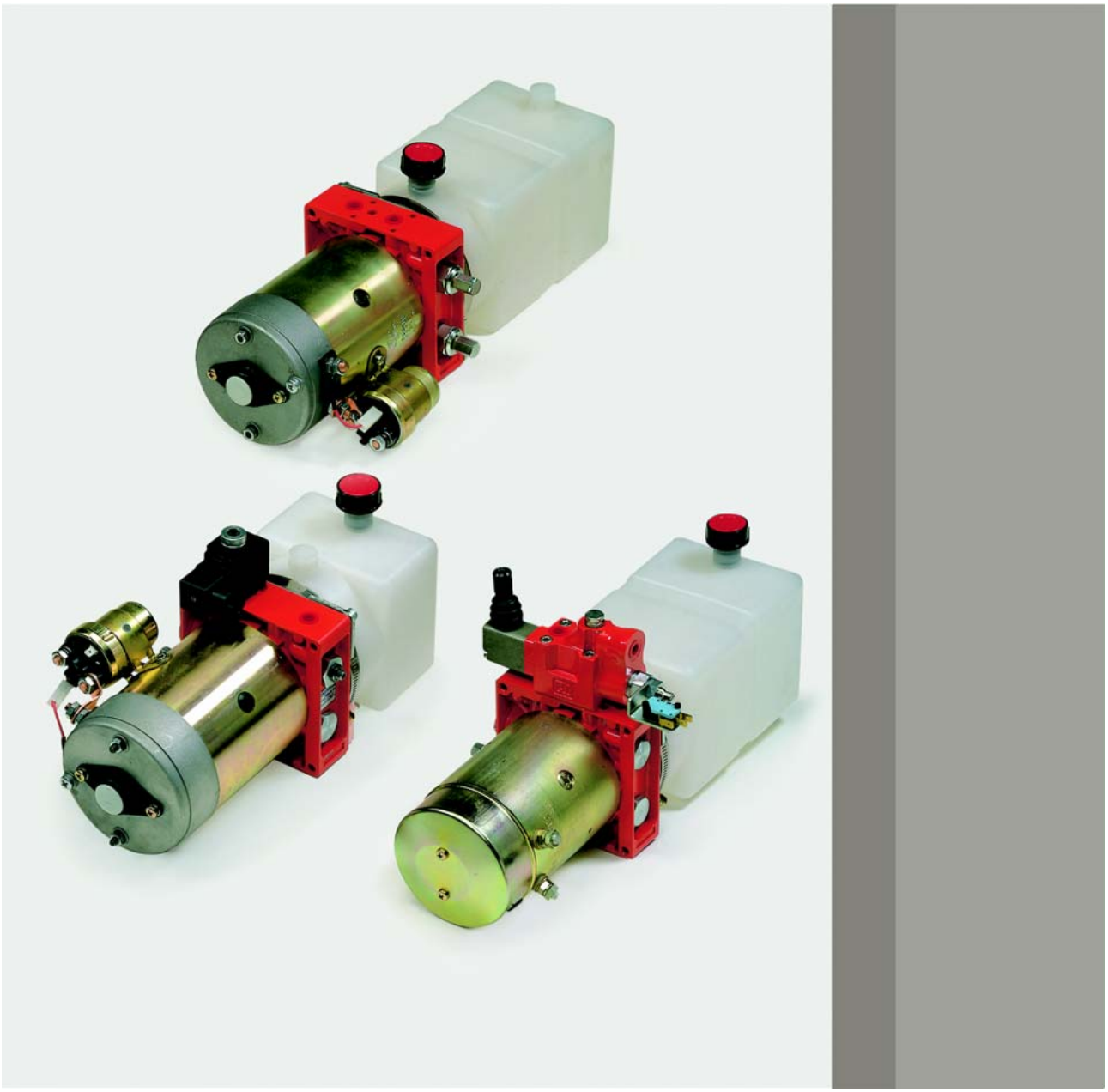
BUCHER HYDRAULICS

Hydraulic Units UP100
S309 Version



motion and progress

Reference: 200-P-991214-E-04 / 02.07

Contents

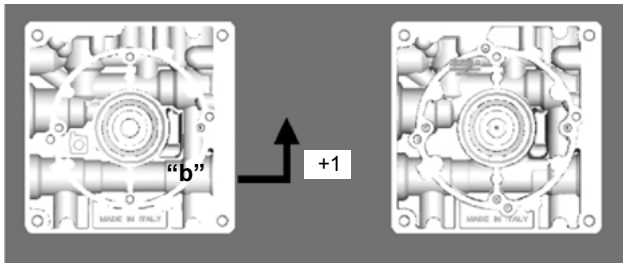
Changes in the Power Units UP100 S309

In order to pursue a continuous improvement and standardisation policy of its products, Bucher Hydraulics introduces some changes in the power unit UP100, concerning the following components: body, filter conveyor, gear pump and suction group as follows:

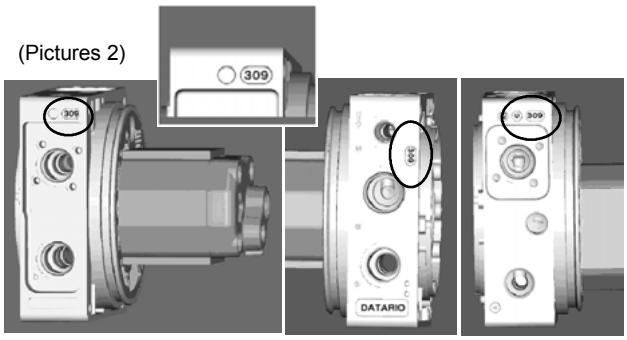
- Power unit body

The S309 power unit body UP100 includes a cavity ”b” as seat of the check valve, that is placed 1 mm upward compared to the S409 UP100 body (picture 1).
In order to facilitate the identification of the S309 UP100 power bodies, we mark on three sides such specific classification codes. In this way, it is possible to identify which pump type rigs the power unit, without disassembling the tank (pictures 2)

(Picture 1)



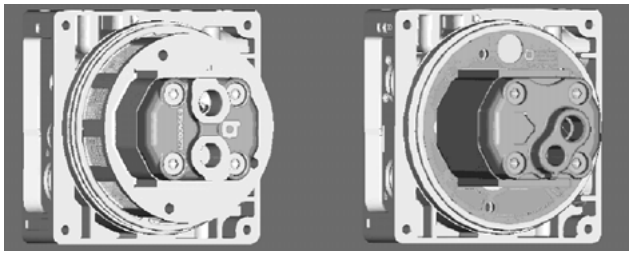
(Pictures 2)



- Filter Conveyor

The picture on the left shows the previous filter conveyor. The new type, on the right, is the same assembled on power Units UP110.

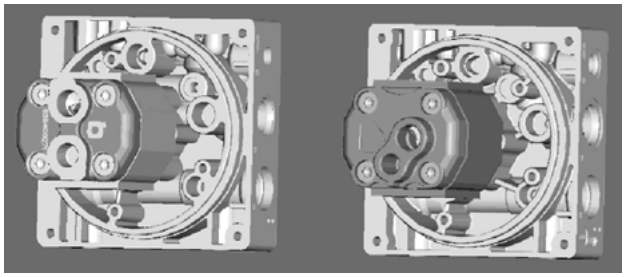
UP100 S409 UP100 S309



- Single Gear Pump

Detailed picture of the two S409-S309 different pumps type.
The picture on the left shows the version AP100 series S409, and on the right the pump series S309, that is externally recognizable by the new back cover.
The two pumps are internally different as they have different balancing plates.
This characteristic doesn’t allow the interchangeability between series S409 and S309; in the S309 body UP100 it is possible to assemble the new pump series S309, only.

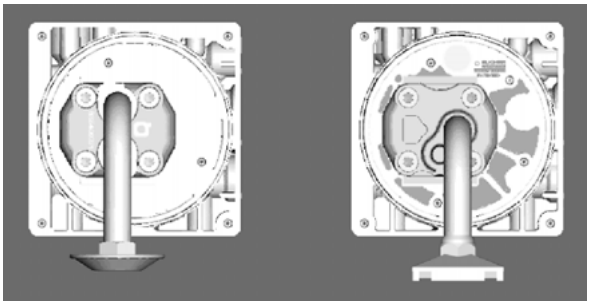
UP100 S409 UP100 S309



- Suction group

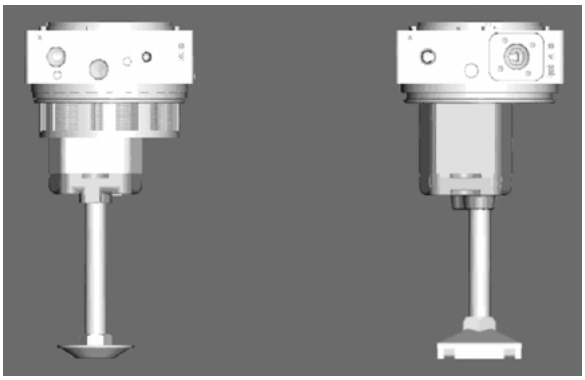
The new back cover of the pump series S309, has the suction placed exactly in the middle of the power unit body.
This enable to use the same suction group, by reducing consequently the model quantities for each different horizontal assembling positions.

UP100 S409 UP100 S309



The width of pump series S309, as it is shown on the right of picture below, is 5 mm longer than the series S409.
This increase is a constant for any pump displacement, because generated by height increase of the back cover.

UP100 S409 UP100 S309



General information

Experience acquired in designing mini power packs, and a research effort aimed constantly at satisfying the technical specifications of our customers: these assets have provided the principal resource for development of the UP100 power packs:

- maximum flexibility, allowing the assembly of a great number of different circuits from just 4 basic versions;

- economy of the manufactured product, gained by adopting innovative technologies and by standardizingvalve cavities with those of the major hydraulic components manufacturers;

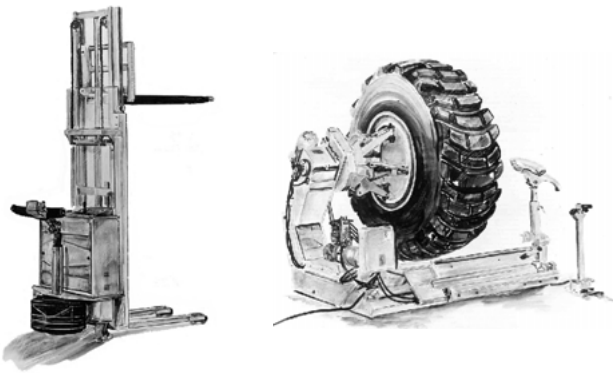
- the assurance of constant quality, thanks to comprehensive control on materials and production cycles;

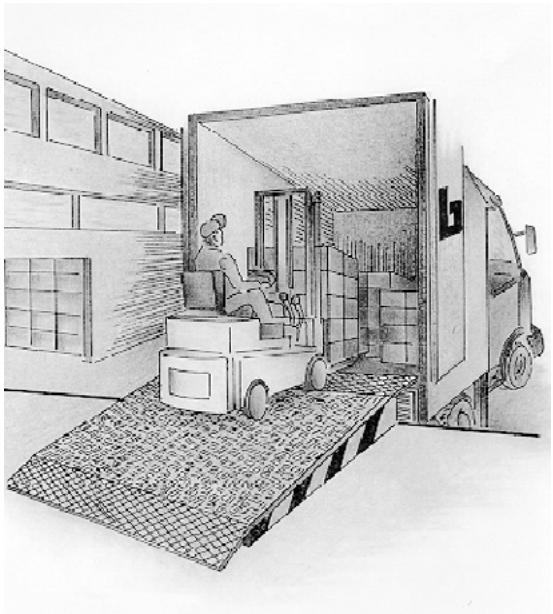
- compact dimensions achieved through detailed analysis of the geometries involved, and of the components used.

Illustrated are some of the various typical applications for UP100 hydraulic power packs.

Power packs are widely utilized in the field of industrial materials handling machines. Lift trucks is a good example, where the compactness of the unit is a particular advantage in view of the limited space available.

The need for fluid power in mobile machines means that power packs can be exploited in the widest variety of applications: lift platforms, and equipment for handling high and bulky loads in general.





Given the facility of integrating power packs with valve blocks designed and constructed to selected functional and dimensional specifications, special circuits can be customized for automation of the most complex machines.

There are also countless applications for industrial machines and stationary equipment in general where the attributes of the power pack are instrumental in simplifying the hydraulic system, bringing significant saving on installation and running cost.

Directives and standards

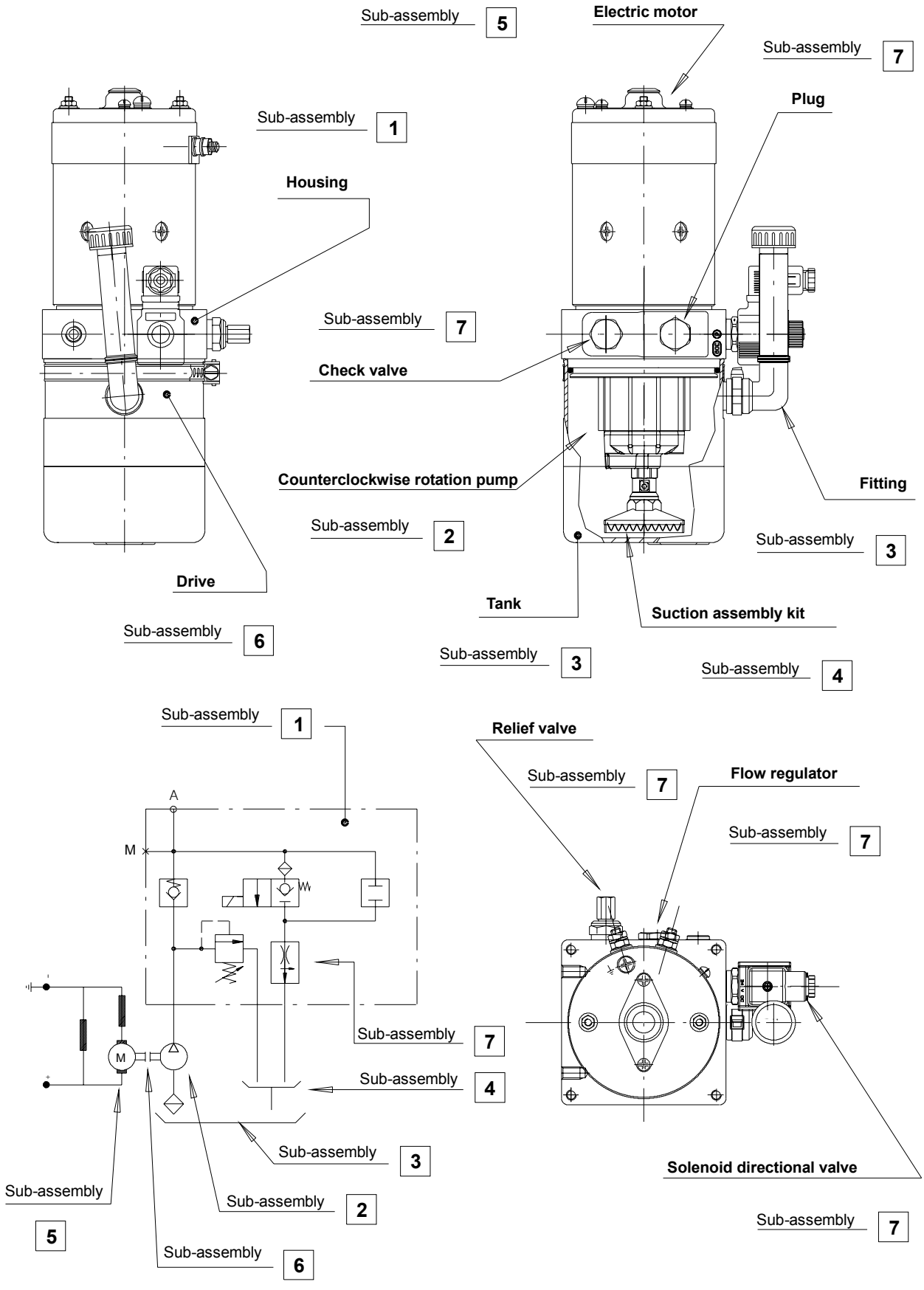
- Atex:

Attention- The equipment and protective systems of these catalogue ARE NOT intended for use in potentially explosive atmospheres that is to say where there is an explosive atmosphere referred to in Article 2 of the Directive 99/92/EC and referred to Article 1.3 of the Directive 94/9/EC

- ISO 9001: 2000

Bucher Hydraulics S.p.A. is certified for research, development and production of directional control valves, power units, gear pumps and motors, electro pumps, cartridge valves and integrated operating blocks for hydraulic applications.

Sub-assembly index



Sub-assemblies making up UP100 power pack

This page serves both as a guide to the contents of the catalogue and as an order form.

Simply fill in the individual sections with the designation codes for the options selected, and send direct to the Bucher Hydraulics S.p.A. Sales Department.

1 Type of housing | Vers.

2 Pump | Hi-Lo | Series

3 Tank | Fitting | Pos.

4 Suction assembly kit | Tank fixing kit

Fill in this section only when ordering single sub-assemblies.
Leave blank when ordering complete power packs.

5 Electric motor | Pos. | Relay | Pos.

6 Drive

7 Cavity a | Cavity b | Cavity c

Cavity d | Cavity e | Cavity f

Cavity g | Hand lever | Lever stick | Volt

8 Sequence | Manifolds | Valves for manifolds | Qty. | Volt

9 El. n. | Sectional valve housing | Circuit | Posit. | Lever | Hand Lever | Valves for sec. valve

Customer

Qty. - sample

Qty. - batch

1 Power pack housing

1.1 Technical information

1.1.1 Materials

Housing: pressure diecast aluminium alloy GdAlSi12CuFe to EN-AB 47100 (UNI 5079).

Seals:

- O-Ring seal on the pump outlet: Buna N
- O-Ring seal on tank: Buna N
- Our own design back-up ring pump : Buna N

Our own design back-up ring pump: ZYTEL E10 3HS
Shaft seal ring: NBR

1.1.2 Versions

The design has been developed in such a way that one basic pattern can be exploited to obtain four different casting versions, designated:
K1 - K3 - K4 - K6.

1.1.3 Maximum operating pressures

230 bar is the maximum continuous operating pressure resulting from test, though higher values are possible subject to approval by Bucher Hydraulics Engineers.

1.1.4 Pumps

The four housing versions are intended for use with:

Single pump AP100 S.309 CCW rotation.

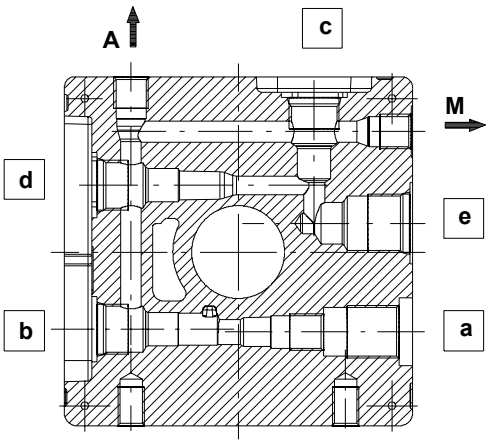
Double pump AP100+AP100 CCW rotation with integrated pressure cut-off valve for for HI-LO versions.

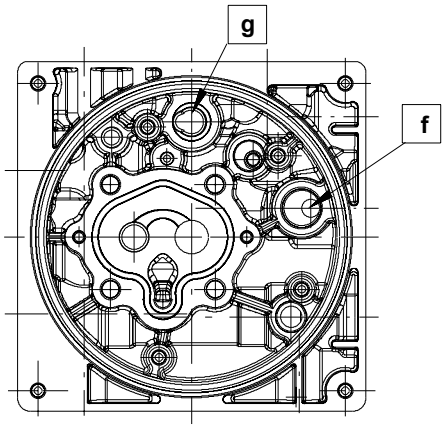
1.1.5 Valves cavities

Standard cavities will allows 3/4-16 UNF and 7/8-14 UNF cartridge valves manufactured by Bucher Hydraulics S.p.A., which are interchangeable with similar components made by major European and US manufacturers.

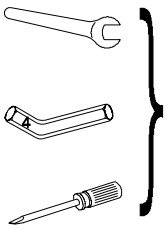
The only exception is the pressure relief valve threaded M20x1.5, according Bucher Hydraulics standard.

A variety of hydraulic circuits can be obtained with the same housing. To facilitate the correct composition of the desired hydraulic circuit, the position of each cavity is identified by a letter. The combination letter/cavity position remain unchanged for all the various UP100K.... housings.





1.1.6 Non-standard symbols used in the text



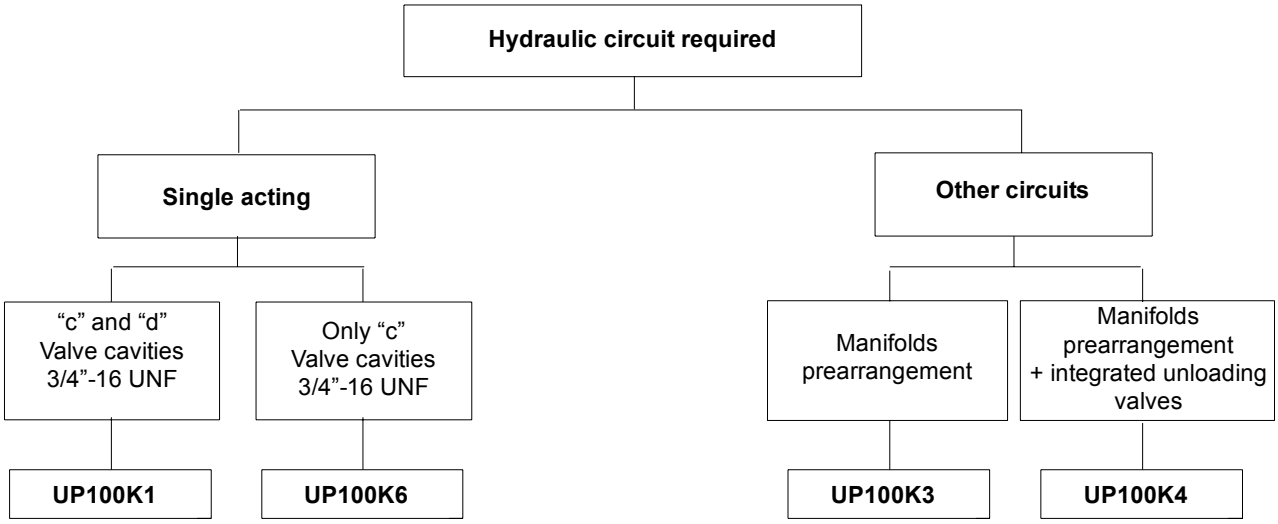
Tools required

1.1.7 Recommended tightening torques

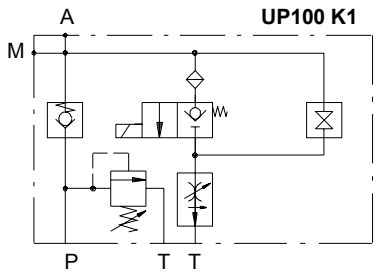
Port	Nm
- 1/4" BSP	$30^{0}_{+0.5}$
- 3/8" BSP	$40^{0}_{+0.5}$
- M18X1.5	$40^{0}_{+0.5}$
- SAE6	$20^{0}_{+0.5}$

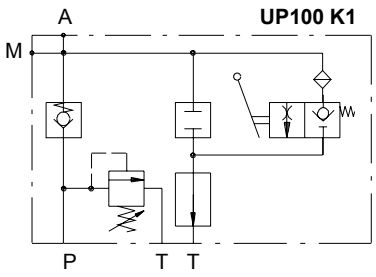
The appropriate power pack housing for the required hydraulic circuit can be identified from the following block diagram.

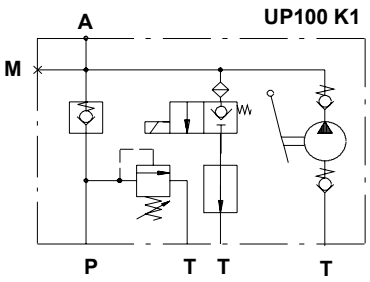
To facilitate selection, typical hydraulic circuits example are indicated for each housing.

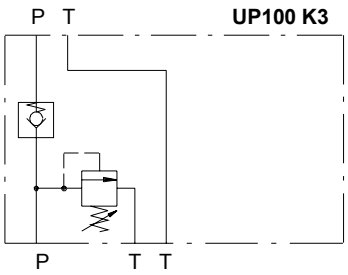


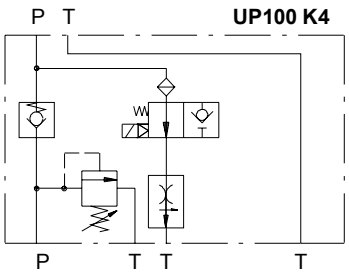
Typical hydraulic circuits

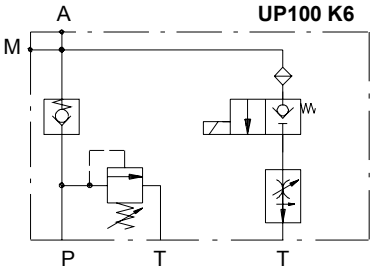












1.2 Housing UP100K1 (Single acting)

1.2.1 Main specification

Cavity **a** = M20X1.5 (relief valve cavity)

Cavity **b** = 3/4”-16 UNF (check valve cavity)

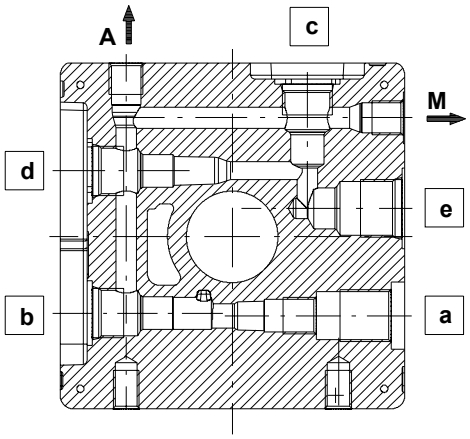
Cavity **c** = 3/4”-16 UNF (directional valve cavity)

Cavity **d** = 3/4”-16 UNF (directional valve cavity)

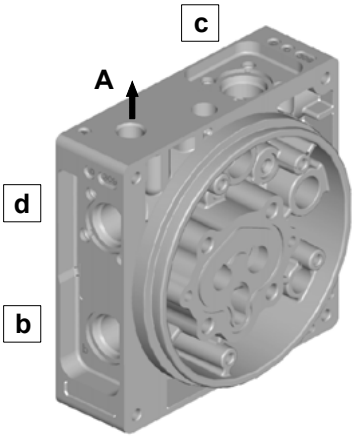
Cavity **e** = 7/8”-14 UNF (flow regulator cavity)

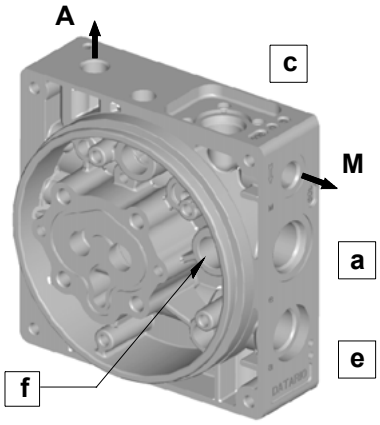
Cavity **f** = return line

- **A** = Main work port
- **M** = Secondary work port

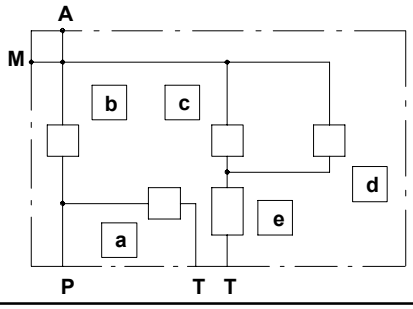


Cavities identification

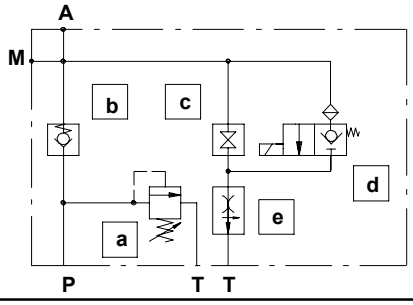




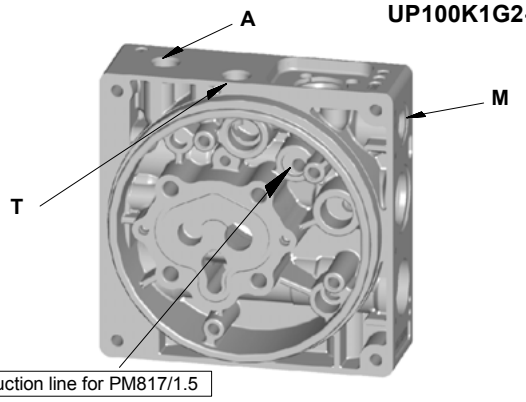
Basic circuit



Example for a standard circuit

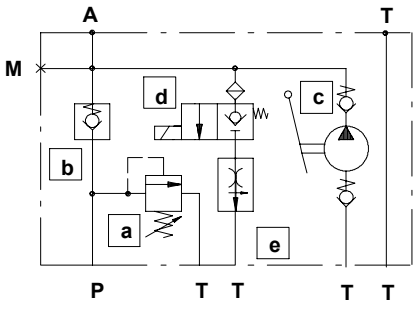


UP100K1G2-19



Suction line for PM817/1.5

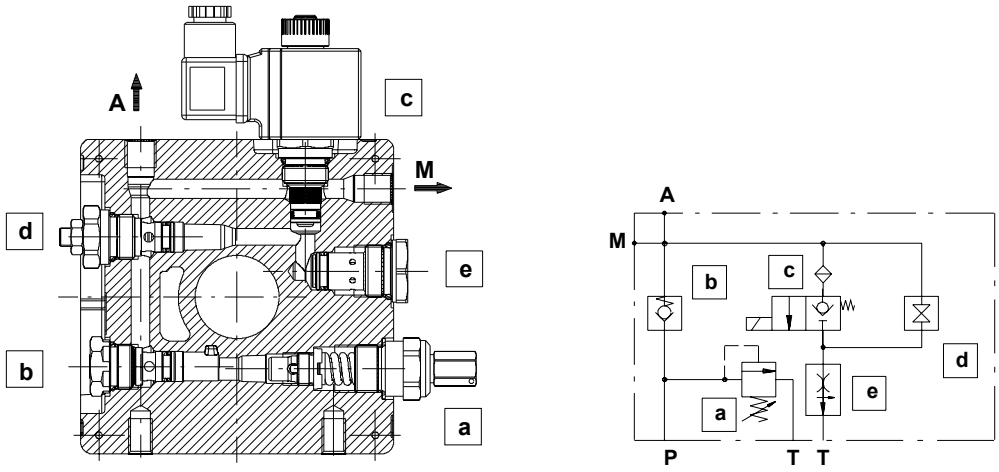
Example for a realizable circuit UP100K1G2-19 (PM817/1.5)

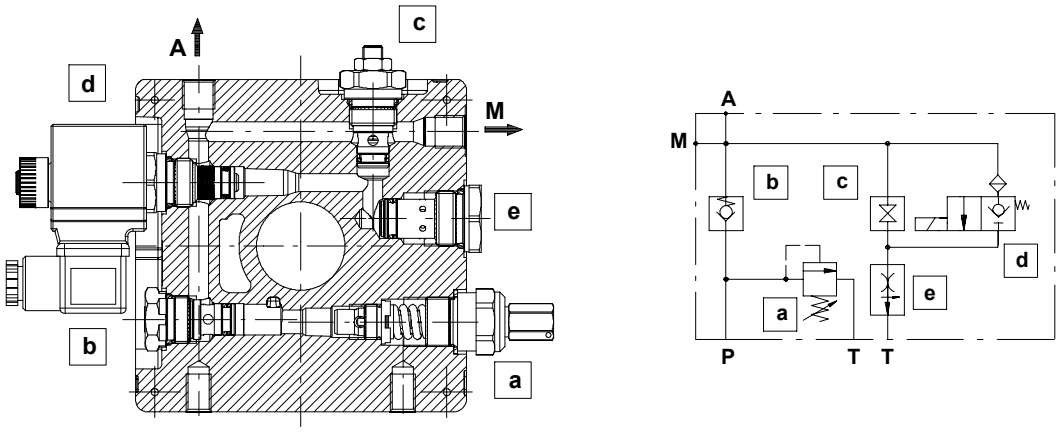


1.2.2 Flexibility of assembly

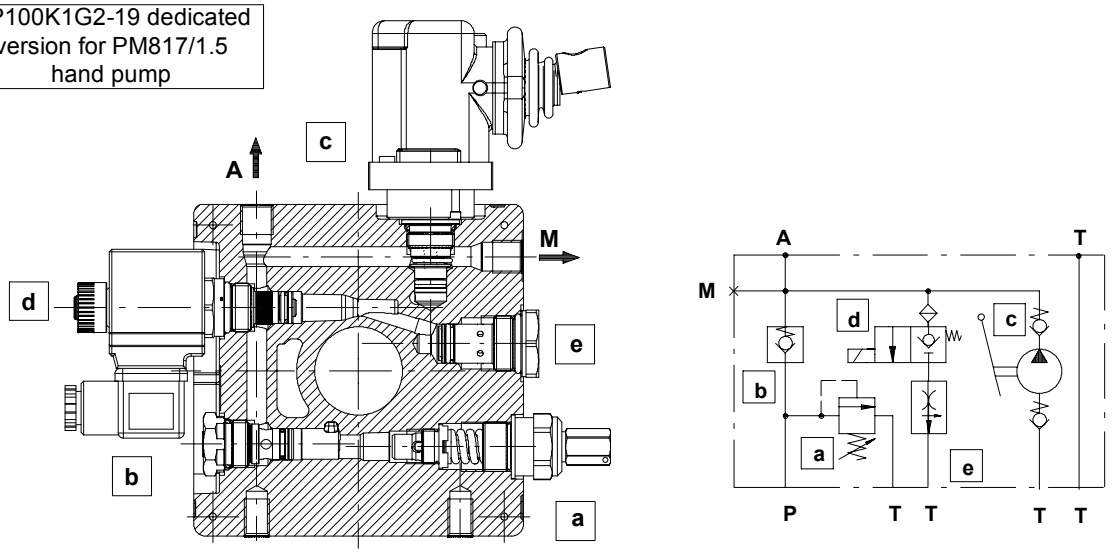
The two hydraulic circuits illustrated are identical in terms of operation but differently arranged, simply by installing the valves in alternative positions.

Available space can be exploited to the best advantage.

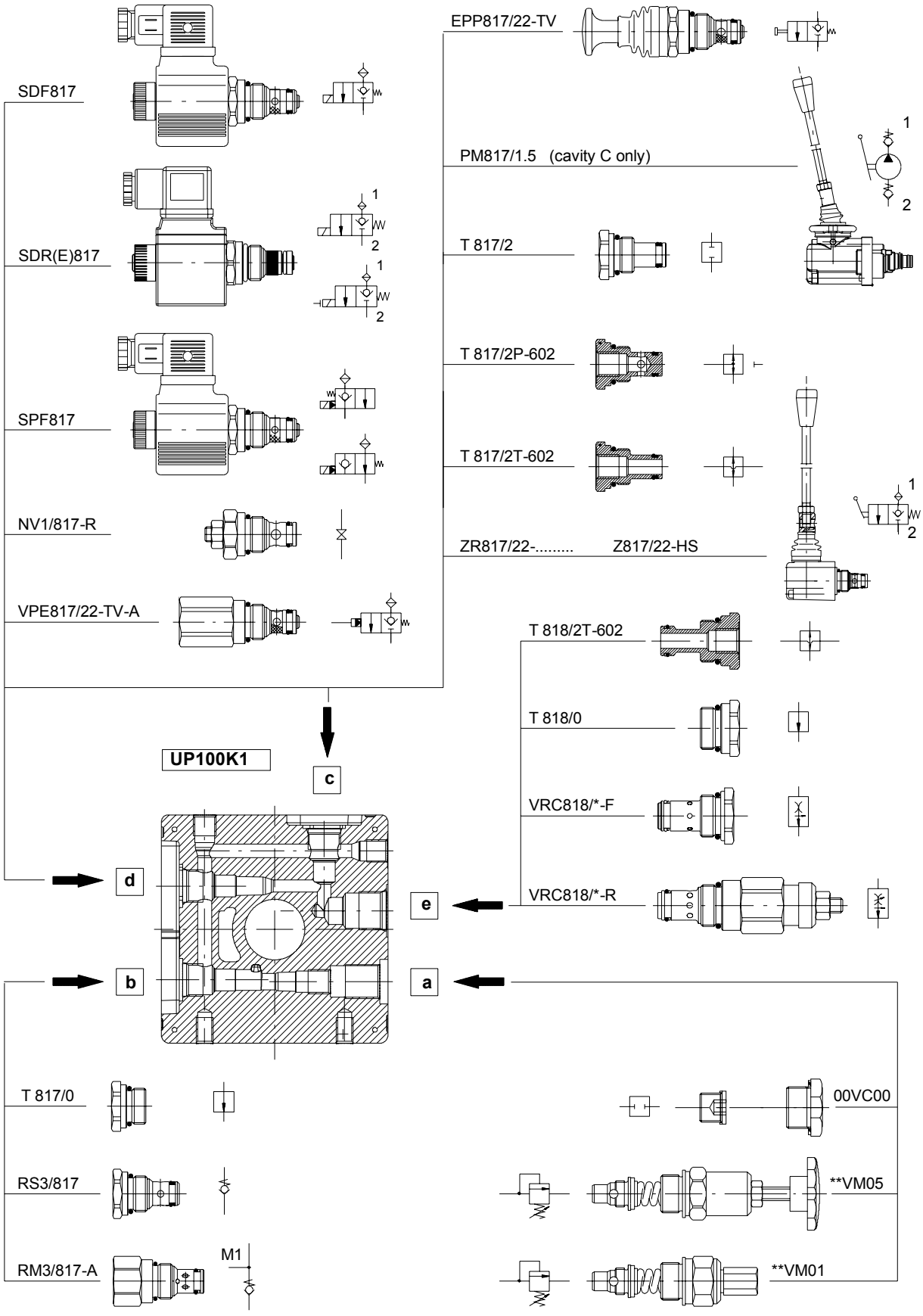




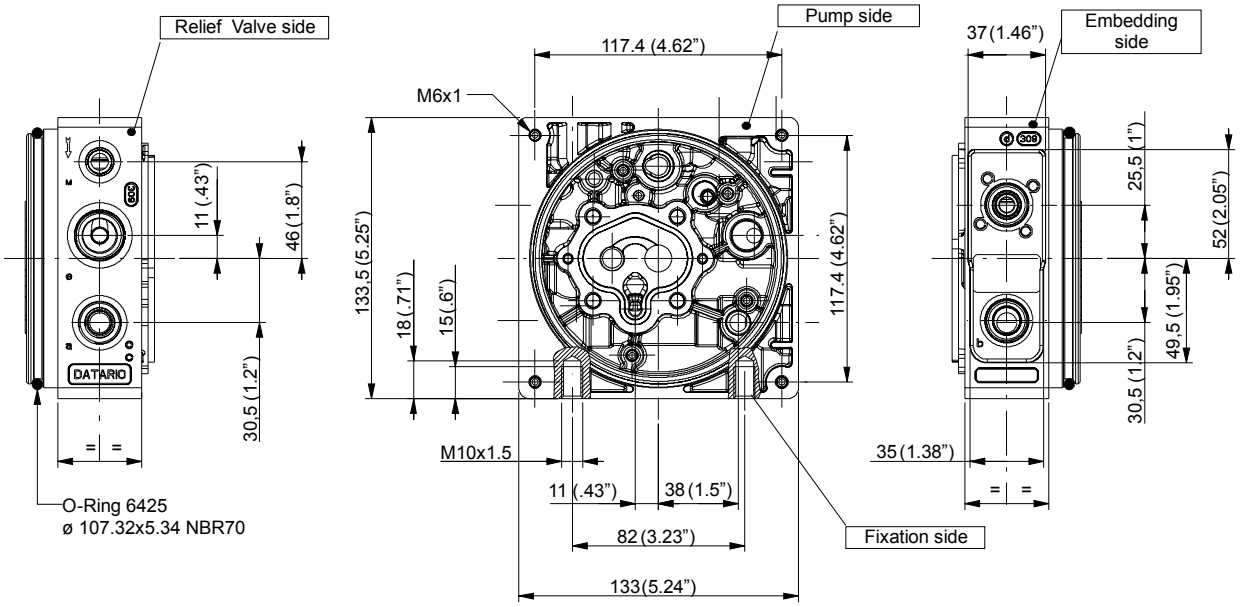
UP100K1G2-19 dedicated version for PM817/1.5 hand pump



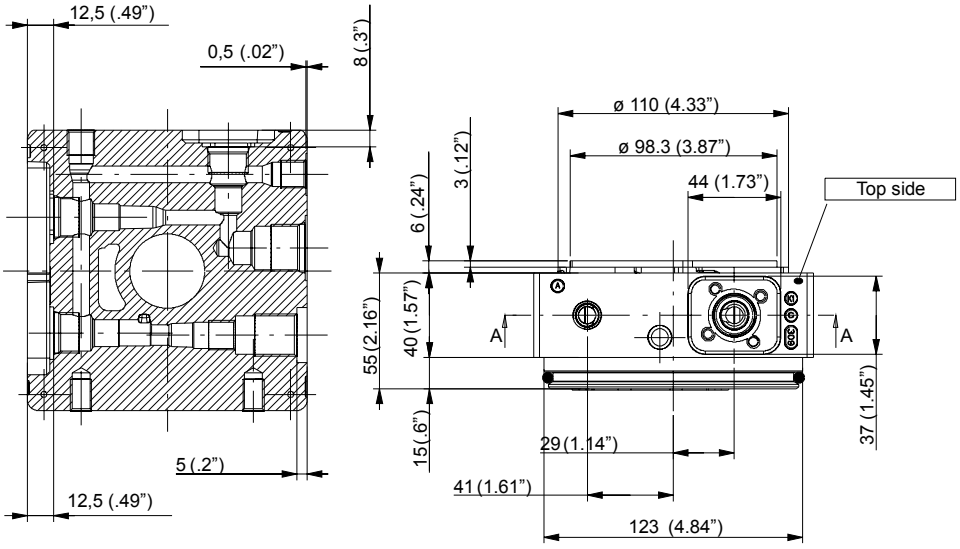
1.2.3 Component accepted by the single cavities



1.2.4 Dimensions



Sec. A-A



Supplied with port M plugged - Standard Version

Type	Port A	Port M
UP100K1G2-01	1/4" BSP	1/4" BSP

Other versions to order

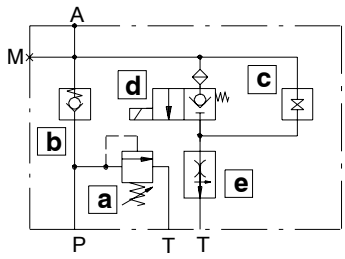
Type	Port A	Port M
UP100K1G3-01	3/8" BSP	1/4" BSP
UP100K1M3-01	M18X1.5	1/4" BSP
UP100K1S2-01	SAE6	SAE6

Example

1	Type of housing										Vers.	
	U	P	1	0	0	**K**	1	**G**	**2**	**-**	**0**	**1**

1.2.5 Examples for compilation of hydraulic power pack specification form

- UP100 Power pack set up for single acting circuit.
- Main work port A thread 1/4"BSP (secondary work port M with 1/4" BSP thread, plugged).
- VM01 pressure relief valve set at 150 bar
- RS3/817 check valve.
- NV1/817-R emergency valve fitted in cavity **c**.
- SDF817/22-TV (12 volt input) solenoid directional valve fitted in cavity **d**
- VRC818/05-F fixed flow control valve fitted in cavity **e**.



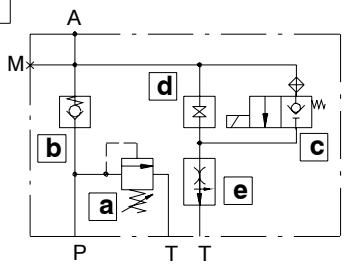
	Type of housing	Vers.
1	UP100K1G2-	01

	Cavity a	Cavity b	Cavity c
7	15VM01	RS3/817	NV1/817-R
	Cavity d	**Cavity e**	
	SDF817/22-TV	VRC818/05-F	

Cavity g	Hand lever	Lever stick	Volt
			13

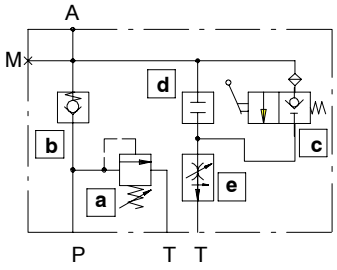
UP100 power pack with same hydraulic circuit as per above example but with:

- SDF817/22-TV solenoid directional valve fitted in cavity **c**.
- NV1/817-R emergency valve fitted in cavity **d**.



	Cavity a	Cavity b	Cavity c
7	15VM01	RS3/817	SDF817/22-TV
	Cavity d	**Cavity e**	**Cavity f**
	NV1/817-R	VRC818/05-F	

- UP100 power pack set up for single acting circuit
- main work port A threaded 3/8" BSP thread (secondary work port M threaded 1/4" BSP plugged).
- VM01 pressure relief valve set at 180 bar
- RS3/817 check valve.
- ZR817/22-TV manually operated directional valve + hand lever L10 and lever stick AL001 fitted in cavity **c**
- cavity **d** plugged with T817/2 plug.
- VRC818/B-R adjustable flow control valve fitted in cavity **e**



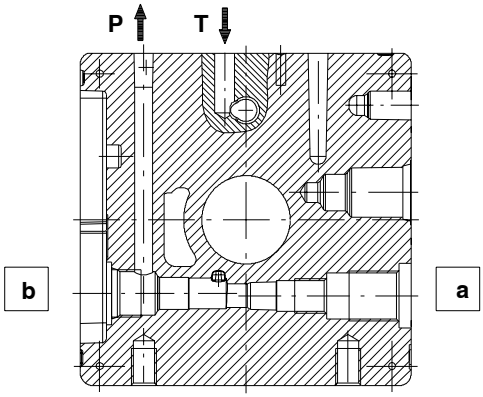
	Type of housing	Vers.
1	UP100K1G3-	01

	Cavity a	Cavity b	Cavity c
7	18VM01	RS3/817	ZR817/22-TV
	Cavity d	**Cavity e**	**Cavity f**
	T817/2	VRC818/B-R	

Cavity g	Hand lever	Lever stick	Volt
	L10	AL001	13

1.3 Housing UP100K3 (Manifolds prearrangement or threaded P-T connections)

1.3.1 Main specification



UP100/K3P0-01

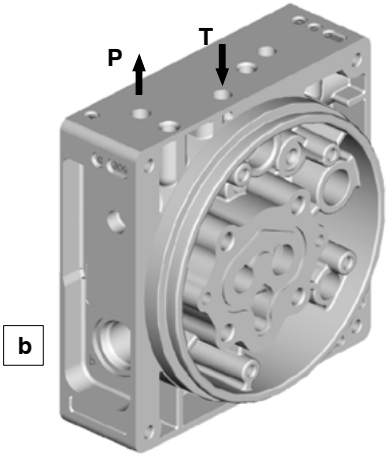
Cavity **a** = M20X1.5 (relief valve cavity)

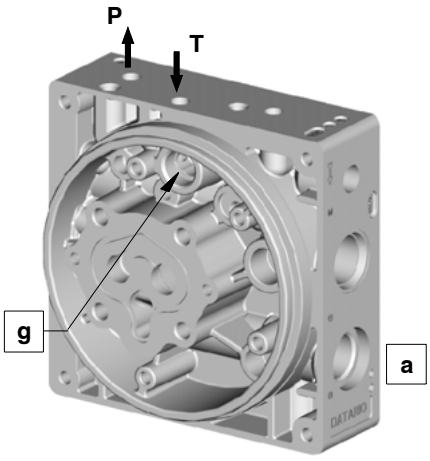
Cavity **b** = 3/4”-16 UNF (check valve cavity)

- **P** = Pressure line for manifolds*
- **T** = Return line T for manifolds*

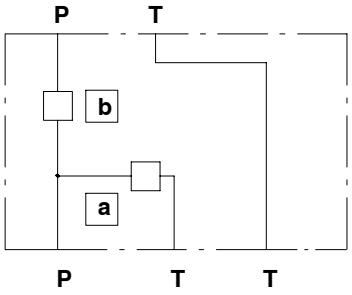
* for manifold see section 8

Cavities identification

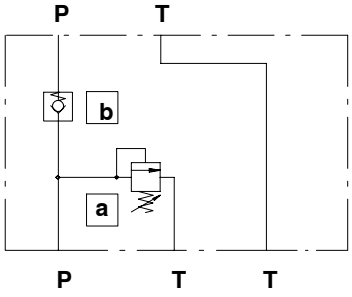




Basic circuit



Example for standard circuit

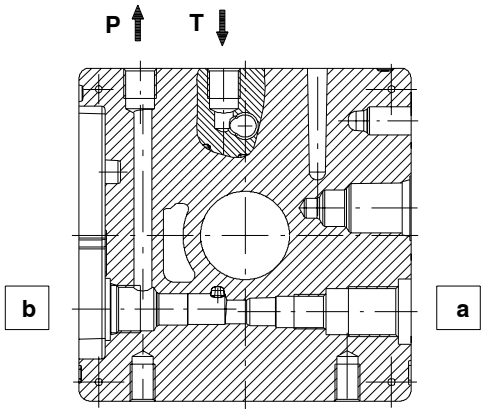


UP100K3-****

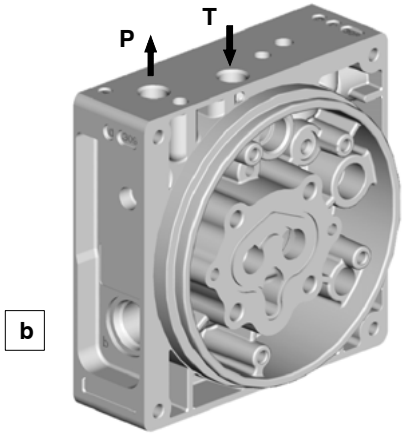
Cavity **a** = M20X1.5 (relief valve cavity)

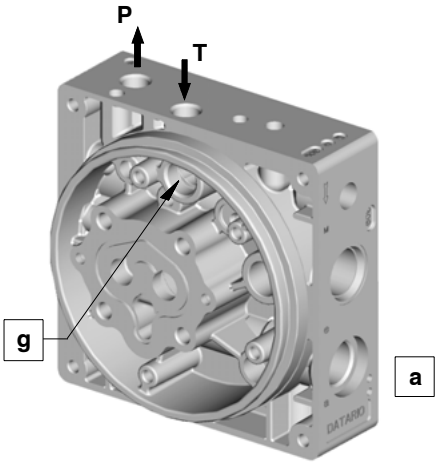
Cavity **b** = 3/4”-16 UNF (check valve cavity)

- **P** = Threaded pressure port
- **T** = Threaded return port

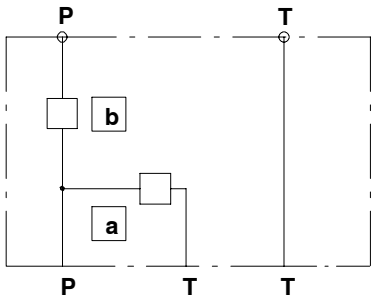


Cavities identification

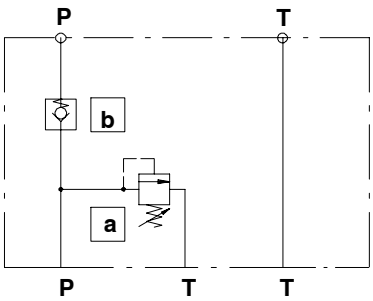




Basic circuit

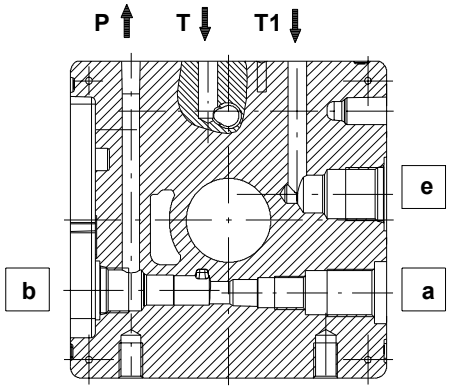


Example for standard circuit

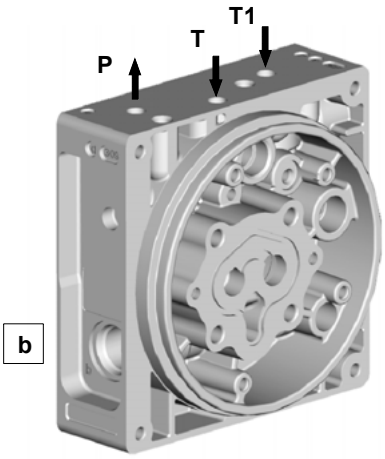


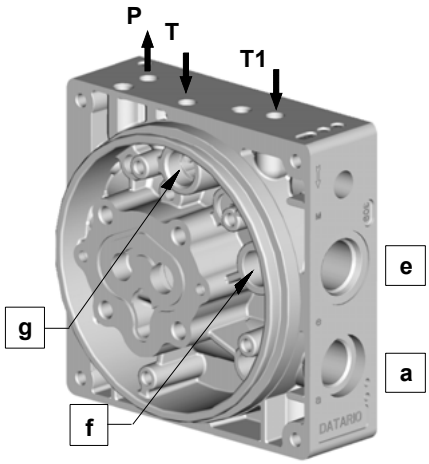
UP100K3P0-02

Cavity **a** = M20X1.5 (relief valve cavity)
Cavity **b** = 3/4”-16 UNF (check valve cavity)
Cavity **e** = 7/8”-14 UNF (flow regulator cavity)
- **P** = Pressure line P for special manifolds
- **T** = Return line T for special manifolds
- **T1** = Secondary return line T1 for special manifolds

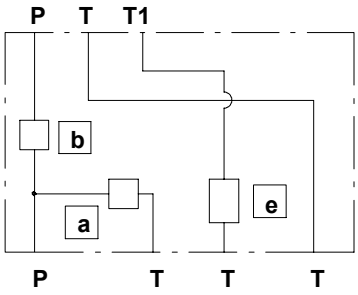


Cavities identification

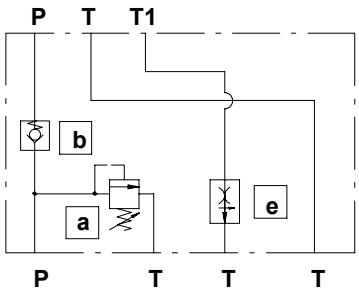




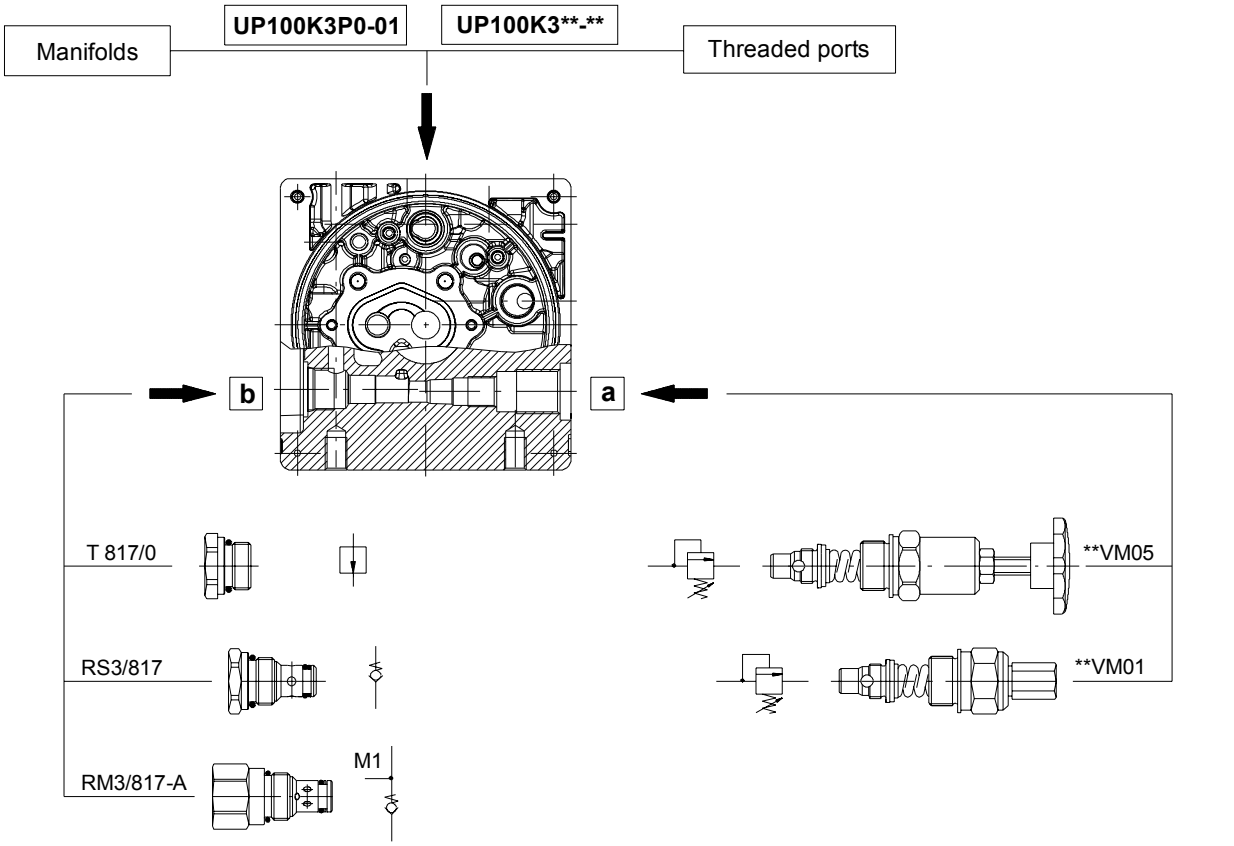
Basic circuit

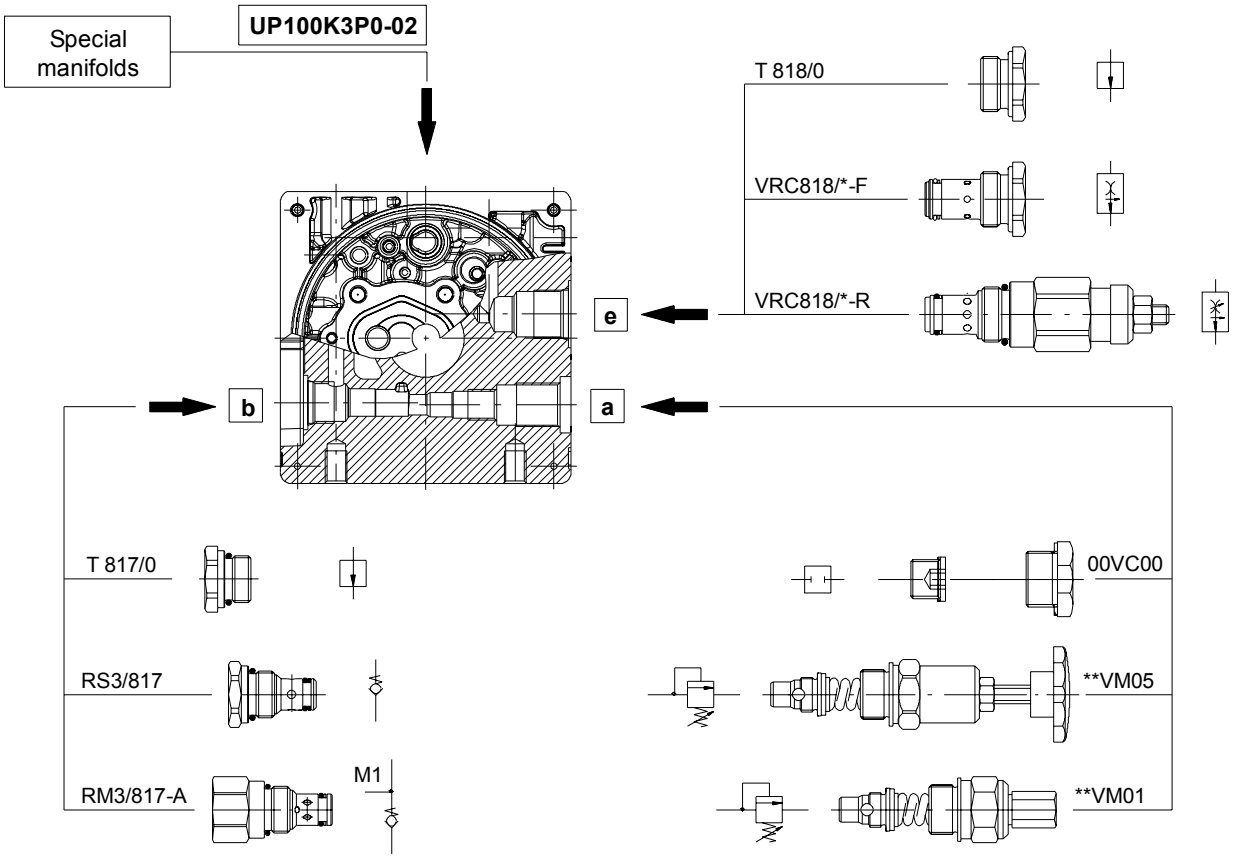


Example for a standard circuit

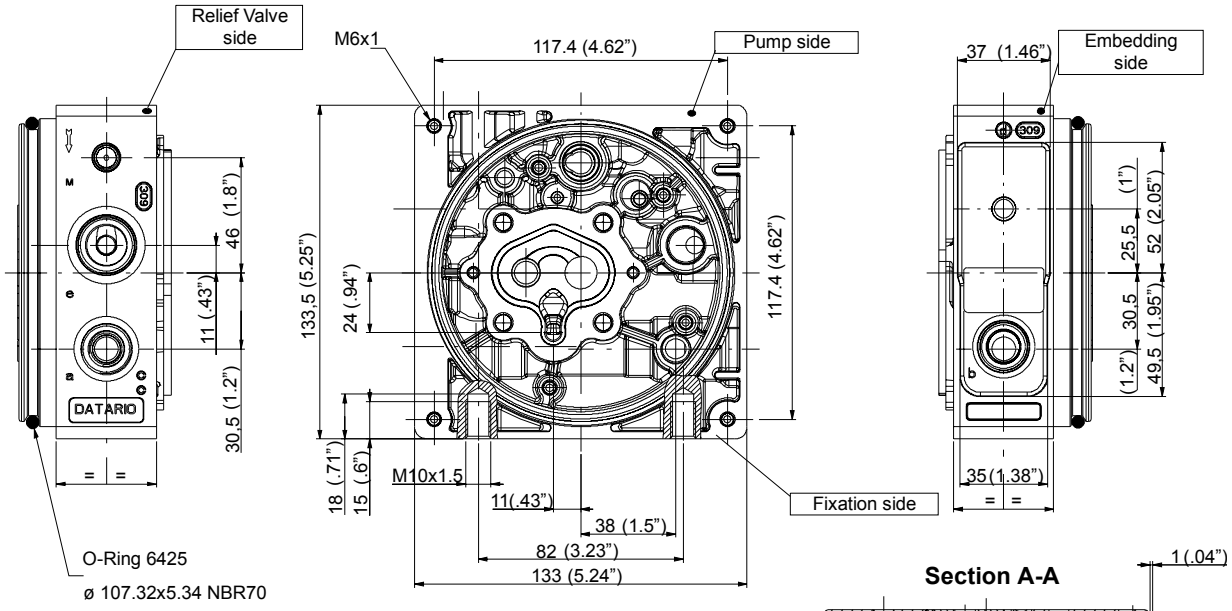


1.3.2 Component accepted by the single cavities

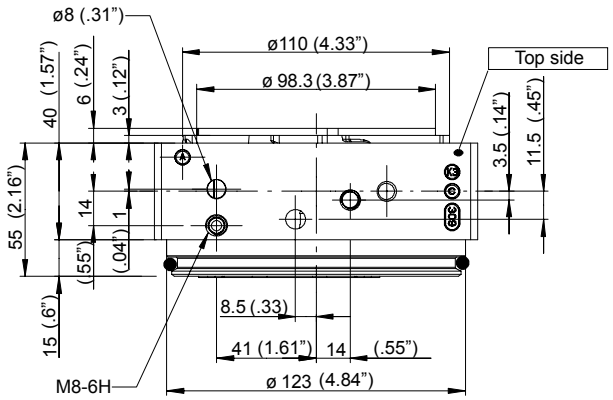




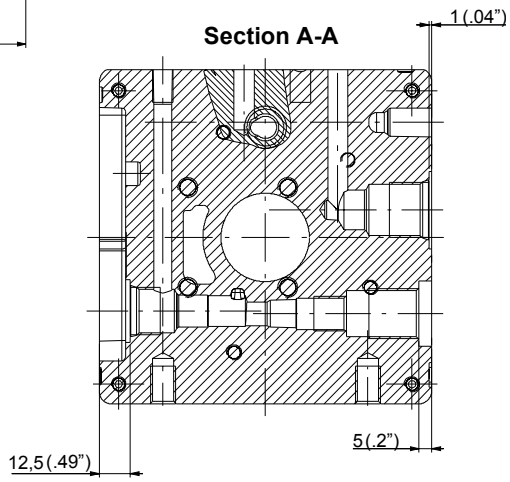
1.3.3 Dimensions



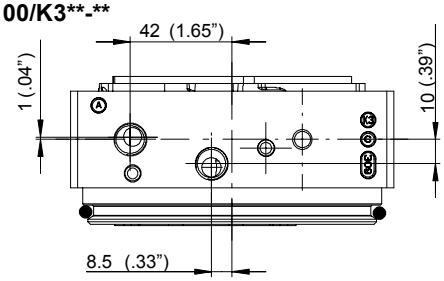
UP100/K3P0-01



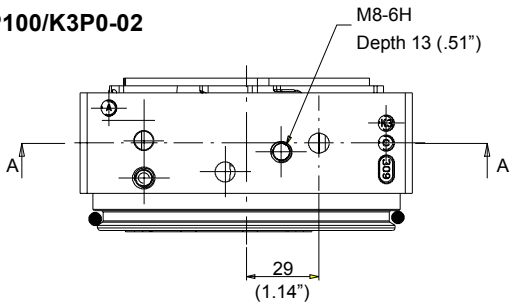
Section A-A



UP100/K3-**



UP100/K3P0-02



Type	For manifolds
UP100K3P0-01	Section 8 of catalogue

Type	Port P/T
UP100K3G2-01	1/4" BSP
UP100K3M2-01	M14X1.5
UP100K3S2-01	SAE6

Type	For special blocks
UP100K3P0-02	Section 8 of catalogue

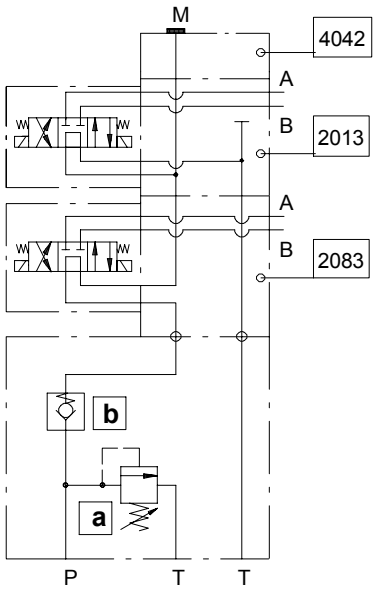
Example

	Type of housing										Vers.	
1	U	P	1	0	0	K	3	P	0	-	0	1

1.3.4 Example for compilation of hydraulic power pack specification form

- UP100 power pack set up for manifolds
- VM01 pressure relief valve set at 210 bar
- RS3/817 check valve.
- combined series manifolds 2083-2013-4042 with assembled two CETOP A-02 solenoid operated directional valves input voltage 24 volt DC.

* for valves and manifolds see section 7 - 8 .



1

Type of housing										Vers.	
U	P	1	0	0	K	3	P	0	-	0	1

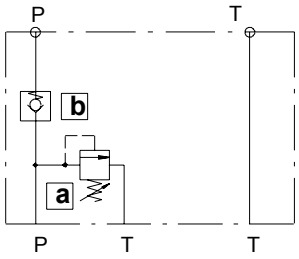
7

Cavity a										Cavity b							
2	1	V	M	0	1					R	S	3	/	8	1	7	

8

Sequence	Manifolds								Valves for manifolds																Q.ty	Volt	
1					2	0	8	3				A	-	0	2											2	3
2					2	0	1	3				A	-	0	2												
					4	0	4	2																			

- UP100 power pack set up for direct threaded 1/4" BSP connections P-T.
- VM01 pressure relief valve set at 170 bar
- RS3/817 check valve.



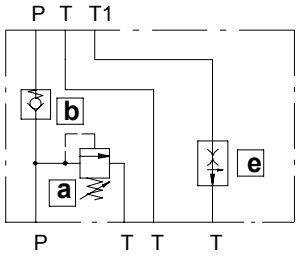
1

Type of housing										Vers.	
U	P	1	0	0	K	3	G	2	-	0	1

7

Cavity a												Cavity b												Cavity c											
1	7	V	M	0	1							R	S	3	/	8	1	7																	

- UP100 power pack set up for special manifolds.
- VM01 pressure relief valve set at 210 bar
- RS3/817 check valve.
- VRC818/05-F fixed flow control valve fitted in cavity **e**.



1

Type of housing										Vers.	
U	P	1	0	0	K	3	P	0	-	0	2

7

Cavity a												Cavity b												Cavity c											
2	1	V	M	0	1							R	S	3	/	8	1	7																	

Cavity d												Cavity e									Cavity f													
												V	R	C	8	1	8	/	0	5	-	F													

1.4 Housing UP100K4 (integrated valves + external manifolds)

1.4.1 Main specification

UP100K4G2-01

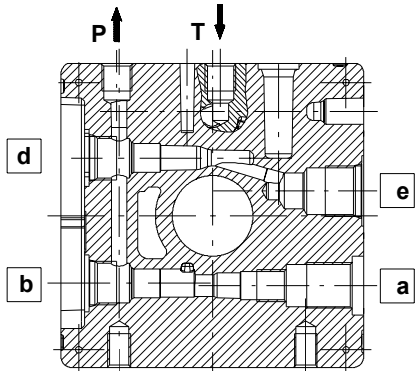
Cavity **a** = M20X1.5 (relief valve cavity)

Cavity **b** = 3/4”-16 UNF (check valve cavity)

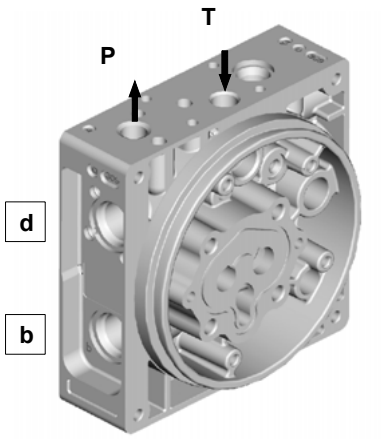
Cavity **d** = 3/4”-16 UNF (directional valve cavity)

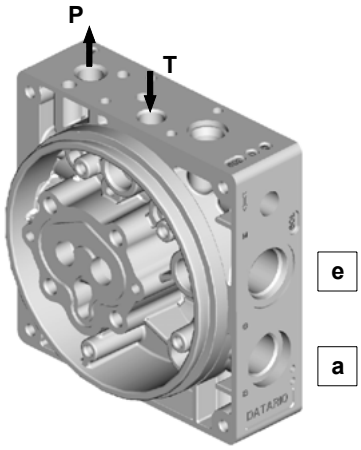
Cavity **e** = 7/8”-14 UNF (flow regulator cavity)

- **P** = Threaded pressure port
- **T** = Threaded return port

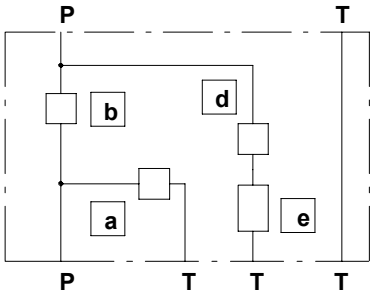


Cavities identification

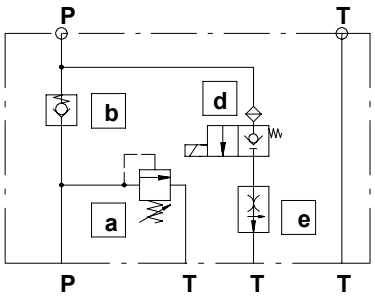




Basic circuit UP100K4G2-01



Example for a standard circuit UP100K4G2-01



UP100K4P0-01

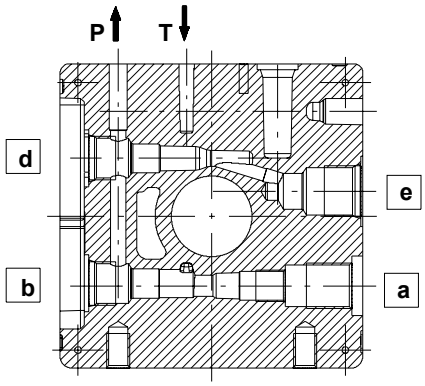
Cavity **a** = M20X1.5 (relief valve cavity)

Cavity **b** = 3/4”-16 UNF (check valve cavity)

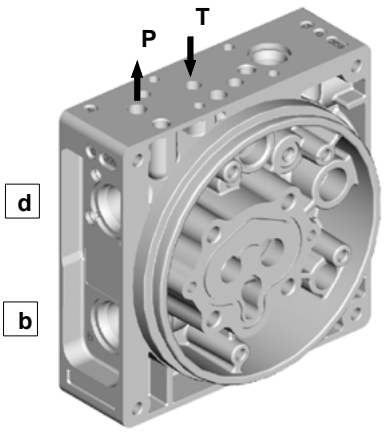
Cavity **d** = 3/4”-16 UNF (directional valve cavity)

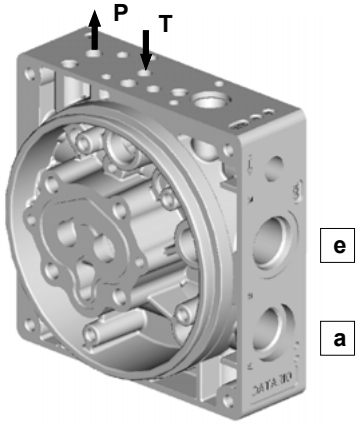
Cavity **e** = 7/8”-14 UNF (flow regulator cavity)

- **P** = Pressure line for manifolds
- **T** = Return line for manifolds

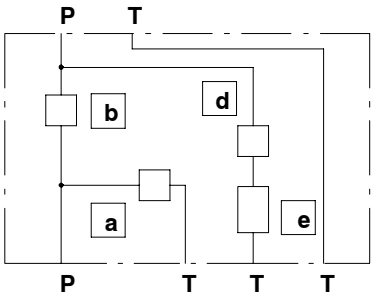


Cavities identification

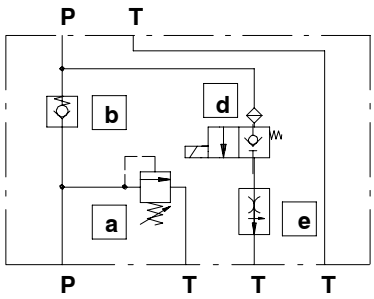




Basic circuit



Example for a standard circuit



UP100K4D0-01 / **UP100K4D0-02**

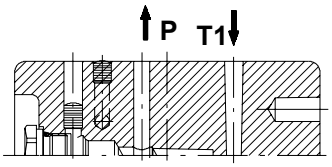
Cavity **a** = M20X1.5 (relief valve cavity)

Cavity **b** = 3/4”-16 UNF (check valve cavity)

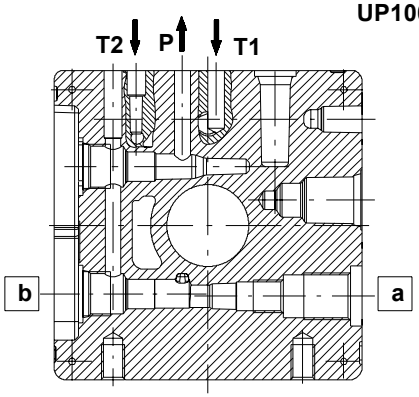
- **P** = Pressure line for directional valves
- **T1** = Return line for directional valves
- **T2** = Secondary return line T2 for directional valves* (Plugged in UP100/K4D002 version)

* for directional valves see section 9

UP100K4D0-02

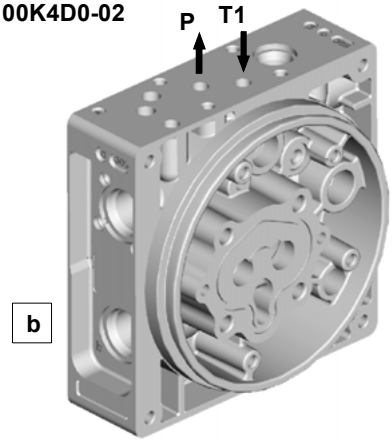


UP100K4D0-01

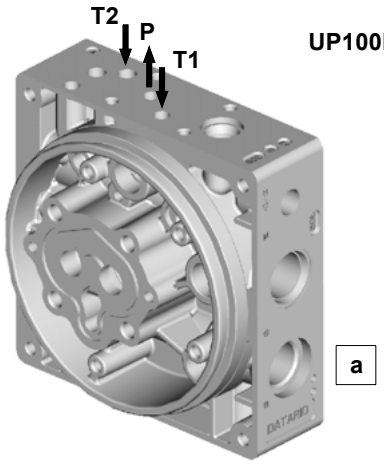


Cavities identification

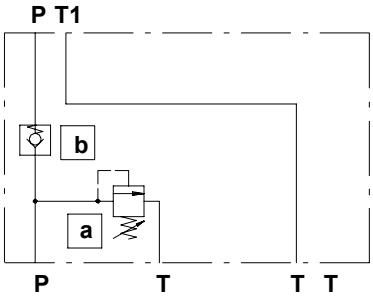
UP100K4D0-02



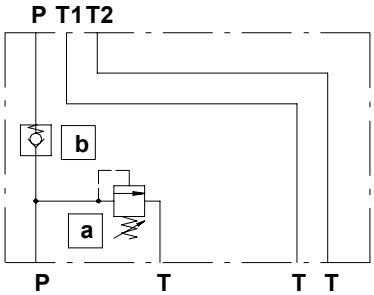
UP100K4D0-01



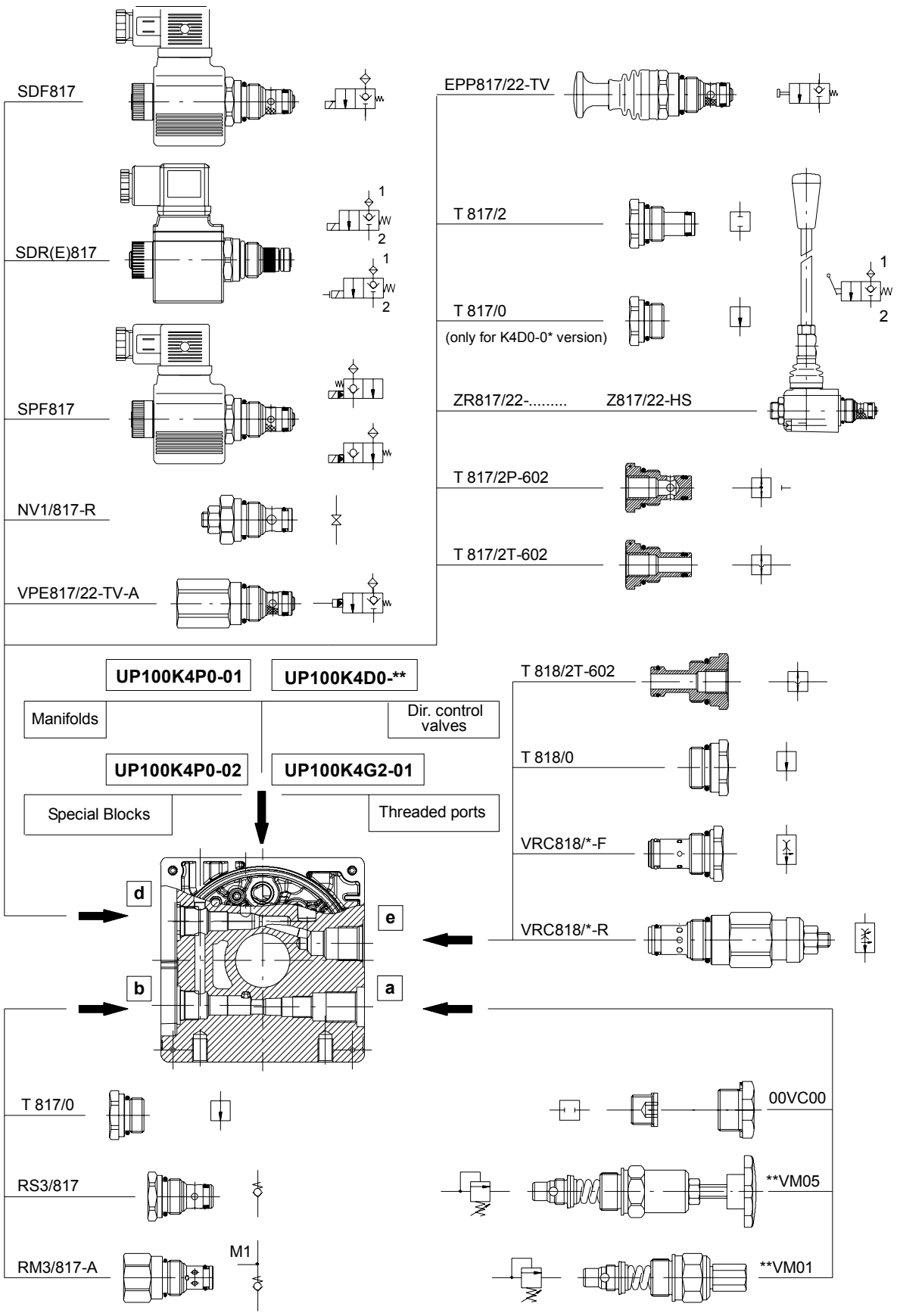
Example for a standard circuit UP100K4D0-02



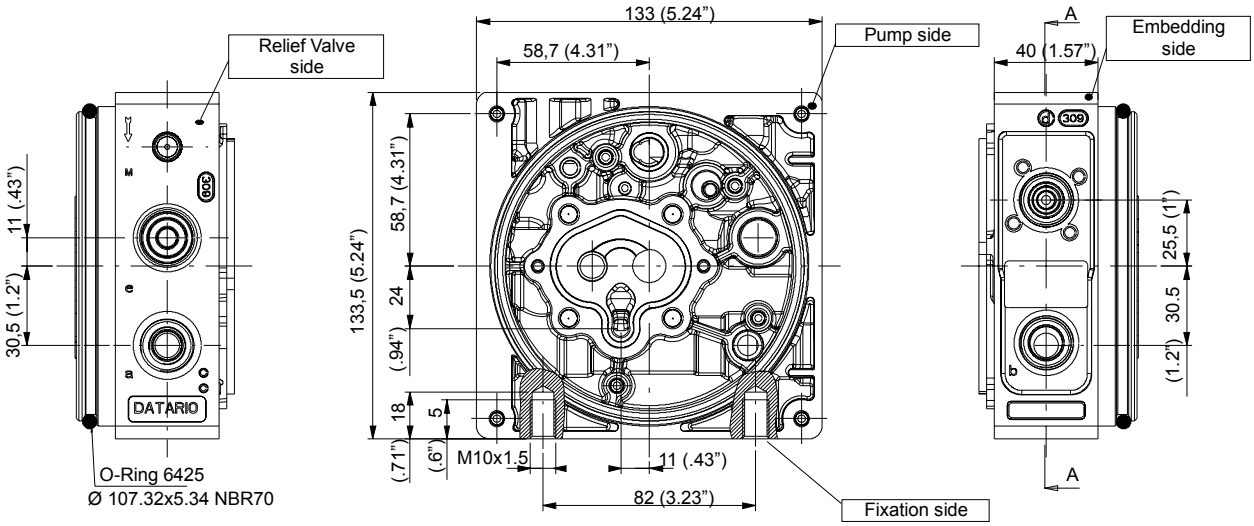
Example for a standard circuit UP100K4D0-01



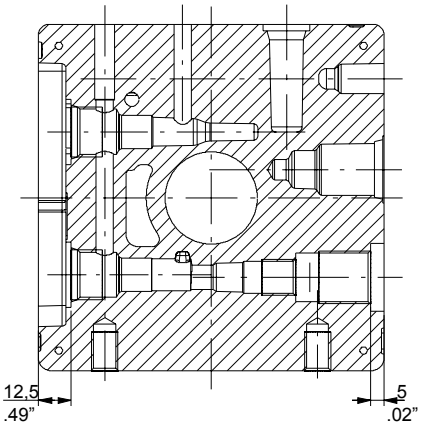
1.4.2 Components accepted by the single cavities



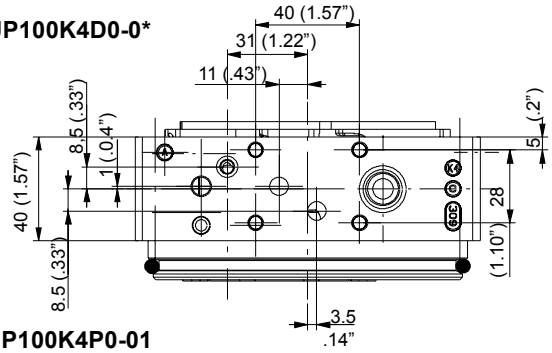
1.4.3 Dimensions



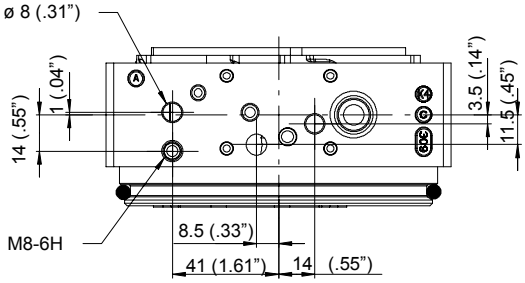
Section A-A



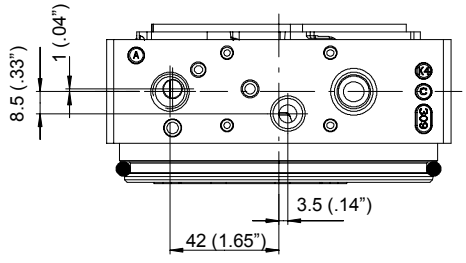
UP100K4D0-0*



UP100K4P0-01



UP100K4*2-01



Type	For directional control valves
UP100K4D0-01	Plates 4270-4280 for HDS11-HDS07
UP100K4D0-02	HD105-HD106

Type	For manifolds
UP100K4P0-01	Section 8 of catalogue

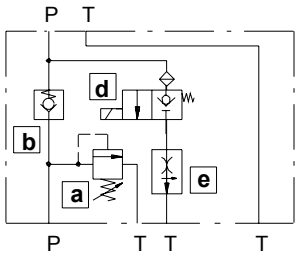
Type	Port P/T
UP100K4G2-01	1/4" BSP
UP100K4M2-01	M14X1.5
UP100K4S2-01	SAE6

Example

	Type of housing										Vers.	
1	U	P	1	0	0	**K**	**4**	**P**	**0**	-	**0**	**1**

1.4.4 Example for compilation of hydraulic power pack specification form

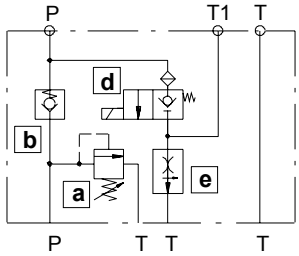
- UP100 Power pack with integrated valves and prearranged for external manifold
- VM01 pressure relief valve set at 180 bar
- RS3/817 check valve.
- SDF817/22-TV solenoid operated directional valve (12 V. D.C.) fitted in cavity **d**.
- VDF818/09-F fixed flow control valve fitted in cavity **e**.



	Type of housing	Vers.
1	UP100K4P0-	01

	Cavity a	Cavity b	Cavity c
7	18VM01	RS3/817	
	Cavity d	**Cavity e**	**Cavity f**
	SDF817/22-TV	VRC818/09-F	
	Cavity g	**Hand lever**	**Lever Stick**
			Volt
			13

- UP100 power pack with integrated valves and threaded connections P/T= 1/4" BSP and T1= 3/8" BSP.
- VM01 pressure relief valve set at 210 bar
- RS3/817 check valve.
- SDF817/22-TV solenoid operated directional valve (24 volt 50 Hz A.C.).
- VRF818/05-F fixed flow control valve fitted in cavity **e**.

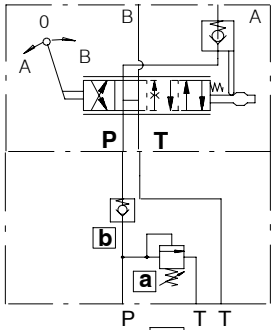


	Type of housing	Vers.
1	UP100K4G2-	04

	Cavity a	Cavity b	Cavity c
7	21VM01	RS3/817	
	Cavity d	**Cavity e**	**Cavity f**
	SDF817/22-TV	VRC818/05-F	
	Cavity g	**Hand Lever**	**Stick Lever**
			Volt
			21

UP100 power pack prearranged for external directional control valves.

- VM01 pressure relief valve set at 210 bar.
- RS3/817 check valve.
- HD106 K02 ADC08 manual operated directional valve fitted on UP100 housing.



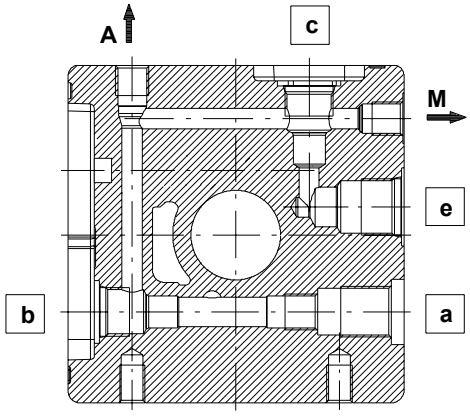
	Type of housing	Vers.
1	UP100K4D0-	02

	Cavity a	Cavity b	Cavity c
7	21VM01	RS3/817	

9	El. n.	Sectional body valve	Circuit	Posit.	Lever	Hand Lever	Valves for sect. valve
	1	HD106K02	ADC	01	L100	AL001	

1.5 Housing UP100K6 (Single acting)

1.5.1 Main specification

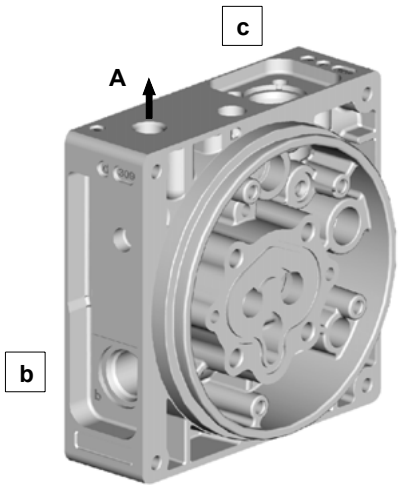


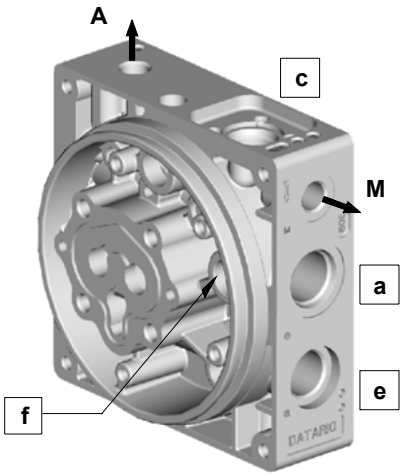
Cavity **a** = M20X1.5 (relief valve cavity)
Cavity **b** = 3/4”-16 UNF (check valve cavity)
Cavity **c** = 3/4”-16 UNF (directional valve cavity)
Cavity **e** = 7/8”-14 UNF (flow regulator cavity)
Cavity **f** = return line
- **A** = Main work port
- **M** = Secondary work port

One only possible assembling position for the directional valve

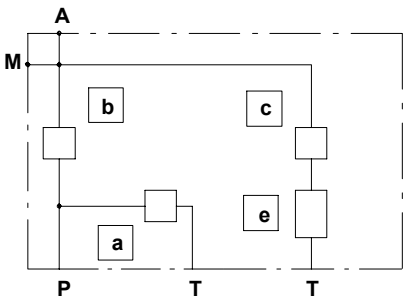
Three possible flow range capacity (8-14-25 lt/1’) for the solenoid directional control valve.

Cavities identification

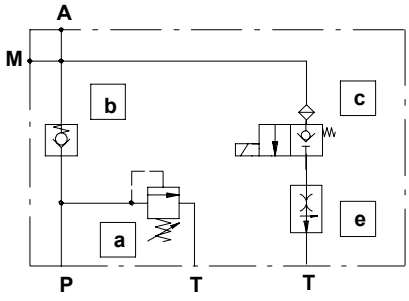




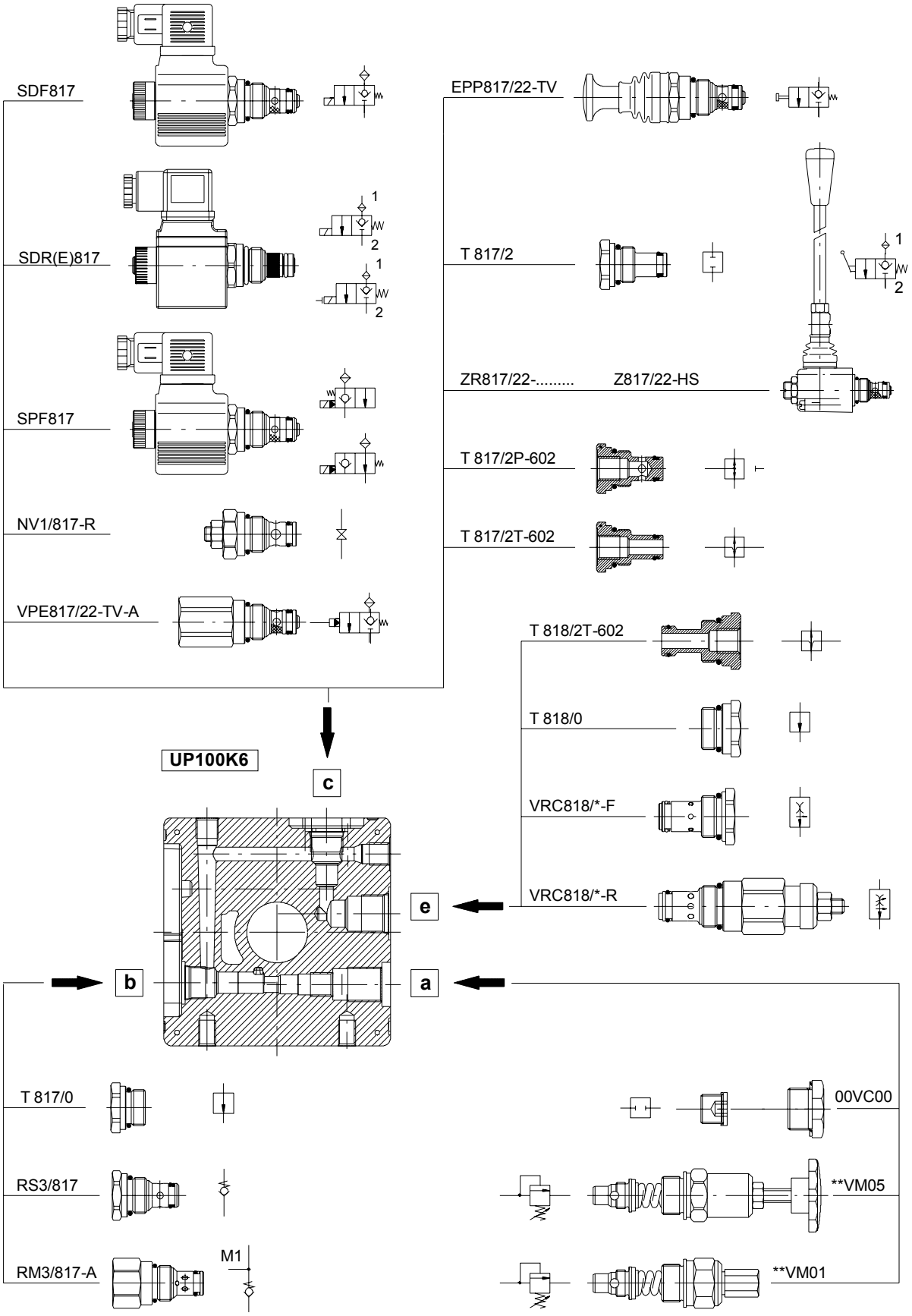
Basic circuit



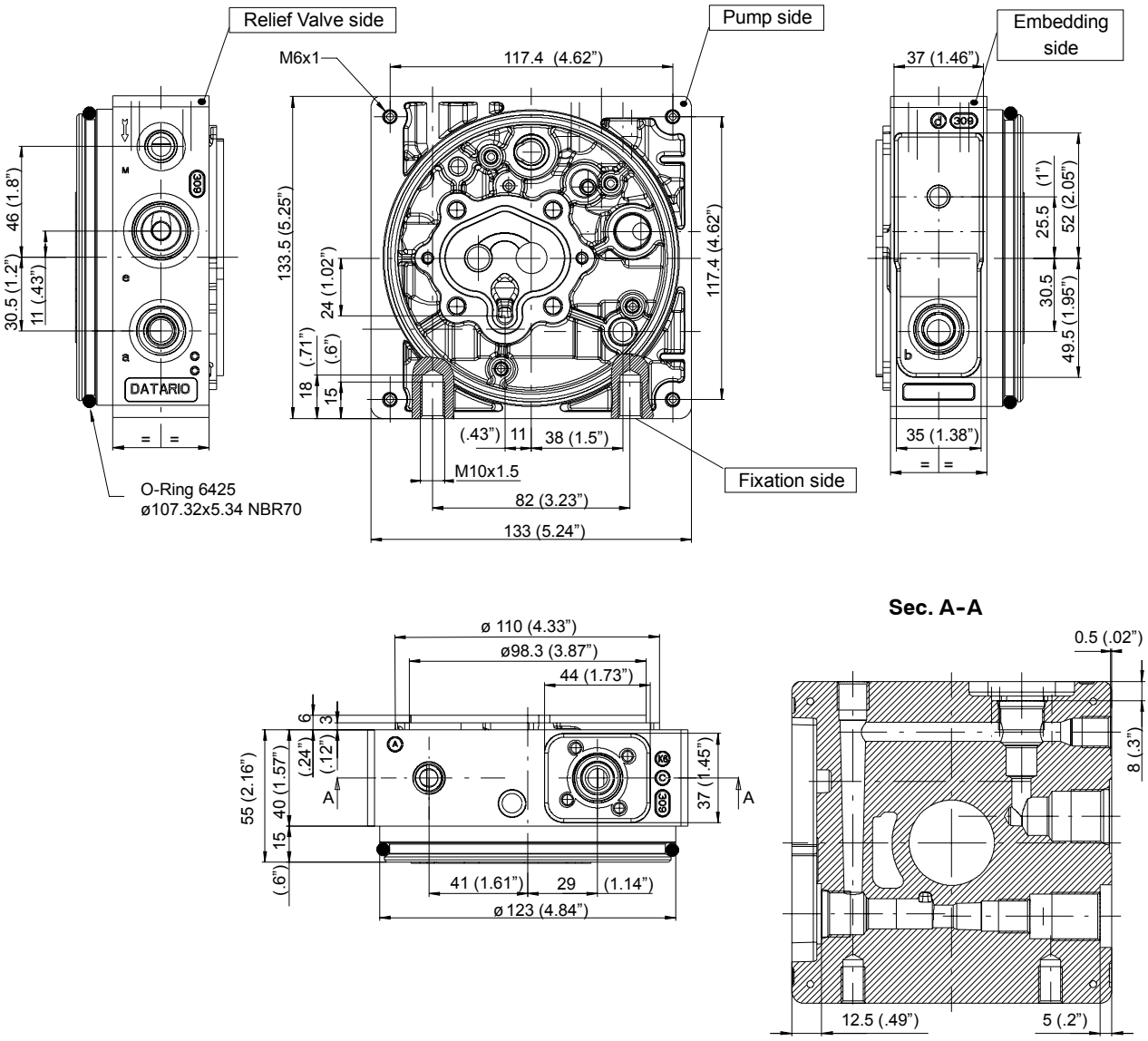
Example for a standard circuit



1.5.2 Component accepted by the single cavities



1.5.3 Dimensions



Supplied with port M plugged - Standard Version

Type	Port A	Port M
UP100K6G2-01	1/4" BSP	1/4" BSP

Other versions to order

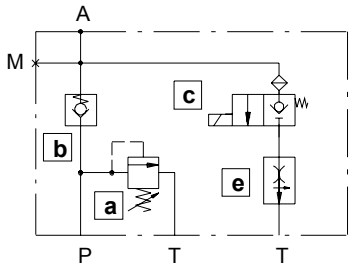
Type	Port A	Port M
UP100K6G3-01	3/8" BSP	1/4" BSP
UP100K6M3-01	M18X1.5	1/4" BSP
UP100K6S2-02	SAE6	SAE6

Example

	Type of housing									Vers.	
1	U	P	1	0	0	**K**	**6**	**G**	**2**	**-**	**0**	**1**

1.5.4 Examples for compilation of hydraulic power pack specification form

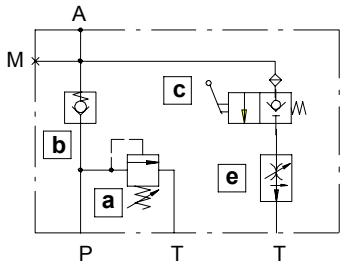
- UP100 Power pack set up for single acting circuit.
  Main work port A thread 1/4" BSP (secondary work port M threaded 1/4" BSP plugged)
- VM01 pressure relief valve set at 150 bar
- RS3/817 check valve.
- SDF817/22-TV solenoid operated directional valve (12 VDC) fitted in cavity **c**.
- VRC818/05-F fixed flow control valve fitted in cavity **e**.



1	Type of housing										Vers.	
	U	P	1	0	0	K	6	G	2	-	0	1

7	Cavity a							Cavity b							Cavity c											
	1	5	V	M	0	1								R	S	3	/	8	1	7			S	D	F	8	1	7	/	2	2	-	T	V	
	Cavity d													Cavity e												
														V	R	C	8	1	8	/	0	5	-	F		
	Cavity g										Hand lever					Lever stick					Volt					
																					1	3				

- UP100 power pack set up for single acting circuit.
  Main work port A with 3/8" BSP thread (secondary work port M with 1/4" BSP thread plugged).
- VM01 pressure relief valve set at 180 bar
- RS3/817 check valve.
- ZR817/22-TV manual operated directional valve fitted in cavity **c**.
- VRC818/B-R adjustable flow control valve fitted in cavity **e**.



1	Type of housing										Vers.	
	U	P	1	0	0	K	6	G	3	-	0	1

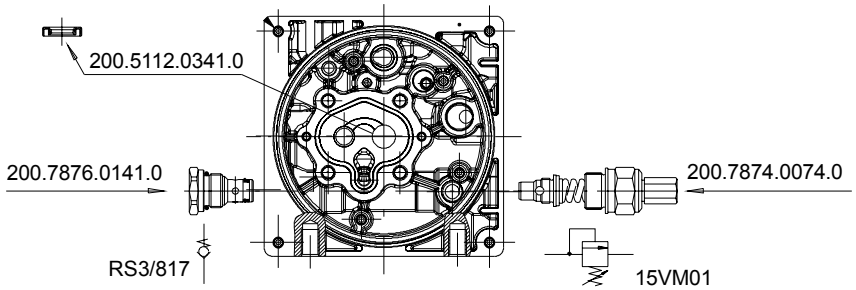
7	Cavity a							Cavity b							Cavity c											
	1	8	V	M	0	1								R	S	3	/	8	1	7			Z	R	8	1	7	/	2	2	-	T	V	
	Cavity d													Cavity e												
														V	R	C	8	1	8	/	B	-	R			
	Cavity f																									
	Cavity g										Hand lever					Lever stick					Volt					
											L	1	0			A	L	0	0	1						

1.6 Preassembled housings

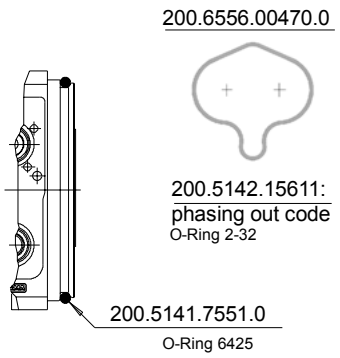
The table summarizes part number to be stated in the event that is wished to order the housing sub-assembly fitted with check and pressure relief valve only. Remember that the pre-assembled housing is supplied with lip seal and circlip but without the O-Rings kit, which must be ordered separately.

Preassembled housing
K1-K3-K4-K6

Pressure relief valve with setting range 95-210 bar (green spring).
For other values, order the different springs separately
See: Chapter 7 - Cartridge valves



O-Rings kit **200.9742.0040.0**



	Body type	Code
K1	UP100 K1G2-01	200.7404.3068.1
	UP100 K1G3-01	200.7404.3066.1
	UP100 K1G2-19	200.7404.3148.1
K3	UP100 K3P0-01	200.7404.1038.1
	UP100 K3P0-02	200.7404.1041.1
	UP100 K3G2-01	200.7404.1042.1
	UP100 K3S2-01	200.7404.2006.1

	Body type	Code
K4	UP100 K4G2-01	200.7404.1043.1
	UP100 K4P0-01	200.7404.1040.1
	UP100 K4D0-01	200.7404.4025.1
	UP100 K4D0-02	200.7404.4026.1
K6	UP100 K6G2-01	200.7404.3141.1
	UP100 K6G3-01	200.7404.3142.1
	UP100 K6S2-02	200.7404.3143.1

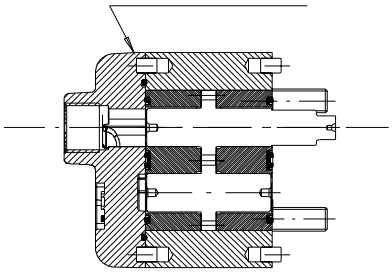
2 Gear pumps

2.1 Technical information

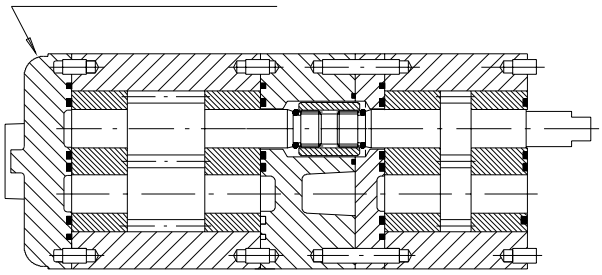
2.1.1 Material

Cover: Pressure diecast aluminium alloy GdAlSi12Cu2Fe to EN-AB 46100 (UNI5076)
Intermediate flange for HI-LO pump: gravity diecast aluminium alloy AlSi10Mg(Cu) to EN-AB 43200 (UNI1706).
Body: Extruded aluminium alloy P-AlZn5.8Mg0.8Zr to EN AW-7003 (UNI9007/6)
Gears: Casehardened and hardened steel 20MnCrS 60 HRC.
Bearings: special SICAL3 antifriction alloy.
Seals: Polyamides NBR.
Backup ring: ZYTEL E10 3HS.

AP100/ S309**



AP100/ - ** S609**



2.1.2 Suitable fluids

Only mineral oil based hydraulic fluids responding to ISO/ DIN standard should be used.

Viscosity range:

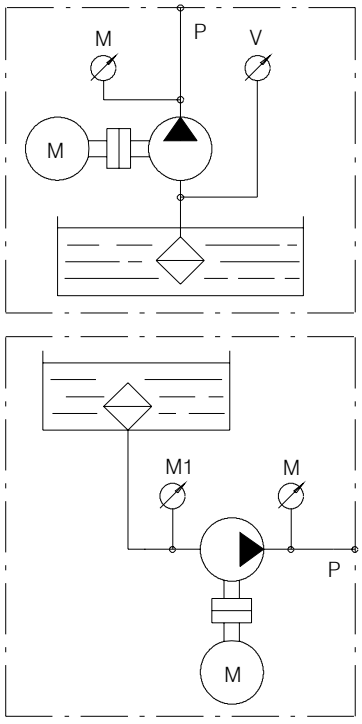
recommended 20 - 120 mm^2/s (cSt)

admitted up to 700 mm^2/s (cSt)

Operating temperature range: -15 +80 °C

For other fluids consult our Sales Department.

Attention: Use of pumps at temperatures above 80°C must always be agreed upon with our Technical Office, and in any case this can cause a significant worsening in the volumetric efficiency. For use under conditions different from those indicated in this catalogue, please contact our Sales Department



2.1.3 Inlet

Absolute pressure at the pump inlet must be

V > 0.75 bar (11 PSI)

Accordingly, avoid:

- significant differences in height of pump and tank
- long pipeline runs
- sharp bends, restrictions, etc. causing turbulent flow

In certain applications, inlet pressure may be higher than 1 bar (14.3 PSI), or at any rate higher than atmospheric. For pumps with standard configuration, the pressure registering at the gauge M1 should be:

M1 < 3.5 bar (50 PSI).

2.1.4 Outlet

Pressure levels:

P1 = continuous operating pressure

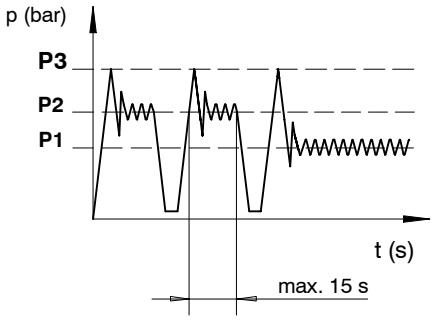
P2 = intermittent operating pressure

P3 = peak pressure

The recommended delivery pipe oil speed is between:

v = 2 - 5 m/s

In the next pages are indicated the performances for each pump.



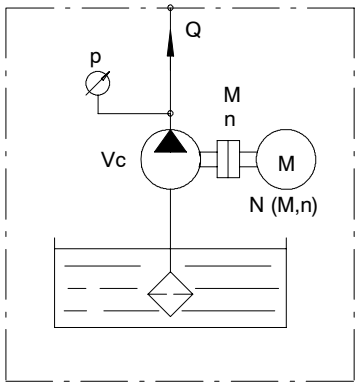
Example of the values in the table

AP100 Pump type	Displacement		L		Max pressure						n min.		n max.	
					P1		P2		P3					
	cm³/ rev	Cu.In. P.R.	mm	inch.	bar	PSI	bar	PSI	bar	PSI	P<P1	P>P1	P<P1	P>P1
AP100/2.5 S309	2.5	.152	86.4	3.40	210	3000	230	3300	250	3600	650	800	4500	5000

2.1.5 Calculating the specifications of a gear pump

The equations for calculating the following parameters are given below:

Vc = (cm^3/g) pump displacement;
n = (g/min) Drive shaft rpm;
Q = (l/min) flow rate;
P = (bar) Operating pressure;
M = (Nm) Torque;
N = (kW) Power
η_v = (%) Volumetric efficiency
η_m = (%) Mechanical efficiency
η_t = (%) Total efficiency



$$Q = \frac{Vc \cdot n}{100000} \cdot \eta_v \qquad Vc = \frac{100000 \cdot Q}{n \cdot \eta_v} \qquad n = \frac{100000 \cdot Q}{Vc \cdot \eta_v}$$

$$N = \frac{Vc \cdot n \cdot p}{6120 \cdot \eta_t} \qquad N = \frac{Q \cdot p}{6.12 \cdot \eta_t} \qquad p = \frac{N \cdot 6.12 \cdot \eta_t}{Q} \qquad p = \frac{N \cdot 6120 \cdot \eta_t}{Vc \cdot n}$$

$$M = 9555 \cdot \frac{N}{n} \qquad \eta_t = \eta_v \cdot \eta_m$$

Example

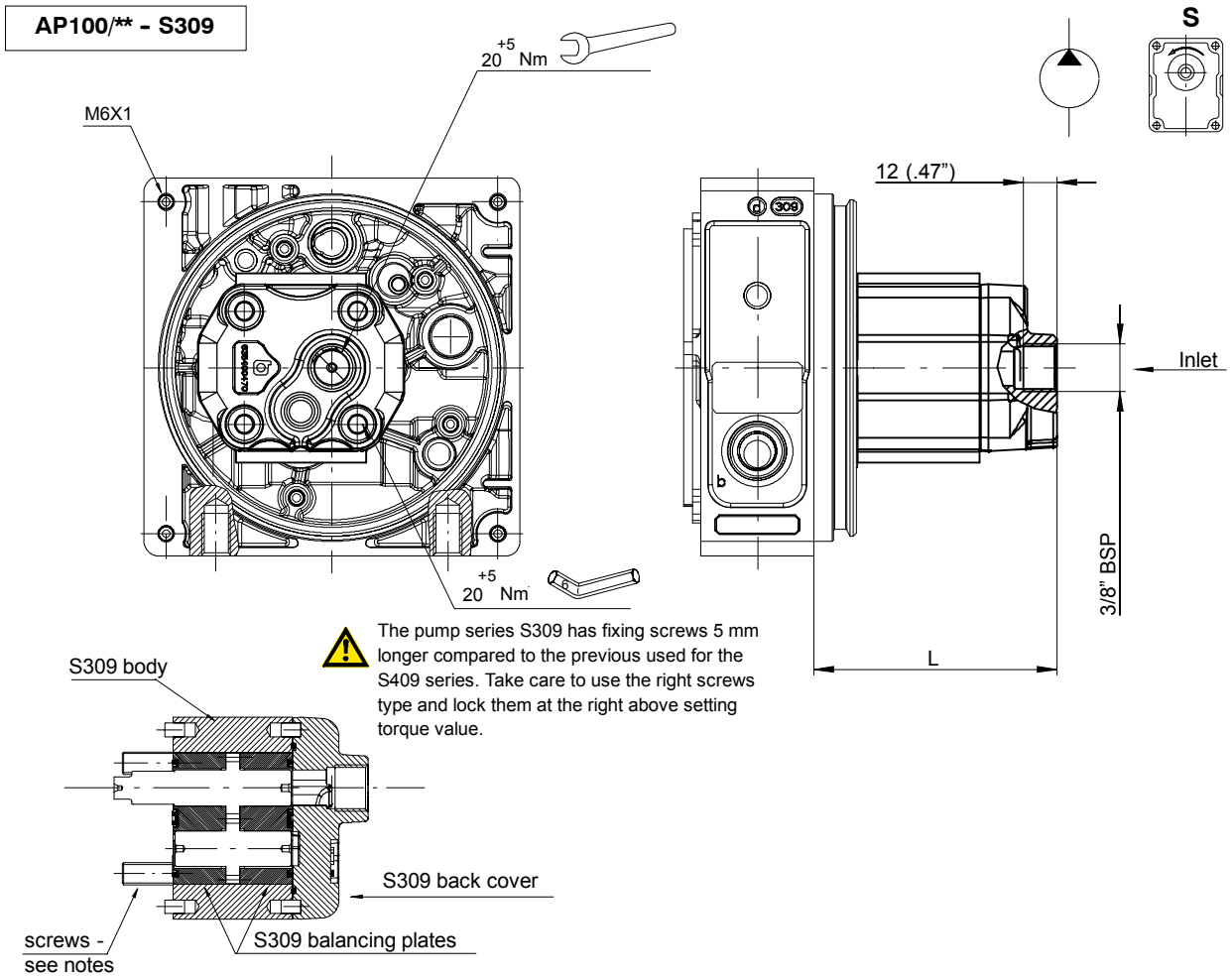
AP100/2.5 Vc= 2.5 cm^3/r n= 1500 r/min p=200 bar η^v= 94% η^m= 87%

$$Q = \frac{2.5 \cdot 1500}{100000} \cdot 94 = 3.52 \text{ l/min.} \qquad \eta_t = 0.94 \cdot 0.87 = 0.82 = 82\%$$

$$N = \frac{3.52 \cdot 200}{6.12 \cdot 82} = 1.4 \text{ kW} \qquad M = 9555 \cdot \frac{1.4}{1500} = 9 \text{ Nm}$$

2.2 Single unidirectional pumps - Counterclockwise rotation

AP100/ - S309**



O-Ring replacement kit: 200.9740.0145.0

Example

	Pump													Hi-Lo		Series			
2	A	P	1	0	0	/	2	.	5							S	3	0	9

Displacement		AP100	Order code	L		Max. pressure						n. min.		n. max	
						P1		P2		P3					
cm³/rev	Cu.In P.R.	Pump type		mm	inch	bar	PSI	bar	PSI	bar	PSI	P<P1	P>P1	P<P1	P>P1
1.2	.073	**AP100/1.2 S309**	200.7482.1027.0	86.1	3.39	210	3000	230	3300	250	3600	800	1000	4500	5000
1.7	.103	**AP100/1.7 S309**	200.7482.2023.0	88.1	3.47	210	3000	230	3300	250	3600	650	800	4500	5000
2.5	.152	**AP100/2.5 S309**	200.7482.3034.0	91.4	3.60	210	3000	230	3300	250	3600	650	800	4500	5000
3.5	.213	**AP100/3.5 S309**	200.7482.4024.0	95.7	3.77	210	3000	230	3300	250	3600	650	800	3500	4000
4.3	.262	**AP100/4.3 S309**	200.7482.5016.0	99.3	3.91	210	3000	230	3300	250	3600	550	700	3500	4000
5.0	.305	**AP100/5 S309**	200.7482.6023.0	102.1	4.02	210	3000	230	3300	250	3600	500	650	3000	3500
6.5	.396	**AP100/6.5 S309**	200.7482.7026.0	107.1	4.22	190	2700	220	3150	240	3400	500	650	2500	3000
7.8	.476	**AP100/8 S309**	200.7482.8013.0	112.7	4.44	180	2600	210	3000	230	3300	500	650	2500	3000
10	.610	**AP100/10 S309**	200.7482.9080.0	121.8	4.79	150	2150	180	2600	200	2900	500	650	2000	2500

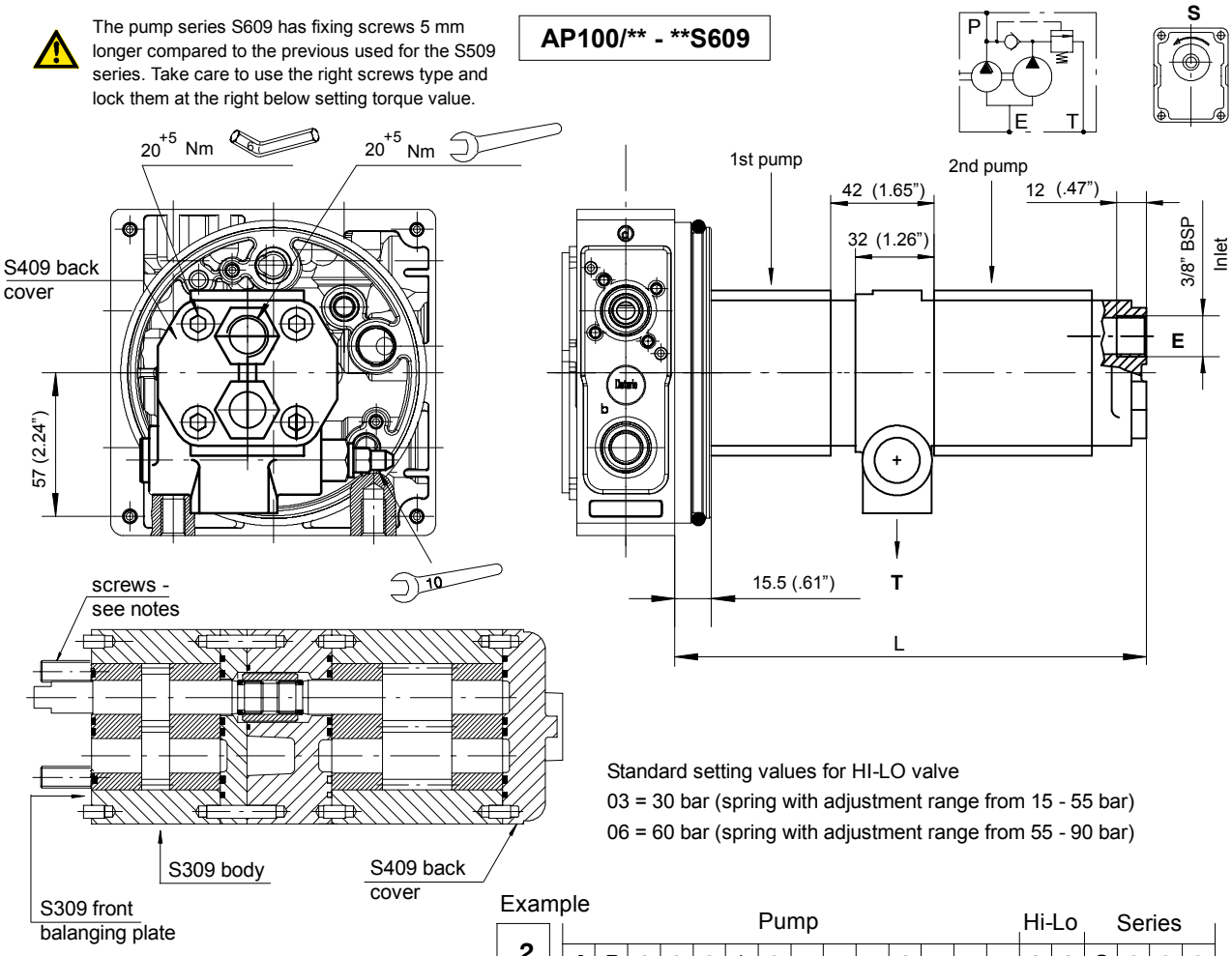
Attention: Use of pumps at temperatures above 80°C must always be agreed upon with our Technical Office, and in any case this can cause a significant worsening in the volumetric efficiency.

For use under conditions different from those indicated in this catalogue, please contact our Sales Department

2.3 Double pumps with HI-LO valve - Counterclockwise rotation

The pump series S609 has fixing screws 5 mm longer compared to the previous used for the S509 series. Take care to use the right screws type and lock them at the right below setting torque value.

AP100/ - **S609**



Standard setting values for HI-LO valve
03 = 30 bar (spring with adjustment range from 15 - 55 bar)
06 = 60 bar (spring with adjustment range from 55 - 90 bar)

Example

2	A	P	1	0	0	/	2	.	5	-	6	.	5		0	6	S	6	0	9
							Pump								Hi-Lo		Series			
							1st pump				2nd pump				Setting Valve					

O-Ring replacement kit: 200.9740.0143.0

1st Pump		2nd Pump		AP100		L Dimension	
cm³/rev	Cu. In. P.R.	cm3/rev	Cu. In. P.R.	1st Pump	2nd Pump	mm	inches
1.2	.073	4.3	.262	**AP100/1.2**	**AP100/4.3**	186.5	7.34
1.2	.073	5.0	.305	**AP100/1.2**	**AP100/5**	189.5	7.46
1.2	.073	6.5	.396	**AP100/1.2**	**AP100/6.5**	194.5	7.66
1.2	.073	7.8	.476	**AP100/1.2**	**AP100/8**	199.5	7.85
1.7	.103	4.3	.262	**AP100/1.7**	**AP100/4.3**	188.5	7.42
1.7	.103	5.0	.305	**AP100/1.7**	**AP100/5**	191.5	7.54
1.7	.103	6.5	.396	**AP100/1.7**	**AP100/6.5**	196.5	7.74
1.7	.103	7.8	.476	**AP100/1.7**	**AP100/8**	201.5	7.93
2.5	.153	4.3	.262	**AP100/2.5**	**AP100/4.3**	191.5	7.54
2.5	.153	5.0	.305	**AP100/2.5**	**AP100/5**	194.5	7.66
2.5	.153	6.5	.396	**AP100/2.5**	**AP100/6.5**	199.5	7.85
2.5	.153	7.8	.476	**AP100/2.5**	**AP100/8**	205.5	8.09
3.5	.215	5.0	.305	**AP100/3.5**	**AP100/5**	198.5	7.81
3.5	.215	6.5	.396	**AP100/3.5**	**AP100/6.5**	203.5	8.01
3.5	.215	7.8	.476	**AP100/3.5**	**AP100/8**	209.5	8.25

N.B.: Please contact our Sales Department if even one of the operating limits indicated in the tables above (temperature, pressure, rpm) is exceeded, as well as in the case of two or more maximum values at the same time, or for applications with particularly heavy-duty cycles.

Note: For availability of pumps without ordering code please contact our Sales Department.

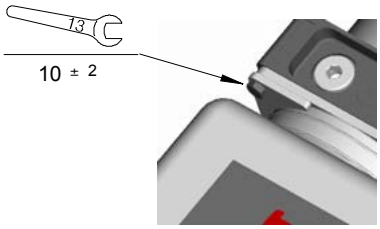
3 Tanks

Tanks supplied by Bucher Hydraulics S.p.A. are classified in two families, according to the material used in manufacture:

3.1 Plastic tanks

3.2 Metal tanks

For both following our fixing system



For the correct number of fixing bracket, bracket spacers and fixing bolts, see “Notes of fitment” of each Tank families

3.1 Plastic tanks

3.1.1 Technical information

Material: Polypropylene (PP)

Color: neutral, translucent allowing visual check on the oil level

Density: 0.9 Kg/dm^3

Conditions of use:

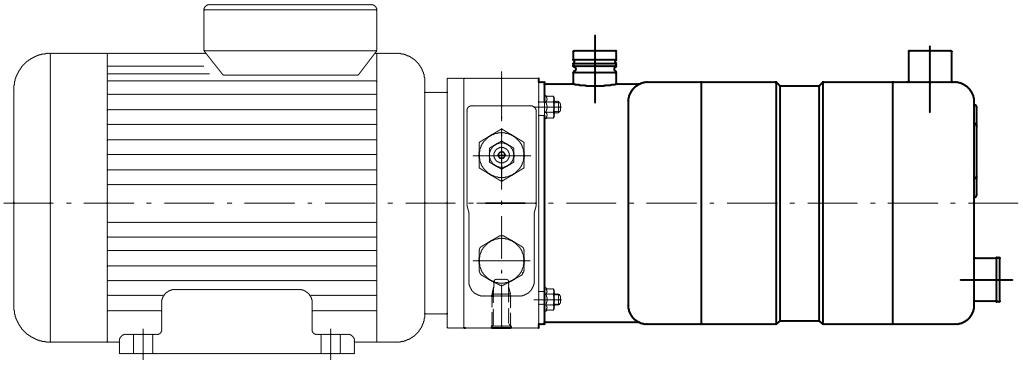
Operating temperature range: -15 / +70°C

Suitable fluids: use only mineral oil based hydraulic fluids responding to ISO - DIN standards.

Hydrocarbon based fluids (e.g. benzene, benzol, etc.) must not be used.

Versions: Tank are available in numerous versions, allowing installation of the power pack in different horizontal and vertical positions.

Attention: Whilst the fixing and sealing systems are designed for operation under the most heavy-duty conditions, the tank must be securely anchored when fitted to mobile equipment, and when subject to shocks and heavy vibrations generally, by means of flexible clips located in the recesses provided. Care must be taken never to stress and deform the tank when tightening the anchorages.



Guideline capacity values:

Two capacity values are defined:

- Filling capacity:

The quantity of oil that the tank is able to hold, allowing for the volume occupied by the pump and the suction assembly kit.

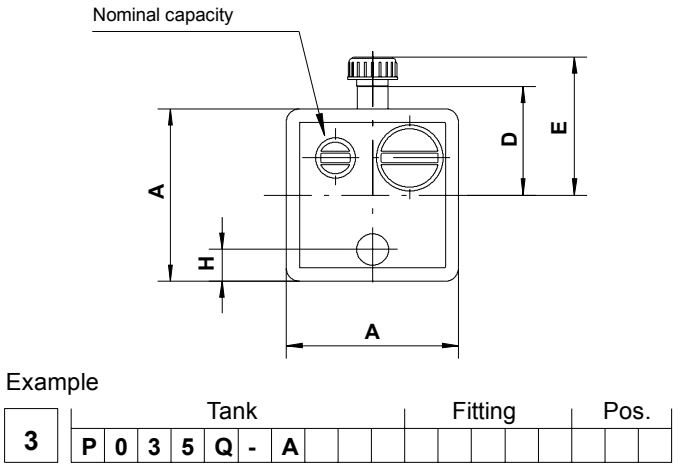
- Suction capacity:

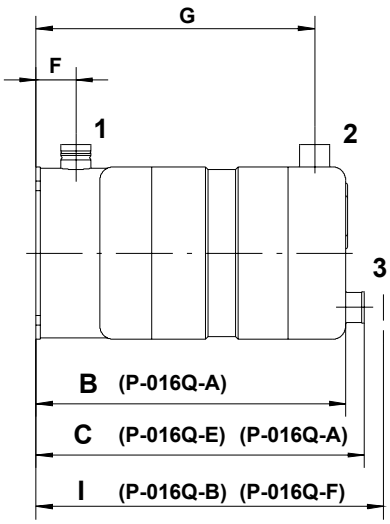
the maximum quantity of the oil the pump is able to draw, hence the quantity of the oil that effectively can be used.

The values given in the table relate to an AP100/1.7 pump with its standard suction assembly kit.

A tolerance of ± 5% is allowed on the values indicated.

3.1.2 Square tanks from 1.5 to 3.5 litres

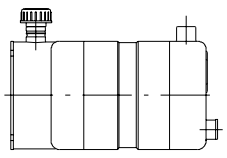




Nom Cap	Type	Code	A		B		C		D		E		F		G		H		I	
			mm	**inch**	mm	**inch**	mm	inch	mm	**inch**	mm	**inch**	mm	**inch**	mm	inch	mm	**inch**	mm	inch
1.5 L	P-015Q-A	200.9734.1002.0	130	5.2	132	5.2	145	5.7	82	3.3	104	4.1	30	1.2	107	4.3	24	1.0		
1.5 L	P-015Q-B	200.9734.1003.0	130	5.2	132	5.2	145	5.7	82	3.3	104	4.1	30	1.2	107	4.3	24	1.0		
1.5 L	P-015Q-E	200.9734.1006.0	130	5.2	132	5.2	145	5.7	82	3.3	104	4.1	30	1.2	107	4.3	24	1.0	150	5.9
1.5 L	P-015Q-F	200.9734.1007.0	130	5.3	132	5.2	145	5.7	82	3.3	104	4.1	30	1.2	107	4.3	24	1.0	150	5.9
1.6 L	P-016Q-A	200.9734.9001.0	130	5.3	150	5.9			82	3.3	104	4.1	30	1.2				1.0		
2.5 L	P-025Q-A	200.9734.2002.0	130	5.3	235	9.3	248	9.8	82	3.3	104	4.1	30	1.2	210	8.3	24	1.0		
2.5 L	P-025Q-B	200.9734.2003.0	130	5.3	235	9.3	248	9.8	82	3.3	104	4.1	30	1.2	210	8.3	24	1.0		
2.5 L	P-025Q-E	200.9734.2006.0	130	5.3	235	9.3	248	9.8	82	3.3	104	4.1	30	1.2	210	8.3	24	1.0	253	10.0
2.5 L	P-025Q-F	200.9734.2007.0	130	5.3	235	9.3	248	9.8	82	3.3	104	4.1	30	1.2	210	8.3	24	1.0	253	10.0
3.5 L	P-035Q-A	200.9734.3002.0	130	5.3	300	11.8	313	12.3	82	3.3	104	4.1	30	1.2	275	10.8	24	1.0		
3.5 L	P-035Q-B	200.9734.3003.0	130	5.3	300	11.8	313	12.3	82	3.3	104	4.1	30	1.2	275	10.8	24	1.0		
3.5 L	P-035Q-E	200.9734.3006.0	130	5.3	300	11.8	313	12.3	82	3.3	104	4.1	30	1.2	275	10.8	24	1.0	318	12.5
3.5 L	P-035Q-F	200.9734.3007.0	130	5.3	300	11.8	313	12.3	82	3.3	104	4.1	30	1.2	275	10.8	24	1.0	318	12.5

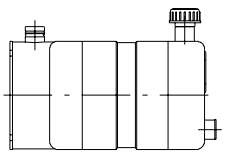
Horizontal mounting

P-0Q-A**



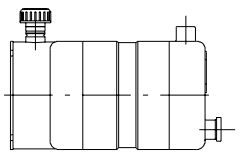
Filler at front (1)

P-0Q-B**



Filler at rear (2)

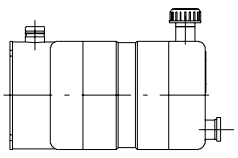
P-0Q-E**



Filler at front (1)

Drain outlet (3)

P-0Q-F**

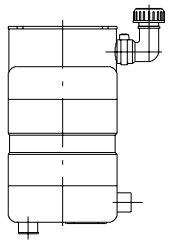


Filler at rear (2)

Drain outlet (3)

Vertical mounting

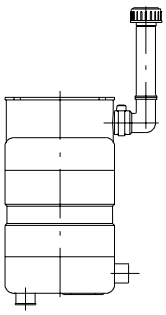
P-0Q-A L30**



Filler at fornt (1)

L= 30 fitting (1)

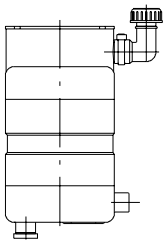
P-0Q-A L115**



Filler at fornt (1)

L= 115 fitting (1)

P-0Q-E L30**

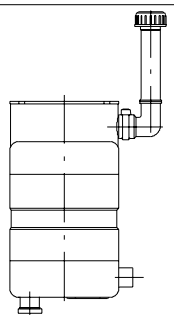


Filler at fornt (1)

L= 30 fitting (1)

Drain outlet (3)

P-0Q-E L115**



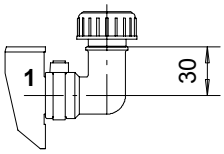
Filler at fornt (1)

L=115 fitting (1)

Drain outlet (3)

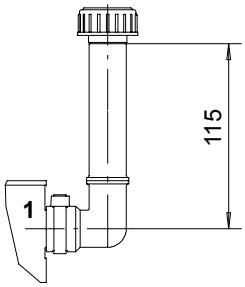
Filler fittings for vertical mounting positions

L= 30 fitting **code 200.9700.0039.0**



Example

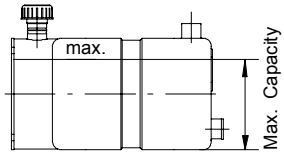
3	Tank									Fitting			Pos.			
	P	0	2	5	Q	-	A				L	3	0			

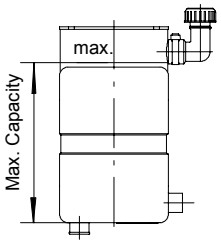


L= 115 fitting **code 200.9700.0038.0**

Filling capacity

AP100/1.7 pump, standard suction assembly kit

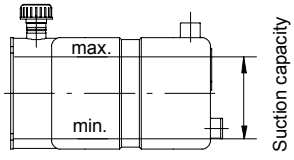


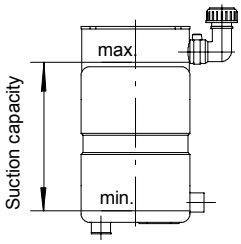


Nominal capacity	Horizontal	Vertical	Type
1.5 l	1.15 l	1.2 l	**P-015Q**
1.6 l	1.4 l	1.45 l	**P-016Q**
2.5 l	2.5 l	2.6 l	**P-025Q**
3.5 l	3.5 l	3.6 l	**P-035Q**

Suction capacity

AP100/1.7 pump, standard suction assembly kit





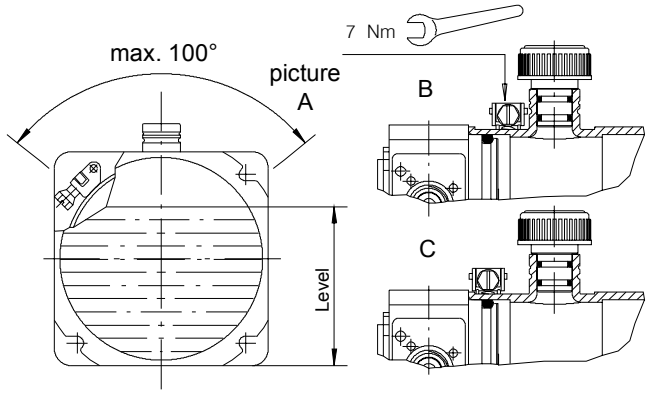
Nominal capacity	Horizontal	Vertical	Type
1.5 l	0.82 l	0.9 l	**P-015Q**
1.6 l	1.15 l	1.15 l	**P-016Q**
2.5 l	2.3 l	2.35 l	**P-025Q**
3.5 l	3.2 l	3.25 l	**P-035Q**

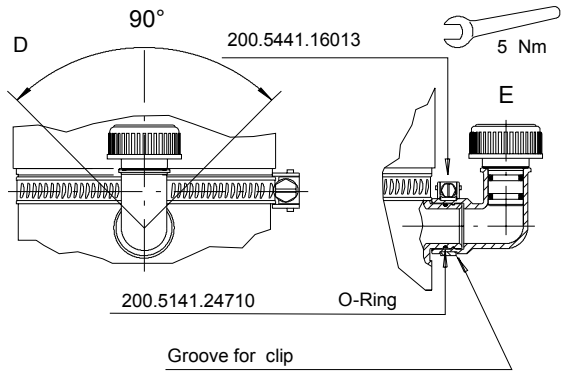
Notes of fitment:

Care needs to be taken over the following aspects of fitting and securing the tank. For horizontal mounting arrangements, the clip fastener must be positioned within the limits indicated in picture A. other positions can result in deformation of the tank, and consequently in the risk of leakage.

The clip should not be positioned against the filler as shown in pack housing,compressing the spigot O-Ring (fig.C).

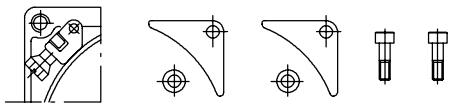
Fig. D shows the range of angular adjustment allowed to the filler. Once positioned, the filler is tightened with a relative clip as shown in picture E, which also indicates the groove provides the sealing action when the filler is in use.





Fixing kit for plastic tank up to 2.5 litres

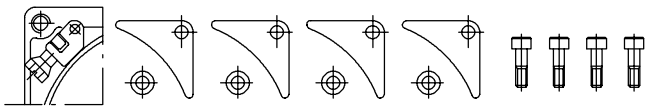
code: 200.7719.0015.0



200.5441.16021	Tank fixing clip
200.6774.0040.0	Tank fixing bracket (q.ty 2)
200.6711.0010.1	Bracket spacer (q.ty 2)
200.5212.03007	M6X18 fixing bolt (q.ty 2)

Fixing kit for plastic tanks of 3.5 litres

code: 200.7719.0016.0



200.5441.16021	Tank fixing clip
200.6774.0040.0	Tank fixing bracket (q.ty 4)
200.6711.0010.1	Bracket spacer (q.ty 4)
200.5212.03007	M6X18 fixing bolt (q.ty 4)

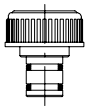
Oil drain plug

code: 200.7780.0012.0

200.6780.0067.0	Plug Ø18
200.5141.37710	O-Ring 3050

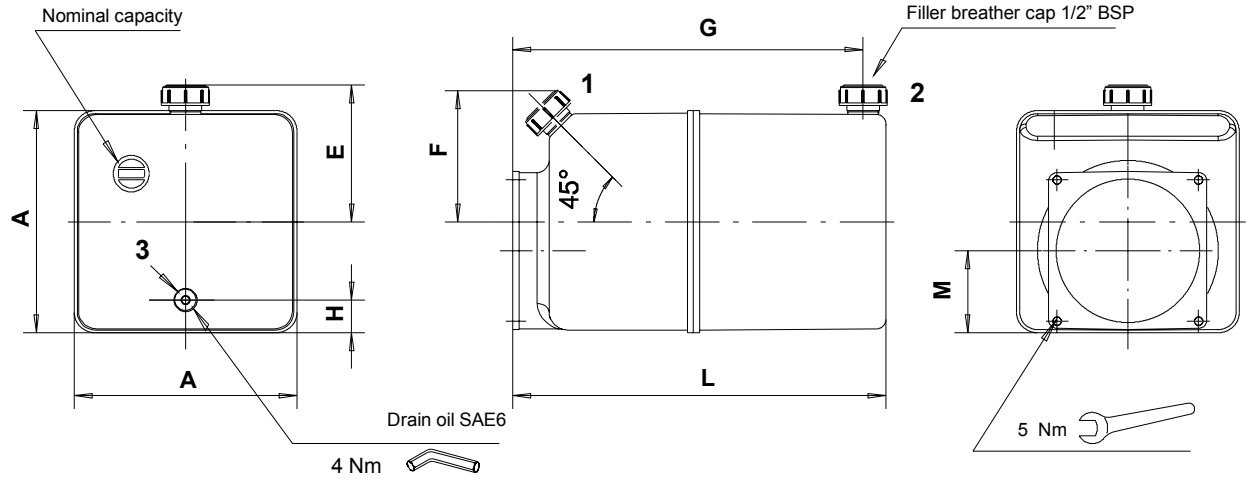
Filler cap

code: 200.5270.99901



Ø18 filler cap with double breather and O-Ring (q.ty 2)

3.1.3 Square tanks from 6 up to 12 litres



Example

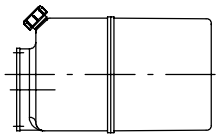
3	Tank									Fitting						Pos.			
	P	0	8	0	Q	-	A	B	T										

Tanks color standard is neutral translucent

Nom. Cap.	Type	Code	A		L		E		F		G		H		M	
			mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
6 l	**P-060Q-A BT**	200.9734.9014.0	180	7.1	310	12.2			110	4.4	291	11.5	25	1.0	66	2.6
8 l	**P-080Q-A BT**	200.9734.5005.0	180	7.1	365	14.4			110	4.4	346	13.7	25	1.0	66	2.6
10 l	**P-100Q-A BT**	200.9734.6005.0	180	7.1	420	16.6			110	4.4	401	15.8	25	1.0	66	2.6
12 l	**P-120Q-A BT**	200.9734.9015.0	180	7.1	490	19.3			110	4.4	471	18.6	25	1.0	66	2.6
6 l	**P-060Q-B BT**	200.9734.9012.0	180	7.1	310	12.2	110	4.4			291	11.5	25	1.0	66	2.6
8 l	**P-080Q-B BT**	200.9734.5004.0	180	7.1	365	14.4	110	4.4			346	13.7	25	1.0	66	2.6
10 l	**P-100Q-B BT**	200.9734.6004.0	180	7.1	420	16.6	110	4.4			401	15.8	25	1.0	66	2.6
12 l	**P-120Q-B BT**	200.9734.9013.0	180	7.1	490	19.3	110	4.4			471	18.6	25	1.0	66	2.6
6 l	**P-060Q-E BT**	200.9734.9010.0	180	7.1	310	12.2			110	4.4	291	11.5	25	1.0	66	2.6
8 l	**P-080Q-E BT**	200.9734.5003.0	180	7.1	365	14.4			110	4.4	346	13.7	25	1.0	66	2.6
10 l	**P-100Q-E BT**	200.9734.6003.0	180	7.1	420	16.6			110	4.4	401	15.8	25	1.0	66	2.6
12 l	**P-120Q-E BT**	200.9734.9011.0	180	7.1	490	19.3			110	4.4	471	18.6	25	1.0	66	2.6
6 l	**P-060Q-F BT**	200.9734.9006.0	180	7.1	310	12.2	110	4.4			291	11.5	25	1.0	66	2.6
8 l	**P-080Q-F BT**	200.9734.5001.0	180	7.1	365	14.4	110	4.4			346	13.7	25	1.0	66	2.6
10 l	**P-100Q-F BT**	200.9734.6001.0	180	7.1	420	16.6	110	4.4			401	15.8	25	1.0	66	2.6
12 l	**P-120Q-F BT**	200.9734.9007.0	180	7.1	490	19.3	110	4.4			471	18.6	25	1.0	66	2.6

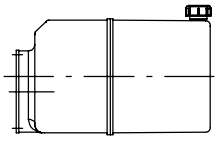
Horizontal/vertical mounting

P-0Q-A BT***



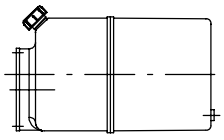
Filler at front (1)

P-0Q-B BT**



Filler at rear (2)

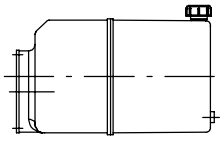
P-0Q-E BT***



Filler at front (1)

Drain outlet (3)

P-0Q-F BT**



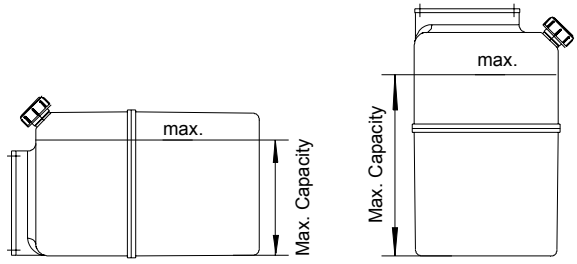
Filler at rear (2)

Drain outlet (3)

* (horizontal and vertical mounting)

Filling capacity

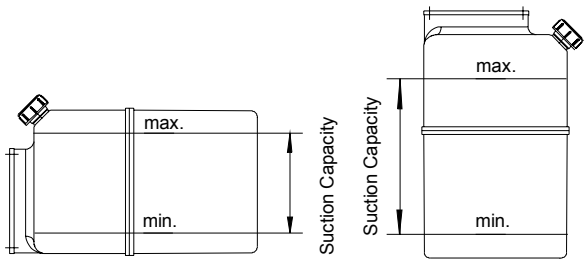
AP100/5 pump, standard suction assembly kit



Nominal capacity	Horizontal	Vertical	Type
6 l	6.5 l	6.5 l	**P-060Q-****
8 l	8.5 l	8.5 l	**P-080Q-****
10 l	10.5 l	10.5 l	**P-100Q-****
12 l	12.5 l	12.5 l	**P-120Q-****

Suction capacity

AP100/5 pump, standard suction assembly kit



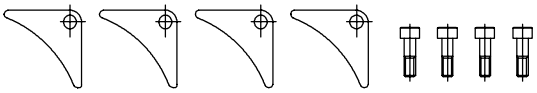
Nominal capacity	Horizontal	Vertical	Type
6 l	5.5 l	5.5 l	**P-060Q-****
8 l	7.5 l	7.5 l	**P-080Q-****
10 l	9.5 l	9.5 l	**P-100Q-****
12 l	11.5 l	11.5 l	**P-120Q-****

Notes of fitment

To assemble the horizontal tanks see the notes at page 39.

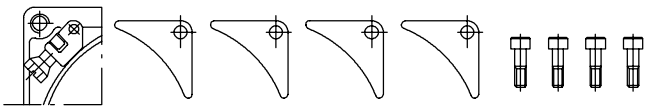
To assemble the vertical tanks do not use the tank fixing clip code 200.5441.16021

Fixing kit for vertical tanks
code: 200.7719.0028.0



200.6774.0040.0	Tank fixing bracket (q.ty 4)
200.5212.03007	M6X18 fixing bolt (q.ty 4)

Fixing kit for horizontal tanks
code: 200.7719.0031.0

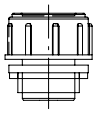


200.5441.16021	Tank fixing clip
200.6774.0040.0	Tank fixing bracket (q.ty 4)
200.5212.03007	M6X18 fixing bolt (q.ty 4)

Oil drain plug
code: 200.5274.81501

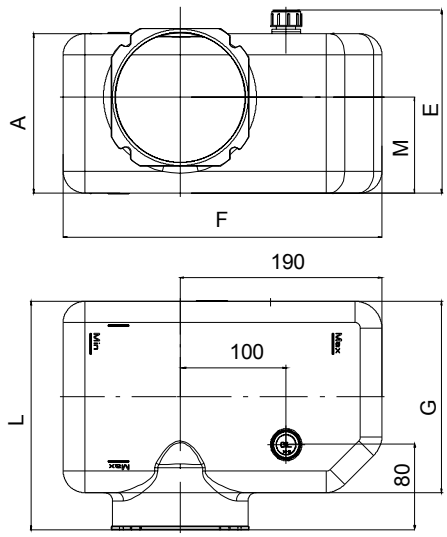
TCEI 9/16UNF SAE6 plug

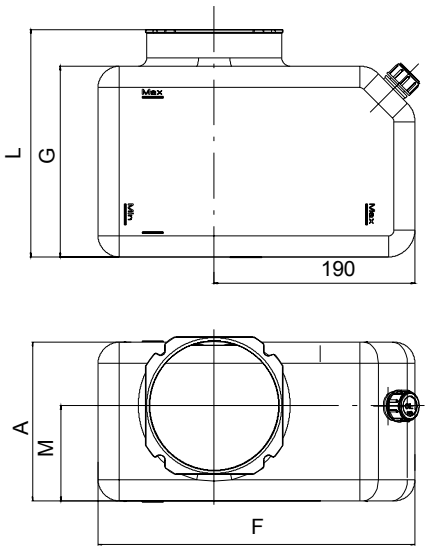
Filler cap **code: 200.5270.60502**



1/2” BSP Plug

3.1.4 Rectangular tanks of 5 litres



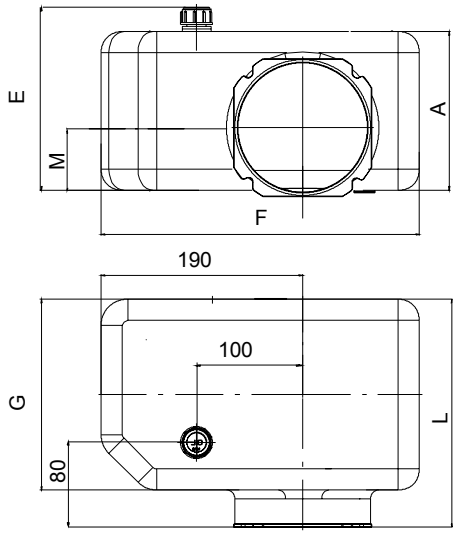


Example

	Tank								Fitting		Pos.	
3	P	0	5	0	S	-	L	B	T			

Example

	Tank								Fitting		Pos.	
3	P	0	5	0	S	-	A	B	T			

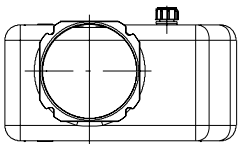


Example

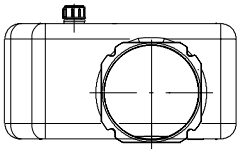
	Tank								Fitting		Pos.	
3	P	0	5	0	S	-	I	B	T			

Horizontal/Vertical mounting

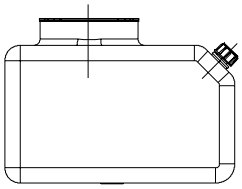
P-050S-L BT



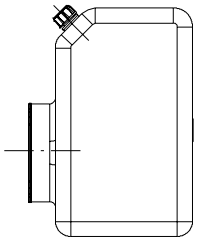
P-050S-I BT



P-050S-A BT



P-050S-A BT

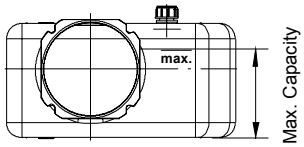


Nom. Cap.	Type	Code	A		L		E		F		G		M	
			mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.
5 l	**P-050S-L BT**	200.9734.4001.0	150	6.03	215	8.64	172.5	6.93	300	12.06	180	7.23	90	3.62
5 l	**P-050S-A BT**	200.9734.4002.0	150	6.03	215	8.64			300	12.06	180	7.23	90	3.62
5 l	**P-050S-I BT**	200.7734.4003.0	150	6.03	215	8.64	172.5	6.93	300	12.06	180	7.23	60	2.41

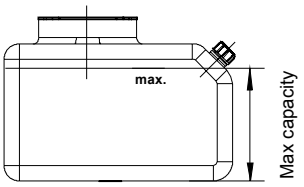
Filling capacity

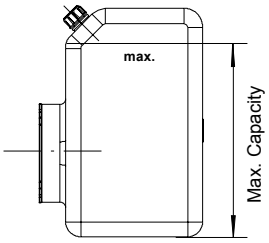
AP100/5 pump, standard suction assembly kit

P-050S-LBT / P-050S-IBT



P-050S-ABT



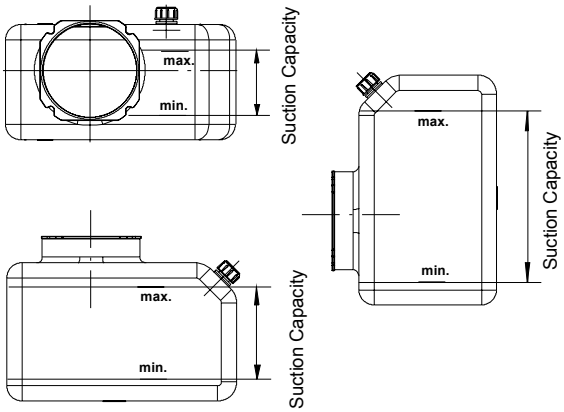


P-050S-ABT

Nominal capacity	Horizontal	Vertical	Type
5 l	6.2 l	6.0 l	**P-050S-ABT**
5 l	6.1 l		**P-050S-LBT**
5 l	6.1 l		**P-050S-IBT**

Suction capacity

AP100/5 pump, standard suction assembly kit

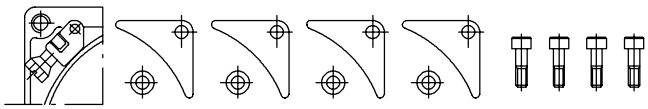


Nominal capacity	Horizontal	Vertical	Type
5 l	5.5 l	5.0 l	**P-050S-ABT**
5 l	5.3 l		**P-050S-LBT**
5 l	5.3 l		**P-050S-IBT**

Notes of fitment

Fixing kit

code: 200.7719.0016.0

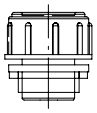


200.5441.16021	Tank fixing clip
200.6774.0040.0	Tank fixing bracket (q.ty 4)
200.6711.0010.1	Bracket spacer (q.ty 4)
200.5212.03007	M6X18 fixing bolt (q.ty 4)

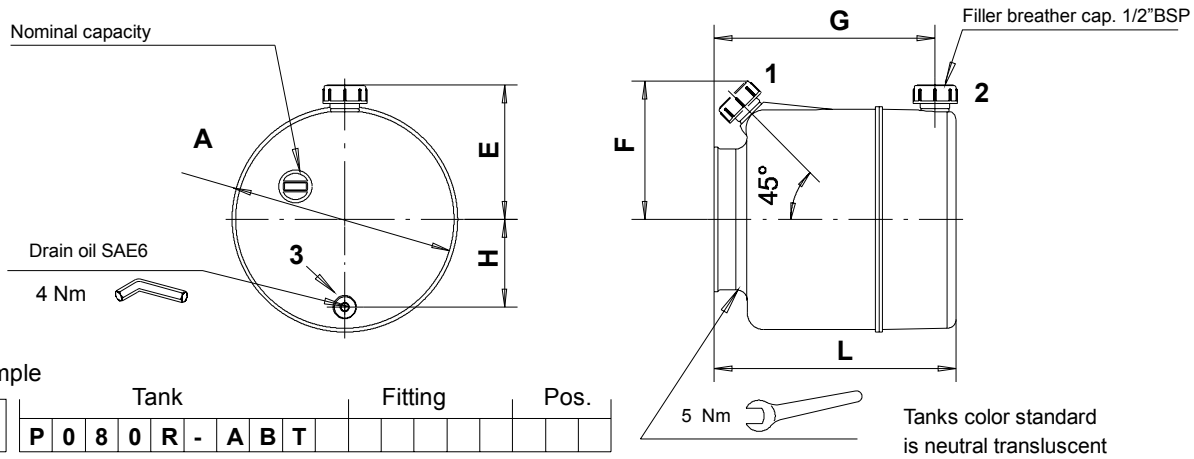
Filler cap

code: 200.5270.60502

1/2” BSP Plug



3.1.5 Round tanks from 6 to 14 litres



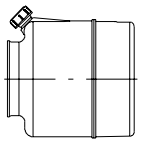
Example

	Tank								Fitting						Pos.		
3	P	0	8	0	R	-	A	B	T								

Nom. Cap.	Type	Code	A		L		E		F		G		H	
			mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.	mm	inch.
6 l	**P-060R-A BT**	200.9734.9023.0	200	7.1	220	8.7			127	5	201	8.0	80	3.2
8 l	**P-080R-A BT**	200.9734.5007.0	200	7.1	285	11.3			127	5	266	10.5	80	3.2
10 l	**P-100R-A BT**	200.9734.6007.0	200	7.1	325	12.8			127	5	306	12.1	80	3.2
12 l	**P-120R-A BT**	200.9734.9024.0	200	7.1	410	16.2			127	5	391	15.4	80	3.2
14 l	**P-140R-A BT**	200.9734.9020.0	200	7.1	490	19.3			127	5	471	18.6	80	3.2
6 l	**P-060R-B BT**	200.9734.9021.0	200	7.1	220	8.7	123	4.9			201	8.0	80	3.2
8 l	**P-080R-B BT**	200.9734.5006.0	200	7.1	285	11.3	123	4.9			266	10.5	80	3.2
10 l	**P-100R-B BT**	200.9734.6006.0	200	7.1	325	12.8	123	4.9			306	12.1	80	3.2
12 l	**P-120R-B BT**	200.9734.9022.0	200	7.1	410	16.2	123	4.9			391	15.4	80	3.2
14 l	**P-140R-B BT**	200.9734.9019.0	200	7.1	490	19.3	123	4.9			471	18.6	80	3.2
6 l	**P-060R-E BT**	200.9734.9029.0	200	7.1	220	8.7			127	5	201	8.0	80	3.2
8 l	**P-080R-E BT**	200.9734.5010.0	200	7.1	285	11.3			127	5	266	10.5	80	3.2
10 l	**P-100R-E BT**	200.9734.6010.0	200	7.1	325	12.8			127	5	306	12.1	80	3.2
12 l	**P-120R-E BT**	200.9734.9030.0	200	7.1	410	16.2			127	5	391	15.4	80	3.2
14 l	**P-140R-E BT**	200.9734.9018.0	200	7.1	490	19.3			127	5	471	18.6	80	3.2
6 l	**P-060R-F BT**	200.9734.9025.0	200	7.1	220	8.7	123	4.9			201	8.0	80	3.2
8 l	**P-080R-F BT**	200.9734.5008.0	200	7.1	285	11.3	123	4.9			266	10.5	80	3.2
10 l	**P-100R-F BT**	200.9734.6008.0	200	7.1	325	12.8	123	4.9			306	12.1	80	3.2
12 l	**P-120R-F BT**	200.9734.9026.0	200	7.1	410	16.2	123	4.9			391	15.4	80	3.2
14 l	**P-140R-F BT**	200.9734.9016.0	200	7.1	490	19.3	123	4.9			471	18.6	80	3.2

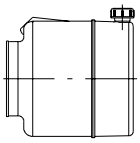
Horizontal/vertical mounting

P-0R-A BT** *



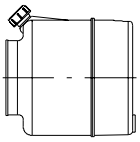
Filler at front (1)

P-0R-B BT**



Filler at rear (2)

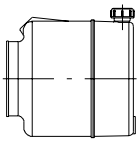
P-0R-E BT** *



Filler at front (1)

Drain outlet (3)

P-0R-F BT**



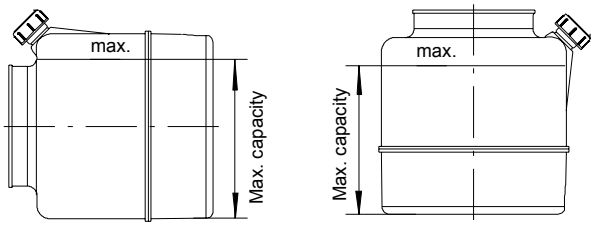
Filler at rear (2)

Drain outlet (3)

* (horizontal and verical mounting)

Filling capacity

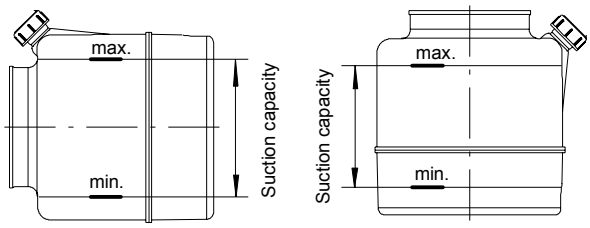
AP100/5 pump, standard suction assembly kit



Nominal capacity	Horizontal	Vertical	Type
6 l	4.8 l	4.5 l	**P-060R-****
8 l	6.8 l	6.5 l	**P-080R-****
10 l	7.5 l	8.0 l	**P-100R-****
12 l	8.5 l	8.5 l	**P-120R-****
14 l	12 l	12.5 l	**P-140R-****

Suction capacity

AP100/5 pump, standard suction assembly kit



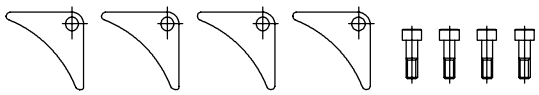
Nominal capacity	Horizontal	Vertical	Type
6 l	4.5 l	3.5 l	**P-060R-****
8 l	6.5 l	5.0 l	**P-080R-****
10 l	7.0 l	7.0 l	**P-100R-****
12 l	8.0 l	7.5 l	**P-120R-****
14 l	11.5 l	11.5 l	**P-140R-****

Notes of fitment

To assemble the horizontal tanks see the notes at page 39.

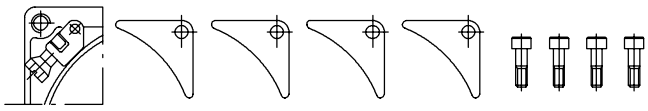
To assemble the vertical tanks do not use the tank fixing clip code 200.5441.16021

Fixing kit for vertical tanks
code: 200.7719.0028.0



200.6774.0040.0	Tank fixing bracket (q.ty 4)
200.5212.03007	M6X18 fixing bolt (q.ty 4)

Fixing kit for horizontal tanks
code : 200.7719.0031.0

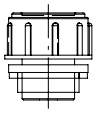


200.5441.16021	Tank fixing clip
200.6774.0040.0	Tank fixing bracket (q.ty 4)
200.5212.03007	M6X18 fixing bolt (q.ty 4)

Oil drain plug
code: 200.5274.81501

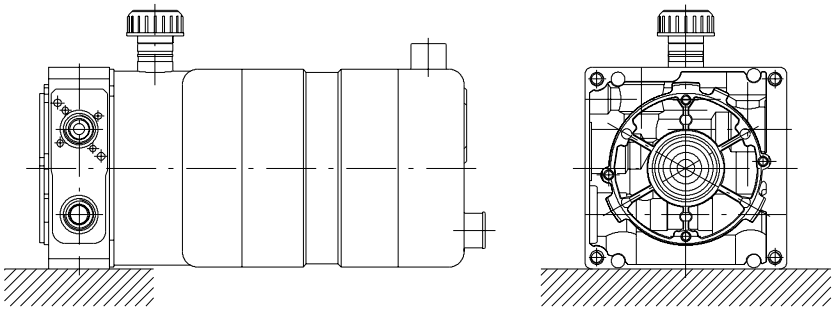
TCEI 9/16UNF SAE6 plug

Filler cap code: **200.5270.60502**



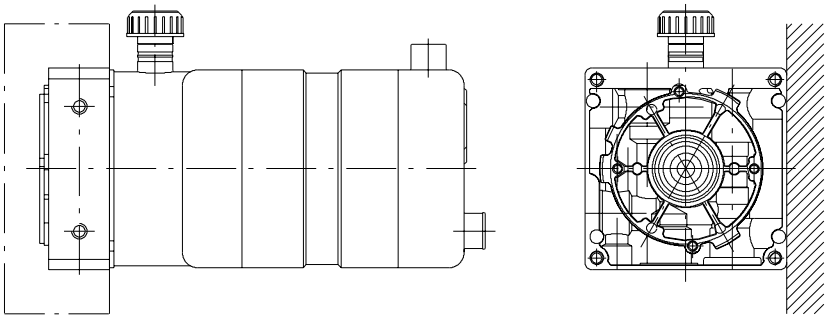
1/2” BSP plug

3.1.6 Plastic tanks horizontal assembling positions



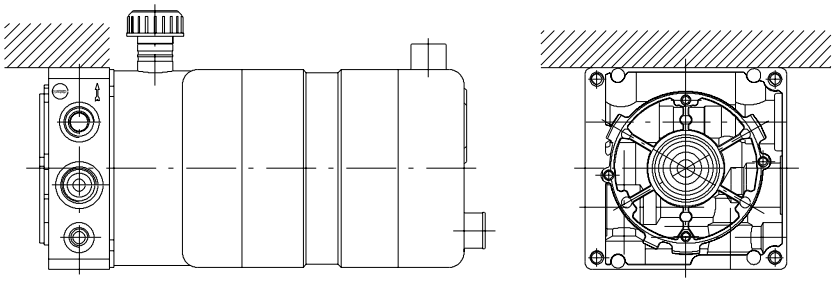
Assembling position

P01



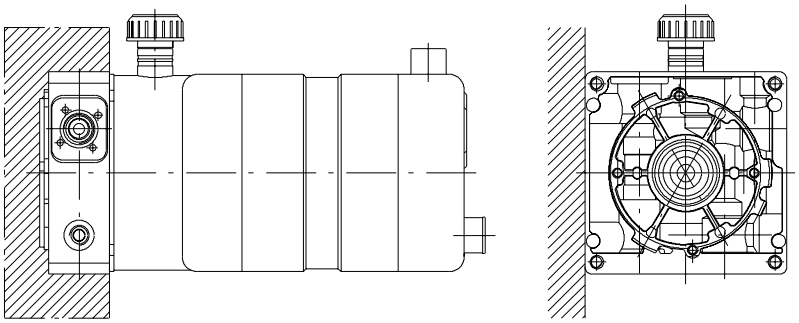
Assembling position

P03



Assembling position

P02



Assembling position

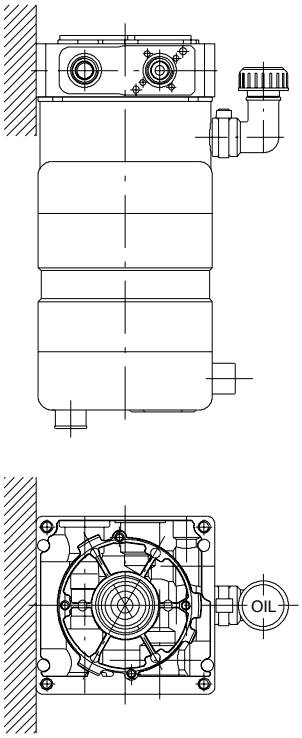
P04

Example

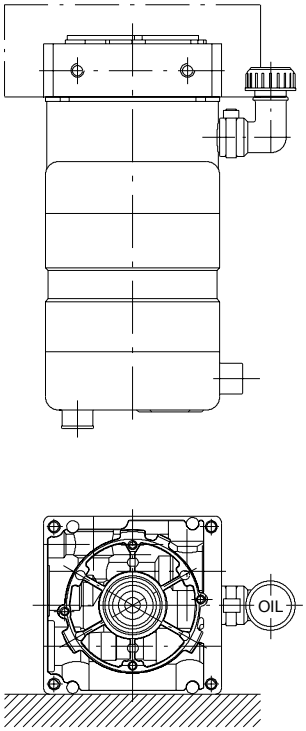
3	Tank										Fitting					Pos.		
	P	0	2	5	Q	-	A									P	0	1

3.1.7 Plastic tanks vertical assembling positions

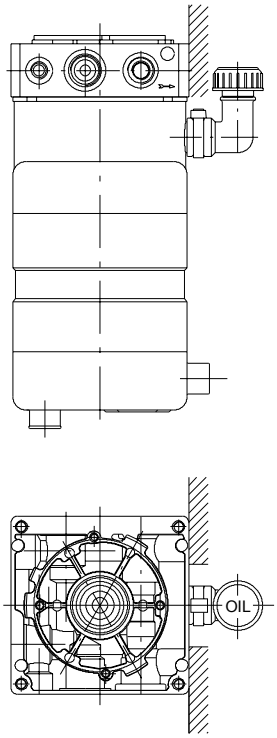
Assembling position **P15**



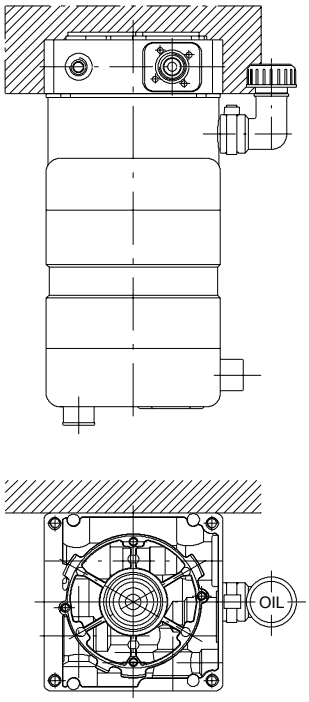
Assembling position **P35**



Assembling position **P25**



Assembling position **P45**



Example

	Tank									Fitting					Pos.		
3	P	0	3	5	Q	-	A				L	3	0			P	1	5

The power pack housing shown in the examples is UP100/K1

3.2 Metal tanks up to 18 litres

3.2.1 Technical information

Materials: Sheet metal.

Color: Black paint finish (Standard)

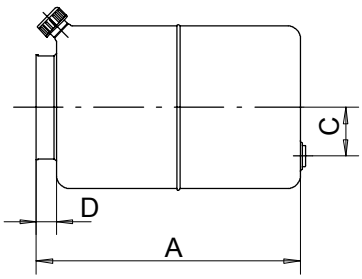
Condition of use: Suitable fluids: mineral oil based hydraulic fluids responding to ISO -DIN standards.

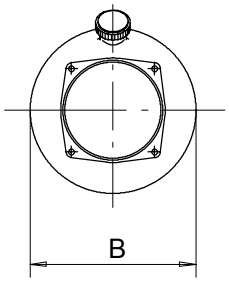
Operating temperature range: -15 / +80°C

Hydrocarbon based fluids (e.g. benzene, benzol, etc.) must not be used.

Versions: tanks are available in numerous versions, allowing installation of the power pack in different horizontal and vertical positions.

3.2.2 Tanks L050R-01, L080R-01



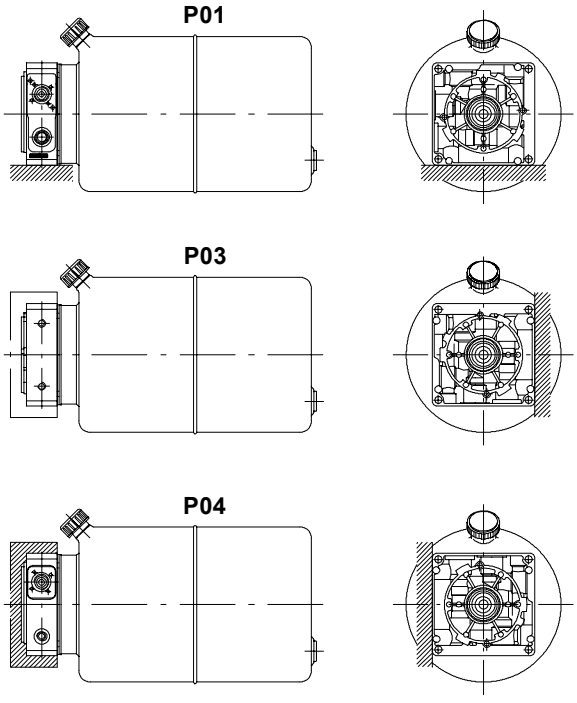


Example

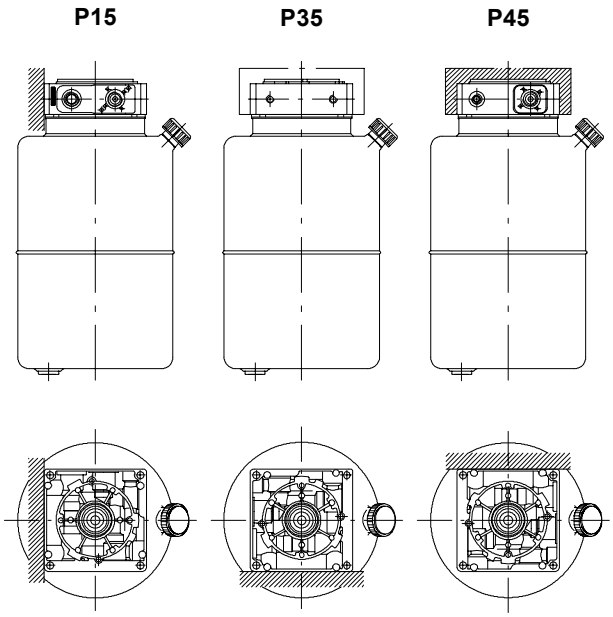
	Tank									Fitting						Pos.		
3	L	0	8	0	R	-	0	1								P	1	5

Nom. Cap.	Type	Code	A		B		C		D		Oil filler cap	Oil drain plug
			mm	inch.	mm	inch.	mm	inch.	mm	inch.		
5 l	**L050R-01**	200.9724.4032.0	270	10.7	170	6.7	50	2	25	1.0	3/8"BSP	1/2"BSP
8 l	**L080R-01**	200.9724.5006.0	285	11.3	200	7.9	60	2.4	25	1.0	3/8"BSP	1/2"BSP

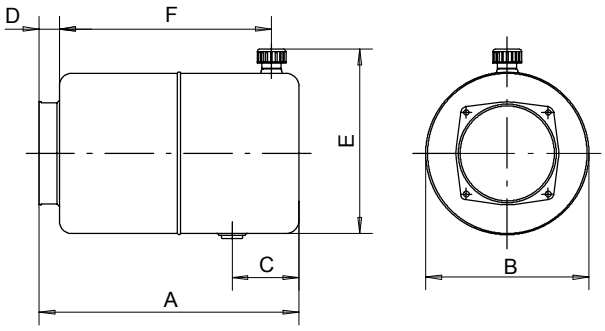
Horizontal assembling positions



Vertical assembling positions



3.2.3 Tanks L050R-02, L080R-02

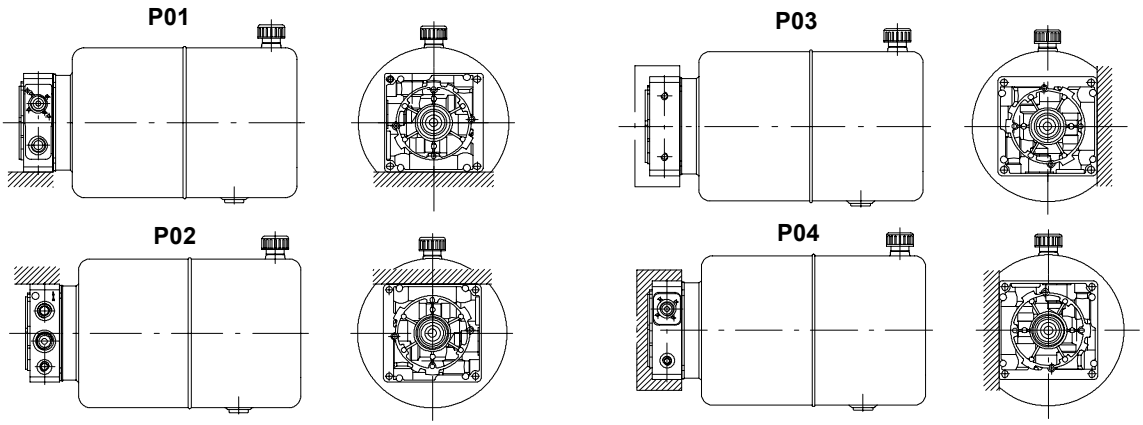


Example

	Tank								Fitting						Pos.		
3	L	0	8	0	R	-	0	2							P	0	1

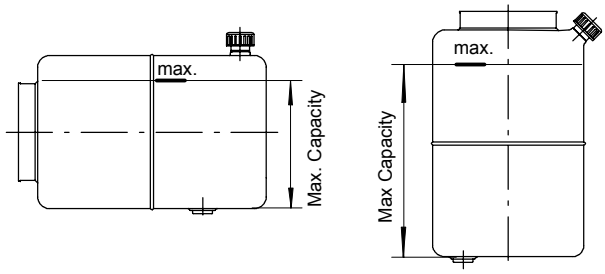
Nom. Cap.	Type	Code	A		B		C		D		E		F		Oil filler cup	Oil drain plug
			mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch		
5 l	**L050R-02**	200.9724.4001.0	270	10.7	170	6.7	50	2	25	1.0	195	7.7	212.5	8.4	3/8"BSP	1/2"BSP
8 l	**L080R-02**	200.9724.5001.0	285	11.3	200	7.9	60	2.4	25	1.0	228	9.0	225	8.9	3/8"BSP	1/2"BSP

Horizontal assembling positions



Filling capacity

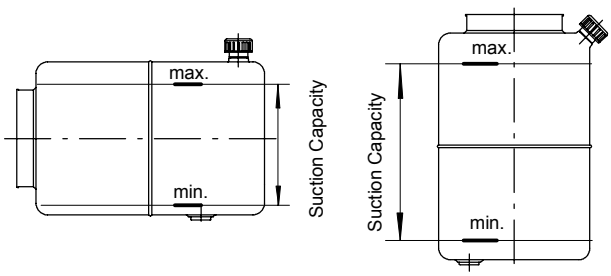
AP100/5 pump, standard suction assembly kit



Nominal capacity	Horizontal	Vertical	Type
5 l	4.9 l	4.7 l	**L050R-01**
5 l	4.9 l		**L050R-02**
8 l	7.5 l	7.0 l	**L080R-01**
8 l	7.5 l		**L080R-02**

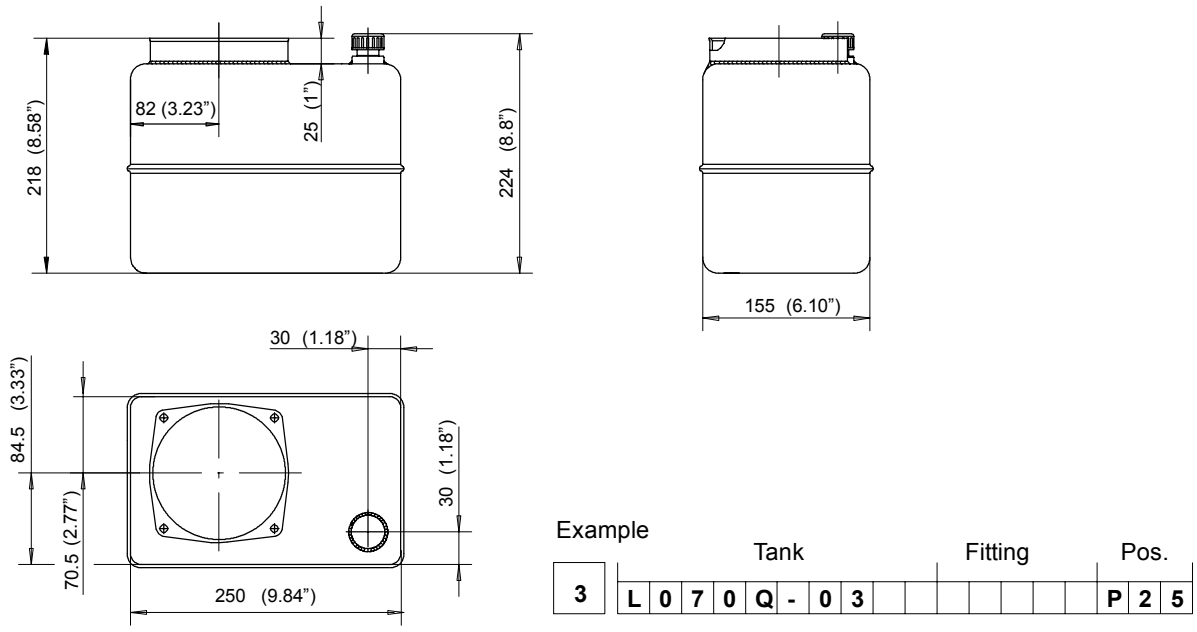
Suction capacity

AP100/5 pump, standard suction assembly kit



Nominal capacity	Horizontal	Vertical	Type
5 l	4.4 l	4.4 l	**L050R-01**
5 l	4.5 l		**L050R-02**
8 l	7.0 l	6.0 l	**L080R-01**
8 l	7.0 l		**L080R-02**

3.2.4 Tank L070Q-03

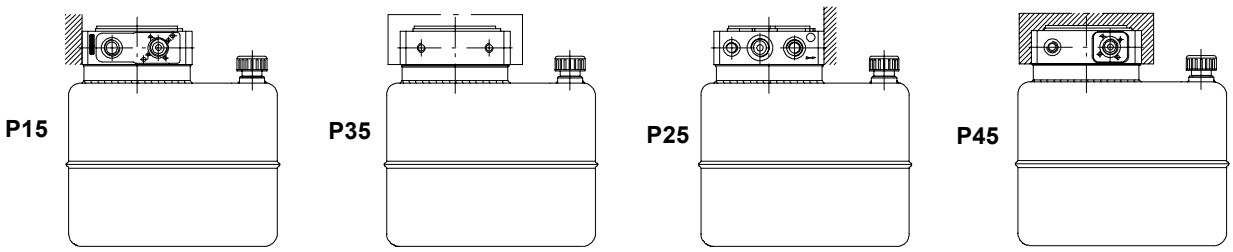


Example

	Tank								Fitting						Pos.		
3	L	0	7	0	Q	-	0	3							P	2	5

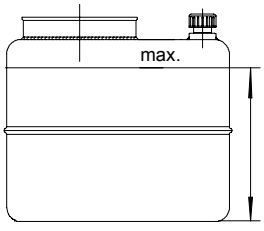
Nominal capacity	Type	Code	Oil filler cap	Oil drain plug
7 l	**L070Q-03**	200.9724.9065.0	1/2"BSP	

Vertical assembling positions



Filling capacity

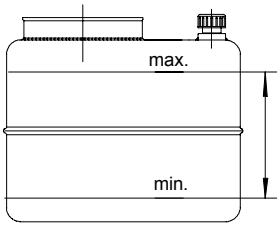
AP100/5 pump, standard suction assembly kit



Max. Capacity
6.5 litres

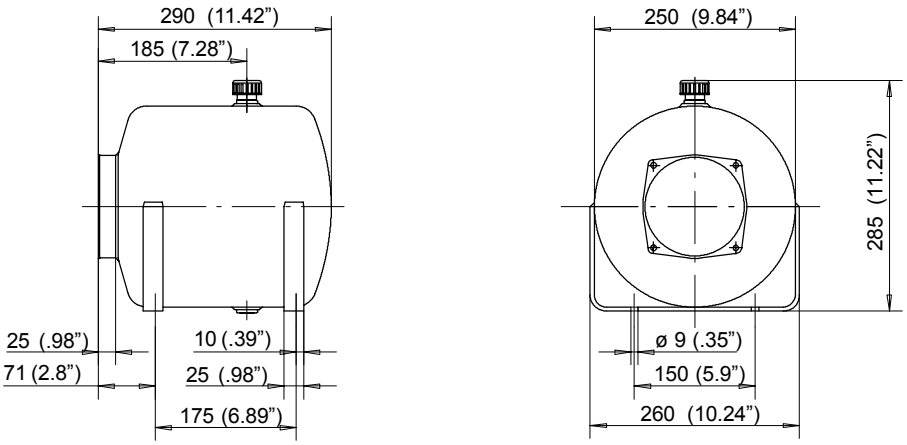
Suction capacity

AP100/5 pump, standard suction assembly kit



Suction Capacity
5.6 litres

3.2.5 Tank L100R-01

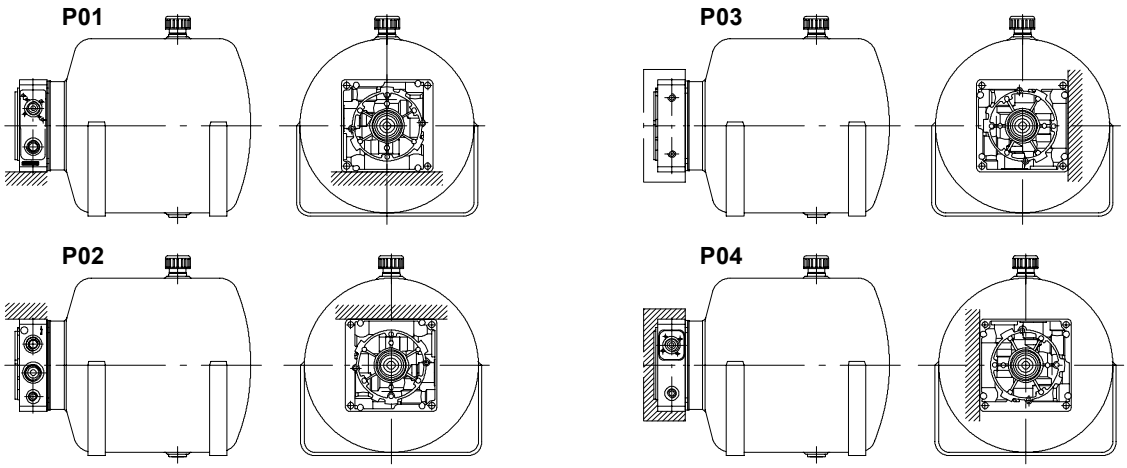


Example

	Tank								Fitting						Pos.		
3	L	1	0	0	R	-	0	1							P	0	1

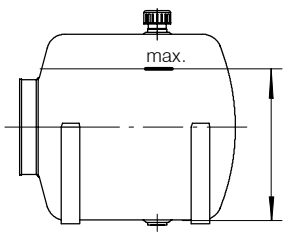
Nominal Capacity	Type	Code	Oil filler cap	Oil drain plug
10 litres	**L100R-01**	200.9724.6002.0	1" BSP	3/4" BSP

Horizontal assembling positions



Filling capacity

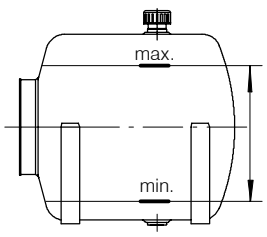
AP100/5 pump, standard suction assembly kit



Max. Capacity **11 litres**

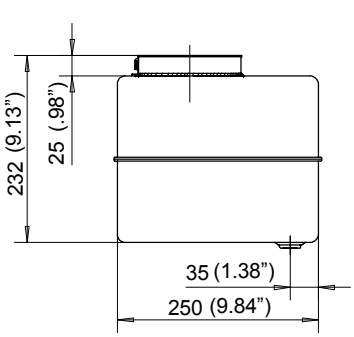
Suction capacity

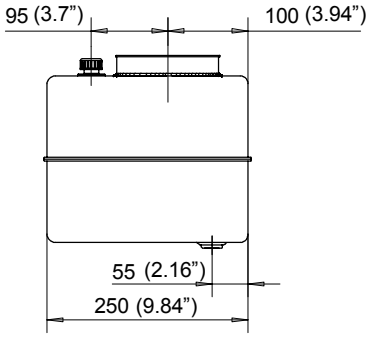
AP100/5 pump, standard suction assembly kit

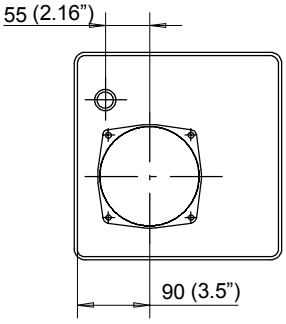


Suction capacity **10.5 litres**

3.2.6 Tank L120Q-01







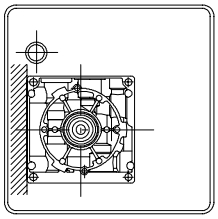
Example

	Tank											Fitting							Pos.		
3	L	1	2	0	Q	-	0	1											P	1	5

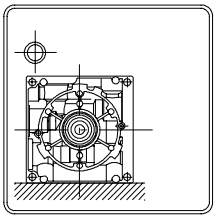
Nominal capacity	Type	Code	Oil filler cap	Oil drain plug
12 litres	**L120Q-01**	200.9724.9015.0	3/8" BSP	3/8" BSP

Vertical assembling position

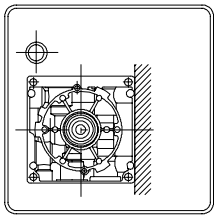
P15



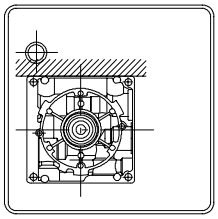
P35



P25

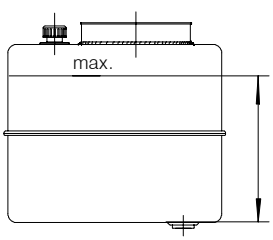


P45



Filling capacity

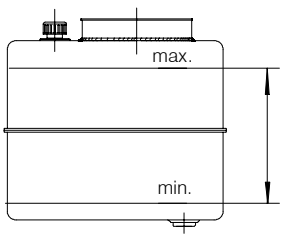
AP100/5 pump, standard suction assembly kit



Max. Capacity
11.5 litres

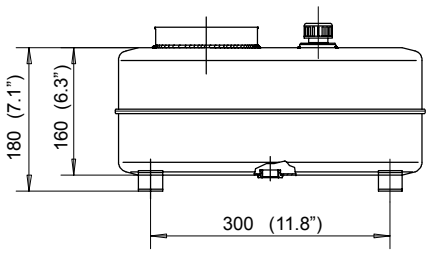
Suction capacity

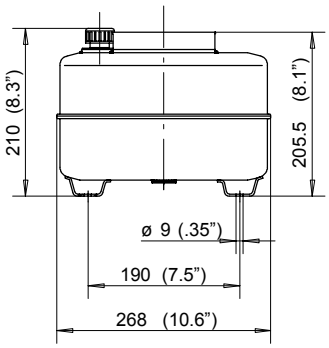
AP100/5 pump, standard suction assembly kit

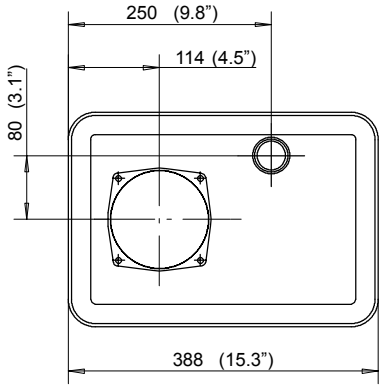


Suction capacity
10 litres

3.2.7 Tank L150Q-01





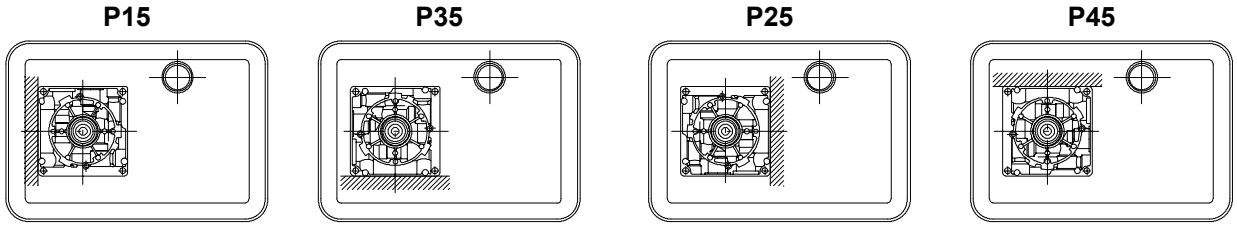


Example

	Tank								Fitting						Pos.		
3	L	1	5	0	Q	-	0	1							P	1	5

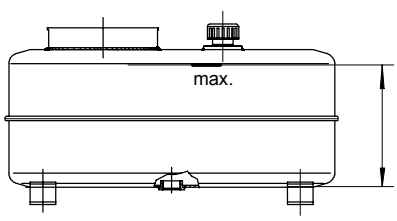
Nominal Capacity	Type	Code	Oil filler cap	Oil drain plug
15 litres	**L150Q-01**	200.9724.7001.0	1" BSP	1/2" BSP

Vertical assembling position



Filling capacity

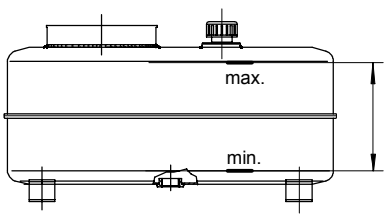
AP100/5 pump, standard suction assembly kit



Max. Capacity
14.5 litres

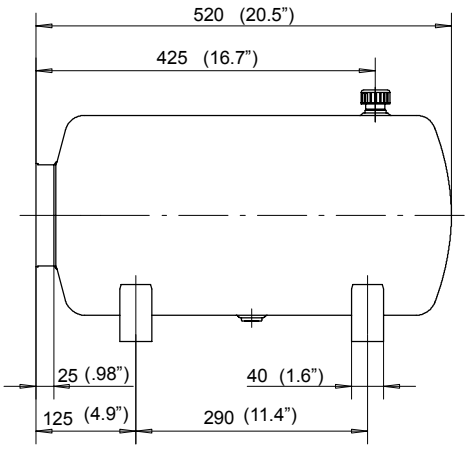
Suction capacity

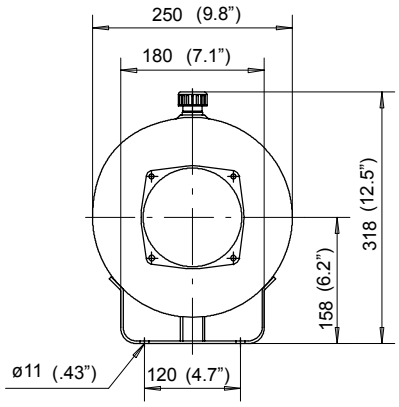
AP100/5 pump, standard suction assembly kit



Suction Capacity
12 litres

3.2.8 Tank L180R-01



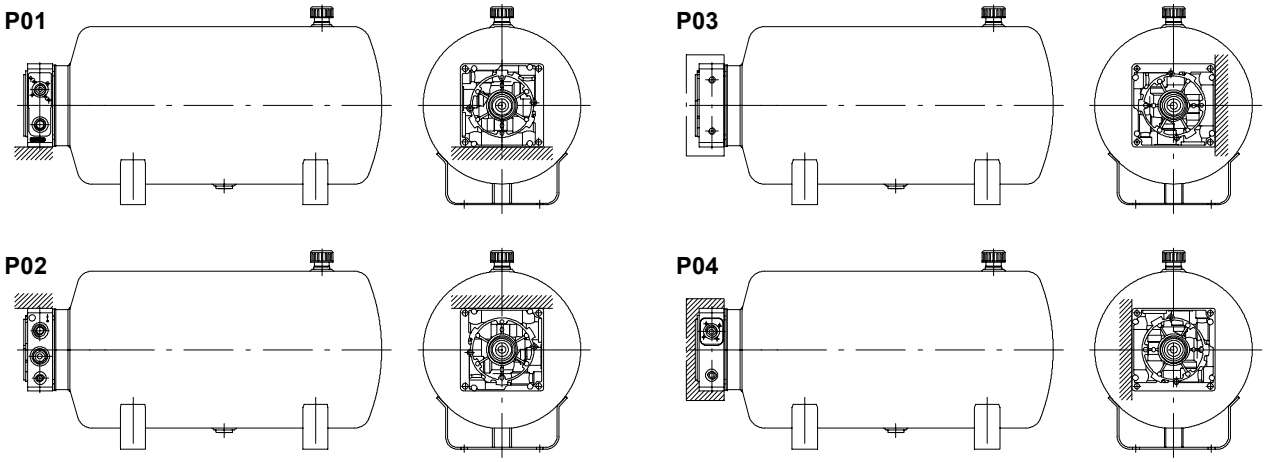


Example

	Tank							Fitting					Pos.		
3	L	1	8	0	R	-	0	1						P	0	1

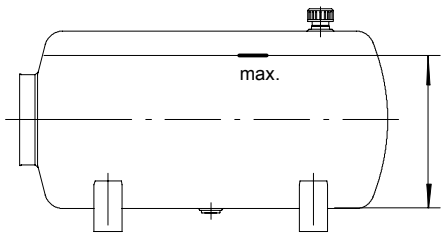
Nominal capacity	Type	Code	Oil filler cap	Oil drain plug
18 litres	**L180R-01**	200.9724.8002.0	1" BSP	3/4" BSP

Horizontal assembling positions



Filling capacity

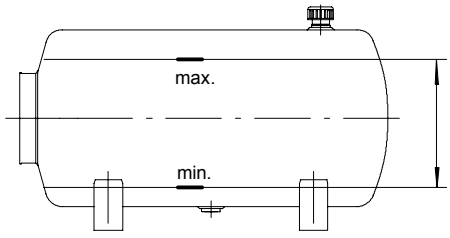
AP100/5 pump, standard suction assembly kit



Max. Capacity
21.5 litres

Suction capacity

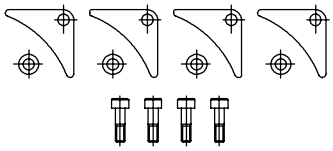
AP100/5 pump, standard suction assembly kit



Suction
Capacity
20.5 litres

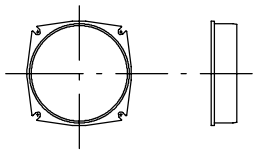
3.2.9 Metal tanks fitting notes

Fixing kit for metal tanks of 3,5 liters and over
code: 200.7719.0018.0



200.6774.0040.0	Fixing bracket (q.ty 4)
200.6711.0010.1	bracket spacer (q.ty 4)
200.5212.03007	M6X18 fixing bolt (q.ty 4)

Tank collar
code: 200.6094.0005.1



Spigot diameter 123

Height of collar 25 mm.

Material: pressed steel

Provides interface between power pack housing and special tank

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Oil filler cap

Plastic material

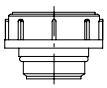
Complete with breather

Thread:	Code:
3/8” BSP	200.6780.0035.0
1/2” BSP	200.5270.60502
1” BSP	200.5270.60901

3/8” BSP

1/2” BSP

1” BSP



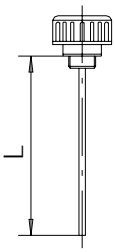
Oil filler cap

Plastic material

Complete with breather

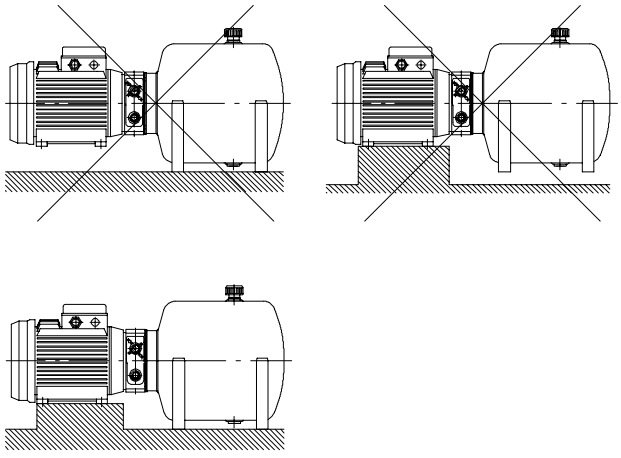
Complete with dipstick

Thread:	Code:
3/8” BSP (L=25)	200.6780.0070.0
3/8” BSP (L=81)	200.6780.0037.0
3/8” BSP (L=103)	200.6780.0038.0
3/8” BSP (L=165)	200.6780.0034.0
1/2” BSP (L=140)	200.6780.0005.0
1” BSP (L=165)	200.6780.0050.0



Horizontal assembling for power pack with plastic/metal tank

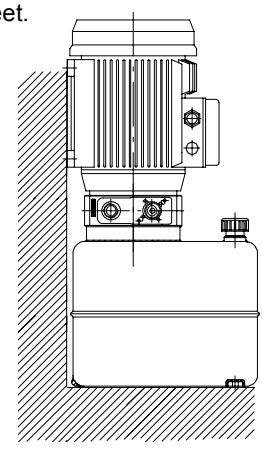
Important: Overhanging assembling configurations for motor or tank are not admitted



Vertical assembling for power pack with plastic/metal tanks

Important: For hydraulic units assembling A.C. electric motors equal or higher than 1.5 HP- 1.1KW, it’s recommended to order the B34 frame size version.

Consequently it is recommended to fix the hydraulic unit by the A.C. electric motor feet or where possible both electric motor and tank feet.



4 Suction/Return assembly kits

This section is intended to assist those customers who choose to purchase single sub-assemblies separately and put together their own power packs.
Table below shows the ordering code for suction and discharging kit.

The right choice is a function of tank capacity, assembly position and pump.
This information is not requested when building a complete power pack ordering code.

4.1 Suction assembly kits for plastic tanks

4.1.1 Suction assembly kits for square tanks from 1,5 to 3,5 litres

Pump S309	Horizontal positions - P01, P02, P03, P04			
	P-015Q-*	P-016Q-*	P-025Q-*	P-035Q-*
AP100/1.2	200.6850.0137.0	200.7599.0212.0	200.7599.0212.0	200.7599.0212.0
AP100/1.7	200.6850.0137.0	200.7599.0212.0	200.7599.0212.0	200.7599.0212.0
AP100/2.5	200.6850.0137.0	200.7599.0212.0	200.7599.0212.0	200.7599.0212.0
AP100/3.5		200.7599.0212.0	200.7599.0212.0	200.7599.0212.0
AP100/4.3		200.7599.0212.0	200.7599.0212.0	200.7599.0212.0
AP100/5			200.7599.0212.0	200.7599.0212.0
AP100/6.5			200.7599.0212.0	200.7599.0212.0
AP100/8			200.7599.0212.0	200.7599.0212.0
AP100/10			200.7599.0212.0	200.7599.0212.0

Pump S309	Vertical positions - P15, P35, P25, P45			
	P-015Q-*	P-016Q-*	P-025Q-*	P-035Q-*
AP100/1.2	200.7599.0194.0	200.7599.0176.0	200.7599.0199.0	200.7599.0202.0
AP100/1.7	200.7599.0194.0	200.7599.0176.0	200.7599.0199.0	200.7599.0202.0
AP100/2.5	200.7599.0193.0	200.7599.0176.0	200.7599.0199.0	200.7599.0202.0
AP100/3.5		200.7599.0194.0	200.7599.0198.0	200.7599.0202.0
AP100/4.3		200.7599.0194.0	200.7599.0198.0	200.7599.0178.0
AP100/5		200.7599.0194.0	200.7599.0198.0	200.7599.0178.0
AP100/6.5			200.7599.0188.0	200.7599.0178.0
AP100/8			200.7599.0188.0	200.7599.0178.0
AP100/10			200.7599.0177.0	200.7599.0186.0

Pump S609			Horizontal positions P01, P02, P03, P04		Vertical positions P15, P35, P25, P45	
			P-025Q-*	P-035Q-*	P-025Q-*	P-035Q-*
AP100/1.2 - AP100/4.3	P01	P03	200.7599.0087.0	200.7599.0088.0	200.7599.0074.0	200.7599.0078.0
	P02	P04	200.6570.0005.0	200.7599.0086.0		
AP100/1.2 - AP100/5	P01	P03	200.7599.0087.0	200.7599.0088.0	200.7599.0074.0	200.7599.0078.0
	P02	P04		200.7599.0086.0		
AP100/1.2 - AP100/6.6	P01	P03		200.7599.0088.0	200.7599.0074.0	200.7599.0078.0
	P02	P04		200.7599.0086.0		
AP100/1.2 - AP100/8	P01	P03		200.7599.0103.0	200.5461.1200.9	200.7599.0101.0
	P02	P04		200.7599.0104.0		
AP100/1.7 - AP100/4.3	P01	P03	200.7599.0087.0	200.7599.0088.0	200.7599.0074.0	200.7599.0078.0
	P02	P04		200.7599.0086.0		
AP100/1.7 - AP100/5	P01	P03	200.7599.0087.0	200.7599.0088.0	200.7599.0074.0	200.7599.0078.0
	P02	P04		200.7599.0086.0		
AP100/1.7 - AP100/6.5	P01	P03		200.7599.0088.0	200.7599.0074.0	200.7599.0078.0
	P02	P04		200.7599.0086.0		
AP100/1.7 - AP100/8	P01	P03		200.7599.0103.0	200.5461.1200.9	200.7599.0101.0
	P02	P04		200.7599.0104.0		
AP100/2.5 - AP100/4.3	P01	P03	200.7599.0087.0	200.7599.0088.0	200.7599.0074.0	200.7599.0078.0
	P02	P04		200.7599.0086.0		
AP100/2.5 - AP100/5	P01	P03		200.7599.0088.0	200.7599.0074.0	200.7599.0078.0
	P02	P04		200.7599.0086.0		
AP100/2.5 - AP100/6.5	P01	P03		200.7599.0103.0	200.5461.1200.9	200.7599.0101.0
	P02	P04		200.7599.0104.0		
AP100/2.5 - AP100/8	P01	P03		200.7599.0103.0	200.5461.1200.9	200.7599.0101.0
	P02	P04		200.7599.0104.0		
AP100/3.5 - AP100/5	P01	P03		200.7599.0088.0	200.5461.1200.9	200.7599.0101.0
	P02	P04		200.7599.0086.0		
AP100/3.5 - AP100/6.5	P01	P03		200.7599.0103.0	200.5461.1200.9	200.7599.0101.0
	P02	P04		200.7599.0104.0		
AP100/3.5 - AP100/8	P01	P03		200.7599.0103.0	200.5461.1200.9	200.7599.0101.0
	P02	P04		200.7599.0104.0		

4.1.2 Suction assembly kits for square tanks from 6 to 12 litres

Pump S309	Horizontal positions - P01, P02, P03, P04			
	P-060Q-**	P-080Q-**	P-100Q-**	P-120Q-**
AP100/1.2	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0
AP100/1.7	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0
AP100/2.5	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0
AP100/3.5	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0
AP100/4.3	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0
AP100/5	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0
AP100/6.5	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0
AP100/8	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0
AP100/10	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0	200.7599.0183.0

Pump S309	Vertical positions - P15, P25, P35, P45			
	P-060Q-**	P-080Q-**	P-100Q-**	P-120Q-**
AP100/1.2	200.7599.0179.0	200.7599.0180.0	200.7599.0205.0	200.7599.0190.0
AP100/1.7	200.7599.0179.0	200.7599.0180.0	200.7599.0205.0	200.7599.0190.0
AP100/2.5	200.7599.0202.0	200.7599.0180.0	200.7599.0205.0	200.7599.0190.0
AP100/3.5	200.7599.0202.0	200.7599.0180.0	200.7599.0205.0	200.7599.0190.0
AP100/4.3	200.7599.0202.0	200.7599.0180.0	200.7599.0181.0	200.7599.0187.0
AP100/5	200.7599.0202.0	200.7599.0180.0	200.7599.0181.0	200.7599.0187.0
AP100/6.5	200.7599.0178.0	200.7599.0203.0	200.7599.0181.0	200.7599.0187.0
AP100/8	200.7599.0178.0	200.7599.0203.0	200.7599.0204.0	200.7599.0187.0
AP100/10	200.7599.0178.0	200.7599.0203.0	200.7599.0204.0	200.7599.0189.0

4.1.3 Suction assembly kits for round tanks from 6 to 14 litres

Pump S309	Horizontal positions - P01, P02, P03, P04				
	P-060R-**	P-080R-**	P-100R-**	P-120R-**	P-140R-**
AP100/1.2	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0
AP100/1.7	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0
AP100/2.5	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0
AP100/3.5	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0
AP100/4.3	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0
AP100/5	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0
AP100/6.5	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0
AP100/8	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0
AP100/10	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0	200.7599.0182.0

Pump S309	Vertical positions - P15, P25, P35, P45				
	P-060R-**	P-080R-**	P-100R-**	P-120R-**	P-140R-**
AP100/1.2	200.7599.0198.0	200.7599.0178.0	200.7599.0203.0	200.7599.0205.0	200.7599.0190.0
AP100/1.7	200.7599.0198.0	200.7599.0178.0	200.7599.0203.0	200.7599.0205.0	200.7599.0190.0
AP100/2.5	200.7599.0188.0	200.7599.0178.0	200.7599.0203.0	200.7599.0205.0	200.7599.0190.0
AP100/3.5	200.7599.0188.0	200.7599.0178.0	200.7599.0179.0	200.7599.0205.0	200.7599.0190.0
AP100/4.3	200.7599.0188.0	200.7599.0186.0	200.7599.0179.0	200.7599.0181.0	200.7599.0187.0
AP100/5	200.7599.0177.0	200.7599.0186.0	200.7599.0179.0	200.7599.0181.0	200.7599.0187.0
AP100/6.5	200.7599.0177.0	200.7599.0186.0	200.7599.0179.0	200.7599.0181.0	200.7599.0187.0
AP100/8	200.7599.0177.0	200.7599.0201.0	200.7599.0178.0	200.7599.0204.0	200.7599.0187.0
AP100/10	200.7599.0192.0	200.7599.0201.0	200.7599.0178.0	200.7599.0204.0	200.7599.0189.0

4.2 Suction assembly kits for metal tanks

4.2.1 Suction assembly kits for square and round metal tanks from 5 to 18 litres

Pump S309	Horizontal positions - P01, P02, P03, P04					
	L-050R-01	L-080R-01	L-050R-02	L-080R-02	L-100R-01	L-180R-01
AP100/1.2	200.7599.0191.0	200.7599.0182.0	200.7599.0191.0	200.7599.0182.0	200.7599.0185.0	200.7599.0185.0
AP100/1.7	200.7599.0191.0	200.7599.0182.0	200.7599.0191.0	200.7599.0182.0	200.7599.0185.0	200.7599.0185.0
AP100/2.5	200.7599.0191.0	200.7599.0182.0	200.7599.0191.0	200.7599.0182.0	200.7599.0185.0	200.7599.0185.0
AP100/3.5	200.7599.0191.0	200.7599.0182.0	200.7599.0191.0	200.7599.0182.0	200.7599.0185.0	200.7599.0185.0
AP100/4.3	200.7599.0191.0	200.7599.0182.0	200.7599.0191.0	200.7599.0182.0	200.7599.0185.0	200.7599.0185.0
AP100/5	200.7599.0191.0	200.7599.0182.0	200.7599.0191.0	200.7599.0182.0	200.7599.0185.0	200.7599.0185.0
AP100/6.5	200.7599.0191.0	200.7599.0182.0	200.7599.0191.0	200.7599.0182.0	200.7599.0185.0	200.7599.0185.0
AP100/8	200.7599.0191.0	200.7599.0182.0	200.7599.0191.0	200.7599.0182.0	200.7599.0185.0	200.7599.0185.0
AP100/10	200.7599.0191.0	200.7599.0182.0	200.7599.0191.0	200.7599.0182.0	200.7599.0185.0	200.7599.0185.0

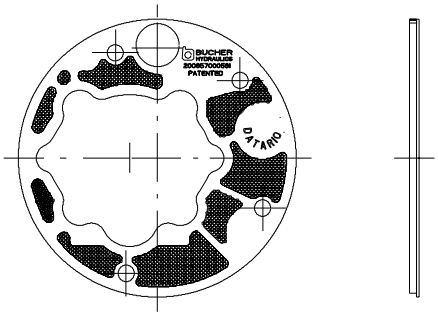
Pump S309	Vertical positions - P15, P25, P35, P45				
	L-050R-01	L-080R-01	L-070Q-01	L-120Q-01	L-15OQ-01
AP100/1.2	200.7599.0178.0	200.7599.0178.0	200.7599.0198.0	200.7599.0199.0	200.7599.0192.0
AP100/1.7	200.7599.0186.0	200.7599.0178.0	200.7599.0198.0	200.7599.0199.0	200.7599.0192.0
AP100/2.5	200.7599.0186.0	200.7599.0178.0	200.7599.0188.0	200.7599.0199.0	200.7599.0192.0
AP100/3.5	200.7599.0186.0	200.7599.0178.0	200.7599.0188.0	200.7599.0198.0	200.7599.0196.0
AP100/4.3	200.7599.0201.0	200.7599.0178.0	200.7599.0188.0	200.7599.0198.0	200.7599.0196.0
AP100/5	200.7599.0201.0	200.7599.0178.0	200.7599.0197.0	200.7599.0188.0	200.7599.0196.0
AP100/6.5	200.7599.0200.0	200.7599.0186.0	200.7599.0197.0	200.7599.0188.0	200.7599.0196.0
AP100/8	200.7599.0200.0	200.7599.0201.0	200.7599.0192.0	200.7599.0188.0	200.7599.0176.0
AP100/10	200.7599.0199.0	200.7599.0201.0	200.7599.0192.0	200.7599.0177.0	200.7599.0176.0

Pump S609			Horizontal positions - P01, P02, P03, P04					
			L-050R-01	L-080R-01	L-050R-02	L-080R-02	L-100R-01	L-180R-01
AP100/1.2 AP100/4.3	P01	P03	200.7599.0120.0	200.7599.0122.0	200.7599.0120.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0119.0	200.7599.0103.0	200.7599.0119.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/1.2 AP100/5	P01	P03	200.7599.0120.0	200.7599.0122.0	200.7599.0120.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0119.0	200.7599.0103.0	200.7599.0119.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/1.2 AP100/6.5	P01	P03	200.7599.0120.0	200.7599.0122.0	200.7599.0120.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0119.0	200.7599.0103.0	200.7599.0119.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/1.2 AP100/8	P01	P03	200.7599.0121.0	200.7599.0122.0	200.7599.0121.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0119.0	200.7599.0103.0	200.7599.0119.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/1.7 AP100/4.3	P01	P03	200.7599.0120.0	200.7599.0122.0	200.7599.0120.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0119.0	200.7599.0103.0	200.7599.0119.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/1.7 AP100/5	P01	P03	200.7599.0120.0	200.7599.0122.0	200.7599.0120.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0119.0	200.7599.0103.0	200.7599.0119.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/1.7 AP100/6.5	P01	P03	200.7599.0120.0	200.7599.0122.0	200.7599.0120.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0119.0	200.7599.0103.0	200.7599.0119.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/1.7 AP100/8	P01	P03	200.7599.0121.0	200.7599.0122.0	200.7599.0121.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0087.0	200.7599.0103.0	200.7599.0087.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/2.5 AP100/4.3	P01	P03	200.7599.0120.0	200.7599.0122.0	200.7599.0120.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0119.0	200.7599.0103.0	200.7599.0119.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/2.5 AP100/5	P01	P03	200.7599.0120.0	200.7599.0122.0	200.7599.0120.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0119.0	200.7599.0103.0	200.7599.0119.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/2.5 AP100/6.5	P01	P03	200.7599.0121.0	200.7599.0122.0	200.7599.0121.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0119.0	200.7599.0103.0	200.7599.0119.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/2.5 AP100/8	P01	P03	200.7599.0121.0	200.7599.0122.0	200.7599.0121.0	200.7599.0122.0	200.7599.0124.0	200.7599.0090.0
	P02	P04	200.7599.0087.0	200.7599.0103.0	200.7599.0087.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/3.5 AP100/5	P01	P03	200.7599.0121.0	200.7599.0122.0	200.7599.0121.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0087.0	200.7599.0103.0	200.7599.0087.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/3.5 AP100/6.5	P01	P03	200.7599.0121.0	200.7599.0122.0	200.7599.0121.0	200.7599.0122.0	200.7599.0123.0	200.7599.0090.0
	P02	P04	200.7599.0087.0	200.7599.0103.0	200.7599.0087.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0
AP100/3.5 AP100/8	P01	P03	200.7599.0121.0	200.7599.0122.0	200.7599.0121.0	200.7599.0122.0	200.7599.0124.0	200.7599.0090.0
	P02	P04	200.7599.0087.0	200.7599.0103.0	200.7599.0087.0	200.7599.0103.0	200.7599.0125.0	200.7599.0091.0

Pump S609	Vertical positions - P15, P25, P35, P45			
	L-050R-01	L-080R-01	L-070Q-01	L-120Q-01
AP100/1.2 AP100/4.3	200.7599.0097.0	200.7599.0112.0	200.5461.12009	200.7599.0074.0
AP100/1.2 AP100/5	200.7599.0097.0	200.7599.0112.0	200.5461.12009	200.7599.0074.0
AP100/1.2 AP100/6.5	200.7599.0097.0	200.7599.0079.0		200.5461.12009
AP100/1.2 AP100/8	200.7599.0114.0	200.7599.0101.0		200.5461.12009
AP100/1.7 AP100/4.3	200.7599.0097.0	200.7599.0112.0	200.5461.12009	200.7599.0074.0
AP100/1.7 AP100/5	200.7599.0097.0	200.7599.0079.0		200.7599.0074.0
AP100/1.7 AP100/6.5	200.7599.0097.0	200.7599.0079.0		200.5461.12009
AP100/1.7 AP100/8	200.7599.0114.0	200.7599.0098.0		200.5461.12009
AP100/2.5 AP100/4.3	200.7599.0097.0	200.7599.0079.0		200.7599.0074.0
AP100/2.5 AP100/5	200.7599.0097.0	200.7599.0079.0		200.5461.12009
AP100/2.5 AP100/6.5	200.7599.0114.0	200.7599.0101.0		200.5461.12009
AP100/2.5 AP100/8	200.7599.0114.0	200.7599.0098.0		200.5461.12009
AP100/3.5 AP100/5	200.7599.0065.0	200.7599.0097.0		200.5461.12009
AP100/3.5 AP100/6.5	200.7599.0114.0	200.7599.0098.0		200.5461.12009
AP100/3.5 AP100/8	200.7599.0109.0	200.7599.0098.0		200.5461.12009

4.3 Accessories

4.3.1 Filter conveyor: standard

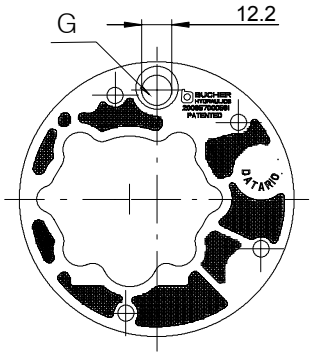


Filter conveyor
PATENTED
Assembled on the return line
Plastic material
Polyester filter area
150 micron filtering net
Fixed directly on the housing
Seal for the pump body.
Code: 200.6570.0056.1

The internal shape of the filtering convejor replaces the external profile of the gear pump as well as the external profile matches the internal diameter of the tank spigot. The main feature of the filtering convejor is to collect all returns avoiding oil-foam effects, possible small clearances between the internal and external above profiles have to be judged as normal referring 150 micron size to the filtering net capacity, only.

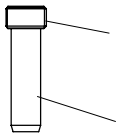
4.3.2 Filter conveyor : special applications

For cavity "G" suction mounting



Filter convejor code: 200.6570.0061.0

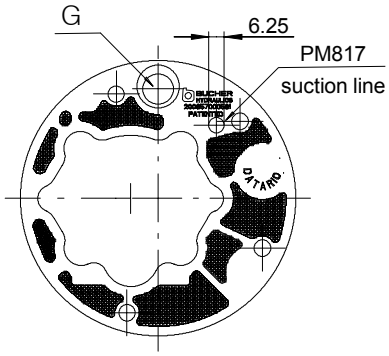
Suction tube code:
200.7850.0020.0



200.5294.20006
(3/8"M-1/4"F H)

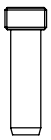
L= 50 mm (1/4" BSP)
200.6850.0051.0

For UP100K1G2-19 mounting

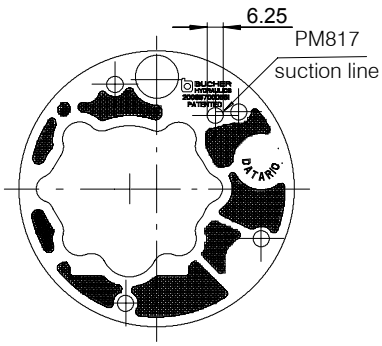


Filter convejor code: 200.6570.0062.0

Return tube for G cavity used for UP100K1G2-19 mounting
Code: 200.7850.0020.0

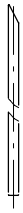


For UP100K3P0-05 mounting



Filter convejor code: 200.6570.0063.0

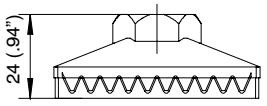
Suction tube for PM817 suction line used for UP100K1G2-19 and UP100K3P0-05 mounting



L= 350 mm (Ø 6)
code: 200.6850.0082.0

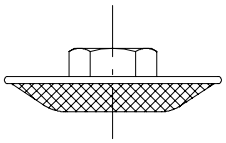
L= 480 mm (Ø 6)
code: 200.6850.0080.0

4.3.3 Suction filter

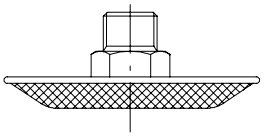


Suitable for standard version

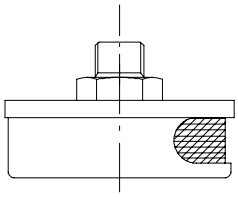
Suction plastic filter
Square: 59 mm
Filtering: 216 micron
Thread: 3/8" BSP - Female
Code: **200.5461.12025**



Suction steel filter
Diameter: 60 mm.
Filtering: 250 micron
Thread: 3/8" BSP - Female
Code: **200.5461.12008**



Suction steel filter
Diameter: 80 mm.
Filtering: 250 micron
Thread: 3/8" NPT - Male
Code: **200.5461.12009**



Suction steel filter
Diameter: 80 mm.
Filtering: 60 micron
Thread: 3/8" NPT
Code: **200.6570.0005.0** (Male)
200.6570.0006.0 (Female)

5 Electric motors

Electric motor available:

5.1 D.C. motors

Generally used for mobile applications

5.2 A.C. motors

Generally used for stationary applications

5.1 D.C. motors

5.1.1 Technical information

Available versions:

Voltage: 12-24 and 48 V

Power rating: 0.8 ÷ 3 kW.

For different input voltage and power rating, consult our Sales Department.

Direction of rotation:

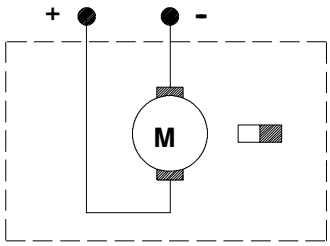
Unless otherwise stated, all motors are specified clockwise rotation, suitable for driving counterclockwise pump.

Type of winding:

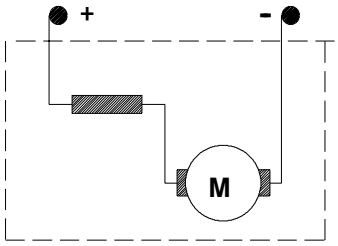
D.C. motors can be manufactured in different types of field windings:

- Permanent magnets
- Series
- Compound

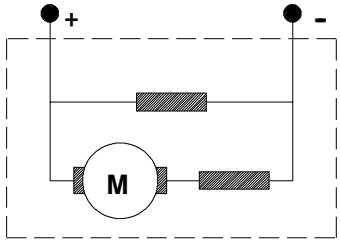
Permanent magnets



Series



Compound



Insulation class:

The class of electric insulation reflects the maximum temperature the motor can register during operation without damage to the insulating material internally of the motor itself.

The following table indicates insulation classes to CEI 15-26.

Class	Y	A	E	B	F	H
Temperature (°C)	90	105	120	130	155	180

Type of duty:

To ensure selection of the electric motor best suited to a given set of operating conditions, the duty cycle needs to be verified. Duty cycles S1, S2 and S3 are defined below in accordance with CEI 2-3

Continuous duty S1:

Operation on-load (steady conditions) for a period of indefinite duration, during which the motor reaches thermal equilibrium without exceeding the maximum permissible temperature.

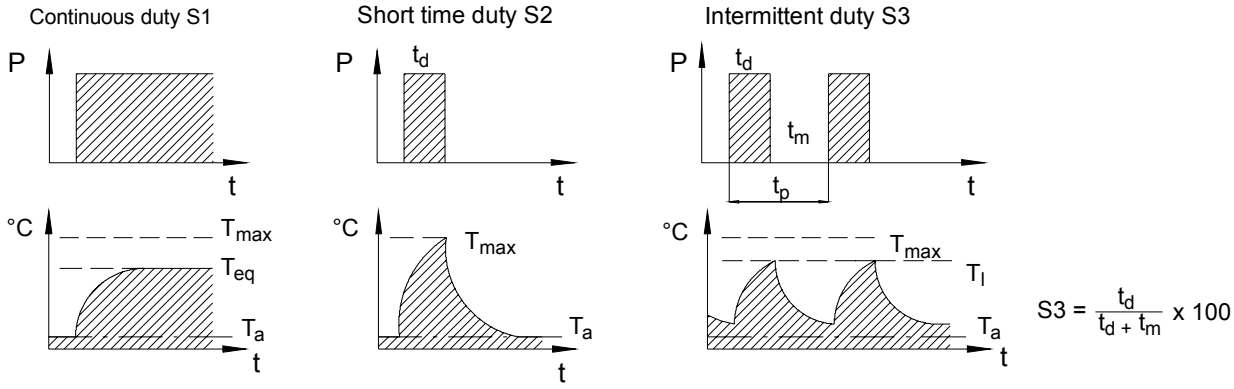
Short time duty S2

Operation on-load (steady conditions) for a period of limited duration, denoted td in the diagram, during which maximum permissible temperature is reached, followed by an off-load period of duration sufficient for the temperature of the motor to return to ambient temperature.

Intermittent duty S3

A sequence of identical cycles, each 10 minutes in duration, the single cycle comprises a period of operation on-load td, during which the motor may reach its maximum permissible temperature, is reached, followed by an off-load period of limited duration tm, insufficient for the temperature of the motor to return to ambient temperature.

The value of S3 indicates the duration of the on-load period td in relation to the overall cycle time tp, as a percentage.



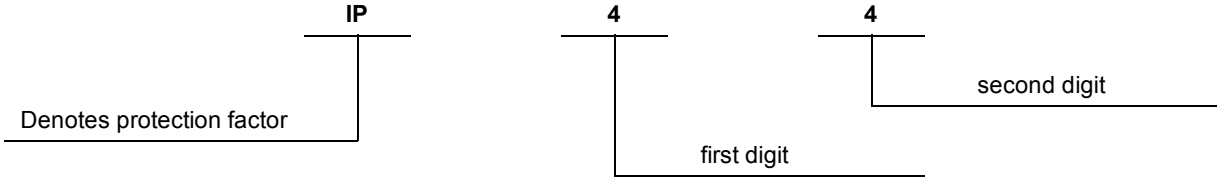
P = load
T_{eq} = temperature at thermal equilibrium
T_{max} = maximum permissible temperature
T_I = operating temperature
T_a = ambient temperature
t_d = duration of on-load period
t_m = duration of off-load period
t_p = duration of cycle (10 min.)

Degree of protection:

This indicates the level of protection afforded in preventing contact between live parts of the motor and people or foreign matter generally, and preventing the penetration of water.

The degree of protection is indicated in accordance with CEI 2-16 by the initials IP and two identifying digits:

Example:



The first digit indicates the degree of protection afforded to the motor against contact with people or foreign bodies.

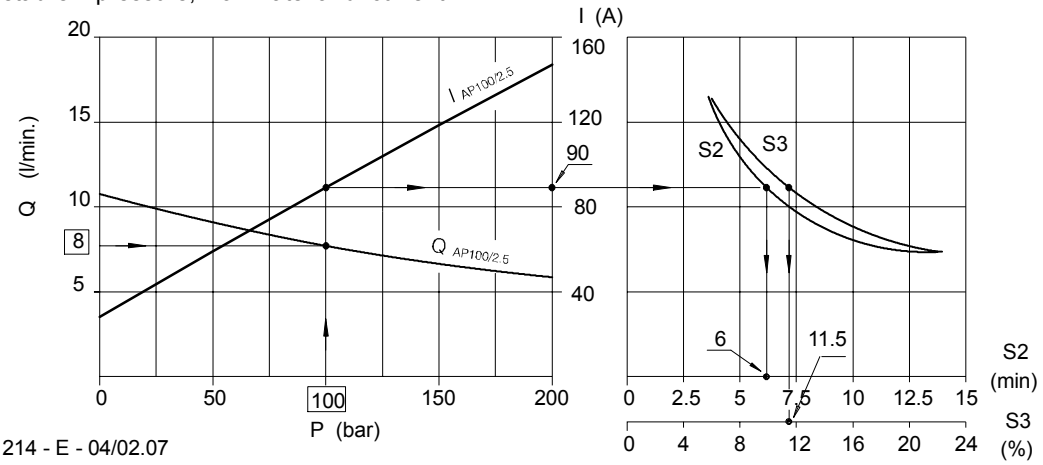
The second digit indicates the degree of protection afforded to the motor against the effects of penetration by water.

0	no protection	**0**	no protection
1	protection against solid bodies measuring > 50 mm	**1**	protection against water dripping vertically
2	protection against solid bodies measuring > 12 mm	**2**	protection against water dripping at 15° max
3	protection against solid bodies measuring > 2.5 mm	**3**	protection against rain
4	protection against solid bodies measuring > 1 mm	**4**	protected against water splash
5	protection against dust	**5**	protected against water spray

The degree of protection indicated for each individual electric motor, refers to the motor when mounted to a Bucher Hydraulics S.p.A. power pack.

5.1.2 Characteristic curves

Characteristic curves are given for each motors, from which to establish pressure, flow rate and current consumption values, and S2 and S3 duty cycles.



5.1.3 Example of how the graphs are used

Required data

Flow rate Q = 8 l/1'

Pressure p =100 bar

Pump displacement

Determined by the intersection of the required p and Q curves.

In the example indicated, pump AP100/2.5 has the required p and Q specifications.

In the event that there is no point of intersection with any curve, a displacement as near as possible to the required flow rate should be selected.

Current consumption

This is determined by taking a vertical line from the pressure value to its point of intersection with the I curve corresponding to the selected displacement.

In the example illustrated, current consumption is:

I = 90 Ampere

Type of use

Having established the current, the relationship of the S2 and S3 curves will give the following values:

S2 = 6 min. S3 = 11.5%

Terminals

Unless otherwise stated, d.c. motors supplied by Bucher Hydraulics S.p.A. have two terminals.

Poles are identified in accordance with IEC34-8

A1 - A2 Armature

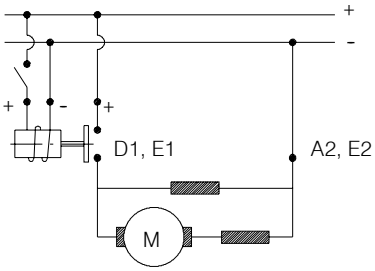
D1 - D2 Series

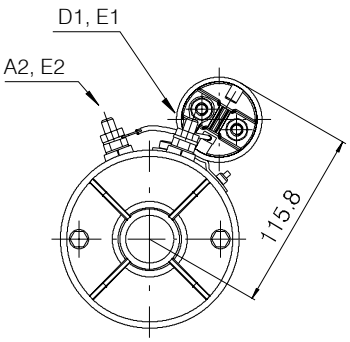
B1 - B2 Poles

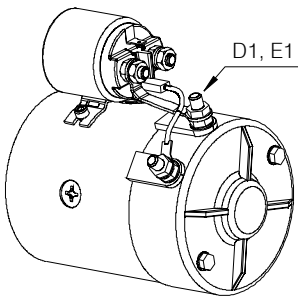
E1 - E2 Parallel

Electric diagram

A typical arrangement for connection of the motor to the power supply is shown in the diagram.







5.1.4 Mounting directions

The tie bolts must not be withdrawn completely while fitting motor, but retracted just for a short distance (30-50 mm max).

Once fitted to the power pack, the motor should be run off-load momentarily (5 seconds max) to verify its correct operation: supply power to the windings and measure the current drain, which must not exceed the following values:

24 V motor - I < 35 Ampere

12 V motor - I< 70 Ampere

Power cable

The wire selected for power connections must be of cross section appropriate for the rated current of the motor.

Tightening torques

When assembling the motor and power pack and securing the wires of the power cable to the motor terminals, observe the tightening torque values indicated.

Brush life

The brushes will wear down progressively with continued operation of the motor, and must be replaced when reduced to their minimum useful length.

Since the rate of wear on the brushes is dictated by the operating conditions and cannot therefore be broadly specified, consult our Sales Department for guidance.

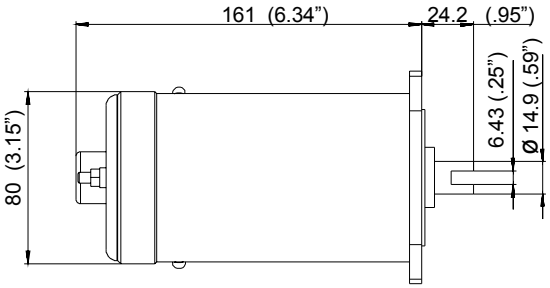
Versions available on request

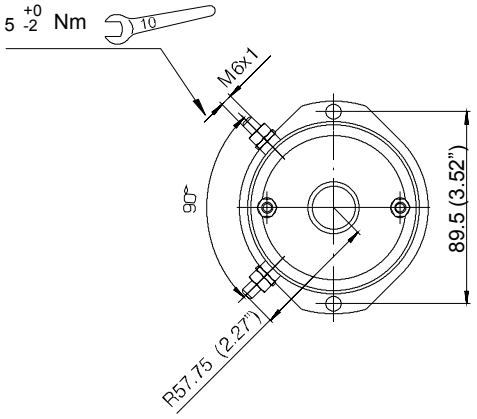
1. Motors with electrical device monitoring brush wear
2. Motors with thermocouple
3. Fan-cooled motors

Fan-cooled motors, 12 and 24 volt, are available, for further information, consult our Sales Department.

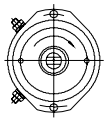
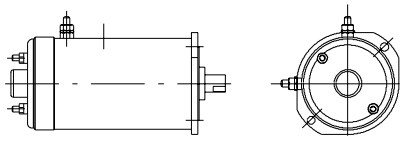
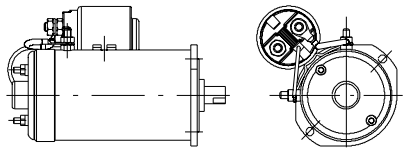
Voltage	Nominal Power
12 V	700 W
24 V	800 W

Protection index: IP42
Insulation class: . . . . . B
Type of winding: . . . . . Compound
Brushes kit: 200.5441.38017
Minimum brushes length: . . . . . 5 mm (0.2 inches)



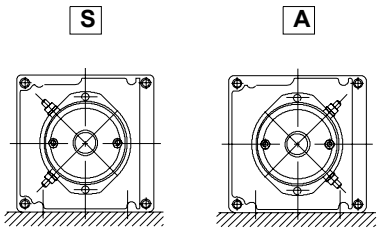


Weight: 3.250 Kg (7.15 lb)

	Motor		Motor with relay	
Rotation Right				
	12 V - 700 W	24 V - 800 W	12 V - 700 W	24 V - 800 W
Type	**C128AE/S0**	**C232AE/R0**	**C128AE/S0 +R106**	**C232AE/R0 +R209**
Code	200.5439.12804	200.5439.23203	200.7633.1014.0	200.7633.2014.0
Relay			Standard	
Relay type			R106	R209

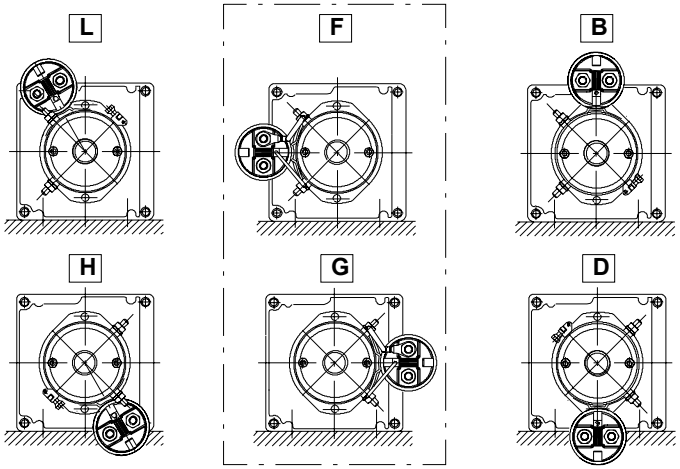
Motor mounting position

Standard positions



Relay mounting positions

Standard positions

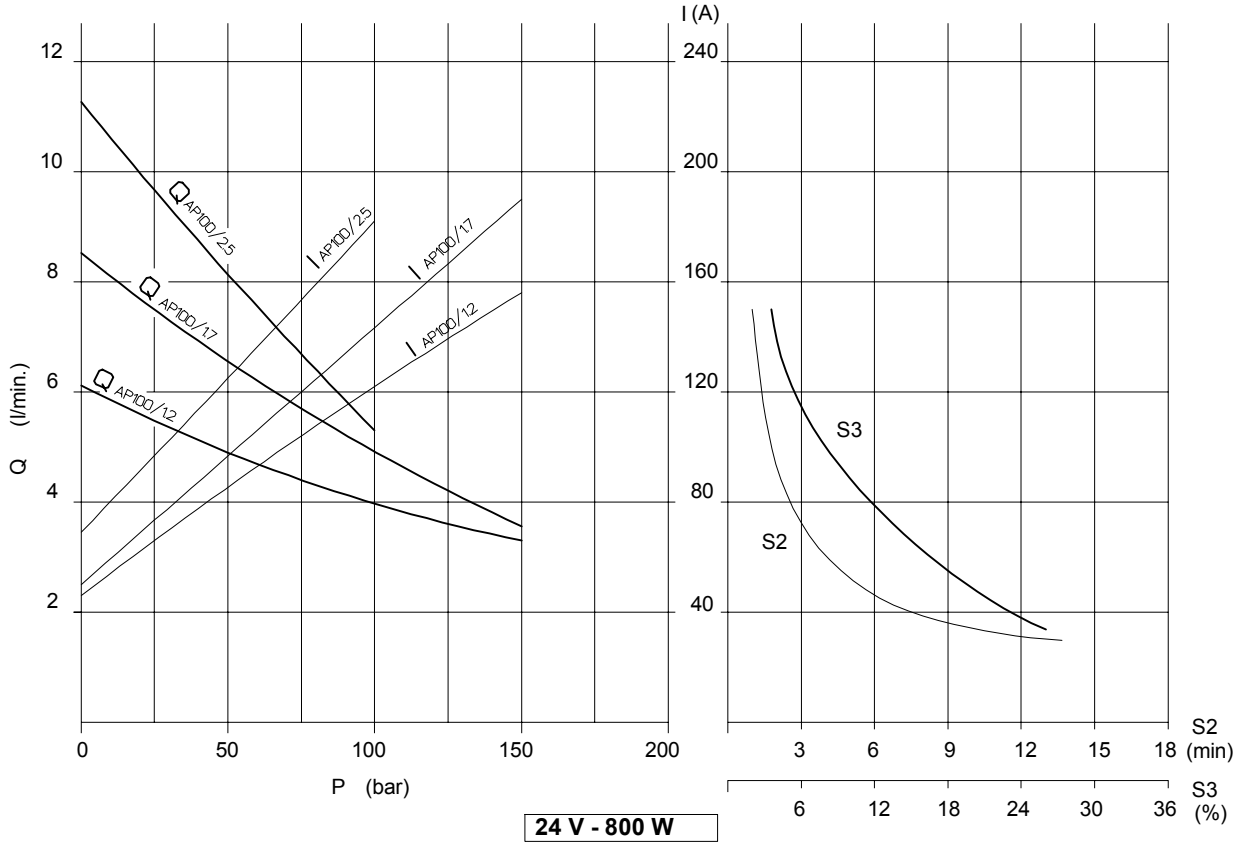


5	Electric motor									Pos.	
	C	2	3	2	A	E	/	R	0	S	

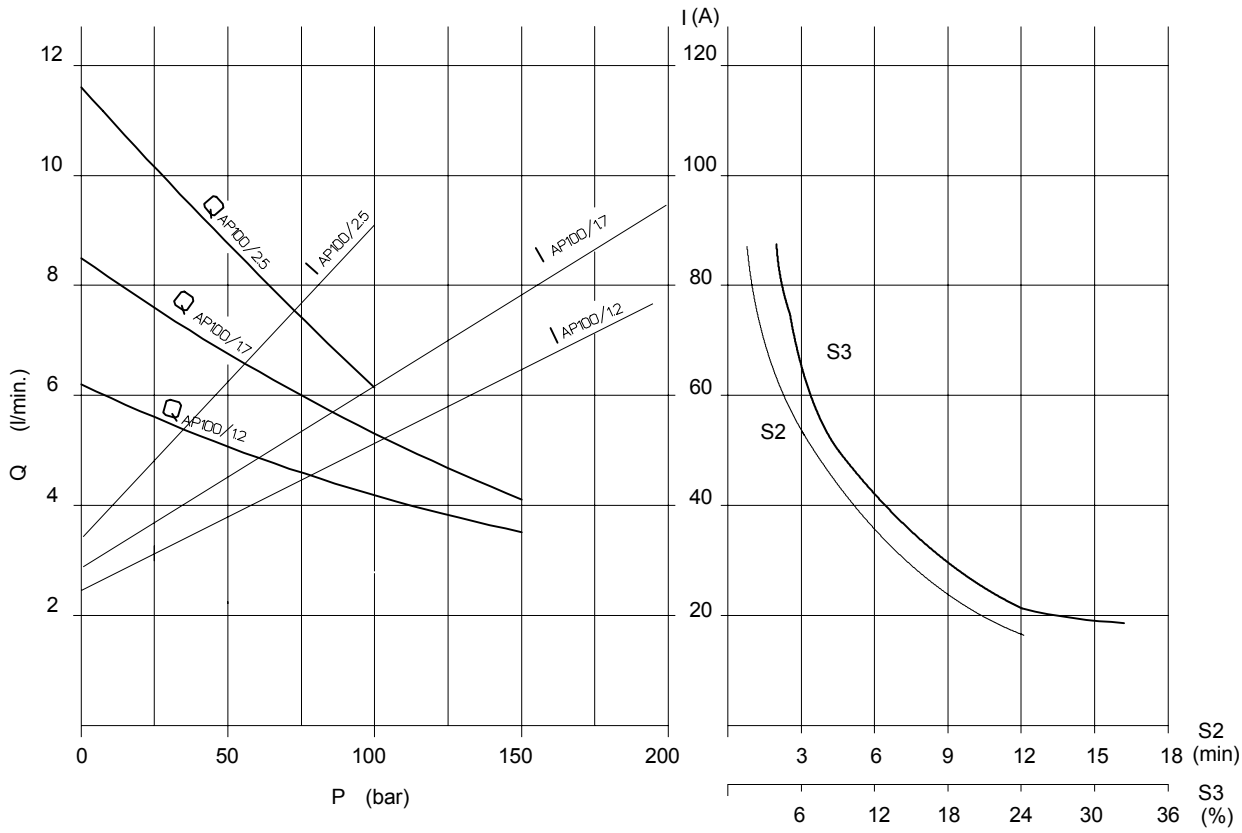
Example

Relè					Pos.	
R	2	0	9		F	

12 V - 700 W

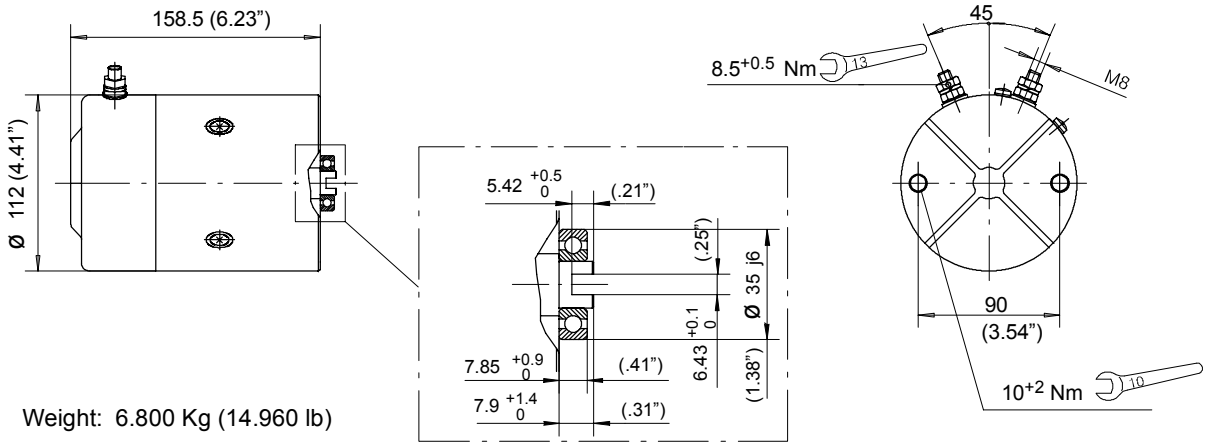


24 V - 800 W

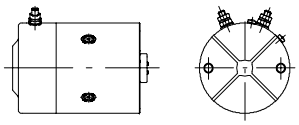
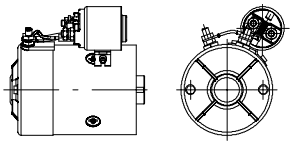
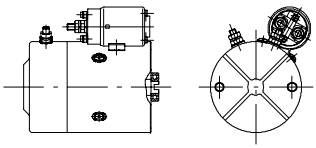


Voltage	Nominal Power
12 V	1600 W
24 V	2200 W

Protection index: IP44
Insulation class: . . . . . F
Type of winding: . . . . . Compound
Brushes kit: . . . . . (12/1600) 200.5441.38022
. . . . . (24/2200) 200.5441.38023
Minimum brushes length: . . . . . 12.5 mm (0.5 inches)

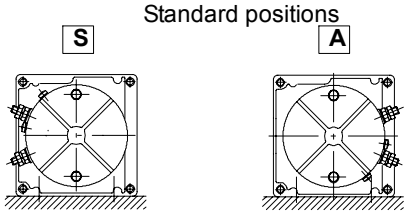


Weight: 6.800 Kg (14.960 lb)

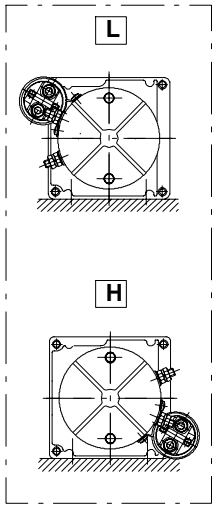
Rotation Right	Motor		Motor with relay			
						
	12 V - 1600 W	24 V - 2200 W	12 V - 1600 W	24 V - 2200 W	12 V - 1600 W	24 V - 2200 W
Type	**C135AK/X0**	**C240AK/Y0**	**C135AK/X1**	**C240AK/Y1**	**C135AK/X0 +R107**	**C240AK/Y0 +R210**
Code	200.5439.13501	200.5439.24001	200.5439.13503	200.5439.24002	200.7633.1009.0	200.7633.2009.0
Relay			Standard		Heavy duty	
Relay type			R106	R209	R107	R210
					Standard positions only	

Motor mounting positions

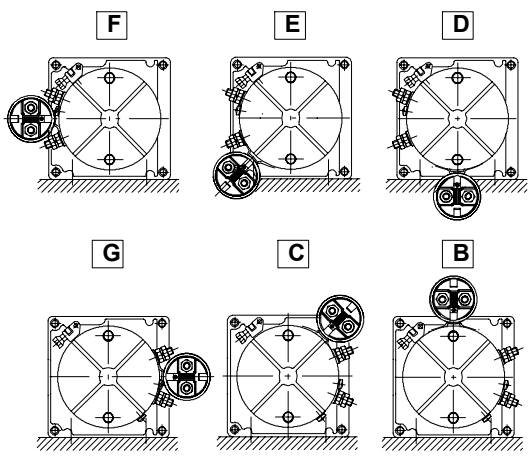
Standard positions



Standard positions



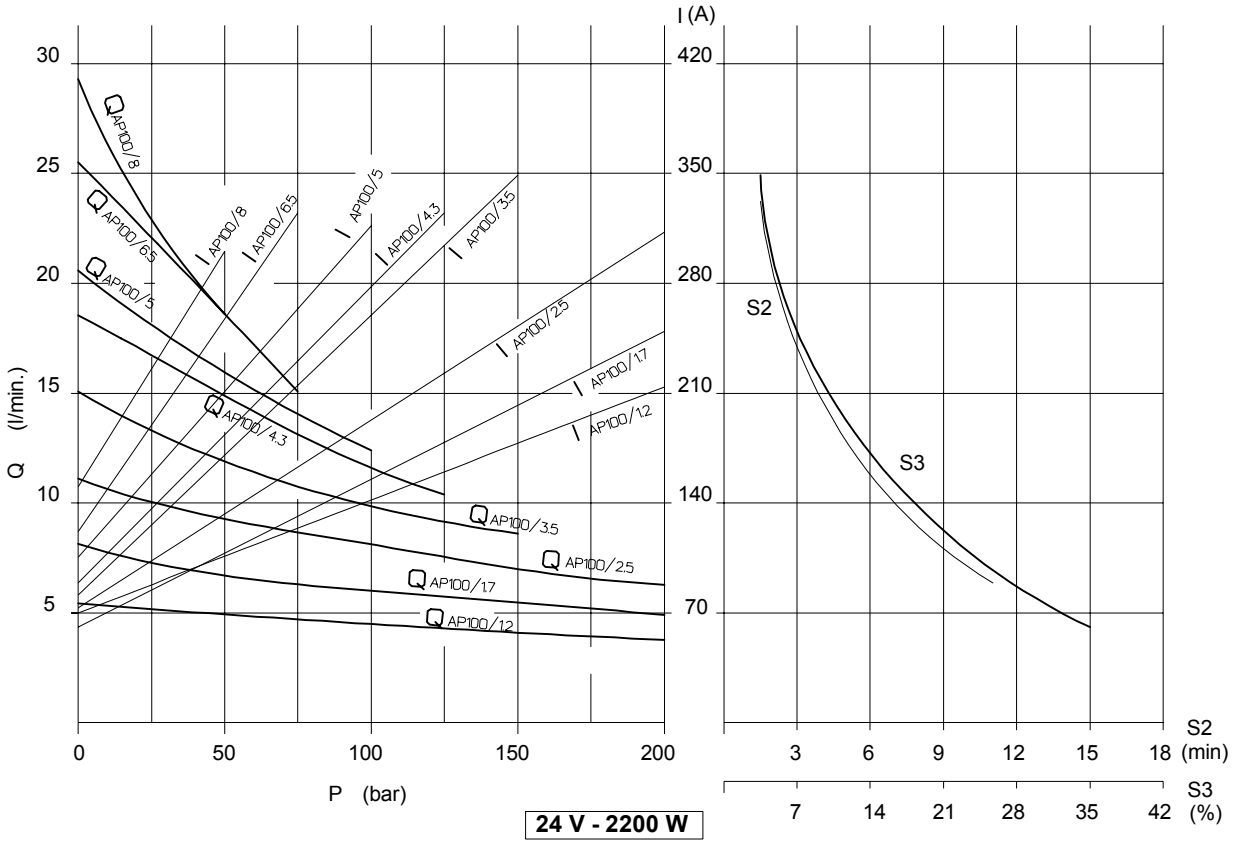
Relay mounting positions



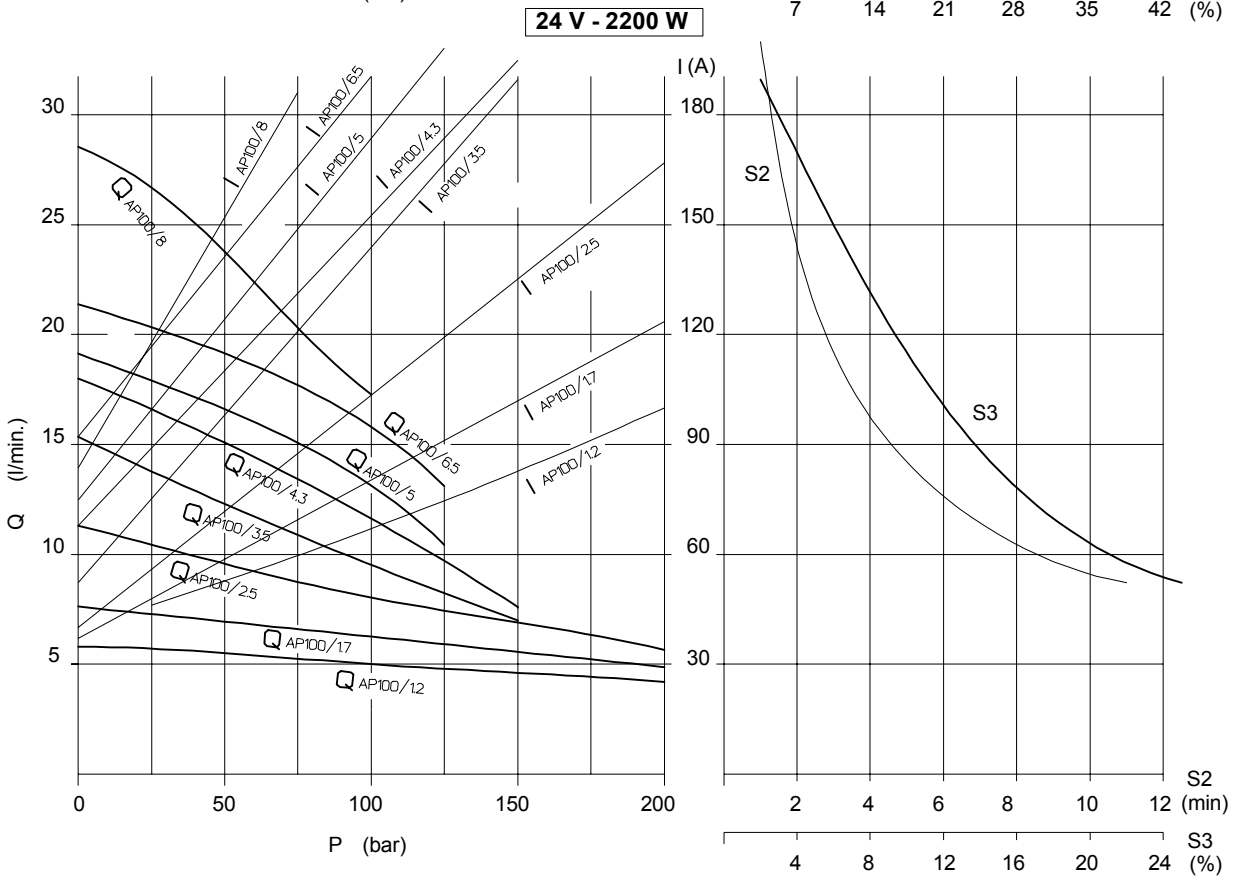
5	Electric motor										Pos.
Example	C	1	3	5	A	K	/	X	0		S

Relay					Pos.
R	1	0	7		L

12 V - 1600 W

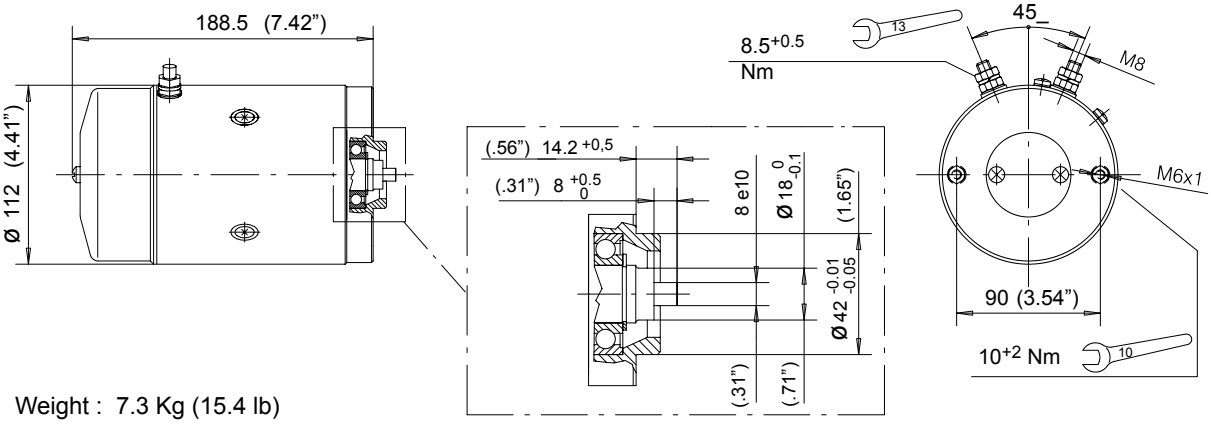


24 V - 2200 W



Voltage	Nominal Power
12 V	1500 W
24 V	2000 W

Protection index: IP54
Insulation class: . . . . . F
Type of winding: . . . . . Compound
Brushes kit: . . . . . (12/1500) 200.5441.38016
. . . . . (24/2000) 200.5441.38015
Minimum brushes length: . . . . . 12.5 mm (0.5 inches)

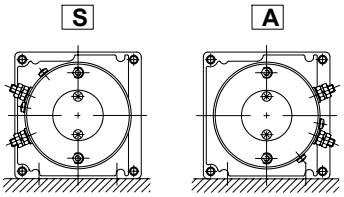


Weight : 7.3 Kg (15.4 lb)

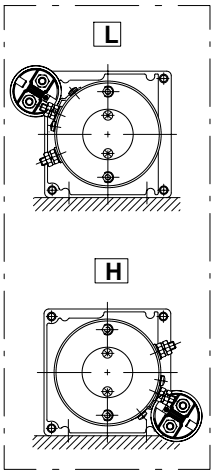
	Motor		Motor with relay			
Rotation Right						
	12 V - 1500 W	24 V - 2000 W	12 V - 1500 W	24 V - 2000 W	12 V - 1500 W	24 V - 2000 W
Type	**C134AK/O0**	**C238AK/P0**	**C134AK/O1**	**C238AK/P1**	**C134AK/O0 +R107**	**C238AK/P0 +R210**
Code	200.5439.13416	200.5439.23813	200.5439.1341.9	200.5439.2381.7	200.7633.1003.0	200.7633.2005.0
Relay			Standard		Heavy duty	
Relay type			R106	R209	R107	R210
					Standard positions only	

Motor mounting positions

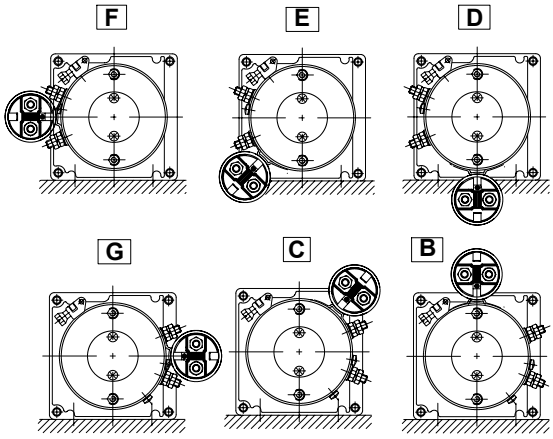
Standard positions



Standard positions



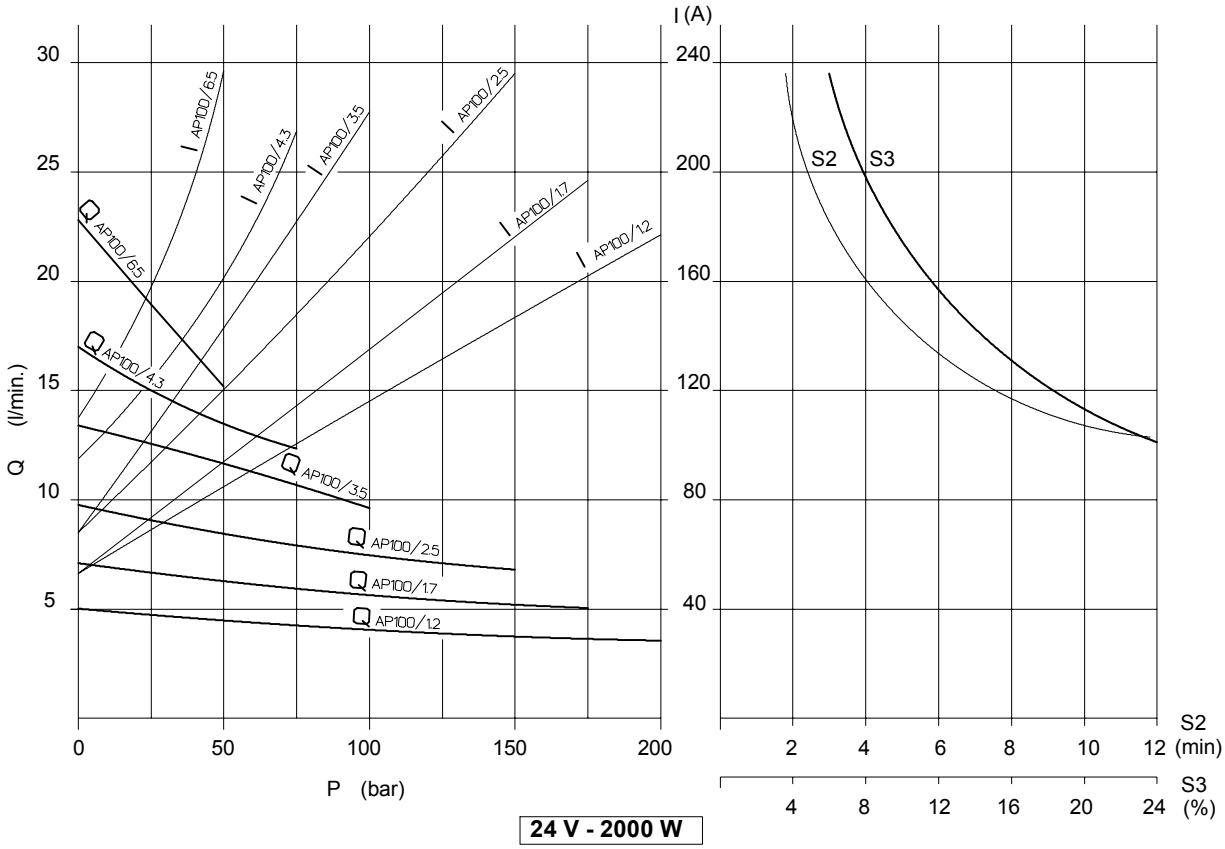
Relay mounting positions



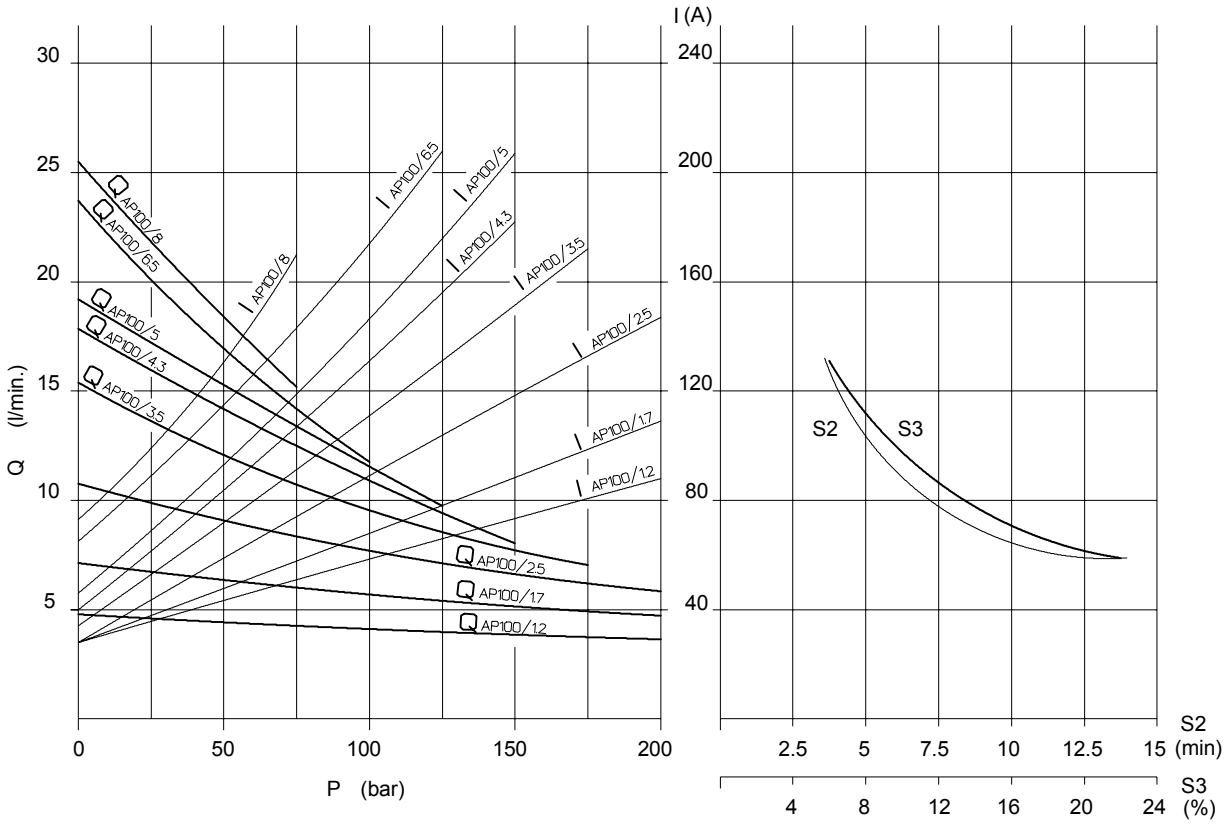
5	Electric motor										Pos.
Example	C	1	3	4	A	K	/	O	0		S

Relay							Pos.

12 V - 1500 W

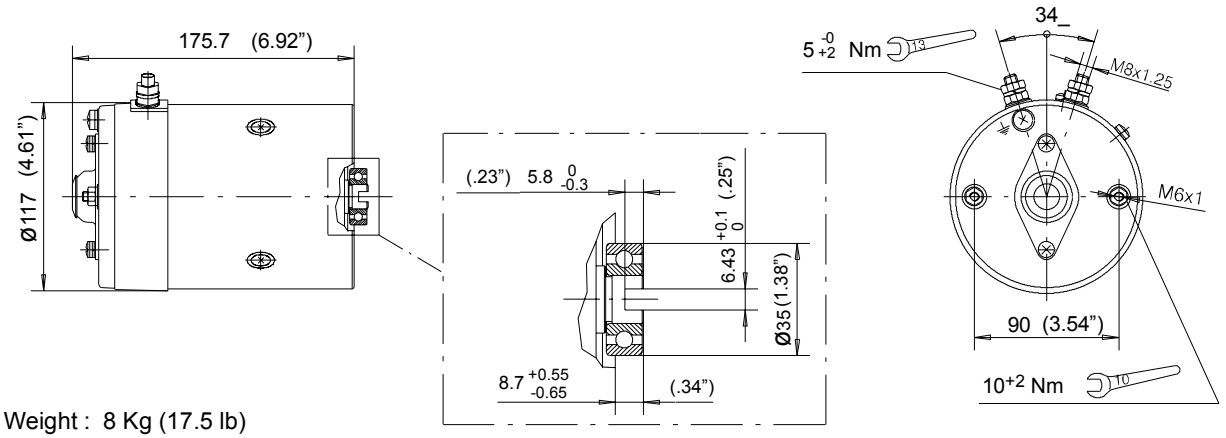


24 V - 2000 W

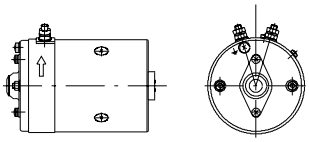
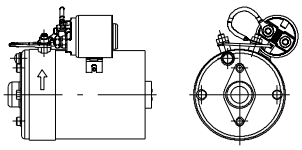
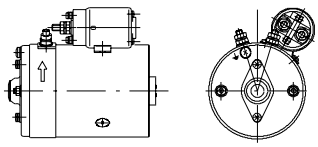


Voltage	Nominal Power
12 V	1700 W
24 V	2200 W

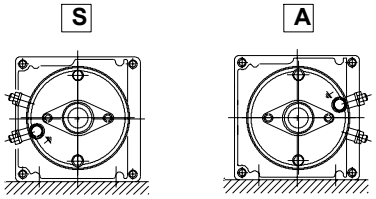
Protection index: IP42
Insulation class: . . . . . B
Type of winding: . . . . . Compound
Brushes kit: . . . . . (12/1700) 200.5441.38012
. . . . . (24/2200) 200.5441.38012
Minimum Brushes length: . . . . . 5 mm (0.2 inches)



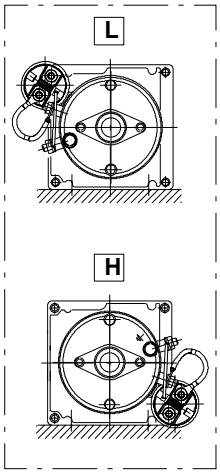
Weight : 8 Kg (17.5 lb)

Rotation Right	Motor		Motor with relay			
						
	12 V - 1700 W	24 V - 2200 W	12 V - 1700 W	24 V - 2200 W	12 V - 1700 W	24 V - 2200 W
Type	**T107E**	**T109E**	**T107E + R106**	**T109E + R 209**	**T111E**	**T112E**
Code	200.5439.13806	200.5439.24205	200.7633.1016.0	200.7633.2017.0	200.5439.13808	200.5439.24207
Relay			Standard		Heavy duty	
Relay type			R106	R209	R107	R210
					Standard positions only	

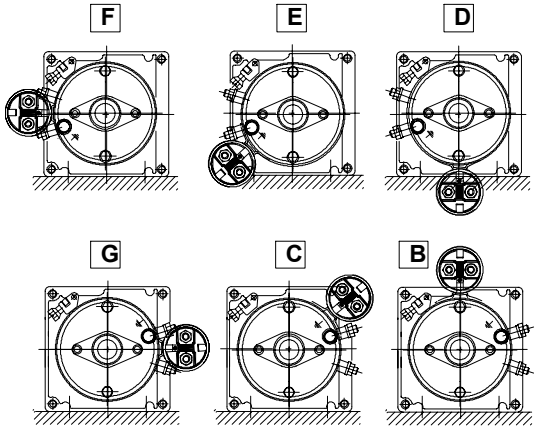
Motor mounting positions
Standard positions



Standard positions



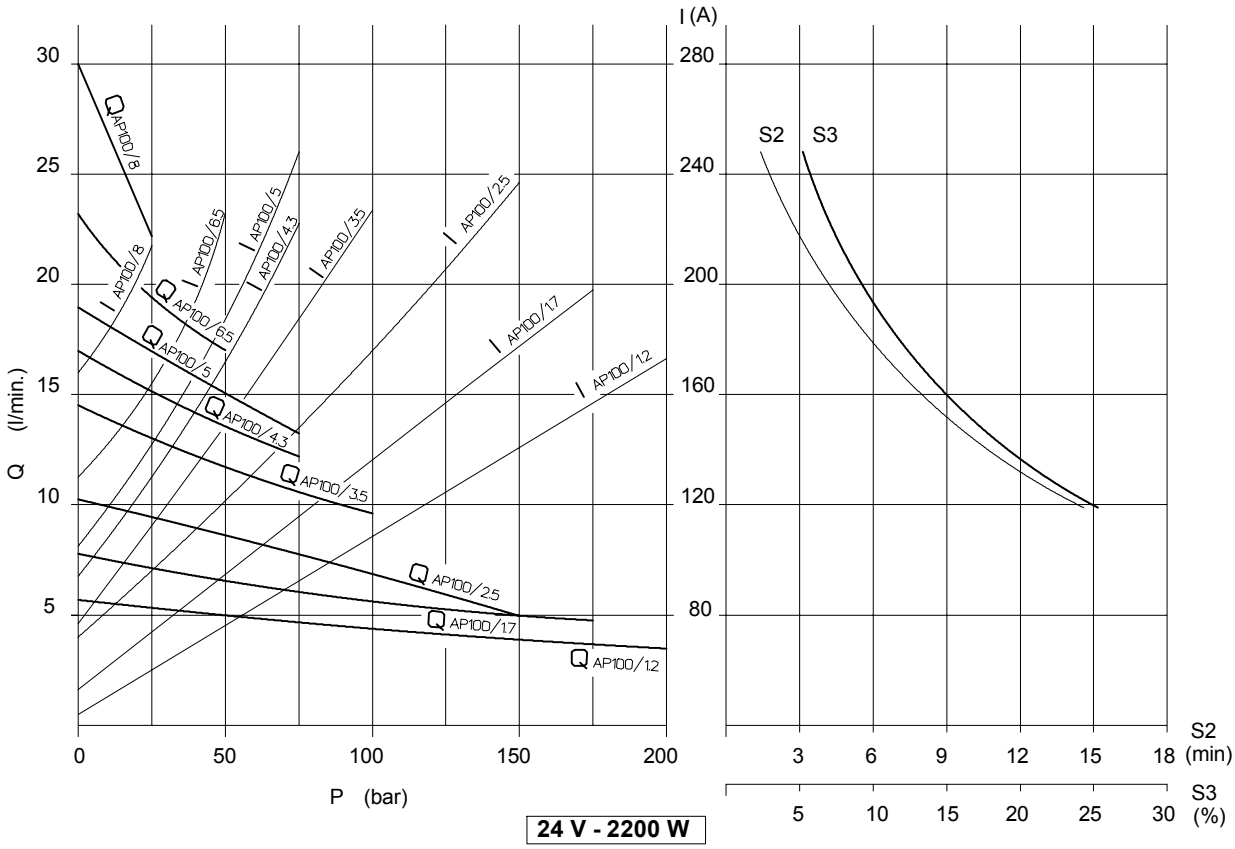
Relay mounting positions



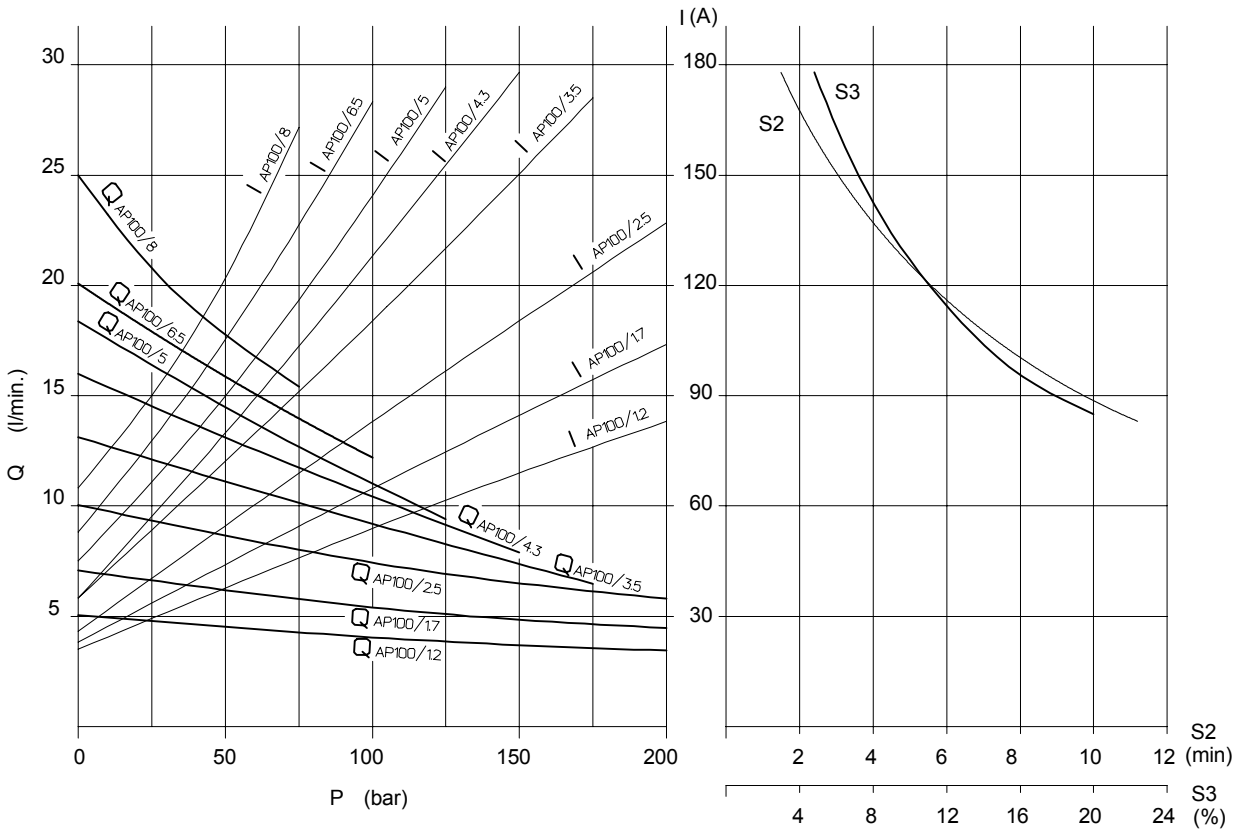
5	Electric motor									Pos.
Example	T	1	O	9	E					S

Relay	Pos.

12 V - 1700 W

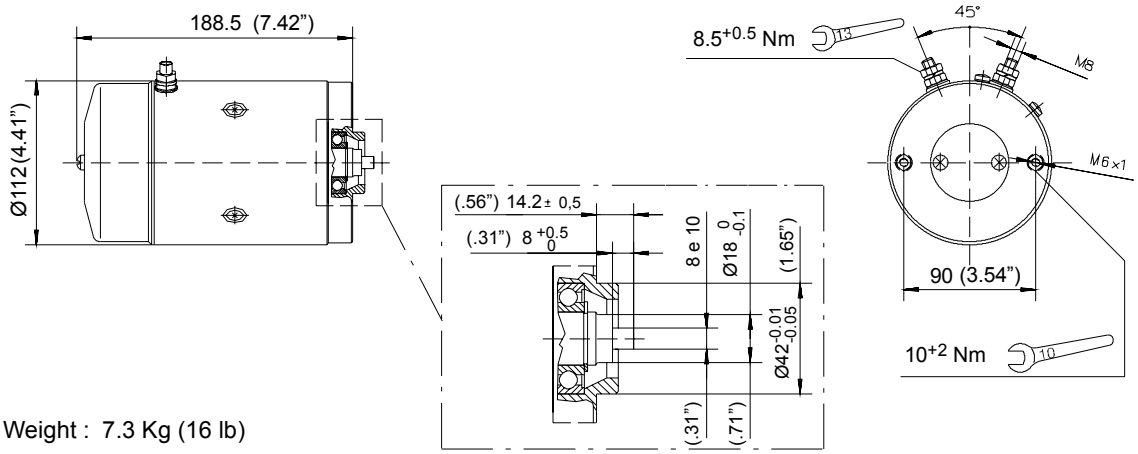


24 V - 2200 W

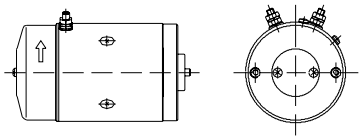


Voltage	Nominal Power
48 V	2000 W

Protection index: IP54
Insulation class: . . . . . F
Type of winding: . . . . . Compound
Brushes kit: 200.5441.38018
Minimum brushes lenght:. . . . . 12.5 mm (0.5 inches)

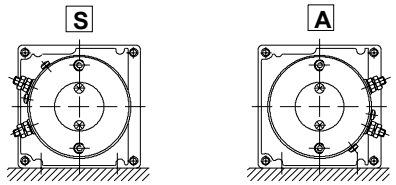


Weight : 7.3 Kg (16 lb)

Rotation Right	Motor		Motor with relay			
						
	48 V - 2000 W					
Type	**T82K**					
Code	200.5439.33803					
Relay						
Relay type						

Motor mounting positions

Standard positions

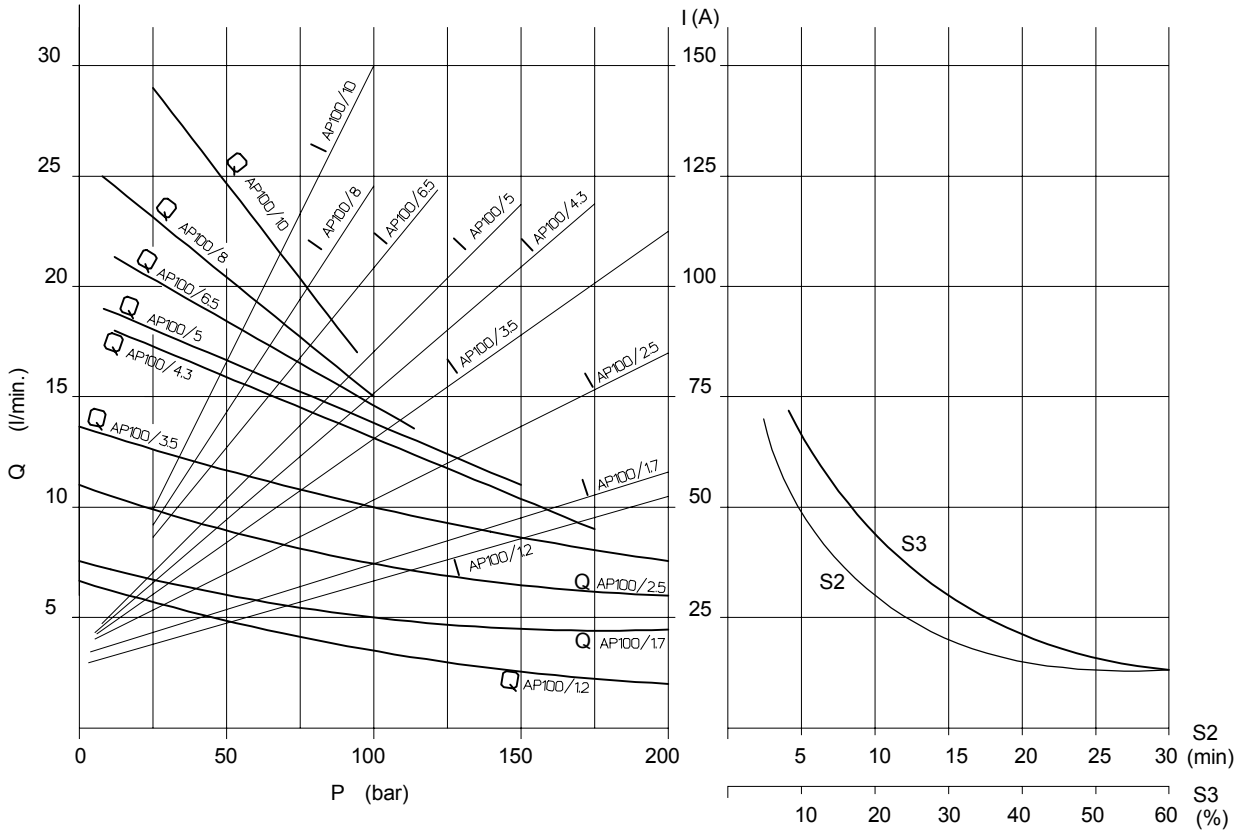


	Electric motor										Pos.
5	T	8	2	K							S

Example

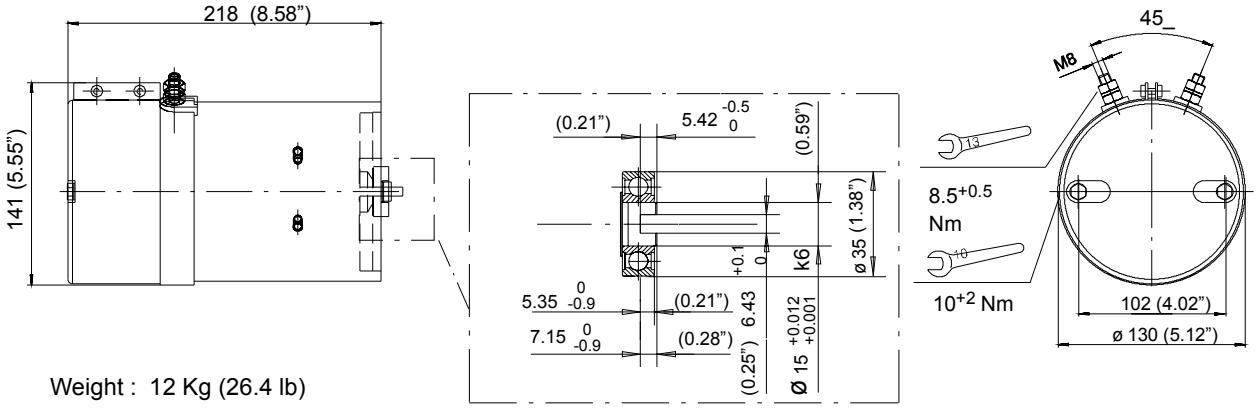
	Relay						Pos.

48 V - 2000 W

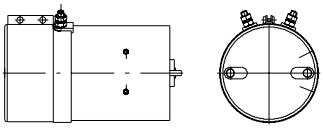
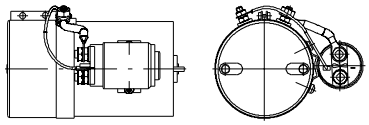

Q (l/min.)
P (bar)
I (A)
S2 (min)
S3 (%)
S2
S3
Q AP100/10
Q AP100/8
Q AP100/6.5
Q AP100/5
Q AP100/4.3
Q AP100/3.5
Q AP100/2.5
Q AP100/1.7
Q AP100/1.2
I AP100/10
I AP100/8
I AP100/6.5
I AP100/5
I AP100/4.3
I AP100/3.5
I AP100/2.5
I AP100/1.7
I AP100/1.2

Voltage	Nominal Power
24 V	3000 W

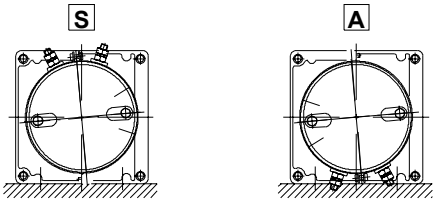
Protection index: IP43
Insulation class: . . . . . F
Type of winding: . . . . . Compound
Brushes kit: 200.5441.38029
Minimum brushes length: . . . . . 15 mm (0.6 inches)



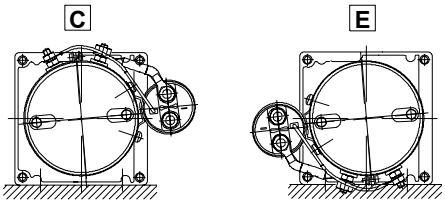
Weight : 12 Kg (26.4 lb)

	Motor		Motor with relay			
Rotation Right						
		24 V - 3000 W				24 V - 3000 W
Type		**C248AK/Z0**				**C248AK/Z1**
Code		200.5439.24601				200.5439.24602
Relay					Heavy duty	
Relay type						R212
					Standard positions only	

Motor mounting position
Standard positions



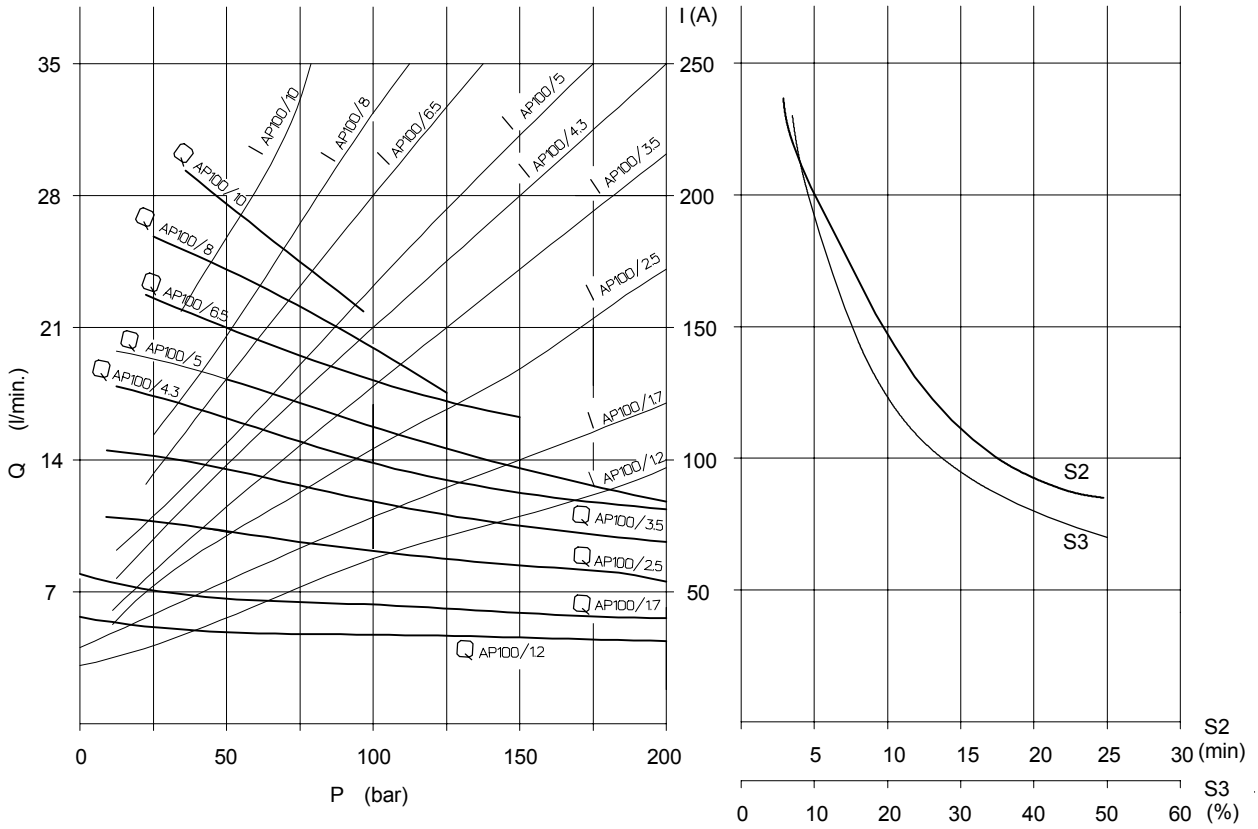
Relay mounting positions
Standard positions



Example

	Electric motor										Pos.	Relay							Pos.
5	C	2	4	8	A	K	/	Z	0		S								

24 V - 3000 W


I (A)
Q (l/min.)
P (bar)
AP100/10
AP100/8
AP100/6.5
AP100/5
AP100/4.3
AP100/3.5
AP100/2.5
AP100/1.7
AP100/1.2
S2
S3
S2 (min)
S3 (%)

5.1.5 Starter Relays - Technical information

Versions:

Available voltage: 12-24 V

Standard: suitable for most applications.

Heavy duty: for more arduous conditions

See relative table for technical data for:

- Electrical insulation class

- Type of duty

- Protection factor:
The level of protection is defined according to the same parameters as listed for electric motors.

- Contact life:
The contacts of the relay will wear down progressively during operation.

Since the rate of wear is dedicated by the type of duty and cannot therefore be broadly specified, consult our Sales dept. for guideline information.

Fitment to electric motor

Starter relays can be fitted to the frame of the motor by two different methods:

1. Direct

The relay is secured with screws, using holes already tapped in motor frame. In this instance there is one standard mounting position only.

2. Metal clip

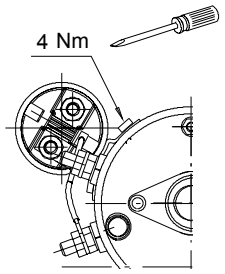
Suitable for standard relays only.

The relay is secured by means of a clip encircling the motor frame and inserted through special slots in the feet of the relay itself.

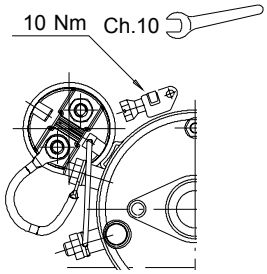
In this instance, several mounting positions are possible.

Electrical diagram

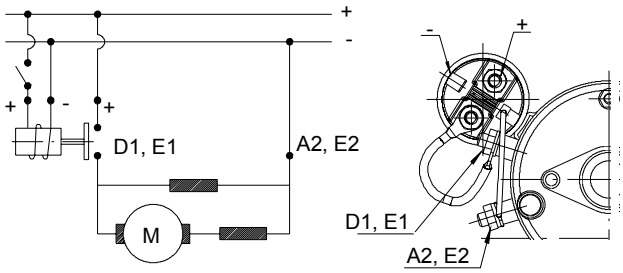
A typical arrangement for connection of the relay to the electric motor is shown in the diagram.



Direct fixing

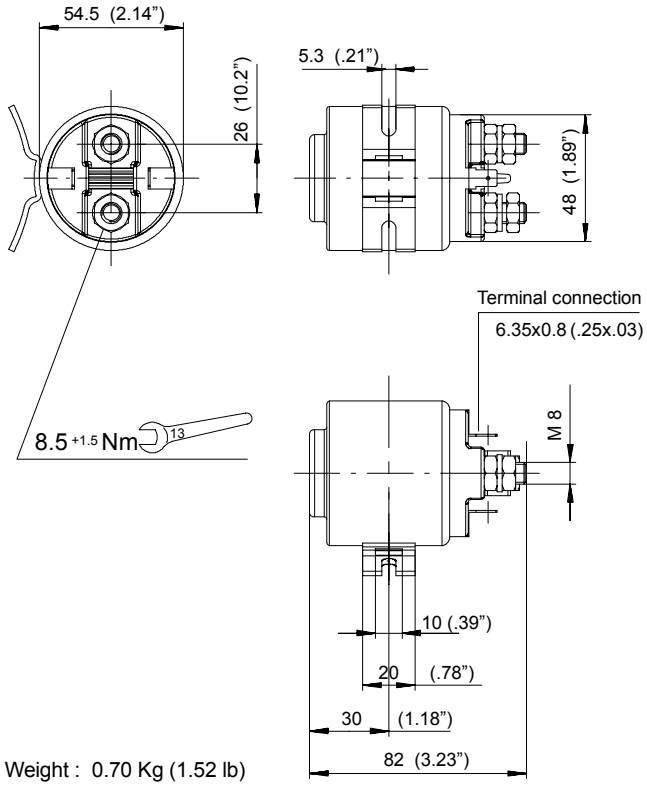


Fixing with clip

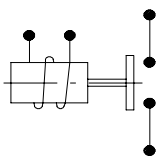


Electric diagram

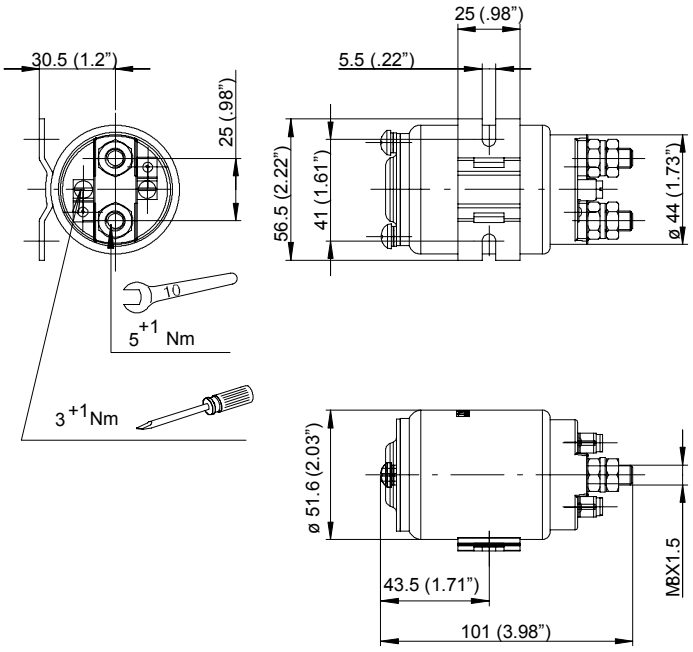
Starter relays

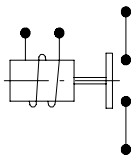


Weight : 0.70 Kg (1.52 lb)

Voltage	12 V	24 V
Type	**R106**	**R209**
Code	200.5441.34106	200.5441.34209
Amps Consumption by the coil	2.8 A	1.1 A
Current for continuous duty		80 A
Max. current (5 sec.)		500 A
Protection index		IP54
Insulation class		F
Electric diagram		

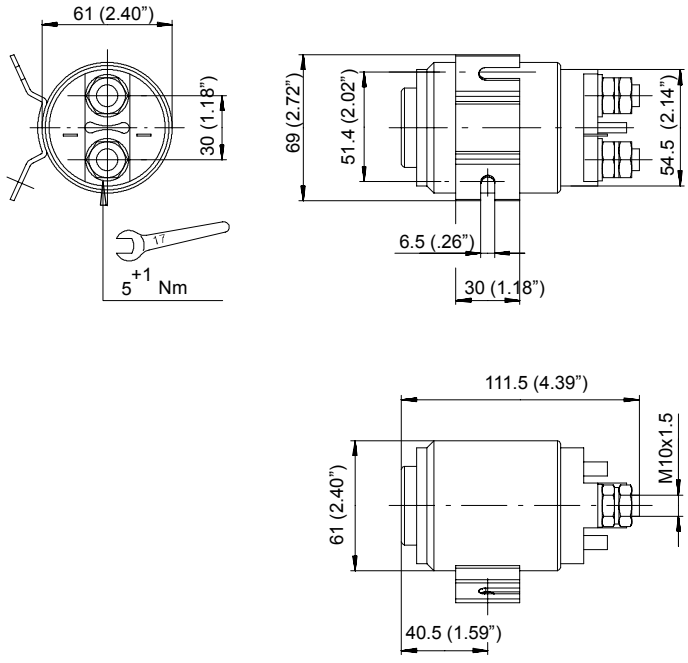
Heavy duty

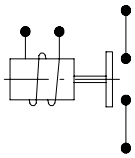


Voltage	12 V	24 V
Type	**R107**	**R210**
Code	200.5441.34107	200.5441.34210
Amps Consumption by the coil	2 A	1.1 A
Current for continuous duty		150 A
Max. current (5 sec.)		800 A
Protection index		IP42
Insulation class		B
Electric diagram		

Weight : 0.78 Kg (1.69 lb)

Heavy duty



Voltage	24 V
Type	**R212**
Code	200.5441.34212
Amps Consumption by the coil	1.1 A
Current for continuous duty	300 A
Protection index	IP42
Insulation class	B
Electric diagram	

Weight : 1.268 Kg (2.75 lb)

5.2 A.C. Motors

5.2.1 Technical information

Versions:

Electric motors supplied by Bucher Hydraulics S.p.A. respond to European Standard IEC 34-1, CEI2.3, VDE0530.1, VDE0530.2

Available power ratings: 0.25 ÷ 4 kW

Single phase motor: 220V 50 Hz

Three phase motor: 220-380V 50 Hz

Max permissible tolerance on power supply voltage: ± 10%.

European standard IEC38 (1983) envisages the unification of supply voltages, adopting 230 V for single phase and 400 V for three phase. Motors responding to this standard are available only by request: consult our Sales Department

Protection factor

Standard electric motors are specified:

Protection degree: IP54

Insulation class F (max 105°).

Type of duty

All motors are self-ventilating and rated for continuous duty S1.

Speed of rotation

The nominal speed of rotation for A.C. motors is calculated with the following formula:

$$n = \frac{60 \cdot f}{P}$$

f= frequency (in Europe 50 Hz)

P= pair of poles

Motors supplied by Bucher Hydraulics S.p.A. have two pairs of poles (4 poles), thus giving 1500 rev/min. as the nominal speed of rotation.

Size

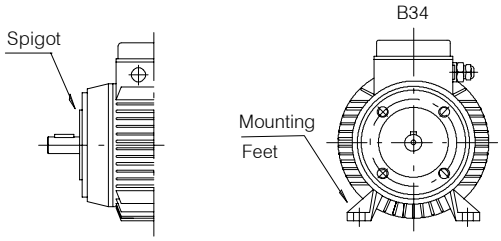
The size designation of an electric motor determines the main standardized dimensions of the machine: diameter and length of shaft extension, type of flange, etc.

A specific table shows the essential dimensions corresponding to each standard size.

Frame size

Standard options:

B34: mounting flange with spigot and tapped fixing holes plus motor fixing feet



Paint finish

All motors are aluminium alloy die cast not painted supplied, suitable for operation in an industrial environment.

Starting single phase motors

Standard single phase motors have a permanently connected run capacitor. Where starts are made on-load or in especially heavy-duty condition, requiring a starting torque higher than the nominal torque, single phase induction motors can be supplied, by request, with a dual capacitor arrangement: a start capacitor, disconnected by an automatic cutout once the motor is up to speed, and a permanently connected run capacitor, or hydraulic circuit with decompression valve assembled on the pump.

Please consult our Technical Department.

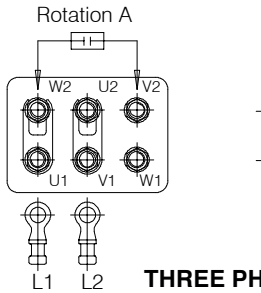
Electrical diagrams

The following illustration shows a number of connection diagrams for single phase and three phase electric motors.

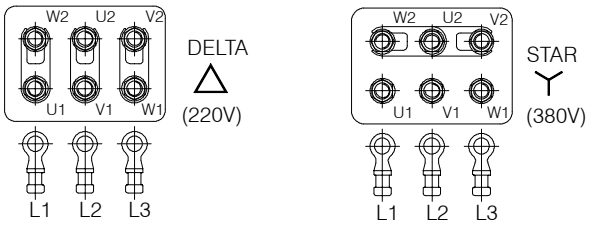
The terminal boxes used for these motors respond to NFC 51-120 (IEC34-8) and have 6 power terminals.

A terminal is also provided for the earth wire, which must always be connected

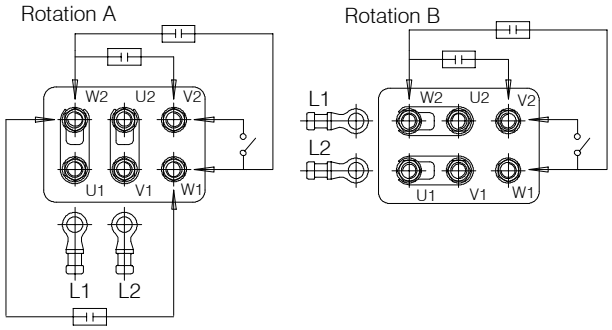
SINGLE PHASE motor



THREE PHASE motor



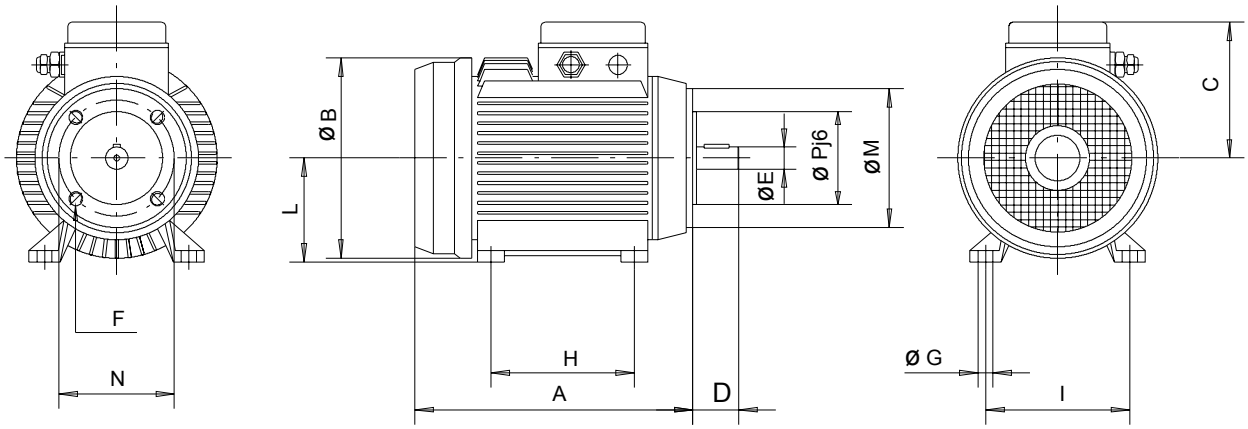
SINGLE PHASE motor With high starting torque



Three phase motors: with terminals U1-V1-W1 connected respectively to phases L1-L2-L3 of supply, the motor will rotate clockwise (as viewed from the shaft end).

The direction of rotation can be reversed by switching any two of the three connections.

Frame size **B34**



Size	Dimensions													
	Units	A	B	C	D	E	F	G	H	I	L	M	N	P
71	mm	230	154	101	30	14	M6	7	90	112	71	105	85	70
	inch	9.05	6.06	3.97	1.18	0.55		0.27	3.54	4.41	2.79	4.13	3.35	2.76
80	mm	250	162	125	40	19	M6	9	100	125	80	120	100	80
	inch	9.84	6.38	4.92	1.57	0.75		0.35	3.94	4.92	3.15	4.72	3.94	3.15
90	mm	278	178	135	50	24	M8	9	125	140	90	140	115	95
	inch	10.94	7	5.31	1.97	0.94		0.35	4.92	5.51	3.54	5.51	4.53	3.74
100	mm	338	196	142	60	28	M8	12	140	160	100	160	130	110
	inch	13.31	7.72	5.59	2.36	1.1		0.47	5.51	6.3	3.94	6.3	5.12	4.33

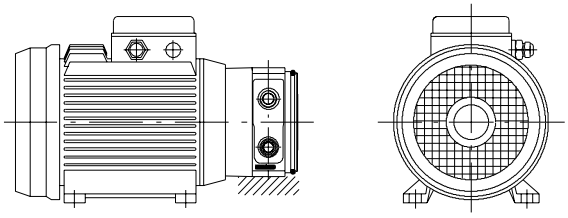
Note: lengths and diameters indicated by the letter A and B are guideline only.

Frame size B34 SINGLE PHASE motor				
Power		Size	Type	Code
kW	HP			
0.25	0.33	71	**T709**	200.5431.61223
0.37	0.5	71	**T701**	200.5431.61822
0.55	0.75	80	**T702**	200.5431.62233
0.75	1	80	**T703**	200.5431.62633
1.1	1.5	90	**T704**	200.5431.63042
1.5	2	90	**T705**	200.5431.63442
2.2	3	100	**T706**	200.5431.64052

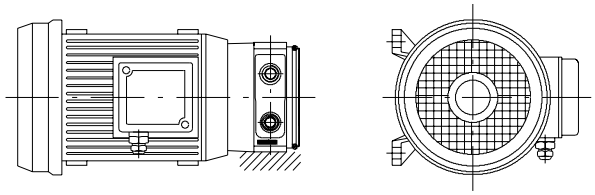
Frame size B34 THREE PHASE motor				
Power		Size	Type	Code
kW	HP			
0.25	0.33	71	**T509**	200.5435.61222
0.37	0.5	71	**T501**	200.5435.61822
0.55	0.75	80	**T502**	200.5435.62232
0.75	1	80	**T503**	200.5435.62632
1.1	1.5	90	**T504**	200.5435.63042
1.5	2	90	**T505**	200.5435.63442
2.2	3	100	**T506**	200.5435.64052
3	4	100	**T507**	200.5435.64852
4	5.5	100	**T508**	200.5435.65062

Mounting position

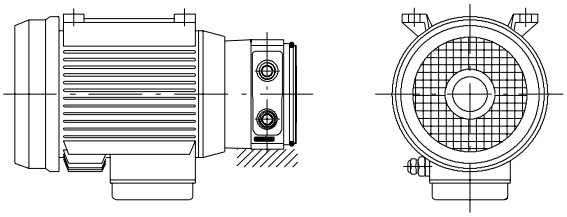
Standard position **S**



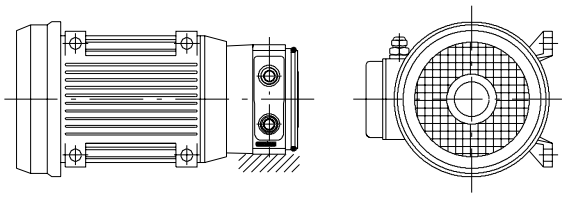
Left lateral **B**



Reversal position **A**



Right lateral **C**



Example **5**

Electric motor											Pos.	
T	5	0	3								S	

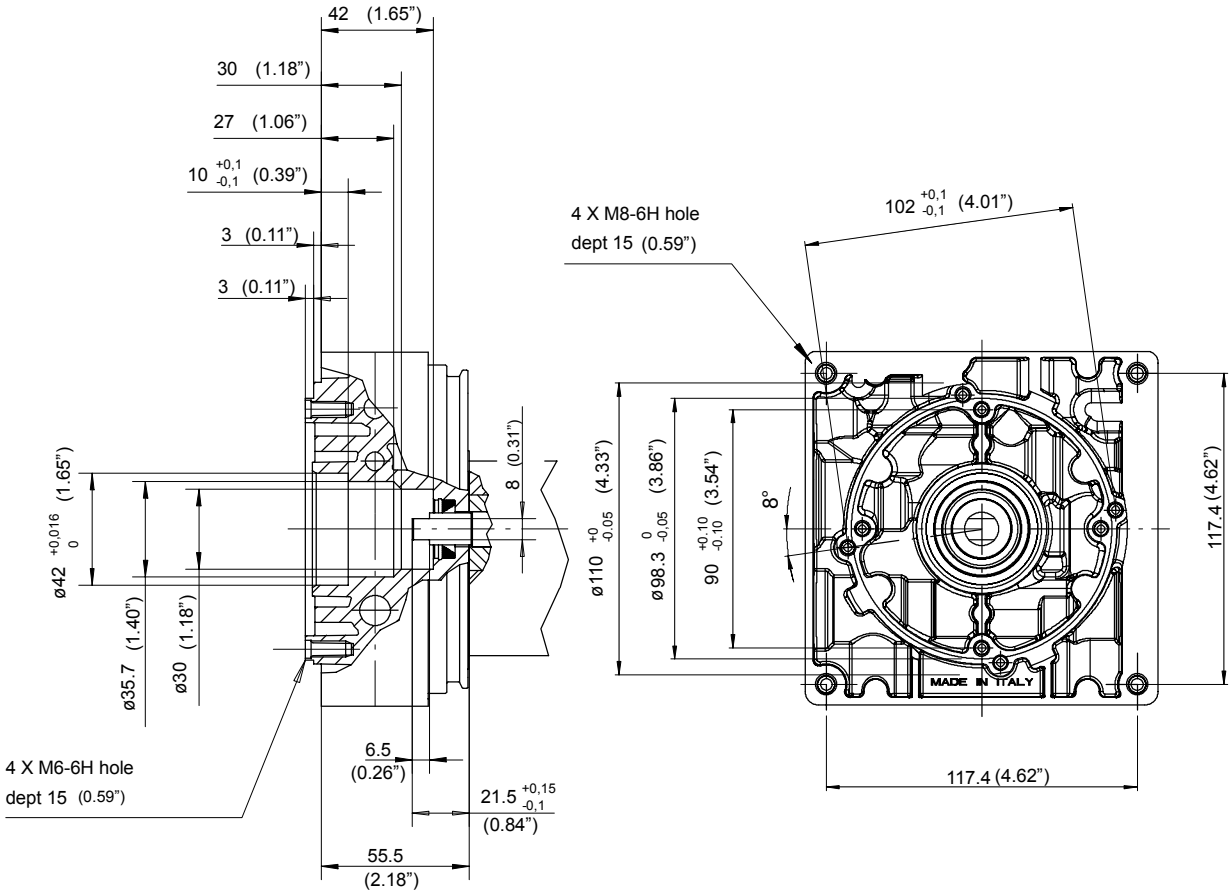
Relay							Pos.

6 Drives

6.1 Introduction

The drives illustrated in this chapter are intended for use in conjunction with D.C. and A.C. motors as described in the previous chapter.

To allow the use of different motors, the interface on the motor side is shown with the dimensions of the spigot and of the end of the pump drive shaft.



6.1.1 Materials

The flanges for connection of the power pack housing and electric motor are in aluminium alloy GdAlSi12Cu to EN-AB 46100 (UNI5076).

Couplings are high strength steel, with mating surfaces hardened by heat treatment for added resistance to wear.

6.2 Drives for D.C. motors

The tables allow selection of the correct drive for the selected motor.

Motor type			Voltage	Power	Drive
C135AK/X0	C135AK/X1	C135AK/X0 + R107	12 V	1600 W	**E145**
C240AK/Y0	C240AK/Y1	C240AK/Y0 + R210	24 V	2200 W	
T107E	T107E+R106	T111E	12 V	1700 W	
T109E	T109E+R209	T112E	24 V	2200 W	
C248AK/Z0	C248AK/Z1		24 V	3000 W	
C134AK/O0	C134AK/O1	C134AK/O0 + R107	12 V	1500W	**E156**
C238AK/P0	C238AK/P1	C238AK/P0 + R210	24 V	2000 W	
T82K			48 V	2000 W	
C128AE/S0	C128AE/S0+R106		12 V	700 W	**E163**
C232AE/R0	C232AE/R0+R209		24 V	800 W	

6.3 Drives for A.C. motors

6.3.1 Single phase

Motor type	Power		Drive
	kW	HP	
T209-T709	0.25	0.33	**E133**
T201-T701	0.37	0.5	
T202-T702	0.55	0.75	**E131**
T203-T703	0.75	1	
T204-T704	1.1	1.5	**E132**
T205-T705	1.5	2	
T206-T706	2.2	3	**E137**

6.3.2 Three phase

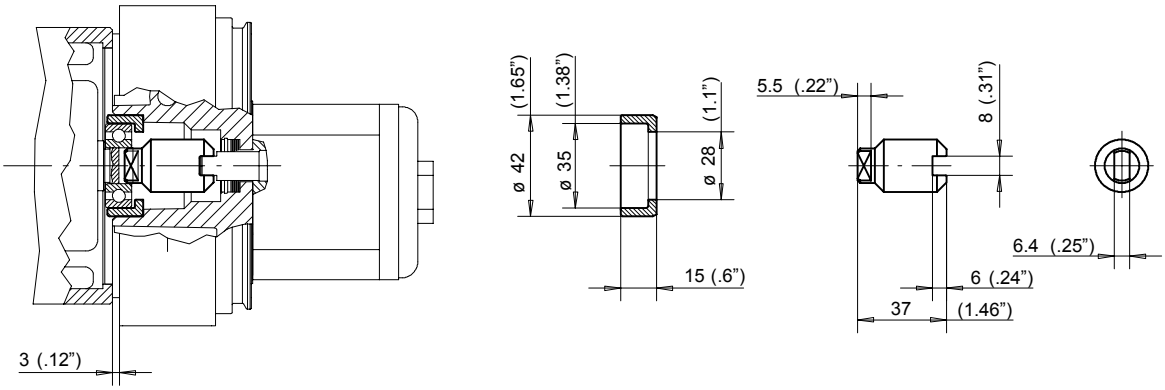
Motor type	Power		Drive
	kW	HP	
T009-T509	0.25	0.33	**E133**
T001-T501	0.37	0.5	
T002-T502	0.55	0.75	**E131**
T003-T503	0.75	1	
T004-T504	1.1	1.5	**E132**
T005-T505	1.5	2	
T006-T506	2.2	3	**E137**
T007-T507	3	4	
T008-T508	4	5.5	

6.4 Drive E145

Code E145 **200.9604.0040.0**

Bush code
200.6582.0006.1

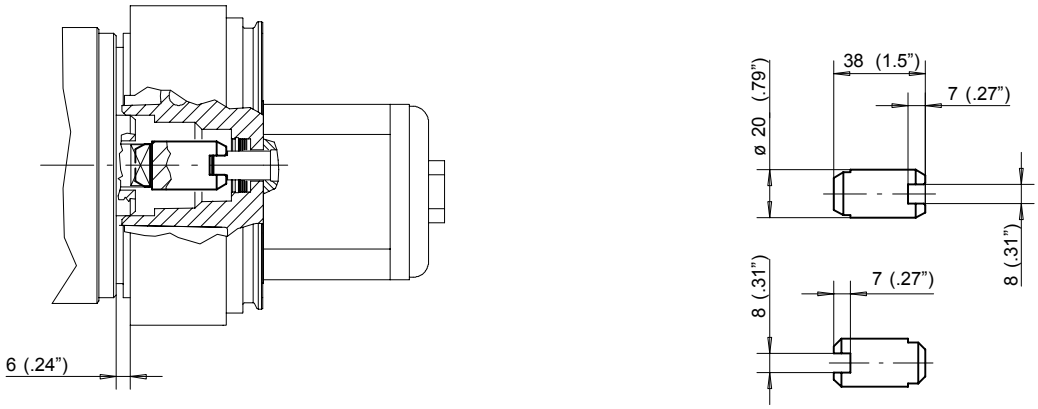
Coupling code
200.6596.0029.0



6.5 Drive E156

Code E156 **200.6596.0028.0**

Coupling code
200.6596.0028.0

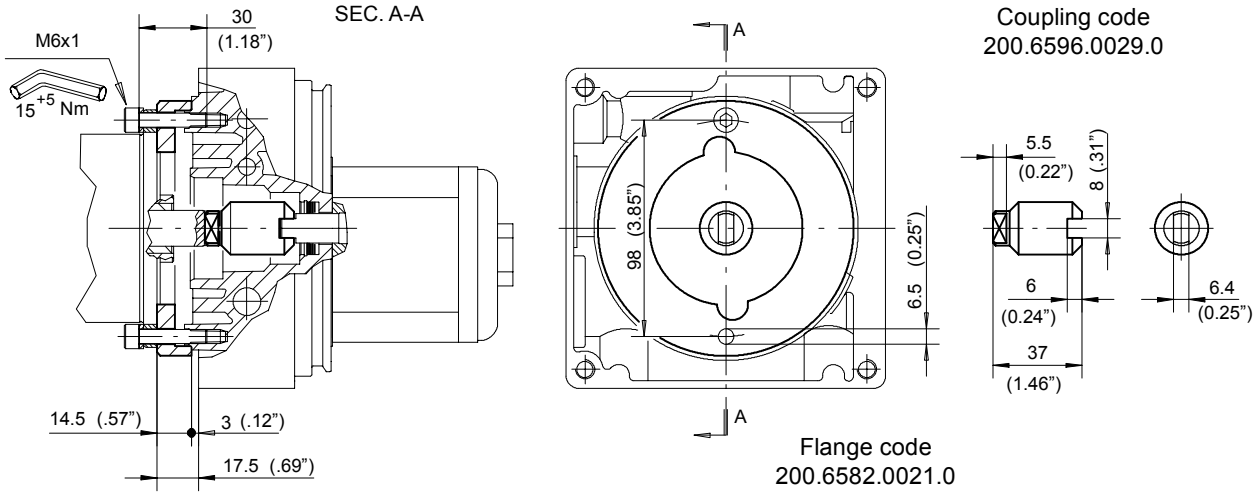


6.6 Drive E163

Code E163 **200.9604.0041.0**

SEC. A-A

Coupling code
200.6596.0029.0

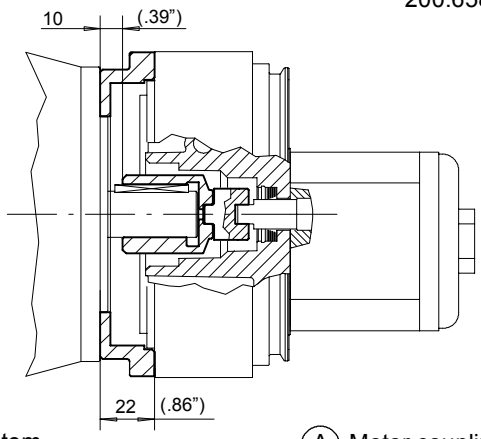


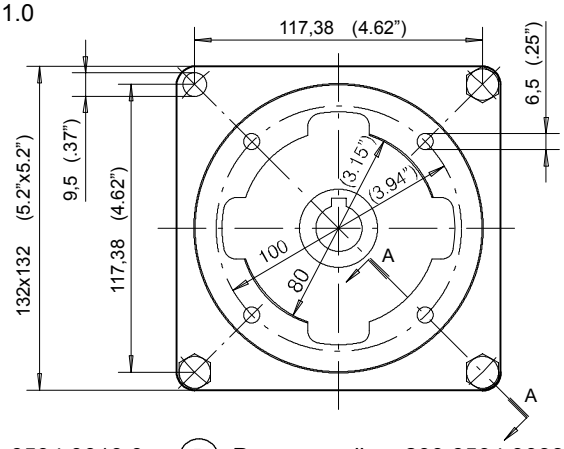
Flange code
200.6582.0021.0

6.7 Drive E131

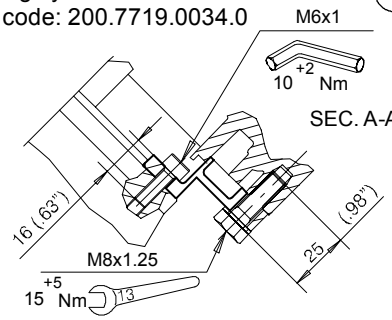
Code E131 **200.9604.0043.0**

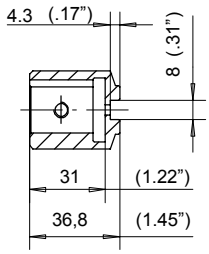
Flange code
200.6582.0011.0

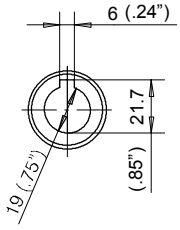


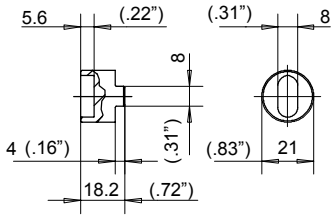


Fixing system
Kit code: 200.7719.0034.0









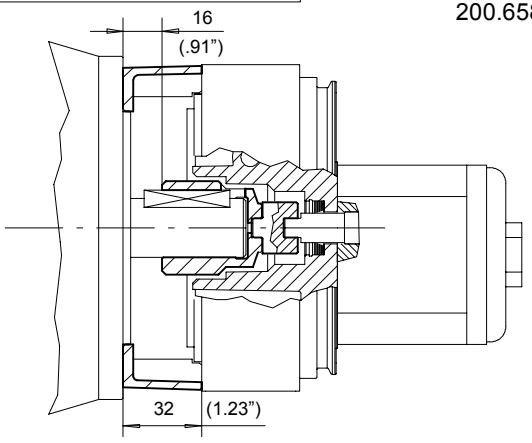
Ⓐ Motor coupling 200.6594.0019.0 Ⓑ Pump coupling: 200.6594.0033.0

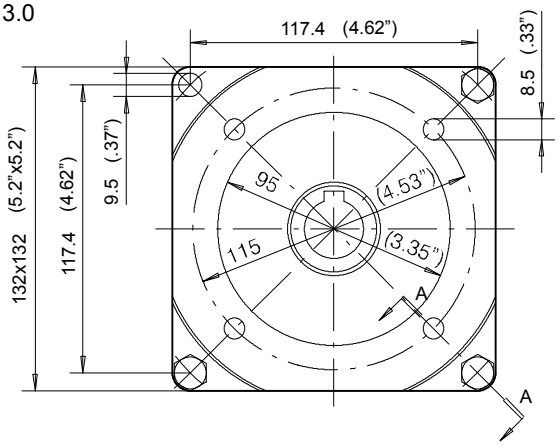
Ⓐ + Ⓑ Code: 200.9594.0012.0

6.8 Drive E132

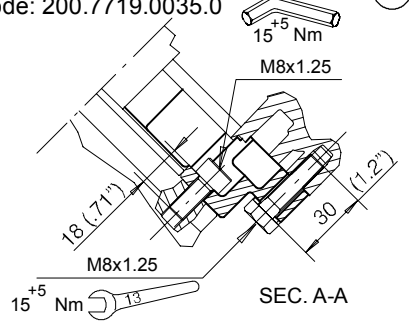
Code E132 **200.9604.0044.0**

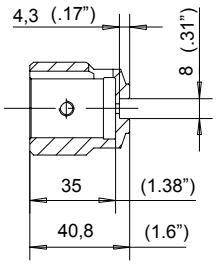
Flange code
200.6582.0013.0

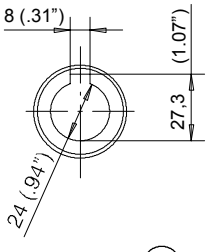


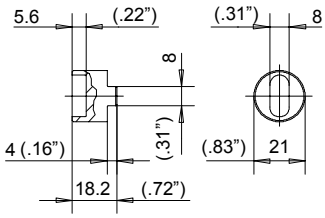


Fixing system
Kit code: 200.7719.0035.0









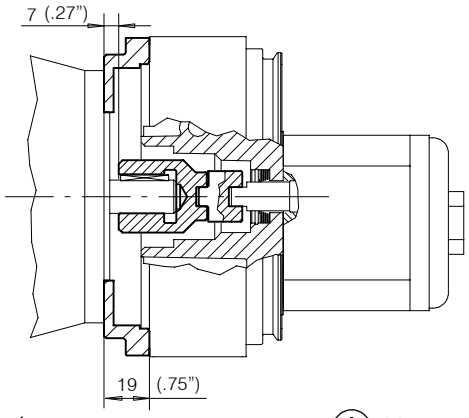
Ⓐ Motor coupling: 200.6594.0023.0 Ⓑ Pump coupling: 200.6594.0033.0

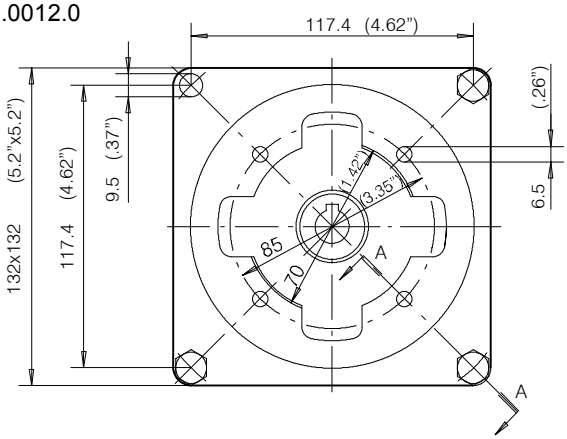
Ⓐ + Ⓑ Code: 200.9594.0013.0

6.9 Drive E133

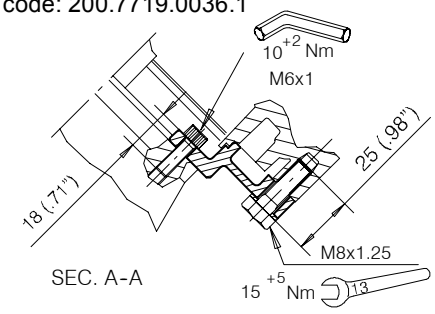
Code E133 **200.9604.0042.0**

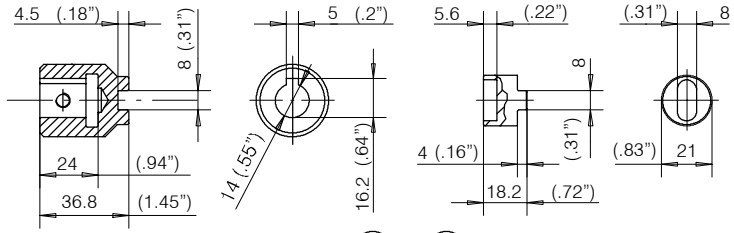
Flange code
200.6582.0012.0





Fixing system
Kit code: 200.7719.0036.1





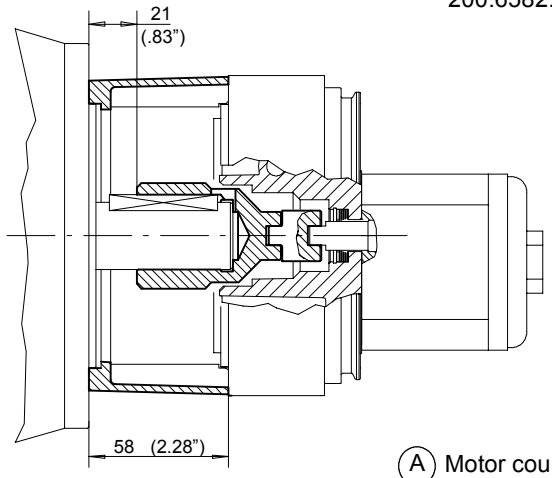
Ⓐ Motor coupling 200.6594.0022.0 Ⓑ Pump coupling 200.6594.0033.0

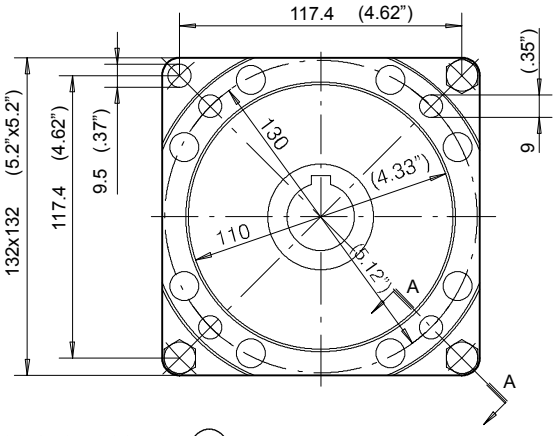
Ⓐ + Ⓑ Code: 200.9594.0011.0

6.10 Drive E137

Code E137 **200.9604.0045.0**

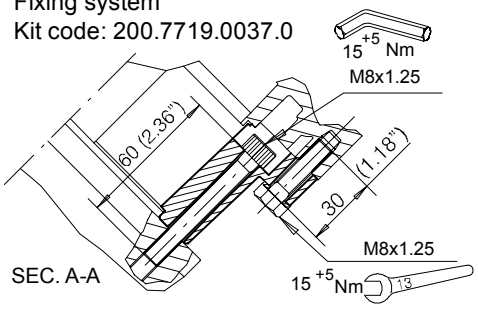
Flange code
200.6582.0014.0

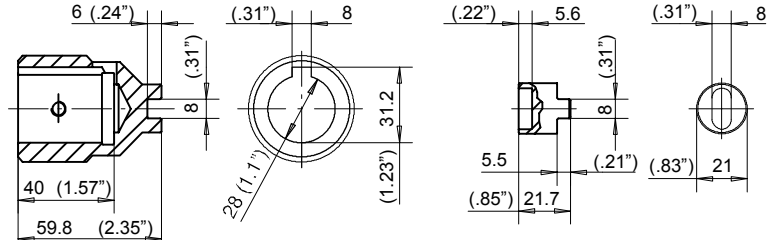




Ⓐ Motor coupling: 200.6594.0024.0 Ⓑ Pump coupling: 200.6594.0032.0

Fixing system
Kit code: 200.7719.0037.0



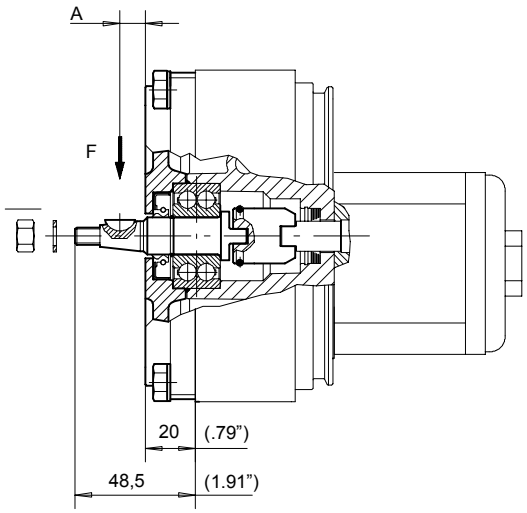


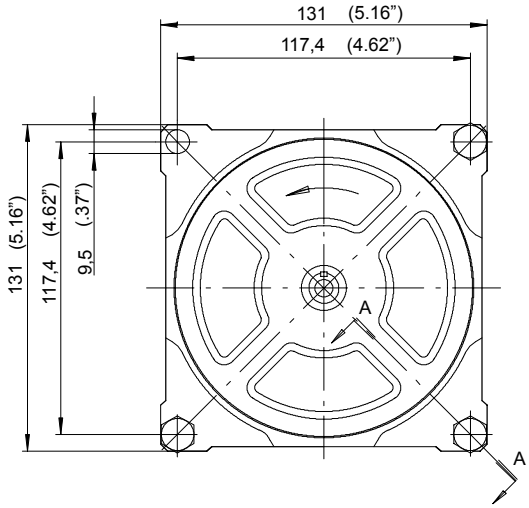
Ⓐ + Ⓑ Code: 200.9594.0014.0

6.11 Drive E181

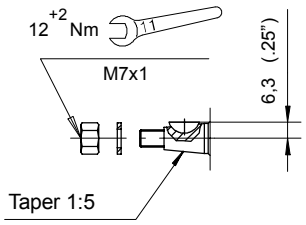
- The E181 Drive is mostly used in application where radial or axial forces occur like: Pulley drive, gear drive, etc.
- The E181 drive can be used with any type of UP100K housing rotation counterclockwise.

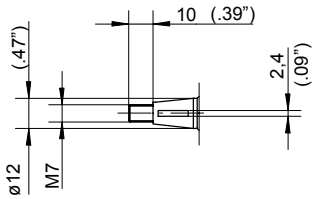
Code E181 **200.7604.0047.0**

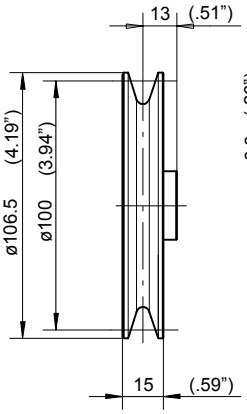




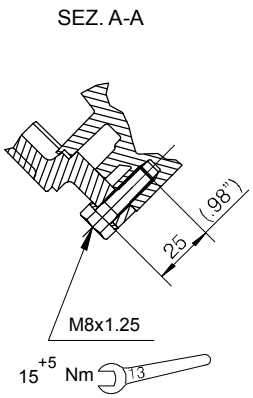
Shaft end

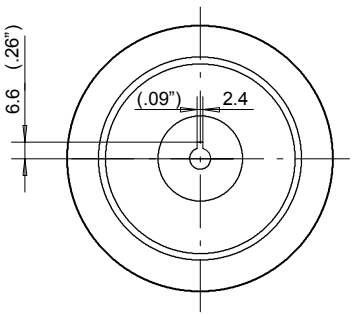




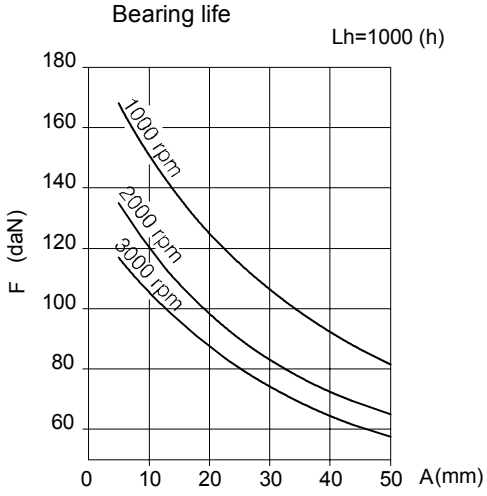


Fixing system





Bearing life



Drive E181 does not include the Ø100 pulley, which must be ordered separately

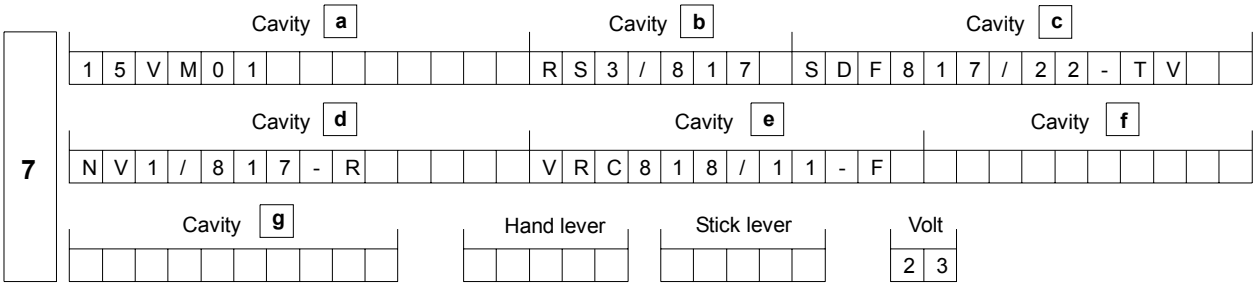
Ø100 pulley, part number: 200.6690.0001.0

7 Cartridge valves

7.1 Introduction

This chapter includes all technical information relating to valves for use in conjunction with the housings described in section 1.

Complete the designation codes for the selected valves according to the technical information and guidelines given for each component. Illustrated here by way of example is a correct and complete compilation for section 7 of the hydraulic power pack designation form.



7.1.1 Materials

Bucher Hydraulics cartridge valves are manufactured using steel of high mechanical strength. Friction and potential wear are minimized by special heat treatments. Surface heat treatments protect parts exposed to the external environment. Standard seals are NBR (Buna N), with backup ring in PTFE. For application requiring special compound FPM (Viton) etc. consult our Sales Dpt.

7.1.2 Indication for use

Use mineral oil based hydraulic fluids to ISO/DIN standard, only. Recommended viscosity range: 20-120 mm^2/s (cSt) maximum viscosity 700 mm^2/s (cSt).

For different fluids and operating conditions, consult our Sales Dpt.

All valves showed in the present catalogue are marked with correct flow direction, please observe it always. Valves must never be tampered with or modified.

Any unwarranted interference may adversely affect the safety and correct operation of the entire system.

Seals and backup rings are user-serviceable.

The appropriate replacement kit is indicated for each valve.

Before installing a valve in its cavity, ensure that the housing and all components of the system are clean.

Smear external seals lightly with grease, and check that any filters installed are correctly positioned.

Tighten the valve to the specified torque setting.

7.1.3 General technical information

All valves with leakage-free operating characteristic are 100% factory tested.

Nonetheless, the guaranteed maximum leakage may be exceeded if the valve is installed in a system with inadequate filtration.

Pressure drops and general performance indicated in the catalogue are referred exclusively to the component.

In the case of valves subject to adjustable setting, such as the pressure relief and if not specified in the order, we set them according to standard setting values indicated at chapter 7.2.1.

7.1.4 Solenoid valves

The correct selection of the solenoid valve is related to the maximum flow rate and operating pressure values. In a system with a single acting cylinder, therefore, it must be considered that the effective rate of flow through the unloading solenoid valve is not the flow delivered by the pump, but rather the momentary flow exhausted from the cylinder, or the restricted flow needing a pressure-compensated flow control valve, if installed.

The nominal voltage is the value indicated on the solenoid.

Effective voltage must be measured at the terminals of the solenoid connector.

A maximum allowed tolerance of ±10% in relation to the nominal value is accepted.

Incorrectly power supply components and cables (which length has to be as shorter as possible) and/or low battery charge can cause not correct solenoid valve operation.

Standard solenoids valves are designed for D.C. operation. A.C. supply requires a connector with bridge rectifier included. When energized with A.C. voltage, the solenoids can operate at 50 or 60 Hz frequency, without distinction.

The connection used for standard solenoids are to EN 175301-803 (DIN 43650).

Solenoid with different connections (Amp JuniorTimer, Direct Wiring, etc.) can be supplied on request, after agreement with our Sales Dpt.

The solenoid can be rotated through 360°, and the connector EN 175301-803 (DIN 43650) positioned at 90° intervals.

Specified performance datas were recorded in stabilized solenoid operated temperature and voltage at the -10% of the nominal value.

All solenoid valves are fitted with protective O-rings installed between the tube and the solenoid.

This protects internal parts from condensation and contaminants, which could cause malfunction.

Standard solenoids are not suitable for operation in environments where there is any risk of explosion (see Directives and standards page 5/142)

7.1.5 General notes on D.C. power input

A swift and secure coupling is obtained using the special connector (type 200.544110009).

The cable coming from the D.C. power source (batteries, rectified a.c. main supply, etc.) must be connected as indicated in the diagram (figure 1).

The negative and positive polarity of the wire need not be verified for connection purposes. The connector incorporates a terminal for earthing the solenoid.

It is important to check that the grommet and armour clamp nut are correctly assembled (figure 2), as this prevents the cable being wrenched from connector.

7.1.6 General notes on A.C. power input

Solenoid valves can be operated off the A.C. mains supply using a special connector (type 200.544110012) which converts the current to provide the D.C. input required by the solenoid.

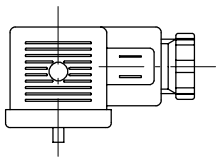
The connector in question is identified by a symbol (figure 3) marked both on the top and on the bottom face.

The conversion from alternate to direct current is effected by a rectifier circuit comprising a four-diode bridge, and a voltage-dependent resistor (figure 4) protecting against over voltages in the power supply circuit.

Accordingly, the solenoid are designed to operate correctly only when connected to a diode bridge which reduces the input voltage by 10%.

The earth connection is made by way of the terminal provided.

Fig. 1



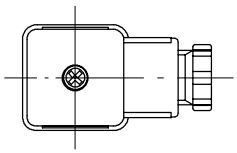


Fig. 2

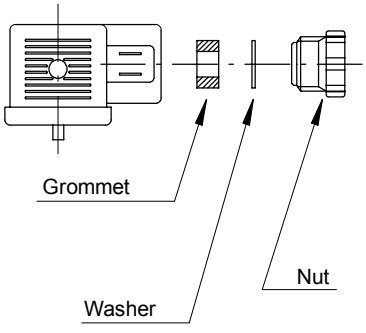
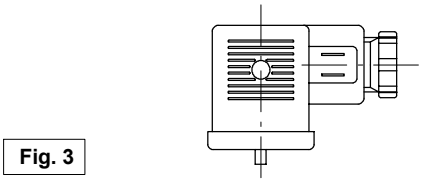
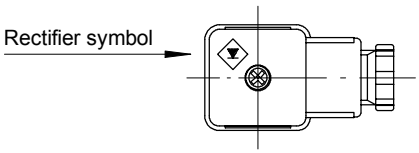
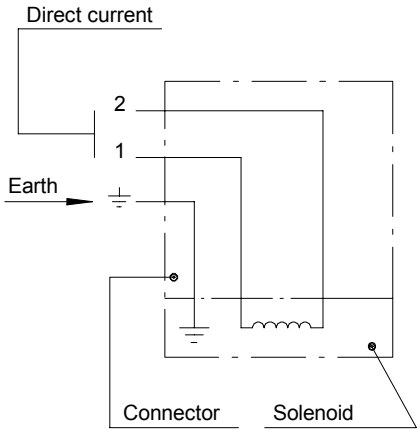


Fig. 3







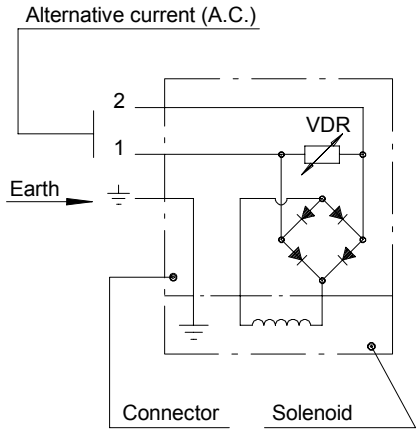
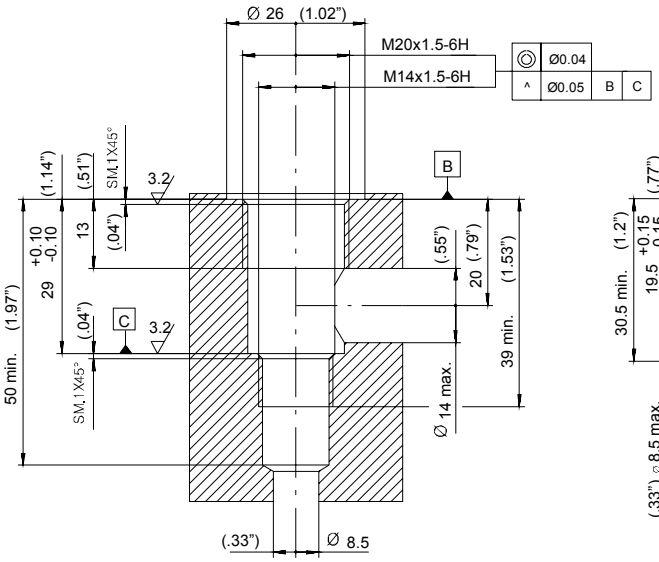


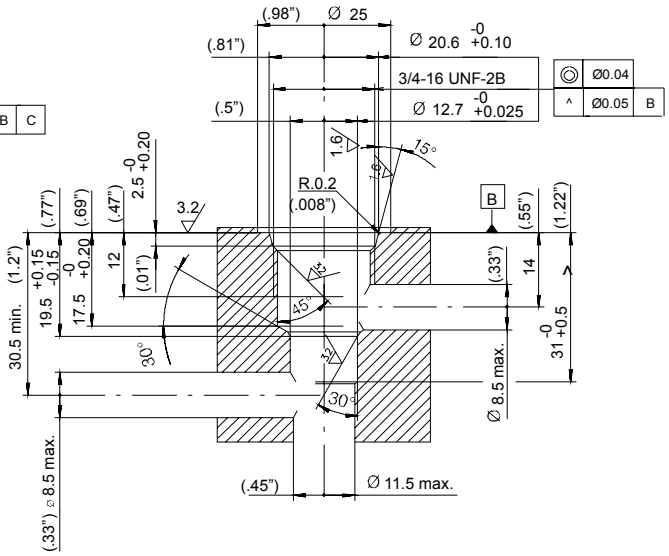
Fig. 4

For users wishing to make up special circuits and blocks with Bucher Hydraulics S.p.A. cartridge valves, it is important to observe the indications given below when machining the valve cavities.

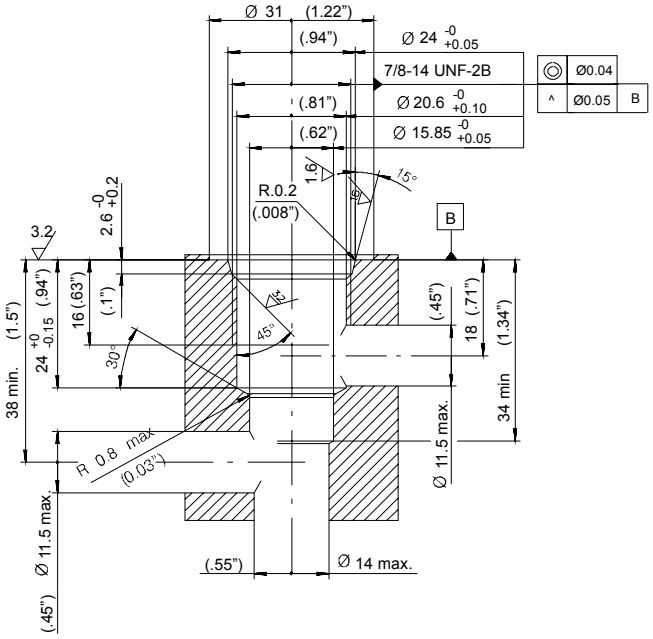
Two-way cavity
M20x1.5



Two-way cavity
3/4" - 16 UNF



Two-way cavity
7/8" - 14 UNF

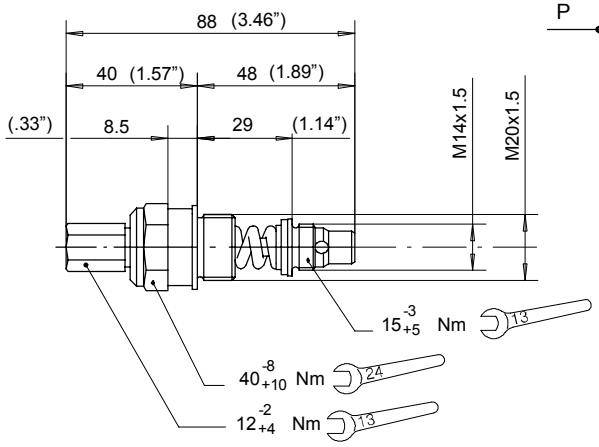


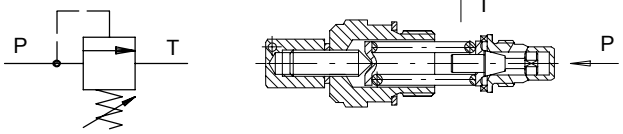
7.2 Pressure relief valves

7.2.1 Pressure relief valve: **VM01

Direct acting
Balanced piston
Adjustable setting
Four setting ranges

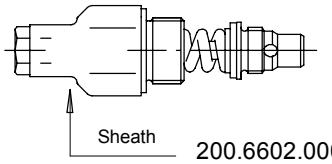
Max. pressure. . . . . 300 bar *
Max flow rate . . . . . 40 l/min.
Temperature range . . . . . -20/+90 °C
Weight . . . . . 0.120 Kg.





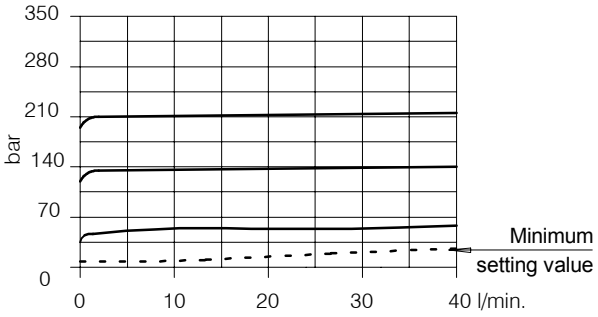
The valve can be sealed against tampering

Sheath shrink temperature: T= 60°C



200.6602.0001.1

Oil: Viscosity 37 mm²/s at 40°C



A heat-shrinkable sheath can be supplied, if requested to prevent the valve being tampered with.

When ordering, state in full the sheath part number, and, if the valve is to be supplied with sheath already fitted, the relief pressure setting required.

* Maximum admitted pressure value: 230 bar when used into the diecast alluminium alloy body

Pressure setting

For present values other than those indicated, replace the first two digits of the designation with the setting required. For example, required setting 120 bar: designation type 12 VM01. Always check that the required value falls within the standard ranges of adjustment.

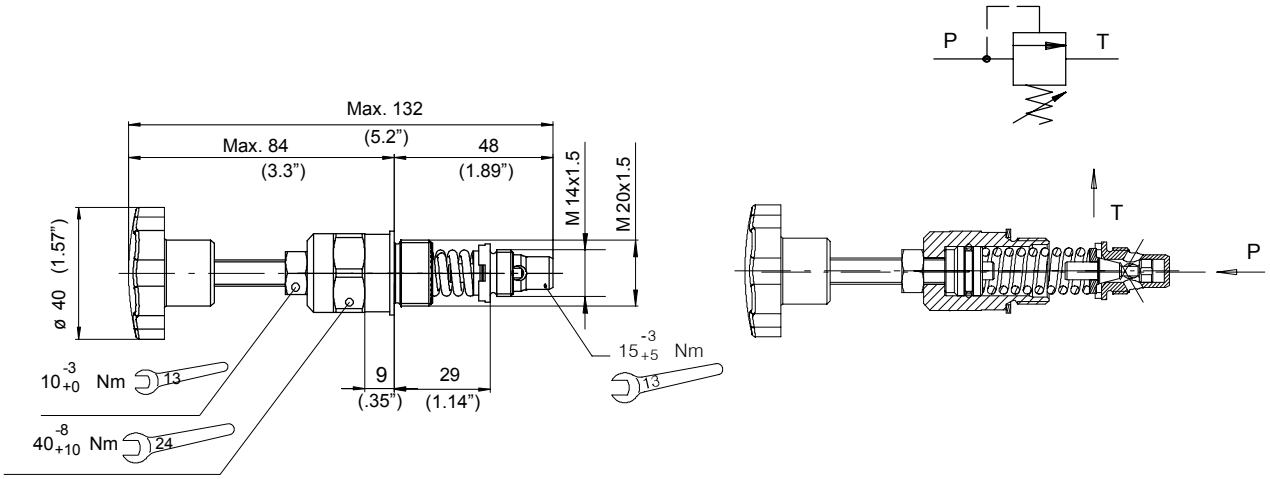
Note: A wrench with the appropriate hex. profile is required to secure the valve in its cavity.

Spring	Spring color	Spring code	Setting range	Standard setting	Type	Code
00			Plugged	Without valve	**00VC00**	200.9784.0014.0
02		200.6624.0147.0	15 - 30 bar	20 bar	**02VM01**	200.7874.0070.0
06	Yellow	200.6624.0145.0	30 - 95 bar	60 bar	**06VM01**	200.7874.0072.0
15	Green	200.6624.0148.0	95 - 210 bar	150 bar	**15VM01**	200.7874.0074.0
22	Blue	200.6624.0146.0	200 - 300 bar	220 bar	**22VM01**	200.7874.0071.0

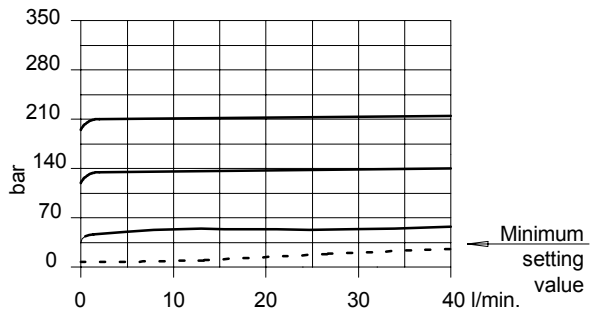
7.2.2 Pressure relief valve: **VM05

Direct acting
Balanced piston
Adjustable setting
Four setting range

Max. pressure . . . . . 300 bar *
Max. flow rate . . . . . 40 l/min.
Temperature range . . . . . -20/+90 °C
Weight . . . . . 0.200 Kg.



Oil: Viscosity 37 mm²/s at 40°C



Pressure setting

For preset values other than those indicated, replace the first two digits of the designation with the setting required.

* Maximum admitted pressure value: 230 bar when used into the diecast alluminium alloy body

For example, required setting 120 bar: designation type 12VM05. Always check that the required value falls within the standard ranges of adjustment.

Note: A wrench with the appropriate hex. profile is required to secure the valve in its cavity.

Spring	Spring color	Spring code	Setting range	Standard setting	Type	Code
00			Plugged	Without valve	**00VC00**	200.9784.0014.0
02		200.6624.0147.0	15 - 30 bar	20 bar	**02VM05**	200.7874.0176.0
06	Yellow	200.6624.0145.0	30 - 95 bar	60 bar	**06VM05**	200.7874.0178.0
15	Green	200.6624.0148.0	95 - 210 bar	150 bar	**15VM05**	200.7874.0180.0
22	Blue	200.6624.0146.0	200 - 300 bar	220 bar	**22VM05**	200.7874.0174.0

7.3 Check valves

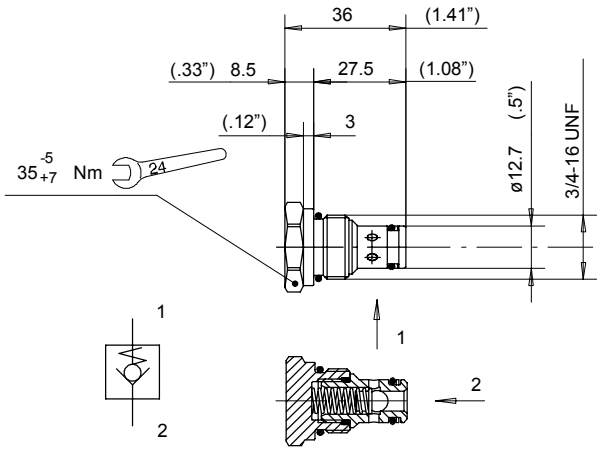
7.3.1 Check valve: RS3/817

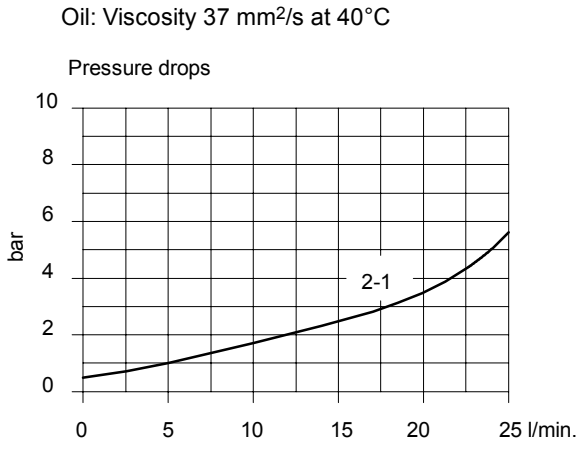
Ball type

Flow from 2 to 1

Code **200.7876.0141.0**

Max. pressure . . . . . 230 bar
Max. flow . . . . . 25 l/min.
Cracking pressure . . . . . 0.5 bar
Temperature range . . . . . -20/+90 °C
O-Ring replacement kit 200.9742.0016.0
Weight . . . . . 0.040 Kg.





7.3.2 Check valve: RM3/817-A

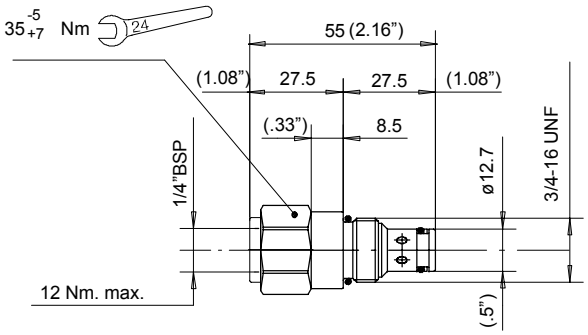
Ball type

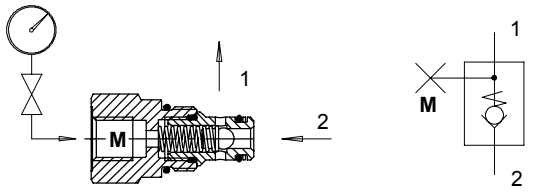
Flow from 2 to 1

Pressure through 1 and M

Code **200.7876.0216.0**

Max. pressure. . . . . 230 bar
Max. flow . . . . . 25 l/min.
Cracking pressure . . . . . 0.5 bar
Temperature range . . . . . -20/+90 °C
O-Ring replacement kit 200.9742.0016.0
Weight . . . . . 0.070 Kg.





Port M must be used only as a pressure outlet.
Normally supplied plugged.

Apply the prescribed tightening torque at port **M**.
Pressure drops: see RS3/817 performances

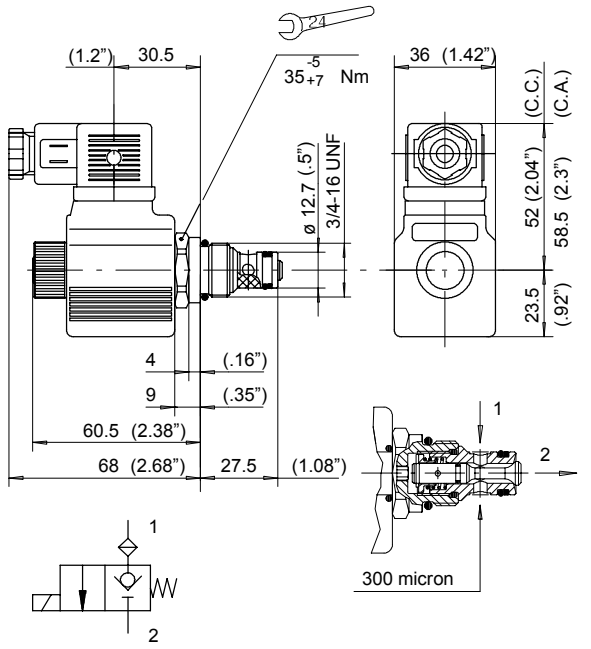
7.4 Solenoid operated directional valves

Circuit	Solenoid	Override	Type	Power	Description	Page
Normally closed						
	On-Off					
		Without manual override				
			Direct acting	standard (22 watt)	**SDF817/22-TV**	Page 96
				heavy duty (27 watt)	**SDR817/22-TV**	Page 97
		With manual override				
			Direct acting	heavy duty (27 watt)	**SDRE817/22-TV**	Page 97
			Piloted	standard (22 watt)	**SPE817/22-TV**	Page 98
	Proportional					
		With manual override				
			Direct acting	standard (17 watt)	**PDF817/22-TV**	Page 102
Normally open						
	On-Off					
		Without manual override				
			Piloted	standard (22 watt)	**SPF817/22-TO**	Page 99
		With manual override				
			Piloted	standard (22 watt)	**SPE817/22-TO**	Page 99

7.4.1 Solenoid operated directional valve: SDF817/22-TV

Normally closed
Direct acting - 22 watt

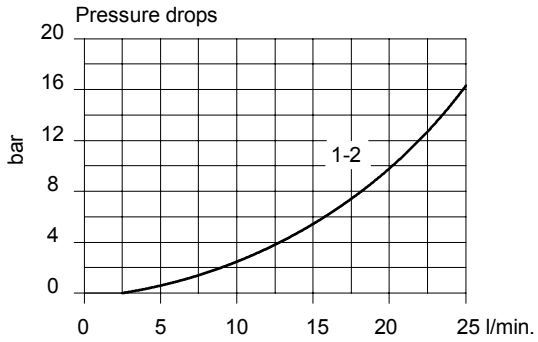
Poppet type
Flow from 1 to 2



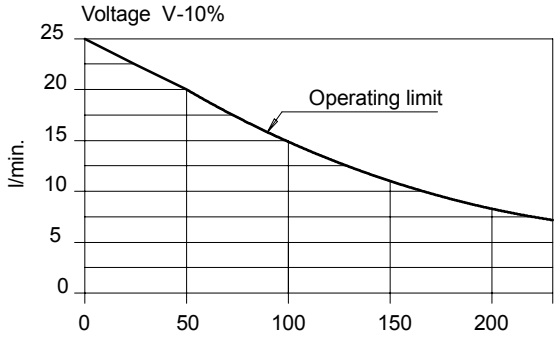
Weight (complete valve): 0.350 Kg.

Electric performances	
Max. pressure	230 bar
Max recommended pressure	210 bar
Max. flow	8 l/min. 210 bar
Rated power	22 Watt
Intermittence	ED= 100%
Voltage tolerance	± 10%
Internal leakage	0-5 drops/min.
Temperature range	-20/+90 °C
Connector type	DIN 43650
Time to open (50-210 bar)	15-50 ms.
Time to close (50-210 bar)	10-40 ms.
O-Ring replacement kit	**200.9742.0014.0**

Oil: Viscosity 37 mm^2/s at 40°C



Max. flow rate depending on nominal pressure



Directional valve without coil and connector

SDF817/22-TV P.M.	**200.7572.0001.0**

Complete solenoid valve for D.C. current

SDF817/22-TV-13-HC	**200.9570.1001.3**
SDF817/22-TV-23-HC	**200.9570.2001.3**

Coil voltage - A.C. supply requires a connector with bridge rectifier included.

22 watt	**D.C.**		**A.C.**		
Volt	12 V.	24 V.	24 V.	110 V.	220 V.
Type	**13**	**23**	**21**	**41**	**51**

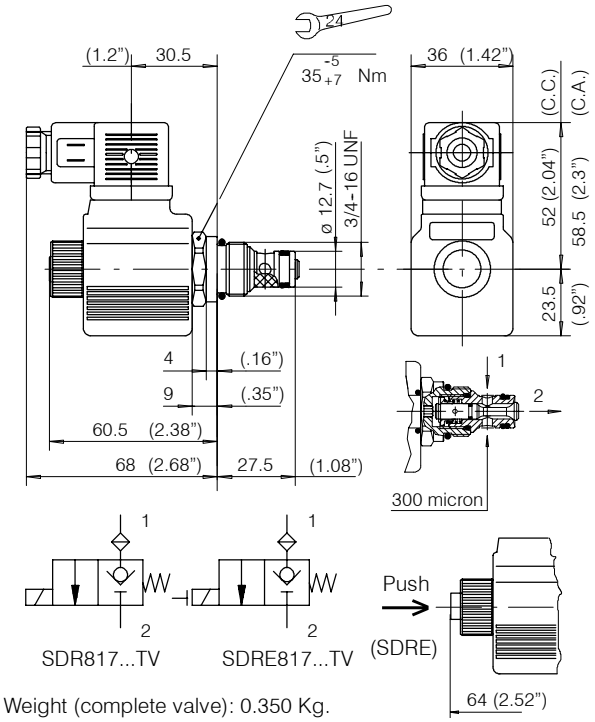
Complete solenoid valve for A.C. current

SDF817/22-TV-21-HC	**200.9569.2001.4**
SDF817/22-TV-41-HC	**200.9569.4001.2**
SDF817/22-TV-51-HC	**200.9569.6001.2**

7.4.2 Solenoid operated directional valve: SDR(E)817/22-TV

Normally closed
With or without manual override
Direct acting - 27 watt

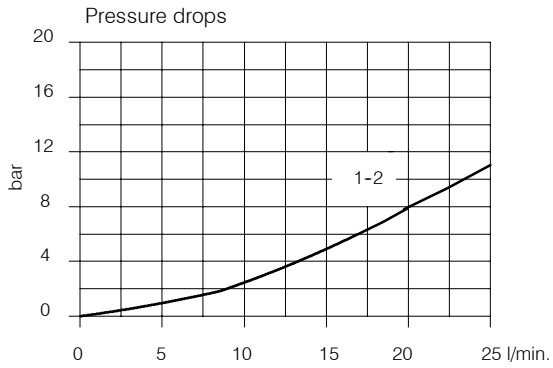
Poppet type
Flow from 1 to 2



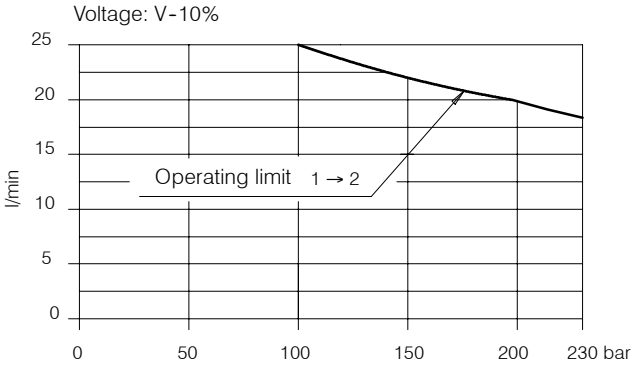
Weight (complete valve): 0.350 Kg.

Electric performances	
Max. pressure	230 bar
Max recommended pressure	210 bar
Max. flow	20 l/min. 210 bar
Rated power	27 Watt
Intermittence	ED= 100%
Voltage tolerance	± 10%
Internal leakage	0-5 drops/min.
Temperature range	-20/+90 °C
Connector type	DIN 43650
Time to open (50-210 bar)	15-50 ms.
Time to close (50-210 bar)	15-50 ms.
O-Ring replacement kit	**200.9742.0039.0**

Oil: Viscosity 37 mm^2/s at 40 °C



Max. flow rate depending on nominal pressure



Directional valve without coil and connector

SDR817/22-TV P.M.	**200.7572.0084.0**
SDRE817/22-TV P.M.	**200.7572.0082.0**

Complete solenoid valve for D.C. current

SDR817/22-TV-13-HC	**200.9570.1005.8**
SDR817/22-TV-23-HC	**200.9570.2006.0**
SDRE817/22-TV-13-HC	**200.9570.1005.7**
SDRE817/22-TV-23-HC	**200.9570.2005.9**

Coil voltage - A.C. supply requires a connector with bridge rectifier included.

27 watt	D.C.		A.C.		
Volt	12 V.	24 V.	24 V.	110 V.	220 V.
Type	**13**	**23**	**21**	**41**	**51**

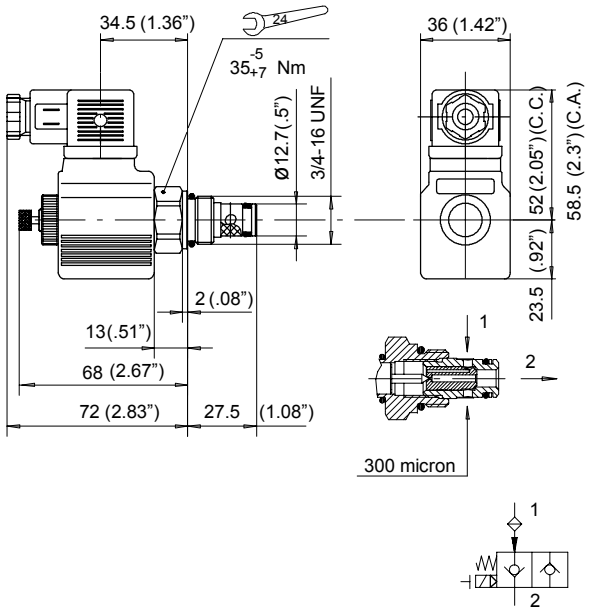
Complete solenoid valve for A.C. current

SDR817/22-TV-21-HC	**200.9569.2004.6**
SDR817/22-TV-41-HC	**200.9569.4004.0**
SDR817/22-TV-51-HC	**200.9569.6004.3**
SDRE817/22-TV-21-HC	**200.9569.2004.5**
SDRE817/22-TV-41-HC	**200.9569.4003.9**
SDRE817/22-TV-51-HC	**200.9569.6004.2**

7.4.3 Solenoid operated directional valve:

SPE817/22-TV

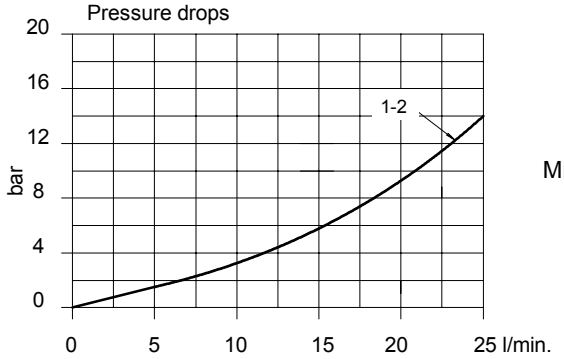
Normally closed Poppet type
Pilot type Flow from 1 to 2, not admitted from 2 to 1



Weight (complete valve): 0.350 Kg

Electric performances	
Max. pressure	300 bar
Max. recommended pressure	230 bar
Max. flow	25 l/min.
Rated power	22 Watt
Intermittence	ED= 100%
Voltage tolerance	± 10%
Internal leakage	0-5 drops/min.
Temperature range	-20/+90 °C
Connector type	DIN 43650
Time to open (50-210 bar)	15-60 ms.
Time to close (50-210 bar)	15-60 ms.
O-Ring replacement kit	200.9742.0014.0

Oil: Viscosity 37 mm^2/s at 40°C



Minimum operating pressure= 5 bar

Directional valve without coil and connector

SPE817/22-TV P.M.	**200.7572.0055.0**

Coil voltage - A.C. supply requires a connector with bridge rectifier included.

	D.C.		A.C.		
Volt	12 V.	24 V.	24 V.	110 V.	220 V.
Type	**13**	**23**	**21**	**41**	**51**

Complete solenoid valve for A.C. current

SPE817/22-TV-21-HC	**200.9569.2003.4**
SPE817/22-TV-41-HC	**200.9569.4004.1**
SPE817/22-TV-51-HC	**200.9569.6004.4**

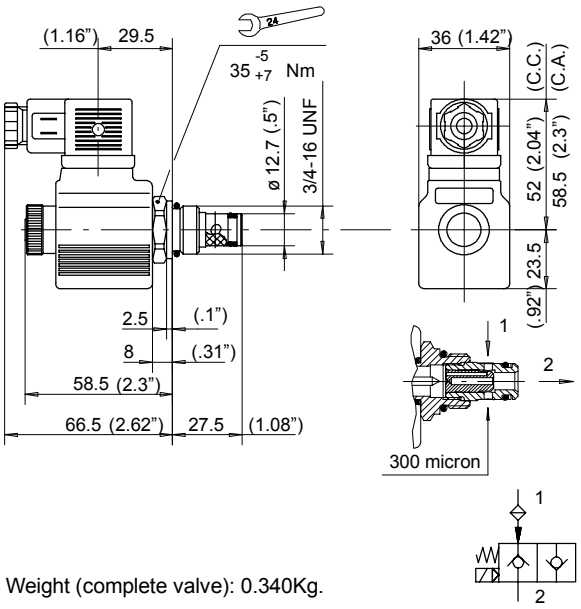
Complete solenoid valve for D.C. current

SPE817/22-TV-13-HC	**200.9570.1005.9**
SPE817/22-TV-23-HC	**200.9570.2201.3**

7.4.4 Solenoid operated directional valve:

SPF817/22-TO

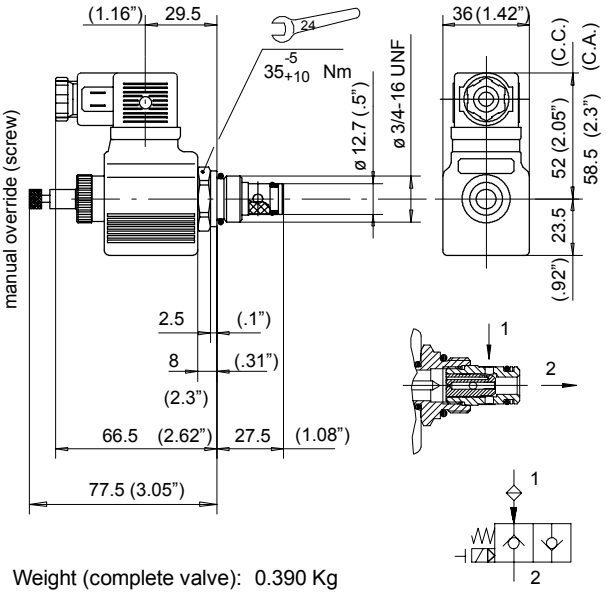
Normally open Poppet type
Pilot type Flow from 1 to 2, not admitted from 2 to 1



Weight (complete valve): 0.340Kg.

SPE817/22-TO

With manual ovverride



Weight (complete valve): 0.390 Kg

Directional valve without coil and connector

SPF817/22-TO P.M.	200.7572.0020.0

Directional valve without coil and connector

SPE817/22-TO P.M.	200.7572.0054.0

Coil voltage - A.C. supply requires a connector with bridge rectifier included.

	D.C.		A.C.		
Volt	12 V.	24 V.	24 V.	110 V.	220 V.
Type	**13**	**23**	**21**	**41**	**51**

Complete solenoid valve for D.C. current

SPF817/22-TO-13-HC	200.9570.1002.1
SPF817/22-TO-23-HC	200.9570.2002.0

Complete solenoid valve for D.C. current

SPE817/22-TO-13-HC	200.9570.1005.6
SPE817/22-TO-23-HC	200.9570.2005.8

Complete solenoid valve for A.C. current

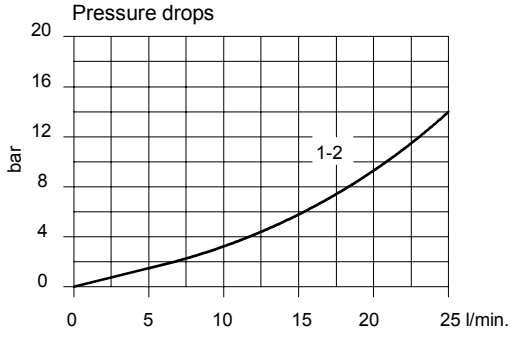
SPF817/22-TO-21-HC	200.9569.2002.0
SPF817/22-TO-41-HC	200.9569.4001.8
SPF817/22-TO-51-HC	200.9569.6001.8

Complete solenoid valve for A.C. current

SPE817/22-TO-21-HC	200.9569.2004.4
SPE817/22-TO-41-HC	200.9569.4003.8
SPE817/22-TO-51-HC	200.9569.6004.1

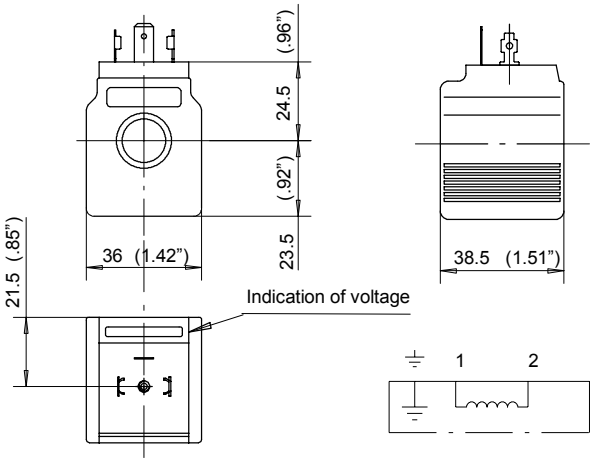
Electric performances	
Max. pressure	300 bar
Max. recommended pressure	210 bar
Max. flow	25 l/min.
Rated power	22 Watt
Intermittence	ED= 100%
Voltage tolerance	± 10%
Internal leakage	0-5 drops/min.
Temperature range	-20/+90° C
Connector type	DIN 43650
Time to open (50-210 bar)	15-60 ms.
Time to close (50-210 bar)	15-60 ms.
O-Ring replacement kit	**200.9742.0014.0**

Oil: Viscosity 37 mm^2/s at 40°C



Minimum operating pressure= 5 bar

7.4.5 Directional valve solenoids



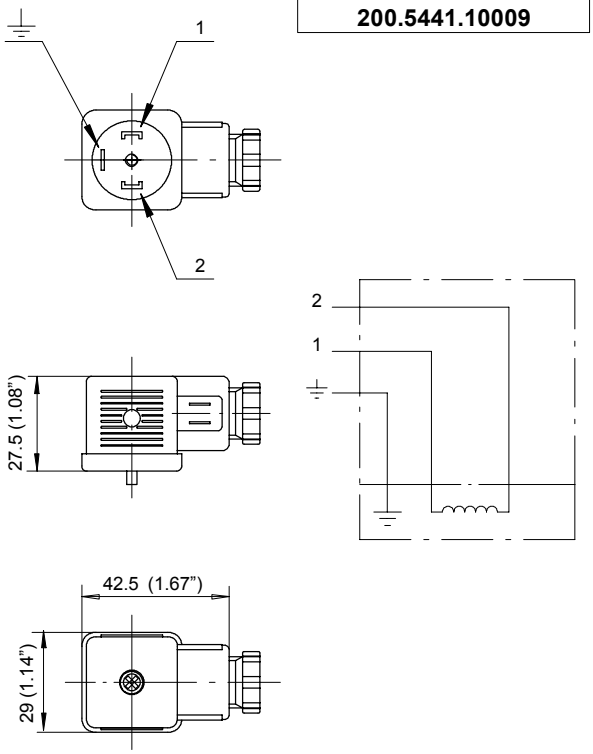
For solenoid valve series	SDF817 SPF817 SDR817 SDRE817
Wire class	H (VDE0580)
Coil insulation	IP65 (DIN40050)
Duty rating	ED 100%
Connector style	DIN 43650
Stabilized temperature	70°C
Voltage tolerance	± 10%

	Supply Voltage	Nominal Coil voltage	Power (Watt)	Resistance (Ohm)		Current (Ampere)		Coil code
				Ambient temp.	Stabil. temp.	Ambient temp.	Stabil. temp.	
SPF - SDF	12 V. DC	12 V. DC	22.8	6.3	8.9	1.9	1.35	200.6749.1001.0
	24 V. DC	24 V. DC	22.5	25.6	36.4	0.94	0.66	200.6749.2001.0
	24 V. AC	21.6 V. DC	23	20.2	28.8	1.07	0.75	200.6748.2001.0
	110 V. AC.	98 V. DC	23	420	598	0.235	0.165	200.6748.4001.0
	220 V. AC.	198 V. DC	23	1720	2450	0.115	0.08	200.6748.6001.0
SDR - SDRE	12 V. DC	12 V. DC	27.2	5.3	8	2.2	1.5	200.6749.1010.0
	24 V. DC	24 V. DC	27	21.3	32	1.12	0.75	200.6749.2008.0
	24 V. AC	21.6 V. DC	27.1	17.2	26	1.25	0.83	200.6748.2005.0
	110 V. AC.	98 V. DC	27	355	530	0.27	0.18	200.6748.4005.0
	220 V. AC.	198 V. DC	27.6	1422	2130	0.14	0.10	200.6748.6006.0

A.C. supply requires a connector with bridge rectifier included.

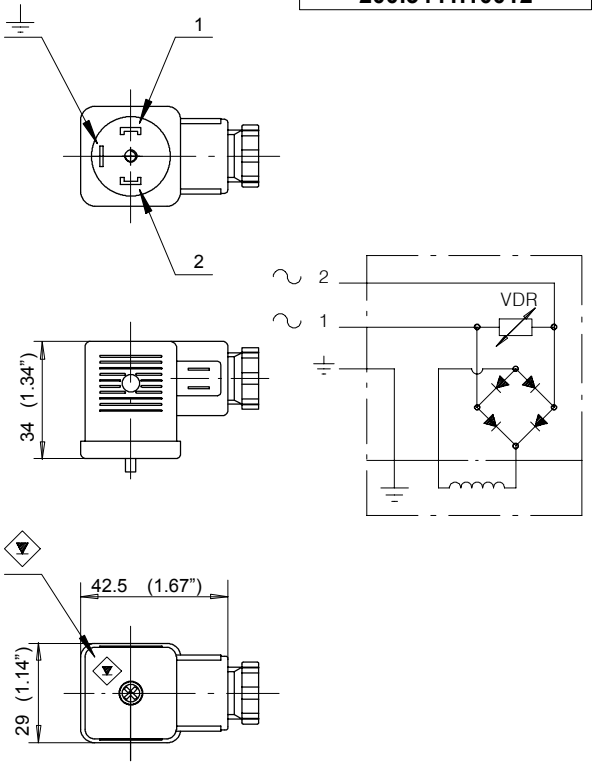
7.4.6 Connector for solenoid directional valves

Part number:
200.5441.10009



For power input	D.C.
Connector type	DIN 43650
Number of poles	2 + ⏚
Supply voltage	max. 220 V.
Nom. capacity at contacts	10 A.
Max capacity at contacts	16 A.
Resistance at contacts	≥ 4 mOhm
Max section of cable	1.5 mm^2
Outer material	Glass fibre reinforced Nylon
Contact mount material	
Color	Black
Armour clamp	Pg 9
Ø cable	6-8 mm.
Protection factor	IP65 (DIN40050)
Insulation class	C (VDE0110)
Temperature range	-40 / +90 °C

Part number:
200.5441.10012



For power input	A.C.
Connector type	DIN 43650
Number of poles	2 + ⏚
Supply voltage	max. 220 V.
Nominal capacity at contacts	10 A.
Max. capacity at contacts	16 A.
Resistance at contacts	≥ 4 mOhm
Max. section of cable	1.5 mm^2
Outer material	Glass fibre reinforced Nylon
Contact mount material	
Color	Black
Diodes	1N 4007 GP
Overvoltage protection	VDR
Armour clamp	Pg 9
Ø cable	6-8 mm.
Protection factor	IP65 (DIN40050)
Insulation class	C (VDE0110)
Temperature range	-40 / +90°C

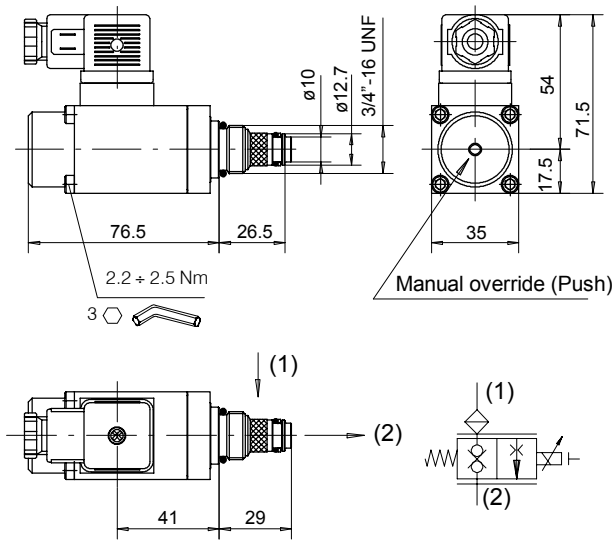
7.5 Proportional solenoid valve: PDF817/HS1

Poppet type

Direct acting

Normally closed

Flow from 1 to 2



(*)= frequence could affect the valve seal

Electric performances		
Coil according to	VDE 0580	
Connector type	DIN 43650	
Duty rating	ED=100%	
Suggested dither	0-150 Hertz (*)	
Insulation class with standard plug	IP54 (DIN 40050)	
Coil winding class	F	
Voltage ±5%	12 V (DC)	24 V (DC)
Max. current	2.25 A.	1.08 A.
Resistance at 20 °C	7.2 Ohm	24.6 Ohm
Nominal power	17.2 Watt	17.4 Watt
Inductange	31 mH armature falling down	140 mH armature rising
	90 mH armature falling down	406 mH armature rising

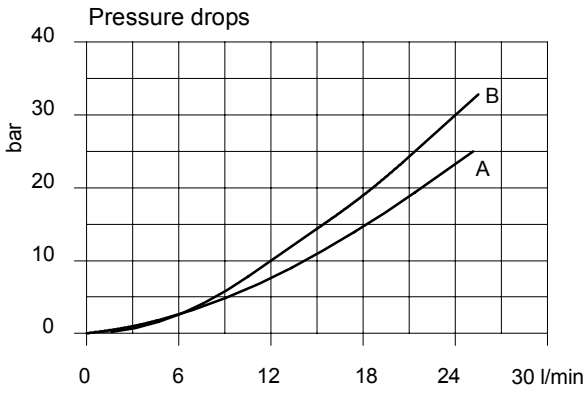
Hydraulic performances

Max. pressure	270 bar
Max recommended pressure	230 bar
Adjustable max flow	18 l/min. 150 bar
Internal leakage	0-5 drops/min.

Temperature range	-5 / +70 °C
Weight	0.530 Kg.
Inlet filter	300 m
O-Ring replacement kit	**200.9742.0031.0**

Code	**PDF817/HS1-P2-13 (12 V) 200.7571.1000.2**	without connector
	PDF817/HS1-P2-23 (24 V) 200.7571.2000.2	

Oil: Viscosity 37 mm^2/s at 40° C



Pressure drops

The curves represent the pressure drops as a function of the flow passing through the valve.

The values are obtained with a totally opened valve

A= Valve only

B= Valve assembled in the UP100 body

The curve of flow regulation and compensation are obtained by using a UP100 power unit and two different hydraulic circuit.

The curve “with VRC818” is obtained by assembling a flow control pressure compensated valve VRC818 on the return line of the PDF817.

The setting of the VRC818 is 20% higher compared to the max flow of the PDF817.

Regulated flow

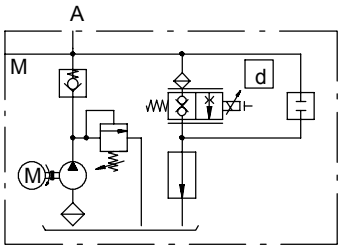
The curves represent the trend of the regulated flow as function of the current delivered from the electronic card that controls the proportional valve.

Particularly:

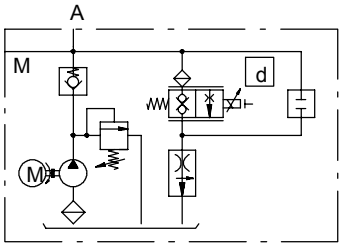
Up =increasing current values from I max. to I min.

Down = decreasing current values from I min. to I max

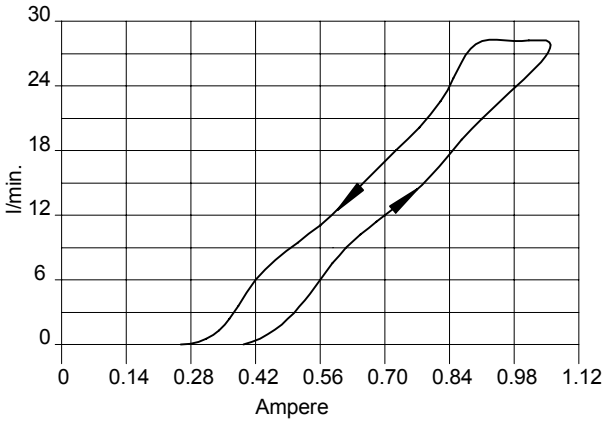
Without VRC818



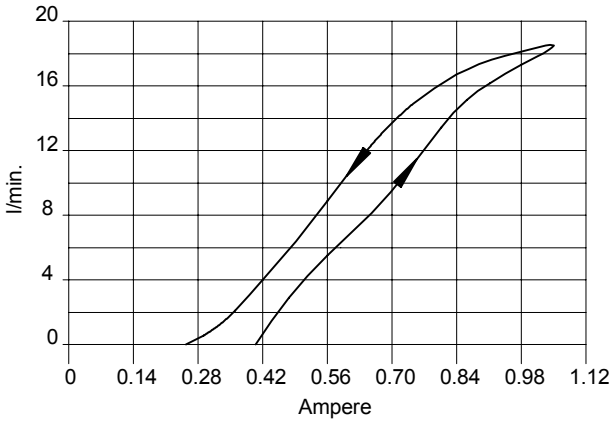
With VRC818



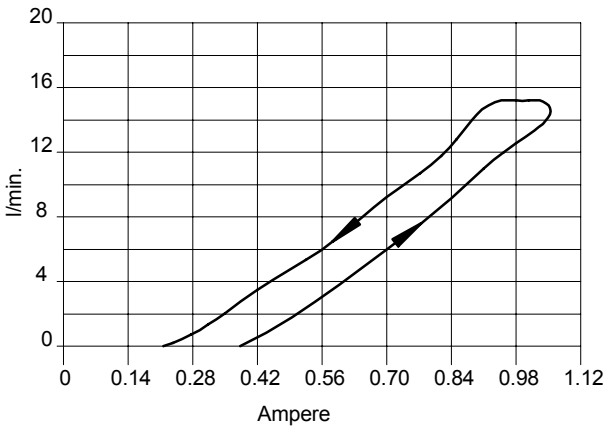
Inlet flow 30 l/min. Pressure 50 bar



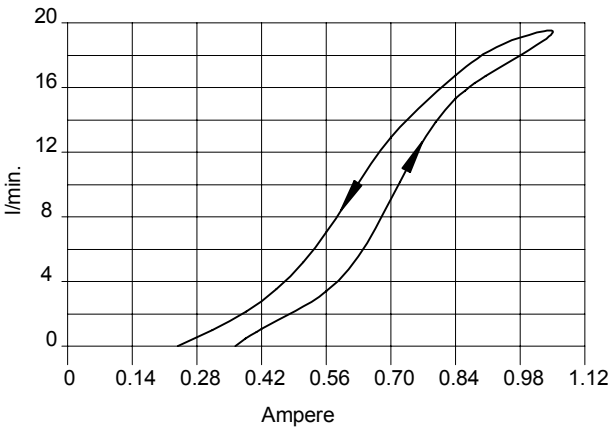
Inlet flow 30 l/min. Pressure 50 bar



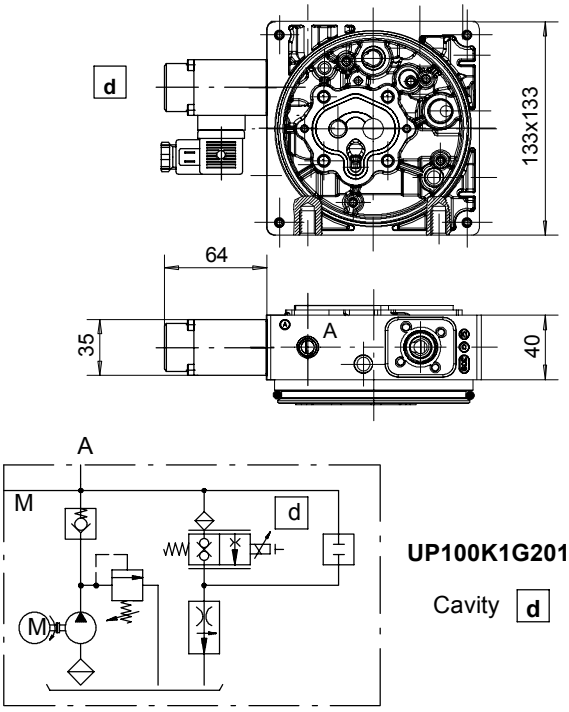
Inlet flow 30 l/min. Pressure 150 bar



Inlet flow 30 l/min. Pressure 150 bar

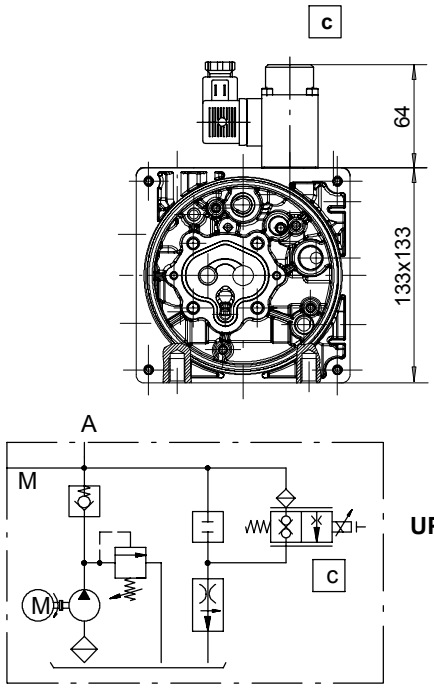


The following drawings represent the most common applications of the proportional valve which can be applied with UP100 power packs.



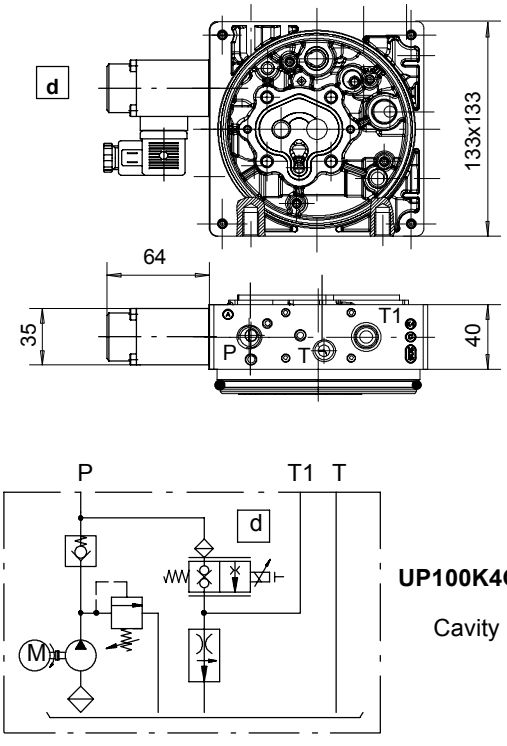
UP100K1G201

Cavity **d**



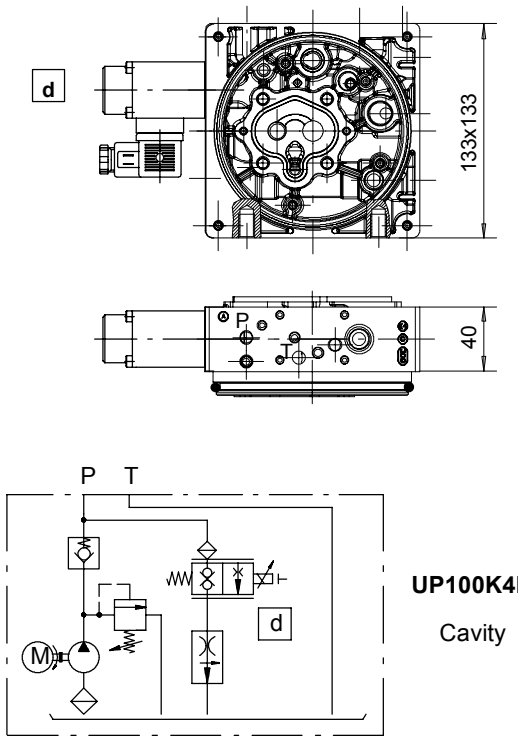
UP100K1G201

Cavity **c**



UP100K4G201

Cavity **d**



UP100K4P001

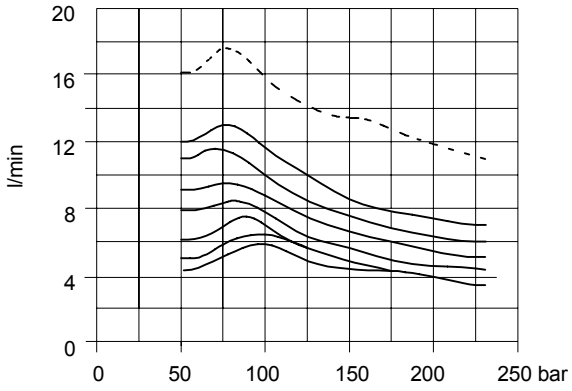
Cavity **d**

Compensated flow

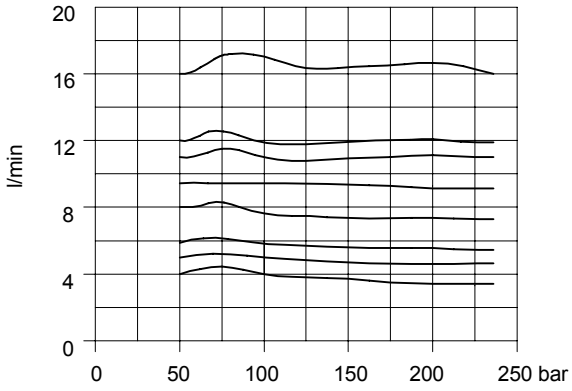
The diagram represents the trend of the regulated flow as function of the pressure.

As an example the variation can be caused by the different load applied to the actuator.

Inlet flow 30 l/min. Without VRC818



Inlet flow 30 l/min. With VRC818



Hydraulic circuits comparison

Normal proportional

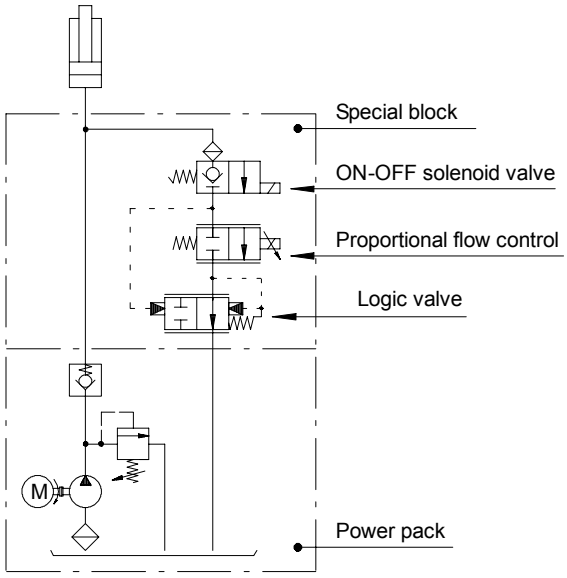
Up and Down progressive movements.

Excellent compensation thanks to the logic el.

Zero Leakage circuit.

Large size and high cost.

External manifolds are needed.



PDF817 Proportional valve

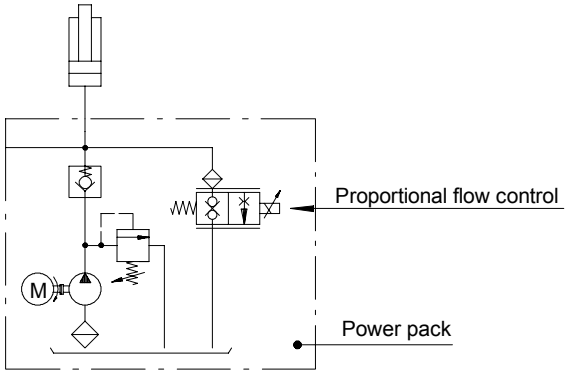
Up and Down progressive movements.

Good compensation.

Zero Leakage circuit.

Cavity as standard electrovalves.

External manifolds are not required.



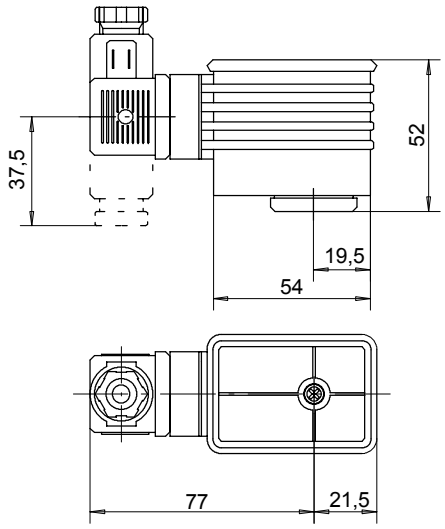
In order to control lowering and rising operations it is recommended to combine the valve with a proportional joystick and to assemble, in the line between power pack and cylinder, a solenoid operated directional valve poppet type.

See special block section 8.13 (special block 3051)

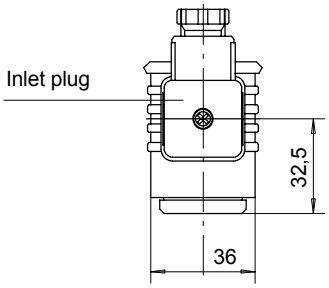
7.5.1 Electric connectors to control proportional valves

Ordering code	**200.5441.10014**
Connector type	R59211NP221
Switching frequency	100-500 Hz (adjustable)
Operating temperature	-5°C / +80 °C

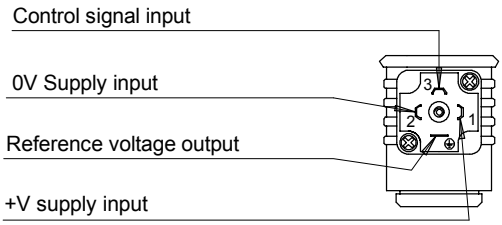
Ramp (up)	0-10 sec.
Ramp (Down)	0-10 sec.
Supply voltage	9 to 30 V. DC.
Full load current	1800 mA (a 12 e 24 V. DC.)
Offset range 12 V.DC.	0-900 mA
Offset range 24 V.DC.	0-600 mA

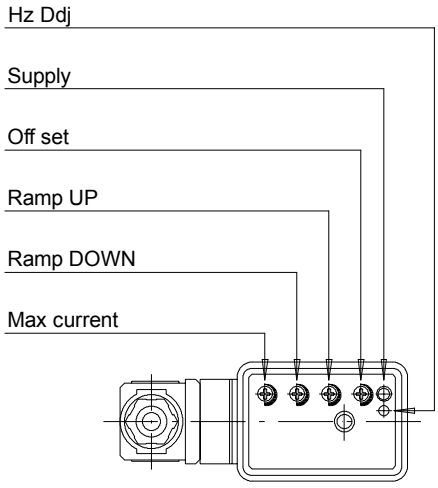


Input plug pin connection

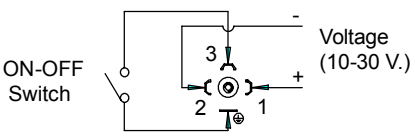


Regulation

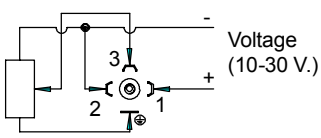




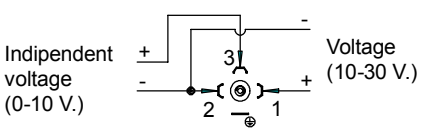
Control with ramps and external switch



Control with external joystick/potentiometer



Control with indipendent voltage

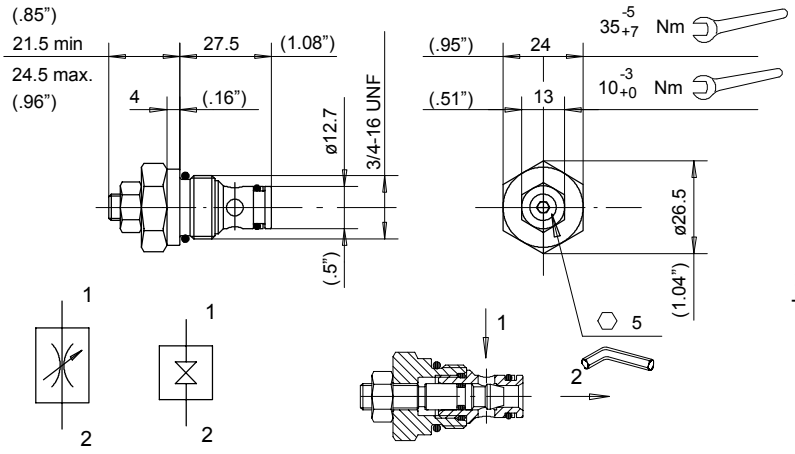


7.6 Manual override valves

7.6.1 Manual override valve: NV1/817-R

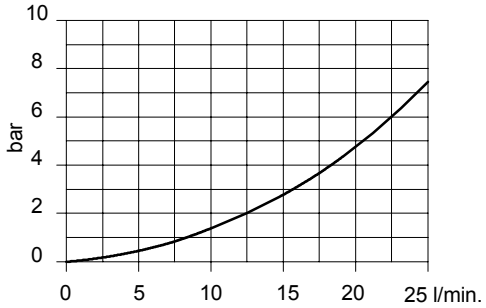
Manual override
Flow restrictor
Poppet type
Flow from 1 to 2
Code **200.7876.0160.1**

Max. pressure ..... 230 bar
Max. flow ..... 25 l/min.
Internal leakage ..... 0-5 drops/min.
Temperature range ..... -20/+90 °C
O-Ring replacement kit 200.9742.0016.0
Weight ..... 0.110 Kg.



Oil: Viscosity 37mm²/s at 40°C

Pressure drops with restrictor open

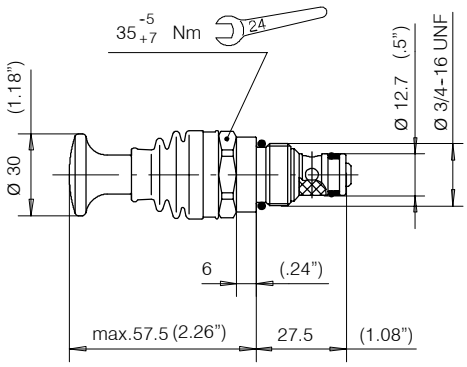


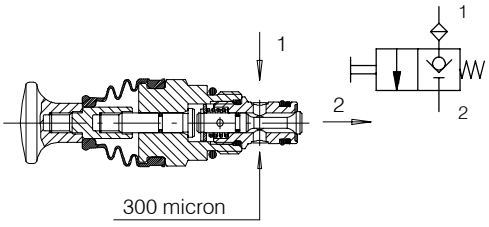
7.7 Directional valves

7.7.1 Directional valve: EPP817/22-TV

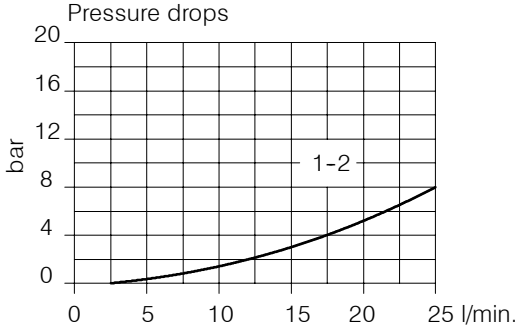
Manually operated
Push to open
Poppet type
Flow from 1 to 2

Max. pressure ..... 230 bar
Max. flow ..... 25 l/min.
Internal leakage ..... 0-5 drops/min.
Temperature range ..... -20/+90 °C
O-Ring replacement kit 200.9742.0016.0
Weight ..... 0.140 Kg.





Oil: Viscosity 37mm²/s at 40°C



The **EPP817/...** comes complete with a knob allowing rapid operation, and a boot of plastic material to exclude dust, dirt, etc.

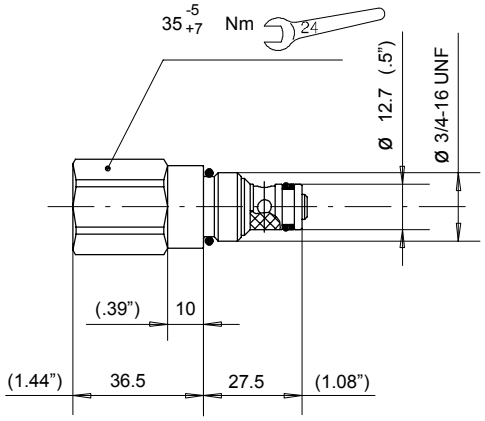
In this version, the knob is fitted with a stroke limiter to prevent possible damage to internal parts.

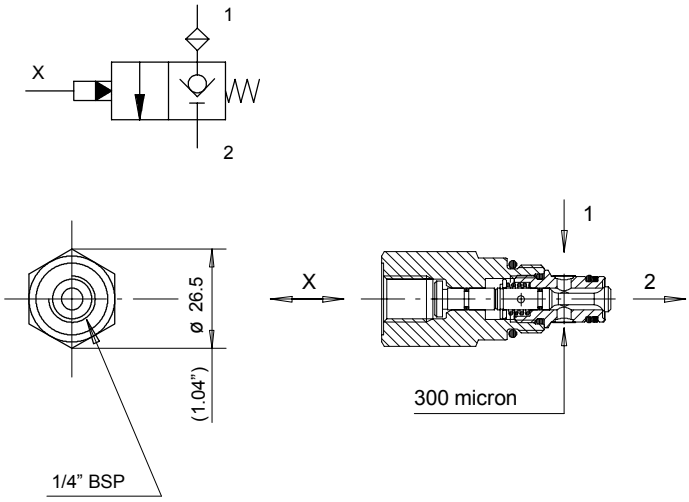
Type	Code
EPP817/22-TV	200.7876.0168.0

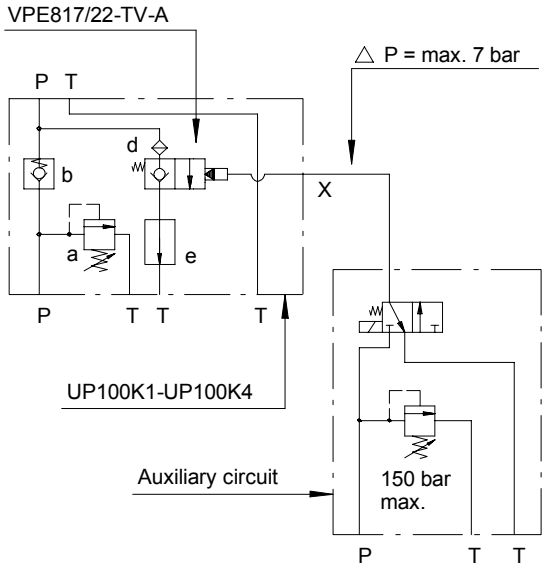
7.7.2 Directional valve: VPE817/22-TV-A

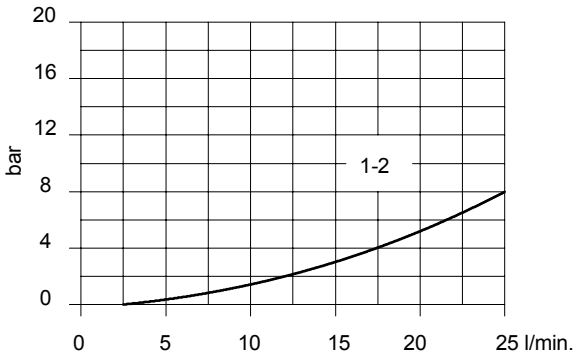
Pilot operated
External connection
Poppet type
Flow from 1 to 2

Max. pressure . . . . . 230 bar
Max. flow . . . . . 25 l/min.
Internal leakage . . . . . 0-5 drops/min.
Temperature range . . . . . -20/+90 °C
O-Ring replacement kit 200.9742.0016.0
Weight . . . . . 0.130 Kg.









This is a pilot operated directional valve, two-way two-position series, with external pilot connection.

The connection of ports 1 and 2 across the valve is obtained by pressurizing the pilot chamber X from an external circuit. Pilot pressure difference to shift is 14 bar approx.

As illustrated in the hydraulic diagram alongside, the pilot chamber X must be connected to tank so as to ensure that the valve cannot be opened involuntarily by back pressure. Care must be taken that the pressure loss and maximum pressure values indicated in the diagram are not exceeded.

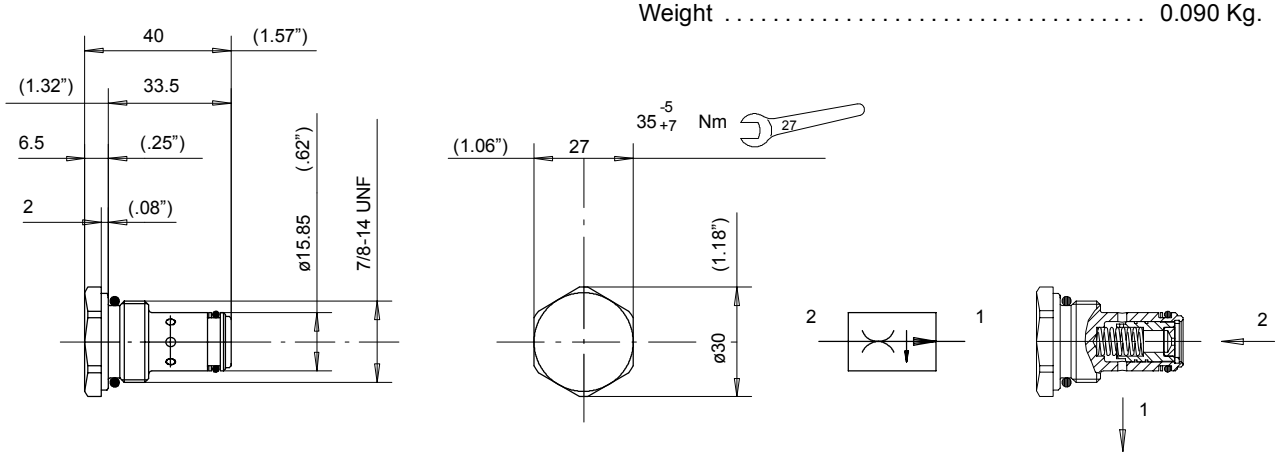
Pilot port	Type	Code
1/4" BSP	**VPE817/22-TV-A**	200.7876.0174.0

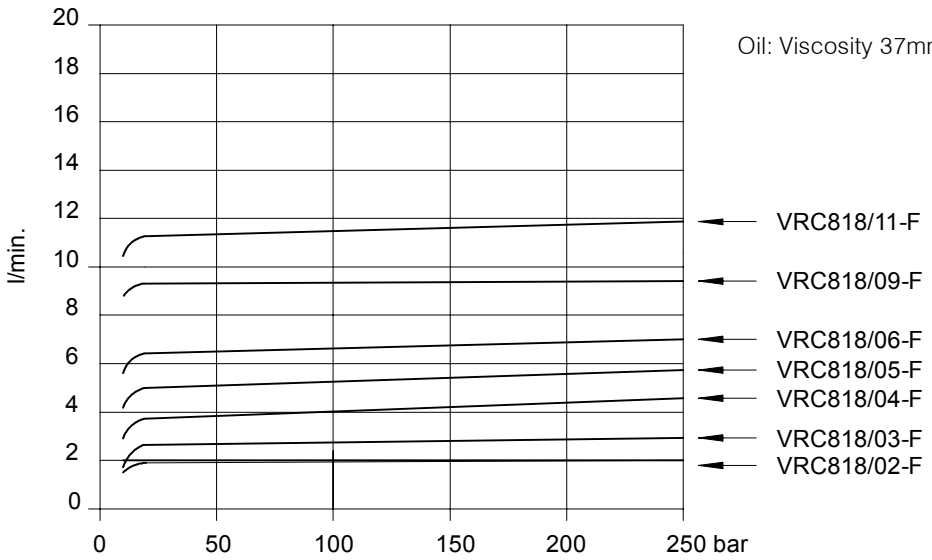
7.8 Flow control valves

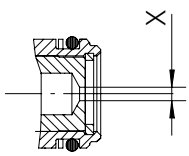
7.8.1 Flow control valve: VRC818/**-F

Compensated
Fixed setting
Seven pre-set flow values
Flow from 2 to 1

Max. pressure . . . . . 230 bar
Max. flow . . . . . 30 l/min.
Controlled flow rate . . . . . see table
Tolerance . . . . . ± 15%
Temperature range . . . . . -20/+90 °C
O-Ring replacement kit 200.9742.0015.0
Weight . . . . . 0.090 Kg.





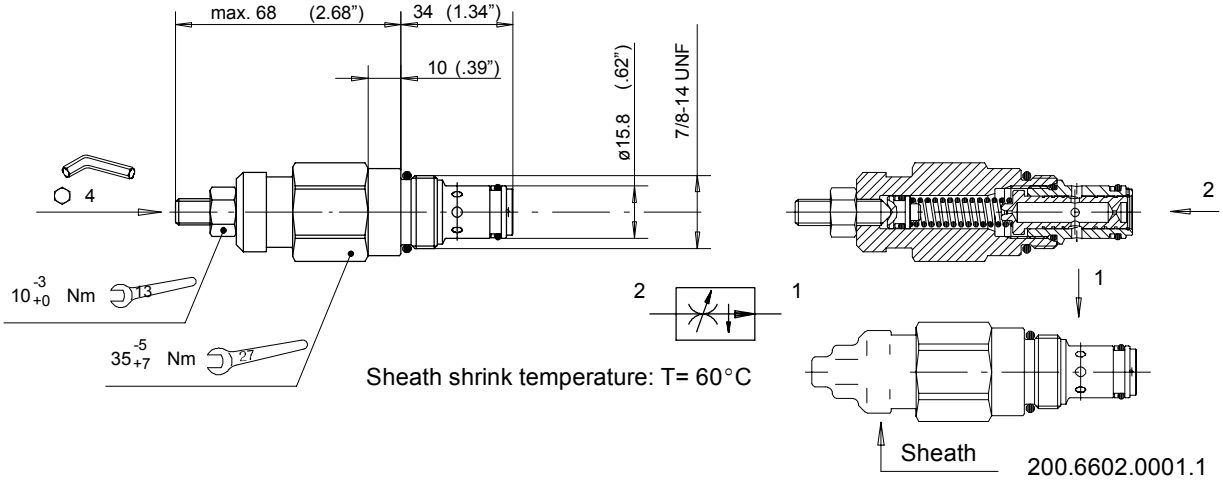


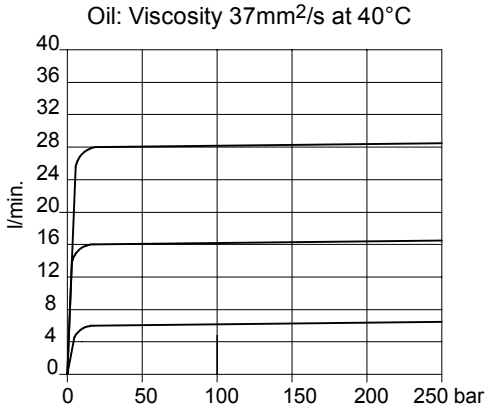
Nominal flow	Ø X	Type	Code
2 l/min.	1.25	**VRC818/02-F**	200.7872.0079.0
3 l/min.	1.50	**VRC818/03-F**	200.7872.0078.0
4 l/min.	2.00	**VRC818/04-F**	200.7872.0077.0
5 l/min.	2.25	**VRC818/05-F**	200.7872.0076.0
6 l/min.	2.50	**VRC818/06-F**	200.7872.0075.0
9 l/min.	3.00	**VRC818/09-F**	200.7872.0074.0
11 l/min.	3.50	**VRC818/11-F**	200.7872.0073.0

7.8.2 Flow control valve: VRC818/*-R

Compensated
Adjustable setting
Two setting flow ranges
Flow from 2 to 1

Max. pressure . . . . . 250 bar
Max. flow . . . . . 50 l/min.
Controlled . . . . . 1-6 l/min.
. . . . . 5-30 l/min.
Temperature range . . . . . -20/+90 °C
O-Ring replacement kit 200.9742.0015.0
Weight . . . . . 0.260 Kg.





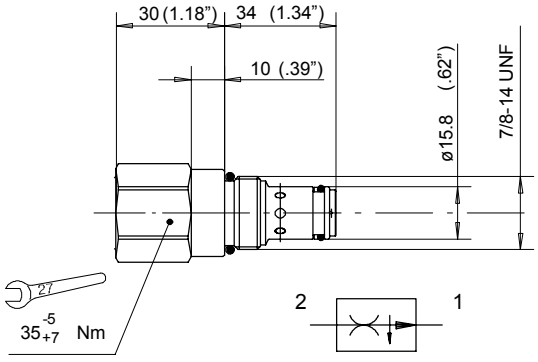
A heat-shrinkable sheath can be supplied, if requested to prevent the valve being tampered with.

When ordering, state in full the sheath part number, and, if the valve is to be supplied with sheath already fitted, the flow value setting required.

Setting range	Type	Code
1-6 l/min.	**VRC818/A-R**	200.7872.0083.0
5-30 l/min.	**VRC818/B-R**	200.7872.0084.0

Fixed version

VRC818/*-F**

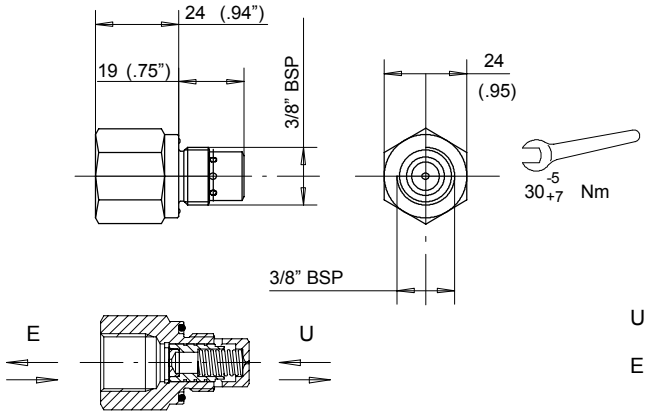


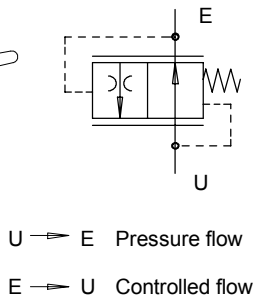
Nominal flow (l/min) ±12%	Type	Code
10	**VRC818/D-F10**	200.7872.0149.0
12	**VRC818/C-F12**	200.7872.0085.0
20	**VRC818/B-F20**	200.7872.0097.0
30	**VRC818/B-F30**	200.7872.0103.0

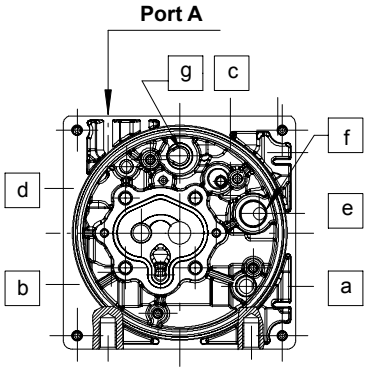
7.8.3 Flow control valve: VRC01/**

Compensated
Fixed setting
Seven pre-set flow values
Flow from E to U

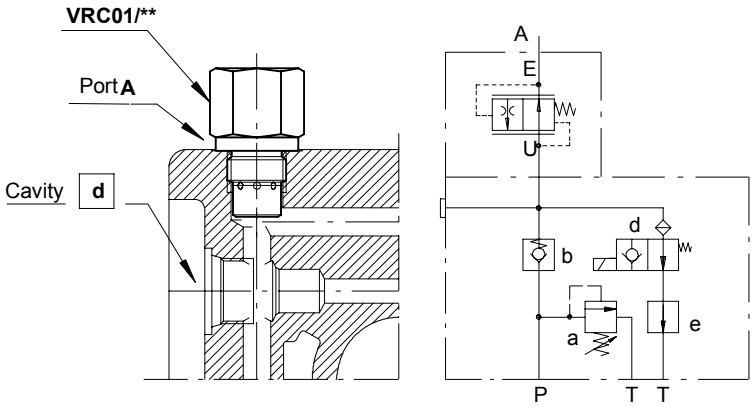
Max. pressure . . . . . 230 bar
Controlled flow rate . . . . . see table
Tolerance . . . . . ± 15%
Performances . . . . . see VRC818/*F
Temperature range . . . . . -20/+90 °C
Weight . . . . . 0.060 Kg.
Max. U-E flow rate = max. + 30% of E-U flow





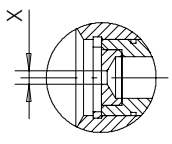


The VRC01 flow control valve can be installed in any power pack housing with 3/8" BSP pressure port E.G. Type **UP100K1G3** housing.



The VRC01 can be utilized in all those applications which make use of a normally open solenoid operated unloading valve. With this arrangement, pump flow is unloaded to tank with the lowest pressure drop.

In view of the particular type of construction, it is important not to exceed the indicated ratio between pressure flow (free reverse flow through the valve) and the controlled flow when unloading.



Nominal flow	Ø X	Type	Code
2 l/min.	1.25	**VRC01/2**	200.7872.0003.0
3 l/min.	1.50	**VRC01/3**	200.7872.0004.0
4 l/min.	2.00	**VRC01/4**	200.7872.0005.0
5 l/min.	2.25	**VRC01/5**	200.7872.0006.0
6 l/min.	2.50	**VRC01/6**	200.7872.0007.0
9 l/min.	3.00	**VRC01/9**	200.7872.0008.0
11 l/min.	3.50	**VRC01/11**	200.7872.0001.0

7.9 Manual lowering valve

7.9.1 Manual lowering valve: ZR817/22-TV

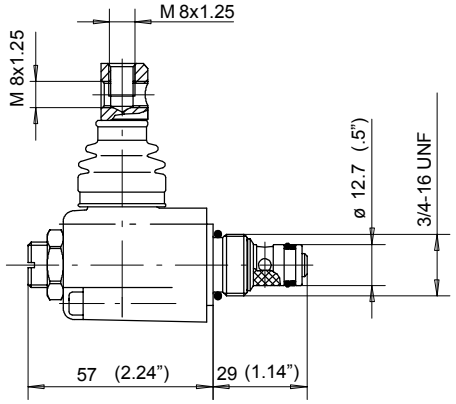
For housings:

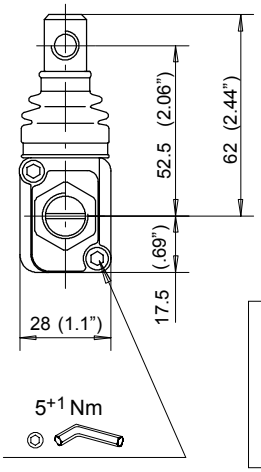
UP100/K1

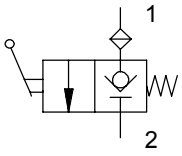
UP100/K4

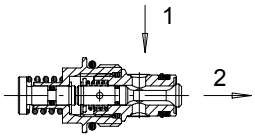
Normally closed

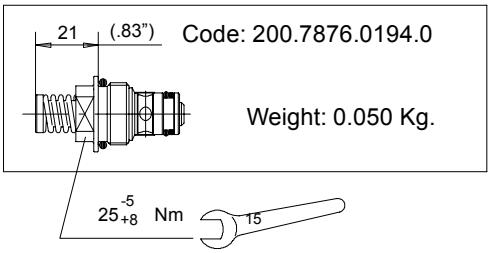
Code **200.9876.0196.0**
Max. pressure . . . . . 230 bar
Max. recommended pressure . . . . . 210 bar
Max flow . . . . . 25 l/min.
Internal leakage . . . . . 0-5 drops/min.
Temperature range . . . . . -20/+90 °C
O-Ring replacement kit 200.9742.0016.0



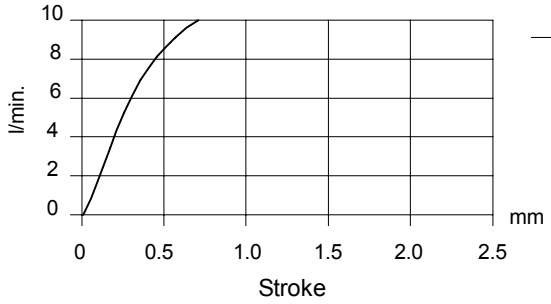


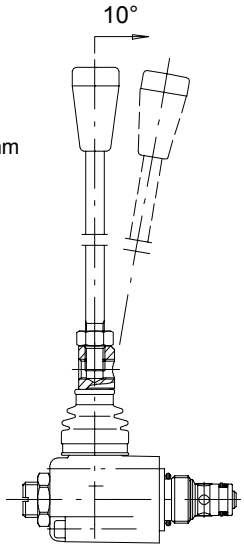






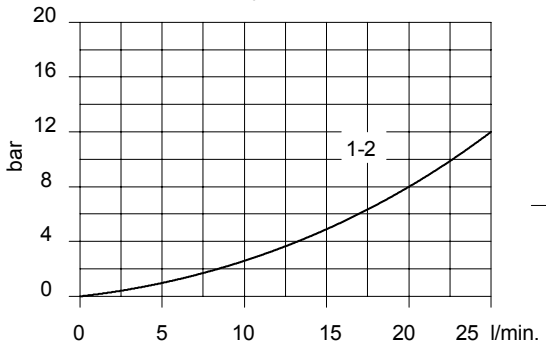
Metering performance

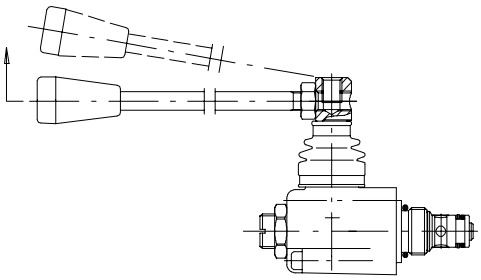




The connecting end of the lever allows the handle to be mounted in two different positions.

Oil: Viscosity 37mm²/s at 40°C



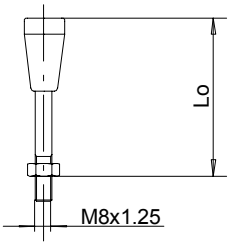


Mounting positions: L10-L12-L14-L16 (see 7.9.2)

Lever stick

7	Lever stick

A	L	0	0	1



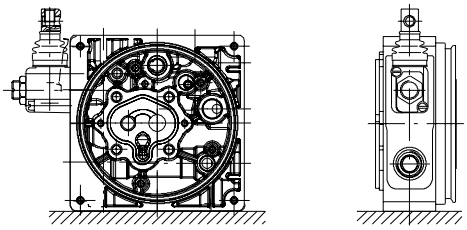
Lo Length	Type	Code
150 mm-5.90 inches	AL001	200.7022.1019.0
200 mm-7.87 inches	AL002	200.7022.1003.0
250 mm-9.84 inches	AL003	200.7022.1005.0
300 mm-11.80 inches	AL004	200.7022.1006.0

7.9.2 Manual lowering valve mounting positions

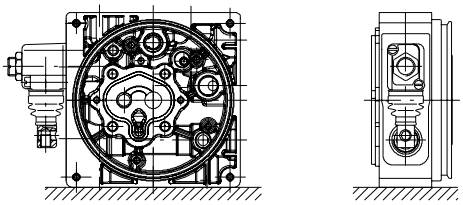
Mounting allowed in housing types **K1-K4** Cavity **d**

1	Type of housing									Vers.
	U	P	1	0	0	K	*	*	*	*	*

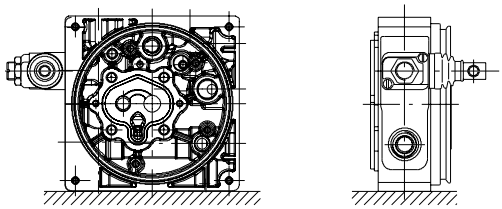
7	Cavity **d**												
	Z	R	8	1	7	/	2	2	-	T	V		



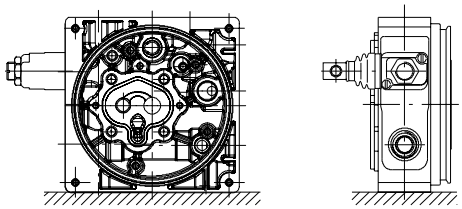
Hand lever				Lever stick				
L	1	0		A	L	0	0	*



Hand Lever				Lever stick				
L	1	2		A	L	0	0	*



Hand lever				Lever stick				
L	1	4		A	L	0	0	*

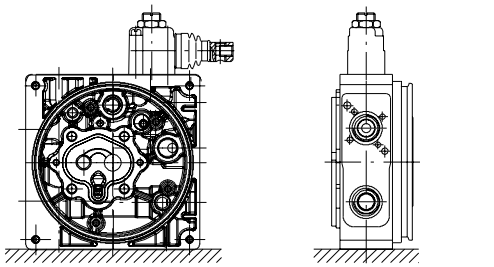


Hand lever				Lever stick				
L	1	6		A	L	0	0	*

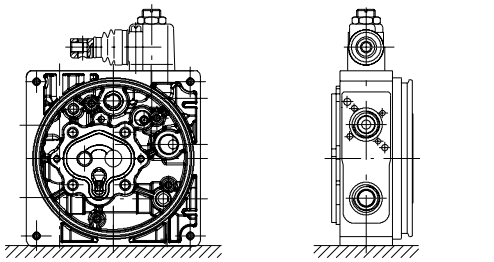
Mounting allowed in housing type **K1** Cavity **c**

1	Type of housing									Vers.
	U	P	1	0	0	K	1	*	*	*	*

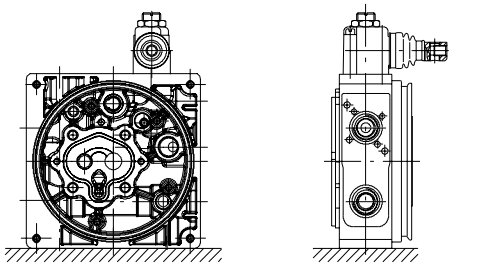
7	Cavity **c**												
	Z	R	8	1	7	/	2	2	-	T	V		



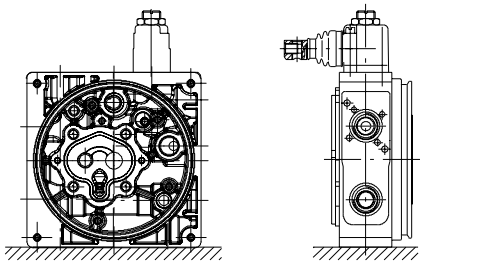
Hand lever				Lever stick				
L	1	0		A	L	0	0	*



Hand lever				Lever stick				
L	1	2		A	L	0	0	*



Hand lever				Lever stick				
L	1	4		A	L	0	0	*

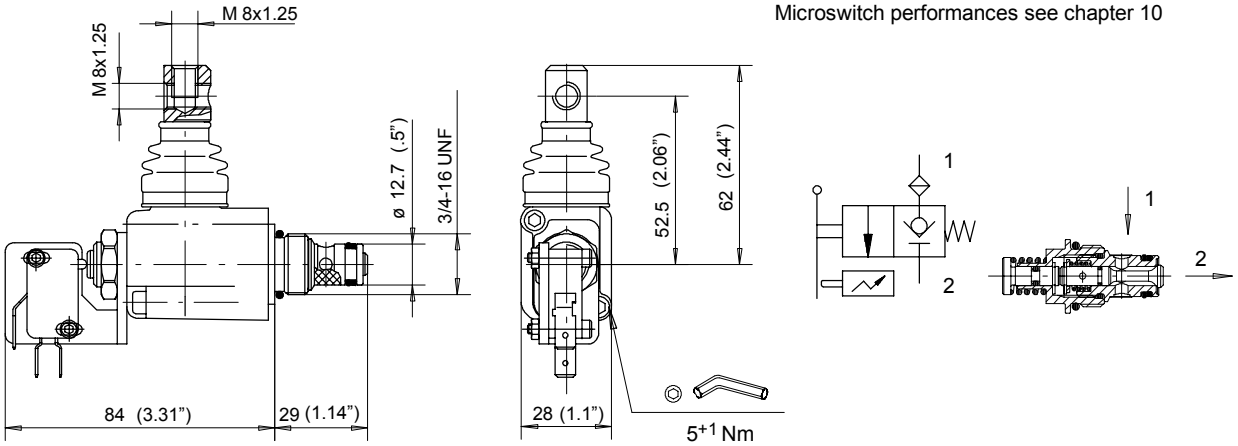


Hand lever				Lever stick				
L	1	6		A	L	0	0	*

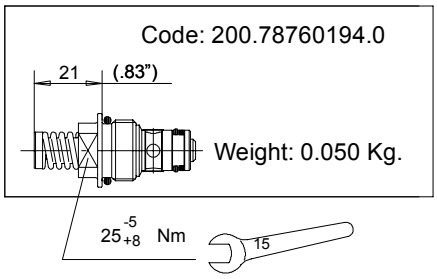
7.9.3 Manual lowering valve with microswitch: ZR817/22-TVM

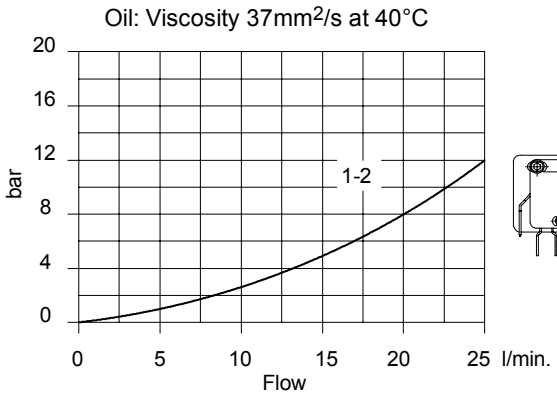
For housings:
UP100/K1
UP100/K4
Normally closed
Code **200.9876.0195.0**

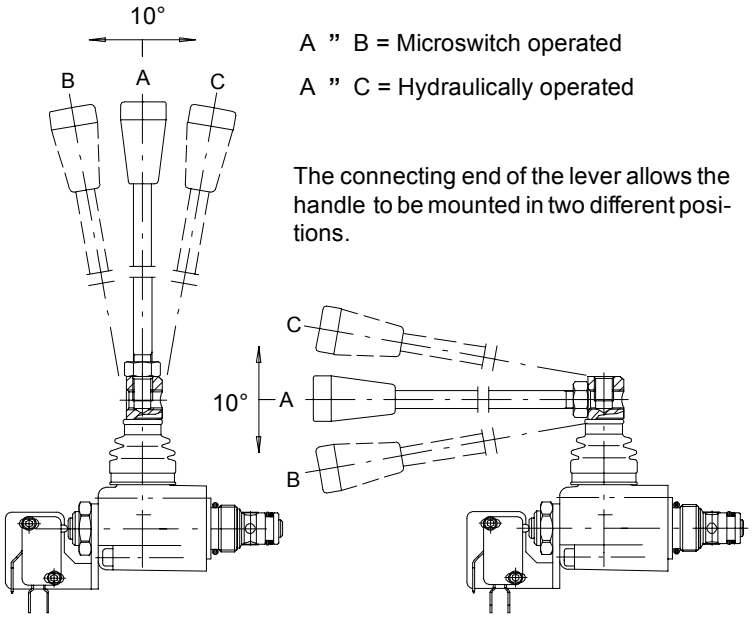
Max. pressure ..... 230 bar
Max. recommended pressure ..... 210 bar
Max. flow ..... 25 l/min.
Internal leakage ..... 0-5 drops/min.
Temperature range ..... -20/+90 °C
O-Ring replacement kit 200.9742.0016.0



Microswitch performances see chapter 10







A ” B = Microswitch operated

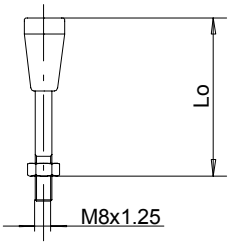
A ” C = Hydraulically operated

The connecting end of the lever allows the handle to be mounted in two different positions.

Mounting positions: L10-L12-L14-L16 (see 7.9.2)

Lever stick

7	Lever Stick				
	A	L	0	0	1

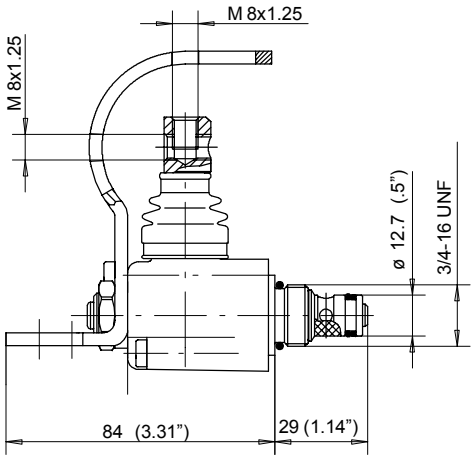


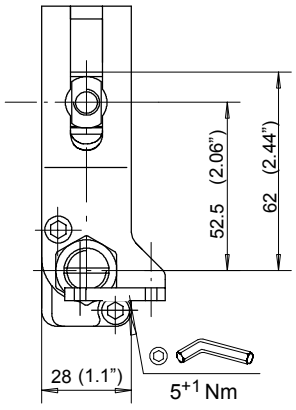
L_0 Length	Type	Code
150 mm-5.90 inches	AL001	200.7022.1019.0
200 mm-7.87 inches	AL002	200.7022.1003.0
250 mm-9.84 inches	AL003	200.7022.1005.0
300 mm-11.80 inches	AL004	200.7022.1006.0

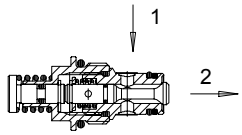
7.9.4 Manual lowering valve without microswitch and safety lever support: ZR817/22-TVS

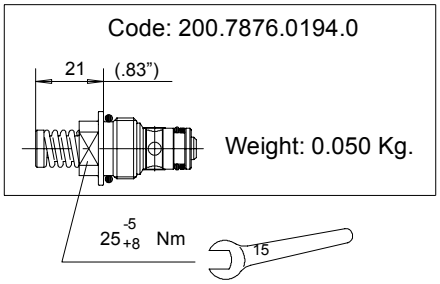
For housings:
UP100/K1
UP100/K4
Normally closed
Code **200.9876.0197.0**

Max. Pressure ..... 230 bar
Max recommended pressure ..... 210 bar
Max. Flow ..... 25 l/min.
Internal Leakage ..... 0-5 drops/min.
Temperature range ..... -20/+90 °C
O-Ring replacement kit 200.9742.0016.0

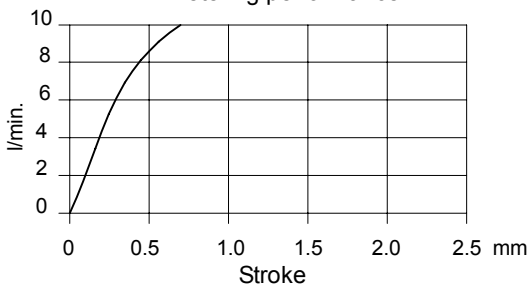


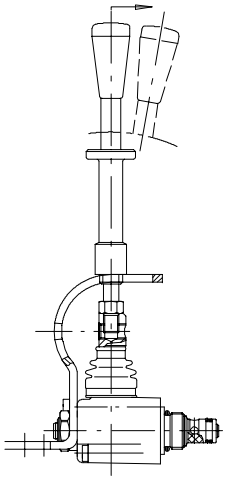




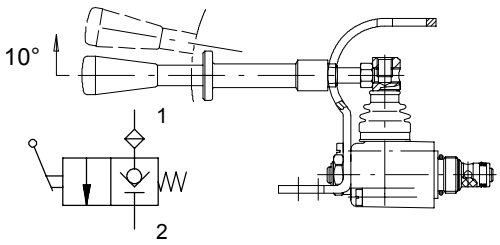


Metering performance

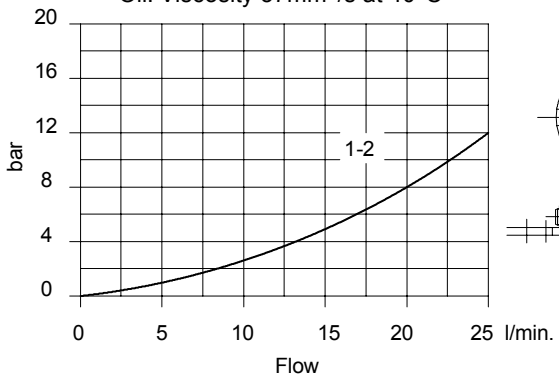




The connecting end of the lever allows the handle to be mounted in two different positions.



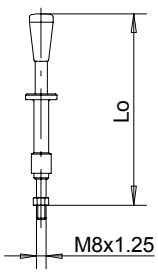
Oil: Viscosity 37mm²/s at 40°C



Mounting positions: L10-L14-L16 (see 7.9.2)

Lever Stick

7	Lever Stick
	A L 0 1 4

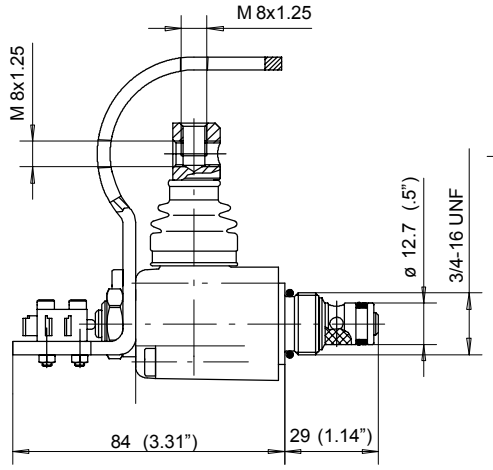


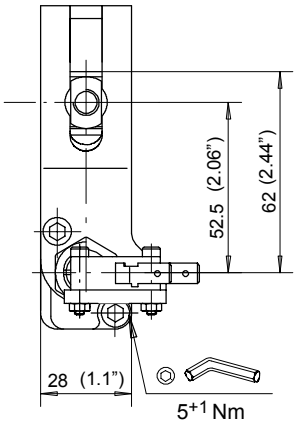
L_0 Length	Type	Code
160 mm-6.29 inches	AL014	200.7022.1009.0
122 mm-4.82 inches	AL002	200.7022.1004.0

7.9.5 Manual lowering valve with microswitch and safety lever support: ZR817/22-TVMS

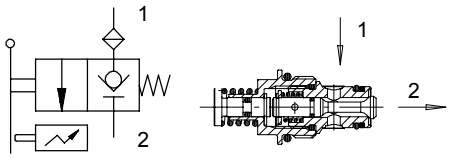
For housings:
UP100/K1
UP100/K4
Normally closed
Code **200.9876.0198.0**

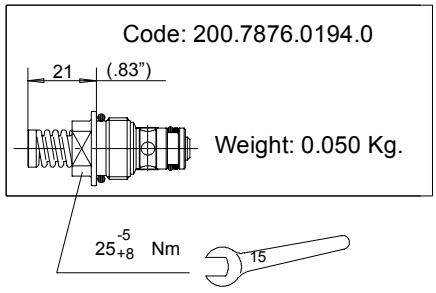
Max. pressure ..... 230 bar
Max. recommended pressure ..... 210 bar
Max flow ..... 25 l/min.
Internal leakage ..... 0-5 drops/min.
Temperature range ..... -20/+90 °C
O-Ring replacement kit 200.9742.0016.0

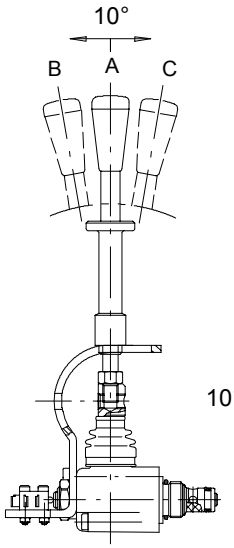




Microswitch performance: see chapter 10



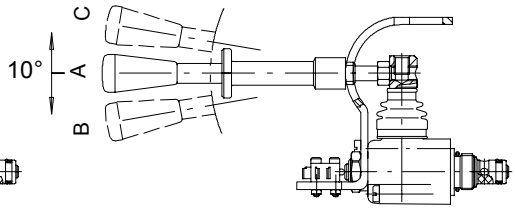




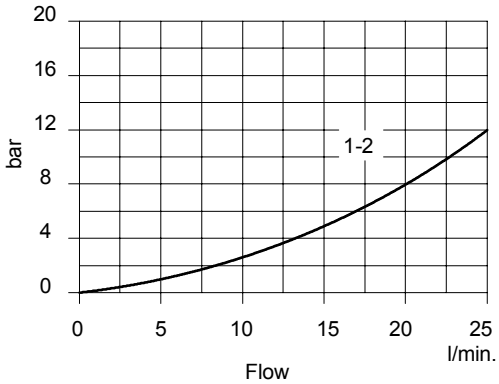
A ” B = Microswitch operated

A ” C = Hydraulically operated

The connecting end of the lever allows the handle to be mounted in two different positions.

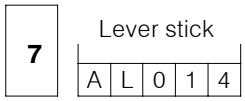


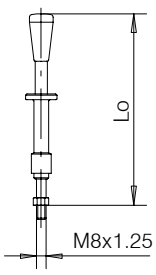
Oil: Viscosity 37mm²/s at 40°C



Mounting positions: L10-L14-L16 (see 7.9.2)

Lever Stick



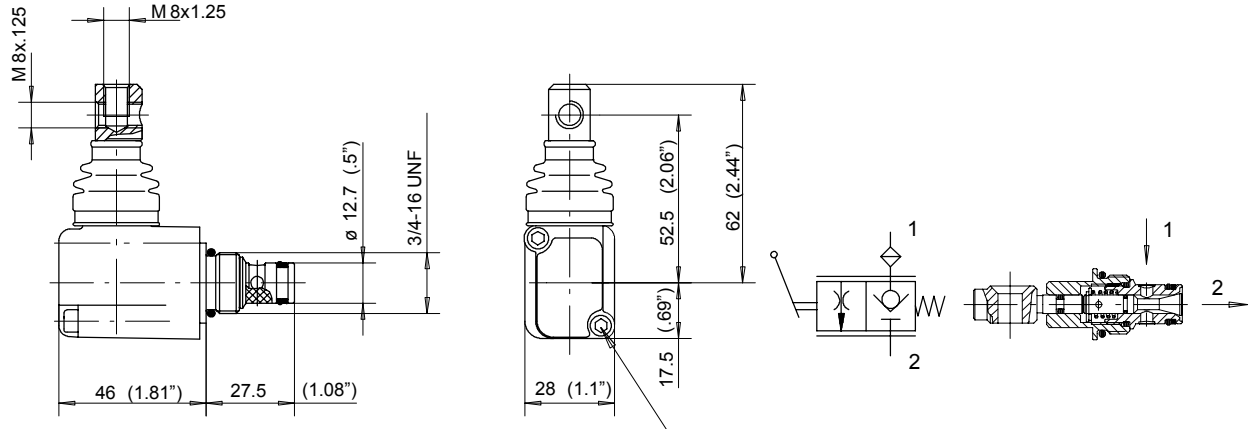


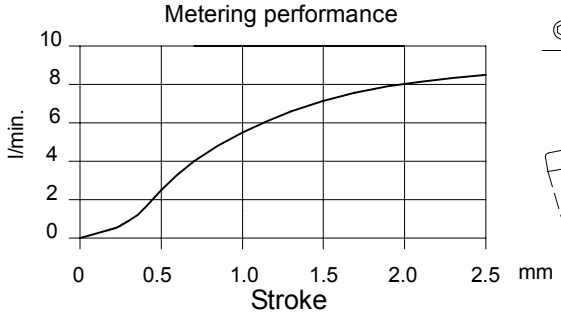
L_0 Length	Type	Code
160 mm-6.29 inches	AL014	200.7022.1009.0
122 mm-4.82 inches	AL002	200.7022.1004.0

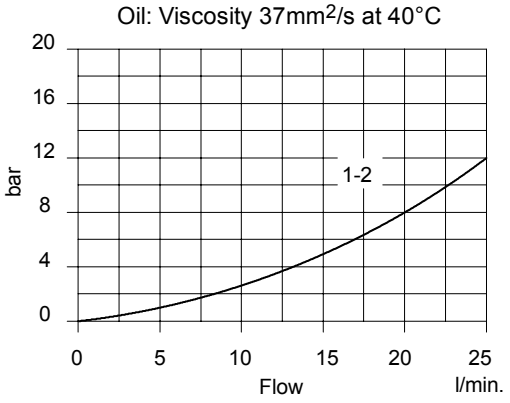
7.9.6 Manual lowering valve: Z817/22-HS

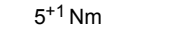
For housings:
UP100/K1
UP100/K4
Normally closed
High sensibility
Code **200.9876.0180.0**

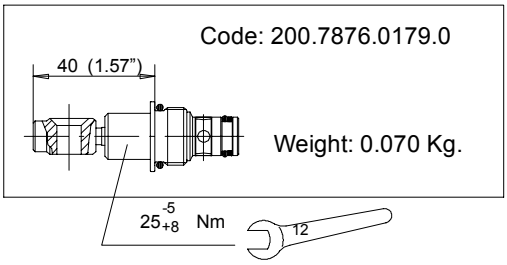
Max. pressure ..... 230 bar
Max. recommended pressure ..... 210 bar
Max. flow ..... 25 l/min.
Internal Leakage ..... 0-5 drops/min.
Temperature range ..... -20/+90 °C
O-Ring replacement 200.9742.0016.0

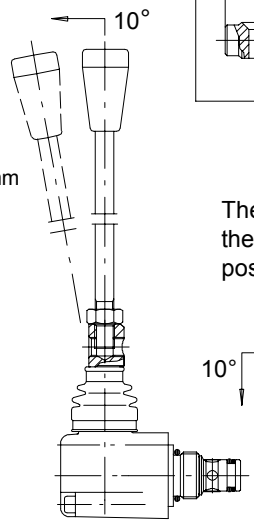




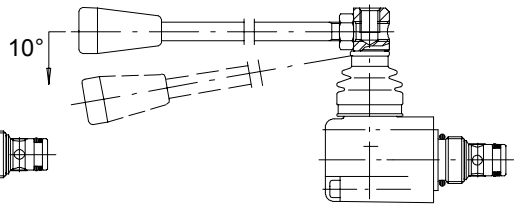








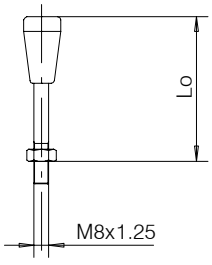
The connecting end of the lever allows the handle to be mounted in two different positions.



Mounting positions: L10-L12-L14-L16 (see 7.9.2)

Lever stick

7	Lever stick				
	A	L	0	0	1



L_0 Length	Type	Code
150 mm-5.90 inches	AL001	200.7022.1019.0
200 mm-7.87 inches	AL002	200.7022.1003.0
250 mm-9.84 inches	AL003	200.7022.1005.0
300 mm-11.80 inches	AL004	200.7022.1006.0

7.10 Emergency hand pumps

7.10.1 Emergency hand pump: PM817/1.5

For housings:

UP100/K1G2-19 and **UP100K4P0-01**

Inlet check

Outlet check

Ball type

Code **200.9482.0008.0**

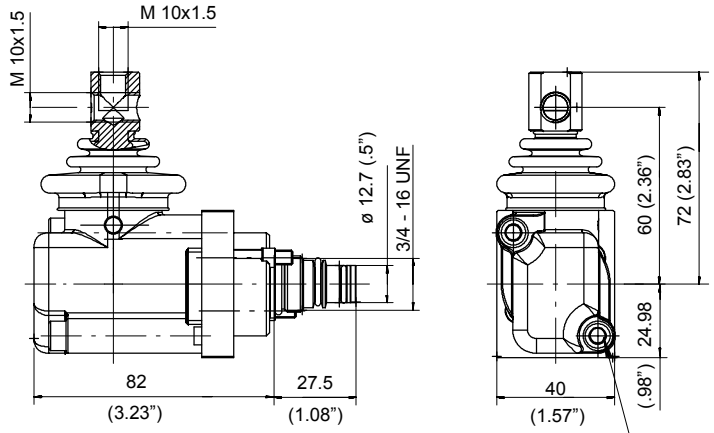
Max recommended pressure . . . . . 210 bar

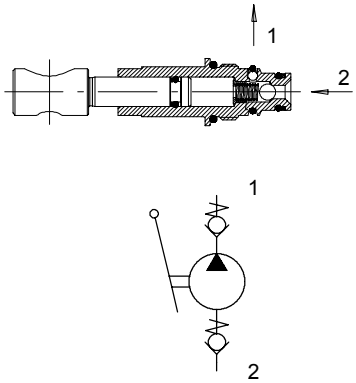
Displacement . . . . . 1.5 cm^3

Internal leakage . . . . . 0-5 drops/min.

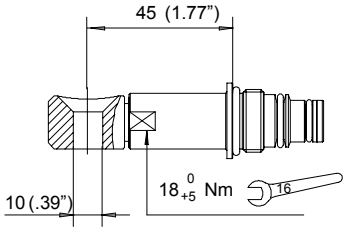
Temperature range . . . . . -20/+90 °C

O-Ring replacement kit 200.9742.0034.0

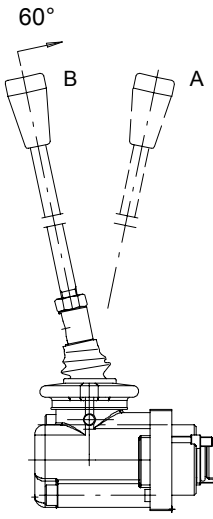




Code: 200.7482.0007.0



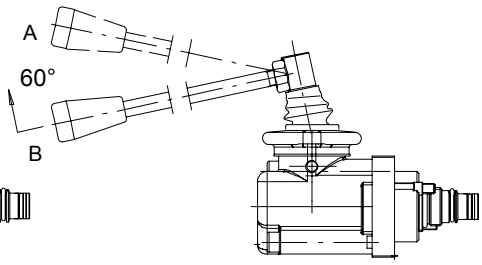
Weight: 0.250 Kg



The connecting end of the lever allows the handle to be mounted in two different positions.

B ” A = Inlet

A ” B = Outlet

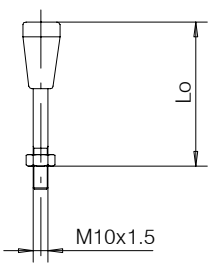


With the hand pump assembled into either **cavity C** a suction pump having proper length, in function of the type and capacity of the tank has to be fitted into the appropriate cavity (see next page).

Mounting positions: L10-L12-L14-L16 (see 7.10.2)

Lever stick

7	Lever stick				
	A	L	0	0	1



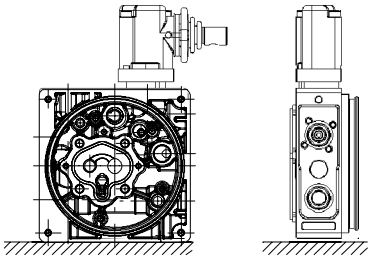
L_0 Length	Type	Code
185 mm-7.28 inches	**AL001**	200.7022.2001.0
250 mm-9.84 inches	**AL002**	200.7022.2003.0
300 mm-11.81 inches	**AL003**	200.7022.2004.0
350 mm-13.78 inches	**AL004**	200.7022.2005.0

7.10.2 Emergency hand pump PM817/1.5 positions

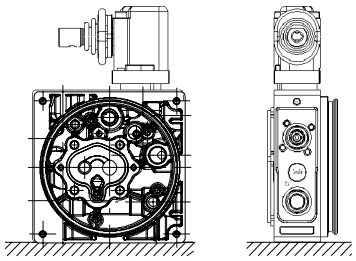
Mounting allowed in housing type **K1G2-19** Cavity **C**

1	Type of housing									Vers.
	U	P	1	0	0	K	1	G	2	1	9

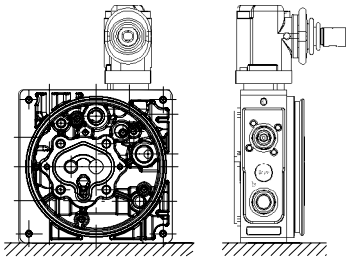
7	Cavity C								
	P	M	8	1	7	/	1	.	5



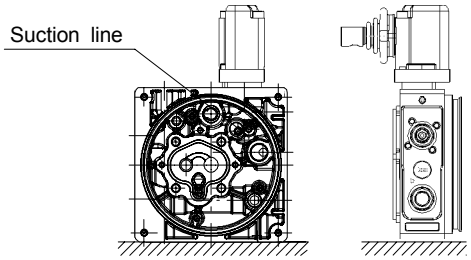
Hand lever				Lever stick				
L	1	0		A	L	0	0	*



Hand Lever				Lever stick				
L	1	2		A	L	0	0	*



Hand lever				Lever stick				
L	1	4		A	L	0	0	*

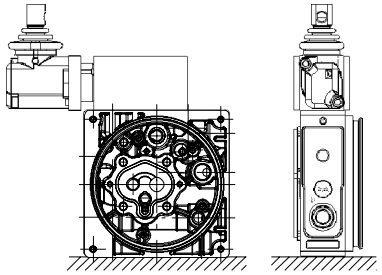


Hand lever				Lever stick				
L	1	6		A	L	0	0	*

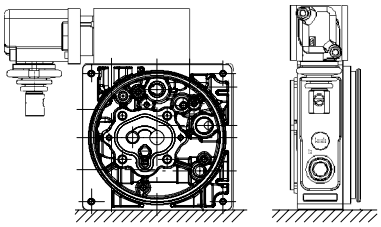
Mounting allowed in housing type **K4P0-01** with manifold **4217**

1	Type of housing									Vers.
	U	P	1	0	0	K	3	P	0	0	1

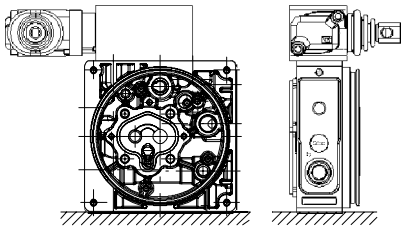
7	Cavity									8	Manifold			
	P	M	8	1	7	/	1	.	5		4	2	1	7



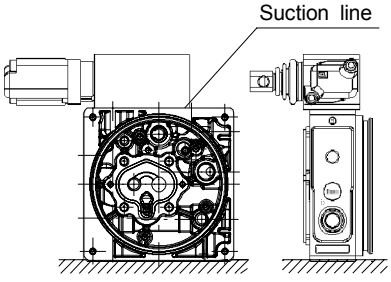
Hand lever				Lever stick				
L	1	0		A	L	0	0	*



Hand lever				Lever stick				
L	1	2		A	L	0	0	*



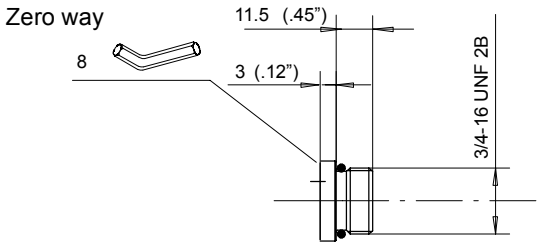
Hand lever				Lever stick				
L	1	4		A	L	0	0	*



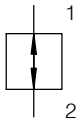
Hand lever				Lever stick				
L	1	6		A	L	0	0	*

7.11 Valve cavity plugs

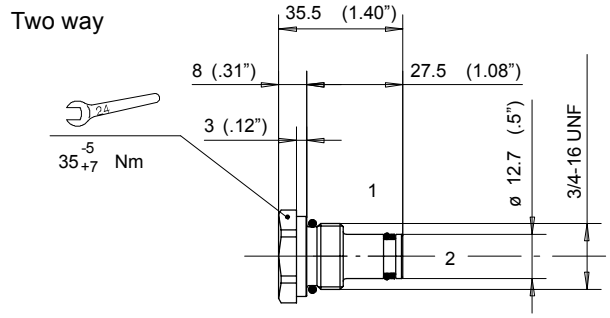
7.11.1 Valve cavity plug T817/0



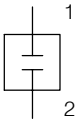
Code	**200.5274.81701**
O-Ring code	200.5142.24711
Weight	0.040 Kg.



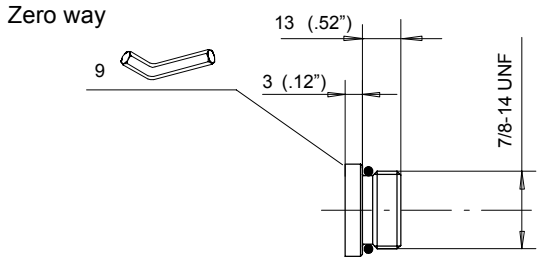
7.11.2 Valve cavity plug T817/2



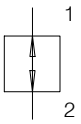
Code	**200.7788.0002.0**
Seal kit code	200.9742.0016.0
Weight	0.070 Kg.



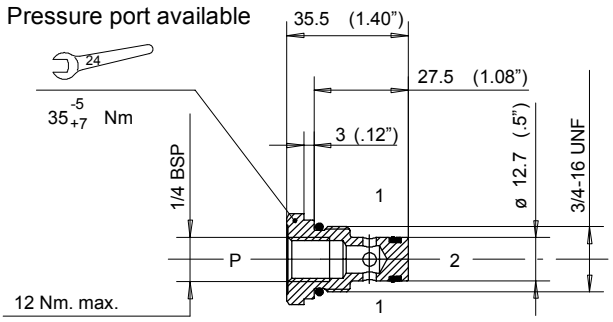
7.11.3 Valve cavity plug T818/0



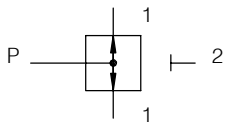
Code	**200.5274.81801**
O-Ring code	200.5142.31511
Weight	0.080 Kg.



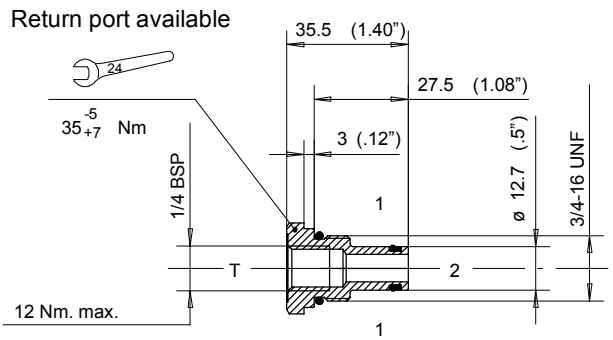
7.11.4 Valve cavity plug T817/2P-602



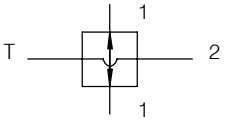
Code	**200.7788.0006.0**
Seal kit code	200.9742.0016.0
Weight	0.040 Kg.



7.11.5 Valve cavity plug T817/2T-602

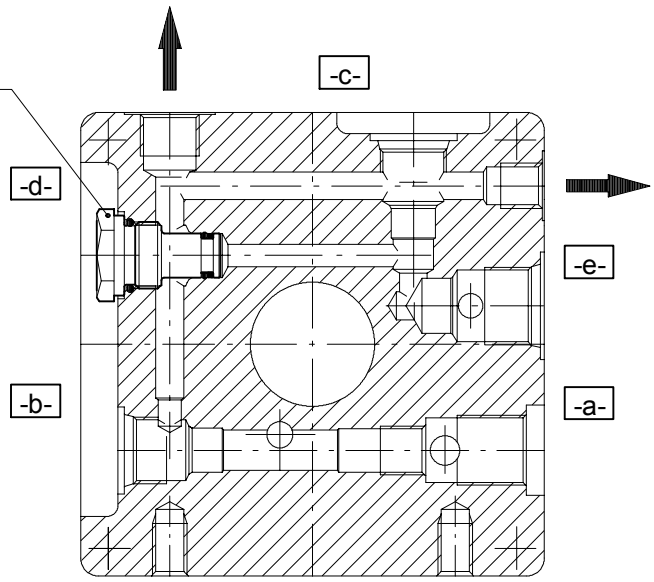


Code	**200.7788.0007.0**
Seal kit code	200.9742.0016.0
Weight	0.030 Kg.



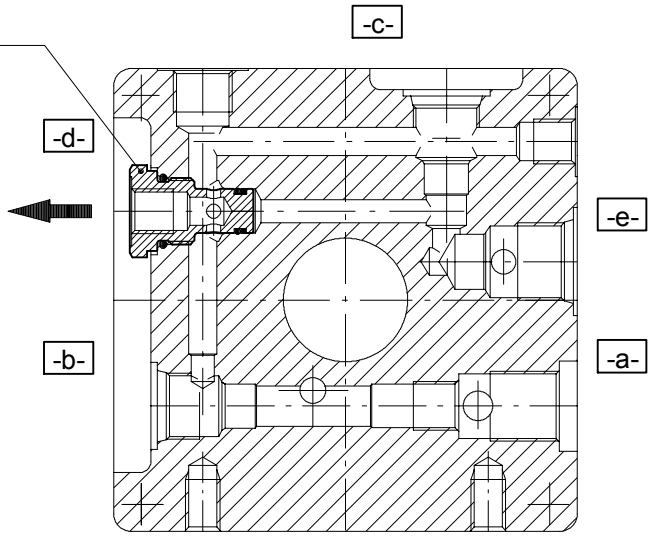
7.11.6 Example of plugs fitted into valve cavities

T817/2



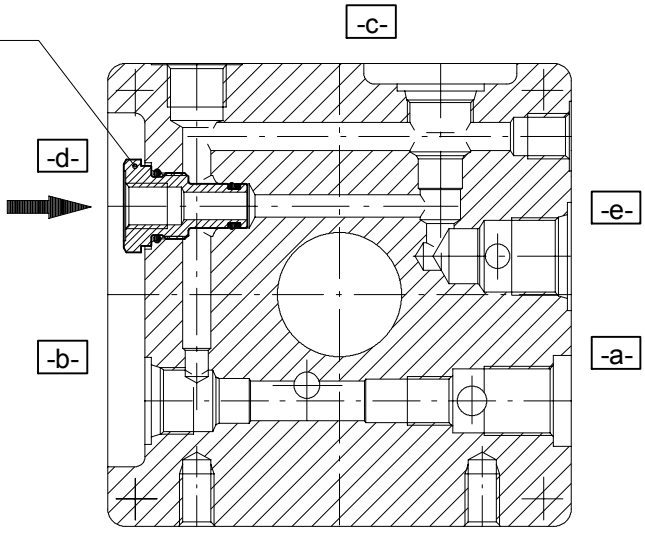
Can be used to plug a standard cavity, preventing the pressure line from unloading directly to tank.

T817/2P-602



Can be used to convert a standard directional valve cavity for use as a threaded port on the pressure line.

T817/2T-602



Can be used to convert a standard directional valve cavity for use as an auxiliary threaded tank return port. The pressure line remains unaffected.

8 Manifolds

8.1 Technical information

Power pack housings K3 and K4 can be connected with manifolds, allowing the assembly of complex circuits in compact and modular solution.

8.1.1 Standard manifolds

The range includes monobloc or sectional manifolds with which to create parallel or series circuits for cartridge type solenoid valves or CETOP R35H design.

Take care to verify the position of the filling plug of the chosen tank avoiding version having interference with the valve block.

8.1.2 Special manifolds

To reduce the dimensions and complexity of the system generally (connecting pipe-lines, etc.) special manifolds can be designed and manufactured to meet particular requirements.

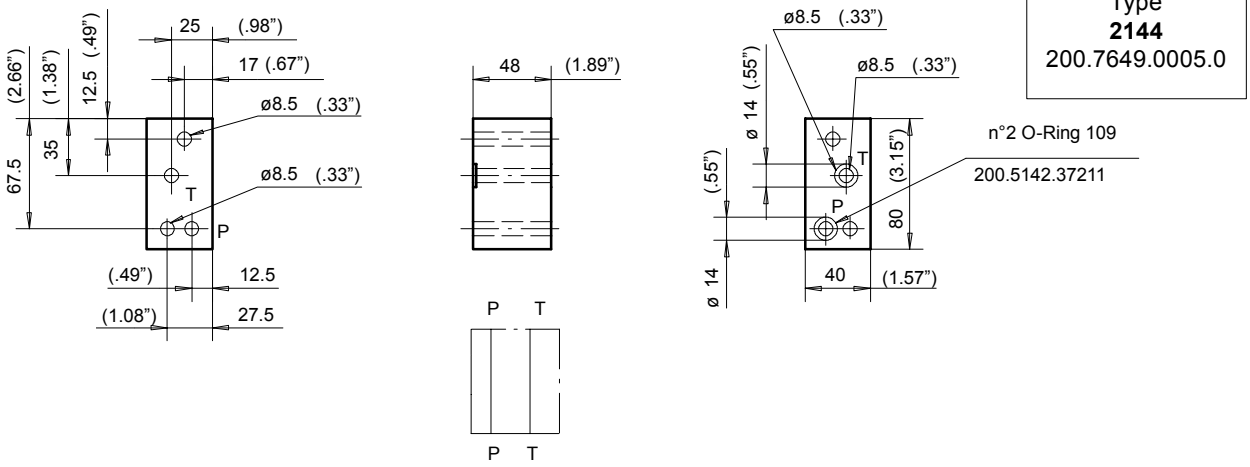
These fully customized manifolds, complete with valves, will incorporate the required hydraulic circuit in its entirety while meeting the dimensional and positional requirements specified by the customer.

8.1.3 Material

Manifold elements are in extruded aluminium alloy EN AW-6082 (UNI3571), with the exception of the directional control valve interface plates which are cast iron EN 6JL250 (UNI5007).

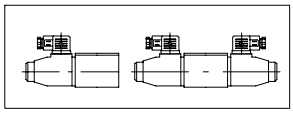
The O-Rings utilized will be NBR-70sh. unless other types are specifically requested.

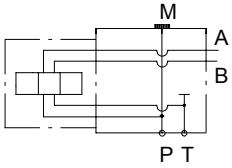
8.2 Intermediate plate 2144 for manifolds 5073-5033-5053-2083-2043-2013

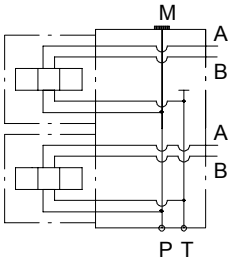


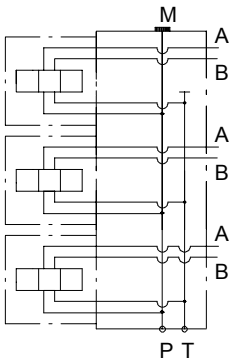
8.3 Parallel circuit - Monobloc manifolds 1-2-3 for solenoid valves DIN24350 FORM A CETOP R35H-ISO4401

A-B ports	3/8" BSP
Port M (plugged)	1/4" BSP





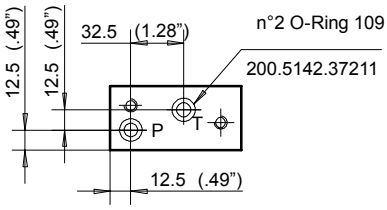


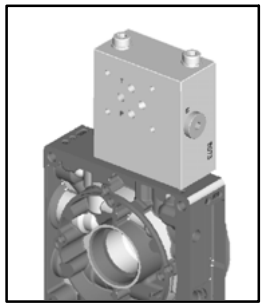


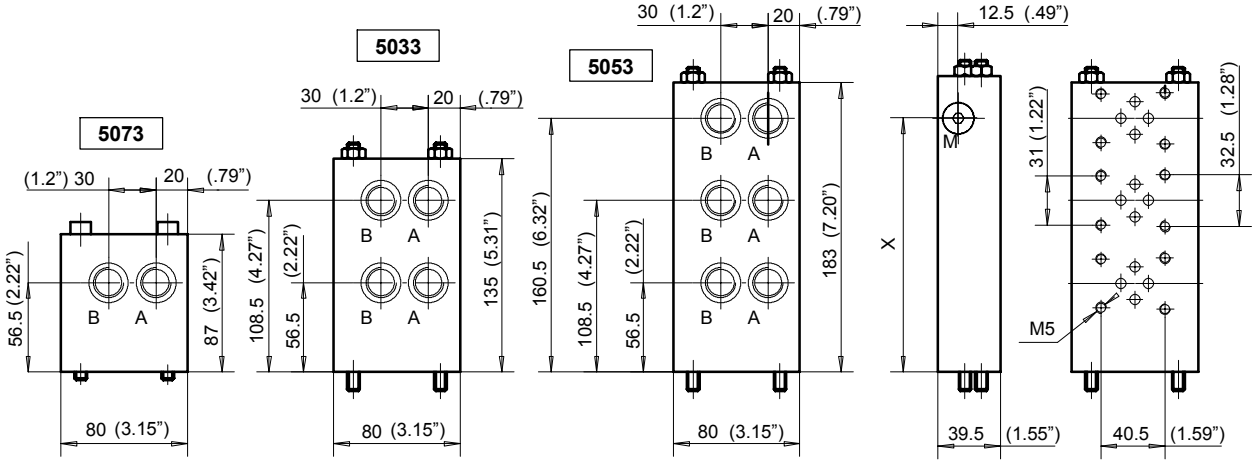
Rear A/B ports :	**5073**	200.7646.0003.0	**5033**	200.7646.0008.0	**5053**	200.7646.0108.0
Lateral A/B ports :	**5173**	200.7646.0002.0	**5133**	200.7646.0004.0	**5153**	200.7646.0005.0

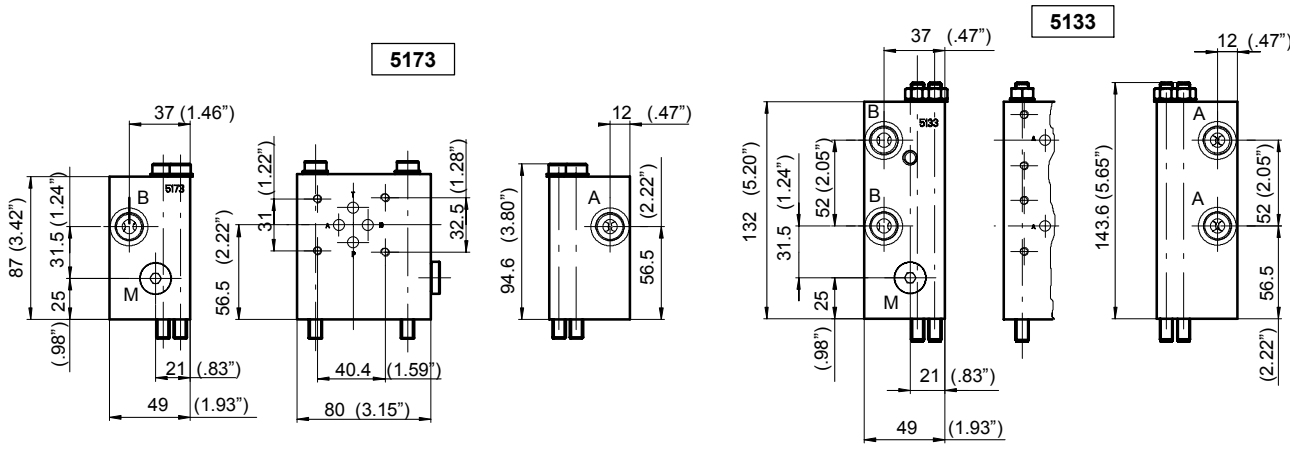
* for versions with 4 and more solenoid valves please contact our Sales Department

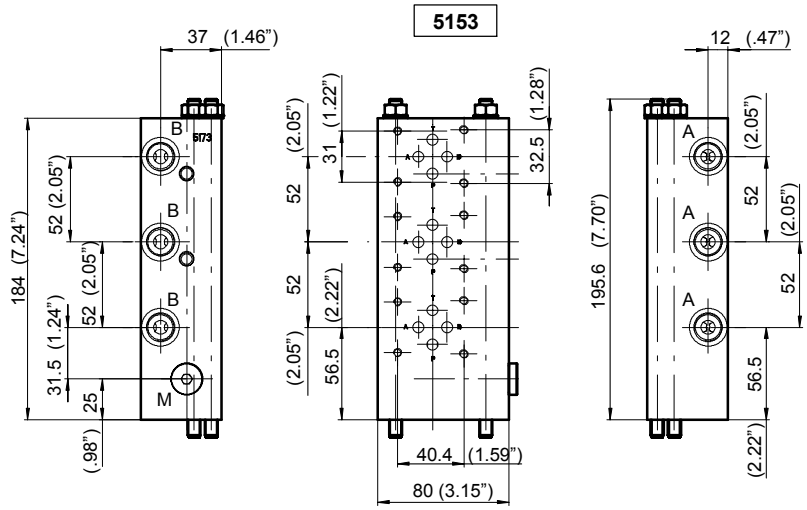
Type	Manometer port
5073	X = 48 (1,89”)
5033	X = 100 (3.94”)
5053	X = 152 (5,98”)

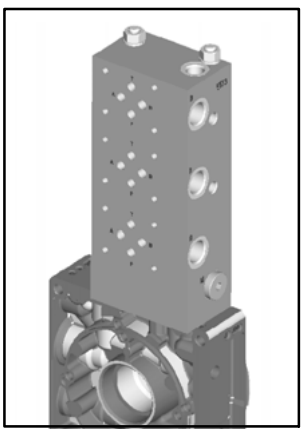






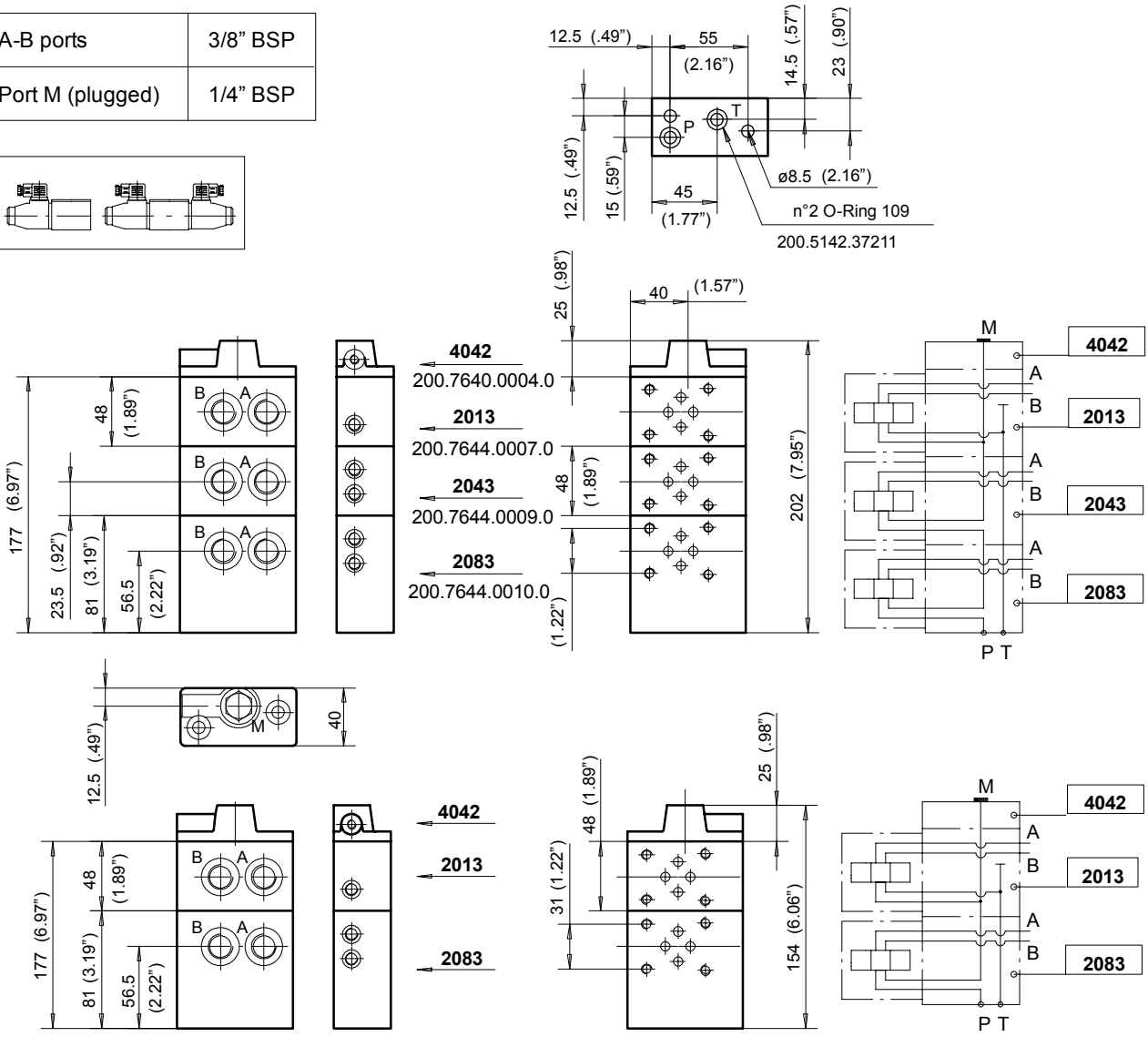






8.4 Series circuit - Suitable for solenoid valves DIN24350 FORM A CETOP R35H - ISO4401

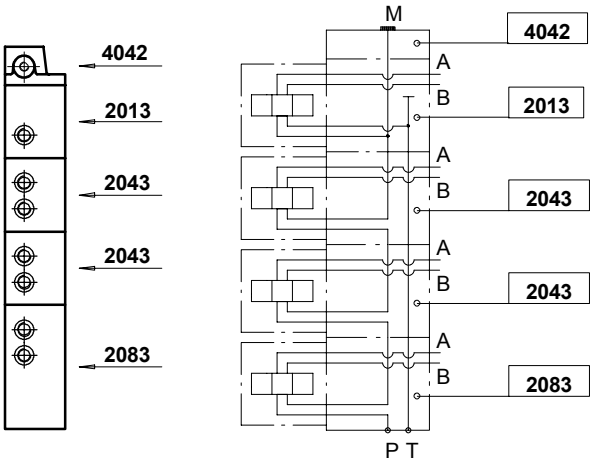
A-B ports	3/8" BSP
Port M (plugged)	1/4" BSP



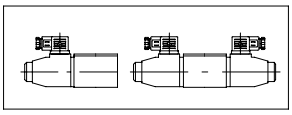
8.5 Series circuit - Circuit with more than three solenoid valves DIN24350 FORM A CETOP R35H - ISO4401

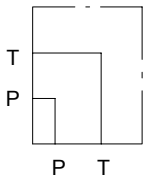
To obtain a hydraulic circuit with more than 3 solenoid valves (DIN24350 FORM A CETOP R35H - ISO4401) connected together, simply add one or more 2043 type manifolds as required.

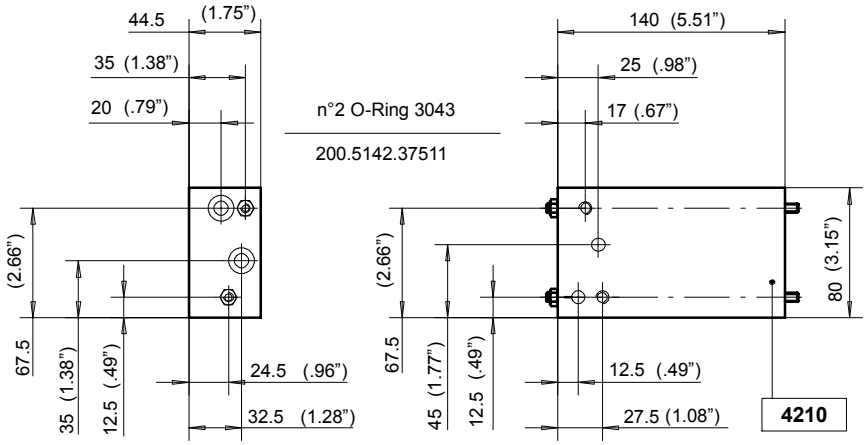
The hydraulic diagram shows an arrangement with 4 solenoid valves



8.6 Spacer plate 4210 for manifolds: 5073-5033-5053-2083-2043-2013 DIN24350 FORM A CETOP R35H-ISO4401

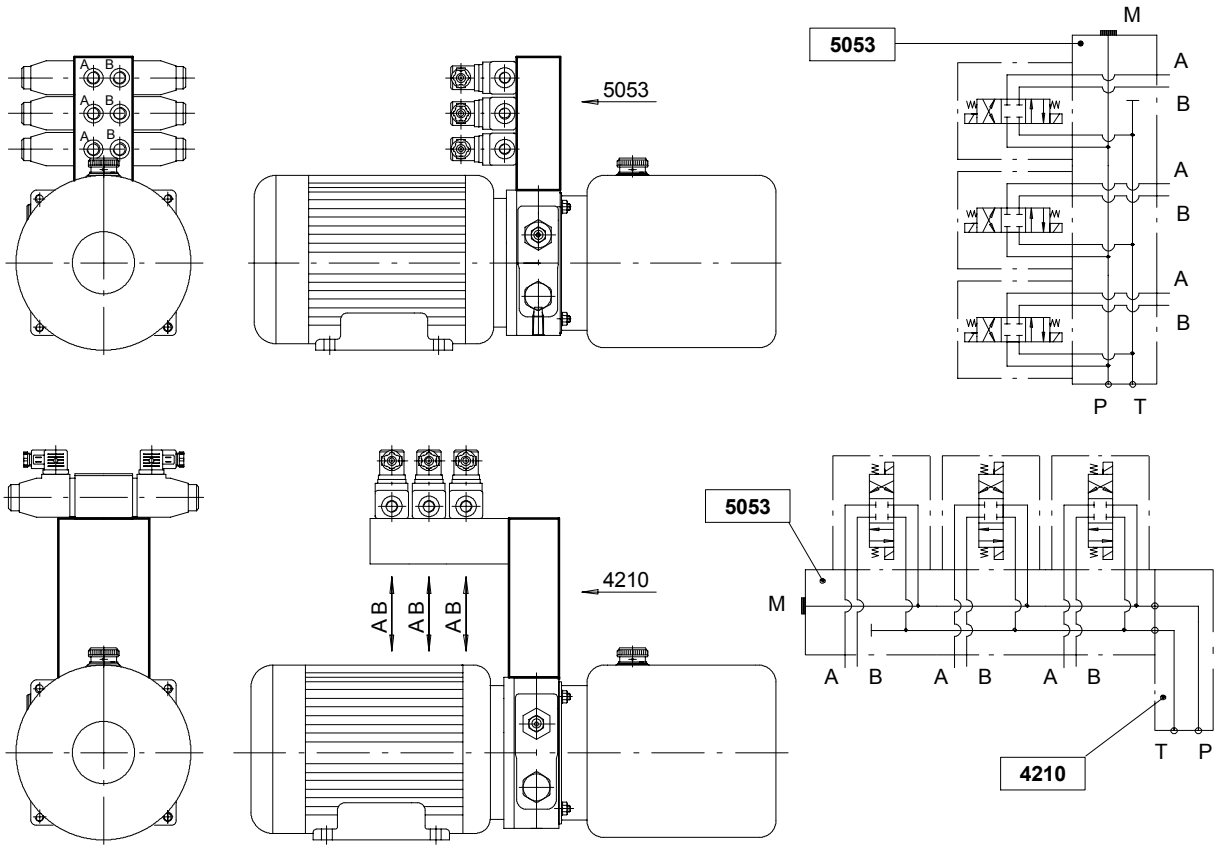






Code: 200.7649.0016.0

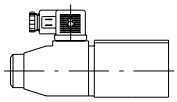
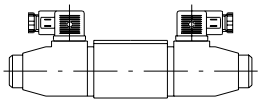
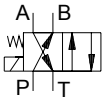
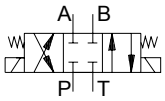
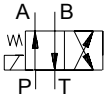
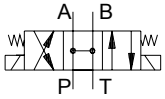
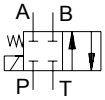
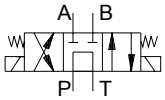
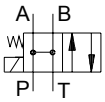
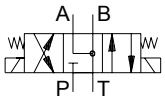
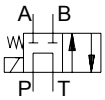
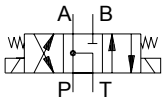
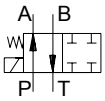
Mounting and ordering examples



Example

	Sequence				Manifolds				Valves for manifolds																				Q.ty	Volt	
8	1				4	2	1	0																					1	1	3
	2				5	0	5	3				B	-	0	2														3		

8.7 Solenoid valves DIN 24350 FORM A CETOP R35H - ISO4401*

			
H-01		**B-02**	
HR-01		**C-02**	
B-01		**A-02**	
C-01		**D-02**	
A-01		**X-02**	
I-01			

Max. Pressure	210 bar
Max. Flow	25 l/min.
Intermittence	ED = 100%
Voltage tolerance	± 10%
Leakage	15/60 cm^3/min.
Connector type	DIN 43650

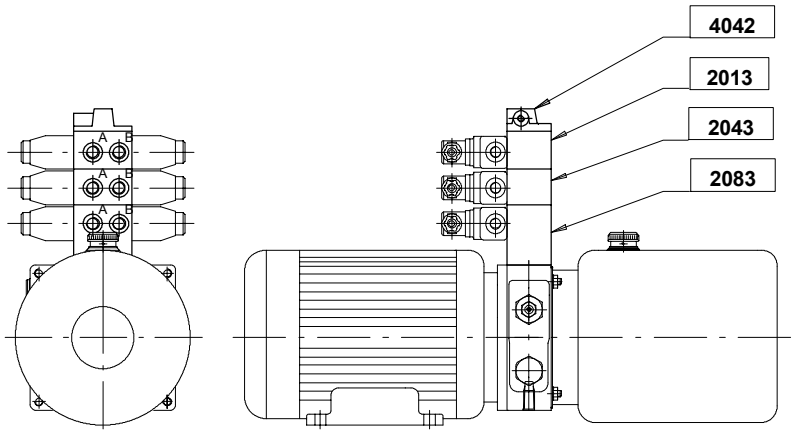
D.C. Coils

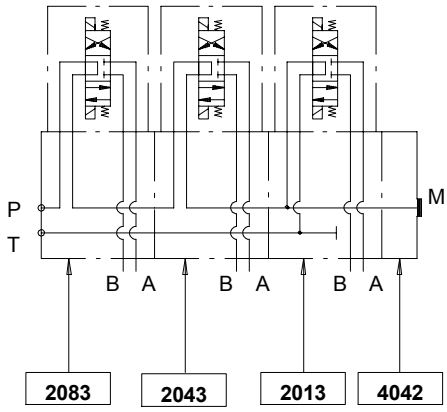
Voltage	Type
12 V.	13
24 V.	23

A.C. Coils

Voltage	Type
24 V.	21
110 V.	41
220 V.	51

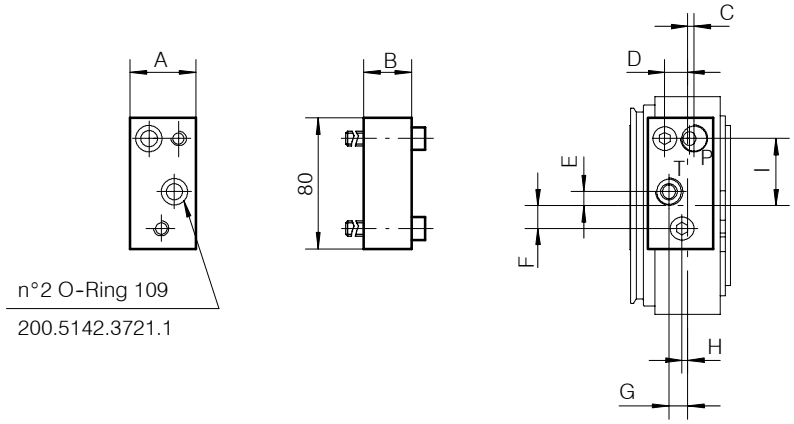
* Please contact our Sales Dept. for hydraulic circuit not indicated





	Sequence	Manifolds	Valves for manifolds	Q.ty	Volt
8	1	2083	A-02	1	13
	2	2043	A-02	1	
	3	2013	A-02	1	
	4	4042		1	

8.8 Manifolds with direct thread ports P and T for K3P001 and K4P001 housings

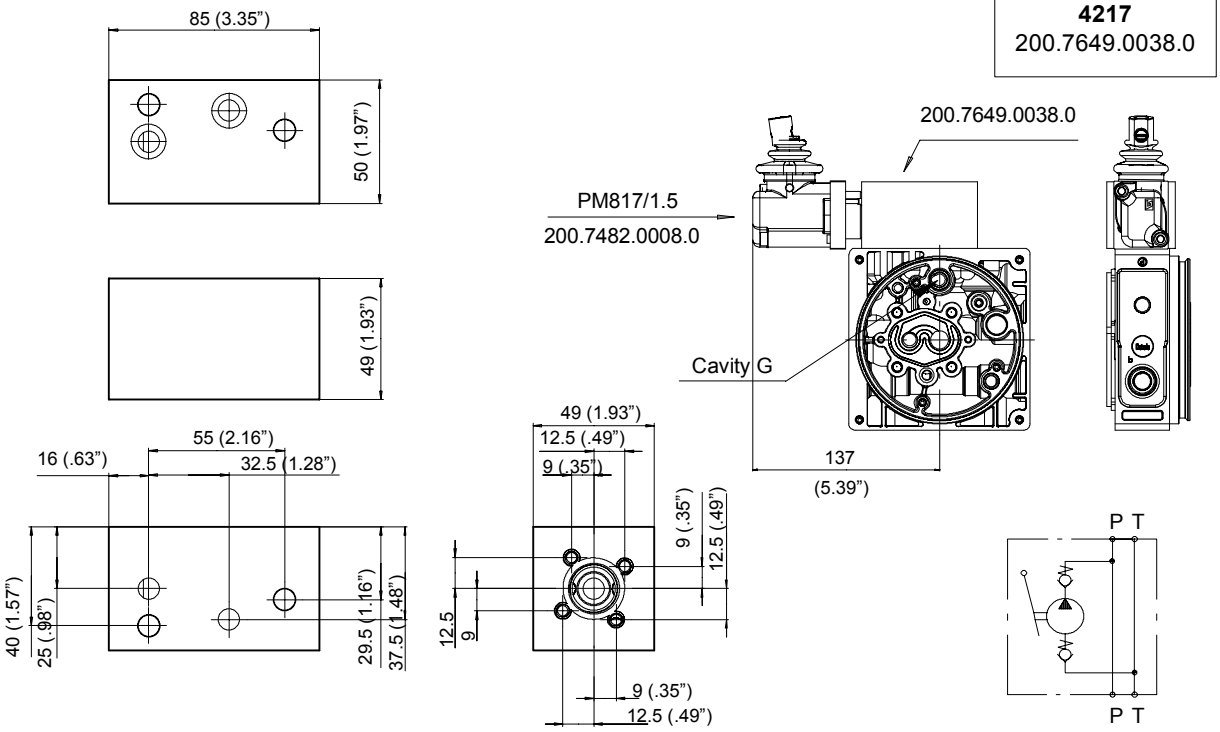


Type
1012 - 1013

Ø (P/T)	Type	Code	A	B	C	D	E	F	G	H	I
1/4" BSP	**1012**	200.7650.0062.0	40	30	3	14	8.5	14	11.5	3.5	41
3/8" BSP	**1013**	200.7650.0060.0	40	29	4	14	8.5	14	11.5	3.5	41

8.9 Intermediate manifold for UP100K3P001 Suitable for PM817/1.5 manual pump

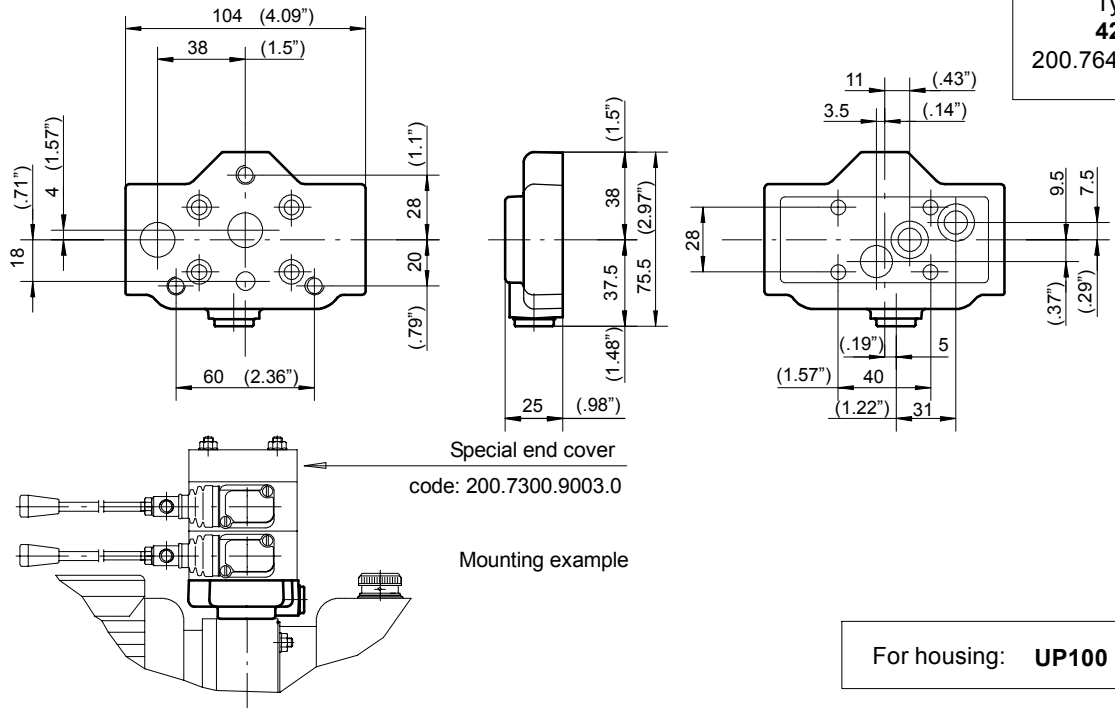
Type
4217
200.7649.0038.0



Note: To use the manual pump a suction pipe has to be assembled inside the cavity G (3/8" BSP); the suction pipe length depends by the tank length. See section 4.3 for special filter convoyer

8.10 Manifolds for HDS11-HDS07 directional control valve - Vertical mounting

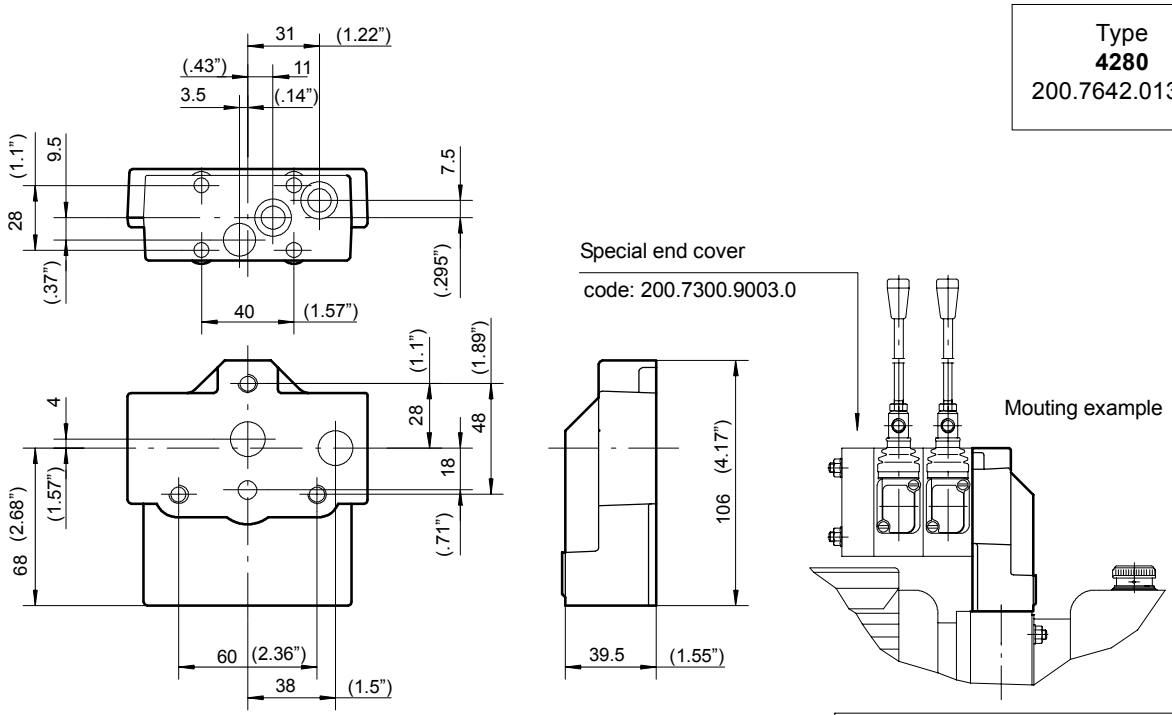
Type
4270
200.7642.0132.1



For housing: **UP100 K4D001**

8.11 Manifold for HDS11-HDS07 directional control valve - Horizontal mounting

Type
4280
200.7642.0133.0



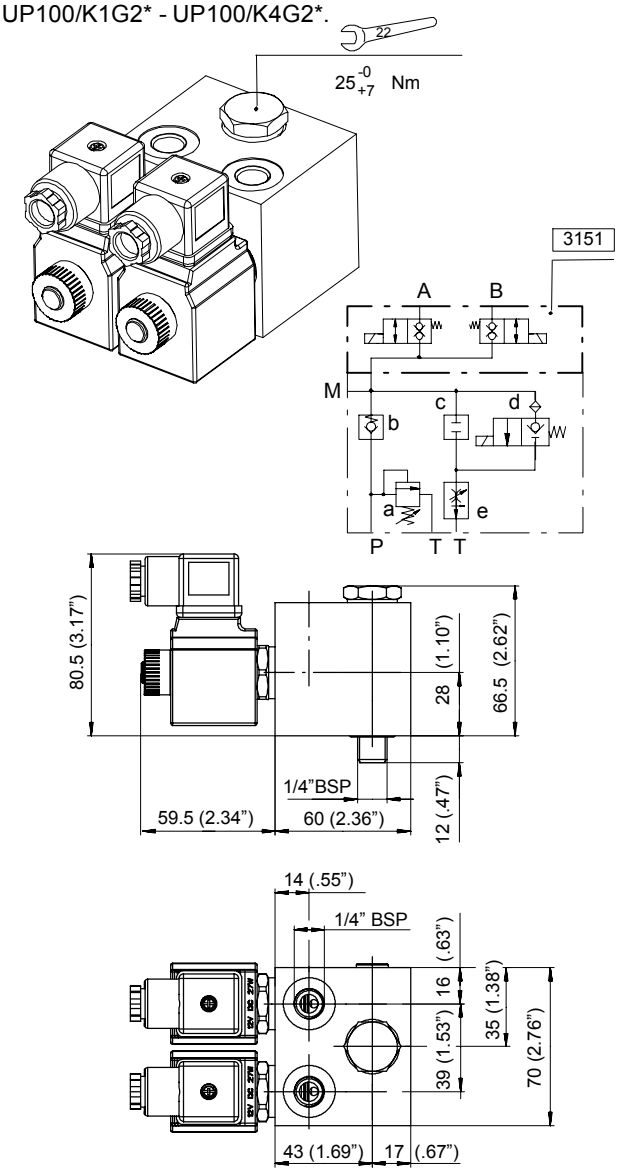
For housing: **UP100 K4D001**

For technical information regarding performance, ordering information and selection, please, refer to the HDS07 and HDS11 section of the Directional control valve catalogue

8.12 Special block 3151

Pre-arranged for 2 x SDR(E)817/22-TS solenoid valve

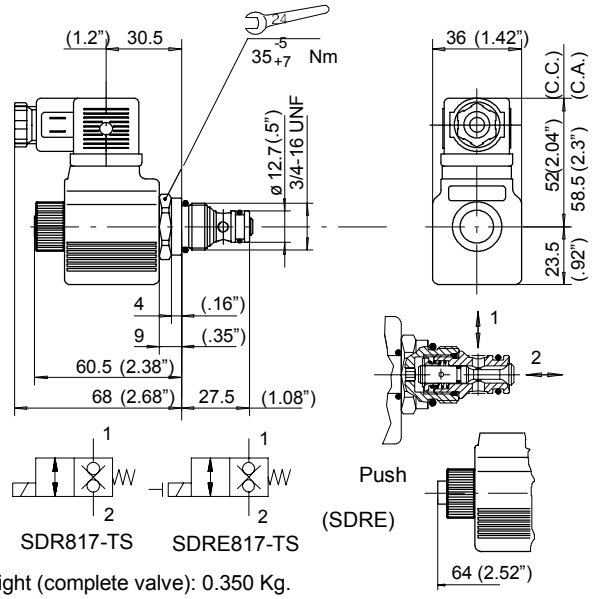
The block allows to control, singly or together the lifting and lowering function of two single acting cylinders connected to the port A and B. Suitable for housing UP100/K1G2* - UP100/K4G2*.



A.C. supply requires connector with bridge rectifier included

SDR(E)817/22-TS Electric performances	
Max. flow (see operating limit at section 7.4.2)	20 l/min.210 bar
Max. pressure	230 bar
Max recommended pressure	210 bar
Rated power	27 Watt
Intermittence	ED= 100%
Voltage tolerance	± 10%
Internal leakage	0-5 drops/min.
Temperature range	-20/+90° C
Connector type	DIN 43650
Time to open (50-210 bar)	15-50 ms.
Time to close (50-210 bar)	15-50 ms.
O-Ring replacement kit	200.9742.0039.0

Normally closed Pilot type
Poppet type Bi-directional flow admitted



Weight (complete valve): 0.350 Kg.

Ordering code

1/4" BSP Fitting: **200.7700.0066.0**

3151 block without solenoid valve : **200.7035.0023.0**

Directional valve without coil and connector

SDR817/22-TS P.M.	**200.7572.0069.0**
SDRE817/22-TS P.M.	**200.7572.0073.0**

Coil voltage

	D.C.		A.C.		
Volt	12 V.	24 V.	24 V.	110 V.	220 V.
Type	13	23	21	41	51

Complete solenoid valve for D.C. current

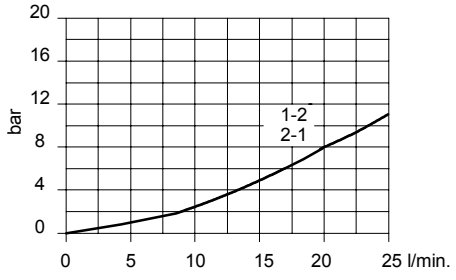
SDR817/22-TS-13-HC	**200.9570.1005.3**
SDR817/22-TS-23-HC	**200.9570.2005.4**
SDRE817/22-TS-13-HC	**200.9570.1005.5**
SDRE817/22-TS-23-HC	**200.9570.2005.6**

Complete solenoid valve for A.C. current

SDR817/22-TS-21-HC	**200.9569.2004.0**
SDR817/22-TS-41-HC	**200.9569.4003.5**
SDR817/22-TS-51-HC	**200.9569.6003.8**
SDRE817/22-TS-21-HC	**200.9569.2004.2**
SDRE817/22-TS-41-HC	**200.9569.4003.7**
SDRE817/22-TS-51-HC	**200.9569.6004.0**

Oil: Viscosity 37 mm^2/s at 40°C

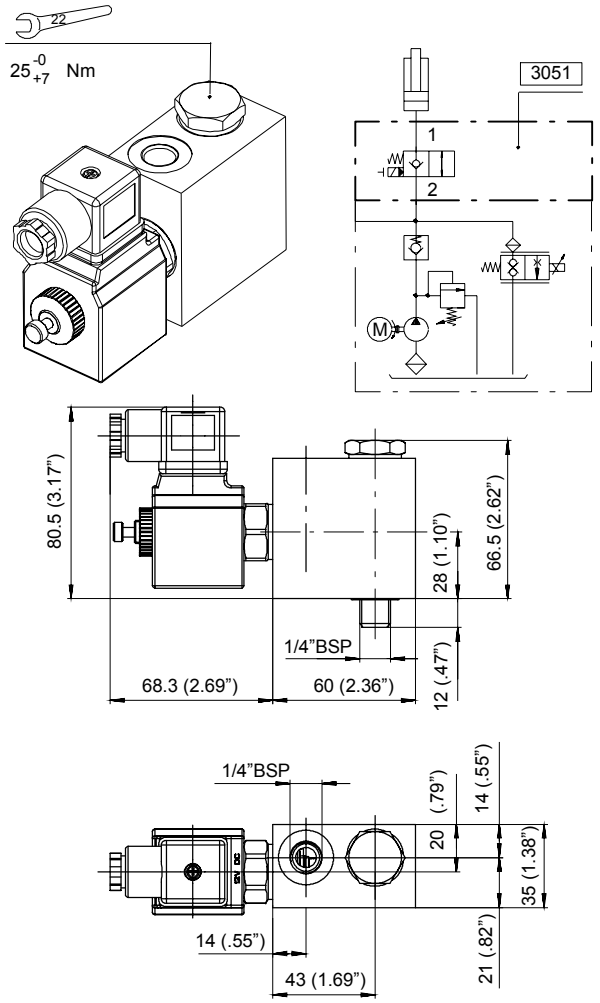
Pressure drops



8.13 Special block 3051

Pre-arranged for one SPE817/22-TVR solenoid valve.

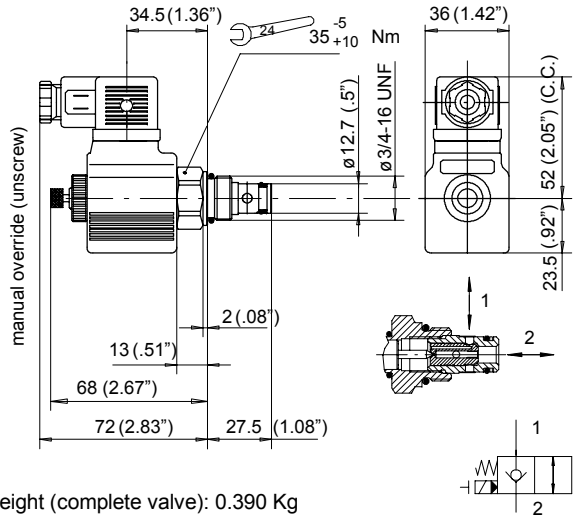
Valve block to be used in combination with the PDF817 solenoid proportional control valve in order to assure the load held at its stopped position and control the load speed proportionally, either during the lifting and lowering function. Suitable for housing UP100/K1G2* - UP100/K4G2*.



A.C. supply requires connector with bridge rectifier included

SPE817/22-TVR Electric performances	
Max. pressure	300 bar
Max. recommended pressure	210 bar
Max. flow	25 l/min.
Rated power	22 Watt
Intermittence	ED= 100%
Voltage tolerance	± 10%
Internal leakage	0-5 drops/min.
Temperature range	-20/+90° C
Connector type	DIN 43650
Time to open (50-210 bar)	15-60 ms.
Time to close (50-210 bar)	15-60 ms.
O-Ring replacement kit	200.9742.0014.0

Normally closed Pilot type
Poppet type, bi-directional flow admitted, without filter



Weight (complete valve): 0.390 Kg

Ordering code

1/4" BSP Fitting: **200.7700.0066.0**

3051 block without solenoid valve: **200.7035.0026.0**

Directional valve without coil and connector

SPE817/22-TVR P.M.	**200.7572.0077.0**

Coil voltage

	D.C.		A.C.		
Volt	12 V.	24 V.	24 V.	110 V.	220 V.
Type	13	23	21	41	51

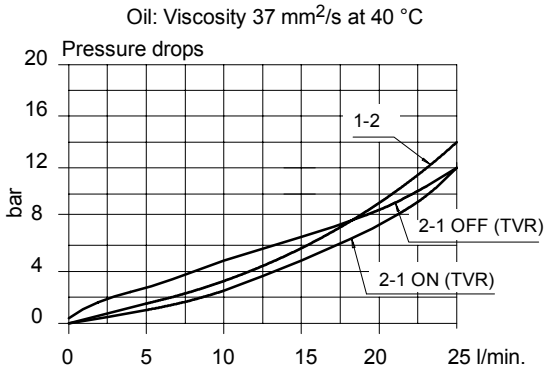
Complete solenoid valve for D.C. current

SPE817/22-TVR-13-HC	**200.9570.1004.6**
SPE817/22-TVR-23-HC	**200.9570.2004.8**

Complete solenoid valve for A.C. current

SPE817/22-TVR-21-HC	**200.9569.2003.7**
SPE817/22-TVR-41-HC	**200.9569.4003.2**
SPE817/22-TVR-51-HC	**200.9569.6003.5**

Performances of the SPE valve, only



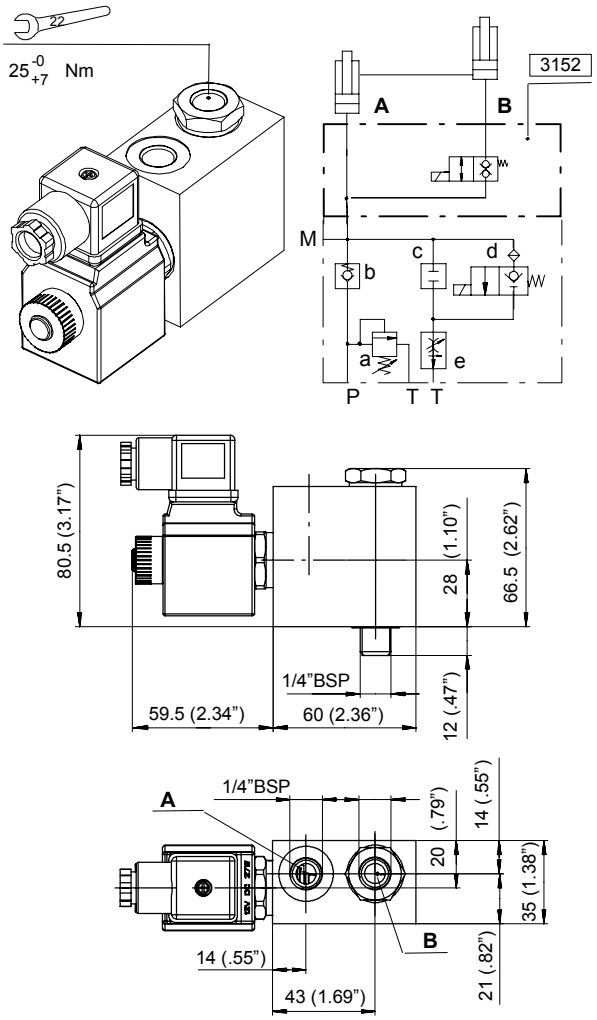
Minimum operating pressure= 5 bar

8.14 Special block 3152

Pre-arranged for one SDR(E)817/22-TS solenoid valve.

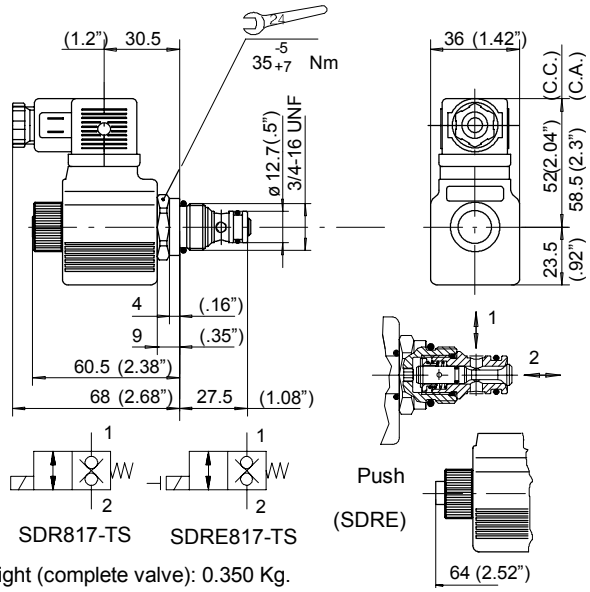
Normally closed
Poppet type
Pilot type
Bi-directional flow admitted

Valve block able to control and operate two single acting cylinders with the possibility to balance both at the same level operating the solenoid control valve.
Suitable for housing UP100/K1G2* - UP100/K4G2*.



A.C. supply requires connector with bridge rectifier included

SDR(E)817/22-TS Electric performances	
Max. flow (see operating limit at section 7.4.2)	20 l/min.210 bar
Max. pressure	230 bar
Max recommended pressure	210 bar
Rated power	27 Watt
Intermittence	ED= 100%
Voltage tolerance	±10%
Internal leakage	0-5 drops/min.
Temperature range	-20/+90° C
Connector type	DIN 43650
Time to open (50-210 bar)	15-50 ms.
Time to close (50-210 bar)	15-50 ms.
O-Ring replacement kit	200.9742.0039.0



Weight (complete valve): 0.350 Kg.

Ordering code

1/4" BSP Fitting: **200.7700.0080.0**

3152 block without solenoid valve: **200.7035.0028.0**

Directional valve without coil and connector

SDR817/22-TS P.M.	**200.7572.0069.0**
SDRE817/22-TS P.M.	**200.7572.0073.0**

Coil voltage

	D.C.		A.C.		
Volt	12 V.	24 V.	24 V.	110 V.	220 V.
Type	13	23	21	41	51

Complete solenoid valve for D.C. current

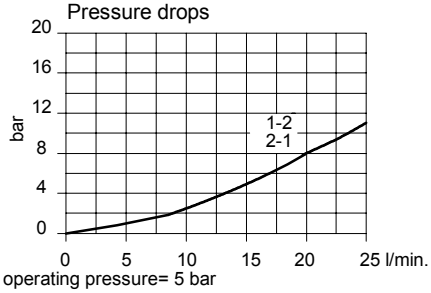
SDR817/22-TS-13-HC	**200.9570.1005.3**
SDR817/22-TS-23-HC	**200.9570.2005.4**
SDRE817/22-TS-13-HC	**200.9570.1005.5**
SDRE817/22-TS-23-HC	**200.9570.2005.6**

Complete solenoid valve for A.C. current

SDR817/22-TS-21-HC	**200.9569.2004.0**
SDR817/22-TS-41-HC	**200.9569.4003.5**
SDR817/22-TS-51-HC	**200.9569.6003.8**
SDRE817/22-TS-21-HC	**200.9569.2004.2**
SDRE817/22-TS-41-HC	**200.9569.4003.7**
SDRE817/22-TS-51-HC	**200.9569.6004.0**

Performances of the SDR817 valve, only

Oil: Viscosity 37 mm²/s at 40°C



Minimum operating pressure= 5 bar

9 Directional control valves

9.1 Introduction

This chapter illustrates single monobloc directional valves assembled directly on power pack housings UP100K4D002.

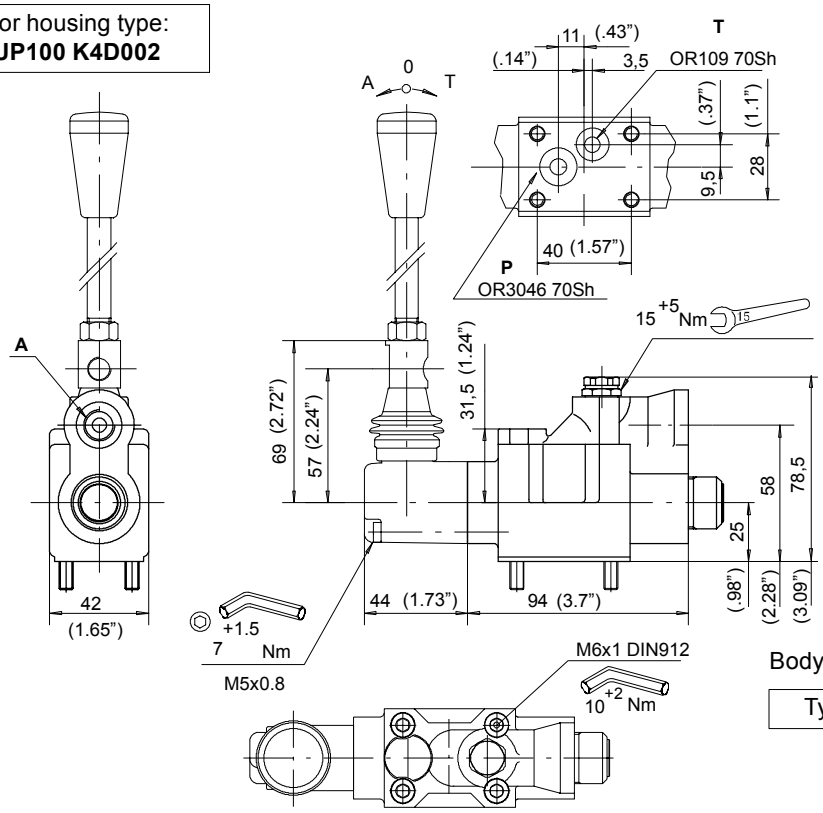
The range includes directional control valves for single and double acting circuits, with or without mechanically released detent on the main work port.

9.2 Directional control valve HD105

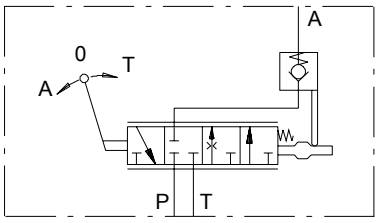
Single acting
Close centre
Mechanical piloted check valve

Max. pressure	210 bar
Max. flow	20 l/min.
Max. back pressure	30 bar

For housing type:
UP100 K4D002



Circuit **B**

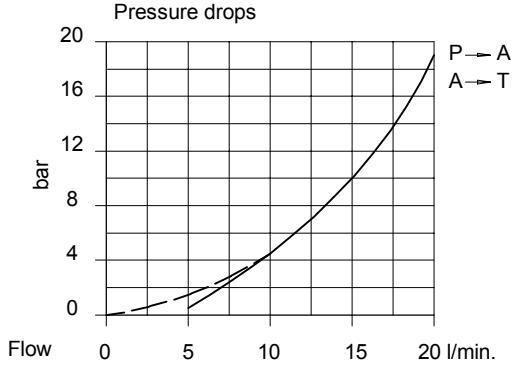


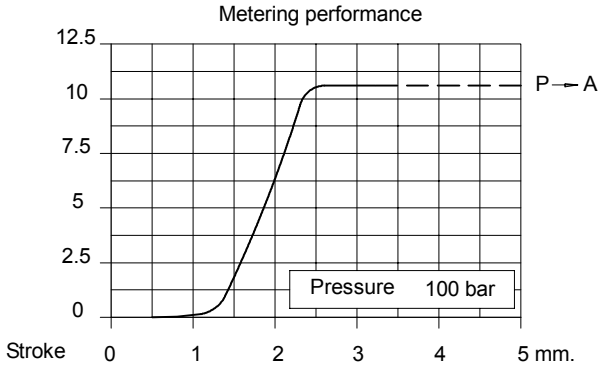
Body

Type: **HD105 K02** port A 1/4" BSP

	El. n.	Sectional valve body									Circuit	Pos.	Hand lever	Lever stick	Valves for sect. valve
9	1		H	D	1	0	5	K	0	2	B				

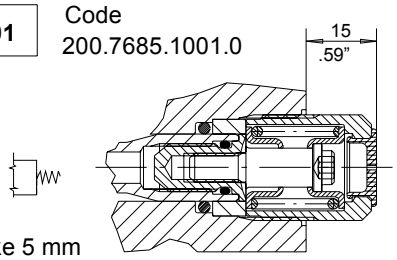
Performances (Viscosity 37 mm²/s at 40° C)





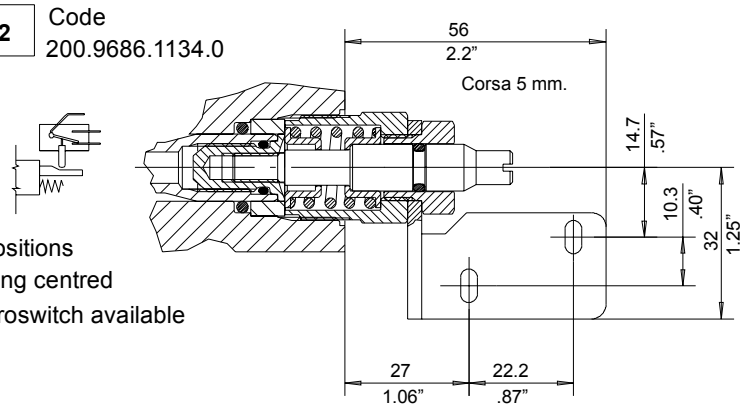
9.2.1 Spool positioner

01 Code 200.7685.1001.0



Stroke 5 mm
3 positions - spring centred

92 Code 200.9686.1134.0

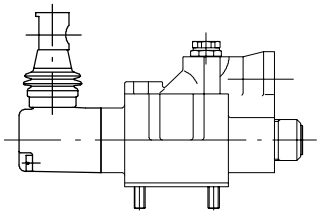


3 positions
Spring centred
Microswitch available

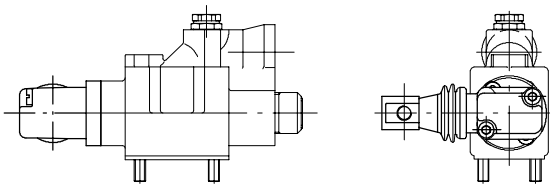
9	El. n.	Sectional valve body	Circuit	Posit.	Hand lever	Lever stick	Valves for sect. valve
	1	HD105	K02	B	**01**		

9.2.2 Hand lever

L100 Code 200.9071.1020.0

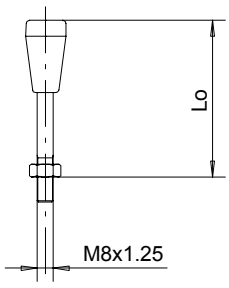


L129 Code 200.9071.2005.0



9	El. n.	Sectional valve body	Circuit	Posit.	Hand lever	Lever stick	Valves for sect. valve
	1	HD105	K02	B	01	**L100**	

9.2.3 Lever stick



L_0 Length	Type	Code
150 mm - 5.90 inches	**AL001**	200.7022.1019.0
200 mm-7.87 inches	**AL002**	200.7022.1003.0
250 mm-9.84 inches	**AL003**	200.7022.1005.0
300 mm-11.80 inches	**AL004**	200.7022.1006.0

9	El. n.	Sectional valve body	Circuit	Posit.	Hand lever	Lever stick	Valves for sect. valve
	1	HD105	K02	B	01	L100	**AL001**

9.2.4 Preassembly code

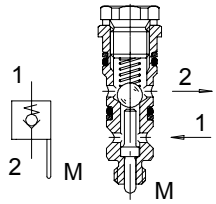
Directional control valves

HD105-K02-B-01-L100 Code: 200.0505.19.011

HD105-K02-B-92-L100 Code: 200.0505.19.005

Mechanical piloted check valve

Code: 200.9876.0176.0



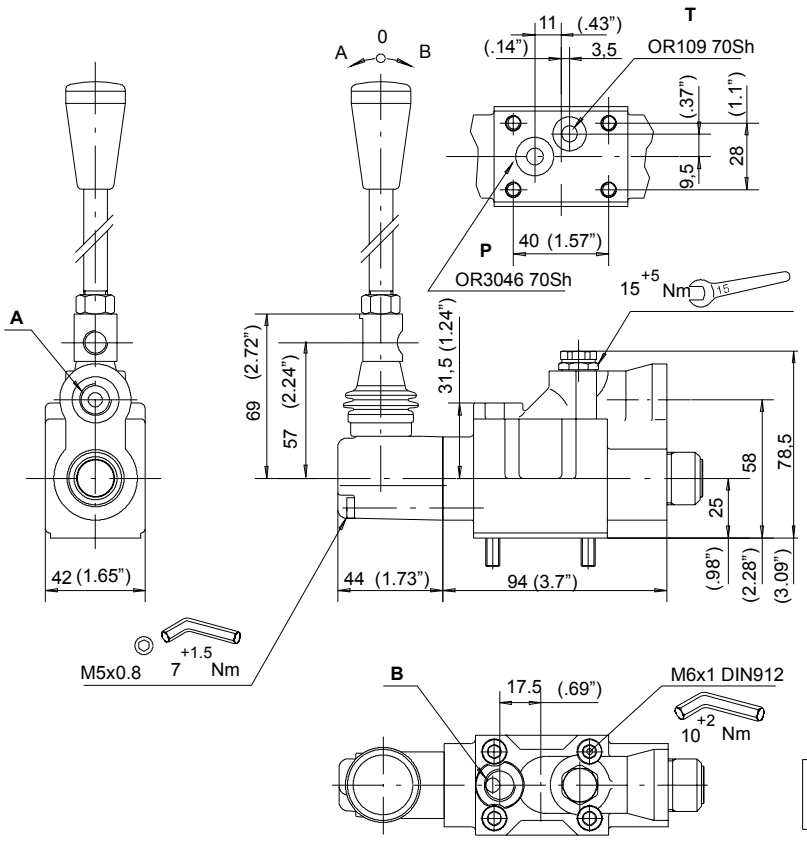
For further information and options, see directional control valves catalogue chapter HDM140

9.3 Directional control valve HD106

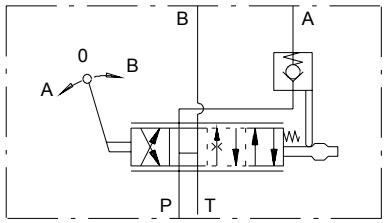
Double acting
Close centre
Mechanical piloted check valve

Max. Pressure	210 bar
Max. Flow	20 l/min.
Max. Back pressure	30 bar

For housing type:
UP100 K4D002



Circuit **ADC**

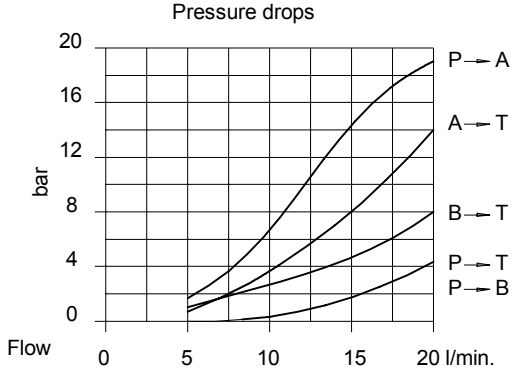


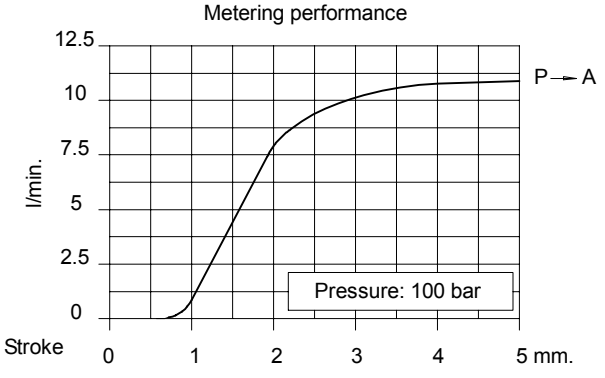
Body

Type: **HD106 K02** A port 1/4" BSP
B port 1/4" BSP

	El. n.	Sectional valve body							Circuit			Pos.	Hand lever			Lever stick				Valves for sect. valve									
9	1			H	D	1	0	6		K	0	2	A	D	C														

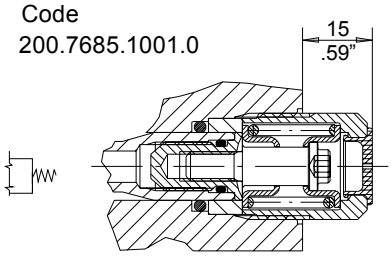
Performances (Viscosity 37 mm²/s at 40° C)





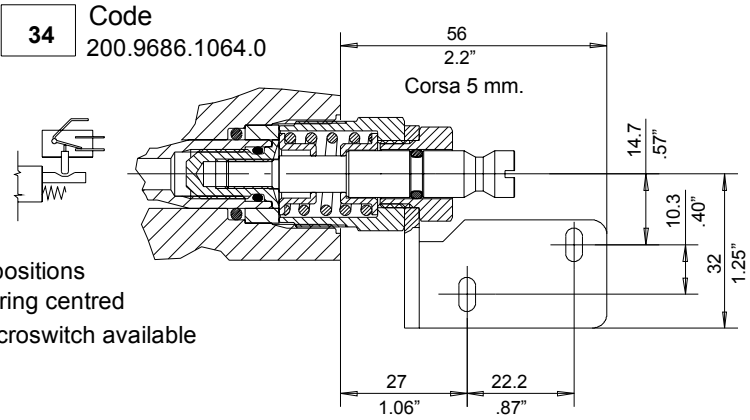
9.3.1 Positioner

01 Code 200.7685.1001.0



Stroke 5 mm
3 positions
spring centred

34 Code 200.9686.1064.0

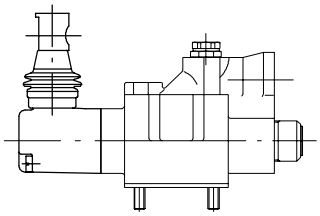


3 positions
Spring centred
Microswitch available

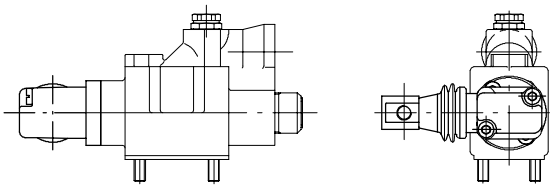
	El. n.	Sectional valve body	Circuit	Posit.	Hand lever	Lever stick	Valves for sect. valve
9	1	HD1062	K22	ADC	**01**		

9.3.2 Hand lever

L100 Code 200.9071.1020.0

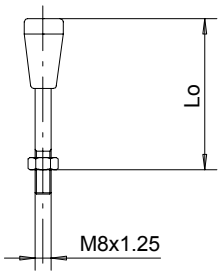


L129 Code 200.9071.2005.0



	El. n.	Sectional valve body	Circuit	Posit.	Hand lever	Lever stick	Valves for sect. valve
9	1	HD1062	K22	ADC	01		
					L100		

9.3.3 Lever stick



L_0 Length	Type	Code
185 mm - 7.28 inches	**AL001**	200.7022.1019.0
250 mm-9.84 inches	**AL002**	200.7022.1003.0
300 mm-11.81 inches	**AL003**	200.7022.1005.0
350 mm-13.78 inches	**AL004**	200.7022.1006.0

	El. n.	Sectional valve body	Circuit	Posit.	Hand Lever	Lever stick	Valves for sect. valve
9	1	HD1062	K22	ADC	01		
					L100	**AL001**	

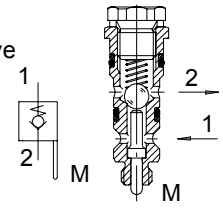
9.3.4 Preassembly code

Directional control valves

HD106-K22-ADC-34-L100 Code: 200.0505.19.011

Mechanical piloted check valve

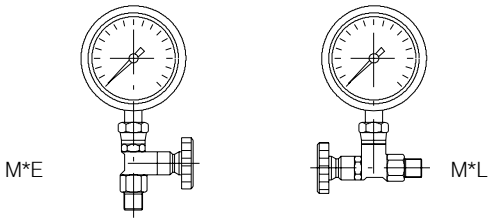
Code: 200.9876.0177.0



For further information and options, see directional controls valves catalogue chapter HDM140

10 Components

10.1 Pressure gauge

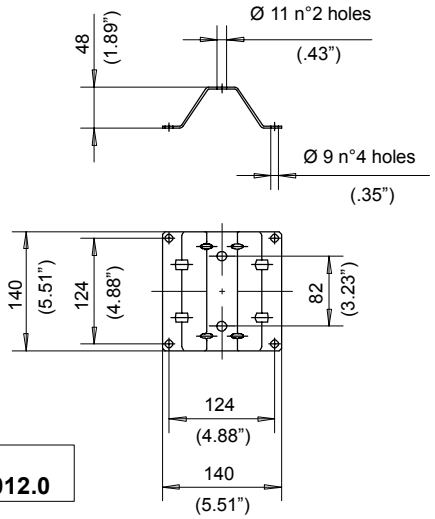


Pressure gauge M01 full scale 0-100 bar	200.5873.22001
Pressure gauge M03 full scale 0-250 bar	200.5873.22003
Cut out device type E	200.5341.10001
Cut out device type L	200.5341.10002

Pressure gauge M01 with cut out type E	200.9620.0001.0*
Pressure gauge M03 with cut out type E	200.9620.0003.0*
Pressure gauge M01 with cut out type L	200.9620.0002.0*
Pressure gauge M03 with cut out type L	200.9620.0004.0*

*** The pressure gauge must be assembled, on housing and manifold, always together with cut out device**

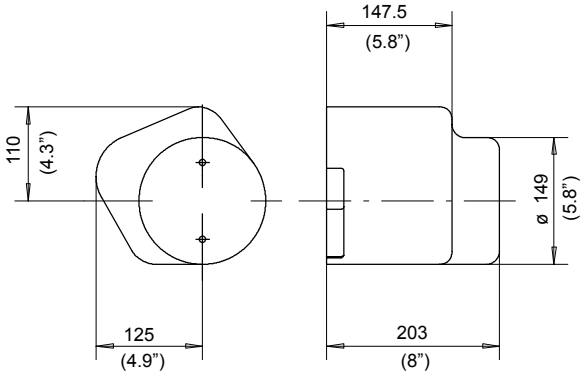
10.2 Steel plate bracket pressed for UP housing



Code**
200.7774.0012.0

** Supplied with screws and washers

10.3 Protective cover for D.C. motors

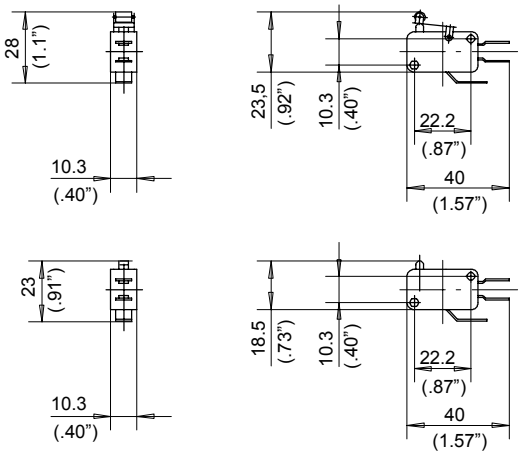


Code**
200.9688.0009.0

Only for motors:
T82K, C134AK, C238AK

10.4 Microswitch

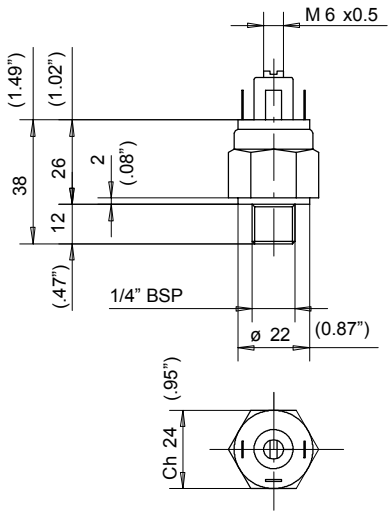
Code **200.5441.24013**



Code **200.5441.24014**

Code (micro only)	**200.5441.24013**	**200.5441.24014**
Complete code (micro+fixing kit)	200.7625.0006.0	200.7625.0005.0
Voltage	250 V.	
Index protection	IP00	
Nominal current	16 A.	
Max. current	20 A.	
Temperature range	-20/+125°C	
Max total stroke	2.6 mm.	
Working stroke	1.2 mm.	
Mechanical life	$2x10^7$ cycles	
Suitable for	HD105-HD106	ZR817/**

10.5 Pressure switch



Setting hysteresis	+0/-0.5 bar
Max. voltage	220 V.
Working voltage	100 VA
Index protection	IP00
Resister current	0.5 A.
Inductive current	0.2 A
Temperature range	-5/+60°C
Max. number of cycles	200/min.
Insulation	1500 V.

Pressure range	Code	Versions
25- 50 bar	**200.5441.30009**	normally closed
50 bar	**200.5441.30005**	normally closed
60 bar	**200.5441.30020**	normally closed
70-80 bar	**200.5441.30010**	normally closed
80 bar	**200.5441.30011**	normally closed
150-250 bar	**200.5441.30012**	normally closed
20 bar	**200.5441.30014**	normally open
60 bar	**200.5441.30021**	normally open

11 Operation and maintenance

This chapter list the main guidelines that should be followed to ensure smooth operation and long life service life of the power pack.

11.1 Oil

Use only a mineral based hydraulic oil responding to ISO/ DIN 6743/4.

Other types of fluid can use serious damage to the power pack and jeopardize its correct operation.

Recommended viscosity is between 20 and 120 mm^2/s.

Contamination levels must be no higher than class 18/15 as prescribed by ISO 4406.

Check that the oil level is correct when filling the tank.

11.2 Starting

Connect the e. motor according paragraph 5.2 page 88/160 and check that the direction of rotation is correct by supplying power for 1-2 seconds only.

For power packs which use pump series AP100 S409 and AP100 S509 the correct rotation is counterclockwise, viewed from the fan side.

Bleed the system of any air, then fill up the oil level in the tank after the initial period of operation.

For systems using solenoid valves with a.c. voltage, check before operating that is fitted the right type of electric connector.

11.3 Maintenance

Check the oil level in the tank on a regular basis.

Following the first few hours operation, inspect the return line filter to verify the rate of pollution, and generally check the level of contaminants in the oil.

Clean the tank inside periodically and replace the oil after every 600-800 hours operation.

In heavy duty conditions or hostile environments, inspections and oil changes should be carried out more often.

Likewise periodically, check the power connections to the electric motor, the solenoid valves and any other electrical accessories (e.g. microswitches, etc.).

In the event that the O-Rings of cartridge valves need to be renewed, use the replacement parts kit specified for each of the valves in the catalogue, positioning the seal and the backup ring as indicated.

Avoid makeshift arrangements using different seals.

11.4 Dealing with possible trouble

This is intended to assist those customers who choose to purchase single sub-assemblies separately and put together their own power packs. Listed below are some of the more commonplace problems that can occur if parts are not assembled correctly.

Trouble observed: **Oil leaking from spigot on tank side**	
Probable reasons:	Possible remedies:
O-Ring damaged	Inspect and replace O-Ring

Trouble observed: **Motor turning but no pressure in circuit**	
Probable reasons:	Possible remedies:
Hydraulic circuit wrongly assembled	Inspect position and type of plugs and valves fitted into the cavities
Solenoid valve normally open energized by not correct or lower tension	Check energizing with the correct nominal input voltage.
Solenoid valve normally closed but continuously energized.	Check electrical connections.
Electric motor rotates in wrong direction	Check and modify the electric connection
Pump bearings fitted incorrectly	Check and re-assembling correctly
Pressure relief valve set at not correct valve	Check with a gauge and set to the correct pressure
The pump does not suck oil owing to low oil level in the tank	Check and fill the tank with correct oil level
The drive coupling between pump and e. motor is not correctly assembled	Check and assemble in the correct position

Trouble observed: **Cylinder rod extends correctly, but fails to retract when unloading valve is opened**	
Probable reasons:	Possible remedies:
Solenoid unloading valve not energized	Check electrical connections
Solenoid unloading valve not energized with nominal input voltage	Check power input and restore nominal voltage.
Solenoid valve has lower performances compared to the circuit requirements. consequently unable to handle flow/pressure.	Verify, and replace with a model giving higher performances.
The solenoid valve is blocked because of dirt in the system	Disassemble and clean
Valve solenoid damaged by overheating	Possible overvoltage. Check rated voltage of solenoid against input voltage. If system is using a.c., make certain the type of the connector is correct.

Trouble observed: **Cylinder rod does not keep the position due to internal leakage**	
Probable reasons:	Possible remedies:
Dirt in the system	Clean up components and restore system to a suitable level of cleanliness. Check that valve elements and seats are undamaged. Check piston seals for wear.

Trouble observed: **Oil leaking on motor side**	
Probable reasons:	Possible remedies:
Pump shaft seal damaged during assembling	Check seal, and replace if it is necessary

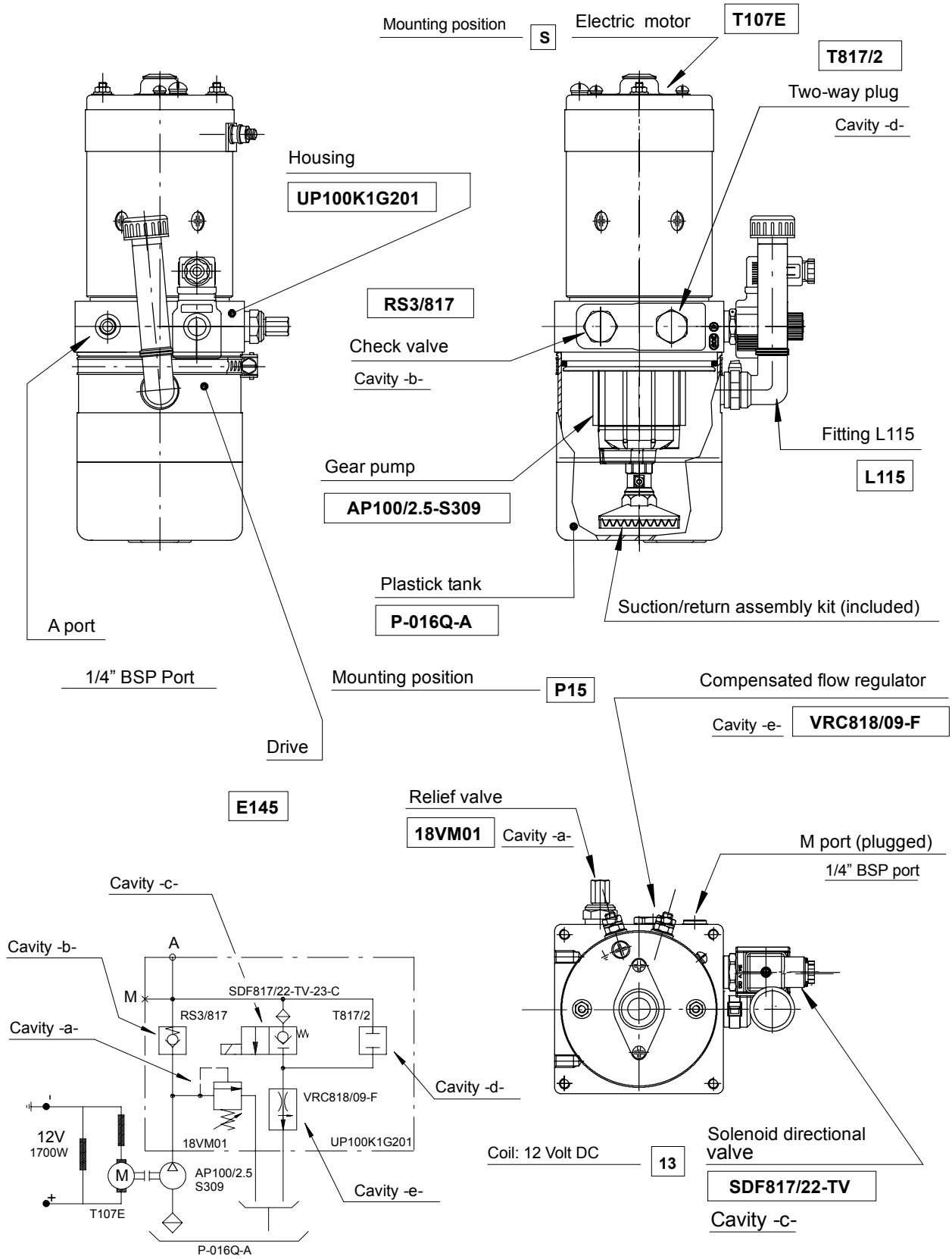
Trouble observed: **High noise level**	
Probable reasons:	Possible remedies:
Air in the system.	Bleed off any air by loosening a pressure line fitting
Possible damage to pump shaft oil seal damaged during assembly	Check seal, and replace if it is necessary
Drive coupling not fitted correctly	Inspect and assemble correctly
Coupling worn	Inspect and replace if necessary
Pump suction with air inside	Check the oil level in the tank and the connections between filter, suction pipe and pump

Trouble observed: **High current consumption of the electric motor**	
Probable reasons:	Possible remedies:
Motor incorrectly installed	Check correct mounting position if necessary
Low battery charge	Measure, and recharge if necessary
Pump O-Ring or backup ring not fitted correctly	Check, and if necessary replace O-Ring and backup ring.

Trouble observed: **Electric motor continues to run even when switched off**	
Probable reasons:	Possible remedies:
Wrong electrical connections	Check, and restore proper connections
Starting relay contacts are fuse together as a result of high current.	Disconnect power input immediately and verify condition of the contacts. Replace starter relay if necessary

12 Composition of hydraulic power pack ordering code

Assembled power pack example



Example of hydraulic power pack ordering code

1 — Type of housing / Vers.: U P 1 0 0 / K 1 G 2 0 1

2 — Pump / Hi-Lo / Series: A P 1 0 0 / 2 . 5 | S 3 0 9

3 — Tank / Fitting / Pos.: P - 0 1 6 Q - A | L 1 1 5 | P 1 5

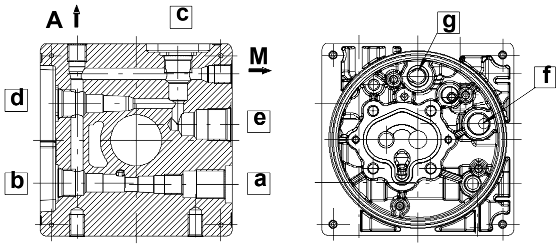
4 — Suspension assembly kit / Tank fixing kit:

5 — Electric motor / Pos. / Relay / Pos.: T 1 0 7 E | S

6 — Drive: E 1 4 5

7 —
Cavity a: 1 8 V M 0 1
Cavity b: R S 3 / 8 1 7
Cavity c: S D F 8 1 7 / 2 2 - T V
Cavity d: T 8 1 7 / 2
Cavity e: V R C 8 1 8 / 0 9 - F
Cavity f:
Cavity g:
Hand lever:
Stick lever:
Volt: 1 3

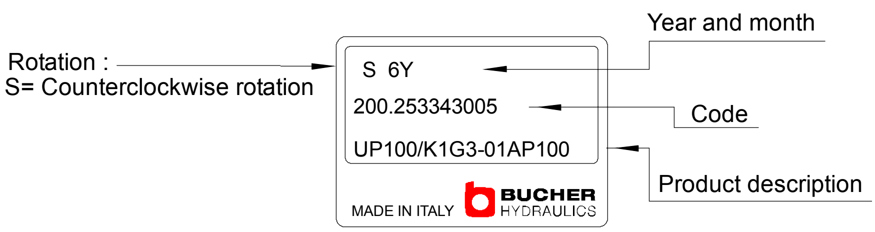
Cavities identification



Composition of product code

UP100/K1G201 AP100/2.5S309
P-0160Q-A L115 P15 T107E S E145
a) 18VM01 b) RS3/817
c) SDF817/22-TV-13-HC
d) T817/2 e) VRC818/09-F

Product identification plate



Manufacturing month	Manufacturing year											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
January	1M	2M	3M	4M	5M	6M	7M	8A	9A	0A	1A	2A
February	1N	2N	3N	4N	5N	6N	7N	8B	9B	0B	1B	2B
March	1P	2P	3P	4P	5P	6P	7P	8C	9C	0C	1C	2C
April	1Q	2Q	3Q	4Q	5Q	6Q	7Q	8D	9D	0D	1D	2D
May	1R	2R	3R	4R	5R	6R	7R	8E	9E	0E	1E	2E
June	1S	2S	3S	4S	5S	6S	7S	8F	9F	0F	1F	2F
July	1T	2T	3T	4T	5T	6T	7T	8G	9G	0G	1G	2G
August	1U	2U	3U	4U	5U	6U	7U	8H	9H	0H	1H	2H
September	1V	2V	3V	4V	5V	6V	7V	8I	9I	0	1I	2I
October	1Z	2Z	3Z	4Z	5Z	6Z	7Z	8J	9J	0J	1J	2J
November	1X	2X	3X	4X	5X	6X	7X	8K	9K	0K	1K	2K
December	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8L	9L	0L	1L	2L

info.it@bucherhydraulics.com **www.bucherhydraulics.com**