DANA BREVINI® Motion Systems

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Product Catalog

Brevini® S270
Industrial Gearbox

Torque up to 51.000 Nm

Brevini® S270 Planetary Gearbox

S270 gearbox with its modularity, wide range of characteristics and variants, allows to meet every possible application needs for both Industrial and Mobile applications.

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B

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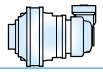
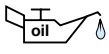
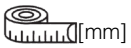
Description	Measurement unit	Symbol
Radial load constant		c
Diameter of element mounted on shaft	[mm]	d
Permissible axial load on output shaft	[N]	F_{a2}
Required axial load on the output shaft	[N]	F_{aR2}
Permissible radial load on input/output shaft	[N]	$F_{r1,2}$
Required radial load on the input/output shaft	[N]	$F_{rR1,2}$
Power increase factor		f_I
Thermal factor		f_K
Environmental factor		f_R
Duty factor		f_S
Speed factor		f_V
Operating life	[h]	h
Required operating life	[h]	h_R
Duty cycle		I
Reduction ratio		i
Input/output duration factor		$L_{h1,2}$
Number of starts per hour	[1/h]	N
Input speed	[rpm]	n_1
Max input speed	[rpm]	n_{1MAX}
Output speed	[rpm]	n_2
Hydraulic motor operating pressure	[bar]	p_A
Input power	[kW]	P_1
Output power	[kW]	P_2
Thermal power to be dissipated	[kW]	P_C
Electric motor nominal power	[kW]	P_n
Thermal power	[kW]	P_T
Corrected thermal power	[kW]	P_{T1}
Hydraulic motor capacity	[l/min]	q
Brake safety factor		S_f
Required input torque	[Nm]	T_{1R}
Transmissible output torque	[Nm]	T_2
Output braking torque	[Nm]	T_{2B}
Max output torque	[Nm]	T_{2MAX}
Nominal output torque	[Nm]	T_{2N}
Required output torque	[Nm]	T_{2R}
Required maximum output torque	[Nm]	T_{2RMAX}
Input braking torque	[Nm]	T_B
Required input braking torque	[Nm]	T_{BR}
Work environment temperature	[°C]	t_a
Operating time	[s]	t_f
Stopping time	[s]	t_r
Hydraulic motor displacement	[cm^3]	V
Required hydraulic motor displacement	[cm^3]	V_R
Input/output radial load application distance	[mm]	$X_{1,2}$
Dynamic efficiency		h_d
Hydraulic motor mechanical efficiency		h_{mh}
Hydraulic motor volumetric efficiency		h_v

SYMBOLS

General					
In-line gearboxes	SL		Additional Planetary Stage on Bevel Gear		
Right-angle gearboxes	SC		Bevel gear dimensions by ratios		
Tightening torque	[Nm]		Refer to page		
Lubrication	[l]		Dimensions	[mm]	
Weight	[kg]				

Outputs			
Male splined shaft		Keyed hollow shaft	
Female splined shaft		Hollow shaft for shrink disc	
Keyed cylindrical shaft			

Inputs			
Universal coupling		Male support	
		Brakes	
		Electric and hydraulic motors adaptor	
		Universal bevel gears	
Direct coupling		Universal decoupling	
		Backstop device	

Accessories	
Drive flange	
Pinion	
Splined sleeve	
Lock washer	
Splined bar	

IN-LINE AND RIGHT-ANGLE PLANETARY GEARBOXES

This new Brevini Industrial gearbox extends and enhances the current Brevini Industrial series that combines high performance with low cost and size. The commercial success this range has achieved for more than 40 years testifies to its quality, reliability, ease of installation and low maintenance requirements.
Brevini Industrial series covers a full range of sizes that ensure optimum durability, quiet operation in all working conditions and efficiency to reduce operating costs and maximize availability.
The ISO 9001 :2000, ISO 45001 :2018 and ISO 14001 :2015 quality systems for design, development, production, assembly and after-sales service guarantee a high supply standard at an international level.

The new Brevini gearbox for Industrial applications

The modular transmission system offers customers various benefits, including:
- Short lead times due to a high level of standardization
- High product quality
- Numerous available variants allow more flexible configuration for a wide range of applications
- Customized variants based on the modular system

Available options:
- From 1 to 4 planetary stages with the in-line configuration
- From 2 to 4 stages with the right-angle configuration
- Configurations with more stages are available on request

Construction and Design:
- Flange, shaft and foot mounting options
- Keyed cylindrical shafts: male and female
- Splined shafts: male and female
- Female cylindrical shaft with retaining ring
- Female hollow shaft for shrink disc Horizontal and vertical installation possible

Output torque
T2N: 27000 Nm

Ratios:
- i = 4.18 up to 1272 with the in-line configuration
- i = 10,6 up to 1182 with the right-angle configuration
- i > 1200 by combining more than 4 planetary stages

Casings
The casings basically consist of an input flange, reduction stages, intermediate coupling flanges and output supports. They are dimensioned to suit the loads transmitted through the gearbox, which increase from the input to the output.

Casing materials:
- Input supports: EN-GJL-250 grey cast iron
- Rim: high-quality hardened steel
- Intermediate coupling flange: EN-GJS-400-15 spheroidal-graphite cast iron
- Output supports: EN-GJS-400-15 spheroidal-graphite cast iron

Output shafts:
- Solid shaft, keyed or splined according to DIN5482
- Hollow shaft, keyed, splined according to DIN5482 or with keyway

Available inputs:
- Direct coupling with adapter flange for electric and hydraulic motors
- Keyed solid shaft
- SAHR (Spring Applied Hydraulically Released) brakes

IN-LINE AND RIGHT-ANGLE PLANETARY GEARBOXES

Gears
The Brevini Industrial series uses gears designed to optimize load distribution and minimize noise. The case-hardening processes are applied to the gears in-house to ensure control over the entire production process.

Bearings:
Only Class A bearings are used in the planet carriers to ensure that they meet the durability criteria required for industrial applications.

Seals:
The following sealing systems are available as standard for the input and output shafts:
- NBR and FKM radial shaft seals, VMQ on request
- Taconite seals on input and output shafts exposed to harsh environmental conditions on request

Lubrication:
- Oil bath lubricated gears and roller bearings as standard
- Sight glass plug as standard for vertical mounting configurations

Accessories:
Output:
Available for male splined output shaft:
- Drive flange
- Splined bush
- Loose pinion
- Retaining cover

Available for female hollow output shaft:
- Keyway
- Retaining cover

Available for female splined output shaft:
- Splined rod

Input:
- Back-stop devices

General:
- Quoted dimensional drawings are available as CAD files for various computer systems and interfaces
- Digital programs for selecting units
- Gear, shaft and bearing calculations with calculation proof
- Surface protection: painting cycles according to ISO 12944

Noise level:
- The gearbox noise level may vary with the size and number of stages, so no specific value has been declared
- If the noise does not cause abnormal vibration or overheating, do not consider it to be a risk for the application
- Unless specifically requested by the customer during the selection process or while developing the gearbox, the gearbox noise is not considered for design purposes
- Warranty claims related to noise will be assessed case-by-case

Nominal output torque
T_{2N} [Nm]
This is the conventional output torque that defines the size of the gearbox.

Transmissible output torque
T_2 [Nm]
This is the output torque that the gearbox can transmit with a uniform and continuous load (duty factor fs=1), for n2xh = 10000, 25000, 50000, 100000, 500000 and 1000000 and for an input speed of 1500 rpm for a duration of 10000 hours

The T2 values are calculated according to ISO 6336 for the gears and ISO 281 for the bearings and are given in the size selection tables.

Max output torque
T_{2MAX} [Nm]
Represent the maximum transmissible torque at the output of the gearbox as an occasional static peak value, without causing permanent damage to the most stressed elements. For drives that involve a high number of starts or reversals, the maximum operating torque must also be appropriately limited in relation to the strength of the gears or shafts.
In any case, it is always recommended to contact the local DANA representative.

Required output torque
T_{2R} [Nm]
This is the output torque required by the application, which must always be less than the transmissible output torque T_2 of the selected gearbox.

Required maximum output torque
T_{2RMAX} [Nm]
This is the maximum output torque required by the application, which must always be less than the maximum transmissible output torque T_{2MAX} of the selected gearbox.

Input braking torque
T_B [Nm]
This is the static braking torque delivered by the multi-disc brake that may be installed on the gearbox input.
The TB values for the various brake configurations are given in the “Oil bath multi-disc brakes” section.

Required input braking torque
T_{BR} [Nm]
This is the braking torque required at the gearbox input if the application involves the use of an input brake.
It can be calculated with the following equation:

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

where

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

Input speed
n_1 [rpm]
This is the speed of the motor coupled to the gearbox or, in general, the speed of the gearbox input stage. For drives with pulleys and belts, for example, its value must take the reduction ratio into account.

Max input speed
n_{1MAX} [rpm]
Represent the maximum input speed to the gearbox for short periods or under intermittent service conditions.
It is limited by the peripheral speed of the gears, bearings, and seals. Staying at the speed n_{1MAX} is allowed for a maximum time of (15 seconds) followed by an adequate cooling period of the gearbox.
In any case, it is always recommended to contact the local DANA representative.

i

Output speed
n_2 [rpm]
This is the gearbox output speed. It can be calculated with the following formula:

$$n_2 = \frac{n_1}{i} \quad [rpm]$$

where n_1 is the input speed and i is the gearbox reduction ratio.

Reduction ratio
i
This is the ratio between the input speed n_1 and output speed n_2.

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

Input power
P_1 [kW]
This is the power applied to the gearbox input. It can be calculated with the following formula:

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

where
- P_2 is the output power
- η_d is the dynamic efficiency of the gearbox, the value of which is given in the table (4)

Output power
P_2 [kW]
This is the power transmitted at the gearbox output. It can be calculated with the following formula:

$$P_2 = \frac{T_{2R} \times n_2}{9550} \quad [kW]$$

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

Thermal power
P_T [kW]
This is the power that the gearbox can transmit continuously in the following conditions:

- with splash lubrication, without an auxiliary cooling circuit
- with horizontal mounting
- at an input speed of 1500 rpm
- for a maximum oil temperature of 80°C (oil viscosity ISO VG150)
- at an ambient temperature of 20°C
- for use in a “large environment”

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

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

Thermal factor
f_K
With work cycles that involve intermittent gearbox use and/or an ambient temperature other than 20°C, the gearbox thermal rating can be adjusted to the specific application with the factor f_K given in the table below.

	Duty cycle I [%]	Ambient temperature [°C]				
		10°	20°	30°	40°	50°
f_K	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)

The duty cycle can be calculated as follows:

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

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

Speed factor

f_V

If the input speed is not 1500 rpm, the thermal power can be adapted to the specific situation with the factor f_V given in the table below. The table refers to the different gearbox mounting positions.

	Mounting position	n_1 [rpm]					
		3000	2500	2000	1500	1000	700
f_V	Horizontal mounting	0.50	0.65	0.80	1.00	1.15	1.30
	Vertical mounting	0.40	0.48	0.58	0.71	0.88	1.00

Tab.(2)

Environmental factor

f_R

If the gearbox is located in a restricted space or outdoors, the thermal power can be adapted with the aid of the factor f_R given in the table below.

	Restricted environment	Large environment	Outdoors
f_R	0.70	1.00	1.35

Tab.(3)

In general, the corrected thermal power of the gearbox will be

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

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

$$P_1 \leq P_{T1}$$

If the thermal power of the gearbox is less than the power applied, even in just one possible operating cycle condition, 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:

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

where η_d is the dynamic efficiency of the gearbox given by the table (4).

i

Temperature

[°C]

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

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

For low ambient temperatures, or for applications involving high operating temperatures, select appropriate lubricants and seals made of suitable materials.

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

Contact the Dana Sales Department for the relevant indications. The “Lubrication” section contains advice on choosing the most appropriate lubricant for different conditions.

Dynamic efficiency

η_d

This is given by the ratio between the output power P_2 transmitted by the gearbox and power 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 reduction ratio. The table below gives the approximate dynamic efficiency values.

	Reduction stages			
	1	2	3	4
	EM	ED - EC	ET - EC	EQ - EC
η_d	0.98	0.96	0.94	0.92

Tab.(4)

Duty factor

f_S

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

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.

	Load type		Drive type	No. of starts/h				
				16	32	63	125	250
f_s	**a**	Smooth	Electric mot.	1.05	1.10	1.15	1.25	1.40
			Hydraulic mot.	1.05	1.05	1.10	1.15	1.20
			Endothermic engine	1.25	--	--	--	--
	b	Variable with moderate shocks	Electric mot.	1.10	1.15	1.20	1.40	1.60
			Hydraulic mot.	1.05	1.00	1.10	1.20	1.30
			Endothermic engine	1.50	--	--	--	--
	c	Variable with strong shocks	Electric mot.	1.20	1.30	1.40	1.60	1.80
			Hydraulic mot.	1.10	1.20	1.25	1.35	1.50
			Endothermic engine	2.00	--	--	--	--

Tab.(5)

Regarding the nature of the load, the table below (6) classifies the most common machines into the three levels **a**, **b** and **c** given in the previous table (5).

Load type	Application field		Driven machine
a	Stirrers/Mixers		Liquids
b			Semi-liquids
b			Non-homogeneous liquid
b	Stone and clay processing		Brick presses
b			Tile machine
c			Compactors
a	Conveyors		Screw
a			Fed smoothly
b		For continuous cycle	Not fed smoothly
b			With motion reversal
c	Crane	Port	Load lifting
c			Auxiliary lifting
c			Arm lifting
c			Arm rotation
c			Crane travel
c		Container	Container lifting
c			Arm lifting
c		Industrial applications	Main lifting
c			Auxiliary lifting
c			Bridge
c			Trolley movement
b	Shredders		Stones and metals

Load type	Application field		Driven machine
b	Dredgers		Cable coiler
b			Conveyor
c			Cutter head
b			Sieves
b			Bucket conveyor
b			Winches
b	Elevators		Bucket
a			Escalator
b	Extruders		In general
b		Plastic	Variable speed
b			Fixed speed
b		Rubber	Continuous cycle - screw
b			Intermittent cycle - screw
b		Food	Plate
b			Belt
b			Screw
a	Food industry		Cereal processing
b			Pasta mixers
b			Meat mincing

Tab. (6)

Load type	Application field	Driven machine
b	Lifters/Elevators	Continuous cycle
b		Intermittent cycle
b		Skip lifting
b	Washing machines	Drums
b		Washing machine
c	Metal processing	Tippers
b		Ingot pusher
c		Shears
b		Extruder
b		Winder
b	Woodworking machines	Conveyors
b		Continuous cycle
b		Log processing
b		Planer
b		Traverser
b		Debarker
b		Planer feed
b		Chain traverser
b	Fabric processing	Dosing systems
b		Calenders
b		Driers

Load type	Application field	Driven machine
b	Tape processing	Taping machines
a		Winder & Unwinder
b		Trimmer
b		Flattener
b		Cylinder regulation
b		Scrap treatment
c		Shears
b		Slitters
b	Concrete processing	Concrete oven
b		Driers
b		Mixers
b	Plastic processing	Batch mixer
b		Continuous cycle mixer
b		Calenders
b	Rubber processing	Batch mixer
b		Continuous cycle mixer
b		Calenders
b		Sand heating

Tab. (6)

Load type	Application field		Driven machine
b	Paper processing		Stirrers (mixers)
b			Liquid stirrers
b			Calenders
c			Chippers
b			Chipper feeder
b			Polishing rollers
b		Conveyors	Bark chips
c			Logs
b		Driers	Cutter
b			Conveyors
b			Extruders
b		Screeners	Chips
b			Rotary
c			Vibrating
b			Size press
b			Super calender
b			Thickener (AC motor)
b			Thickener (DC motor)
b			Washing machine (AC motor)
b			Washing machine (DC motor)

Load type	Application field		Driven machine
b	Water treatment		Bar screen
b			Chemical feeders
b			Dehydrator screens
b			Scum breakers
b			Mixer
b			Sludge collector
b			Thickener
b			Vacuum filters
a		Screens	Air washing
b			Rotary for gravel
c	Sugar processing		Beetroot slicer
b			Cane crushers
b			Shredders
b			Grinders

Tab. (6)

Lifetime factor

L_{h1}, L_{h2}

This is the product of the gearbox input speed n_1 or output speed n_2 and the hours of operation required by the application h_R:

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

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

i

Permissible radial loads on output / input shafts
F_{r2}, F_{r1} [N]

For each gearbox 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 load application point and the shaft shoulder; the values are given for various values of bearing duration factor nxh.

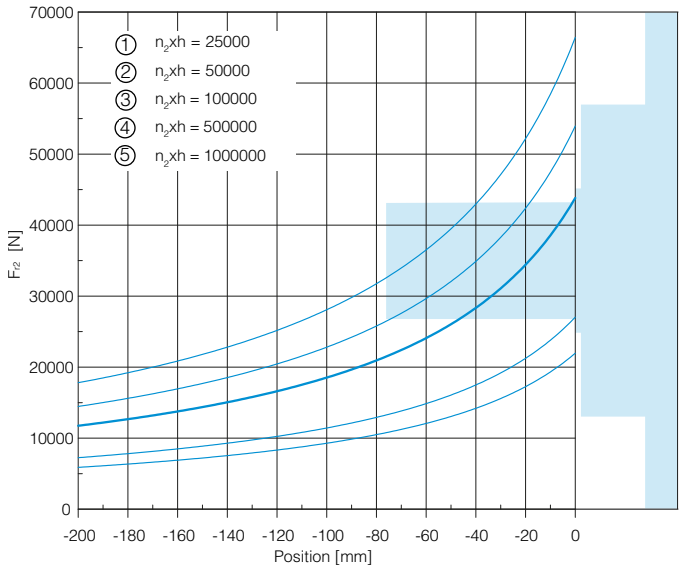


Fig. (1)

NOTE:
These radial loads can be used for output supports with 2 spigots only if both the spigots are used on the customer's structure.
Contact the Dana Sales Department for duration factors $n_2$xh < 25000 cycles.

Permissible output shaft axial loads
F_{a2} [N] and F_{a2MAX} [N]

For each gearbox size, the tables give the permissible axial loads F_{a2} for continuous duration and F_{a2MAX} for intermittent duration.
If there are radial and axial loads on the output shaft at the same time, we recommend contacting the Dana Sales Department.
FE and FET gearboxes with female output shafts are Normally used to transmit torque only, and are not designed to withstand radial and/or axial loads.

When using keyed or hollow shaft for shrink disc, contact Dana Sales Department if there are axial loads.

DANA
BREVINI®
Motion Systems

DESIGNATION

The following designation system has been developed to identify all of the configuration options for the S270 series.
Use the model code below to specify the desired features.
All alphanumeric digits of the code must be present when ordering.
We advise carefully reading the catalogue before filling out the ordering code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Series	Transmission type	Size Stage sequence	Number of stages	Support version	Shaft version	Output accessories	Reduction ratio	Brake	Input type	Mounting position	Color	Special gloss color	Painting cycle	Output seal
S	L	0270	3	LAA	M100	R11	51.45	50CPVX	WAGG1	B30	5012	S	C3	X

1

Series (1 digit)	
S	S series

2

Transmission type (1 digit)	
L	In line
C	Right angle

3

Size - Stage sequence (4 digits)	
0270	Size 270

4

Number of stages (1 digit)		**Transmission type** L	C
1	1 stage	●	
2	2 stage	●	●
3	3 stage	●	●
4	4 stages	●	●

5

Support version (3 digits)	
LAA	Standard light support version AA
LBA	Standard light support version BA
LCA	Standard light support version CA
LAB	Standard light support version AB
FAA	Standard support with foot version AA

6

Shaft version (4 digits)		**Support version** LAA	LBA	LCA	LAB	FAA
M100	Male splined	●				
N100	Male cylindrical with keyway	●				●
F100	Female splined		●			
C100	Female with keyway			●		
S100	Female for shrink disc				●	
M1**	Loose pinion (** see pinion classification) (4 digits)	●				

7

Output accessories (3 digits)		**Shaft version** M100	N100	F100	C100	S100	M1**
D11	D: driving flange (+ standard retaining cover)	●					
D21	D: driving flange (+ standard retaining cover)	●					
M11	M: splined bush (+ standard retaining cover)	●					
R11	R: retaining cover (used alone)	●					
L11	L: loose pinion variant 1 (see pinion classification)	●					●
L21	L: loose pinion variant 2 (see pinion classification)	●					●
XXX	X: not present (3 digits)	●	●	●	●	●	●

16	17	18	19	20	21	22	23	24		
Input seal	Input stages devices	NOT USED	Certification	Ratio composition	Backstop	NOT USED	Gearbox Oil	NOT USED		
X	R	X	X01	X	O	X	S2	XX	XXXXX	XXXXXXXX

For internal use only

8

Reduction ratio (5 digits)	
4.182	See pages S270 2 S270 3
4.889	
.....	
51.45	
.....	
528.1	
.....	
_1047	
_1273	

9

Brake (6 digits)			Transmission type						
			L				C		
			Number of stages				Number of stages		
			1	2	3	4	2	3	4
xxxxx		no brake	●	●	●	●	●	●	●
50ADVX	85.3 Nm ÷ 95.5 Nm	5” brake			●	●		●	●
50BDVX	170.6 Nm ÷ 190.9 Nm				●	●		●	●
50CDVX	263.3 Nm ÷ 293.3 Nm				●	●		●	●
50CGVX	394.9 Nm ÷ 439.9 Nm				●	●		●	●
50DGVX	541.3 Nm ÷ 600.3 Nm				●	●		●	●
50CPVX	511.9 Nm ÷ 567.7 Nm				●	●		●	●
50DPVX	700.8 Nm ÷ 774.0 Nm				●	●		●	●
50EGVX	588.3 Nm ÷ 696.4 Nm				●	●		●	●
50FGVX	728.0 Nm ÷ 856.4 Nm				●	●		●	●
50GGVX	875.0 Nm ÷ 1023.1 Nm				●	●		●	●
50EPVX	766.5 Nm ÷ 900.6 Nm				●	●		●	●
50FPVX	947.1 Nm ÷ 1106.3 Nm				●	●		●	●
50GPVX	1136.9 Nm ÷ 1320.6 Nm				●	●		●	●
60DUVX	922.6 Nm ÷ 1115.3 Nm	6” brake		●					
60EUVX	1153.2 Nm ÷ 1394.1 Nm			●					
60FUVX	1383.9 Nm ÷ 1673.0 Nm			●					
60GUVX	1614.5 Nm ÷ 1951.8 Nm			●					
60HUVX	1845.2 Nm ÷ 2230.6 Nm			●					
60IUVX	2075.8 Nm ÷ 2509.4 Nm			●					
20GDVX	238.8 Nm ÷ 284.6 Nm	2” brake installed on universal input			●	●		●	●
35FEVX	352.1 Nm ÷ 401.2 Nm	3.5” brake installed on universal input			●	●		●	●

DESIGNATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Series	Transmission type	Size Stage sequence	Number of stages	Support version	Shaft version	Output accessories	Reduction ratio	Brake	Input type	Mounting position	Color	Special gloss color	Painting cycle	Output seal
S	L	0270	3	LAA	M100	R11	51.45	50CPVX	WAGG1	B30	5012	S	C3	X

10

Input type (5 digits)		Transmission type						
		L				C		
		Number of stages				Number of stages		
		1	2	3	4	2	3	4
WAGG1	Universal input 00 - 6 holes			●	●		●	●
WBGG1	Universal input 00 - 12 holes		●					
WCFA1	Universal input S00	●	●					
WHGG1	Universal input 00 - 6 holes + universal protection cover			●	●		●	●
WIGG1	Universal input 00 - 12 holes + universal protection cover		●					
WLFA1	Universal input S00 + universal protection cover	●	●					
WAGI1	Universal input 00 - 6 holes - Z27					●		
WHGI1	Universal input 00 - 6 holes - Z27 + universal protection cover					●		
RATA1	Input shaft on 00 - 28x50 - w/o flange		●	●	●		●	●
RATC1	Input shaft on 00 - 40x58 - w/o flange		●	●	●		●	●
RATG1	Input shaft on 00 - 48x82 - w/o flange		●	●	●		●	●
RATE1	Input shaft on 00 - 42x80 - w flange		●	●	●		●	●
RBTA1	Input shaft on 00 - 28x50 - w flange		●	●	●		●	●
RBTC1	Input shaft on 00 - 40x58 - w flange		●	●	●		●	●
RBTG1	Input shaft on 00 - 48x82 - w flange		●	●	●		●	●
RATY1	Input shaft on 00 - 1" 1/2 x 3" 1/4 - w/o flange		●	●	●		●	●
RAUC1	Input shaft on 00 - 1" 3/8" - w/o flange		●	●	●		●	●
ACTF1	Input shaft on bevel gear 45x70 (not available with brake)						●	
ACTG1	Input shaft on bevel gear 48x82 (not available with brake)						●	●
ACTK1	Input shaft on bevel gear 65x105 (not available with brake)					●		
AATK1	Light input shaft 65x105 (not available with brake)			●	●			
AATC1	Light input shaft 40x58 (not available with brake)	●	●					
AATI1	Light input shaft 63,5x108 (not available with brake)			●	●			
AAUA1	Light input shaft B58x53 DIN5482 Z=27 (not available with brake)			●	●			
ABTK1	Reinforced input shaft 65x105 (not available with brake)			●	●			
ABTI1	Reinforced input shaft 63.5x108 (not available with brake)			●	●			
ABUA1	Reinforced input shaft B58x53 DIN5482 Z=27 (not available with brake)			●	●			
*****	Motor adaptor	***** see table page						

11

Mounting position (3 digits)	
B30	See pages S270 31, S270 32
B3A	
...	
...	
V6D	

16	17	18	19	20	21	22	23	24		
Input seal	Input stages devices	NOT USED	Certification	Ratio composition	Backstop	NOT USED	Gearbox Oil	NOT USED		
X	R	X	X01	X	O	X	S2	XX	XXXXX	XXXXXXXX

For internal use only

12

Color (4 digits)	
5012	RAL 5012
7035	RAL 7035
9005	RAL 9005
....	RAL ….
xxxx	no painted NN/NP

13

Special gloss color (1 digit)		Painting cycle	
		P0/P2/P3	C2/C3/C4/C5
S	Standard	10%	50%
A	10%		●
B	30%		●
C	80%		●

14

Painting cycle (2 digits)	
P0	Primer RAL5012
C2	C2H (C2 - EN ISO 12944)
C3	C3H (C3 - EN ISO 12944)
C4	C4H (C4 - EN ISO 12944)
C5	C5MH (C5 - EN ISO 12944)
P2	Primer RAL7035
P3	Primer RAL7035
NN	Not painted, not protected
NP	Not painted, protected

15

Output seal (1 digit)	
R	R: NBR (Rubber)
V	V: FKM (Viton)

16

Input seal (1 digit)	
X	No seal
R	R: NBR (Rubber)
V	V: FKM (Viton)

DESIGNATION

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Series	Transmission type	Size Stage sequence	Number of stages	Support version	Shaft version	Output accessories	Reduction ratio	Brake	Input type	Mounting position	Color	Special gloss color	Painting cycle	Output seal
S	L	0270	3	LAA	M100	R11	51.45	50CPVX	WAGG1	B30	5012	S	C3	X

17

Input stages devices (1 digit)		Transmission type						
		L				C		
		Number of stages				Number of stages		
		1	2	3	4	2	3	4
X	No input device	●	●	●	●	●	●	●
A	1010						●	●
B	1020						●	●
D	2010						●	●
E	2020						●	●
F	2022						●	●
J	CCU25			●	●			
K	DU150.1			●	●		●	●

18

NOT USED (1 digit)	
X	Always " X "

19

Certification (3 digits)	
XXX	No WTC
X01	WTC - Certificate EN 10204 Type 3.1+ Assembly test
X02	WTC - Magnetic particles inspection (MPI)
X03	Painting Certificate + Adhesion
X04	No load rotation inspection test Type 2.2
X05	WTC - Fitting dimensions

20

Ratio composition (1 digit)	
X	Standard

16	17	18	19	20	21	22	23	24		
Input seal	Input stages devices	NOT USED	Certification	Ratio composition	Backstop	NOT USED	Gearbox Oil	NOT USED		
X	R	X	X01	X	O	X	S2	XX	XXXXX	XXXXXXXX

For internal use only

21

Backstop (1 digit)			Transmission type						
			L				C		
			Number of stages				Number of stages		
		Constrain	1	2	3	4	2	3	4
X	Not present		●	●	●	●	●	●	●
O	free rotation CW	Brake			●	●		●	
		No Brake							●
		Input shaft ABTK1			●	●			
A	free rotation CCW	Brake			●	●		●	
		No Brake							●
		Input shaft ABTK1			●	●			

22

NOT USED (1 digit)	
X	Always " X "

23

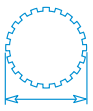
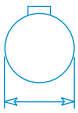
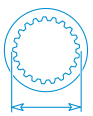
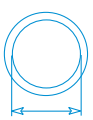
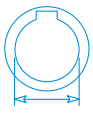
Gearbox Oil (2 digits)	
XX	No Oil
S1	Synthetic oil VG 150 - PAO
S2	Synthetic oil VG 220 - PAO
S3	Synthetic oil VG 320 - PAO
S4	Synthetic oil VG 460 - PAO
M1	Mineral oil VG 150
M2	Mineral oil VG 220
M3	Mineral oil VG 320

24

NOT USED (15 digits)	
X	Always " X "

DANA
BREVINI®
Motion Systems

S270

i_{eff}	4.182 - 1273
T_{2N} (Nm)	27000
	B100X94 DIN5482
	110 mm
	B100X94 DIN5482
	130 mm
	110 mm

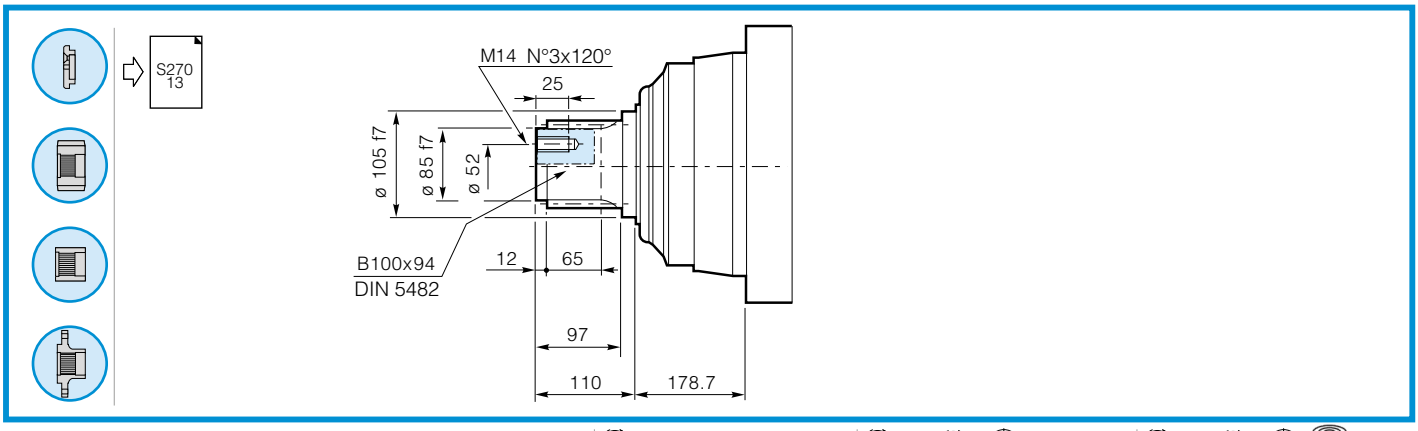
TECHNICAL DATA

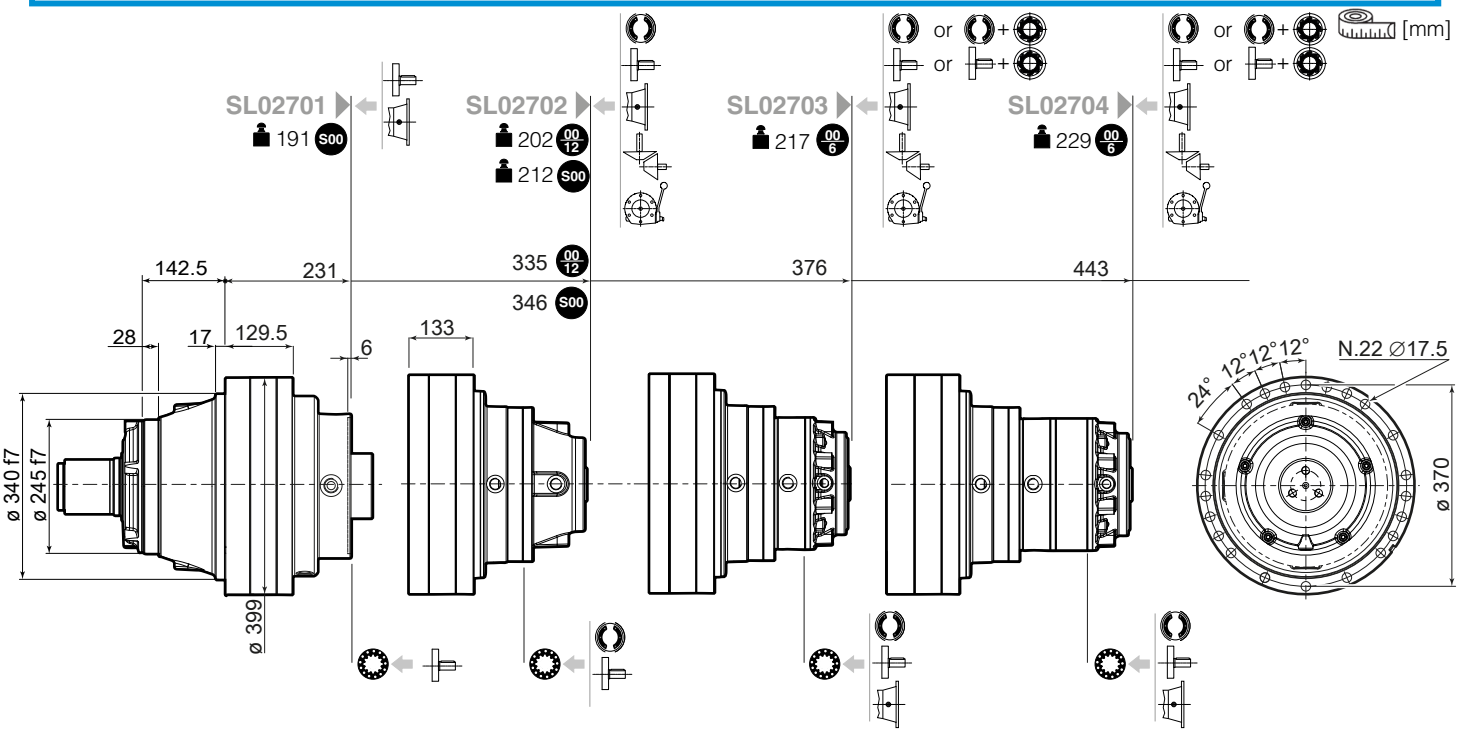
i_{eff}	$n_2$xh 10000 T_2 [Nm]	$n_2$xh 25000 T_2 [Nm]	$n_2$xh 50000 T_2 [Nm]	$n_2$xh 100000 T_2 [Nm]	$n_2$xh 500000 T_2 [Nm]	$n_2$xh 1000000 T_2 [Nm]	10000 hours life n_1 = 1500 rpm n_2 [rpm]	T_2 [Nm]	P_2 [kW]	T_{2max} peak. [Nm]	n_{1max} peak. [rpm]	P_t [kW]
SL02701												
4.182	44.649	38.114	33.741	31.186	20.520	16.664	359	11.375	427	51.000	2.500	55
4.889	37.099	31.594	27.910	26.319	20.148	16.362	307	11.706	376	51.000	2.500	
6.000	27.388	23.193	20.807	19.733	17.410	15.986	250	12.164	318	51.000	2.500	
SL02702												
14.71	36.347	31.778	30.096	26.032	16.063	13.047	102	12.978	139	43.900	3.000	33
17.01	35.493	33.959	32.200	27.587	17.022	13.826	88	14.376	132	51.000	3.000	
19.90	37.099	31.594	27.909	26.319	18.989	15.424	75	16.807	132	51.000	3.000	
24.21	34.530	31.592	27.906	26.320	18.552	15.069	62	17.411	113	51.000	3.000	
28.75	28.704	26.713	25.281	23.908	18.212	14.793	52	17.999	98	51.000	3.000	
35.28	27.386	23.193	20.807	19.733	17.408	15.986	42	17.519	78	51.000	3.000	
SL02703												
51.50	36.356	31.780	30.097	26.032	16.063	13.047	29.2	18.898	58	43.900	3.000	22
59.54	35.502	33.962	32.202	27.587	17.022	13.826	25.2	20.935	55	51.000	3.000	
69.66	37.099	31.594	27.909	26.319	18.989	15.424	21.5	24.475	55	51.000	3.000	
82.20	37.099	31.594	27.909	26.319	18.989	15.424	18.3	25.134	48	51.000	3.000	
87.96	35.502	33.966	32.206	27.587	17.022	13.826	17.0	23.534	42	51.000	3.000	
99.97	34.534	31.592	27.906	26.320	18.552	15.069	15.0	25.518	40	51.000	3.000	
102.8	37.099	31.594	27.909	26.319	18.989	15.424	14.6	25.576	39	51.000	3.000	
106.9	30.466	27.645	26.178	24.772	16.630	13.508	14.0	23.478	34	51.000	3.000	
119.4	37.099	31.594	27.909	26.319	18.989	15.424	12.6	25.870	34	51.000	3.000	
123.3	34.932	31.686	29.337	27.100	17.022	13.826	12.1	26.046	33	51.000	3.000	
125.1	34.533	31.592	27.906	26.320	18.552	15.069	12.0	25.962	33	51.000	3.000	
144.3	37.099	31.594	27.909	26.319	18.989	15.424	10.4	26.246	29	51.000	3.000	
150.0	30.465	27.643	26.175	24.769	16.630	13.508	10.0	24.231	25	51.000	3.000	
175.5	34.531	31.592	27.906	26.320	18.552	15.069	8.5	26.636	24	51.000	3.000	
SL02704												
158.6	36.356	31.780	30.097	26.032	16.063	13.047	9.5	26.484	26	43.900	3.000	16
180.2	36.356	31.780	30.097	26.032	16.063	13.047	8.3	27.519	24	43.900	3.000	
187.2	36.356	31.779	30.096	26.032	16.063	13.047	8.0	27.832	23	43.900	3.000	
208.4	35.502	33.962	32.202	27.587	17.022	13.826	7.2	30.485	23	51.000	3.000	
216.4	35.502	33.961	32.201	27.587	17.022	13.826	6.9	30.831	22	51.000	3.000	
243.8	37.099	31.594	27.909	26.319	18.989	15.424	6.1	27.302	18	51.000	3.000	
245.9	35.502	33.962	32.202	27.587	17.022	13.826	6.1	31.232	20	51.000	3.000	
260.9	34.535	31.592	27.906	26.320	18.552	15.069	5.7	27.440	16	51.000	3.000	
270.9	35.502	33.966	32.206	27.587	17.022	13.826	5.5	31.485	18	51.000	3.000	
290.2	35.502	33.961	32.201	27.587	17.022	13.826	5.2	31.666	17	51.000	3.000	
307.8	35.502	33.962	32.202	27.587	17.022	13.826	4.9	31.821	16	51.000	3.000	
314.4	35.502	33.963	32.202	27.587	17.022	13.826	4.8	31.876	16	51.000	3.000	
339.5	37.099	31.594	27.909	26.319	18.989	15.424	4.4	28.568	13	51.000	3.000	
357.3	35.502	33.962	32.202	27.587	17.022	13.826	4.2	32.212	14	51.000	3.000	
363.3	35.502	33.961	32.201	27.587	17.022	13.826	4.1	32.256	14	51.000	3.000	
385.4	34.533	31.592	27.906	26.320	18.552	15.069	3.9	29.226	12	51.000	3.000	
412.9	34.534	31.592	27.906	26.320	18.552	15.069	3.6	29.590	11	51.000	3.000	
431.7	35.502	33.962	32.202	27.587	17.022	13.826	3.5	32.710	12	51.000	3.000	
447.3	34.532	31.592	27.906	26.320	18.552	15.069	3.3	30.018	11	51.000	3.000	
460.1	37.099	31.593	27.908	26.323	17.919	14.555	3.3	30.160	10.3	43.900	3.000	
493.2	37.099	31.594	27.909	26.319	18.989	15.424	3.0	30.550	9.7	51.000	3.000	
509.4	35.502	33.961	32.201	27.587	17.022	13.826	2.9	33.148	10.2	51.000	3.000	
527.7	35.502	33.966	32.206	27.587	17.022	13.826	2.8	33.242	9.9	51.000	3.000	
540.5	34.531	31.592	27.906	26.320	18.552	15.069	2.8	31.050	9.0	51.000	3.000	
595.9	37.099	31.594	27.909	26.319	18.989	15.424	2.5	31.597	8.3	51.000	3.000	
612.5	28.702	26.711	25.277	23.904	18.212	14.793	2.4	33.638	8.6	51.000	3.000	
647.0	34.533	31.592	27.906	26.320	18.552	15.069	2.3	31.677	7.7	51.000	3.000	
663.2	27.384	23.193	20.807	19.733	17.409	15.986	2.3	23.656	5.6	51.000	3.000	
716.5	37.099	31.594	27.909	26.319	18.989	15.424	2.1	32.646	7.1	51.000	3.000	
740.1	35.502	33.963	32.202	27.587	17.022	13.826	2.0	34.145	7.2	51.000	3.000	
768.5	28.707	26.710	25.277	23.903	18.212	14.793	2.0	26.395	5.4	51.000	3.000	
865.8	37.099	31.594	27.909	26.319	18.989	15.424	1.7	33.753	6.1	51.000	3.000	
894.2	34.933	31.674	29.337	27.098	17.022	13.826	1.7	34.655	6.1	51.000	3.000	
_1046	37.099	31.594	27.909	26.319	18.989	15.424	1.4	34.892	5.2	51.000	3.000	
_1272	34.531	31.592	27.906	26.320	18.552	15.069	1.2	33.452	4.1	51.000	3.000	

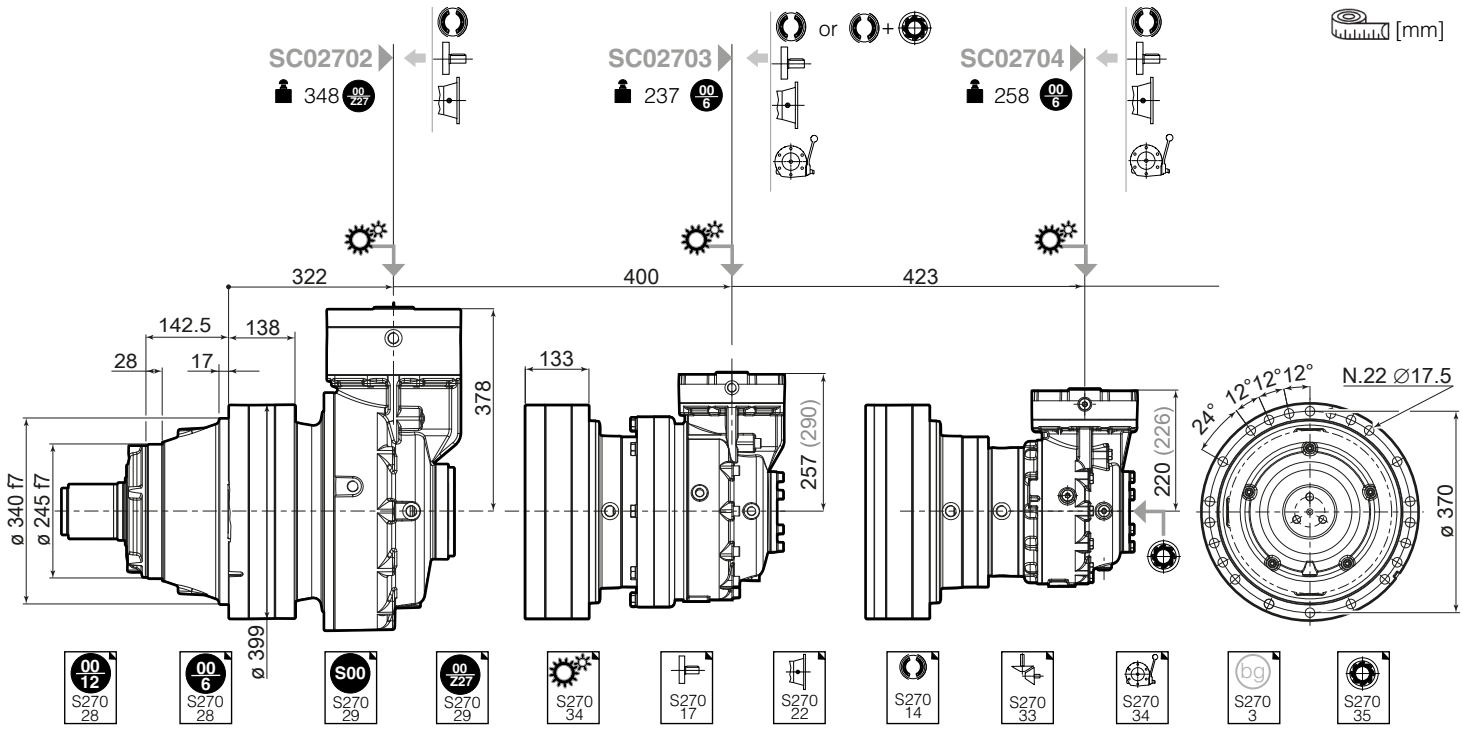
i_{eff}	$n_2$xh 10000 T_2 [Nm]	$n_2$xh 25000 T_2 [Nm]	$n_2$xh 50000 T_2 [Nm]	$n_2$xh 100000 T_2 [Nm]	$n_2$xh 500000 T_2 [Nm]	$n_2$xh 1000000 T_2 [Nm]	10000 hours life n_1 = 1500 rpm n_2 [rpm]	T_2 [Nm]	P_2 [kW]	T_{2max} peak. [Nm]	n_{1max} peak. [rpm]	P_t [kW]
SC02702												
10.62	25.781	24.964	22.480	20.687	14.445	11.733	141	11.865	175	51.000	1.800	21
12.21	40.079	38.114	31.833	25.856	15.954	12.959	123	14.334	184	51.000	1.500	
14.28	37.099	31.594	27.910	26.319	17.798	14.456	105	16.144	177	51.000	1.500	
17.52	27.388	23.193	20.807	19.733	17.410	15.986	86	16.421	147	51.000	1.500	
22.30	31.761	27.651	25.556	24.445	15.083	12.252	67	17.250	122	51.000	2.500	
27.36	27.388	23.193	20.807	19.733	17.408	14.140	55	17.127	98	51.000	2.500	
SC02703												
40.46	36.347	31.778	30.096	26.032	16.063	13.047	37.1	17.579	68	43.900	2.000	16
46.78	37.099	31.593	27.908	26.323	17.919	14.555	31.7	19.473	65	51.000	2.000	
51.50	37.099	31.594	27.909	26.319	18.989	15.424	27.4	18.898	54	43.900	3.000	
58.08	27.384	23.193	20.808	19.734	17.410	15.986	25.9	18.277	49	43.900	2.000	
59.54	35.493	28.029	22.767	18.493	11.412	9.270	25.2	20.935	55	51.000	3.000	
60.24	37.099	31.594	27.909	26.319	18.989	15.424	22.8	22.094	53	43.900	3.000	
66.57	24.943	23.166	21.924	20.737	16.325	13.260	22.2	23.584	55	51.000	2.000	
67.59	27.384	23.193	20.808	19.734	17.410	15.986	21.6	18.319	41	51.000	2.000	
72.42	30.465	27.644	26.101	21.201	13.084	10.628	20.7	21.686	47	51.000	3.000	
73.92	27.384	23.194	20.808	19.734	17.406	15.986	18.6	18.644	36	43.900	3.000	
81.68	27.384	23.193	20.807	19.733	17.409	15.986	18.4	18.799	36	51.000	2.000	
84.72	34.530	31.592	27.906	23.652	14.596	11.856	17.7	25.192	47	51.000	3.000	
86.02	24.943	23.166	21.924	20.737	14.759	11.989	17.4	18.792	34	51.000	3.000	
96.92	34.647	28.276	22.969	18.658	11.509	9.349	15.4	25.458	41	51.000	3.500	
97.02	27.384	23.193	20.807	19.733	17.409	15.986	15.3	19.062	31	51.000	2.000	
103.9	27.384	23.193	20.807	19.733	16.846	13.684	14.4	19.168	29	51.000	3.000	
117.9	34.530	31.592	26.333	21.391	13.195	10.718	12.7	25.843	34	51.000	3.500	
123.5	27.386	23.193	20.807	19.733	17.408	15.436	12.1	19.433	25	51.000	3.000	
140.0	28.704	26.713	25.281	23.908	14.884	12.090	10.7	22.705	25	51.000	3.500	
171.8	27.386	23.193	20.807	19.733	17.178	13.954	8.7	19.945	18	51.000	3.500	
SC02704												
154.5	36.356	31.780	30.097	26.032	16.063	13.047	9.7	26.275	27	43.900	2.700	12
178.6	35.502	33.962	32.202	27.587	17.022	13.826	8.4	29.107	26	51.000	2.700	
180.7	37.099	31.593	27.908	26.323	17.919	14.555	8.3	26.692	23	43.900	2.700	
210.8	35.502	33.961	32.201	27.587	17.022	13.826	7.1	30.589	23	51.000	2.700	
228.2	36.356	31.782	30.098	26.032	16.063	13.047	6.6	28.826	20	43.900	2.700	
246.6	37.099	31.594	27.909	26.319	18.989	15.424	6.1	27.325	17	51.000	2.700	
256.4	27.384	23.194	20.808	19.734	17.406	15.986	5.8	20.577	13	51.000	2.700	
263.9	35.502	33.966	32.206	27.587	17.022	13.826	5.7	31.416	19	51.000	2.700	
278.3	37.099	31.593	26.952	21.893	13.511	10.970	5.4	26.576	15	43.900	3.500	
299.9	34.534	31.592	27.906	26.320	18.552	15.069	5.0	27.931	15	51.000	2.700	
308.7	37.099	31.594	27.909	26.319	18.989	15.424	4.9	28.080	14	51.000	2.700	
324.6	35.502	33.961	30.055	24.413	15.066	12.233	4.6	31.090	15	51.000	3.500	
334.6	30.468	27.647	26.174	24.767	15.396	12.500	4.5	25.989	12	51.000	3.500	
358.2	37.099	31.594	27.909	26.319	18.989	15.424	4.2	28.847	13	51.000	2.700	
379.8	37.099	31.594	27.909	26.319	16.800	13.646	3.9	29.151	12	51.000	3.500	
406.4	35.502	33.966	32.206	27.587	17.022	13.826	3.7	32.551	13	51.000	3.500	
432.9	37.099	31.594	27.909	26.319	18.989	15.424	3.5	29.845	11	51.000	2.700	
461.9	34.534	31.592	27.906	26.320	18.552	15.069	3.2	30.191	10	51.000	3.500	
471.6	35.502	33.963	32.202	27.587	17.022	13.826	3.2	32.944	11	51.000	3.500	
494.2	30.466	27.645	26.178	24.772	16.630	13.508	3.0	26.846	9	51.000	3.500	
526.5	34.531	31.592	27.906	26.320	18.552	15.069	2.8	30.905	9	51.000	2.700	
551.7	37.099	31.594	27.909	26.319	18.989	15.424	2.7	31.167	9	51.000	3.500	
585.5	27.384	23.193	20.808	19.734	17.410	15.986	2.6	23.112	6	43.900	3.500	
635.0	27.386	23.193	20.807	19.733	17.408	15.986	2.4	23.468	6	51.000	2.700	
666.6	37.099	31.594	27.909	26.319	18.989	15.424	2.2	32.232	8	51.000	3.500	
707.4	27.384	23.193	20.808	19.734	17.410	15.986	2.1	23.929	5	43.900	3.500	
767.3	27.386	23.193	20.807	19.733	17.408	15.986	2.0	24.295	5	51.000	2.700	
810.8	34.531	31.592	27.906	26.320	18.552	15.069	1.8	32.264	6	51.000	3.500	
842.7	27.386	23.193	20.807	19.733	17.408	15.986	1.8	24.714	5	51.000	3.500	
978.0	27.386	23.193	20.807	19.733	17.408	15.986	1.5	25.391	4	51.000	3.500	
_1181	27.386	23.193	20.807	19.733	17.408	15.986	1.3	26.274	3	51.000	3.500	

(bg) All the ratios in light grey (i.e. **40.42**) have particular dimensions of bevel gears in some versions.
See dimensional tables.

LAAM100 GEARBOX DIMENSIONS WITH SUPPORT

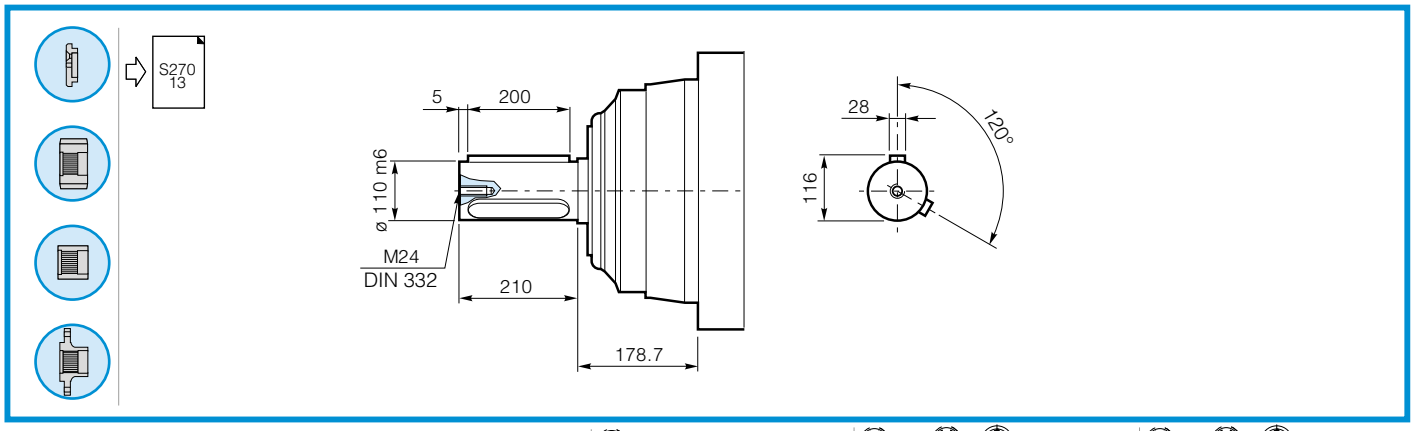


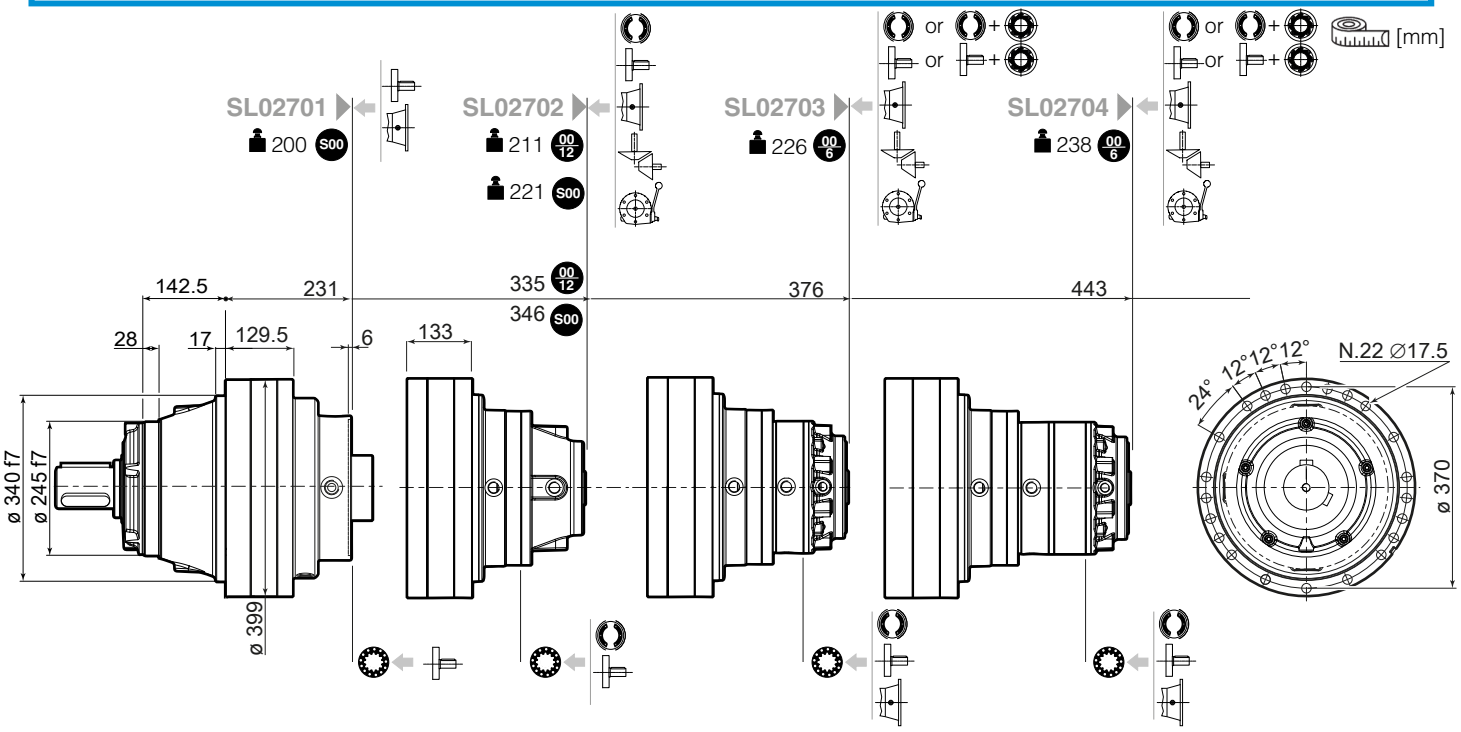


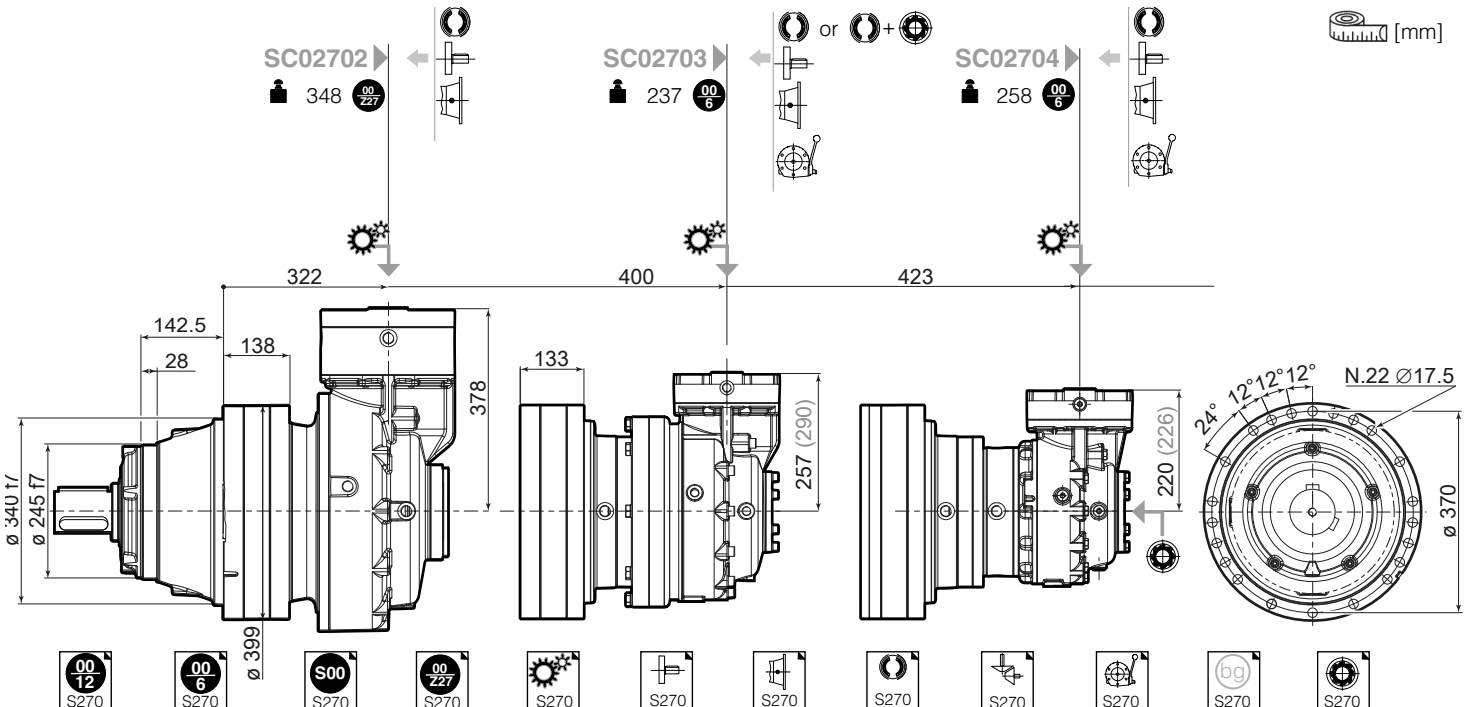


00 12 S270 28 | 00 6 S270 28 | S00 S270 29 | 00 227 S270 29 | S270 34 | S270 17 | S270 22 | S270 14 | S270 33 | S270 34 | S270 3 | S270 35

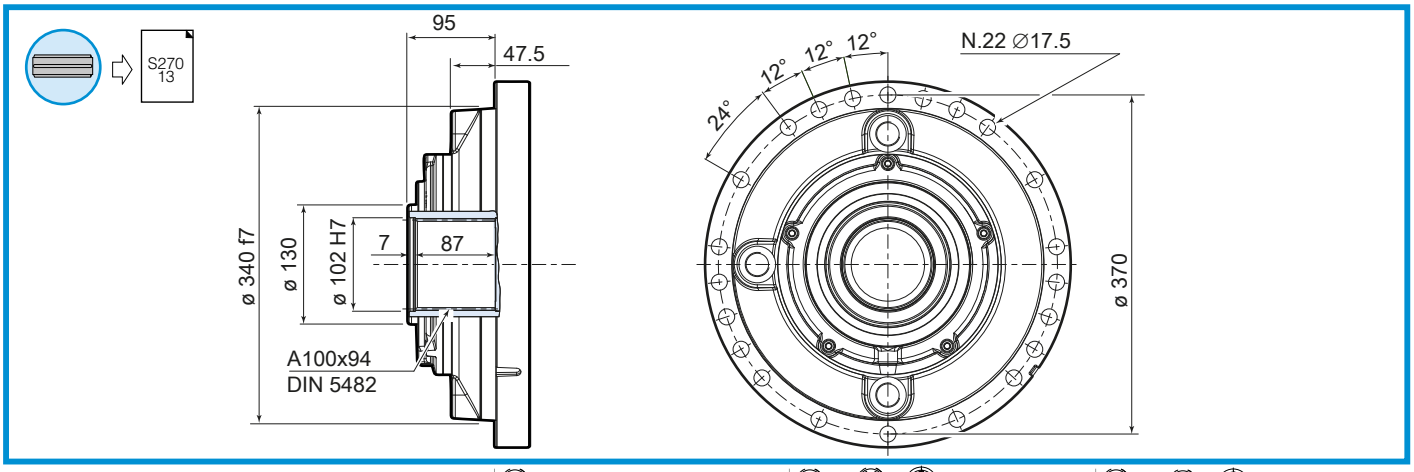
GEARBOX DIMENSIONS WITH SUPPORT

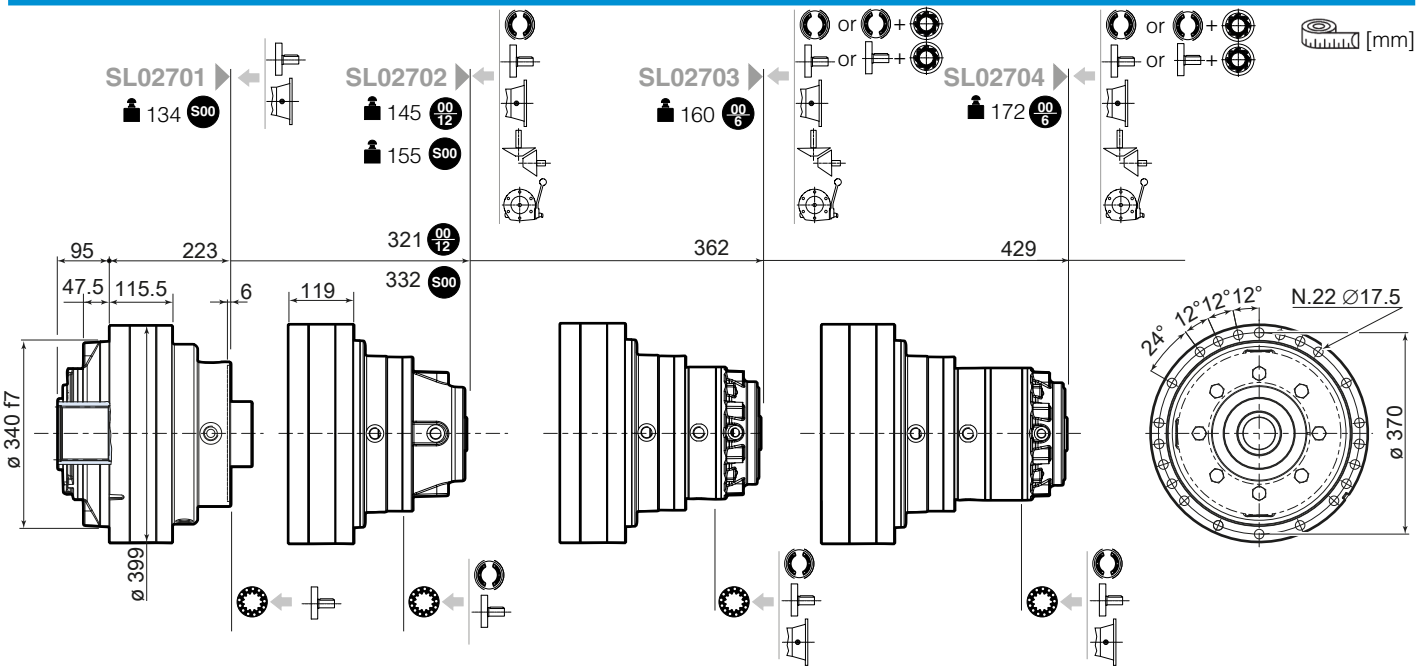


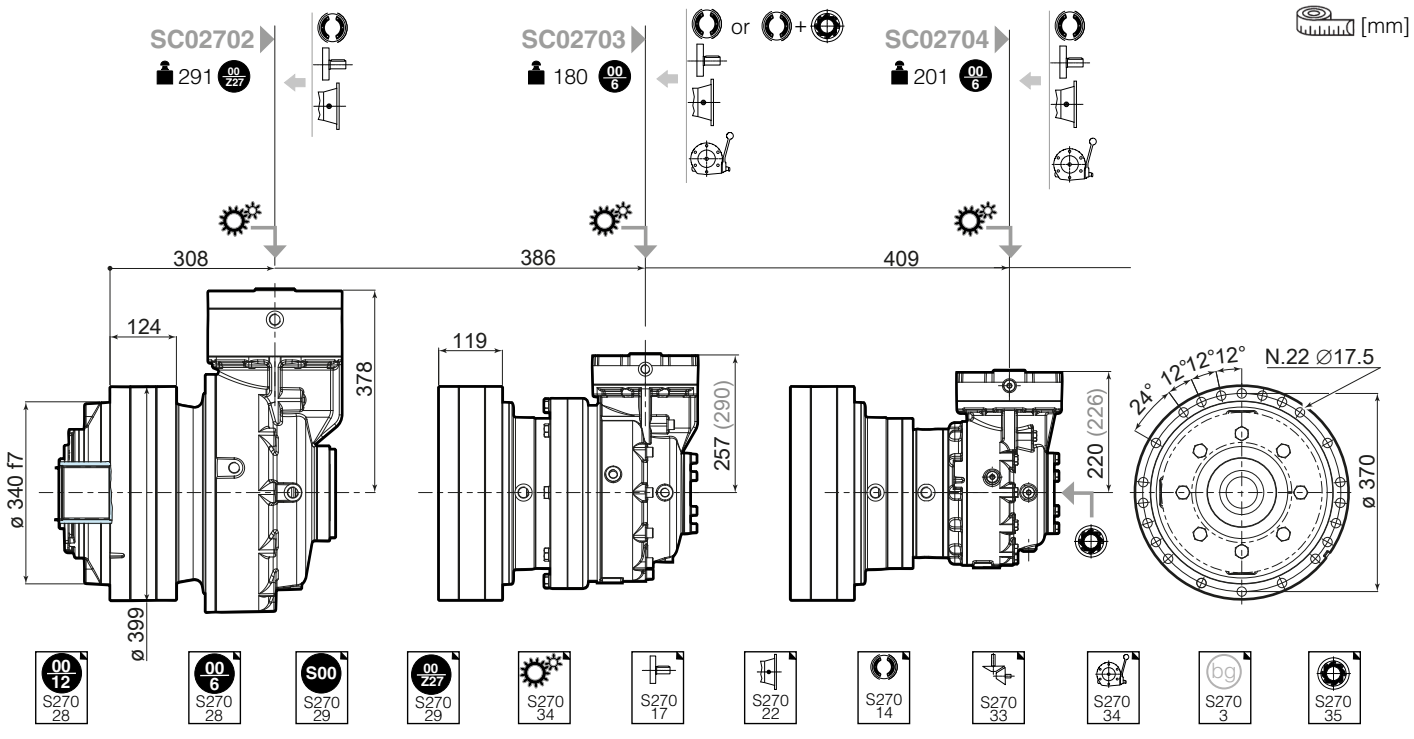




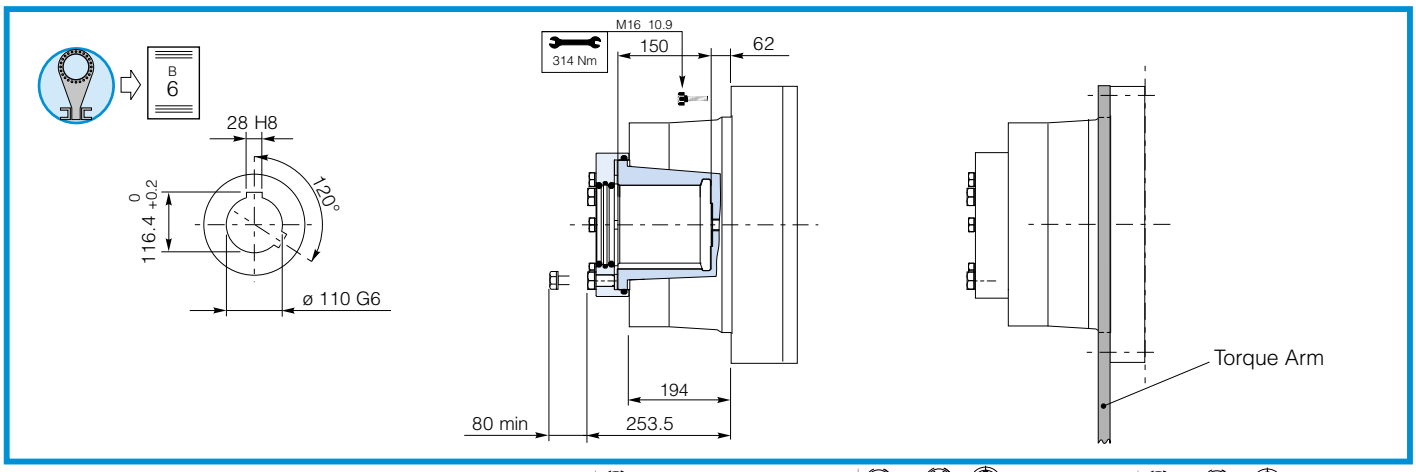
GEARBOX DIMENSIONS WITH SUPPORT

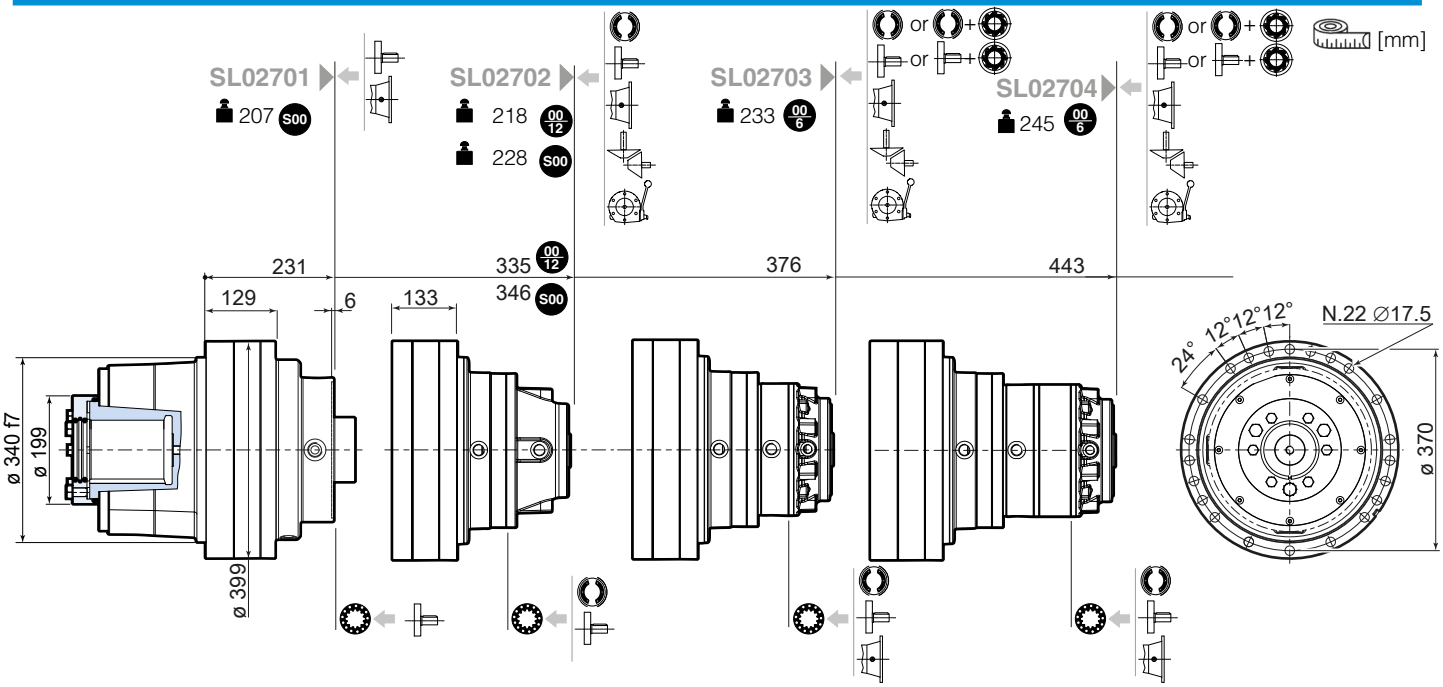


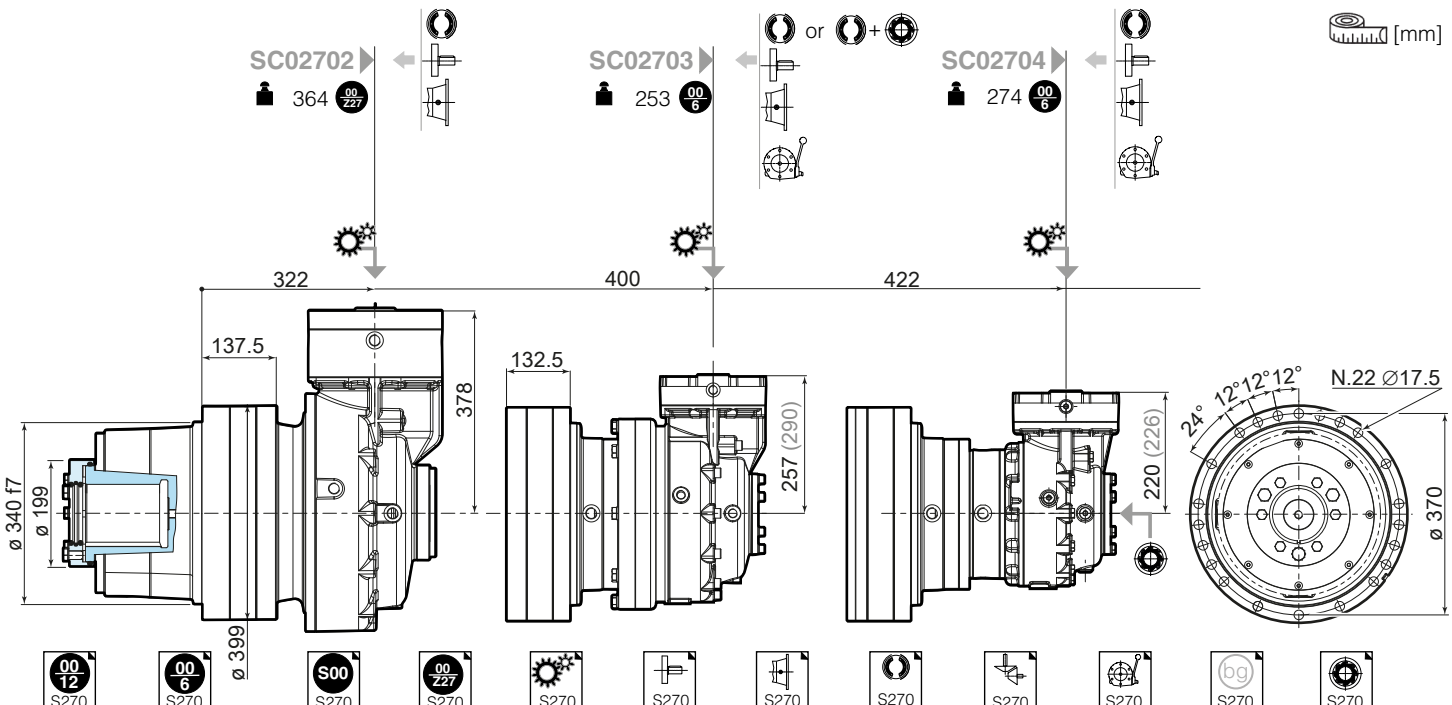




GEARBOX DIMENSIONS WITH SUPPORT

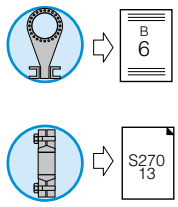


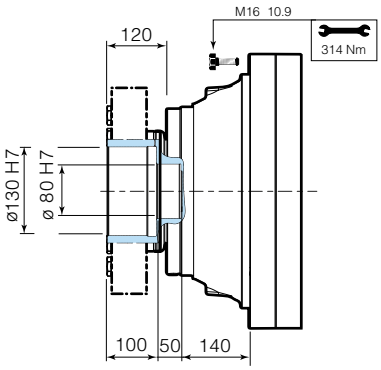


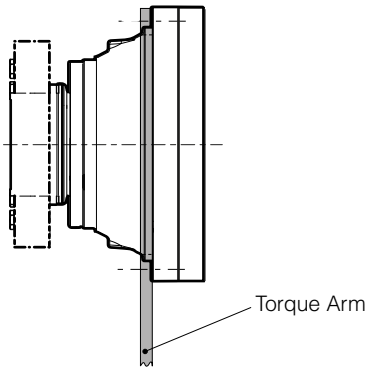


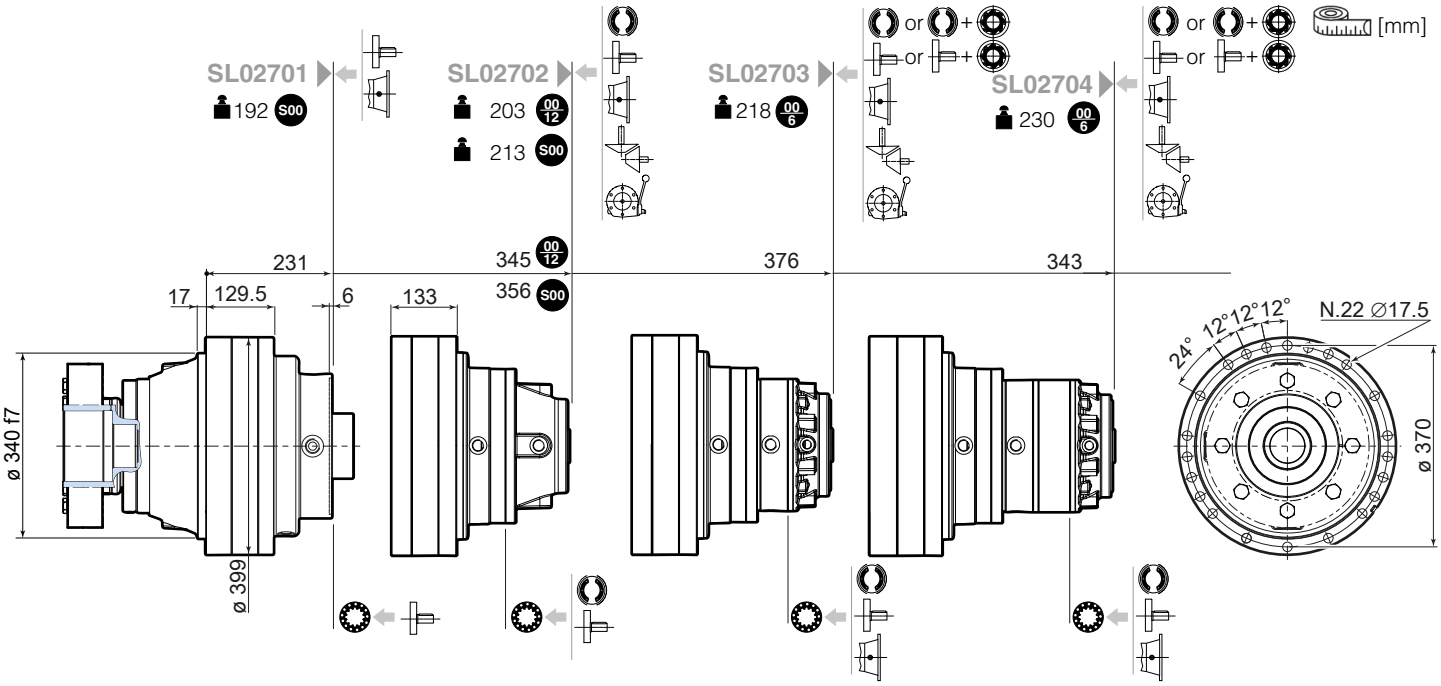
00 12 S270 28 | 00 6 S270 28 | S00 S270 29 | 00 227 S270 29 | S270 34 | S270 17 | S270 22 | S270 14 | S270 33 | S270 34 | bg S270 3 | S270 35

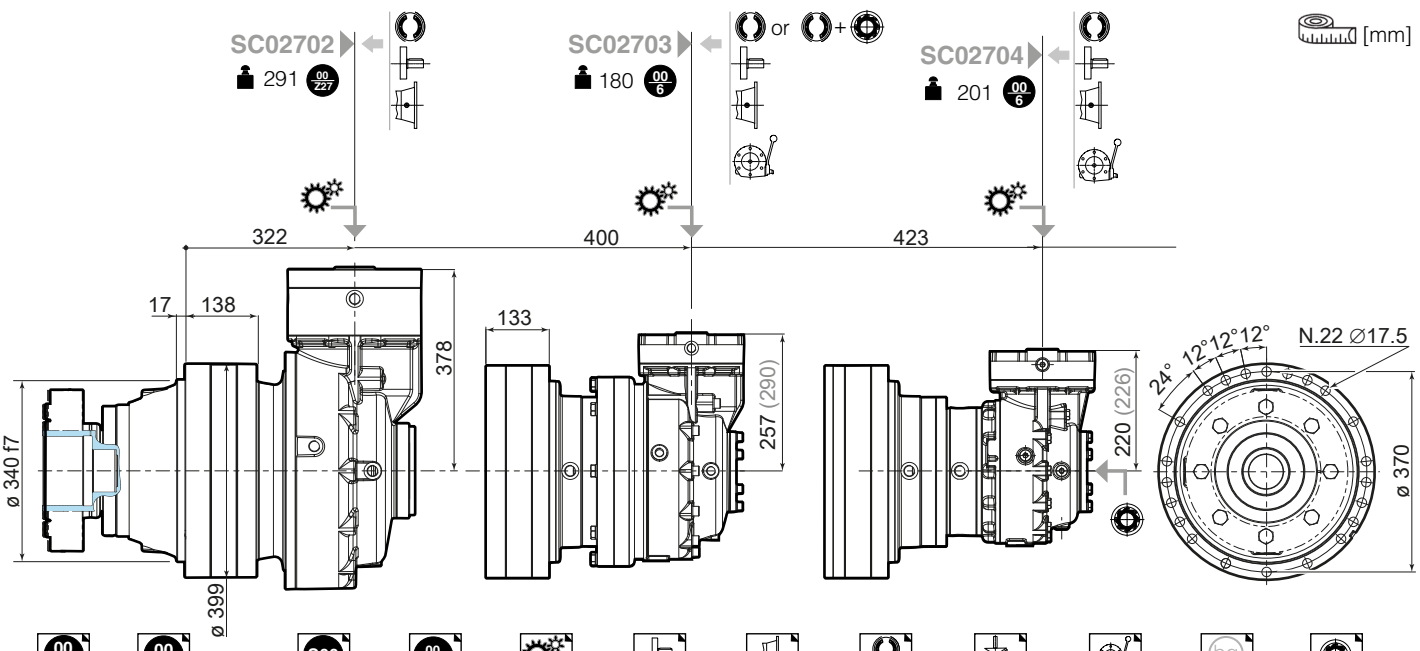
GEARBOX DIMENSIONS WITH SUPPORT

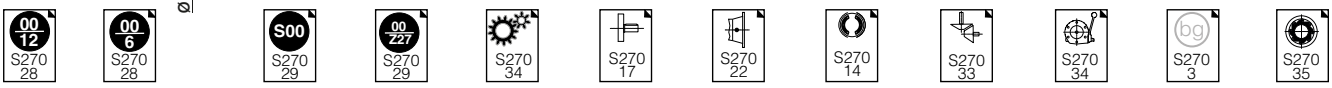




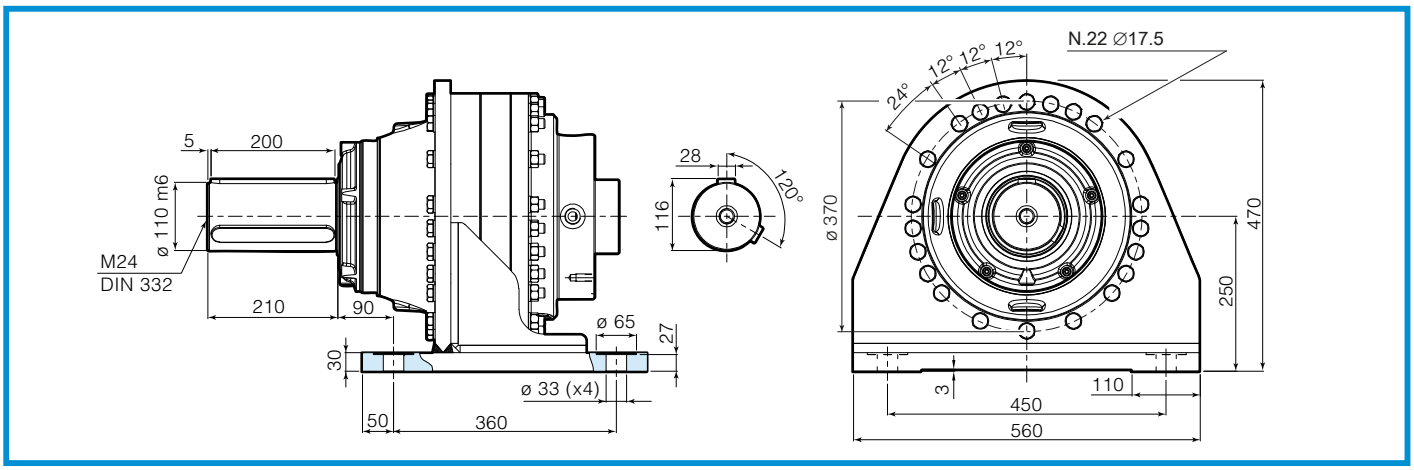


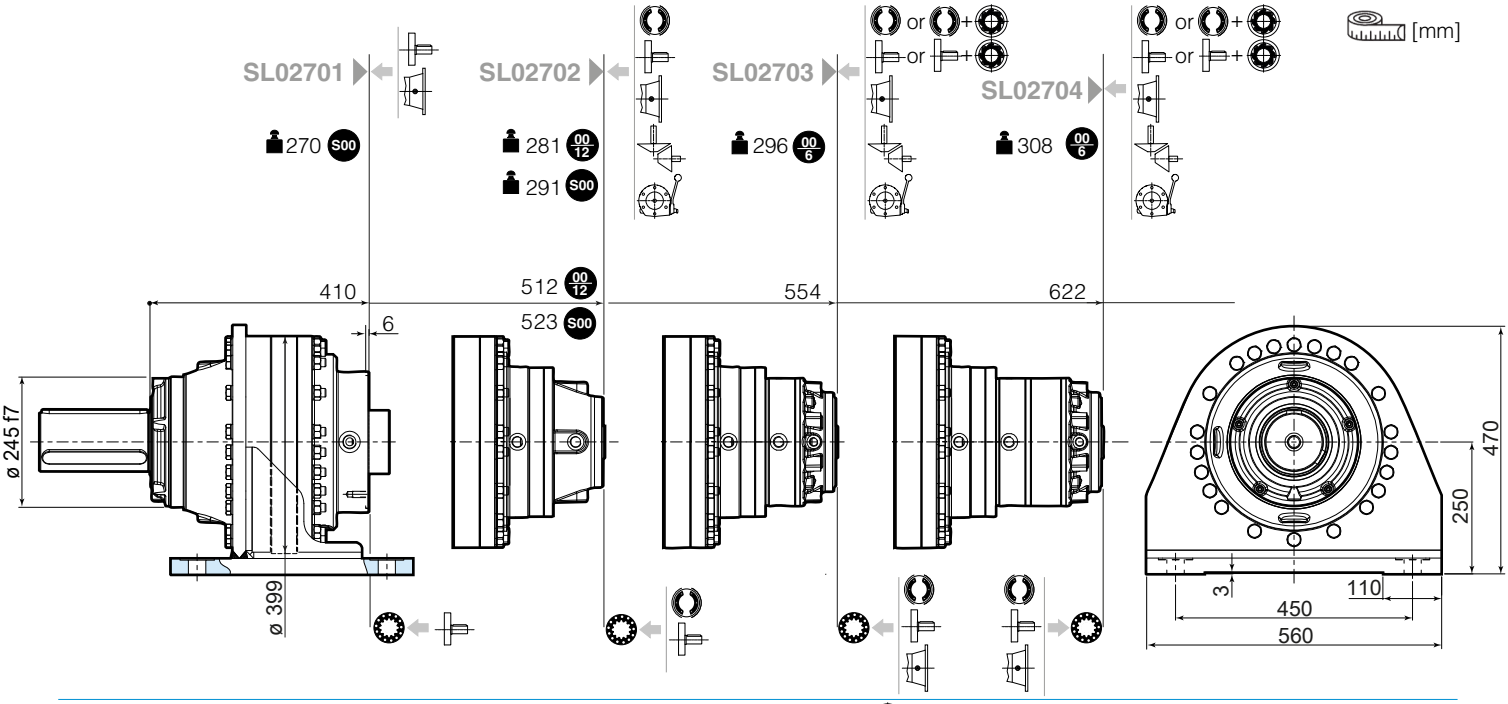


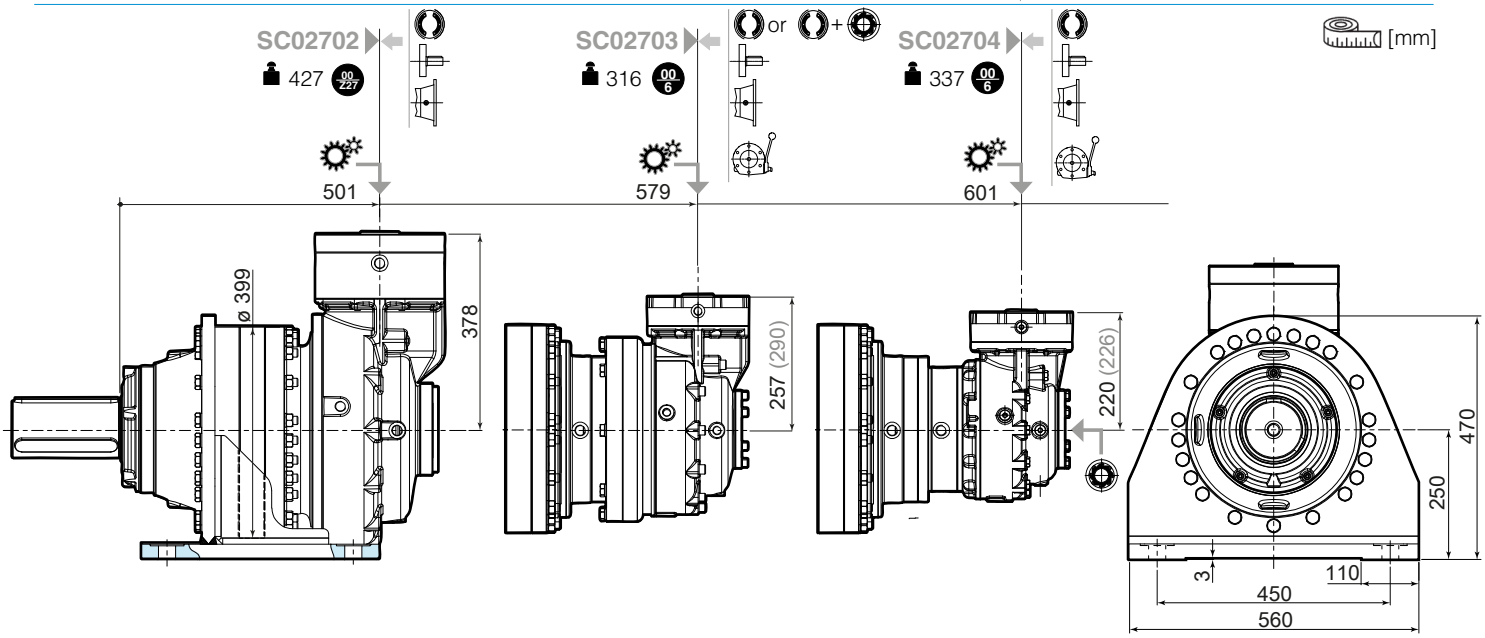




GEARBOX DIMENSIONS WITH SUPPORT

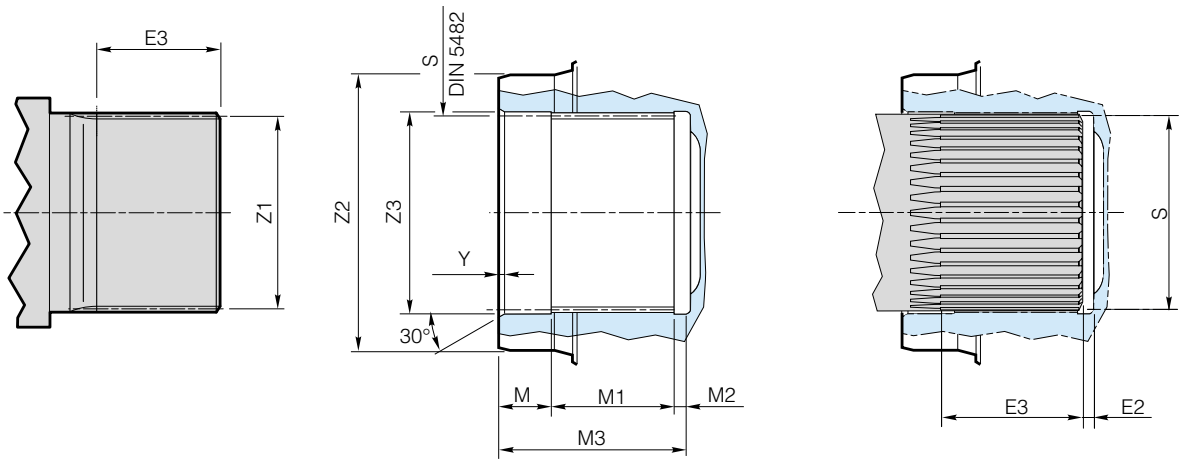






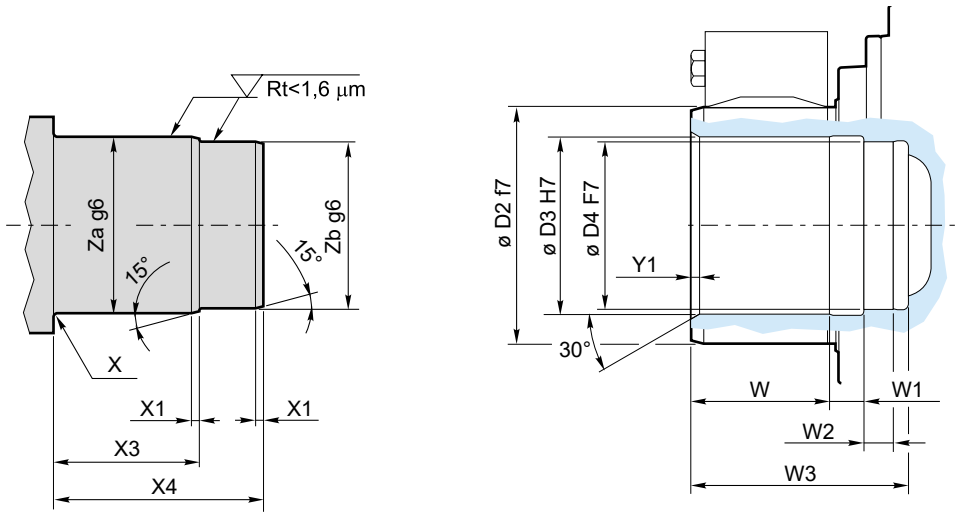
00 12 S270 28 | 00 6 S270 28 | S00 S270 29 | 00 227 S270 29 | S270 34 | S270 17 | S270 22 | S270 14 | S270 33 | S270 34 | (bg) S270 3 | S270 35

LABF100 Female splined shaft



Type	M3	M	M1	M2	Y	S	Z2	Z3	Z1	E2	E3
270	85	7	87	-	1.5	A100x94 H10	130 f7	102 H7	B100x94 c9	2	>78

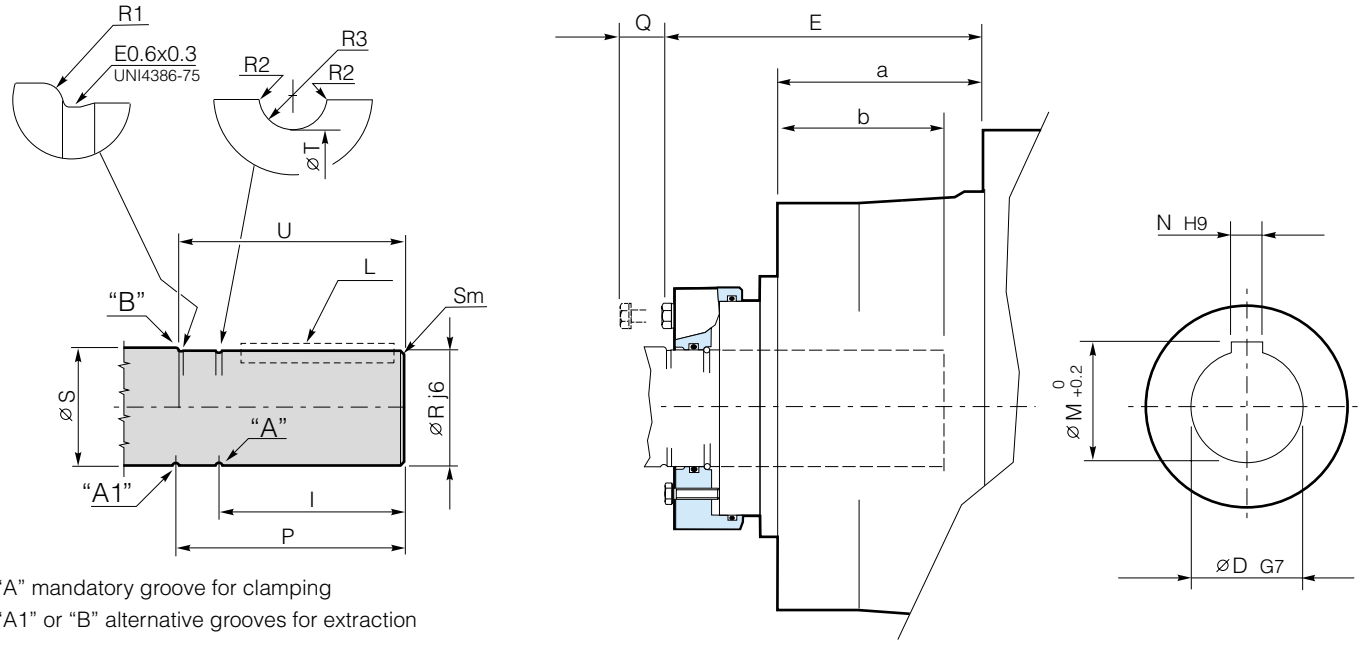
LABS100 Female shaft for shrink disc



Type	W	W1	W2	W3	D2	D3	D4	Y1	X	X1	X3	X4	Za	Zb
270	80	20	47	150	175	130	80	2	R 1.5	5	81	145	130	80

To check the mating with the coupling, see page B-4.

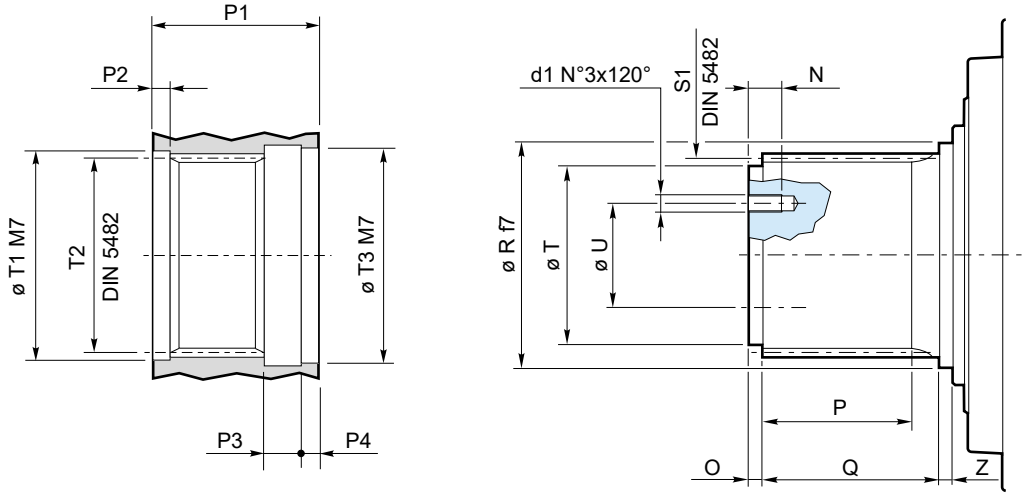
LCAC100 Female shaft with keyway and retaining ring



"A" mandatory groove for clamping
"A1" or "B" alternative grooves for extraction

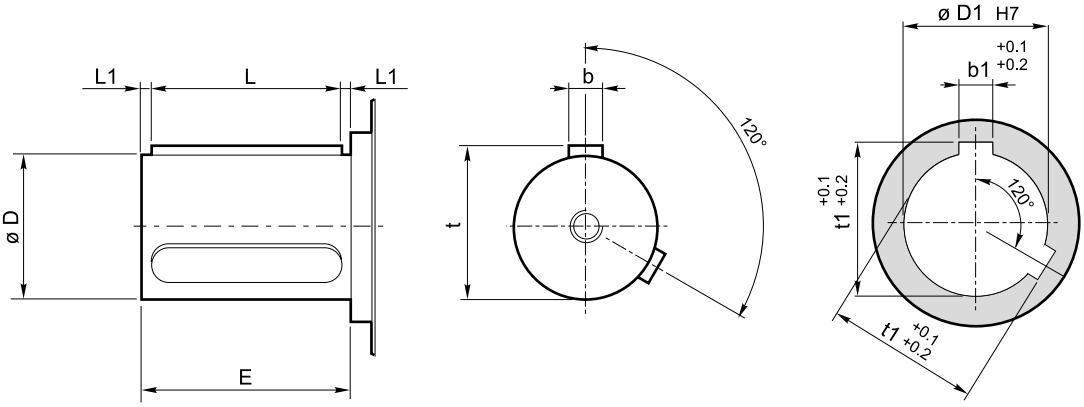
Type	D	M	N	R	R1	R2	R3	S	T	I	P	L	U	E	Q	a	b	Sm
270	110	116.4	28	110	3	0.3	3.4	115.8 $^{+0.2}_{+0.1}$	104	159	186	28x16x125	183	253	80	192	130	2

LAAM100 Male splined shaft



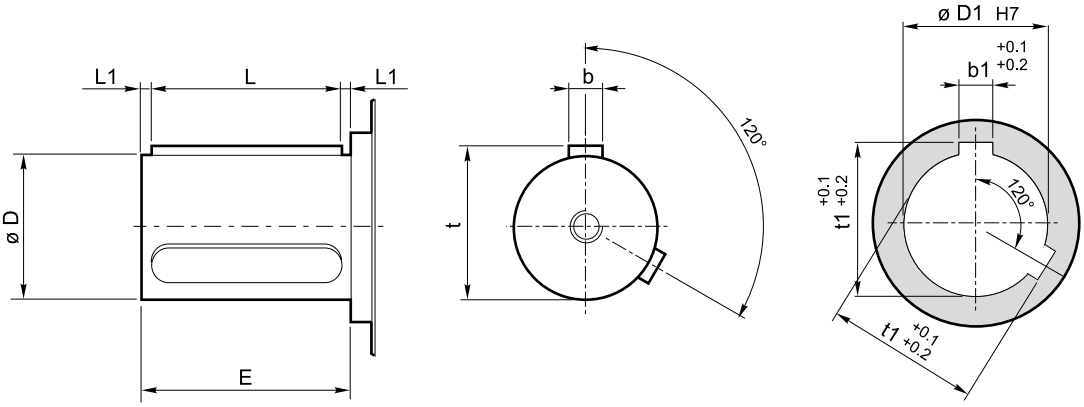
Type	d1	N	O	P	P1	P2	P3	P4	Q	R	S1	T	T1	T2	T3	U	Z
270	M14	25	12	65	110	12	22	15	97	105	B100x94 c9	85 f7	105	A100x94	105	52	13

LAAN100 Keyed cylindrical shaft



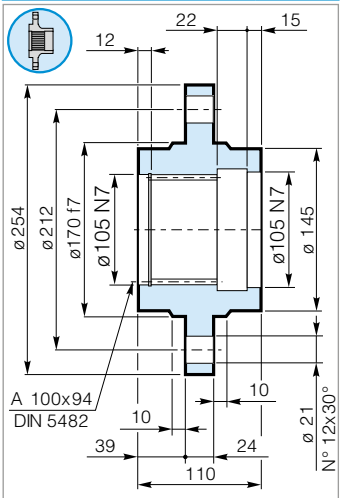
Type	D	E	L	L1	t	b	d2	D1	t1	b1
270	110 m6	210	200	5	116	28	M24	100	116	28

FAAN100 Keyed cylindrical shaft with foot



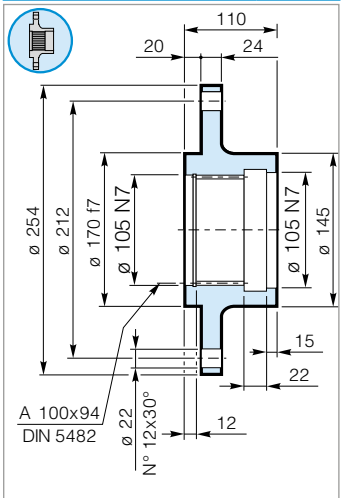
Type	D	E	L	L1	t	b	d2	D1	t1	b1
270	110 m6	210	200	5	116	28	M24	100	116	28

D11 Wheel Flange



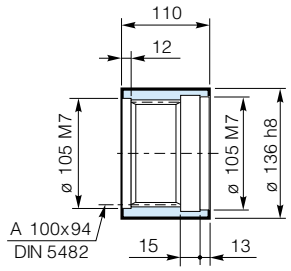
With 10.9 screws T_{2max} = 30000 Nm

D21 Wheel Flange

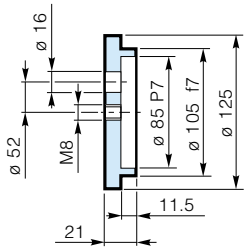


With 10.9 screws T_{2max} = 30000 Nm

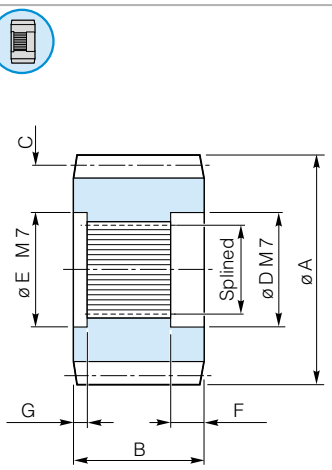
M11 Splined Sleeve



R11 Lock Washer

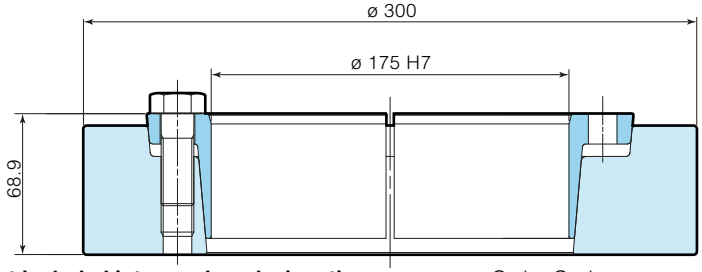


M1.. Pinions



Shaft version	Output accessories	Ø A [mm]	B [mm]	C			Ø D [mm]	Ø E [mm]	F [mm]	G [mm]
				m	z	x				
M1JF	L11	191	110	12	13	0.5	105	105	37	22
M1ME	L11	238	123	16	12	0.5	105	105	37	22
M1MF	L11	256	100	16	13	0.5	105	105	37	22
M1HH	L11	178	105	10	15	0.6	105	105	37	22
M1FI	L11	142	80	8	16	0	105	105	37	22
M1JF	L21	192	110	12	13	0.5	105	105	37	22
M1KH	L11	252	120	14	15	0.5	105	105	37	22
M1JI	L11	216	92	12	16	0	105	105	37	22
M1JH	L11	204	90	12	15	0	105	105	37	22
M1HK	L11	200	83	10	18	0	105	105	37	22
M1KF	L11	218.4	110	14	13	0.5	105	105	37	22

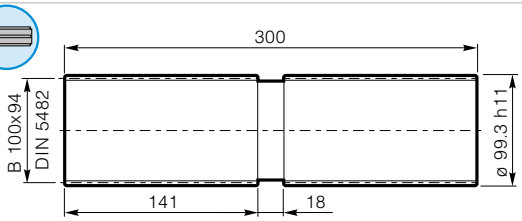
S11 Shrink disc



Not included into gearbox designation

Order Code: 9022752

B11 Splined Bar

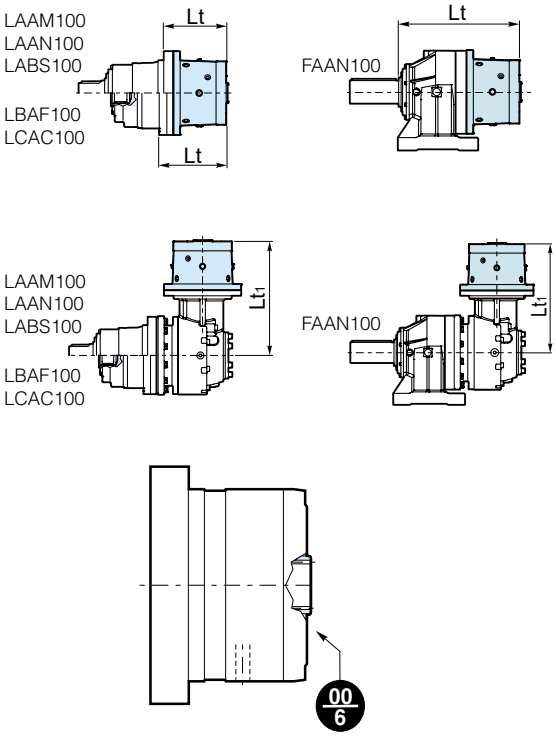


Order Code: 39127330100

Mat.: High mechanical resistance alloyed steel

Not included into gearbox designation

Integral version

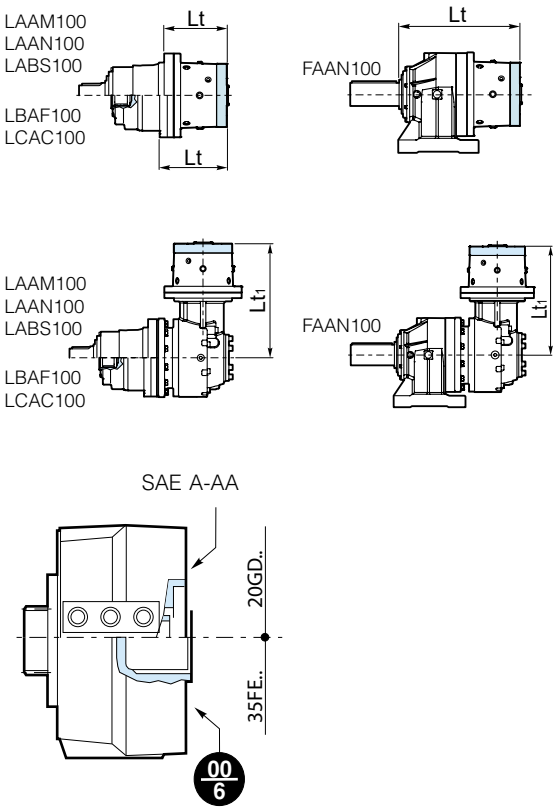


	Support version	Lt		
		SL02702	SL02703	SL02704
50A... 50B... 50C... 50D...	LAA-LCA-LAB	-	470	537
	LBA	-	456	523
	FAA	-	648	716
50E... 50F... 50G...	LAA-LCA-LAB	-	483	551
	LBA	-	469	537
	FAA	-	662	729
60D... 60E... 60F... 60H... 60I...	LAA-LCA-LAB	426	-	-
	LBA	412	-	-
	FAA	604	-	-

	Support version	Lt1			
		SC02703	SC02703	SC02704	SC02704
50A... 50B... 50C... 50D...	LAA-LCA-LAB	409	441	280	378
	LBA	409	441	280	378
	FAA	409	441	280	378
50E... 50F... 50G...	LAA-LCA-LAB	422	455	294	391
	LBA	422	455	294	391
	FAA	422	455	294	391

bg S270 3

Universal input version



	Support version	Lt		
		SL02702	SL02703	SL02704
20GD..	LAA-LCA-LAB	440	481	548
	LBA	426	467	534
	FAA	618	659	727
35FE..	LAA-LCA-LAB	426	467	535
	LBA	412	453	521
	FAA	605	646	714

	Support version	Lt1			
		SC02703	SC02703	SL02704	SL02704
20GD..	LAA-LCA-LAB	361.5	394.5	324.5	330.5
	LBA	361.5	394.5	324.5	330.5
	FAA	361.5	394.5	324.5	330.5
35FE..	LAA-LCA-LAB	348	381	311	317
	LBA	348	381	311	317
	FAA	348	381	311	317

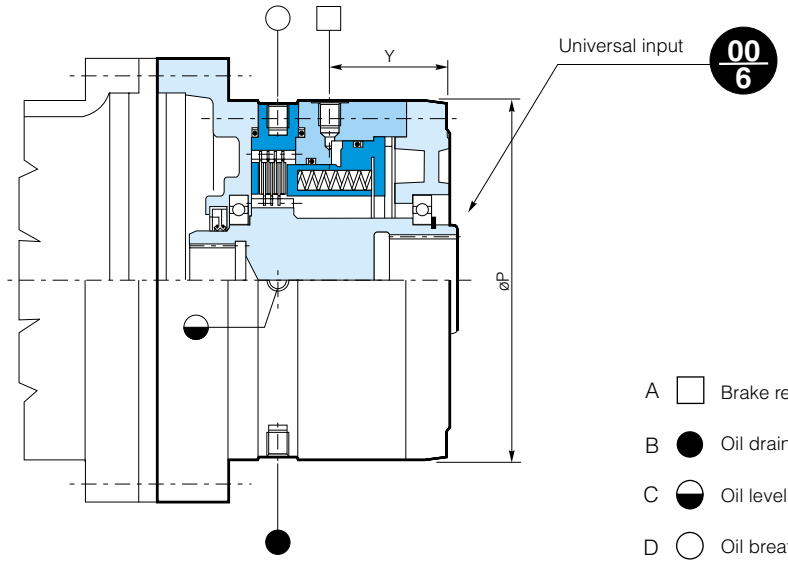
bg S270 3

Oil-bath multi-disc brakes

The gearbox inputs can be equipped with hydraulically released oil-bath multi-disc brakes.

	T_B [Nm]	P [bar]	P_{max} [bar]	Vo [l] horizontal	Vo [l] vertical	Va [cm³] new plates
50ADVX	85.3	14	315	0.3	0.6	15
50BDVX	170.6	14	315	0.3	0.6	15
50CDVX	263.3	14	315	0.3	0.6	15
50CGVX	394.9	20	315	0.3	0.6	15
50DGVX	541.3	20	315	0.3	0.6	15
50CPVX	511.9	26	315	0.3	0.6	15
50DPVX	700.8	26	315	0.3	0.6	15
50EGVX	588.3	20	315	0.3	0.6	15
50FGVX	728.0	20	315	0.3	0.6	15
50GGVX	875.0	20	315	0.3	0.6	15
50EPVX	766.5	26	315	0.5	1	15
50FPVX	947.1	26	315	0.5	1	15
50GPVX	1136.9	26	315	0.5	1	15
60DUVX	922.6	22	315	0.5	1	22
60EUVX	1153.2	22	315	0.5	1	22
60FUVX	1383.9	22	315	0.5	1	22
60GUVX	1614.5	22	315	0.5	1	22
60HUVX	1845.2	22	315	0.5	1	22
60IUVX	2075.8	22	315	0.5	1	22
30GDVX	238.8	25	210	0.2	0.4	10

T_B: Minimum granted torque
P: Brake release pressure
Pmax: Max. pressure
Vo: Oil volume
Va: Oil volume for brake release control



	ø P [mm]	Y [mm]	Fitting A	Fitting B	Fitting C	Fitting D	kg
30.....	131	46	M10 x 1	R 1/8	R 1/8"	R 1/8"	8
40.....	165	55	M12 x 1,5	R 1/4	R 1/4"	R 1/4"	10
50 AD/BD/CD	195	67	M12X1.5	R 1/4"	R 1/4"	R 1/4"	24
50 CG/DG	195	67	M12X1.5	R 1/4"	R 1/4"	R 1/4"	24
50 CP/DP	195	67	M12X1.5	R 1/4"	R 1/4"	R 1/4"	26
50 EG/FG/GG	195	67	M12X1.5	R 1/4"	R 1/4"	R 1/4"	36
50 EP/FP/GP	195	67	M12X1.5	R 1/4"	R 1/4"	R 1/4"	37
50 DU/EU/FU/GU/HU/IU	225	72.5	M12X1.5	R 1/4"	R 1/4"	R 1/4"	42

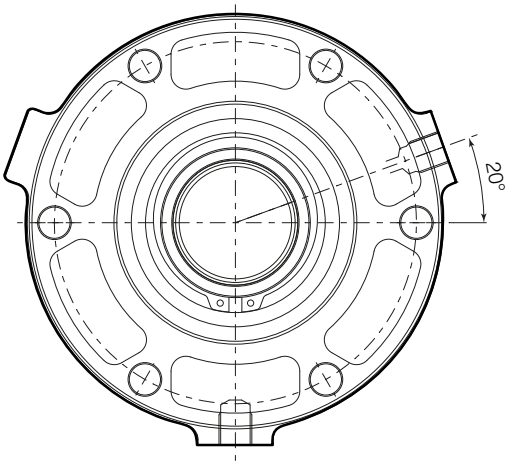
Universal multi-disc brakes

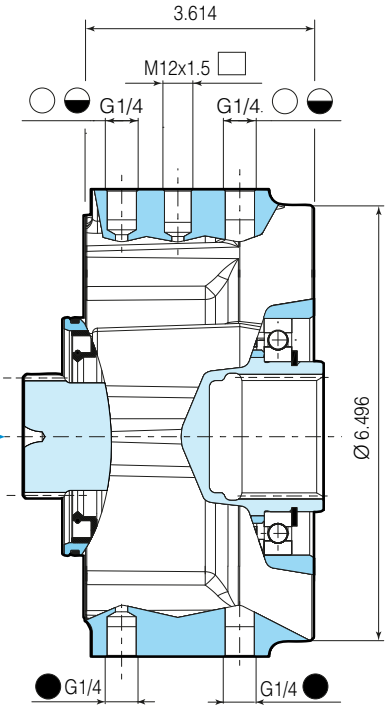
	T_B [Nm]	P [bar]	P_{max} [bar]	Vo [l]		Va [cm³]
				horizontal	vertical	new plates
35FE..	352.1	14	315	0.2	0.4	10
20GD..	238.8	25	210	0.2	0.4	10

T_B: Minimum granted torque
P: Brake release pressure
Pmax: Max. pressure
Vo: Oil volume
Va: Oil volume for brake release control

35FE

Universal Input **00**



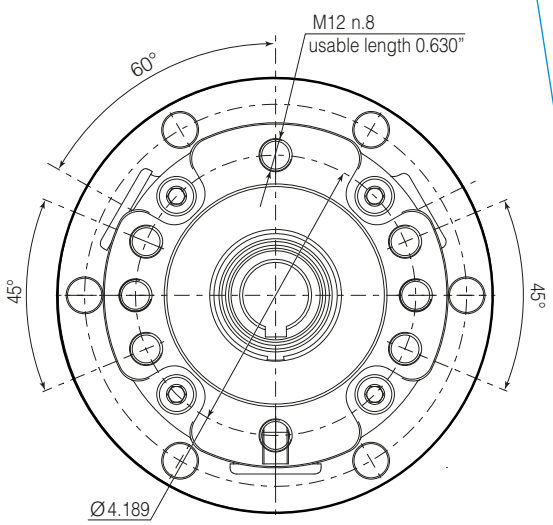


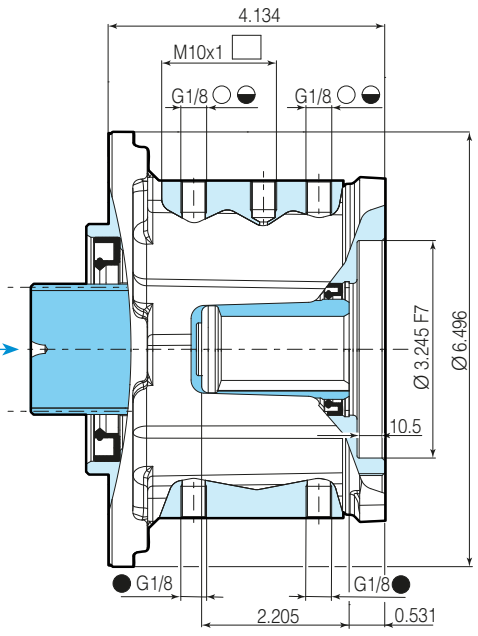
00 **Universal Input**

A Brake release fitting
B Oil drain plug
C Oil level plug
D Oil breather and filler plug

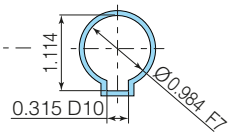
20GD

Universal Input **00**

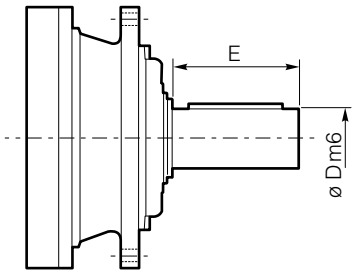




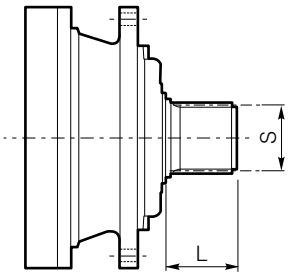
Direct Motor Coupling
SAE A shaft ø 0.984



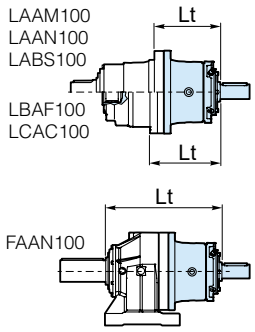
Integral input shaft - inline version



AATK1 - ABTK1 - AATC1

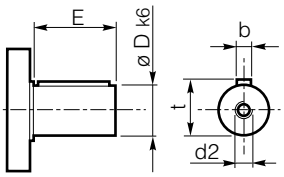


AAUA1 - ABUA1

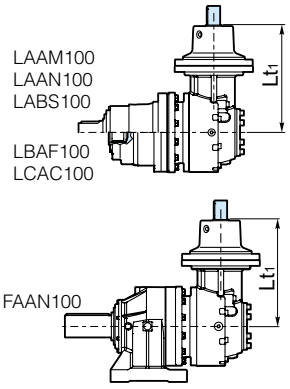


	ø D	E	L	S	Support version	Lt			
						SL02701	SL02702	SL02703	SL02704
AATK1	65 m6	105	-	-	LAA-LCA-LAB	-	-	438	505
					LBA	-	-	424	491
					FAA	-	-	617	684
AAUA1	-	-	68	B58x53	LAA-LCA-LAB	-	-	438	505
					LBA	-	-	424	491
					FAA	-	-	617	684
ABTK1	65 m6	105	-	-	LAA-LCA-LAB	-	-	479.5	547
					LBA	-	-	465.5	533
					FAA	-	-	658	726
ABUA1	-	-	68	B58x53	LAA-LCA-LAB	-	-	479.5	547
					LBA	-	-	465.5	533
					FAA	-	-	658	726
AATI1	63.5 2.5"	108 4.252"	-	-	LAA-LCA-LAB	-	-	438	505
					LBA	-	-	424	491
					FAA	-	-	617	684
ABTI1	63.5 2.5"	108 4.252"	-	-	LAA-LCA-LAB	-	-	479.5	547
					LBA	-	-	465.5	533
					FAA	-	-	658	726
AATC1	40 k6	58	-	-	LAA-LCA-LAB	352	454.5	-	-
					LBA	338	440.5	-	-
					FAA	531	633	-	-

Integral input shaft - right angle version



ACTF1 - ACTG1 - ACTK1



	ø D	E	b	t	d2	Lt1			
						SC02702	SC02703	SC02703	SC02704
ACTF1	45	70	14	48.5	M10	-	-	307	-
ACTG1	48	82	14	51.5	M10	-	317	-	280
ACTK1	65	105	18	69	M20	376	-	-	-

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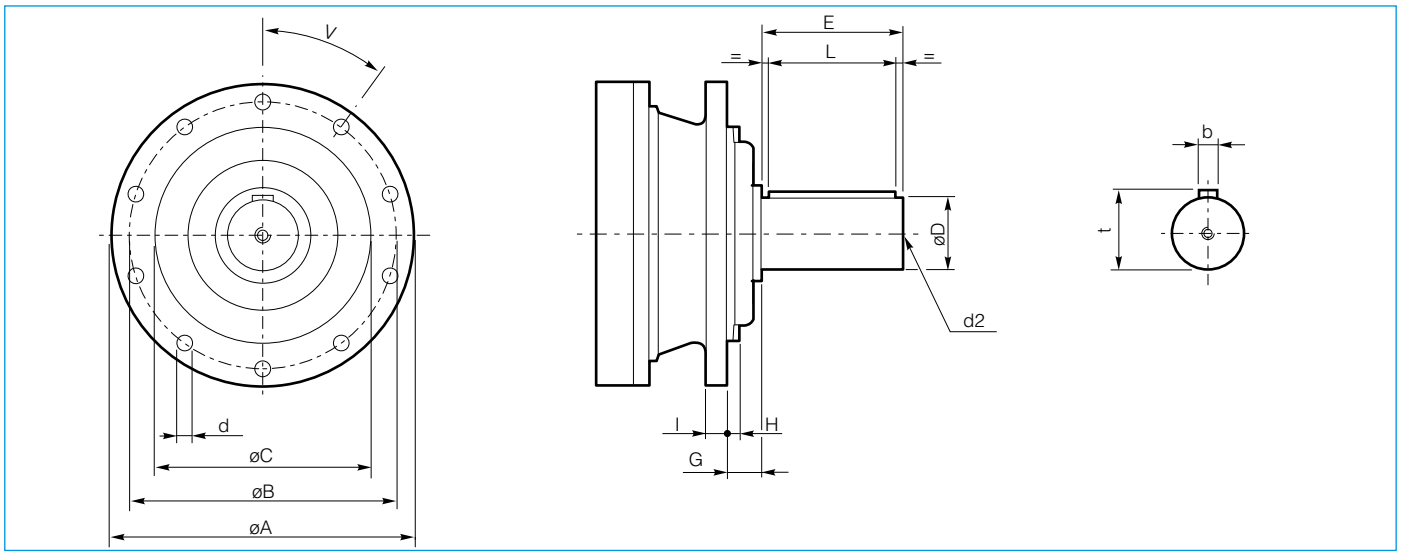
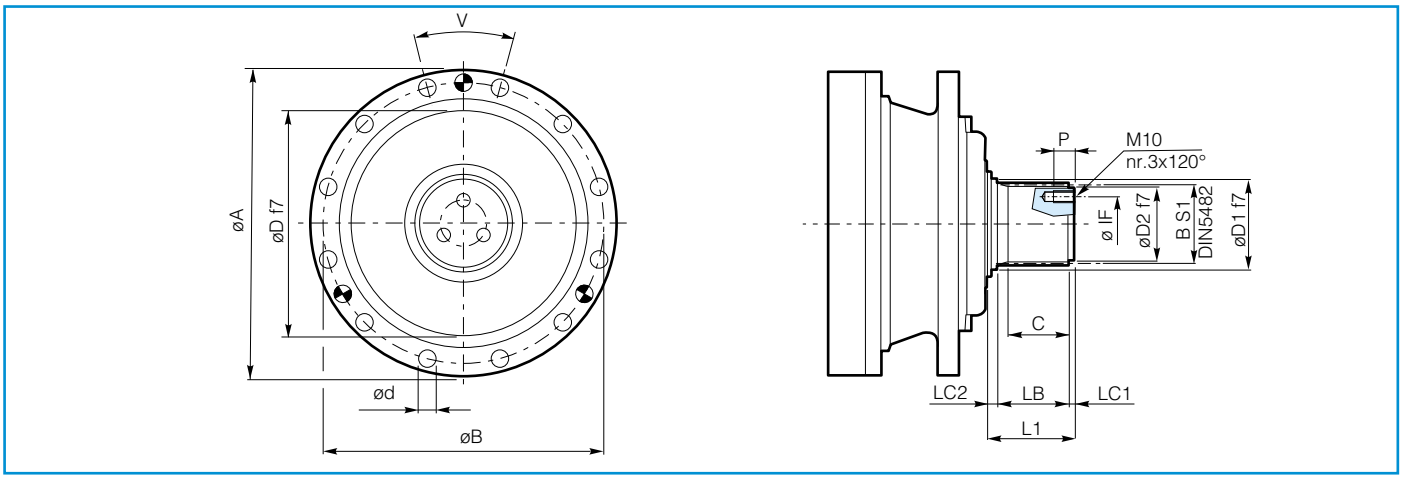
Male input supports

The input shafts described below are used when the drive motor, which is usually electric, is coupled to the input shaft by a flexible coupling, cardan shaft or belt. The normal mounting position is with the axis horizontal; the lubrication must be adapted for other mounting positions. Please contact your local DANA representative for more details.
The maximum working speed is typically 1800 min-1. For the permissible loads, refer to the dedicated section for the size concerned.
ILS shafts are specifically for use with a flexible coupling.
These types are suitable for use on specific sizes of gearbox, as indicated in the corresponding dimension tables



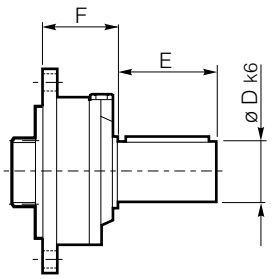
Type	Backstop	ø A	ø B	ø C f7	ø D m6	E	G	H	I	L	b	ø d	d2 DIN332	t	V
AATK1	X	220	195	150	65	105	15	5	16	90	18	14	M20	69	10x36°
ABTK1	X	272	245	175	65	105	39	10	18	90	18	14	M20	69	10x36°
ABTK1	A/O	272	245	175	65	85	39	10	18	90	18	14	M20	69	10x36°
AATI1	X	220	195	150	2 1/2" (63.5)	4 1/4" (108)	15	5	16	4" (101.6)	5/8" (15.875)	14	3/4"	2.773" (70.435)	10X36°
ABTI1	X	272	245	175	2 1/2" (63.5)	4 1/4" (108)	39	10	18	4" (101.6)	5/8" (15.875)	14	3/4"	2.773" (70.435)	10X36°
AATC1	X	-	-	-	40 k6	58	109	-	-	50	12	-	M10	43	-



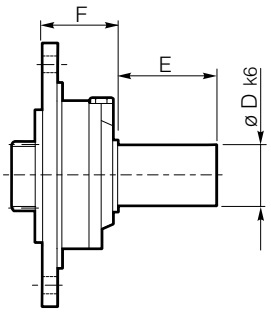
Type	Backstop	ø A	ø B	ø D	ø d	V	ø D1	ø D2	S1 DIN5482	ø IF	M	P	L1	LC1	LC2	C	LB
AAUA1	X	240	195	150	14	10x36°	60	50	B58x53	32	M10	20	68	8	10	38	50
ABUA1	X	280	250	200	16	12x30°	72	62	B70x64	40	M10	20	90	10	10.5	50	69.5

X : No backstop
O: backstop with free rotation clockwise
A : backstop with free rotation counterclockwise

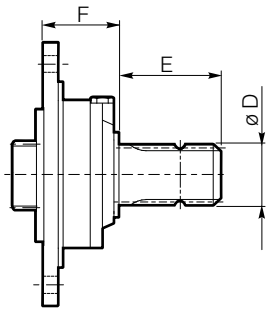
Universal input shaft - inline version



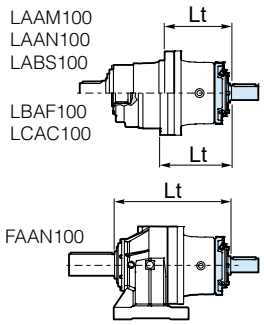
RATA - RATC - RATG - RATE - RATY



RBTA - RBTC - RBTG

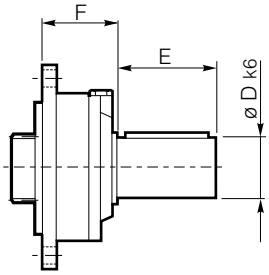


RAUC

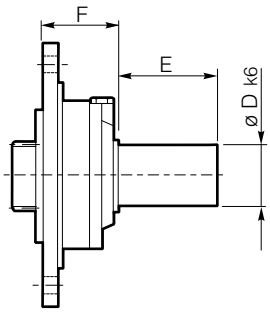


	ø D	E	F	Support version	Lt		
					SL02702	SL02703	SL02704
RATA	28	50	60	LAA-LCA-LAB	395	436	504
				LBA	381	422	490
				FAA	574	615	682
RATC	40	58	60	LAA-LCA-LAB	395	436	504
				LBA	381	422	490
				FAA	574	615	682
RATG	48	82	60	LAA-LCA-LAB	395	436	504
				LBA	381	422	490
				FAA	574	615	682
RATE	42	80	101.5	LAA-LCA-LAB	437	478	545
				LBA	423	464	531
				FAA	615	656	724
RBTA	28	50	60	LAA-LCA-LAB	395	436	504
				LBA	381	422	490
				FAA	574	615	682
RBTC	40	58	60	LAA-LCA-LAB	395	436	504
				LBA	381	422	490
				FAA	574	615	682
RBTG	48	82	60	LAA-LCA-LAB	395	436	504
				LBA	381	422	490
				FAA	574	615	682
RATY	38.10 1 1/2"	82.55 3 1/4"	60	LAA-LCA-LAB	395	436	504
				LBA	381	422	490
				FAA	574	615	682
RAUC	1 3/8" DIN9611	97	101.5	LAA-LCA-LAB	437	478	545
				LBA	423	464	531
				FAA	615	656	724

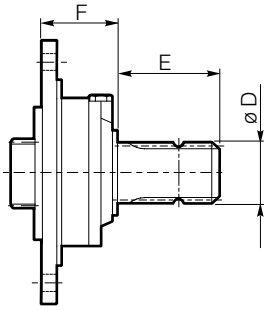
Universal input shaft - right angle version



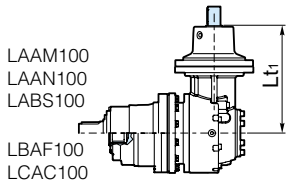
RATA - RATC - RATG - RATE - RATY

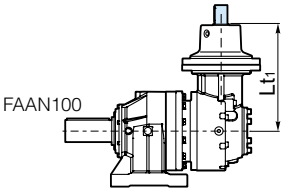


RBTA - RBTC - RBTG



RAUC





	ø D	E	F	Lt1			
				SC02703	SC02703	SC02704	SC02704
RATA	28	50	60	317	350	280	286
RATC	40	58	60	317	350	280	286
RATG	48	82	60	317	350	280	286
RATE	42	80	101.5	358.5	391.5	321.5	327.5
RBTA	28	50	60	317	350	280	286
RBTC	40	58	60	317	350	280	286
RBTG	48	82	60	317	350	280	286
RATY	38.10 1 1/2"	82.55 3 1/4"	60	317	350	280	286
RAUC	1 3/8" DIN9611	97	101.5	358.5	391.5	321.5	327.5

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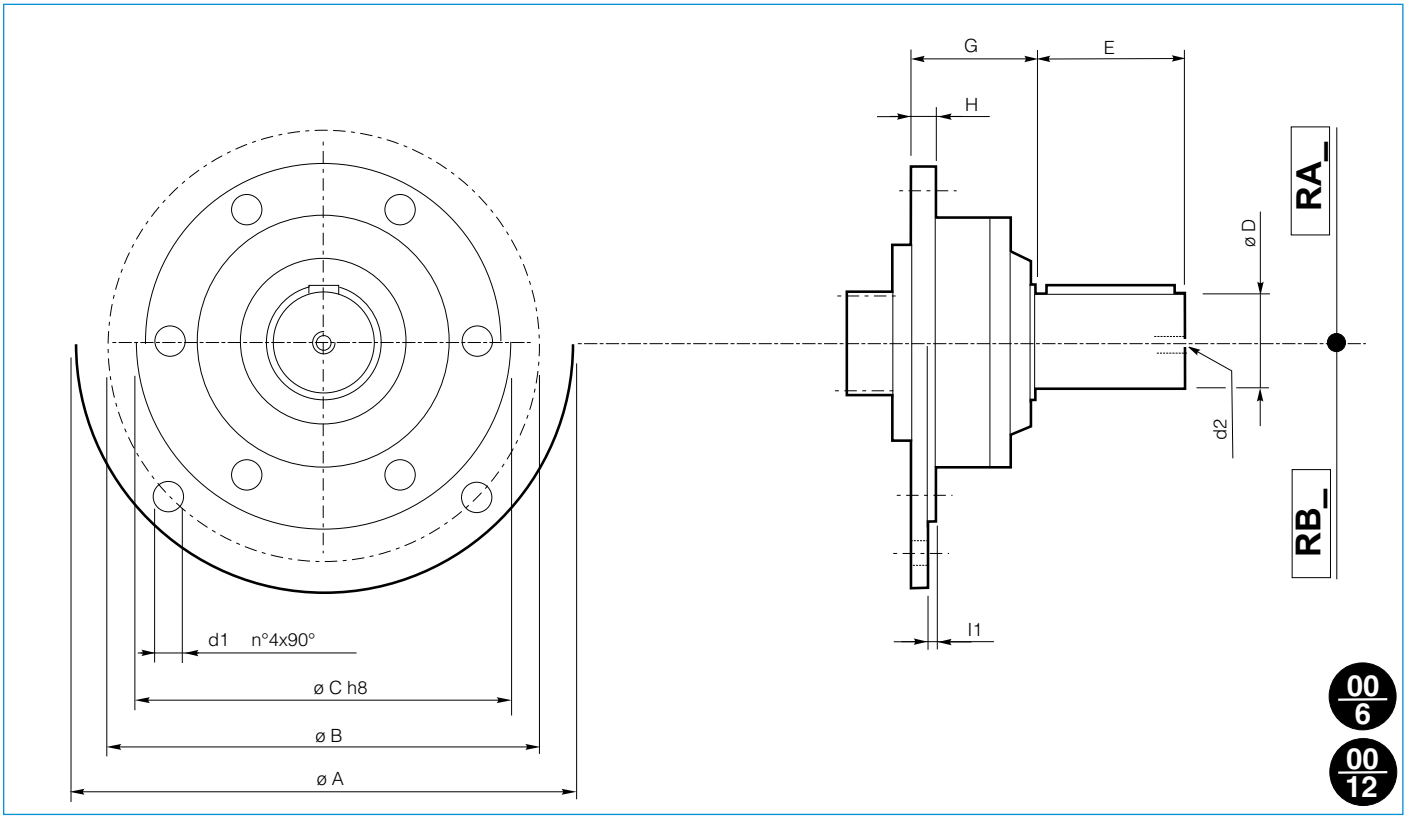
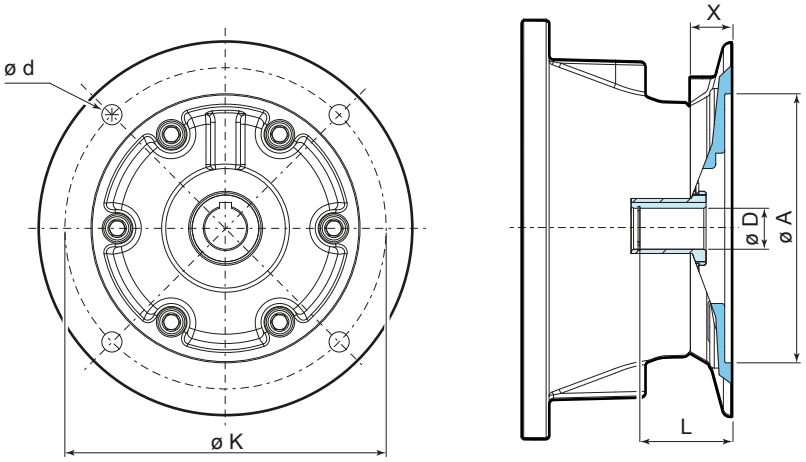
Male supports for universal inputs

RA_ / RB_ types are generally used with a flexible coupling. They can be mounted directly to any type of gearbox with universal input 00, and can be supplied separately. See the gearbox section for the dimensions and radial loads.



Type	A	B	C	D	E	d1	d2	G	H	l1
RATA	-	-	-	28	50	-	M10x22	60	12	-
RATC	-	-	-	40	58	-	M10x22	60	12	-
RATG	-	-	-	48	82	-	M10x25	60	12	-
RATE	-	-	-	42	80	-	M10x22	101.5	14	-
RAUC	-	-	-	1 3/8" DIN 9611	97	-	-	101.5	14	-
RATY	-	-	-	38.1	82.55	-	5/8" -11 UNC	60	14	-
RBTA	250	215	180	28	50	13	M10x22	60	12	3
RBTC	250	215	180	40	58	13	M10x22	60	12	3
RBTG	250	215	180	48	82	13	M10x25	60	12	3

IEC B5 Motor Flange



Input Type	IEC B5 Motor size	ØD [mm]	L [mm]	ØA [mm]	ØK [mm]	nr. holes x Ød [mm]	X [mm]
BKBB1	63	11	23	95	115	4 x 9	20
BLBD1	71	14	30	110	130	4 x M8	22
BNBH1	80	19	40	130	165	4 x M10	27
BNBK1	90	24	50	130	165	4 x 11	27
BBBM1	100-112	28	60	180	215	4 x 14	28
BCCA1	132	38	80	230	265	4 x 13.5	95
BDCC1	160	42	110	250	300	4 x 18	126

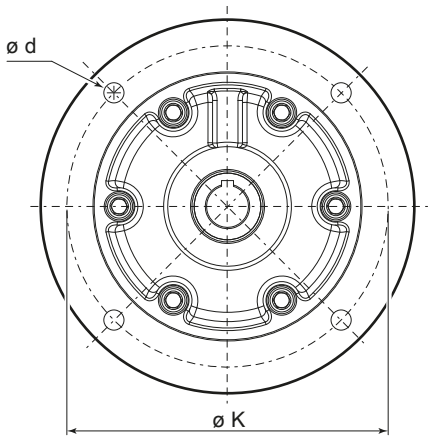
IEC B5 Motor Flange (special)

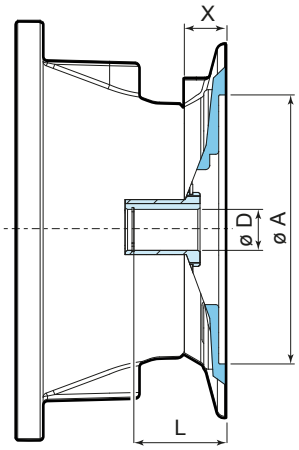
Input Type	IEC B5 Motor size (special)		ØD [mm]	L [mm]	ØA [mm]	ØK [mm]	nr. holes x Ød [mm]	X [mm]
BJBH1	63	SPEC.SHAFT_IEC80	19	40	95	115	4 x M8	20
BLBH1	71	SPEC.SHAFT_IEC80	19	40	110	130	4 x M8	22
BLBK1	71	SPEC.SHAFT_IEC90	24	50	110	130	4 x M8	22
BNBM1	90	SPEC.SHAFT_IEC100	28	60	130	165	4 x M10	27
BBCA2	100-112	SPEC.SHAFT_IEC132	38 B	80	180	215	4 x 14	95
BBCC1	100-112	SPEC.SHAFT_IEC160	42	110	180	215	4 x 14	134
BBBK1	100-112	SPEC.SHAFT_IEC90	24	50	180	215	4 x 14	28
BCCC1	132	SPEC.SHAFT_IEC160	42	110	230	265	4 x 15	127
BCCE1	132	SPEC.SHAFT_IEC180	48	110	230	265	4 x 15	130

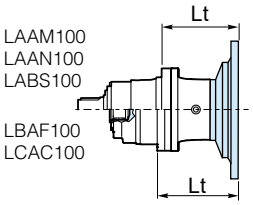
IEC B14 Motor Flange

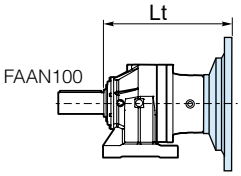
Input Type	IEC B14 Motor size	ØD [mm]	L [mm]	ØA [mm]	ØK [mm]	nr. holes x Ød [mm]	X [mm]
BIBH1	80	19	40	80	100	4 x 7	27
BKBK1	90	24	50	95	115	4 x 9	30
BABM1	100-112	28	60	110	130	4 x 11	38
BNCA1	132	38	80	130	165	4 x 10,5	97

IEC Motor Flange - universal inline version



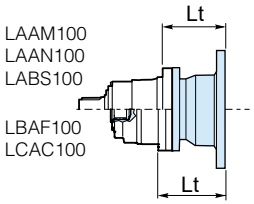


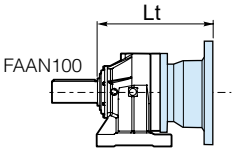




Input Type	IEC B5 Motor size	Support version	ØD [mm]	L [mm]	ØA [mm]	ØK [mm]	nr. holes x Ød [mm]	Lt S00 SL02701	Lt S00 SL02702	Lt 00/12 SL02702
BDCE1	180	LAA-LCA-LAB	48	110	250	300	4 x 18	415	530	461
		LBA						407	516	447
		FAA						594	708	640
BECG1	200	LAA-LCA-LAB	55	110	300	350	12 x 18	306	421	472
		LBA						298	407	458
		FAA						485	599	651
BFCH1	225	LAA-LCA-LAB	60	140	350	400	12 x 18	336	451	502
		LBA						328	437	488
		FAA						515	629	681
BGCJ1	250	LAA-LCA-LAB	65	140	450	500	4 x 18	336	451	499
		LBA						328	437	485
		FAA						515	629	678
BGCK1	280	LAA-LCA-LAB	75	140	450	500	4 x 18	336	451	499
		LBA						328	437	485
		FAA						515	629	678

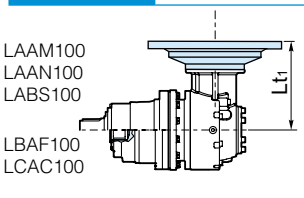
IEC Motor Flange - integral inline version

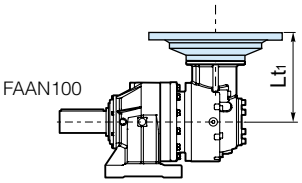




Input Type	IEC B5 Motor size	Support version	ØD [mm]	L [mm]	ØA [mm]	ØK [mm]	nr. holes x Ød [mm]	Lt SL02703	Lt SL02704
CDCE1	180	LAA-LCA-LAB	48	110	250	300	4 x 18	502	569
		LBA						488	555
		FAA						680	748
CECG1	200	LAA-LCA-LAB	55	110	300	350	12 x 18	512	579
		LBA						498	565
		FAA						690	758

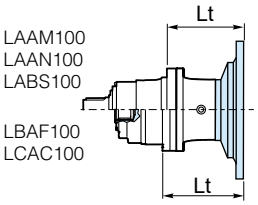
IEC Motor Flange - universal right angle version

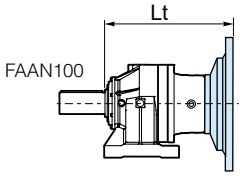




Input Type	IEC B5 Motor size	Support version	ØD [1] [mm]	L [1] [mm]	ØA [1] [mm]	ØK [1] [mm]	nr. holes x Ød [1] [mm]	Lt1 00 Z27 SC02702
CDCE1	180	LAA-LCA-LAB	48	110	250	300	4 x 18	504
		LBA						
		FAA						
CECG1	200	LAA-LCA-LAB	55	110	300	350	12 x 18	540
		LBA						
		FAA						

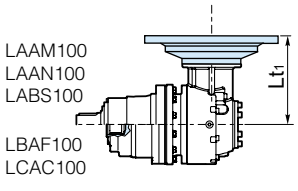
IEC Motor Flange (special) - universal inline version

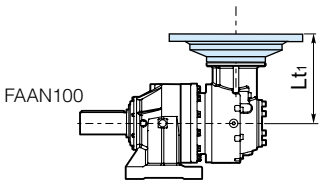




Input Type	IEC B5 Motor size (special)		Support version	ØD [1] [mm]	L [1] [mm]	ØA [1] [mm]	ØK [1] [mm]	nr. holes x Ød [1] [mm]	Lt S00 SL02701	Lt S00 SL02702	Lt 00 12 SL02702
BDCG1	160 180	SPEC.SHAFT_IEC200	LAA-LCA-LAB	55	110	250	300	4 x 18	425	540	471
			LBA						417	526	457
			FAA						604	718	650
BECE1	200	SPEC.SHAFT_IEC180	LAA-LCA-LAB	48	110	300	350	4 x 18	-	-	472
			LBA						-	-	458
			FAA						-	-	651
BECH1	200	SPEC.SHAFT_IEC225	LAA-LCA-LAB	60	140	300	350	4 x 18	336	451	507
			LBA						328	437	493
			FAA						515	629	686
BFCJ1	225	SPEC.SHAFT_IEC250	LAA-LCA-LAB	65	140	350	400	8 x 17.5	530	645	638
			LBA						522	631	629
			FAA						709	823	822

IEC Motor Flange (special) - universal right angle version

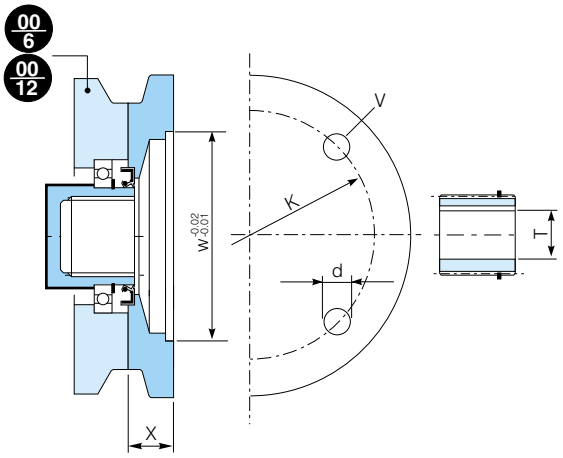




Input Type	IEC B5 Motor size (special)		Support version	ØD [1] [mm]	L [1] [mm]	ØA [1] [mm]	ØK [1] [mm]	nr. holes x Ød [1] [mm]	Lt1 00 Z27 SC02702
CECH1	200	SPEC.SHAFT_IEC225	LAA-LCA-LAB	60	140	300	350	4 x 18	560
			LBA						
			FAA						

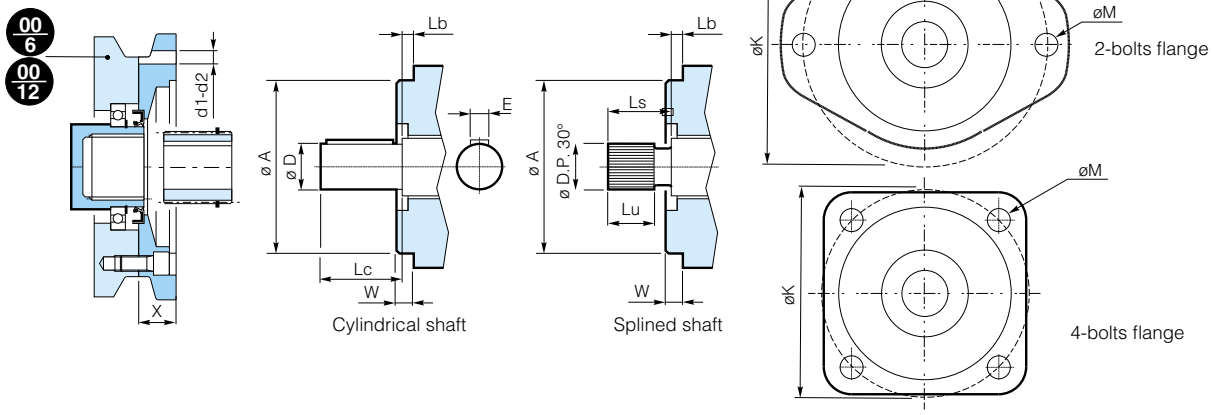
[1] See dimensions in page S270-22

NEMA Motor Flange



Input Type	NEMA Motor size	ØW [mm]	V (nr. of bolts)	Ød [mm]	ØK [mm]	X [mm]	T [mm]
DADA1	NEMA 56 C-TC Metric 15,87 CYL.	114.3	4	Ø12	149.3	38	15.87
DADF1	NEMA 56 SPEC.SHAFT_NEMA182-184 C-TC Metric 28,575 CYL.	114.3	4	Ø12	149.3	38	28.58
DADD1	NEMA 143-145 C-TC Metric 22,22 CYL.	114.3	4	Ø12	149.3	38	22.22
DBDD1	NEMA 143-145 D-TD Metric 22,22 CYL.	228.5	4	Ø14	254	30	22.22
DCDF1	NEMA 182-184 C-TC Metric 28,575 CYL.	215.9	4	Ø14	184.15	30	28.58
DBDF1	NEMA 182-184 D-TD Metric 28,575 CYL.	228.5	4	Ø14	254	46	28.58
DCDH1	NEMA 213-215 C-TC Metric 34,92 CYL.	215.9	4	Ø14	184.15	51	34.92
DIDH1	NEMA 213-215 D-TD Inch 34,92 CYL.	228.5	4	Ø14	254	58	34.92
DCDJ1	NEMA 254 C-TC Metric 41,27 CYL.	215.9	4	Ø14	184.15	122	41.27
DDDJ1	NEMA 254-256 D-TD Metric 41,27 CYL.	279.4	4	Ø20	317.5	118	41.27
DCDJ1	NEMA 256 C-TC Metric 41,27 CYL.	215.9	4	Ø14	184.15	122	41.27

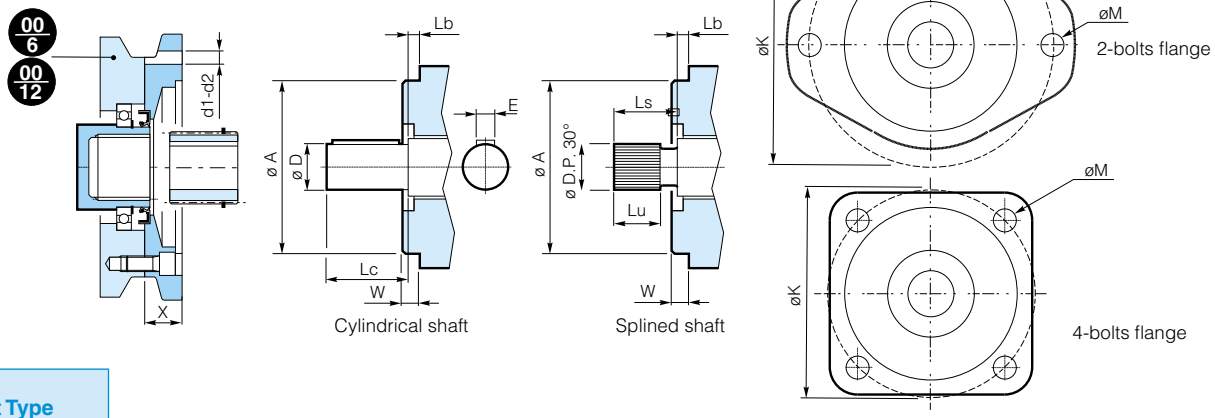
SAE J 744C Motor Flange



SAE type	Ø A [mm]	W [mm]	Ø K [mm]	Ø M (min) [mm]	Splined shaft				Cylindrical shaft			X [mm]	Input Type						
													No.of bolts	Flange with **d1** metric			Flange with **d2** imperial		
					No.of teeth 30° D.P.	Ls [mm]	Lb [mm]	Lu [mm]	Ø D [mm]	Lc [mm]	Lb [mm]			d1 U.L. [1] [mm]	Splined shaft	Cylindrical shaft	d2 U.L. [1] [in]	Splined shaft	Cylindrical shaft
A	82.55	21	106.4	11	16/32" Z=9	23.5	8	21.8	15.87	23.8	7.7	25	2	M10 13 mm	**HPKJ1**	**HPDA1**	3/8"-16 UNC 13 mm	**HBKJ1**	**-**
					-	-	-	-	19.05	48.0	7.6				**-**	**HPDC1**	-	**-**	**-**
	127	15	181	5/8" UNC	12/24" Z=14 A	48	8	40	-	-	-	29	2	-	**-**	**-**	5/8"-11 UNC 18 mm	**HHKG1**	**-**
B	101.6	10	146	13	16/32" Z=13	33	8	23	22.22	33.1	7.9	25	2	M12 25 mm	**-**	**HDDD1**	1/2"-13 UNC 25 mm	**HEKK1**	**HEDD1**
						33.6	7.6	25.3	25.4	38	8				**HDKK1**	**-**		**-**	**HEDE1**
B-B	101.6	10	146	13	16/32" Z=15	36	10	28	25.4	38.1	7.9	25	2	M12 25 mm	**HDKL1**	**HDDE1**	-	**-**	**-**
						38	8	30	-	-	-			-	**-**	**-**	1/2"-13 UNC 25 mm	**HEKL1**	**-**
C	127	15	181	17	12/24" Z=14 A	48	8	40	31.75	48	8	29	2	M16 15 mm	**HGKG1**	**HGDG1**	5/8"-11 UNC 18 mm	**-**	**HHDG1**
C-C	127	15	181	13	-	-	-	-	38.1	67	8	80	2	-	**-**	**-**	5/8"-11 UNC 18 mm	**-**	**HHDI1**
					-	-	-	-				93		M12 30 mm	**-**	**HGDI1**	-	**-**	**-**
		10	114	15	12/24" Z=17	54	8	44	-	-	-	80	4	M14 18 mm	**HGKI1**				
								29	-	-	-			-	**-**	**-**	1/2"-13 UNC 18 mm	**HHKI1**	**-**
D	152.4	12.7	228.6	19	-	-	-	-	44.45	61.9	12.7	93	2	-	**-**	**-**	3/4"-10 UNC 26 mm	**-**	**HLDL1**
					-		-	-		66.4	8	93	2	M18 26mm	**-**	**HKDL1**	-	**-**	**-**
		18	161.6		8/16" Z=13	66.5	8	37.9	-	-	-	93	4	M18 26mm	**HKKA1**	**-**	3/4"-10 UNC 26 mm	**HLKA1**	**-**
E	165.1	18	224.5	D22	8/16" Z=13	66.5	8.3	42.5	-	-	-	93	4	Ø 22 22 mm	**HMKA1**	**-**	Ø 22 22 mm	**HMKA1**	**-**

[1] U.L. = Useful length

ISO 3019-2 Motor Flange

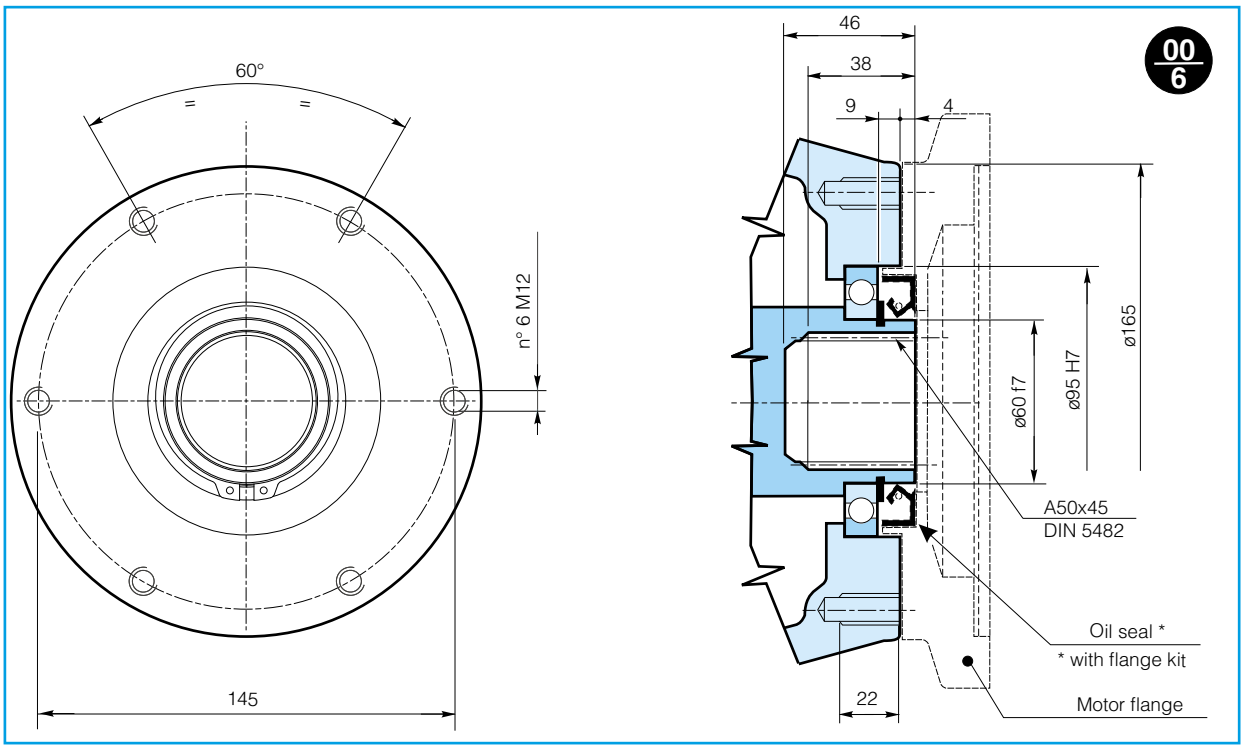


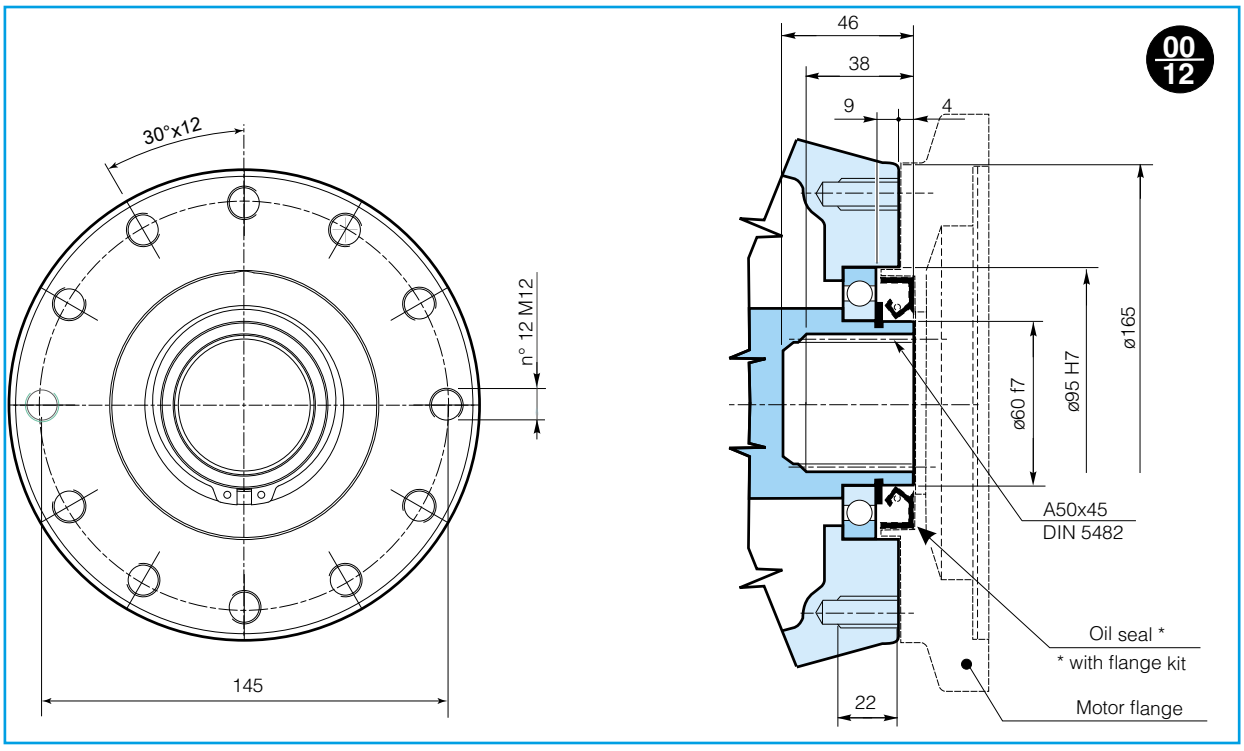
Input Type	No.of bolts	d [mm]	Splined shaft DIN5480	Ls [mm]	Lb [mm]	Lu [mm]	Cylindrical shaft Ø D [mm]	Lc [mm]	Lb [mm]	X [mm]	Ø A [mm]	W [mm]	Ø K [mm]	Ø M (min) [mm]	U.L. [1] [mm]
FDBN1	4	M12	-	-	-	-	30	60	32	65	125	15	160	13	30
FDBP1	4	M12	-	-	-	-	35	60	32	106	125	15	160	13	30
FDCB1	4	M12	-	-	-	-	40	82	31	129	125	12	160	13	35
FDFE1	4	M12	W30X2 Z=14	35	32	24	-	-	-	44	125	32	160	13	26
FDFF1	4	M12	W32x2 Z=14	35	32.5	28	-	-	-	65	125	32	160	13	30
FDFG1	4	M12	W35x2 Z=16	40	32	32	-	-	-	60	125	32	160	13	26
FDFH1	4	M12	W40x2 Z=18	40	33	28	-	-	-	60	125	32	160	13	26
FDBP2	4	M12	-	-	-	-	35 B	60	8	44	125	32	160	13	26
FDFF2	4	M12	W32x2 Z=14 A	36	10	28	-	-	-	44	125	8	160	13	26
FEBP1	4	M12	-	-	-	-	35	70	32	123	140	15	180	13	30
FECB1	4	M12	-	-	-	-	40	70	33	132	140	15	180	13	30
FEFG1	4	M12	W35X2 Z=16	40	32	32	-	-	-	56	140	15	180	13	30
FEFH1	4	M12	W40x2 Z=18	45	32	33.6	-	-	-	56	140	15	180	13	30
FEFH2	4	M12	W40X2 Z=18 B	46	9	35	-	-	-	80	140	15	180	13	30
FFCB1	4	M16	-	-	-	-	40	80	40	146	160	25	200	17	35
FFCF1	4	M16	-	-	-	-	50	82	40	155	160	25	200	17	35
FFFH1	4	M16	W40x2 Z=18	45	39.9	30	-	-	-	74	160	11	200	17	32
FFFI1	4	M16	W45x2 Z=21	50	40	42	-	-	-	109	160	20	200	17	32
FFFJ1	4	M16	W50x2 Z=24	54	10	42	-	-	-	107	160	17	200	17	35
FYFH1	2	M20	W40x2 Z=18	45	10.5	36	-	-	-	34	160	10	224	21	17
FGCD1	4	M16	-	-	-	-	45	90	40	153	180	10	224	17	16
FGCF1	4	M16	-	-	-	-	50	90	40	146	180	10	224	17	40
FGFH1	4	M16	W40x2 Z=18	50	41	40	-	-	-	63	180	10	224	17	16
FGFI1	4	M16	W45x2 Z=21	50	40	42	-	-	-	114	180	15	224	17	16
FGFJ1	4	M16	W50x2 Z=24	55	40	44	-	-	-	146	180	40	224	17	40
FHCF2	4	M20	-	-	-	-	50	82	50	156	200	15	250	21	25
FHFJ1	4	M20	W50x2 Z=24	55	50.5	40	-	-	-	156	200	15	250	21	25
FHFM1	4	M20	W60x2 Z=28	70	50	59	-	-	-	156	200	15	250	21	25
FIFJ1	4	M20	W50x2 Z=24	55	50.5	40	-	-	-	157	224	15	280	21	25

[1] U.L. = Useful length

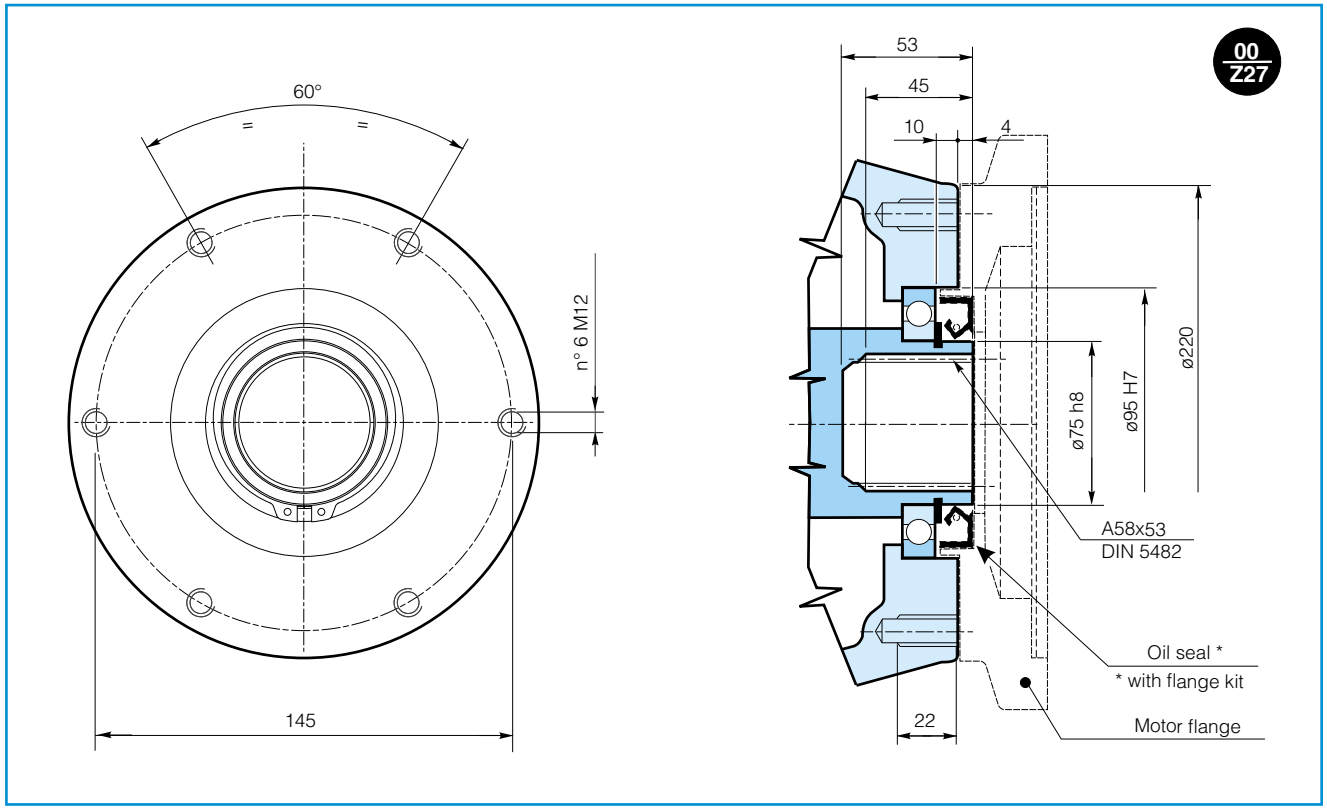
Universal inputs

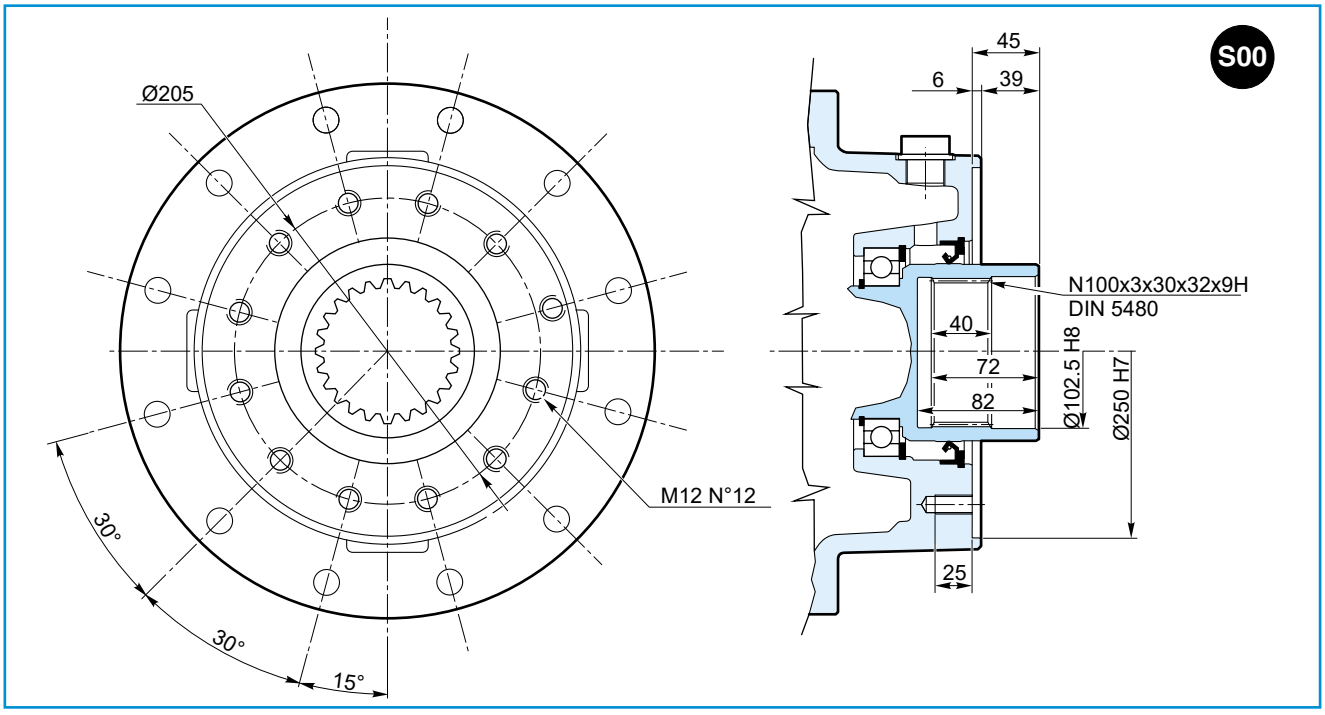
The universal input is a configuration mounted on the gearbox input so that various types of drives can be coupled by means of a special flange and adapter sleeve.
There are two different universal input sizes, depending on the size mounted as the gearbox input stage.
The dimension tables for the various sizes give the applicability.



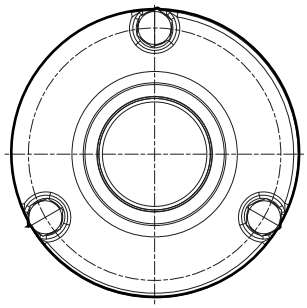


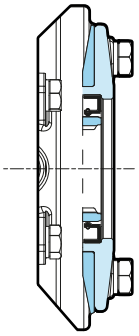
Universal inputs





Universal protection cover





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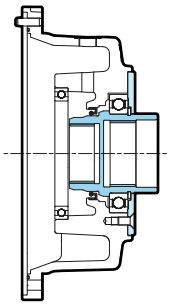
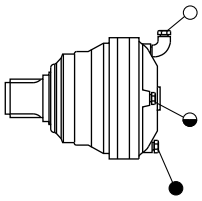
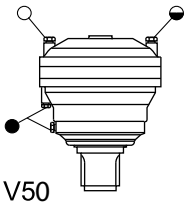
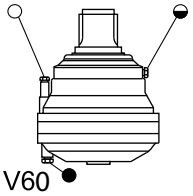
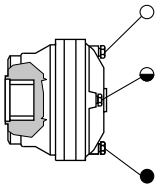
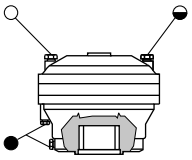
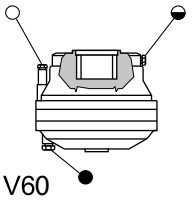
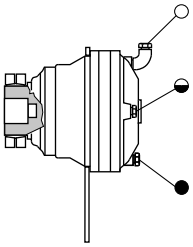
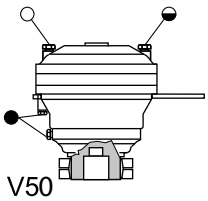
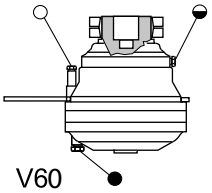
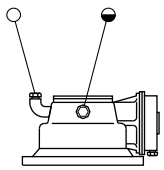
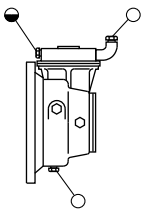
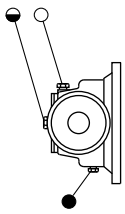
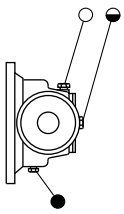
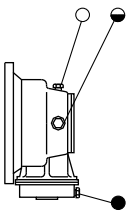
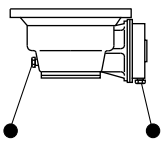


S00

Mounting positions and plugs

	Horizontal position	Vertical position
IN LINE VERSION	 B30	 V50
		 V60
	 B30	 V50
		 V60
	 B30	 V50
		 V60

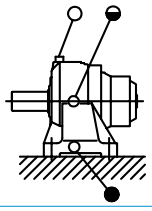
RIGHT ANGLE VERSION						
 V5B	 B3D	 B3C	 B3A	 B3B	 V6B	

● Oil drain plug ◒ Oil level plug ○ Oil breather and filler plug

Mounting positions and plugs

Horizontal position | **Vertical position**

IN LINE VERSION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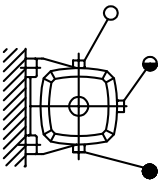
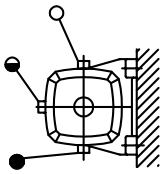

B60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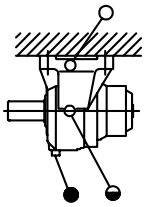
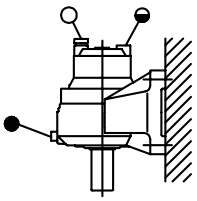
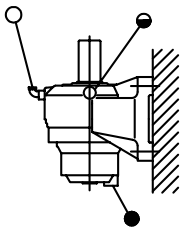
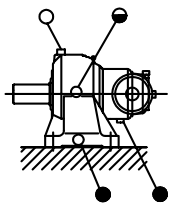
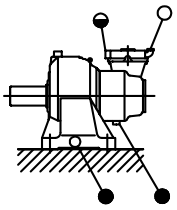

B80

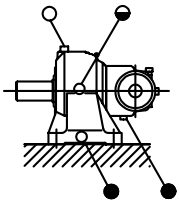

V50

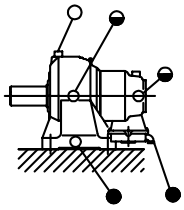

V60

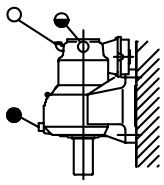
RIGHT ANGLE VERSION

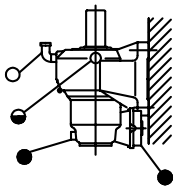

B3C

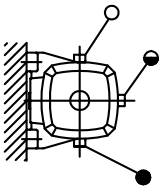

B3D


B3A


B3B


V5B


V6B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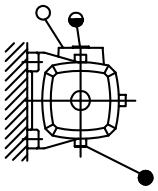
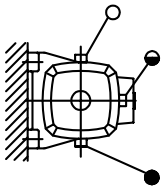
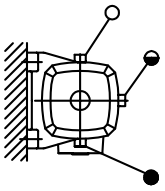
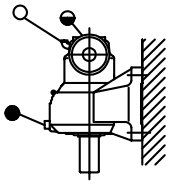
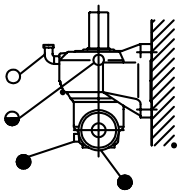
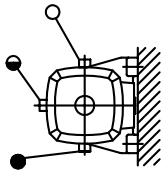

B6C

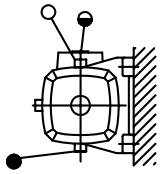

B6D

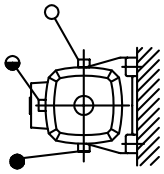

B6A

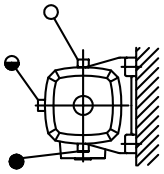

V5A

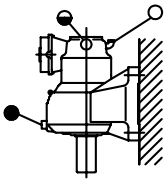

V6A

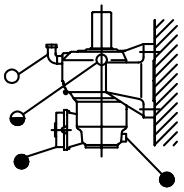

B7B

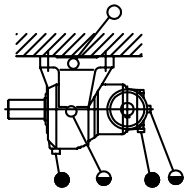

B7A


B7D


B7C


V5D


V6D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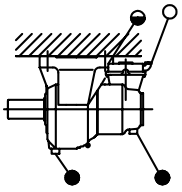
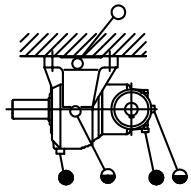
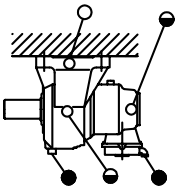

B8B


B8C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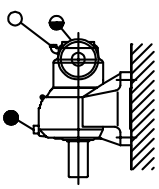
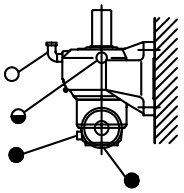
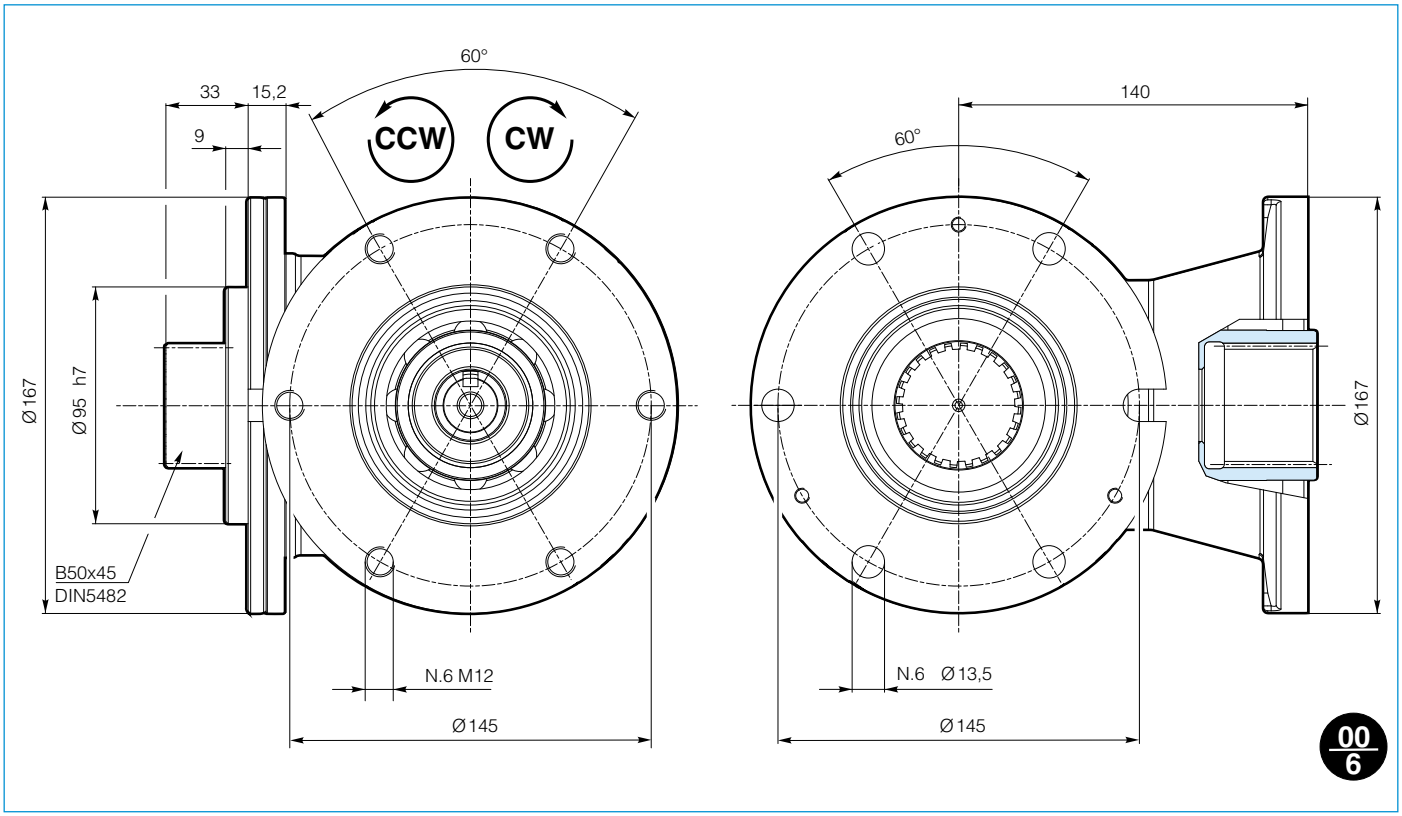

V5C


V6C

CCU25 - Universal bevel gears

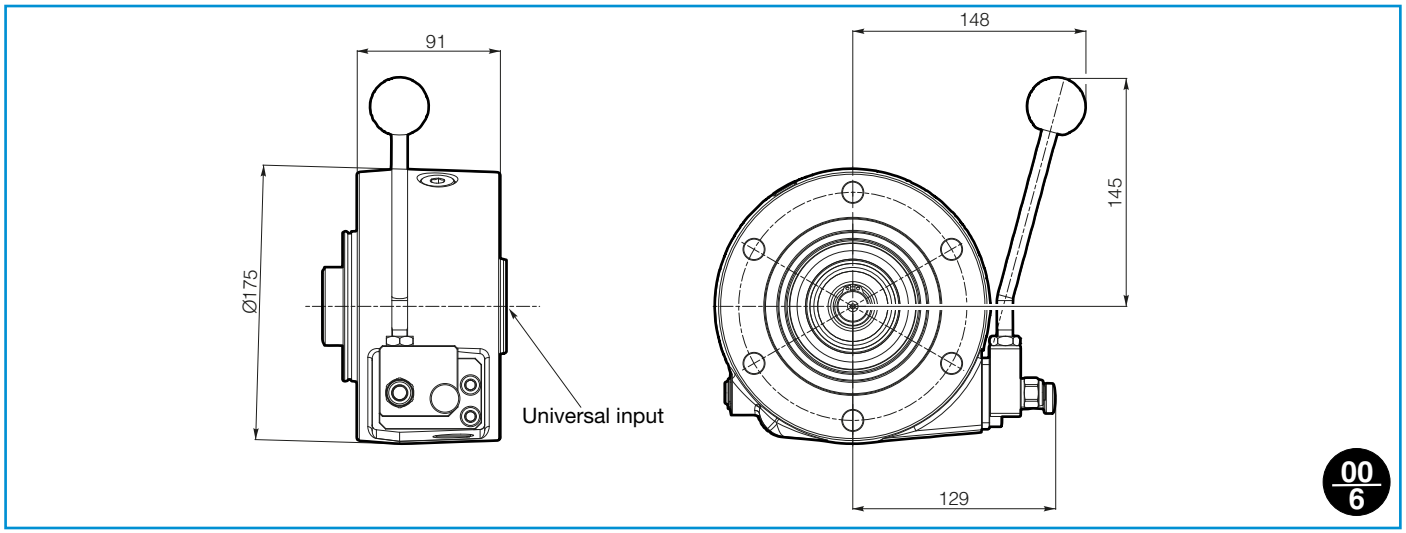


Input stage devices		Rotation *	i_{eff}	n_{1max}	n_1 1500 [rpm]			n_1 1000 [rpm]			n_1 500 [rpm]		
					n_2	T_1	P_1	n_2	T_1	P_1	n_2	T_1	P_1
					[rpm]	[Nm]	[kW]	[rpm]	[Nm]	[kW]	[rpm]	[Nm]	[kW]
J	CCU25	CW	2.23	3500	672.6	61.24	9.62	448.4	69.16	7.24	224.2	85.15	4.46
J	CCU25	CCW	2.23	3500	672.6	42.09	6.61	448.4	47.53	4.98	224.2	58.52	3.06

* Direction of rotation as viewed from the gearbox input (CW = clockwise, CCW = counter-clockwise).
The direction of rotation affects the performance of the device.

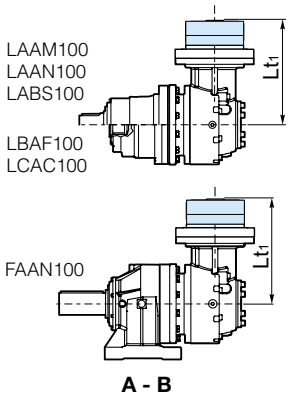
DU150.1 - Universal decoupling

The **DU150.1** is a manual decoupling device, which can be used to temporarily interrupt the transmission of torque and speed between the gearbox input and output.
Both when decoupling and when coupling again, it can only be operated with the gearbox stationary and without any load applied to it.

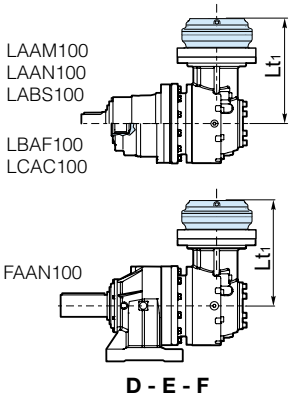


Input stage devices		T_{max} [Nm]	n_{max} [rpm]	P [kW]
K	**DU150.1**	1500	1500	30

Additional planetary stage on bevel gear



A - B



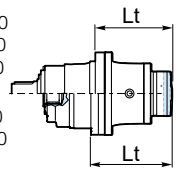
D - E - F

	Input stage		Lt1 (00/6)			
			SC02703	SC02703	SC02704	SC02704
	1010	A	364	397	327	333
	1020	B	382	415	345	351
	2010	D	403	436	366	372
	2020	E	435	468	398	404
	2022	F	450	483	413	419

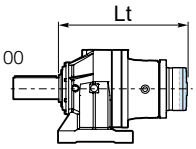
bg S270 3

Backstop

LAAM100
LAAN100
LABS100
LBAF100
LCAC100

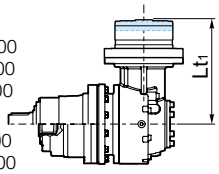


FAAN100

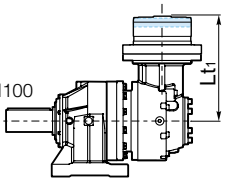


		Brake type	Support version	Lt	
				SL02703	SL02704
Backstop	+	50A... 50B... 50C... 50D...	LAA-LCA-LAB	496	563
			LBA	482	549
			FAA	674	742
		50E... 50F... 50G...	LAA-LCA-LAB	509	577
			LBA	495	563
			FAA	688	755

LAAM100
LAAN100
LABS100
LBAF100
LCAC100



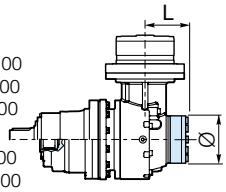
FAAN100



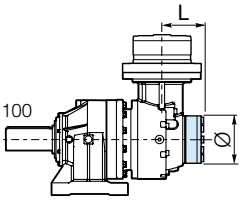
		Brake type	Support version	Lt1	
				SC02703	SC02703
Backstop	+	50A... 50B... 50C... 50D...	LAA-LCA-LAB	436	-
			LBA	436	-
			FAA	436	-
		50E... 50F... 50G...	LAA-LCA-LAB	449.5	-
			LBA	449.5	-
			FAA	449.5	-

bg S270 3

LAAM100
LAAN100
LABS100
LBAF100
LCAC100

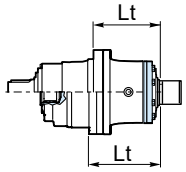


FAAN100

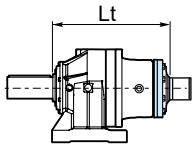


			L	Ø
Backstop	+	SC02704	135	150

LAAM100
LAAN100
LABS100
LBAF100
LCAC100



FAAN100

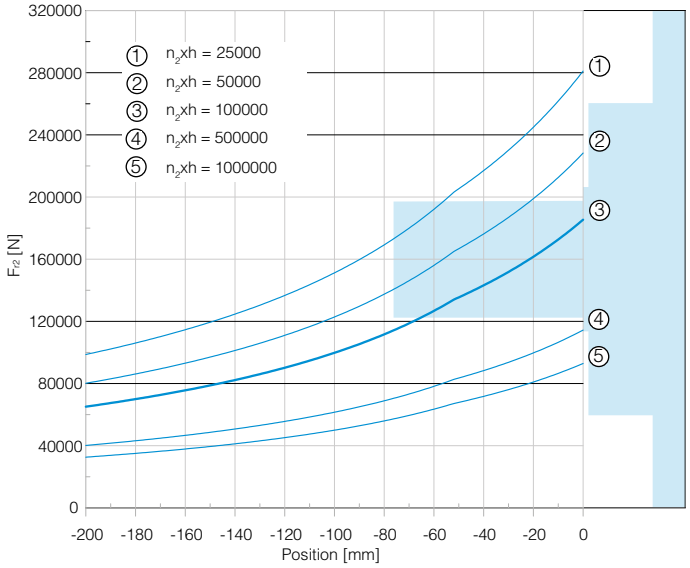


		Input type	Support version	Lt	
				SL02703	SL02704
Backstop	+	ABTK1	LAA-LCA-LAB	500	567
			LBA	486	553
			FAA	679	746

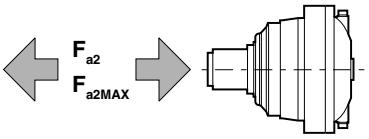
RADIAL AND AXIAL LOADS

Output Radial Loads

LAAM100 - LAAN100 - FAAN100

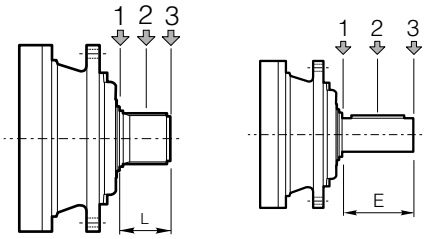


Output Axial Loads



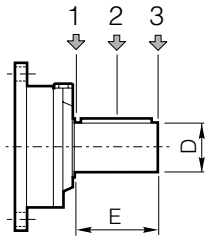
		LAAM100 - LAAN100 - FAAN100
F_{a2}	[N]	100000
F_{a2MAX}	[N]	100000

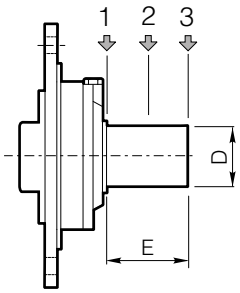
Input Radial Loads

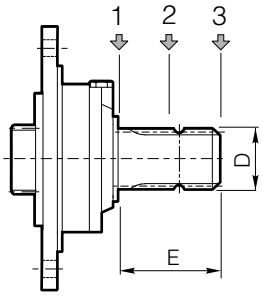


			F_{r1} [N]					
			$n_1 . h = 10^7$			$n_1 . h = 10^8$		
Type	L	E	1	2	3	1	2	3
AATK1	-	105	10000	6000	4000	5000	3000	2000
ABTK1	-	105	14000	8800	6400	7000	4400	3200
AAUA1	68	-	10000	6000	4000	5000	3000	2000
ABUA1	68	-	14000	8800	6400	7000	4400	3200
AATC1	-	58	2000	1550	1250	940	720	580

Input Radial Loads







			F_{r1} [N]					
			$n_1 . h = 10^7$			$n_1 . h = 10^8$		
Type	**D (k6)**	**E**	**1**	**2**	**3**	**1**	**2**	**3**
RATE	42	80	3000	2000	1500	1400	1000	700
RATA	28	50	3000	2000	1500	1400	1000	700
RATC	40	58	3000	2000	1500	1400	1000	700
RATG	48	82	3000	2000	1500	1400	1000	700
RAUC	1 3/8"	97	2800	1800	1500	1300	900	600
RATY	38.1 1 1/2"	82.55 3 1/4"	3000	2000	1500	1400	1000	700
RBTA	28	50	3000	2000	1500	1400	1000	700
RBTC	40	58	3000	2000	1500	1400	1000	700
RBTG	48	82	3000	2000	1500	1400	1000	700

DANA BREVINI® Motion Systems

Supply status

Unless otherwise specified in the contract, the gearboxes are painted externally with an anticorrosive 2-component water-soluble epoxy resin based primer, blue RAL 5012.
The protection is suitable for withstanding normal industrial environments (also outdoors) and can be finished with synthetic, nitro-synthetic or 2-component enamel paints.
In case of particularly aggressive ambient conditions, it is necessary to use special painting cycles, which can be carried out on request. The machined external parts of the gearbox, such as the shaft ends, support surfaces, spigots, etc., must be protected with antioxidant oil (Tectyl).
The inside walls of the gearbox casings are painted with oil-proof paint and the kinematic mechanisms are protected with antioxidant oil. Unless otherwise specified in the contract, all gearboxes are supplied without lubricant, as shown by a special sticker applied to the gearbox to indicate its condition.
The gearboxes are packed and shipped in crates or on pallets able to withstand normal industrial environments.
Each gearbox comes with an "Installation and Maintenance Manual", "Manufacturer's Declaration" and "Certificate of Conformity" 2.1 according to EN10204.

Storage conditions

If the product is to be stored for more than 2 months:

- protect shafts and spigots with a film of grease or corrosion protection products
- fill the gearbox completely with the lubricant required for the application
- store in a dry place with a temperature from -5 °C to +30 °C
- protect the gearbox from dirt, dust and damp
- always place a wooden support or other material between the gearbox and the ground to prevent direct contact with the ground.

When storing for more than 1 year, the rotary seals will lose efficiency. In this case, it is advisable to carry out a periodic check by turning the input shaft by hand to rotate the gears.
If there is a negative multi-disc brake, release the brake with a hydraulic pump or similar (see the "Oil bath multi-disc brakes" section for the brake release pressure).
At start-up, it is advisable to replace the seals.

INSTALLATION

General

The gearboxes 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 gearbox operation
3. safe operation

In this respect:

- any arbitrary tampering with the gearbox and with any accessories originally provided is strictly prohibited
- when lifting and transporting, do not knock the shaft ends and use specific lifting straps or the eye-bolts provided for this purpose, and make sure that the lifting equipment has adequate lifting capacity
- never carry out welding work on gearboxes.
- only carry out installation or maintenance work with the gearbox stationary. It is therefore advisable to ensure that the driving force cannot be activated unintentionally.
- regarding the gearbox input, electric or hydraulic motors are often mounted with the DANA 00 universal flange system (see the "Universal Input" section). Note that the 00 flange is normally used for motors weighing up to approximately 100 kg and 1000 Nm of maximum torque. Specific adapters can be used with heavier motors: in this case, please contact you local DANA representative.
- with connections involving the use of rotating parts such as shafts, couplings or pulleys with belts, always provide adequate accident-prevention protection.

For flange-mounted gearboxes, we recommend observing the following requirements:

- the structures to which the gearboxes are secured must be rigid, with flat machined support surfaces that are free of paint, perpendicular to the driven shaft, and centered with a tolerance of H8.
- the mating surfaces must be perfectly degreased in advance.
- take care to align the gearbox with the driven shaft, especially with gearboxes that have splined female outputs, which cannot take external radial or axial loads.
- use at least class 10.9 screws with 75% tightening yield strength for fastening
- during assembly, take care to avoid violent axial impacts that could damage the inner bearings.
- the drive parts to be keyed to the output must be machined as specified in the “Outputs” section.

Note:
For right-angle gearboxes with male input shafts, the input shaft may not be in its ideal position during installation. To remedy this situation, we recommend:

- when connecting with couplings that are able to recover misalignments, measure the existing misalignment and check that it is acceptable for the coupling; if the misalignment is too big, shim the motor to bring it within the permissible play
- when connecting with mechanical parts that do not allow an play adjustment, align the motor using shims.

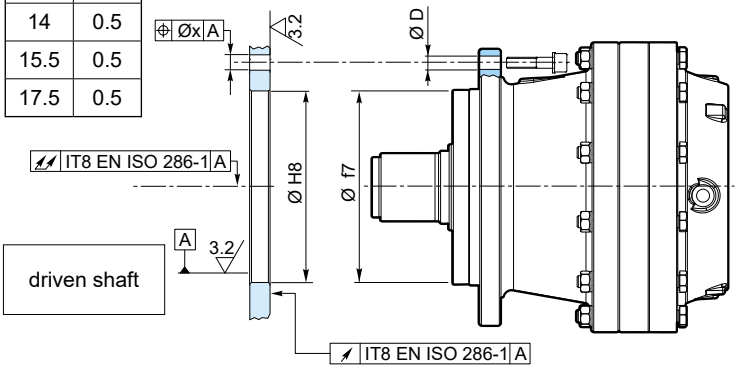
Shaft mounting

Before mounting, carefully clean the mating surfaces and lubricate them with suitable anti-seizure products (except for versions with FS hollow shafts - see the "Shrink disc" section).
Installation and removal must be carried out with suitable equipment, such as pullers and puller screws, using the threaded holes provided on the shafts; in any case, avoid any impacts or shocks that could cause permanent damage to the internal parts of the gearbox.
For the sizes of the driven shaft, refer to the section "Outputs".

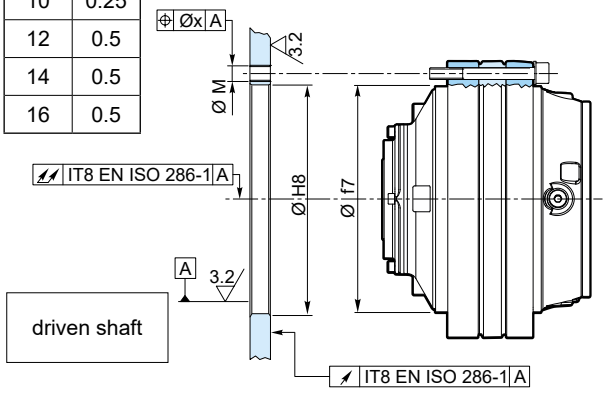
Flange and foot support mounting

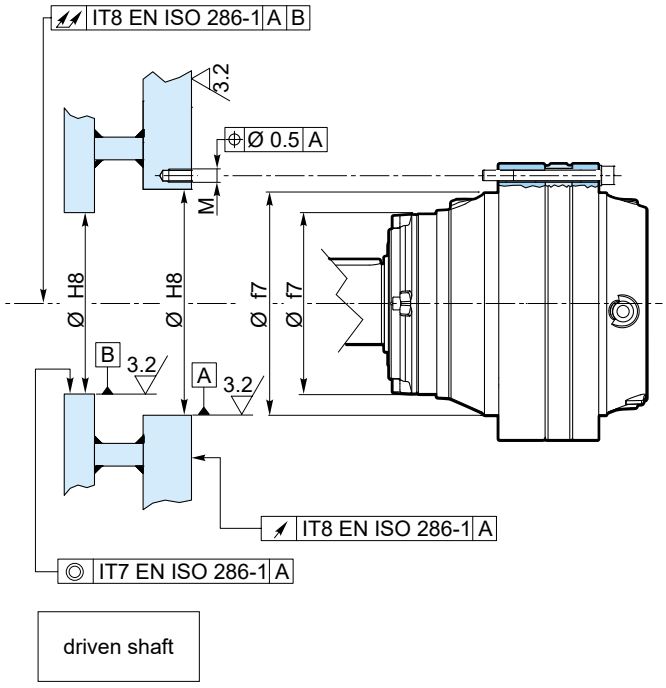
The mating surfaces must be machined with a degree of finish that ensures the required coefficient of friction (approx. Ra 3.2 mm). To ensure alignment between the gearbox, motor and driven machine, observe the tolerances given in the diagrams below.
Before installation, clean and degrease the mating 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 gearbox and the shaft to be driven, or the gearbox and the motor whenever the motor is not directly flange-mounted to the gearbox.

D	x
11	0.25
13.5	0.5
14	0.5
15.5	0.5
17.5	0.5

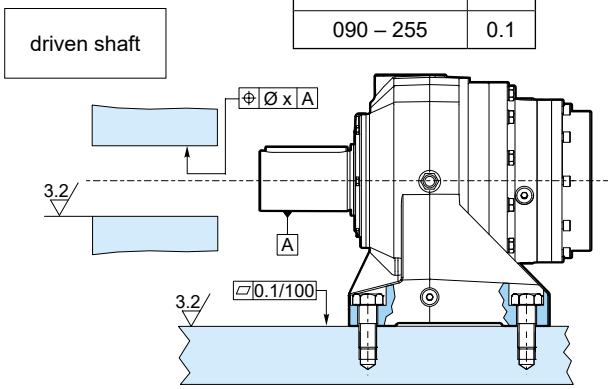


M	x
10	0.25
12	0.5
14	0.5
16	0.5





Size	x
010 – 067	0.05
090 – 255	0.1



A particularly important measure to prevent stress on the gearbox support flanges even during mounting, is to ensure that the mounting counter-flange adheres perfectly to the gearbox flange before tightening the fastening screws.

Fastening screws

Secure the gearboxes with class 10.9 screws with ISO 7089 washers (300 HV min.)
The screws must be tightened (depending on their size) according to the torque values given in the dimension table for the specific size; 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 surface friction coefficient of could overload the screws during tightening
Always check the tightening torque of the screws after the first few hours of machine operation.

SHRINK DISC

The shrink discs are fitted on S100 output shafts.
Given below are the characteristics and measures to be considered for correct assembly and disassembly of these parts used for the transmission of motion.

Mounting

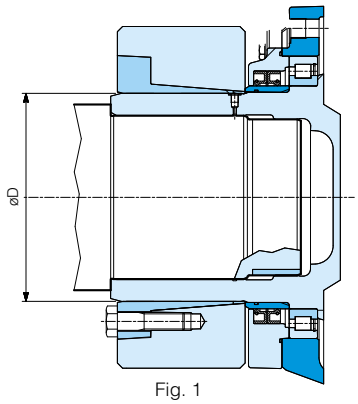


Fig. 1

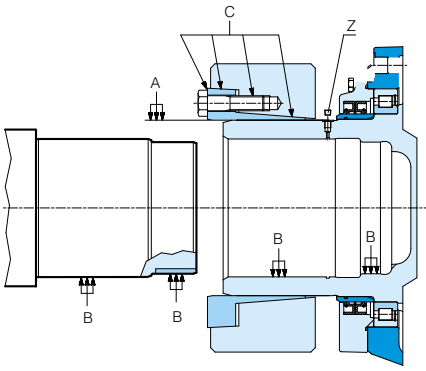


Fig. 2

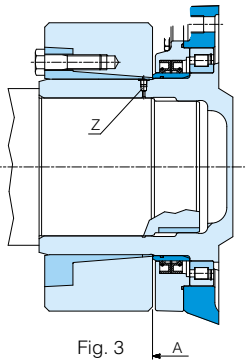


Fig. 3

	T_N [Nm]	D [mm]	T_{GN} [Nm]	Dimensions
S270	27000	175	55000	175x300

T_N: Nominal gearbox torque
T_{GN}: Nominal coupling torque
D: Shaft diameter

1. Thoroughly clean and degrease the shaft and its seat (see point B). To facilitate subsequent removal, it is advisable to make the small spigot for the shaft from a suitably machined bushing.
2. Lubricate the coupling seat (see point A) with molybdenum disulfide grease (MoS_2). When new, the coupling does not have to be disassembled for greasing. Greasing of the areas C is advisable only when reinstalling a used coupling.
3. Fit the coupling on the gearbox 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.
4. Fit the shaft in its seat. Mounting must take place without any interference, and this is only possible with precise gearbox/shaft alignment using suitable lifting equipment.

CAUTION!
Assembly must be carried out without applying axial forces, blows or impacts that could damage the gearbox bearings.

5. Fit the coupling up against the shoulder on the shaft before tightening the screws.
6. Tighten the screws gradually in a circular order, using a suitable torque wrench set to the tightening torque specified 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 tightened further, otherwise repeat the procedure from point 5.
   Mounting is complete and correct if the front surfaces of the inner and outer ring are at the same level.
   The tightening torque does not have to be rechecked after the coupling is put into service.
7. Protect the coupling area with suitable sheet metal casing (point P) if there is risk of stones, sand or other material damaging the coupling or the gearbox seals.

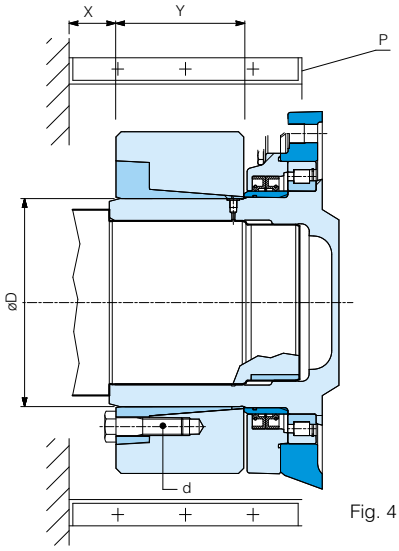
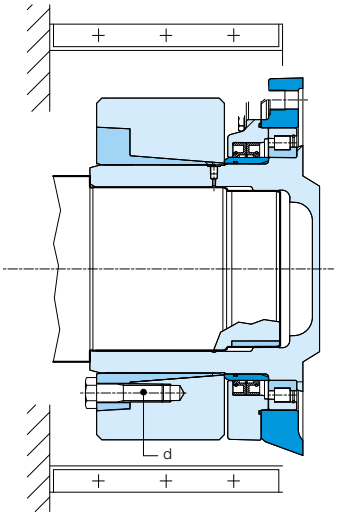


Fig. 4

	Dimensions	Y [mm]	d	T [Nm]
S270	175x300	69	M16	290

Disassembly



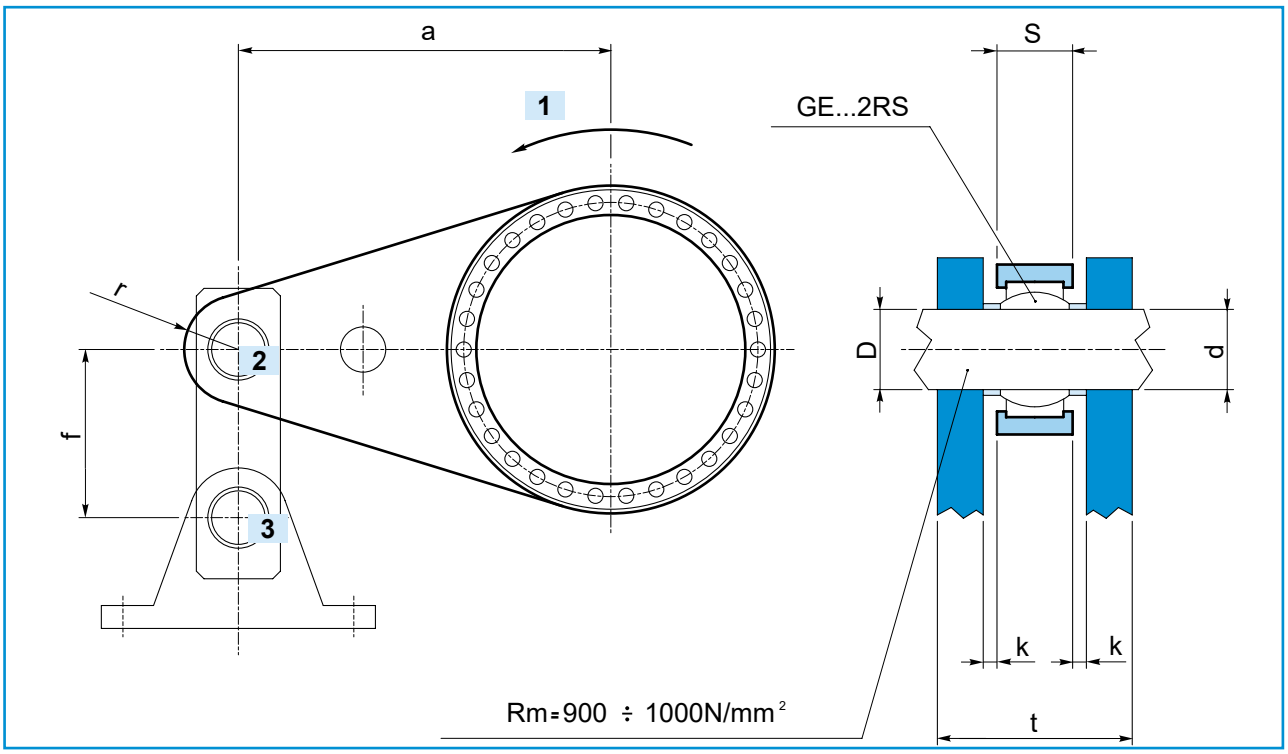
1) Loosen the screws “d” in several passes and in sequence so that the coupling can move on the hub.

CAUTION! Do not undo the screws completely so that the rings can separate on their own.
High axial forces could cause violent removal, resulting in a hazard to operators.

2) This normally releases the clamping unit. Use suitable equipment to support the gearbox and separate the gearbox from the machine shaft.

CAUTION!
Refer to the maintenance manual to check the permissible axial loads.

Indications for torque arm construction and anchoring



1
Preferential direction of rotation output shaft side

2 – 3
GE...2RS in positions 2 and 3

	a min [mm]	s [mm]	r min [mm]	f min [mm]	GE...2RS	D [mm]	d [mm]	k [mm]	t min [mm]
S270	700	30	45	150	35	35	35	4	66

Mounting the arm

1. The torque arm must be free to move axially and have enough play in the couplings to allow small gearbox oscillations (always present) without overloading the gearbox. Therefore ball joints must be used in all connections.

2. It is advisable to use long-life ball joints in which the rubbing surfaces are protected with PTFE. Alternatively, “steel to steel” joints can be used, provided they are greased periodically.
3. The anchoring connecting rod must be parallel to the torque arm in order to ensure the side clearance “k” (unloaded), 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 corresponding connecting rod may have different design solutions from those proposed, but the following measures must be taken:

   CAUTION!
   Do not carry out any welding work involving the gearbox, not even earthing.

6. Always use a torque wrench to tighten the coupling screws.

DANA gearboxes are supplied without lubricant; therefore the user must fill them correctly before starting the machine.

Essential oil specifications

The important parameters to consider when choosing the oil type are:

- viscosity under 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 decreases rapidly as the temperature increases. If the gearbox operating temperature is from 50 °C to 70 °C, a nominal viscosity can be chosen from the following guide table; choose the highest viscosity if a higher operating temperature is expected.

Output speed n_2 [rpm]	**Working temperature**	
	50° C	**70° C**
$n_2 \geq 20$	VG 150	VG 220
$5 < n_2 < 20$	VG 220	VG 320
$n_2 \leq 5$	VG 320	VG 460

Special attention must be paid to highly loaded output stages and those 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 anti-foam and antioxidant additives, it is important to use oils with additives offering EP (extreme-pressure) and anti-wear properties, according to ISO 67436 L-CKC or DIN 515173 CLP. The lower the gearbox 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 in case of very low speeds and high loads, it is important to observe the maintenance intervals so as not to lower the lubricating properties of the oil excessively.

Oil types

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.

Gearboxes that are not particularly loaded and with an intermittent operating cycle but without considerable temperature ranges can be lubricated with mineral oil.
In cases of heavy use, when the gearboxes are highly and continuously loaded resulting in a 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 can go unnoticed, but rapidly diminishes the lubricating properties of the oil. Moreover, these lubricants may chemically attack the oil seals and paint inside the gearbox.

In addition to the above, there are also hydraulic oils and oils for the food industry.
The former are used for negative brakes.

The latter are used specifically in the food industry as they are special products that are not harmful to health.
The tables below contain lubricants offered by the best-known manufacturers, with specifications suitable for lubricating DANA gearboxes.

Contamination

During normal operation, due to run-in of the surfaces, metallic microparticles will inevitably form in the oil.
This contamination can shorten the life of the bearings, resulting in premature gearbox failure.
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 stabilising the operating temperature at a level more suitable for ensuring the required viscosity.

For lubrication problems with gearboxes intended for special uses, it is advisable to contact your local DANA representative regarding the construction type and operating parameters.

Lubricant oils for general use

Manufacturer	Mineral Oil			Polyalphaolefin Synthetic Oils (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	Enersyn EPX 150	Enersyn EPX 220	Enersyn 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	-	Atol 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

Lubricant oils for use in the food industry

(USDA-H1 and NSF-H1 approved)

Manufacturer	Gear Oil		
	ISO VG 150	**ISO VG 220**	**ISO VG 320**
ARAL	Eural Gear 150	Eural Gear 220	-
CASTROL	Optileb GT 150	Optileb GT 220	Optileb GT 320
CHEVRON	-	Lubricating Oil FM 220	-
ENI	Rocol Foodlube Hi-Torque 150	Rocol Foodlube Hi-Torque 220	Rocol Foodlube Hi-Torque 320
FUCHS	Cassida Fluid GL 150	Cassida Fluid GL 220	Cassida Fluid GL 320
KLÜBER	Klüberoil 4 UH1-150N	Klüberoil 4 UH1-220N	Klüberoil 4 UH1-320N
MOBIL	Mobil SHC Cibus 150	Mobil SHC CIbus 220	Mobil SHC Cibus 320
NILS	Ripress Synt Food 150	Ripress Synt Food 220	Ripress Synt Food 320
TEXACO	Cygnus Gear PAO 150	Cygnus Gear PAO 220	-
TRIBOL	-	Foodproof 1810/220	Foodproof 1810/320

Oil checking with unforced lubrication

Horizontal mounting
Levels
When the gearbox is mounted horizontally, the normal level to ensure correct lubrication is at the centre line, Fig. (A). For applications with very low output rotation speeds (n2 ≤ 5 rpm), it is advisable to fix the level at a value above 50–100 mm. Fig. (B).
The correct level can be easily checked using a transparent tube positioned as shown in figure (B).
If the output speed is extremely low (n2 ≤ 1 rpm), or if long idle periods are expected, 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 an electrical signal), mount it as shown in the diagram in Fig. (C).
Mount the breather plug above the sight glass with a tube that is long enough. Connect the top part (empty) of the gearbox just below the breather. This will prevent the leakage of oil.

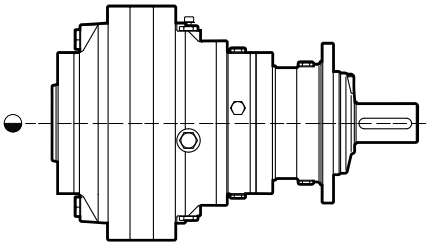


Fig. A

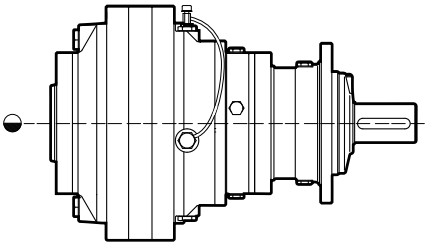


Fig. B

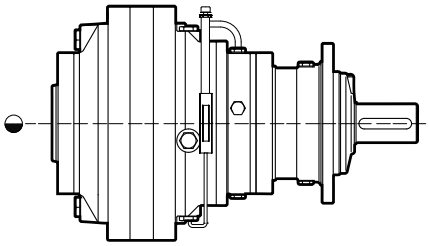
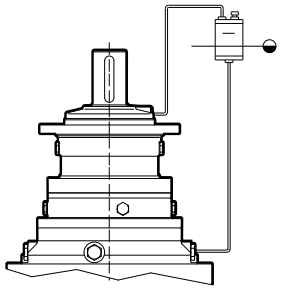


Fig. C

Expansion vessel - Supplied separately from the gearboxes
Several rules must be followed with vertical mounting, and in any case whenever the gearbox has to be filled completely.
During filling, an air bubble can form at the top, at the output shaft rotary seal, which must be eliminated to ensure that the seal is lubricated properly. Also, since the oil volume increases with the temperature, an auxiliary tank must be provided to allow it to expand without creating hazardous pressures inside the gearbox.



For dimensioning, the oil expansion volume (Ve) must be determined at the operating temperature:

$$V_e = V_t \times \Delta T / 1000$$

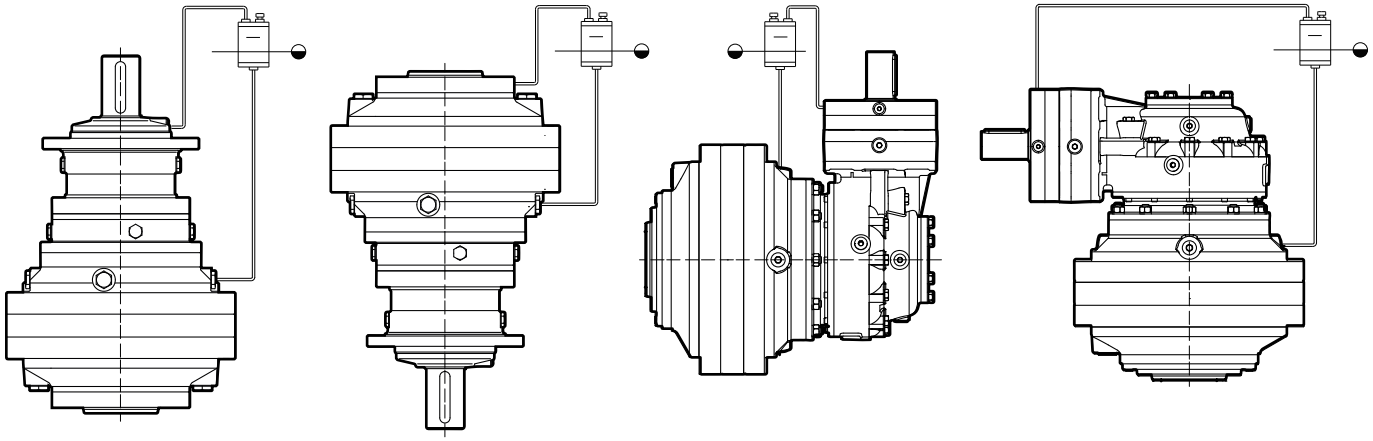
$\mathbf{V_t}$ = total oil volume
$\mathbf{\Delta T}$ = difference between operating temperature and ambient temperature

The capacity (Vs) of the expansion vessel is:

$$V_S = 2 \times V_e$$

To remove any residual air, the holes at the top of the gearbox and the top of the expansion tank must be connected; the latter must be located at a height that allows the gearbox to be filled up to the minimum level. It is advisable to make the bleed pipe or the expansion vessel with transparent material in order to easily check the exact position of the lubricant level.

Vertical in-line mounting and right-angle versions
The gearboxes must be completely full, so an expansion vessel must be fitted. As already mentioned, it is very important to connect the top gearbox breather to the expansion vessel to allow the oil to rise up to the rotary seal ring on the upper gearbox shaft.
When fitting an instrument for visual checking (or by means of a special electric signal), the instrument must be placed on the side of the tank.



Auxiliary cooling and filtering systems

If the power applied is greater than the thermal power that can be dissipated by the gearbox, an auxiliary cooling system (air-oil) must be used to dissipate the excess thermal power and keep the lubricating oil clean by means of constant filtering.

If an auxiliary tank is required (e.g. for cooling several gearboxes with a single system), we recommend contacting your local DANA representative. When designing an oil circulation circuit, it is advisable for the suction to be at the lowest point, so that this branch of the circuit can also be used to drain the gearbox.

In any case, the oil suction and delivery points must be far enough apart to ensure that fresh oil passes through the gearbox. The diameter of the oil holes is very important, especially in suction. In fact, the pump tends to cavitate if the holes are too small. 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 the input supports or flanges of fast gearboxes, the use of one hole may be insufficient for the entire 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, if the natural flow rate is too low, a small pressure is generated which ensures the flow.

For correct dimensioning of the circuit, it is advisable to follow these rules.

Suction:

- suck from several holes when the oil speed v_o is higher than 1.30 m/s with just one hole;

Delivery:

- deliver to several holes when the oil velocity v_o is higher than 2.10 m/s with just one hole.

The speed can be obtained from the table below, or calculated with the following equation:

$$V = (Q \times 21.2) / d^2$$

where:

V = oil speed in m/s
Q = flow rate in l/min
d = inside diameter of the union in mm

The calculation takes the kinematic oil viscosity of 60 cSt into account.

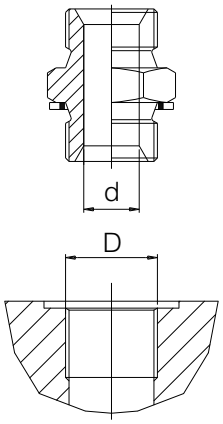


Fig. 15

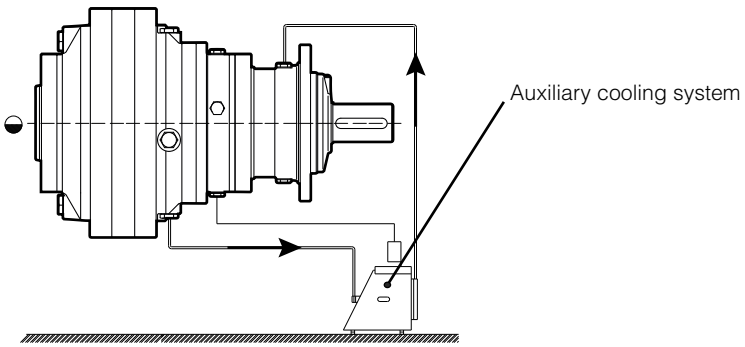
	Oil speed table [m/s]					
	Hole diam.					
D (nom.)	G 1/4”	G 3/8”	G 1/2”	G 3/4”	G 1”	G 1 1/4”
d [mm]	7	10	12	16	22	30

Oil speed table [m/s]						
Pump delivery [l/min]						
6	2.59	1.27	0.9	0.5	0.26	0.14
12	5.19	2.54	1.76	1	0.52	0.28
20	8.6	4.4	2.94	1.65	0.87	0.47

Oil checking with auxiliary cooling system

In-line horizontal gearbox

Refer to the figure below to check the oil level and the position of the cooling circuit fittings.



In-line and right-angle vertical gearbox
Refer to Fig. (D), (E) and (F) to check the oil level and the position of the cooling circuit fittings.

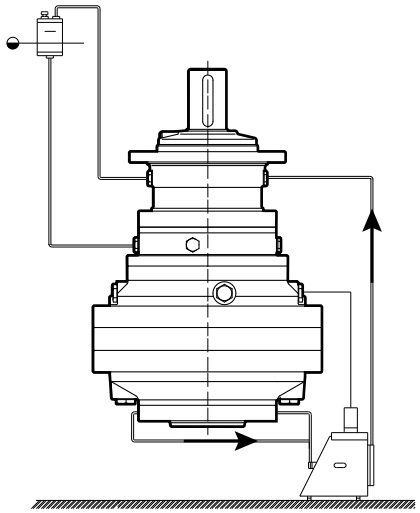


Fig. D

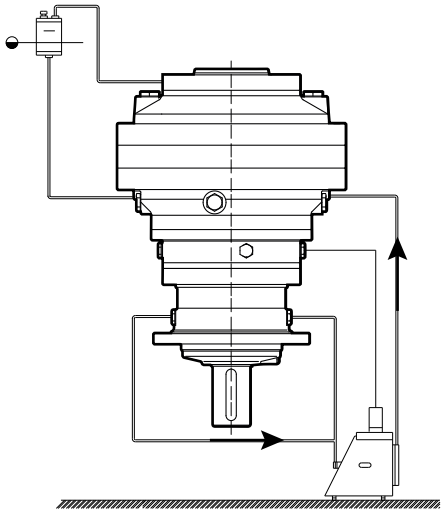


Fig. E

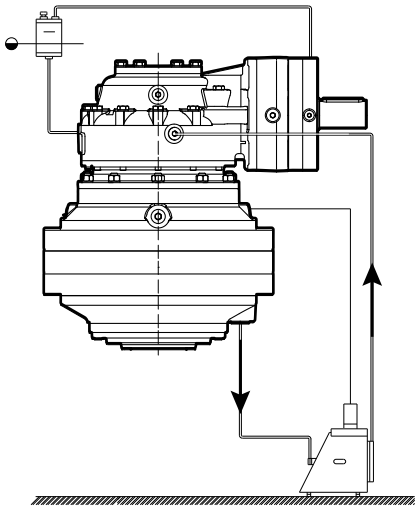


Fig. F

Caution
The auxiliary oil cooling and filtration systems described above are the minimum condition required to control the gearbox lubrication. The end-user can always extend the system by adding auxiliary safety checks on the flow, temperature and level.
The system may also be fitted with valves to facilitate oil changes with the aid of the service pump and auxiliary suction filter to protect the pump from unwanted debris from inside the gearbox.

Oil change

If there is no filtering and cooling circuit, the first oil change must be done after 500–600 hours of operation.
Subsequently, the following oil change frequencies are recommended:

Oil temperature [°C]	**Oil change interval** [h]	
	Synthetic Oil	**Mineral Oil**
≤ 65	10'000	4'000
65 – 80	8'000	3'000

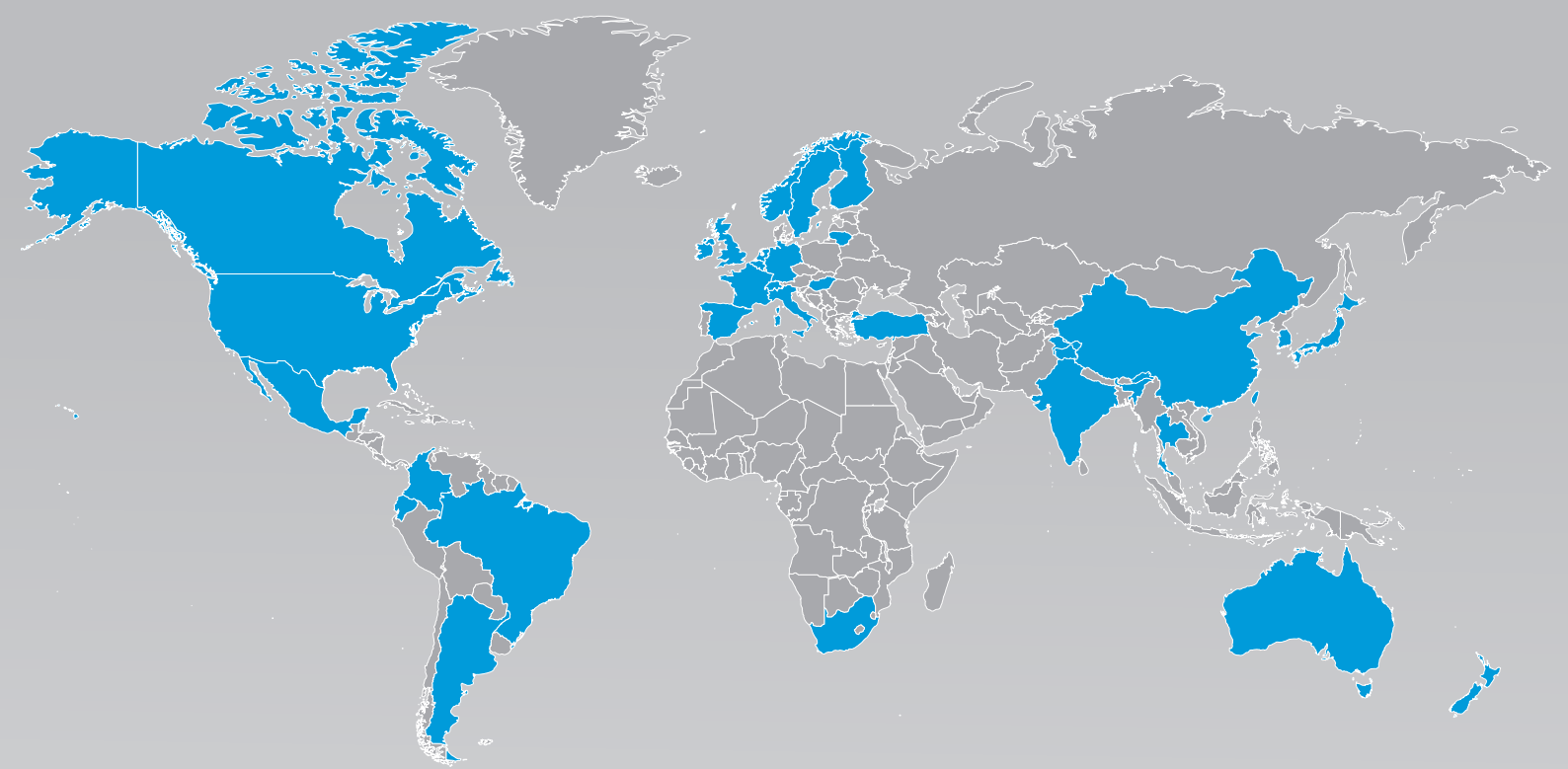
In case of heavy duty applications, the above values must be halved. The values given in the table refer to a work environments free from external contamination.
It is advisable to carry out the oil change with the gearbox hot, (approximately 40°C) to prevent sludge from forming and to help it drain completely.

For the correct procedure, follow the rules given in the installation and maintenance manual supplied with each gearbox.
It is advisable to check the oil level periodically.
Check for leaks if more than 10% the total volume has to be added.

Lubricant quantity [l]

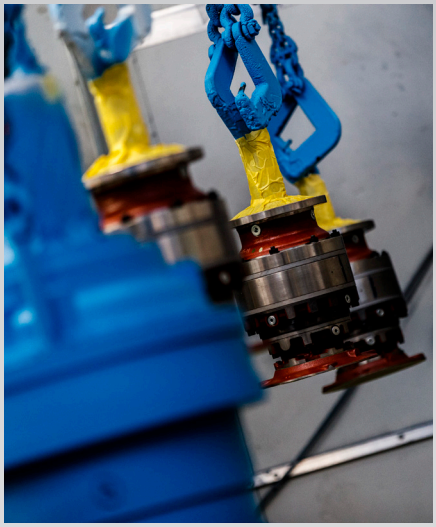
The quantities of oil indicated are approximate and to be used for supply purposes.
The exact quantity of oil to be introduced into the reducer is defined by its level.

S270		Mounting position		
		B30 B60 B70 B80 B3C B3A B3B	V50 V60	V5A V6A B3D V5B V6B B6C V5C V6C B7A V5D V6D B8B
SL02701	LAAM100/LAAN100	3.8	7	-
	LBAF100	2.5	5	-
	LABS100	3.8	7	-
	LCAC100	3.8	7	-
	FAAN100	3.8	7	-
SL02702	LAAM100/LAAN100	4.5	9	-
	LBAF100	3.5	7	-
	LABS100	4.5	9	-
	LCAC100	4.5	9	-
	FAAN100	4.5	9	-
SL02703	LAAM100/LAAN100	5	10	-
	LBAF100	4.5	9	-
	LABS100	5	10	-
	LCAC100	5	10	-
	FAAN100	5	10	-
SL02704	LAAM100/LAAN100	5.2	10.4	-
	LBAF100	4.8	9.6	-
	LABS100	5.2	10.4	-
	LCAC100	5.2	10.4	-
	FAAN100	5.2	10.4	-
SC02702	LAAM100/LAAN100	6.5	13	13
	LBAF100	5	10	10
	LABS100	6.5	13	13
	LCAC100	6.5	13	13
	FAAN100	6.5	13	13
SC02703	LAAM100/LAAN100	5.7	11.4	11.4
	LBAF100	6	12	12
	LABS100	5.7	11.4	11.4
	LCAC100	5.7	11.4	11.4
	FAAN100	5.7	11.4	11.4
SC02704	LAAM100/LAAN100	7	14	14
	LBAF100	5.7	11.4	11.4
	LABS100	7	14	14
	LCAC100	7	14	14
	FAAN100	7	14	14



Technologies Customized to **Every Part of the Globe**

With a presence in 31 countries, Dana Incorporated boasts more than 150 engineering, manufacturing, and distribution facilities. Our worldwide network of local service centers provides assurance that each customer will benefit from the local proximity and responsiveness.



About Dana Incorporated

Dana is a leader in the design and manufacture of highly efficient propulsion and energy-management solutions that power vehicles and machines in all mobility markets across the globe. The company is shaping sustainable progress through its conventional and clean-energy solutions that support nearly every vehicle manufacturer with drive and motion systems; electrodynamic technologies, including software and controls; and thermal, sealing, and digital solutions. Founded in 1904, we employ thousands of people across six continents.

About Dana Off-Highway Drive and Motion Systems

Dana delivers fully optimized Spicer® drivetrain and Brevini® motion systems to customers in construction, agriculture, material-handling, mining, and industrial markets. We bring our global expertise to the local level with technologies customized to individual requirements through a network of strategically located technology centers, manufacturing locations, and distribution facilities.

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DANA

BREVINI®
Motion Systems