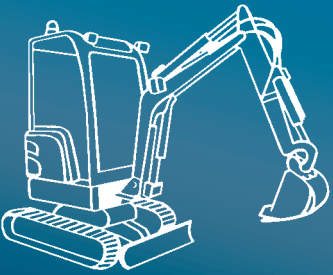


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AERO TECHNOLOGY & HYDRA



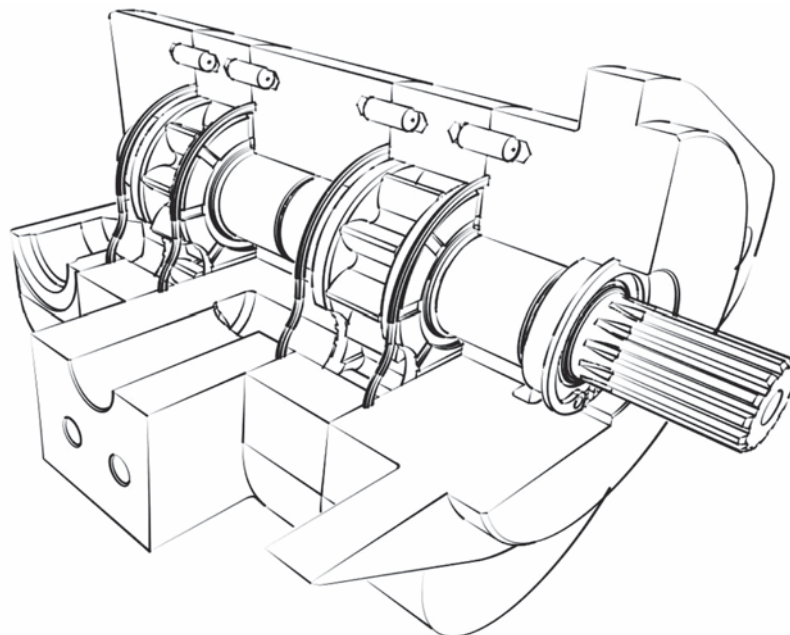
Displacement from 10 to 36 ccm
Pressure up to 300 bar
Speed from 350 to 3400 RPM

GEAR PUMPS

GHDO

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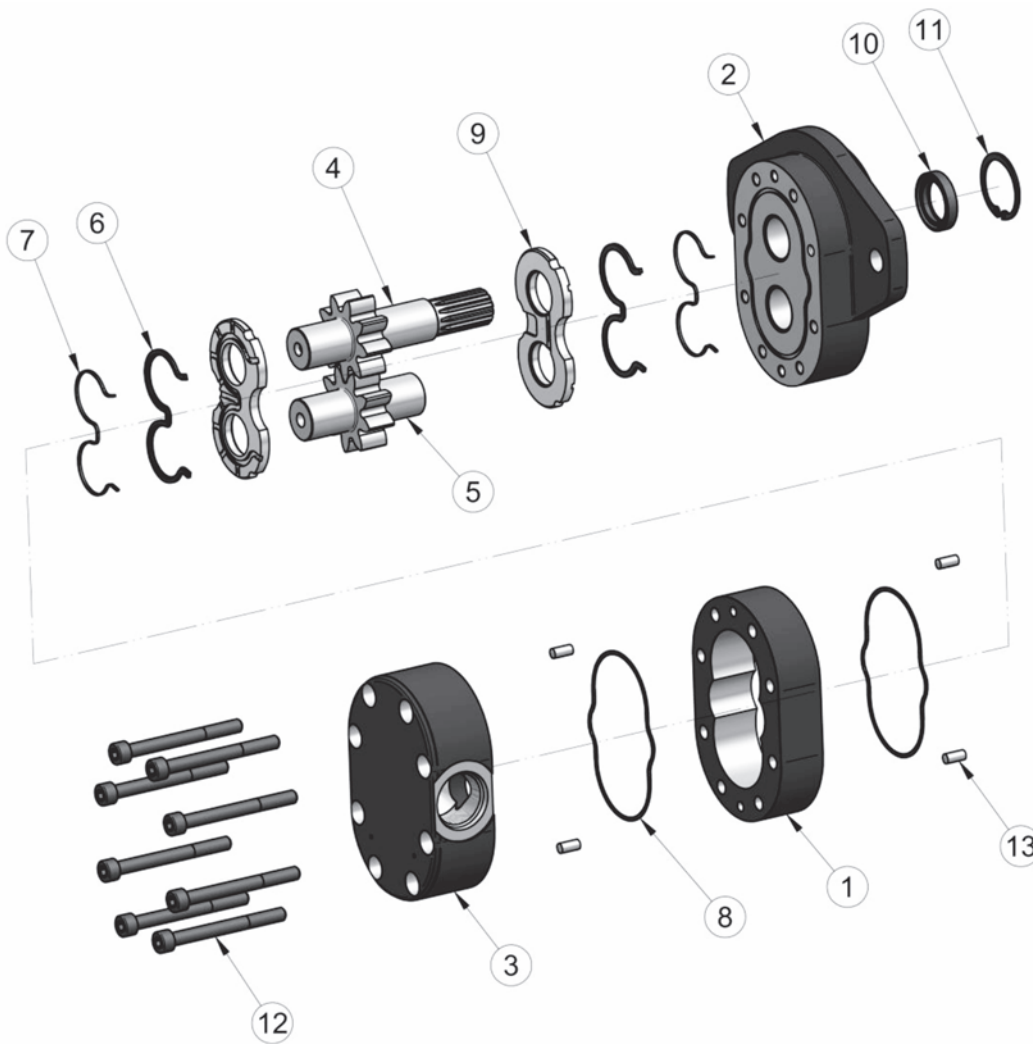
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DESCRIPTION

- Pumps and motors of X series are designed for use in hydraulic systems with very low performance (up to 2.3 kW). They are produced in unidirectional and bi-directional design.
- A wide range of shafts, flanges, inlets and outlets working liquid allows their use in hydraulic circuits stationary and mobile machines and devices of smaller dimensions. The used types of connections and flanges conform to world standards.
- The X series have a wide spectrum of usable rotational speed from 800 to 8000 min⁻¹, enabling connection to high-speed motors. Pumps and motors have a very favourable efficiency and noise throughout the rev range and pressure.

BASIC PARTS OF PUMP



1. Body
2. Flange
3. Cover
4. Driving gear
5. Driven gear
6. Peripheral sealing
7. Sealing protective plate
8. Balancing sealing
9. Shaft seal
10. Bearing sleeves
11. Safety ring
12. Connection bolts
13. Spring washers

PARAMETER TABLE

Nominal Size Parameters		Sym.	Unit.	GHDOP 7	GHDOP 10	GHDOP 13	GHDOP 17	GHDOP 19	GHDOP 23	GHDOP 27
Actual displacement		V_g	[cm ³]	7.21	9.71	12.85	17.31	19.41	22.95	27.54
Rotation speed	nominal	n_n	[min ⁻¹]	1500	1500	1500	1500	1500	1500	1500
	minimum	n_{min}	[min ⁻¹]	400	400	400	350	350	350	350
	maximum	n_{max}	[min ⁻¹]	3400	3400	3400	3400	3400	3400	3400
Pressure at inlet*	minimum	p_{1min}	[bar]	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
	maximum	p_{1max}	[bar]	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pressure at outlet**	max. continuous	p_{2n}	[bar]	300	300	300	300	295	295	290
	maximum	p_{2max}	[bar]	320	320	320	320	315	315	310
	peak	p_3	[bar]	330	330	330	330	325	325	320
Nominal flow rate (min.) at n_n and p_{2n}		Q_n	[dm ³ .min ⁻¹]	9.9	13.5	18.1	24.4	27.4	32.4	38.8
Maximum flow rate at n_{max} a p_{2max}		Q_{max}	[dm ³ .min ⁻¹]	22.6	30.7	41.1	55.3	62.0	73.3	88.0
Nominal input power (max.) at n_n and p_{2n}		P_n	[kW]	6.6	8.8	11.5	15.5	17.0	20.1	23.8
Maximum input power at n_{max} a p_{2max}		P_{max}	[kW]	15.9	21.2	27.7	37.4	41.2	48.8	57.6
Weight		m	[kg]	8.7	8.8	9.0	9.2	9.4	9.8	10.1

Nominal Size Parameters		Sym.	Unit.	GHDOP 29	GHDOP 32	GHDOP 36	GHDOP 38	GHDOP 41	GHDOP 44	GHDOP 51
Actual displacement		V_g	[cm ³]	29.64	32.66	36.72	38.82	41.84	44.99	52.07
Rotation speed	nominal	n_n	[min ⁻¹]	1500	1500	1500	1500	1500	1500	1500
	minimum	n_{min}	[min ⁻¹]	350	350	350	350	350	350	350
	maximum	n_{max}	[min ⁻¹]	3200	3000	2700	2600	2400	2300	2000
Pressure at inlet*	minimum	p_{1min}	[bar]	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
	maximum	p_{1max}	[bar]	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pressure at outlet**	max. continuous	p_{2n}	[bar]	290	280	250	240	225	220	210
	maximum	p_{2max}	[bar]	310	300	270	260	245	240	230
	peak	p_3	[bar]	320	310	280	270	255	250	240
Nominal flow rate (min.) at n_n and p_{2n}		Q_n	[dm ³ .min ⁻¹]	41.8	46.1	51.8	54.7	59.0	63.4	73.4
Maximum flow rate at n_{max} a p_{2max}		Q_{max}	[dm ³ .min ⁻¹]	89.2	92.1	93.2	94.9	94.4	97.3	97.9
Nominal input power (max.) at n_n and p_{2n}		P_n	[kW]	25.6	27.2	27.3	27.7	28.0	29.5	32.5
Maximum input power at n_{max} a p_{2max}		P_{max}	[kW]	58.3	58.3	53.1	52.1	48.8	49.3	47.5
Weight		m	[kg]	10.2	10.4	10.6	10.7	10.9	11.1	11.4

* 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

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

V_g [cm³] pump displacement
 n [min⁻¹] rotation speed
 η_v [-] volumetric efficiency

Displacement
 V_g

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

Torque
 M_k

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

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

Input power
 P

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

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:

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

$Q_{act.}$ [dm³ · min⁻¹] actual flow rate
 Q_{theor} [dm³ · 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

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

Cinematic viscosity

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

Filtration coefficient β_α

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

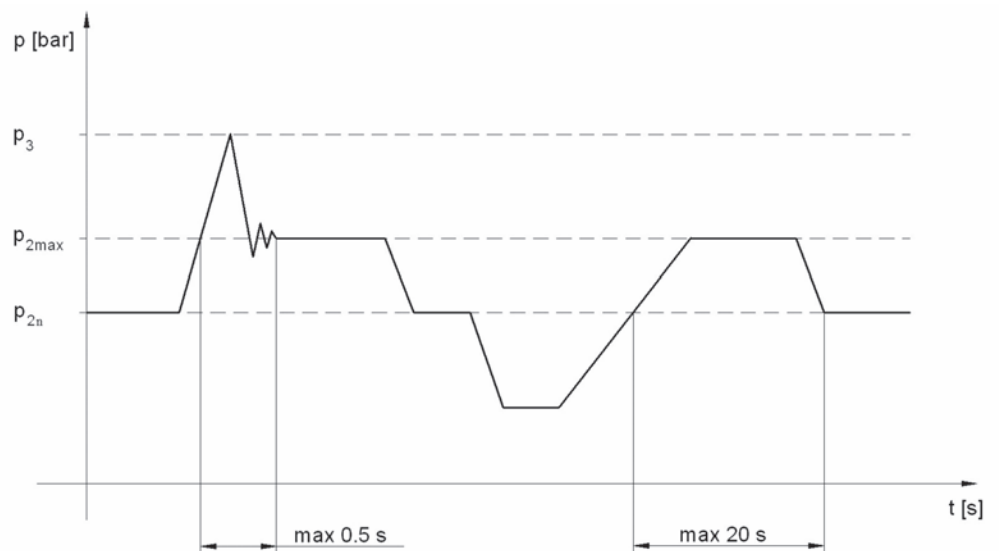
Liquid contamination class according to ISO 4406

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



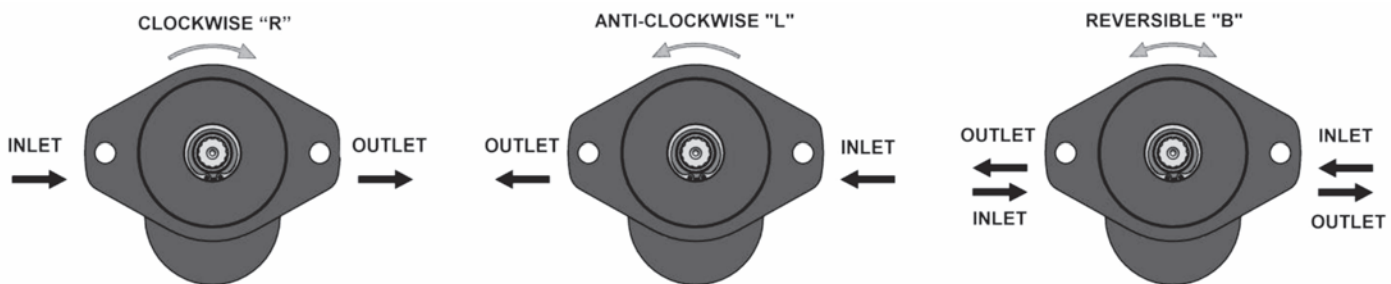
- p_{2n} **max. contin. pressure** Max. working pressure, at which the pump can be operated without time limitation.
- p_{2max} **max. pressure** Maximum pressure permissible for a short time, max. 20s.
- p_3 **peak pressure** Short-time pressure (fractions of a second) arising in case of a sudden change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

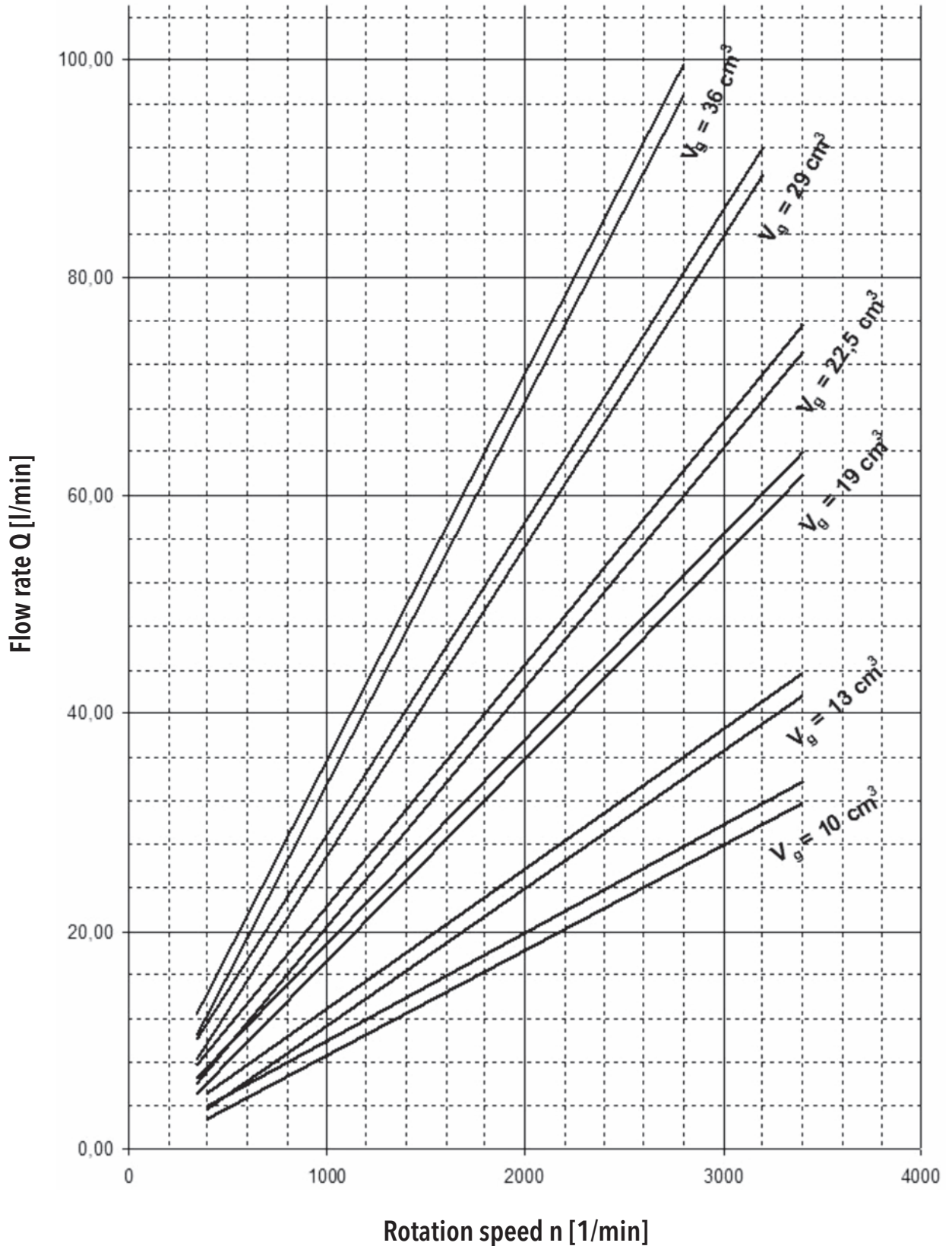
- Determine direction of rotation by looking at the drive shaft. The pump can only be used in the specified direction of rotation.



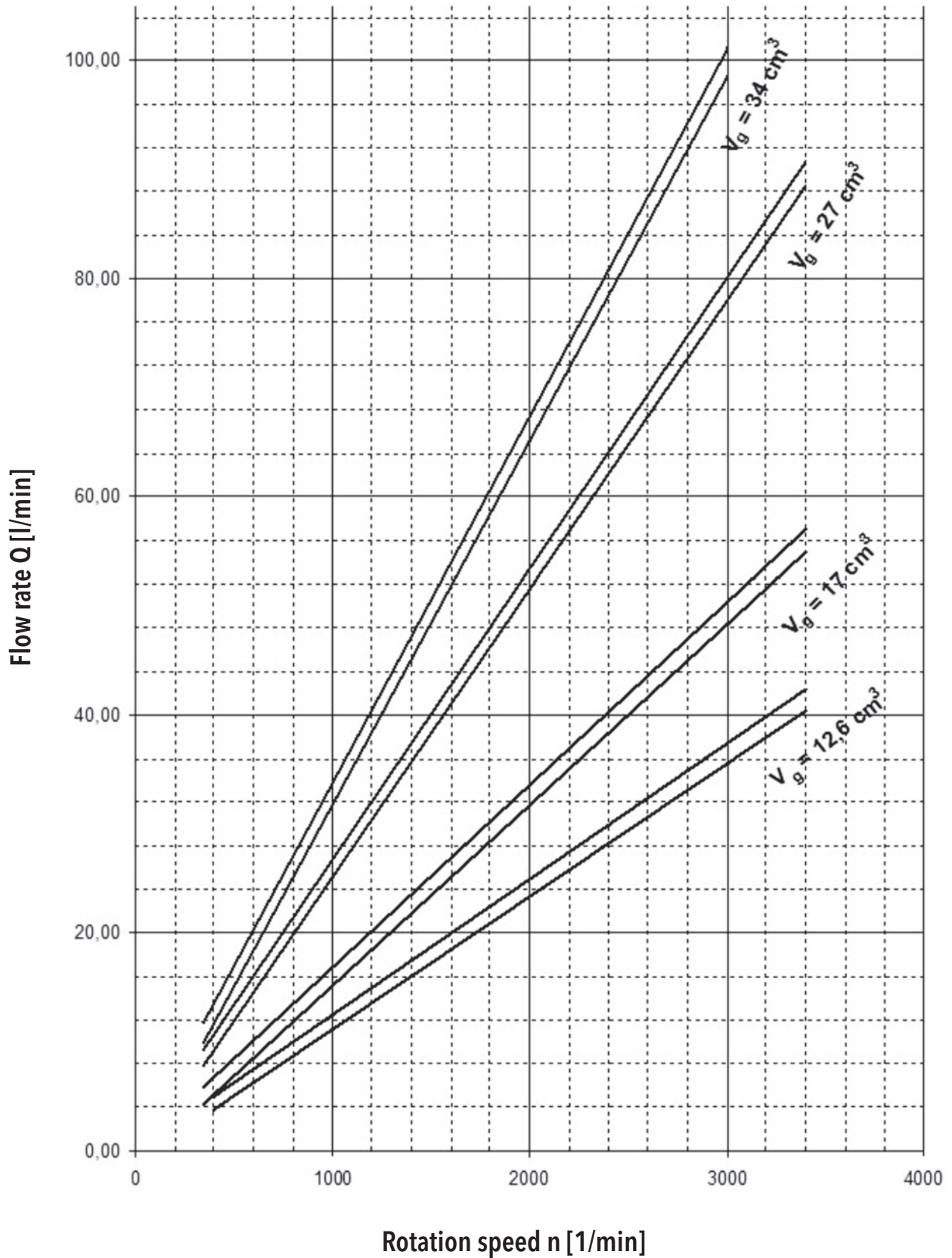
REVERSIBLE DESIGN

- The pumps with the possibility of bidirectional rotation have a different internal arrangement requiring drainage. Two types of drain 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.

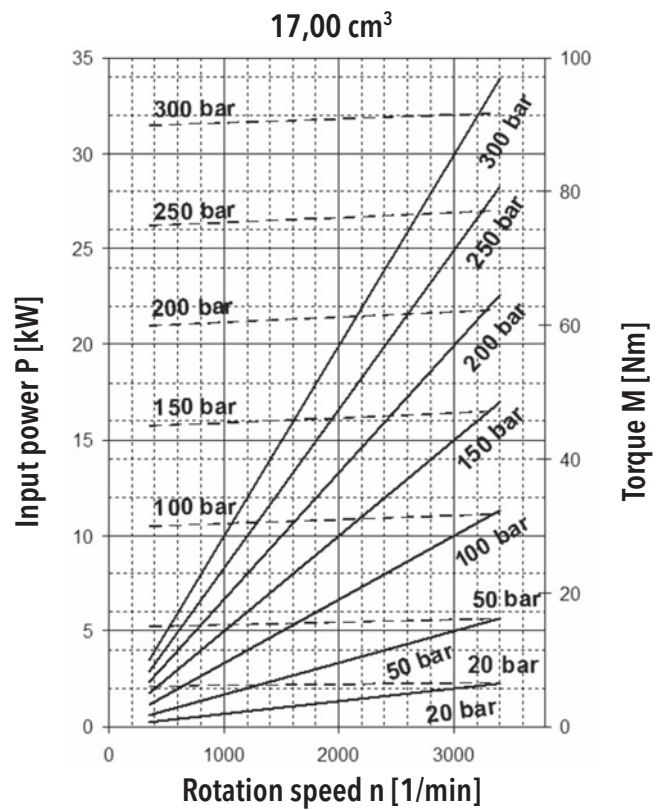
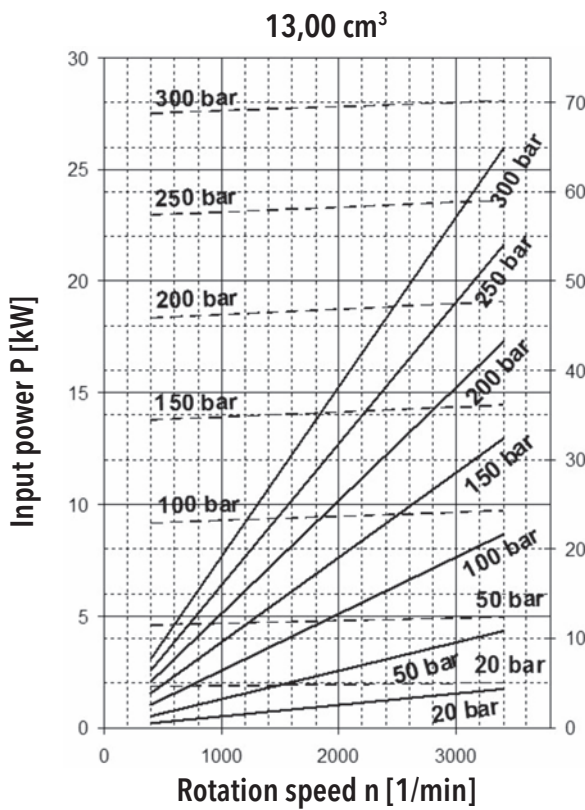
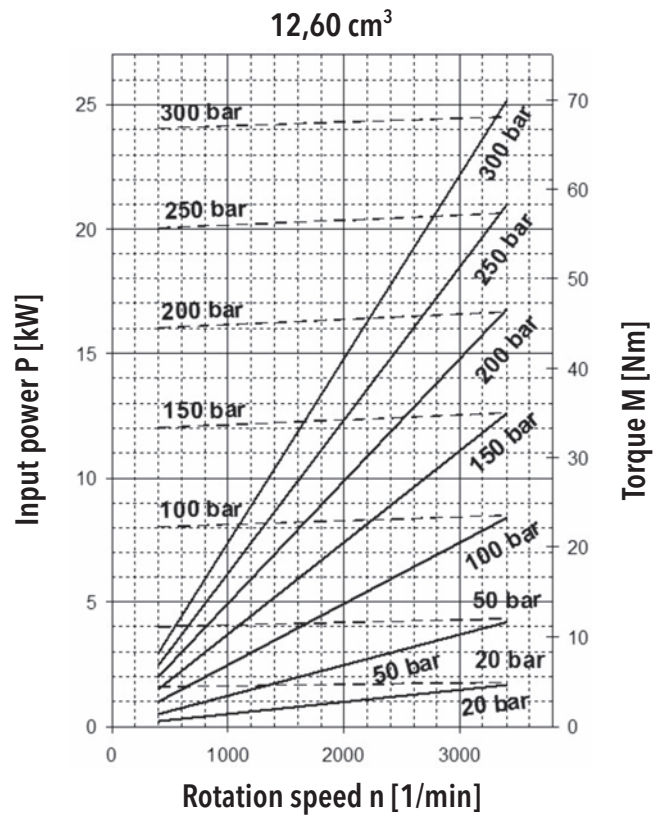
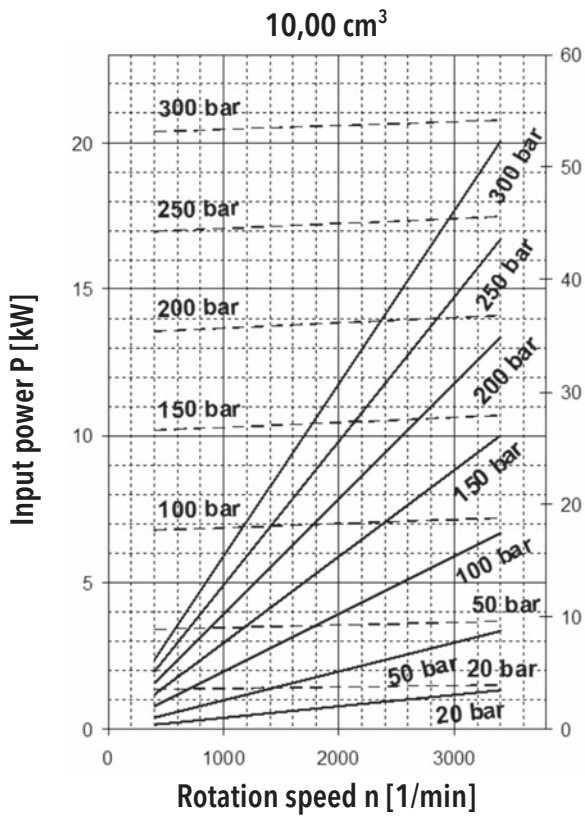
GHDO FLOW RATE AND POWER CURVES

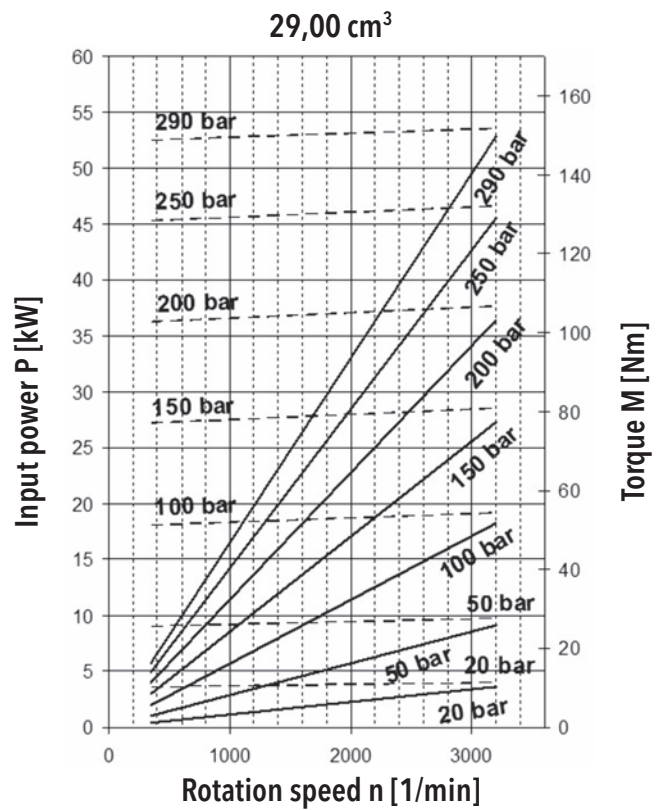
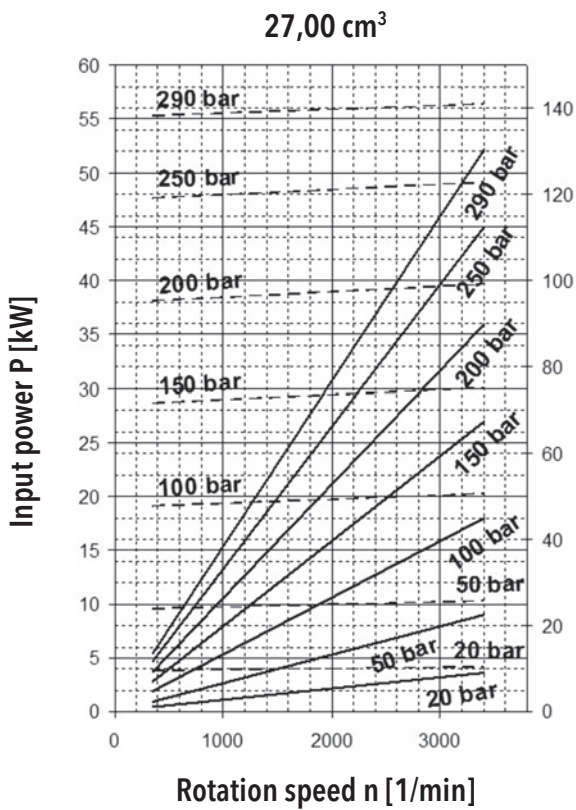
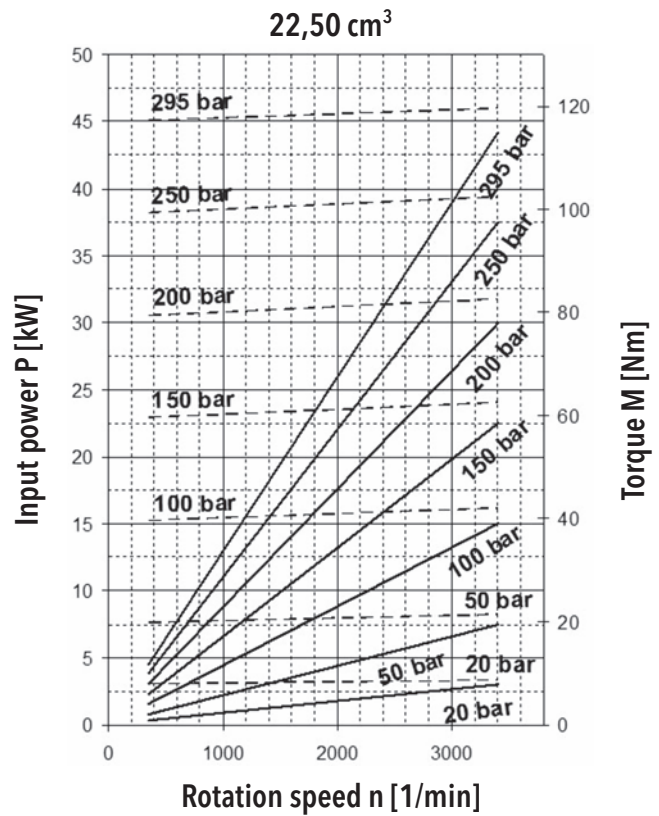
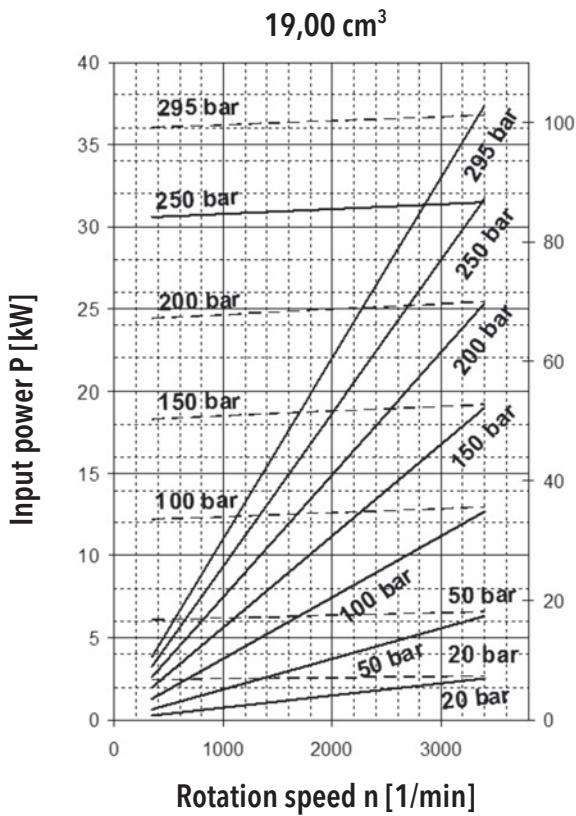


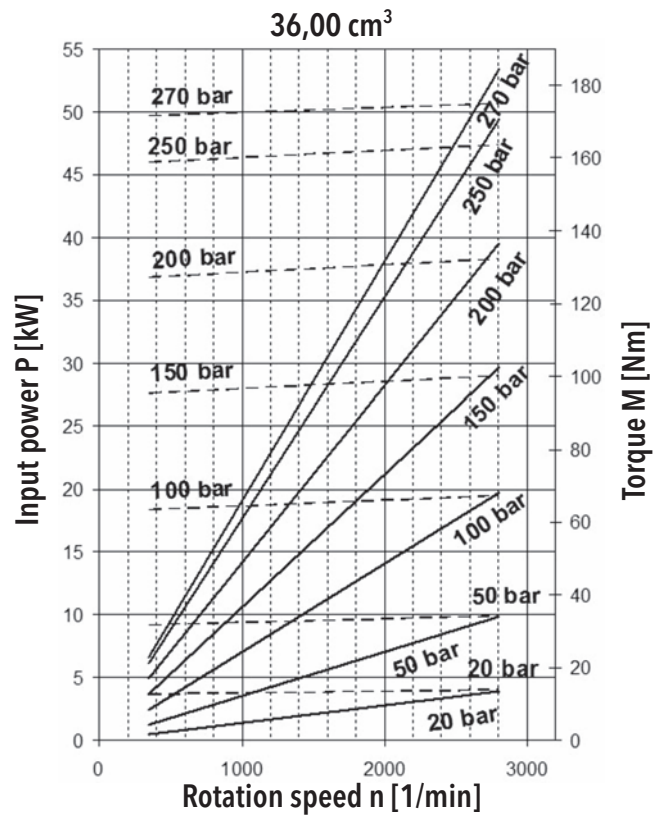
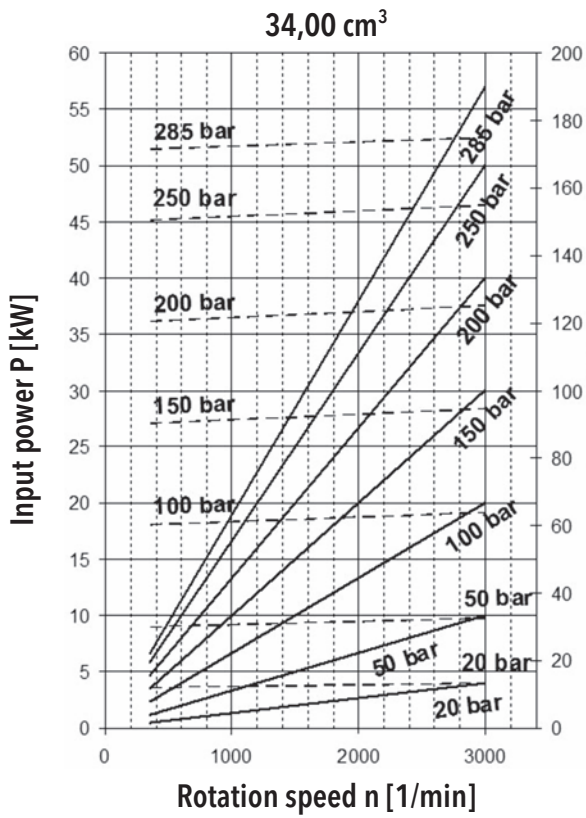
Above curves apply to ISO V_g 46 oil at temperature t = 45°C.



Above curves apply to ISO V_g 46 oil at temperature $t = 45^\circ\text{C}$.







ORDER KEY - SINGLE VERSION

GHDO - 22,5 R - S03 D13 - S U07 U05 - N . 001

Code	Displacement [cm ³]
10	10,016
12,6	12,584
13	12,970
17	16,951
19	19,005
22,5	22,472
27	26,967
29	29,021
34	34,029
36	35,956
38	38,010
XX	Other displacement on request

Code	Direction of rotation
R	Clockwise
L	Anti-clockwise
B	Bi-directional

Code	Type
GHDO	GHDO series pump

Code	Location of inlets and outlets
S	Side
R	Axial
C	Combination

Code	Drive shaft design
C11	Cone 1:8
D04	Spline SAE 9T
D06	Spline SAE 11T
D12	Spline 22x1
D13	Spline SAE B 13T
D15	Spline SAE BB 15T
D17	Spline UNI 221
D18	Equilateral spline A8x32x36x6 DIN5462
D23	Spline UNI 221
V17	Cylindric SAE B, Ø 22,22 Key 6,4x6,4x25,4
Z	Special design

Code	Special arrangements
-	No special arrangements
001	With front-end bearing
004	Without shaft seal

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

Code	Liquid inlet and outlet connection shape
M07	Thread M 22x1,5
M08	Thread M 27x1,5
M09	Thread M 27x2
M11	Thread M 33x1,5
M12	Thread M 33x2
G03	Thread BSP G1/2
G04	Thread BSP G3/4
G05	Thread BSP G1"
U03	Thread 3/4 - 16 UNF
U04	Thread 7/8 - 14 UNF
U05	Thread 1-1/16 - 12 UN
U07	Thread 1-5/16 - 12 UN
H07	Fitting Ø13,5; 4xM6 Ø30
H08	Fitting Ø20; 4xM8 Ø40
H09	Fitting Ø18 ; 4xM8 Ø55
H10	Fitting Ø25; 4xM8 Ø55
A02	Fitting SAE (SSS) 3/4"
A03	Fitting SAE (SSS) 1"
A04	Fitting SAE (SSS) 1" 1/4
E02	Fitting SAE (SSM) 3/4"
E03	Fitting SAE (SSM) 1"
E04	Fitting SAE (SSM) 1" 1/4
K03	Fitting Ø18; 4xM8/Ø40
K04	Fitting Ø26; 4xM10/Ø51
K05	Fitting Ø18; 4xM8/Ø55
K06	Fitting Ø25; 4xM8/Ø55
S05	Fitting Ø22; 4xM10 - 48x48
Z	Special design

An example of designation for the GHDO clockwise pump with displacement of 22.5 cm³, SAE B flange, SAE B spline, UNF side inlets and standard NBR seal without special arrangements:

GHDO-22.5R-S03D13-SU07U05-N

ORDER KEY - MULTIPLE VERSION

GHD0 - 29 / 17 L - S03 D13 - S U07 U05 / U07 U05 - N . 001

Code	Displacement [cm ³]
10	10,016
12,6	12,584
13	12,970
17	16,951
19	19,005
22,5	22,472
27	26,967
29	29,021
34	34,029
36	35,956
38	38,010
XX	Other displacement on request

Code	Direction of rotation
R	Clockwise
L	Anti-clockwise
B	Bi-directional

Code	Type
GHD0	GHDO series pump

Code	Flange design	
R09		Square, centre ring Ø 62 Spacing screw 86 x 120
R11		Square, centre ring Ø 50,8 Spacing screw 98,5 x 128
S02		SAE A 2 apertures
S03		SAE B 2 apertures
I02		ISO, centre ring Ø 80
U01		UNI
Z		Special design

Code	Location of inlets and outlets	
S		Side
C		Combination

Code	Drive shaft design	
C11		Cone 1:8
D04		Spline SAE 9T
D06		Spline SAE 11T
D12		Spline 22x1
D13		Spline SAE B 13T
D15		Spline SAE BB 15T
D17		Spline UNI 221
D18		Equilateral spline A8x32x36x6 DIN5462
D23		Spline UNI 221
V17		Cylindric SAE B, Ø 22,22 Key 6,4x6,4x25,4
Z		Special design

Code	Special arrangements
-	No special arrangements
001	With front-end bearing
004	Without shaft seal

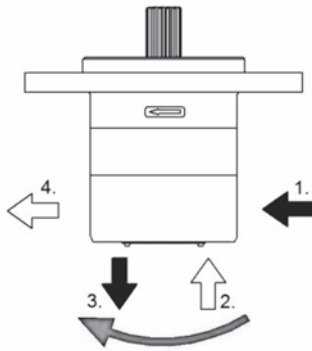
Code	Seal material
N	NBR
V	FKM (VITON)
H	HNBR

Code	Liquid inlet and outlet connection shape	
M07		Thread M 22x1,5
M08		Thread M 27x1,5
M09		Thread M 27x2
M11		Thread M 33x1,5
M12		Thread M 33x2
G03		Thread BSP G1/2
G04		Thread BSP G3/4
G05		Thread BSP G1
U03		Thread 3/4 - 16 UNF
U04		Thread 7/8 - 14 UNF
U05		Thread 1-1/16 - 12 UN
U07		Thread 1-5/16 - 12 UN
H07		Fitting Ø13,5; 4xM6 Ø30
H08		Fitting Ø20; 4xM8 Ø40
H09		Fitting Ø18; 4xM8 Ø55
H10		Fitting Ø25; 4xM8 Ø55
A02		Fitting SAE (SSS) 3/4
A03		Fitting SAE (SSS) 1
A04		Fitting SAE (SSS) 1 1/4
E02		Fitting SAE (SSM) 3/4
E03		Fitting SAE (SSM) 1
E04		Fitting SAE (SSM) 1 1/4
K03		Fitting Ø18; 4xM8/Ø40
K04		Fitting Ø26; 4xM10/Ø51
K05		Fitting Ø18; 4xM8/Ø55
K06		Fitting Ø25; 4xM8/Ø55
S05		Fitting Ø22; 4xM10 - 48x48
Z		Special design

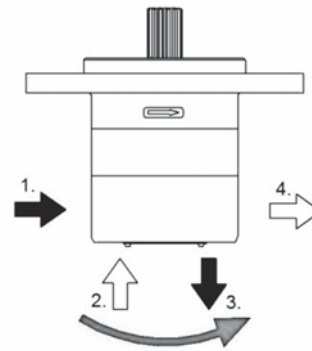
An example of designation for the GHDO two-section anti-clockwise pump with displacements of 29 and 17 cm³, SAE B flange, SAE B spline, UNF side inlets and standard NBR seal without special arrangements:

GHD0-29/17L-S03D13-SU07U05/U07U05-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

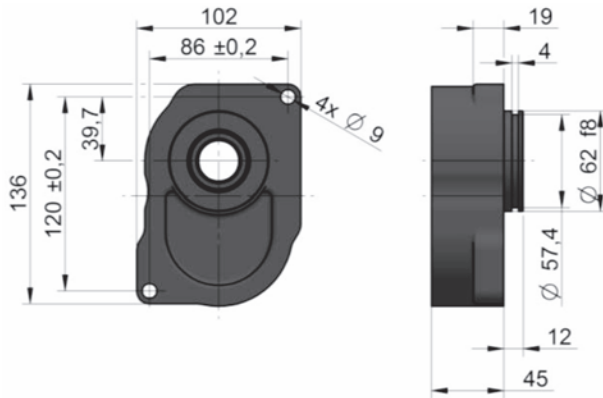
For. ex....: GHDO-43B-R11C11-CG05 G05 G04 G04 -N
1. 2. 3. 4.

COMBINATIONS OF FLANGES AND SHAFTS

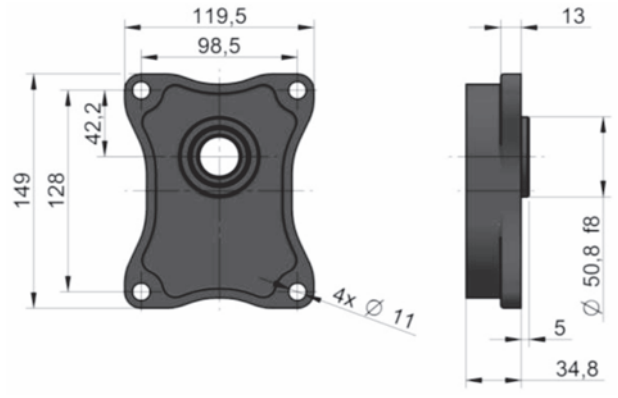
		FLANGE DESIGN					
		R11	R09	S02	S03	I02	U01
DRIVE SHAFT	C11						
	D04						
	D06						
	D12						
	D13						
	D15						
	D17						
	D18						
	D23						
	V17						

FLANGES DESIGN

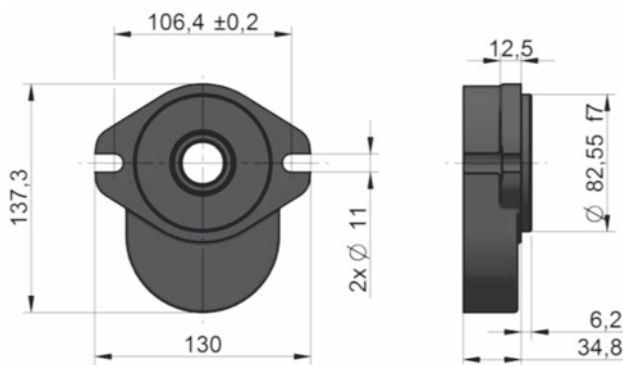
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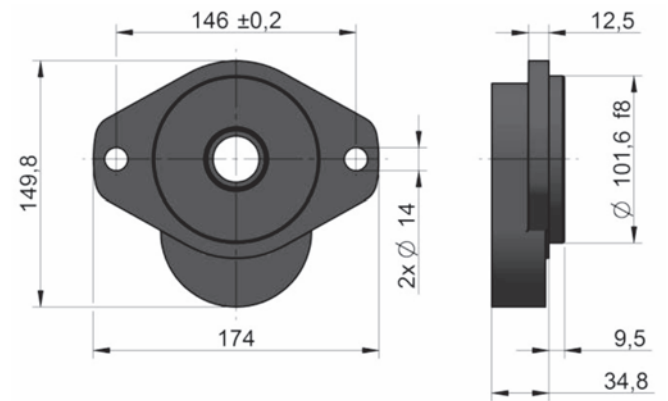
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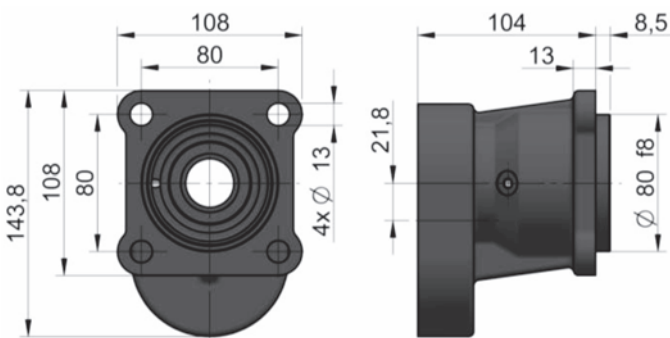
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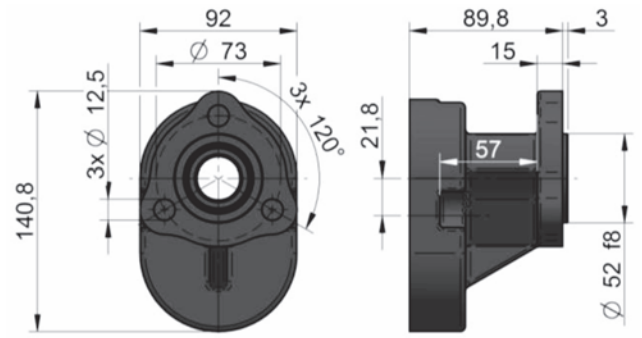
S03:



I01:

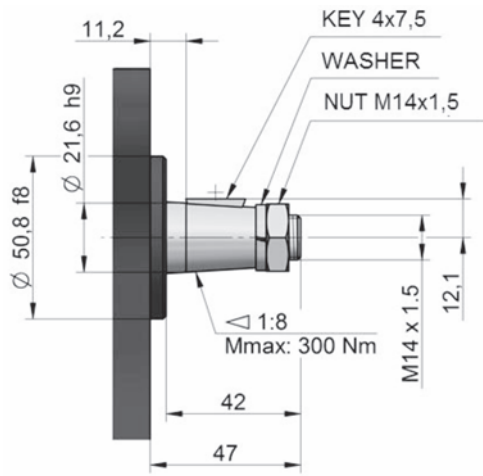


U01:

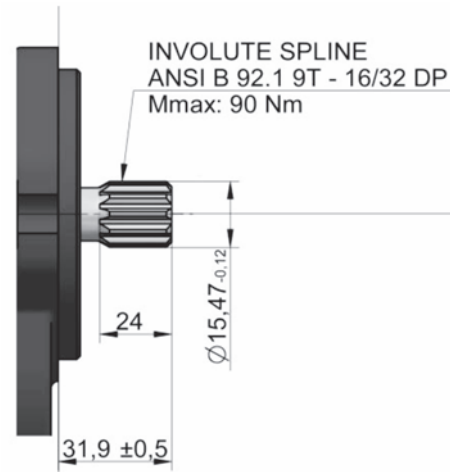


DRIVE SHAFTS

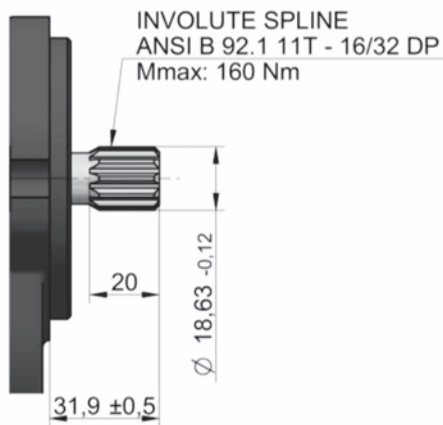
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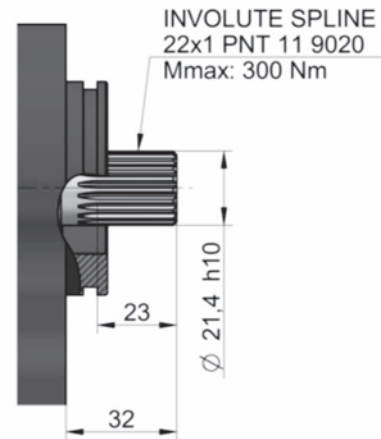
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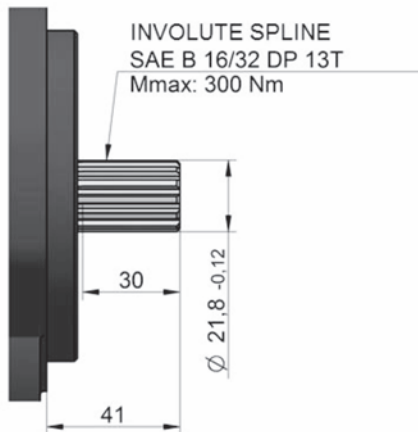
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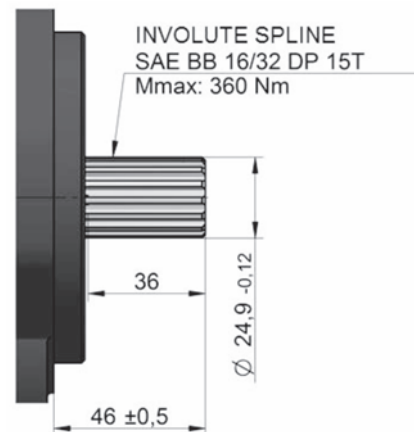
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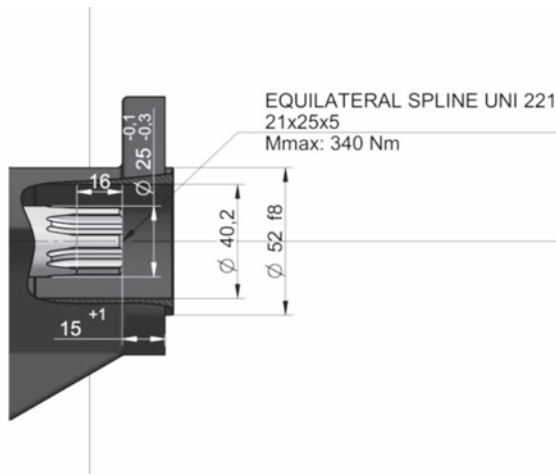
D13:



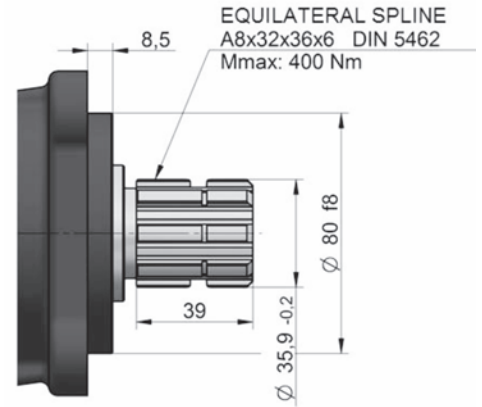
D15:



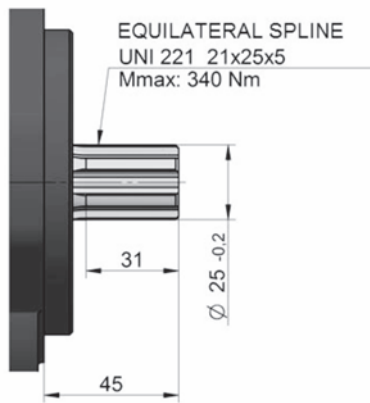
D17:



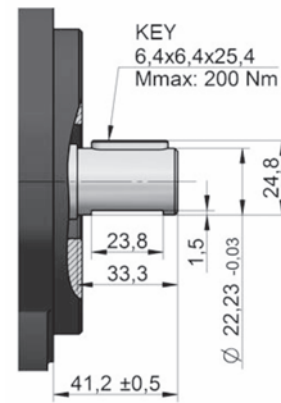
D18:



D23:

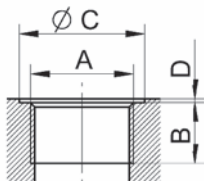


V17:



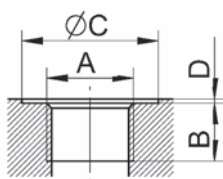
LIQUID INLET AND OUTLET CONNECTION

Metric thread according to ISO 6149



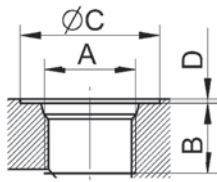
Code	A	B	C	D
M07	M 22 x 1.5	14	28	1
M08	M 27 x 1.5	16	33	1
M09	M 27 x 2.0	16	33	1
M11	M 33 x 1.5	18	40	1
M12	M 33 x 2.0	18	40	1

BSPP pipe thread according to ISO 228-1



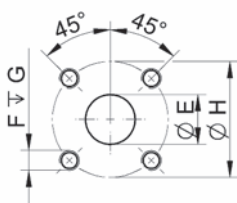
Code	A	B	C	D
G03	G 1/2"	14	33	1
G04	G 3/4"	16	39	1
G05	G 1"	18	45	1

UNF thread according to SAE



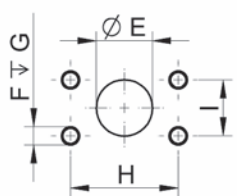
Code	A	B	C	D
U03	3/4 - 16 UNF	15	30	1
U04	7/8 - 14 UNF	17	34	1
U05	1 - 1/16 - 12 UN	19	41	1
U07	1 - 5/16 - 12 UN	19	49	1

Flanged fittings according to DIN 8901/8902



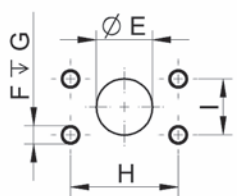
Code	E	F	G	H
H07	13.5	M6	13	30
H08	20.0	M8	16	40
H09	18.0	M8	16	55
H10	25.0	M8	16	55

Flanged fittings according to SAE, metric thread



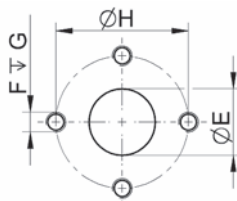
Code	E	F	G	H	I
E02	19.0	M10	22	47.6	22.2
E03	25.4	M10	22	52.4	26.2
E04	30.5	M10	22	58.7	30.2

Flanged fittings according to SAE, UNC thread



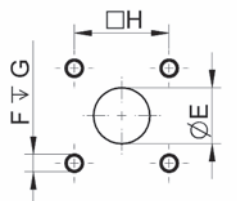
Code	E	F	G	H	I
A02	19.0	3/8-16 UNC-2B	22.0	47.6	22.2
A03	25.4	3/8-16 UNC-2B	22.0	52.4	26.2
A04	30.5	7/16-14 UNC-2B	28.5	58.7	30.2

Flanged fittings - „cross“



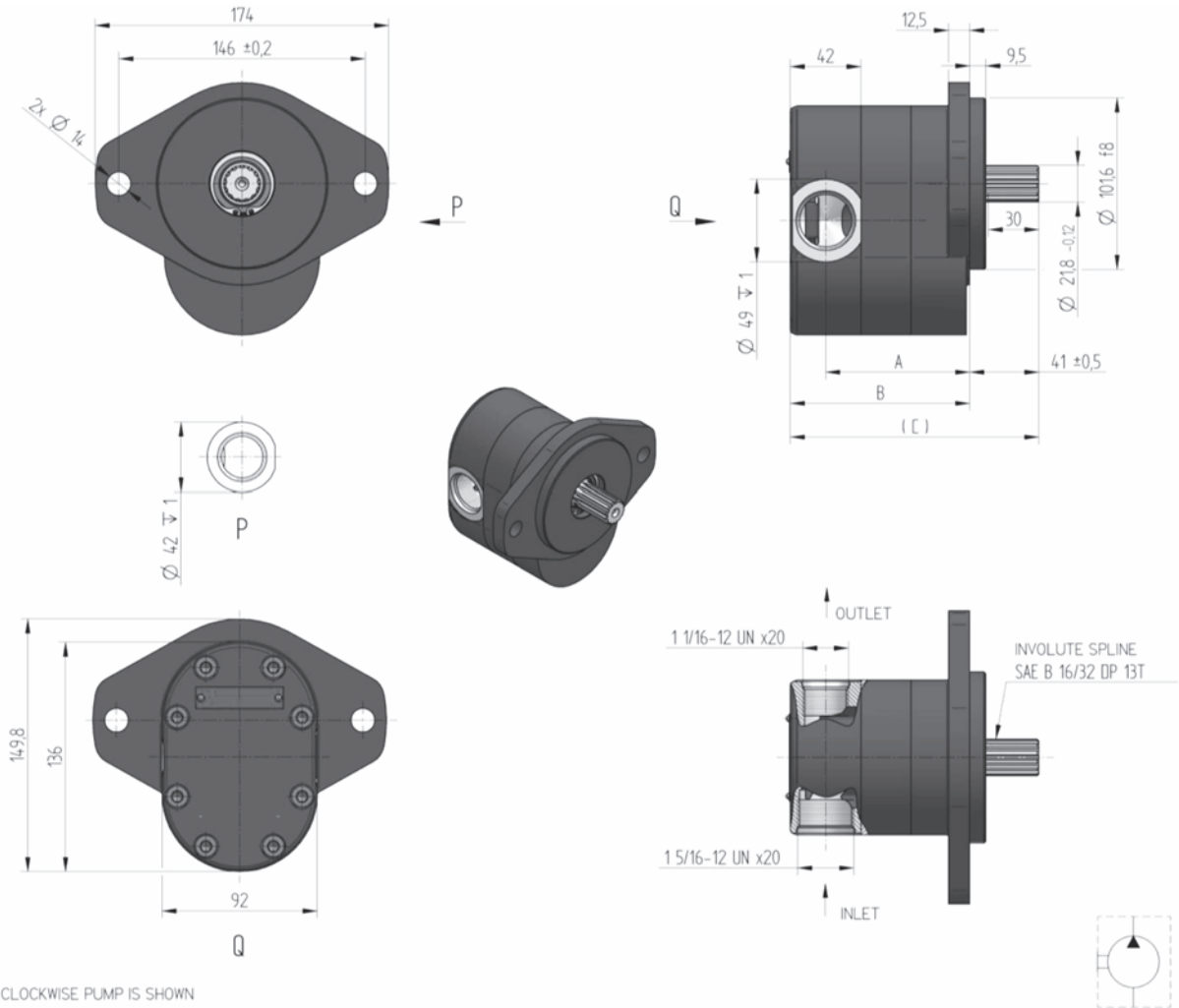
Code	E	F	G	H
K03	18	M8	16	40
K04	26	M10	22	51
K05	18	M8	16	55
K06	25	M8	16	55

Flanged fittings - „square“



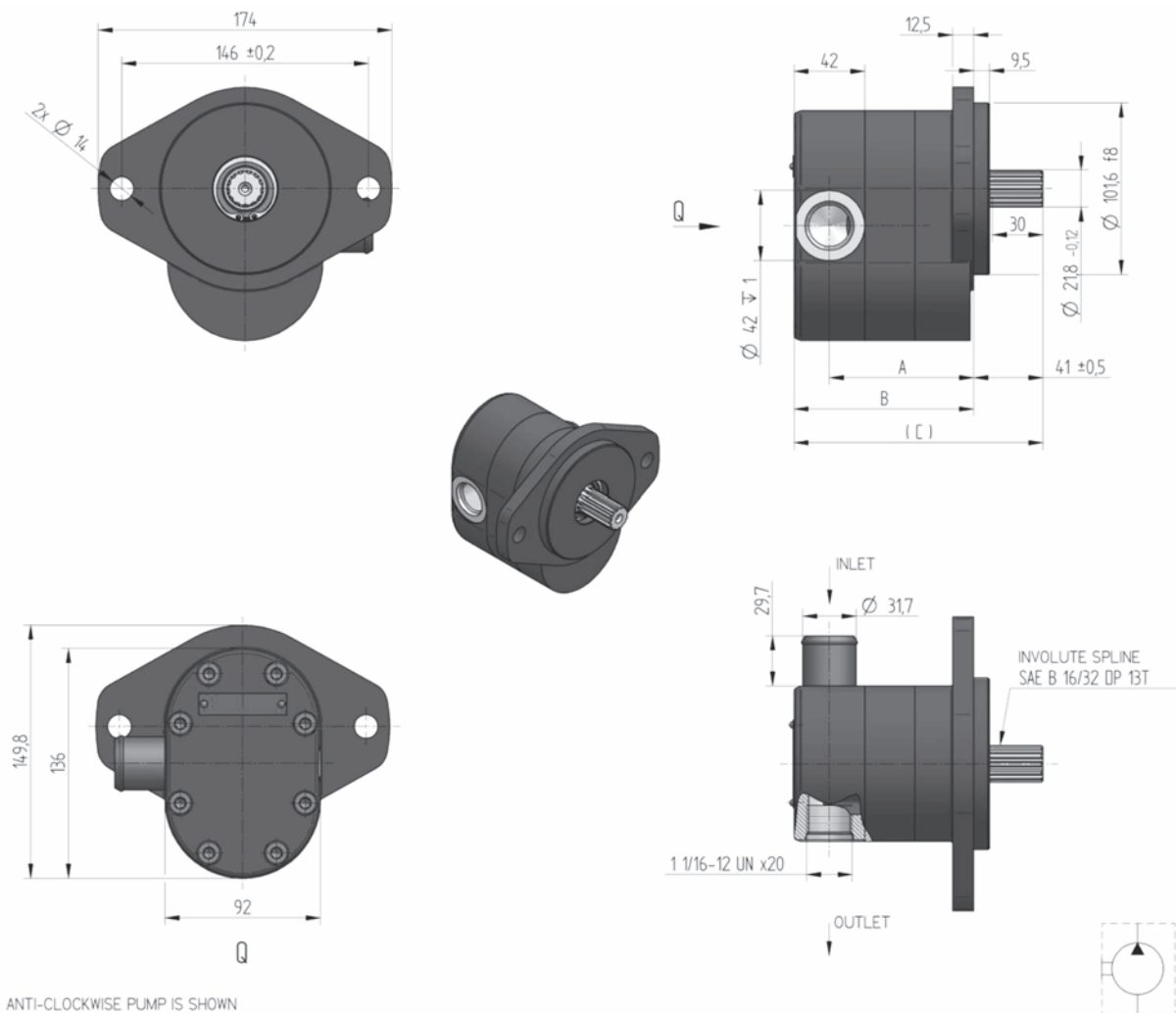
Code	E	F	G	H
S05	22	M10	22	48

CATALOGUE SHETS OF GHDO SERIES BASIC DESIGNS



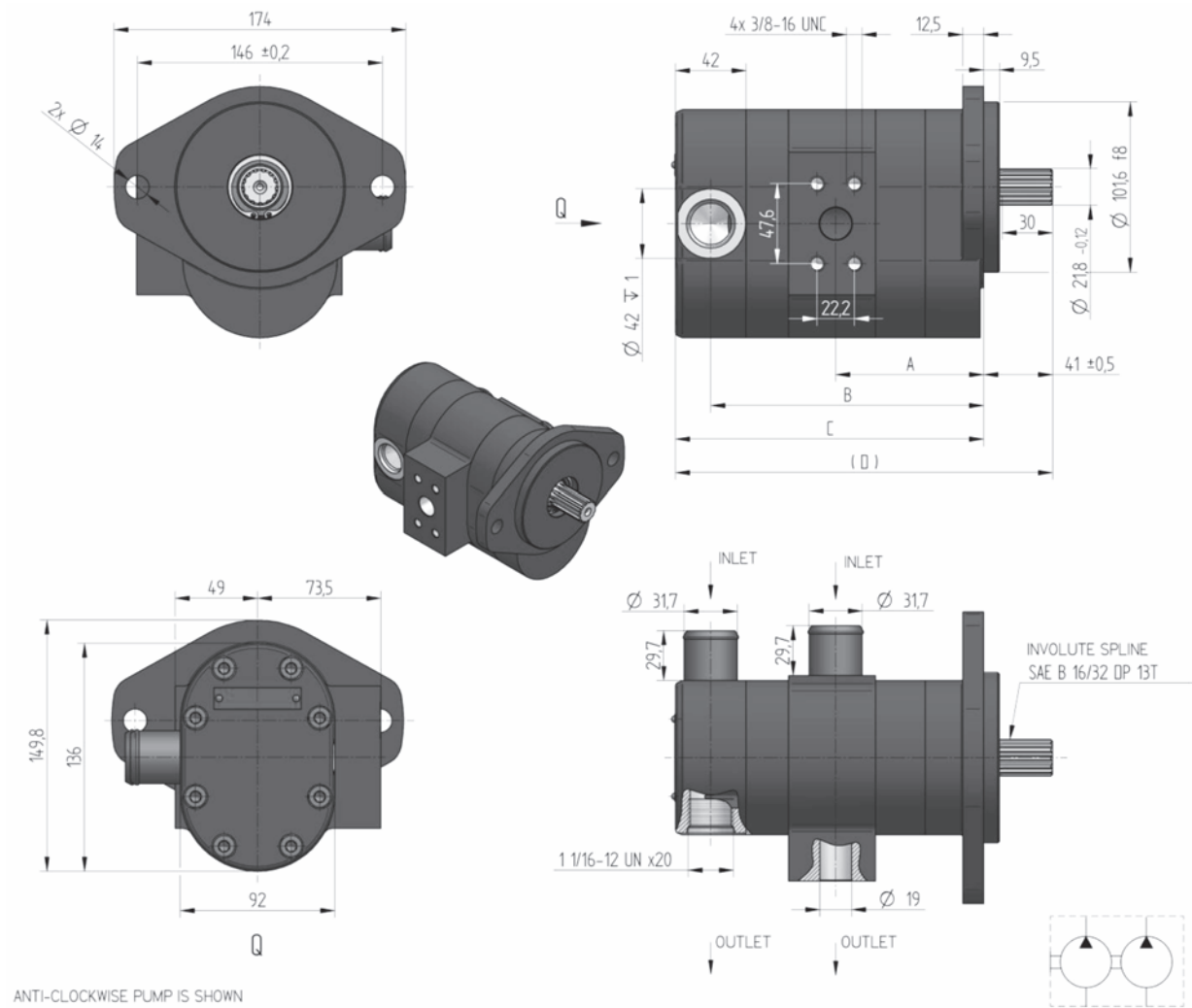
CLOCKWISE PUMP IS SHOWN

Order key	purch. code	direct. of rot.	displacement [cm ³ /1]	nom. press. [bar]	speed MIN. [min ⁻¹]	speed MAX. [min ⁻¹]	A [mm]	dimension B [mm]	C [mm]
GHDO-36R-S03D13-SU07U05-N		R	36	270	350	2800	95.8	116.8	157.8
GHDO-36L-S03D13-SU07U05-N		L							
GHDO-34R-S03D13-SU07U05-N		R	34	285	350	3000	94.3	115.3	156.3
GHDO-34L-S03D13-SU07U05-N		L							
GHDO-29R-S03D13-SU07U05-N		R	29	290	350	3200	90.4	111.4	152.4
GHDO-29L-S03D13-SU07U05-N		L							
GHDO-27R-S03D13-SU07U05-N		R	27	290	350	3400	88.8	109.8	150.8
GHDO-27L-S03D13-SU07U05-N		L							
GHDO-22.5R-S03D13-SU07U05-N		R	22.5	295	350	3400	85.3	106.3	147.3
GHDO-22.5L-S03D13-SU07U05-N		L							
GHDO-19R-S03D13-SU07U05-N		R	19	295	350	3400	82.6	103.6	144.6
GHDO-19L-S03D13-SU07U05-N		L							
GHDO-17R-S03D13-SU07U05-N		R	17	300	350	3400	81.0	102.0	143.0
GHDO-17L-S03D13-SU07U05-N		L							
GHDO-13R-S03D13-SU07U05-N		R	13	300	400	3400	77.9	98.9	139.9
GHDO-13L-S03D13-SU07U05-N		L							
GHDO-12.6R-S03D13-SU07U05-N		R	12.6	300	400	3400	77.6	98.6	139.6
GHDO-12.6L-S03D13-SU07U05-N		L							
GHDO-10R-S03D13-SU07U05-N		R	10	300	400	3400	75.6	96.6	137.6
GHDO-10L-S03D13-SU07U05-N		L							



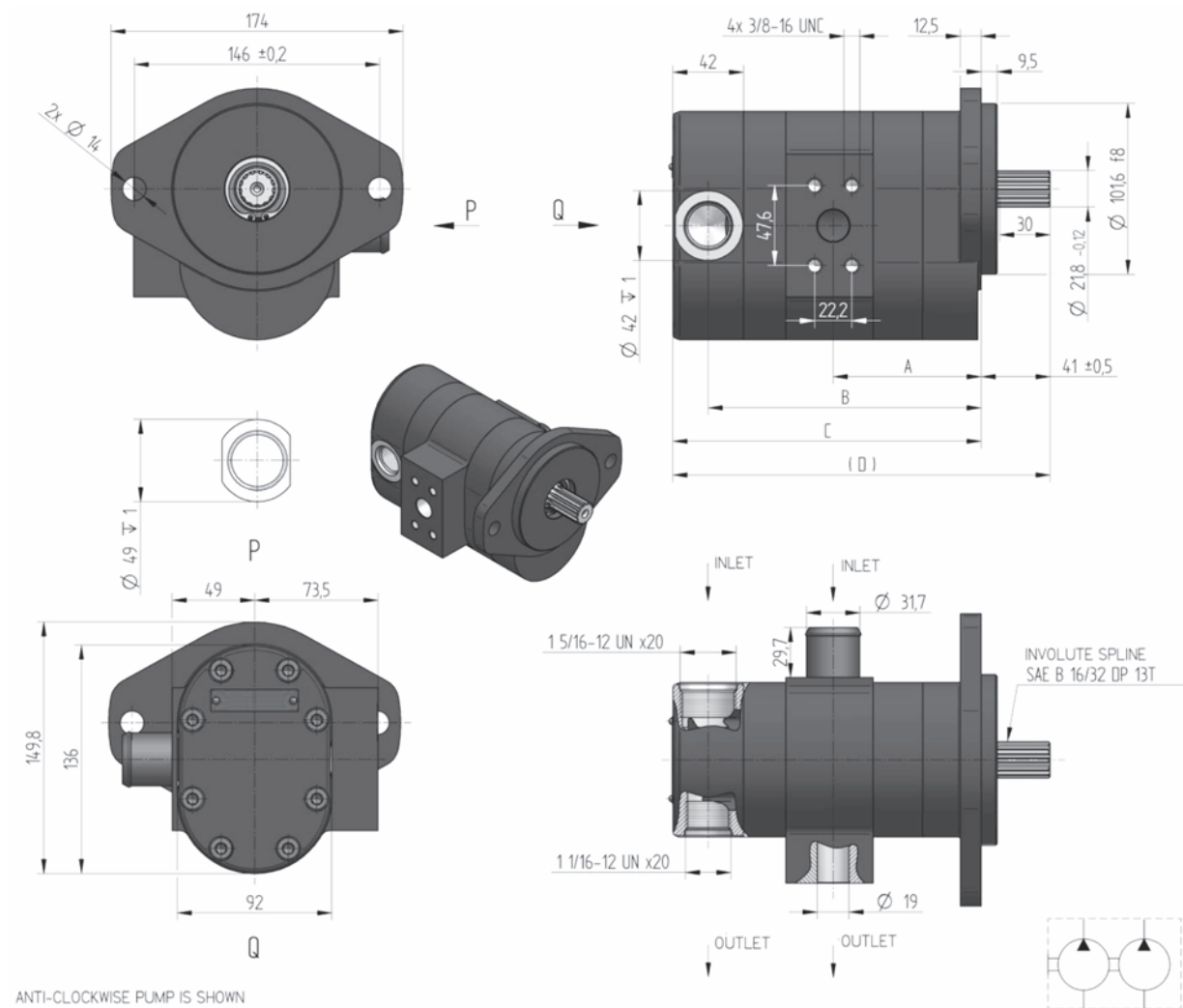
ANTI-CLOCKWISE PUMP IS SHOWN

Order key	purch. code	direct. of rot.	displacement [cm ³ /1]	nom. press. [bar]	speed MIN. [min ⁻¹]	speed MAX. [min ⁻¹]	dimension		
							A [mm]	B [mm]	C [mm]
GHDO-36R-S03D13-SZU05-N		R	36	270	350	2800	95.8	116.8	157.8
GHDO-36L-S03D13-SZU05-N		L							
GHDO-34R-S03D13-SZU05-N		R	34	285	350	3000	94.3	115.3	156.3
GHDO-34L-S03D13-SZU05-N		L							
GHDO-29R-S03D13-SZU05-N		R	29	290	350	3200	90.4	111.4	152.4
GHDO-29L-S03D13-SZU05-N		L							
GHDO-27R-S03D13-SZU05-N		R	27	290	350	3400	88.8	109.8	150.8
GHDO-27L-S03D13-SZU05-N		L							
GHDO-22.5R-S03D13-SZU05-N		R	22.5	295	350	3400	85.3	106.3	147.3
GHDO-22.5L-S03D13-SZU05-N		L							
GHDO-19R-S03D13-SZU05-N		R	19	295	350	3400	82.6	103.6	144.6
GHDO-19L-S03D13-SZU05-N		L							
GHDO-17R-S03D13-SZU05-N		R	17	300	350	3400	81.0	102.0	143.0
GHDO-17L-S03D13-SZU05-N		L							
GHDO-13R-S03D13-SZU05-N		R	13	300	400	3400	77.9	98.9	139.9
GHDO-13L-S03D13-SZU05-N		L							
GHDO-12.6R-S03D13-SZU05-N		R	12.6	300	400	3400	77.6	98.6	139.6
GHDO-12.6L-S03D13-SZU05-N		L							
GHDO-10R-S03D13-SZU05-N		R	10	300	400	3400	75.6	96.6	137.6
GHDO-10L-S03D13-SZU05-N		L							

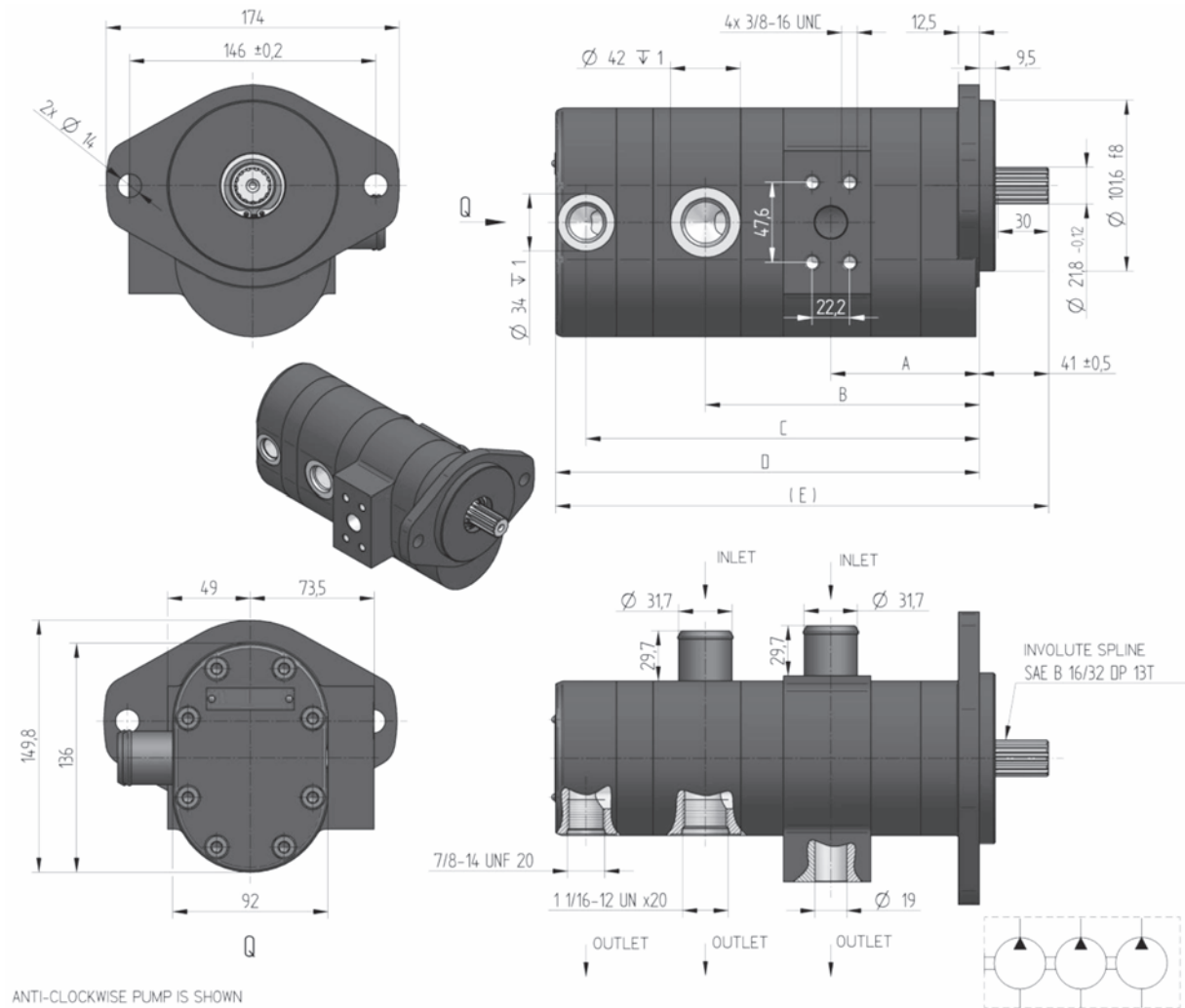


ANTI-CLOCKWISE PUMP IS SHOWN

Order key	purch. code	direct. of rot.	displacement [cm ³ /1]	nom. press. [bar]	speed MIN. [min ⁻¹]	speed MAX. [min ⁻¹]	dimension			
							A [mm]	B [mm]	C [mm]	D [mm]
GHDO-22.5/17R-S03D13-SZA02/ZU05-N		R	22.5/17	295/300	350	3400	88.1	162.5	183.5	224.5
GHDO-22.5/17L-S03D13-ST02A02/T02U05-V	188 9400	L								

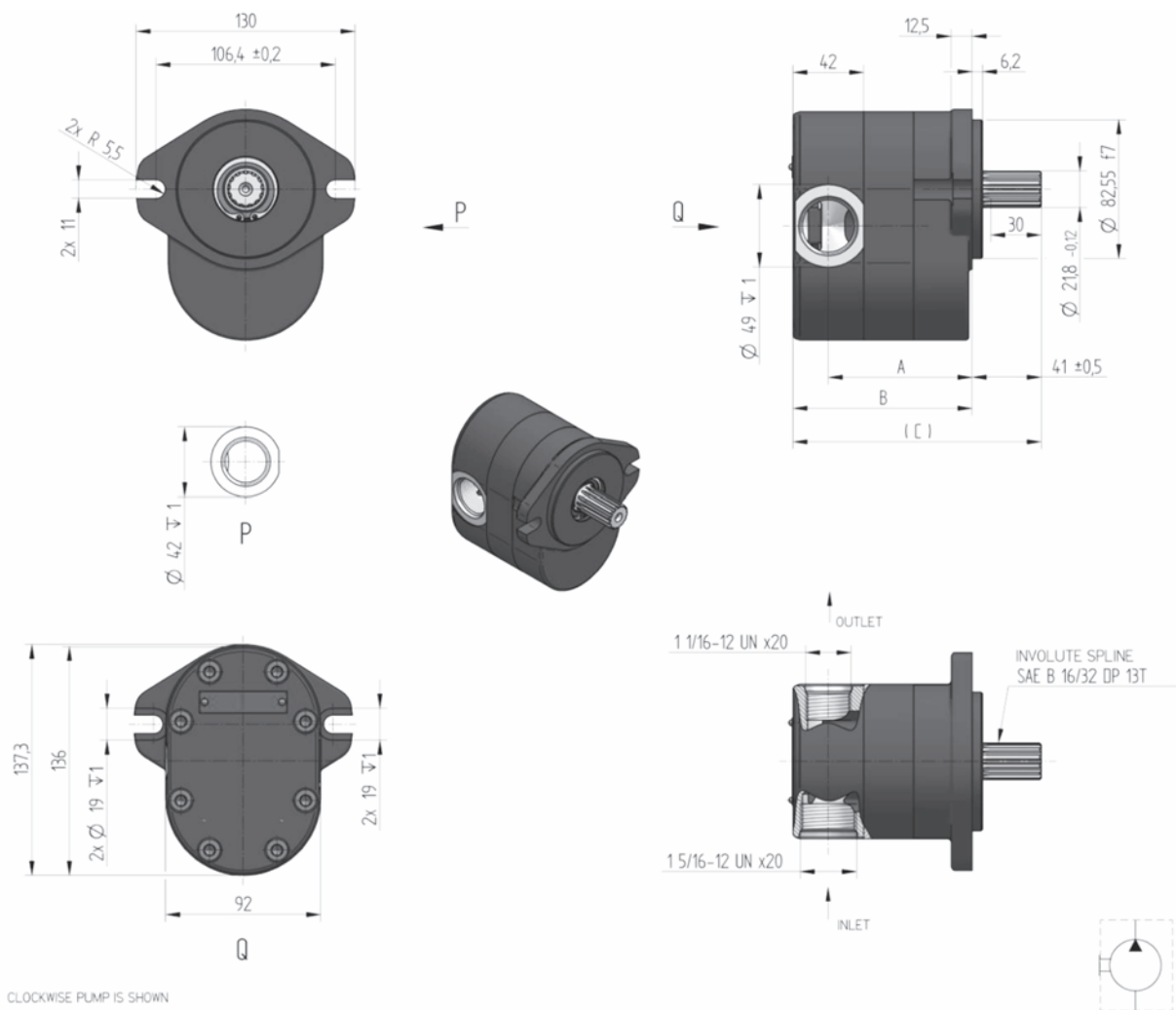


Order key	purch. code	direct. of rot.	displacement [cm ³ /1]	nom. press. [bar]	speed MIN. [min ⁻¹]	speed MAX. [min ⁻¹]	dimension			
							A [mm]	B [mm]	C [mm]	D [mm]
GHDO-22.5/17R-S03D13-SZA02/U07U05-N		R	22.5/17	295/300	350	3400	88.1	162.5	183.5	224.5
GHDO-22.5/17L-S03D13-ST02A02/U07U05-V	188 9401	L								

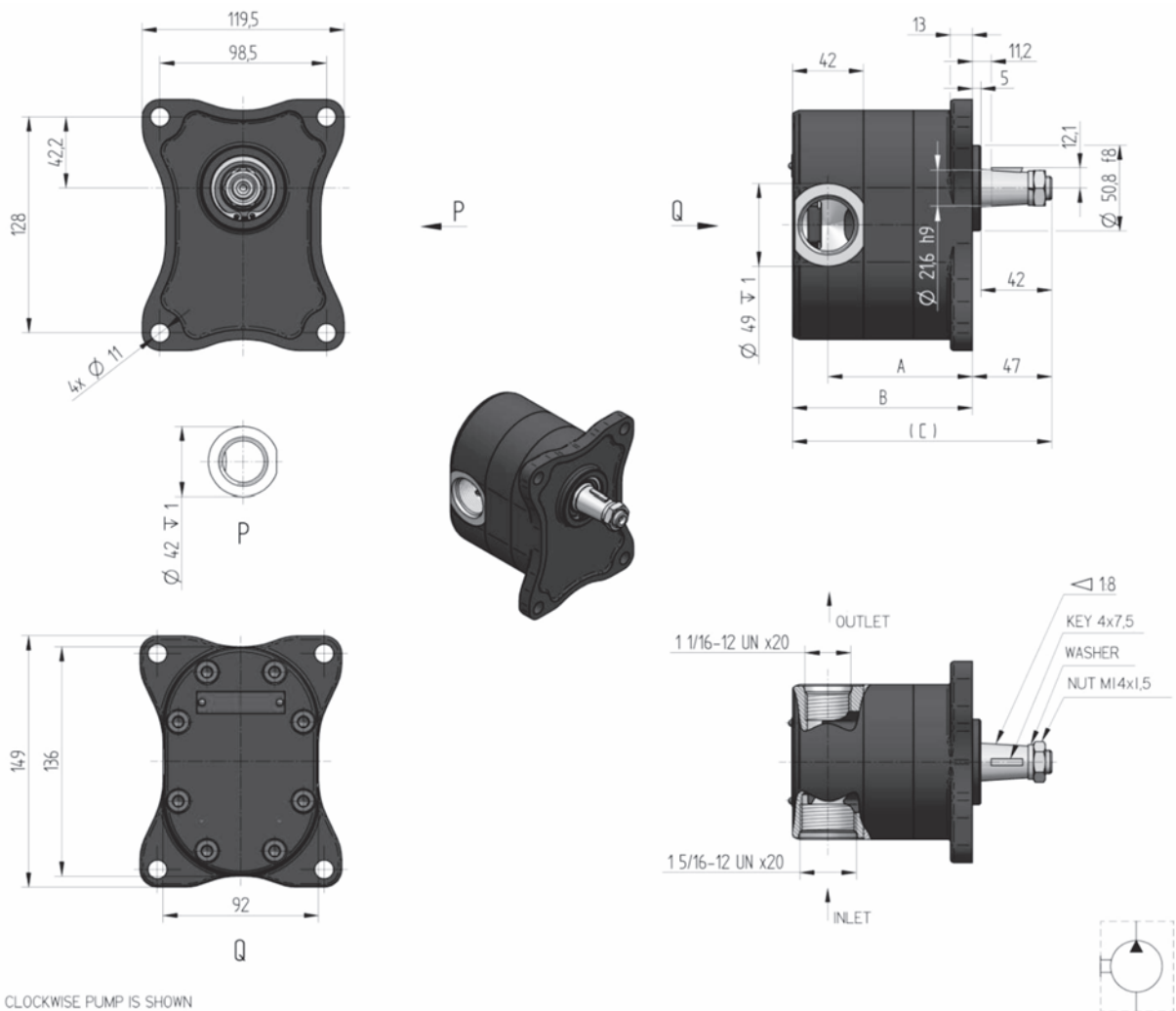


ANTI-CLOCKWISE PUMP IS SHOWN

Order key	purch. code	direct. of rot.	displacement [cm ³ /1]	nom. press. [bar]	speed MIN. [min ⁻¹]	speed MAX. [min ⁻¹]	dimension				
							A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
GHDO-22.5/17/12.6R-S03D13-SZA02/ZU05/NU04-N		R	22.5/17	295/300	350	3400	88.1	162.5	233.3	251.3	292.3
GHDO-22.5/17/12.6L-S03D13-SZA02/ZU05/NU04-N		L	/12.6	/300							

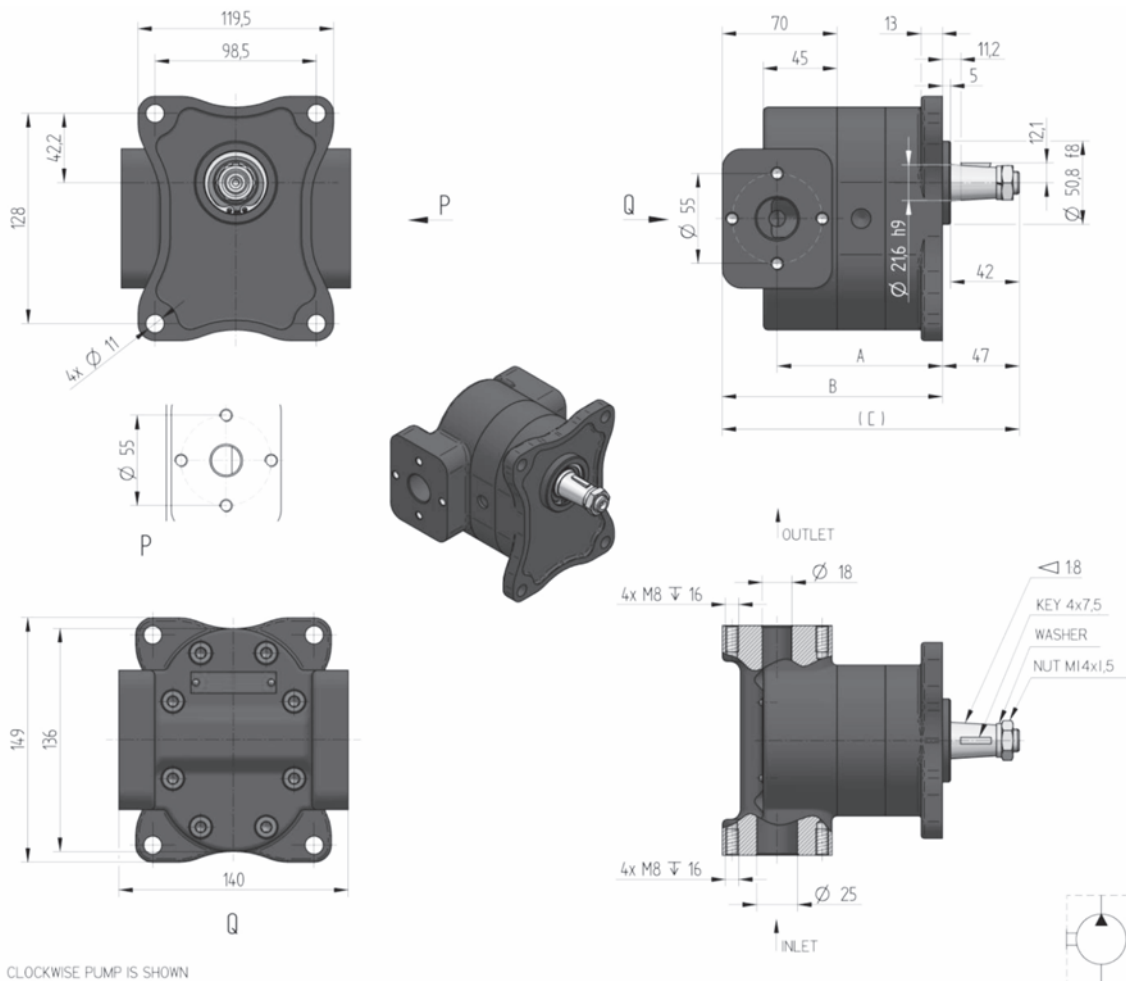


Order key	purch. code	direct. of rot.	displacement [cm ³ /1]	nom. press. [bar]	speed MIN. [min ⁻¹]	speed MAX. [min ⁻¹]	A [mm]	dimension B [mm]	C [mm]
GHDO-36R-S02D13-SU07U05-N		R	36	270	350	2800	95.8	116.8	157.8
GHDO-36L-S02D13-SU07U05-N		L							
GHDO-34R-S02D13-SU07U05-N		R	34	285	350	3000	94.3	115.3	156.3
GHDO-34L-S02D13-SU07U05-N		L							
GHDO-29R-S02D13-SU07U05-N		R	29	290	350	3200	90.4	111.4	152.4
GHDO-29L-S02D13-SU07U05-N		L							
GHDO-27R-S02D13-SU07U05-N		R	27	290	350	3400	88.8	109.8	150.8
GHDO-27L-S02D13-SU07U05-N		L							
GHDO-22.5R-S02D13-SU07U05-N		R	22.5	295	350	3400	85.3	106.3	147.3
GHDO-22.5L-S02D13-SU07U05-N		L							
GHDO-19R-S02D13-SU07U05-N		R	19	295	350	3400	82.6	103.6	144.6
GHDO-19L-S02D13-SU07U05-N		L							
GHDO-17R-S02D13-SU07U05-N		R	17	300	350	3400	81.0	102.0	143.0
GHDO-17L-S02D13-SU07U05-N		L							
GHDO-13R-S02D13-SU07U05-N		R	13	300	400	3400	77.9	98.9	139.9
GHDO-13L-S02D13-SU07U05-N		L							
GHDO-12.6R-S02D13-SU07U05-N		R	12.6	300	400	3400	77.6	98.6	139.6
GHDO-12.6L-S02D13-SU07U05-N		L							
GHDO-10R-S02D13-SU07U05-N		R	10	300	400	3400	75.6	96.6	137.6
GHDO-10L-S02D13-SU07U05-N		L							

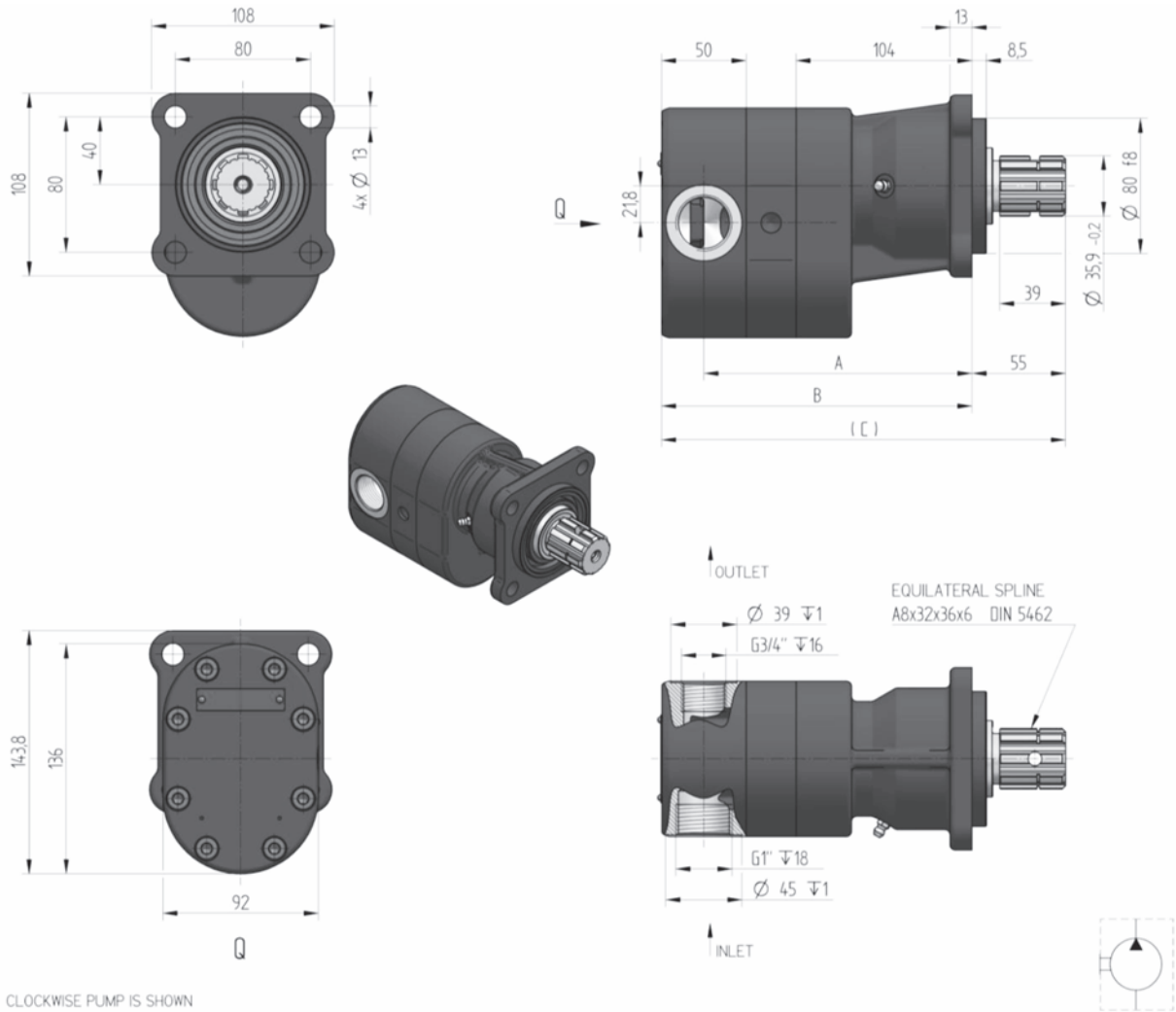


CLOCKWISE PUMP IS SHOWN

Order key	purch. code	direct. of rot.	displacement [cm ³ /1]	nom. press. [bar]	speed MIN. [min ⁻¹]	speed MAX. [min ⁻¹]	dimension		
							A [mm]	B [mm]	C [mm]
GHDO-36R-R11C11-SU07U05-N		R	36	270	350	2800	95.8	116.8	163.8
GHDO-36L-R11C11-SU07U05-N		L							
GHDO-34R-R11C11-SU07U05-N		R	34	285	350	3000	94.3	115.3	162.3
GHDO-34L-R11C11-SU07U05-N		L							
GHDO-29R-R11C11-SU07U05-N		R	29	290	350	3200	90.4	111.4	158.4
GHDO-29L-R11C11-SU07U05-N		L							
GHDO-27R-R11C11-SU07U05-N		R	27	290	350	3400	88.8	109.8	156.8
GHDO-27L-R11C11-SU07U05-N		L							
GHDO-22.5R-R11C11-SU07U05-N		R	22.5	295	350	3400	85.3	106.3	153.3
GHDO-22.5L-R11C11-SU07U05-N		L							
GHDO-19R-R11C11-SU07U05-N		R	19	295	350	3400	82.6	103.6	150.6
GHDO-19L-R11C11-SU07U05-N		L							
GHDO-17R-R11C11-SU07U05-N		R	17	300	350	3400	81.0	102.0	149.0
GHDO-17L-R11C11-SU07U05-N		L							
GHDO-13R-R11C11-SU07U05-N		R	13	300	400	3400	77.9	98.9	145.9
GHDO-13L-R11C11-SU07U05-N		L							
GHDO-12.6R-R11C11-SU07U05-N		R	12.6	300	400	3400	77.6	98.6	145.6
GHDO-12.6L-R11C11-SU07U05-N		L							
GHDO-10R-R11C11-SU07U05-N		R	10	300	400	3400	75.6	96.6	143.6
GHDO-10L-R11C11-SU07U05-N		L							

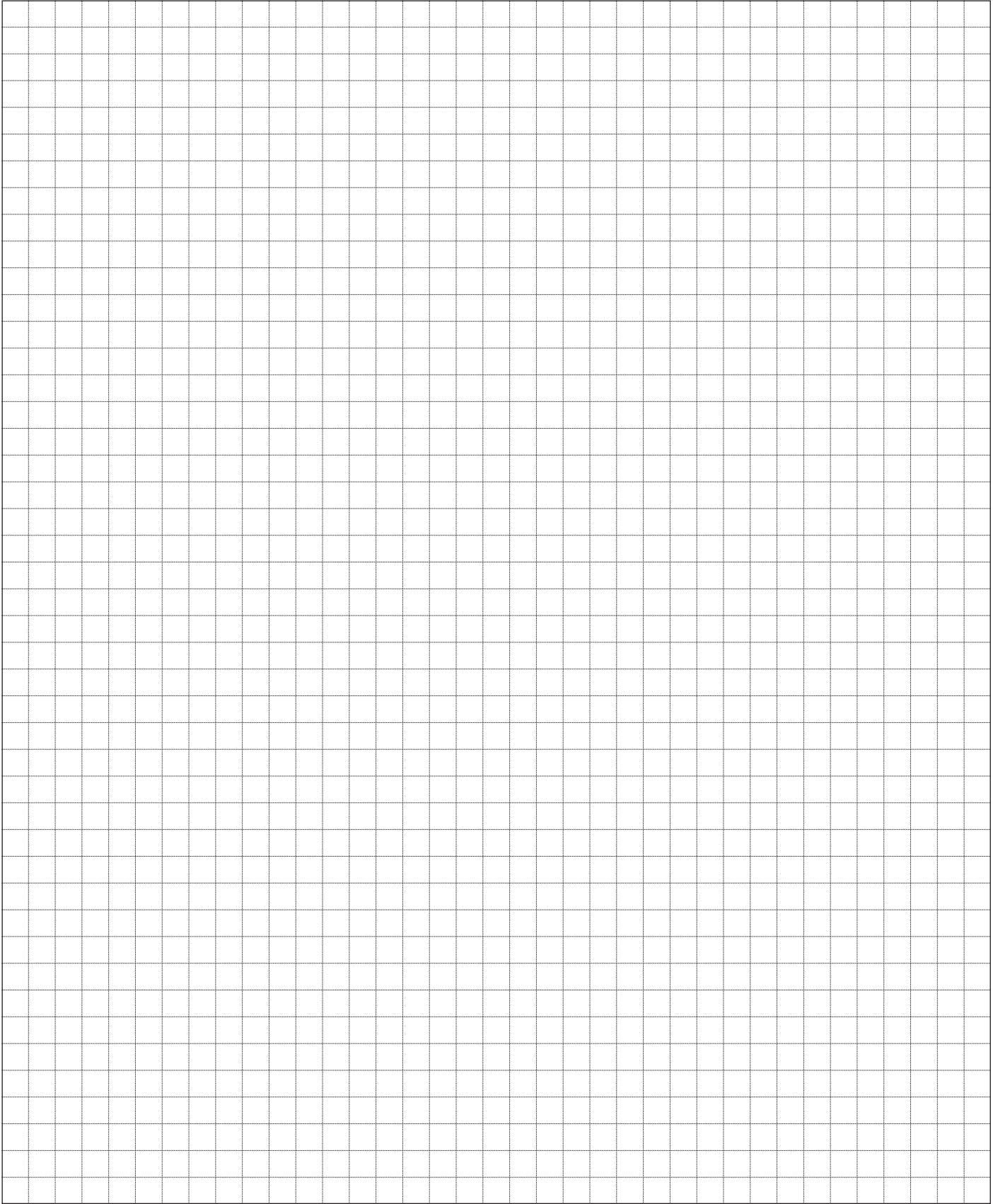


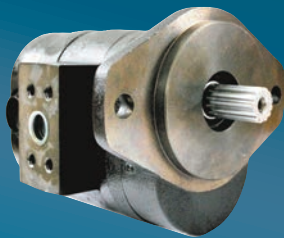
Order key	purch. code	direct. of rot.	displacement [cm ³ /1]	nom. press. [bar]	speed MIN. [min ⁻¹]	speed MAX. [min ⁻¹]	dimension		
							A [mm]	B [mm]	C [mm]
GHDO-36R-R11C11-SK06K05-N		R	36	270	350	2800	111.3	144.8	191.8
GHDO-36L-R11C11-SK06K05-N		L							
GHDO-34R-R11C11-SK06K05-N		R	34	285	350	3000	109.8	143.3	190.3
GHDO-34L-R11C11-SK06K05-N		L							
GHDO-29R-R11C11-SK06K05-N		R	29	290	350	3200	105.9	139.4	186.4
GHDO-29L-R11C11-SK06K05-N		L							
GHDO-27R-R11C11-SK06K05-N		R	27	290	350	3400	104.3	137.8	184.8
GHDO-27L-R11C11-SK06K05-N		L							
GHDO-22.5R-R11C11-SK06K05-N		R	22.5	295	350	3400	100.8	134.3	181.3
GHDO-22.5L-R11C11-SK06K05-N		L							
GHDO-19R-R11C11-SK06K05-N		R	19	295	350	3400	98.1	131.6	178.6
GHDO-19L-R11C11-SK06K05-N		L							
GHDO-17R-R11C11-SK06K05-N		R	17	300	350	3400	96.5	130.0	177.0
GHDO-17L-R11C11-SK06K05-N		L							
GHDO-13R-R11C11-SK06K05-N		R	13	300	400	3400	93.4	126.9	173.9
GHDO-13L-R11C11-SK06K05-N		L							
GHDO-12.6R-R11C11-SK06K05-N		R	12.6	300	400	3400	93.1	126.6	173.6
GHDO-12.6L-R11C11-SK06K05-N		L							
GHDO-10R-R11C11-SK06K05-N		R	10	300	400	3400	91.1	124.6	171.6
GHDO-10L-R11C11-SK06K05-N		L							



CLOCKWISE PUMP IS SHOWN

Order key	purch. code	direct. of rot.	displacement [cm ³ /1]	nom. press. [bar]	speed MIN. [min ⁻¹]	speed MAX. [min ⁻¹]	A [mm]	dimension B [mm]	C [mm]
GHDO-36R-I02D18-SG05G04-N.001		R	36	270	350	2800	169.0	194.0	249.0
GHDO-36L-I02D18-SG05G04-N.001		L							
GHDO-34R-I02D18-SG05G04-N.001		R	34	285	350	3000	167.5	192.5	247.5
GHDO-34L-I02D18-SG05G04-N.001		L							
GHDO-29R-I02D18-SG05G04-N.001		R	29	290	350	3200	163.6	188.6	243.6
GHDO-29L-I02D18-SG05G04-N.001		L							
GHDO-27R-I02D18-SG05G04-N.001		R	27	290	350	3400	162.0	187.0	242.0
GHDO-27L-I02D18-SG05G04-N.001		L							
GHDO-22.5R-I02D18-SG05G04-N.001		R	22.5	295	350	3400	158.5	183.5	238.5
GHDO-22.5L-I02D18-SG05G04-N.001		L							
GHDO-19R-I02D18-SG05G04-N.001		R	19	295	350	3400	155.8	180.8	235.8
GHDO-19L-I02D18-SG05G04-N.001		L							
GHDO-17R-I02D18-SG05G04-N.001		R	17	300	350	3400	154.2	179.2	234.2
GHDO-17L-I02D18-SG05G04-N.001		L							
GHDO-13R-I02D18-SG05G04-N.001		R	13	300	400	3400	151.1	176.1	231.1
GHDO-13L-I02D18-SG05G04-N.001		L							
GHDO-12.6R-I02D18-SG05G04-N.001		R	12.6	300	400	3400	150.8	175.8	230.8
GHDO-12.6L-I02D18-SG05G04-N.001		L							
GHDO-10R-I02D18-SG05G04-N.001		R	10	300	400	3400	148.8	173.8	228.8
GHDO-10L-I02D18-SG05G04-N.001		L							





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