GEAR PUMPS

GEAR MOTORS

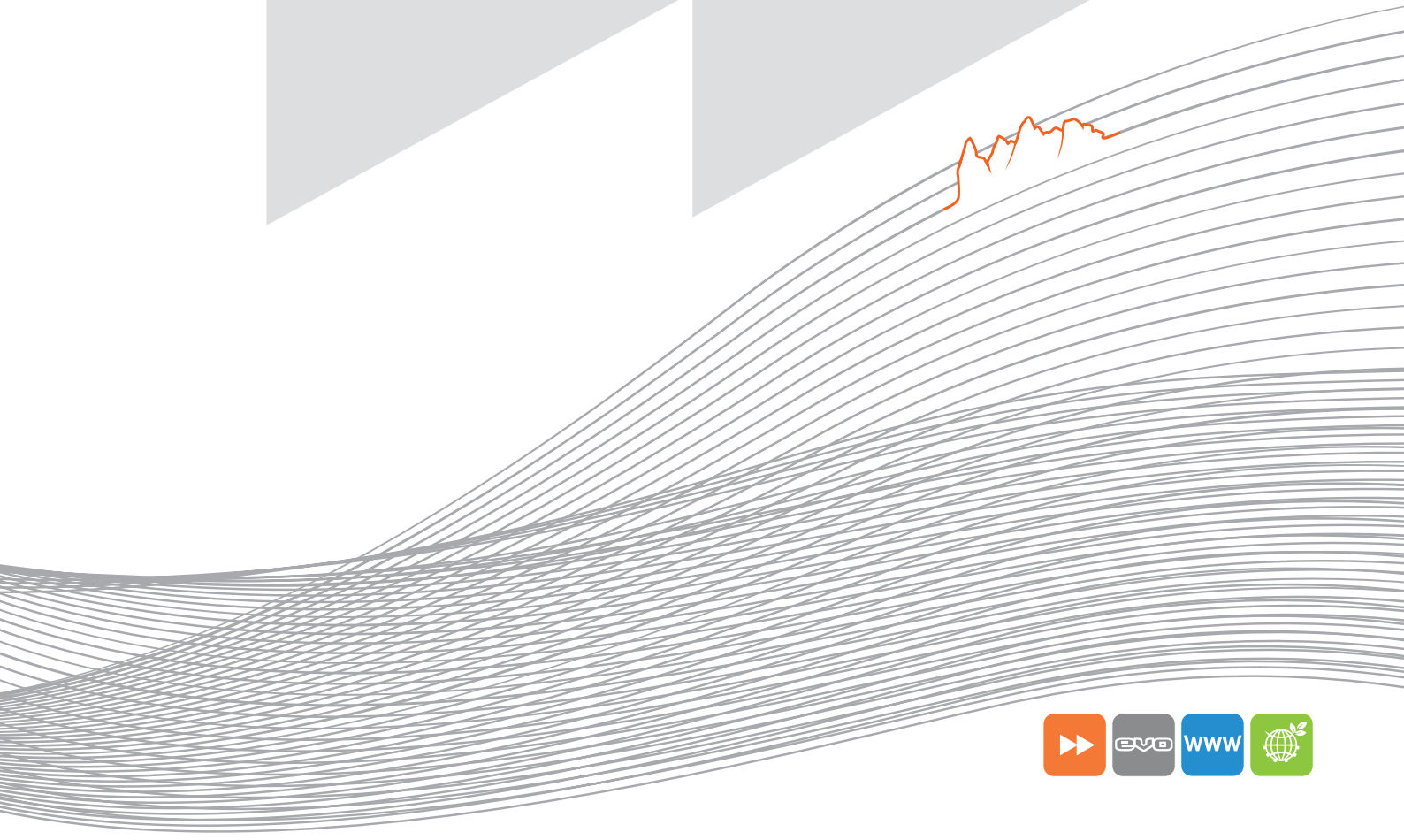
Member of the Danfoss Group

TUROLLA

fast forward thinking

CAST IRON GEAR PUMPS AND MOTORS

Dolomites Group 3 | Technical Information

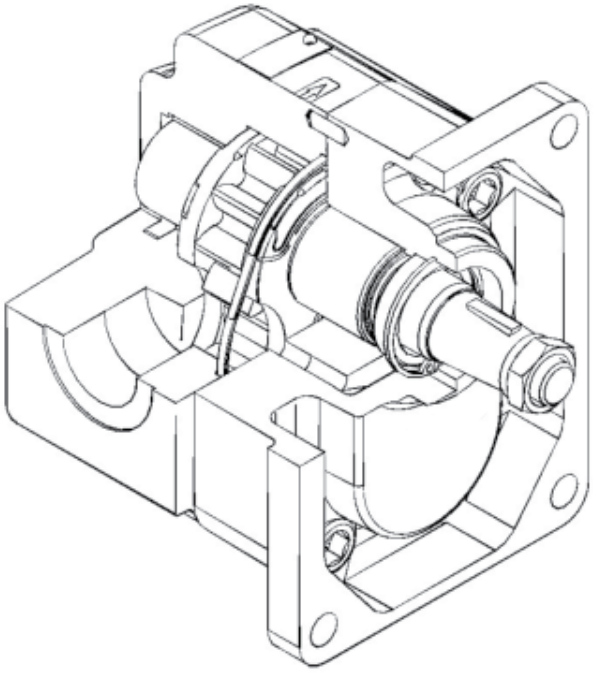


History of revisions

Date	Page	Changed	Rev.
March 2015	-	First edition	-
September 2016	-	Second edition	-

Contents

General Information



DESCRIPTION

Overview

Dolomites fixed displacement gear pump and motor has been specifically designed for demanding mobile equipment applications where maximum performance is required at peak power levels and operating temperatures. The design integrates cast iron construction with pressure balanced thrust plates to deliver consistent efficiency across the entire operating range of pressure, speed, and temperature.

Typical characteristic of Dolomites series is the two-piece construction consisting of separate flange and body. This makes the Dolomites pumps extremely compact and price competitive while maintaining the high performance and long durability. The flange and body are made of high-strength cast iron. Cast iron provides contamination resistance, thermal stability and the strength needed for consistently high levels of performance and durability required in demanding off-highway applications.
Sleeve bushings are pressed in the flange and body and have been optimized to provide long life in low viscosity, high pressure conditions. Axial pressure balance is ensured by aluminium alloy thrust plates with integrated pressure seals.

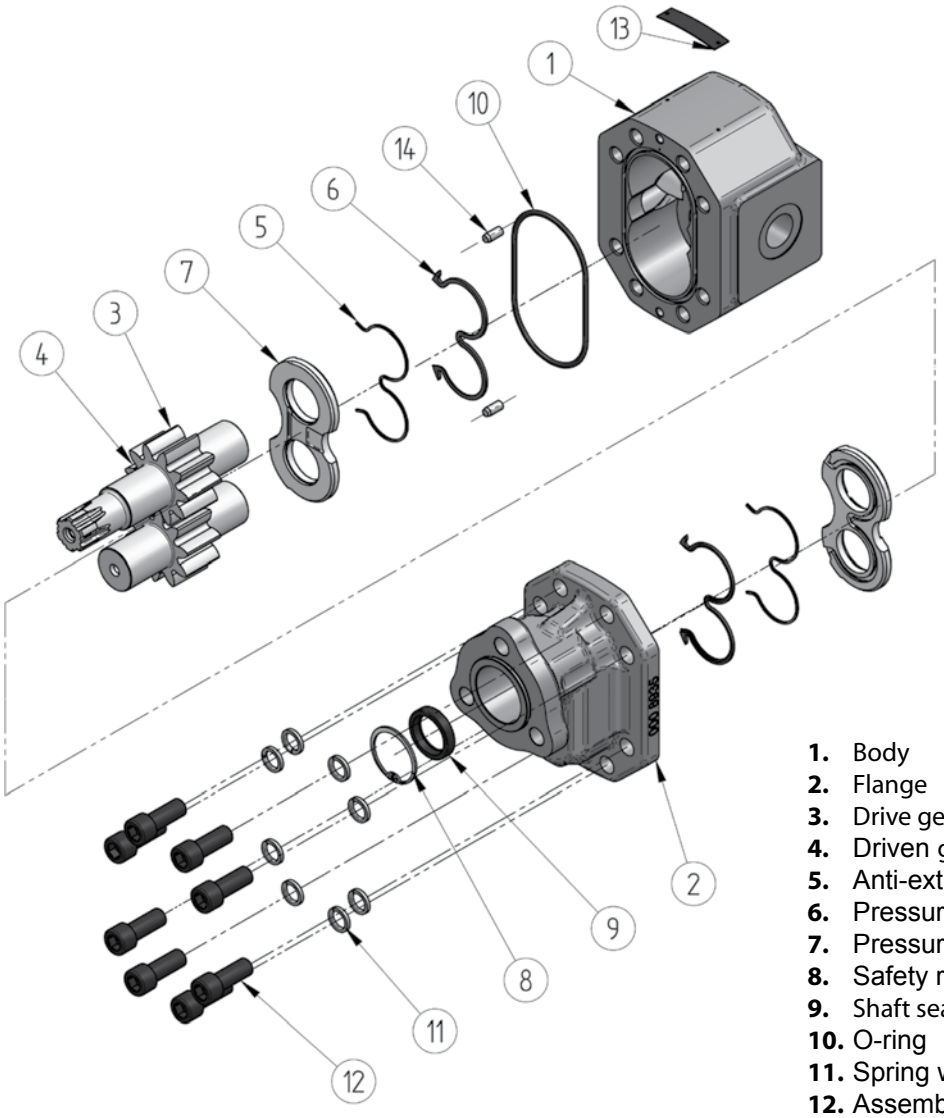
In order accomodate the strictest demands for extranal radial and axial force, most of the flange types are available also with the optional integrated outrigger bearings.

Due to their two-piece design, Dolomites pumps are produced as single pumps and motors only.

Dolomites pumps comes in two sizes, Group 3 and Group 4, which together cover the wide range of displacement from 10 to 150 cm^3.

Dolomites Group 3 pumps and motors are available in the diplacements from 10 to 100cm^3.

DESIGN



1. Body
2. Flange
3. Drive gear
4. Driven gear
5. Anti-extrusion ring
6. Pressure seal
7. Pressure plates
8. Safety ring
9. Shaft seal
10. O-ring
11. Spring washer
12. Assembly screws
13. Nameplate
14. Centering pin

Formulas used for calculation

Determination of nominal pump sizes

Use these formula to determine the nominal pump size for a specific application:

	Based on SI units	Based on US units
Output flow:	$Q = \frac{Vg \cdot n \cdot \eta_v}{1000}$ l/min	$Q = \frac{Vg \cdot n \cdot \eta_v}{231}$ [US gal/min]
Input torque:	$M = \frac{Vg \cdot \Delta p}{20 \cdot \pi \cdot \eta_m}$ N•m	$M = \frac{Vg \cdot \Delta p}{2 \cdot \pi \cdot \eta_m}$ [lbf•in]
Input power:	$P = \frac{M \cdot n}{9550} = \frac{Q \cdot \Delta p}{600 \cdot \eta_t}$ kW	$P = \frac{M \cdot n}{63.025} = \frac{Q \cdot \Delta p}{1714 \cdot \eta_t}$ [hp]

Variables: SI units [US units]

V_g	=	Displacement per rev.	cm^3/rev [in^3/rev]
p_{HD}	=	Outlet pressure	bar [psi]
p_{ND}	=	Inlet pressure	bar [psi]
Δp	=	$p_{OUT} - p_{IN}$	bar [psi]
n	=	Speed	min^{-1} (rpm)
η_v	=	Volumetric efficiency	
η_m	=	Mechanical (torque) efficiency	
η_t	=	Overall efficiency ($\eta_v \cdot \eta_m$)	

Application parameters

Hydraulic fluids

Ratings and data for Cascade gear pumps are based on operating with premium hydraulic fluids containing oxidation, rust, and foam inhibitors. These fluids must possess good thermal and hydrolytic stability to prevent wear, erosion, and corrosion of internal components. They include:

- Hydraulic fluids following DIN 51524, part 2 (HLP) and part 3 (HVLP) specifications
- API CD engine oils conforming to SAE J183
- M2C33F or G automatic transmission fluids
- Certain agricultural tractor fluids

Use only clean fluid in the pump and hydraulic circuit.

Caution

Never mix hydraulic fluids.

Please see Turolla publication Hydraulic Fluids and Lubricants Technical Information, **L1021414** for more information.

Temperature and Viscosity

Temperature and viscosity requirements must be concurrently satisfied. Use petroleum / mineral-based fluids.

High temperature limits apply at the inlet port to the pump. The pump should run at or below the maximum continuous temperature. The peak temperature is based on material properties. Don't exceed it.

Cold oil, generally, doesn't affect the durability of pump components. It may affect the ability of oil to flow and transmit power. For this reason, keep the temperature at 16 °C [60 °F] above the pour point of the hydraulic fluid.

Minimum (cold start) temperature relates to the physical properties of component materials. Minimum viscosity occurs only during brief occasions of maximum ambient temperature and severe duty cycle operation. You will encounter maximum viscosity only at cold start. During this condition, limit speeds until the system warms up. Size heat exchangers to keep the fluid within these limits. Test regularly to verify that these temperatures and viscosity limits aren't exceeded. For maximum unit efficiency and bearing life, keep the fluid viscosity in the recommended viscosity range.

Fluid viscosity

Maximum (cold start)	mm^2/s [SUS]	1200 [5500]
Recommended range		20-80 [97-365]
Minimum		10 [60]

Temperature

Minimum (cold start)	°C [°F]	-20 [-4]
Maximum continuous		90 [194]
Peak (intermittent)		110 [230]

Filtration

Filters

Use a filter that conforms to Class:	21/18/15 (for pressure p2 < 200 bar)	10 (for pressure p2 < 200 bar)
	20/17/14 (for pressure p2 > 200 bar)	8 (for pressure p2 > 200 bar)
	according to ISO 4406	according to NAS 1683

Selecting a filter

- When selecting a filter, please consider:
- contaminant ingression rate (determined by factors such as the number of actuators used in the system)
- generation of contaminants in the system
- required fluid cleanliness
- desired maintenance interval
- filtration requirements of other system components

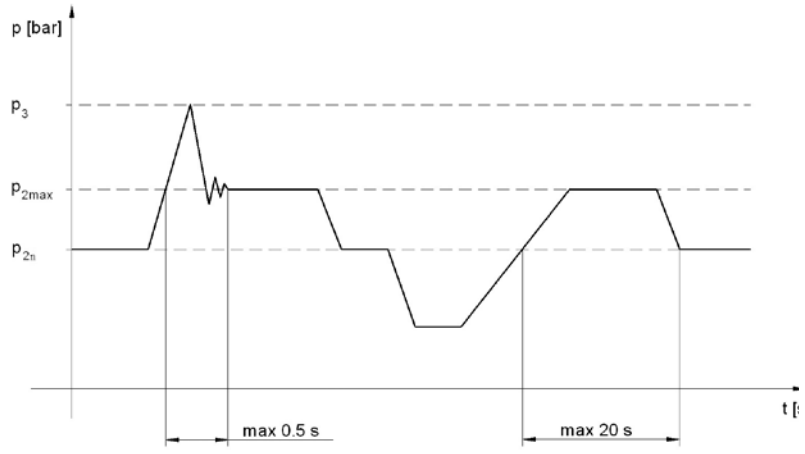
β_x ratio is a measure of filter efficiency defined by ISO 4572. It is the ratio of the number of particles greater than a given diameter ("$_x$" in microns) upstream of the filter to the number of these particles downstream of the filter.

Fluid cleanliness level and β_x ratio

Fluid cleanliness level (per ISO 4406)	21/18/15 or better (for pressure p2 < 200 bar) 20/17/14 or better (for pressure p2 > 200 bar)
β_x ratio (suction filtration)	$\beta_{35\text{-}45} = 75$ and $\beta_{10} = 2$
β_x ratio (pressure or return filtration)	$\beta_{10} = 75$
Recommended inlet screen size	100-125 µm [0.004-0.005 in]

The filtration requirements for each system are unique. Evaluate filtration system capacity by monitoring and testing prototypes.

Pressure load



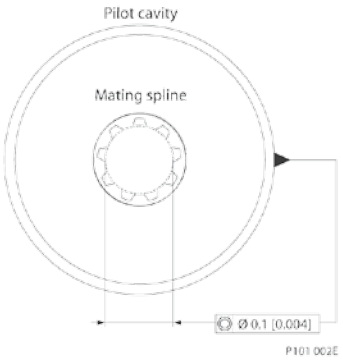
$p2_n$ rated pressure the average, regularly occuring operating pressure that should yield satisfactory product life. The maximum machine load demand determines rated pressure. For all systems, the load should move below this pressure.

$p2_{max}$ intermittent pressure
p_3 peak pressure maximum pressure permissible for a short time, max. 20s. at time the highest intermittent pressure allowed. The relief valve overshoot (reaction time) or directional valve midpositon usually determines peak pressure. It is assumed to occur for less that 100ms at a time.

Pump drive

Shaft options for Dolomites gear pumps include tapered, splined, or parallel shafts. They are suitable for a wide range of direct and indirect drive applications for radial and thrust loads.

Plug-in drives, acceptable only with a splined shaft, can impose severe radial loads when the mating spline is rigidly supported. Increasing spline clearance does not alleviate this condition.



Use plug-in drives if the concentricity between the mating spline and pilot diameter is within 0.1 mm [0.004 in]. Lubricate the drive by flooding it with oil. A 3-piece coupling minimizes radial or thrust shaft loads.

Caution

In order to avoid spline shaft damages it is recommended to use carburised and hardened steel couplings with 80-82 HRA surface hardness.

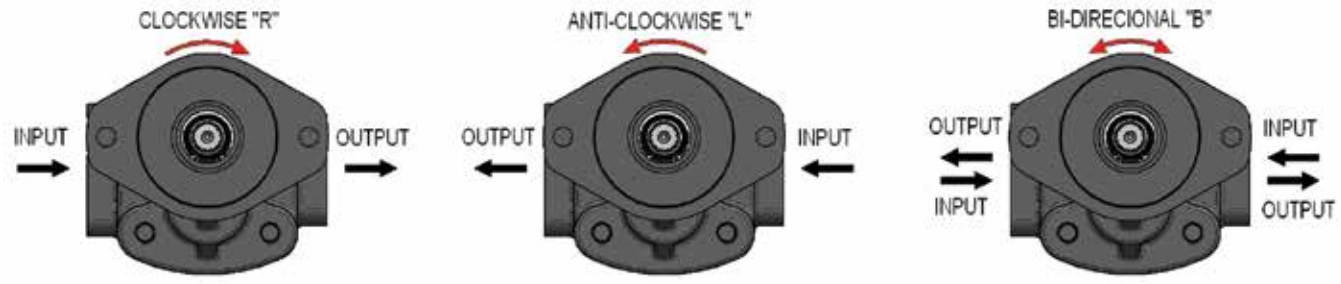
Allowable **radial shaft loads** are a function of the load position, load orientation, and operating pressure of the hydraulic pump. All external shaft loads have an effect on bearing life, and may affect pump performance.
In applications where external shaft loads can't be avoided, minimize the impact on the pump by optimizing the orientation and magnitude of the load and selecting a pump with an appropriate outrigger bearing. Don't use splined shafts for belt or gear drive applications. A spring-loaded belt tension-device is recommended for belt drive applications to avoid excessive tension.

Direction of Rotation

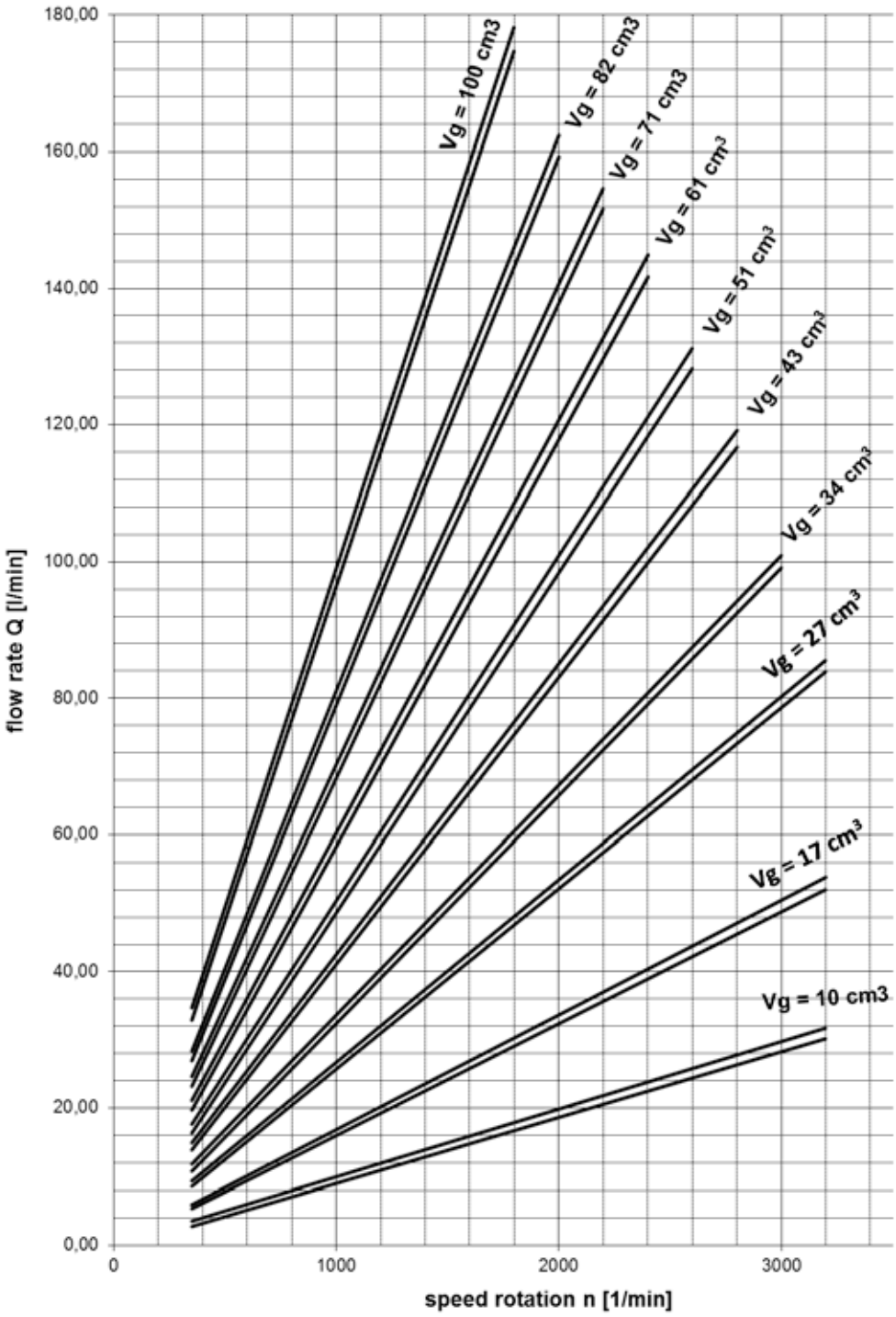
Determine direction of rotation by looking at the drive shaft. The pump can only be used in the specified direction of rotation.

Bidirectional pumps and motors

The pumps and motors with the possibility of bidirectional rotation have a different internal arrangement requiring drainage. Two types of drain are used - internal and external. The internal drainage is always interconnected with the low pressure side outlet by means of valves. The external drainage is a port located in the cover opposite the driven gear.

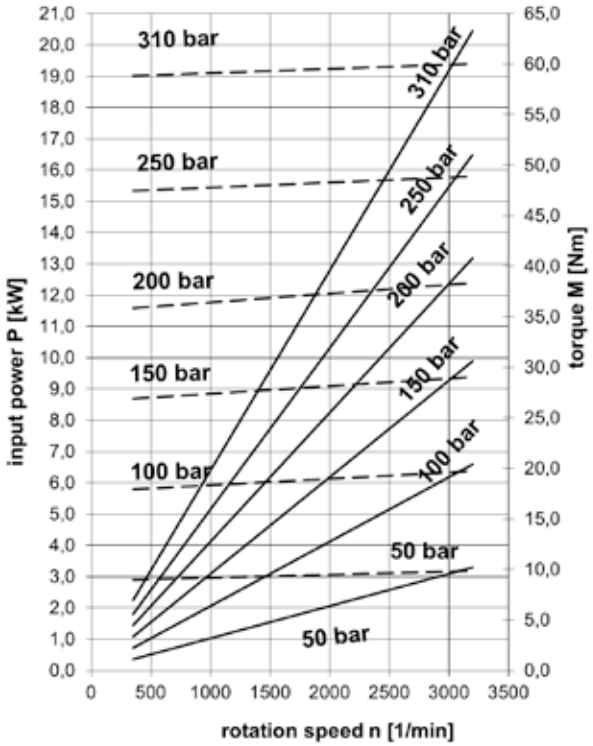


Flow rate and power curves

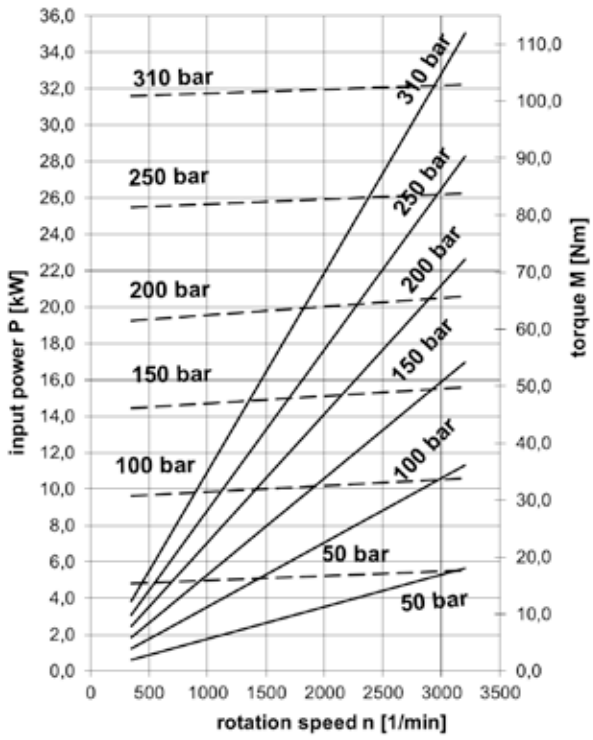


Above curves apply to ISO Vg 46 oil at temperature t = 45°C.

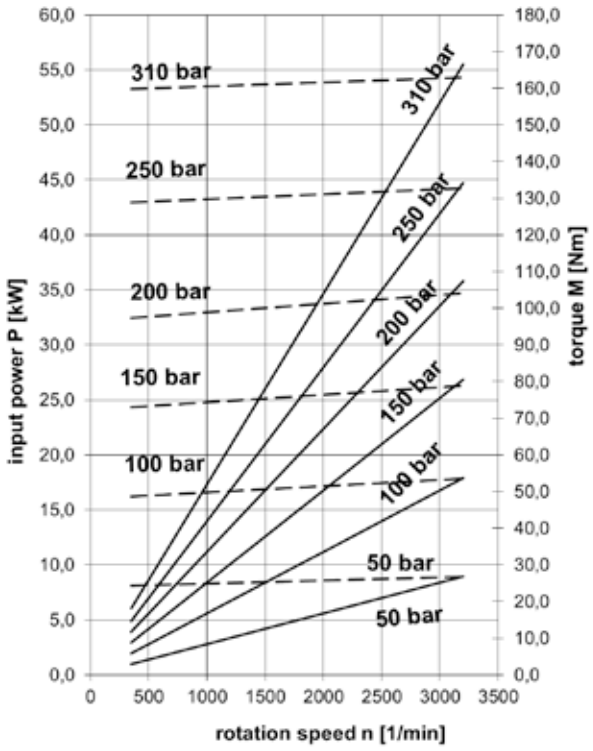
10 cm³



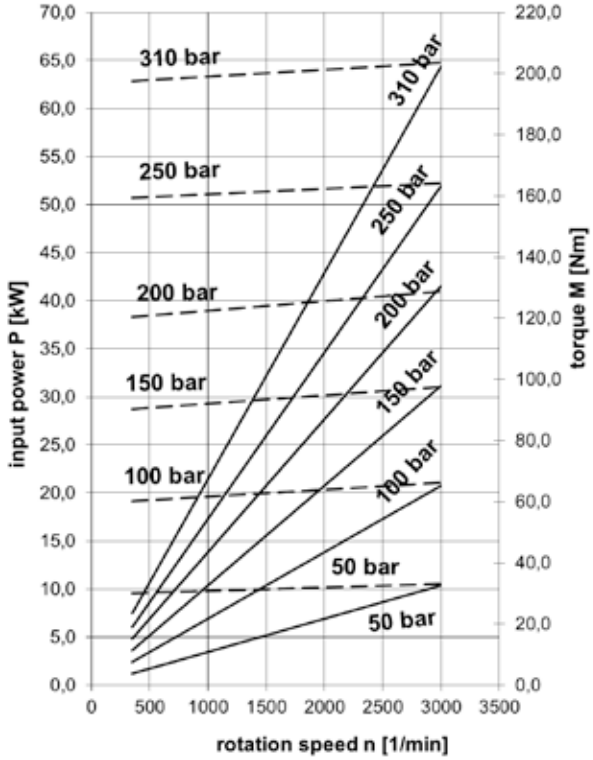
17 cm³



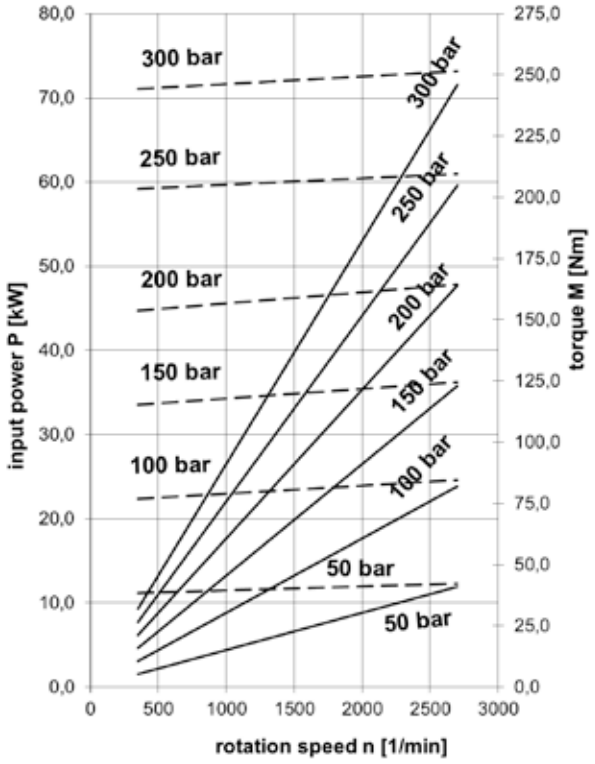
27 cm³



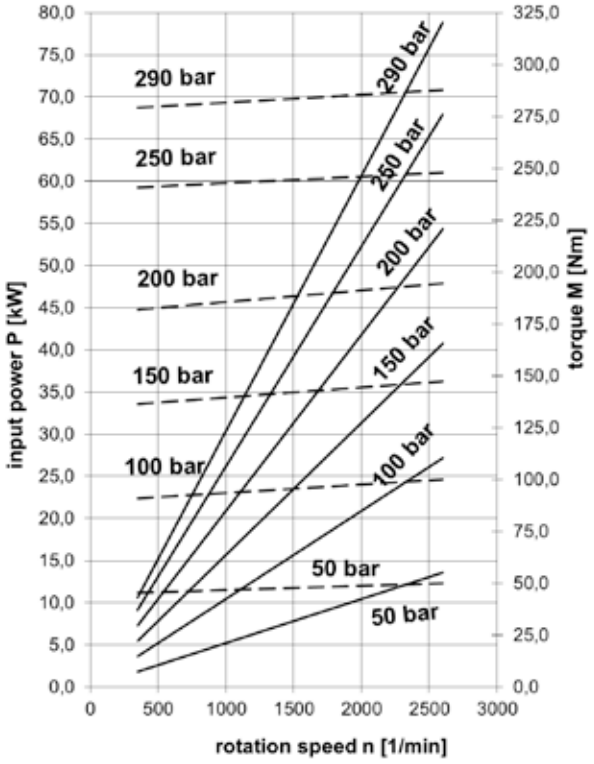
34 cm³



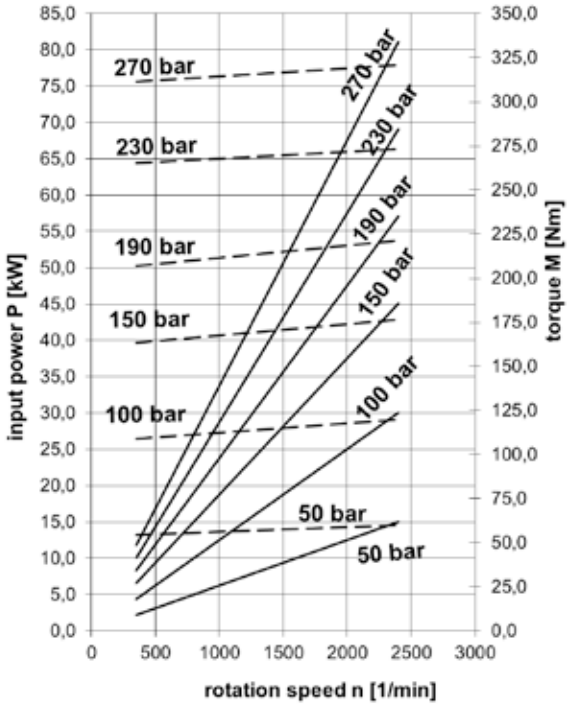
43 cm³



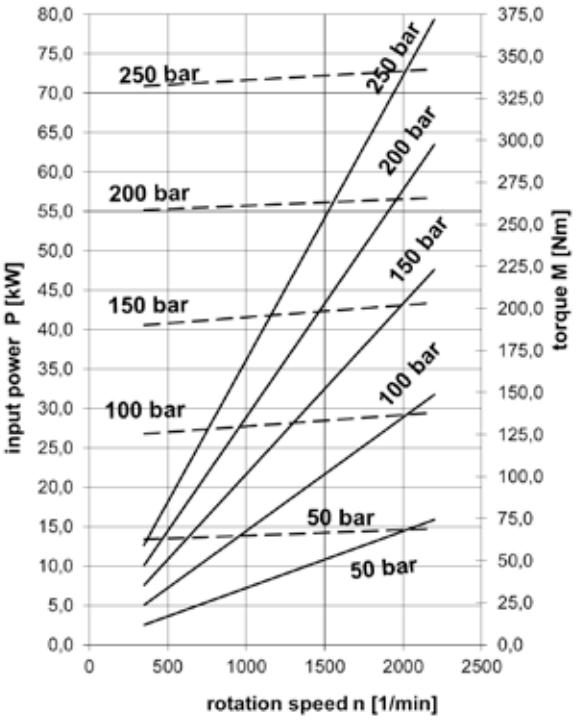
51 cm³



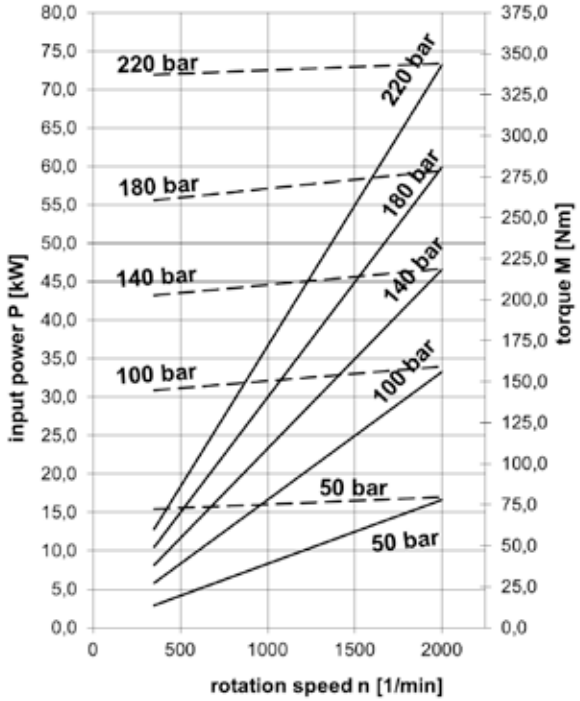
61 cm³



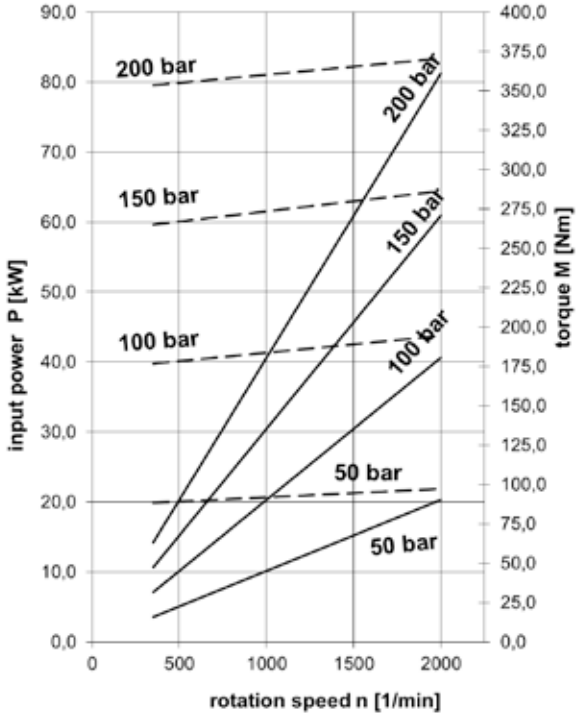
71 cm³



82 cm³



100 cm³



Technical data

Nominal Size Parameters		Sym.	Unit	Dolomites3 10	Dolomites3 17	Dolomites3 27	Dolomites3 34	Dolomites3 43	Dolomites3 51	Dolomites3 61	Dolomites3 71	Dolomites3 82	Dolomites3 100
Actual displacement		Vg	cm3/rev [in3/ rev]	10.11 [0.617]	17.24 [1.052]	27.53 [1.679]	34.05 [2.078]	43.47 [2.653]	51.44 [3.139]	61.59 [3.758]	71.01 [4.333]	81,87 [4.996]	99,98 [6.101]
Rotation speed	nominal	nn	min -1 [rpm]	1500									
	minimum	nmin	min -1 [rpm]	400									
	maximum	nmax	min -1 [rpm]	3200	3200	3200	3000	2800	2600	2200	1800	2000	1800
Pressure at inlet	minimum	p1min	bar [psi]	-0.3 [-4.3]									
	maximum	p1max	bar [psi]	3 [43.5]									
Pressure at outlet *	max. continuous	p2n	bar [psi]	290 [4200]	290 [4200]	290 [4200]	290 [4200]	280 [4060]	260 [3770]	260 [3770]	230 [3330]	200 [2900]	180 [2610]
	maximum	p2max	bar [psi]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	300 [4350]	280 [4060]	280 [4060]	250 [3620]	220 [3190]	200 [2900]
	peak	p3	bar [psi]	320 [4640]	320 [4640]	320 [4640]	330 [4780]	310 [4500]	290 [4200]	290 [4200]	260 [3770]	230 [3330]	210 [3040]
Nominal flow rate (min.) at nn and p2n		Qn	l/min [US gal/ min]	13.7 [3.6]	54.3 [14.3]	37 [9.8]	47,5 [12.5]	60.6 [16]	71.8 [18.9]	85.9 [22.7]	99,0 [26.1]	114,2 [30.1]	139,5 [36.8]
Maximum flow rate at nmax and p2max		Qmax	l/min [US gal/ min]	31.8 [8.4]	54.5 [14.4]	86.2 [22.7]	100.6 [26.5]	119.9 [31.6]	131.7 [34.8]	145.6 [38.4]	153,9 [40.6]	161,3 [42.6]	177,3 [46.8]
Nominal input power (max.) at nn and p2n		Pn	kW [HP]	8.7 [45]	14.8 [19.8]	23.4 [31.4]	30.0 [40.2]	35.8 [48]	40.8 [54.7]	45.3 [60.7]	48,0 [64.3]	48,2 [64.6]	52,9 [70.9]
Maximum input power at nmax and p2max		Pmax	kW [HP]	19.7 [26.4]	33.6 [45]	53.2 [71.3]	64.1 [86]	71.6 [96]	76.0 [101.9]	78.2 [104.9]	76,6 [102.7]	70,6 [94.7]	70,6 [94.7]
Weight		m	kg [lb]	10.4 [22.9]	10.9 [24.0]	11.7 [28.8]	12.1 [26.7]	13 [28.7]	13.5 [29.8]	14 [30.9]	14.8 [32.6]	15.7 [34.6]	17.8 [39.3]

* reversible pumps have outlet pressure ratings decreased by 10%

Model code

A B C D E F G H I J K L M N O P

A

Code	Family
DOL	Dolomites

B

Code	Number of pump sections
1	Pump
M	Motor

C

Code	Rotation Direction
L	Left (Counterclockwise)
R	Right (Clockwise)
I	Bidirectional (Internally Drained)
E	Bidirectional (Externally Drained)

D

Code	Mouting Flange
BB	SAE-B 2-Bolt
B4	SAE-B 4-Bolt
II	ISO
EU	EU 4-Bolt
UU	UNI (Italy)

A B C D E F G H I J K L M N O P

E

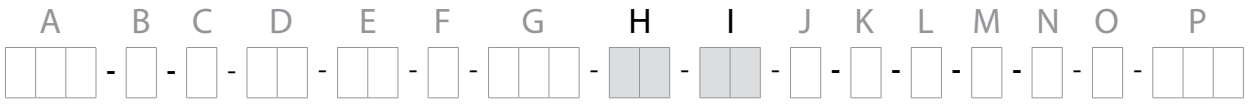
Code	Shaft Type
BA	1:8 Tapered Shaft
AA	1:5 Tapered Shaft
SH	Spline SAE B 13T
SV	Spline SAE BB 15T
S2	Spline UNI 221
S3	Spline DIN 5462
S8	Spline DIN 9611
PB	Cylindric SAE B 7/8"
P1	Cylindric 20
P2	Cylindric 25
PZ	Cylindric SAE BB 1"

F

Code	Frame Size
3	Group 3

G

Code	Displacement	
	cm^3	in^3
010	10.11	0.617
017	17.24	1.052
027	27.35	1.669
034	34.05	2.078
043	43.47	2.653
051	51.44	3.139
061	61.59	3.758
071	71.01	4.333
081	81.87	4.996
100	99.98	6.101



H **I**

Inlet (H) and Outlet (I) Ports		
Code	**Port Type**	**Description**
DA	27 x 1.5	Metric ORB
DB	27 x 2	Metric ORB
DD	33 x 1.5	Metric ORB
DE	33 x 2	Metric ORB
DF	48 x 2	Metric ORB
F4	G 1/2	BSP/GAS
F5	G 3/4	BSP/GAS
F6	G 1	BSP/GAS
F7	G 1-1/4	BSP/GAS
E5	7/8 - 14 UNF	SAE ORB
E6	1-1/16 - 12 UN	SAE ORB
E8	1-5/16 - 12 UN	SAE ORB
E9	1-5/8 - 12 UN	SAE ORB
BM	18 x 40 x 4xM8	DIN Flange (X)
B5	15 x 35 x 4xM6	DIN Flange (x)
B7	20 x 40 x 4xM6	DIN Flange (x)
BA	18 x 55 x 4xM8	DIN Flange (x)
BN	25 x 55 x 4xM8	DIN Flange (x)
BO	26 x 51 x 4xM10	DIN Flange (X)
A2	3/4"	SAE Flange
A3	1"	SAE Flange
A4	1-1/4"	SAE Flange
A5	1-1/2"	SAE Flange
M4	3/4"	SAE Flange Metric
M5	1"	SAE Flange Metric
M6	1-1/4"	SAE Flange Metric
M7	1-1/2"	SAE Flange Metric
C7	18x40xM8	EU Flange (+)
C0	18x55xM8	EU Flange (+)
CA	26x51xM10	EU Flange (+)
CP	25x55xM8	EU Flange (+)
T1	1"	Tube Inlet
T2	1-1/4"	Tube Inlet
T3	1-1/2"	Tube Inlet
T4	2"	Tube Inlet

A B C D E F G H I J K L M N O P

J

Port Configuration	
Code	**Type**
A	Axial Ports
R	Radial Ports
I	Radial Inlet/Axial Outlet
O	Axial Inlet/Radial Outlet
Q	Quad Ports

L*

Internal Seal Options *	
Code	**Description**
N	NBR
B	Viton
G	HNBR

* Applies to shaft seal and case O-ring material. Prsssure seals are always NBR

N

Aux pad option	
Code	**Description**
N	Without aux pad

K

Case Drain Options		
Code	**Dimension**	**Port Type**
N	N/A	No Drain
1	M16x1.5	Metric ORB
2	M18x1.5	Metric ORB
4	G 1/4"	BSP/GAS
5	G 3/8"	BSP/GAS
6	G 1/2"	BSP/GAS
8	9/16"-18 UNF	SAE ORB

M

Outrigger bearing option	
Code	**Description**
N	Without outrigger Bearing
M	Medium Duty Outrigger Bearing
I	ISO Outrigger Bearing*

* Available only with ISO Flange (type II in the model code)

O

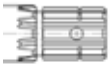
Wet mount option	
Code	**Description**
N	Standard shaft seal, flange pilot diameter not sealed
O	Standard shaft seal, O-ring on flange pilot diameter
W	Double sided shaft seal, O-ring on flange pilot diameter

P

Special Configuration	
Code	**Description**
NNN	Standard black paint
*	Special features (e.g. customer p.n., customized name plate, others)*

* contact Turolla for code specification

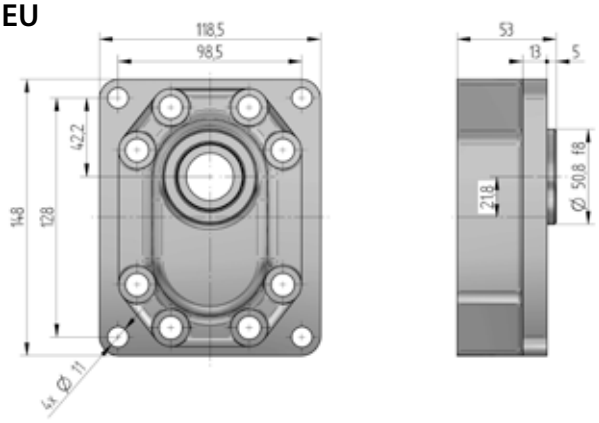
Combination of flanges and shafts

Shaft Type	Model Code	Flange Type	SAE-B 2 bolt	SAE-B 4 bolt	ISO	European rectangular	UNI
			BB	B4	II	EU	UU
							
1:8 Tapered Shaft	BA		a	a	S	S	
1:5 Tapered Shaft	AA		a	a		S	
Spline SAE B 13T	SH		S	S		a	
Spline SAE BB 15T	SV		S	S		a	
Spline UNI 221	S2						S
Spline DIN 5462	S3				S		
Spline DIN 9611	S8				S		
Cylindric SAE B 7/8"	PB		S	S		a	
Cylindric 20	P1		a	a		S	
Cylindric 25	P2		a	a		S	
Cylindric SAE BB 1"	PZ		S	S		a	

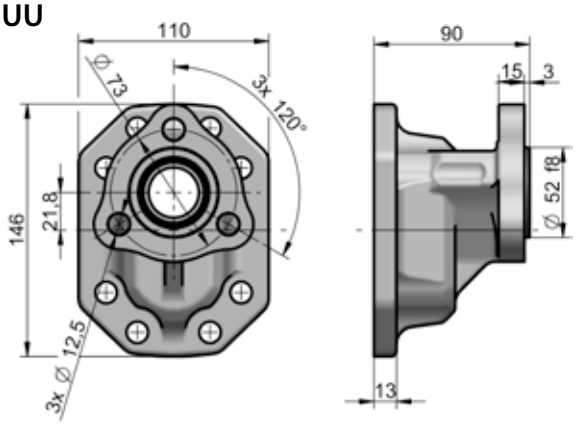
S-Standard **a - Available**

Flange types

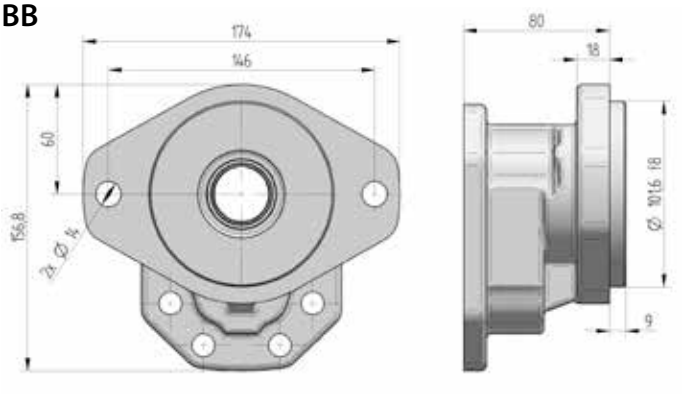
EU



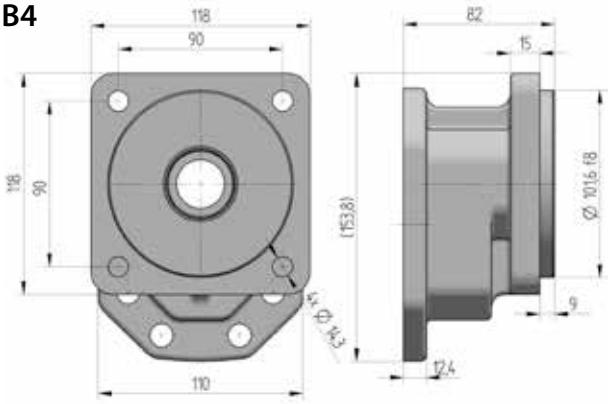
UU



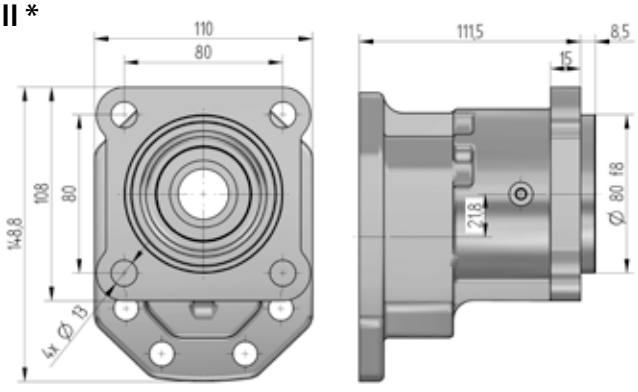
BB



B4

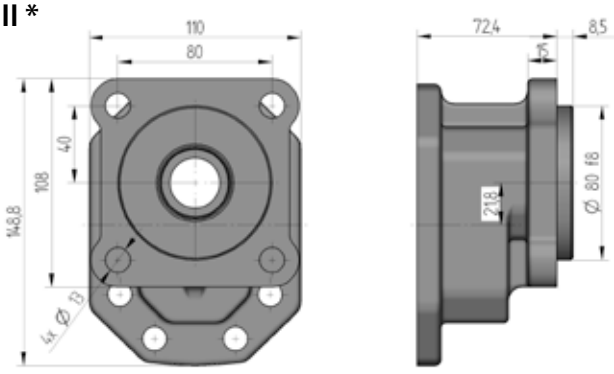


II *



* With ISO outrigger bearing ("I" in model code position M)

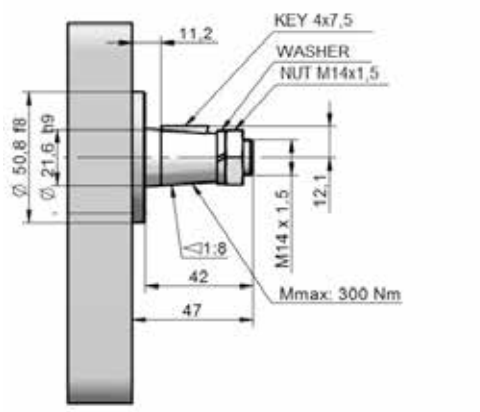
II *



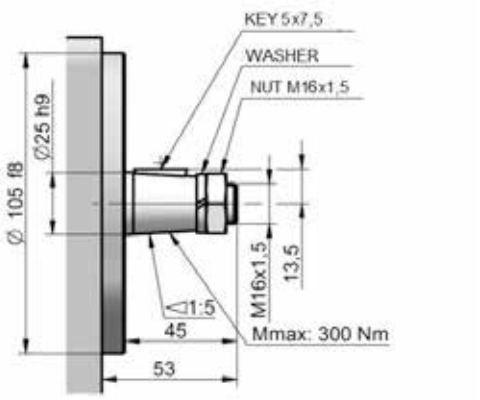
* Without outrigger bearing ("N" in model code position M)

Drive types

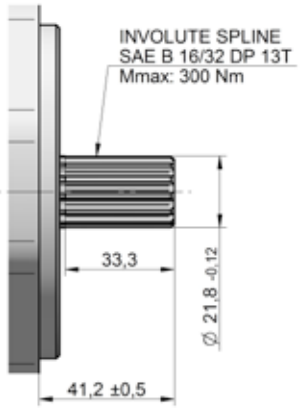
BA



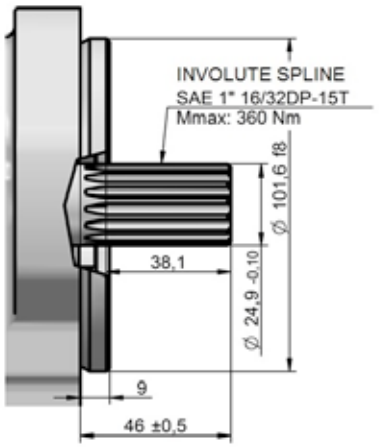
AA



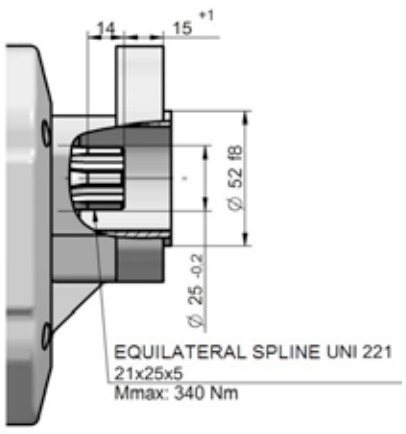
SH



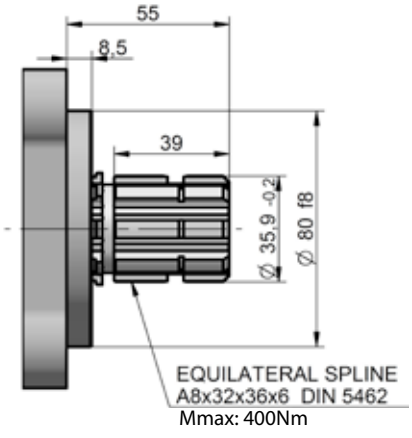
SV



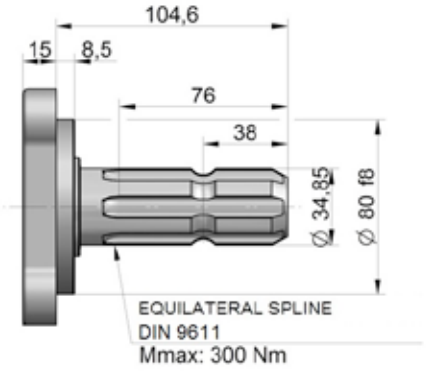
S2



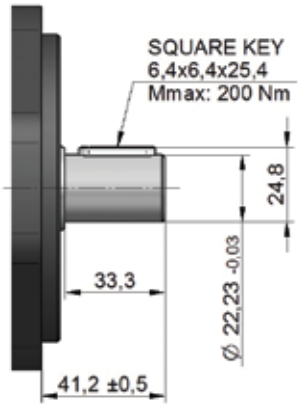
S3



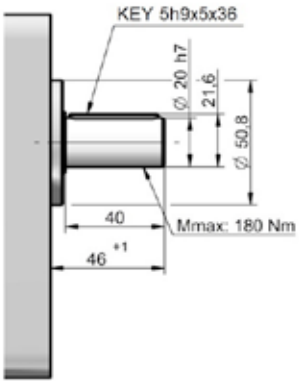
S8


104,6
15
8,5
76
38
Ø 34,85
Ø 80 f8
EQUILATERAL SPLINE
DIN 9611
Mmax: 300 Nm

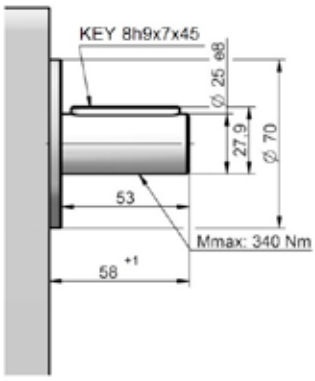
PB


SQUARE KEY
6,4x6,4x25,4
Mmax: 200 Nm
24,8
33,3
Ø 22,23 -0,03
41,2 ±0,5

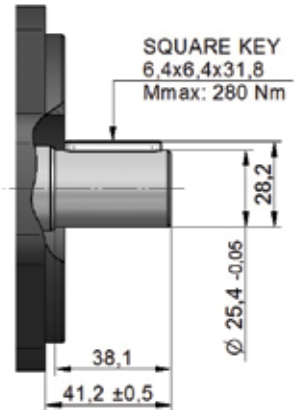
P1


KEY 5h9x5x36
Ø 20 h7
21,6
Ø 50,8
40
Mmax: 180 Nm
46 +1

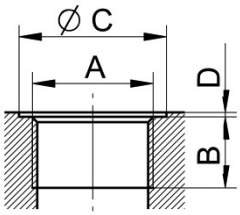
P3


KEY 8h9x7x45
Ø 25 e8
27,9
Ø 70
53
Mmax: 340 Nm
58 +1

PZ

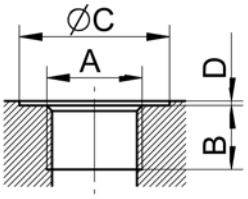

SQUARE KEY
6,4x6,4x31,8
Mmax: 280 Nm
28,2
Ø 25,4 -0,05
38,1
41,2 ±0,5

Combinations of liquid inlets and outlets



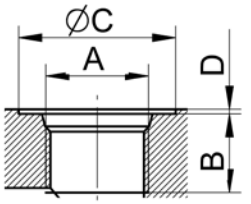
Metric thread according to ISO 6149

Displacement [cm³]	Code	Inlet				Code	Outlet			
		A	B	C	D		A	B	C	D
Dolomites 3 10 - 51	DE	M33x2	18		1	DA	M27x1.5	16	33	1
				40		DB	M27x2	16	33	
Dolomites 3 51-100	DF	M48x2		56		DE	M33x2	18	40	



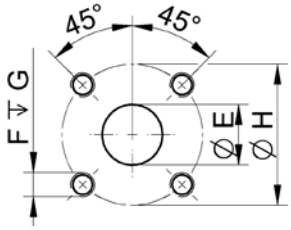
BSPP pipe thread according to ISO 228 - 1

Displacement [cm³]	Code	Inlet				Code	Outlet			
		A	B	C	D		A	B	C	D
Dolomites 3 10 - 17	F4	G 1/2	14	33	1	F4	G 1/2	14	33	1
Dolomites 3 17 - 34	F5	G 3/4	16	39		F5	G 3/4	16	39	
Dolomites 3 34 - 51	F6	G 1	18	45		F6	G 1	18	45	
Dolomites 3 51 - 100	F7	G 1 1/4		57						



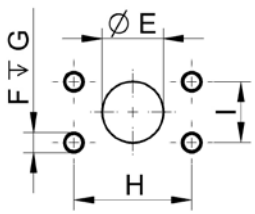
UNF thread according to SAE

Displacement [cm³]	Code	Inlet				Code	Outlet			
		A	B	C	D		A	B	C	D
Dolomites 3 10 - 17	E6	1-1/16-12UNF	19	41	1	E5	7/8-14UNF	17	34	1
Dolomites 3 17 - 27	E8	1-5/16-12UNF	23	49		E6	1-1/16-12UNF	19	41	
Dolomites 3 27 - 39						E8	1-5/16-12UNF	23	49	
Dolomites 3 39 - 100	E9	1 5/8-12 UN 2B		58						



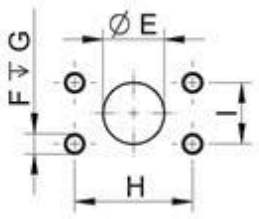
Flanged fittings according to DIN

Displacement [cm³]	Code	Inlet				Code	Outlet			
		E	F	G	H		E	F	G	H
Dolomites 3 10 - 51	BO	26	M10	16	51	BM	20	M8	16	40
	BN	25	M8		55	BA	18			55
Dolomites 3 10 - 17	B7	20	M6	13	40	B5	15	M6	13	35



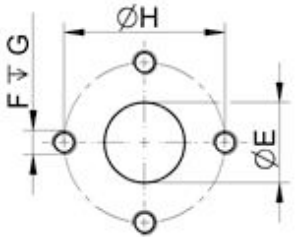
Flanged fittings according to SAE, metric thread

Displacement [cm³]	Code	Inlet					Code	Outlet				
		E	F	G	H	I		E	F	G	H	I
Dolomites 3 10 - 61	M5	25.4	M10	22	52.4	26.2	M4	19	M10	22	47.6	22.2
Dolomites 3 61 - 100	M6	30.5			58.7	30.2	M5	25.4			52.4	26.2
	M7	39.3	M12	27	69.8	35.7	M6	30.5			58.7	30.2



Flanged fittings according to SAE, UNC thread

Displacement [cm³]	Code	Inlet					Code	Outlet				
		E	F	G	H	I		E	F	G	H	I
Dolomites 3 10 - 61	A3	25.4	3/8-16-UNC	22	52.4	26.2	A2	19	3/8-16-UNC	22	47.6	22.2
Dolomites 3 61 - 100	A4	30.5	7/16-14-UNC	29	58.7	30.2	A3	25.4			52.4	26.2
	A5	39.3	1/2-13-UNC	27	69.8	35.7	A4	30.5	7/16-14-UNC	29	58.7	30.2

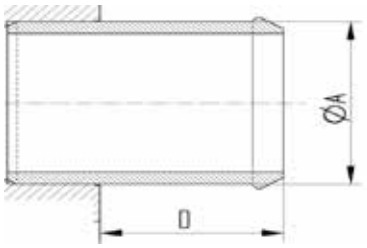


Flanged fittings – "cross"

Displacement [cm³]	Code	Inlet				Code	Outlet			
		E	F	G	H		E	F	G	H
Dolomites3 17 - 51	CA	26	M10	18	51	C7	18	M8	18	40
	CP	25	M8	16	55	CO			16	55

Note: Available only as side ports

Tube inlets

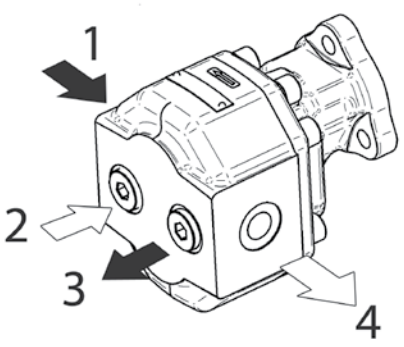


Displacement [cm³]	Code	Inlet	
		A	D
Dolomites 3 10 - 34	**T1**	25.4	27.6
Dolomites 3 34 - 51	**T2**	31.7	29.7
Dolomites 3 51 - 71	**T3**	38.1	31.5
Dolomites 3 71 - 100	**T4**	50.8	29.7

Drain ports:

Case Drain Options		
Code	**Dimension**	**Port Type**
N	N/A	No Drain
1	M16x1.5	Metric ORB
2	M18x1.5	Metric ORB
4	G 1/4"	BSP/GAS
5	G 3/8"	BSP/GAS
6	G 1/2"	BSP/GAS
8	9/16"-18 UNF	SAE ORB

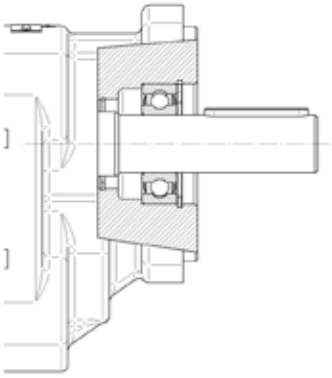
Q (Quad ports) options:
In case of quad ports, there are both rear and side ports present. Rear and side inlet of the same type and size are specified by position E in the model code, rear and side outlet of the same type and size are specified by position I in the model code. The products with quad port configuration are delivered with rear ports fitted with sealed metal plugs.



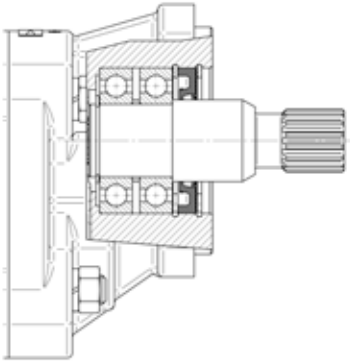
Outrigger bearings

The need for an additonal outrigger bearing depends on many factors including but no limited to magnitude of external force, direction of external force, point of effect on the shaft, load cycle etc. When in doubt if an outrigger bearing is necessary, contact Turolla technical support with application parameters.

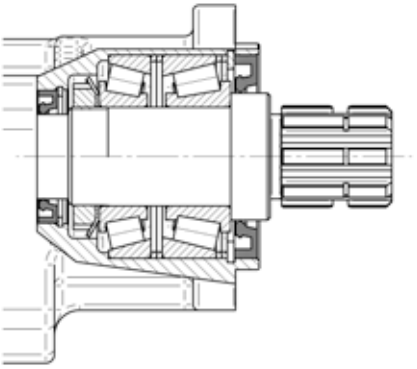
Type M (Medium duty bearing)



Type H (Heavy duty bearing)

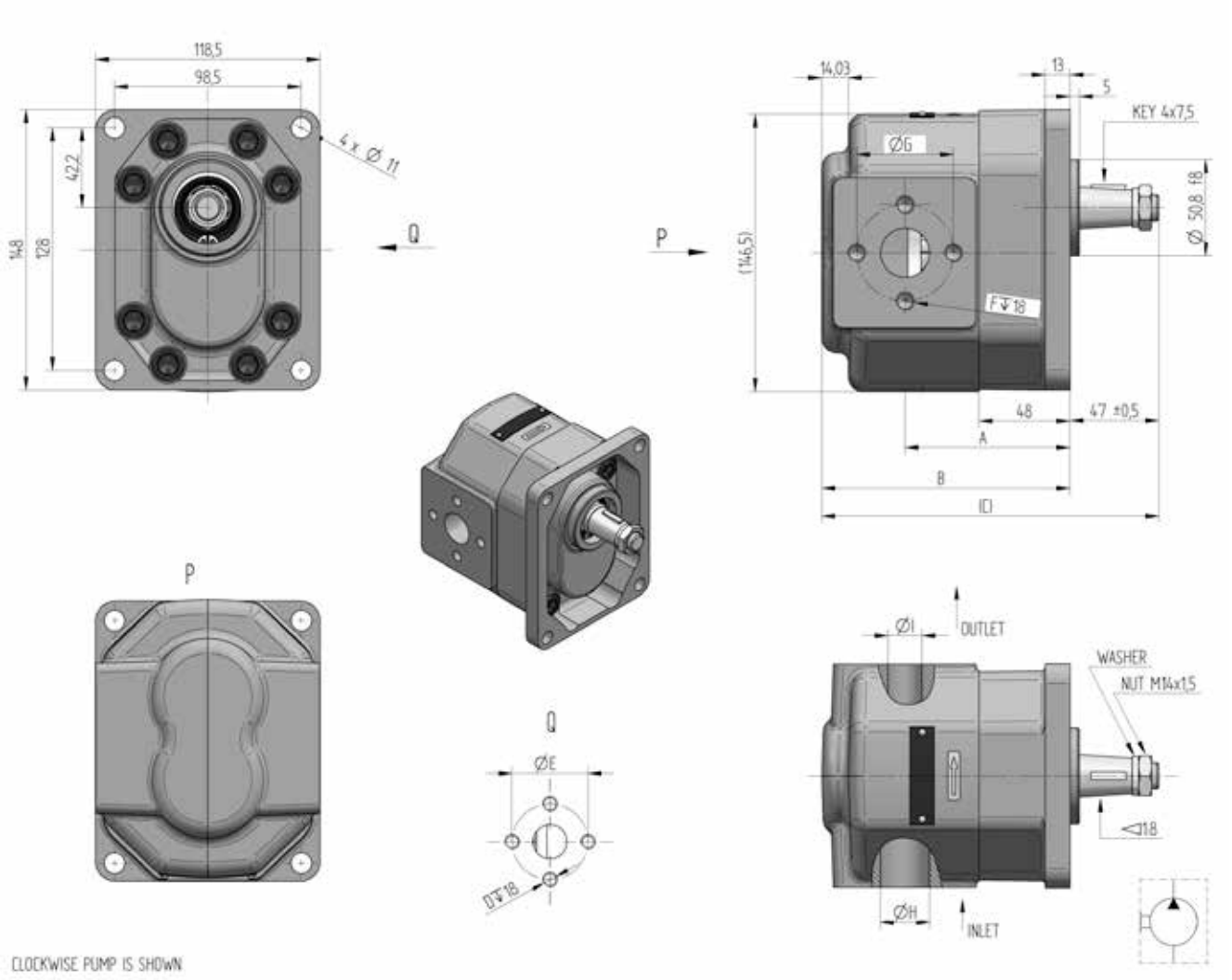


Type I (ISO bearing)

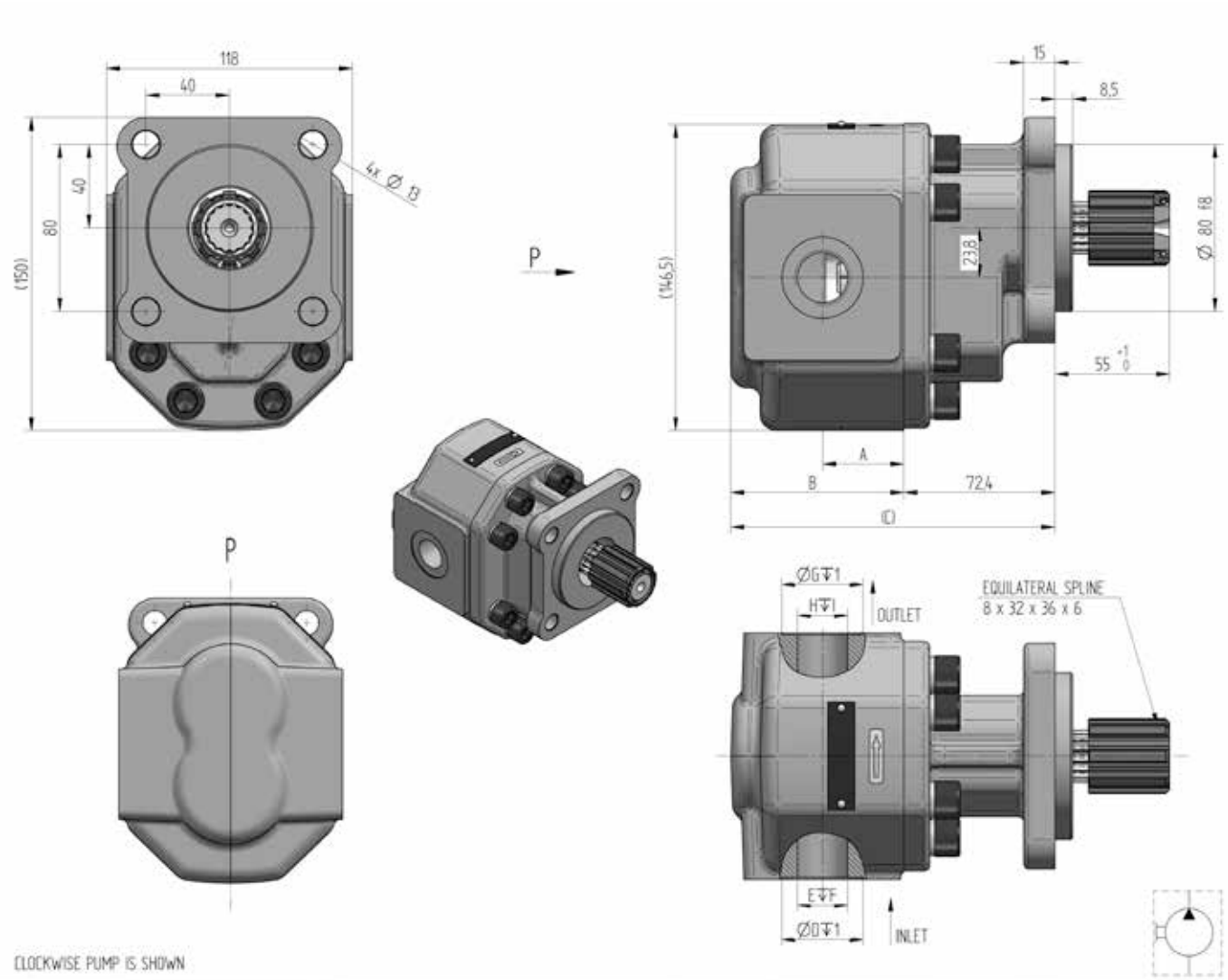


Note: Available only with ISO Flange (II)

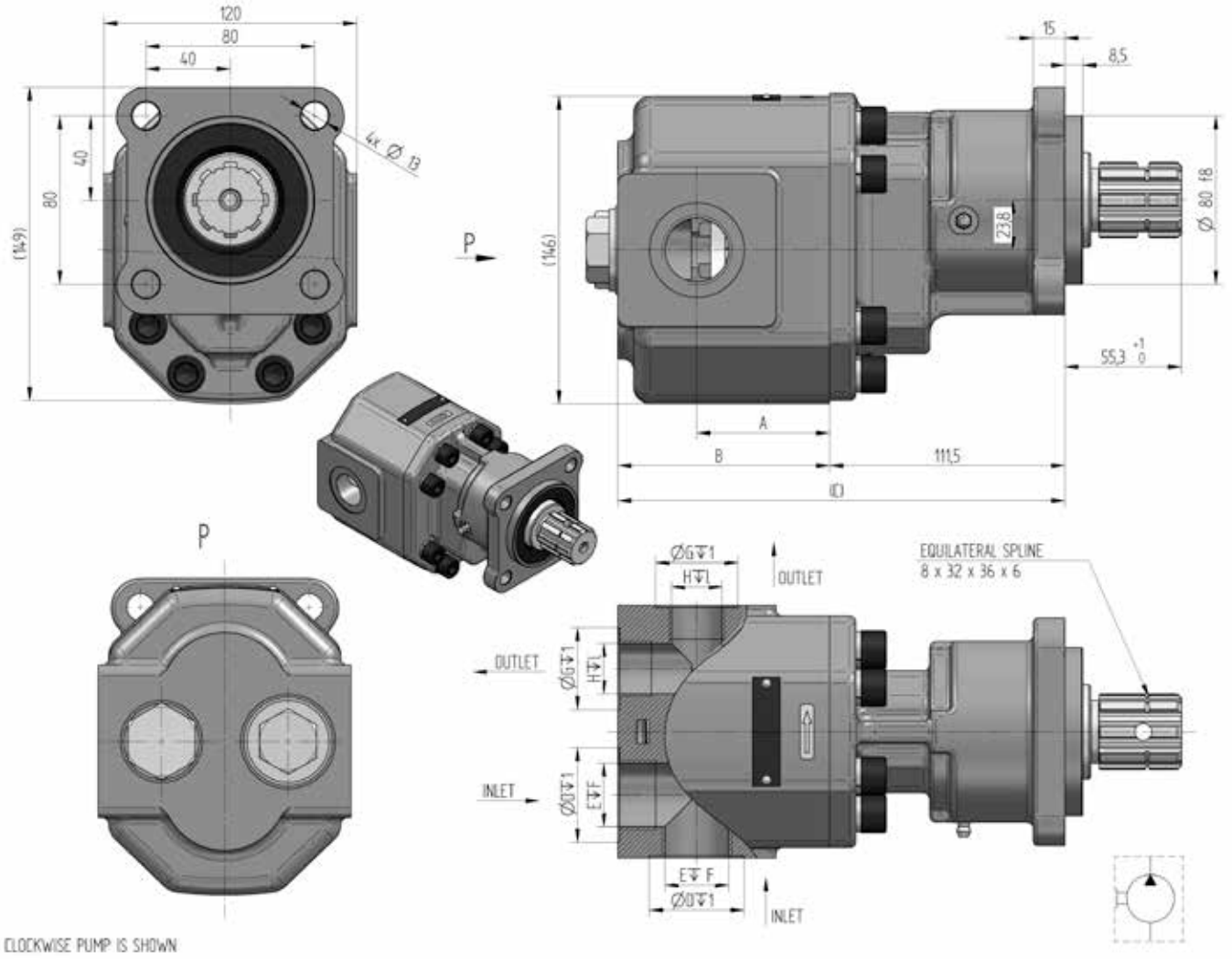
Configuration examples



Model Code	DIR. OF ROT.	DIDPLACEMENT [cm³ /1]	MIN SPEED [min-1]	MAX SPEED [min-1]	A	B	C	D	ØE	F	ØG	ØH	ØI
					DIMENSIONS [mm]								
DOL-1-R-EU-BA-3-051-CP-CO-R-N-N-N-N-N-NNN	R	51	350	2600	110,5	150,5	197,5	M8	55	M8	55	25	18
DOL-1-L-EU-BA-3-051-CP-CO-R-N-N-N-N-N-NNN	L												
DOL-1-R-EU-BA-3-043-CP-CO-R-N-N-N-N-N-NNN	R	43	350	2700	105	145	192	M8	55	M8	55	25	18
DOL-1-L-EU-BA-3-043-CP-CO-R-N-N-N-N-N-NNN	L												
DOL-1-R-EU-BA-3-034-CP-CO-R-N-N-N-N-N-NNN	R	34	350	3000	98,5	138,5	185,5	M8	55	M8	55	25	18
DOL-1-L-EU-BA-3-034-CP-CO-R-N-N-N-N-N-NNN	L												
DOL-1-R-EU-BA-3-027-CP-CO-R-N-N-N-N-N-NNN	R	27	350	3200	94	134	181	M8	55	M8	55	25	18
DOL-1-L-EU-BA-3-027-CP-CO-R-N-N-N-N-N-NNN	L												
DOL-1-R-EU-BA-3-017-CP-CO-R-N-N-N-N-N-NNN	R	17	350	3200	87	127	174	M8	55	M8	55	25	18
DOL-1-L-EU-BA-3-017-CP-CO-R-N-N-N-N-N-NNN	L												
DOL-1-R-EU-BA-3-010-CP-CO-R-N-N-N-N-N-NNN	R	10	350	3200	82	122,0	169,0	M8	55	M8	55	25	18
DOL-1-L-EU-BA-3-010-CP-CO-R-N-N-N-N-N-NNN	L												

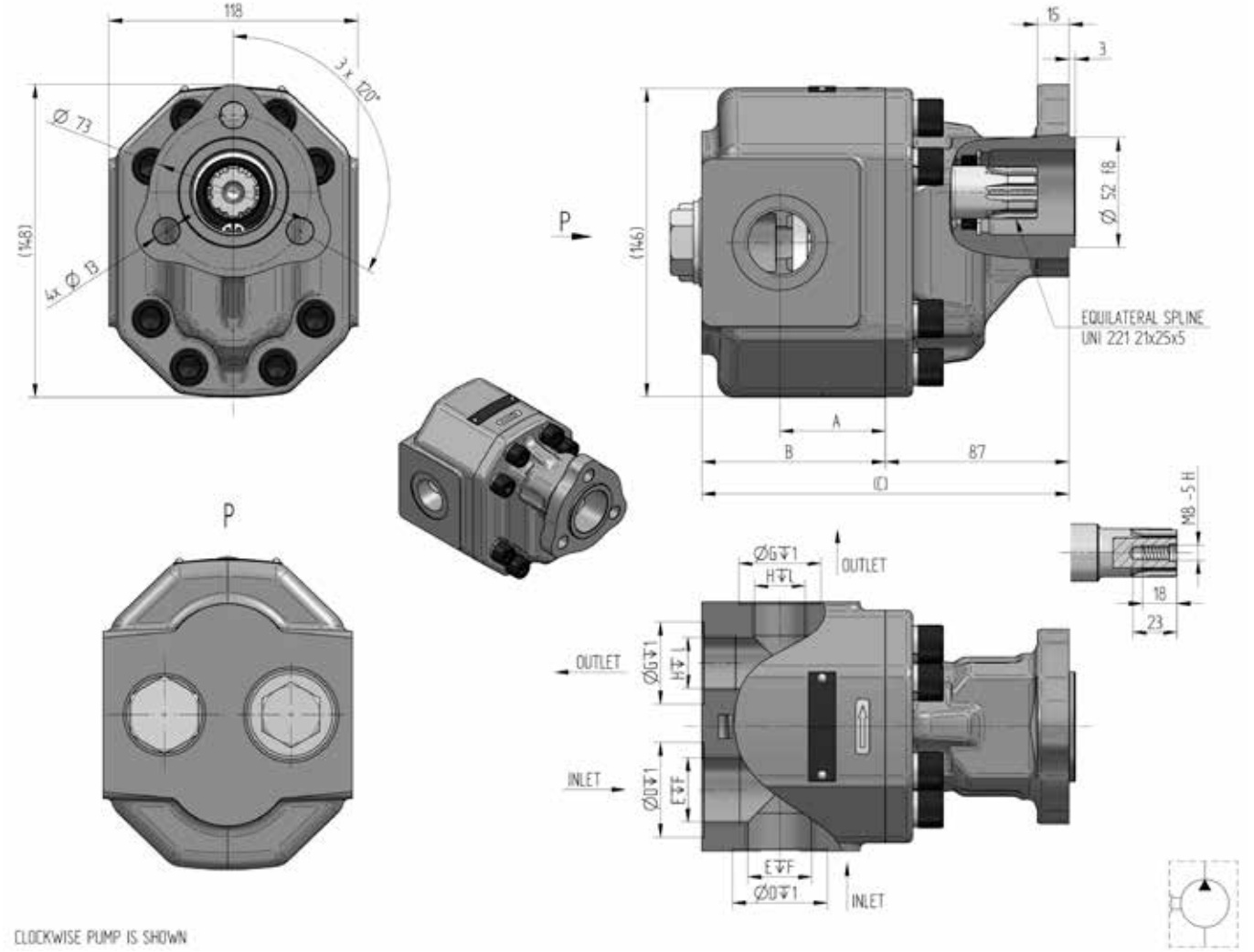


Model Code	DIR. OF ROT.	DISPLA-. CEMENT [cm³ /1]	MIN. SPEED [min-1]	MAX.	A	B	C	ØD	E	F	ØG	H	I
					DIMENSIONS [mm]								
DOL-1-R-II-S3-3-071-F6-F5-R-N-N-N-N-N-NNN	R	71	350	2200	65	104	176,4	45	G1"	18	39	G3/4"	16
DOL-1-L-II-S3-3-071-F6-F5-R-N-N-N-N-N-NNN	L												
DOL-1-R-II-S3-3-061-F6-F5-R-N-N-N-N-N-NNN	R	61	350	2400	63	100,5	172,9	45	G1"	18	39	G3/4"	16
DOL-1-L-II-S3-3-061-F6-F5-R-N-N-N-N-N-NNN	L												
DOL-1-R-II-S3-3-051-F6-F5-R-N-N-N-N-N-NNN	R	51	350	2600	55	92,5	164,9	45	G1"	18	39	G3/4"	14
DOL-1-L-II-S3-3-051-F6-F5-R-N-N-N-N-N-NNN	L												
DOL-1-R-II-S3-3-043-F6-F5-R-N-N-N-N-N-NNN	R	43	350	2800	50	87	159,4	45	G1"	18	39	G3/4"	14
DOL-1-L-II-S3-3-043-F6-F5-R-N-N-N-N-N-NNN	L												
DOL-1-R-II-S3-3-034-F6-F5-R-N-N-N-N-N-NNN	R	34	350	3000	42	80,5	152,9	39	G3/4"	16	39	G3/4"	16
DOL-1-L-II-S3-3-034-F6-F5-R-N-N-N-N-N-NNN	L												
DOL-1-R-II-S3-3-027-F6-F5-R-N-N-N-N-N-NNN	R	27	350	3200	39	76,5	148,9	39	G3/4"	16	33	G1/2"	14
DOL-1-L-II-S3-3-027-F6-F5-R-N-N-N-N-N-NNN	L												
DOL-1-R-II-S3-3-017-F6-F5-R-N-N-N-N-N-NNN	R	17	350	3200	32	68,5	140,9	33	G1/2"	14	33	G1/2"	14
DOL-1-L-II-S3-3-017-F6-F5-R-N-N-N-N-N-NNN	L												
DOL-1-R-II-S3-3-010-F6-F5-R-N-N-N-N-N-NNN	R	10	350	3200	30	64	136,4	33	G1/2"	14	33	G1/2"	14
DOL-1-L-II-S3-3-010-F6-F5-R-N-N-N-N-N-NNN	L												



CLOCKWISE PUMP IS SHOWN

Model Code	DIR. OF. ROT.	DISPLA-CEMENT	MIN SPEED	MAX. SPEED	A	B	C	Ø D	E	F	Ø G	H	I
					DIMENSIONS [mm]								
DOL-1-R-II-S3-3-071-F6-F5-Q-N-N-N-I-N-NNN	R	71	350	2200	65	104	215,5	45	G 1"	18	39	G 3/4"	16
DOL-1-L-II-S3-3-071-F6-F5-Q-N-N-N-I-N-NNN	L												
DOL-1-R-II-S3-3-061-F6-F5-Q-N-N-N-I-N-NNN	R	61	350	2400	63	100,5	212	45	G 1"	18	39	G 3/4"	16
DOL-1-L-II-S3-3-061-F6-F5-Q-N-N-N-I-N-NNN	L												
DOL-1-R-II-S3-3-051-F6-F5-Q-N-N-N-I-N-NNN	R	51	350	2600	55	92,5	204	45	G 1"	18	39	G 3/4"	16
DOL-1-L-II-S3-3-051-F6-F5-Q-N-N-N-I-N-NNN	L												
DOL-1-R-II-S3-3-043-F6-F5-Q-N-N-N-I-N-NNN	R	43	350	2800	50	87	198,5	45	G 1"	18	39	G 3/4"	16
DOL-1-L-II-S3-3-043-F6-F5-Q-N-N-N-I-N-NNN	L												
DOL-1-R-II-S3-3-034-F6-F5-Q-N-N-N-I-N-NNN	R	34	350	3000	42	80,5	192	39	G 3/4"	16	39	G 3/4"	16
DOL-1-L-II-S3-3-034-F6-F5-Q-N-N-N-I-N-NNN	L												
DOL-1-R-II-S3-3-027-F6-F5-Q-N-N-N-I-N-NNN	R	27	350	3200	39	76,5	188	39	G 3/4"	16	33	G1/2"	14
DOL-1-L-II-S3-3-027-F6-F5-Q-N-N-N-I-N-NNN	L												
DOL-1-R-II-S3-3-017-F6-F5-Q-N-N-N-I-N-NNN	R	17	350	3200	32	68,5	180	33	G 1/2"	14	33	G1/2"	14
DOL-1-L-II-S3-3-017-F6-F5-Q-N-N-N-I-N-NNN	L												
DOL-1-R-II-S3-3-010-F6-F5-Q-N-N-N-I-N-NNN	R	10	350	3200	30	64	175,5	33	G 1/2"	14	33	G1/2"	14
DOL-1-L-II-S3-3-010-F6-F5-Q-N-N-N-I-N-NNN	L												



CLOCKWISE PUMP IS SHOWN

ORDER KEY	DIR. OF ROT.	DISPLACEMENT	MIN SPEED	MAX. SPEED	A	B	C	Ø D	E	F	Ø G	H	I
					DIMENSIONS [mm]								
DOL-1-R-UU-S2-3-071-F6-F5-Q-N-N-N-N-N-NNN	R	71	350	2200	65	104	194	45	G 1"	18	39	G 3/4"	16
DOL-1-L-UU-S2-3-071-F6-F5-Q-N-N-N-N-N-NNN	L												
DOL-1-R-UU-S2-3-061-F6-F5-Q-N-N-N-N-N-NNN	R	61	350	2400	63	100,5	190,5	45	G 1"	18	39	G 3/4"	16
DOL-1-L-UU-S2-3-061-F6-F5-Q-N-N-N-N-N-NNN	L												
DOL-1-R-UU-S2-3-051-F6-F5-Q-N-N-N-N-N-NNN	R	51	350	2600	55	92,5	182,5	45	G 1"	18	39	G 3/4"	16
DOL-1-L-UU-S2-3-051-F6-F5-Q-N-N-N-N-N-NNN	L												
DOL-1-R-UU-S2-3-043-F6-F5-Q-N-N-N-N-N-NNN	R	43	350	2800	50	87	177	45	G 1"	18	39	G 3/4"	16
DOL-1-L-UU-S2-3-043-F6-F5-Q-N-N-N-N-N-NNN	L												
DOL-1-R-UU-S2-3-034-F6-F5-Q-N-N-N-N-N-NNN	R	34	350	3000	42	80,5	170,5	39	G 3/4"	16	39	G 3/4"	16
DOL-1-L-UU-S2-3-034-F6-F5-Q-N-N-N-N-N-NNN	L												
DOL-1-R-UU-S2-3-027-F6-F5-Q-N-N-N-N-N-NNN	R	27	350	3200	39	76,5	166,5	39	G 3/4"	16	33	G1/2"	14
DOL-1-L-UU-S2-3-027-F6-F5-Q-N-N-N-N-N-NNN	L												
DOL-1-R-UU-S2-3-017-F6-F5-Q-N-N-N-N-N-NNN	R	17	350	3200	32	68,5	158,5	33	G 1/2"	14	33	G1/2"	14
DOL-1-L-UU-S2-3-017-F6-F5-Q-N-N-N-N-N-NNN	L												
DOL-1-R-UU-S2-3-010-F6-F5-Q-N-N-N-N-N-NNN	R	10	350	3200	30	64	154	33	G 1/2"	14	33	G1/2"	14
DOL-1-L-UU-S2-3-010-F6-F5-Q-N-N-N-N-N-NNN	L												

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