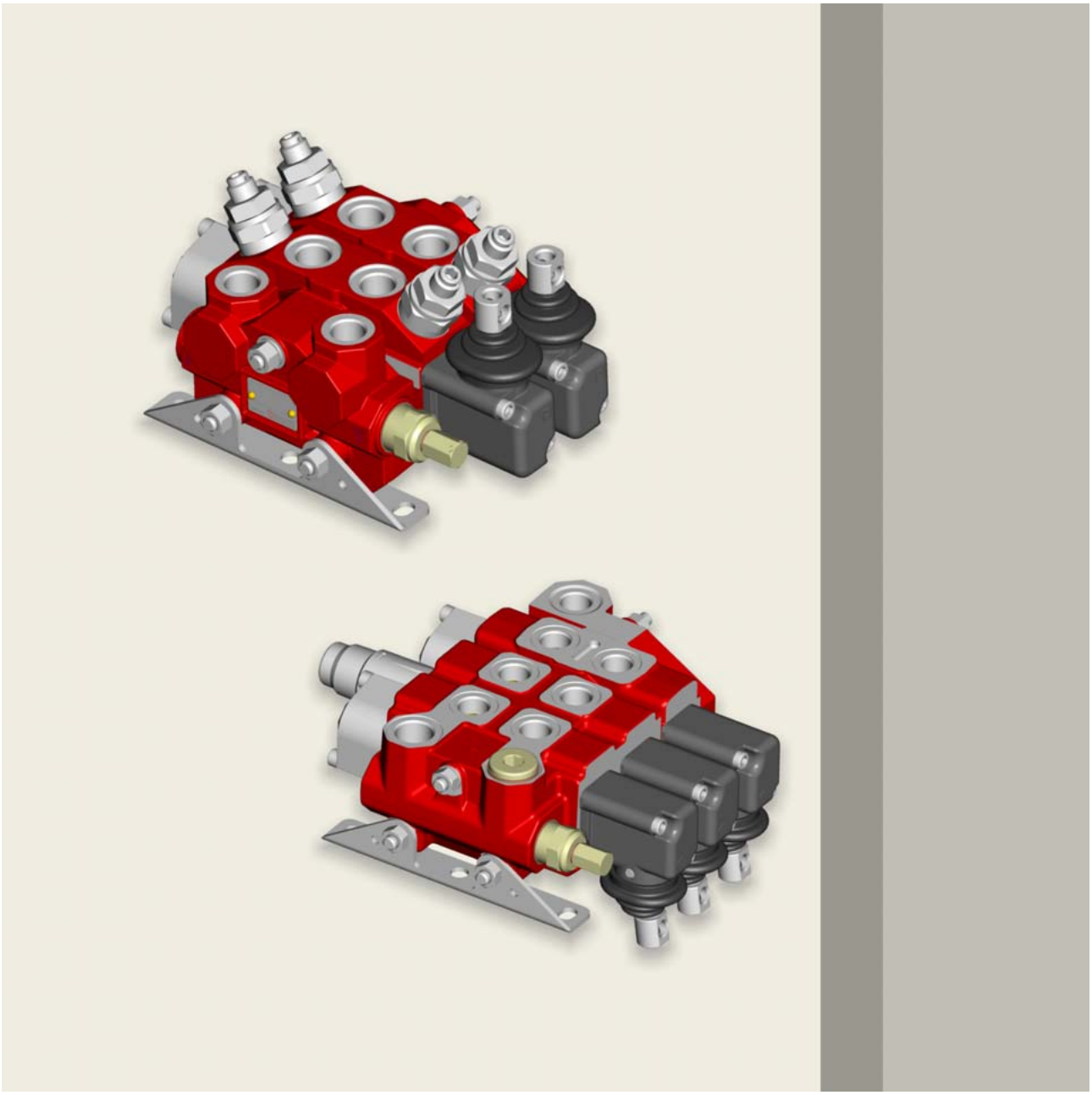
BUCHER HYDRAULICS

Monoblock and Sectional Directional Control Valve series HDM/HDS15



motion and progress

Reference: 200-P-991228-E-00

BUCHER HYDRAULICS

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1 Installation and maintenance - General information

1.1 Directional valve installation

For the installation of the directional control valve on the equipment frame it is important to consider the following recommendations:

- the valve can be assembled in any position but, in order to avoid deformations and spool sticking, the surface on which the product is mounted has to be flat;
- before cabling pipelines, make sure that the pipeline hollows as well as fittings and seals are thoroughly clean; check also that the work ports are protected until the connection of the pipelines
- during assembly and servicing operations, it is necessary to adopt clean procedures and work in an environment free of chips, swarf, dust and other possible source of pollution;
- if the spools are connected to the equipment controls through linkages, make sure that they do not affect their operations;
- before painting the valve, check that the work port plastic plugs are tightly in place.

1.2 Fittings

In the interest of safety, only fittings with STRAIGHT THREAD ENDS should be used (e.g. DIN3852).

Fittings with TAPERED THREAD ENDS (e.g. DIN 3852 form C) should never be used, as they can cause deformation and cracks in the valve body.

Our warranty conditions will be not valid in case tapered fittings are used.

The work port adaptors have to be fastened respecting the tightening torque values indicated in the following table (for different port types contact our Sales Dept.):

Recommended tightening torque for work port fittings - Nm/lbft			
Metric - ISO 261	**M18X1.5**	**M22X1.5**	**M27X2**
With O-Ring seal (ISO 6149-1)	40/29.5	60/44.3	90/66.4
With copper washer (ISO 9974-1)	40/29.5	60/44.3	90/66.4
With rubber washer or steel (ISO 9974-1)	35/25.8	60/44.3	70/51.7
BSP - ISO 228-1	**3/8” BSP**	**1/2” BSP**	**3/4” BSP**
With copper washer (ISO 1179-1)	40/29.5	60/44.3	90/66.4
With rubber washer or steel (ISO 1179-1)	35/25.8	60/44.3	70/51.7
UN-UNF - ISO 263	**SAE8 - 3/4-16 UNF**	**SAE10 - 7/8-14UNF**	**SAE12 - 1-1/16-12UNF**
With O-Ring seal (ISO 11926-1)	40/29.5	60/44.3	90/66.4

IMPORTANT!: Tightening torques depends on several different factors including lubrication, coating and surfaces finish. The fitting manufacturer shall be consulted.

1.3 Hydraulic fluid

The main function of the fluid used in hydraulic systems is to transfer energy but it performs also other important functions: protect the components from corrosion, lubricate the directional valve moving parts, remove particles and heat from the system.

In order to ensure proper operation and long life of the system it is important to choose the correct hydraulic fluid with proper additives.

Bucher Hydraulics recommends to use a mineral based oil responding to ISO 6743/4 requirements, only.

The system should be operated only with hydraulic oil containing anti-foaming and antioxidant additives.
Before using other types of fluid, please contact our Sales Dept, since they can cause serious damage to the directional valve components and jeopardize the correct function of the system.

1.4 Filtration

In order to ensure proper operation and long life of the directional valve components it is extremely important to provide a proper and effective filtration of the hydraulic fluid.
It is advisable to follow filter manufacturers instructions and recommendations.

The fineness of the filter should be selected in order to guarantee that a contamination level of 21/19/16 ISO4406: 1999 (NAS 1638-CLASS10) is not exceeded.

When solenoid operated valves, (eg: on direct acting electromagnetic or electro-hydraulic positioners) are integrated in the directional valve, a 10 μm nominal pressure filter must be used. In these cases it is also advisable to use a pressure filter with by-pass and indicator.

For mechanical operated directional valves a <30 μm nominal return filter is adequate.

The size of the return filters must suit the maximum return flow whereas the size of the pressure filters must suit the maximum pump flow.

It is advisable to fit filters with pressure gauge or dirt indicator in order to make it possible to verify the filter condition.

Particular attention has to be paid to the cleaning of the machine hydraulic circuit and its components before the first run-in, since the presence of foreign materials could cause damages to the directional valve components even if a proper filtration is provided.

1.5 Directives and standards

Recommended conditions for obtaining the best performance of the system: we recommend to strictly follow the conditions advised here above, failing which warranty shall be void.

- **Atex:**

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

- **Machinery safety**

Hydraulic directional control valves are excluded by Directive 2006/42/EC

- **ISO 9001: 2000**

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

- **ISO 14000**

BHRE is certified in Environmental Management System.

1.6 Hydraulic system

1.6.1 Technical specification:

IMPORTANT!: Specifications and diagrams shown in this catalogue are measured with mineral oil having a viscosity of 23 mm^2/s at 50° C

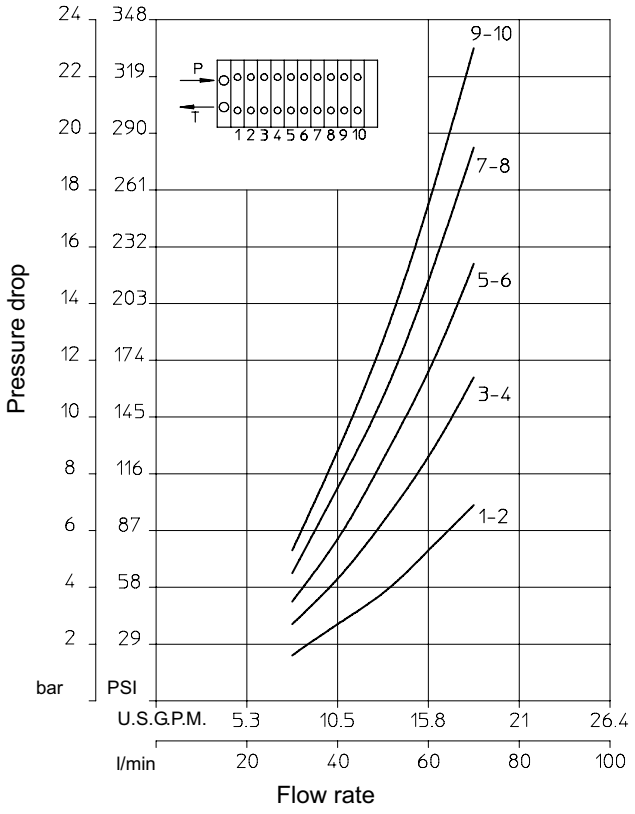
Features		
	Standard	**ON-OFF**
Nominal flow range	**60 l/min** *(15 US gpm)*	
Max inlet pressure (P)	**250 bar** *(3600 PSI)*	
Max work port pressure (A/B)	**320 bar** *(4600 PSI)*	
Max back pressure (outlet port T)	**30 bar** *(430 PSI)*	**20 bar** *(290 PSI)*
Max back pressure (outlet port T) with electro-hydraulic positioner (EHO)	**10 bar** *(143 PSI)*	**10 bar** *(143 PSI)*
Max spool leakage at 100 bar *(1450 PSI)* temp 50°C *(120°F)* viscosity 23 cSt	**14 cc/min** *(0.854 Cu In/min)*	**35 cc/min** *(2.492 Cu In/min)*
	16 cc/min with UC valve *(1.139 Cu In/min)*	**37 cc/min with UC valve** *(2.634 Cu In^3min)*
Fluid	**mineral based oil (ISO 6743/4)**	
Fluid temperature (with NBR seals)	**from -20° to 80 °C** *(from -4° to 176° F)*	
Viscosity	**from 15 to 75 mm^2/s**	
Max contamination level	**21/19/16 ISO4406:1999** *(NAS 1638-CLASS10)*	
Number of spools	**2-10**	
Adjustable direct operated relief valve (tamper-proof seal available on request)	**RV**	
Load hold check valve in each section	**LC**	
Antishock, anticavitation and combined valves	**OA-UC-C**	
Mechanical operated check valve	**RSM3**	

For different operating conditions, please contact our Sales Dept.

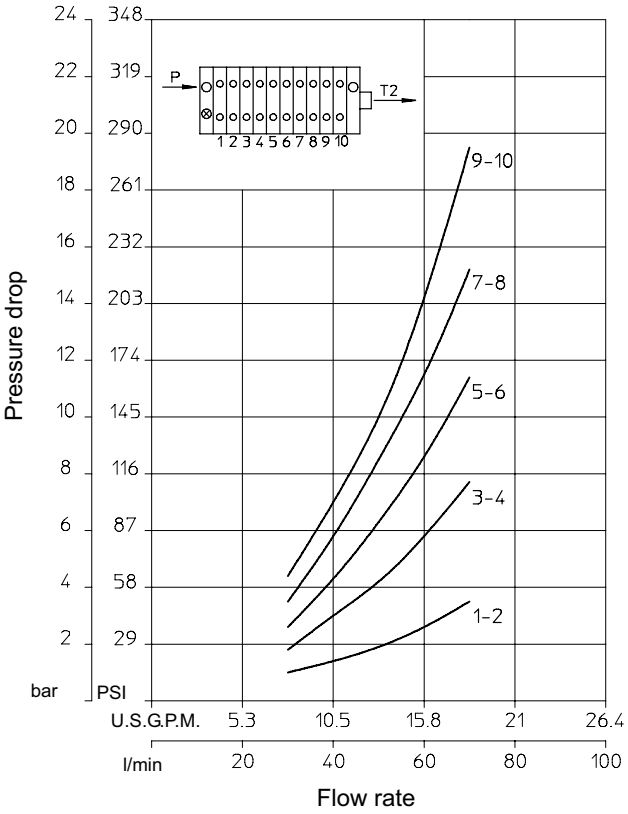
2 Performance curves

Oil: Shell Tellus T32
Temperature: 50° C (120° F)
Viscosity: 23 mm^2/s

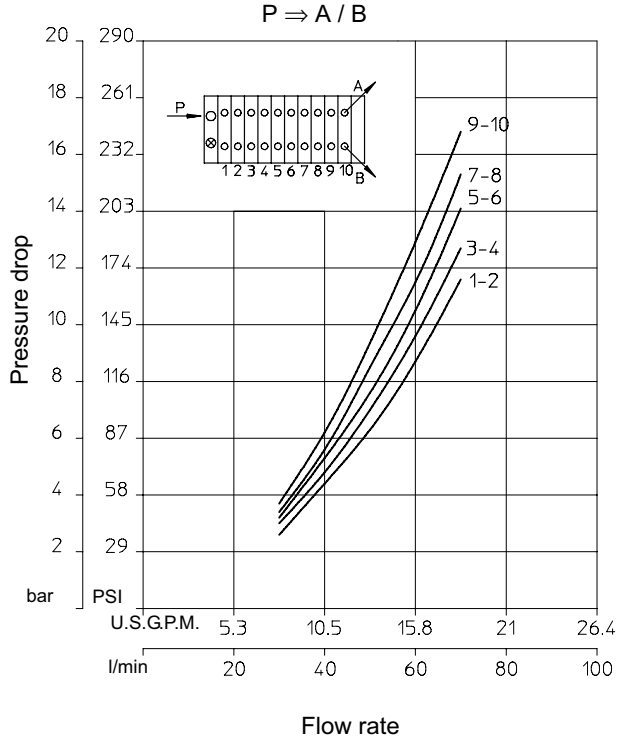
P ⇒ T



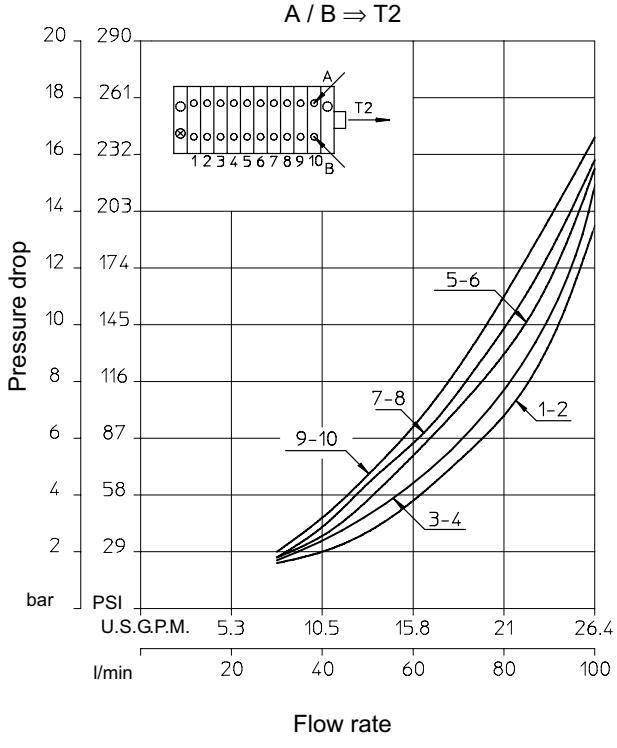
P ⇒ T2



P ⇒ A / B

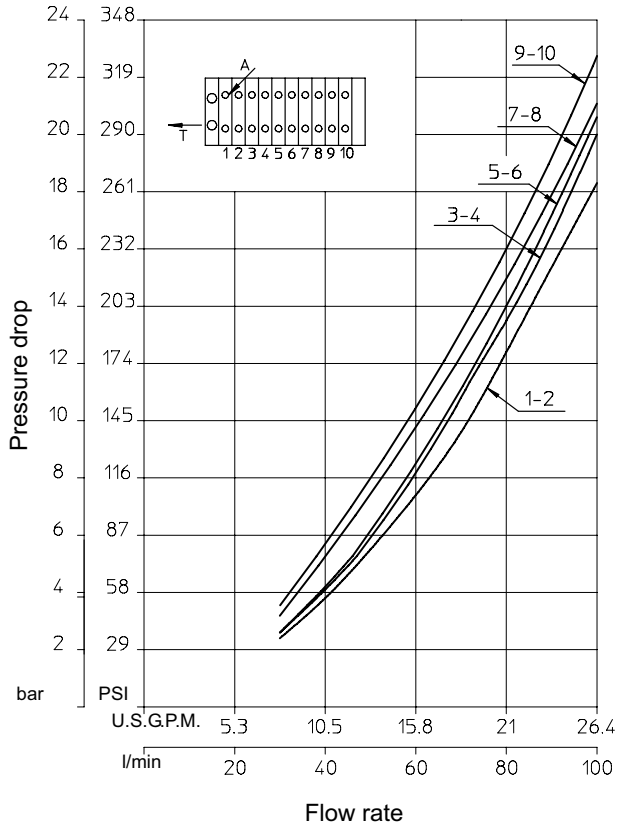


A / B ⇒ T2

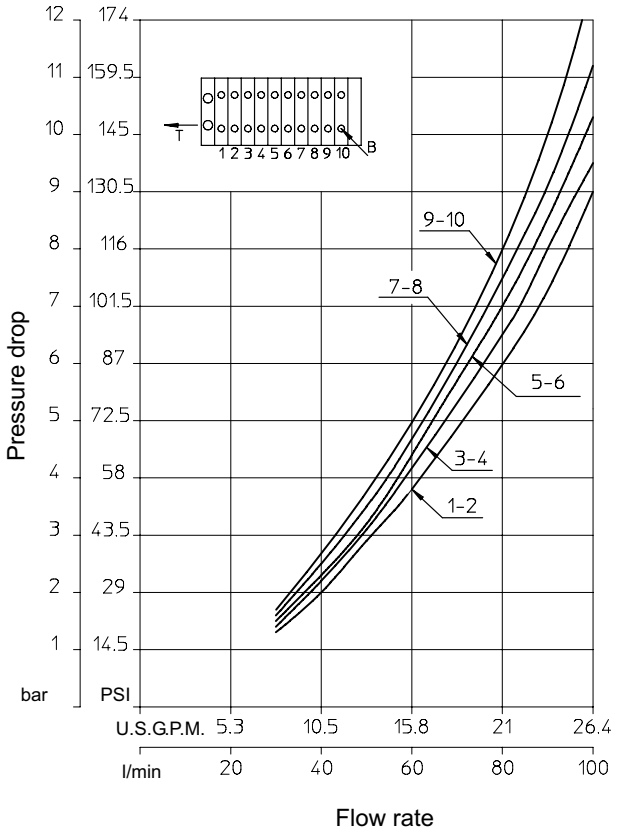


Oil: Shell Tellus T37
Temperature: 50° C (120° F)
Viscosity: 27 mm²/s

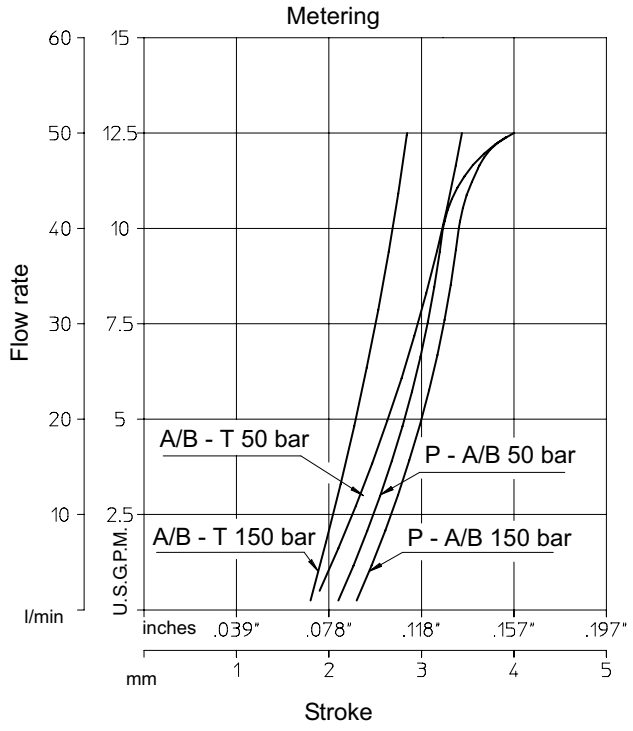
A ⇒ T



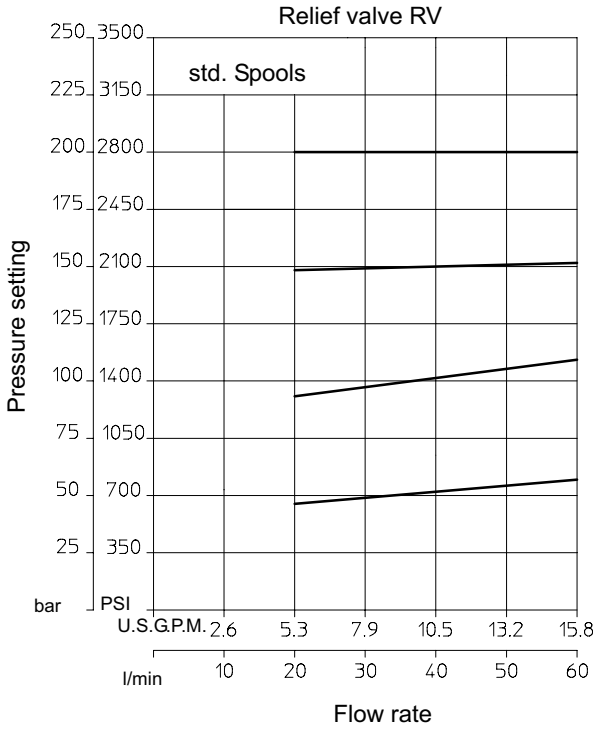
B ⇒ T



Metering



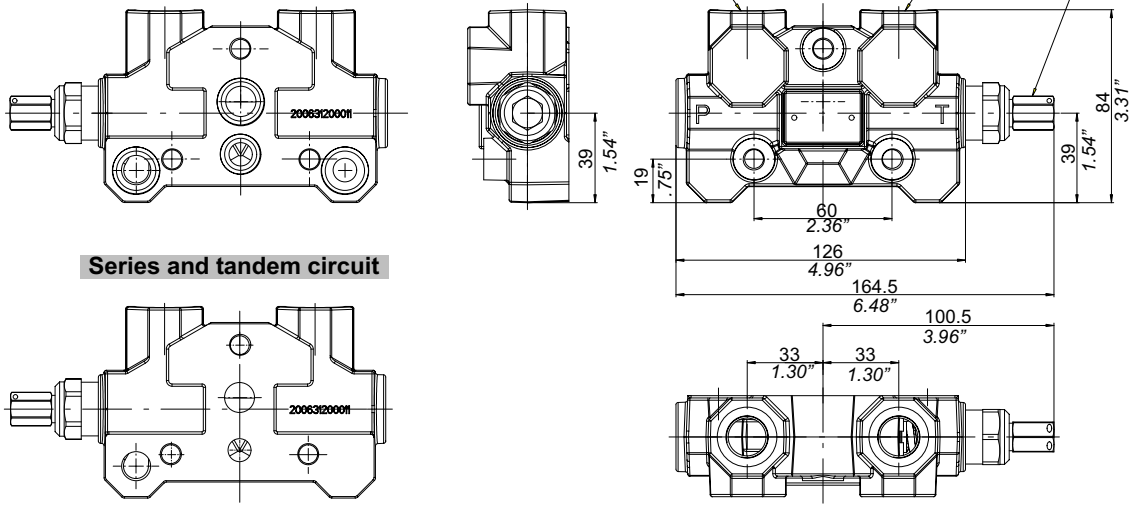
Relief valve RV



3 Inlet cover

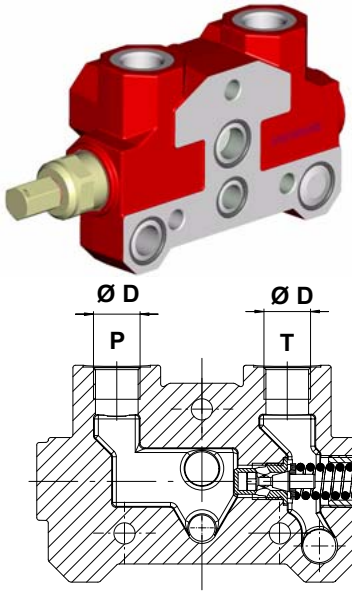
3.1 Std inlet cover with relief valve RV dimension

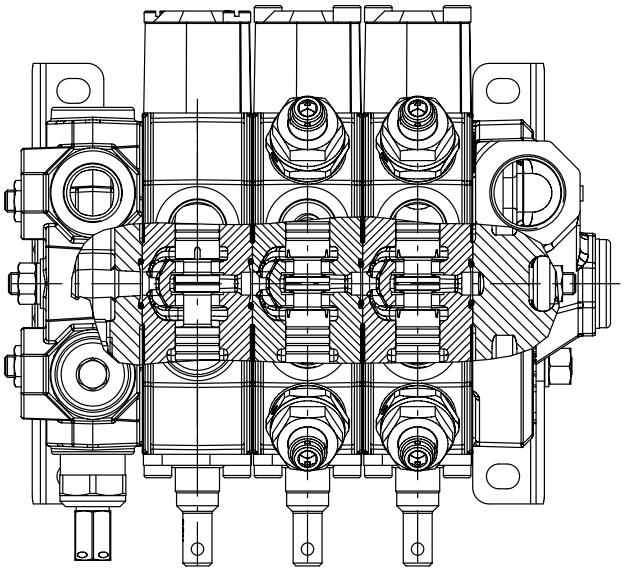
Parallel circuit



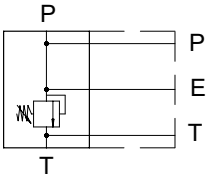
Series and tandem circuit

3.1.1 Std inlet cover for parallel circuit with relief valve RV + o-ring seals



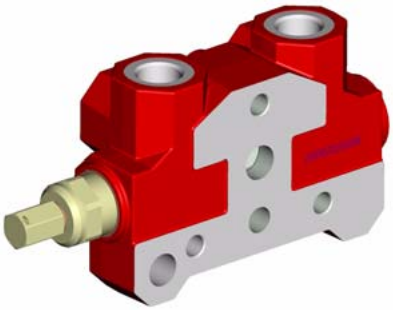


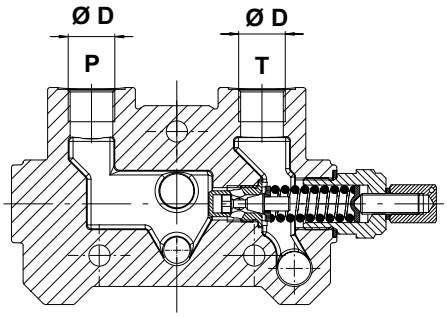
Ø D	Type/Code*
M18X1.5	**T01 200931210070**
3/8" BSP	**T02 200931220060**
1/2" BSP Standard	**T03 200931230110**
SAE10	**T05 200931280020**

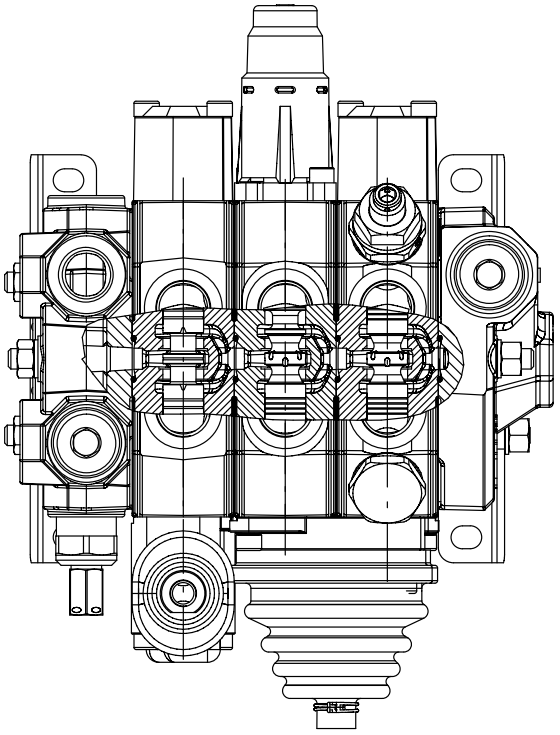


* Group code with RV set at standard pressure 150 bar (210 PSI)

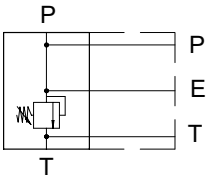
3.1.2 Std inlet cover for series and tandem circuit with relief valve RV





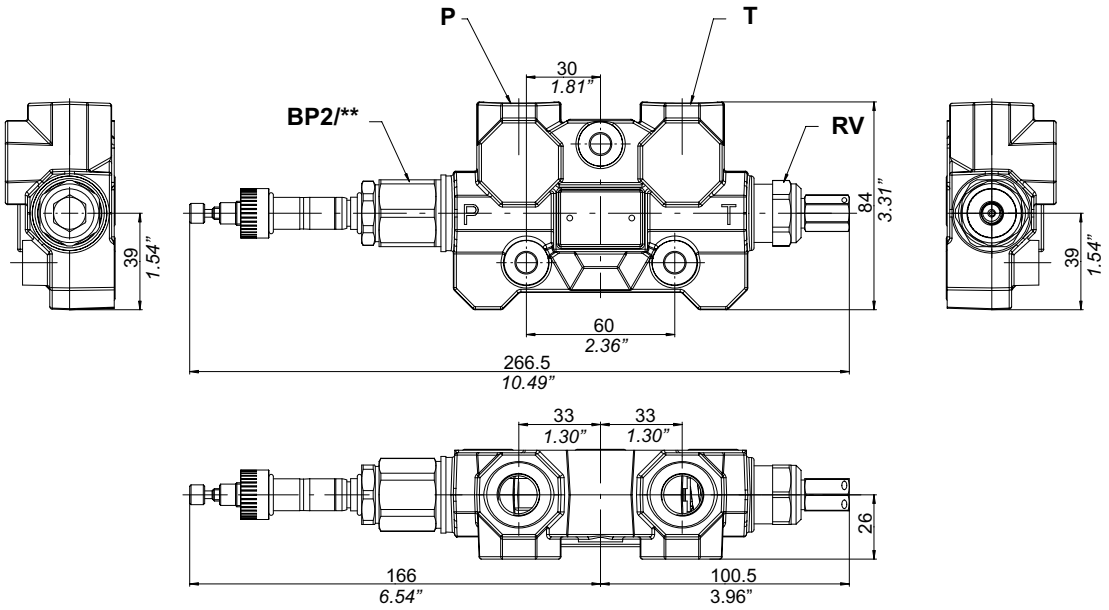


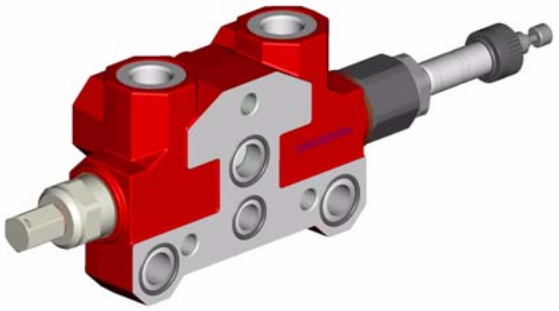
Ø D	Type/Code*
M18X1.5	**T41 200931210050**
3/8” BSP	**T42 200931220050**
1/2” BSP Standard	**T43 200931230080**
SAE10	**T45 200931280010**

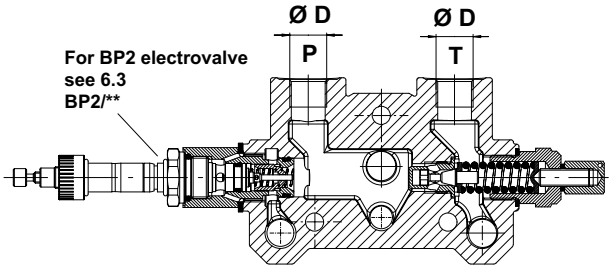


* Group code with RV set at standard pressure 150 bar (210 PSI)

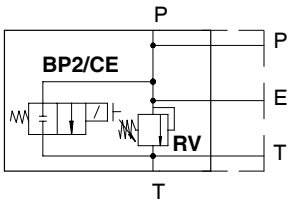
3.2 Unloading solenoid valve BP2/CE -BP2/AE for parallel circuit

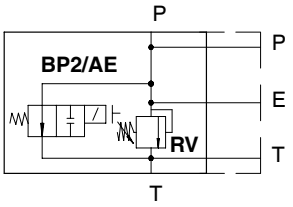






Ø D	By-pass solenoid valve circuit	Type	Type code (*)
M18X1.5	**BP2/AE BP2/CE**	**T21**	**200931210150 200931210160**
3/8” BSP	**BP2/AE BP2/CE**	**T22**	**200931220180 200931220190**
1/2” BSP Standard	**BP2/AE BP2/CE**	**T23**	**200931230220 200931230230**
SAE10	**BP2/AE BP2/CE**	**T25**	**200931280070 200931280080**

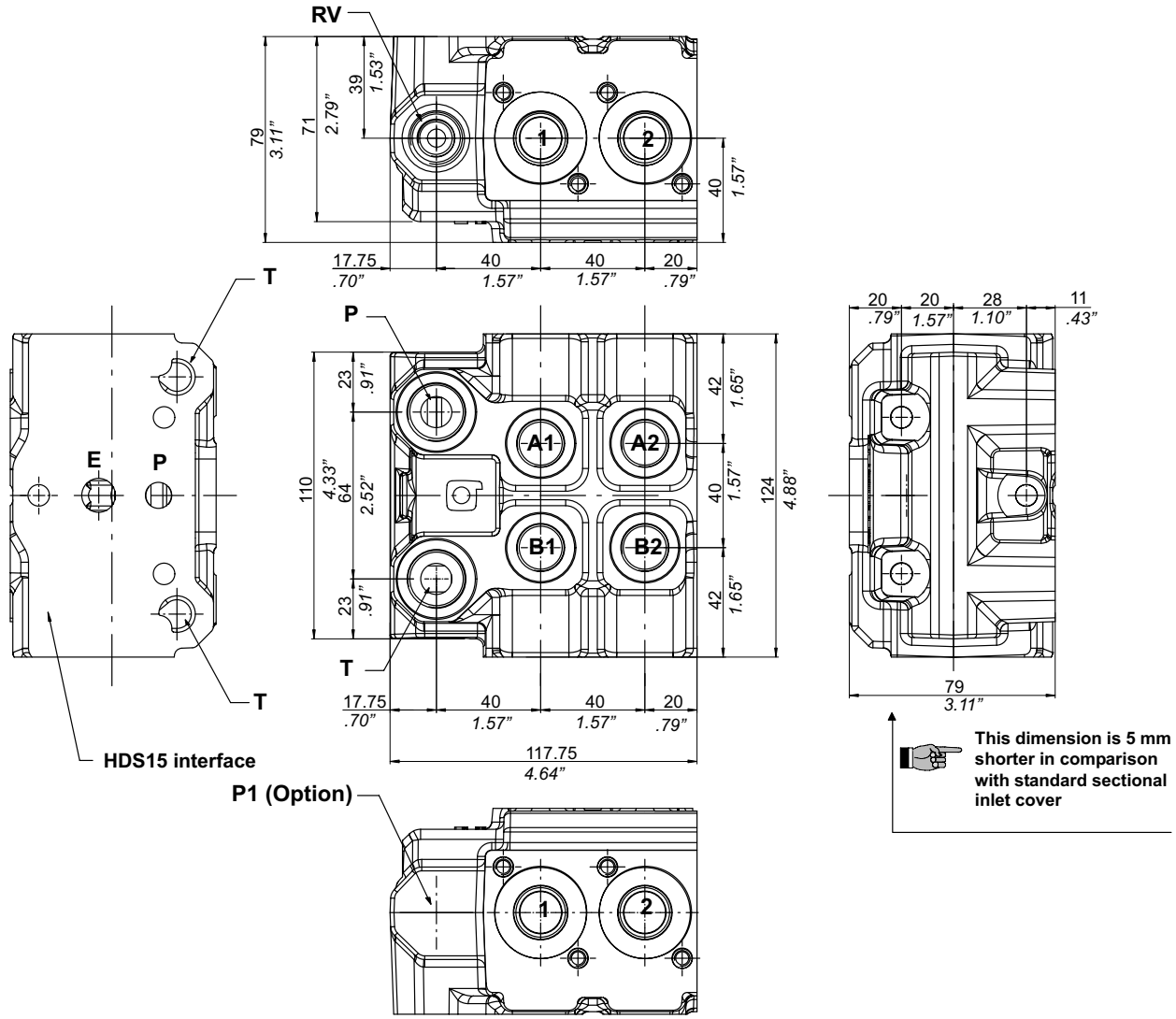




* Mechanical part only (without coil)

3.3 Two spools monoblock with inlet and outlet ports inlet cover HDM15/2

3.3.1 Ports dimensions

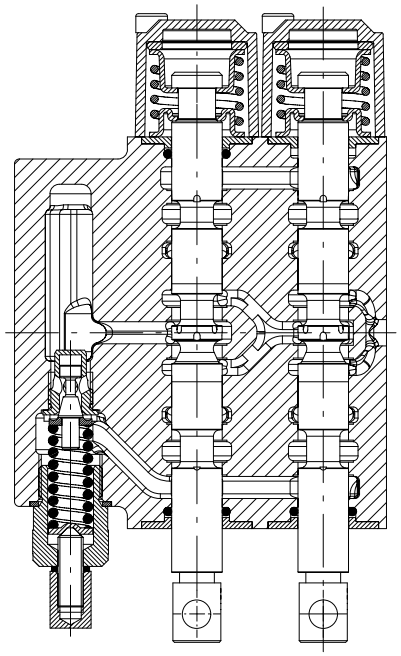


3.3.2 Port threads

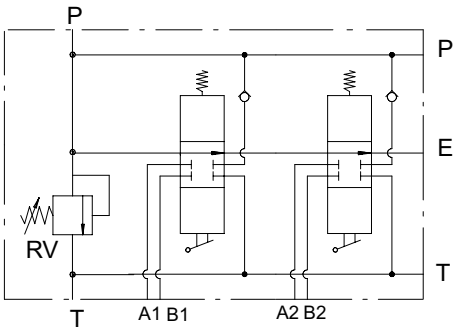
PORT CAVITIES - STANDARDS			
	BSP parallel thread	**Metric straight thread**	**UN-UNF straight thread**
Thread	ISO228-1	ISO 261	ISO 263
			SAE J475
Cavity	ISO 1179-1	ISO 9974-1	ISO 11926-1
	DIN 3852-2	DIN 3852-1	SAE J1926-1
Inlet P, P1	1/2”	M22X1.5	7/8”-14 (SAE10)
Ports A/B	1/2”	M18X1.5	3/4”-16 (SAE8)
Outlet T1, T2, T3, T4, T5, HPC	1/2”	M22X1.5	7/8”-14 (SAE10)
Hydraulic control	1/4”		
Open loop proportional control	1/4”		

For different ports size please contact our Sales Department

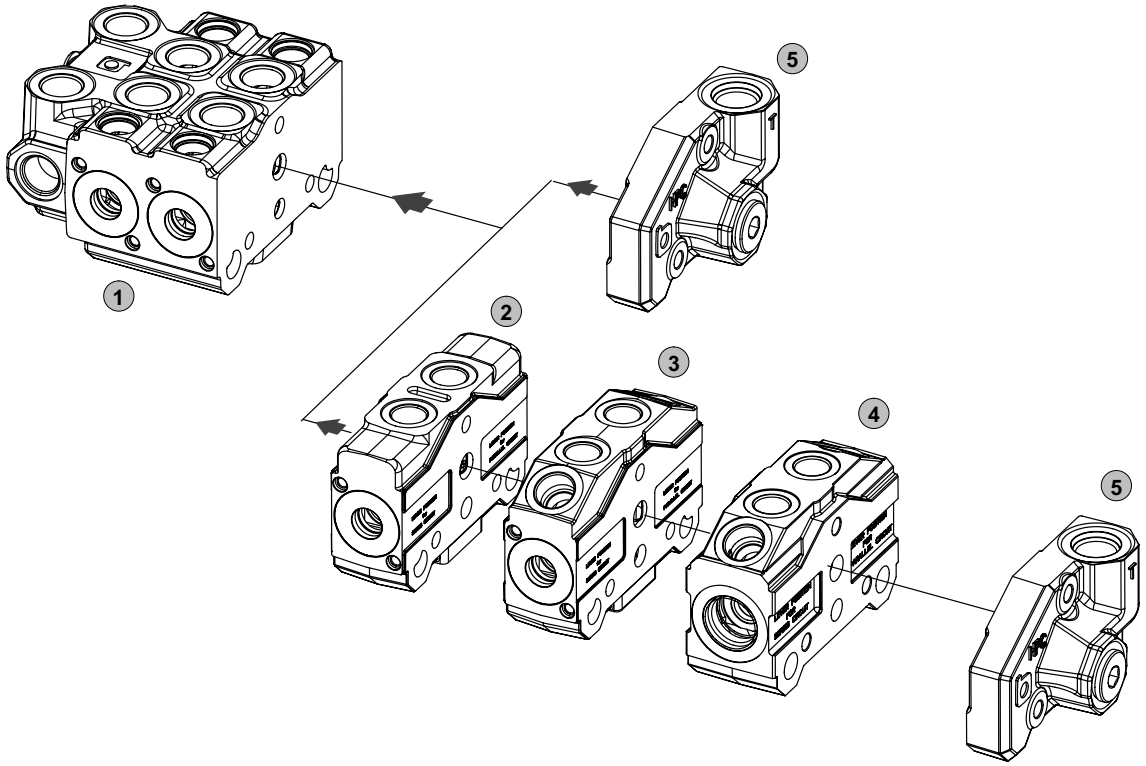
3.3.3 Monobloc body



ØD	Type/Code Standard	Type/Code Section with valve OA-UC-C
M18X1.5		
3/8”BSP		
1/2” BSP	**K03 200741331230**	**K13 200741331240**
SAE10		



IMPORTANT!: Body codes consist of machined casting, seals and load hold check valve only. Not to be used for complete valve orders.

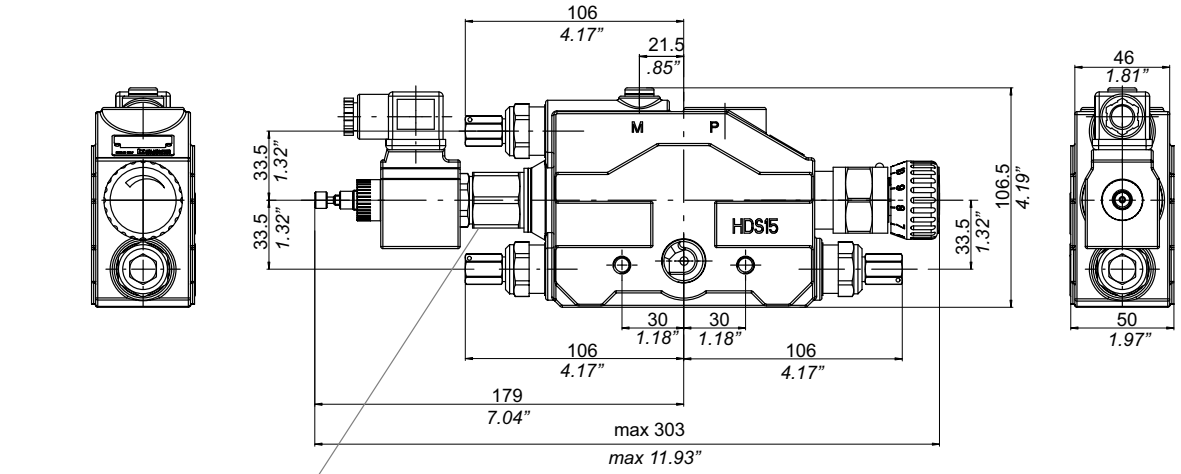


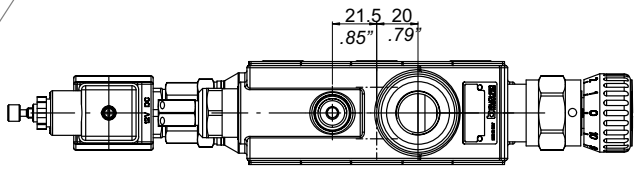
1 HDM15 body 2 HDS15 body 79 mm dedicated 3 HDS15 valve body 4 HDS15 ON-OFF valve body 5 HDS15 end cover

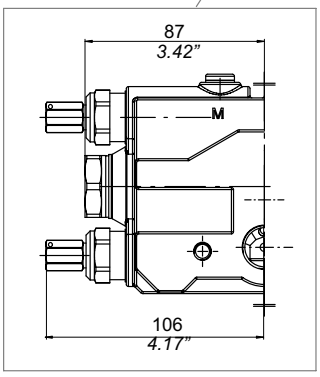
For inlet covers see chapter 3
For bodies see chapter 4

3.4 Pressure and flow control inlet covers PQ

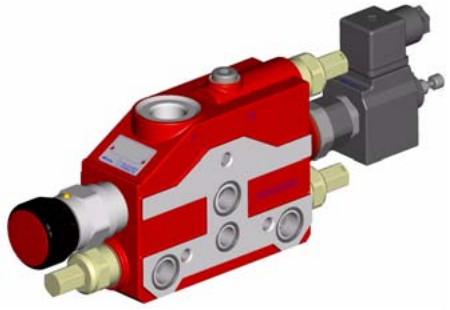
3.4.1 Inlet cover T100: dimensions

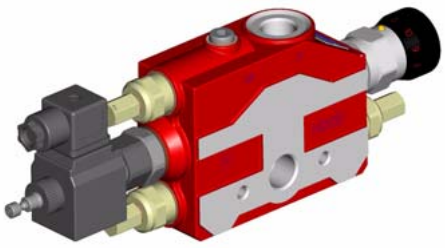


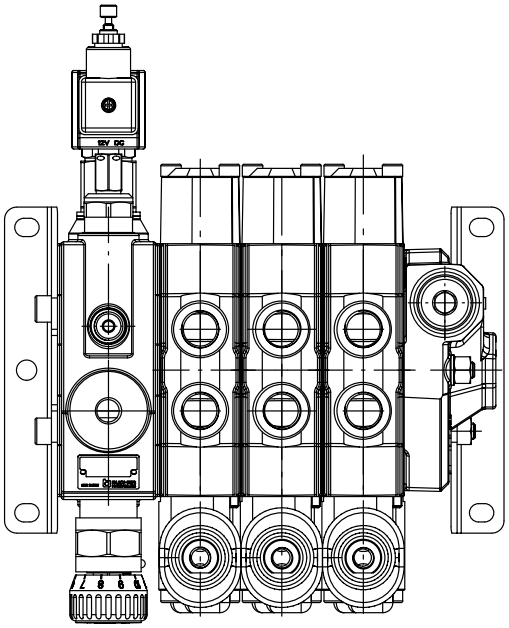




With 00EC plug



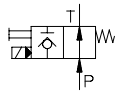




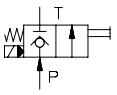
3.4.2 Inlet cover T100

Inlet cover with priority flow regulator, pressure relief valves and by-pass valve.
H.P.C.O. port can be pressurized

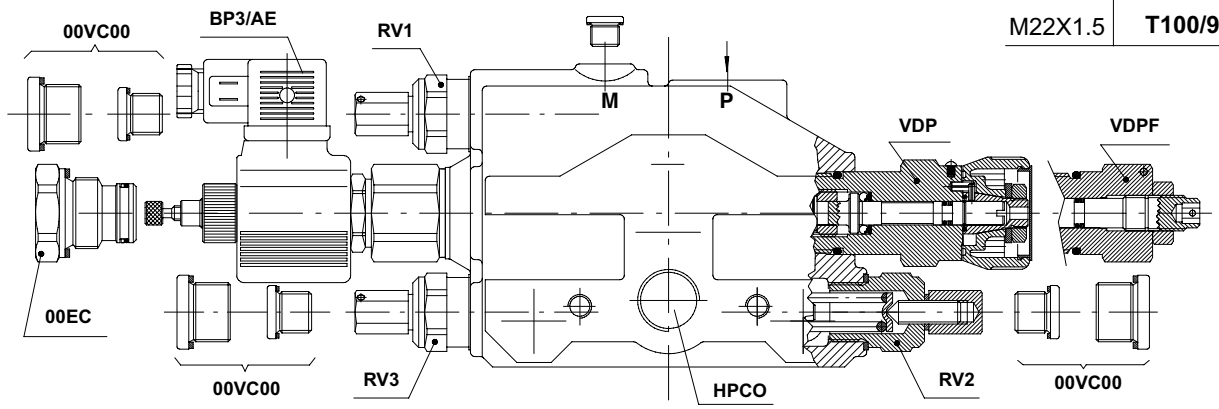
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



Ø D (**P**)	Type
M18X1.5	**T100/1**
1/2" BSP	**T100/3**
M22X1.5	**T100/9**

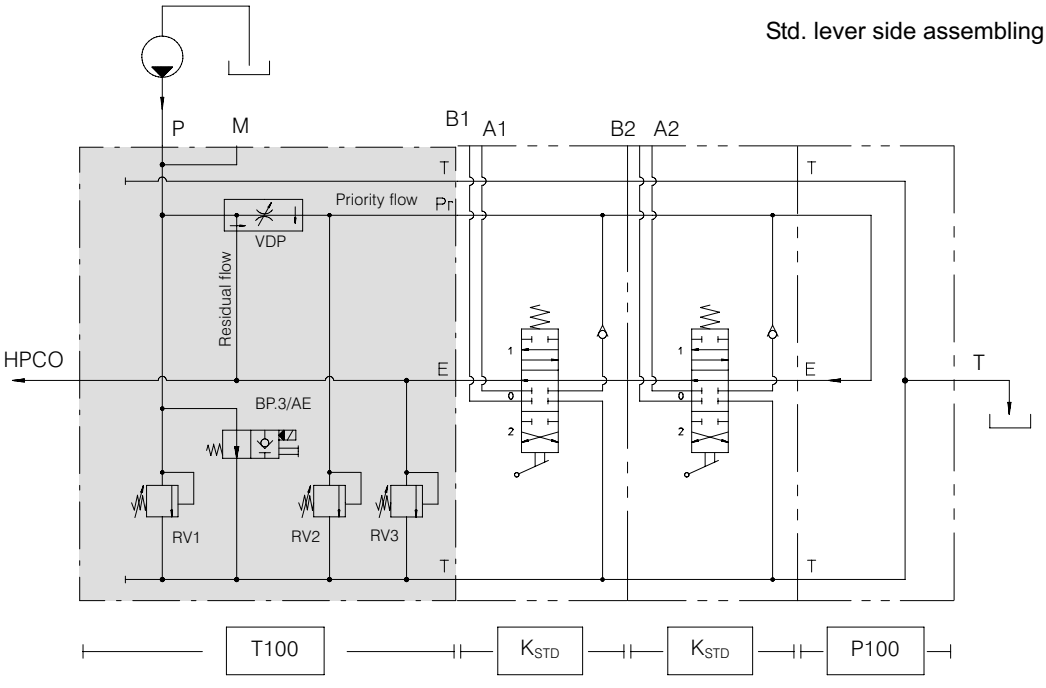


VDPF: 1 ÷ 50 l/min

Pressure set range (bar)	Standard Setting (bar)	Relief valves Type
30 ÷ 95	60	**RV1 / RV2 / RV3 –06**
96 ÷ 210	150	**RV1 / RV2 / RV3 –15**
211 ÷ 320	260	**RV1 / RV2 / RV3 –26**

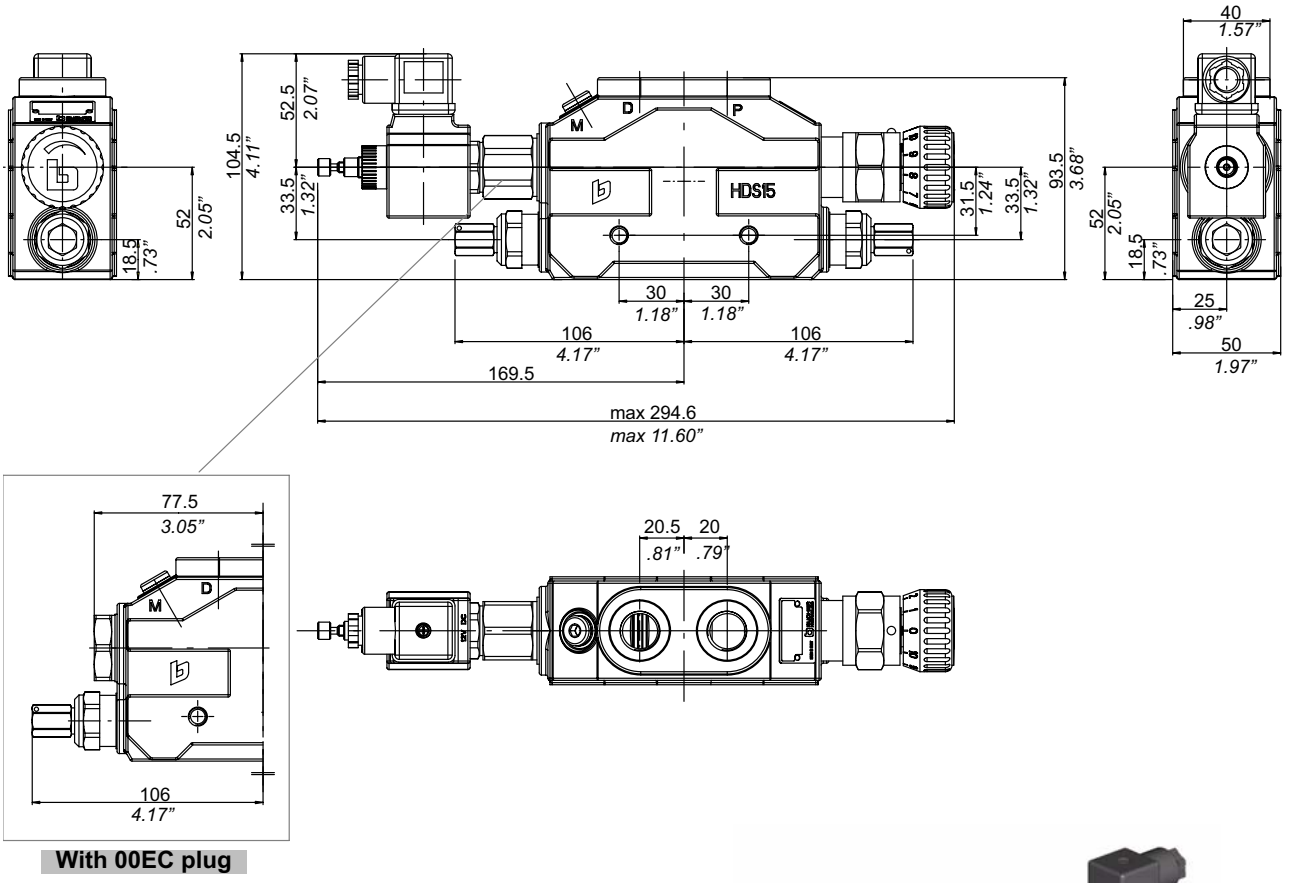
Flow set range (l/min)	Standard Setting (l/min)	Flow regulator Type
0.5 ÷ 6	06	**VD 06**
0.5 ÷ 12	12	**VD 12**
0.5 ÷ 25	25	**VD 25**
0.5÷ 50	50	**VD 50**

Std. lever side assembling position

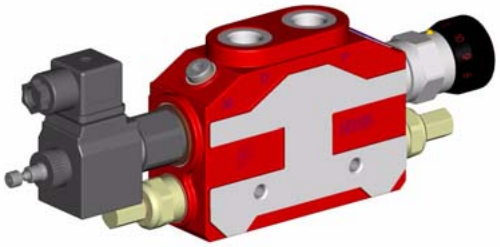


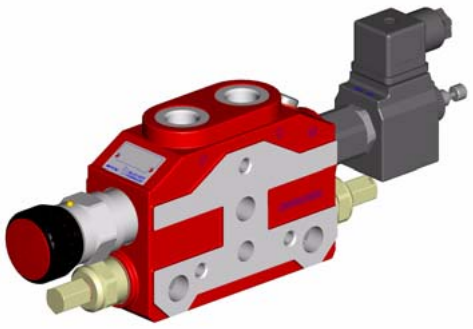
HPCO= can be pressurized

3.4.3 Inlet covers T88-T90: dimensions



With 00EC plug

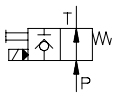




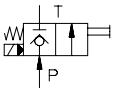
3.4.4 Inlet cover T88

Inlet cover with priority flow regulator, pressure relief valves and by-pass valve.
D = residual flow can be pressurized

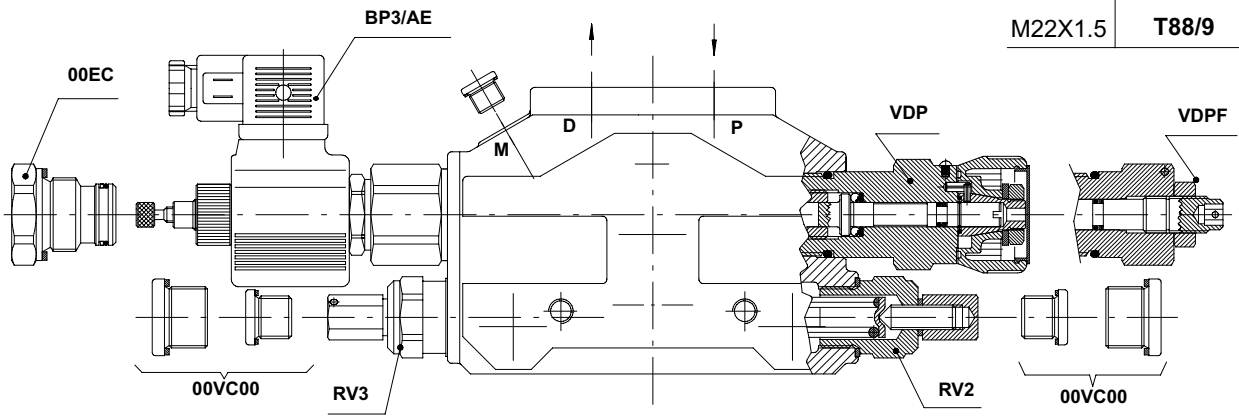
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



Ø D (**P**)	Type
M18X1.5	**T88/1**
1/2" BSP	**T88/3**
M22X1.5	**T88/9**

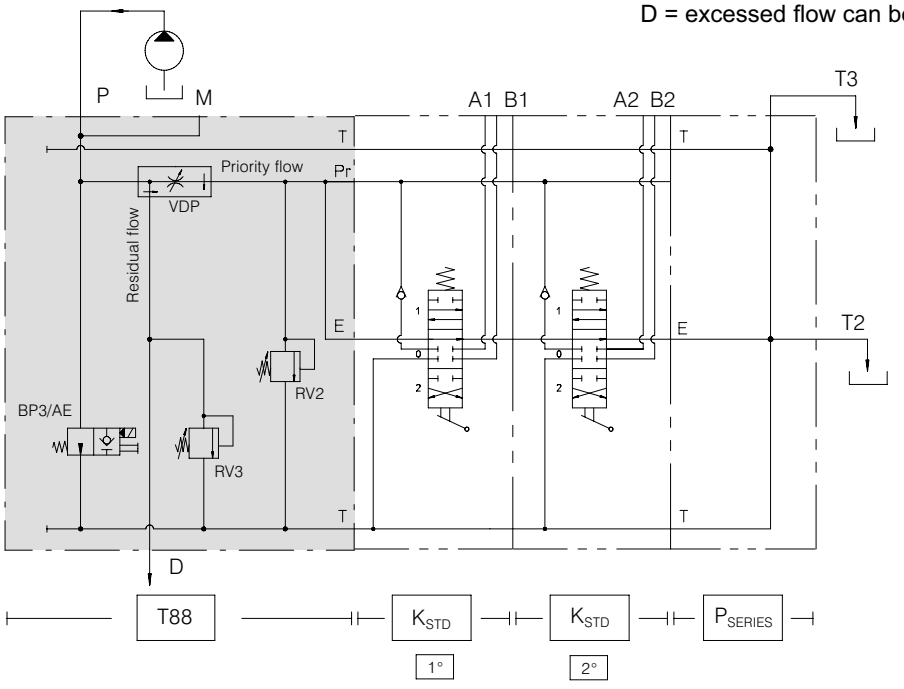


VDPF: 1 ÷ 50 l/min

Pressure set range (bar)	Standard Setting (bar)	Relief valves Type
30 ÷ 95	60	**RV2 / RV3 –06**
96 ÷ 210	150	**RV2 / RV3 –15**
211 ÷ 320	260	**RV2 / RV3 –26**

Flow set range (l/min)	Standard Setting (l/min)	Flow regulator Type
0.5 ÷ 6	06	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5÷ 50	50	**VDP 50**

D = excessed flow can be pressurized

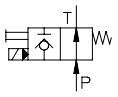


Spool reversed to have the lever at the same side of the regulator knob

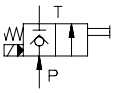
3.4.5 Inlet cover T90

Inlet cover with priority flow regulator, pressure relief valves and by-pass valve.
Residual flow directly to tank (cannot be pressurized).

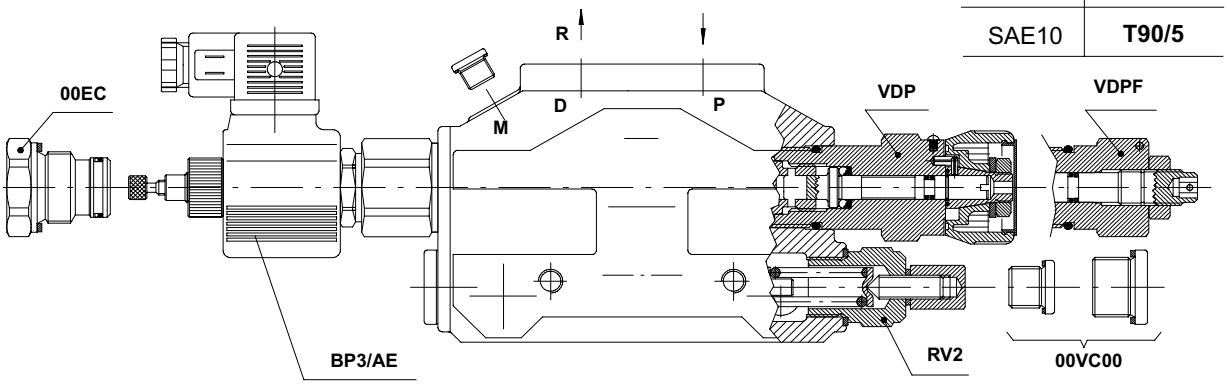
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



Ø D (**R-P**)	Type
M18X1.5	**T90/1**
1/2” BSP	**T90/3**
M22X1.5	**T90/9**
SAE10	**T90/5**

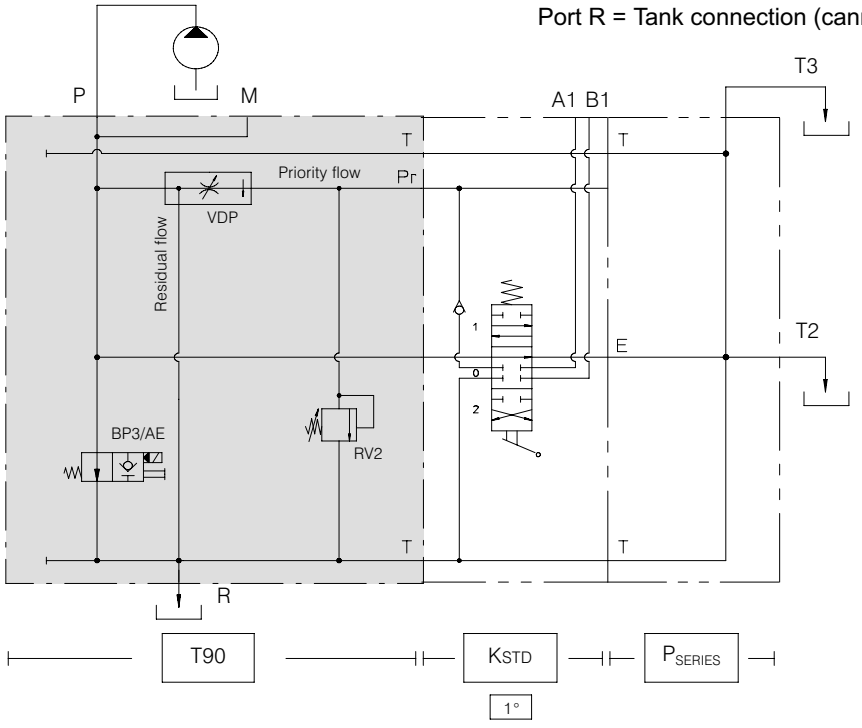


VDPF: 1 ÷ 50 l/min

Pressure set range (bar)	Standard Setting (bar)	Relief valves Type
30 ÷ 95	60	**RV2 –06**
96 ÷ 210	150	**RV2 –15**
211 ÷ 320	260	**RV2 –26**

Flow set range (l/min)	Standard Setting (l/min)	Flow regulator Type
0.5 ÷ 6	06	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5÷ 50	50	**VDP 50**

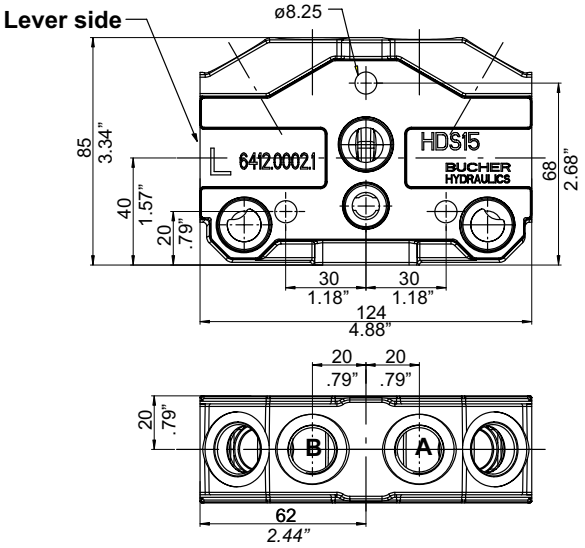
Port R = Tank connection (cannot be pressurized)

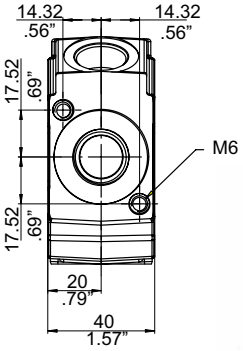


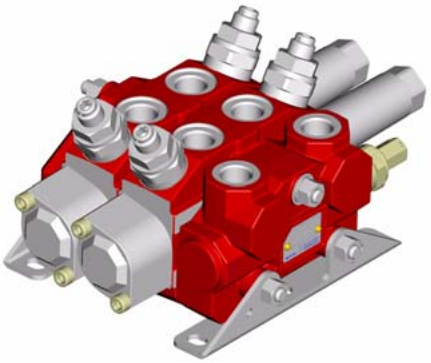
Spool reversed to have the lever on the same side of the regulator knob

4 Elements

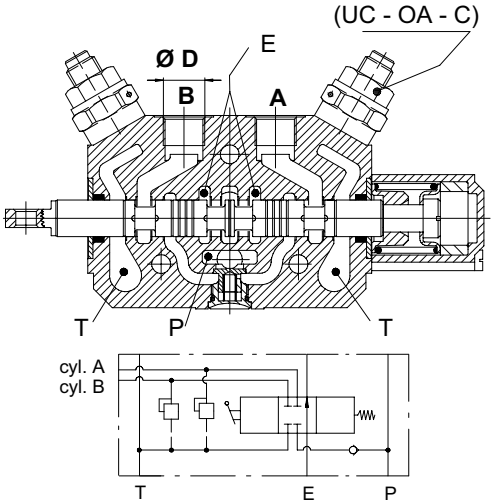
4.1 HDS15 valve body: dimensions





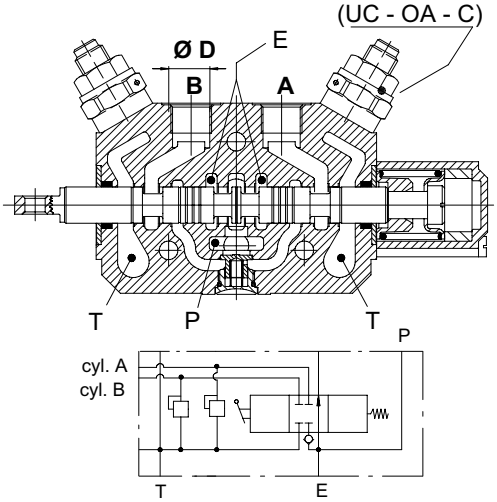


4.1.1 Standard circuit: parallel



ØD	Type/Code Standard	Type/Code Section with valve UC-OA-C
M18X1.5	**K01 200941312420**	**K11 200941312430**
3/8"BSP	**K02 200941325770**	**K12 200941325780**
1/2" BSP	**K03 200941330740**	**K13 200941330750**
SAE10	**K05 200941380010**	**K15 200941380020**

4.1.2 Optional circuits: series and tandem

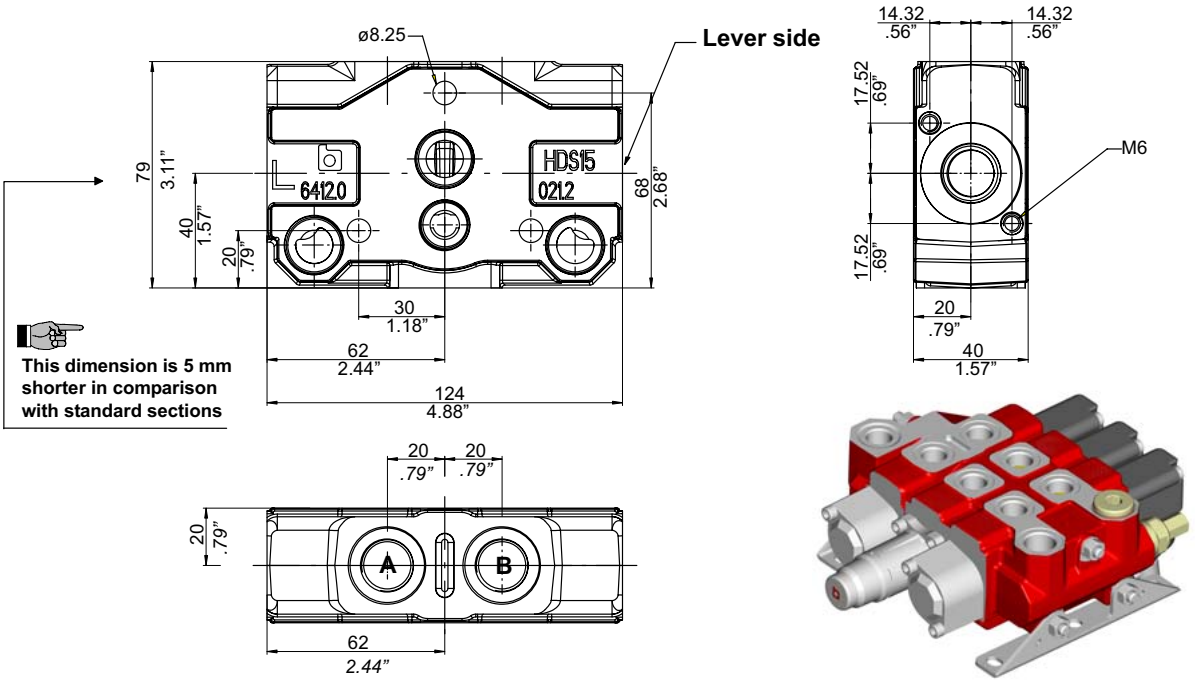


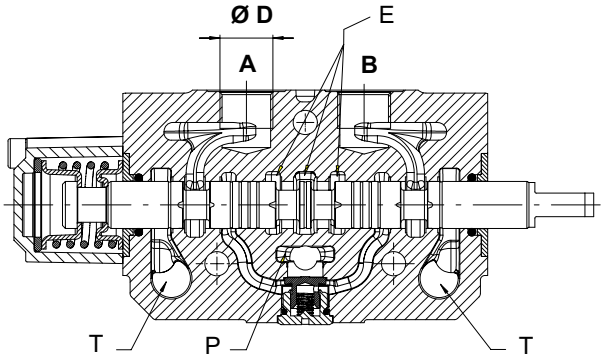
ØD	Type/Code Standard	Type/Code Section with valve UC-OA-C
M18X1.5	**K41 200941312440**	**K51 200941312450**
3/8"BSP	**K42 200941325790**	**K52 200941325800**
1/2" BSP	**K43 200941330760**	**K53 200941330770**
SAE10	**K45 200941380030**	**K55 200941380040**

IMPORTANT!: Body codes consist of machined casting, seals and load hold check valve only. Not to be used for complete valve order.

Attention: In case of series, tandem, parallel/series circuits, it is necessary to reverse the positioner and the lever group, even for standard parallel sections (see the indications on the side of the valve body): Lever position for parallel circuit, lever position for series circuit

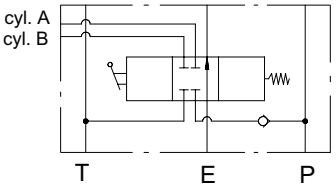
4.2 HDS15 valve body dimensions: 79 mm dedicated for HDM15

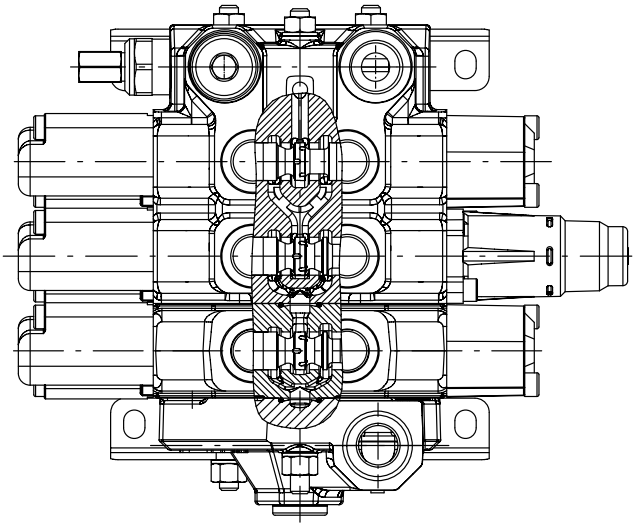




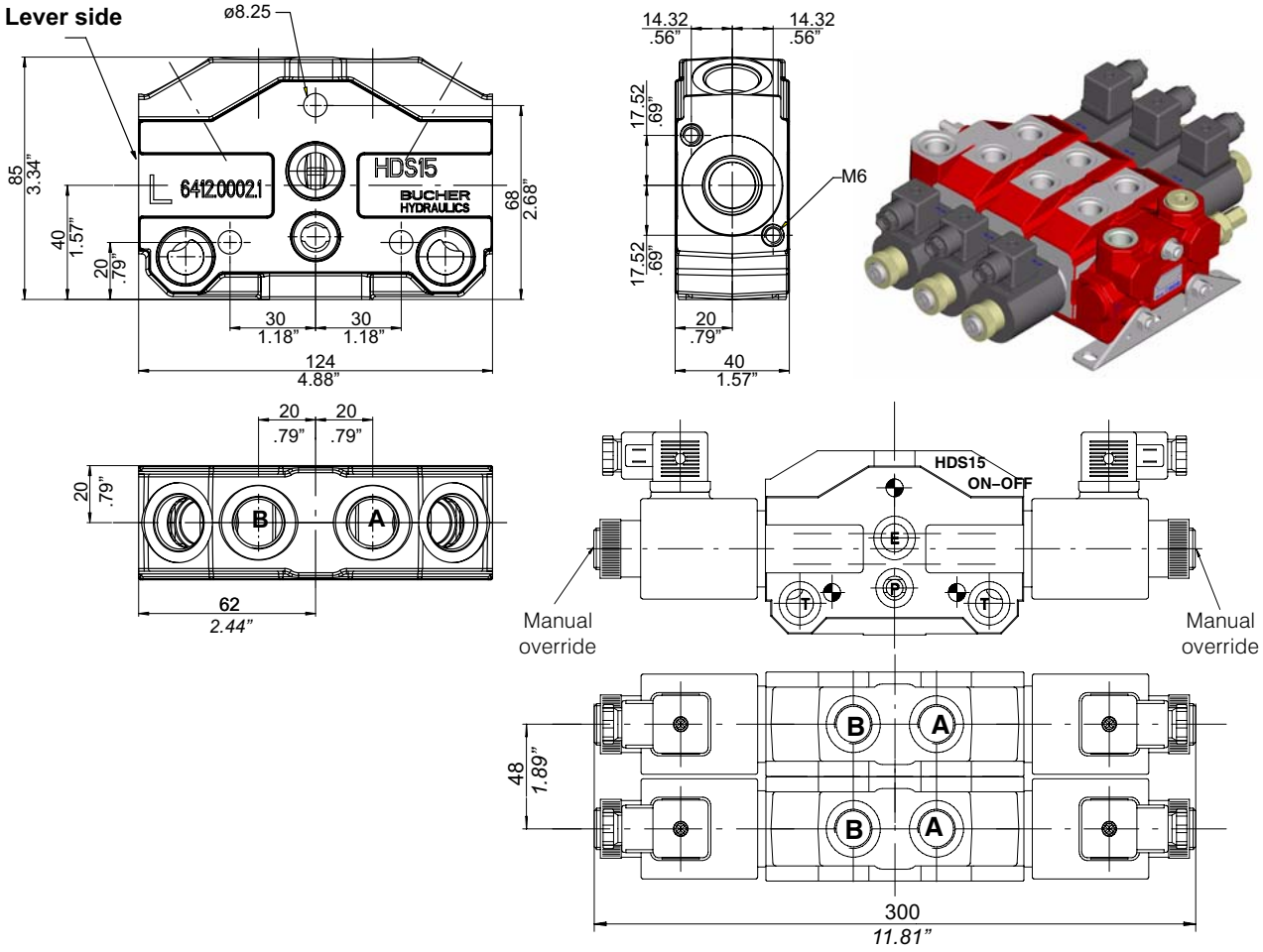
ØD	Type/Code Standard
M18X1.5	**K145 200741313050**
3/8"BSP	
1/2" BSP	
SAE10	

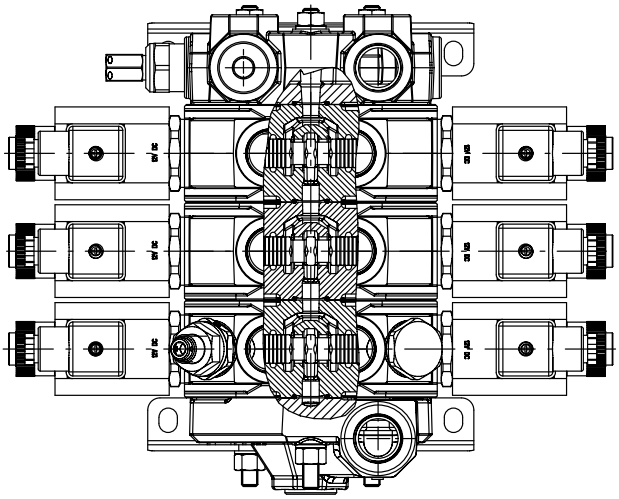
IMPORTANT!: It is not possible to have service port valves

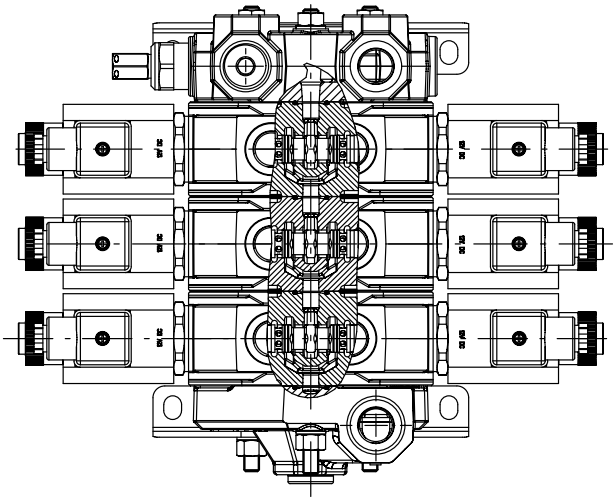




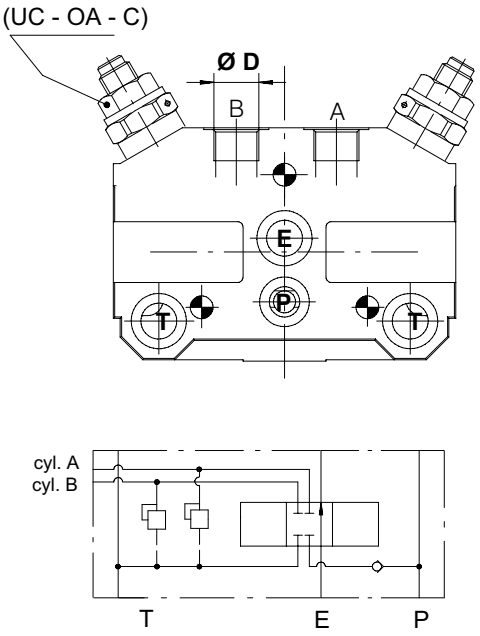
4.3 HDS15 ON-OFF valve body: dimensions





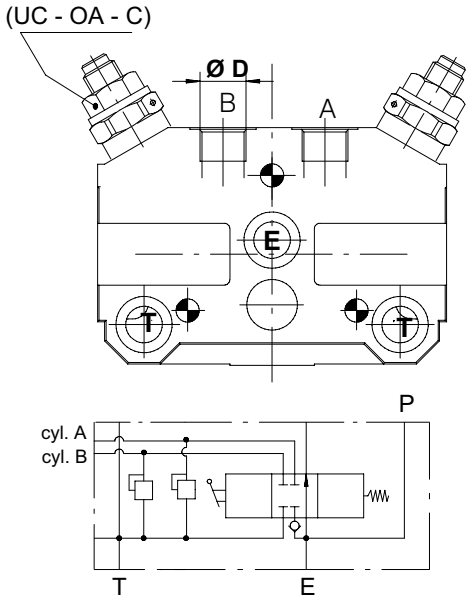


4.3.1 Standard circuit: parallel



ØD	Type/Code Standard	Type/Code Section with valve UC-OA-C
M18X1.5	**K201 200941312700**	**K211 200941312710**
3/8”BSP	**K202 200941326220**	**K212 200941326230**
1/2” BSP	**K203 2009413310600**	**K213 200941331070**
SAE10	**K205 200941380120**	**K215 200941380150**

4.3.2 Optional circuit: series and tandem



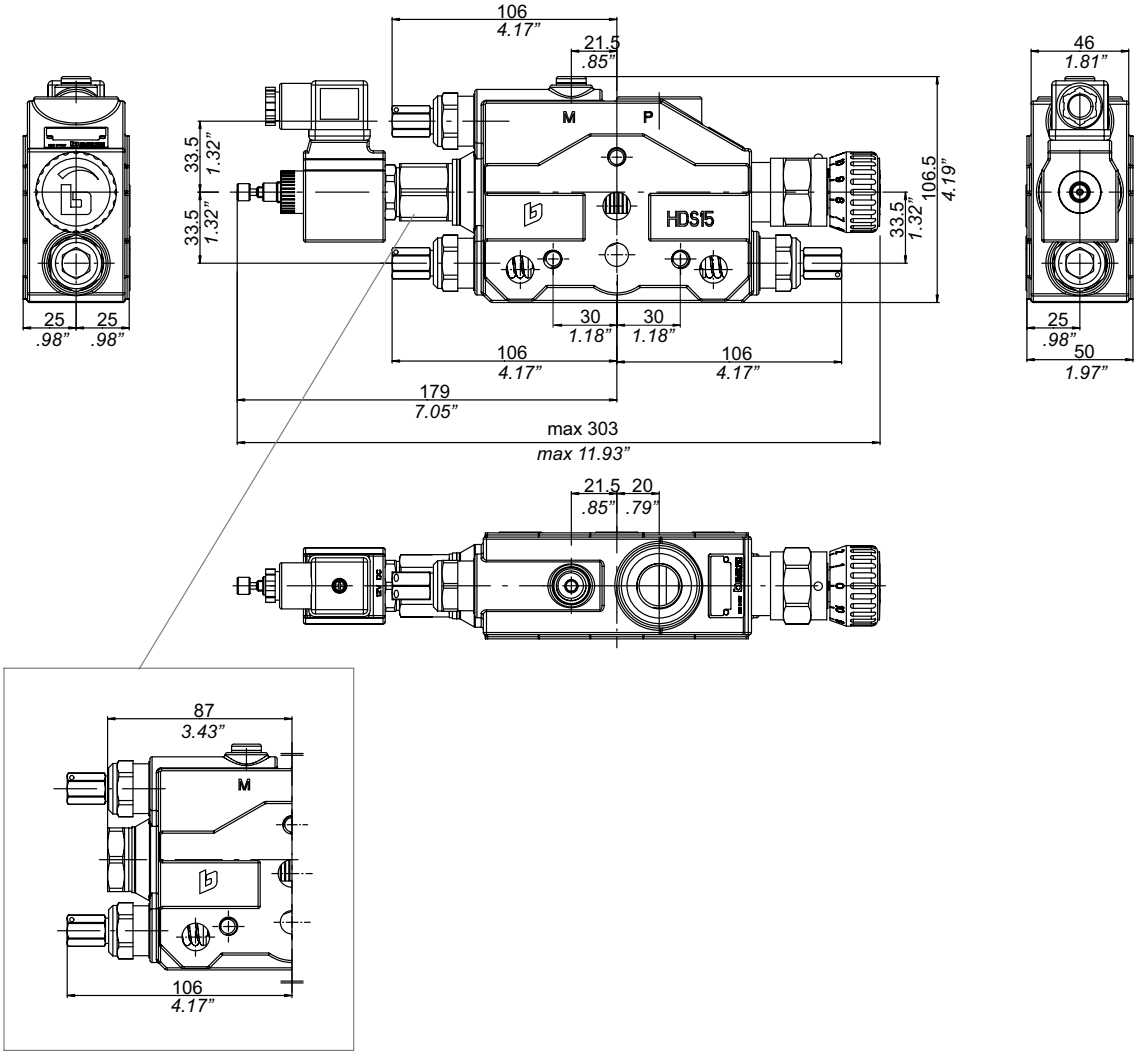
ØD	Type/Code Standard	Type/Code Section with valve UC-OA-C
M18X1.5	**K241 200941310290**	**K251 200941310360**
3/8”BSP	**K242**	**K252**
1/2” BSP	**K243 200941331010**	**K253 200941331090**
SAE10	**K245 200941380130**	**K255 200941380160**

IMPORTANT!: For availability of -K- bodies without code please contact our Sales Department.
Body codes consist of machined casting, seals and load hold check valve only.
Not to be used for complete valve orders.

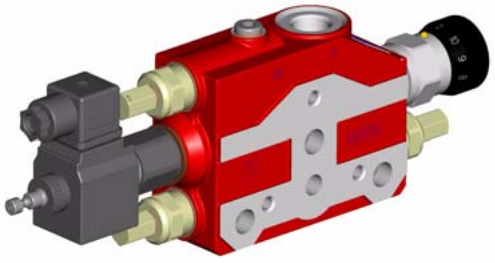
Attention: in case of series and tandem circuits use always inlet and outlet covers for series circuits (ex. - T41, T42, etc. - P32, P41, etc.).

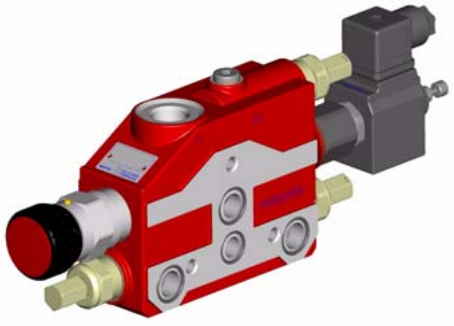
4.4 Pressure and flow controls elements PQ

4.4.1 Sectional body K100: dimensions



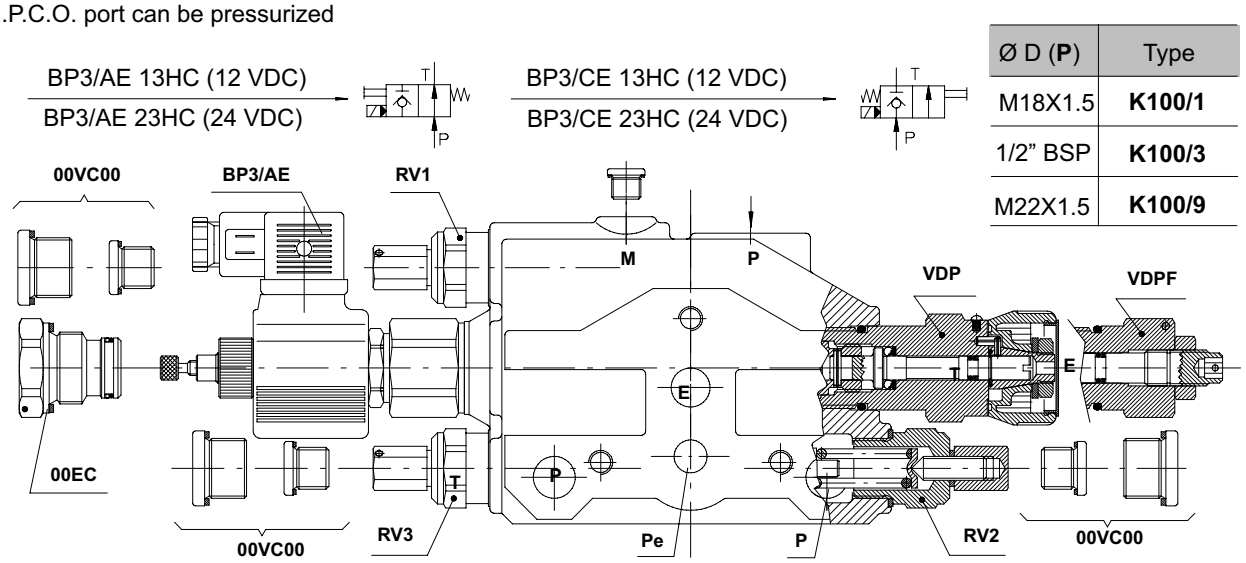
With 00EC plug





4.4.2 Sectional body K100

Intermediate section with priority flow regulator, pressure relief valves and by-pass valve.
H.P.C.O. port can be pressurized



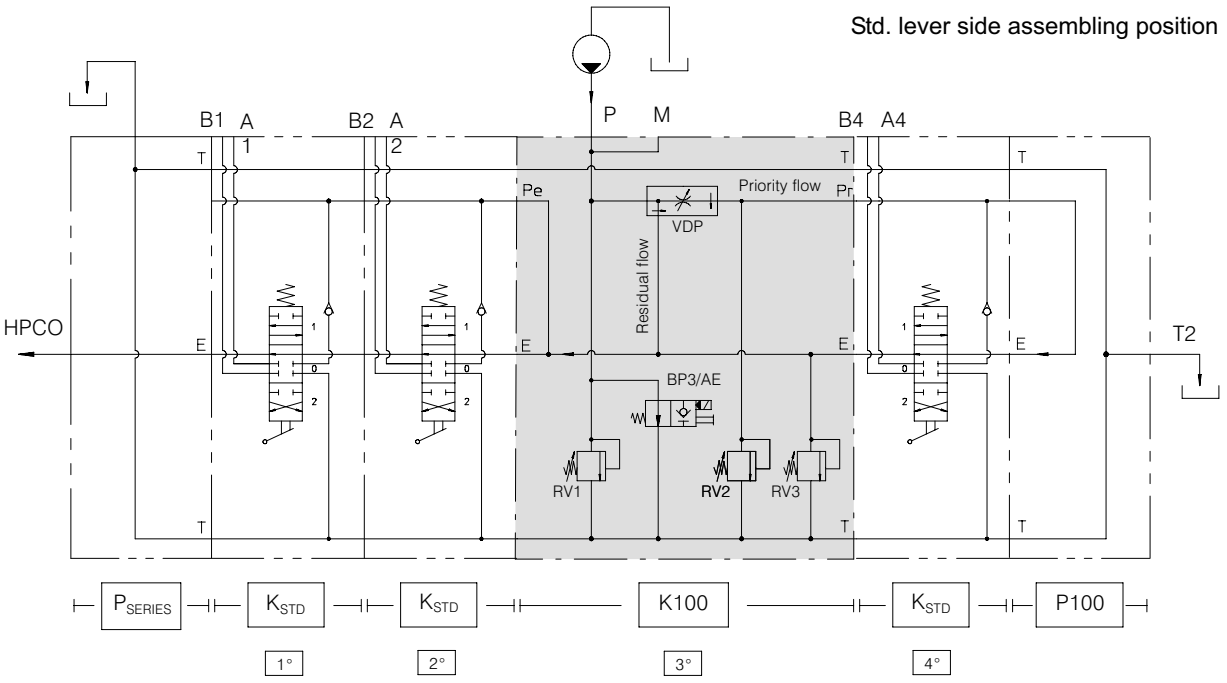
Ø D (**P**)	Type
M18X1.5	**K100/1**
1/2" BSP	**K100/3**
M22X1.5	**K100/9**

VDPF: 1 ÷ 50 l/min

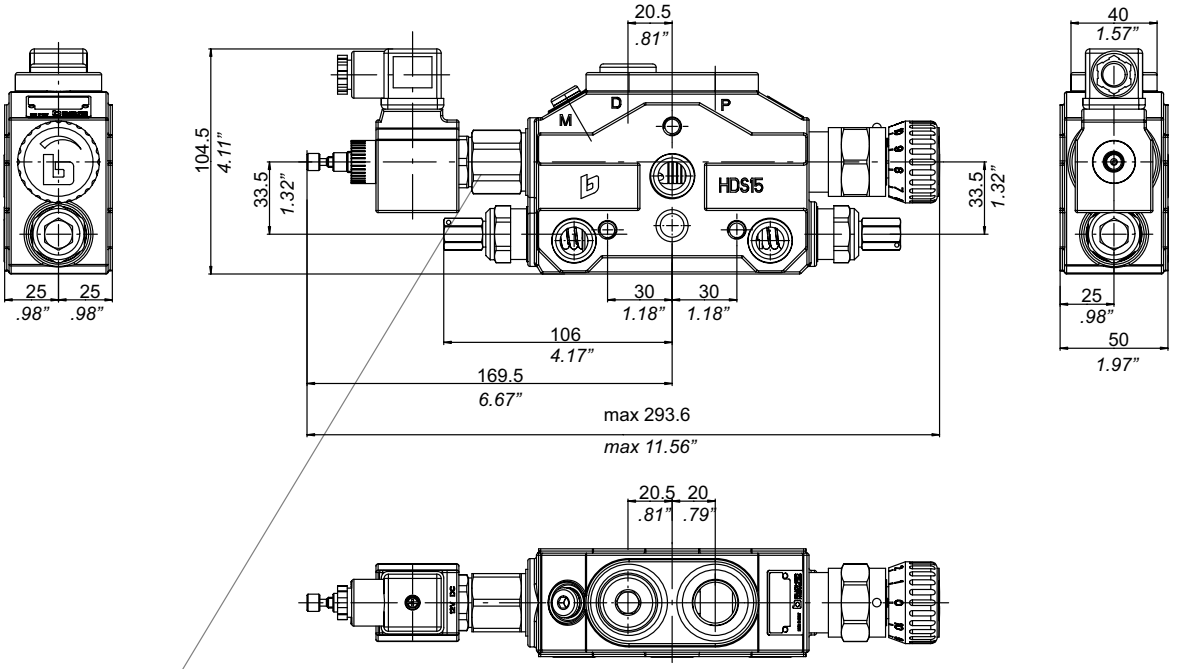
Pressure set range (bar)	Standard Setting (bar)	Relief valves Type
30 ÷ 95	60	**RV1 / RV2 / RV3 –06**
96 ÷ 210	150	**RV1 / RV2 / RV3 –15**
211 ÷ 320	260	**RV1 / RV2 / RV3 –26**

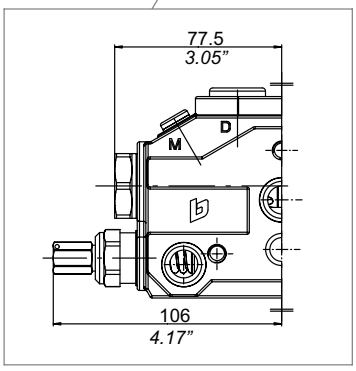
Flow set range (l/min)	Standard Setting (l/min)	Flow regulator Type
0.5 ÷ 6	06	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5÷ 50	50	**VDP 50**

Std. lever side assembling position

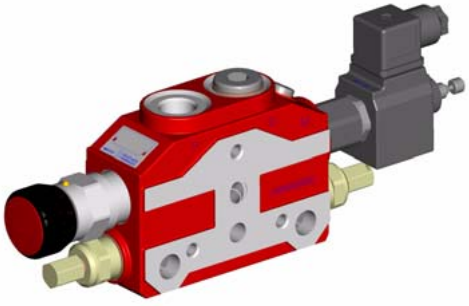


4.4.3 Sectional body K88-K90: dimensions





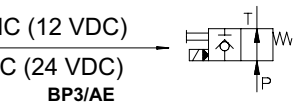
With 00EC plug



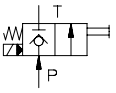
4.4.4 Sectional body K88

Intermediate section with priority flow regulator, pressure relief valves and by-pass valve.
D = residual flow can be pressurized

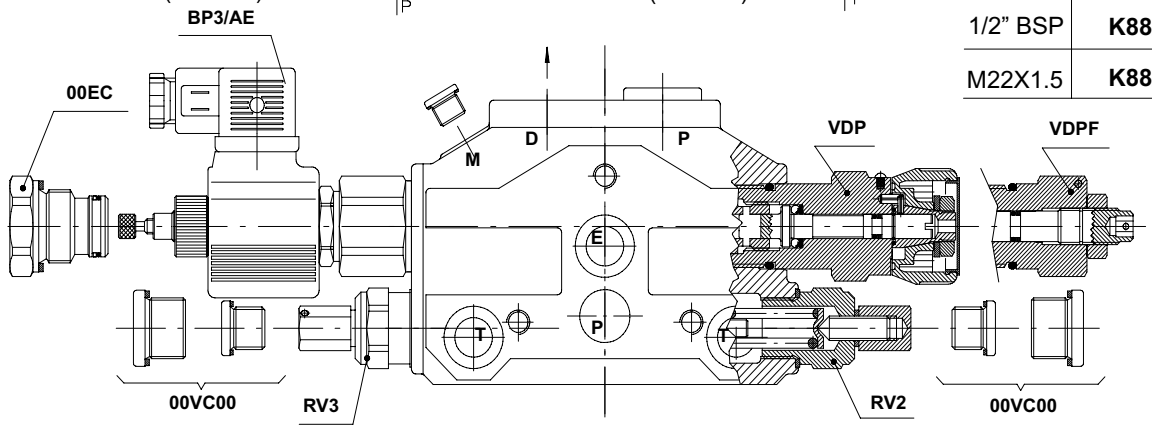
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



Ø D (**P**)	Type
M18X1.5	**K88/1**
1/2" BSP	**K88/3**
M22X1.5	**K88/9**

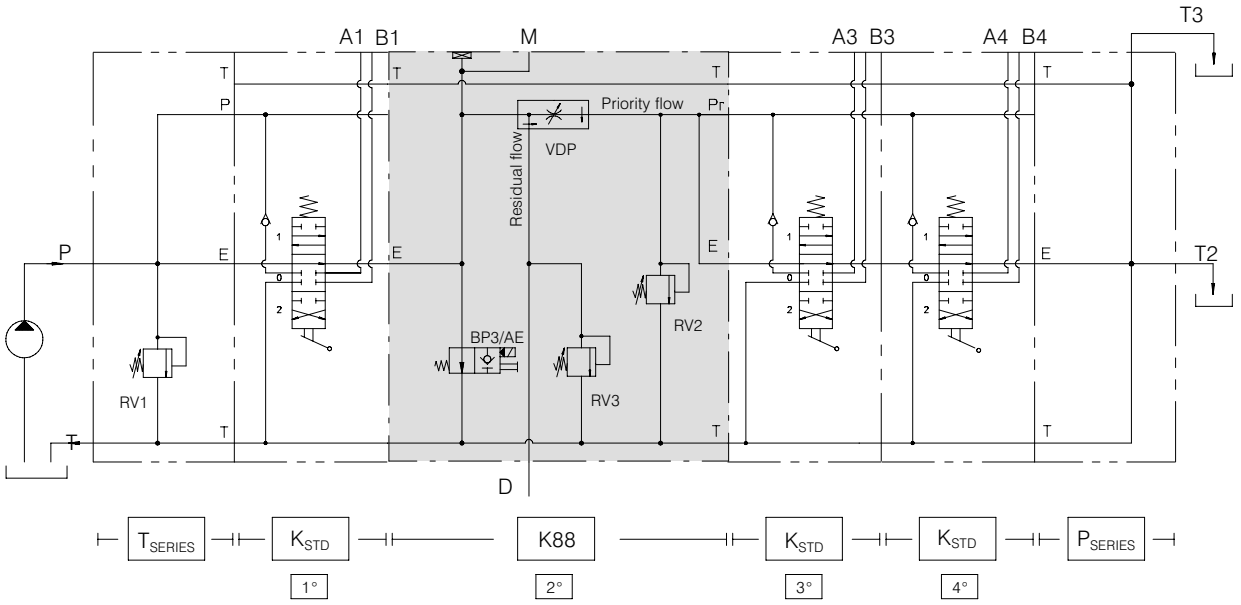


VDPF: 1 ÷ 50 l/min

Pressure set range (bar)	Standard Setting (bar)	Relief valves Type
30 ÷ 95	60	**RV2 or RV3 –06**
96 ÷ 210	150	**RV2 or RV3 –15**
211 ÷ 320	260	**RV2 or RV3 –26**

Flow set range (l/min)	Standard Setting (l/min)	Flow regulator Type
0.5 ÷ 6	06	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5÷ 50	50	**VDP 50**

D = excessed flow can be pressurized

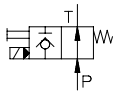


Spool reversed to have the lever at the same side of the regulator knob.

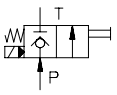
4.4.5 Sectional body K90

Intermediate section with priority flow regulator, pressure relief valves and by-pass valve.
Residual flow directly to tank (cannot be pressurised)

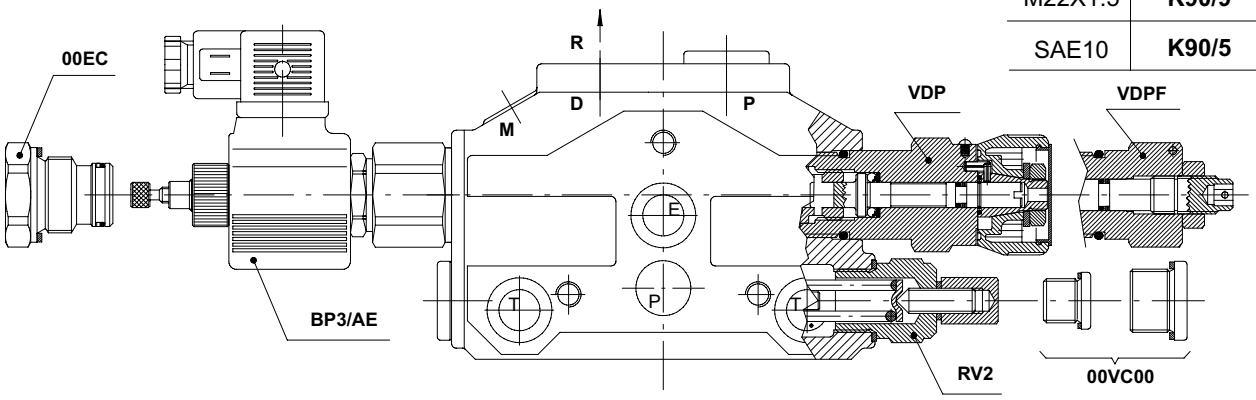
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



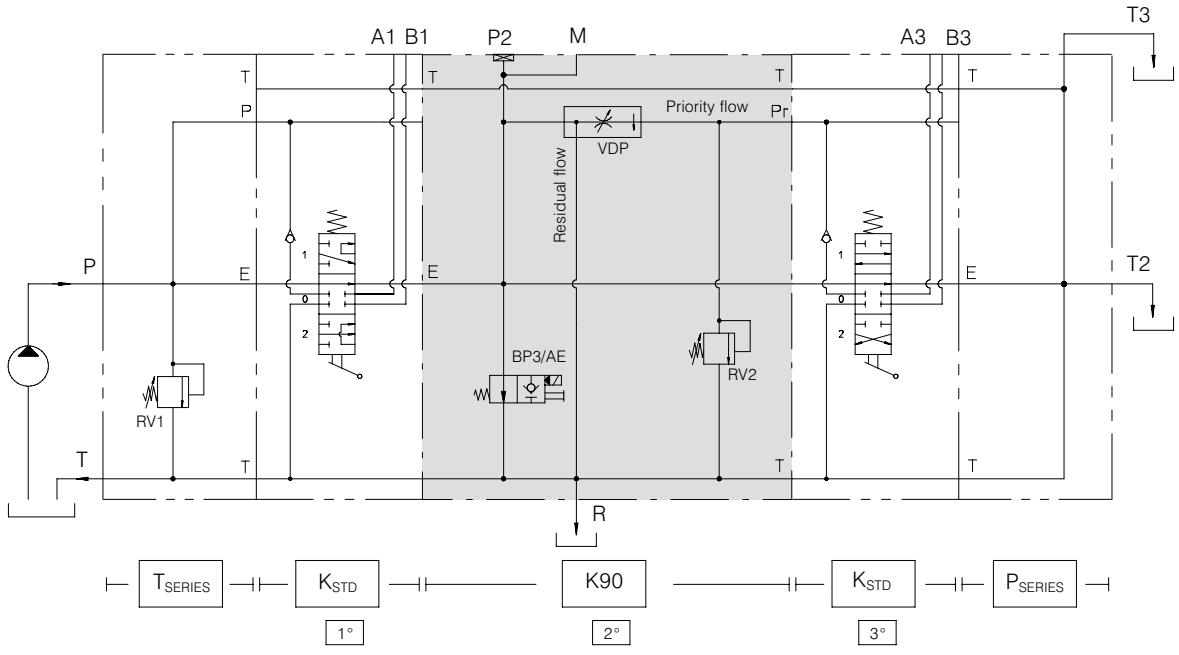
Ø D (**R-P**)	Type
M18X1.5	**K90/1**
1/2" BSP	**K90/3**
M22X1.5	**K90/9**
SAE10	**K90/5**



VDPF: 1 ÷ 50 l/min

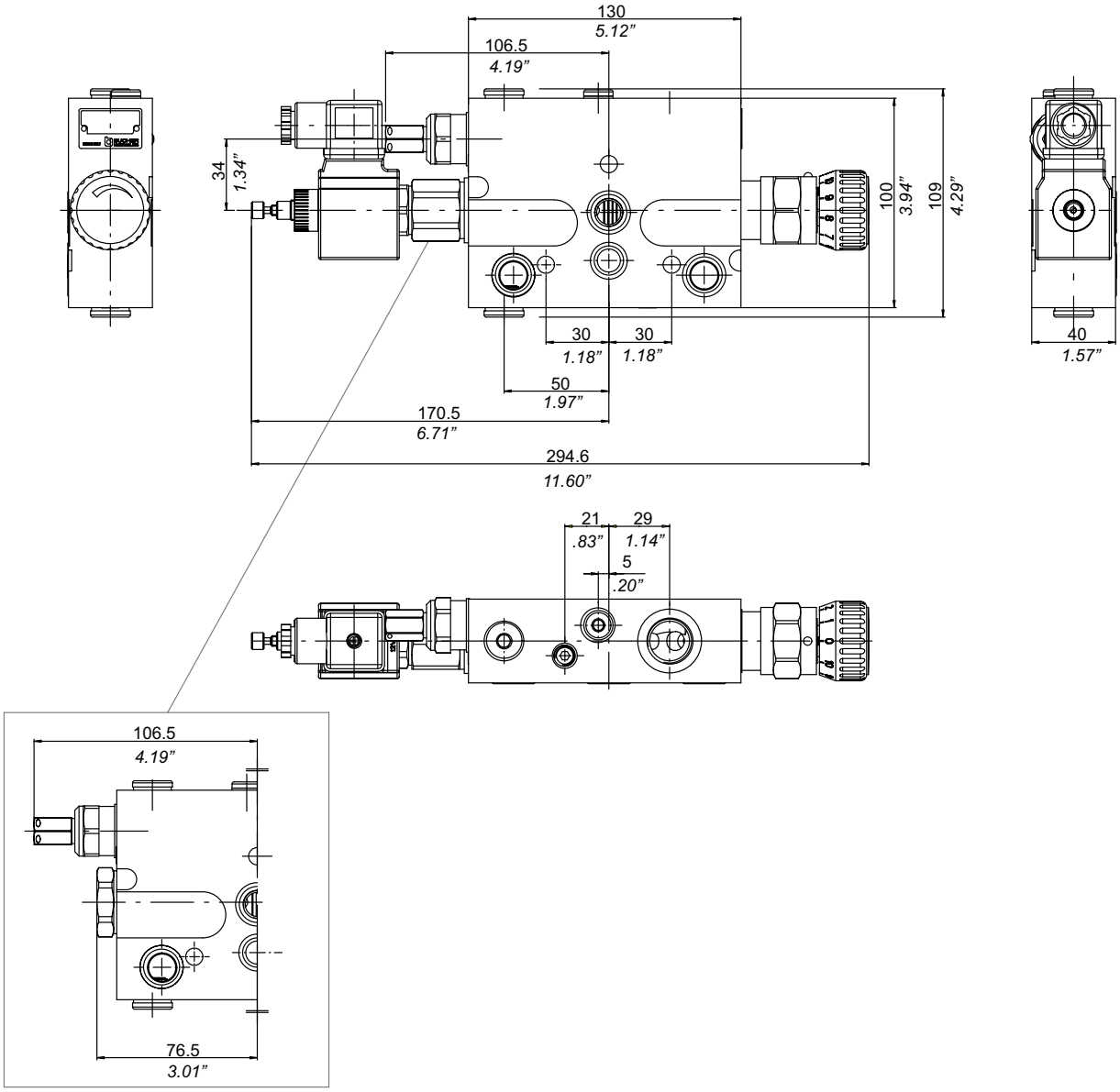
Pressure set range (bar)	Standard Setting (bar)	Relief valves Type
30 ÷ 95	60	**RV2 –06**
96 ÷ 210	150	**RV2 –15**
211 ÷ 320	260	**RV2 –26**

Flow set range (l/min)	Standard Setting (l/min)	Flow regulator Type
0.5 ÷ 6	06	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5÷ 50	50	**VDP 50**

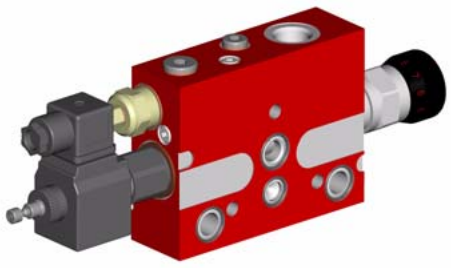


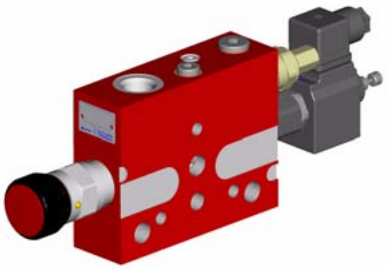
Spool reversed to have the lever at the same side of the regulator knob.

4.4.6 Sectional body K91-K92: dimensions



With 00EC plug

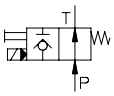




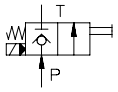
4.4.7 Sectional body K91

Intermediate section with priority flow regulator, pressure relief valves and by-pass valve.
Residual flow (port D) can be pressurized. Suitable for circuits where there are several priority sections
(Tie rods crossing holes instead of blind holes like in the standard priority sections)

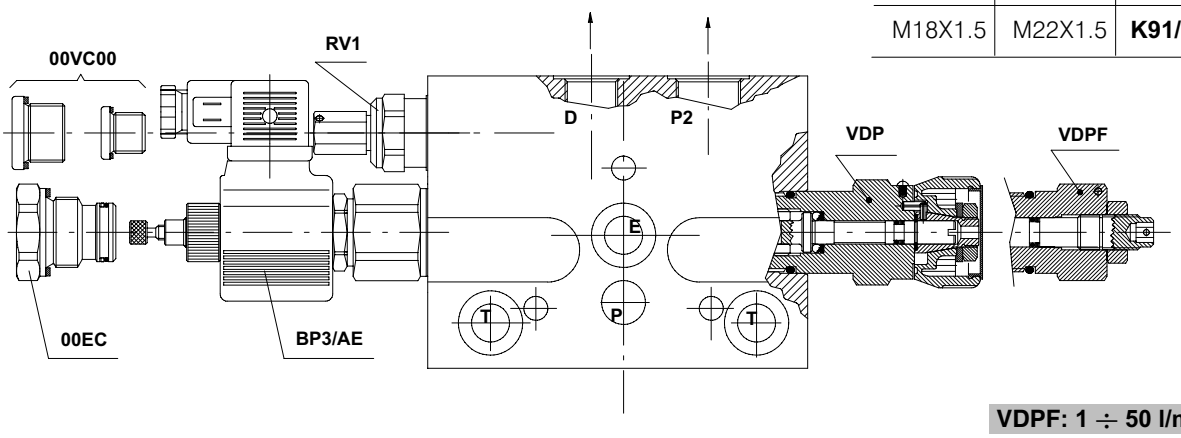
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



Ø D (**D**)	Ø D (**P2**)	Type
M18X1.5	M18X1.5	**K91/1**
3/8" BSP	1/2" BSP	**K91/3**
M18X1.5	M22X1.5	**K91/9**

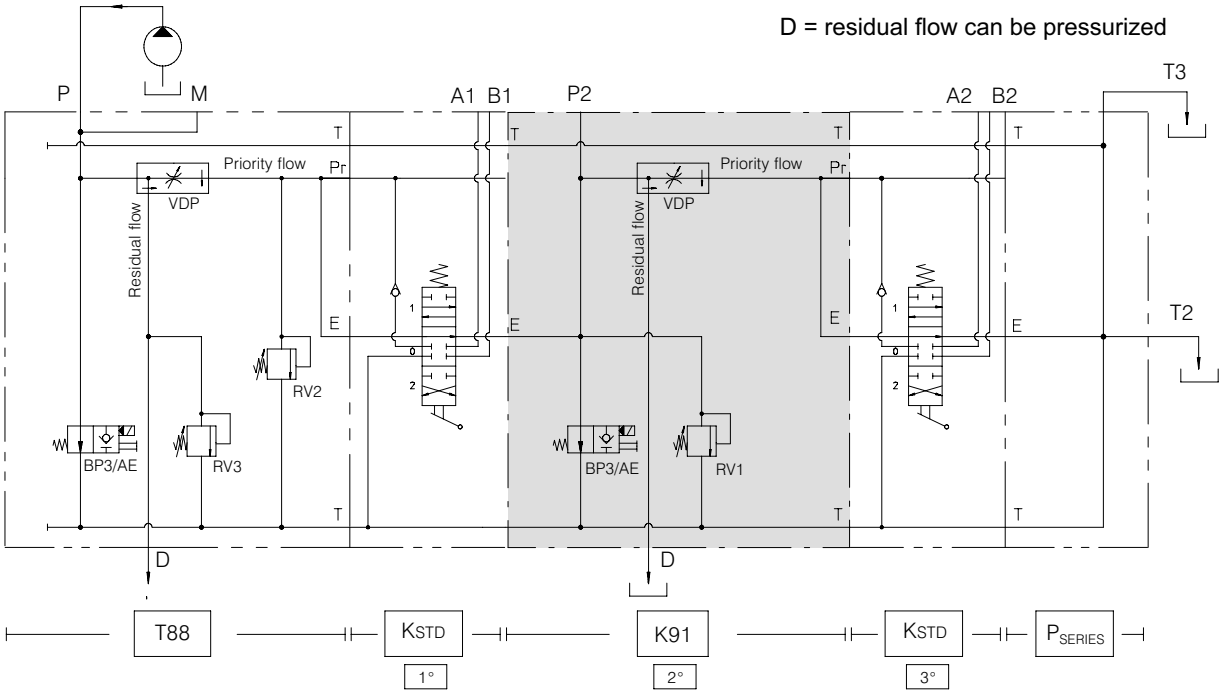


VDPF: 1 ÷ 50 l/min

Pressure set range (bar)	Standard Setting (bar)	Relief valves Type
30 ÷ 95	60	**RV1 – 06**
96 ÷ 210	150	**RV1 – 15**
211 ÷ 320	260	**RV1 – 26**

Flow set range (l/min)	Standard Setting (l/min)	Flow regulator Type
0.5 ÷ 6	06	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5÷ 50	50	**VDP 50**

D = residual flow can be pressurized

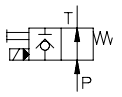


Spool reversed to have the lever at the same side of the regulator knob.

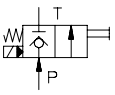
4.4.8 Sectional body K92

Intermediate section with priority flow regulator, pressure relief valves and by-pass valve. Residual flow directly to tank (cannot be pressurised). Suitable for circuits where there are several priority sections (Tie rods crossing holes instead of blind holes like in the standard priority sections)

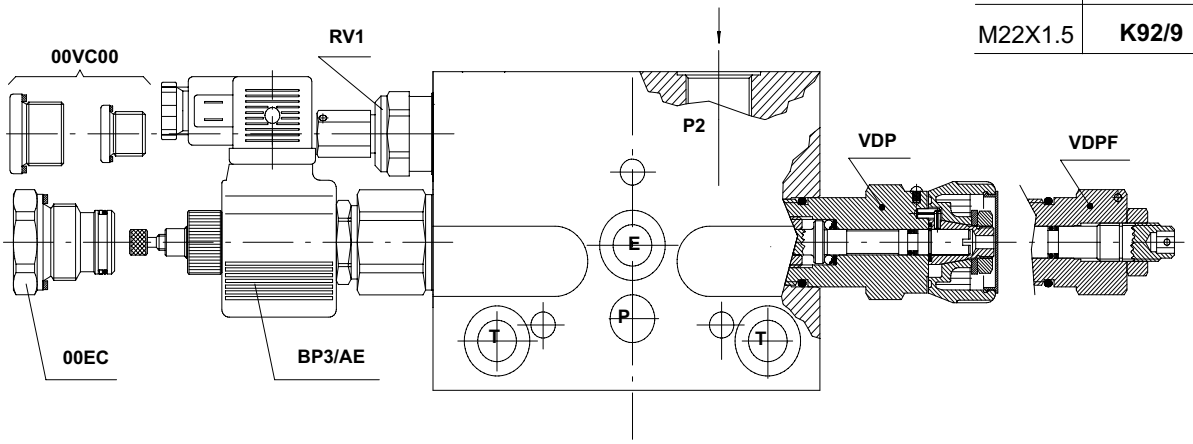
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



BP3/CE 13HC (12 VDC)
BP3/CE 23HC (24 VDC)



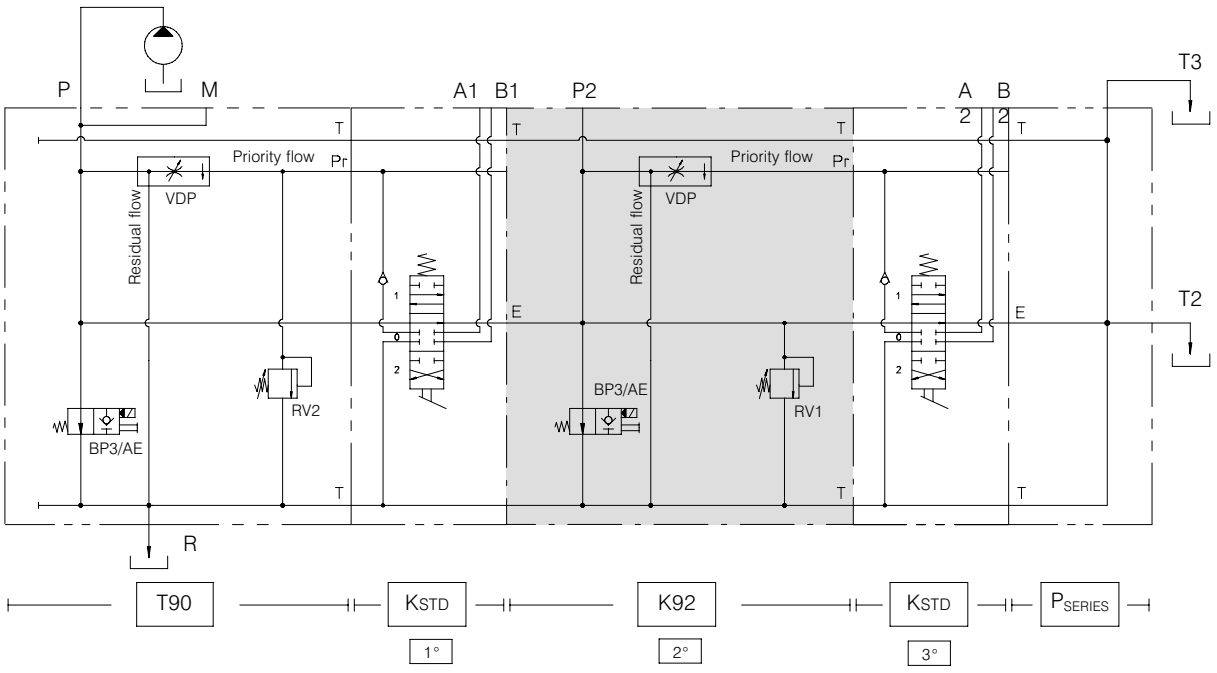
Ø D (**P**)	Type
M18X1.5	**K92/1**
1/2" BSP	**K92/3**
M22X1.5	**K92/9**



VDPF: 1 ÷ 50 l/min

Pressure set range (bar)	Standard Setting (bar)	Relief valves Type
30 ÷ 95	60	**RV1 –06**
96 ÷ 210	150	**RV1 –15**
211 ÷ 320	260	**RV1 –26**

Flow set range (l/min)	Standard Setting (l/min)	Flow regulator Type
0.5 ÷ 6	06	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5÷ 50	50	**VDP 50**

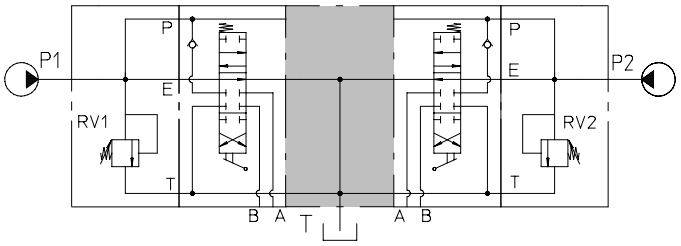


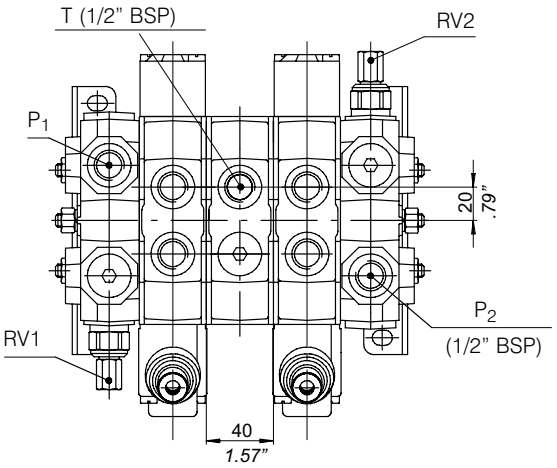
Spool reversed to have the lever at the same side of the regulator knob.

4.5 Intermediate sections

4.5.1 Intermediate outlet section

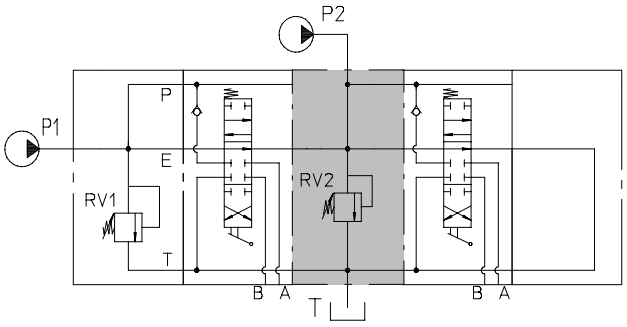
Type	Code
K83	200756200200

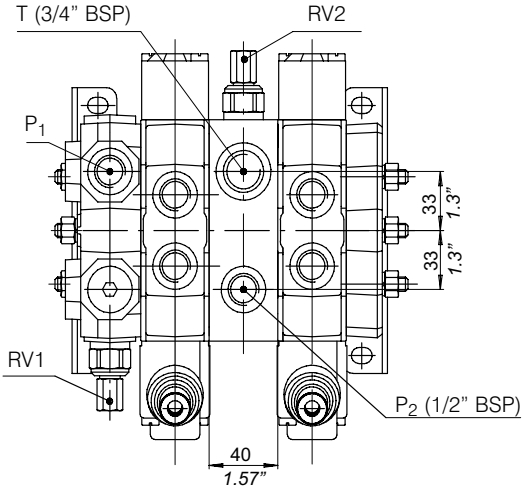




4.5.2 Intermediate inlet section with pressure relief valve (suitable for circuits with two pumps)

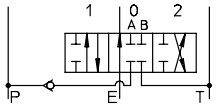
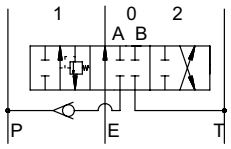
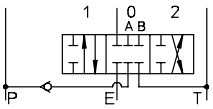
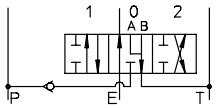
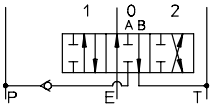
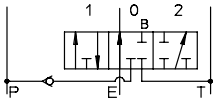
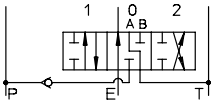
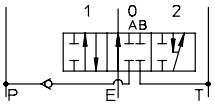
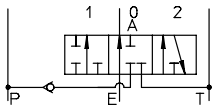
Type	Code
K84	200756200210

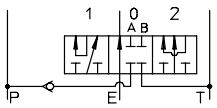
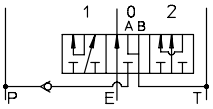
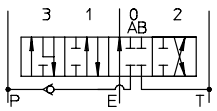
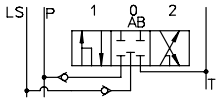
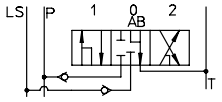
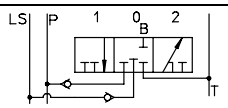
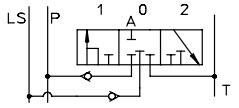




5 Spools

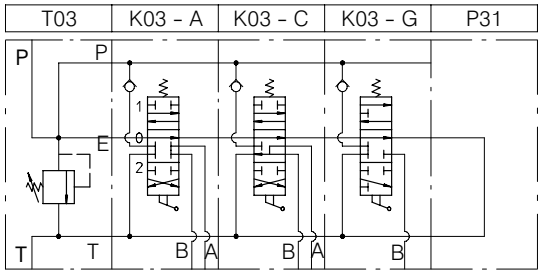
5.1 Spool charts for HDS15 standard body (79 and 85 mm)

Spool Type	Hydraulic schematic	Features	Body / lever / positioner notes
A		4 way - 3 position A/B blocked - E open by-pass	Standard
AS		4 way - 3 position A/B blocked - E open by-pass High metering low flow spools	Standard
AXB		4 way - 3 position A/B blocked - E open by-pass High metering to tank positioner side (Specific for wheel loader)	Standard
APD		4 way - 3 position A/B blocked - E open by-pass Electromagnetic ON-OFF control	For push-pull ON-OFF section
AVM		4 way - 3 position Piloted differential pressure relief valve on B port (Fork Lift application)	Special body required
B		4 way - 3 position A/B blocked - E closed	Standard
C		4 way - 3 position A/B to tank in neutral - E open by-pass	Standard
CS		4 way - 3 position A/B to tank in neutral - E open by-pass High metering low flow spools	Standard
CPD		4 way - 3 position A/B to tank in neutral - E open by-pass Electromagnetic ON-OFF control	For push pull ON-OFF section
D		4 way - 3 position A blocked - B to tank in neutral	Standard
G		3 way - 3 position B blocked - E open by-pass	Standard
GS		3 way - 3 position B blocked - E open by-pass High metering low flow spools	Standard
L		4 way - 3 position B blocked - A to tank in neutral	Standard
R		4 way - 3 position with regenerative spool in 2nd pos.	Special body required
S		3 way - 3 position A blocked - E open by pass	Standard
SS		3 way - 3 position A blocked - E open by pass High metering low flow spools	Standard

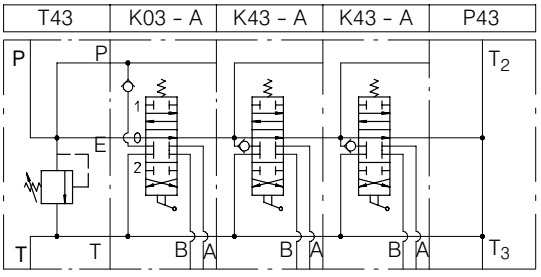
Spool Type	Hydraulic schematic	Features	Body / lever / positioner notes
X		4 way - 3 position A/B: blocked - series connection	Series body required
XS		4 way - 3 position A/B: blocked - series connection High metering low flow spools	Series body required
XC		4 way - 3 position A/B: to tank in neutral - series connection	Series body required
Z		4 way - 4 position 4th float position	Standard For version with UC valve on B port special lever L228 required
ZSS		4 way - 4 position 4th float position High metering low flow spools	Special body required
LSA		4 way - 3 position A/B: blocked - Load Sensing	For LS version - For the availability contact our Sales Dept. Special body required
LSC		4 way - 3 position A/B: to tank in neutral - Load Sensing	For LS version - For the availability contact our Sales Dept. Special body required
LSG		3 way - 3 position B: blocked - Load Sensing	For LS version - For the availability contact our Sales Dept. Special body required
LSS		3 way - 3 position A: blocked Load Sensing	For LS version - For the availability contact our Sales Dept. Special body required

5.1.1 Hydraulic circuit for HDS15 standard bodies

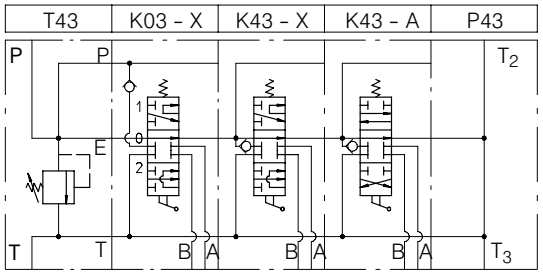
Standard parallel circuit



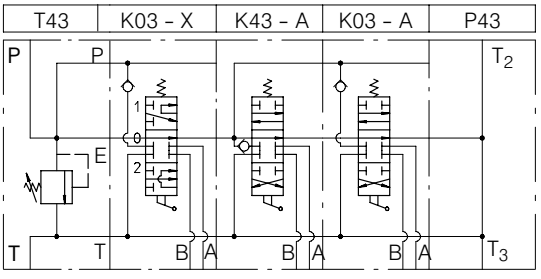
Optional tandem circuit



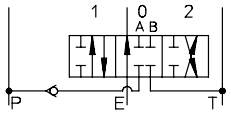
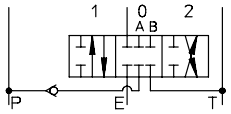
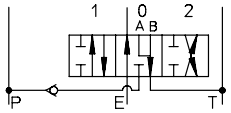
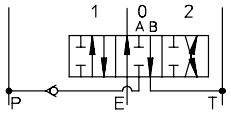
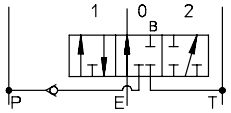
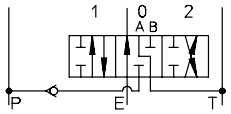
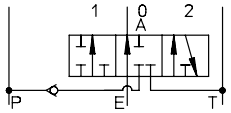
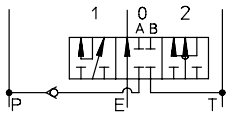
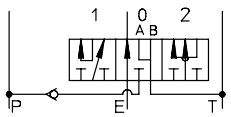
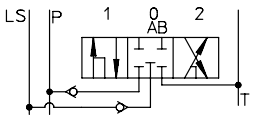
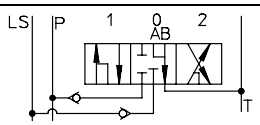
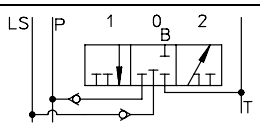
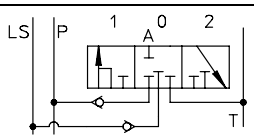
Optional series circuit



Combined parallel/series circuit

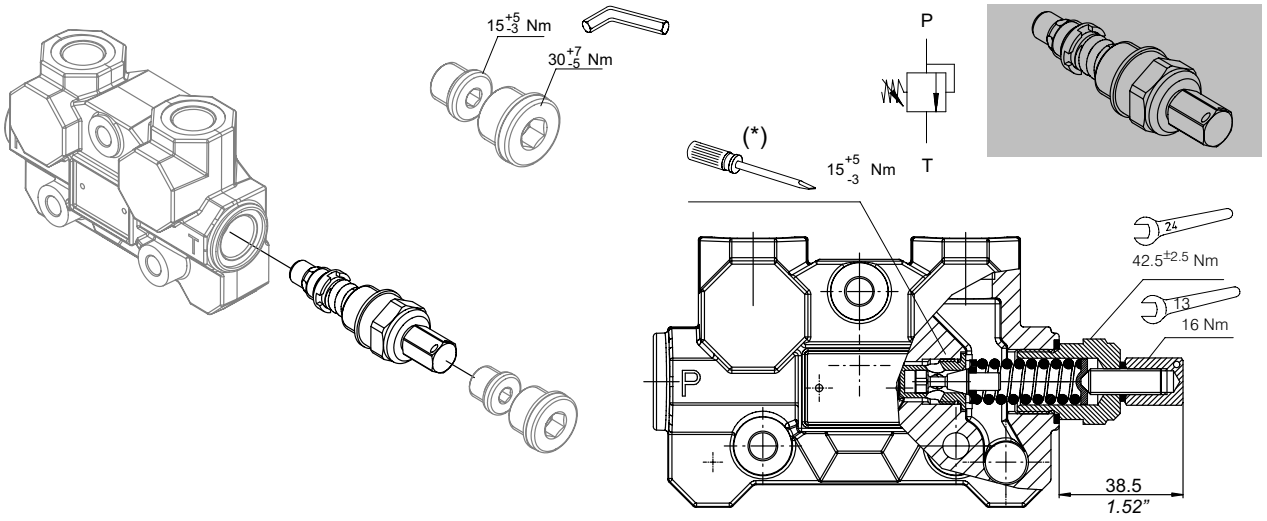


5.2 Spool charts for HDS15 ON-OFF body

Spool Type	Hydraulic schematic	Features	Body notes
AE		4 way - 3 position A/B: blocked E: open by pass	Standard ON-OFF body
BE		4 way - 3 position A/B: blocked E: closed	Standard ON-OFF body
CE		4 way - 3 position A/B to tank in neutral E: open by pass	Standard ON-OFF body
DE		4 way - 3 position A: blocked B: to tank in neutral	Standard ON-OFF body
GE		3 way - 3 position B: blocked E:open by pass	Standard ON-OFF body
LE		4 way - 3 position B: blocked A: to tank in neutral	Standard ON-OFF body
SE		3 way - 3 position A: blocked E: open by pass	Standard ON-OFF body
XE		4 way - 3 position A/B: blocked series connection	Series body required
XCE		4 way - 3 position A/B: to tank in neutral series connection	Series body required
LAE		4 way - 3 position A/B: blocked Load Sensing	For LS version - For the availability contact our Sales Dept.
LCE		4 way - 3 position A/B to tank in neutral Load Sensing	For LS version - For the availability contact our Sales Dept.
LGE		3 way -3 position B: blocked Load Sensing	For LS version - For the availability contact our Sales Dept.
LSE		3 way - 3 position A: blocked Load Sensing	For LS version - For the availability contact our Sales Dept.

6 Valves

6.1 Direct acting relief valve

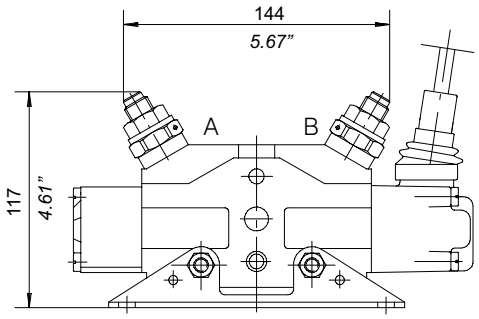


A tamper proof shrinkable-sheat can be supplied if requested

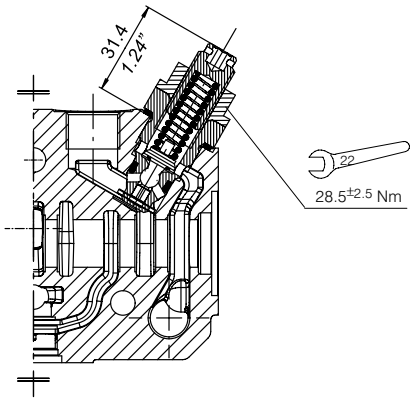
Pressure set range bar *(PSI)*	Type	Code	Spring code	Std. setting bar *(PSI)*	Setting code	Spring colour
15-30 *(215-400)*	RV01-02	200787400700	200662401470	-	-	-
30-95 *(400-1300)*	RV01-06	200787400720	200662401450	60 *(860)*	06	Yellow (YE)
96-210 *(1300-300)*	RV01-15	200787400740	200662401480	150 *(2100)*	15	Green (GR)
150-250 *(2170-3620)*	RV14	200787402970	200662402400	200 (*2900*)	20	-
211-300 *(3000-4200)*	RV01-26	200787400710	200662401460	260 *(3700)*	26	Blue (BL)
VC (Plugged valve)		200778400140	-	-	-	-

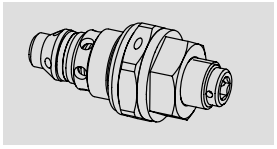
IMPORTANT!:Example: RV1 - 06*= 60 bar standard setting value. Different setting values have to be specified at the order. Please pay attention that the minimum setting step has to be fixed in 10 bar.

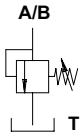
6.2 Anti shock and anti-cavitation valves

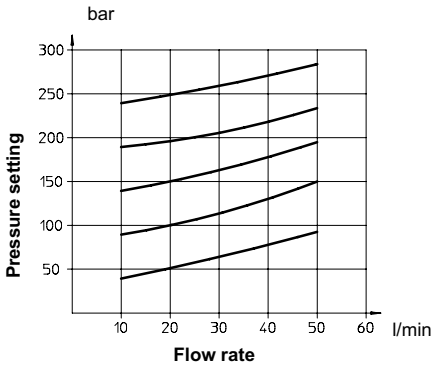


6.2.1 Port relief valve OA





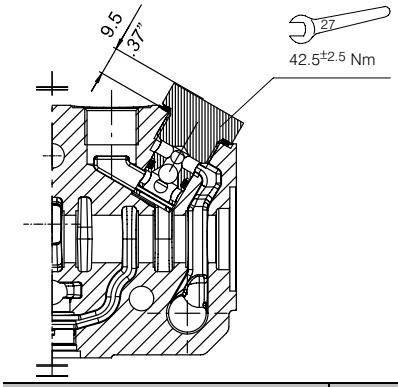


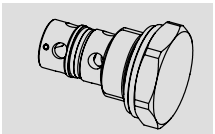


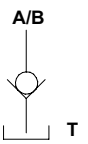
Pressure set range bar *(PSI)*	Type	Code	Spring code	Std. setting bar *(PSI)*	Setting code	Spring colour
0-130 (0-1900)	OA/A06 OA/B06	200787400950	200662401150	60 (860)	05	Yellow (YE)
131-350 (1900-5000)	OA/A15 OA/B15	200787400960	200662401160	150 (2100)	15	Green (GR)
VC (Plugged valve)		200778400050	-			

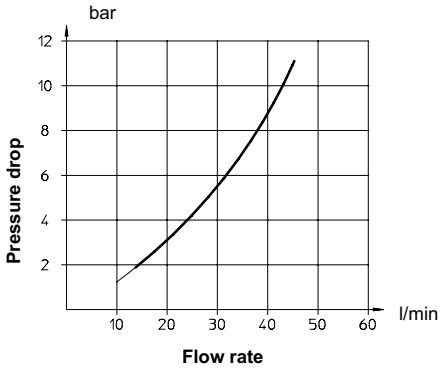
Setting is made, at required pressure, with flow Q = 16 l/min

6.2.2 Anti-cavitation valve C



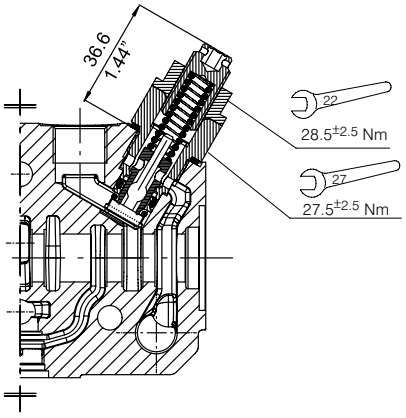


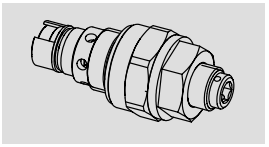


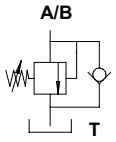


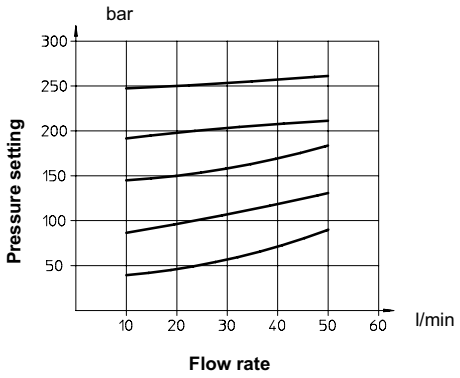
Thread	Code
C/A or C/B	200787601430
VC (Plugged valve)	200778400050

6.2.3 Combined port relief and anti-cavitation valve UC





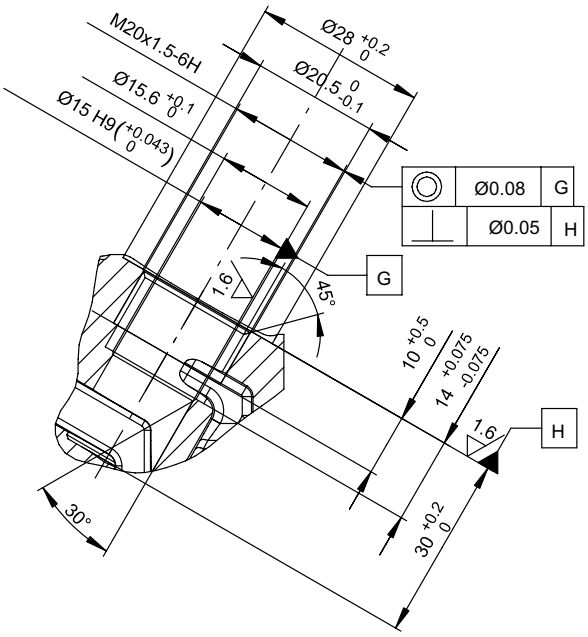


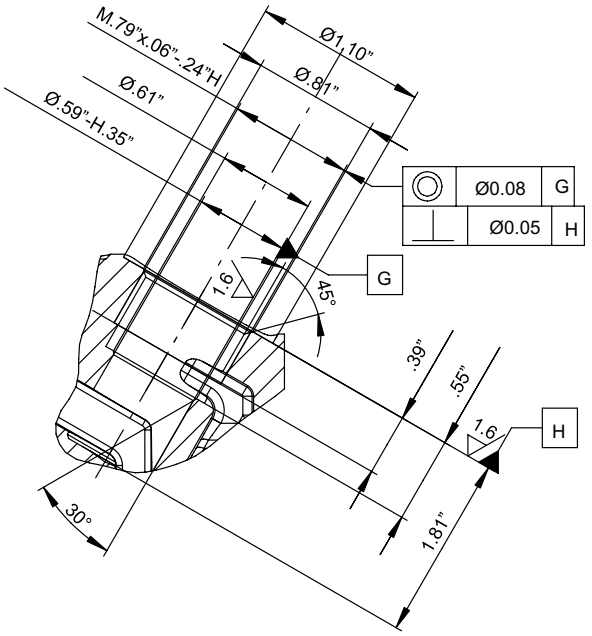


Pressure set range bar *(PSI)*	Type	Code	Spring code	Std. setting bar *(PSI)*	Setting code	Spring colour
0-130 (0-1900)	UC/A06 UC/B06	200787401310	200662401150	60 (860)	05	Yellow (YE)
131-350 (1900-5000)	UC/A15 UC/B15	200787401320	200662401160	150 (2100)	15	Green (GR)
VC (Plugged valve)		200778400050	-			

Setting is made, at required pressure, with flow Q = 16 l/min

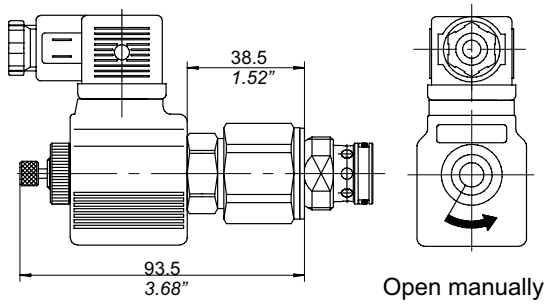
6.2.4 Service port valves cavity



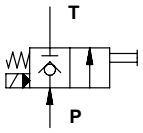


6.3 By-Pass solenoid valve - BP2 -

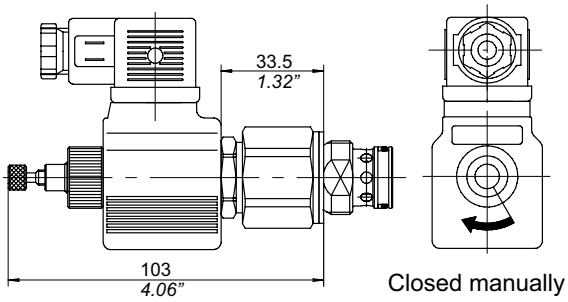
6.3.1 Normally closed with manual override



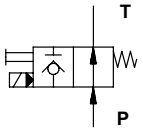
Voltage	Type	Code
Without coil	**BP2/CE HDS15 p.m.**	200757200440
12 V.D.C.	**BP2/CE 23-HC27 HDS15**	200757010062
24 V.D.C.	**BP2/CE 23-HC27 HDS15**	200757020069



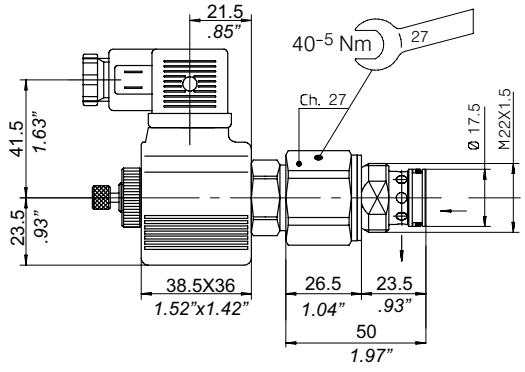
6.3.2 Normally open with manual override



Voltage	Type	Code
Without coil	**BP2/AE HDS15 p.m.**	200757200450
12 V.D.C.	**BP2/AE 23-HC27 HDS15**	200757010063
24 V.D.C.	**BP2/AE 23-HC27 HDS15**	200757020070



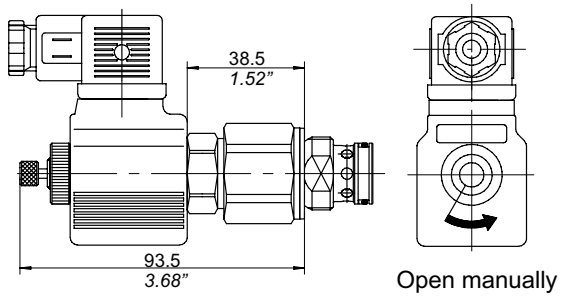
6.3.3 Dimension



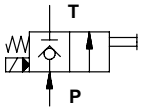
BP2 Solenoid valve performance	
Max pressure	315 bar
Max flow	60 l/min
Power	27 Watt
Intermittence	ED 100%
Voltage tolerance	±10%
Temperature range	-20/+80 °C
Oil filtration	≤25 micron
Pressure drop Q= 30 l/min	7.5 bar
Pressure drop Q= 50 l/min	12.7 bar

6.4 By-Pass solenoid valve - BP3 - for PQ elements

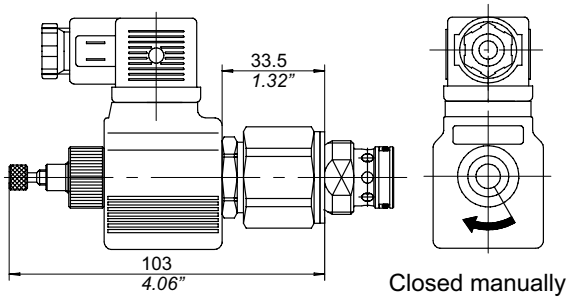
6.4.1 Normally closed with manual override



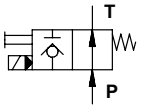
Voltage	Type	Code
Without coil	**BP3/CE HDS15 p.m.**	200757200480
12 V.D.C.	**BP3/CE 23-HC27 HDS15**	200757010064
24 V.D.C.	**BP3/CE 23-HC27 HDS15**	200757020071



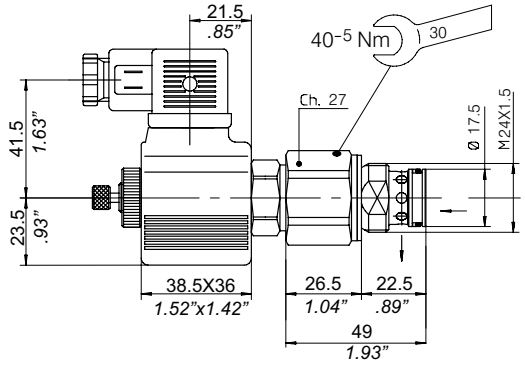
6.4.2 Normally open with manual override



Voltage	Type	Code
Without coil	**BP3/AE HDS15 p.m.**	200757200490
12 V.D.C.	**BP3/AE 23-HC27 HDS15**	200757010065
24 V.D.C.	**BP3/AE 23-HC27 HDS15**	200757020072



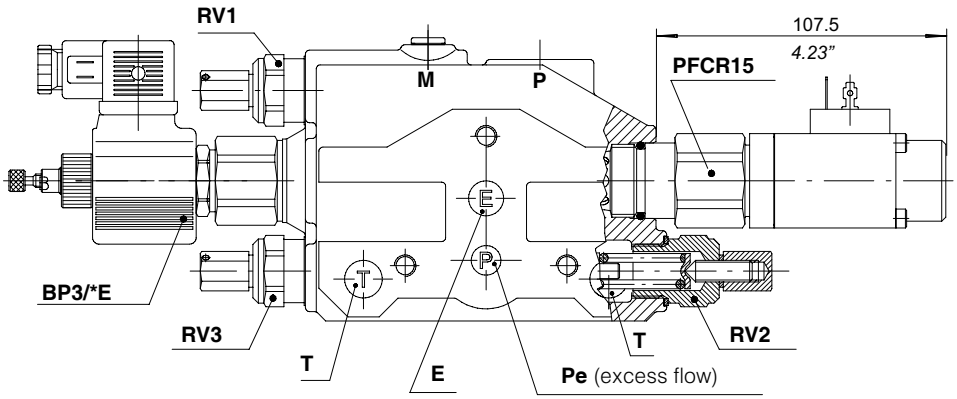
6.4.3 Dimension



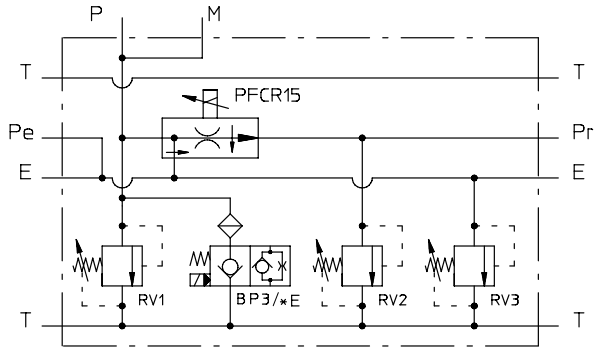
BP2 Solenoid valve performance	
Max pressure	315 bar
Max flow	60 l/min
Power	27 Watt
Intermittence	ED 100%
Voltage tolerance	±10%
Temperature range	-20/+80 °C
Oil filtration	≤25 micron
Pressure drop Q= 30 l/min	7.5 bar
Pressure drop Q= 50 l/min	12.7 bar

6.5 Proportional Flow Control PFCR15

6.5.1 Example of application on K100 body



6.5.2 Example of hydraulic scheme K100



6.5.3 Electric performances

Coil according to	**VDE 0580**
Connector type	**DIN 43650**
Max. current	**0.75 A (24 V. DC)**
Duty rating	**ED= 100%**
Suggested dither	**110 Hz**
Insulation class with std. plug	**IP54 (DIN 40050)**

Voltage ±5%	**12**	**24**	**V (DC)**
Nominal current	**1.25**	**0.68**	**Ampere**
Resistance at 20°C	**7.2**	**24.6**	**Ohm**
Nominal power	**17.2**	**17.4**	**watt**

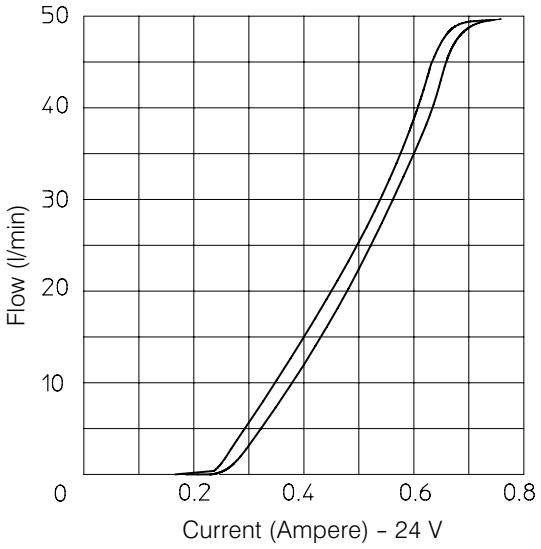
6.5.4 Code

Voltage	Type	Code*
12 V	**PFCR15/V8-45-P2-13**	200788000100
24 V	**PFCR15/V8-45-P2-23**	200788000130

6.5.5 Hydraulic performances

Max. pressure	**270 bar**
Max. recommended pressure	**230 bar**
Regulated flow range	**0.5 - 45 l/min**
Temperature range	**-5/+70° C**

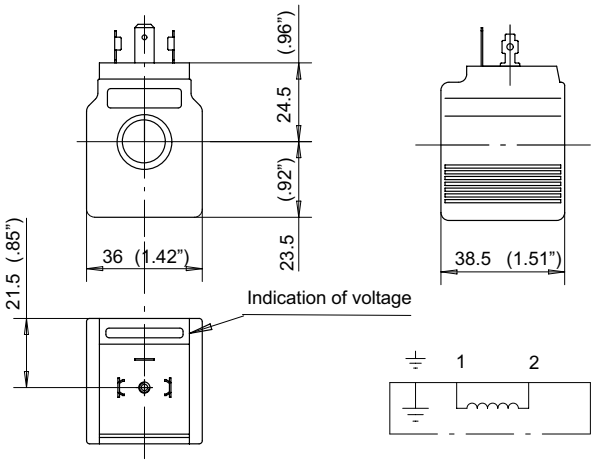
6.5.6 Current/flow regulated diagram



Performance recorded with:
24 VDC Proportional Coil
Pressure on priority flow channel: 100 bar
No pressure on the residual flow channel:
Minimum current: 0 Ampere
Maximum current: 1.05 Ampere
Ramp UP: 30 sec - Ramp DOWN: 30 sec
Oil temp.: 50° C - Oil viscosity: 23 cSt

(* code without connector)

6.6 Directional valve solenoids



For solenoid valve series	BP2 – BP3
Wire class	H (VDE0580)
Coil insulation	IP65 (DIN40050)
Duty rating	ED 100%
Connector style	DIN 43650 see 8.15 section
Stabilized temperature	70°C
Voltage tolerance	± 10%

Supply Voltage	Nominal Coil voltage	Power (Watt)	Resistance (Ohm)		Current (Ampere)		Coil code
			Ambient temp.	Stabil. temp.	Ambient temp.	Stabil. temp.	
12 V. DC	12 V. DC	27.2	5.3	8	2.2	1.5	200674910100
24 V. DC	24 V. DC	27	21.3	32	1.12	0.75	200674920080
48 V. DC	48 V. DC	27	85.3	130	0.56	0.37	200674930030
24 V. AC	21.6 V. DC	27.1	17.2	26	1.25	0.83	200674820050
110 V. AC.	98 V. DC	27	355	530	0.27	0.18	200674840050
220 V. AC.	198 V. DC	27.6	1422	2130	0.14	0.10	200674860060

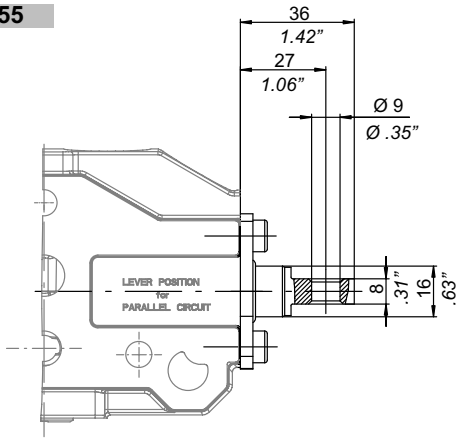
A.C. supply requires a connector with bridge rectifier included.

For different connector style, please contact our Sales Dept.

7 Levers

7.1 Free end spool with dust proof seal

L55



1	0	2

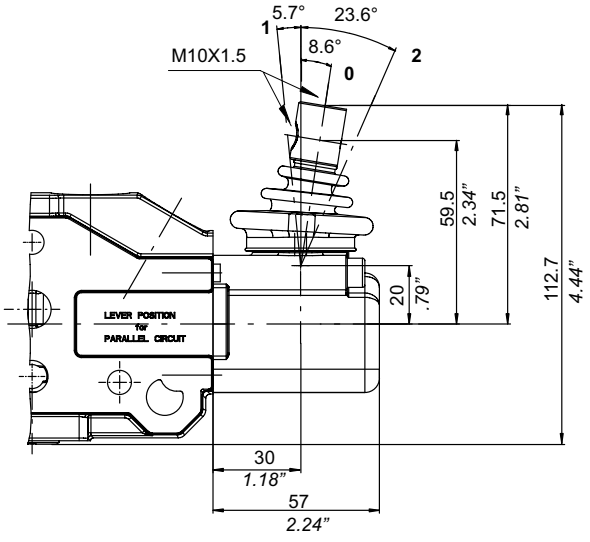
Code: 200707190040

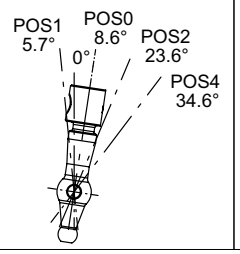
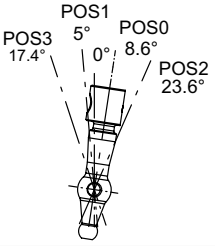
7.2 Standard lever group

2	0	1

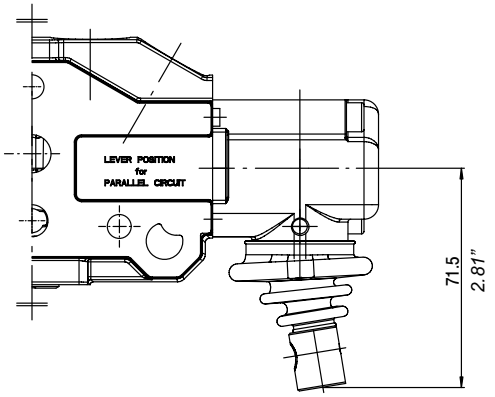
L100: code 200707120340

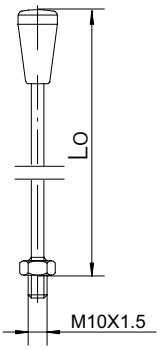
1 - 2 standard stroke 5-5
0 neutral position



Floating position W spool - Stroke: 5-5-9	Floating position Z spool - Stroke: 5-5-9
	

L300

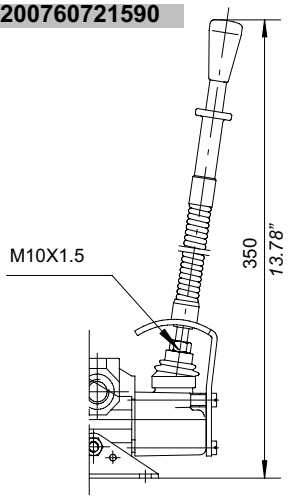




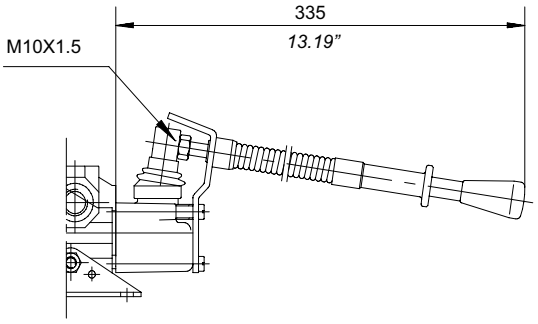
Lo		Type	Code
mm	inches		
185	7.28	**AL001**	200702220010
250	9.84	**AL002**	200702220030
300	11.81	**AL003**	200702220040
350	13.78	**AL004**	200702220050

7.3 Safety levers

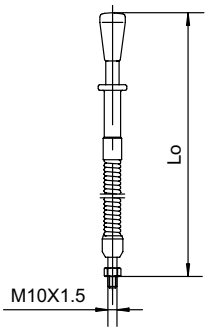
L50: code 200760721590



L51: code 200760721600



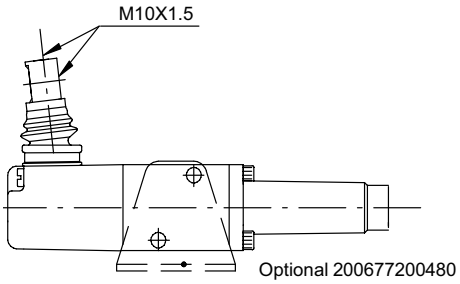
AL056



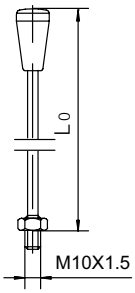
Lo		Type	Code
mm	inches		
279	10.98	**AL056**	200760721590

7.4 Remote cable control

Lever support code: 200760900130

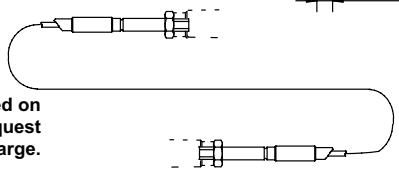


AL00*



Lo		Type	Code
mm	inches		
185	7.28	**AL001**	200702220010
250	9.84	**AL002**	200702220030
300	11.81	**AL003**	200702220040
350	13.78	**AL004**	200702220050

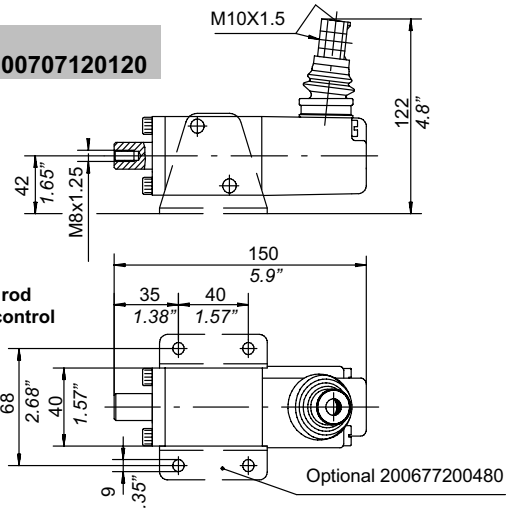
Cable



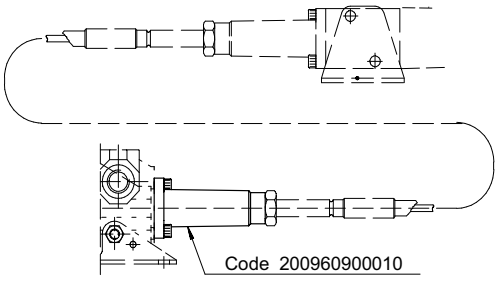
Cables are assembled on the valve only on request and with an extra charge.

Cable length	Code	Cable length	Code
1000 mm	**200544104002**	2500 mm	**200544104007**
1500 mm	**200544104005**	3000 mm	**200544104008**
2000 mm	**200544104006**	4000 mm	**200544104009**

L142
code 200707120120

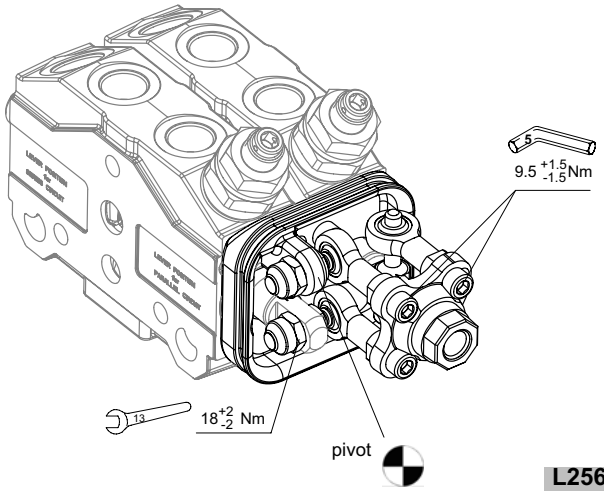


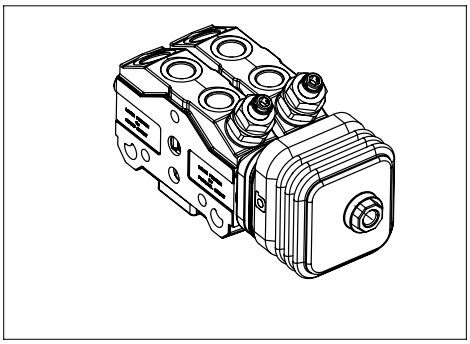
Spool kit



7.5 Joystick control L256 - 456

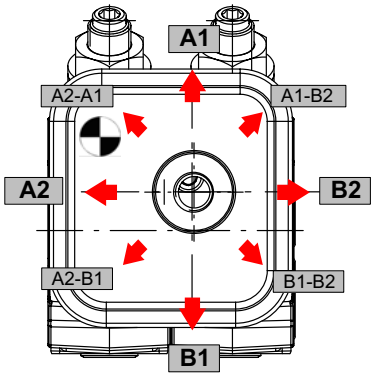
Code: 200775930370

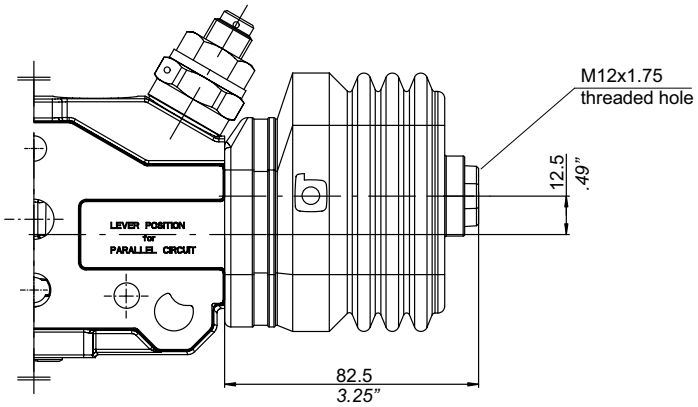




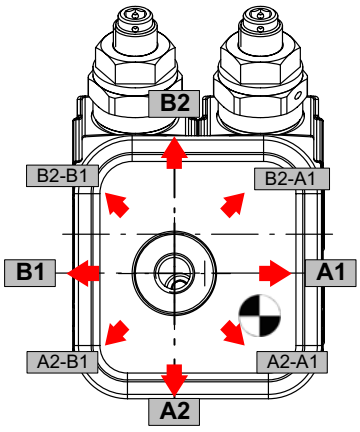
L256

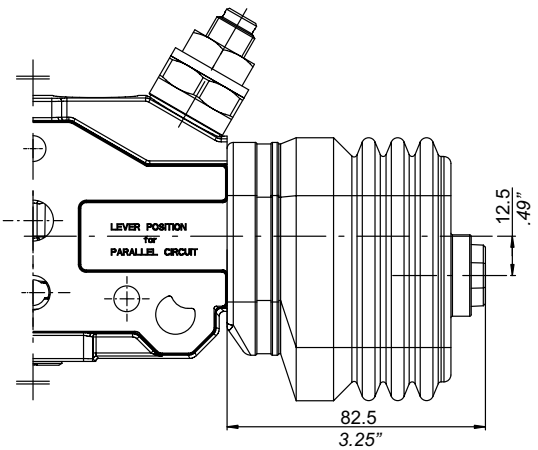
PORT SIDE



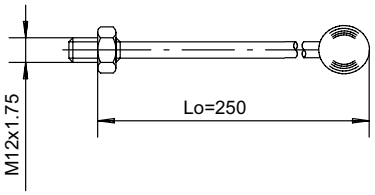


L456



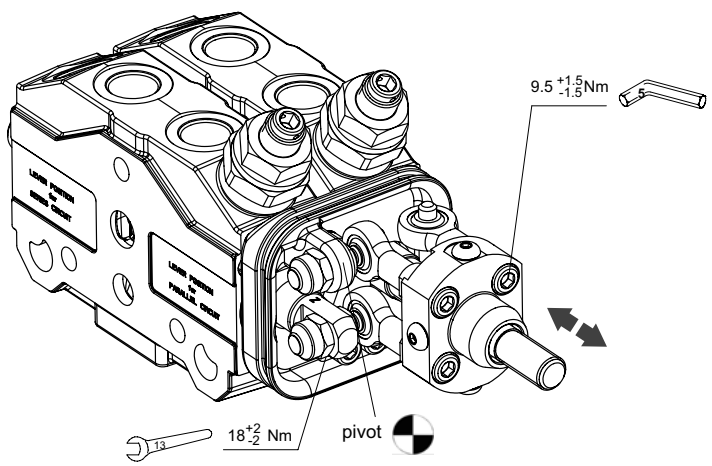


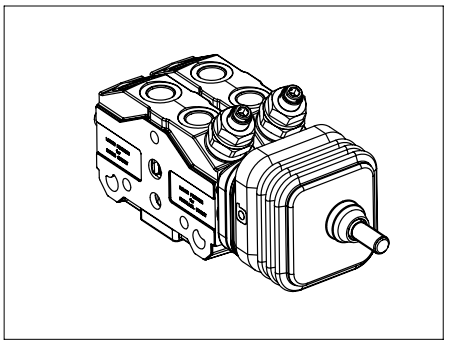
AL010
Code: 200702230040



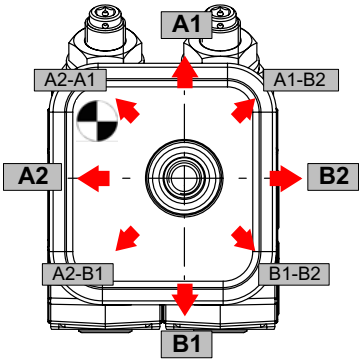
7.6 Joystick control L263 - 463 with integrated locking system

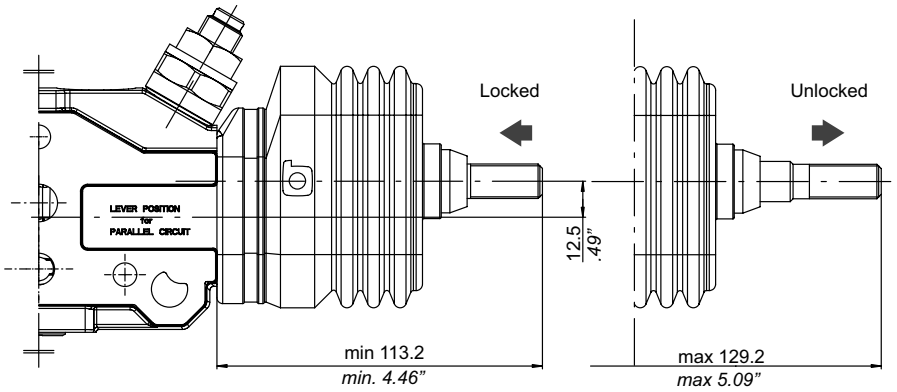
Code: 200775930390



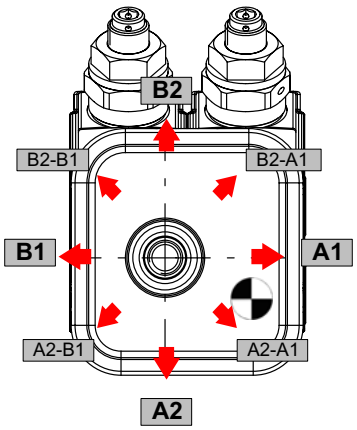


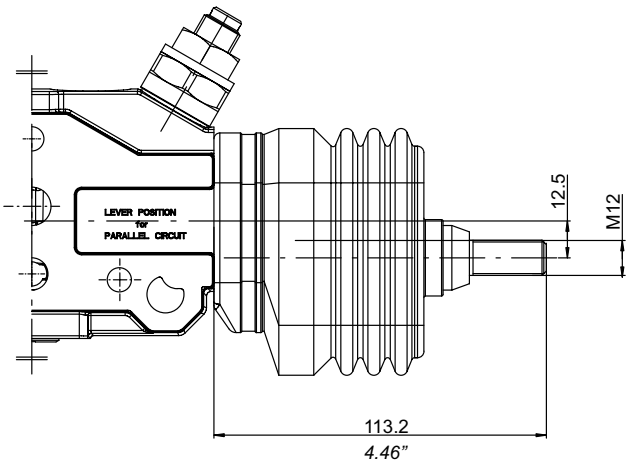
L263





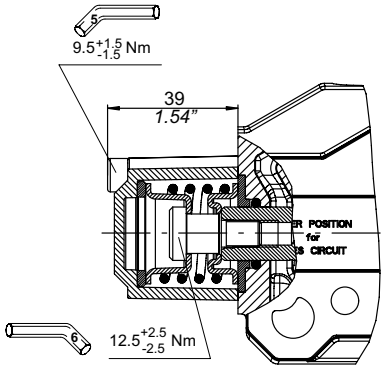
L463





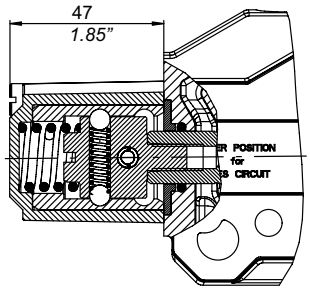
8 Positioners

8.1 Spring return to neutral position



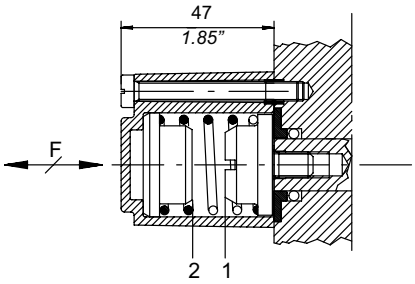
Type	Code	Spring code	Colour	Scheme
08	200968610080	200662402410	YELLOW	1 0 2
38	200968610690	200662401521	YELLOW	1 0
79	200968610910	200662402430	BLACK	1 0 2
133	200968610310	200662402450	WHITE	1 0 2

8.2 Spring return to neutral position and detent position in 1 or 2



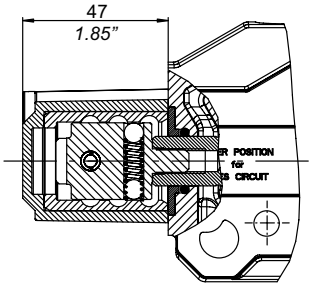
Type	Code	Main spring code	Scheme
10	200968630040	200662401240	1 0 2
20	200968630090	200662400860	1 0 2
29	200968630250	200662401240	0 2

8.3 Spring return to position 1 or 2



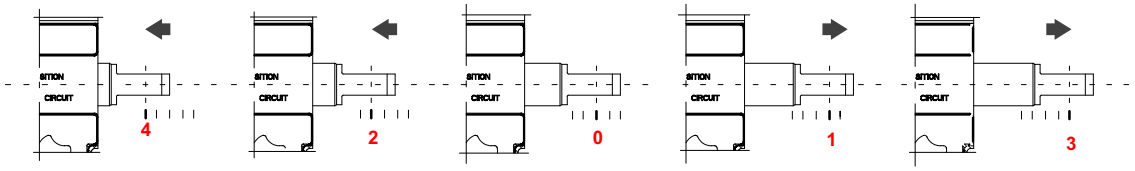
Type	Code	Spring code	Scheme
27	200968610440	200662401521	1→2 1 0 2
37	200968610660	200662401521	1←2 1 0 2

8.4 Hand lever in detent position

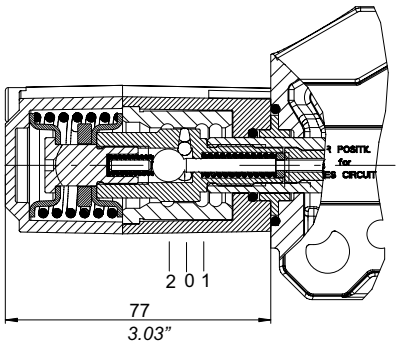


Type	Code	Spring code	Scheme
17	200968620140	-	1 0 2
25	200968620150	-	0 2
36	200968620170	-	1 0 2

Spool positions



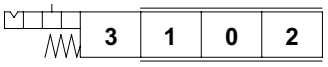
8.5 KicK-out

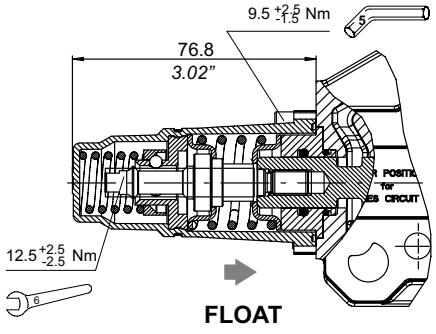


Type	Code	Main spring code	Scheme
358	200968630471	200662401521	

8.6 Detent in floating position and spring return to neutral from position 1 and 2

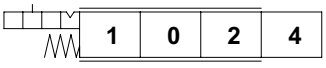
Floating position pulling the spool (Z type)

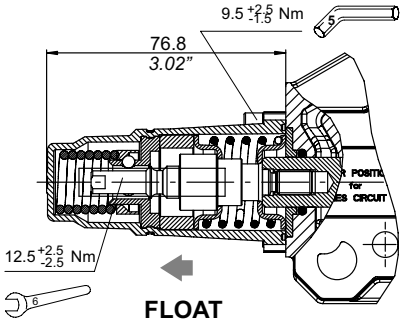




Type	Code	Main spring	Detent spring
331	200968640620	WHITE	YELLOW
341	200968640660	WHITE	BLACK
355	200968640720	BLACK	BLACK

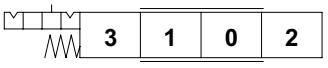
Floating position pushing the spool (W type)

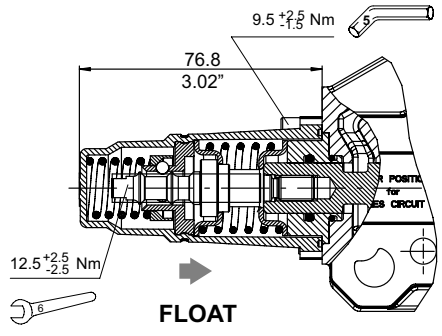




Type	Code	Main spring	Detent spring
354	200968640710	YELLOW	WHITE

Floating position pulling the spool (Z type)

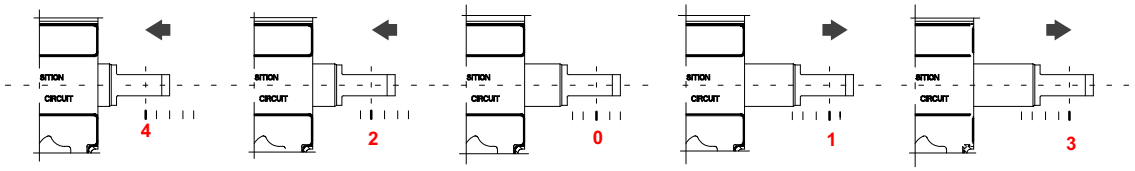




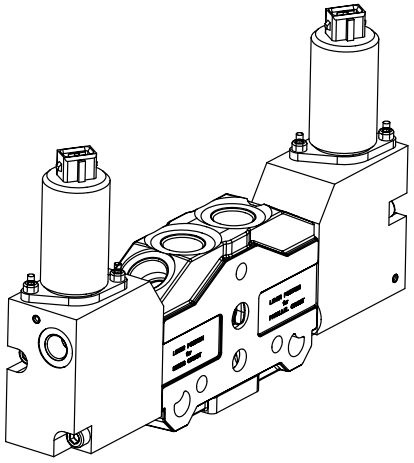
Type	Code	Main spring	Detent spring
366	200968640760	WHITE	BLACK

Detent in position 2 and 3 and spring return to neutral in both directions

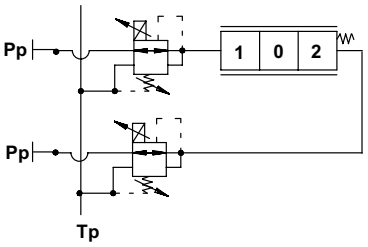
Spool positions



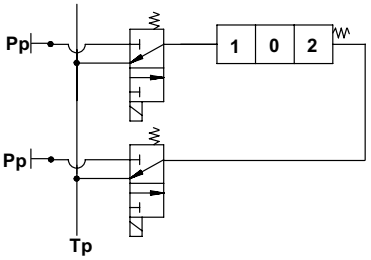
8.7 Electro-hydraulic open loop proportional / ON-OFF control (EHO)



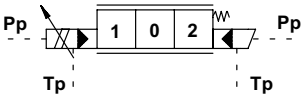
Complete PROPORTIONAL scheme



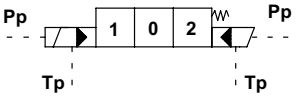
Complete ON-OFF scheme

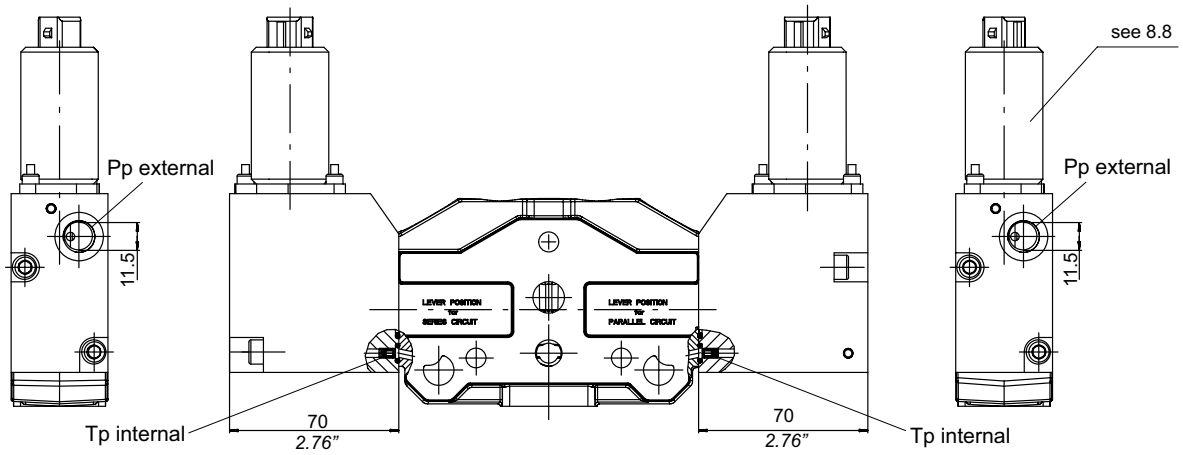


Simplified PROPORTIONAL scheme



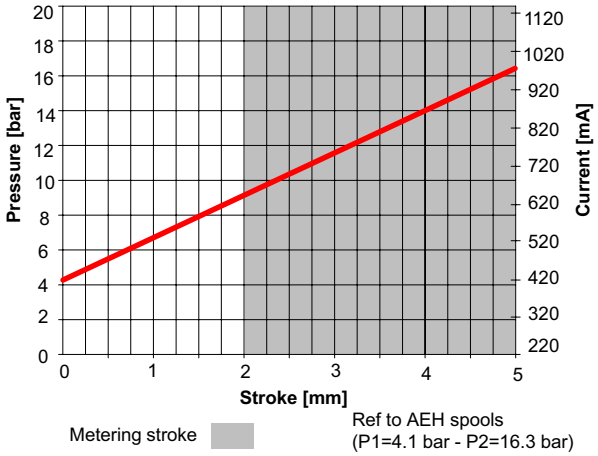
Simplified ON-OFF scheme





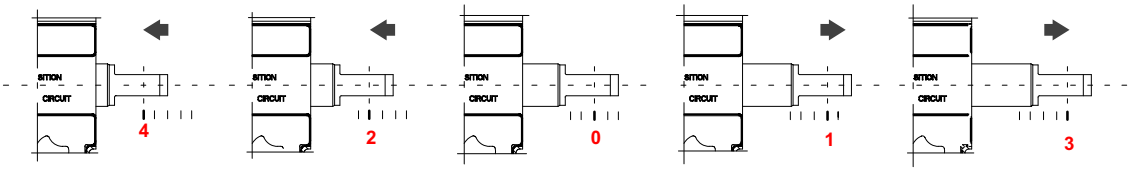
Control	Type	Code	Voltage	Connector
Proportional	420	200968660680	12 VDC	AMP 84-9419
Proportional	421	200968660790	12 VDC	AMP 84-9419
ON-OFF	425	200968630470	12 VDC	AMP 84-9419

EHO standard spring curve

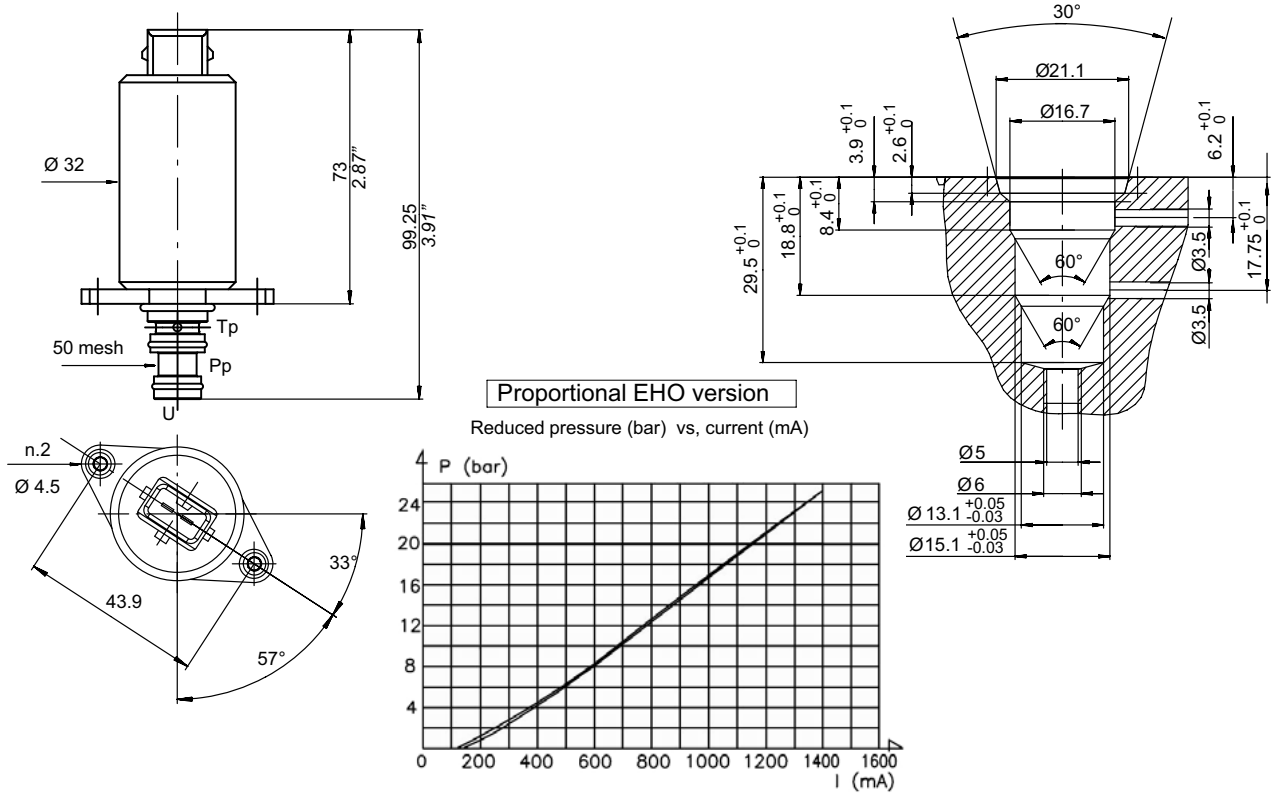


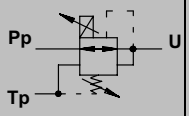
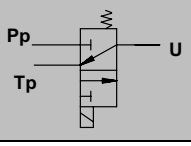
Ref to AEH spools
(P1=4.1 bar - P2=16.3 bar)

Spool positions



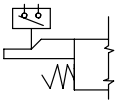
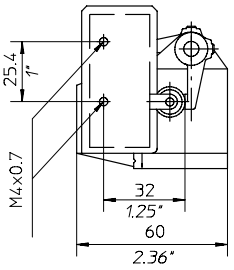
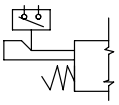
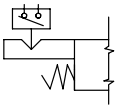
8.8 Proportional pressure reducing valve / ON-OFF directional valve



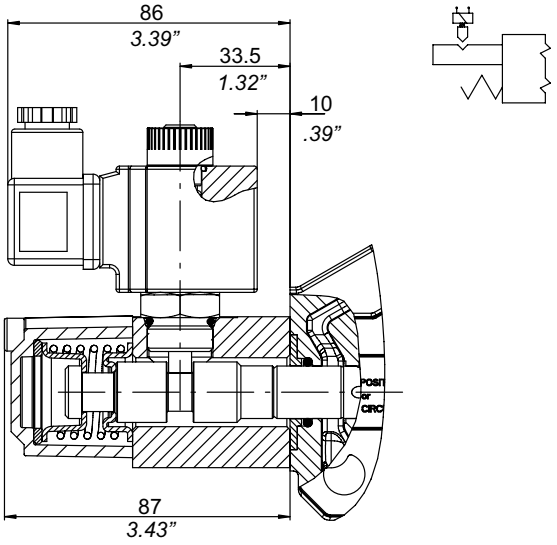
Electro-hydraulic specifications		
	Proportional 	**ON-OFF** 
Nominal flow rate	4 l/min *(1 GPM)*	6 l/min *(1.5 GPM)*
Max inlet pressure	35 bar *(500 PSI)*	
Rated supply voltage	12 VDC ±10%	
Current supply characteristic	PWM (Pulse width modul.)	-
Superimposed dither frequency	100 to 150 Hz	-
Degree of protection	IP67	
Max power consumption	11 W	20 W
Coil resistance	5.4 Ohm	7.2 Ohm
Response time	< 80 ms	from 30 to 45 ms
Leakage	< 15 cc/min. at 35 bar and 80°C *(< 0.9 cu:in./min. at 500 psi and 176 °F)*	
Duty cycle	ED 100%	
Connector Type	AMP Junior timer (AMP84-9419)	
Connector colour	BLUE	BLACK
Code (*)	200533960004	200533940075

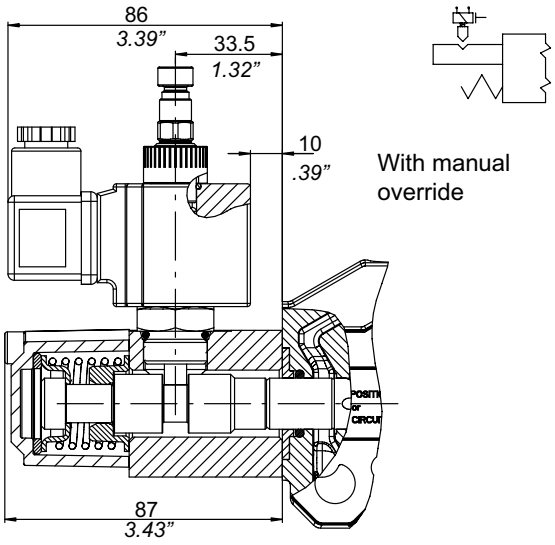
(*) nr. 2 screws M4x12 are not included

8.9 Microswitch control for multisectional directional valve

Type	Code	Feature	Hydraulic scheme	
30	**200968610480**	Microswitch is operated when the spool is switch to pos. 1		 **The microswitch is supplied only on customer's request.**
32	**200968610610**	Microswitch is operated when the spool is in pos. 2		
34	**200968610650**	Microswitch is operated when the spool is in pos. 1 and 2		

8.10 Electro-mechanical locking system (normally locked)



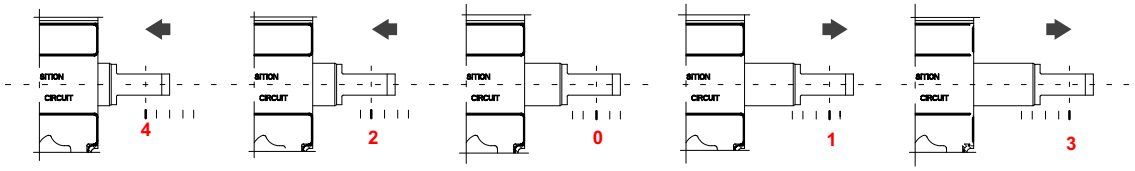


Type	Code
379	200768690080

Type	Code
380	200768690130

For solenoids features see chapter 6.6

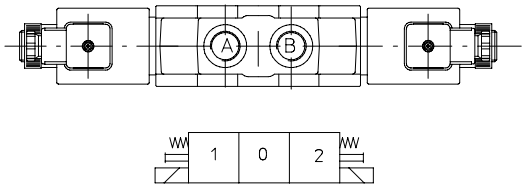
Spool positions



8.11 Spool actions for ON-OFF control

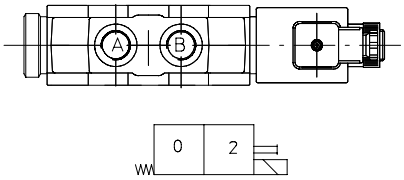
Double acting

Type 01E



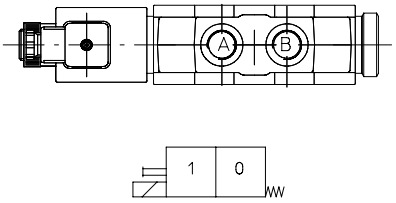
Single acting port “B”

Type 02E



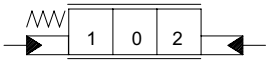
Single acting port “A”

Type 03E

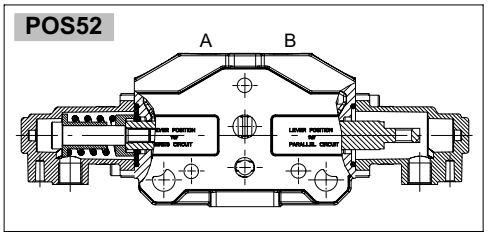


8.12 Hydraulic control (HP)

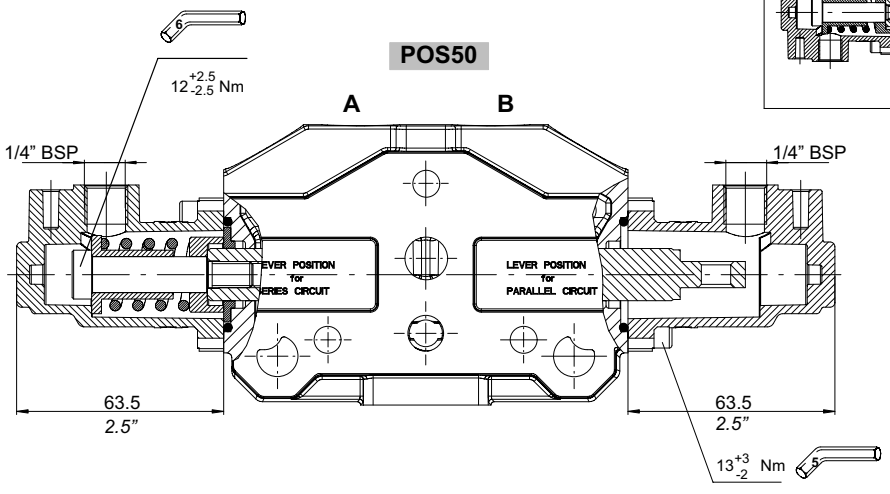
Type	Code
50-52	200968650631

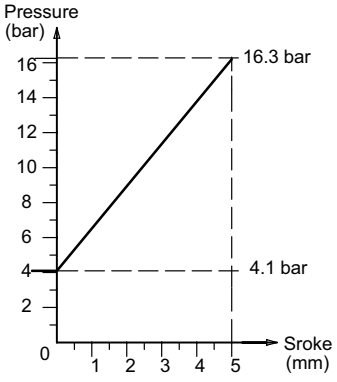


POS52



POS50

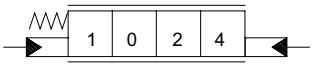


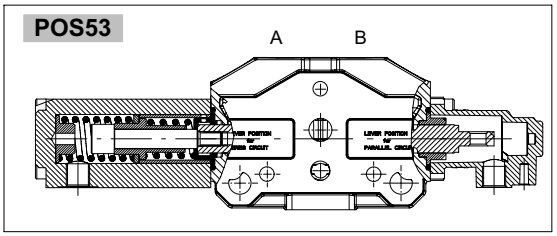


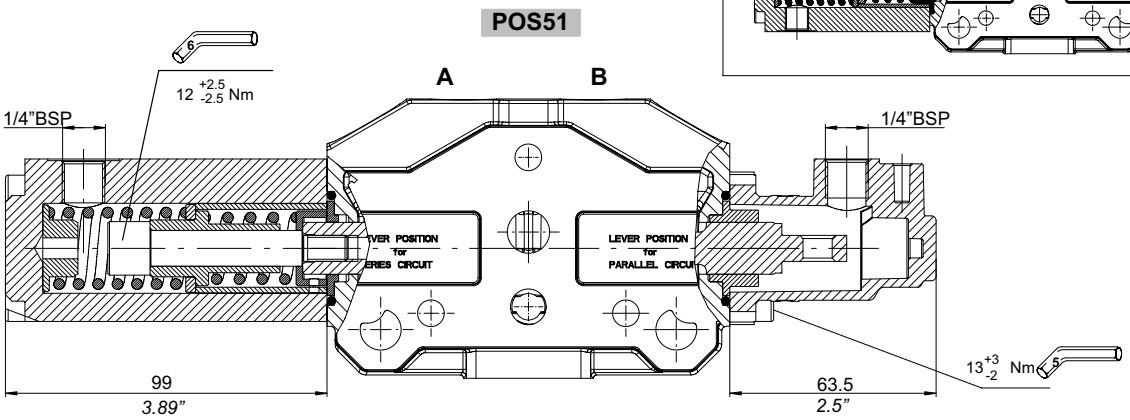
P1= 4.1 bar
P2= 16.3 bar

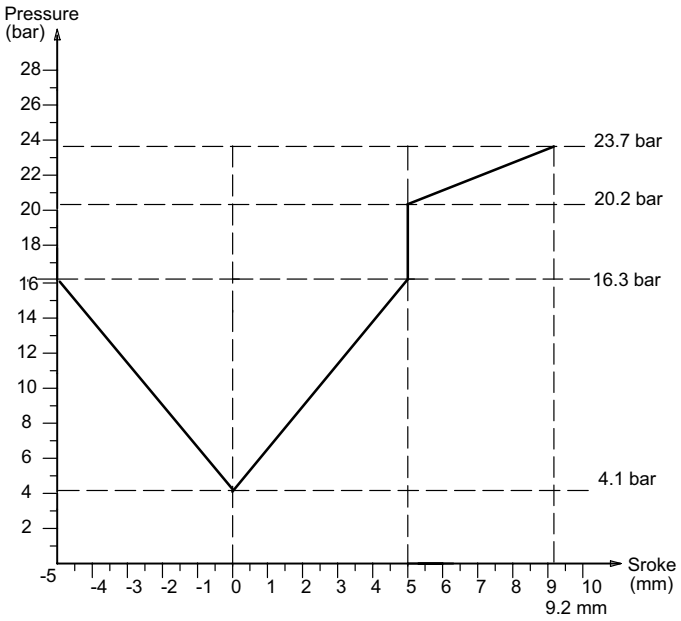
8.13 Hydraulic control (HP) + floating position

Type	Code
51-53	200968650641

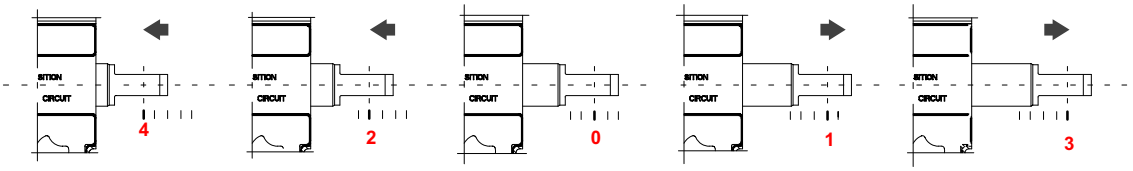








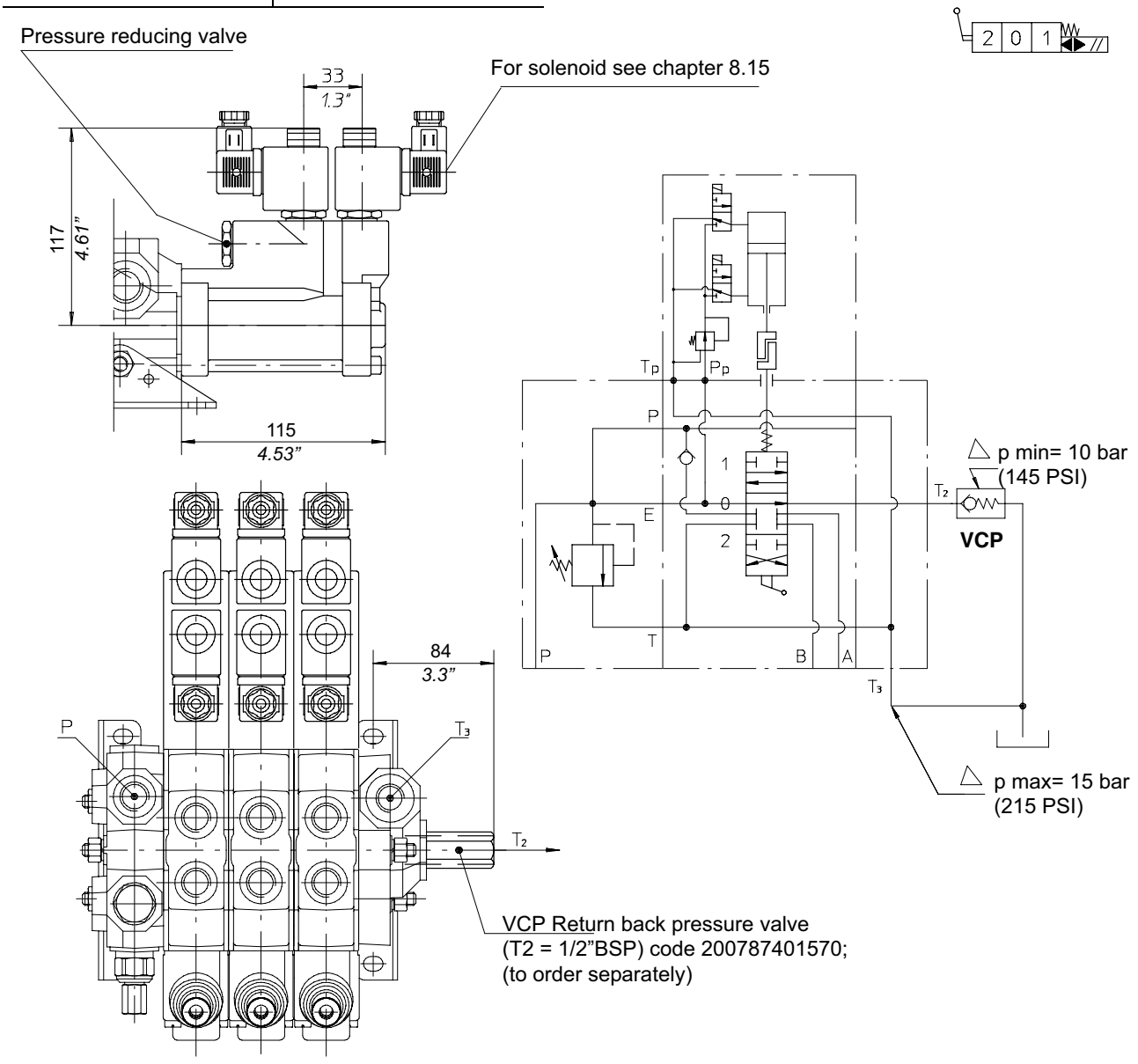
Spool positions



8.14 Electro-Hydraulic ON-OFF controls

8.14.1 Electro-hydraulic ON-OFF control internal piloted with integrated pressure reducing valve

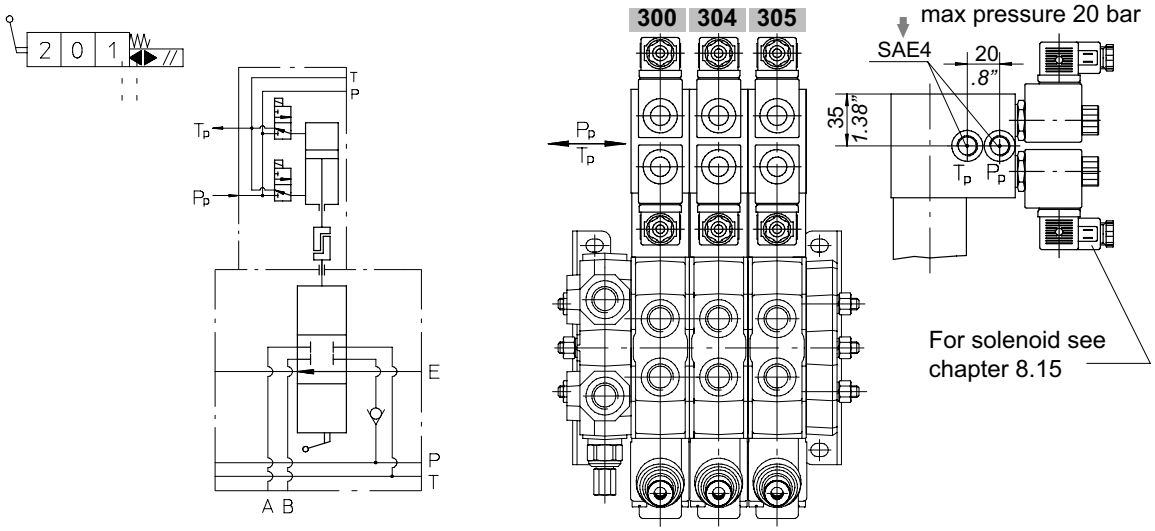
Type	Code
EHI 263*	200968660380 (without coils)



Mechanical and hydraulic features	
Max pressure on Pp port	**250 bar *(4200 PSI)***
Reduced pressure after pressure reducing valve	**10 bar / *(145 PSI)***
Fixed delivery on Pp pilot line	**1 l/min / *(0.26 U.S.G.P.M)***
Leakage of pressure reducing valve (in neutral pos.)	**100 ml/min / *(6.1 in^3/min)***
Min. suggested filtration	**25 micron**
Operating oil temperature	**min. -30°C- max. 90°C / *min.-22°F - max 194°F***

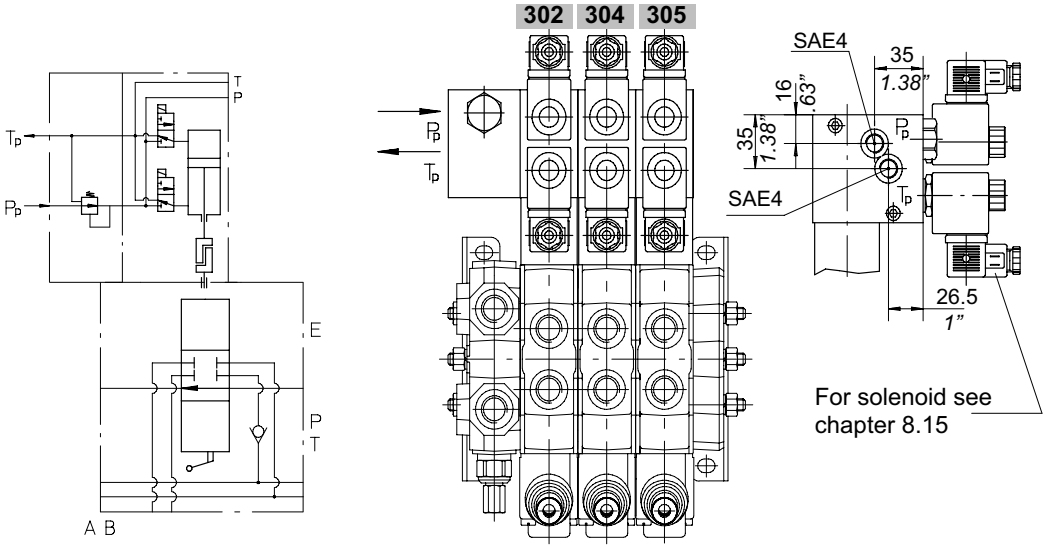
8.14.2 Electro-hydraulic ON-OFF control external piloted

Description	Type	Code
Inlet section	**EHE 300**	200968660420 (without coils)
Intermediate section	**EHE 304**	200968660340 (without coils)
End section	**EHE 305**	200968660360 (without coils)



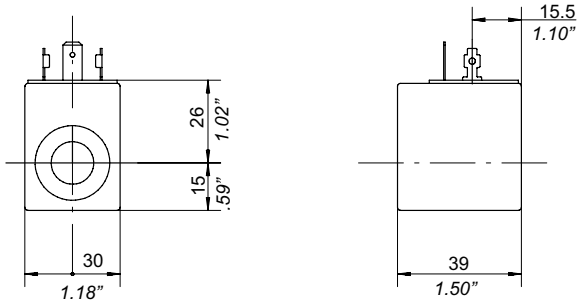
8.14.3 Electro-hydraulic ON-OFF control external piloted with integrated pressure reducing valve

Description	Type	Code
Inlet section	**EHE 302**	200968660310 (without coils)



Mechanical and hydraulic features	
Pilot pressure with pressure reducing valve	**12 bar / *(175 PSI)***
Pilot flow to each working section	**1 l/min/(*0.26 U.S.G.P.M.*)**
Operating oil temperature	**min.-30°C- max. 90° C / min. - 22°F - max 194°F**
Leakage of pressure reducing valve (in neutral pos.)	**100 ml/min / *(6.1 in3/min)***
Min. suggested filtration	**25 micron**

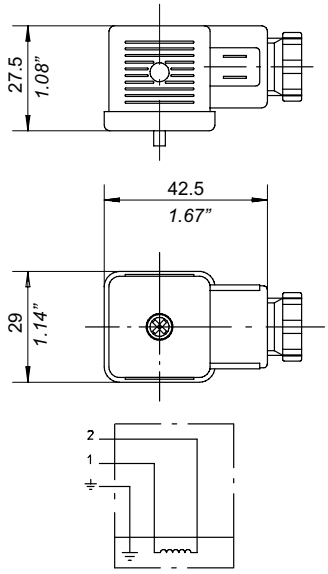
8.15 Coils for EHI-EHE solenoid valves

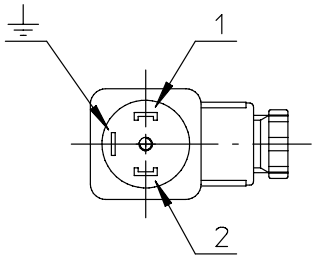


Wire class	**F (VDE 0580)**
Coil insulation	**IP65 (DIN 40050)**
Duty rating	**ED 100%**
Stabilized temperature	**70° C**
Voltage tolerance	**± 10%**

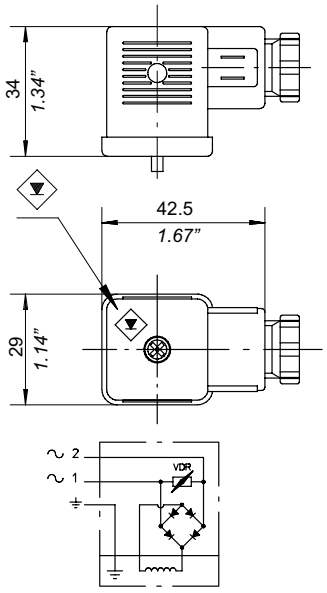
Supply voltage	Nominal coil voltage	Power (Watt)	Resistance (Ohm)		Current (Ampere)		Coil code
			Ambient temp.	Stabilized temp.	Ambient temp.	Stabilized temp.	
12 V.DC	12 V.DC	18.7	7.7	10.8	1.56	1.11	200674910030
24 V.DC	24 V.DC	18.6	31	41.1	0.77	0.58	200674920030
24 V.AC	21.6 V.DC	17.3	27	36	0.80	0.60	200674820030
110 V.AC	98 V.DC	15.6	630	825	0.157	0.120	200674840030
220 V.AC	198 V.DC	15.7	2500	330	0.08	0.06	200674860030

D.C.
Part number
200544110009





A.C.
Part number
200544110012

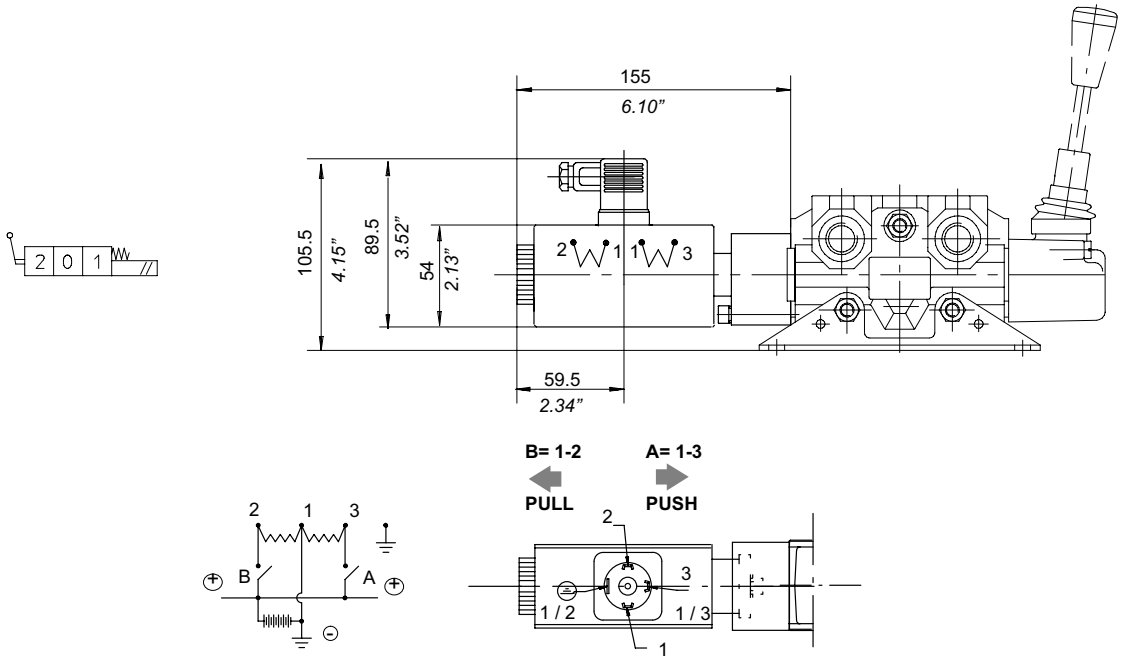


Armour clamp	**Pg 9**
Ø cable	**6-8 mm**
Diodes	**1N 4007 GP**
Overvoltage protection	**VDR**
Connector type	**DIN 43650**
Number of poles	**2 +** ⏚
Supply voltage	**max. 220 V**
Nom. capacity at contacts	**10 Ampere**

Max capacity at contacts	**16 Ampere**
Resistance at contacts	**≥ 4 mOhm**
Max section of cable	**1.5 mm²**
Outer material	**Glass fibre reinforced nylon**
Protection factor	**IP65 (DIN 40050)**
Insulation class	**C (VDE 0110)**
Temperature range	**-40° +90° C**

8.16 Electromagnetic ON-OFF control - Push/Pull type

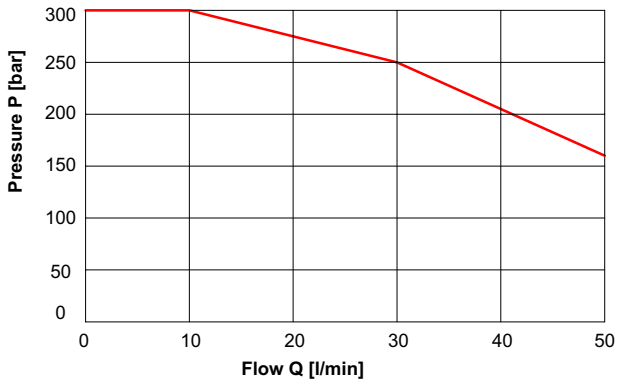
Voltage	Type	Code
12 V.DC	**EPP 344***	200968611790
24 V.DC	**EPP 343***	200968611800



* To be used with special spools only: the spool definition is different from the standard one because of the extention “PD”. For example A spool become APD.

Ex.: (A spool + 24 VDC positioner)= APD343

Mechanical and hydraulic features	
Max flow vs pressure	**see diagram**
Max back pressure	**5 bar *(70 PSI)***
Operating oil temperature	**80° C *(180° F)***



Electromagnetic specification	
Input tension	**12 V DC [24 V DC] + 10%**
Power consumption	**60 W**
ED	**100%**
Ohms resistance (cold T°)	**2.4 Ω [9.6 Ω]**
Ohms resistance (stabilized T°)	**3.1 Ω [12.5 Ω]**
Intensity of current (cold T°)	**5 A (2.5 A)**
Intensity of current (stabilized T°)	**3.8 A (1.9 A)**
Ambient operating temperature range	**-25° C/+60°C**
Average stabilized coil temperature operated continuously	**+105°C (*)**

(*)The above mentioned average stabilized temperature is obtained with a nominal voltage of 12 V (24 V), with an ambient temperature of 25° C and with the electromagnet assembled on an hydraulic valve with oil circulation.

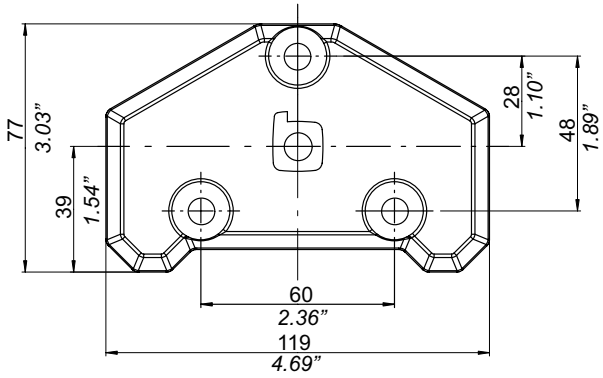
Insulation class:

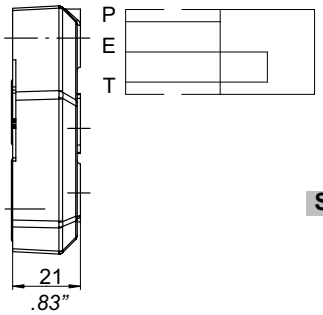
According to VDE 0580 standard: **H**

Electrical connection: DIN 43650: **IP 65**

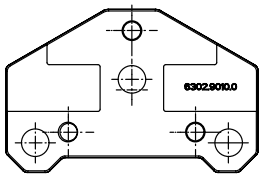
9 End covers

9.1 Standard end cover

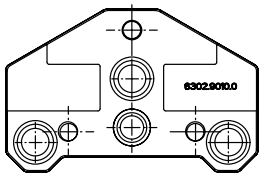




Parallel circuit

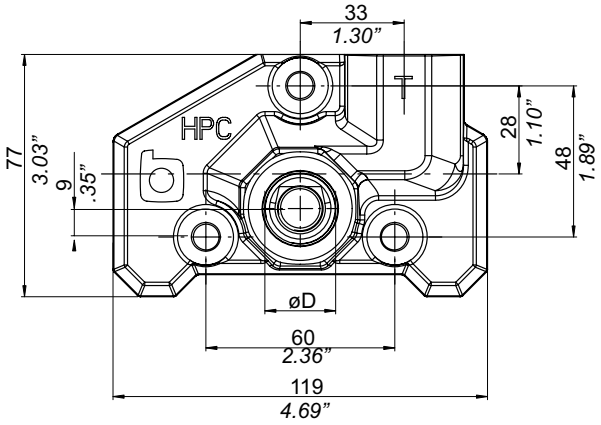


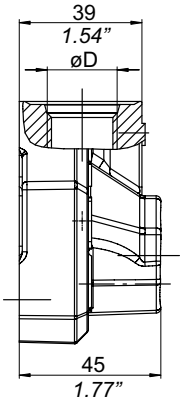
Series and tandem circuit



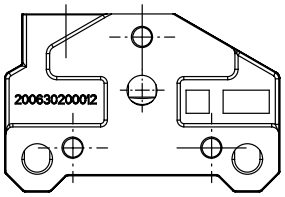
Type/code	
Standard circuit parallel	**Optional circuit series and tandem**
P31 200630290100	**P32** 200930290110

9.1.1 End cover with outlet ports T_2 and T_3

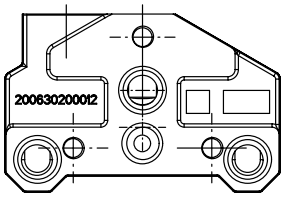


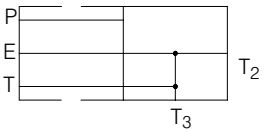


Parallel circuit



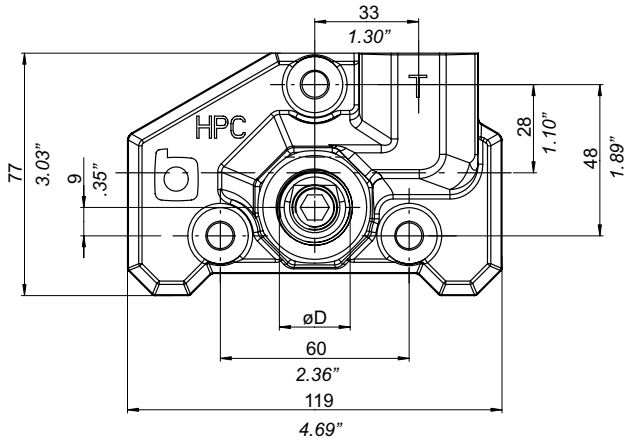
Series and tandem circuit

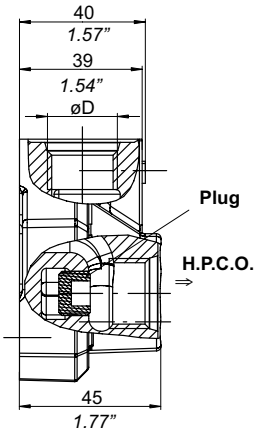




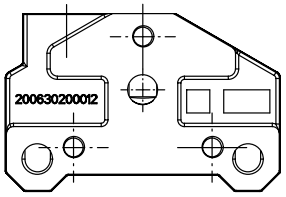
ØD	Type/code	
	Standard circuit parallel	**Optional circuit series and tandem**
M18X1.5	**P01** 200930210060	**P41** 200930210040
3/8” BSP	**P02** 200930220070	**P42** 200930220050
1/2”BSP	**P03** 200930230070	**P43** 200930230050
SAE10	**P05** 200930280030	**P45** 200930280060
3/4” BSP	**P09** 200930240010	**P49** 200930240030

9.1.2 End cover with outlet port T_3 and H.P.C.O.

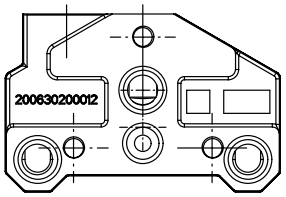


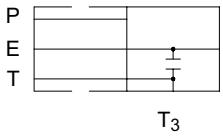


Parallel circuit



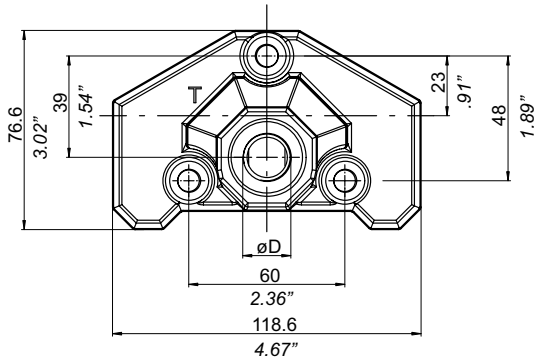
Series and tandem circuit

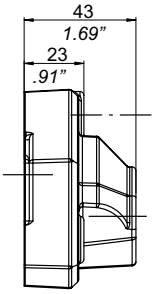


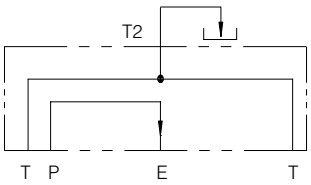


ØD	Type/code	
	Standard circuit parallel	Optional circuit series and tandem
M18X1.5	**P11** 200930210030	**P51** 200930210050
3/8" BSP	**P12** 200930220040	**P52** 200930220060
1/2"BSP	**P13** 200930230040	**P53** 200930230060
SAE10	**P15** 200930280020	**P55** 200930280040
3/4" BSP	**P19** 200930240020	**P59** 200930240040

9.1.3 Right end cover for K100 and T100



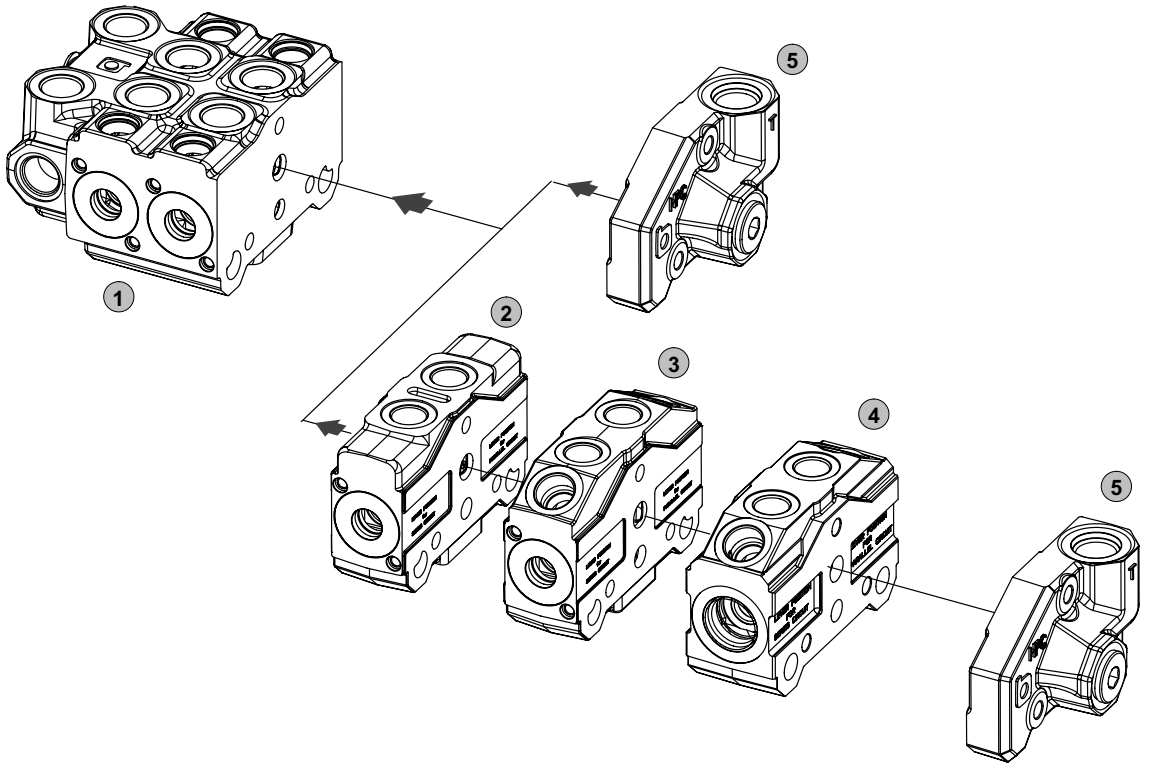




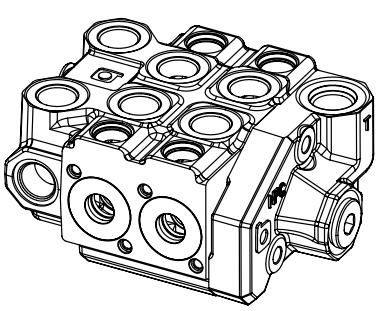
ØD	Type	Code
M18X1.5	**P100/1**	200630210050
1/2" BSP	**P100/3**	200630230090

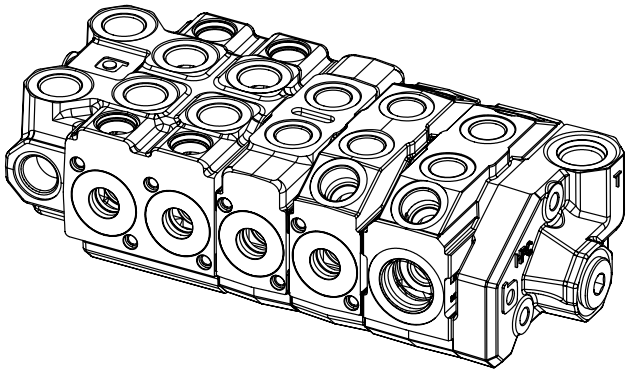
10 Combination

10.1 Example

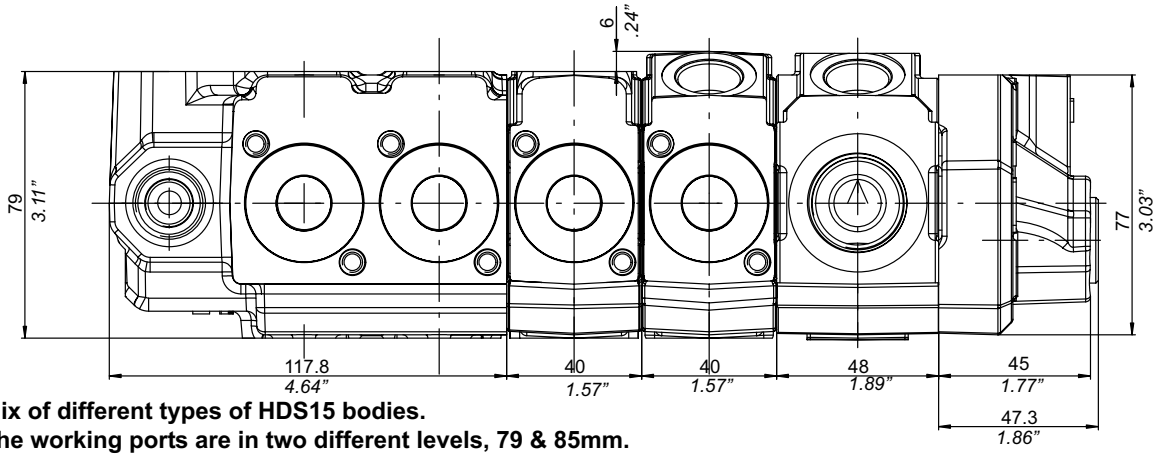


1 HDM15 body 2 HDS15 body 3 HDS15 valve body 4 HDS15 ON-OFF valve body 5 HDS15 end cover





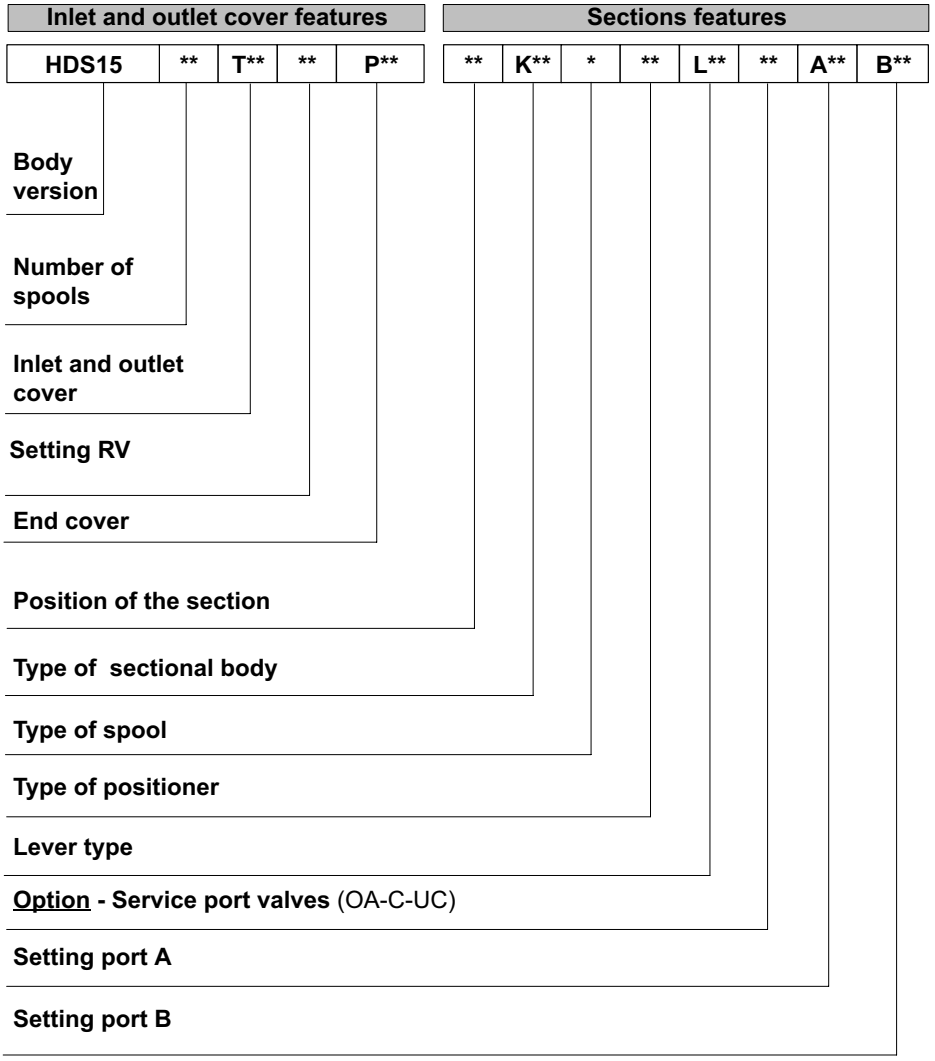
10.1.1 Example of some HDM15 / HDS15 body dimensions



Mix of different types of HDS15 bodies.
The working ports are in two different levels, 79 & 85mm.

11 Composition of ordering code

11.1 Example for manual valves



How to order

HDS15	02	T01	15	P11	01	K11	A	08	L100	OA	A15	B26	1st section features
					02	K01	C	03	L100				2nd section features

11.2 Example for valves with electromagnetic control EMC

Inlet and outlet cover features					Sections features							
HDS15	**	T**	**	P**	**	K**	*	**	**	**	A**	B**

Body version

Number of spools

Inlet and outlet cover

Setting RV

End cover

Position of the section

Type of sectional body

Type of spool

Type of positioner

Voltage

Option - Service port valves (OA-C-UC)

Setting port A

Setting port B

How to order

HDS15	02	T05	15	P05	01	K215	AE	01E	13	OA	A15	B26	1st section features
					02	K205	CE	03E	13				2nd section features

11.3 Example for valves with and flow control PQ elements

HDS15	K**/* T**/*	RV1-** 00VC00	RV2-** 00VC00	RV3-** 00VC00	BP3-** 00EC	VDP-** VDPF

Type of valve: HDS15

Type of sectional body K:
K100-K88-K90-K91-K92

Type of head T :
T100-T88-T90

(**/1**=M18X1.5 - **/3**= 1/2" BSP - **/9**=M22X1.5 - **/5**= SAE10)

Std setting pressure relief valve RV1: 06-15-26

Valve closed : 00VC00

Std setting pressure relief valve RV2: 06-15-26

Valve closed : 00VC00

Std setting pressure relief valve RV3: 06-15-26

Valve closed : 00VC00

Solenoid valve By-pass: BP3/AE - BP3/CE
13 HC (12 V. DC)
23 HC (24 V. DC)

Solenoid valve seat closed : 00EC

Flow control valve adjustable setting VDP: 06-12-25-50

Flow control valve fixed: VDPF

How to order

HDS15	K100/1	RV1-15	RV2-26	00VC00	BP3/AE 13HC	VDP-06

IMPORTANT!: RV1.. - RV2.. -RV3: do not indicate the valves in the order code if the section is not preset for their assembly

11.4 Example for monobloc HDM15/2

Body features			1st Spool features				2nd Spool features			
HDM15/*	K	**	*	**	L**	*****	*	**	L**	*****
HDM15/2	K03	18VM01	A	133	L440	VS23/A	A	133	L440	VS23/B

Body version

N. of elements: 2

Type of thread

Setting RV

1st SPOOL

Type of Spool

Type of Positioner

Lever style

Service port valves:
OA-C-UC-VS

Setting of ports:
A or B

2nd SPOOL

Type of Spool

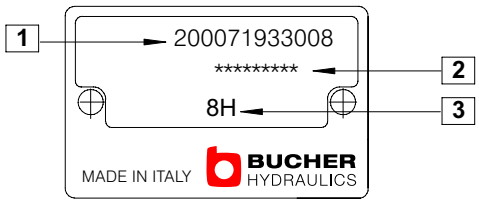
Type of Positioner

Lever style

Service port valves:
OA-C-UC-VS

Setting of ports:
A or B

11.5 Product identification plate



1 : Order Code
2 : Customer Code
3 : Manufacturing Year and Month

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

BUCHER HYDRAULICS

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

Classification: 430.300.000