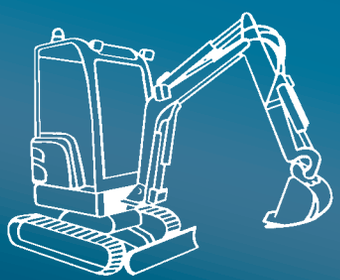
jihostroj
AERO TECHNOLOGY & HYDRAULICS



Displacement from 43 to 150 ccm
Pressure up to 280 bar
Speed from 250 to 3200 RPM

GEAR PUMPS
QHD2

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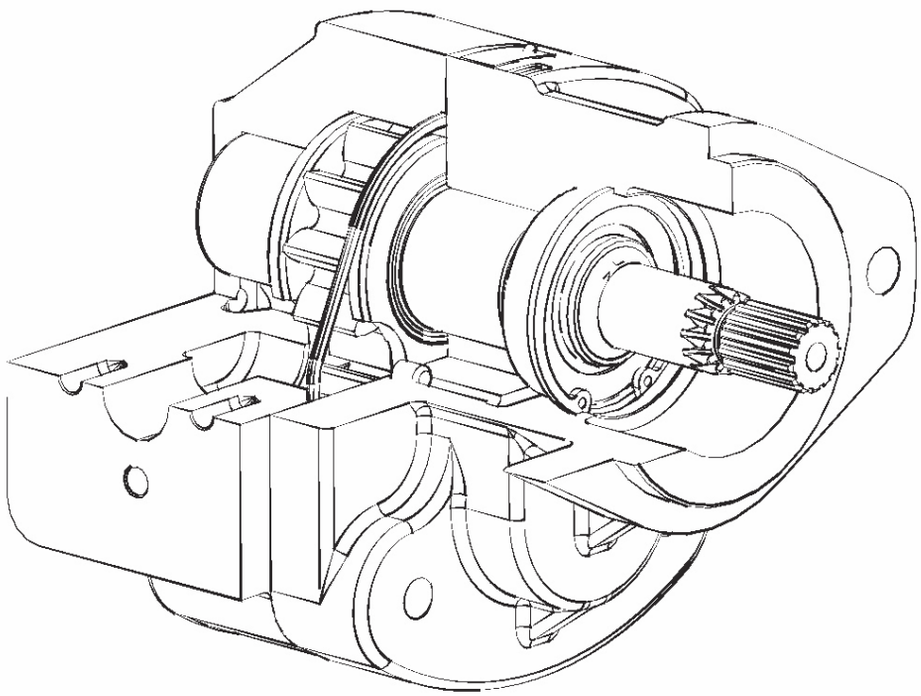
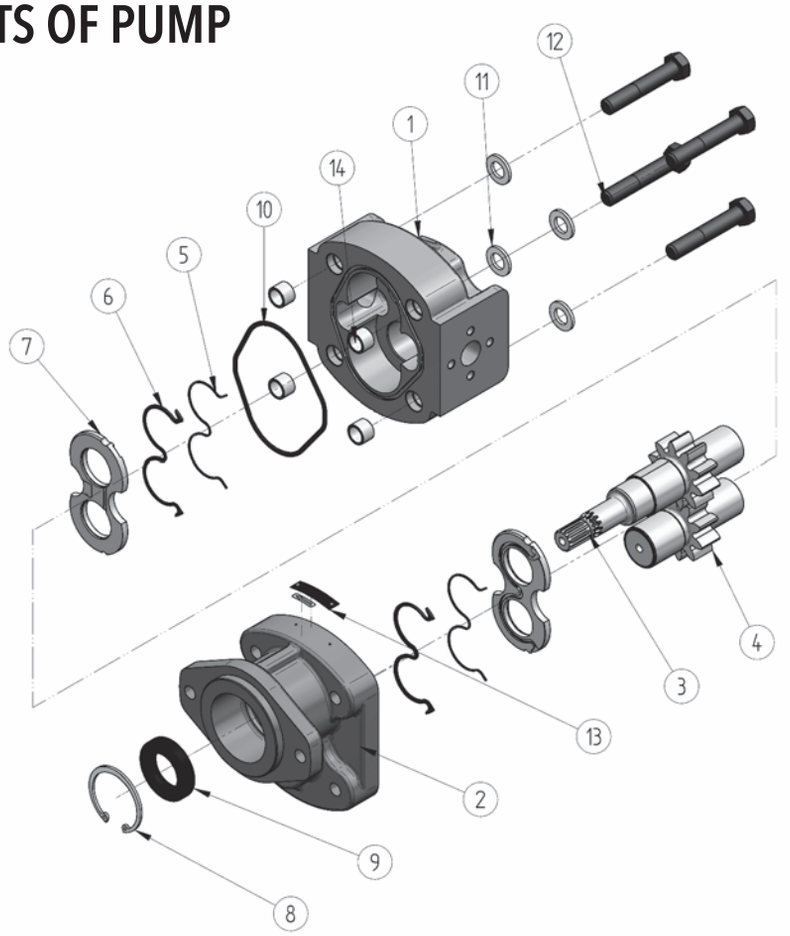


DESCRIPTION

- QHD2 series are particularly designed to be used in mobile hydraulic systems of agricultural, heavy construction and road building machines as well as in advanced hydraulic systems of material handling devices. The QHD2 series covers the range of displacements from 43 to 150 cm^3/rev.
- The pumps are characterized by simple construction with hydraulic pressure balance, compact dimensions and a wide range of connection types. QHD2 pumps have a two-piece all-cast-iron construction. The basis consists of a supporting body with a blind chamber for gear wheels and a fastening flange. The body, as well as the flange are made from a high-quality grey cast iron. In the body and the flange, sliding sleeves for gear wheels are molded. Gear wheels with 12 teeth made of ultra high-strength steel, which are optimised to achieve a low noise level. The axial pump balancing is performed using sliding aluminium alloy pressure plates in which a shape sealing of balancing surface is located in grooves. For heavy duty with a weight-bearing drive shaft, the pumps can be equipped with front-end roller bearings. QHD2 construction enables the pumps to be used already at low revolutions at high pressure.
- QHD2 pumps are produced in various designs of divers clamping flanges as well as liquid inlets and outlets. These pumps comply with the standards ISO, SAE, UNI and other world-recognised standards and can be delivered in simple or multiple designs. They can also be delivered in a reversible design, with external or internal drainage.

BASIC PARTS OF PUMP



1. Body
2. Flange
3. Driving gear
4. Driven gear
5. Sealing protective plate
6. Balancing sealing
7. Pressure plates
8. Safety ring
9. Shaft seal
10. Peripheral sealing
11. Washers
12. Connection bolts
13. Serial label
14. Centering tube

PARAMETER TABLE

Nominal Size Parameters		Sym.	Unit	QHD2 43	QHD2 51	QHD2 56	QHD2 61	QHD2 71	QHD2 82
Actual displacement		V_g	[cm^3]	43.57	51.81	56.52	61.23	71.83	82.43
Rotation speed	nominal	n_n	[min^{-1}]	1500	1500	1500	1500	1500	1500
	minimum	n_{min}	[min^{-1}]	400	400	400	400	400	400
	maximum	n_{max}	[min^{-1}]	3200	3200	3200	3200	3200	3000
Pressure at inlet*	minimum	p_{1min}	[bar]	-0,3	-0,3	-0,3	-0,3	-0,3	-0,3
	maximum	p_{1max}	[bar]	0,5	0,5	0,5	0,5	0,5	0,5
Pressure at outlet**	max. continuous	p_{2n}	[bar]	280	280	280	270	260	260
	maximum	p_{2max}	[bar]	300	300	300	290	280	280
	peak	p_3	[bar]	310	310	310	300	290	290
Nominal flow rate (min.) at n_n and p_{2n}		Q_n	[$dm^3.min^{-1}$]	60.4	69.9	76.3	82.7	99.1	116.2
Maximum flow rate at n_{max} a p_{2max}		Q_{max}	[$dm^3.min^{-1}$]	136.6	162.5	177.2	192.0	225.3	242.3
Nominal input power (max.) at n_n and p_{2n}		P_n	[kW]	36.1	44.8	48.8	51.0	56.4	63.3
Maximum input power at n_{max} a p_{2max}		P_{max}	[kW]	79.0	94.0	102.5	107.4	121.6	130.8
Weight		m	[kg]	–	–	–	–	–	–

Nominal Size Parameters		Sym.	Unit	QHD2 90	QHD2 100	QHD2 110	QHD2 125	QHD2 150
Actual displacement		V_g	[cm^3]	90.67	100.09	110.69	125.99	150.72
Rotation speed	nominal	n_n	[min^{-1}]	1500	1500	1500	1500	1500
	minimum	n_{min}	[min^{-1}]	400	350	350	250	250
	maximum	n_{max}	[min^{-1}]	2800	2700	2600	2400	2000
Pressure at inlet*	minimum	p_{1min}	[bar]	-0.3	-0.3	-0.3	-0.3	-0.3
	maximum	p_{1max}	[bar]	0.5	0.5	0.5	0.5	0.5
Pressure at outlet**	max. continuous	p_{2n}	[bar]	240	230	210	190	170
	maximum	p_{2max}	[bar]	260	250	230	210	190
	peak	p_3	[bar]	270	260	240	220	200
Nominal flow rate (min.) at n_n and p_{2n}		Q_n	[$dm^3.min^{-1}$]	127.8	141.1	156.1	177.6	212.5
Maximum flow rate at n_{max} a p_{2max}		Q_{max}	[$dm^3.min^{-1}$]	248.8	264.8	282.0	296.3	295.4
Nominal input power (max.) at n_n and p_{2n}		P_n	[kW]	64.3	68.0	68.7	70.7	75.7
Maximum input power at n_{max} a p_{2max}		P_{max}	[kW]	124.7	127.7	125.1	120.0	108.2
Weight		m	[kg]	–	–	–	–	–

* Inlet pressure in the reversible design can be up to **$p_1 = p_{2n}$-70 bar max.** External drainage must be used in case of the reversible design.

** Outlet pressure in the reversible design is **10% lower** than shown in the table (depending on operating conditions – it is necessary to consult with the manufacturer).

FORMULAS USED FOR CALCULATION

Flow rate
Q

$$Q = \frac{V_g \cdot n}{1000} \cdot \eta_v \quad [dm^3 \cdot min^{-1}]$$

V_g [cm^3] pump displacement
n [min^{-1}] rotation speed
η_v [–] volumetric efficiency

Displacement
V_g

$$V_g = \frac{Q \cdot 1000}{n \cdot \eta_v} \quad [cm^3]$$

Torque
M_k

$$M_k = \frac{V_g \cdot p}{20 \cdot \pi \cdot \eta_m} \quad [Nm]$$

p [bar] required pressure at outlet
η_m [–] mechanical efficiency

Input power
P

$$P = \frac{V_g \cdot n \cdot p}{600 \cdot 1000 \cdot \eta_t} \quad [kW]$$

η_t [–] total efficiency

PUMP EFFICIENCIES

Volumetric efficiency
η_v

It determines the amount of flow losses. Its value is $\eta_v = 0{,}92 \div 0{,}98$ (depending on rotation speed, viscosity of working liquid and outlet pressure). It can be expressed as follows:

$$\eta_v = \frac{Q_{act.}}{Q_{theor}} \quad [–]$$

$Q_{act.}$ [$dm^3 \cdot min^{-1}$] actual flow rate
Q_{theor} [$dm^3 \cdot min^{-1}$] theoretical flow rate

Mechanical efficiency
η_m

It determines mechanical losses. Its value is about $\eta_m = 0{,}85$.
It can be expressed as follows:

$$\eta_m = \frac{M_{theor}}{M_{act.}} \quad [–]$$

$M_{act.}$ [Nm] actual torque
M_{theor} [Nm] theoretical torque

Total efficiency
η_t

t is defined as product of η_n and η_m
and determines difference between theoretical and actual required input power:

$$\eta_t = \eta_v \cdot \eta_m = \frac{P_{theor}}{P_{act.}} \quad [–]$$

$P_{act.}$ [kW] actual input power
P_{theor} [kW] theoretical input power

WORKING LIQUID

- Mineral oils for hydraulic drives
- Hydraulic liquids based on plant oils suitable for hydraulic drives

Liquid temperature

- t = –20 ÷ +80 [°C]
  when used with FKM (Viton) seal up to 120 [°C]

Cinematic viscosity

- Recommended (during continuous operation): $\nu = 20 \div 80 \cdot 10^{-6}\ [m^2 \cdot s^{-1}]$
- Maximum (cold starting, at viscosity >1000, operating pressure <10 bar is permissible, speed <1500·min^{-1}): $\nu = 1200 \cdot 10^{-6}\ [m^2 \cdot s^{-1}]$
- Minimum (operating mode at $10 \cdot 10^{-6}$ up $20 \cdot 10^{-6}$ should be consulted with manufacturer): $\nu = 10 \cdot 10^{-6}\ [m^2 \cdot s^{-1}]$

Filtration coefficient β_α

$\beta_{25}\ 75 \geq$ (for pressure $p_2 < 200$ bar)
$\beta_{10}\ 75 \geq$ (for pressure $p_2 > 200$ bar)

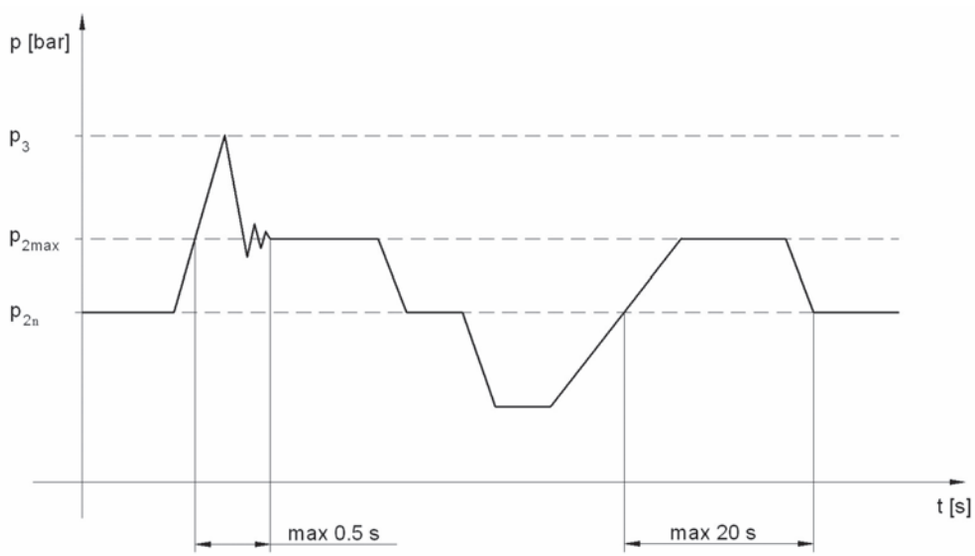
Liquid contamination class according to ISO 4406

21/18/15 (for pressure $p_2 < 200$ bar)
20/17/14 (for pressure $p_2 > 200$ bar)

Liquid contamination class according to NAS 1638

10 (for pressure $p_2 < 200$ bar)
8 (for pressure $p_2 > 200$ bar)

PRESSURE LOAD



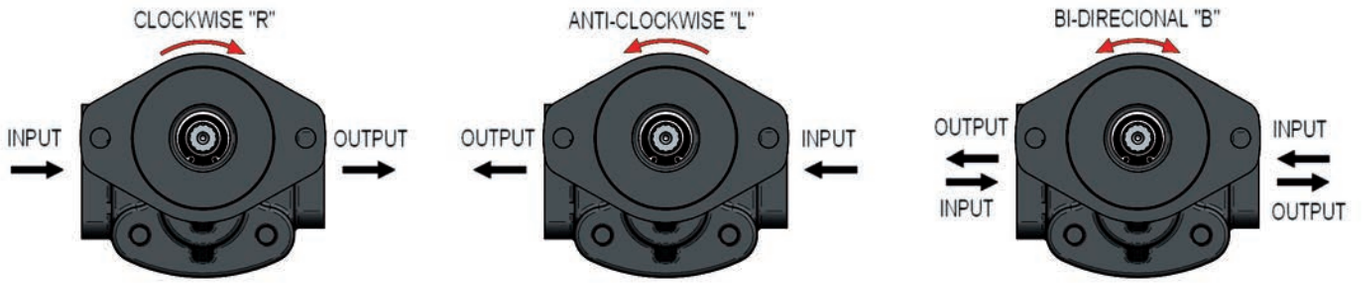
p_{2n}	**max. contin. pressure**	Max. working pressure, at which the pump can be operated without time limitation.
p_{2max}	**max. pressure**	Maximum pressure permissible for a short time, max. 20s.
p_3	**peak pressure**	Short-time pressure (fractions of a second) arising in case of a sudden change of the operating mode; any excess of this pressure during operation is impermissible.

OTHER REQUIREMENTS

- A driving device must not generate an axial or a radial load of the pump shaft, unless this is exclusively permitted for the pump with a front-end bearing.
- All the matters affecting technical parameters and properties of the pump are given in respective operating manuals, technical specifications and test specifications of the manufacturer.

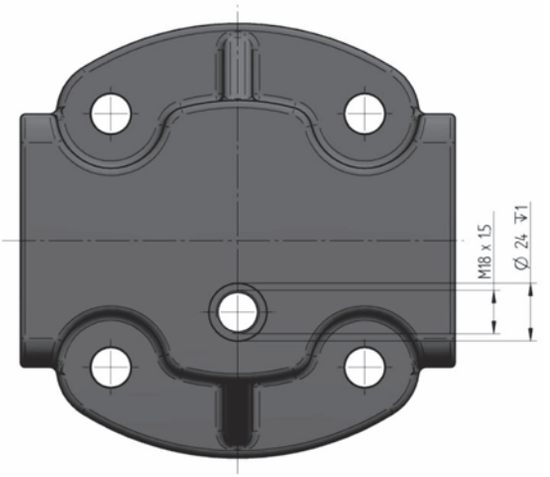
DIRECTION OF ROTATION

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

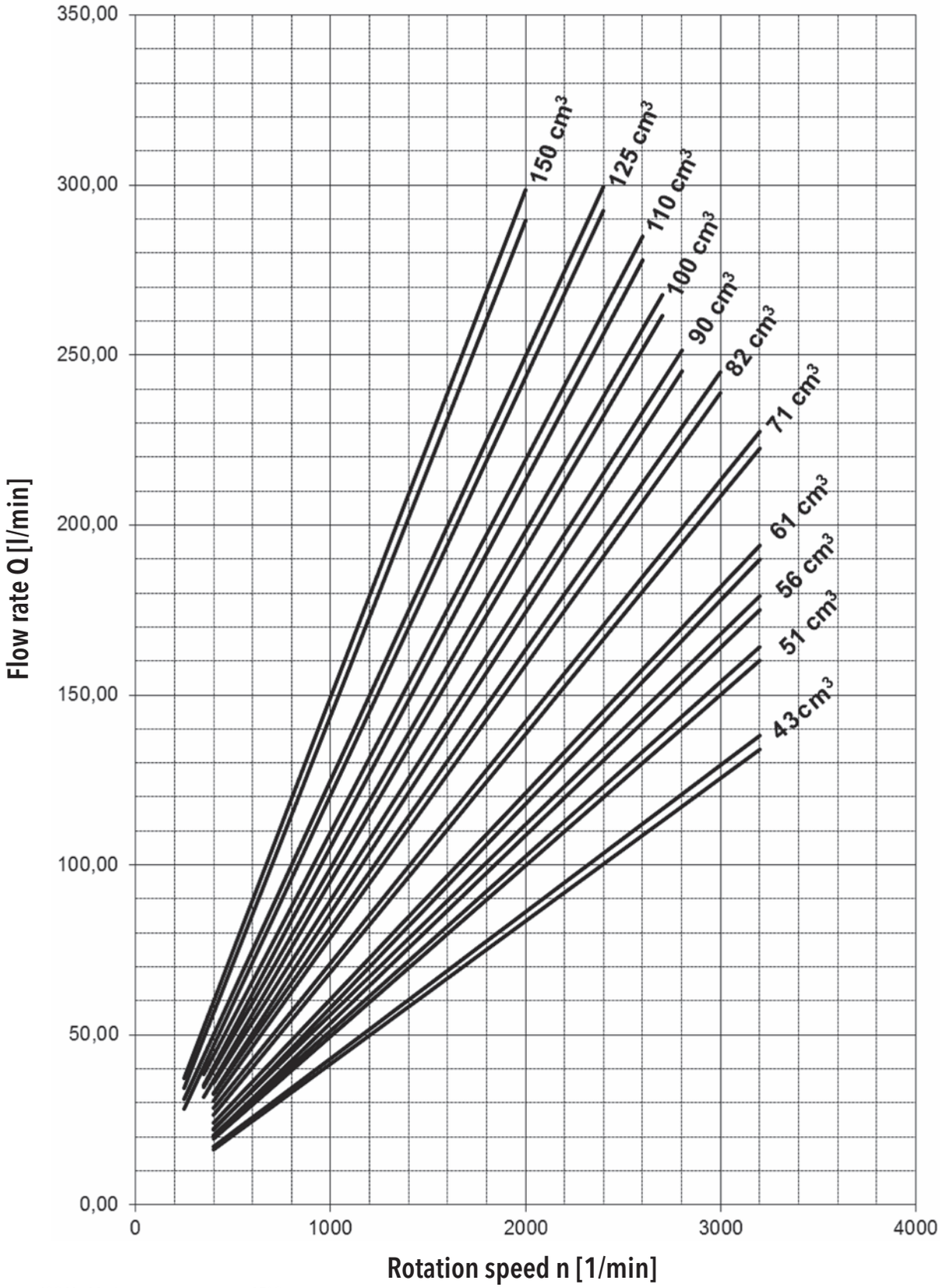


REVERSIBLE DESIGN

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

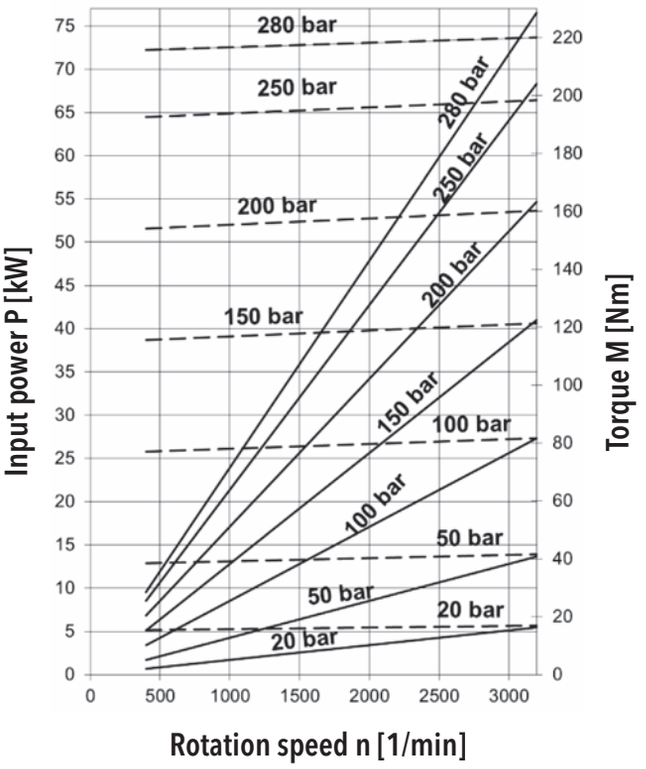


QHD2 FLOW RATE AND POWER CURVES

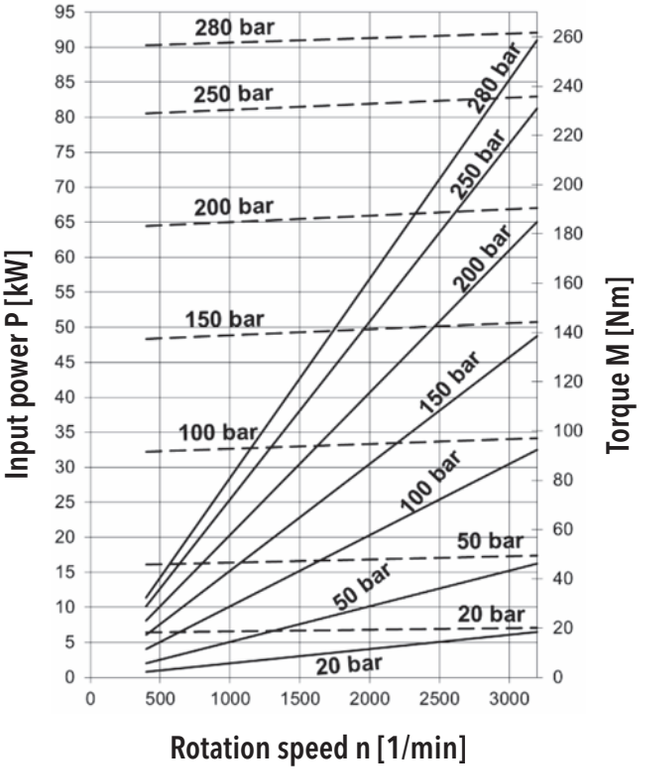


Above curves apply to ISO V_g 46 oil at temperature t = 45°C.

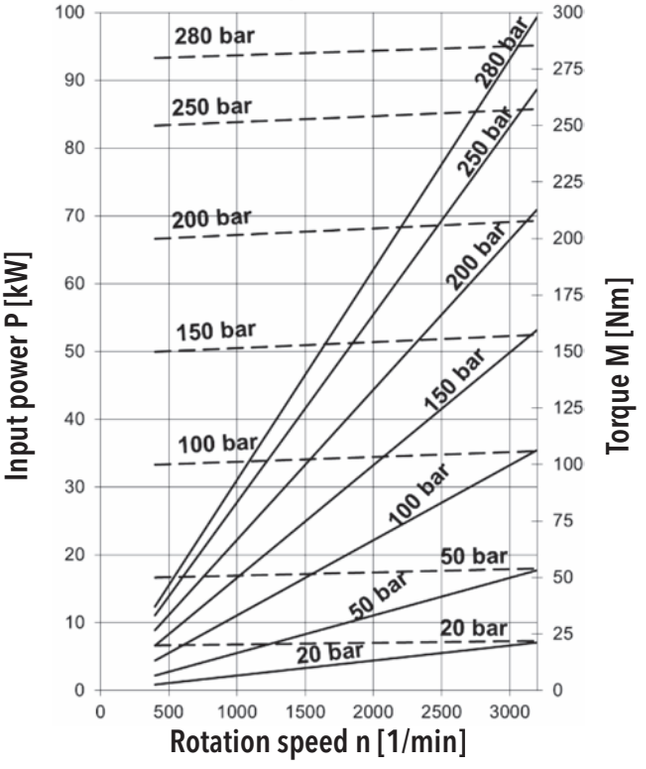
43,00 cm³



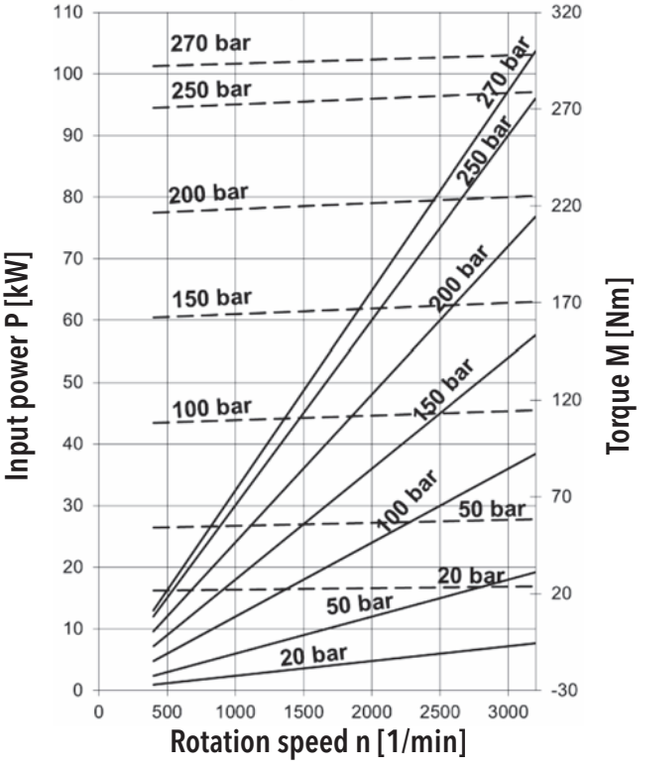
51,00 cm³



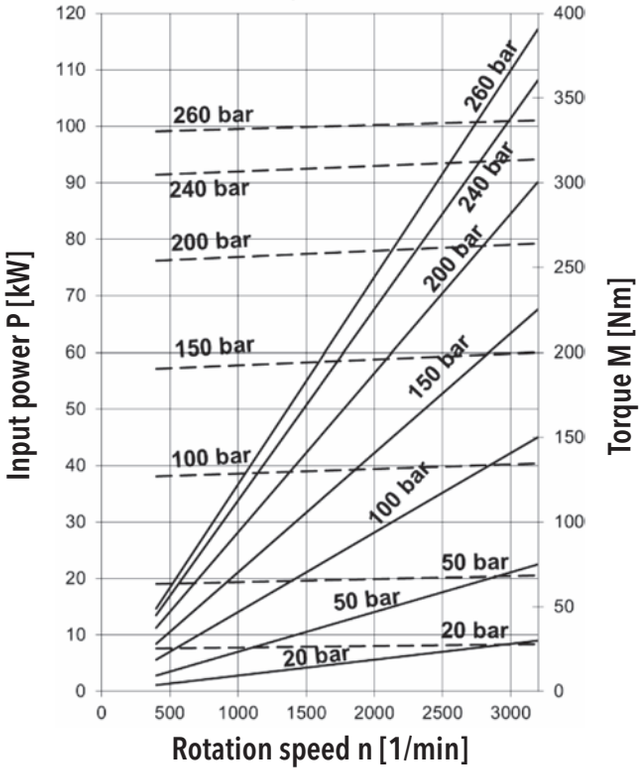
56,00 cm³



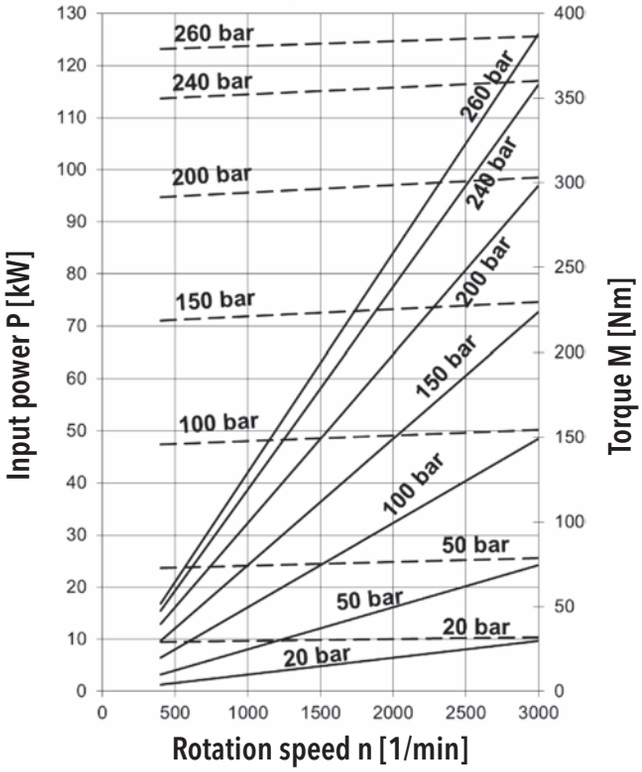
61,00 cm³



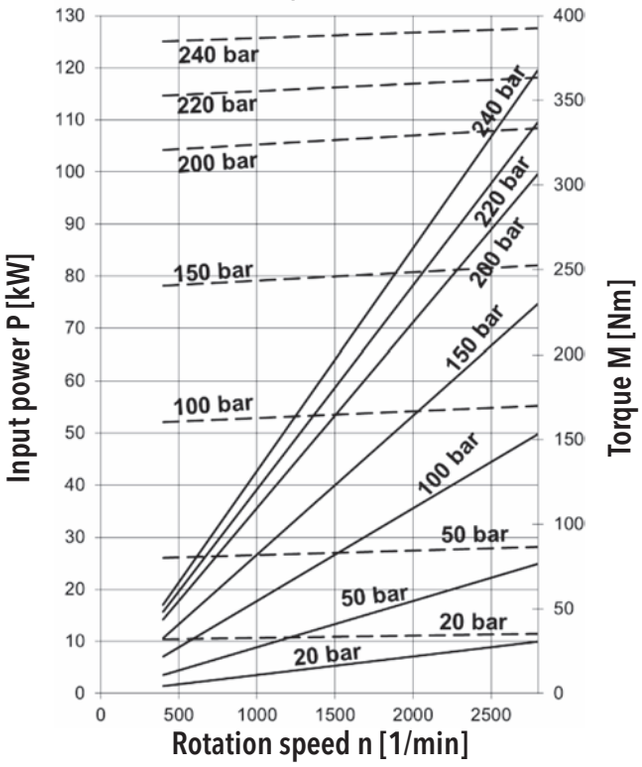
71,00 cm³



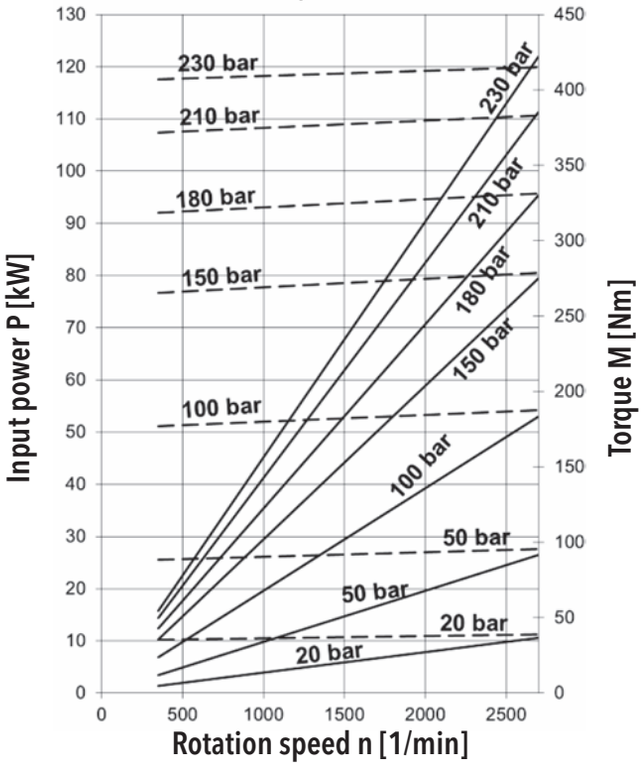
82,00 cm³

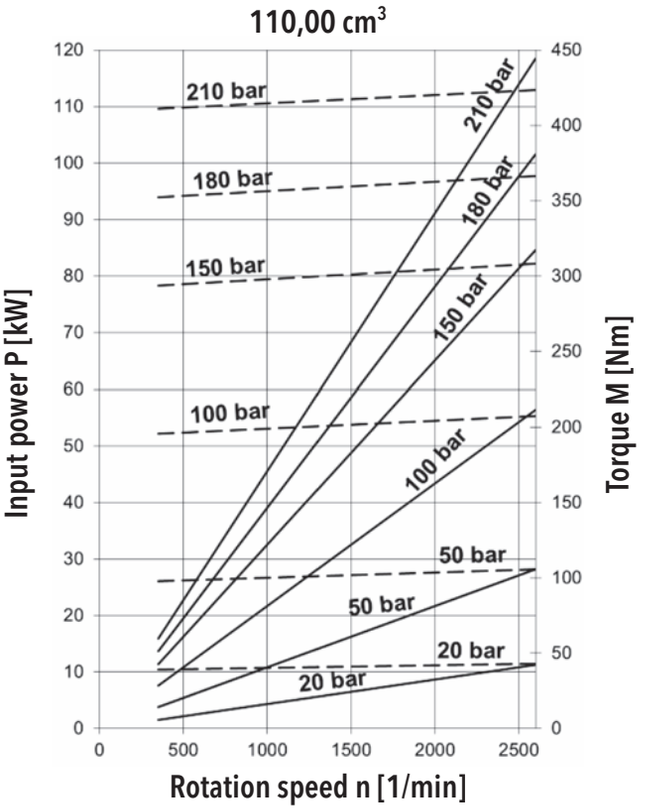


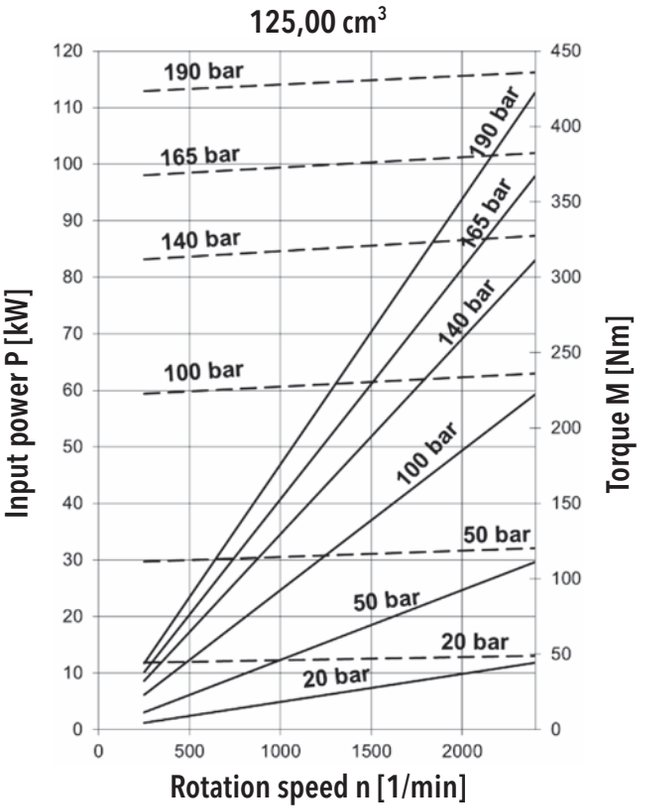
90,00 cm³

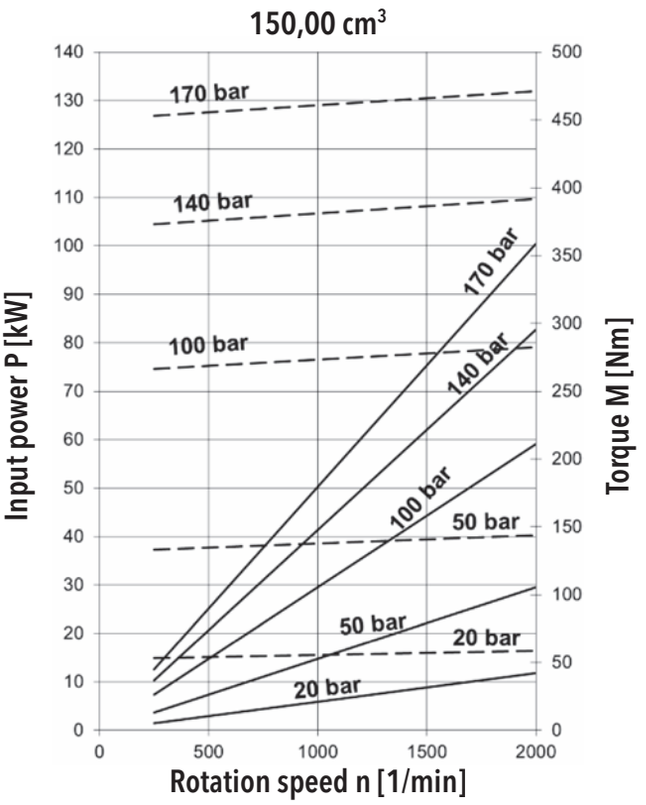


100,00 cm³




110,00 cm3
Input power P [kW]
Torque M [Nm]
Rotation speed n [1/min]
210 bar
180 bar
150 bar
100 bar
50 bar
20 bar


125,00 cm3
Input power P [kW]
Torque M [Nm]
Rotation speed n [1/min]
190 bar
165 bar
140 bar
100 bar
50 bar
20 bar


150,00 cm3
Input power P [kW]
Torque M [Nm]
Rotation speed n [1/min]
170 bar
140 bar
100 bar
50 bar
20 bar

ORDER KEY

QHD2 - 56 R - S03 D13 - S E05 E04 - N . 001

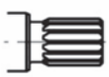
Code		Displacement [cm³]
QHD2	43	43,57
	51	51,81
	56	56,52
	61	61,23
	71	71,83
	82	82,43
	90	90,67
	100	100,09
	110	110,69
	125	125,99
	150	150,72
XX		Other displacements on request

Code	Rotation
R	Clockwise rotation
L	Anti-clockwise rotation
B	Bi-directional rotation

Code	Type
QHD2	QHD2 Series Gear Pump

Code	Flange design	
R15		Square flance, centre ring Ø 90 spacing screw 155 x 155
S03		SAE B 2 aperture
S04		SAE C 2 aperture
S06		SAE C 2 + 4 aperture
I02		ISO, centre ring Ø 80
F03		Square flance, centre ring Ø 125 spacing screw Ø 160
Z		Special design

Code	Location of suction and pressure port	
S		Side (in the body)
R		Rear (in the cover)
C		Combination

Code	Drive shaft design	
D13		Spline SAE B 13T
D14		Spline SAE C 14T
D15		Spline SAE BB 15T
D18		Spline DIN 5462 A8x32x36x6
D19		Spline ČSN 28x1,5
D25		Spline ČSN 014942 D-6x28x34e9x7
D26		Spline ČSN 38x1,5
D27		Spline DIN 5480 WA 35x2x16x9g
V17		Cylindric SAE B, Ø 22,22 Key 6,4x6,4x25,4
V18		Cylindric SAE BB, Ø 25,4 Key 6,4x6,4x31,8
V19		Cylindric SAE C, Ø 31,7 Key 7,9x7,9x31,8
Z		Special design

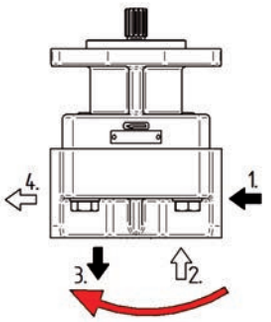
Code	Special arrangements
-	No special arrangements
001	With front end bearing
004	Without shaft seal
012	Rear and side input and output

Code	Sealing material
N	NBR
V	FKM (VITON)
H	HNBR

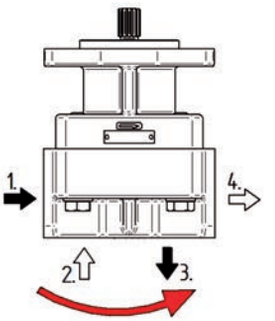
Code	Design of suction and pressure port	
M08		Thread M 27x1,5
M09		Thread M 27x2
M11		Thread M 33x1,5
M12		Thread M 33x2
M15		Thread M 48x2
G05		Thread BSP G1
G06		Thread BSP G1 1/4
G07		Thread BSP G1 1/2
G09		Thread BSP G2
U07		Thread 1-5/16 - 12 UN
U08		Thread 1-5/8 - 12 UN
U09		Thread 1-7/8 - 12 UN
U10		Thread 2-1/2 - 12 UN
H08		Fitting ∅20; 4xM8 ∅40
H09		Fitting ∅18; 4xM8 ∅55
H10		Fitting ∅25; 4xM8 ∅55
A03		Fitting SAE (SSS) 1´´
A04		Fitting SAE (SSS) 1´´ 1/4
A05		Fitting SAE (SSS) 1´´ 1/2
A06		Fitting SAE (SSS) 2´´
E03		Fitting SAE (SSM) 1´´
E04		Fitting SAE (SSM) 1´´ 1/4
E05		Fitting SAE (SSM) 1´´ 1/2
E06		Fitting SAE (SSM) 2´´
K03		Fitting ∅18; 4xM8/∅40
K04		Fitting ∅26; 4xM10/∅51
K05		Fitting ∅18; 4xM8/∅55
K06		Fitting ∅25; 4xM8/∅55
S04		Fitting ∅46; 4xM12 - 78x78
S05		Fitting ∅22; 4xM10 - 48x48
S06		Fitting ∅30; 4xM10 - 48x48
Z		Special design

An example of designation for the QHD2 clockwise pump with displacement of 56 cm³ , flange with centre ring ∅ 101,6, Involute spline 25x1,5, Flanged fittings according to SAE, metric thread, standard NBR: **QHD2 – 56 R – S03D13 – SE05E04 – N**

Note: In case of combination inlets, with the code „C" is respected following sequence of inlets and outlets:



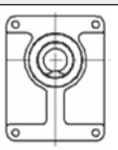
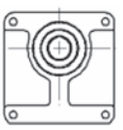
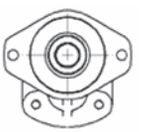
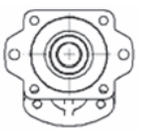
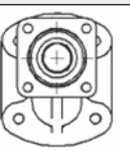
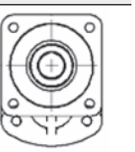
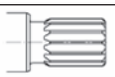
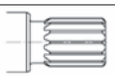
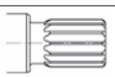
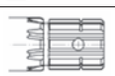
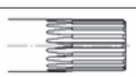
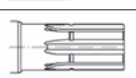
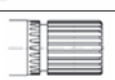
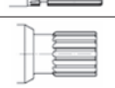
For clockwise and reverse gear pump,
in direction clockwise



For anti-clockwise gear pump,
in direction anti-clockwise

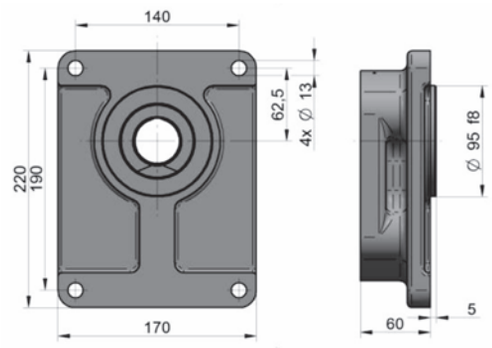
For. ex...: QHD2-43B-S03D13-C<u>G05</u> <u>G05</u> <u>G04</u> <u>G04</u> -N
1. 2. 3. 4.

COMBINATIONS OF FLANGES AND SHAFTS

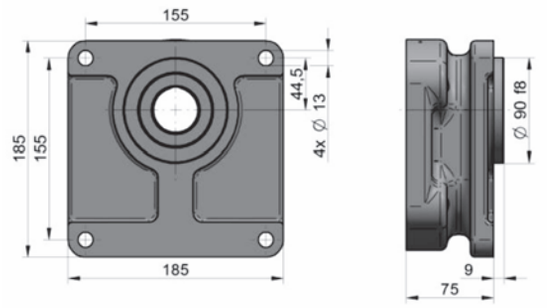
			FLANGE DESIGN						
			R14	R15	S03	S04	S06	I02	F03
									
DRIVE SHAFT	D13				●				
	D14					●	●		
	D15				●	○	○		
	D18							●	
	D19		●						
	D25			●					
	D26		●						
	D27								●
	V17				●				
	V18				●	○	○		
	V19					●	●		

FLANGES DESIGN

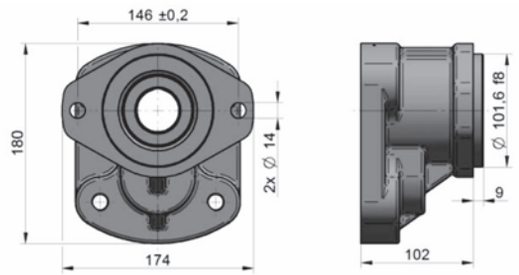
R14:



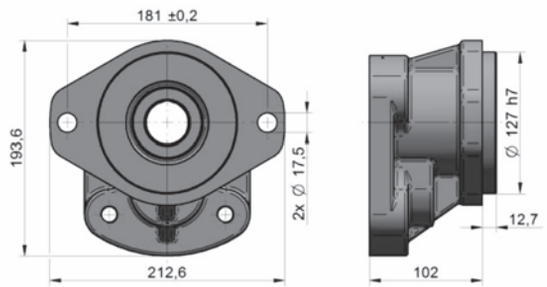
R15:



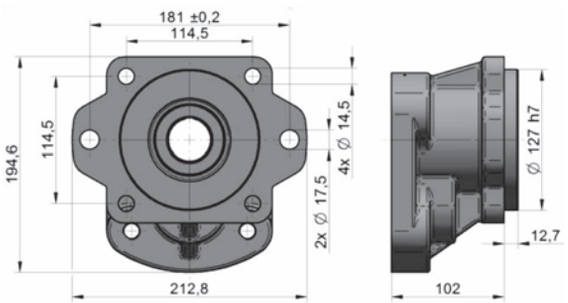
S03:



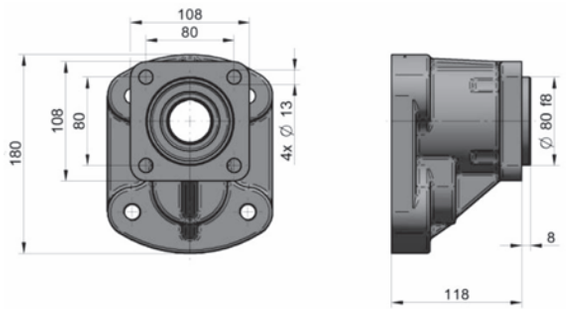
S04:



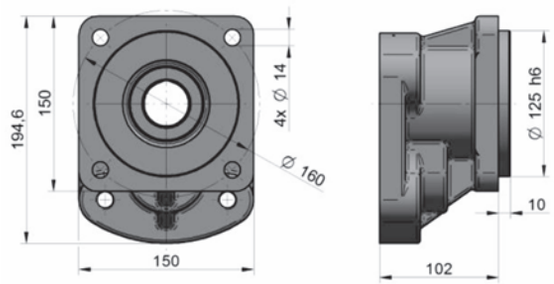
S06:



I01:

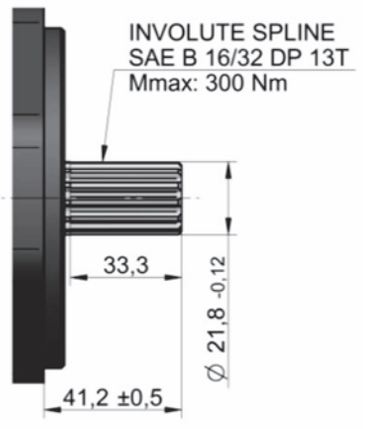


F03:

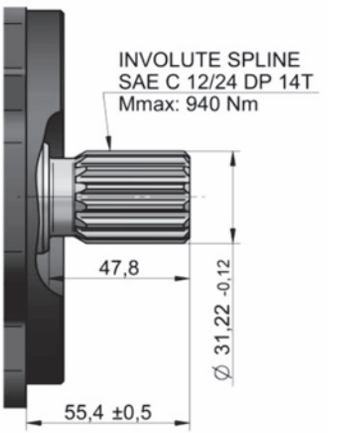


DRIVE SHAFTS

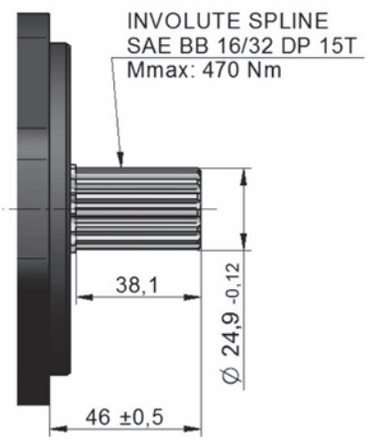
D13:



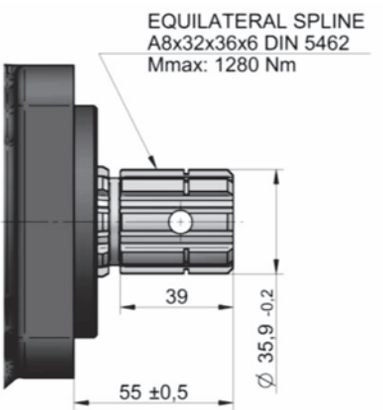
D14:



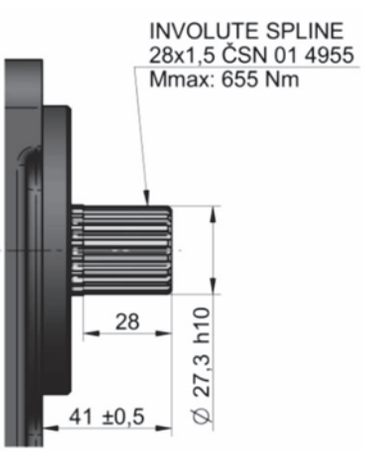
D15:



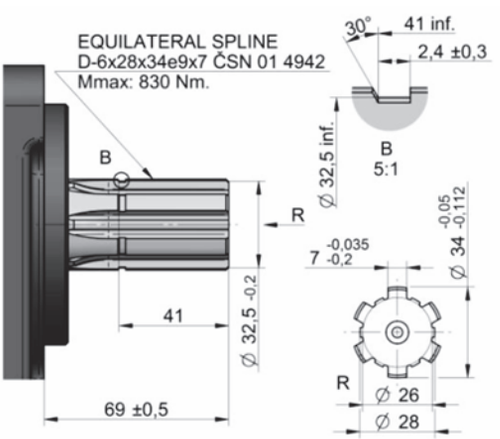
D18:



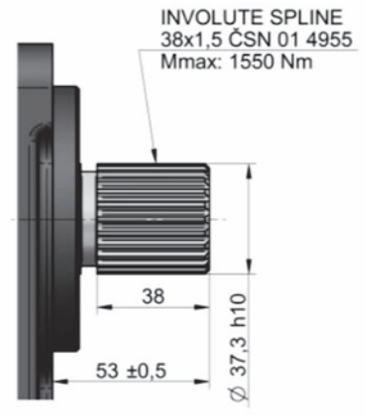
D19:



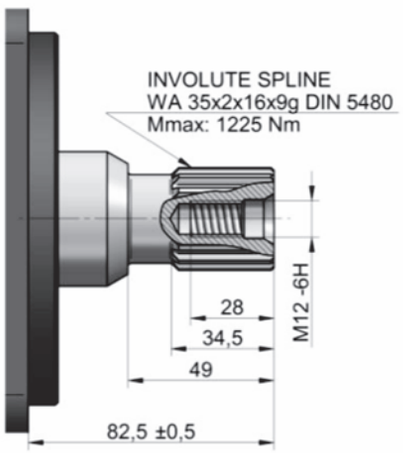
D25:



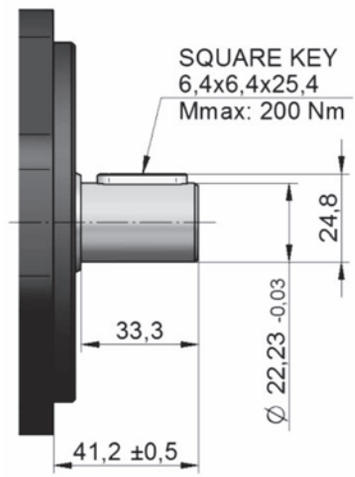
D26:



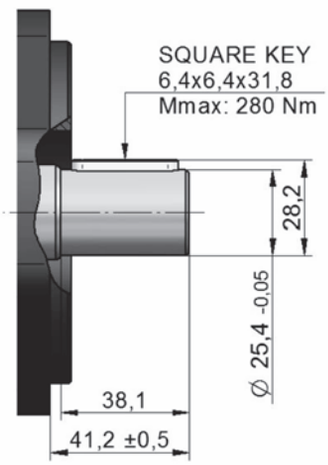
D27:



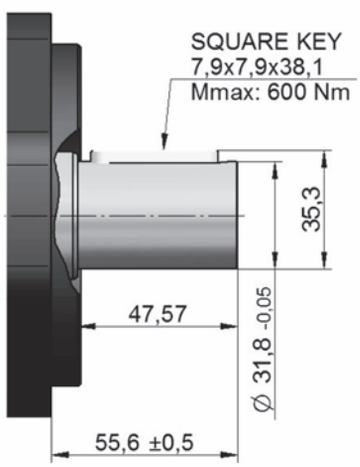
V17:



V18:

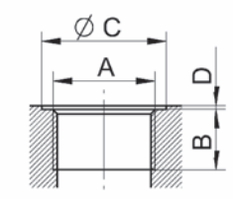


V19:



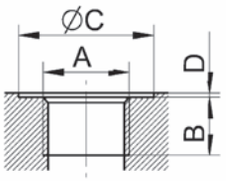
LIQUID INLET AND OUTLET CONNECTION

Metric thread according to ISO 6149



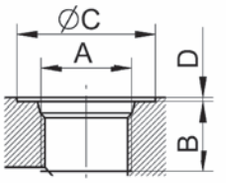
Displacement [cm³]	Code	Inlet				Code	Outlet			
		A	B	C	D		A	B	C	D
43 - 51	M11	M 33x1.5	18	40	1	M08	M 27x1.5	16	33	1
43 - 51	M12	M 33x2	18	40	1	M09	M 27x2	16	33	1
51 - 150	M15	M 48x2	22	56	1	M12	M 33x2	18	40	1

BSPP pipe thread according to ISO 228-1



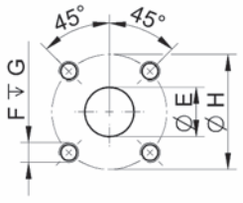
Displacement [cm³]	Code	Inlet				Code	Outlet			
		A	B	C	D		A	B	C	D
43 -71	G06	G 1 1/4"	24	58	1	G05	G 1"	18	45	1
71 - 100	G07	G 1 1/2"	26	64	1	G06	G 1 1/4"	24	58	1
100 - 150	G09	G 2"	32	78	1	G07	G 1 1/2"	26	64	1

UNF thread according to SAE



Displacement [cm³]	Code	Inlet				Code	Outlet			
		A	B	C	D		A	B	C	D
43 -71	U08	1-5/8-12UN	19	58	1	U07	1-5/16-12UN	19	49	1
51 - 80	U08	1-5/8-12UN	19	58	1	U07	1-5/16-12UN	19	49	1
80 - 150	U09	1-7/8-12UN	19	65	1	U08	1-5/8-12UN	19	58	1

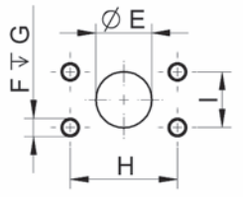
Flanged fittings according to DIN 8901/8902



Displacement [cm³]	Code	Inlet				Code	Outlet			
		E	F	G	H		E	F	G	H
43 -51	H10	25	M8	16	55	H09	18	M8	16	55

Note: Applicable only as side inputs

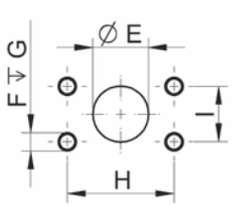
Flanged fittings according to SAE, metric thread



Displacement [cm³]	Code	Inlet					Code	Outlet				
		E	F	G	H	I		E	F	G	H	I
43-51	E04	30.5	M10	22	58.7	30.2	E03	25.4	M10	22	52.4	26.2
51-71	E05	39.3	M12	27	69.8	35.7	E04	30.5	M10	22	58.7	30.2
51-82	E05	39.3	M12	27	69.8	35.7	E04	30.5	M10	22	58.7	30.2
82-150	E06	51.0	M12	27	77.8	42.9	E05	39.3	M12	27	69.8	35.7

Note: Applicable only as side inputs

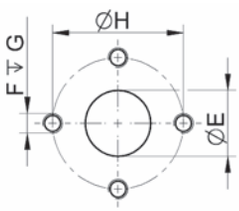
Flanged fittings according to SAE, UNC thread



Displacement [cm³]	Code	Inlet					Code	Outlet				
		E	F	G	H	I		E	F	G	H	I
43-51	A04	30.5	7/16-14 UNC-2B	28.5	58.7	30.2	A03	25.4	3/8-16 UNC-2B		52.4	26.2
51-71	A05	39.3	1/2-13 UNC-2B	27.0	69.8	35.7	A04	30.5	7/16-14 UNC-2B	29	58.7	30.2
51-82	A05	39.3	1/2-13 UNC-2B	27.0	69.8	35.7	A04	30.5	7/16-14 UNC-2B	29	58.7	30.2
82-150	A06	51.0	1/2-13 UNC-2B	27.0	77.8	42.9	A05	39.3	1/2-13 UNC-2B	27	69.8	35.7

Note: Applicable only as side inputs

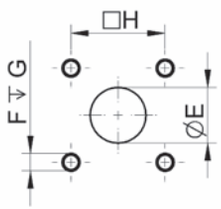
Flanged fittings – „cross"



Displacement [cm³]	Code	Inlet				Code	Outlet			
		E	F	G	H		E	F	G	H
43-51	K04	26	M10	18	51	K03	18	M8	18	40
43-51	K06	25	M8	16	55	K05	18	M8	16	55

Note: Applicable only as side inputs

Flanged fittings – „square"



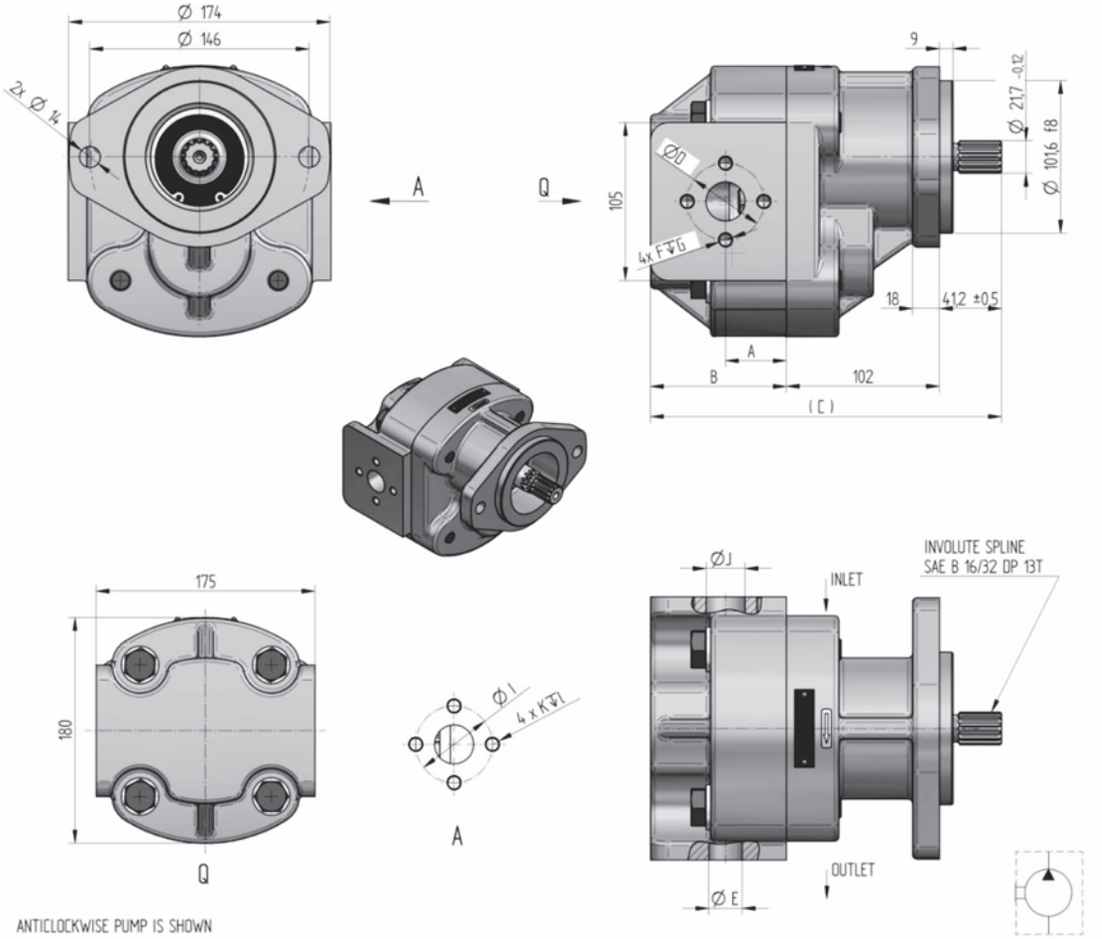
Displacement [cm³]	Code	Inlet				Code	Outlet			
		E	F	G	H		E	F	G	H
43-51	S06	30	M10	22	48	S05	22	M10	22	48
51-150	S04	46	M12	24	78	S04	46	M12	24	78

Note: S04 – Applicable only as side inputs
S05, S06 – Applicable as axial inputs

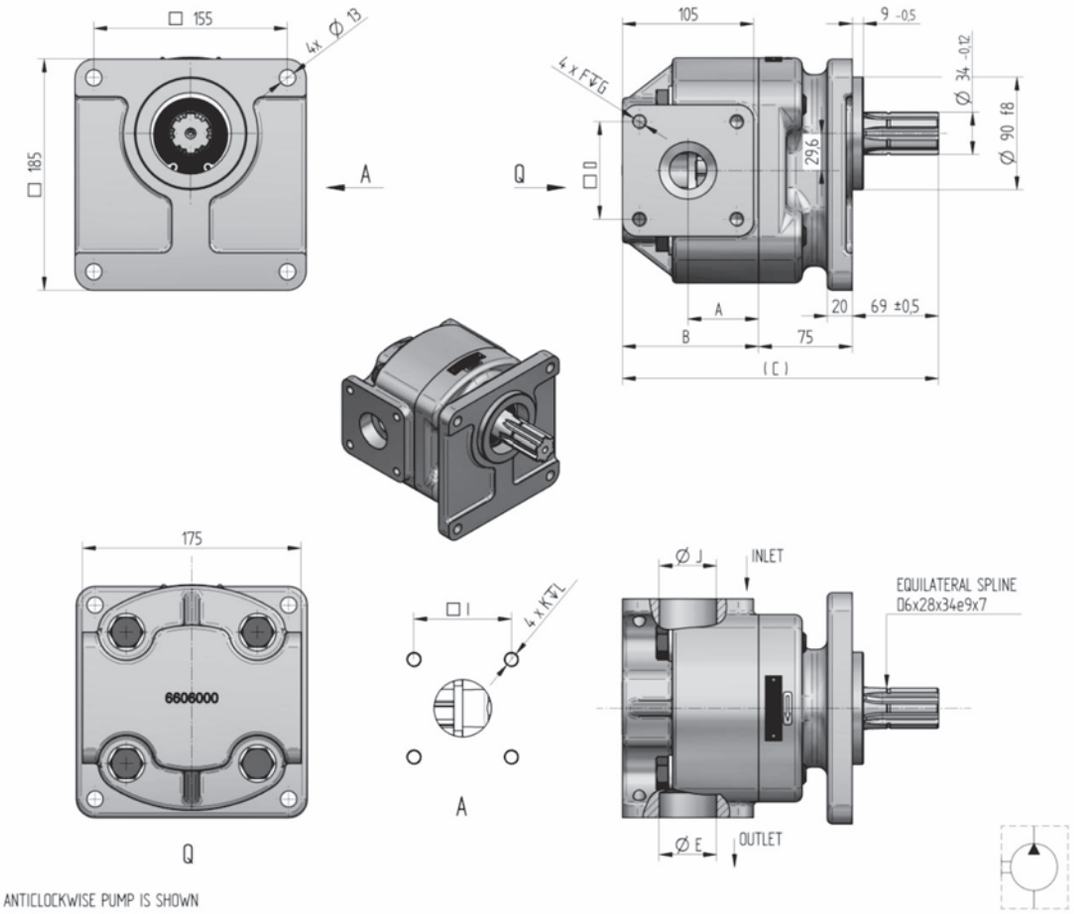
Drains:

Displacement [cm³]	Code	Outlet			
		A	B	C	D
all	M05	M 18 x 1.5	14	24	1
all	M07	M 22 x 1.5	14	28	1
all	G03	G 1/2"	14	33	1

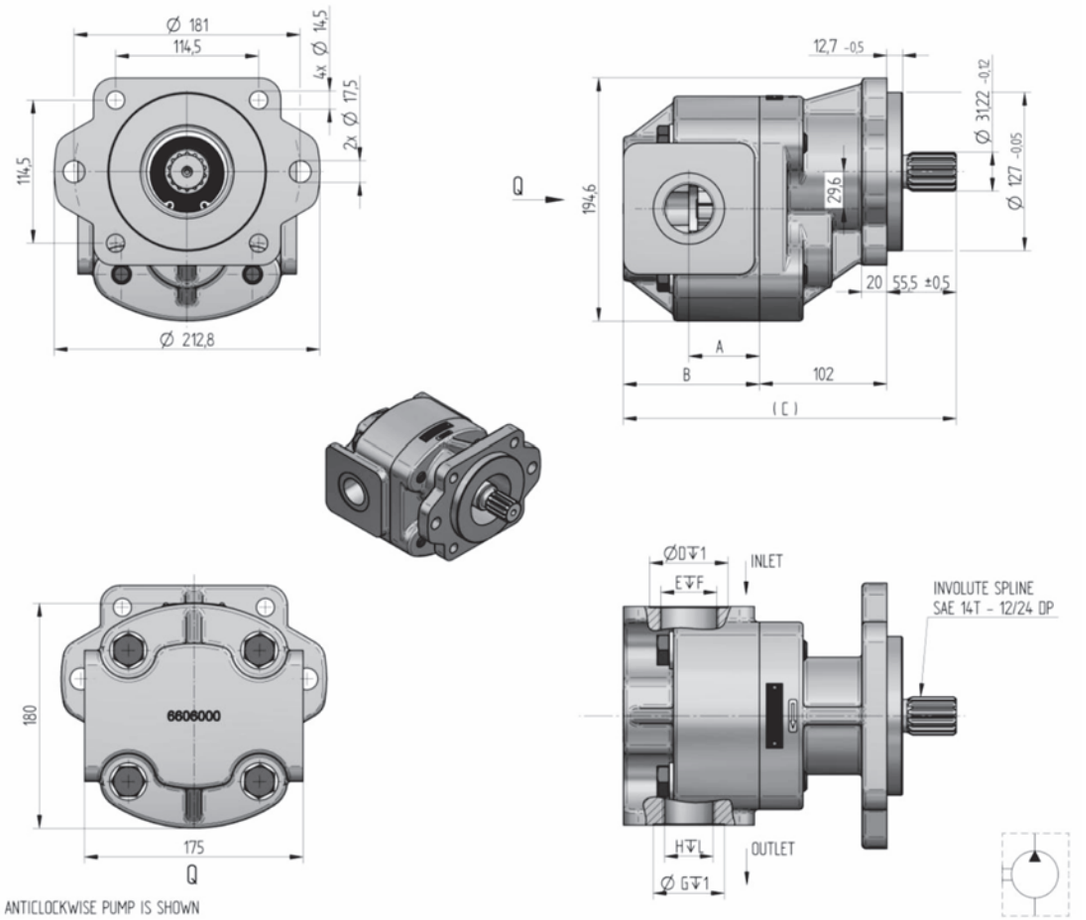
CATALOGUE SHETS OF QHD2 SERIES BASIC DESIGNS



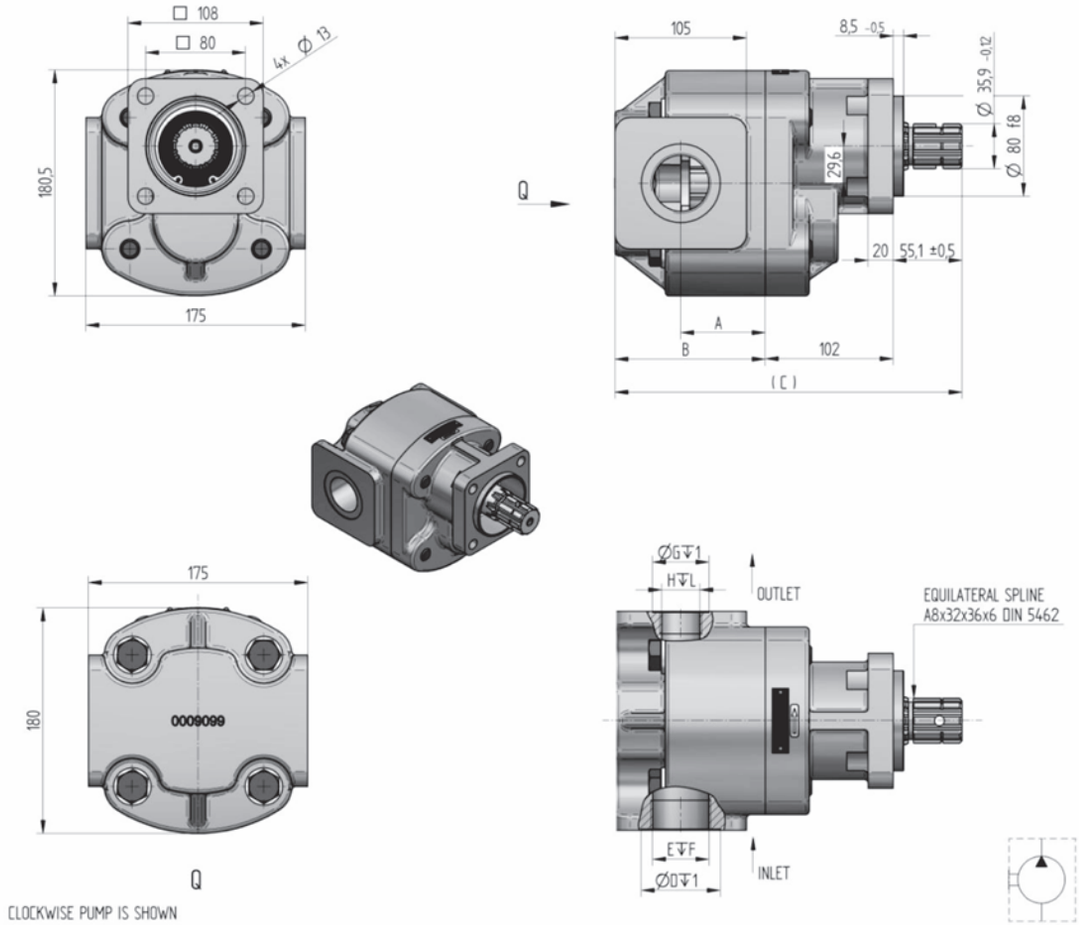
Order key	purch. code	direct. of rot.	displa-cement [cm³/1]	nom. press. [bar]	speed MIN. [min⁻¹]	speed MAX. [min⁻¹]	dimension A [mm]	B [mm]	C [mm]	∅D [mm]	∅E [mm]	F [mm]	G [mm]	∅I [mm]	∅J [mm]	K [mm]	L [mm]
QHD2-150R-S03D13-		R	150	170	250	2000	78,0	130,5	273,7								
QHD2-150L-S03D13-		L															
QHD2-125R-S03D13-		R	125	190	250	2400	67,5	120,0	263,2								
QHD2-125L-S03D13-		L															
QHD2-110R-S03D13-		R	110	210	350	2600	61,0	113,5	256,7								
QHD2-110L-S03D13-		L															
QHD2-100R-S03D13-		R	100	230	350	2700	56,5	109,0	252,2								
QHD2-100L-S03D13-		L															
QHD2-90R-S03D13-		R	90	240	400	2800	52,5	105,0	248,2								
QHD2-90L-S03D13-		L															
QHD2-82R-S03D13-		R	82	260	400	3000	50,8	101,5	244,7								
QHD2-82L-S03D13-		L															
QHD2-71R-S03D13-		R	71	260	400	3200	48,5	97,0	240,2								
QHD2-71L-S03D13-		L															
QHD2-61R-S03D13-		R	61	270	400	3200	46,3	92,5	235,7								
QHD2-61L-S03D13-		L															
QHD2-56R-S03D13-K04K04-N		R	56	280	400	3200	40,5	90,5	233,7	51	26	M10	16	51	26	M10	16
QHD2-56L-S03D13-K04K04-N	188 9806	L															
QHD2-51R-S03D13-		R	51	280	400	3200	38,5	88,5	231,7								
QHD2-51L-S03D13-		L															
QHD2-43R-S03D13-		R	43	280	400	3200	32,5	85,0	228,2								
QHD2-43L-S03D13-		L															



Order key	purch. code	direct. of rot.	displa-cement [cm³/1]	nom. press. [bar]	speed MIN. [min⁻¹]	speed MAX. [min⁻¹]	dimension A [mm]	B [mm]	C [mm]	∅D [mm]	∅E [mm]	F [mm]	G [mm]	∅I [mm]	∅J [mm]	K [mm]	L [mm]
QHD2-150R- R15D25-		R	150	170	250	2000	78,0	130,5	274,0								
QHD2-150L- R15D25-		L															
QHD2-125R- R15D25-		R	125	190	250	2400	67,5	120,0	264,0								
QHD2-125L- R15D25-		L															
QHD2-110R- R15D25-		R	110	210	350	2600	61,0	113,5	257,5								
QHD2-110L- R15D25-		L															
QHD2-100R- R15D25-SS04S04N		R	100	230	350	2700	56,5	109,0	253,0	78	46	M12	24	78	46	M12	24
QHD2-100L- R15D25-SS04S04N		L															
QHD2-90R- R15D25-		R	90	240	400	2800	52,5	105,0	249,0								
QHD2-90L- R15D25-		L															
QHD2-82R- R15D25-		R	82	260	400	3000	50,8	101,5	243,9								
QHD2-82L- R15D25-		L															
QHD2-71R- R15D25-		R	71	260	400	3200	48,5	97,0	241,0								
QHD2-71L- R15D25-		L															
QHD2-61R- R15D25-		R	61	270	400	3200	46,3	92,5	236,5								
QHD2-61L- R15D25-		L															
QHD2-56R- R15D25-		R	56	280	400	3200	40,5	90,5	234,5								
QHD2-56L- R15D25-		L															
QHD2-51R- R15D25-		R	51	280	400	3200	36,0	88,5	232,5								
QHD2-51L- R15D25-		L															
QHD2-43R- R15D25-		R	43	280	400	3200	32,5	85,0	229,0								
QHD2-43L- R15D25-		L															



Order key	purch. code	direct. of rot.	displa-cement [cm³/1]	nom. press. [bar]	speed MIN. [min⁻¹]	speed MAX. [min⁻¹]	dimension A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	L [mm]
QHD2-150R-S06D14-		R	150	170	250	2000	78,0	130,5	288,0						
QHD2-150L-S06D14-		L													
QHD2-125R-S06D14-		R	125	190	250	2400	67,5	120,0	277,5						
QHD2-125L-S06D14-		L													
QHD2-110R-S06D14-		R	110	210	350	2600	61,0	113,5	271,0						
QHD2-110L-S06D14-		L													
QHD2-100R-S06D14-SE07E06N		R	100	230	350	2700	56,5	109,0	266,5	64	G1½"	26	58	G1¼"	24
QHD2-100L-S06D14-SE07E06N		L													
QHD2-90R-S06D14-		R	90	240	400	2800	52,5	105,0	262,5						
QHD2-90L-S06D14-		L													
QHD2-82R-S06D14-		R	82	260	400	3000	50,8	101,5	259,0						
QHD2-82L-S06D14-		L													
QHD2-71R-S06D14-		R	71	260	400	3200	48,5	97,0	254,5						
QHD2-71L-S06D14-		L													
QHD2-61R-S06D14-		R	61	270	400	3200	46,3	92,5	250,0						
QHD2-61L-S06D14-		L													
QHD2-56R-S06D14-		R	56	280	400	3200	40,5	90,5	248,0						
QHD2-56L-S06D14-		L													
QHD2-51R-S06D14-		R	51	280	400	3200	36,0	88,5	246,0						
QHD2-51L-S06D14-		L													
QHD2-43R-S06D14-		R	43	280	400	3200	32,5	85,0	242,5						
QHD2-43L-S06D14-		L													



Order key	purch. code	direct. of rot.	displa-cement [cm³/1]	nom. press. [bar]	speed MIN. [min⁻¹]	speed MAX. [min⁻¹]	dimension A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	L [mm]
QHD2-150R-I02D18-		R	150	170	250	2000	78,0	130,5	287,6						
QHD2-150L-I02D18-		L													
QHD2-125R-I02D18-SG07G05N		R	125	190	250	2400	67,5	120,0	277,1	64	G1½"	26	45	G1"	18
QHD2-125L-I02D18-SG07G05N		L													
QHD2-110R-I02D18-		R	110	210	350	2600	61,0	113,5	270,6						
QHD2-110L-I02D18-		L													
QHD2-100R-I02D18-		R	100	230	350	2700	56,5	109,0	266,1						
QHD2-100L-I02D18-		L													
QHD2-90R-I02D18-		R	90	240	400	2800	52,5	105,0	262,1						
QHD2-90L-I02D18-		L													
QHD2-82R-I02D18-		R	82	260	400	3000	50,8	101,5	258,6						
QHD2-82L-I02D18-		L													
QHD2-71R-I02D18-		R	71	260	400	3200	48,5	97,0	254,1						
QHD2-71L-I02D18-		L													
QHD2-61R-I02D18-		R	61	270	400	3200	46,3	92,5	249,6						
QHD2-61L-I02D18-		L													
QHD2-56R-I02D18-		R	56	280	400	3200	40,5	90,5	247,6						
QHD2-56L-I02D18-		L													
QHD2-51R-I02D18-		R	51	280	400	3200	36,0	88,5	254,6						
QHD2-51L-I02D18-		L													
QHD2-43R-I02D18-		R	43	280	400	3200	32,5	85,0	242,1						
QHD2-43L-I02D18-		L													

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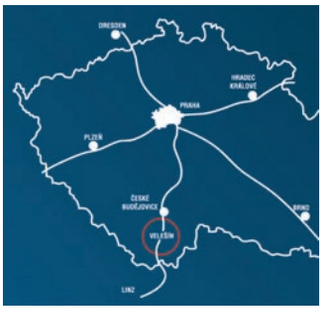
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