GEAR PUMPS

GEAR MOTORS

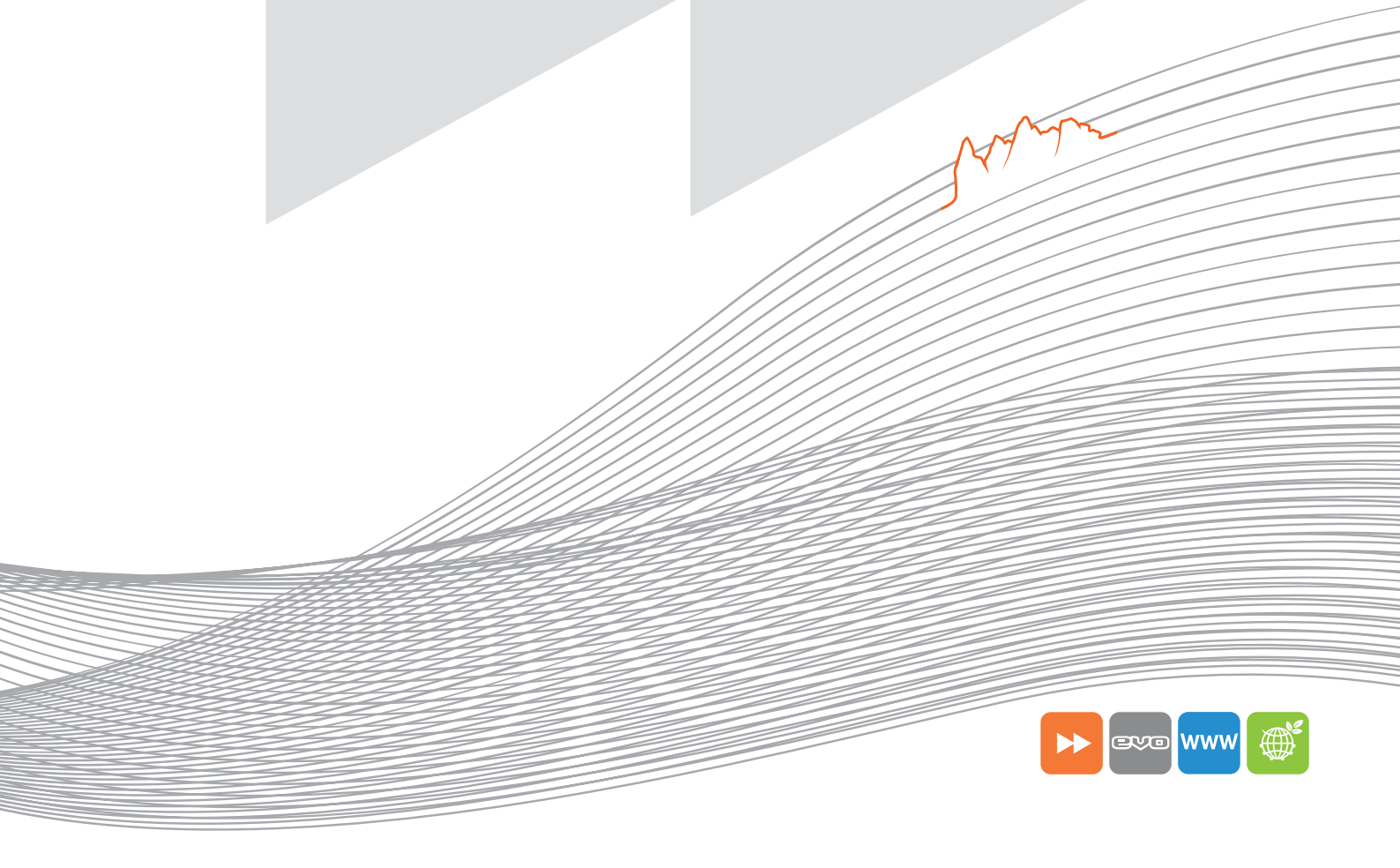
Member of the Danfoss Group

TUROLLA

fast forward thinking

CAST IRON GEAR PUMPS AND MOTORS

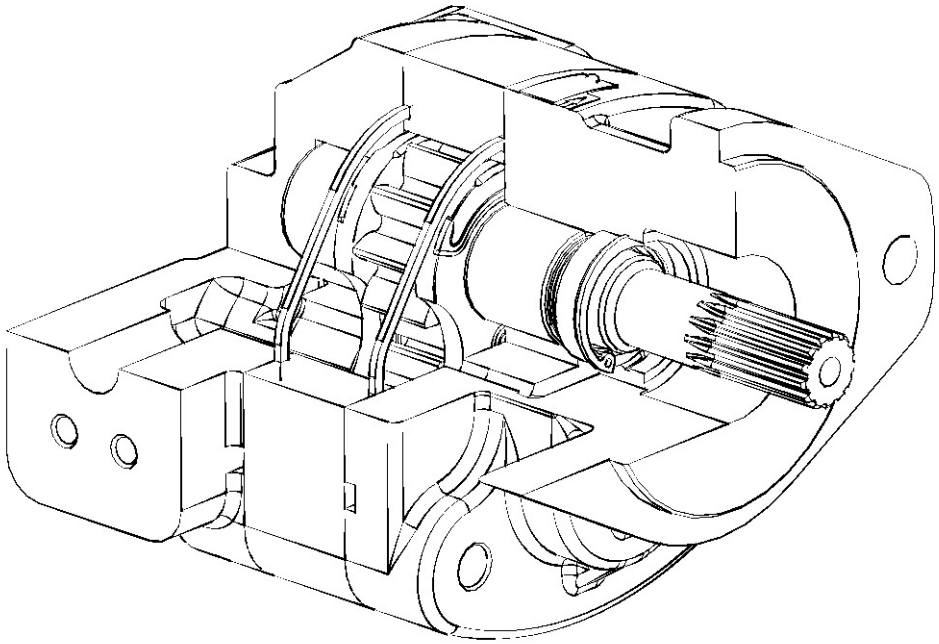
Cascade Group 3 | Technical Information



History of revisions

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

Contents



Description

Overview
Cascade 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.

The three structural members of the pump and motor are: flange, body and cover, 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 needed in demanding off highway applications.

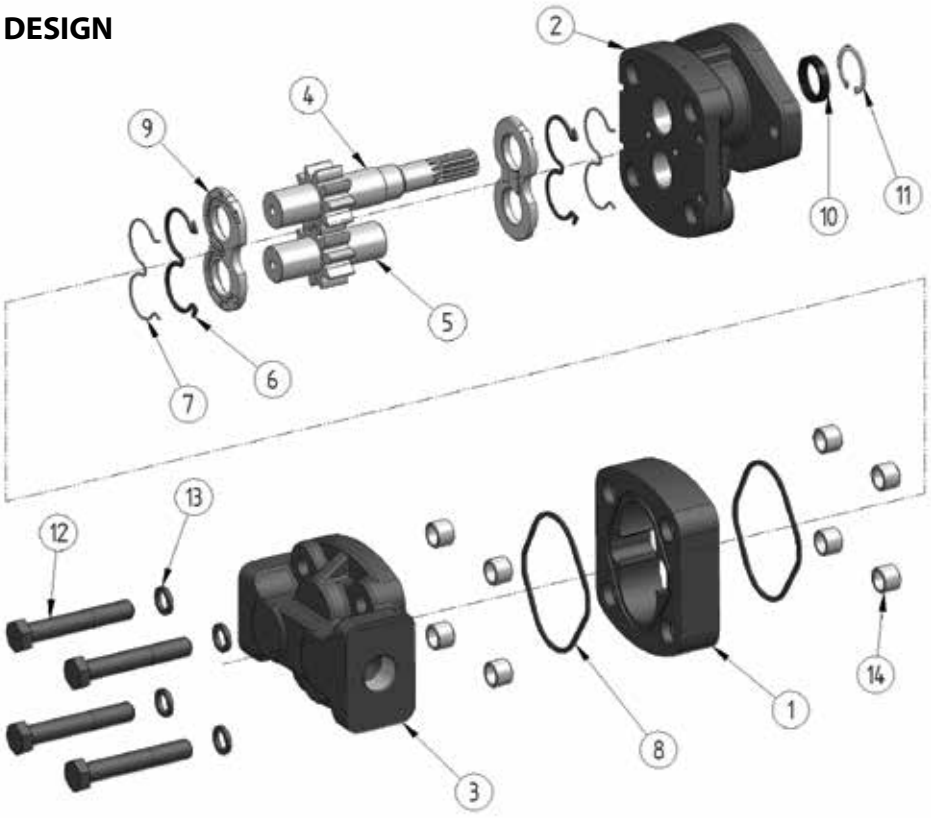
Sleeve bushings are pressed in the flange and cover and have been optimized to provide long life in low viscosity, high pressure conditions. Axial pressure balance is ensured by aluminium alloy thrust plates with integrated pressure seals.

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

Cascade Group 3 pumps can be coupled together to produce tandem, triple and even quadruple units. The interconnecting chambers can accommodate fluid flow between sections and allow the number of inlet connections to be minimized.

Cascade Group 3 pumps and motors cover the wide range of displacements from 17 to 71 cm^3.

DESIGN



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

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

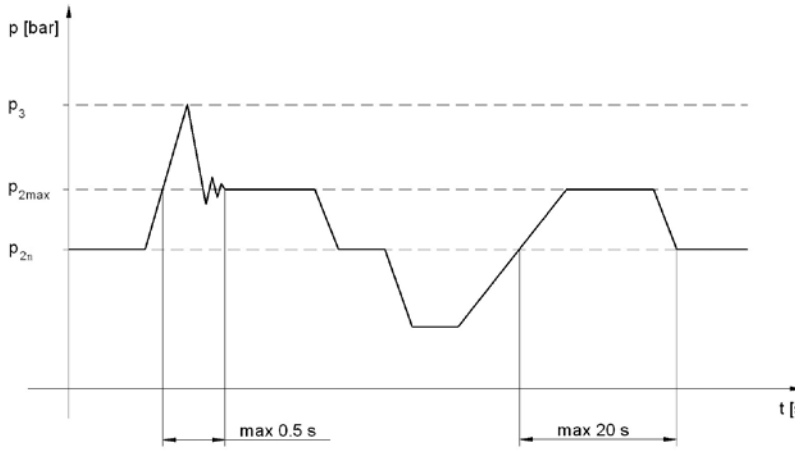
β_x ratio is a measure of filter efficiency defined by ISO 4572. It is the ratio of the number of particles greater than a given diameter ("$_x$" in microns) upstream of the filter to the number of these particles downstream of the filter.

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

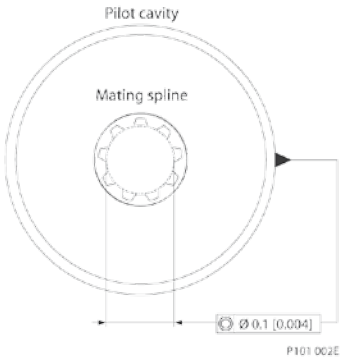


$p2_n$	**rated pressure**	the average, regularly occuring operating pressure that should yield satisfactory product life. The maximum machine load demand determines rated pressure. For all systems, the load should be below this pressure.
$p2_{max}$	**intermittent pressure**	maximum pressure permissible for a short time, max. 20s. at a time
p_3	**peak pressure**	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 Cascade 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.

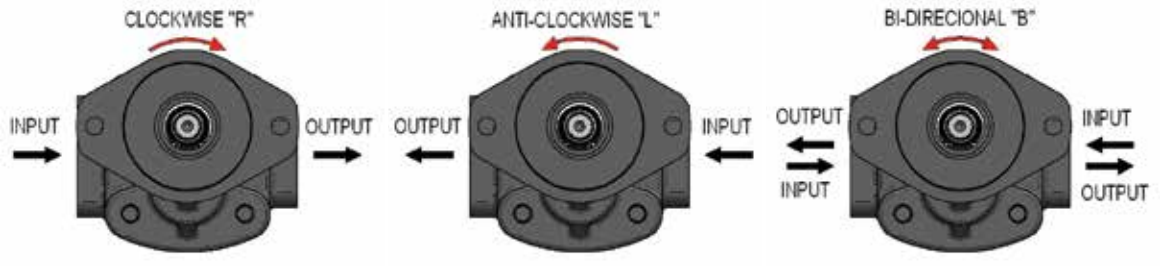
Allowable **radial shaft loads** are a function of the load position, load orientation, and operating pressure of the hydraulic pump. All external shaft loads have an effect on bearing life, and may affect pump performance.
In applications where external shaft loads can't be avoided, minimize the impact 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.

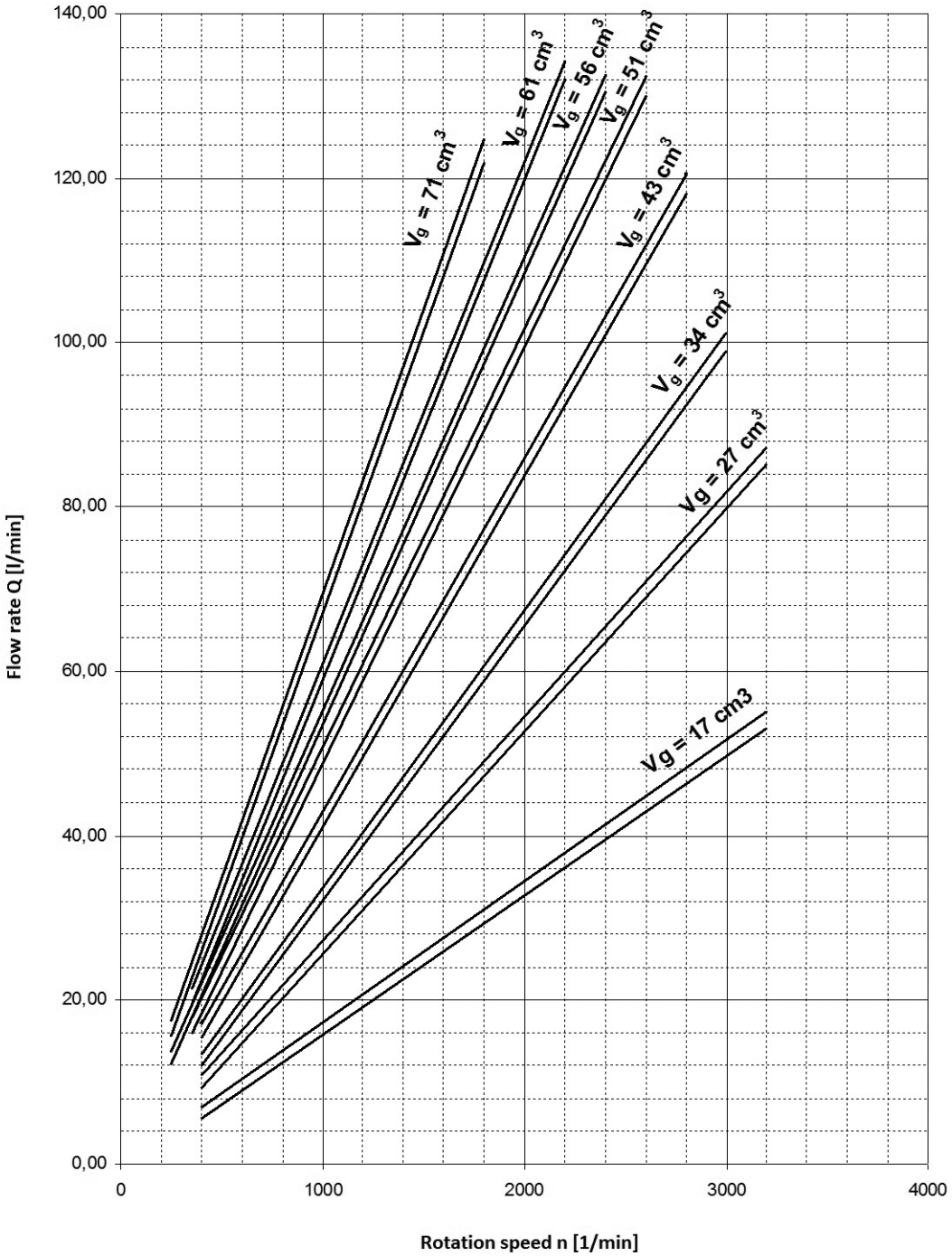


Technical data

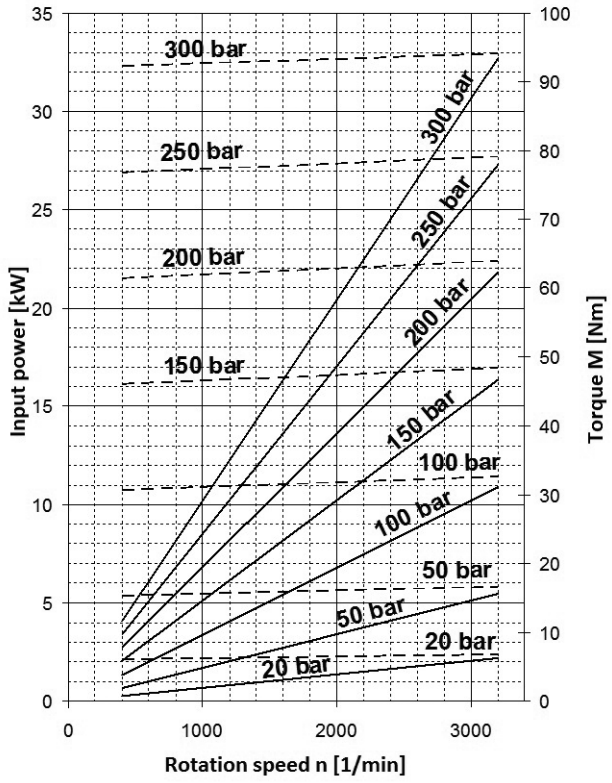
Nominal Size Parameters		Sym.	Unit	Cascade3 17	Cascade3 22	Cascade3 27	Cascade3 34	Cascade3 43	Cascade3 51	Cascade3 56	Cascade3 61	Cascade3 71
Actual displacement		Vg	cm3/rev [in3/rev]	17.39 [1.061]	22.46 [1.370]	27.53 [1.679]	34.05 [2.078]	43.47 [2.653]	51.44 [3.139]	55.79 [3.405]	61.59 [3.758]	71.01 [4.333]
Rotation speed	nominal	nn	min -1 [rpm]	1500								
	minimum	nmin	min -1 [rpm]	400	400	400	400	400	350	350	350	350
	maximum	nmax	min -1 [rpm]	3200	3200	3200	3000	2800	2600	2400	2200	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]	300 [4350]	300 [4350]	300 [4350]	300 [4350]	280 [4060]	260 [3770]	250 [3620]	230 [3330]	210 [3040]
	maximum	p2max	bar [psi]	320 [4640]	320 [4640]	320 [4640]	320 [4640]	300 [4350]	280 [4060]	270 [3900]	250 [3620]	230 [3330]
	peak	p3	bar [psi]	330 [4780]	330 [4780]	330 [4780]	330 [4780]	310 [4500]	290 [4200]	280 [4060]	260 [3770]	240 [3480]
Nominal flow rate (min.) at nn and p2n		Qn	l/min [US gal/ min]	23.5 [6.2]	31 [8.2]	38 [10]	48 [12.7]	61.3 [16.2]	72.5 [19.1]	78.7 [20.8]	86.8 [22.9]	100.1 [26.4]
Maximum flow rate at nmax and p2max		Qmax	l/min [US gal/ min]	54.5 [14.4]	70.4 [18.6]	86.3 [22.8]	100.1 [26.4]	119.3 [31.5]	131.1 [34.6]	131.2 [34.6]	132.8 [35.1]	125.3 [33.1]
Nominal input power (max.) at nn and p2n		Pn	kW [HP]	16.1 [21.6]	20.3 [27.2]	24.9 [33.4]	30.2 [40.5]	36 [48.2]	39.5 [53]	41.2 [55.2]	41.9 [56.2]	44.1 [59.1]
Maximum input power at nmax and p2max		Pmax	kW [HP]	33.6 [45]	43.5 [58.3]	53.3 [71.5]	61.8 [82.8]	69 [92.5]	70.8 [95]	68.3 [91.6]	64 [85.8]	55.6 [74.5]
Weight		m	kg [lb]	15.3 [33.7]	15.6 [34.4]	15.7 [34.6]	16.2 [35.7]	16.7 [36.8]	17.1 [37.7]	17.3 [38.1]	17.6 [38.8]	18.1 [39.9]

* reversible pumps have outlet pressure ratings decreased by 10%

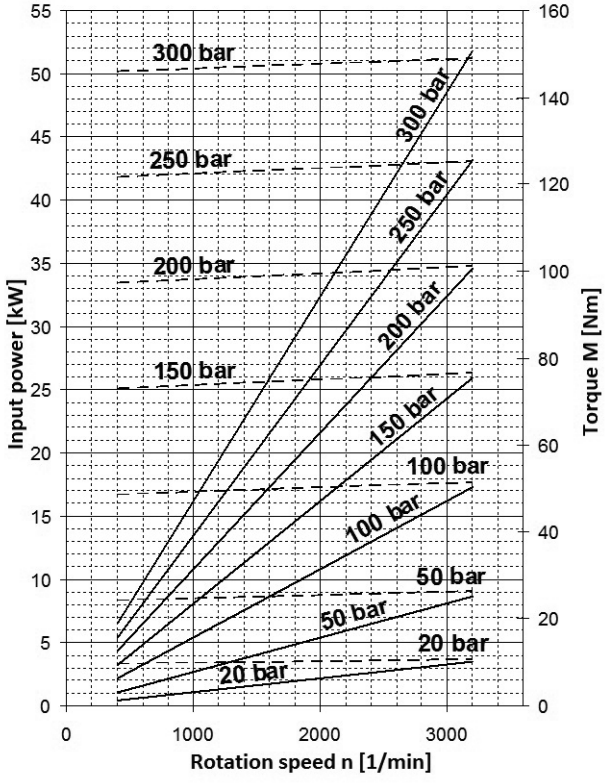
Flow rate and power curves



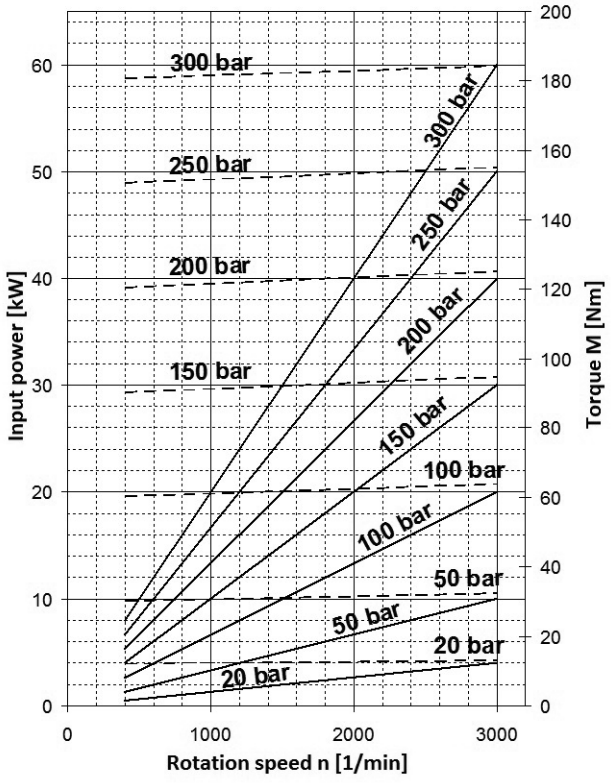
17 cm³



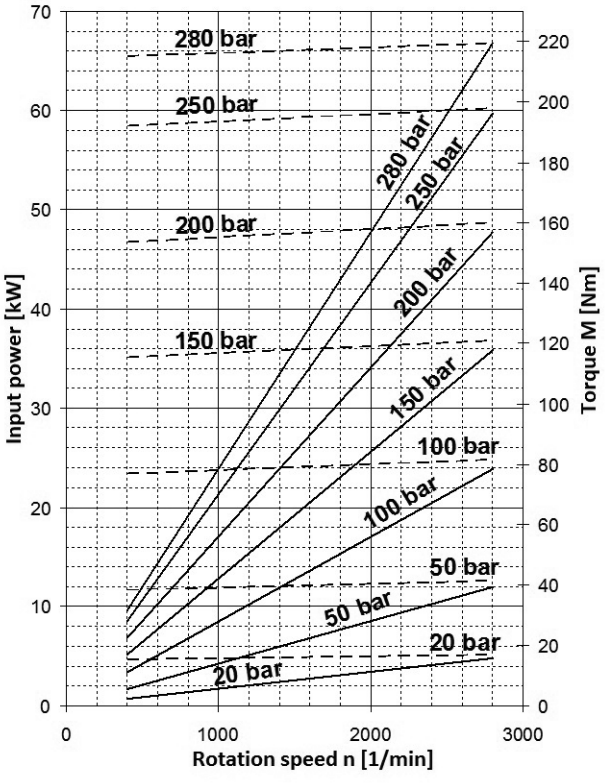
27 cm³



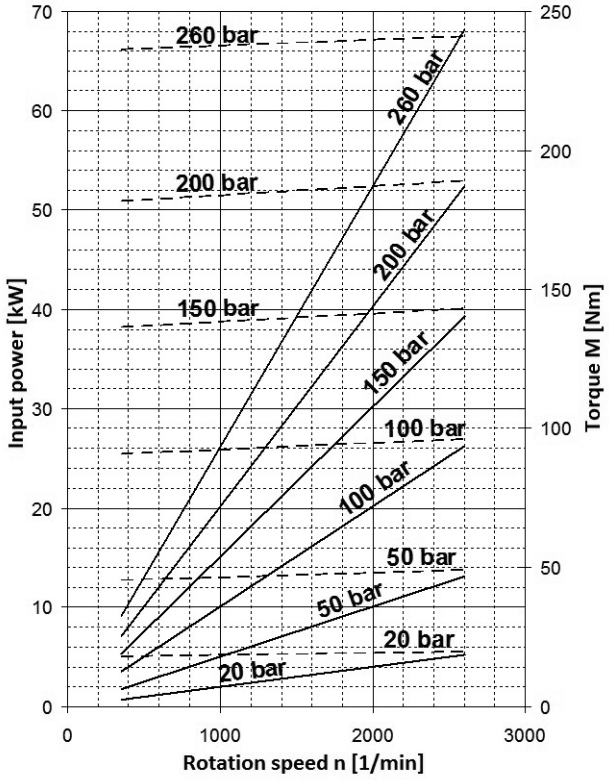
34 cm³



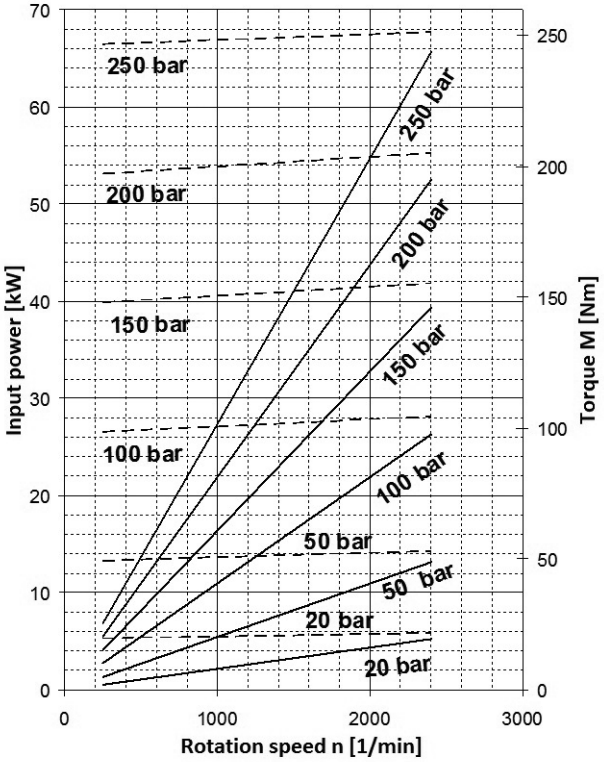
43 cm³



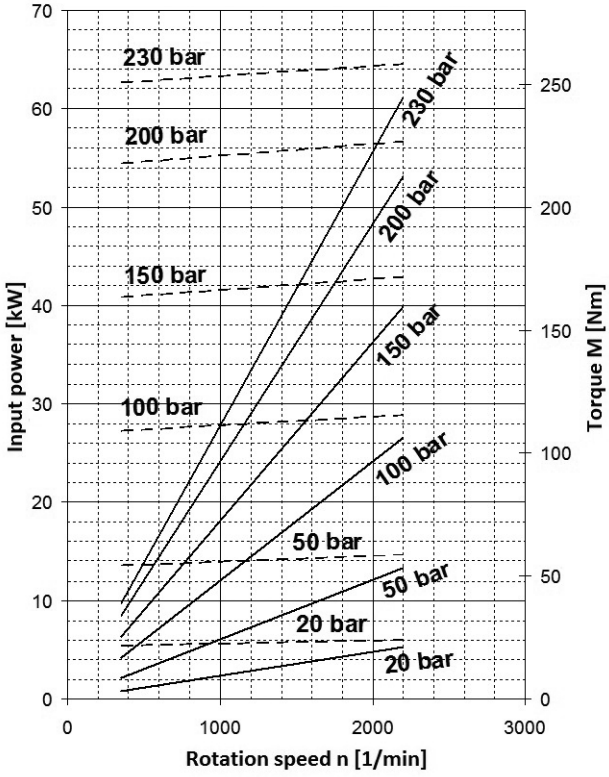
51 cm³



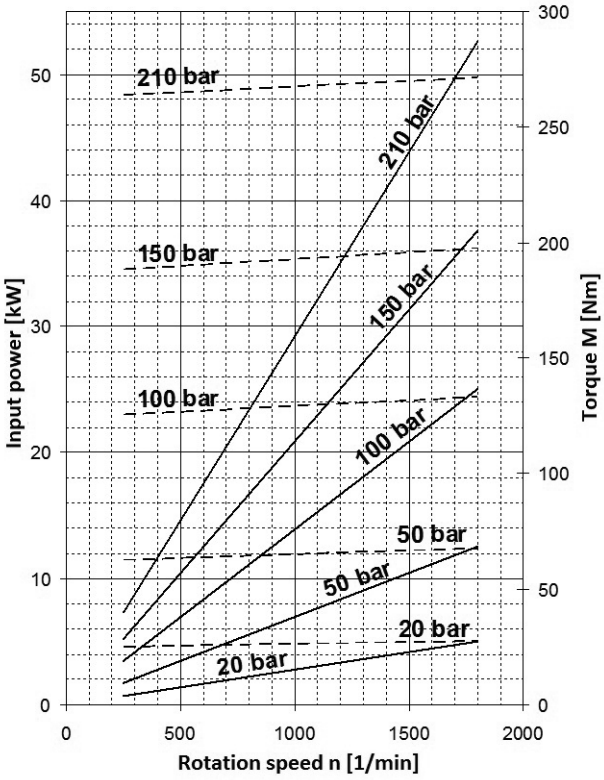
56 cm³



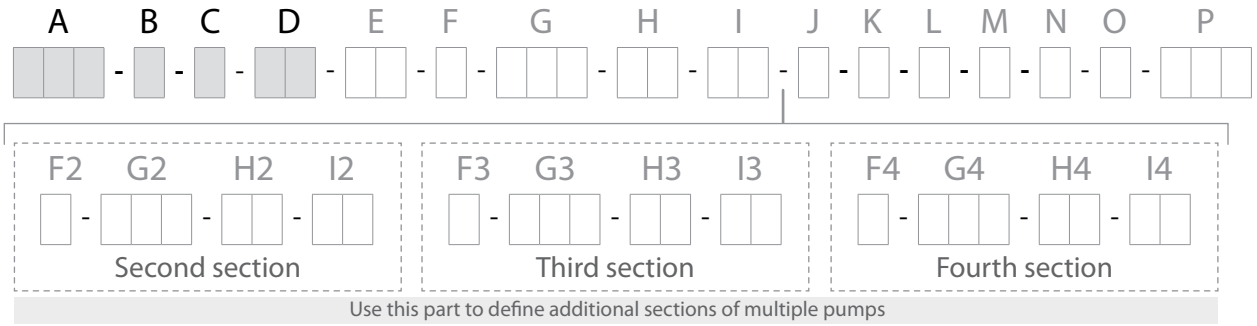
61 cm³



71 cm³



Model code



A

Code	Family
CAS	Cascade

B

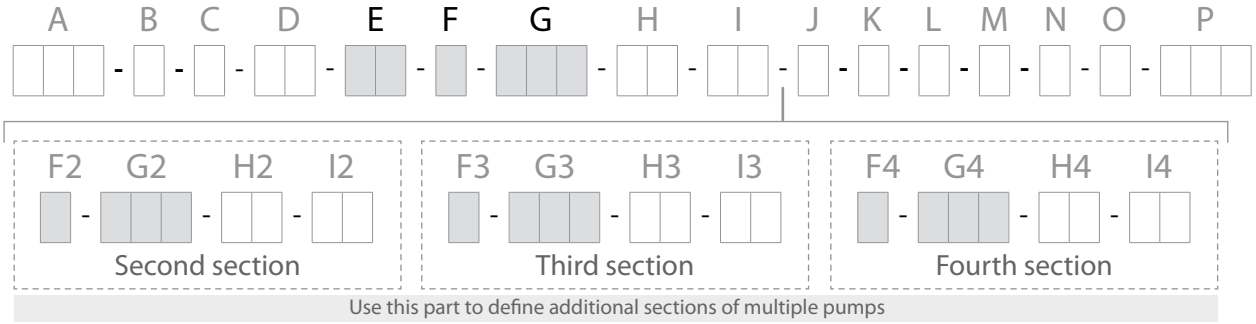
Code	Type (Number of sections)
1	Single, (One)
2	Tandem, (Two)
3	Triple, (Three)
4	Quadruple, (Four)
M	Motor

C

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

D

Code	Mouting Flange
AA	SAE-A 2 bolt
BB	SAE-B 2 bolt
B4	SAE-B 4 bolt
C2	SAE-C 2 bolt
C6	SAE-C 2+4 bolt (universal)
II	ISO



E

Code	Shaft Type
BA	1:8 Tapered Shaft
AA	1:5 Tapered Shaft
SE	Spline SAE A 9T
SC	Spline SAE A 11T
SH	Spline SAE B 13T
S0	Spline SAE C 14T *
SV	Spline SAE BB 15T
S3	Spline DIN 5462
S7	Spline DIN 5480 *
PB	Cylindric SAE B 7/8"
PZ	Cylindric SAE BB 1"
P3	Cylindric SAE C 1-1/4" *

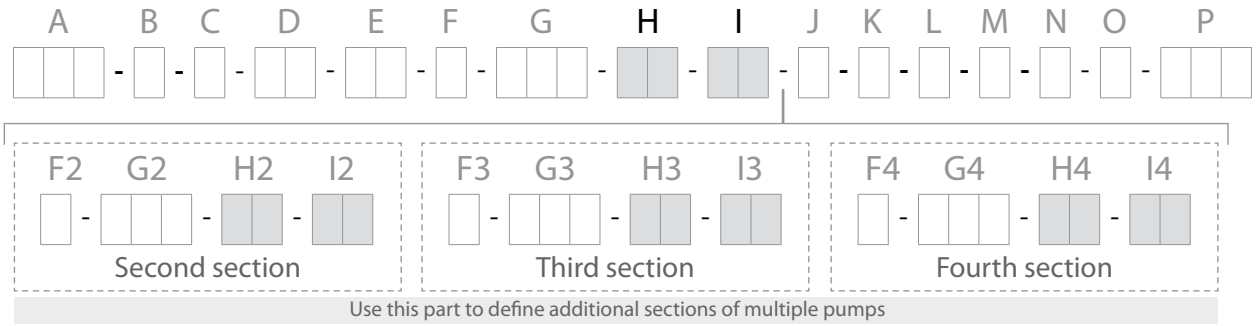
* available only incombination with heavy duty outrigger bearing (type H in the model code)

F

Code	Frame Size
3	Group 3

G

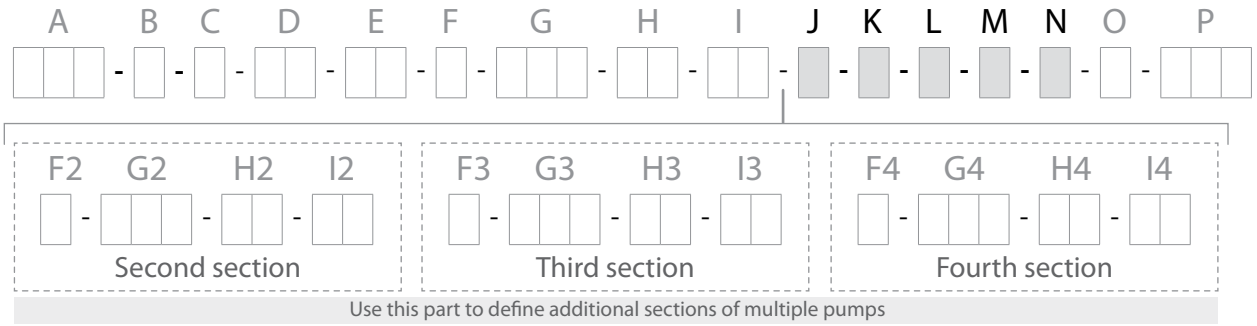
Code	Displacement	
	(cc)	in^3
017	17,39	1,06
022	22,50	1,37
027	27,53	1,68
034	34,05	2,08
043	43,47	2,65
051	51,44	3,14
056	55,79	3,40
061	61,59	3,76
071	71,01	4,33



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
F5	G 3/4	BSP/GAS
F6	G 1	BSP/GAS
F7	G 1-1/4	BSP/GAS
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)
BA	18 x 55 x 4xM8	DIN Flange (x)
B5	15 x 35 x 4xM6	DIN Flange (x)
B7	20 x 40 x 4xM6	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
A6	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
M8	2"	SAE Flange Metric
C7	18x40xM8	EU Flange (+)
CO	18x55xM8	EU Flange (+)
CA	26x51xM10	EU Flange (+)
CP	25x55xM8	EU Flange (+)
NN	-	No port
T1	1"	Tube Inlet
T2	1-1/4"	Tube Inlet
T3	1-1/2"	Tube Inlet
T4	2"	Tube Inlet

Note: When selecting multiple pump with single inlet, please specify required inlet size in the required section and specify NN (no port) for inlets in other sections



J

Port Configuration	
Code	**Type**
A	Axial Ports
R	Radial Ports
I	Radial Inlet+Axial Outlet
O	Axial Inlet+Radial Outlet
Q	Quad ports (Radial AND Axial ports)

L

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

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

N

Aux pad option	
Code	**Description**
N	Without aux pad
1	SAE-A 9T Aux Flange
2	SAE-A 11T Aux Flange

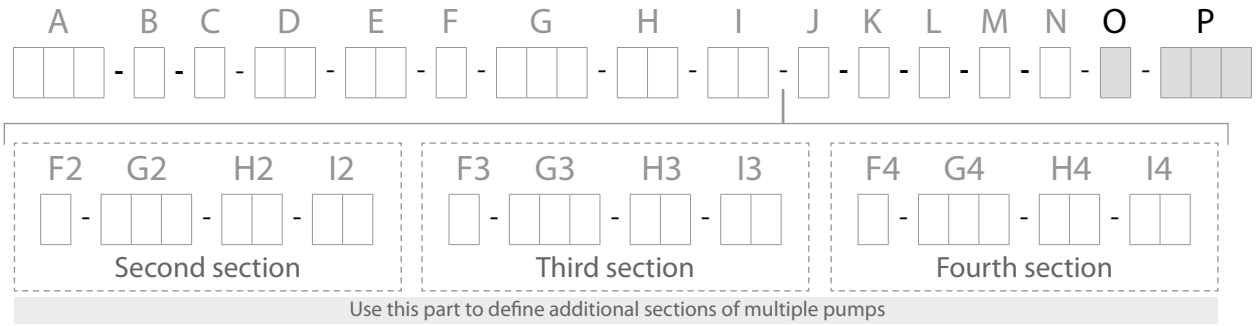
K

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
H	Heavy 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

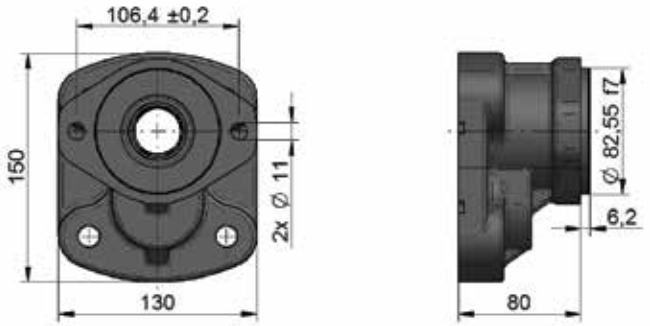
P

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

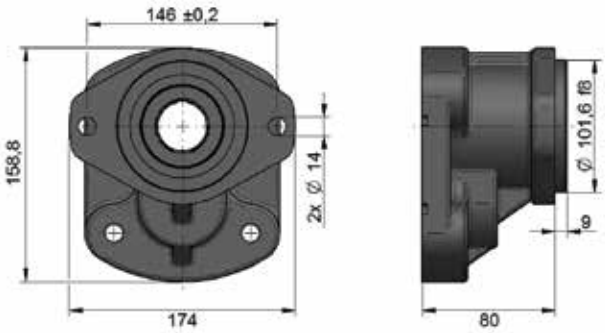
* contact Turolla for code specification

Flange types

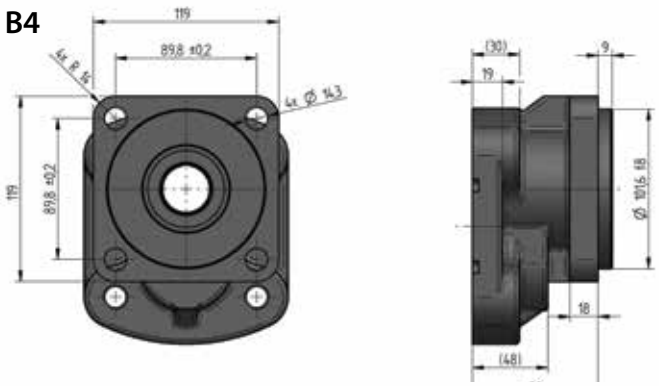
AA



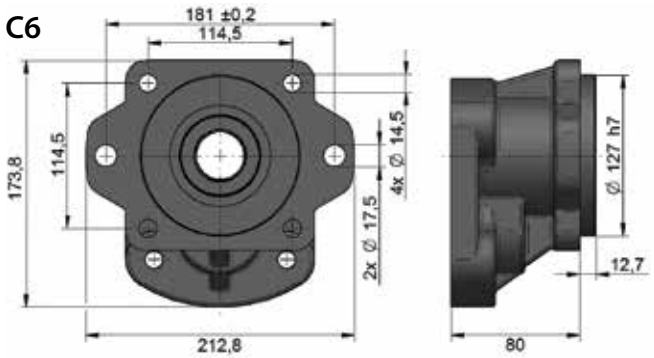
BB



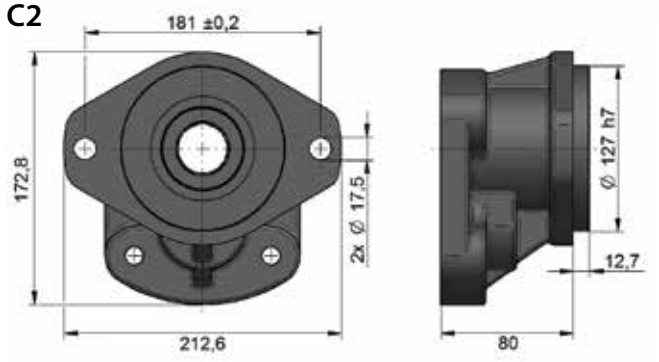
B4



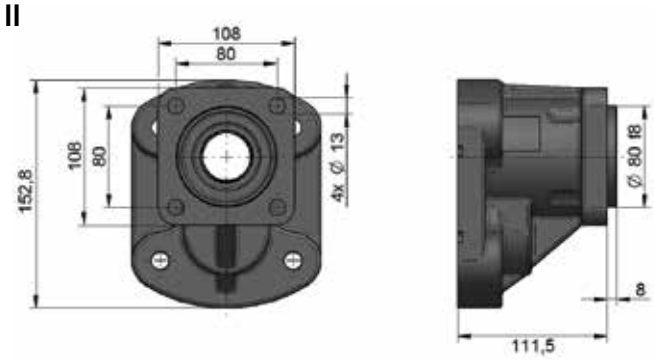
C6



C2

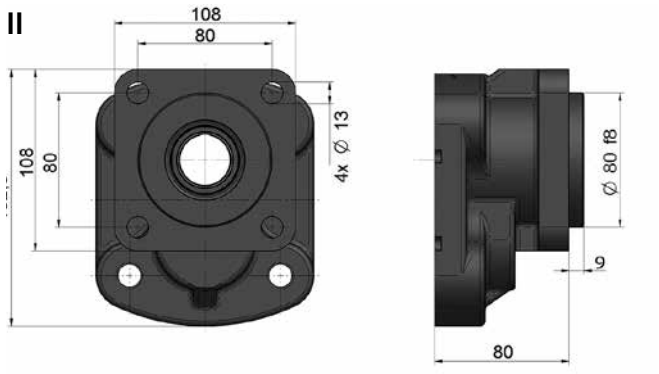


II



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

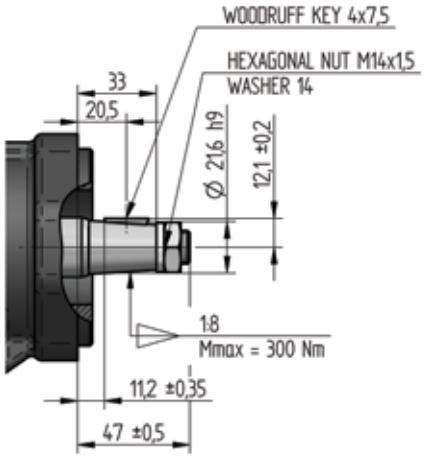
II



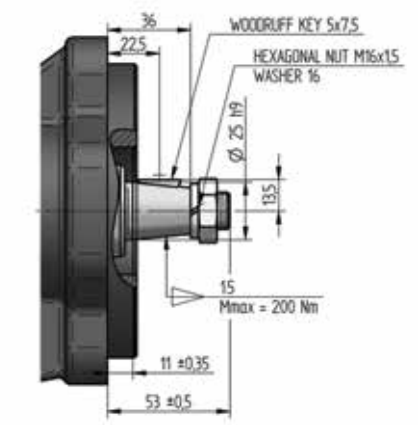
* Without outrigger bearing ("N" in model code position M)

Shaft types

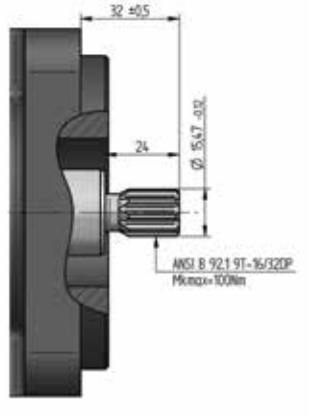
BA



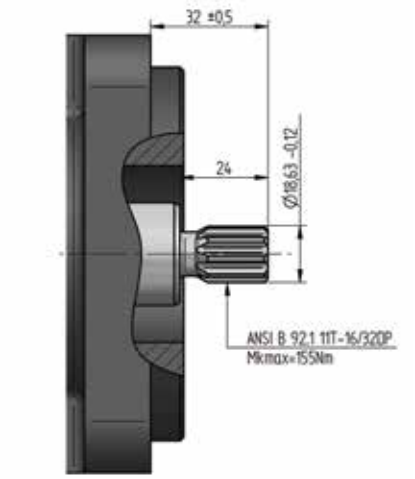
AA



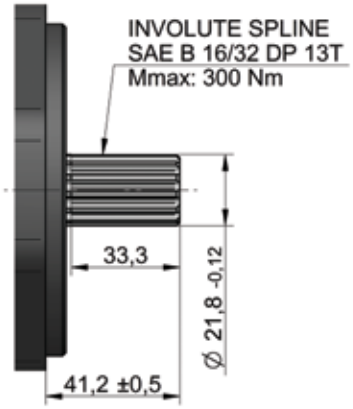
SE



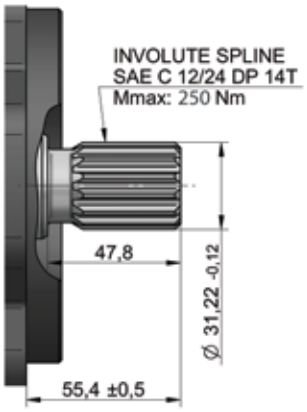
SC



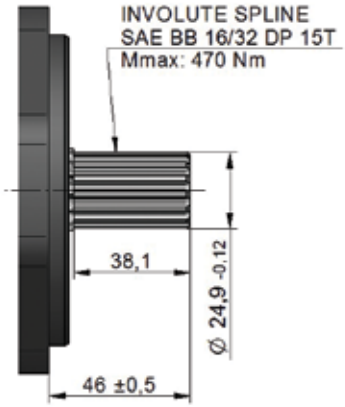
SH



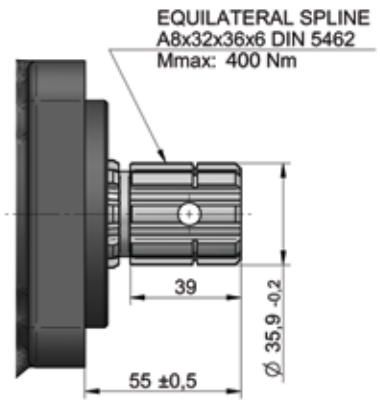
S0



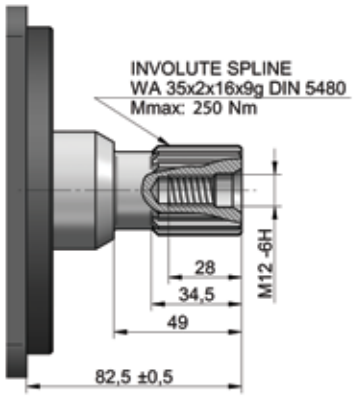
SV



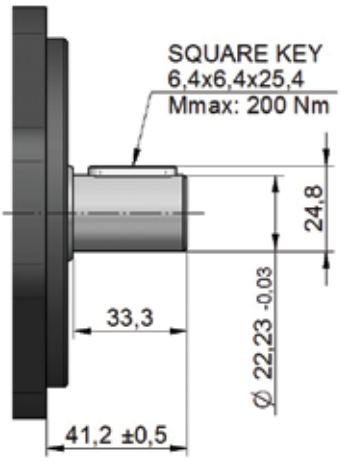
S3



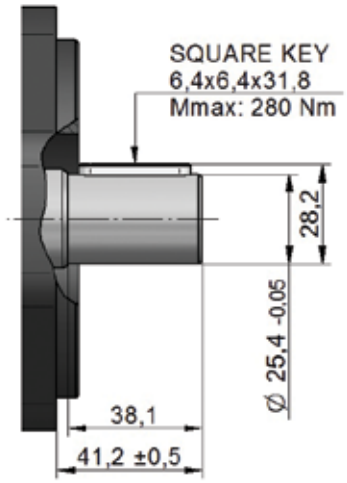
S7


INVOLUTE SPLINE
WA 35x2x16x9g DIN 5480
Mmax: 250 Nm
M12 -6H
28
34,5
49
82,5 ±0,5

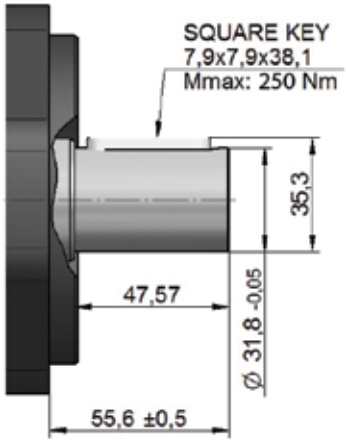
PB


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

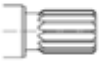
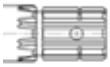
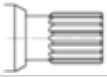
PZ


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

P3


SQUARE KEY
7,9x7,9x38,1
Mmax: 250 Nm
35,3
Ø 31,8 -0,05
47,57
55,6 ±0,5

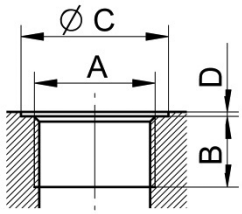
Combinations of flanges and shafts

Shaft Type	Model Code	Flange Type	SAE-A	SAE-B 2 bolt	SAE-B 4 bolt	SAE-C 2 bolt	SAE-C 4+2 bolt	ISO	square
			AA	BB	B4	C2	C6	II	R6
									
1:8 Tapered Shaft	BA		a	a	a				
1:5 Tapered Shaft	AA		a	a	a				
Spline SAE A 9T	SE		S	a	a	a	a		
Spline SAE A 11T	SC		S	a	a	a	a		
Spline SAE B 13T	SH		S	S	S	a	a		
Spline SAE C 14T *	SO				a	a	S	S	
Spline SAE BB 15T	SV		a	S	S	a	a		
Spline DIN 5462	S3							S	
Spline DIN 5480 *	S7								S
Cylindric SAE B 7/8"	PB		a	S	S	a	a		
Cylindric SAE BB 1"	PZ		a	S	S	a	a		
Cylindric SAE C 1-1/4" *	P3			a	a	S	S		

* Only available with ORB

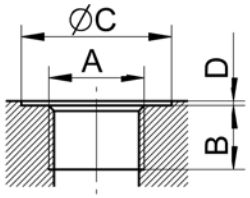
S-Standard **a - Available**

Port types



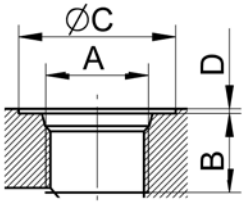
Metric thread according to ISO 6149

Displacement [cm³]	Inlet					Outlet				
	Code	A	B	C	D	Code	A	B	C	D
Cascade 3 17 - 51	DE	M 33x2	18	40	1	DB	M 27x2	16	33	1
Cascade 3 51 - 71	DF	M 48x2	22	56		DE	M 33x2	18	40	



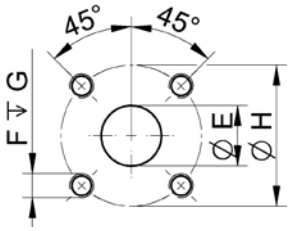
BSPP pipe thread according to ISO 228 - 1

Displacement [cm³]	Inlet					Outlet				
	Code	A	B	C	D	Code	A	B	C	D
Cascade3 17 - 34	**F6**	G 1“	18	45	1	**F5**	G 3/4	16	39	1
Cascade3 34 - 71	**F7**	G 1 1/4	24	58		**F6**	G 1“	18	45	



UNF thread according to SAE

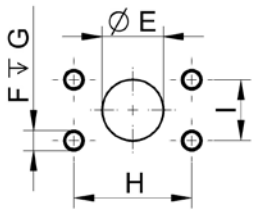
Displacement [cm³]	Inlet					Outlet				
	Code	A	B	C	D	Code	A	B	C	D
Cascade3 17 - 34	**E8**	1–5/16–12UN	19	49	1	**E6**	1–1/16–12UN	19	41	1
Cascade3 34 - 71	**E9**	1–5/8–12UN		58		**E8**	1–5/16–12UN		49	



Flanged fittings according to DIN

Displacement [cm3]	Code	Inlet				Code	Outlet			
		E	F	G	H		E	F	G	H
Cascade3 17 - 51	BO	26	M10	16	51	BM	20	M8	16	40
	BN	25	M8		55	BA	18			55
Cascade3 10 - 17	B7	20	M6	13	40	B5	15	M6	13	35

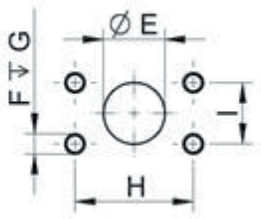
Note: Available only as side ports



Flanged fittings according to SAE, metric thread

Displacement [cm³]	Code	Inlet					Code	Outlet				
		E	F	G	H	I		E	F	G	H	I
Cascade 3 17 - 34	**M5**	25.4	M10	22	52.4	26.2	**M4**	19.0	M10	22	47.6	22.2
Cascade3 34 - 51	**M6**	30.5			58.7	30.2	**M5**	25.4			52.4	26.2
Cascade3 51 - 71	**M7**	39.3	M12	27	69.8	35.7	**M6**	30.5			58.7	30.2
Cascade3 (single Inlet on multile pump)	**M8**	51.0	M12	27	77.8	42.9						

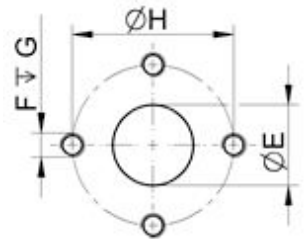
Note: Available only as side ports



Flanged fittings according to SAE, UNC thread

Displacement [cm³]	Code	Inlet					Code	Outlet				
		E	F	G	H	I		E	F	G	H	I
Cascade 3 17 - 34	**A3**	25.4	3/8-16 UNC-2B	22	52.4	26.2	**A2**	19.0	3/8-16 UNC-2B	22	47.6	22.2
Cascade3 34 - 51	**A4**	30.5	7/16-14 UNC-2B	28.5	58.7	30.2	**A3**	25.4			52.4	26.2
Cascade3 51 - 71	**A5**	39.3	1/2-13 UNC-2B	27	69.8	35.7	**A4**	30.5	7/16-14 UNC-2B	29	58.7	30.2
Cascade3 (single Inlet on multile pump)	**A6**	51.0	1/2-13 UNC-2B	27	77.8	42.9						

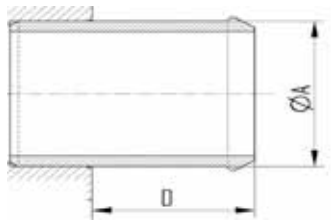
Note: Available only as side ports



Flanged fittings – "cross"

Displacement [cm³]	Code	Inlet				Code	Outlet			
		E	F	G	H		E	F	G	H
Cascade3 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



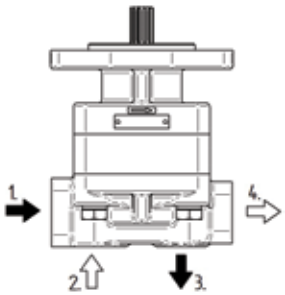
Tube Inlets

Displacement [cm³]	Code	Inlet	
		A	D
Cascade 3 17 - 34	**T1**	25,4	27,6
Cascade3 34 - 51	**T2**	31,7	29,7
Cascade3 51 - 71	**T3**	38,1	31,5
Cascade 3 tandems/triples (single inlet)	**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

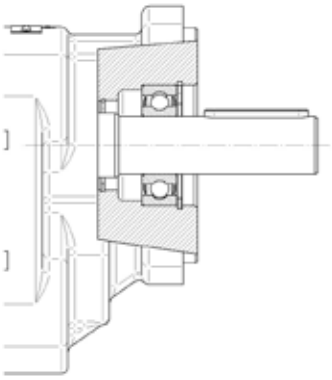
Q (Quad ports) options:
In case of quad ports, there are both rear and side ports present. Rear and side inlet of the same type and size are specified by position E in the model code, rear and side outlet of the same type and size are specified by position I in the model code. The products with quad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



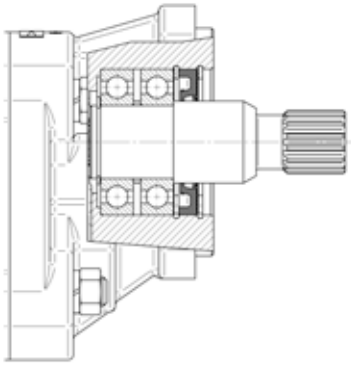
Outrigger bearings

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.

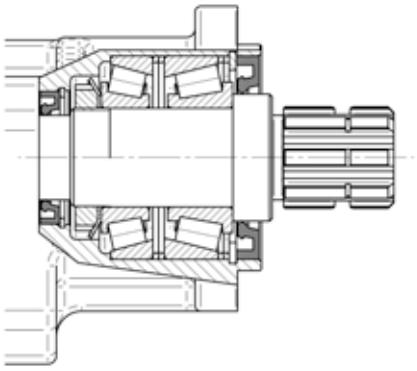
Type M (Medium duty bearing)



Type H (Heavy duty bearing)



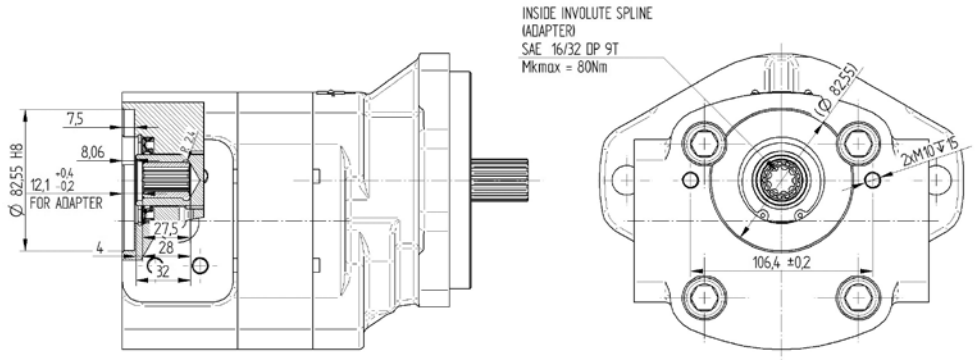
Type I (ISO bearing)



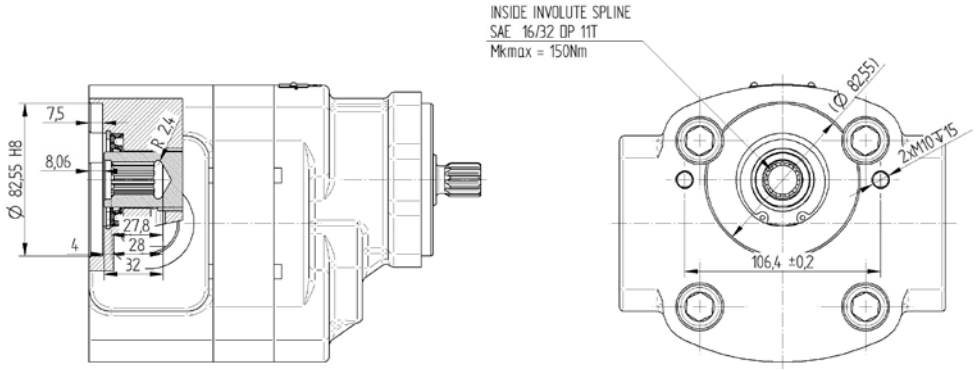
Note: Available only with ISO Flange (II)

Aux pads

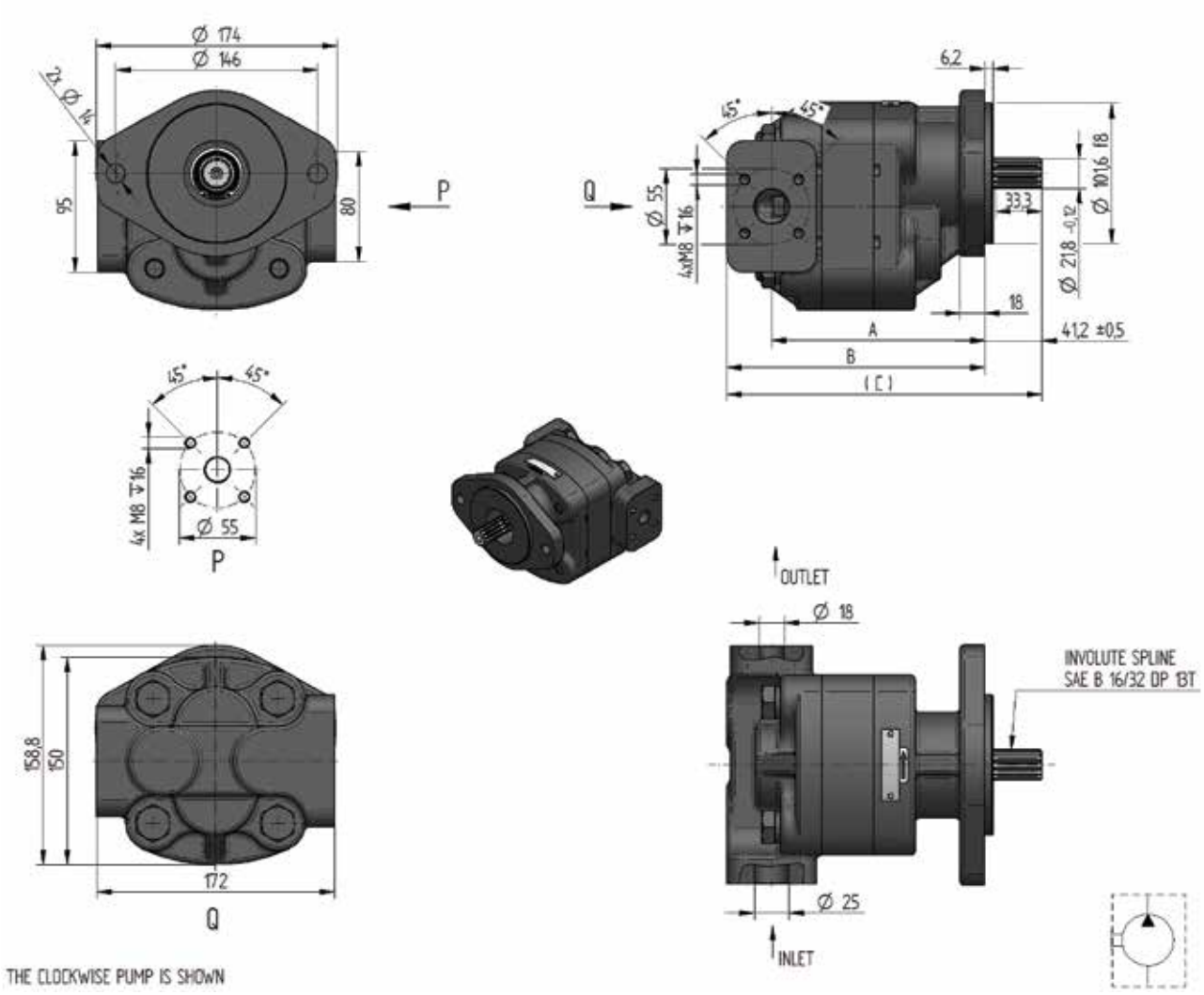
Type 1 (accomodates SAE-A flange, 9T shaft)



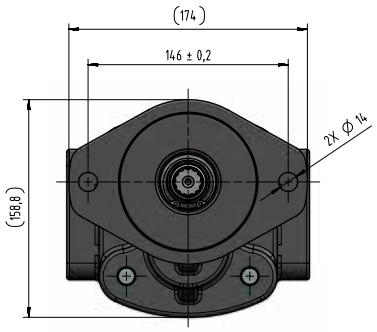
Type 2 (accomodates SAE-A flange, 11T shaft)

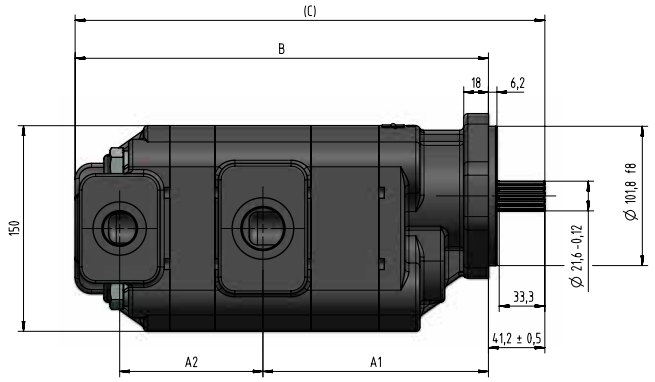


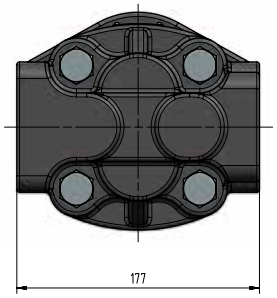
Configuration examples



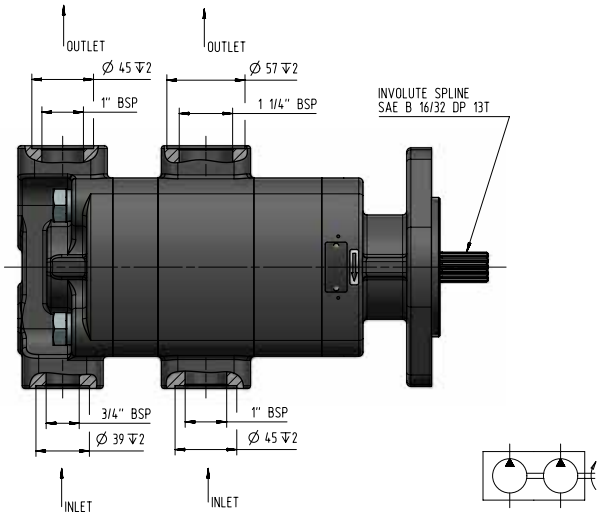
Model Code	DIRECT. OF ROT.	DISPLACEMENT [cm³/1]	SPEED MIN. [min⁻¹]	SPEED MAX. [min⁻¹]	DIMENSION A [mm]	DIMENSION B [mm]	DIMENSION C [mm]
CAS-1-R-BB-SH-3-071-BN-BA-R-N-N-NNN-NNN	R	71	250	1 800	63.7	128.5	168.3
CAS-1-L-BB-SH-3-071-BN-BA-R-N-N-NNN-NNN	L						
CAS-1-R-BB-SH-3-051-BN-BA-R-N-N-NNN-NNN	R	51	350	2 600	59.0	119.1	158.9
CAS-1-L-BB-SH-3-051-BN-BA-R-N-N-NNN-NNN	L						
CAS-1-R-BB-SH-3-043-BN-BA-R-N-N-NNN-NNN	R	43	400	2 800	48.8	98.6	138.4
CAS-1-L-BB-SH-3-043-BN-BA-R-N-N-NNN-NNN	L						
CAS-1-R-BB-SH-3-034-BN-BA-R-N-N-NNN-NNN	R	34	400	3 000	45.6	92.3	132.1
CAS-1-L-BB-SH-3-034-BN-BA-R-N-N-NNN-NNN	L						
CAS-1-R-BB-SH-3-027-BN-BA-R-N-N-NNN-NNN	R	27	400	3 200	44.0	89.2	129.0
CAS-1-L-BB-SH-3-027-BN-BA-R-N-N-NNN-NNN	L						
CAS-1-R-BB-SH-3-017-BN-BA-R-N-N-NNN-NNN	R	17	400	3 200	42.5	86.0	125.8
CAS-1-L-BB-SH-3-017-BN-BA-R-N-N-NNN-NNN	L						







THE ANTICLOCKWISE PUMP IS SHOWN



Model Code	DIRECT. OF ROT.	DISPLACEMENT [cm³/1]		SPEED [min⁻¹] MIN.	SPEED [min⁻¹] MAX.	DIMENSION [mm] A1	DIMENSION [mm] A2	DIMENSION [mm] B	DIMENSION [mm] C
CAS-2-R-BB-SH-3-071-F7-F6-3-051-F6-F5-R-N-N-N-N-N-NNN	R	71	51	350	1800	178	121	331,5	372,7
CAS-2-L-BB-SH-3-071-F7-F6-3-051-F6-F5-R-N-N-N-N-N-NNN	L								
CAS-2-R-BB-SH-3-061-F7-F6-3-043-F6-F5-R-N-N-N-N-N-NNN	R	61	43	400	2200	171,5	115,5	319,5	360,7
CAS-2-L-BB-SH-3-061-F7-F6-3-043-F6-F5-R-N-N-N-N-N-NNN	L								
CAS-2-R-BB-SH-3-056-F7-F6-3-034-F6-F5-R-N-N-N-N-N-NNN	R	56	34	400	2400	167,5	109	309	350,2
CAS-2-L-BB-SH-3-056-F7-F6-3-034-F6-F5-R-N-N-N-N-N-NNN	L								
CAS-2-R-BB-SH-3-051-F7-F6-3-027-F6-F5-R-N-N-N-N-N-NNN	R	51	27	400	2600	164,5	104,5	301,5	342,7
CAS-2-L-BB-SH-3-051-F7-F6-3-027-F6-F5-R-N-N-N-N-N-NNN	L								
CAS-2-R-BB-SH-3-043-F7-F6-3-022-F6-F5-R-N-N-N-N-N-NNN	R	43	22	400	2800	159	101	292,5	333,7
CAS-2-L-BB-SH-3-043-F7-F6-3-022-F6-F5-R-N-N-N-N-N-NNN	L								
CAS-2-R-BB-SH-3-034-F7-F6-3-017-F6-F5-R-N-N-N-N-N-NNN	R	34	17	400	3000	152,5	97,5	282,5	323,7
CAS-2-L-BB-SH-3-034-F7-F6-3-017-F6-F5-R-N-N-N-N-N-NNN	L								

Notes

Notes

Member of the Danfoss Group
TUROLLA
fast forward thinking

Italy
Via Natale Salieri, 33-35
40024 Castel San Pietro Terme
Bologna, Italia
Phone: +39 051 6054 411

U.S.A.
2800 East 13th Street
Ames, IA 50010, USA
Phone: +1 515 239 6677

E-mail: turollaocg@turollaocg.com
www.turollaocg.com

Local address