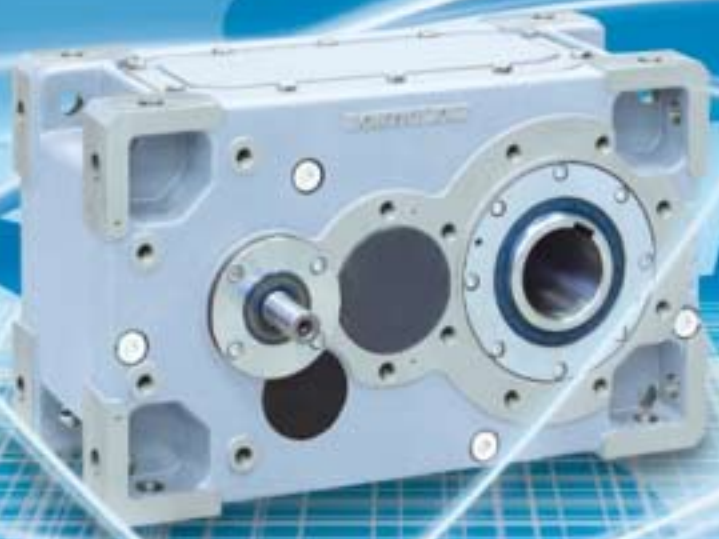
BONFIGLIOLI RIDUTTORI

Industry Process and Automation Solutions

HDP

60 ... 90



BONFIGLIOLI

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Revisions

Refer to page 50 for the catalogue revision index.

Visit www.bonfiglioli.com to search for catalogues with up-to-date revisions.

PURE FORCE

Consistently high torque ratings, numerous close progression ratios, various mounting options along with compact dimensions to ease the application engineering to unmatched levels. The rigid monobloc gear case and the gears' high class of precision yield an extremely quiet and vibration-free operation. For more information:
www.bonfiglioli.com

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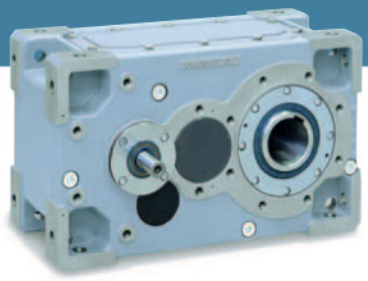
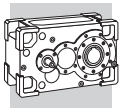




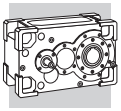
1 GENERAL INFORMATION

1.1 SYMBOLS AND UNITS OF MEASUREMENT

Symb.	U.m.	Description	Symb.	U.m.	Description
$An_{1,2}$	[kN]	Permissible axial force	$Mr_{1,2}$	[Nm]	Torque demand
f_S	-	Service factor	$n_{1,2}$	[min^{-1}]	Speed
i	-	Gear ratio	$P_{1,2}$	[kW]	Power
I	-	Cyclic duration factor	$P_{n\ 1,2}$	[kW]	Rated power
J	[Kgm^2]	Mass moment of inertia	$P_{r\ 1,2}$	[kW]	Power demand
$M_{1,2}$	[Nm]	Torque	$R_{c\ 1,2}$	[kN]	Calculated radial force
$Mc_{1,2}$	[Nm]	Calculated torque	$R_{n\ 1,2}$	[kN]	Permissible overhung load
$Mn_{1,2}$	[Nm]	Rated torque	η	-	Efficiency

$\square_1$ value applies to input shaft

$\square_2$ value applies to output shaft



1.2 PRODUCT FEATURES

Gear units of the HDP 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

The main construction features of the HDP parallel shaft gear unit range are:

- 4 frame sizes: HDP 60, HDP 70, HDP 80 and HDP 90 with 2 and 3 reduction stages
- Optimum distribution of rated torque values across the entire ratio range
- Gear ratios with 12% constant escalation
- Monobloc housing in rigid, nodular cast iron, paint coated both internally and externally. A modern design without recesses for easy cleaning. Universal mounting thanks to the many machined surfaces. Profiles and dimensions optimised by FEM analysis for superior structural rigidity, low acoustic emissions and a moderate weight.
- Casehardened and hardened alloy steel helical gears with ground profile, optimised for:
  - more silent operation and smoother transmission of input gears
  - maximum transmissible torque of the final reductions
- Input shafts generally casehardened and ground finished. Output shafts from hardened and tempered alloy steel.
- Input shaft configurations:
  - solid, single or double-sided shaft with dimensions to UNI/ISO 775-88 (extended length)
  - direct motor mounting or lantern housing and flexible coupling provision
- Output shaft configurations:
  - solid, single or double-sided shaft with dimensions to UNI/ISO 775-88 (extended length)
  - hollow shaft with keyway
  - hollow shaft with shrink disc
- Heavy duty taper roller bearings from the most reputed brands for unparalleled overhung load capacity that can be further increased through the reinforced “HDB” bearing option.
- 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
  - seals of different types and materials
  - sensors
  - dry-well device for vertical shaft installations
  - fixing elements

1.3 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 being painted, 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.

- Parts fitted on the gearbox output shaft must be machined to ISO H7 tolerance to prevent interference fits that could damage the gearbox itself. Further, to mount or remove such parts, use suitable pullers or extraction devices using the tapped hole located at the top of the shaft

extension.

- 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 89/392.

- Before starting up the machine, make sure that oil level conforms to the mounting position specified for the gear unit.

- For outdoor installation provide adequate guards in order to protect the drive from rainfalls as well as direct sun radiation.

1.4 MAINTENANCE

It is advisable to change the lubricant after the initial 300 hours of operation and thoroughly clean the interior of the unit with a suitable detergent.
Do not mix different types and/or brands of oil.
Periodically check the oil level, and replace at the intervals given in the chart.

Oil temperature [°C]	Oil change interval [h]	
	mineral oil	synthetic oil
< 65	8000	25000
65 - 80	4000	15000
80 - 95	2000	12500

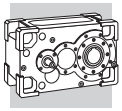
1.5 STORAGE

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 (Mobilarma 248 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.



1.6 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;
- shafts are protected during transportation by plastic caps.

1.7 PAINT COATING

Internal and external paint coating with thermosetting epoxy resin and polyester-based powder with a high corrosion protection rating, also suitable for outdoor installation. Colour is grey RAL 7042.
It can be top-coated with synthetic paints.

1.8 SELECTING THE GEAR UNIT

1.8.1 ENGINEERING SELECTION

1. First determine the gear ratio:

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

2. Calculate the power $\mathbf{Pr_1}$ required at the input shaft:

$$P_{r1} = \frac{P_{r2}}{\eta}$$

	η
2x	0.96
3x	0.94

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 $\mathbf{Pn_1}$, so that:

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

1.8.2 VERIFICATIONS

1.8.2.1 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:

$$M_p \leq M_{n2} \times f_p$$

		f_p				
peaks / hour		**1**	**2 ... 10**	**11 ... 50**	**51 ... 100**	**> 100**
Drive	Constant direction	2.0	1.6	1.3	1.1	1.0
	Reversals	1.4	1.2	0.9	0.8	0.7

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

1.8.2.2 MOTOR MOUNTING

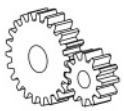
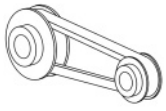
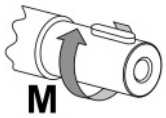
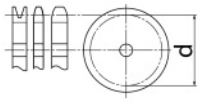
Verify that the appropriate motor adapter is available for the selected gear unit. See section 2.4. Because of standardisation, the rated power of the electric motor selected might be greater than power $\mathbf{Pr_1}$ actually requested by the application. Make sure that the electric motor will never 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.

1.8.2.3 BACKSTOP DEVICE

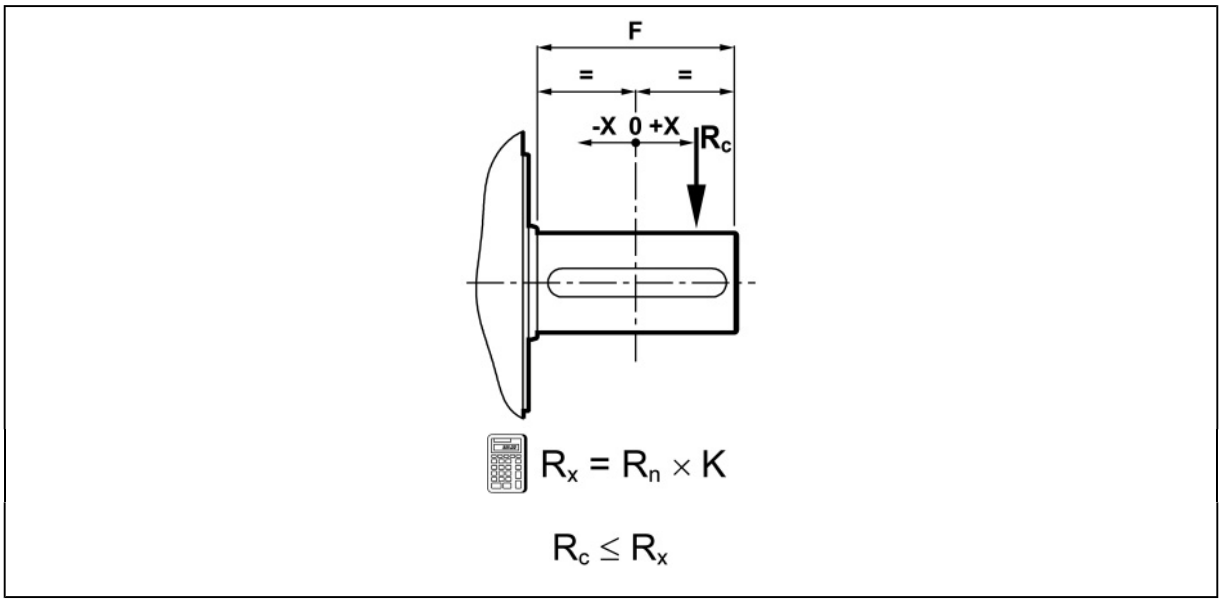
If the gear unit is specified with a backstop, verify the load capacity of the device in the relevant section of this catalogue and make sure the torque $\mathbf{M_{1MAX}}$ is never exceeded in operation.

1.8.2.4 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 (R_{c1} for input shaft, R_{c2} for output shaft), must be equal or lower than admissible overhung load capacity for shaft under study (R_{x1} for input shaft, R_{x2} for output shaft). OHL capability listed in the rating chart section.
In the formulas given below, index (1) applies to parameters relating to input shaft, whereas index (2) refers to output shaft.
The load generated by an external transmission can be calculated with close approximation by the following equation:

$R_c = \frac{2000 \times M \times K_r}{d}$	
K_r = 1	
K_r = 1.25	
K_r = 1.5 - 2.0	
M [Nm]	
d [mm]	

1.8.2.5 OVERHUNG LOADING VERIFICATION



	K_1							
x [mm] =	-50	-25	0	25	50	75	100	150
HDP 60	-	1.10	1.00	0.77	0.62	0.52	0.45	-
HDP 70	-	1.10	1.00	0.77	0.62	0.52	0.45	-
HDP 80	1.17	1.08	1.00	0.81	0.68	0.54	0.44	0.32
HDP 90	1.15	1.07	1.00	0.83	0.72	0.61	0.50	0.37

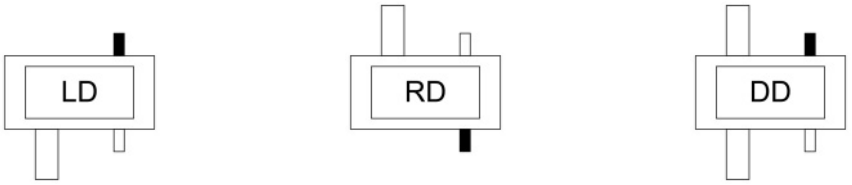
	K_2											
x [mm] =	-100	-75	-50	-25	0	25	50	75	100	150	200	250
HDP 60	-	-	1.20	1.09	1.00	0.74	0.58	0.48	0.41	0.32	-	-
HDP 70	-	1.34	1.20	1.09	1.00	0.77	0.63	0.53	0.46	0.36	0.30	-
HDP 80	1.38	1.26	1.16	1.07	1.00	0.82	0.69	0.59	0.52	0.42	0.35	0.30
HDP 90	1.33	1.23	1.14	1.07	1.00	0.81	0.68	0.58	0.51	0.41	0.34	0.30

1.8.2.6 SHAFT LOADING

1. **Overhung loads on output shaft**
   Refer to section 3.5.1, and verify that both the radial and the axial force acting onto output shaft do not exceed the maximum permitted for the selected product configuration. In addition to overhung load, thrust load may also be applied:
   $\mathbf{An_2} \leqslant 0.2 \times \mathbf{Rn_2}$.
   The HDB option provides higher capacity bearings to cater for particularly heavy external loads. If external loads exceed the capacity of even the heavy-duty bearings, consider providing external support for the drive shafts, reducing external loads or, if necessary, selecting a gear unit of the next size up.
   When checking the overhung load capacity refer to scheme shown at paragraph 1.8.2.5. 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 $\mathbf{Rn_2}$, as listed in the technical data section, for the load location factor $\mathbf{K_2}$ to get the permissible overhung load $\mathbf{Rx_2}$ 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 contact the Technical Service of

Bonfiglioli Riduttori.
When a radial force applies a thrust load $\mathbf{An_2} \leqslant 0.2 \times \mathbf{Rn_2}$ is also permitted.

2. **Thrust loads on output shaft**
   Refer to section 3.6.1 and verify that thrust force on the shaft does not exceed that specified in the chart for the selected product configuration and combination of direction of shaft rotation / direction of force.
   If an overhung load is present in addition to the thrust load, contact Bonfiglioli Riduttori's Technical Service.
   Permissible thrust loads refer exclusively to forces applying axially on the shaft. In case of forces applying offset please consult with Bonfiglioli's Technical Service.
3. **Overhung and thrust loads on input shaft**
   When checking the overhung load capacity refer to scheme shown at paragraph 1.8.2.5. 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 contact the Technical Service of Bonfiglioli Riduttori.
   When a radial force applies a thrust load $\mathbf{An_1} \leqslant 0.2 \times \mathbf{Rn_1}$ is also permitted.
   For gear units with double extended shafts (configurations LD, RD and DD) the permitted overhung load charted refers to shaft end highlighted in black in the scheme here below:



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

1.8.3 LUBRICATION

Internal parts of HDP gear units are oil bath and splash lubricated. Upper bearings in the V5 mounting position are grease lubricated. In this case a Nilos ring retains the grease, unless forced lubrication by mechanical pump (OP1 and OP2 options) or motor pump (MOP option) is specified in the order.
The gear units are supplied without lubricant. It is the customer's responsibility to fill the unit with the appropriate quantity of oil before start-up.

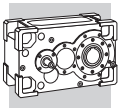
The quantities of lubricant given in the chart are indicative. Refer to the sight glass' centre line, or the dipstick if supplied, for correct filling.
The quantity of lubricant given in the chart may vary, sometimes substantially, depending on the gear ratio or a particular product modification.

	oil [l]			
	B3	**B6**	**B7**	**V5**
HDP 60	10.0	14.8	14.6	16.0
HDP 70	10.5	15.5	15.3	16.7
HDP 80	16.1	23.8	23.5	25.6
HDP 90	22.9	33.8	33.4	36.5

		kinematic viscosity at 40°C [cst]		
Lubricant		**ISO VG 220**	**ISO VG 320**	**ISO VG 460**
Mineral Oil (EP additives)	Tamb	0°C ... 20°C	10°C ... 40°C	20°C ... 50°C
Synthetic oil	Tamb	0°C ... 30°C	10°C ... 50°C	-

Lubricant must be pre-heated through the appropriate electric resistance (HE option) in the following cases:

- operation at ambient temperatures lower than 0°C
- upon starting up gear units that are oil-bath and splash lubricated if the difference between the ambient temperature and the oil's pour point is greater than 10°C
- Upon starting up gear units with forced lubrication systems (options OP1, OP2 or MOP) if the oil viscosity exceeds 1800 cst. Depending of the type of lubricant used, this value may be produced with ambient temperatures between 10°C and 20°C approx.



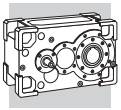
1.8.4 SERVICE FACTOR

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 hrs/day	> 10 hrs/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
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

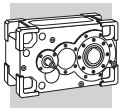
Application	⩽ 10 hrs/day	> 10 hrs/day
Fans		
Centrifugal	1.00	1.25
Cooling towers	2.00	2.00
Forced draft	1.25	1.25
Induced draft	1.50	1.50
Industrial and mine	1.50	1.50
Feeders		
Apron	1.25	1.50
Belt	1.15	1.50
Disc	1.00	1.25
Reciprocating	1.75	2.00
Screw	1.25	1.50
Food industry		
Dough mixer	1.25	1.50
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
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

(*) - 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	⩽ 10 hrs/day	> 10 hrs/day
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
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

Application	⩽ 10 hrs/day	> 10 hrs/day
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
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



1.8.5 THERMAL CAPACITY

Checking the thermal capacity may not be necessary if the gear unit operates continuously for less than 3 hours followed by a rest time sufficient to restore the ambient temperature.

$$P_{r1} \leq (P_T \times f_{TA} \times f_{AMB} \times f_{ALT} - P_{T0} \times f_i \times f_{n1}) \times f_{INT} + P_{FAN} \times f_{TA} \times f_{ALT} + P_{SR}$$

Reference values	
Symbol	Definition
P_T	Base thermal capacity
P_{TO}	Equivalent thermal capacity under no load
P_{SR}	Additional thermal capacity linked to the use of the cooling coil
P_{FAN}	Additional thermal capacity linked to fan cooling

Adjusting factors	
Symbol	Relationship
f_i	factor depends on nominal gear ratio [i_N]
f_{n1}	factor depends on drive speed n_1. Interpolate for intermediate speed values
f_{TA}	factor depends on ambient temperature t_a. Interpolate for intermediate values
f_{INT}	factor depends on the operating cycle per hour [ED%]. Interpolation is permitted
f_{AMB}	factor depends on the type of ambient the gear unit is installed into
f_{ALT}	factor depends on the altitude the gear unit operates at. Interpolation is permitted

		HDP 60				HDP 70				HDP 80				HDP 90			
		B3	B6	B7	V5	B3	B6	B7	V5	B3	B6	B7	V5	B3	B6	B7	V5
P_T [kW]	2x	46	49	49	43	48	52	52	45	63	69	69	60	83	90	90	78
	3x	32	34	34	29	33	36	36	31	44	47	47	41	57	62	62	54
P_{TO} [kW]	2x	16	26	34	31	18	35	40	34	10	56	63	57	14	82	93	79
	3x	9	11	13	10	10	12	14	12	11	19	21	17	15	27	29	23
P_{SR} [kW]	2x	32	32	18	17	32	32	17	18	41	41	23	27	48	39	27	30
	3x	18	18	9	10	18	18	8	10	28	28	16	18	22	22	8	14

		HDP 60			HDP 70			HDP 80			HDP 90		
	n_1 [min^{-1}]	900	1100	1400	900	1100	1400	900	1100	1400	900	1100	1400
P_{FAN}	2x	10	13	15	10	13	15	19	24	27	22	28	32
	3x	7	9	10	7	9	10	13	16	18	15	19	22

	i_N	f_i
2x	7.1	1.00
	8.0	1.00
	9.0	1.00
	10.0	0.85
	11.2	0.85
	12.5	0.73
	14.0	0.73
	16.0	0.64
	18.0	0.64
	20.0	0.55
	22.4	0.55
3x	22.4	1.00
	25.0	1.00
	28.0	1.00
	31.5	0.95
	35.5	0.95
	40.0	0.90
	45.0	0.90
	50.0	0.83
	56.0	0.83
	63.0	0.56
	71.0	0.56
	80.0	0.49
	90.0	0.49
	100.0	0.47
	112.0	0.47

	n_1 [min^{-1}]			
	500	900	1100	1400
f_{n1}	0.34	0.63	0.78	1.00

	Ambient temperature [°C]				
	10 °C	20 °C	30 °C	40 °C	50 °C
f_{TA}	1.14	1.00	0.86	0.71	0.57

	small confined space v = 0.5 m/s	large indoor space v = 1.4 m/s	outdoors v = 4 m/s
f_{AMB}	0.75	1.00	1.30

	Operating cycle per hours [%]				
	100%	80%	60%	40%	20%
f_{INT}	1.00	1.05	1.20	1.35	1.80

	altitude a.s.l [m]			
	0	1000	2000	3000
f_{ALT}	1.00	0.93	0.87	0.81

1.8.6 EXAMPLE

Application data
n_1 = 900 min^{-1}
n_2 = 75 min^{-1}
f_s = 2
P_{r2} = 25 kW
Mounting position: **B7**
Operating cycle per hours: 100% ---> f_{INT} = 1

Environmental conditions	
Ambient temperature = 30°C	f_{AMB} = 1
large indoor space	f_{TA} = 0.86
altitude m.s.l.m. = 0 m	f_{ALT} = 1

Product selection:

$i = n_1 / n_2 = 12$ ---> $\mathbf{i_N} = 12$
$P_{r1} = P_{r2} / \eta = 26$ ---> $\mathbf{P_{r1}} = 26$ kW
$P_{n1} \geqslant P_{r1} \times f_s = 52$ ---> $\mathbf{P_{n1}} \geqslant 52$ kW

Ordering numbers:

HDP 70 2 11.7 LP LR VP B7

Thermal capacity check:

n_1 = 900 min^{-1}	f_{n1} = 0.63
HDP 70 2...B7	P_T = 52 kW
HDP 70 2...B7	P_{T0} = 40 kW
i_N = 12	f_i = 0.85

$\mathbf{P_{r1}} \leqslant (\mathbf{P_T} \times \mathbf{f_{TA}} \times \mathbf{f_{AMB}} \times \mathbf{f_{ALT}} - \mathbf{P_{T0}} \times \mathbf{f_i} \times \mathbf{f_{n1}}) \times \mathbf{f_{INT}} =$ 23.3 kW < 26 kW ⚠

Option 1 - Fan cooling **HDP 70 2** ---> $\mathbf{P_{FAN}}$ = 10 kW

$\mathbf{P_{r1}} \leqslant (\mathbf{P_T} \times \mathbf{f_{TA}} \times \mathbf{f_{AMB}} \times \mathbf{f_{ALT}} - \mathbf{P_{T0}} \times \mathbf{f_i} \times \mathbf{f_{n1}}) \times \mathbf{f_{INT}} + \mathbf{P_{FAN}} \times \mathbf{f_{TA}} \times \mathbf{f_{ALT}}$ = 31.9 kW > 26 kW ☺

Option 2 - Cooling coil **HDP 70 2 ... B7** ---> $\mathbf{P_{SR}}$ = 17 kW

$\mathbf{P_{r1}} \leqslant (\mathbf{P_T} \times \mathbf{f_{TA}} \times \mathbf{f_{AMB}} \times \mathbf{f_{ALT}} - \mathbf{P_{T0}} \times \mathbf{f_i} \times \mathbf{f_{n1}}) \times \mathbf{f_{INT}} + \mathbf{P_{SR}}$ = 40.3 kW > 26 kW ☺

2 PRODUCT CONFIGURATIONS

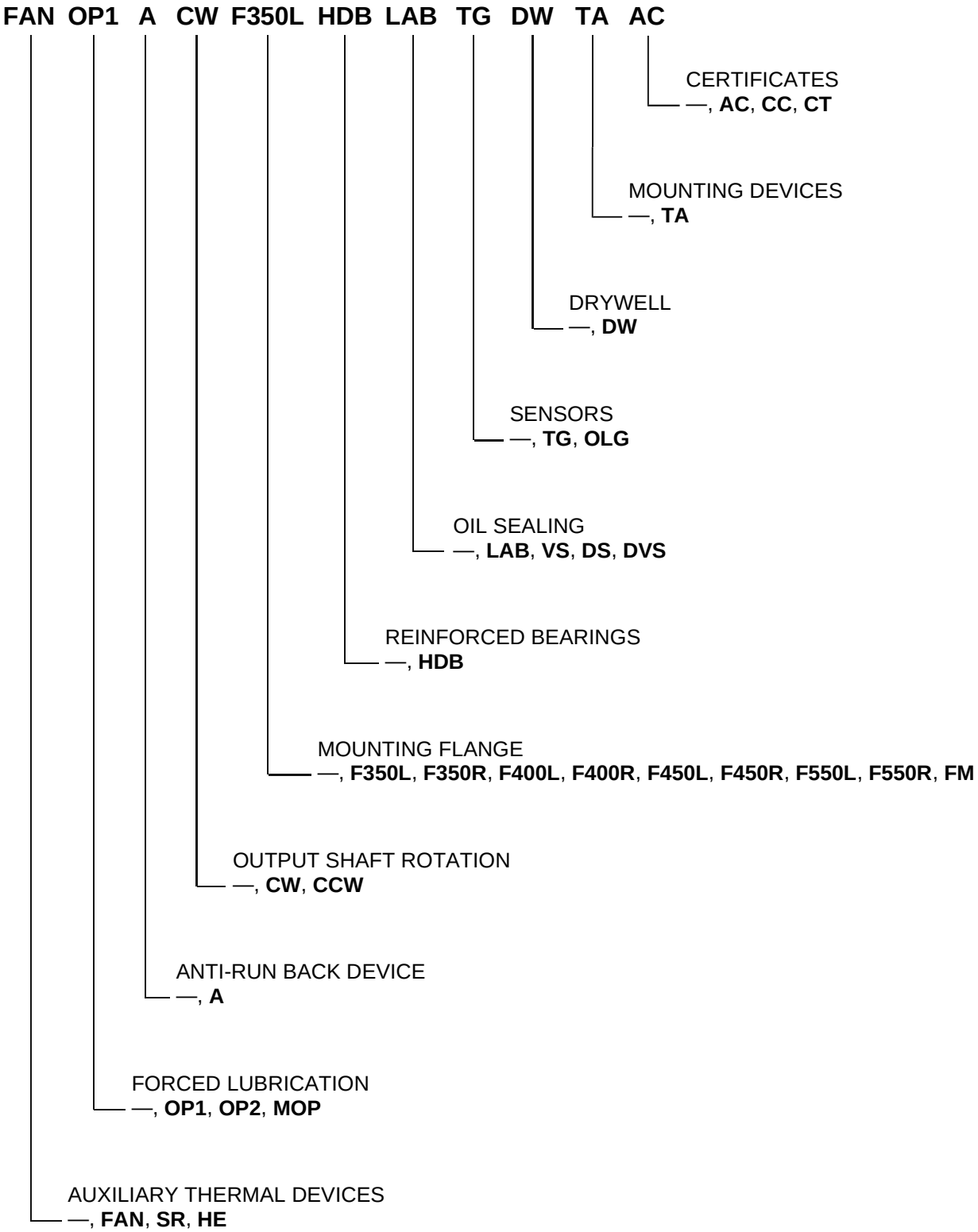
2.1 ORDERING NUMBERS

2.1.1 BASE VARIANTS

HDP 70 2 25.0 LP LR GL 132 B3

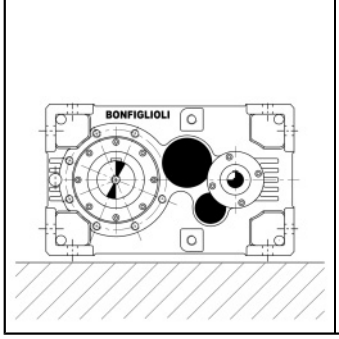
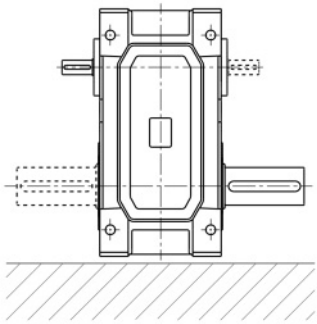
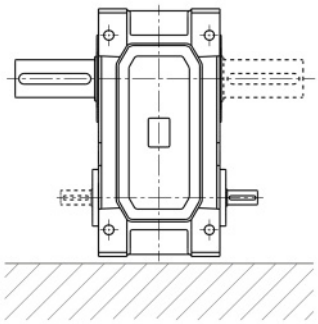
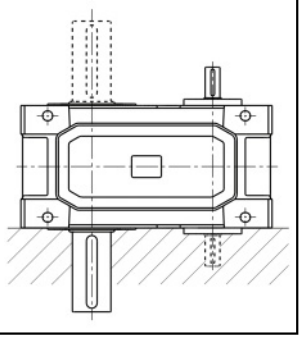
- **HDP** — GEARBOX TYPE: **HDP**
- **70** — GEAR FRAME SIZE: **60**, **70**, **80**, **90**
- **2** — REDUCTIONS: **2**, **3**
- **25.0** — GEAR RATIO: **7.1** ... **112.0**
- **LP** — OUTPUT CONFIGURATION: **LP**, **H**, **S**
- **LR** — SHAFT ARRANGEMENT: **LL**, **LR**, **LD**, **RL**, **RR**, **RD**, **DL**, **DR**, **DD**
- **GL** — INPUT CONFIGURATION: **VP**, **AD**, **GL**, **GR**
- **132** — MOTOR SIZE: **112...280**
- **B3** — MOUNTING POSITION: **B3**, **B6**, **B7**, **V5**

2.1.2 OPTIONAL VARIANTS



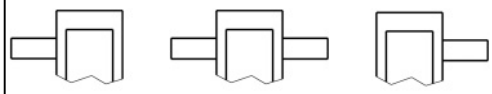
REMARK: The multiple selection of some of the variants may be subject to technical or dimensional constraints. Consult with the factory to have your selection approved.

2.2 MOUNTING POSITION

B3	B6	B7	V5
			

2.3 INPUT AND OUTPUT CONFIGURATION

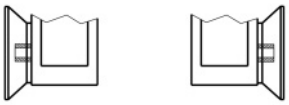
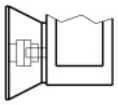
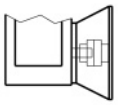
2.3.1 OUTPUT CONFIGURATION

LP	H	S
		

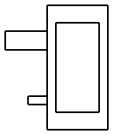
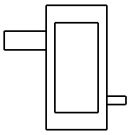
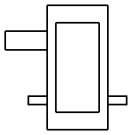
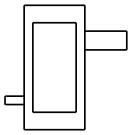
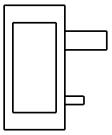
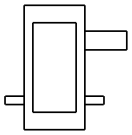
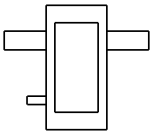
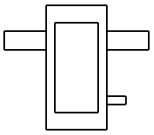
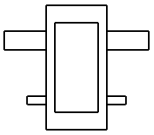
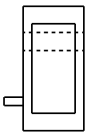
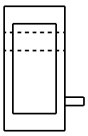
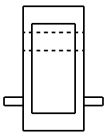
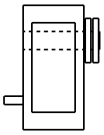
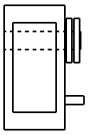
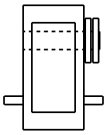
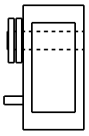
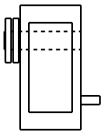
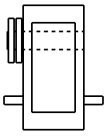
2.3.2 INPUT CONFIGURATION

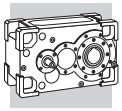
On the input side the gear unit can be arranged in either one of the configurations described here after:

- **Solid input shaft**, single- or double-sided – Specify **VP**
- **Motor flange mounting** for an IEC-standard electric motor with IM B5 flange. Drive is transmitted via the gear unit's keyed hollow input shaft. The option is only applicable to units HDP 60... HDP 90 in the triple reduction configuration – Specify **AD**.
- **Motor mounting through bell housing and flexible coupling**. The option is designated **GL** or **GR** depending on what side of the gear unit the coupling is mounted. The flexible coupling is within the scope for supply.

VP	AD	GL	GR
			

2.3.3 SHAFT ARRANGEMENT

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



2.4 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 / GR input configuration (coupling through bell housing 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 power $\mathbf{Pr_1}$ 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.

	Input configuration AD						
	112	**132**	**160**	**180**	**200**	**225**	**250**
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	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

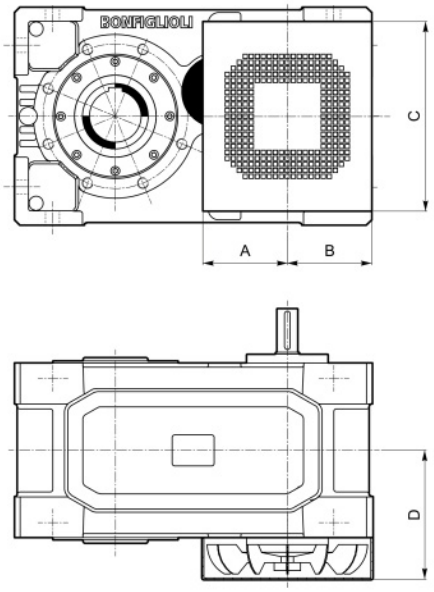
2.5 OPTIONAL VARIANTS

2.5.1 AUXILIARY COOLING DEVICES

2.5.1.1 FAN COOLING

If the **FAN** option is specified, a cooling fan is keyed to the end of the input shaft opposite the drive side. This option is not available with other configurations that use the same shaft end and with variants MOP - forced lubrication with motor pump - and LAB - labyrinth oil seals. The increased cooling effect obtained by this option is shown by the thermal capacity value P_{FAN}. See the section, 1.8.5.

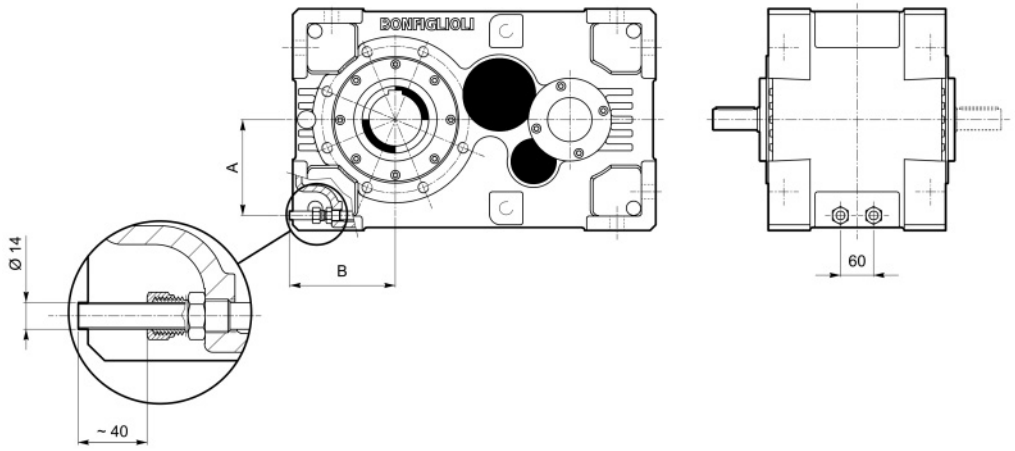
The efficiency of the fan is greatly reduced at drive speed lower than n_1 = 900 min^{-1}. Should this be the case the cooling coil is recommended instead as the device that best increases the heat dissipation when the mechanical power is greater than thermal capacity.



	A	B	C	D
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

2.5.1.2 COOLING COIL

The cooling coil option **SR** is designed for integration in a cooling circuit to be provided by the installer. The water supply circuit must correspond to the following specifications: maximum pressure 8 bar, flow rate 5 l/min, maximum delivery temperature 20°C.
The increased cooling effect obtained in these conditions is shown by the thermal capacity value P_{SR}.
See the section, 1.8.5.



	A	B
HDP 60_ SR	147	170
HDP 70_ SR	147	170
HDP 80_ SR	173	190
HDP 90_ SR	190	210

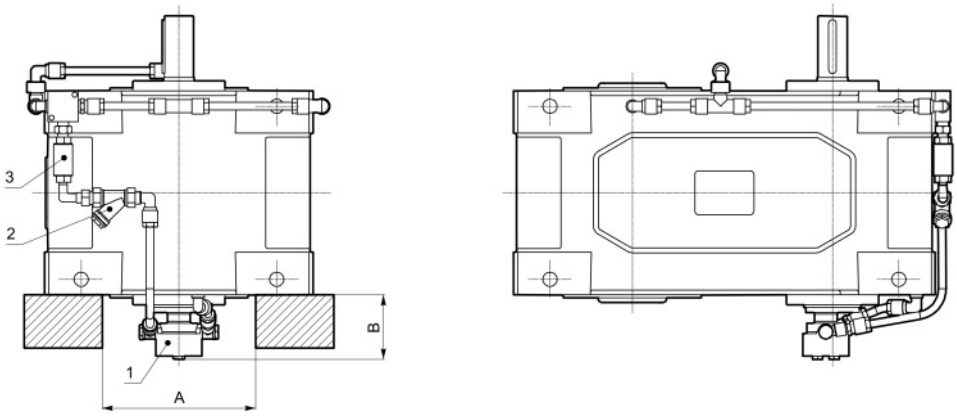
2.5.1.3 HEATERS

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.

2.5.2 FORCED LUBRICATION

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



1 - Pump
2 - Filter
3 - Oil flow visual indicator

	n_1 = 900 min^{-1}	n_1 = 1100 min^{-1}	n_1 = 1400 min^{-1}
HDP	OP2	OP2	OP1

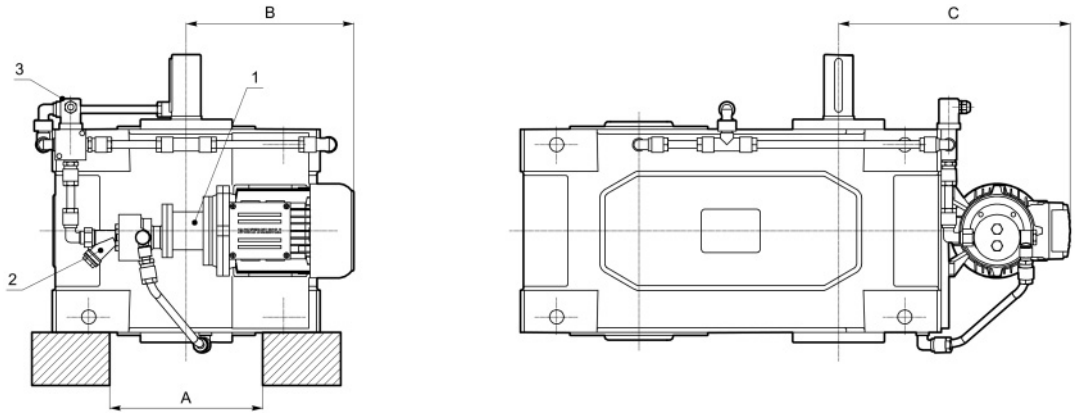
	A	**B**
HDP 60_ OP1	190	105
HDP 60_ OP2	190	105
HDP 70_ OP1	215	105
HDP 70_ OP2	215	105
HDP 80_ OP1	240	105
HDP 80_ OP2	240	130
HDP 90_ OP1	240	130
HDP 90_ OP2	240	130

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

	LL RD DL	**LR RR DR**	**LD RD DD**
LP	⛔	VP GR AD	⛔
H	⛔	VP GR AD	⛔
S	⛔	VP GR AD	⛔

2.5.2.2 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.



1 - Motorpump
2 - Filter
3 - Minimum pressure switch

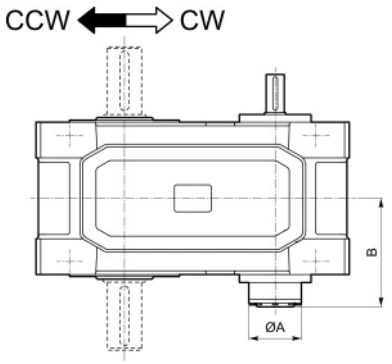
	A	B	C
HDP 60_ MOP	190	225	310
HDP 70_ MOP	215	225	330
HDP 80_ MOP	240	270	355
HDP 90_ MOP	240	285	390

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

	LL RL DL	**LR RR DR**	**LD RD DD**
LP	VP	VP GR AD	VP GR
H	VP	VP GR AD	VP GR
S	VP	VP GR AD	VP GR

2.5.3 BACKSTOP DEVICE

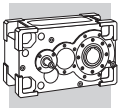
The backstop device ensures that only one direction of rotation is allowed, and prevents the gearbox to be backdriven by the load connected to the output shaft.
In addition to verifying the shock loads shown in section 1.8.2.1, also make sure that the torque transmitted to the backstop $M_1 = M_2 / (i \times \eta)$ is less than the admissible torque M_{1max} listed in the chart below.
A drive speed $\mathbf{n_1} \geqslant 800\ min^{-1}$ will ensure the optimal operation for the device.
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.



	i	A	B	M_{1max} [Nm]
HDP 60_ A	7.1 ... 15.2	125	202.5	800
	17.3 ... 98.4	100	197.5	375
HDP 70_ A	8.0 ... 17.7	125	202.5	800
	19.4 ... 114.4	100	197.5	375
HDP 80_ A	8.1 ... 22.6	130	233	912
	25.8 ... 111.4	110	228	550
HDP 90_ A	7.9 ... 22.4	150	261	1400
	25.4 ... 110.1	125	256	800

2.5.4 REINFORCED BEARINGS

Optional heavy-duty bearings are also available, with increased overhung load capacity. The **HDB** option can only be applied to units with an LP version solid output shaft.
See the relevant section in this catalogue for precise overhung load values.
Option cannot be specified along with variants DW -drywell- or LAB -labyrinth seals-.



2.5.5 SEALS AND GASKETS

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

LAB – Standard oil seals on each shaft are replaced by non-contacting seals, labyrinth type, that are wear- and maintenance-free. The option only applies to configurations featuring solid input shaft, type VP, exclusively in the B3 mounting position.
Option cannot be specified along with variants FAN -fan cooling-, HDB -reinforced bearings- and OLG - oil level indicator.
VS – Viton® compound seal rings
DS – Dual set of seal rings at each shaft end
DVS – Dual set of Viton® compound seal rings at each shaft end.

2.5.6 SENSORS

Bimetal thermostat – If the **TG** option is specified, a bimetal thermostat is supplied to prevent the oil to exceed the set temperature of 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, the gearbox is supplied with a device permitting 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.
Variant not available along with the DW -dry well- and LAB -labyrinth seals-

2.5.7 DRYWELL

The “drywell” device, option **DW**, is only available for the V5 vertical mounting position, and ensures the oil-tightness of the output shaft.
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.
Option cannot be specified along with variant LAB -labyrinth seals-.
The chart shows the applicability for the drywell depending on the input and output configurations.

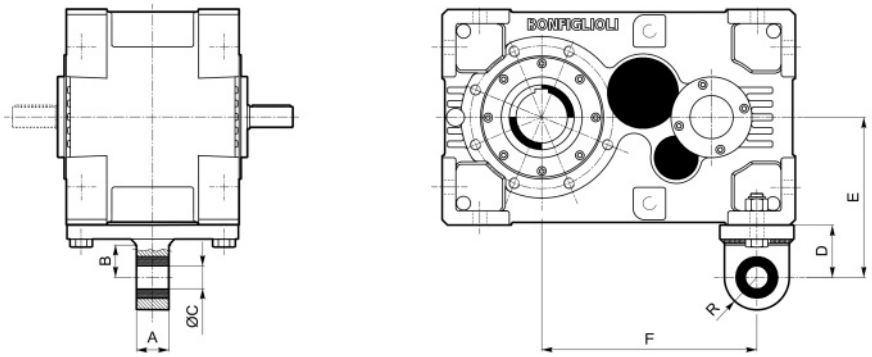
	LR	DR	LD	DD	LL	DL
LP	VP GR	VP GR	VP GR GL	VP GR GL	AD	AD
H	VP GR	⛔	VP GR GL	⛔	AD	⛔
S	VP GR	⛔	VP GR GL	⛔	AD	⛔

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

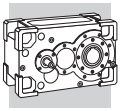
⛔ DW	HDP 60	HDP 70	HDP 80	HDP 90
i =	17.3 19.4 43.7 49.1 87.6 98.4	19.4 22.6 49.1 57.0 98.5 114.4	-	20.4 22.4 65.8 73.3 98.9 110.1

2.5.8 FIXING ELEMENTS

For shaft-mounted installations, a torque arm from fabricated steel is provided, complete with vibration dampening rubber bushing. Specify the **TA** option.



	A	B	C	D	E	F	R
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



2.5.9 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

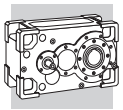
The document entails checking on order compliance, the visual inspection of external conditions and of mating dimensions. Checking on main functional parameters in unloaded conditions is also performed along with oil seal proofing, both in static and in running conditions.
Units inspected are sampled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



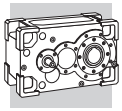
3 GEARBOX RATING CHARTS

3.1 HDP 60

i	n_1 = 1400 min^{-1}			n_1 = 1100 min^{-1}			n_1 = 900 min^{-1}			n_1 = 500 min^{-1}		
	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]
HDP 602_ 7.1	4200	90	3200	4500	76	3510	4600	63	4490	4650	35	4510
HDP 602_ 8.0	4200	80	4510	4200	63	4510	4200	51	4510	4300	29	4510
HDP 602_ 9.0	4500	77	-	4600	62	2100	4600	50	3590	4650	28	4510
HDP 602_ 10.1	4200	64	4290	4250	51	4510	4250	41	4510	4300	23	4510
HDP 602_ 11.2	4600	63	3280	4600	49	4510	4650	41	4510	4650	23	4510
HDP 602_ 12.5	4250	52	4510	4300	41	4510	4300	34	4510	4300	18.7	4510
HDP 602_ 13.5	4600	52	4510	4650	41	4510	4650	34	4510	4650	18.7	4510
HDP 602_ 15.2	4300	43	4510	4300	34	4510	4300	28	4510	4300	15.4	4510
HDP 602_ 17.3	4650	41	1680	4650	32	2950	4650	26	2950	4650	14.7	2950
HDP 602_ 19.4	4300	34	2950	4300	27	2950	4300	22	2950	4300	12.1	2950
HDP 603_ 22.7	4350	30	2880	4650	25	3050	4650	21	3050	4650	11.4	3050
HDP 603_ 25.5	4300	26	3050	4300	21	3050	4300	16.9	3050	4300	9.4	3050
HDP 603_ 28.2	4650	26	3050	4650	20	3050	4650	16.5	3050	4650	9.2	3050
HDP 603_ 31.7	4300	21	3050	4300	16.6	3050	4300	13.6	3050	4300	7.5	3050
HDP 603_ 34.2	4650	21	3050	4650	16.6	3050	4650	13.6	3050	4650	7.6	3050
HDP 603_ 38.5	4300	17.4	3050	4300	13.7	3050	4300	11.2	3050	4300	6.2	3050
HDP 603_ 43.7	4650	16.6	3050	4650	13.0	3050	4650	10.7	3050	4650	5.9	3050
HDP 603_ 49.1	4300	13.6	3050	4300	10.7	3050	4300	8.8	3050	4300	4.9	3050
HDP 603_ 56.6	4650	12.8	2130	4650	10.1	2130	4650	8.2	2130	4650	4.6	2130
HDP 603_ 63.6	4300	10.5	2130	4300	8.3	2130	4300	6.8	2130	4300	3.8	2130
HDP 603_ 68.6	4650	10.6	2130	4650	8.3	2130	4650	6.8	2130	4650	3.8	2130
HDP 603_ 77.1	4300	8.7	2130	4300	6.8	2130	4300	5.6	2130	4300	3.1	2130
HDP 603_ 87.6	4650	8.3	2130	4650	6.5	2130	4650	5.3	2130	4650	3.0	2130
HDP 603_ 98.4	4300	6.8	2130	4300	5.3	2130	4300	4.4	2130	4300	2.4	2130

3.2 HDP 70

i	n_1 = 1400 min^{-1}			n_1 = 1100 min^{-1}			n_1 = 900 min^{-1}			n_1 = 500 min^{-1}		
	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]
HDP 702_ 8.0	5450	103	3470	5850	87	3760	6200	76	4040	6200	42	4510
HDP 702_ 9.3	5650	92	4510	6050	78	4510	6250	66	4510	6350	37	4510
HDP 702_ 10.1	5850	89	-	6300	75	-	6550	64	1300	6550	35	4510
HDP 702_ 11.7	6050	79	3470	6250	64	4510	6300	53	4510	6350	30	4510
HDP 702_ 12.6	6300	77	2190	6550	63	3240	6550	51	4510	6550	28	4510
HDP 702_ 14.6	6250	65	4510	6300	52	4510	6350	43	4510	6350	24	4510
HDP 702_ 15.2	6500	65	3380	6550	52	4510	6550	42	4510	6550	23	4510
HDP 702_ 17.7	6300	54	4510	6350	43	4510	6350	35	4510	6350	19.6	4510
HDP 702_ 19.4	6550	51	1730	6550	40	2950	6550	33	2950	6550	18.4	2950
HDP 702_ 22.6	6350	43	2950	6350	34	2950	6350	28	2950	6350	15.3	2950
HDP 703_ 25.5	6550	40	1790	6550	31	2800	6550	26	3050	6550	14.3	3050
HDP 703_ 29.6	6350	33	3050	6350	26	3050	6350	21	3050	6350	11.9	3050
HDP 703_ 31.7	6400	31	2500	6550	25	3050	6550	21	3050	6550	11.5	3050
HDP 703_ 36.9	6350	27	3050	6350	21	3050	6350	17.3	3050	6350	9.6	3050
HDP 703_ 38.5	6550	26	3050	6550	21	3050	6550	17.0	3050	6550	9.5	3050
HDP 703_ 44.7	6350	22	3050	6350	17.4	3050	6350	14.2	3050	6350	7.9	3050
HDP 703_ 49.1	6550	21	3050	6550	16.3	3050	6550	13.3	3050	6550	7.4	3050
HDP 703_ 57.0	6350	17.3	3050	6350	13.6	3050	6350	11.1	3050	6350	6.2	3050
HDP 703_ 63.7	6500	15.9	2130	6550	12.6	2130	6550	10.3	2130	6550	5.7	2130
HDP 703_ 73.9	6350	13.4	2130	6350	10.5	2130	6350	8.6	2130	6350	4.8	2130
HDP 703_ 77.2	6550	13.2	2130	6550	10.4	2130	6550	8.5	2130	6550	4.7	2130
HDP 703_ 89.6	6350	11.0	2130	6350	8.7	2130	6350	7.1	2130	6350	3.9	2130
HDP 703_ 98.5	6550	10.4	2130	6550	8.1	2130	6550	6.7	2130	6550	3.7	2130
HDP 703_ 114.4	6350	8.6	2130	6350	6.8	2130	6350	5.6	2130	6350	3.1	2130



3.3 HDP 80

i	n_1 = 1400 min^{-1}			n_1 = 1100 min^{-1}			n_1 = 900 min^{-1}			n_1 = 500 min^{-1}		
	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]
HDP 802_ 8.1	9500	180	3980	10250	152	4160	10350	126.0	4960	10350	70	4960
HDP 802_ 9.4	9850	161	4960	10550	135	4960	11250	117.9	4960	11450	67	4960
HDP 802_ 9.8	10150	157	3220	10950	133	3430	11350	113.1	4490	11350	63	4960
HDP 802_ 11.4	10550	141	4960	11300	119	4960	11350	97.5	4960	11450	55	4960
HDP 802_ 12.6	11050	134	2500	11450	109	4160	11500	89.6	4960	11500	50	4960
HDP 802_ 14.6	11300	118	4960	11400	93	4960	11450	76.8	4960	11450	43	4960
HDP 802_ 15.5	11450	113	4640	11500	89	5530	11500	72.9	5530	11500	40	5530
HDP 802_ 18.0	11350	96	5530	11450	76	5530	11450	62.5	5530	11450	35	5530
HDP 802_ 19.4	11500	90	5530	11500	71	5530	11500	58.0	5530	11500	32	5530
HDP 802_ 22.6	11450	77	5530	11450	61	5530	11450	49.8	5530	11450	28	5530
HDP 803_ 25.8	9900	60	3420	9900	47	4810	9900	38.4	5830	9900	21	5830
HDP 803_ 30.0	11450	60	3480	11450	47	4870	11450	38.3	5830	11450	21	5830
HDP 803_ 31.7	11000	54	4860	11500	44	5590	11500	36.3	5830	11500	20	5830
HDP 803_ 36.8	11450	48	5830	11450	38	5830	11450	31.1	5830	11450	17.3	5830
HDP 803_ 39.8	11500	45	5830	11500	35	5830	11500	28.9	5830	11500	16.1	5830
HDP 803_ 46.2	11450	39	5830	11450	30	5830	11450	24.8	5830	11450	13.8	5830
HDP 803_ 51.6	11500	35	4060	11500	27	5310	11500	22.3	6360	11500	12.4	6400
HDP 803_ 59.9	11450	30	5770	11450	23	6400	11450	19.1	6400	11450	10.6	6400
HDP 803_ 64.8	11500	28	6400	11500	22	6400	11500	17.8	6400	11500	9.9	6400
HDP 803_ 75.2	11450	24	6400	11450	18.6	6400	11450	15.2	6400	11450	8.5	6400
HDP 803_ 76.4	11500	23	1200	11500	18.4	1690	11500	15.1	2130	11500	8.4	3030
HDP 803_ 88.7	11450	20	1970	11450	15.8	2460	11450	12.9	2890	11450	7.2	3030
HDP 803_ 95.9	11500	18.7	2290	11500	14.7	2780	11500	12.0	3030	11500	6.7	3030
HDP 803_ 111.4	11450	16.0	2900	11450	12.6	3030	11450	10.3	3030	11450	5.7	3030

3.4 HDP 90

i	n_1 = 1400 min^{-1}			n_1 = 1100 min^{-1}			n_1 = 900 min^{-1}			n_1 = 500 min^{-1}		
	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]	Mn_2 [Nm]	Pn_1 [kW]	Rn_1 [N]
HDP 902_ 7.9	12500	241	4210	13450	206	4590	14000	173	5770	14000	96	6340
HDP 902_ 8.8	13100	227	6340	14050	191	6340	14950	166	6340	15250	94	6340
HDP 902_ 10.1	13550	206	4160	14600	174	4390	15500	151	4650	16550	90	6340
HDP 902_ 11.2	14200	194	6340	15050	161	6340	15150	133	6340	15250	74	6340
HDP 902_ 12.2	14350	179	5940	15450	152	6320	16400	132	6340	16550	74	6340
HDP 902_ 13.6	15050	169	6340	15150	134	6340	15250	110	6340	15250	61	6340
HDP 902_ 15.8	15350	148	5940	16500	125	6340	16550	103	6340	16550	57	6340
HDP 902_ 17.6	15150	131	6340	15250	104	6340	15250	85	6340	15250	47	6340
HDP 902_ 20.1	16450	125	6340	16550	99	6340	16550	81	6340	16550	45	6340
HDP 902_ 22.4	15250	104	6340	15250	82	6340	15250	67	6340	15250	37	6340
HDP 903_ 25.4	15600	96	6110	16550	80	6110	16550	65	6110	16550	36	6110
HDP 903_ 28.3	15250	84	6110	15250	66	6110	15250	54	6110	15250	30	6110
HDP 903_ 32.9	16550	78	6110	16550	62	6110	16550	50	6110	16550	28.0	6110
HDP 903_ 36.6	15250	65	6110	15250	51	6110	15250	42	6110	15250	23.2	6110
HDP 903_ 40.0	16150	63	2370	16550	51	3470	16550	41	4750	16550	23.0	6110
HDP 903_ 44.6	15250	53	4920	15250	42	6110	15250	34	6110	15250	19.0	6110
HDP 903_ 51.8	16550	50	5720	16550	39	6110	16550	32	6110	16550	17.8	6110
HDP 903_ 57.7	15250	41	6110	15250	32	6110	15250	26.5	6110	15250	14.7	6110
HDP 903_ 65.8	16550	39	6110	16550	31	6110	16550	25.2	6110	16550	14.0	6110
HDP 903_ 73.3	15250	32	6110	15250	26	6110	15250	20.8	6110	15250	11.6	6110
HDP 903_ 77.8	16550	33	2050	16550	26	3390	16550	21.3	3680	16550	11.8	3680
HDP 903_ 86.6	15250	27	3680	15250	22	3680	15250	17.6	3680	15250	9.8	3680
HDP 903_ 98.9	16550	26	3680	16550	21	3680	16550	16.8	3680	16550	9.3	3680
HDP 903_ 110.1	15250	22	3680	15250	17.0	3680	15250	13.9	3680	15250	7.7	3680

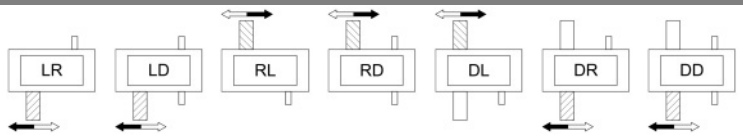
3.5 PERMITTED OVERHUNG LOADS ON OUTPUT SHAFT

3.5.1 HDP 60

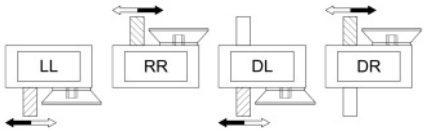
h : expected lifetime [hours] for bearing of the output shaft

Rn_2 [kN]

input = VP,GL,GR



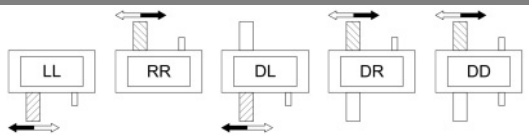
input = AD



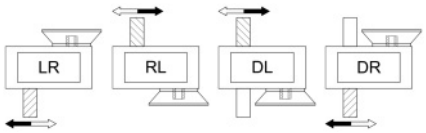
n_2 x h	M_2 = 4300 Nm		M_2 = 3400 Nm		M_2 = 2850 Nm		M_2 = 2150 Nm	
250 000 ⇨	34.4	35.0	35.0		35.0		35.0	
250 000 ←	32.0	35.0	34.1	35.0	35.0		35.0	
500 000 ⇨	25.0	29.9	28.1	32.0	29.1	32.9	30.2	34.1
500 000 ←	24.2	28.0	26.2	30.1	27.5	31.3	29.0	32.9
750 000 ⇨	19.9	24.4	23.9	27.6	25.2	28.6	26.4	29.8
750 000 ←	20.3	23.7	22.3	25.7	23.6	27.0	25.1	28.5
1 000 000 ⇨	16.5	20.8	20.7	24.7	22.7	25.8	23.9	27.0
1 000 000 ←	17.8	20.9	19.8	23.0	21.1	24.2	22.7	25.8
1 250 000 ⇨	14.0	18.1	18.4	22.2	20.8	23.8	22.1	25.0
1 250 000 ←	15.1	19.0	18.1	21.0	19.3	22.2	20.9	23.8
2 500 000 ⇨		10.5	11.9	15.1	14.5	17.6	17.2	19.6
2 500 000 ←		11.2	12.8	15.6	14.5	16.8	16.0	18.4
3 750 000 ⇨			8.4	11.4	11.3	14.1	14.5	17.0
3 750 000 ←			9.0	12.4	12.1	14.2	13.6	15.7
5 000 000 ⇨				9.0	9.2	11.9	12.5	15.0
5 000 000 ←				9.6	9.9	12.5	12.1	14.0

Rn_2 [kN]

input = VP,GL,GR



input = AD



n_2 x h	M_2 = 4300 Nm		M_2 = 3400 Nm		M_2 = 2850 Nm		M_2 = 2150 Nm	
250 000 ⇨	27.6	32.3	30.6	35.0	32.4	35.0	34.7	35.0
250 000 ←	25.1	29.9	28.6	33.3	30.7	35.0	33.4	35.0
500 000 ⇨	19.8	23.6	22.7	26.6	24.5	28.4	26.8	30.7
500 000 ←	17.3	21.1	20.8	24.6	22.9	26.7	25.6	29.4
750 000 ⇨	15.9	19.3	18.8	22.2	20.6	24.0	22.9	26.3
750 000 ←	13.4	16.8	16.9	20.3	19.0	22.4	21.7	25.1
1 000 000 ⇨	13.4	16.5	16.4	19.5	18.2	21.3	20.5	23.6
1 000 000 ←	10.9	14.0	14.4	17.5	16.5	19.7	19.2	22.3
1 250 000 ⇨	11.6	14.5	14.6	17.5	16.4	19.3	18.7	21.6
1 250 000 ←	9.1	12.1	12.6	15.5	14.7	17.7	17.4	20.4
2 500 000 ⇨		9.1	9.7	12.1	11.5	13.9	13.8	16.2
2 500 000 ←		6.7	7.8	10.1	9.9	12.3	12.6	15.0
3 750 000 ⇨			7.3	9.4	9.1	11.2	11.4	13.5
3 750 000 ←			5.4	7.5	7.5	9.6	10.2	12.3
5 000 000 ⇨				7.7	7.6	9.5	9.9	11.8
5 000 000 ←				5.8	6.0	7.9	8.7	10.6

Shaft the rated overhung load is applicable to. For double extended shaft the load is only applicable to the extension highlighted. Should this not be the case consult Bonfiglioli's Technical Service.

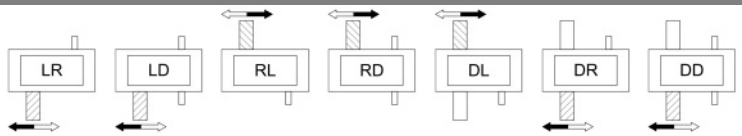
Rated overhung loads relevant to reinforced bearings type HDB.

3.5.2 HDP 70

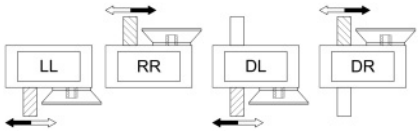
h : expected lifetime [hours] for bearing of the output shaft

Rn_2 [kN]

input = VP,GL,GR



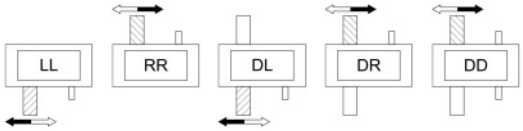
input = AD



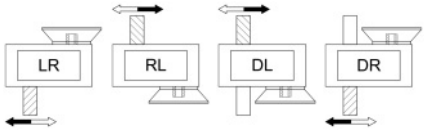
n_2 x h		M_2 = 6350 Nm		M_2 = 5050 Nm		M_2 = 4200 Nm		M_2 = 3150 Nm	
250 000	⇨	35.2	40.0	37.2	40.0	38.1	40.0	39.2	40.0
	⇦	32.8	40.0	34.8	40.0	36.1	40.0	37.8	40.0
500 000	⇨	25.1	34.5	28.9	37.0	30.1	37.9	31.2	39.0
	⇦	24.8	32.7	26.8	34.7	28.1	36.0	29.7	37.6
750 000	⇨	20.0	28.5	23.9	32.1	26.1	33.1	27.2	34.2
	⇦	20.8	27.9	22.8	29.8	24.2	31.1	25.8	32.7
1 000 000	⇨	16.5	24.6	20.7	28.3	23.2	30.0	24.7	31.1
	⇦	17.8	24.8	20.3	26.7	21.6	28.0	23.2	29.6
1 250 000	⇨	13.0	21.8	18.4	25.5	20.9	27.7	22.9	28.8
	⇦	15.1	22.5	18.4	24.5	19.8	25.8	21.4	27.4
2 500 000	⇨		12.7	11.2	18.0	14.6	20.5	17.7	22.8
	⇦		14.7	12.6	18.5	14.8	19.7	16.5	21.3
3 750 000	⇨				14.1	11.4	16.7	14.6	19.7
	⇦		10.0		15.1	12.2	16.7	14.0	18.3
5 000 000	⇨				11.0		14.3	12.7	17.3
	⇦				12.3		14.8	12.4	16.4

Rn_2 [kN]

input = VP,GL,GR



input = AD



n_2 x h		M_2 = 6350 Nm		M_2 = 5050 Nm		M_2 = 4200 Nm		M_2 = 3150 Nm	
250 000	⇨	26.0	35.7	29.4	39.1	31.6	40.0	34.4	40.0
	⇦	23.1	32.8	27.1	36.8	29.7	39.4	33.0	40.0
500 000	⇨	18.0	25.9	21.4	29.3	23.6	31.5	26.4	34.2
	⇦	15.1	23.0	19.1	27.0	21.7	29.6	25.0	32.8
750 000	⇨	14.0	21.0	17.4	24.4	19.7	26.6	22.4	29.3
	⇦	11.1	18.1	15.1	22.1	17.7	24.7	21.0	27.9
1 000 000	⇨	11.4	17.9	14.9	21.3	17.1	23.5	19.9	26.2
	⇦		15.0	12.6	19.0	15.2	21.6	18.4	24.8
1 250 000	⇨		15.7	13.0	19.1	15.3	21.3	18.0	24.0
	⇦		12.8	10.7	16.8	13.4	19.4	16.6	22.6
2 500 000	⇨		9.7		13.0	10.3	15.2	13.1	18.0
	⇦		6.7		10.7		13.3	11.7	16.5
3 750 000	⇨				10.0		12.2	10.6	15.0
	⇦				7.7		10.3		13.5
5 000 000	⇨				8.1		10.3		13.0
	⇦				5.8		8.4		11.6

Shaft the rated overhung load is applicable to. For double extended shaft the load is only applicable to the extension highlighted. Should this not be the case consult Bonfiglioli's Technical Service.

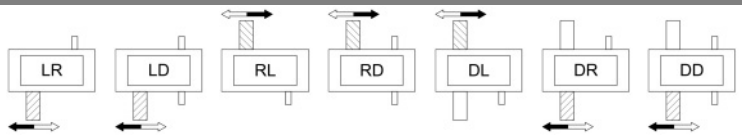
Rated overhung loads relevant to reinforced bearings type HDB.

3.5.3 HDP 80

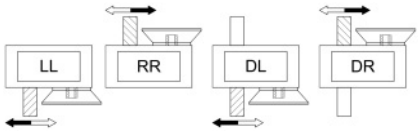
h : expected lifetime [hours] for bearing of the output shaft

Rn_2 [kN]

input = VP,GL,GR



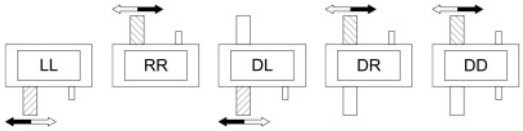
input = AD



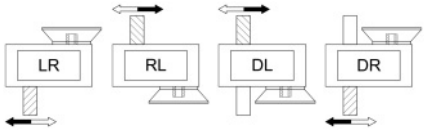
n_2 x h		M_2 = 11450 Nm		M_2 = 9150 Nm		M_2 = 7600 Nm		M_2 = 5700 Nm	
250 000	⇨	39.3	46.0	43.7	46.0	45.3	46.0	47.2	46.0
	⇦	37.1	46.0	40.3	46.0	42.4	46.0	45.1	46.0
500 000	⇨	26.0	41.7	32.3	46.0	35.3	46.0	37.2	46.0
	⇦	27.1	39.9	30.3	43.1	32.5	45.2	35.1	46.0
750 000	⇨	16.7	33.5	25.8	39.3	29.8	41.6	32.3	43.5
	⇦	20.0	33.5	25.4	36.7	27.5	38.8	30.2	41.4
1 000 000	⇨	10.4	28.1	21.5	34.2	25.8	37.6	29.1	39.5
	⇦	14.8	29.4	22.2	32.6	24.4	34.7	27.0	37.3
1 250 000	⇨		24.2	17.8	30.5	22.8	34.3	26.9	36.5
	⇦		25.7	19.5	29.7	22.1	31.8	24.8	34.4
2 500 000	⇨		10.1		20.0	13.5	24.3	19.7	28.6
	⇦		13.0		21.3	15.2	23.9	18.6	26.5
3 750 000	⇨				13.8		19.1	15.7	24.1
	⇦				15.3		19.9	15.6	22.5
5 000 000	⇨				9.0		15.8	13.1	21.0
	⇦				11.2		16.8	13.6	20.0

Rn_2 [kN]

input = VP,GL,GR



input = AD



n_2 x h		M_2 = 11450 Nm		M_2 = 9150 Nm		M_2 = 7600 Nm		M_2 = 5700 Nm	
250 000	⇨	27.5	43.6	32.6	46.0	36.1	46.0	40.3	46.0
	⇦	23.3	39.4	29.2	45.2	33.3	46.0	38.2	46.0
500 000	⇨	17.5	30.7	22.7	35.7	26.1	39.1	30.3	43.2
	⇦	13.3	26.5	19.3	32.4	23.3	36.3	28.2	41.1
750 000	⇨	12.6	24.3	17.7	29.3	21.2	32.7	25.4	36.8
	⇦	8.4	20.1	14.4	26.0	18.3	29.9	23.3	34.7
1 000 000	⇨		20.2	14.5	25.3	18.0	28.6	22.2	32.8
	⇦		16.1	11.2	21.9	15.2	25.8	20.2	30.7
1 250 000	⇨		17.3	12.3	22.3	15.7	25.7	20.0	29.8
	⇦		13.1	9.0	19.0	13.0	22.9	17.9	27.7
2 500 000	⇨		9.4		14.4		17.8	13.8	21.9
	⇦		5.2		11.0		15.0	11.8	19.8
3 750 000	⇨				10.4		13.8		18.0
	⇦				7.1		11.0		15.9
5 000 000	⇨						11.3		15.4
	⇦						8.5		13.4

Shaft the rated overhung load is applicable to. For double extended shaft the load is only applicable to the extension highlighted. Should this not be the case consult Bonfiglioli's Technical Service.

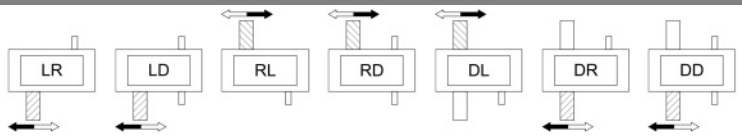
Rated overhung loads relevant to reinforced bearings type HDB.

3.5.4 HDP 90

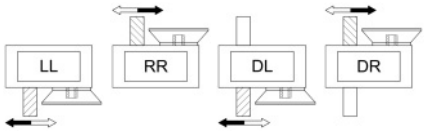
h : expected lifetime [hours] for bearing of the output shaft

Rn_2 [kN]

input = VP,GL,GR



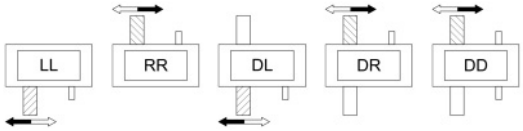
input = AD



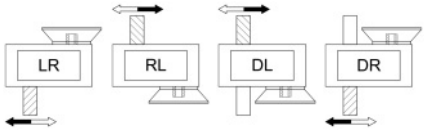
n_2 x h		M_2 = 15250 Nm		M_2 = 12200 Nm		M_2 = 10150 Nm		M_2 = 7600 Nm	
250 000	⇨	49.1	62.0	56.9	62.0	61.5	62.0	63.7	
	⇦	50.3	62.0	54.4	62.0	57.1	62.0	60.4	62.0
500 000	⇨	31.9	52.0	40.4	60.7	45.7	62.0	50.5	62.0
	⇦	34.9	53.4	41.1	57.9	43.8	60.8	47.2	62.0
750 000	⇨	23.0	40.7	32.0	49.9	37.5	55.5	43.9	59.3
	⇦	25.0	44.3	34.5	49.2	37.3	52.2	40.6	55.9
1 000 000	⇨	17.0	33.3	26.5	42.8	32.1	48.6	38.7	53.8
	⇦	18.3	36.2	28.9	43.7	33.1	46.6	36.4	50.3
1 250 000	⇨		27.9	22.4	37.6	28.3	43.7	35.0	49.8
	⇦		30.2	24.4	39.6	30.1	42.7	33.4	46.4
2 500 000	⇨		11.9		23.3	17.5	29.8	24.7	37.2
	⇦		12.1		25.2	19.0	31.9	25.2	35.6
3 750 000	⇨				15.6		22.8	19.5	30.6
	⇦				16.7		24.7	21.2	30.2
5 000 000	⇨						18.1	16.1	26.2
	⇦						19.6	17.6	26.8

Rn_2 [kN]

input = VP,GL,GR



input = AD



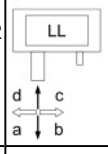
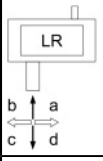
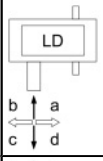
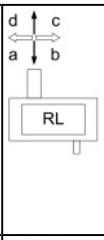
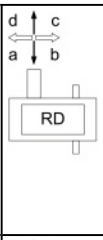
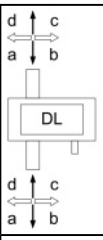
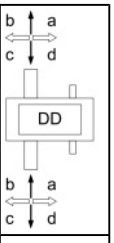
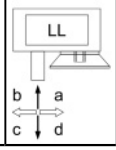
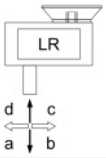
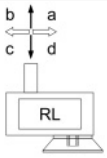
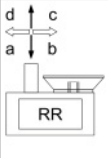
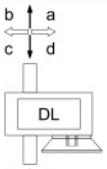
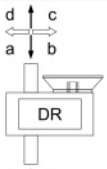
n_2 x h		M_2 = 15250 Nm		M_2 = 12200 Nm		M_2 = 10150 Nm		M_2 = 7600 Nm	
250 000	⇨	40.7	62.0	46.7	62.0	50.7	62.0	55.7	62.0
	⇦	33.0	54.4	40.5	62.0	45.6	62.0	51.8	62.0
500 000	⇨	27.5	44.5	33.5	50.8	37.5	54.9	42.4	60.2
	⇦	19.7	37.0	27.3	44.7	32.3	49.9	38.6	56.4
750 000	⇨	20.9	35.8	26.9	42.1	30.9	46.3	35.9	51.5
	⇦	13.1	28.3	20.7	36.0	25.7	41.3	32.0	47.7
1 000 000	⇨	16.4	30.3	22.7	36.5	26.7	40.7	31.7	45.9
	⇦	8.9	22.7	16.5	30.5	21.5	35.7	27.8	42.2
1 250 000	⇨		26.3	19.7	32.5	23.7	36.8	28.7	41.9
	⇦		18.7	13.5	26.5	18.5	33.3	24.8	38.2
2 500 000	⇨				21.7	15.5	25.9	20.5	31.2
	⇦				15.7	10.3	20.9	16.6	27.4
3 750 000	⇨				14.8		20.6	16.4	25.8
	⇦				10.3		15.5	12.6	22.0
5 000 000	⇨						17.1		22.4
	⇦						12.1		18.6

Shaft the rated overhung load is applicable to. For double extended shaft the load is only applicable to the extension highlighted. Should this not be the case consult Bonfiglioli's Technical Service.

Rated overhung loads relevant to reinforced bearings type HDB.

3.6 PERMITTED THRUST LOAD ON OUTPUT SHAFT

3.6.1 HDP 60

input = VP, GL, GR									
input = AD									

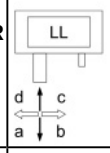
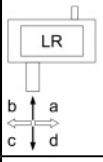
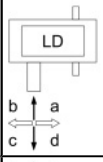
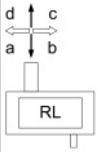
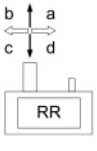
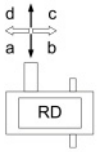
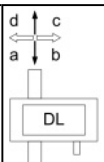
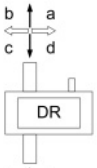
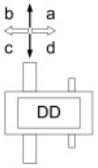
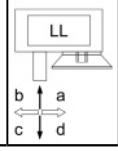
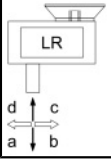
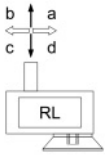
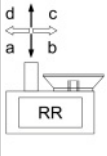
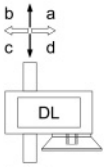
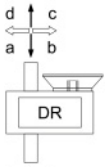
direction of rotation of output shaft

direction of application of axial force

An_2 [kN]									
n_2 x h		M_2 = 4300 Nm		M_2 = 3400 Nm		M_2 = 2850 Nm		M_2 = 2150 Nm	
250 000	a	17.5		17.5		17.5		17.5	
	b	17.5		17.5		17.5		17.5	
	c	17.5		17.5		17.5		17.5	
	d	17.5		17.5		17.5		17.5	
500 000	a	17.5		17.5		17.5		17.5	
	b	17.5		17.5		17.5		17.5	
	c	17.5		17.5		17.5		17.5	
	d	17.5		17.5		17.5		17.5	
750 000	a	16.5	17.5	17.5		17.5		17.5	
	b	17.5		17.5		17.5		17.5	
	c	15.7	17.5	17.5		17.5		17.5	
	d	17.5		17.5		17.5		17.5	
1 000 000	a	13.4	17.3	17.5		17.5		17.5	
	b	17.5		17.5		17.5		17.5	
	c	12.6	16.6	17.3		17.5		17.5	
	d	17.5		17.5		17.5		17.5	
1 250 000	a	11.1	14.8	15.6	17.5	17.5		17.5	
	b	17.5		17.5		17.5		17.5	
	c	10.3	14.0	15.0	17.5	17.5		17.5	
	d	17.5		17.5		17.5		17.5	
2 500 000	a	4.9	7.9	9.5	12.5	12.2	15.3	15.8	17.5
	b	17.5		17.5		17.5		17.5	
	c	4.1	7.1	8.8	11.9	11.7	14.7	15.4	17.5
	d	17.5		17.5		17.5		17.5	
3 750 000	a		4.5	6.4	9.1	9.2	11.9	12.7	15.4
	b	17.5		17.5		17.5		17.5	
	c		3.7	5.8	8.4	8.7	11.3	12.3	15.0
	d	17.5		17.5		17.5		17.5	
5 000 000	a			4.4	6.9	7.2	9.7	10.8	13.2
	b		17.5	17.5		17.5		17.5	
	c			3.8	6.3	6.7	9.2	10.4	12.8
	d		17.5	16.8	17.5	17.5		17.5	

Rated thrust loads relevant to reinforced bearings type HDB.

3.6.2 HDP 70

input = VP, GL, GR									
input = AD									

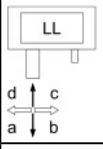
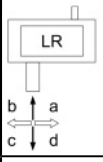
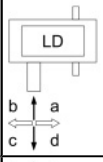
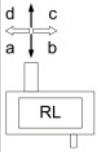
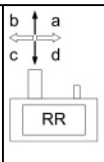
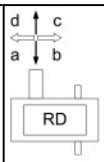
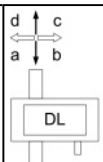
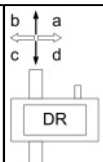
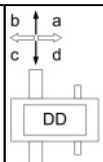
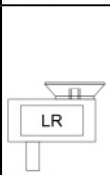
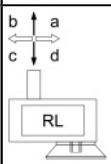
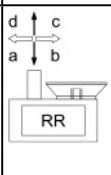
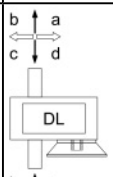
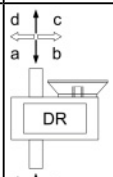
⇦⇨ direction of rotation of output shaft

⇅ direction of application of axial force

An_2 [kN]									
n_2 x h	⇕	M_2 = 6350 Nm		M_2 = 5050 Nm		M_2 = 4200 Nm		M_2 = 3150 Nm	
250 000	a	25.0		25.0		25.0		25.0	
	b	25.0		25.0		25.0		25.0	
	c	25.0		25.0		25.0		25.0	
	d	25.0		25.0		25.0		25.0	
500 000	a	25.0		25.0		25.0		25.0	
	b	25.0		25.0		25.0		25.0	
	c	25.0		25.0		25.0		25.0	
	d	25.0		25.0		25.0		25.0	
750 000	a	20.6	25.0	25.0		25.0		25.0	
	b	25.0		25.0		25.0		25.0	
	c	19.3	25.0	25.0		25.0		25.0	
	d	25.0		25.0		25.0		25.0	
1 000 000	a	16.6	25.0	22.1	25.0	25.0		25.0	
	b	25.0		25.0		25.0		25.0	
	c	15.4	24.9	21.2	25.0	24.9	25.0	25.0	
	d	25.0		25.0		25.0		25.0	
1 250 000	a	13.8	22.7	19.3	25.0	22.9	25.0	25.0	
	b	25.0		25.0		25.0		25.0	
	c	12.6	21.5	18.3	25.0	22.1	25.0	25.0	
	d	25.0		25.0		25.0		25.0	
2 500 000	a	6.2	13.5	11.7	18.9	15.3	22.4	19.7	25.0
	b	24.0	25.0	25.0		25.0		25.0	
	c	4.9	12.3	10.7	17.9	14.5	21.6	19.1	25.0
	d	22.3	25.0	24.5	25.0	25.0		25.0	
3 750 000	a		8.9	7.9	14.3	11.5	17.8	15.9	22.2
	b		25.0	22.1	25.0	23.3	25.0	24.8	25.0
	c		7.7	6.9	13.4	10.7	17.0	15.3	21.6
	d		25.0	20.7	25.0	22.2	25.0	23.9	25.0
5 000 000	a		6.0	5.5	11.4	9.1	14.9	13.5	19.3
	b		23.9	19.6	25.0	20.8	25.0	22.3	25.0
	c		4.8	4.5	10.4	8.2	14.1	12.9	18.7
	d		22.2	18.3	24.3	19.7	25.0	21.5	25.0

Rated thrust loads relevant to reinforced bearings type HDB.

3.6.3 HDP 80

input = VP, GL, GR									
input = AD									

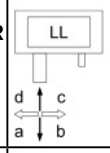
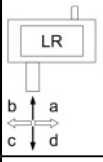
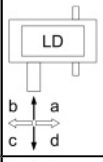
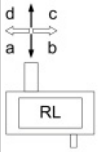
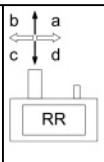
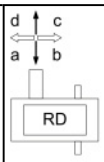
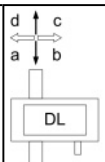
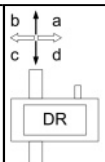
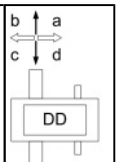
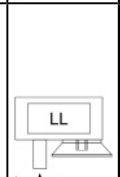
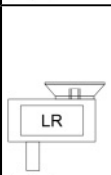
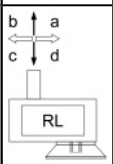
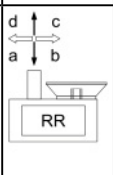
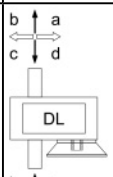
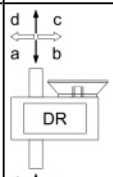
⇦⇨ direction of rotation of output shaft

⇅ direction of application of axial force

An_2 [kN]									
n_2 x h		M_2 = 11450 Nm		M_2 = 9150 Nm		M_2 = 7600 Nm		M_2 = 5700 Nm	
250 000	a	30.0		30.0		30.0		30.0	
	b	30.0		30.0		30.0		30.0	
	c	30.0		30.0		30.0		30.0	
	d	30.0		30.0		30.0		30.0	
500 000	a	25.3	30.0	30.0		30.0		30.0	
	b	30.0		30.0		30.0		30.0	
	c	23.5	30.0	30.0		30.0		30.0	
	d	30.0		30.0		30.0		30.0	
750 000	a	17.7	30.0	26.0	30.0	30.0		30.0	
	b	30.0		30.0		30.0		30.0	
	c	15.8	30.0	24.5	30.0	30.0		30.0	
	d	30.0		30.0		30.0		30.0	
1 000 000	a	12.7	26.8	21.1	30.0	26.8	30.0	30.0	
	b	30.0		30.0		30.0		30.0	
	c	10.9	25.1	19.6	30.0	25.5	30.0	30.0	
	d	30.0		30.0		30.0		30.0	
1 250 000	a	9.2	22.5	17.6	30.0	23.2	30.0	30.0	
	b	30.0		30.0		30.0		30.0	
	c	7.3	20.8	16.1	29.2	22.0	30.0	29.2	30.0
	d	30.0		30.0		30.0		30.0	
2 500 000	a		10.8	8.0	18.8	13.7	24.2	20.6	30.0
	b		30.0	29.6	30.0	30.0		30.0	
	c		9.1	6.5	17.5	12.4	23.1	19.7	29.9
	d		30.0	27.7	30.0	30.0		30.0	
3 750 000	a				13.0	8.9	18.4	15.8	25.0
	b		30.0		30.0	26.8	30.0	29.3	30.0
	c				11.6	7.7	17.3	14.9	24.2
	d		29.9		30.0	25.3	30.0	28.1	30.0
5 000 000	a				9.3	5.9	14.7	12.8	21.3
	b				30.0	23.8	30.0	26.2	30.0
	c				7.9	4.7	13.6	11.9	20.4
	d				29.1	22.2	30.0	25.1	30.0

Rated thrust loads relevant to reinforced bearings type HDB.

3.6.4 HDP 90

input = VP, GL, GR									
input = AD									

⇦⇨ direction of rotation of output shaft

⇅ direction of application of axial force

An_2 [kN]									
n_2 x h	⇕	M_2 = 15250 Nm		M_2 = 12200 Nm		M_2 = 10150 Nm		M_2 = 7600 Nm	
250 000	a	37.5		37.5		37.5		37.5	
	b	37.5		37.5		37.5		37.5	
	c	37.5		37.5		37.5		37.5	
	d	37.5		37.5		37.5		37.5	
500 000	a	34.1	37.5	37.5		37.5		37.5	
	b	37.5		37.5		37.5		37.5	
	c	32.2	37.5	37.5		37.5		37.5	
	d	37.5		37.5		37.5		37.5	
750 000	a	23.6	37.3	35.1	37.5	37.5		37.5	
	b	37.5		37.5		37.5		37.5	
	c	21.7	35.5	33.5	37.5	37.5		37.5	
	d	37.5		37.5		37.5		37.5	
1 000 000	a	16.9	29.8	28.4	37.5	36.1	37.5	37.5	
	b	37.5		37.5		37.5		37.5	
	c	15.0	28.0	26.8	37.5	34.8	37.5	37.5	
	d	37.5		37.5		37.5		37.5	
1 250 000	a	12.1	24.3	23.6	35.2	31.3	37.5	37.5	
	b	37.5		37.5		37.5		37.5	
	c	10.2	22.5	22.0	33.7	30.0	37.5	37.5	
	d	37.5		37.5		37.5		37.5	
2 500 000	a		9.5	10.5	20.4	18.2	27.7	27.8	36.8
	b		37.5	37.5		37.5		37.5	
	c		7.8	9.0	19.0	16.9	26.5	26.9	35.9
	d		37.5	37.5		37.5		37.5	
3 750 000	a			4.1	13.1	11.8	20.4	21.4	29.4
	b		37.5	36.0	37.5	37.5		37.5	
	c			2.5	11.6	10.5	19.2	20.4	28.6
	d		37.5	33.5	37.5	36.3	37.5	37.5	
5 000 000	a				8.4	7.6	15.7	17.2	24.8
	b				37.5	34.2	37.5	37.1	37.5
	c				7.0	6.3	14.5	16.3	23.9
	d				37.5	32.1	37.5	35.6	37.5

Rated thrust loads relevant to reinforced bearings type HDB.

3.7 MASS MOMENT OF INERTIA

Moments of inertia are relevant to gear unit's input shaft and to product configuration correspondent to the combination: LP-LR with single-sided input shaft.

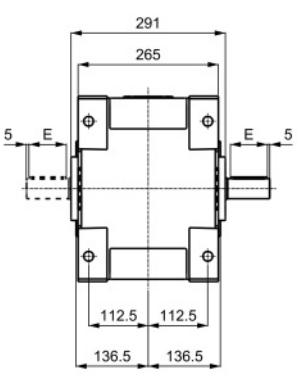
i_N	$J \cdot 10^{-4}$ [Kg m^2]			
	HDP 60	**HDP 70**	**HDP 80**	**HDP 90**
7.1	120	-	-	-
8.0	116	143	335	600
9.0	95	133	314	570
10.0	92	109	263	440
11.2	68	103	248	421
12.5	67	77	183	324
14.0	54	74	175	311
16.0	53	60	132	226
18.0	33	58	127	219
20.0	33	40	99	171
22.4	33	38	95	166
25.0	33	36	85	177
28.0	29	35	83	174
31.5	29	30	68	156
35.5	27	30	67	154
40.0	27	28	67	91
45.0	24	27	66	90
50.0	24	25	44	82
56.0	11	25	44	82
63.0	11	12	41	77
71.0	11	12	41	77
80.0	11	11	21	39
90.0	10	11	21	38
100.0	10	10	20	36
112.0	-	10	20	36

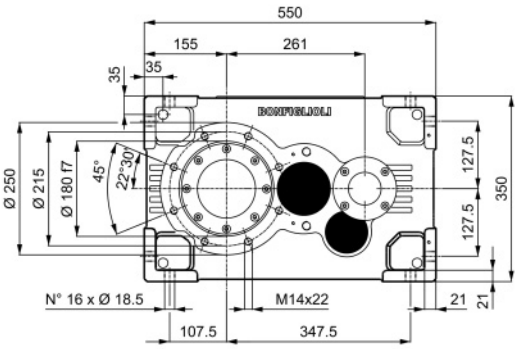
3.8 EXACT RATIOS

i_N	**HDP 60**	**HDP 70**	**HDP 80**	**HDP 90**
7.1	7.146			
8.0	8.031	8.039	8.063	7.929
9.0	8.969	9.333	9.361	8.828
10.0	10.079	10.090	9.844	10.059
11.2	11.156	11.714	11.429	11.200
12.5	12.538	12.551	12.600	12.214
14.0	13.533	14.571	14.629	13.600
16.0	15.209	15.225	15.488	15.807
18.0	17.267	17.676	17.981	17.600
20.0	19.404	19.425	19.441	20.086
22.4	22.686	22.552	22.571	22.364
25.0	25.494	25.521	25.800	25.406
28.0	28.219	29.630	29.954	28.288
31.5	31.713	31.746	31.713	32.878
35.5	34.231	36.857	36.818	36.608
40.0	38.470	38.510	39.809	40.036
45.0	43.675	44.710	46.218	44.578
50.0	49.082	49.134	51.625	51.811
56.0	56.578	57.044	59.937	57.689
63.0	63.583	63.650	64.805	65.837
71.0	68.633	73.898	75.238	73.306
80.0	77.131	77.213	76.405	77.818
90.0	87.567	89.644	88.706	86.646
100.0	98.408	98.513	95.911	98.884
112.0	-	114.373	111.352	110.102

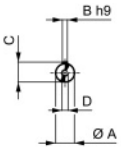
4 DIMENSIONS AND WEIGHT

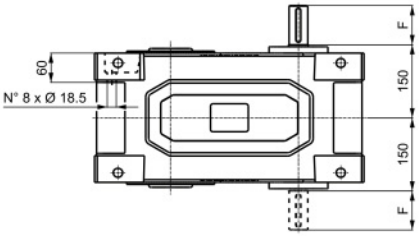
4.1 HDP 60





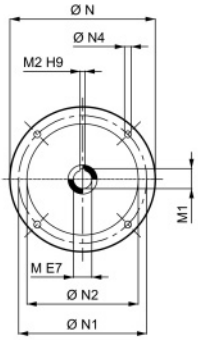
VP

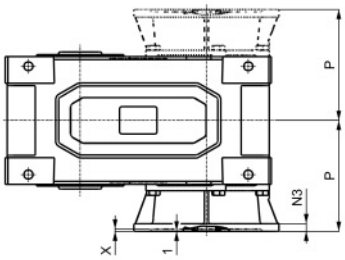




VP	i	A	B	C	D	E	F	Kg
HDP 60 2	**7.1 ... 15.2**	38 k6	10	41	M12x28	70	80	161
HDP 60 2	**17.3 ... 19.4**	32 k6	10	35	M12x28	70	80	161
HDP 60 3	**22.7 ... 49.1**	32 k6	10	35	M12x28	70	80	164
HDP 60 3	**56.6 ... 98.4**	28 j6	8	31	M10x22	50	60	164

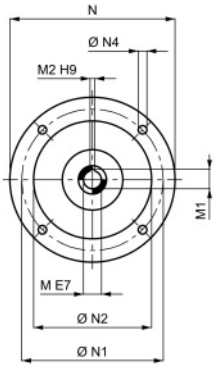
AD

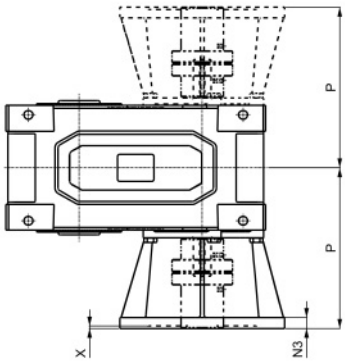




AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 60_ 112	28	31.3	8	250	215	180	15	14	5	220
HDP 60_ 132	38	41.3	10	300	265	230	16	14	5	230
HDP 60_ 160	42	45.3	12	350	300	250	23	18	6	261
HDP 60_ 180	48	51.8	14	350	300	250	23	18	6	261

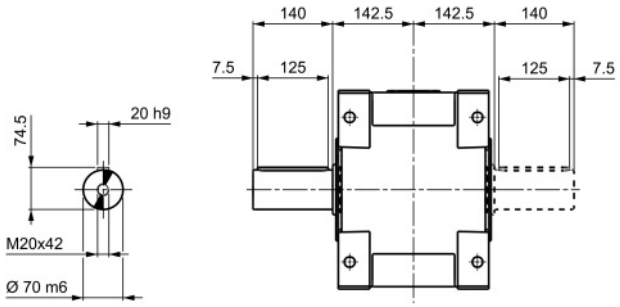
GL
GR



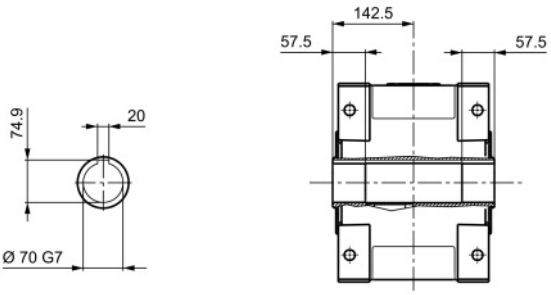


GL / GR	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 60_ 132	38	41.3	10	300	265	230	16	14	5	311
HDP 60_ 160	42	45.3	12	350	300	250	23	18	6	341
HDP 60_ 180	48	51.8	14	350	300	250	23	18	6	341
HDP 60_ 200	55	59.3	16	400	350	300	-	M16x23	7	366
HDP 60_ 225	60	64.4	18	450	400	350	25	18	7	374

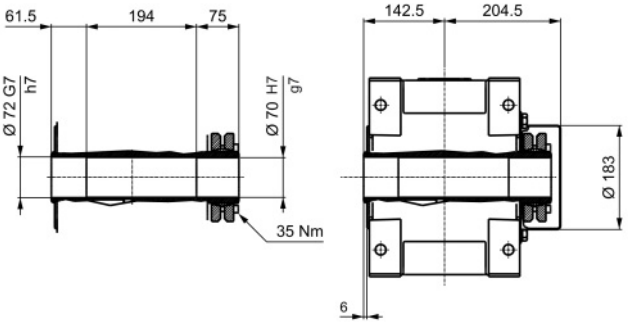
LP


140
142.5
142.5
140
7.5
125
125
7.5
74.5
20 h9
M20x42
Ø 70 m6

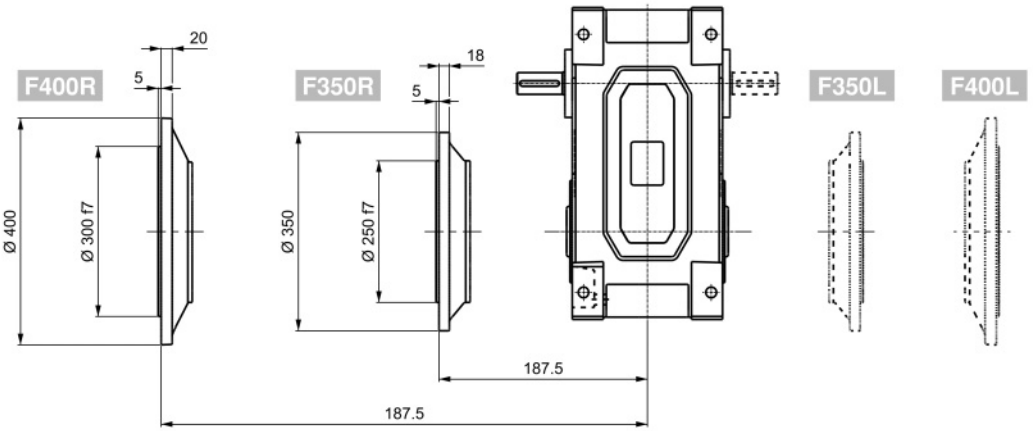
H

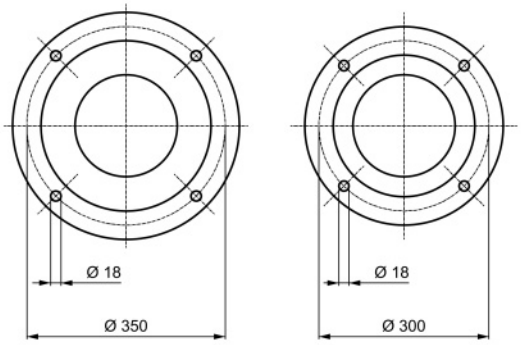

142.5
57.5
57.5
74.9
20
Ø 70 G7

S

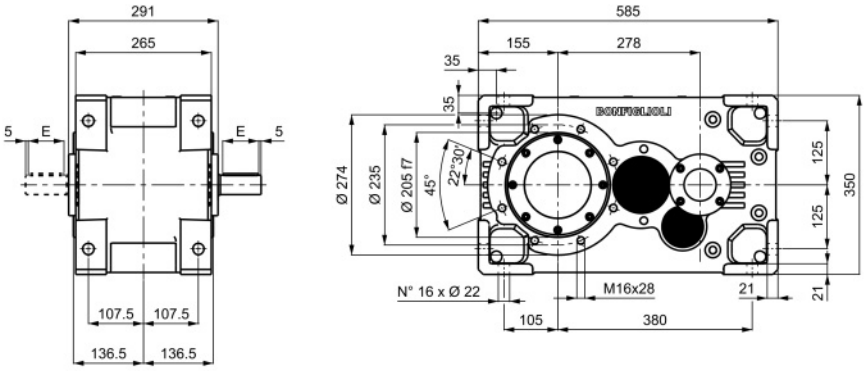

61.5
194
75
142.5
204.5
Ø 72 G7 h7
Ø 70 H7 g7
Ø 183
35 Nm
6

F...

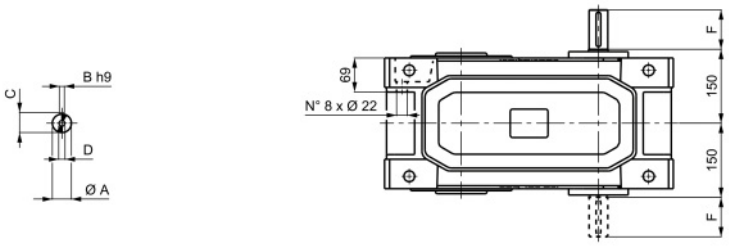

F400R
F350R
F350L
F400L
20
5
18
5
Ø 400
Ø 300 f7
Ø 350
Ø 250 f7
187.5
187.5


Ø 18
Ø 350
Ø 18
Ø 300

4.2 HDP 70

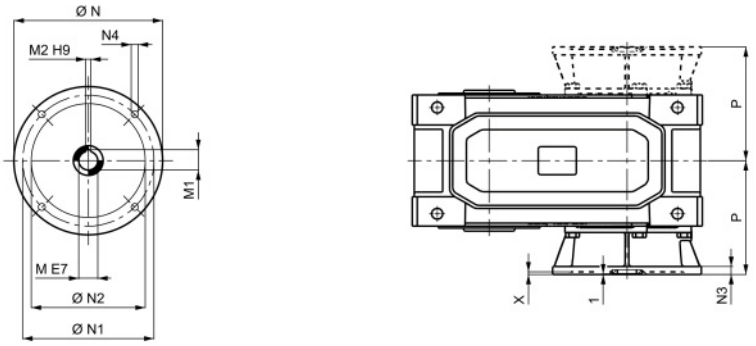


VP



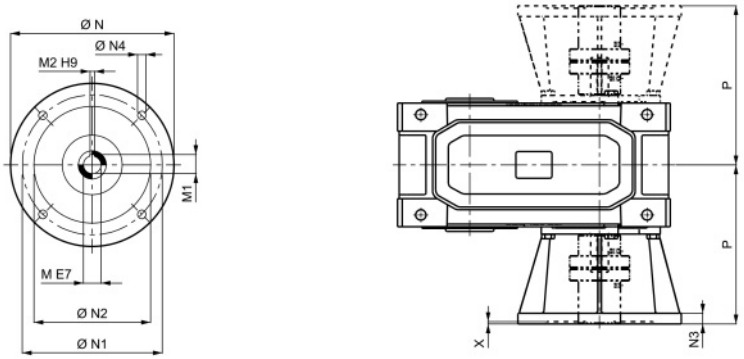
VP	i	A	B	C	D	E	F	Kg
HDP 70 2	**8.0 ... 17.7**	38 k6	10	41	M12x28	70	80	189
HDP 70 2	**19.4 ... 22.6**	32 k6	10	35	M12x28	70	80	189
HDP 70 3	**25.5 ... 57.0**	32 k6	10	35	M12x28	70	80	192
HDP 70 3	**63.7 ... 114.4**	28 j6	8	31	M10x22	50	60	192

AD



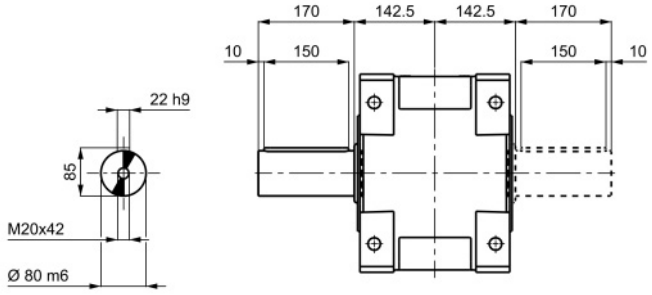
AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 70_ 112	28	31.3	8	250	215	180	15	14	5	220
HDP 70_ 132	38	41.3	10	300	265	230	16	14	5	230
HDP 70_ 160	42	45.3	12	350	300	250	23	18	6	261
HDP 70_ 180	48	51.8	14	350	300	250	23	18	6	261
HDP 70_ 200	55	59.3	16	400	350	300	-	M16x23	7	286

GL
GR

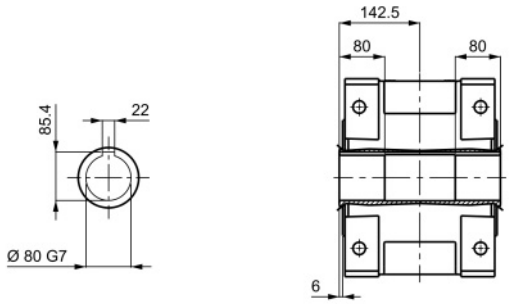


GL / GR	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 70_ 132	38	41.3	10	300	265	230	16	14	5	311
HDP 70_ 160	42	45.3	12	350	300	250	23	18	6	341
HDP 70_ 180	48	51.8	14	350	300	250	23	18	6	341
HDP 70_ 200	55	59.3	16	400	350	300	-	M16x23	7	366
HDP 70_ 225	60	64.4	18	450	400	350	25	18	7	374

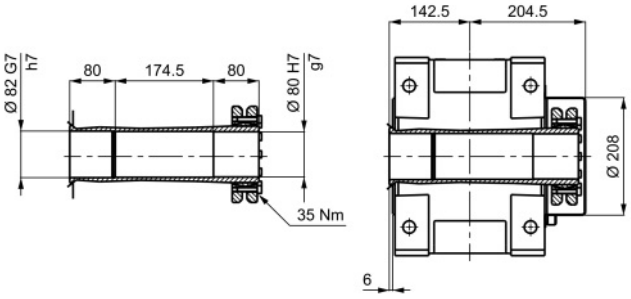
LP


170
142.5
142.5
170
10
150
150
10
22 h9
85
M20x42
Ø 80 m6

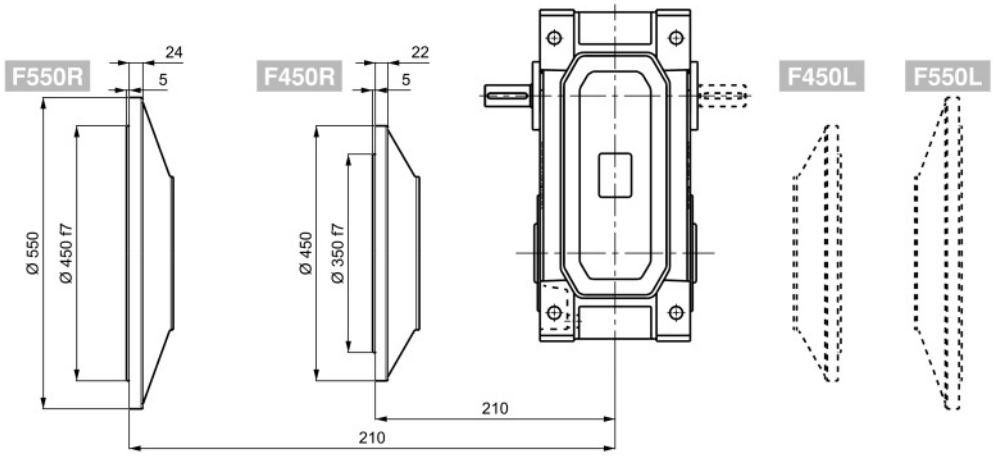
H

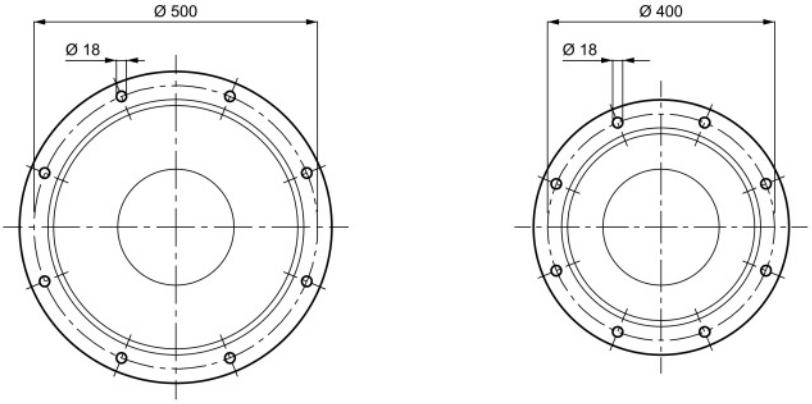

142.5
80
80
85.4
22
Ø 80 G7
6

S

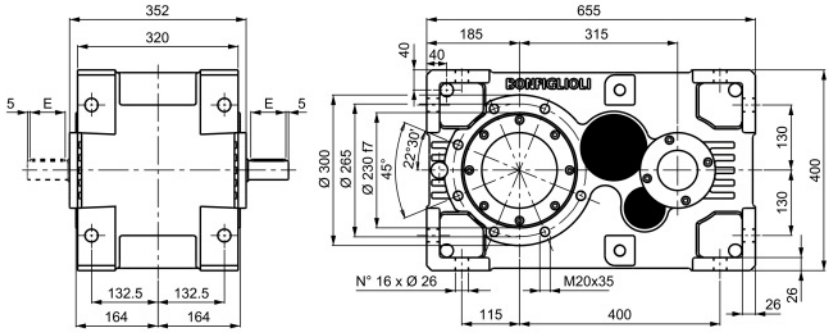

142.5
204.5
Ø 82 G7
h7
80
174.5
80
Ø 80 H7
g7
Ø 208
35 Nm
6

F...

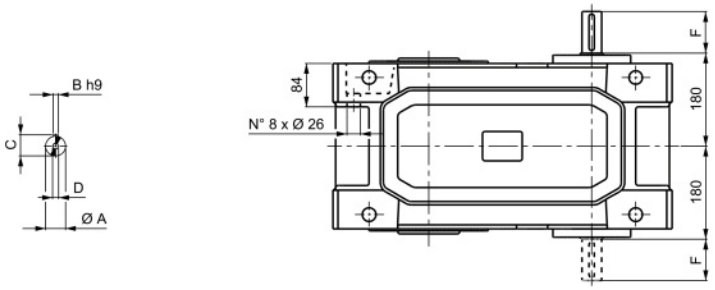

F550R
24
5
Ø 550
Ø 450 f7
F450R
22
5
Ø 450
Ø 350 f7
210
210
F450L
F550L


Ø 500
Ø 18
Ø 400
Ø 18

4.3 HDP 80

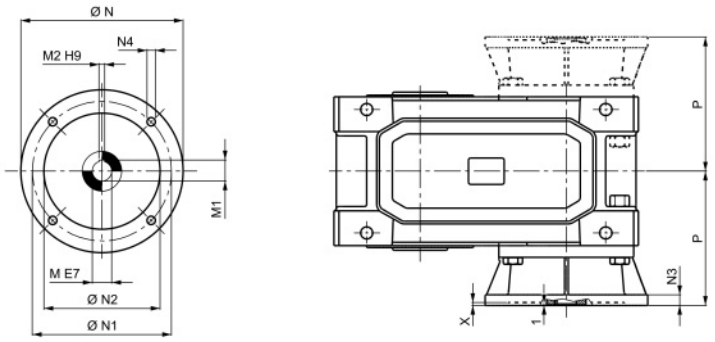


VP



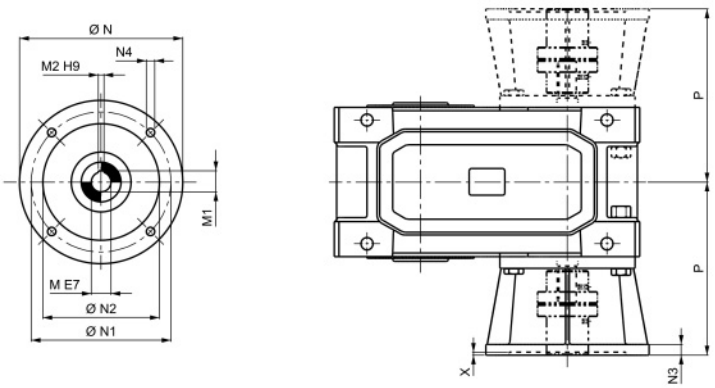
VP	i =	A	B	C	D	E	F	Kg
HDP 80 2	**8.1 ... 14.6**	45 k6	14	48.5	M16x36	100	110	301
HDP 80 2	**15.5 ... 22.6**	38 k6	10	41	M12x28	70	80	301
HDP 80 3	**25.8 ... 75.2**	38 k6	10	41	M12x28	70	80	306
HDP 80 3	**76.4 ... 114.4**	28 j6	8	31	M10x22	50	60	306

AD



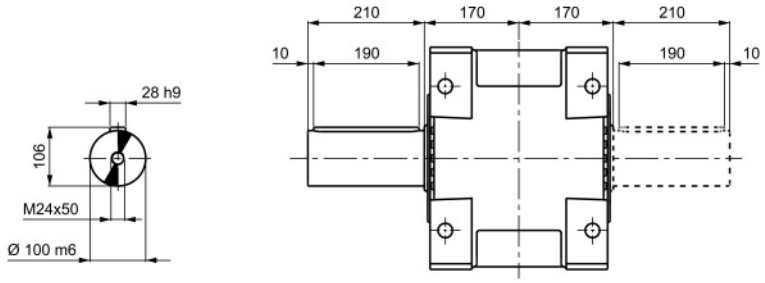
AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 80_ 132	38	41.3	10	300	265	230	16	14	5	257.5
HDP 80_ 160	42	45.3	12	350	300	250	23	18	6	288.5
HDP 80_ 180	48	51.8	14	350	300	250	23	18	6	288.5
HDP 80_ 200	55	59.3	16	400	350	300	-	M16x23	7	313.5

GL
GR

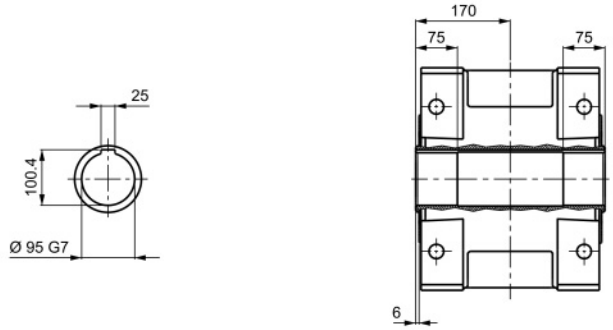


GL / GR	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 80_ 160	42	45.3	12	350	300	250	23	18	6	371
HDP 80_ 180	48	51.8	14	350	300	250	23	18	6	371
HDP 80_ 200	55	59.3	16	400	350	300	-	M16x23	7	396
HDP 80_ 225	60	64.4	18	450	400	350	25	18	7	432
HDP 80_ 250	65	69.4	18	550	500	450	30	18	6	462
HDP 80_ 280	75	79.9	20	550	500	450	30	18	6	462

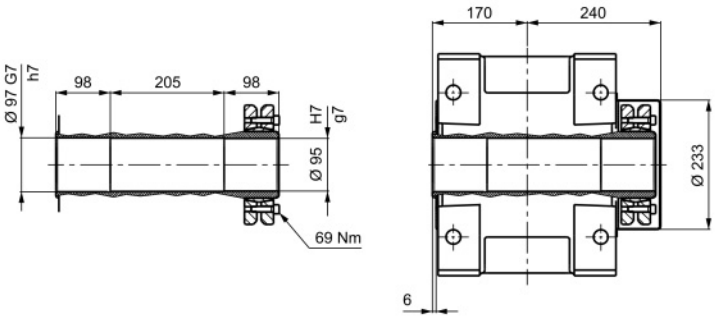
LP


28 h9
106
M24x50
Ø 100 m6
210
170
170
210
10
190
190
10

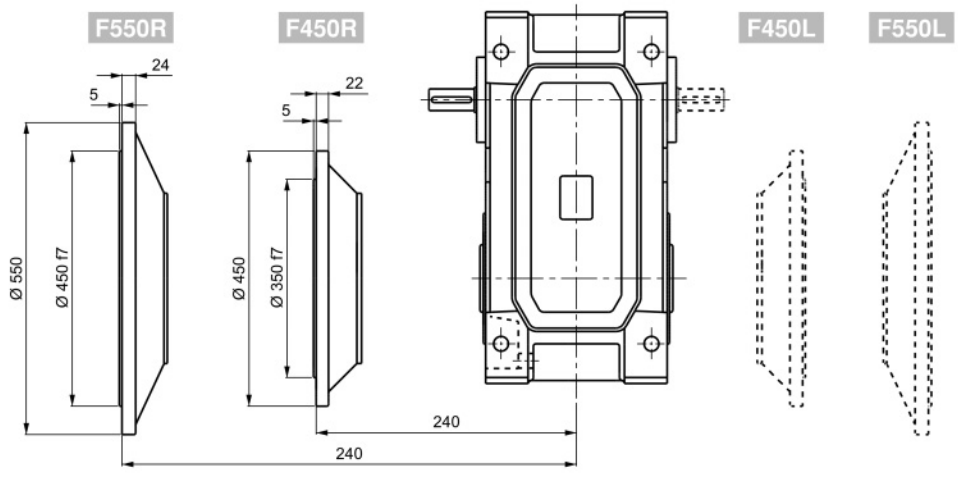
H

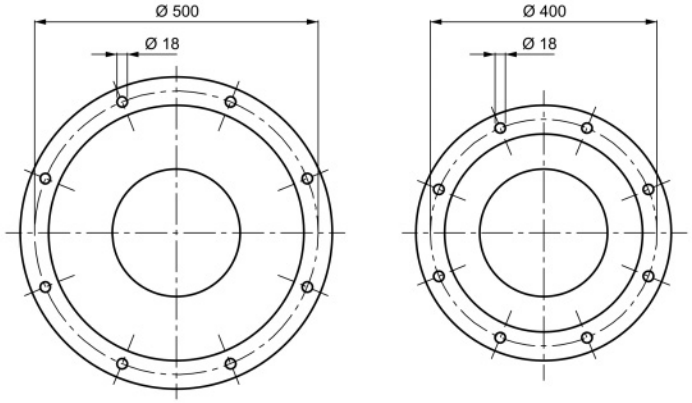

25
100.4
Ø 95 G7
170
75
75
6

S

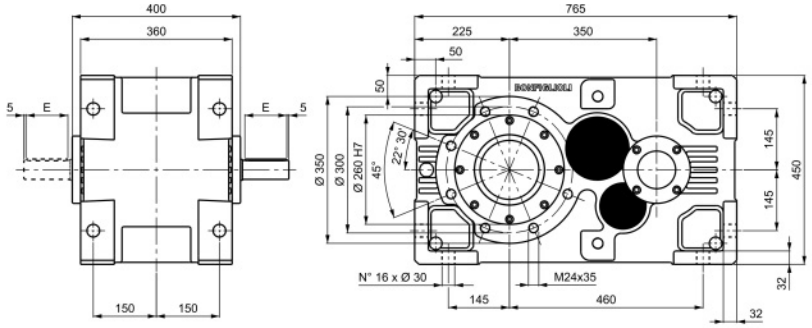

Ø 97 G7
h7
98
205
98
H7
g7
Ø 95
69 Nm
170
240
Ø 233
6

F...

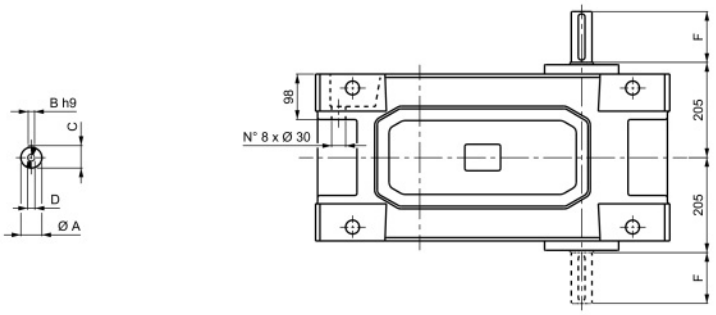

F550R
F450R
F450L
F550L
24
5
Ø 550
Ø 450 f7
22
5
Ø 450
Ø 350 f7
240
240


Ø 500
Ø 18
Ø 400
Ø 18

4.4 HDP 90

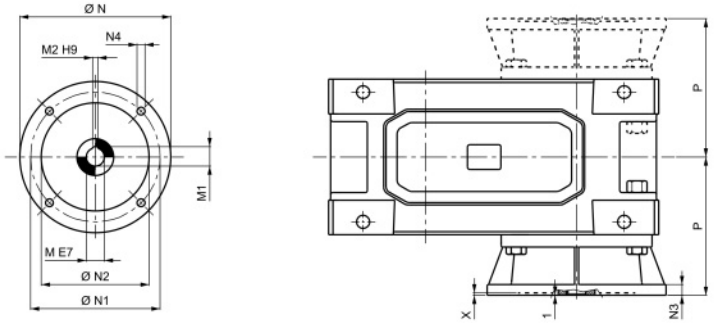


VP



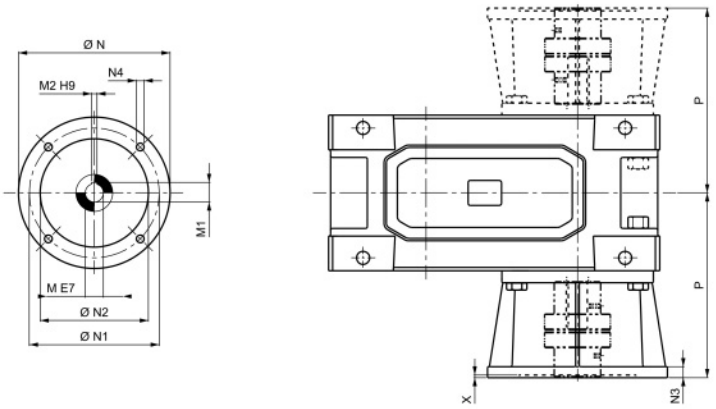
VP	i	A	B	C	D	E	F	Kg
HDP 90 2	**7.9 ... 13.6**	50 k6	14	53.5	M16x36	100	110	429
HDP 90 2	**15.8 ... 22.4**	45 k6	14	48.5	M16x36	100	110	429
HDP 90 3	**25.4 ... 73.3**	45 k6	14	48.5	M16x36	100	110	440
HDP 90 3	**77.8 ... 110.1**	32 k6	10	35	M12x28	70	80	440

AD



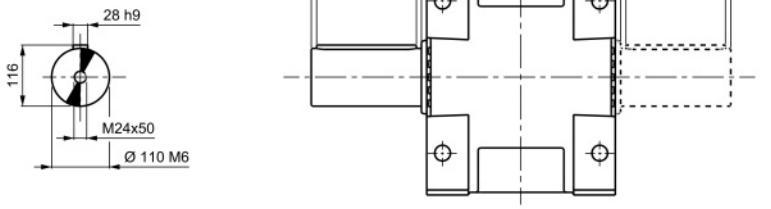
AD	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 90_ 160	42	45.3	12	350	300	250	23	18	6	308.5
HDP 90_ 180	48	51.8	14	350	300	250	23	18	6	308.5
HDP 90_ 200	55	59.3	16	400	350	300	-	M16x23	7	333.5

GL
GR

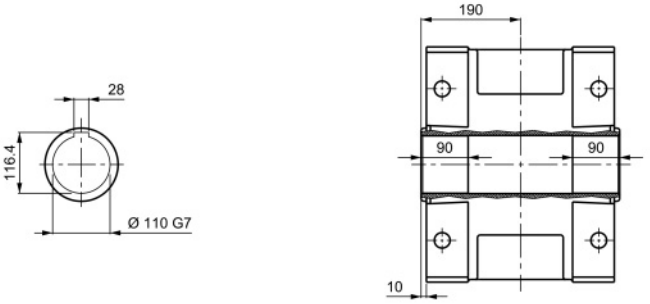


GL / GR	M	M1	M2	N	N1	N2	N3	N4	X	P
HDP 90_ 160	42	45.3	12	350	300	250	23	18	6	427
HDP 90_ 180	48	51.8	14	350	300	250	23	18	6	427
HDP 90_ 200	55	59.3	16	400	350	300	-	M16x23	7	452
HDP 90_ 225	60	64.4	18	450	400	350	25	18	7	457
HDP 90_ 250	65	69.4	18	550	500	450	30	18	6	487
HDP 90_ 280	75	79.9	20	550	500	450	30	18	6	487

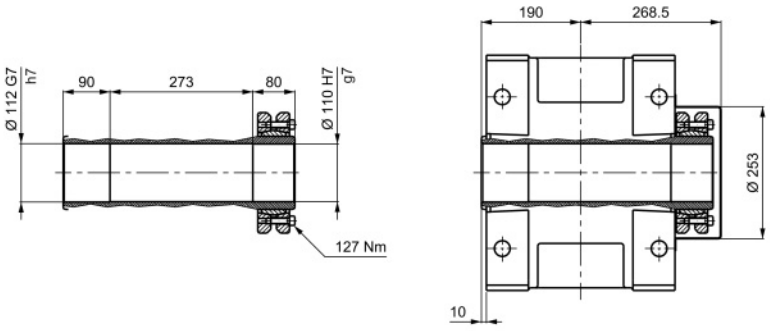
LP


28 h9
116
M24x50
Ø 110 M6
210
190
190
210
10
190
190
10

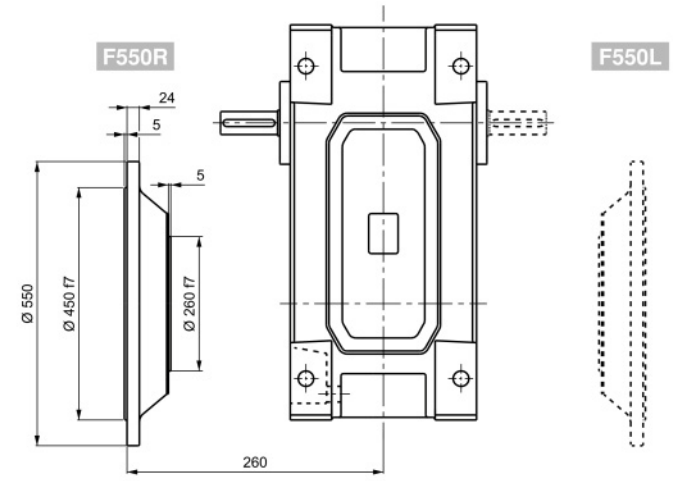
H

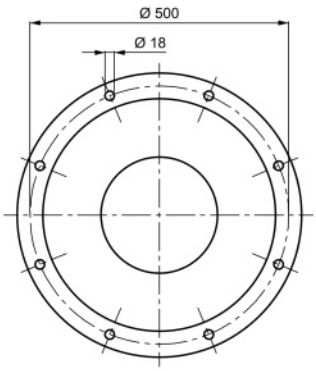

28
116.4
Ø 110 G7
190
90
90
10

S


Ø 112 G7
h7
90
273
80
Ø 110 H7
g7
127 Nm
190
268.5
Ø 253
10

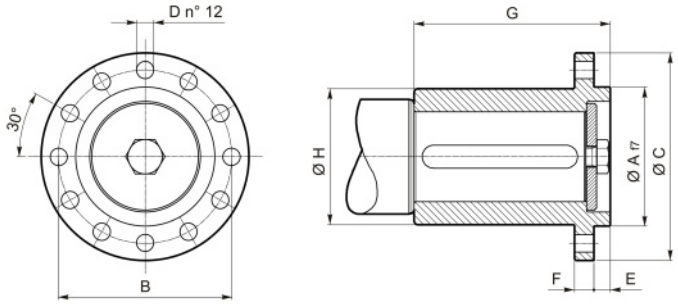
F...


F550R
F550L
24
5
5
Ø 550
Ø 450 f7
Ø 260 f7
260


Ø 500
Ø 18

4.5 MANIFOLD FLANGE

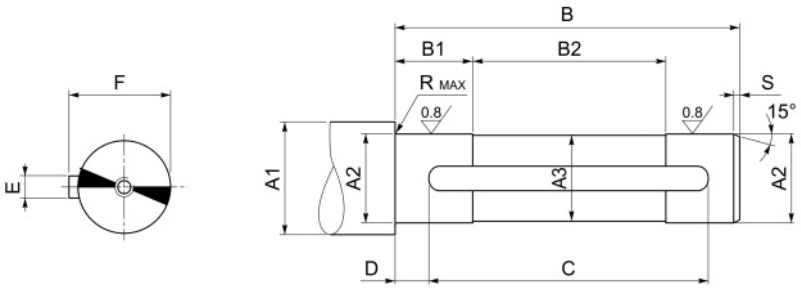
Available for shaft arrangement: LL, LR, LD, RL, RR and RD, all featuring a single shaft extension.



	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

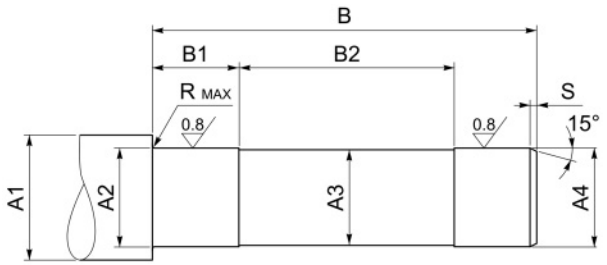
4.6 CUSTOMER'S SHAFT series HDP

H

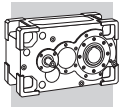


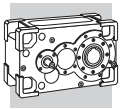
	A1	A2	A3	B	B1	B2	C	D	E	F	R	S	UNI6604
HDP 60	⩾ 78	70 h6	69	283	56	172	220	30	20 h9	74.5	2.5	2	20 x 12 x 220A
HDP 70	⩾ 89	80 h6	79	283	78	127	220	30	22 h9	85	2.5	2.5	22 x 14 x 220A
HDP 80	⩾ 104	95 h6	94	338	73	192	280	30	25 h9	100	2.5	2.5	25 x 14 x 280A
HDP 90	⩾ 121	110 h6	109	378	88	202	320	30	28 h9	116	2.5	2.5	28 x 16 x 320A

S



	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





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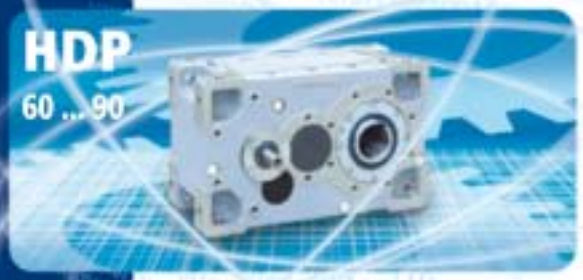
DOCUMENT	SECTION	DESCRIPTION

Industry Process
and Automation Solutions



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