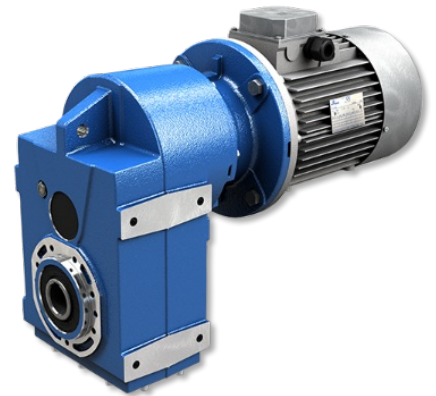


TECHNICAL CATALOGUE



SHAFT MOUNTED GEARED MOTORS

STANDARD **IEC**

1. GENERAL INFORMATION

1.1	SYMBOLS AND FORMULAS	4
1.1.1	Symbols	4
1.1.2	Formulas	5
1.2	PRODUCT SELECTION	6
1.3	SERVICE FACTOR	7
1.4	INSTALLATION	8

2. PRODUCT INFORMATION

2.1	DESIGN FEATURES	9
2.2	TYOLOGY	10
2.2.1	Designation	10
2.2.2	Versions	11
2.2.3	Modularity	12
2.3	MOUNTING POSITIONS	13
2.3.1	Mounting positions	13
2.3.2	Position of terminal box	13
2.4	THERMAL POWER	14
2.4.1	Information	14
2.4.2	Verification	14
2.5	CRITICAL APPLICATIONS	15
2.5.1	Critical applications	15
2.5.2	Information	15
2.6	MOTOR FLANGE AVAILABILITY	16
2.7	OUTPUT SHAFT BEARINGS	20
2.8	OVERHUNG LOAD	21
2.8.1	Information	21
2.8.2	Input	21
2.8.3	Output	22
2.9	LUBRICATION	23
2.9.1	Information	23
2.9.2	Lubricants	23
2.9.3	Special lubricants	24

2.9.4	Quantity	25
2.10	MOMENTS OF INERTIA	26

3. DIMENSIONS

3.1	REDUCERS/GEARED MOTORS	27
3.1.1	S 052...123	27
3.1.2	S 142...153	28
3.1.3	CS 052...123	29
3.1.4	IS 052...123	31
3.1.5	IS 142...153	32
3.2	ELECTRIC MOTORS	33
3.2.1	Electric motors	33
3.2.2	Standard high efficiency (TS), high (TH) and premium (TP) motors	35
3.2.3	Nominal power - [kW]	36
3.3	WEIGHTS	37
3.4	SHAFT END	38

4. ACCESSORIES AND OPTIONS

4.1	LOW SPEED SHAFTS	39
4.2	OUTPUT FLANGE	40
4.3	SHAFT MOUNTING FASTENING	41
4.3.1	Reaction bolt	41
4.3.2	Torque arm - S 142...153	41
4.4	BACKSTOP DEVICE	42
4.5	OUTPUT SHAFT WITH SHRINK DISC	43
4.6	REINFORCED OIL SEALS FOR OUTPUT SHAFT	44
4.7	ASSEMBLING/DISASSEMBLING KIT	45
4.8	MACHINE AXIS	46

5. PERFORMANCES

5.1	S GEARED MOTORS (50Hz)	47
-----	-------------------------------------	----

5.2	IS GEAR REDUCER - 1750 rpm	138
5.3	IS GEAR REDUCER - 1400 rpm	146
5.4	IS GEAR REDUCER - 1140 rpm	154
5.5	IS GEAR REDUCER - 900 rpm	162
5.6	IS GEAR REDUCER - 700 rpm	170
5.7	IS GEAR REDUCER - 500 rpm	178

6. SALES CONDITIONS

6.1	SALES CONDITIONS	186
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1.1.1 Symbols

Physical dimension	Symbol	Symbol units of measure	Input	Output
Power	P	[kW]	P ₁	P ₂
Requested power	Pr	[kW]	Pr ₁	Pr ₂
Nominal power	Pn	[kW]	Pn ₁	Pn ₂
Torque	M	[Nm]	M ₁	M ₂
Nominal torque	Mn	[Nm]		Mn ₂
Requested torque	Mr	[Nm]	Mr ₁	Mr ₂
Speed	n	[rpm]	n ₁	n ₂
Force	F	[N]		
Radial load	Fr	[N]	Fr ₁	Fr ₂
Axial load	Fa	[N]	Fa ₁	Fa ₂
Reduction ratio	i			
Dynamic efficiency	η _d			
Service factor	f.s.			
Static	s			
Dynamic	d			
Calculated	c			
Maximum	max			
Minimum	min			
Moment of inertia	J	[kgm ²]	J ₁	
Ambient temperature	T _{amb}	[°C]		
Dimension		[mm]		

1.1.2 Formulas

REDUCER		
Starting or stopping time	$t = v / a$	[s]
Velocity in rotary motion	$v = \pi * d * n / 60$ $v = \omega * r$	[m/s]
Speed velocity Angular velocity	$n = 60 * v / (\pi * d)$ $\omega = v / r$	[rpm] [rad/s]
Acceleration or deceleration according to a starting / stopping time	$a = v / t$	[m/s ²]
Angular acceleration	$\alpha = n / (9,55 * t)$ $\alpha = \omega / t$	[rad/s ²]
Starting or stopping distance (according to acceleration / deceleration or angular velocity)	$s = a * t^2 / 2$ $s = v * t / 2$	[m]
Horizontal translation force	$F = \mu * m * g$	[N]
Vertical translation force (lifting)	$F = m * g$	
Inclined plane translation force	$F = m * g (\mu * \cos\beta + \sin\beta)$	
m= mass [kg]; g= gravity acceleration [m/s ²]; μ = friction coefficient; β = angle of inclination		
Moment of inertia	$J = m * v^2 / \omega^2$	[kgm ²]
Torque	$M = F * d / 2$ $M = J * \omega / t$	[Nm]

MOTOR and GEARMOTOR		
Starting time	$t_a = (J_{ext} + J_m) * n_n / 9,55 + (M_{peak} - M_r)$	[s]
Braking time	$t_s = (J_{ext} + J_m) * n_n / 9,55 + (M_{peak} + M_r)$	[s]
Motor rotation angle during starting	$\varphi = n_n * t_a / 19,1$	[rad]
Motor rotation angle during braking	$\varphi = n_n * t_s / 19,1$	[rad]
Power available at the shaft of single phase motor	$P = V * I * \eta * \cos\omega$	[W]
Power available at the shaft of three phase motor	$P = 1,73 * V * I * \eta * \cos\omega$	[W]

RUNNING at 60Hz		
Speed velocity at 60Hz	$n_{60Hz} = 1,2 * n_{50Hz}$	[rpm]
Power at 60Hz	$P_{1\ 60Hz} = P_{1\ 50Hz} * V_{60Hz} / V_{50Hz}$	[kW]
If input voltage at 60 Hz (V_{60Hz}) corresponds to winding voltage at 50 Hz (V_{50Hz}), power doesn't change $P_{1\ 60Hz} = P_{1\ 50Hz}$		
If input voltage at 60 Hz (V_{60Hz}) is 20% higher than winding voltage at 50 Hz (V_{50Hz}), power increases by 20% $P_{1\ 60Hz} = 1,2 P_{1\ 50Hz}$		
Torque at 60Hz	$M_{60Hz} = M_{50Hz} * P_{1\ 60Hz} / (1,2 * P_{1\ 50Hz})$	[Nm]
Service factor at 60Hz	$f.s_{60Hz} = f.s_{50Hz} * 1,175 * P_{1\ 50Hz} / P_{1\ 60Hz}$	-

For correctly selecting a gear reducer or geared motor, several essential pieces of data are required:

- A. The rotational input speed to the gear reducer (n_1) and the rotational output speed (n_2). Through these two values it is possible to calculate the reduction ratio (i) of the gear reducer using the following formula: $i = n_1/n_2$
- B. The torque required by the application (Mr_2).

The geared motor or gear reducer can be selected once this data is known.

This guide helps you to select the right product in just a few steps:

Geared motor selection

1. Determine the application's actual service factor (**s.f.**). This parameter depends on the type of load of the powered machine, the number of starts per hour and the hours of operation (refer to the "Service factor" paragraph).
2. Calculate the input power Pr_1 using the required torque value Mr_2 , the speed n_2 and dynamic efficiency value. $Pr_1 = (Mr_2 * n_2) / (9550 * \eta_d)$. The dynamic efficiency value depends on the type of gear reducer and on the number of gear reduction stages. (To calculate the efficiency value see its page).
3. Consult the geared motor performance tables and identify a normalised power value Pn_1 exceeding the required power Pr_1 , such that: $Pn_1 \geq Pr_1$
4. Once the suitable nominal power has been identified, select the geared motor capable of generating the rotational speed closest to the desired n_2 value and with service factor s.f. greater or equal to that required by the application.

In the geared motor selection tables the combinations include 2-pole, 4-pole and 6-pole motors powered at 50Hz.

Gear reducer selection

1. Determine the application's service factor (**s.f.**) (consult to the "Service factor" paragraph on its page) .
2. Calculate the reduction ratio i from the requested output speed n_2 and from the input speed n_1 . $i = n_1/n_2$
3. Calculate the torque M_{c_2} for selecting the gear reducer through the torque required by the application Mr_2 and the service factor s.f.: $M_{c_2} = Mr_2 * (f.s.)$
4. Consult the Gear Reducer Performance tables looking for the reducer that, with the reduction ratio closer to the calculated one, has a nominal torque Mn_2 so that: $Mn_2 \geq M_{c_2}$

Checks

Once the gear reducer or geared motor has been selected, the following checks should be performed:

A. Thermal power

The gear reducer's thermal power must be equal to or greater than the installed mechanical power, or the power required by the application according to the indications contained in the section (refer to the "Thermal power" paragraph).

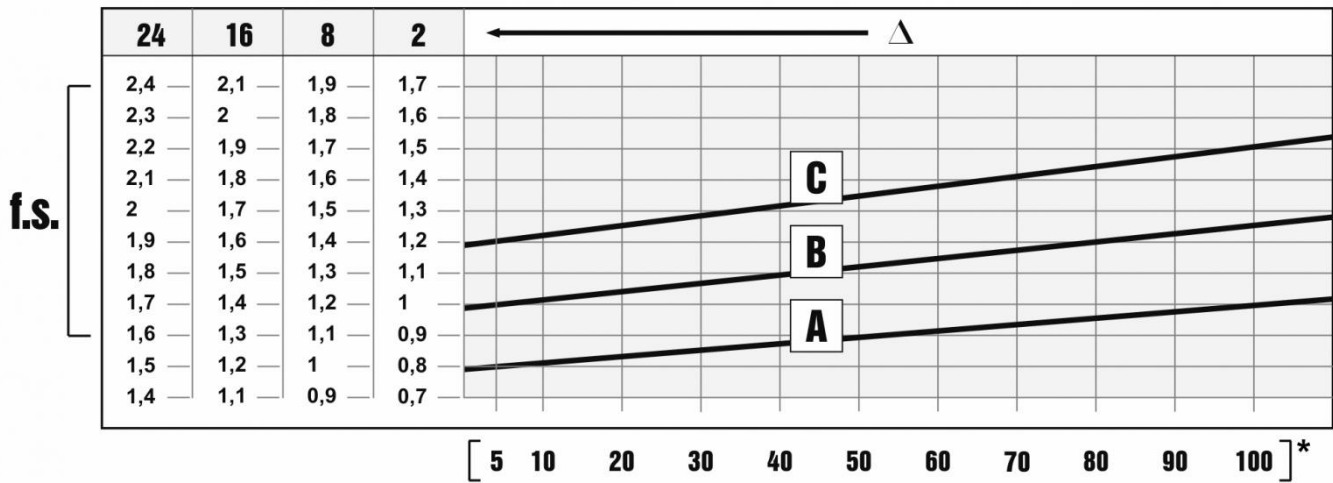
B. Maximum torque

Generally, the maximum torque (peak instantaneous load) that can be applied to the gear reducer must not exceed 200% of the nominal torque Mn_2 (ATEX - M_{2max}).

C. Radial loads

1. Verify that the radial loads acting on the input and/or output shafts are within with the values indicated in the catalogue. If they exceed these values, increase the size of the gear reducer or modify the external load capacity. During the checking phase, it is important to remember that the values indicated in the catalogue refer to loads acting on the mid-point of the shaft protrusion, therefore, if the load is applied to a different position, appropriate formulas must be used to calculate the admissible load in the desired position (refer to the "Radial loads" paragraph).
2. If accessory output shafts are present, make sure that the applied load is compatible with shaft size. If help is needed: contact MOTOVARIO TECHNICAL SERVICE.

D. If an electric motor is going to be fitted to the selected gear reducer, check for its applicability by referring to the configuration table (see paragraph "Motor flange availability"). From IEC 180 motors, verify if necessary to support the motor with feet. In case of need please contact MOTOVARIO TECHNICAL SERVICE.



The service factor (f.s.) depends on the operating conditions the gear reducer is subjected to.

The parameters that need to be taken into consideration to select the most adequate service factor correctly comprise:

- type of load of the operated machine : A - B - C
- length of daily operating time: hours/day (Δ)
- start-up frequency: starts/hour (*)

LOAD:

- **A** - uniform = $f_a \leq 0,3$
- **B** - moderate shocks = $f_a \leq 3$
- **C** - heavy shocks = $f_a \leq 10$

$f_a = J_e/J_m$

- J_e [kgm^2] moment of reduced external inertia at the drive-shaft
- J_m [kgm^2] moment of inertia of motor

If $f_a > 10$ call MOTOVARIO TECHNICAL SERVICE.

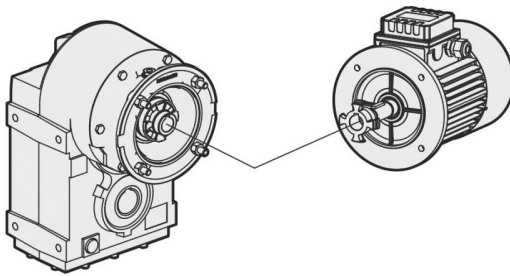
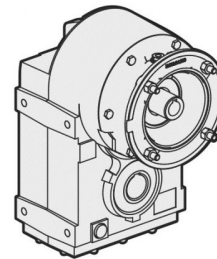
- Screw feeders for light materials, fans, assembly lines, conveyor belts for light materials, small mixers, lifts, cleaning machines, fillers, control machines.
- Winding devices, woodworking machine feeders, goods lifts, balancers, threading machines, medium mixers, conveyor belts for heavy materials, winches, sliding doors, fertilizer scrapers, packing machines, concrete mixers, crane mechanisms, milling cutters, folding machines, gear pumps.
- Mixers for heavy materials, shears, presses, centrifuges, rotating supports, winches and lifts for heavy materials, grinding lathes, stone mills, bucket elevators, drilling machines, hammer mills, cam presses, folding machines, turntables, tumbling barrels, vibrators, shredders.

To install the gear reducer it is necessary to note the following recommendations:

- Check the correct direction of rotation of the gear reducer output shaft before fitting the unit to the machine.
- In the case of particularly lengthy periods of storage (4/6 months), if the oil seal is not immersed in the lubricant inside the unit, it is recommended to change it since the rubber could stick to the shaft or may even have lost the elasticity it needs to function properly.
- Whenever possible, protect the gear reducer against solar radiation and bad weather.
- Ensure the motor cools correctly by ensuring good passage of air from the fan side.
- In the case of ambient temperatures $< -5^{\circ}\text{C}$ or $> +40^{\circ}\text{C}$ call MOTOVARIO TECHNICAL SERVICE.
- The various parts (pulleys, gear wheels, couplings, shafts, etc.) must be mounted on the shafts using special threaded holes or other systems that anyhow ensure correct operation without risking damage to the bearings or external parts of the units. Lubricate the surfaces in contact to avoid seizure or oxidation.
- Painting must definitely not go over rubber parts and the holes on the breather plugs, if any.
- For units equipped with oil plugs, replace the closed plug used for shipping with the special breather plug.
- Check the correct level of the lubricant through the indicator, if there is one.
- Starting must take place gradually, without immediately applying the maximum load.
- When there are parts, objects or materials under the motor drive that can be damaged by even limited spillage of oil, special protection should be fitted.

Assembling motor on pam flange

When the unit is supplied without motor, it is necessary to follow these recommendation to ensure the correct assembly of the electric motor. Check that the tolerances for the motor shaft and flange correspond to the "standard". Carefully clean the shaft, spigot and surfaces of the flange removing traces of paint and dirt, and confirm the key is fitted correctly. Fit the half coupling/sleeve to the motor shaft (see picture) taking care to ensure the motor shaft and bearings are not damaged by avoiding excessive force and where necessary using assembly equipment. Place the couplings elastic element onto the motor half coupling and position the motor up to the gear unit ensuring the coupling element is aligned with the driven half coupling. Complete the assembly using the fixing bolts. Key-ways with tightened tolerances.

Flexible joint**PAM Sleeve**

Motovario products are supplied with the following surface treatment features:

Grey-coloured cast-iron cases for gears

- Die-cast materials are always painted.

Grey-coloured cast-iron inspection cover: The gear reducer S... series with 2, 3 stages size 125, 140, 150 are supplied with grey-coloured cast-iron closing cover and a metal nameplate printed.



Painting specifications:

- Orange-peel blue epoxy-polyester RAL 5010. Polyester resin based heat-hardening powders, altered with epoxy resins.

Mechanical properties: Tests carried out onto degreased Unichim white lattens (film thickness: 60 microns) comply with the following specifications: adherence (ISO2409).

Heat resistance: 24 HOURS AT 150°C.

Corrosion strength: ASTM B 117/97 salt fog from 100 to 500 hours depending on the support's preliminary treatment.

Performance:

- Loading capacity in accordance with DIN 3990, ISO 6336, AGMA 2101, ISO 10300, DIN 3991, ISO 281, DIN 743.

Efficiency η :

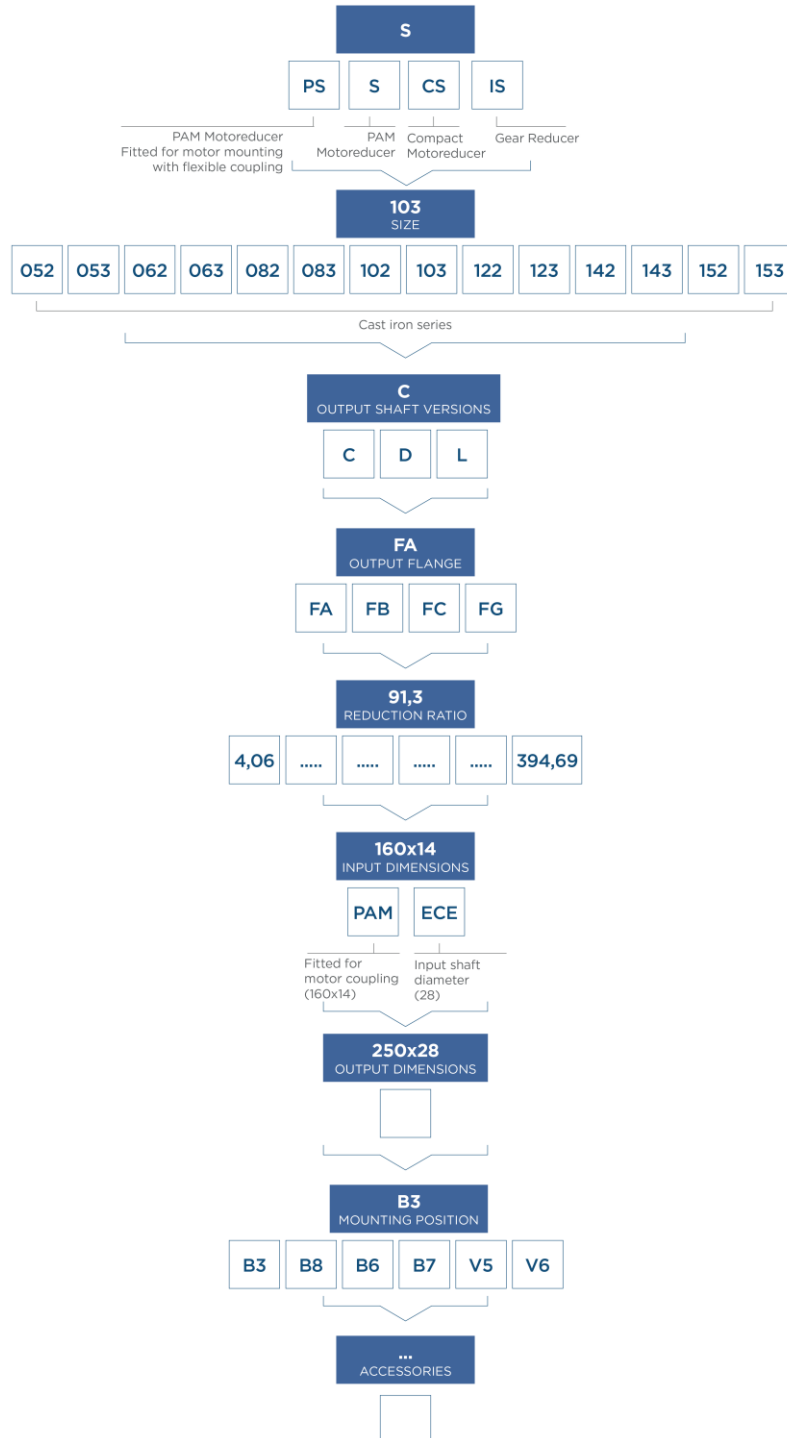
- The efficiency is the ratio between the output power P_2 and the power absorbed by the gear reducer P_1 : $\eta = P_2/P_1$.

S-range shaft-mounted reducers have an average value equal to:

S..2 stages = 0,96

S..3 stages = 0,94

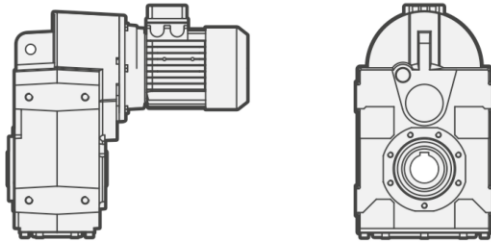
2.2.1 Designation



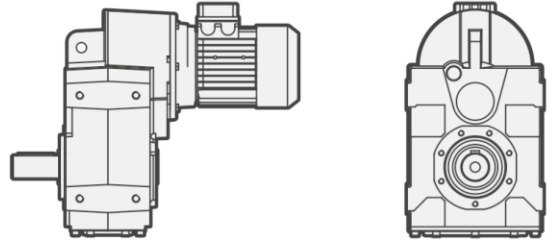
2.2.2 Versions

S... C - S... D - S... L

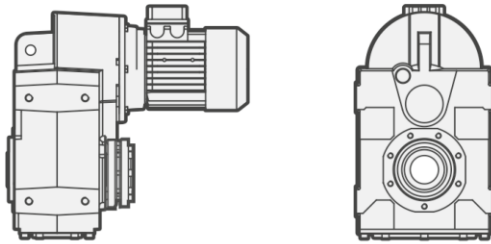
S.. C FOOT-FLANGE MOUNTING / HOLLOW SHAFT



S.. D FOOT-FLANGE MOUNTING / D SOLID SHAFT

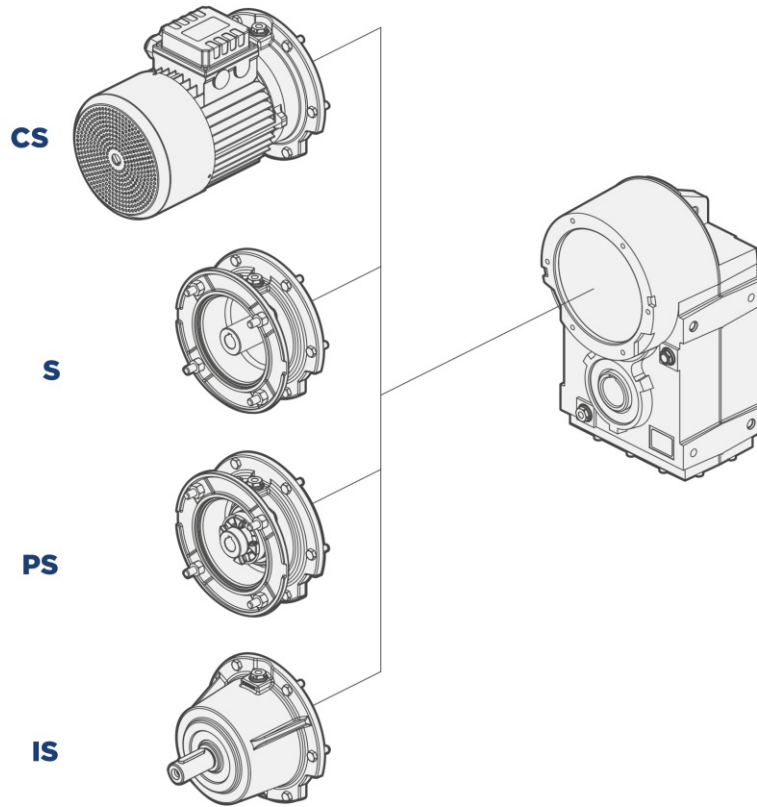


S.. L FOOT-FLANGE MOUNTING / SHRINK DISC SHAFT



2.2.3 Modularity

S GREY CAST IRON SERIES



CS
Compact electric motor versions

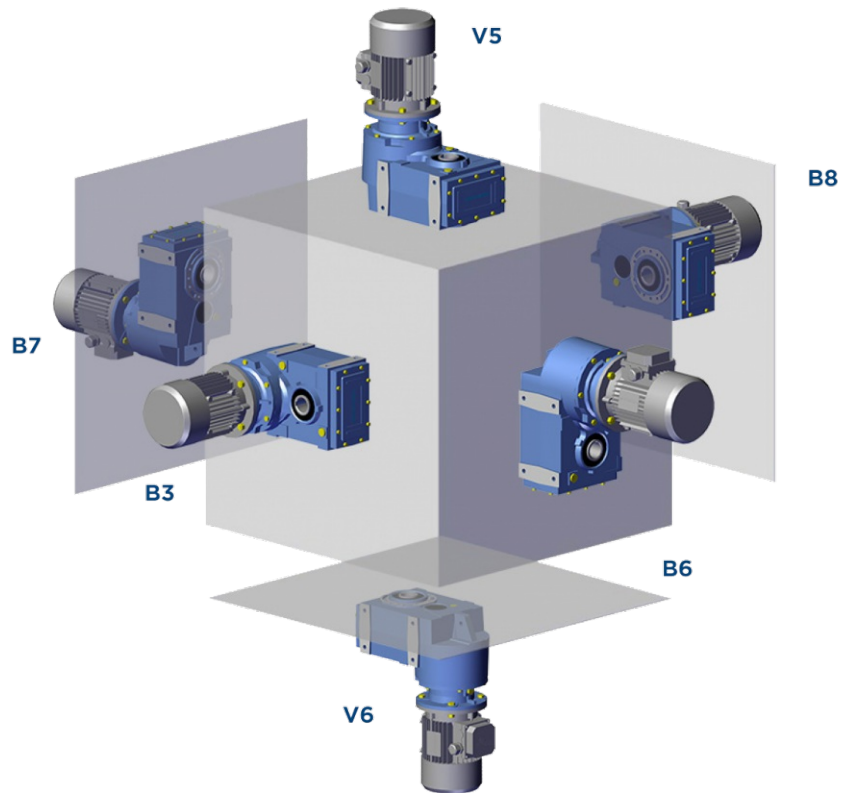
PS
Fitted for motor mounting
with flexible coupling

S
Fitted for motor coupling version
(PAM)

IS
Input shaft versions

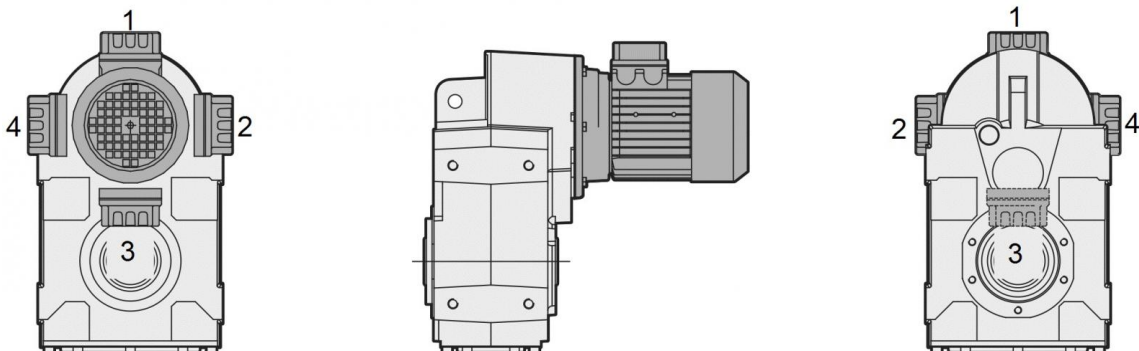
2.3.1 Mounting positions

The mounting position of the gear unit identifies its space orientation. B3 mounting position, as from a technical point of view, ensures lower oil splash, better lubrication and less heating.



2.3.2 Position of terminal box

Unless otherwise specified when ordering, the gear reducer is supplied with terminal box in position 1.



2.4.1 Information

The scheme below indicates the nominal thermal power capacity Pth [kW] according to the following conditions:

- mounting position B3
- continuous operation at input speed ≤ 1500 rpm
- environment temperature $T_{amb}=25^{\circ}\text{C}$
- sea level altitude
- air speed around the gear reducer $\geq 1\text{m/s}$
- absence of external radial and/or axial loads

$n_1=1500\text{rpm}$	
	Pth [kW]
S052	7
S062	9,5
S082	15,5
S102	20,5
S122	34,5
S142	53
S152	65

A correct lubrication and a proper running condition of the gearbox are guaranteed only applying an input power not exceeding Pth (at the above reference conditions)(T oil max=95°C).

NOTE: Normally, three stages gearboxes do not require thermal power verification because the thermal rating usually exceed the mechanical one.

2.4.2 Verification

Application check

Except for continuous operating times below two hours and successive pauses capable of bringing the gear reducer back to ambient temperature, for each application it is peremptory to verify the gear reducer's thermal limit according to the following formula: $P_1 < P_{th} * F_c * F_v * F_a$, where:

- P_1 = input power to the gear reducer [kW]
- P_{th} = thermal power at the reference conditions [kW] (see above table)
- F_c = ambient and operating temperature correction factor
- F_v = ventilation correction factor
- F_a = altitude correction factor

The correction factors refer to different operating conditions compared to the reference conditions, and are provided by the following ISO14179 tables:

Ambient temperature °C	F_c	Duty per hour of operation %				
		100	80	70	40	20
10	1,15	1,21	1,32	1,55	2,07	
18	1,07	1,12	1,23	1,44	1,93	
25	1,00	1,05	1,15	1,35	1,80	
30	0,93	0,98	1,07	1,26	1,67	
40	0,83	0,87	0,95	1,12	1,49	
43	0,75	0,79	0,86	1,01	1,35	
50	0,67	0,70	0,77	0,90	1,21	

Altitude (m)	F_a
0*	1
750	0,95
1500	0,9
2250	0,85
3000	0,81

Ventilation correction factor	F_v
Stagnant air (<0,5 m/s)	0.75
Indoor installation with slight ventilation	1
Indoor installation with good ventilation (>1,4 m/s)	1.4
Installazione all'aperto (>3,7 m/s)	1.9

*Sea level

In case of operation at input speeds exceeding 2000 rpm, or ambient temperatures greater than 40°C, it is advisable to contact our technical department.

2.5.1 Critical applications

S	050	060	080	100	125	140	150
2000 < n1 < 3000	✓	✓	✓	✓	✓	B	B
V6	B	B	B	B	B	B	B
n1 > 3000	B	B	B	B	B	A	A
...L : V5 - V6	B	B	B	B	B	B	B
(*) ...L	B	B	B	B	B	B	B

✓ Verified application

A Application not recommended

B Check the application and/or call MOTOVARIO TECHNICAL SERVICE.

(*) The shrink disc is designed only to transmit the output torque.

In case of mounting position with radial and/or axial loads, please contact MOTOVARIO TECHNICAL SERVICE.

2.5.2 Information

The performance given in the catalogue correspond to mounting position B3 or similar, when the first stage is not entirely immersed in oil. For other mounting positions and/or particular input speeds, refer to the tables that highlight different critical situations for each size of gear reducer. It is also necessary to take due consideration of and carefully assess the following applications by calling MOTOVARIO TECHNICAL SERVICE:

- To avoid the use as multiplier.
- Use in services that could be hazardous for people if the gear reducer fails.
- Applications with especially high inertia.
- Use as a lifting winch.
- Applications with high dynamic strain on the case of the gear reducer.
- In places with T_{amb} under -5°C or over 40°C .
- Use in chemically aggressive environments.
- Use in a salty environment.
- Mounting positions not envisaged in the catalogue.
- Use in radioactive environments.
- Use in environments pressures other than atmospheric pressure.

Avoid applications where even partial immersion of the reducer is required.

In the presence of overloading due to full load, braking, shocks or other static and dynamic causes, please verify that the peak torque is less than $2 \cdot Mn_2$.

2.6 MOTOR FLANGE AVAILABILITY

B11 = Compact electric motor versions.

These tables report all possible dimensions. Please verify service factor.

*For motor size 063 the PS version does not exist.

#Ratio not existent for version IS.

CS - S - PS 052				
i	071	080	090	100-112
8,63	B5-B11	B5-B11	B5-B11	B5-B11
11,14	B5-B11	B5-B11	B5-B11	B5-B11
12,00	B5-B11	B5-B11	B5-B11	B5-B11
13,66	B5-B11	B5-B11	B5-B11	B5-B11
15,27	B5-B11	B5-B11	B5-B11	B5-B11
16,29	B5-B11	B5-B11	B5-B11	B5-B11
18,63	B5-B11	B5-B11	B5-B11	B5-B11
19,73	B5-B11	B5-B11	B5-B11	B5-B11
21,04	B5-B11	B5-B11	B5-B11	B5-B11
21,53	B5-B11	B5-B11	B5-B11	B5-B11
24,07	B5-B11	B5-B11	B5-B11	B5-B11
25,20	B5-B11	B5-B11	B5-B11	B5-B11
25,79	B5-B11	B5-B11	B5-B11	B5-B11
27,81	B5-B11	B5-B11	B5-B11	B5-B11
30,00	B5-B11	B5-B11	B5-B11	
32,55	B5-B11	B5-B11	B5-B11	B5-B11
33,00	B5-B11	B5-B11	B5-B11	
34,09	B5-B11	B5-B11	B5-B11	B5-B11
36,55	B5-B11	B5-B11	B5-B11	
38,75	B5-B11	B5-B11	B5-B11	
39,90	B5-B11	B5-B11	B5-B11	B5-B11
42,63	B5-B11	B5-B11	B5-B11	
46,00	B5-B11	B5-B11	B5-B11	
47,20	B5-B11	B5-B11	B5-B11	
52,25	B5-B11	B5-B11	B5-B11	
57,86	B5-B11	B5-B11	B5-B11	
59,42	B5-B11	B5-B11	B5-B11	
72,83	B5-B11	B5-B11	B5-B11	

CS - S - PS 053				
i	*063	071	080	090
36,50	B5-B11	B5-B11	B5-B11	B5-B11
47,14	B5-B11	B5-B11	B5-B11	B5-B11
57,79	B5-B11	B5-B11	B5-B11	B5-B11
63,74	B5-B11	B5-B11	B5-B11	B5-B11
78,14	B5-B11	B5-B11	B5-B11	B5-B11
74,20	B5-B11	B5-B11	B5-B11	B5-B11
95,84	B5-B11	B5-B11	B5-B11	B5-B11
117,48	B5-B11	B5-B11	B5-B11	B5-B11
137,45	B5-B11	B5-B11	B5-B11	B5-B11
177,55	B5-B11	B5-B11	B5-B11	B5-B11
198,45	B5-B11	B5-B11	B5-B11	
217,64	B5-B11	B5-B11	B5-B11	B5-B11
256,33	B5-B11	B5-B11	B5-B11	
314,21	B5-B11	B5-B11	B5-B11	

2.6 MOTOR FLANGE AVAILABILITY

CS - S - PS 062				
i	071	080	090	100-112
8,00		B5-B11	B5-B11	B5-B11
8,92		B5-B11	B5-B11	B5-B11
9,55		B5-B11	B5-B11	B5-B11
10,65		B5-B11	B5-B11	B5-B11
11,71		B5-B11	B5-B11	B5-B11
13,06		B5-B11	B5-B11	B5-B11
13,36		B5-B11	B5-B11	B5-B11
15,94		B5-B11	B5-B11	B5-B11
16,16		B5-B11	B5-B11	B5-B11
19,29		B5-B11	B5-B11	B5-B11
19,55		B5-B11	B5-B11	B5-B11
23,18	B5-B11	B5-B11	B5-B11	B5-B11
23,75	B5-B11	B5-B11	B5-B11	B5-B11
25,14	B5-B11	B5-B11	B5-B11	B5-B11
27,66	B5-B11	B5-B11	B5-B11	B5-B11
30,00	B5-B11	B5-B11	B5-B11	B5-B11
33,93	B5-B11	B5-B11	B5-B11	B5-B11
36,57	B5-B11	B5-B11	B5-B11	B5-B11
39,38	B5-B11	B5-B11	B5-B11	B5-B11
43,64	B5-B11	B5-B11	B5-B11	B5-B11
46,10	B5-B11	B5-B11	B5-B11	
48,30	B5-B11	B5-B11	B5-B11	B5-B11
53,53	B5-B11	B5-B11	B5-B11	B5-B11
55,00	B5-B11	B5-B11	B5-B11	
67,47	B5-B11	B5-B11	B5-B11	

CS - S - PS 063			
i	071	080	090
33,57	B5-B11	B5-B11	B5-B11
37,77	B5-B11	B5-B11	B5-B11
40,05	B5-B11	B5-B11	B5-B11
49,13	B5-B11	B5-B11	B5-B11
55,29	B5-B11	B5-B11	B5-B11
58,72	B5-B11	B5-B11	B5-B11
65,85	B5-B11	B5-B11	B5-B11
68,25	B5-B11	B5-B11	B5-B11
73,63	B5-B11	B5-B11	B5-B11
81,43	B5-B11	B5-B11	B5-B11
99,89	B5-B11	B5-B11	B5-B11
126,43	B5-B11	B5-B11	B5-B11
150,85	B5-B11	B5-B11	B5-B11
182,53	B5-B11	B5-B11	B5-B11
185,05	B5-B11	B5-B11	B5-B11
217,79	B5-B11		
267,16	B5-B11		

CS - S - PS 082				
i	080	090	100-112	132
7,34	B5-B11	B5-B11	B5-B11	B5-B11
8,06	B5-B11	B5-B11	B5-B11	B5-B11
9,94	B5-B11	B5-B11	B5-B11	B5-B11
11,61	B5-B11	B5-B11	B5-B11	B5-B11
12,75	B5-B11	B5-B11	B5-B11	B5-B11
14,04	B5-B11	B5-B11	B5-B11	B5-B11
15,43	B5-B11	B5-B11	B5-B11	B5-B11
15,73	B5-B11	B5-B11	B5-B11	B5-B11
17,29	B5-B11	B5-B11	B5-B11	B5-B11
19,03	B5-B11	B5-B11	B5-B11	B5-B11
20,14	B5-B11	B5-B11	B5-B11	B5-B11
22,13	B5-B11	B5-B11	B5-B11	B5-B11
24,00	B5-B11	B5-B11	B5-B11	B5-B11
26,05	B5-B11	B5-B11	B5-B11	B5-B11
27,29	B5-B11	B5-B11	B5-B11	B5-B11
28,67	B5-B11	B5-B11	B5-B11	B5-B11
29,60	B5-B11	B5-B11	B5-B11	B5-B11
31,78	B5-B11	B5-B11	B5-B11	B5-B11
34,91	B5-B11	B5-B11	B5-B11	B5-B11
35,50	B5-B11	B5-B11	B5-B11	
40,05	B5-B11	B5-B11	B5-B11	B5-B11
43,05	B5-B11	B5-B11	B5-B11	B5-B11
50,25	B5-B11	B5-B11	B5-B11	
54,27	B5-B11	B5-B11	B5-B11	
61,98	B5-B11	B5-B11	B5-B11	

CS - S - PS 083				
i	071	080	090	100-112
67,52		B5-B11	B5-B11	B5-B11
74,18		B5-B11	B5-B11	B5-B11
81,71		B5-B11	B5-B11	B5-B11
91,49		B5-B11	B5-B11	B5-B11
100,62		B5-B11	B5-B11	B5-B11
117,17	B5-B11	B5-B11	B5-B11	
128,73	B5-B11	B5-B11	B5-B11	
136,34	B5-B11	B5-B11	B5-B11	B5-B11
158,76	B5-B11	B5-B11	B5-B11	
184,88	B5-B11	B5-B11	B5-B11	
203,11	B5-B11	B5-B11	B5-B11	
205,34	B5-B11	B5-B11	B5-B11	B5-B11
226,04	B5-B11	B5-B11	B5-B11	B5-B11
250,50	B5-B11	B5-B11	B5-B11	
266,13	B5-B11	B5-B11	B5-B11	
292,36	B5-B11	B5-B11	B5-B11	
315,73	B5-B11	B5-B11	B5-B11	
360,58	B5-B11	B5-B11	B5-B11	

2.6 MOTOR FLANGE AVAILABILITY

CS - S - PS 102					
i	080	090	100-112	132	160
8,06	B5-B11	B5-B11	B5-B11	B5-B11	B5
8,85	B5-B11	B5-B11	B5-B11	B5-B11	B5
10,88	B5-B11	B5-B11	B5-B11	B5-B11	B5
12,75	B5-B11	B5-B11	B5-B11	B5-B11	B5
13,99	B5-B11	B5-B11	B5-B11	B5-B11	B5
15,43	B5-B11	B5-B11	B5-B11	B5-B11	
17,21	B5-B11	B5-B11	B5-B11	B5-B11	B5
19,00	B5-B11	B5-B11	B5-B11	B5-B11	
20,83	B5-B11	B5-B11	B5-B11	B5-B11	
22,13	B5-B11	B5-B11	B5-B11	B5-B11	
24,28	B5-B11	B5-B11	B5-B11	B5-B11	
26,33	B5-B11	B5-B11	B5-B11	B5-B11	
29,87	B5-B11	B5-B11	B5-B11	B5-B11	
32,40	B5-B11	B5-B11	B5-B11	B5-B11	
34,91	B5-B11	B5-B11	B5-B11	B5-B11	
38,30	B5-B11	B5-B11	B5-B11	B5-B11	
42,53	B5-B11	B5-B11	B5-B11	B5-B11	
44,00	B5-B11	B5-B11	B5-B11		
47,13	B5-B11	B5-B11	B5-B11	B5-B11	
50,25	B5-B11	B5-B11	B5-B11		
55,14	B5-B11	B5-B11	B5-B11		
59,40	B5-B11	B5-B11	B5-B11		
67,84	B5-B11	B5-B11	B5-B11		

CS - S - PS 103				
i	071	080	090	100-112
74,18		B5-B11	B5-B11	B5-B11
81,39		B5-B11	B5-B11	B5-B11
89,77		B5-B11	B5-B11	B5-B11
100,15		B5-B11	B5-B11	B5-B11
110,55	B5-B11	B5-B11	B5-B11	B5-B11
121,29	B5-B11	B5-B11	B5-B11	B5-B11
128,73	B5-B11	B5-B11	B5-B11	B5-B11
141,24	B5-B11	B5-B11	B5-B11	B5-B11
173,78	B5-B11	B5-B11	B5-B11	B5-B11
188,51	B5-B11	B5-B11	B5-B11	B5-B11
203,11	B5-B11	B5-B11	B5-B11	B5-B11
222,85	B5-B11	B5-B11	B5-B11	B5-B11
224,76	B5-B11	B5-B11	B5-B11	B5-B11
274,20	B5-B11	B5-B11	B5-B11	B5-B11
280,89	B5-B11	B5-B11	B5-B11	
292,36	B5-B11	B5-B11	B5-B11	
320,79	B5-B11	B5-B11	B5-B11	
345,60	B5-B11	B5-B11	B5-B11	
394,69	B5-B11	B5-B11	B5-B11	

CS - S - PS 122							
i	080	090	100-112	132	160	180	200
8,48					B5	B5	B5
9,30					B5	B5	B5
10,24					B5	B5	B5
11,42					B5	B5	B5
12,63					B5	B5	B5
13,84					B5	B5	B5
16,99					B5	B5	B5
21,25			B5-B11	B5-B11	B5	B5	
22,37			B5-B11	B5-B11	B5	B5	
23,29			B5-B11	B5-B11	B5	B5	
26,15			B5-B11	B5-B11	B5	B5	
28,60			B5-B11	B5-B11	B5	B5	
30,51			B5-B11	B5-B11	B5	B5	
32,76			B5-B11	B5-B11	B5	B5	
33,44			B5-B11	B5-B11	B5	B5	
35,20			B5-B11	B5-B11	B5	B5	
41,07			B5-B11	B5-B11	B5	B5	
43,60	B5-B11	B5-B11	B5-B11	B5-B11			
44,63	B5-B11	B5-B11	B5-B11	B5-B11			
49,04	B5-B11	B5-B11	B5-B11	B5-B11			
53,75	B5-B11	B5-B11	B5-B11	B5-B11			
66,00	B5-B11	B5-B11	B5-B11	B5-B11			

CS - S - PS 123				
i	080	090	100-112	132
64,84			B5-B11	B5-B11
71,07			B5-B11	B5-B11
78,46			B5-B11	B5-B11
87,27			B5-B11	B5-B11
105,91			B5-B11	B5-B11
112,52	B5-B11	B5-B11	B5-B11	B5-B11
123,33	B5-B11	B5-B11	B5-B11	B5-B11
130,04	B5-B11	B5-B11	B5-B11	B5-B11
133,78	B5-B11	B5-B11	B5-B11	B5-B11
151,43	B5-B11	B5-B11	B5-B11	B5-B11
177,53	B5-B11	B5-B11	B5-B11	B5-B11
194,59	B5-B11	B5-B11	B5-B11	B5-B11
215,60	B5-B11	B5-B11	B5-B11	B5-B11
238,93	B5-B11	B5-B11	B5-B11	B5-B11
# 255,54	B5-B11	B5-B11	B5-B11	
# 280,10	B5-B11	B5-B11	B5-B11	
# 301,16	B5-B11	B5-B11	B5-B11	
# 343,93	B5-B11	B5-B11	B5-B11	

2.6 MOTOR FLANGE AVAILABILITY

S142				
i	132	160	180	200
4.11	B5	B5	B5	B5
4.58	B5	B5	B5	B5
5.14	B5	B5	B5	B5
5.81	B5	B5	B5	B5
6.21	B5	B5	B5	B5
7.31	B5	B5	B5	B5
8.20	B5	B5	B5	B5
9.28	B5	B5	B5	B5
9.91	B5	B5	B5	B5
11.40	B5	B5	B5	B5
12.81	B5	B5	B5	B5
14.27	B5	B5	B5	B5
16.00	B5	B5	B5	B5
18.10	B5	B5	B5	B5
19.33	B5	B5	B5	B5
22.24	B5	B5	B5	B5
25.26	B5	B5	B5	
28.33	B5	B5	B5	
32.05	B5	B5	B5	
34.22	B5	B5	B5	
39.37	B5	B5		

S143			
i	100 - 112	132	160
45.76	B5	B5	B5
50.97	B5	B5	B5
57.17	B5	B5	B5
64.67	B5	B5	B5
69.05	B5	B5	B5
79.45	B5	B5	B5
98.80	B5	B5	
110.05	B5	B5	
123.43	B5	B5	
139.64	B5	B5	
149.09	B5	B5	
157.48	B5		
171.54	B5	B5	
175.40	B5		
196.73	B5		
222.56	B5		
237.62	B5		
273.41	B5		

S152				
i	160	180	200	225
4.06	B5	B5	B5	B5
4.53	B5	B5	B5	B5
5.20	B5	B5	B5	B5
5.71	B5	B5	B5	B5
6.52	B5	B5	B5	B5
7.28	B5	B5	B5	B5
8.35	B5	B5	B5	B5
9.17	B5	B5	B5	B5
10.41	B5	B5	B5	B5
12.46	B5	B5	B5	B5
13.90	B5	B5	B5	B5
15.96	B5	B5	B5	B5
17.52	B5	B5	B5	B5
19.90	B5	B5	B5	B5
22.88	B5	B5	B5	B5
27.10	B5	B5	B5	B5
29.75	B5	B5	B5	B5
33.79	B5	B5	B5	B5
38.84	B5	B5	B5	B5

S153			
i	132	160	180
40.10	B5	B5	B5
44.75	B5	B5	B5
51.37	B5	B5	B5
56.39	B5	B5	B5
64.05	B5	B5	B5
73.62	B5	B5	B5
87.16	B5	B5	
97.27	B5	B5	
111.66	B5	B5	
122.56	B5	B5	
139.20	B5	B5	
154.01	B5		
160.01	B5		
176.81	B5		
194.05	B5		
220.41	B5		
253.35	B5		

2.7 OUTPUT SHAFT BEARINGS

S	S050		S060		S080		S100	
Versions	Standard	On request	Standard	On request	Standard	On request	Standard	On request
C	1	/	1	2	1 (Ø40)	2 (Ø40)	1	2
D	1	/	1	/	2	/	2	/
L	1	/	1	/	1	/	1	/

S	S125		S140		S150	
Versions	Standard	On request	Standard	On request	Standard	On request
C	1	2	1	2	1	2
D	2	/	2	/	2	/
L	1	/	1	/	1	/

1 - Ball Bearing

2 - Roller bearings

/ - Not available

2.8.1 Information

The value of the admissible radial load [N] is given in the tables relating to the performance of the gear reducer at issue. It is related to the load applied on the centre line of the shaft and in the most unfavourable conditions of angle of application and direction of rotation. The maximum admissible axial loads are 1/5 of the value of the given radial load when they are applied in combination with the radial load. The tables relating to the output shafts give the maximum admissible value. This value must never be exceeded since it relates to the strength of the case. Particular conditions of radial load higher than the limits of the catalogue may occur. In this case, call our Technical Service and provide details on the application: direction of the load, direction of rotation of the shaft, type of service. In case of double extension shafts with radial load applied on both ends, the max. admissible radial loads must be defined according to the specific running conditions, in this case call our Technical Service. The radial load on the shaft is calculated with the following formula:

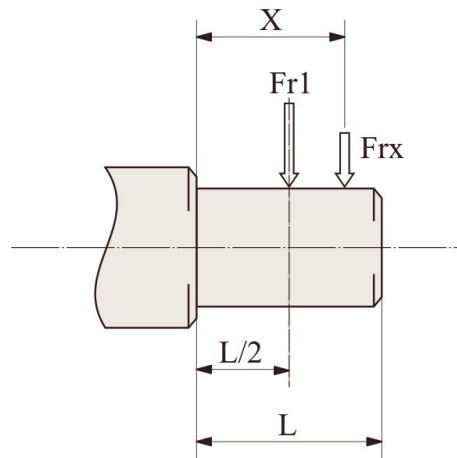
$$Fr_e = (2000 \cdot M \cdot fz) / D \leq Fr1 \text{ or } Fr2$$

- **Fr_e** [N] Resulting radial load
- **M** [Nm] Torque on the shaft
- **D** [mm] Diameter of the transmission member mounted on the shaft
- **Fr1-Fr2** [N] Value of the maximum admitted radial load (see relative tables)
- **fz** = 1,1 gear pinion - 1,4 chain wheel - 1,7 v-pulley - 2,5 flat pulley

2.8.2 Input

When the radial load is not on the centre line of the shaft, it is necessary to adjust the admissible radial load Fr1 with the following formula: $Fr_x = (Fr1 \cdot a) / (b + x)$

- **a**, **b** = values given in the tables
- **x** = distance from the point of application of the load to the shaft shoulder



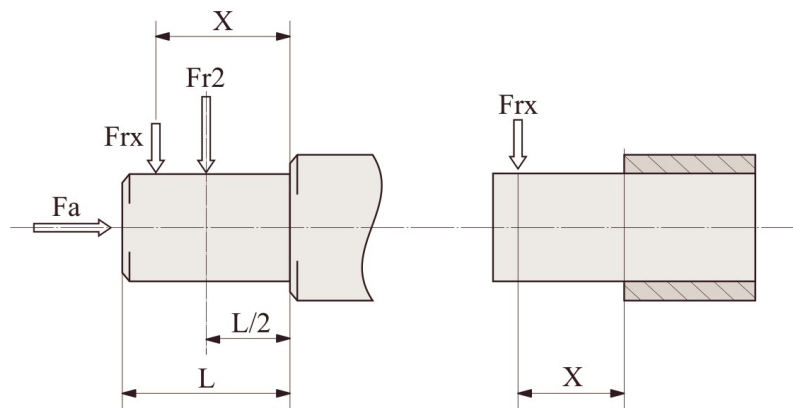
IS	052/053	062/063	082/083	102/103	122/123	142/143	152/153
a	105	105	137	137	175	146	190
b	80	80	108	108	135	106	135
Fr1 max(**)	1500	2500	3600	3600	7200	4200	5200

(**Fr1 max) Max admissible value of the reducer in static conditions and/or for limited operations. For continuous overhung loads please check the values on the performances tables calculated according to the casing, the shaft and bearings.

2.8.3 Output

When the radial load is not on the centre line of the shaft, it is necessary to adjust the admissible radial load Fr_2 with the following formula: $Fr_x = (Fr_2 \cdot a) / (b + x)$

- a , b = values given in the tables
- x = distance from the point of application of the load to the shaft shoulder



S	052/053	062/063	082/083	102/103	122/123	142/143	152/153
a	125	145	190	225	265	360,5	409,5
b	96	116	150	175	202	261	299
D (Fr_2 max ^{**})	6000	10000	18000	22000	30000	35000	40000
C (Fr_2 max ^{**})	6000	4000	7200	9000	11200	18500	19400

(** Fr_2 max) Max admissible value of the reducer in static conditions and/or for limited operations. For continuous overhung loads please check the values on the performances tables calculated according to the casing, the shaft and bearings.

2.9.1 Information

In cases of ambient temperatures not envisaged in the table, call our Technical Service. In the case of temperatures under -30°C or over 60°C it is necessary to use oil seals with special properties. For operating ranges with temperatures under 0°C it is necessary to consider the following:

1. The motors need to be suitable for operation at the envisaged ambient temperature.
2. The power of the electric motor needs to be adequate for exceeding the higher starting torques required.
3. In case of cast-iron gear reducers, pay attention to impact loads since cast iron may have problems of fragility at temperatures under -15°C .
4. During the early stages of service, problems of lubrication may arise due to the high level of viscosity taken on by the oil and so it is wise to have a few minutes of rotation under no load.

Oil (NON Atex products) must be changed after approx. 10000 hours/2 years of operation; this time varies based on the type of service and on the environment inside which the gear reducer is installed. Units not featuring any oil plug are life-lubricated, and therefore maintenance-free.

2.9.2 Lubricants

Specifications of lubricants recommended by Motovario.

The units **S052/3 ÷ 102/3** are supplied with ENI BLASIA 220 oil, unless otherwise specified by the client.

The units **S122/3 ÷ 152/3** are supplied without lubricant.

	S052/3 ÷ 152/3	
	Mineral oil	
$T_{\text{amb}}^{\circ}\text{C}$ ISO	(-5) ÷ (+40) ISO VG220	(-15) ÷ (+25) ISO VG150
ENI	BLASIA 220	BLASIA 150
SHELL	OMALA S2 G 220	OMALA S2 G 150
KLUBER	Kluberoil GEM 1-220N	Kluberoil GEM 1-150N
MOBIL	MOBILGEAR 600 XP220	MOBILGEAR 600 XP150
CASTROL	ALPHA SP 220	ALPHA SP 150
BP	ENERGOL GR-XP220	ENERGOL GR-XP150

2.9.3 Special lubricants

	T _{amb} °C	Polyglycol synthetic oil
ENI	(-30) ÷ (+30)	Blasia S 150 (ISO VG150)
	(-20) ÷ (+40)	Blasia S 220 (ISO VG220)
MOBIL	(-45) ÷ (+0)	SCH 624 (ISO VG32)
	(-40) ÷ (+5)	SCH 626 (ISO VG68)
KLUBER	(-40) ÷ (+5)	Klubersynth GH 6-32 (ISO VG32)
	(-35) ÷ 10)	Klubersynth GH 6-80 (ISO VG80)
	(-30) ÷ (+40)	Klubersynth GH 6-150 (ISO VG150)
	(-25) ÷ (+40)	Klubersynth GH 6-220 (ISO VG220)
	(-15) ÷ (+50)	Klubersynth GH 6-460 (ISO VG460)
	(-10) ÷ (+70)	Klubersynth GH 6-680 (ISO VG680)
	T _{amb} °C	Polyglycol synthetic oil for food grade
KLUBER	(-30) ÷ (+15)	Klubersynth UH1-6 100 (ISO VG100)
	(-25) ÷ (+40)	Klubersynth UH1-6 220 (ISO VG220)
	(-15) ÷ (+40)	Klubersynth UH1-6 320 (ISO VG320)
	(-15) ÷ (+50)	Klubersynth UH1-6 460 (ISO VG460)
	(-10) ÷ (+50)	Klubersynth UH1-6 680 (ISO VG680)

If 'special' lubricant is required please contact for Technical Assistance.

2.9.4 Quantity

- For the gear reducers S ... series with 2, 3 stages it is always necessary to specify the envisaged position.
- The gear S... series with 2, 3 stages sizes 050, 060 gear reducers are supplied complete with lubricant, have no oil plugs and need no maintenance.
- The gear S... series with 2, 3 stages sizes 080, 100 gear reducers are supplied complete with lubricant and are fitted with oil plugs to suit any mounting position included in the catalogue
- The gear S... series with 2, 3 stages sizes 125, 140, 150 have no lubricant and are fitted with oil plugs to suit any mounting position included in the catalogue. The oil filling can be done on request, in this case it is recommended, after installation, to replace the closed plug used for transportation with the supplied breather plug. When the reduction unit is supplied without lubricant, it is provided with a label to be filled.

Oil quantity in the table (litres ~) are indicative; for a proper use you will have to refer to the level plug or the dipstick. Any level difference could depend on construction tolerances, but also by the placement of the unit or by the mounting surface at the customer's premises. It is appropriate to check and, if necessary, restores the level when the units are installed.

S - CS	052/053	062/063	082/083	102/103	122/123	142	143	152	153
B3	2,05	2,4	6	9	14,7	22	20	29,7	27
B8	1,8	2,3	4	6	11,8	20	20	31	31
B6	2,4	2,9	5,7	8	16	22 (25)	18 (24,5)	29,3 (42)	24 (40)
B7	2,1	2,6	4,5	6,8	11,3	17,5	14	22,5	18
V5	2,8	3,5	6,8	10,3	19	24,5	23,5	34,4	33
V6	2,4	2,9	6,4	9,9	18	20,8	20	33,3	32

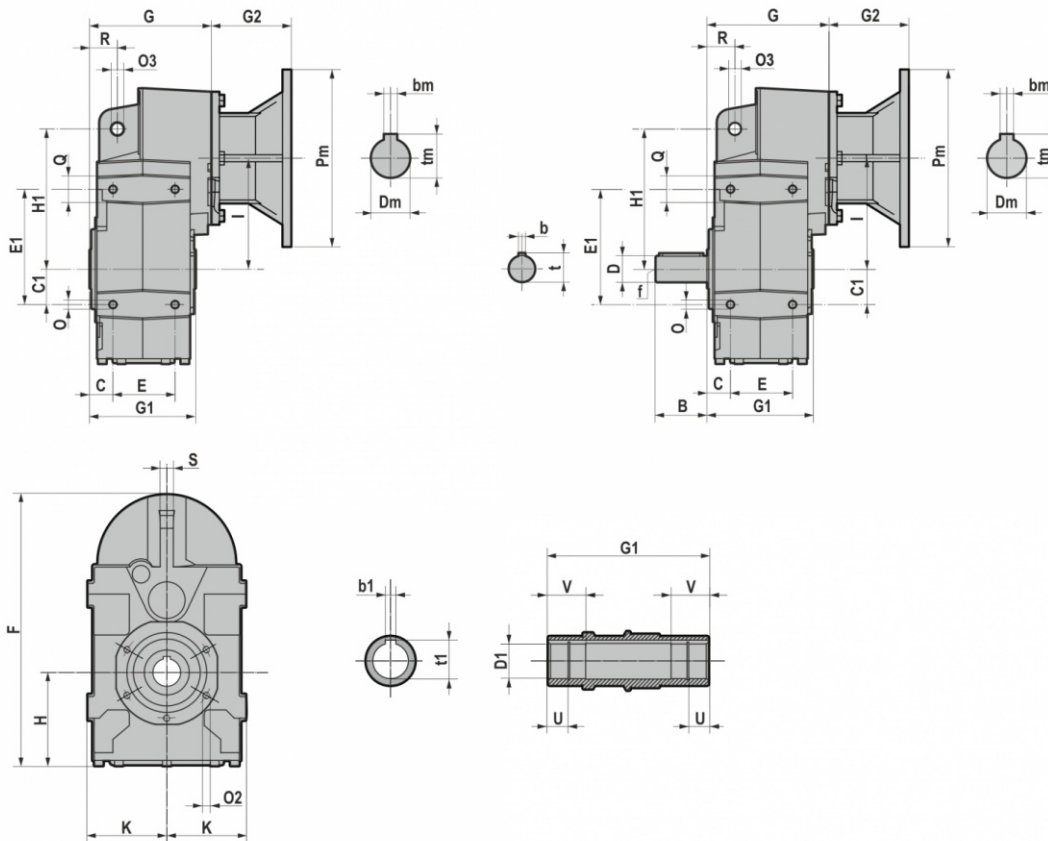
(...) 142-143-152-153 quantity of oil [l] for gearbox with backstop device

2.10 MOMENTS OF INERTIA

The following values of J1 moment of inertia are only estimated, referred to the maximum calculated, and to the gearbox input side.

S-2/3	J ₁ [Kg*m ²]
052/053	0,0004
062/063	0,0006
082/083	0,0015
102/103	0,0034
122/123	0,0085
142/143	0,0384
152/153	0,0830

3.1.1 S 052...123

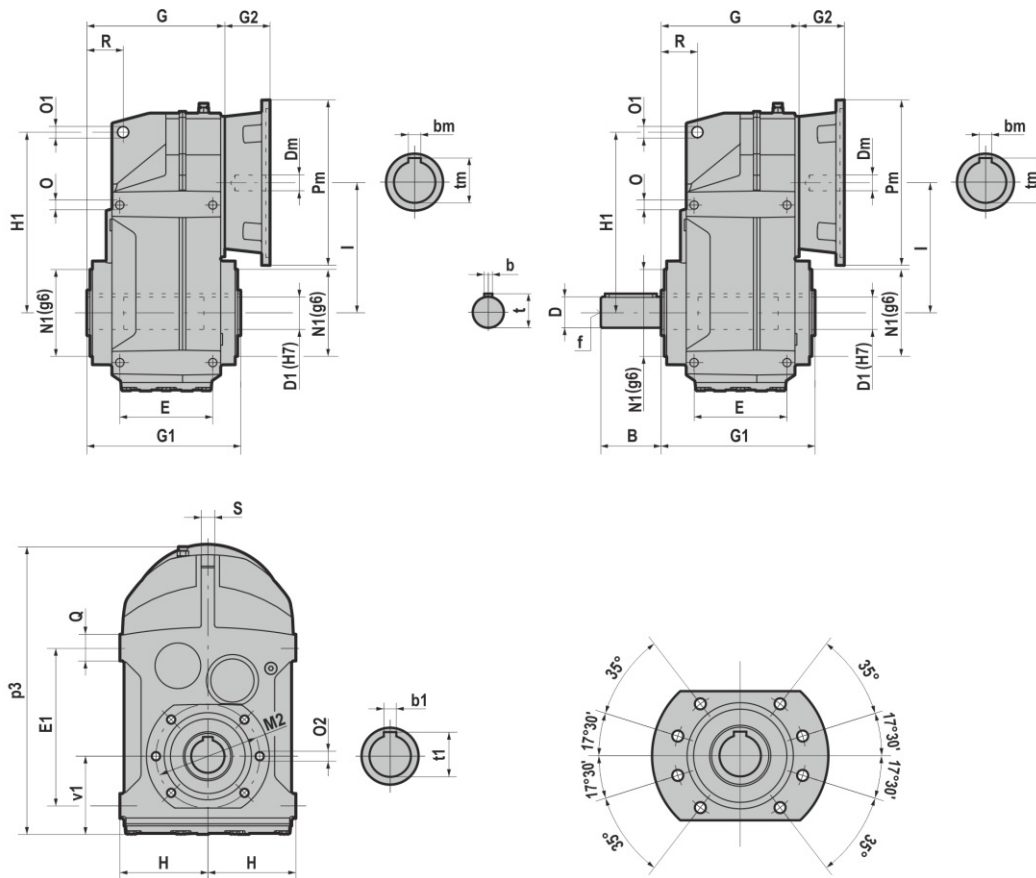


	D1 H7	b1	t1	U	V	B	D	b	t	f	C	C1	E	E1	F	G	G1	H	H1	I	K	O	O3	O2	Q	R	S
S052/S053	30	8	33	13,8	30	58	30 j6	8	33	M10	27	40	70	130	311	137,5	120	107	158	125	90,5	M10x18	14	M8x16 (n.5)	30	31,5	15
S062/S063	35	10	38	12	35	58	35 j6	10	38	M12	30	45	80	147	320	158,5	140	97	170	143	96,5	M12x20	14	M8x16 (n.5)	40	32	15
S082/S083	40	12	43	22,3	42	80	40 k6	12	43	M16	37	60	106	190	383	207	180	107	218	170	112,5	M12x20	14	M10x20 (n.7)	44	41	20
S102/S103	45	14	49	22,3	50	100	50 k6	14	54	M16	37	70	137	275	426	217,5	210	119	278	180	130	M16x26	22	M12x22 (n.7)	50	50	20
S122/S123	55	16	59,3	28	70	120	60 m6	18	64	M20	43	100	165	310	558	257	240	166	346	235	165	M16x30	22	M14x28 (n.7)	50	62	26
	60	18	64																								

IEC	Pm x Dm	G2				
		S052/S053	S062/S063	S082/S083	S102/S103	S122/S123
063	140x11	57	/	/	/	/
071	160x14	69	69	49	49	/
080	200x19	90	90	70	70	60,5
090	200x24	90	90	70	70	60,5
100-112	250x28	105	105	85	85	75,5
132	300x38	/	/	110	110	100,5
160	350x42	/	/	/	157,5	148
180	350x48	/	/	/	/	148
200	400x55	/	/	/	/	185

B5	Pm	Dm	bm	tm
063	140	11	4	12,8
071	160	14	5	16,3
080	200	19	6	21,8
090	200	24	8	27,3
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3
180	350	48	14	51,8
200	400	55	16	59,3

3.1.2 S 142...153



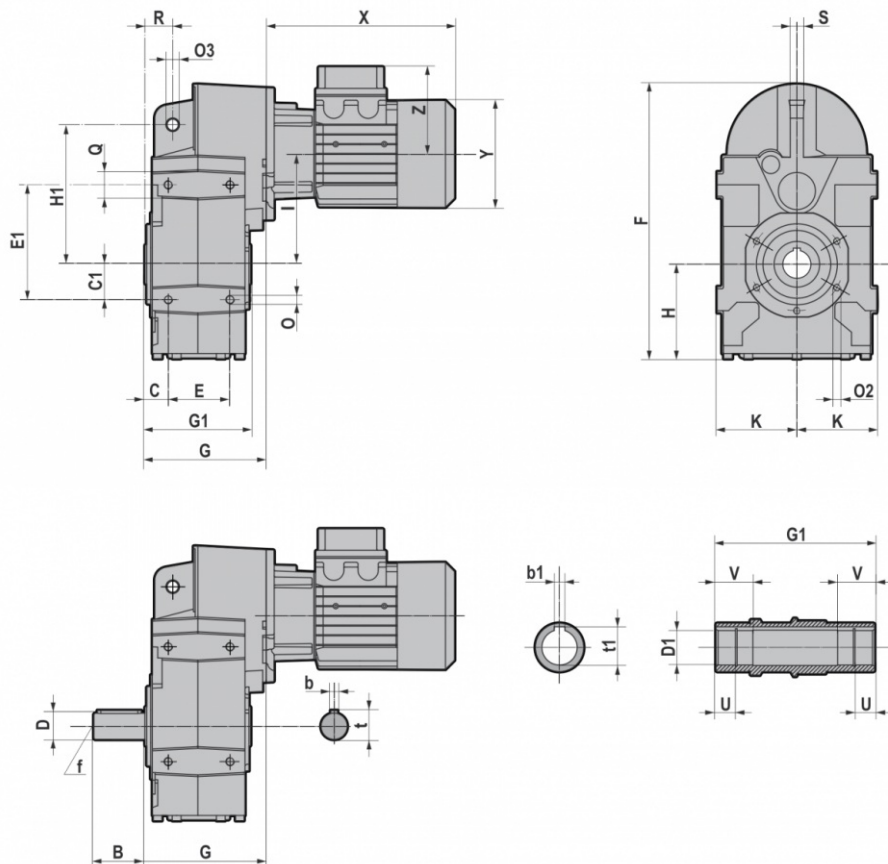
	D1	b1	t1	B	D	b	t	f	E	E1	G	G1	H	H1	I	N1	M2	O	O1	O2	p3	Q	R	S	v1
S142/S143	70	20	74,9	140	70	20	74,5	M20	205	350	282	300	200	395	269	180	220	M20x28	26	M16x26	615	50	70	30	177
	65	18	69,4																						
S152/S153	80	2522	85,4	170	90	25	95	M20	220	400	321,5	350	225	485	325	210	260	M24x36	26	M20x30	730	60	88	36	213
	90	2225	95,4																						

IEC	Pm x Dm	G2	
		S142/S143	S152/S153
100-112	250x28	73,5	/
132	300x38	84,0	87,5
160	350x42	119,5	112
180	350x48	119,5	112
200	400x55	119,5	113
225	450x60	/	144,5

B5	Pm	Dm	bm	tm
100	250	28	8	31,3
112	250	28	8	31,3
132	300	38	10	41,3
160	350	42	12	45,3
180	350	48	14	51,8
200	400	55	16	59,3
225	450	60	18	64,4

3.1 REDUCERS/GEARED MOTORS

3.1.3 CS 052...123



	D1 H7	b1	t1	U	V	B	D	b	t	f	C	C1	E	E1
CS052/CS053	30	8	33	13,8	30	58	30 j6	8	33	M10	27	40	70	130
CS062/CS063	35	10	38	12	35	58	35 j6	10	38	M12	30	45	80	147
CS082/CS083	40	12	43	22,3	42	80	40 k6	12	43	M16	37	60	106	190
	45	14	48	22,3	42									
CS102/CS103	45	14	49	22,3	50	100	50 k6	14	54	M16	37	70	137	275
	50	14	54	25	50									
CS122/CS123	55	16	59,3	28	70	120	60 m6	18	64	M20	43	100	165	310
	60	18	64											

	F	G	G1	H	H1	I	K	O	O3	O2	Q	R	S
CS052/CS053	311	137,5	120	107	158	125	90,5	M10x18	14	M8x16 (n.5)	30	31,5	15
CS062/CS063	320	158,5	140	97	170	143	96,5	M12x20	14	M8x16 (n.5)	40	32	15
CS082/CS083	383	207	180	107	218	170	112,5	M12x20	14	M10x20 (n.7)	44	41	20
CS102/CS103	426	217,5	210	119	278	180	130	M16x26	22	M12x22 (n.7)	50	50	20
CS122/CS123	558	257	240	166	346	235	165	M16x30	22	M14x28 (n.7)	50	62	26

3.1 REDUCERS/GEARED MOTORS

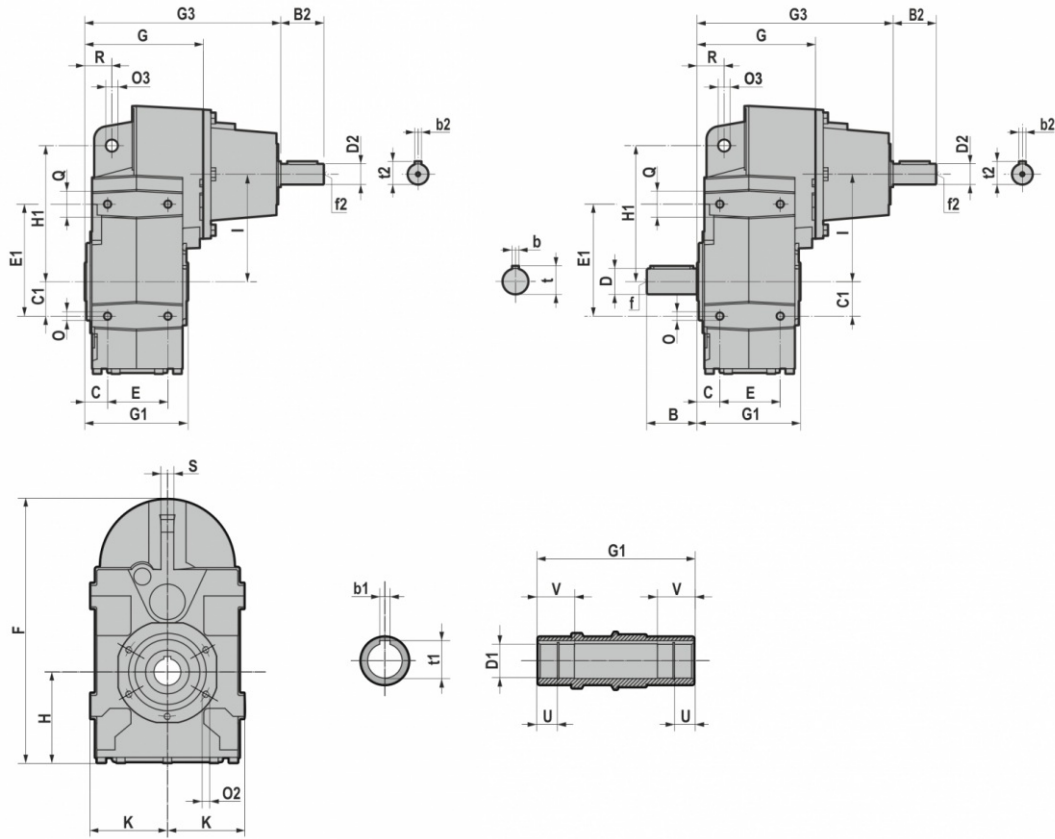
T (IE1 - IE2 - IE3)										
		063	071	080	090S	090L	100	112	132S	132M/L
CS052/CS053 CS062/CS063	X	215	241	268 *(291)	296 *(329)	321 *(354)	333	351 *(375)	/	/
	Y	121	139	158	173	173	191	211	/	/
	Z	104	112	122	130	130	139	154	/	/
CS082/CS083 CS102/CS103	X	/	221	248 *(271)	276 *(309)	301 *(334)	335	356 *(380)	405	443
	Y	/	139	158	173	173	191	211	249	249
	Z	/	112	122	130	130	139	154	194	194
CS122/CS123	X	/	/	/	267 *(300)	292 *(325)	326	347 *(371)	396	434
	Y	/	/	/	173	173	191	211	249	249
	Z	/	/	/	130	130	139	154	194	194

TB (IE1 - IE2 - IE3)										
		063	071	080	090S	090L	100	112	132S	132M/L
CS052/CS053 CS062/CS063	X	273	306,5	341 *(364)	373 *(406)	398 *(431)	415	448 *(472)	/	/
	Y	121	139	158	173	173	191	211	/	/
	Z	119	129	137	157	157	168	183	/	/
CS082/CS083 CS102/CS103	X	/	286,5	321 *(344)	353 *(386)	378 *(411)	417	453 *(477)	505	547
	Y	/	139	158	173	173	191	211	249	249
	Z	/	129	137	157	157	168	183	230	230
CS122/CS123	X	/	/	/	343 *(376)	368 *(401)	407	443 *(467)	495	537
	Y	/	/	/	173	173	191	211	249	249
	Z	/	/	/	157	157	168	183	230	230

*TP80B4, TP90S4, TP90L4, TP90S6, TP112M4, TP112M6

3.1 REDUCERS/GEARED MOTORS

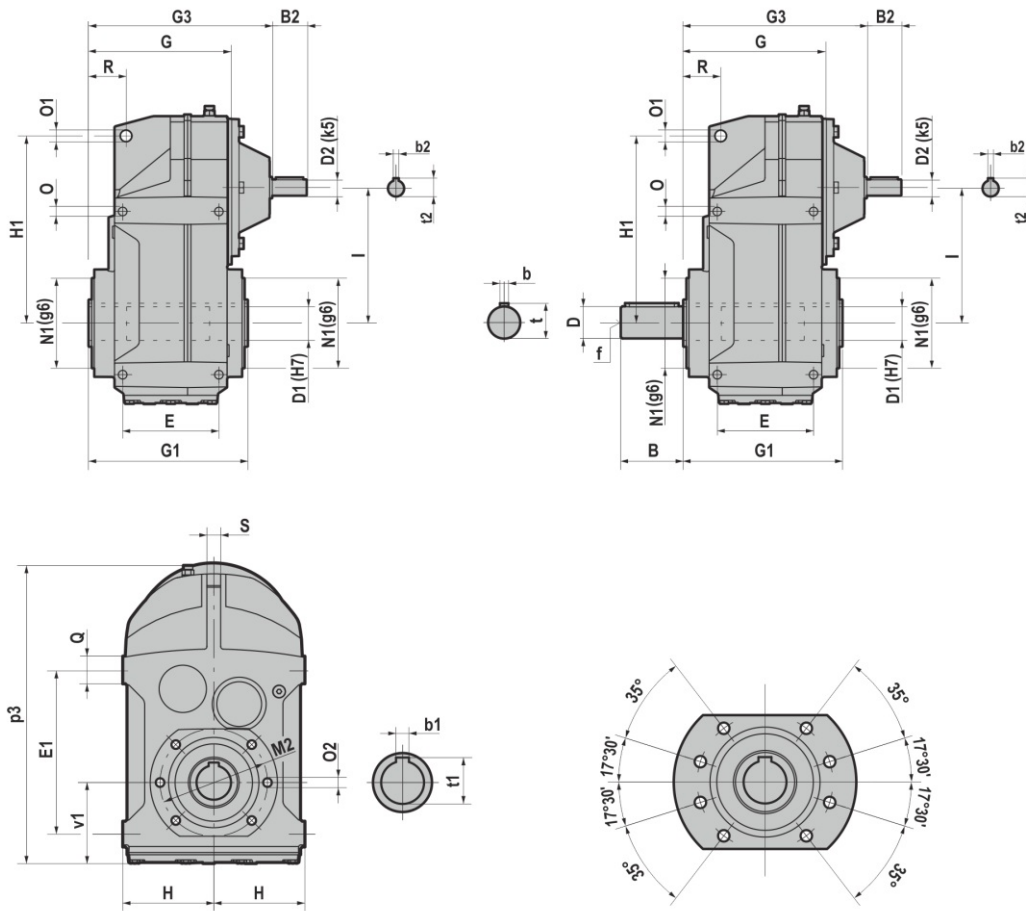
3.1.4 IS 052...123



	D1 H7	b1	t1	U	V	B	D	b	t	f	C	C1	E	E1	F	G	G1	H	H1	I	K	O	O3	O2	Q	R	S
IS052/IS053	30	8	33	13,8	30	58	30 j6	8	33	M10	27	40	70	130	311	137,5	120	107	158	125	90,5	M10x18	14	M8x16 (n.5)	30	31,5	15
IS062/IS063	35	10	38	12	35	58	35 j6	10	38	M12	30	45	80	147	320	158,5	140	97	170	143	96,5	M12x20	14	M8x16 (n.5)	40	32	15
IS082/IS083	40 45	12 14	43 48	22,3 22,3	42 42	80	40 k6	12 12	43 43	M16	37 37	60 60	106 190	190 383	207	180	107	218	170	112,5	M12x20	14	M10x20 (n.7)	44	41	20	
IS102/IS103	45 50	14 14	49 54	22,3 25	50 50	100	50 k6	14 14	54 54	M16	37 37	70 70	137 275	275 426	426	217,5	210	119	278	180	130	M16x26	22	M12x22 (n.7)	50	50	20
IS122/IS123	55 60	16 18	59,3 64	28	70	120	60 m6	18 18	64 64	M20	43 43	100 100	165 310	310 558	558	257	240	166	346	235	165	M16x30	22	M14x28 (n.7)	50	62	26

	G3	B2	D2	b2	t2	f2
IS052/IS053	227,5	50	24 j6	8	27	M8
IS062/IS063	248,5	50	24 j6	8	27	M8
IS082/IS083	320	60	28 j6	8	31	M10
IS102/IS103	330,5	60	28 j6	8	31	M10
IS122/IS123	383,5	80	38 k6	10	41	M12

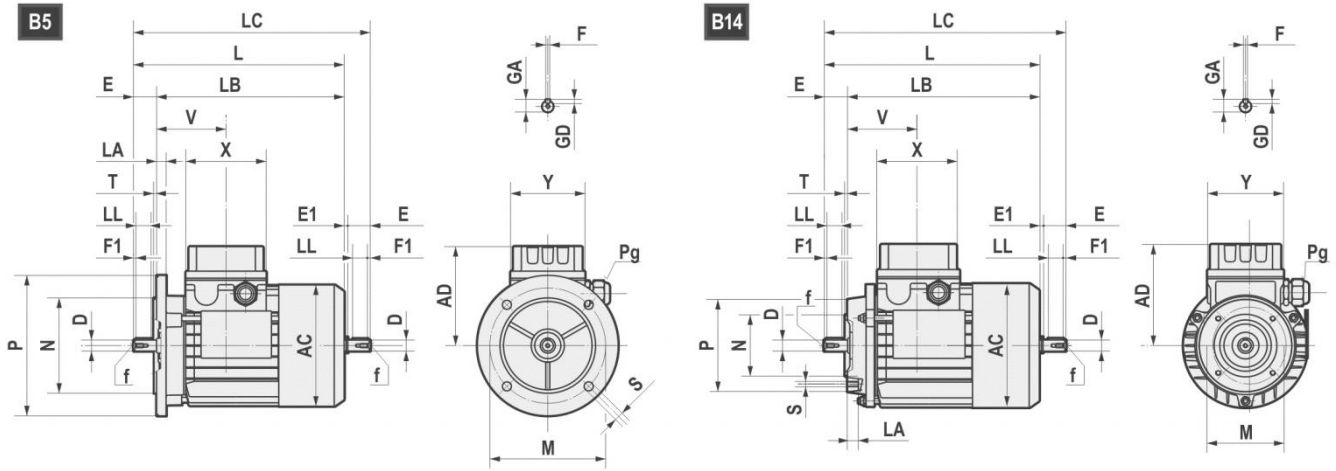
3.1.5 IS 142...153



	D1	b1	t1	B	D	b	t	f	E	E1	G	G1	H	H1	I	N1	M2	O	O1	O2	p3	Q	R	S	v1
IS142/IS143	70	20	74,9	140	70	20	74,5	M20	205	350	282	300	200	395	269	180	220	M20x28	26	M16x26	615	50	70	30	177
	65	18	69,4																						
IS152/IS153	80	22	85,4	170	90	25	95	M20	220	400	321,5	350	225	485	325	210	260	M24x36	26	M20x30	730	60	88	36	213
	90	25	95,4																						

	G3	D2	B2	b2	t2
IS142/IS143	362	38	80	10	41
IS152/IS153	422	42	110	12	45

3.2.1 Electric motors



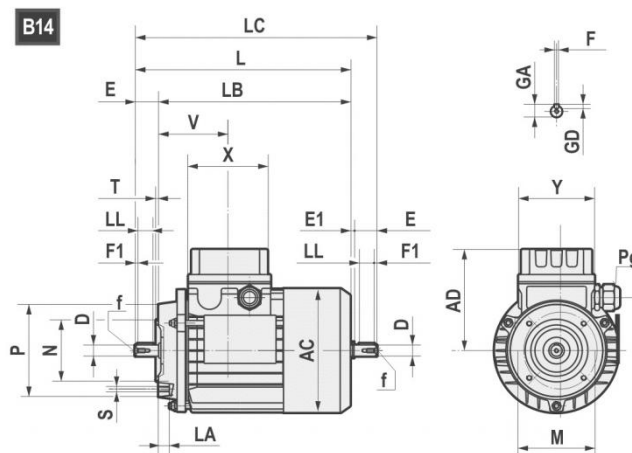
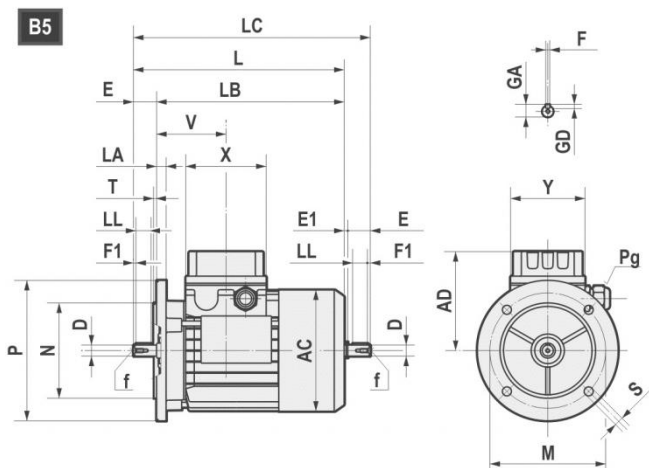
	AC	AD	L	LB	LC	X	Y	V	D	E	E1	f	F1	GA	F	GD
63	121	104	211	188	235,5	80	74	69	11 j6	23	1,5	M4x10	2,5	12,5	4	4
71	139	112	238,5	208,5	271	80	74	74,5	14 j6	30	2,5	M5x12.5	3	16	5	5
80	158	122	272,5 *(296)	232,5 *(256)	314 *(337)	80	74	78	19 j6	40	1,5	M6x16	5	21,5	6	6
90S	173	146	298 *(331)	248 *(281)	349,5 *(381)	98	98	89,5	24 j6	50	1,5	M8x19	5	27	8	7
90L	173	146	323 *(356)	273 *(306)	374,5 *(408)	98	98	89,5	24 j6	50	1,5	M8x19	5	27	8	7
100	191	155	368	308	431,5	98	98	97,5	28 j6	60	3,5	M10x22	7,5	31	8	7
112	211	170	382,5 *(408)	322,5 *(348)	447 *(472)	98	98	100	28 j6	60	3,5	M10x22	7,5	31	8	7
132S	249	195	452	372	536,5	118	118	115,5	38 k6	80	4	M12x28	10	41	10	8
132L	249	195	490	410	574,5	118	118	115,5	38 k6	80	4	M12x28	10	41	10	8
160S	249	195	520	410	/	118	118	115,5	42k6	100	/	M16x36	10	45	12	8

*TP80B4, TP90S4, TP90L4, TP90S6, TP112M4, TP112M6

B5	M	N	P	LA	S	T
63	115	95	140	10	9	3
71	130	110	160	10	9,5	3,5
80	165	130	200	12	11	3,5
90	165	130	200	12	11	3,5
100	215	180	250	15	14	4
112	215	180	250	14,5	14	4
132	265	230	300	20	14	3,5
160	300	250	350	13	18,5	3,5

B14	M	N	P	LA	S	T
63	75	60	90	10	M5	2,5
71	85	70	105	10,5	M6	2,5
80	100	80	120	10,5	M6	3
90	115	95	140	11,5	M8	3
100	130	110	160	15	M8	3,5
112	130	110	160	11,5	M8	3,5
132	165	130	200	20,5	M10	3,5
160	215	180	250	-	M12	4

3.2 ELECTRIC MOTORS



		AC	AD	L	LB	X	D	E	f	GA	F	GD	LL	Pg	
160M	2-4-6	314	251	600	490	158	42	110	M16	45	12	8	90	2-M40x1,5	1-M16x1,5
160L	2-4-6	314	251	645	535	158	42	110	M16	45	12	8	90	2-M40x1,5	1-M16x1,5
180M	2-4	355	267	680	570	158	48	110	M16	51,5	14	9	100	2-M40x1,5	1-M16x1,5
180L	4-6	355	267	720	610	158	48	110	M16	51,5	14	9	100	2-M40x1,5	1-M16x1,5
200L	2-4-6	397	300	785	675	187	55	110	M20	59	16	10	100	2-M50x1,5	1-M16x1,5
225S	4	446	325	820	680	187	60	140	M20	64	18	11	125	2-M50x1,5	1-M16x1,5
225M	2	446	325	815	705	187	55	110	M20	59	16	10	100	2-M50x1,5	1-M16x1,5
225M	4-6	446	325	845	705	187	60	140	M20	64	18	11	125	2-M50x1,5	1-M16x1,5
250M	2-4-6	485	360	910	770	238	60	140	M20	64	18	11	125	2-M63x1,5	1-M16x1,5
250M	2-4-6	485	360	910	770	238	65	140	M20	69	18	11	125	2-M63x1,5	1-M16x1,5
280S	2-4-6	547	390	970	830	238	65	140	M20	69	18	11	125	2-M63x1,5	1-M16x1,5
280S	2-4-6	547	390	970	830	238	75	140	M20	79,5	20	12	125	2-M63x1,5	1-M16x1,5
280M	2-4-6	547	390	1025	885	238	65	140	M20	69	18	11	125	2-M63x1,5	1-M16x1,5
280M	2-4-6	547	390	1025	885	238	75	140	M20	79,5	20	12	125	2-M63x1,5	1-M16x1,5

B5	M	N	P	LA	S	T
160	300	250	350	13	19	5
180	300	250	350	15	19	5
200	350	300	400	17	19	5
225	400	350	450	20	19	5
250	500	450	550	22	19	5
280	500	450	550	22	19	5

3.2.2 Standard high efficiency (TS), high (TH) and premium (TP) motors

Motovario, three-phase, single polarity motors are available in three different versions (IE1-IE2-IE3) in compliance with standard 60034-30-1 (see table). The efficiency value is calculated according to the method set forth in standard IEC 60034-2-1.

1. IE1: Standard efficiency TS series.
2. IE2: High efficiency TH series
3. IE3: Premium efficiency TP series.

Table of Motovario commercial availability

NOMINAL POWER [kW]	POLES	EFFICIENCY LEVEL		
		IE1	IE2	IE3
$0,09 \leq P_n < 0,75$	2 - 4 - 6	TS-TBS	-	-
$0,75 \leq P_n \leq 11$	2 - 4	TBS	-	-
$0,75 \leq P_n \leq 5,5$	6	TBS	TH-TBH	TP-TBP
$0,75 \leq P_n \leq 9,2$	2 - 4	-	TH-TBH	-
$0,75 \leq P_n \leq 7,5$	2 - 4	-	-	TP-TBP
$7,5 \leq P_n \leq 22$	6	TBS (*)	-	TP
$11 \leq P_n \leq 90$	4	-	-	TP
$15 \leq P_n \leq 37$	2	TBS (*)	-	TP
$15 \leq P_n \leq 55$	4	TBS (*)	-	-

(*) Series available on request.

3.2.3 Nominal power - [kW]

	63A	63B	63C	71A	71B	71C	80A			80B		
Poles	TS	TS	TS	TS	TS	TS	TS	TH	TP	TS	TH	TP
2	0,18	0,25	0,37	0,37	0,55	-	-	0,75	0,75	-	1,1	1,1
4	0,12	0,18	0,22	0,25	0,37	0,55	0,55	-	-	-	0,75	0,75
6	0,09	0,12	0,15	0,18	0,25	0,37	0,37	-	-	0,55	-	-

	90S		90L		100LR	100L	100LA		112MR	112MS	112MA	112M
Poles	TH	TP	TH	TP	TP	TP	TH	TP	TP	TP	TH	TP
2	1,5	1,5	2,2	2,2	-	3	3	-	-	-	4	4
4	1,1	1,1	1,5	1,5	-	-	2,2	2,2	2,2	3	4	4
6	-	0,75	0,75	-	1,1	1,5	1,1	-	-	-	2,2	2,2

	112MR	112MS	132S	132SA	132MS	132SB	132M	132MA		132MB	
Poles	TP	TP	TP	TH	TP	TH	TP	TH	TP	TH	TP
2	-	-	5,5	5,5	-	7,5	7,5	9,2	-	-	-
4	2,2	3	-	5,5	5,5	-	7,5	7,5	-	9,2	-
6	-	-	3	3	-	-	-	4	4	5,5	5,5

	160M	160MA	160MB	160L	160LA	180M	180L
Poles	TP	TP	TP	TP	TP	TP	TP
2	-	11	15	18,5	-	22	-
4	-	11	-	-	15	18,5	22
6	7,5	-	-	11	-	-	15

	200L	200LA	200LB	225S	225M	250M	280S	280M
Poles	TP	TP	TP	TP	TP	TP	TP	TP
2	-	30	37	-	-	-	-	-
4	30	-	-	37	45	55	75	90
6	-	18,5	22	-	-	-	-	-

3.3 WEIGHTS

The values reported in the tables are referred to the weight of the gearbox with lubricant (S140/S150 supplied without lubricant) included.

*Weight without motor.

* S-PS	063	071	080-090	100-112	132	160	180	200	225	
052-053	16	16,4	17	21,2	/	/	/	/	/	- kg
062-063	/	19,9	20,6	24,9	/	/	/	/	/	
082-083	/	32,9	35	37	39,7	/	/	/	/	
102-103	/	44	46	48	50,7	57,4	57,4	/	/	
122-123	/	/	82	84,2	87	93	93	108	/	
142	/	/	/	/	172	180	180	183	/	
143	/	/	/	175	183	190	/	/	/	
152	/	/	/	/	/	255	255	258	264	
153	/	/	/	/	250	270	270	/	/	

IS	- kg
052-053	19,2
062-063	22,7
082-083	39
102-103	50
122-123	91,8
142	155
143	165
152	220
153	240

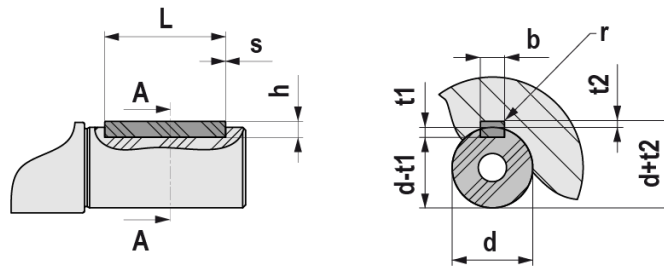
CS	TS									
	063	071	080	090S	090L	100	112	132S	132M	
052-053	19,5	20,4	25,1	29	31	36,5	48	/	/	- kg
062-063	/	23,9	28,7	32,6	34,6	40,1	51,6	/	/	
082-083	/	36,5	41,6	44	45,5	50,6	62	76	87,6	
102-103	/	47,5	52,6	55	56,5	61,6	73	87	98,6	
122-123	/	/	/	91	92	98	108	123	132	

CS	TH							
	080	090S	090L	100	112	132S	132M	
052-053	26,8	31,3	33	38,8	51,1	/	/	- kg
062-063	30,4	34,9	36,6	42,4	54,7	/	/	
082-083	43,3	46,3	47,5	52,9	65,1	81,3	94,4	
102-103	54,3	57,3	58,5	63,9	76,1	92,3	105,4	
122-123	/	93,3	94	100,3	111,1	128,3	138,8	

CS	TBS									
	063	071	080	090S	090L	100	112	132S	132M	
052-053	21	22,6	28,6	34,5	36,5	42	57,7	/	/	- kg
062-063	/	26,2	32,2	38,1	40,1	45,6	61,3	/	/	
082-083	/	38,7	45	49,5	51	56	71,7	86,3	102,3	
102-103	/	49,7	56	60,5	62	67	82,7	97,3	113,3	
122-123	/	/	/	96,5	97,5	103,5	117,7	133,3	146,7	

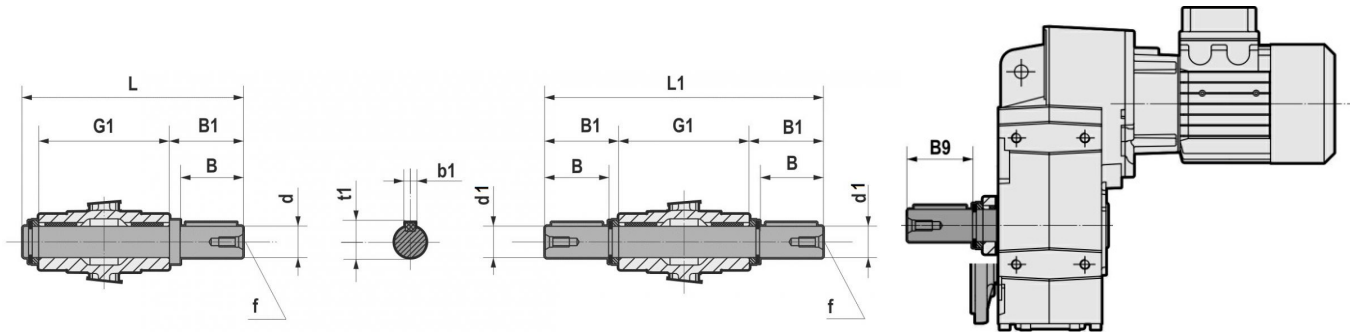
CS	TBH							
	080	090S	090L	100	112	132S	132M	
052-053	30,3	36,8	38,5	45,7	60,8	/	/	- kg
062-063	33,9	40,4	42,1	49,3	64,4	/	/	
082-083	46,7	51,8	53	59,7	74,8	91,6	108,8	
102-103	57,7	62,8	64	70,7	85,8	102,6	119,8	
122-123	/	98,8	99,5	104	120,8	138,6	153,2	

3.4 SHAFT END



UNI 6604 - DIN 6885														
d		b x h			Tol. b/h	L		$\frac{s}{\min / \max}$	b	t1	t2	Tol. t1/t2	r max	
	6	8	2	x	2	h9 / h9	6	20	0,16 0,25	2	1,2	1	0,1 0	0,08 0,16
>	8	10	3	x	3		6	36		3	1,8	1,4		
>	10	12	4	x	4		8	45		4	2,5	1,8		
>	12	17	5	x	5		10	56	0,25 0,4	5	3	2,3		0,16 0,25
>	17	22	6	x	6		14	70		6	3	2,8		
>	22	30	8	x	7		18	90		8	4	3,3		
>	30	38	10	x	8	22	110	0,4 0,6	10	5	3,3	0,25 0,4		
>	38	44	12	x	8	28	140		12	5	3,3			
>	44	50	14	x	9	36	160		14	5,5	3,8			
>	50	58	16	x	10	45	180		16	6	4,3			
>	58	65	18	x	11	50	200		18	7	4,4			
>	65	75	20	x	12	56	110		0,6 0,8	20	7,5		4,9	0,2 0
>	75	85	22	x	14	63	140	22		9	5,4			
>	85	95	25	x	14	70	160	25		9	5,4	0,4 0,6		
>	95	110	28	x	16	80	180	28		10	6,4			
>	110	130	32	x	18	90	200	32		11	7,4			
>	130	150	36	x	20	100	160	1 1,2		36	12	8,4	0,3 0	
>	150	170	40	x	22	110	180		40	13	9,4			
>	170	200	45	x	25	125	200		45	14	10,4	0,7 1		

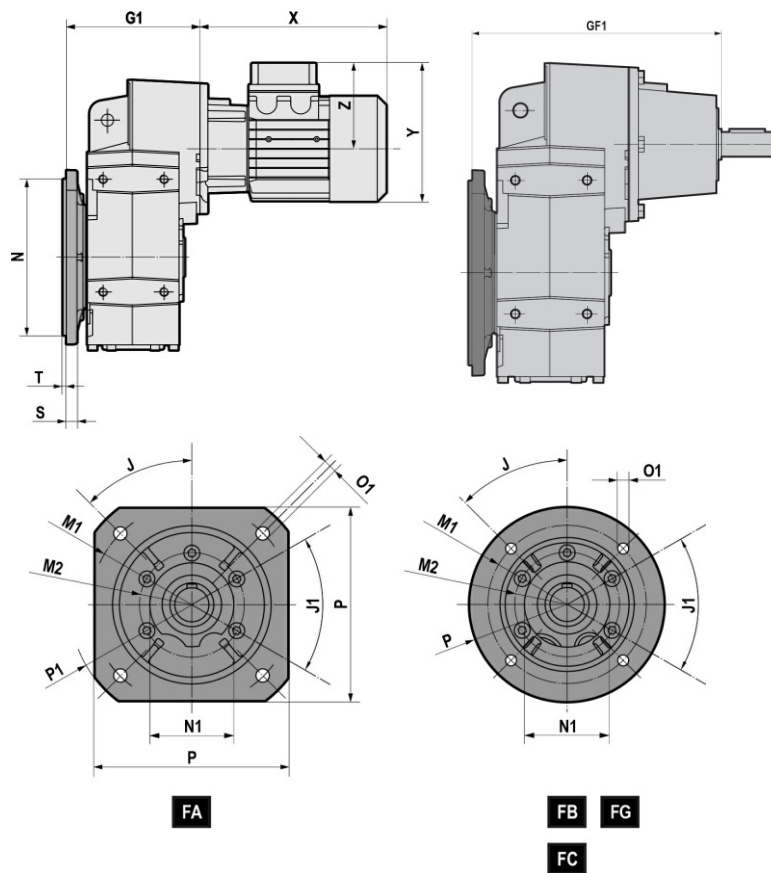
4.1 LOW SPEED SHAFTS



	d h6	B	B1	G1	L	f	b1	t1
S062/S063	35	58	62	140	210,5	M12	10	38
S082/S083	40	80	84,25	180	273	M16	12	43
S102/S103	50	100	105	210	325	M16	14	53,5
S122/S123	60	120	125	240	375	M20	18	64

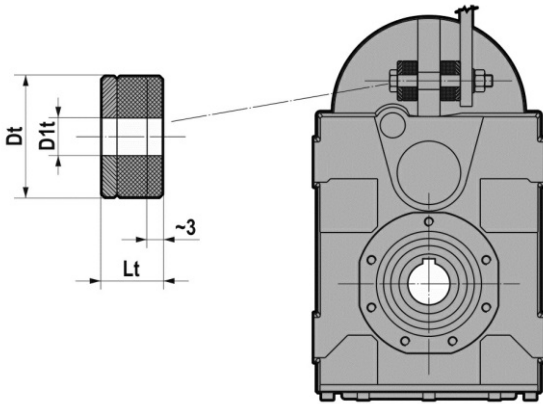
	d k5	d1 h6	B	B1	B9	L1	f	b1	t1
S142/S143	70	70	140	150	197	600	M20	20	74,5
	65	65							69
S152/S153	90	90	170	180	221	710	M24	25	95
	80	80							M20

4.2 OUTPUT FLANGE



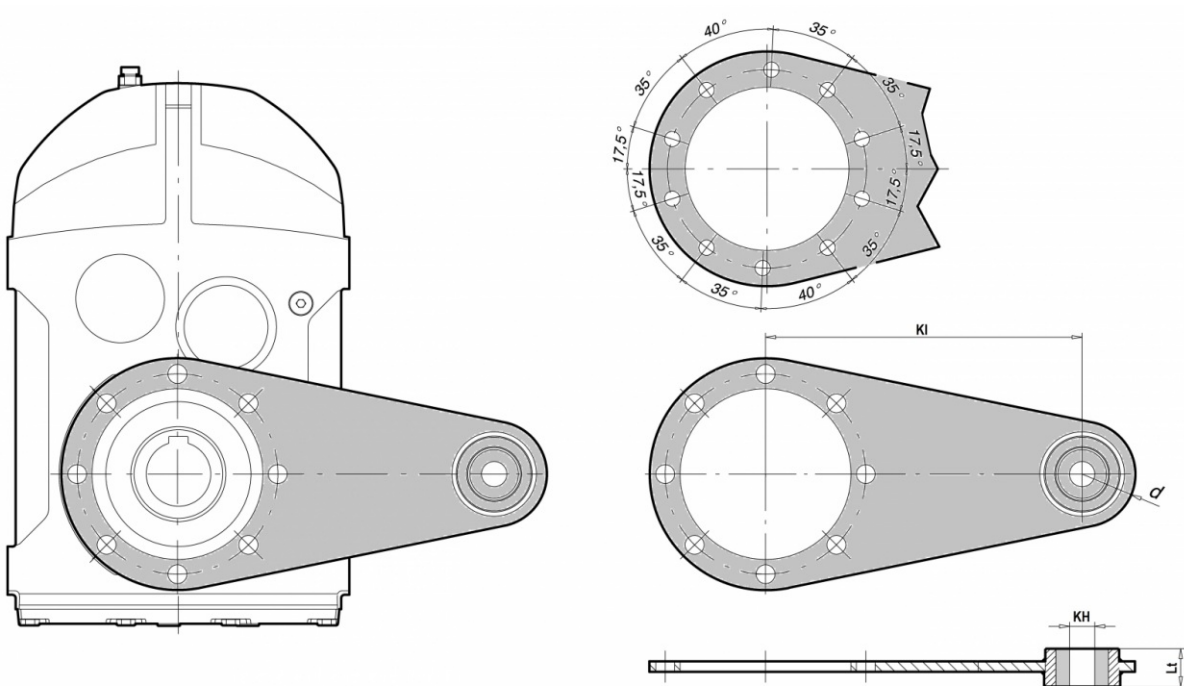
		J	J1	M1	M2	N f8	N1	O1	P	P1	S	T	G1	GF1
S052 S053	FA	45°	45	215	105	180	90	14 (n.4)	200	250	12	4	153	243
	FB	45°	45	165	105	130	90	11 (n.4)	200	/	12	3,5	153	243
S062 S063	FA	45°	45	215	105	180	90	14 (n.4)	200	250	12	4	172,5	262,5
	FB	45°	45	165	105	130	90	11 (n.4)	200	/	12	3,5	172,5	262,5
S082 S083	FA	45°	45	265	130	230	110	14 (n.4)	250	300	15	4	227	340
	FB	45°	45	215	130	180	110	14 (n.4)	250	/	15	4	227	340
	FC	45°	45	165	130	130	110	11 (n.4)	200	/	15	3,5	227	340
S102 S103	FA	45°	45	300	165	250	130	18 (n.4)	300	350	16	5	247,5	360,5
	FB	45°	45	265	165	230	130	14 (n.4)	300	/	16	4	247,5	360,5
	FC	45°	45	215	165	180	130	14 (n.4)	250	/	16	4	247,5	360,5
S122 S123	FA	45°	45	350	185	300	150	18 (n.4)	350	400	18	5	287	413,5
	FB	45°	45	300	185	250	150	18 (n.4)	350	/	18	5	287	413,5
	FC	45°	45	265	185	230	150	14 (n.4)	300	/	18	4	287	413,5
S142 S143	FG	22°30'	/	400	/	350 g6	/	18 (n.8)	450	/	20	5	338,5	426
S152 S153	FG	22°30'	/	400	/	350 g6	/	18 (n.8)	450	/	20	5	372,5	481

4.3.1 Reaction bolt



	Dt	D1t	Lt
S052/S053	40	12,5	20
S062/S063	40	12,5	20
S082/S083	40	12,5	20
S102/S103	60	21	30
S122/S123	60	21	30
S142/S143	60	25	38,8
S152/S153	60	25	35,5

4.3.2 Torque arm - S 142...153



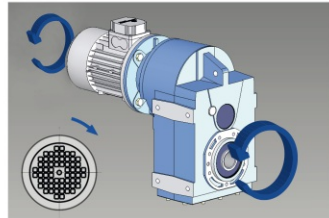
	KI	KH $\pm 0,2$	d	Lt
S142/S143	350	25	45	30
S152/S153	450	25	50	30

4.4 BACKSTOP DEVICE

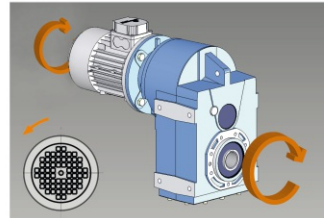
The gear reducer can be supplied with backstop device on input shaft. Backstop device allows output shaft rotation in only one sense of direction; according to the size, it is available in the input flange or in the motor with the same dimensions. It is important to specify the required sense of direction on the order. The backstop device is not available for mounting position V5 with motor size IEC 100...225.

SENSE OF DIRECTION AVAILABLE

S... 2/C-D-L

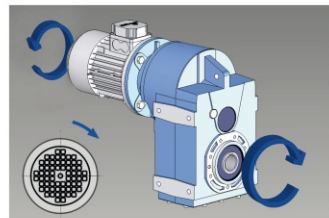


CLOCKWISE SENSE OF DIRECTION REFERRED TO HIGH SPEED SHAFT

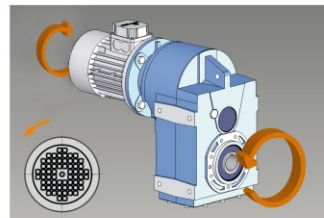


COUNTER CLOCKWISE SENSE OF DIRECTION REFERRED TO HIGH SPEED SHAFT

S... 3/C-D-L



CLOCKWISE SENSE OF DIRECTION REFERRED TO HIGH SPEED SHAFT

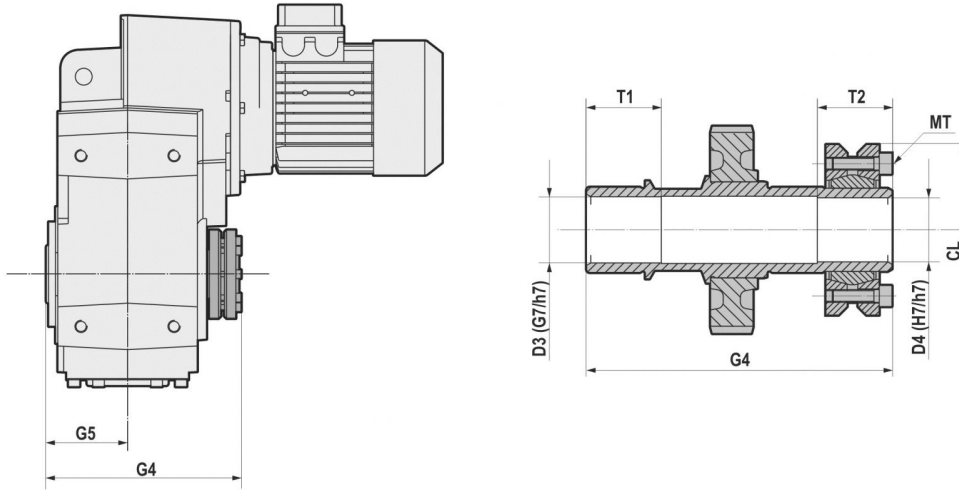


COUNTER CLOCKWISE SENSE OF DIRECTION REFERRED TO HIGH SPEED SHAFT

	063	071	080	090	100-112	132	160	180	200	225
	140x11	160x14	200x19	200x24	250x28	300x38	350x42	350x48	400x55	450x60
S052		B5	B5	B5	B5					
S053	B5	B5	B5	B5						
S062		B5	B5	B5	B5					
S063		B5	B5	B5						
S082			B5	B5	B5	B5				
S083		B5	B5	B5	B5					
S102			B5	B5	B5	B5	B5			
S103		B5	B5	B5	B5					
S122			B5	B5	B5	B5	B5	B5	B5	
S123			B5	B5	B5	B5				
S142						B5	B5	B5	B5	
S143					B5	B5	B5			
S152							B5	B5	B5	B5
S153						B5	B5	B5		

4.5 OUTPUT SHAFT WITH SHRINK DISC

Clean and degrease the surfaces of the shaft to be fitted to. Comply with the indicated tightening torque of screws (M_T). The shrink disc is designed only to transmit the output torque. In case of radial and/or axial loads or V5-V6 mounting positions, please contact the technical support.



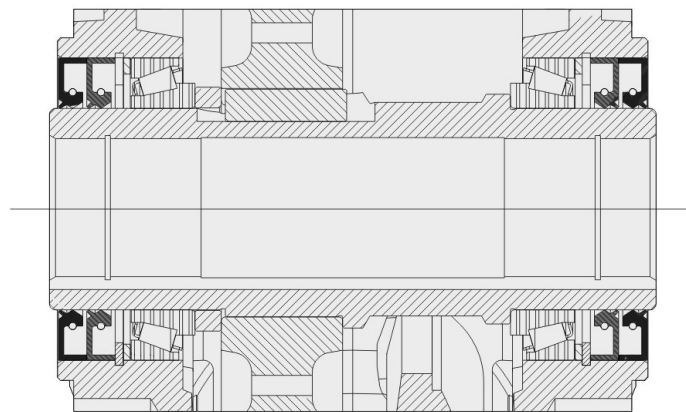
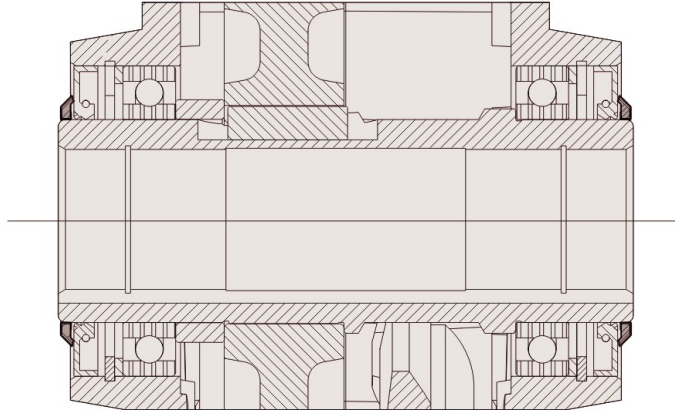
	D3	D4	G4	G5	T1	T2	CL	M_T 12.9 [Nm]
S052/S053	31	30	152	60	35	35	74	15
S062/S063	36	35	173	70	40	35	80	15
S082/S083	41	40	217	90	50	40	100	15
S102/S103	51	50	248	105	55	40	115	15
S122/S123	61	60	282	120	60	50	145	40

	D3 - D4 (H7/h6)	G4	CL	M_T 12.9 [Nm]
S142-S143	75	345	155	70
S152-S153	95	405	200	103
	80		185	

4.6 REINFORCED OIL SEALS FOR OUTPUT SHAFT

The reinforced seal can be done depending on the gearbox size by means of two oil seals or through the standard oil seal with VRM ring. The difference of the two solutions is explained on the drawings.

On request the gear reducer can be supplied with fluoroelastomer FPM (FKM) seals.

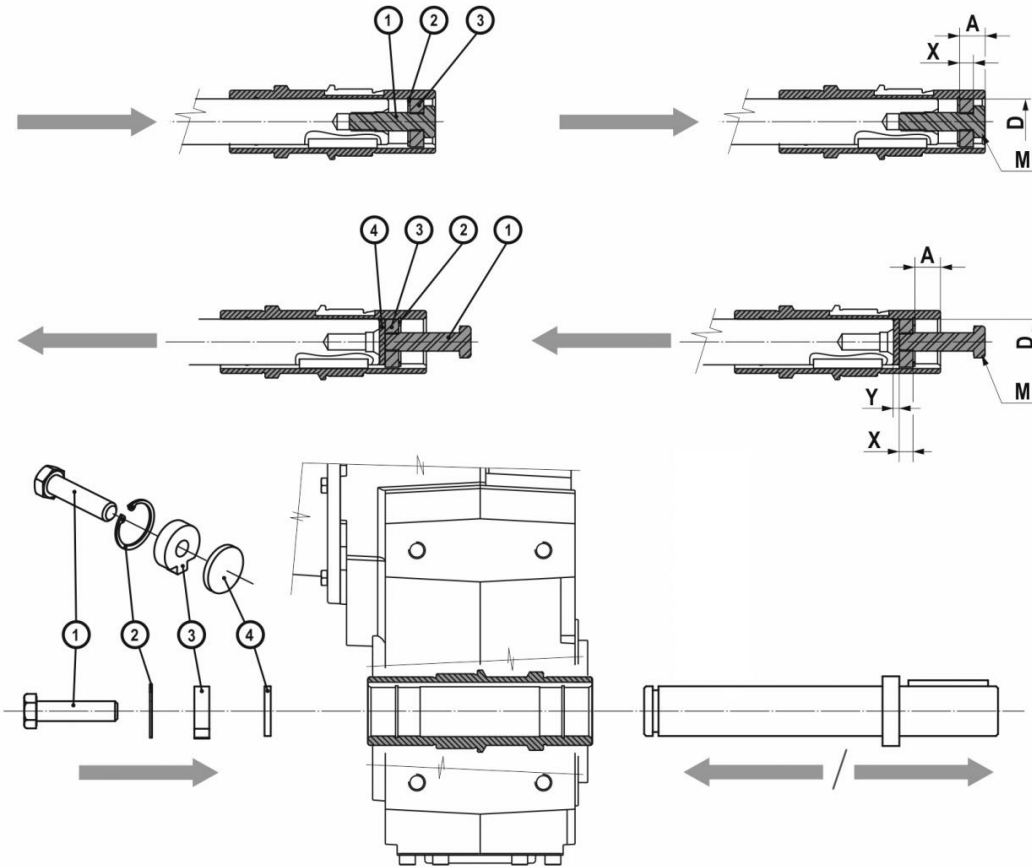


	Double oil seal	VRM ring
S050 2/3		x
S060 2/3		x
S080 2/3		x
S100 2/3		x
S125 2/3		x
S140 2/3		x
S150 2/3	x	

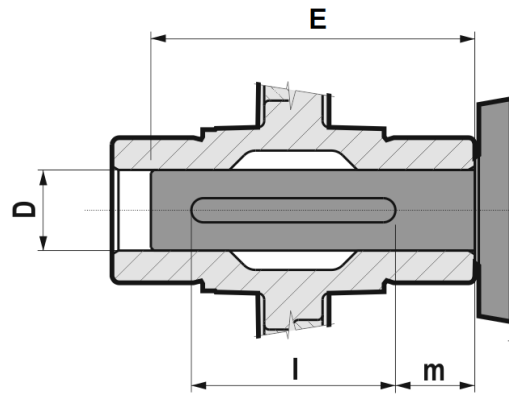
4.7 ASSEMBLING/DISASSEMBLING KIT

Mounting/dismounting kit for hollow shaft gear reducers with keyway that includes:

1. Retaining bolt
2. Circlip
3. Fixed nut
4. Forcing washer



	D	A	X	Y	M
S052/S053	30	13,8	10	5	M10x35
S062/S063	35	12	12	5	M16x50
S082/S083	40	22,25	12	5	M16x50
	45				
S102/S103	50	25	12	5	M16x50
S122/S123	60	28	16	5	M20x70



	D H7/h6	E*	l*	m*
S052/S053	30	85	60	12,5
S062/S063	35	105	80	12,5
S082/S083	40	135	100	17,5
	45			
S102/S103	50	160	120	20
S122/S123	60	185	140	22,5

(*) Suggested values.