

Ex INCLUDED

HDP-HDO SERIES

Parallel shaft gear units HDP series
Bevel helical gear units HDO series

Bonfiglioli

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Revisions

Refer to page 280 for the catalogue revision index. Visit www.bonfiglioli.com to search for catalogues with up-to-date revisions.

GENERAL INFORMATION

1 SYMBOLS AND UNITS OF MEASUREMENT

Symbols	Units of Measure	Description
$An_{1,2}$	[kN]	Permissible axial force
f_S	–	Service factor
i	–	Gear ratio
l	–	Cyclic duration factor
J	[Kgm^2]	Mass moment of inertia
$M_{1,2}$	[Nm]	Torque
$Mc_{1,2}$	[Nm]	Calculated torque
$Mn_{1,2}$	[Nm]	Rated torque
$Mr_{1,2}$	[Nm]	Torque demand
$n_{1,2}$	[min^{-1}]	Speed
$P_{1,2}$	[kW]	Power
$Pn_{1,2}$	[kW]	Rated power
$Pr_{1,2}$	[kW]	Power demand
P_T	[kW]	Thermal Power
$Rc_{1,2}$	[kN]	Calculated radial force
$Rn_{1,2}$	[kN]	Permissible overhung load
t_a	[°C]	Ambient temperature
t_s	[°C]	Surface temperature
t_o	[°C]	Oil temperature
η	–	Efficiency

$_1$ value applies to input shaft

$_2$ value applies to output shaft

2 GENERAL DESIGN FEATURES

Gear units of the HDP and HDO series make optimum use of advanced design features, to offer:

- Top torque density
- Superior performance
- Silent and vibration-free operation
- Total ruggedness and reliability
- Lifetime calculation in accordance with the applicable ISO and AGMA standards
- Extensive customisation through a wide range of options offered in the catalogue

3 ALLOWED TEMPERATURE LIMITS

Symbols	Description / Condition	Value (*)	
		Synthetic Oil	Mineral Oil
t_a	Ambient temperature		
$t_{au\ min}$	Minimum operating ambient temperature	**-30°C**	**-10°C**
$t_{au\ Max}$	Maximum operating ambient temperature	**+50°C**	**+40°C**
$t_{as\ min}$	Minimum storage ambient temperature	**-40°C**	**-10°C**
$t_{as\ Max}$	Maximum storage ambient temperature	**+50°C**	**+50°C**
t_s	Surface temperature		
$t_{s\ min}$	Minimum gearbox surface temperature starting with partial load (#)	**-25°C**	**-10°C**
$t_{sc\ min}$	Minimum gearbox surface temperature starting with full load	**-10°C**	**-5°C**
$t_{s\ Max}$	Maximum casing surface temperature during continuous operation (measured next to the gearbox input)	**+100°C**	**+100°C** (@)
t_o	Oil temperature		
$t_{o\ Max}$	Maximum oil temperature during continuous operation	**+95°C**	**+95°C** (@)

(*) = Refer to the table “Selection of the optimal oil viscosity” for further information about minimum and maximum values of different oil viscosity. For values of t_a < -20°C and t_s, t_o > 80 °C, choose (as permitted in the product configuration stage) the sealing type of the most suitable material to the type of application. If needed contact Bonfiglioli Technical Service.

(@) = Continuous operation it is not advised if t_s and t_o range is 80°C to 95 °C.

(#) = For full load start-up it is recommended to ramp-up and provide for greater absorption of the motor. If needed, contact Bonfiglioli Technical Service.

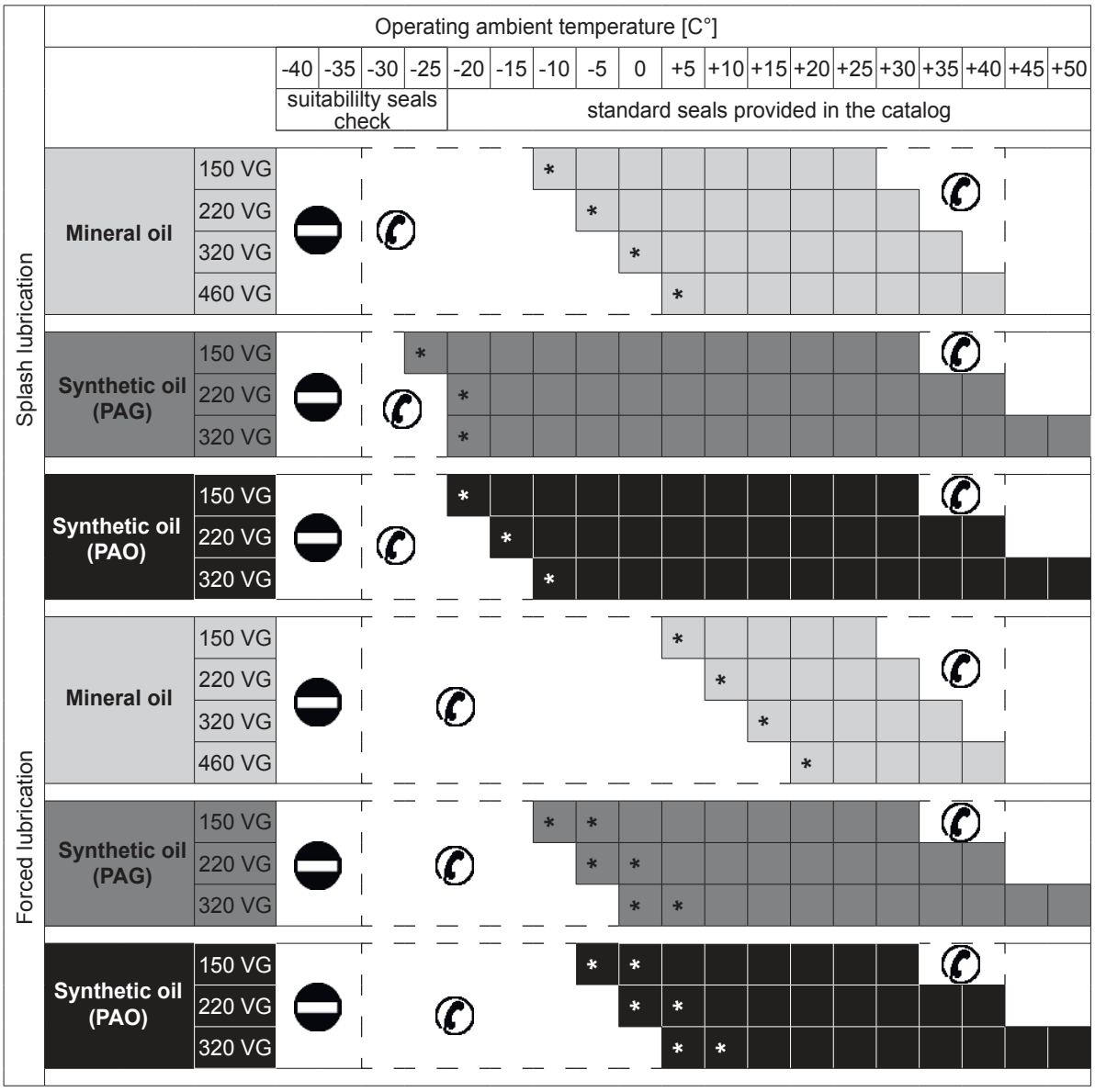
4 INSTALLATION

The following installation instructions must be observed:
• Make sure that the gearbox is correctly secured to avoid vibrations.
If shocks or overloads are expected, install hydraulic couplings, clutches, torque limiters, etc.
• Before the eventual painting, the machined surfaces and the outer face of the oilseals must be protected to prevent paint drying out the rubber and jeopardising the oil-seal function.
• Components to be keyed on to the gearbox output shafts should be machined to ISO H7 tolerances to prevent mating surfaces jamming and causing irreparable damage to the gearbox during installation. Suitable pullers and extractors should also be used to fit and remove such components. These should be properly secured to the threaded hole at the end of the shafts.
The customer is required to verify the mating on the output shaft defining appropriate tolerances according to the torque to be transmitted.
• Mating surfaces must be cleaned and treated with suitable protective products before mounting to avoid oxidation and, as a result, seizure of parts.
• Prior to putting the gear unit into operation make sure that the equipment that incorporates the same complies with the current revision of the Machines Directive 2006/42/CE.
• Before starting up the machine, make sure that oil level conforms to the mounting position specified for the gear unit and viscosity is suitable for the specific application.
• For outdoor installation provide adequate guards in order to protect the drive from rainfalls as well as direct sun radiation.

5 LUBRICATION

Refer to the User's Manual available at www.bonfiglioli.com for indications about checking the oil level and its replacement.
Do not mix mineral oils with synthetic oils and/or different brands.
However, oil level should be checked at regular intervals and topped up as required.
Check monthly if unit operates under intermittent duty, more frequently if duty is continuous.

5.1 Selection of the optimal oil viscosity (data relating to Shell Oils)



Recommended operating limits

Allowed operating limits.

Forbidden operating limits.

* = It is recommended to ramp-up and to provide for greater absorption of the motor.
If needed and in the event of impulse loads, contact Bonfiglioli Technical Service.

5.2 Lubrication for HDP-HDO series gearboxes

The internal parts of HDP gearboxes are lubricated with a mixed immersion and splash system. Should the output speed be lower than 1 min^{-1} or the input speed greater than 1800 min^{-1}, please contact Bonfiglioli Technical Service for advise.
In mounting position V5, the top bearings in gearbox sizes HDP 60 to HDP 90 are pre-lubricated with grease and fitted with Nilos seals, unless the order specifies a forced lubrication system with mechanical pump (optional variants OP1, OP2) or electric pump (option MOP).
If HDP 100 to 180 gearboxes have to be installed in mounting position V5, with the output shaft vertical, one of the above mentioned forced lubrication systems must be specified. The actual system should be selected on the basis of speed and/or operating conditions.
These gearboxes are supplied without lubricant. It is the customer's responsibility to fill them with the appropriate amount of oil before start-up.

The internal parts of HDO gearboxes are lubricated with a mixed immersion and splash system. Should the output speed be lower than 1 min^{-1} or the input speed greater than 1800 min^{-1}, please contact Bonfiglioli Technical Service for advise.
In mounting positions V5 and B6, the top bearings in gearbox sizes HDO 71 to HD0 95 are pre-lubricated with grease and fitted with Nilos seals.
If HDO 100 to 180 gearboxes have to be installed in mounting positions V5 and B6 it is required that the order specifies a forced lubrication system with mechanical pump (optional variants OP1, OP2) or electric pump (option MOP).
Depending on the configuration and mounting position, HDO gearboxes may require one of a number of forced lubrication systems described later in this catalogue.
The gearboxes are supplied without lubricant. It is the customer's responsibility to fill them with the appropriate amount of oil before start-up.

6 STORAGE

Observe the following instructions to ensure correct storage of the products:

- Do not store outdoors, in areas exposed to weather or with excessive humidity.
- Always place boards, wood or other material between the products and the floor. The gearboxes should not have direct contact with the floor.
- In case of long-term storage all machined surfaces such as flanges, shafts and couplings must be coated with a suitable rust inhibiting product (Tectile 506 EH or equivalent). Furthermore gear units must be placed with the fill plug in the highest position and filled up with oil. Before putting the units into operation the appropriate quantity, and type, of oil must be restored.
- In the cases of long-term storage defined in the order phase with the optional choice of SLM or SLP (see specific chapter for cases and times), the appropriate technical requirements are given in the User Manual available on www.bonfiglioli.com. To guarantee times, conditions and extensions, contact the Bonfiglioli Assistance Center available on the company website.

7 CONDITIONS OF SUPPLY

Gear units are supplied as follows:

- configured for installation in the mounting position specified when ordering;
- tested to manufacturer specifications;
- mating machined surfaces come unpainted;
- nuts and bolts for mounting motors are provided if a flanged motor input is specified.

8 PAINT COATING

HDP gearboxes in sizes 60 to 90 and HDO in sizes 71 to 95 are externally and internally painted in oven hardened epoxy resin and polyester powder paint. The painted (ferrous) surfaces of these gearboxes are protected to at least corrosivity class C2 (UNI EN ISO 12944-2). The colour is RAL 7042 grey. A synthetic top coat may be applied later.
HDP and HDO gearbox sizes 100 to 180 are internally and externally spray painted with an epoxy primer, and then externally painted on completion of assembly. These gearboxes are protected to at least corrosivity class C3 (UNI EN ISO 12944-2). The colour is RAL 7042 grey.

9 SERVICE FACTOR

Service factors listed here under are empirical values based on AGMA and ISO specifications as well as our experience for use in common applications. They apply for state of the art-designed driven machines and normal operating conditions.

Application	≤ 10 hours/day	> 10 hours/day
AGITATORS, MIXERS		
Pure liquids	1.25	1.50
Liquids and solids	1.25	1.50
Liquids - variable density	1.50	1.75
BLOWERS		
Centrifugal	1.00	1.25
Lobe	1.25	1.50
Vane	1.25	1.50
CLARIFIERS	1.00	1.25
CLAY WORKING MACHINERY		
Brick press	1.75	2.00
Briquette machine	1.75	2.00
Pug mill	1.25	1.50
COMPACTORS	2.00	2.00
COMPRESSORS		
Centrifugal	1.25	1.50
Lobe	1.25	1.50
Reciprocating, multi-cylinder	1.50	1.75
Reciprocating, single-cylinder	1.75	2.00
CONVEYORS - GENERAL PURPOSE		
Uniformly loaded or fed	1.15	1.25
- Heavy duty		
Not uniformly fed	1.25	1.50
- Reciprocating or shaker	1.75	2.00
CRANES (*)		
Dry dock		
Main hoist	2.50	2.50
Auxiliary hoist	2.50	3.00
Boom hoist	2.50	3.00
Slewing Drive	2.50	3.00
Traction Drive	3.00	3.00

Application	≤ 10 hours/day	> 10 hours/day
Trolley Drive		
Gantry Drive	3.00	3.00
Traction Drive	2.00	2.00
Industrial duty		
Main hoist	2.50	3.00
Auxiliary hoist	2.50	3.00
Bridge and	3.00	3.00
Trolley travel	3.00	3.00
CRUSHER		
Stone or ore	2.00	2.00
DREDGES		
Conveyors	1.25	1.50
Cutter head drives	2.00	2.00
Screen drives	1.75	2.00
Stackers	1.25	1.50
Winches	1.25	1.50
ELEVATORS		
Bucket	1.25	1.50
Centrifugal discharge	1.15	1.25
Escalators	1.15	1.25
Freight	1.25	1.50
Gravity discharge	1.15	1.25
EXTRUDERS		
General	1.50	1.50
Plastics		
Variable speed drive	1.50	1.50
Fixed speed drive	1.75	1.75
Rubber		
Continuous screw operation	1.75	1.75
Intermittent screw operation	1.75	1.75
FANS		
Centrifugal	1.00	1.25
Cooling towers	2.00	2.00

(*) - Indication of service factor based on FEM 1.001 classification available upon request. Consult factory.

- Hoists for passengers lift: charted **values not applicable**. Consult factory.
- Application with service factor < 1.5, it is recommended the use of oil ISO VG 320

Application	≤ 10 hours/day	> 10 hours/day
Forced draft	1.25	1.25
Induced draft	1.50	1.50
Industrial and mine	1.50	1.50
FEEDERS		
Apron	1.25	1.50
Belt	1.15	1.50
Disc	1.00	1.25
Reciprocating	1.75	2.00
Screw	1.25	1.50
FOOD INDUSTRY		
Dough mixer	1.25	1.50
Meat grinders	1.25	1.50
Slicers	1.25	1.50
GENERATORS AND EXCITERS	1.00	1.25
HAMMER MILLS	1.75	2.00
HOISTS (*)		
Heavy duty	1.75	2.00
Medium duty	1.25	1.50
Skip hoist	1.25	1.50
LUMBER INDUSTRY		
Barkers - spindle feed	1.25	1.50
Main drive	1.75	1.75
Conveyors - burner	1.25	1.50
Main or heavy duty	1.50	1.50
Main log	1.75	2.00
Re-saw, merry-go-round	1.25	1.50
Conveyors		
Slab	1.75	2.00
Transfer	1.25	1.50
Chains		
Floor	1.50	1.50
Green	1.50	1.75
Cut-off saws		
Chain	1.50	1.75
Drag	1.50	1.75
Debarking drums	1.75	2.00
Feeds		
Edger	1.25	1.50
Gang	1.75	1.75
Trimmer	1.25	1.50
Log deck	1.75	1.75

Application	≤ 10 hours/day	> 10 hours/day
Log hauls - incline - weel type	1.75	1.75
Log turning devices	1.75	1.75
Planer feed	1.25	1.50
Planer tilting hoists	1.50	1.50
Rolls - live-off brg. - roll cases	1.75	1.75
Sorting table	1.25	1.50
Tipple hoist	1.25	1.50
Transfers		
Chain	1.50	1.75
Craneways	1.50	1.75
Tray drives	1.25	1.50
Veneer lathe drives	1.25	1.50
METAL MILLS		
Slab pushers	1.50	1.50
Shears	2.00	2.00
Wire drawing	1.25	1.50
Wire winding machine	1.50	1.50
MILLS, ROTARY TYPE		
Ball and rod	2.00	2.00
Spur ring gear	2.00	2.00
Helical ring gear	1.50	1.50
Direct connected	2.00	2.00
Cement kilns	1.50	1.50
Dryers and coolers	1.50	1.50
MIXERS		
Concrete	1.50	1.75
PAPER MILLS		
Agitator (mixer)	1.50	1.50
Agitator for pure liquors	1.25	1.25
Barking drums	2.00	2.00
Barkers - mechanical	2.00	2.00
Beater	1.50	1.50
Breaker stack	1.25	1.25
Calendar	1.25	1.25
Chipper	2.00	2.00
Chip feeder	1.50	1.50
Coating rolls	1.25	1.25
Conveyors		
Chip, bark, chemical	1.25	1.25
Log (including slab)	2.00	2.00

(*) - Indication of service factor based on FEM 1.001 classification available upon request. Consult factory.

- Hoists for passengers lift: charted **values not applicable**. Consult factory.
- Application with service factor < 1.5, it is recommended the use of oil ISO VG 320

Application	≤ 10 hours/day	> 10 hours/day
Couch rolls	1.25	1.25
Cutter	2.00	2.00
Cylinder molds	1.25	1.25
Dryers		
Paper machine	1.25	1.25
Conveyors type	1.25	1.25
Embosser	1.25	1.25
Extruder	1.50	1.50
Jordan	1.50	1.50
Kiln drive	1.50	1.50
Paper rolls	1.25	1.25
Platter	1.50	1.50
Presses - felt and suction	1.25	1.25
Pulper	2.00	2.00
Pumps - vacuum	1.50	1.50
Reel (surface type)	1.25	1.25
Screens		
Chip	1.50	1.50
Rotary	1.50	1.50
Vibrating	2.00	2.00
Size press	1.25	1.25
Super calendar	1.25	1.25
Thickener (AC motor)	1.50	1.50
Thickener (DC motor)	1.25	1.25
Washer (AC motor)	1.50	1.50
Washer (DC motor)	1.25	1.25
Wind and unwind stand	1.25	1.50
Winders (surface type)	1.25	1.25
Yankee dryers	1.25	1.25
PLASTICS INDUSTRY		
Batch mixers	1.75	1.75
Continuous mixers	1.50	1.50
Compounding mill	1.25	1.25
Calendars	1.50	1.50
Secondary processing		
Blow molders	1.50	1.50
Coating	1.25	1.25
Film	1.25	1.25
Pre-plasticizers	1.50	1.50
Rods	1.25	1.25

Application	≤ 10 hours/day	> 10 hours/day
Sheet	1.25	1.25
Tubing	1.25	1.50
PUMPS		
Centrifugal	1.15	1.25
Reciprocating		
Single acting, three or more cylinders	1.25	1.50
Double acting, two or more cylinders	1.25	1.50
Rotary		
Gear type	1.15	1.25
Lobe	1.15	1.25
Vane	1.15	1.25
RUBBER INDUSTRY		
Intensive internal mixer		
Batch mixers	1.75	1.75
Continuous mixers	1.50	1.50
Refiner - two rolls	1.50	1.50
Calendars	1.50	1.50
SAND MULLER	1.25	1.50
SEWAGE DISPOSAL EQUIPMENT		
Aerators	2.00	2.00
Chemical feeders	1.25	1.25
Dewatering screens	1.50	1.50
Scum breakers	1.50	1.50
Slow or rapid mixers	1.50	1.50
Sludge collectors	1.25	1.25
Thickeners	1.50	1.50
Vacuum filters	1.50	1.50
SCREENS		
Air washing	1.00	1.25
Rotary - stone or gravel	1.25	1.50
Travelling water intake	1.00	1.25
SUGAR INDUSTRY		
Beet slicer	2.00	2.00
Cane knives	1.50	1.50
Crushers	1.50	1.50
Mills (low speed end)	1.75	1.75
TEXTILE MACHINERY	1.25	1.50

(*) - Indication of service factor based on FEM 1.001 classification available upon request. Consult factory.

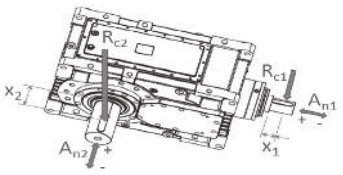
- Hoists for passengers lift: charted **values not applicable**. Consult factory.
- Application with service factor < 1.5, it is recommended the use of oil ISO VG 320

SELECTING THE GEAR UNIT

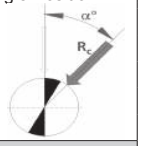
Selection of the Atex product must fit through the compilation of this selection form.
For a safe selection it is strongly recommended to rely on the long time experience of the Bonfiglioli Technical Service Dept.

Bonfiglioli Forever Forward	**TECHNICAL DATA REQUIRED FOR THE SELECTION OF HDP - HDO**	Nr:
		Date:
		Rev_ Date:

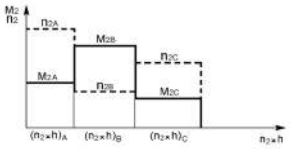
		A)	***GENERAL DATA***					
#	1		Company / Customer					
#	2		Contact					
#	3		Branch / Distributor					
#	4		Order quantity					
	5		Delivery time					
		B)	***ELECTRIC MOTOR***					
	6		Motor Type					
#	7	P_{n1}	Rated motor power		[kW]			
#	8	P_{r1}	Motor power demand		[kW]			
	9	n_1	Input speed		[min^{-1}]			
	10		Pole number					
	11		Motor mounting: B3 - B5 - B14					
		C_1)	***GEARBOX***			***C_2)***	***ATEX CONDITION [GROUPII] - 2014/34/EU***	
#	12		Gearbox configuration					
#	13	i	Gear ratio			Category: [**2** = standard / **3** = special]		
#	14	n_2	Output speed		[min^{-1}]	Atmosphere: [**G** = gas / **D** = dust]		
#	15	M_{r2}	Output torque demand		[Nm]	Zone: [**1 - 21** / **2 - 22**]		
#	17	f_S	Service factor required			Temperature class: [T4 / 135°C]		
	18		Rotation of the output shaft [front view]:		**CW**		**CCW**	
#	19	L_{10H}	Bearings lifetime		[h]			
	20		Gears lifetime		[h]			
	21	SF_{min}	Safety for tooth root stress		standard reference (ISO preferred)			
	22	SH_{min}	Safety for flank pressure		standard reference (ISO preferred)			
		D)	***ADDITIONAL LOADS***					
	23	R_{c2}	Radial load on output shaft		[N]			
	24	x_2	Load application distance from shaft shoulder		[mm]			
	25	α_{Rc2}	Angle of application of the output Radial load		[° ' "]			
	26	R_{c1}	Radial load on input shaft		[N]			
	27	x_1	Load application distance from shaft shoulder		[mm]			
	28	α_{Rc1}	Angle of application of the input Radial load		[° ' "]			
	29	A_{n2}	Thrust load on output shaft (+ / -)		[N]			
	30	A_{n1}	Thrust load on intput shaft (+ / -)		[N]			



Angle Position



+ =Push
- = Pull

		E)	***APPLICATION***						
#	31		Type of application						
	32		Duty cycle	Time phase %		Time phase hours	Gearbox output torque [Nm]	Gearbox output speed [min^{-1}]	
				,,,,		,,,,			
				,,,,		,,,,			
				,,,,		,,,,			
				,,,,		,,,,			
				,,,,		,,,,			
	33		Notes about Duty Cycle:						
			Duty type	**S1**		**S2**	**S3**	**S4-S8**	
	34	v_A	Ambient air velocity		[m/s]	≤ 0.5	> 0.5 ≤ 1.4	> 1.4	
#	35	t_a	Ambient temperature range		[°C]				
	36		Altitude a.s.l.		[m]				
	37		Rating according FEM class	T-		L-	M-		
		F)	***OPTIONS OR ADDITIONAL REQUESTS***						
	38		Lubrification						
	39		Supplementary cooling systems						
	40		Paint coating						
	41		To specific requests for testing						
		G)	***NOTES***						
	42		Notes and additional Customer requirements:						
#	43		**PLP number if present for Special Gearbox**						

Mandatory for the selection

The selection of the drive unit can only be optimized upon knowing both the engineering and the environmental conditions the gearbox will operate into.

10 ENGINEERING SELECTION

1. First determine the gear ratio:

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

2. Calculate the power $\mathbf{P_{r1}}$ required at the input shaft:

$$P_{r1} = \frac{M_{r2} \times n_2}{9550 \times \eta}$$

	η
2x 	0.96
3x 	0.94
4x 	0.92

3. Determine the applicable service factor $\mathbf{f_s}$ and the adjusting factor $\mathbf{f_m}$ depending on prime mover:

	f_m
Electric motor Hydraulic motor Turbine	1.00
Multi-cylinder internal combustion engine	1.25
Single cylinder internal combustion engine	1.50

4. Use the rating charts to select the gear unit with the gear ratio nearest to that calculated, and with a rated power $\mathbf{P_{n1}}$, so that:

$$P_{n1} \geq P_{r1} \times f_s \times f_m$$

11 VERIFICATIONS

11.1 SHOCK LOADING

For intermittent duty, impact/shock loading applications or start-ups under full load or with high inertial loads, make sure the following condition is satisfied for momentary peak torque $\mathbf{M_p}$ generated during the operating cycle:

$$M_p \leq M_{n2ref} \times f_p$$

Peaks/hour		f_p				
		1	**2 ... 10**	**11 ... 50**	**51 ... 100**	**> 100**
Drive	Constant direction	2.0 1.8 (HDO 71…95 3x) 1.6 (HDO 71…95 4x)	1.6	1.3	1.1	1.0
	Reversals	1.4 1.3 (HDO 71…95 3x) 1.1 (HDO 71…95 4x)	1.1	0.9	0.8	0.7

For configuration S (output shaft with shrink disc), use the following values to verify applicability.

Peaks/hour		f_p		
		1 ... 50	**51 ... 100**	**> 100**
Drive	Constant direction	1.3 1.1 (HDP 80) 1 (HDO 81) 1.2 (HDO 95)	1.1 1 (HDO 81)	1.0
	Reversals	0.9 0.8 (HDP 80 - HDO 95) 0.7 (HDO 81)	0.8 0.7 (HDO 81)	0.7

If the above condition is not satisfied, consider installing a torque limiter or selecting a gear unit of the next size up.

11.2 MOTOR MOUNTING

Verify that the appropriate motor adapter is available for the selected gear unit. See sections 15.5 and 26.6.
Because of standardisation, the rated power of the electric motor selected might be greater than power $\mathbf{P_{r1}}$ actually requested by the application. Make sure that the electric motor will never develop the extra power at any stage of the operating cycle. If you have any doubts about the validity of the application data, or uncertainty concerning the actual load pattern, install a torque limiting device or proportionally revise the applicable service factor.

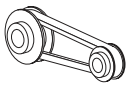
11.3 BACKSTOP DEVICE

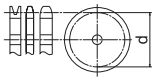
If the gear unit is specified with a backstop, verify the load capacity of the device at sections 15.6.3 and 26.7.3 of this catalogue and make sure the torque M_{1MAX} is never exceeded in operation.

11.4 CALCULATING THE RESULTING OVERHUNG LOAD

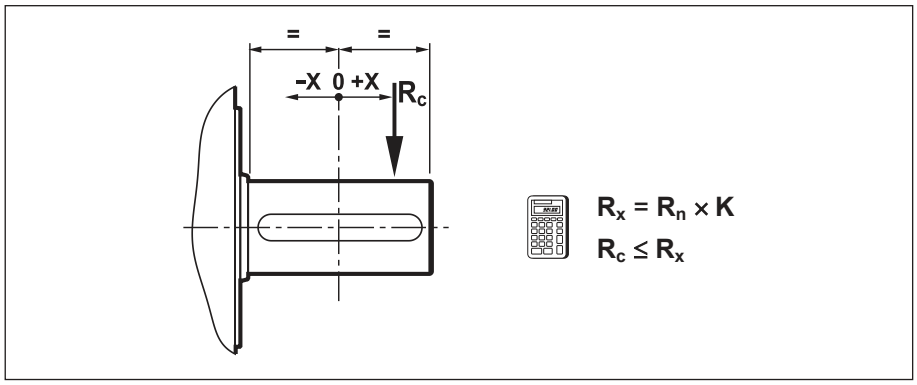
External transmissions keyed onto input and/or output shaft generate loads that act radially onto same shaft.
Resulting shaft loading must be compatible with both the bearing and the shaft capacity.
Namely shaft loading ($\mathbf{R_{c1}}$ for input shaft, $\mathbf{R_{c2}}$ for output shaft), must be equal or lower than admissible overhung load capacity for shaft under study ($\mathbf{R_{x1}}$ for input shaft, $\mathbf{R_{x2}}$ for output shaft). OHL capability listed in the rating chart section.
The procedure described above applies to both the input shaft and the output shaft, but care must be taken to apply factor $\mathbf{K_1}$ or factor $\mathbf{K_2}$ to suit the particular shaft.
The load generated by an external transmission can be calculated, to a good approximation, by the following equation:

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

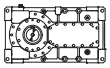
$\mathbf{K_r = 1}$	
$\mathbf{K_r = 1.25}$	
$\mathbf{K_r = 1.5 - 2.0}$	

M [Nm]	
d [mm]	

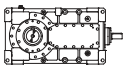
11.5 OVERHUNG LOADING VERIFICATION

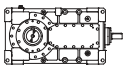


The $Rn_{1\ max}$ values listed in the table are the maximum permissible overhung loads; these loads may have to be reduced in certain applications.
For an exact value, please contact Bonfiglioli's Technical Service.

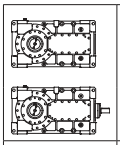
	i =	$Rn_{1\ max}$ [kN]	K_1												
			x [mm] =												
			-100	-75	-50	-25	0	25	50	75	100	150	200	250	300
HDP 60 2	**7.1 ... 15.2**	4.5	—	—	—	1.29	1.00	0.82	0.69	0.60	0.53	—	—	—	—
	17.3 … 19.4	3.0	—	—	—	1.28	1.00	0.82	0.70	0.60	0.53	—	—	—	—
HDP 60 3	**22.7 … 49.1**	3.1	—	—	—	1.29	1.00	0.82	0.69	0.60	0.53	—	—	—	—
	56.6 … 98.4	2.1	—	—	—	1.33	1.00	0.80	0.67	0.57	0.50	—	—	—	—
HDP 70 2	**8.0 … 17.7**	4.5	—	—	—	1.29	1.00	0.82	0.69	0.60	0.53	—	—	—	—
	19.4 … 22.6	3.0	—	—	—	1.28	1.00	0.82	0.70	0.60	0.53	—	—	—	—
HDP 70 3	**25.5 … 57.0**	3.1	—	—	—	1.29	1.00	0.82	0.69	0.60	0.53	—	—	—	—
	63.7 … 114.4	2.1	—	—	—	1.33	1.00	0.80	0.67	0.57	0.50	—	—	—	—
HDP 80 2	**8.1 … 14.6**	5.0	—	—	1.53	1.21	1.00	0.85	0.74	0.66	0.59	0.49	—	—	—
	15.5 … 22.6	5.5	—	—	—	1.24	1.00	0.84	0.72	0.63	0.56	0.41	—	—	—
HDP 80 3	**25.8 …75.2**	5.8	—	—	—	1.26	1.00	0.83	0.71	0.62	0.53	0.39	—	—	—
	76.4 … 111.4	3.0	—	—	—	1.29	1.00	0.82	0.69	0.54	0.44	0.32	—	—	—
HDP 90 2	**7.9 … 13.6**	6.3	—	—	1.48	1.19	1.00	0.86	0.76	0.67	0.61	0.51	—	—	—
	15.8 … 22.4	6.3	—	—	1.48	1.19	1.00	0.86	0.76	0.67	0.61	0.51	—	—	—
HDP 90 3	**25.4 … 73.3**	6.1	—	—	1.45	1.18	1.00	0.87	0.76	0.68	0.62	0.52	—	—	—
	77.8 … 110.1	3.7	—	—	—	1.22	1.00	0.85	0.73	0.61	0.50	0.37	—	—	—
HDP 100 2	**7.4 … 21.8**	11.1	—	—	1.35	1.15	1.00	0.89	0.80	0.72	0.66	0.56	0.49	—	—
HDP 100 3	**22.8 …50**	6.3	—	—	1.48	1.19	1.00	0.86	0.76	0.67	0.61	0.51	—	—	—
	55.5 … 107.8	6.9	—	—	1.54	1.21	1.00	0.85	0.74	0.65	0.59	0.49	—	—	—
HDP 100 4	**110.6 … 246.9**	2.1	—	—	—	1.18	1.00	0.87	0.76	0.68	0.62	—	—	—	—
	286.4 … 507.9	2.7	—	—	—	1.25	1.00	0.83	0.71	0.63	0.56	—	—	—	—
HDP 110 2	**8.1 … 25.0**	11.1	—	—	1.35	1.15	1.00	0.89	0.80	0.72	0.66	0.56	0.49	—	—
HDP 110 3	**24.9 … 54.5**	6.3	—	—	1.48	1.19	1.00	0.86	0.76	0.67	0.61	0.51	—	—	—
	60.7 …123.5	6.9	—	—	1.54	1.21	1.00	0.85	0.74	0.65	0.59	0.49	—	—	—
HDP 110 4	**120. … 214.2**	2.1	—	—	—	1.18	1.00	0.87	0.76	0.68	0.62	—	—	—	—
	248.6 … 499.4	2.7	—	—	—	1.25	1.00	0.83	0.71	0.63	0.56	—	—	—	—

	i =	$Rn_{1\ max}$ [kN]	K_1												
			x [mm] =												
			-100	-75	-50	-25	0	25	50	75	100	150	200	250	300
HDP 120 2	**7.9 … 25.4**	17.8	—	—	1.37	1.16	1.00	0.88	0.79	0.71	0.65	0.55	0.48	—	—
HDP 120 3	**25.8 … 56.1**	6.3	—	—	1.48	1.19	1.00	0.86	0.76	0.67	0.61	0.51	—	—	—
	64.3 … 125.2	6.9	—	—	1.54	1.21	1.00	0.85	0.74	0.65	0.59	0.49	—	—	—
HDP 120 4	**128 … 277.2**	2.1	—	—	—	1.18	1.00	0.87	0.76	0.68	0.62	—	—	—	—
	323.2 … 523.7	2.7	—	—	—	1.25	1.00	0.83	0.71	0.63	0.56	—	—	—	—
HDP 125 2	**8.9 … 25.0**	17.8	—	—	1.37	1.16	1.00	0.88	0.79	0.71	0.65	0.55	0.48	—	—
HDP 125 3	**29.1 … 62.6**	6.3	—	—	1.48	1.19	1.00	0.86	0.76	0.67	0.61	0.51	—	—	—
	72.5 … 123.6	6.9	—	—	1.54	1.21	1.00	0.85	0.74	0.65	0.59	0.49	—	—	—
HDP 125 4	**144.4 … 506.5**	2.1	—	—	—	1.18	1.00	0.87	0.76	0.68	0.62	—	—	—	—
HDP 130 2	**7.3 … 12.3**	28.0	—	1.47	1.27	1.12	1.00	0.90	0.82	0.76	0.69	0.54	0.45	0.38	—
	14.1 … 21.7	22.1	—	—	1.30	1.13	1.00	0.90	0.81	0.74	0.69	0.55	0.45	—	—
HDP 130 3	**21.8 … 48.1**	11.9	—	—	1.28	1.12	1.00	0.90	0.82	0.75	0.69	0.60	0.53	—	—
	56.5 … 108.3	8.1	—	—	1.31	1.13	1.00	0.89	0.81	0.74	0.68	0.58	—	—	—
HDP 130 4	**111.2 … 237.9**	4.8	—	—	1.33	1.14	1.00	0.89	0.80	0.73	0.67	0.57	—	—	—
	274.5 … 534.5	1.8	—	—	—	1.15	1.00	0.88	0.79	0.72	0.65	—	—	—	—
HDP 140 2	**8.4 … 14.4**	28.0	—	1.47	1.27	1.12	1.00	0.90	0.82	0.76	0.69	0.54	0.45	0.38	—
	16.3 … 24.9	22.1	—	—	1.30	1.13	1.00	0.90	0.81	0.74	0.69	0.55	0.45	—	—
HDP 140 3	**25.1 … 56.2**	11.9	—	—	1.28	1.12	1.00	0.90	0.82	0.75	0.69	0.60	0.53	—	—
	65.1 … 124.7	8.1	—	—	1.31	1.13	1.00	0.89	0.81	0.74	0.68	0.58	—	—	—
HDP 140 4	**141.6 … 277.5**	4.8	—	—	1.33	1.14	1.00	0.89	0.80	0.73	0.67	0.57	—	—	—
	315.9 … 495.3	1.8	—	—	—	1.15	1.00	0.88	0.79	0.72	0.65	—	—	—	—
HDP 150 2	**7.9 … 14.1**	31.7	1.60	1.39	1.23	1.10	1.00	0.91	0.84	0.78	0.73	0.61	0.51	0.44	0.38
	15.4 … 19.6	26.4	—	1.43	1.25	1.11	1.00	0.91	0.83	0.77	0.71	0.58	0.48	0.40	—
HDP 150 3	**21.5 … 38.1**	26.6	—	1.44	1.26	1.11	1.00	0.91	0.83	0.77	0.71	0.57	0.47	0.40	—
	43.5 … 77.0	17.4	—	—	1.28	1.12	1.00	0.90	0.82	0.75	0.70	0.61	0.54	—	—
HDP 150 4	**89.0 … 157.8**	10.8	—	—	1.47	1.19	1.00	0.86	0.76	0.68	0.61	0.51	—	—	—
	170.9 … 303.1	6.1	—	—	1.45	1.18	1.00	0.87	0.76	0.68	0.62	0.52	—	—	—
HDP 160 2	**9.0 …15.9**	31.7	1.60	1.39	1.23	1.10	1.00	0.91	0.84	0.78	0.73	0.61	0.51	0.44	0.38
	17.5 … 22.1	26.4	—	1.43	1.25	1.11	1.00	0.91	0.83	0.77	0.71	0.58	0.48	0.40	—
HDP 160 3	**24.4 … 43.1**	26.6	—	1.44	1.26	1.11	1.00	0.91	0.83	0.77	0.71	0.57	0.47	0.40	—
	49.4 … 87.0	17.4	—	—	1.28	1.12	1.00	0.90	0.82	0.75	0.70	0.61	0.54	—	—
HDP 160 4	**101.1 … 178.1**	10.8	—	—	1.47	1.19	1.00	0.86	0.76	0.68	0.61	0.51	—	—	—
	194.1 … 342.2	6.1	—	—	1.45	1.18	1.00	0.87	0.76	0.68	0.62	0.52	—	—	—
HDP 170 2	**7.8 ... 14.2**	35.3	1.33	1.22	1.14	1.06	1.00	0.95	0.90	0.85	0.81	0.73	0.67	0.62	0.58
	15.4 ... 19.3	32.5	1.40	1.28	1.18	1.09	1.00	0.94	0.88	0.82	0.78	0.7	0.65	0.61	0.57
HDP 170 3	**23.2 ... 39.7**	24.8	—	1.29	1.18	1.08	1.00	0.93	0.87	0.82	0.77	0.69	0.62	0.57	—
	45.1 ... 77.2	11.6	—	—	1.13	1.06	1.00	0.97	0.91	0.87	0.84	0.77	0.71	—	—
HDP 170 4	**92.7 ... 158.8**	10.8	—	—	1.47	1.19	1.00	0.86	0.76	0.68	0.61	0.51	—	—	—
	177.4 ... 303.8	8.1	—	—	1.31	1.13	1.00	0.89	0.81	0.74	0.68	0.58	—	—	—
HDP 180 2	**8.7 ... 15.7**	35.3	1.33	1.22	1.14	1.06	1.00	0.95	0.90	0.85	0.81	0.73	0.67	0.62	0.58
	17.1 ... 21.4	32.5	1.40	1.28	1.18	1.09	1.00	0.94	0.88	0.82	0.78	0.7	0.65	0.61	0.57
HDP 180 3	**25.8 ... 43.9**	24.8	—	1.29	1.18	1.08	1.00	0.93	0.87	0.82	0.77	0.69	0.62	0.57	—
	50.1 ... 85.4	11.6	—	—	1.13	1.06	1.00	0.97	0.91	0.87	0.84	0.77	0.71	—	—
HDP 180 4	**103.0 ... 175.6**	10.8	—	—	1.47	1.19	1.00	0.86	0.76	0.68	0.61	0.51	—	—	—
	197.2 ... 336.1	8.1	—	—	1.31	1.13	1.00	0.89	0.81	0.74	0.68	0.58	—	—	—

	i =	$Rn_{1\ max}$ [kN]	K_1												
			x [mm] =												
			-100	**-75**	**-50**	**-25**	**0**	**25**	**50**	**75**	**100**	**150**	**200**	**250**	**300**
HDO 71 2	**5.6 … 14.6**	11.3	—	—	2.35	1.41	1.00	0.78	0.64	0.54	0.46	—	—	—	—
HDO 71 3	**21.8 … 71.9**	6.1	—	—	—	1.56	1.00	0.70	0.51	0.39	0.33	—	—	—	—
HDO 71 4	**77.0 … 475.4**	4.8	—	—	—	1.88	1.00	0.54	0.38	0.29	0.23	—	—	—	—
HDO 81 2	**5.5 … 14.7**	17.2	—	—	2.59	1.58	1.00	0.69	0.52	0.43	0.35	—	—	—	—
HDO 81 3	**25.9 … 71.9**	11.7	—	—	2.61	1.56	1.00	0.69	0.52	0.43	0.36	—	—	—	—
HDO 81 4	**78.3 … 473.3**	7.2	—	—	—	1.76	1.00	0.54	0.38	0.28	0.22	—	—	—	—
HDO 91 2	**7.4 … 15.9**	17.9	—	—	2.37	1.41	1.00	0.78	0.64	0.54	0.46	—	—	—	—
HDO 91 3	**18.6 … 66.1**	11.6	—	—	2.17	1.37	1.00	0.79	0.65	0.52	0.43	—	—	—	—
HDO 91 4	**82.0 … 489.3**	5.9	—	—	—	1.54	1.00	0.75	0.53	0.42	0.34	—	—	—	—
HDO 95 3	**21.2 … 72.3**	11.6	—	—	2.17	1.37	1.00	0.79	0.65	0.52	0.43	—	—	—	—
HDO 95 4	**81.6 … 489.7**	5.8	—	—	—	1.55	1.00	0.74	0.53	0.41	0.34	—	—	—	—
HDO 100 2	**5.8 … 13.5**	19.4	—	—	1.88	1.30	1.00	0.81	0.68	0.59	0.51	0.40	0.32	—	—
HDO 100 3	**14 … 17.3**	18.7	—	—	2.23	1.38	1.00	0.78	0.64	0.54	0.45	0.34	—	—	—
	20.2 … 67.5	10.8	—	—	2.23	1.38	1.00	0.78	0.63	0.51	0.43	0.32	—	—	—
HDO 100 4	**70.8 … 139.8**	7.2	—	—	—	1.56	1.00	0.72	0.52	0.40	0.33	—	—	—	—
	160 … 344.2	4.8	—	—	—	1.56	1.00	0.74	0.58	0.46	0.38	—	—	—	—
HDO 110 2	**6.4 … 15.5**	19.4	—	—	1.88	1.30	1.00	0.81	0.68	0.59	0.51	0.40	0.32	—	—
HDO 110 3	**18.9 … 20.9**	18.7	—	—	2.23	1.38	1.00	0.78	0.64	0.54	0.45	0.34	—	—	—
	22 … 77.5	10.8	—	—	2.23	1.38	1.00	0.78	0.63	0.51	0.43	0.32	—	—	—
HDO 110 4	**77.4 … 121.7**	7.2	—	—	—	1.56	1.00	0.72	0.52	0.40	0.33	—	—	—	—
	137.1 … 395	4.8	—	—	—	1.56	1.00	0.74	0.58	0.46	0.38	—	—	—	—
HDO 120 2	**6.6 … 15.5**	22.6	—	—	1.82	1.29	1.00	0.78	0.62	0.51	0.44	0.34	0.28	—	—
HDO 120 3	**17.3 … 24.6**	18.7	—	—	2.23	1.38	1.00	0.78	0.64	0.54	0.45	0.34	—	—	—
	28.3 … 78.6	10.8	—	—	2.23	1.38	1.00	0.78	0.63	0.51	0.43	0.32	—	—	—
HDO 120 4	**87 … 162.2**	7.2	—	—	—	1.56	1.00	0.72	0.52	0.40	0.33	—	—	—	—
	179.7 … 400.6	4.8	—	—	—	1.56	1.00	0.74	0.58	0.46	0.38	—	—	—	—
HDO 125 2	**7.4 … 16.9**	22.6	—	—	1.82	1.29	1.00	0.78	0.62	0.51	0.44	0.34	0.28	—	—
HDO 125 3	**19.2 … 35.8**	18.7	—	—	2.23	1.38	1.00	0.78	0.64	0.54	0.45	0.34	—	—	—
	38.8 … 85.9	10.8	—	—	2.23	1.38	1.00	0.78	0.63	0.51	0.43	0.32	—	—	—
HDO 125 4	**97.0 … 178.0**	7.2	—	—	—	1.56	1.00	0.72	0.52	0.40	0.33	—	—	—	—
	200.3 … 438.0	4.8	—	—	—	1.56	1.00	0.74	0.58	0.46	0.38	—	—	—	—
HDO 130 2	**5.7 … 13.6**	35.8	—	2.21	1.57	1.22	1.00	0.85	0.73	0.62	0.54	0.42	0.35	0.30	—
HDO 130 3	**15.2 … 67.1**	22.6	—	—	1.82	1.29	1.00	0.78	0.62	0.51	0.44	0.34	0.28	—	—
HDO 130 4	**71.5 … 335.6**	10.9	—	—	2.25	1.38	1.00	0.78	0.63	0.50	0.42	0.32	—	—	—
HDO 140 2	**6.6 … 15.7**	35.8	—	2.21	1.57	1.22	1.00	0.85	0.73	0.62	0.54	0.42	0.35	0.30	—
HDO 140 3	**17.7 … 77.3**	22.6	—	—	1.82	1.29	1.00	0.78	0.62	0.51	0.44	0.34	0.28	—	—
HDO 140 4	**82.3 … 386.6**	10.9	—	—	2.25	1.38	1.00	0.78	0.63	0.50	0.42	0.32	—	—	—

	i =	$Rn_{1\ max}$ [kN]	K_1												
			x [mm] =												
			-100	-75	-50	-25	0	25	50	75	100	150	200	250	300
HDO 150 2	**5.5 … 7.0**	54.0	2.75	1.91	1.47	1.19	1.00	0.86	0.76	0.67	0.59	0.47	0.40	0.34	0.30
	8.1 … 13.7	41.6	2.75	1.91	1.47	1.19	1.00	0.86	0.76	0.66	0.58	0.46	0.39	0.33	0.29
HDO 150 3	**15.6 … 60.8**	35.8	—	2.21	1.57	1.22	1.00	0.85	0.73	0.62	0.54	0.42	0.35	0.30	—
HDO 150 4	**66.9 … 92.9**	18.7	—	—	2.23	1.38	1.00	0.78	0.64	0.54	0.45	0.34	—	—	—
	101.8 … 238.8	10.9	—	—	2.25	1.38	1.00	0.78	0.63	0.50	0.42	0.32	—	—	—
HDO 160 2	**7.3 … 7.9**	54.0	2.75	1.91	1.47	1.19	1.00	0.86	0.76	0.67	0.59	0.47	0.40	0.34	0.30
	8.9 … 15.4	41.6	2.75	1.91	1.47	1.19	1.00	0.86	0.76	0.66	0.58	0.46	0.39	0.33	0.29
HDO 160 3	**17.7 … 68.6**	35.8	—	2.21	1.57	1.22	1.00	0.85	0.73	0.62	0.54	0.42	0.35	0.30	—
HDO 160 4	**75.9 … 96.3**	18.7	—	—	2.23	1.38	1.00	0.78	0.64	0.54	0.45	0.34	—	—	—
	115.2 … 269.7	10.9	—	—	2.25	1.38	1.00	0.78	0.63	0.50	0.42	0.32	—	—	—
HDO 170 3	**15.9 ... 21.7**	41.6	2.75	1.91	1.47	1.19	1.00	0.86	0.76	0.66	0.58	0.46	0.39	0.33	0.29
	26.2 ... 59.9	35.8	—	2.21	1.57	1.22	1.00	0.85	0.73	0.62	0.54	0.42	0.35	0.30	—
HDO 170 4	**72.9 … 239.5**	22.6	—	—	1.82	1.29	1.00	0.78	0.62	0.51	0.44	0.34	0.28	—	—
HDO 180 3	**17.7 ... 27.9**	41.6	2.75	1.91	1.47	1.19	1.00	0.86	0.76	0.66	0.58	0.46	0.39	0.33	0.29
	31.4 ... 66.2	35.8	—	2.21	1.57	1.22	1.00	0.85	0.73	0.62	0.54	0.42	0.35	0.30	—
HDO 180 4	**81.0 … 244.9**	22.6	—	—	1.82	1.29	1.00	0.78	0.62	0.51	0.44	0.34	0.28	—	—

The values for overhung and thrust loads are the maximum permissible values.

	$Rn_{2\ max}$ [kN]	K_2																	$An_{2\ max}$ [kN]
		x [mm] =																	
		-100	-75	-50	-25	0	25	50	75	100	150	200	250	300	350	400	450	500	
HDP 60	35.0	—	—	1.20	1.09	1.00	0.74	0.58	0.48	0.41	0.32	—	—	—	—	—	—	—	17.5
HDP 70 HDO 71	40.0	—	1.34	1.20	1.09	1.00	0.77	0.63	0.53	0.46	0.36	0.30	—	—	—	—	—	—	25.0
HDP 80 HDO 81	46.0	1.38	1.26	1.16	1.07	1.00	0.82	0.69	0.59	0.52	0.42	0.35	0.30	—	—	—	—	—	32.5
HDP 90 HDO 91	62.0	1.33	1.23	1.14	1.07	1.00	0.81	0.68	0.58	0.51	0.41	0.34	0.30	—	—	—	—	—	37.5
HDO 95	69.0	1.28	1.20	1.12	1.06	1.00	0.81	0.68	0.58	0.51	0.41	0.34	0.30	0.26	—	—	—	—	38.5
HDP 100 HDO 100	80.0	1.28	1.20	1.12	1.06	1.00	0.81	0.68	0.58	0.51	0.41	0.34	0.30	0.26	—	—	—	—	40.0
HDP 110 HDO 110	86.0	1.27	1.19	1.12	1.06	1.00	0.83	0.71	0.63	0.56	0.45	0.38	0.33	0.29	0.26	0.24	—	—	43.0
HDP 120 HDO 120	107.0	1.25	1.18	1.11	1.05	1.00	0.83	0.71	0.63	0.56	0.45	0.38	0.33	0.29	0.26	0.24	—	—	53.5
HDP 125 HDO 125	130.0	1.20	1.14	1.09	1.04	1.00	0.86	0.75	0.67	0.60	0.50	0.43	0.38	0.33	0.30	0.27	0.25	—	65.0
HDP 130 HDO 130	160.0	1.20	1.14	1.09	1.04	1.00	0.86	0.75	0.67	0.60	0.50	0.43	0.38	0.33	0.30	0.27	0.25	—	80.0
HDP 140 HDO 140	190.0	1.20	1.14	1.09	1.04	1.00	0.86	0.75	0.67	0.60	0.50	0.43	0.38	0.33	0.30	0.27	0.25	—	95.0
HDP 150 HDO 150	200.0	1.15	1.11	1.07	1.03	1.00	0.92	0.85	0.80	0.75	0.66	0.60	0.54	0.49	0.45	0.41	0.38	0.35	100.0
HDP 160 HDO 160	220.0	1.15	1.11	1.07	1.03	1.00	0.92	0.85	0.80	0.75	0.66	0.60	0.54	0.49	0.45	0.41	0.38	0.35	110.0
HDP 170 HDO 170	250.0	1.15	1.11	1.07	1.03	1.00	0.92	0.85	0.80	0.75	0.66	0.60	0.54	0.49	0.45	0.41	0.38	0.35	125.0
HDP 180 HDO 180	260.0	1.15	1.11	1.07	1.03	1.00	0.92	0.85	0.80	0.75	0.66	0.60	0.54	0.49	0.45	0.41	0.38	0.35	130.0

11.6 SHAFT LOADING

11.6.1 Overhung load on the output shaft

Make sure that the overhung load on the output shaft does not exceed the maximum permitted value for the gearbox in question. The HDB option can be specified only for HDP 60...HDP 90 and HDO 71...HDO 91 to provide higher capacity bearings to cater for particularly large overhung loads. If external loads exceed the load capacity of even the heavy duty bearings, consider the options of providing external support for the shafts, reducing external load in some other way, or, if necessary, selecting a gearbox of the next size up.

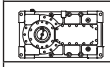
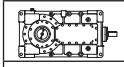
To check overhung load capacity, refer to the figure in section 11.5 and compare the actual overhung load Rc on the shaft with the maximum permissible overhung load **Rx** for the distance from the centre of the shaft at which the load is applied. Maximum permissible overhung load $\mathbf{Rx_2}$ for the output shaft is obtained by multiplying the nominal overhung load $\mathbf{Rn_2}$, as listed in the technical data section, by the load location factor $\mathbf{K_2}$.

Rated overhung loads Rn are conservative values, as they are calculated for the most unfavourable conditions in terms of direction of rotation and angle of application of the force on the shaft.

The following table shows the rated overhung loads that can be applied to solid (LP) output shafts under the following conditions:

- force applied to the centre of the end of the shaft
- no thrust loads
- gearbox service factor ≥ 1.25

Contact Bonfiglioli Riduttori's Technical Service if an exact calculation is required.

	$\mathbf{Rn_2}$ [kN]					
	HDP/HD0 … 2		HDP/HD0 … 3		HDP/HD0 … 4	
$\mathbf{n_2}$	**≤ 150 [min^-1]**		**≤ 75 [min^-1]**		**≤ 25 [min^-1]**	
	Shaft arrangement					
	**LR/RL**	**LL/RR**	**LR/RL**	**LL/RR**	**LL/RR**	**LR/RL**
	**L1/R2**	**L2/R1**	**L1/R2**	**L2/R1**	**L1/R2**	**L2/R1**
HDP 60	22	14	31	22	BONFIGLIOLI TECHNICAL SERVICE	
HDP 70 - HDO 71	18	9	25	16		
HDP 80 - HDO 81	15	8	28	15		
HDP 90 - HDO 91	20	10	36	20		
HDP 100 - HDO 95 - HDO 100	28	13	52	26	80	55
HDP 110 - HDO 110	46	33	61	37	86	72
HDP 120 - HDO 120	62	34	83	54	107	101
HDP 125 - HDO 125	75	48	98	69	130	122
HDP 130 - HDO 130	90	46	119	73	160	137
HDP 140 - HDO 140	85	43	116	73	183	138
HDP 150 - HDO 150	BONFIGLIOLI TECHNICAL SERVICE		109	52	183	132
HDP 160 - HDO 160			88	36	172	110
HDP 170 - HDO 170	BONFIGLIOLI TECHNICAL SERVICE					
HDP 180 - HDO 180						

For other load conditions, such as:

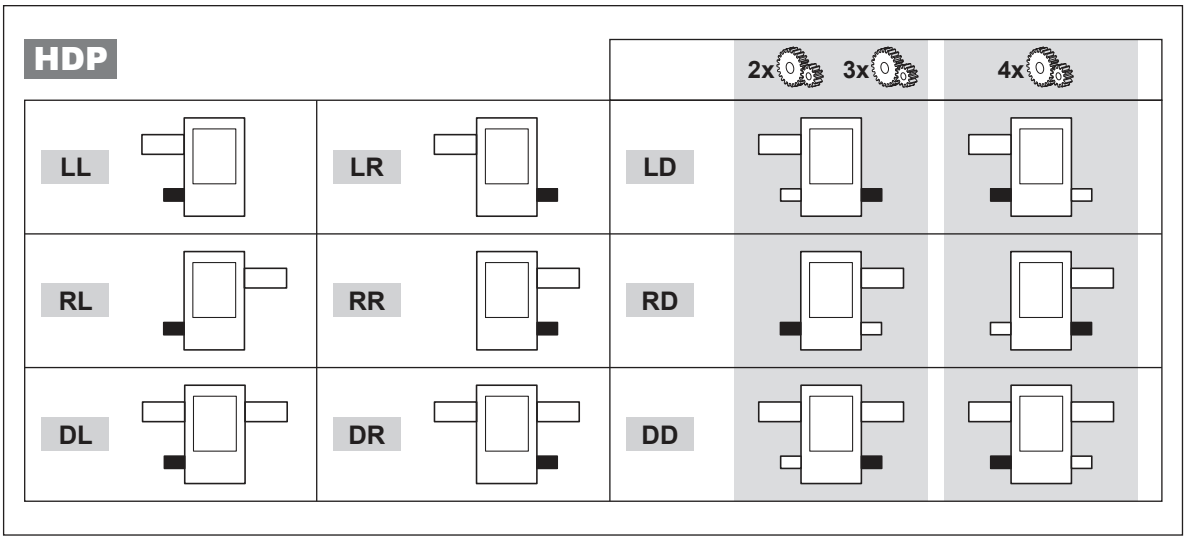
- high overhung loads
- thrust loads
- combined overhung and thrust loads
- different output shaft configurations

consult Bonfiglioli Riduttori's Technical Service.

11.6.2 Overhung and thrust loads on input shaft

When checking the overhung load capacity refer to scheme shown at paragraph 11.5. Calculate the admissible overhung load **Rx** that is relevant to the distance the force applies from shaft midpoint and compare this with the force **Rc** that acts onto the shaft. Multiply the nominal radial load $\mathbf{Rn_1}$, as listed in the technical data section, for the load location factor $\mathbf{K_1}$ to get the permissible overhung load $\mathbf{Rx_1}$ for the output shaft.
Rated overhung loads **Rn** are calculated for the most unfavourable condition as far as direction of rotation and the angle the force applies onto the shaft. Catalogue values are therefore conservative, for an in-depth calculation, or in case of HDP with 4 reductions and through-shafts (LD, RD and DD), contact the Technical Service of Bonfiglioli Riduttori.
When a radial force applies a thrust load $\mathbf{An_1 \leq 0.2 \times Rn_1}$ is also permitted.

In the case of HDP gearboxes with through-shafts the maximum permitted overhung load refers to the shaft end highlighted in black below:



If an overhung load is applied to both shaft ends, contact Bonfiglioli Riduttori's Technical Service for advise.

11.7 THERMAL POWER

Thermal power is the maximum power that the gearbox can transmit mechanically, under continuous operation, without the internal temperature rising to a value that could damage the gearbox components.
Base thermal capacities values $\mathbf{P_{TB}}$ and thermal capacities with **FAN** are listed in chapters 17 and 28, calculated under the following operating conditions:
- Input speed 1800/1500 min^{-1}
- Ambient temperature 20/40 °C
- Horizontal mounting position B3
- Installation in large area (air speed > 1.4 m/s)
- Continuous duty
- Max. installation altitude 1000 m
- Oil ISO VG 220

They are valid for a specific size and gearbox ratio.

Please contact Bonfiglioli Technical Service for other conditions.

Base thermal capacities must be greater than the Pr1 (required input power).

$$P_{TB} \geq Pr_1$$

Pay attention: in case of $\mathbf{P_{TB}} > \mathbf{P_{n1}}$ (rated power) for the selection of the gearbox consider $\mathbf{P_{n1}}$ as limit.

12 SAMPLE APPLICATIONS

Product selection:

 → **HDP 80 2 18.0 B3**

Thermal power check:

$P_{TB} = 65\ kW < Pr_1 = 71.1\ kW$ ⚠

Option: Fan coolig

$P_{TFAN} = 83\ kW > 71.1\ kW$ ✓ OK

Product selection:

 → **HDO 110 2 12.5 B3**

Thermal power check:

$P_{TB} = 142\ kW < Pr_1 = 176.7\ kW$ ⚠

Option: Fan coolig

$P_{TFAN} = 240\ kW > 176.7\ kW$ ✓ OK

GEAR UNITS ATEX CONFIGURATION

13 INTRODUCTION TO THE ATEX DIRECTIVES

13.1 Explosive atmosphere

An **explosive atmosphere** for the purposes of Directive 2014/34/EU is defined as a mixture:

a. of **flammable substances**, in the form of gases, vapours, mists or dusts;
b. with **air**;
c. under atmospheric conditions;
d. in which, after ignition, the combustion spreads to the entire unburned mixture (it has to be noted that sometimes, mainly with dust, not always the whole quantity of the combustible material is consumed by the combustion).

An atmosphere, which could become explosive due to local and/or operational conditions is called a **potentially explosive atmosphere**.
It is only in this kind of potentially explosive atmosphere which products falling under the Directive 2014/34/EU are designed for.

13.2 European harmonised atex standards

Directive 2014/34/EU stipulates the minimum safety requirements for products intended for use in explosion risk areas within the member countries of the European Union. The directive also assigns such equipment to **categories,** which are defined by the directive itself.

The following table describes the **zones** into which the user of a plant, in which an explosive atmosphere may occur,is required to divide the equipment application areas.

Zones		Formation frequency of a potentially explosive atmosphere	Type of danger
Gaseous atmosphere G	Dusty atmosphere D		
0	20	Present continuously or for long periods	Permanent
1	21	Likely to occur in normal operation occasionally	Potential
2	22	Not likely to occur in normal operation but if it does occur will persist for short period only	Minimal

BONFIGLIOLI RIDUTTORI gear units selected in this catalogue are marked and suitable for installation in zones 1, 21, as highlighted in light gray in the above diagram and they may of course also be installed in areas (minor risk) 2 and 22.
As from 20 April 2016 the ATEX directive 2014/34/EU come into force throughout the entire European Union, and replace existing conflicting national and European laws on explosive atmospheres and the previous directive 94/9/EC.
The directives apply to mechanical, hydraulic and pneumatic equipment.

13.3 Levels of protection for the various categories of equipment

The various categories of equipment must be able to operate in conformity witht he Manufacturer's operational specifications, at certain defined levels of protection.
The availability of BONFIGLIOLI RIDUTTORI products is highlighted in grey.

Protection level	Category		Type of protection	Operating conditions
	Group **I**	Group **II**		
Very high	M1		Two independent means of protection or safety capable of operating even when two independent faults occur	The equipment remains powered and operational even in the presence of an explosive atmosphere
Very high		1	Two independent means of protection or safety capable of operating even when two independent faults occur	The equipment remains powered and operational in zones 0, 1, 2 (G) and/or zones 20, 21, 22 (D)
High	M2		Protection suitable for normal operation and heavy duty conditions	Power to the equipment is shut off in the presence of a potentially explosive atmosphere
High		2	Protection suitable for normal operation and frequent faults or equipment in which malfunction is normal.	The equipment remains powered and operational in zones 1, 2 (G) and/or zones 21, 22 (D)
Normal		3	Protection suitable for normal operation	The equipment remains powered and operational in zones 2 (G) and/or 22 (D)

13.4 Definition of groups

Group I Applies to equipment intended for use underground in parts of mines and those parts of surface installations of such mines, liable to been dangered by fire damp and/or combustible dust.
Group II Applies to equipment intended for use in other places liable to been dangered by explosive atmospheres.

BONFIGLIOLI RIDUTTORI products may not therefore be installed in mines, classified in **Group I** and in **Group II**, category 1.
To summarise, the classification of equipment in to groups, categories and zones is illustrated in the table below, where by the availability of BONFIGLIOLI RIDUTTORI products is highlighted in grey.

Group	I mines, firedamp		II other potentially explosive areas (gas, dust)					
Category	M1	M2	1		2		3	
Atmosphere(1)			G	D	G	D	G	D
Zone			0	20	1	21	2	22
Type of protection gear unit(2)					Ex h Gb	Ex h Db	Ex h Gc	Ex h Dc

(1) **G** = gas **D** = dust
(2) as per 80079-36 and EN 80079-37

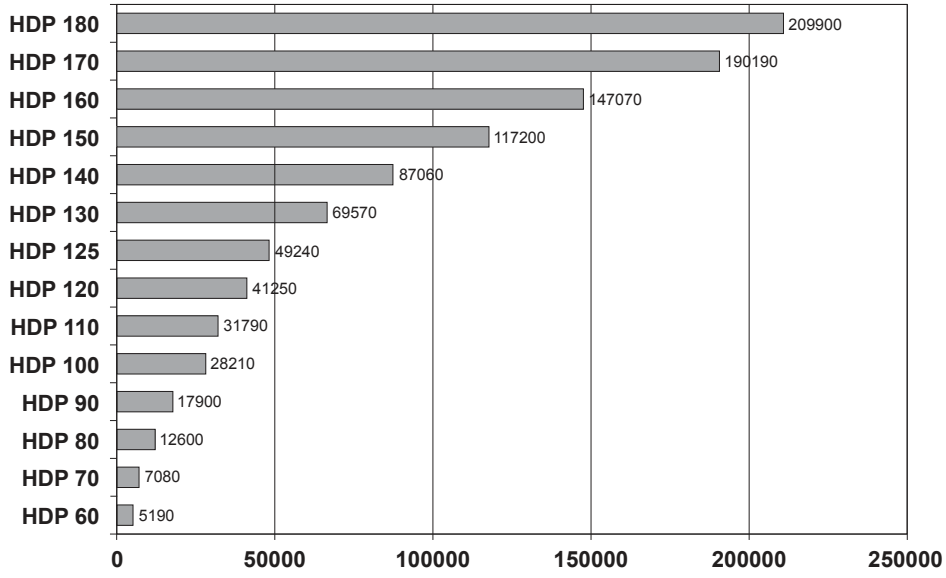
13.5 Declaration of conformity

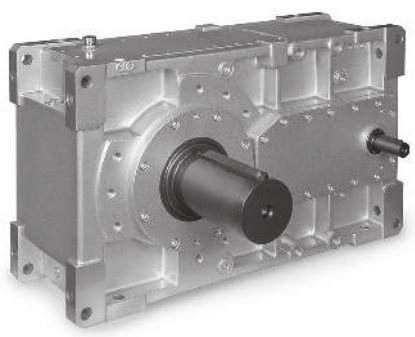
The Declaration of Conformity, is the document which attests to the conformity of the product to Directive 2014/34/EU.
The validity of the Declaration is bound to observance of the instructions given in the User, Installation and Service Manual for safe use of the product throughout its service life.
This can be downloaded from www.bonfiglioli.com where the manual is available in PDF format in a number of languages.
The instructions regarding ambient conditions are of particular importance inasmuch as failure to observe them during operation of the product renders the certificate null and void. In case of doubt regarding the validity of the certificate of conformity, contact the BONFIGLIOLI RIDUTTORI technical department.

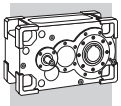


14 DESIGN FEATURES

The main construction features of the HDP parallel shaft gear unit range are:
- sizes from HDP 60 to HDP 90 with double and triple reduction.
- sizes from HDP 100 to HDP 180 with double, triple and quadruple reduction.
- Favourable distribution of rated torque values across the entire ratio range.
- Gear ratios in a 12% progression between consecutive values.
- HDP 60 ... HDP 125: Monobloc housing in rigid, spheroidal cast iron, paint coated both internally and externally. Universal mounting thanks to the many machined surfaces. Profiles and dimensions optimised by FEM analysis for superior structural rigidity and low acoustic emissions.
- HDP 130 ... HDP 180: housing in spheroidal cast iron or electrically-welded steel, horizontally split. This design makes maintenance quick and economical. Profiles and dimensions optimised by FEM analysis for superior structural rigidity and low acoustic emissions.
- Casehardened and hardened alloy steel helical gears ground finished and with profile corrected for:
  - more silent operation and smoother transmission of high speed input gears
  - maximum transmissible torque of the lower speed output gear reductions
- Input shafts generally casehardened and ground finished on outer diametre. Output shafts from hardened and tempered alloy steel.





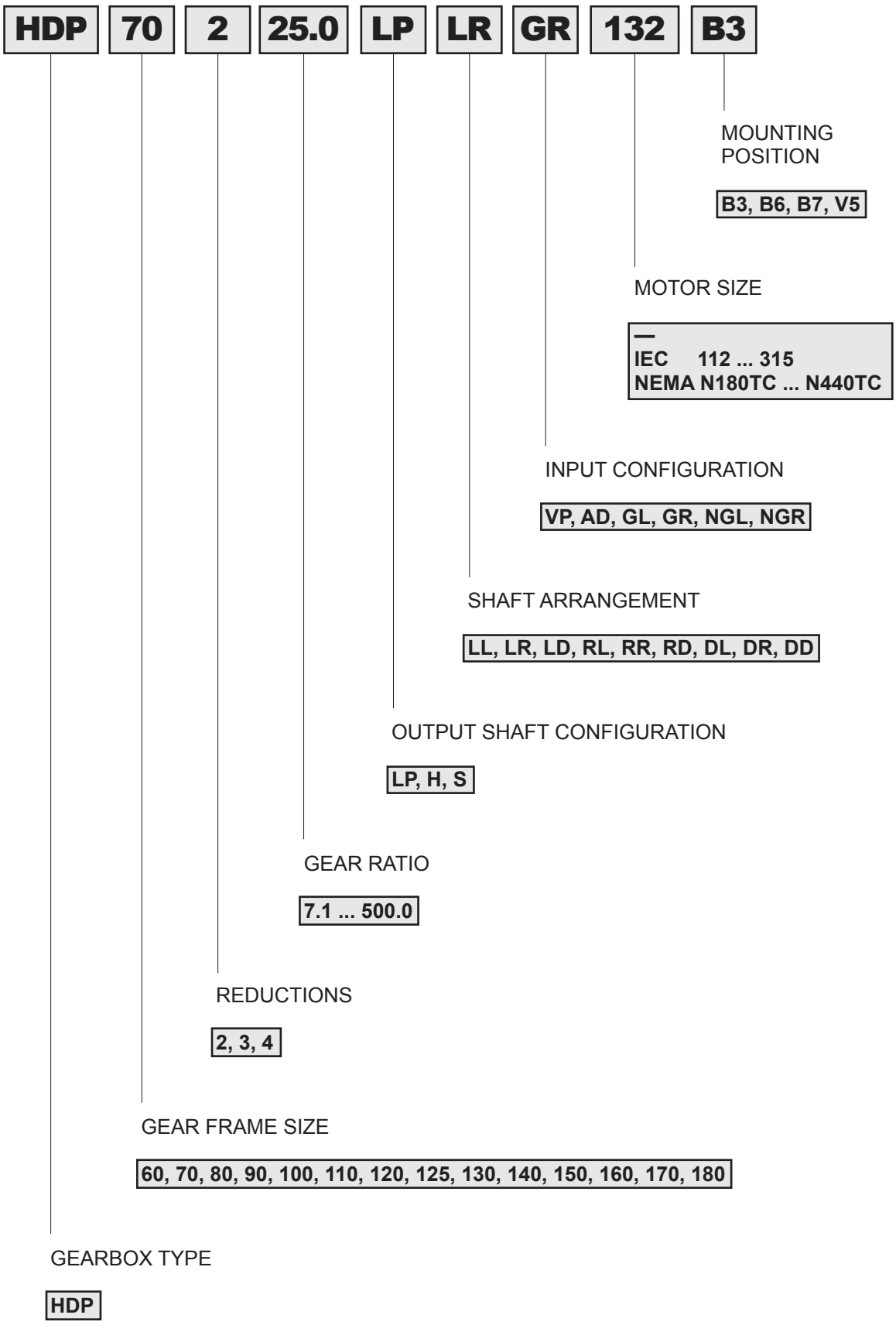


• Input shaft configurations:
- HDP 60 ... HDP 180: solid, single or double-sided shaft with dimensions to UNI/ISO 775-88
- HDP 60 ... HDP 90: direct motor mounting or lantern housing and flexible coupling provision.
- HDP 100 ... HDP 180: motor mounting with bell and housing and flexible coupling.
• Output shaft configurations:
- solid, single or double-sided shaft with dimensions to UNI/ISO 775-88
- hollow shaft with keyway
- hollow shaft with shrink disc
• Heavy duty taper roller bearings or extra large self-aligning roller bearings from the most reputed brands for unparalleled overhung load capacity.

• A wide range of customisation options are available upon request, including:
- auxiliary cooling/heating devices
- forced lubrication systems
- backstop device
- mounting or manifold flanges
- bearings for increased overhung load capacity (only for HDP 60 ... HDP 90)
- seals and gaskets in various types and materials
- sensors
- dry-well device for vertical shaft installations
- fixing elements

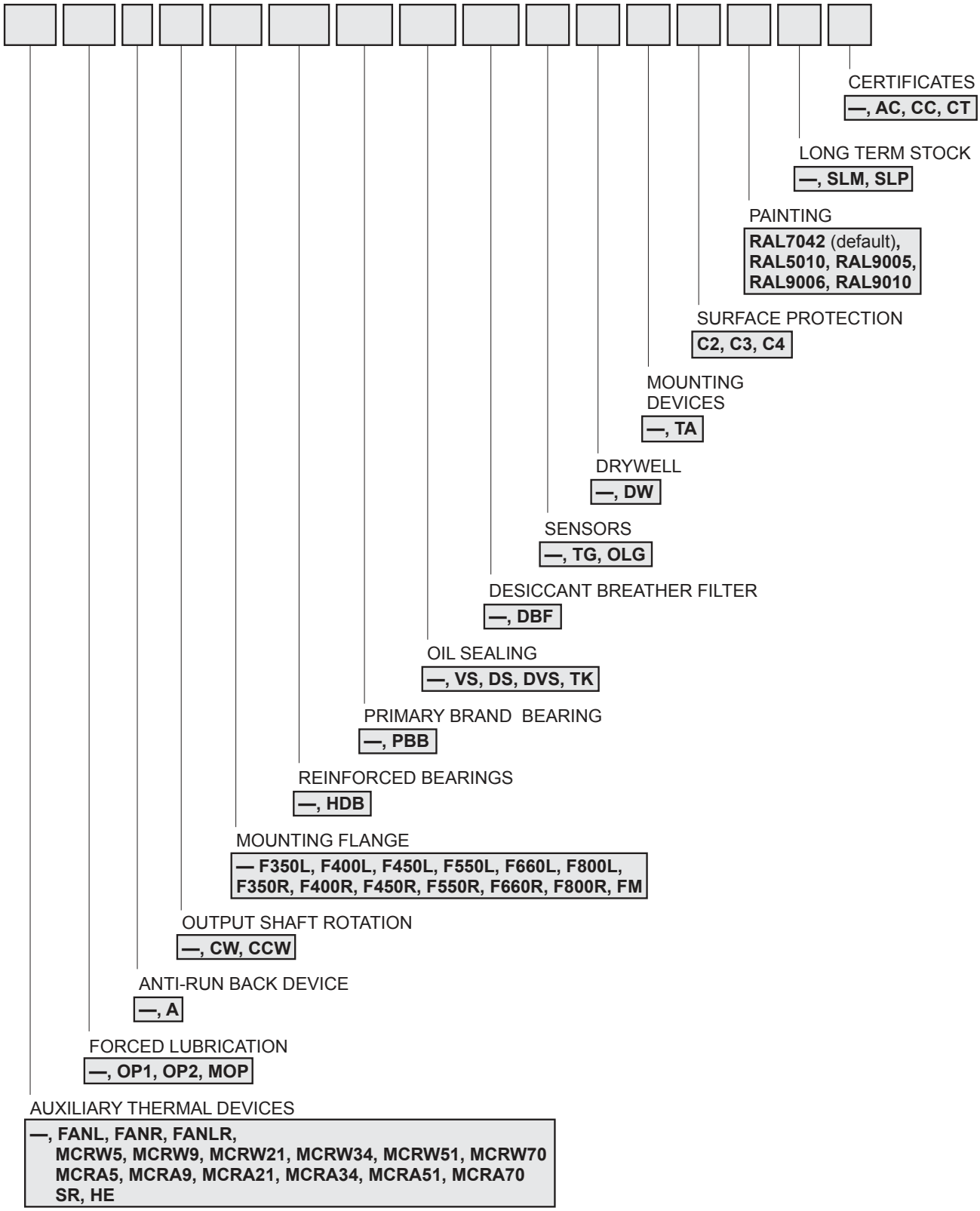
15 PRODUCT CONFIGURATIONS

15.1 BASE VARIANTS



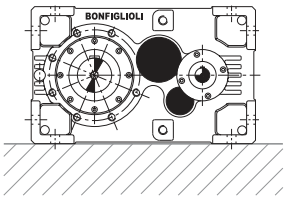
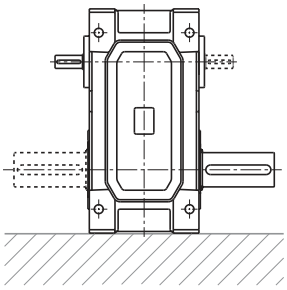
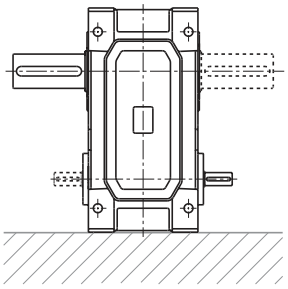
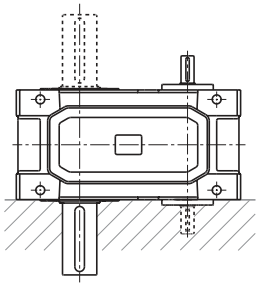
REMARK: For 170 - 180 size selection and verification please contact Bonfiglioli Technical Service.

15.2 OPTIONAL VARIANTS



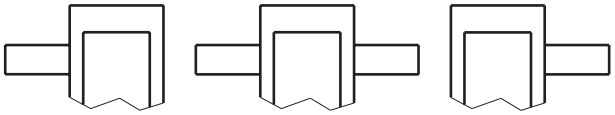
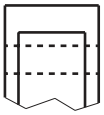
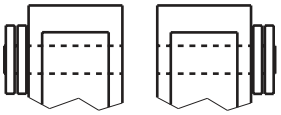
REMARK: The multiple selection of some of the variants may be subject to technical or dimensional constraints. Consult with the factory to have your selection approved.

15.3 MOUNTING POSITION

B3	B6	B7	V5
			
	⛔ HDP 170, HDP 180		

15.4 INPUT AND OUTPUT CONFIGURATION

15.4.1 OUTPUT SHAFT CONFIGURATION

LP	H	S
		

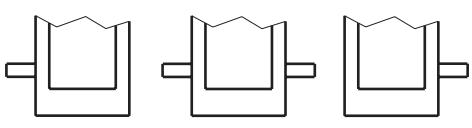
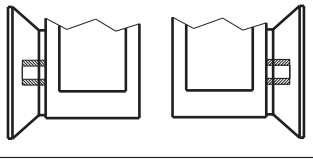
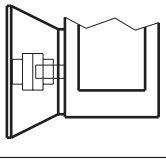
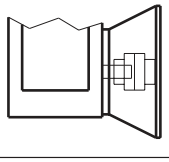
15.4.2 INPUT CONFIGURATION

On the input side the gear unit can be arranged in either one of the configurations described here after:

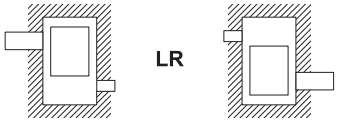
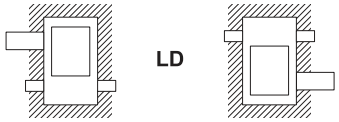
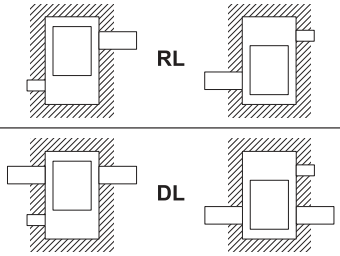
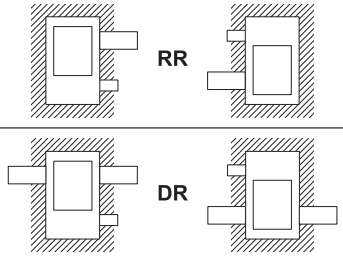
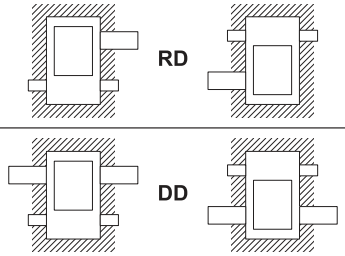
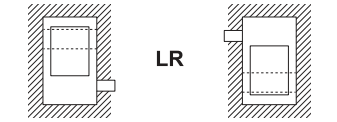
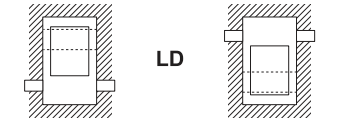
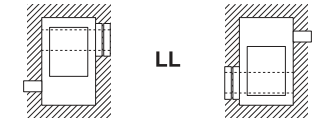
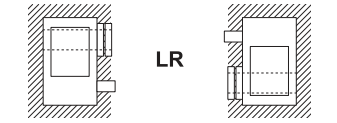
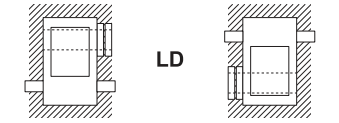
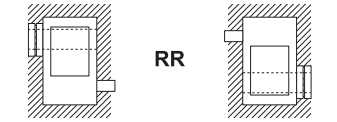
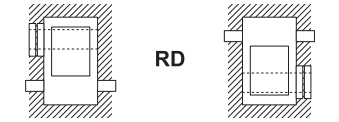
• **Solid input shaft**, single- or double-sided – Specify **VP**

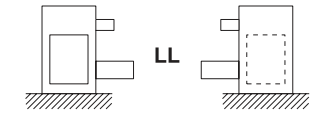
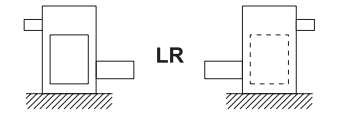
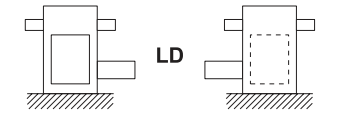
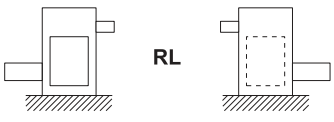
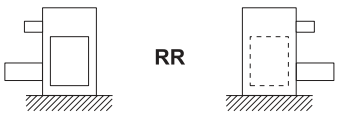
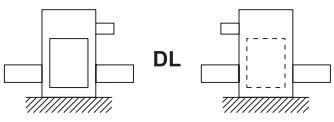
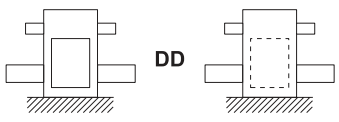
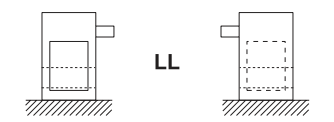
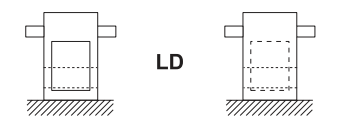
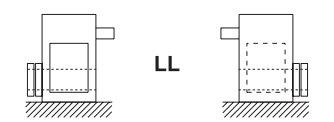
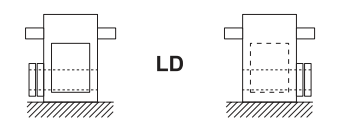
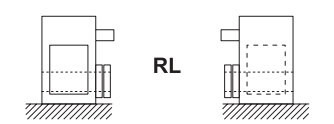
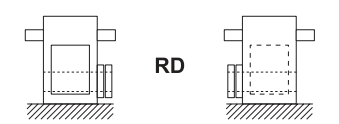
• **Motor flange mounting** for an IEC-standard electric motor with IM B5 flange. The option is only applicable to units HDP 60... HDP 90 in the triple reduction configuration – Specify **AD**.

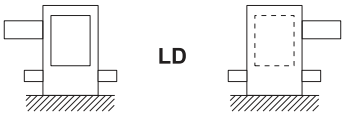
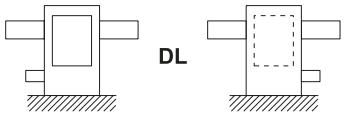
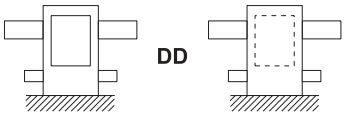
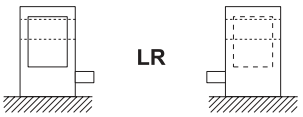
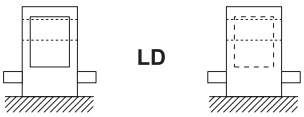
• **Motor mounting through motor bell housing IEC or NEMA and flexible coupling**. The option is designated **GL/NGL** or **GR/NGR** depending on what side of the gear unit the coupling is mounted. The flexible coupling is within the scope for supply.

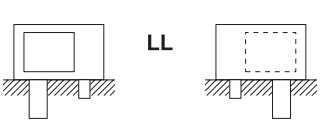
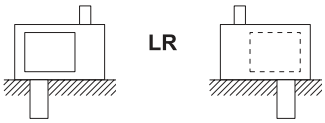
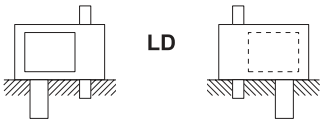
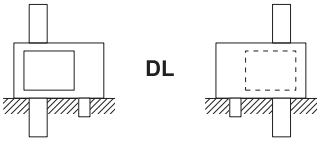
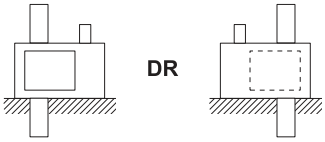
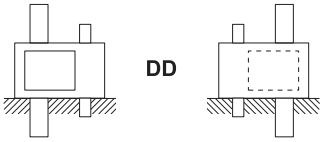
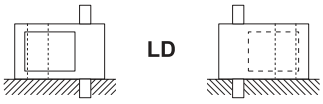
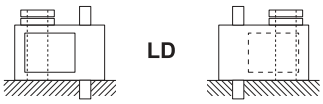
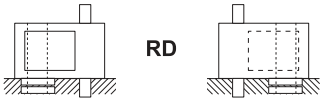
VP	AD	GL-NGL	GR-NGR
			

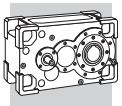
15.4.3 SHAFT ARRANGEMENT

		VP - GL - NGL - AD	VP - GR - NGR - AD	VP - GL - NGL - GR - NGR
B3	LP	 LL	 LR	 LD
		 RL	 RR	 RD
		DL	DR	DD
	H	 LL	 LR	 LD
	S	 LL	 LR	 LD
		 RL	 RR	 RD

		VP - GL - NGL - AD	VP - GR - NGR - AD	VP - GL - NGL - GR - NGR
B6	LP	 LL	 LR	 LD
		 RL	 RR	 RD
		 DL	 DR	 DD
	H	 LL	 LR	 LD
	S	 LL	 LR	 LD
		 RL	 RR	 RD

		VP - GL - NGL - AD	VP - GR - NGR - AD	VP - GL - NGL - GR - NGR
B7	LP	 LL RL	 LR RR	 LD RD
		 DL	 DR	 DD
	H	 LL	 LR	 LD
	S	 LL	 LR	 LD
		 RL	 RR	 RD

		VP - GL - NGL - AD	VP - GR - NGR - AD	VP - GL - NGL - GR - NGR
V5	LP	 LL RL	 LR RR	 LD RD
		 DL	 DR	 DD
	H	 LL	 LR	 LD
	S	 LL	 LR	 LD
		 RL	 RR	 RD



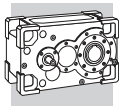
15.5 MOTOR AVAILABILITY

The following charts list the motor/gearbox combinations that are geometrically feasible. Variants are only applicable if either an AD (direct motor mounting) or a GL/NGL - GR/NGR input configuration (coupling through motor bell housing IEC or NEMA and flexible coupling) were previously specified within the ordering code.

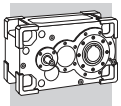
Because of standardisation, the rated power of the electric motor selected might be greater than nominal power Pn1 of choosen gearbox. Make sure that the electric motor will never develop the extra power at any stage of the operating cycle. If you have any doubts about the validity of the application data, or uncertainty concerning the actual load pattern, install a torque limiting device or proportionally revise the applicable service factor.

	Input configuration				
	AD				
	112	132	160	180	200
HDP 60 3	X	X	X	X	
HDP 70 3	X	X	X	X	X
HDP 80 3	—	X	X	X	X
HDP 90 3	—	—	X	X	X

		Input configuration						
		GL - GR						
		132	160	180	200	225	250	280
HDP 60 2	i =	17.3_19.4	7.1_19.4	7.1_19.4	7.1_19.4	7.1_19.4	—	—
HDP 60 3		22.7_98.4	22.7_98.4	22.7_49.1	22.7_49.1	22.7_49.1	—	—
HDP 70 2		19.4_22.6	8.0_22.6	8.0_22.6	8.0_22.6	8.0_22.6	—	—
HDP 70 3		25.5_114.4	25.5_114.4	25.5_57.0	25.5_57.0	25.5_57.0	—	—
HDP 80 2		—	15.5_22.6	15.5_22.6	15.5_22.6	8.1_22.6	8.1_22.6	8.1_22.6
HDP 80 3		—	25.8_111.4	25.8_111.4	25.8_75.2	25.8_75.2	25.8_75.2	25.8_75.2
HDP 90 2		—	15.8_22.4	15.8_22.4	15.8_22.4	15.8_22.4	7.9_22.4	7.9_22.4
HDP 90 3		—	25.4_110.1	25.4_110.1	25.4_110.1	25.4_73.3	25.4_73.3	25.4_73.3



Input configuration										
		GL - GR								
		112	132	160	180	200	225	250	280	315
HDP 100 2		—	—	—	—	—	—	7.4_21.8	7.4_21.8	7.4_21.8
HDP 100 3		—	—	55.5_107.6	55.5_107.6	22.8_107.6	22.8_107.6	22.8_107.6	22.8_50.0	22.8_50.0
HDP 100 4		110.6_507.9	110.6_507.9	110.6_507.9	110.6_507.9	110.6_507.9	—	—	—	—
HDP 110 2		—	—	—	—	—	—	8.1_25.0	8.1_25.0	8.1_25.0
HDP 110 3		—	—	60.7_123.4	60.7_123.4	24.9_123.4	24.9_123.4	24.9_123.4	24.9_54.5	24.9_54.5
HDP 110 4		120.9_499.4	120.9_499.4	120.9_499.4	120.9_499.4	120.9_499.4	—	—	—	—
HDP 120 2		—	—	—	—	—	—	—	7.9_25.4	7.9_25.4
HDP 120 3		—	—	—	64.3_125.2	64.3_125.2	25.8_125.2	25.8_125.2	25.8_56.1	25.8_56.1
HDP 120 4		—	128.0_523.7	128.0_523.7	128.0_523.7	128.0_523.7	128.0_523.7	—	—	—
HDP 125 2		—	—	—	—	—	—	—	8.9_25.0	8.9_25.0
HDP 125 3		—	—	—	72.5_123.6	72.5_123.6	29.1_123.6	29.1_123.6	29.1_62.6	29.1_62.6
HDP 125 4		—	144.4_506.5	144.4_506.5	144.4_506.5	144.4_506.5	144.4_506.5	—	—	—
HDP 130 2	i =	—	—	—	—	—	—	—	—	7.3_21.7
HDP 130 3		—	—	—	—	—	56.5_108.3	56.5_108.3	21.8_108.3	21.8_108.3
HDP 130 4		—	—	111.2_534.5	111.2_534.5	111.2_534.5	111.2_237.9	111.2_237.9	—	—
HDP 140 2		—	—	—	—	—	—	—	—	8.4_24.9
HDP 140 3		—	—	—	—	—	65.1_124.7	65.1_124.7	25.1_124.7	25.1_124.7
HDP 140 4		—	—	141.6_495.3	141.6_495.3	141.6_495.3	141.6_277.5	141.6_277.5	—	—
HDP 150 2		—	—	—	—	—	—	—	—	—
HDP 150 3		—	—	—	—	—	—	—	43.5_77.0	21.5_77.0
HDP 150 4		—	—	170.9_303.1	170.9_303.1	89.0_303.1	89.0_303.1	89.0_303.1	89.0_303.1	89.0_157.8
HDP 160 2		—	—	—	—	—	—	—	—	—
HDP 160 3		—	—	—	—	—	—	—	49.4_87.0	24.4_87.0
HDP 160 4		—	—	194.1_342.2	194.1_342.2	101.1_342.2	101.1_342.2	101.1_342.2	101.1_342.2	101.1_178.1
HDP 170		BONFIGLIOLI TECHNICAL SERVICE								
HDP 180										



Input configuration							
		NGL - NGR					
		N210TC	N250TC	N280TC	N320TC	N360TC	N400TC
HDP 60 2	i =	17.3_19.4	7.1_19.4	7.1_19.4	7.1_19.4	7.1_19.4	—
HDP 60 3		22.7_98.4	22.7_98.4	22.7_49.1	22.7_49.1	22.7_49.1	—
HDP 70 2		19.4_22.6	8.0_22.6	8.0_22.6	8.0_22.6	8.0_22.6	—
HDP 70 3		25.5_114.4	25.5_114.4	25.5_57.0	25.5_57.0	25.5_57.0	—
HDP 80 2		—	15.5_22.6	15.5_22.6	8.1_22.6	8.1_22.6	8.1_22.6
HDP 80 3		—	25.8_111.4	25.8_111.4	25.8_75.2	25.8_75.2	25.8_75.2
HDP 90 2		—	15.8_22.4	15.8_22.4	15.8_22.4	7.9_22.4	7.9_22.4
HDP 90 3		—	25.4_110.1	25.4_110.1	25.4_110.1	25.4_73.3	25.4_73.3

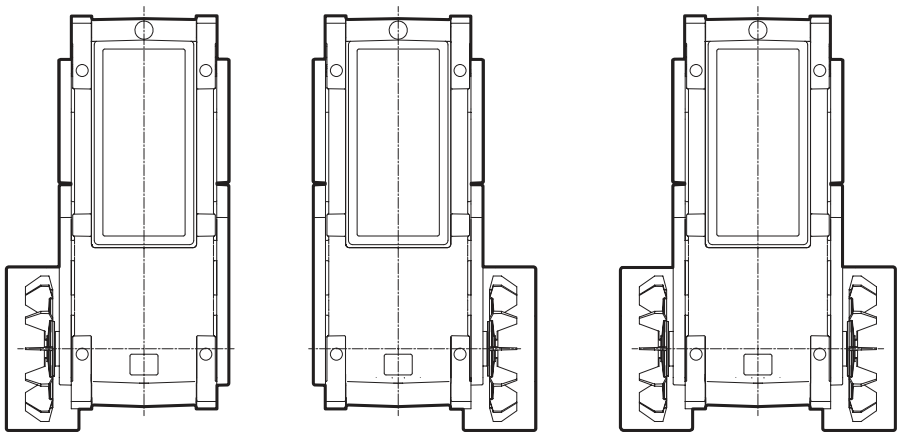
Input configuration									
		NGL - NGR							
		N180TC	N210TC	N250TC	N280TC	N320TC	N360TC	N400TC	N440TC
HDP 100 2	i =	—	—	—	—	—	7.4_21.8	7.4_21.8	—
HDP 100 3		—	—	55.5_107.6	55.5_107.6	22.8_107.6	22.8_107.6	22.8_50.0	—
HDP 100 4		110.6_507.9	110.6_507.9	110.6_507.9	110.6_507.9	110.6_507.9	—	—	—
HDP 110 2		—	—	—	—	—	8.1_25.0	8.1_25.0	—
HDP 110 3		—	—	60.7_123.4	60.7_123.4	24.9_123.4	24.9_123.4	24.9_54.5	—
HDP 110 4		120.9_499.4	120.9_499.4	120.9_499.4	120.9_499.4	120.9_499.4	—	—	—
HDP 120 2		—	—	—	—	—	—	7.9_25.4	7.9_25.4
HDP 120 3		—	—	—	64.3_125.2	25.8_125.2	25.8_125.2	25.8_56.1	25.8_56.1
HDP 120 4		—	128.0_523.7	128.0_523.7	128.0_523.7	128.0_523.7	128.0_523.7	—	—
HDP 125 2		—	—	—	—	—	—	8.9_25.0	8.9_25.0
HDP 125 3		—	—	—	72.5_123.6	29.1_123.6	29.1_123.6	29.1_62.6	29.1_62.6
HDP 125 4		—	144.4_506.5	144.4_506.5	144.4_506.5	144.4_506.5	144.4_506.5	—	—
HDP 130 2		—	—	—	—	—	—	—	7.3_21.7
HDP 130 3		—	—	—	—	56.5_108.3	56.5_108.3	21.8_108.3	21.8_108.3
HDP 130 4		—	—	111.2_534.5	111.2_534.5	111.2_534.5	111.2_237.9	—	—
HDP 140 2		—	—	—	—	—	—	—	8.4_24.5
HDP 140 3		—	—	—	—	65.1_124.7	65.1_124.7	25.1_124.7	25.1_124.7
HDP 140 4		—	—	141.6_495.3	141.6_495.3	141.6_495.3	141.6_277.5	—	—

15.6 OPTIONAL VARIANTS

15.6.1 AUXILIARY COOLING DEVICES

15.6.1.1 FAN COOLING

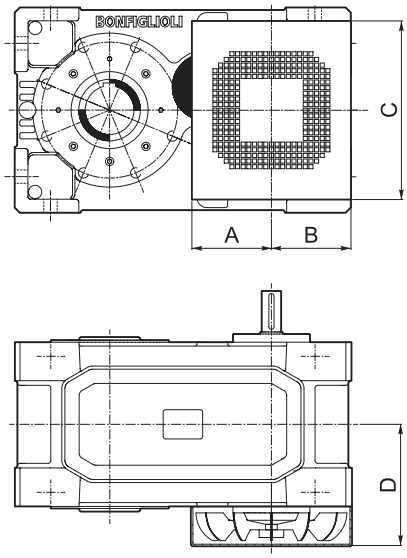
Greater heat dissipation capacity can be achieved by installing cooling fans, which are keyed on to the gearbox input shaft. Gear units HDP 60 ... HDP 90, except for configuration LD – RD – DD, and HDP 100 ... HDP 160 with lantern type motor adapter (GL/NGL or GR/NGR) may have an auxiliary fan fitted to the side opposite the drive end. Specify code **FANL** or **FANR**. On units ranging from HDP 100 to HDP 160 in the solid input shaft configuration (VP), the fan can be mounted on the right or left side irrespective of whether a drive shaft is present or not.
It is also possible to maximise the cooling capacity on HDP 100 to HDP 160 gearboxes by fitting two fans, specifying code FANLR in the order.
On the gearboxes HDP 170 and HDP 180, are used axial fans with fixed airfoil profile as standard.
Along with the specification of the option FANL or FANR, the direction of rotation for the output shaft (CW or CCW) must also be specified in the order, according to the conventions given in paragraph 15.6.3.



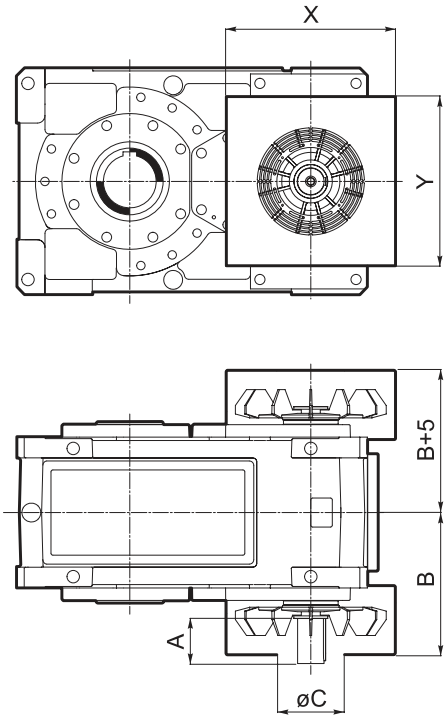
FANL **FANR** **FANLR**

(HDP 100 ... HDP 160)

This option is not available in conjunction with configurations that use the same shaft end or with MOP variant (forced lubrication with electric pump).
The efficiency of forced ventilation falls drastically below the drive speed of n_1 = 900 min^{-1}. In this case, it is advisable to adopt other auxiliary cooling devices to increase the thermal capacity of the gearbox.



	A [mm]	B [mm]	C [mm]	D [mm]
HDP 60 FAN_	125	130	255	200
HDP 70 FAN_	125	130	255	200
HDP 80 FAN_	155	155	348	235
HDP 90 FAN_	178	178	360	260



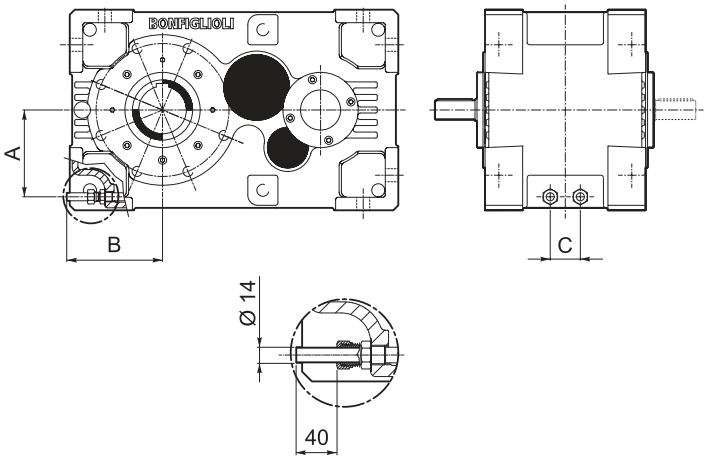
	i	A [mm]	B [mm]	C [mm]	X [mm]	Y [mm]
HDP 100 FAN_	7.4 ≤ i ≤ 21.8	105	330	180	424	420
	22.8 ≤ i ≤ 107.6	82	330	180	424	420
	110.6 ≤ i ≤ 507.9	58	330	180	424	420
HDP 110 FAN_	8.1 ≤ i ≤ 25.0	105	330	180	424	420
	24.9 ≤ i ≤ 123.4	82	330	180	424	420
	120.9 ≤ i ≤ 499.4	58	330	180	424	420
HDP 120 FAN_	7.9 ≤ i ≤ 25.4	105	345	180	450	450
	25.8 ≤ i ≤ 125.2	85	345	180	450	450
	128.0 ≤ i ≤ 523.7	58	345	180	450	450
HDP 125 FAN_	8.9 ≤ i ≤ 25.0	105	345	180	450	450
	29.1 ≤ i ≤ 123.6	85	345	180	450	450
	144.4 ≤ i ≤ 506.5	58	345	180	450	450
HDP 130 FAN_	7.3 ≤ i ≤ 12.3	130	422	230	540	590
	14.1 ≤ i ≤ 48.1	105	422	230	540	590
	56.5 ≤ i ≤ 237.9	82	422	230	540	590
	274.5 ≤ i ≤ 534.5	58	422	230	540	590
HDP 140 FAN_	8.4 ≤ i ≤ 14.4	130	422	230	540	590
	16.3 ≤ i ≤ 56.2	105	422	230	540	590
	65.1 ≤ i ≤ 277.5	82	422	230	540	590
	315.9 ≤ i ≤ 495.3	58	422	230	540	590
HDP 150 FAN_	7.9 ≤ i ≤ 14.1	165	472	230	540	665
	15.4 ≤ i ≤ 38.1	130	472	230	540	665
	43.5 ≤ i ≤ 77.0	105	472	230	540	665
	89.0 ≤ i ≤ 303.1	82	472	230	540	665
HDP 160 FAN_	9.0 ≤ i ≤ 15.9	165	472	230	540	665
	17.5 ≤ i ≤ 43.1	130	472	230	540	665
	49.4 ≤ i ≤ 87.0	105	472	230	540	665
	101.1 ≤ i ≤ 342.2	82	472	230	540	665
HDP 170 FAN_	BONFIGLIOLI TECHNICAL SERVICE					
HDP 180 FAN_						

15.6.1.2 HEAT DISSIPATION THROUGH COOLING COIL

The cooling coil option **SR** is designed for integration in a cooling circuit to be provided by the installer.

For optimal efficiency the cooling circuit supply must comply with the following specifications:

- max. pressure 8 bar
- min flow rate 5 l/min for HDP 60 … HDP 90
- min flow rate 10 l/min for HDP 100 … HDP 140
- max. water temperature 20°C



	A [mm]	B [mm]	C [mm]
HDP 60_ SR	147	170	60
HDP 70_ SR	147	170	60
HDP 80_ SR	173	190	60
HDP 90_ SR	190	210	60
HDP 100_ SR	230	285	100
HDP 110_ SR	230	270	100
HDP 120_ SR	258	305	100
HDP 125_ SR	288	345	100
HDP 130_ SR	325	340	100
HDP 140_ SR	325	365	100
HDP 150	BONFIGLIOLI TECHNICAL SERVICE		
HDP 160			
HDP 170			
HDP 180			

15.6.1.3 AUXILIARY COOLING WITH AUTONOMOUS COOLING UNIT

Two types of cooling units are available, each in a range of sizes providing different cooling capacities. The two types use different cooling media for the oil: MCRW… – water/oil heat exchanger and MCRA… – air/oil heat exchanger.

If an independent cooling unit is installed on the advice of the Bonfiglioli Technical Service, no additional forced lubrication devices are required. See section 15.6.2. The following chart shows device availability according to gearbox size.

	MCRW5 MCRA5	MCRW9 MCRA9	MCRW21 MCRA21	MCRW34 MCRA34	MCRW51 MCRA51	MCRW70 MCRA70
HDP 100	**X**	**X**				
HDP 110	**X**	**X**				
HDP 120	**X**	**X**	**X (*)**			
HDP 125	**X**	**X**	**X (**)**			
HDP 130	**X**	**X**	**X**	**X (**)**		
HDP 140	**X**	**X**	**X**	**X (**)**		
HDP 150	**X**	**X**	**X**	**X**	**X (**)**	
HDP 160	**X**	**X**	**X**	**X**	**X (**)**	
HDP 170	BONFIGLIOLI TECHNICAL SERVICE					
HDP 180						

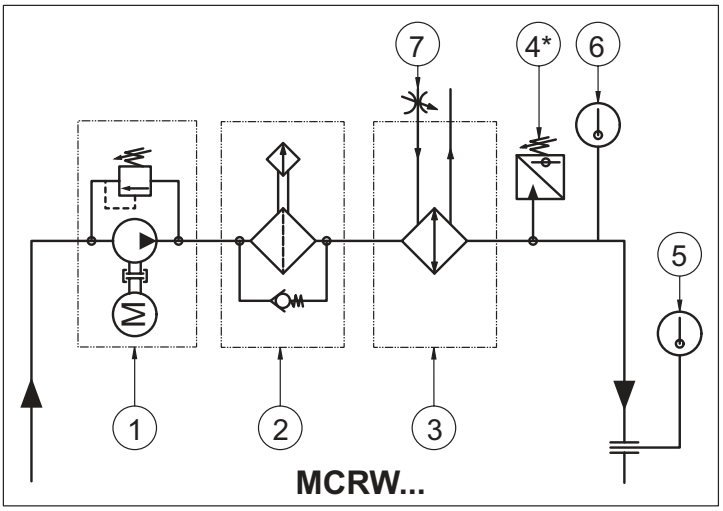
(*) not available for mounting position B3.

(**) not available for double reduction units in the mounting position B3.

The main components of the cooling units are as follows:

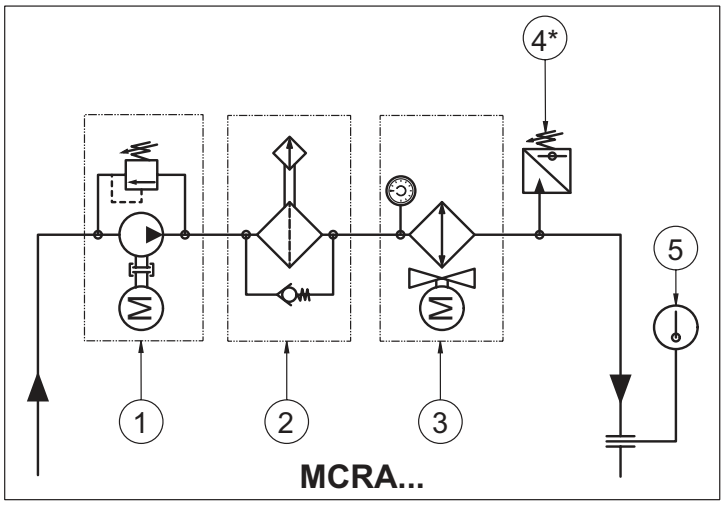
MCRW…

1) motorpump complete with by-pass circuit
2) filter with clogging visual indicator
3) water/oil heat exchanger
4) minimum pressure switch (only available in combination with forced lubrication)
5) maximum temperature thermostat
6) minimum temperature switch
7) electro-valve



MCRA…

1) motorpump complete with by-pass circuit
2) filter with clogging visual indicator
3) air/oil heat exchanger with thermostat
4) minimum pressure switch (only available in combination with forced lubrication)
5) maximum temperature thermostat



General warnings:

MCRW... : provide a water supply system that corresponds to the following specifications:

- max. pressure 10 bar
- maximum delivery temperature 20°C
- minimum flow rate Q_{H2O} as per the chart:

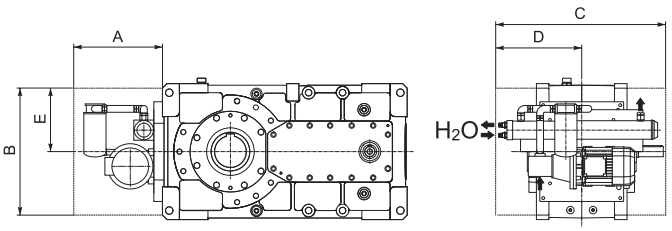
	MCRW5	MCRW9	MCRW21	MCRW34	MCRW51	MCRW70
Q_{H2O} [l/min]	10	18	31	56	81	BONFIGLIOLI TECHNICAL SERVICE

MCRA... : leave sufficient space around the heat exchanger to ensure an unrestricted air flow.

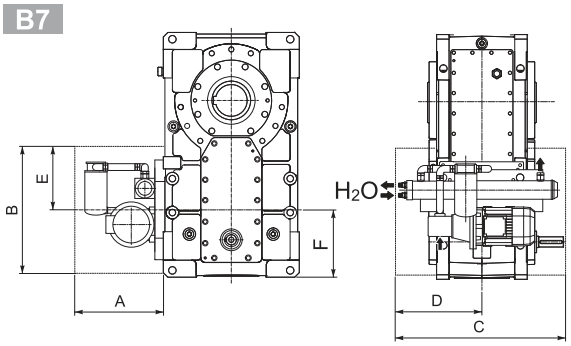
The cooling units are mounted as shown in the figure below.

MCRW...

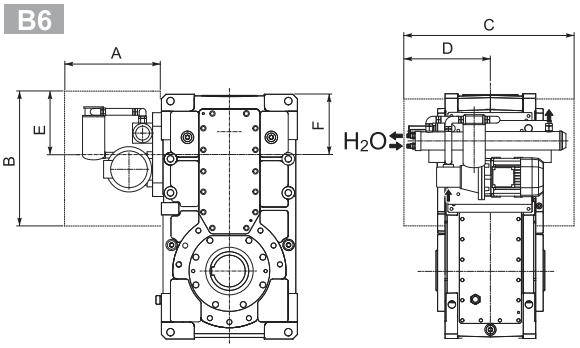
B3



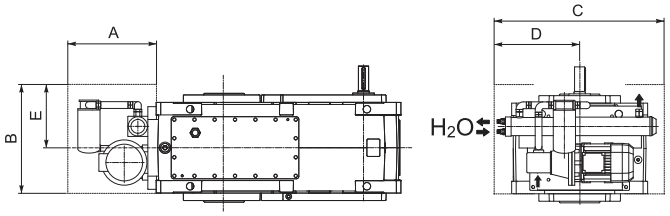
B7



B6



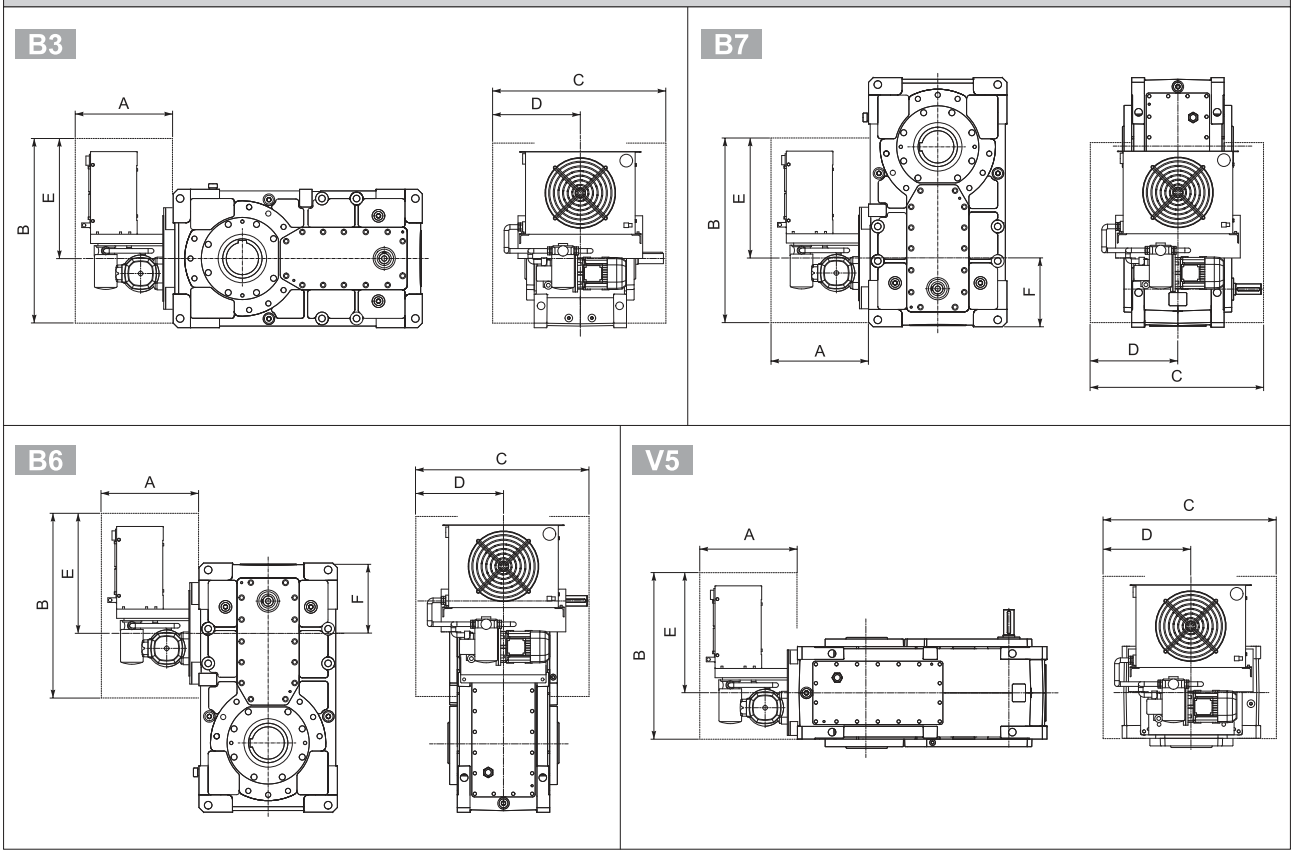
V5



	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]									
						HDP 100 - HDP 110		HDP 120		HDP 125		HDP 130 - HDP 140		HDP 150 - HDP 160	
						2x	3x/4x	2x	3x/4x	2x	3x/4x	2x	3x/4x	2x	3x/4x
MCRW5	360	415	730	365	230	325	270	350	300	BONFIGLIOLI TECHNICAL SERVICE		420	380	475	395
MCRW9	360	380	870	435	195										
MCRW21	400	425	780	390	240										
MCRW34	430	650	1000	500	465										
MCRW51	520	650	1250	625	465										
MCRW70	BONFIGLIOLI TECHNICAL SERVICE														

⚠ Overall dimensions A, B, C, D and E are indicative only

MCRA...



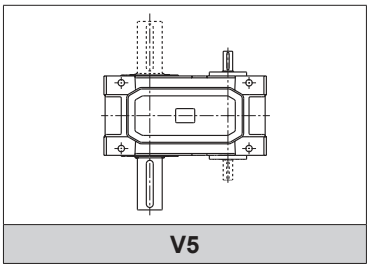
	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]									
						HDP 100 - HDP 110		HDP 120		HDP 125		HDP 130 - HDP 140		HDP 150 - HDP 160	
						2x	3x/4x	2x	3x/4x	2x	3x/4x	2x	3x/4x	2x	3x/4x
MCRA5	400	560	500	250	375	325	270	350	300	BONFIGLIOLI TECHNICAL SERVICE		420	380	475	395
MCRA9	435	650	640	320	465										
MCRA21	440	815	700	350	630										
MCRA34	500	920	840	420	735										
MCRA51	560	1075	1000	500	890										
MCRA70	BONFIGLIOLI TECHNICAL SERVICE														

⚠ Overall dimensions A, B, C, D and E are indicative only

15.6.1.4 HEATERS

In very low ambient temperatures it may prove necessary to pre-heat the lubricant in the sump before start-up and/or during operation. The **HE** option envisages the installation of an electrical heating element, supplied with a thermostat to detect when the minimum temperature needed for correct operation has been reached. The wiring necessary for the thermostat must be provided by the installer.

15.6.2 GREASE LUBRICATION



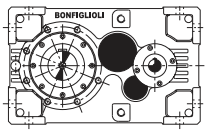
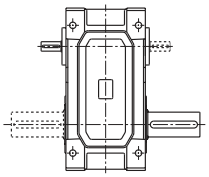
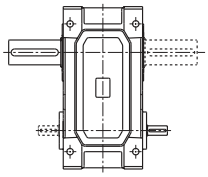
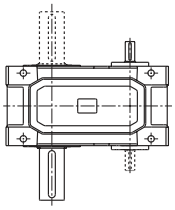
V5

Gearboxes of sizes HDP 60… HDP 90 in mounting position V5 are supplied with upper bearings (not immersed in oil) lubricated with grease and do not require periodic maintenance.

15.6.2.1 FORCED LUBRICATION

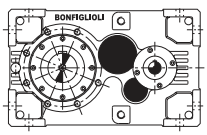
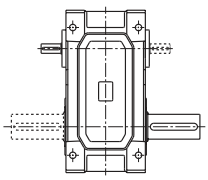
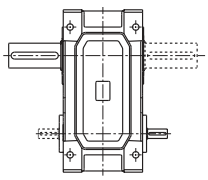
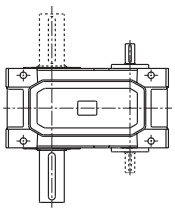
OPTIONAL application conditions

Gearboxes of sizes HDP 60… HDP 90 in mounting position V5 can be supplied, on request, with a forced lubrication circuit for bearings lubrication.

				
	B3	**B6**	**B7**	**V5**
HDP 60 ... HDP 90	⛔	⛔	⛔	OP... MOP

MANDATORY application conditions

Gearboxes of sizes HDP 100 ... HDP 180 in mounting position V5 are supplied with upper bearings not immersed in oil and lubricated through a forced lubrication circuit the lubrication of the same.

				
	B3	**B6**	**B7**	**V5**
HDP 100 ... HDP 180	⛔	⛔	⛔	OP... MOP

Remark: Forced lubrication devices may be replaced, upon approval from Bonfiglioli Technical Service, by independent cooling systems, type MCR...

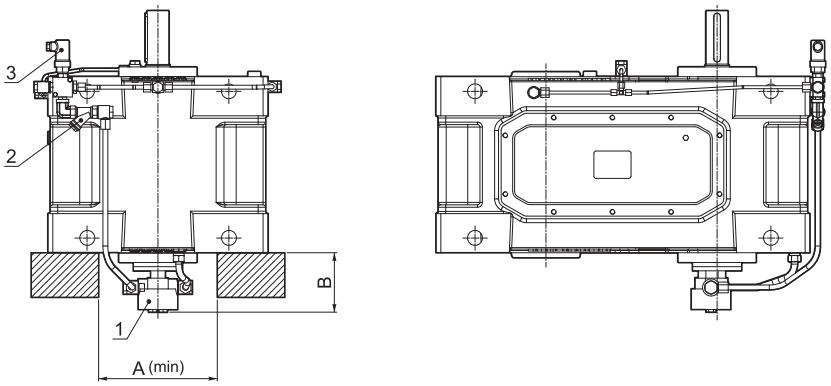
15.6.2.2 MECHANICAL PUMP

In continuous duty applications and V5 mounting position installations, an optional forced lubrication circuit is available on request, complete with a pump keyed to the shaft end opposite the drive side. This system ensures adequate lubrication of the top bearings.
When ordering, specify the pump type - **OP1** or **OP2** to suit drive speed n_1. See the table below.

	n_1 = 1000 min^{-1}	n_1 = 1200 min^{-1}	n_1 = 1500 min^{-1}
HDP 60 ... HDP 140	OP2	OP2	OP1
HDP 150, HDP 160	OP2	OP2	OP2
HDP 170, HDP 180	BONFIGLIOLI TECHNICAL SERVICE		

This option is not available with other configurations that use the same shaft end.

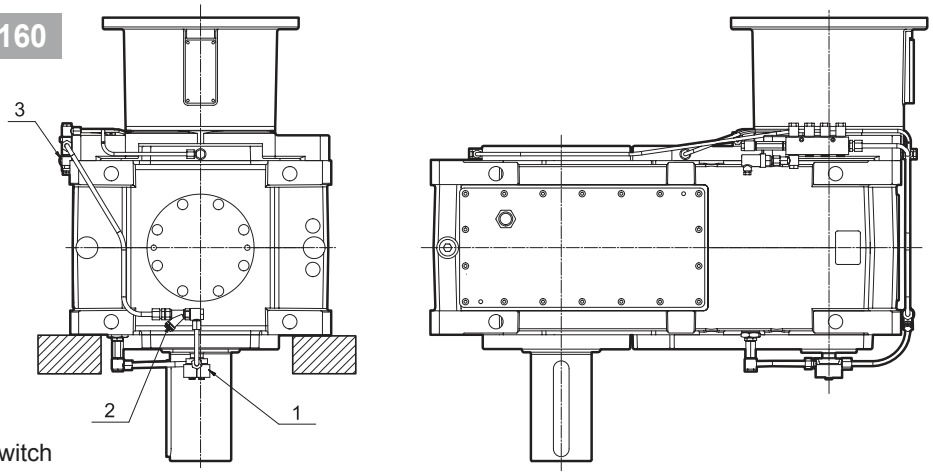
HDP 60 ... HDP 90



1 - Pump
2 - Filter
3 - Minimum pressure switch

	A (min) [mm]	B [mm]
HDP 60_ OP1	190	105
HDP 60_ OP2	190	105
HDP 70_ OP1	215	105
HDP 70_ OP2	215	105
HDP 80_ OP1	240	105
HDP 80_ OP2	240	130
HDP 90_ OP1	240	130
HDP 90_ OP2	240	130

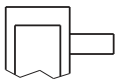
HDP 100 ... HDP 160



1 - Pump
2 - Filter
3 - Minimum pressure switch

Contact the Bonfiglioli Technical Service for overall dimensions.

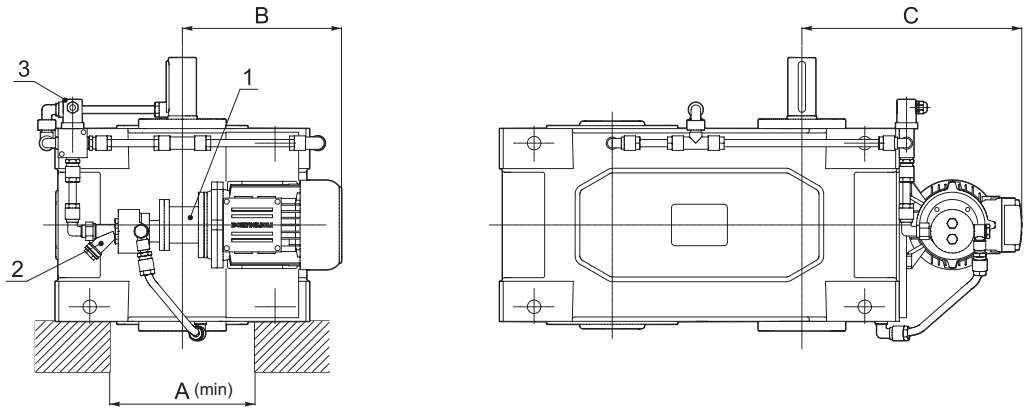
The chart shows the applicability for the pump depending on the input and output configuration.

			LL RL DL	LR RR DR	LD RD DD
HDP 60 ... HDP 180		LP	⛔	VP GR AD	⛔
		H	⛔	VP GR AD	⛔
		S	⛔	VP GR AD	⛔

15.6.2.3 MOTOR PUMP

For intermittent duty applications and V5 mounting position installations, a forced lubrication circuit is available on request, complete with an independently powered motor pump. This system ensures a constant oil flow to the top bearings. Specify the **MOP** option.
Option MOP is not available if fan cooling - option FAN_ - is also specified.

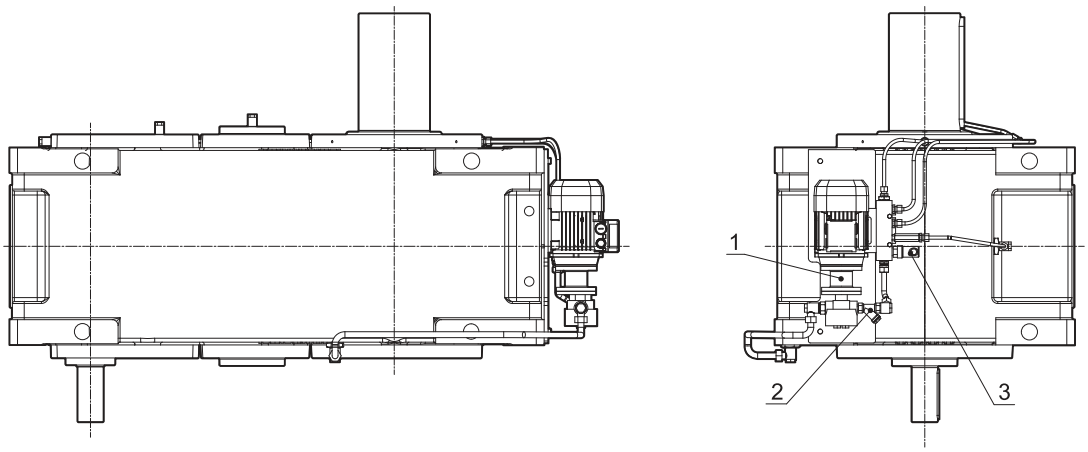
HDP 60 ... HDP 90



1 - Motorpump
2 - Filter
3 - Minimum pressure switch

	A (min) [mm]	B [mm]	C [mm]
HDP 60_ MOP	190	285	370
HDP 70_ MOP	215	280	370
HDP 80_ MOP	240	310	400
HDP 90_ MOP	240	325	440

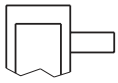
HDP 100 ... HDP 160



1 - Motorpump
2 - Filter
3 - Minimum pressure switch

Contact the Bonfiglioli Technical Service for overall dimensions.

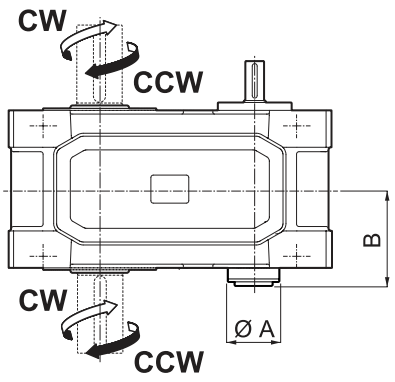
The chart shows the applicability for the motorpump depending on the input and output configuration.

			LL RD DL	**LR RR DR**	**LD RD DD**
HDP 60 ... HDP 90		**LP**	VP	VP GR AD	VP GR
		**H**	VP	VP GR AD	VP GR
		**S**	VP	VP GR AD	VP GR
HDP 100 ... HDP 180	No limitation on the basis of output or input configurations				

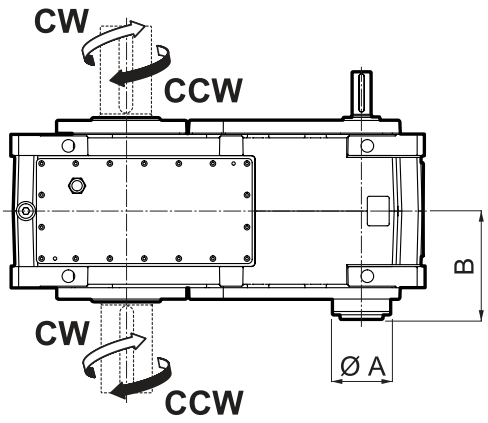
15.6.3 BACKSTOP DEVICE

The backstop device ensures that only one direction of rotation is allowed, and prevents the gearbox to be backdriven by the load connected to the output shaft.
In addition to verifying the shock loads shown in section 11.1, also make sure that the torque transmitted to the backstop $M_1 = M_2 / (i \times \eta)$ is less than the admissible torque M_{1max} listed in the chart below.
The backstop is keyed to the input shaft opposite the drive end and it is accessible for inspection.
Along with the specification of the backstop device, option **A**, the direction of free rotation for the output shaft (**CW** or **CCW**) must also be specified in the order. This option is not available with other configurations that use the same shaft end.
If special operating conditions require it, the user can reverse the direction of rotation of the backstop device by opening the backstop compartment and reversing the direction of the freewheel. If you need to perform this operation, contact Bonfiglioli's Technical Service for the necessary instructions.
The type of backstop device used, based on centrifugally released shoes, does not require any regular maintenance.
This option is not available with other configurations that use the same shaft end.

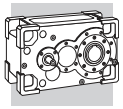
Under continuous operating conditions, it is advisable to maintain a neutral rotation speed n_{1min} greater than that specified in the chart in order to ensure the effective centrifugal release of all the shoes and avoid unnecessary wear.
For further details, contact the Bonfiglioli Technical Service.



	i	A [mm]	B [mm]	M_{1max} [Nm]	n_{1min} [min^{-1}]
HDP 60 2_A	7.1 ≤ i ≤ 15.2	125	202.5	800	630
	i = 17.3 ; 19.4	100	197.5	375	700
HDP 60 3_A	22.7 ≤ i ≤ 98.4	100	197.5	375	700
HDP 70 2_A	8.0 ≤ i ≤ 17.7	125	202.5	800	630
	i = 19.4 ; 22.6	100	197.5	375	700
HDP 70 3_A	25.5 ≤ i ≤ 114.4	100	197.5	375	700
HDP 80 2_A	8.1 ≤ i ≤ 22.6	130	233	910	610
HDP 80 3_A	25.8 ≤ i ≤ 111.4	110	228	550	710
HDP 90 2_A	7.9 ≤ i ≤ 22.4	150	261	1400	560
HDP 90 3_A	25.4 ≤ i ≤ 110.1	125	256	800	630



	i	A [mm]	B [mm]	M_{1max} [Nm]	n_{1min} [min^{-1}]
HDP 100 2_A	7.4 ≤ i ≤ 21.8	175	285	2350	510
HDP 100 3_A	22.8 ≤ i ≤ 50.0	150	298	1400	560
	55.5 ≤ i ≤ 107.6	125	293	800	630
HDP 100 4_A	110.6 ≤ i ≤ 507.9	95	262	310	725
HDP 110 2_A	8.1 ≤ i ≤ 25.0	175	285	2350	510
HDP 110 3_A	24.9 ≤ i ≤ 54.5	150	298	1400	560
	60.7 ≤ i ≤ 123.4	125	293	800	630
HDP 110 4_A	120.9 ≤ i ≤ 499.4	95	262	310	725
HDP 120 2_A	7.9 ≤ i ≤ 25.4	190	315	3050	470
HDP 120 3_A	25.8 ≤ i ≤ 56.1	150	285	1400	560
	64.3 ≤ i ≤ 125.2	125	279	800	630
HDP 120 4_A	128.0 ≤ i ≤ 523.7	95	277	310	725
HDP 125 2_A	8.9 ≤ i ≤ 25.0	190	315	3050	470
HDP 125 3_A	29.1 ≤ i ≤ 62.6	150	285	1400	560
	72.5 ≤ i ≤ 123.6	125	279	800	630
HDP 125 4_A	144.4 ≤ i ≤ 506.5	95	277	310	725
HDP 130 2_A	7.3 ≤ i ≤ 12.3	230	425	5600	410
	14.1 ≤ i ≤ 21.7	210	395	4500	440
HDP 130 3_A	21.8 ≤ i ≤ 48.1	190	366	3050	470
	56.5 ≤ i ≤ 108.3	175	355	2350	510
HDP 130 4_A	111.2 ≤ i ≤ 534.5	110	332	550	670
HDP 140 2_A	8.4 ≤ i ≤ 14.4	230	425	5600	410
	16.3 ≤ i ≤ 24.9	210	395	4500	440
HDP 140 3_A	25.1 ≤ i ≤ 56.2	190	366	3050	470
	65.1 ≤ i ≤ 124.7	175	355	2350	510
HDP 140 4_A	141.6 ≤ i ≤ 495.3	110	332	550	670
HDP 150 2_A	7.9 ≤ i ≤ 14.1	290	487.5	10500	355
	15.4 ≤ i ≤ 19.6	230	447.5	5600	410
HDP 150 3_A	21.5 ≤ i ≤ 38.1	230	445.5	5600	410
	43.5 ≤ i ≤ 77.0	190	417	3050	470
HDP 150 4_A	89.0 ≤ i ≤ 303.1	150	385	1400	560
HDP 160 2_A	9.0 ≤ i ≤ 15.9	290	487.5	10500	355
	17.5 ≤ i ≤ 22.1	230	447.5	5600	410
HDP 160 3_A	24.4 ≤ i ≤ 43.1	230	445.5	5600	410
	49.4 ≤ i ≤ 87.0	190	417	3050	470
HDP 160 4_A	101.1 ≤ i ≤ 342.2	150	385	1400	560
HDP 170	BONFIGLIOLI TECHNICAL SERVICE				
HDP 180					



15.6.4 REINFORCED BEARINGS

Optional heavy-duty bearings are also available, with increased overhung load capacity. The HDB option can only be applied to HDP 60 ... HDP 90 units with the LP shaft arrangement (solid shaft). Option cannot be specified along with variant DW -drywell-.

15.6.4.1 PRIMARY BRAND BEARINGS

The new **PBB** option, for customers who request it, allows the gear unit to be equipped with bearings manufactured only by primary brands, thus ensuring the highest quality and production standards.

15.6.5 SEALS AND GASKETS

On request, gearboxes can be equipped with different oil sealing systems. These are:

TK - Taconite seals are recommended for environments characterised by the presence of abrasive dust or powders. Taconite seals incorporate a combination of sealing rings, labyrinths and a grease chamber. Greasing must be ensured as part of the scheduled maintenance programme. This option is not available for HDP 60 ... HDP 90 and is not also available for every size of gearboxes if combined with the optional variant “Mounting flanges” (FM excluded).
VS – Fluoro elastomer compound seal rings.
DS – Dual set of seal rings at each shaft end.
DVS – Dual set of Fluoro elastomer compound seal rings at each shaft end.

15.6.6 VENT FILTER WITH DRYING SALTS

The **DBF** option includes a vent with a filter to protect the gear unit from external environment contamination such as moisture that can cause rusting of internal components and degradation of the oil’s lubricating capacity, and fine particulate matter that induces premature wear of gears, bearings and seals.
The change of colour of the gel contained inside the filter indicates that the solution adopted is working correctly and efficiently. The control valve in the device ensures that no overpressure is created inside the gear unit (opening at 0.017 bar).
This option can only be configured for installation in mounting position B3 and is supplied as a kit, which is not assembled but is included with the gear unit. For all other mounting positions, please contact Bonfiglioli’s technical service. For installing the device, please refer to the User and Maintenance Manual available at www.bonfiglioli.com.

Gearbox size	Mounting position			
	B3	B6	V5	B7
HDP 60...HDP 90	X	BONFIGLIOLI TECHNICAL SERVICE		
HDP 100...HDP 125	X			
HDP 130...HDP 160	X			
HDP 170, HDP 180				

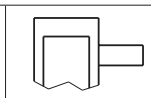
15.6.7 SENSORS

Bimetal thermostat – If the **TG** option is specified, a bimetallic thermostat detects when the oil temperature exceeds 90°C ± 5°C.
The device is supplied with the gear unit, but installation and wiring are the responsibility of the installer.

Oil level indicator – If the **OLG** option is specified in the order, the gearbox is supplied with a device to permit remote control of the oil level. The device best operates when the gearbox is idle and should be bypassed when the gearbox is operating. Wiring is the responsibility of the installer.
The device may not be available in combination with other accessories and/or particular product configurations. Please contact Bonfiglioli Technical Service for advise.

15.6.8 DRYWELL

The Drywell device, option **DW**, guarantees proper sealing for the output shaft. It can only be applied to gearboxes in vertical mounting position V5.
When specified, it necessarily requires the installation of a forced lubrication system, selected from those available for the gearbox, as illustrated in the relevant section of this catalogue.
At scheduled intervals, check and refill the grease in the vane underneath the output shaft's bottom bearing.
The chart shows the applicability for the drywell depending on the input and output configurations.

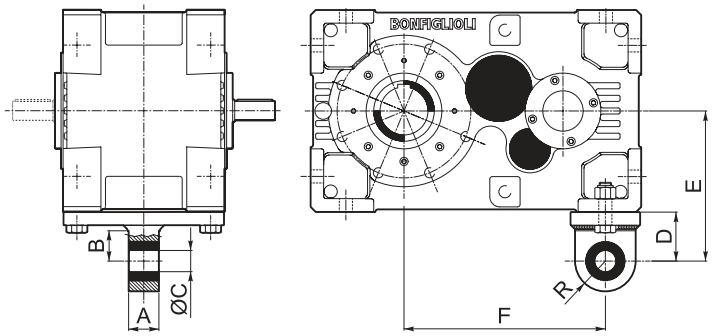
			LR	DR	LD	DD	LL	DL
HDP 60 ... HDP 180		LP	VP GR	VP GR	VP GR GL	VP GR GL	AD	AD
		H	VP GR	⛔	VP GR GL	⛔	AD	⛔
		S	VP GR	⛔	VP GR GL	⛔	AD	⛔

The drywell **is NOT available** for the gear ratios listed here under:

⛔ DW	HDP 60	HDP 70	HDP 80	HDP 90	HDP 100	HDP 110	HDP 120	HDP 125	HDP 130	HDP 140	HDP 150	HDP 160	HDP 170	HDP 180
i =	17.3 19.4 43.7 49.1 87.6 98.4	19.4 22.6 49.1 57.0 98.5 114.4	—	20.1 22.4 65.8 73.3 98.9 110.1	BONFIGLIOLI TECHNICAL SERVICE									

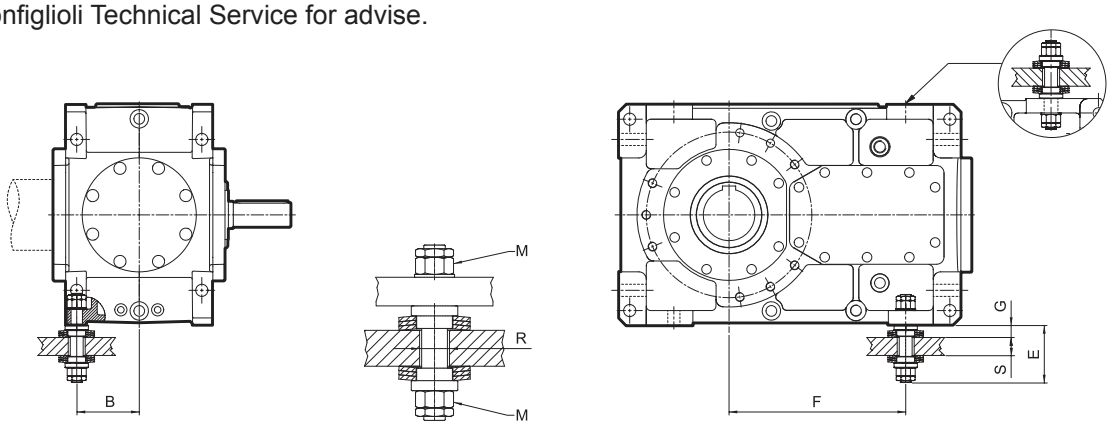
15.6.9 FIXING ELEMENTS

For shaft-mounted installations, HDP 60 ... HDP 90 gearboxes can be fitted with an electro-welded steel torque arm, complete with anti-vibration bushing.

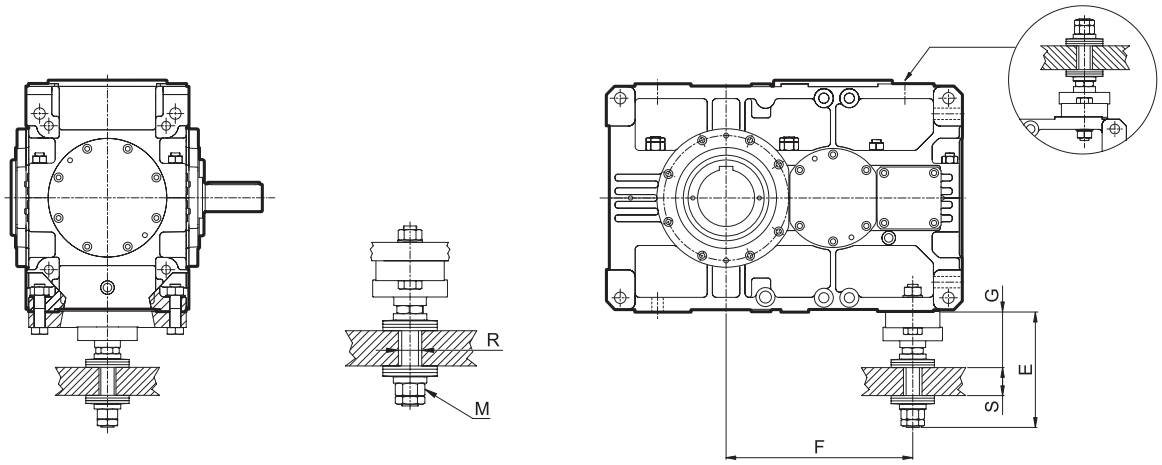


	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	R [mm]
HDP 60_ TA	40	47	32	76	251	340	47
HDP 70_ TA	40	47	32	76	251	375	47
HDP 80_ TA	60	60	42	97	297	400	60
HDP 90_ TA	60	68	42	113	338	460	68

To perform the same function, gearboxes HDP 100 and larger can be supplied with a hardened steel bolt to secure the units to the machine framwork.
Vibration damping cup springs are also supplied within the kit. The customer must adjust the preload of these springs during installation, respecting the value G given in the chart below.
The reaction bolt must be fitted on the side of the gearbox next to the driven machine and in the farthest hole from output shaft centre (see dimension F in the following figure).
Fitting the bolt on same side as the inspection cover is not possible. In this case please contact Bonfiglioli Technical Service for advise.



	F [mm]	B [mm]	E [mm]	G [mm] Rated value	M	R [mm]	S [mm]	DIN2093
HDP 100 2_TA	420	160	153	33.4	M27	35	30 - 40	A100
HDP 100 3_TA **HDP 100 4_TA**	540							
HDP 110 2_TA	435	160	153	33.4	M27	35	30 - 40	A100
HDP 110 3_TA **HDP 110 4_TA**	555							
HDP 120 2_TA	480	170	166	33.4	M30	40	40 - 50	A100
HDP 120 3_TA **HDP 120 4_TA**	630							
HDP 125 2_TA	530	170	166	33.4	M30	40	40 - 50	A100
HDP 125 3_TA **HDP 125 4_TA**	680							
HDP 130 2_TA	585	216	205	42.7	M36	45	50 - 60	A125
HDP 130 3_TA **HDP 130 4_TA**	780							
HDP 140 2_TA	625	216	205	42.7	M36	45	50 - 60	A125
HDP 140 3_TA **HDP 140 4_TA**	790							



	F [mm]	E [mm]	G [mm] Rated value	M	R [mm]	S [mm]	DIN2093
HDP 150 2_TA	687.5	405	204.3	M48x2	52	70 - 80	A160
HDP 150 3_TA **HDP 150 4_TA**	877.5						
HDP 160 2_TA	727.5	405	204.3	M48x2	52	70 - 80	A160
HDP 160 3_TA **HDP 160 4_TA**	927.5						
HDP 170	BONFIGLIOLI TECHNICAL SERVICE						
HDP 180							

15.6.10 SURFACE PROTECTION

HDP 60 ... 90

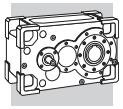
When no specific protection class is requested, the painted (ferrous) surfaces of gearboxes are protected to at least corrosivity class C2 (UNI EN ISO 12944-2). For improved resistance to atmospheric corrosion, gearboxes can be delivered with C3 and C4 surface protection, obtained by painting the complete gearbox.

HDP 100 ... 180

When no specific protection class is requested, the painted surfaces of gearboxes are protected to at least corrosivity class C3 (UNI EN ISO 12944-2). For improved resistance to atmospheric corrosion, gearboxes can be delivered with C4 surface protection, obtained by painting the complete gearbox.

SURFACE PROTECTION	Typical environments	Maximum surface temperature	Corrosivity class according to UNI EN ISO 12944-2
C3	Urban and industrial environments with up to 100% relative humidity (medium air pollution)	120°C	C3
C4	Industrial areas, coastal areas, chemical plant, with up to 100% relative humidity (high air pollution)	120°C	C4

Gearboxes with optional protection to class C3 or C4 are available in a choice of colours.
If no specific colour is requested (see the “PAINTING” option) gearboxes are finished in RAL 7042.
Gearboxes can also be supplied with surface protection for corrosivity class C5 according to UNI EN ISO 12944-2. Contact our Technical Service for further details.



15.6.11 PAINTING

Gearboxes with optional protection to class C3 or C4 are available in the colours listed in the following table.

PAINTING	Colour	RAL number
RAL7042*	Traffik Grey A	7042
RAL5010	Gentian Blue	5010
RAL9005	Jet Black	9005
RAL9006	White Aluminium	9006
RAL9010	Pure White	9010
RAL7035	Light Grey	7035
RAL7001	Silver Grey	7001
RAL5015	Sky Blue	5015
RAL7037	Dusty Grey	7037
RAL5024	Pastel Blue	5024

* Gearboxes are supplied in this standard colour if no other colour is specified.

NOTE - “PAINTING” options can only be specified in conjunction with “SURFACE PROTECTION” options.

15.6.12 LONG TERM STOCK

In presence of the Long Term Stock option the configured product is supplied without the standard lubricant oil but with an anticorrosive protective liquid to grant the integrity and full functionality of the gear unit in those cases where the unit will not be installed immediately but it has to be stocked for a long period of time (installation later than 6 months from delivery).
The warranty conditions are valid 12 months from commissioning (with commissioning within 24 months from delivery) or 24 months from delivery without commissioning.
After 2 years of stock, the unit with the Long Term Stock option needs to be checked by Bonfiglioli assistance center. In case of a product that is not properly preserved, an offer by Bonfiglioli will be issued for a complete restore.
With the recovery activity successfully concluded, the warranty conditions restart from the 12 months of commissioning (with commissioning within 24 months from restore date) or 24 months from restore date

Applicability of the Long Term Stock option:

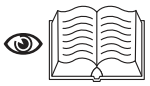
Gearbox size	Applicability of Long Term Stock option
HDP 60 ... HDP 160	**SLM, SLP**

The Long Term Stock option can be requested in 2 versions:

- SLM Long Term Stock_Mineral Oil: option having anti-corrosive protective oil compatible with all mineral-based oil and with synthetically based oils Polyalphaolefin (PAO) lubricants listed in the “Installation, operation and maintenance” Bonfiglioli manual.
- SLP Long Term Stock_Polyglycol Oil: option having anti-corrosive protective oil compatible with all synthetically based PolyGlycol (PAG) oil lubricants listed in the “Installation, operation and maintenance” Bonfiglioli manual.

Note: only one version can be selected. SLM and SLP can’t coexist.

When configuring a gear unit or gearmotor with the Long Term Stock option, it is necessary to know the type of lubricating oil that will be used by the customer during the operating period (mineral or polyglycol oil). Before commissioning a Bonfiglioli product with this option, make sure that the lubricating oil filling activity takes place through the specific filling plug determined by the mounting position indicated on the plate.
With regards to gear units with lifetime lubrication (see table below), the quantity of lubricating oil to top up is not indicated in the relevant “installation, use and maintenance” Bonfiglioli manual. In this case, if the Long Term Stock option is active, it is therefore necessary to contact the Bonfiglioli assistance center to receive this information.

Gearbox size	Lubricant charge quantity
HDP 60 ... HDP 160	

15.6.13 CERTIFICATES

AC - Certificate of compliance
The document certifies the compliance of the product with the purchase order and the construction in conformity with the applicable procedures of the Bonfiglioli Quality System.

CC - Inspection certificate
The document entails checking on order compliance, the visual inspection of external conditions and of mating dimensions. Checking on main functional parameters in unloaded conditions is also performed along with oil seal proofing, both in static and in running conditions. Units inspected are sampled within the shipping batch and marked individually.

CT - Type certificate
Further to the activities relevant to the Inspection certificate the following checks are also conducted:
• noise
• surface temperature
• tightness of external hardware
• functionality of ancillary devices, if fitted

All checks are conducted with the gear unit running unloaded. Units inspected are sampled within the shipping batch and marked individually.

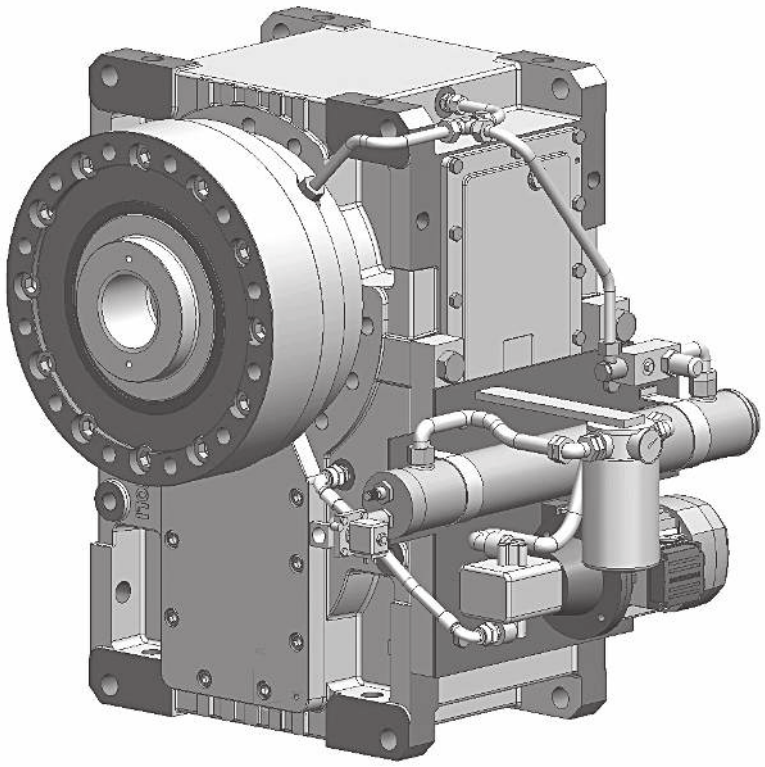
15.7 EXECUTION FOR EXTRUDER

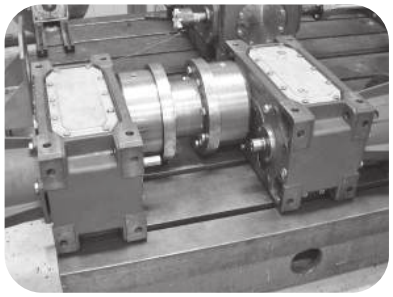
The HDPE series is the configuration specifically developed for **single-screw extruder drive** generated from the renown heavy duty series HDP, with which it shares most of the component parts and gearing.
Mounted forward to the sturdy nodular cast iron case, and housed into a robust extruder support, HDPE units feature a heavy duty spherical roller thrust bearing of series 294…E, exclusively sourced from primary brands.

Design features

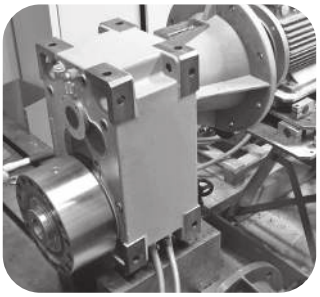
- Spheroidal graphite cast iron casing with universal mounting options
- Thrust bearing optimised for each application
- Radial roller bearings on the output shaft
- Customisable extruder screw/cylinder interface dimensions
- External cooling and forced lubrication units
- Lubrication shared between gearbox casing and screw box
- Fluoro elastomer compound seal rings

For more information see HDPE catalog.





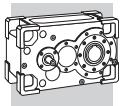




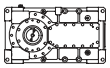
16 REFERENCE TORQUE

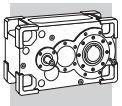
The torque values given in the table are influenced by the following elements: gear teeth, shafts and couplings. Performance may therefore vary with application conditions (see the “Thermal Capacity and Rating Charts”).

HDP															
		Mn_{2REF} [Nm]													
	i_N	HDP 60	HDP 70	HDP 80	HDP 90	HDP 100	HDP 110	HDP 120	HDP 125	HDP 130	HDP 140	HDP 150	HDP 160	HDP 170	HDP 180
2x	7.1	5.190	—	—	—	24.400	—	—		68.800	—	—	—	—	—
	8.0	4.720	6.200	10.350	14.000	24.710	26.080	36.820		65.830	86.990	113.880	—	150.450	—
	9.0	5.190	7.080	12.050	15.600	24.840	27.420	38.290	42.100	68.360	86.040	116.900	129.320	174.600	167.150
	10.0	4.720	6.750	11.350	17.700	24.740	26.540	37.550	43.940	65.410	86.990	112.740	150.940	189.150	193.450
	11.2	5.190	7.080	12.350	17.120	25.230	27.880	39.010	42.910	67.690	85.490	123.320	144.620	188.900	207.610
	12.5	4.720	6.750	11.500	17.700	24.740	26.940	38.140	44.300	64.770	86.990	115.490	142.390	197.670	209.900
	14.0	5.190	7.080	12.500	17.120	25.620	28.270	39.590	43.590	67.180	84.660	111.370	151.130	188.150	215.480
	16.0	4.720	6.750	11.750	17.000	24.570	27.330	38.580	44.980	64.290	86.990	123.610	142.840	188.900	204.880
	18.0	5.190	7.080	11.950	17.120	25.890	28.660	40.030	44.090	66.730	84.030	114.210	142.390	195.560	209.900
	20.0	4.720	6.750	11.900	17.700	24.410	27.660	39.000	45.480	63.860	86.990	110.150	149.410	186.170	213.180
	22.4	—	7.080	12.600	17.120	22.790	28.990	39.780	44.580	64.070	83.480	—	141.240	—	202.720
	25.0	—	—	—	—	—	26.960	36.630	45.950	—	82.230	—	—	—	—
3x	22.4	5.190	—	—	—	26.130	—	—		66.280	—	113.760	—	183.920	—
	25.0	4.720	6.750	9.900	17.900	24.260	30.360	40.090		63.450	77.440	113.030	129.180	190.190	204.380
	28.0	5.190	7.080	11.500	17.120	25.990	29.680	39.550	45.940	65.790	82.930	109.030	146.300	182.320	202.450
	31.5	4.720	6.750	11.650	17.900	24.140	30.740	40.810	47.450	62.990	84.810	117.200	139.790	188.900	200.130
	35.5	5.190	7.080	12.600	17.120	25.860	29.540	39.330	46.680	65.430	82.330	112.010	143.440	190.190	209.900
	40.0	4.720	6.750	12.600	17.900	24.030	31.130	40.620	48.180	62.650	84.810	108.070	146.300	182.210	202.450
	45.0	5.190	7.080	12.600	17.120	25.740	29.400	39.150	47.230	65.120	81.890	117.200	138.540	183.920	198.410
	50.0	4.720	6.750	11.950	17.900	23.920	31.100	40.410	48.720	62.360	82.170	111.000	138.770	189.610	204.380
	56.0	5.190	7.080	12.600	17.120	25.650	29.270	38.960	47.750	64.780	81.510	107.110	145.150	180.610	202.450
	63.0	4.720	6.750	12.600	17.900	23.830	30.740	40.250	49.240	62.050	84.810	117.200	137.300	188.900	196.680
	71.0	5.190	7.080	12.600	17.120	25.880	29.160	38.800	46.680	65.650	81.100	110.230	143.440	188.320	209.900
	80.0	4.720	6.750	12.000	17.900	24.050	31.130	40.600	48.180	62.890	84.810	106.390	144.140	179.410	202.450
	90.0	5.190	7.080	12.600	17.120	26.850	29.430	39.160	47.230	67.750	82.200	—	136.370	—	195.370
	100.0	4.720	6.750	12.600	17.900	24.880	31.350	41.250	48.720	64.910	82.170	—	—	—	—
	112.0	—	7.080	12.600	17.120	23.340	30.550	40.740	47.750	63.140	84.850	—	—	—	—
	125.0	—	—	—	—	—	27.630	37.570	49.240	—	78.870	—	—	—	—
4x	90.0	—	—	—	—	—	—	—		—	—	116.800	—	183.920	—
	100.0	—	—	—	—	—	—	—		—	—	116.060	132.640	190.190	204.380
	112.0	—	—	—	—	27.790	—	—		69.570	—	112.070	146.300	182.320	202.450
	125.0	—	—	—	—	24.880	31.350	41.250		66.770	—	117.200	143.630	188.900	205.480
	140.0	—	—	—	—	28.210	31.630	40.920	46.680	69.570	87.060	117.090	142.380	190.190	209.900
	160.0	—	—	—	—	24.880	31.790	41.250	48.180	66.770	84.860	114.780	146.300	182.320	202.450
	180.0	—	—	—	—	28.210	31.570	40.920	46.680	69.570	87.060	116.800	147.070	183.920	207.020
	200.0	—	—	—	—	24.880	31.570	41.250	48.180	66.770	81.580	117.090	132.640	190.190	204.380
	224.0	—	—	—	—	28.210	31.790	40.920	47.230	69.570	87.060	114.780	146.300	182.320	202.450
	250.0	—	—	—	—	24.880	31.350	41.250	49.240	66.770	81.230	117.200	147.070	188.900	205.480
	280.0	—	—	—	—	28.210	31.790	40.920	47.750	69.570	87.060	117.090	140.530	190.190	209.900
	315.0	—	—	—	—	25.110	31.570	41.250	48.180	66.770	84.860	114.780	146.300	182.320	202.450
	355.0	—	—	—	—	28.210	31.790	40.920	47.230	69.570	87.060	—	147.070	—	207.020
	400.0	—	—	—	—	25.410	31.570	41.250	48.180	66.770	84.860	—	—	—	—
	450.0	—	—	—	—	28.210	31.790	40.920	47.230	66.770	87.060	—	—	—	—
	500.0	—	—	—	—	25.410	31.570	41.250	49.240	63.140	82.170	—	—	—	—



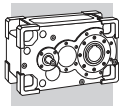
17 THERMAL CAPACITY AND RATING CHARTS

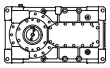
HDP 60								n_1 = 1500 min^{-1}
					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		$P_{TFANL / R}$ [kW]	
HDP 60 2	**7.1**	210	4570	105	96	67	114	80
HDP 60 2	**8.0**	187	4630	94	88	62	106	75
HDP 60 2	**9.0**	167	4900	89	82	58	99	71
HDP 60 2	**10.1**	149	4720	77	77	54	93	66
HDP 60 2	**11.2**	134	5190	76	75	53	91	65
HDP 60 2	**12.5**	120	4720	62	70	50	85	61
HDP 60 2	**13.5**	111	5190	63	69	49	84	60
HDP 60 2	**15.2**	99	4720	51	65	46	79	56
HDP 60 2	**17.3**	87	5190	49	62	45	75	55
HDP 60 2	**19.4**	77	4720	40	59	42	71	51
HDP 60 3	**22.7**	66	4740	35	48	35	57	42
HDP 60 3	**25.5**	59	4720	31	46	33	55	39
HDP 60 3	**28.2**	53	5190	31	45	33	54	39
HDP 60 3	**31.7**	47	4720	25	43	31	51	37
HDP 60 3	**34.2**	44	5190	25	43	31	51	37
HDP 60 3	**38.5**	39	4720	20	41	30	49	36
HDP 60 3	**43.7**	34	5190	19.8	40	29	48	35
HDP 60 3	**49.1**	31	4720	16.0	38	28	46	34
HDP 60 3	**56.6**	26.5	5190	15.3	37	27	44	32
HDP 60 3	**63.6**	23.6	4720	12.4	35	26	42	31
HDP 60 3	**68.6**	21.9	5190	12.6	35	26	42	31
HDP 60 3	**77.1**	19.4	4720	10.2	34	25	41	30
HDP 60 3	**87.6**	17.1	5190	9.9	33	24	39	29
HDP 60 3	**98.4**	15.2	4720	8.0	32	23	38	27

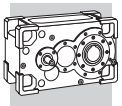


HDP 60 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 60 2	**7.1**	252	4300	118	94	63	115	78
HDP 60 2	**8.0**	224	4410	108	87	59	107	74
HDP 60 2	**9.0**	201	4630	101	82	56	102	70
HDP 60 2	**10.1**	179	4690	91	77	53	96	67
HDP 60 2	**11.2**	161	4960	87	76	53	94	66
HDP 60 2	**12.5**	144	4720	74	71	49	88	62
HDP 60 2	**13.5**	133	5190	75	70	49	87	61
HDP 60 2	**15.2**	118	4720	61	66	46	82	58
HDP 60 2	**17.3**	104	5190	59	64	45	79	56
HDP 60 2	**19.4**	93	4720	48	60	42	74	52
HDP 60 3	**22.7**	79	4460	39	48	34	58	42
HDP 60 3	**25.5**	71	4630	36	46	33	56	40
HDP 60 3	**28.2**	64	4960	35	46	33	56	40
HDP 60 3	**31.7**	57	4720	30	44	31	54	38
HDP 60 3	**34.2**	53	5180	30	43	31	53	38
HDP 60 3	**38.5**	47	4720	25	42	30	51	37
HDP 60 3	**43.7**	41	5190	24	40	29	49	36
HDP 60 3	**49.1**	37	4720	19.3	39	28	48	34
HDP 60 3	**56.6**	32	5190	18.4	37	27	45	33
HDP 60 3	**63.6**	28	4720	14.9	36	26	44	32
HDP 60 3	**68.6**	26	5190	15.1	36	26	44	32
HDP 60 3	**77.1**	23	4720	12.3	34	25	42	31
HDP 60 3	**87.6**	21	5190	11.9	34	24	41	29
HDP 60 3	**98.4**	18.3	4720	9.6	32	23	39	28

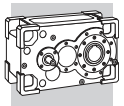


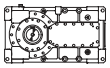
HDP 70								n_1 = 1500 min^{-1}
					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		$P_{TFANL / R}$ [kW]	
HDP 70 2	**8.0**	187	5940	121	95	65	113	78
HDP 70 2	**9.3**	161	6150	108	89	61	106	73
HDP 70 2	**10.1**	149	6370	103	83	58	99	70
HDP 70 2	**11.7**	128	6590	92	78	54	94	65
HDP 70 2	**12.6**	120	6750	88	76	54	91	65
HDP 70 2	**14.6**	103	7080	79	72	50	86	60
HDP 70 2	**15.2**	99	6750	73	70	50	84	60
HDP 70 2	**17.7**	85	7080	66	66	47	79	57
HDP 70 2	**19.4**	77	6750	57	64	46	76	55
HDP 70 2	**22.6**	67	7080	51	60	43	71	51
HDP 70 3	**25.5**	59	6750	44	49	35	58	41
HDP 70 3	**29.6**	51	7080	40	47	34	56	40
HDP 70 3	**31.7**	47	6750	35	47	34	55	40
HDP 70 3	**36.9**	41	7080	32	45	33	53	39
HDP 70 3	**38.5**	39	6750	29	44	32	52	38
HDP 70 3	**44.7**	34	7080	26	43	31	51	37
HDP 70 3	**49.1**	31	6750	23	42	30	50	36
HDP 70 3	**57.0**	26.3	7080	21	40	29	47	34
HDP 70 3	**63.7**	23.6	6750	17.7	38	28	45	33
HDP 70 3	**73.9**	20.3	7080	16.0	37	27	44	32
HDP 70 3	**77.2**	19.4	6750	14.6	37	27	44	32
HDP 70 3	**89.6**	16.7	7080	13.2	35	26	41	31
HDP 70 3	**98.5**	15.2	6750	11.4	35	25	41	29
HDP 70 3	**114.4**	13.1	7080	10.3	33	25	39	29

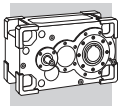


HDP 70 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 70 2	**8.0**	224	5620	137	93	61	113	76
HDP 70 2	**9.3**	193	5840	123	86	57	105	71
HDP 70 2	**10.1**	178	6010	117	82	55	101	69
HDP 70 2	**11.7**	154	6230	104	77	52	95	65
HDP 70 2	**12.6**	143	6510	102	76	52	93	65
HDP 70 2	**14.6**	124	6730	91	72	49	88	61
HDP 70 2	**15.2**	118	6750	87	71	49	87	61
HDP 70 2	**17.7**	102	7080	79	67	46	82	57
HDP 70 2	**19.4**	93	6750	68	65	45	79	55
HDP 70 2	**22.6**	80	7080	62	61	43	74	53
HDP 70 3	**25.5**	71	6750	53	50	35	60	42
HDP 70 3	**29.6**	61	7080	48	48	34	58	41
HDP 70 3	**31.7**	57	6620	42	47	33	57	40
HDP 70 3	**36.9**	49	6840	37	45	32	54	39
HDP 70 3	**38.5**	47	6750	35	45	32	54	39
HDP 70 3	**44.7**	40	7080	32	43	31	52	38
HDP 70 3	**49.1**	37	6750	28	42	30	51	36
HDP 70 3	**57.0**	32	7080	25	40	29	48	35
HDP 70 3	**63.7**	28.3	6670	21	38	28	46	34
HDP 70 3	**73.9**	24.4	7080	19.2	37	27	45	33
HDP 70 3	**77.2**	23.3	6750	17.5	37	27	45	33
HDP 70 3	**89.6**	20.1	7080	15.8	36	26	43	31
HDP 70 3	**98.5**	18.3	6750	13.7	35	25	42	30
HDP 70 3	**114.4**	15.7	7080	12.4	34	24	40	29

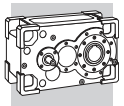


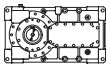
HDP 80								n_1 = 1500 min^{-1}
					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		$P_{TFANL / R}$ [kW]	
HDP 80 2	**8.1**	186	10350	210	133	88	167	113
HDP 80 2	**9.4**	160	10730	187	121	81	154	105
HDP 80 2	**9.8**	152	11060	184	121	81	153	105
HDP 80 2	**11.4**	131	11500	165	110	75	140	97
HDP 80 2	**12.6**	119	11500	149	110	75	139	96
HDP 80 2	**14.6**	103	12420	139	101	69	128	89
HDP 80 2	**15.5**	97	11750	124	102	71	129	91
HDP 80 2	**18.0**	83	11950	109	94	65	119	83
HDP 80 2	**19.4**	77	11900	100	94	65	118	83
HDP 80 2	**22.6**	66	12600	91	86	60	108	76
HDP 80 3	**25.8**	58	9900	64	72	51	89	64
HDP 80 3	**30.0**	50	11500	64	68	48	85	60
HDP 80 3	**31.7**	47	11650	61	69	49	85	61
HDP 80 3	**36.8**	41	12600	57	66	47	82	59
HDP 80 3	**39.8**	38	12600	53	67	47	83	59
HDP 80 3	**46.2**	32	12600	45	63	45	78	56
HDP 80 3	**51.6**	29.1	11950	39	56	40	71	51
HDP 80 3	**59.9**	25.0	12600	35	54	39	68	49
HDP 80 3	**64.8**	23.1	12600	32	54	39	68	49
HDP 80 3	**75.2**	19.9	12600	28	52	37	65	47
HDP 80 3	**76.4**	19.6	12000	26	54	40	67	50
HDP 80 3	**88.7**	16.9	12600	24	52	38	64	47
HDP 80 3	**95.9**	15.6	12600	22	53	39	65	48
HDP 80 3	**111.4**	13.5	12600	18.9	50	37	61	45

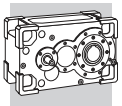


HDP 80 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 80 2	**8.1**	223	9820	239	126	80	165	109
HDP 80 2	**9.4**	192	10150	213	114	73	151	100
HDP 80 2	**9.8**	183	10480	209	116	75	153	102
HDP 80 2	**11.4**	158	10870	187	106	69	141	94
HDP 80 2	**12.6**	143	11420	178	108	71	141	95
HDP 80 2	**14.6**	123	11750	158	99	65	130	88
HDP 80 2	**15.5**	116	11750	149	102	68	132	90
HDP 80 2	**18.0**	100	11950	130	93	62	121	83
HDP 80 2	**19.4**	93	11900	120	93	63	120	83
HDP 80 2	**22.6**	80	12600	110	86	58	111	77
HDP 80 3	**25.8**	70	9900	77	72	49	91	63
HDP 80 3	**30.0**	60	11500	77	67	46	86	60
HDP 80 3	**31.7**	57	11310	71	68	47	87	61
HDP 80 3	**36.8**	49	12600	69	65	45	83	58
HDP 80 3	**39.8**	45	12020	60	66	46	84	59
HDP 80 3	**46.2**	39	12600	55	62	44	79	57
HDP 80 3	**51.6**	35	11950	46	56	39	73	51
HDP 80 3	**59.9**	30	12600	42	54	38	70	50
HDP 80 3	**64.8**	27.8	12600	39	54	38	70	50
HDP 80 3	**75.2**	23.9	12600	34	52	37	67	48
HDP 80 3	**76.4**	23.6	11200	29	55	40	70	51
HDP 80 3	**88.7**	20.3	12600	28	53	38	67	48
HDP 80 3	**95.9**	18.8	12600	26	53	39	67	49
HDP 80 3	**111.4**	16.2	12600	23	51	37	64	46

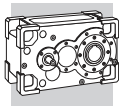


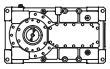
HDP 90								n_1 = 1500 min^{-1}
					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		$P_{TFANL / R}$ [kW]	
HDP 90 2	**7.9**	189	13620	281	170	113	204	138
HDP 90 2	**8.8**	170	14280	265	170	113	203	137
HDP 90 2	**10.1**	149	14770	240	160	109	192	132
HDP 90 2	**11.2**	134	15470	226	160	109	191	131
HDP 90 2	**12.2**	123	15640	209	154	106	184	128
HDP 90 2	**13.6**	110	16460	198	153	106	181	127
HDP 90 2	**15.8**	95	16730	173	140	98	166	117
HDP 90 2	**17.6**	85	17120	159	140	97	165	115
HDP 90 2	**20.1**	75	17700	144	123	86	147	103
HDP 90 2	**22.4**	67	17120	125	123	86	145	102
HDP 90 3	**25.4**	59	17000	112	99	70	116	83
HDP 90 3	**28.3**	53	17120	101	99	69	116	81
HDP 90 3	**32.9**	46	17900	91	93	66	109	78
HDP 90 3	**36.6**	41	17120	78	93	66	109	78
HDP 90 3	**40.0**	37	17600	73	85	60	101	72
HDP 90 3	**44.6**	34	17120	64	84	60	99	71
HDP 90 3	**51.8**	29.0	17900	58	80	57	95	68
HDP 90 3	**57.7**	26.0	17120	50	81	59	95	69
HDP 90 3	**65.8**	22.8	17900	45	76	55	90	65
HDP 90 3	**73.3**	20.5	17120	39	75	54	88	64
HDP 90 3	**77.8**	19.3	17900	38	72	53	85	62
HDP 90 3	**86.6**	17.3	17120	33	72	53	84	62
HDP 90 3	**98.9**	15.2	17900	30	68	50	80	59
HDP 90 3	**110.1**	13.6	17120	26	68	50	79	58

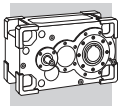


HDP 90 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 90 2	**7.9**	227	12910	320	160	101	199	130
HDP 90 2	**8.8**	204	13510	300	160	101	198	129
HDP 90 2	**10.1**	179	14010	273	154	100	190	127
HDP 90 2	**11.2**	161	14620	256	155	101	190	127
HDP 90 2	**12.2**	147	14840	238	151	100	185	125
HDP 90 2	**13.6**	132	15560	225	150	100	182	124
HDP 90 2	**15.8**	114	15830	197	140	94	170	116
HDP 90 2	**17.6**	102	16930	189	139	94	168	115
HDP 90 2	**20.1**	90	16990	166	124	84	151	104
HDP 90 2	**22.4**	80	17120	150	123	84	148	103
HDP 90 3	**25.4**	71	16110	127	99	67	118	81
HDP 90 3	**28.3**	64	16710	118	98	67	117	81
HDP 90 3	**32.9**	55	17210	105	92	63	111	77
HDP 90 3	**36.6**	49	17120	94	92	64	110	77
HDP 90 3	**40.0**	45	16660	83	85	59	103	72
HDP 90 3	**44.6**	40	17120	77	84	59	101	72
HDP 90 3	**51.8**	35	17900	69	80	56	97	68
HDP 90 3	**57.7**	31	17120	59	82	58	98	70
HDP 90 3	**65.8**	27.3	17900	54	76	54	92	65
HDP 90 3	**73.3**	24.6	17120	47	76	54	91	65
HDP 90 3	**77.8**	23.1	17820	46	74	54	89	65
HDP 90 3	**86.6**	20.8	17120	40	73	54	87	64
HDP 90 3	**98.9**	18.2	17900	36	69	51	82	61
HDP 90 3	**110.1**	16.3	17120	31	69	50	82	59

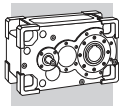


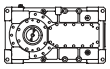
HDP 100								n_1 = 1500 min^{-1}
					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		$P_{TFANL / R}$ [kW]	
HDP 100 2	**7.4**	203	21450	474	212	139	303	206
HDP 100 2	**8.2**	182	24040	478	201	132	289	197
HDP 100 2	**9.1**	165	22560	405	201	133	286	196
HDP 100 2	**10.1**	148	24740	400	190	127	272	187
HDP 100 2	**11.3**	133	23790	346	189	127	268	185
HDP 100 2	**12.5**	120	24740	324	179	120	255	176
HDP 100 2	**14.2**	106	24880	287	174	117	246	170
HDP 100 2	**15.7**	95	24570	255	166	113	235	163
HDP 100 2	**18.0**	83	25890	235	158	108	222	155
HDP 100 2	**20.0**	75	24410	200	150	103	211	148
HDP 100 2	**21.8**	69	22790	171	145	99	203	142
HDP 100 3	**22.8**	66	23410	172	136	96	181	129
HDP 100 3	**25.3**	59	24260	160	130	92	174	124
HDP 100 3	**28.1**	53	24640	146	128	90	171	122
HDP 100 3	**31.3**	48	24140	129	123	87	166	118
HDP 100 3	**35.4**	42	25740	121	121	85	163	116
HDP 100 3	**39.3**	38	24030	102	116	82	157	112
HDP 100 3	**45.0**	33	25740	95	115	82	154	111
HDP 100 3	**50.0**	30	23920	80	110	79	148	107
HDP 100 3	**55.5**	27.0	25650	77	105	75	142	102
HDP 100 3	**61.7**	24.3	23830	64	102	73	138	100
HDP 100 3	**69.9**	21.5	25880	62	100	72	135	97
HDP 100 3	**77.7**	19.3	24050	52	97	70	130	95
HDP 100 3	**88.9**	16.9	26850	50	96	69	128	92
HDP 100 3	**98.8**	15.2	24880	42	92	67	122	89
HDP 100 3	**107.6**	13.9	23340	36	90	65	119	87
HDP 100 4	**110.6**	13.6	26300	40	81	60	106	79
HDP 100 4	**122.9**	12.2	24880	34	79	58	104	76
HDP 100 4	**139.2**	10.8	27540	34	78	58	103	76
HDP 100 4	**154.7**	9.7	24880	27	76	56	100	74
HDP 100 4	**177.0**	8.5	28210	27	74	55	98	73
HDP 100 4	**196.7**	7.6	24880	22	73	54	97	71
HDP 100 4	**222.2**	6.8	28210	22	72	53	95	70
HDP 100 4	**246.9**	6.1	24880	17.2	70	52	93	69
HDP 100 4	**286.4**	5.2	28210	16.8	66	49	88	65
HDP 100 4	**318.3**	4.7	25110	13.4	64	48	85	64
HDP 100 4	**359.6**	4.2	28210	13.4	64	48	85	63
HDP 100 4	**399.5**	3.8	25410	10.8	62	47	82	62
HDP 100 4	**457.1**	3.3	28210	10.5	61	46	80	60
HDP 100 4	**507.9**	3.0	25410	8.5	60	45	79	59

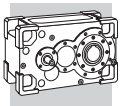


HDP 100 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 100 2	**7.4**	243	20310	539	196	120	300	196
HDP 100 2	**8.2**	219	22760	543	188	116	288	190
HDP 100 2	**9.1**	198	21360	460	189	117	286	188
HDP 100 2	**10.1**	178	23950	465	179	113	273	182
HDP 100 2	**11.3**	160	22520	393	179	114	269	180
HDP 100 2	**12.5**	144	24750	389	170	109	256	173
HDP 100 2	**14.2**	127	23550	326	166	107	248	167
HDP 100 2	**15.7**	114	24700	308	159	103	237	160
HDP 100 2	**18.0**	100	24740	270	152	99	225	153
HDP 100 2	**20.0**	90	24530	241	145	95	214	146
HDP 100 2	**21.8**	83	22900	206	139	92	205	141
HDP 100 3	**22.8**	79	22050	194	136	93	187	131
HDP 100 3	**25.3**	71	23480	186	131	89	181	126
HDP 100 3	**28.1**	64	23210	165	128	87	177	123
HDP 100 3	**31.3**	58	23480	150	123	85	172	121
HDP 100 3	**35.4**	51	24250	137	120	83	167	118
HDP 100 3	**39.3**	46	23480	120	116	80	162	114
HDP 100 3	**45.0**	40	25410	113	114	80	159	113
HDP 100 3	**50.0**	36	23480	94	110	77	154	109
HDP 100 3	**55.5**	32	25730	93	106	75	148	106
HDP 100 3	**61.7**	29.2	23480	76	103	73	144	103
HDP 100 3	**69.9**	25.7	25620	73	101	72	140	101
HDP 100 3	**77.7**	23.2	23480	61	98	70	136	98
HDP 100 3	**88.9**	20.3	26110	59	97	69	133	96
HDP 100 3	**98.8**	18.2	23480	48	93	67	128	92
HDP 100 3	**107.6**	16.7	22050	41	91	65	124	90
HDP 100 4	**110.6**	16.3	24800	46	82	60	111	81
HDP 100 4	**122.9**	14.6	23480	39	80	59	109	80
HDP 100 4	**139.2**	12.9	25960	38	80	58	108	79
HDP 100 4	**154.7**	11.6	23480	31	77	57	105	77
HDP 100 4	**177.0**	10.2	26450	31	76	56	103	76
HDP 100 4	**196.7**	9.2	23480	24	74	54	101	74
HDP 100 4	**222.2**	8.1	26450	24	73	54	99	73
HDP 100 4	**246.9**	7.3	24880	21	72	53	98	72
HDP 100 4	**286.4**	6.3	26450	18.9	67	50	92	68
HDP 100 4	**318.3**	5.7	24890	16.0	66	49	90	67
HDP 100 4	**359.6**	5.0	26450	15.0	65	48	89	65
HDP 100 4	**399.5**	4.5	25280	12.9	64	47	87	64
HDP 100 4	**457.1**	3.9	28210	12.6	62	46	84	62
HDP 100 4	**507.9**	3.5	25410	10.2	61	45	82	61

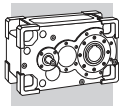


HDP 110								n_1 = 1500 min^{-1}
					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		$P_{TFANL / R}$ [kW]	
HDP 110 2	**8.1**	186	24740	500	209	134	297	199
HDP 110 2	**9.0**	167	26170	478	200	129	286	192
HDP 110 2	**9.9**	151	26010	428	198	129	281	190
HDP 110 2	**11.0**	136	27880	414	192	126	272	185
HDP 110 2	**12.3**	122	26940	358	187	123	263	179
HDP 110 2	**13.6**	110	28270	340	179	119	252	173
HDP 110 2	**15.5**	97	27330	289	174	116	243	167
HDP 110 2	**17.1**	88	28660	273	167	112	233	160
HDP 110 2	**19.7**	76	27660	230	161	109	222	154
HDP 110 2	**21.8**	69	28990	218	154	105	212	148
HDP 110 2	**25.0**	60	26960	176	144	99	198	139
HDP 110 3	**24.9**	60	26870	180	136	95	180	128
HDP 110 3	**27.6**	54	28010	170	132	92	176	124
HDP 110 3	**30.7**	49	28750	156	128	89	171	120
HDP 110 3	**34.0**	44	29540	145	125	88	167	119
HDP 110 3	**38.7**	39	30000	129	122	86	163	116
HDP 110 3	**42.8**	35	29400	115	118	83	158	112
HDP 110 3	**49.2**	31	31100	106	115	81	153	109
HDP 110 3	**54.5**	27.5	29270	90	111	79	148	107
HDP 110 3	**60.7**	24.7	30740	85	106	76	142	103
HDP 110 3	**67.2**	22.3	29160	72	103	74	138	100
HDP 110 3	**76.4**	19.6	31130	68	101	73	135	98
HDP 110 3	**84.6**	17.7	29430	58	98	71	130	95
HDP 110 3	**97.1**	15.4	31120	53	96	70	127	92
HDP 110 3	**107.6**	13.9	30550	47	94	68	123	90
HDP 110 3	**123.4**	12.2	27630	37	90	65	118	85
HDP 110 4	**120.9**	12.4	30410	43	81	60	106	78
HDP 110 4	**133.9**	11.2	31630	40	79	58	104	76
HDP 110 4	**168.5**	8.9	31790	32	77	56	101	74
HDP 110 4	**191.0**	7.9	31570	28	75	56	99	73
HDP 110 4	**193.4**	7.8	31570	28	75	55	99	72
HDP 110 4	**214.2**	7.0	31790	25	74	55	97	72
HDP 110 4	**248.6**	6.0	31350	21	68	51	91	68
HDP 110 4	**275.4**	5.4	31790	19.7	67	50	89	66
HDP 110 4	**313.0**	4.8	31570	17.2	66	49	88	65
HDP 110 4	**346.7**	4.3	31790	15.6	65	48	86	63
HDP 110 4	**392.9**	3.8	31570	13.7	64	48	84	63
HDP 110 4	**440.7**	3.4	31790	12.3	62	46	82	60
HDP 110 4	**499.4**	3.0	31570	10.8	61	46	80	60



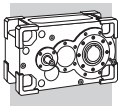
HDP 110 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 110 2	**8.1**	223	23430	569	190	113	291	187
HDP 110 2	**9.0**	201	24780	543	184	111	282	183
HDP 110 2	**9.9**	181	24630	486	183	111	277	180
HDP 110 2	**11.0**	163	26540	473	179	111	270	178
HDP 110 2	**12.3**	146	25950	414	176	109	263	173
HDP 110 2	**13.6**	132	27970	403	168	106	251	167
HDP 110 2	**15.5**	116	27100	344	165	104	244	162
HDP 110 2	**17.1**	105	28660	328	158	101	233	156
HDP 110 2	**19.7**	92	27660	276	154	100	224	152
HDP 110 2	**21.8**	83	28990	261	148	97	214	146
HDP 110 2	**25.0**	72	27090	213	139	91	200	136
HDP 110 3	**24.9**	72	25300	204	136	92	186	129
HDP 110 3	**27.6**	65	26400	192	131	89	181	125
HDP 110 3	**30.7**	59	27110	177	128	86	177	122
HDP 110 3	**34.0**	53	28320	167	125	85	173	120
HDP 110 3	**38.7**	47	28270	146	121	83	167	117
HDP 110 3	**42.8**	42	29040	136	117	80	162	113
HDP 110 3	**49.2**	37	29090	118	114	79	158	111
HDP 110 3	**54.5**	33	29040	107	111	77	154	108
HDP 110 3	**60.7**	29.7	30740	101	107	75	148	105
HDP 110 3	**67.2**	26.8	29040	87	104	73	144	102
HDP 110 3	**76.4**	23.6	30960	81	103	73	141	101
HDP 110 3	**84.6**	21.3	29040	69	100	71	137	98
HDP 110 3	**97.1**	18.5	29090	60	97	69	132	95
HDP 110 3	**107.6**	16.7	29040	54	95	67	128	92
HDP 110 3	**123.4**	14.6	26010	42	90	64	121	87
HDP 110 4	**120.9**	14.9	28540	48	83	60	112	81
HDP 110 4	**133.9**	13.4	29040	44	81	59	109	80
HDP 110 4	**168.5**	10.7	29040	35	78	57	105	77
HDP 110 4	**191.0**	9.4	31570	34	77	56	104	76
HDP 110 4	**193.4**	9.3	29090	31	77	56	104	76
HDP 110 4	**214.2**	8.4	29040	28	75	55	101	74
HDP 110 4	**248.6**	7.2	31350	26	70	51	96	70
HDP 110 4	**275.4**	6.5	29040	22	68	50	93	69
HDP 110 4	**313.0**	5.8	31570	21	67	50	92	68
HDP 110 4	**346.7**	5.2	29040	17.1	66	49	90	67
HDP 110 4	**392.9**	4.6	31570	16.4	65	48	88	65
HDP 110 4	**440.7**	4.1	29040	13.5	63	47	85	63
HDP 110 4	**499.4**	3.6	29090	11.9	62	46	84	62



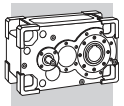
HDP 120 — n_1 = 1500 min^{-1}

					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		$P_{TFANL\,/\,R}$ [kW]	
HDP 120 2	**7.9**	190	32940	681	272	174	376	250
HDP 120 2	**8.6**	174	33560	637	261	168	362	242
HDP 120 2	**10.3**	146	35710	567	249	162	344	232
HDP 120 2	**11.2**	134	36370	530	239	156	331	224
HDP 120 2	**13.0**	115	37080	466	235	156	322	220
HDP 120 2	**14.2**	106	37840	437	225	150	309	212
HDP 120 2	**16.0**	94	38580	395	217	145	296	203
HDP 120 2	**17.4**	86	39810	374	208	140	284	196
HDP 120 2	**20.6**	73	39000	309	199	134	269	185
HDP 120 2	**22.5**	67	39780	290	191	129	258	178
HDP 120 2	**25.4**	59	36630	236	187	127	249	173
HDP 120 3	**25.8**	58	36330	235	169	119	220	157
HDP 120 3	**28.0**	53	37110	221	164	116	215	153
HDP 120 3	**32.5**	46	38040	195	159	112	208	148
HDP 120 3	**35.4**	42	38620	182	153	109	201	145
HDP 120 3	**39.9**	38	39930	167	149	106	196	141
HDP 120 3	**43.5**	34	39150	150	145	103	191	137
HDP 120 3	**51.6**	29.1	40410	131	142	102	186	135
HDP 120 3	**56.1**	26.7	38960	116	138	99	181	131
HDP 120 3	**64.3**	23.3	40250	105	130	93	172	124
HDP 120 3	**70.0**	21.4	38800	93	126	91	166	121
HDP 120 3	**78.9**	19.0	40600	86	123	89	162	117
HDP 120 3	**85.9**	17.5	39160	76	121	88	158	116
HDP 120 3	**101.8**	14.7	41250	68	117	85	152	111
HDP 120 3	**110.9**	13.5	40740	61	114	83	148	108
HDP 120 3	**125.2**	12.0	37570	50	113	82	145	105
HDP 120 4	**128.0**	11.7	38110	51	98	72	127	93
HDP 120 4	**139.4**	10.8	40920	50	96	71	125	92
HDP 120 4	**157.1**	9.5	39600	43	95	70	123	91
HDP 120 4	**171.1**	8.8	40920	41	93	69	121	90
HDP 120 4	**202.8**	7.4	41250	35	92	68	119	88
HDP 120 4	**220.8**	6.8	40920	32	90	67	117	87
HDP 120 4	**254.6**	5.9	41250	28	88	65	114	84
HDP 120 4	**277.2**	5.4	40920	25	86	64	112	83
HDP 120 4	**323.2**	4.6	41250	22	80	60	105	78
HDP 120 4	**351.9**	4.3	40920	19.8	77	58	101	76
HDP 120 4	**405.7**	3.7	41250	17.3	77	57	101	74
HDP 120 4	**454.3**	3.3	40920	15.3	75	56	98	73
HDP 120 4	**523.7**	2.9	41250	13.4	74	55	96	71



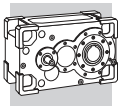
HDP 120 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 120 2	**7.9**	228	31180	774	247	147	365	234
HDP 120 2	**8.6**	209	31770	724	239	143	354	228
HDP 120 2	**10.3**	175	33810	644	230	141	339	221
HDP 120 2	**11.2**	160	34440	602	222	137	327	214
HDP 120 2	**13.0**	138	35100	529	221	139	320	212
HDP 120 2	**14.2**	127	35830	496	212	134	308	204
HDP 120 2	**16.0**	113	36900	453	206	130	297	197
HDP 120 2	**17.4**	103	37690	425	198	126	285	190
HDP 120 2	**20.6**	87	39000	371	189	122	269	181
HDP 120 2	**22.5**	80	39990	349	182	118	258	174
HDP 120 2	**25.4**	71	36810	285	178	116	249	168
HDP 120 3	**25.8**	70	34260	266	170	116	229	159
HDP 120 3	**28.0**	64	34980	250	165	113	223	155
HDP 120 3	**32.5**	55	35860	221	160	110	216	151
HDP 120 3	**35.4**	51	36410	206	154	106	209	147
HDP 120 3	**39.9**	45	37670	189	149	103	203	143
HDP 120 3	**43.5**	41	38220	176	144	100	197	139
HDP 120 3	**51.6**	35	38880	151	142	100	193	137
HDP 120 3	**56.1**	32	38500	137	138	97	187	133
HDP 120 3	**64.3**	28.0	38880	121	131	93	178	128
HDP 120 3	**70.0**	25.7	38500	110	128	90	174	124
HDP 120 3	**78.9**	22.8	38880	99	125	88	169	120
HDP 120 3	**85.9**	21.0	38500	90	123	87	166	118
HDP 120 3	**101.8**	17.7	38880	76	119	85	159	114
HDP 120 3	**110.9**	16.2	38500	70	116	83	154	111
HDP 120 3	**125.2**	14.4	34920	56	114	82	150	109
HDP 120 4	**128.0**	14.1	35910	57	100	73	133	97
HDP 120 4	**139.4**	12.9	39160	57	98	72	131	96
HDP 120 4	**157.1**	11.5	37010	48	97	71	129	95
HDP 120 4	**171.1**	10.5	38500	46	95	70	127	93
HDP 120 4	**202.8**	8.9	38880	39	94	69	125	92
HDP 120 4	**220.8**	8.2	38500	36	92	68	123	91
HDP 120 4	**254.6**	7.1	38880	31	90	66	120	88
HDP 120 4	**277.2**	6.5	38500	28	88	65	117	87
HDP 120 4	**323.2**	5.6	38880	25	82	61	110	82
HDP 120 4	**351.9**	5.1	38500	22	79	59	107	79
HDP 120 4	**405.7**	4.4	38880	20	78	58	105	78
HDP 120 4	**454.3**	4.0	40920	18	76	57	102	76
HDP 120 4	**523.7**	3.4	41250	16	75	56	100	74



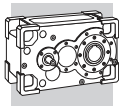
HDP 125 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 125 2	**8.9**	168	40210	737	350	227	450	301
HDP 125 2	**9.6**	156	40830	696	339	222	437	294
HDP 125 2	**11.6**	129	42910	604	316	209	407	276
HDP 125 2	**12.5**	120	44240	578	310	207	398	272
HDP 125 2	**14.7**	102	43590	486	297	200	380	261
HDP 125 2	**15.8**	95	44980	466	289	195	369	254
HDP 125 2	**18.0**	83	44090	400	275	185	350	240
HDP 125 2	**19.4**	77	45480	383	271	184	343	237
HDP 125 2	**23.3**	64	44580	313	252	171	317	219
HDP 125 2	**25.0**	60	45950	300	245	167	308	213
HDP 125 3	**29.1**	52	40990	235	222	159	272	196
HDP 125 3	**31.3**	48	43680	233	218	155	268	192
HDP 125 3	**36.7**	41	46030	209	208	149	256	184
HDP 125 3	**39.5**	38	46580	197	203	146	250	181
HDP 125 3	**45.1**	33	47230	175	195	140	241	174
HDP 125 3	**48.5**	31	48720	168	191	137	236	170
HDP 125 3	**58.2**	25.8	47750	137	182	131	225	162
HDP 125 3	**62.6**	24.0	49240	131	181	130	223	161
HDP 125 3	**72.5**	20.7	46680	107	166	121	206	150
HDP 125 3	**78.0**	19.2	48180	103	163	119	202	148
HDP 125 3	**89.0**	16.9	47230	89	158	115	195	142
HDP 125 3	**95.8**	15.7	48720	85	155	113	191	139
HDP 125 3	**114.9**	13.1	48230	70	148	108	181	132
HDP 125 3	**123.6**	12.1	49240	66	146	106	178	130
HDP 125 4	**144.4**	10.4	43000	51	120	89	149	110
HDP 125 4	**155.4**	9.7	46280	51	119	88	147	109
HDP 125 4	**181.2**	8.3	46680	44	116	86	144	106
HDP 125 4	**195.0**	7.7	48180	42	114	85	141	105
HDP 125 4	**222.5**	6.7	47230	36	112	83	139	103
HDP 125 4	**246.2**	6.1	49240	34	110	82	136	101
HDP 125 4	**287.2**	5.2	47750	28	107	80	133	99
HDP 125 4	**319.6**	4.7	48180	26	96	72	121	90
HDP 125 4	**364.6**	4.1	47230	22	95	70	119	88
HDP 125 4	**401.2**	3.7	48180	20	93	69	117	86
HDP 125 4	**457.7**	3.3	47230	17.6	93	70	116	87
HDP 125 4	**506.5**	3.0	49240	16.6	91	68	113	84



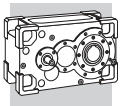
HDP 125 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 125 2	**8.9**	202	38070	837	321	195	435	279
HDP 125 2	**9.6**	187	38660	790	314	192	425	274
HDP 125 2	**11.6**	155	41280	697	296	185	400	261
HDP 125 2	**12.5**	144	41890	657	293	185	394	259
HDP 125 2	**14.7**	123	42740	571	281	180	375	249
HDP 125 2	**15.8**	114	43450	540	274	176	365	243
HDP 125 2	**18.0**	100	44090	480	261	169	346	232
HDP 125 2	**19.4**	93	45480	460	260	170	342	231
HDP 125 2	**23.3**	77	44580	376	242	159	317	214
HDP 125 2	**25.0**	72	45950	360	236	154	308	207
HDP 125 3	**29.1**	62	38810	267	225	157	282	199
HDP 125 3	**31.3**	58	41360	265	221	154	278	196
HDP 125 3	**36.7**	49	43580	238	211	148	266	188
HDP 125 3	**39.5**	46	44100	224	207	145	261	185
HDP 125 3	**45.1**	40	45710	203	198	139	250	177
HDP 125 3	**48.5**	37	46240	191	193	136	244	174
HDP 125 3	**58.2**	31	47750	164	183	129	232	165
HDP 125 3	**62.6**	28.8	49240	158	182	129	230	164
HDP 125 3	**72.5**	24.8	46430	128	170	121	215	154
HDP 125 3	**78.0**	23.1	48180	124	167	119	211	152
HDP 125 3	**89.0**	20.2	47230	106	161	115	203	146
HDP 125 3	**95.8**	18.8	48720	102	158	113	199	143
HDP 125 3	**114.9**	15.7	47750	83	151	108	189	136
HDP 125 3	**123.6**	14.6	49240	80	148	106	185	133
HDP 125 4	**144.4**	12.5	40710	58	124	91	157	115
HDP 125 4	**155.4**	11.6	43810	58	122	90	154	114
HDP 125 4	**181.2**	9.9	46060	52	119	87	151	110
HDP 125 4	**195.0**	9.2	48180	50	117	86	148	109
HDP 125 4	**222.5**	8.1	47230	43	115	84	146	107
HDP 125 4	**246.2**	7.3	49240	41	113	84	143	106
HDP 125 4	**287.2**	6.3	47750	34	110	81	139	102
HDP 125 4	**319.6**	5.6	48180	31	98	73	126	94
HDP 125 4	**364.6**	4.9	47230	26	97	71	125	91
HDP 125 4	**401.2**	4.5	48180	25	95	70	122	90
HDP 125 4	**457.7**	3.9	47230	21	95	71	121	90
HDP 125 4	**506.5**	3.6	49240	19.9	93	69	118	87



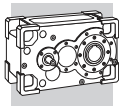
HDP 130 — n_1 = 1500 min^{-1}

					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		$P_{TFANL\,/\,R}$ [kW]	
HDP 130 2	**7.3**	207	48400	1090	460	307	630	432
HDP 130 2	**7.9**	189	51280	1058	446	299	612	421
HDP 130 2	**8.6**	174	51140	971	435	294	597	413
HDP 130 2	**9.4**	160	54050	940	421	286	578	402
HDP 130 2	**11.3**	133	56600	819	405	281	552	389
HDP 130 2	**12.3**	122	57900	767	391	272	533	377
HDP 130 2	**14.1**	106	57810	669	424	303	558	402
HDP 130 2	**15.4**	97	59300	629	412	297	541	392
HDP 130 2	**17.4**	86	61990	582	391	282	513	372
HDP 130 2	**19.0**	79	63860	549	378	273	495	359
HDP 130 2	**21.7**	69	64070	484	407	294	516	374
HDP 130 3	**21.8**	69	65950	505	317	225	401	287
HDP 130 3	**23.8**	63	63450	445	308	219	391	280
HDP 130 3	**28.6**	52	65790	384	293	209	374	268
HDP 130 3	**31.2**	48	62990	337	284	203	364	261
HDP 130 3	**35.7**	42	65430	305	276	197	353	254
HDP 130 3	**39.0**	38	62650	268	267	192	343	248
HDP 130 3	**44.1**	34	65120	246	260	187	334	241
HDP 130 3	**48.1**	31	62360	216	253	182	325	235
HDP 130 3	**56.5**	26.5	64780	191	243	177	312	228
HDP 130 3	**61.7**	24.3	62050	168	237	173	304	222
HDP 130 3	**70.7**	21.2	65650	155	233	170	297	217
HDP 130 3	**77.1**	19.4	62890	136	227	166	289	212
HDP 130 3	**87.2**	17.2	67750	130	220	161	280	205
HDP 130 3	**95.1**	15.8	64910	114	215	157	273	199
HDP 130 3	**108.3**	13.9	63140	97	226	165	281	205
HDP 130 4	**111.2**	13.5	61600	94	187	139	234	174
HDP 130 4	**121.4**	12.4	66770	94	183	136	230	170
HDP 130 4	**139.0**	10.8	69570	85	180	134	226	168
HDP 130 4	**151.7**	9.9	66770	75	177	131	223	165
HDP 130 4	**176.7**	8.5	69350	67	171	127	216	160
HDP 130 4	**192.9**	7.8	66770	59	168	125	212	157
HDP 130 4	**217.9**	6.9	69570	54	165	122	208	154
HDP 130 4	**237.9**	6.3	66770	48	161	120	204	151
HDP 130 4	**274.5**	5.5	69570	43	156	117	197	147
HDP 130 4	**299.6**	5.0	66770	38	153	115	194	145
HDP 130 4	**348.9**	4.3	69570	34	148	111	187	140
HDP 130 4	**380.9**	3.9	66770	30	145	109	183	137
HDP 130 4	**469.8**	3.2	66770	24	140	104	176	130
HDP 130 4	**534.5**	2.8	63140	20	146	109	181	134



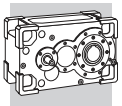
HDP 130 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 130 2	**7.3**	248	45820	1238	430	269	624	412
HDP 130 2	**7.9**	227	48550	1202	418	263	607	402
HDP 130 2	**8.6**	209	48410	1103	412	263	597	399
HDP 130 2	**9.4**	191	51170	1068	400	257	579	389
HDP 130 2	**11.3**	159	53590	930	391	259	559	382
HDP 130 2	**12.3**	146	54820	872	378	252	540	371
HDP 130 2	**14.1**	127	54730	760	423	295	576	408
HDP 130 2	**15.4**	117	56150	714	414	291	561	399
HDP 130 2	**17.4**	103	58690	661	393	277	532	379
HDP 130 2	**19.0**	95	62410	644	381	270	514	368
HDP 130 2	**21.7**	83	64410	584	410	291	534	382
HDP 130 3	**21.8**	83	62200	572	315	218	411	289
HDP 130 3	**23.8**	76	62590	527	306	212	401	282
HDP 130 3	**28.6**	63	65230	457	292	203	384	271
HDP 130 3	**31.2**	58	62590	401	283	197	374	264
HDP 130 3	**35.7**	50	62040	348	275	192	363	257
HDP 130 3	**39.0**	46	62590	321	267	187	354	251
HDP 130 3	**44.1**	41	64510	293	258	181	342	243
HDP 130 3	**48.1**	37	62590	260	250	175	332	236
HDP 130 3	**56.5**	32	65020	230	245	176	324	234
HDP 130 3	**61.7**	29.2	62270	202	239	171	316	227
HDP 130 3	**70.7**	25.5	64730	183	235	169	308	223
HDP 130 3	**77.1**	23.3	62000	161	229	165	300	217
HDP 130 3	**87.2**	20.7	64510	148	222	160	290	210
HDP 130 3	**95.1**	18.9	62590	132	217	156	283	204
HDP 130 3	**108.3**	16.6	58960	109	228	164	290	210
HDP 130 4	**111.2**	16.2	57640	106	190	139	244	179
HDP 130 4	**121.4**	14.8	62590	105	186	137	239	176
HDP 130 4	**139.0**	13.0	65230	96	183	135	236	174
HDP 130 4	**151.7**	11.9	62590	84	180	132	232	170
HDP 130 4	**176.7**	10.2	64840	75	173	128	224	165
HDP 130 4	**192.9**	9.3	62590	66	171	127	221	164
HDP 130 4	**217.9**	8.3	64510	61	168	124	217	160
HDP 130 4	**237.9**	7.6	62590	54	164	121	212	157
HDP 130 4	**274.5**	6.6	65230	49	161	119	208	154
HDP 130 4	**299.6**	6.0	62590	43	157	117	203	151
HDP 130 4	**348.9**	5.2	65230	38	151	113	196	146
HDP 130 4	**380.9**	4.7	62590	34	149	111	193	143
HDP 130 4	**469.8**	3.8	62590	27	143	106	184	136
HDP 130 4	**534.5**	3.4	58960	23	149	111	188	140



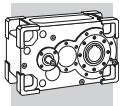
HDP 140 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 140 2	**8.4**	179	55710	1090	639	413	802	533
HDP 140 2	**9.3**	162	61640	1090	609	397	767	513
HDP 140 2	**9.9**	151	58850	971	579	379	733	493
HDP 140 2	**11.0**	137	65130	971	595	398	744	507
HDP 140 2	**13.0**	115	66760	839	565	380	704	482
HDP 140 2	**14.4**	104	73870	839	537	362	670	460
HDP 140 2	**16.3**	92	75910	763	534	368	660	461
HDP 140 2	**18.0**	83	81780	743	508	350	628	438
HDP 140 2	**20.1**	75	71350	582	484	335	598	418
HDP 140 2	**22.2**	68	78950	582	403	280	495	350
HDP 140 2	**24.9**	60	82230	539	410	290	500	360
HDP 140 3	**25.1**	60	75910	505	322	228	405	289
HDP 140 3	**27.7**	54	82930	499	311	221	392	281
HDP 140 3	**32.9**	46	84810	430	297	212	376	270
HDP 140 3	**36.4**	41	82330	377	287	205	364	262
HDP 140 3	**41.1**	36	84810	344	280	200	355	255
HDP 140 3	**45.5**	33	81890	300	272	195	345	249
HDP 140 3	**50.7**	29.6	82170	270	266	190	337	242
HDP 140 3	**56.2**	26.7	81510	242	258	185	327	236
HDP 140 3	**65.1**	23.1	84810	218	243	176	309	225
HDP 140 3	**72.0**	20.8	81100	188	236	171	300	218
HDP 140 3	**81.3**	18.4	84810	174	237	173	298	218
HDP 140 3	**90.0**	16.7	82200	152	230	168	289	211
HDP 140 3	**100.3**	15.0	82170	137	224	164	280	205
HDP 140 3	**111.0**	13.5	84850	128	218	159	272	199
HDP 140 3	**124.7**	12.0	78870	106	229	168	280	206
HDP 140 4	**141.6**	10.6	78480	94	184	137	230	171
HDP 140 4	**160.0**	9.4	84820	90	183	136	228	169
HDP 140 4	**177.0**	8.5	87060	84	179	132	224	165
HDP 140 4	**197.3**	7.6	81580	70	175	130	219	162
HDP 140 4	**225.0**	6.7	87060	66	169	125	212	157
HDP 140 4	**250.8**	6.0	81230	55	166	124	208	155
HDP 140 4	**277.5**	5.4	87060	53	163	121	204	151
HDP 140 4	**315.9**	4.7	84820	46	157	118	197	147
HDP 140 4	**349.6**	4.3	87060	42	154	115	193	144
HDP 140 4	**401.6**	3.7	84820	36	149	111	187	139
HDP 140 4	**444.4**	3.4	87060	33	146	109	183	136
HDP 140 4	**495.3**	3.0	82170	28	143	107	178	133

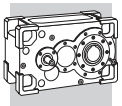


HDP 140 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 140 2	**8.4**	215	52740	1238	581	348	767	485
HDP 140 2	**9.3**	195	58360	1238	558	340	738	473
HDP 140 2	**9.9**	182	55720	1103	533	326	709	455
HDP 140 2	**11.0**	164	61660	1103	560	352	730	477
HDP 140 2	**13.0**	138	63200	953	535	339	694	456
HDP 140 2	**14.4**	125	69940	953	510	324	662	436
HDP 140 2	**16.3**	111	71870	867	516	338	660	444
HDP 140 2	**18.0**	100	77420	844	491	324	628	425
HDP 140 2	**20.1**	90	67550	661	470	310	599	405
HDP 140 2	**22.2**	81	74750	661	460	300	590	385
HDP 140 2	**24.9**	72	82150	646	468	335	600	439
HDP 140 3	**25.1**	72	71610	572	319	220	413	289
HDP 140 3	**27.7**	65	79250	572	309	213	402	281
HDP 140 3	**32.9**	55	80680	491	296	205	386	271
HDP 140 3	**36.4**	49	80850	445	286	199	374	264
HDP 140 3	**41.1**	44	80350	391	279	194	365	257
HDP 140 3	**45.5**	40	80850	356	272	190	356	251
HDP 140 3	**50.7**	35	74300	293	263	184	344	244
HDP 140 3	**56.2**	32	80850	288	255	179	334	237
HDP 140 3	**65.1**	27.7	82330	253	244	173	319	228
HDP 140 3	**72.0**	25.0	80850	225	237	168	310	222
HDP 140 3	**81.3**	22.1	81510	201	239	171	309	222
HDP 140 3	**90.0**	20.0	80850	180	232	166	299	215
HDP 140 3	**100.3**	17.9	74300	148	226	162	290	209
HDP 140 3	**111.0**	16.2	80850	146	219	158	280	203
HDP 140 3	**124.7**	14.4	73920	119	232	166	290	209
HDP 140 4	**141.6**	12.7	73370	106	187	137	239	176
HDP 140 4	**160.0**	11.3	81510	104	186	136	238	174
HDP 140 4	**177.0**	10.2	80850	93	181	133	232	170
HDP 140 4	**197.3**	9.1	74300	77	178	131	228	168
HDP 140 4	**225.0**	8.0	80850	73	172	126	221	162
HDP 140 4	**250.8**	7.2	74300	61	169	125	217	160
HDP 140 4	**277.5**	6.5	80850	60	165	122	212	157
HDP 140 4	**315.9**	5.7	81510	53	161	120	207	154
HDP 140 4	**349.6**	5.1	80850	47	158	118	203	151
HDP 140 4	**401.6**	4.5	81510	41	152	113	195	145
HDP 140 4	**444.4**	4.1	80850	37	149	111	191	142
HDP 140 4	**495.3**	3.6	74300	31	146	109	186	139

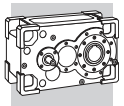


HDP 150								n_1 = 1500 min^{-1}
					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		$P_{TFANL / R}$ [kW]	
HDP 150 2	**7.9**	190	78630	1627	639	413	847	566
HDP 150 2	**9.3**	162	92140	1627	609	397	807	542
HDP 150 2	**10.1**	149	97880	1587	579	379	771	520
HDP 150 2	**11.1**	136	97060	1435	595	398	780	534
HDP 150 2	**13.0**	116	106020	1338	565	380	739	508
HDP 150 2	**14.1**	106	108500	1257	537	362	705	486
HDP 150 2	**15.4**	98	102870	1095	534	368	696	487
HDP 150 2	**18.0**	83	114210	1037	508	350	658	460
HDP 150 2	**19.6**	76	110150	919	484	335	628	441
HDP 150 3	**21.5**	70	92560	718	423	299	528	377
HDP 150 3	**25.2**	60	108460	718	405	287	508	363
HDP 150 3	**27.4**	55	109030	663	389	276	491	351
HDP 150 3	**29.9**	50	117200	654	380	270	480	344
HDP 150 3	**35.0**	43	112010	534	364	258	461	329
HDP 150 3	**38.1**	39	108070	473	350	249	445	319
HDP 150 3	**43.5**	35	117200	450	360	264	453	332
HDP 150 3	**50.9**	29.5	111000	364	346	254	435	319
HDP 150 3	**55.5**	27.0	107110	322	333	245	420	309
HDP 150 3	**60.4**	24.8	117200	324	327	241	412	303
HDP 150 3	**70.8**	21.2	110230	260	315	232	395	291
HDP 150 3	**77.0**	19.5	106390	230	305	224	383	281
HDP 150 4	**89.0**	16.9	116800	224	263	194	323	238
HDP 150 4	**104.3**	14.4	116060	190	255	188	314	232
HDP 150 4	**113.6**	13.2	112070	168	248	182	307	225
HDP 150 4	**123.6**	12.1	117200	161	242	178	300	221
HDP 150 4	**144.9**	10.4	117090	138	235	173	292	215
HDP 150 4	**157.8**	9.5	114780	124	231	171	288	213
HDP 150 4	**170.9**	8.8	116800	116	218	162	274	203
HDP 150 4	**200.3**	7.5	117090	100	212	158	267	198
HDP 150 4	**218.1**	6.9	114780	90	207	154	261	194
HDP 150 4	**237.5**	6.3	117200	84	204	152	257	191
HDP 150 4	**278.3**	5.4	117090	72	198	148	250	186
HDP 150 4	**303.1**	4.9	114780	64	193	144	244	181



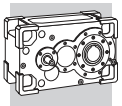
HDP 150 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 150 2	**7.9**	228	74450	1848	581	348	818	522
HDP 150 2	**9.3**	194	87230	1848	558	340	783	506
HDP 150 2	**10.1**	178	92670	1803	533	326	752	487
HDP 150 2	**11.1**	163	91890	1630	560	352	771	507
HDP 150 2	**13.0**	139	100380	1520	535	339	734	485
HDP 150 2	**14.1**	128	102730	1428	510	324	701	465
HDP 150 2	**15.4**	117	97390	1244	516	338	700	474
HDP 150 2	**18.0**	100	111710	1217	491	324	662	450
HDP 150 2	**19.6**	92	110820	1109	470	310	634	430
HDP 150 3	**21.5**	84	87340	813	416	285	536	373
HDP 150 3	**25.2**	71	102350	813	400	274	517	360
HDP 150 3	**27.4**	66	109620	800	384	264	500	349
HDP 150 3	**29.9**	60	117200	785	376	259	490	343
HDP 150 3	**35.0**	51	112560	644	361	249	472	330
HDP 150 3	**38.1**	47	108590	570	347	240	456	320
HDP 150 3	**43.5**	41	117200	540	368	266	474	344
HDP 150 3	**50.9**	35	111470	438	352	255	453	330
HDP 150 3	**55.5**	32	107560	388	339	245	438	318
HDP 150 3	**60.4**	29.8	117200	389	331	240	428	311
HDP 150 3	**70.8**	25.4	110640	313	320	232	412	299
HDP 150 3	**77.0**	23.4	106780	278	309	224	398	289
HDP 150 4	**89.0**	20.2	110220	253	268	194	337	244
HDP 150 4	**104.3**	17.3	111430	218	260	189	328	239
HDP 150 4	**113.6**	15.9	109050	196	251	181	318	230
HDP 150 4	**123.6**	14.6	117200	194	245	177	311	226
HDP 150 4	**144.9**	12.4	117090	165	238	172	303	220
HDP 150 4	**157.8**	11.4	114590	148	235	171	300	219
HDP 150 4	**170.9**	10.5	114510	137	222	163	286	210
HDP 150 4	**200.3**	9.0	117090	119	216	159	278	205
HDP 150 4	**218.1**	8.3	114780	108	212	156	274	201
HDP 150 4	**237.5**	7.6	117200	101	209	154	270	199
HDP 150 4	**278.3**	6.5	117090	86	203	150	262	193
HDP 150 4	**303.1**	5.9	114780	77	198	146	256	188



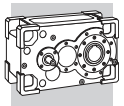
HDP 160 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 160 2	**9.0**	167	89290	1627	689	451	889	598
HDP 160 2	**10.5**	143	104220	1627	649	427	838	566
HDP 160 2	**11.4**	132	110510	1587	622	410	805	545
HDP 160 2	**12.6**	119	110220	1435	628	422	804	552
HDP 160 2	**14.7**	102	119890	1337	598	405	763	526
HDP 160 2	**15.9**	94	122470	1257	573	389	732	506
HDP 160 2	**17.5**	86	116810	1095	565	390	717	502
HDP 160 2	**20.4**	74	133430	1071	532	368	673	472
HDP 160 2	**22.1**	68	136230	1006	511	354	646	453
HDP 160 3	**24.4**	61	105110	718	467	331	571	407
HDP 160 3	**28.5**	53	122690	718	444	315	545	389
HDP 160 3	**31.0**	48	133350	718	430	306	530	379
HDP 160 3	**33.9**	44	142310	700	419	298	517	370
HDP 160 3	**39.6**	38	146300	616	401	286	496	356
HDP 160 3	**43.1**	35	138540	537	388	277	481	345
HDP 160 3	**49.4**	30	138770	469	392	288	482	354
HDP 160 3	**57.6**	26.0	145150	421	374	275	460	338
HDP 160 3	**62.6**	24.0	137300	366	366	270	450	332
HDP 160 3	**68.6**	21.9	143440	349	359	265	440	325
HDP 160 3	**80.0**	18.7	144140	301	344	254	421	311
HDP 160 3	**87.0**	17.2	136370	262	334	247	409	302
HDP 160 4	**101.1**	14.8	132640	224	287	210	346	254
HDP 160 4	**117.9**	12.7	146300	211	277	203	336	246
HDP 160 4	**128.2**	11.7	143630	191	270	198	328	241
HDP 160 4	**140.4**	10.7	142380	173	264	194	321	236
HDP 160 4	**163.9**	9.2	146300	152	255	187	311	228
HDP 160 4	**178.1**	8.4	147070	141	249	183	305	224
HDP 160 4	**194.1**	7.7	132640	116	238	178	293	218
HDP 160 4	**226.6**	6.6	146300	110	230	172	284	211
HDP 160 4	**246.3**	6.1	147070	102	226	168	279	207
HDP 160 4	**269.7**	5.6	140530	89	222	166	274	204
HDP 160 4	**314.8**	4.8	146300	79	215	160	265	197
HDP 160 4	**342.2**	4.4	147070	73	210	157	259	193

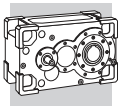


HDP 160 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 160 2	**9.0**	201	84540	1848	636	389	864	556
HDP 160 2	**10.5**	172	98670	1848	602	367	818	526
HDP 160 2	**11.4**	158	104630	1803	579	356	788	510
HDP 160 2	**12.6**	143	104350	1630	594	373	795	521
HDP 160 2	**14.7**	123	113510	1519	570	365	758	503
HDP 160 2	**15.9**	113	115960	1428	547	351	728	484
HDP 160 2	**17.5**	103	110600	1244	547	360	721	488
HDP 160 2	**20.4**	88	126330	1217	516	341	677	459
HDP 160 2	**22.1**	81	128970	1143	496	328	649	441
HDP 160 3	**24.4**	74	99160	813	461	318	579	405
HDP 160 3	**28.5**	63	115770	813	439	304	554	389
HDP 160 3	**31.0**	58	125840	813	425	294	538	377
HDP 160 3	**33.9**	53	134250	792	416	289	527	371
HDP 160 3	**39.6**	45	146300	740	399	277	507	356
HDP 160 3	**43.1**	42	139210	647	386	269	492	347
HDP 160 3	**49.4**	36	133700	543	401	289	503	364
HDP 160 3	**57.6**	31	145030	504	381	276	479	348
HDP 160 3	**62.6**	28.7	137880	441	373	271	468	341
HDP 160 3	**68.6**	26.3	143440	419	365	266	458	334
HDP 160 3	**80.0**	22.5	144680	362	350	255	438	320
HDP 160 3	**87.0**	20.7	136870	315	340	247	425	310
HDP 160 4	**101.1**	17.8	125180	253	291	210	359	260
HDP 160 4	**117.9**	15.3	146130	253	281	203	348	252
HDP 160 4	**128.2**	14.0	137000	218	274	198	340	247
HDP 160 4	**140.4**	12.8	142990	208	268	194	334	242
HDP 160 4	**163.9**	11.0	146300	182	258	187	322	234
HDP 160 4	**178.1**	10.1	146860	168	252	183	316	230
HDP 160 4	**194.1**	9.3	130070	137	244	181	307	227
HDP 160 4	**226.6**	7.9	146300	132	236	175	297	220
HDP 160 4	**246.3**	7.3	147070	122	231	171	291	215
HDP 160 4	**269.7**	6.7	141000	107	228	169	287	212
HDP 160 4	**314.8**	5.7	146300	95	220	162	277	204
HDP 160 4	**342.2**	5.3	147070	88	215	159	271	200



HDP 170								n_1 = 1500 min^{-1}
					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		$P_{TFANL / R}$ [kW]	
HDP 170 2	**7.8**	191	133930	2796	882	536	1153	735
HDP 170 2	**9.1**	165	140750	2532	856	528	1114	718
HDP 170 2	**9.8**	152	143860	2389	824	512	1075	697
HDP 170 2	**11.3**	133	144760	2099	840	539	1079	715
HDP 170 2	**13.1**	115	159740	1996	808	524	1034	690
HDP 170 2	**14.2**	106	163600	1887	776	505	994	665
HDP 170 2	**15.4**	98	157710	1679	855	591	1065	746
HDP 170 2	**17.8**	84	165580	1519	820	568	1016	712
HDP 170 2	**19.3**	78	169600	1436	786	546	974	684
HDP 170 3	**23.2**	65	151770	1093	587	413	705	500
HDP 170 3	**26.9**	56	176160	1093	577	409	692	494
HDP 170 3	**29.1**	51	182320	1044	560	398	674	482
HDP 170 3	**31.6**	48	177810	940	562	400	674	483
HDP 170 3	**36.7**	41	190190	866	544	388	653	468
HDP 170 3	**39.7**	38	182210	766	529	378	636	457
HDP 170 3	**45.1**	33	183920	680	509	372	613	448
HDP 170 3	**52.4**	28.6	189610	604	493	361	593	434
HDP 170 3	**56.7**	26.4	180610	531	478	350	576	422
HDP 170 3	**61.4**	24.4	188900	513	485	357	580	427
HDP 170 3	**71.3**	21.0	188320	441	471	347	562	414
HDP 170 3	**77.2**	19.4	179410	388	458	338	546	403
HDP 170 4	**92.7**	16.2	183920	338	363	265	431	315
HDP 170 4	**107.6**	13.9	190190	301	351	255	418	304
HDP 170 4	**116.6**	12.9	182320	266	343	249	409	298
HDP 170 4	**126.3**	11.9	188900	255	344	251	410	299
HDP 170 4	**146.6**	10.2	190190	221	336	245	401	293
HDP 170 4	**158.8**	9.4	182320	196	328	239	392	286
HDP 170 4	**177.4**	8.5	183920	177	303	224	366	270
HDP 170 4	**206.0**	7.3	190190	157	297	219	359	264
HDP 170 4	**223.1**	6.7	182320	139	296	220	357	265
HDP 170 4	**241.7**	6.2	188900	133	300	222	360	266
HDP 170 4	**280.5**	5.3	190190	115	293	218	351	261
HDP 170 4	**303.8**	4.9	182320	102	281	208	338	250

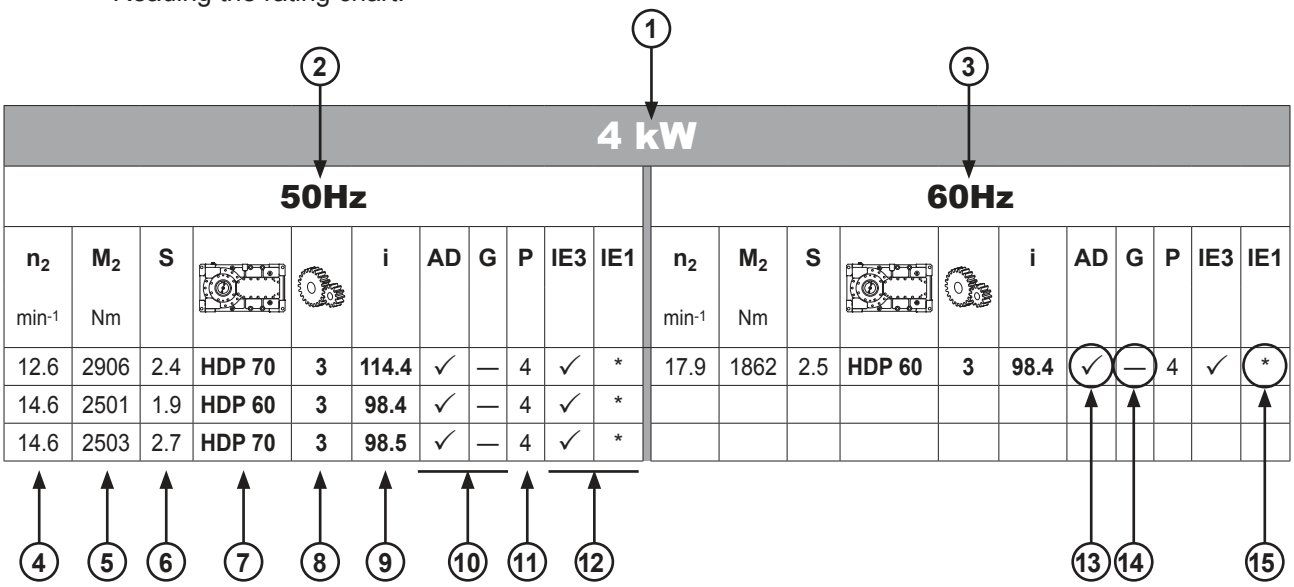


HDP 180 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C $P_{TFANL / R}$ [kW]	T_{amb} = 40°C $P_{TFANL / R}$ [kW]
HDP 180 2	**8.7**	172	148810	2796	957	586	1219	779
HDP 180 2	**10.1**	149	155960	2533	901	558	1150	741
HDP 180 2	**10.9**	138	159170	2390	862	538	1104	716
HDP 180 2	**12.5**	120	160840	2099	908	589	1138	758
HDP 180 2	**14.5**	103	176950	1996	850	555	1066	714
HDP 180 2	**15.7**	96	180960	1887	814	533	1022	686
HDP 180 2	**17.1**	88	175290	1680	919	638	1119	785
HDP 180 2	**19.8**	76	183470	1519	858	598	1044	735
HDP 180 2	**21.4**	70	187640	1437	822	573	1000	704
HDP 180 3	**25.8**	58	168630	1093	656	467	772	552
HDP 180 3	**29.8**	50	195130	1093	625	446	738	529
HDP 180 3	**32.2**	47	200130	1036	605	432	717	514
HDP 180 3	**35.1**	43	197560	940	619	444	729	525
HDP 180 3	**40.6**	37	202450	832	588	422	694	500
HDP 180 3	**43.9**	34	198410	754	572	412	677	489
HDP 180 3	**50.1**	30	204380	680	557	409	658	483
HDP 180 3	**58.0**	26	202450	583	531	390	628	461
HDP 180 3	**62.7**	24	196680	523	517	381	612	451
HDP 180 3	**68.3**	22	209900	513	530	391	622	459
HDP 180 3	**79.0**	19	202450	428	506	374	594	438
HDP 180 3	**85.4**	18	195370	382	491	363	576	426
HDP 180 4	**103.0**	15	204380	338	391	285	458	334
HDP 180 4	**119.2**	13	202450	289	378	275	444	324
HDP 180 4	**128.9**	12	205480	271	369	269	435	317
HDP 180 4	**140.3**	11	209900	255	376	274	441	322
HDP 180 4	**162.4**	9	202450	212	362	264	426	311
HDP 180 4	**175.6**	9	207020	201	356	261	419	307
HDP 180 4	**197.2**	8	204380	177	334	247	396	293
HDP 180 4	**228.1**	7	202450	151	323	240	384	285
HDP 180 4	**246.7**	6	205480	142	316	234	376	278
HDP 180 4	**268.5**	6	209900	133	318	235	377	278
HDP 180 4	**310.7**	5	202450	111	307	227	364	269
HDP 180 4	**336.1**	4	207020	105	300	222	356	263

17.1 GEARMOTOR RATING CHARTS

Reading the rating chart.



1	Motor Power coupled with the gearbox	**9**	Gearbox ratio
2	50 Hz section	**10**	Availability for direct motor mounting (AD) / coupling through bell housing and flexible coupling (G)
3	60 Hz section	**11**	Number of motor poles
4	Gearbox output speed	**12**	Efficiency motor availability
5	Torque delivered at the output shaft	**13**	Symbol for available variant
6	Service factor	**14**	Symbol for not available variant
7	Gearbox size	**15**	Contact Bonfiglioli Technical Support
8	Gearbox stages		

For the complete gearmotor desingation see motor correlation tables

POLE		**4**	
Efficiency class		**IE1**	**IE3**
Pn [kW]	**4**	BN 112M 4	BX 112M 4
	5.5	BN 132S 4	BX 132SB 4
	7.5	BN 132MA 4	BX 132MA 4
	9.2	BN 132MB 4	BX 160MA 4
	11	BN 160MR 4	BX 160MB 4
	15	BN 160L 4	BX 160L 4
	18.5	BN 180M 4	BX 180M 4
	22	BN 180L 4	BX 180L 4
	30	BN 200L 4	BX 200LAK 4
	37	—	BX 225SAK 4
	45	—	BX 225SBK 4
	55	—	BX 250MAK 4
	75	—	BX 280SAK 4
	90	—	BX 280SBK 4

For more information on Bonfiglioli electric motors, as available options, performances, dimensions, etc. ... see the specific catalogue.

Example of complete gearmotor designation: **HDP 80 3 51.6 AD 180 BX 180M 4**

For Thermal Power validation take in consideration the appropriate catalogue section.

4 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
12.6	2906	2.4	**HDP 70**	**3**	**114.4**	✓	—	4	✓	*
14.6	2501	1.9	**HDP 60**	**3**	**98.4**	✓	—	4	✓	*
14.6	2503	2.7	**HDP 70**	**3**	**98.5**	✓	—	4	✓	*
16.4	2225	2.3	**HDP 60**	**3**	**87.6**	✓	—	4	✓	*
18.7	1960	2.4	**HDP 60**	**3**	**77.1**	✓	—	4	✓	*
21.0	1744	3.0	**HDP 60**	**3**	**68.6**	✓	—	4	✓	*
22.6	1616	2.9	**HDP 60**	**3**	**63.6**	✓	—	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
17.9	1862	2.5	**HDP 60**	**3**	**98.4**	✓	—	4	✓	*

5.5 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
12.8	3875	1.8	**HDP 70**	**3**	**114.4**	✓	✓	4	✓	*
14.8	3334	1.4	**HDP 60**	**3**	**98.4**	✓	✓	4	✓	*
14.8	3338	2.0	**HDP 70**	**3**	**98.5**	✓	✓	4	✓	*
16.3	3037	2.3	**HDP 70**	**3**	**89.6**	✓	✓	4	✓	*
16.7	2967	1.7	**HDP 60**	**3**	**87.6**	✓	✓	4	✓	*
18.9	2613	1.8	**HDP 60**	**3**	**77.1**	✓	✓	4	✓	*
18.9	2616	2.6	**HDP 70**	**3**	**77.2**	✓	✓	4	✓	*
19.8	2504	2.8	**HDP 70**	**3**	**73.9**	✓	✓	4	✓	*
21.3	2325	2.2	**HDP 60**	**3**	**68.6**	✓	✓	4	✓	*
23.0	2154	2.2	**HDP 60**	**3**	**63.6**	✓	✓	4	✓	*
25.8	1917	2.7	**HDP 60**	**3**	**56.6**	✓	✓	4	✓	*
29.7	1663	2.8	**HDP 60**	**3**	**49.1**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
15.5	3197	2.2	**HDP 70**	**3**	**114.4**	✓	✓	4	✓	*
18.0	2751	1.7	**HDP 60**	**3**	**98.4**	✓	✓	4	✓	*
18.0	2754	2.5	**HDP 70**	**3**	**98.5**	✓	✓	4	✓	*
19.7	2506	2.8	**HDP 70**	**3**	**89.6**	✓	✓	4	✓	*
20.2	2448	2.1	**HDP 60**	**3**	**87.6**	✓	✓	4	✓	*
22.9	2156	2.2	**HDP 60**	**3**	**77.1**	✓	✓	4	✓	*
25.8	1919	2.7	**HDP 60**	**3**	**68.6**	✓	✓	4	✓	*
27.8	1777	2.7	**HDP 60**	**3**	**63.6**	✓	✓	4	✓	*

7.5 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
12.8	5275	1.3	**HDP 70**	**3**	**114.4**	✓	✓	4	✓	*
13.1	5135	2.5	**HDP 80**	**3**	**111.4**	✓	—	4	✓	*
14.8	4538	1.0	**HDP 60**	**3**	**98.4**	✓	✓	4	✓	*
14.8	4543	1.5	**HDP 70**	**3**	**98.5**	✓	✓	4	✓	*
15.2	4423	2.8	**HDP 80**	**3**	**95.9**	✓	—	4	✓	*
16.3	4134	1.7	**HDP 70**	**3**	**89.6**	✓	✓	4	✓	*
16.7	4038	1.3	**HDP 60**	**3**	**87.6**	✓	✓	4	✓	*
18.9	3557	1.3	**HDP 60**	**3**	**77.1**	✓	✓	4	✓	*
18.9	3561	1.9	**HDP 70**	**3**	**77.2**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
15.5	4360	1.6	**HDP 70**	**3**	**114.4**	✓	✓	4	✓	*
15.9	4245	3.0	**HDP 80**	**3**	**111.4**	✓	—	4	✓	*
18.0	3751	1.3	**HDP 60**	**3**	**98.4**	✓	✓	4	✓	*
18.0	3755	1.8	**HDP 70**	**3**	**98.5**	✓	✓	4	✓	*
19.7	3417	2.1	**HDP 70**	**3**	**89.6**	✓	✓	4	✓	*
20.2	3338	1.6	**HDP 60**	**3**	**87.6**	✓	✓	4	✓	*
22.9	2940	1.6	**HDP 60**	**3**	**77.1**	✓	✓	4	✓	*
22.9	2943	2.3	**HDP 70**	**3**	**77.2**	✓	✓	4	✓	*
24.0	2817	2.5	**HDP 70**	**3**	**73.9**	✓	✓	4	✓	*

7.5 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
19.8	3408	2.1	**HDP 70**	**3**	**73.9**	✓	✓	4	✓	*
21.3	3165	1.6	**HDP 60**	**3**	**68.6**	✓	✓	4	✓	*
22.9	2935	2.3	**HDP 70**	**3**	**63.7**	✓	✓	4	✓	*
23.0	2932	1.6	**HDP 60**	**3**	**63.6**	✓	✓	4	✓	*
25.6	2631	2.7	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
25.8	2609	2.0	**HDP 60**	**3**	**56.6**	✓	✓	4	✓	*
29.7	2264	2.1	**HDP 60**	**3**	**49.1**	✓	✓	4	✓	*
29.7	2266	3.0	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
33	2014	2.6	**HDP 60**	**3**	**43.7**	✓	✓	4	✓	*
38	1774	2.7	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
25.8	2616	2.0	**HDP 60**	**3**	**68.6**	✓	✓	4	✓	*
27.8	2424	1.9	**HDP 60**	**3**	**63.6**	✓	✓	4	✓	*
27.8	2426	2.7	**HDP 70**	**3**	**63.7**	✓	✓	4	✓	*
31	2157	2.4	**HDP 60**	**3**	**56.6**	✓	✓	4	✓	*
36	1871	2.5	**HDP 60**	**3**	**49.1**	✓	✓	4	✓	*

9.2 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
12.8	6459	1.1	**HDP 70**	**3**	**114.4**	✓	✓	4	✓	*
13.1	6288	2.0	**HDP 80**	**3**	**111.4**	✓	—	4	✓	*
14.8	5563	1.2	**HDP 70**	**3**	**98.5**	✓	✓	4	✓	*
15.2	5416	2.3	**HDP 80**	**3**	**95.9**	✓	—	4	✓	*
16.3	5062	1.4	**HDP 70**	**3**	**89.6**	✓	✓	4	✓	*
16.5	5009	2.5	**HDP 80**	**3**	**88.7**	✓	—	4	✓	*
16.7	4945	1.0	**HDP 60**	**3**	**87.6**	✓	✓	4	✓	*
18.9	4356	1.1	**HDP 60**	**3**	**77.1**	✓	✓	4	✓	*
18.9	4360	1.5	**HDP 70**	**3**	**77.2**	✓	✓	4	✓	*
19.1	4315	2.8	**HDP 80**	**3**	**76.4**	✓	—	4	✓	*
19.4	4249	3.0	**HDP 80**	**3**	**75.2**	✓	—	4	✓	*
19.8	4173	1.7	**HDP 70**	**3**	**73.9**	✓	✓	4	✓	*
21.3	3876	1.3	**HDP 60**	**3**	**68.6**	✓	✓	4	✓	*
22.9	3594	1.9	**HDP 70**	**3**	**63.7**	✓	✓	4	✓	*
23.0	3591	1.3	**HDP 60**	**3**	**63.6**	✓	✓	4	✓	*
25.6	3221	2.2	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
25.8	3195	1.6	**HDP 60**	**3**	**56.6**	✓	✓	4	✓	*
29.7	2772	1.7	**HDP 60**	**3**	**49.1**	✓	✓	4	✓	*
29.7	2775	2.4	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
33	2525	2.8	**HDP 70**	**3**	**44.7**	✓	✓	4	✓	*
33	2466	2.1	**HDP 60**	**3**	**43.7**	✓	✓	4	✓	*
38	2172	2.2	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*
43	1933	2.7	**HDP 60**	**3**	**34.2**	✓	✓	4	✓	*
46	1791	2.6	**HDP 60**	**3**	**31.7**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
15.5	5339	1.3	**HDP 70**	**3**	**114.4**	✓	✓	4	✓	*
15.9	5198	2.4	**HDP 80**	**3**	**111.4**	✓	—	4	✓	*
18.0	4594	1.0	**HDP 60**	**3**	**98.4**	✓	✓	4	✓	*
18.0	4599	1.5	**HDP 70**	**3**	**98.5**	✓	✓	4	✓	*
18.5	4477	2.8	**HDP 80**	**3**	**95.9**	✓	—	4	✓	*
19.7	4185	1.7	**HDP 70**	**3**	**89.6**	✓	✓	4	✓	*
20.2	4088	1.3	**HDP 60**	**3**	**87.6**	✓	✓	4	✓	*
22.9	3601	1.3	**HDP 60**	**3**	**77.1**	✓	✓	4	✓	*
22.9	3605	1.9	**HDP 70**	**3**	**77.2**	✓	✓	4	✓	*
24.0	3450	2.1	**HDP 70**	**3**	**73.9**	✓	✓	4	✓	*
25.8	3204	1.6	**HDP 60**	**3**	**68.6**	✓	✓	4	✓	*
27.8	2968	1.6	**HDP 60**	**3**	**63.6**	✓	✓	4	✓	*
27.8	2971	2.2	**HDP 70**	**3**	**63.7**	✓	✓	4	✓	*
31	2663	2.7	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
31	2641	2.0	**HDP 60**	**3**	**56.6**	✓	✓	4	✓	*
36	2294	2.9	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
36	2291	2.1	**HDP 60**	**3**	**49.1**	✓	✓	4	✓	*
41	2039	2.5	**HDP 60**	**3**	**43.7**	✓	✓	4	✓	*
46	1796	2.6	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*

11 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
12.8	7751	0.9	**HDP 70**	**3**	**114.4**	✓	✓	4	✓	*
13.2	7546	1.7	**HDP 80**	**3**	**111.4**	✓	✓	4	✓	*
13.3	7461	2.3	**HDP 90**	**3**	**110.1**	✓	✓	4	✓	*
14.8	6701	2.7	**HDP 90**	**3**	**98.9**	✓	✓	4	✓	*
14.9	6676	1.0	**HDP 70**	**3**	**98.5**	✓	✓	4	✓	*
15.3	6499	1.9	**HDP 80**	**3**	**95.9**	✓	✓	4	✓	*
16.3	6075	1.2	**HDP 70**	**3**	**89.6**	✓	✓	4	✓	*
16.5	6011	2.1	**HDP 80**	**3**	**88.7**	✓	✓	4	✓	*
16.9	5872	2.9	**HDP 90**	**3**	**86.6**	✓	✓	4	✓	*
19.0	5227	0.9	**HDP 60**	**3**	**77.1**	✓	✓	4	✓	*
19.0	5232	1.3	**HDP 70**	**3**	**77.2**	✓	✓	4	✓	*
19.2	5178	2.3	**HDP 80**	**3**	**76.4**	✓	✓	4	✓	*
19.5	5099	2.5	**HDP 80**	**3**	**75.2**	✓	✓	4	✓	*
19.8	5008	1.4	**HDP 70**	**3**	**73.9**	✓	✓	4	✓	*
21.3	4651	1.1	**HDP 60**	**3**	**68.6**	✓	✓	4	✓	*
22.6	4392	2.9	**HDP 80**	**3**	**64.8**	✓	✓	4	✓	*
23.0	4309	1.1	**HDP 60**	**3**	**63.6**	✓	✓	4	✓	*
23.0	4313	1.6	**HDP 70**	**3**	**63.7**	✓	✓	4	✓	*
25.7	3866	1.8	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
25.9	3834	1.4	**HDP 60**	**3**	**56.6**	✓	✓	4	✓	*
29.8	3326	1.4	**HDP 60**	**3**	**49.1**	✓	✓	4	✓	*
29.8	3330	2.0	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
33	3030	2.3	**HDP 70**	**3**	**44.7**	✓	✓	4	✓	*
34	2960	1.8	**HDP 60**	**3**	**43.7**	✓	✓	4	✓	*
38	2610	2.6	**HDP 70**	**3**	**38.5**	✓	✓	4	✓	*
38	2607	1.8	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*
40	2498	2.8	**HDP 70**	**3**	**36.9**	✓	✓	4	✓	*
43	2320	2.2	**HDP 60**	**3**	**34.2**	✓	✓	4	✓	*
46	2149	2.2	**HDP 60**	**3**	**31.7**	✓	✓	4	✓	*
52	1912	2.7	**HDP 60**	**3**	**28.2**	✓	✓	4	✓	*
58	1728	2.7	**HDP 60**	**3**	**25.5**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
15.5	6383	1.1	**HDP 70**	**3**	**114.4**	✓	✓	4	✓	*
15.9	6215	2.0	**HDP 80**	**3**	**111.4**	✓	✓	4	✓	*
16.1	6145	2.8	**HDP 90**	**3**	**110.1**	✓	✓	4	✓	*
18.0	5498	1.2	**HDP 70**	**3**	**98.5**	✓	✓	4	✓	*
18.5	5353	2.4	**HDP 80**	**3**	**95.9**	✓	✓	4	✓	*
19.7	5003	1.4	**HDP 70**	**3**	**89.6**	✓	✓	4	✓	*
20.0	4951	2.5	**HDP 80**	**3**	**88.7**	✓	✓	4	✓	*
20.2	4887	1.1	**HDP 60**	**3**	**87.6**	✓	✓	4	✓	*
22.9	4305	1.1	**HDP 60**	**3**	**77.1**	✓	✓	4	✓	*
22.9	4309	1.6	**HDP 70**	**3**	**77.2**	✓	✓	4	✓	*
23.2	4264	2.6	**HDP 80**	**3**	**76.4**	✓	✓	4	✓	*
24.0	4124	1.7	**HDP 70**	**3**	**73.9**	✓	✓	4	✓	*
25.8	3831	1.4	**HDP 60**	**3**	**68.6**	✓	✓	4	✓	*
27.8	3549	1.3	**HDP 60**	**3**	**63.6**	✓	✓	4	✓	*
27.8	3552	1.9	**HDP 70**	**3**	**63.7**	✓	✓	4	✓	*
31	3184	2.2	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
31	3158	1.6	**HDP 60**	**3**	**56.6**	✓	✓	4	✓	*
36	2742	2.5	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
36	2739	1.7	**HDP 60**	**3**	**49.1**	✓	✓	4	✓	*
40	2495	2.8	**HDP 70**	**3**	**44.7**	✓	✓	4	✓	*
41	2438	2.1	**HDP 60**	**3**	**43.7**	✓	✓	4	✓	*
46	2147	2.2	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*
52	1911	2.7	**HDP 60**	**3**	**34.2**	✓	✓	4	✓	*
56	1770	2.7	**HDP 60**	**3**	**31.7**	✓	✓	4	✓	*

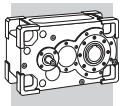
15 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
13.2	10271	1.2	**HDP 80**	**3**	**111.4**	✓	✓	4	✓	*
13.3	10155	1.7	**HDP 90**	**3**	**110.1**	✓	✓	4	✓	*
14.8	9121	2.0	**HDP 90**	**3**	**98.9**	✓	✓	4	✓	*
15.3	8847	1.4	**HDP 80**	**3**	**95.9**	✓	✓	4	✓	*
16.5	8182	1.5	**HDP 80**	**3**	**88.7**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
15.9	8479	1.5	**HDP 80**	**3**	**111.4**	✓	✓	4	✓	*
16.1	8383	2.0	**HDP 90**	**3**	**110.1**	✓	✓	4	✓	*
17.9	7529	2.4	**HDP 90**	**3**	**98.9**	✓	✓	4	✓	*
18.5	7303	1.7	**HDP 80**	**3**	**95.9**	✓	✓	4	✓	*
19.7	6826	1.0	**HDP 70**	**3**	**89.6**	✓	✓	4	✓	*



15 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
16.9	7992	2.1	**HDP 90**	**3**	**86.6**	✓	✓	4	✓	*
18.8	7178	2.5	**HDP 90**	**3**	**77.8**	✓	✓	4	✓	*
19.0	7122	0.9	**HDP 70**	**3**	**77.2**	✓	✓	4	✓	*
19.2	7047	1.7	**HDP 80**	**3**	**76.4**	✓	✓	4	✓	*
19.5	6940	1.8	**HDP 80**	**3**	**75.2**	✓	✓	4	✓	*
19.8	6816	1.0	**HDP 70**	**3**	**73.9**	✓	✓	4	✓	*
20.0	6761	2.5	**HDP 90**	**3**	**73.3**	✓	✓	4	✓	*
22.3	6073	2.9	**HDP 90**	**3**	**65.8**	✓	✓	4	✓	*
22.6	5977	2.1	**HDP 80**	**3**	**64.8**	✓	✓	4	✓	*
23.0	5871	1.1	**HDP 70**	**3**	**63.7**	✓	✓	4	✓	*
24.4	5528	2.3	**HDP 80**	**3**	**59.9**	✓	✓	4	✓	*
25.7	5262	1.3	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
25.9	5219	1.0	**HDP 60**	**3**	**56.6**	✓	✓	4	✓	*
28.4	4762	2.5	**HDP 80**	**3**	**51.6**	✓	✓	4	✓	*
29.8	4527	1.0	**HDP 60**	**3**	**49.1**	✓	✓	4	✓	*
29.8	4532	1.5	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
32	4263	3.0	**HDP 80**	**3**	**46.2**	✓	✓	4	✓	*
33	4124	1.7	**HDP 70**	**3**	**44.7**	✓	✓	4	✓	*
34	4028	1.3	**HDP 60**	**3**	**43.7**	✓	✓	4	✓	*
38	3552	1.9	**HDP 70**	**3**	**38.5**	✓	✓	4	✓	*
38	3548	1.3	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*
40	3400	2.1	**HDP 70**	**3**	**36.9**	✓	✓	4	✓	*
43	3157	1.6	**HDP 60**	**3**	**34.2**	✓	✓	4	✓	*
46	2928	2.3	**HDP 70**	**3**	**31.7**	✓	✓	4	✓	*
46	2925	1.6	**HDP 60**	**3**	**31.7**	✓	✓	4	✓	*
49	2733	2.6	**HDP 70**	**3**	**29.6**	✓	✓	4	✓	*
52	2603	2.0	**HDP 60**	**3**	**28.2**	✓	✓	4	✓	*
57	2354	2.9	**HDP 70**	**3**	**25.5**	✓	✓	4	✓	*
58	2352	2.0	**HDP 60**	**3**	**25.5**	✓	✓	4	✓	*
65	2092	2.3	**HDP 60**	**3**	**22.7**	✓	✓	4	✓	*
76	1826	2.6	**HDP 60**	**2**	**19.4**	—	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
20.0	6754	1.9	**HDP 80**	**3**	**88.7**	✓	✓	4	✓	*
20.4	6597	2.6	**HDP 90**	**3**	**86.6**	✓	✓	4	✓	*
22.9	5879	1.1	**HDP 70**	**3**	**77.2**	✓	✓	4	✓	*
23.2	5818	1.9	**HDP 80**	**3**	**76.4**	✓	✓	4	✓	*
23.5	5729	2.2	**HDP 80**	**3**	**75.2**	✓	✓	4	✓	*
24.0	5627	1.3	**HDP 70**	**3**	**73.9**	✓	✓	4	✓	*
25.8	5226	1.0	**HDP 60**	**3**	**68.6**	✓	✓	4	✓	*
27.3	4934	2.6	**HDP 80**	**3**	**64.8**	✓	✓	4	✓	*
27.8	4841	1.0	**HDP 60**	**3**	**63.6**	✓	✓	4	✓	*
27.8	4846	1.4	**HDP 70**	**3**	**63.7**	✓	✓	4	✓	*
29.5	4564	2.8	**HDP 80**	**3**	**59.9**	✓	✓	4	✓	*
31	4343	1.6	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
31	4308	1.2	**HDP 60**	**3**	**56.6**	✓	✓	4	✓	*
36	3741	1.8	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
36	3737	1.3	**HDP 60**	**3**	**49.1**	✓	✓	4	✓	*
40	3404	2.1	**HDP 70**	**3**	**44.7**	✓	✓	4	✓	*
41	3325	1.6	**HDP 60**	**3**	**43.7**	✓	✓	4	✓	*
46	2929	1.6	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*
46	2932	2.3	**HDP 70**	**3**	**38.5**	✓	✓	4	✓	*
48	2806	2.4	**HDP 70**	**3**	**36.9**	✓	✓	4	✓	*
52	2606	2.0	**HDP 60**	**3**	**34.2**	✓	✓	4	✓	*
56	2415	2.0	**HDP 60**	**3**	**31.7**	✓	✓	4	✓	*
56	2417	2.7	**HDP 70**	**3**	**31.7**	✓	✓	4	✓	*
63	2149	2.3	**HDP 60**	**3**	**28.2**	✓	✓	4	✓	*
69	1941	2.4	**HDP 60**	**3**	**25.5**	✓	✓	4	✓	*
78	1727	2.6	**HDP 60**	**3**	**22.7**	✓	✓	4	✓	*

18.5 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
13.2	12681	1.0	**HDP 80**	**3**	**111.4**	✓	✓	4	✓	*
13.3	12539	1.4	**HDP 90**	**3**	**110.1**	✓	✓	4	✓	*
14.8	11261	1.6	**HDP 90**	**3**	**98.9**	✓	✓	4	✓	*
15.3	10923	1.2	**HDP 80**	**3**	**95.9**	✓	✓	4	✓	*
16.5	10102	1.2	**HDP 80**	**3**	**88.7**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
16.0	10397	1.2	**HDP 80**	**3**	**111.4**	✓	✓	4	✓	*
16.2	10280	1.7	**HDP 90**	**3**	**110.1**	✓	✓	4	✓	*
18.0	9232	1.9	**HDP 90**	**3**	**98.9**	✓	✓	4	✓	*
18.6	8955	1.4	**HDP 80**	**3**	**95.9**	✓	✓	4	✓	*
20.1	8282	1.5	**HDP 80**	**3**	**88.7**	✓	✓	4	✓	*

18.5 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
16.9	9868	1.7	**HDP 90**	**3**	**86.6**	✓	✓	4	✓	*
18.8	8862	2.0	**HDP 90**	**3**	**77.8**	✓	✓	4	✓	*
19.2	8701	1.4	**HDP 80**	**3**	**76.4**	✓	✓	4	✓	*
19.5	8568	1.5	**HDP 80**	**3**	**75.2**	✓	✓	4	✓	*
20.0	8348	2.1	**HDP 90**	**3**	**73.3**	✓	✓	4	✓	*
22.3	7498	2.4	**HDP 90**	**3**	**65.8**	✓	✓	4	✓	*
22.6	7380	1.7	**HDP 80**	**3**	**64.8**	✓	✓	4	✓	*
23.0	7249	0.9	**HDP 70**	**3**	**63.7**	✓	—	4	✓	*
24.4	6826	1.8	**HDP 80**	**3**	**59.9**	✓	✓	4	✓	*
25.4	6570	2.6	**HDP 90**	**3**	**57.7**	✓	✓	4	✓	*
25.7	6496	1.1	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
28.4	5879	2.0	**HDP 80**	**3**	**51.6**	✓	✓	4	✓	*
29.8	5596	1.2	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
32	5263	2.4	**HDP 80**	**3**	**46.2**	✓	✓	4	✓	*
33	5092	1.4	**HDP 70**	**3**	**44.7**	✓	✓	4	✓	*
34	4974	1.0	**HDP 60**	**3**	**43.7**	✓	✓	4	✓	*
37	4534	2.8	**HDP 80**	**3**	**39.8**	✓	✓	4	✓	*
38	4386	1.5	**HDP 70**	**3**	**38.5**	✓	✓	4	✓	*
38	4381	1.1	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*
40	4197	1.7	**HDP 70**	**3**	**36.9**	✓	✓	4	✓	*
43	3898	1.3	**HDP 60**	**3**	**34.2**	✓	✓	4	✓	*
46	3615	1.9	**HDP 70**	**3**	**31.7**	✓	✓	4	✓	*
46	3612	1.3	**HDP 60**	**3**	**31.7**	✓	✓	4	✓	*
49	3374	2.1	**HDP 70**	**3**	**29.6**	✓	✓	4	✓	*
52	3214	1.6	**HDP 60**	**3**	**28.2**	✓	✓	4	✓	*
57	2906	2.3	**HDP 70**	**3**	**25.5**	✓	✓	4	✓	*
58	2903	1.6	**HDP 60**	**3**	**25.5**	✓	✓	4	✓	*
65	2584	1.8	**HDP 60**	**3**	**22.7**	✓	✓	4	✓	*
65	2621	2.7	**HDP 70**	**2**	**22.6**	—	✓	4	✓	*
75	2257	3.0	**HDP 70**	**2**	**19.4**	—	✓	4	✓	*
76	2255	2.1	**HDP 60**	**2**	**19.4**	—	✓	4	✓	*
85	2007	2.6	**HDP 60**	**2**	**17.3**	—	✓	4	✓	*
96	1767	2.7	**HDP 60**	**2**	**15.2**	—	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
20.5	8090	2.1	**HDP 90**	**3**	**86.6**	✓	✓	4	✓	*
22.9	7266	2.5	**HDP 90**	**3**	**77.8**	✓	✓	4	✓	*
23.1	7209	0.9	**HDP 70**	**3**	**77.2**	✓	—	4	✓	*
23.3	7134	1.6	**HDP 80**	**3**	**76.4**	✓	✓	4	✓	*
23.7	7025	1.8	**HDP 80**	**3**	**75.2**	✓	✓	4	✓	*
24.1	6900	1.0	**HDP 70**	**3**	**73.9**	✓	—	4	✓	*
24.3	6844	2.5	**HDP 90**	**3**	**73.3**	✓	✓	4	✓	*
27.0	6147	2.9	**HDP 90**	**3**	**65.8**	✓	✓	4	✓	*
27.5	6051	2.1	**HDP 80**	**3**	**64.8**	✓	✓	4	✓	*
28.0	5943	1.1	**HDP 70**	**3**	**63.7**	✓	—	4	✓	*
29.7	5596	2.3	**HDP 80**	**3**	**59.9**	✓	✓	4	✓	*
31	5326	1.3	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
32	5282	1.0	**HDP 60**	**3**	**56.6**	✓	—	4	✓	*
35	4820	2.5	**HDP 80**	**3**	**51.6**	✓	✓	4	✓	*
36	4587	1.5	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
36	4583	1.0	**HDP 60**	**3**	**49.1**	✓	✓	4	✓	*
39	4315	2.9	**HDP 80**	**3**	**46.2**	✓	✓	4	✓	*
40	4174	1.7	**HDP 70**	**3**	**44.7**	✓	✓	4	✓	*
41	4078	1.3	**HDP 60**	**3**	**43.7**	✓	✓	4	✓	*
46	3596	1.9	**HDP 70**	**3**	**38.5**	✓	✓	4	✓	*
46	3592	1.3	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*
48	3441	2.0	**HDP 70**	**3**	**36.9**	✓	✓	4	✓	*
52	3196	1.6	**HDP 60**	**3**	**34.2**	✓	✓	4	✓	*
56	2961	1.6	**HDP 60**	**3**	**31.7**	✓	✓	4	✓	*
56	2964	2.2	**HDP 70**	**3**	**31.7**	✓	✓	4	✓	*
60	2766	2.6	**HDP 70**	**3**	**29.6**	✓	✓	4	✓	*
63	2635	1.9	**HDP 60**	**3**	**28.2**	✓	✓	4	✓	*
70	2383	2.8	**HDP 70**	**3**	**25.5**	✓	✓	4	✓	*
70	2380	1.9	**HDP 60**	**3**	**25.5**	✓	✓	4	✓	*
79	2118	2.1	**HDP 60**	**3**	**22.7**	✓	✓	4	✓	*
92	1849	2.6	**HDP 60**	**2**	**19.4**	—	✓	4	✓	*

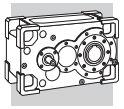
22 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
13.3	14819	1.2	**HDP 90**	**3**	**110.1**	✓	✓	4	✓	*
14.8	13309	1.3	**HDP 90**	**3**	**98.9**	✓	✓	4	✓	*
15.3	12909	1.0	**HDP 80**	**3**	**95.9**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
15.9	12367	1.0	**HDP 80**	**3**	**111.4**	✓	✓	4	✓	*
16.1	12228	1.4	**HDP 90**	**3**	**110.1**	✓	✓	4	✓	*
18.0	10982	1.6	**HDP 90**	**3**	**98.9**	✓	✓	4	✓	*



22 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
16.5	11939	1.1	**HDP 80**	**3**	**88.7**	✓	✓	4	✓	*
16.9	11662	1.5	**HDP 90**	**3**	**86.6**	✓	✓	4	✓	*
18.8	10474	1.7	**HDP 90**	**3**	**77.8**	✓	✓	4	✓	*
19.2	10283	1.2	**HDP 80**	**3**	**76.4**	✓	✓	4	✓	*
19.5	10126	1.2	**HDP 80**	**3**	**75.2**	✓	✓	4	✓	*
20.0	9866	1.7	**HDP 90**	**3**	**73.3**	✓	✓	4	✓	*
22.3	8861	2.0	**HDP 90**	**3**	**65.8**	✓	✓	4	✓	*
22.6	8722	1.4	**HDP 80**	**3**	**64.8**	✓	✓	4	✓	*
24.4	8067	1.6	**HDP 80**	**3**	**59.9**	✓	✓	4	✓	*
25.4	7764	2.2	**HDP 90**	**3**	**57.7**	✓	✓	4	✓	*
25.7	7678	0.9	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
28.3	6973	2.6	**HDP 90**	**3**	**51.8**	✓	✓	4	✓	*
28.4	6948	1.7	**HDP 80**	**3**	**51.6**	✓	✓	4	✓	*
29.8	6613	1.0	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
32	6220	2.0	**HDP 80**	**3**	**46.2**	✓	✓	4	✓	*
33	6018	1.2	**HDP 70**	**3**	**44.7**	✓	✓	4	✓	*
33	6000	2.9	**HDP 90**	**3**	**44.6**	✓	✓	4	✓	*
37	5358	2.4	**HDP 80**	**3**	**39.8**	✓	✓	4	✓	*
38	5183	1.3	**HDP 70**	**3**	**38.5**	✓	✓	4	✓	*
38	5178	0.9	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*
40	4961	1.4	**HDP 70**	**3**	**36.9**	✓	✓	4	✓	*
40	4955	2.5	**HDP 80**	**3**	**36.8**	✓	✓	4	✓	*
43	4607	1.1	**HDP 60**	**3**	**34.2**	✓	✓	4	✓	*
46	4273	1.6	**HDP 70**	**3**	**31.7**	✓	✓	4	✓	*
46	4268	1.1	**HDP 60**	**3**	**31.7**	✓	✓	4	✓	*
46	4268	2.7	**HDP 80**	**3**	**31.7**	✓	✓	4	✓	*
49	4031	2.9	**HDP 80**	**3**	**30.0**	✓	✓	4	✓	*
49	3988	1.8	**HDP 70**	**3**	**29.6**	✓	✓	4	✓	*
52	3798	1.4	**HDP 60**	**3**	**28.2**	✓	✓	4	✓	*
57	3472	2.9	**HDP 80**	**3**	**25.8**	✓	✓	4	✓	*
57	3435	2.0	**HDP 70**	**3**	**25.5**	✓	✓	4	✓	*
58	3431	1.4	**HDP 60**	**3**	**25.5**	✓	✓	4	✓	*
65	3053	1.6	**HDP 60**	**3**	**22.7**	✓	✓	4	✓	*
65	3097	2.3	**HDP 70**	**2**	**22.6**	—	✓	4	✓	*
75	2668	2.5	**HDP 70**	**2**	**19.4**	—	✓	4	✓	*
76	2665	1.8	**HDP 60**	**2**	**19.4**	—	✓	4	✓	*
83	2428	2.9	**HDP 70**	**2**	**17.7**	—	✓	4	✓	*
85	2371	2.2	**HDP 60**	**2**	**17.3**	—	✓	4	✓	*
96	2089	2.3	**HDP 60**	**2**	**15.2**	—	✓	4	✓	*
108	1859	2.8	**HDP 60**	**2**	**13.5**	—	✓	4	✓	*
117	1722	2.7	**HDP 60**	**2**	**12.5**	—	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
18.5	10652	1.2	**HDP 80**	**3**	**95.9**	✓	✓	4	✓	*
20.0	9852	1.3	**HDP 80**	**3**	**88.7**	✓	✓	4	✓	*
20.5	9623	1.8	**HDP 90**	**3**	**86.6**	✓	✓	4	✓	*
22.8	8642	2.1	**HDP 90**	**3**	**77.8**	✓	✓	4	✓	*
23.2	8486	1.3	**HDP 80**	**3**	**76.4**	✓	✓	4	✓	*
23.6	8356	1.5	**HDP 80**	**3**	**75.2**	✓	✓	4	✓	*
24.2	8141	2.1	**HDP 90**	**3**	**73.3**	✓	✓	4	✓	*
27.0	7312	2.4	**HDP 90**	**3**	**65.8**	✓	✓	4	✓	*
27.4	7197	1.8	**HDP 80**	**3**	**64.8**	✓	✓	4	✓	*
27.9	7069	0.9	**HDP 70**	**3**	**63.7**	✓	—	4	✓	*
29.6	6657	1.9	**HDP 80**	**3**	**59.9**	✓	✓	4	✓	*
31	6407	2.7	**HDP 90**	**3**	**57.7**	✓	✓	4	✓	*
31	6335	1.1	**HDP 70**	**3**	**57.0**	✓	✓	4	✓	*
34	5734	2.1	**HDP 80**	**3**	**51.6**	✓	✓	4	✓	*
36	5457	1.2	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
38	5133	2.5	**HDP 80**	**3**	**46.2**	✓	✓	4	✓	*
40	4966	1.4	**HDP 70**	**3**	**44.7**	✓	✓	4	✓	*
41	4851	1.1	**HDP 60**	**3**	**43.7**	✓	✓	4	✓	*
45	4421	2.7	**HDP 80**	**3**	**39.8**	✓	✓	4	✓	*
46	4272	1.1	**HDP 60**	**3**	**38.5**	✓	✓	4	✓	*
46	4277	1.6	**HDP 70**	**3**	**38.5**	✓	✓	4	✓	*
48	4093	1.7	**HDP 70**	**3**	**36.9**	✓	✓	4	✓	*
52	3802	1.4	**HDP 60**	**3**	**34.2**	✓	✓	4	✓	*
56	3526	1.9	**HDP 70**	**3**	**31.7**	✓	✓	4	✓	*
56	3522	1.3	**HDP 60**	**3**	**31.7**	✓	✓	4	✓	*
60	3291	2.2	**HDP 70**	**3**	**29.6**	✓	✓	4	✓	*
63	3134	1.6	**HDP 60**	**3**	**28.2**	✓	✓	4	✓	*
70	2834	2.4	**HDP 70**	**3**	**25.5**	✓	✓	4	✓	*
70	2831	1.6	**HDP 60**	**3**	**25.5**	✓	✓	4	✓	*
78	2519	1.8	**HDP 60**	**3**	**22.7**	✓	✓	4	✓	*
79	2556	2.8	**HDP 70**	**2**	**22.6**	—	✓	4	✓	*
92	2199	2.1	**HDP 60**	**2**	**19.4**	—	✓	4	✓	*
103	1957	2.7	**HDP 60**	**2**	**17.3**	—	✓	4	✓	*
117	1724	2.7	**HDP 60**	**2**	**15.2**	—	✓	4	✓	*

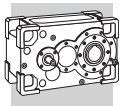
30 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
15.0	17981	1.0	**HDP 90**	**3**	**98.9**	✓	✓	4	✓	*
17.1	15756	1.1	**HDP 90**	**3**	**86.6**	✓	✓	4	✓	*
19.1	14150	1.3	**HDP 90**	**3**	**77.8**	✓	✓	4	✓	*
19.7	13681	0.9	**HDP 80**	**3**	**75.2**	✓	✓	4	✓	*
20.2	13330	1.3	**HDP 90**	**3**	**73.3**	✓	✓	4	✓	*
22.5	11972	1.5	**HDP 90**	**3**	**65.8**	✓	✓	4	✓	*
22.9	11784	1.1	**HDP 80**	**3**	**64.8**	✓	✓	4	✓	*
24.7	10899	1.2	**HDP 80**	**3**	**59.9**	✓	✓	4	✓	*
25.7	10490	1.6	**HDP 90**	**3**	**57.7**	✓	✓	4	✓	*
28.6	9421	1.9	**HDP 90**	**3**	**51.8**	✓	✓	4	✓	*
28.7	9387	1.3	**HDP 80**	**3**	**51.6**	✓	✓	4	✓	*
32	8404	1.5	**HDP 80**	**3**	**46.2**	✓	✓	4	✓	*
33	8106	2.1	**HDP 90**	**3**	**44.6**	✓	✓	4	✓	*
37	7280	2.4	**HDP 90**	**3**	**40.0**	✓	✓	4	✓	*
37	7239	1.7	**HDP 80**	**3**	**39.8**	✓	✓	4	✓	*
39	7003	1.0	**HDP 70**	**3**	**38.5**	✓	✓	4	✓	*
40	6702	1.1	**HDP 70**	**3**	**36.9**	✓	✓	4	✓	*
40	6695	1.9	**HDP 80**	**3**	**36.8**	✓	✓	4	✓	*
41	6657	2.6	**HDP 90**	**3**	**36.6**	✓	✓	4	✓	*
45	5978	3.0	**HDP 90**	**3**	**32.9**	✓	✓	4	✓	*
47	5773	1.2	**HDP 70**	**3**	**31.7**	✓	✓	4	✓	*
47	5767	2.0	**HDP 80**	**3**	**31.7**	✓	✓	4	✓	*
50	5447	2.1	**HDP 80**	**3**	**30.0**	✓	✓	4	✓	*
50	5388	1.3	**HDP 70**	**3**	**29.6**	✓	✓	4	✓	*
53	5131	1.0	**HDP 60**	**3**	**28.2**	—	✓	4	✓	*
58	4691	2.1	**HDP 80**	**3**	**25.8**	✓	✓	4	✓	*
58	4641	1.5	**HDP 70**	**3**	**25.5**	✓	✓	4	✓	*
58	4636	1.0	**HDP 60**	**3**	**25.5**	—	✓	4	✓	*
65	4125	1.1	**HDP 60**	**3**	**22.7**	—	✓	4	✓	*
66	4185	1.7	**HDP 70**	**2**	**22.6**	—	✓	4	✓	*
76	3604	1.9	**HDP 70**	**2**	**19.4**	—	✓	4	✓	*
76	3600	1.3	**HDP 60**	**2**	**19.4**	—	✓	4	✓	*
84	3280	2.2	**HDP 70**	**2**	**17.7**	—	✓	4	✓	*
86	3204	1.6	**HDP 60**	**2**	**17.3**	—	✓	4	✓	*
97	2825	2.4	**HDP 70**	**2**	**15.2**	—	✓	4	✓	*
98	2822	1.7	**HDP 60**	**2**	**15.2**	—	✓	4	✓	*
102	2704	2.6	**HDP 70**	**2**	**14.6**	—	✓	4	✓	*
110	2511	2.1	**HDP 60**	**2**	**13.5**	—	✓	4	✓	*
118	2329	2.9	**HDP 70**	**2**	**12.6**	—	✓	4	✓	*
118	2326	2.0	**HDP 60**	**2**	**12.5**	—	✓	4	✓	*
133	2070	2.5	**HDP 60**	**2**	**11.2**	—	✓	4	✓	*
147	1870	2.5	**HDP 60**	**2**	**10.1**	—	✓	4	✓	*
165	1664	2.9	**HDP 60**	**2**	**9.0**	—	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
16.2	16580	1.0	**HDP 90**	**3**	**110.1**	✓	✓	4	✓	*
18.1	14891	1.2	**HDP 90**	**3**	**98.9**	✓	✓	4	✓	*
20.1	13358	0.9	**HDP 80**	**3**	**88.7**	✓	—	4	✓	*
20.6	13048	1.3	**HDP 90**	**3**	**86.6**	✓	✓	4	✓	*
23.0	11719	1.5	**HDP 90**	**3**	**77.8**	✓	✓	4	✓	*
23.4	11506	1.0	**HDP 80**	**3**	**76.4**	✓	—	4	✓	*
23.7	11330	1.1	**HDP 80**	**3**	**75.2**	✓	✓	4	✓	*
24.4	11039	1.6	**HDP 90**	**3**	**73.3**	✓	✓	4	✓	*
27.1	9914	1.8	**HDP 90**	**3**	**65.8**	✓	✓	4	✓	*
27.6	9759	1.3	**HDP 80**	**3**	**64.8**	✓	✓	4	✓	*
29.8	9026	1.4	**HDP 80**	**3**	**59.9**	✓	✓	4	✓	*
31	8687	2.0	**HDP 90**	**3**	**57.7**	✓	✓	4	✓	*
35	7802	2.3	**HDP 90**	**3**	**51.8**	✓	✓	4	✓	*
35	7774	1.5	**HDP 80**	**3**	**51.6**	✓	✓	4	✓	*
36	7399	0.9	**HDP 70**	**3**	**49.1**	✓	✓	4	✓	*
39	6960	1.8	**HDP 80**	**3**	**46.2**	✓	✓	4	✓	*
40	6733	1.1	**HDP 70**	**3**	**44.7**	✓	✓	4	✓	*
40	6713	2.6	**HDP 90**	**3**	**44.6**	✓	✓	4	✓	*
45	6029	2.8	**HDP 90**	**3**	**40.0**	✓	✓	4	✓	*
45	5995	2.0	**HDP 80**	**3**	**39.8**	✓	✓	4	✓	*
46	5799	1.2	**HDP 70**	**3**	**38.5**	✓	✓	4	✓	*
49	5550	1.2	**HDP 70**	**3**	**36.9**	✓	✓	4	✓	*
49	5544	2.3	**HDP 80**	**3**	**36.8**	✓	✓	4	✓	*
52	5155	1.0	**HDP 60**	**3**	**34.2**	—	✓	4	✓	*
56	4776	1.0	**HDP 60**	**3**	**31.7**	—	✓	4	✓	*
56	4781	1.4	**HDP 70**	**3**	**31.7**	✓	✓	4	✓	*
56	4776	2.4	**HDP 80**	**3**	**31.7**	✓	✓	4	✓	*
60	4511	2.5	**HDP 80**	**3**	**30.0**	✓	✓	4	✓	*
60	4462	1.6	**HDP 70**	**3**	**29.6**	✓	✓	4	✓	*
63	4249	1.2	**HDP 60**	**3**	**28.2**	—	✓	4	✓	*
69	3885	2.5	**HDP 80**	**3**	**25.8**	✓	✓	4	✓	*
70	3843	1.8	**HDP 70**	**3**	**25.5**	✓	✓	4	✓	*
70	3839	1.2	**HDP 60**	**3**	**25.5**	—	✓	4	✓	*
79	3416	1.3	**HDP 60**	**3**	**22.7**	—	✓	4	✓	*
79	3465	2.0	**HDP 70**	**2**	**22.6**	—	✓	4	✓	*
92	2985	2.3	**HDP 70**	**2**	**19.4**	—	✓	4	✓	*
92	2982	1.6	**HDP 60**	**2**	**19.4**	—	✓	4	✓	*
101	2716	2.6	**HDP 70**	**2**	**17.7**	—	✓	4	✓	*
103	2653	2.0	**HDP 60**	**2**	**17.3**	—	✓	4	✓	*
117	2340	2.9	**HDP 70**	**2**	**15.2**	—	✓	4	✓	*
117	2337	2.0	**HDP 60**	**2**	**15.2**	—	✓	4	✓	*
132	2080	2.5	**HDP 60**	**2**	**13.5**	—	✓	4	✓	*
143	1927	2.4	**HDP 60**	**2**	**12.5**	—	✓	4	✓	*
160	1714	2.9	**HDP 60**	**2**	**11.2**	—	✓	4	✓	*



37 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
20.2	16462	1.0	**HDP 90**	**3**	**73.3**	—	✓	4	✓	—
22.5	14785	1.2	**HDP 90**	**3**	**65.8**	—	✓	4	✓	—
24.7	13460	0.9	**HDP 80**	**3**	**59.9**	—	✓	4	✓	—
25.7	12955	1.3	**HDP 90**	**3**	**57.7**	—	✓	4	✓	—
28.6	11635	1.5	**HDP 90**	**3**	**51.8**	—	✓	4	✓	—
28.7	11593	1.0	**HDP 80**	**3**	**51.6**	—	✓	4	✓	—
32	10379	1.2	**HDP 80**	**3**	**46.2**	—	✓	4	✓	—
33	10011	1.7	**HDP 90**	**3**	**44.6**	—	✓	4	✓	—
37	8991	2.0	**HDP 90**	**3**	**40.0**	—	✓	4	✓	—
37	8940	1.4	**HDP 80**	**3**	**39.8**	—	✓	4	✓	—
40	8268	1.5	**HDP 80**	**3**	**36.8**	—	✓	4	✓	—
41	8221	2.1	**HDP 90**	**3**	**36.6**	—	✓	4	✓	—
45	7383	2.4	**HDP 90**	**3**	**32.9**	—	✓	4	✓	—
47	7129	0.9	**HDP 70**	**3**	**31.7**	—	✓	4	✓	—
47	7122	1.6	**HDP 80**	**3**	**31.7**	—	✓	4	✓	—
50	6727	1.7	**HDP 80**	**3**	**30.0**	—	✓	4	✓	—
50	6654	1.1	**HDP 70**	**3**	**29.6**	—	✓	4	✓	—
52	6353	2.7	**HDP 90**	**3**	**28.3**	—	✓	4	✓	—
57	5794	1.7	**HDP 80**	**3**	**25.8**	—	✓	4	✓	—
58	5731	1.2	**HDP 70**	**3**	**25.5**	—	✓	4	✓	—
58	5705	3.0	**HDP 90**	**3**	**25.4**	—	✓	4	✓	—
65	5094	0.9	**HDP 60**	**3**	**22.7**	—	✓	4	✓	—
66	5168	1.4	**HDP 70**	**2**	**22.6**	—	✓	4	✓	—
66	5172	2.4	**HDP 80**	**2**	**22.6**	—	✓	4	✓	—
76	4455	2.7	**HDP 80**	**2**	**19.4**	—	✓	4	✓	—
76	4451	1.5	**HDP 70**	**2**	**19.4**	—	✓	4	✓	—
76	4447	1.1	**HDP 60**	**2**	**19.4**	—	✓	4	✓	—
82	4120	2.9	**HDP 80**	**2**	**18.0**	—	✓	4	✓	—
84	4051	1.7	**HDP 70**	**2**	**17.7**	—	✓	4	✓	—
86	3957	1.3	**HDP 60**	**2**	**17.3**	—	✓	4	✓	—
97	3489	1.9	**HDP 70**	**2**	**15.2**	—	✓	4	✓	—
97	3485	1.4	**HDP 60**	**2**	**15.2**	—	✓	4	✓	—
102	3339	2.1	**HDP 70**	**2**	**14.6**	—	✓	4	✓	—
110	3101	1.7	**HDP 60**	**2**	**13.5**	—	✓	4	✓	—
118	2876	2.3	**HDP 70**	**2**	**12.6**	—	✓	4	✓	—
118	2873	1.6	**HDP 60**	**2**	**12.5**	—	✓	4	✓	—
127	2684	2.5	**HDP 70**	**2**	**11.7**	—	✓	4	✓	—
133	2556	2.0	**HDP 60**	**2**	**11.2**	—	✓	4	✓	—
147	2312	2.8	**HDP 70**	**2**	**10.1**	—	✓	4	✓	—
147	2310	2.0	**HDP 60**	**2**	**10.1**	—	✓	4	✓	—
159	2139	2.9	**HDP 70**	**2**	**9.3**	—	✓	4	✓	—
165	2055	2.4	**HDP 60**	**2**	**9.0**	—	✓	4	✓	—
185	1840	2.5	**HDP 60**	**2**	**8.0**	—	✓	4	✓	—
207	1637	2.8	**HDP 60**	**2**	**7.1**	—	✓	4	✓	—

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
24.3	13661	1.3	**HDP 90**	**3**	**73.3**	—	✓	4	✓	—
27.1	12269	1.5	**HDP 90**	**3**	**65.8**	—	✓	4	✓	—
27.5	12077	1.0	**HDP 80**	**3**	**64.8**	—	✓	4	✓	—
29.8	11170	1.1	**HDP 80**	**3**	**59.9**	—	✓	4	✓	—
31	10751	1.6	**HDP 90**	**3**	**57.7**	—	✓	4	✓	—
34	9655	1.9	**HDP 90**	**3**	**51.8**	—	✓	4	✓	—
35	9621	1.2	**HDP 80**	**3**	**51.6**	—	✓	4	✓	—
39	8613	1.5	**HDP 80**	**3**	**46.2**	—	✓	4	✓	—
40	8307	2.1	**HDP 90**	**3**	**44.6**	—	✓	4	✓	—
45	7461	2.2	**HDP 90**	**3**	**40.0**	—	✓	4	✓	—
45	7419	1.6	**HDP 80**	**3**	**39.8**	—	✓	4	✓	—
46	7177	0.9	**HDP 70**	**3**	**38.5**	—	✓	4	✓	—
48	6869	1.0	**HDP 70**	**3**	**36.9**	—	✓	4	✓	—
49	6861	1.8	**HDP 80**	**3**	**36.8**	—	✓	4	✓	—
49	6822	2.5	**HDP 90**	**3**	**36.6**	—	✓	4	✓	—
54	6127	2.8	**HDP 90**	**3**	**32.9**	—	✓	4	✓	—
56	5916	1.1	**HDP 70**	**3**	**31.7**	—	✓	4	✓	—
56	5910	1.9	**HDP 80**	**3**	**31.7**	—	✓	4	✓	—
60	5582	2.1	**HDP 80**	**3**	**30.0**	—	✓	4	✓	—
60	5522	1.3	**HDP 70**	**3**	**29.6**	—	✓	4	✓	—
63	5259	0.9	**HDP 60**	**3**	**28.2**	—	✓	4	✓	—
69	4808	2.1	**HDP 80**	**3**	**25.8**	—	✓	4	✓	—
70	4756	1.4	**HDP 70**	**3**	**25.5**	—	✓	4	✓	—
70	4751	1.0	**HDP 60**	**3**	**25.5**	—	✓	4	✓	—
79	4228	1.1	**HDP 60**	**3**	**22.7**	—	✓	4	✓	—
79	4292	2.9	**HDP 80**	**2**	**22.6**	—	✓	4	✓	—
79	4289	1.7	**HDP 70**	**2**	**22.6**	—	✓	4	✓	—
92	3694	1.8	**HDP 70**	**2**	**19.4**	—	✓	4	✓	—
92	3690	1.3	**HDP 60**	**2**	**19.4**	—	✓	4	✓	—
101	3361	2.1	**HDP 70**	**2**	**17.7**	—	✓	4	✓	—
103	3283	1.6	**HDP 60**	**2**	**17.3**	—	✓	4	✓	—
117	2895	2.3	**HDP 70**	**2**	**15.2**	—	✓	4	✓	—
117	2892	1.6	**HDP 60**	**2**	**15.2**	—	✓	4	✓	—
122	2771	2.4	**HDP 70**	**2**	**14.6**	—	✓	4	✓	—
132	2573	2.0	**HDP 60**	**2**	**13.5**	—	✓	4	✓	—
142	2387	2.7	**HDP 70**	**2**	**12.6**	—	✓	4	✓	—
142	2384	2.0	**HDP 60**	**2**	**12.5**	—	✓	4	✓	—
152	2228	2.8	**HDP 70**	**2**	**11.7**	—	✓	4	✓	—
160	2121	2.3	**HDP 60**	**2**	**11.2**	—	✓	4	✓	—
177	1917	2.4	**HDP 60**	**2**	**10.1**	—	✓	4	✓	—
199	1705	2.7	**HDP 60**	**2**	**9.0**	—	✓	4	✓	—
222	1527	2.9	**HDP 60**	**2**	**8.0**	—	✓	4	✓	—

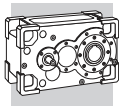
45 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
22.5	17970	1.0	**HDP 90**	**3**	**65.8**	—	✓	4	✓	—
25.7	15746	1.1	**HDP 90**	**3**	**57.7**	—	✓	4	✓	—
28.6	14142	1.3	**HDP 90**	**3**	**51.8**	—	✓	4	✓	—
32	12615	1.0	**HDP 80**	**3**	**46.2**	—	✓	4	✓	—
33	12167	1.4	**HDP 90**	**3**	**44.6**	—	✓	4	✓	—
37	10928	1.6	**HDP 90**	**3**	**40.0**	—	✓	4	✓	—
37	10866	1.2	**HDP 80**	**3**	**39.8**	—	✓	4	✓	—
40	10049	1.3	**HDP 80**	**3**	**36.8**	—	✓	4	✓	—
41	9992	1.7	**HDP 90**	**3**	**36.6**	—	✓	4	✓	—
45	8974	2.0	**HDP 90**	**3**	**32.9**	—	✓	4	✓	—
47	8656	1.3	**HDP 80**	**3**	**31.7**	—	✓	4	✓	—
50	8176	1.4	**HDP 80**	**3**	**30.0**	—	✓	4	✓	—
52	7721	2.2	**HDP 90**	**3**	**28.3**	—	✓	4	✓	—
57	7042	1.4	**HDP 80**	**3**	**25.8**	—	✓	4	✓	—
58	6966	1.0	**HDP 70**	**3**	**25.5**	—	✓	4	✓	—
58	6934	2.5	**HDP 90**	**3**	**25.4**	—	✓	4	✓	—
66	6281	1.1	**HDP 70**	**2**	**22.6**	—	✓	4	✓	—
66	6287	2.0	**HDP 80**	**2**	**22.6**	—	✓	4	✓	—
66	6229	2.7	**HDP 90**	**2**	**22.4**	—	✓	4	✓	—
76	5415	2.2	**HDP 80**	**2**	**19.4**	—	✓	4	✓	—
76	5410	1.2	**HDP 70**	**2**	**19.4**	—	✓	4	✓	—
82	5008	2.4	**HDP 80**	**2**	**18.0**	—	✓	4	✓	—
84	4923	1.4	**HDP 70**	**2**	**17.7**	—	✓	4	✓	—
86	4809	1.1	**HDP 60**	**2**	**17.3**	—	✓	4	✓	—
96	4314	2.7	**HDP 80**	**2**	**15.5**	—	✓	4	✓	—
97	4240	1.6	**HDP 70**	**2**	**15.2**	—	✓	4	✓	—
97	4236	1.1	**HDP 60**	**2**	**15.2**	—	✓	4	✓	—
102	4058	1.7	**HDP 70**	**2**	**14.6**	—	✓	4	✓	—
110	3769	1.4	**HDP 60**	**2**	**13.5**	—	✓	4	✓	—
118	3496	1.9	**HDP 70**	**2**	**12.6**	—	✓	4	✓	—
118	3492	1.4	**HDP 60**	**2**	**12.5**	—	✓	4	✓	—
127	3263	2.0	**HDP 70**	**2**	**11.7**	—	✓	4	✓	—
133	3107	1.7	**HDP 60**	**2**	**11.2**	—	✓	4	✓	—
147	2810	2.3	**HDP 70**	**2**	**10.1**	—	✓	4	✓	—
147	2807	1.7	**HDP 60**	**2**	**10.1**	—	✓	4	✓	—
159	2599	2.4	**HDP 70**	**2**	**9.3**	—	✓	4	✓	—
165	2498	2.0	**HDP 60**	**2**	**9.0**	—	✓	4	✓	—
184	2239	2.7	**HDP 70**	**2**	**8.0**	—	✓	4	✓	—
185	2237	2.1	**HDP 60**	**2**	**8.0**	—	✓	4	✓	—
207	1990	2.3	**HDP 60**	**2**	**7.1**	—	✓	4	✓	—

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
24.4	16559	1.0	**HDP 90**	**3**	**73.3**	—	✓	4	✓	—
27.1	14872	1.2	**HDP 90**	**3**	**65.8**	—	✓	4	✓	—
29.8	13539	0.9	**HDP 80**	**3**	**59.9**	—	✓	4	✓	—
31	13031	1.3	**HDP 90**	**3**	**57.7**	—	✓	4	✓	—
35	11703	1.5	**HDP 90**	**3**	**51.8**	—	✓	4	✓	—
35	11661	1.0	**HDP 80**	**3**	**51.6**	—	✓	4	✓	—
39	10440	1.2	**HDP 80**	**3**	**46.2**	—	✓	4	✓	—
40	10069	1.7	**HDP 90**	**3**	**44.6**	—	✓	4	✓	—
45	9044	1.8	**HDP 90**	**3**	**40.0**	—	✓	4	✓	—
45	8992	1.3	**HDP 80**	**3**	**39.8**	—	✓	4	✓	—
49	8317	1.5	**HDP 80**	**3**	**36.8**	—	✓	4	✓	—
49	8269	2.1	**HDP 90**	**3**	**36.6**	—	✓	4	✓	—
54	7427	2.3	**HDP 90**	**3**	**32.9**	—	✓	4	✓	—
56	7171	0.9	**HDP 70**	**3**	**31.7**	—	✓	4	✓	—
56	7163	1.6	**HDP 80**	**3**	**31.7**	—	✓	4	✓	—
60	6766	1.7	**HDP 80**	**3**	**30.0**	—	✓	4	✓	—
60	6693	1.1	**HDP 70**	**3**	**29.6**	—	✓	4	✓	—
63	6390	2.6	**HDP 90**	**3**	**28.3**	—	✓	4	✓	—
69	5828	1.7	**HDP 80**	**3**	**25.8**	—	✓	4	✓	—
70	5765	1.2	**HDP 70**	**3**	**25.5**	—	✓	4	✓	—
70	5739	2.8	**HDP 90**	**3**	**25.4**	—	✓	4	✓	—
79	5198	1.4	**HDP 70**	**2**	**22.6**	—	✓	4	✓	—
79	5203	2.4	**HDP 80**	**2**	**22.6**	—	✓	4	✓	—
92	4481	2.7	**HDP 80**	**2**	**19.4**	—	✓	4	✓	—
92	4477	1.5	**HDP 70**	**2**	**19.4**	—	✓	4	✓	—
92	4473	1.1	**HDP 60**	**2**	**19.4**	—	✓	4	✓	—
99	4145	2.9	**HDP 80**	**2**	**18.0**	—	✓	4	✓	—
101	4074	1.7	**HDP 70**	**2**	**17.7**	—	✓	4	✓	—
103	3980	1.3	**HDP 60**	**2**	**17.3**	—	✓	4	✓	—
117	3509	1.9	**HDP 70**	**2**	**15.2**	—	✓	4	✓	—
117	3506	1.3	**HDP 60**	**2**	**15.2**	—	✓	4	✓	—
123	3359	2.0	**HDP 70**	**2**	**14.6**	—	✓	4	✓	—
132	3119	1.7	**HDP 60**	**2**	**13.5**	—	✓	4	✓	—
142	2893	2.3	**HDP 70**	**2**	**12.6**	—	✓	4	✓	—
142	2890	1.6	**HDP 60**	**2**	**12.5**	—	✓	4	✓	—
152	2700	2.3	**HDP 70**	**2**	**11.7**	—	✓	4	✓	—
160	2571	1.9	**HDP 60**	**2**	**11.2**	—	✓	4	✓	—
177	2326	2.6	**HDP 70**	**2**	**10.1**	—	✓	4	✓	—
177	2323	2.0	**HDP 60**	**2**	**10.1**	—	✓	4	✓	—
191	2151	2.7	**HDP 70**	**2**	**9.3**	—	✓	4	✓	—
199	2067	2.2	**HDP 60**	**2**	**9.0**	—	✓	4	✓	—
222	1851	2.4	**HDP 60**	**2**	**8.0**	—	✓	4	✓	—
250	1647	2.6	**HDP 60**	**2**	**7.1**	—	✓	4	✓	—



55 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
28.6	17272	1.0	**HDP 90**	**3**	**51.8**	—	✓	4	✓	—
33	14861	1.2	**HDP 90**	**3**	**44.6**	—	✓	4	✓	—
37	13347	1.3	**HDP 90**	**3**	**40.0**	—	✓	4	✓	—
37	13271	0.9	**HDP 80**	**3**	**39.8**	—	✓	4	✓	—
40	12274	1.0	**HDP 80**	**3**	**36.8**	—	✓	4	✓	—
41	12204	1.4	**HDP 90**	**3**	**36.6**	—	✓	4	✓	—
45	10961	1.6	**HDP 90**	**3**	**32.9**	—	✓	4	✓	—
47	10572	1.1	**HDP 80**	**3**	**31.7**	—	✓	4	✓	—
50	9986	1.2	**HDP 80**	**3**	**30.0**	—	✓	4	✓	—
52	9430	1.8	**HDP 90**	**3**	**28.3**	—	✓	4	✓	—
57	8601	1.2	**HDP 80**	**3**	**25.8**	—	✓	4	✓	—
58	8470	2.0	**HDP 90**	**3**	**25.4**	—	✓	4	✓	—
66	7678	1.6	**HDP 80**	**2**	**22.6**	—	✓	4	✓	—
66	7608	2.3	**HDP 90**	**2**	**22.4**	—	✓	4	✓	—
74	6833	2.6	**HDP 90**	**2**	**20.1**	—	✓	4	✓	—
76	6613	1.8	**HDP 80**	**2**	**19.4**	—	✓	4	✓	—
82	6117	2.0	**HDP 80**	**2**	**18.0**	—	✓	4	✓	—
84	5987	2.9	**HDP 90**	**2**	**17.6**	—	✓	4	✓	—
96	5268	2.2	**HDP 80**	**2**	**15.5**	—	✓	4	✓	—
101	4976	2.5	**HDP 80**	**2**	**14.6**	—	✓	4	✓	—
118	4286	2.7	**HDP 80**	**2**	**12.6**	—	✓	4	✓	—
130	3888	3.0	**HDP 80**	**2**	**11.4**	—	✓	4	✓	—

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
27.1	18156	1.0	**HDP 90**	**3**	**65.8**	—	✓	4	✓	—
31	15909	1.1	**HDP 90**	**3**	**57.7**	—	✓	4	✓	—
35	14288	1.3	**HDP 90**	**3**	**51.8**	—	✓	4	✓	—
39	12745	1.0	**HDP 80**	**3**	**46.2**	—	✓	4	✓	—
40	12293	1.4	**HDP 90**	**3**	**44.6**	—	✓	4	✓	—
45	11041	1.5	**HDP 90**	**3**	**40.0**	—	✓	4	✓	—
45	10978	1.1	**HDP 80**	**3**	**39.8**	—	✓	4	✓	—
49	10153	1.2	**HDP 80**	**3**	**36.8**	—	✓	4	✓	—
49	10095	1.7	**HDP 90**	**3**	**36.6**	—	✓	4	✓	—
54	9067	1.9	**HDP 90**	**3**	**32.9**	—	✓	4	✓	—
56	8745	1.3	**HDP 80**	**3**	**31.7**	—	✓	4	✓	—
60	8260	1.4	**HDP 80**	**3**	**30.0**	—	✓	4	✓	—
63	7801	2.1	**HDP 90**	**3**	**28.3**	—	✓	4	✓	—
69	7115	1.4	**HDP 80**	**3**	**25.8**	—	✓	4	✓	—
70	7006	2.3	**HDP 90**	**3**	**25.4**	—	✓	4	✓	—
79	6352	2.0	**HDP 80**	**2**	**22.6**	—	✓	4	✓	—
80	6293	2.7	**HDP 90**	**2**	**22.4**	—	✓	4	✓	—
92	5471	2.2	**HDP 80**	**2**	**19.4**	—	✓	4	✓	—
99	5060	2.4	**HDP 80**	**2**	**18.0**	—	✓	4	✓	—
115	4358	2.7	**HDP 80**	**2**	**15.5**	—	✓	4	✓	—
122	4116	2.9	**HDP 80**	**2**	**14.6**	—	✓	4	✓	—

75 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
37	18200	1.0	**HDP 90**	**3**	**40.0**	—	✓	4	✓	—
41	16642	1.0	**HDP 90**	**3**	**36.6**	—	✓	4	✓	—
45	14946	1.2	**HDP 90**	**3**	**32.9**	—	✓	4	✓	—
53	12860	1.3	**HDP 90**	**3**	**28.3**	—	✓	4	✓	—
59	11549	1.5	**HDP 90**	**3**	**25.4**	—	✓	4	✓	—
66	10470	1.2	**HDP 80**	**2**	**22.6**	—	✓	4	✓	—
66	10374	1.7	**HDP 90**	**2**	**22.4**	—	✓	4	✓	—
74	9317	1.9	**HDP 90**	**2**	**20.1**	—	✓	4	✓	—
76	9018	1.3	**HDP 80**	**2**	**19.4**	—	✓	4	✓	—
83	8341	1.4	**HDP 80**	**2**	**18.0**	—	✓	4	✓	—
84	8164	2.1	**HDP 90**	**2**	**17.6**	—	✓	4	✓	—
94	7332	2.3	**HDP 90**	**2**	**15.8**	—	✓	4	✓	—
96	7184	1.6	**HDP 80**	**2**	**15.5**	—	✓	4	✓	—
102	6786	1.8	**HDP 80**	**2**	**14.6**	—	✓	4	✓	—

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
35	19554	0.9	**HDP 90**	**3**	**51.8**	—	✓	4	✓	—
40	16824	1.0	**HDP 90**	**3**	**44.6**	—	✓	4	✓	—
45	15110	1.1	**HDP 90**	**3**	**40.0**	—	✓	4	✓	—
49	13896	0.9	**HDP 80**	**3**	**36.8**	—	✓	4	✓	—
49	13817	1.2	**HDP 90**	**3**	**36.6**	—	✓	4	✓	—
54	12409	1.4	**HDP 90**	**3**	**32.9**	—	✓	4	✓	—
56	11969	0.9	**HDP 80**	**3**	**31.7**	—	✓	4	✓	—
60	11305	1.0	**HDP 80**	**3**	**30.0**	—	✓	4	✓	—
63	10676	1.6	**HDP 90**	**3**	**28.3**	—	✓	4	✓	—
69	9737	1.0	**HDP 80**	**3**	**25.8**	—	✓	4	✓	—
70	9589	1.7	**HDP 90**	**3**	**25.4**	—	✓	4	✓	—
79	8693	1.4	**HDP 80**	**2**	**22.6**	—	✓	4	✓	—
80	8613	2.0	**HDP 90**	**2**	**22.4**	—	✓	4	✓	—
89	7735	2.2	**HDP 90**	**2**	**20.1**	—	✓	4	✓	—

75 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
109	6309	2.6	**HDP 90**	**2**	**13.6**	—	✓	4	✓	—
118	5845	2.0	**HDP 80**	**2**	**12.6**	—	✓	4	✓	—
122	5666	2.8	**HDP 90**	**2**	**12.2**	—	✓	4	✓	—
130	5301	2.2	**HDP 80**	**2**	**11.4**	—	✓	4	✓	—
133	5195	3.0	**HDP 90**	**2**	**11.2**	—	✓	4	✓	—
151	4566	2.4	**HDP 80**	**2**	**9.8**	—	✓	4	✓	—
159	4342	2.5	**HDP 80**	**2**	**9.4**	—	✓	4	✓	—
184	3740	2.8	**HDP 80**	**2**	**8.1**	—	✓	4	✓	—

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
92	7487	1.6	**HDP 80**	**2**	**19.4**	—	✓	4	✓	—
99	6925	1.7	**HDP 80**	**2**	**18.0**	—	✓	4	✓	—
102	6778	2.5	**HDP 90**	**2**	**17.6**	—	✓	4	✓	—
113	6087	2.6	**HDP 90**	**2**	**15.8**	—	✓	4	✓	—
115	5965	2.0	**HDP 80**	**2**	**15.5**	—	✓	4	✓	—
122	5634	2.1	**HDP 80**	**2**	**14.6**	—	✓	4	✓	—
132	5238	3.0	**HDP 90**	**2**	**13.6**	—	✓	4	✓	—
142	4853	2.4	**HDP 80**	**2**	**12.6**	—	✓	4	✓	—
157	4401	2.5	**HDP 80**	**2**	**11.4**	—	✓	4	✓	—
182	3791	2.8	**HDP 80**	**2**	**9.8**	—	✓	4	✓	—
191	3605	2.8	**HDP 80**	**2**	**9.4**	—	✓	4	✓	—

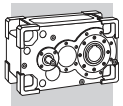
90 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
45	17886	1.0	**HDP 90**	**3**	**32.9**	—	✓	4	✓	—
53	15389	1.1	**HDP 90**	**3**	**28.3**	—	✓	4	✓	—
59	13821	1.2	**HDP 90**	**3**	**25.4**	—	✓	4	✓	—
66	12530	1.0	**HDP 80**	**2**	**22.6**	—	✓	4	✓	—
66	12415	1.4	**HDP 90**	**2**	**22.4**	—	✓	4	✓	—
74	11150	1.6	**HDP 90**	**2**	**20.1**	—	✓	4	✓	—
76	10792	1.1	**HDP 80**	**2**	**19.4**	—	✓	4	✓	—
83	9981	1.2	**HDP 80**	**2**	**18.0**	—	✓	4	✓	—
84	9770	1.8	**HDP 90**	**2**	**17.6**	—	✓	4	✓	—
94	8774	1.9	**HDP 90**	**2**	**15.8**	—	✓	4	✓	—
96	8597	1.4	**HDP 80**	**2**	**15.5**	—	✓	4	✓	—
102	8120	1.5	**HDP 80**	**2**	**14.6**	—	✓	4	✓	—
109	7550	2.2	**HDP 90**	**2**	**13.6**	—	✓	4	✓	—
118	6994	1.6	**HDP 80**	**2**	**12.6**	—	✓	4	✓	—
122	6780	2.3	**HDP 90**	**2**	**12.2**	—	✓	4	✓	—
130	6344	1.8	**HDP 80**	**2**	**11.4**	—	✓	4	✓	—
133	6217	2.5	**HDP 90**	**2**	**11.2**	—	✓	4	✓	—
148	5584	2.6	**HDP 90**	**2**	**10.1**	—	✓	4	✓	—
151	5464	2.0	**HDP 80**	**2**	**9.8**	—	✓	4	✓	—
159	5196	2.1	**HDP 80**	**2**	**9.4**	—	✓	4	✓	—
168	4901	2.9	**HDP 90**	**2**	**8.8**	—	✓	4	✓	—
184	4476	2.3	**HDP 80**	**2**	**8.1**	—	✓	4	✓	—

60Hz

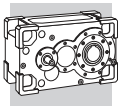
n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
45	18125	0.9	**HDP 90**	**3**	**40.0**	—	✓	4	✓	—
49	16573	1.0	**HDP 90**	**3**	**36.6**	—	✓	4	✓	—
54	14884	1.2	**HDP 90**	**3**	**32.9**	—	✓	4	✓	—
63	12806	1.3	**HDP 90**	**3**	**28.3**	—	✓	4	✓	—
70	11502	1.4	**HDP 90**	**3**	**25.4**	—	✓	4	✓	—
79	10427	1.2	**HDP 80**	**2**	**22.6**	—	✓	4	✓	—
80	10331	1.7	**HDP 90**	**2**	**22.4**	—	✓	4	✓	—
89	9279	1.8	**HDP 90**	**2**	**20.1**	—	✓	4	✓	—
92	8981	1.3	**HDP 80**	**2**	**19.4**	—	✓	4	✓	—
99	8306	1.4	**HDP 80**	**2**	**18.0**	—	✓	4	✓	—
102	8130	2.1	**HDP 90**	**2**	**17.6**	—	✓	4	✓	—
113	7302	2.2	**HDP 90**	**2**	**15.8**	—	✓	4	✓	—
115	7154	1.6	**HDP 80**	**2**	**15.5**	—	✓	4	✓	—
122	6758	1.7	**HDP 80**	**2**	**14.6**	—	✓	4	✓	—
132	6283	2.5	**HDP 90**	**2**	**13.6**	—	✓	4	✓	—
142	5821	2.0	**HDP 80**	**2**	**12.6**	—	✓	4	✓	—
146	5642	2.6	**HDP 90**	**2**	**12.2**	—	✓	4	✓	—
157	5279	2.1	**HDP 80**	**2**	**11.4**	—	✓	4	✓	—
160	5174	2.8	**HDP 90**	**2**	**11.2**	—	✓	4	✓	—
182	4547	2.3	**HDP 80**	**2**	**9.8**	—	✓	4	✓	—
191	4324	2.3	**HDP 80**	**2**	**9.4**	—	✓	4	✓	—
222	3724	2.6	**HDP 80**	**2**	**8.1**	—	✓	4	✓	—



18 MASS MOMENT OF INERTIA

Moments of inertia listed refer to gearbox input shaft and apply exclusively for configurations with a single extension input and output shaft.

	i_N	$J \cdot 10^{-4}$ [kg m^2]													
		HDP 60	**HDP 70**	**HDP 80**	**HDP 90**	**HDP 100**	**HDP 110**	**HDP 120**	**HDP 125**	**HDP 130**	**HDP 140**	**HDP 150**	**HDP 160**	**HDP 170**	**HDP 180**
2x	**7.1**	120	—	—	—	1220	—	—	—	5602	—	—	—	BONFIGLIOLI TECHNICAL SERVICE	
	8.0	116	143	335	600	1170	1288	2558	—	5402	6157	12297	—		
	9.0	95	133	314	570	918	1232	2481	2729	4446	5858	11477	13554		
	10.0	92	109	263	440	884	963	1804	2643	4303	4840	11094	12503		
	11.2	68	103	248	421	682	926	1759	1905	3050	4627	7584	12014		
	12.5	67	77	183	324	661	712	1285	1854	2967	3279	7165	8226		
	14.0	54	74	175	311	508	688	1256	1348	1916	3155	6970	7689		
	16.0	53	60	132	226	494	526	1038	1316	1863	2062	4651	7439		
	18.0	33	58	127	219	388	511	1019	1080	1418	1983	4434	4983		
	20.0	33	40	99	171	379	399	717	1059	1383	1514	4332	4705		
	22.4	—	38	95	166	374	390	705	742	1621	1462	—	4576		
	25.0	—	—	—	—	—	378	689	729	—	1401	—	—		
3x	**22.4**	33	—	—	—	346	—	—	—	1365	—	4112	—		
	25.0	33	36	85	177	341	354	468	—	1343	1427	4002	4282		
	28.0	29	35	83	174	307	348	461	485	1147	1394	3950	4140		
	31.5	29	30	68	156	304	312	382	476	1134	1183	3433	4074		
	35.5	27	30	67	154	279	308	378	393	1031	1163	3375	3521		
	40.0	27	28	67	91	277	282	341	387	1023	1054	3348	3447		
	45.0	24	27	66	90	261	280	338	348	959	1041	1306	3413		
	50.0	24	25	44	82	260	263	296	345	953	974	1278	1347		
	56.0	11	25	44	82	110	262	294	300	414	966	1266	1312		
	63.0	11	12	41	77	109	111	137	298	410	451	1139	1296		
	71.0	11	12	41	77	102	110	136	140	384	446	1125	1161		
	80.0	11	11	21	39	102	103	126	138	382	390	1118	1143		
	90.0	10	11	21	38	97	103	126	128	365	387	—	1134		
	100.0	10	10	20	36	97	98	112	127	364	369	—	—		
	112.0	—	10	20	36	97	97	111	116	374	367	—	—		
	125.0	—	—	—	—	—	97	111	115	—	365	—	—		
4x	**90.0**	—	—	—	—	—	—	—	—	—	—	510	—		
	100.0	—	—	—	—	—	—	—	—	—	—	503	519		
	112.0	—	—	—	—	46	—	—	—	244	—	500	511		
	125.0	—	—	—	—	46	47	51	—	243	—	470	507		
	140.0	—	—	—	—	45	46	51	52	237	245	466	475		
	160.0	—	—	—	—	44	45	49	52	239	238	465	471		
	180.0	—	—	—	—	43	40	49	45	214	237	184	469		
	200.0	—	—	—	—	43	44	46	45	214	233	182	187		
	224.0	—	—	—	—	39	43	46	43	212	215	181	184		
	250.0	—	—	—	—	39	16	41	43	211	212	173	183		
	280.0	—	—	—	—	16	16	41	41	74	212	172	175		
	315.0	—	—	—	—	16	16	17	18	73	74	172	173		
	355.0	—	—	—	—	15	16	17	17	68	74	—	173		
	400.0	—	—	—	—	15	15	15	16	68	68	—	—		
	450.0	—	—	—	—	14	15	16	16	67	68	—	—		
	500.0	—	—	—	—	14	14	15	16	67	67	—	—		

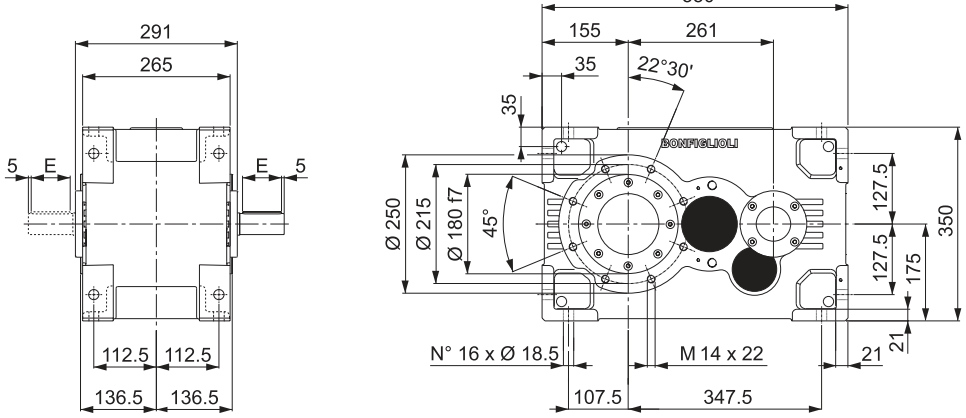


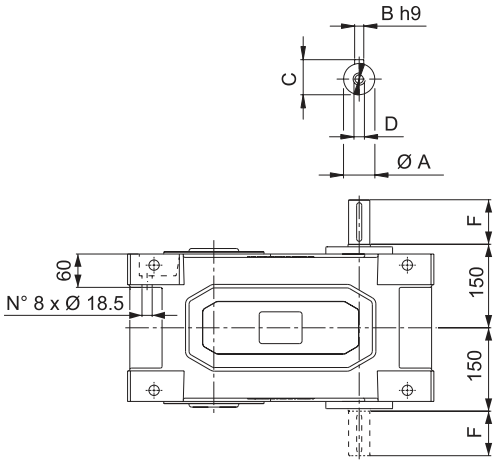
19 EXACT RATIOS

	i_N	i													
		HDP 60	HDP 70	HDP 80	HDP 90	HDP 100	HDP 110	HDP 120	HDP 125	HDP 130	HDP 140	HDP 150	HDP 160	HDP 170	HDP 180
2x	7.1	7.146	—	—	—	7.400	—	—	—	7.263	—	—	—	—	—
	8.0	8.031	8.039	8.063	7.929	8.222	8.085	7.907	—	7.929	8.359	7.905	—	7.833	—
	9.0	8.969	9.333	9.361	8.828	9.106	8.956	8.611	8.922	8.613	9.250	9.263	8.977	9.092	8.704
	10.0	10.079	10.090	9.844	10.059	10.118	9.949	10.302	9.601	9.402	9.913	10.087	10.478	9.848	10.071
	11.2	11.156	11.714	11.429	11.200	11.250	11.021	11.219	11.624	11.307	10.969	11.063	11.389	11.278	10.892
	12.5	12.538	12.551	12.600	12.214	12.500	12.292	13.013	12.508	12.343	13.013	12.963	12.563	13.090	12.531
	14.0	13.533	14.571	14.629	13.600	14.160	13.616	14.171	14.682	14.133	14.400	14.116	14.663	14.178	14.500
	16.0	15.209	15.225	15.488	15.807	15.733	15.471	15.976	15.800	15.429	16.267	15.370	15.938	15.361	15.681
	18.0	17.267	17.676	17.981	17.600	18.000	17.138	17.398	18.025	17.431	18.000	18.010	17.454	17.830	17.068
	20.0	19.404	19.425	19.441	20.086	20.000	19.667	20.624	19.397	19.029	20.062	19.612	20.371	19.311	19.750
	22.4	—	22.552	22.571	22.364	21.786	21.786	22.459	23.269	21.652	22.200	—	22.143	—	21.359
	25.0	—	—	—	—	—	25.000	25.357	25.040	—	24.941	—	—	—	—
3x	22.4	22.686	—	—	—	22.765	—	—	—	21.785	—	21.510	—	23.182	—
	25.0	25.494	25.521	25.800	25.406	25.294	24.873	25.756	—	23.781	25.073	25.205	24.427	26.908	25.758
	28.0	28.219	29.630	29.954	28.288	28.125	27.553	28.048	29.059	28.599	27.744	27.448	28.510	29.143	29.806
	31.5	31.713	31.746	31.713	32.878	31.250	30.729	32.533	31.271	31.220	32.916	29.886	30.990	31.576	32.234
	35.5	34.231	36.857	36.818	36.608	35.400	34.040	35.429	36.706	35.749	36.424	35.019	33.938	36.650	35.084
	40.0	38.470	38.510	39.809	40.036	39.333	38.678	39.940	39.500	39.025	41.145	38.135	39.611	39.695	40.597
	45.0	43.675	44.710	46.218	44.578	45.000	42.845	43.495	45.063	44.090	45.529	43.460	43.056	45.111	43.905
	50.0	49.082	49.134	51.625	51.811	50.000	49.167	51.560	48.493	48.131	50.746	50.924	49.353	52.361	50.123
	56.0	56.578	57.044	59.937	57.689	55.547	54.464	56.148	58.172	56.533	56.153	55.456	57.603	56.711	58.000
	63.0	63.583	63.650	64.805	65.837	61.719	60.690	64.253	62.600	61.714	65.067	60.381	62.612	61.444	62.726
	71.0	68.633	73.898	75.238	73.306	69.915	67.229	69.971	72.494	70.667	72.000	70.752	68.568	71.319	68.272
	80.0	77.131	77.213	76.405	77.818	77.683	76.389	78.882	78.013	77.143	81.333	77.048	80.031	77.244	79.000
	90.0	87.567	89.644	88.706	86.646	88.875	84.619	85.902	88.999	87.156	90.000	—	86.990	—	85.437
	100.0	98.408	98.513	95.911	98.884	98.750	97.104	101.830	95.774	95.143	100.311	—	—	—	—
	112.0	—	114.373	111.352	110.102	107.567	107.567	110.892	114.890	108.259	111.000	—	—	—	—
	125.0	—	—	—	—	—	123.438	125.201	123.636	—	124.704	—	—	—	—
4x	90.0	—	—	—	—	—	—	—	—	—	—	88.989	—	92.728	—
	100.0	—	—	—	—	—	—	—	—	—	—	104.273	101.055	107.631	103.032
	112.0	—	—	—	—	110.625	—	—	—	111.182	—	113.553	117.948	116.573	119.222
	125.0	—	—	—	—	122.917	120.868	127.964	—	121.371	—	123.638	128.205	126.302	128.937
	140.0	—	—	—	—	139.240	133.891	139.352	144.376	138.978	141.600	144.873	140.402	146.601	140.336
	160.0	—	—	—	—	154.711	168.525	157.099	155.367	151.714	159.956	157.765	163.872	158.780	162.389
	180.0	—	—	—	—	177.000	190.972	171.080	181.235	176.667	177.000	170.942	178.122	177.437	175.621
	200.0	—	—	—	—	196.667	193.389	202.801	195.031	192.857	197.279	200.301	194.121	205.954	197.152
	225.0	—	—	—	—	222.188	214.226	220.849	222.499	217.889	225.000	218.127	226.571	223.064	228.133
	250.0	—	—	—	—	246.875	248.643	254.575	246.228	237.857	250.778	237.499	246.272	241.681	246.722
	280.0	—	—	—	—	286.437	275.434	277.231	287.226	274.481	277.500	278.290	269.702	280.523	268.535
	315.0	—	—	—	—	318.263	312.958	323.176	319.611	299.636	315.912	303.056	314.787	303.828	310.733
	355.0	—	—	—	—	359.563	346.679	351.936	364.624	348.917	349.575	—	342.160	—	336.052
	400.0	—	—	—	—	399.514	392.856	405.681	401.207	380.893	401.583	—	—	—	—
	450.0	—	—	—	—	457.071	440.694	454.317	457.712	469.768	444.375	—	—	—	—
	500.0	—	—	—	—	507.857	499.393	523.697	506.527	534.530	495.286	—	—	—	—

20 DIMENSIONS AND WEIGHT

HDP 60



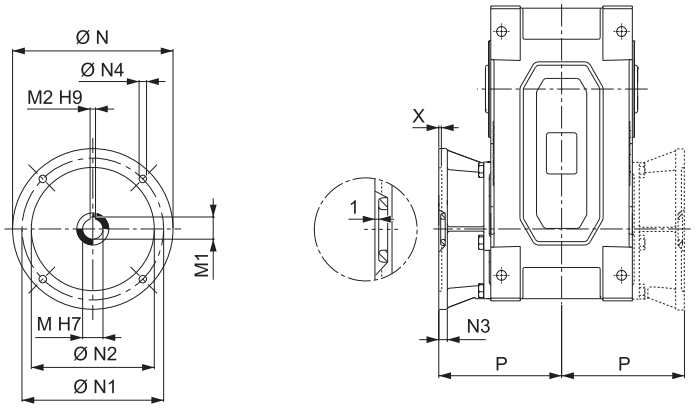


VP

Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	Kg LP
HDP 60 2	**7.1 ... 15.2**	38 k6	10	41	M12x28	70	80	161
HDP 60 2	**17.3 ... 19.4**	32 k6	10	35	M12x28	70	80	161
HDP 60 3	**22.7 ... 49.1**	32 k6	10	35	M12x28	70	80	164
HDP 60 3	**56.6 ... 98.4**	28 j6	8	31	M10x22	50	60	164

AD

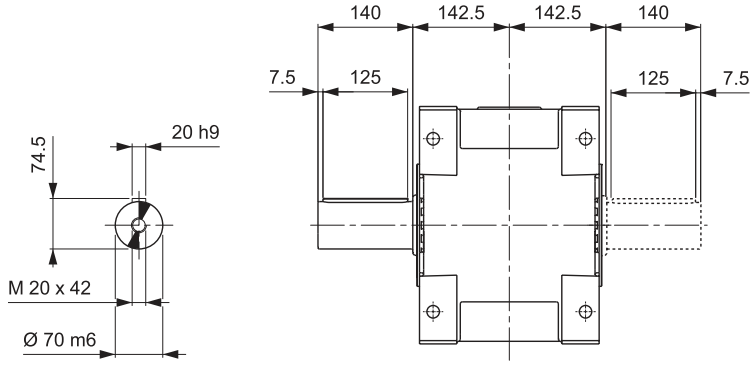


Dimensions are in [mm].

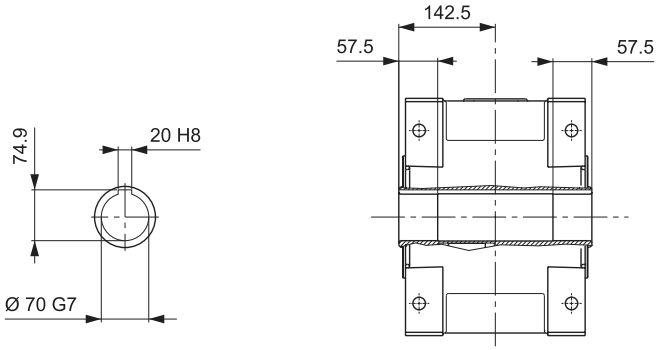
AD	M [mm]	M1 [mm]	M2 [mm]	N [mm]	N1 [mm]	N2 [mm]	N3 [mm]	N4 [mm]	X [mm]	P [mm]
HDP 60 3_ 112	28	31.3	8	250	215	180	15	14	5	220
HDP 60 3_ 132	38	41.3	10	300	265	230	16	14	5	230
HDP 60 3_ 160	42	45.3	12	350	300	250	23	18	6	261
HDP 60 3_ 180	48	51.8	14	350	300	250	23	18	6	261

HDP 60

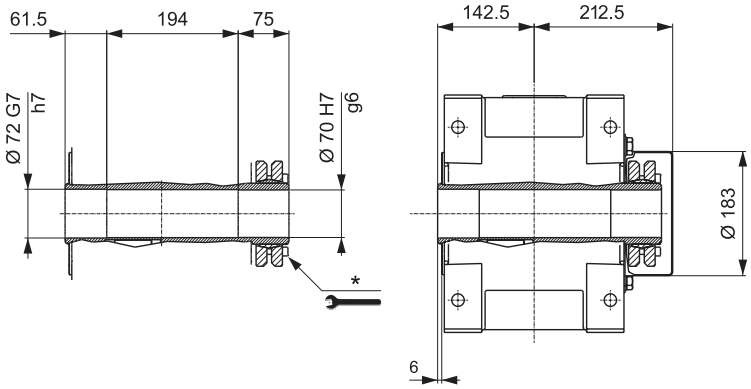
LP



H



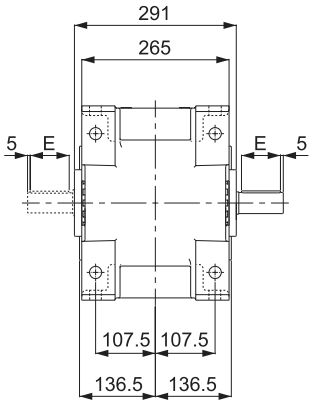
S

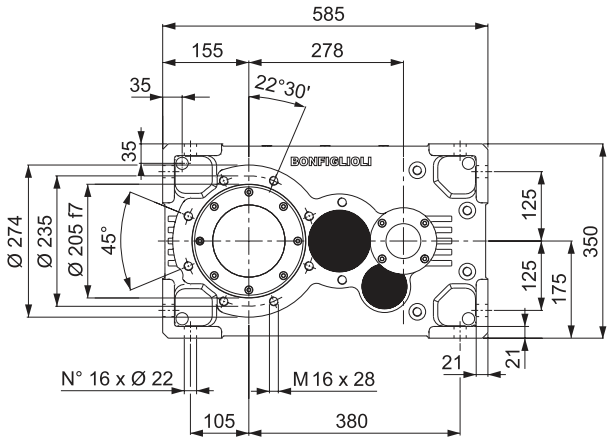


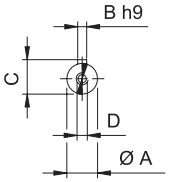
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

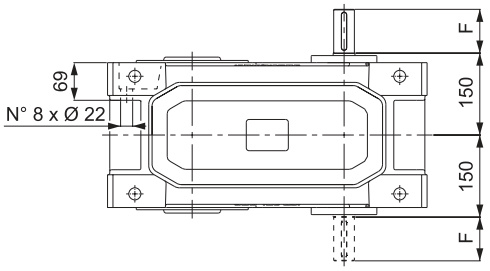
HDP 70







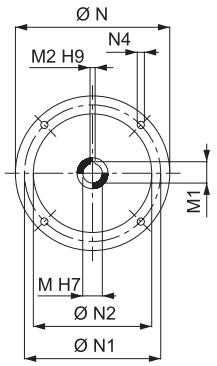
VP

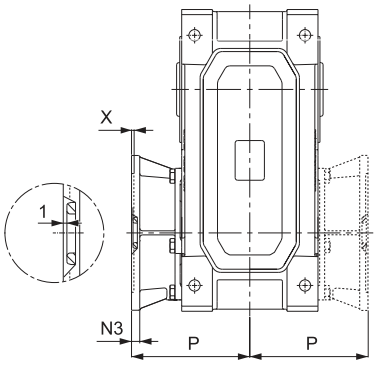


Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	Kg LP
HDP 70 2	**8.0 ... 17.7**	38 k6	10	41	M12x28	70	80	189
HDP 70 2	**19.4 ... 22.6**	32 k6	10	35	M12x28	70	80	189
HDP 70 3	**25.5 ... 57.0**	32 k6	10	35	M12x28	70	80	192
HDP 70 3	**63.7 ... 114.4**	28 j6	8	31	M10x22	50	60	192

AD



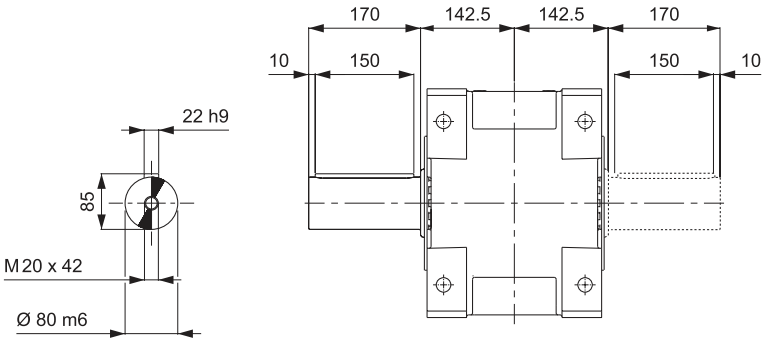


Dimensions are in [mm].

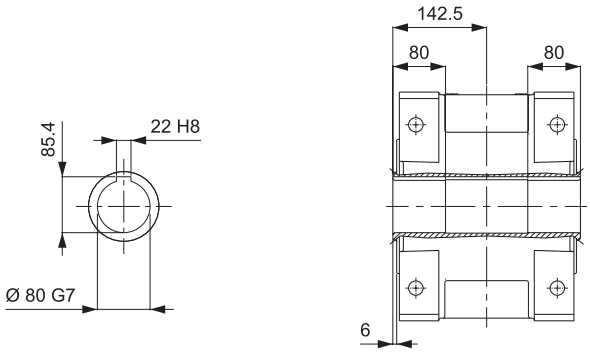
AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 70 3_ 112	28	31.3	8	250	215	180	15	14	5	220
HDP 70 3_ 132	38	41.3	10	300	265	230	16	14	5	230
HDP 70 3_ 160	42	45.3	12	350	300	250	23	18	6	261
HDP 70 3_ 180	48	51.8	14	350	300	250	23	18	6	261
HDP 70 3_ 200	55	59.3	16	400	350	300	-	M16x23	7	286

HDP 70

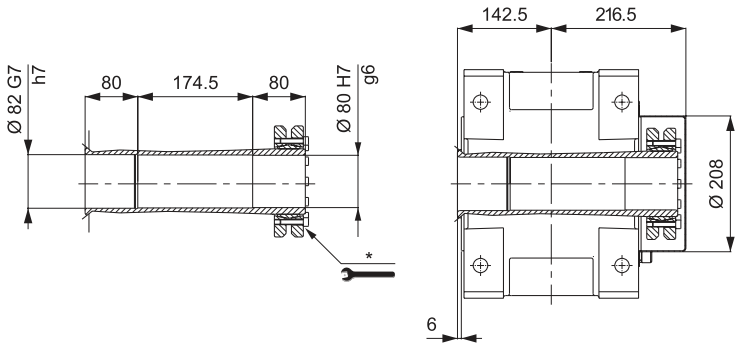
LP



H



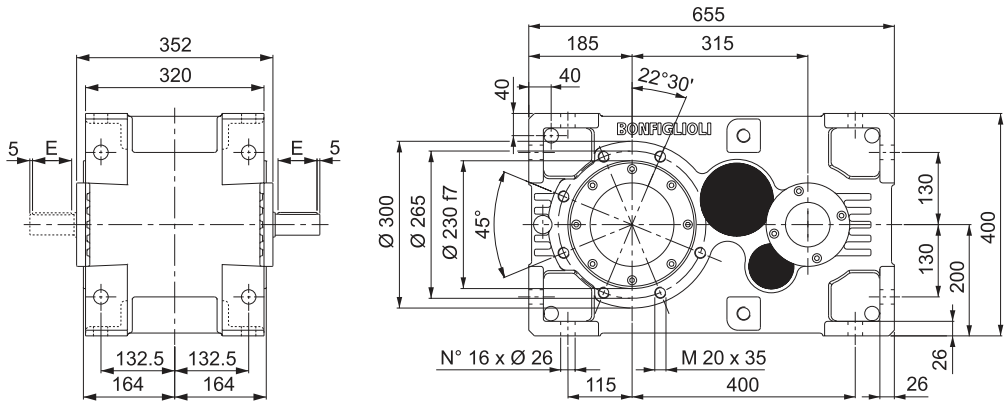
S



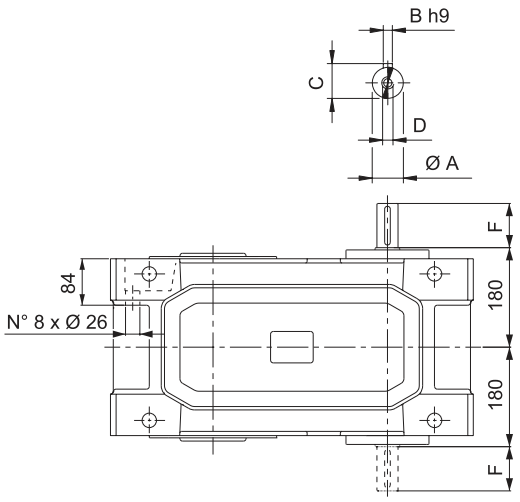
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

HDP 80



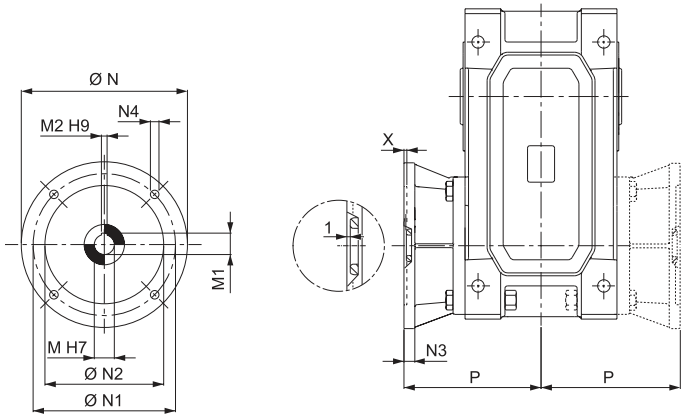
VP



Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	Kg LP
HDP 80 2	**8.1 ... 14.6**	45 k6	14	48.5	M16x36	100	110	301
HDP 80 2	**15.5 ... 22.6**	38 k6	10	41	M12x28	70	80	301
HDP 80 3	**25.8 ... 75.2**	38 k6	10	41	M12x28	70	80	306
HDP 80 3	**76.4 ... 114.4**	28 j6	8	31	M10x22	50	60	306

AD

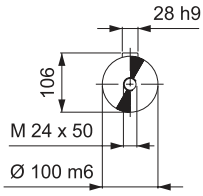


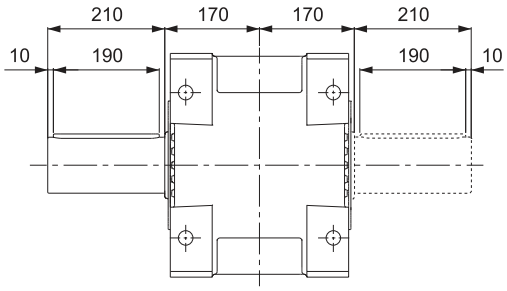
Dimensions are in [mm].

AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 80 3_ 132	38	41.3	10	300	265	230	16	14	5	257.5
HDP 80 3_ 160	42	45.3	12	350	300	250	23	18	6	288.5
HDP 80 3_ 180	48	51.8	14	350	300	250	23	18	6	288.5
HDP 80 3_ 200	55	59.3	16	400	350	300	-	M16x23	7	313.5

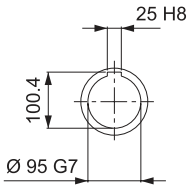
HDP 80

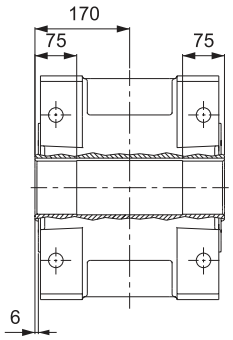
LP



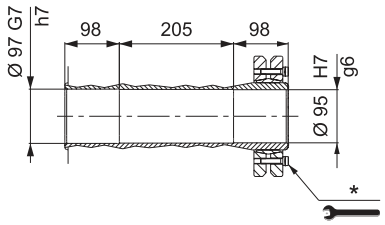


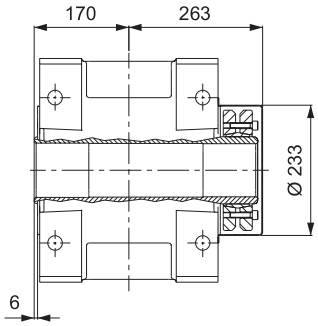
H





S

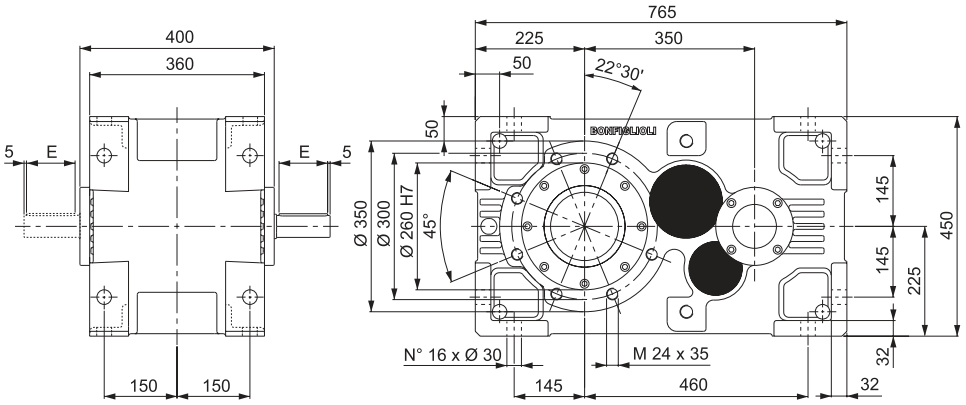




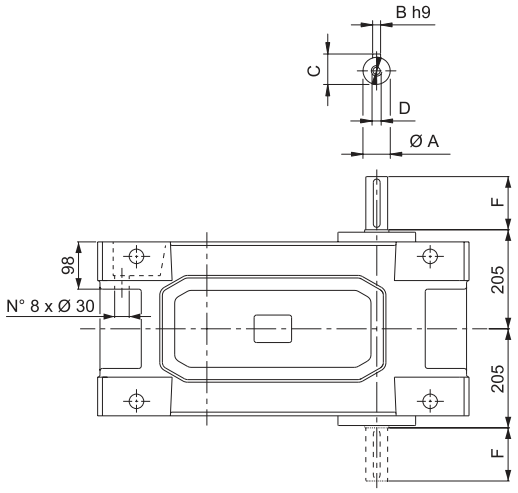
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

HDP 90



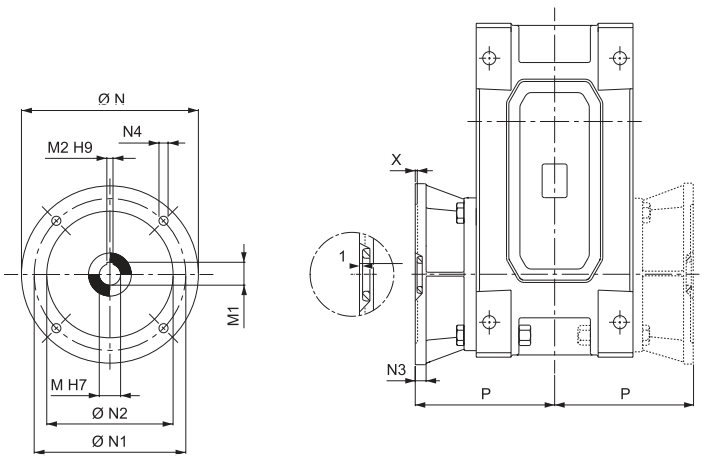
VP



Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	Kg LP
HDP 90 2	**7.9 ... 13.6**	50 k6	14	53.5	M16x36	100	110	429
HDP 90 2	**15.8 ... 22.4**	45 k6	14	48.5	M16x36	100	110	429
HDP 90 3	**25.4 ... 73.3**	45 k6	14	48.5	M16x36	100	110	440
HDP 90 3	**77.8 ... 110.1**	32 k6	10	35	M12x28	70	80	440

AD

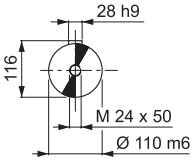


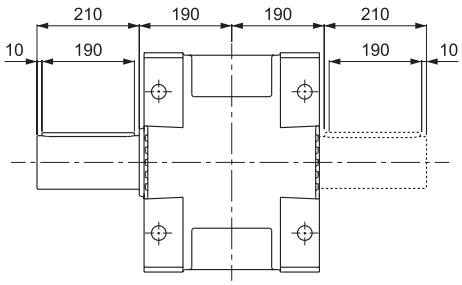
Dimensions are in [mm].

AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 90 3_ 160	42	45.3	12	350	300	250	23	18	6	308.5
HDP 90 3_ 180	48	51.8	14	350	300	250	23	18	6	308.5
HDP 90 3_ 200	55	59.3	16	400	350	300	-	M16x23	7	333.5

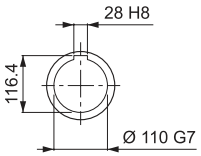
HDP 90

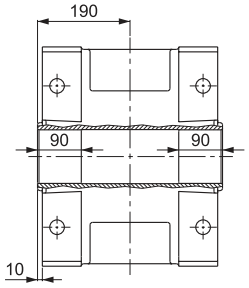
LP



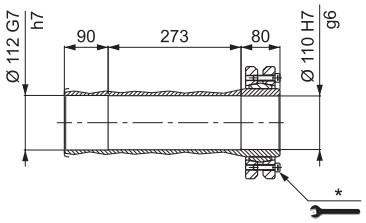


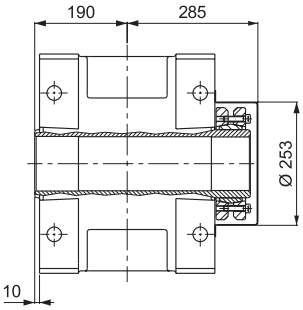
H





S



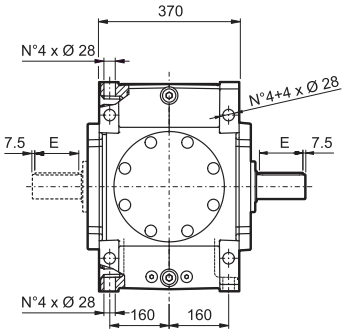


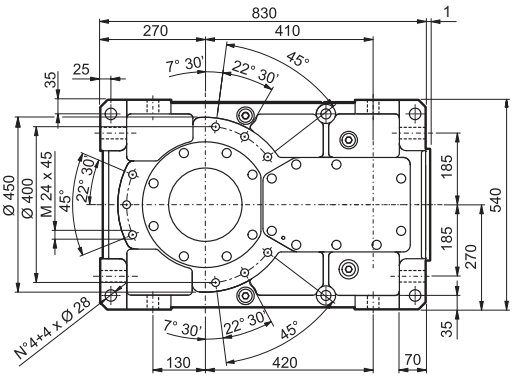
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

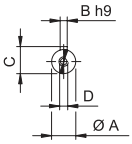
Dimensions are in [mm].

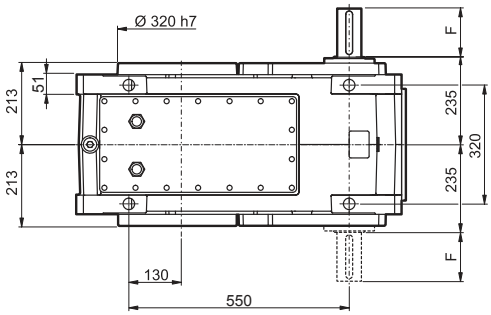
HDP 100

HDP 100 2

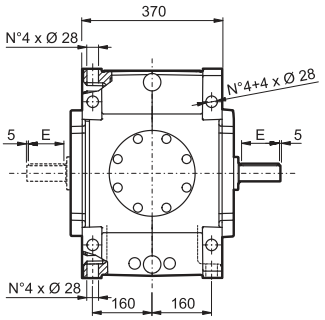


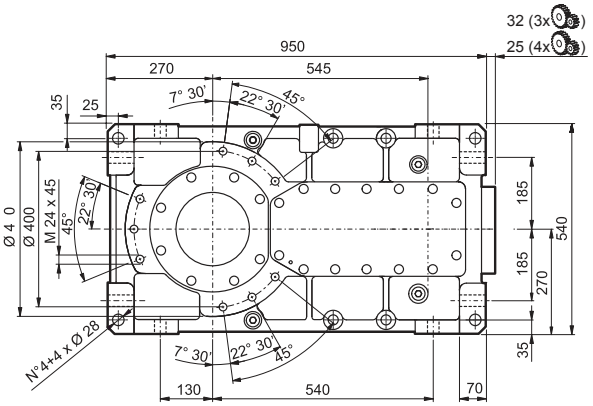


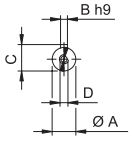


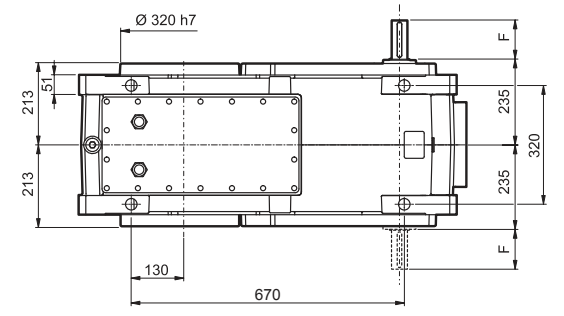


HDP 100 3
HDP 100 4







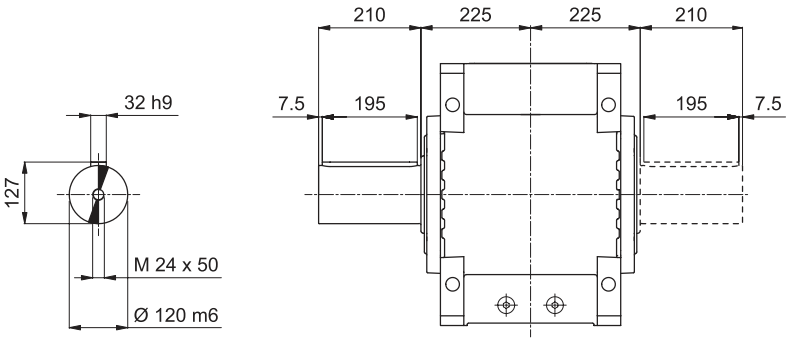


Dimensions are in [mm].

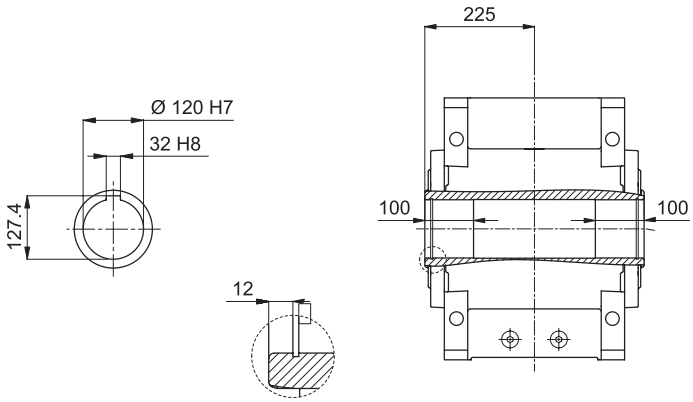
VP	i =	A	B	C	D	E	F	Kg LP
HDP 100 2	**7.4 … 21.8**	60 m6	18	64	M20x42	125	140	625
HDP 100 3	**22.8 … 50**	48 k6	14	51.5	M16x36	100	110	700
HDP 100 3	**55.5 … 107.8**	45 k6	14	48.5	M16x36	100	110	700
HDP 100 4	**110.6 … 507.9**	32 k6	10	35	M12x28	70	80	715

HDP 100

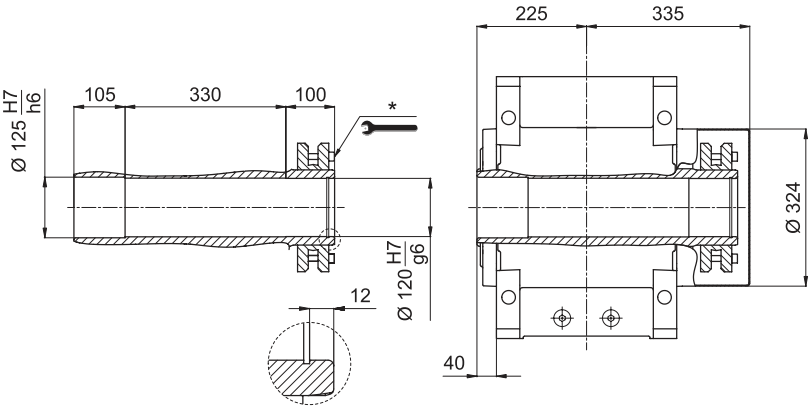
LP



H



S

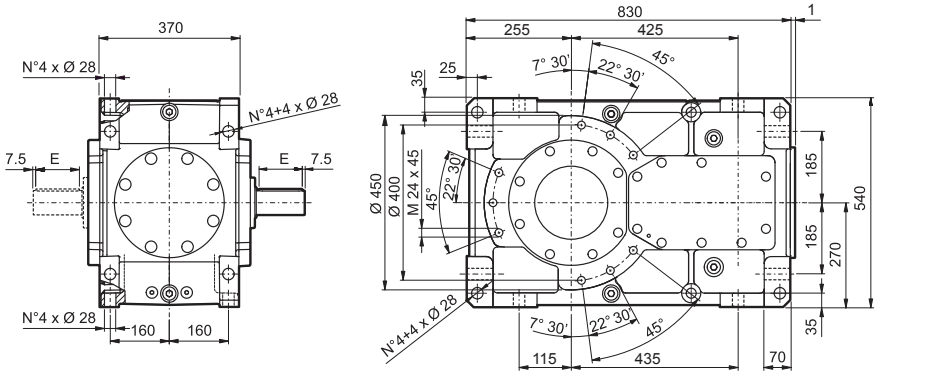


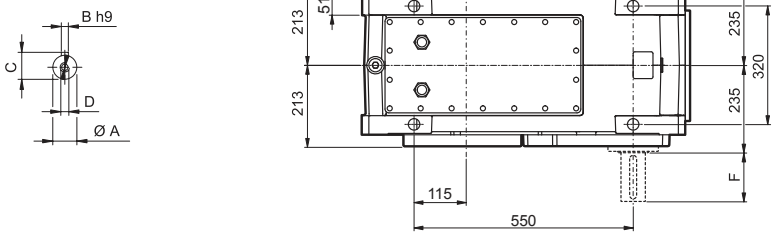
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

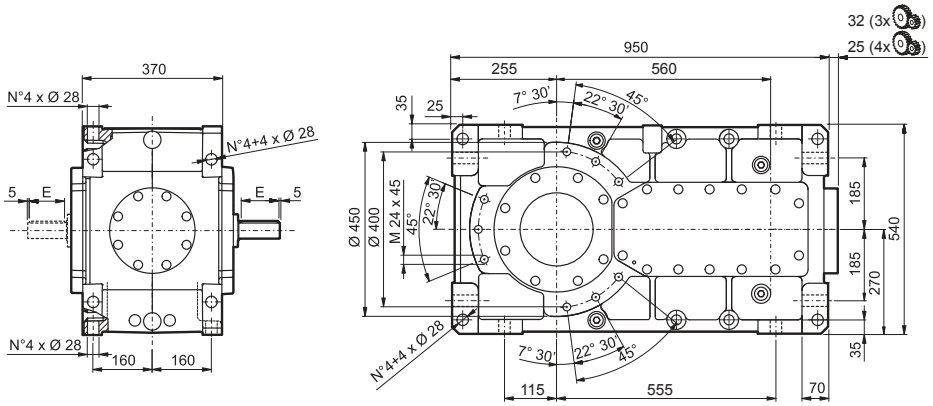
HDP 110

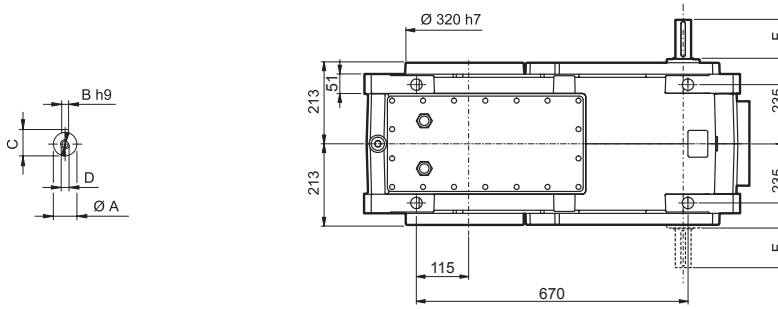
HDP 110 2





HDP 110 3
HDP 110 4



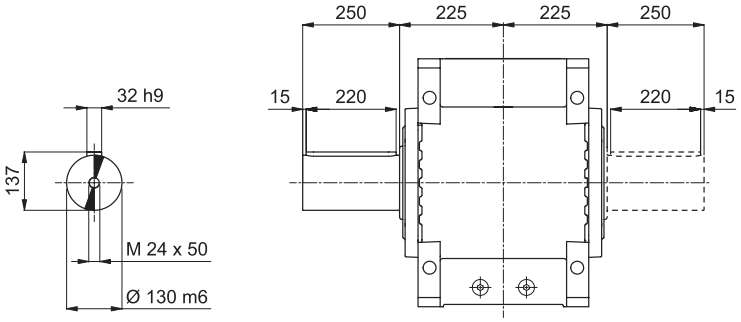


Dimensions are in [mm].

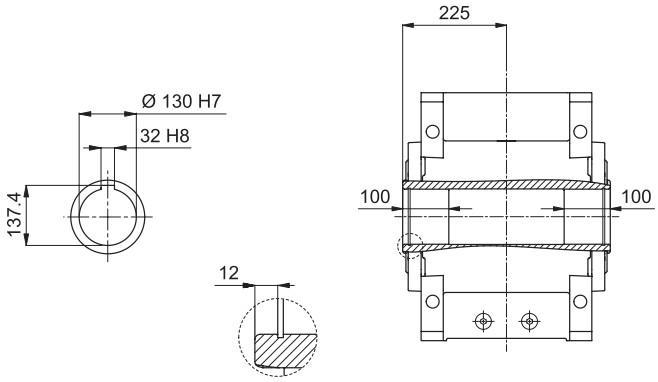
VP	i =	A	B	C	D	E	F	Kg LP
HDP 110 2	**8.1 … 25.0**	60 m6	18	64	M20x42	125	140	670
HDP 110 3	**24.9 … 54.5**	48 k6	14	51.5	M16x36	100	110	740
HDP 110 3	**60.7 … 123.5**	45 k6	14	48.5	M16x36	100	110	740
HDP 110 4	**120.9 … 499.4**	32 k6	10	35	M12x28	70	80	730

HDP 110

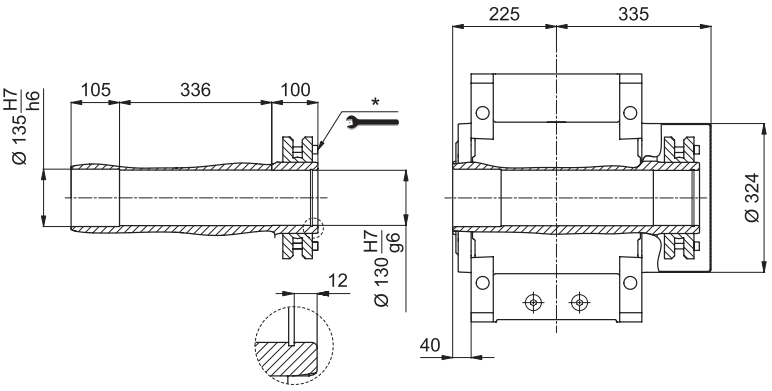
LP



H



S

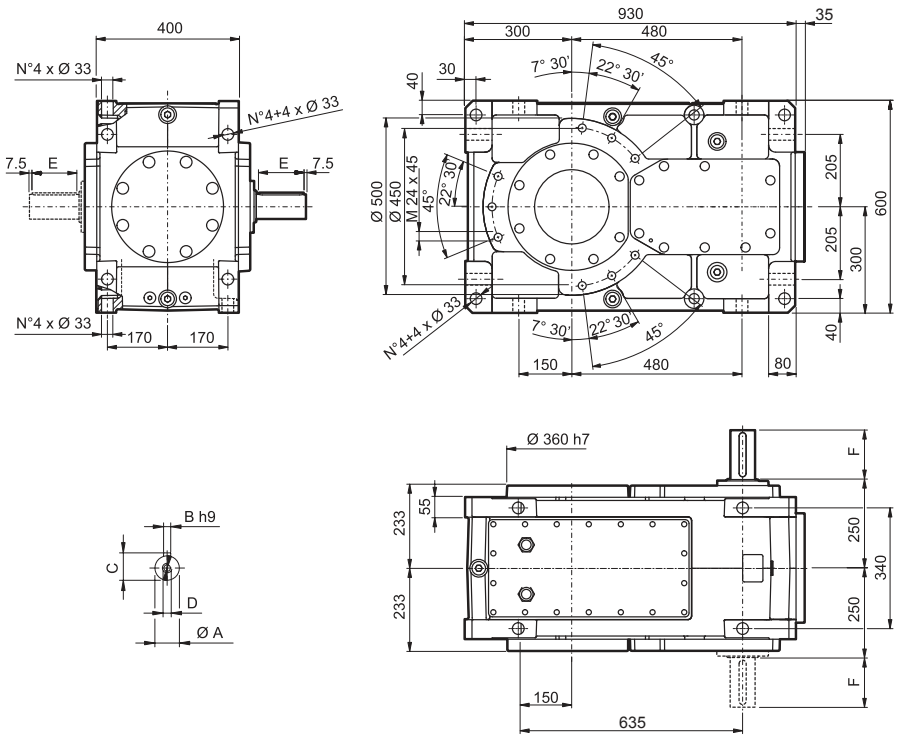


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

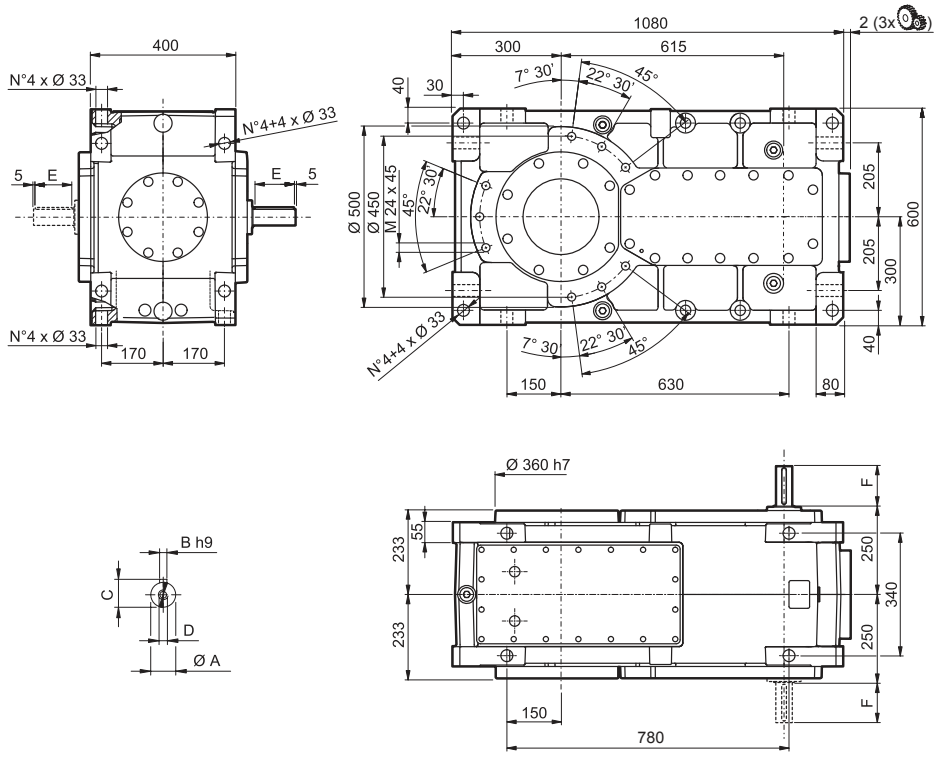
Dimensions are in [mm].

HDP 120

HDP 120 2



HDP 120 3
HDP 120 4

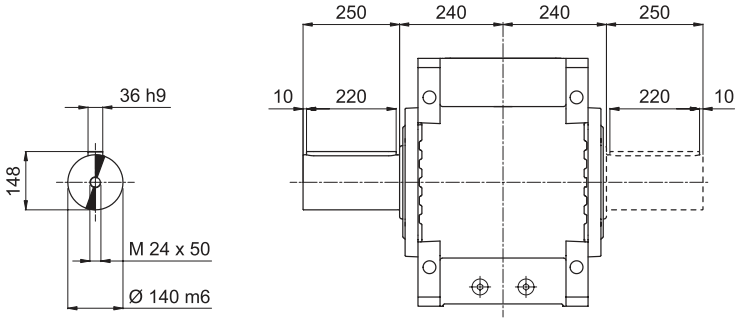


Dimensions are in [mm].

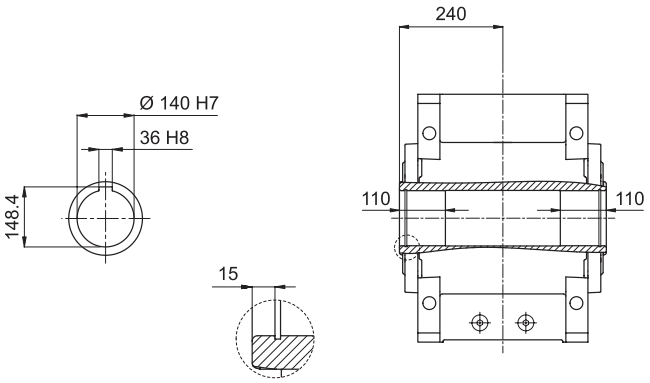
VP	i =	A	B	C	D	E	F	Kg LP
HDP 120 2	**7.9 … 25.4**	70 m6	20	74.5	M20x42	125	140	890
HDP 120 3	**25.8 … 56.1**	48 k6	14	51.5	M16x36	100	110	995
HDP 120 3	**64.3 … 125.2**	45 k6	14	48.5	M16x36	100	110	995
HDP 120 4	**128 … 523.7**	32 k6	10	35	M12x36	70	80	985

HDP 120

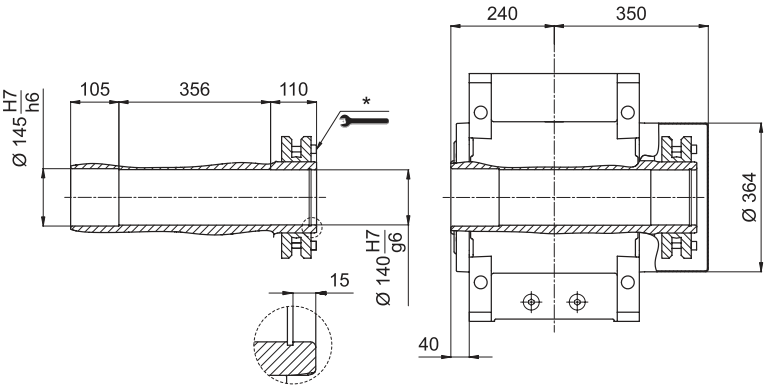
LP



H



S

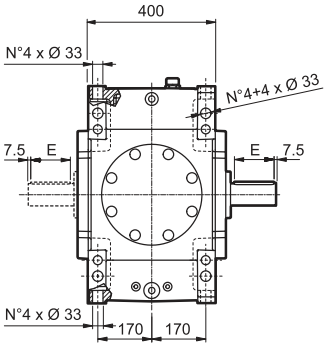


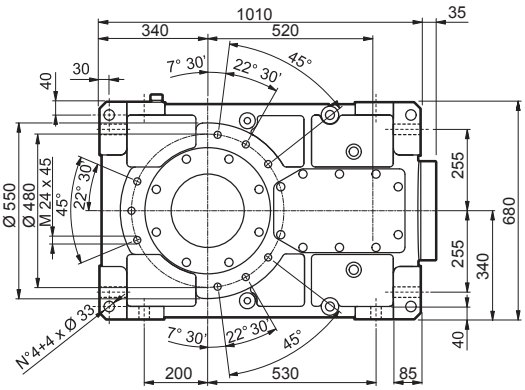
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

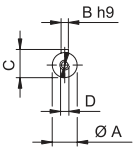
Dimensions are in [mm].

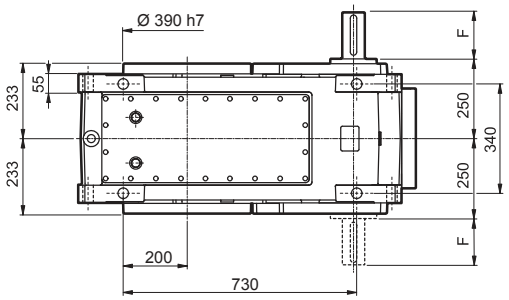
HDP 125

HDP 125 2

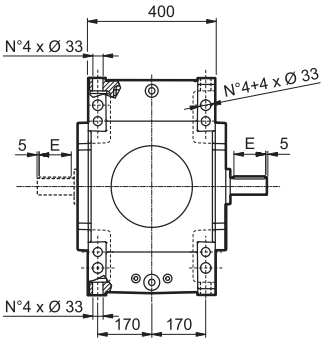


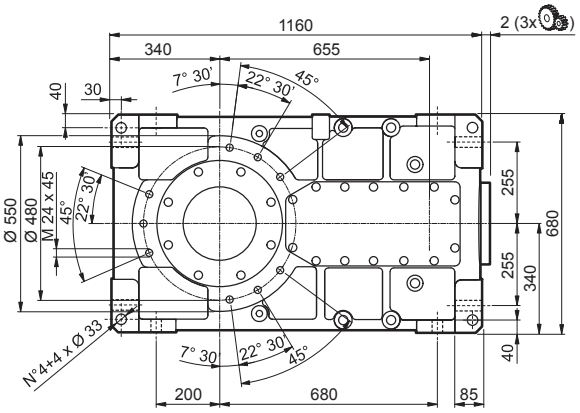


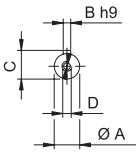


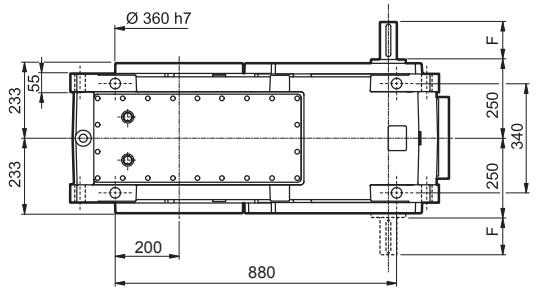


HDP 125 3
HDP 125 4







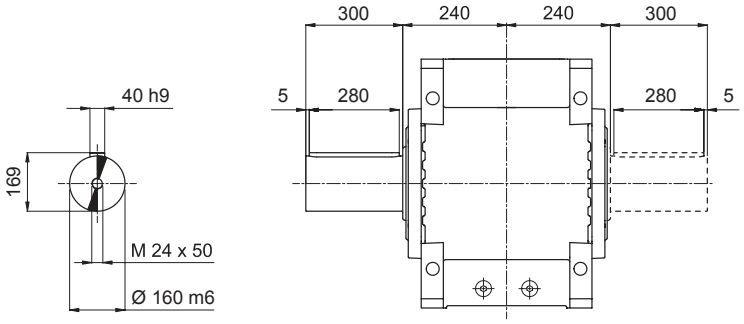


Dimensions are in [mm].

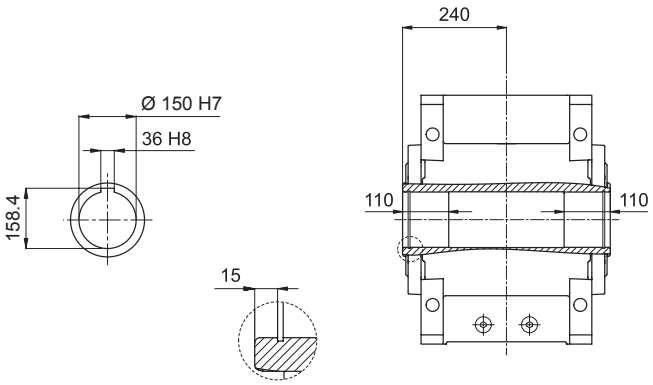
VP	i =	A	B	C	D	E	F	Kg LP
HDP 125 2	**8.9 ... 25.0**	70 m6	20	74.5	M20x42	125	140	1075
HDP 125 3	**29.1 … 62.6**	48 k6	14	51.5	M16x36	100	110	1175
HDP 125 3	**72.5 … 123.6**	45 k6	14	48.5	M16x36	100	110	1175
HDP 125 4	**144.4 … 506.5**	32 k6	10	35	M12x28	70	80	1160

HDP 125

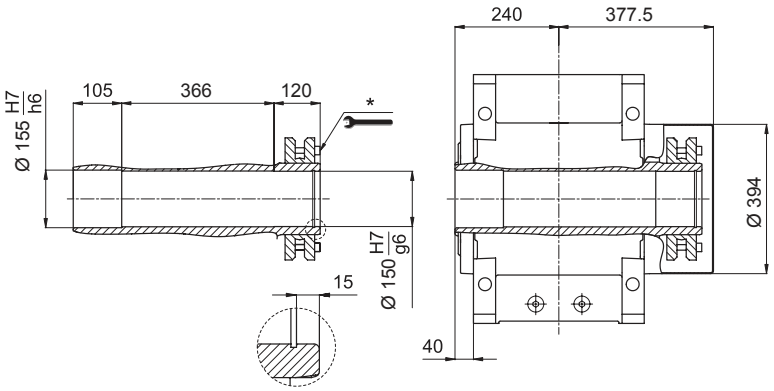
LP



H



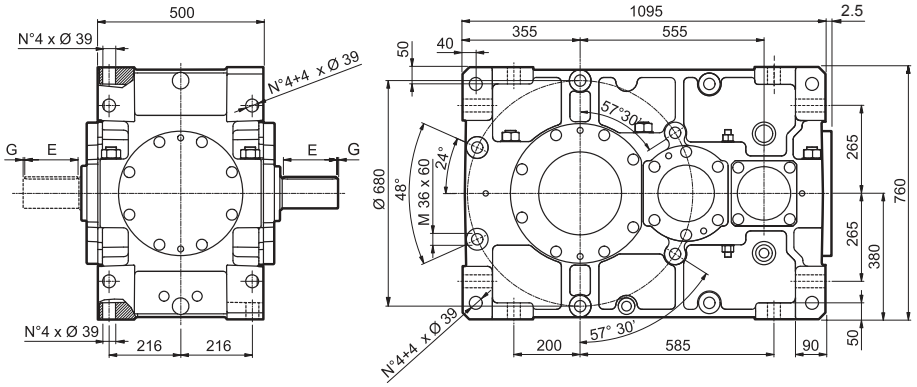
S



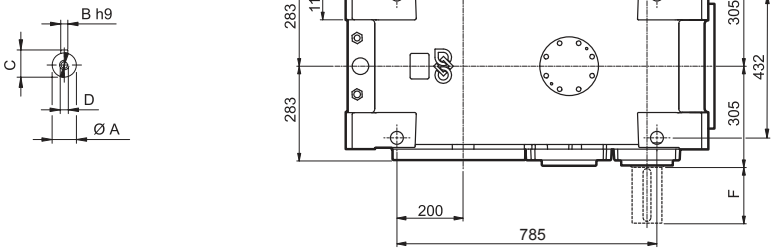
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

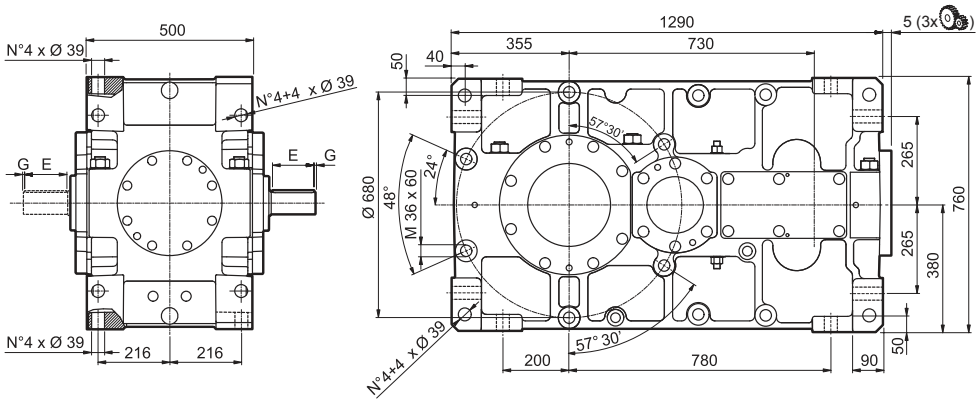
Dimensions are in [mm].

HDP 130

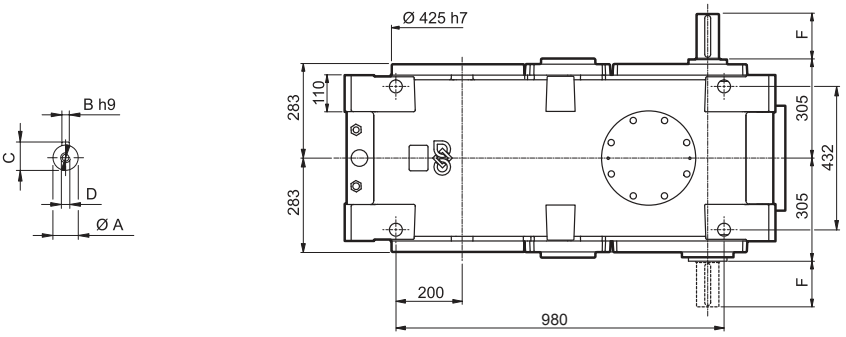


HDP 130 2





HDP 130 3
HDP 130 4

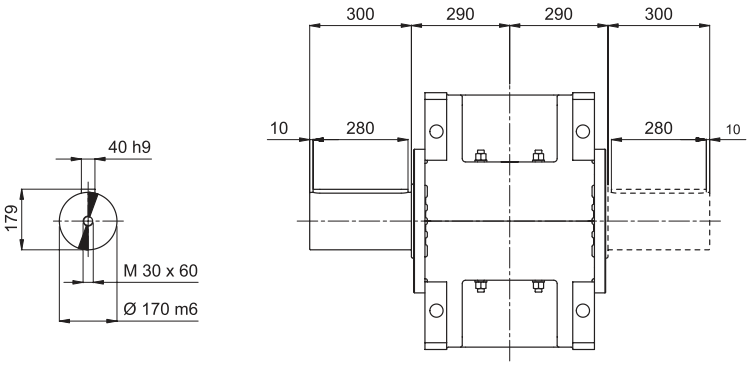


Dimensions are in [mm].

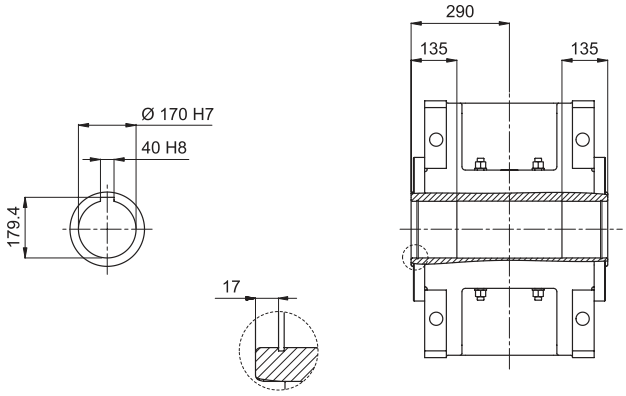
VP	i =	A	B	C	D	E	F	G	Kg LP
HDP 130 2	**7.3 … 12.3**	90 m6	25	95	M24x50	160	170	5	1500
HDP 130 2	**14.1 … 21.7**	70 m6	20	74.5	M20x42	125	140	7.5	1500
HDP 130 3	**21.8 … 48.1**	65 m6	18	69	M20x42	125	140	7.5	1705
HDP 130 3	**56.5 … 108.3**	50 k6	14	53.5	M16x36	100	110	5	1705
HDP 130 4	**111.2 … 237.9**	42 k6	12	45	M16x36	100	110	5	1740
HDP 130 4	**274.5 … 534.5**	32 k6	10	35	M12x28	70	80	5	1740

HDP 130

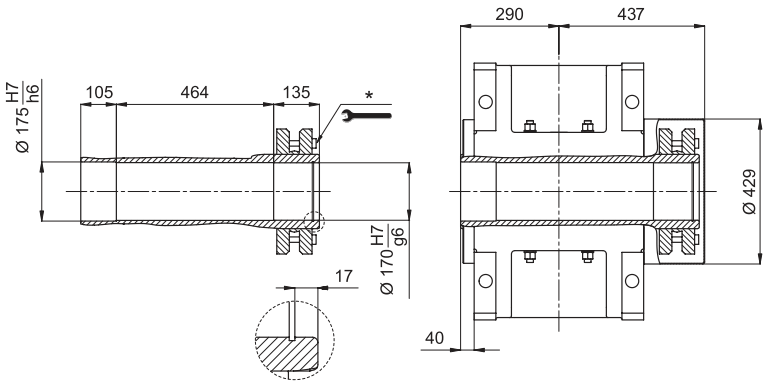
LP



H



S

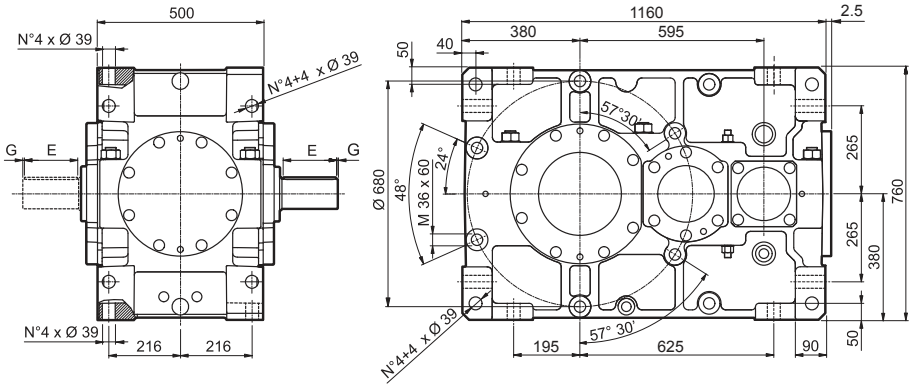


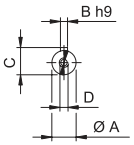
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

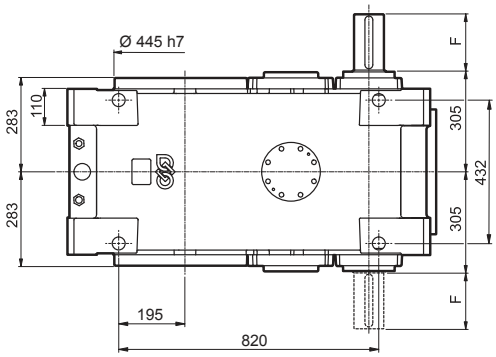
Dimensions are in [mm].

HDP 140

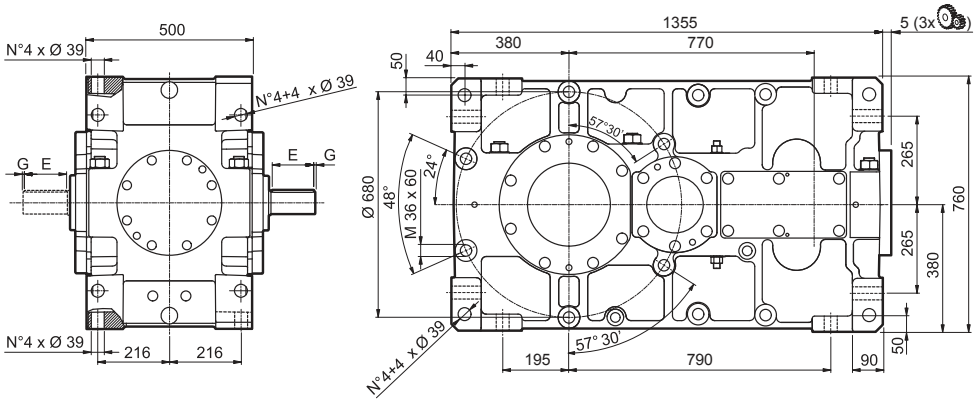
HDP 140 2

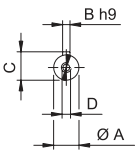


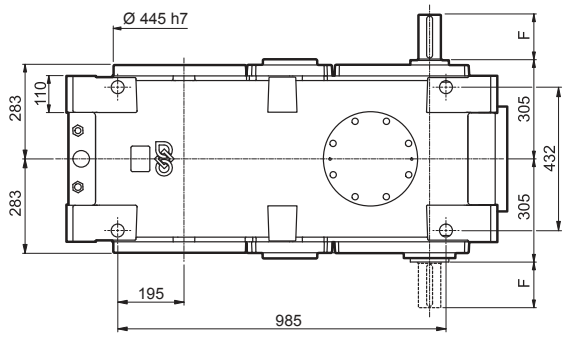




HDP 140 3
HDP 140 4





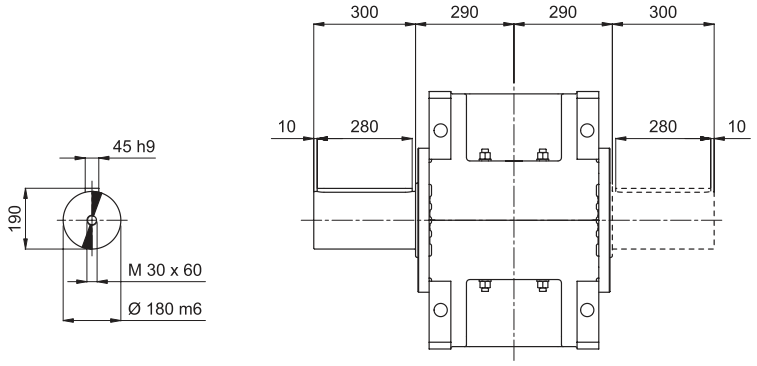


Dimensions are in [mm].

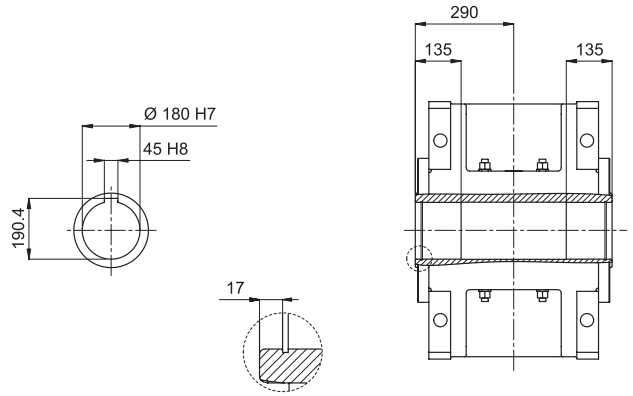
VP	i =	A	B	C	D	E	F	G	Kg LP
HDP 140 2	**8.4 … 14.4**	90 m6	25	95	M24x50	160	170	5	1640
HDP 140 2	**16.3 … 24.9**	70 m6	20	74.5	M20x42	125	140	7.5	1640
HDP 140 3	**25.1 … 56.2**	65 m6	18	69	M20x42	125	140	7.5	1915
HDP 140 3	**65.1 … 124.7**	50 k6	14	53.5	M16x36	100	110	5	1915
HDP 140 4	**141.6 … 277.5**	42 k6	12	45	M16x36	100	110	5	1935
HDP 140 4	**315.9 … 495.3**	32 k6	10	35	M12x28	70	80	5	1935

HDP 140

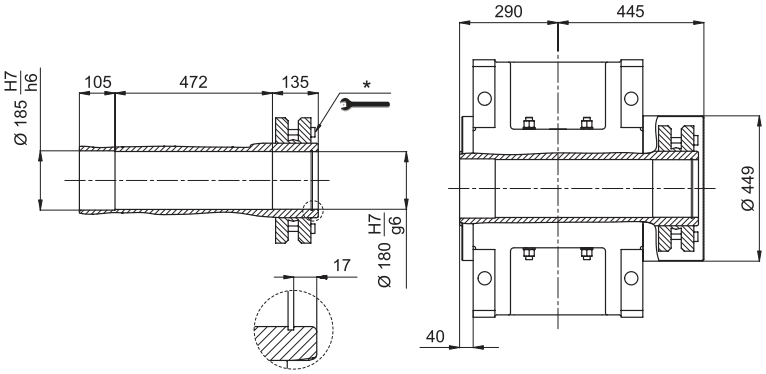
LP



H



S

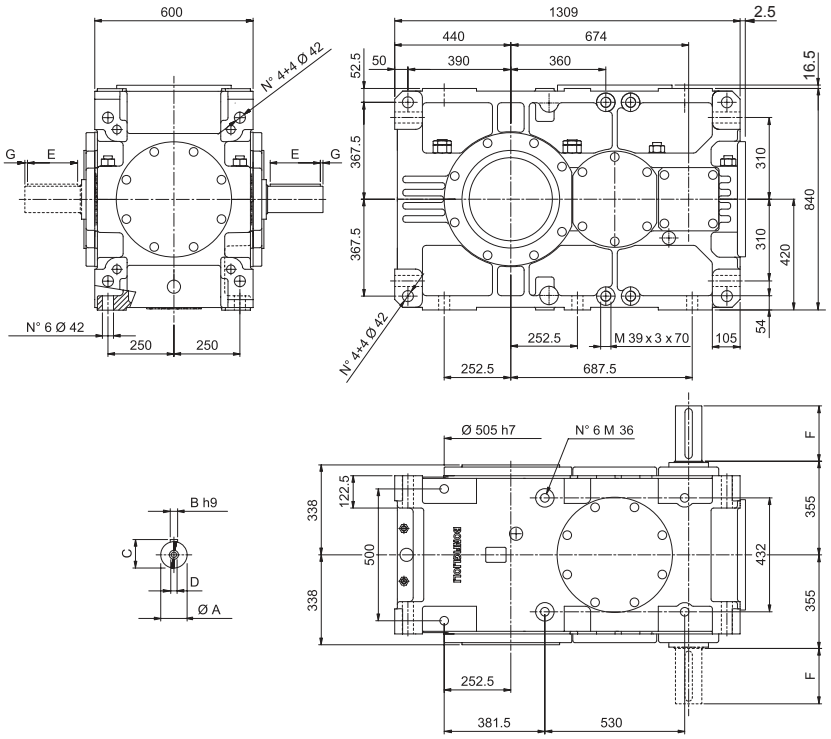


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

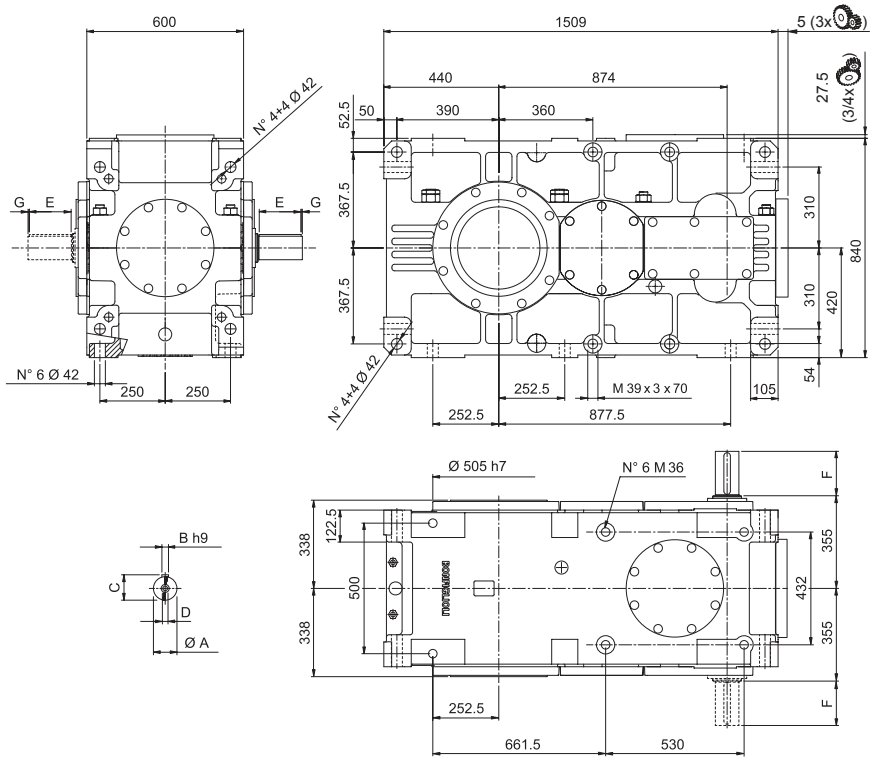
Dimensions are in [mm].

HDP 150

HDP 150 2



HDP 150 3
HDP 150 4

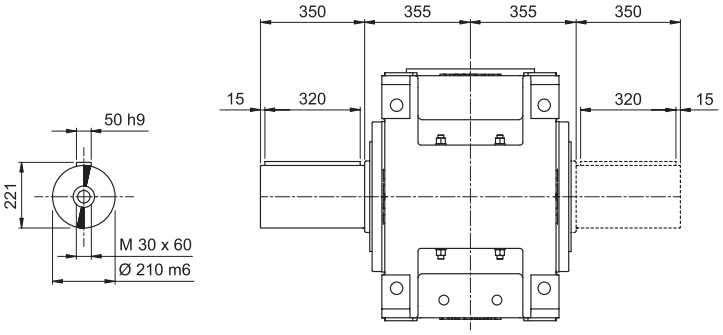


Dimensions are in [mm].

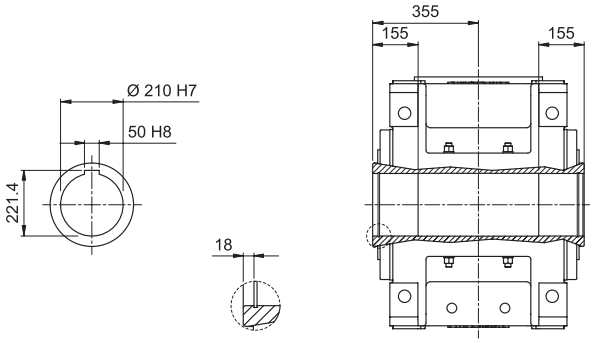
VP	i =	A	B	C	D	E	F	G	Kg LP
HDP 150 2	**7.9 … 14.1**	100 m6	28	106	M24x50	190	210	10	2585
HDP 150 2	**15.4 … 19.6**	90 m6	25	95	M24x50	160	170	5	2585
HDP 150 3	**21.5 … 38.1**	90 m6	25	95	M24x50	160	170	5	2835
HDP 150 3	**43.5 … 77.0**	70 m6	20	74.5	M20x42	125	140	7.5	2835
HDP 150 4	**89.0 … 157.8**	55 m6	16	59	M20x42	90	110	10	2870
HDP 150 4	**170.9 … 303.1**	45 k6	14	48.5	M16x36	100	110	5	2870

HDP 150

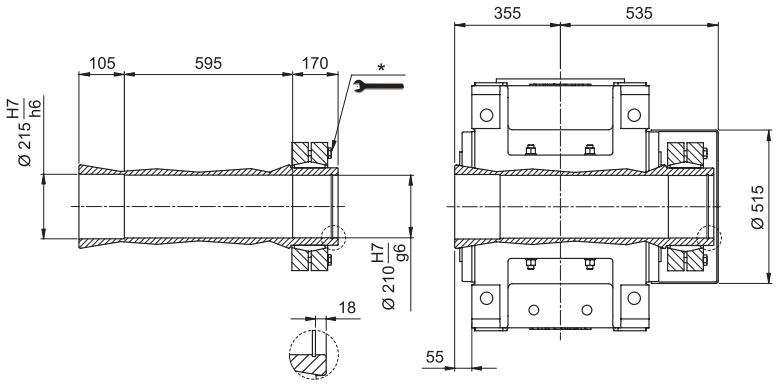
LP



H



S

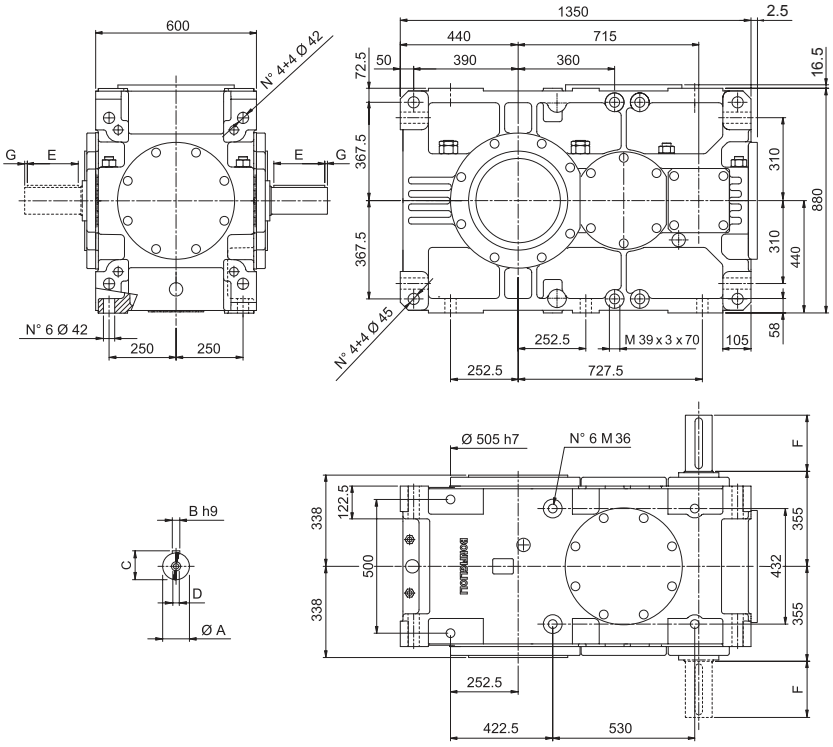


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

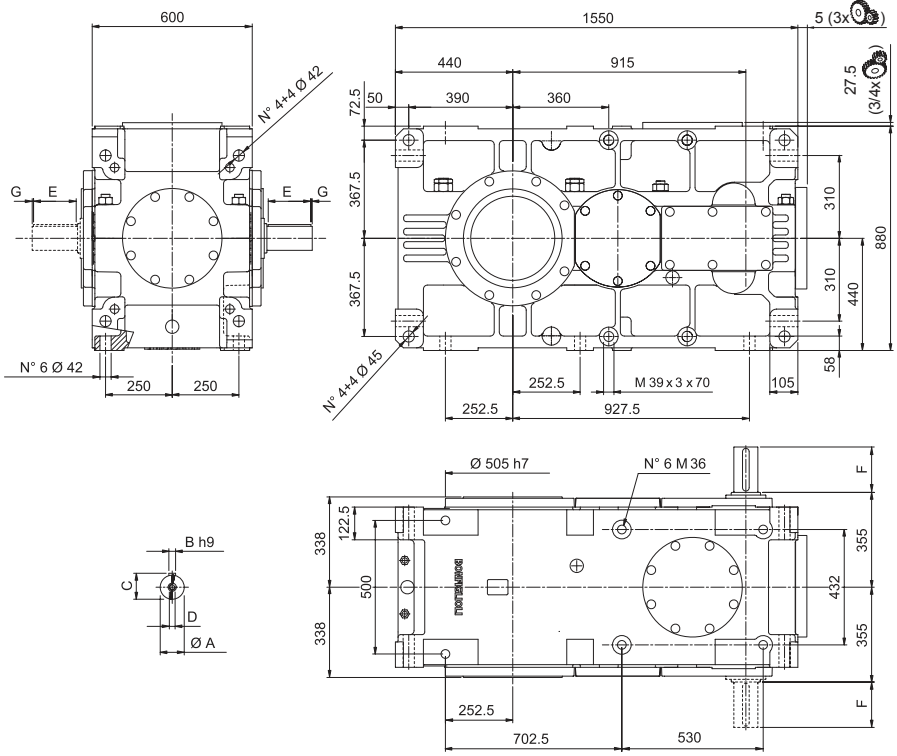
Dimensions are in [mm].

HDP 160

HDP 160 2



HDP 160 3
HDP 160 4

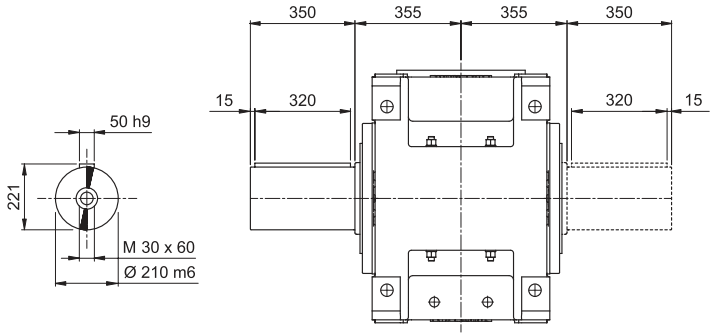


Dimensions are in [mm].

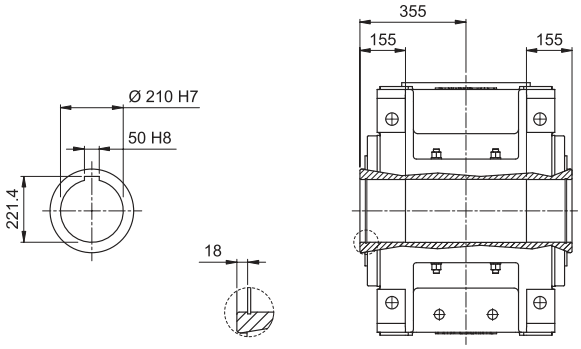
VP	i =	A	B	C	D	E	F	G	Kg LP
HDP 160 2	**9.0 … 15.9**	100 m6	28	106	M24x50	190	210	10	2860
HDP 160 2	**17.5 … 22.1**	90 m6	25	95	M24x50	160	170	5	2860
HDP 160 3	**24.4 … 43.1**	90 m6	25	95	M24x50	160	170	5	3120
HDP 160 3	**49.4 … 87.0**	70 m6	20	74.5	M20x42	125	140	7.5	3120
HDP 160 4	**101.1 … 178.1**	55 m6	16	59	M20x42	90	110	10	3145
HDP 160 4	**194.1 … 342.2**	45 k6	14	48.5	M16x36	100	110	5	3145

HDP 160

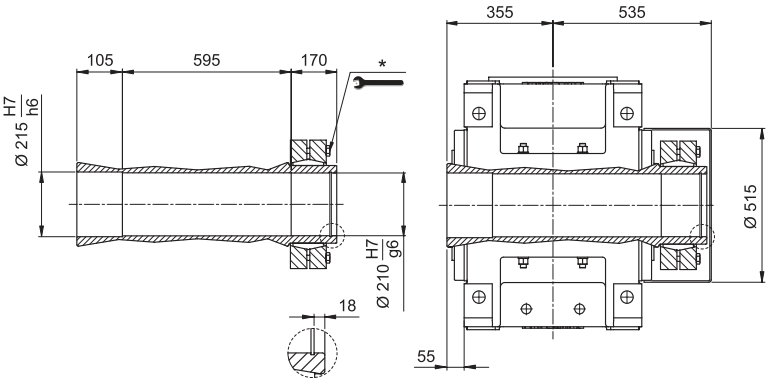
LP



H



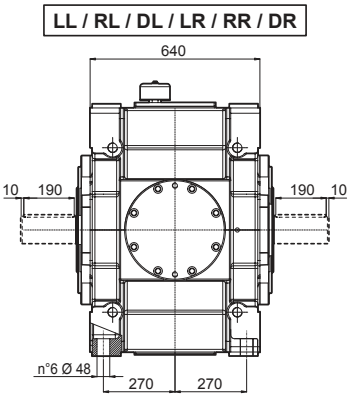
S

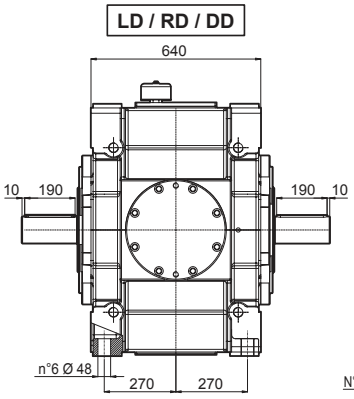


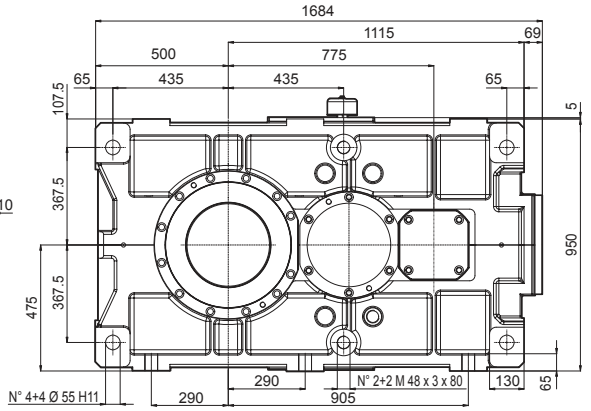
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

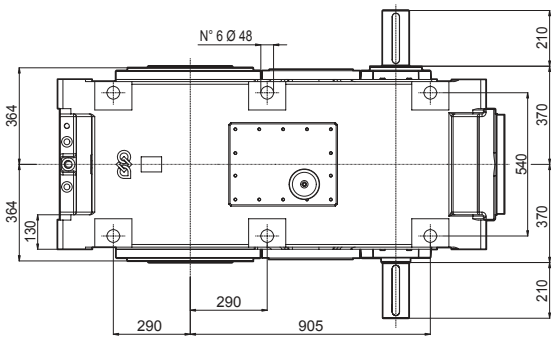
HDP 170

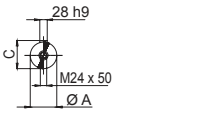


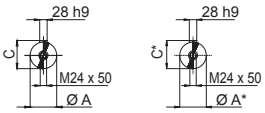


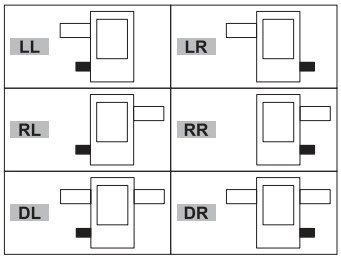


HDP 170 2

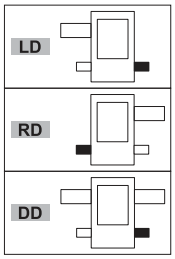








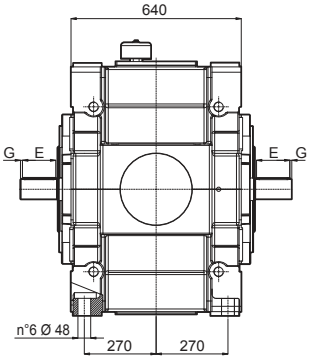
■ A/C single extension

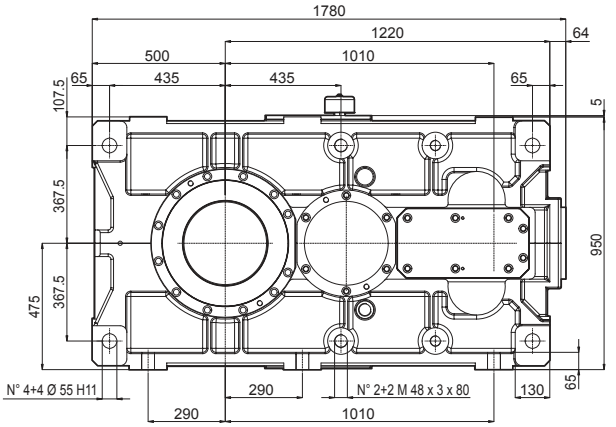


■ A/C primary extension
□ A*/C* secondary extension

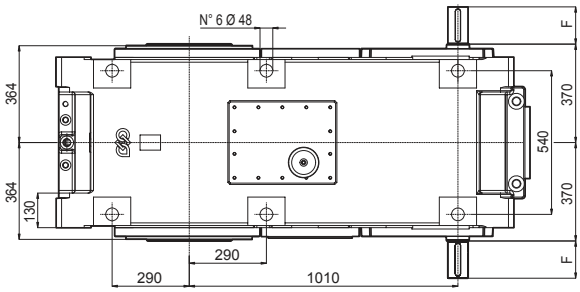
VP	i =	A	A*	C	C*	Kg LP
HDP 170 2	**7.8 ... 14.2**	110 m6	100 m6	116	106	3495
HDP 170 2	**15.4 ... 19.3**	100 m6		106		3495

HDP 170 3
HDP 170 4







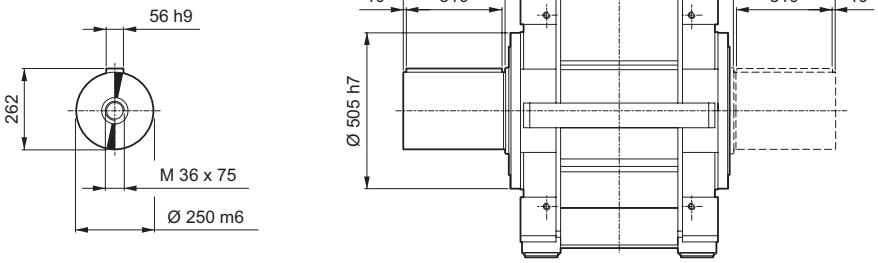


Dimensions are in [mm].

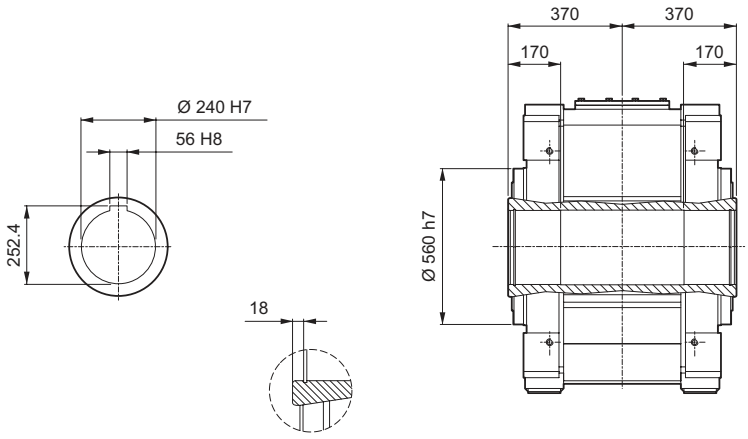
VP	i =	A	B	C	D	E	F	G	Kg LP
HDP 170 3	**23.2 ... 39.7**	90 m6	25	95	M24x50	160	170	5	3765
HDP 170 3	**45.1 ... 77.2**	75 m6	20	79.5	M20x42	125	140	7.5	3765
HDP 170 4	**92.7 ... 158.8**	55 m6	16	59	M20x42	90	110	10	3795
HDP 170 4	**177.4 ... 303.8**	50 k6	14	53.5	M16x36	100	110	5	3795

HDP 170

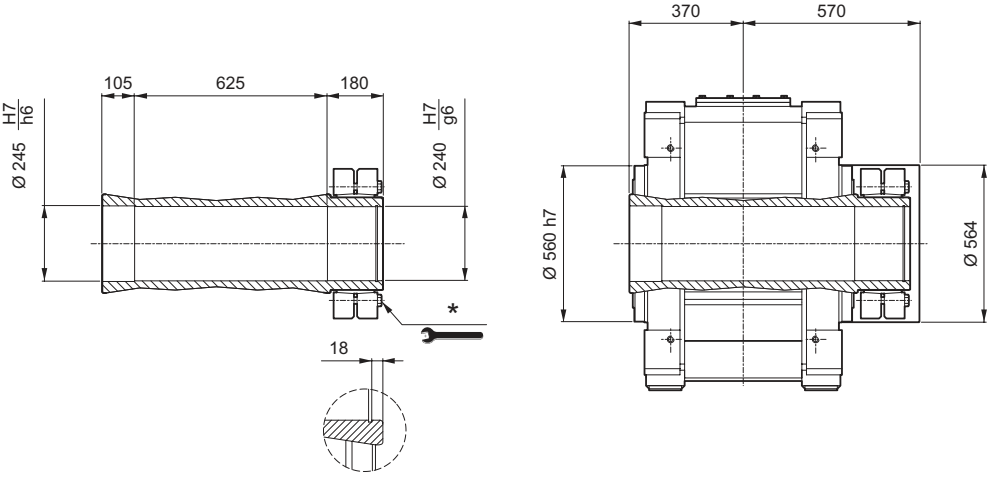
LP



H



S

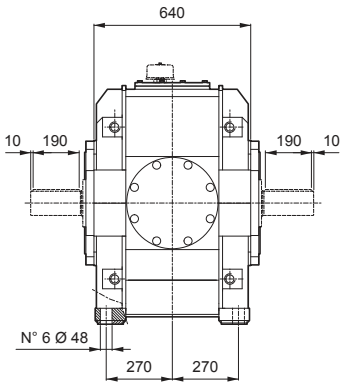


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

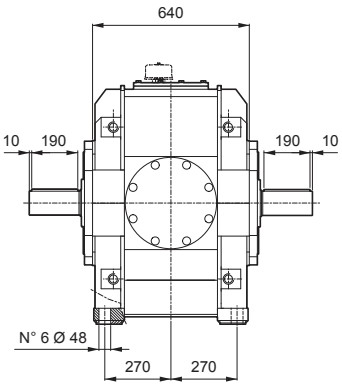
Dimensions are in [mm].

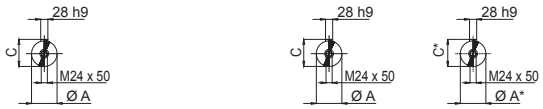
HDP 180

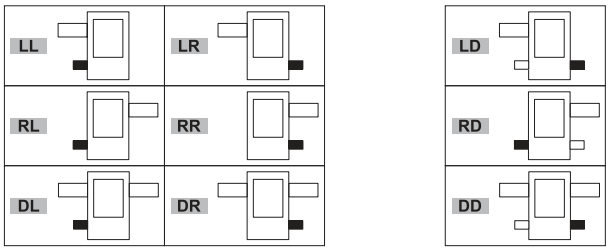
LL / RL / DL / LR / RR / DR



LD / RD / DD





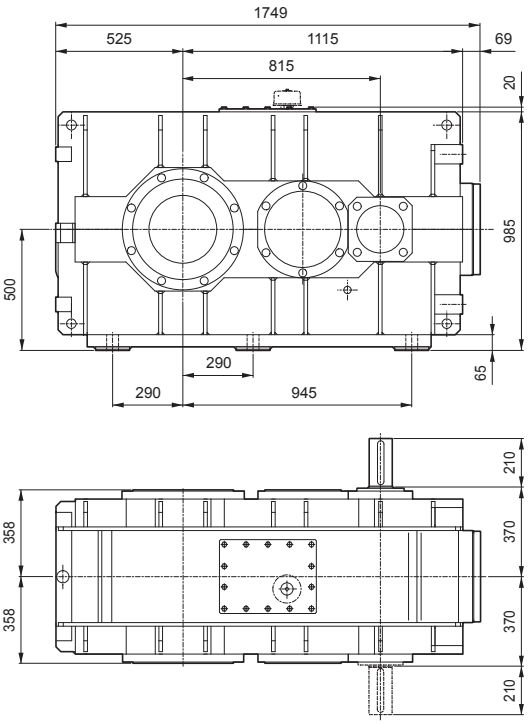


■ A/C single extension

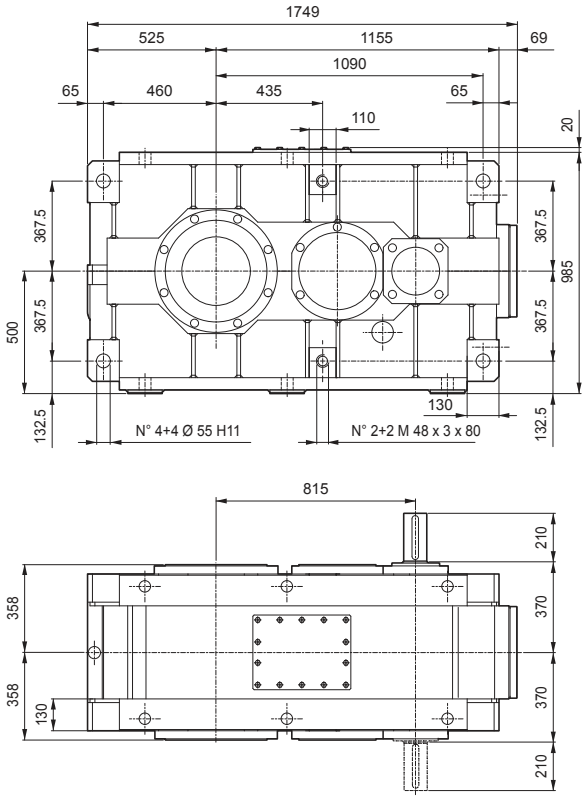
■ A/C primary extension
□ A*/C* secondary extension

VP	i =	A	A*	C	C*	Kg LP
HDP 180 2	**8.7 ... 15.7**	110 m6	100 m6	116	106	3640
HDP 180 2	**17.1 ... 21.4**	100 m6		106		3640

HDP 180 2 B3



HDP 180 2 V5

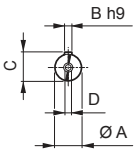


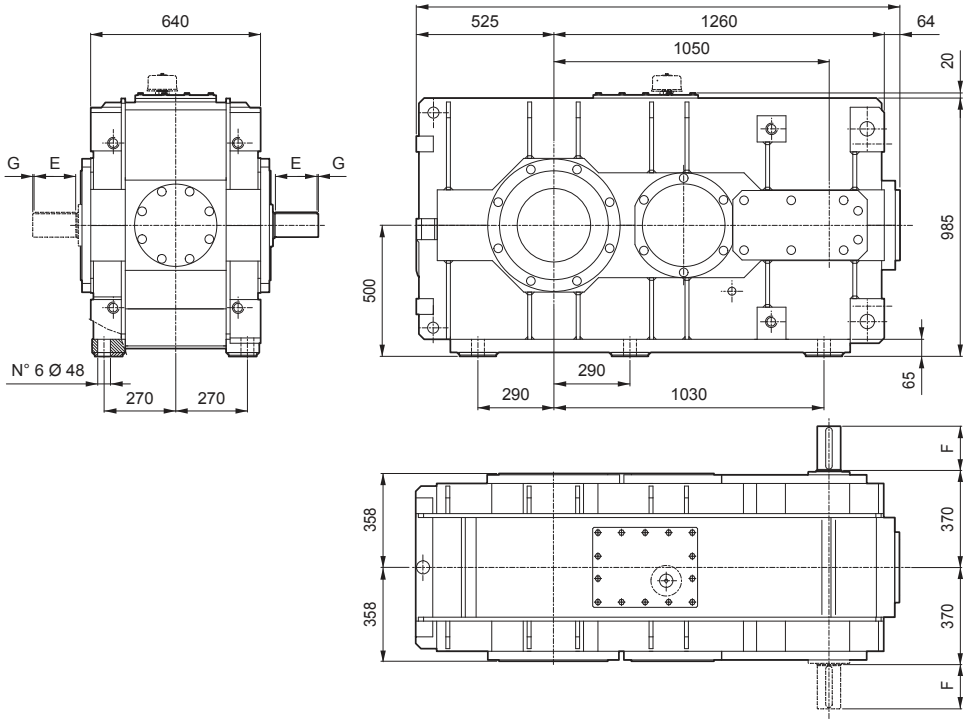
Dimensions are in [mm].

HDP 180

HDP 180 3/4

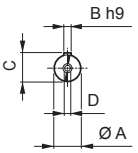
B3

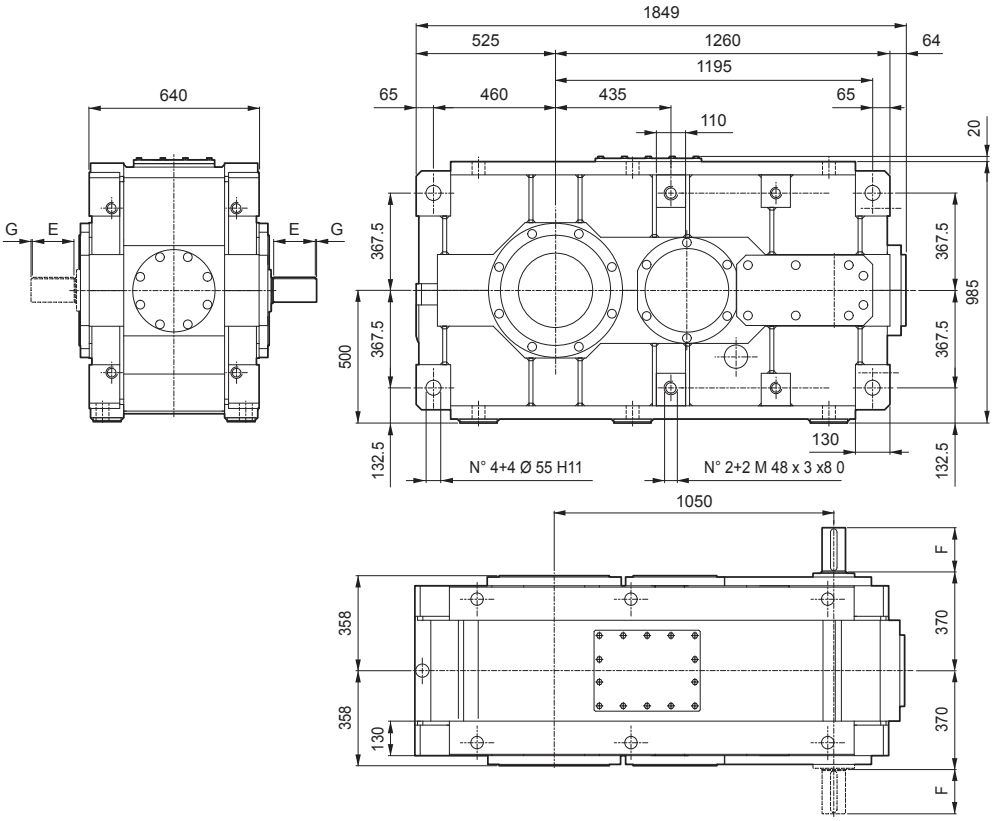




HDP 180 3/4

V5



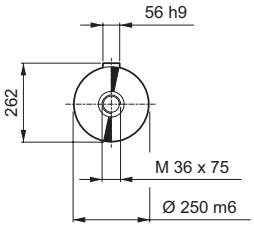


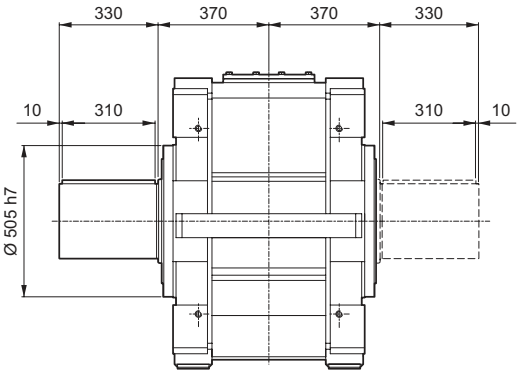
Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	G	Kg LP
HDP 180 3	**25.8 ... 43.9**	90 m6	25	95	M24x50	160	170	5	3860
HDP 180 3	**50.1 ... 85.4**	75 m6	20	79.5	M20x42	125	140	7.5	3860
HDP 180 4	**103.0 ... 175.6**	55 m6	16	59	M20x42	90	110	10	3890
HDP 180 4	**197.2 ... 336.1**	50 k6	14	53.5	M16x36	100	110	5	3890

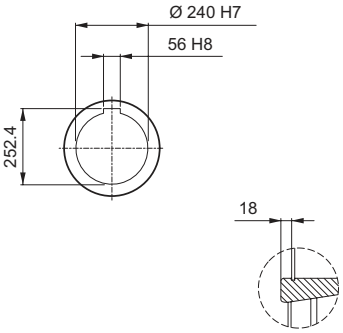
HDP 180

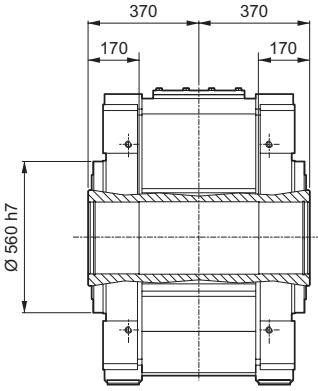
LP



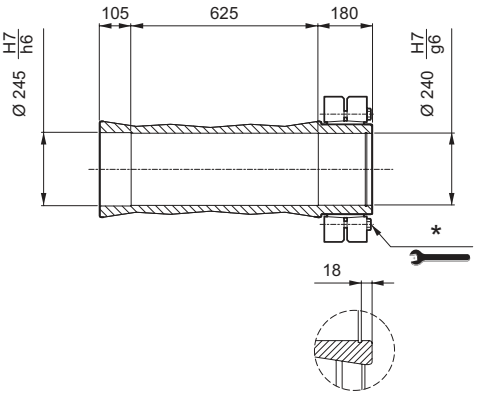


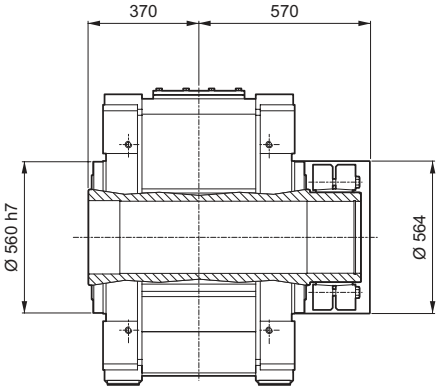
H





S

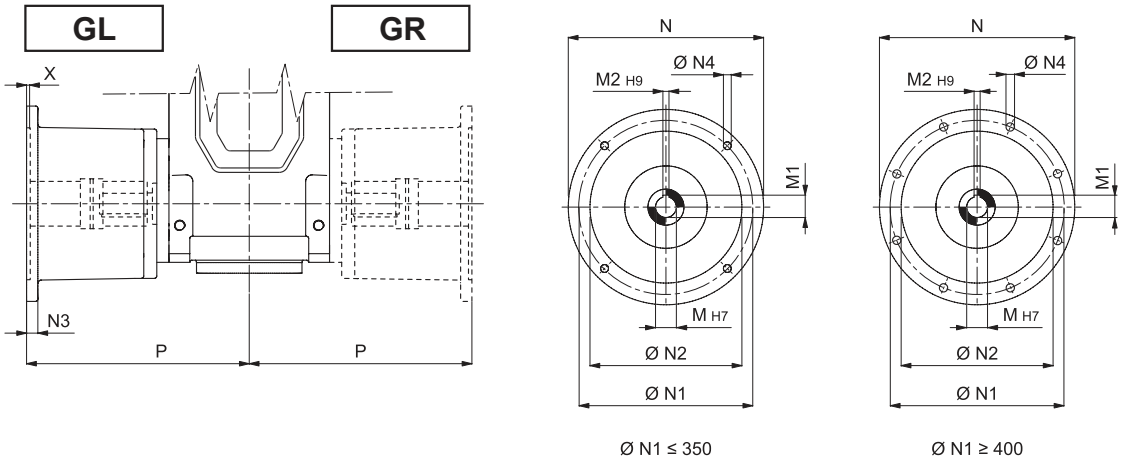




* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

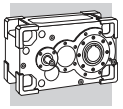
Dimensions are in [mm].

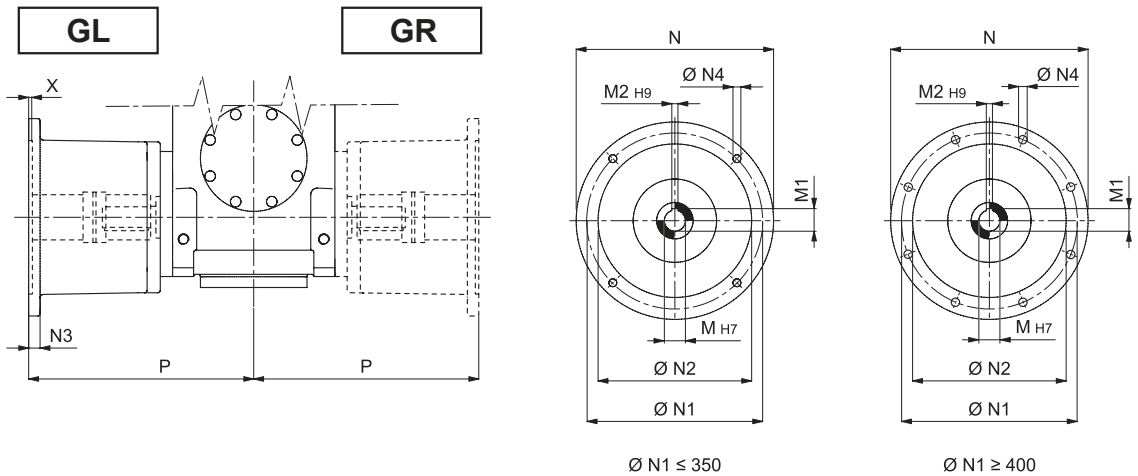
20.1 MOTOR MOUNTING WITH BELL HOUSING AND FLEXIBLE COUPLING



	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 60_132	38	41.3	10	300	265	230	16	14	5	311
HDP 60_160	42	45.3	12	350	300	250	23	18	6	341
HDP 60_180	48	51.8	14	350	300	250	23	18	6	341
HDP 60_200	55	59.3	16	400	350	300	—	M16x23	7	366
HDP 60_225	60	64.4	18	450	400	350	25	18	7	374
HDP 70_132	38	41.3	10	300	265	230	16	14	5	311
HDP 70_160	42	45.3	12	350	300	250	23	18	6	341
HDP 70_180	48	51.8	14	350	300	250	23	18	6	341
HDP 70_200	55	59.3	16	400	350	300	—	M16x23	7	366
HDP 70_225	60	64.4	18	450	400	350	25	18	7	374
HDP 80_160	42	45.3	12	350	300	250	23	18	6	371
HDP 80_180	48	51.8	14	350	300	250	23	18	6	371
HDP 80_200	55	59.3	16	400	350	300	—	M16x23	7	396
HDP 80_225	60	64.4	18	450	400	350	25	18	7	432
HDP 80_250	65	69.4	18	550	500	450	30	18	6	462
HDP 80_280	75	79.9	20	550	500	450	30	18	6	462
HDP 90_160	42	45.3	12	350	300	250	23	18	6	427
HDP 90_180	48	51.8	14	350	300	250	23	18	6	427
HDP 90_200	55	59.3	16	400	350	300	—	M16x23	7	452
HDP 90_225	60	64.4	18	450	400	350	25	18	7	457
HDP 90_250	65	69.4	18	550	500	450	30	18	6	487
HDP 90_280	75	79.9	20	550	500	450	30	18	6	487

Dimensions are in [mm].



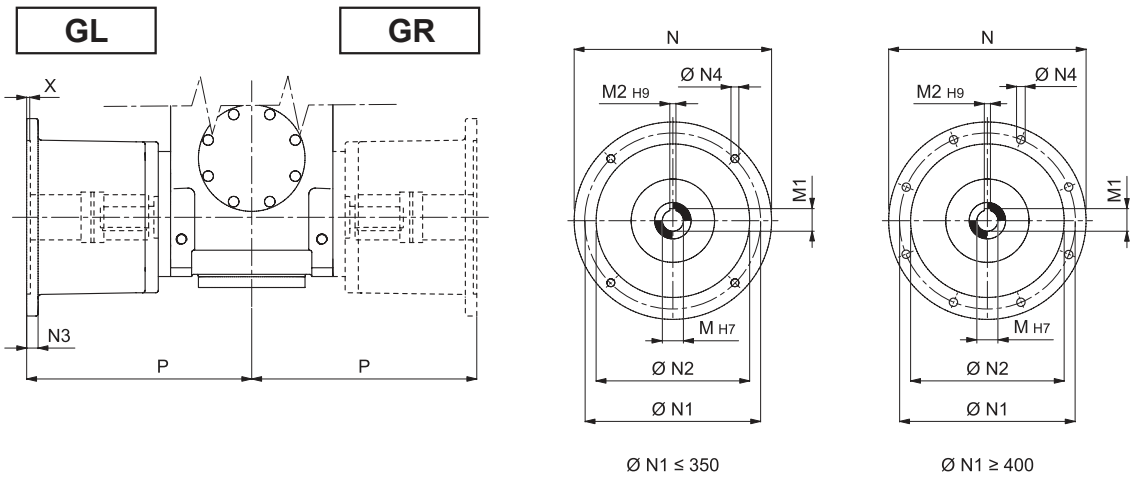


Ø N1 ≤ 350

Ø N1 ≥ 400

	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 100_112	28	31.3	8	250	215	180	15	14	5	395
HDP 100_132	38	41.3	10	300	265	230	—	M12x20	6	415
HDP 100_160	42	45.3	12	350	300	250	23	18	6	481
HDP 100_180	48	51.8	14	350	300	250	23	18	6	481
HDP 100_200	55	59.3	16	400	350	300	—	M16x23	7	506
HDP 100_225	60	64.4	18	450	400	350	26	18	7	513
HDP 100_250	65	69.4	18	550	500	450	30	18	6	543
HDP 100_280	75	79.9	20	550	500	450	30	18	6	543
HDP 100_315	80	85.4	22	660	600	550	22	22	10	579.5
HDP 110_112	28	31.3	8	250	215	180	15	14	5	395
HDP 110_132	38	41.3	10	300	265	230	—	M12x20	6	415
HDP 110_160	42	45.3	12	350	300	250	23	18	6	481
HDP 110_180	48	51.8	14	350	300	250	23	18	6	481
HDP 110_200	55	59.3	16	400	350	300	—	M16x23	7	506
HDP 110_225	60	64.4	18	450	400	350	26	18	7	513
HDP 110_250	65	69.4	18	550	500	450	30	18	6	543
HDP 110_280	75	79.9	20	550	500	450	30	18	6	543
HDP 110_315	80	85.4	22	660	600	550	22	22	10	579.5
HDP 120_132	38	41.3	10	300	265	230	—	M12x20	6	430
HDP 120_160	42	45.3	12	350	300	250	23	18	6	496
HDP 120_180	48	51.8	14	350	300	250	23	18	6	496
HDP 120_200	55	59.3	16	400	350	300	—	M16x23	7	521
HDP 120_225	60	64.4	18	450	400	350	26	18	7	528
HDP 120_250	65	69.4	18	550	500	450	30	18	6	558
HDP 120_280	75	79.9	20	550	500	450	30	18	6	558
HDP 120_315	80	85.4	22	660	600	550	22	22	10	594.5
HDP 125_132	38	41.3	10	300	265	230	—	M12x20	6	430
HDP 125_160	42	45.3	12	350	300	250	23	18	6	496
HDP 125_180	48	51.8	14	350	300	250	23	18	6	496
HDP 125_200	55	59.3	16	400	350	300	—	M16x23	7	521
HDP 125_225	60	64.4	18	450	400	350	26	18	7	528
HDP 125_250	65	69.4	18	550	500	450	30	18	6	558
HDP 125_280	75	79.9	20	550	500	450	30	18	6	558
HDP 125_315	80	85.4	22	660	600	550	22	22	10	594.5

Dimensions are in [mm].

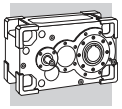


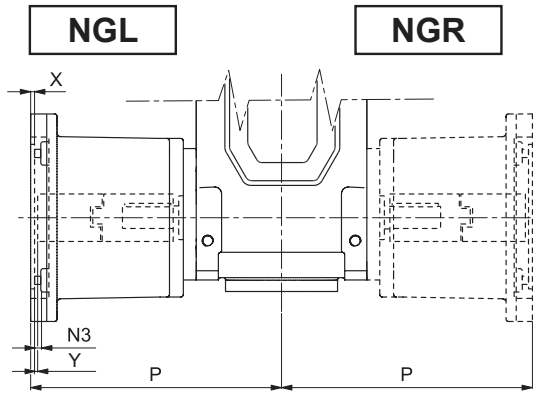
Ø N1 ≤ 350

Ø N1 ≥ 400

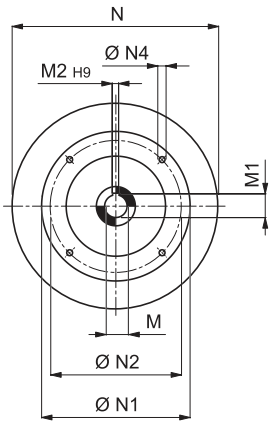
	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 130_160	42	45.3	12	350	300	250	23	18	6	551
HDP 130_180	48	51.8	14	350	300	250	23	18	6	551
HDP 130_200	55	59.3	16	400	350	300	—	M16x23	7	576
HDP 130_225	60	64.4	18	450	400	350	26	18	7	583
HDP 130_250	65	69.4	18	550	500	450	30	18	6	613
HDP 130_280	75	79.9	20	550	500	450	30	18	6	613
HDP 130_315	80	85.4	22	660	600	550	22	22	10	649.5
HDP 140_160	42	45.3	12	350	300	250	23	18	6	551
HDP 140_180	48	51.8	14	350	300	250	23	18	6	551
HDP 140_200	55	59.3	16	400	350	300	—	M16x23	7	576
HDP 140_225	60	64.4	18	450	400	350	26	18	7	583
HDP 140_250	65	69.4	18	550	500	450	30	18	6	613
HDP 140_280	75	79.9	20	550	500	450	30	18	6	613
HDP 140_315	80	85.4	22	660	600	550	22	22	10	649.5
HDP 150_160	42	45.3	12	350	300	250	23	18	6	601
HDP 150_180	48	51.8	14	350	300	250	23	18	6	601
HDP 150_200	55	59.3	16	400	350	300	—	M16x23	7	626
HDP 150_225	60	64.4	18	450	400	350	26	18	7	633
HDP 150_250	65	69.4	18	550	500	450	30	18	6	663
HDP 150_280	75	79.9	20	550	500	450	30	18	6	663
HDP 150_315	80	85.4	22	660	600	550	22	22	10	699.5
HDP 160_160	42	45.3	12	350	300	250	23	18	6	601
HDP 160_180	48	51.8	14	350	300	250	23	18	6	601
HDP 160_200	55	59.3	16	400	350	300	—	M16x23	7	626
HDP 160_225	60	64.4	18	450	400	350	26	18	7	633
HDP 160_250	65	69.4	18	550	500	450	30	18	6	663
HDP 160_280	75	79.9	20	550	500	450	30	18	6	663
HDP 160_315	80	85.4	22	660	600	550	22	22	10	699.5
HDP 170	BONFIGLIOLI TECHNICAL SERVICE									
HDP 180										

Dimensions are in [mm].

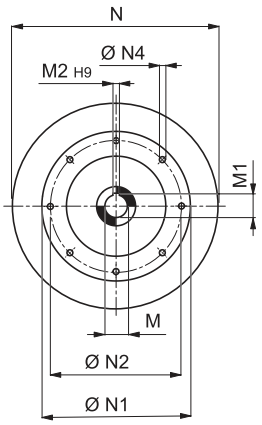




N180TC ... N360TC

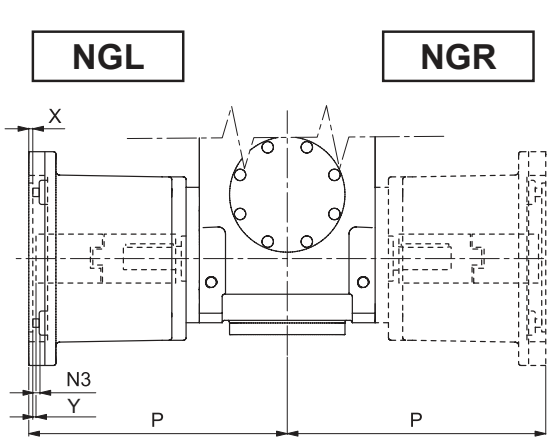


N400TC ... N440TC

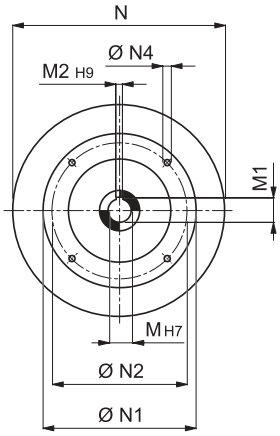


	M	M1	M2	N	N1	N2	N3	N4	X	Y	P
HDP 60_N210TC	1.375 $^{+0.0014}_{+0.0006}$	1.518	0.312 $^{+0.0014}_{0}$	11.811	7.25	8.520	0.413	0.551	0.217	0.128	13.012
	34.925 $^{+0.035}_{+0.015}$	*38.557*	*7.925* $^{+0.036}_{0}$	*300*	*184.15*	*215.9*	*10.5*	*14*	*5.5*	*3.25*	*330.5*
HDP 60_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	14.193
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*360.5*
HDP 60_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	14.39
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.3*	*365.5*
HDP 60_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	15.768
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*400.5*
HDP 60_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	15.768
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*400.5*
HDP 70_N210TC	1.375 $^{+0.0014}_{+0.0006}$	1.518	0.312 $^{+0.0014}_{0}$	11.811	7.25	8.520	0.413	0.551	0.217	0.128	13.012
	34.925 $^{+0.035}_{+0.015}$	*38.557*	*7.925* $^{+0.036}_{0}$	*300*	*184.15*	*215.9*	*10.5*	*14*	*5.5*	*3.25*	*330.5*
HDP 70_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	14.193
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*360.5*
HDP 70_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	14.39
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.3*	*365.5*
HDP 70_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	15.768
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*400.5*
HDP 70_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	15.768
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*400.5*
HDP 80_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	15.374
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*390.5*
HDP 80_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	15.571
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*395.5*
HDP 80_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	18.051
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*458.5*
HDP 80_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	18.051
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*458.5*
HDP 80_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	18.642
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*473.5*
HDP 90_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	17.579
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*446.5*
HDP 90_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	17.776
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*451.5*
HDP 90_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	19.035
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*483.5*
HDP 90_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	19.035
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*483.5*
HDP 90_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	19.626
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*498.5*

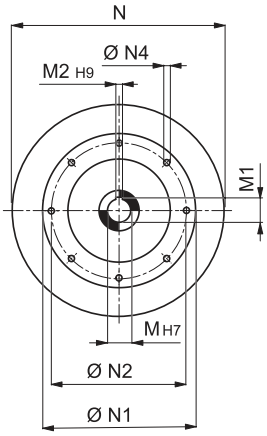
Dimensions are in Inch except when shown in *italic [mm]*



N180TC ... N360TC

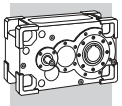


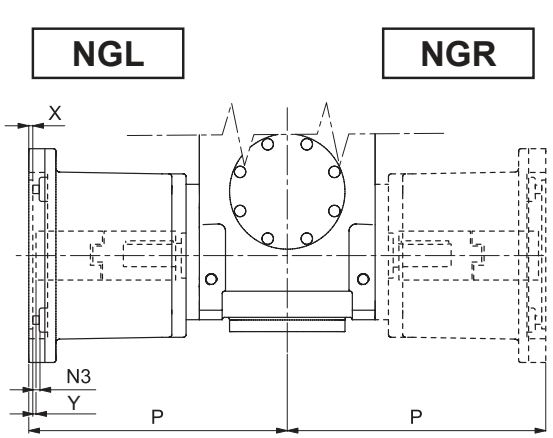
N400TC ... N440TC



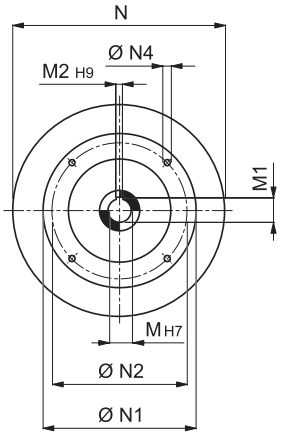
	M	M1	M2	N	N1	N2	N3	N4	X	Y	P
HDP 100_N180TC	1.125 $^{+0.0014}_{+0.0006}$	1.241	0.25 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.061	16.535
	28.575 $^{+0.035}_{+0.015}$	*31.521*	*6.35* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*1.55*	*420*
HDP 100_N210TC	1.375 $^{+0.0014}_{+0.0006}$	1.518	0.312 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.128	16.535
	34.925 $^{+0.035}_{+0.015}$	*38.557*	*7.925* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*3.25*	*420*
HDP 100_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	19.705
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*500.5*
HDP 100_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	19.902
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*505.5*
HDP 100_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	21.24
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*539.5*
HDP 100_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	21.24
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*539.5*
HDP 100_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	21.831
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*554.5*
HDP 110_N180TC	1.125 $^{+0.0014}_{+0.0006}$	1.241	0.25 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.061	16.535
	28.575 $^{+0.035}_{+0.015}$	*31.521*	*6.35* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*1.55*	*420*
HDP 110_N210TC	1.375 $^{+0.0014}_{+0.0006}$	1.518	0.312 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.128	16.535
	34.925 $^{+0.035}_{+0.015}$	*38.557*	*7.925* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*3.25*	*420*
HDP 110_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	19.705
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*500.5*
HDP 110_N280TC	1.87 5 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	19.902
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*505.5*
HDP 110_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	21.24
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*539.5*
HDP 110_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	21.24
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*539.5*
HDP 110_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	21.831
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*554.5*
HDP 120_N210TC	1.375 $^{+0.0014}_{+0.0006}$	1.518	0.312 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.128	17.126
	34.925 $^{+0.035}_{+0.015}$	*38.557*	*7.925* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*3.25*	*435*
HDP 120_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	20.295
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*515.5*
HDP 120_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	20.492
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*520.5*
HDP 120_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	21.831
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*554.5*
HDP 120_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	21.831
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*554.5*
HDP 120_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	22.421
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*569.5*
HDP 120_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	24.882
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.225* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*632*

Dimensions are in Inch except when shown in *italic [mm]*

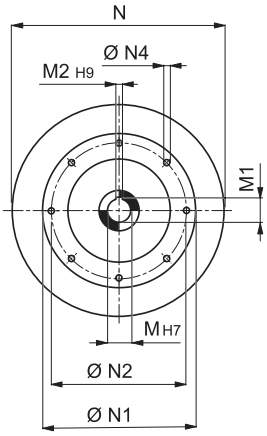




N180TC ... N360TC



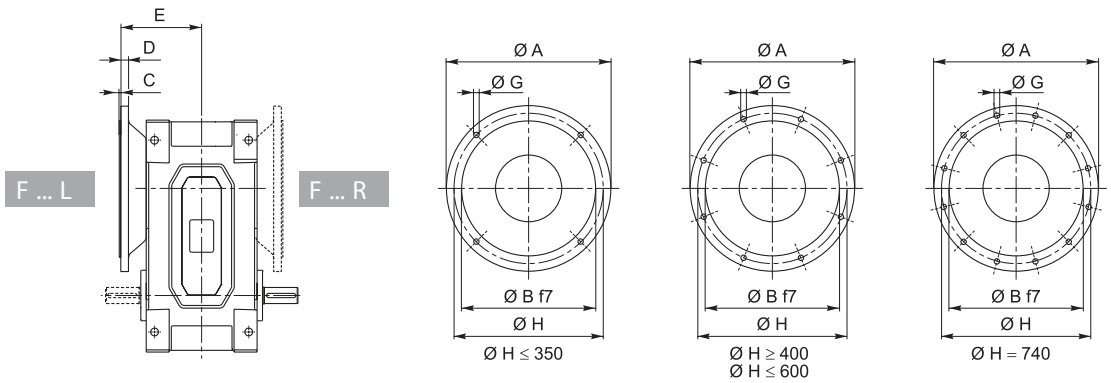
N400TC ... N440TC

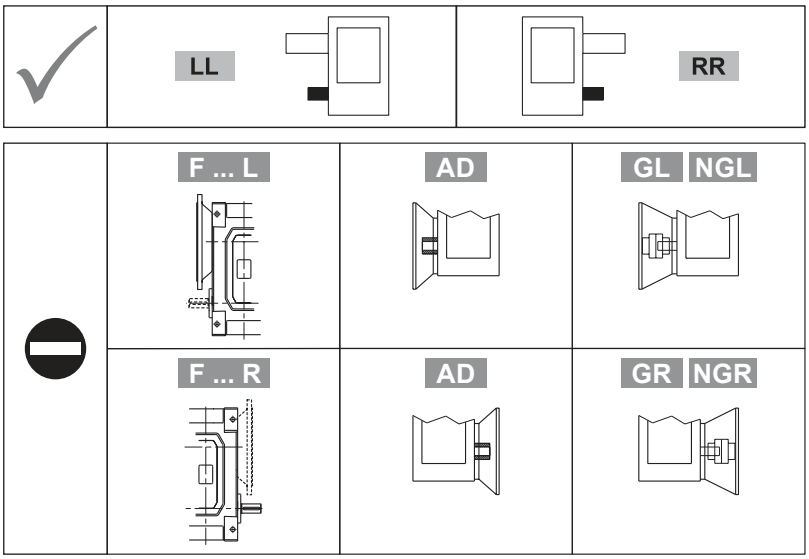


	M	M1	M2	N	N1	N2	N3	N4	X	Y	P
HDP 125_N210TC	1.375 $^{+0.0014}_{+0.0006}$	1.518	0.312 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.128	17.126
	34.925 $^{+0.035}_{+0.015}$	*38.557*	*7.925* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*3.25*	*435*
HDP 125_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	20.295
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*515.5*
HDP 125_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	20.492
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*520.5*
HDP 125_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	21.831
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*554.5*
HDP 125_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	21.831
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*554.5*
HDP 125_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	22.421
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*569.5*
HDP 125_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	24.882
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.225* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*632*
HDP 130_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	22.461
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*570.5*
HDP 130_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	22.657
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*575.5*
HDP 130_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	23.996
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*609.5*
HDP 130_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	23.996
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*609.5*
HDP 130_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	24.587
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*624.5*
HDP 130_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	27.047
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.225* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*687*
HDP 140_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	22.461
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*570.5*
HDP 140_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	22.657
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*575.5*
HDP 140_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	23.996
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*609.5*
HDP 140_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	23.996
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*609.5*
HDP 140_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	24.587
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*624.5*
HDP 140_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	27.047
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.225* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*687*

Dimensions are in Inch except when shown in *italic [mm]*

20.2 MOUNTING FLANGE



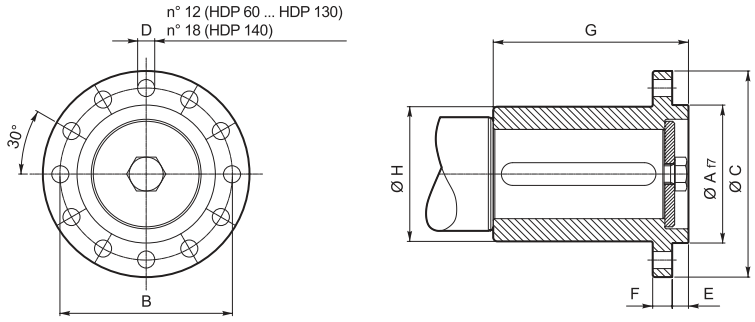


Dimensions are in [mm].

		A	B	C	D	E	G	H
HDP 60	**F350_**	350	250	5	18	187.5	18	300
	F400_	400	300	5	20	187.5	18	350
HDP 70	**F450_**	450	350	5	22	210	18	400
	F550_	550	450	5	24	210	18	500
HDP 80	**F450_**	450	350	5	22	240	18	400
	F550_	550	450	5	24	240	18	500
HDP 90	**F550_**	550	450	5	24	260	18	500
HDP 100	**F660_**	660	550	7	30	335	22	600
HDP 110	**F660_**	660	550	7	30	335	22	600
HDP 120	**F660_**	660	550	7	30	355	26	600
HDP 125	**F730_**	730	580	7	35	360	26	660
HDP 130	**F800_**	800	680	7	40	460	26	740
HDP 140	**F800_**	800	680	7	40	460	26	740
HDP 150		BONFIGLIOLI TECHNICAL SERVICE						
HDP 160								
HDP 170								
HDP 180								

20.3 MANIFOLD FLANGE

Available for shaft arrangement: LL, LR, LD, RL, RR and RD, all featuring a single output shaft extension.

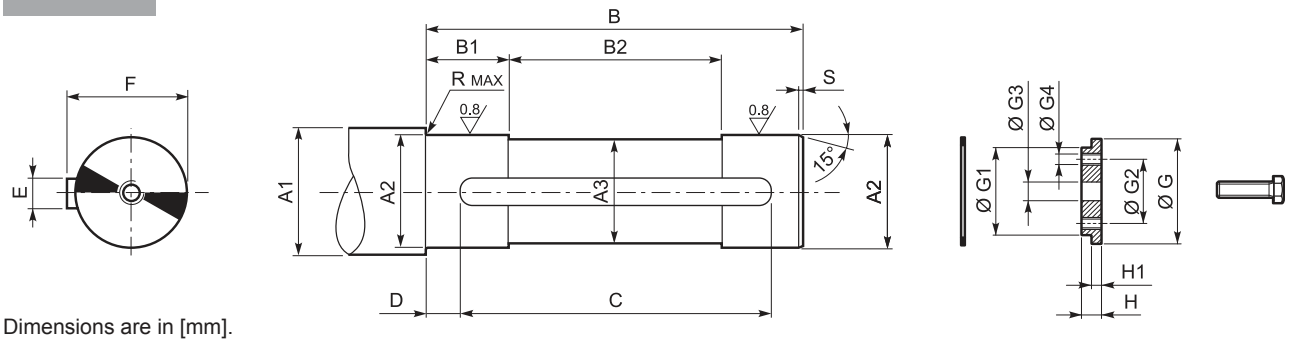


Dimensions are in [mm].

	A	B	C	D	E	F	G	H
HDP 60_ FM	125	175	208	19	14	21	165	135
HDP 70_ FM	125	175	208	19	14	21	195	135
HDP 80_ FM	170	212	254	21	20	24	240	166
HDP 90_ FM	170	212	254	21	20	24	240	166
HDP 100_ FM	200	260	309	25	19	31	244	200
HDP 110_ FM	200	260	309	25	19	31	289	200
HDP 120_ FM	200	260	309	25	19	31	289	200
HDP 125_ FM	220	320	384	32	19	31	344	240
HDP 130_ FM	220	320	384	32	19	31	344	250
HDP 140_ FM	250	380	450	32	19	40	344	310
HDP 150	BONFIGLIOLI TECHNICAL SERVICE							
HDP 160								
HDP 170								
HDP 180								

20.4 CUSTOMER'S SHAFT

H

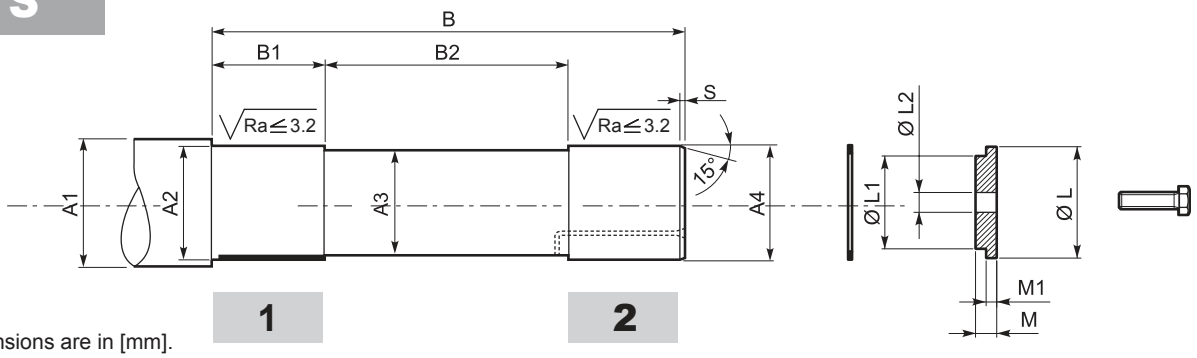


Dimensions are in [mm].

	A1	A2	A3	B	B1	B2	C	D	E	F	R	S	UNI6604
HDP 60	≥ 78	70 h6	69	283	56	172	220	30	20 h9	74.5	2.5	2	20x12x220A
HDP 70	≥ 89	80 h6	79	283	78	127	220	30	22 h9	85	2.5	2.5	22x14x220A
HDP 80	≥ 104	95 h6	94	338	73	192	280	30	25 h9	100	2.5	2.5	25x14x280A
HDP 90	≥ 121	110 h6	109	378	88	202	320	30	28 h9	116	2.5	2.5	28x16x320A
HDP 100	≥ 133	120 h6	119.5	420	100	250	360	30	32 h9	127	3	2.5	32x18x360A
HDP 110	≥ 143	130 h6	129.5	420	100	250	360	30	32 h9	137	3	2.5	32x18x360A
HDP 120	≥ 153	140 h6	139.5	444	110	260	400	40	36 h9	148	3	2.5	36x20x400A
HDP 125	≥ 163	150 h6	149.5	444	110	260	400	40	36 h9	158	3	2.5	36x20x400A
HDP 130	≥ 183	170 h6	169.5	540	135	310	400	80	40 h9	179	3	2.5	40x22x400A
HDP 140	≥ 193	180 h6	179.5	540	135	310	400	80	45 h9	190	3	2.5	45x25x400A
HDP 150	≥ 223	210 h6	209.5	667	155	400	500	100	50 h9	221	3	3	50x28x450B
HDP 160	≥ 223	210 h6	209.5	667	155	400	500	100	50 h9	221	3	3	50x28x450B
HDP 170	≥ 255	240 h6	239.5	697	170	400	506	100	56 h9	252	3	3	56x32x450B
HDP 180	BONFIGLIOLI TECHNICAL SERVICE												

	Out of scope for supply								
	UNI7437	G	G1	G2	G3	G4	H	H1	UNI5739
HDP 60	—	90	70 d9	—	22	—	10	8.5	M20x50
HDP 70	—	100	80 d9	—	22	—	10	8.5	M20x50
HDP 80	—	115	95 d9	—	26	—	15	13.5	M24x60
HDP 90	—	130	110 d9	—	26	—	15	13.5	M24x60
HDP 100	120x4	120 d9	96	64	26	M16	24	12	M24x70
HDP 110	130x4	130 d9	105	69	26	M20	24	12	M24x70
HDP 120	140x4	140 d9	115	79	26	M20	30	15	M24x80
HDP 125	150x4	150 d9	122	86	26	M20	30	15	M24x80
HDP 130	170x4	170 d9	142	102	33	M24	34	17	M30x90
HDP 140	180x4	180 d9	150	110	33	M24	34	17	M30x90
HDP 150	210x5	210 d9	178	140	33	M24	36	18	M30x100
HDP 160	210x5	210 d9	178	140	33	M24	36	18	M30x100
HDP 170	240x5	240 d9	208	160	39	M24	36	18	M36x110
HDP 180	BONFIGLIOLI TECHNICAL SERVICE								

S



Dimensions are in [mm].

	A1	A2	A3	A4	B	B1	B2	R	S
HDP 60	≥ 90	72 h7	69	70 g6	328	59	194	2.5	2.5
HDP 70	≥ 104	82 h7	79	80 g6	332	77	174	2.5	2.5
HDP 80	≥ 119	97 h7	94	95 g6	398	95	205	2.5	2.5
HDP 90	≥ 136	112 h7	109	110 g6	440	87	273	2.5	2.5
HDP 100	≥ 138	125 h6	119.5	120 g6	517	104	328	3	2.5
HDP 110	≥ 148	135 h6	129.5	130 g6	523	104	334	3	2.5
HDP 120	≥ 158	145 h6	139.5	140 g6	550	104	354	3	2.5
HDP 125	≥ 168	155 h6	149.5	150 g6	570	104	363	3	2.5
HDP 130	≥ 188	175 h6	169.5	170 g6	681	104	462	3	2.5
HDP 140	≥ 198	185 h6	179.5	180 g6	689	104	470	3	2.5
HDP 150	≥ 228	215 h6	209.5	210 g6	839	104	593	3	3
HDP 160	≥ 228	215 h6	209.5	210 g6	839	104	593	3	3
HDP 170	BONFIGLIOLI TECHNICAL SERVICE								
HDP 180									

	Out of scope for supply						
	UNI7437	L	L1	L2	M	M1	UNI5739
HDP 60	—	90	70 d9	22	10	8.5	M20x50
HDP 70	—	100	80 d9	22	10	8.5	M20x50
HDP 80	—	115	95 d9	26	15	13.5	M24x60
HDP 90	—	130	110 d9	26	15	13.5	M24x60
HDP 100	120x4	120 d9	96	26	16	12	M24x65
HDP 110	130x4	130 d9	105	26	16	12	M24x65
HDP 120	140x4	140 d9	115	26	19	15	M24x70
HDP 125	150x4	150 d9	122	26	19	15	M24x70
HDP 130	170x4	170 d9	142	33	21	17	M30x80
HDP 140	180x4	180 d9	150	33	21	17	M30x80
HDP 150	210x5	210 d9	178	33	29	18	M30x90
HDP 160	210x5	210 d9	178	33	29	18	M30x90
HDP 170	BONFIGLIOLI TECHNICAL SERVICE						
HDP 180							

To facilitate part removal in the area of the cylindrical guide opposite the shrink disc, install a machine pivot to which a self-lubricating cylindrical bushing (1) can be fitted and/or with a hole big enough to allow application of a rust treatment (2).
In the presence of external thrust loads, vibration, safety problems, requirements for enhanced reliability, or unfavourable mounting positions (e.g. V5 mounting positions, output shaft directed downwards), install suitable devices to secure the shaft in an axial direction and prevent accidental decoupling.

PARALLEL SHAFT GEAR UNIT SERIES HDP ATEX CONFIGURATION

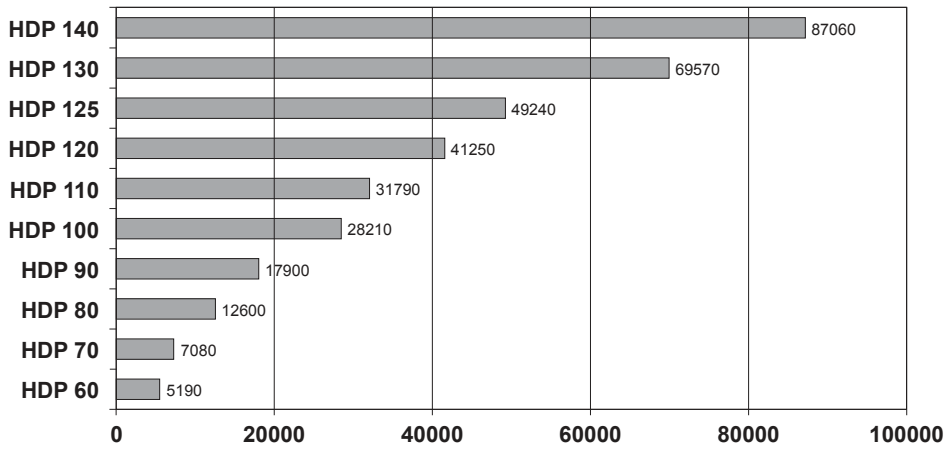
Selection of the the product must fit through the compilation of the selection form (see page 11). For a safe selection it is strongly recommended to rely on the long time experience of the Bonfiglioli Technical Service Dept.

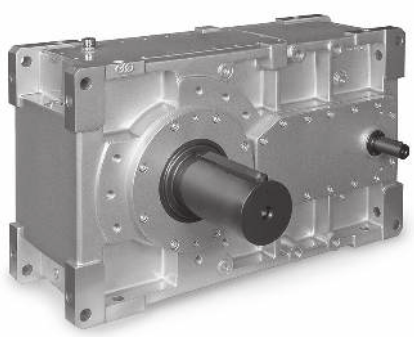
21 INSTALLATION, USE AND MAINTENANCE

All the instructions for installation, use and maintenance of the product are given in the unit's Manual. This can be downloaded from www.bonfiglioli.com where the manual is available in PDF format in a number of languages.
This document must be kept in a suitable place, in the vicinity of the installed gear unit, as a reference for all persons authorised to work with or on the product throughout its service life.

22 CONSTRUCTION OF ATEX-SPECIFIED EQUIPMENT

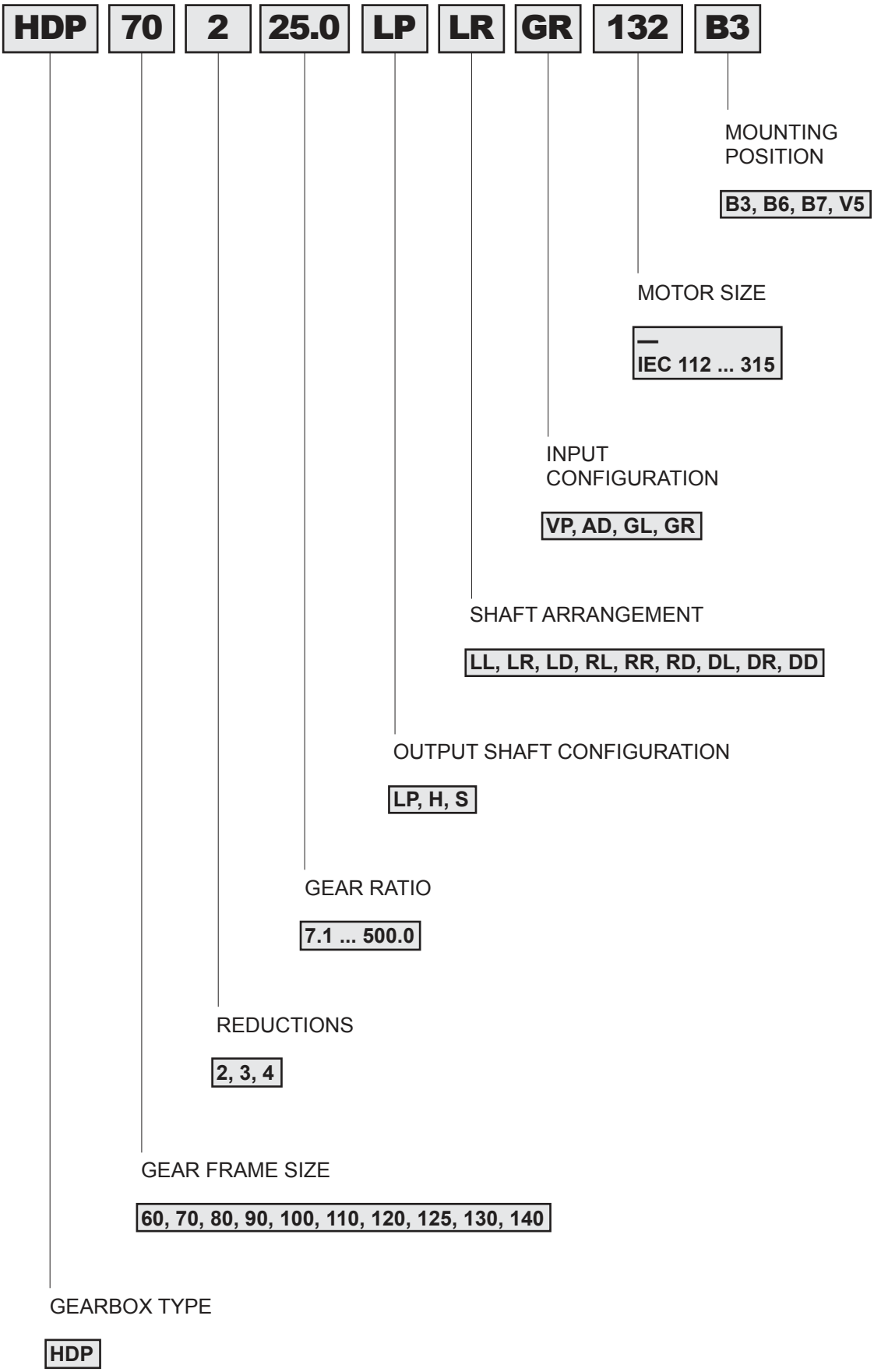
- Equipped with service plugs for periodic lubricant level checks.
- Equipped with vent caps with anti-intrusion valve.
- Fluoro elastomer seal rings as standard.
- No plastic component parts..
- Nameplate indication of the product category and type of protection.
- Components operable at above the operating temperature.
- Temperature indicator supplied along with each unit.



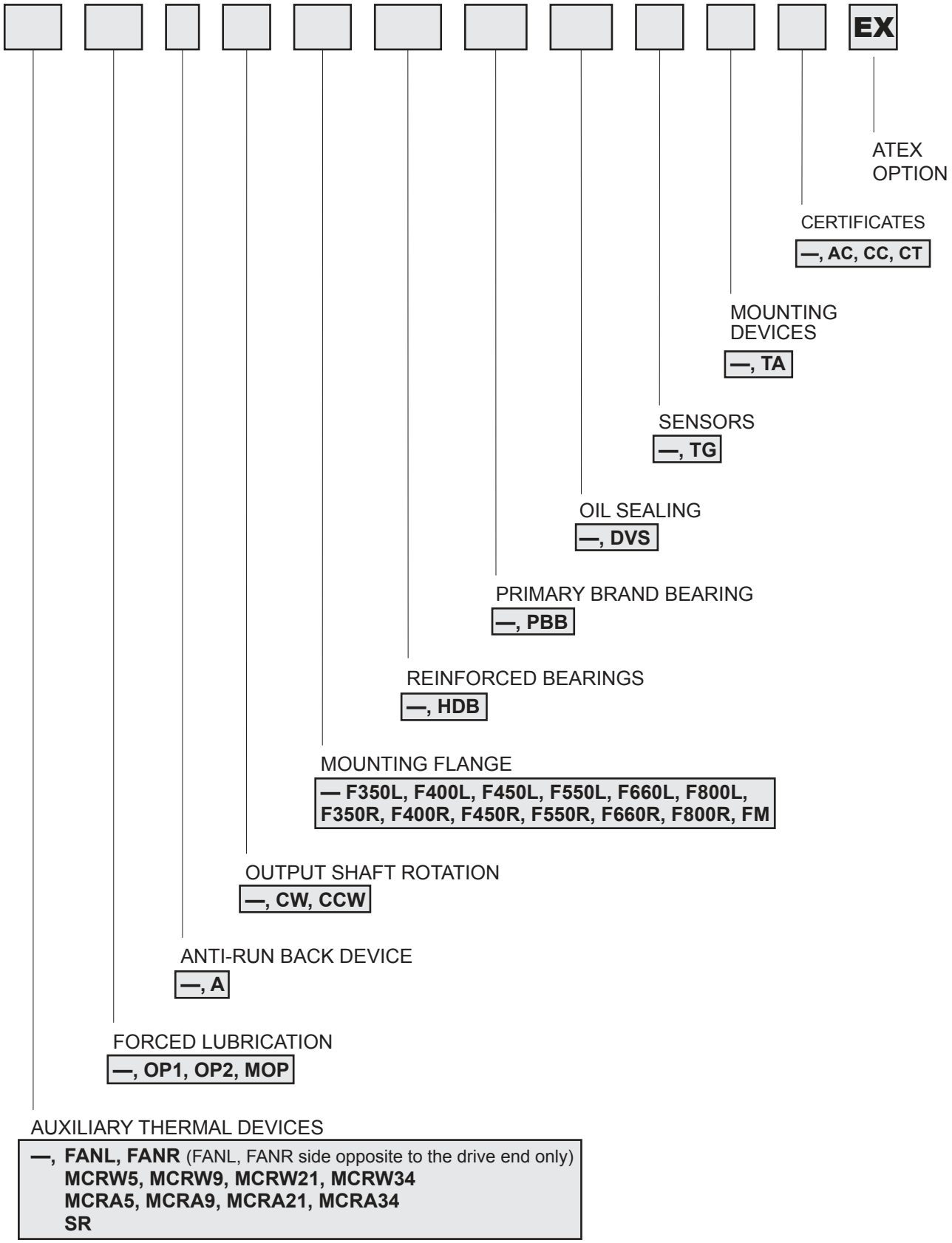


23 DESIGNATION

23.1 BASE VARIANTS



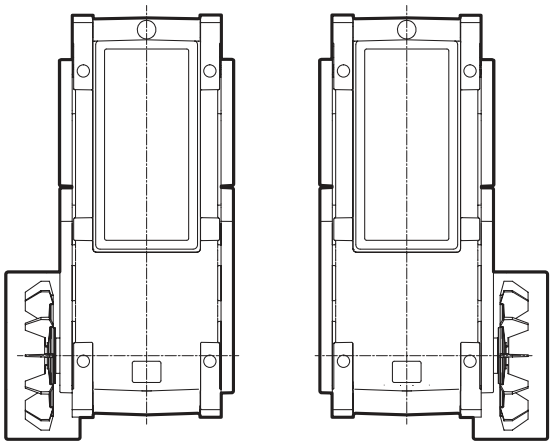
23.2 OPTIONAL VARIANTS



REMARK: The multiple selection of some of the variants may be subject to technical or dimensional constraints. Consult with the factory to have your selection approved.

23.3 FAN COOLING

Greater heat dissipation capacity can be achieved by installing cooling fans, which are keyed on to the gearbox input shaft. Gear units HDP 60 ... HDP 90 featuring a solid input shaft (VP), except for configuration LD – RD – DD and HDP 100 ... HDP 160 with lantern type motor adapter (GL/GR) may have an auxiliary fan fitted to the side opposite the drive end. Specify code **FANL** or **FANR**.



FANL **FANR**

23.4 AUXILIARY COOLING WITH AUTONOMOUS COOLING UNIT

Two types of cooling units are available, each in a range of sizes providing different cooling capacities. The two types use different cooling media for the oil: MCRW…EX – water/oil heat exchanger and MCRA…EX – air/oil heat exchanger.
If an independent cooling unit is installed on the advice of the Bonfiglioli Technical Service, no additional forced lubrication devices are required. See section 15.6.2. The following chart shows device availability according to gearbox size.

	MCRW5_EX MCRA5_EX	MCRW9_EX MCRA9_EX	MCRW21_EX MCRA21_EX	MCRW34_EX MCRA34_EX
HDP 100_EX	**X**	**X**		
HDP 110_EX	**X**	**X**		
HDP 120_EX	**X**	**X**	**X (*)**	
HDP 125_EX	**X**	**X**	**X (**)**	
HDP 130_EX	**X**	**X**	**X**	**X (**)**
HDP 140_EX	**X**	**X**	**X**	**X (**)**

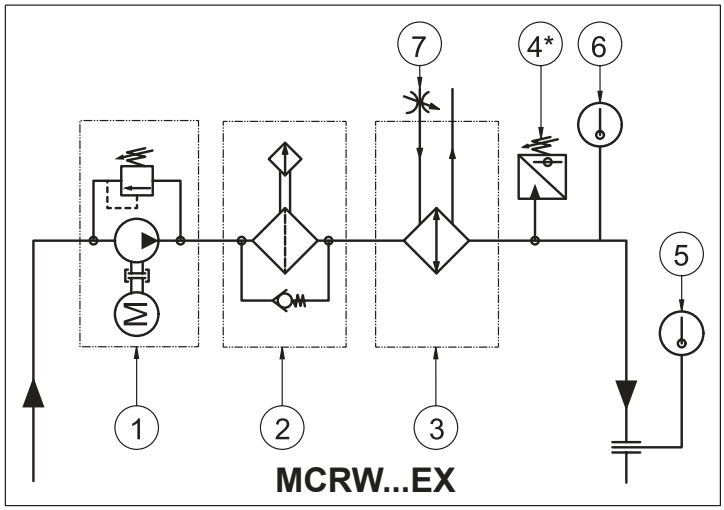
(*) not available for mounting position B3.

(**) not available for double reduction units in the mounting position B3.

The main components of the cooling units are as follows:

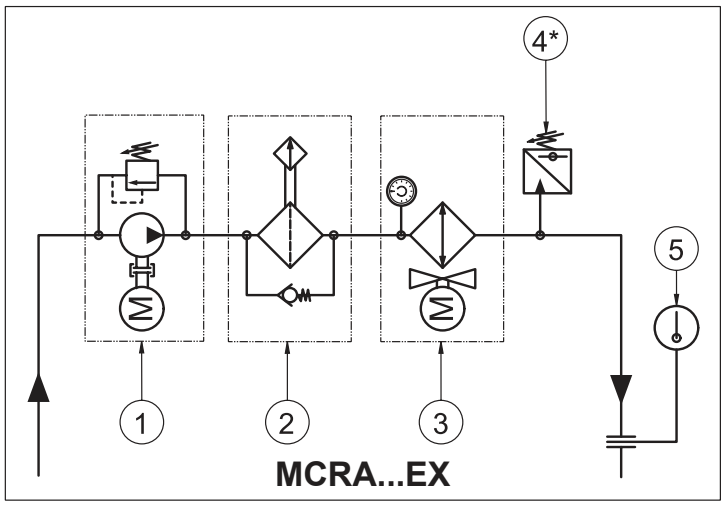
MCRW…EX

1) motorpump complete with by-pass circuit
2) filter with clogging visual indicator
3) water/oil heat exchanger
4) minimum pressure switch (only available in combination with forced lubrication)
5) maximum temperature thermostat
6) minimum temperature switch
7) electro-valve



MCRA…EX

1) motorpump complete with by-pass circuit
2) filter with clogging visual indicator
3) air/oil heat exchanger with thermostat
4) minimum pressure switch (only available in combination with forced lubrication)
5) maximum temperature thermostat



General warnings:

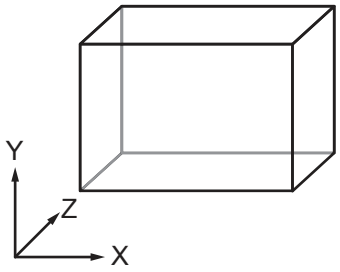
MCRW…EX : provide a water supply system that corresponds to the following specifications:

- max. pressure 10 bar
- maximum delivery temperature 20°C
- minimum flow rate Q_{H2O} as per the chart:

	MCRW5_EX	MCRW9_EX	MCRW21_EX	MCRW34_EX
Q_{H2O} [l/min]	10	18	31	56

MCRA…EX : leave sufficient space around the heat exchanger to ensure an unrestricted air flow.

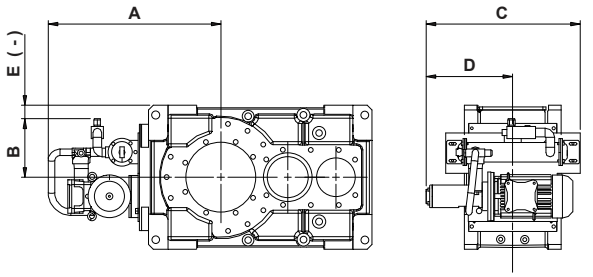
Cooling units maximum dimensions



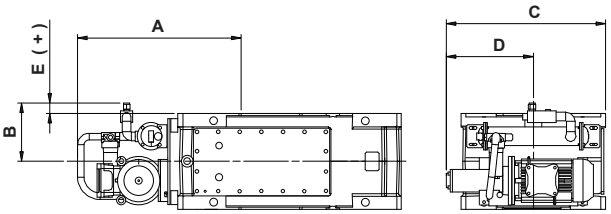
	X	Y	Z
MCRW5_EX	500	288	432
MCRW9_EX	565	328	409
MCRW21_EX	641	382	429
MCRW34_EX	811	430	551
MCRA5_EX	630	505	788
MCRA9_EX	808	605	648
MCRA21_EX	640	605	921
MCRA34_EX	921	605	699

MCRW...EX

B3



V5



B3 - MCRW5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x ; 3x ; 4x	596	247	500	295	-23
	110	2x ; 3x ; 4x	581				-23
	120	2x ; 3x ; 4x	626				-53
	125	2x ; 3x ; 4x	666				-93
	130	2x ; 3x ; 4x	681				-133
	140	2x ; 3x ; 4x	706				-133

V5 - MCRW5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x ; 3x ; 4x	596	247	500	295	62
	110	2x ; 3x ; 4x	581				62
	120	2x ; 3x ; 4x	626				47
	125	2x ; 3x ; 4x	666				47
	130	2x ; 3x ; 4x	681				-3
	140	2x ; 3x ; 4x	706				-3

B3 - MCRW9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x ; 3x ; 4x	610.5	224	565	295	-46
	110	2x ; 3x ; 4x	595.5				-46
	120	2x ; 3x ; 4x	640.5				-76
	125	2x ; 3x ; 4x	680.5				-116
	130	2x ; 3x ; 4x	695.5				-156
	140	2x ; 3x ; 4x	720.5				-156

V5 - MCRW9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x ; 3x ; 4x	610.5	224	565	295	39
	110	2x ; 3x ; 4x	595.5				39
	120	2x ; 3x ; 4x	640.5				24
	125	2x ; 3x ; 4x	680.5				24
	130	2x ; 3x ; 4x	695.5				-26
	140	2x ; 3x ; 4x	720.5				-26

B3 - MCRW21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	120	2x ; 3x ; 4x	—	—	—	—	—
	125	2x	—	—	—	—	—
		3x ; 4x	760	244	641.5	361.5	-96
	130	2x ; 3x ; 4x	775				-136
	140	2x ; 3x ; 4x	800				-136

V5 - MCRW21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	120	2x ; 3x ; 4x	720	244	641.5	361.5	44
	125	2x ; 3x ; 4x	760				44
	130	2x ; 3x ; 4x	775				-6
	140	2x ; 3x ; 4x	800				-6

B3 - MCRW34_EX

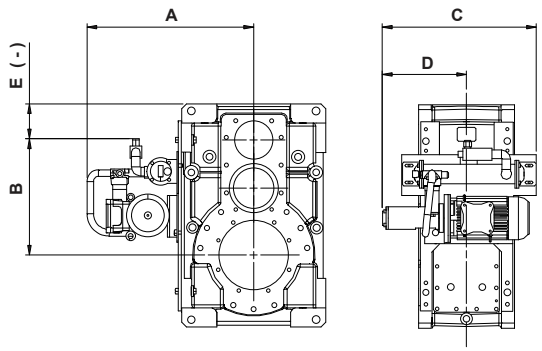
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	130	2x	—	—	—	—	—
		3x ; 4x	823	366	811	431	-14
	140	2x	—	—	—	—	—
		3x ; 4x	848	366	811	431	-14

V5 - MCRW34_EX

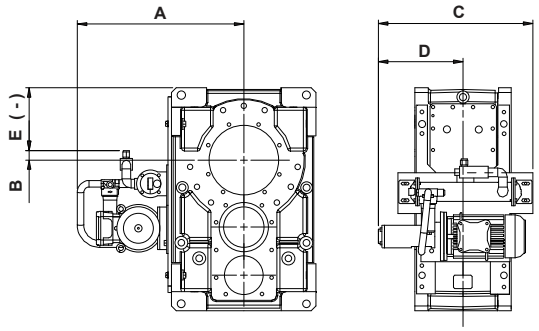
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	130	2x ; 3x ; 4x	823	366	811	431	116
	140	2x ; 3x ; 4x	848				116

MCRW...EX

B6



B7



B6 - MCRW5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x	573	465	500	295	-95
		3x ; 4x	573	585			-95
	110	2x	573	480			-95
		3x ; 4x	573	600			-95
	120	2x	603	473			-157
		3x ; 4x	603	608			-172
	125	2x	643	473			-197
		3x ; 4x	643	608			-212
	130	2x	683	479.5			-260.5
		3x ; 4x	683	575.8			-359.3
	140	2x	683	501.5			-278.5
		3x ; 4x	683	585.8			-389.3

B7 - MCRW5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x	573	29	500	295	-241
		3x ; 4x	573	-91			-361
	110	2x	573	14			-241
		3x ; 4x	573	-106			-361
	120	2x	603	21			-279
		3x ; 4x	603	-114			-414
	125	2x	643	21			-319
		3x ; 4x	643	-114			-454
	130	2x	683	14.5			-340.5
		3x ; 4x	683	-86			-441
	140	2x	683	-8.5			-388.5
		3x ; 4x	683	-91			-471

B6 - MCRW9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x	587.5	442	565	295	-118
		3x ; 4x	587.5	562			-118
	110	2x	587.5	457			-118
		3x ; 4x	587.5	577			-118
	120	2x	617.5	450			-180
		3x ; 4x	617.5	585			-195
	125	2x	657.5	450			-220
		3x ; 4x	657.5	585			-235
	130	2x	697.5	456.5			-283.5
		3x ; 4x	697.5	552.8			-382.3
	140	2x	697.5	478.5			-301.5
		3x ; 4x	697.5	562.8			-412.3

B7 - MCRW9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x	587.5	6	565	295	-264
		3x ; 4x	587.5	-114			-384
	110	2x	587.5	-9			-264
		3x ; 4x	587.5	-129			-384
	120	2x	617.5	-2			-302
		3x ; 4x	617.5	-137			-437
	125	2x	657.5	-2			-342
		3x ; 4x	657.5	-137			-477
	130	2x	697.5	-8.5			-363.5
		3x ; 4x	697.5	-109			-464
	140	2x	697.5	-31.5			-411.5
		3x ; 4x	697.5	-114			-494

B6 - MCRW21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	120	2x	697	470	641.2	361.2	-160
		3x ; 4x	697	605			-175
	125	2x	737	470			-200
		3x ; 4x	737	605			-215
	130	2x	777	476.5			263.5
		3x ; 4x	777	572.8			-362.3
	140	2x	777	498.5			-281.5
		3x ; 4x	777	582.8			-392.3

B7 - MCRW21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	120	2x	697	18	641.2	361.2	-282
		3x ; 4x	697	-117			-417
	125	2x	737	18			-322
		3x ; 4x	737	-117			-457
	130	2x	777	11.5			-343.5
		3x ; 4x	777	-89			-444
	140	2x	777	-11.5			-391.5
		3x ; 4x	777	-94			-474

B6 - MCRW34_EX

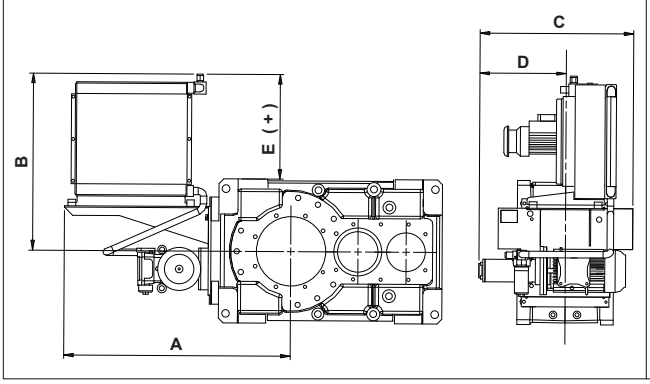
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	130	2x	825	618.5	811	431	-121.5
		3x ; 4x	825	714.8			-220.3
	140	2x	825	640.5			-139.5
		3x ; 4x	825	724.8			-250.3

B7 - MCRW34_EX

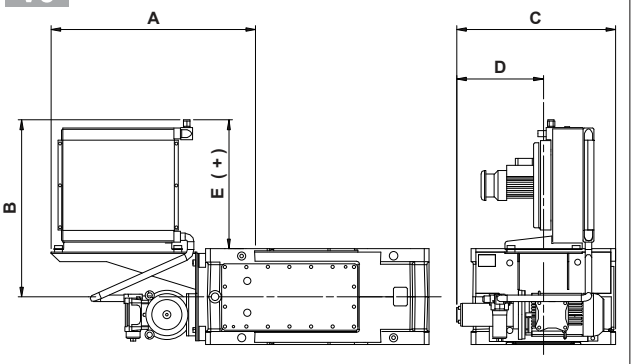
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	130	2x	825	153.5	811	431	-201.5
		3x ; 4x	825	53			-302
	140	2x	825	130.5			-249.5
		3x ; 4x	825	48			-332

MCRA...EX

B3



V5



B3 - MCRA5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x ; 3x ; 4x	813	603	642	430	333
	110	2x ; 3x ; 4x	798				333
	120	2x ; 3x ; 4x	843				303
	125	2x ; 3x ; 4x	883				263
	130	2x ; 3x ; 4x	898				223
	140	2x ; 3x ; 4x	923				223

V5 - MCRA5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x ; 3x ; 4x	813	603	642	430	418
	110	2x ; 3x ; 4x	798				418
	120	2x ; 3x ; 4x	843				403
	125	2x ; 3x ; 4x	883				403
	130	2x ; 3x ; 4x	898				353
	140	2x ; 3x ; 4x	923				353

B3 - MCRA9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x ; 3x ; 4x	913	623	678	295.5	353
	110	2x ; 3x ; 4x	898				353
	120	2x ; 3x ; 4x	943				323
	125	2x ; 3x ; 4x	983				283
	130	2x ; 3x ; 4x	998				243
	140	2x ; 3x ; 4x	1023				243

V5 - MCRA9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x ; 3x ; 4x	913	623	678	295.5	438
	110	2x ; 3x ; 4x	898				438
	120	2x ; 3x ; 4x	943				423
	125	2x ; 3x ; 4x	983				423
	130	2x ; 3x ; 4x	998				373
	140	2x ; 3x ; 4x	1023				373

B3 - MCRA21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	120	2x ; 3x ; 4x	—	—	—	—	—
	125	2x	—	—	—	—	—
		3x ; 4x	983	736	640.5	360.5	396
	130	2x ; 3x ; 4x	998				356
	140	2x ; 3x ; 4x	1023				356

V5 - MCRA21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	120	2x ; 3x ; 4x	943	736	640.5	360.5	536
	125	2x ; 3x ; 4x	983				536
	130	2x ; 3x ; 4x	998				486
	140	2x ; 3x ; 4x	1023				486

B3 - MCRA34_EX

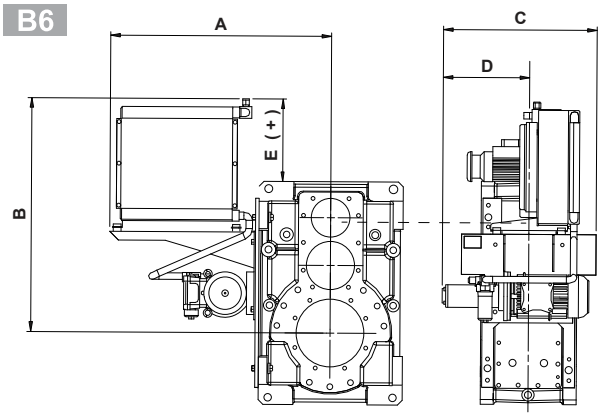
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	130	2x	—	—	—	—	—
		3x ; 4x	998	736	701	416	356
	140	2x	—	—	—	—	—
		3x ; 4x	1023	736	701	416	356

V5 - MCRA34_EX

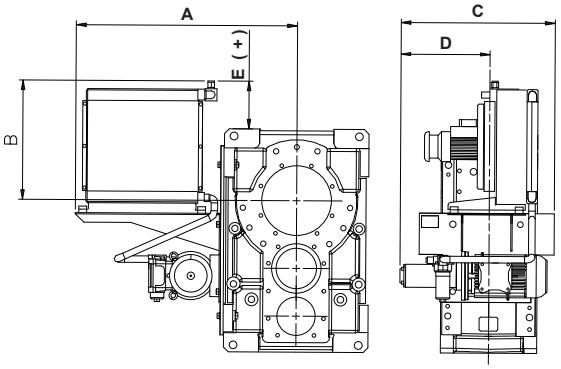
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	130	2x ; 3x ; 4x	998	736	701	416	486
	140	2x ; 3x ; 4x	1023				486

MCRA...EX

B6



B7



B6 - MCRA5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x	790	820.5	641.7	430	260.5
		3x ; 4x	790	940.5			260.5
	110	2x	790	835.5			260.5
		3x ; 4x	790	955.5			260.5
	120	2x	820	828.5			198.5
		3x ; 4x	820	963.5			183.5
	125	2x	860	828.5			158.5
		3x ; 4x	860	963.5			143.5
	130	2x	900	835			95
		3x ; 4x	900	931.3			-3.8
	140	2x	900	857			77
		3x ; 4x	900	941.3			-33.8

B7 - MCRA5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x	790	384.5	641.7	430	114.5
		3x ; 4x	790	264.5			-5.5
	110	2x	790	369.5			114.5
		3x ; 4x	790	249.5			-5.5
	120	2x	820	376.5			76.5
		3x ; 4x	820	241.5			-58.5
	125	2x	860	376.5			36.5
		3x ; 4x	860	241.5			-98.5
	130	2x	900	370			15
		3x ; 4x	900	269.5			-85.5
	140	2x	900	347			-33
		3x ; 4x	900	264.5			-115.5

B6 - MCRA9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x	890	840.5	680	295.2	280.5
		3x ; 4x	890	960.5			280.5
	110	2x	890	855.5			280.5
		3x ; 4x	890	975.5			280.5
	120	2x	920	848.5			218.5
		3x ; 4x	920	983.5			203.5
	125	2x	960	848.5			178.5
		3x ; 4x	960	983.5			163.5
	130	2x	1000	855			115
		3x ; 4x	1000	951.3			16.3
	140	2x	1000	877			97
		3x ; 4x	1000	961.3			-13.8

B7 - MCRA9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	100	2x	890	404.5	680	295.2	134.5
		3x ; 4x	890	284.5			14.5
	110	2x	890	389.5			134.5
		3x ; 4x	890	269.5			14.5
	120	2x	920	396.5			96.5
		3x ; 4x	920	261.5			-38.5
	125	2x	960	396.5			56.5
		3x ; 4x	960	261.5			-78.5
	130	2x	1000	390			35
		3x ; 4x	1000	289.5			-65.5
	140	2x	1000	367			-13
		3x ; 4x	1000	284.5			-95.5

B6 - MCRA21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	120	2x	920	962	640.2	360.2	332
		3x ; 4x	920	1097			317
	125	2x	960	962			292
		3x ; 4x	960	1097			277
	130	2x	1000	968.5			228.5
		3x ; 4x	1000	1064.8			129.8
	140	2x	1000	990.5			210.5
		3x ; 4x	1000	1074.8			99.8

B7 - MCRA21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	120	2x	920	510	640.2	360.2	210
		3x ; 4x	920	375			75
	125	2x	960	510			170
		3x ; 4x	960	375			35
	130	2x	1000	503.5			148.5
		3x ; 4x	1000	403			48
	140	2x	1000	480.5			100.5
		3x ; 4x	1000	398			18

B6 - MCRA34_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	130	2x	1000	966	701	416	226
		3x ; 4x	1000	1062.3			127.3
	140	2x	1000	988			208
		3x ; 4x	1000	1072.3			97.3

B7 - MCRA34_EX

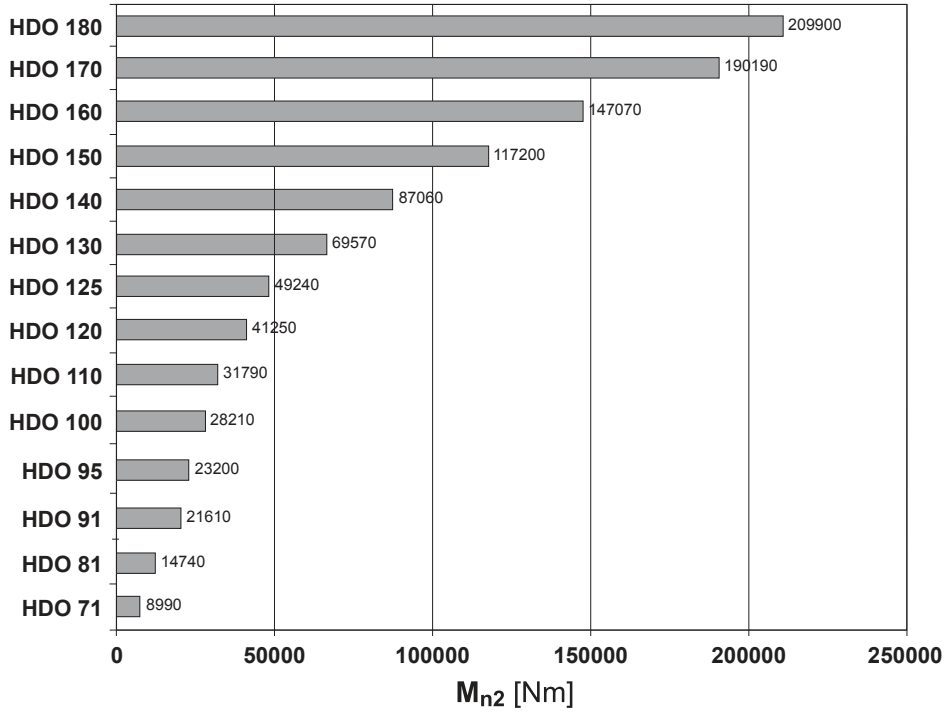
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDP	130	2x	1000	501	701	416	146
		3x ; 4x	1000	400.5			45.5
	140	2x	1000	478			98
		3x ; 4x	1000	395.5			15.5

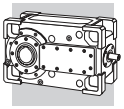
24 OTHER INFORMATION ABOUT GEARBOX AND GEARMOTOR

Mounting positions, technical data, motor availability,moments of inertia and dimensions of **HDP-EX (Atex)** series don't change among equivalent **HDP** product series. All of these information can be obtained in the related chapters of this catalogue.

25 DESIGN FEATURES

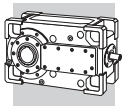
The main design features of the HDO bevel helical range are:
• 11 frame sizes: HDO 71, 81, 91, 100, 110, 120, 125, 130, 140, 150 and 160, with 2, 3, and 4 reduction stages.
• 3 frame sizes: HDO 95, 170, 180, with 3, and 4 reduction stages.
• Excellent distribution of rated torque values across the entire ratio range.
• Gear ratios with constant 12% escalation.
• HDO 71, 81, 91, 95, 100, 110, 120 and 125: monobloc casing in rigid, strong and precision machined spheroidal graphite cast iron, with internal and external paint finish. Universal mounting thanks to large number of machined and drilled surfaces. Casing shapes and thicknesses optimised by FEM analysis for superior structural rigidity, low acoustic emissions and reduced weight.
• HDO 130 ... HDO 180: spheroidal graphite cast iron or electrically-welded steel body made up of two half-casings, split along the same plane as the shafts. This design makes maintenance operations quick and economical. Casing shapes and thicknesses optimised by FEM analysis for superior structural rigidity, low acoustic emissions and reduced weight.
• Case hardened, tempered and ground finished alloyed steel bevel and helical gears, with corrected profiles for:
- more silent operation and smoother running of input gears
- maximum transmissible torque from final reduction stages
• Casehardened and ground finished input shafts; output shafts in extremely rigid hardened and tempered steel.





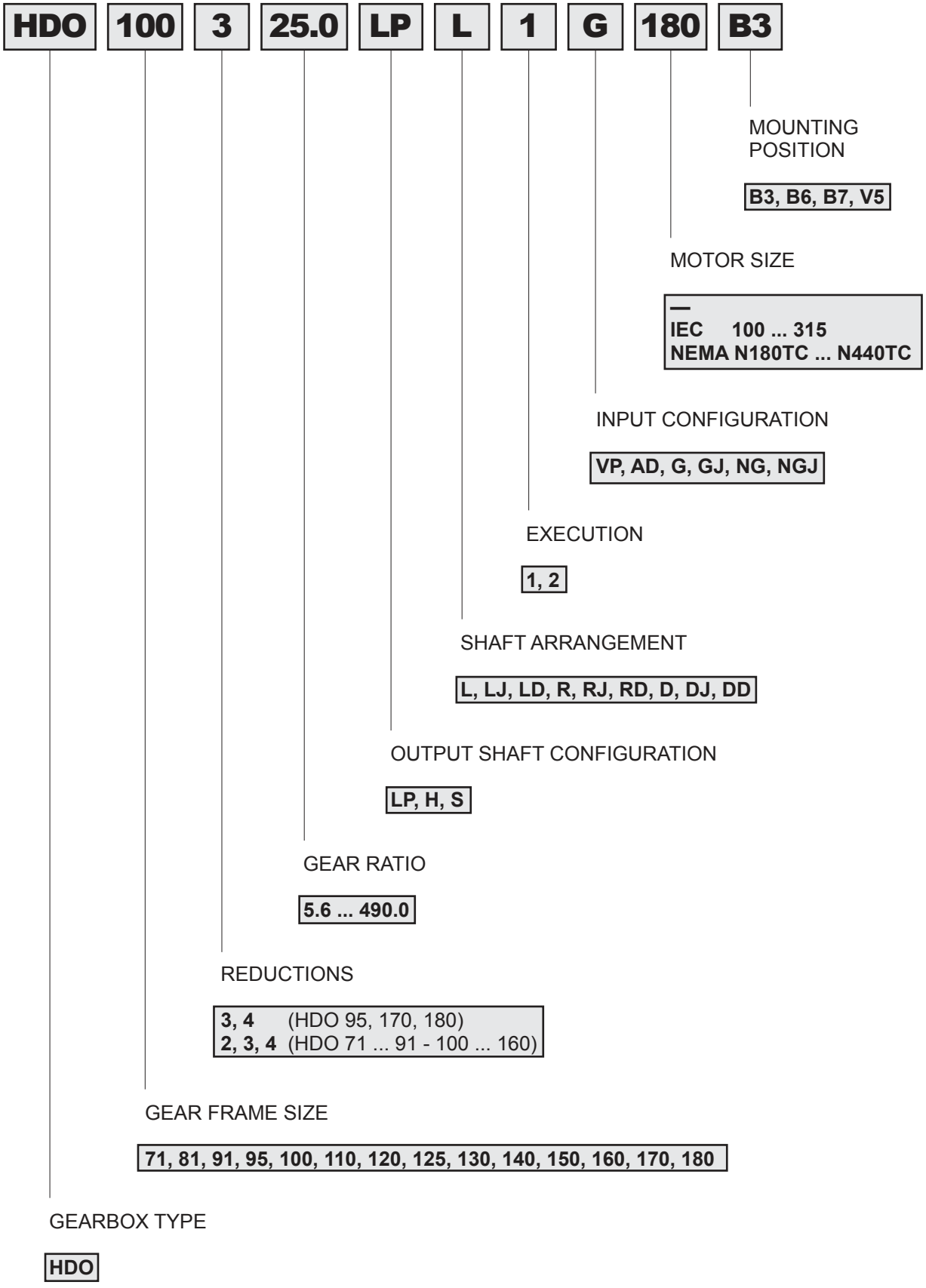
• Input shaft configurations:
Solid input shaft on same plane as or orthogonal to gear shafts, even simultaneously.Shaft end according to UNI/ISO 775-88 standards.
Provision for motor mounting with coupling bell and flexible joint.
• Output shaft configurations:
- solid, single or double-extension output shaft with ends conforming to UNI/ISO 775-88 standards
- hollow shaft with keyway
- hollow shaft with shrink disc
• Large, leading brand taper roller or self aligning roller bearings capable of withstanding high external loads.

• A wide range of gearbox customisation options available upon request, including:
- auxiliary cooling/heating devices
- forced lubrication systems
- backstop device
- mounting flanges or sleeves
- seals and gaskets in various types and materials
- sensors
- dry-well device for vertical shaft installations
- fixing elements



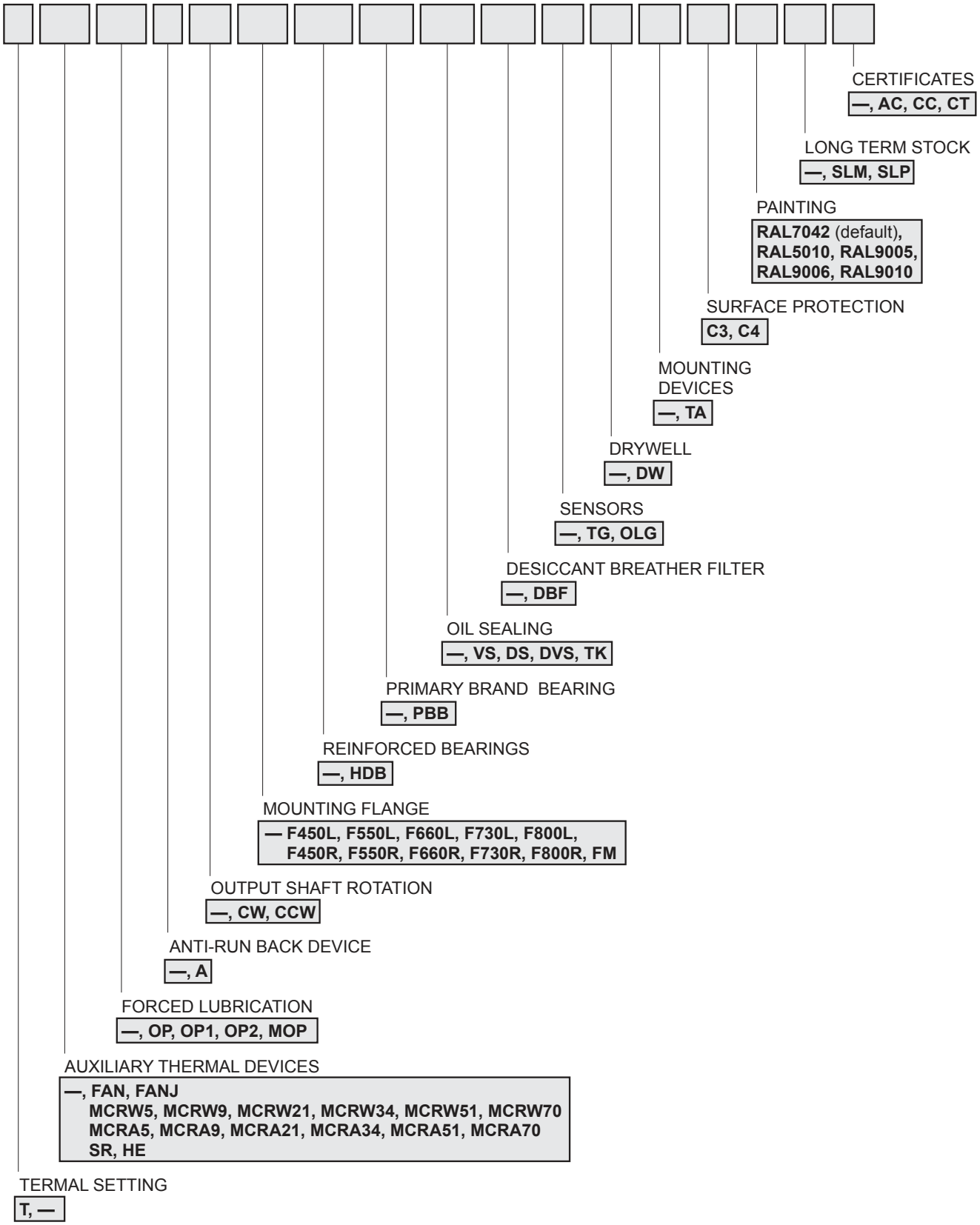
26 PRODUCT CONFIGURATIONS

26.1 BASE VARIANTS



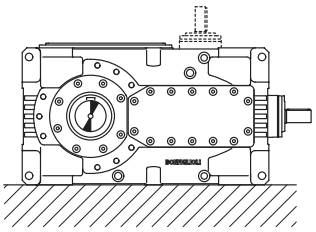
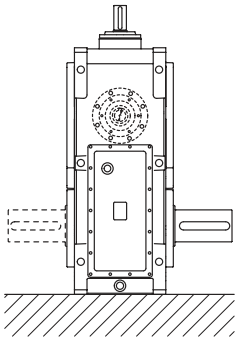
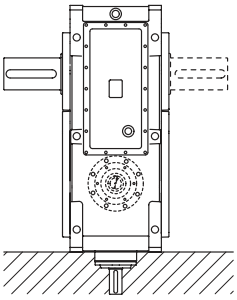
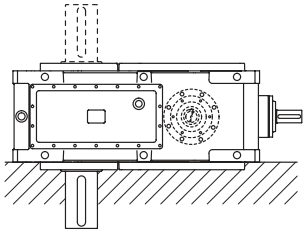
REMARK: For 170 - 180 size selection and verification please contact Bonfiglioli Technical Service.

26.2 OPTIONAL VARIANTS



REMARK: The multiple selection of some of the variants may be subject to technical or dimensional constraints. Consult with the factory to have your selection approved.

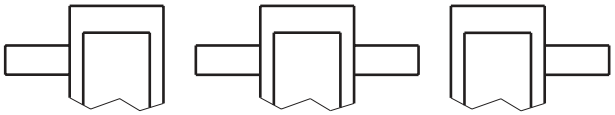
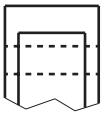
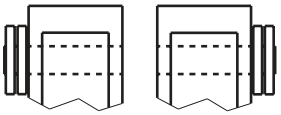
26.3 MOUNTING POSITION

B3	B6	B7	V5
			
	⛔ HDO 170, HDO 180		

If necessary, the sizes HDO 71-81-91-95 in position B3 can be used with the inspection cover on the bottom side (B3 flip over). In this case it will be necessary for the installer to reverse the position of some plugs to ensure proper lubrication. For this operation please refer to the Operation and Maintenance Manual. This operation has to be evaluated taking into consideration its compatibility with the individual variants (fast part **J** configuration) and options **(SR, HE, TG, OLG)** by consulting our Technical Service.

26.4 INPUT AND OUTPUT CONFIGURATION

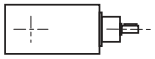
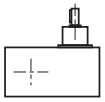
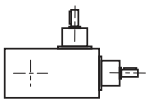
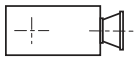
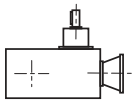
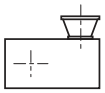
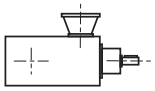
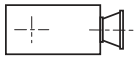
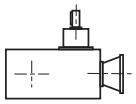
26.4.1 OUTPUT SHAFT CONFIGURATION

LP	H	S
		

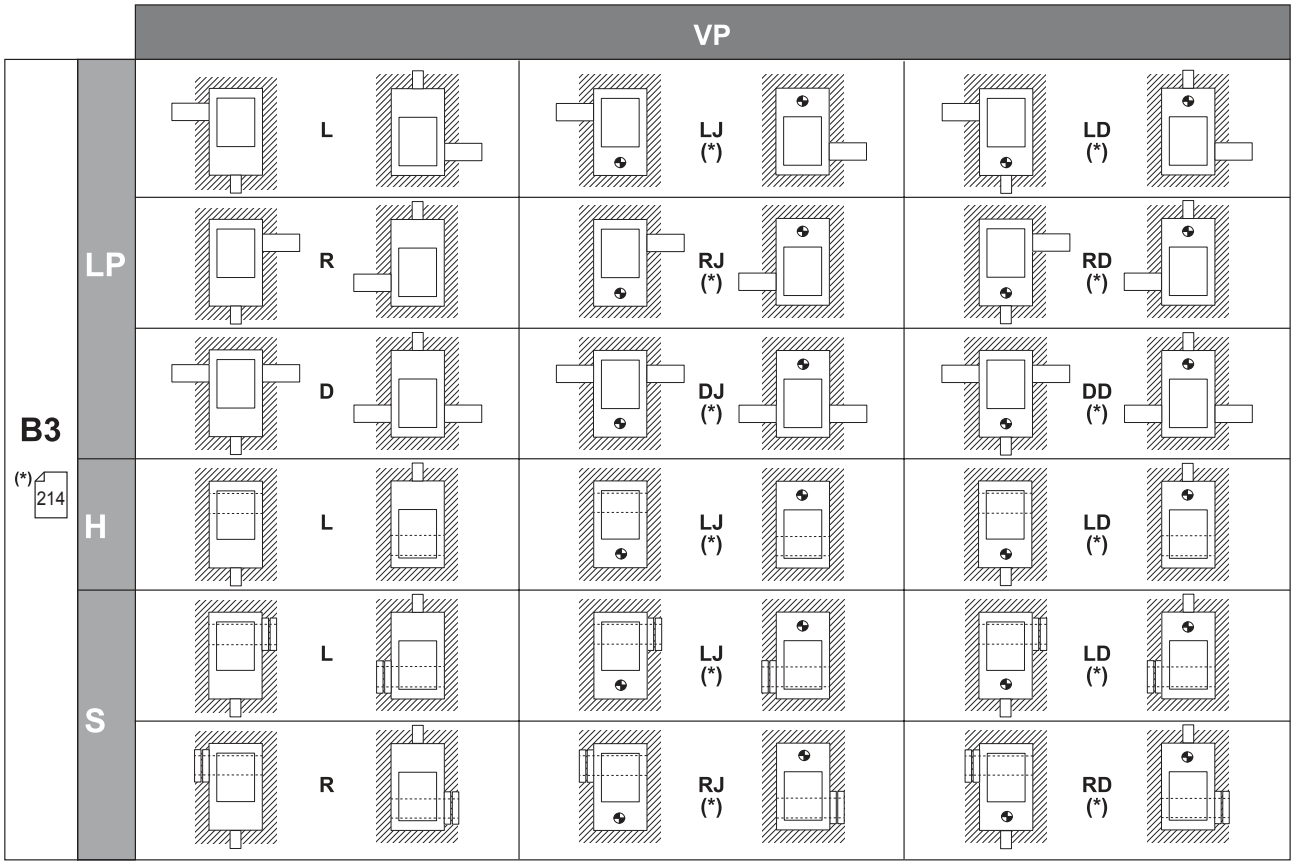
26.4.2 INPUT CONFIGURATION

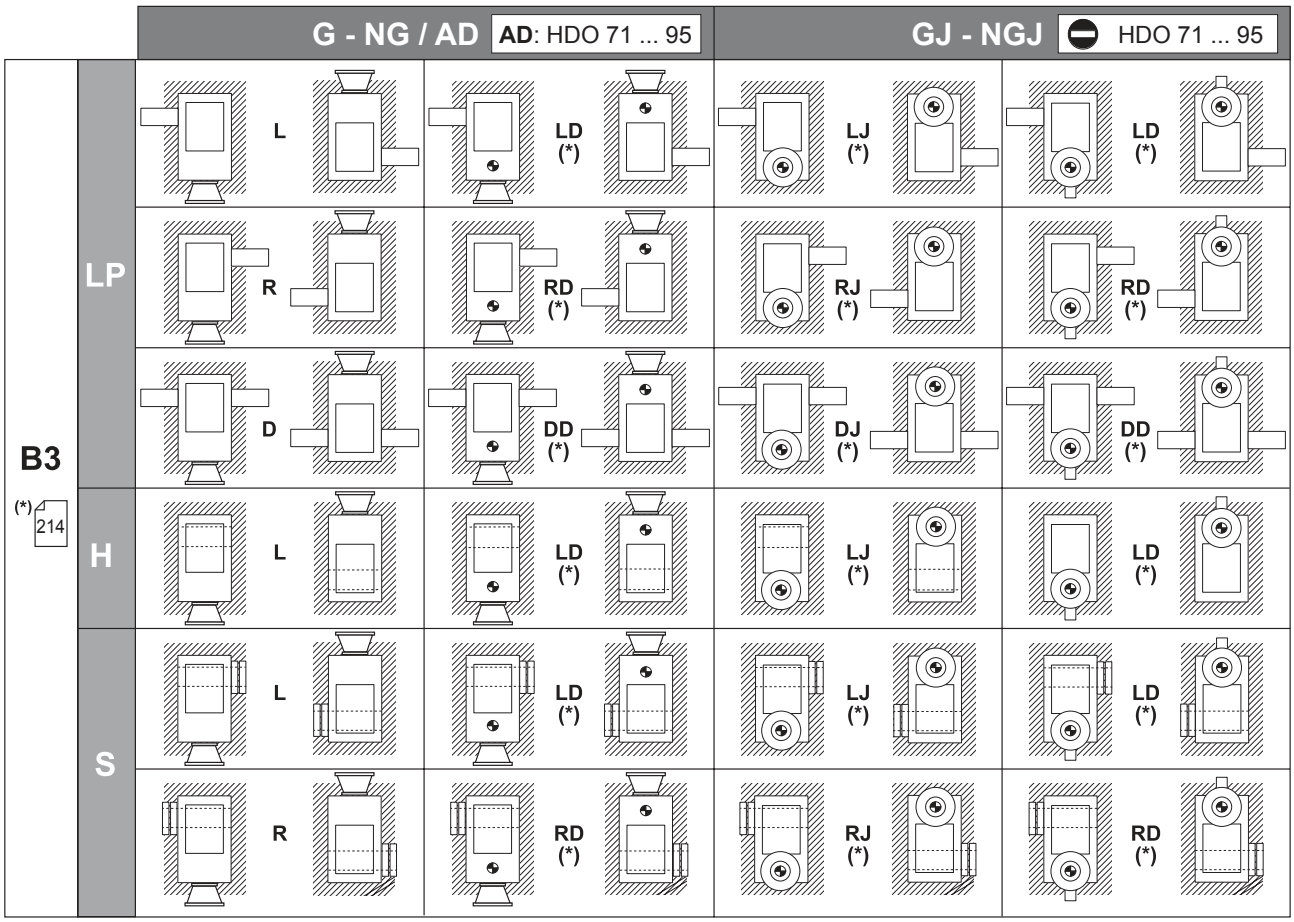
On the input side the gear unit can be arranged in either one of the configurations described here after:

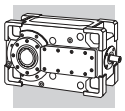
- **Solid input shaft**, single- or double-sided – Specify **VP**
- **Motor mounting through bell housing IEC or NEMA and flexible coupling.** The option is designated **G/NG** or **GJ/NGJ** depending on what side of the gear unit the coupling is mounted. The flexible coupling is within the scope for supply.
- **Motor mounting for direct coupling** to an electric motor normalized in IM B5 construction form. It is only available for the HDO 71 ... 95 gearboxes in the three-stage reduction version - Specify **AD**.

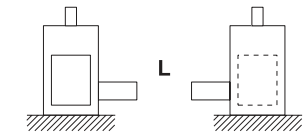
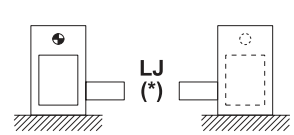
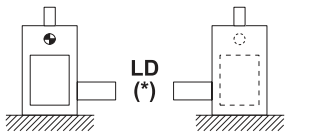
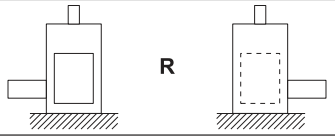
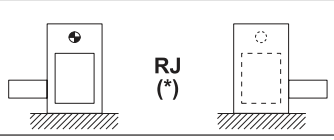
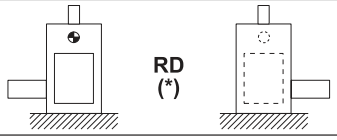
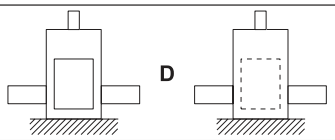
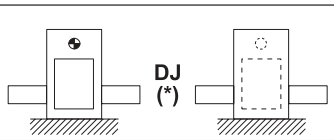
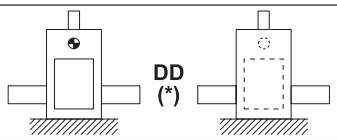
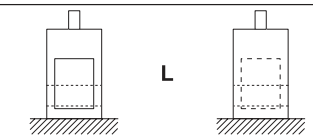
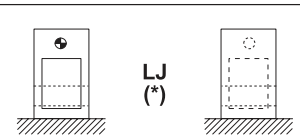
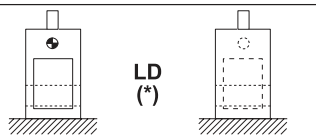
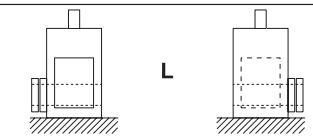
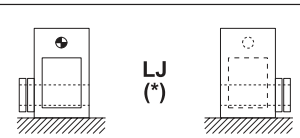
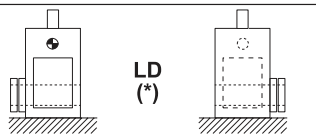
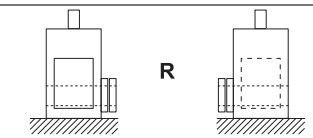
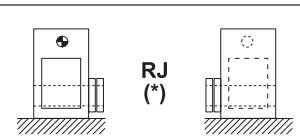
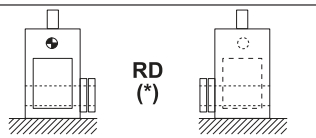
VP			
G **NG**		⛔	
GJ **NGJ**	⛔	 ⛔ HDO 71 ... 95	 ⛔ HDO 71 ... 95
AD	 HDO 71 ... 95	⛔ HDO 71 ... 95	 HDO 71 ... 95

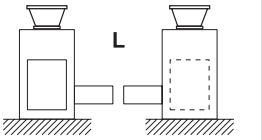
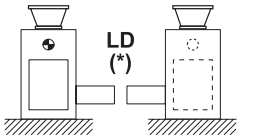
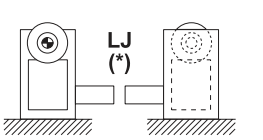
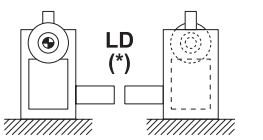
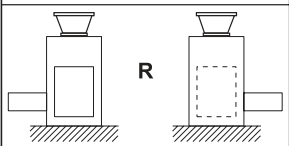
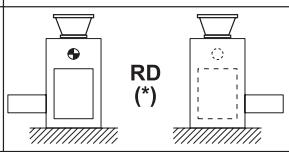
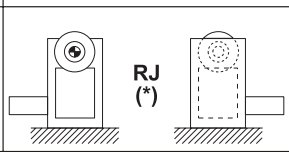
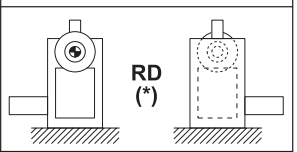
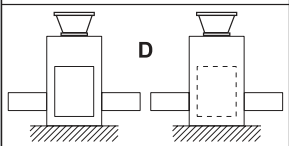
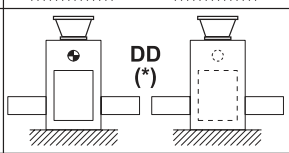
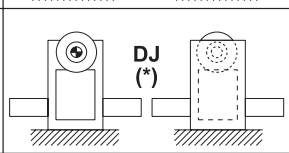
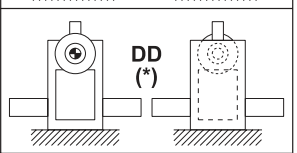
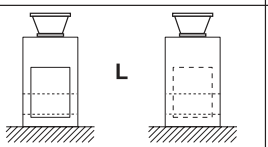
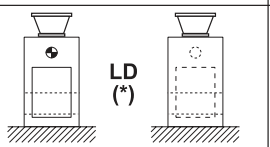
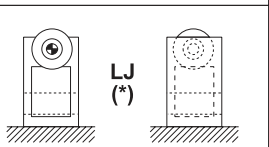
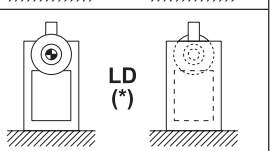
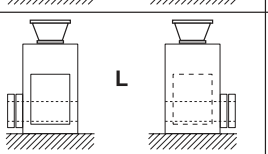
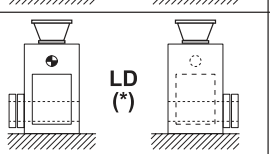
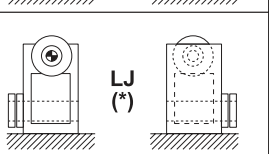
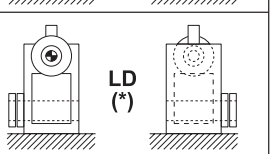
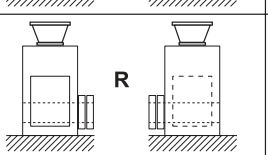
26.4.3 SHAFT ARRANGEMENT

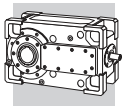






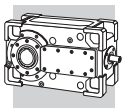
		VP		
B6 (*) 214	LP	 L	 LJ (*)	 LD (*)
		 R	 RJ (*)	 RD (*)
		 D	 DJ (*)	 DD (*)
	H	 L	 LJ (*)	 LD (*)
	S	 L	 LJ (*)	 LD (*)
		 R	 RJ (*)	 RD (*)

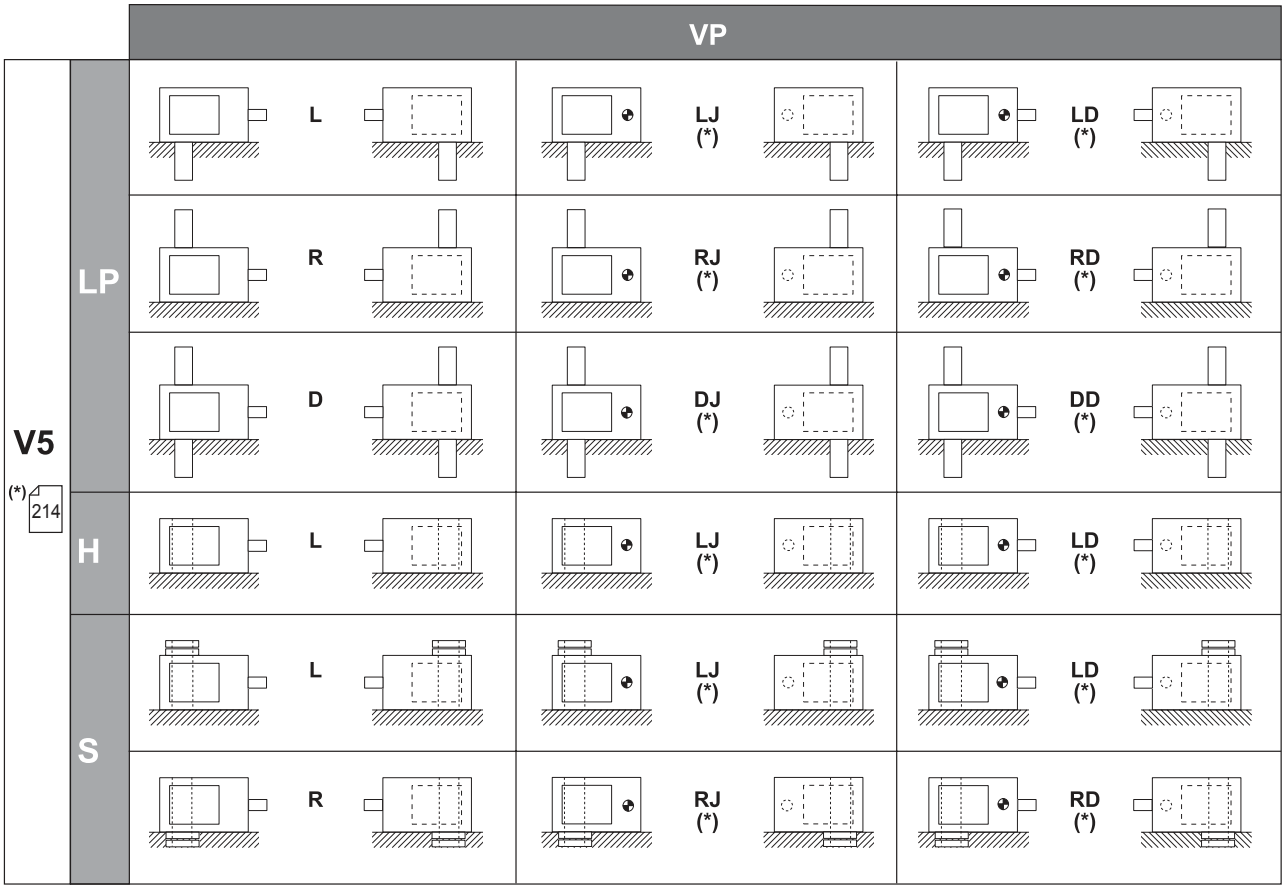
		G - NG / AD **AD**: HDO 71 ... 95		GJ - NGJ HDO 71 ... 95	
B6 (*) 214	LP	 L	 LD (*)	 LJ (*)	 LD (*)
		 R	 RD (*)	 RJ (*)	 RD (*)
		 D	 DD (*)	 DJ (*)	 DD (*)
	H	 L	 LD (*)	 LJ (*)	 LD (*)
	S	 L	 LD (*)	 LJ (*)	 LD (*)
		 R	RD (*)	RJ (*)	RD (*)

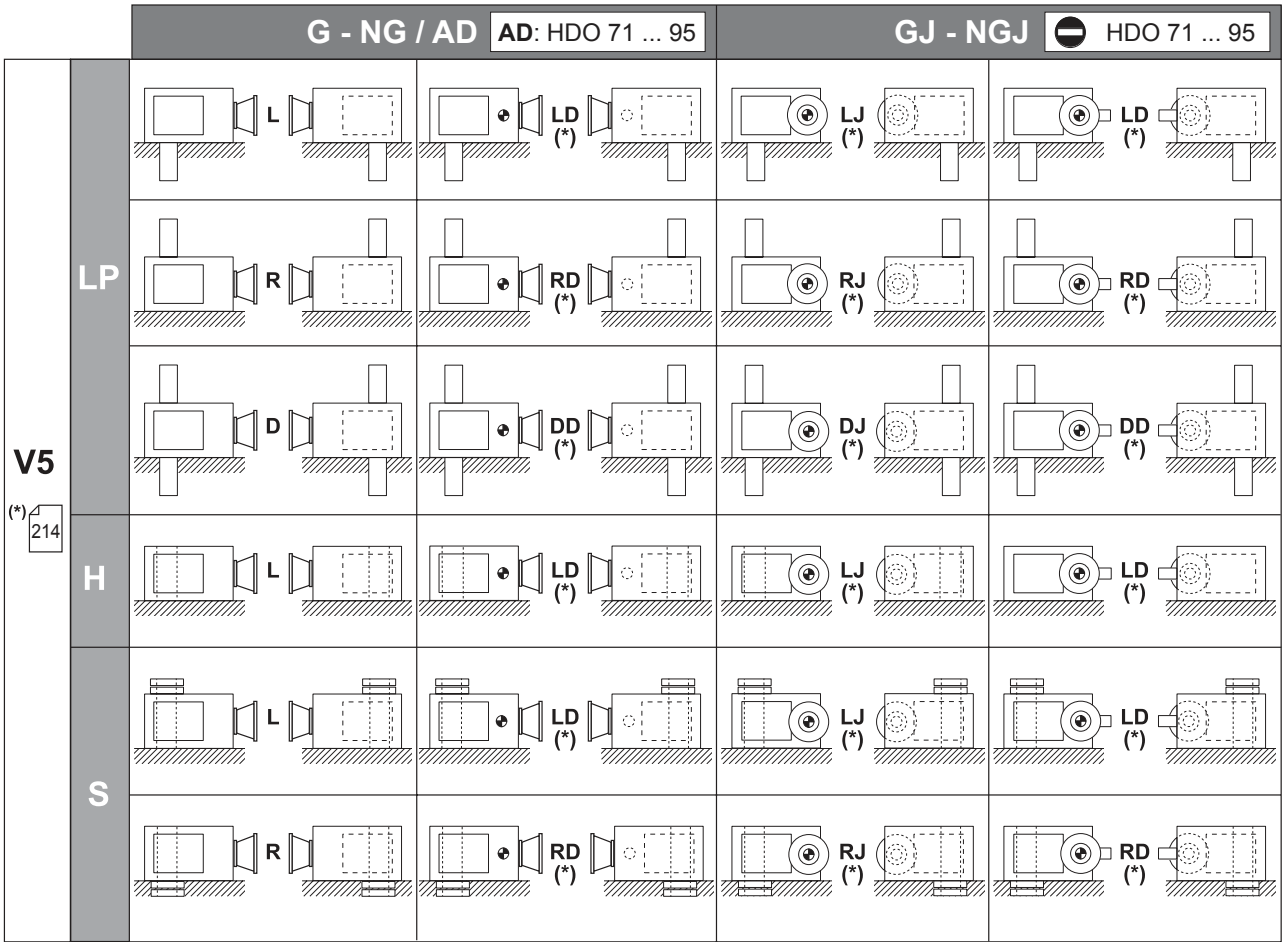


		VP		
B7 (*) 214	LP	L	LJ (*)	LD (*)
		R	RJ (*)	RD (*)
		D	DJ (*)	DD (*)
	H	L	LJ (*)	LD (*)
	S	L	LJ (*)	LD (*)
		R	RJ (*)	RD (*)

		G - NG / AD **AD**: HDO 71 ... 95		GJ - NGJ ⊖ HDO 71 ... 95	
B7 (*) 214	LP	L	LD (*)	LJ (*)	LD (*)
		R	RD (*)	RJ (*)	RD (*)
		D	DD (*)	DJ (*)	DD (*)
	H	L	LD (*)	LJ (*)	LD (*)
	S	L	LD (*)	LJ (*)	LD (*)
		R	RD (*)	RJ (*)	RD (*)



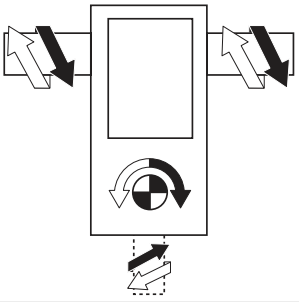
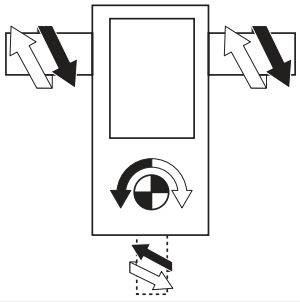

VP
V5
(*) 214
LP
H
S
L
LJ (*)
LD (*)
R
RJ (*)
RD (*)
D
DJ (*)
DD (*)

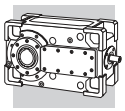

G - NG / AD
AD: HDO 71 ... 95
GJ - NGJ
HDO 71 ... 95
V5
(*) 214
LP
H
S
L
LD (*)
LJ (*)
R
RD (*)
RJ (*)
D
DD (*)
DJ (*)

The gear ratios listed below are those that are not available for the configurations marked with (*) in the charts here before.

(*)	Configurations not possible
	i
HDO 71 2	⊖
HDO 71 4	⊖
HDO 81 2	⊖
HDO 81 4	⊖
HDO 91 2	⊖
HDO 91 3	i = 30.6
HDO 91 4	⊖
HDO 95 2	⊖
HDO 95 3	34.9 ≤ i ≤ 40.5
HDO 95 4	⊖
HDO 100 2	⊖
HDO 100 4	⊖
HDO 110 2	⊖
HDO 110 4	⊖
HDO 120 2	⊖
HDO 120 3	i = 24.6
HDO 120 4	⊖
HDO 125 2	⊖
HDO 125 3	27.7 ≤ i ≤ 35.8
HDO 125 4	⊖
HDO 130 2	⊖
HDO 130 4	⊖
HDO 140 2	⊖
HDO 140 4	⊖
HDO 150 2	⊖
HDO 150 3	15.6 ≤ i ≤ 25.4
HDO 150 4	⊖
HDO 160 2	⊖
HDO 160 3	17.7 ≤ i ≤ 31.3
HDO 160 4	⊖
HDO 170	⊖
HDO 180	⊖

26.5 EXECUTION

HDO□ 1	HDO□ 2
	

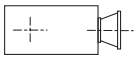


26.6 MOTOR AVAILABILITY

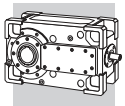
The following charts list the motor/gearbox combinations that are geometrically feasible. Variants are only applicable if either an AD (direct motor mounting) or a G/NG - GJ/NGJ input configuration (coupling through bell housing IEC or NEMA and flexible coupling) were previously specified within the ordering code.

Because of standardisation, the rated power of the electric motor selected might be greater than nominal power Pn_1 of choosen gearbox. Make sure that the electric motor will never develop the extra power at any stage of the operating cycle. If you have any doubts about the validity of the application data, or uncertainty concerning the actual load pattern, install a torque limiting device or proportionally revise the applicable service factor.

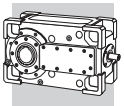
	Input configuration				
	AD				
	112	132	160	180	200
HDO 71 3	—	X	X	X	X
HDO 81 3	—	—	X	X	X
HDO 91 3	—	—	—	X	X
HDO 91 4	—	—	X	X	X
HDO 95 3	—	—	—	X	X
HDO 95 4	—	—	X	X	X

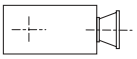


		Input configuration								
		G								
		100	112	132	160	180	200	225	250	280
HDO 71 2	i =	—	—	—	—	—	5.6_14.6	5.6_14.6	—	—
HDO 71 3		—	—	15.9_69.2	15.9_69.2	15.9_69.2	15.9_69.2	15.9_69.2	—	—
HDO 71 4		77.0_475.4	77.0_475.4	77.0_475.4	77.0_475.4	77.0_475.4	—	—	—	—
HDO 81 2		—	—	—	—	—	5.5_14.7	5.5_14.7	5.5_14.7	5.5_14.7
HDO 81 3		—	—	—	15.5_69.2	15.5_69.2	15.5_69.2	15.5_69.2	15.5_69.2	15.5_69.2
HDO 81 4		78.3_473.3	78.3_473.3	78.3_473.3	78.3_473.3	78.3_473.3	78.3_473.3	—	—	—
HDO 91 2		—	—	—	—	—	7.4_15.9	7.4_15.9	7.4_15.9	7.4_15.9
HDO 91 3		—	—	—	18.6_66.1	18.6_66.1	18.6_66.1	18.6_66.1	18.6_66.1	18.6_66.1
HDO 91 4		—	82.0_489.3	82.0_489.3	82.0_489.3	82.0_489.3	82.0_489.3	82.0_489.3	—	—
HDO 95 3		—	—	—	21.2_72.3	21.2_72.3	21.2_72.3	21.2_72.3	21.2_72.3	21.2_72.3
HDO 95 4		—	81.6_489.7	81.6_489.7	81.6_489.7	81.6_489.7	81.6_489.7	81.6_489.7	—	—

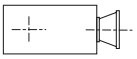


		Input configuration								
		G								
		112	132	160	180	200	225	250	280	315
HDO 100_2		—	—	—	—	—	—	5.8_13.5	5.8_13.5	5.8_13.5
HDO 100_3		—	—	20.2_67.5	20.2_67.5	20.2_67.5	20.2_67.5	14.0_67.5	14.0_67.5	14.0_67.5
HDO 100_4		160.0_344.2	70.8_344.2	70.8_344.2	70.8_344.2	70.8_139.8	70.8_139.8	—	—	—
HDO 110_2		—	—	—	—	—	—	—	6.4_15.5	6.4_15.5
HDO 110_3		—	—	22.0_77.5	22.0_77.5	22.0_77.5	22.0_77.5	22.0_77.5	18.9_77.5	18.9_77.5
HDO 110_4		137.1_395.0	137.1_395.0	77.4_395.0	77.4_395.0	77.4_121.7	77.4_121.7	—	—	—
HDO 120_2		—	—	—	—	—	—	—	—	6.6_15.5
HDO 120_3		—	—	—	—	28.3_78.6	28.3_78.6	28.3_78.6	17.3_78.6	17.3_78.6
HDO 120_4		—	87.0_400.6	87.0_400.6	87.0_400.6	87.0_162.2	87.0_162.2	—	—	—
HDO 125_2		—	—	—	—	—	—	—	—	7.4_16.9
HDO 125_3		—	—	—	—	38.8_85.9	38.8_85.9	38.8_85.9	19.2_85.9	19.2_85.9
HDO 125_4		—	97.0_438.0	97.0_438.0	97.0_438.0	97.0_178.0	97.0_178.0	—	—	—
HDO 130_2	i =	—	—	—	—	—	—	—	—	5.7_13.6
HDO 130_3		—	—	—	—	—	—	15.2_67.1	15.2_67.1	15.2_67.1
HDO 130_4		—	—	71.5_335.6	71.5_335.6	71.5_335.6	71.5_335.6	71.5_335.6	71.5_335.6	—
HDO 140_2		—	—	—	—	—	—	—	—	6.6_15.7
HDO 140_3		—	—	—	—	—	—	17.7_77.3	17.7_77.3	17.7_77.3
HDO 140_4		—	—	82.3_386.6	82.3_386.6	82.3_386.6	82.3_386.6	82.3_386.6	82.3_386.6	—
HDO 150_2		—	—	—	—	—	—	—	—	—
HDO 150_3		—	—	—	—	—	—	—	15.6_60.8	15.6_60.8
HDO 150_4		—	—	—	101.8_238.8	101.8_238.8	101.8_238.8	66.9_238.8	66.9_238.8	66.9_238.8
HDO 160_2		—	—	—	—	—	—	—	—	—
HDO 160_3		—	—	—	—	—	—	—	17.7_68.6	17.7_68.6
HDO 160_4		—	—	—	115.2_269.7	115.2_269.7	115.2_269.7	75.9_269.7	75.9_269.7	75.9_269.7
HDO 170		BONFIGLIOLI TECHNICAL SERVICE								
HDO 180										

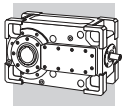




		Input configuration						
		NG						
		N180TC	N210TC	N250TC	N280TC	N320TC	N360TC	N400TC
HDO 71 2	i =	—	—	—	—	5.6_14.6	5.6_14.6	—
HDO 71 3		—	15.9_69.2	15.9_69.2	15.9_69.2	15.9_69.2	15.9_69.2	—
HDO 81 2		—	—	—	—	5.5_14.7	5.5_14.7	5.5_14.7
HDO 81 3		—	—	15.5_69.2	15.5_69.2	15.5_69.2	15.5_69.2	15.5_69.2
HDO 91 2		—	—	—	—	7.4_15.9	7.4_15.9	7.4_15.9
HDO 91 3		—	—	18.6_66.1	18.6_66.1	18.6_66.1	18.6_66.1	18.6_66.1
HDO 91 4		82.0_489.3	82.0_489.3	82.0_489.3	82.0_489.3	82.0_489.3	82.0_489.3	—
HDO 95 3		—	—	21.2_72.3	21.2_72.3	21.2_72.3	21.2_72.3	21.2_72.3
HDO 95 4		81.6_489.7	81.6_489.7	81.6_489.7	81.6_489.7	81.6_489.7	81.6_489.7	—



		Input configuration							
		NG							
		N180TC	N210TC	N250TC	N280TC	N320TC	N360TC	N400TC	N440TC
HDO 100_2	i =	—	—	—	—	—	5.8_13.5	5.8_13.5	—
HDO 100_3		—	—	20.2_67.5	20.2_67.5	20.2_67.5	14.0_67.5	14.0_67.5	—
HDO 100_4		160.0_344.2	70.8_344.2	70.8_344.2	70.8_344.2	70.8_139.8	70.8_139.8	—	—
HDO 110_2		—	—	—	—	—	—	6.4_15.5	—
HDO 110_3		—	—	22.0_77.5	22.0_77.5	22.0_77.5	22.0_77.5	18.9_77.5	—
HDO 110_4		137.1_395.0	77.4_395.0	77.4_395.0	77.4_395.0	77.4_121.7	77.4_121.7	—	—
HDO 120_2		—	—	—	—	—	—	—	6.6_15.5
HDO 120_3		—	—	—	—	28.3_78.6	28.3_78.6	17.3_78.6	17.3_78.6
HDO 120_4		—	87.0_400.6	87.0_400.6	87.0_400.6	87.0_162.2	87.0_162.2	—	—
HDO 125_2		—	—	—	—	—	—	—	7.4_16.9
HDO 125_3		—	—	—	—	38.8_85.9	38.8_85.9	19.2_85.9	19.2_85.9
HDO 125_4		—	97.0_438.0	97.0_438.0	97.0_438.0	97.0_178.0	97.0_178.0	—	—
HDO 130_2		—	—	—	—	—	—	—	5.7_13.6
HDO 130_3		—	—	—	—	—	15.2_67.1	15.2_67.1	15.2_67.1
HDO 130_4		—	—	71.5_335.6	71.5_335.6	71.5_335.6	71.5_335.6	71.5_335.6	—
HDO 140_2		—	—	—	—	—	—	—	6.6_15.7
HDO 140_3		—	—	—	—	—	17.7_77.3	17.7_77.3	17.7_77.3
HDO 140_4		—	—	82.3_386.6	82.3_386.6	82.3_386.6	82.3_386.6	82.3_386.6	—



		Input configuration						
		GJ						
		160	180	200	225	250	280	315
HDO 100_2		⛔						
HDO 100_3		20.2_67.5	20.2_67.5	20.2_67.5	20.2_67.5	14.0_67.5	14.0_67.5	14.0_67.5
HDO 100_4		⛔						
HDO 110_2		⛔						
HDO 110_3		22.0_77.5	22.0_77.5	22.0_77.5	22.0_77.5	22.0_77.5	18.9_77.5	18.9_77.5
HDO 110_4		⛔						
HDO 120_2		⛔						
HDO 120_3		—	—	28.3_78.6	28.3_78.6	28.3_78.6	17.3_78.6 ⛔ (24.6)	17.3_78.6 ⛔ (24.6)
HDO 120_4		⛔						
HDO 125_2		⛔						
HDO 125_3		—	—	38.8_85.9	38.8_85.9	38.8_85.9	19.2_85.9 ⛔ (27.7_33.0_35.8)	19.2_85.9 ⛔ (27.7_33.0_35.8)
HDO 125_4		⛔						
HDO 130_2	i =	⛔						
HDO 130_3		—	—	—	—	15.2_67.1	15.2_67.1	15.2_67.1
HDO 130_4		⛔						
HDO 140_2		⛔						
HDO 140_3		—	—	—	—	17.7_77.3	17.7_77.3	17.7_77.3
HDO 140_4		⛔						
HDO 150_2		⛔						
HDO 150_3		—	—	—	—	—	28.2_60.8	28.2_60.8
HDO 150_4		⛔						
HDO 160_2		⛔						
HDO 160_3		—	—	—	—	—	34.9_68.6	34.9_68.6
HDO 160_4		⛔						
HDO 170		⛔						
HDO 180								

		Input configuration							
		NGJ							
		N180TC	N210TC	N250TC	N280TC	N320TC	N360TC	N400TC	N440TC
HDO 100_3		—	—	20.2_67.5	20.2_67.5	20.2_67.5	14.0_67.5	14.0_67.5	—
HDO 110_3		—	—	22.0_77.5	22.0_77.5	22.0_77.5	22.0_77.5	18.9_77.5	—
HDO 120_3		—	—	—	—	28.3_78.6	28.3_78.6	17.3_78.6 ⛔ (24.6)	17.3_78.6 ⛔ (24.6)
HDO 125_3	i =	—	—	—	—	38.8_85.9	38.8_85.9	19.2_85.9 ⛔ (27.7_33.0_35.8)	19.2_85.9 ⛔ (27.7_33.0_35.8)
HDO 130_3		—	—	—	—	—	15.2_67.1	15.2_67.1	15.2_67.1
HDO 140_3		—	—	—	—	—	17.7_77.3	17.7_77.3	17.7_77.3

26.7 OPTIONAL VARIANTS

26.7.1 THERMAL SETTING

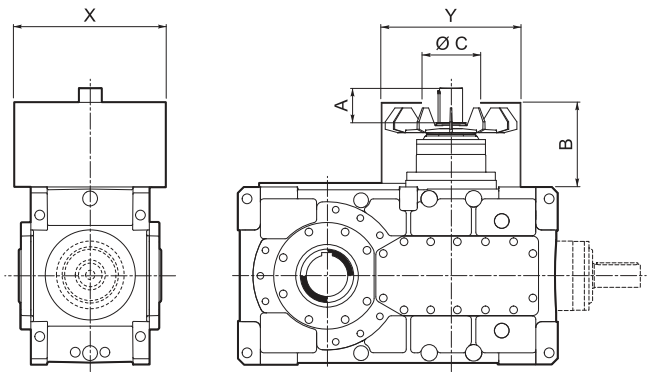
For the HDO series, only two-stage reduction sizes 71-81-91 are now available as a standard ("**T**" variant) in the optimised version with increased power transmission capacity of the gear unit (Thermal Power). However, it is possible to deselect this option ("-" variant) only in compliance with specific requirements and subject to application verification by contacting Bonfiglioli's technical service.

26.7.2 AUXILIARY THERMAL DEVICES

26.7.2.1 FORCED VENTILATION

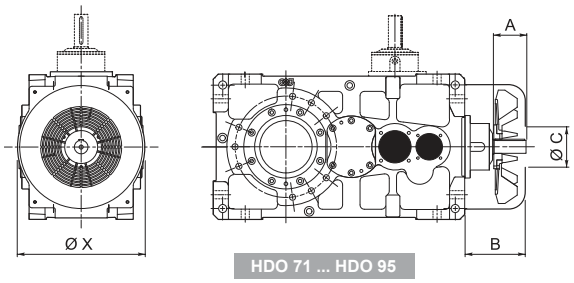
Improved heat dissipation can be achieved on HDO gearboxes by keying a cooling fan on to the gearbox input shaft.
Specify the **FAN** option to have the fan installed on the shaft in the same plane. The alternative option, **FANJ**, with an orthogonally mounted fan, is only available with three stage gearboxes.
In combination with some configuration or mounting position forced ventilation may not be available along with forced lubrication devices - option OP... or MOP.
For frame sizes HDO 71 ... HDO 95 the forced ventilation FAN option is not compatible with the TK option of Taconite seals.
The effectiveness of forced ventilation is drastically reduced in intermittent duty applications and also below drive speeds of $n_1 = 900\ min^{-1}$.
In such cases, other auxiliary cooling devices should be used to increase the thermal capacity of the gearbox.

FANJ

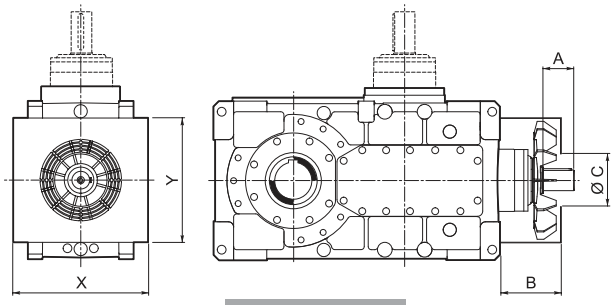


	A [mm]	B [mm]	C [mm]	X [mm]	Y [mm]
HDO 100 3	82	207	180	460	440
HDO 110 3	82	207	180	460	440
HDO 120 3	82	172	180	480	480
HDO 125 3	82	172	180	480	480
HDO 130 3	105	222	230	600	600
HDO 140 3	105	222	230	600	600
HDO 150 3					
HDO 160 3					
HDO 170					
HDO 180					

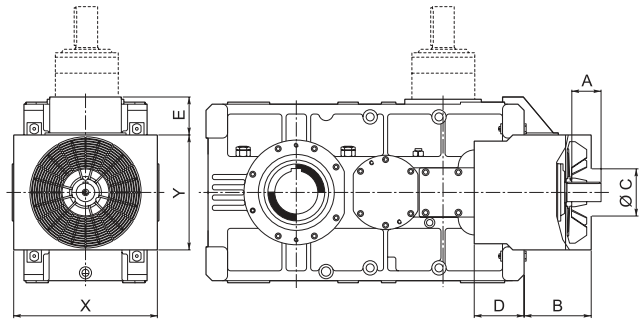
FAN



HDO 71 ... HDO 95



HDO 100 ... HDO 140

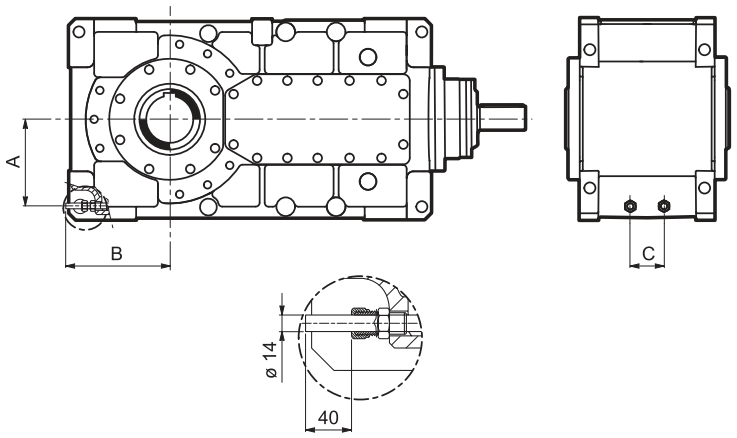


HDO 150 - HDO 160

	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	X [mm]	Y [mm]
HDO 71_2	82	151.5	140	—	—	345	—
HDO 71_3	58	152	140	—	—	345	—
HDO 81_2	82	161.5	140	—	—	345	—
HDO 81_3	82	162	140	—	—	345	—
HDO 91_2	82	208.5	140	—	—	440	—
HDO 91_3	82	209	140	—	—	440	—
HDO 91_4	58	209	140	—	—	440	—
HDO 95_3	82	209	140	—	—	440	—
HDO 95_4	58	209	140	—	—	440	—
HDO 100_2	105	207	180	—	—	460	424
HDO 100_3	82	207	180	—	—	460	424
HDO 100_4	58	207	180	—	—	460	424
HDO 110_2	105	207	180	—	—	460	424
HDO 110_3	82	207	180	—	—	460	424
HDO 110_4	58	207	180	—	—	460	424
HDO 120_2	105	232	180	—	—	480	460
HDO 120_3	82	172	180	—	—	480	460
HDO 120_4	58	172	180	—	—	480	460
HDO 125_2	105	232	180	—	—	480	460
HDO 125_3	82	172	180	—	—	480	460
HDO 125_4	58	172	180	—	—	480	460
HDO 130_2	140	327	230	—	—	600	600
HDO 130_3	105	222	230	—	—	600	600
HDO 130_4	82	287	230	—	—	600	600
HDO 140_2	140	327	230	—	—	600	600
HDO 140_3	105	222	230	—	—	600	600
HDO 140_4	82	287	230	—	—	600	600
HDO 150_2	165	387	230	243	185	700	560
HDO 150_3	130	327	230	243	185	700	560
HDO 150_4	82	297	230	243	185	700	560
HDO 160_2	165	387	230	243	185	700	560
HDO 160_3	130	327	230	243	185	700	560
HDO 160_4	82	297	230	243	185	700	560
HDO 170	BONFIGLIOLI TECHNICAL SERVICE						
HDO 180							

26.7.2.2 HEAT DISSIPATION THROUGH COOLING COIL

The cooling coil option **SR** is designed for integration in a cooling circuit to be provided by the installer.
For optimal efficiency the cooling circuit supply must comply with the following specifications:
- max. pressure 8 bar
- min flow rate 5 l/min for HDO 71 … HDO 95
- min flow rate 10 l/min for HDO 100 … HDO 140
- max. water temperature 20°C



	A [mm]	B [mm]	C [mm]
HDO 71_ SR	147	170	60
HDO 81_ SR	173	190	60
HDO 91_ SR	190	210	60
HDO 95_ SR	215	259	60
HDO 100_ SR	230	285	100
HDO 110_ SR	230	270	100
HDO 120_ SR	258	305	100
HDO 125_ SR	258	305	100
HDO 130_ SR	325	340	100
HDO 140_ SR	325	365	100
HDO 150	BONFIGLIOLI TECHNICAL SERVICE		
HDO 160			
HDO 170			
HDO 180			

26.7.2.3 AUXILIARY COOLING WITH AUTONOMOUS COOLING UNIT

Two types of cooling unit are available, each in a range of sizes providing different cooling capacities. The two types use different cooling media for the oil: MCRW… – water/oil heat exchanger and MCRA… – air/oil heat exchanger.
If an autonomous cooling unit is installed on the advice of the Bonfiglioli Technical Service, no additional forced lubrication devices are required. See section 26.7.2. The following chart shows device availability according to gearbox size.

	MCRW5 MCRA5	MCRW9 MCRA9	MCRW21 MCRA21	MCRW34 MCRA34	MCRW51 MCRA51	MCRW70 MCRA70
HDO 100	X	X				
HDO 110	X	X				
HDO 120	X	X	X (*)			
HDO 125	X	X	X (**)			
HDO 130	X	X	X	X (**)		
HDO 140	X	X	X	X (**)		
HDO 150	X	X	X	X	X (**)	
HDO 160	X	X	X	X	X (**)	
HDO 170	BONFIGLIOLI TECHNICAL SERVICE					
HDO 180						

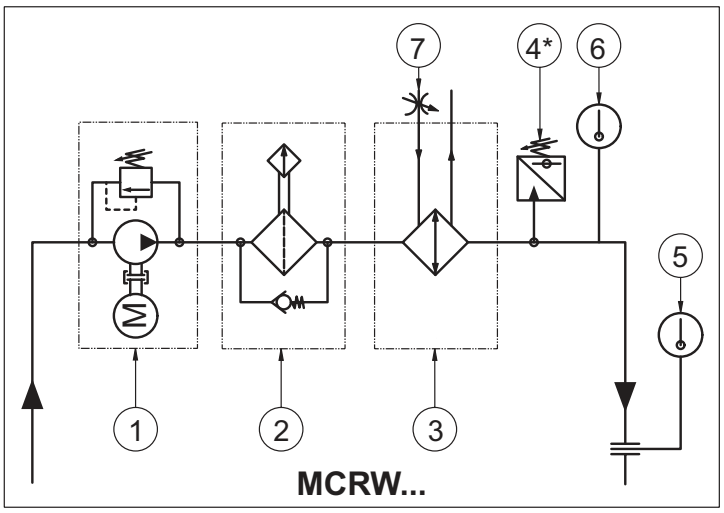
(*) not available for mounting position B3.

(**) not available for double reduction units in the mounting position B3.

The main components of the cooling units are as follows:

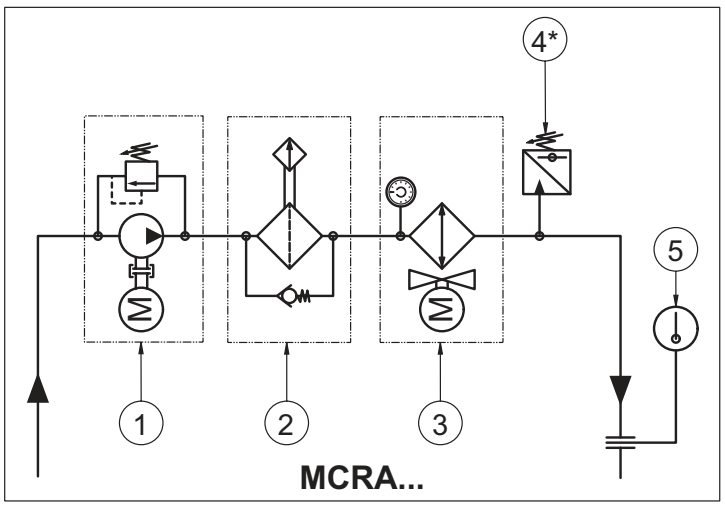
MCRW…

1) motorpump complete with by-pass circuit
2) filter with clogging visual indicator
3) water/oil heat exchanger
4) minimum pressure switch (only available in combination with forced lubrication)
5) maximum temperature thermostat
6) minimum temperature switch
7) electro-valve



MCRA…

1) motorpump complete with by-pass circuit
2) filter with clogging visual indicator
3) air/oil heat exchanger with thermostat
4) minimum pressure switch (only available in combination with forced lubrication)
5) maximum temperature thermostat



General warnings:

MCRW... : provide a water supply system that corresponds to the following specifications:

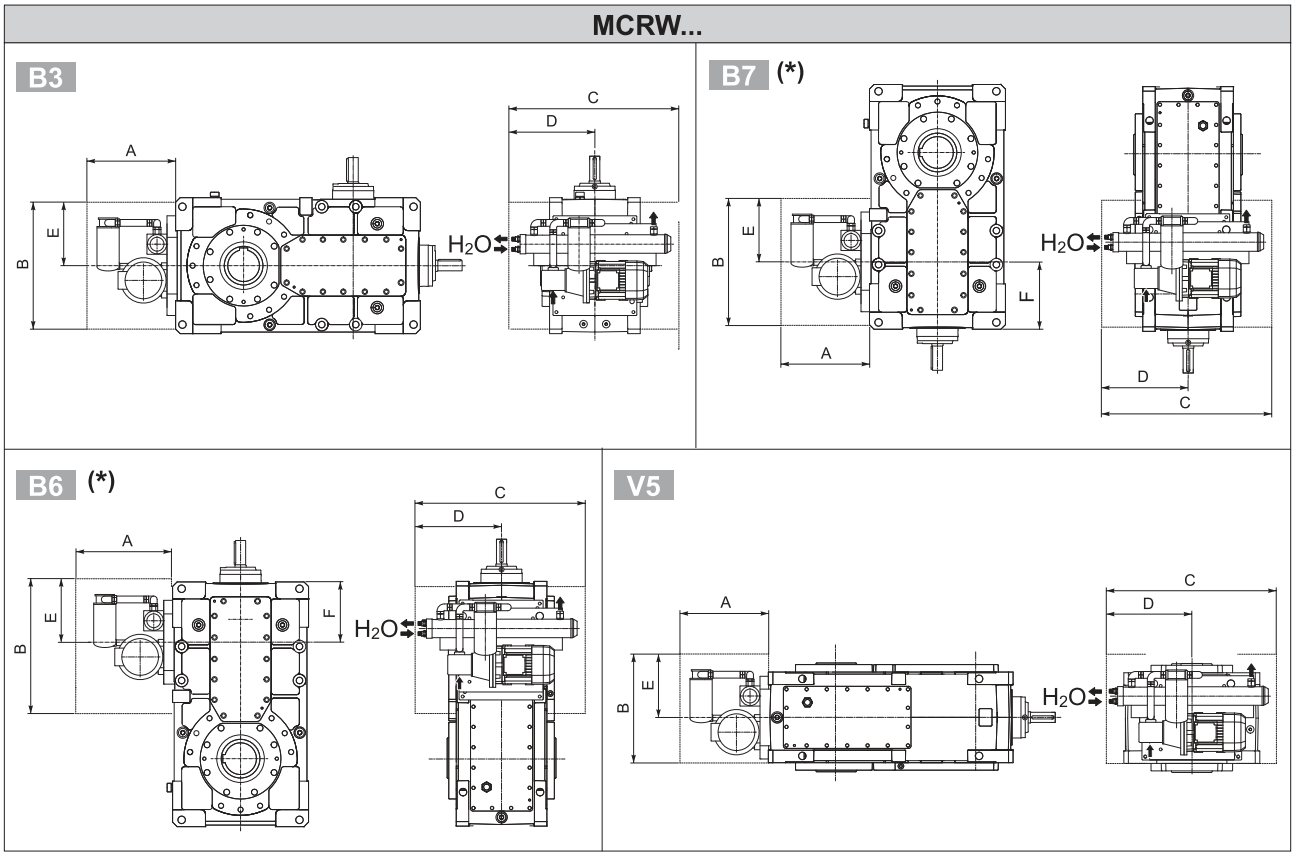
- max. pressure, 10 bar
- maximum delivery temperature, 20°C
- minimum flow rate Q_{H2O} as per the chart:

	MCRW5	MCRW9	MCRW21	MCRW34	MCRW51	MCRW70
Q_{H2O} [l/min]	10	18	31	56	81	BONFIGLIOLI TECHNICAL SERVICE

MCRA... : leave sufficient space around the heat exchanger to ensure an unrestricted air flow.

The cooling units are installed on the gearboxes as shown in the figure below.

MCRW...



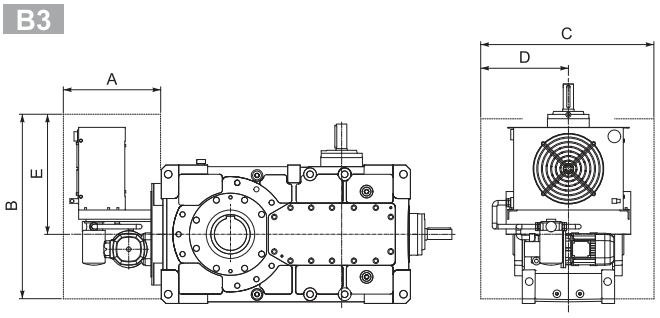
	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]									
						HDO 100 - HDO 110		HDO 120		HDO 125		HDO 130 - HDO 140		HDO 150 - HDO 160	
						2x	3x/4x	2x	3x/4x	2x	3x/4x	2x	3x/4x	2x	3x/4x
MCRW5	360	415	730	365	230	325	270	350	300	BONFIGLIOLI TECHNICAL SERVICE		420	380	475	395
MCRW9	360	380	870	435	195										
MCRW21	400	425	780	390	240										
MCRW34	430	650	1000	500	465										
MCRW51	520	650	1250	625	465										
MCRW70	BONFIGLIOLI TECHNICAL SERVICE														

(*) Units featuring the "J" input configuration have the cooling unit fitted on opposite side as shown.

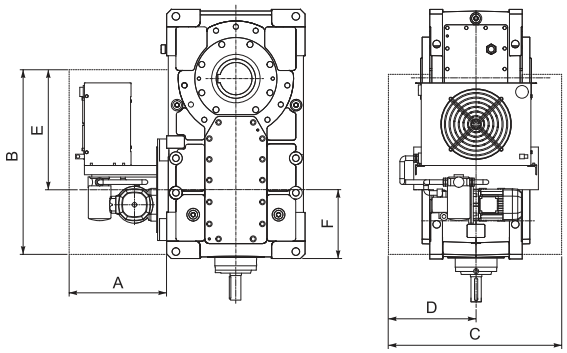
Overall dimensions A, B, C, D and E are indicative only

MCRA...

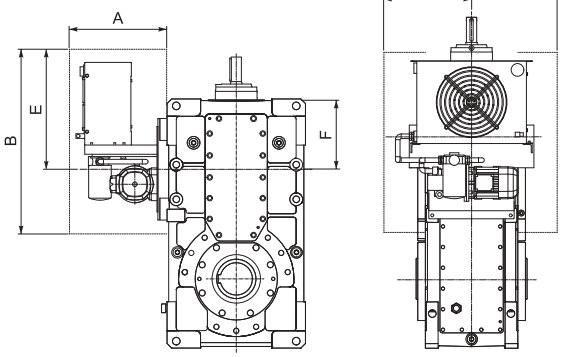
B3



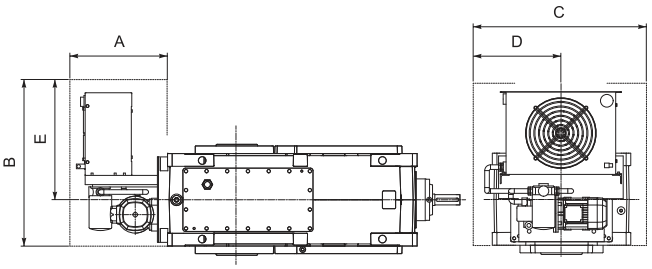
B7 (*)



B6 (*)



V5



	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]								
						HDO 100 - HDO 110		HDO 120		HDO 125		HDO 130 - HDO 140		HDO 150 - HDO 160	
						2x	3x/4x	2x	3x/4x	2x	3x/4x	2x	3x/4x	2x	3x/4x
MCRA5	400	560	500	250	375	325	270	350	300	BONFIGLIOLI TECHNICAL SERVICE		420	380	475	395
MCRA9	435	650	640	320	465										
MCRA21	440	815	700	350	630										
MCRA34	500	920	840	420	735										
MCRA51	560	1075	1000	500	890										
MCRA70	BONFIGLIOLI TECHNICAL SERVICE														

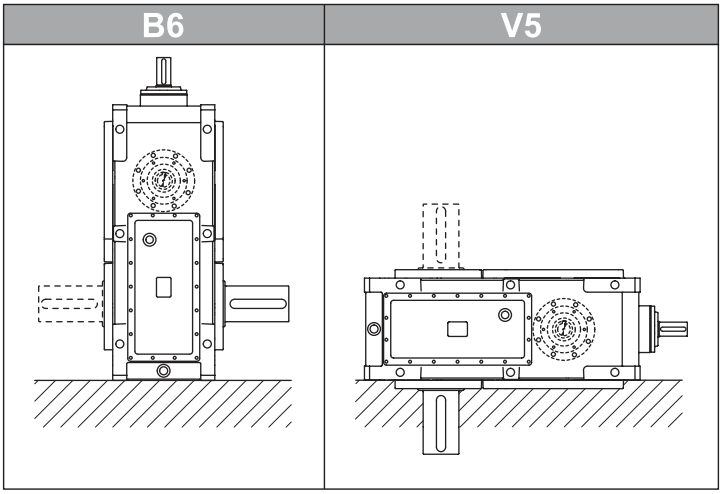
(*) Units featuring the "J" input configuration have the cooling unit fitted on opposite side as shown.

Overall dimensions A, B, C, D and E are indicative only

26.7.2.4 HEATERS

In very low ambient temperatures it may prove necessary to pre-heat the lubricant in the sump before start-up and/or during operation. The **HE** option envisages the installation of an electrical heating element, supplied with a thermostat to detect when the minimum temperature needed for correct operation has been reached. The wiring necessary for the thermostat must be provided by the installer.

26.7.3 GREASE LUBRICATION



Gearboxes of sizes HDO 71… HDO 95 in mounting position V5, B6 (or B3 with input J) are supplied with the upper bearings (not immersed in oil) lubricated with grease and require periodic maintenance. For lubrication, methodology, quantity and type of grease, refer to the Use and Maintenance Manual.

26.7.3.1 FORCED LUBRICATION

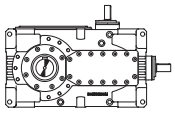
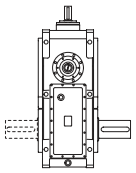
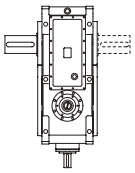
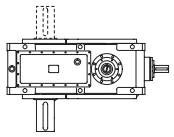
OPTIONAL application conditions

Gearboxes of sizes HDO 71… HDO 95 in mounting position V5 and B6 (or B3 with input J) can be supplied, on request, with a forced lubrication circuit for bearings lubrication.

HDO 71 ... HDO 95		B3	B6	B7	V5
	**L R D**	⛔	OP MOP	⛔	⛔
	**LJ RJ DJ**	OP MOP	⛔	⛔	⛔
	**LD RD DD**	OP MOP	OP MOP	⛔	⛔

MANDATORY application conditions

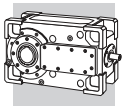
Gearboxes of sizes HDO 100 ... HDO 180 in mounting position V5 and B6 (or B3 with input J) are supplied with upper bearings not immersed in oil and lubricated through a forced lubrication circuit.

HDO 100 ... HDO 180					
		B3	**B6**	**B7**	**V5**
	**L R D**	⛔	OP MOP	⛔	OP... MOP
	**LJ RJ DJ**	OP MOP	⛔	⛔	OP... MOP
	**LD RD DD**	OP MOP	OP MOP	⛔	OP... MOP

Remark: Forced lubrication devices for gearboxes size HDO 100 ... HDO 180 may be replaced, upon approval from Bonfiglioli Techical Service, by independent cooling systems, type MCR...

26.7.3.2 PUMP FOR MOUNTING POSITIONS B3 and B6

In continuous duty applications and, when required, for B3 or B6 mounting positions (see section 26.7.2.1), an optional forced lubrication circuit is available with a mechanically driven pump keyed on to the intermediate shaft.
This circuit only guarantees lubrication of the top bearings that are not immersed in oil.
Before specifying the OP option in your order, check the chart to make sure that the device is fully compatible with the drive speed n_1 and reduction ratio. See the following diagram.



	i	n_1		
		1000 min^{-1}	1200 min^{-1}	1500 min^{-1}
HDO 71 2	5.6 ≤ i ≤ 9.5	OP	OP	OP
	i = 11.1	⛔	OP	OP
	12.1 ≤ i ≤ 14.6	⛔	⛔	OP
HDO 71 3	15.9 ≤ i ≤ 35.6	OP	OP	OP
	38.5 ≤ i ≤ 69.2	⛔	⛔	OP
HDO 71 4	77.0 ≤ i ≤ 197.0 i=237.7	OP	OP	OP
	i=228.2 308.9 ≤ i ≤ 475.4	⛔	⛔	⛔
HDO 81 2	5.5 ≤ i ≤ 9.1	OP	OP	OP
	9.6 ≤ i ≤ 11.1	⛔	OP	OP
	12.2 ≤ i ≤ 14.7	⛔	⛔	OP
HDO 81 3	15.5 ≤ i ≤ 35.6	OP	OP	OP
	38.6 ≤ i ≤ 69.2	⛔	⛔	OP
HDO 81 4	78.3 ≤ i ≤ 181.4 i=227.8	OP	OP	OP
	i=196.5 254.8 ≤ i ≤ 473.3	⛔	⛔	⛔
HDO 91 2	7.4 ≤ i ≤ 9.0	OP	OP	OP
	10.3 ≤ i ≤ 12.5	⛔	OP	OP
	14.6 ≤ i ≤ 15.9	⛔	⛔	OP
HDO 91 3	18.6 ≤ i ≤ 30.6	OP	OP	OP
	36.9 ≤ i ≤ 66.1	⛔	⛔	OP
HDO 91 4	82.0 ≤ i ≤ 225.4	OP	OP	OP
	256.3 ≤ i ≤ 489.3	⛔	⛔	⛔
HDO 95 3	21.2≤ i ≤ 40.5	OP	OP	OP
	44.0 ≤ i ≤ 72.3	⛔	⛔	OP
HDO 95 4	81.6 ≤ i ≤ 231.1	OP	OP	OP
	256.6 ≤ i ≤ 489.7	⛔	⛔	⛔
HDO 100 2	5.8 ≤ i ≤ 8.7	OP	OP	OP
	i = 10.0; 10.9	⛔	OP	OP
	i = 12.4; 13.5	⛔	⛔	OP
HDO 100 3	14.0 ≤ i ≤ 40.0	OP	OP	OP
	43.9 ≤ i ≤ 67.5	⛔	⛔	OP
HDO 100 4	70.8 ≤ i ≤ 139.8	OP	OP	OP
	160.0 ≤ i ≤ 344.2	⛔	⛔	OP
HDO 110 2	6.4 ≤ i ≤ 10.0	OP	OP	OP
	i = 10.9; 12.5	⛔	OP	OP
	i = 13.5; 15.5	⛔	⛔	OP
HDO 110 3	18.9 ≤ i ≤ 43.6	OP	OP	OP
	48.0 ≤ i ≤ 77.5	⛔	⛔	OP
HDO 110 4	77.4 ≤ i ≤ 121.7	OP	OP	OP
	137.1 ≤ i ≤ 395.0	⛔	⛔	OP
HDO 120 2	6.6 ≤ i ≤ 10.0	OP	OP	OP
	i = 11.1; 12.5	⛔	OP	OP
	i = 13.7; 15.5	⛔	⛔	OP
HDO 120 3	17.3 ≤ i ≤ 44.9	OP	OP	OP
	49.5 ≤ i ≤ 78.6	⛔	⛔	OP
HDO 120 4	87.0 ≤ i ≤ 162.2	OP	OP	OP
	179.7 ≤ i ≤ 400.6	⛔	⛔	OP

	i	n_1		
		1000 min^{-1}	1200 min^{-1}	1500 min^{-1}
HDO 125 2	7.4 ≤ i ≤ 9.9	OP	OP	OP
	i = 11.5; 12.3	⛔	OP	OP
	i = 14.2; 15.3; 16.9	⛔	⛔	OP
HDO 125 3	19.2 ≤ i ≤ 55.5	OP	OP	OP
	60.1 ≤ i ≤ 85.9	⛔	⛔	OP
HDO 125 4	90.1 ≤ i ≤ 178.0	OP	OP	OP
	200.3 ≤ i ≤ 438.0	⛔	⛔	OP
HDO 130 2	5.7 ≤ i ≤ 7.1	⛔	OP	OP
	i = 7.7; 8.8	⛔	⛔	OP
	9.6 ≤ i ≤ 13.6	⛔	⛔	⛔
HDO 130 3	15.2 ≤ i ≤ 34.9	OP	OP	OP
	38.3 ≤ i ≤ 67.1	⛔	⛔	OP
HDO 130 4	71.5 ≤ i ≤ 190.3	OP	OP	OP
	219.1 ≤ i ≤ 335.6	⛔	⛔	OP
HDO 140 2	6.6 ≤ i ≤ 8.2	⛔	OP	OP
	i = 9.0; 10.1	⛔	⛔	OP
	11.3 ≤ i ≤ 15.7	⛔	⛔	⛔
HDO 140 3	17.7 ≤ i ≤ 44.4	OP	OP	OP
	50.4 ≤ i ≤ 77.3	⛔	⛔	OP
HDO 140 4	82.3 ≤ i ≤ 180.0	OP	OP	OP
	198.3 ≤ i ≤ 386.6	⛔	⛔	OP
HDO 150 2	5.5 ≤ i ≤ 7.0	⛔	OP	OP
	i = 8.1; 8.9	⛔	⛔	OP
	10.0 ≤ i ≤ 13.7	⛔	⛔	⛔
HDO 150 3	15.6 ≤ i ≤ 25.4	⛔	OP	OP
	28.2 ≤ i ≤ 36.0	⛔	⛔	OP
	40.2 ≤ i ≤ 60.8	⛔	⛔	⛔
HDO 150 4	66.9 ≤ i ≤ 92.9	OP	OP	OP
	101.8 ≤ i ≤ 141.5	⛔	OP	OP
	157.9 ≤ i ≤ 238.8	⛔	⛔	⛔
HDO 160 2	i = 7.3; 7.9	⛔	OP	OP
	8.9 ≤ i ≤ 11.3	⛔	⛔	OP
	12.2 ≤ i ≤ 15.4	⛔	⛔	⛔
HDO 160 3	17.7 ≤ i ≤ 31.3	⛔	OP	OP
	34.9 ≤ i ≤ 44.3	⛔	⛔	OP
	49.4 ≤ i ≤ 68.6	⛔	⛔	⛔
HDO 160 4	75.9 ≤ i ≤ 96.3	OP	OP	OP
	115.2 ≤ i ≤ 174.0	⛔	OP	OP
	194.1 ≤ i ≤ 269.7	⛔	⛔	⛔
HDO 170		⛔		
HDO 180				

This option is not available with other configurations that use the same shaft end.

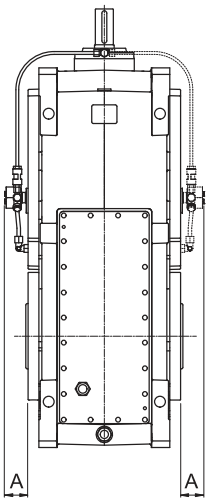
HDO ... G-NG ... B6
HDO ... VP ... B6

HDO 71 ... 91
- 2x ... 2
- 3x ... 2
- 4x ... 2

HDO 95
- 3x ... 2
- 4x ... 2

HDO 100 ... 140
- 2x ... 2
- 3x ... 2
- 4x ... 2

HDO 150 - 160
- 2x ... 2
- 3x ... 2
- 4x ... 1



HDO 71 ... 91
- 2x ... 1
- 3x ... 1
- 4x ... 1

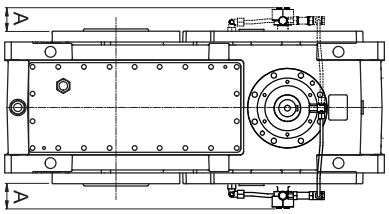
HDO 95
- 3x ... 1
- 4x ... 1

HDO 100 ... 140
- 2x ... 1
- 3x ... 1
- 4x ... 1

HDO 150 - 160
- 2x ... 1
- 3x ... 1
- 4x ... 2

HDO ... VP ... B3

HDO 71 ... 95
- 3x ... 2

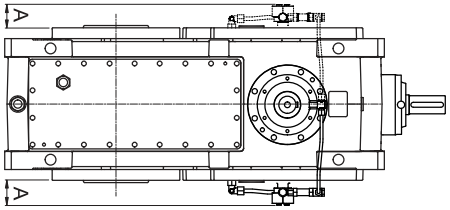


HDO 71 ... 95
- 3x ... 1

HDO ... GJ-NGJ ... B3
HDO ... VP ... B3

HDO 100 ... 140
- 2x ... 2
- 3x ... 2
- 4x ... 2

HDO 150 - 160
- 2x ... 2
- 3x ... 2
- 4x ... 1



HDO 100 ... 140
- 2x ... 1
- 3x ... 1
- 4x ... 1

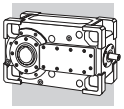
HDO 150 - 160
- 2x ... 1
- 3x ... 1
- 4x ... 2

	A (min) [mm]
HDO 71 2_OP	85
HDO 71 3_OP	78
HDO 71 4_OP	85
HDO 81 2_OP	78
HDO 81 3_OP	78
HDO 81 4_OP	78
HDO 91 2_OP	78
HDO 91 3_OP	78
HDO 91 4_OP	75

	A (min) [mm]
HDO 95 3_OP	53
HDO 95 4_OP	50
HDO 100 2_OP	100
HDO 100 3_OP	95
HDO 100 4_OP	95
HDO 110 2_OP	130
HDO 110 3_OP	95
HDO 110 4_OP	95

	A (min) [mm]
HDO 120 2_OP	125
HDO 120 3_OP	105
HDO 120 4_OP	100
HDO 125 2_OP	125
HDO 125 3_OP	105
HDO 125 4_OP	100
HDO 130 2_OP	120
HDO 130 3_OP	110
HDO 130 4_OP	110

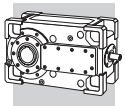
	A (min) [mm]
HDO 140 2_OP	125
HDO 140 3_OP	110
HDO 140 4_OP	110
HDO 150 2_OP	125
HDO 150 3_OP	110
HDO 150 4_OP	110
HDO 160 2_OP	125
HDO 160 3_OP	110
HDO 160 4_OP	110



The following chart specifies the availability of the pump on the basis of mounting position, shaft arrangement and input configuration.

Mounting position	Shaft arrangement	Input configuration
B3	LJ - RJ - DJ - LD - RD - DD	VP - GJ* - NGJ*
B6	L - R - D - LD - RD - DD	VP - G - NG

(*) HDO 71 ... HDO 95 excluded



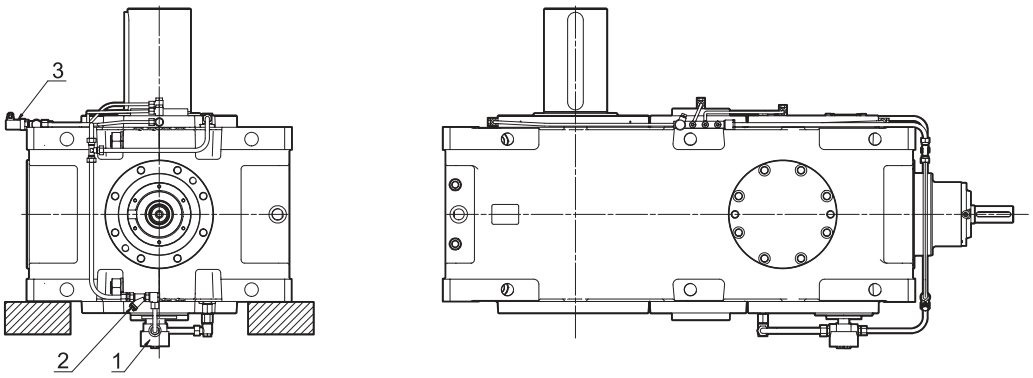
26.7.3.3 PUMP FOR MOUNTING POSITION V5

In continuous duty applications and with V5 mounting positions version 1 (version 2 for 4-stage HDO 150 ... HDO 180), an optional forced lubrication circuit is available with a mechanically driven pump keyed on to the intermediate shaft.
This circuit only guarantees lubrication of the top bearings that are not immersed in oil. If this device is required in conjunction with the Drywell device, consult the Bonfiglioli Technical Service.
When ordering, specify the OP1 or OP2 option in your order after first checking the chart to make sure that the device is fully compatible with drive speed n_1 and the reduction ratio. See the following diagram.

	i	n_1		
		1000 min^{-1}	1200 min^{-1}	1500 min^{-1}
HDO 100 2	5.8 ≤ i ≤ 7.0	OP1	OP1	OP1
	i = 8.0; 8.7	⛔	OP1	OP1
	i = 10.0; 10.9	⛔	⛔	OP1
	i = 12.4; 13.5	⛔	⛔	⛔
HDO 100 3	14.0 ≤ i ≤ 17.3	OP2	OP1	OP1
	20.2 ≤ i ≤ 40.0	⛔	OP2	OP1
	43.9 ≤ i ≤ 67.5	⛔	⛔	⛔
HDO 100 4	70.8 ≤ i ≤ 139.8	⛔	OP2	OP1
	160.0 ≤ i ≤ 344.2	⛔	⛔	⛔
HDO 110 2	6.4 ≤ i ≤ 8.1	OP2	OP2	OP1
	i = 8.7; 10.0	⛔	OP2	OP2
	i = 10.9; 12.5	⛔	⛔	OP2
	i = 13.5; 15.5	⛔	⛔	⛔
HDO 110 3	i = 18.9; 20.9	OP2	OP1	OP1
	22.0 ≤ i ≤ 43.6	⛔	OP2	OP1
	48.0 ≤ i ≤ 77.5	⛔	⛔	⛔
HDO 110 4	77.4 ≤ i ≤ 121.7	⛔	OP2	OP2
	137.1 ≤ i ≤ 395.0	⛔	⛔	⛔
HDO 120 2	6.6 ≤ i ≤ 8.1	OP2	OP2	OP1
	i = 8.9; 10.0	⛔	OP2	OP2
	i = 11.1; 12.5	⛔	⛔	OP2
	i = 13.7; 15.5	⛔	⛔	⛔
HDO 120 3	17.3 ≤ i ≤ 28.3	OP2	OP2	OP1
	32.0 ≤ i ≤ 44.9	⛔	OP2	OP2
	49.5 ≤ i ≤ 78.6	⛔	⛔	⛔
HDO 120 4	87.0 ≤ i ≤ 162.2	⛔	OP2	OP2
	179.0 ≤ i ≤ 400.6	⛔	⛔	⛔
HDO 125 2	7.4 ≤ i ≤ 8.8	OP2	OP2	OP1
	i = 9.9	⛔	OP2	OP2
	i = 11.5; 12.3	⛔	⛔	OP2
	14.2 ≤ i ≤ 16.9	⛔	⛔	⛔
HDO 125 3	19.2 ≤ i ≤ 35.8	OP2	OP2	OP1
	38.8 ≤ i ≤ 55.4	⛔	OP2	OP2
	60.1 ≤ i ≤ 85.9	⛔	⛔	⛔
HDO 125 4	97.0 ≤ i ≤ 178.0	⛔	OP2	OP2
	200.3 ≤ i ≤ 438.0	⛔	⛔	⛔
HDO 130 2	5.7 ≤ i ≤ 7.1	OP2	OP1	OP1
	i = 7.7; 8.8	⛔	OP2	OP1
	i = 9.6; 11.0	⛔	⛔	OP2
	i = 12.0; 13.6	⛔	⛔	⛔
HDO 130 3	15.2 ≤ i ≤ 19.9	OP2	OP2	OP1
	22.6 ≤ i ≤ 34.9	⛔	OP2	OP2
	38.3 ≤ i ≤ 67.1	⛔	⛔	⛔
HDO 130 4	71.5 ≤ i ≤ 190.3	⛔	OP2	OP1
	219.1 ≤ i ≤ 335.6	⛔	⛔	⛔

	i	n_1		
		1000 min^{-1}	1200 min^{-1}	1500 min^{-1}
HDO 140 2	6.6 ≤ i ≤ 8.2	OP2	OP2	OP1
	i = 9.0; 10.1	⛔	OP2	OP2
	i = 11.3; 12.6	⛔	⛔	OP2
	i = 14.0; 15.7	⛔	⛔	⛔
HDO 140 3	17.7 ≤ i ≤ 23.3	OP2	OP2	OP1
	26.0 ≤ i ≤ 44.4	⛔	OP2	OP2
	50.4 ≤ i ≤ 77.3	⛔	⛔	⛔
HDO 140 4	82.3 ≤ i ≤ 180.0	⛔	OP2	OP1
	198.3 ≤ i ≤ 386.6	⛔	⛔	⛔
HDO 150 2	5.5 ≤ i ≤ 7.0	OP2	OP2	OP1
	i = 8.1; 8.9	⛔	OP2	OP2
	10.0 ≤ i ≤ 10.9	⛔	⛔	OP2
	12.6 ≤ i ≤ 13.7	⛔	⛔	⛔
HDO 150 3	15.6 ≤ i ≤ 25.4	OP2	OP2	OP1
	28.2 ≤ i ≤ 36.0	⛔	OP2	OP2
	40.2 ≤ i ≤ 60.8	⛔	⛔	⛔
HDO 150 4	66.9 ≤ i ≤ 92.9	OP2	OP2	OP1
	101.8 ≤ i ≤ 141.5	⛔	OP2	OP2
	157.9 ≤ i ≤ 238.8	⛔	⛔	⛔
HDO 160 2	i = 7.3; 7.9	OP2	OP2	OP1
	8.9 ≤ i ≤ 11.3	⛔	⛔	OP2
	12.2 ≤ i ≤ 15.4	⛔	⛔	⛔
HDO 160 3	17.7 ≤ i ≤ 31.3	OP2	OP2	OP1
	34.9 ≤ i ≤ 44.3	⛔	OP2	OP2
	49.4 ≤ i ≤ 68.6	⛔	⛔	⛔
HDO 160 4	75.9 ≤ i ≤ 96.3	OP2	OP2	OP1
	115.2 ≤ i ≤ 174.0	⛔	OP2	OP2
	194.1 ≤ i ≤ 269.7	⛔	⛔	⛔
HDO 170 HDO 180	BONFIGLIOLI TECHNICAL SERVICE			

This option is not available with other configurations that use the same shaft end.



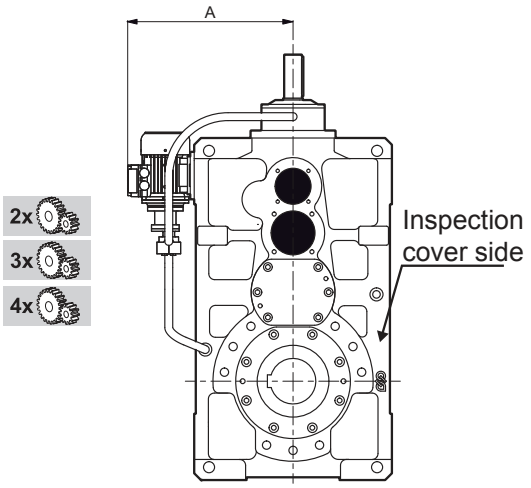
1 - Pump
2 - Filter
3 - Minimum pressure switch

Contact the Bonfiglioli Technical Service for overall dimensions.

26.7.3.4 ELECTRIC PUMP FOR MOUNTING POSITIONS B3 and B6

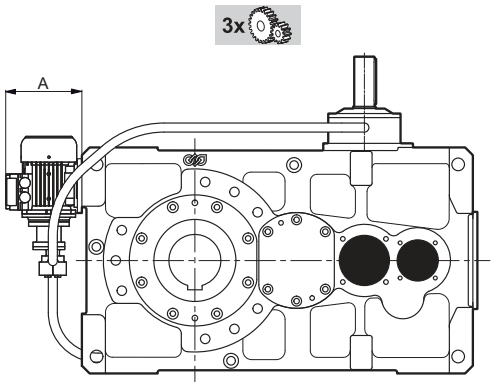
In intermittent duty applications, if speeds are incompatible with the use of the OP pump option, and when required for B3 and B6 mounting positions (see section 26.7.2.1), the MOP optional forced lubrication circuit is available with an independently powered electric pump. This system ensures a constant flow of oil to the top bearings.

HDO ... G-NG ... B6
HDO ... VP ... B6



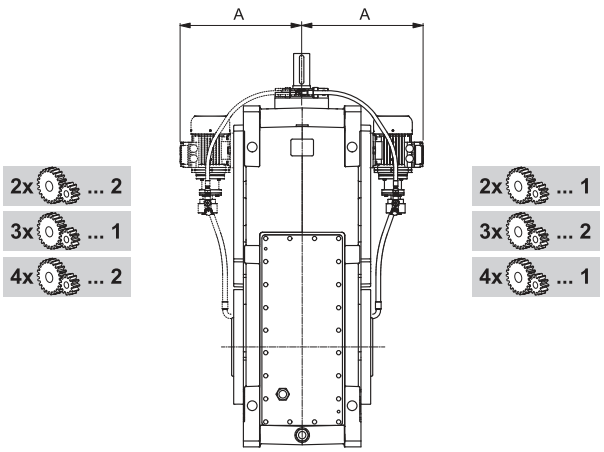
	A (min) [mm]
HDO 71	386
HDO 81	411
HDO 91	436
HDO 95	461

HDO ... VP ... B3

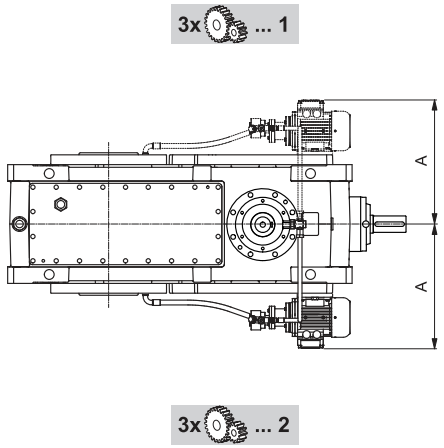


	A (min) [mm]
HDO 71	211
HDO 81	211
HDO 91	211
HDO 95	211

HDO ... G-NG ... B6
HDO ... VP ... B6



HDO ... GJ-NGJ ... B3
HDO ... VP ... B3



	A (min) [mm]
HDO 100	410
HDO 110	410
HDO 120	430
HDO 125	430
HDO 130	480
HDO 140	480
HDO 150	BONFIGLIOLI TECHNICAL SERVICE
HDO 160	
HDO 170	⛔
HDO 180	

The electric pump arrangements shown above are purely indicative. Pump positions may vary depending on the presence of other options

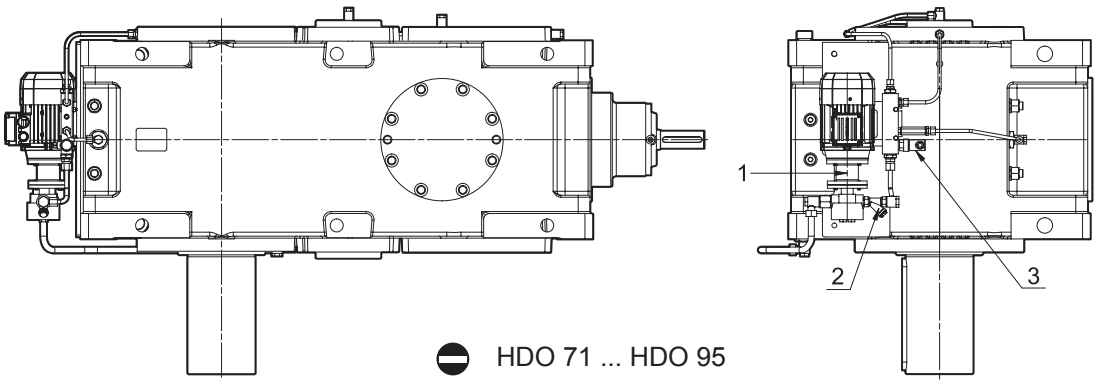
The chart specifies electric pump availability on the basis of mounting position and shaft arrangement.

Mounting position	Shaft arrangement	Input configuration
B3	LJ - RJ - DJ - LD - RD - DD	VP - GJ* - NGJ*
B6	L - R - D - LD - RD - DD	VP - G - NG

(*) HDO 71 ... HDO 95 excluded

26.7.3.5 ELECTRIC PUMP FOR MOUNTING POSITION V5

In intermittent duty applications or when speeds are incompatible with the use of the OP pump option, and when required for mounting position V5, the MOP optional forced lubrication circuit is available with an independently powered electric pump.
If this device is required in conjunction with the Drywell device, consult the Bonfiglioli Technical Service. This system ensures a constant flow of oil to the top bearings.



HDO 71 ... HDO 95

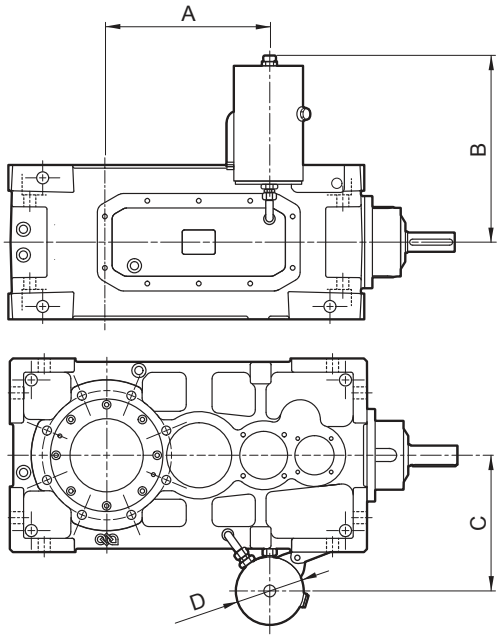
1 - Motorpump
2 - Filter
3 - Minimum pressure switch

The electric pump arrangements shown above are purely indicative. Pump positions may vary depending on the presence of other options at the same time.

Contact the Bonfiglioli Technical Service for overall dimensions.

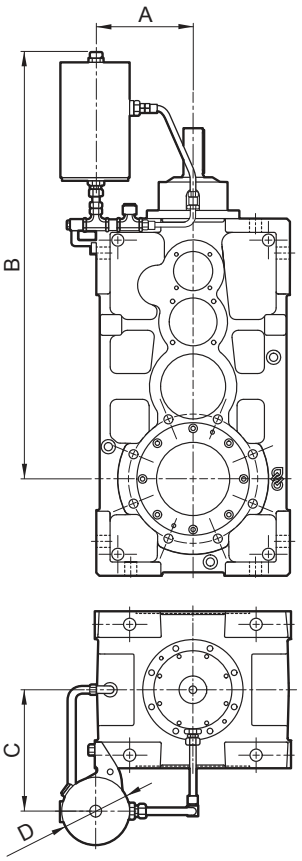
26.7.3.6 OIL BATH LUBRICATION SYSTEM (SPECIAL VARIANT)

As a variant of the forced lubrication systems (OP or MOP) and oil splash and grease lubrication systems (where provided), the option “oil bath lubrication” system is available.
The “oil bath lubrication” option may be supplied only for gearboxes in mounting positions B6 and V5. With this variant, gears and bearings will be completely immersed in oil and the gearbox will be equipped with an expansion tank in order to compensate any variations in the volume of lubricant that will occur in the gearbox due to temperature variations. Using the gearbox outside of the “Allowed temperature limits” may compromise the correct lubrication, it will therefore be appropriate to thermally check the gearbox according to the work cycle and the application.
The HDO 71, HDO 81, HDO 91, HDO 95 gearboxes, in mounting positions V5 and B6 can be supplied with the “oil bath lubrication” system by consulting the Bonfiglioli Technical Service in advance (type of lubrication not configurable as standard).



HDO 71 ... HDO 91 - V5

	A [mm]	B [mm]	C [mm]	D [mm]
HDO 71 2 - 3 - 4	330	366	235	99
HDO 81 2 - 3 - 4	405	393	262	99
HDO 91 2	281	483	340	159
HDO 91 3 - 4	369	483	340	159



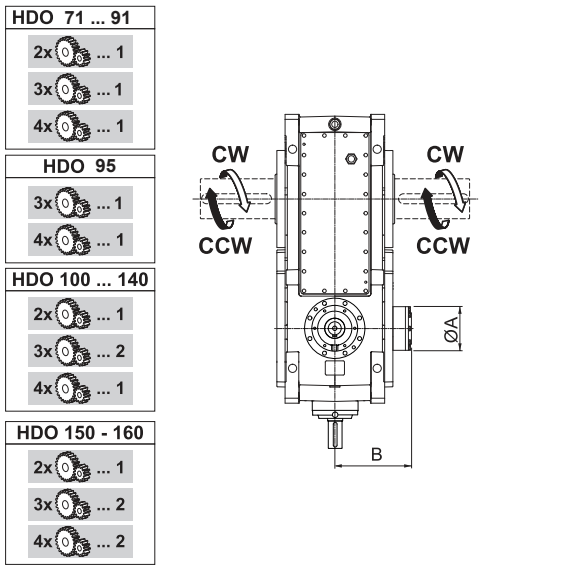
HDO 71 ... HDO 95 - B6

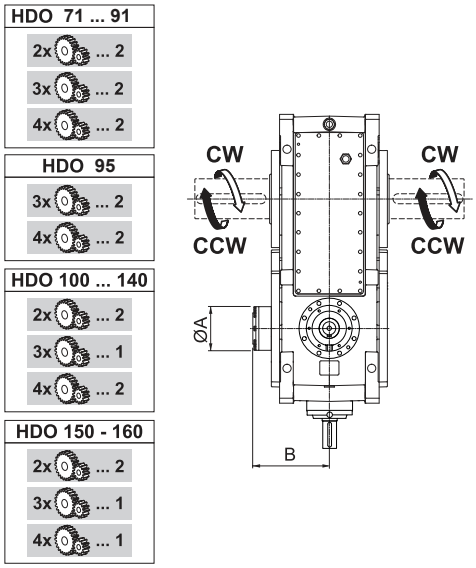
	A [mm]	B [mm]	C [mm]	D [mm]
HDO 71 2	185	644	200	99
HDO 71 3	175	694	200	99
HDO 71 4	175	730	165	99
HDO 81 2	201	715	220	99
HDO 81 3	201	757	220	99
HDO 81 4	190	833	185	99
HDO 91 2	225	929	295	159
HDO 91 3 - 4	225	1050	295	159
HDO 95 3 - 4	225	1044	295	159

26.7.4 BACKSTOP DEVICE

The backstop device ensures that only one direction of rotation is allowed, and prevents the gearbox to be backdriven by the load connected to the output shaft.
In addition to verifying the shock loads shown in section 11.1, also make sure that the torque transmitted to the backstop $M_1 = M_2 / (i \times \eta)$ is less than the admissible torque M_{1max} listed in the chart below.
Along with the specification of the backstop device, option **A**, the direction of free rotation for the output shaft (**CW** or **CCW**) must also be specified in the order.
If special operating conditions require it, the user can reverse the direction of rotation of the backstop device by opening the backstop compartment and reversing the direction of the freewheel. If you need to perform this operation, contact Bonfiglioli's Technical Service for the necessary instructions.
The type of backstop device used, based on centrifugally released shoes, does not require any regular maintenance.
This option is not available with other configurations that use the same shaft end.

Under continuous operating conditions, it is advisable to maintain a neutral rotation speed n_{1min} greater than that specified in the chart in order to ensure the effective centrifugal release of all the shoes and avoid unnecessary wear. For further details, contact the Bonfiglioli Technical Service.

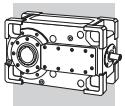




	i	A [mm]	B [mm]	M_{1max} [Nm]	n_{1min} [min^{-1}]
HDO 71 2_A	5.6 ≤ i ≤ 6.8	130	212	650	870
	7.9 ≤ i ≤ 9.5			460	1220
	i=11.1			380	1490
	12.1 ≤ i ≤ 14.6			300	(*)
HDO 71 3_A	15.9 ≤ i ≤ 35.6	110	204	350	1060
	38.5 ≤ i ≤ 69.2			180	(*)
HDO 71 4_A	77.0 ≤ i ≤ 197.0 i=237.7	91	199	100	1500
	i=228.2 308.9 ≤ i ≤ 475.4			50	(*)
HDO 81 2_A	5.5 ≤ i ≤ 6.7	151	242	1010	790
	i=7.9 ; 9.1			710	1120
	i=9.6 ; 11.1			580	1365
	12.2 ≤ i ≤ 14.7			460	1740
HDO 81 3_A	15.5 ≤ i ≤ 35.8	110	231	350	1060
	38.6 ≤ i ≤ 69.2			180	(*)
HDO 81 4_A	78.3 ≤ i ≤ 181.4 i=227.8	95	231	150	1485
	i=196.5 254.8 ≤ i ≤ 473.3			80	(*)

	i	A [mm]	B [mm]	M_{1max} [Nm]	n_{1min} [min^{-1}]
HDO 91 2_A	7.4 ≤ i ≤ 9.0	175	279	1310	935
	i=10.3 ; 12.5			940	1290
	i=14.6 ; 15.9			740	1640
HDO 91 3_A	18.6 ≤ i ≤ 30.6	130	259	610	930
	36.9 ≤ i ≤ 66.1			340	1660
HDO 91 4_A	82.0 ≤ i ≤ 225.4	110	250	270	1455
	256.3 ≤ i ≤ 489.3			130	(*)
HDO 95 3_A	21.2 ≤ i ≤ 40.5	130	259	610	930
	44.0 ≤ i ≤ 72.3			340	1660
HDO 95 4_A	81.6 ≤ i ≤ 231.1	110	250	270	1455
	256.6 ≤ i ≤ 489.7			130	(*)

(*) Contact the Bonfiglioli Technical Service.

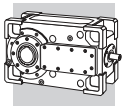


	i	A [mm]	B [mm]	M_{1max} [Nm]	n_{1min} [min^{-1}]
HDO 100 2_A	5.8 ≤ i ≤ 7.0	210	335	2840	715
	i = 8.0 ; 8.7			2290	880
	i = 10.0 ; 10.9			1830	1100
	i = 12.4 ; 13.5			1480	1365
HDO 100 3_A	14.0 ≤ i ≤ 17.3	175	285	1550	785
	20.2 ≤ i ≤ 40.0			1190	1020
	43.9 ≤ i ≤ 67.5			770	1585
HDO 100 4_A	70.8 ≤ i ≤ 139.8	125	278	400	1260
	160.0 ≤ i ≤ 344.2			250	(*)
HDO 110 2_A	6.4 ≤ i ≤ 8.1	210	335	2840	715
	i = 8.7 ; 10.0			2290	880
	i = 10.9 ; 12.5			1830	1100
	i = 13.5 ; 15.5			1480	1365
HDO 110 3_A	i = 18.9 ; 20.9	175	285	1550	785
	22.0 ≤ i ≤ 43.6			1190	1020
	48.0 ≤ i ≤ 77.5			770	1585
HDO 110 4_A	77.4 ≤ i ≤ 121.7	125	278	400	1260
	137.1 ≤ i ≤ 395.0			250	(*)
HDO 120 2_A	6.6 ≤ i ≤ 8.1	230	336	3530	665
	i = 8.9 ; 10.0			2850	820
	i = 11.1 ; 12.5			2280	1025
	i = 13.7 ; 15.5			1840	1275
HDO 120 3_A	17.3 ≤ i ≤ 24.6	175	305	1550	785
	28.3 ≤ i ≤ 44.9			1190	1020
	49.5 ≤ i ≤ 78.6			770	1585
HDO 120 4_A	87.0 ≤ i ≤ 162.2	125	279	400	1260
	179.7 ≤ i ≤ 400.6			250	(*)
HDO 125 2_A	7.4 ≤ i ≤ 8.8	230	336	3530	665
	i = 9.9			2850	820
	i = 11.5 ; 12.3			2280	1025
	14.2 ≤ i ≤ 16.9			1840	1275
HDO 125 3_A	19.2 ≤ i ≤ 35.8	175	305	1550	785
	38.8 ≤ i ≤ 55.4			1190	1020
	60.1 ≤ i ≤ 85.9			770	1585
HDO 125 4_A	97.0 ≤ i ≤ 178.0	125	279	400	1260
	200.3 ≤ i ≤ 438.0			250	(*)

(*) Contact the Bonfiglioli Technical Service.

(**) Option not available in configuration ...S-L-1... e ...S-R-2...

	i	A [mm]	B [mm]	M_{1max} [Nm]	n_{1min} [min^{-1}]
HDO 130 2_A (**)	5.7 ≤ i ≤ 7.1	290	437	6630	575
	i = 7.7 ; 8.8			5350	710
	i = 9.6 ; 11.0			4280	890
	i = 12.0 ; 13.6			3450	1105
HDO 130 3_A	15.2 ≤ i ≤ 19.9	210	402	2840	715
	22.6 ≤ i ≤ 34.9			2290	880
	38.3 ≤ i ≤ 67.1			1480	1365
HDO 130 4_A	71.5 ≤ i ≤ 190.3	175	366	1190	1020
	219.1 ≤ i ≤ 335.6			770	1585
HDO 140 2_A (**)	6.6 ≤ i ≤ 8.2	290	437	6630	575
	i = 9.0 ; 10.1			5350	710
	i = 11.3 ; 12.6			4280	890
	i = 14.0 ; 15.7			3450	1105
HDO 140 3_A	17.7 ≤ i ≤ 23.3	210	402	2840	715
	26.0 ≤ i ≤ 44.4			2290	880
	50.4 ≤ i ≤ 77.3			1480	1365
HDO 140 4_A	82.3 ≤ i ≤ 180.0	175	366	1190	1020
	198.3 ≤ i ≤ 386.6			770	1585
HDO 150 2_A	5.5 ≤ i ≤ 7.0	322	447	10110	525
	i = 8.1 ; 8.9			8030	660
	i = 10.0 ; 10.9			6520	815
	i = 12.6 ; 13.7			5180	1025
HDO 150 3_A	15.6 ≤ i ≤ 25.4	230	440	4040	580
	28.2 ≤ i ≤ 36.0			2850	820
	40.2≤ i ≤ 60.8			1840	1275
HDO 150 4_A	66.9 ≤ i ≤ 92.9	—	333	1550	785
	101.8 ≤ i ≤ 141.5			1190	1020
	157.9 ≤ i ≤ 238.8			770	1585
HDO 160 2_A	i = 7.3 ; 7.9	322	447	10110	525
	8.9 ≤ i ≤ 11.3			7090	750
	12.2 ≤ i ≤ 15.4			5210	1020
HDO 160 3_A	17.7 ≤ i ≤ 31.3	230	440	4040	580
	34.9 ≤ i ≤ 44.3			2850	820
	49.4 ≤ i ≤ 68.6			1840	1275
HDO 160 4_A	75.9 ≤ i ≤ 96.3	—	333	1550	785
	115.2 ≤ i ≤ 174.0			1190	1020
	194.1 ≤ i ≤ 269.7			770	1585
HDO 170	BONFIGLIOLI TECHNICAL SERVICE				
HDO 180					



26.7.4 REINFORCED BEARINGS

Optional heavy-duty bearings are also available, with increased overhung load capacity. The HDB option can only be applied to HDO 71, 81, 91 units with the LP shaft arrangement (solid shaft).

26.7.4.1 PRIMARY BRAND BEARINGS

The new **PBB** option, for customers who request it, allows the gear unit to be equipped with bearings manufactured only by primary brands, thus ensuring the highest quality and production standards.

26.7.5 SEALS AND GASKETS

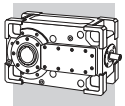
On request, gearboxes can be equipped with different oil sealing systems. These are:

TK – Taconite seals are recommended for environments characterised by the presence of abrasive dust or powders. Taconite seals incorporate a combination of sealing rings, labyrinths and a grease chamber. Greasing must be ensured as part of the scheduled maintenance programme.
Gearboxes of size HDO 71 ... HDO 95 with AD-G-NG inputs are provided with the taconite seal on the output axis only. This option is not available if combined with the optional variant “Mounting flanges” (FM excluded) and / or combined with the optional forced ventilation FAN variant.
VS – Fluoro elastomer compound seal rings.
DS – Dual set of seal rings at each shaft end.
DVS – Dual set of Fluoro elastomer compound seal rings at each shaft end.

26.7.6 VENT FILTER WITH DRYING SALTS

The **DBF** option includes a vent with a filter to protect the gear unit from external environment contamination such as moisture that can cause rusting of internal components and degradation of the oil’s lubricating capacity, and fine particulate matter that induces premature wear of gears, bearings and seals.
The change of colour of the gel contained inside the filter indicates that the solution adopted is working correctly and efficiently. The control valve in the device ensures that no overpressure is created inside the gear unit (opening at 0.017 bar).
This option can only be configured for installation in mounting position B3 and is supplied as a kit, which is not assembled but is included with the gear unit. For all other mounting positions, please contact Bonfiglioli’s technical service. For installing the device, please refer to the User and Maintenance Manual available at www.bonfiglioli.com.

Gearbox size	Mounting position			
	B3	B6	V5	B7
HDO 71...HDO 95	X	BONFIGLIOLI TECHNICAL SERVICE		
HDO 100...HDO 125	X			
HDO 130, HDO 140	LJ-RJ-DJ LD-RD-DD			
HDO 150, HDO 160	X			
HDO 170, HDO 180				



26.7.7 SENSORS

Bimetal thermostat – If the **TG** option is specified, a bimetallic thermostat detects when the oil temperature exceeds 90°C ± 5°C. The device is supplied with the gear unit, but installation and wiring are the responsibility of the installer.

Oil level indicator – If the **OLG** option is specified in the order, the gearbox is supplied with a device permitting the remote checking of the oil level. The device best operates when the gearbox is idle and should be bypassed when the gearbox is operating. Wiring is the responsibility of the installer.
The device may not be available in combination with other accessories and/or particular product configurations. Please contact Bonfiglioli Technical Service for advise.

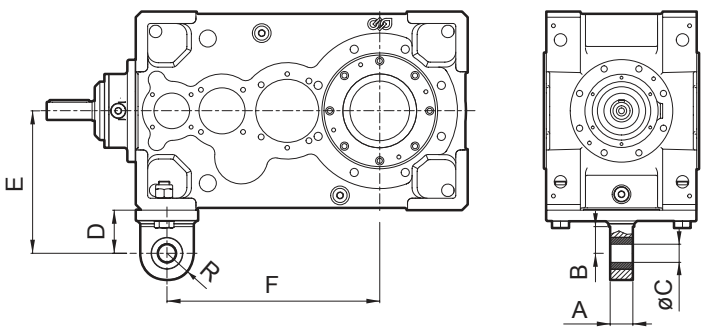
26.7.8 DRYWELL

The “drywell” - option **DW** - is a device providing output shaft sealing for units with output shaft laying vertically in the V5 position.
For gearboxes from HDO 71 to HDO 95 with “drywell” sealing system consult the Bonfiglioli Technical Service. When specified, for HDO 100 to 180 gearboxes, it necessarily requires the installation of a forced lubrication system, selected from those available for the gearbox, as illustrated in the relevant section of this catalogue. At scheduled intervals, check and refill the grease in the vane underneath the output shaft’s bottom bearing.
Availability of the Drywell may be subject to limitations, depending on the contemporary specification of other devices. Please consult with Bonfiglioli Technical Service.

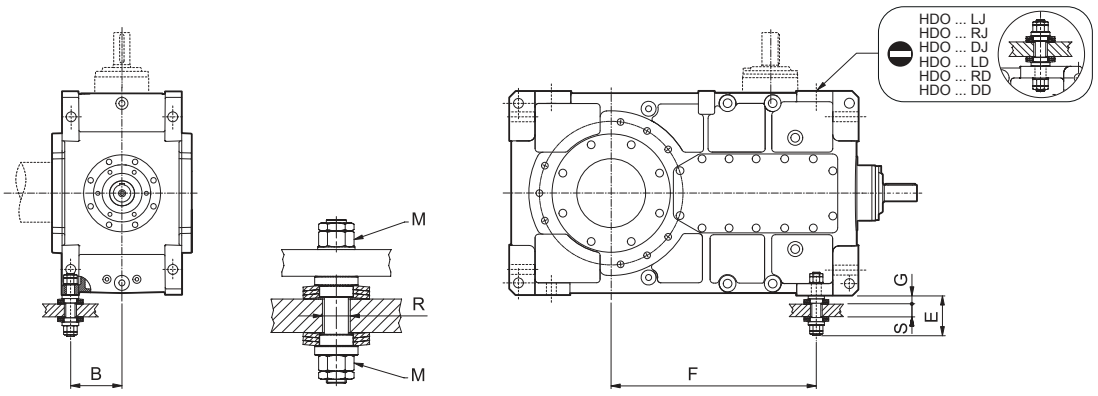
26.7.9 FIXING ELEMENTS

For shaft-mounted installations, **HDO 71 ... HDO 95** gearboxes can be fitted with an electro-welded steel torque arm, complete with anti-vibration bushing.

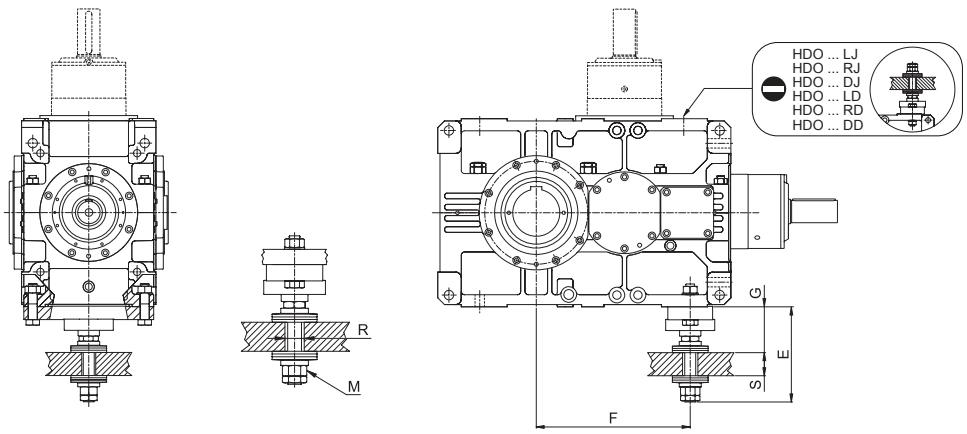
For shaft mounted HDO gearboxes, a specially shaped hardened steel bolt is available to secure the unit to the supporting structure.
Vibration damping cup springs are also supplied in the kit. The customer must adjust the preload of these springs during installation, respecting the value G given in the following chart.
The reaction bolt must be fitted on the side of the gearbox next to the driven machine and in the farthest hole from output shaft centre (see dimension F in the following figure).
Fitting the bolt on same side as the inspection cover is not possible. In this case please contact Bonfiglioli Technical Service for advise.



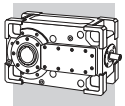
	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	R [mm]
HDO 71_TA	40	47	32	76	251	375	47
HDO 81_TA	60	60	42	97	297	413	60
HDO 91_TA	60	68	42	113	338	525	68
HDO 95_TA	60	68	42	113	363	520	68



	F [mm]	B [mm]	E [mm]	G [mm] Rated value	M	R [mm]	S [mm]	DIN2093
HDO 100 2_TA	420	160	153	33.4	M27	35	30 - 40	A100
HDO 100 3_TA **HDO 100 4_TA**	540							
HDO 110 2_TA	435	160	153	33.4	M27	35	30 - 40	A100
HDO 110 3_TA **HDO 110 4_TA**	555							
HDO 120 2_TA	480	170	166	33.4	M30	40	40 - 50	A125
HDO 120 3_TA **HDO 120 4_TA**	630							
HDO 125 2_TA	530	170	166	33.4	M30	40	40 - 50	A125
HDO 125 3_TA **HDO 125 4_TA**	680							
HDO 130 2_TA	585	216	205	42.7	M36	45	50 - 60	A125
HDO 130 3_TA **HDO 130 4_TA**	780							
HDO 140 2_TA	625	216	205	42.7	M36	45	50 - 60	A125
HDO 140 3_TA **HDO 140 4_TA**	790							



	F [mm]	E [mm]	G [mm] Rated value	M	R [mm]	S [mm]	DIN2093
HDO 150 2_TA	687.5	405	204.3	M48x2	52	70 - 80	A160
HDO 150 3_TA **HDO 150 4_TA**	877.5						
HDO 160 2_TA	727.5	405	204.3	M48x2	52	70 - 80	A160
HDO 160 3_TA **HDO 160 4_TA**	927.5						
HDO 170 **HDO 180**	BONFIGLIOLI TECHNICAL SERVICE						



26.7.10 SURFACE PROTECTION

HDO 71 ... 95

When no specific protection class is requested, the painted (ferrous) surfaces of gearboxes are protected to at least corrosivity class C2 (UNI EN ISO 12944-2). For improved resistance to atmospheric corrosion, gearboxes can be delivered with C3 and C4 surface protection, obtained by painting the complete gearbox.

SURFACE PROTECTION	Typical environments	Maximum surface temperature	Corrosivity class according to UNI EN ISO 12944-2
C3	Urban and industrial environments with up to 100% relative humidity (medium air pollution)	120°C	C3
C4	Industrial areas, coastal areas, chemical plant, with up to 100% relative humidity (high air pollution)	120°C	C4

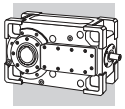
Gearboxes with optional protection to class C3 or C4 are available in a choice of colours.
If no specific colour is requested (see the “PAINTING” option) gearboxes are finished in RAL 7042.
Gearboxes can also be supplied with surface protection for corrosivity class C5 according to UNI EN ISO 12944-2. Contact our Technical Service for further details.

HDO 100 ... 180

When no specific protection class is requested, the painted surfaces of gearboxes are protected to at least corrosivity class C3 (UNI EN ISO 12944-2). For improved resistance to atmospheric corrosion, gearboxes can be delivered with C4 surface protection, obtained by painting the complete gearbox.

SURFACE PROTECTION	Typical environments	Maximum surface temperature	Corrosivity class according to UNI EN ISO 12944-2
C4	Industrial areas, coastal areas, chemical plant, with up to 100% relative humidity (high air pollution)	120°C	C4

Gearboxes with optional protection to class C4 are available in a choice of colours.
If no specific colour is requested (see the “PAINTING” option) gearboxes are finished in RAL 7042.
Gearboxes can also be supplied with surface protection for corrosivity class C5 according to UNI EN ISO 12944-2. Contact our Technical Service for further details.



26.7.11 PAINTING

Gearboxes with optional protection to class C3 or C4 are available in the colours listed in the following table.

PAINTING	Colour	RAL number
RAL7042*	Traffik Grey A	7042
RAL5010	Gentian Blue	5010
RAL9005	Jet Black	9005
RAL9006	White Aluminium	9006
RAL9010	Pure White	9010
RAL7035	Light Grey	7035
RAL7001	Silver Grey	7001
RAL5015	Sky Blue	5015
RAL7037	Dusty Grey	7037
RAL5024	Pastel Blue	5024

* Gearboxes are supplied in this standard colour if no other colour is specified.

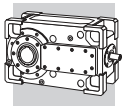
NOTE - “PAINTING” options can only be specified in conjunction with “SURFACE PROTECTION” options.

26.7.12 LONG TERM STOCK

In presence of the Long Term Stock option the configured product is supplied without the standard lubricant oil but with an anticorrosive protective liquid to grant the integrity and full functionality of the gear unit in those cases where the unit will not be installed immediately but it has to be stocked for a long period of time (installation later than 6 months from delivery).
The warranty conditions are valid 12 months from commissioning (with commissioning within 24 months from delivery) or 24 months from delivery without commissioning.
After 2 years of stock, the unit with the Long Term Stock option needs to be checked by Bonfiglioli assistance center. In case of a product that is not properly preserved, an offer by Bonfiglioli will be issued for a complete restore.
With the recovery activity successfully concluded, the warranty conditions restart from the 12 months of commissioning (with commissioning within 24 months from restore date) or 24 months from restore date

Applicability of the Long Term Stock option:

Gearbox size	Applicability of Long Term Stock option
HDO 71 ... HDO 160	**SLM, SLP**

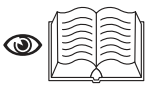


The Long Term Stock option can be requested in 2 versions:

- SLM Long Term Stock_Mineral Oil: option having anti-corrosive protective oil compatible with all mineral-based oil and with synthetically based oils Polyalphaolefin (PAO) lubricants listed in the “Installation, operation and maintenance” Bonfiglioli manual.
- SLP Long Term Stock_Polyglycol Oil: option having anti-corrosive protective oil compatible with all synthetically based PolyGlycol (PAG) oil lubricants listed in the “Installation, operation and maintenance” Bonfiglioli manual.

Note: only one version can be selected. SLM and SLP can’t coexist.

When configuring a gear unit or gearmotor with the Long Term Stock option, it is necessary to know the type of lubricating oil that will be used by the customer during the operating period (mineral or polyglycol oil). Before commissioning a Bonfiglioli product with this option, make sure that the lubricating oil filling activity takes place through the specific filling plug determined by the mounting position indicated on the plate.
With regards to gear units with lifetime lubrication (see table below), the quantity of lubricating oil to top up is not indicated in the relevant “installation, use and maintenance” Bonfiglioli manual. In this case, if the Long Term Stock option is active, it is therefore necessary to contact the Bonfiglioli assistance center to receive this information.

Gearbox size	Lubricant charge quantity
HDO 71 ... HDO 160	

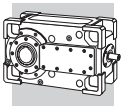
26.7.13 CERTIFICATES

AC - Certificate of compliance
The document certifies the compliance of the product with the purchase order and the construction in conformity with the applicable procedures of the Bonfiglioli Quality System.

CC - Inspection certificate
The document entails checking on order compliance, the visual inspection of external conditions and of mating dimensions. Checking on main functional parameters in unloaded conditions is also performed along with oil seal proofing, both in static and in running conditions. Units inspected are sampled within the shipping batch and marked individually.

CT - Type certificate
Further to the activities relevant to the Inspection certificate the following checks are also conducted:
• noise
• surface temperature
• tightness of external hardware
• functionality of ancillary devices, if fitted

All checks are conducted with the gear unit running unloaded. Units inspected are sampled within the shipping batch and marked individually.

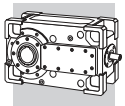


27 REFERENCE TORQUE

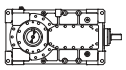
The torque values given in the table are influenced by the following elements: gear teeth, shafts and couplings. Performance may therefore vary with application conditions (see the “Thermal Capacity and Rating Charts”).

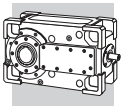
HDO

		Mn_{2ref} [Nm]													
	i_N	HDO 71	HDO 81	HDO 91	HDO 95	HDO 100	HDO 110	HDO 120	HDO 125	HDO 130	HDO 140	HDO 150	HDO 160	HDO 170	HDO 180
2x	5.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	5.6	6560	11680	—	—	20910	—	—	—	60700	—	89750	—	—	—
	6.3	7530	13060	—	—	22620	22220	31520	—	66260	69850	105160	—	—	—
	7.1	7030	11950	18910	—	23610	23580	32970	35500	65220	77290	114290	118960	—	—
	8.0	6390	11510	18230	—	22820	25740	35120	36890	65900	81460	113280	129300	—	—
	9.0	7420	12670	17150	—	23430	23790	34440	39420	65400	80240	113290	121910	—	—
	10.0	6950	11060	17810	—	22070	25960	36600	38520	62660	81680	104620	131940	—	—
	11.2	7400	12200	18040	—	23110	23040	33350	35910	65440	73090	112410	137750	—	—
	12.5	6030	10220	16970	—	21490	25180	35500	37300	59310	80740	105820	116840	—	—
	14.0	7000	11820	17920	—	22530	22480	32500	34960	64980	69190	111480	126850	—	—
	16.0	6870	11890	16850	—	—	24600	34640	36350	—	77730	—	132600	—	—
	18.0	—	—	—	—	—	—	—	38880	—	—	—	—	—	—
3x	14.0	—	—	—	—	26470	—	—	—	—	—	—	—	—	—
	16.0	7630	9930	—	—	—	—	—	—	—	—	99460	—	179960	—
	18.0	7310	11520	16760	—	26310	30740	32720	—	65750	68660	114150	111830	190190	199920
	20.0	7590	10760	17750	20040	24400	29890	35300	36480	63770	77140	110100	131830	182320	202450
	22.4	7270	12490	16690	21290	26130	29850	38530	39920	65610	82910	117200	141170	188900	202480
	25.0	7560	12280	18260	19320	24270	30740	40340	43390	63380	75510	113000	136270	190190	209900
	28.0	7240	12520	16590	20680	25990	29690	36250	45510	65810	82850	108950	146300	182320	202450
	31.5	7530	12920	18160	19200	24140	31130	38110	46950	63010	84810	116920	139750	188900	200290
	35.5	7210	12460	17520	20940	25860	29540	39350	47750	65470	82360	111930	132770	190190	209900
	40.0	7500	12870	16480	19110	24020	31240	40590	46730	62680	82170	107250	146300	190190	202450
	45.0	7180	12410	18030	19070	25750	29390	39130	46650	65130	81940	107700	138440	181730	198560
	50.0	7470	12820	16400	20680	23930	31120	37620	49240	62370	82500	114010	131890	188900	197890
	56.0	7160	12370	17960	18980	25640	29280	38990	46390	64840	81520	110770	129470	189370	209900
	63.0	7450	12770	17360	20940	23830	30990	40250	48720	62100	82170	106900	144850	180390	202450
	71.0	7140	12330	16330	18910	22260	29160	38800	47750	62420	81170	—	137030	—	196430
	80.0	—	—	—	—	—	26350	35760	49240	—	78870	—	—	—	—
	90.0	—	—	—	—	—	—	—	46010	—	—	—	—	—	—
4x	71.0	—	—	—	—	25930	—	—	—	65760	—	109890	—	180330	—
	80.0	7530	11500	18190	21220	24100	31130	—	—	63000	84810	111250	124790	190190	200360
	90.0	7220	12570	17590	20330	26910	29490	39240	—	67870	82350	117200	135850	182320	202450
	100.0	7830	11750	17710	21370	24880	30740	41250	48720	65030	82170	112750	137650	188900	199380
	112.0	7510	11790	18340	19300	27820	30610	40820	47750	69570	85000	111670	127540	190190	209900
	125.0	7010	12060	17260	21370	24880	31130	41250	49240	66770	84810	117200	137260	182320	202450
	140.0	—	13000	16540	19980	28210	31750	40920	47230	69570	87060	117090	142460	183700	207020
	160.0	8260	12070	19230	21370	24880	31350	41250	48720	66770	84810	116600	146300	190190	204100
	180.0	8100	13910	19250	20680	28210	31790	40920	47700	69570	87060	114780	147070	182320	202450
	200.0	8010	12070	20310	21370	24880	31570	41250	49240	66770	84810	117200	143330	188900	205480
	224.0	8430	14530	19250	20940	28210	31790	40920	47700	69570	87060	117090	141140	190190	209900
	250.0	7890	12070	19360	21370	24880	31570	41250	48720	66770	84810	114780	146300	182320	202450
	280.0	—	13000	20210	22400	28210	31790	40920	47230	69570	87060	—	147070	—	—
	315.0	8260	11980	18950	19420	25080	31570	41250	49240	66770	80940	—	—	—	—
	355.0	—	13910	19740	20680	23870	31790	40920	47750	63140	87060	—	—	—	—
	400.0	8150	13190	20550	23200	—	28490	37730	49240	—	78870	—	—	—	—
	450.0	8990	14740	20460	20940	—	—	—	49240	—	—	—	—	—	—
	500.0	8890	12990	21610	21940	—	—	—	—	—	—	—	—	—	—



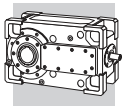
28 THERMAL CAPACITY AND RATING CHARTS

HDO 71								n_1 = 1500 min^{-1}
					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		P_{TFAN} [kW]	
HDO 71 2	**5.6**	268	4150	121	57	31	107	68
HDO 71 2	**6.5**	231	4820	121	54	30	102	65
HDO 71 2	**6.8**	222	5010	121	54	30	101	65
HDO 71 2	**7.9**	190	4630	96	57	33	102	66
HDO 71 2	**9.1**	164	5380	96	53	32	96	64
HDO 71 2	**9.5**	158	5590	96	54	32	96	63
HDO 71 2	**11.1**	135	5400	79	49	29	89	58
HDO 71 2	**12.1**	124	5370	73	48	29	87	57
HDO 71 2	**14.0**	107	6200	72	45	28	81	55
HDO 71 2	**14.6**	103	6410	72	45	28	81	54
HDO 71 3	**15.9**	94	5960	62	34	22	64	44
HDO 71 3	**18.5**	81	6910	62	33	21	62	42
HDO 71 3	**19.8**	76	6620	56	32	21	61	42
HDO 71 3	**23.0**	65	7270	53	31	20	59	40
HDO 71 3	**24.0**	62	7130	50	31	20	58	40
HDO 71 3	**27.9**	54	7240	43	30	20	57	40
HDO 71 3	**30.7**	49	7530	41	29	19	55	38
HDO 71 3	**35.6**	42	7210	34	28	19	53	37
HDO 71 3	**38.5**	39	7500	33	27	18	51	36
HDO 71 3	**44.7**	34	7180	27	26	18	49	35
HDO 71 3	**46.7**	32	7470	27	26	18	49	35
HDO 71 3	**54.2**	27.7	7160	22	25	17	47	33
HDO 71 3	**59.6**	25.2	7450	21	25	17	46	32
HDO 71 3	**69.2**	21.7	7140	17.2	24	16	44	30
HDO 71 4	**77.0**	19.5	7530	16.7	24	17	40	28
HDO 71 4	**89.4**	16.8	7220	13.8	23	17	38	28
HDO 71 4	**98.3**	15.3	7830	13.6	23	16	38	27
HDO 71 4	**114.1**	13.1	7510	11.2	22	16	37	27
HDO 71 4	**118.5**	12.7	7010	10.1	22	16	37	27
HDO 71 4	**154.4**	9.7	8260	9.1	21	15	36	26
HDO 71 4	**179.3**	8.4	8100	7.7	20	14	34	25
HDO 71 4	**197.0**	7.6	8010	6.9	20	14	34	24
HDO 71 4	**228.2**	6.6	8430	6.3	18	13	32	23
HDO 71 4	**237.7**	6.3	7890	5.7	19	14	33	24
HDO 71 4	**308.9**	4.9	8260	4.6	17	12	30	22
HDO 71 4	**394.1**	3.8	8150	3.5	16	11	28	20
HDO 71 4	**457.5**	3.3	8990	3.3	16	11	28	20
HDO 71 4	**475.4**	3.2	8890	3.2	16	11	28	19



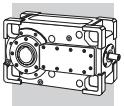
HDO 71 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 71 2	**5.6**	321	3930	138	45	21	102	63
HDO 71 2	**6.5**	277	4570	138	44	20	99	60
HDO 71 2	**6.8**	266	4750	138	44	21	98	61
HDO 71 2	**7.9**	229	4380	109	48	24	100	62
HDO 71 2	**9.1**	197	5090	109	45	24	94	60
HDO 71 2	**9.5**	189	5290	109	46	24	94	60
HDO 71 2	**11.1**	162	5110	90	42	23	88	57
HDO 71 2	**12.1**	149	5080	82	42	23	86	55
HDO 71 2	**14.0**	128	5870	82	40	23	81	53
HDO 71 2	**14.6**	123	6070	82	40	23	81	53
HDO 71 3	**15.9**	113	5640	71	31	19	65	44
HDO 71 3	**18.5**	97	6550	71	30	18	63	42
HDO 71 3	**19.8**	91	6270	63	30	18	63	42
HDO 71 3	**23.0**	78	7280	63	29	18	61	41
HDO 71 3	**24.0**	75	6750	56	28	18	59	41
HDO 71 3	**27.9**	64	7270	52	28	18	58	40
HDO 71 3	**30.7**	59	7360	48	27	17	57	39
HDO 71 3	**35.6**	51	7230	41	26	17	54	38
HDO 71 3	**38.5**	47	7230	38	26	17	54	37
HDO 71 3	**44.7**	40	7200	32	25	16	51	35
HDO 71 3	**46.7**	39	7490	32	25	16	51	35
HDO 71 3	**54.2**	33	7180	27	24	15	49	33
HDO 71 3	**59.6**	30	7470	25	23	15	47	32
HDO 71 3	**69.2**	26.0	7150	21	22	15	44	31
HDO 71 4	**77.0**	23.4	7420	19.7	24	17	42	30
HDO 71 4	**89.4**	20.1	7130	16.3	23	16	41	29
HDO 71 4	**98.3**	18.3	7600	15.8	23	16	40	29
HDO 71 4	**114.1**	15.8	7290	13.1	22	15	39	28
HDO 71 4	**118.5**	15.2	6810	11.7	22	15	39	28
HDO 71 4	**154.4**	11.7	8190	10.8	20	14	37	26
HDO 71 4	**179.3**	10.0	7860	9.0	20	14	36	26
HDO 71 4	**197.0**	9.1	8040	8.3	20	14	36	26
HDO 71 4	**228.2**	7.9	8180	7.3	18	13	34	25
HDO 71 4	**237.7**	7.6	7650	6.6	19	14	35	25
HDO 71 4	**308.9**	5.8	8260	5.5	17	12	32	23
HDO 71 4	**394.1**	4.6	7960	4.1	16	11	30	21
HDO 71 4	**457.5**	3.9	8750	3.9	15	11	28	21
HDO 71 4	**475.4**	3.8	8620	3.7	15	11	28	21



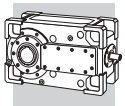
HDO 81 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 81 2	**5.5**	270	9090	268	76	39	126	76
HDO 81 2	**6.4**	233	9440	240	71	37	119	72
HDO 81 2	**6.7**	224	9490	232	73	38	120	73
HDO 81 2	**7.9**	190	9800	204	72	41	117	74
HDO 81 2	**9.1**	164	10210	183	68	39	111	71
HDO 81 2	**9.6**	156	10170	173	74	42	116	73
HDO 81 2	**11.1**	135	10630	156	68	40	108	69
HDO 81 2	**12.2**	123	10220	137	61	36	100	64
HDO 81 2	**14.2**	106	11240	130	57	34	93	61
HDO 81 2	**14.7**	102	11310	126	59	35	94	61
HDO 81 3	**15.5**	97	6570	71	47	29	77	51
HDO 81 3	**18.0**	83	7630	71	44	27	73	48
HDO 81 3	**19.9**	75	7850	66	44	27	73	48
HDO 81 3	**23.1**	65	9120	66	41	26	69	46
HDO 81 3	**24.5**	61	9270	63	42	26	69	46
HDO 81 3	**28.4**	53	10760	63	40	25	66	44
HDO 81 3	**30.7**	49	10590	58	40	26	66	45
HDO 81 3	**35.6**	42	12300	58	38	24	63	42
HDO 81 3	**38.6**	39	8750	38	35	23	59	41
HDO 81 3	**44.9**	33	10160	38	34	21	57	38
HDO 81 3	**47.5**	32	10360	36	34	22	57	39
HDO 81 3	**55.1**	27.2	12030	36	33	21	54	37
HDO 81 3	**59.6**	25.2	11940	33	33	21	54	36
HDO 81 3	**69.2**	21.7	12330	30	31	20	51	34
HDO 81 4	**78.3**	19.2	11500	25	35	24	51	35
HDO 81 4	**94.5**	15.9	12570	23	33	23	48	34
HDO 81 4	**98.2**	15.3	11750	20	34	23	49	34
HDO 81 4	**105.6**	14.2	11790	19.0	31	21	46	32
HDO 81 4	**127.4**	11.8	12060	16.1	30	21	45	32
HDO 81 4	**132.6**	11.3	13000	16.7	30	21	45	32
HDO 81 4	**159.9**	9.4	12070	12.9	29	20	44	31
HDO 81 4	**181.4**	8.3	13910	13.1	27	19	41	30
HDO 81 4	**196.5**	7.6	12070	10.5	27	19	41	29
HDO 81 4	**227.8**	6.6	14530	10.9	26	19	40	29
HDO 81 4	**254.8**	5.9	12070	8.1	24	17	37	27
HDO 81 4	**265.1**	5.7	13000	8.4	24	17	37	27
HDO 81 4	**312.6**	4.8	11980	6.5	23	16	36	25
HDO 81 4	**362.9**	4.1	13910	6.5	22	16	34	25
HDO 81 4	**392.4**	3.8	13190	5.7	23	16	35	25
HDO 81 4	**455.5**	3.3	14740	5.5	22	15	34	24
HDO 81 4	**473.3**	3.2	12990	4.7	22	16	34	24



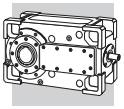
HDO 81 — n_1 = 1800 min^{-1}

					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2	Mn_2	Pn_1	P_{TB}		P_{TFAN}	
		[min^{-1}]	[Nm]	[kW]	[kW]		[kW]	
HDO 81 2	**5.5**	324	8600	304	57	24	114	66
HDO 81 2	**6.4**	279	8940	272	54	23	109	63
HDO 81 2	**6.7**	269	8980	263	56	24	110	64
HDO 81 2	**7.9**	229	9270	231	58	27	110	65
HDO 81 2	**9.1**	197	9670	208	55	27	104	63
HDO 81 2	**9.6**	188	9630	197	61	30	109	65
HDO 81 2	**11.1**	162	10060	177	57	29	103	63
HDO 81 2	**12.2**	147	10170	164	52	27	96	59
HDO 81 2	**14.2**	127	10640	147	49	26	90	56
HDO 81 2	**14.7**	122	10710	143	50	27	90	57
HDO 81 3	**15.5**	116	6570	85	41	22	75	47
HDO 81 3	**18.0**	100	7630	85	39	22	72	46
HDO 81 3	**19.9**	90	7430	75	39	22	72	46
HDO 81 3	**23.1**	78	8630	75	37	21	69	44
HDO 81 3	**24.5**	74	8770	72	38	22	69	45
HDO 81 3	**28.4**	63	10180	72	35	21	65	43
HDO 81 3	**30.7**	59	10030	65	36	21	66	43
HDO 81 3	**35.6**	51	11640	65	34	20	62	41
HDO 81 3	**38.6**	47	8290	43	32	19	60	39
HDO 81 3	**44.9**	40	9620	43	30	18	56	37
HDO 81 3	**47.5**	38	9810	41	31	18	57	37
HDO 81 3	**55.1**	33	11390	41	30	18	55	36
HDO 81 3	**59.6**	30	11300	38	30	18	54	35
HDO 81 3	**69.2**	26.0	12360	36	29	17	51	33
HDO 81 4	**78.3**	23.0	11530	30	34	23	52	36
HDO 81 4	**94.5**	19.0	12300	27	32	22	50	35
HDO 81 4	**98.2**	18.3	11500	24	33	22	50	35
HDO 81 4	**105.6**	17.0	11790	23	30	20	47	33
HDO 81 4	**127.4**	14.1	11900	19.1	29	20	46	33
HDO 81 4	**132.6**	13.6	13000	20	29	20	46	32
HDO 81 4	**159.9**	11.3	12060	15.4	28	19	45	31
HDO 81 4	**181.4**	9.9	13570	15.3	27	18	43	30
HDO 81 4	**196.5**	9.2	12070	12.6	26	18	42	30
HDO 81 4	**227.8**	7.9	14100	12.7	26	17	42	29
HDO 81 4	**254.8**	7.1	12070	9.7	23	16	38	27
HDO 81 4	**265.1**	6.8	13000	10.0	23	16	38	27
HDO 81 4	**312.6**	5.8	11980	7.8	23	15	38	26
HDO 81 4	**362.9**	5.0	13910	7.8	22	15	36	25
HDO 81 4	**392.4**	4.6	13190	6.9	22	15	36	25
HDO 81 4	**455.5**	4.0	14740	6.6	21	14	34	24
HDO 81 4	**473.3**	3.8	12610	5.4	21	15	34	25



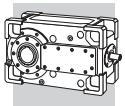
HDO 91 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 91 2	**7.4**	202	12380	272	102	56	179	112
HDO 91 2	**8.3**	181	13470	266	103	56	177	111
HDO 91 2	**9.0**	167	14150	257	91	51	163	104
HDO 91 2	**10.3**	146	13070	208	99	57	168	108
HDO 91 2	**11.5**	131	14370	205	98	57	164	105
HDO 91 2	**12.5**	120	15100	198	87	51	151	98
HDO 91 2	**14.6**	103	15280	172	88	52	147	96
HDO 91 2	**15.9**	95	16060	166	79	47	136	89
HDO 91 3	**18.6**	81	15920	143	67	42	115	77
HDO 91 3	**20.7**	72	17720	143	67	41	114	76
HDO 91 3	**22.5**	67	16690	124	61	38	107	72
HDO 91 3	**24.1**	62	17600	122	63	40	109	74
HDO 91 3	**29.1**	51	16590	95	57	36	101	68
HDO 91 3	**30.6**	49	18160	99	58	38	101	70
HDO 91 3	**36.9**	41	17520	79	55	35	96	65
HDO 91 3	**40.2**	37	16480	68	51	33	91	62
HDO 91 3	**42.9**	35	18030	70	52	33	91	62
HDO 91 3	**52.0**	28.9	16400	53	49	33	86	60
HDO 91 3	**54.5**	27.5	17960	55	50	33	86	59
HDO 91 3	**60.7**	24.7	17360	48	50	33	84	58
HDO 91 3	**66.1**	22.7	16330	41	46	31	79	55
HDO 91 4	**82.0**	18.3	16840	35	47	33	73	52
HDO 91 4	**91.3**	16.4	17590	33	47	33	73	52
HDO 91 4	**95.3**	15.7	17710	32	48	33	74	52
HDO 91 4	**118.1**	12.7	18340	26	45	31	70	49
HDO 91 4	**128.5**	11.7	17260	23	42	30	67	48
HDO 91 4	**137.1**	10.9	16540	21	40	28	65	46
HDO 91 4	**159.3**	9.4	19230	21	39	28	63	46
HDO 91 4	**177.4**	8.5	19250	18.5	39	27	63	45
HDO 91 4	**202.5**	7.4	20310	17.1	37	26	60	43
HDO 91 4	**225.4**	6.7	19250	14.5	37	26	60	43
HDO 91 4	**256.3**	5.9	19360	12.9	34	24	56	41
HDO 91 4	**268.8**	5.6	20210	12.8	34	24	56	40
HDO 91 4	**317.8**	4.7	18950	10.2	32	22	53	38
HDO 91 4	**353.8**	4.2	19740	9.5	32	22	53	37
HDO 91 4	**403.8**	3.7	20550	8.7	30	21	50	36
HDO 91 4	**449.6**	3.3	20460	7.8	30	22	50	36
HDO 91 4	**489.3**	3.1	21610	7.5	29	20	48	34



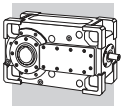
HDO 91 — n_1 = 1800 min^{-1}

					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2	Mn_2	Pn_1	P_{TB}		P_{TFAN}	
		[min^{-1}]	[Nm]	[kW]	[kW]		[kW]	
HDO 91 2	**7.4**	242	11720	309	80	36	167	100
HDO 91 2	**8.3**	217	12750	302	82	37	167	99
HDO 91 2	**9.0**	200	13390	292	74	34	156	94
HDO 91 2	**10.3**	175	12380	236	82	41	160	99
HDO 91 2	**11.5**	157	13610	233	82	41	157	96
HDO 91 2	**12.5**	144	14300	225	74	38	147	91
HDO 91 2	**14.6**	124	14470	195	75	39	143	89
HDO 91 2	**15.9**	114	15200	188	68	36	133	84
HDO 91 3	**18.6**	97	15070	162	59	34	114	74
HDO 91 3	**20.7**	87	16780	162	59	34	113	74
HDO 91 3	**22.5**	80	16770	149	54	31	107	70
HDO 91 3	**24.1**	75	16660	139	56	33	108	71
HDO 91 3	**29.1**	62	16660	114	52	31	102	68
HDO 91 3	**30.6**	59	17820	117	53	32	102	68
HDO 91 3	**36.9**	49	17580	95	49	30	96	64
HDO 91 3	**40.2**	45	16540	82	46	28	92	62
HDO 91 3	**42.9**	42	18100	84	47	29	92	62
HDO 91 3	**52.0**	35	16450	63	46	29	88	60
HDO 91 3	**54.5**	33	18020	66	46	29	87	59
HDO 91 3	**60.7**	30	17410	57	46	29	85	58
HDO 91 3	**66.1**	27.2	16380	50	43	27	81	55
HDO 91 4	**82.0**	22.0	15940	40	46	31	76	53
HDO 91 4	**91.3**	19.7	17300	39	46	31	75	53
HDO 91 4	**95.3**	18.9	17290	37	47	32	76	53
HDO 91 4	**118.1**	15.2	17810	31	44	30	73	51
HDO 91 4	**128.5**	14.0	16760	27	41	28	69	49
HDO 91 4	**137.1**	13.1	16620	25	39	27	67	48
HDO 91 4	**159.3**	11.3	19310	25	38	26	66	46
HDO 91 4	**177.4**	10.1	19020	22	38	26	65	46
HDO 91 4	**202.5**	8.9	20370	21	36	25	63	45
HDO 91 4	**225.4**	8.0	19250	17.5	36	25	62	44
HDO 91 4	**256.3**	7.0	18780	15.0	33	23	59	42
HDO 91 4	**268.8**	6.7	20270	15.4	33	23	58	42
HDO 91 4	**317.8**	5.7	19020	12.2	31	21	55	39
HDO 91 4	**353.8**	5.1	19260	11.1	31	21	55	39
HDO 91 4	**403.8**	4.5	20150	10.2	29	20	52	37
HDO 91 4	**449.6**	4.0	19910	9.1	30	20	52	36
HDO 91 4	**489.3**	3.7	20950	8.8	28	19	50	35



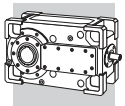
HDO 95 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 95 3	**21.2**	71	18710	147	79	50	126	85
HDO 95 3	**22.5**	67	19320	143	79	50	125	84
HDO 95 3	**24.7**	61	19320	131	75	47	121	80
HDO 95 3	**27.5**	55	20680	126	73	47	117	80
HDO 95 3	**31.9**	47	19200	100	71	46	114	77
HDO 95 3	**34.9**	43	20940	100	68	44	110	75
HDO 95 3	**40.5**	37	19110	79	65	42	105	71
HDO 95 3	**44.0**	34	19070	72	61	40	100	69
HDO 95 3	**49.0**	31	20680	70	62	41	99	69
HDO 95 3	**56.9**	26.4	18980	56	60	40	95	66
HDO 95 3	**62.2**	24.1	20940	56	58	39	92	64
HDO 95 3	**72.3**	20.7	18910	44	56	37	88	61
HDO 95 4	**81.6**	18.4	21220	44	58	41	84	60
HDO 95 4	**93.6**	16.0	19220	35	54	38	80	57
HDO 95 4	**103.7**	14.5	21370	35	55	39	80	58
HDO 95 4	**113.5**	13.2	19300	29	53	37	78	56
HDO 95 4	**128.7**	11.7	21370	28	52	36	77	54
HDO 95 4	**140.7**	10.7	19980	24	50	35	75	53
HDO 95 4	**163.5**	9.2	21370	22	49	35	73	53
HDO 95 4	**181.9**	8.2	20680	19.4	45	32	69	50
HDO 95 4	**211.3**	7.1	21370	17.2	43	31	66	48
HDO 95 4	**231.1**	6.5	20940	15.4	42	30	65	47
HDO 95 4	**256.6**	5.8	21370	14.2	42	30	64	47
HDO 95 4	**280.6**	5.3	22400	13.6	41	29	63	45
HDO 95 4	**325.7**	4.6	19420	10.2	37	26	58	42
HDO 95 4	**362.7**	4.1	20680	9.7	37	26	58	41
HDO 95 4	**421.4**	3.6	23200	9.4	36	26	56	41
HDO 95 4	**460.9**	3.3	20940	7.7	35	25	54	39
HDO 95 4	**489.7**	3.1	21940	7.6	35	25	54	39



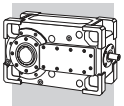
HDO 95 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 95 3	**21.2**	85	17710	167	71	42	125	81
HDO 95 3	**22.5**	80	18290	163	71	42	124	81
HDO 95 3	**24.7**	73	18900	154	67	39	119	77
HDO 95 3	**27.5**	66	19580	143	66	39	117	76
HDO 95 3	**31.9**	56	19290	121	64	39	113	75
HDO 95 3	**34.9**	52	20940	120	62	38	110	73
HDO 95 3	**40.5**	44	19180	95	60	37	105	70
HDO 95 3	**44.0**	41	19150	87	56	35	100	68
HDO 95 3	**49.0**	37	20680	85	58	37	101	68
HDO 95 3	**56.9**	32	19050	67	56	35	96	65
HDO 95 3	**62.2**	28.9	20940	67	54	35	93	64
HDO 95 3	**72.3**	24.9	18960	53	52	33	88	60
HDO 95 4	**81.6**	22.0	20650	52	58	40	88	62
HDO 95 4	**93.6**	19.2	18190	40	53	36	82	58
HDO 95 4	**103.7**	17.4	21200	42	54	37	83	58
HDO 95 4	**113.5**	15.9	18830	34	52	36	81	57
HDO 95 4	**128.7**	14.0	21370	34	51	35	79	56
HDO 95 4	**140.7**	12.8	19400	28	49	34	77	55
HDO 95 4	**163.5**	11.0	21370	27	48	34	76	54
HDO 95 4	**181.9**	9.9	20680	23	44	30	71	50
HDO 95 4	**211.3**	8.5	20730	20.0	42	29	69	48
HDO 95 4	**231.1**	7.8	20940	18.5	42	29	68	48
HDO 95 4	**256.6**	7.0	21370	17.0	41	28	67	47
HDO 95 4	**280.6**	6.4	21730	15.8	40	27	65	45
HDO 95 4	**325.7**	5.5	19490	12.2	36	25	60	43
HDO 95 4	**362.7**	5.0	20680	11.7	36	25	60	42
HDO 95 4	**421.4**	4.3	23200	11.3	35	24	58	41
HDO 95 4	**460.9**	3.9	20940	9.3	34	24	56	40
HDO 95 4	**489.7**	3.7	21940	9.2	35	24	57	40



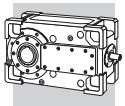
HDO 100 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 100 2	**5.8**	258	14990	422	126	72	253	165
HDO 100 2	**6.5**	232	17080	432	122	71	246	162
HDO 100 2	**7.0**	213	17740	412	121	71	242	160
HDO 100 2	**8.0**	188	17370	355	125	73	241	158
HDO 100 2	**8.7**	172	17950	337	122	72	235	155
HDO 100 2	**10.0**	150	17580	288	117	69	224	148
HDO 100 2	**10.9**	138	18220	274	115	68	219	144
HDO 100 2	**12.4**	121	17980	237	105	63	204	136
HDO 100 2	**13.5**	111	18670	226	103	62	198	132
HDO 100 3	**14.0**	107	20240	241	114	71	192	128
HDO 100 3	**15.6**	96	22210	238	110	69	187	125
HDO 100 3	**17.3**	87	21300	205	109	69	184	124
HDO 100 3	**20.2**	74	23650	195	120	79	193	133
HDO 100 3	**22.5**	67	23040	171	121	82	193	135
HDO 100 3	**25.0**	60	24270	162	117	79	187	131
HDO 100 3	**28.3**	53	24080	142	114	77	182	127
HDO 100 3	**31.5**	48	24140	128	110	75	176	124
HDO 100 3	**36.0**	42	25230	117	107	73	171	120
HDO 100 3	**40.0**	38	24020	100	103	71	165	117
HDO 100 3	**43.9**	34	25580	97	100	69	160	113
HDO 100 3	**48.8**	31	23930	82	96	67	154	110
HDO 100 3	**55.8**	26.9	25640	77	94	65	149	106
HDO 100 3	**62.0**	24.2	23830	64	91	64	144	103
HDO 100 3	**67.5**	22.2	22260	55	89	62	140	99
HDO 100 4	**70.8**	21.2	25930	62	83	59	123	89
HDO 100 4	**78.7**	19.1	24100	52	82	58	122	88
HDO 100 4	**90.0**	16.7	26910	51	80	57	120	86
HDO 100 4	**100.0**	15.0	24880	42	78	56	117	85
HDO 100 4	**111.4**	13.5	27820	43	75	54	114	83
HDO 100 4	**123.8**	12.1	24880	34	73	53	112	81
HDO 100 4	**139.8**	10.7	28210	34	72	52	110	80
HDO 100 4	**160.0**	9.4	24880	26	71	51	108	79
HDO 100 4	**178.2**	8.4	28210	27	71	51	108	78
HDO 100 4	**198.0**	7.6	24880	21	67	49	103	76
HDO 100 4	**223.7**	6.7	28210	21	66	48	102	74
HDO 100 4	**248.6**	6.0	24880	17.0	65	47	100	73
HDO 100 4	**284.4**	5.3	28210	16.9	64	46	98	71
HDO 100 4	**316.0**	4.7	25080	13.5	64	47	97	71
HDO 100 4	**344.2**	4.4	23870	11.8	62	46	95	70



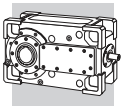
HDO 100 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 100 2	**5.8**	310	14190	479	103	49	248	156
HDO 100 2	**6.5**	279	16170	491	101	50	242	154
HDO 100 2	**7.0**	256	16790	468	101	51	239	152
HDO 100 2	**8.0**	225	16440	403	105	55	237	152
HDO 100 2	**8.7**	207	17000	383	103	55	232	150
HDO 100 2	**10.0**	180	16640	327	99	53	221	143
HDO 100 2	**10.9**	165	17250	311	98	53	217	140
HDO 100 2	**12.4**	145	17020	269	90	49	202	132
HDO 100 2	**13.5**	133	17680	257	88	48	196	128
HDO 100 3	**14.0**	128	19080	273	102	59	191	124
HDO 100 3	**15.6**	116	20950	270	99	57	186	121
HDO 100 3	**17.3**	104	20070	232	99	58	185	121
HDO 100 3	**20.2**	89	22110	219	113	70	197	131
HDO 100 3	**22.5**	80	21720	193	117	75	199	135
HDO 100 3	**25.0**	72	24090	193	112	73	192	132
HDO 100 3	**28.3**	64	22710	161	109	72	187	129
HDO 100 3	**31.5**	57	23480	149	106	70	182	126
HDO 100 3	**36.0**	50	23760	132	102	68	175	122
HDO 100 3	**40.0**	45	23480	118	99	66	170	118
HDO 100 3	**43.9**	41	24090	110	97	66	166	116
HDO 100 3	**48.8**	37	23480	96	94	64	160	113
HDO 100 3	**55.8**	32	25730	92	91	62	154	108
HDO 100 3	**62.0**	29.0	23480	76	89	61	149	105
HDO 100 3	**67.5**	26.7	22050	65	87	59	145	102
HDO 100 4	**70.8**	25.4	25620	74	83	58	129	92
HDO 100 4	**78.7**	22.9	23480	61	82	57	128	91
HDO 100 4	**90.0**	20.0	26160	59	80	56	125	89
HDO 100 4	**100.0**	18.0	23480	48	77	54	122	87
HDO 100 4	**111.4**	16.2	26450	49	75	53	120	86
HDO 100 4	**123.8**	14.5	23480	39	73	52	117	84
HDO 100 4	**139.8**	12.9	26450	39	72	51	115	83
HDO 100 4	**160.0**	11.3	23480	30	71	50	114	81
HDO 100 4	**178.2**	10.1	26450	30	71	51	113	82
HDO 100 4	**198.0**	9.1	23480	24	68	48	109	78
HDO 100 4	**223.7**	8.0	26450	24	67	48	108	78
HDO 100 4	**248.6**	7.2	24880	20	65	47	105	76
HDO 100 4	**284.4**	6.3	28210	20	64	46	103	74
HDO 100 4	**316.0**	5.7	24880	16.1	64	46	102	74
HDO 100 4	**344.2**	5.2	23870	14.2	63	45	100	72



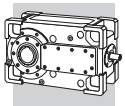
HDO 110 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 110 2	**6.4**	236	21050	542	159	100	283	191
HDO 110 2	**7.0**	213	22150	515	155	99	276	188
HDO 110 2	**8.1**	186	23880	484	149	96	265	181
HDO 110 2	**8.7**	172	23730	445	158	102	271	185
HDO 110 2	**10.0**	150	25580	418	150	98	257	177
HDO 110 2	**10.9**	138	23040	346	150	99	254	175
HDO 110 2	**12.5**	120	25180	329	142	94	240	166
HDO 110 2	**13.5**	111	22480	272	105	61	200	131
HDO 110 2	**15.5**	97	24600	260	100	59	189	125
HDO 110 3	**18.9**	79	24850	219	110	69	184	124
HDO 110 3	**20.9**	72	25980	207	107	68	180	122
HDO 110 3	**22.0**	68	25740	195	124	82	196	135
HDO 110 3	**24.6**	61	26070	177	120	80	190	132
HDO 110 3	**27.2**	55	28100	172	116	78	185	129
HDO 110 3	**30.9**	48	28060	151	113	75	180	124
HDO 110 3	**34.3**	44	29540	144	111	75	176	123
HDO 110 3	**39.3**	38	29350	125	107	72	169	118
HDO 110 3	**43.6**	34	29390	113	104	70	164	114
HDO 110 3	**48.0**	31	31120	108	99	68	157	111
HDO 110 3	**53.1**	28	29280	92	96	66	152	107
HDO 110 3	**61.0**	25	30990	85	94	65	147	104
HDO 110 3	**67.5**	22	29160	72	92	63	143	100
HDO 110 3	**77.5**	19.4	26350	57	89	62	137	97
HDO 110 4	**77.4**	19.4	31130	69	86	61	126	91
HDO 110 4	**85.7**	17.5	29490	59	84	60	124	89
HDO 110 4	**96.7**	15.5	30690	54	80	57	120	86
HDO 110 4	**108.9**	13.8	30610	48	80	58	119	87
HDO 110 4	**121.7**	12.3	31130	44	76	54	115	82
HDO 110 4	**137.1**	10.9	30410	38	74	54	112	82
HDO 110 4	**154.7**	9.7	31350	35	71	51	109	79
HDO 110 4	**174.3**	8.6	31790	31	71	51	108	78
HDO 110 4	**194.7**	7.7	31570	28	69	50	105	77
HDO 110 4	**215.7**	7.0	31790	25	70	51	106	77
HDO 110 4	**244.4**	6.1	31570	22	69	50	104	76
HDO 110 4	**274.2**	5.5	31790	19.7	67	49	101	74
HDO 110 4	**310.7**	4.8	31570	17.3	66	48	99	73
HDO 110 4	**344.2**	4.4	31790	15.7	64	47	97	71
HDO 110 4	**395.0**	3.8	28490	12.3	61	44	92	67



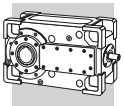
HDO 110 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 110 2	**6.4**	283	19920	615	140	81	282	185
HDO 110 2	**7.0**	256	20970	585	138	81	276	182
HDO 110 2	**8.1**	223	22600	549	135	81	267	178
HDO 110 2	**8.7**	207	22470	506	143	87	272	182
HDO 110 2	**10.0**	180	24220	475	137	85	259	175
HDO 110 2	**10.9**	165	23040	415	138	86	257	173
HDO 110 2	**12.5**	144	25180	395	132	83	244	165
HDO 110 2	**13.5**	133	21820	317	88	46	196	126
HDO 110 2	**15.5**	116	23570	298	85	45	187	120
HDO 110 3	**18.9**	95	23370	247	99	58	184	120
HDO 110 3	**20.9**	86	24470	234	97	57	180	118
HDO 110 3	**22.0**	82	24090	219	117	74	199	134
HDO 110 3	**24.6**	73	24360	198	115	73	195	132
HDO 110 3	**27.2**	66	26510	195	111	71	189	129
HDO 110 3	**30.9**	58	26450	171	107	69	183	125
HDO 110 3	**34.3**	53	28210	165	106	69	180	123
HDO 110 3	**39.3**	46	27660	141	102	66	173	118
HDO 110 3	**43.6**	41	29500	136	99	65	168	116
HDO 110 3	**48.0**	38	30190	126	96	63	163	112
HDO 110 3	**53.1**	34	29040	109	93	62	157	109
HDO 110 3	**61.0**	29.5	29090	96	91	61	152	106
HDO 110 3	**67.5**	26.7	29040	86	89	60	147	103
HDO 110 3	**77.5**	23.2	26010	67	87	59	142	99
HDO 110 4	**77.4**	23.3	29530	78	86	60	132	94
HDO 110 4	**85.7**	21.0	29040	69	84	59	130	92
HDO 110 4	**96.7**	18.6	28930	61	80	56	125	89
HDO 110 4	**108.9**	16.5	29040	54	80	57	125	90
HDO 110 4	**121.7**	14.8	30300	51	75	53	119	85
HDO 110 4	**137.1**	13.1	28650	43	74	53	118	85
HDO 110 4	**154.7**	11.6	30850	41	71	51	114	83
HDO 110 4	**174.3**	10.3	29040	34	71	51	113	82
HDO 110 4	**194.7**	9.2	31570	33	69	49	111	80
HDO 110 4	**215.7**	8.3	29040	28	70	51	111	81
HDO 110 4	**244.4**	7.4	31570	26	69	50	109	79
HDO 110 4	**274.2**	6.6	29040	22	67	49	106	78
HDO 110 4	**310.7**	5.8	29090	19.1	66	48	104	76
HDO 110 4	**344.2**	5.2	31790	18.9	65	47	102	74
HDO 110 4	**395.0**	4.6	28490	14.7	61	44	97	70



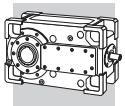
HDO 120 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 120 2	**6.6**	228	27460	684	204	129	350	237
HDO 120 2	**7.2**	210	29900	684	200	127	343	232
HDO 120 2	**8.1**	186	32870	666	200	129	338	230
HDO 120 2	**8.9**	169	33980	627	207	136	340	234
HDO 120 2	**10.0**	150	35860	586	203	134	331	228
HDO 120 2	**11.1**	135	33350	493	196	130	319	220
HDO 120 2	**12.5**	120	35500	464	195	130	312	216
HDO 120 2	**13.7**	109	32500	387	179	120	291	203
HDO 120 2	**15.5**	97	34640	365	176	117	282	195
HDO 120 3	**17.3**	87	31620	306	146	95	236	161
HDO 120 3	**19.5**	77	34750	298	145	94	233	159
HDO 120 3	**21.8**	69	33390	256	142	94	228	157
HDO 120 3	**24.6**	61	34510	234	138	92	222	154
HDO 120 3	**28.3**	53	33780	199	150	103	231	163
HDO 120 3	**32.0**	47	37340	195	146	100	225	158
HDO 120 3	**34.8**	43	37920	182	141	97	218	154
HDO 120 3	**41.2**	36	39780	161	136	94	209	148
HDO 120 3	**44.9**	33	39130	145	132	91	203	143
HDO 120 3	**49.5**	30	36900	124	126	88	195	138
HDO 120 3	**53.9**	28	38990	121	123	86	189	135
HDO 120 3	**63.9**	23	40250	105	119	83	181	129
HDO 120 3	**69.6**	22	38800	93	116	81	176	125
HDO 120 3	**78.6**	19.1	35760	76	115	81	172	123
HDO 120 4	**87.0**	17.2	35210	69	103	74	150	109
HDO 120 4	**103.1**	14.5	38150	63	99	72	146	106
HDO 120 4	**112.3**	13.4	40820	62	97	70	143	104
HDO 120 4	**125.7**	11.9	38460	52	96	70	142	104
HDO 120 4	**136.9**	11.0	40920	51	94	68	139	101
HDO 120 4	**162.2**	9.2	41250	43	93	67	138	100
HDO 120 4	**179.7**	8.3	39850	38	90	65	134	97
HDO 120 4	**201.1**	7.5	41250	35	87	64	130	96
HDO 120 4	**219.0**	6.8	40920	32	85	62	128	93
HDO 120 4	**252.4**	5.9	41250	28	82	60	123	90
HDO 120 4	**282.7**	5.3	40920	25	80	58	120	88
HDO 120 4	**325.9**	4.6	41250	22	79	57	118	86
HDO 120 4	**354.9**	4.2	40920	20	79	58	117	86
HDO 120 4	**400.6**	3.7	37730	16.0	78	57	115	84



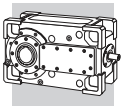
HDO 120 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 120 2	**6.6**	274	26000	777	180	105	347	228
HDO 120 2	**7.2**	252	28310	777	178	105	341	225
HDO 120 2	**8.1**	223	31120	756	181	109	338	224
HDO 120 2	**8.9**	203	32170	713	190	118	342	230
HDO 120 2	**10.0**	180	33950	666	188	117	334	224
HDO 120 2	**11.1**	163	33350	591	183	115	323	218
HDO 120 2	**12.5**	144	35500	557	182	116	315	214
HDO 120 2	**13.7**	131	32500	465	168	108	296	202
HDO 120 2	**15.5**	116	34640	439	165	106	286	195
HDO 120 3	**17.3**	104	29590	343	134	82	236	157
HDO 120 3	**19.5**	92	32780	337	133	81	233	155
HDO 120 3	**21.8**	83	31460	289	133	84	231	156
HDO 120 3	**24.6**	73	32560	265	131	83	227	153
HDO 120 3	**28.3**	64	31840	225	146	96	238	164
HDO 120 3	**32.0**	56	35200	221	142	94	232	160
HDO 120 3	**34.8**	52	35750	206	138	91	226	155
HDO 120 3	**41.2**	44	37510	182	131	88	214	149
HDO 120 3	**44.9**	40	38110	170	128	85	209	145
HDO 120 3	**49.5**	36	34480	139	124	85	202	143
HDO 120 3	**53.9**	33	37560	139	121	83	197	139
HDO 120 3	**63.9**	28.2	38880	122	117	80	188	132
HDO 120 3	**69.6**	25.9	38500	111	114	78	182	128
HDO 120 3	**78.6**	22.9	34920	89	113	77	178	124
HDO 120 4	**87.0**	20.7	33220	78	103	73	157	113
HDO 120 4	**103.1**	17.5	35970	71	100	71	153	110
HDO 120 4	**112.3**	16.0	38500	70	98	69	151	108
HDO 120 4	**125.7**	14.3	36240	59	97	69	149	107
HDO 120 4	**136.9**	13.2	38500	57	94	68	146	106
HDO 120 4	**162.2**	11.1	38880	49	93	66	144	103
HDO 120 4	**179.7**	10.0	37560	43	91	65	141	102
HDO 120 4	**201.1**	9.0	38880	40	88	64	137	100
HDO 120 4	**219.0**	8.2	38500	36	86	62	134	98
HDO 120 4	**252.4**	7.1	38880	31	83	60	130	95
HDO 120 4	**282.7**	6.4	38500	28	81	58	127	92
HDO 120 4	**325.9**	5.5	38880	24	79	57	124	90
HDO 120 4	**354.9**	5.1	40920	24	80	58	124	90
HDO 120 4	**400.6**	4.5	37730	19.2	79	57	121	88



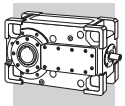
HDO 125 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 125 2	**7.4**	202	30980	684	256	166	397	270
HDO 125 2	**8.0**	188	33330	683	253	165	391	267
HDO 125 2	**8.8**	170	36910	684	242	159	376	257
HDO 125 2	**9.9**	152	38280	634	262	173	390	267
HDO 125 2	**11.5**	131	35910	512	252	167	373	256
HDO 125 2	**12.3**	122	37300	494	250	167	368	253
HDO 125 2	**14.2**	105	34970	402	229	154	339	235
HDO 125 2	**15.3**	98	36350	388	225	151	332	230
HDO 125 2	**16.9**	89	38880	375	216	147	318	222
HDO 125 3	**19.2**	78	35530	308	199	132	287	197
HDO 125 3	**22.6**	66	37160	275	194	130	279	193
HDO 125 3	**24.3**	62	39990	275	191	128	275	190
HDO 125 3	**27.7**	54	40300	243	184	125	266	185
HDO 125 3	**33.0**	45	43560	220	171	117	249	174
HDO 125 3	**35.8**	42	44100	206	171	117	247	173
HDO 125 3	**38.8**	39	45680	197	189	131	263	186
HDO 125 3	**43.0**	35	46650	181	177	123	249	176
HDO 125 3	**50.1**	30	48640	162	175	122	243	172
HDO 125 3	**55.4**	27.1	46390	140	165	116	231	164
HDO 125 3	**60.1**	24.9	44800	124	161	114	225	161
HDO 125 3	**72.1**	20.8	47750	110	154	109	213	152
HDO 125 3	**77.6**	19.3	49240	106	152	107	209	149
HDO 125 3	**85.9**	17.5	46010	89	144	102	198	142
HDO 125 4	**97.0**	15.5	39260	69	132	96	179	131
HDO 125 4	**116.3**	12.9	47090	69	127	92	173	126
HDO 125 4	**125.2**	12.0	49240	67	125	91	171	125
HDO 125 4	**141.8**	10.6	45000	54	119	87	164	120
HDO 125 4	**152.6**	9.8	48420	54	118	85	163	118
HDO 125 4	**178.0**	8.4	47230	45	112	81	156	113
HDO 125 4	**200.3**	7.5	44430	38	109	79	152	111
HDO 125 4	**226.9**	6.6	47230	35	104	76	146	107
HDO 125 4	**244.1**	6.1	48720	34	106	77	148	108
HDO 125 4	**284.8**	5.3	47230	28	103	76	143	106
HDO 125 4	**315.2**	4.8	49240	27	101	74	141	103
HDO 125 4	**367.6**	4.1	47750	22	99	73	137	101
HDO 125 4	**395.6**	3.8	49240	21	98	72	135	99
HDO 125 4	**438.0**	3.4	49240	19.1	94	69	130	96



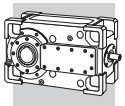
HDO 125 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 125 2	**7.4**	243	29330	777	231	140	392	258
HDO 125 2	**8.0**	226	31560	777	230	141	387	257
HDO 125 2	**8.8**	204	34940	776	222	138	374	250
HDO 125 2	**9.9**	182	36250	720	241	153	387	261
HDO 125 2	**11.5**	157	35910	614	234	150	372	252
HDO 125 2	**12.3**	146	37300	593	234	151	368	250
HDO 125 2	**14.2**	127	34960	482	215	139	341	232
HDO 125 2	**15.3**	118	36350	466	211	137	333	227
HDO 125 2	**16.9**	106	38880	450	204	135	320	220
HDO 125 3	**19.2**	94	33640	350	186	118	286	192
HDO 125 3	**22.6**	80	35190	312	184	118	281	190
HDO 125 3	**24.3**	74	37860	312	181	117	277	187
HDO 125 3	**27.7**	65	38150	275	177	115	270	183
HDO 125 3	**33.0**	54	41240	250	165	108	254	173
HDO 125 3	**35.8**	50	41760	234	165	108	252	172
HDO 125 3	**38.8**	46	43250	223	186	126	271	188
HDO 125 3	**43.0**	42	44620	208	175	119	257	179
HDO 125 3	**50.1**	36	46050	184	171	117	249	174
HDO 125 3	**55.4**	32	46570	168	162	110	237	165
HDO 125 3	**60.1**	29.9	42420	141	159	110	232	163
HDO 125 3	**72.1**	25.0	47620	132	153	106	220	155
HDO 125 3	**77.6**	23.2	49240	127	150	104	215	152
HDO 125 3	**85.9**	20.9	46160	108	142	99	204	144
HDO 125 4	**97.0**	18.6	37170	78	134	96	188	135
HDO 125 4	**116.3**	15.5	44590	78	129	92	182	131
HDO 125 4	**125.2**	14.4	47980	78	127	91	179	129
HDO 125 4	**141.8**	12.7	42600	61	120	86	172	124
HDO 125 4	**152.6**	11.8	45850	61	118	85	169	123
HDO 125 4	**178.0**	10.1	46190	53	112	80	162	117
HDO 125 4	**200.3**	9.0	42070	43	110	79	159	115
HDO 125 4	**226.9**	7.9	47230	43	105	76	153	111
HDO 125 4	**244.1**	7.4	48720	41	107	78	155	113
HDO 125 4	**284.8**	6.3	47230	34	104	76	150	110
HDO 125 4	**315.2**	5.7	49240	32	103	75	148	108
HDO 125 4	**367.6**	4.9	47750	27	100	73	143	105
HDO 125 4	**395.6**	4.5	49240	25	99	72	142	103
HDO 125 4	**438.0**	4.1	49240	23	95	69	136	99



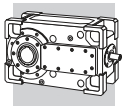
HDO 130 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 130 2	**5.7**	263	43810	1255	309	191	559	375
HDO 130 2	**6.2**	241	45370	1191	304	190	549	370
HDO 130 2	**7.1**	212	47000	1084	327	206	563	380
HDO 130 2	**7.7**	194	48650	1031	315	202	545	371
HDO 130 2	**8.8**	171	50380	939	337	214	558	376
HDO 130 2	**9.6**	156	51050	866	300	193	513	350
HDO 130 2	**11.0**	137	52950	789	326	211	529	360
HDO 130 2	**12.0**	125	53660	734	277	182	473	326
HDO 130 2	**13.6**	110	55730	670	294	192	480	329
HDO 130 3	**15.2**	99	58470	642	297	208	448	319
HDO 130 3	**18.3**	82	60430	552	287	202	433	310
HDO 130 3	**19.9**	75	63770	534	280	198	424	304
HDO 130 3	**22.6**	66	63570	469	278	197	419	300
HDO 130 3	**24.7**	61	63380	428	271	193	409	295
HDO 130 3	**28.3**	53	65810	389	264	188	398	286
HDO 130 3	**30.9**	49	63010	341	257	183	388	279
HDO 130 3	**34.9**	43	65470	313	252	180	379	273
HDO 130 3	**38.3**	39	62680	273	229	163	352	254
HDO 130 3	**43.8**	34	65130	248	225	161	343	248
HDO 130 3	**47.8**	31	62370	218	220	157	335	241
HDO 130 3	**54.0**	27.8	64840	200	218	156	328	237
HDO 130 3	**59.0**	25.4	62100	176	213	153	319	231
HDO 130 3	**67.1**	22.3	62420	155	223	160	323	234
HDO 130 4	**71.5**	21.0	65760	157	197	142	276	200
HDO 130 4	**78.1**	19.2	63000	137	198	143	277	201
HDO 130 4	**88.2**	17.0	67870	131	193	140	271	197
HDO 130 4	**96.3**	15.6	65030	115	189	137	267	194
HDO 130 4	**111.2**	13.5	69570	107	180	131	257	187
HDO 130 4	**121.4**	12.4	66770	94	177	129	253	185
HDO 130 4	**141.3**	10.6	69570	84	167	121	242	176
HDO 130 4	**154.3**	9.7	66770	74	164	119	238	173
HDO 130 4	**174.3**	8.6	69570	68	160	116	233	169
HDO 130 4	**190.3**	7.9	66770	60	158	115	230	168
HDO 130 4	**219.1**	6.8	69570	54	147	107	217	159
HDO 130 4	**239.1**	6.3	66770	48	148	108	217	159
HDO 130 4	**270.2**	5.6	69570	44	144	106	211	156
HDO 130 4	**294.9**	5.1	66770	39	139	101	205	150
HDO 130 4	**335.6**	4.5	63140	32	144	105	208	152



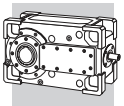
HDO 130 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 130 2	**5.7**	315	41480	1426	269	141	554	351
HDO 130 2	**6.2**	289	42950	1353	267	144	546	349
HDO 130 2	**7.1**	254	44500	1232	287	161	556	359
HDO 130 2	**7.7**	233	46060	1172	282	165	544	358
HDO 130 2	**8.8**	205	47690	1066	301	178	552	363
HDO 130 2	**9.6**	187	48330	984	273	166	516	345
HDO 130 2	**11.0**	164	50120	896	298	184	530	354
HDO 130 2	**12.0**	151	50800	834	255	161	479	326
HDO 130 2	**13.6**	132	52750	761	271	169	483	325
HDO 130 3	**15.2**	119	55160	727	289	197	461	323
HDO 130 3	**18.3**	99	56980	625	281	193	448	316
HDO 130 3	**19.9**	90	62200	625	274	189	438	310
HDO 130 3	**22.6**	80	59950	531	274	190	434	308
HDO 130 3	**24.7**	73	62590	508	267	186	424	302
HDO 130 3	**28.3**	64	65230	462	261	182	414	294
HDO 130 3	**30.9**	58	62590	406	255	178	404	288
HDO 130 3	**34.9**	52	64510	371	250	175	394	281
HDO 130 3	**38.3**	47	62590	328	227	159	367	262
HDO 130 3	**43.8**	41	64790	296	222	155	357	254
HDO 130 3	**47.8**	38	62590	262	216	152	347	248
HDO 130 3	**54.0**	33	61210	227	215	152	340	244
HDO 130 3	**59.0**	31	62330	212	210	149	331	238
HDO 130 3	**67.1**	26.8	58960	176	221	156	335	240
HDO 130 4	**71.5**	25.2	64720	185	195	138	285	205
HDO 130 4	**78.1**	23.1	61990	162	197	141	287	207
HDO 130 4	**88.2**	20.4	64510	149	193	138	282	204
HDO 130 4	**96.3**	18.7	62590	133	189	135	278	200
HDO 130 4	**111.2**	16.2	65230	120	180	129	267	193
HDO 130 4	**121.4**	14.8	62590	105	176	126	263	190
HDO 130 4	**141.3**	12.7	65230	94	166	119	251	182
HDO 130 4	**154.3**	11.7	66770	88	163	116	247	178
HDO 130 4	**174.3**	10.3	69570	82	159	114	242	175
HDO 130 4	**190.3**	9.5	66770	72	157	113	239	173
HDO 130 4	**219.1**	8.2	65230	61	147	106	227	165
HDO 130 4	**239.1**	7.5	66770	57	148	108	227	166
HDO 130 4	**270.2**	6.7	69570	53	145	105	222	161
HDO 130 4	**294.9**	6.1	66770	46	139	100	214	155
HDO 130 4	**335.6**	5.4	63140	38	144	103	217	157



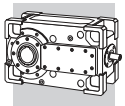
HDO 140 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 140 2	**6.6**	228	52260	1301	332	205	573	382
HDO 140 2	**7.3**	206	57840	1301	326	204	560	376
HDO 140 2	**8.2**	184	64740	1296	352	219	578	385
HDO 140 2	**9.0**	167	67890	1234	341	216	560	377
HDO 140 2	**10.1**	148	69410	1123	364	231	574	385
HDO 140 2	**11.3**	133	71210	1035	326	210	527	358
HDO 140 2	**12.6**	119	72940	944	351	227	543	368
HDO 140 2	**14.0**	108	69190	811	299	196	483	331
HDO 140 2	**15.7**	96	76770	801	317	207	491	335
HDO 140 3	**17.7**	85	68210	642	298	208	445	316
HDO 140 3	**19.9**	75	76630	642	313	218	457	324
HDO 140 3	**23.3**	64	76960	552	281	198	421	301
HDO 140 3	**26.0**	58	73170	469	281	198	417	298
HDO 140 3	**28.8**	52	80970	469	273	193	406	291
HDO 140 3	**32.5**	46	80860	415	267	190	396	285
HDO 140 3	**36.0**	42	82360	382	259	184	384	276
HDO 140 3	**40.1**	37	79400	330	254	181	375	270
HDO 140 3	**44.4**	34	81940	308	248	178	365	264
HDO 140 3	**50.4**	29.7	82500	273	228	163	340	246
HDO 140 3	**55.8**	26.9	81520	244	223	159	331	239
HDO 140 3	**62.2**	24.1	82170	220	219	157	323	233
HDO 140 3	**68.8**	21.8	81170	197	214	153	313	226
HDO 140 3	**77.3**	19.4	78870	170	226	162	320	231
HDO 140 4	**82.3**	18.2	80550	167	199	143	278	201
HDO 140 4	**91.1**	16.5	82350	154	195	140	273	197
HDO 140 4	**101.5**	14.8	82170	138	190	137	267	194
HDO 140 4	**112.3**	13.4	85000	129	186	134	263	190
HDO 140 4	**128.0**	11.7	84810	113	178	129	254	185
HDO 140 4	**141.6**	10.6	87060	105	174	126	249	181
HDO 140 4	**162.7**	9.2	84810	89	173	126	246	180
HDO 140 4	**180.0**	8.3	87060	82	169	123	241	176
HDO 140 4	**198.3**	7.6	84810	73	159	116	230	168
HDO 140 4	**219.5**	6.8	87060	68	152	110	222	162
HDO 140 4	**252.1**	5.9	84810	57	148	108	216	158
HDO 140 4	**279.0**	5.4	87060	53	145	106	212	155
HDO 140 4	**311.0**	4.8	80940	44	142	104	207	152
HDO 140 4	**344.1**	4.4	87060	43	139	101	203	148
HDO 140 4	**386.6**	3.9	78870	35	145	105	207	151



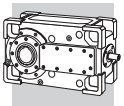
HDO 140 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 140 2	**6.6**	274	49490	1478	287	147	562	349
HDO 140 2	**7.3**	248	54750	1478	282	150	549	346
HDO 140 2	**8.2**	220	61300	1473	305	171	563	360
HDO 140 2	**9.0**	200	64270	1401	305	179	554	362
HDO 140 2	**10.1**	178	65720	1276	324	192	563	368
HDO 140 2	**11.3**	160	67420	1176	296	180	525	349
HDO 140 2	**12.6**	142	69060	1072	319	196	538	357
HDO 140 2	**14.0**	129	66760	939	276	171	485	325
HDO 140 2	**15.7**	115	72680	910	291	181	489	327
HDO 140 3	**17.7**	102	64350	727	288	196	456	319
HDO 140 3	**19.9**	90	72270	727	303	205	467	326
HDO 140 3	**23.3**	77	72600	625	274	188	433	305
HDO 140 3	**26.0**	69	69020	531	276	190	432	304
HDO 140 3	**28.8**	63	76390	531	268	186	420	298
HDO 140 3	**32.5**	55	76280	470	263	183	410	291
HDO 140 3	**36.0**	50	80850	450	256	178	399	283
HDO 140 3	**40.1**	45	74300	371	251	175	389	277
HDO 140 3	**44.4**	41	80850	365	246	173	380	271
HDO 140 3	**50.4**	36	81510	324	225	157	353	251
HDO 140 3	**55.8**	32	80850	290	219	153	342	244
HDO 140 3	**62.2**	28.9	74300	239	216	151	334	238
HDO 140 3	**68.8**	26.2	80850	235	210	148	323	231
HDO 140 3	**77.3**	23.3	73920	191	223	157	330	236
HDO 140 4	**82.3**	21.9	76010	189	198	139	288	205
HDO 140 4	**91.1**	19.8	80850	181	193	136	282	201
HDO 140 4	**101.5**	17.7	74300	150	189	134	277	199
HDO 140 4	**112.3**	16.0	80850	147	185	131	272	195
HDO 140 4	**128.0**	14.1	81510	130	177	125	263	188
HDO 140 4	**141.6**	12.7	80850	117	173	123	258	186
HDO 140 4	**162.7**	11.1	81510	102	172	123	256	185
HDO 140 4	**180.0**	10.0	80850	92	168	121	250	182
HDO 140 4	**198.3**	9.1	81510	84	159	114	240	174
HDO 140 4	**219.5**	8.2	80850	75	151	108	231	167
HDO 140 4	**252.1**	7.1	81510	66	148	106	226	163
HDO 140 4	**279.0**	6.5	87060	64	145	104	221	160
HDO 140 4	**311.0**	5.8	81180	53	142	102	217	157
HDO 140 4	**344.1**	5.2	87060	52	139	100	212	153
HDO 140 4	**386.6**	4.7	78870	42	145	104	216	156



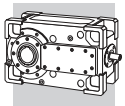
HDO 150 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 150 2	**5.5**	272	67710	2009	432	241	700	438
HDO 150 2	**6.5**	232	79310	2008	424	242	681	431
HDO 150 2	**7.0**	213	81770	1901	412	234	663	418
HDO 150 2	**8.1**	184	84250	1694	444	274	684	450
HDO 150 2	**8.9**	169	86910	1605	429	266	662	437
HDO 150 2	**10.0**	150	88070	1439	418	262	641	426
HDO 150 2	**10.9**	138	90930	1364	410	260	626	419
HDO 150 2	**12.6**	119	92930	1206	375	239	578	389
HDO 150 2	**13.7**	109	96020	1144	362	233	558	377
HDO 150 3	**15.6**	96	90530	967	395	268	554	385
HDO 150 3	**18.3**	82	102670	936	382	258	537	372
HDO 150 3	**19.9**	75	105070	880	369	251	522	363
HDO 150 3	**21.7**	69	104840	806	368	252	518	362
HDO 150 3	**25.4**	59	113000	742	354	244	499	351
HDO 150 3	**28.2**	53	105090	621	267	169	409	273
HDO 150 3	**30.7**	49	99350	539	264	168	403	270
HDO 150 3	**36.0**	42	111930	519	255	163	388	261
HDO 150 3	**40.2**	37	100660	418	231	145	360	240
HDO 150 3	**43.8**	34	107700	411	228	144	353	236
HDO 150 3	**47.6**	31	110750	388	224	143	345	232
HDO 150 3	**55.8**	26.9	110770	331	218	139	333	223
HDO 150 3	**60.8**	24.7	106900	293	212	136	323	217
HDO 150 4	**66.9**	22.4	94970	242	244	174	328	236
HDO 150 4	**78.3**	19.1	111250	242	243	174	327	235
HDO 150 4	**92.9**	16.1	117200	215	232	166	314	227
HDO 150 4	**101.8**	14.7	111630	187	245	178	327	238
HDO 150 4	**110.9**	13.5	111670	171	238	173	319	233
HDO 150 4	**120.8**	12.4	117200	165	233	169	314	228
HDO 150 4	**141.5**	10.6	117090	141	222	161	301	219
HDO 150 4	**157.9**	9.5	113780	123	209	153	287	210
HDO 150 4	**171.9**	8.7	114780	114	204	149	281	206
HDO 150 4	**187.2**	8.0	117200	107	201	147	277	203
HDO 150 4	**219.3**	6.8	117090	91	196	143	270	198
HDO 150 4	**238.8**	6.3	114780	82	195	143	268	197



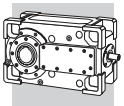
HDO 150 — n_1 = 1800 min^{-1}

					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2	Mn_2	Pn_1	P_{TB}		P_{TFAN}	
		[min^{-1}]	[Nm]	[kW]	[kW]		[kW]	
HDO 150 2	**5.5**	327	64090	2282	341	134	646	358
HDO 150 2	**6.5**	279	75090	2282	343	143	636	358
HDO 150 2	**7.0**	256	77410	2160	336	144	622	354
HDO 150 2	**8.1**	221	79760	1925	387	209	660	410
HDO 150 2	**8.9**	203	82270	1823	376	206	642	401
HDO 150 2	**10.0**	180	83380	1635	371	210	625	397
HDO 150 2	**10.9**	165	86080	1550	368	214	614	395
HDO 150 2	**12.6**	143	87980	1370	339	203	571	374
HDO 150 2	**13.7**	131	90900	1299	330	198	553	362
HDO 150 3	**15.6**	115	85410	1095	375	245	556	378
HDO 150 3	**18.3**	98	96850	1060	363	238	540	368
HDO 150 3	**19.9**	90	99110	996	351	231	525	359
HDO 150 3	**21.7**	83	98890	913	353	236	524	362
HDO 150 3	**25.4**	71	107800	849	342	228	508	350
HDO 150 3	**28.2**	64	99160	703	240	143	402	262
HDO 150 3	**30.7**	59	93720	611	239	144	397	260
HDO 150 3	**36.0**	50	109830	611	231	140	382	251
HDO 150 3	**40.2**	45	94980	473	208	123	355	231
HDO 150 3	**43.8**	41	103400	473	206	125	349	230
HDO 150 3	**47.6**	38	104500	439	203	122	341	224
HDO 150 3	**55.8**	32	111230	399	197	119	328	215
HDO 150 3	**60.8**	29.6	107330	354	192	116	318	209
HDO 150 4	**66.9**	26.9	89590	274	240	167	336	238
HDO 150 4	**78.3**	23.0	104990	274	240	168	335	238
HDO 150 4	**92.9**	19.4	117200	258	230	161	324	230
HDO 150 4	**101.8**	17.7	111430	224	246	176	339	245
HDO 150 4	**110.9**	16.2	108670	200	239	171	332	239
HDO 150 4	**120.8**	14.9	117200	198	234	167	326	234
HDO 150 4	**141.5**	12.7	117090	169	222	158	312	224
HDO 150 4	**157.9**	11.4	107360	139	209	150	298	215
HDO 150 4	**171.9**	10.5	114780	136	204	147	292	212
HDO 150 4	**187.2**	9.6	117200	128	201	145	288	209
HDO 150 4	**219.3**	8.2	117090	109	196	141	281	203
HDO 150 4	**238.8**	7.5	114780	98	196	142	279	203



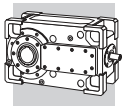
HDO 160 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 160 2	**7.3**	205	89730	2009	458	264	706	446
HDO 160 2	**7.9**	189	94750	1951	446	260	688	438
HDO 160 2	**8.9**	168	95690	1752	503	313	735	484
HDO 160 2	**10.4**	144	103430	1622	481	302	701	464
HDO 160 2	**11.3**	132	106410	1536	465	294	678	450
HDO 160 2	**12.2**	123	98150	1321	448	283	655	435
HDO 160 2	**14.2**	106	110890	1279	433	279	626	421
HDO 160 2	**15.4**	97	114230	1212	419	271	605	408
HDO 160 3	**17.7**	85	102810	967	441	300	597	415
HDO 160 3	**20.7**	72	119990	967	422	288	574	399
HDO 160 3	**22.5**	67	130430	967	410	280	559	390
HDO 160 3	**24.6**	61	119050	806	408	281	554	389
HDO 160 3	**28.8**	52	138950	806	391	270	532	374
HDO 160 3	**31.3**	48	139750	746	379	262	517	364
HDO 160 3	**34.9**	43	118520	567	298	190	432	289
HDO 160 3	**40.7**	37	138380	567	287	186	415	280
HDO 160 3	**44.3**	34	138440	522	280	181	405	273
HDO 160 3	**49.4**	30	123770	418	255	162	375	250
HDO 160 3	**54.1**	27.7	125770	388	250	160	366	245
HDO 160 3	**63.2**	23.8	144850	383	245	158	354	238
HDO 160 3	**68.6**	21.9	137030	333	239	155	344	232
HDO 160 4	**75.9**	19.8	107850	242	275	196	359	258
HDO 160 4	**88.6**	16.9	125870	242	266	190	349	251
HDO 160 4	**96.3**	15.6	136820	242	254	181	336	241
HDO 160 4	**115.2**	13.0	126280	187	262	190	343	249
HDO 160 4	**125.2**	12.0	138630	189	256	185	336	244
HDO 160 4	**137.1**	10.9	142460	177	250	181	329	239
HDO 160 4	**160.1**	9.4	146300	156	242	175	320	232
HDO 160 4	**174.0**	8.6	147070	144	236	171	313	228
HDO 160 4	**194.1**	7.7	139890	123	224	164	300	220
HDO 160 4	**212.6**	7.1	141140	113	209	153	284	208
HDO 160 4	**248.1**	6.0	146300	100	320	223	393	276
HDO 160 4	**269.7**	5.6	147070	93	314	219	385	272



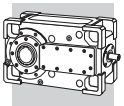
HDO 160 — n_1 = 1800 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 160 2	**7.3**	246	84950	2282	378	167	661	375
HDO 160 2	**7.9**	227	89700	2217	370	168	645	370
HDO 160 2	**8.9**	201	90600	1990	443	247	708	442
HDO 160 2	**10.4**	173	97920	1843	427	242	677	426
HDO 160 2	**11.3**	159	100750	1745	415	238	657	416
HDO 160 2	**12.2**	148	92930	1501	403	240	639	413
HDO 160 2	**14.2**	127	104970	1452	395	239	615	401
HDO 160 2	**15.4**	117	108140	1377	384	234	596	390
HDO 160 3	**17.7**	101	97020	1096	420	277	598	408
HDO 160 3	**20.7**	87	113190	1095	404	267	577	394
HDO 160 3	**22.5**	80	123030	1095	392	259	562	384
HDO 160 3	**24.6**	73	112310	913	394	263	561	386
HDO 160 3	**28.8**	63	131120	913	378	253	539	371
HDO 160 3	**31.3**	58	138760	889	367	247	525	363
HDO 160 3	**34.9**	52	110880	636	271	165	424	277
HDO 160 3	**40.7**	44	129410	636	264	161	410	268
HDO 160 3	**44.3**	41	134530	608	257	157	399	261
HDO 160 3	**49.4**	36	116760	473	231	139	368	240
HDO 160 3	**54.1**	33	118630	439	228	138	360	235
HDO 160 3	**63.2**	28.5	138490	439	224	137	348	228
HDO 160 3	**68.6**	26.2	137580	401	219	135	339	223
HDO 160 4	**75.9**	23.7	101750	274	271	190	366	260
HDO 160 4	**88.6**	20.3	118740	274	263	184	357	253
HDO 160 4	**96.3**	18.7	129080	274	250	175	344	244
HDO 160 4	**115.2**	15.6	126060	224	261	186	353	254
HDO 160 4	**125.2**	14.4	137000	224	255	182	346	249
HDO 160 4	**137.1**	13.1	143080	213	250	178	341	245
HDO 160 4	**160.1**	11.2	146300	187	242	173	331	238
HDO 160 4	**174.0**	10.3	146330	172	236	169	324	234
HDO 160 4	**194.1**	9.3	132000	139	224	162	310	226
HDO 160 4	**212.6**	8.5	141660	136	210	152	295	215
HDO 160 4	**248.1**	7.3	146300	121	310	210	393	271
HDO 160 4	**269.7**	6.7	147070	111	304	206	385	266



HDO 170 — n_1 = 1500 min^{-1}

	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	T_{amb} = 20°C P_{TB} [kW]	T_{amb} = 40°C P_{TB} [kW]	T_{amb} = 20°C P_{TFAN} [kW]	T_{amb} = 40°C P_{TFAN} [kW]
HDO 170 3	**15.9**	94	130010	1364	524	348	707	482
HDO 170 3	**18.5**	81	150910	1364	512	341	690	472
HDO 170 3	**20.0**	75	163440	1364	499	333	675	462
HDO 170 3	**21.7**	69	146900	1132	509	343	682	470
HDO 170 3	**26.2**	57	165080	1052	468	319	634	441
HDO 170 3	**28.4**	53	178800	1052	456	312	619	432
HDO 170 3	**30.7**	49	158700	862	459	314	619	432
HDO 170 3	**35.7**	42	184210	862	446	306	599	419
HDO 170 3	**38.6**	37	183140	753	400	275	550	385
HDO 170 3	**44.0**	34	181730	690	390	269	534	375
HDO 170 3	**47.6**	31	176740	619	391	270	531	373
HDO 170 3	**55.3**	27.1	189370	572	380	264	512	361
HDO 170 3	**59.9**	25.1	180390	503	374	261	502	355
HDO 170 4	**72.9**	20.6	172210	402	320	223	417	294
HDO 170 4	**84.6**	17.7	190190	383	314	219	410	289
HDO 170 4	**91.6**	16.4	182320	339	307	215	402	285
HDO 170 4	**99.3**	15.1	188900	324	309	216	403	285
HDO 170 4	**115.2**	13.0	190190	281	303	212	396	280
HDO 170 4	**124.8**	12.0	182320	249	296	208	388	276
HDO 170 4	**139.8**	10.7	183700	224	276	195	367	262
HDO 170 4	**162.3**	9.2	190190	200	258	181	348	247
HDO 170 4	**175.8**	8.5	182320	177	258	182	347	247
HDO 170 4	**190.5**	7.9	188900	169	272	194	359	258
HDO 170 4	**221.1**	6.8	190190	146	266	190	351	253
HDO 170 4	**239.5**	6.3	182320	130	261	187	345	249

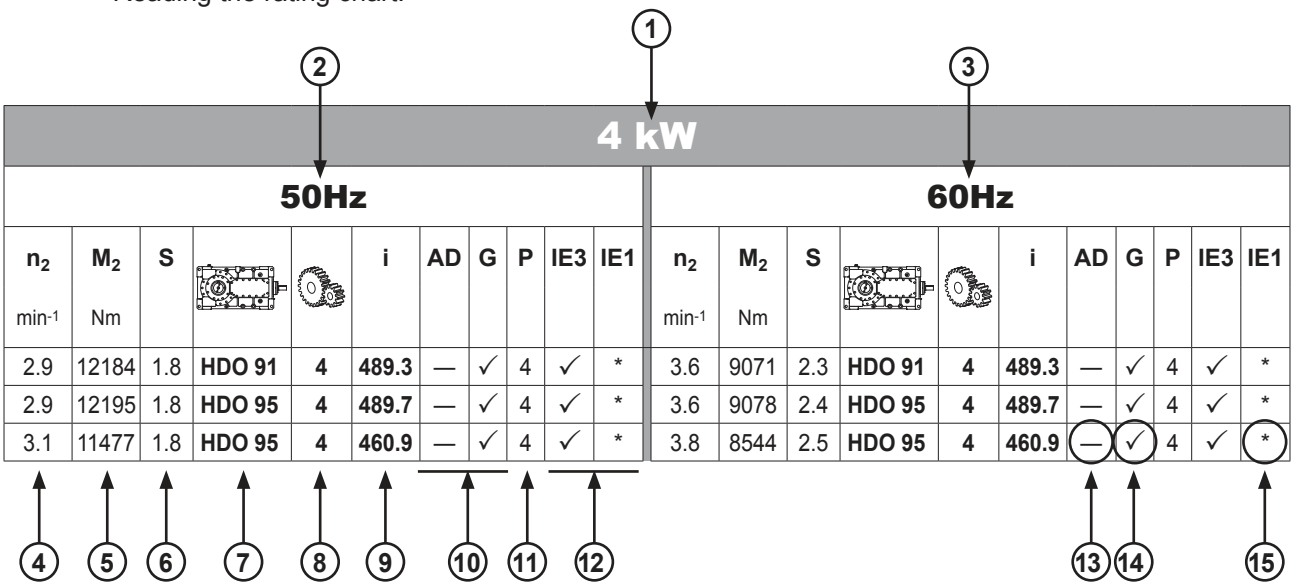


HDO 180 — n_1 = 1500 min^{-1}

					T_{amb} = 20°C	T_{amb} = 40°C	T_{amb} = 20°C	T_{amb} = 40°C
	i	n_2 [min^{-1}]	Mn_2 [Nm]	Pn_1 [kW]	P_{TB} [kW]		P_{TFAN} [kW]	
HDO 180 3	**17.7**	85	144460	1363	586	393	766	525
HDO 180 3	**20.5**	73	167160	1363	562	379	737	508
HDO 180 3	**22.1**	68	180780	1363	548	370	720	497
HDO 180 3	**24.1**	62	163220	1130	574	393	743	517
HDO 180 3	**27.9**	54	188870	1130	550	377	714	497
HDO 180 3	**31.4**	48	197760	1052	498	343	657	460
HDO 180 3	**34.1**	44	176340	862	508	351	663	465
HDO 180 3	**39.5**	38	202450	855	487	337	636	446
HDO 180 3	**42.7**	35	198560	776	477	332	622	439
HDO 180 3	**48.6**	31	197890	679	426	296	565	398
HDO 180 3	**52.9**	28.3	196380	619	433	302	568	401
HDO 180 3	**61.2**	24.5	202450	552	418	293	545	386
HDO 180 3	**66.2**	22.7	196430	495	407	285	530	375
HD0 180 4	**81.0**	18.5	191340	402	352	248	448	319
HD0 180 4	**93.7**	16.0	202450	368	341	240	436	310
HD0 180 4	**101.3**	14.8	199380	335	334	235	428	304
HD0 180 4	**110.3**	13.6	209900	324	340	240	434	309
HD0 180 4	**127.6**	11.8	202450	270	329	232	421	300
HD0 180 4	**138.0**	10.9	207020	255	311	218	402	285
HD0 180 4	**155.4**	9.7	204100	224	290	204	380	270
HD0 180 4	**179.8**	8.3	202450	192	296	211	384	276
HD0 180 4	**194.5**	7.7	205480	180	290	207	377	271
HD0 180 4	**211.6**	7.1	209900	169	296	212	382	275
HD0 180 4	**244.9**	6.1	202450	141	287	206	371	268

28.1 GEARMOTOR RATING CHARTS

Reading the rating chart.



1	Motor Power coupled with the gearbox	**9**	Gearbox ratio
2	50 Hz section	**10**	Availability for direct motor mounting (AD) / coupling through bell housing and flexible coupling (G)
3	60 Hz section	**11**	Number of motor poles
4	Gearbox output speed	**12**	Efficiency motor availability
5	Torque delivered at the output shaft	**13**	Symbol for not available variant
6	Service factor	**14**	Symbol for available variant
7	Gearbox size	**15**	Contact Bonfiglioli Technical Support
8	Gearbox stages		

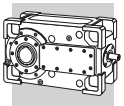
For the complete gearmotor desingation see motor correlation tables

POLE		**4**	
Efficiency class		**IE1**	**IE3**
Pn [kW]	**4**	BN 112M 4	BX 112M 4
	5.5	BN 132S 4	BX 132SB 4
	7.5	BN 132MA 4	BX 132MA 4
	9.2	BN 132MB 4	BX 160MA 4
	11	BN 160MR 4	BX 160MB 4
	15	BN 160L 4	BX 160L 4
	18.5	BN 180M 4	BX 180M 4
	22	BN 180L 4	BX 180L 4
	30	BN 200L 4	BX 200LAK 4
	37	—	BX 225SAK 4
	45	—	BX 225SBK 4
	55	—	BX 250MAK 4
	75	—	BX 280SAK 4
	90	—	BX 280SBK 4

For more information on Bonfiglioli electric motors, as available options, performances, dimensions, etc. ... see the specific catalogue.

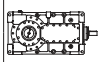
Example of complete gearmotor designation: **HDO 81 3 59.6 AD 180 BX 180M 4**

For Thermal Power validation take in consideration the appropriate catalogue section.

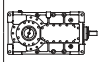


4 kW

50Hz

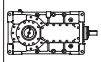
n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
2.9	12184	1.8	**HDO 91**	**4**	**489.3**	—	✓	4	✓	*
2.9	12195	1.8	**HDO 95**	**4**	**489.7**	—	✓	4	✓	*
3.1	11477	1.8	**HDO 95**	**4**	**460.9**	—	✓	4	✓	*
3.2	11196	1.8	**HDO 91**	**4**	**449.6**	—	✓	4	✓	*
3.4	10496	2.2	**HDO 95**	**4**	**421.4**	—	✓	4	✓	*
3.6	10056	2.0	**HDO 91**	**4**	**403.8**	—	✓	4	✓	*
4.0	9032	2.3	**HDO 95**	**4**	**362.7**	—	✓	4	✓	*
4.1	8811	2.2	**HDO 91**	**4**	**353.8**	—	✓	4	✓	*
4.4	8110	2.4	**HDO 95**	**4**	**325.7**	—	✓	4	✓	*
4.5	7913	2.4	**HDO 91**	**4**	**317.8**	—	✓	4	✓	*

60Hz

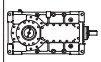
n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
3.6	9071	2.3	**HDO 91**	**4**	**489.3**	—	✓	4	✓	*
3.6	9078	2.4	**HDO 95**	**4**	**489.7**	—	✓	4	✓	*
3.8	8544	2.5	**HDO 95**	**4**	**460.9**	—	✓	4	✓	*
3.9	8335	2.4	**HDO 91**	**4**	**449.6**	—	✓	4	✓	*
4.2	7813	3.0	**HDO 95**	**4**	**421.4**	—	✓	4	✓	*
4.4	7486	2.7	**HDO 91**	**4**	**403.8**	—	✓	4	✓	*
5.0	6559	2.9	**HDO 91**	**4**	**353.8**	—	✓	4	✓	*

5.5 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
3.0	16246	1.3	**HDO 91**	**4**	**489.3**	—	✓	4	✓	*
3.0	16259	1.3	**HDO 95**	**4**	**489.7**	—	✓	4	✓	*
3.2	14929	1.4	**HDO 91**	**4**	**449.6**	—	✓	4	✓	*
3.2	15303	1.4	**HDO 95**	**4**	**460.9**	—	✓	4	✓	*
3.5	13994	1.7	**HDO 95**	**4**	**421.4**	—	✓	4	✓	*
3.6	13407	1.5	**HDO 91**	**4**	**403.8**	—	✓	4	✓	*
4.0	12043	1.7	**HDO 95**	**4**	**362.7**	—	✓	4	✓	*
4.1	11748	1.7	**HDO 91**	**4**	**353.8**	—	✓	4	✓	*
4.5	10814	1.8	**HDO 95**	**4**	**325.7**	—	✓	4	✓	*
4.6	10551	1.8	**HDO 91**	**4**	**317.8**	—	✓	4	✓	*
5.2	9317	2.4	**HDO 95**	**4**	**280.6**	—	✓	4	✓	*
5.4	8927	2.3	**HDO 91**	**4**	**268.8**	—	✓	4	✓	*
5.7	8512	2.3	**HDO 91**	**4**	**256.3**	—	✓	4	✓	*
5.7	8519	2.5	**HDO 95**	**4**	**256.6**	—	✓	4	✓	*
6.3	7674	2.7	**HDO 95**	**4**	**231.1**	—	✓	4	✓	*
6.5	7486	2.6	**HDO 91**	**4**	**225.4**	—	✓	4	✓	*

60Hz

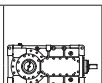
n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
3.6	13403	1.6	**HDO 91**	**4**	**489.3**	—	✓	4	✓	*
3.6	13414	1.6	**HDO 95**	**4**	**489.7**	—	✓	4	✓	*
3.8	12625	1.7	**HDO 95**	**4**	**460.9**	—	✓	4	✓	*
3.9	12316	1.6	**HDO 91**	**4**	**449.6**	—	✓	4	✓	*
4.2	11545	2.0	**HDO 95**	**4**	**421.4**	—	✓	4	✓	*
4.4	11061	1.8	**HDO 91**	**4**	**403.8**	—	✓	4	✓	*
4.9	9935	2.1	**HDO 95**	**4**	**362.7**	—	✓	4	✓	*
5.0	9692	2.0	**HDO 91**	**4**	**353.8**	—	✓	4	✓	*
5.4	8921	2.2	**HDO 95**	**4**	**325.7**	—	✓	4	✓	*
5.6	8705	2.2	**HDO 91**	**4**	**317.8**	—	✓	4	✓	*
6.3	7687	2.8	**HDO 95**	**4**	**280.6**	—	✓	4	✓	*
6.6	7364	2.8	**HDO 91**	**4**	**268.8**	—	✓	4	✓	*
6.9	7022	2.7	**HDO 91**	**4**	**256.3**	—	✓	4	✓	*

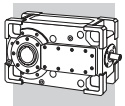
7.5 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
3.0	22112	1.0	**HDO 91**	**4**	**489.3**	—	✓	4	✓	*
3.0	22131	1.0	**HDO 95**	**4**	**489.7**	—	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
3.6	18276	1.1	**HDO 91**	**4**	**489.3**	—	✓	4	✓	*
3.6	18292	1.2	**HDO 95**	**4**	**489.7**	—	✓	4	✓	*



7.5 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
3.2	20319	1.0	**HDO 91**	**4**	**449.6**	—	✓	4	✓	*
3.2	20829	1.0	**HDO 95**	**4**	**460.9**	—	✓	4	✓	*
3.5	19048	1.2	**HDO 95**	**4**	**421.4**	—	✓	4	✓	*
3.6	18249	1.1	**HDO 91**	**4**	**403.8**	—	✓	4	✓	*
4.0	16392	1.3	**HDO 95**	**4**	**362.7**	—	✓	4	✓	*
4.1	15991	1.2	**HDO 91**	**4**	**353.8**	—	✓	4	✓	*
4.5	14719	1.3	**HDO 95**	**4**	**325.7**	—	✓	4	✓	*
4.6	14361	1.3	**HDO 91**	**4**	**317.8**	—	✓	4	✓	*
5.2	12682	1.8	**HDO 95**	**4**	**280.6**	—	✓	4	✓	*
5.4	12150	1.7	**HDO 91**	**4**	**268.8**	—	✓	4	✓	*
5.7	11586	1.7	**HDO 91**	**4**	**256.3**	—	✓	4	✓	*
5.7	11596	1.8	**HDO 95**	**4**	**256.6**	—	✓	4	✓	*
6.3	10445	2.0	**HDO 95**	**4**	**231.1**	—	✓	4	✓	*
6.5	10189	1.9	**HDO 91**	**4**	**225.4**	—	✓	4	✓	*
6.9	9552	2.2	**HDO 95**	**4**	**211.3**	—	✓	4	✓	*
7.2	9151	2.2	**HDO 91**	**4**	**202.5**	—	✓	4	✓	*
8.0	8220	2.5	**HDO 95**	**4**	**181.9**	—	✓	4	✓	*
8.2	8019	2.4	**HDO 91**	**4**	**177.4**	—	✓	4	✓	*
8.9	7389	2.9	**HDO 95**	**4**	**163.5**	—	✓	4	✓	*
9.2	7202	2.7	**HDO 91**	**4**	**159.3**	—	✓	4	✓	*
10.6	6196	2.7	**HDO 91**	**4**	**137.1**	—	✓	4	✓	*
11.4	5810	3.0	**HDO 91**	**4**	**128.5**	—	✓	4	✓	*
21.1	3190	2.2	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*
24.5	2747	2.7	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*
26.9	2500	2.9	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
3.8	17216	1.2	**HDO 95**	**4**	**460.9**	—	✓	4	✓	*
3.9	16795	1.2	**HDO 91**	**4**	**449.6**	—	✓	4	✓	*
4.2	15743	1.5	**HDO 95**	**4**	**421.4**	—	✓	4	✓	*
4.4	15083	1.3	**HDO 91**	**4**	**403.8**	—	✓	4	✓	*
4.9	13548	1.5	**HDO 95**	**4**	**362.7**	—	✓	4	✓	*
5.0	13217	1.5	**HDO 91**	**4**	**353.8**	—	✓	4	✓	*
5.4	12165	1.6	**HDO 95**	**4**	**325.7**	—	✓	4	✓	*
5.6	11870	1.6	**HDO 91**	**4**	**317.8**	—	✓	4	✓	*
6.3	10482	2.1	**HDO 95**	**4**	**280.6**	—	✓	4	✓	*
6.6	10042	2.0	**HDO 91**	**4**	**268.8**	—	✓	4	✓	*
6.9	9576	2.0	**HDO 91**	**4**	**256.3**	—	✓	4	✓	*
6.9	9584	2.2	**HDO 95**	**4**	**256.6**	—	✓	4	✓	*
7.7	8633	2.4	**HDO 95**	**4**	**231.1**	—	✓	4	✓	*
7.9	8422	2.3	**HDO 91**	**4**	**225.4**	—	✓	4	✓	*
8.4	7895	2.6	**HDO 95**	**4**	**211.3**	—	✓	4	✓	*
8.7	7564	2.7	**HDO 91**	**4**	**202.5**	—	✓	4	✓	*
10.0	6628	2.9	**HDO 91**	**4**	**177.4**	—	✓	4	✓	*
25.6	2636	2.7	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*

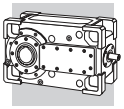
9.2 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
3.5	23324	1.0	**HDO 95**	**4**	**421.4**	—	✓	4	✓	*
3.6	22346	0.9	**HDO 91**	**4**	**403.8**	—	✓	4	✓	*
4.0	20072	1.0	**HDO 95**	**4**	**362.7**	—	✓	4	✓	*
4.1	19580	1.0	**HDO 91**	**4**	**353.8**	—	✓	4	✓	*
4.5	18023	1.1	**HDO 95**	**4**	**325.7**	—	✓	4	✓	*
4.6	17585	1.1	**HDO 91**	**4**	**317.8**	—	✓	4	✓	*
5.2	15529	1.4	**HDO 95**	**4**	**280.6**	—	✓	4	✓	*
5.4	14878	1.4	**HDO 91**	**4**	**268.8**	—	✓	4	✓	*
5.7	14187	1.4	**HDO 91**	**4**	**256.3**	—	✓	4	✓	*
5.7	14199	1.5	**HDO 95**	**4**	**256.6**	—	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
3.6	22383	0.9	**HDO 91**	**4**	**489.3**	—	✓	4	✓	*
3.6	22402	1.0	**HDO 95**	**4**	**489.7**	—	✓	4	✓	*
3.8	21084	1.0	**HDO 95**	**4**	**460.9**	—	✓	4	✓	*
3.9	20568	1.0	**HDO 91**	**4**	**449.6**	—	✓	4	✓	*
4.2	19281	1.2	**HDO 95**	**4**	**421.4**	—	✓	4	✓	*
4.4	18472	1.1	**HDO 91**	**4**	**403.8**	—	✓	4	✓	*
4.9	16592	1.2	**HDO 95**	**4**	**362.7**	—	✓	4	✓	*
5.0	16186	1.2	**HDO 91**	**4**	**353.8**	—	✓	4	✓	*
5.4	14899	1.3	**HDO 95**	**4**	**325.7**	—	✓	4	✓	*
5.6	14537	1.3	**HDO 91**	**4**	**317.8**	—	✓	4	✓	*



9.2 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
6.3	12790	1.6	**HDO 95**	**4**	**231.1**	—	✓	4	✓	*
6.5	12477	1.5	**HDO 91**	**4**	**225.4**	—	✓	4	✓	*
6.9	11696	1.8	**HDO 95**	**4**	**211.3**	—	✓	4	✓	*
7.2	11205	1.8	**HDO 91**	**4**	**202.5**	—	✓	4	✓	*
8.0	10065	2.1	**HDO 95**	**4**	**181.9**	—	✓	4	✓	*
8.2	9819	2.0	**HDO 91**	**4**	**177.4**	—	✓	4	✓	*
8.9	9048	2.4	**HDO 95**	**4**	**163.5**	—	✓	4	✓	*
9.2	8818	2.2	**HDO 91**	**4**	**159.3**	—	✓	4	✓	*
10.4	7787	2.6	**HDO 95**	**4**	**140.7**	—	✓	4	✓	*
10.6	7587	2.2	**HDO 91**	**4**	**137.1**	—	✓	4	✓	*
11.4	7114	2.4	**HDO 91**	**4**	**128.5**	—	✓	4	✓	*
12.4	6537	2.8	**HDO 91**	**4**	**118.1**	—	✓	4	✓	*
21.1	3906	1.8	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*
24.5	3364	2.2	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*
26.9	3061	2.3	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*
31	2637	2.8	**HDO 71**	**3**	**46.7**	✓	✓	4	✓	*
33	2523	2.8	**HDO 71**	**3**	**44.7**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
6.3	12837	1.7	**HDO 95**	**4**	**280.6**	—	✓	4	✓	*
6.6	12299	1.6	**HDO 91**	**4**	**268.8**	—	✓	4	✓	*
6.9	11728	1.6	**HDO 91**	**4**	**256.3**	—	✓	4	✓	*
6.9	11738	1.8	**HDO 95**	**4**	**256.6**	—	✓	4	✓	*
7.7	10573	2.0	**HDO 95**	**4**	**231.1**	—	✓	4	✓	*
7.9	10314	1.9	**HDO 91**	**4**	**225.4**	—	✓	4	✓	*
8.4	9669	2.1	**HDO 95**	**4**	**211.3**	—	✓	4	✓	*
8.7	9263	2.2	**HDO 91**	**4**	**202.5**	—	✓	4	✓	*
9.7	8320	2.5	**HDO 95**	**4**	**181.9**	—	✓	4	✓	*
10.0	8117	2.3	**HDO 91**	**4**	**177.4**	—	✓	4	✓	*
10.8	7479	2.9	**HDO 95**	**4**	**163.5**	—	✓	4	✓	*
11.1	7290	2.6	**HDO 91**	**4**	**159.3**	—	✓	4	✓	*
12.9	6272	2.6	**HDO 91**	**4**	**137.1**	—	✓	4	✓	*
13.8	5881	2.8	**HDO 91**	**4**	**128.5**	—	✓	4	✓	*
25.6	3229	2.2	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*
29.7	2781	2.7	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*
33	2531	2.8	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*

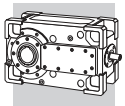
11 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
5.2	18635	1.2	**HDO 95**	**4**	**280.6**	✓	✓	4	✓	*
5.4	17853	1.1	**HDO 91**	**4**	**268.8**	✓	✓	4	✓	*
5.7	17024	1.1	**HDO 91**	**4**	**256.3**	✓	✓	4	✓	*
5.7	17039	1.3	**HDO 95**	**4**	**256.6**	✓	✓	4	✓	*
6.3	15348	1.4	**HDO 95**	**4**	**231.1**	✓	✓	4	✓	*
6.5	14972	1.3	**HDO 91**	**4**	**225.4**	✓	✓	4	✓	*
6.9	14035	1.5	**HDO 95**	**4**	**211.3**	✓	✓	4	✓	*
7.2	13447	1.5	**HDO 91**	**4**	**202.5**	✓	✓	4	✓	*
8.1	12078	1.7	**HDO 95**	**4**	**181.9**	✓	✓	4	✓	*
8.3	11782	1.6	**HDO 91**	**4**	**177.4**	✓	✓	4	✓	*
9.0	10857	2.0	**HDO 95**	**4**	**163.5**	✓	✓	4	✓	*
9.2	10582	1.8	**HDO 91**	**4**	**159.3**	✓	✓	4	✓	*
10.4	9344	2.1	**HDO 95**	**4**	**140.7**	✓	✓	4	✓	*
10.7	9105	1.8	**HDO 91**	**4**	**137.1**	✓	✓	4	✓	*
11.4	8537	2.0	**HDO 91**	**4**	**128.5**	✓	✓	4	✓	*
11.4	8544	2.5	**HDO 95**	**4**	**128.7**	✓	✓	4	✓	*
12.4	7845	2.3	**HDO 91**	**4**	**118.1**	✓	✓	4	✓	*
12.9	7535	2.6	**HDO 95**	**4**	**113.5**	✓	✓	4	✓	*
15.4	6326	2.8	**HDO 91**	**4**	**95.3**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
4.2	23052	1.0	**HDO 95**	**4**	**421.4**	✓	✓	4	✓	*
4.4	22085	0.9	**HDO 91**	**4**	**403.8**	✓	✓	4	✓	*
4.9	19837	1.0	**HDO 95**	**4**	**362.7**	✓	✓	4	✓	*
5.0	19352	1.0	**HDO 91**	**4**	**353.8**	✓	✓	4	✓	*
5.4	17813	1.1	**HDO 95**	**4**	**325.7**	✓	✓	4	✓	*
5.6	17380	1.1	**HDO 91**	**4**	**317.8**	✓	✓	4	✓	*
6.3	15348	1.4	**HDO 95**	**4**	**280.6**	✓	✓	4	✓	*
6.6	14704	1.4	**HDO 91**	**4**	**268.8**	✓	✓	4	✓	*
6.9	14021	1.3	**HDO 91**	**4**	**256.3**	✓	✓	4	✓	*
6.9	14033	1.5	**HDO 95**	**4**	**256.6**	✓	✓	4	✓	*
7.7	12640	1.7	**HDO 95**	**4**	**231.1**	✓	✓	4	✓	*
7.9	12331	1.6	**HDO 91**	**4**	**225.4**	✓	✓	4	✓	*
8.4	11559	1.8	**HDO 95**	**4**	**211.3**	✓	✓	4	✓	*
8.7	11075	1.8	**HDO 91**	**4**	**202.5**	✓	✓	4	✓	*
9.7	9948	2.1	**HDO 95**	**4**	**181.9**	✓	✓	4	✓	*
10.0	9704	2.0	**HDO 91**	**4**	**177.4**	✓	✓	4	✓	*
10.8	8942	2.4	**HDO 95**	**4**	**163.5**	✓	✓	4	✓	*
11.1	8715	2.2	**HDO 91**	**4**	**159.3**	✓	✓	4	✓	*
12.6	7696	2.5	**HDO 95**	**4**	**140.7**	✓	✓	4	✓	*



11 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
16.0	6062	2.9	**HDO 91**	**4**	**91.3**	✓	✓	4	✓	*
21.2	4687	1.5	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*
21.2	4691	2.6	**HDO 81**	**3**	**69.2**	✓	✓	4	✓	*
24.6	4037	1.8	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*
24.6	4040	3.0	**HDO 81**	**3**	**59.6**	✓	✓	4	✓	*
27.0	3673	1.9	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*
31	3164	2.4	**HDO 71**	**3**	**46.7**	✓	✓	4	✓	*
33	3028	2.4	**HDO 71**	**3**	**44.7**	✓	✓	4	✓	*
38	2608	2.9	**HDO 71**	**3**	**38.5**	✓	✓	4	✓	*
41	2413	3.0	**HDO 71**	**3**	**35.6**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
12.9	7499	2.2	**HDO 91**	**4**	**137.1**	✓	✓	4	✓	*
13.8	7031	2.4	**HDO 91**	**4**	**128.5**	✓	✓	4	✓	*
15.0	6461	2.8	**HDO 91**	**4**	**118.1**	✓	✓	4	✓	*
25.6	3860	1.9	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*
29.7	3325	2.2	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*
33	3025	2.4	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*
38	2606	2.9	**HDO 71**	**3**	**46.7**	✓	✓	4	✓	*
40	2494	2.9	**HDO 71**	**3**	**44.7**	✓	✓	4	✓	*

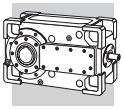
15 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
5.7	23191	0.9	**HDO 95**	**4**	**256.6**	✓	✓	4	✓	*
6.3	20890	1.0	**HDO 95**	**4**	**231.1**	✓	✓	4	✓	*
6.5	20379	0.9	**HDO 91**	**4**	**225.4**	✓	✓	4	✓	*
6.9	19103	1.1	**HDO 95**	**4**	**211.3**	✓	✓	4	✓	*
7.2	18302	1.1	**HDO 91**	**4**	**202.5**	✓	✓	4	✓	*
8.1	16440	1.3	**HDO 95**	**4**	**181.9**	✓	✓	4	✓	*
8.3	16037	1.2	**HDO 91**	**4**	**177.4**	✓	✓	4	✓	*
9.0	14778	1.4	**HDO 95**	**4**	**163.5**	✓	✓	4	✓	*
9.2	14403	1.3	**HDO 91**	**4**	**159.3**	✓	✓	4	✓	*
10.4	12719	1.6	**HDO 95**	**4**	**140.7**	✓	✓	4	✓	*
10.7	12392	1.3	**HDO 91**	**4**	**137.1**	✓	✓	4	✓	*
11.4	11620	1.5	**HDO 91**	**4**	**128.5**	✓	✓	4	✓	*
11.4	11630	1.8	**HDO 95**	**4**	**128.7**	✓	✓	4	✓	*
12.4	10678	1.7	**HDO 91**	**4**	**118.1**	✓	✓	4	✓	*
12.9	10256	1.9	**HDO 95**	**4**	**113.5**	✓	✓	4	✓	*
14.1	9378	2.3	**HDO 95**	**4**	**103.7**	✓	✓	4	✓	*
15.4	8610	2.1	**HDO 91**	**4**	**95.3**	✓	✓	4	✓	*
15.7	8458	2.3	**HDO 95**	**4**	**93.6**	✓	✓	4	✓	*
16.0	8251	2.1	**HDO 91**	**4**	**91.3**	✓	✓	4	✓	*
17.9	7410	2.3	**HDO 91**	**4**	**82.0**	✓	✓	4	✓	*
17.9	7380	2.9	**HDO 95**	**4**	**81.6**	✓	✓	4	✓	*
20.3	6670	2.8	**HDO 95**	**3**	**72.3**	—	✓	4	✓	*
21.2	6379	1.1	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*
21.2	6385	1.9	**HDO 81**	**3**	**69.2**	✓	✓	4	✓	*
22.2	6093	2.7	**HDO 91**	**3**	**66.1**	—	✓	4	✓	*
24.6	5495	1.4	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
6.3	20938	1.0	**HDO 95**	**4**	**280.6**	✓	✓	4	✓	*
6.6	20060	1.0	**HDO 91**	**4**	**268.8**	✓	✓	4	✓	*
6.9	19129	1.0	**HDO 91**	**4**	**256.3**	✓	✓	4	✓	*
6.9	19145	1.1	**HDO 95**	**4**	**256.6**	✓	✓	4	✓	*
7.7	17245	1.2	**HDO 95**	**4**	**231.1**	✓	✓	4	✓	*
7.9	16823	1.1	**HDO 91**	**4**	**225.4**	✓	✓	4	✓	*
8.4	15770	1.3	**HDO 95**	**4**	**211.3**	✓	✓	4	✓	*
8.7	15109	1.3	**HDO 91**	**4**	**202.5**	✓	✓	4	✓	*
9.7	13571	1.5	**HDO 95**	**4**	**181.9**	✓	✓	4	✓	*
10.0	13239	1.4	**HDO 91**	**4**	**177.4**	✓	✓	4	✓	*
10.8	12199	1.8	**HDO 95**	**4**	**163.5**	✓	✓	4	✓	*
11.1	11890	1.6	**HDO 91**	**4**	**159.3**	✓	✓	4	✓	*
12.6	10500	1.8	**HDO 95**	**4**	**140.7**	✓	✓	4	✓	*
12.9	10230	1.6	**HDO 91**	**4**	**137.1**	✓	✓	4	✓	*
13.8	9592	1.7	**HDO 91**	**4**	**128.5**	✓	✓	4	✓	*
13.8	9600	2.2	**HDO 95**	**4**	**128.7**	✓	✓	4	✓	*
15.0	8814	2.0	**HDO 91**	**4**	**118.1**	✓	✓	4	✓	*
15.6	8466	2.2	**HDO 95**	**4**	**113.5**	✓	✓	4	✓	*
17.1	7741	2.7	**HDO 95**	**4**	**103.7**	✓	✓	4	✓	*
18.6	7108	2.4	**HDO 91**	**4**	**95.3**	✓	✓	4	✓	*
18.9	6982	2.6	**HDO 95**	**4**	**93.6**	✓	✓	4	✓	*
19.4	6811	2.5	**HDO 91**	**4**	**91.3**	✓	✓	4	✓	*
21.6	6117	2.6	**HDO 91**	**4**	**82.0**	✓	✓	4	✓	*
25.6	5266	1.4	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*
25.6	5271	2.3	**HDO 81**	**3**	**69.2**	✓	✓	4	✓	*
29.7	4536	1.6	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*



15 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
24.6	5499	2.2	**HDO 81**	**3**	**59.6**	✓	✓	4	✓	*
26.6	5086	2.4	**HDO 81**	**3**	**55.1**	✓	✓	4	✓	*
27.0	5000	1.4	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*
31	4381	2.4	**HDO 81**	**3**	**47.5**	✓	✓	4	✓	*
31	4307	1.7	**HDO 71**	**3**	**46.7**	✓	✓	4	✓	*
33	4138	2.5	**HDO 81**	**3**	**44.9**	✓	✓	4	✓	*
33	4122	1.7	**HDO 71**	**3**	**44.7**	✓	✓	4	✓	*
38	3564	2.5	**HDO 81**	**3**	**38.6**	✓	✓	4	✓	*
38	3550	2.1	**HDO 71**	**3**	**38.5**	✓	✓	4	✓	*
41	3284	2.2	**HDO 71**	**3**	**35.6**	✓	✓	4	✓	*
48	2829	2.7	**HDO 71**	**3**	**30.7**	✓	✓	4	✓	*
53	2574	2.8	**HDO 71**	**3**	**27.9**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
29.7	4540	2.5	**HDO 81**	**3**	**59.6**	✓	✓	4	✓	*
32	4199	2.7	**HDO 81**	**3**	**55.1**	✓	✓	4	✓	*
33	4127	1.7	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*
37	3616	2.7	**HDO 81**	**3**	**47.5**	✓	✓	4	✓	*
38	3555	2.1	**HDO 71**	**3**	**46.7**	✓	✓	4	✓	*
40	3416	2.8	**HDO 81**	**3**	**44.9**	✓	✓	4	✓	*
40	3402	2.1	**HDO 71**	**3**	**44.7**	✓	✓	4	✓	*
46	2942	2.8	**HDO 81**	**3**	**38.6**	✓	✓	4	✓	*
46	2931	2.5	**HDO 71**	**3**	**38.5**	✓	✓	4	✓	*
50	2711	2.7	**HDO 71**	**3**	**35.6**	✓	✓	4	✓	*

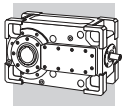
18.5 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
6.9	23587	0.9	**HDO 95**	**4**	**211.3**	✓	✓	4	✓	*
8.1	20298	1.0	**HDO 95**	**4**	**181.9**	✓	✓	4	✓	*
8.3	19801	1.0	**HDO 91**	**4**	**177.4**	✓	✓	4	✓	*
9.0	18246	1.2	**HDO 95**	**4**	**163.5**	✓	✓	4	✓	*
9.2	17784	1.1	**HDO 91**	**4**	**159.3**	✓	✓	4	✓	*
10.4	15704	1.3	**HDO 95**	**4**	**140.7**	✓	✓	4	✓	*
10.7	15301	1.1	**HDO 91**	**4**	**137.1**	✓	✓	4	✓	*
11.4	14347	1.2	**HDO 91**	**4**	**128.5**	✓	✓	4	✓	*
11.4	14359	1.5	**HDO 95**	**4**	**128.7**	✓	✓	4	✓	*
12.4	13184	1.4	**HDO 91**	**4**	**118.1**	✓	✓	4	✓	*
12.9	12663	1.5	**HDO 95**	**4**	**113.5**	✓	✓	4	✓	*
14.1	11578	1.8	**HDO 95**	**4**	**103.7**	✓	✓	4	✓	*
15.4	10631	1.7	**HDO 91**	**4**	**95.3**	✓	✓	4	✓	*
15.7	10443	1.8	**HDO 95**	**4**	**93.6**	✓	✓	4	✓	*
16.0	10187	1.7	**HDO 91**	**4**	**91.3**	✓	✓	4	✓	*
17.9	9149	1.8	**HDO 91**	**4**	**82.0**	✓	✓	4	✓	*
17.9	9112	2.3	**HDO 95**	**4**	**81.6**	✓	✓	4	✓	*
20.3	8235	2.3	**HDO 95**	**3**	**72.3**	✓	✓	4	✓	*
21.2	7876	0.9	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*
21.2	7883	1.6	**HDO 81**	**3**	**69.2**	✓	✓	4	✓	*
22.2	7523	2.2	**HDO 91**	**3**	**66.1**	✓	✓	4	✓	*
23.5	7087	3.0	**HDO 95**	**3**	**62.2**	✓	✓	4	✓	*
24.1	6913	2.5	**HDO 91**	**3**	**60.7**	✓	✓	4	✓	*
24.6	6784	1.1	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
6.9	23475	0.9	**HDO 95**	**4**	**256.6**	✓	✓	4	✓	*
7.7	21146	1.0	**HDO 95**	**4**	**231.1**	✓	✓	4	✓	*
7.9	20628	0.9	**HDO 91**	**4**	**225.4**	✓	✓	4	✓	*
8.4	19337	1.1	**HDO 95**	**4**	**211.3**	✓	✓	4	✓	*
8.8	18526	1.1	**HDO 91**	**4**	**202.5**	✓	✓	4	✓	*
9.8	16641	1.2	**HDO 95**	**4**	**181.9**	✓	✓	4	✓	*
10.0	16234	1.2	**HDO 91**	**4**	**177.4**	✓	✓	4	✓	*
10.9	14959	1.4	**HDO 95**	**4**	**163.5**	✓	✓	4	✓	*
11.2	14580	1.3	**HDO 91**	**4**	**159.3**	✓	✓	4	✓	*
12.7	12875	1.5	**HDO 95**	**4**	**140.7**	✓	✓	4	✓	*
13.0	12544	1.3	**HDO 91**	**4**	**137.1**	✓	✓	4	✓	*
13.8	11762	1.4	**HDO 91**	**4**	**128.5**	✓	✓	4	✓	*
13.8	11772	1.8	**HDO 95**	**4**	**128.7**	✓	✓	4	✓	*
15.1	10808	1.6	**HDO 91**	**4**	**118.1**	✓	✓	4	✓	*
15.7	10382	1.8	**HDO 95**	**4**	**113.5**	✓	✓	4	✓	*
17.2	9492	2.2	**HDO 95**	**4**	**103.7**	✓	✓	4	✓	*
18.7	8715	2.0	**HDO 91**	**4**	**95.3**	✓	✓	4	✓	*
19.0	8561	2.1	**HDO 95**	**4**	**93.6**	✓	✓	4	✓	*
19.5	8352	2.1	**HDO 91**	**4**	**91.3**	✓	✓	4	✓	*
21.7	7501	2.1	**HDO 91**	**4**	**82.0**	✓	✓	4	✓	*
21.8	7470	2.8	**HDO 95**	**4**	**81.6**	✓	✓	4	✓	*
24.6	6751	2.8	**HDO 95**	**3**	**72.3**	✓	✓	4	✓	*
25.7	6457	1.1	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*
25.7	6463	1.9	**HDO 81**	**3**	**69.2**	✓	✓	4	✓	*



18.5 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
24.6	6790	1.8	**HDO 81**	**3**	**59.6**	✓	✓	4	✓	*
25.7	6480	2.9	**HDO 95**	**3**	**56.9**	✓	✓	4	✓	*
26.6	6280	1.9	**HDO 81**	**3**	**55.1**	✓	✓	4	✓	*
26.9	6209	2.9	**HDO 91**	**3**	**54.5**	✓	✓	4	✓	*
27.0	6173	1.2	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*
28.2	5920	2.8	**HDO 91**	**3**	**52.0**	✓	✓	4	✓	*
31	5409	1.9	**HDO 81**	**3**	**47.5**	✓	✓	4	✓	*
31	5317	1.4	**HDO 71**	**3**	**46.7**	✓	✓	4	✓	*
33	5109	2.0	**HDO 81**	**3**	**44.9**	✓	✓	4	✓	*
33	5089	1.4	**HDO 71**	**3**	**44.7**	✓	✓	4	✓	*
38	4400	2.0	**HDO 81**	**3**	**38.6**	✓	✓	4	✓	*
38	4383	1.7	**HDO 71**	**3**	**38.5**	✓	✓	4	✓	*
41	4055	1.8	**HDO 71**	**3**	**35.6**	✓	✓	4	✓	*
48	3493	2.2	**HDO 71**	**3**	**30.7**	✓	✓	4	✓	*
53	3178	2.3	**HDO 71**	**3**	**27.9**	✓	✓	4	✓	*
61	2738	2.6	**HDO 71**	**3**	**24.0**	✓	✓	4	✓	*
64	2620	2.8	**HDO 71**	**3**	**23.0**	✓	✓	4	✓	*
74	2257	2.9	**HDO 71**	**3**	**19.8**	✓	✓	4	✓	*

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
26.9	6168	2.7	**HDO 91**	**3**	**66.1**	✓	✓	4	✓	*
29.9	5562	1.3	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*
29.9	5567	2.0	**HDO 81**	**3**	**59.6**	✓	✓	4	✓	*
32	5148	2.2	**HDO 81**	**3**	**55.1**	✓	✓	4	✓	*
33	5061	1.4	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*
38	4434	2.2	**HDO 81**	**3**	**47.5**	✓	✓	4	✓	*
38	4359	1.7	**HDO 71**	**3**	**46.7**	✓	✓	4	✓	*
40	4188	2.3	**HDO 81**	**3**	**44.9**	✓	✓	4	✓	*
40	4172	1.7	**HDO 71**	**3**	**44.7**	✓	✓	4	✓	*
46	3608	2.3	**HDO 81**	**3**	**38.6**	✓	✓	4	✓	*
46	3594	2.0	**HDO 71**	**3**	**38.5**	✓	✓	4	✓	*
50	3325	2.2	**HDO 71**	**3**	**35.6**	✓	✓	4	✓	*
58	2864	2.6	**HDO 71**	**3**	**30.7**	✓	✓	4	✓	*
64	2606	2.8	**HDO 71**	**3**	**27.9**	✓	✓	4	✓	*

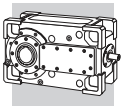
22 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
9.0	21563	1.0	**HDO 95**	**4**	**163.5**	✓	✓	4	✓	*
9.2	21017	0.9	**HDO 91**	**4**	**159.3**	✓	✓	4	✓	*
10.4	18559	1.1	**HDO 95**	**4**	**140.7**	✓	✓	4	✓	*
10.7	18083	0.9	**HDO 91**	**4**	**137.1**	✓	✓	4	✓	*
11.4	16955	1.0	**HDO 91**	**4**	**128.5**	✓	✓	4	✓	*
11.4	16970	1.3	**HDO 95**	**4**	**128.7**	✓	✓	4	✓	*
12.4	15581	1.2	**HDO 91**	**4**	**118.1**	✓	✓	4	✓	*
12.9	14965	1.3	**HDO 95**	**4**	**113.5**	✓	✓	4	✓	*
14.1	13684	1.6	**HDO 95**	**4**	**103.7**	✓	✓	4	✓	*
15.4	12564	1.4	**HDO 91**	**4**	**95.3**	✓	✓	4	✓	*
15.7	12342	1.6	**HDO 95**	**4**	**93.6**	✓	✓	4	✓	*
16.0	12039	1.5	**HDO 91**	**4**	**91.3**	✓	✓	4	✓	*
17.9	10813	1.6	**HDO 91**	**4**	**82.0**	✓	✓	4	✓	*
17.9	10768	2.0	**HDO 95**	**4**	**81.6**	✓	✓	4	✓	*
20.3	9732	1.9	**HDO 95**	**3**	**72.3**	✓	✓	4	✓	*
21.2	9316	1.3	**HDO 81**	**3**	**69.2**	✓	✓	4	✓	*
22.2	8891	1.8	**HDO 91**	**3**	**66.1**	✓	✓	4	✓	*
23.5	8375	2.5	**HDO 95**	**3**	**62.2**	✓	✓	4	✓	*

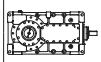
60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
8.4	23002	0.9	**HDO 95**	**4**	**211.3**	✓	✓	4	✓	*
8.8	22037	0.9	**HDO 91**	**4**	**202.5**	✓	✓	4	✓	*
9.8	19795	1.0	**HDO 95**	**4**	**181.9**	✓	✓	4	✓	*
10.0	19310	1.0	**HDO 91**	**4**	**177.4**	✓	✓	4	✓	*
10.9	17794	1.2	**HDO 95**	**4**	**163.5**	✓	✓	4	✓	*
11.1	17343	1.1	**HDO 91**	**4**	**159.3**	✓	✓	4	✓	*
12.6	15315	1.3	**HDO 95**	**4**	**140.7**	✓	✓	4	✓	*
12.9	14921	1.1	**HDO 91**	**4**	**137.1**	✓	✓	4	✓	*
13.8	13991	1.2	**HDO 91**	**4**	**128.5**	✓	✓	4	✓	*
13.8	14003	1.5	**HDO 95**	**4**	**128.7**	✓	✓	4	✓	*
15.0	12857	1.4	**HDO 91**	**4**	**118.1**	✓	✓	4	✓	*
15.6	12349	1.5	**HDO 95**	**4**	**113.5**	✓	✓	4	✓	*
17.1	11291	1.9	**HDO 95**	**4**	**103.7**	✓	✓	4	✓	*
18.6	10367	1.7	**HDO 91**	**4**	**95.3**	✓	✓	4	✓	*
19.0	10184	1.8	**HDO 95**	**4**	**93.6**	✓	✓	4	✓	*
19.4	9935	1.7	**HDO 91**	**4**	**91.3**	✓	✓	4	✓	*
21.7	8922	1.8	**HDO 91**	**4**	**82.0**	✓	✓	4	✓	*
21.7	8886	2.3	**HDO 95**	**4**	**81.6**	✓	✓	4	✓	*

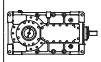


22 kW

50Hz

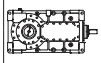
n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
24.1	8170	2.1	**HDO 91**	**3**	**60.7**	✓	✓	4	✓	*
24.6	8018	0.9	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*
24.6	8024	1.5	**HDO 81**	**3**	**59.6**	✓	✓	4	✓	*
25.7	7659	2.5	**HDO 95**	**3**	**56.9**	✓	✓	4	✓	*
26.6	7422	1.6	**HDO 81**	**3**	**55.1**	✓	✓	4	✓	*
26.9	7338	2.4	**HDO 91**	**3**	**54.5**	✓	✓	4	✓	*
27.0	7296	1.0	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*
28.2	6997	2.3	**HDO 91**	**3**	**52.0**	✓	✓	4	✓	*
31	6392	1.6	**HDO 81**	**3**	**47.5**	✓	✓	4	✓	*
31	6284	1.2	**HDO 71**	**3**	**46.7**	✓	✓	4	✓	*
33	6038	1.7	**HDO 81**	**3**	**44.9**	✓	✓	4	✓	*
33	6014	1.2	**HDO 71**	**3**	**44.7**	✓	✓	4	✓	*
38	5201	1.7	**HDO 81**	**3**	**38.6**	✓	✓	4	✓	*
38	5180	1.4	**HDO 71**	**3**	**38.5**	✓	✓	4	✓	*
41	4793	1.5	**HDO 71**	**3**	**35.6**	✓	✓	4	✓	*
41	4797	2.6	**HDO 81**	**3**	**35.6**	✓	✓	4	✓	*
48	4132	2.6	**HDO 81**	**3**	**30.7**	✓	✓	4	✓	*
48	4128	1.8	**HDO 71**	**3**	**30.7**	✓	✓	4	✓	*
52	3821	2.8	**HDO 81**	**3**	**28.4**	✓	✓	4	✓	*
53	3756	1.9	**HDO 71**	**3**	**27.9**	✓	✓	4	✓	*
60	3291	2.8	**HDO 81**	**3**	**24.5**	✓	✓	4	✓	*
61	3235	2.2	**HDO 71**	**3**	**24.0**	✓	✓	4	✓	*
63	3109	2.9	**HDO 81**	**3**	**23.1**	✓	✓	4	✓	*
64	3097	2.3	**HDO 71**	**3**	**23.0**	✓	✓	4	✓	*
74	2678	2.9	**HDO 81**	**3**	**19.9**	✓	✓	4	✓	*
74	2667	2.5	**HDO 71**	**3**	**19.8**	✓	✓	4	✓	*
79	2489	2.8	**HDO 71**	**3**	**18.5**	✓	✓	4	✓	*
92	2144	2.8	**HDO 71**	**3**	**15.9**	✓	✓	4	✓	*

60Hz

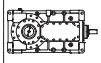
n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
24.5	8031	2.4	**HDO 95**	**3**	**72.3**	✓	✓	4	✓	*
25.6	7688	1.6	**HDO 81**	**3**	**69.2**	✓	✓	4	✓	*
25.7	7681	0.9	**HDO 71**	**3**	**69.2**	✓	✓	4	✓	*
26.9	7337	2.2	**HDO 91**	**3**	**66.1**	✓	✓	4	✓	*
29.2	6742	2.6	**HDO 91**	**3**	**60.7**	✓	✓	4	✓	*
29.8	6616	1.1	**HDO 71**	**3**	**59.6**	✓	✓	4	✓	*
29.8	6621	1.7	**HDO 81**	**3**	**59.6**	✓	✓	4	✓	*
32	6124	1.9	**HDO 81**	**3**	**55.1**	✓	✓	4	✓	*
33	6055	3.0	**HDO 91**	**3**	**54.5**	✓	✓	4	✓	*
33	6020	1.2	**HDO 71**	**3**	**54.2**	✓	✓	4	✓	*
34	5774	2.8	**HDO 91**	**3**	**52.0**	✓	✓	4	✓	*
37	5275	1.9	**HDO 81**	**3**	**47.5**	✓	✓	4	✓	*
38	5185	1.4	**HDO 71**	**3**	**46.7**	✓	✓	4	✓	*
40	4982	1.9	**HDO 81**	**3**	**44.9**	✓	✓	4	✓	*
40	4963	1.5	**HDO 71**	**3**	**44.7**	✓	✓	4	✓	*
46	4291	1.9	**HDO 81**	**3**	**38.6**	✓	✓	4	✓	*
46	4275	1.7	**HDO 71**	**3**	**38.5**	✓	✓	4	✓	*
50	3955	1.8	**HDO 71**	**3**	**35.6**	✓	✓	4	✓	*
50	3958	2.9	**HDO 81**	**3**	**35.6**	✓	✓	4	✓	*
58	3409	2.9	**HDO 81**	**3**	**30.7**	✓	✓	4	✓	*
58	3406	2.2	**HDO 71**	**3**	**30.7**	✓	✓	4	✓	*
64	3100	2.3	**HDO 71**	**3**	**27.9**	✓	✓	4	✓	*
74	2670	2.5	**HDO 71**	**3**	**24.0**	✓	✓	4	✓	*
77	2555	2.8	**HDO 71**	**3**	**23.0**	✓	✓	4	✓	*
90	2201	2.8	**HDO 71**	**3**	**19.8**	✓	✓	4	✓	*

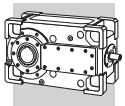
30 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
11.5	22927	0.9	**HDO 95**	**4**	**128.7**	✓	✓	4	✓	*
13.1	20219	1.0	**HDO 95**	**4**	**113.5**	✓	✓	4	✓	*
14.3	18487	1.2	**HDO 95**	**4**	**103.7**	✓	✓	4	✓	*
15.6	16974	1.0	**HDO 91**	**4**	**95.3**	✓	✓	4	✓	*
15.8	16674	1.2	**HDO 95**	**4**	**93.6**	✓	✓	4	✓	*
16.2	16266	1.1	**HDO 91**	**4**	**91.3**	✓	✓	4	✓	*
18.1	14609	1.2	**HDO 91**	**4**	**82.0**	✓	✓	4	✓	*
18.2	14549	1.5	**HDO 95**	**4**	**81.6**	✓	✓	4	✓	*

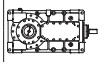
60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
12.7	20765	0.9	**HDO 95**	**4**	**140.7**	✓	✓	4	✓	*
13.9	18987	1.1	**HDO 95**	**4**	**128.7**	✓	✓	4	✓	*
15.1	17433	1.0	**HDO 91**	**4**	**118.1**	✓	✓	4	✓	*
15.7	16744	1.1	**HDO 95**	**4**	**113.5**	✓	✓	4	✓	*
17.2	15310	1.4	**HDO 95**	**4**	**103.7**	✓	✓	4	✓	*
18.8	14057	1.2	**HDO 91**	**4**	**95.3**	✓	✓	4	✓	*
19.1	13809	1.3	**HDO 95**	**4**	**93.6**	✓	✓	4	✓	*
19.6	13471	1.3	**HDO 91**	**4**	**91.3**	✓	✓	4	✓	*

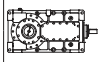


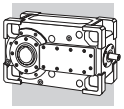
30 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
20.5	13148	1.4	**HDO 95**	**3**	**72.3**	✓	✓	4	✓	*
21.4	12587	1.0	**HDO 81**	**3**	**69.2**	✓	✓	4	✓	*
22.4	12012	1.4	**HDO 91**	**3**	**66.1**	✓	✓	4	✓	*
23.8	11315	1.9	**HDO 95**	**3**	**62.2**	✓	✓	4	✓	*
24.4	11038	1.6	**HDO 91**	**3**	**60.7**	✓	✓	4	✓	*
24.9	10841	1.1	**HDO 81**	**3**	**59.6**	✓	✓	4	✓	*
26.1	10347	1.8	**HDO 95**	**3**	**56.9**	✓	✓	4	✓	*
26.9	10027	1.2	**HDO 81**	**3**	**55.1**	✓	✓	4	✓	*
27.2	9914	1.8	**HDO 91**	**3**	**54.5**	✓	✓	4	✓	*
28.5	9453	1.7	**HDO 91**	**3**	**52.0**	✓	✓	4	✓	*
30	8905	2.3	**HDO 95**	**3**	**49.0**	✓	✓	4	✓	*
31	8636	1.2	**HDO 81**	**3**	**47.5**	✓	✓	4	✓	*
33	8157	1.2	**HDO 81**	**3**	**44.9**	✓	✓	4	✓	*
34	7996	2.4	**HDO 95**	**3**	**44.0**	✓	✓	4	✓	*
35	7802	2.3	**HDO 91**	**3**	**42.9**	✓	✓	4	✓	*
37	7372	2.6	**HDO 95**	**3**	**40.5**	✓	✓	4	✓	*
37	7305	2.3	**HDO 91**	**3**	**40.2**	✓	✓	4	✓	*
38	7026	1.2	**HDO 81**	**3**	**38.6**	✓	✓	4	✓	*
39	6999	1.1	**HDO 71**	**3**	**38.5**	✓	✓	4	✓	*
40	6712	2.6	**HDO 91**	**3**	**36.9**	✓	✓	4	✓	*
42	6475	1.1	**HDO 71**	**3**	**35.6**	✓	✓	4	✓	*
42	6481	1.9	**HDO 81**	**3**	**35.6**	✓	✓	4	✓	*
48	5582	1.9	**HDO 81**	**3**	**30.7**	✓	✓	4	✓	*
48	5577	1.4	**HDO 71**	**3**	**30.7**	✓	✓	4	✓	*
52	5163	2.1	**HDO 81**	**3**	**28.4**	✓	✓	4	✓	*
53	5075	1.4	**HDO 71**	**3**	**27.9**	✓	✓	4	✓	*
61	4447	2.1	**HDO 81**	**3**	**24.5**	✓	✓	4	✓	*
62	4371	1.6	**HDO 71**	**3**	**24.0**	✓	✓	4	✓	*
64	4200	2.2	**HDO 81**	**3**	**23.1**	✓	✓	4	✓	*
65	4184	1.7	**HDO 71**	**3**	**23.0**	✓	✓	4	✓	*
75	3618	2.2	**HDO 81**	**3**	**19.9**	✓	✓	4	✓	*
75	3603	1.8	**HDO 71**	**3**	**19.8**	✓	✓	4	✓	*
80	3363	2.1	**HDO 71**	**3**	**18.5**	✓	✓	4	✓	*
82	3281	2.3	**HDO 81**	**3**	**18.0**	✓	✓	4	✓	*
93	2897	2.1	**HDO 71**	**3**	**15.9**	✓	✓	4	✓	*
95	2826	2.3	**HDO 81**	**3**	**15.5**	✓	✓	4	✓	*
102	2707	2.4	**HDO 71**	**2**	**14.6**	—	✓	4	✓	*
106	2605	2.4	**HDO 71**	**2**	**14.0**	—	✓	4	✓	*
123	2244	2.4	**HDO 71**	**2**	**12.1**	—	✓	4	✓	*
133	2068	2.6	**HDO 71**	**2**	**11.1**	—	✓	4	✓	*

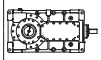
60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
21.8	12098	1.3	**HDO 91**	**4**	**82.0**	✓	✓	4	✓	*
21.9	12049	1.7	**HDO 95**	**4**	**81.6**	✓	✓	4	✓	*
24.7	10889	1.7	**HDO 95**	**3**	**72.3**	✓	✓	4	✓	*
25.8	10424	1.2	**HDO 81**	**3**	**69.2**	✓	✓	4	✓	*
27.0	9948	1.6	**HDO 91**	**3**	**66.1**	✓	✓	4	✓	*
28.7	9371	2.2	**HDO 95**	**3**	**62.2**	✓	✓	4	✓	*
29.4	9141	1.9	**HDO 91**	**3**	**60.7**	✓	✓	4	✓	*
30	8978	1.3	**HDO 81**	**3**	**59.6**	✓	✓	4	✓	*
31	8569	2.2	**HDO 95**	**3**	**56.9**	✓	✓	4	✓	*
32	8304	1.4	**HDO 81**	**3**	**55.1**	✓	✓	4	✓	*
33	8210	2.2	**HDO 91**	**3**	**54.5**	✓	✓	4	✓	*
34	7829	2.1	**HDO 91**	**3**	**52.0**	✓	✓	4	✓	*
37	7374	2.8	**HDO 95**	**3**	**49.0**	✓	✓	4	✓	*
38	7152	1.4	**HDO 81**	**3**	**47.5**	✓	✓	4	✓	*
38	7031	1.1	**HDO 71**	**3**	**46.7**	✓	✓	4	✓	*
40	6756	1.4	**HDO 81**	**3**	**44.9**	✓	✓	4	✓	*
40	6729	1.1	**HDO 71**	**3**	**44.7**	✓	✓	4	✓	*
41	6622	2.9	**HDO 95**	**3**	**44.0**	✓	✓	4	✓	*
42	6461	2.8	**HDO 91**	**3**	**42.9**	✓	✓	4	✓	*
45	6049	2.7	**HDO 91**	**3**	**40.2**	✓	✓	4	✓	*
46	5819	1.4	**HDO 81**	**3**	**38.6**	✓	✓	4	✓	*
46	5796	1.2	**HDO 71**	**3**	**38.5**	✓	✓	4	✓	*
50	5367	2.2	**HDO 81**	**3**	**35.6**	✓	✓	4	✓	*
50	5362	1.3	**HDO 71**	**3**	**35.6**	✓	✓	4	✓	*
58	4619	1.6	**HDO 71**	**3**	**30.7**	✓	✓	4	✓	*
58	4623	2.2	**HDO 81**	**3**	**30.7**	✓	✓	4	✓	*
63	4275	2.4	**HDO 81**	**3**	**28.4**	✓	✓	4	✓	*
64	4203	1.7	**HDO 71**	**3**	**27.9**	✓	✓	4	✓	*
73	3683	2.4	**HDO 81**	**3**	**24.5**	✓	✓	4	✓	*
74	3620	1.9	**HDO 71**	**3**	**24.0**	✓	✓	4	✓	*
77	3478	2.5	**HDO 81**	**3**	**23.1**	✓	✓	4	✓	*
78	3465	2.1	**HDO 71**	**3**	**23.0**	✓	✓	4	✓	*
90	2996	2.5	**HDO 81**	**3**	**19.9**	✓	✓	4	✓	*
90	2984	2.1	**HDO 71**	**3**	**19.8**	✓	✓	4	✓	*
97	2785	2.4	**HDO 71**	**3**	**18.5**	✓	✓	4	✓	*
99	2717	2.8	**HDO 81**	**3**	**18.0**	✓	✓	4	✓	*
112	2399	2.4	**HDO 71**	**3**	**15.9**	✓	✓	4	✓	*
115	2341	2.8	**HDO 81**	**3**	**15.5**	✓	✓	4	✓	*
122	2242	2.7	**HDO 71**	**2**	**14.6**	—	✓	4	✓	*
127	2158	2.7	**HDO 71**	**2**	**14.0**	—	✓	4	✓	*
148	1858	2.7	**HDO 71**	**2**	**12.1**	—	✓	4	✓	*
160	1712	3.0	**HDO 71**	**2**	**11.1**	—	✓	4	✓	*

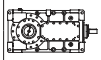


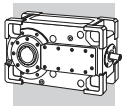
37 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
14.3	22832	0.9	**HDO 95**	**4**	**103.7**	—	✓	4	✓	—
15.8	20592	0.9	**HDO 95**	**4**	**93.6**	—	✓	4	✓	—
18.1	18041	0.9	**HDO 91**	**4**	**82.0**	—	✓	4	✓	—
18.2	17968	1.2	**HDO 95**	**4**	**81.6**	—	✓	4	✓	—
20.5	16238	1.2	**HDO 95**	**3**	**72.3**	—	✓	4	✓	—
22.4	14835	1.1	**HDO 91**	**3**	**66.1**	—	✓	4	✓	—
23.8	13974	1.5	**HDO 95**	**3**	**62.2**	—	✓	4	✓	—
24.4	13632	1.3	**HDO 91**	**3**	**60.7**	—	✓	4	✓	—
26.0	12779	1.5	**HDO 95**	**3**	**56.9**	—	✓	4	✓	—
26.9	12383	1.0	**HDO 81**	**3**	**55.1**	—	✓	4	✓	—
27.2	12243	1.5	**HDO 91**	**3**	**54.5**	—	✓	4	✓	—
28.5	11675	1.4	**HDO 91**	**3**	**52.0**	—	✓	4	✓	—
30	10997	1.9	**HDO 95**	**3**	**49.0**	—	✓	4	✓	—
31	10666	1.0	**HDO 81**	**3**	**47.5**	—	✓	4	✓	—
33	10074	1.0	**HDO 81**	**3**	**44.9**	—	✓	4	✓	—
34	9875	1.9	**HDO 95**	**3**	**44.0**	—	✓	4	✓	—
35	9635	1.9	**HDO 91**	**3**	**42.9**	—	✓	4	✓	—
37	9104	2.1	**HDO 95**	**3**	**40.5**	—	✓	4	✓	—
37	9021	1.8	**HDO 91**	**3**	**40.2**	—	✓	4	✓	—
38	8677	1.0	**HDO 81**	**3**	**38.6**	—	✓	4	✓	—
40	8290	2.1	**HDO 91**	**3**	**36.9**	—	✓	4	✓	—
42	7997	0.9	**HDO 71**	**3**	**35.6**	—	✓	4	✓	—
42	8003	1.5	**HDO 81**	**3**	**35.6**	—	✓	4	✓	—
43	7834	2.7	**HDO 95**	**3**	**34.9**	—	✓	4	✓	—
47	7164	2.7	**HDO 95**	**3**	**31.9**	—	✓	4	✓	—
48	6888	1.1	**HDO 71**	**3**	**30.7**	—	✓	4	✓	—
48	6894	1.5	**HDO 81**	**3**	**30.7**	—	✓	4	✓	—
49	6864	2.6	**HDO 91**	**3**	**30.6**	—	✓	4	✓	—
51	6545	2.5	**HDO 91**	**3**	**29.1**	—	✓	4	✓	—
52	6376	1.7	**HDO 81**	**3**	**28.4**	—	✓	4	✓	—
53	6268	1.2	**HDO 71**	**3**	**27.9**	—	✓	4	✓	—
61	5492	1.7	**HDO 81**	**3**	**24.5**	—	✓	4	✓	—
62	5399	1.3	**HDO 71**	**3**	**24.0**	—	✓	4	✓	—
64	5187	1.8	**HDO 81**	**3**	**23.1**	—	✓	4	✓	—
64	5167	1.4	**HDO 71**	**3**	**23.0**	—	✓	4	✓	—
75	4468	1.8	**HDO 81**	**3**	**19.9**	—	✓	4	✓	—
75	4450	1.5	**HDO 71**	**3**	**19.8**	—	✓	4	✓	—
80	4154	1.7	**HDO 71**	**3**	**18.5**	—	✓	4	✓	—
82	4052	1.9	**HDO 81**	**3**	**18.0**	—	✓	4	✓	—
93	3578	1.7	**HDO 71**	**3**	**15.9**	—	✓	4	✓	—
95	3490	1.9	**HDO 81**	**3**	**15.5**	—	✓	4	✓	—
102	3343	1.9	**HDO 71**	**2**	**14.6**	—	✓	4	✓	—
106	3217	1.9	**HDO 71**	**2**	**14.0**	—	✓	4	✓	—
123	2771	1.9	**HDO 71**	**2**	**12.1**	—	✓	4	✓	—

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
13.9	23496	0.9	**HDO 95**	**4**	**128.7**	—	✓	4	✓	—
15.7	20721	0.9	**HDO 95**	**4**	**113.5**	—	✓	4	✓	—
17.2	18947	1.1	**HDO 95**	**4**	**103.7**	—	✓	4	✓	—
18.7	17396	1.0	**HDO 91**	**4**	**95.3**	—	✓	4	✓	—
19.1	17088	1.1	**HDO 95**	**4**	**93.6**	—	✓	4	✓	—
19.5	16670	1.0	**HDO 91**	**4**	**91.3**	—	✓	4	✓	—
21.8	14972	1.1	**HDO 91**	**4**	**82.0**	—	✓	4	✓	—
21.9	14910	1.4	**HDO 95**	**4**	**81.6**	—	✓	4	✓	—
24.7	13475	1.4	**HDO 95**	**3**	**72.3**	—	✓	4	✓	—
25.8	12899	1.0	**HDO 81**	**3**	**69.2**	—	✓	4	✓	—
27.0	12311	1.3	**HDO 91**	**3**	**66.1**	—	✓	4	✓	—
28.7	11596	1.8	**HDO 95**	**3**	**62.2**	—	✓	4	✓	—
29.4	11312	1.5	**HDO 91**	**3**	**60.7**	—	✓	4	✓	—
29.9	11111	1.0	**HDO 81**	**3**	**59.6**	—	✓	4	✓	—
31	10604	1.8	**HDO 95**	**3**	**56.9**	—	✓	4	✓	—
32	10276	1.1	**HDO 81**	**3**	**55.1**	—	✓	4	✓	—
33	10160	1.8	**HDO 91**	**3**	**54.5**	—	✓	4	✓	—
34	9688	1.7	**HDO 91**	**3**	**52.0**	—	✓	4	✓	—
36	9126	2.3	**HDO 95**	**3**	**49.0**	—	✓	4	✓	—
38	8851	1.1	**HDO 81**	**3**	**47.5**	—	✓	4	✓	—
40	8360	1.2	**HDO 81**	**3**	**44.9**	—	✓	4	✓	—
41	8194	2.3	**HDO 95**	**3**	**44.0**	—	✓	4	✓	—
42	7995	2.3	**HDO 91**	**3**	**42.9**	—	✓	4	✓	—
44	7555	2.5	**HDO 95**	**3**	**40.5**	—	✓	4	✓	—
44	7486	2.2	**HDO 91**	**3**	**40.2**	—	✓	4	✓	—
46	7201	1.2	**HDO 81**	**3**	**38.6**	—	✓	4	✓	—
46	7173	1.0	**HDO 71**	**3**	**38.5**	—	✓	4	✓	—
48	6879	2.6	**HDO 91**	**3**	**36.9**	—	✓	4	✓	—
50	6636	1.1	**HDO 71**	**3**	**35.6**	—	✓	4	✓	—
50	6642	1.8	**HDO 81**	**3**	**35.6**	—	✓	4	✓	—
58	5721	1.8	**HDO 81**	**3**	**30.7**	—	✓	4	✓	—
58	5716	1.3	**HDO 71**	**3**	**30.7**	—	✓	4	✓	—
63	5291	1.9	**HDO 81**	**3**	**28.4**	—	✓	4	✓	—
64	5201	1.4	**HDO 71**	**3**	**27.9**	—	✓	4	✓	—
73	4557	1.9	**HDO 81**	**3**	**24.5**	—	✓	4	✓	—
74	4480	1.5	**HDO 71**	**3**	**24.0**	—	✓	4	✓	—
77	4304	2.0	**HDO 81**	**3**	**23.1**	—	✓	4	✓	—
78	4288	1.7	**HDO 71**	**3**	**23.0**	—	✓	4	✓	—
90	3708	2.0	**HDO 81**	**3**	**19.9**	—	✓	4	✓	—
90	3693	1.7	**HDO 71**	**3**	**19.8**	—	✓	4	✓	—
97	3447	1.9	**HDO 71**	**3**	**18.5**	—	✓	4	✓	—
99	3363	2.3	**HDO 81**	**3**	**18.0**	—	✓	4	✓	—
112	2969	1.9	**HDO 71**	**3**	**15.9**	—	✓	4	✓	—
115	2896	2.3	**HDO 81**	**3**	**15.5**	—	✓	4	✓	—



HDO

37 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
133	2553	2.1	**HDO 71**	**2**	**11.1**	—	✓	4	✓	—
156	2177	2.6	**HDO 71**	**2**	**9.5**	—	✓	4	✓	—
162	2095	2.6	**HDO 71**	**2**	**9.1**	—	✓	4	✓	—
188	1805	2.6	**HDO 71**	**2**	**7.9**	—	✓	4	✓	—

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
122	2774	2.2	**HDO 71**	**2**	**14.6**	—	✓	4	✓	—
127	2670	2.2	**HDO 71**	**2**	**14.0**	—	✓	4	✓	—
148	2300	2.2	**HDO 71**	**2**	**12.1**	—	✓	4	✓	—
160	2119	2.4	**HDO 71**	**2**	**11.1**	—	✓	4	✓	—
188	1807	2.9	**HDO 71**	**2**	**9.5**	—	✓	4	✓	—
195	1739	2.9	**HDO 71**	**2**	**9.1**	—	✓	4	✓	—
227	1498	2.9	**HDO 71**	**2**	**7.9**	—	✓	4	✓	—

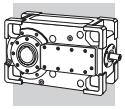
45 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
18.2	21838	1.0	**HDO 95**	**4**	**81.6**	—	✓	4	✓	—
20.5	19736	1.0	**HDO 95**	**3**	**72.3**	—	✓	4	✓	—
22.4	18031	0.9	**HDO 91**	**3**	**66.1**	—	✓	4	✓	—
23.8	16984	1.2	**HDO 95**	**3**	**62.2**	—	✓	4	✓	—
24.4	16569	1.0	**HDO 91**	**3**	**60.7**	—	✓	4	✓	—
26.0	15532	1.2	**HDO 95**	**3**	**56.9**	—	✓	4	✓	—
27.2	14881	1.2	**HDO 91**	**3**	**54.5**	—	✓	4	✓	—
28.5	14190	1.2	**HDO 91**	**3**	**52.0**	—	✓	4	✓	—
30	13366	1.5	**HDO 95**	**3**	**49.0**	—	✓	4	✓	—
34	12002	1.6	**HDO 95**	**3**	**44.0**	—	✓	4	✓	—
35	11710	1.5	**HDO 91**	**3**	**42.9**	—	✓	4	✓	—
37	11065	1.7	**HDO 95**	**3**	**40.5**	—	✓	4	✓	—
37	10965	1.5	**HDO 91**	**3**	**40.2**	—	✓	4	✓	—
40	10076	1.7	**HDO 91**	**3**	**36.9**	—	✓	4	✓	—
42	9728	1.3	**HDO 81**	**3**	**35.6**	—	✓	4	✓	—
43	9522	2.2	**HDO 95**	**3**	**34.9**	—	✓	4	✓	—
47	8708	2.2	**HDO 95**	**3**	**31.9**	—	✓	4	✓	—
48	8379	1.3	**HDO 81**	**3**	**30.7**	—	✓	4	✓	—
49	8343	2.2	**HDO 91**	**3**	**30.6**	—	✓	4	✓	—
51	7955	2.1	**HDO 91**	**3**	**29.1**	—	✓	4	✓	—
52	7749	1.4	**HDO 81**	**3**	**28.4**	—	✓	4	✓	—
53	7618	1.0	**HDO 71**	**3**	**27.9**	—	✓	4	✓	—
54	7494	2.8	**HDO 95**	**3**	**27.5**	—	✓	4	✓	—
60	6729	2.9	**HDO 95**	**3**	**24.7**	—	✓	4	✓	—
61	6675	1.4	**HDO 81**	**3**	**24.5**	—	✓	4	✓	—
62	6561	1.1	**HDO 71**	**3**	**24.0**	—	✓	4	✓	—
62	6565	2.7	**HDO 91**	**3**	**24.1**	—	✓	4	✓	—
64	6304	1.4	**HDO 81**	**3**	**23.1**	—	✓	4	✓	—
64	6280	1.2	**HDO 71**	**3**	**23.0**	—	✓	4	✓	—
66	6147	2.7	**HDO 91**	**3**	**22.5**	—	✓	4	✓	—
75	5430	1.4	**HDO 81**	**3**	**19.9**	—	✓	4	✓	—
75	5409	1.2	**HDO 71**	**3**	**19.8**	—	✓	4	✓	—

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
17.2	22965	0.9	**HDO 95**	**4**	**103.7**	—	✓	4	✓	—
21.9	18073	1.1	**HDO 95**	**4**	**81.6**	—	✓	4	✓	—
24.7	16333	1.2	**HDO 95**	**3**	**72.3**	—	✓	4	✓	—
27.0	14922	1.1	**HDO 91**	**3**	**66.1**	—	✓	4	✓	—
28.7	14056	1.5	**HDO 95**	**3**	**62.2**	—	✓	4	✓	—
29.4	13712	1.3	**HDO 91**	**3**	**60.7**	—	✓	4	✓	—
31	12854	1.5	**HDO 95**	**3**	**56.9**	—	✓	4	✓	—
32	12456	0.9	**HDO 81**	**3**	**55.1**	—	✓	4	✓	—
33	12315	1.5	**HDO 91**	**3**	**54.5**	—	✓	4	✓	—
34	11743	1.4	**HDO 91**	**3**	**52.0**	—	✓	4	✓	—
37	11062	1.9	**HDO 95**	**3**	**49.0**	—	✓	4	✓	—
38	10728	0.9	**HDO 81**	**3**	**47.5**	—	✓	4	✓	—
40	10133	0.9	**HDO 81**	**3**	**44.9**	—	✓	4	✓	—
41	9933	1.9	**HDO 95**	**3**	**44.0**	—	✓	4	✓	—
42	9691	1.9	**HDO 91**	**3**	**42.9**	—	✓	4	✓	—
44	9157	2.1	**HDO 95**	**3**	**40.5**	—	✓	4	✓	—
44	9074	1.8	**HDO 91**	**3**	**40.2**	—	✓	4	✓	—
46	8728	0.9	**HDO 81**	**3**	**38.6**	—	✓	4	✓	—
48	8338	2.1	**HDO 91**	**3**	**36.9**	—	✓	4	✓	—
50	8050	1.4	**HDO 81**	**3**	**35.6**	—	✓	4	✓	—
51	7880	2.7	**HDO 95**	**3**	**34.9**	—	✓	4	✓	—
56	7206	2.7	**HDO 95**	**3**	**31.9**	—	✓	4	✓	—
58	6934	1.4	**HDO 81**	**3**	**30.7**	—	✓	4	✓	—
58	6928	1.1	**HDO 71**	**3**	**30.7**	—	✓	4	✓	—
58	6904	2.6	**HDO 91**	**3**	**30.6**	—	✓	4	✓	—
61	6584	2.5	**HDO 91**	**3**	**29.1**	—	✓	4	✓	—
63	6413	1.6	**HDO 81**	**3**	**28.4**	—	✓	4	✓	—
64	6304	1.2	**HDO 71**	**3**	**27.9**	—	✓	4	✓	—
73	5524	1.6	**HDO 81**	**3**	**24.5**	—	✓	4	✓	—
74	5430	1.2	**HDO 71**	**3**	**24.0**	—	✓	4	✓	—
77	5217	1.7	**HDO 81**	**3**	**23.1**	—	✓	4	✓	—
78	5197	1.4	**HDO 71**	**3**	**23.0**	—	✓	4	✓	—



45 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
80	5048	1.4	**HDO 71**	**3**	**18.5**	—	✓	4	✓	—
82	4925	1.5	**HDO 81**	**3**	**18.0**	—	✓	4	✓	—
93	4348	1.4	**HDO 71**	**3**	**15.9**	—	✓	4	✓	—
95	4242	1.5	**HDO 81**	**3**	**15.5**	—	✓	4	✓	—
101	4101	2.8	**HDO 81**	**2**	**14.7**	—	✓	4	✓	—
102	4063	1.6	**HDO 71**	**2**	**14.6**	—	✓	4	✓	—
105	3947	2.8	**HDO 81**	**2**	**14.2**	—	✓	4	✓	—
106	3911	1.6	**HDO 71**	**2**	**14.0**	—	✓	4	✓	—
123	3368	1.6	**HDO 71**	**2**	**12.1**	—	✓	4	✓	—
133	3103	1.7	**HDO 71**	**2**	**11.1**	—	✓	4	✓	—
156	2646	2.1	**HDO 71**	**2**	**9.5**	—	✓	4	✓	—
162	2546	2.1	**HDO 71**	**2**	**9.1**	—	✓	4	✓	—
188	2193	2.1	**HDO 71**	**2**	**7.9**	—	✓	4	✓	—
219	1883	2.7	**HDO 71**	**2**	**6.8**	—	✓	4	✓	—
228	1812	2.7	**HDO 71**	**2**	**6.5**	—	✓	4	✓	—
265	1561	2.7	**HDO 71**	**2**	**5.6**	—	✓	4	✓	—

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
90	4494	1.7	**HDO 81**	**3**	**19.9**	—	✓	4	✓	—
90	4476	1.4	**HDO 71**	**3**	**19.8**	—	✓	4	✓	—
97	4178	1.6	**HDO 71**	**3**	**18.5**	—	✓	4	✓	—
99	4076	1.9	**HDO 81**	**3**	**18.0**	—	✓	4	✓	—
112	3599	1.6	**HDO 71**	**3**	**15.9**	—	✓	4	✓	—
115	3511	1.9	**HDO 81**	**3**	**15.5**	—	✓	4	✓	—
122	3363	1.8	**HDO 71**	**2**	**14.6**	—	✓	4	✓	—
127	3236	1.8	**HDO 71**	**2**	**14.0**	—	✓	4	✓	—
148	2788	1.8	**HDO 71**	**2**	**12.1**	—	✓	4	✓	—
160	2568	2.0	**HDO 71**	**2**	**11.1**	—	✓	4	✓	—
188	2190	2.4	**HDO 71**	**2**	**9.5**	—	✓	4	✓	—
195	2107	2.4	**HDO 71**	**2**	**9.1**	—	✓	4	✓	—
227	1815	2.4	**HDO 71**	**2**	**7.9**	—	✓	4	✓	—

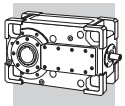
55 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
23.8	20744	1.0	**HDO 95**	**3**	**62.2**	—	✓	4	✓	—
26.0	18970	1.0	**HDO 95**	**3**	**56.9**	—	✓	4	✓	—
27.2	18175	1.0	**HDO 91**	**3**	**54.5**	—	✓	4	✓	—
28.5	17331	0.9	**HDO 91**	**3**	**52.0**	—	✓	4	✓	—
30	16325	1.3	**HDO 95**	**3**	**49.0**	—	✓	4	✓	—
34	14659	1.3	**HDO 95**	**3**	**44.0**	—	✓	4	✓	—
35	14303	1.3	**HDO 91**	**3**	**42.9**	—	✓	4	✓	—
37	13515	1.4	**HDO 95**	**3**	**40.5**	—	✓	4	✓	—
37	13392	1.2	**HDO 91**	**3**	**40.2**	—	✓	4	✓	—
40	12306	1.4	**HDO 91**	**3**	**36.9**	—	✓	4	✓	—
42	11881	1.0	**HDO 81**	**3**	**35.6**	—	✓	4	✓	—
43	11630	1.8	**HDO 95**	**3**	**34.9**	—	✓	4	✓	—
47	10635	1.8	**HDO 95**	**3**	**31.9**	—	✓	4	✓	—
48	10233	1.0	**HDO 81**	**3**	**30.7**	—	✓	4	✓	—
49	10190	1.8	**HDO 91**	**3**	**30.6**	—	✓	4	✓	—
51	9716	1.7	**HDO 91**	**3**	**29.1**	—	✓	4	✓	—
52	9465	1.1	**HDO 81**	**3**	**28.4**	—	✓	4	✓	—
54	9153	2.3	**HDO 95**	**3**	**27.5**	—	✓	4	✓	—
60	8218	2.4	**HDO 95**	**3**	**24.7**	—	✓	4	✓	—
61	8152	1.1	**HDO 81**	**3**	**24.5**	—	✓	4	✓	—
62	8019	2.2	**HDO 91**	**3**	**24.1**	—	✓	4	✓	—
64	7700	1.2	**HDO 81**	**3**	**23.1**	—	✓	4	✓	—
66	7514	2.6	**HDO 95**	**3**	**22.5**	—	✓	4	✓	—

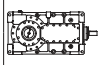
60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
24.7	19940	1.0	**HDO 95**	**3**	**72.3**	—	✓	4	✓	—
28.7	17160	1.2	**HDO 95**	**3**	**62.2**	—	✓	4	✓	—
29.4	16740	1.0	**HDO 91**	**3**	**60.7**	—	✓	4	✓	—
31	15692	1.2	**HDO 95**	**3**	**56.9**	—	✓	4	✓	—
33	15034	1.2	**HDO 91**	**3**	**54.5**	—	✓	4	✓	—
34	14336	1.1	**HDO 91**	**3**	**52.0**	—	✓	4	✓	—
37	13504	1.5	**HDO 95**	**3**	**49.0**	—	✓	4	✓	—
41	12126	1.6	**HDO 95**	**3**	**44.0**	—	✓	4	✓	—
42	11832	1.5	**HDO 91**	**3**	**42.9**	—	✓	4	✓	—
44	11179	1.7	**HDO 95**	**3**	**40.5**	—	✓	4	✓	—
45	11078	1.5	**HDO 91**	**3**	**40.2**	—	✓	4	✓	—
48	10180	1.7	**HDO 91**	**3**	**36.9**	—	✓	4	✓	—
50	9828	1.2	**HDO 81**	**3**	**35.6**	—	✓	4	✓	—
51	9621	2.2	**HDO 95**	**3**	**34.9**	—	✓	4	✓	—
56	8798	2.2	**HDO 95**	**3**	**31.9**	—	✓	4	✓	—
58	8465	1.2	**HDO 81**	**3**	**30.7**	—	✓	4	✓	—
59	8429	2.1	**HDO 91**	**3**	**30.6**	—	✓	4	✓	—
61	8038	2.1	**HDO 91**	**3**	**29.1**	—	✓	4	✓	—
63	7829	1.3	**HDO 81**	**3**	**28.4**	—	✓	4	✓	—
65	7571	2.6	**HDO 95**	**3**	**27.5**	—	✓	4	✓	—
73	6798	2.8	**HDO 95**	**3**	**24.7**	—	✓	4	✓	—
73	6744	1.3	**HDO 81**	**3**	**24.5**	—	✓	4	✓	—
74	6633	2.5	**HDO 91**	**3**	**24.1**	—	✓	4	✓	—

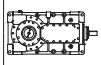


55 kW

50Hz

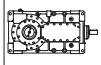
n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
66	7508	2.2	**HDO 91**	**3**	**22.5**	—	✓	4	✓	—
70	7072	2.6	**HDO 95**	**3**	**21.2**	—	✓	4	✓	—
72	6899	2.6	**HDO 91**	**3**	**20.7**	—	✓	4	✓	—
75	6632	1.2	**HDO 81**	**3**	**19.9**	—	✓	4	✓	—
80	6196	2.6	**HDO 91**	**3**	**18.6**	—	✓	4	✓	—
82	6016	1.3	**HDO 81**	**3**	**18.0**	—	✓	4	✓	—
94	5394	3.0	**HDO 91**	**2**	**15.9**	—	✓	4	✓	—
95	5181	1.3	**HDO 81**	**3**	**15.5**	—	✓	4	✓	—
101	5009	2.3	**HDO 81**	**2**	**14.7**	—	✓	4	✓	—
105	4821	2.3	**HDO 81**	**2**	**14.2**	—	✓	4	✓	—
121	4152	2.5	**HDO 81**	**2**	**12.2**	—	✓	4	✓	—
133	3791	2.8	**HDO 81**	**2**	**11.1**	—	✓	4	✓	—

60Hz

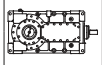
n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
77	6370	1.4	**HDO 81**	**3**	**23.1**	—	✓	4	✓	—
79	6211	2.7	**HDO 91**	**3**	**22.5**	—	✓	4	✓	—
79	6216	2.9	**HDO 95**	**3**	**22.5**	—	✓	4	✓	—
86	5707	2.9	**HDO 91**	**3**	**20.7**	—	✓	4	✓	—
90	5486	1.4	**HDO 81**	**3**	**19.9**	—	✓	4	✓	—
96	5126	2.9	**HDO 91**	**3**	**18.6**	—	✓	4	✓	—
99	4976	1.5	**HDO 81**	**3**	**18.0**	—	✓	4	✓	—
115	4286	1.5	**HDO 81**	**3**	**15.5**	—	✓	4	✓	—
121	4144	2.6	**HDO 81**	**2**	**14.7**	—	✓	4	✓	—
126	3988	2.7	**HDO 81**	**2**	**14.2**	—	✓	4	✓	—
146	3435	3.0	**HDO 81**	**2**	**12.2**	—	✓	4	✓	—

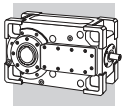
75 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
30	22261	0.9	**HDO 95**	**3**	**49.0**	—	✓	4	✓	—
34	19989	1	**HDO 95**	**3**	**44.0**	—	✓	4	✓	—
35	19504	0.9	**HDO 91**	**3**	**42.9**	—	✓	4	✓	—
37	18429	1	**HDO 95**	**3**	**40.5**	—	✓	4	✓	—
37	18262	0.9	**HDO 91**	**3**	**40.2**	—	✓	4	✓	—
40	16781	1	**HDO 91**	**3**	**36.9**	—	✓	4	✓	—
43	15859	1.3	**HDO 95**	**3**	**34.9**	—	✓	4	✓	—
47	14503	1.3	**HDO 95**	**3**	**31.9**	—	✓	4	✓	—
49	13895	1.3	**HDO 91**	**3**	**30.6**	—	✓	4	✓	—
51	13250	1.3	**HDO 91**	**3**	**29.1**	—	✓	4	✓	—
54	12481	1.7	**HDO 95**	**3**	**27.5**	—	✓	4	✓	—
60	11207	1.7	**HDO 95**	**3**	**24.7**	—	✓	4	✓	—
62	10935	1.6	**HDO 91**	**3**	**24.1**	—	✓	4	✓	—
66	10238	1.6	**HDO 91**	**3**	**22.5**	—	✓	4	✓	—
66	10247	1.9	**HDO 95**	**3**	**22.5**	—	✓	4	✓	—
70	9644	1.9	**HDO 95**	**3**	**21.2**	—	✓	4	✓	—
72	9408	1.9	**HDO 91**	**3**	**20.7**	—	✓	4	✓	—
80	8450	1.9	**HDO 91**	**3**	**18.6**	—	✓	4	✓	—
82	8203	0.9	**HDO 81**	**3**	**18.0**	—	✓	4	✓	—
94	7356	2.2	**HDO 91**	**2**	**15.9**	—	✓	4	✓	—
96	7066	0.9	**HDO 81**	**3**	**15.5**	—	✓	4	✓	—
101	6831	1.7	**HDO 81**	**2**	**14.7**	—	✓	4	✓	—
102	6759	2.3	**HDO 91**	**2**	**14.6**	—	✓	4	✓	—
105	6574	1.7	**HDO 81**	**2**	**14.2**	—	✓	4	✓	—
119	5781	2.6	**HDO 91**	**2**	**12.5**	—	✓	4	✓	—
122	5662	1.8	**HDO 81**	**2**	**12.2**	—	✓	4	✓	—
130	5313	2.7	**HDO 91**	**2**	**11.5**	—	✓	4	✓	—
133	5169	2.1	**HDO 81**	**2**	**11.1**	—	✓	4	✓	—

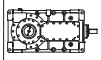
60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
37	18482	1.1	**HDO 95**	**3**	**49.0**	—	✓	4	✓	—
41	16596	1.2	**HDO 95**	**3**	**44.0**	—	✓	4	✓	—
42	16193	1.1	**HDO 91**	**3**	**42.9**	—	✓	4	✓	—
44	15300	1.3	**HDO 95**	**3**	**40.5**	—	✓	4	✓	—
45	15161	1.1	**HDO 91**	**3**	**40.2**	—	✓	4	✓	—
48	13932	1.3	**HDO 91**	**3**	**36.9**	—	✓	4	✓	—
51	13167	1.6	**HDO 95**	**3**	**34.9**	—	✓	4	✓	—
56	12041	1.6	**HDO 95**	**3**	**31.9**	—	✓	4	✓	—
59	11536	1.5	**HDO 91**	**3**	**30.6**	—	✓	4	✓	—
61	11000	1.5	**HDO 91**	**3**	**29.1**	—	✓	4	✓	—
63	10715	1	**HDO 81**	**3**	**28.4**	—	✓	4	✓	—
65	10362	1.9	**HDO 95**	**3**	**27.5**	—	✓	4	✓	—
73	9304	2	**HDO 95**	**3**	**24.7**	—	✓	4	✓	—
73	9229	1	**HDO 81**	**3**	**24.5**	—	✓	4	✓	—
74	9078	1.8	**HDO 91**	**3**	**24.1**	—	✓	4	✓	—
77	8718	1	**HDO 81**	**3**	**23.1**	—	✓	4	✓	—
79	8507	2.1	**HDO 95**	**3**	**22.5**	—	✓	4	✓	—
79	8500	2.0	**HDO 91**	**3**	**22.5**	—	✓	4	✓	—
84	8007	2.2	**HDO 95**	**3**	**21.2**	—	✓	4	✓	—
86	7811	2.1	**HDO 91**	**3**	**20.7**	—	✓	4	✓	—
90	7509	1.0	**HDO 81**	**3**	**19.9**	—	✓	4	✓	—
96	7015	2.1	**HDO 91**	**3**	**18.6**	—	✓	4	✓	—
99	6811	1.1	**HDO 81**	**3**	**18.0**	—	✓	4	✓	—
113	6107	2.5	**HDO 91**	**2**	**15.9**	—	✓	4	✓	—
115	5866	1.1	**HDO 81**	**3**	**15.5**	—	✓	4	✓	—
121	5671	1.9	**HDO 81**	**2**	**14.7**	—	✓	4	✓	—
123	5612	2.6	**HDO 91**	**2**	**14.6**	—	✓	4	✓	—
126	5458	1.9	**HDO 81**	**2**	**14.2**	—	✓	4	✓	—

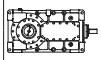


75 kW

50Hz

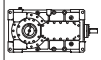
n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
144	4771	2.7	**HDO 91**	**2**	**10.3**	—	✓	4	✓	—
155	4452	2.3	**HDO 81**	**2**	**9.6**	—	✓	4	✓	—
162	4241	2.4	**HDO 81**	**2**	**9.1**	—	✓	4	✓	—
189	3653	2.7	**HDO 81**	**2**	**7.9**	—	✓	4	✓	—

60Hz

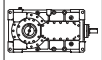
n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
144	4800	3.0	**HDO 91**	**2**	**12.5**	—	✓	4	✓	—
147	4701	2.2	**HDO 81**	**2**	**12.2**	—	✓	4	✓	—
161	4291	2.3	**HDO 81**	**2**	**11.1**	—	✓	4	✓	—
186	3696	2.6	**HDO 81**	**2**	**9.6**	—	✓	4	✓	—
196	3521	2.7	**HDO 81**	**2**	**9.1**	—	✓	4	✓	—

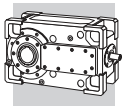
90 kW

50Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
43	18979	1.1	**HDO 95**	**3**	**34.9**	—	✓	4	✓	—
47	17355	1.1	**HDO 95**	**3**	**31.9**	—	✓	4	✓	—
49	16628	1.1	**HDO 91**	**3**	**30.6**	—	✓	4	✓	—
51	15856	1.0	**HDO 91**	**3**	**29.1**	—	✓	4	✓	—
54	14935	1.4	**HDO 95**	**3**	**27.5**	—	✓	4	✓	—
60	13411	1.4	**HDO 95**	**3**	**24.7**	—	✓	4	✓	—
62	13085	1.3	**HDO 91**	**3**	**24.1**	—	✓	4	✓	—
66	12252	1.4	**HDO 91**	**3**	**22.5**	—	✓	4	✓	—
66	12262	1.6	**HDO 95**	**3**	**22.5**	—	✓	4	✓	—
70	11541	1.6	**HDO 95**	**3**	**21.2**	—	✓	4	✓	—
72	11259	1.6	**HDO 91**	**3**	**20.7**	—	✓	4	✓	—
80	10111	1.6	**HDO 91**	**3**	**18.6**	—	✓	4	✓	—
94	8802	1.8	**HDO 91**	**2**	**15.9**	—	✓	4	✓	—
101	8174	1.4	**HDO 81**	**2**	**14.7**	—	✓	4	✓	—
102	8089	1.9	**HDO 91**	**2**	**14.6**	—	✓	4	✓	—
105	7867	1.4	**HDO 81**	**2**	**14.2**	—	✓	4	✓	—
119	6918	2.2	**HDO 91**	**2**	**12.5**	—	✓	4	✓	—
122	6776	1.5	**HDO 81**	**2**	**12.2**	—	✓	4	✓	—
130	6357	2.3	**HDO 91**	**2**	**11.5**	—	✓	4	✓	—
133	6186	1.7	**HDO 81**	**2**	**11.1**	—	✓	4	✓	—
144	5710	2.3	**HDO 91**	**2**	**10.3**	—	✓	4	✓	—
155	5328	1.9	**HDO 81**	**2**	**9.6**	—	✓	4	✓	—
162	5075	2.0	**HDO 81**	**2**	**9.1**	—	✓	4	✓	—
165	5001	2.8	**HDO 91**	**2**	**9.0**	—	✓	4	✓	—
179	4595	2.9	**HDO 91**	**2**	**8.3**	—	✓	4	✓	—
189	4372	2.2	**HDO 81**	**2**	**7.9**	—	✓	4	✓	—
200	4127	3.0	**HDO 91**	**2**	**7.4**	—	✓	4	✓	—
222	3715	2.6	**HDO 81**	**2**	**6.7**	—	✓	4	✓	—
231	3576	2.6	**HDO 81**	**2**	**6.4**	—	✓	4	✓	—
268	3080	3.0	**HDO 81**	**2**	**5.5**	—	✓	4	✓	—

60Hz

n_2 min^{-1}	M_2 Nm	S			i	AD	G	P	IE3	IE1
37	22169	0.9	**HDO 95**	**3**	**49.0**	—	✓	4	✓	—
41	19906	1.0	**HDO 95**	**3**	**44.0**	—	✓	4	✓	—
42	19423	0.9	**HDO 91**	**3**	**42.9**	—	✓	4	✓	—
44	18353	1.0	**HDO 95**	**3**	**40.5**	—	✓	4	✓	—
45	18186	0.9	**HDO 91**	**3**	**40.2**	—	✓	4	✓	—
48	16712	1.1	**HDO 91**	**3**	**36.9**	—	✓	4	✓	—
51	15794	1.3	**HDO 95**	**3**	**34.9**	—	✓	4	✓	—
56	14443	1.3	**HDO 95**	**3**	**31.9**	—	✓	4	✓	—
59	13837	1.3	**HDO 91**	**3**	**30.6**	—	✓	4	✓	—
61	13195	1.3	**HDO 91**	**3**	**29.1**	—	✓	4	✓	—
65	12429	1.6	**HDO 95**	**3**	**27.5**	—	✓	4	✓	—
73	11160	1.7	**HDO 95**	**3**	**24.7**	—	✓	4	✓	—
74	10889	1.5	**HDO 91**	**3**	**24.1**	—	✓	4	✓	—
79	10205	1.8	**HDO 95**	**3**	**22.5**	—	✓	4	✓	—
79	10196	1.6	**HDO 91**	**3**	**22.5**	—	✓	4	✓	—
84	9604	1.8	**HDO 95**	**3**	**21.2**	—	✓	4	✓	—
86	9369	1.8	**HDO 91**	**3**	**20.7**	—	✓	4	✓	—
96	8415	1.8	**HDO 91**	**3**	**18.6**	—	✓	4	✓	—
99	8169	0.9	**HDO 81**	**3**	**18.0**	—	✓	4	✓	—
113	7325	2.1	**HDO 91**	**2**	**15.9**	—	✓	4	✓	—
115	7036	0.9	**HDO 81**	**3**	**15.5**	—	✓	4	✓	—
121	6802	1.6	**HDO 81**	**2**	**14.7**	—	✓	4	✓	—
123	6731	2.1	**HDO 91**	**2**	**14.6**	—	✓	4	✓	—
126	6547	1.6	**HDO 81**	**2**	**14.2**	—	✓	4	✓	—
144	5757	2.5	**HDO 91**	**2**	**12.5**	—	✓	4	✓	—
147	5639	1.8	**HDO 81**	**2**	**12.2**	—	✓	4	✓	—
156	5291	2.6	**HDO 91**	**2**	**11.5**	—	✓	4	✓	—
161	5147	2.0	**HDO 81**	**2**	**11.1**	—	✓	4	✓	—
174	4752	2.6	**HDO 91**	**2**	**10.3**	—	✓	4	✓	—
186	4434	2.2	**HDO 81**	**2**	**9.6**	—	✓	4	✓	—
196	4224	2.3	**HDO 81**	**2**	**9.1**	—	✓	4	✓	—
227	3638	2.5	**HDO 81**	**2**	**7.9**	—	✓	4	✓	—
267	3092	2.9	**HDO 81**	**2**	**6.7**	—	✓	4	✓	—

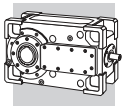


29 MASS MOMENT OF INERTIA

Moments of inertia listed refer to gearbox input shaft and apply exclusively for configurations with a single extension input and output shaft.

	i_N	$J \cdot 10^{-4}$ [kg m^2]													
		HDO 71	HDO 81	HDO 91	HDO 95	HDO 100	HDO 110	HDO 120	HDO 125	HDO 130	HDO 140	HDO 150	HDO 160	HDO 170	HDO 180
2x	5.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	5.6	263	628	—	—	1862	—	—	—	8268	—	23425	—	—	—
	6.3	244	583	—	—	1780	1893	2869	—	7943	9161	21737	—	—	—
	7.1	238	566	970	—	1725	1803	2757	3116	10164	8677	20949	23848	—	—
	8.0	183	457	935	—	1578	1692	2592	2991	6959	8104	16297	22841	—	—
	9.0	174	434	913	—	1543	1566	2774	2922	8408	7438	15670	19669	—	—
	10.0	171	350	625	—	1204	1494	2666	2920	5207	7065	12076	18609	—	—
	11.2	142	335	607	—	1182	1168	2056	2206	6135	5514	12006	18114	—	—
	12.5	116	276	596	—	967	1121	1987	2154	4070	5275	9091	12785	—	—
	14.0	112	266	431	—	952	996	1572	1670	4673	4269	8884	12212	—	—
	16.0	111	263	424	—	—	966	1528	1636	—	4114	—	11945	—	—
	18.0	—	—	—	—	—	—	—	1617	—	—	—	—	—	—
3x	14.0	—	—	—	—	940	—	—	—	—	—	—	—		
	16.0	112	248	—	—	926	—	—	—	3156	—	9690	—		
	18.0	109	242	414	—	836	849	1233	—	2675	3280	9480	10012		
	20.0	99	216	408	419	540	839	1205	1273	2643	3184	9382	9743		
	22.4	97	212	405	416	487	550	1013	1052	1913	2716	8401	9618		
	25.0	92	197	374	411	481	494	917	1038	1893	1970	8292	8568		
	28.0	91	195	368	377	443	488	592	934	1728	1940	5067	8428		
	31.5	85	185	350	373	440	448	534	920	1714	1764	4578	8363		
	35.5	84	184	179	353	415	444	530	808	1612	1744	4524	4661		
	40.0	46	99	178	350	413	418	464	540	1137	1636	3114	4592		
	45.0	45	98	169	180	240	415	461	537	1069	1623	3093	4559		
	50.0	44	94	167	170	239	242	278	467	1063	1084	2890	3142		
	56.0	44	94	161	168	228	241	276	465	1021	1076	2867	2924		
	63.0	42	91	161	162	227	230	249	280	1017	1031	2857	2895		
	71.0	42	91	160	161	227	229	248	251	1042	1025	—	2882		
	80.0	—	—	—	—	—	227	246	250	—	1019	—	—		
	90.0	—	—	—	—	—	—	—	249	—	—	—	—		
4x	71.0	—	—	—	—	168	—	—	—	553	—	1023	—		
	80.0	17	44	66	76	167	169	—	—	551	558	1011	1040		
	90.0	17	43	66	66	163	168	182	—	535	555	952	1025		
	100.0	17	43	74	74	163	143	171	183	533	538	589	1019		
	112.0	17	38	65	74	139	163	171	172	447	536	586	597		
	125.0	17	38	64	65	139	140	145	172	446	449	554	593		
	140.0	—	38	61	65	132	70	145	146	410	448	550	559		
	160.0	14	38	60	64	68	60	141	146	410	412	301	555		
	180.0	14	36	60	60	59	68	71	136	406	411	300	553		
	200.0	14	20	60	60	59	59	61	72	405	243	287	303		
	224.0	8	36	60	60	56	59	61	62	227	242	285	289		
	250.0	14	19	30	30	56	56	58	62	226	227	284	287		
	280.0	—	19	30	30	56	58	60	58	225	227	—	286		
	315.0	7	18	29	29	56	56	57	58	225	225	—	—		
	355.0	—	18	29	29	56	56	57	57	226	225	—	—		
	400.0	7	18	29	29	—	56	56	57	—	225	—	—		
	450.0	7	18	29	29	—	—	—	57	—	—	—	—		
	500.0	7	18	29	29	—	—	—	—	—	—	—	—		

BONFIGLIOLI TECHNICAL SERVICE

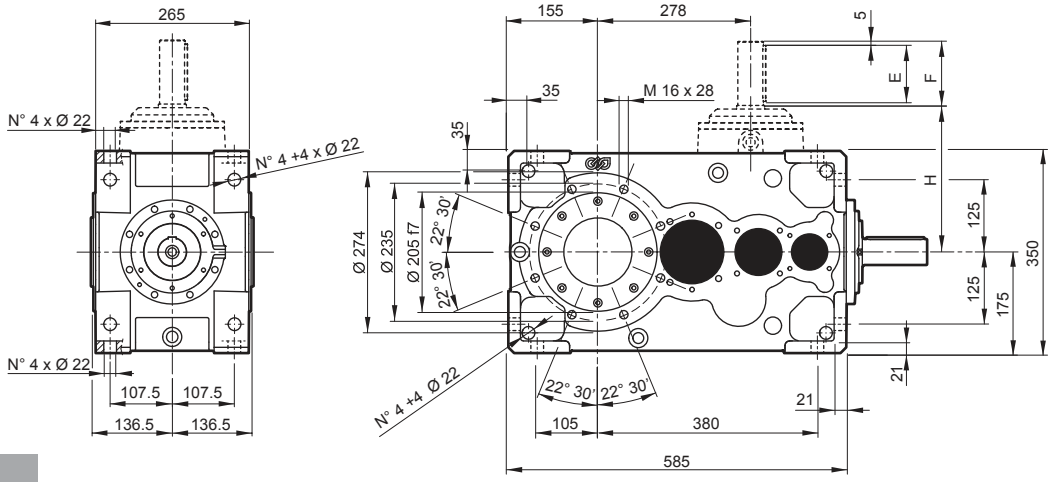


30 EXACT RATIOS

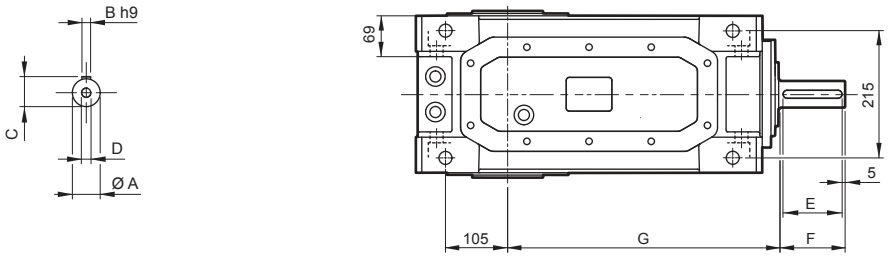
	i_N	i													
		HDO 71	HDO 81	HDO 91	HDO 95	HDO 100	HDO 110	HDO 120	HDO 125	HDO 130	HDO 140	HDO 150	HDO 160	HDO 170	HDO 180
2x	**5.0**	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	5.6	5.603	5.548	—	—	5.815	—	—	—	5.708	—	5.512	—	—	—
	6.3	6.505	6.442	—	—	6.462	6.354	6.569	—	6.231	6.569	6.459	—	—	—
	7.1	6.760	6.693	7.435	—	7.038	7.038	7.154	7.412	7.090	7.269	7.034	7.306	—	—
	8.0	7.875	7.875	8.278	—	8.000	8.077	8.077	7.976	7.714	8.167	8.133	7.941	—	—
	9.0	9.143	9.143	9.009	—	8.714	8.714	8.857	8.831	8.778	9.000	8.857	8.933	—	—
	10.0	9.500	9.598	10.286	—	10.000	10.000	10.000	9.875	9.643	10.111	10.010	10.427	—	—
	11.2	11.143	11.143	11.453	—	10.893	10.893	11.071	11.471	10.972	11.250	10.901	11.333	—	—
	12.5	12.094	12.206	12.463	—	12.400	12.500	12.500	12.344	11.957	12.639	12.607	12.152	—	—
	14.0	14.041	14.171	14.571	—	13.507	13.507	13.729	14.224	13.606	13.950	13.729	14.183	—	—
	16.0	14.589	14.725	15.857	—	—	15.500	15.500	15.306	—	15.672	—	15.417	—	—
	18.0	—	—	—	—	—	—	—	16.947	—	—	—	—	—	—
3x	**14.0**	—	—	—	—	14.009	—	—	—	—	—	—	—	—	—
	16.0	15.931	15.543	—	—	15.566	—	—	—	15.188	—	15.618	—	15.902	—
	18.0	18.496	18.045	18.587	—	17.308	18.910	17.260	—	18.265	17.719	18.300	17.735	18.457	17.691
	20.0	19.817	19.895	20.696	21.215	20.235	20.948	19.487	19.244	19.938	19.906	19.929	20.700	19.991	20.471
	22.4	23.008	23.098	22.522	22.541	22.500	22.042	21.802	22.588	22.613	23.262	21.698	22.500	21.659	22.139
	25.0	24.039	24.454	24.054	24.652	25.000	24.583	24.579	24.308	24.686	26.027	25.425	24.641	26.181	24.096
	28.0	27.910	28.391	29.146	27.454	28.320	27.232	28.343	27.731	28.267	28.800	28.232	28.760	28.356	27.882
	31.5	30.671	30.697	30.565	31.903	31.467	30.942	31.952	33.040	30.857	32.533	30.739	31.261	30.722	31.363
	35.5	35.609	35.639	36.914	34.887	36.000	34.276	34.796	35.798	34.862	36.000	36.019	34.908	35.660	34.136
	40.0	38.489	38.640	40.171	40.539	40.000	39.333	41.248	38.795	38.263	40.124	40.184	40.743	38.622	39.500
	45.0	44.686	44.861	42.904	43.971	43.896	43.571	44.918	42.952	43.813	44.400	43.760	44.286	43.951	42.719
	50.0	46.690	47.495	51.987	48.970	48.773	47.960	49.526	50.080	47.829	50.427	47.646	49.406	47.619	48.613
	56.0	54.207	55.142	54.518	56.904	55.800	53.128	53.934	55.448	54.036	55.800	55.830	54.107	55.273	52.910
	63.0	59.570	59.620	60.703	62.226	62.000	60.967	63.934	60.132	58.989	62.193	60.798	63.151	59.864	61.225
	71.0	69.161	69.219	66.060	72.309	67.536	67.536	69.623	72.134	67.121	68.820	—	68.643	—	66.214
	80.0	—	—	—	—	—	77.500	78.607	77.625	—	77.316	—	—	—	—
	90.0	—	—	—	—	—	—	—	85.944	—	—	—	—	—	—
4x	**71.0**	—	—	—	—	70.800	—	—	—	71.498	—	66.861	—	72.872	—
	80.0	77.021	78.252	81.978	81.642	78.667	77.356	—	—	78.050	82.290	78.345	75.927	84.583	80.969
	90.0	89.421	94.536	91.278	93.568	90.000	85.690	86.990	—	88.181	91.059	92.894	88.620	91.610	93.692
	100.0	98.268	98.229	95.251	103.743	100.000	96.694	103.119	96.987	96.262	101.491	101.848	96.326	99.256	101.326
	112.0	114.089	105.597	118.125	113.461	111.392	108.929	112.296	116.345	111.182	112.306	110.912	115.205	115.208	110.285
	125.0	118.545	127.386	128.548	128.656	123.769	121.706	125.679	125.201	121.371	127.964	120.762	125.223	124.779	127.615
	140.0	—	132.555	137.096	140.708	139.830	137.105	136.864	141.798	141.333	141.600	141.503	137.137	139.844	138.014
	160.0	154.425	159.908	159.341	163.484	160.000	154.711	162.241	152.592	154.286	162.667	157.865	160.061	162.319	155.383
	180.0	179.287	181.444	177.418	181.869	178.227	174.286	179.673	177.999	174.311	180.000	171.914	173.980	175.804	179.800
	200.0	197.025	196.458	202.476	211.337	198.030	194.730	201.087	200.321	190.286	198.345	187.182	194.096	190.478	194.450
	224.0	228.177	227.766	225.447	231.102	223.728	215.711	218.982	226.877	219.067	219.480	219.330	212.562	221.090	211.642
	250.0	237.681	254.773	256.348	256.564	248.587	244.444	252.424	244.148	239.143	252.133	238.849	248.095	239.458	244.900
	280.0	—	265.110	268.832	280.597	284.400	274.210	282.686	284.798	270.182	279.000	—	269.668	—	—
	315.0	308.850	312.566	317.756	325.662	316.000	310.733	325.856	315.172	294.943	310.964	—	—	—	—
	355.0	—	362.888	353.805	362.681	344.214	344.214	354.855	367.649	335.604	344.100	—	—	—	—
	400.0	394.050	392.363	403.774	421.444	—	395.000	400.643	395.635	—	386.581	—	—	—	—
	450.0	457.491	455.532	449.583	460.861	—	—	—	438.036	—	—	—	—	—	—
	500.0	475.362	473.327	489.252	489.665	—	—	—	—	—	—	—	—	—	—

31 DIMENSIONS AND WEIGHT

HDO 71



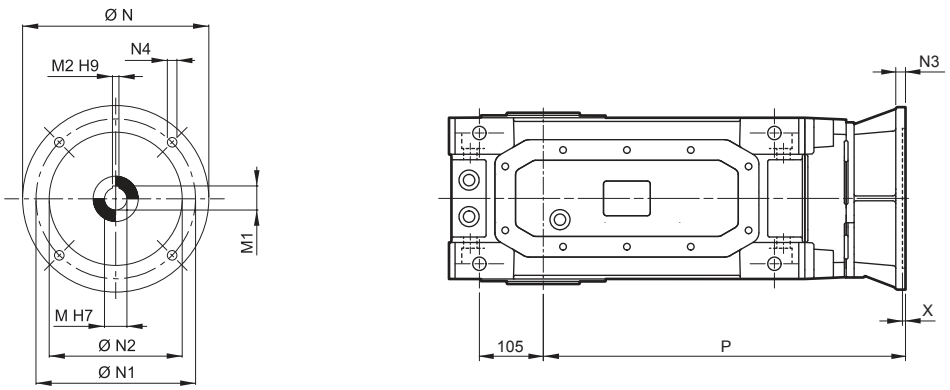
VP



Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	G	H	Kg LP
HDO 71 2	**5.6 … 14.6**	45 k6	14	48.5	M16x36	100	110	460	—	210
HDO 71 3	**15.9 … 69.2**	32 k6	10	35	M12x28	70	80	507	229	195
HDO 71 4	**77.0 … 475.4**	24 j6	8	27	M8x19	50	60	543	—	215

AD

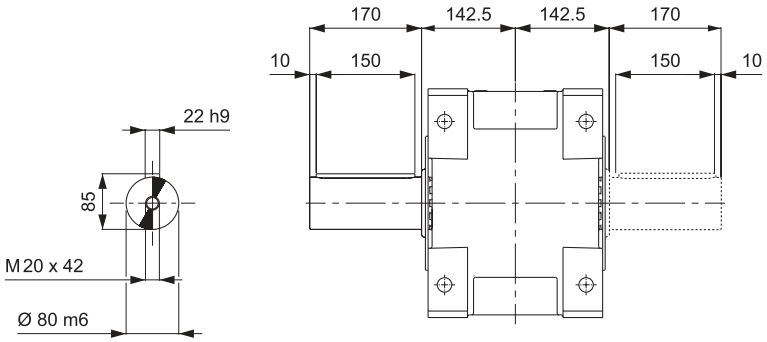


Dimensions are in [mm].

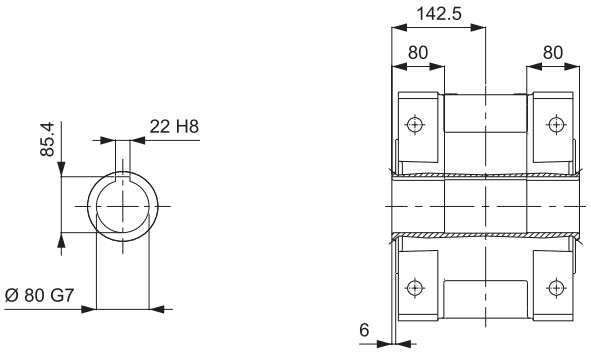
AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDO 71 3_ 132	38	41.3	10	300	265	230	16	14	5	595.5
HDO 71 3_ 160	42	45.3	12	350	300	250	23	18	6	626.5
HDO 71 3_ 180	48	51.8	14	350	300	250	23	18	6	626.5
HDO 71 3_ 200	55	59.3	16	400	350	300	—	M16x23	7	651.5

HDO 71

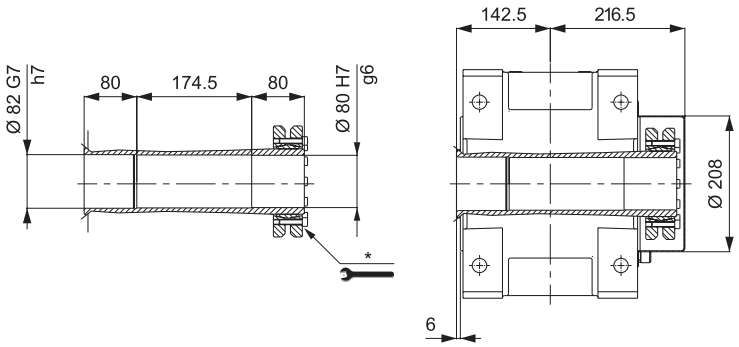
LP



H



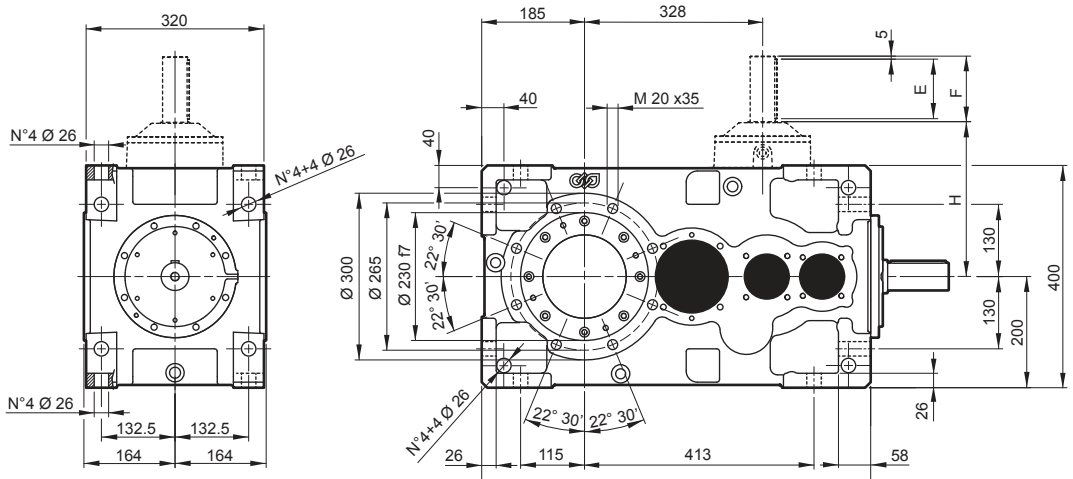
S



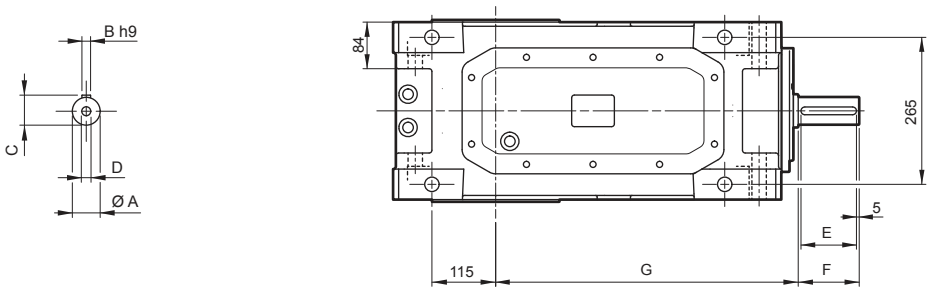
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

HDO 81



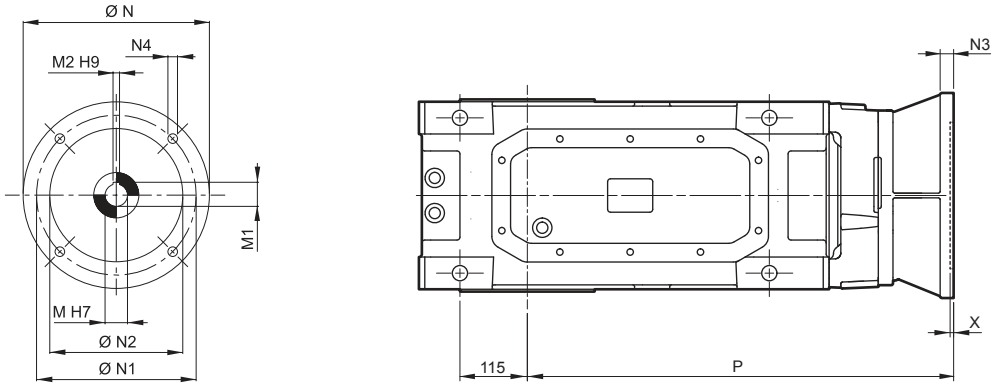
VP



Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	G	H	Kg LP
HDO 81 2	**5.5 … 14.7**	50 k6	14	53.5	M16x36	100	110	545.5	—	340
HDO 81 3	**15.5 … 69.2**	42 k6	12	45	M16x36	100	110	600	272	330
HDO 81 4	**78.3 … 473.3**	28 j6	8	31	M10x22	50	60	645	—	340

AD

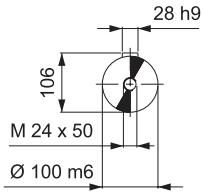


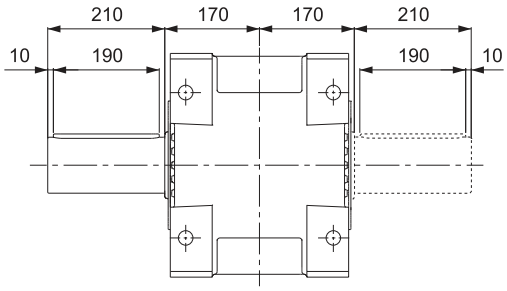
Dimensions are in [mm].

AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDO 81 3_ 160	42	45.3	12	350	300	250	23	18	6	727.5
HDO 81 3_ 180	48	51.8	14	350	300	250	23	18	6	727.5
HDO 81 3_ 200	55	59.3	16	400	350	300	—	M16x23	7	752.5

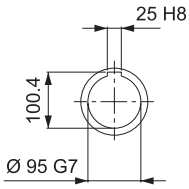
HDO 81

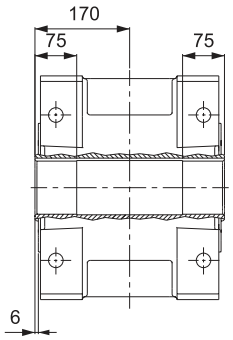
LP



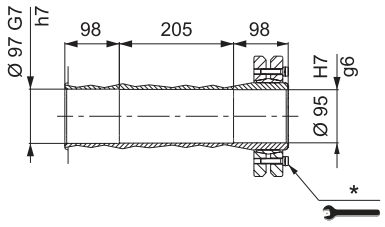


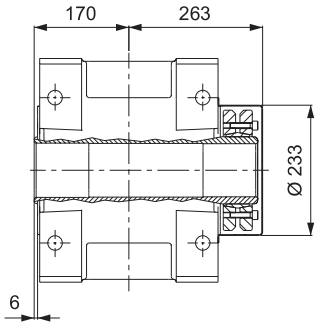
H





S

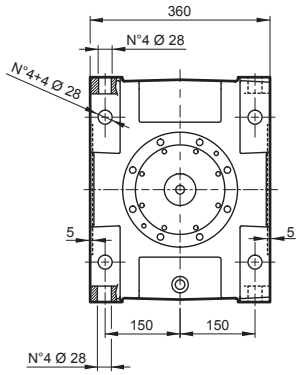


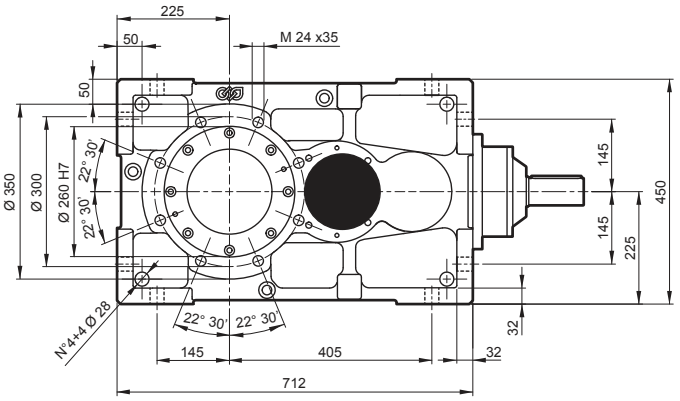


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

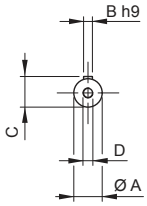
Dimensions are in [mm].

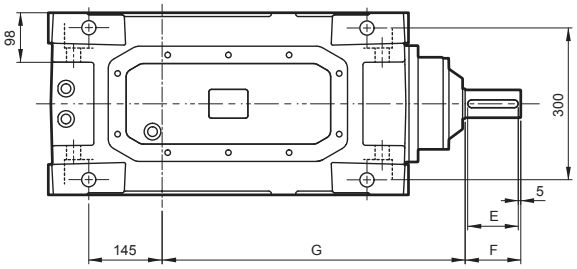
HDO 91

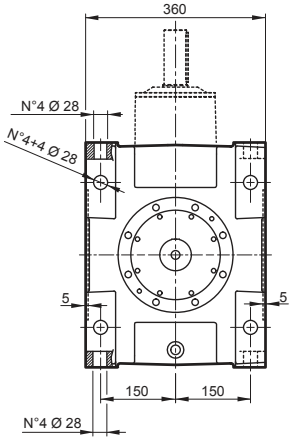


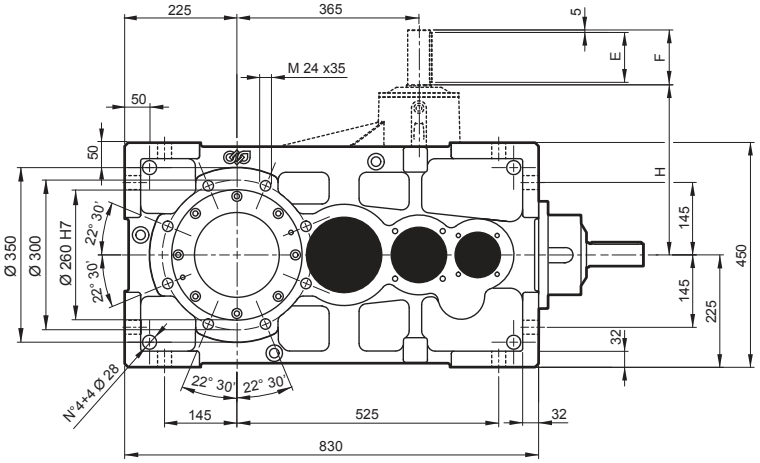


HDO 91 2

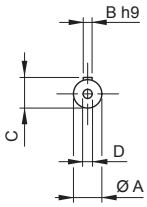


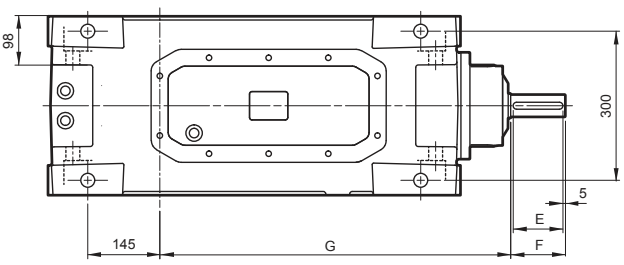






HDO 91 3
HDO 91 4



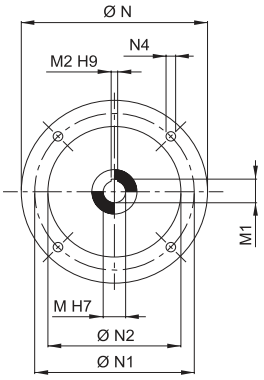


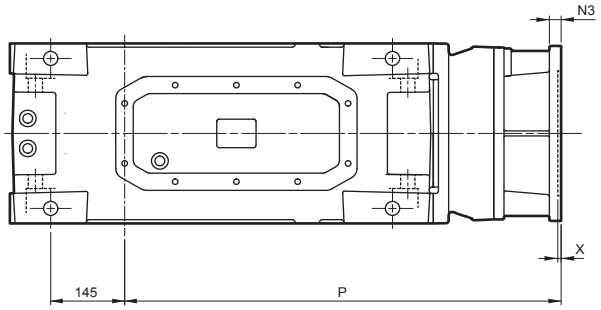
Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	G	H	Kg LP
HDO 91 2	**7.4 … 15.9**	55 m6	16	59	M20x42	100	110	599	—	430
HDO 91 3	**18.6 … 66.1**	45 k6	14	48.5	M16x36	100	110	706	341	490
HDO 91 4	**82 … 489.3**	32 k6	10	35	M12x28	70	80	711	—	495

HDO 91

AD

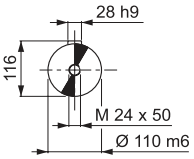


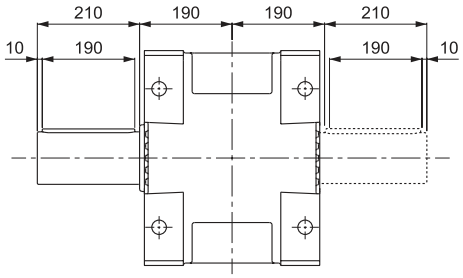


Dimensions are in [mm].

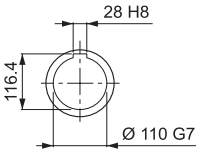
AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDO 91 3_ 180	48	51.8	14	350	300	250	23	18	6	855.5
HDO 91 3_ 200	55	59.3	16	400	350	300	—	M16x23	7	880.5
HDO 91 4_ 160	42	45.3	12	350	300	250	23	18	6	855.5
HDO 91 4_ 180	48	51.8	14	350	300	250	23	18	6	855.5
HDO 91 4_ 200	55	59.3	16	400	350	300	—	M16x23	7	880.5

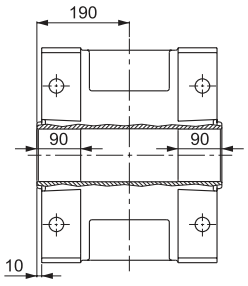
LP



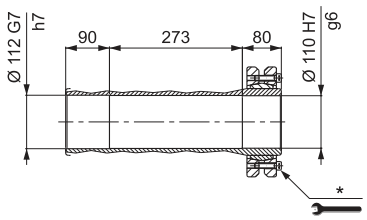


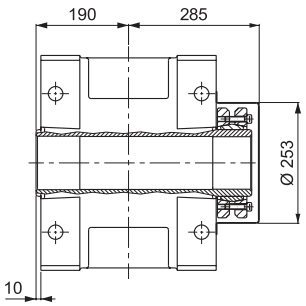
H





S

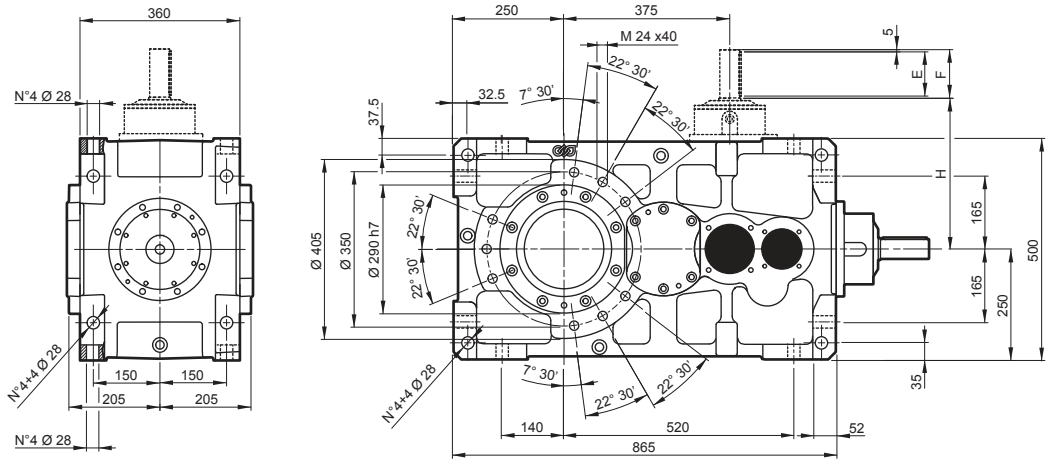




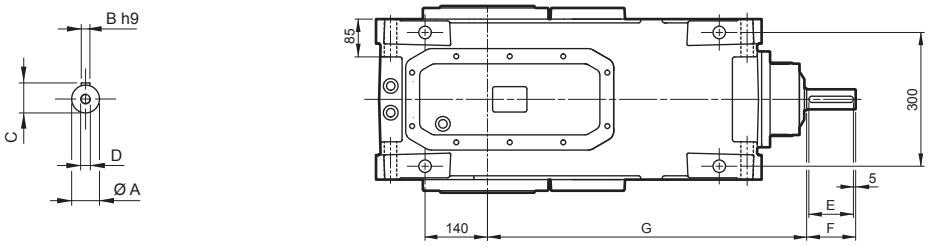
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

HDO 95



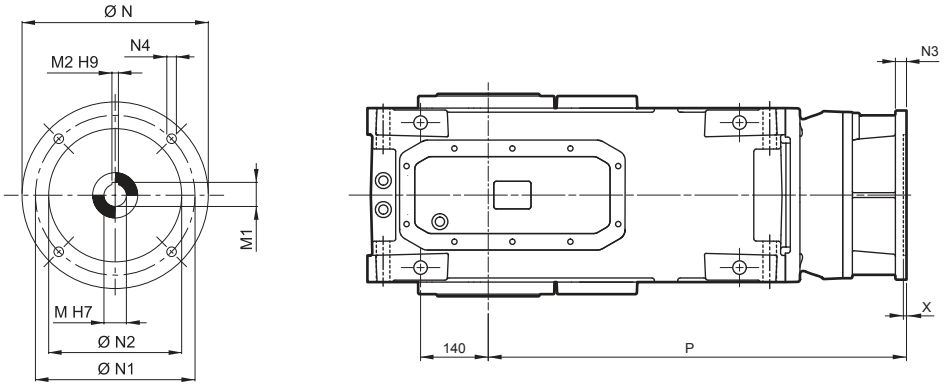
HDO 95 3
HDO 95 4



Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	G	H	Kg LP
HDO 95 3	**21.2 … 72.3**	45 k6	14	48.5	M16x36	100	110	716	341	560
HDO 95 4	**81.6 … 489.7**	32 k6	10	35	M12x28	70	80	711	—	565

AD

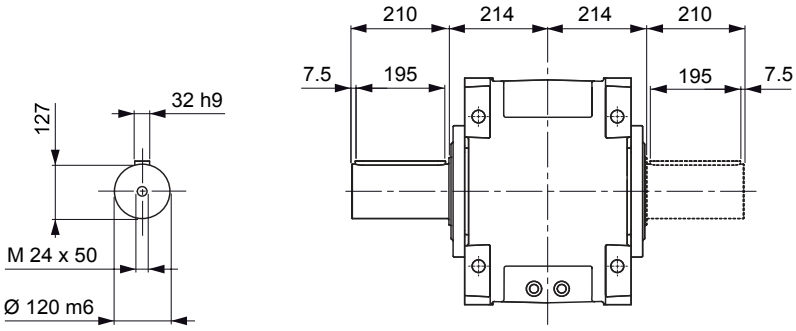


Dimensions are in [mm].

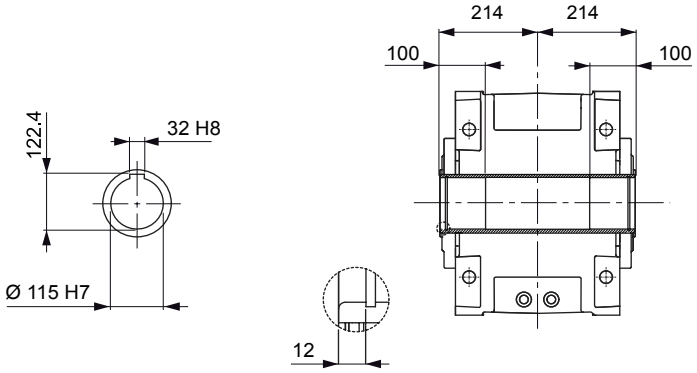
AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDO 95 3_ 180	48	51.8	14	350	300	250	23	18	6	865.5
HDO 95 3_ 200	55	59.3	16	400	350	300	—	M16x23	7	890.5
HDO 95 4_ 160	42	45.3	12	350	300	250	23	18	6	865.5
HDO 95 4_ 180	48	51.8	14	350	300	250	23	18	6	865.5
HDO 95 4_ 200	55	59.3	16	400	350	300	—	M16x23	7	890.5

HDO 95

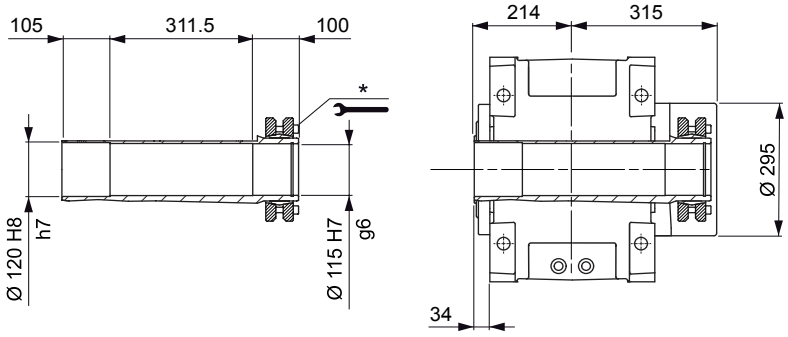
LP



H



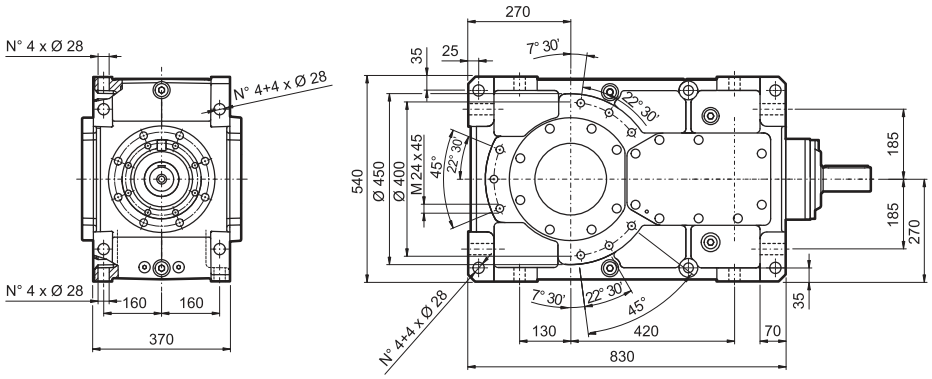
S



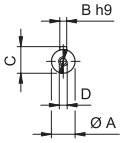
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

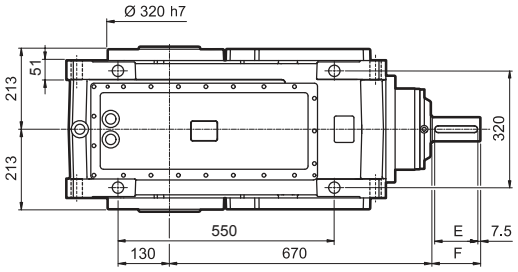
Dimensions are in [mm].

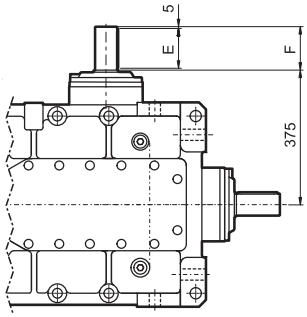
HDO 100

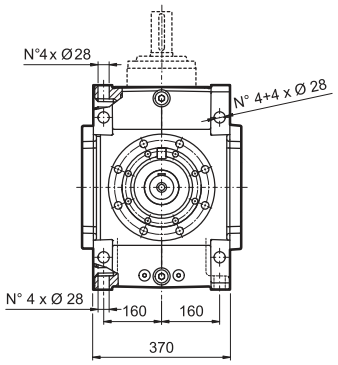


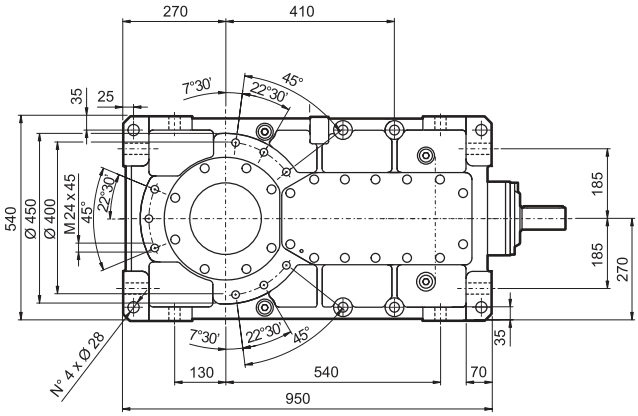
HDO 100 2



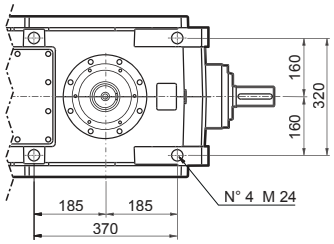


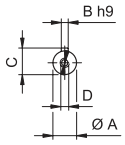


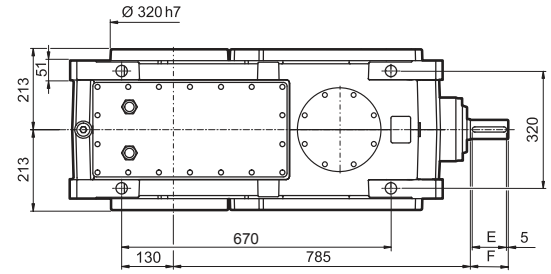




HDO 100 3
HDO 100 4





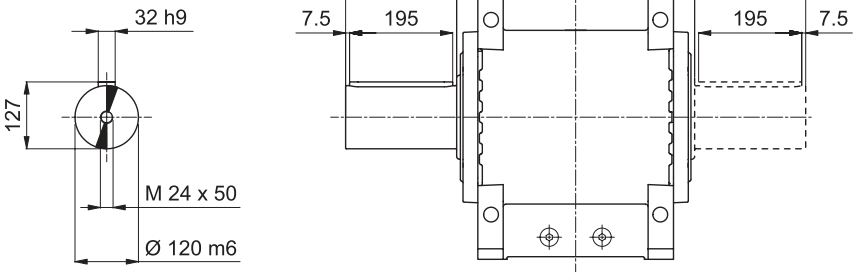


Dimensions are in [mm].

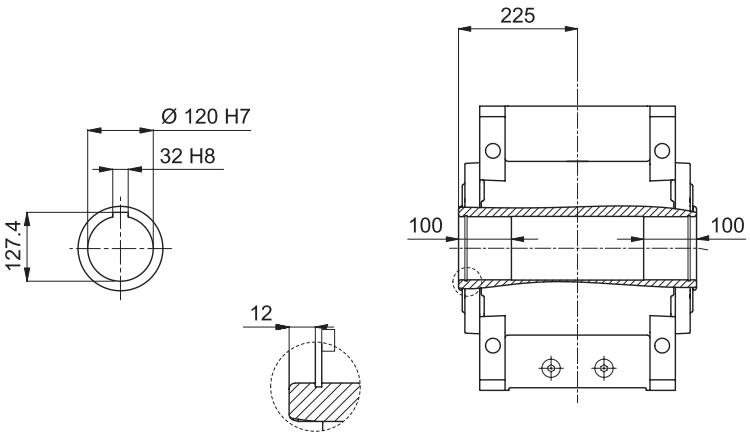
VP	i =	A	B	C	D	E	F	Kg LP
HDO 100 2	**5.8 … 13.5**	70 m6	20	74.5	M20x42	125	140	640
HDO 100 3	**14 … 17.3**	55 m6	16	59	M20x42	100	110	715
HDO 100 3	**20.2 … 67.5**	45 k6	14	48.5	M16x36	100	110	715
HDO 100 4	**70.8 … 139.8**	35 k6	10	38	M12x28	70	80	730
HDO 100 4	**160 … 344.2**	32 k6	10	35	M12x28	70	80	730

HDO 100

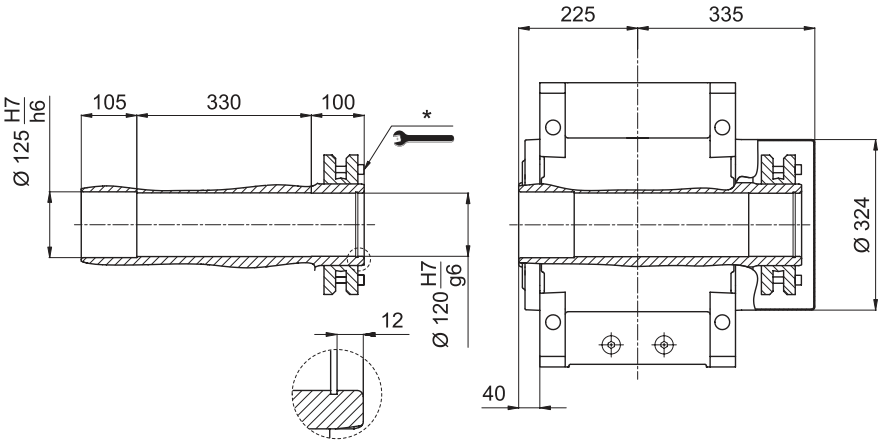
LP



H



S

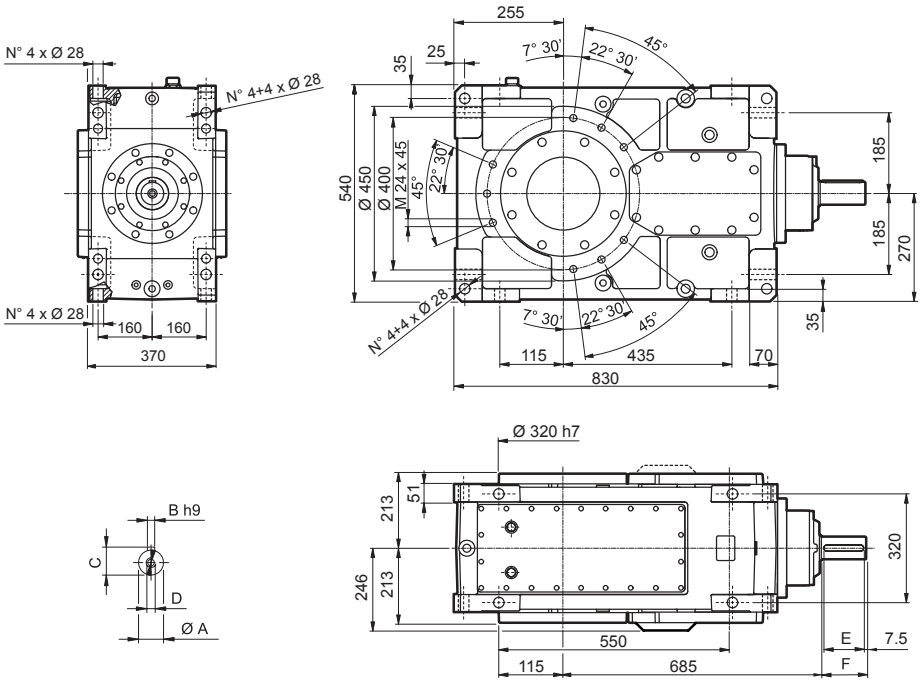


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

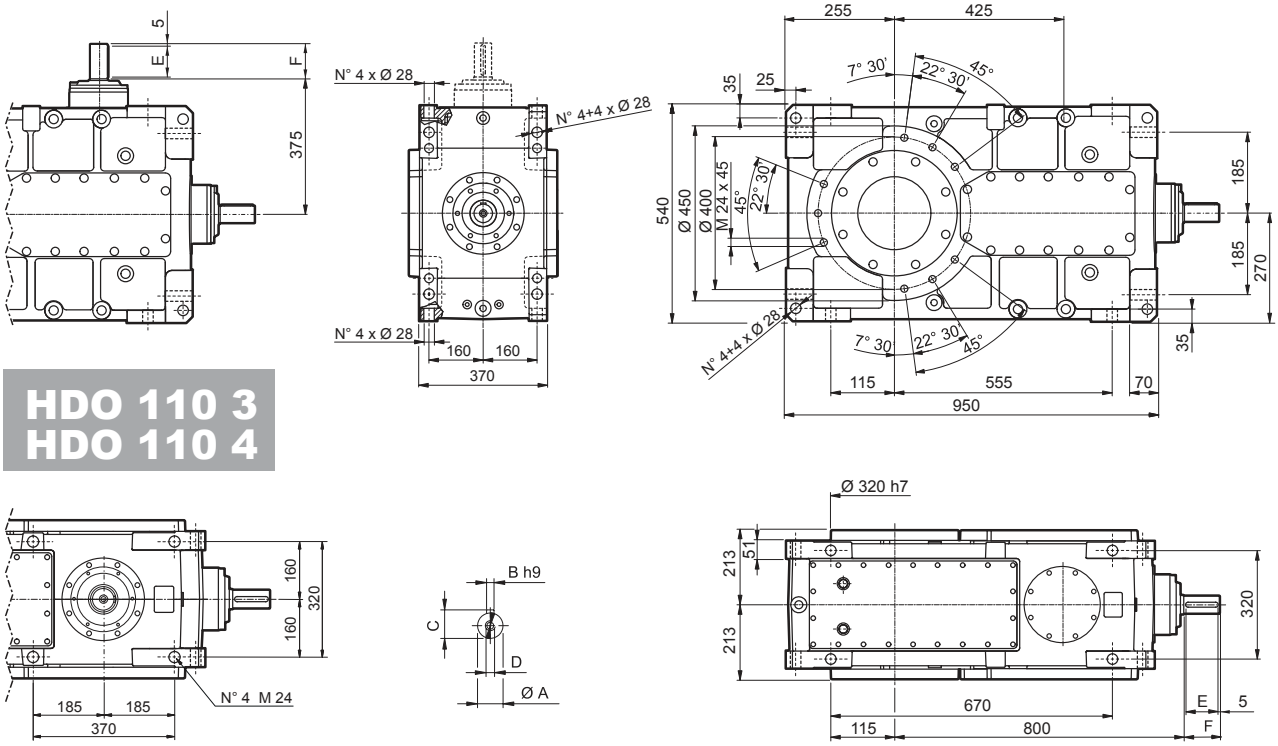
Dimensions are in [mm].

HDO 110

HDO 110 2



HDO 110 3
HDO 110 4

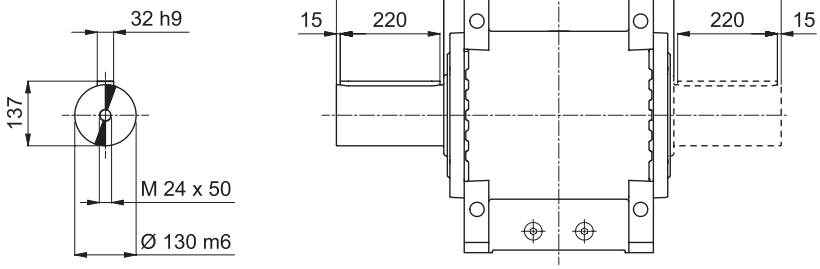


Dimensions are in [mm].

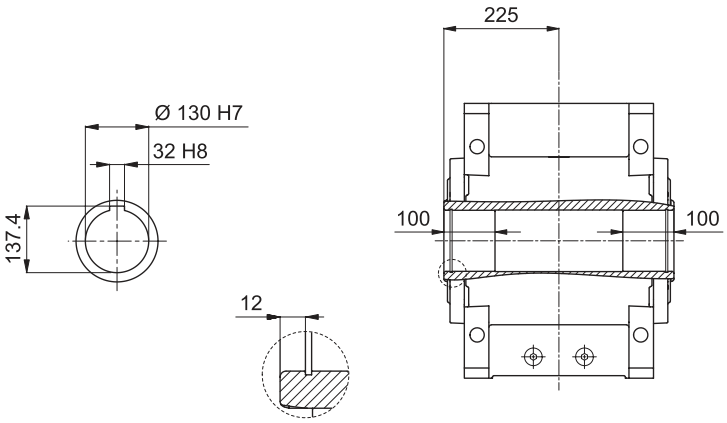
VP	i =	A	B	C	D	E	F	Kg LP
HDO 110 2	**6.4 … 15.5**	70 m6	20	74.5	M20x42	125	140	695
HDO 110 3	**18.9 … 20.9**	55 m6	16	59	M20x42	100	110	770
HDO 110 3	**22 … 77.5**	45 k6	14	48.5	M16x36	100	110	770
HDO 110 4	**77.4 … 121.7**	35 k6	10	38	M12x28	70	80	765
HDO 110 4	**137.1 … 395**	32 k6	10	35	M12x28	70	80	765

HDO 110

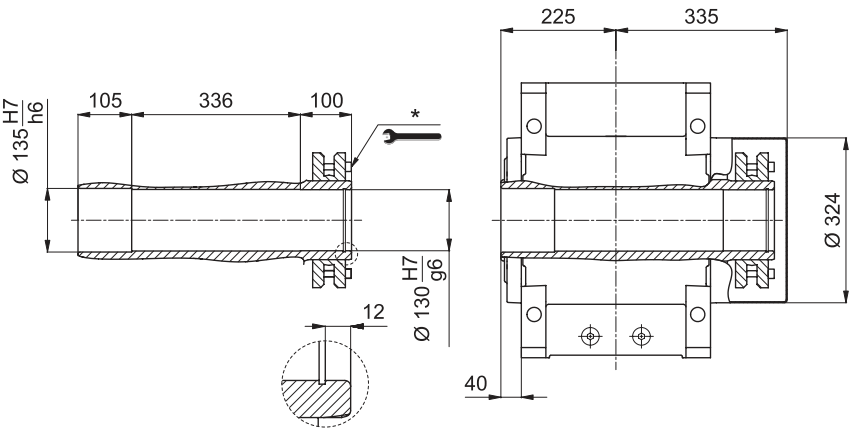
LP



H



S

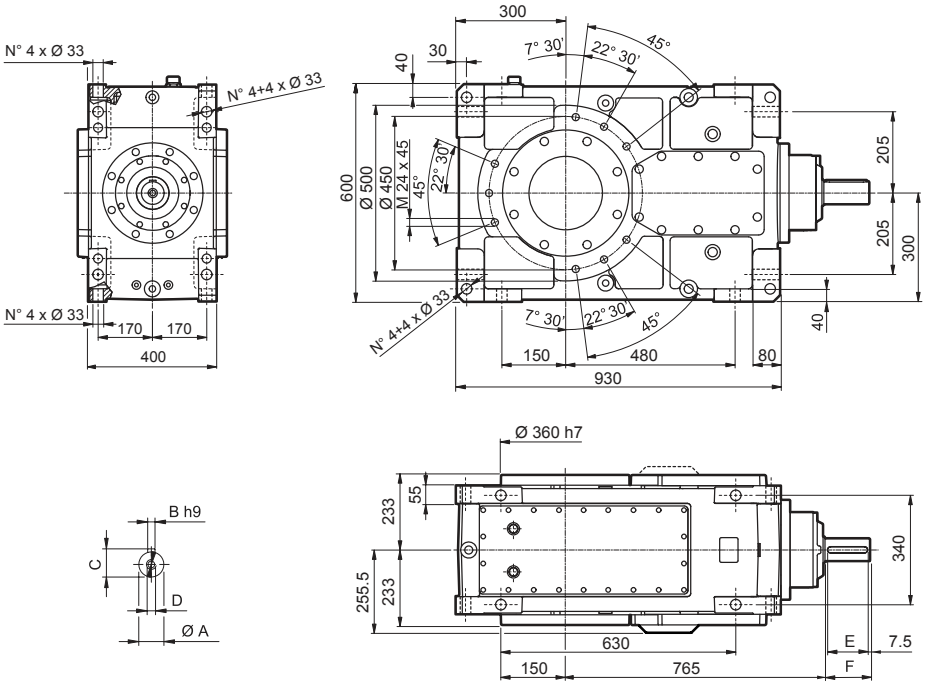


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

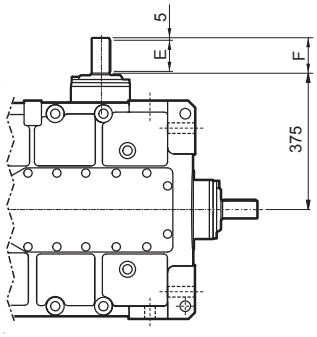
Dimensions are in [mm].

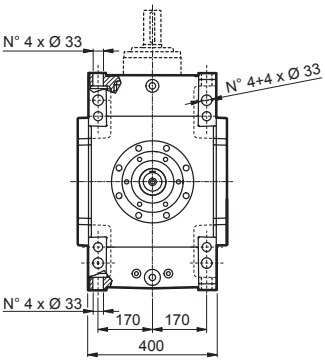
HDO 120

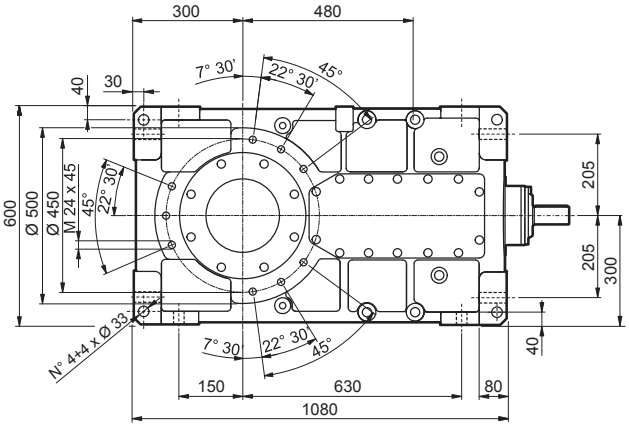
HDO 120 2

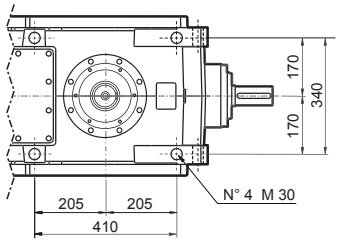


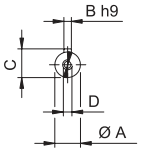
HDO 120 3
HDO 120 4

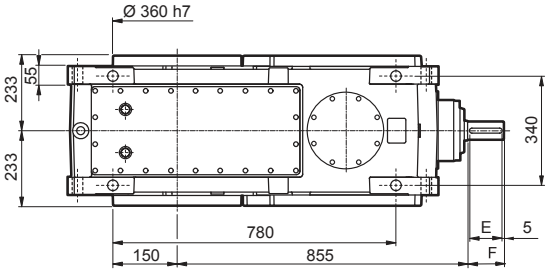










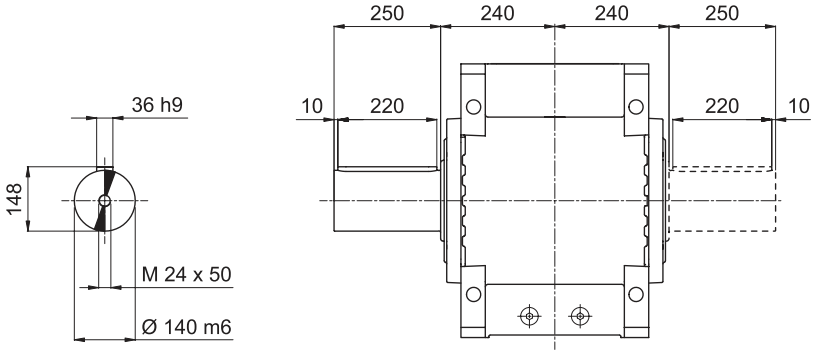


Dimensions are in [mm].

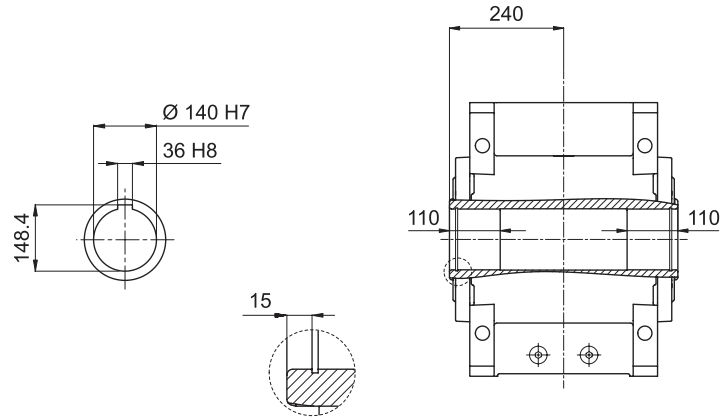
VP	i =	A	B	C	D	E	F	Kg LP
HDO 120 2	**6.6 … 15.5**	70 m6	20	74.5	M20x42	125	140	945
HDO 120 3	**17.3 … 24.6**	55 m6	16	59	M20x42	100	110	1025
HDO 120 3	**28.3 … 78.6**	45 k6	14	48.5	M16x36	100	110	1025
HDO 120 4	**87 … 162.2**	35 k6	10	38	M12x28	70	80	990
HDO 120 4	**179.7 … 400.6**	32 k6	10	35	M12x28	70	80	990

HDO 120

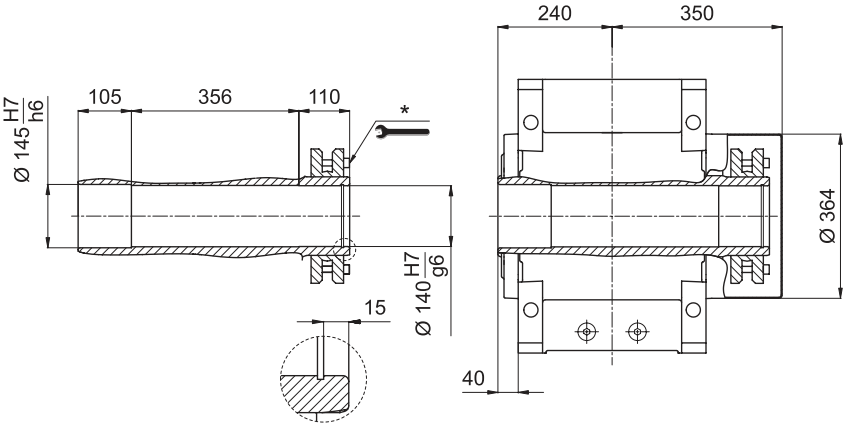
LP



H



S

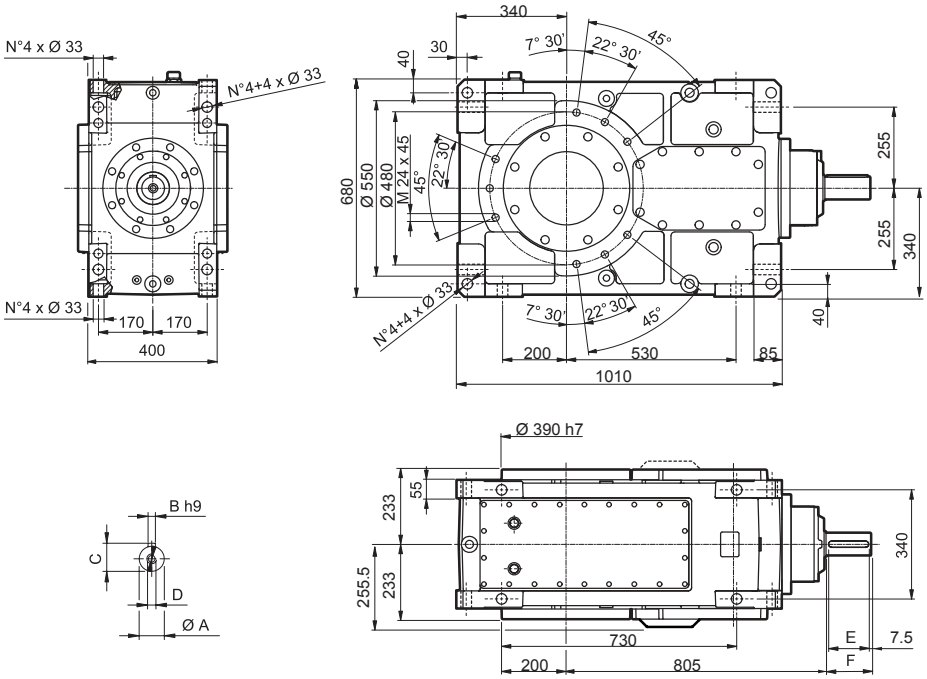


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

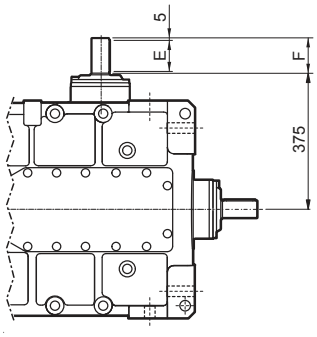
Dimensions are in [mm].

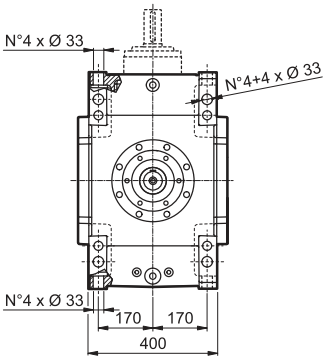
HDO 125

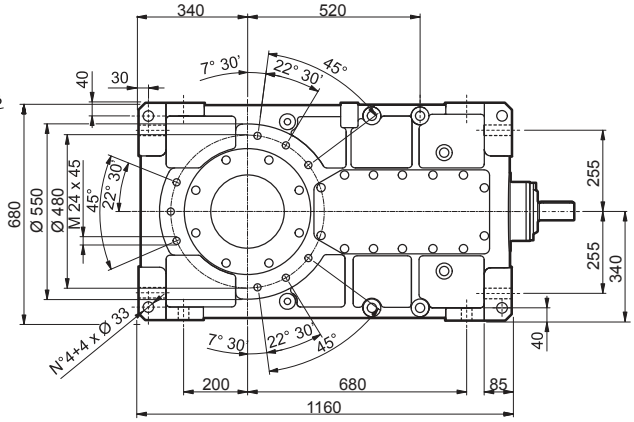
HDO 125 2

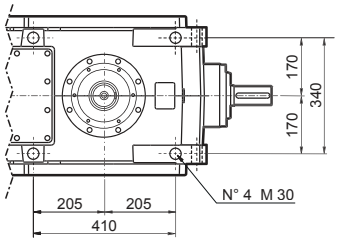


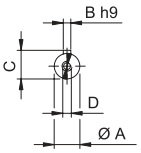
HDO 125 3
HDO 125 4

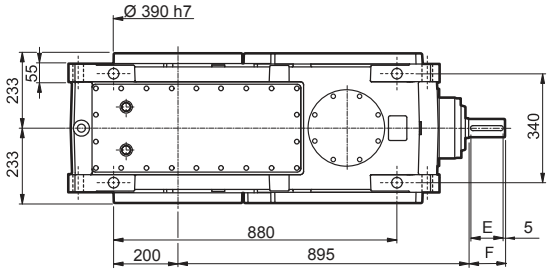










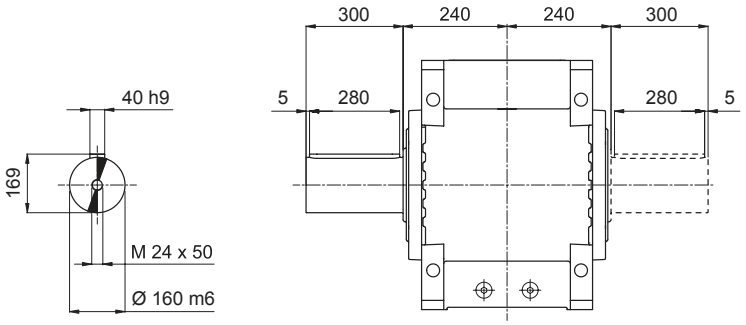


Dimensions are in [mm].

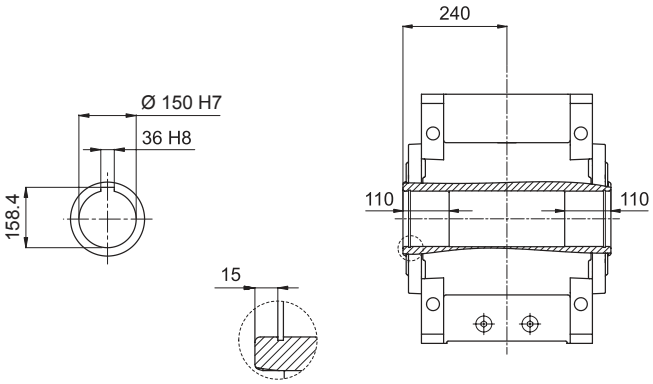
VP	i =	A	B	C	D	E	F	Kg LP
HDO 125 2	**7.4…17.0**	70 m6	20	74.5	M20x42	125	140	1130
HDO 125 3	**19.2...35.8**	55 m6	16	59	M20x43	100	110	1205
HDO 125 3	**38.8…85.9**	45 k6	14	48.5	M16x36	100	110	1205
HDO 125 4	**97.0…178.0**	35 k6	10	38	M12x28	70	80	1165
HDO 125 4	**200.3…438.0**	32 k6	10	35	M12x28	70	80	1165

HDO 125

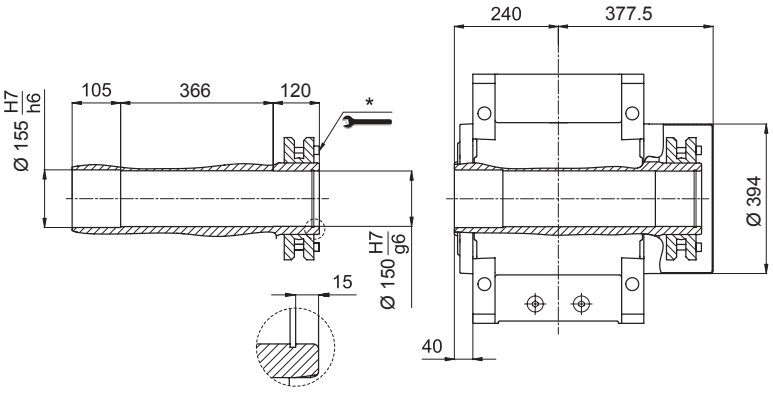
LP



H



S

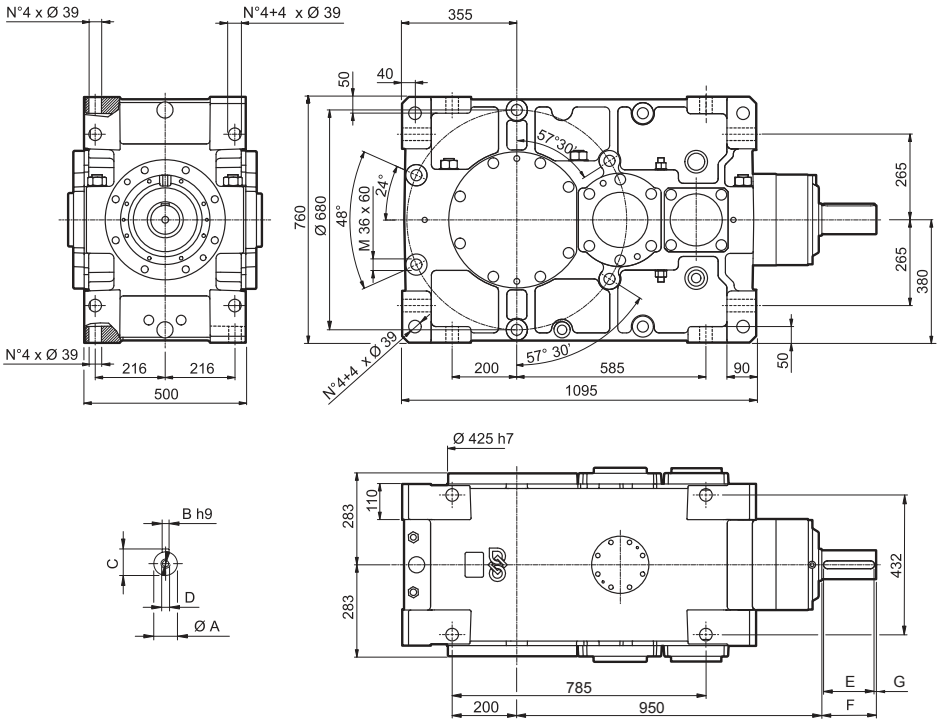


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

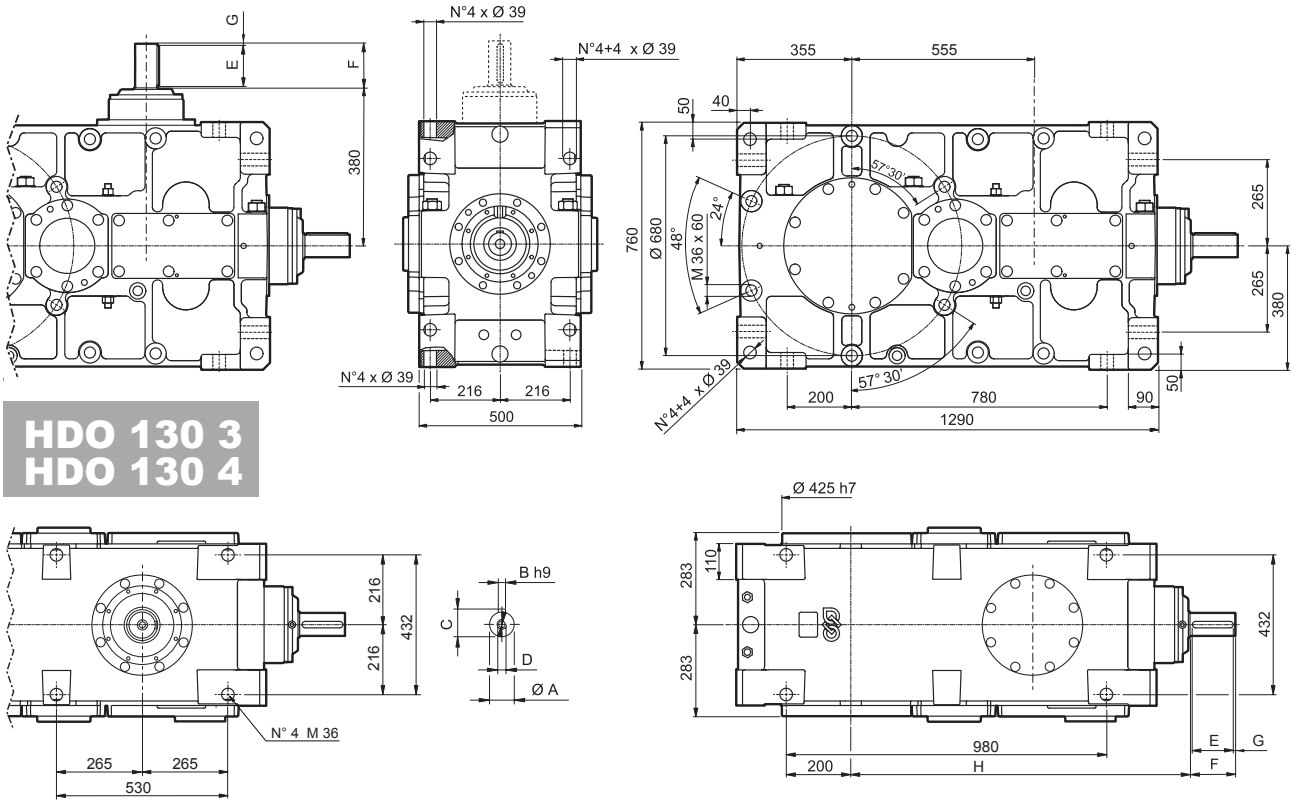
Dimensions are in [mm].

HDO 130

HDO 130 2



HDO 130 3
HDO 130 4

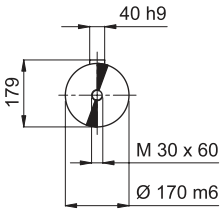


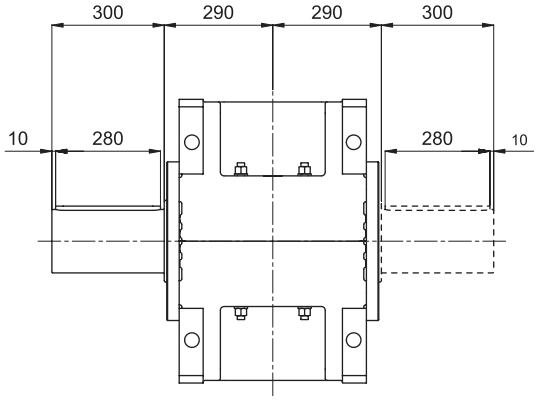
Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	G	H	Kg LP
HDO 130 2	**5.7 … 13.6**	90 m6	25	95	M24x50	160	170	5	—	1570
HDO 130 3	**15.2 … 67.1**	70 m6	20	74.5	M20x42	125	140	7.5	1040	1730
HDO 130 4	**71.5 … 335.6**	45 k6	14	48.5	M16x36	100	110	5	1105	1700

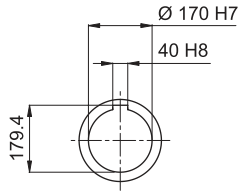
HDO 130

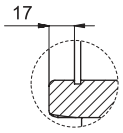
LP

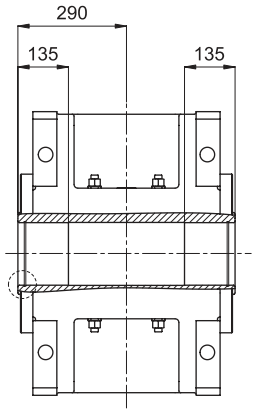




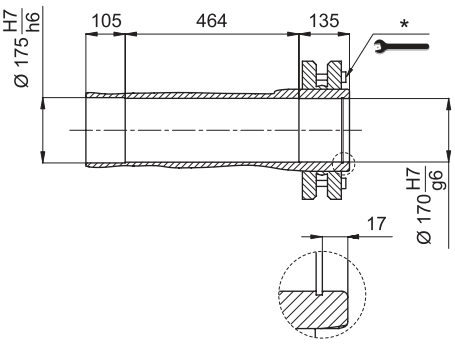
H

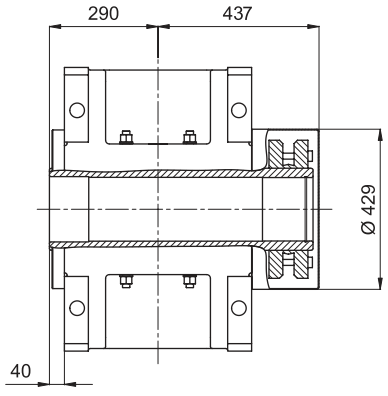






S



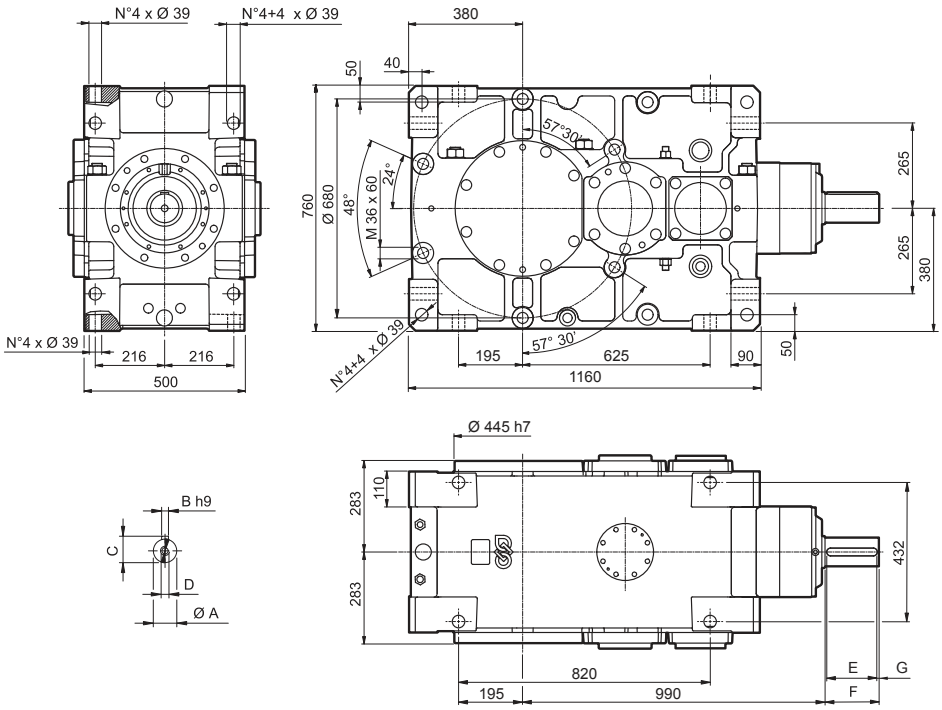


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

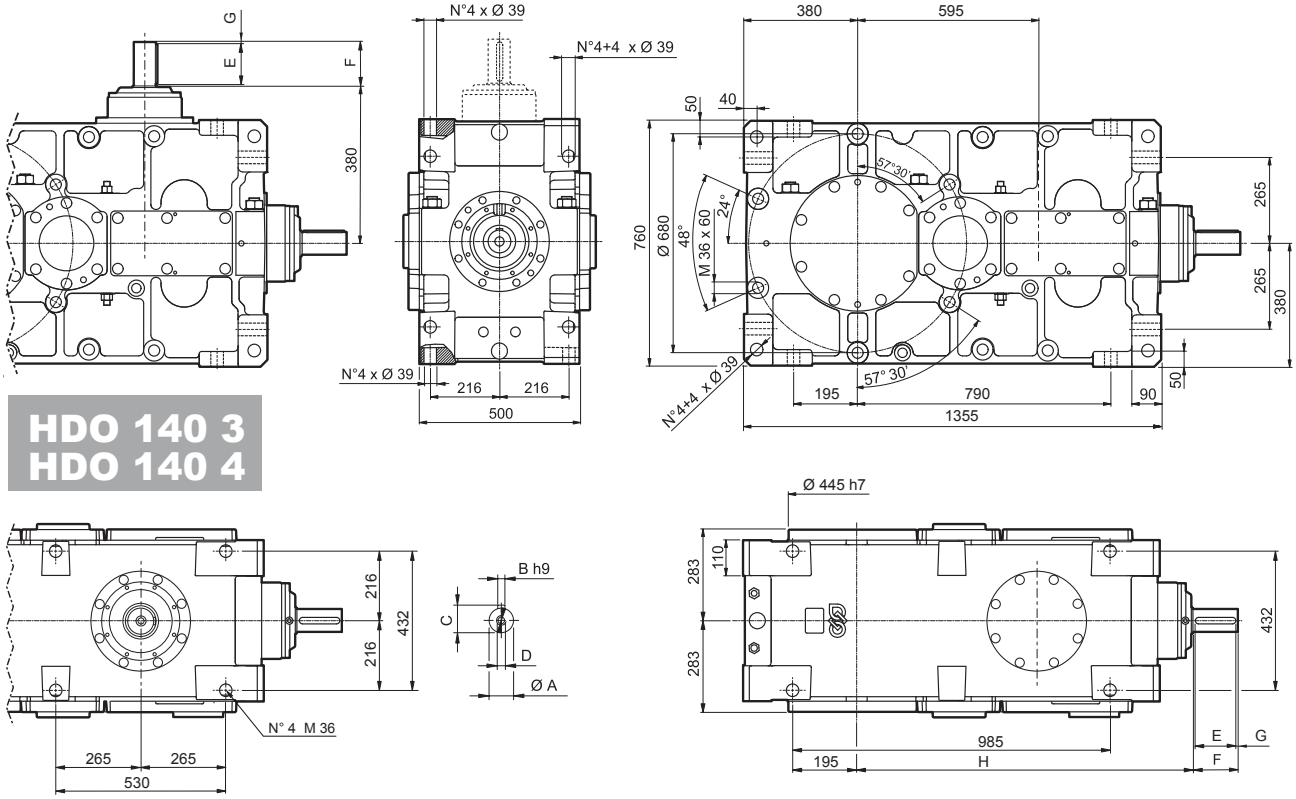
Dimensions are in [mm].

HDO 140

HDO 140 2



HDO 140 3
HDO 140 4

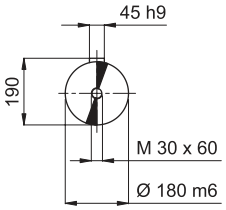


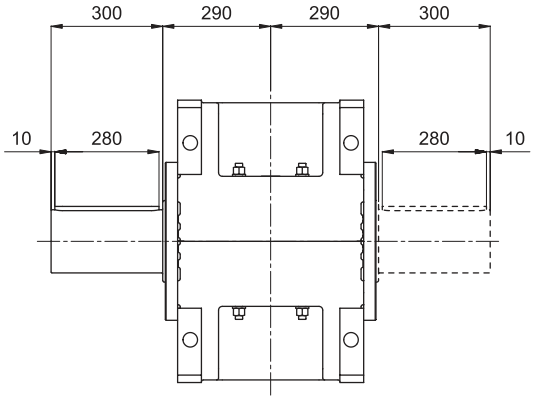
Dimensions are in [mm].

VP	i =	A	B	C	D	E	F	G	H	Kg LP
HDO 140 2	**6.6 … 15.7**	90 m6	25	95	M24x50	160	170	5	—	1710
HDO 140 3	**17.7 … 77.3**	70 m6	20	74.5	M20x42	125	140	7.5	1080	1960
HDO 140 4	**82.3 … 386.6**	45 k6	14	48.5	M16x36	100	110	5	1145	1925

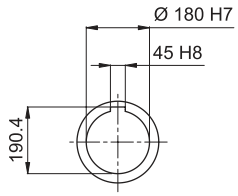
HDO 140

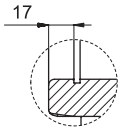
LP

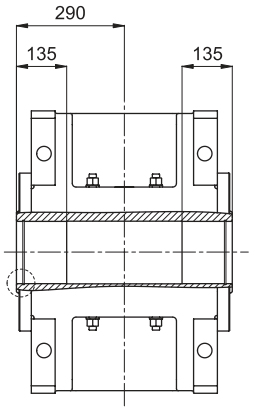




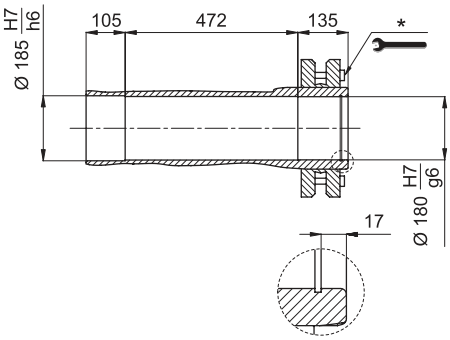
H

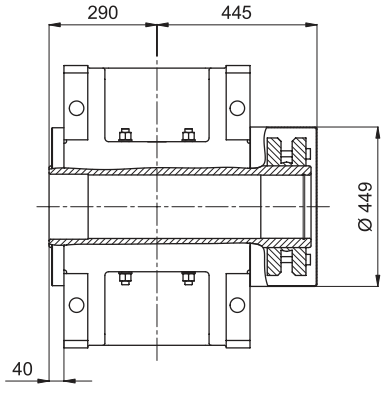






S



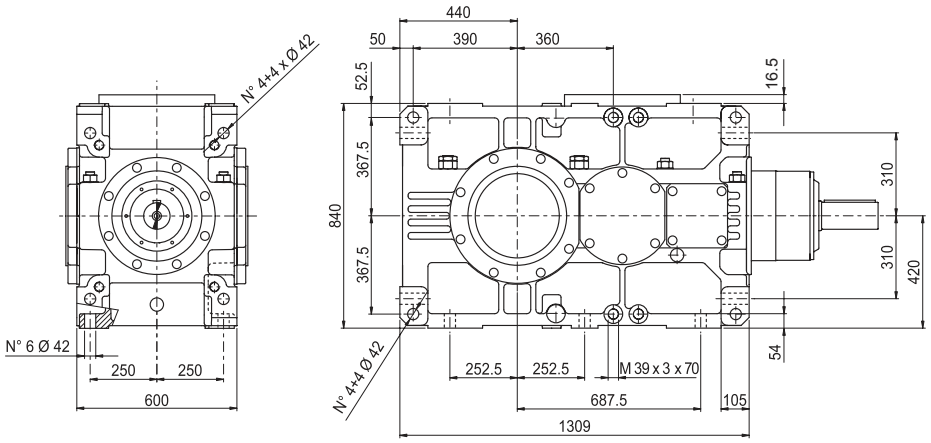


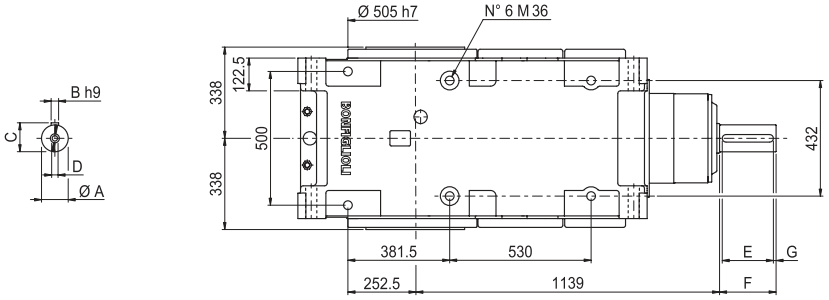
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

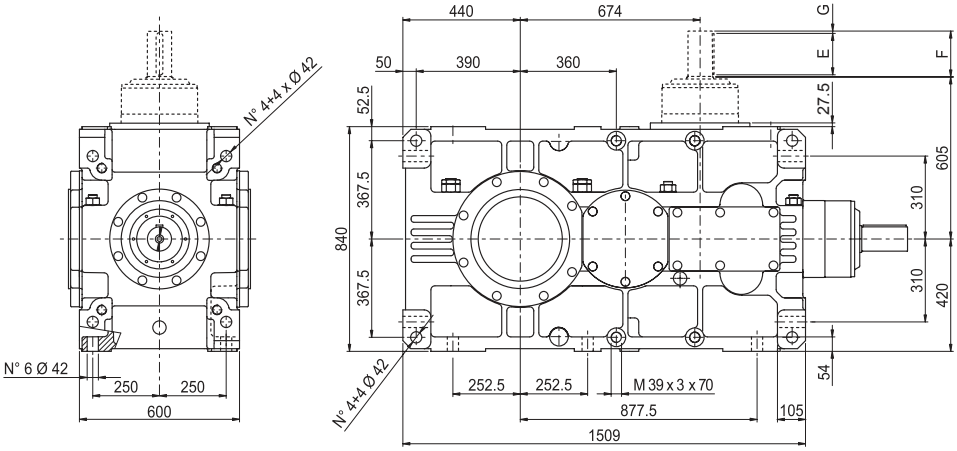
HDO 150

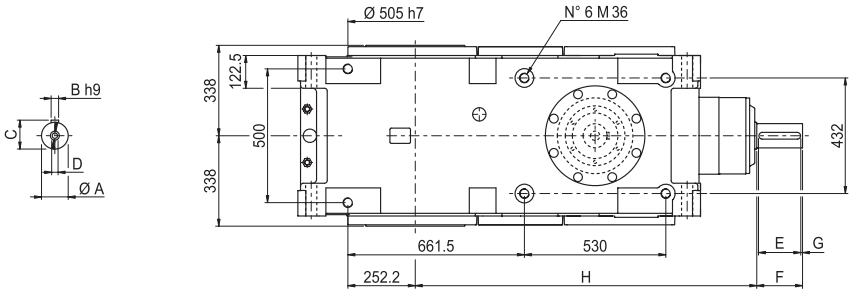
HDO 150 2





HDO 150 3
HDO 150 4



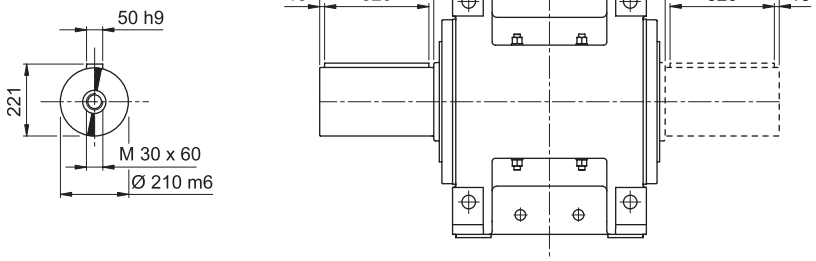


Dimensions are in [mm].

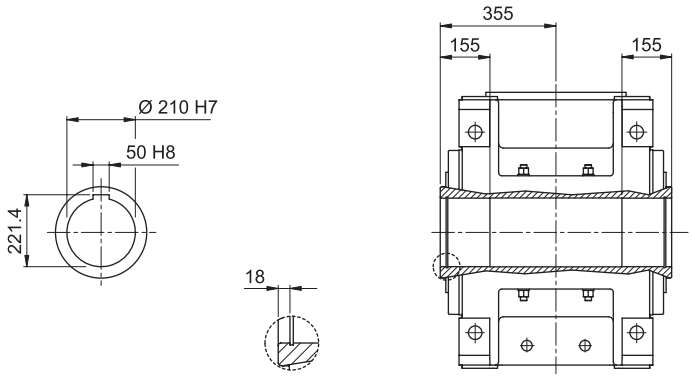
VP	i =	A	B	C	D	E	F	G	H	Kg LP
HDO 150 2	**5.5 … 7.0**	110 m6	28	116	M24x50	190	210	10	—	2795
HDO 150 2	**8.1 … 13.7**	100 m6	28	106	M24x50	190	210	10	—	2795
HDO 150 3	**15.6 … 60.8**	90 m6	25	95	M24x50	160	170	5	1279	2895
HDO 150 4	**66.9 … 92.9**	55 m6	16	59	M20x42	100	110	5	1249	2875
HDO 150 4	**101.8 … 238.8**	45 k6	14	48.5	M16x36	100	110	5	1249	2875

HDO 150

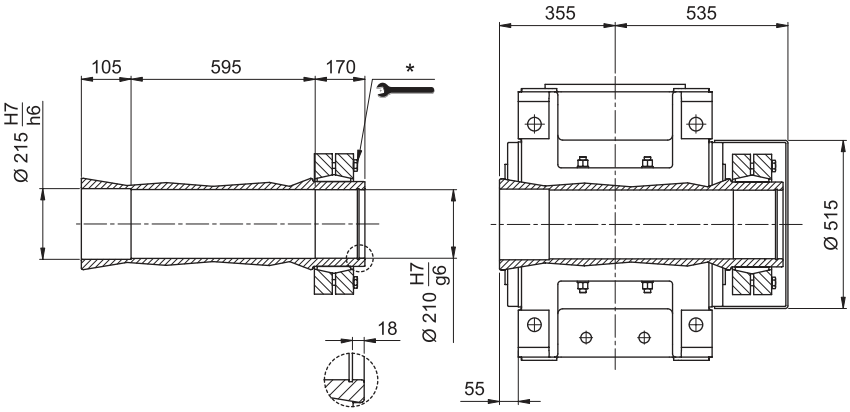
LP



H



S

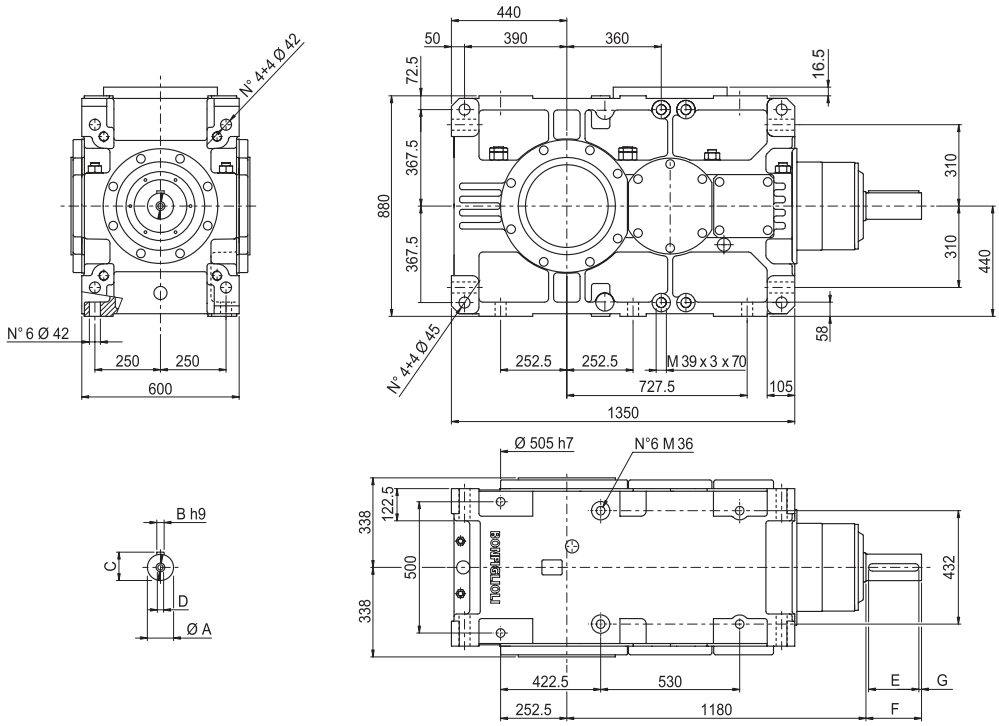


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

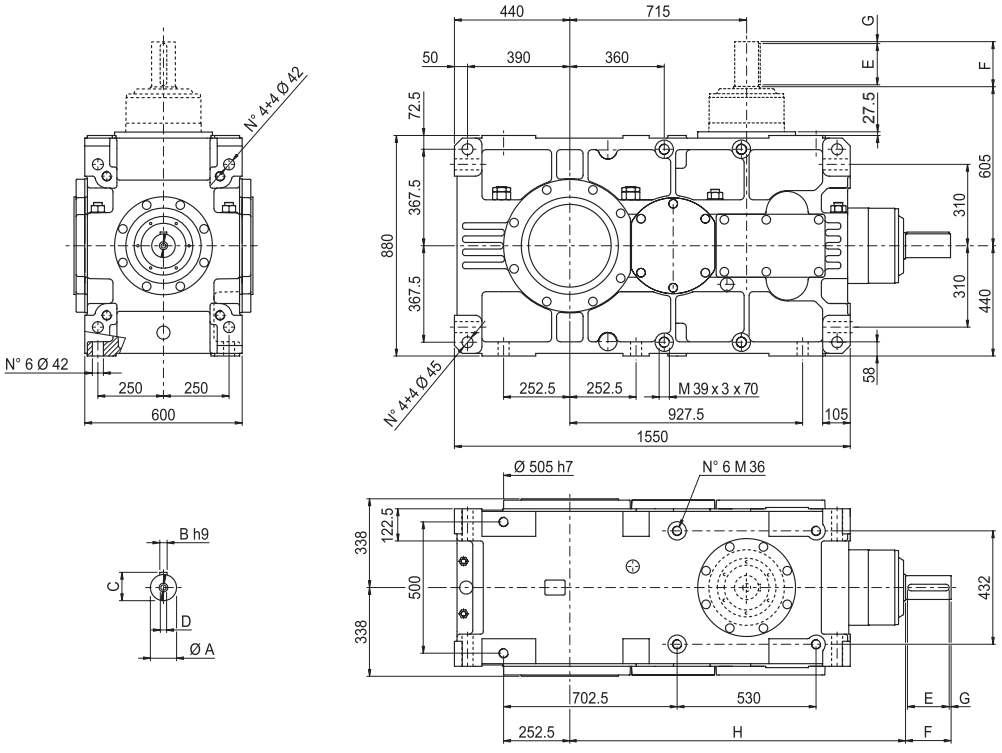
Dimensions are in [mm].

HDO 160

HDO 160 2



HDO 160 3
HDO 160 4

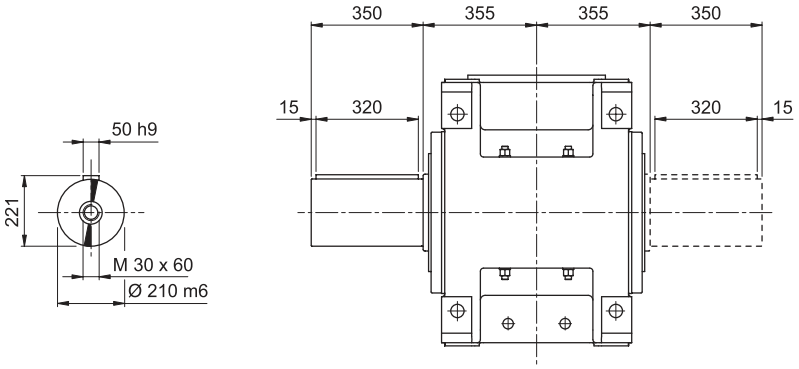


Dimensions are in [mm].

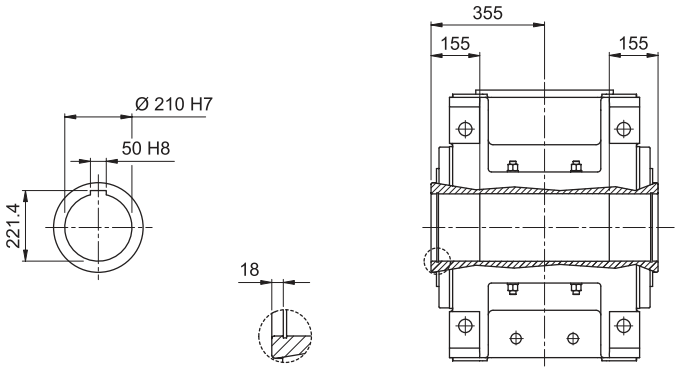
VP	i =	A	B	C	D	E	F	G	H	Kg LP
HDO 160 2	**7.3 … 7.9**	110 m6	28	116	M24x50	190	210	10	—	3075
HDO 160 2	**8.9 … 15.4**	100 m6	28	106	M24x50	190	210	10	—	3075
HDO 160 3	**17.7 … 68.6**	90 m6	25	95	M24x50	160	170	5	1320	3175
HDO 160 4	**75.9 … 96.3**	55 m6	16	59	M20x42	100	110	5	1290	3160
HDO 160 4	**115.2 … 269.7**	45 k6	14	48.5	M16x36	100	110	5	1290	3160

HDO 160

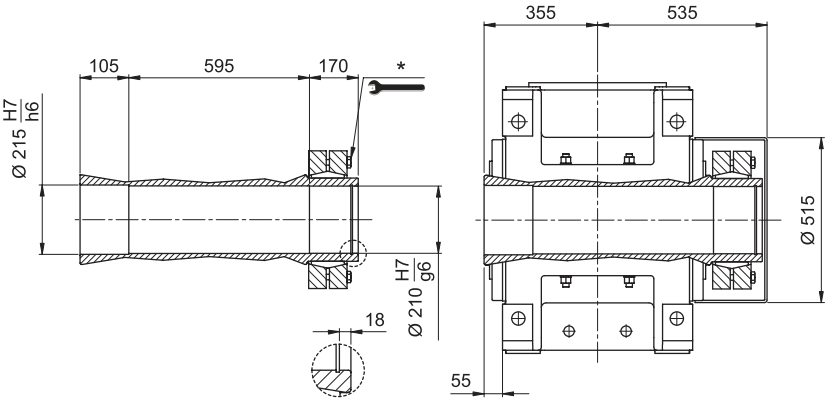
LP



H



S

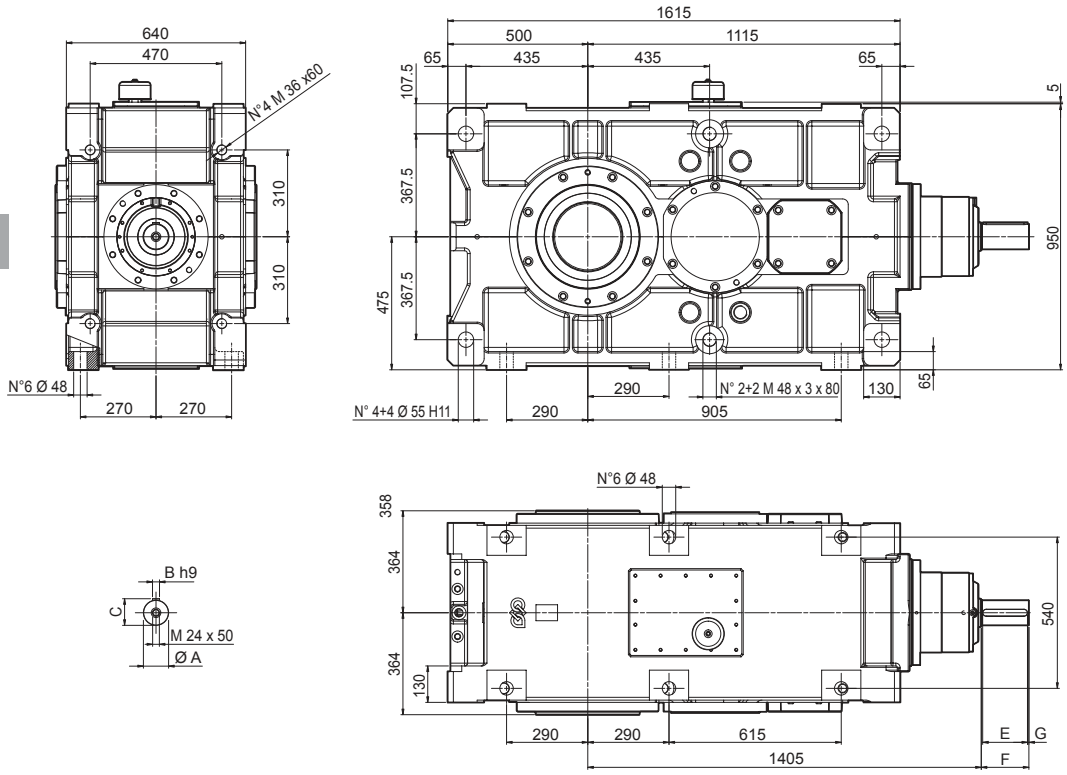


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

HDO 170

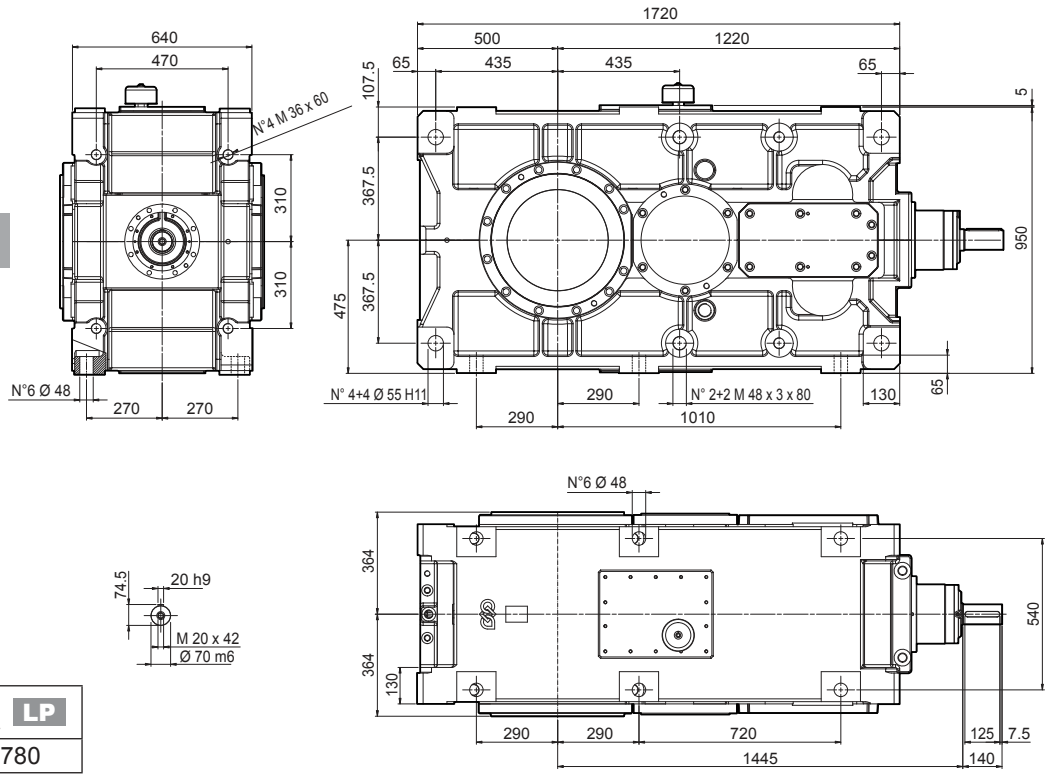
HDO 170 3



Dimensions are in [mm].

VP	i =	A	B	C	E	F	G	Kg LP
HDO 170 3	**15.9 ... 21.7**	100 m6	28	106	190	210	10	3675
HDO 170 3	**26.2 ... 59.9**	90 m6	25	95	160	170	5	3675

HDO 170 4

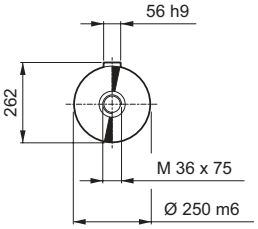


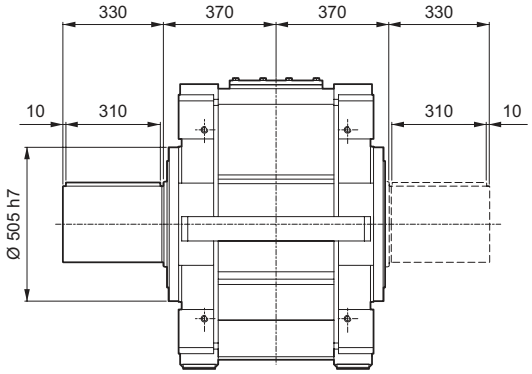
VP	Kg LP
HDO 170 4	3780

Bonfiglioli Riduttori

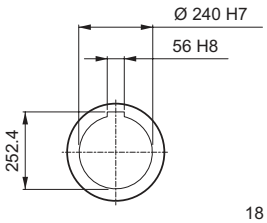
HDO 170

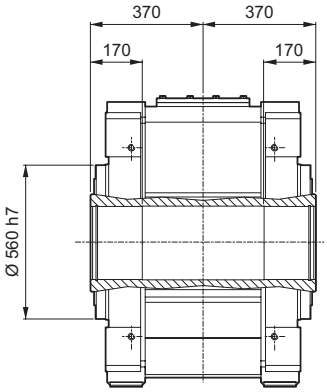
LP



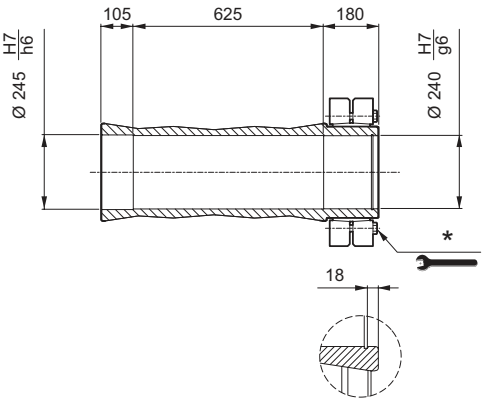


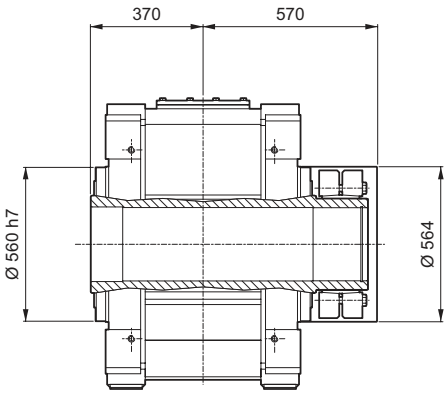
H





S





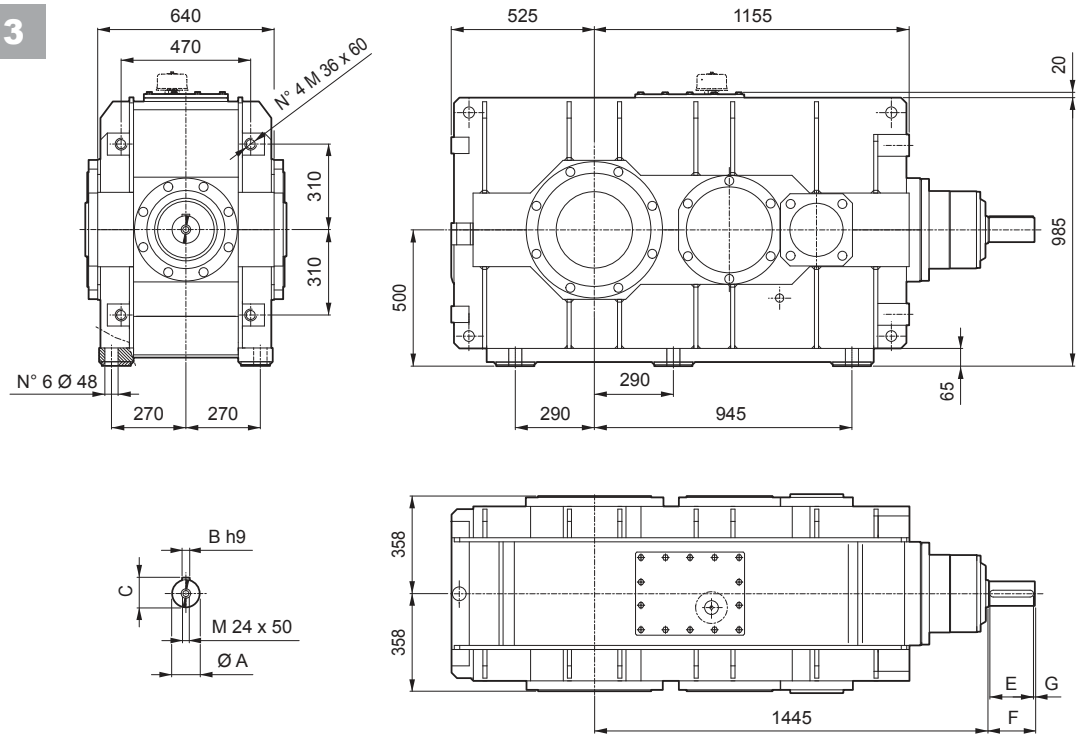
* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

HDO 180

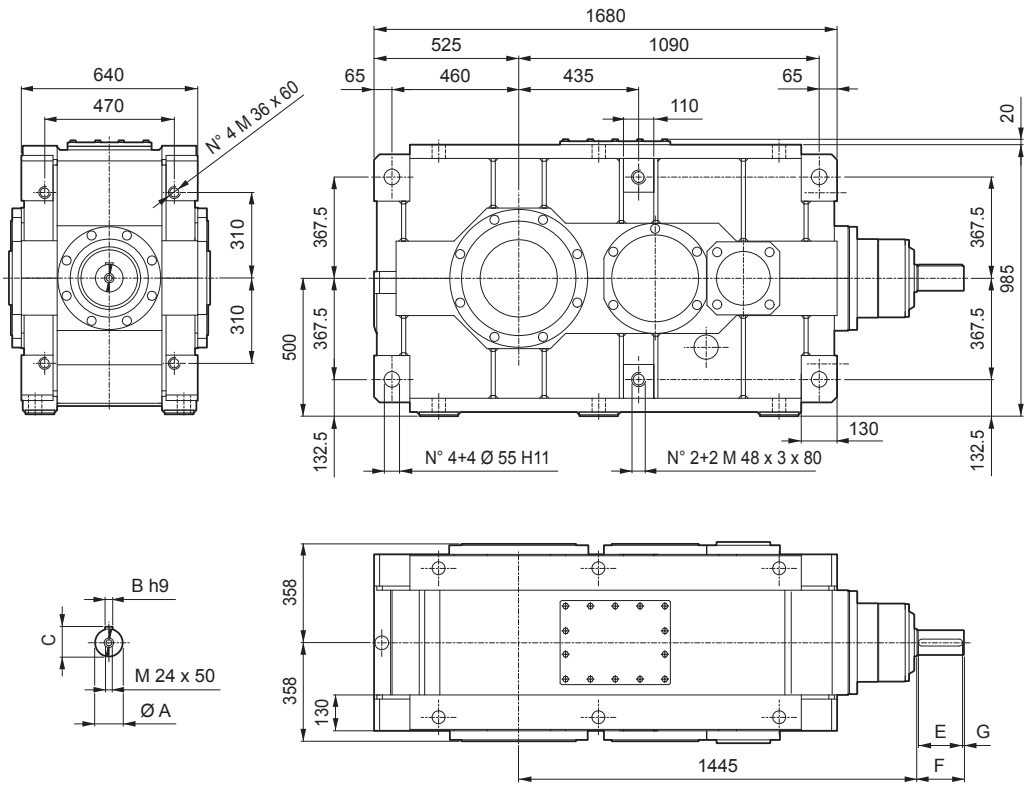
HDO 180 3

B3



HDO 180 3

V5



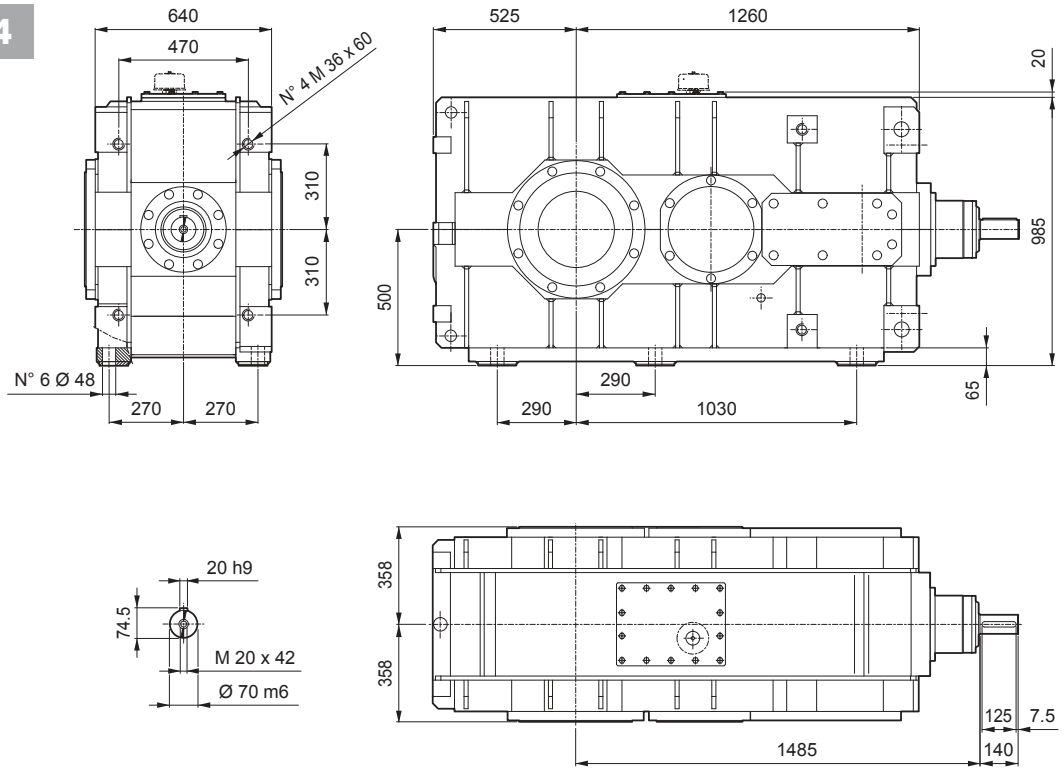
Dimensions are in [mm].

VP	i =	A	B	C	E	F	G	Kg LP
HDO 180 3	**17.7 ... 27.9**	100 m6	28	106	190	210	10	3820
HDO 180 3	**31.4 ... 66.2**	90 m6	25	95	160	170	5	3820

HDO 180

HDO 180 4

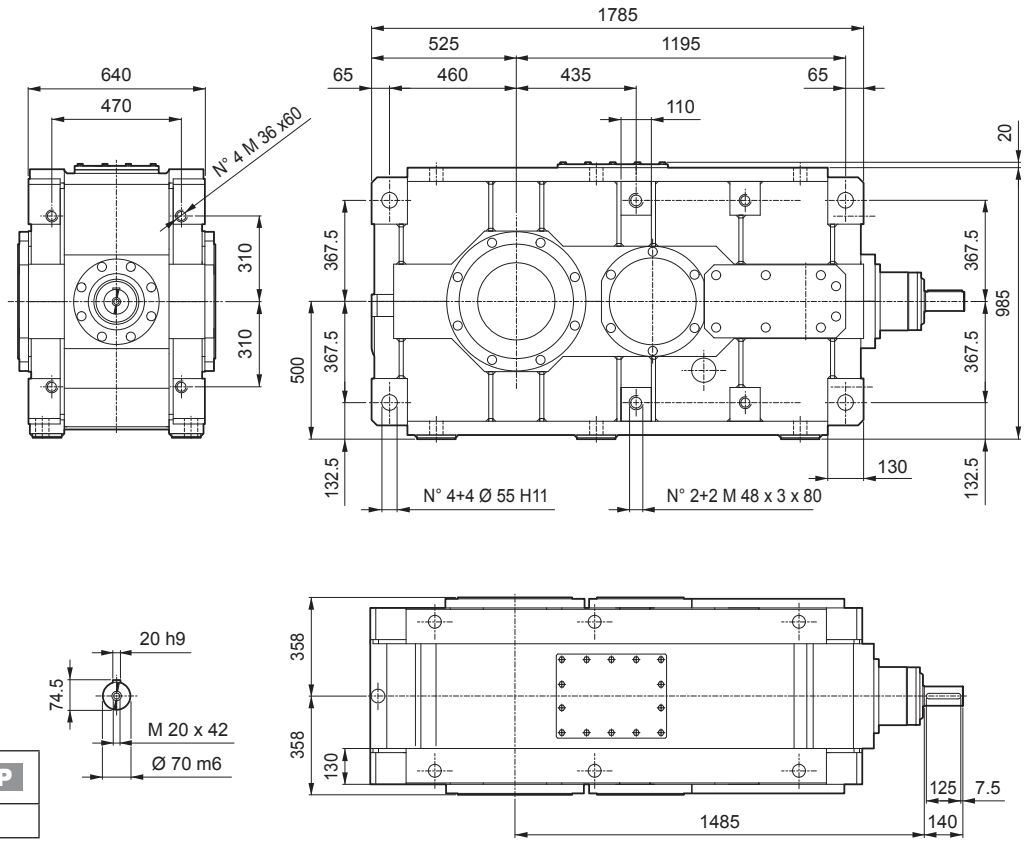
B3



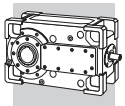
Dimensions are in [mm].

HDO 180 4

V5

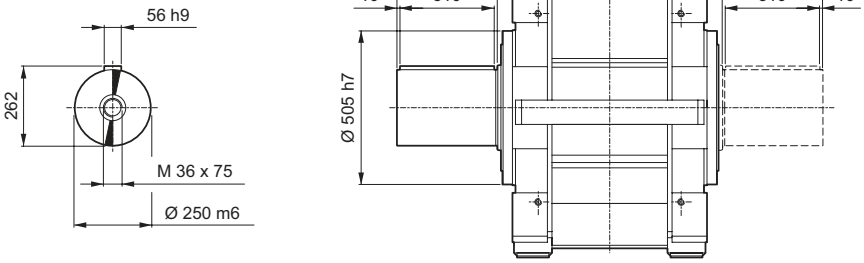


VP	Kg LP
HDO 180 4	3875

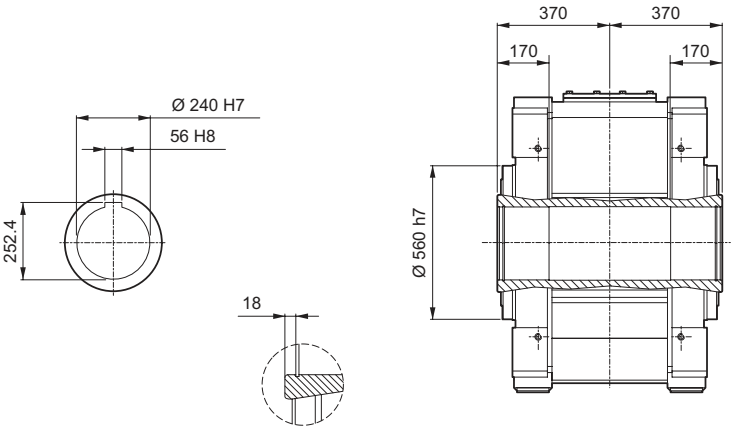


HDO 180

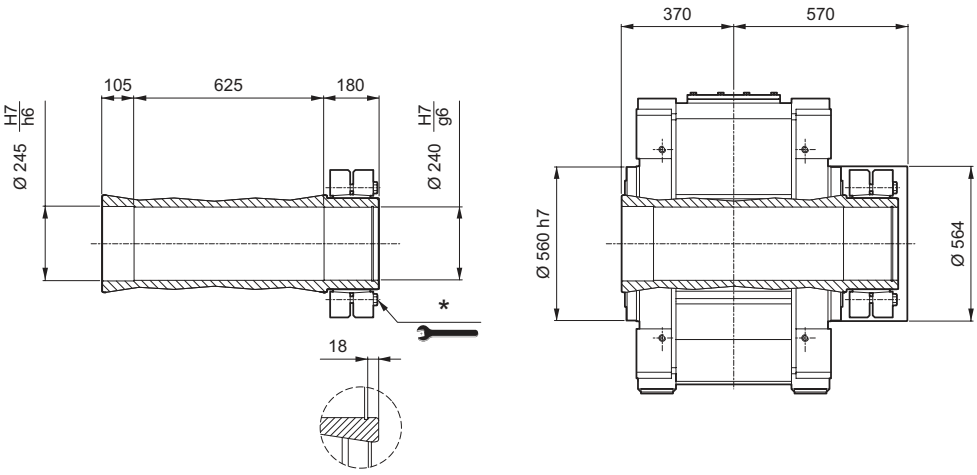
LP



H

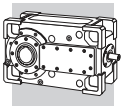


S

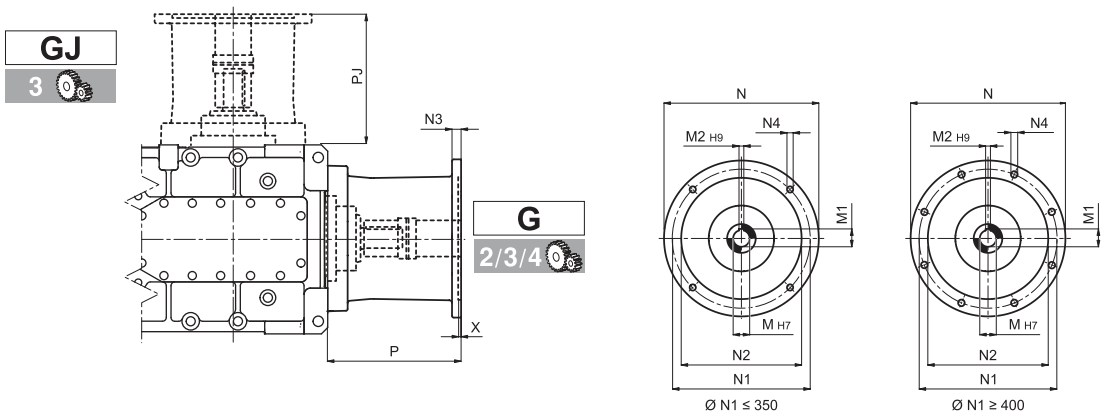


* For correct use, refer to the “OPERATION AND MAINTENANCE MANUAL”.

Dimensions are in [mm].

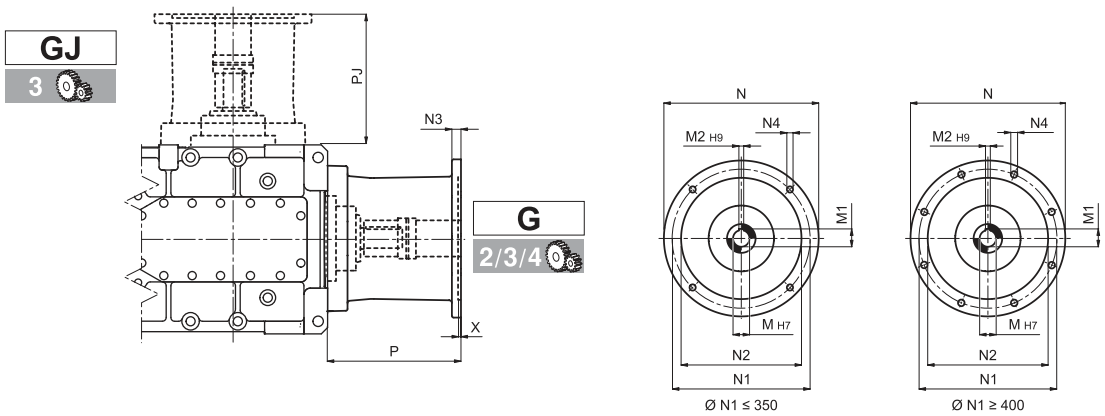


31.1 MOTOR MOUNTING WITH BELL HOUSING AND FLEXIBLE COUPLING



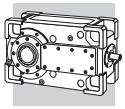
	M	M1	M2	N	N1	N2	N3	N4	X	P	PJ
HDO 71 4 _100	28	31.3	8	250	215	180	—	M12x20	5	302.5	—
HDO 71 4 _112	28	31.3	8	250	215	180	—	M12x20	5	302.5	—
HDO 71 3_132	38	41.3	10	300	265	230	16	M12x20	5	246.5	—
HDO 71 4 _132	38	41.3	10	300	265	230	16	14	5	282.5	—
HDO 71 3_160	42	45.3	12	350	300	250	23	18	6	276.5	—
HDO 71 4 _160	42	45.3	12	350	300	250	23	18	6	312.5	—
HDO 71 3_180	48	51.8	14	350	300	250	23	18	6	276.5	—
HDO 71 4 _180	48	51.8	14	350	300	250	23	18	6	312.5	—
HDO 71 2/3_200	55	59.3	16	400	350	300	—	M16x23	7	301.5	—
HDO 71 2/3_225	60	64.4	18	450	400	350	25	18	7	309.5	—
HDO 81 4 _100	28	31.3	8	250	215	180	—	M12x20	5	364	—
HDO 81 4_112	28	31.3	8	250	215	180	—	M12x20	5	364	—
HDO 81 4 _132	38	41.3	10	300	265	230	—	M12x20	7	369	—
HDO 81 3_160	42	45.3	12	350	300	250	48	18	7	320	—
HDO 81 4 _160	42	45.3	12	350	300	250	48	18	7	369	—
HDO 81 3_180	48	51.8	14	350	300	250	48	18	7	320	—
HDO 81 4 _180	48	51.8	14	350	300	250	48	18	7	369	—
HDO 81 2/3_200	55	59.3	16	400	350	300	—	M16x23	7	320	—
HDO 81 4 _200	55	59.3	16	400	350	300	25	M16x23	7	369	—
HDO 81 2/3_225	60	64.4	18	450	400	350	25	18	7	356	—
HDO 81 2/3_250	65	69.4	18	550	500	450	30	18	6	386	—
HDO 81 2/3_280	75	79.9	20	550	500	450	30	18	6	386	—
HDO 91 4_112	28	31.3	8	250	215	180	15	14	5	260	—
HDO 91 4_132	38	41.3	10	300	265	230	—	M12x20	6	280	—
HDO 91 3/4_160	42	45.3	12	350	300	250	23	18	6	346	—
HDO 91 3/4_180	48	51.8	14	350	300	250	23	18	6	346	—
HDO 91 2/3/4_200	55	59.3	16	400	350	300	—	M16x23	7	371	—
HDO 91 2/3/4_225	60	64.4	18	450	400	350	26	18	7	378	—
HDO 91 2/3_250	65	69.4	18	550	500	450	30	18	6	408	—
HDO 91 2/3_280	75	79.9	20	550	500	450	30	18	6	408	—

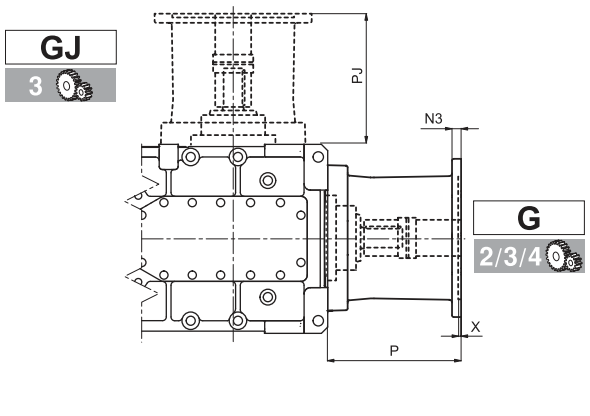
Dimensions are in [mm].

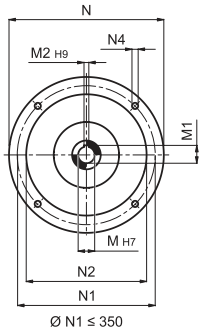


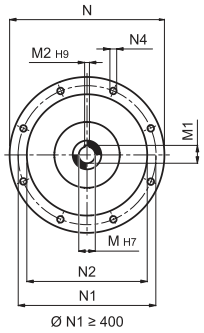
	M	M1	M2	N	N1	N2	N3	N4	X	P	PJ
HDO 95 4_112	28	31.3	8	250	215	180	15	14	5	260	—
HDO 95 4_132	38	41.3	10	300	265	230	—	M12x20	6	280	—
HDO 95 3/4_160	42	45.3	12	350	300	250	23	18	6	346	—
HDO 95 3/4_180	48	51.8	14	350	300	250	23	18	6	346	—
HDO 95 3/4_200	55	59.3	16	400	350	300	—	M16x23	7	371	—
HDO 95 3/4_225	60	64.4	18	450	400	350	26	18	7	378	—
HDO 95 3_250	65	69.4	18	550	500	450	30	18	6	408	—
HDO 95 3_280	75	79.9	20	550	500	450	30	18	6	408	—
HDO 100 2_250	65	69.4	18	550	500	450	30	18	6	420.5	—
HDO 100 2_280	75	79.9	20	550	500	450	30	18	6	420.5	—
HDO 100 2_315	80	85.4	22	660	600	550	22	22	10	457	—
HDO 100 3_160	42	45.3	12	350	300	250	23	18	6	351	351
HDO 100 3_180	48	51.8	14	350	300	250	23	18	6	351	351
HDO 100 3_200	55	59.3	16	400	350	300	—	M16x23	7	376	376
HDO 100 3_225	60	64.4	18	450	400	350	26	18	7	383	383
HDO 100 3_250	65	69.4	18	550	500	450	30	18	6	413	413
HDO 100 3_280	75	79.9	20	550	500	450	30	18	6	413	413
HDO 100 3_315	80	85.4	22	660	600	550	22	22	10	449.5	449.5

Dimensions are in [mm].



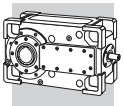


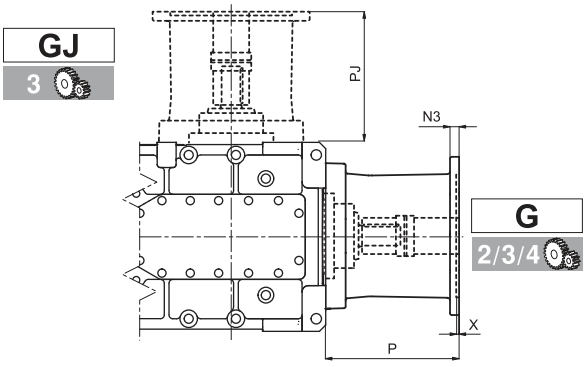


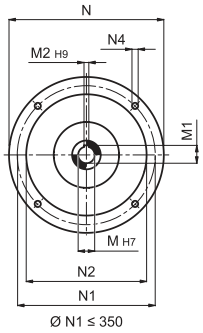


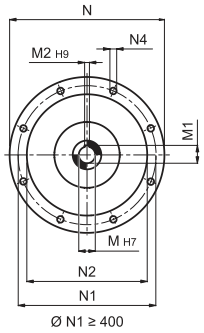
	M	M1	M2	N	N1	N2	N3	N4	X	P	PJ
HDO 100 4_112	28	31.3	8	250	215	180	15	14	5	265	—
HDO 100 4_132	38	41.3	10	300	265	230	—	M12x20	6	285	—
HDO 100 4_160	42	45.3	12	350	300	250	23	18	6	351	—
HDO 100 4_180	48	51.8	14	350	300	250	23	18	6	351	—
HDO 100 4_200	55	59.3	16	400	350	300	—	M16x23	7	376	—
HDO 100 4_225	60	64.4	18	450	400	350	26	18	7	383	—
HDO 110 2_280	75	79.9	20	550	500	450	30	18	6	420.5	—
HDO 110 2_315	80	85.4	22	660	600	550	22	22	10	457	—
HDO 110 3_160	42	45.3	12	350	300	250	23	18	6	351	351
HDO 110 3_180	48	51.8	14	350	300	250	23	18	6	351	351
HDO 110 3_200	55	59.3	16	400	350	300	—	M16x23	7	376	376
HDO 110 3_225	60	64.4	18	450	400	350	26	18	7	383	383
HDO 110 3_250	65	69.4	18	550	500	450	30	18	6	413	413
HDO 110 3_280	75	79.9	20	550	500	450	30	18	6	413	413
HDO 110 3_315	80	85.4	22	660	600	550	22	22	10	449.5	449.5
HDO 110 4_112	28	31.3	8	250	215	180	15	14	5	265	—
HDO 110 4_132	38	41.3	10	300	265	230	—	M12x20	6	285	—
HDO 110 4_160	42	45.3	12	350	300	250	23	18	6	351	—
HDO 110 4_180	48	51.8	14	350	300	250	23	18	6	351	—
HDO 110 4_200	55	59.3	16	400	350	300	—	M16x23	7	376	—
HDO 110 4_225	60	64.4	18	450	400	350	26	18	7	383	—
HDO 120 2_315	80	85.4	22	660	600	550	22	22	10	482	—
HDO 120 3_200	55	59.3	16	400	350	300	—	M16x23	7	346	—
HDO 120 3_225	60	64.4	18	450	400	350	26	18	7	353	353
HDO 120 3_250	65	69.4	18	550	500	450	30	18	6	383	383
HDO 120 3_280	75	79.9	20	550	500	450	30	18	6	383	383
HDO 120 3_315	80	85.4	22	660	600	550	22	22	10	419.5	419.5
HDO 120 4_132	38	41.3	10	300	265	230	—	M12x40	6	255	—
HDO 120 4_160	42	45.3	12	350	300	250	23	18	6	321	—
HDO 120 4_180	48	51.8	14	350	300	250	23	18	6	321	—
HDO 120 4_200	55	59.3	16	400	350	300	—	M16x23	7	346	—
HDO 120 4_225	60	64.4	18	450	400	350	26	18	7	353	—
HDO 125 2_315	80	85.4	22	660	600	550	22	22	10	482	—
HDO 125 3_200	55	59.3	16	400	350	300	—	M16x23	7	346	306
HDO 125 3_225	60	64.4	18	450	400	350	26	18	7	353	313
HDO 125 3_250	65	69.4	18	550	500	450	30	18	6	383	343
HDO 125 3_280	75	79.9	20	550	500	450	30	18	6	383	343
HDO 125 3_315	80	85.4	22	660	600	550	22	22	10	419.5	375.5
HDO 125 4_132	38	41.3	10	300	265	230	—	M12x40	6	255	—
HDO 125 4_160	42	45.3	12	350	300	250	23	18	6	321	—
HDO 125 4_180	48	51.8	14	350	300	250	23	18	6	321	—
HDO 125 4_200	55	59.3	16	400	350	300	—	M16x23	7	346	—
HDO 125 4_225	60	64.4	18	450	400	350	26	18	7	353	—

Dimensions are in [mm].





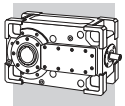




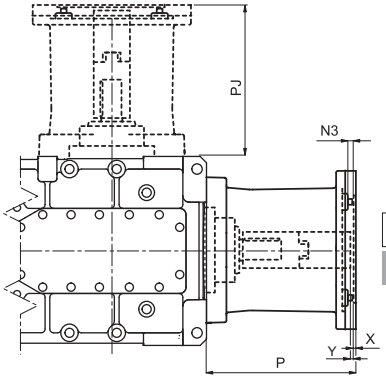
HDO

	M	M1	M2	N	N1	N2	N3	N4	X	P	PJ
HDO 130 2_315	80	85.4	22	660	600	550	22	22	10	590	—
HDO 130 3_250	65	69.4	18	550	500	450	30	18	6	415.5	413
HDO 130 3_280	75	79.9	20	550	500	450	30	18	6	415.5	413
HDO 130 3_315	80	85.4	22	660	600	550	22	22	10	452	449.5
HDO 130 4_160	42	45.3	12	350	300	250	23	18	6	416	—
HDO 130 4_180	48	51.8	14	350	300	250	23	18	6	416	—
HDO 130 4_200	55	59.3	16	400	350	300	—	M16x23	7	441	—
HDO 130 4_225	60	64.4	18	450	400	350	26	18	7	448	—
HDO 130 4_250	65	69.4	18	550	500	450	30	18	6	478	—
HDO 130 4_280	75	79.9	20	550	500	450	30	18	6	478	—
HDO 140 2_315	80	85.4	22	660	600	550	22	22	10	590	—
HDO 140 3_250	65	69.4	18	550	500	450	30	18	6	415.5	413
HDO 140 3_280	75	79.9	20	550	500	450	30	18	6	415.5	413
HDO 140 3_315	80	85.4	22	660	600	550	22	22	10	452	449.5
HDO 140 4_160	42	45.3	12	350	300	250	23	18	6	416	—
HDO 140 4_180	48	51.8	14	350	300	250	23	18	6	416	—
HDO 140 4_200	55	59.3	16	400	350	300	—	M16x23	7	441	—
HDO 140 4_225	60	64.4	18	450	400	350	26	18	7	448	—
HDO 140 4_250	65	69.4	18	550	500	450	30	18	6	478	—
HDO 140 4_280	75	79.9	20	550	500	450	30	18	6	478	—
HDO 150 3_280	75	79.9	20	550	500	450	30	18	6	553.5	528.5
HDO 150 3_315	80	85.4	22	660	600	550	22	22	10	590	565
HDO 150 4_180	48	51.8	14	350	300	250	23	18	6	426	—
HDO 150 4_200	55	59.3	16	400	350	300	—	M16x23	7	451	—
HDO 150 4_225	60	64.4	18	450	400	350	26	18	7	458	—
HDO 150 4_250	65	69.4	18	550	500	450	30	18	6	488	—
HDO 150 4_280	75	79.9	20	550	500	450	30	18	6	488	—
HDO 150 4_315	80	85.4	22	660	600	550	22	22	10	524.5	—
HDO 160 3_280	75	79.9	20	550	500	450	30	18	6	553.5	508.5
HDO 160 3_315	80	85.4	22	660	600	550	22	22	10	590	545
HDO 160 4_180	48	51.8	14	350	300	250	23	18	6	426	—
HDO 160 4_200	55	59.3	16	400	350	300	—	M16x23	7	451	—
HDO 160 4_225	60	64.4	18	450	400	350	26	18	7	458	—
HDO 160 4_250	65	69.4	18	550	500	450	30	18	6	488	—
HDO 160 4_280	75	79.9	20	550	500	450	30	18	6	488	—
HDO 160 4_315	80	85.4	22	660	600	550	22	22	10	524.5	—
HDO 170	BONFIGLIOLI TECHNICAL SERVICE										
HDO 180											

Dimensions are in [mm].

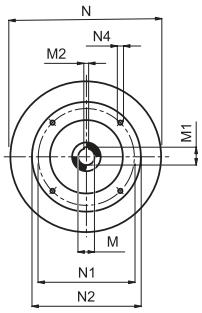


NGJ
3

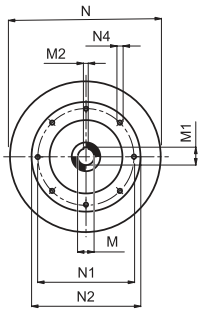


NG
2/3/4

N180TC ... N360TC

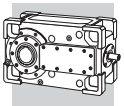


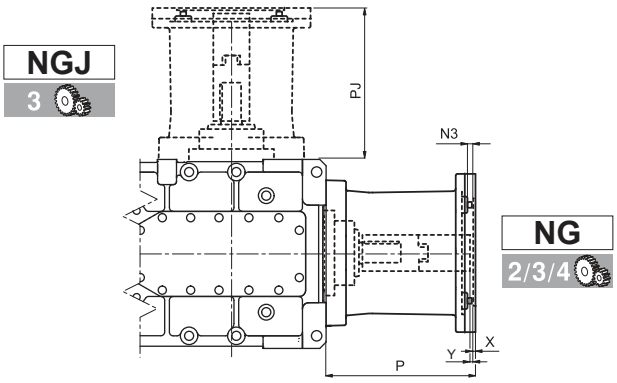
N400TC ... N440TC



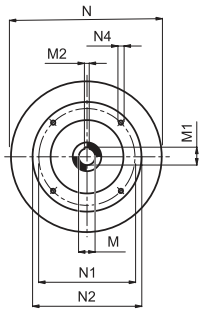
	M	M1	M2	N	N1	N2	N3	N4	X	Y	P	PJ
HDO 71 2/3_N320TC	2.125 +0.0022 +0.0010	2.35	0.5 +0.0017 0	17.677	11	12.5	0.669	0.669	0.217	0.079	13.228	—
	53.975 +0.055 +0.025	*59.690*	*12.7 +0.043 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*336*	
HDO 71 2/3_N360TC	2.375 +0.0022 +0.0010	2.651	0.625 +0.0017 0	17.677	11	12.5	0.669	0.669	0.217	0.108	13.228	—
	60.325 +0.055 +0.025	*67.335*	*15.875 +0.043 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*336*	
HDO 71 3_N210TC	1.375 +0.0014 +0.0006	1.518	0.312 +0.0014 0	11.811	7.25	8.520	0.413	0.551	0.217	0.128	10.472	—
	34.925 +0.035 +0.015	*38.557*	*7.925 +0.036 0*	*300*	*184.15*	*215.9*	*10.5*	*14*	*5.5*	*3.25*	*266*	
HDO 71 3_N250TC	1.625 +0.0018 +0.0008	1.796	0.375 +0.0014 0	13.78	7.25	8.5	0.65	0.551	0.217	0.09	11.654	—
	41.275 +0.045 +0.020	*45.618*	*9.525 +0.036 0*	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*296*	
HDO 71 3_N280TC	1.875 +0.0018 +0.0008	2.102	0.5 +0.0017 0	13.74	9	10.5	0.512	0.551	0.217	0.09	11.85	—
	47.625 +0.045 +0.020	*53.381*	*12.7 +0.043 0*	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*301*	
HDO 81 2/3_N320TC	2.125 +0.0022 +0.0010	2.35	0.5 +0.0017 0	17.677	11	12.5	0.669	0.669	0.217	0.079	15.059	—
	53.975 +0.055 +0.025	*59.690*	*12.7 +0.043 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*382.5*	
HDO 81 2/3_N360TC	2.375 +0.0022 +0.0010	2.651	0.625 +0.0017 0	17.677	11	12.5	0.669	0.669	0.217	0.108	15.059	—
	60.325 +0.055 +0.025	*67.335*	*15.875 +0.043 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*382.5*	
HDO 81 2/3_N400TC	2.875 +0.0022 +0.0010	3.205	0.75 +0.002 0	17.677	11	12.5	0.669	0.669	0.217	1.488	15.65	—
	73.025 +0.055 +0.025	*81.407*	*19.05 +0.05 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*397.5*	
HDO 81 3_N250TC	1.625 +0.0018 +0.0008	1.796	0.375 +0.0014 0	13.78	7.25	8.5	0.65	0.551	0.217	0.09	13.366	—
	41.275 +0.045 +0.020	*45.618*	*9.525 +0.036 0*	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*339.5*	
HDO 81 3_N280TC	1.875 +0.0018 +0.0008	2.102	0.5 +0.0017 0	13.74	9	10.5	0.512	0.551	0.217	0.09	13.366	—
	47.625 +0.045 +0.020	*53.381*	*12.7 +0.043 0*	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*344.5*	
HDO 91 2/3_N400TC	2.875 +0.0022 +0.0010	3.205	0.75 +0.002 0	17.677	11	12.5	0.669	0.669	0.217	1.488	16.516	—
	73.025 +0.055 +0.025	*81.407*	*19.05 +0.05 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*419.5*	
HDO 91 2/3/4_N320TC	2.125 +0.0022 +0.0010	2.35	0.5 +0.0017 0	17.677	11	12.5	0.669	0.669	0.217	0.079	15.925	—
	53.975 +0.055 +0.025	*59.690*	*12.7 +0.043 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*404.5*	
HDO 91 2/3/4_N360TC	2.375 +0.0022 +0.0010	2.651	0.625 +0.0017 0	17.677	11	12.5	0.669	0.669	0.217	0.108	15.925	—
	60.325 +0.055 +0.025	*67.335*	*15.875 +0.043 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*404.5*	
HDO 91 3/4_N250TC	1.625 +0.0018 +0.0008	1.796	0.375 +0.0014 0	13.78	7.25	8.5	0.65	0.551	0.217	0.09	14.39	—
	41.275 +0.045 +0.020	*45.618*	*9.525 +0.036 0*	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*365.5*	
HDO 91 3/4_N280TC	1.875 +0.0018 +0.0008	2.102	0.5 +0.0017 0	13.74	9	10.5	0.512	0.551	0.217	0.09	14.587	—
	47.625 +0.045 +0.020	*53.381*	*12.7 +0.043 0*	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*370.5*	
HDO 91 4_N180TC	1.125 +0.0014 +0.0006	1.241	0.25 +0.0014 0	9.843	7.25	8.5	0.453	0.551	0.217	0.061	11.22	—
	28.575 +0.035 +0.015	*31.521*	*6.35 +0.036 0*	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*1.55*	*285*	
HDO 91 4_N210TC	1.375 +0.0014 +0.0006	1.518	0.312 +0.0014 0	9.843	7.25	8.5	0.453	0.551	0.217	0.128	11.22	—
	34.925 +0.035 +0.015	*38.557*	*7.925 +0.036 0*	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*3.25*	*285*	
HDO 95 2/3_N400TC	2.875 +0.0022 +0.0010	3.205	0.75 +0.002 0	17.677	11	12.5	0.669	0.669	0.217	1.488	16.516	—
	73.025 +0.055 +0.025	*81.407*	*19.05 +0.05 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*419.5*	
HDO 95 2/3/4_N320TC	2.125 +0.0022 +0.0010	2.35	0.5 +0.0017 0	17.677	11	12.5	0.669	0.669	0.217	0.079	15.925	—
	53.975 +0.055 +0.025	*59.690*	*12.7 +0.043 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*404.5*	
HDO 95 2/3/4_N360TC	2.375 +0.0022 +0.0010	2.651	0.625 +0.0017 0	17.677	11	12.5	0.669	0.669	0.217	0.108	15.925	—
	60.325 +0.055 +0.025	*67.335*	*15.875 +0.043 0*	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*404.5*	
HDO 95 3/4_N250TC	1.625 +0.0018 +0.0008	1.796	0.375 +0.0014 0	13.78	7.25	8.5	0.65	0.551	0.217	0.09	14.39	—
	41.275 +0.045 +0.020	*45.618*	*9.525 +0.036 0*	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*365.5*	
HDO 95 3/4_N280TC	1.875 +0.0018 +0.0008	2.102	0.5 +0.0017 0	13.74	9	10.5	0.512	0.551	0.217	0.09	14.587	—
	47.625 +0.045 +0.020	*53.381*	*12.7 +0.043 0*	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*370.5*	
HDO 95 4_N180TC	1.125 +0.0014 +0.0006	1.241	0.25 +0.0014 0	9.843	7.25	8.5	0.453	0.551	0.217	0.061	11.22	—
	28.575 +0.035 +0.015	*31.521*	*6.35 +0.036 0*	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*1.55*	*285*	
HDO 95 4_N210TC	1.375 +0.0014 +0.0006	1.518	0.312 +0.0014 0	9.843	7.25	8.5	0.453	0.551	0.217	0.128	11.22	—
	34.925 +0.035 +0.015	*38.557*	*7.925 +0.036 0*	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*3.25*	*285*	

Dimensions are in Inch except when shown in *italic [mm]*

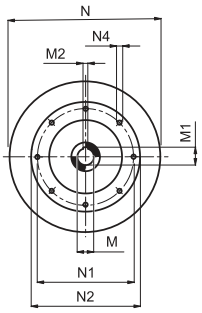




N180TC ... N360TC

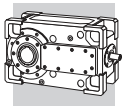


N400TC ... N440TC

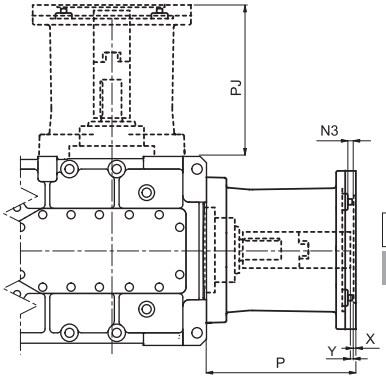


	M	M1	M2	N	N1	N2	N3	N4	X	Y	P	PJ
HDO 100 2_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	16.122	—
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*409.5*	
HDO 100 2_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	17.008	—
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*432*	
HDO 100 3_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	14.587	14.587
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*370.5*	*370.5*
HDO 100 3_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	14.783	14.783
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*375.5*	*375.5*
HDO 100 3_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	16.122	16.122
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*409.5*	*409.5*
HDO 100 3_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	16.122	16.122
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*409.5*	*409.5*
HDO 100 3_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	16.713	16.713
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*424.5*	*424.5*
HDO 100 4_N180TC	1.125 $^{+0.0014}_{+0.0006}$	1.241	0.25 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.061	11.417	—
	28.575 $^{+0.035}_{+0.015}$	*31.521*	*6.35* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*1.55*	*290*	
HDO 100 4_N210TC	1.375 $^{+0.0014}_{+0.0006}$	1.518	0.312 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.128	11.417	—
	34.925 $^{+0.035}_{+0.015}$	*38.557*	*7.925* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*3.25*	*290*	
HDO 100 4_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	14.587	—
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*370.5*	
HDO 100 4_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	14.783	—
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*375.5*	
HDO 100 4_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	16.122	—
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*409.5*	
HDO 100 4_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	16.122	—
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*409.5*	
HDO 110 2_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	17.008	—
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*432*	
HDO 110 3_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	14.587	14.587
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*370.5*	*370.5*
HDO 110 3_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	14.783	14.783
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*375.5*	*375.5*
HDO 110 3_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	16.122	16.122
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*409.5*	*409.5*
HDO 110 3_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	16.122	16.122
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*409.5*	*409.5*
HDO 110 3_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	16.713	16.713
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*424.5*	*424.5*
HDO 110 4_N180TC	1.125 $^{+0.0014}_{+0.0006}$	1.241	0.25 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.061	11.417	—
	28.575 $^{+0.035}_{+0.015}$	*31.521*	*6.35* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*1.55*	*290*	
HDO 110 4_N210TC	1.375 $^{+0.0014}_{+0.0006}$	1.518	0.312 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.128	11.417	—
	34.925 $^{+0.035}_{+0.015}$	*38.557*	*7.925* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*3.25*	*290*	
HDO 110 4_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	14.587	—
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*370.5*	
HDO 110 4_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	14.783	—
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*375.5*	
HDO 110 4_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	16.122	—
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*409.5*	
HDO 110 4_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	16.122	—
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*409.5*	

Dimensions are in Inch except when shown in *italic [mm]*

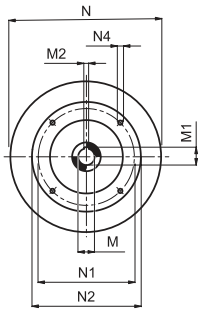


NGJ
3

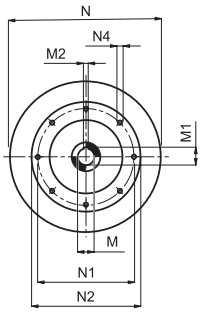


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2/3/4

N180TC ... N360TC

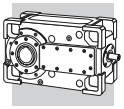


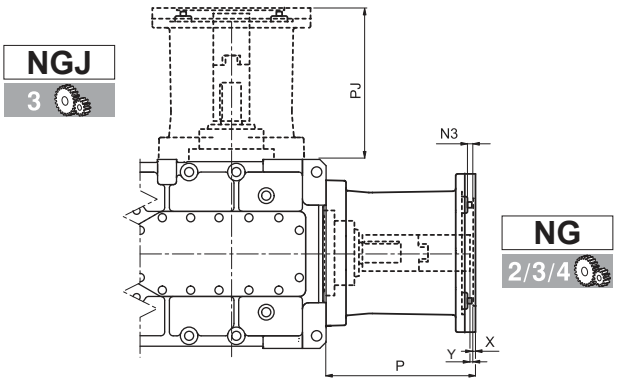
N400TC ... N440TC



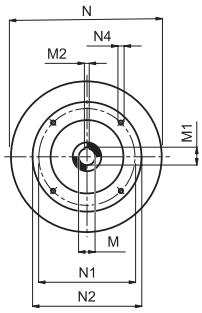
	M	M1	M2	N	N1	N2	N3	N4	X	Y	P	PJ
HDO 120 2_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	20.453	—
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.23* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*519.5*	
HDO 120 3_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	14.941	14.941
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*379.5*	*379.5*
HDO 120 3_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	14.941	14.941
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*379.5*	*379.5*
HDO 120 3_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	15.531	15.531
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*394.5*	*394.5*
HDO 120 3_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	17.992	17.992
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.23* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*457*	*457*
HDO 120 4_N210TC	1.375 $^{+0.0014}_{+0.0006}$	1.518	0.312 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.128	10.236	—
	34.925 $^{+0.035}_{+0.015}$	*38.557*	*7.925* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*3.25*	*260*	
HDO 120 4_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	13.405	—
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*340.5*	
HDO 120 4_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	13.602	—
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*345.5*	
HDO 120 4_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	14.941	—
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*379.5*	
HDO 120 4_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	14.941	—
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*379.5*	
HDO 125 2_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	20.453	—
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.23* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*519.5*	
HDO 125 3_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	14.941	13.366
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*379.5*	*339.5*
HDO 125 3_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	14.941	13.366
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*379.5*	*339.5*
HDO 125 3_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	15.531	13.957
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*394.5*	*354.5*
HDO 125 3_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	17.992	16.417
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.23* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*457*	*417*
HDO 125 4_N210TC	1.375 $^{+0.0014}_{+0.0006}$	1.518	0.312 $^{+0.0014}_{0}$	9.843	7.25	8.5	0.453	0.551	0.217	0.128	10.236	—
	34.925 $^{+0.035}_{+0.015}$	*38.557*	*7.925* $^{+0.036}_{0}$	*250*	*184.15*	*215.9*	*11.5*	*14*	*5.5*	*3.25*	*260*	
HDO 125 4_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	13.405	—
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*340.5*	
HDO 125 4_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	13.602	—
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*345.5*	
HDO 125 4_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	14.941	—
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*379.5*	
HDO 125 4_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	14.941	—
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*379.5*	

Dimensions are in Inch except when shown in *italic [mm]*

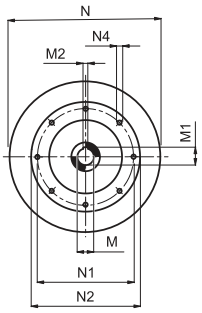




N180TC ... N360TC



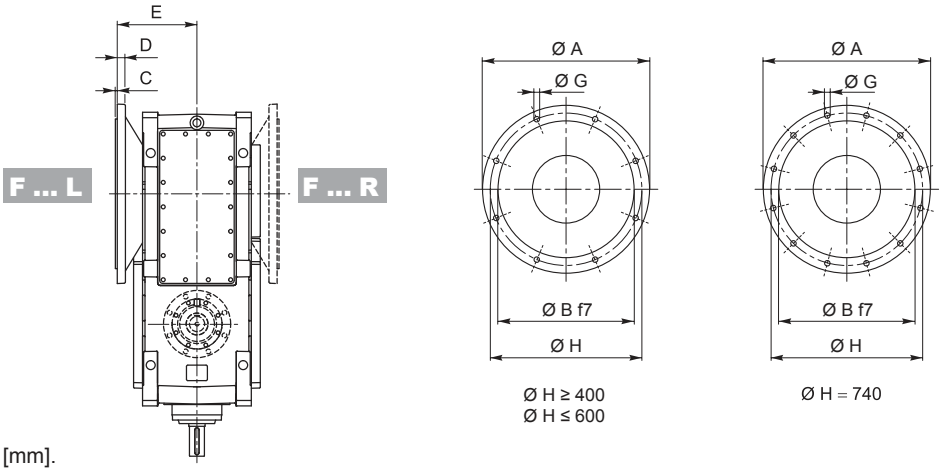
N400TC ... N440TC



	M	M1	M2	N	N1	N2	N3	N4	X	Y	P	PJ
HDO 130 2_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	24.705	—
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.225* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*627.5*	
HDO 130 3_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	16.220	—
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*412*	
HDO 130 3_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	16.811	16.811
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*427*	*427*
HDO 130 3_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	19.272	19.272
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.225* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*489.5*	*489.5*
HDO 130 4_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	17.146	—
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*435.5*	
HDO 130 4_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	17.343	—
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*440.5*	
HDO 130 4_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	18.681	—
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*474.5*	
HDO 130 4_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	18.681	—
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*474.5*	
HDO 130 4_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	19.272	—
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*489.5*	
HDO 140 2_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	24.705	—
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.225* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*627.5*	
HDO 140 3_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	16.220	—
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*412*	
HDO 140 3_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	16.811	16.811
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*427*	*427*
HDO 140 3_N440TC	3.375 $^{+0.0026}_{+0.0012}$	3.76	0.875 $^{+0.002}_{0}$	25.984	14	16	0.748	0.709	0.236	1.56	19.272	19.272
	85.725 $^{+0.065}_{+0.030}$	*95.504*	*22.225* $^{+0.05}_{0}$	*660*	*355.6*	*406.4*	*19*	*18*	*6*	*39.6*	*489.5*	*489.5*
HDO 140 4_N250TC	1.625 $^{+0.0018}_{+0.0008}$	1.796	0.375 $^{+0.0014}_{0}$	13.78	7.25	8.5	0.65	0.551	0.217	0.09	17.146	—
	41.275 $^{+0.045}_{+0.020}$	*45.618*	*9.525* $^{+0.036}_{0}$	*350*	*184.15*	*215.9*	*16.5*	*14*	*5.5*	*2.25*	*435.5*	
HDO 140 4_N280TC	1.875 $^{+0.0018}_{+0.0008}$	2.102	0.5 $^{+0.0017}_{0}$	13.74	9	10.5	0.512	0.551	0.217	0.09	17.343	—
	47.625 $^{+0.045}_{+0.020}$	*53.381*	*12.7* $^{+0.043}_{0}$	*349*	*228.6*	*266.7*	*13*	*14*	*5.5*	*2.25*	*440.5*	
HDO 140 4_N320TC	2.125 $^{+0.0022}_{+0.0010}$	2.35	0.5 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.079	18.681	—
	53.975 $^{+0.055}_{+0.025}$	*59.690*	*12.7* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2*	*474.5*	
HDO 140 4_N360TC	2.375 $^{+0.0022}_{+0.0010}$	2.651	0.625 $^{+0.0017}_{0}$	17.677	11	12.5	0.669	0.669	0.217	0.108	18.681	—
	60.325 $^{+0.055}_{+0.025}$	*67.335*	*15.875* $^{+0.043}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*2.75*	*474.5*	
HDO 140 4_N400TC	2.875 $^{+0.0022}_{+0.0010}$	3.205	0.75 $^{+0.002}_{0}$	17.677	11	12.5	0.669	0.669	0.217	1.488	19.272	—
	73.025 $^{+0.055}_{+0.025}$	*81.407*	*19.05* $^{+0.05}_{0}$	*449*	*279.4*	*317.5*	*17*	*17*	*5.5*	*37.8*	*489.5*	

Dimensions are in Inch except when shown in *italic [mm]*

31.2 MOUNTING FLANGE

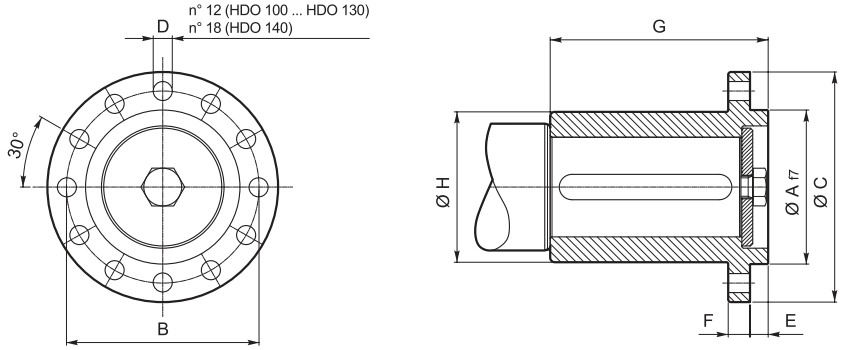


Dimensions are in [mm].

		A	B	C	D	E	G	H
HDO 71	**F450**	450	350	5	22	210	18	400
	F550	550	450	5	24	210	18	500
HDO 81	**F450**	450	350	5	22	240	18	400
	F550	550	450	5	24	240	18	500
HDO 91	**F550**	550	450	5	24	260	18	500
HDO 95	**F550**	550	450	5	24	315	18	500
HDO 100	**F660**	660	550	7	30	335	22	600
HDO 110	**F660**	660	550	7	30	335	22	600
HDO 120	**F660**	660	550	7	30	355	26	600
HDO 125	**F730**	730	580	7	35	360	26	660
HDO 130	**F800**	800	680	7	40	460	26	740
HDO 140	**F800**	800	680	7	40	460	26	740
HDO 150		BONFIGLIOLI TECHNICAL SERVICE						
HDO 160								
HDO 170								
HDO 180								

31.3 MANIFOLD FLANGE

Available for shaft arrangement: L, LJ, LD, R, RJ and RD, all featuring a single output shaft extension.

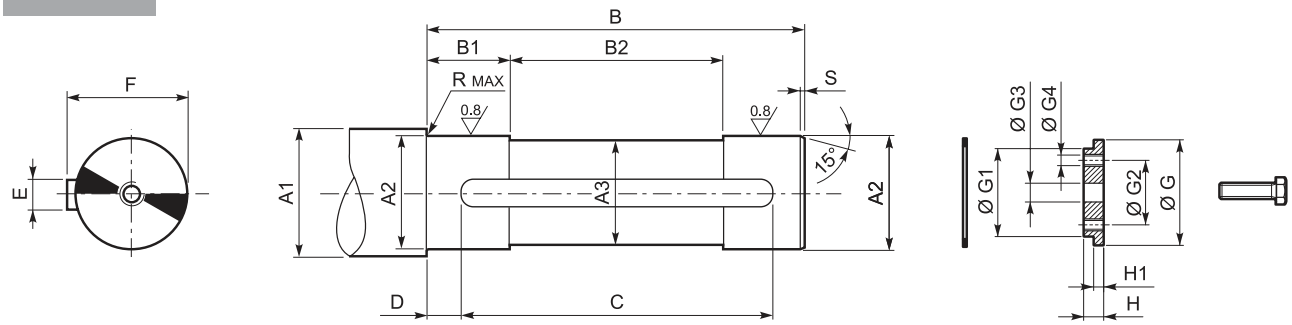


Dimensions are in [mm].

	A	B	C	D	E	F	G	H
HDO 71_ FM	125	175	208	19	14	21	195	135
HDO 81_ FM	170	212	254	21	20	24	240	166
HDO 91_ FM	170	212	254	21	20	24	240	166
HDO 95_ FM	200	260	309	25	19	31	244	200
HDO 100_ FM	200	260	309	25	19	31	244	200
HDO 110_ FM	200	260	309	25	19	31	289	200
HDO 120_ FM	200	260	309	25	19	31	289	200
HDO 125_ FM	220	320	384	32	19	31	344	240
HDO 130_ FM	220	320	384	32	19	31	344	250
HDO 140_ FM	250	380	450	32	19	40	344	310
HDO 150	BONFIGLIOLI TECHNICAL SERVICE							
HDO 160								
HDO 170								
HDO 180								

31.4 CUSTOMER'S SHAFT

H

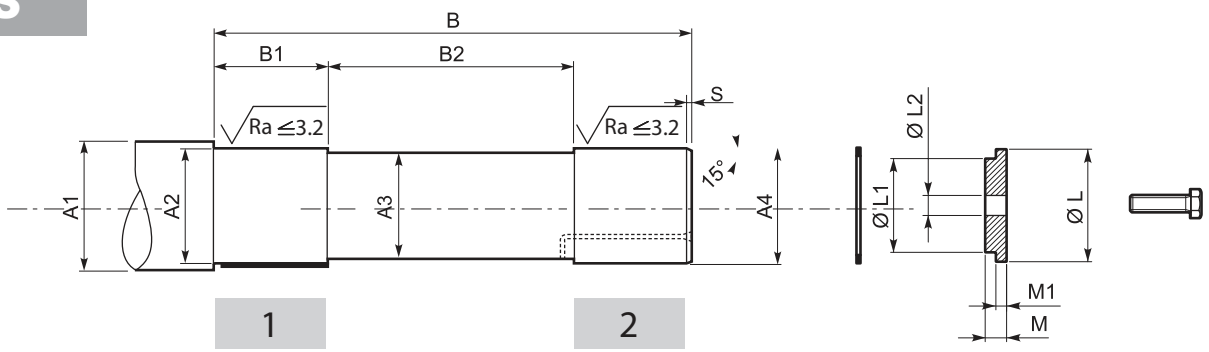


Dimensions are in [mm].

	A1	A2	A3	B	B1	B2	C	D	E	F	R	S	UNI6604
HDO 71	≥ 89	80 h6	79	283	78	127	220	30	22 h9	85	2.5	2.5	22x14x220A
HDO 81	≥ 104	95 h6	94	338	73	192	280	30	25 h9	100	2.5	2.5	25x14x280A
HDO 91	≥ 121	110 h6	109	378	88	202	320	30	28 h9	116	2.5	2.5	28x16x320A
HDO 95	≥ 128	115 h6	114	398	100	228	340	30	32 h9	122	2.5	2.5	32x18x340A
HDO 100	≥ 133	120 h6	119.5	420	100	250	360	30	32 h9	127	3	2.5	32x18x360A
HDO 110	≥ 143	130 h6	129.5	420	100	250	360	30	32 h9	137	3	2.5	32x18x360A
HDO 120	≥ 153	140 h6	139.5	444	110	260	400	40	36 h9	148	3	2.5	36x20x400A
HDO 125	≥ 163	150 h6	149.5	444	110	260	400	40	36 h9	158	3	2.5	36x20x400A
HDO 130	≥ 183	170 h6	169.5	540	135	310	400	80	40 h9	179	3	2.5	40x22x400A
HDO 140	≥ 193	180 h6	179.5	540	135	310	400	80	45 h9	190	3	2.5	45x25x400A
HDO 150	≥ 223	210 h6	209.5	667	155	400	500	100	50 h9	221	3	3	50x28x450B
HDO 160	≥ 223	210 h6	209.5	667	155	400	500	100	50 h9	221	3	3	50x28x450B
HDO 170	≥ 255	240 h6	239.5	697	170	400	506	100	56 h9	252	3	3	56x32x450B
HDO 180	BONFIGLIOLI TECHNICAL SERVICE												

	Out of scope for supply								
	UNI7437	G	G1	G2	G3	G4	H	H1	UNI5739
HDO 71	—	100	80 d9	—	22	—	10	8.5	M20x50
HDO 81	—	115	95 d9	—	26	—	15	13.5	M24x60
HDO 91	—	130	110 d9	—	26	—	15	13.5	M24x60
HDO 95	115x4	115 d9	91	59	26	M16	24	12	M24x70
HDO 100	120x4	120 d9	96	64	26	M16	24	12	M24x70
HDO 110	130x4	130 d9	105	69	26	M20	24	12	M24x70
HDO 120	140x4	140 d9	115	79	26	M20	30	15	M24x80
HDO 125	150x4	150 d9	122	86	26	M20	30	15	M24x80
HDO 130	170x4	170 d9	142	102	33	M24	34	17	M30x90
HDO 140	180x4	180 d9	150	110	33	M24	34	17	M30x90
HDO 150	210x5	210 d9	178	140	33	M24	36	18	M30x100
HDO 160	210x5	210 d9	178	140	33	M24	36	18	M30x100
HDO 170	240x5	240 d9	208	160	39	M24	36	18	M36x110
HDO 180	BONFIGLIOLI TECHNICAL SERVICE								

S



Dimensions are in [mm].

	A1	A2	A3	A4	B	B1	B2	R	S
HDO 71	≥ 104	82 h7	79	80 g6	332	77	174	2.5	2.5
HDO 81	≥ 119	97 h7	94	95 g6	398	95	205	2.5	2.5
HDO 91	≥ 128	112 h7	109	110 g6	440	87	273	2.5	2.5
HDO 95	≥ 133	120 h6	114.5	115 g6	498	104	309	2.5	2.5
HDO 100	≥ 138	125 h6	119.5	120 g6	517	104	328	3	2.5
HDO 110	≥ 148	135 h6	129.5	130 g6	523	104	334	3	2.5
HDO 120	≥ 158	145 h6	139.5	140 g6	550	104	354	3	2.5
HDO 125	≥ 168	155 h6	149.5	150 g6	570	104	363	3	2.5
HDO 130	≥ 188	175 h6	169.5	170 g6	681	104	462	3	2.5
HDO 140	≥ 198	185 h6	179.5	180 g6	689	104	470	3	2.5
HDO 150	≥ 228	215 h6	209.5	210 g6	839	104	593	3	3
HDO 160	≥ 228	215 h6	209.5	210 g6	839	104	593	3	3
HDO 170	BONFIGLIOLI TECHNICAL SERVICE								
HDO 180									

	Out of scope for supply						
	UNI7437	L	L1	L2	M	M1	UNI5739
HDO 71	—	100	80 d9	22	10	8.5	M20x50
HDO 81	—	115	95 d9	26	15	13.5	M24x60
HDO 91	—	130	110 d9	26	15	13.5	M24x60
HDO 95	115x4	115 d9	91	26	16	12	M24x65
HDO 100	120x4	120 d9	96	26	16	12	M24x65
HDO 110	130x4	130 d9	105	26	16	12	M24x65
HDO 120	140x4	140 d9	115	26	19	15	M24x70
HDO 125	150x4	150 d9	122	26	19	15	M24x70
HDO 130	170x4	170 d9	142	33	21	17	M30x80
HDO 140	180x4	180 d9	150	33	21	17	M30x80
HDO 150	210x5	210 d9	178	33	29	18	M30x90
HDO 160	210x5	210 d9	178	33	29	18	M30x90
HDO 170	BONFIGLIOLI TECHNICAL SERVICE						
HDO 180							

To facilitate part removal in the area of the cylindrical guide opposite the shrink disc, install a machine pivot to which a self-lubricating cylindrical bushing (1) can be fitted and/or with a hole big enough to allow application of a rust treatment (2). In the presence of external thrust loads, vibration, safety problems, requirements for enhanced reliability, or unfavourable mounting positions (e.g. V5 mounting positions, output shaft directed downwards), install suitable devices to secure the shaft in an axial direction and prevent accidental decoupling.

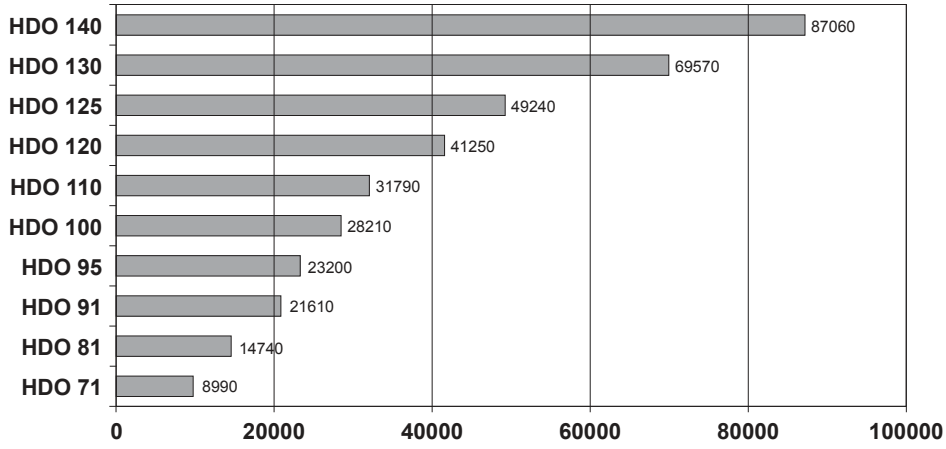
Selection of the the product must fit through the compilation of the selection form (see page 11). For a safe selection it is strongly recommended to rely on the long time experience of the Bonfiglioli Technical Service Dept.

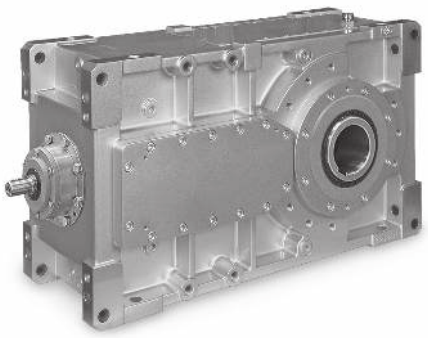
32 INSTALLATION, USE AND MAINTENANCE

All the instructions for installation, use and maintenance of the product are given in the unit's Manual. This can be downloaded from www.bonfiglioli.com where the manual is available in PDF format in a number of languages.
This document must be kept in a suitable place, in the vicinity of the installed gear unit, as a reference for all persons authorised to work with or on the product throughout its service life.

33 CONSTRUCTION OF ATEX-SPECIFIED EQUIPMENT

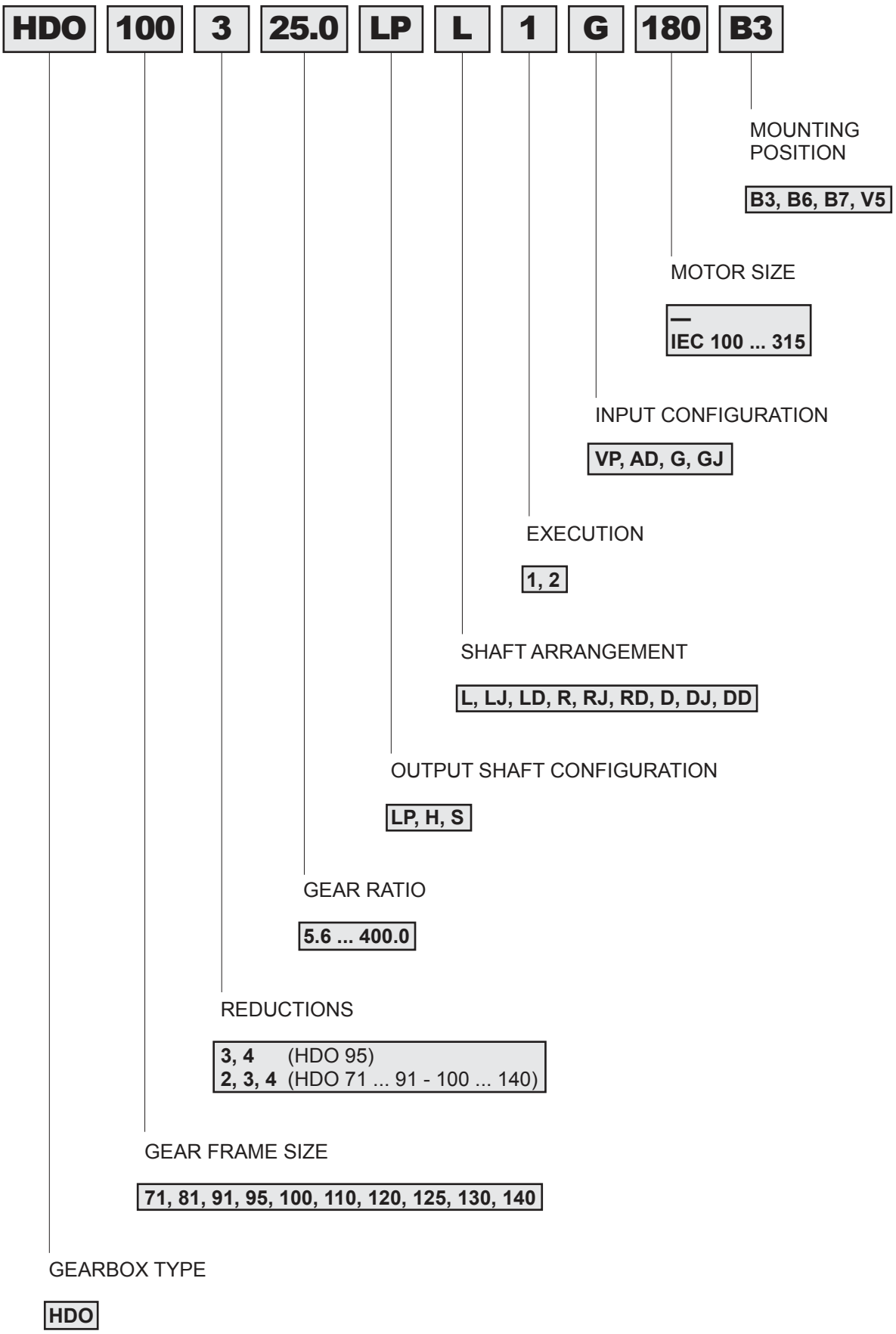
- Equipped with service plugs for periodic lubricant level checks.
- Equipped with vent caps with anti-intrusion valve.
- Fluoro elastomer seal rings as standard.
- No plastic component parts..
- Nameplate indication of the product category and type of protection.
- Components operable at above the operating temperature.
- Temperature indicator supplied along with each unit.



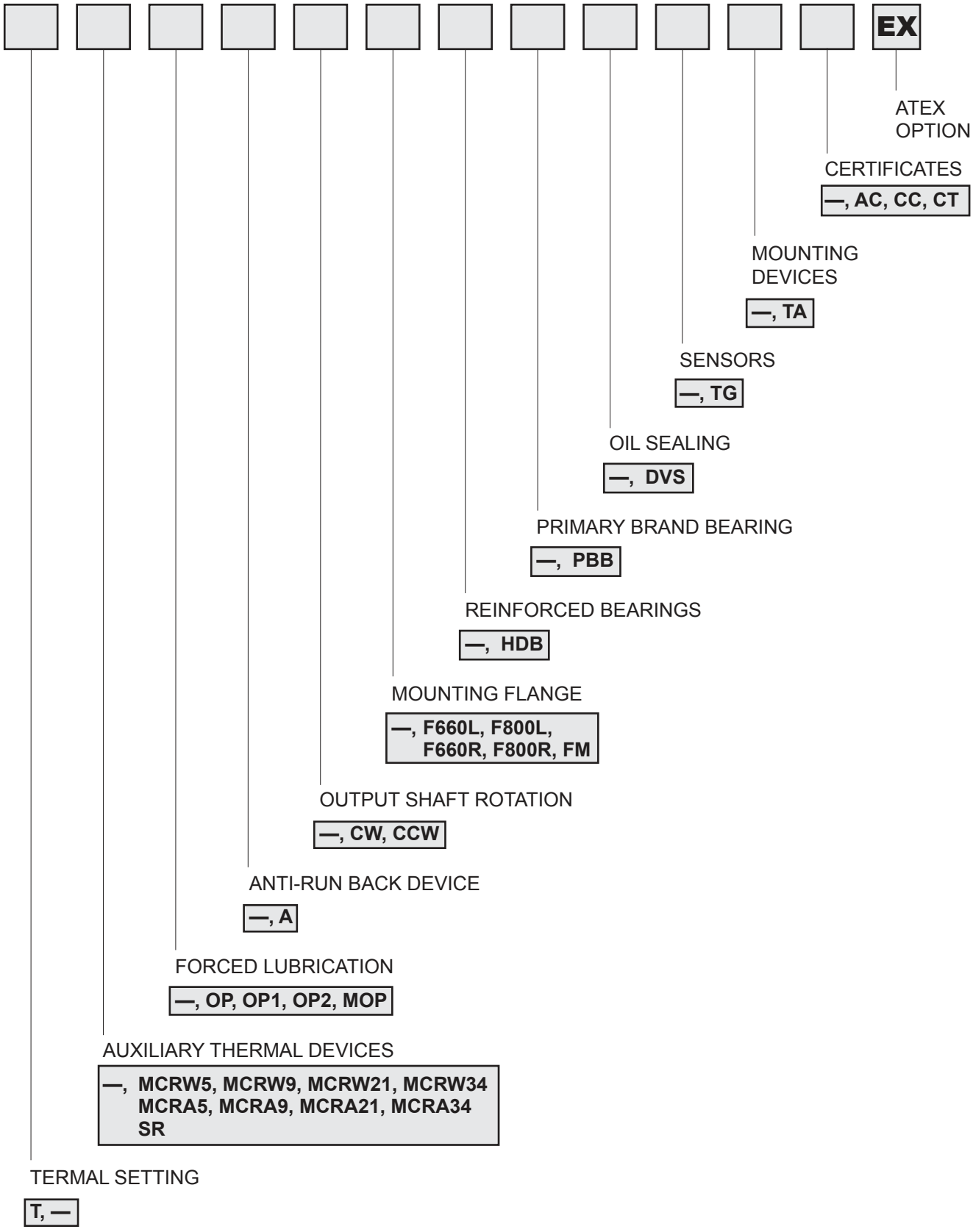


34 DESIGNATION

34.1 BASE VARIANTS



34.2 OPTIONAL VARIANTS



REMARK: The multiple selection of some of the variants may be subject to technical or dimensional constraints. Consult with the factory to have your selection approved.

34.3 AUXILIARY COOLING WITH AUTONOMOUS COOLING UNIT

Two types of cooling unit are available, each in a range of sizes providing different cooling capacities. The two types use different cooling media for the oil: MCRW…EX – water/oil heat exchanger and MCRA…EX – air/oil heat exchanger.
If an autonomous cooling unit is installed on the advice of the Bonfiglioli Technical Service, no additional forced lubrication devices are required. See section 26.7.2. The following chart shows device availability according to gearbox size.

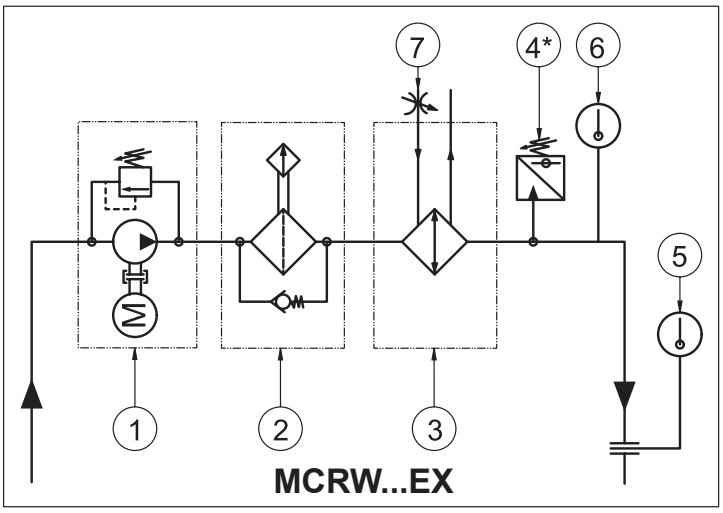
	MCRW5_EX MCRA5_EX	MCRW9_EX MCRA9_EX	MCRW21_EX MCRA21_EX	MCRW34_EX MCRA34_EX
HDO 100_EX	**X**	**X**		
HDO 110_EX	**X**	**X**		
HDO 120_EX	**X**	**X**	**X (*)**	
HDO 125_EX	**X**	**X**	**X (**)**	
HDO 130_EX	**X**	**X**	**X**	**X (**)**
HDO 140_EX	**X**	**X**	**X**	**X (**)**

(*) not available for mounting position B3.
(**) not available for double reduction units in the mounting position B3.

The main components of the cooling units are as follows:

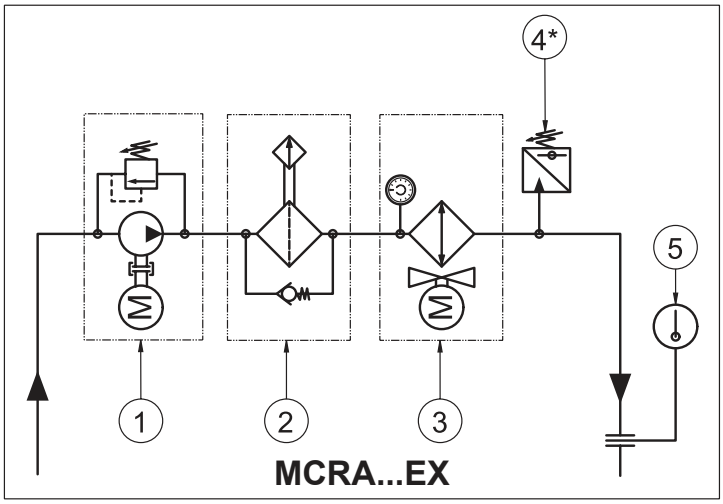
MCRW...EX

1) motorpump complete with by-pass circuit
2) filter with clogging visual indicator
3) water/oil heat exchanger
4) minimum pressure switch (only available in combination with forced lubrication)
5) maximum temperature thermostat
6) minimum temperature switch
7) electro-valve



MCRA...EX

1) motorpump complete with by-pass circuit
2) filter with clogging visual indicator
3) air/oil heat exchanger with thermostat
4) minimum pressure switch (only available in combination with forced lubrication)
5) maximum temperature thermostat

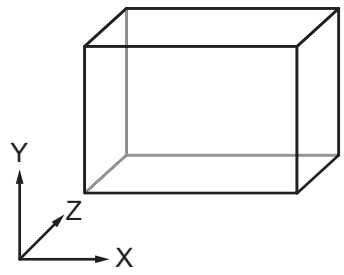


General warnings:
MCRW...EX : provide a water supply system that corresponds to the following specifications:
- max. pressure, 10 bar
- maximum delivery temperature, 20°C
- minimum flow rate Q_{H2O} as per the chart:

	MCRW5_EX	MCRW9_EX	MCRW21_EX	MCRW34_EX
Q_{H2O} [l/min]	10	18	31	56

MCRA...EX : leave sufficient space around the heat exchanger to ensure an unrestricted air flow.

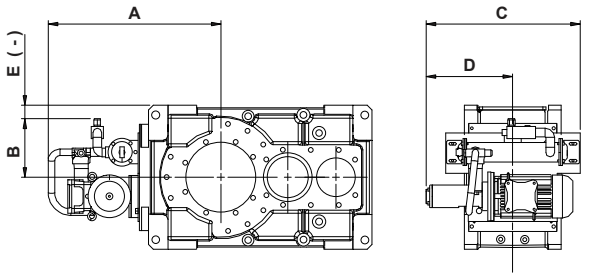
Cooling units maximum dimensions



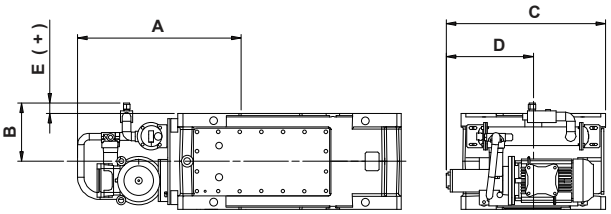
	X	Y	Z
MCRW5_EX	500	288	432
MCRW9_EX	565	328	409
MCRW21_EX	641	382	429
MCRW34_EX	811	430	551
MCRA5_EX	630	505	788
MCRA9_EX	808	605	648
MCRA21_EX	640	605	921
MCRA34_EX	921	605	699

MCRW...EX

B3



V5



B3 - MCRW5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x ; 3x ; 4x	596	247	500	295	-23
	110	2x ; 3x ; 4x	581				-23
	120	2x ; 3x ; 4x	626				-53
	125	2x ; 3x ; 4x	666				-93
	130	2x ; 3x ; 4x	681				-133
	140	2x ; 3x ; 4x	706				-133

V5 - MCRW5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x ; 3x ; 4x	596	247	500	295	62
	110	2x ; 3x ; 4x	581				62
	120	2x ; 3x ; 4x	626				47
	125	2x ; 3x ; 4x	666				47
	130	2x ; 3x ; 4x	681				-3
	140	2x ; 3x ; 4x	706				-3

B3 - MCRW9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x ; 3x ; 4x	610.5	224	565	295	-46
	110	2x ; 3x ; 4x	595.5				-46
	120	2x ; 3x ; 4x	640.5				-76
	125	2x ; 3x ; 4x	680.5				-116
	130	2x ; 3x ; 4x	695.5				-156
	140	2x ; 3x ; 4x	720.5				-156

V5 - MCRW9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x ; 3x ; 4x	610.5	224	565	295	39
	110	2x ; 3x ; 4x	595.5				39
	120	2x ; 3x ; 4x	640.5				24
	125	2x ; 3x ; 4x	680.5				24
	130	2x ; 3x ; 4x	695.5				-26
	140	2x ; 3x ; 4x	720.5				-26

B3 - MCRW21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	120	2x ; 3x ; 4x	—	—	—	—	—
	125	2x	—	—	—	—	—
		3x ; 4x	760	244	641.5	361.5	-96
	130	2x ; 3x ; 4x	775				-136
	140	2x ; 3x ; 4x	800				-136

V5 - MCRW21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	120	2x ; 3x ; 4x	720	244	641.5	361.5	44
	125	2x ; 3x ; 4x	760				44
	130	2x ; 3x ; 4x	775				-6
	140	2x ; 3x ; 4x	800				-6

B3 - MCRW34_EX

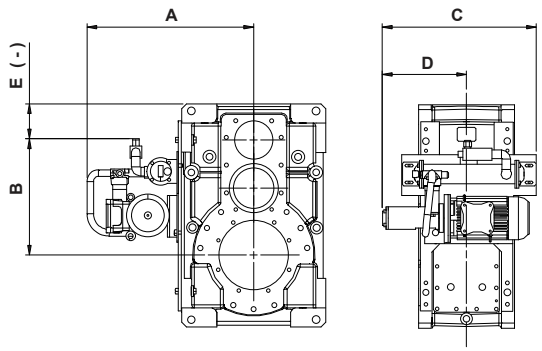
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	130	2x	—	—	—	—	—
		3x ; 4x	823	366	811	431	-14
	140	2x	—	—	—	—	—
		3x ; 4x	848	366	811	431	-14

V5 - MCRW34_EX

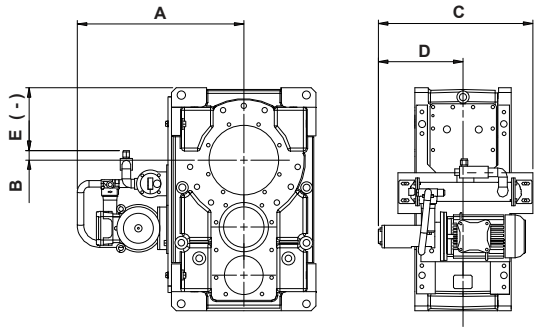
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	130	2x ; 3x ; 4x	823	366	811	431	116
	140	2x ; 3x ; 4x	848				116

MCRW...EX

B6



B7



B6 - MCRW5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x	573	465	500	295	-95
		3x ; 4x	573	585			-95
	110	2x	573	480			-95
		3x ; 4x	573	600			-95
	120	2x	603	473			-157
		3x ; 4x	603	608			-172
	125	2x	643	473			-197
		3x ; 4x	643	608			-212
	130	2x	683	479.5			-260.5
		3x ; 4x	683	575.8			-359.3
	140	2x	683	501.5			-278.5
		3x ; 4x	683	585.8			-389.3

B7 - MCRW5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x	573	29	500	295	-241
		3x ; 4x	573	-91			-361
	110	2x	573	14			-241
		3x ; 4x	573	-106			-361
	120	2x	603	21			-279
		3x ; 4x	603	-114			-414
	125	2x	643	21			-319
		3x ; 4x	643	-114			-454
	130	2x	683	14.5			-340.5
		3x ; 4x	683	-86			-441
	140	2x	683	-8.5			-388.5
		3x ; 4x	683	-91			-471

B6 - MCRW9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x	587.5	442	565	295	-118
		3x ; 4x	587.5	562			-118
	110	2x	587.5	457			-118
		3x ; 4x	587.5	577			-118
	120	2x	617.5	450			-180
		3x ; 4x	617.5	585			-195
	125	2x	657.5	450			-220
		3x ; 4x	657.5	585			-235
	130	2x	697.5	456.5			-283.5
		3x ; 4x	697.5	552.8			-382.3
	140	2x	697.5	478.5			-301.5
		3x ; 4x	697.5	562.8			-412.3

B7 - MCRW9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x	587.5	6	565	295	-264
		3x ; 4x	587.5	-114			-384
	110	2x	587.5	-9			-264
		3x ; 4x	587.5	-129			-384
	120	2x	617.5	-2			-302
		3x ; 4x	617.5	-137			-437
	125	2x	657.5	-2			-342
		3x ; 4x	657.5	-137			-477
	130	2x	697.5	-8.5			-363.5
		3x ; 4x	697.5	-109			-464
	140	2x	697.5	-31.5			-411.5
		3x ; 4x	697.5	-114			-494

B6 - MCRW21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	120	2x	697	470	641.2	361.2	-160
		3x ; 4x	697	605			-175
	125	2x	737	470			-200
		3x ; 4x	737	605			-215
	130	2x	777	476.5			263.5
		3x ; 4x	777	572.8			-362.3
	140	2x	777	498.5			-281.5
		3x ; 4x	777	582.8			-392.3

B7 - MCRW21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	120	2x	697	18	641.2	361.2	-282
		3x ; 4x	697	-117			-417
	125	2x	737	18			-322
		3x ; 4x	737	-117			-457
	130	2x	777	11.5			-343.5
		3x ; 4x	777	-89			-444
	140	2x	777	-11.5			-391.5
		3x ; 4x	777	-94			-474

B6 - MCRW34_EX

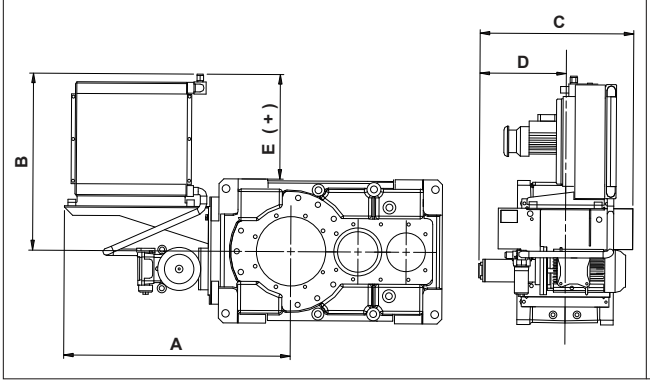
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	130	2x	825	618.5	811	431	-121.5
		3x ; 4x	825	714.8			-220.3
	140	2x	825	640.5			-139.5
		3x ; 4x	825	724.8			-250.3

B7 - MCRW34_EX

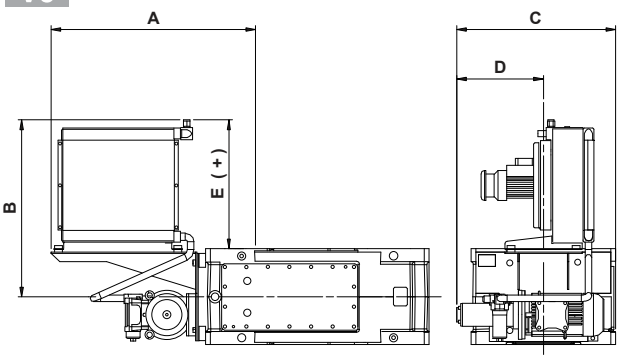
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	130	2x	825	153.5	811	431	-201.5
		3x ; 4x	825	53			-302
	140	2x	825	130.5			-249.5
		3x ; 4x	825	48			-332

MCRA...EX

B3



V5



B3 - MCRA5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x ; 3x ; 4x	813	603	642	430	333
	110	2x ; 3x ; 4x	798				333
	120	2x ; 3x ; 4x	843				303
	125	2x ; 3x ; 4x	883				263
	130	2x ; 3x ; 4x	898				223
	140	2x ; 3x ; 4x	923				223

V5 - MCRA5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x ; 3x ; 4x	813	603	642	430	418
	110	2x ; 3x ; 4x	798				418
	120	2x ; 3x ; 4x	843				403
	125	2x ; 3x ; 4x	883				403
	130	2x ; 3x ; 4x	898				353
	140	2x ; 3x ; 4x	923				353

B3 - MCRA9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x ; 3x ; 4x	913	623	678	295.5	353
	110	2x ; 3x ; 4x	898				353
	120	2x ; 3x ; 4x	943				323
	125	2x ; 3x ; 4x	983				283
	130	2x ; 3x ; 4x	998				243
	140	2x ; 3x ; 4x	1023				243

V5 - MCRA9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x ; 3x ; 4x	913	623	678	295.5	438
	110	2x ; 3x ; 4x	898				438
	120	2x ; 3x ; 4x	943				423
	125	2x ; 3x ; 4x	983				423
	130	2x ; 3x ; 4x	998				373
	140	2x ; 3x ; 4x	1023				373

B3 - MCRA21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	120	2x ; 3x ; 4x	—	—	—	—	—
	125	2x	—	—	—	—	—
		3x ; 4x	983	736	640.5	360.5	396
	130	2x ; 3x ; 4x	998				356
	140	2x ; 3x ; 4x	1023				356

V5 - MCRA21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	120	2x ; 3x ; 4x	943	736	640.5	360.5	536
	125	2x ; 3x ; 4x	983				536
	130	2x ; 3x ; 4x	998				486
	140	2x ; 3x ; 4x	1023				486

B3 - MCRA34_EX

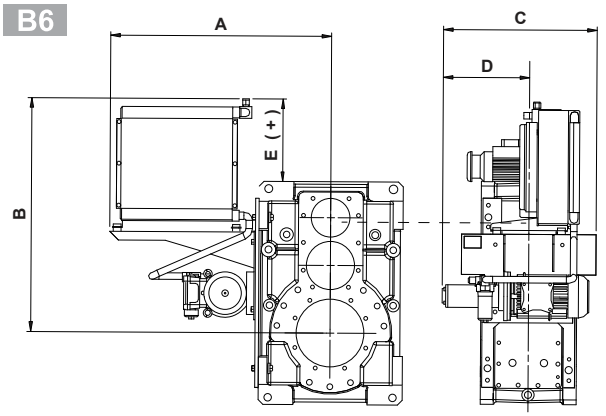
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	130	2x	—	—	—	—	—
		3x ; 4x	998	736	701	416	356
	140	2x	—	—	—	—	—
		3x ; 4x	1023	736	701	416	356

V5 - MCRA34_EX

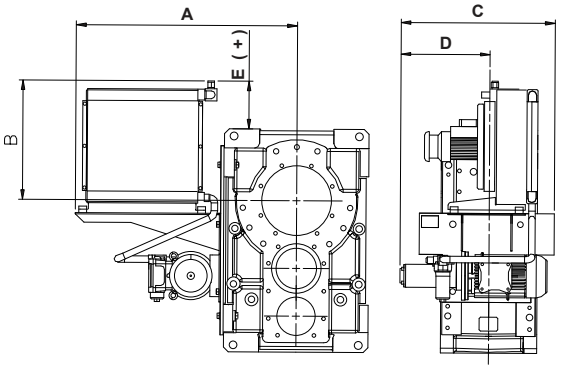
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	130	2x ; 3x ; 4x	998	736	701	416	486
	140	2x ; 3x ; 4x	1023				486

MCRA...EX

B6



B7



B6 - MCRA5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x	790	820.5	641.7	430	260.5
		3x ; 4x	790	940.5			260.5
	110	2x	790	835.5			260.5
		3x ; 4x	790	955.5			260.5
	120	2x	820	828.5			198.5
		3x ; 4x	820	963.5			183.5
	125	2x	860	828.5			158.5
		3x ; 4x	860	963.5			143.5
	130	2x	900	835			95
		3x ; 4x	900	931.3			-3.8
	140	2x	900	857			77
		3x ; 4x	900	941.3			-33.8

B7 - MCRA5_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x	790	384.5	641.7	430	114.5
		3x ; 4x	790	264.5			-5.5
	110	2x	790	369.5			114.5
		3x ; 4x	790	249.5			-5.5
	120	2x	820	376.5			76.5
		3x ; 4x	820	241.5			-58.5
	125	2x	860	376.5			36.5
		3x ; 4x	860	241.5			-98.5
	130	2x	900	370			15
		3x ; 4x	900	269.5			-85.5
	140	2x	900	347			-33
		3x ; 4x	900	264.5			-115.5

B6 - MCRA9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x	890	840.5	680	295.2	280.5
		3x ; 4x	890	960.5			280.5
	110	2x	890	855.5			280.5
		3x ; 4x	890	975.5			280.5
	120	2x	920	848.5			218.5
		3x ; 4x	920	983.5			203.5
	125	2x	960	848.5			178.5
		3x ; 4x	960	983.5			163.5
	130	2x	1000	855			115
		3x ; 4x	1000	951.3			16.3
	140	2x	1000	877			97
		3x ; 4x	1000	961.3			-13.8

B7 - MCRA9_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	100	2x	890	404.5	680	295.2	134.5
		3x ; 4x	890	284.5			14.5
	110	2x	890	389.5			134.5
		3x ; 4x	890	269.5			14.5
	120	2x	920	396.5			96.5
		3x ; 4x	920	261.5			-38.5
	125	2x	960	396.5			56.5
		3x ; 4x	960	261.5			-78.5
	130	2x	1000	390			35
		3x ; 4x	1000	289.5			-65.5
	140	2x	1000	367			-13
		3x ; 4x	1000	284.5			-95.5

B6 - MCRA21_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	120	2x	920	962	640.2	360.2	332
		3x ; 4x	920	1097			317
	125	2x	960	962			292
		3x ; 4x	960	1097			277
	130	2x	1000	968.5			228.5
		3x ; 4x	1000	1064.8			129.8
	140	2x	1000	990.5			210.5
		3x ; 4x	1000	1074.8			99.8

B7 - MCRA21_EX

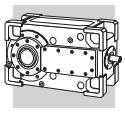
			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	120	2x	920	510	640.2	360.2	210
		3x ; 4x	920	375			75
	125	2x	960	510			170
		3x ; 4x	960	375			35
	130	2x	1000	503.5			148.5
		3x ; 4x	1000	403			48
	140	2x	1000	480.5			100.5
		3x ; 4x	1000	398			18

B6 - MCRA34_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	130	2x	1000	966	701	416	226
		3x ; 4x	1000	1062.3			127.3
	140	2x	1000	988			208
		3x ; 4x	1000	1072.3			97.3

B7 - MCRA34_EX

			A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
HDO	130	2x	1000	501	701	416	146
		3x ; 4x	1000	400.5			45.5
	140	2x	1000	478			98
		3x ; 4x	1000	395.5			15.5



35 OTHER INFORMATION ABOUT GEARBOX AND GEARMOTOR

Mounting positions, technical data, motor availability,moments of inertia and dimensions of **HDO-EX (Atex)** series don’t change among equivalent **HDO** product series. All of these information can be obtained in the related chapters of this catalogue.

INDEX OF REVISIONS

BR_CAT_HDPO_IE3_ENG_R03_0	
	Description
…	New Thermal Power information.
48, 179	Added "Primary Brand Bearings" option.
48, 179	Added "Vent Filter with Drying Salts" option.
52, 181	Updated "Long Term Stock" option.
151, 258	Added availability of motor mounting for HDO 71 4 and HDO 81 4 gearboxes.
161	Added "Thermal Setting" option.
248, 250	Updated some dimensions for HDO 150 4 and HDO 160 4 gearboxes.

2023 07 28

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