei der Schmierölauswahl sind die folgenden wichtige Parameter zu berücksichtigen:

- Viskosität bei Nennbetriebsbedingungen
- Additive

Dasselbe Öl muss sowohl Lager wie auch Zahnräder schmieren und diese Bauteile funktionieren zusammen in demselben Gehäuse unter unterschiedlichen Betriebsbedingungen.

Viskosität

Die Nennviskosität bezieht sich auf eine Temperatur von 40 °C und nimmt mit der Zunahme der Temperatur rasch ab. Liegt die Betriebstemperatur des Getriebes zwischen 50 °C und 70 °C, kann eine Nennviskosität laut folgender Tabelle gewählt werden, wobei bei sehr hoher Temperatur die höchste Viskosität zu wählen ist.

Besonders vorsichtig muss man bei Abtriebsstufen unter hohen Lasten und mit niedriger Drehzahl (<1 rpm) sein. In diesen Fällen muss immer Schmieröl mit hoher Viskosität und einer ausreichenden Menge an Extreme-Pressure-Additiven (EP) eingesetzt werden.

Additive

Neben den normalen Entschäumern und Oxidationshemmern müssen Schmieröle EP-Additive (Extrem-Pressure) und verschleißhemmende Wirkstoffe laut ISO 6743-6 L-CKC oder DIN 51517-3 CLP enthalten. Der Einsatz von Produkten mit höheren EP-Eigenschaften ist umso wichtiger, je niedriger die Drehzahl abtriebsseitig ist. Es wird daran erinnert, dass sich die chemischen Substitutionsverbindungen der hydrodynamischen Schmierung zu Lasten des ursprünglichen EP-Gehalts bilden.

Es ist daher bei sehr niedrigen Drehzahlen und hohen Belastungen sehr wichtig, dass die Wartungszeiträume zur Vermeidung einer übermäßigen Verschlechterung der Schmieröleigenschaften genau eingehalten werden.

Tipi di oli

Gli oli disponibili appartengono generalmente a tre grandi famiglie.

- Oli minerali
- Oli sintetici a base di Poli-Alfa-Olefine (PAO)
- Oli sintetici a base di Poli-Alchilen-Glicole (PAG)

La scelta più appropriata è generalmente legata alle condizioni di impiego.

I riduttori non particolarmente caricati, con un ciclo di impiego discontinuo senza escursioni termiche importanti, possono essere lubrificati con olio minerale. Nei casi di impiego gravoso, quando i riduttori saranno prevedibilmente caricati molto ed in modo continuativo, con conseguente prevedibile innalzamento della temperatura, è bene utilizzare lubrificanti sintetici a base di Poli-Alfa-Olefine.

Non è consentito l'uso di oli a base di Poli-Alchilen-Glicole in quanto non sono compatibili con gli altri oli e sono invece spesso completamente miscibili con l'acqua: questo fenomeno è particolarmente pericoloso poiché non si nota, ma deprime velocemente le caratteristiche lubrificanti dell'olio. Inoltre, questi lubrificanti possono essere chimicamente attivi nei confronti delle tenute olio e delle vernici interne del riduttore.

Oltre a questi già menzionati, ricordiamo che esistono gli oli idraulici e gli oli per l'industria alimentare.

I primi vengono usati per il comando dei freni negativi.

I secondi trovano specifico impiego nell'industria alimentare in quanto sono prodotti speciali non nocivi alla salute.

A seguire vengono riportate tabelle di lubrificanti, proposti dai produttori più noti, con caratteristiche adeguate alla lubrificazione dei riduttori DANA.

Contaminazione

Durante il normale funzionamento, a causa del rodaggio delle superfici, è inevitabile che si trasferiscano nell'olio delle microparticelle metalliche.

Questa contaminazione può ridurre la vita dei cuscinetti, mandando in avaria prematura il riduttore.

Per limitare e controllare il fenomeno, senza ricorrere a frequenti e costosi cambi d'olio, occorre prevedere l'impiego di un opportuno sistema ausiliario di circolazione con filtrazione e raffreddamento dell'olio.

Con questo sistema, si ottiene il doppio vantaggio di controllare il livello di contaminazione attraverso l'impiego di appositi filtri e di stabilizzare la temperatura di funzionamento al livello più adeguato per garantire la viscosità voluta.

Types of oils

The oils available generally belong to three large families.

- Mineral oils
- Polyalphaolefin (PAO) synthetic oils
- Polyalkylene glycol (PAG) synthetic oils

The most suitable choice is generally tied to the conditions of use.

Gear units that are not particularly loaded and with a discontinuous operating cycle, without considerable temperature ranges, can be lubricated with mineral oil. In cases of heavy use, when the gear units are very loaded and in a continuous way, with resultant temperature increase, it is best to use polyalphaolefin synthetic lubricants.

The use of polyalkylene glycol oils is not allowed as they are not compatible with other oils and are often completely mixable with water: this phenomenon is particularly dangerous because it is not noticed, but rapidly diminishes the lubricating properties of the oil. Moreover, these lubricants can be chemically active against the oil seals and paint inside the gear unit.

In addition to the above, there are also hydraulic oils and oils for the food industry.

The former are used for the command of negative brakes.

The latter have a specific use in the food industry since they are special products that are not harmful to the health.

Given below are tables of lubricants, proposed by the best-known producers, with characteristics suitable for the lubrication of DANA gear units.

Contamination

During normal operation, due to running-in of the surfaces, metallic microparticles will inevitably form in the oil.

This contamination can shorten the life of the bearings, resulting in early breakdown of the gear unit.

To limit and control this phenomenon, without resorting to frequent and costly oil changes, a suitable auxiliary oil circulation system with filtering and cooling of the oil must be provided.

This system offers the dual advantage of controlling the level of contamination through the use of special filters and stabilizing the operating temperature at a level more suitable for ensuring the required viscosity.

Schmierölsorten

Die verfügbaren Ölsorten gehören allgemein zu drei großen Familien.

- Mineralöle
- Synthetische Öle auf der Basis von Polyalphaolefinen (PAO)
- Synthetische Öle auf der Basis von Polyalkylenglykolen (PAG)

Die Auswahl hängt im Allgemeinen von den Einsatzbedingungen ab.

Getriebe, die nicht im Dauerbetrieb laufen und keinen großen Belastungen und großen Temperaturschwankungen ausgesetzt sind, können mit Mineralölen geschmiert werden.

Bei Einsatz unter erschwerten Bedingungen, bei denen die Getriebe voraussichtlich hohen Lasten im Dauerbetrieb mit der entsprechenden voraussehbaren Temperaturerhöhung ausgesetzt sind, ist es angebracht, synthetische Polyalphaolefin-Öle zu verwenden.

Verboten ist die Verwendung von Ölen auf der Basis von Polyalkylenglykolen, da sie nicht mit anderen Ölen kompatibel sind, aber oft mit Wasser gemischt werden können: dieses Phänomen ist besonders gefährlich, da es nicht festgestellt werden kann, verschlechtert aber schnell die Schmiereigenschaften des Öls. Darüber hinaus können diese Öle zu chemische Reaktionen bei Öldichtungen und den Innenanstrichen des Getriebes führen.

Neben den erwähnten Ölen gibt es noch Hydrauliköl und Öle für die Lebensmittelindustrie.

Die ersteren werden auf Negativbremsen eingesetzt.

Letztere werden von der Lebensmittelindustrie verwendet, da sie nicht gesundheitsschädlich sind.

Im Folgenden finden Sie Schmiermitteltabellen der bekanntesten Hersteller mit entsprechenden Eigenschaften für die Schmierung von DANA-Getrieben.

Verschmutzung

Während des normalen Betriebs entstehen durch den Abrieb der Oberflächen Mikrometallpartikel im Öl.

Diese Verschmutzung kann die Lebensdauer der Lager verkürzen und zu einem Ausfall des Getriebes führen.

Zur Einschränkung dieser Erscheinung ohne häufigen und kostspieligen Ölwechsel ist der Einbau einer zusätzlichen Filteranlage für das Schmieröl mit Ölfilter- und Ölkühlvorrichtung empfehlenswert.

Diese Anlage bietet den doppelten Vorteil, einerseits den Grad der Ölverschmutzung zu reduzieren und andererseits die Betriebstemperatur auf einer für die gewünschte Viskosität geeigneten Temperaturstufe zu stabilisieren.

Per problemi di lubrificazione di riduttori destinati a impieghi particolari, relativamente alla tipologia costruttiva o ai parametri di funzionamento, è consigliabile contattare il referente DANA di zona.

For lubrication problems with gear units intended for particular uses, regarding the construction type and operating parameters, it is advisable to consult the DANA area contact person.

Wenden Sie sich bei Schmierproblemen von Getrieben, die sowohl bauseitig wie auch aufgrund der Betriebsparameter für besondere Anwendungen vorgesehen sind, direkt an sich an die DANA Kontaktperson der zone zu wenden.

**TABELLA OLI LUBRIFICANTI
USO GENERALE**

**TABLE OF LUBRICANT OILS
GENERAL USE**

**TABELLE DER ALLGEMEIN
VERWENDETEN SCHMIERÖLE**

Produttore Manufacturer Hersteller	Oli Minerali Mineral oils Mineralöle			Oli Sintetici Polialfaolefine (PAO) Poly-Alpha-Olefin synthetic oils (PAO) Synthetische Poly-Alpha-Olefin-Öle (PAO)		
	ISO VG 150	ISO VG 220	ISO VG 320	ISO VG 150	ISO VG 220	ISO VG 320
ADDINOL	Eco Gear 150 M	Eco Gear 220 M	Eco Gear 320 M	Eco Gear 150 S	Eco Gear 220 S	Eco Gear 320 S
ARAL	Degol BG 50 Plus	Degol BG 220 Plus	Degol BG 320 Plus	Degol PAS 150	Degol PAS 220	Degol PAS 320
BP	Energol GR-XP 150	Energol GR-XP 220	Energol GR-XP 320	Energol EPX 150	Energol EPX 220	Energol EPX 320
CASTROL	Alpha SP 150	Alpha SP 220	Alpha SP 320	Alphasyn EP 150	Alphasyn EP 220	Alphasyn EP 320
CEPSA	Engranajes XMP 150	Engranajes XMP 220	Engranajes XMP 320	-	Aerogear Synt 220	Aerogear Synt 320
CHEVRON	-	-	-	Tegra Synthetic Gear 150	Tegra Synthetic Gear 220	Tegra Synthetic Gear 320
ENI	Blasia 150	Blasia 220	Blasia 320	Blasia SX 150	Blasia SX 220	Blasia SX 320
FUCHS	Renolin CLP Gear Oil 150	Renolin CLP Gear Oil 220	Renolin CLP Gear Oil 320	Renolin Unisyn CLP 150	Renolin Unisyn CLP 220	Renolin Unisyn CLP 320
KLÜBER	Klüberoil GEM 1-150 N	Klüberoil GEM 1-220 N	Klüberoil GEM 1-320 N	Klübersynth GEM 4-150 N	Klübersynth GEM 4-220 N	Klübersynth GEM 4-320 N
LUBRITECH	Gearmaster CLP 150	Gearmaster CLP 220	Gearmaster CLP 320	Gearmaster SYN 150	Gearmaster SYN 220	Gearmaster SYN 320
MOBIL	Mobilgear XMP 150	Mobilgear XMP 220	Mobilgear XMP 320	Mobil SHC Gear 150	Mobil SHC Gear 220	Mobil SHC Gear 320
MOLIKOTE	L-0115	L-0122	L-0132	L-2115	L-2122	L-2132
NILS	Ripress EP 150	Ripress EP 220	Ripress EP 320	Atoil Synth PAO 150	-	Atoil Synth PAO 320
Q8	Goya NT 150	Goya NT 220	Goya NT 320	El Greco 150	El Greco 220	El Greco 320
REPSOL	Super Tauro 150	Super Tauro 220	Super Tauro 320	Super Tauro Sintetico 150	Super Tauro Sintetico 220	Super Tauro Sintetico 320
SHELL	Omala S2 G 150	Omala S2 G 220	Omala S2 320	Omala S4 GX 150	Omala S4 GX 220	Omala S4 GX 320
SUNOCO	Sun EP 150	Sun EP 220	Sun EP 320	-	-	-
TEXACO	Meropa 150	Meropa 220	Meropa 320	Pinnacle EP 150	Pinnacle EP 220	Pinnacle EP 320
TOTAL	Carter EP 150	Carter EP 220	Carter EP 320	Carter SH 150	Carter SH 220	Carter SH 320
TRIBOL	1100/150	1100/220	1100/320	-	-	1510/320

Tab. (33)

**TABELLA OLI LUBRIFICANTI
PER L'INDUSTRIA ALIMENTARE**
**TABLE OF LUBRICATING
OILS FOR THE FOOD INDUSTRY**
**TABELLEDERSCHMIERÖLEFÜR
DIENHRUNGSMITTELINDUSTRIE**

 (approvati secondo specifiche USDA-H1
e NSF-H1)

 (approved according to USDA-H1 and
NSF-H1 specifications)

 (zugelassen laut Normen USDA-H1
und NSF-H1)

Produttore Manufacturer Hersteller	Oli Idraulici Hydraulic oils Hydrauliköle			Oli per ingranaggi Gear oils Getriebeöle		
	ISO VG 32	ISO VG 46	ISO VG 68	ISO VG 150	ISO VG 220	ISO VG 320
ARAL	Eural Hyd 32	Eural Hyd 46	Eural Hyd 68	Eural Gear 150	Eural Gear 220	-
CASTROL	Optileb HY 32	Optileb HY 46	Optileb HY 68	Optileb GT 150	Optileb GT 220	Optileb GT 320
CHEVRON	Lubricating Oil FM 32	Lubricating Oil FM 46	Lubricating Oil FM 68	-	Lubricating Oil FM 220	-
ENI	Rocol Foodlube Hi-Power 32	Rocol Foodlube Hi-Power 46	Rocol Foodlube Hi-Power 68	Rocol Foodlube Hi-Torque 150	Rocol Foodlube Hi-Torque 220	Rocol Foodlube Hi-Torque 320
FUCHS	Cassida Fluid HF 32	Cassida Fluid HF 46	Cassida Fluid HF 68	Cassida Fluid GL 150	Cassida Fluid GL 220	Cassida Fluid GL 320
KLÜBER	Klüberfood 4 NH1-32	Klüberfood 4 NH1-46	Klüberfood 4 NH1-68	Klüberoil 4 UH1-150N	Klüberoil 4 UH1-220N	Klüberoil 4 UH1-320N
MOBIL	Mobil SHC Cibus 32	Mobil SHC Cibus 46	Mobil SHC Cibus 68	Mobil SHC Cibus 150	Mobil SHC Cibus 220	Mobil SHC Cibus 320
NILS	Mizar 32	Mizar 46	Mizar 68	Ripress Synt Food 150	Ripress Synt Food 220	Ripress Synt Food 320
TEXACO	Cygnus Hydraulic Oil 32	Cygnus Hydraulic Oil 32	Cygnus Hydraulic Oil 32	Cygnus Gear PAO 150	Cygnus Gear PAO 220	-
TRIBOL	Foodproof 1840/32	Foodproof 1840/46	Foodproof 1840/68	-	Foodproof 1810/220	Foodproof 1810/320

Tab. (34)

**Montaggio orizzontale
Posizione livelli**

Nel caso di montaggio orizzontale del riduttore, il normale livello per garantire una corretta lubrificazione è posto sulla mezzeria, Fig. 24. Per applicazioni con velocità di rotazione in uscita molto bassa ($n_2 \leq 5$ rpm) è consigliabile fissare il livello ad una quota superiore di 25 - 50 mm, Fig. 25.

E' possibile verificare con facilità il corretto livello utilizzando un tubo trasparente posizionato come da Fig. 25.

Nel caso in cui la velocità di uscita sia estremamente bassa ($n_2 \leq 1$ rpm), oppure se sono prevedibili lunghi periodi di fermo del riduttore, è consigliabile riempire tutta la scatola. In questo caso occorre prevedere l'impiego di un apposito serbatoio ausiliario.

Volendo montare uno strumento che consenta la verifica visiva del livello (o tramite apposito segnale elettrico), occorre eseguire un montaggio secondo lo schema di Fig. 26.

Montare il tappo di sfiato al di sopra dell'indicatore di livello tramite un tubo abbastanza lungo, collegando la parte superiore (vuota) del riduttore appena sotto allo sfiato. In questo modo si eviterà la fuoriuscita di olio.

**Horizontal mounting
Position of levels**

With horizontal mounting of the gear unit, the normal level for ensuring correct lubrication is located at the center line. Fig. 24. For applications with very low output rotation speed ($n_2 \leq 5$ rpm) it is advisable to fix the level at a value above 25 - 50 mm, Fig. 25.

The correct level can be easily checked using a transparent tube positioned as shown in Fig. 25.

If the output speed is extremely low ($n_2 \leq 1$ rpm), or if the gear unit will have foreseeable long idle periods, it is advisable to fill the entire box. In this case a special auxiliary tank must be provided.

To fit an instrument for visually checking the level (or by means of a special electric signal), assembly must be done according to the diagram in Fig. 26.

Fit the breather cap above the level indicator via a long enough tube, connecting the upper part (empty) of the gear unit just below the breather. This will prevent the leakage of oil.

**Horizontale Einbaulage
Füllstände**

Bei horizontalem Getriebeeinbau liegt der normale Füllstand für eine störungsfreie Schmierung auf der Mittellinie, Abb. 24. Bei Anwendungen mit äußerst niedrigen Abtriebsdrehzahlen ($n_2 \leq 5$ rpm) sollte der Füllstand um 25 - 50 mm höher liegen, Abb. 25.

Der vorschriftsmäßige Füllstand kann leicht mit einem durchsichtigen Schlauch kontrolliert werden siehe Abbildung 25.

Bei extrem niedriger Abtriebsdrehzahl ($n_2 \leq 1$ rpm) oder bei voraussichtlichen langen Stillstandzeiten des Getriebes ist es angebracht, das Gehäuse vollständig zu füllen. In diesem Fall ist ein besonderes Zusatzgefäß einzusetzen.

Falls eine Sichtkontrolle des Ölstands (oder eine Kontrolle mittels eines elektrischen Signals) gewünscht wird, muss die Installation laut Schema der Abb. 26 vorgenommen werden.

Die Entlüfterkappe auf dem Füllstandanzeiger mit einem ausreichend langen Schlauch montieren und den oberen (leeren) Teil des Getriebes knapp unter dem Entlüfter anschließen. Auf diese Weise wird das Austreten von Schmieröl verhindert.

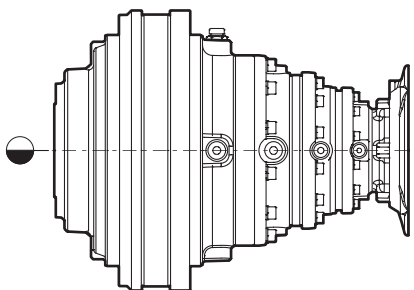


Fig. (24)

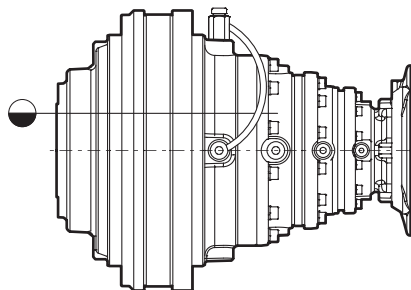


Fig. (25)

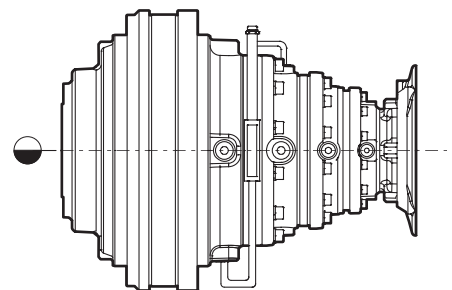


Fig. (26)

Vaso di espansione

Nel caso di montaggio verticale e, comunque, ogni volta si renda necessario riempire completamente il riduttore, occorre rispettare alcune regole (Fig. 27).

All'atto del riempimento, nella parte superiore, in corrispondenza della tenuta rotante dell'albero di uscita, si può formare una bolla d'aria che deve essere eliminata per evitare l'insufficiente lubrificazione della tenuta stessa. Inoltre sapendo che il volume dell'olio aumenta con la temperatura, occorre predisporre un serbatoio ausiliario che consenta all'olio di espandersi senza creare pericolose pressioni interne al riduttore.

Expansion tank

Several rules must be followed with vertical mounting, and in any case whenever the gear unit has to be completely filled (Fig. 27).

During filling, an air bubble can form in the upper part, at the output shaft revolving seal, and which must be eliminated in order to avoid insufficient lubrication of the seal. Also, since the volume of oil increases with the temperature, an auxiliary tank must be provided to allow the oil to expand without creating dangerous pressures inside the gear unit.

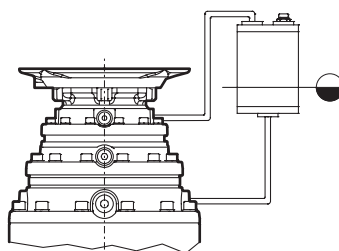


Fig. (27)

Expansionsgefäß

Bei vertikalem Einbau und in allen Fällen, in denen das Getriebe vollständig gefüllt werden muss, sind einige wichtige Regeln einzuhalten (Abb. 27).

Während des Füllens kann sich im oberen Teil in Höhe der Wellendichtung eine Luftblase bilden, die zur Vermeidung ungenügender Schmierung beseitigt werden muss. Da sich das Ölvolumen mit steigender Temperatur erhöht, muss ein Hilfsbehälter eingebaut werden, der die Ausdehnung des Öls ausgleicht und gefährliche Drücke im Inneren des Getriebes verhindert.

Per il dimensionamento occorre determinare il volume V_e di espansione dell'olio alla temperatura di funzionamento:

For dimensioning, the oil expansion volume V_e at operating temperature must be determined:

Für die Bemessung des Behälters muss das Ausdehnungsvolumen V_e des Öls bei Betriebstemperatur berechnet werden:

$$V_e = \frac{V_t \times \Delta T}{1.000} \quad [l] \quad (32)$$

dove

- V_t = volume totale dell'olio contenuto nel riduttore [l]
- ΔT = differenza tra temperatura di funzionamento e temperatura ambiente [°C]

where

- V_t = total volume of oil in the gear unit [l]
- ΔT = difference between operating temperature and ambient temperature [°C]

dabei ist

- V_t = die Gesamtölmenge im Getriebe [l]
- ΔT = der Unterschied zwischen Betriebs- und Umgebungstemperatur [°C]

La capacità V_s del vaso di espansione è:

The capacity V_s of the expansion tank is:

Das Aufnahmevermögen V_s des Expansionsbehälters ist:

$$V_s = 2 \times V_e \quad [l] \quad (33)$$

Per eliminare l'eventuale aria residua, devono essere collegati il foro presente nella zona più alta del riduttore e la parte superiore del vaso di espansione; quest'ultimo deve essere posto ad un'altezza tale da garantire il pieno riempimento del riduttore al livello minimo.

Si consiglia di realizzare il tubo di spurgo o lo stesso vaso di espansione con materiale trasparente, per poter verificare con facilità l'esatta posizione del livello del lubrificante.

To remove any residual air, the holes in the top part of the gear unit and the upper part of the expansion tank must be connected; the latter must be located at a height ensuring complete filling of the gear unit up to the minimum level.

It is advisable to make the bleeding tube or the expansion tank with transparent material, to be able to easily check the exact position of the lubricant level.

Zur Entlüftung der Restluft ist die Bohrung im höchsten Teil des Getriebes mit dem Oberteil des Expansionsgefäßes zu verbinden; letzteres muss auf einer Höhe angeordnet werden, die gewährleistet, dass das Getriebe immer bis zum Mindeststand gefüllt ist.

Es ist angebracht, einen Entlüftungsschlauch und ein Expansionsgefäß aus durchsichtigem Material zu verwenden, um jederzeit auf leichte Weise den Schmierölstand kontrollieren zu können.

Montaggio verticale in linea e versioni ortogonali

I riduttori debbono essere completamente pieni, quindi occorre montare il vaso di espansione. Come detto in precedenza, è molto importante collegare lo sfiato superiore del riduttore al vaso di espansione per consentire all'olio di risalire fino all'anello di tenuta rotante dell'albero superiore del riduttore.

Volendo montare uno strumento che consenta la verifica visiva (o tramite apposito segnale elettrico), lo strumento sarà collocato sul fianco del serbatoio.

Vertical in-line mounting and right-angle versions

The gear units must be completely full, then the expansion tank must be fitted. As already stated, it is very important to connect the top breather to the expansion tank in order to allow the oil to rise up to the rotating seal ring of the gear unit upper shaft.

To fit an instrument for visual checking (or by means of a special electric signal), the instrument must be placed on the side of the tank.

Vertikaleinbau von Koaxial- und Winkelgetrieben

Die Getriebe müssen vollständig gefüllt sein; daher ist immer ein Expansionsbehälter erforderlich. Wie bereits ausgeführt wurde, ist es sehr wichtig, dass die obere Entlüftung des Getriebes an das Expansionsgefäß angeschlossen wird, damit das Schmieröl die Wellendichtung der oberen Getriebewelle erreichen kann.

Falls eine Sichtkontrolle des Ölstands (oder eine Kontrolle mittels eines elektrischen Signals) gewünscht wird, muss das Gerät auf der Seite des Behälters angeordnet werden.

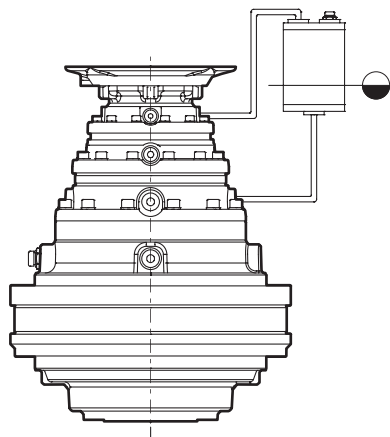


Fig. (28)

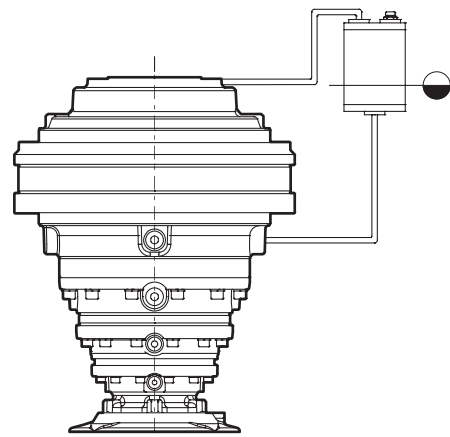


Fig. (29)

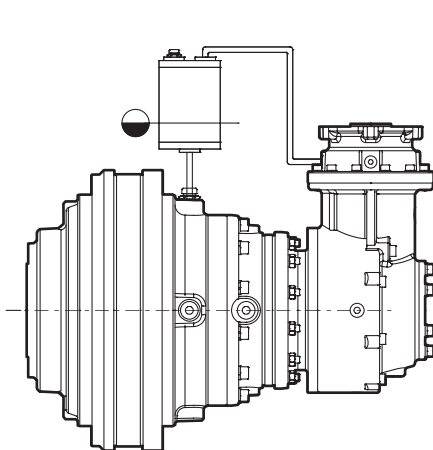


Fig. (30)

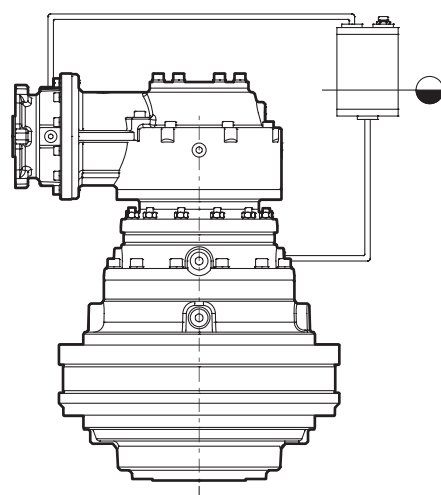


Fig. (31)

CONTROLLO OLIO CON SISTEMA AUSILIARIO DI RAFFREDDAMENTO**OIL CHECK WITH AUXILIARY COOLING SYSTEM****ÖLKONTROLLE BEI ZUSÄTZLICHEM KÜHLSYSTEM****Sistemi ausiliari di raffreddamento e filtrazione**

Nel caso la potenza applicata sia superiore alla potenza termica dissipabile dal riduttore, è necessario l'impiego di un sistema ausiliario di raffreddamento aria-olio, in grado di smaltire la potenza termica in eccedenza e di mantenere anche un buon livello di pulizia dell'olio lubrificante, attraverso la filtrazione continua.

Per assolvere questa funzione DANA offre diverse tipologie di centraline di raffreddamento: contattare il referente DANA di zona per i dettagli.

Le centraline sono composte da uno scambiatore di calore aria-olio, un filtro, un motore elettrico, una pompa idraulica con valvola di sicurezza e una ventola coassiale e solidale alla pompa.

Volendo montare un sistema ausiliario di tipo diverso, ricordiamo che è assolutamente sconsigliato l'impiego di impianti con serbatoio esterno.

Nel caso in cui si renda necessario un serbatoio ausiliario (per es. per raffreddare più riduttori con un unico impianto) consigliamo di contattare il referente DANA di zona.

Progettando un circuito di circolazione dell'olio è consigliabile aspirare nel punto più basso, così questo ramo del circuito può servire anche a vuotare il riduttore.

In ogni caso i punti di aspirazione e mandata dell'olio debbono essere sufficientemente lontani tra loro per garantire l'attraversamento del riduttore da parte dell'olio fresco.

Il diametro dei fori di passaggio dell'olio, soprattutto in aspirazione, è molto importante. Infatti, in presenza di fori troppo stretti, la pompa tende a cavitare. Non potendo modificare la portata della pompa, che è funzione della potenza da smaltire, occorre verificare la capacità dei fori.

Quando si aspira l'olio dai supporti in entrata o dalle flange delle riduzioni veloci, l'impiego di un solo foro può essere insufficiente a smaltire tutta la portata: pertanto occorre collegare 2 o 3 fori mediante un collettore collegato al tubo di aspirazione.

La mandata è solitamente meno problematica poiché, nel caso di portata naturale insufficiente, si genera una piccola pressione che garantisce il flusso.

Per un corretto dimensionamento del circuito, si consiglia di seguire le seguenti regole.

Auxiliary cooling and filtering systems

If the power applied is greater than the thermal power that can be dissipated by the gear unit, an auxiliary cooling system (air-oil) able to dissipate the excess thermal power and also maintain a good level of cleanness of the lubricating oil through constant filtering, must be used.

To fulfill this function, DANA offers different types of cooling units: consult the DANA area contact person for details.

The control units consist of an air-oil heat exchanger, a filter, an electric motor, a hydraulic pump with safety valve and a coaxial fan integral with the pump.

If a different type of auxiliary system is to be fitted, make sure not to use systems with an external tank.

If an auxiliary tank is required (e.g. for cooling several gear units with a single system) it is advisable to consult the DANA area contact person.

In designing an oil circulating circuit it is advisable for suction to be in the lowest point, so that this branch of the circuit can also be used to drain the gear unit.

In any case, the oil suction and delivery points must be far enough apart to ensure fresh oil crossing the gear unit.

The diameter of the oil passage is very important, above all in suction. In fact, with too narrow holes, the pump tends to cavitate. Not being able to change the pump delivery, which is a function of the power to be dissipated, the capacity of the holes must be verified.

When sucking oil from input supports or the flanges of the fast gear units, the use of one hole may be insufficient for all the flow: therefore 2 or 3 holes must be connected by means of a manifold connected to the suction pipe.

Delivery is usually less problematic since, in the event of an insufficient natural rate, a small pressure is generated which ensures the flow.

For correct dimensioning of the circuit, it is advisable to follow these rules.

Zusätzliche kühl- und filteranlage

Falls die angelegte Leistung höher ist als die vom Getriebe abführbare Wärmeleistung muss ein zusätzliches Kühlsystem (Lüft-Öl) installiert werden, das in der Lage ist, die überschüssige Wärmeleistung abzuführen und durch Dauerfiltration das Schmieröl auf einem ausreichend sauberen Niveau zu halten.

Zur Lösung dieser Funktion bietet DANA verschiedene Kühlaggregate an: nehmen Sie für Einzelheiten dazu sich an die DANA Kontaktperson der zone zu wenden.

Die Aggregate haben einen Luft-Öl-Wärmetauscher, einen Filter, einen Elektromotor, eine Hydraulikpumpe mit Überdruckventil und einen Koaxiallüfter, der fest mit der Pumpe verbunden ist.

Falls der Einbau eines anderen Hilffsystems gewünscht wird, weisen wir darauf hin, dass auf keinen Fall Anlagen mit externem Behälter eingesetzt werden dürfen.

Falls ein Zusatztank erforderlich sein sollte (um z. B. mehrere Getriebe mit einer einzigen Anlage zu kühlen), wenden Sie sich bitte zuvor an die DANA Kontaktperson der zone zu wenden.

Bei der Planung einer Ölumlaufschmierung sollte die Ansaugung am niedrigsten Punkt des Kreislaufs angeordnet werden, so dass derselbe auch zum Entleeren des Getriebes dient.

Die Rück- und Vorlaufpunkte des Schmieröls müssen in jedem Fall in einem ausreichenden Abstand von einander angeordnet sein, damit das Frischöl das gesamte Getriebe durchströmen kann.

Der Durchmesser der Bohrungen des Öldurchflusses, extrem wichtig. Bei zu engen Bohrungen tendiert die Pumpe zum Kavitieren. Da die Pumpenfördermenge, die eine Funktion der abzuführenden Leistung ist, nicht geändert werden kann, ist die Kapazität der Durchlässe zu kontrollieren.

Wenn Öl von den Antriebswellen oder den Flanschverbindungen der Schnellgetriebe angesaugt wird, kann die Verwendung einer einzigen Bohrung unzureichend sein, um die gesamte Leistung abzuführen; es ist daher erforderlich, 2 oder 3 Bohrungen mit einer Sammelleitung an das Saugrohr anzuschließen.

Die Druckseite weist weniger Schwierigkeiten auf, da bei unzureichender Fördermenge ein kleiner Druck entsteht, der für den notwendigen Durchfluss sorgt.

Befolgen Sie für eine korrekte Bemessung des Kreislaufs die folgenden Hinweise.

Aspirazione:

- aspirare da più fori quando, usando un solo foro, la velocità dell'olio v_o è superiore a 1.30 m/s;

Suction:

- suck from several holes when, using just one hole, the oil velocity v_o is higher than 1.30 m/s;

Ansaugung:

- Für die Ansaugung mehrere Bohrungen benutzen, wenn bei nur einer Bohrung die Ölgeschwindigkeit v_o höher als 1.30 m/s ist;

Mandata:

- mandare in più fori quando, usando un solo foro, la velocità dell'olio v_o è superiore a 2.10 m/s

Delivery:

- deliver in several holes when, using just one hole, the oil velocity v_o is higher than 2.10 m/s

Druckseite:

- Für die Förderung mehrere Bohrungen benutzen, wenn bei nur einer Bohrung die Ölgeschwindigkeit v_o höher als 2.10 m/s ist

La velocità può essere dedotta dalla tabella sotto riportata o calcolata mediante la seguente relazione (34):

The velocity can be obtained from the table below, or calculated with the equation (34):

Die Geschwindigkeit kann der nachstehenden Tabelle entnommen oder mit der folgenden Formel (34) berechnet werden:

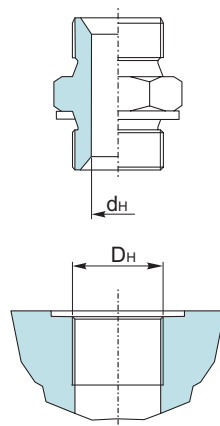


Fig. (32)

$$v_o = \frac{21.2 \times Q_o}{d_H^2} \quad (34)$$

dove:

- v_o = velocità dell'olio [m/s]
- Q_o = portata della pompa [l/min]
- d_H = diametro interno del raccordo [mm]

where:

- v_o = oil velocity [m/s]
- Q_o = pump delivery [l/min]
- d_H = union internal diameter [mm]

wobei bedeuten:

- v_o = Ölgeschwindigkeit [m/s]
- Q_o = Pumpenfördermenge [l/min]
- d_H = Innendurchmesser des Anschlusses [mm]

Nel calcolo viene considerata una viscosità cinematica dell'olio pari a 60 cSt.

In calculating, a kinematic oil viscosity of 60 cSt is considered.

Bei der Berechnung wurde eine kinematische Viskosität des Öls von 60 cSt zugrunde gelegt.

Tabella velocità olio / Oil velocity table / Tabelle Ölgeschwindigkeit				
v_o [m/s]				
Diametro fori / Hole diameter / Durchm. Bohrungen [mm]		Portata pompa / Pump flow / Pumpendurchsatz Q_o [l/min]		
D_H	d_H	6	12	20
G 1/4"	7	2.59	5.19	8.60
G 3/8"	10	1.27	2.54	4.24
G 1/2"	12	0.90	1.76	2.94
G 3/4"	16	0.50	1.00	1.65
G 1"	22	0.26	0.52	0.87
G 1 1/4"	30	0.14	0.28	0.47

Tab. (35)

Riduttore orizzontale in linea

Fare riferimento alla Fig. 33 per il controllo del livello olio e la posizione degli attacchi del circuito di raffreddamento.

In-line horizontal gear unit

Refer to Fig. 33 for oil level checking and the position of the cooling circuit connections.

Horizontales Koaxialgetriebe

Siehe Abb. 33 für die Überprüfung des Ölstands und der Position der Anschlüsse des Kühlkreislaufs.

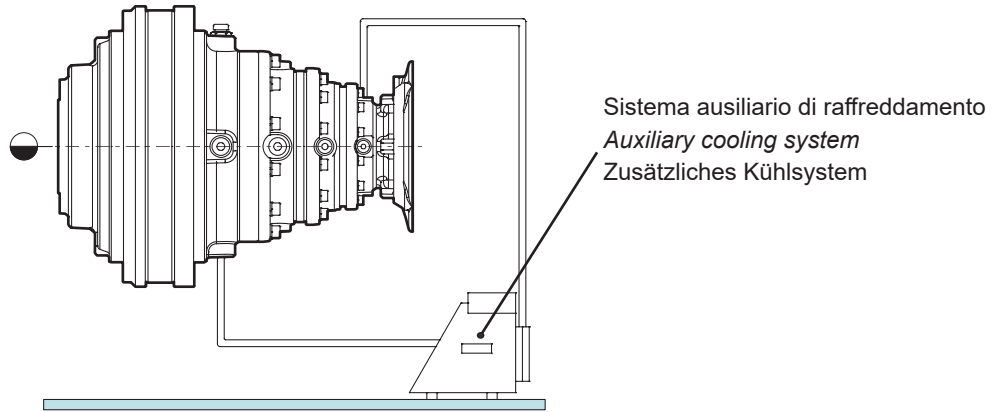


Fig. (33)

Riduttore verticale in linea ed ortogonale

Fare riferimento alle Fig. 34, 35 e 36 per il controllo del livello olio e la posizione degli attacchi del circuito di raffreddamento.

In-line and right-angle vertical gear unit

Refer to Fig. 34, 35 and 36 for checking the oil level and the position of the cooling circuit connections.

Vertikales In-Line- und Winkelgetriebe

Siehe Abb. 34, 35 und 36 Überprüfung des Ölstands und der Position der Anschlüsse des Kühlkreislaufs.

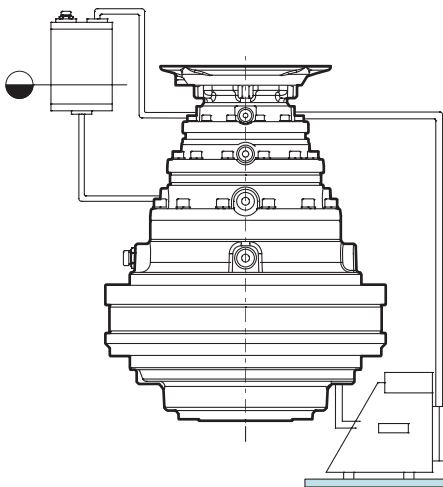


Fig. (34)

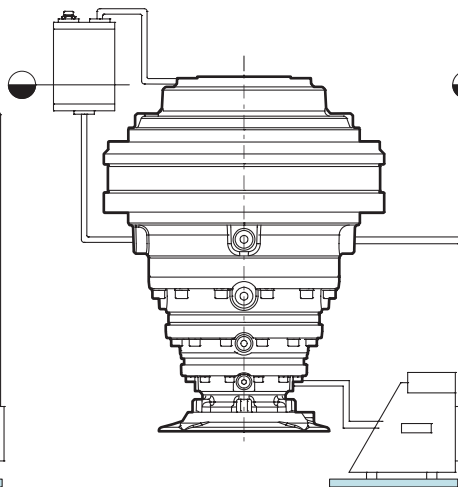


Fig. (35)

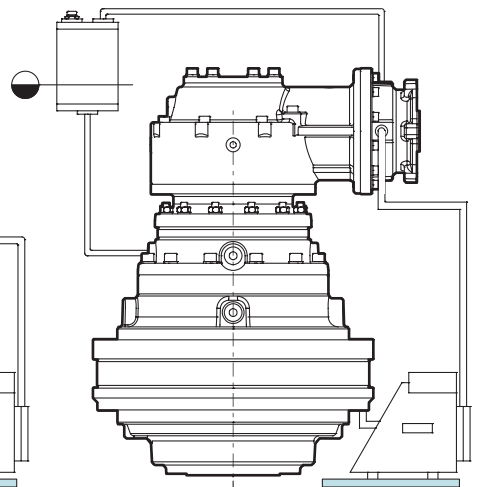


Fig. (36)

CAMBIO DELL'OLIO

OIL CHANGE

ÖLWECHSEL

In assenza di un circuito di filtrazione e raffreddamento, il primo cambio dell'olio deve essere effettuato la prima volta dopo 500-600 ore di funzionamento.

In the absence of a filtering and cooling circuit, the first oil change must be done the first time after 500-600 hours of operation.

Falls kein Filter- und Kühlkreislauf vorhanden ist, muss der erste Ölwechsel nach 500-600 Betriebsstunden erfolgen.

Successivamente si suggeriscono i seguenti intervalli di cambio olio:

Subsequently, the following oil change intervals are suggested:

Im Folgenden schlagen wir folgende Ölwechselintervalle vor:

Temperatura olio Oil temperature Öltemperatur [°C]	Intervallo cambio olio / Oil change interval / Ölwechselintervall [h]	
	Olio sintetico Synthetic oil Synthetische Öl	Olio minerale Mineral oil Mineralöl
≤ 65	10'000	4'000
65 ÷ 80	8'000	3'000

Tab. (36)

In caso di applicazioni particolarmente gravose i valori sopra indicati devono essere dimezzati. I valori riportati in tabella si riferiscono ad ambienti di lavoro esenti da contaminazioni esterne.

In case of heavy duty applications, the above values must be halved. The values given in the table refer to a work environment free from external contamination.

Bei besonders erschwerten Einsatzbedingungen sind die o.a.Werte zu halbieren. Die in der Tabelle angegebenen Werte beziehen sich auf Einsatzumgebungen ohne externe Einflüsse.

Si consiglia di compiere l'operazione del cambio olio a riduttore caldo (circa 40 °C), per evitare il depositarsi di morchie e facilitare il completo svuotamento. Per una corretta procedura attenersi alle norme riportate sul manuale di installazione e manutenzione in dotazione a ogni riduttore.

It is advisable to carry out the oil change with the gear unit hot, (approx. 40°C) to prevent sludge from forming and to facilitate complete draining. For the correct procedure comply with the rules given in the installation and maintenance manual supplied with each unit.

Der Ölwechsel sollte bei warmem Getriebe (ca. 40 °C) vorgenommen werden, da dadurch die Ablagerung von Bodensatz vermieden und das Entleeren erleichtert wird. Halten Sie sich dabei immer an die Installations- und Wartungsanweisungen, die jedem Getriebe beiliegen.

E' consigliabile un controllo periodico del livello dell'olio. Nel caso si rendesse necessaria un'aggiunta superiore al 10% del volume totale è bene accertare la presenza di eventuali perdite.

It is advisable to periodically check the oil level. If more than 10% the total volume has to be added, check for leaks.

Kontrollieren Sie regelmäßig den Ölstand. Sollte es notwendig sein, mehr als 10% der Gesamtmenge nachzufüllen, ist es angebracht, die Anlage auf eventuell vorhandene Lecks zu überprüfen.

Ingrassaggio

Greasing

Schmierung

I supporti in uscita prevedono la lubrificazione ad olio in comune con il riduttore oppure, per alcune specifiche versioni, la lubrificazione a grasso del cuscinetto lato uscita: in quest'ultimo caso, i supporti sono già lubrificati tramite grasso **Shell Gadus S3 T220 2** e pronti ad entrare in servizio al momento della fornitura. Per tali versioni non è necessario prevedere l'ingrassaggio periodico, in quanto la lubrificazione a grasso è da intendersi "a vita".

The output supports provide for oil lubrication in common with the gearbox or, for some specific versions, grease lubrication of the output side bearing: in the latter case, the supports are already lubricated with Shell Gadus S3 T220 2 grease and ready to enter into service at the time of delivery. For these versions periodic greasing is not required, as they are "lifetime" lubricated.

Einige Abtriebskonfigurationen sehen die Schmierung mit Öl zusammen mit dem Getriebe vor oder bei einigen spezifischen Versionen das Schmieren der abtriebsseitigen Lager mit Fett: In diesen Fällen sind die Wellen bereits mit **Shell Gadus S3 T220 2** grease geschmiert und zum Lieferzeitpunkt einsatzbereit. In diesen Fällen ist eine periodische Schmierung nicht notwendig, da es sich um eine „Lebensdauerschmierung“ mit Fett handelt.

L'ingrassaggio periodico è invece da effettuare per i supporti in ingresso tipo IS e ISL. Questi supporti prevedono infatti che la tenuta in ingresso sia protetta da un vano riempito di grasso che evita l'ingresso di contaminanti esterni; tale grasso deve essere periodicamente rinnovato.

However, IS and ISL type input supports require periodic greasing. In fact, these supports require the input seal to be protected by a compartment filled with grease that prevents the entry of external contaminants; this grease must be periodically changed.

Die periodische Schmierung muss aber bei den Antriebskonfigurationen IS und ISL durchgeführt werden. Bei diesen Antriebskonfigurationen ist es nämlich vorgesehen, dass die antriebsseitige Dichtung durch eine mit Fett gefüllte Kammer geschützt wird, die das Eindringen von äußeren Verunreinigungen verhindert; das Fett muss periodisch erneuert werden.

Il grasso da utilizzare per l'ingrassaggio periodico è il **Polymer 400 NLGI 2** o, in alternativa, un prodotto equivalente a base di PTFE.

The grease to be used for periodic greasing is Polymer 400 NLGI 2 or, alternatively, an equivalent PTFE-based product.

Das einzusetzende Fett für die periodische Schmierung ist **Polymer 400 NLGI 2** oder alternativ ein gleichwertiges Produkt auf PTFE-Basis.

L'ingrassaggio deve essere eseguito utilizzando sistemi a bassa pressione per non danneggiare l'anello di tenuta. Si consiglia di eseguire l'operazione di ingrassaggio periodico almeno ogni 6 mesi.

Greasing must be done using low pressure systems to avoid damaging the sealing ring. It is advisable to do periodic greasing at least every 6 months.

Die Schmierung ist mit Niederdrucksystemen durchzuführen, damit der Dichttring nicht beschädigt wird. Es wird empfohlen, die periodische Schmierung mindestens alle 6 Monate durchzuführen.

QUANTITA' OLIO






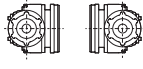

OIL QUANTITY

ÖLMENGE






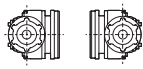




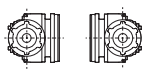

Le quantità d'olio riportate nelle tabelle sottostanti sono indicative: è sempre necessario controllare il livello secondo quanto riportato nei paragrafi "Controllo Olio".

The quantities of oil given in the tables below are only approximate: it is always necessary to check the level as given in the sections "Oil Check".






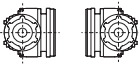




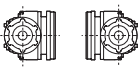

Die in den nachstehenden Tabellen angegebenen Ölmengen sind Richtwerte: der Füllstand ist immer entsprechend den Angaben in den Abschnitten „Ölkontrolle“ zu überprüfen.

	Posizioni Positions Schmierstellen	Uscite Outputs Abtriebskonfigurationen								
			EL101	EL102	EL103	EL104	EC102	EC103	EC104	
E10	V5 	MP	0.7	1.2	1.6	2.0	-	-	-	
		ML	0.7	1.1	1.5	1.9	-	-	-	
		MP1	0.7	1.2	1.6	2.0	-	-	-	
		ML1	0.7	1.1	1.5	1.9	-	-	-	
		FE	0.7	1.2	1.6	2.0	-	-	-	
		FS	0.7	1.2	1.6	2.0	-	-	-	
		FCP	0.7	1.2	1.6	2.0	-	-	-	
		MPP1	1.4	1.8	2.2	2.6	-	-	-	
		B3 	MP	0.4	0.6	0.8	1.0	-	-	-
			ML	0.4	0.6	0.8	1.0	-	-	-
	MP1		0.4	0.6	0.8	1.0	-	-	-	
	ML1		0.4	0.6	0.8	1.0	-	-	-	
	FE		0.4	0.6	0.8	1.0	-	-	-	
	FS		0.4	0.6	0.8	1.0	-	-	-	
	FCP		0.4	0.6	0.8	1.0	-	-	-	
	MPP1		0.7	0.9	1.1	1.3	-	-	-	
	V5B 		MP	-	-	-	-	1.9	2.3	2.7
			ML	-	-	-	-	1.8	2.3	2.7
		MP1	-	-	-	-	1.9	2.3	2.7	
		ML1	-	-	-	-	1.8	2.3	2.7	
		FE	-	-	-	-	1.9	2.3	2.7	
		FS	-	-	-	-	1.9	2.3	2.7	
		FCP	-	-	-	-	1.9	2.3	2.7	
		MPP1	-	-	-	-	2.5	3.0	3.4	
	B3A - B3C 	MP	-	-	-	-	1.0	1.2	1.4	
		ML	-	-	-	-	0.9	1.2	1.4	
		MP1	-	-	-	-	1.0	1.2	1.4	
		ML1	-	-	-	-	0.9	1.2	1.4	
		FE	-	-	-	-	1.0	1.2	1.4	
		FS	-	-	-	-	1.0	1.2	1.4	
		FCP	-	-	-	-	1.0	1.2	1.4	
		MPP1	-	-	-	-	1.3	1.5	1.7	
	B3D 	MP	-	-	-	-	1.9	2.3	2.7	
		ML	-	-	-	-	1.8	2.3	2.7	
		MP1	-	-	-	-	1.9	2.3	2.7	
		ML1	-	-	-	-	1.8	2.3	2.7	
		FE	-	-	-	-	1.9	2.3	2.7	
		FS	-	-	-	-	1.9	2.3	2.7	
		FCP	-	-	-	-	1.9	2.3	2.7	
		MPP1	-	-	-	-	2.5	3.0	3.4	











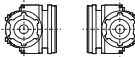

Tab. (37)

	Posizioni Positions Schmierstellen	Uscite Outputs Abtriebskonfigurationen								
			EL161	EL162	EL163	EL164	EC162	EC163	EC164	
E16	V5 	MP	1.0	1.7	2.0	2.4	-	-	-	
		MP 010	1.0	1.7	2.0	2.4	-	-	-	
		MP 020	1.3	1.9	2.3	2.8	-	-	-	
		MP1	1.0	1.7	2.0	2.4	-	-	-	
		MP1 010	1.0	1.9	2.0	2.4	-	-	-	
		MP1 020	1.3	1.9	2.3	2.8	-	-	-	
		FE	1.2	1.8	2.1	2.7	-	-	-	
		FS	1.0	1.7	2.0	2.4	-	-	-	
		FCP	1.4	2.0	2.4	2.9	-	-	-	
		MPP1	1.7	2.4	2.8	3.2	-	-	-	
		B3 	MP	0.5	0.8	1.0	1.3	-	-	-
			MP 010	0.5	0.9	1.0	1.3	-	-	-
			MP 020	0.7	1.0	1.2	1.4	-	-	-
			MP1	0.5	0.9	1.0	1.3	-	-	-
	MP1 010		0.5	0.9	1.0	1.3	-	-	-	
	MP1 020		0.7	1.0	1.2	1.4	-	-	-	
	FE		0.6	0.9	1.1	1.4	-	-	-	
	FS		0.5	0.8	1.0	1.3	-	-	-	
	FCP		0.7	1.0	1.2	1.5	-	-	-	
	MPP1		0.9	1.2	1.4	1.6	-	-	-	
	V5B 	MP	-	-	-	-	2.2	2.9	3.3	
		MP 010	-	-	-	-	2.2	2.9	3.3	
		MP 020	-	-	-	-	2.4	3.2	3.6	
		MP1	-	-	-	-	2.2	2.9	3.3	
		MP1 010	-	-	-	-	2.2	2.9	3.3	
		MP1 020	-	-	-	-	2.4	3.2	3.6	
		FE	-	-	-	-	2.3	3.0	3.4	
		FS	-	-	-	-	2.2	2.9	3.3	
		FCP	-	-	-	-	2.4	3.2	3.6	
		MPP1	-	-	-	-	2.8	3.6	3.9	
		B3A - B3C 	MP	-	-	-	-	1.1	1.4	1.6
			MP 010	-	-	-	-	1.1	1.4	1.6
	MP 020		-	-	-	-	1.2	1.6	1.8	
	MP1		-	-	-	-	1.1	1.4	1.6	
	MP1 010		-	-	-	-	1.1	1.4	1.6	
	MP1 020		-	-	-	-	1.2	1.6	1.8	
	FE		-	-	-	-	1.2	1.5	1.7	
	FS		-	-	-	-	1.1	1.4	1.6	
	FCP		-	-	-	-	1.2	1.6	1.8	
	MPP1		-	-	-	-	1.4	1.8	2.0	
	B3D 	MP	-	-	-	-	2.2	2.9	3.3	
		MP 010	-	-	-	-	2.2	2.9	3.3	
MP 020		-	-	-	-	2.4	3.2	3.6		
MP1		-	-	-	-	2.2	2.9	3.3		
MP1 010		-	-	-	-	2.2	2.9	3.3		
MP1 020		-	-	-	-	2.4	3.2	3.6		
FE		-	-	-	-	2.3	3.0	3.4		
FS		-	-	-	-	2.2	2.9	3.3		
FCP		-	-	-	-	2.4	3.2	3.6		
MPP1		-	-	-	-	2.8	3.6	3.9		
E25	V5 	MP	2.0	2.3	2.7	3.1	-	-	-	
		MP1	2.0	2.3	2.7	3.1	-	-	-	
		FE	2.1	2.2	2.5	3.0	-	-	-	
		FS	2.0	2.3	2.7	3.1	-	-	-	
		FCP	2.1	2.2	2.5	3.0	-	-	-	
		MPP1	3.9	4.0	4.4	4.9	-	-	-	
		B3 	MP	1.0	1.2	1.4	1.6	-	-	-
	MP1		1.0	1.2	1.4	1.6	-	-	-	
	FE		1.1	1.1	1.3	1.5	-	-	-	
	FS		1.0	1.2	1.4	1.6	-	-	-	
	FCP		1.1	1.1	1.3	1.5	-	-	-	
	MPP1		1.9	2.0	2.2	2.4	-	-	-	
	V5B 	MP	-	-	-	-	5.3	3.4	3.8	
		MP1	-	-	-	-	5.3	3.4	3.8	
		FE	-	-	-	-	5.2	3.3	3.7	
		FS	-	-	-	-	5.3	3.4	3.8	
		FCP	-	-	-	-	5.1	3.2	3.6	
		MPP1	-	-	-	-	7.2	5.1	5.6	
	B3A - B3C 	MP	-	-	-	-	2.7	1.7	1.9	
		MP1	-	-	-	-	2.7	1.7	1.9	
		FE	-	-	-	-	2.6	1.7	1.9	
		FS	-	-	-	-	2.7	1.7	1.9	
		FCP	-	-	-	-	2.5	1.6	1.8	
		MPP1	-	-	-	-	3.6	2.5	2.8	
	B3D 	MP	-	-	-	-	5.3	3.4	3.8	
		MP1	-	-	-	-	5.3	3.4	3.8	
		FE	-	-	-	-	5.2	3.3	3.7	
		FS	-	-	-	-	5.3	3.4	3.8	
		FCP	-	-	-	-	5.1	3.2	3.6	
		MPP1	-	-	-	-	7.2	5.1	5.6	






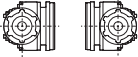




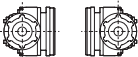
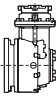
Tab. (37)

	Posizioni Positions Schmierstellen	Uscite Outputs Abtriebskonfigurationen								
			EL301	EL302	EL303	EL304	EC302	EC303	EC304	
E30	V5 	MP	2.0	2.3	2.7	3.1	-	-	-	
		MP1	2.0	2.3	2.7	3.1	-	-	-	
		FE	2.1	2.2	2.5	3.0	-	-	-	
		FS	2.0	2.3	2.7	3.1	-	-	-	
		FCP	2.1	2.2	2.5	3.0	-	-	-	
		MPP1	3.9	4.0	4.4	4.9	-	-	-	
	B3 	MP	1.0	1.2	1.4	1.6	-	-	-	
		MP1	1.0	1.2	1.4	1.6	-	-	-	
		FE	1.1	1.1	1.3	1.5	-	-	-	
		FS	1.0	1.2	1.4	1.6	-	-	-	
		FCP	1.1	1.1	1.3	1.5	-	-	-	
		MPP1	1.9	2.0	2.2	2.4	-	-	-	
	V5B 	MP	-	-	-	-	5.3	3.4	3.8	
		MP1	-	-	-	-	5.3	3.4	3.8	
		FE	-	-	-	-	5.2	3.3	3.7	
		FS	-	-	-	-	5.3	3.4	3.8	
		FCP	-	-	-	-	5.1	3.2	3.6	
		MPP1	-	-	-	-	7.2	5.1	5.6	
	B3A - B3C 	MP	-	-	-	-	2.7	1.7	1.9	
		MP1	-	-	-	-	2.7	1.7	1.9	
		FE	-	-	-	-	2.6	1.7	1.9	
		FS	-	-	-	-	2.7	1.7	1.9	
		FCP	-	-	-	-	2.5	1.6	1.8	
		MPP1	-	-	-	-	3.6	2.5	2.8	
	B3D 	MP	-	-	-	-	5.3	3.4	3.8	
		MP1	-	-	-	-	5.3	3.4	3.8	
		FE	-	-	-	-	5.2	3.3	3.7	
		FS	-	-	-	-	5.3	3.4	3.8	
FCP		-	-	-	-	5.1	3.2	3.6		
MPP1		-	-	-	-	7.2	5.1	5.6		
E50	V5 	MP	2.1	2.6	3.2	3.6	-	-	-	
		MP 045	2.1	2.6	3.2	3.6	-	-	-	
		MP 065	2.3	2.8	3.4	3.8	-	-	-	
		MP1	2.1	2.6	3.2	3.6	-	-	-	
		MP1 045	2.1	2.6	3.2	3.6	-	-	-	
		MP1 065	2.2	2.7	3.3	3.7	-	-	-	
		FE	2.2	2.7	3.3	3.7	-	-	-	
		FS 045	2.1	2.6	3.2	3.6	-	-	-	
		FCP	2.4	2.9	3.6	4.0	-	-	-	
		MPP1	4.5	5.0	5.6	6.0	-	-	-	
		B3 	MP	1.1	1.3	1.6	1.8	-	-	-
			MP 045	1.1	1.3	1.6	1.8	-	-	-
	MP 065		1.2	1.4	1.7	1.9	-	-	-	
	MP1		1.1	1.3	1.6	1.8	-	-	-	
	MP1 045		1.1	1.3	1.6	1.8	-	-	-	
	MP1 065		1.1	1.4	1.7	1.8	-	-	-	
	FE		1.1	1.4	1.7	1.8	-	-	-	
	FS 045		1.1	1.3	1.6	1.8	-	-	-	
	FCP		1.2	1.5	1.8	2.0	-	-	-	
	MPP1		2.3	2.5	2.8	3.0	-	-	-	
	V5B 		MP	-	-	-	-	5.5	3.6	4.3
			MP 045	-	-	-	-	5.5	3.6	4.3
		MP 065	-	-	-	-	5.8	3.8	4.5	
		MP1	-	-	-	-	5.5	3.6	4.3	
		MP1 045	-	-	-	-	5.5	3.6	4.3	
		MP1 065	-	-	-	-	5.8	3.8	4.5	
		FE	-	-	-	-	5.5	3.6	4.3	
		FS 045	-	-	-	-	5.5	3.6	4.3	
		FCP	-	-	-	-	5.9	3.9	4.8	
		MPP1	-	-	-	-	7.7	6.0	7.0	
		B3A - B3C 	MP	-	-	-	-	2.7	1.8	2.1
			MP 045	-	-	-	-	2.7	1.8	2.1
	MP 065		-	-	-	-	2.9	1.9	2.3	
	MP1		-	-	-	-	2.7	1.8	2.1	
	MP1 045		-	-	-	-	2.7	1.8	2.1	
	MP1 065		-	-	-	-	2.9	1.9	2.3	
	FE		-	-	-	-	2.7	1.8	2.1	
	FS 045		-	-	-	-	2.7	1.8	2.1	
	FCP		-	-	-	-	2.9	1.9	2.4	
	MPP1		-	-	-	-	3.9	3.0	3.5	
	B3D 		MP	-	-	-	-	5.5	3.6	4.3
			MP 045	-	-	-	-	5.5	3.6	4.3
		MP 065	-	-	-	-	5.8	3.8	4.5	
		MP1	-	-	-	-	5.5	3.6	4.3	
		MP1 045	-	-	-	-	5.5	3.6	4.3	
		MP1 065	-	-	-	-	5.8	3.8	4.5	
		FE	-	-	-	-	5.5	3.6	4.3	
		FS 045	-	-	-	-	5.5	3.6	4.3	
		FCP	-	-	-	-	5.9	3.9	4.8	
		MPP1	-	-	-	-	7.7	6.0	7.0	

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	Posizioni Positions Schmierstellen	Uscite Outputs Abtriebskonfigurationen								
			EL801	EL802	EL803	EL804	EC802	EC812	EC803	EC804
E80	V5 	MP	3.3	4.3	4.5	4.9	-	-	-	-
		MP 090	3.3	4.3	4.5	4.9	-	-	-	-
		MP1	3.3	4.3	4.5	4.9	-	-	-	-
		MP1 090	3.3	4.3	4.5	4.9	-	-	-	-
		FE	3.3	4.3	4.5	4.9	-	-	-	-
		FS	3.3	4.3	4.5	4.9	-	-	-	-
		FCP	3.8	4.8	5.1	5.4	-	-	-	-
	MPP1	6.6	7.4	7.6	7.8	-	-	-	-	
	B3 	MP	1.7	2.2	2.3	2.4	-	-	-	-
		MP 090	1.7	2.2	2.3	2.4	-	-	-	-
		MP1	1.7	2.2	2.3	2.4	-	-	-	-
		MP1 090	1.7	2.2	2.3	2.4	-	-	-	-
		FE	1.7	2.2	2.3	2.4	-	-	-	-
		FS	1.7	2.2	2.3	2.4	-	-	-	-
		FCP	1.9	2.4	2.6	2.7	-	-	-	-
	MPP1	3.3	3.7	3.8	3.9	-	-	-	-	
	V5B 	MP	-	-	-	-	6.8	12.0	7.6	5.5
		MP 090	-	-	-	-	6.8	12.0	7.6	5.5
		MP1	-	-	-	-	6.8	12.0	7.6	5.5
		MP1 090	-	-	-	-	6.8	12.0	7.6	5.5
		FE	-	-	-	-	6.8	12.0	7.6	5.5
		FS	-	-	-	-	6.8	12.0	7.6	5.5
		FCP	-	-	-	-	7.2	12.5	8.1	6.0
	MPP1	-	-	-	-	9	14.3	10.2	6.5	
	B3A - B3C 	MP	-	-	-	-	3.4	6.0	3.8	2.8
		MP 090	-	-	-	-	3.4	6.0	3.8	2.8
		MP1	-	-	-	-	3.4	6.0	3.8	2.8
		MP1 090	-	-	-	-	3.4	6.0	3.8	2.8
		FE	-	-	-	-	3.4	6.0	3.8	2.8
		FS	-	-	-	-	3.4	6.0	3.8	2.8
		FCP	-	-	-	-	3.6	6.3	4.2	3.0
	MPP1	-	-	-	-	4.5	7.2	5.1	3.2	
	B3D 	MP	-	-	-	-	6.8	12.0	7.6	5.5
		MP 090	-	-	-	-	6.8	12.0	7.6	5.5
		MP1	-	-	-	-	6.8	12.0	7.6	5.5
		MP1 090	-	-	-	-	6.8	12.0	7.6	5.5
FE		-	-	-	-	6.8	12.0	7.6	5.5	
FS		-	-	-	-	6.8	12.0	7.6	5.5	
FCP		-	-	-	-	7.2	12.5	8.1	6.0	
MPP1	-	-	-	-	9	14.3	10.2	6.5		
E120	V5 	MP	5.1	5.9	6.6	7.2	-	-	-	
		MP1	5.0	5.8	6.5	7.2	-	-	-	
		FE	5.0	5.8	6.5	7.0	-	-	-	
		FS	5.1	5.9	6.6	7.2	-	-	-	
		FCP	5.8	6.9	7.5	8.2	-	-	-	
		MPP1	10.9	11.9	12.3	13.2	-	-	-	
		MPP1	10.9	11.9	12.3	13.2	-	-	-	
	B3 	MP	2.6	3.0	3.3	3.6	-	-	-	
		MP1	2.5	2.9	3.3	3.6	-	-	-	
		FE	2.5	2.9	3.3	3.5	-	-	-	
		FS	2.6	3.0	3.3	3.6	-	-	-	
		FCP	2.9	3.5	3.8	4.1	-	-	-	
		MPP1	5.5	6.0	6.2	6.6	-	-	-	
		MPP1	5.5	6.0	6.2	6.6	-	-	-	
	V5B 	MP	-	-	-	-	12.8	9.3	6.8	
		MP1	-	-	-	-	12.8	9.3	6.8	
		FE	-	-	-	-	12.9	9.4	6.9	
		FS	-	-	-	-	12.8	9.3	6.8	
		FCP	-	-	-	-	13.9	10.4	7.8	
		MPP1	-	-	-	-	18.6	15.2	12.0	
		MPP1	-	-	-	-	18.6	15.2	12.0	
	B3A - B3C 	MP	-	-	-	-	6.4	4.6	3.4	
		MP1	-	-	-	-	6.4	4.7	3.4	
		FE	-	-	-	-	6.5	4.7	3.4	
		FS	-	-	-	-	6.4	4.6	3.4	
		FCP	-	-	-	-	7.0	5.2	3.9	
		MPP1	-	-	-	-	9.3	7.6	6.0	
		MPP1	-	-	-	-	9.3	7.6	6.0	
	B3D 	MP	-	-	-	-	12.8	9.3	6.8	
		MP1	-	-	-	-	12.8	9.3	6.8	
		FE	-	-	-	-	12.9	9.4	6.9	
		FS	-	-	-	-	12.8	9.3	6.8	
		FCP	-	-	-	-	13.9	10.4	7.8	
		MPP1	-	-	-	-	18.6	15.2	12.0	
		MPP1	-	-	-	-	18.6	15.2	12.0	

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	Posizioni Positions Schmierstellen	Uscite Outputs Abtriebskonfigurationen								
			EL1601	EL1602	EL1603	EL1604	EC1602	EC1603	EC1604	
E160	V5 	MP	6.0	6.5	7.5	6.6	-	-	-	
		MP1	6.3	6.8	7.3	6.3	-	-	-	
		ML	6.3	7.3	7.7	6.9	-	-	-	
		ML1	6.3	7.3	7.7	6.9	-	-	-	
		FE	6.1	6.5	7.7	6.8	-	-	-	
		FS	6.8	7.4	7.8	6.0	-	-	-	
		FCP	7.3	7.6	8.0	7.7	-	-	-	
		MPP1	13.0	13.5	14.0	13.1	-	-	-	
	B3 	MP	3.0	3.2	3.8	3.3	-	-	-	
		MP1	3.2	3.4	3.6	3.2	-	-	-	
		ML	3.2	3.7	3.9	3.4	-	-	-	
		ML1	3.2	3.7	3.9	3.4	-	-	-	
		FE	3.1	3.3	3.9	3.4	-	-	-	
		FS	3.4	3.7	3.9	3.5	-	-	-	
		FCP	3.6	3.8	4.0	3.8	-	-	-	
		MPP1	6.5	6.7	7.0	6.5	-	-	-	
	V5B 	MP	-	-	-	-	14.7	9.7	9.2	
		MP1	-	-	-	-	14.4	9.4	8.8	
		ML	-	-	-	-	14.8	10.3	9.8	
		ML1	-	-	-	-	14.8	10.3	9.8	
		FE	-	-	-	-	13.9	9.2	8.7	
		FS	-	-	-	-	15.2	10.2	9.7	
		FCP	-	-	-	-	16	11.0	10.5	
		MPP1	-	-	-	-	21.2	16.2	15.6	
	B3A - B3C 	MP	-	-	-	-	7.4	4.9	4.6	
		MP1	-	-	-	-	7.2	4.7	4.4	
		ML	-	-	-	-	7.4	5.2	4.9	
		ML1	-	-	-	-	7.4	5.2	4.9	
		FE	-	-	-	-	7	4.6	4.3	
		FS	-	-	-	-	7.6	5.1	4.8	
		FCP	-	-	-	-	8	5.5	5.3	
		MPP1	-	-	-	-	10.6	8.1	7.8	
	B3D 	MP	-	-	-	-	14.7	9.7	9.2	
		MP1	-	-	-	-	14.4	9.4	8.8	
		ML	-	-	-	-	14.8	10.3	9.8	
		ML1	-	-	-	-	14.8	10.3	9.8	
		FE	-	-	-	-	13.9	9.2	8.7	
		FS	-	-	-	-	15.2	10.2	9.7	
		FCP	-	-	-	-	16	11.0	10.5	
		MPP1	-	-	-	-	21.2	16.2	15.6	
	E260	V5 	MP	10.5	12.3	12.8	13.0	-	-	-
			MP1	10.5	12.3	12.8	13.0	-	-	-
			FE	9.0	10.2	11.0	12.0	-	-	-
			FS	10.5	12.3	12.8	13.0	-	-	-
			FCP	11.8	13.7	14.2	14.9	-	-	-
			MPP1	10.5	12.3	12.8	13.0	-	-	-
			B3 	MP	5.2	6.1	6.4	6.5	-	-
MP1				5.2	6.1	6.4	6.5	-	-	-
FE		4.5		5.1	5.5	6.0	-	-	-	
FS		5.2		6.1	6.4	6.5	-	-	-	
FCP		5.9		6.9	7.1	7.5	-	-	-	
MPP1		5.2		6.1	6.4	6.5	-	-	-	
V5B 		MP		-	-	-	-	19.5	13.4	14.6
		MP1		-	-	-	-	19.5	13.4	14.6
		FE	-	-	-	-	18.7	12.7	13.9	
		FS	-	-	-	-	19.5	13.4	14.6	
		FCP	-	-	-	-	19.6	13.5	14.7	
		MPP1	-	-	-	-	19.5	13.4	14.6	
		B3A - B3C 	MP	-	-	-	-	9.7	6.7	7.3
			MP1	-	-	-	-	9.7	6.7	7.3
FE			-	-	-	-	9.4	6.4	7.0	
FS			-	-	-	-	9.7	6.7	7.3	
FCP			-	-	-	-	9.8	6.8	7.4	
MPP1			-	-	-	-	9.7	6.7	7.3	
B3D 			MP	-	-	-	-	19.5	13.4	14.6
			MP1	-	-	-	-	19.5	13.4	14.6
		FE	-	-	-	-	18.7	12.7	13.9	
		FS	-	-	-	-	19.5	13.4	14.6	
		FCP	-	-	-	-	19.6	13.5	14.7	
		MPP1	-	-	-	-	19.5	13.4	14.6	

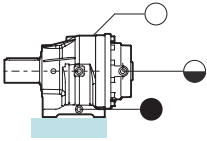
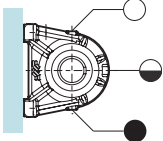
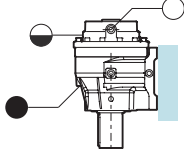
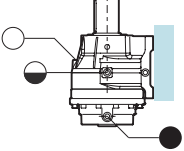
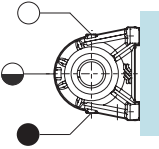
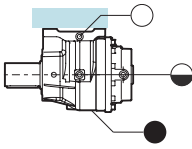
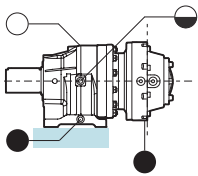
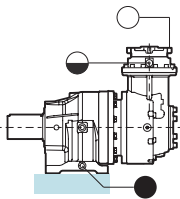
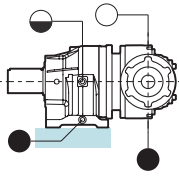
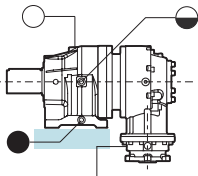
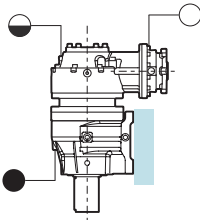
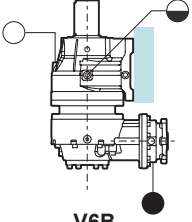
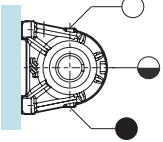
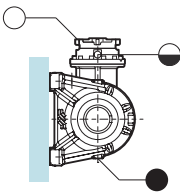
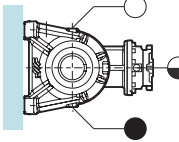
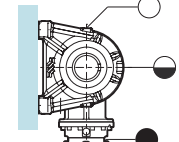
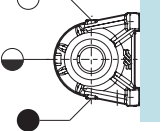
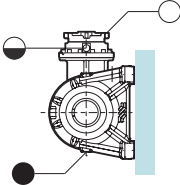
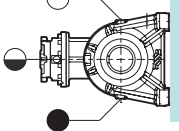
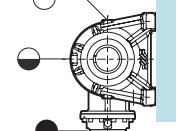
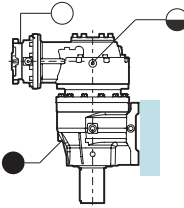
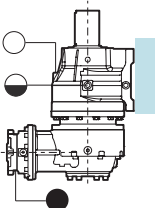
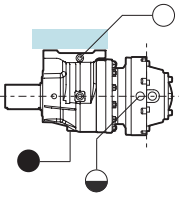
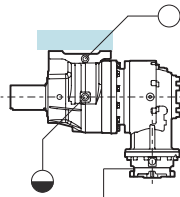
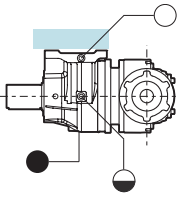
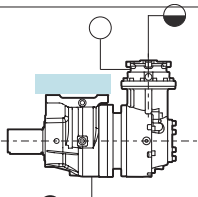
Tab. (37)

24. POSIZIONI DI MONTAGGIO

24. MOUNTING POSITION

24. EINBAUPOSITION

		Posizione orizzontale Horizontal position Waagerechte Stellung		Posizione verticale Vertical position Senkrechte Stellung	
		10-16-25-30-50-80-120	160-260	10-16-25-30-50-80-120	160-260
EL	MP - MP1 - ML - ML1				
		B3	B3	V5	V5
		B3	B3	V6	V6
EL	FE				
		B3	B3	V5	V5
		B3	B3	V6	V6
EL	FS				
		B3	B3	V5	V5
		B3	B3	V6	V6
EL	FCP				
		B3	B3	V5	V5
		B3	B3	V6	V6
EC					
	<p>V5B B3D B3C B3A B3B V6B</p> <p>● Tappo scarico ● Drain plug ● Ölabblassstufen</p> <p>○ Tappo livello ○ Oil level plug ○ Ölstandsstufen</p> <p>○ Tappo carico e sfiato ○ Breather and filling plug ○ Öleinfüll- und entlüftungstopfen</p>				

Posizione orizzontale <i>Horizontal position</i> Waagerechte Stellung				Posizione verticale <i>Vertical position</i> Senkrechte Stellung		
EL - MPP1						
						
EC - MPP1						
						
						
						

Tab. (38)

A large grid of 20 columns and 30 rows for taking notes. The grid is composed of light blue lines on a white background. The columns are of equal width, and the rows are of equal height. The grid is intended for writing notes in the three designated language sections.

5 mm

NOTE

NOTES

NOTE

A large grid of 20 columns and 30 rows for taking notes. The grid is composed of light blue lines on a white background. The columns are of equal width, and the rows are of equal height. The grid is intended for handwritten notes.

5 mm



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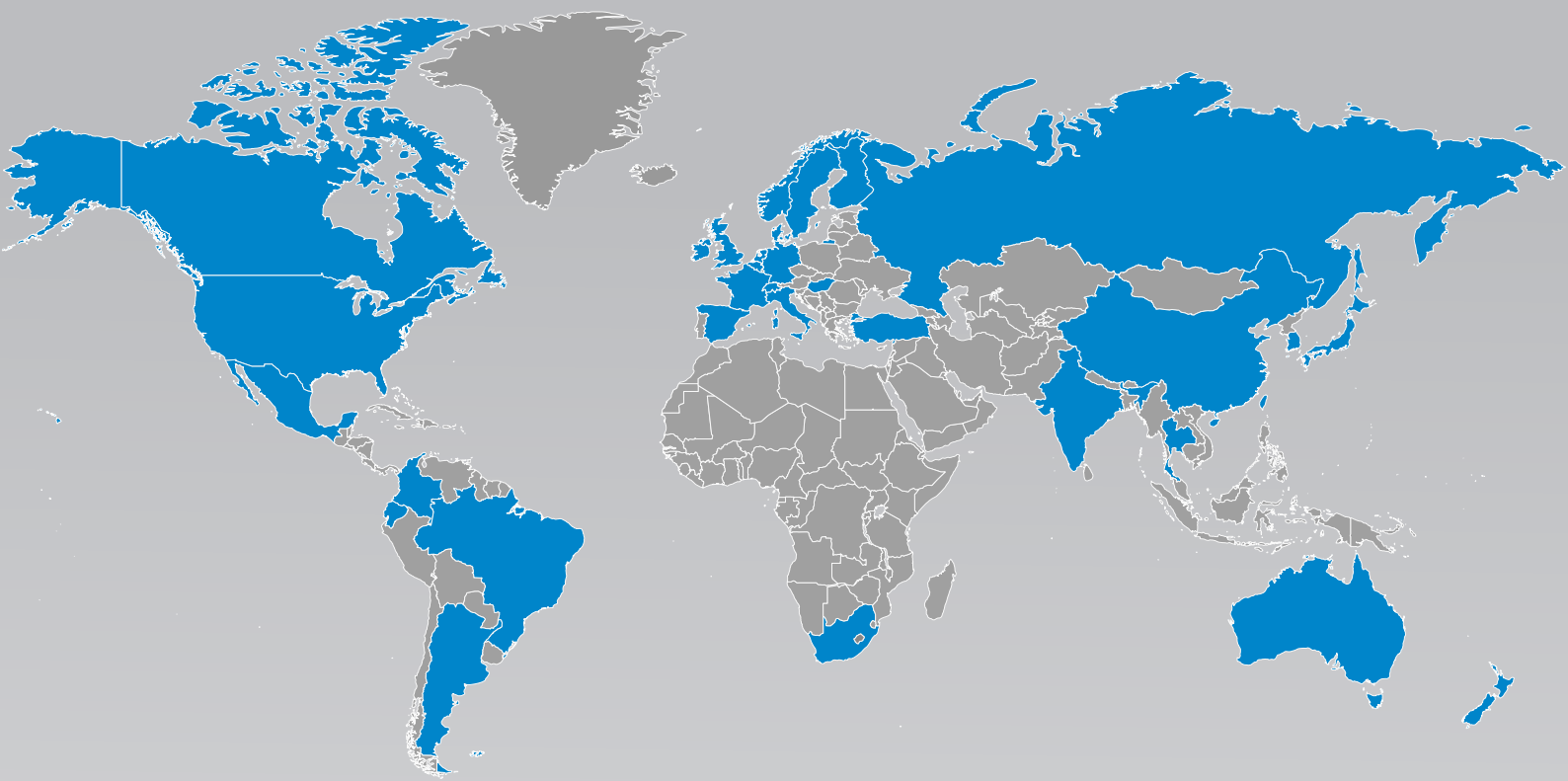
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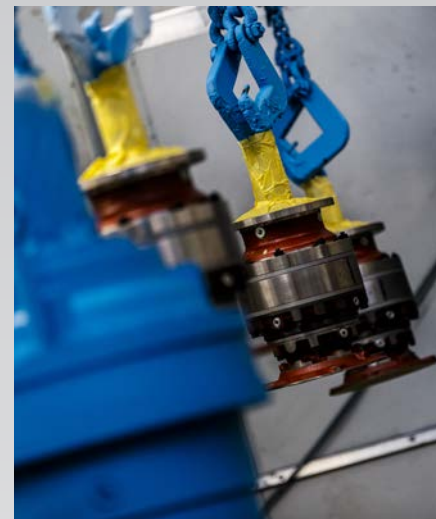


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