2019
AC & DC Micro series
Hydraulic Power Packs

Hydronit

Why choose Hydronit?

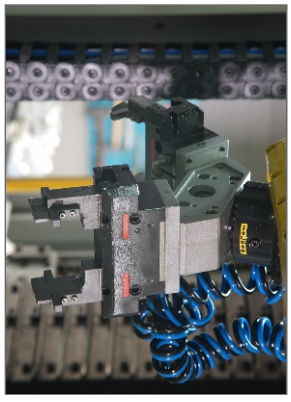
- Complete focus on hydraulic components & modular power packs design, **continuous** research, development and **innovation**
- **Expertise** on hydraulic applications; design and development of **customised solutions**, including special manifolds, ex-proof units, proportional systems,...
- Organization fully based on processes and **Total Quality Management** principles through risk analysis, certified **ISO 9001**
- Lean and **energy efficient** product design and manufacturing
- Mass production and **cost optimization**: hundreds of thousands of Hydronit modular power packs are now reliably running worldwide
- Flexible marketing policy: supply of loose hydraulic components and power packs either in kit or fully assembled and tested in accordance with **Machine Directive 2006/42/CE**
- Distributors, associate companies and partners in over **50 countries** worldwide


DNV·GL

MANAGEMENT SYSTEM
CERTIFICATE

HYDRONIT S.r.l. - Sede Legale e Operativa
Via Pastrengo, 62 - 20814 Varedo (MB) - Italy

ISO 9001:2015



Hydronit - The sustainable factory

- Production is carried out in a building of 20000 m^3 **requiring almost no use of fossil fuels** to operate

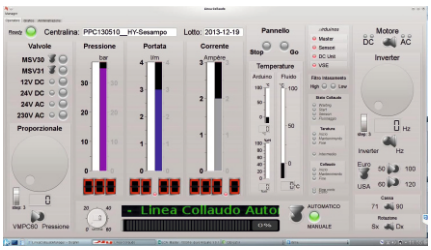
- The **hyper insulation of the structure** through the use of materials, mainly natural, such as wood and cork, ensures a consumption of only 7,4 kWh/m^3/year for winter heating and for summer cooling only 3,2 kWh/m^3/year

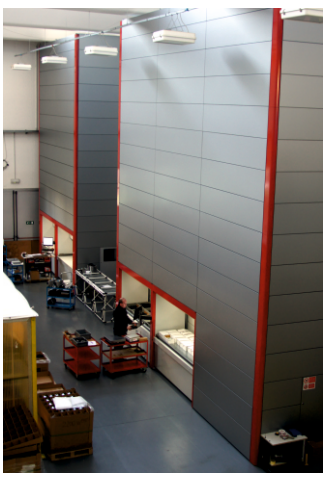
- A **heat pump** provides **high efficiency** thermal regulation

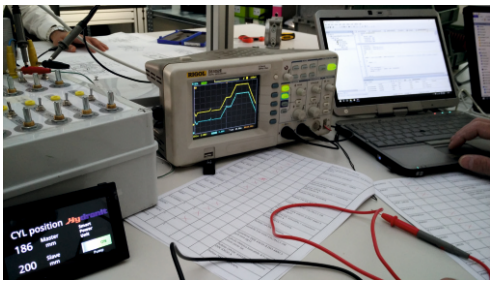
- A system of 60 solar panels on the roof of the offices provides 13,8 kW of electrical power that contributes about 60% of the electricity consumed by the plant for its own operation

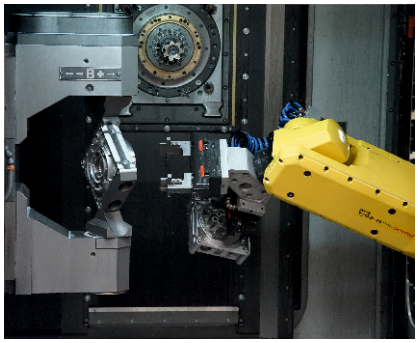
- **Solar thermal panels** provide hot water

- The **automatic wharehouses** and the **semi-automatic assembly** line increase efficiency, reduce process paperwork and human errors, thus ensuring compliance with **stringent quality standards** and **consistent test results**







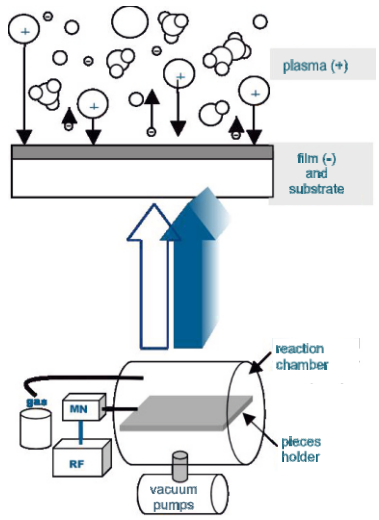


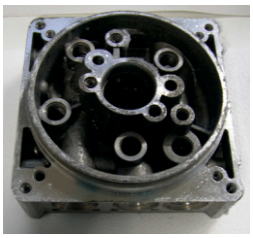
Countinuous innovation

Hydronit Srl, in the pursuit of excellence, have dedicated a large part of their profits to **research and continuous development of the product**, in order to increase the performance, efficiency, durability and reliability over time, and for the **continuous improvement of the processes**, constantly monitoring efficiency and efficacity of the organization as a whole.

Nanotechnology surface treatment

Hydronit Srl, in partnership with research institutions and external bodies, co-financed by the Lombardy Region, has conducted a project for the **development of advanced applications of plasma surface treatment of metallic materials**. In short it is the application of **nanotechnology** to hydraulic equipment to improve the performance of our units. We have obtained excellent results in the following fields: **improvement of the pressure tightness** of the aluminum die-casting; **improvement of the characteristics of surface hardness** of the treated components and a **remarkable increase in the corrosion resistance of the surface.** More information is available by contacting our sales department.

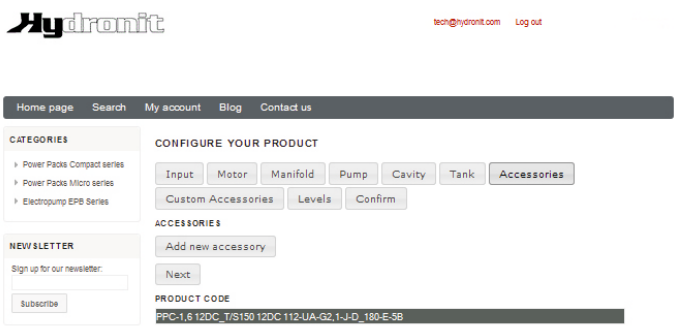


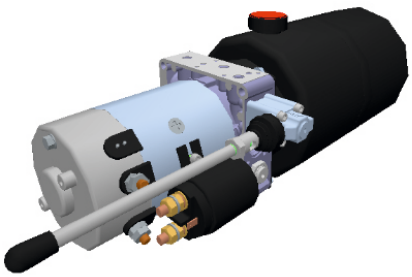


Treated manifold Nanotech Standard manifold

Exposure to salt spray > 300 hours

Product Configurator





Hydronit Srl has developed over the years a smart **Product Configurator** which allows the user, from a PC or mobile device web browser:
- to simply and quickly create the **speaking code** of the unit starting from the customer's specific requirements
- to **limit the possible mistakes** in the product configuration
- to obtain quickly the **unit description and parts list**, the **hydraulic diagram**, **instant 3D preview**, **weight**, **dimensions**, **price** and **terms of sale**. This **reduces the time-to-market** and provides full information on the custom power unit to be realized, which can be easily transmitted to the final customer.

The access to the web configurator is offered free of charge to official partners of Hydronit Srl.

Hydronit hydraulic range

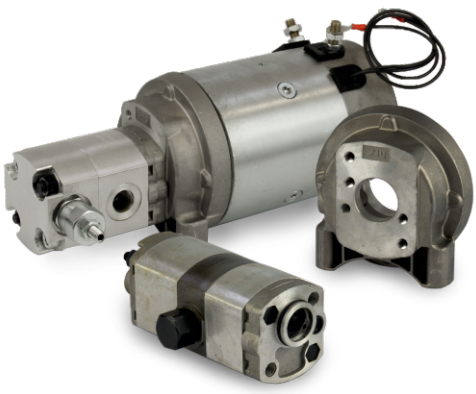
Three main families: **Power Pack Micro, Power Pack Compact, Electropumps Bull** sharing most core components, allowing mass production and stock optimization.
Design, research & development according to **flexibility, modularity** and **efficiency** principles.

AC & DC MICRO hydraulic power packs

- Extremely **compact and lightweight**
- Flow: **0,2 ~ 6 l/min**
- Pressure up to **250 bar**
- DC motors up to **2,2 kW 12,24 and 48 VDC**
- AC motors up to **1,8 kW single and three phase**
- High modularity: single & double acting & reversible circuits from the same micro central manifold
- Main valves **on one side** in most configurations for enhanced positioning in small machines

AC & DC COMPACT hydraulic power packs

- **Over 10 years** of serial production
- Hundred of thousands of power packs running worldwide
- Flow: **0,2 ~ 25 l/min**
- **Low pressure drop**
- Pressure up to **300 bar** (or more in special application)
- DC motors up to **4 kW 2,24 and 48 VDC**
- AC motors up to **7,5 kW single and three phase**
- High modularity: single & double acting & reversibl
- **High modularity**: single & double acting & reversible circuits from the same micro central manifold
- Ideal choice for hydraulic distributors & assemblers
- See PPC catalog



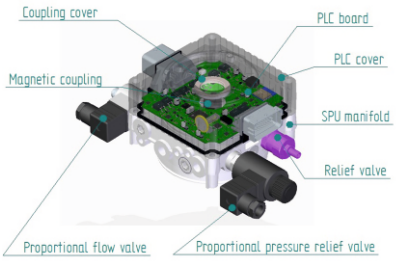
DC electropumps

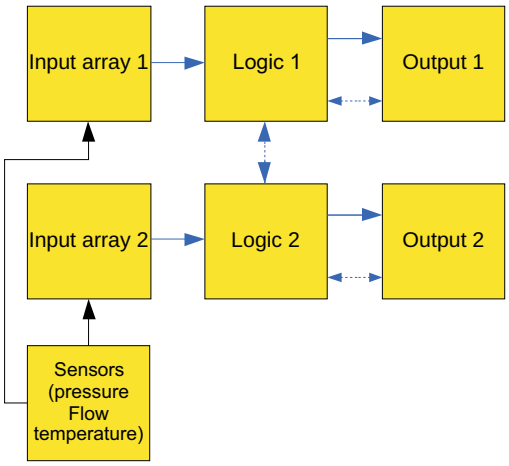
- **0,15 ~ 4 kW**, **12V, 24V and 48V DC** motors (same used in Compact and Micro power packs)
- Forced ventilation **for high cycle times**
- 0,19 ~ 7,9 cc/rev gear pumps (same used in Compact and Micro power packs. Available also lateral ports pumps)
- **Option:** relief valve, starter switch, thermal protection, foot mounting support
- See EPB catalog

Hydronit Smart Power Unit

The **SPU** is the first generation of **Programmable Digital Hydraulic Power Pack** available on the market.

The core of the Smart Power Unit is the **HPC (Hydraulic Process Controller)**: a Mechatronic Module which integrates Sensors, Electronics and Hydraulics in a single device. Programmable with **Codesys**™ IEC61131-3 automation software.





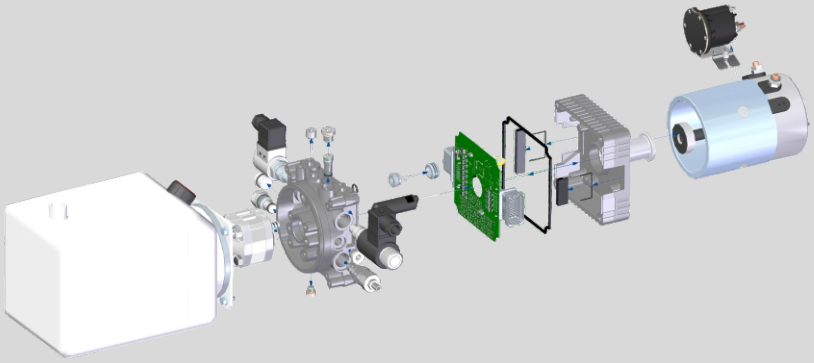
Features

The core of the Smart Power Unit is the **HPC (Hydraulic Process Controller)**: a programmable controller with **SAFETY Architecture**. It integrates I/O, sensors, double core processors to enable SAFETY features, power Output in order to directly drive solenoid operated proportional or on-off valves without the need of external relays.

The **Hydraulic Process Computer** is integrated in the power pack and available in different executions: P/Q proportional control and LS functionality. See SPU catalog.

Hydraulic Integration

The **HPC** is perfectly integrated with the standard **Hydronit Compact Pack** range since it can use same PPC components.
Hydraulic circuits are availble with redundant valves in order to match mechanics to electronics and offer a SAFETY RELATED mechatronic power pack ready for **Industry 4.0** and **Smart Manufacturing**.



Built in Sensors

The **Hydraulic Process Computer** integrates fluid sensors: one ceramic **Pressure sensor** reading the LS line, up to 350 bar.

An oil temperature sensor completes the fluid monitoring.
Additional external sensors can be need through the I/O lines.

Sensors are embedded in the mechanic body and are available as a variable in the software programming environment.

SEAL OF EXCELLENCE

European Commission

Certificate delivered by the European Commission, as the institution managing Horizon 2020, the EU Framework Programme for Research and Innovation 2014-2020

The project proposal **767310, MIDRAULICS**

Modular Intelligent Hydraulics

Submitted under the Horizon 2020's **SME instrument phase 2** call **H2020-SMEInst-2016-2017 (H2020-SMEINST-2-2016-2017)** of **18 January 2017** in the area of **Small business innovation research for Transport and Smart Cities Mobility**

by

HYDRONIT SRL
VIA PASTRENGO 62
20814 VAREDO
Italy

following evaluation by an international panel of independent experts

WAS SUCCESSFUL IN A HIGHLY COMPETITIVEVALUATION PROCESS* AS A HIGH QUALITY PROJECT PROPOSAL

This proposal is recommended for funding by other sources since Horizon 2020 resources available for this specific Call were already allocated following a competitive ranking.

* This means passing all stringent Horizon 2020 assessment thresholds for the 3 award criteria (excellence, impact, quality and efficiency of implementation) required to receive funding from the EU budget Horizon 2020.

Corina Cretu, Commissioner for Regional Policy

Carlos Moedas, Commissioner for Research, Science and Innovation

Brussels, 07/03/2017

International Awards

Hydronit directly competing against European most innovative companies, has been awarded with multiple **Seals of Excellence** by the European Commission **during Horizon 2020 Framework Programme for Research and Innovation.**

In July 2017 it has been granted by EU Commission as project 779020

The **Smart Power Unit** is patented.

POWER PACKS MICRO speaking code

PPM	2,2 24DC_T/S150
Power Pack type	Electric AC or DC motor or motor mounting kit

Power Packs

Standard mounting positioning:

- Filler cap on P and T ports side
- AC motor electric box on cavity 0-1-2 side
- DC motor and solenoid poles on cavity 0-1-2 side
- For horizontal mounting units, suction filter on mounting foot holes side

In lack of specific request by the customer, all power units are supplied assembled according to these basic rules.

This page contains only the most common codes and options.

For the full available range please check out next pages.

DC motors / Motor mounting kits

code	description
0,15 12DC_T	12VDC 150W + thermal prot.
0,15 24DC_T	24VDC 150W + thermal prot.
0,3 12DC_T	12VDC 300W + thermal prot.
0,3 24DC_T	24VDC 300W + thermal prot.
0,5 12DC_T	12VDC 500W + thermal prot.
0,5 24DC_T	24VDC 500W + thermal prot.
0,8 12DC_T	12VDC 800W + thermal prot.
0,8 24DC_T	24VDC 800W + thermal prot.
0,8 48DC_T	48VDC 800W + thermal prot.
1,2 12DC_T	12VDC 1200W + thermal prot.
1,2 24DC_T	24VDC1200W + thermal prot.

code	description
1,6 12DC_T	12VDC 1600W + thermal pr.
2,1 12DC_T	12VDC 2100W + thermal pr.
2,2 24DC_T	24VDC 2200W + thermal pr.
2,2 48DC_T	48VDC 2200W + thermal pr.

DC motors options	
S150T	starting relay 150A
S300	starting relay 200A
R100	inverting / starting relay 100A

code	description
NB14 63-0	B14 frame 63
NB14 71-1	B14 frame 71

AC motors

code	description
N0,37AC 34 71	0,37kW S3 3 ph 4 poles
N0,55AC 34 71	0,55kW S3 3 ph 4 poles
N0,75AC 34 71	0,75kW S3 3 ph 4 poles
N0,55AC 32 71	0,55kW S3 3 ph 2 poles
N0,75AC 32 71	0,75kW S3 3 ph 2 poles
N0,37AC S4 71	0,37kW S3 1 ph 4 poles
N0,55AC S4 71	0,75kW S3 1 ph 4 poles
N0,55AC S2 71	0,75kW S3 1 ph 2 poles
N0,75AC S2 71	0,75kW S3 1 ph 2 poles
N0,55AC 34 71	0,55kW S3 3 ph 4 poles
N0,75AC 34 71	0,75kW S3 3 ph 4 poles

MB — Central manifold

GM0,4 — Gear pump

JM — Cavity 0

DM_280 — Cavity 1

Central manifolds

code	description
MB	Micro B type with 4 lateral cavities
MR	Micro R type for reversible pump
M4	Micro 4 type for 4 way cartridge valves

Central manifolds options	
US	SAE06 exit ports for North America market

Gear pumps

code	description
GM0,1	0,19 cc/rev G type gr0
GM0,2	0,26 cc/rev G type gr0
GM0,4	0,38 cc/rev G type gr0
GM0,6	0,64 cc/rev G type gr0

code	description
KM0,1	0,20 cc/rev K type gr0
KM0,2	0,26 cc/rev K type gr0
KM0,4	0,38 cc/rev K type gr0
KM0,6	0,64 cc/rev K type gr0
KM0,9	0,8 cc/rev K type gr0
KM1,3	1,2 cc/rev K type gr0
KM1,5	1,5 cc/rev K type gr0

code	description
HM0,1	0,20 cc/rev high P gr0
HM0,2	0,26 cc/rev high P gr0
HM0,4	0,38 cc/rev high P gr0
HM0,6	0,64 cc/rev high P gr0
HM0,8	0,88 cc/rev high P gr0
HM1,2	1,20 cc/rev high P gr0
HM1,5	1,50 cc/rev high P gr0

code	description
RM0,1	0,19 cc/rev reversible gr0
RM0,2	0,26 cc/rev reversible gr0
RM0,3	0,32 cc/rev reversible gr0
RM0,4	0,38 cc/rev reversible gr0
RM0,5	0,49 cc/rev reversible gr0
RM0,7	0,64 cc/rev reversible gr0
RM0,9	0,88 cc/rev reversible gr0
RM1,3	1,25 cc/rev reversible gr0
RM1,5	1,50 cc/rev reversible gr0

Hydraulic valves cavity 0

code	description
JM	check valve 5/8-18UNF
ML	plug 5/8-18UNF

Hydraulic valves cavity 1

code	description
DM_*	relief valve P (*= bar max)
XM	closed plug for relief valve cavity

A 24DC	R5	U	X	X	X	1,2R
Cavity 2	Cavity 3	Cavity 4	Cavity 5	Cavity 7	Cavity 8	Tank & mounting style

Hydraulic valves cavity 2-3-4

code	description
A	NC 2/2 way poppet valve
B	NC 2/2 way poppet valve + emergency
Q	NO 2/2 way poppet valve
C	NO 2/2 way poppet valve + emergency
D	NC 2/2 way double poppet valve + emerg.
M	NO 2/2 way double poppet valve + emerg.
E	lever operated 2/2 valve
EM	lever operated 2/2 valve with microswitch
Z	2 way emergency button
S	flow control valve
T*	proportional flow control valve (*=VDC)
U	hand pump 2cc/stroke
G	closed plug
H	closed plug with 1/4"BSP exit port
N	open plug with 1/4"BSP exit port
P	plug passing through 1/4"BSP exit port
L	basic plug
J	check valve
JF	check valve with 1/4"BSP exit port

code	description (M4 manifolds only)
4VA11C	4/2 way directional valve
4VA2	4/3 way directional valve, center P to T
4VB2	4/3 way directional valve, closed center
4VC2	4/3 way directional valve, H center
4VE2	4/3 way directional valve, center A-B to T

code	description
F*	pressure comp. flow control valve (*=l/min)
R*	adj. pressure comp. flow control valve (*=l/min)
S	adjustable flow control valve
Z	2 way emergency button
AR	NC 2/2 way poppet valve reverse flow
BR	NC 2/2 way poppet v. reverse flow + emer.
CR	NO 2/2 way poppet v. reverse flow + emer.
D	NC 2/2 way double poppet valve + emerg.
P*	proportional relief valve (*= bar max)
G	closed plug
H	closed plug with 1/4"BSP exit port
N	open plug with 1/4"BSP exit port
P	plug passing through 1/4"BSP exit port
L	basic plug
J	check valve

code	description (MR manifolds only)
DM_*	relief valve P (*= bar max)
XM	closed plug for relief valve cavity

code	description (MR manifolds)
MG	closed plug
JP	check valve 5/8-18UNF poppet type

Hydraulic valves cavity 5-7-8

code	description
1(04)	1 l/min pressure comp. flow control
1,5(04)	1,5 l/min press. comp. flow control
2(04)	2 l/min pressure comp. flow control
3(04)	3 l/min pressure comp. flow control
5(04)	5 l/min pressure comp. flow control
7(04)	7 l/min pressure comp. flow control
10(04)	10 l/min pressure comp. flow control
13(04)	13 l/min pressure comp. flow control
17(04)	17 l/min pressure comp. flow control
22(04)	22 l/min pressure comp. flow control
1(01)	1 l/min 1/4"BSPP p. comp. flow ctrl
1,5(01)	1,5 l/min 1/4"BSPP p.comp. flow ctrl
2(01)	2 l/min 1/4"BSPP p. comp. flow ctrl
3(01)	3 l/min 1/4"BSPP p. comp. flow ctrl
5(01)	5 l/min 1/4"BSPP p. comp. flow ctrl
7(01)	7 l/min 1/4"BSPP p. comp. flow ctrl
10(01)	10 l/min 1/4"BSPP p. comp. flow ctrl
13(01)	13 l/min 1/4"BSPP p. comp. flow ctrl
17(01)	17 l/min 1/4"BSPP p. comp. flow ctrl
22(01)	22 l/min 1/4"BSPP p. comp. flow ctrl
P01	1/4"BSPP plug
RETURN-KIT	suction/return line pipe
PP01370	suction/return line pipe
TADPH00001	Plastic pipe 90 degrees elbow 1/4 BSPP 126mm
TADPH00002	Plastic pipe 90 degrees elbow 1/4 BSPP 150 mm
TADPH00003	Plastic pipe 90 degrees elbow 1/4 BSPP 207mm

Tanks & mounting style

code	description
0,4R	0,4l cylindrical plastic
0,7R	0,7l cylindrical plastic
1,2R	1,2l cylindrical plastic
1T	1l square plastic
1,5T	1,5l square plastic
2T	2l square plastic
2,7T	2,7l square plastic
3,5T	3,5l square plastic

code	description
0,7F	0,7l cylindrical steel
1,2F	1,2l cylindrical steel
1,7N	1,7l cylindrical steel
2,4H	2,4l cylindrical steel
F80000012	steel tank adapter - to be welded

Tanks options	
V	vertical mounting

External Manifolds & Accessories





code	description
N50403007DN	base manifold for SD02 stackable valves
M60403004	23mm spacer subplate
M60403005	90° rotation manifold
M60403039	additional single acting manifold
M60403010	NG3 MICRO parallel block lateral ports
M60413001	NG3 MICRO manifold with p.o. check valves
PM04M	hand pump 4 cc/stroke
PM09M	hand pump 8,8 cc/stroke
M60403008E	PPM to PPC base converter

code	description
E60403006DN	base manifold for SD02 stackable valves
E60403008M	PPC to PPM base converter
E60403004	28mm spacer subplate
E60403004CV	28mm spacer subplate + check valve
E60403002	49mm 90° rotation manifold
E60403005DF	90° rotation manifold double face
E60403039	additional single acting manifold
E60403001	NG6 (Cetop3) parallel block rear ports
E60403010	NG6 (Cetop3) parallel block lateral ports
E60403011	NG6 (Cetop3) series block lateral ports
E60413001	NG6 (Cetop3) manifold with p.o. check valves
E60403020	spin-on return line filter manifold
E60403025	pressure line filter manifold
PM04	hand pump 4 cc/stroke
PM09	hand pump 8,8 cc/stroke
E60403030	SAE08 2-way cartridge manifold block
E60403031	SAE08 3-way cartridge manifold block

Manifold blocks option	
US	SAE06 exit ports for North America market





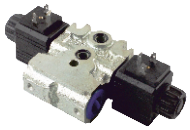



code	description
MIR6360	pressure gauge 60bar
MIR63160	pressure gauge 160bar
MIR63250	pressure gauge 250bar
MIR63315	pressure gauge 315bar
PSL01S0100	pressure switch 10÷100bar
PSL01S0300	pressure switch 50÷300bar
PSH01S0100	pressure switch 10÷100bar high performance
PSH01S0300	pressure switch 50÷300bar high performance

code	description
P0201	remote 2 buttons control box
P0202	remote 4 buttons control box
VPC00	PWM driver for proportional valves
E60543003	foot mounting support PPM

code	description
VUR01C	in-line check valve 1/4" BSPP
VUR02C	in-line check valve 3/8" BSPP
VURSAE06C	in-line check valve 9/16-18UNF
STU01	in-line unidirectional flow valve 1/4" BSPP
STU02	in-line unidirectional flow valve 3/8" BSPP
STUSAE06	in-line unidirectional flow valve 9/16-18UNF
STB01	in-line bidirectional flow valve 1/4" BSPP
STB02	in-line bidirectional flow valve 3/8" BSPP
STBSAE06	in-line bidirectional flow valve 9/16-18UNF
BFCSAE0801	in-line mounting SAE08 manifold 1/4"BSPP
BFCSAE0802	in-line mounting SAE08 manifold 3/8"BSPP

External Valves

code	description
SD00A11C	NG3 MICRO directional valve 4/2
SD00A2	NG3 MICRO directional valve 4/3 center P to T
SD00B2	NG3 MICRO directional valve 4/3 closed center
SD00C2	NG3 MICRO directional valve 4/3 H center
SD00E2	NG3 MICRO directional valve 4/3 center A-B › T
SD02C2RP	stackable directional valve 4/3 H center + p. o. check valves
SD02E2RP	stackable directional valve 4/3 center A-B to T + p. o. check valves
SD02A2TP	stackable dir. v. 4/3 center P to T + cav. SAE08 for additional valves
SD02B2TP	stackable dir. v. 4/3 closed center + cav. SAE08 for additional valves
SD02C2TP	stackable dir. v. 4/3 H center + cav. SAE08 for additional valves
SD02E2TP	stackable dir. v. 4/3 center A-B to T + SAE08 for additional valves

code	description
SD03A11C	NG6 (cetop3) directional valve 4/2
SD03A2	NG6 (cetop3) directional valve 4/3 center P to T
SD03B2	NG6 (cetop3) directional valve 4/3 closed center
SD03C2	NG6 (cetop3) directional valve 4/3 H center
SD03E2	NG6 (cetop3) directional valve 4/3 center A-B to T




code	description
HD03A1	NG6 (cetop3) manual directional valve spring centred P to T
HD03A2	NG6 (cetop3) manual directional valve spring centred closed centre
HD03A3	NG6 (cetop3) manual directional valve spring centred H centre
HD03A4	NG6 (cetop3) manual directional valve spring centred A-B to T
HD03D1	NG6 (cetop3) manual directional valve with detent, centre P to T
HD03D2	NG6 (cetop3) manual directional valve with detent, closed centre
HD03D3	NG6 (cetop3) manual directional valve with detent, H centre
HD03D4	NG6 (cetop3) manual directional valve with detent, centre A-B to T
E60424001	NG6 (cetop3) sandwich type modular relief valve on A & B
E60424002	NG6 (cetop3) sandwich type modular relief valve on A
E60424003	NG6 (cetop3) sandwich type modular relief valve on B
E60433001	NG6 (cetop3) sandwich type modular throttle valve on A & B
E60433002	NG6 (cetop3) sandwich type modular throttle valve on A
E60433003	NG6 (cetop3) sandwich type modular throttle valve on B
E60453001	NG6 (cetop3) sandwich type modular overcentre valve on A & B
E60483001	NG6 (cetop3) sandwich type pressure reducing valve on P
E60483002	NG6 (cetop3) sandwich type pressure reducing valve on A
E60483003	NG6 (cetop3) sandwich type pressure reducing valve on B

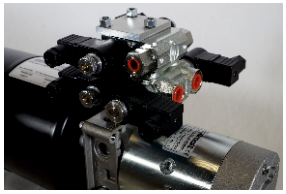
Solenoid valves coils voltages	
12DC	12V direct current
24DC	24V direct current
24AC	24V alternate current 50 or 60Hz
48DC	24V direct current
115AC	115V alternate current 50 or 60Hz
230AC	230V alternate current 50 or 60Hz

Note: not all the voltages are available on some valves codes

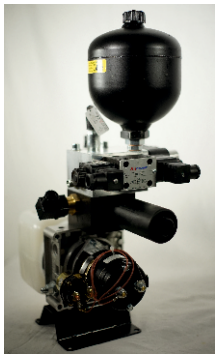
Some typical applications

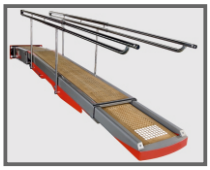
The **high level of modularity** and **circuit flexibility** of Hydronit hydraulic power packs and electropumps allow their use in the most varied applications: in addition to typical applications of **lifting equipment** and hydraulic **vehicles** (dump trucks, tail lifts, ...) and in the **industrial** stationary applications (presses, machine tools, hoists, hydraulic brakes, compactors,...), even in the **automotive industry** (drive doors and hood, suspension, campervan ...), **marine** (bridges, cranes, doors, ...), in the **alternative energies** sector, in **agricultural equipment**, in the field of **construction machinery**, in **explosions proof** environments. Hydronit has also developed **solutions for improvement** to equipment previously available on the market, including the use of **proportional components** and **electronics** for **forklift trucks**, **snow plows**, **brake** and **transmission equipment**, **loading ramps**,...

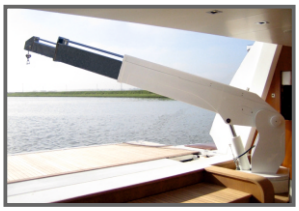
DC applications







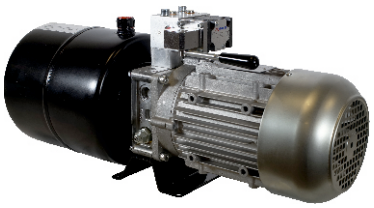
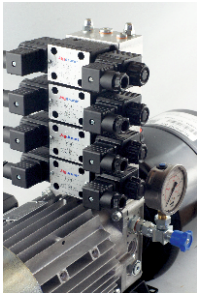



AC applications







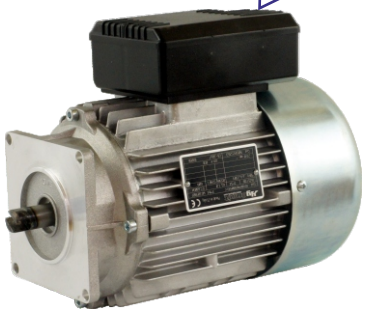



General application for Hydronit Power Units

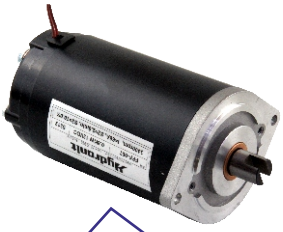
Installation location	Any. Take care of the correct positioning of the suction filter and pipe to avoid negative pressure at the pump inlet
Environment temperature	-15 ÷ +50°C
Hydraulic fluid	Fluid for hydraulic use mineral based or synthetic ISO 6743/4 / DIN 51519, viscosity 15 ÷ 100 mm^2/s ISO 3448 (recommended viscosity 22 ÷ 46 mm^2/s)
Fluid temperature	-10° ÷ +70°C
Commissioning instructions	• After connecting the electric motor and the suction pipe, check the direction of rotation of the pump with pulses of 1÷2 sec. For standard pumps the direction of motor rotation must be clockwise as viewed from the side of the motor fan. • Flush the oil at atmospheric pressure in order to remove any impurity and air bubbles from the circuit. • Connect all devices to the system and gradually increase oil pressure. • Check the oil level and, if necessary, fill up to the maximum level. • To ensure a correct and longlasting operation, check oil after 100h from commissioning and replace every year or 300h of use.
Recommended torques	• M5: 4÷5,5 Nm (35÷49 lbf·in) • M5 for pumps gr.0,5: 8÷9,5 Nm (71÷84 lbf·in) • M6: 8÷10 Nm (71÷89 lbf·in) • M8: 16÷20 Nm (142÷177 lbf·in) • M8 for pumps gr.1: 21÷25 Nm (186÷221 lbf·in) • M10: 30÷40 Nm (266÷354 lbf·in) • 3/8-16 UNC: 30÷40 Nm (266÷354 lbf·in) • 5/16-24 UNF: 16÷20 Nm (142÷177 lbf·in) • Valves and plugs 1/8 BSP: 12÷15 Nm (106÷133 lbf·in) • Valves and plugs 1/4 BSP (ISO 228): 15÷20 Nm (133÷177 lbf·in) • Valves and plugs 3/4-16 UNF: 25÷30 Nm (221÷266 lbf·in) • Valves and plugs M18x1,5: 30÷35 Nm (266÷310 lbf·in) • Relief valves M20x1,5: 50 Nm (443 lbf·in) • Tank's plugs 1/2 BSP (ISO 228): max 10 Nm (89 lbf·in) • Relief valves M14x1: 15÷25 Nm (133÷221 lbf·in) • Valves and plugs 9/16-18 UNF: 6÷20 Nm (53÷177 lbf·in) • Valves and plugs 5/8-18 UNF: 15÷25 Nm (133÷177 lbf·in) • Valves 7/8-14 UNF: 45÷55 Nm (398÷487 lbf·in) • Relay's electric poles 5/16-24 UNF: 5 Nm (44 lbf·in)
Fluid contamination	Must be better than class 20/18/15 ISO 4406
Ambient relative humidity	30% ÷ 60%

AC & DC ELECTRIC MOTORS

Integral AC motors: the engineered solution for compact and optimised power units from 0,25 to 1,8 kW, single or three phase. The AC motors are **directly flanged** on the central manifold for extra compactness.
A **single coupling** can suit all powers. We suggest that you adopt these advanced motors because of their special advantages over standard B14 IEC AC motors and because they are **designed specifically** for use on our micro power packs, offering **higher power density** than market standard motors. These motors are intendend for intermittent use (S3 40%), which is the case for most micro-power pack applications. They can be used in emergency situations continuously at a reduced rated power (about 30% less than S3 nominal power).
Single phase motors should not run in any case without load for long periods to avoid overheating.



B14 IEC standard AC motors: the standard solution easily available on every market from 0,12 to 0,55 kW, single or three phase. These motors are normally procured by the customer itself. Hydronit provides adaptor flanges and double piece coupling for frame size: 63 and 71.



Frame 80 DC motors: with or without thermal protector and running time up to 6 min. Power from 0,15kW up to 1,2kW 12 or 24VDC and 0,8 kW 48 VDC.
The permanent magnet construction allows their use in reversible units.

Frame 114 DC motors: power up to 2,2kW 24VDC for high performance.
All motors have thermal protector switch as standard.

Q & A

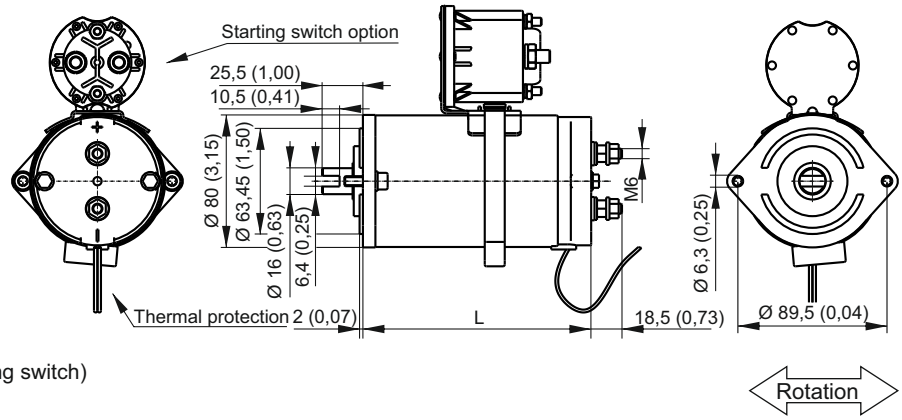
Are Integral AC motors compliant with the European Union Minimum Energy Performance Standards?
Hydronit AC integral motors are manufactured using the best technologies currently available and are specifically designed for mini power pack duties, typically intermittent ones. Hydronit motors have higher power density, lower weight and are cost effective, compared with standard IE3 motors on the market. Due to the specific field of application, Hydronit motors are not included in the requirements of the above mentioned Standard since they are specifically and solely manufactured for mini power pack intermittent duties. For continuous duty (S1) applications with 3 phase supply voltage, IE3 motors (IEC 60034-30) must be applied. Ask our sales office.

Are there special requirements to mount IEC B14 AC motors?
No special tools are required. Please carefully follow motor side coupling mounting dimension tolerance as per the relevant drawings. Failure to do so may cause malfunction of the power pack and even breakage of the coupling and pump.

Can I start single phase AC motors under load?
Single phase motors have a reduced starting torque due to their intrinsic design. Starting torque is around 30-40% of the nominal torque at full power output. When designing circuits where a single phase motor must start under load, a proper calculation must be done followed by a field test to ensure proper starting. Alternatively, you can overcome the problem with the startup valve SUV. Ask our technical office.

How do I dimension a DC motor?
DC motors are normally for intermittent duty. It is important to know the required flow in l/min or Gpm, working pressure in bar or PSI and the duty charge. Then, following the diagrams in following pages and relevant instructions, a proper motor/pump combination can be selected.

INTEGRAL DC MOTORS Ø80



Permanent magnets
Protection degree: IP54
Insulation class: F
Weight 300W/500W/800W: 2,6 kg (without starting switch)
Weight 150W: 1,85 kg (without starting switch)
UL motors available on request

Code

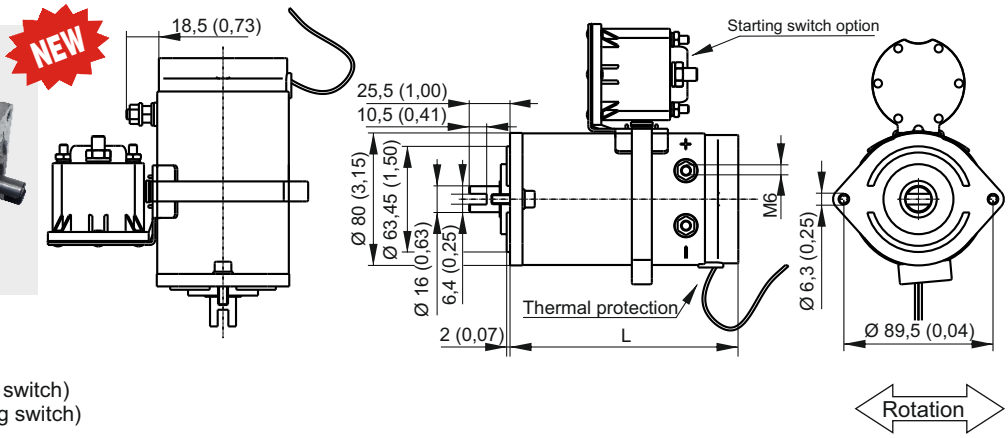
Description	Assembly code	Spare part code	Nominal duty cycle	Nominal speed	Nominal current	L
150W 12V DC + thermal protection	**0,15 12DC_T**	**M46C1ST01**	S2: 20 min S3: 30% ED	1200 rpm	28 A	108 mm
150W 24V DC + thermal protection	**0,15 24DC_T**	**M46C2ST01**	S2: 20 min S3: 30% ED	1650 rpm	12 A	108 mm
300W 12V DC + thermal protection	**0,3 12DC_T**	**M46C1ST03**	S2: 9 min S3: 18% ED	1800 rpm	39 A	137 mm
300W 24V DC + thermal protection	**0,3 24DC_T**	**M46C2ST03**	S2: 9 min S3: 18% ED	1800 rpm	20 A	137 mm
500W 12V DC + thermal protection	**0,5 12DC_T**	**M46C1ST05**	S2: 5 min S3: 15% ED	2400 rpm	68 A	137 mm
500W 24V DC + thermal protection	**0,5 24DC_T**	**M46C2ST05**	S2: 5 min S3: 15% ED	2500 rpm	31 A	137 mm
800W 12V DC + thermal protection	**0,8 12DC_T**	**M46C1ST08**	S2: 3 min S3: 10% ED	2800 rpm	119 A	137 mm
800W 24V DC + thermal protection	**0,8 24DC_T**	**M46C2ST08**	S2: 3 min S3: 10% ED	3100 rpm	52 A	137 mm

Options & couplings

Description	Assembly code	Spare part code
12V DC 150 Amp start relay + mounting kit	**S150T 12DC 80**	**M47TC0001+M47SK0801**
12V DC 150 Amp start relay + mounting kit + Faston optional connector	**S150 T 12DC 80 F**	**M47TC0001+M47SK0801+2x24556**
24V DC 150 Amp start relay + mounting kit	**S150T 24DC 80**	**M47TC0002+M47SK0801**
24V DC 150 Amp start relay + mounting kit + Faston optional connector	**S150 T 24DC 80 F**	**M47TC0002+M47SK0801+2x24556**
48V DC 150 Amp start relay + mounting kit	**S150T 48DC 80**	**M47TC0004+M47SK0801**
48V DC 150 Amp start relay + mounting kit + Faston optional connector	**S150 T 48DC 80 F**	**M47TC0004+M47SK0801+2x24556**
12VDC 100 Amp start relay (reversible)	**R100 12DC***	**M47NB0001**
24VDC 100 Amp start relay (reversible)	**R100 24DC***	**M47NB0002**
Coupling for Ø 80 DC motors and gr.0 pump	**E36200003** See table page A200	
Wired remote control with 2 buttons and 3m cable	**P0201** (single acting)	
Wired remote control with 4 buttons and 3m cable	**P0202** (double acting)	

Notes:The starting switch mounting kit is provided when specifying the **/S150** as motor option in the PPM assembly code. When ordering spare starting switches, they must be ordered separately (example code: M47SK0801).
The coupling is already included when specifying the motor in the PPM assembly code. It is to be indicated only when ordering PPM with no motor but with a coupling. The reversible start switch cannot be mounted on the motor. It must be fixed on the machine.
For ambient relative humidity over 60%, motors with optional IP67 protection index are available and required. Please ask your sales representative.

INTEGRAL DC MOTORS Ø80



Permanent magnets
Protection degree: IP54
Insulation class: F
Weight 800W: 2,6 kg (without starting switch)
Weight 1200W: 3,7 kg (without starting switch)
UL motors available on request

Code

Description	Assembly code	Spare part code	Nominal duty cycle	Nominal speed	Nominal current	L
800W 48V DC + thermal protection	**0,8 48DC_T**	**M46C4ST08**	S2: 3 min S3: 10% ED	2900 rpm	26 A	187 mm
1200W 12V DC + thermal protection	**1,2 12DC_T**	**M46C1ST12**	S2: 1,5 min S3: 7% ED	3200 rpm	140 A	186 mm
1200W 24V DC + thermal protection	**1,2 24DC_T**	**M46C2ST12**	S2: 1,5 min S3: 7% ED	3200 rpm	70 A	186 mm

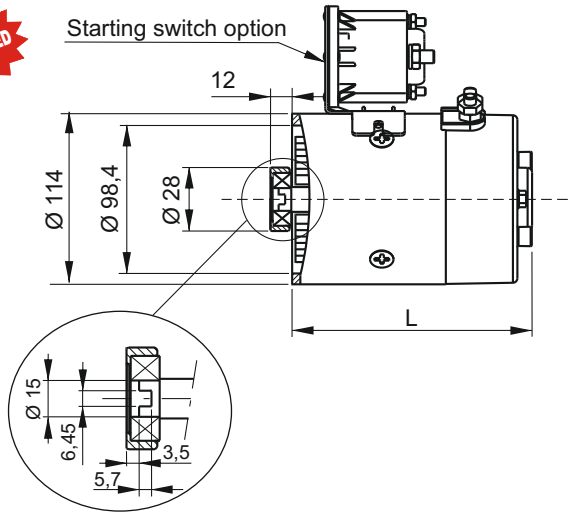
Options & couplings

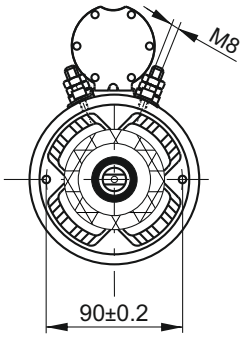
Description	Assembly code	Spare part code
12V DC 150 Amp start relay + mounting kit	**S150T 12DC 80**	**M47TC0001+M47SK0801**
12V DC 150 Amp start relay + mounting kit + Faston optional connector	**S150 T 12DC 80 F**	**M47TC0001+M47SK0801+2x24556**
24V DC 150 Amp start relay + mounting kit	**S150T 24DC 80**	**M47TC0002+M47SK0801**
24V DC 150 Amp start relay + mounting kit + Faston optional connector	**S150 T 24DC 80 F**	**M47TC0002+M47SK0801+2x24556**
48V DC 150 Amp start relay + mounting kit	**S150T 48DC 80**	**M47TC0004+M47SK0801**
48V DC 150 Amp start relay + mounting kit + Faston optional connector	**S150 T 48DC 80 F**	**M47TC0004+M47SK0801+2x24556**
12VDC 100 Amp start relay (reversible)	**R100 12DC***	**M47NB0001**
24VDC 100 Amp start relay (reversible)	**R100 24DC***	**M47NB0002**
Coupling for Ø 80 DC motors and gr.0 pump	**E36200003** See table page A200	
Wired remote control with 2 buttons and 3m cable	**P0201** (single acting)	
Wired remote control with 4 buttons and 3m cable	**P0202** (double acting)	

Notes: The starting switch mounting kit is provided when specifying the **/S150** as motor option in the PPM assembly code. When ordering spare starting switches, they must be ordered separately (example code: M47SK0801).
The coupling is already included when specifying the motor in the PPM assembly code. It is to be indicated only when ordering PPM with no motor but with a coupling. The reversible start switch cannot be mounted on the motor. It must be fixed on the machine.
For ambient relative humidity over 60%, motors with optional IP67 protection index are available and required. Please ask your sales representative.

INTEGRAL DC MOTORS Ø114

Compound wound
Protection degree: IP54
Insulation class: F
Weight: 8,15 kg (without starting switch)
UL motors available on request





Code

Description	Assembly code	Spare part code	Nominal duty cycle	Nominal speed	Nominal current	L
1600W 12V DC + thermal protection for PPM	**1,6 12DC_TM**	**M46C1ST16M**	S2: 3 min S3: 10% ED	2800 rpm	210 A	165 mm
2100W 12V DC + thermal protection for PPM	**2,1 12DC_TM**	**M46C1ST21M**	S2: 2,5 min S3: 10% ED	2400 rpm	300 A	182 mm
2200W 24V DC + thermal protection for PPM	**2,2 24DC_TM**	**M46C2ST22M**	S2: 3,5 min S3: 15% ED	2400 rpm	130 A	165 mm
2200W 48V DC + thermal protection for PPM	**2,2 48DC_TM**	**M46C4ST22M**	S2: 3 min S3: 15% ED	3000 rpm	65 A	163 mm

Options & couplings

Description	Assembly code	Spare part
12V DC 150 Amp start switch + mounting kit	**S150T 12DC 112**	**M47TC0001 + XACNH00001**
12V DC 150 Amp start relay + mounting kit + Faston optional connector	**S150T 12DC 112 F**	**M47TC0001+XACNH00001+2x24556**
24V DC 150 Amp start switch + mounting kit	**S150T 24DC 112**	**M47TC0002 + XACNH00001**
24V DC 150 Amp start relay + mounting kit+ Faston optional connector	**S150T 24DC 112 F**	**M47TC0002+XACNH00001+2x24556**
48V DC 150 Amp start relay + mounting kit	**S150T 48DC 112**	**M47TC0004+XACNH00001**
48V DC 150 Amp start relay + mounting kit+ Faston optional connector	**S150T 48DC 112 F**	**M47TC0004+XACNH00001+2x24556**
12V DC 300 Amp start switch + mounting kit	**S300T 12DC 112**	**MASRH00001 + XACNH00001**
12V DC 300 Amp start relay + mounting kit + Faston optional connector	**S300T 12DC 112F**	**MASRH00001+XACNH00001+2x24556**
Coupling for Ø114 motors and gr.0 pump	**E36200002** See table page A200	
Remote wired control with 2 buttons and 3m cable	**P0201** (single acting)	
Remote wired control with 4 buttons and 3m cable	**P0202** (double acting)	

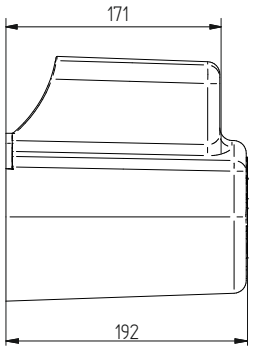
Notes: the starting switch mounting kit is provided when specifying the **/S150** as motor option in PPM assembly code.
When ordering spare starting switches, it must be ordered separately (code: XACNH00001).

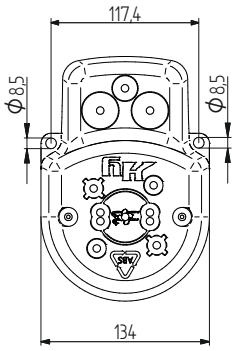
The coupling is already included when specifying the motor in PPM assembly code. It is to be indicated only when ordering PPM with no motor but with coupling. Optional relay connection cable can be ordered separately (see page A060).
For ambient relative humidity over 60%, motors with optional IP67 protection index are available and required. Please ask your sales representative.

DC MOTOR OPTIONS

Plastic cover for DC motors Ø 114
Weight: 0,35 kg

Assembly code
MC
Spare part code
MACVH00001





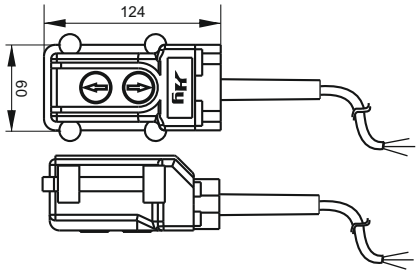
Note: this cover is not intended to improve IP grade but to avoid inadvertent contact with high temperature motor surface.
DC motors S2/S3 values as per the relevant tech tables must be downgraded due to reduced motor ventilation.

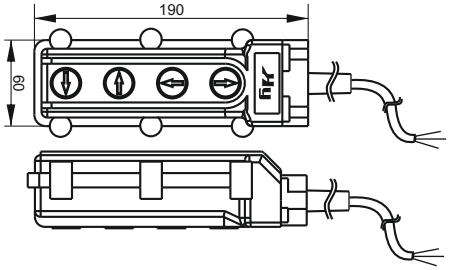
Wired remote control

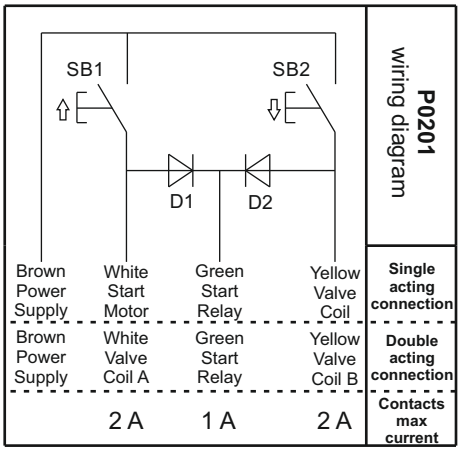
Weight: 0,60 kg
Protection degree: IP65
DC only use

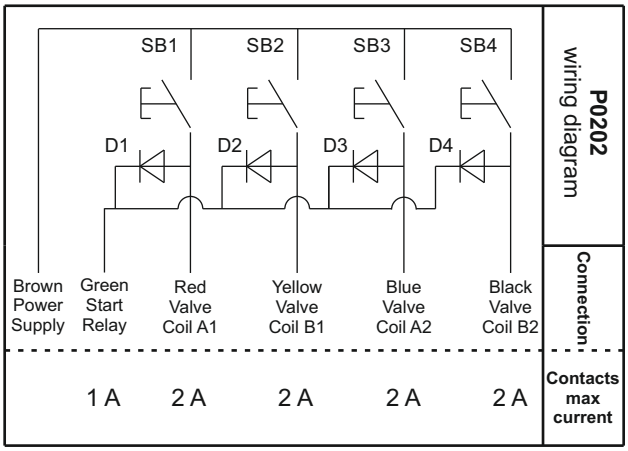
Description	Spare part code
Wired remote control with 2 buttons single/double acting	P0201

Description	Spare part code
Wired remote control with 4 buttons double acting	P0202

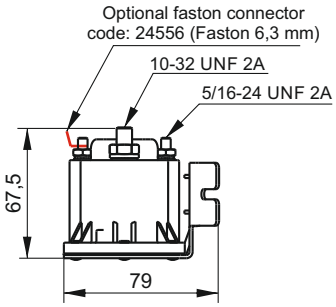




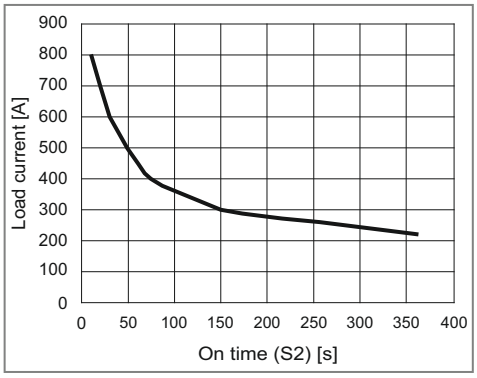




DC MOTOR OPTIONS



Typical Intermittent Duty Unit Performance in a + 25°C Ambient using 2 foot lenght (0,6 m) of 2#AWG (33,6 mm^2) cable. ON time versus Load current reach 90°C temperature.

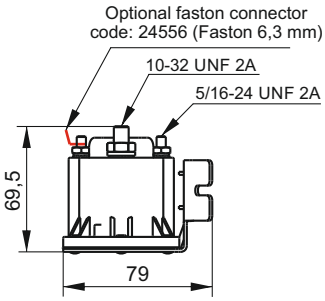


Starting relay 150A
for motors Ø80 - Ø114

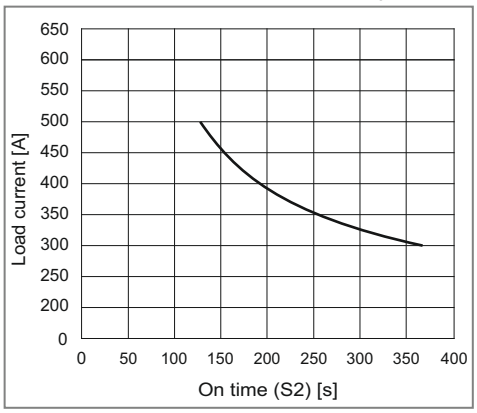
Weight: 0,38kg
Protection degree: IP67
Max current draw: 2A@12VDC - 1A@24VDC - 0,5A@48VDC
Standard temperature range: -40°C to +82°C
Poles thread: 2 x 10-32 UNF 2A; 2 x 5/16-24 UNF 2A
UL starting relays available on request
* on resistive load

Nominal current	Peak Current (3ms) *	Spare part code
150A	800A	**M47TC0001 (12V DC)** **M47TC0002 (24V DC)** **M47TC0004 (48V DC)**

Coils	M47TC0001 12V DC	M47TC0002 24V DC	M47TC0004 48V DC
Max Sustained Duty Cycle (S3)	25%	25%	25%
Max On-Time (S2) @ 150A	6 min	6 min	6 min
Pull In Voltage	7,6 V	15,5 V	33 V
Hold minimum Voltage	3,5 V	7,0 V	14 V
Coil Resistance [Ohms]	5,7 Ω	20,1 Ω	86 Ω



Typical Intermittent Duty Unit Performance in a + 25°C Ambient using 2 foot lenght (0,6 m) of 2#AWG (33,6 mm^2) cable. ON time versus Load current reach 110°C temperature.



Starting relay 300A
for motors Ø125 and 151

Weight: 0,39kg
Protection degree: IP67
Max current draw: 2A@12VDC - 1A@24VDC
Standard temperature range: -40°C to +85°C
Poles thread: 2 x 10-32 UNF 2A; 2 x 5/16-24 UNF 2A
UL starting relays available on request
*on resistive load

Nominal current	Peak Current (3ms)*	Spare part code
300A	1000A	**MASRH00001 (12V DC)** **MASRH00002 (24V DC)**

Coils	MASRH00001 12V DC	MASRH0002 24V DC
Max Sustained Duty Cycle (S3)	25%	25%
Max On-Time (S2) @ 150A	6 min	6 min
Pull In Voltage at 25°C	8,5 V	15 V
Hold minimum Voltage at 25°C	4,5 V	7,0 V
Coil Resistance at 25°C [Ohms]	5,37 Ω	20,1 Ω

Recommended working position: either horizontal or vertical with poles set upwards.
Optional faston connector code: 24556.
All the test are made at the environmental temperature of 25 °C.

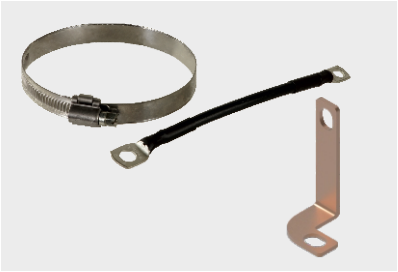
DC MOTOR OPTIONS

Starting relay (reversible) 100A
for reversible motors and pumps

Weight: 0,5kg
Protection degree: IP65
Max current draw: 1A@12VDC - 0,5A@24VDC
Max environment temperature: 40°C
Poles thread: 4 x M6

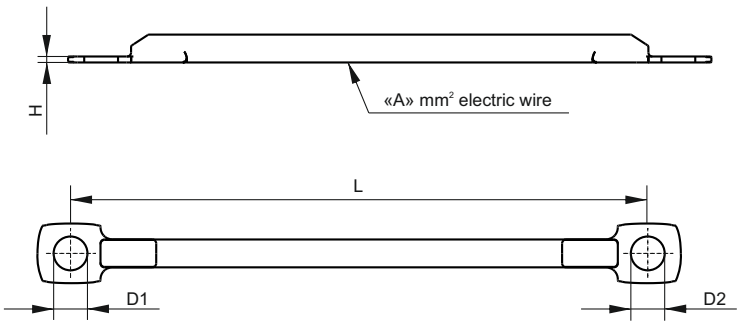
Nominal current	Peak Current (40ms)	Spare part code
100A	400A	**M47NB0001 (12V DC)** **M47NB0002 (24V DC)**

Recommended working position: either horizontal or vertical with poles set upwards.

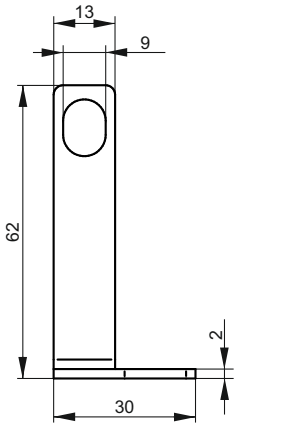


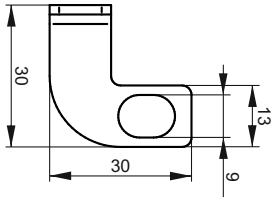
Mounting kit for DC motors

Motor Type	Mounting Kit code	Mounting kit sub-parts	
		Power cable	Fixing system
Ø 80	M47SK0801	M47SK000A	Clamp band E60513080
Ø 114 Rigid	XACNH00001	MACNH00001	2xscrew TCEIM5X10 + 2xwasher WASHL05
Ø 114 Flexible	M47SK1121	M47SK000C	2xscrew TCEIM5X10 + 2xwasher WASHL05
Ø 125 - 151	M47SK1251	M47SK000E	2xscrews TCEIM5X10 + 2xwasher WASHL05



Spare part code
MACNH00001





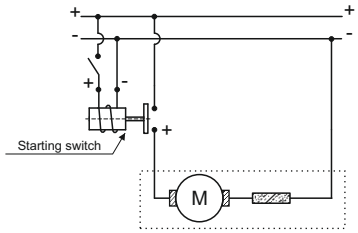
Power Cables

Spare part	L (mm)	A (mm²)	D1 (mm)	D2 (mm)	H (mm)
M47SK000A	130	10	6	8	1,5
M47SK000C	130	16	8	8	2
M47SK000E	130	25	10	8	2

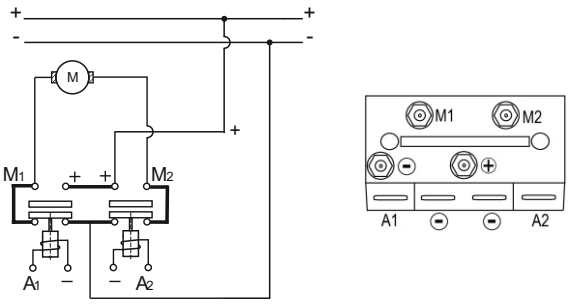
DC MOTOR CHOICE AND ELECTRIC CONNECTION SCHEME

Electrical connection scheme

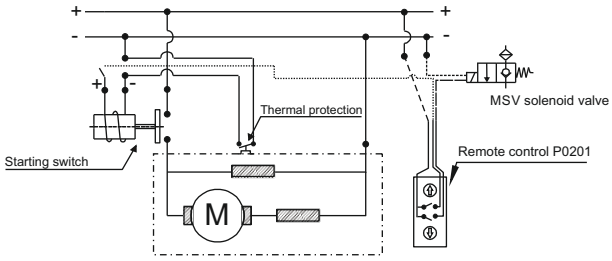
M47*C000*



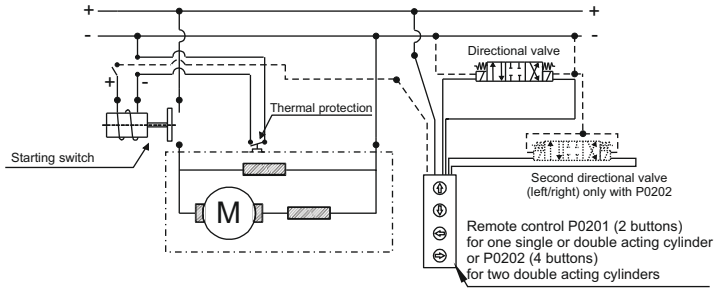
M47NB000*



Single acting cylinder



Double acting cylinder



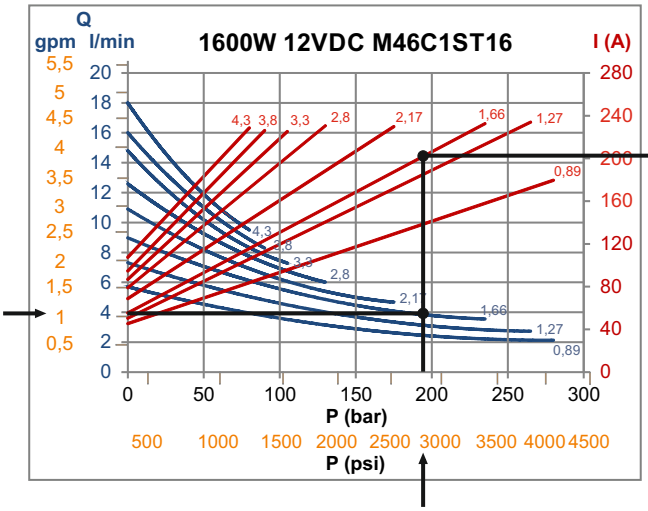
DC motors selection

DC motor selection is a critical step for the proper power pack definition. Required Pressure, Required Flow, Service Factor (or Duty Cycle) should be known before starting the motor selection. Please note that DC motors speed is **not** constant and depends on torque.
Once you choose a motor, look at Motor-Pump Performance diagram if a pump displacement (blue curve) is available at the **intersection** of required pressure and flow values. On the relevant "I" axis (red curve) you obtain the current drawn. When the intersection point is not exactly on a pump curve, select a smaller pump . On Motor Ratings diagram you can easily obtain the maximum allowed Service Factor: S2, Short Time Duty (min); S3, Intermittent Periodic Duty (% of total cycle). If the obtained Service values are not sufficient to meet required performances, choose a higher power or heavier duty motor and repeat the calculation on the new motor curves.

Example:

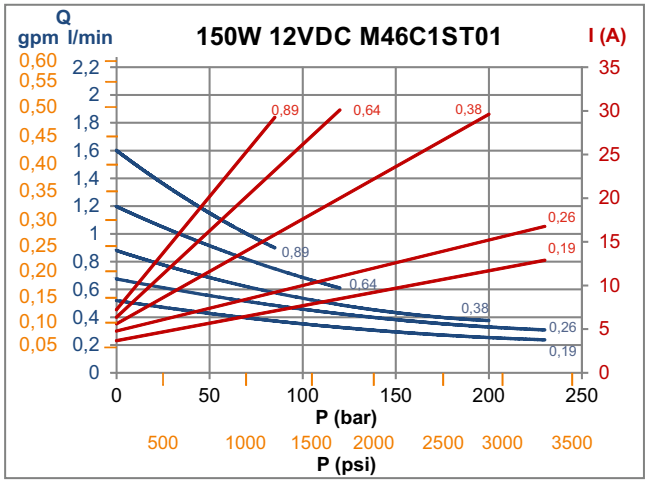
an application requires the following data: flow = 4 l/min, max pressure = 195 bar, duty cycle is unknown.
- check on 1,6 Kw 12V DC motor diagram: the 1,66 cc pump curve meet the intersection of 4 liters/minutes and 195 bar
- choose from curves a 1,66 cm^3/rev pump. the corresponding "I" curve declares 200 A drawn current at 195 bar.
- project horizontally the current drawn to the Motor Rating diagram: the DC motor can work for maximum 3 min (S2) and S3 is about 9% of the total cycle, i.e. after 3 min working, the motor should cool down for at least 30 min.
- The total cycle time is calculated by adding the working time and the idle time (9% working time plus 91% idle time), in this case 33 min. If this duty cycle is not adequate for our application, we must choose a higher power or higher duty DC motor and check the relevant diagram again.

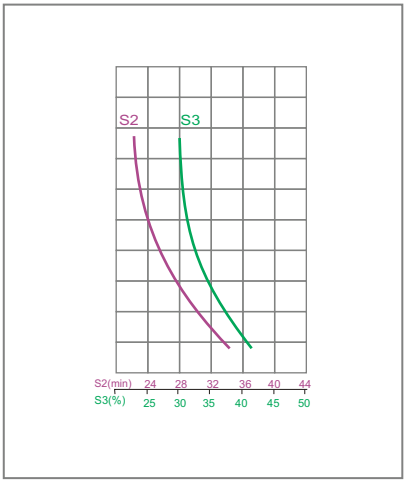
Motor-Pump Performances

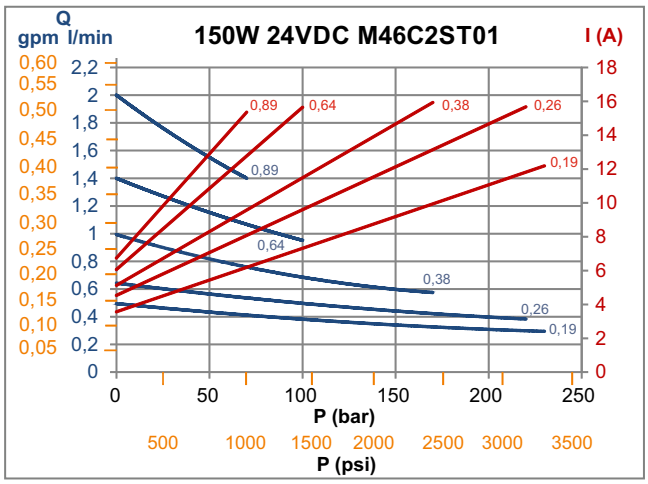


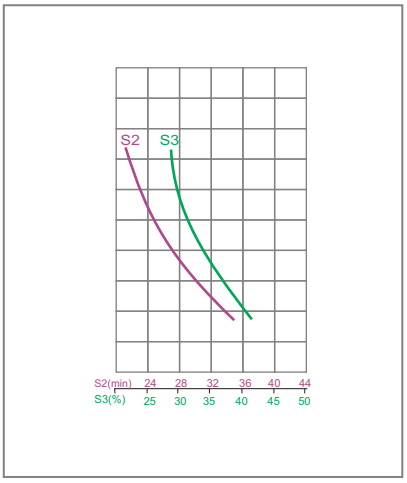
Motor Ratings

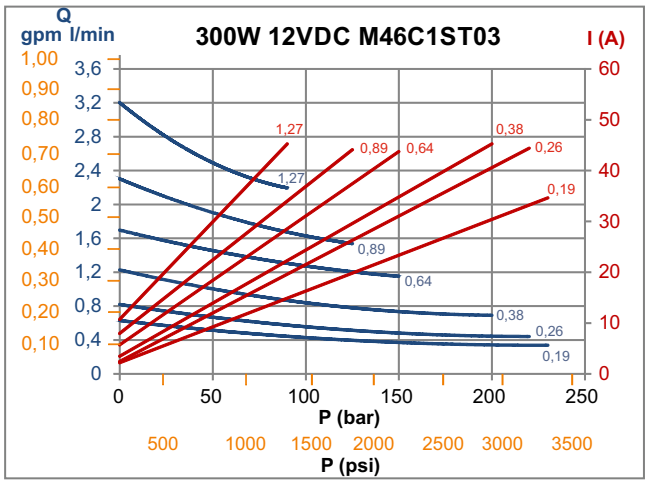
DC MOTORS Ø80 DIAGRAMS

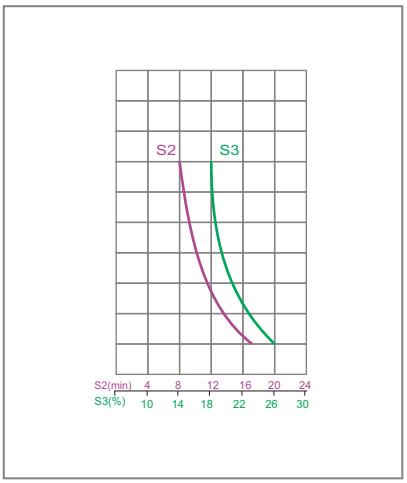






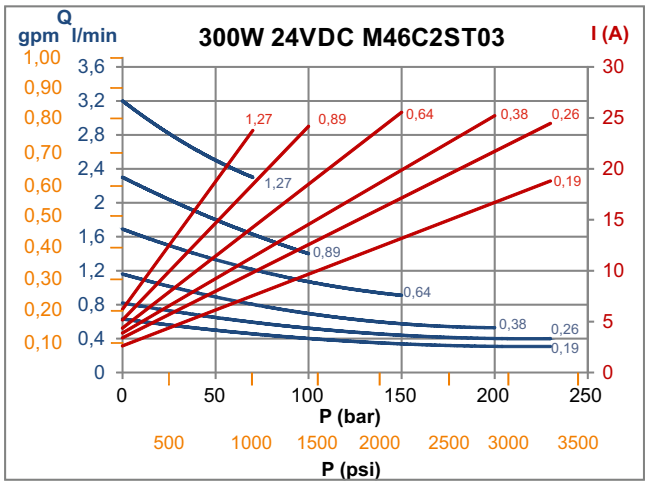


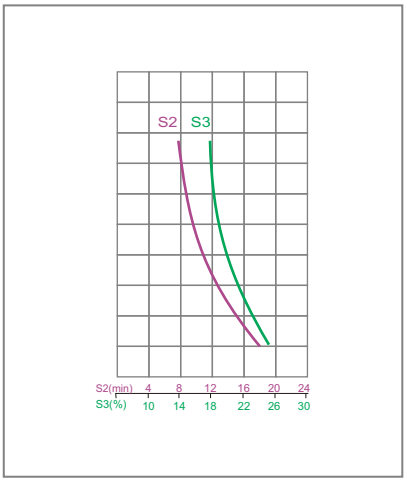


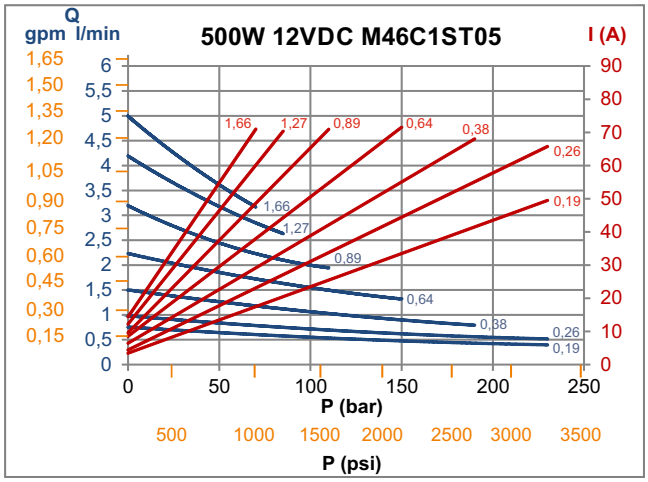


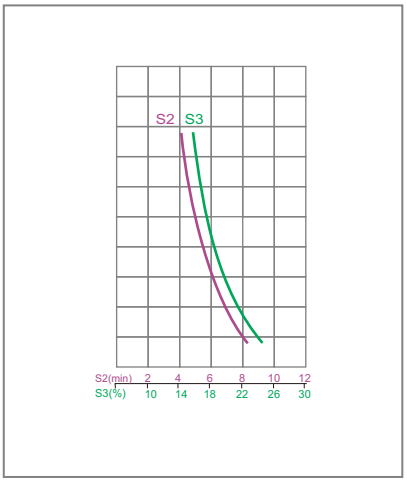
Tests made with rectified current supplied at nominal motor voltage (measured at the motor connection terminals) and oil ISO VG46 at 40°C

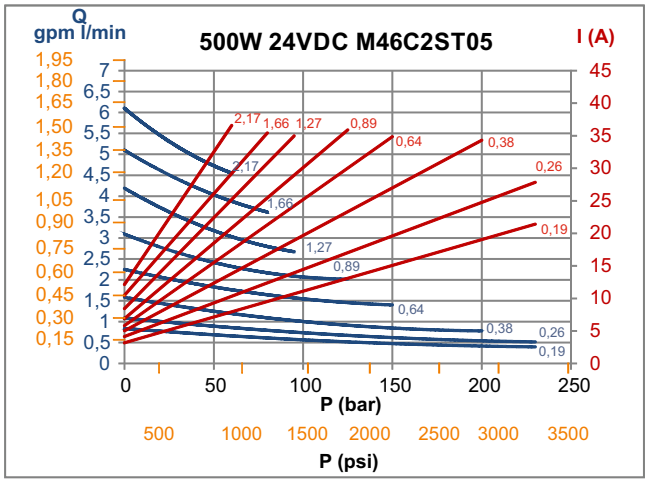
DC MOTORS Ø80 DIAGRAMS

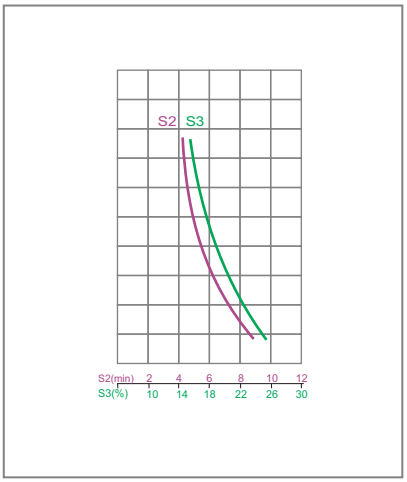






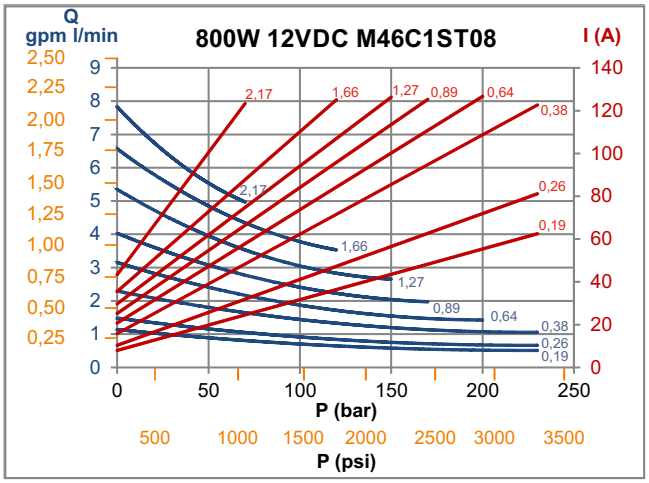


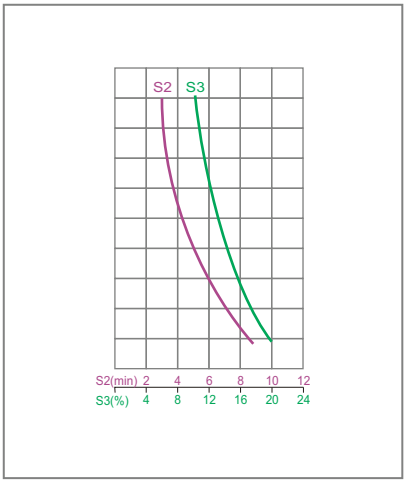


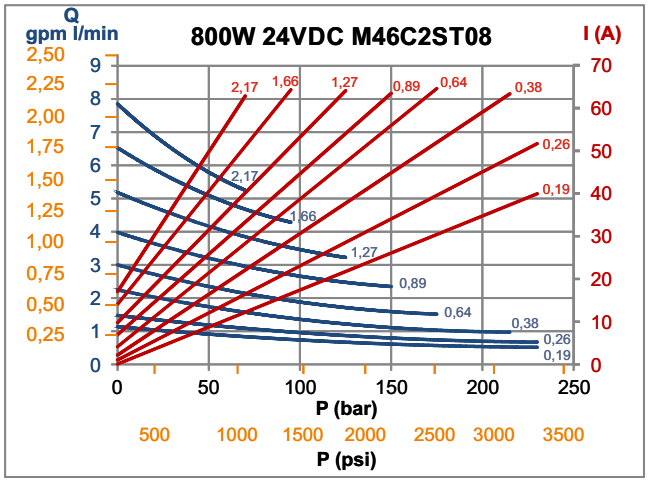


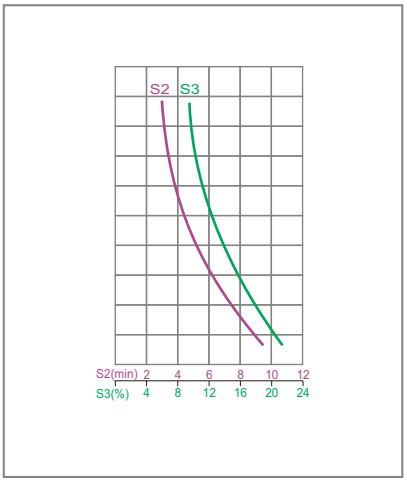
Tests made with rectified current supplied at nominal motor voltage (measured at the motor connection terminals) and oil ISO VG46 at 40°C

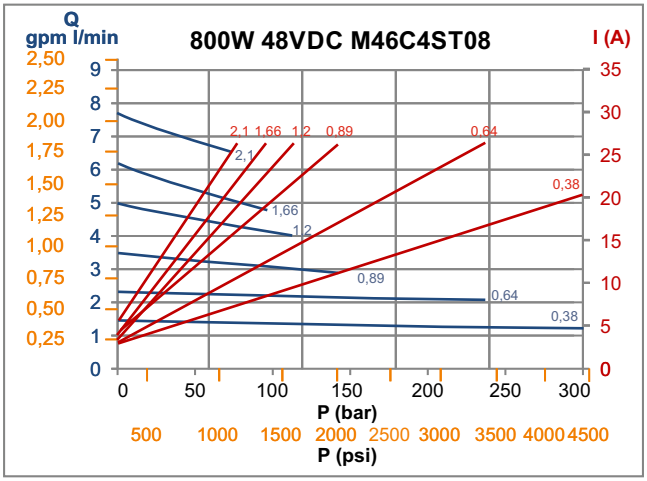
DC MOTORS Ø80 DIAGRAMS

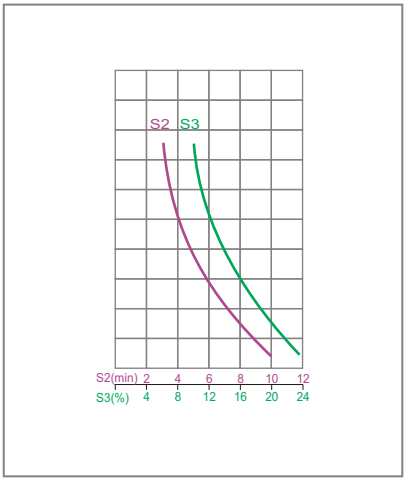






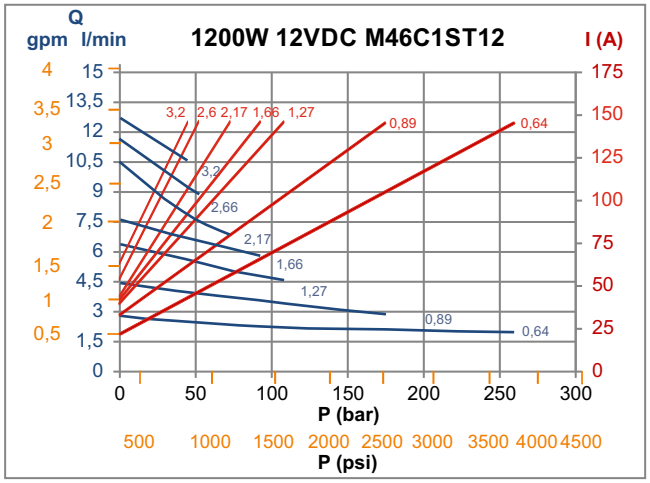


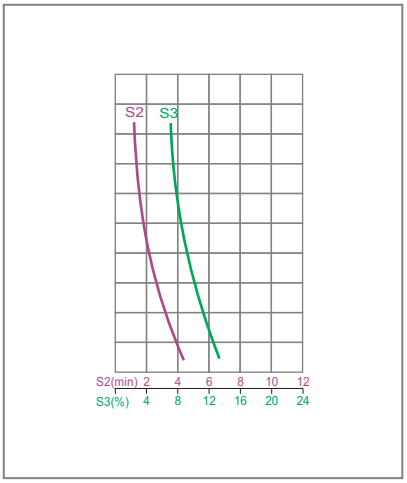


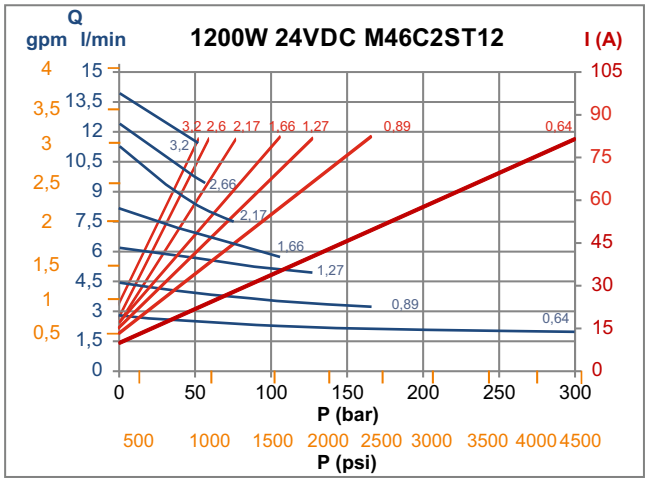


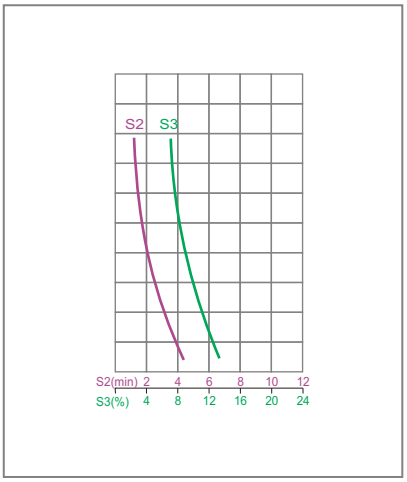
Tests made with rectified current supplied at nominal motor voltage (measured at the motor connection terminals) and oil ISO VG46 at 40°C

DC MOTORS Ø80 DIAGRAMS



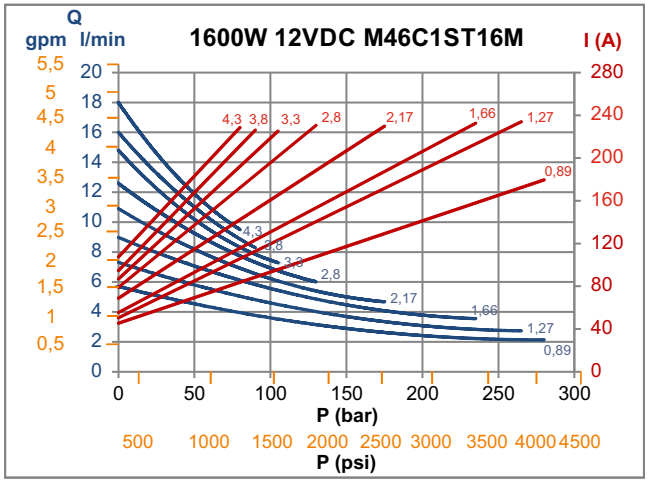


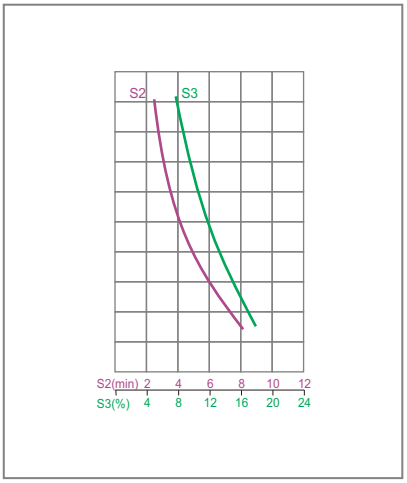


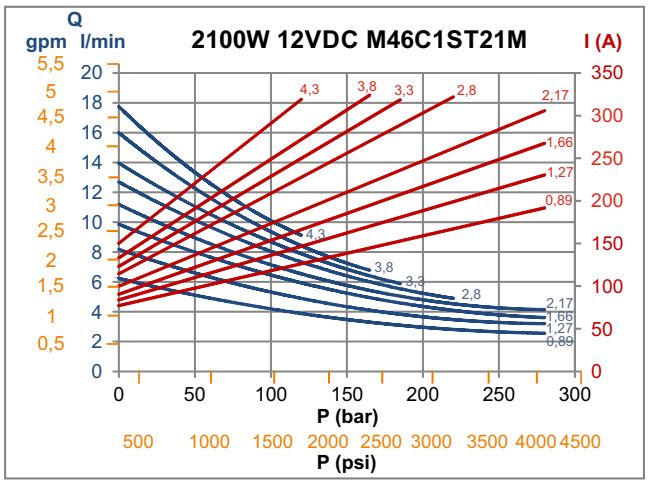


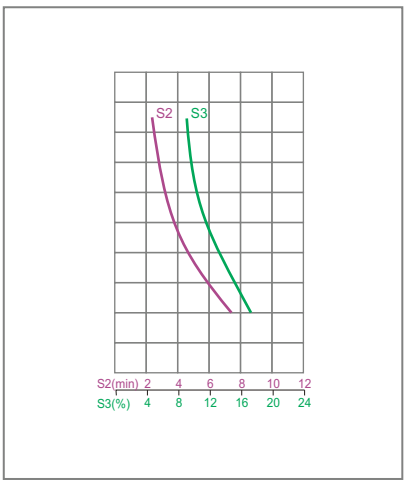
Tests made with rectified current supplied at nominal motor voltage (measured at the motor connection terminals) and oil ISO VG46 at 40°C

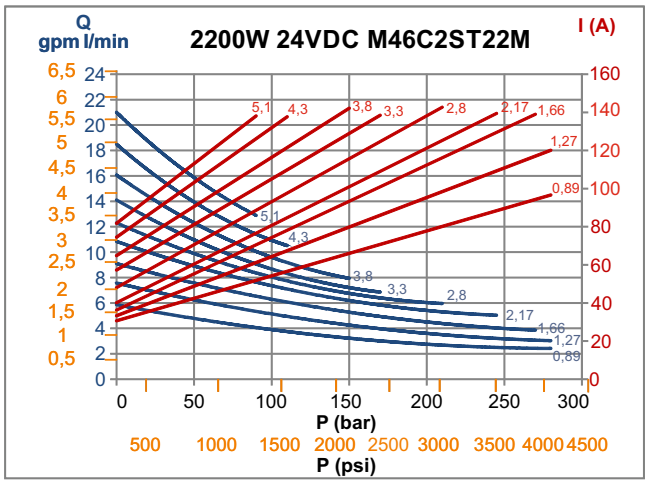
DC MOTORS Ø114 DIAGRAMS

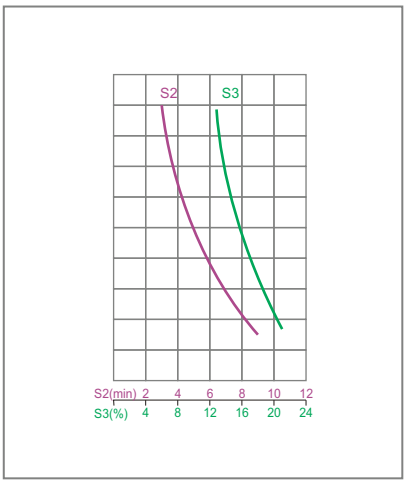






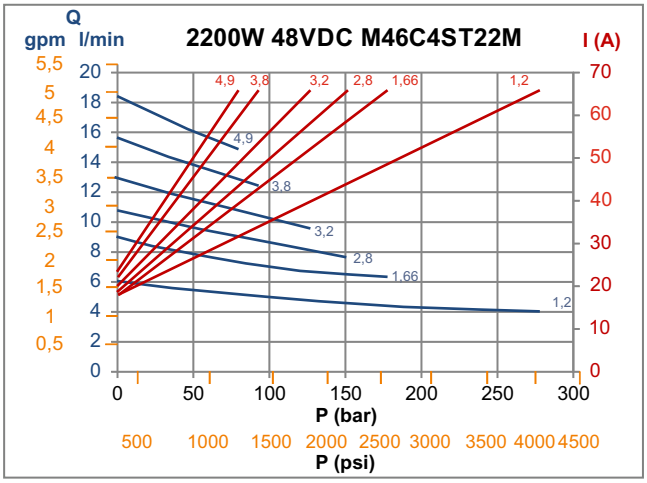


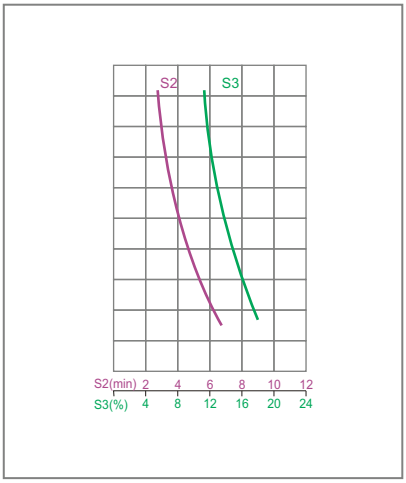




Tests made with rectified current supplied at nominal motor voltage (measured at the motor connection terminals) and oil ISO VG46 at 40°C

DC MOTORS Ø114 DIAGRAMS





INTEGRAL AC MOTORS

IMPROVED

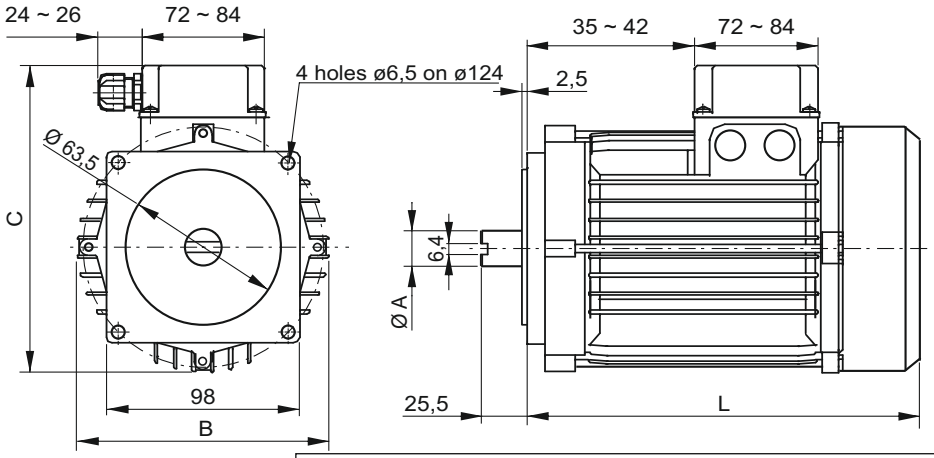
Integral motors: these are motors specifically engineered and manufactured for our mini power packs, featuring high power density and direct connection to the PPM.
They are available in single phase or three phase execution, in frame 71 with square flange and tang drive shaft. A single coupling fits all dimensions.

Other powers and/or special designs are available on request. Standard motors are for intermittent use: S3 40% is a typical work cycle consisting of up to six cycles (on-off) in one hour with the motor ON and OFF for 4 min to 6 min. These motors can be used in emergency situations even in continuous use at a reduced power (30% less than the nominal value S3).

CE

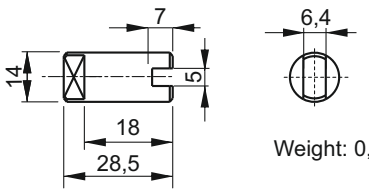
Drawings show typical three phase motors.
Single phase motors have a larger wiring box which also contains the capacitor(s) or can have an external capacitor(s).

Protection degree:IP54
Insulation class: F
Type of duty: S3= intermittent use



A single coupling will fit all motor frame sizes. This is the same coupling (pump side) included in the B14 motor mounting kit. The coupling is already included when specifying an integral AC motor in the PPM assembly code. When ordering spare motors, the coupling is not included and must be ordered separately.

Coupling code
E36200003



Weight: 0,063 kg

PPM motor assembly code

N	**AC integral motor**
0,75	**Maximum Power [kW]**
AC	**Alternate current**
3	**Fasi: 3** = three phase **S** = single phase
4	**Poli: 4** = four poles **2** = two poles
71	**Cassa**

See a table of available codes on next page

INTEGRAL AC MOTORS

Three-phase 4 poles (~1450 rpm at 50Hz)

Frame size	Maximum Power (S3 40%)	Assembly code	Spare motor code	Ø A	B	C	L	Weight kg
71	0,37kW (0,5HP)	**N0,37AC 34 71**	**N037AC341S3**	15	138	180	210	5,5
	0,55kW (0,75HP)	**N0,55AC 34 71**	**N055AC341S3**	15	138	180	210	5,5
	0,75kW (1HP)	**N0,75AC 34 71**	**N075AC341S3**	15	138	180	210	5,5

Three-phase 2 poles (~2900 rpm at 50Hz)

Frame size	Maximum Power (S3 40%)	Assembly code	Spare motor code	Ø A	B	C	L	Weight kg
71	0,55kW (0,75HP)	**N0,55AC 32 71**	**N055AC321S3**	15	138	180	210	5
	0,75kW (1HP)	**N0,75AC 32 71**	**N075AC321S3**	15	138	180	210	5

Single-phase 4 poles (~1450 rpm at 50Hz)

Frame size	Maximum Power (S3 40%)	Assembly code	Spare motor code	Ø A	B	C	L	Weight kg
71	0,37kW (0,5HP)	**N0,37AC S4 71**	**N037ACS41S3**	15	138	180	210	6,5
	0,55kW (0,75HP)	**N0,55AC S4 71**	**N055ACS41S3**	15	138	180	210	7,2

Single-phase 2 poles (~2900 rpm at 50Hz)

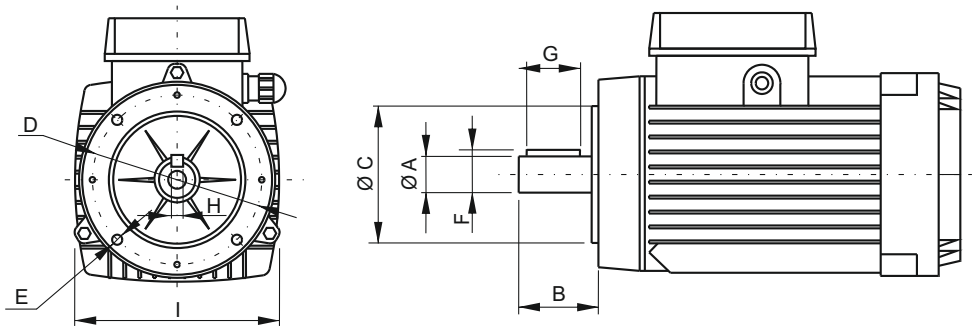
Frame size	Maximum Power (S3 40%)	Assembly code	Spare motor code	Ø A	B	C	L	Weight kg
71	0,55kW (0,75HP)	**N0,55AC S2 71**	**N055ACS21S3**	15	138	180	210	6
	0,75kW (1HP)	**N0,75AC S2 71**	**N075ACS21S3**	15	138	180	210	6,5

B14 IEC AC MOTORS

B14 IEC motors: for market compatibility, any IEC standard B14 AC motor with frame 63 and 71 can be mounted. In this case two-piece couplings and additional adaptor flanges as per relevant tables must be mounted.

Motor overall dimensions are not indicated since they can vary substantially depending on the motor brand selected.

CE



Main dimensions for B14 IEC standard motors

Frame size	Typical power range	ØA	B	ØC	D	E	F	G	H	Mounting kit
63	0,12 ~ 0,25 kW 0,16 ~ 0,35 HP	11 j6	23	60	75	M5	12,5	18	4	**NB14 63**
71	0,25 ~ 0,37 kW 0,37 ~ 5 HP	14 j6	30	70	85	M6	16	25	5	**NB14 71**

PPM B14 motor assembly code

B14	**Type**
025	**Power [kW]**
AC	**Alternate current**
3	**Phase: 3** = three phase **S** = single phase
4	**Poles: 4** = four poles **2** = two poles
0	**Frame size: 0** = 63 **1** = 71
-	**Duty factor: -** = ED 100% (S1) **S3** = intermittent duty

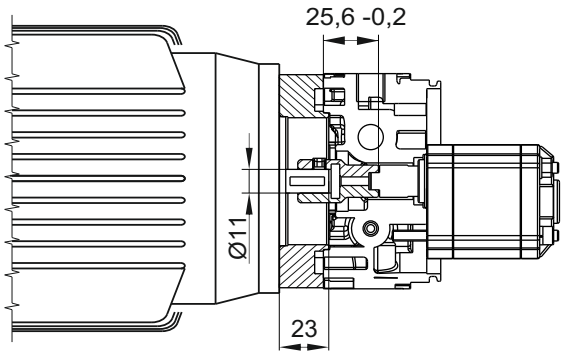
Mounting kit spare parts

The B14 mounting kits are made of:
- a semi-coupling E3610000M on pump shaft side, that is the same used on AC integral motors.
- a semi-coupling on motor shaft side, which is different for each frame size,
- an adaptor flange to suit the central manifold, which is also different for each frame size.

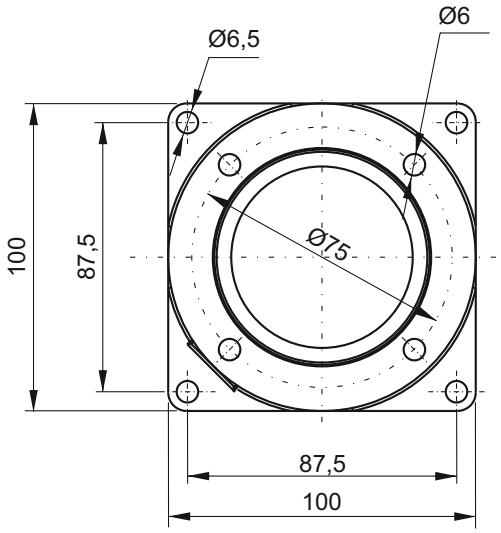
The mounting kit is already included when specifying a B14 AC motor in PPM assembly code.
When ordering spare motors, the relevant mounting kit is not included and must be ordered separately.

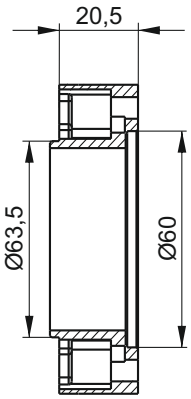
MOUNTING KIT FOR FRAME 63 B14 IEC MOTORS

Kit weight: 0,18 Kg



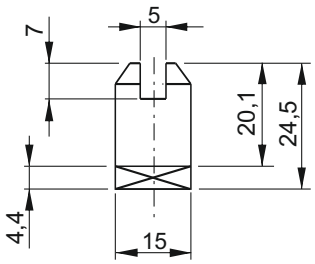
Adaptor flange



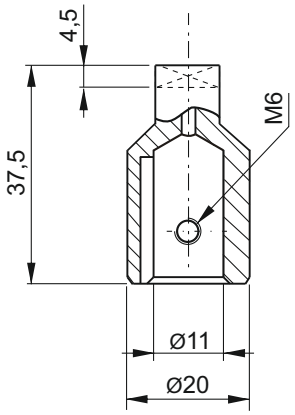


Coupling

Pump side **E36100000M**



Motor side **M36100011**



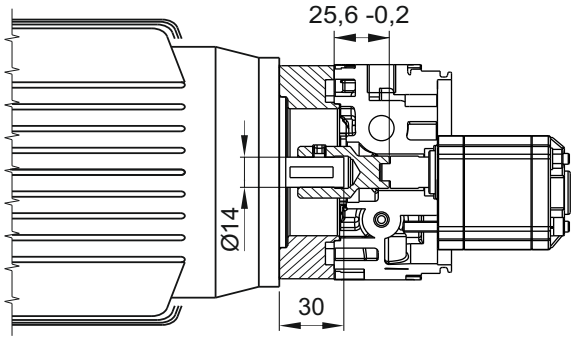
Description	Assembly code*	Spare part code
B14 63 motor side semi-coupling	**NB14 63**	**M36100011**
B14 pump side semi-coupling		**E36100000M**
B14 63 adaptor flange		**F25030002**

* Note: the coupling + flange kit is already included when specifying a B14 motor in PPM assembly code. NB1463 code to be indicated only when ordering PPM with no motor but with coupling + flange kit.

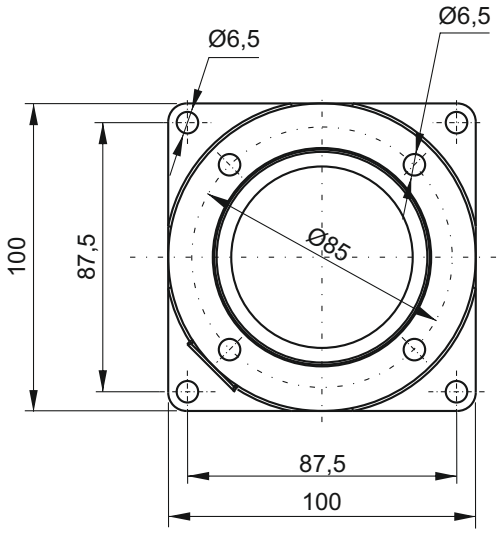
Attention! When assembling B14 IEC motors with NB14 flange + couplings kit, please respect positioning tolerances as shown in the drawing at the top of this page. Failure to do so can cause malfunctioning or component failure.

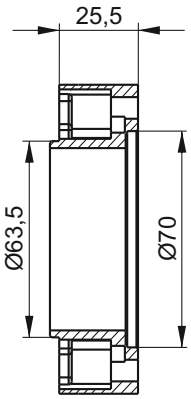
MOUNTING KIT FOR FRAME 71 B14 IEC MOTORS

Kit weight: 0,18 Kg



Adaptor flange



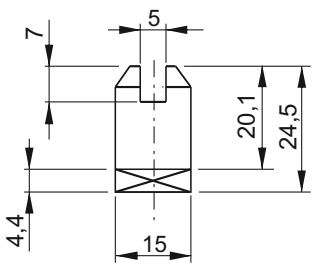


Description	Assembly code*	Spare part code
B14 71 motor side semi-coupling	NB14 71	**E36100001**
B14 pump side semi-coupling		**E36100000M**
B14 71 adaptor flange		**F25030003**

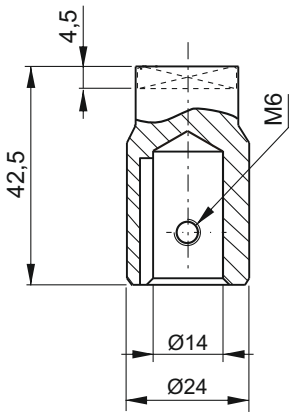
* Note: the coupling + flange kit is already included when specifying a B14 motor in PPM assembly code. NB1471 code to be indicated only when ordering PPM with no motor but with coupling + flange kit.

Couplings

Pump side **E36100000M**



Motor side **E36100001**

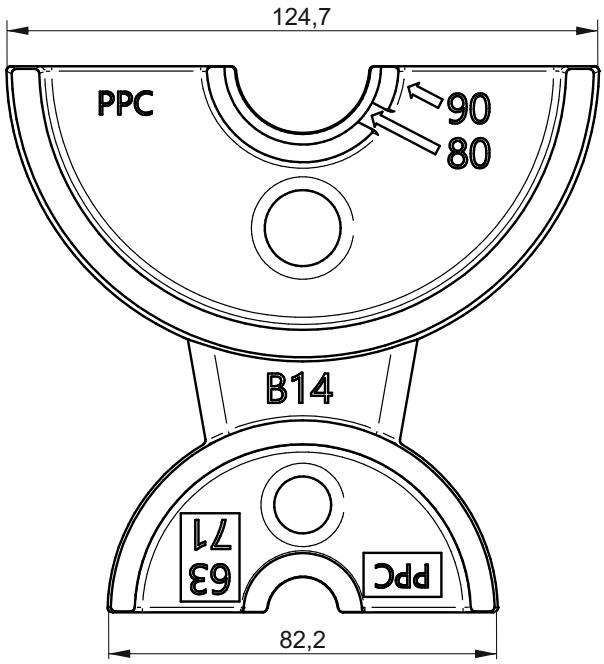


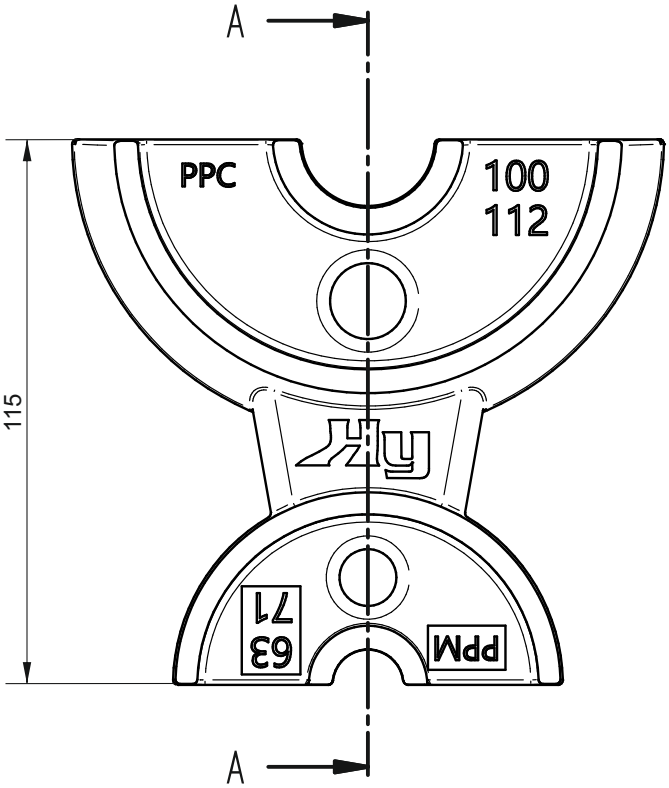
Attention! When assembling B14 IEC motors with NB14 flange + couplings kit, please respect positioning tolerances as shown in the drawing at the top of this page. Failure to do so can cause malfunctioning or component failure.

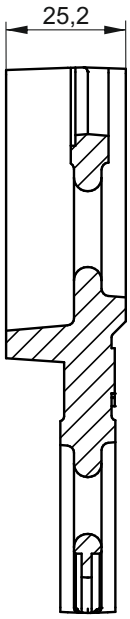
SECTION A

COUPLING MOUNTING TOOL FOR FRAME 63/71 B14 MOTORS PPC-PPM

NEW





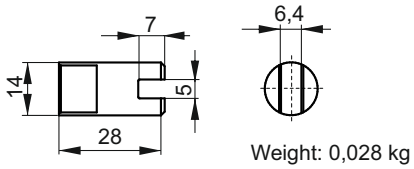
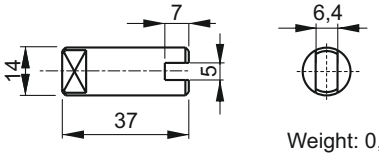


SECTION A–A

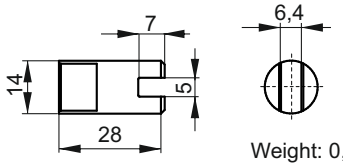
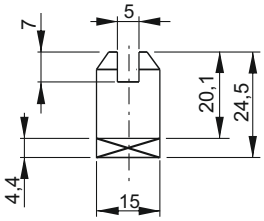
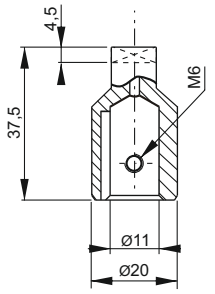
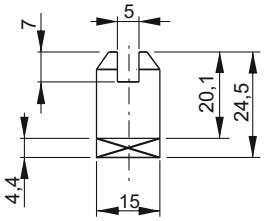
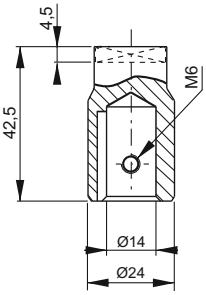
Description	Spare part code
Coupling mounting tool for B14 motors	**ATZB14001**

Attention! Cannot be used for EPB151 electropumps with flange E10105010.

SUMMARY TABLE - DC PUMP/MOTOR COUPLING KITS

Motor \ Pump	Group 0 pump	Dimensional drawings
DC Ø 80	E36200003	 Weight: 0,028 kg
DC Ø 114	E36200002	 Weight: 0,041 kg

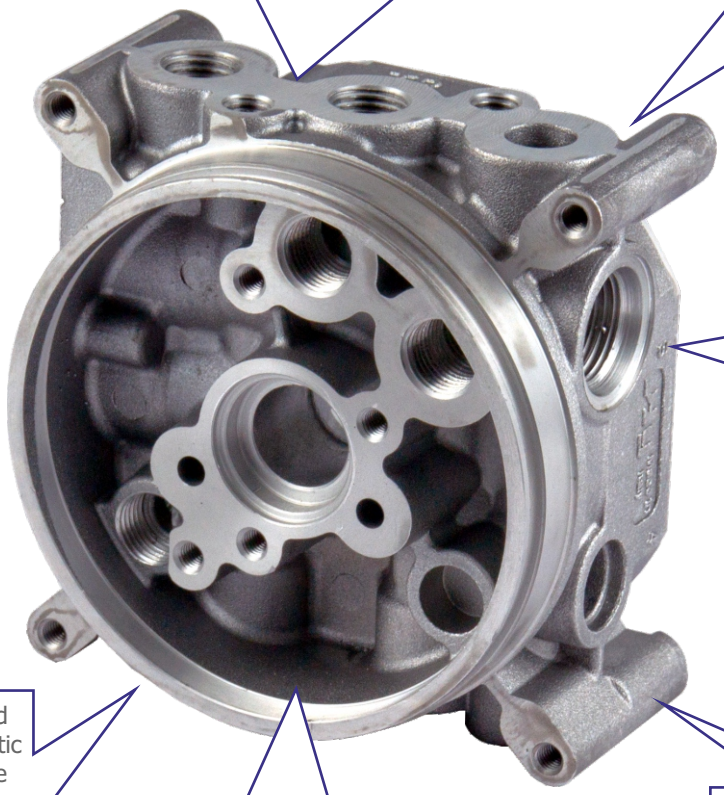
SUMMARY TABLE - AC PUMP/MOTOR COUPLING KITS

Motor \ Pump	Group 0 pump	Dimensional drawings
INTEGRAL AC	E36200003	 Weight: 0,028 kg
AC B14 63	NB14 63 (M36100011+E36100000M+F25030002)	Pump side **E36100000M**  Motor side **M36100011** 
AC B14 71	NB14 71 (E36100001+E36100000M+F25030003)	Pump side **E36100000M**  Motor side **E36100001** 

MICRO CENTRAL MANIFOLD

A single **universal die-cast aluminium** central manifold in 3 different executions is the core part to realize all power units in industrial, mobile and marine fields. It features the **highest integration and flexibility** on the market, with up to **seven devices** which can be fitted inside, plus a wide selection of manifold blocks which can be connected to cartridge type valves or NG3 valves

The **interface** to hose fittings or external additional manifolds is **unified**. The P and T port tappings for the hose fittings are **1/4" BSP** (International standard) or **9/16-18UNF** (SAE06) for the American standard execution



Lateral cavities are according **SAE08 standard** (3/4-16UNF), except for the main check valve (5/8-18UNF) and main relief valve (M14)

The **interfaces** to tanks and motors are **unified**. All plastic or steel tanks have the same interface and can be easily swapped.
All AC or DC motors can be fitted easily either directly to the central manifold or through adaptor flanges (B14 IEC standard motors)

Clockwise (our standard) or counterclockwise or bidirectional rotation tang drive shaft **standard gear pumps** can be mounted

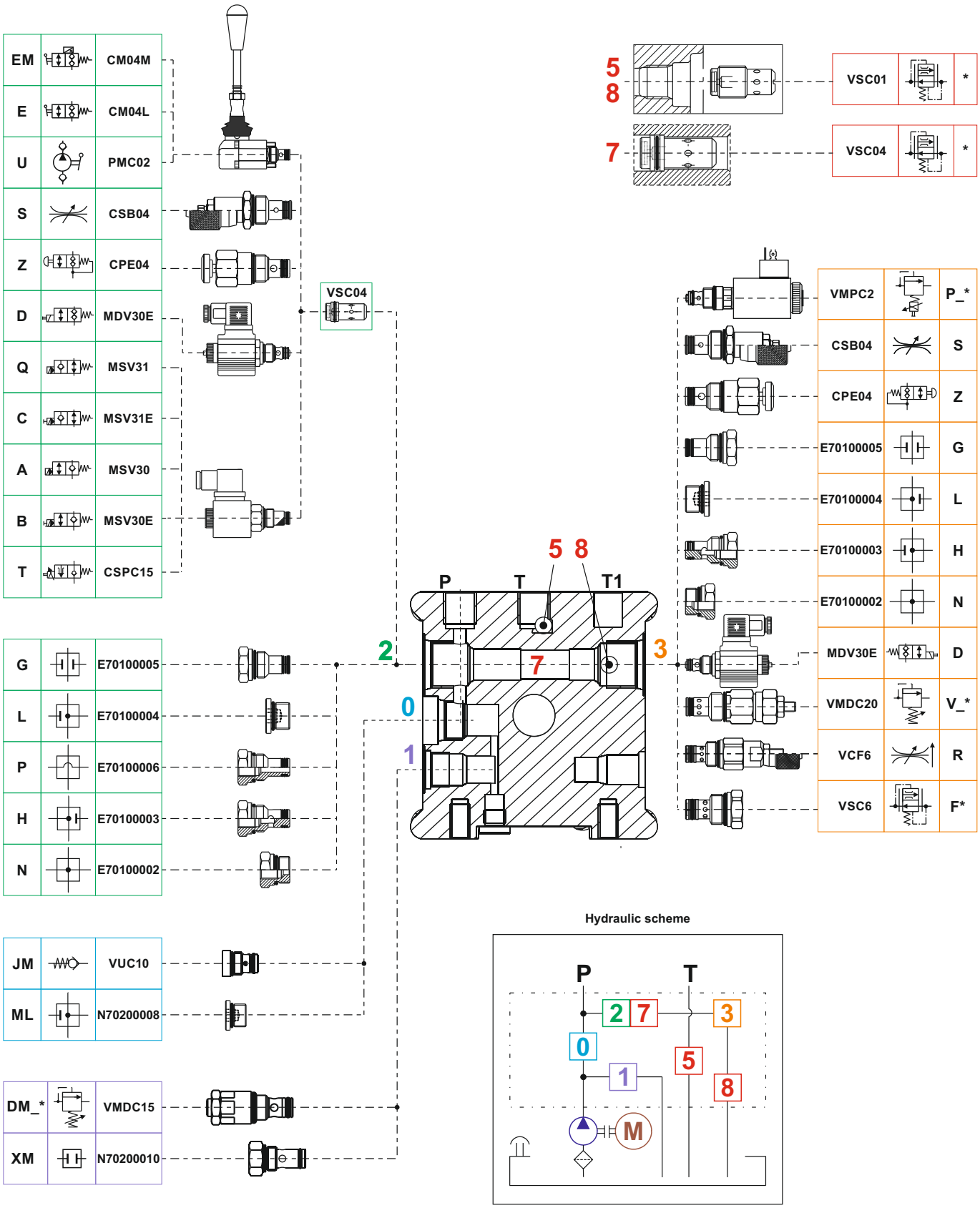
The maximum flow is **6 l/min**, with a **low pressure drop**, and maximum motor power is 2,2kW, well above the average of other alternative products on the market

Which micro central manifold execution should I choose?
MB type is the most widely applied for single acting or double acting circuits. M4 execution is recommended for compact and cost effective double acting circuits with a single cylinder while MR is for bidirectional pump and may integrate double relief valve, double pilot operated check valves and also an extra pilot operated check valve to ensure that differential cylinder circuits function properly (this extra valve discharges excess return flow from the piston side of the cylinder).

Do I need special tools to assemble the components within the central manifold?
No. All valves are screw-in type in a single piece construction (no loose nuts, washers, springs,... difficult to assemble and falling apart). The components are easily assemblable with simple hand tools and hexagon keys.

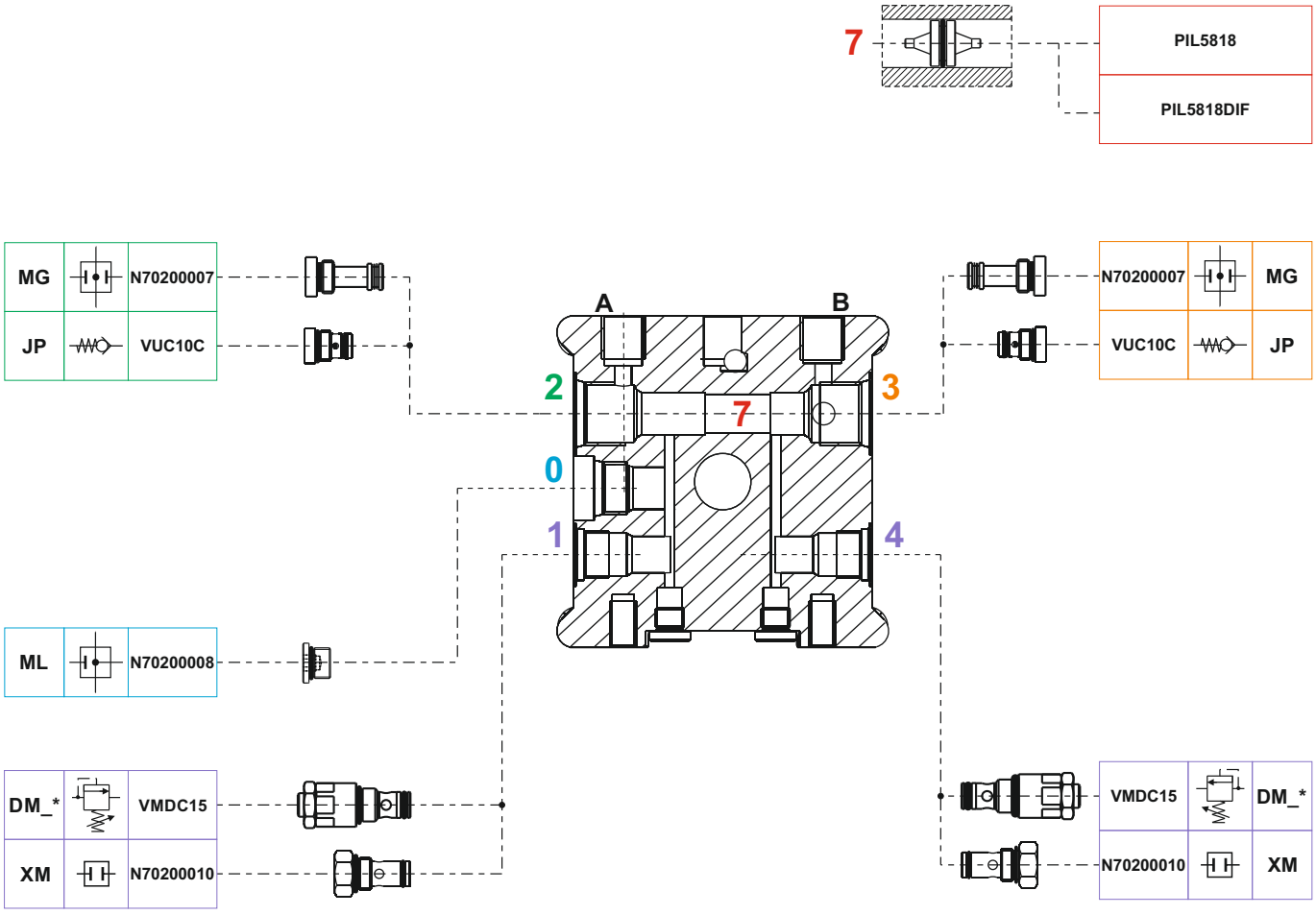
Is the central manifold available as a loose component?
Yes. We can supply either fully assembled and tested power packs or kits of loose components, which can be kept in stock by our worldwide distributors and easily assembled to satisfy local market demand quickly and effectively. Central manifolds and core other components are 100% tested even when supplied as loose parts.

MICRO CENTRAL MANIFOLD «MB» EXECUTION VALVE COMBINATIONS

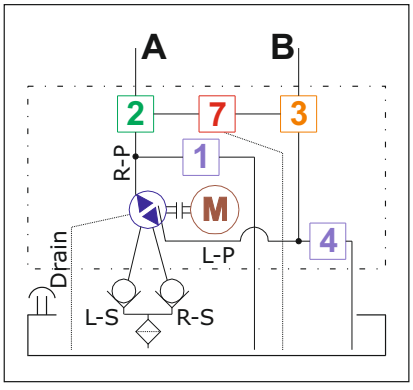


Hydraulic scheme

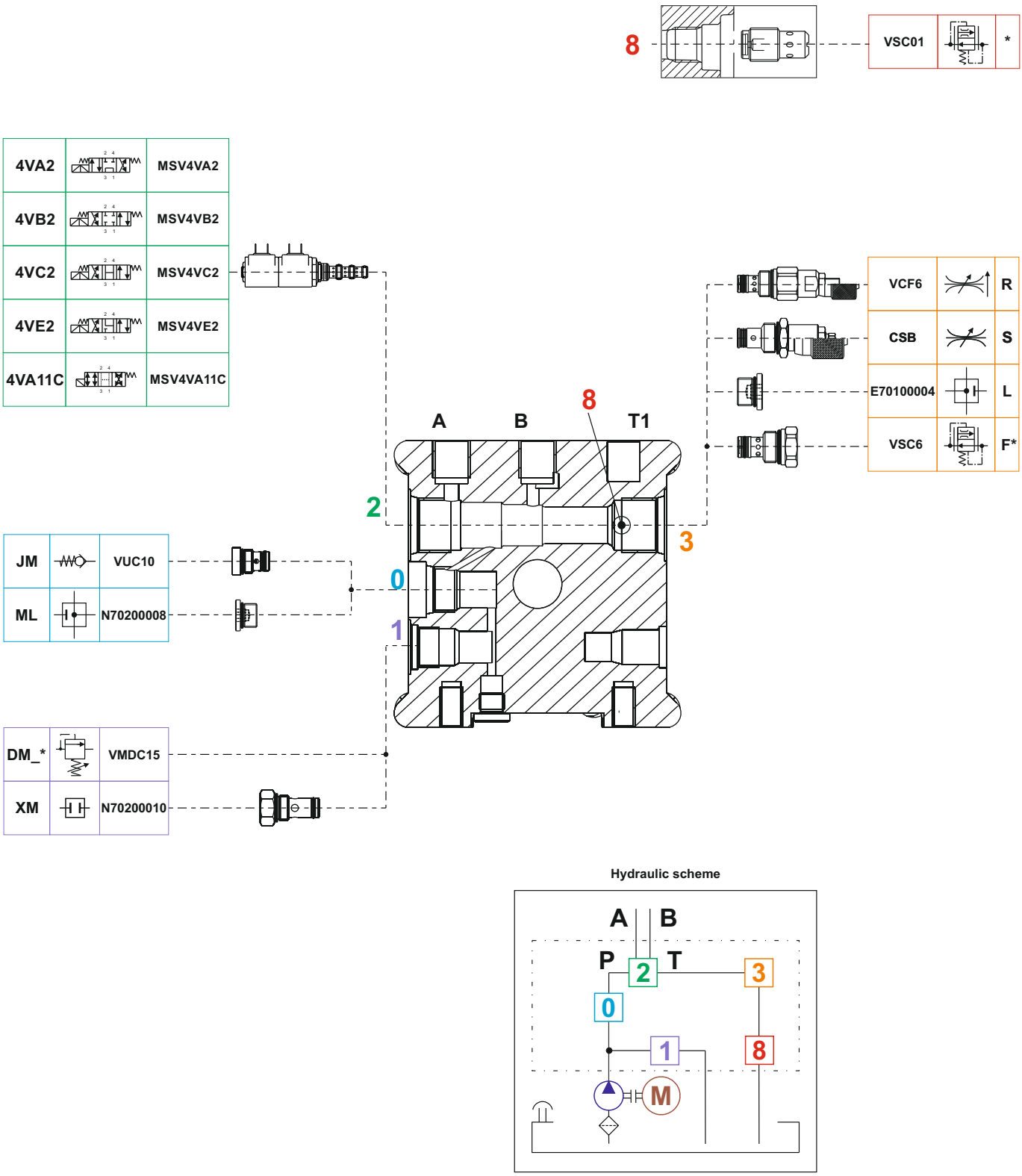
MICRO CENTRAL MANIFOLD «MR» EXECUTION VALVE COMBINATIONS



Hydraulic scheme



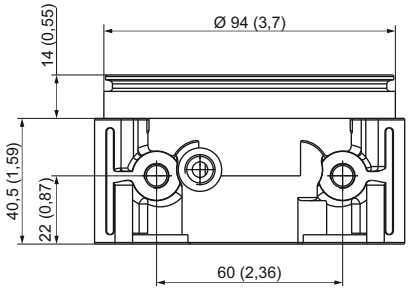
MICRO CENTRAL MANIFOLD «M4» EXECUTION VALVE COMBINATIONS



Hydraulic scheme

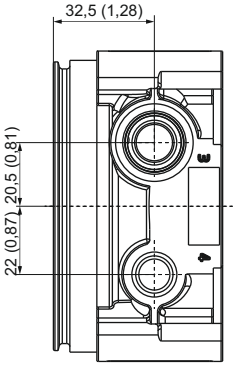
MICRO CENTRAL MANIFOLD OVERALL DIMENSIONS

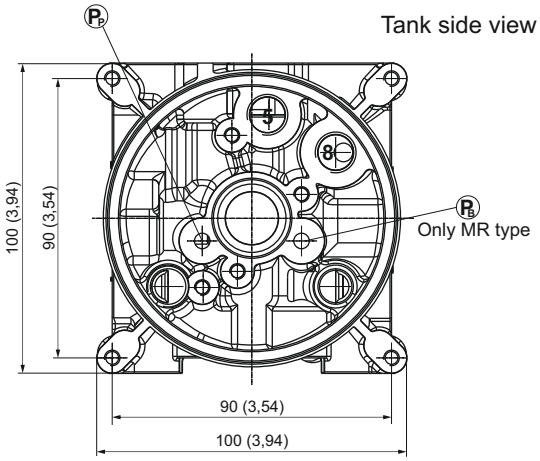
Type	Spare part code
MB	E60102031
MR	E60102032
M4	E60102033
MBUS	E60102031US
MRUS	E60102032US
M4US	E60102033US

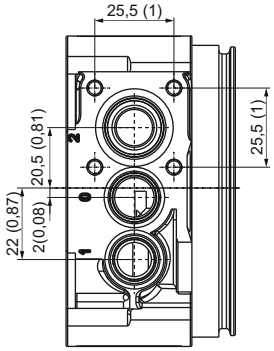


Weight: 0,60 kg (1,32 lb)

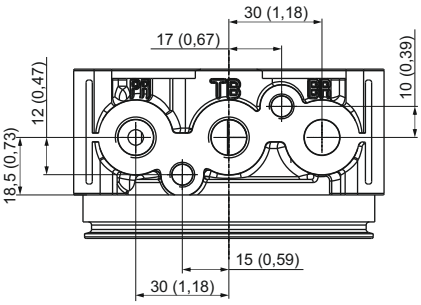
Notes:
- codes ending with US are intended for the American market and machined with 9/16-18 UNF (SAE06) exit ports.
- all dimensions in mm and (inches)

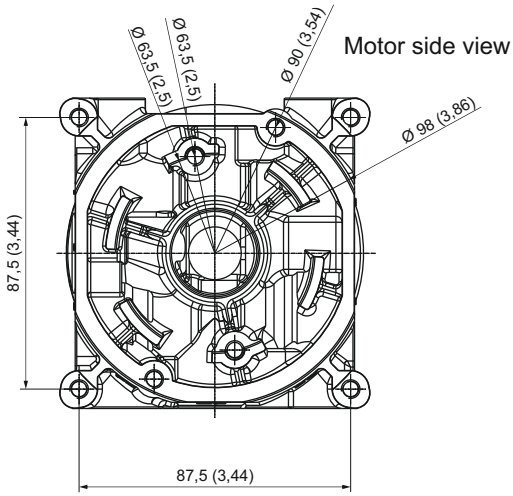






Cavity	Threads
1, 4 (MR type)	M14x1 (relief valve)
0	5/8-18 UNF
2, 3	3/4-16 UNF (SAE 08) 5/8-18 UNF (MR type)
P-T, A-B, T1 (threaded on request only)	1/4 BSP 9/16-18 UNF (US type)
5, 8	1/4 BSP
External manifold attachment	2 M8 tie-rods
Tank attachment	4 bolts M5x10
Integral AC motor attachment	4 bolts M6x20
DC motor attachment	2 bolts M6x14 or M6 tie-rods
Pump attachment	2 bolts M5x** (see pump length on the relevant tables)
Foot mounting support attachment	2 bolts M8x16 5/16-24UNF (US type)
PMC hand pump / CM lever valve cap attachments	4 bolts M5x45

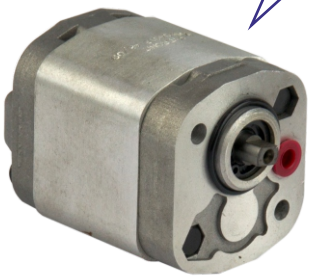




NOTES

GEAR PUMPS

K series. It's the standard choice.
Specifically for micro power packs designed balanced pressure to improve the volumetric efficiency



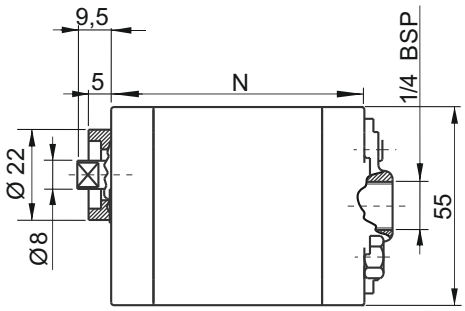
H series. It's designed and dimensioned for high pressure applications with peaks up to 270 bar

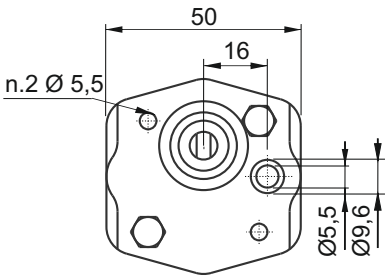
R series. Bidirectional pumps with integrated suction check valves and two front outlet ports.
They can be fitted on MR type central manifold

Why are pressure balanced gear pumps better than fixed clearance gear pumps used by some competitors?
Pressure balanced gear pumps are built with lateral compensation plates which reduce the mechanical clearance on the gears as the output pressure increases, relevant greatly improving the volumetric efficiency, reducing heat generation and energy consumption. The mechanical efficiency is always maintained at optimal levels.

Why are the pump technical specifications showing three maximum pressure levels?
Our pumps have three ratings for the maximum allowable pressure: 1-Peak: is the highest one and can be allowed for a maximum cycle of 2 seconds. 2-Intermittent: it can be applied on the pump for a maximum cycle of 20 seconds; 3-Continuous: it can be applied on the pump continuously.

G TYPE GEAR PUMPS





Main features

Oil temperature	-15 ÷ +80 °C
Inlet pressure	0,7 < P < 3,0 bar (absolute pressure)
Fixing bolts	2 x M5 8.8 class steel tightening torque: 8 ÷ 9,5 Nm
Pressure limits definition	Peak pressure: cycle 2 s ON Intermittent pressure: cycle 20 s ON Continuous pressure: cycle always ON

Standard rotation direction: clockwise (from shaft side).
Counterclockwise rotation pumps can be mounted on request.
Ask our sales department.

Spare part code

E60 50 30 **

Type:
50 = Group 0

Series:
30 = G

Reference code:
see below table

Assembly code

GM — **Series:** GM = G series

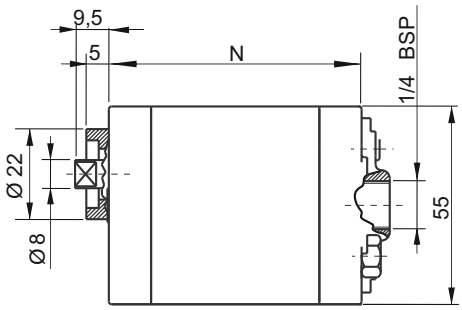
0,4 — **Size**

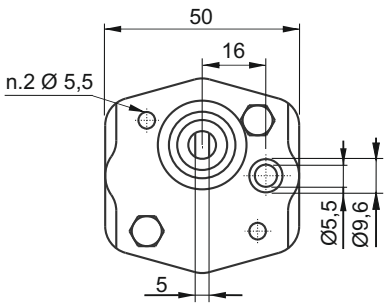
Available range

Nominal displacement [cc/rev]	Peak pressure [bar]	Intermittent pressure [bar]	Continuous pressure [bar]	Max speed [rpm]	N [mm]	Bolts* [mm]	Code marked on pump	Spare part code	Weight [Kg]
0,19	230	210	190	7000	43,6	M5x65	UK0,25D18G	E60503001	0,49
0,26	230	210	190	7000	44,6	M5x55	UK0,25D24G	E60503002	0,50
0,38	230	210	190	7000	46,6	M5x60	UK0,25D36G	E60503004	0,51
0,64	230	210	190	7000	53,5	M5x65	UK0,5D0,75G	E60503006	0,52

* One or more washers are always fitted to secure the bolt engagement
Other pumps with different displacement/pressure/speed are available on request.

K TYPE GEAR PUMPS





Main features

Oil temperature	-15 ÷ +80 °C
Inlet pressure	0,7 < P < 3,0 bar (absolute pressure)
Fixing bolts	2 x M5 8.8 steel class tightening torque: 25 Nm
Pressure definition	Peak pressure: cycle 2 s ON Intermittent pressure: cycle 20 s ON Continuous pressure: cycle always ON

Standard rotation direction: clockwise rotation (from shaft side).
Counterclockwise rotation pumps can be mounted on request.
Ask our sales department.

Spare part code

E60 50 40 **

Pump type:
50 = Group 0

Series:
40 = K

Nominal size:
see table

PPM assembly code

KM — **Pump series:**
KM = K series

0,6 — **Nominal displacement**
cc/rev (see table below)

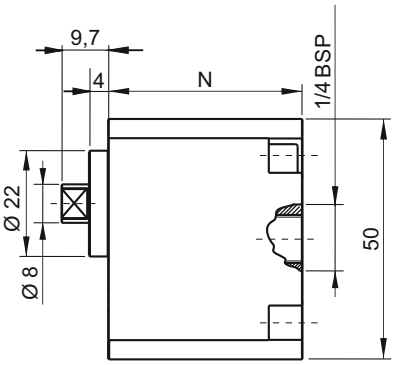
Available range

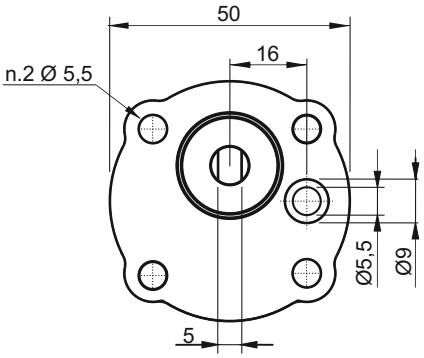
Nominal displacement [cc/rev]	Peak pressure [bar]	Intermittent pressure [bar]	Continuous pressure [bar]	Max speed [rpm]	N [mm]	Bolts* [mm]	Spare part code	Weight [Kg]
0,2	200	180	160	6000	51,9	M5x65	E60504002	0,33
0,4	200	180	160	6000	52,9	M5x65	E60504004	0,35
0,6	200	180	160	6000	54,9	M5x65	E60504006	0,40
0,9	200	180	160	5000	56,9	M5x70	E60504009	0,44
1,3	200	180	160	3900	59,9	M5x70	E60504013	0,49
1,5	200	180	160	3900	62,2	M5x75	E60504015	0,51

Other gear pumps with different pressure and speed available upon request.

* Washers may be fitted to adapt bolt lenght

H TYPE HIGH PRESSURE GEAR PUMPS





Main features

Oil temperature	-15 ÷ +80 °C
Inlet pressure	0,7 < P < 3,0 bar
Fixing bolts	2 x M5 8.8 steel class tightening torque: 25 Nm
Pressure definition	Peak pressure: cycle 2 s ON Intermittent pressure: cycle 20 s ON Continuous pressure: cycle always ON

Standard rotation direction: clockwise rotation (from shaft side).
Counterclockwise rotation pumps can be mounted on request.
Ask our sales department.

Spare part code

E60 50 50 **

Pump type:
50 = Group 0

Series:
50 = H

Nominal size:
see spare part code on table

PPM assembly code

HM — **Pump series:**
HM = H series

0,8 — **Nominal displacement**
cc/rev **(**see below table)

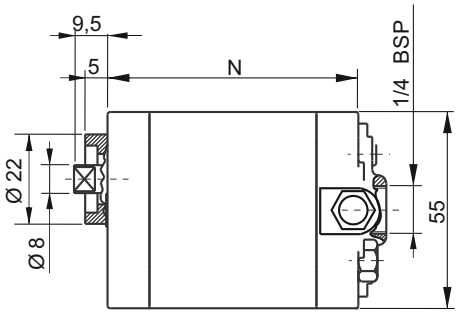
Available range

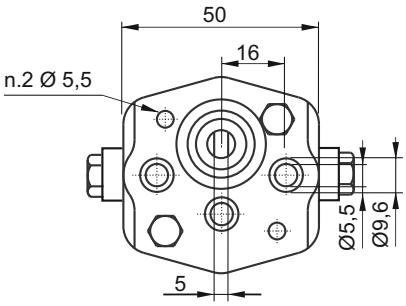
Nominal displacement [cc/rev]	Peak pressure [bar]	Intermittent pressure [bar]	Continuous pressure [bar]	Max speed [rpm]	N [mm]	Bolts* [mm]	Spare part code	Weight [Kg]
0,1	270	250	230	7000	36,4	5x50	E60505001	0,26
0,2	270	250	230	7000	36,7	5x50	E60505002	0,27
0,4	270	250	230	7000	37,8	5x50	E60505004	0,27
0,6	270	250	230	7000	39,5	5x50	E60505006	0,28
0,8	270	250	230	7000	40,7	5x50	E60505008	0,29
1,2	270	250	230	5000	43,4	5x55	E60505012	0,31
1,5	270	250	230	5000	45,0	5x55	E60505015	0,32

Other gear pumps with different pressure and speed available upon request.

* Washers may be fitted to adapt bolt lenght

R TYPE BIDIRECTIONAL GEAR PUMPS





Main features

Oil temperature	-15 ÷ +80 °C
Inlet pressure	0,7 < P < 3,0 bar
Fixing bolts	2 x M5 8.8 steel class tightening torque: 25 Nm
Pressure definition	Peak pressure: cycle 2 s ON Intermittent pressure: cycle 20 s ON Continuous pressure: cycle always ON

Spare part code

E60 50 35 **

Pump type:
50 = Group 0

Series:
35 = R

Nominal size:
see table

PPM assembly code

RM — **Pump type:**
RM = R series

1,3 — **Nominal displacement:**
cc/rev (see below table)

Available range

Nominal size	Nominal displacement [cc/rev]	Peak pressure [bar]	Intermittent pressure [bar]	Continuous pressure [bar]	Max speed [rpm]	N [mm]	Bolts* [mm]	Code marked on pump	Spare part code	Weight [Kg]
R0,1	0,19	190	170	150	7000	44,5	M5x55	U0.25R18GVNKX	E60503501	0,38
R0,2	0,26	190	170	150	7000	45,6	M5x55	U0.25R24GVNKX	E60503502	0,39
R0,3	0,32	190	170	150	7000	46,5	M5x60	U0.25R30GVNKX	E60503503	0,42
R0,4	0,38	190	170	150	7000	47,7	M5x60	U0.25R36GVNKX	E60503504	0,43
R0,5	0,51	190	170	150	7000	49,6	M5x60	U0.25R48GVNKX	E60503505	0,44
R0,7	0,64	190	170	150	7000	55,6	M5x65	U0.5R0,75GVNKX	E60503506	0,46
R0,9	0,88	190	170	150	7000	56,6	M5x70	U0.5R1,00GVNKX	E60503509	0,48
R1,3	1,25	190	170	150	5000	59,6	M5x70	U0.5R1,60GVNKX	E60503513	0,49
R1,5	1,5	190	170	150	4000	61,6	M5x75	U0.5R2,00GVNKX	E60503515	0,58

Other gear pumps with different pressure and speed available upon request.

* Washers may be fitted to adapt bolt lenght

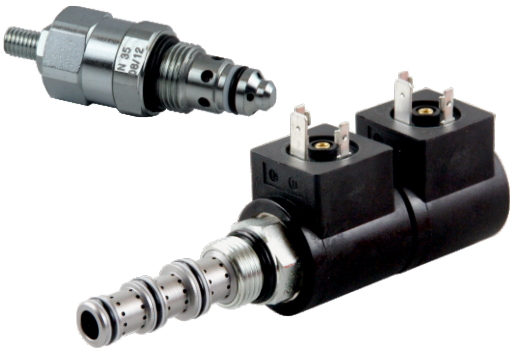
NOTES

INTEGRAL COMPONENTS

The **hand pump cartridge** SAE08 (3/4-16UNF), 2 cc/stroke, is an affordable and easy way to add an emergency function to your powerpack

Two way no leakage solenoid valves SAE08 (3/4-16UNF), are available in Normally Open, Normally Closed, single and double locking executions. Manual override also available

Pressure and flow proportional control valves are available as standard, also with integrated **PWM amplifier**



All cartridges are supplied in **single piece**, easily screwable

The **main relief valve** is fitted in a M14 cavity and constructed with **dampening poppet** to increase the accuracy of pressure adjustment and avoid the typical noise of other valves on the market

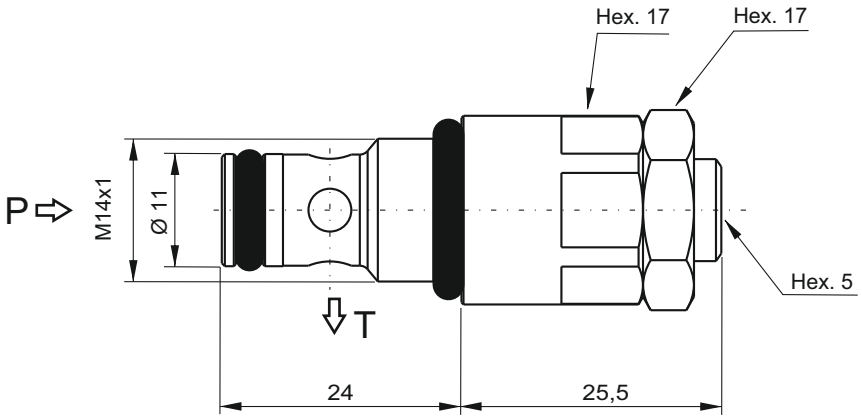
The **main check valve** fits in SAE06 (5/8-16UNF) standard cavity and can be easily removed from the outside for cleaning and servicing

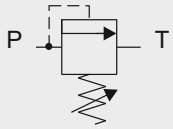
How does the coding of the power pack works?
The power packs are coded with a speaking code, which is basically the list of subassemblies which make up the power pack (motor, pump, valves, tank,...). Integral components are those fitting inside central manifold cavities, which are numbered from 0 to 8. Each component has an assembly code, normally a single letter which compose the speaking code, and a spare part code in case they are ordered as loose components. The numbered cavities are indicated in the hydraulic scheme, so that it is easy to draw it starting from the speaking code itself, and on the central manifold casting too, to simplify assembling.

There are several different coils and connectors for the cartridge solenoid valves. How do I choose the correct ones?
Normally closed 2-way solenoid valves (MSV30*) use M130*/M63* series of coils either DC or directly AC. Normally open 2-way solenoid valves (MSV31E) can only use DC or RC (rectified current) coils due to their construction. When choosing a RC not rectified coil, an external rectifying bridge must be applied (ex. by adopting the KA132R*** connectors). MSV4V 4-way cartridge valves use the M63* series coils only. M630 are for DC supply voltage, while M631 are rectified coils with integral rectifying bridge, to be supplied straight with AC current. A standard KA13200000 connector must be always used in this case. On page D180 you will find the coil / connector table for all valves.

Which are the most used plugs?
G or H plugs are normally fitted in cavity 2 of MB central manifold when this cavity is not used for functional valves. L type plug goes in cavity 3 of MB manifolds, when this cavity is not used. MR central manifold cavities 2 and 3 are machined to 5/8-18UNF cavity to allow the mounting of piloted operated check valves. MG plugs must be used there if P. O. check valves are not needed.

VMDC15 - DIRECT ACTING MAIN RELIEF VALVE





Main features

Maximum pressure	280 bar
Maximum flow	15 l/min
Weight	0,06 kg

Recommended tightening torque: 25 Nm
Recommended filtration settings: 25 ÷ 50 μ
Oil temperature: -30 ÷ + 80 °C

Spare part code

VMDC — **Direct acting main relief valve**

15 — **Nominal size:** 15 = 15 l/min

B — **Working range:** L = 10 ÷ 60 bar, A = 10 ÷ 180 bar, B = 20 ÷ 280 bar

1 — **Options:** 1 = screw (std)

Assembly code

DM_*

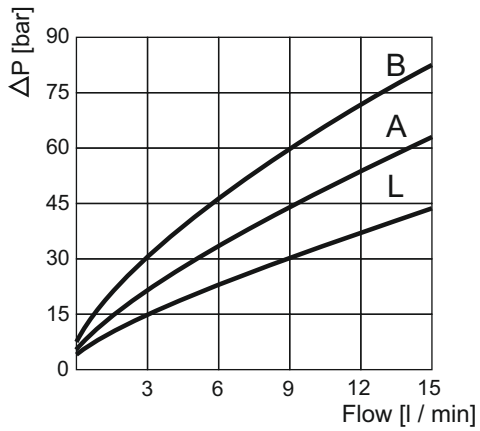
where *** stands for max setting pressure [bar]. Ex. DM_280

Mounting cavities

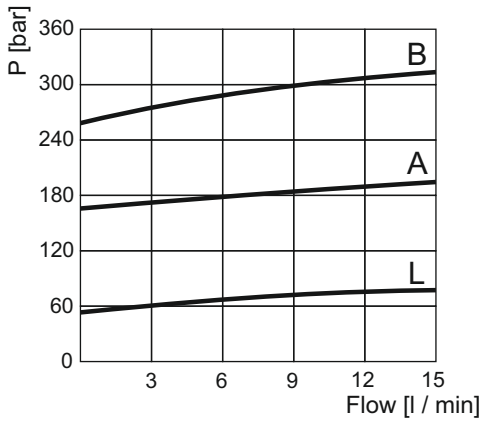
0	**1**			
2	3	**4**		
5			7	8

Note: cavity 4 only for MR type.

Minimum setting pressure

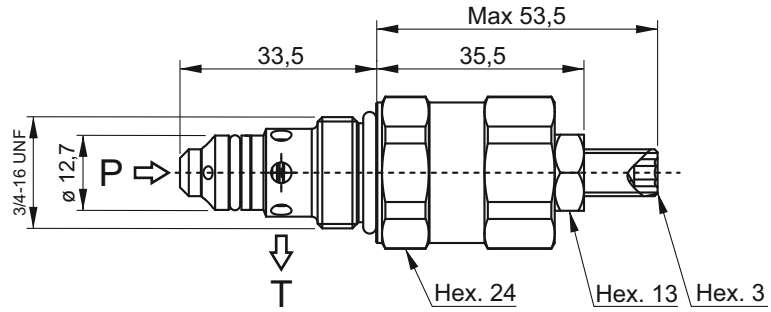


Pressure vs flow

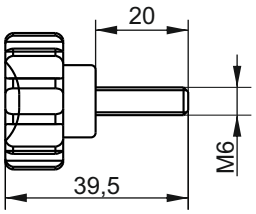


Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

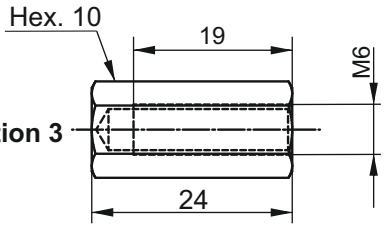
VMDC20 - DIRECT ACTING MAIN RELIEF VALVE



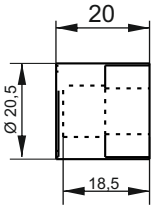
Option 2

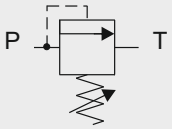


Option 3



Option 4





Main features

Max pressure	350 bar
Max flow	20 l/min
Weight	0,14 kg

Recommended tightening torque: 40 Nm
Recommended filtration: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

VMDC — **Relief valve**

20 — **Nominal size:**
20 = 20 l/min

B — **Working range:**
A = 3 ÷ 60 bar
B = 40 ÷ 120 bar
C = 80 ÷ 250 bar
D = 150 ÷ 350 bar

1 — **Option:**
1 = M6 screw (std)
2 = handwheel
3 = with cap
4 = plastic seal

Assembly code

V* ♦**

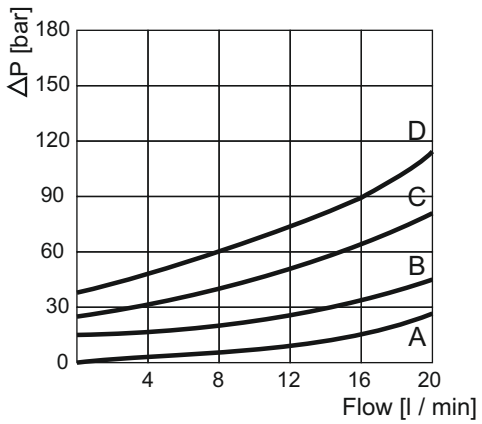
where *** stands for max setting pressure [bar]. Ex. V200

where ♦ is the option

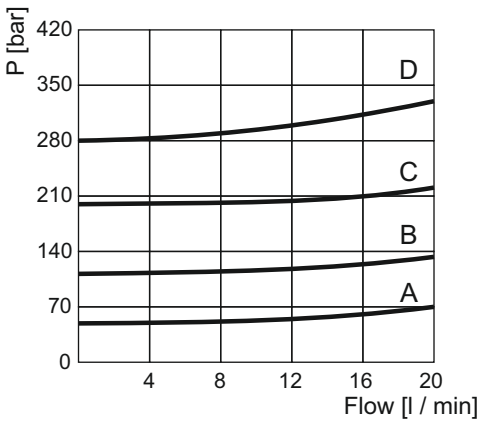
Mounting cavities

0	1			
2	**3**	4		
5		7	8	

Minimum setting pressure

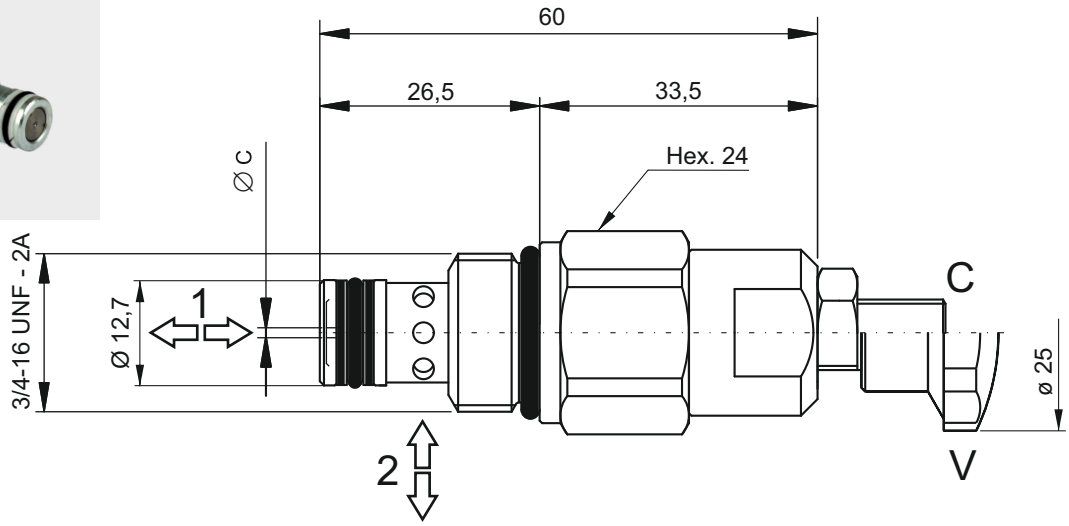


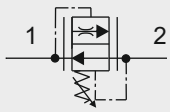
Pressure vs Flow



Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

VCF6 - PRESSURE COMPENSATED FLOW CONTROL VALVE





Main features

Max pressure	350 bar
Max flow	18 l/min
Weight	0,11 kg

Recommended tightening torque: 25 Nm
Recommended filtration: 15 ÷ 20 µm
Oil temperature: -20 ÷ + 80 °C

Spare part code

VCF6 — **Flow control valve pressure compensated**

***** — **Nominal dimension:** see below table

C — **Adjustment:** C = screw (std) V = handwheel

Assembly code

R *

Where * stands for nominal dimension

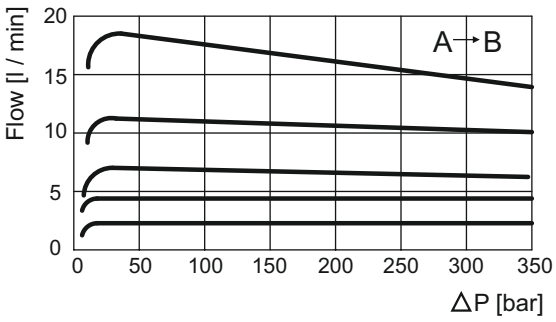
Mounting cavities

0	1		
2	**3**	4	
5		7	8

Available Range

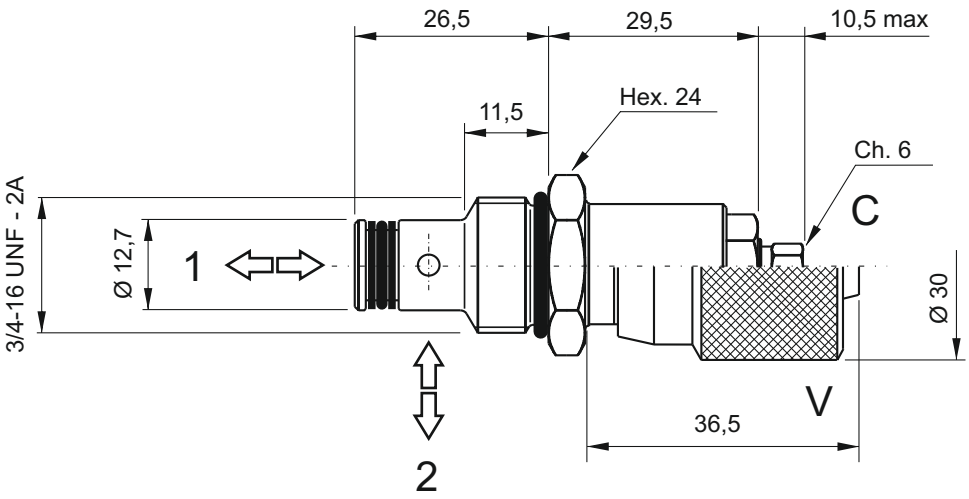
Nominal dimension	∅ C	Controlled flow at 100 bar ± 10% l/min
2	1	0,8 ÷ 3,0 l/min
3	1,3	1,3 ÷ 5,1 l/min
4	1,5	1,9 ÷ 6,8 l/min
5	1,7	2,6 ÷ 9,1 l/min
6	2,2	4,0 ÷ 14,4 l/min
7	2,8	7,2 ÷ 18,0 l/min

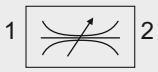
Pressure drop diagram



Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

CSB - BIDIRECTIONAL FLOW CONTROL VALVE





Main features

Max pressure	300 bar
Max flow	15 l/min
Weight	0,08 kg

Recommended tightening torque: 25 Nm
Recommended filtration: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

CSB — **Flow control valve**

04 — **Nominal size:**
04 = 3/4-16 UNF

C — **Adjustment:**
C = screw (std)
V = handwheel

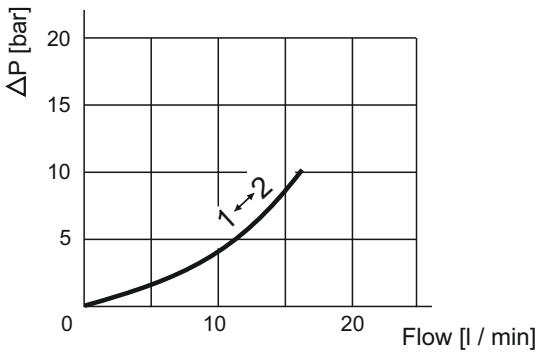
Assembly code

S

Mounting cavities

0	1			
2	**3**	4		
5		7	8	

Pressure drop diagram

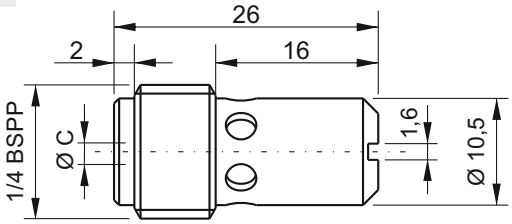


Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

VSC01 - PRESSURE COMPENSATED FIXED FLOW CONTROL VALVE

Controlled flow

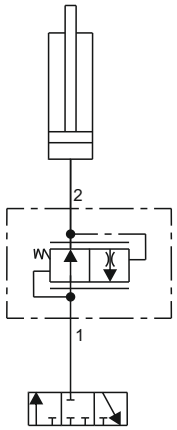
2 ⇨

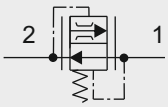


Reversible flow

⇦ 1

Typical application





Main features

Max pressure	300 bar
Max flow	22 l/min
Weight	0,012 kg

Recommended tightening torque: 15 Nm
Recommended filtration settings: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

VSC — **Flow control valve pressure compensated**

01 — **Nominal size:** 01

***** — **Controlled flow:** see below table

Assembly code

***(01)**

Where * stands for controlled flow [l/min]

Mounting cavities

0	1			
2	3	4		
5		7	**8**	

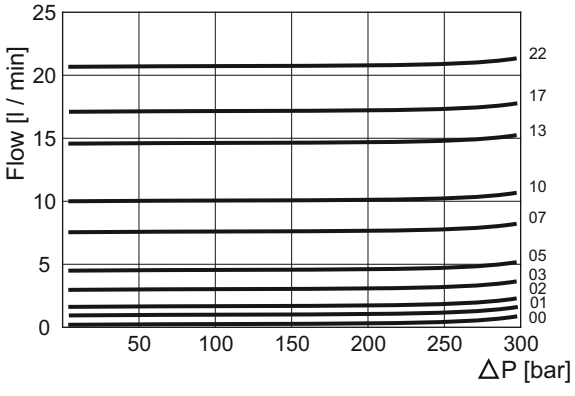
Note: cavity 5 is machined only on central manifold MB, cavity 8 is machined only on central manifolds MB and M4.

Controlled flow

Spare part code	Ø C [mm]	Portata [l/min]
VSC0100	0,8	1
VSC0101	1	1,5
VSC0102	1,25	2
VSC0103	1,5	3
VSC0105	1,75	5
VSC0107	2	7
VSC0110	2,5	10
VSC0113	2,75	13
VSC0117	3	17
VSC0122	3,5	22

Note: nominal controlled flows, measured at 100 bar with an oil viscosity of 46 cSt at 50 °C, are to be taken as general reference values and must be tested in the field.

Pressure drop diagram

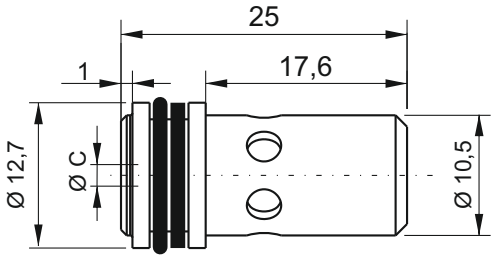


Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

VSC04 - PRESSURE COMPENSATED FIXED FLOW CONTROL VALVE

Controlled flow

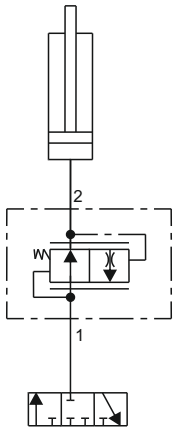
2 ⇨

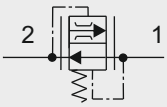


Reversible flow

⇦ 1

Typical application





Main features

Max pressure	300 bar
Max flow	22 l/min
Weight	0,012 kg

Mounting cavity dimension: 12,7 H8
Recommended filtration settings: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

VSC — **Flow control valve pressure compensated**

04 — **Nominal size:** 04

***** — **Controlled flow:** see below table

Assembly code

***(04)**

Where * stands for controlled flow [l/min]

Mounting cavities

0	1			
2	3	4		
5		**7**	8	

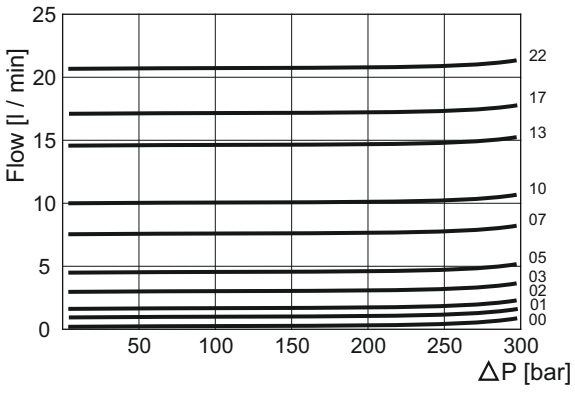
Note: cavity 7 is machined only on central manifold MB and MR.

Controlled flow

Spare part code	Ø C [mm]	Portata [l/min]
VSC0400	0,8	1
VSC0401	1	1,5
VSC0402	1,25	2
VSC0403	1,5	3
VSC0405	1,75	5
VSC0407	2	7
VSC0410	2,5	10
VSC0413	2,75	13
VSC0417	3	17
VSC0422	3,5	22

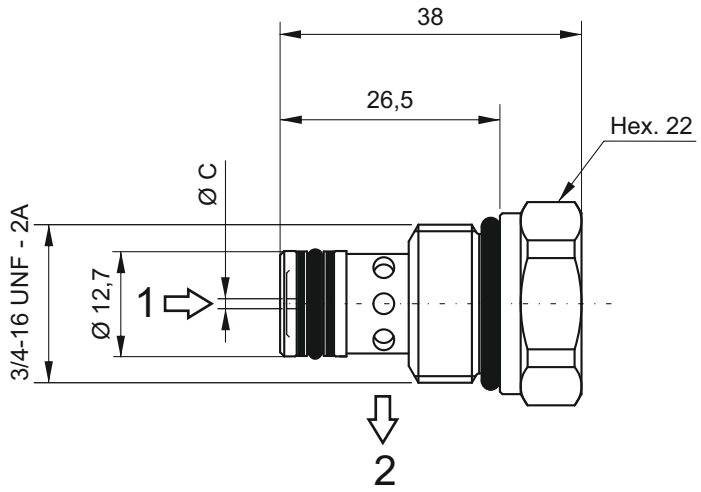
Note: nominal controlled flows, measured at 100 bar with an oil viscosity of 46 cSt at 50 °C, are to be taken as general reference values and must be tested in the field.

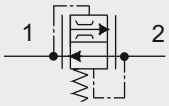
Pressure drop diagram



Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

VSC6 - PRESSURE COMPENSATED FIXED FLOW CONTROL VALVE





Main features

Max pressure	350 bar
Max flow	22 l/min
Weight	0,06 kg

Recommended tightening torque: 25 Nm
Recommended filtration: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

VSC — **Flow control valve pressure compensated**

6 — **Nominal size:** 6

***** — **Controlled flow:** see below table

Assembly code

F*

Where * stands for controlled flow [l/min]

Mounting cavities

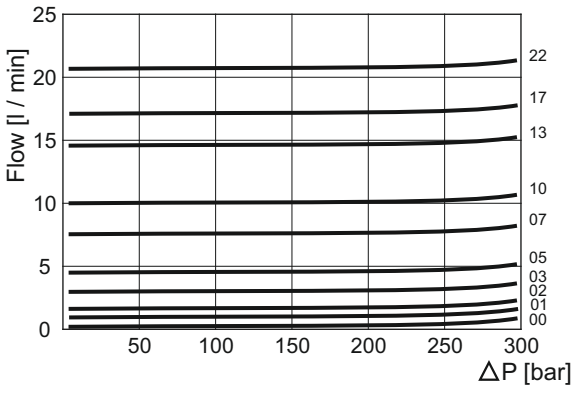
0	1		
2	**3**	4	
5		7	8

Controlled flow

Spare part code	Ø C [mm]	Portata [l/min]
VSC600	0,8	1
VSC601	1	1,5
VSC602	1,25	2
VSC603	1,5	3
VSC605	1,75	5
VSC607	2	7
VSC610	2,5	10
VSC613	2,75	13
VSC617	3	17
VSC622	3,5	22

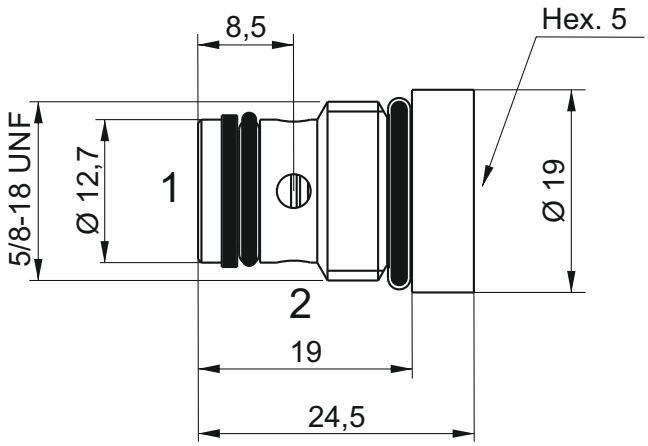
Note: nominal controlled flows, measured at 100 bar with an oil viscosity of 46 cSt at 50 °C, are to be taken as general reference values and must be tested in the field.

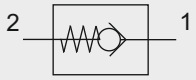
Pressure drop diagram



Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

VUC10 - BASIC CHECK VALVE





Main features

Max pressure	350 bar
Max flow	15 l/min
Weight	0,045 kg
Cracking pressure	1 bar

Recommended tightening torque: 25 Nm
Recommended filtration settings: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

VUC — **Check valve**

10 — **Nominal size:** 10

- — **Options:**
- = ball type
C = poppet type

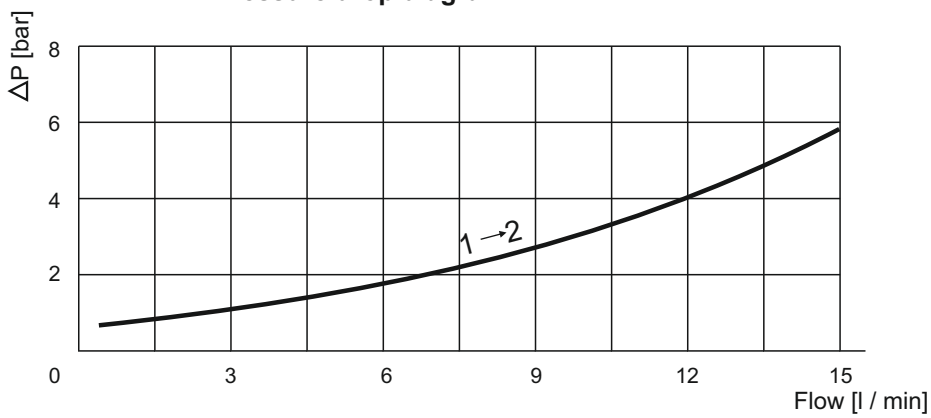
Assembly code

JM (VUC10)
JP (VUC10C)

Mounting cavities

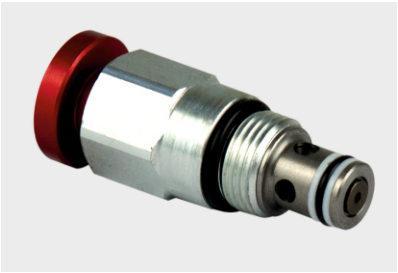
0	1		
2	**3**	4	
5		7	8

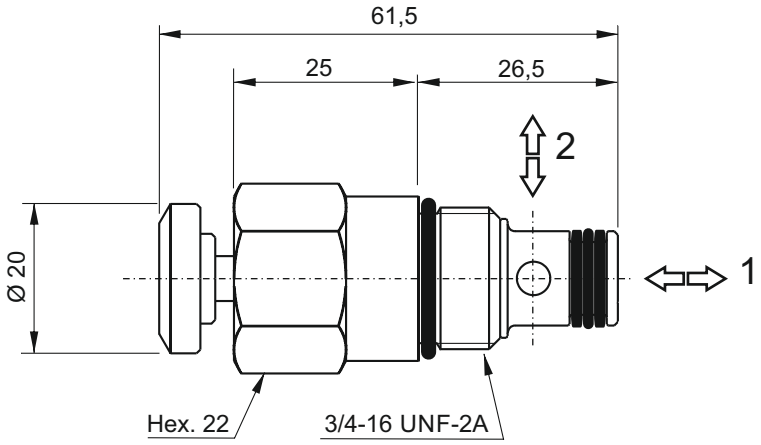
Pressure drop diagram

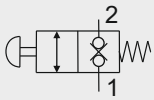


Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

CPE - MANUAL EMERGENCY VALVE







Main features

Max pressure	300 bar
Max flow	25 l/min
Weight	0,12 kg

Recommended tightening torque: 25 Nm
Recommended filtration: 25 ÷ 50 μ
Oil temperature: -30 ÷ + 80 °C

Spare part code

CPE — **Two-way manual emergency valve**

04 — **Nominal size:** 04 = 3/4-16 UNF

P — **Operating device:** P = press button

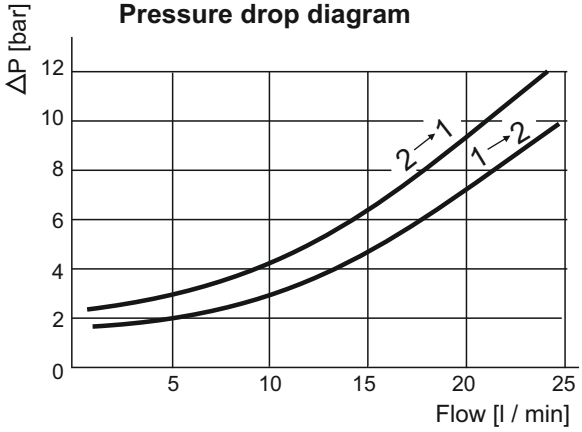
Assembly code

Z

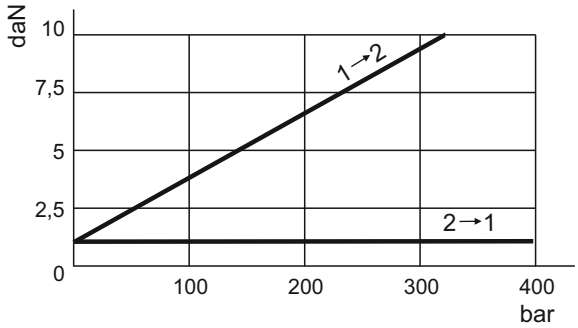
Mounting cavities

0	1		
2	**3**	4	
5		7	8

Pressure drop diagram

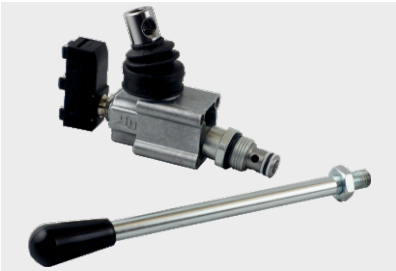


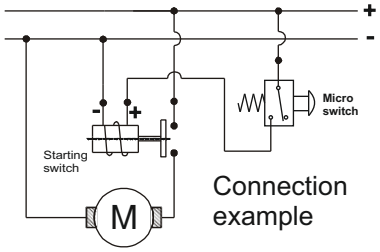
Operating force (daN) on the button



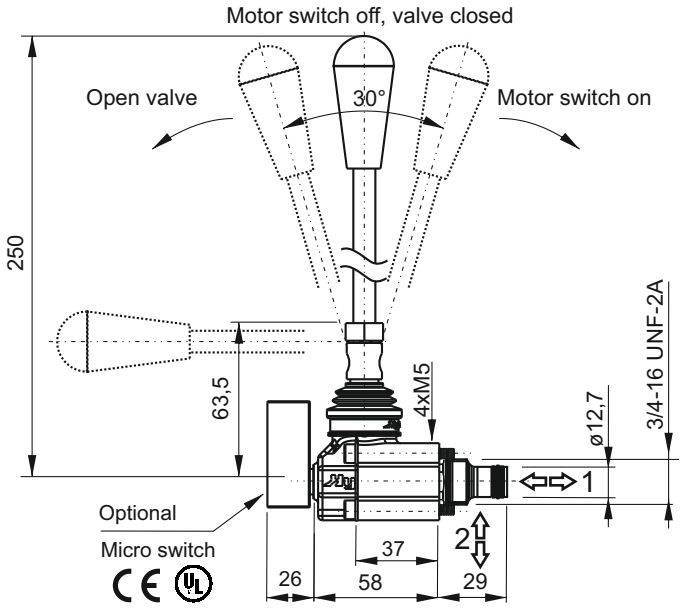
Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

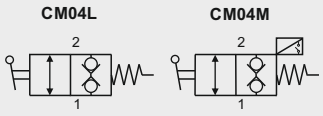
CM - MANUAL LEVER VALVE





Connection example





Main features

Max pressure	300 bar
Max flow	25 l/min
Weight	0,34 kg
Max current	10 A - 400 V
Protection	IP20 (up to IP65 on request)
Room temp.	-25°C ÷ +85°C (higher temperature on request)

Fixing bolts: 4 x M5x45 (torque 5Nm)
Cartridge tightening torque: 25Nm
Recommended filtration: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

CM — **Two-way manual lever valve**

04 — **Nominal size:** 04 = 3/4-16 UNF

L — **Type:** L = lever (std), M = lever+micro switch

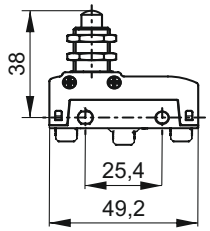
Assembly code

E (CM04L)
EM (CM04M)

Mounting cavities

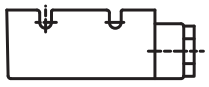
0	1		
2	3	4	
5		7	8

Micro switch option



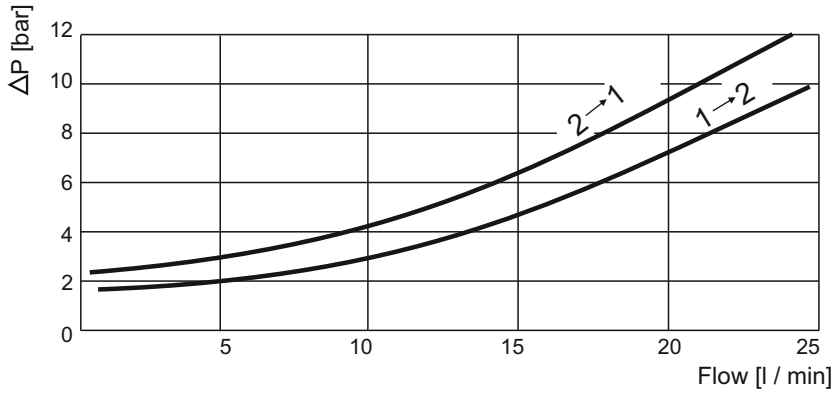
Spare part code
MCR1222

Plastic terminal cover protection



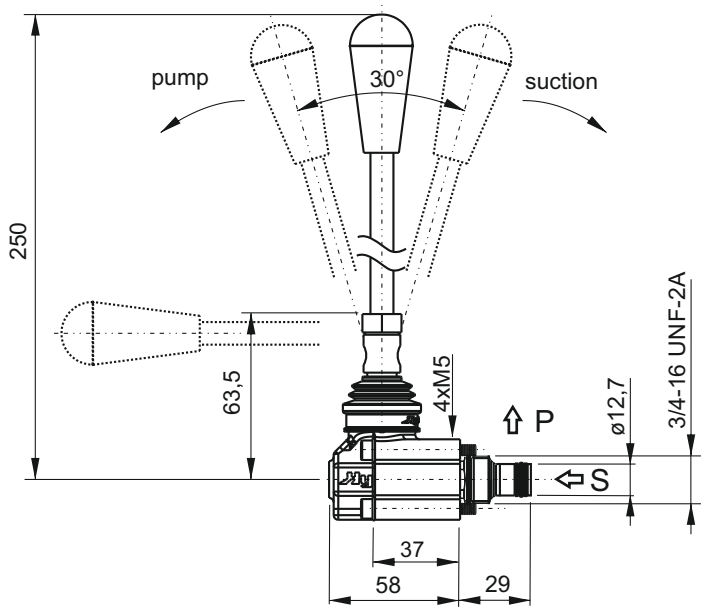
Spare part code
VFC02

Pressure drop diagram



Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

PMC - CARTRIDGE HAND PUMP



Main features

Max pressure	180 bar
Max flow	-
Weight	0,34 kg

Fixing bolts: 4x M5x45 (tightening torque: 5Nm)
Cartridge tightening torque: 25Nm
Recommended filtration: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

PMC — **Hand pump**

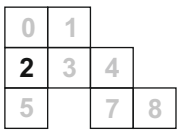
02 — **Nominal size:**
02 = 2 cc/stroke

L — **Type:**
L = lever (std)

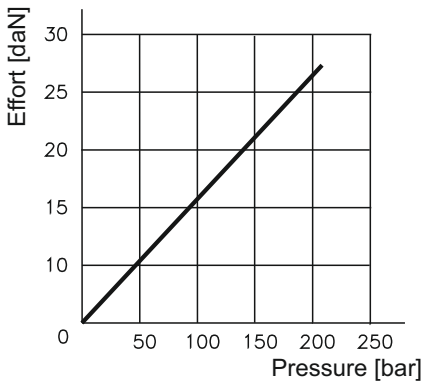
Assembly code

U

Mounting cavities



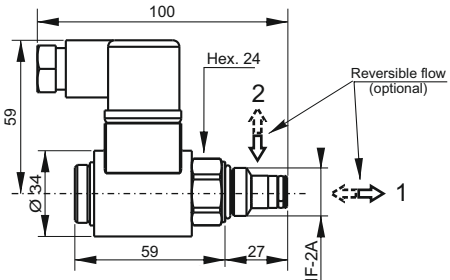
Effort (daN)
operating on the lever end



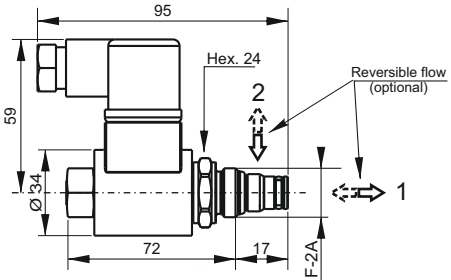
Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

MSV - PILOT OPERATED TWO-WAY SINGLE LOCKING SOLENOID VALVES

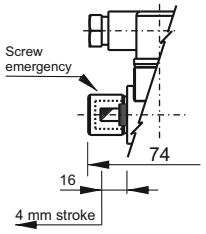
Normally closed

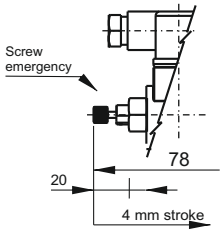


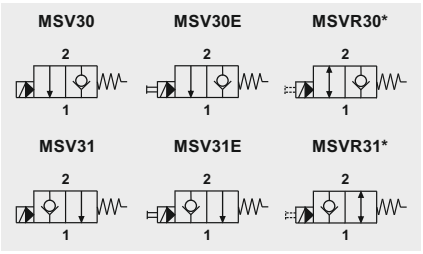
Normally open



Options







Main features

Max pressure	up to 350 bar
Max flow	up to 30 l/min
Weight	0,11 Kg (without coil)
Internal leakage	5 drops/min at 350bar
Response time	30ms (energizing) 50ms (de-energizing)
Available voltages	12VDC 24VDC 24VAC 110RAC 220RAC
Coils (see coils table)	M630 series M631 series
Standards	EN50081-1/EN50082-2 (89/336 CEE electromagnetic comp.) 73/23/CEE / 96/68/CEE (low voltage)

Recommended tightening torque: 25 Nm
Recommended filtration settings: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

MSV — **Pilot Operated 2-way Single Locking Valve**

- — **Options:**
R = with reversible flow

30 — **Operation:**
30 = normally closed
31 = normally open

0 — **Emergency override:**
0 = no emergency (std)
E = emergency

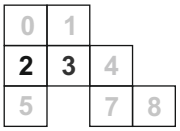
0000 — **Supply voltage:**
0000 = no coil (std)
see coils table

Assembly code

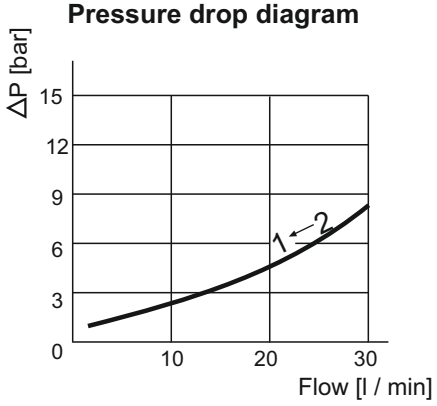
A (MSV30) **Voltage**
B (MSV30E) **Voltage**
Q (MSV31) **Voltage**
C (MSV31E) **Voltage**

Ex: A12DC

Mounting cavities

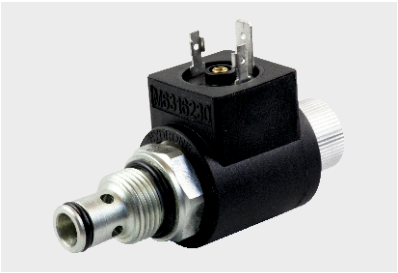


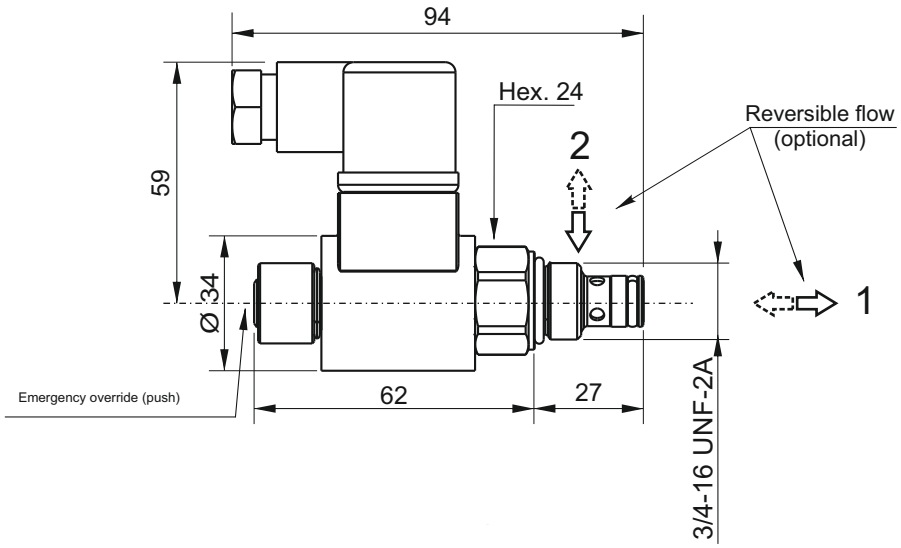
Pressure drop diagram

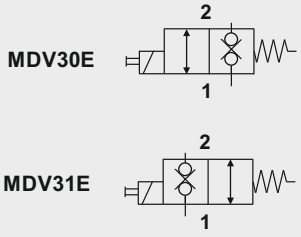


Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

MDV - DIRECT OPERATED TWO-WAY DOUBLE LOCKING SOLENOID VALVES







Main features

Max pressure	up to 250 bar
Max flow	up to 15 l/min
Weight	0,11 Kg (without coil)
Internal leakage	5 drops/min at 350bar
Response time	30ms (energizing) 50ms (de-energizing)
Available voltage	12VDC 24VDC 24VAC 110RAC 220RAC
Coils (see coils table)	M140 series
Normatives	EN50081-1/EN50082-2 (89/336 CEE electromagnetic comp.) 73/23/CEE / 96/68/CEE (low voltage)

Recommended tightening torque: 25 Nm
Recommended filtration: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

MDV — **Two-way double blocking solenoid valve**

30 — **Operation:**
30 = normally closed
31 = normally open

E — **Option:**
E = emergency (std)

0000 — **Supply voltage:**
0000 = no coil (std)
see coils table

Assembly code

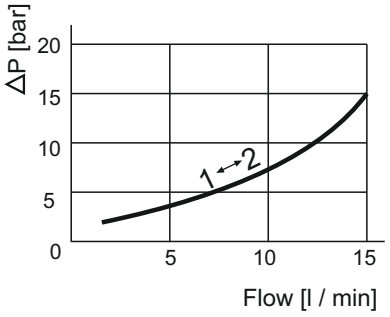
D (MDV30E) **Voltage**
M (MDV31E) **Voltage**

Ex: D12DC

Mounting cavities

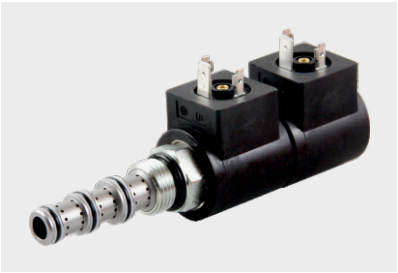
0	1		
2	**3**	**4**	
5		7	8

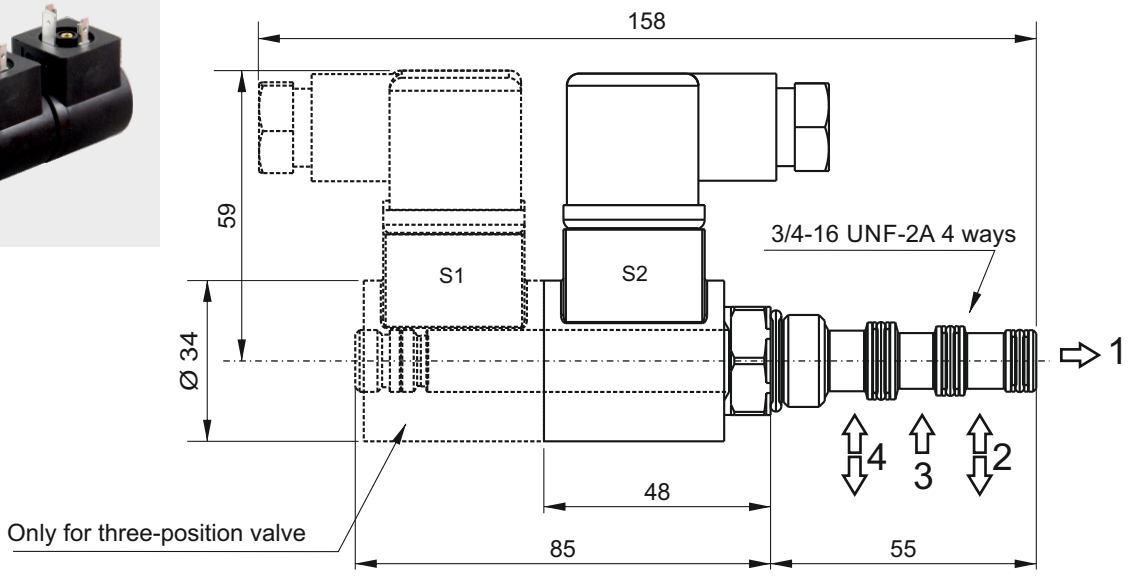
Pressure drop diagram



Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature

MSV4V - DIRECT OPERATED 4/3 OR 4/2 DIRECTIONAL SPOOL SOLENOID VALVES





Main features

Max pressure	210 bar
Max flow	11,5 l/min
Weight	0,37 Kg (1 solenoid) 0,64 Kg (2 solenoid)
Internal leakage	278 cc/min at 210 bar
Minimum pull-in voltage	85% of nominal
Available voltage	12VDC 24VDC 24VAC 110RAC 220RAC
Coils (see coils table)	M630 series M631 series
Normatives	EN50081-1/EN50082-2 (89/336 CEE electromagnetic comp.) 73/23/CEE / 96/68/CEE (low voltage)

Recommended tightening torque: 25 Nm
Recommended filtration: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

Spare part code

MSV4V — **4/3 or 4/2 directional spool solenoid valve**

A2 — **Spool configuration:** see below table

00 — **Option:** 00 = std

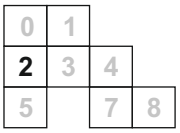
0000 — **Supply voltage:** 0000 = no coil (std) see coils table

Assembly code

4VA2 Voltage

Ex: 4VA2 24DC

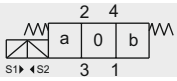
Mounting cavities



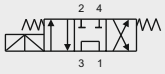
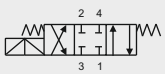
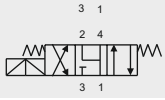
Note: MSV4V can be mounted on central manifold type M4 only.

Spools

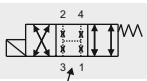
Code



Double solenoid

A2	
B2	
C2	
E2	

Single solenoid

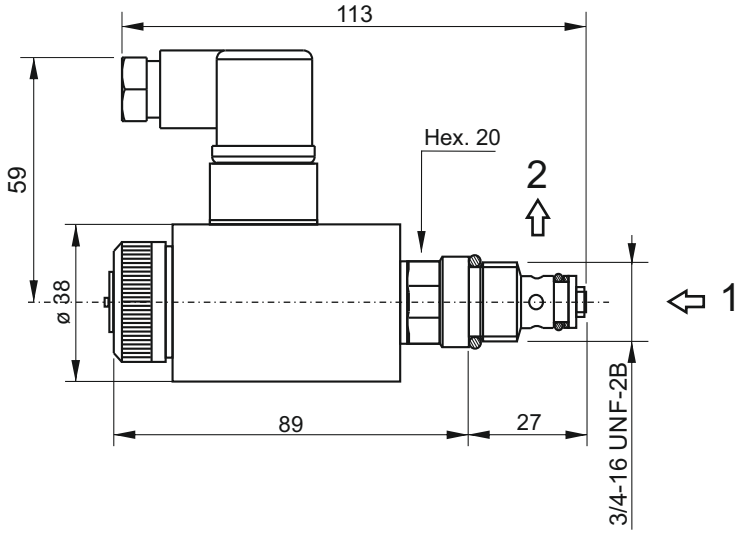
A11C	 transition

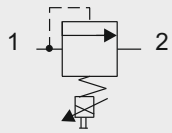
VMPC2 - PROPORTIONAL PRESSURE RELIEF VALVE

Coils

Supply Voltage	Coil code	Connector code
12DC	98001190	KA132000B1
24DC	98002190	KA132000B1

For the controller see the VPC table in D section





Main features

Max pressure	350 bar
Max flow	2l/min
Weight	0,46 Kg
PWM	120Hz
Hysteresis	5%
Duty cycle	ED 100%
Voltage	+/- 10% nominal voltage
Normatives	EN50081-1/EN50082-2(89/336 CEE electr. comp.) - 73/23/CEE / 96/68/CEE (low voltage)

Spare part code

VMPC — **Direct acting proportional relief valve**

2 — **Nominal size:**
2 = 2 l/min

C — **Working range:**
A = 10 ÷ 80 bar
C = 40 ÷ 250 bar

E — **Options:**
E = emergency (std)

0000 — **Supply voltage:**
- 0000 = no coil
- 12DC
- 24DC
see coils table

Assembly code

P* Voltage**

where *** stands for max setting pressure [bar]. eg. P25012DC

Mounting cavities

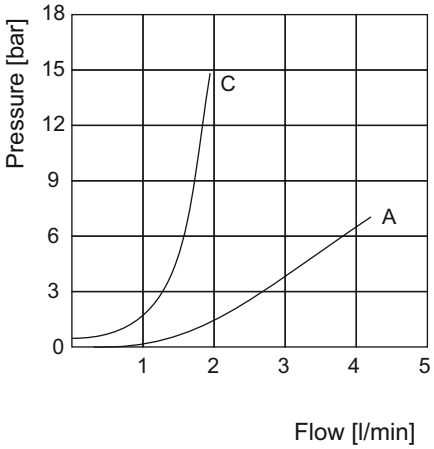
0	1	
2	**3**	4
5		7 8

Recommended tightening torque: 25Nm
Recommended filtration: 25 ÷ 50 µ
Oil temperature: -30 ÷ + 80 °C

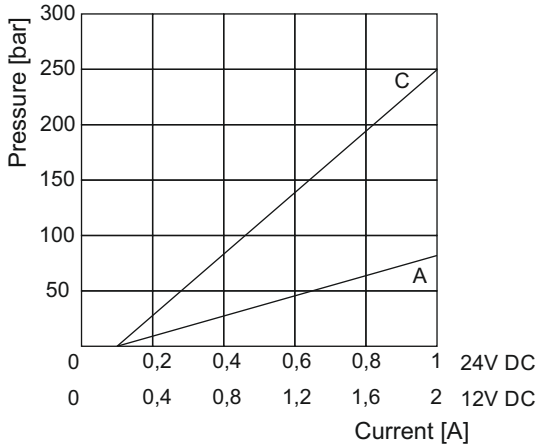
For the controller see table D170

Note: Supplying current to the coil from 0 to I max (see diagram), a proportional pressure variation is obtained on port P.

Pressure drop diagram



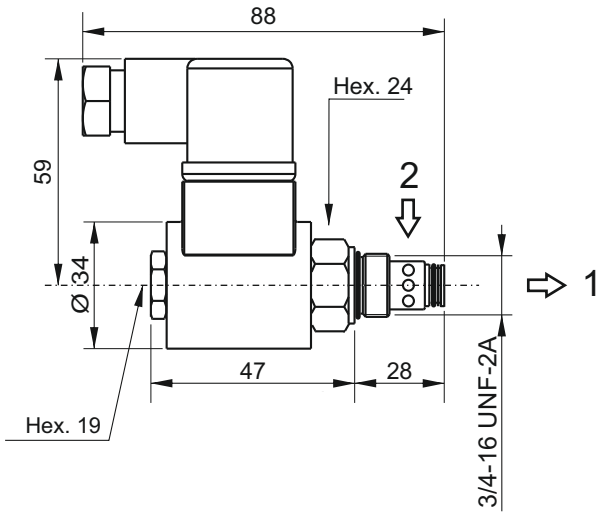
Pressure vs current



Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C. Pressure drop may change depending on fluid viscosity and temperature.

CSPC15 - PROPORTIONAL FLOW CONTROL VALVE

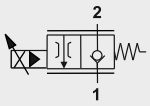
CE



Coils

Supply voltage	Coil code	Connector code
12DC	M6306012	KA132000B1
24DC	M6306024	KA132000B1

For the controller see the VPC table in D section



Main features

Max press.	210 bar
Max flow	22 l/min
Weight	0,1 Kg (without coil)
PWM	120Hz
Hysteresis	5% (10% above 85% Imax)
Duty cycle	ED 100%
Voltage	+/- 10% nominal voltage
Normatives	EN50081-1/EN50082-2 (89/336 CEE) 73/23/CEE / 96/68/CEE
Oil temperature	-40 - +120°C
Filtration	10 ÷ 25 µ
Tightening torque	30Nm

Spare part code

CSPC — **Proportional flow control valve**

15 — **Nominal size:** 15 = 15 l/min

0 — **Option:** 0 = no option

0000 — **Supply voltage:**
- 0000 = no coil (std)
- 12DC
- 24DC

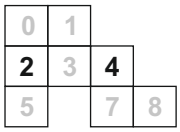
see coils table

Assembly code

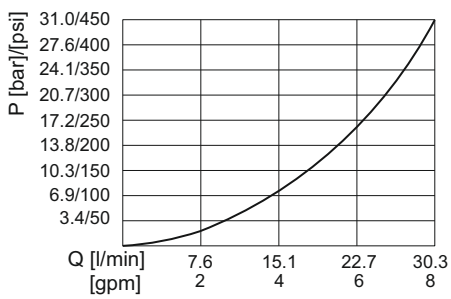
T* Voltage**

eg: T12DC

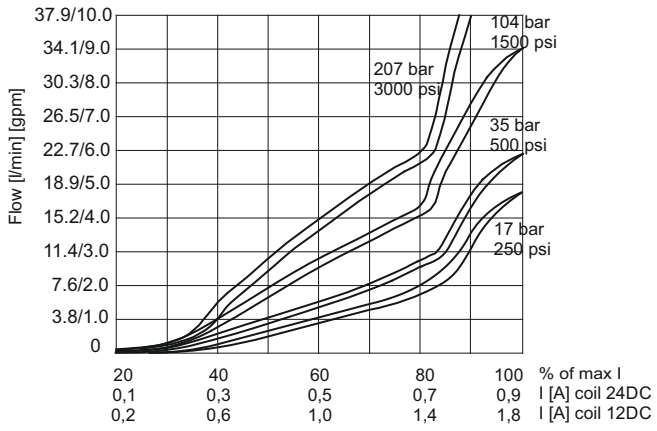
Mounting cavities



Pressure Drop 2 > 1 with fully open valve

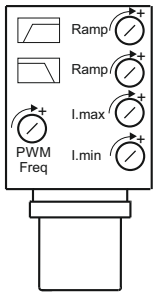


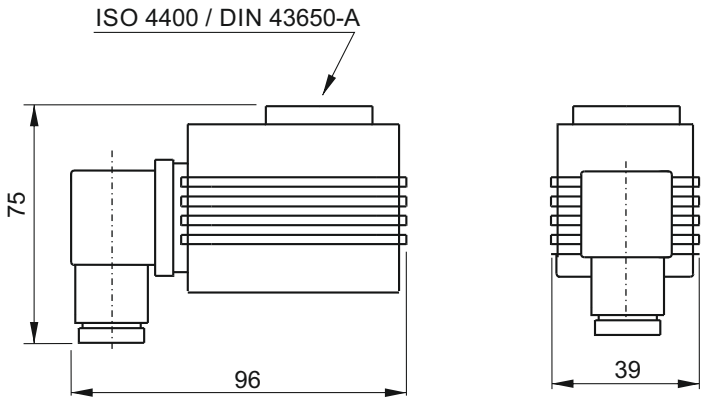
Flow vs current at different pressure drops



Note: Values measured on valve alone (no cavity) with an oil viscosity of 46 cSt at 50 °C.
Pressure drop may change depending on fluid viscosity and temperature.

VPC - ELECTRONIC AMPLIFIER FOR PROPORTIONAL SOLENOID VALVES





Main features

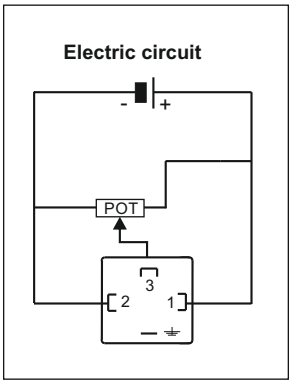
Supply voltage	12 / 24V DC
Voltage input signal range	0 ~ 10 V
Max current range	2,5A
PWM (optionally adjustable)	120 Hz (50 ÷ 400 Hz)
Ramp adjustment (independent)	5%
Input impedance	100 kohm
Voltage	+/- 10% nominal voltage
Weight	0,11 kg
Normatives	EN50081-1/EN50082-2 (89/336 CEE electromagnetic comp.) 73/23/CEE / 96/68/CEE (low voltage)

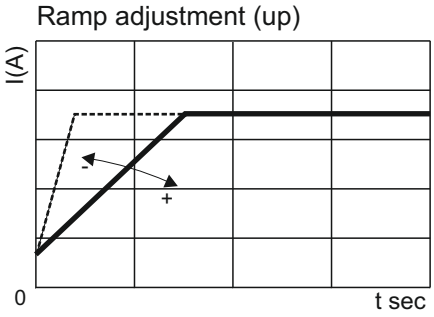
Spare part code

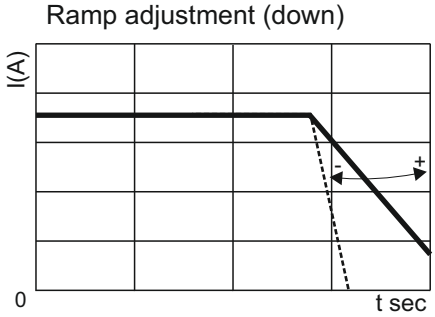
VPC — **Electronic amplifier for solenoid valves**

00 — **Options**

Suitable for:
- CSPC15**** proportional flow control valve
- VMPC2**** proportional pressure relief valve
- other proportional valves



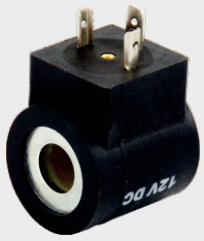




Instruction for use:

1) turn the “I MIN” trimmer fully counterclockwise;
2) adjust the external voltage input signal to the desired initial regulating (flow or pressure) value;
3) turn “I MIN” trimmer in a clockwise direction until valve just starts regulating;
4) adjust the external voltage input signal to the max value and adjust “I MAX” trimmer until the valve regulates the maximum flow or pressure on the hydraulic system.

COILS FOR SOLENOID VALVES



M630* / M631*

9800*

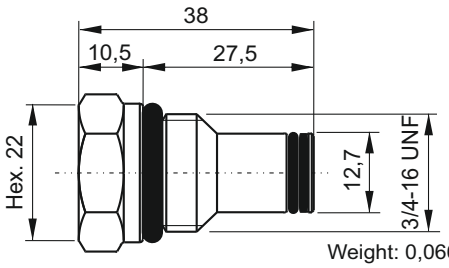
M140

M630DT*

Supply voltage [V]	Assembly code	Coil type	Spare part code	Spare connector code	Holding Power [W]	Duty charge ED [%]	Prot. class	Wt [g]	Suitable for valves
12DC	12DC_M630	DC	**M6306012**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV30 MSV4V CSPC15
24DC	24DC_M630	DC	**M6306024**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV30 MSV4V CSPC15
48DC	48DC_M630	DC	**M6306048**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV3V MSV30/31 SD02
24AC	24AC_M631	RC with integrated rectifying bridge	**M6316024**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV30 MSV4V
115AC	115AC_M631	RC with integrated rectifying bridge	**M6316115**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV30 MSV4V
230AC	230AC_M631	RC with integrated rectifying bridge	**M6316230**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV30 MSV4V
12DC	12DC_M630DT	DC, Deutsch	**M6306012DT**	DT06-4S Deutsch	16W	100	H	117	MSV30 SD00
24DC	24DC_M630DT	DC, Deutsch	**M6306024DT**	DT06-4S Deutsch	16W	100	H	117	MSV30 SD00
12DC	Embedded in the VMPC2 proportional valve code	DC	**98001190**	KA132000B1 DIN43650/ISO4400	36W	100	H	257	VMPC2
24DC	Embedded in the VMPC2 proportional valve code	DC	**98002190**	KA132000B1 DIN43650/ISO4400	36W	100	H	247	VMPC2
12DC	12DC_M140	DC	**M14040001**	KA132000B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
24DC	24DC_M140	DC	**M14040002**	KA132000B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
48DC	48DC_M140	DC	**M14040003**	KA132000B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
24AC	24RAC_M140	RC - needs external rectifying connector	**M14040002**	KA132R11B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
115AC	110RAC_M140	RC - needs external rectifying connector	**M14040004**	KA132R12B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
230AC	220RAC_M140	RC - needs external rectifying connector	**M14040005**	KA132R13B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31

Other voltages and electric connector types (Amp Junior, flying leads,...) available on request.
Inrush power consumption can be up to 3,5 times higher than holding power.
Coil thermal insulation: Class H. Electric connection: DIN 43650-A / ISO 4400. Coil protection degree: IP65
The tests were carried out at the nominal current ± 5%, at an environmental temperature of 25°C.

PLUGS



Weight: 0,066 Kg

Hydraulic symbol

Spare part code

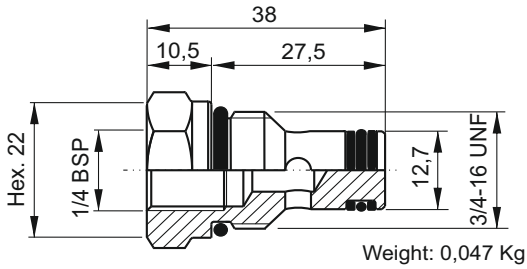
E70100005

PPM assembly code

G

Mounting cavities

0	1			
2	**3**	4		
5		7	8	



Weight: 0,047 Kg

Hydraulic symbol

Spare part code

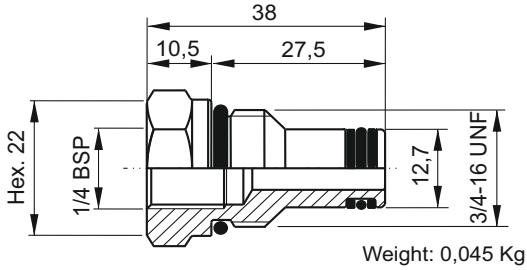
E70100003

PPM assembly code

H

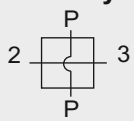
Mounting cavities

0	1			
2	**3**	4		
5		7	8	



Weight: 0,045 Kg

Hydraulic symbol



Spare part code

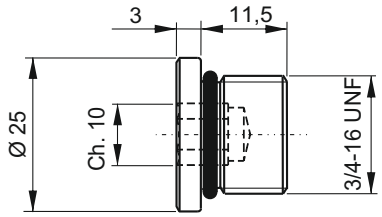
E70100006

PPM assembly code

P

Mounting cavities

0	1			
2	**3**	4		
5		7	8	



Weight: 0,027 Kg

Hydraulic symbol

Spare part code

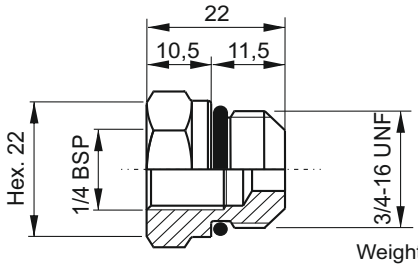
E70100004

PPM assembly code

L

Mounting cavities

0	1			
2	**3**	4		
5		7	8	



Weight: 0,042 Kg

Hydraulic symbol

Spare part code

E70100002

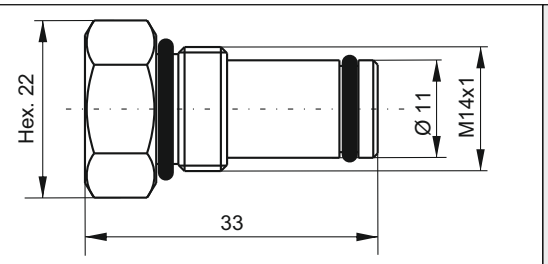
PPM assembly code

N

Mounting cavities

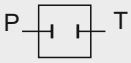
0	1			
2	**3**	4		
5		7	8	

PLUGS



Weight: 0,110 Kg

Hydraulic symbol



Spare part code

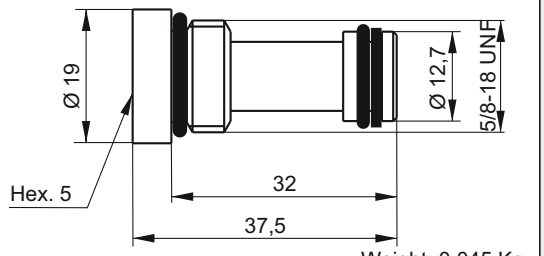
N70200010

PPM assembly code

XM

Mounting cavities

0	**1**		
2	3	**4**	
5		7	8



Weight: 0,045 Kg

Hydraulic symbol

Spare part code

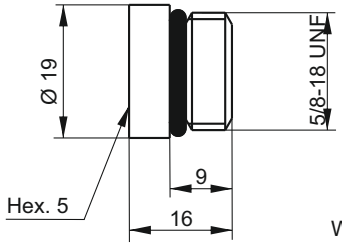
N70200007

PPM assembly code

MG

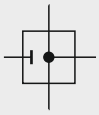
Mounting cavities

0	1		
2	**3**	4	
5		7	8



Weight: 0,027 Kg

Hydraulic symbol



Spare part code

N70200008

PPM assembly code

ML

Mounting cavities

0	1		
2	**3**	4	
5		7	8

Note: cavities 2 and 3 are machined SAE08 (3/4-16UNF) in central manifold MB and 5/8-18UNF in central manifold MR.
Cavity 2 is machined SAE08-4way in central manifold M4.
Cavity 4 is machined only in reversible central manifold MR.

NOTES

TANKS

Round steel tanks from **0,7** to **2,4 l**, for horizontal and vertical mounting

Square plastic tanks, from **1** to **3,5 l**, for horizontal and vertical mounting. Thanks to the special shape can be screwed to the body with automatic screw driver

Round plastic tanks from **0,4** to **1,2 l**, for horizontal and vertical mounting

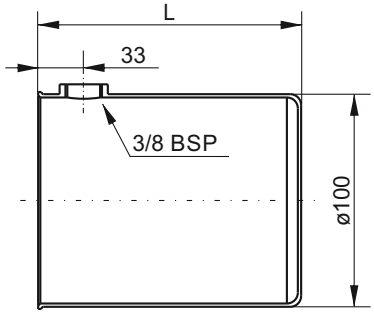
Better plastic or steel tanks?
Plastic tanks have several advantanges. Among them: they do not corrode, the oil level is visible, they do not damage if they get bumped,... On the other hand steel tanks are to be preferred in case of ultra high or ultra low temperatures or when exposed to direct sunlight.

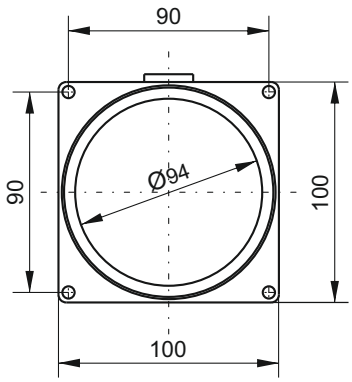
Is it possible to design and make custom made tanks?
Yes. We can provide an adaptor flange (F80000012) which can welded on custom made steel tanks, by the customer.

How do I order spare tanks?
Tanks can be ordered without accessories just by adding a J in front of the relevant code (ex. JE50404006 instead of E50404006). When ordered with the normal code (ex. E50404006) all relevant accessories are included (plugs, filler breather, fixing devices,... depending on the kind of tank).
Tanks specified in assembly code (ex. 2,4HV) always include all relevant accessories.

ROUND STEEL TANKS F & H SERIES

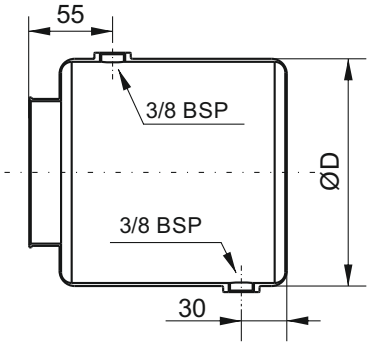
Recommended tightening torque for 3/8" BSPP: 10 Nm

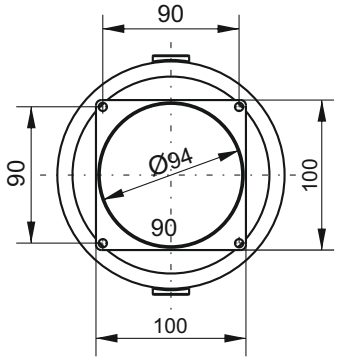




Description	Spare part code	Assembly code	L (mm)	Weight	Actual filling volume (lt)	
					Horizontal	Vertical
0,7 l cylindrical horizontal / vertical mounting	**E50403001**	**0,7F / 0,7FV**	120	0,26 Kg	0,75	0,52
1,2 l cylindrical horizontal / vertical mounting	**E50403002**	**1,2F / 1,2FV**	186	0,38 Kg	1,1	0,9

Recommended tightening torque for 3/8" BSPP: 10 Nm



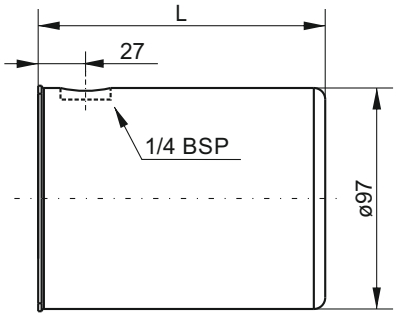


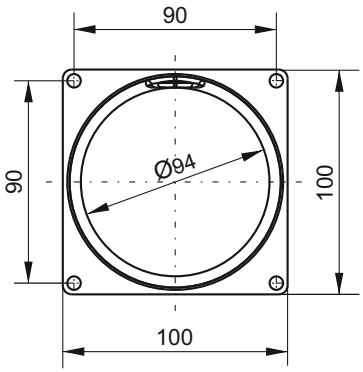
Description	Spare part code	Assembly code	L (mm)	ØD (mm)	Weight	Actual filling volume (lt)	
						Horizon.	Vert.
1,7 l cylindrical horizontal / vertical mounting	**E50404004**	**1,7H / 1,7HV**	170	120	0,64 Kg	1,5	1,2
2,4 l cylindrical horizontal / vertical mounting	**E50404006**	**2,4H / 2,4HV**	170	150	0,8 Kg	2,4	1,8

Material	Fe P04-EN10130 steel sheet 1,5 mm thickness
Fluid	Mineral based oil ISO/DIN 6743/4
Working temperature	-15 / +70°C

Note: the piping kit, standard suction filter, filler/breather and discharge plug are included when specifying the tank in PPM assembly code
When ordering spare parts, only the discharge plug and filler/breather are included

ROUND PLASTIC TANKS R SERIES



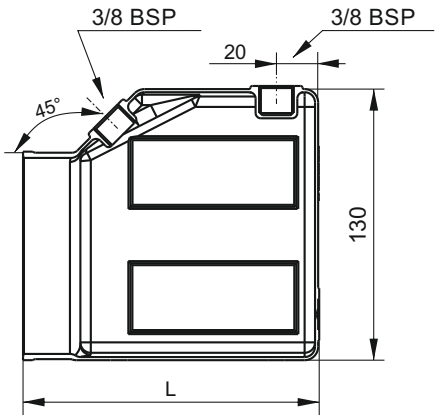


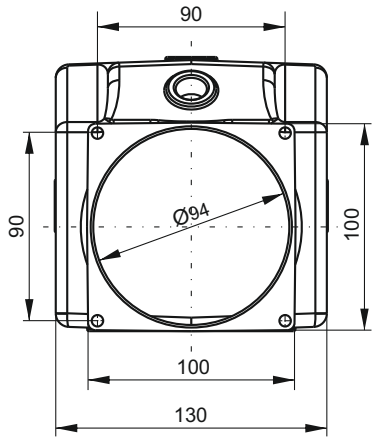
Description	Spare part code	Assembly code	L (mm)	Weight	Actual filling volume (lt)	
					Horizontal	Vertical
0,4 l round horizontal / vertical mounting	**H50403001**	**0,4R / 0,4RV**	90	0,07 Kg	0,45	0,35
0,7 l round horizontal / vertical mounting	**H50403002**	**0,7R / 0,7RV**	124	0,09 Kg	0,75	0,62
1,2 l round horizontal / vertical mounting	**H50403003**	**1,2R / 1,2RV**	186	0,14 Kg	1,17	1,05

Material	PE-HD neutral / transparent color (DO NOT EXPOSE TO DIRECT SUNLIGHT)
Fluid	Mineral based oil ISO/DIN 6743/4
Working temperature	-15 / +70°C

Note: the piping kit, standard suction filter, filler/breather and discharge plug are included when specifying the tank in PPM assembly code
When ordering spare parts, only the discharge plug and filler/breather are included

SQUARE PLASTIC TANKS T SERIES





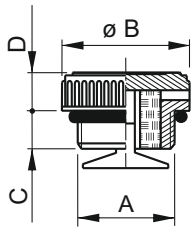
Description	Spare part code	Assembly code	L (mm)	Weight	Actual filling volume (lt)	
					Horizontal	Vertical
1 l square horizontal / vertical mounting	**H50403005**	**1T / 1TV**	125	0,23 Kg	1,0	0,8
1,5 l square horizontal / vertical mounting	**H50403007**	**1,5T / 1,5TV**	150	0,24 Kg	1,4	1,2
2 l square horizontal / vertical mounting	**H50403009**	**2T / 2TV**	211	0,34 Kg	2,2	2,0
2,7 l square horizontal / vertical mounting	**H50403011**	**2,7T / 2,7TV**	261	0,40 Kg	2,7	2,7
3,5 l square horizontal / vertical mounting	**H50403013**	**3,5T / 3,5TV**	326	0,49 Kg	3,7	3,9

Material	PE-HD neutral / transparent color (DO NOT EXPOSE TO DIRECT SUNLIGHT)
Fluid	Mineral based oil ISO/DIN 6743/4
Working temperature	-15 / +70°C

Note: the piping kit, standard suction filter, filler/breather and discharge plug are included when specifying the tank in PPM assembly code
When ordering spare parts, only the discharge plug and filler/breather are included

TANK ACCESSORIES

Knurled filler breather with vane 1/4" - 3/8" BSP



	1/4"	3/8"
A	1/4"	3/8"
B	21,5	21,5
C	11	13
D	16	16

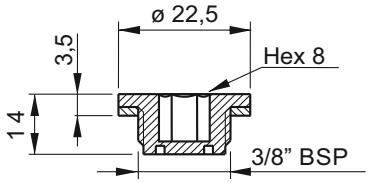
Weight: 0,01 Kg

Suitable for R type tanks (1/4" BSPP)
Suitable for F/H/T type tanks (3/8" BSPP)

Spare part code

C75100001 (1/4 BSPP)
C75100002 (3/8 BSPP)

Drain plug



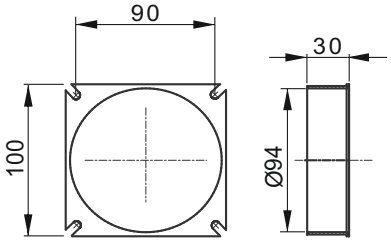
Weight: 0,01 Kg

Suitable for F/H/T type tanks

Spare part code

TCNB0702

Bare steel tank adapter



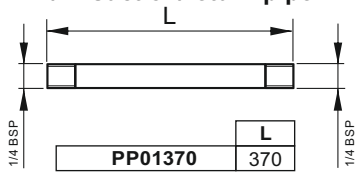
Unpainted, to be welded on custom made tanks

Weight: 0,12 Kg

Spare part code

F80000012

1/4" suction/return pipe



	L
PP01370	370

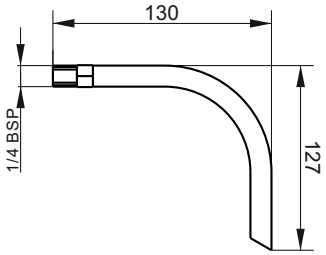
Recommended as suction pipe for PMC02 hand pumps and as return pipe with C3420001 return filter.

Weight: 0,04 Kg

Spare part code

PP01370

90° Plastic pipe for return line

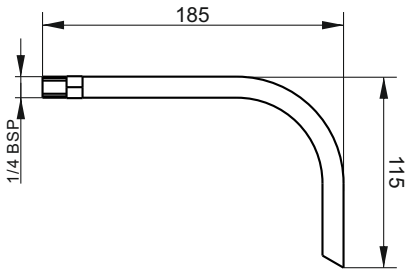


Weight: 0,02 Kg

Spare part code

PP01E130127

90° Plastic pipe for return line



Weight: 0,02 Kg

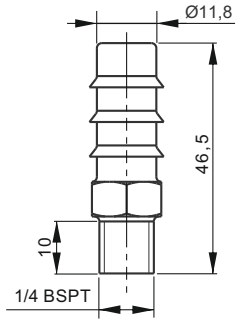
Spare part code

PP01E185115

Notes: Max torque for plastic pipe 5 Nm

TANK ACCESSORIES

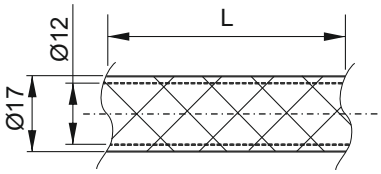
Flexible plastic pipe holder for return line 1/4" BSPT



Weight: 0,01 Kg

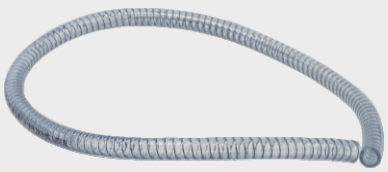
Spare part code
TR0112

Flexible plastic pipe



Recommended as standard return pipe. To be fixed with TR01-12 and cut to correct length. To be ordered in meters.

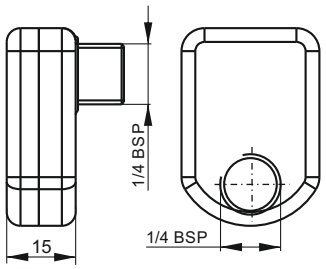
Weight: 0,18 Kg/meter



Spare part code
SF12

Micro inlet filter

Filtration degree: 90 micron

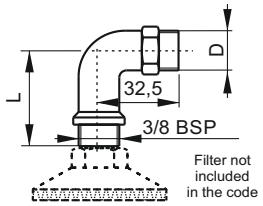


Recommended for pumps gr. 0

Weight: 0,01 Kg

Spare part code
C34100100

90° elbow for suction pipe M 1/4" & 3/8" BSPT - M 3/8" BSP



	L	D
PP01E40	40	1/4 BSPT
PP01E77	77	1/4 BSPT
PP02E40	40	3/8 BSPT
PP02E77	77	3/8 BSPT

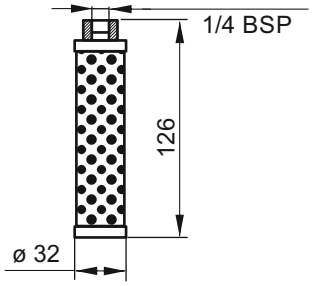
Recommended for horizontal tanks

Weight: 0,01 Kg

Spare part code
PP0*E**

In-tank return filter

Filtration degree: 90 micron



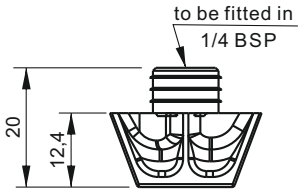
Suitable for all tanks over 3l

Weight: 0,09 Kg

Spare part code
C34200001

Relief valve diffuser

To be mounted in cavity Tr



It reduces foam and noise when relief valve is working Recommended for all vertical mounted tanks.

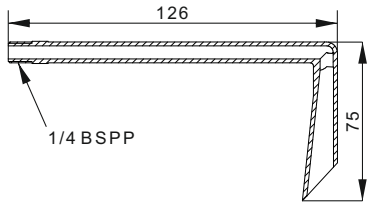
Weight: 0,01 Kg

Spare part code
SFEP01D

Notes: Max torque for plastic pipe 5 Nm

TANK ACCESSORIES

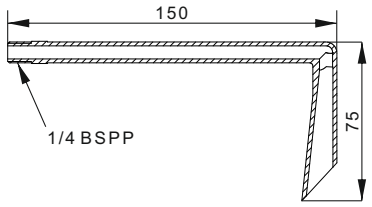
Plastic pipe 90 degrees elbow 1/4 BSPP



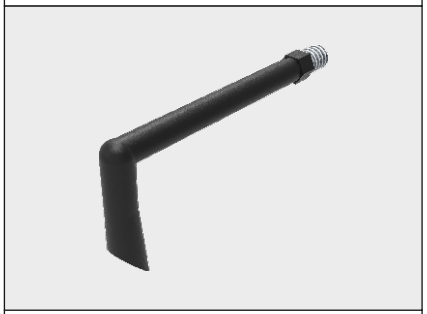
Weight: 0,02 Kg

Spare part code
TADPH00001

Plastic pipe 90 degrees elbow 1/4 BSPP

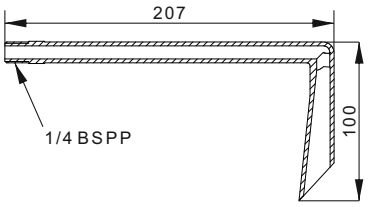


Weight: 0,02 Kg



Spare part code
TADPH00002

Plastic pipe 90 degrees elbow 1/4 BSPP



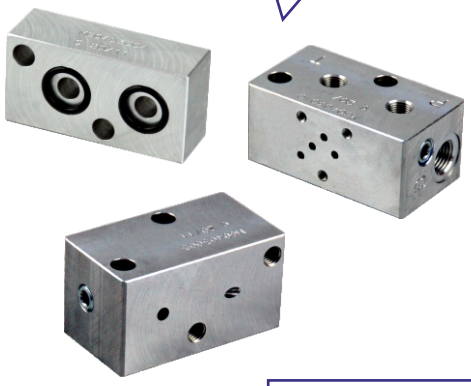
Weight: 0,03 Kg

Spare part code
TADPH00003

NOTES

EXTERNAL MANIFOLDS & ACCESSORIES

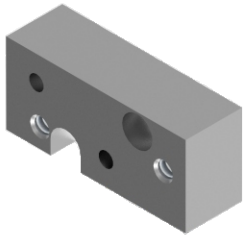
Basic blocks for **NG3** modular valves **MICRO**, with parallel connection and side ports. They can be stacked modularly. Use simple 1/8 BSPP plugs to close the end P and T ports



Pilot operated check valves integrated into the NG3 MICRO modular block, eliminating the check valve module sandwiched between the base block and the directional valve

The **external hand pump** 4 or 8,8cc/stroke can be fitted between the central body and the NG3 MICRO modular blocks. The lever can be rotated 360 degrees to be placed in the most appropriate position

Adaptor manifold PPM to PPC. It's used to convert PPM interface to PPC one in order to mount PPC full range manifold blocks.



A full set of **accessories** is available to complete the power pack configuration

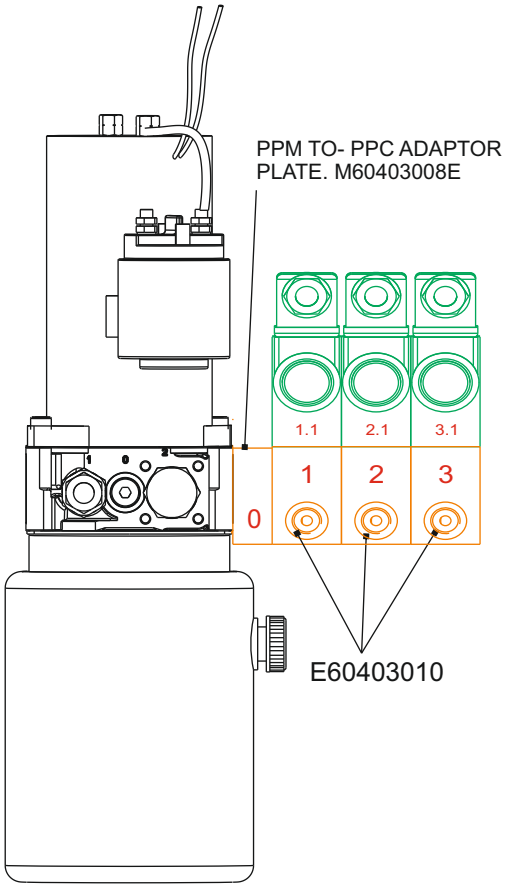
The PPM adaptor block for **stackable valves** SD01 and SD02 allows you to mount the range of SD02 valves, a modular alternative to the NG3 MICRO directional valves

Which types of external manifold blocks can be mounted?
The central manifold exit face allows the mounting of manifold blocks fixed by 2x M8 bolts.
The first choice of external blocks is the NG3 MICRO system. Lateral exit ports base manifolds, spacer and 90° adaptor are available to modify dimensions and mounting positions for high flexibility.
To mount stackable directional valves the relevant adaptor plate PPM to SD02 (N50403007DN) is required. See section G technical tables for the relevant valve details.
To mount any block of the PPC manifolds range, adaptor M60403008E is required.

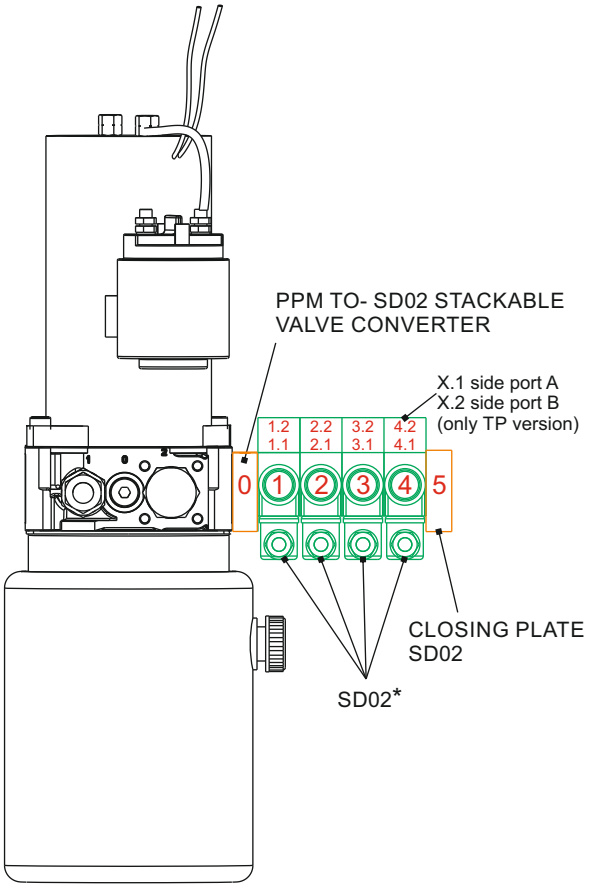
When do I need to mount the spacer block?
Whenever a large motor is mounted on the power pack, to avoid interference between the motor and external blocks and valves.
Normally M60403004 spacer must be mounted below the stack of NG3 MICRO manifolds whenever using any AC motor and with DC motors with frame 114.

EXTERNAL MANIFOLDS & VALVE MOUNTING EXAMPLES

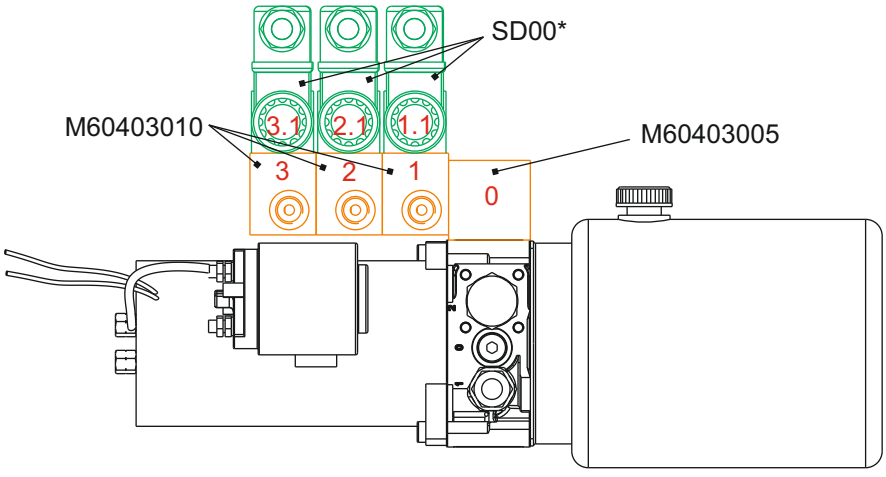
PPM + PPC MODULAR BLOCKS



PPM + SD02 STACKABLE VALVES



PPM + NG3 MICRO BLOCKS & VALVES



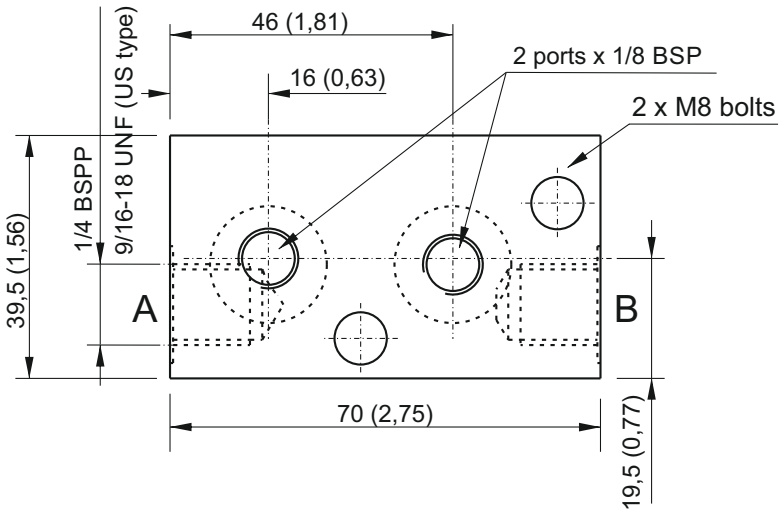
The micro powerpack external manifolds and valves are arranged following a stack level logic. Each stack is numbered as n, n.1, n.2, n.3,... where **n** is the basic manifold stack number, n.1 is the first valve mounted on top of manifold n, n.2 is the second one, mounted on top of n.1 one,...
See above self-explanatory drawings where manifolds are coloured in orange and valves in green. Stack levels are numbered in red.

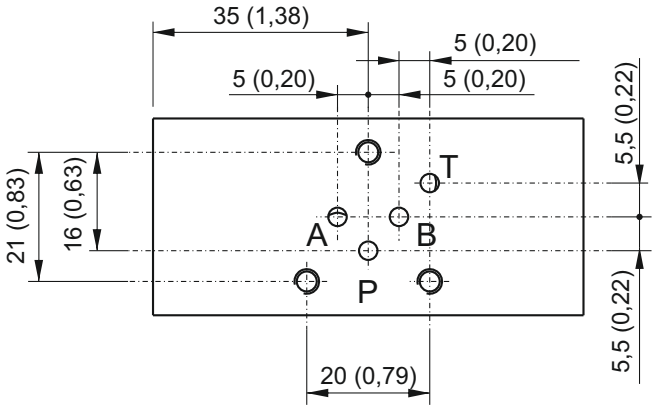
NG3 MICRO MODULAR MANIFOLDS, LATERAL PORTS

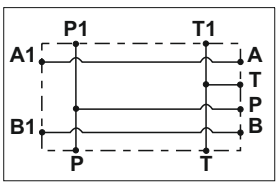
Dimensions in mm (inches)

Main features

Max pressure	350 bar
Weight	0,21 Kg (0,46lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above







Parallel connection	Spare part code
Lateral ports	**M60403010**
Lateral ports US execution	**M60403010US**

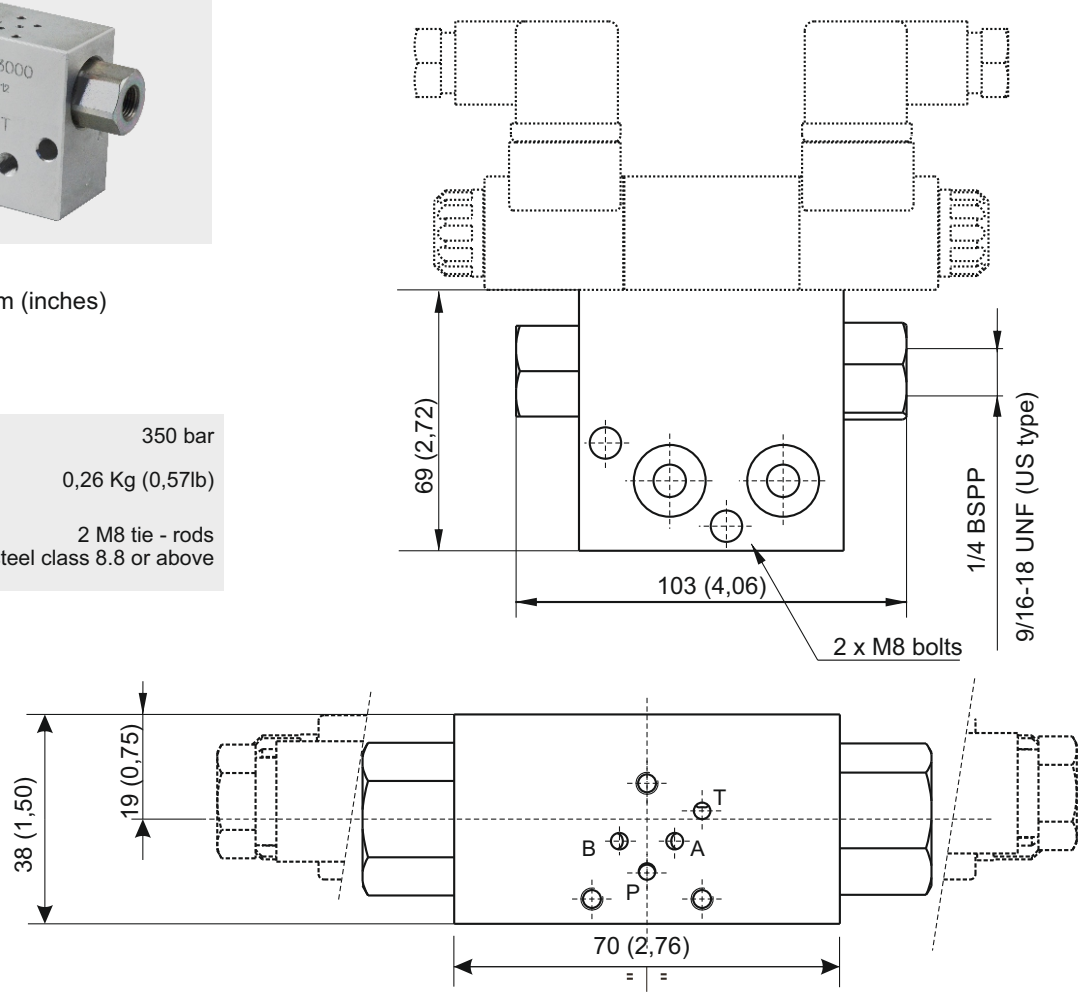
Note: to add external manifolds to PPM assembly code, just add their spare part codes at the end of PPM code. Ex: PPM-0,8 12DC-MB-J-K0,6-D/280-G-1,5L+**M60403004**+**M60403010**

The NG3 micro valve attachment is on motor side.

Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie rods with steel class less than 8.8.

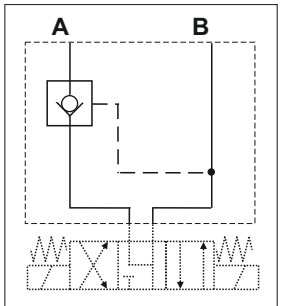
NG3 MODULAR MANIFOLD WITH INTEGRAL PILOT OPERATED CHECK VALVES

Dimensions in mm (inches)

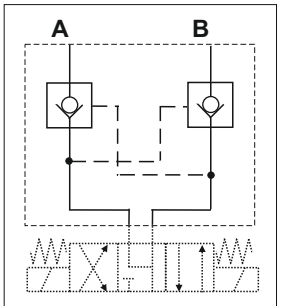


Main features

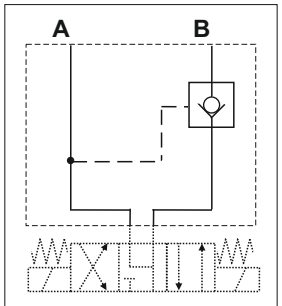
Max pressure	350 bar
Weight	0,26 Kg (0,57lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above



Spare part code
M60413002
M60413002US*



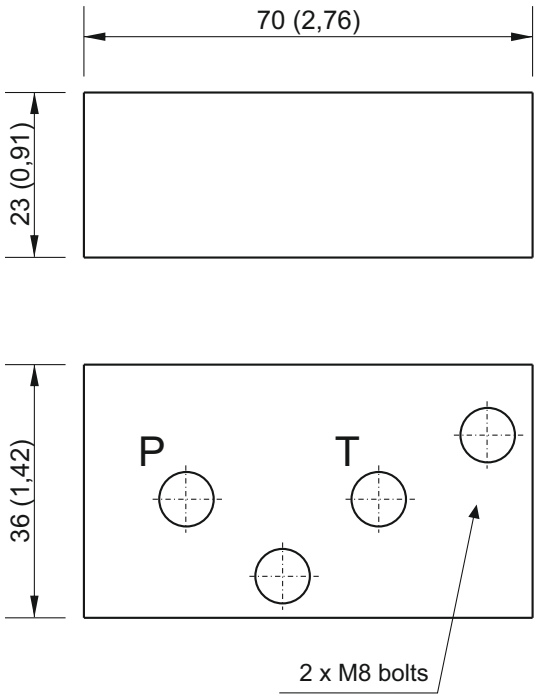
Spare part code
M60413001
M60413001US*



Spare part code
M60413003
M60413003US*

*: US execution with 9/16-18UNF SAE06 exit ports
Code does not include the NG3 valve
Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie rods with steel class less than 8.8.

SPACER ELEMENT 23MM

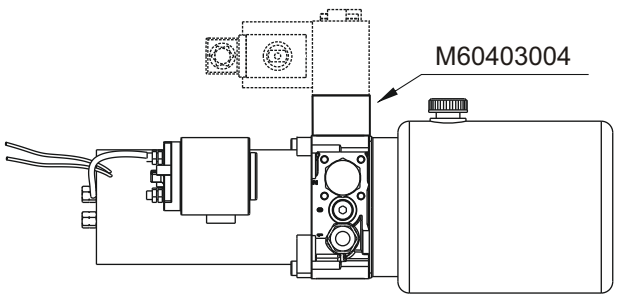


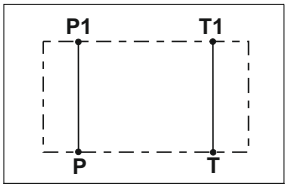
Dimensions in mm (inches)

Main features

Max pressure	350 bar
Weight	0,14 Kg (0,3lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above

Mounting example

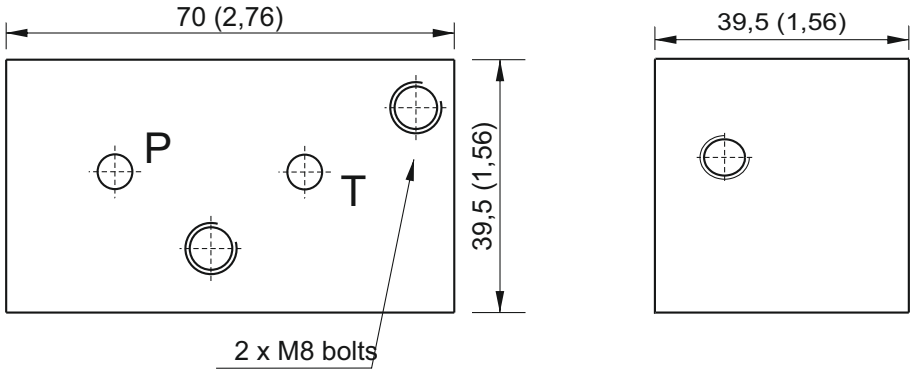




Spare part code
M60403004

Note: Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie rods with steel class less than 8.8.

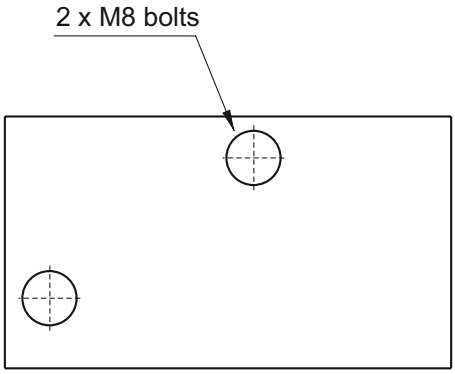
90° ROTATION MANIFOLD 39,5MM



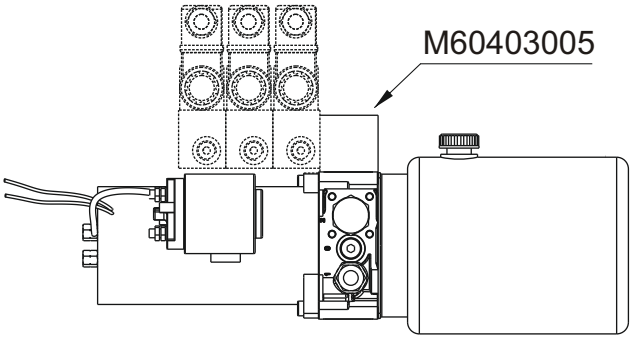
Dimensions in in mm (inches)

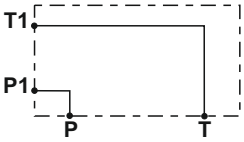
Main features

Max pressure	350 bar
Weight	0,26 Kg (0,57lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above



Mounting example

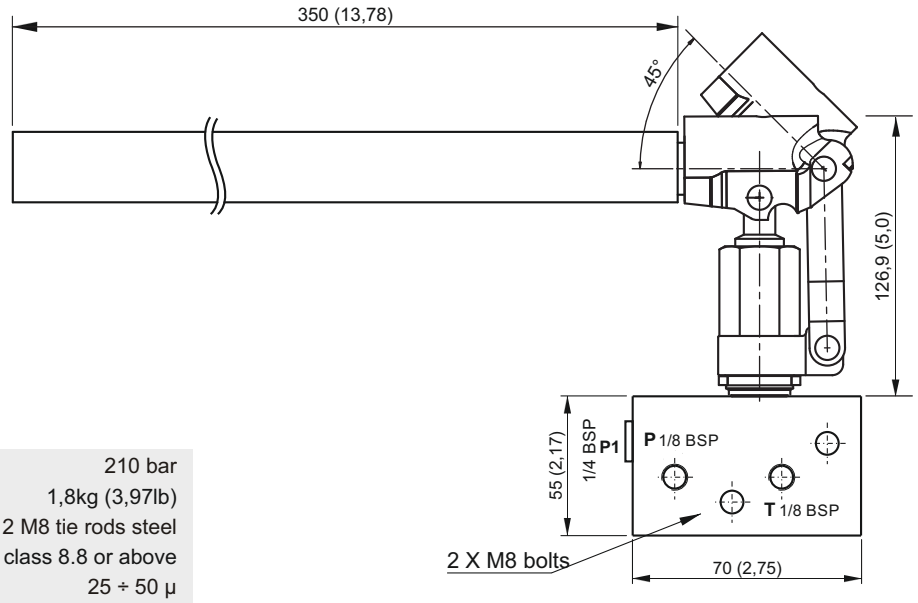




Spare part code
M60403005

Recommended tightening torque for M8 bolts: 16 Nm. Attention! Don't use tie rods with steel class less than 8.8.

PM09 HAND PUMP MODULAR MANIFOLD



Dimensions in mm (inches)

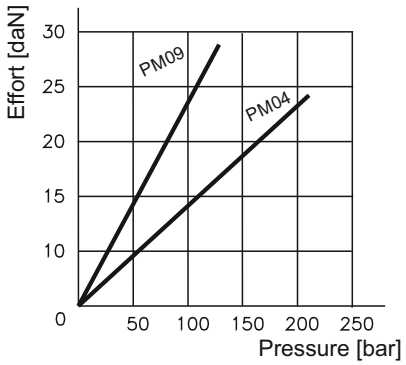
Block thickness: 39mm (1,54)

Main features

Max pressure	210 bar
Weight	1,8kg (3,97lb)
Fixing bolts	2 M8 tie rods steel class 8.8 or above
Filtration degree	25 ÷ 50 µ
Temperature range	-20 ÷ +70°C

Effort (daN)

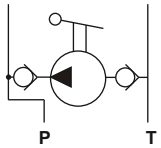
operating on the end of the standard lever



Spare part code without block

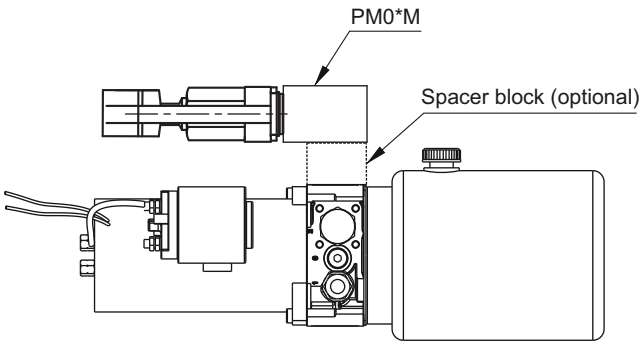
CARTPM04L — **hand pump cartridge 4 cc 7/8-14 UNF + lever**

CARTPM09L — **hand pump cartridge 8,8 cc 7/8-14 UNF + lever**



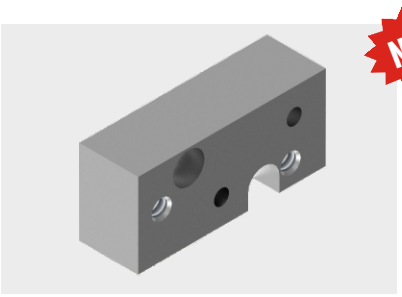
Assembly code	Displacement cc/stroke
PM04M	4
PM09M	8,8

Mounting example



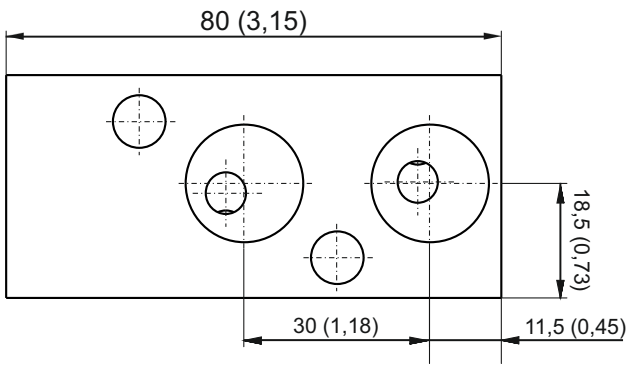
Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie rods with steel class less than 8.8.

ADAPTOR PLATE PPM TO PPC



Dimensions in mm (inches)

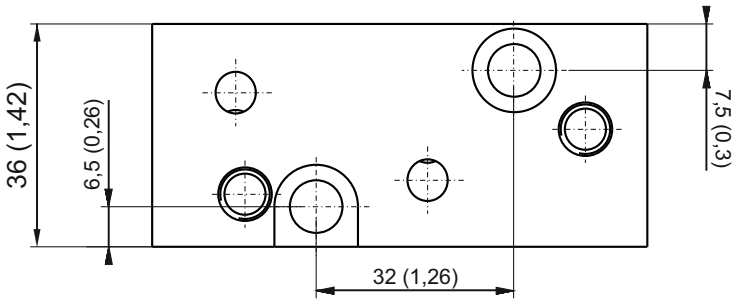
PPM INTERFACE



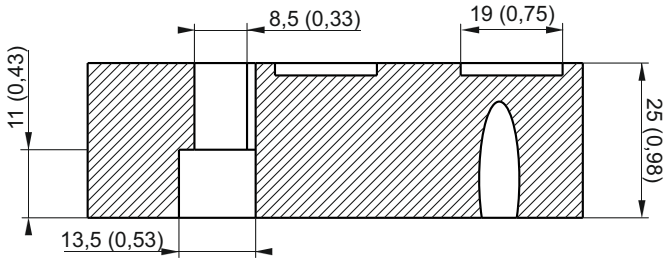
Main features

Weight	0,14 Kg (0,31lb)
Fixing bolts	2xM8 tie-rods steel class 8.8 or above

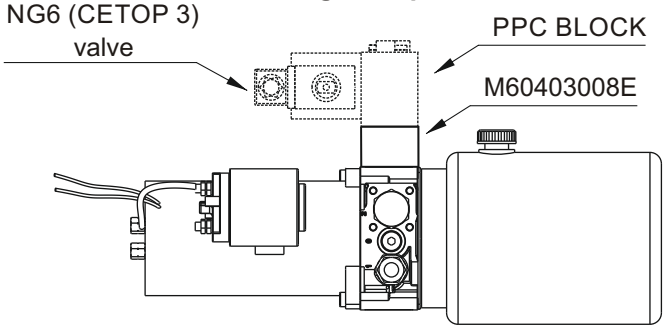
PPC INTERFACE



Spare part code
M60403008E



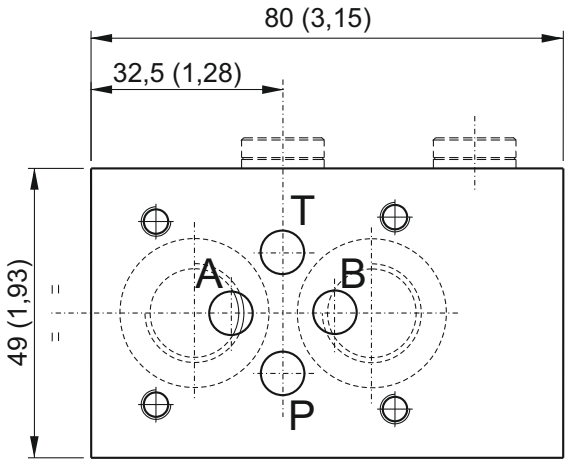
Mounting example

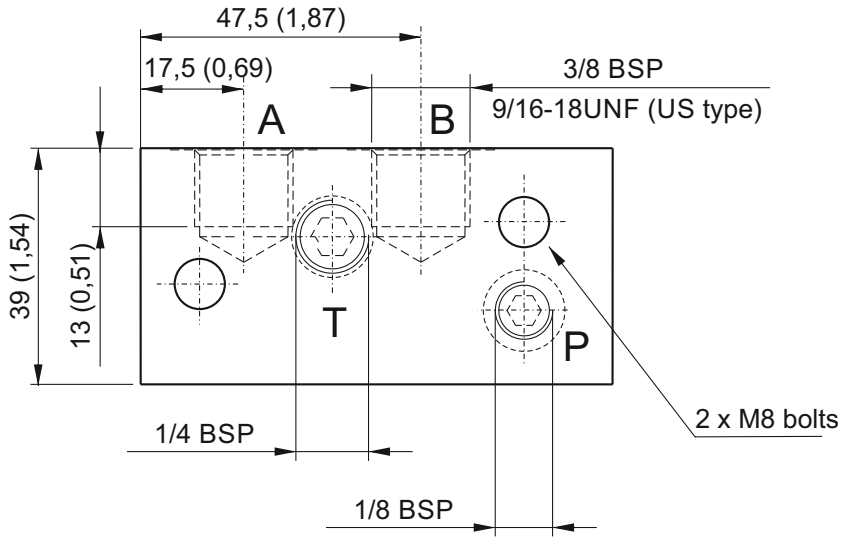


Attention! Do not use tie rods with steel class less than 8.8.

MODULAR MANIFOLDS NG6 (CETOP 3), REAR PORTS

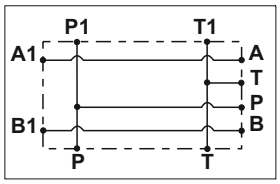
Dimensions in mm (inches)





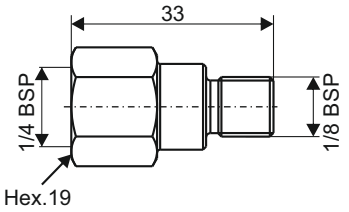
Main features

Max pressure	350 bar
Weight	0,37 Kg (0,82lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above



Parallel connection	Spare part code
Rear ports	**E60403001**
Rear ports US execution	**E60403001US**

Option 1/4"BSP P port:



Spare part code
PORTMF0001

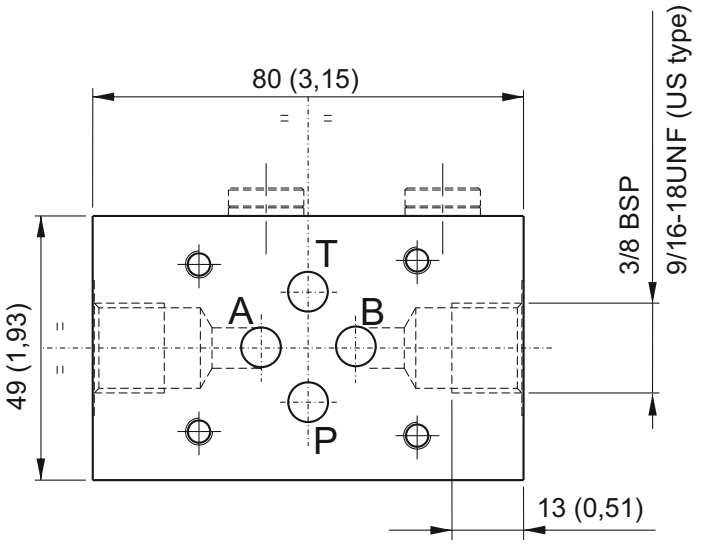
Note: Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie-rods less than 8.8.
To use blocks with a PPC interface on PPM manifold, the M60403008E block must be used.
*: US execution with 9/16-18UNF SAE06 exit ports
To add external manifolds to a PPM assembly code, just add their spare part codes at the end of the PPM code. eg: PPM-0,8 12DC-MB-J-K0,6-V180-G-RETURN KIT-1,5L+**M60403008E+E60403001.**
The Cetop attachment is on motor side. Code does not include the Cetop solenoid valve. See NG6 (Cetop 3) valves table in section G.

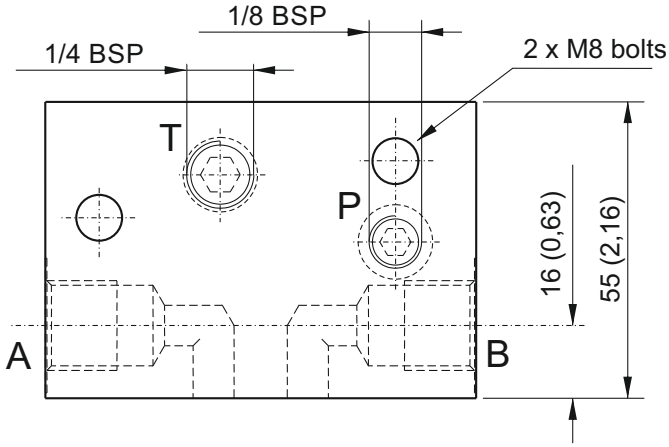
MODULAR MANIFOLDS NG6 (CETOP 3), LATERAL PORTS

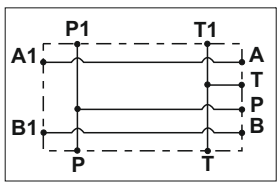
Dimensions in mm (inches)

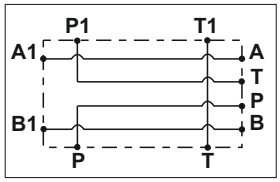
Main features

Max pressure	350 bar
Weight	0,56 Kg (1,2lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above





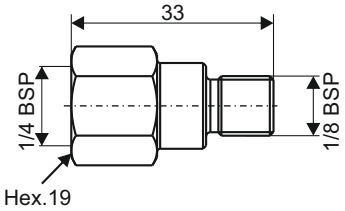




Parallel connection	Spare part code
Lateral ports	E60403010
Lateral port US execution	E60403010US

Series connection	Spare part code
Lateral ports	E60403011
Lateral port US execution	E60403011US

Option 1/4"BSP P port:



Spare part code
PORTMF0001

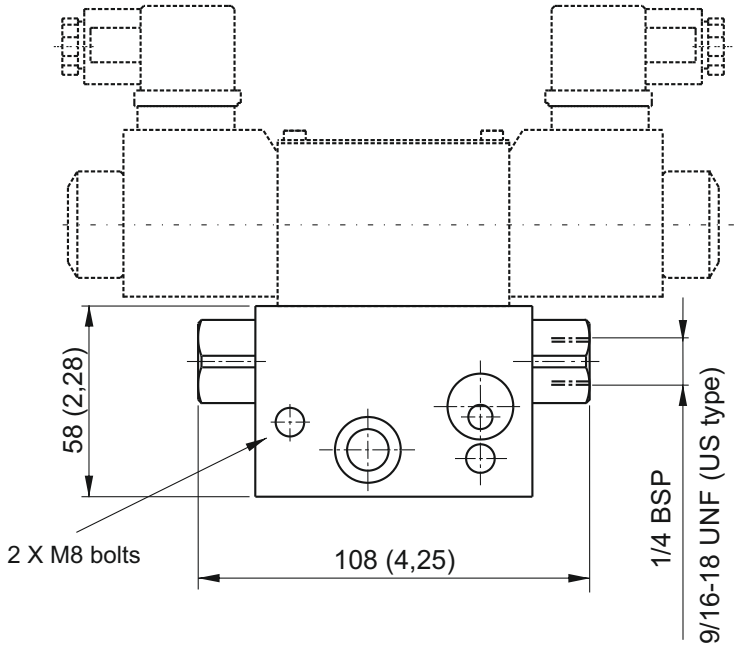
Note: Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie-rods less than 8.8.
To use blocks with a PPC interface on PPM manifold, the M60403008E block must be used.
*: US execution with 9/16-18UNF SAE06 exit ports
To add external manifolds to a PPM assembly code, just add their spare part codes at the end of the PPM code. eg: PPM-0,8 12DC-MB-J-K0,6-D180-G-RETURN KIT-1,5L+**M60403008E+E604030010.**
The Cetop attachment is on motor side. Code does not include the Cetop solenoid valve. See NG6 (Cetop 3) valves table in section G.

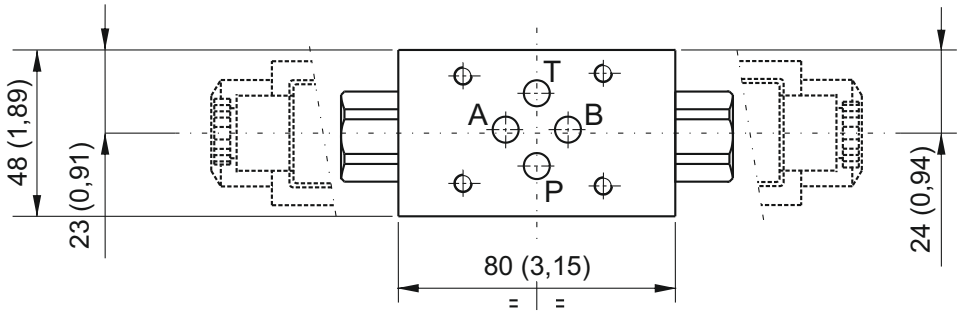
MODULAR MANIFOLDS NG6 (CETOP 3) WITH INTEGRAL PILOT OPERATED CHECK VALVES

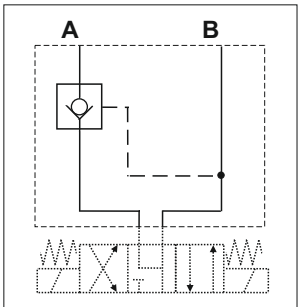
Dimensions in mm (inches)

Main features

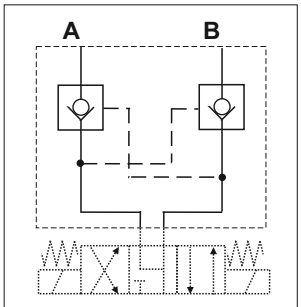
Max pressure	350 bar
Pilot ratio	1:5,6
Weight	0,71 Kg (1,56lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above



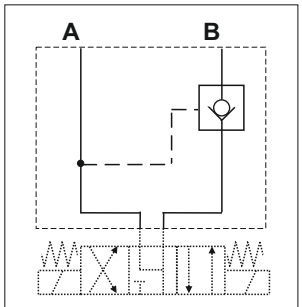




Spare part code
E60413002
E60413002US*



Spare part code
E60413001
E60413001US*



Spare part code
E60413003
E60413003US*

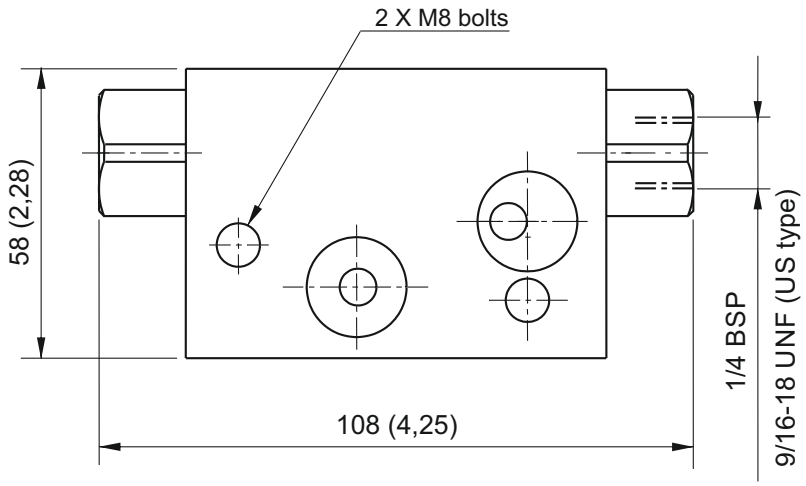
Note: Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie-rods less than 8.8.
To use blocks with a PPC interface on PPM manifold, the M60403008E block must be used.
*: US execution with 9/16-18UNF SAE06 exit ports
To add external manifolds to a PPM assembly code, just add their spare part codes at the end of the PPM code. eg: PPM-0,8 12DC-MB-J-K0,6-V180-G-RETURN KIT-1,5L+**M60403008E+E60413001.**
Code does not include the Cetop solenoid valve. See NG6 (Cetop 3) valves table in section G.

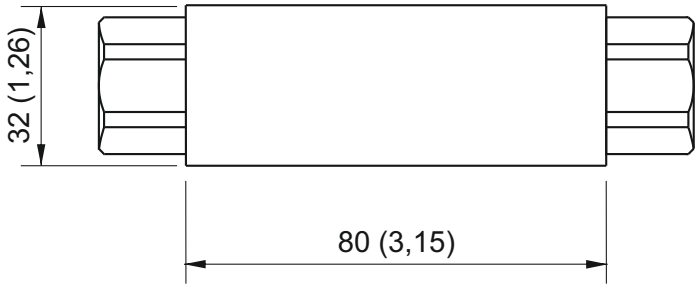
MODULAR MANIFOLDS WITH PILOT OPERATED CHECK VALVES

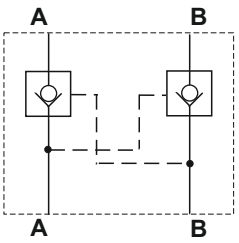
Dimensions in mm (inches)
Suitable for:
- central manifold U4
- central manifold MR

Main features

Max pressure	350 bar
Pilot ratio	1:5,6
Weight	0,5 Kg (1,1lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above





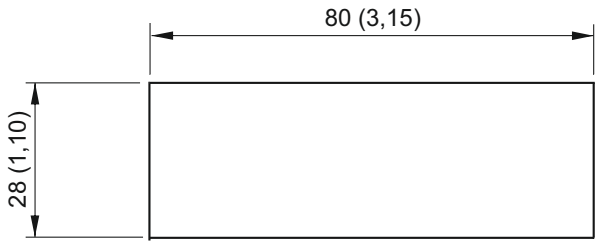


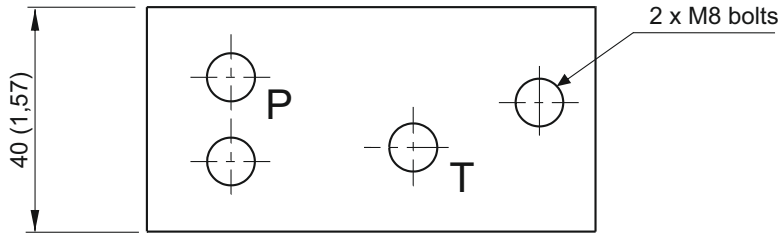
Spare part code
E60403027
E60403027US*

Note: Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie-rods less than 8.8.
*: US execution with 9/16-18UNF SAE06 exit ports
To use blocks with a PPC interface on PPM manifold, the M60403008E block must be used.

SPACER ELEMENTS

Dimensions in mm (inches)

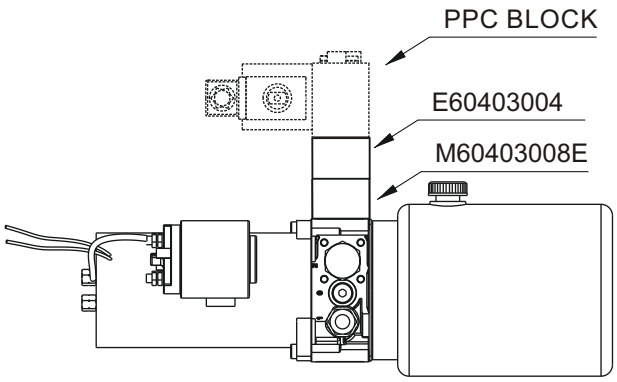


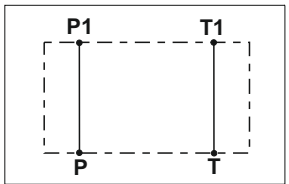


Main features

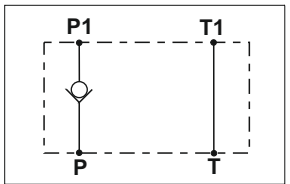
Max pressure	350 bar
Weight	0,23 Kg (0,5lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above

Mounting example





Spare part code
E60403004

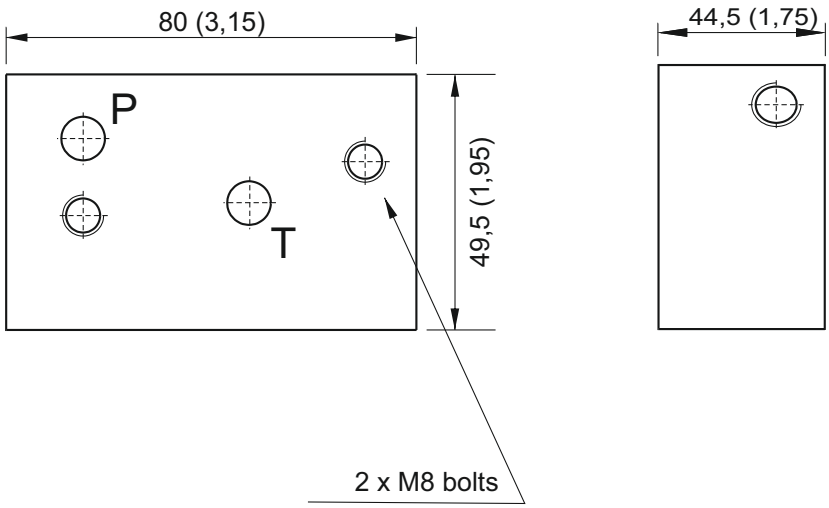


Spare part code
E60403004CV

Note: Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie-rods less than 8.8.

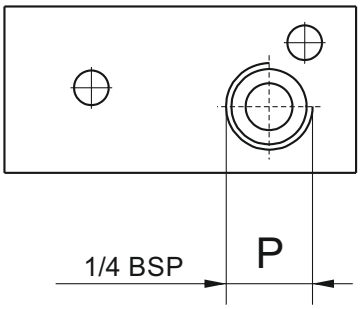
90° ROTATION MANIFOLDS 49MM

Dimensions in mm (inches)

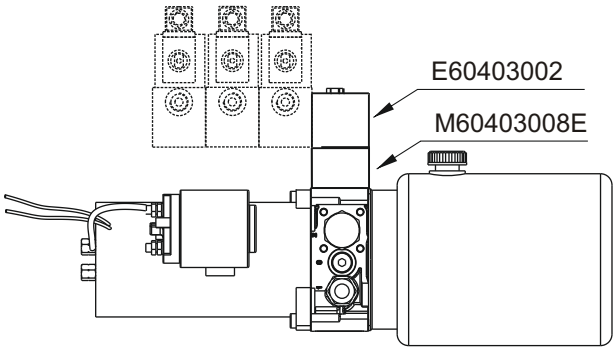


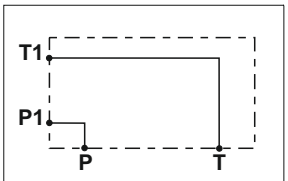
Main features

Max pressure	350 bar
Weight	0,72 Kg (1,59lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above



Mounting example



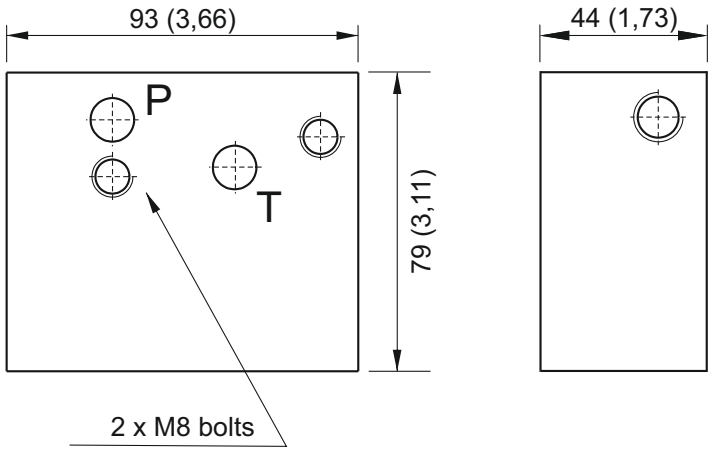


Spare part code
E60403002

Note: Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie-rods less than 8.8.

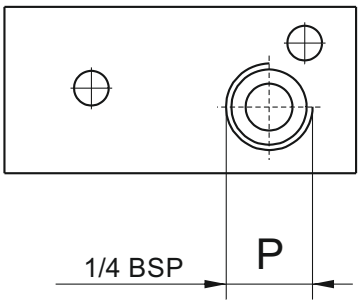
90° ROTATION MANIFOLDS WITH DOUBLE-SIDED ATTACHMENT P & T 79MM

Dimensions in mm (inches)

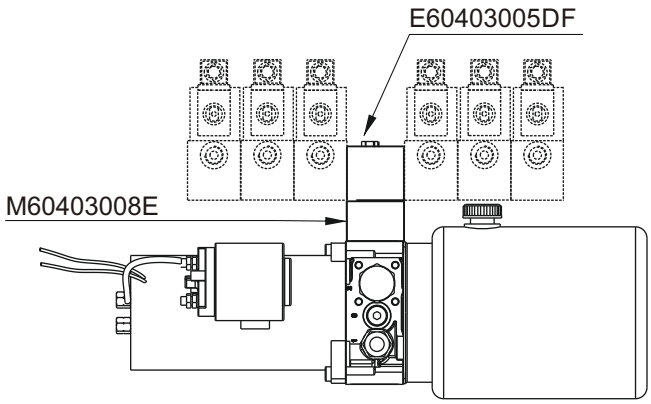


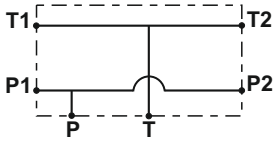
Main features

Max pressure	350 bar
Weight	0,72 Kg (1,59lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above



Mounting example



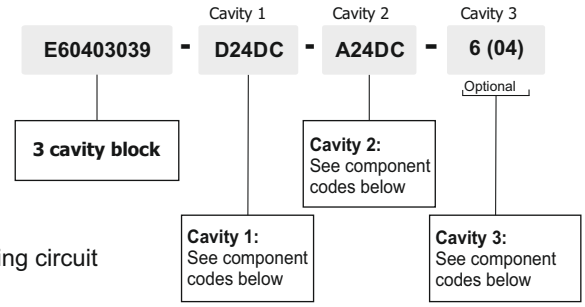


Spare part code
E60403005DF

Note: Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie-rods less than 8.8.

MANIFOLD FOR ADDITIONAL SINGLE ACTING CIRCUIT

ASSEMBLY CODE - example



Dimensions in mm (inches)

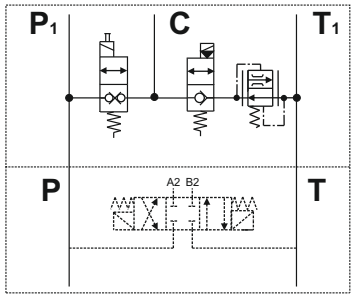
Typically used to create a single acting circuit in parallel with a double acting circuit

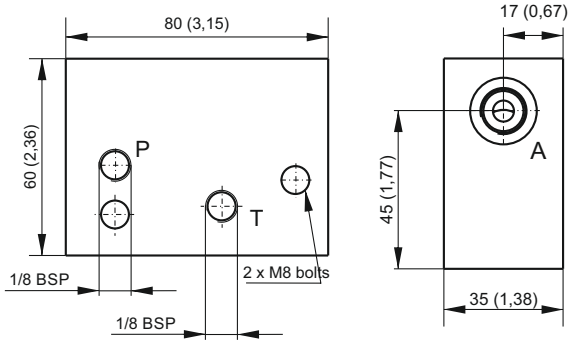
Main features

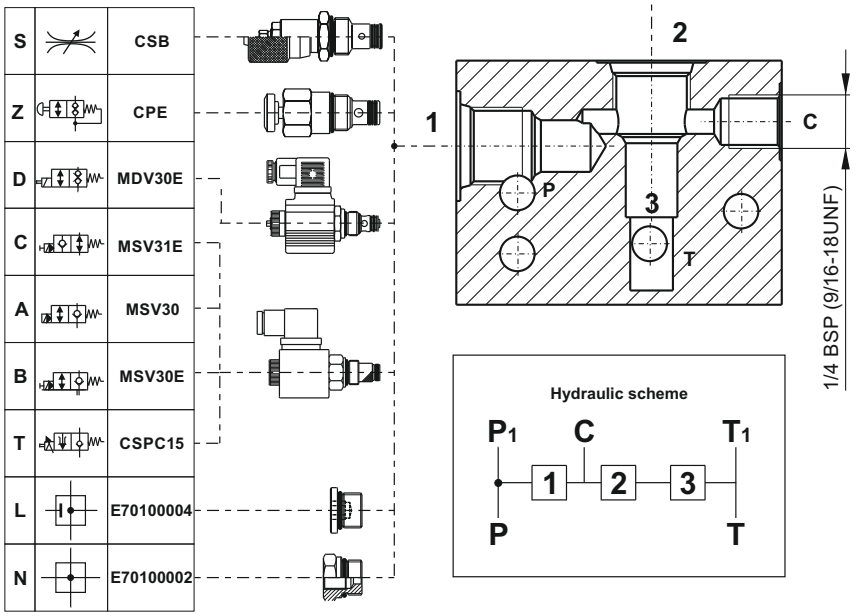
Max pressure	350 bar
Weight	0,39 Kg (0,88lb)
Fixing bolts	2 M8 tie - rods steel class 8.8 or above

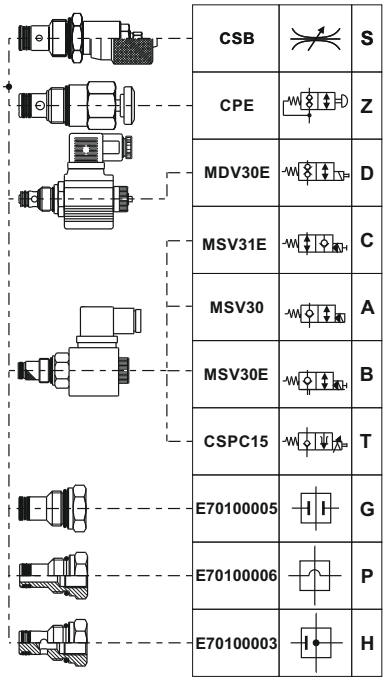
Spare part code
E60403039
E60403039US*

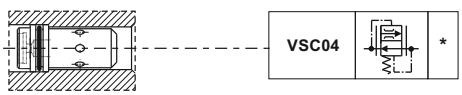
Application example









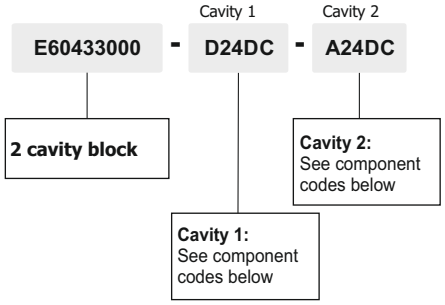


Note: to add external manifolds to PPM assembly code, just add their spare part codes at the end of the PPM code.
Example: PPM-0,8 12DC-MB-KM0,4-JM-DM_280-G-1,5T**+M60403008E+E6030010+SD03C2+2x24DC_M160.**

NG6 (CETOP 3) SANDWICH MODULAR MANIFOLD FOR SAE08 CARTRIDGE VALVES

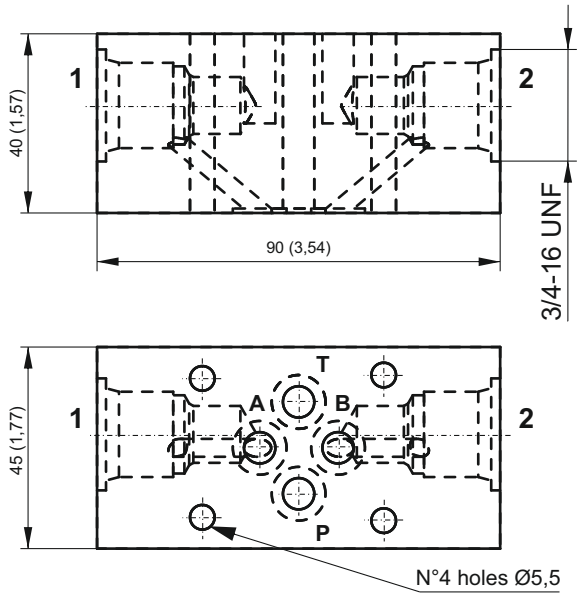
Dimensions in mm (inches)

ASSEMBLY CODE - example



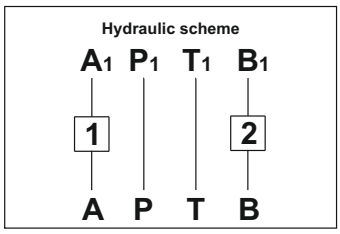
Main features

Max pressure	300 bar
Max flow	up to 40 l/min
Weight	0,4 Kg (0,88lb)
Fixing bolts	4 M5x** bolts. 5Nm torque 10,9 class steel or above
Fluid temperature	-20 ÷ +80°C
Filtration degree	25 ÷ 50 µ

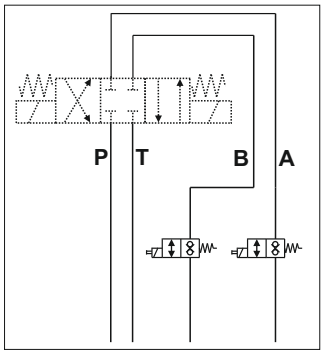


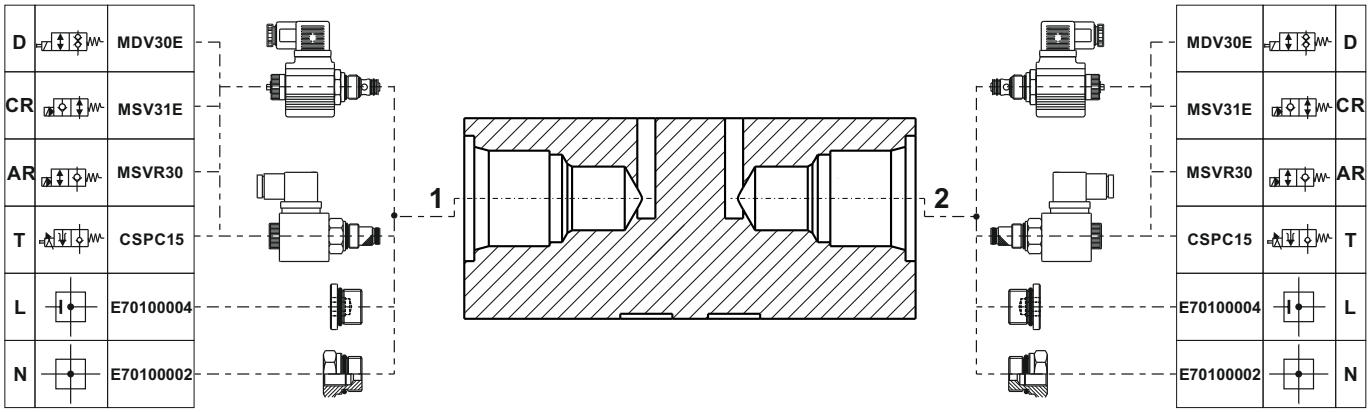
Spare part code
E60433000

Hydraulic scheme



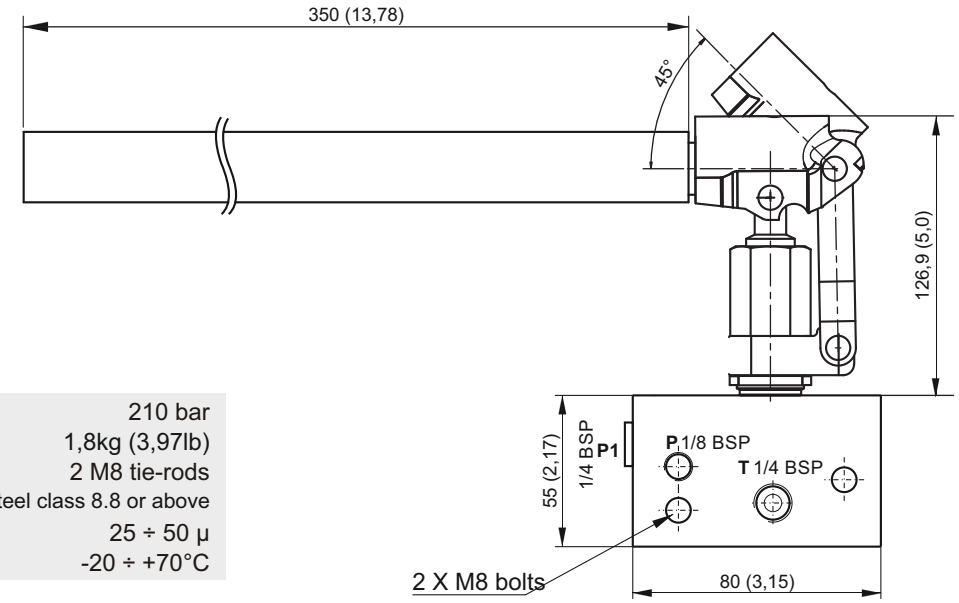
Application example





Note: to add external manifolds to PPM assembly code, just add their spare part codes at the end of the PPM code.
Example: PPM-0,8 12DC-MB-KM0,4-JM-DM_280-G-1,5T**+M60403008E+E6030010+SD03C2+2x24DC_M160.**

HAND PUMP MODULAR MANIFOLD



Dimensions in mm (inches)

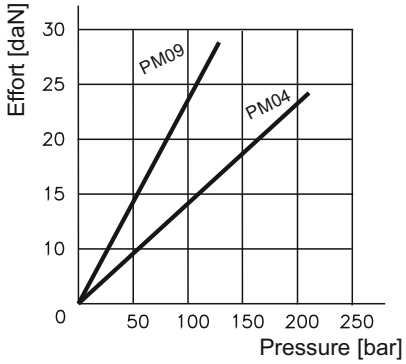
Block thickness: 39mm (1,54)

Main features

Max pressure	210 bar
Weight	1,8kg (3,97lb)
Fixing bolts	2 M8 tie-rods steel class 8.8 or above
Filtration grade	25 ÷ 50 µ
Fluid temperature	-20 ÷ +70°C

Effort (daN)

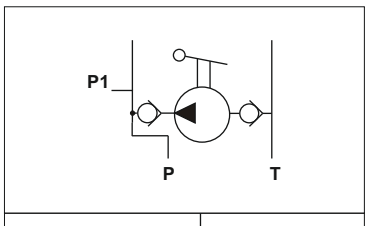
operating on the top of the lever



Note: Values are measured only on the valve (no cavity) with oil viscosity of 46 cSt at 50 °C. The drop of the pressure can change by the fluid viscosity and fluid temperature.

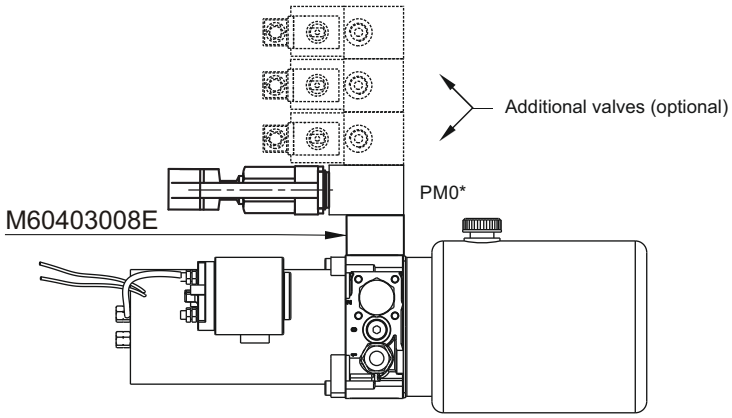
Spare part codes - cartridges only

Description	Spare part code
4cc hand pump 7/8-14UNF cartridge + lever	**CARTPM04L**
8,8cc hand pump 7/8-14UNF cartridge + lever	**CARTPM09L**



Spare part code	Displacement cc/stroke
PM04	**4**
PM09	**8,8**

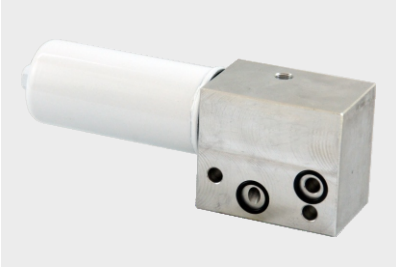
Mounting example

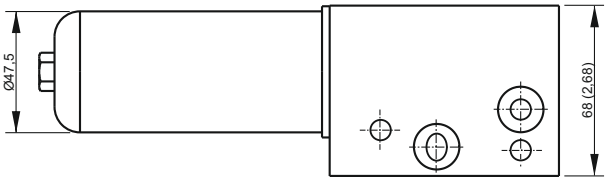


Note: Recommended tightening torque for M8 bolts: 16 Nm. Attention! Do not use tie-rods less than 8.8.

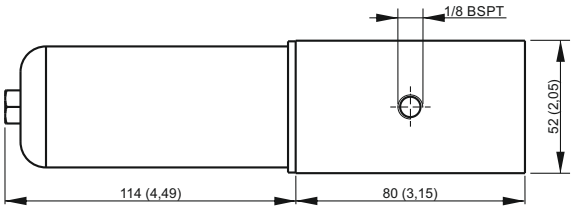
Commissioning: the pump must be bled by opening the plug of the unused pressure port (P or P1), pumping a few times until all air bubbles and then clean oil come out, then tightening the plug again.

RETURN LINE FILTER MODULAR MANIFOLD





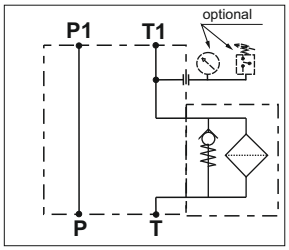
Dimensions in mm (inches)



Main features

Open by-pass valve press.	1 bar
Max flow	20 l/min
Filtration grade	15 µ
Fluid temperature	-30 ÷ + 80 °C
Weight	0,87 kg
Fixing bolts	2 M8 bolts steel class 8.8 or above

Hydraulic scheme



Note: standard code does not include the MIR40 pressure gauge or F4 pressure switch

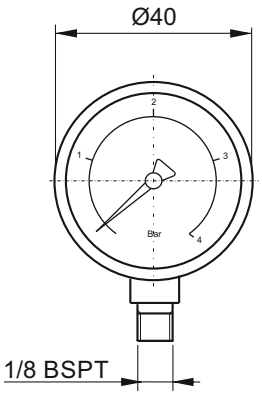
Spare part code

E60403020	**Modular manifold with return filter on T**
FO201385	**15 micron replacement cartridge part number**

Note: Recommended tightening torque for M8 bolts: 16 Nm.
Attention! Do not use tie-rods less than 8.8.
Recommended tightening torque for spin on cartridge: 10Nm

OPTIONS

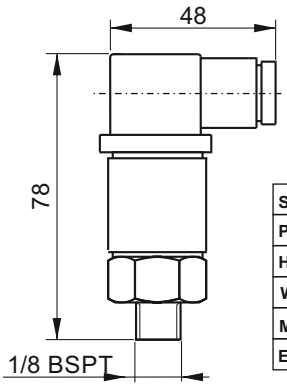
Pressure gauge for return filter manifold



Weight: 0,1 Kg

Spare part code
MIR4004

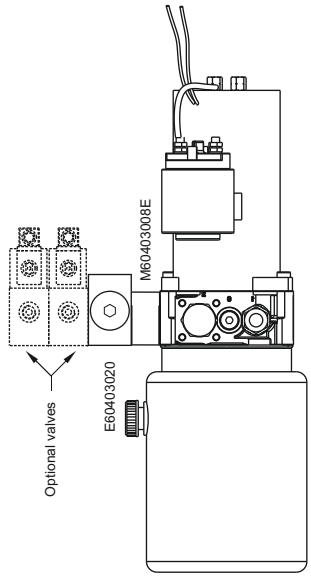
Pressure switch for return filter manifold



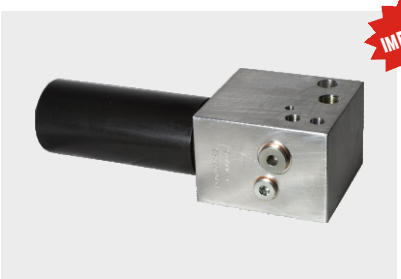
Setting range	0,2 ÷ 2,5 bar
Protection degree	IP 65
Hysteresis	10 ÷ 15 %
Weight	0,05 Kg
Max load	0,5 A a 250 VAC
Electric switch	NO/NC

Spare part code
F4R0M3

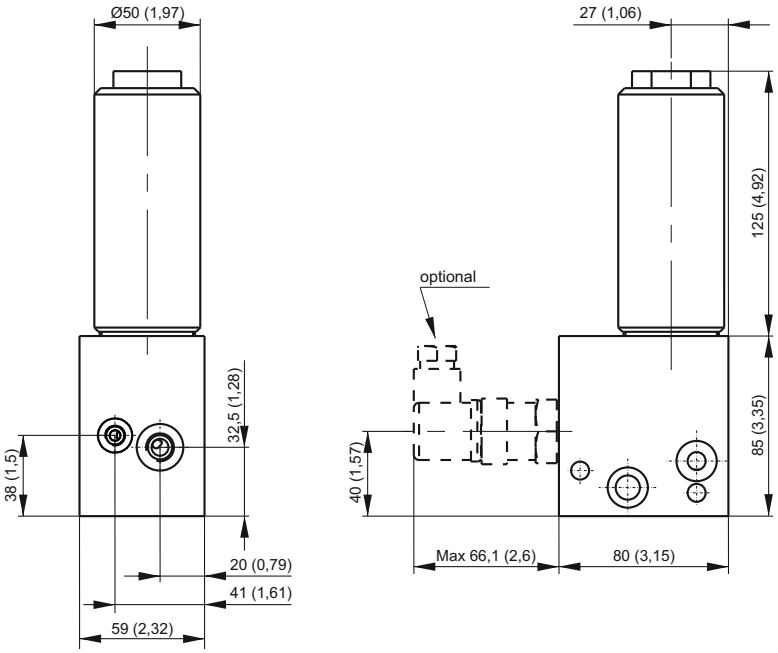
Mounting example



MODULAR BLOCK WITH PRESSURE FILTER



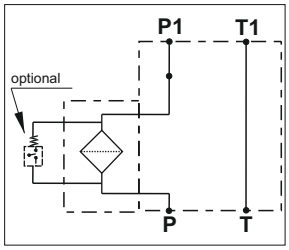
Dimensions in mm (inches)



Main features

Backpressure allowable	21 bar
Max pressure	400 bar
Max flow	32 l/min
Filtration grade	5-15-25 µ
Fluid temperature	-30 ÷ + 80 °C
Weight	2,3 kg
Fixing bolts	2xM8 steel 8.8 or better

Hydraulic scheme



Note: standard code does not include the differential electric or visual pressure switch

Spare part code

E60403025* — **Modular manifold with pressure filter**

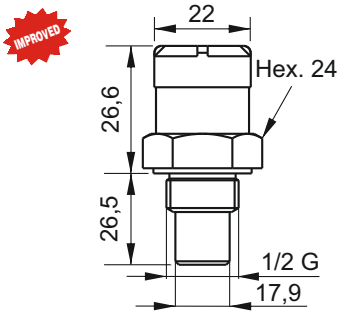
B — **Cartridge filter:**

A = 5 micron fiber reinforced cartridge filter (cartridge spare part code: HPFEHY05)
B = 15 micron fiber reinforced cartridge filter (cartridge spare part code: HPFEHY15)
C = 25 micron fiber reinforced cartridge filter (cartridge spare part code: HPFEHY25)

Note:other filtration grades cartridges available on request
Recommended tightening torque for M8 bolts: 16 Nm.
Attention! Do not use tie-rods less than 8.8
Recommended tightening torque for spin on cartridge: 45Nm

OPTIONS

Differential pressure visual indicator

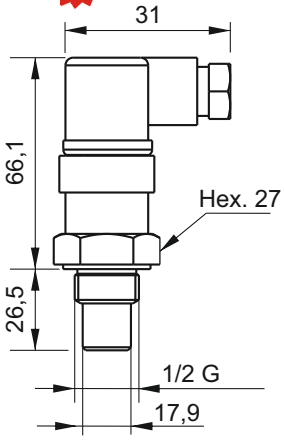


Switching contacts	Red/Green
Ambient temperature	-25 ÷ +80°C
Torque	50 Nm
Proof pressure	675 bar
Max pressure (P1=P2)	400 bar
Pressure rate for set.	10 bar/15 sec
Max different pressure (P1-P2)	200 bar
Diff. pressure setting (horizontal position)	5 bar ± 15%

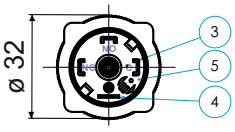
Spare part code

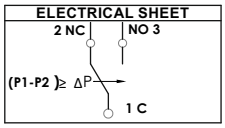
DPV03400

Differential pressure switch



Diff. pressure setting	5 bar ±15%
Protection degree	IP 65
Switching contacts	SPDT
Weight	0,16 Kg
Max different pressure (P1-P2)	200 bar
Proof pressure	675 bar
Max pressure (P1=P2)	450 bar
Torque	50 Nm
Pressure rate for set.	10 bar/15 sec
Ambient temperature	-25 ÷ +85°C
Voltage 14 Vdc	5 (4) A
Voltage 30 Vdc	4 (3) A
Voltage 125 Vdc	5 (3) A
Voltage 250 Vdc	3 (2) A

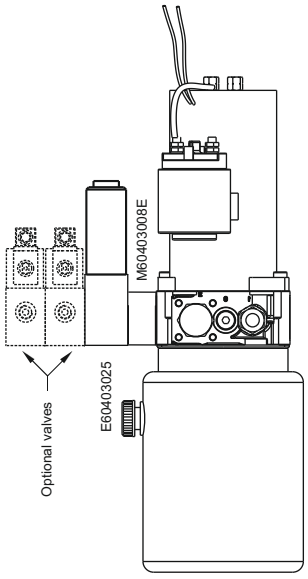




Spare part code

DPE03400

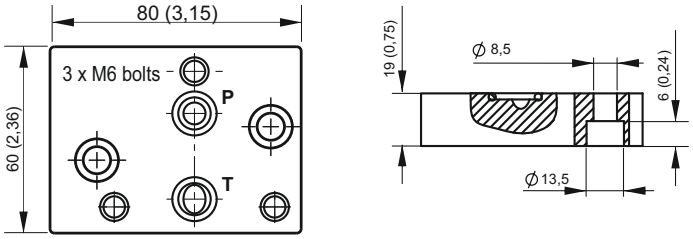
Mounting example



ADAPTOR MANIFOLD FOR SD02 STACKABLE SOLENOID VALVES

Dimensions in mm (inches)

PPC TO SD02 STACKABLE VALVE CONVERTER
(needed to mount SD02 stackable valves)

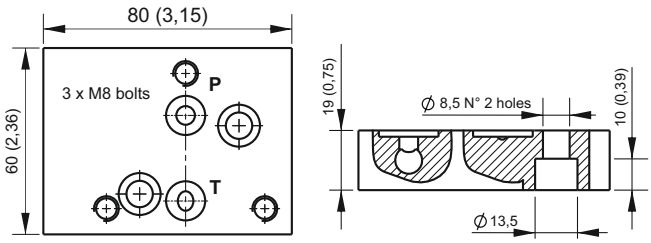


Fixing system: 2 M8x20 bolts steel class 8.8 or above
Weight: 0,22 Kg

Spare part code
E60403006DN

Dimensions in mm (inches)

PPM TO SD02 STACKABLE VALVE CONVERTER
(necessary to mount SD02 stackable valves)



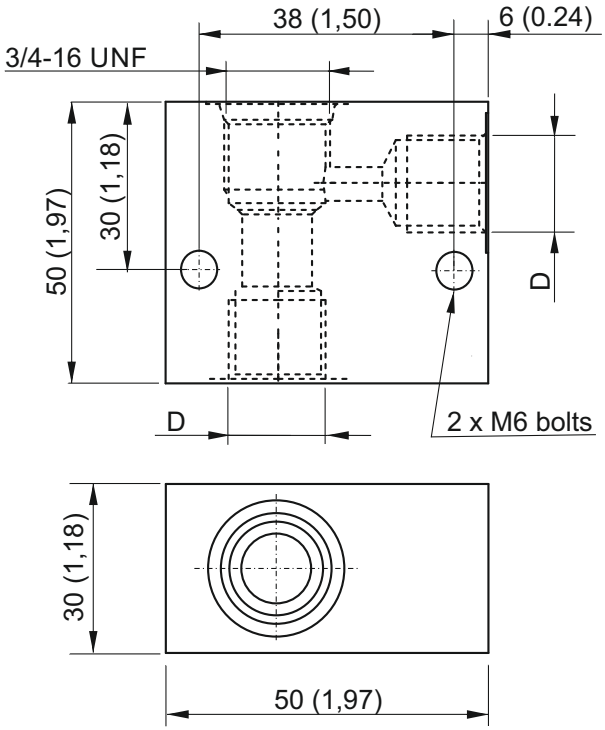
Fixing system: 2 M8x20 bolts steel class 8.8 or above
Weight: 0,22 Kg

Spare part code
N50403007DN

ACCESSORIES

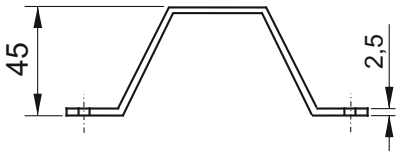
Dimensions in mm (inches)

In line mounting 3/4-16 UNF 2 way manifolds

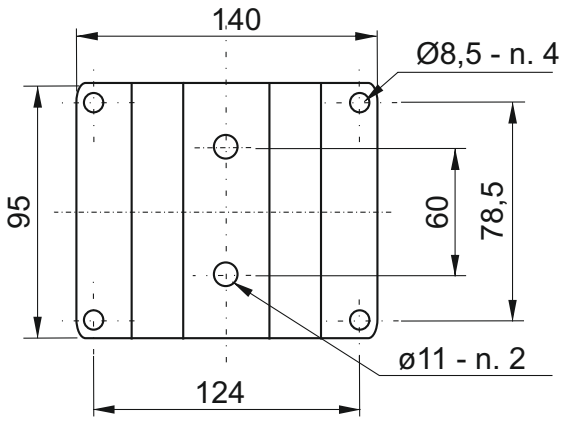


Spare part code	D	Weight
BFCSAE0801	1/4 BSP	0,16 Kg
BFCSAE0802	3/8 BSP	0,16 Kg

Foot mounting support



Weight: 0,35 Kg

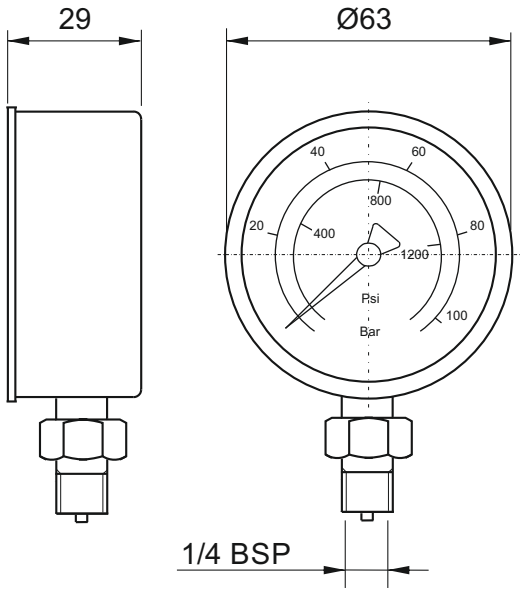


Spare part code
E60543003

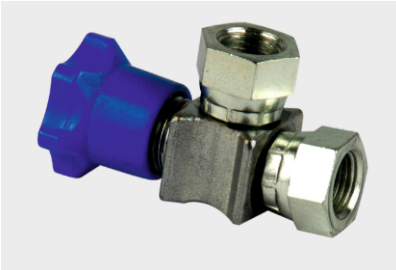
ACCESSORIES

Pressure gauge

Protection degree	IP 65
Thermal drift	±0,04%/1K a 20°C
Weight	0,206 Kg
Static working pressure	75% end of scale
Peak working pressure	end of scale
Fluid temperature	-10 ÷ +60°C
Precision class	cl. 1.6 EN837-1

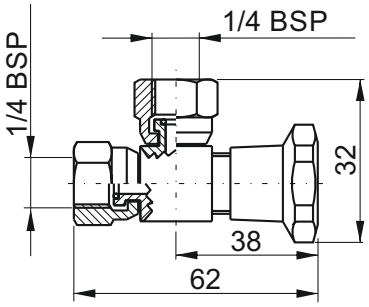


Spare part code	
MIR63* **	***: max pressure in bar (60, 160, 250, 315 bar)**



Gauge isolator 90° F-F

EM9001C

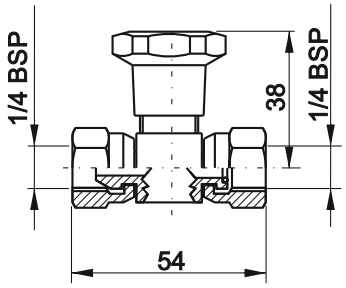


Weight: 0,14 Kg. Max working pressure: 400 bar

Spare part code
EM9001C

Gauge isolator F-F

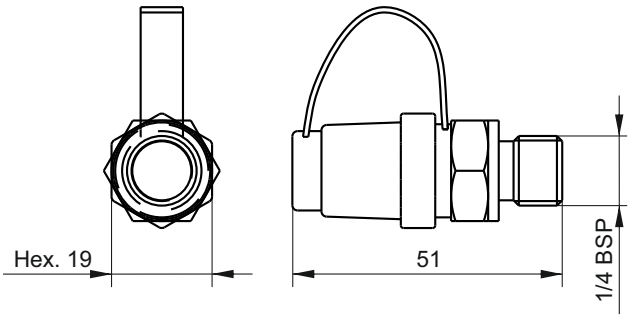
EMIL01C



Weight: 0,14 Kg. Max working pressure: 400 bar

Spare part code
EMIL01C

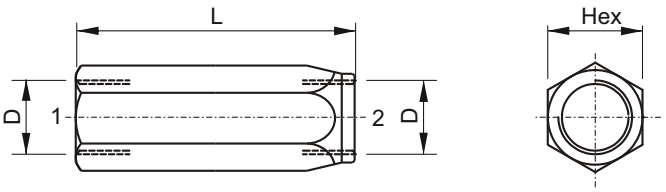
ACCESSORIES



Weight: 0,05 Kg. Max working pressure: 350 bar

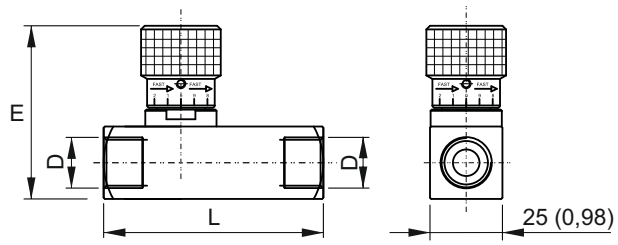
Spare part code
MINIMESS01

In-line check valve



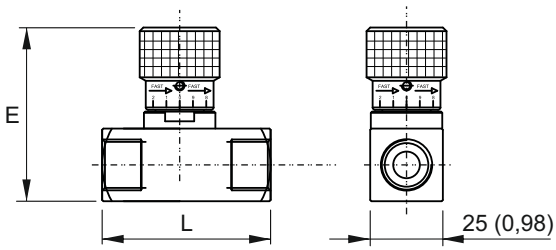
Spare part code	D	Ch	L	Weight
VUR01C	1/4 BSP	19	55	0,10 kg
VUR02C	3/8 BSP	24	65	0,18 kg
VURSAE06C	9/16-18UNF	19 (0,75)	58 (2,28)	0,10 kg (0,22 lb)

In-line unidirectional flow control valve



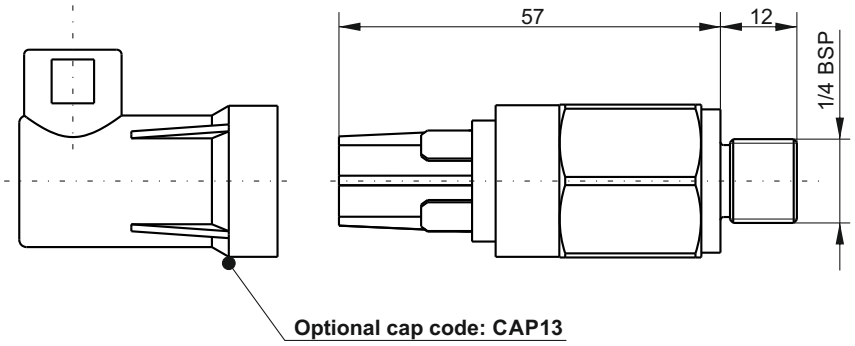
Spare part code	D	E	L	Weight
STU01	1/4 BSP	68	66	0,34 kg
STU02	3/8 BSP	68	77	0,36 kg
STUSAE06	9/16-18UNF	68 (2,68)	70,5 (2,78)	0,38 kg (0,84 lb)

In-line bidirectional flow control valve



Spare part code	D	E	L	Weight
STB01	1/4 BSP	68	54	0,29 kg
STB02	3/8 BSP	68	54	0,27 kg
STBSAE06	9/16-18UNF	68 (2,68)	54 (2,13)	0,30 kg (0,66 lb)

PRESSURE SWITCHES

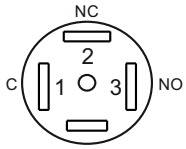


Dimensions in mm (inches)

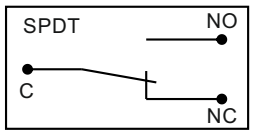
Main features

Switch rating resistive	6A / 250 Vca
Switch rating resistive	2A / 24 Vdc
Switch rating inductive	2A / 250 Vca
Switch rating inductive	1A / 24 Vdc
Fluid temperature	-25°C ÷ +80°C
Weight	0,1 Kg
Tightening torque	20 Nm
Hysteresis	~ 15%
Max. pressure	300 bar
Contact	SPDT C/O
Protection (terminals)	IP 00
Protection with connector	IP 65

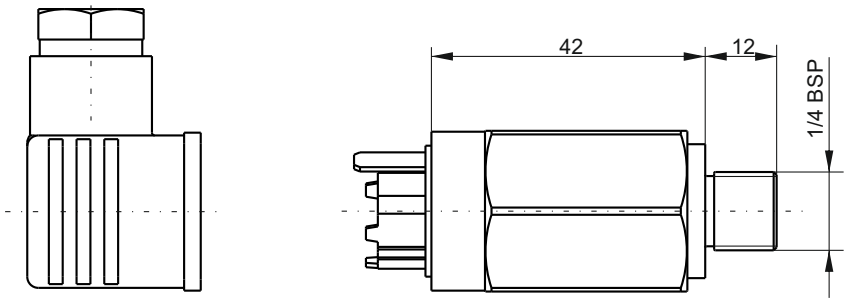
Pin out scheme



Electrical scheme



Assembly code (including cap)	Spare part code	Pressure (bar)	Tolerance (bar)
PSL01100W	PSL01S0100	10÷100	±3
PSL01300W	PSL01S0300	50÷300	±15

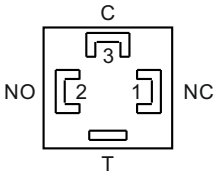


Dimensions in mm (inches)

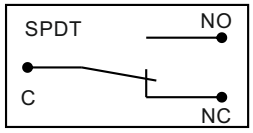
Main features

Max. voltage	250 Vca
Current resistive load	6 A
Current inductive load	2 A
Fluid temperature	-25°C ÷ +80°C
Weight	0,1 Kg
Tightening torque	20 Nm
Hysteresis	adjustable 10% ÷ 30%
Max. pressure	300 bar
Contact	SPDT C/O
Protection with connector	IP 65

Pin out scheme



Electrical scheme



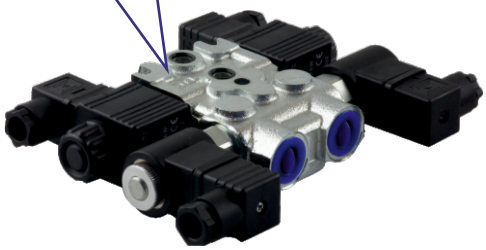
Spare part code	Pressure (bar)	Tolerance (bar)
PSH01S0100	10 ÷ 100	±3
PSH01S0300	50 ÷ 300	±15

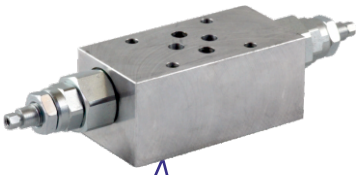
NOTES

EXTERNAL VALVES

NG3 MICRO directional valves: the optimized solution for **top performance** with **ultra compact dimensions**. Each valve requires a base modular manifold

STACKABLE directional valves: the advanced solution to conventional spool valves, to reduce power pack dimensions and weight. A and B threaded ports are directly machined in to the valve body. Additional cavities allow extra flexibility in the hydraulic circuit design





NG6 (Cetop 3) modular **sandwich valves** for flow and pressure control, and overcentre. These valves use the same cartridges as those in the power pack central manifold

NG6 (Cetop 3) valves: the conventional choice for market compatibility and universal service around the world. Each valve requires a base modular manifold.

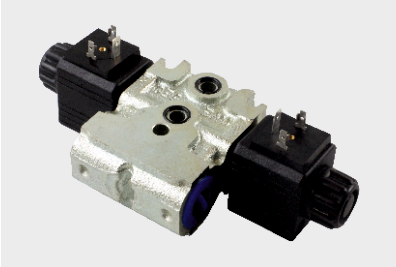
Cartridge valves in external blocks: the cost effective and lightweight solution

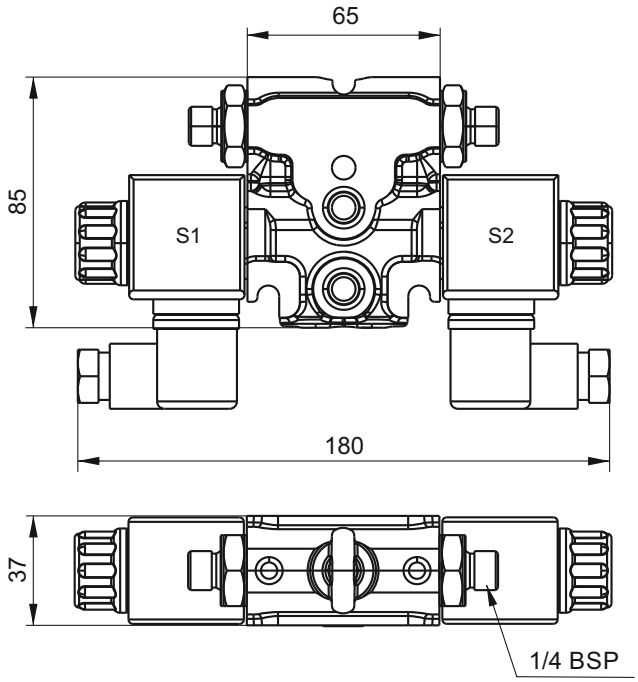
What are the advantages of NG3 MICRO directional valves and stackable directional valves compared to NG6 (Cetop 3) valves?
Lower weight, smaller dimensions, lower cost. Each stackable valve height of just 31mm allows you build a stack of, for example, 7 valves in 217mm. A similar stack made with cetop 3 valves would be nearly double the height. NG6 (Cetop 3) directional valves are to be preferred when other valves (pilot operated check valves, flow controls, pressure controls,...) are added to the hydraulic circuit.

Is it possible to manufacture special manifold blocks with customized valve combinations for specific applications?
Yes. Whenever quantities justify the investment in design and manufacturing. Ask our sales department first.

Which coils and connectors do I select for the spool type directional control valves?
Ng3 MICRO valves SD00* series use the M100 series of coils, 12 or 24 VDC. SD02* bankable vales share the same M630/M631 coils series of the integral solenoid valves. NG6 (Cetop 3) valves SD03* series use M160 series of coils either DC or RC (rectified current). When choosing a RC coil, a rectifying bridge connector must be chosen (KA132R***), except for M631 coils series which have an integral rectifying bridge. See coils table at the end of section G.

STACKABLE MODULAR DIRECTIONAL SOLENOID VALVES WITH REAR PORTS





Options

Description	Spare part code
Closure plate, to be used as the last element	**SD02TOP**
Kit 3 tie rods + nut M8 8.8 (x = number of element)	**SD020x**

Main features

Max pressure	250 bar
Max pressure on T port	50 bar
Max flow	50 l/min
Weight	1,37 Kg (1 solenoid) 1,67 Kg (2 solenoid)
Internal leakage	0,02÷0,06 l/min at 100bar, 21 cSt
Fixing bolts	3 TCEI M8 tie-rods 15 Nm torque. 8.8 class steel or above
Coil insulation	Class H
Electric connection	DIN 43650-A / ISO 4400
Protection class	IP 65 / DIN 40050
Duty cycle	ED 100%
Voltage required	+/- 10% nominal voltage
Manual Overide	included as standard
Standards	EN50081-1 / EN50082-2 (89/336 CEE electromagnetic comp.) 73/23/CEE / 96/68/CEE (low voltage)
Fluid temperature	-20°C +80°C

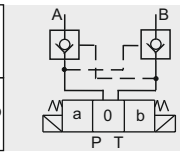
Spare part code

SD02 — **Stackable modular directional solenoid valve**

E2 — **Spool configuration:**
see below table

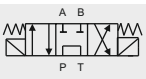
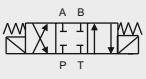
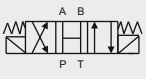
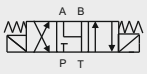
RP — **Option:**
- = free outputs
RP = outputs with piloted check valves (only spool E2 and C2)

24DC — **Supply voltage:**
see coils table section G

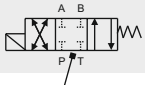
Option RP	
Code RP	

Spool

Double solenoid

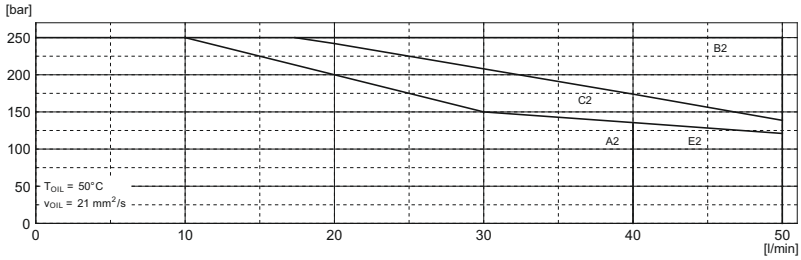
A2	
B2	
C2	
E2	

Single solenoid

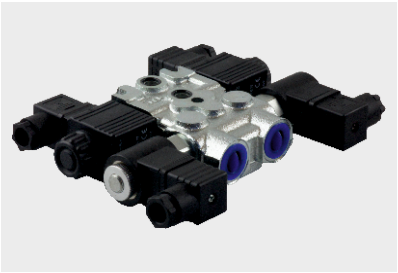
A11C	

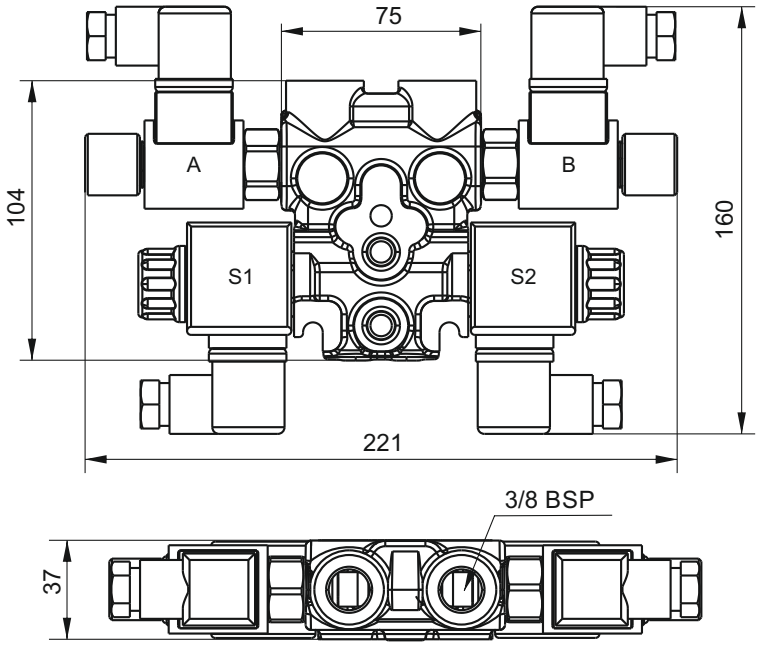
transitory

Limits of use



STACKABLE SOLENOID VALVES WITH 3/4-16UNF CAVITY FOR ADDITIONAL VALVES





Options

Description	Spare part code
Closure plate, to be used as the last element	**SD02TOP**
Kit 3 tie rods + nut M8 8.8 (x = number of element)	**SD020x**

Main features

Max pressure	250 bar
Max pressure on T port	50 bar
Max flow	50 l/min
Weight	2,08 Kg (1 solenoid) 2,38 Kg (2 solenoid)
Internal leakage	0,02÷0,06 l/min at 100bar, 21 cSt
Fixing bolts	3 x M8 tie-rods 15 Nm torque. 8.8 class steel or above
Coil insulation	Class H
Electric connection	DIN 43650-A / ISO 4400
Protection class	IP 65 / DIN 40050
Duty cycle	ED 100%
Voltage required	+/- 10% nominal voltage
Manual Overide	included as standard
Standards	EN50081-1 / EN50082-2 (89/336 CEE electromagnetic comp.) 73/23/CEE / 96/68/CEE (low voltage)
Fluid temperature	-20°C +80°C

Note: For limits of use see diagram page G010

Spare part code

SD02 — **Stackable modular directional solenoid valve + cavity 3/4-16UNF for additional valves**

E2 — **Spool configuration:**
see table below

TP — **Version:**
TP = parallel ports
with 3/4-16 UNF cavity

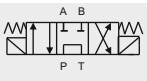
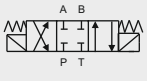
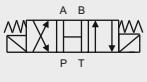
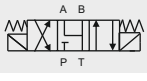
24DC — **Supply voltage:**
see coils table section G

AR24DC — **Cavity A:**
X = open cavity
L = closed plug
ARxx = valve 2/2 NC (xx = voltage)
S = check flow bidirectional valve

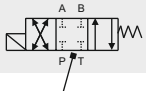
AR24DC — **Cavity B:**
X = open cavity
L = closed plug
ARxx = valve 2/2 NC (xx = voltage)
S = bidirectional flow control valve

Spool

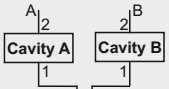
Double solenoid

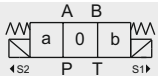
A2	
B2	
C2	
E2	

Single solenoid

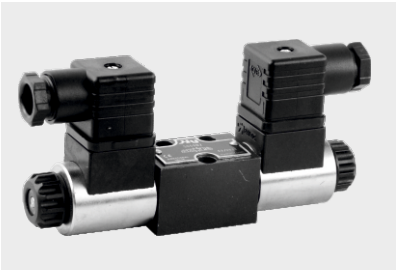
A11C	

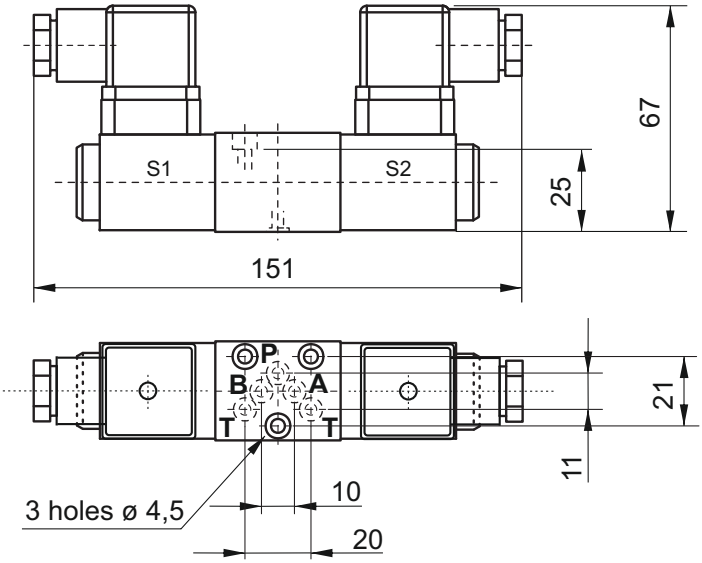
transitory

Cavity option	
Code	

Code	

NG3 MICRO DIRECTIONAL SOLENOID VALVES





Main features

Max pressure	315 bar
Max pressure on T port	100 bar
Max flow	15 l/min
Weight	0,7 kg (2 solenoid) 0,55 kg (1 solenoid)
Internal leakage	< 0,01 l/min at 200bar
Fixing bolts	3 TCEI M4x35 bolts 2,8 Nm torque. 10,9 class steel or above
Coil insulation	Class H
Electric connection	DIN 43650-A / ISO 4400
Protection class	IP 65 / DIN 40050
Duty cycle	ED 100%
Voltage required	+/- 10% nominal voltage
Manual Overide	included as standard
Standards	EN50081-1 / EN50082-2 (89/336 CEE electromagnetic comp.) 73/23/CEE / 96/68/CEE (low voltage)

Spare part code

SD00 — **NG3 micro directional solenoid valve**

A2 — **Spool configuration:** see table below

24DC — **Supply voltage:** see coils table section G

- — **Options:** - = std

Spool

Code	
	A B / a 0 b / S2 P T S1

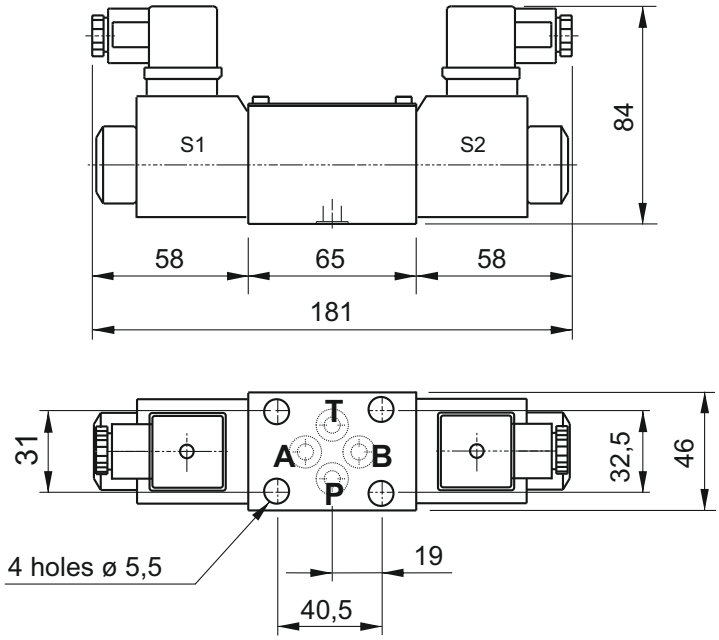
Double solenoid

A2	A B / P T
B2	A B / P T
C2	A B / P T
E2	A B / P T

Single solenoid

A11C	A B / P T (transitory)

NG6 (CETOP 3) DIRECTIONAL SOLENOID VALVES



Main features

Max pressure	280 bar
Max pressure on T port	210 bar static, 180 bar dinamic
Max flow	40 l/min
Weight	1,43 kg (2 solenoid) 1,16 kg (1 solenoid)
Internal leakage	0,04 l/min at 200bar
Fixing bolts	4 M5x30 bolts. 5Nm torque 10,9 class steel or above
Coil insulation	Class H
Electric connection	DIN 43650-A / ISO 4400
Protection class	IP 65 / DIN 40050
Duty cycle	ED 100%
Voltage required	+/- 10% nominal voltage
Manual Overide	included as standard
Standards	EN50081-1 / EN50082-2 (89/336 CEE electromagnetic comp.) 73/23/CEE / 96/68/CEE (low voltage)

Spare part code

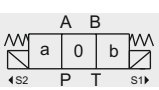
SD03 — **Cetop 3 directional solenoid valve**

A2 — **Spool configuration:** see table below

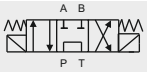
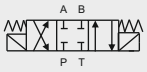
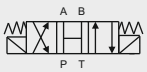
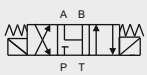
24DC — **Supply voltage:** see coils table section G

- — **Options:** - = std

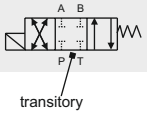
Spool

Code	
	

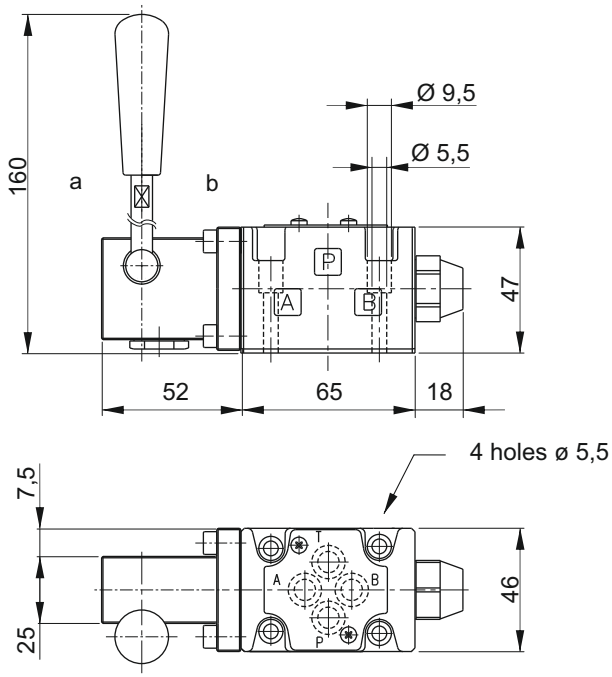
Double solenoid

A2	
B2	
C2	
E2	

Single solenoid

A11C	

NG6 (CETOP 3) MANUAL DIRECTIONAL CONTROL VALVES



Main features

Max pressure	300 bar
Max pressure on T port	150 bar
Max flow	30 l/min
Weight	1,32 kg
Fixing bolts	4 M5x30 bolts 5Nm torque 10,9 class steel or above
Fluid temperature	-20 ÷ +80°C
Filtration degree	25 ÷ 50 µ

Spare part code

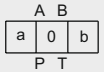
HD03 — **Cetop 3 manual directional control valve**

A — **Spool control:** see table below

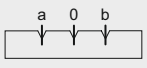
1 — **Spool configuration** see table below

- — **Options:** - = std

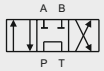
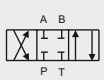
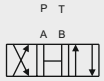
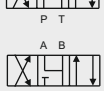
Code



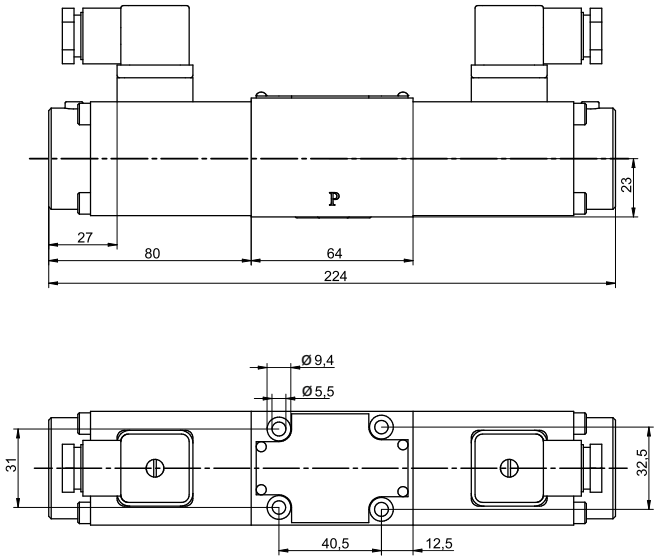
Spool control

Spring centered	**A**	
Detented	**D**	

Spool

1	
2	
3	
4	

CETOP3 (NG6) PROPORTIONAL DIRECTIONAL VALVE



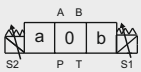
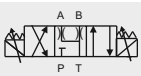
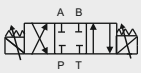
Main features

Max pressure	315 bar
Max pressure on T port	160 bar
Max flow	up to 10 l/min
Weight 2 solenoids	2,5 Kg
Weight 1 solenoid	1,8 Kg
Coil insulation	Class H
Electric connection	DIN 43650-A / ISO 4400
Protection class	IP 65 / DIN 40050
Duty cycle	ED 100%
Voltage required	+/- 10% nominal voltage
Manual Overide	push
Standards	EN50081-1 / EN50082-2 (89/336 CEE electromagnetic comp.) 73/23/CEE / 96/68/CEE (low voltage)

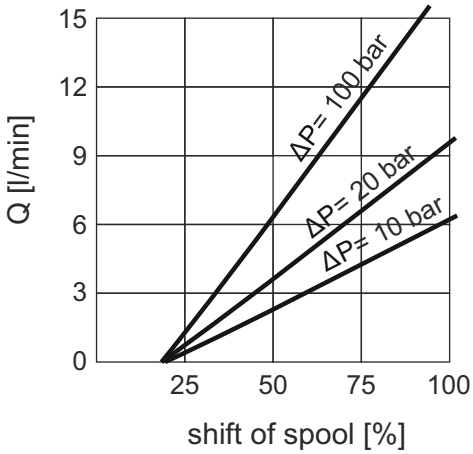
Code

SPD03	**CETOP3 (NG6) proportional directional valve**
E2	**Spool configuration:** see table below
10	**Flow [lpm]**
-	**Options:** - = std

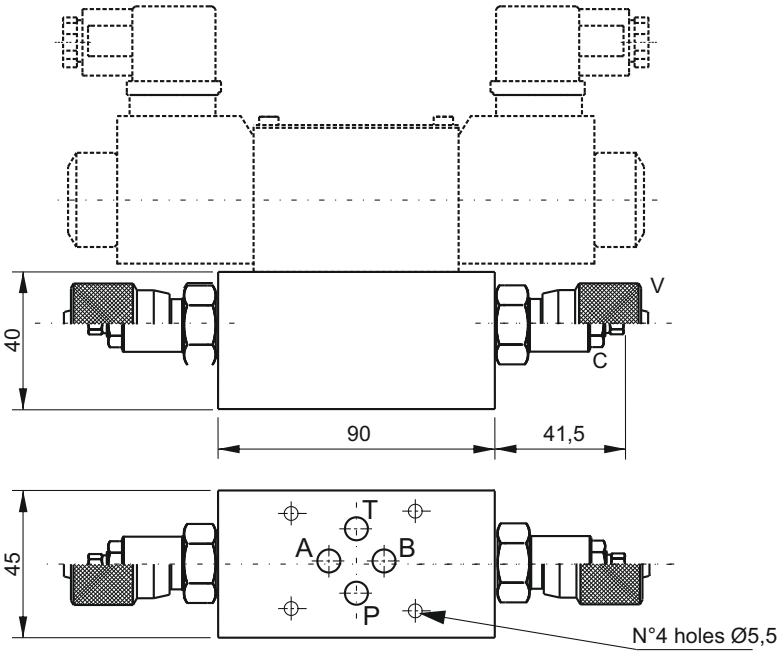
Spool

Code	
	
E2	
B2	

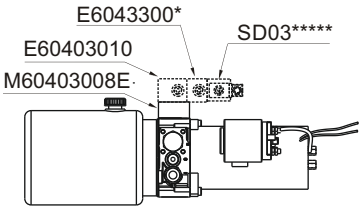
Flow vs current



NG6 (CETOP 3) SANDWICH FLOW CONTROL VALVE



Mounting example



Main features

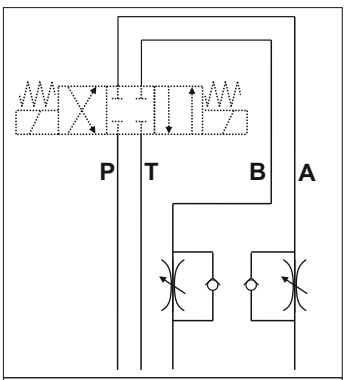
Max pressure	300 bar
Max flow	15 l/min
Weight	Single valve: 0,52 kg Double valve: 0,64 kg
Fixing bolts	4 M5x° bolts. 5Nm torque 10,9 class steel or above
Fluid temperature	-20 ÷ +80°C
Filtration degree	25 ÷ 50 µ

Spare part code

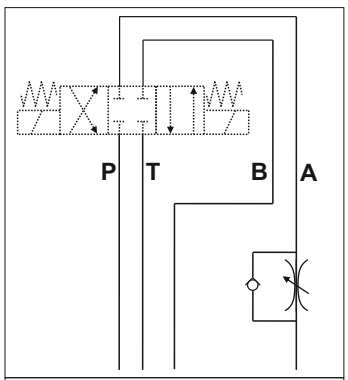
E6043300** — **NG6 (Cetop 3) sandwich meter-out flow control valve**

1 — **Type:**
1 = on A and B
2 = on A
3 = on B

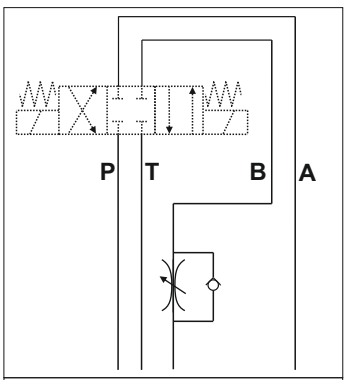
- — **Adjusting device:**
- = screw (std)
V = handwheel



Spare part code
E60433001*



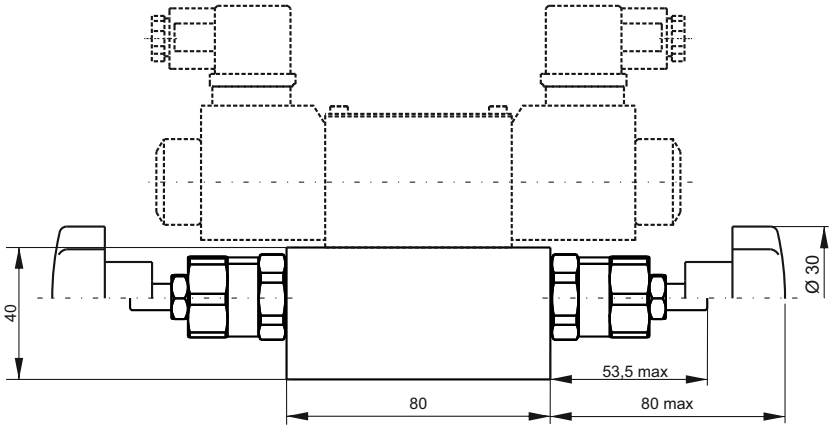
Spare part code
E60433002*



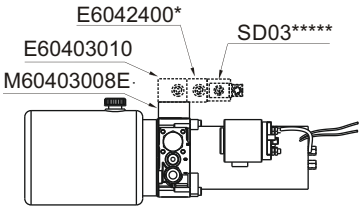
Spare part code
E60433003*

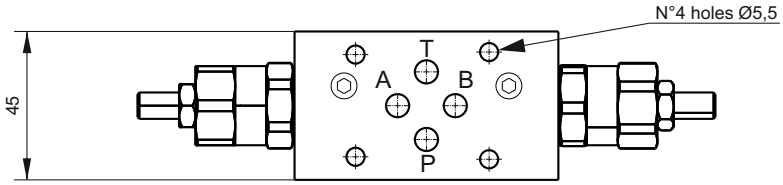
Notes: code does not include the Cetop solenoid valve.
° Bolt length depends on number of modular blocks and type of valve.

NG6 (CETOP 3) SANDWICH RELIEF VALVE



Mounting example





Main features

Max pressure	350 bar
Max flow	20 l/min
Weight	Single valve: 0,52 kg Double valve: 0,64 kg
Fixing bolts	4 M5x° bolts. 5Nm torque 10,9 class steel or above
Fluid temperature	-20 ÷ +80°C
Filtration	25 ÷ 50 µ

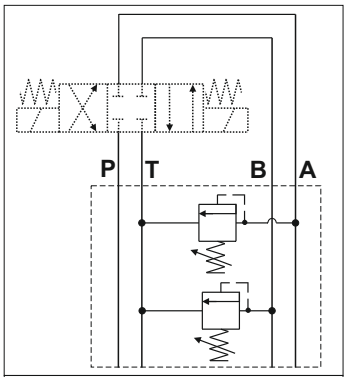
Spare part code

E6042400** — **NG6 (Cetop 3) sandwich relief v.**

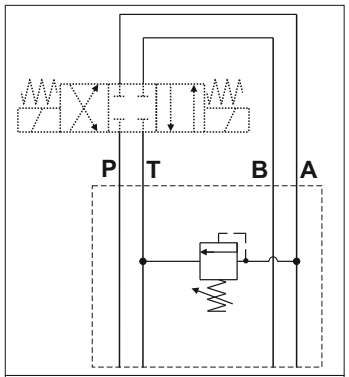
1 — **Type:**
1 = on A and B
2 = on A
3 = on B

B — **Pressure range settings:**
A = 3 ÷ 60 bar
B = 40 ÷ 120 bar
C = 80 ÷ 250 bar
D = 150 ÷ 350 bar

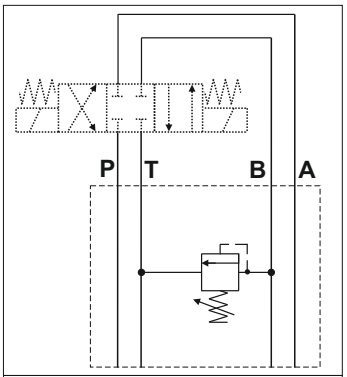
***** — **Option:**
see VMDC20 table in section D



Spare Part Code
E60424001**



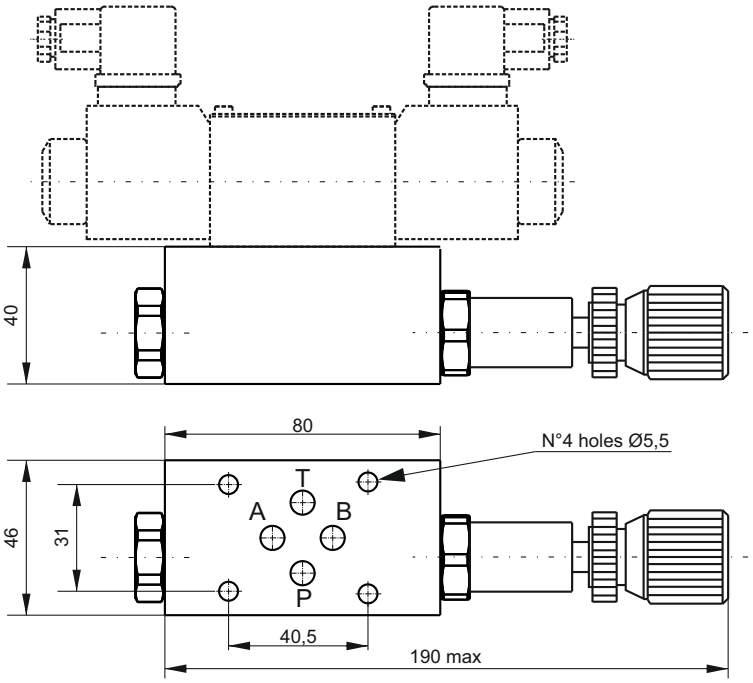
Spare Part Code
E60424002**



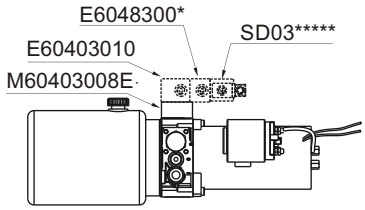
Spare Part Code
E60424003**

Notes: code does not include the Cetop solenoid valve. When E60423001 relief valves have different pressure ranges, please specify them separately.
eg: E60424001AB=60 bar max for valve on A port, 120bar max for valve on B port.
° Bolt length depends on number of modular blocks and type of valve.

NG6 (CETOP 3) SANDWICH PRESSURE REDUCING VALVE



Mounting example



Main features

Max pressure	210 bar
Max flow	35 l/min
Weight	1,3 kg
Fixing bolts	4 M5x** bolts. 5Nm torque 10,9 class steel or above
Fluid temperature	-20 ÷ +80°C
Filtration	25 ÷ 50 µ

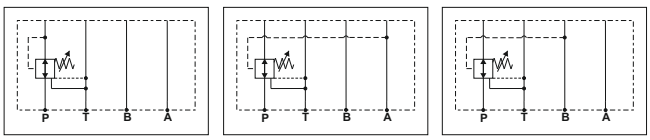
Spare part code

E6048300* — **NG6 (Cetop 3) pressure reducing valve**

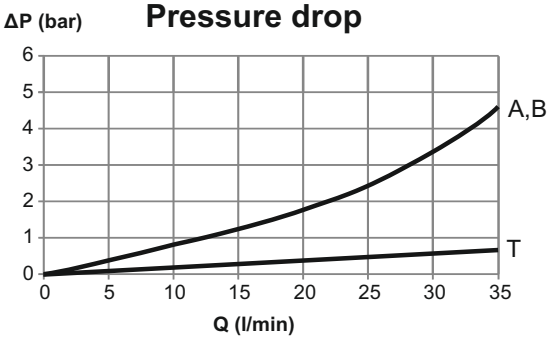
1 — **Hydraulic scheme (see below):**
1: reducing on P
2: reducing on A
3: reducing on B

B — Spring range:
B: 7-70 bar
D: 70-210 bar

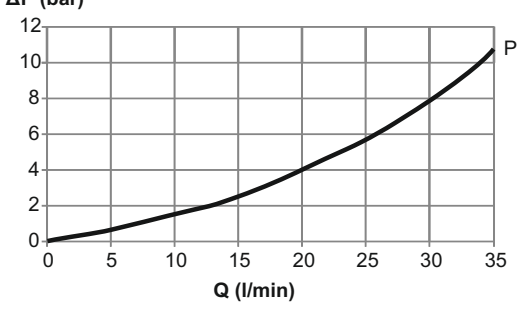
1 2 3



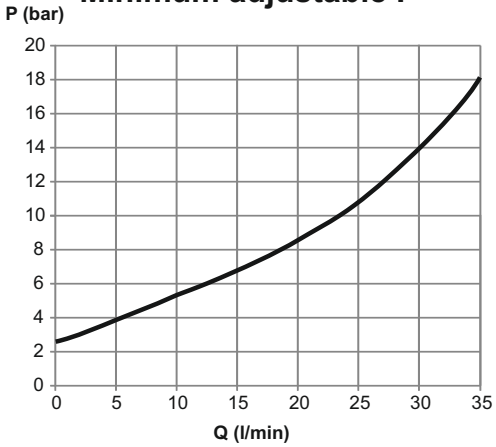
Pressure drop



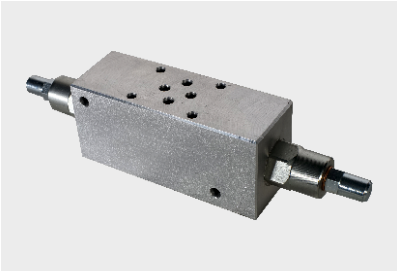
Pressure drop



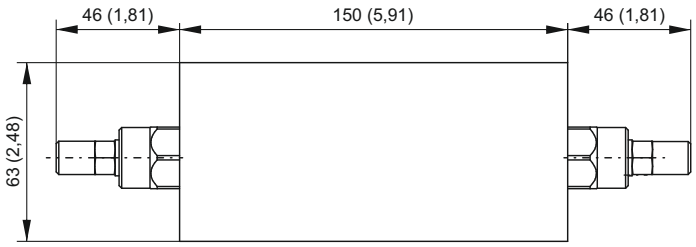
Minimum adjustable P



NG6 (CETOP 3) SANDWICH MODULAR OVERCENTRE VALVE



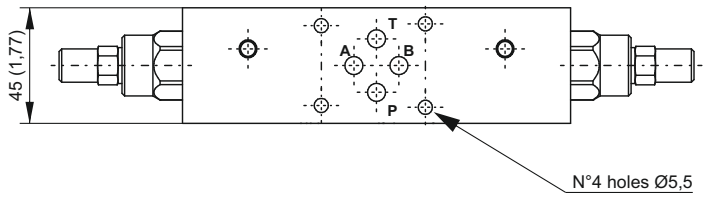
Dimensions in mm (inches)



Main features

Max pressure	350 bar
Max flow	up to 50 l/min
Fixing bolts	4 M5x** bolts. 5Nm torque 10,9 class steel or above
Fluid temperature	-30 ÷ +80°C
Filtration degree	25 ÷ 50 µ
Pilot ratios	4.25:1

Setting pressure must be at least 1,3 times the maximum load induced pressure.

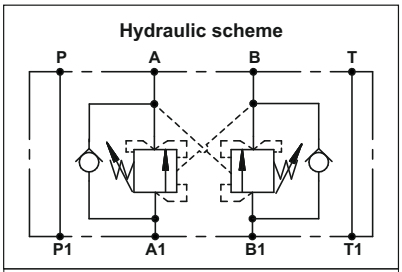


Spare part code

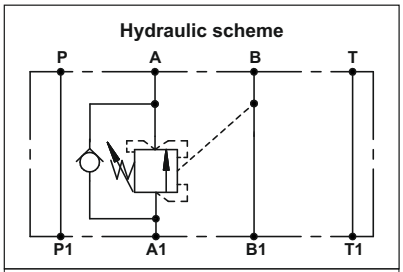
E6045300**
NG6 (Cetop 3) sandwich overcentre valve

1
Type:
1: on A and B
2: on A
3: on B

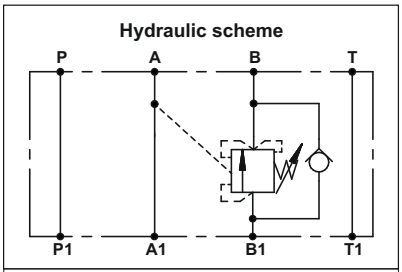
A
Pressure range settings:
A = 30 ÷ 220 bar
B = 60 ÷ 350 bar



Spare Part Code
E60453001*



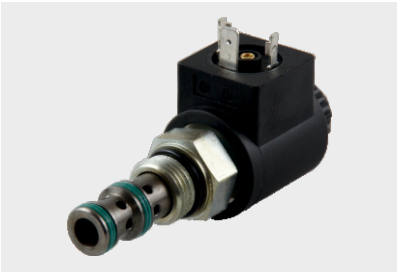
Spare Part Code
E60453002*

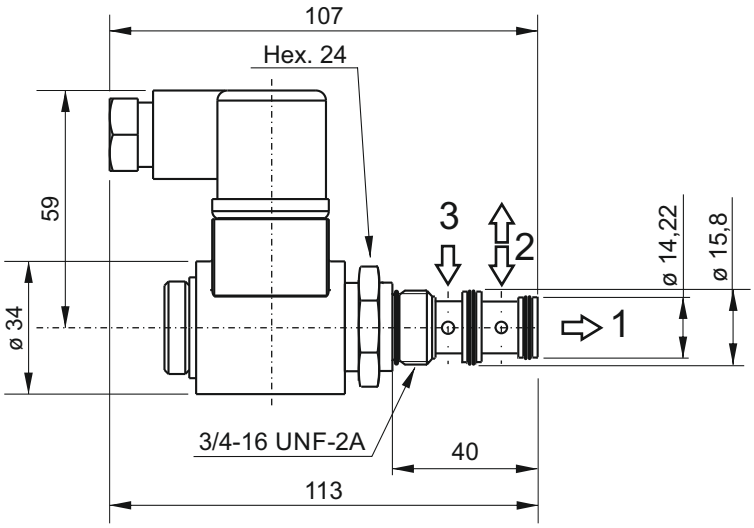


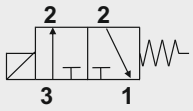
Spare Part Code
E60453003*

Note: to add external manifolds to PPC assembly code, just add their spare part codes at the end of the PPC code.
eg: PPC-0,8 12DC-UA-J-G1,1-V200-G-RETURN KIT-1,5L+**E60403004-E60403010-E60453001+SD03A2 12DC.**

MSV3V - DIRECT OPERATED 3/2 WAY DIRECTIONAL SPOOL SOLENOID CARTRIDGE







Main features

Max pressure	210 bar
Max flow	12 l/min (20 l/min without block)
Weight	0,35 Kg (with coil)
Coil insulation	Class H
Electric connection	DIN 43650-A / ISO 4400
Protection class	IP 65 / DIN 40050
Duty cycle	ED 100%
Voltage required	+/- 10% nominal voltage
Torque recommended	30 Nm
Fluid temperature	-25 ÷ +70°C

Spare part code

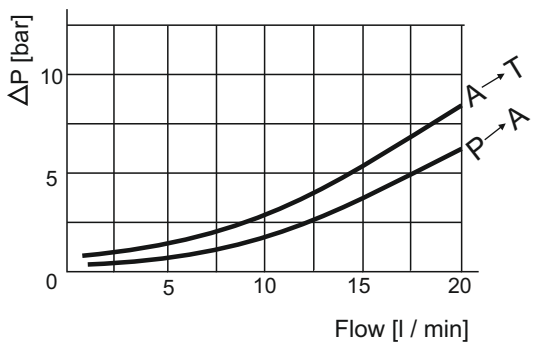
MSV3V — **Three-way direct acting solenoid valve**

40 — **Spool type:** 40 = std

0 — **Options:** 0 = no options (std)

0000 — **Supply voltage:** 0000 = no coil (std) see coils table

Pressure drop diagram



VALVES COILS

M100 M630/M631 M140 M160 M630DT*

Supply voltage [V]	Assembly code	Coil type	Spare part code	Spare connector code/type	Holding power [W]	Duty cycle ED [%]	Coil insulation	Weight [g]	Suitable for valves
12DC	12DC_M100	DC	**M10040001**	KA132000B1 DIN43650/ISO4400	16W	100	H	121	SD00
24DC	24DC_M100	DC	**M10040002**	KA132000B1 DIN43650/ISO4400	16W	100	H	121	SD00
24AC	24RAC_M100	RC - needs external rectifying connector	**M10040002**	KA132R11B1 DIN43650/ISO4400	16W	100	H	121	SD00
12DC	12DC_M140	DC	**M14040001**	KA132000B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
24DC	24DC_M140	DC	**M14040002**	KA132000B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
48DC	48DC_M140	DC	**M14040003**	KA132000B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
24AC	24RAC_M140	RC - needs external rectifying connector	**M14040002**	KA132R11B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
115AC	110RAC_M140	RC - needs external rectifying connector	**M14040004**	KA132R12B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
230AC	220RAC_M140	RC - needs external rectifying connector	**M14040005**	KA132R13B1 DIN43650/ISO4400	22W	100	H	202	MDV30 MDV31
12DC	12DC_M160	DC	**M16040001**	KA132000B1 DIN43650/ISO4400	26W	100	H	190	SD03
24DC	24DC_M160	DC	**M16040002**	KA132000B1 DIN43650/ISO4400	26W	100	H	190	SD03
24AC	24RAC_M160	RC - needs external rectifying connector	**M16040002**	KA132R11B1 DIN43650/ISO4400	26W	100	H	190	SD03
115AC	110RAC_M160	RC - needs external rectifying connector	**M16040004**	KA132R12B1 DIN43650/ISO4400	26W	100	H	190	SD03
230AC	220RAC_M160	RC - needs external rectifying connector	**M16040005**	KA132R13B1 DIN43650/ISO4400	26W	100	H	190	SD03
12DC	12DC_M630	DC	**M6306012**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV3V MSV30/31 SD02
24DC	24DC_M630	DC	**M6306024**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV3V MSV30/31 SD02
48DC	48DC_M630	DC	**M6306048**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV3V MSV30/31 SD02
24AC	24AC_M631	RC with integrated rectifying bridge	**M6316024**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV3V MSV30/31 SD02
115AC	115AC_M631	RC with integrated rectifying bridge	**M6316115**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV3V MSV30/31 SD02
230AC	230AC_M631	RC with integrated rectifying bridge	**M6316230**	KA132000B1 DIN43650/ISO4400	18W	100	H	130	MSV3V MSV30/31 SD02
12DC	12DC_M630DT	DC, Deutsch	**M6306012DT**	DT06_4S Deutsch	16W	100	H	117	MDV30 MSV30/31 SD00
24DC	24DC_M630DT	DC, Deutsch	**M6306024DT**	DT06-4S Deutsch	16W	100	H	117	MDV30 MSV30/31 SD00

Standard electric connector: ISO 4400 DIN 43650-A. Other voltages and electric connector types (Amp Junior, flying leads,...) available on request.
Inrush power consumption can be up to 3,5 times higher than the holding power. Coil protection class: IP65.
M160* coils supplied with AC current need and external rectifying connector.
The tests were carried out at the nominal current ± 5%, at an environmental temperature of 25°C.

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