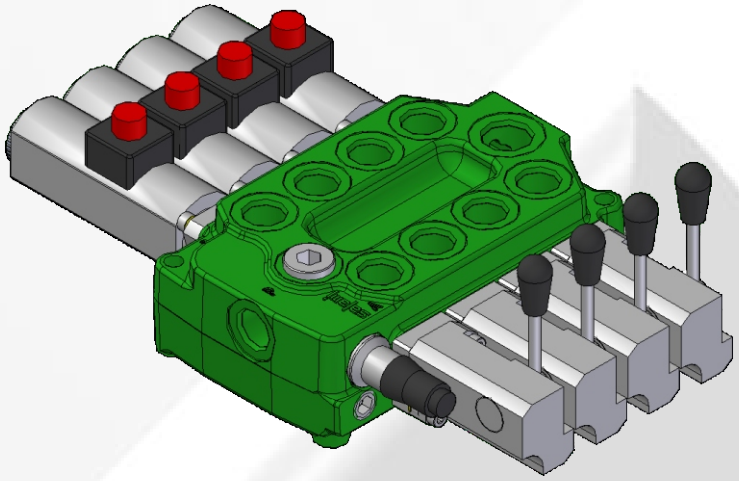
MONOBLOCK VALVE

VDM6

Technical catalogue



E0.02.0911.02.02

COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
=ISO 9001/2000=

salami™

DIRECTIONAL CONTROL VALVE MONOBLOCK TYPE

INDEX

When in our catalogues you will find this symbol, please read carefully

E0.02.0911.02.02

The data in this catalogue refers to the standard product.
The policy of Salami S.p.A. consists of a continuous improvement of its products.It reserves the right to change the specifications of the different products whenever necessary and without giving prior information.
If any doubts, please get in touch with our sales departement.

GENERAL FEATURES

Among all hydraulic directional control valves used in the field of mobile equipment applications, the spool valve is the most popular.
The monoblock valve type offers an excellent performance price ratio.

FEATURES

VDM6 directional control valve has the following:
- cast-iron monoblock construction up to 6 spools
- parallel circuit, load check valve protection on down-stream of the pressure "P" line
- tandem circuit, only the first working section, l.c.v. protection + l.c.v. protection on down-stream of the "P" line
- possibility of venting valve
- possibility of power beyond
- spool construction in steel, hardened and nichel-plated to obtain a higher surface hardness and a better corrosion resistance
- several types of spool: double, single acting, spool motor, float position etc.
- minimum tolerance between the spools and the body to obtain a minimum internal leakage
- interchangeabilty of all the spools
- several spool control devices and spool positioning devices

VALVE AND DEVICE TYPES

In order to meet the most stringent demands and to offer a wider range of applications, the following types of valves and devices are available:

Valves
- direct main relief valve: controls the maximum pressure in the circuit when one or more spools are on end stroke located on "A" port side, can be:
  direct type version up to 375 bar - *5440 psi*
- electric venting valve is available as:
  12 or 24 Vdc and normally open or normally closed versions
- flow restrictor: directly fitted on the "A/B" ports orifice
- hydraulic piloted load check valve on the "A/B" ports: built-in a manifold assembled on the top of the VDM6

Devices
- handle controls
- cross lever: allows to acting two spools with one manual joystick
- cable remote control
- control device for microswitches: for the operation with electric d.c. motor driven pumps at one or more rotation speeds
- hydraulic kick-out: returns the spool automatically to the neutral position when the pre-set pressure of port "A" or "B" is exceeded
- anti-tilt device: the spool returns automatically in neutral position when the pressure reaches a pre-set value to avoid cranes from becoming unstable
- pneumatic proportional control available also with float position
- electropneumatic control
- hydraulic proportional control available also with float position
- direct electric on-off control with emergency manual device
- electrohydraulic on-off and proportional control, available also for 1 working section monoblock
- several spool positionings device to return the spool to neutral position or to lock the spool on working position
- rotary control

TECHNICAL DATA

Spools	from 1 to 7		
Nominal flow	Q	45 l/min	(*12 gpm US*)
☞ Max flow		60 l/min	(*16 gpm US*)
Max pressure	port P	350 bar	(*5100 psi*)
	ports A/B	350 bar	(*5100 psi*)
	☞ port T	25 bar	(*363 psi*)
Internal leakage at 160 bar (*2285 psi*)	ports A/B → T	18 ÷ 25 cm^3/min	(*1.1 ÷ 1.52 cu.in./min*)
For lower leakage please contact our sales dept.			
Solenoid control 45W the leakage is		70 ÷ 90 cm^3/min	(*4.3 ÷ 5.49 cu.in./min*)
Solenoid control 31W the leakage is		100 ÷ 120 cm^3/min	(*6.1 ÷ 7.32 cu.in./min*)
Spool stroke (positions 1 and 2)		± 6 mm	(*0,236 in.*)
Spool stroke (position 4, float or regenerative)		± 6 + 4 mm	(*0.236 + 0.157 in.*)
For direct solenoid control - spool stroke		± 2.5 mm	(*0,098 in.*)
Stroke of the overcenter spools		± 4.5 mm	(*0.177 in.*)

☞ In case you need flows from 45 l/min to 60 l/min please contact our sales dept.

☞ For higher back pressure please contact our sales dept.

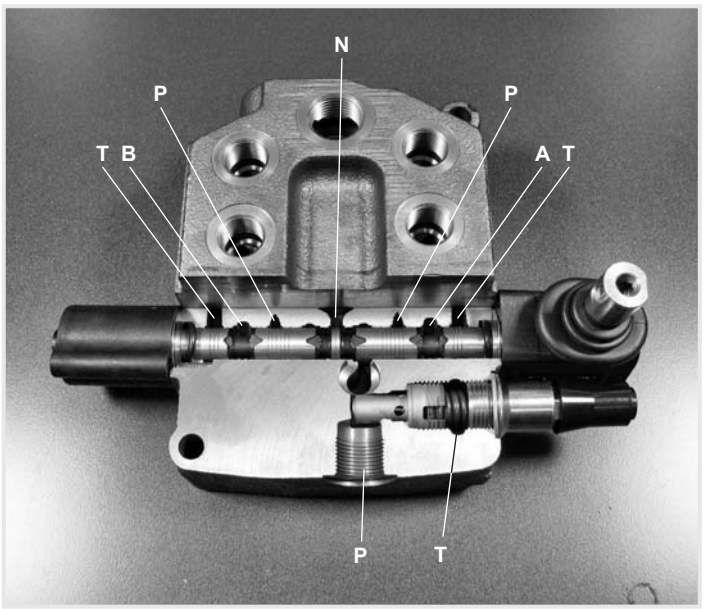
All technical data carried out using mineral oil with viscosity of 16 cSt and contamination level 19/16 as ISO 4406.

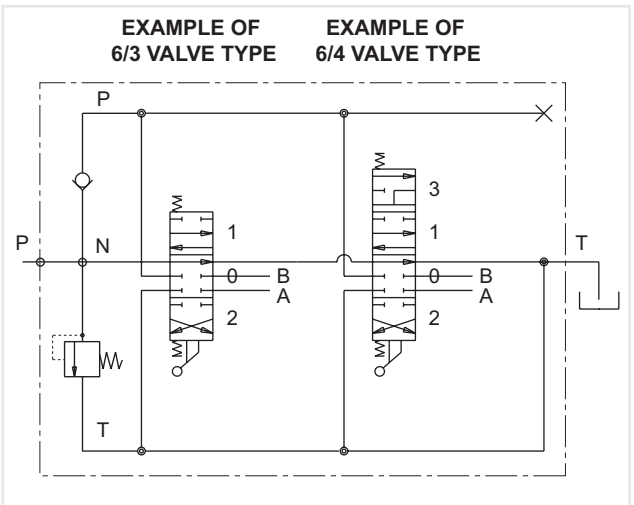
Nominal flow meaning: flow causing 1 bar (*14.5 psi*) pressure drop each section, with spools in neutral position

WORKING CONDITIONS

Hydraulic fluid	mineral oil according to DIN 51524		
Viscosity			
	viscosity range	10...400 mm^2/sec	(*0.15...7.13 sq.in./sec*)
	optimal viscosity	12...75 mm^2/sec	(*0.19...1.16 sq.in./sec*)
Temperature			
	fluid range temperature	-20...85 °C	(*-4...185 °F*) NBR seals
	suggested range	30...60 °C	(*86...140 °F*) NBR seals
Maximum contamination level		NAS 1683: class 9	ISO 4406: 19/16
Room temperature		-30...60 °C	(-22...140 °F)
Working limits		see diagrams at page 6	
Pressure drop		see diagrams at page 7	
For operation with fire resistant fluid, please contact our sales department			

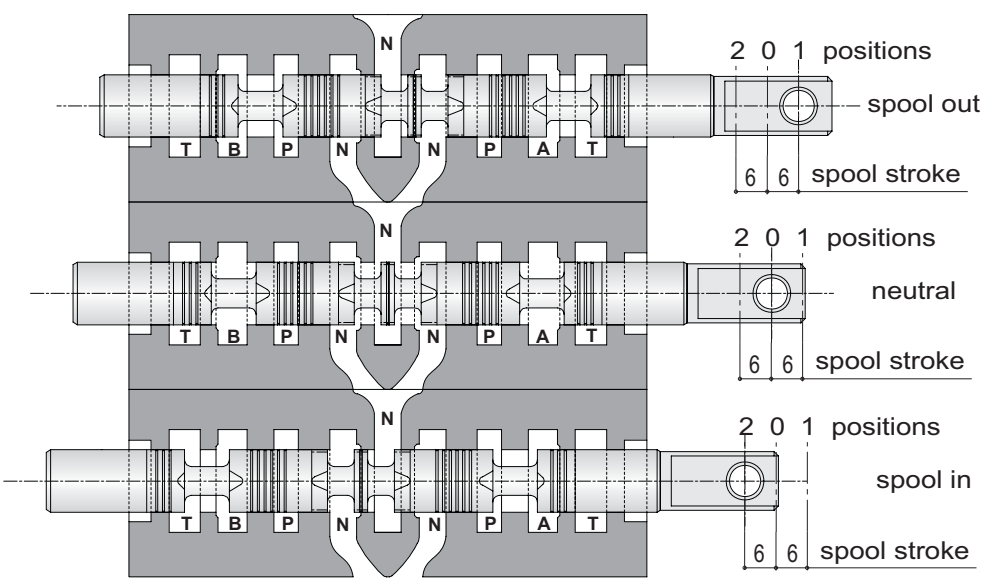
OPERATING PRINCIPLE





The picture show the paths N - P - A - T, the other paths are simmetrical

Salami directional control valves belong to the 6/3 (or 6/4) type; they can control 6 gallery in 3 (or 4) spool positions simultaneously.
They are open circuit types: when the spool is in neutral position, the fluid flows directly to the tank with minimum internal pressure drops (approximatively 1 bar / 14.5 psi for each spool at nominal flow).
When the spool is moved from this position, the neutral gallery is gradually throttled and the connection between pump and actuator, through the corresponding port, is made.
When pressure exceeds the value of the pressure existing in port A or B, the fluid flows through the load check valve to the actuator.



IMPORTANT
Looking at this side of the spool, we usually say: spool in when the spool is pushed into the valve and spool out when it is pulled out of the valve. Independing on assembling of the spool on "A" or "B" side

There are two characteristic phases in the spool stroke (6 mm - 0,236 in.):
a) the overlap phase (about 18% of the stroke) guarantees minimum internal leakages in neutral position;
b) the progressive flow regulation phase (82% of the stroke).
Both pictures show a 6/3 valve type with double acting spool only as principle of functioning.
Salami VDM6 is available in different solutions.

HYDRAULIC FLUIDS

Usually a mineral-base oil with a good viscosity index should be used, preferably with good lubricating properties and corrosion, oxidation and foaming resistant.
Sometimes the fluids supplied by the manufacturers do not satisfy purity requirements (see page 3 WORKING CONDITIONS). It is therefore necessary to filter the fluid carefully before filling. Your supplier can give you the information about NAS class of its fluids. To maintain the proper purity class, the use of filters of high dirt capacity with clogging indicator is recommended.
Under humidity conditions it is necessary to use hygroscopic salts.
For operation with fire resistant and ecological fluids, please contact our technical department.

INSTALLATION

When proceeding to mount the unit on the structure and to connect fittings to work ports, it is necessary to comply with the values of tightening torques.
The attachment of linkages to spools should not affect their operation. The mounting position can be vertical with inlet module on the top or horizontal.

Standard tightening torques - Nm / *lbft*

FITTING TYPE	P and PL ports	A and B ports	T and TL ports
BSP (ISO 228/1)	G 3/8	G 3/8	G 1/2
with o-ring seal	**30 / *22.1***	**30 / *22.1***	**50 / *36.9***
with copper washer	40 / *29.5*	40 / *29.5*	**60 / *44.2***
with steel washer	**40 / *29.5***	**40 / *29.5***	**60 / *44.2***
SAE	**SAE 8 (3/4-16 UNF)**	**SAE 8 (3/4-16 UNF)**	**SAE 10 (7/8-14 UNF)**
with o-ring seal	**30 / *22.1***	**30 / *22.1***	**60 / *44.2***

FILTRATION

The contamination of the fluid in the system greatly affects the life of the unit. Above all, contamination may result in irregular operation, wear of seals in valve housings and failures. Once the initial contamination level of the system has been reached, it is necessary to limit any increase of contamination installing an efficient filtration system (see working conditions page 3).

PIPES

Pipes should be as short as possible, without restrictions or sharp bends (especially the return lines). Before connecting pipes to the fittings of the corresponding components, make sure that they are free from burrs and other contamination.
As a first approximation, for a mobile machine with standard length pipes, their width should guarantee the following values of fluid speed*:

6 ÷ 10 m/sec	inlet pipe
3 ÷ 5 m/sec	outlet pipe

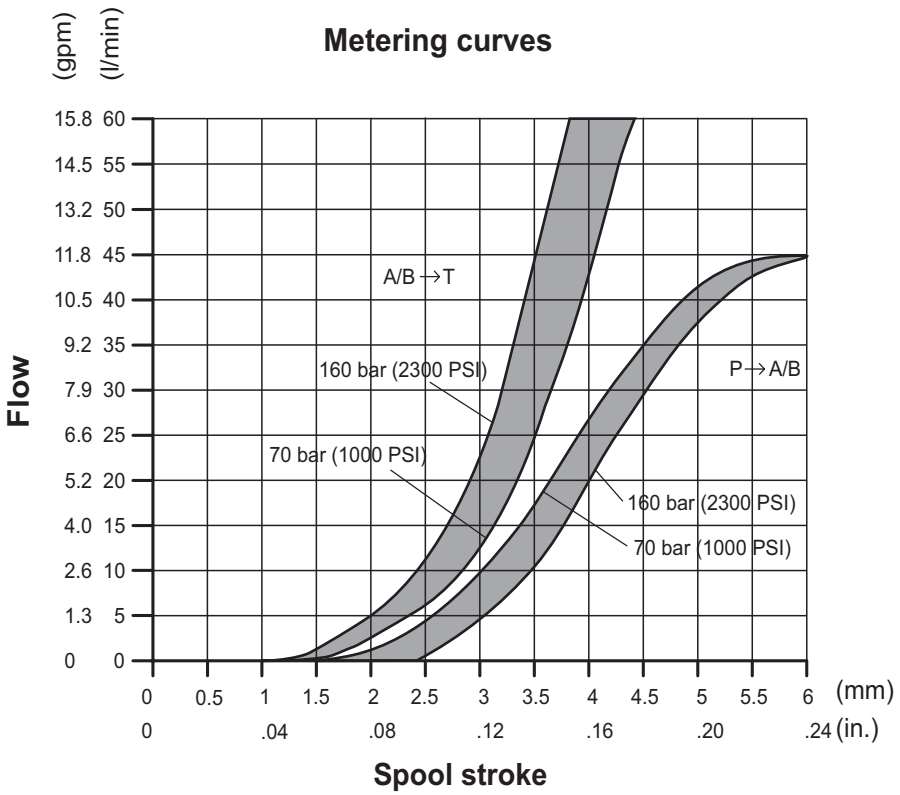
19,7 ÷ 32,8 ft/sec	inlet pipe
9,9 ÷ 16,4 ft/sec	outlet pipe

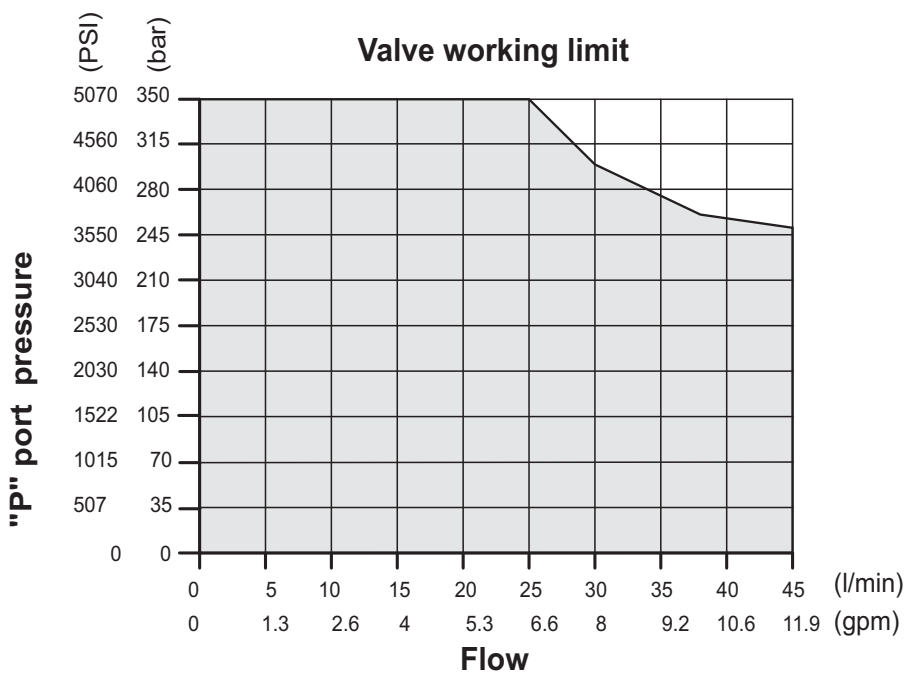
the lowest values of fluid speed are required in case of wide temperature range and/or for continuous duty.

* $[v = \frac{21{,}2 \times Q}{d^2}$ v = fluid speed [m/sec], Q = flow [l/min], d = pipe internal diameter [mm]

PERFORMANCE DATA

The characteristics in this catalogue are typical measured results.
During measuring a mineral based hydraulic oil with a viscosity of 16 cSt at a temperature of 50°C was used.
FOR FURTHER DETAILS PLEASE CONTACT OUR SALES DEPARTEMENT





The data of this diagram have been obtained with a force of:
stroke beginning 80 N - stroke end 105 N and standard leakage data.

PERFORMANCE DATA

The characteristics in this catalogue are typical measured results.
During measuring a mineral based hydraulic oil with a viscosity of 16 cSt at a temperature of 50°C was used.

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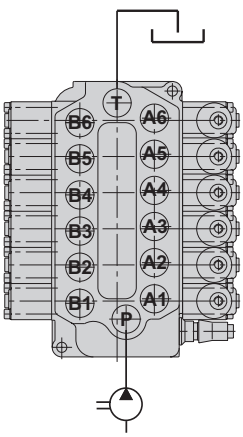
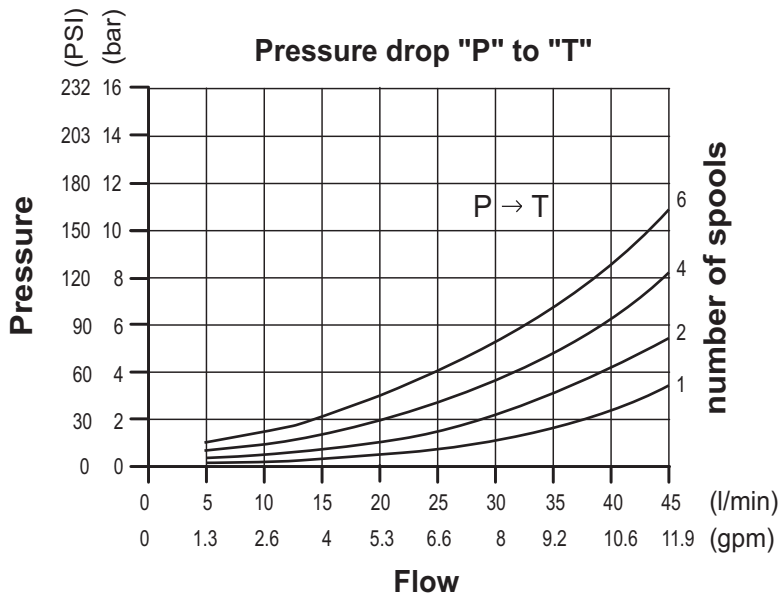
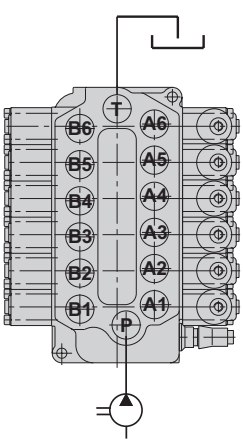
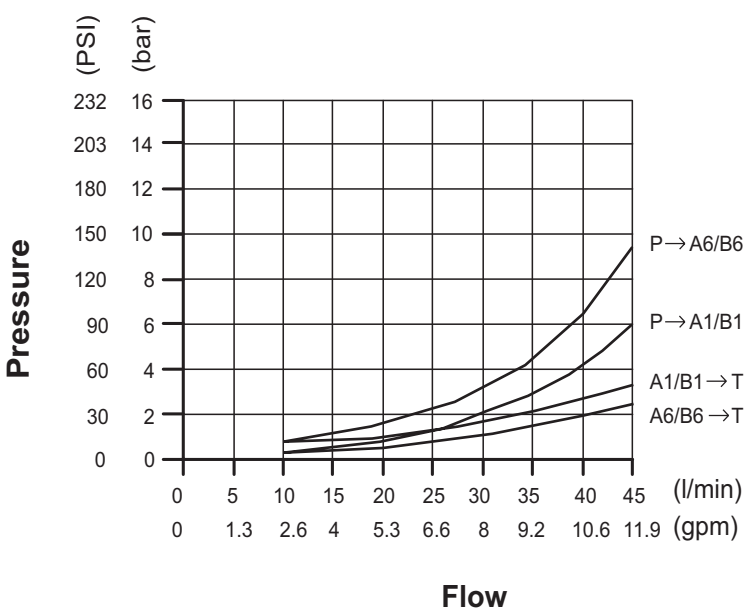


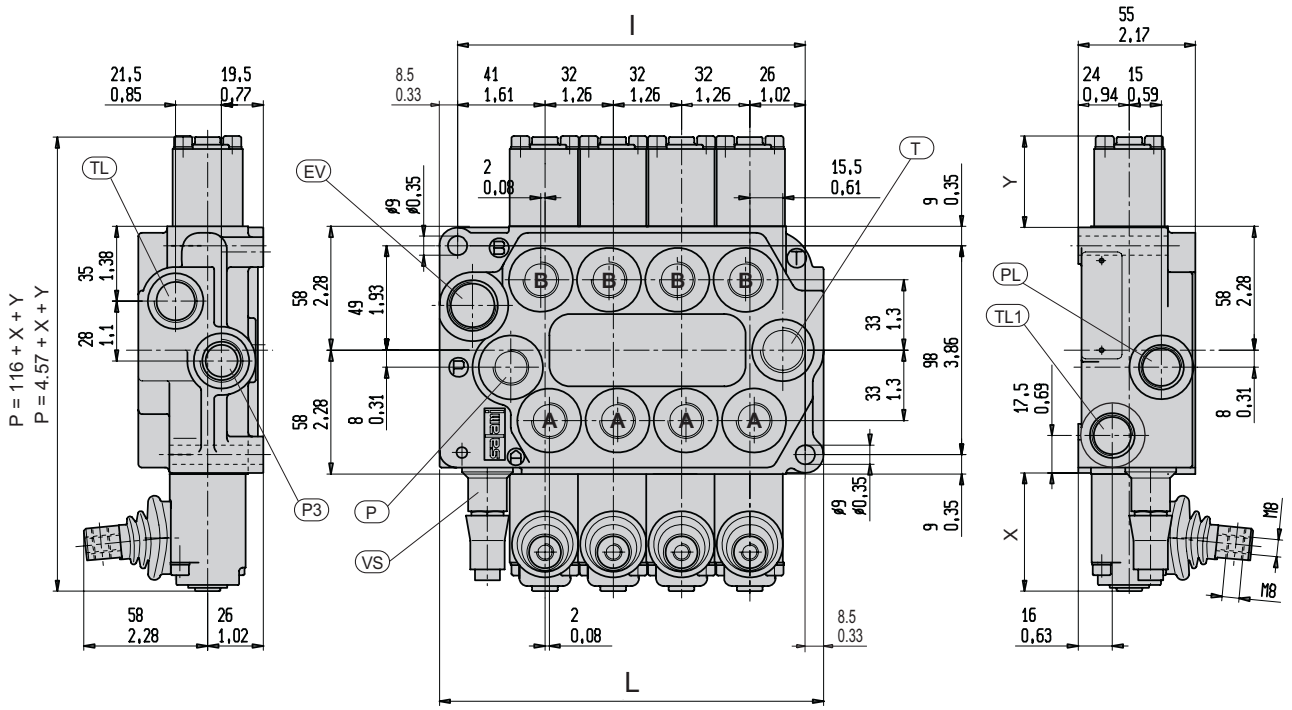


Pressure drop "P" to "A1/B1" and to "A6/B6"
Pressure drop "A1/B1" and "A6/B6" to "T"





DIMENSIONS FROM 2 TO 7 SECTIONS MONOBLOCK



The drawing shown is just an example.The overall dimensions you read are valid for all the VDM6 except the parametric dimensions "L" and "I" depending of the number of working sections.The parametric dimension "P" depends on a fixed dimension of 116 mm (4.57 in.) to wich you have to add the "X" and "Y" dimensions that you can find in the spool controls and spool positionings pages.

Spools		1	2	3	4	5	6	7	8
I	mm	/	99	131	163	195	227	259	/
	in	/	*3.90*	*5.16*	*6.42*	*7.68*	*8.94*	*10.2*	/
L	mm	/	116	148	180	212	244	276	/
	in	/	*4.57*	*5.83*	*7.09*	*8.35*	*9.61*	*10.87*	/
Weight	Kg.	/	4.5	5.7	7.5	9.3	9.9	10.9	/
	lb.	/	*9.9*	*12.6*	*16.5*	*20.5*	*21.8*	*24*	/

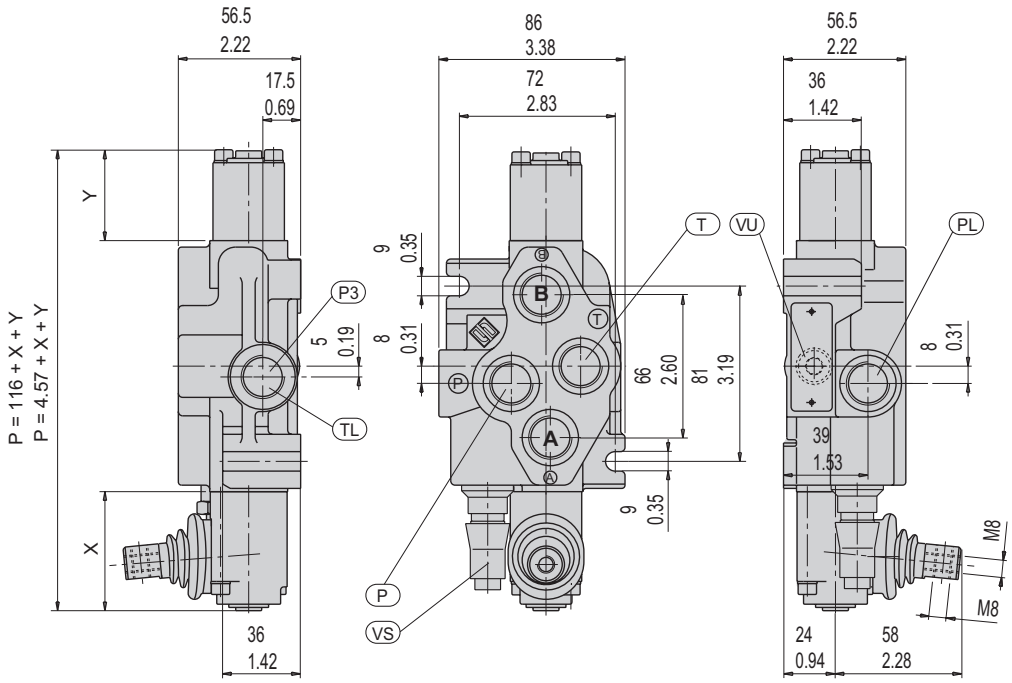
INDEX:

P = top inlet port
PL = side inlet port
T = top outlet port
TL = side outlet port
TL1 = side outlet port
A/B = work ports
P3 = power beyond port
VS = main relief valve
EV = seat for venting valve

PORT SIZES	P - PL - TL1 - P3	T - TL	A - B
BSP ISO 228	G 3/8	G 1/2	G 3/8
SAE ISO 176	SAE#8 3/4 - 16 UNF	SAE#10 7/8 - 14 UNF	SAE#8 3/4 - 16 UNF
ISO 262 - ISO 6149	M 18 x 1.5	M 22 x 1.5	M 18 x 1.5
BSPF JIS B 2351	G 3/8	G 1/2	G 3/8

For smaller or bigger thread ports, please contact our sales department.

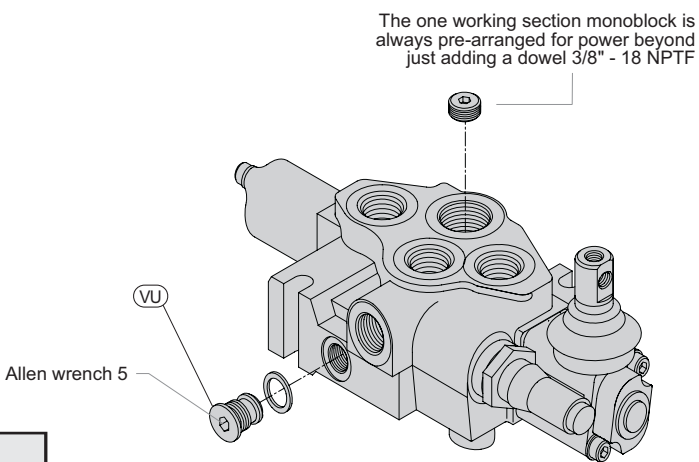
DIMENSIONS FOR 1 SECTION MONOBLOCK



The parametric dimension "P" depends on a fixed dimension of 116 mm (4.57 in.) to which you have to add the "X" and "Y" dimensions that you can find in the spool controls and spool positionings pages. In this monoblock the main relief valve can be assembled only on "A" side.

INDEX:

P = top inlet port
PL = side inlet port
P3 = side outlet port for power beyond
T = top outlet port
TL = side outlet port
A/B = work ports
VS = main relief valve(adjustable)
VU = load check valve



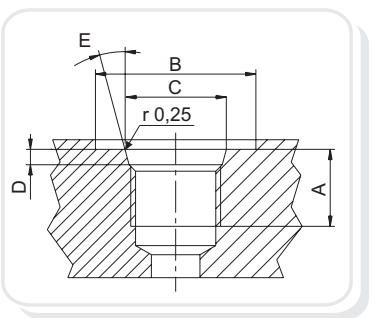
Weight = 2.8 Kg - 6.17 lb.

PORT SIZES	P - PL - TL1 - P3	T - TL	A - B
BSP ISO 228	G 3/8	G 1/2	G 3/8
SAE ISO 176	SAE#8 3/4 - 16 UNF	SAE#10 7/8 - 14 UNF	SAE#8 3/4 - 16 UNF
ISO 262 - ISO 6149	M 18 x 1.5	M 22 x 1.5	M 18 x 1.5
BSPF JIS B 2351	G 3/8	G 1/2	G 3/8

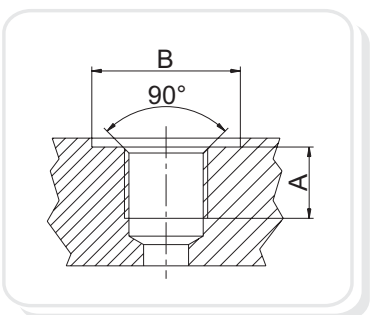
For smaller or bigger thread ports, please contact our sales department.

PORTS

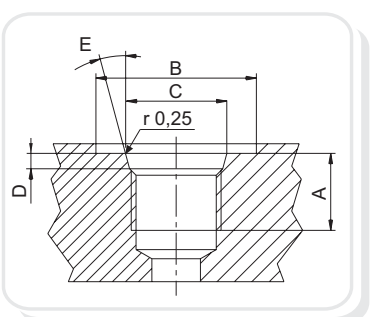
Following are standard ports. For different port types, please contact our sales department.



SAE UN-UNF (ISO 725)						
Dimensions		9/16 -18 UNF		3/4 - 16 UNF		7/8 - 14 UNF
mm	In.	SAE6		SAE8		SAE10
A		13	0,51	15	0,59	17	0,67
B		25	0.83	30	1,18	34	1,34
C		15.6	0.61	20.6	0.81	23.9	0.94
D		2,5	0,10	2.5	0.10	2.5	0.10
E		15°		15°		15°	

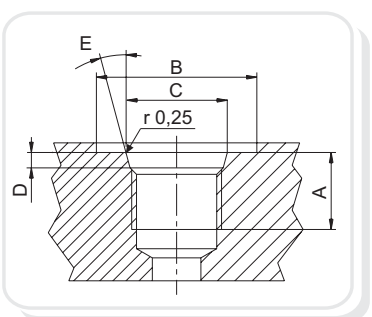


BSP (ISO 228)						
Dimensions		G1/4		G3/8		G1/2
mm	In.					
A		14	0,55	14	0,55	16	0,63
B		19	1,75	23	1,91	27	1,06



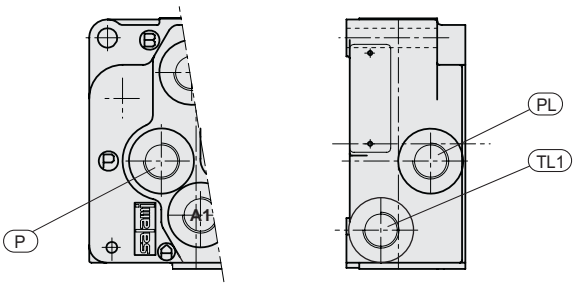
METRIC (ISO 262 - ISO 6149)*								
Dimensions		M18 x 1.5				M22 x 1.5			
mm	In.	ISO 262		ISO 6149		ISO 262		ISO 6149	
A		14	0.55	14,5	0,57	16	0,63	16	0,63
B		27,5	1.08	29	1,14	31,5	1,24	34	1,34
C				19,8	0,78			23,8	0,94
D				2,4	0.09			2,4	0,09

*Available for quantity, please contact our sales dept.

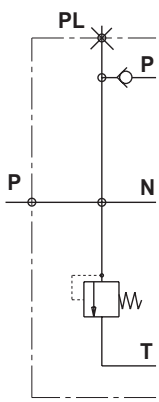


BSPF O-RING BOSS (JIS B 2351)						
Dimensions		G 1/4		G 3/8		G 1/2
mm	In.					
A		12	0,47	12	0,47	16	0,63
B		24	0,94	28	1,10	34	1,34
C		15.6	0,61	18.6	0,73	22.6	0,89
D		2,5	0,10	2,5	0,10	2,5	0,10
E		15°		15°		15°	

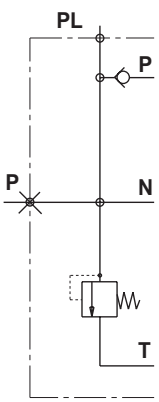
INLET AND OUTLET TYPES (HYDRAULIC CIRCUITS)



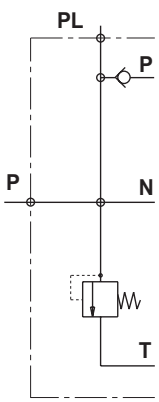
Top port side port plugged **01**



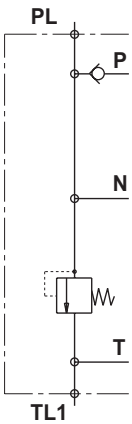
Side port top port plugged **02**



Top and side ports **03**

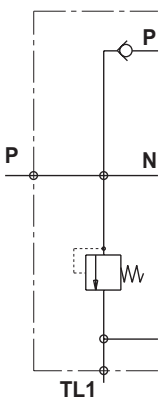


Side inlet and outlet ports **07**



Available for quantity

Top inlet port and side outlet port **08**



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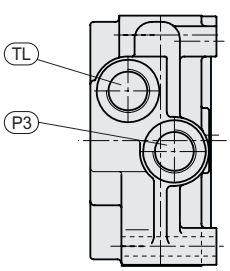
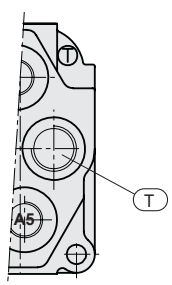
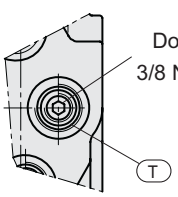
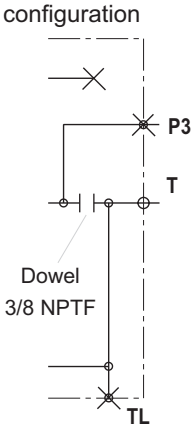




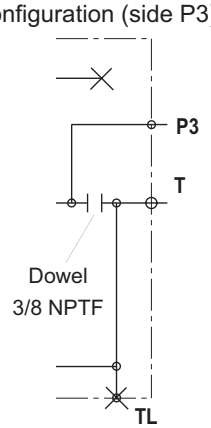


To obtain U5 and U7 configurations, starting from standard monoblock, it needs to insert a dowel 3/8 - 18 NPTF threaded to interrupt the N line.

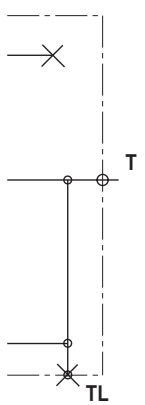
Closed center configuration **U7**



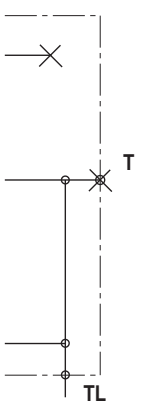
Power beyond configuration (side P3) **U5**



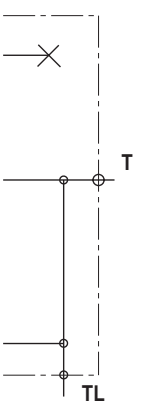
Top port side port plugged **U4**



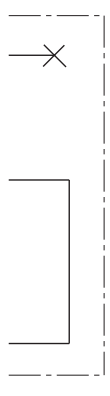
Side port top port plugged **U3**



Top and side ports **U2**



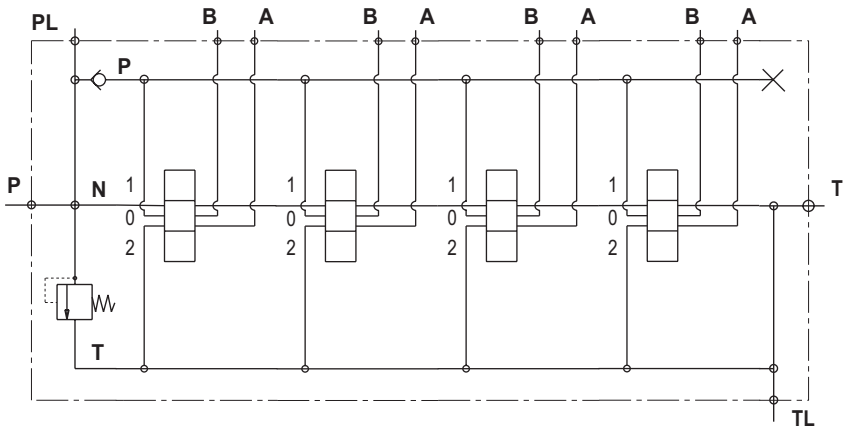
Without ports **U0**



WORKING SECTIONS (HYDRAULIC CIRCUITS)

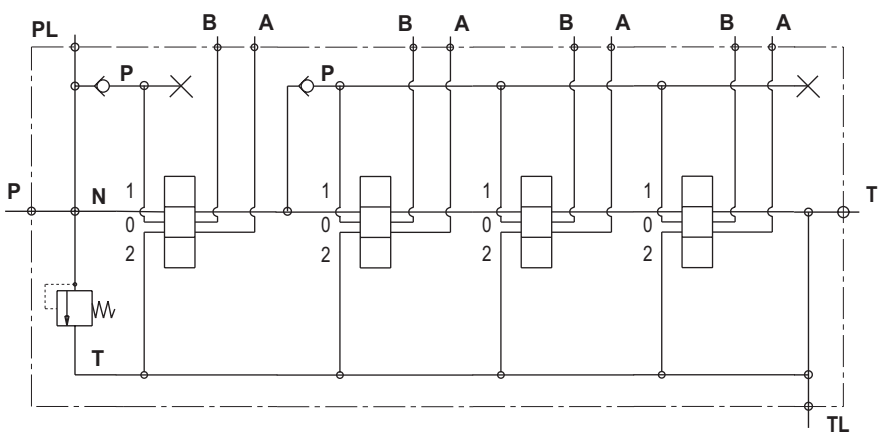
P

Parallel circuit, load check valve protection on down-stream of the pressure "P" line
can be from 1 to 7 working sections



T

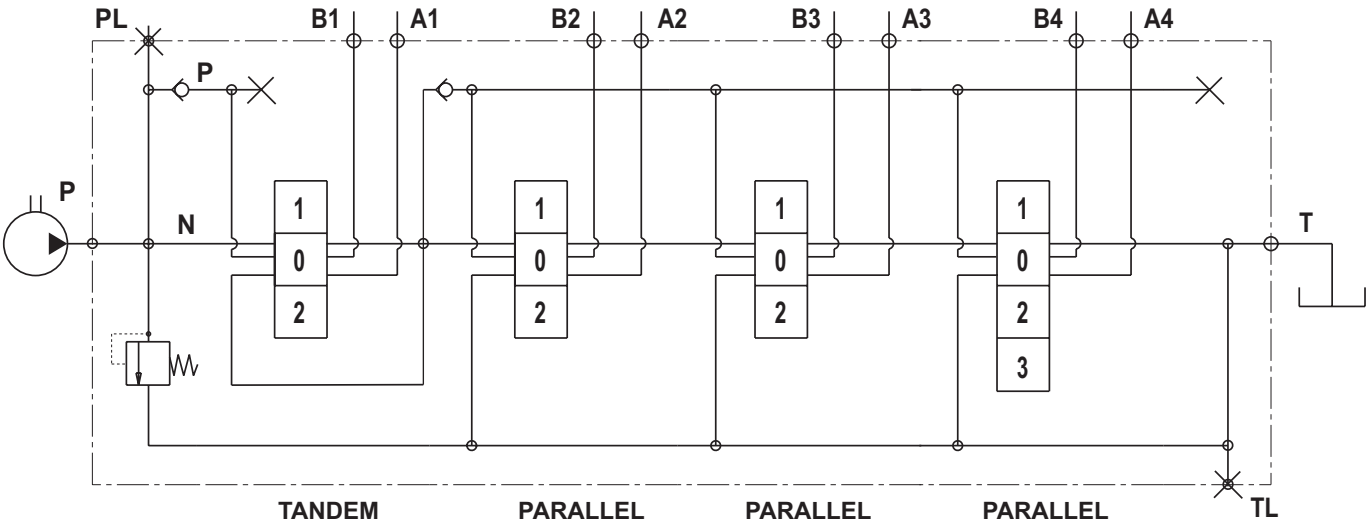
Tandem circuit only in the first working section, load check valve protection of the first section,
load check valve protection on down-stream of the pressure "P" line (parallel circuit)
can be from 2 to 4 working sections



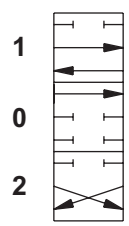
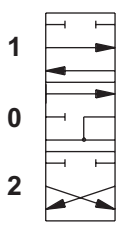
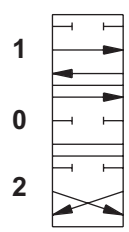
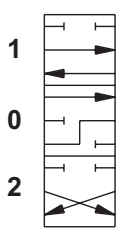
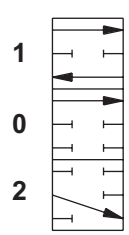
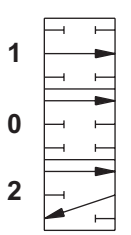
☞ This type of circuit is available only for quantity, please contact our sales department.

NOTES

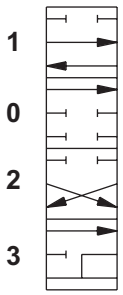
CIRCUIT AND SPOOL TYPES



The circuits available are:
parallel type, tandem type only in the first working section as shown in the picture above (see page 12). You can have main relief valve and venting valve in the inlet(see pages 16 and 17).
The spools can be 3 or 4 positions (as shown here below) moreover VDM6 is available for power beyond just insert a plug 1/4" - 18 NPTF (see page 11).
As you can read at page 37, the spools can be types "A" nominal flow or "C" 2/3 of nominal flow.

01		Double acting spool	Double acting motor spool		**02**
03		Double acting motor spool ("B" port blocked)	Double acting motor spool ("A" port blocked)		**04**
05		Single acting spool "A" working port	Single acting spool "B" working port		**06**

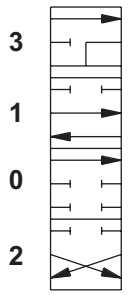
11



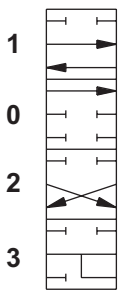
Double acting spool with float function in 3rd position (spool in)

12

Double acting spool with float function in 3rd position (spool out)



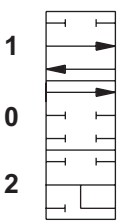
13



Double acting spool with regenerative function in 3rd position (spool in)

With this type of spool a special machining of the body is required

17



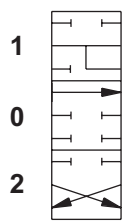
Double acting spool with regenerative function in position 2 (spool in)

With this type of spool a special machining of the body is required

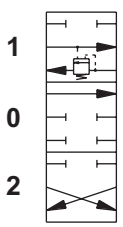
18

Double acting spool with regenerative function in position 1 (spool out)

With this type of spool a special machining of the body is required



52



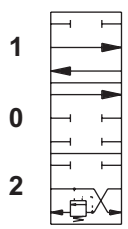
Over center double acting spool "A" working port

The stroke of this type of spool is ± 4.5 mm

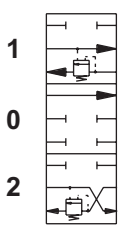
53

Over center double acting spool "B" working port

The stroke of this type of spool is ± 4.5 mm



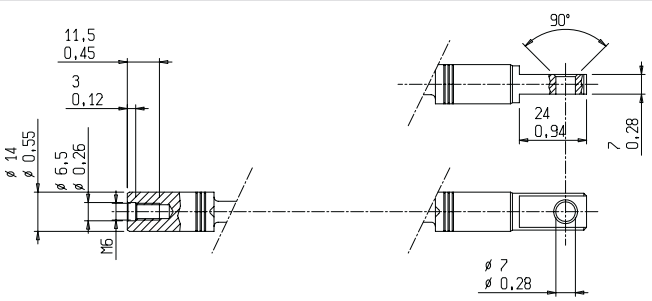
54



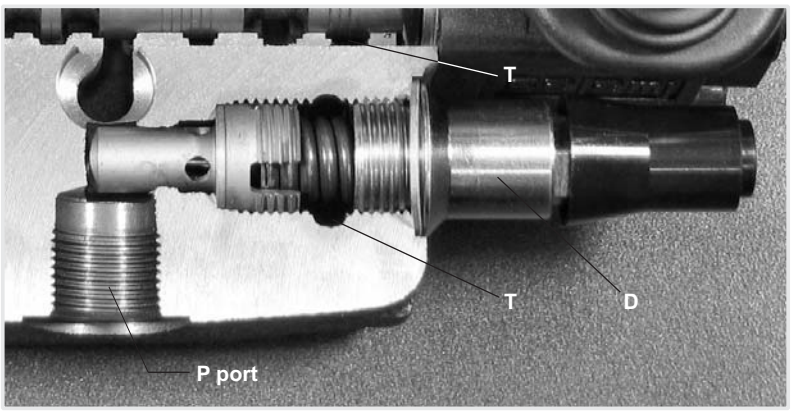
Over center double acting spool "A and B" working ports

The stroke of this type of spool is ± 4.5 mm

Salami standard spools have the ends as shown in this drawing. These ends spool are necessary to join it the controls and the positionings. With direct electric and hydraulic controls the ends spool are different as you can see at pages 25 and 26.



MAIN RELIEF VALVES

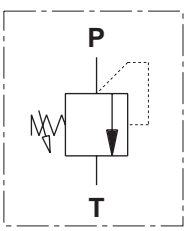


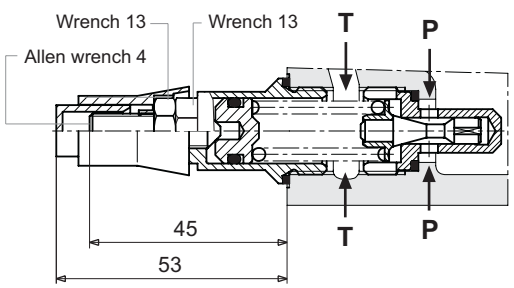
Max tightening torque:
wrench 10 - 18 Nm
wrench 13 - 24 Nm
wrench 22 - 35 Nm
wrench 24 - 30 Nm
wrench 26 - 30 Nm
wrench 27 - 30 Nm
Allen wrench 6 - 30 Nm
Allen wrench 8 - 30 Nm

The main relief valve can be mounted only on "A", in case of venting valve there is an appropriate cavity on the top of VDM6.All the testing values of this page have been obtained with nominal flow of 35 L/min - *9.25 gpm*, viscosity 16cST and oil temperature 50°C - *122°F.*

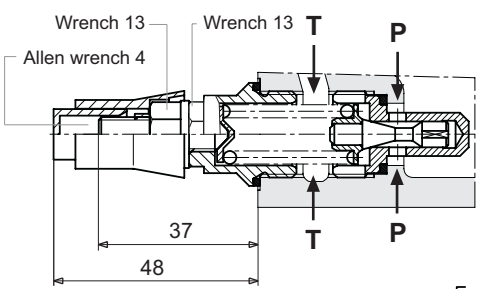
D

MAIN RELIEF VALVE DIRECT OPERATED
(setting range from 51 to 350 bar - *740 to 5100 psi*)
available in two type, see drawing here below

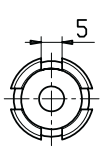




TYPE 1

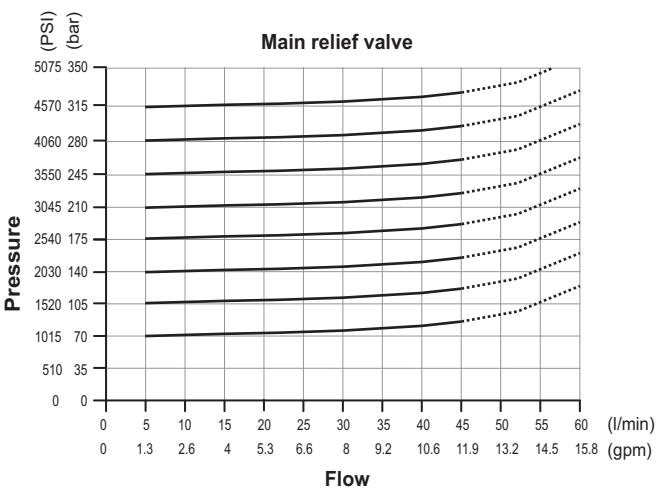


TYPE 2

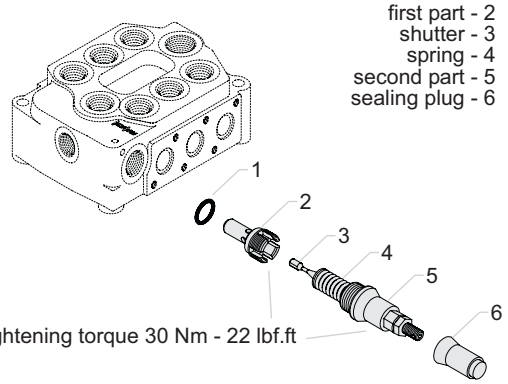


First part of the valve

The only difference between the two types
is the type 1 is adjustable without oil leaking.



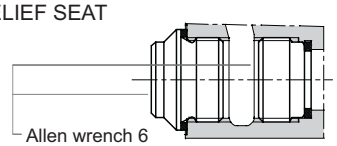
This valve is built as shown in the drawing here below:
washer - 1
first part - 2
shutter - 3
spring - 4
second part - 5
sealing plug - 6

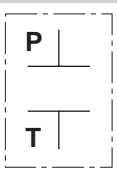


Tightening torque 30 Nm - 22 lbf.ft

W

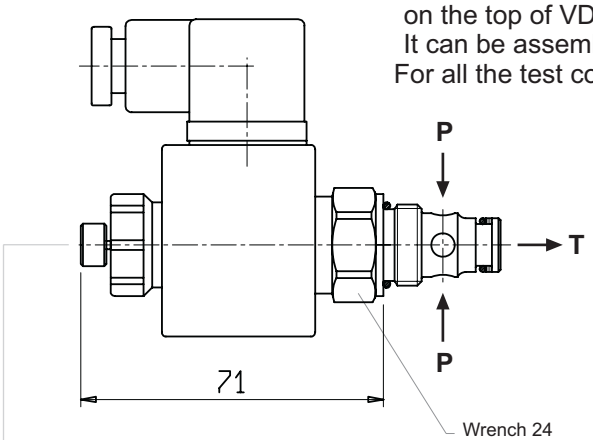
PLUG FOR MAIN RELIEF SEAT
WITHOUT VALVE

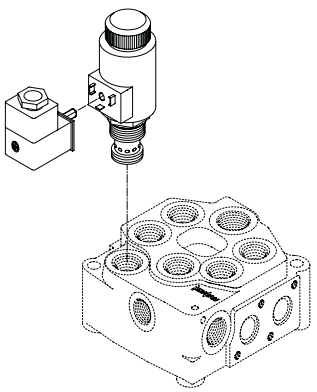


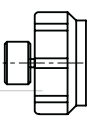


VENTING VALVES

This valve is located in an appropriate cavity
on the top of VDM6 from 2 to 6 sections, see page 8.
It can be assembled with or without main relief valve.
For all the test conditions, please refer you to page 16.

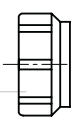






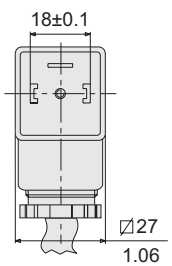
Screw-out override
normally closed
Push override
normally open

Push override



Standard
without override

CONNECTOR
DIN 43650 - A/ISO 4400



EV1

12 Vdc - Normally opened
Push override, on request

EV2

24 Vdc - Normally opened
Push override, on request

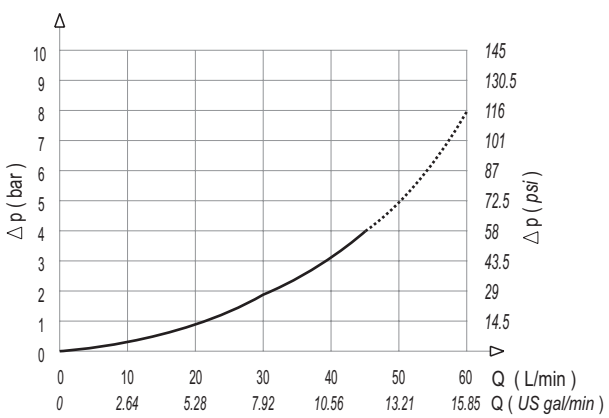
EV3

12 Vdc - Normally closed
Screw-out override, on request

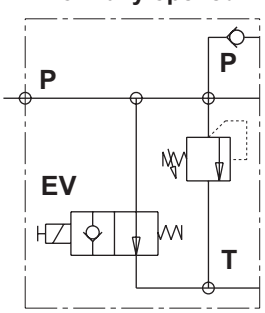
EV4

24 Vdc - Normally closed
Screw-out override, on request

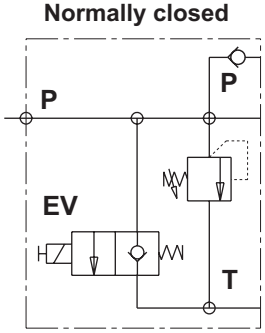
SPECIFICATIONS	
- MAX PRESSURE IN "P"	350 bar
- MAX FLOW	40 l/min
- OIL LEAKAGE-max pressure - 46 cST	0.30 cm^3/min
- AVAILABLE VOLTAGE	12 - 24 Vcc
- COIL RESISTANCE	12Vdc:8.7Ω - 24Vdc:33Ω
- COIL POWER	17 W
- PROTECTION INDEX WITH STANDARD CONNECTOR	IP 65



Normally opened



Normally closed

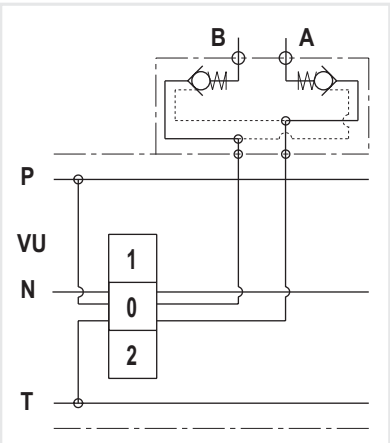


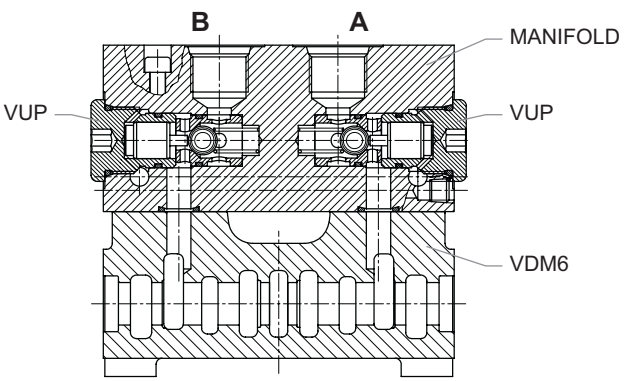
HYDRAULIC PILOTED LOAD CHECK VALVE

VUP

AVAILABLE ONLY FOR QUANTITY, PLEASE CONTACT OUR SALES DEPARTMENT

Built-in a manifold assembled on the top.
Zero leakage, lock the load in position when the spool is in neutral (0 position).
As you can see in the circuit here below, the opening of VUP is caused by the pressure of the ports.

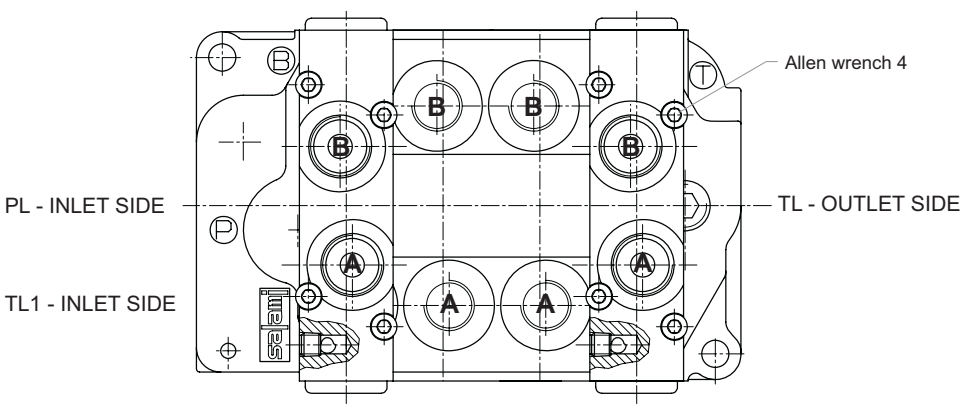




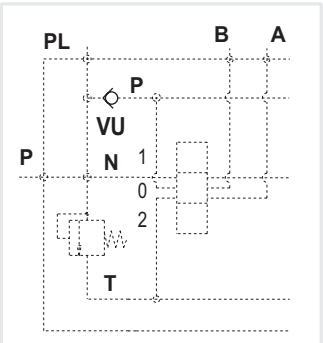
SECTIONAL VIEW

Assembling recommendations

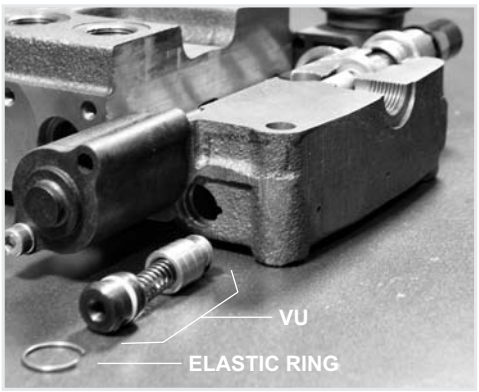
The monoblock you need to install the manifold is a special machined monoblock.
The manifold with double VUP valve can be assembled on all the working sections, but not consecutive working sections.
Remember that in case you need to install it in the first working section you must have also the inlet port PL.
At the same way if you need to install it in the last section you must have also the outlet ports TL and TL1.

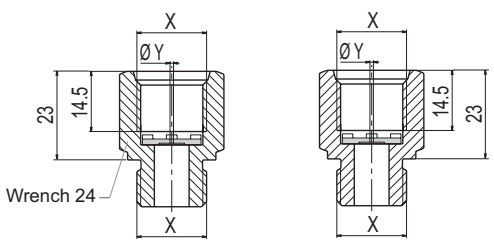


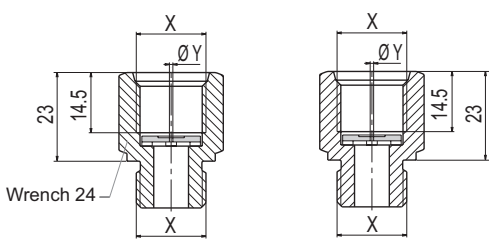
OTHER VALVES

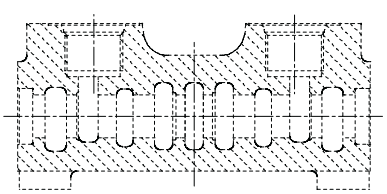


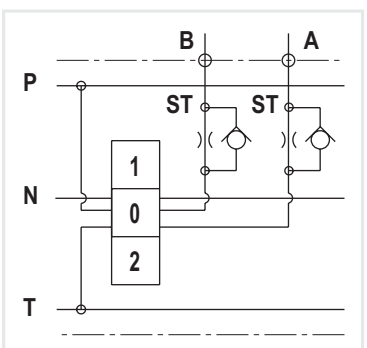
This is the load check valve VU which is built in the monoblock at the down-stream of the pressure line P and you need not to specify in phase of ordering because it is part of it.
In the tandem circuit working section (available only in the first section) you have another load check valve as you can see in the hydraulic circuit of page 12.





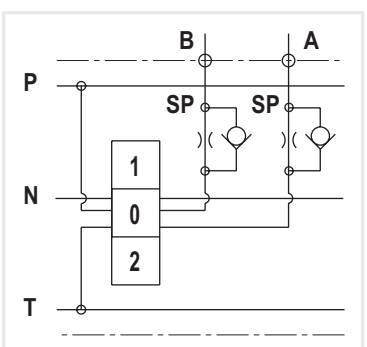






SP

Flow restrictor P ⟶ A/B



ST

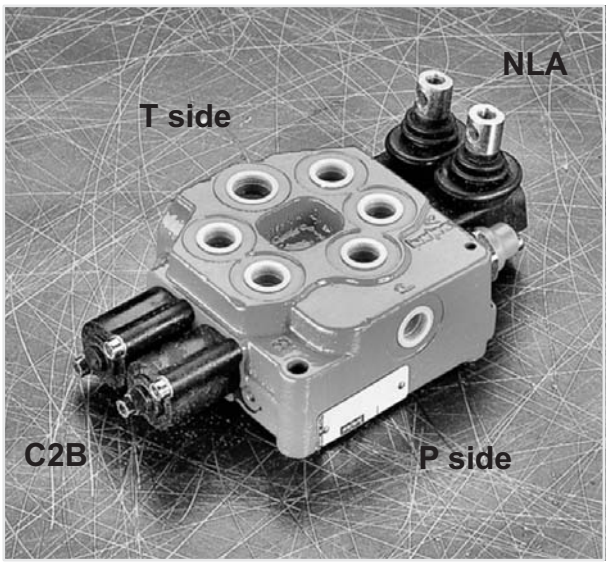
Flow restrictor A/B ⟶ T

X available threads			ϕ Y available measures		
*M18 x 1.5	SAE 8	G 3/8	ϕ 1.10	ϕ 1.25	ϕ 1.50

*Available for quantity, please contact our sales dept.

For tightening torque, please refer you to page 5.

SPOOL CONTROLS AND SPOOL POSITIONINGS

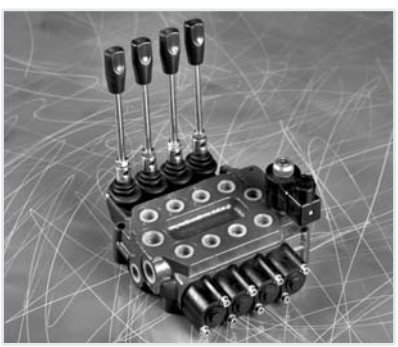


This picture shows the VDM6 assembled, in this case you have a manual control "NL" on A side and a spring return in neutral position "C2" on B side. Considering that VDM6 is a simmetrical valve, all spool controls and positionings can be placed on both sides A or B.In case of hydraulic kick-out "G2 - G4 - G5" and with spools types 13 - 17 - 18, you can also decide from A or B side but after that this is the final position because with this type of control and spools the monoblock have a special machining.

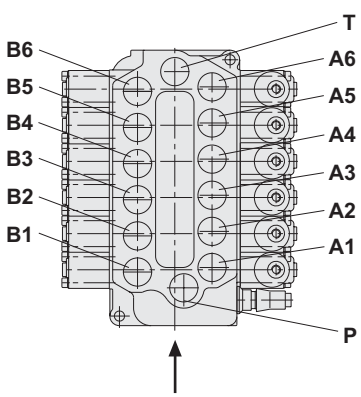
In this and following pages you can find all spool controls and spool positionings, they are all assembled with socket hexagon head screw or in some case hexagon head screw: **M5 x 0.8 with tightening torque of 4.5 ± 0.5 Nm.**

The drw. here below show the reference to fix A and B side from the point of view of the operator.

VDM6 - 6 working sections with cross levers for 2 spools **L1/L2** and **NL** controls



VDM6 - 4 working sections with venting valve **EV...** , **NL** controls and **C2** positionings

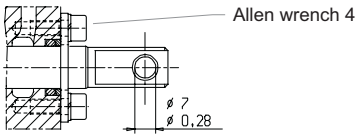


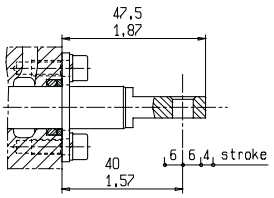
VDM6 - 1 working section with **NL** control and **CM** positioning spool

VDM6 - 2 working sections with solenoid push-pull control **E7/E8** and safety lever **ES**

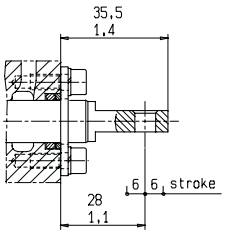
SPOOL CONTROLS

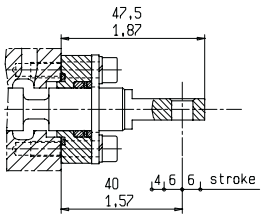
For spool with float position commercial code **12**





For spool with float position commercial code **11**





On request available with dust proof plate

SL

Without lever box

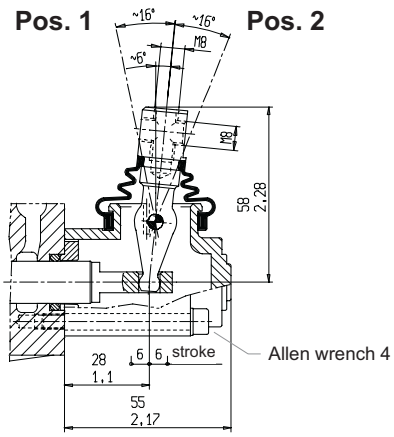
1
0
2

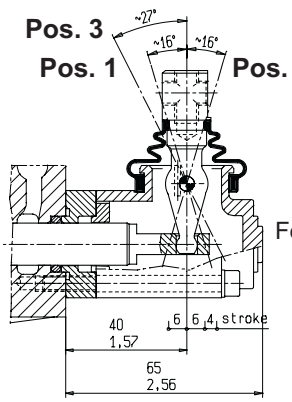
NL

Standard protected lever

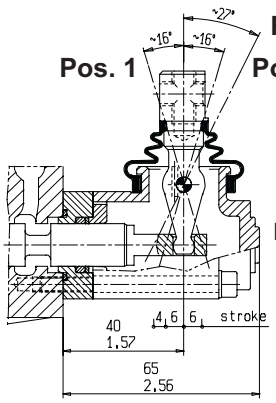
1
0
2

This lever can be assembled turned of 180°





For spool with float position commercial code **12**



For spool with float position commercial code **11**

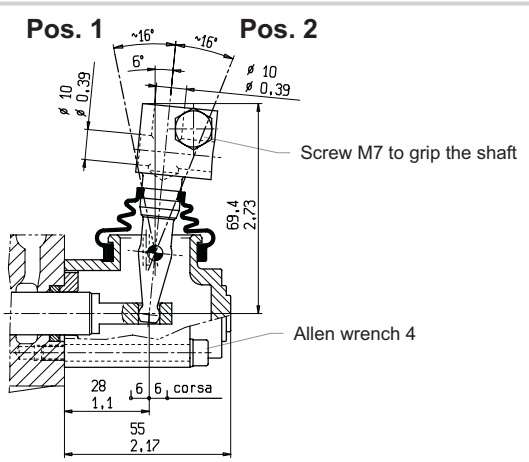
On request available for spools with float position: commercial codes 11 and 12 as shown in the drawing above

MP

Protected clamp lever

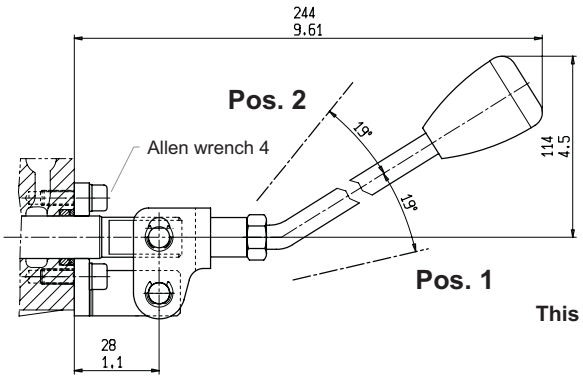
1
0
2

This lever can be assembled turned of 180°

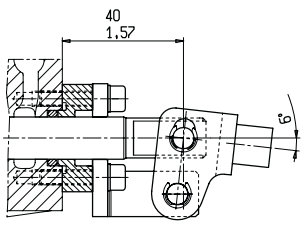


PF

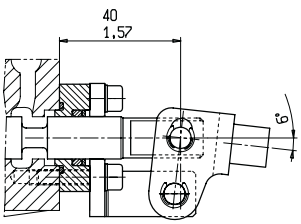
Not protected lever



This lever can be assembled turned of 180°



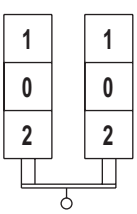
For spool with float position commercial code **12**



For spool with float position commercial code **11**

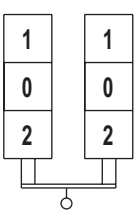
L2

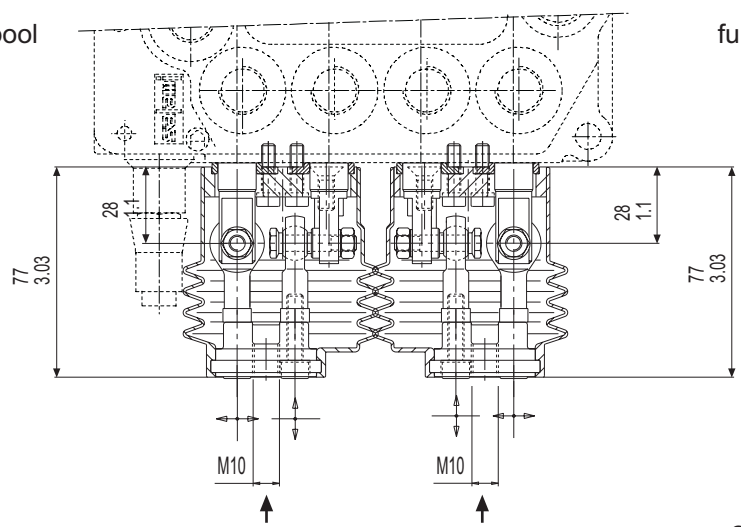
Cross lever for 2 spools
fulcrum on down-stream spool



L1

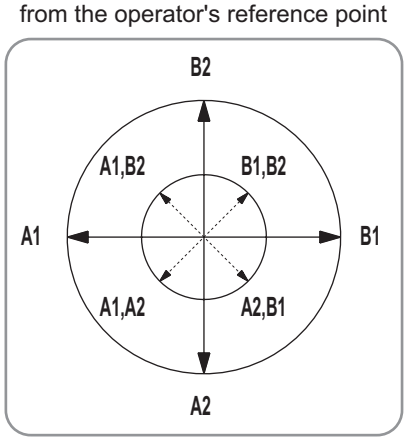
Cross lever for 2 spools
fulcrum on up-stream spool



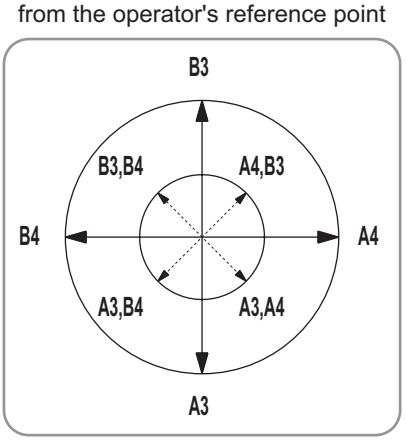


OPERATOR'S REFERENCE POINT

Standard movements
from the operator's reference point

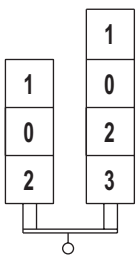


Standard movements
from the operator's reference point

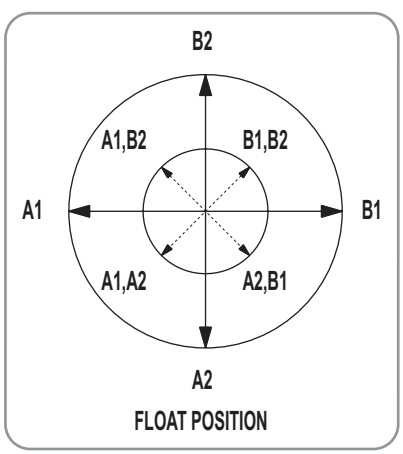


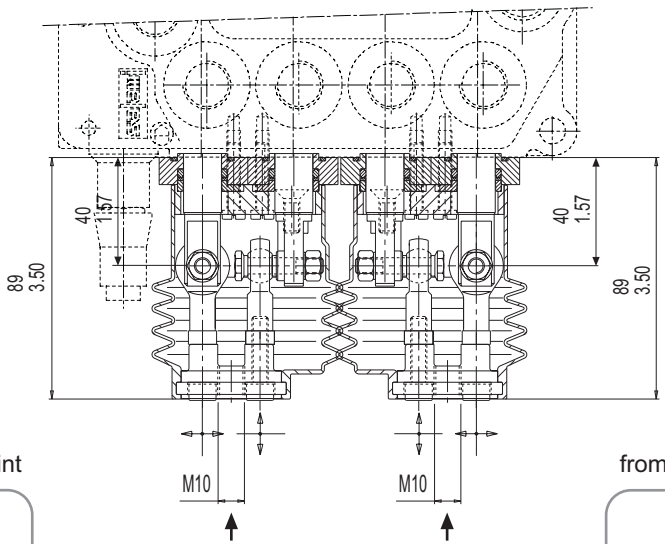
L4

Cross lever for 2 spools fulcrum and spool with (float-in) position on down-stream working module



Standard movements from the operator's reference point

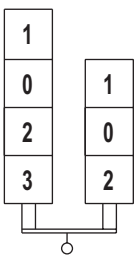




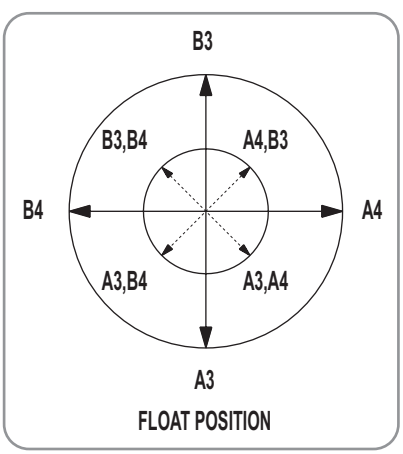
IMPORTANT
the double acting spool assembled with double acting + (float in) position is longer than a standard spool. In case you need joystick with double acting spool + (float out) position, please get in touch with our technical department.

L3

Cross lever for 2 spools fulcrum and spool with (float-in) position on up-stream working module



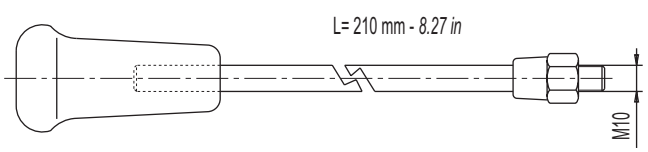
Standard movements from the operator's reference point



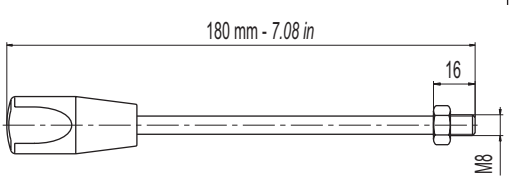
STANDARD SHAFTS

For different diameter and/or length, please get in touch with our sales dept.

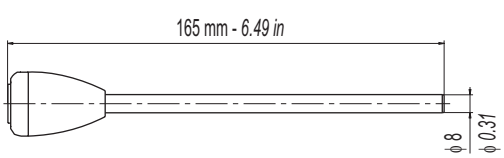
Shaft with ergonomic knob for cross lever L1/L2
R202 8996 0



Shaft with threaded end
R202 9018 0



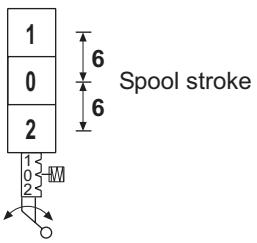
Shaft for clamp lever
R202 8839 0

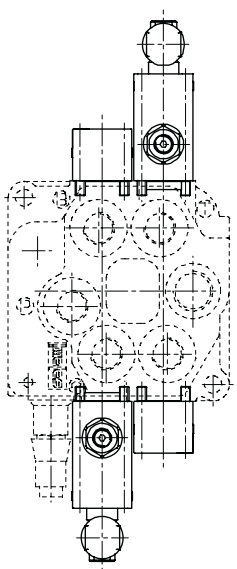


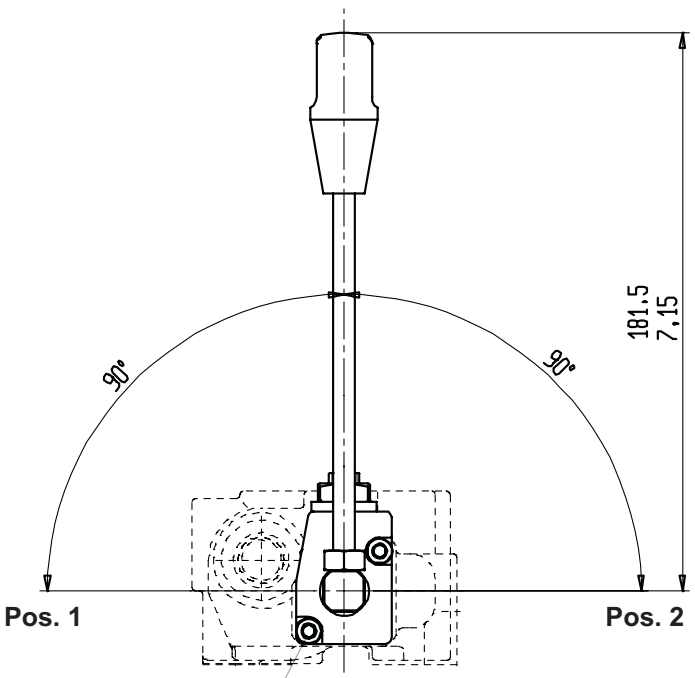
CR

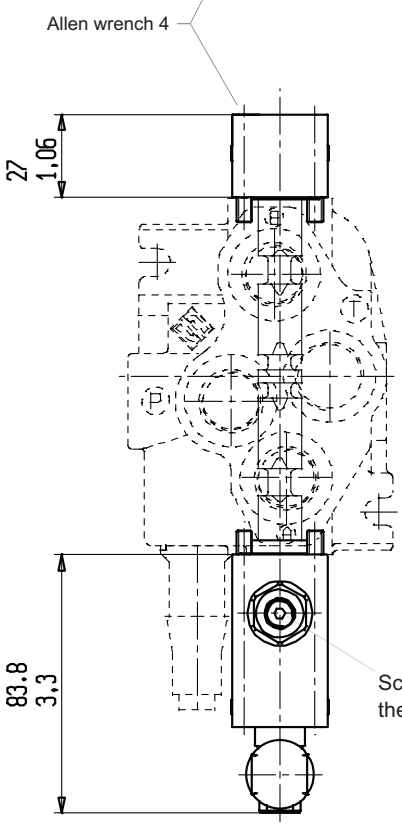
Rotary control, available for 1 working section or two working section but one at the opposite side of the other.
This device is realized for marine applications, so all the material components are corrosion proofing.
This control uses special type spools, available types
are: 01 - 02.Mountable on both side (A or B).

Device with cam
and adjustable friction
detent + rotary lever





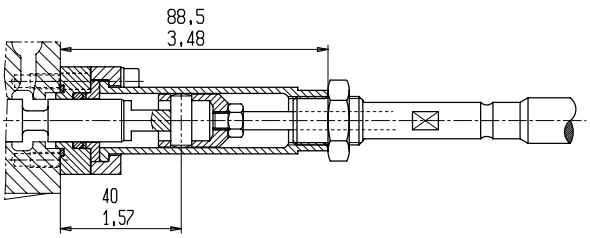




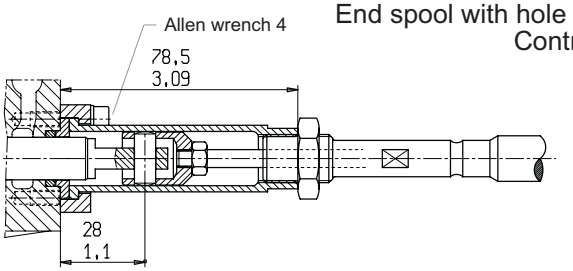
TC

Devices for cable remote control .
For more details about cables, please consult our catalogue cable remote controls.

For spool with (float-in) and (float-out) positions commercial codes **11 - 12**



End spool with hole ϕ 7 mm. Controls side



E9

Working conditions for this control:
Flows up to 40 l/min (10.6 *gpm*)
Pressure up to 210 bar (3050 *psi*)

Electric push-pull control 3 positions
12 Vdc (coil power 45 Watt at 20°C)

E10

Working conditions for this control:
Flows up to 40 l/min (10.6 *gpm*)
Pressure up to 210 bar (3050 *psi*)

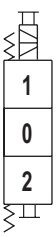
Electric push-pull control 3 positions
24 Vdc (coil power 45 Watt at 20°C)

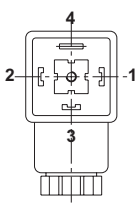
ELECTRIC DATA
- STANDARD COIL POWER: 45 Watt at 20°C
- HEAVY DUTY 80%
- OPTIONAL COIL POWER: 31 Watt at 20°C
- HEAVY DUTY 100%
- PROTECTION INDEX WITH CONNECTOR: IP 65

The available spools are from 01 to 06.
The working data a side are referred to the working conditions of page 3.

SL

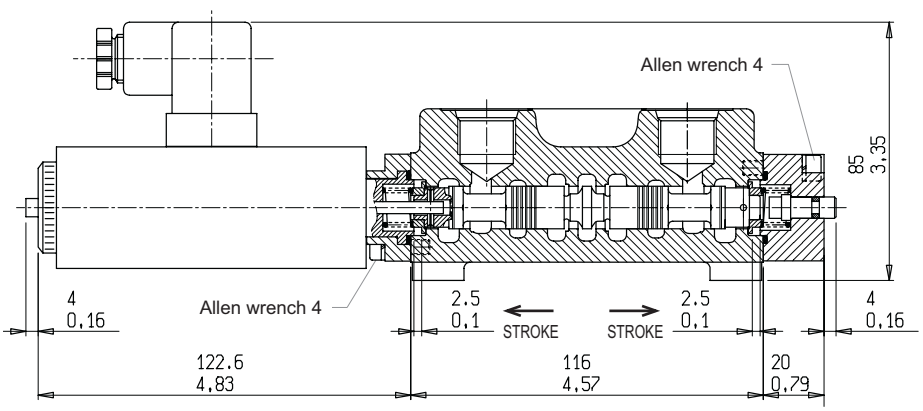
Without lever for electric push-pull control with override device





CONNECTOR
DIN 43650 - A/ISO 4400

To avoid an excessive wearing of the contacts, depending on the sparking of these parts, we suggest a suitable protection(for example diodes)



ES

Emergency lever for electric push-pull control

E7

Working conditions for this control:
Flows up to 30 l/min (7.9 *gpm*)
Pressure up to 210 bar (3050 *psi*)

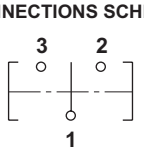
Electric push-pull control 3 positions
12 Vdc (coil power 31 Watt at 20°C)

E8

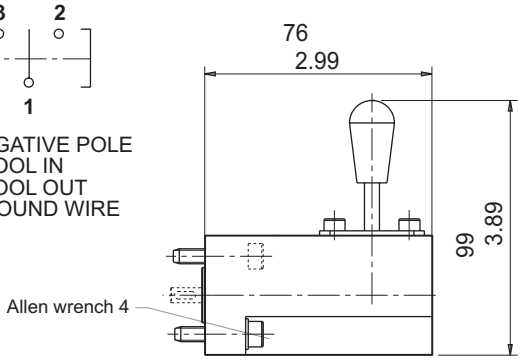
Working conditions for this control:
Flows up to 30 l/min (7.9 *gpm*)
Pressure up to 210 bar (3050 *psi*)

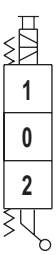
Electric push-pull control 3 positions
24 Vdc (coil power 31 Watt at 20°C)

ELECTRIC CONNECTIONS SCHEME



1) NEGATIVE POLE
2) SPOOL IN
3) SPOOL OUT
4) GROUND WIRE



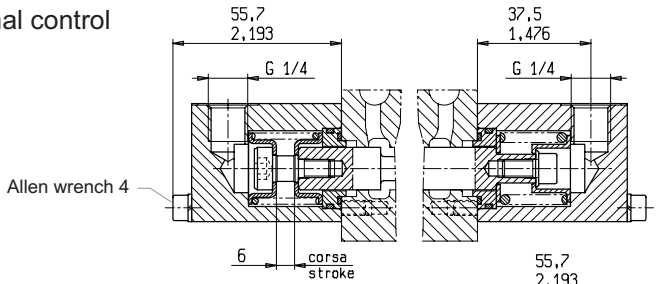


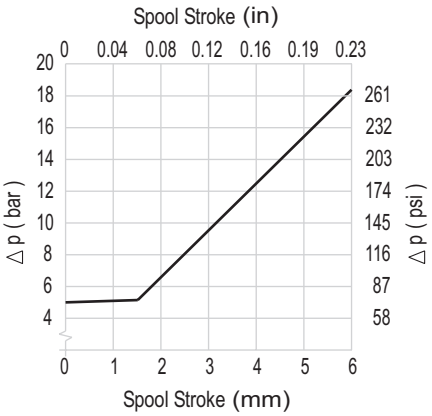
Important: this lever was realized as emergency lever and it'isnot allowed a continuos use.

IP

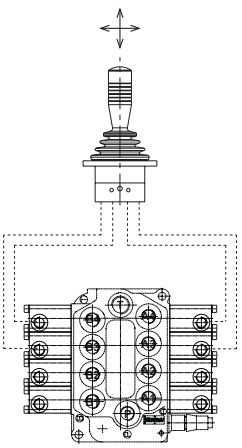
Important:
when you order please specify top or side ports

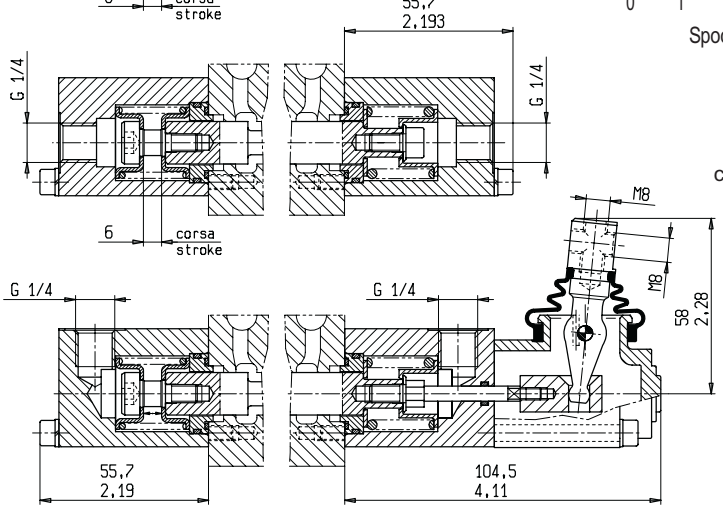
Hydraulic proportional control





Salami hydraulic
2 axis joystick





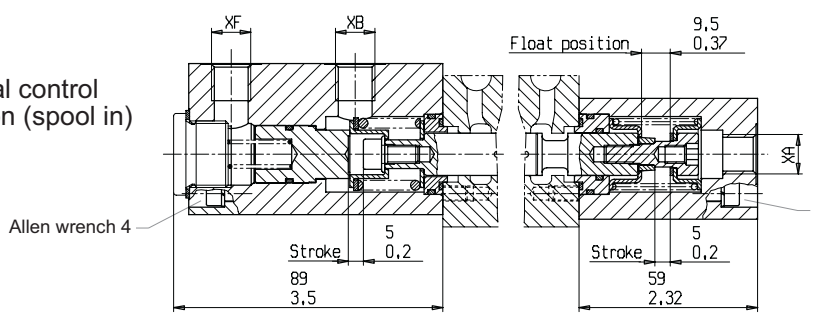
Hydraulic proportional control with emergency lever. Available for q.ty please get in touch with our sales dept.

Also available release with emergency lever and microswitch.

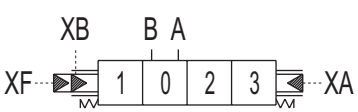
IF

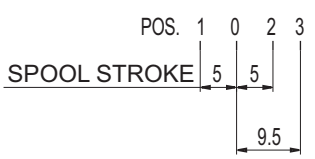
XA, XB, XF PORTS : G 1/4

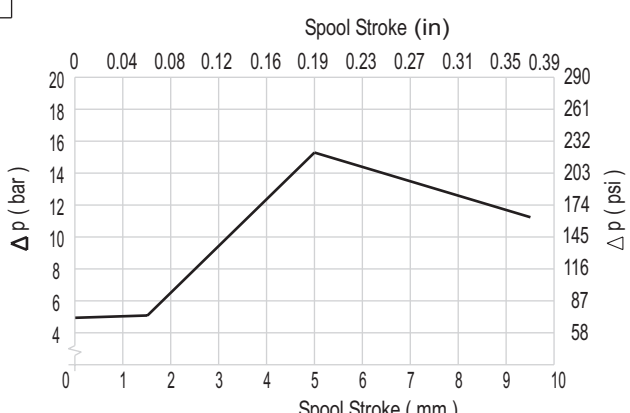
Hydraulic proportional control with third float position (spool in)



OPERATING SCHEME







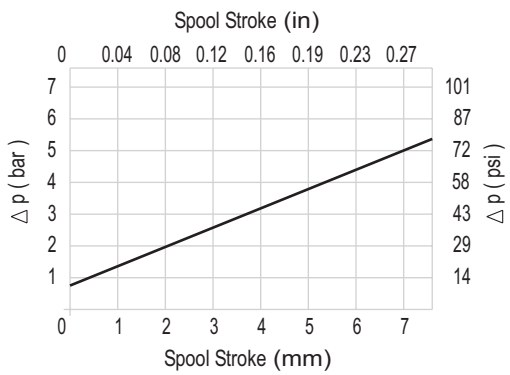
XA,XB,XF → T ⇨ POS. 0
Pressure → XB ⇨ POS. 1
Pressure → XA,XF ⇨ POS. 2
Pressure → XA ⇨ POS. 3

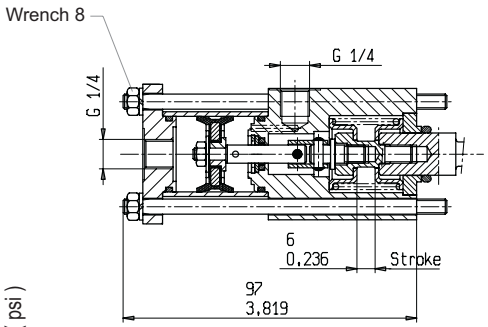
Thought for all truck hydraulic applications

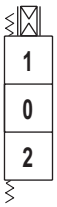
PP/P0

Pneumatic proportional/on-off control

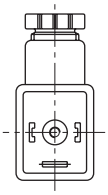
Available also with ports threaded 1/8 NPT



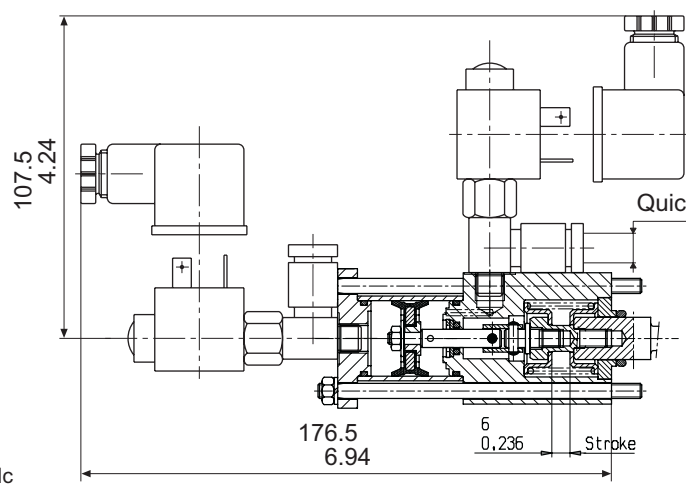




Pneumatic proportional/on-off control
This control is at the same time proportional and on-off type, it depends if you use a pneumatic remote control proportional type(with the characteristic curve of diagram), or on-off type.



CONNECTOR
DIN 43650 - A/ISO 4400



P1

Electro-pneumatic on-off control - 12 Vdc

P2

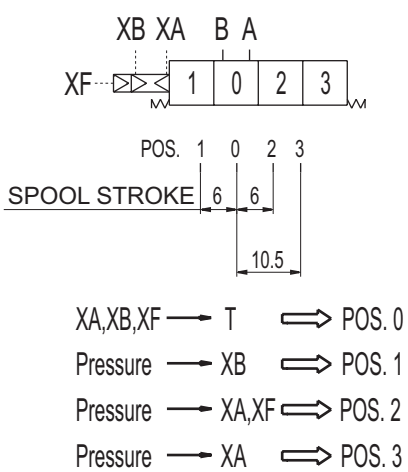
Electro-pneumatic on-off control - 24 Vdc

ELECTRICAL DATA

- VOLTAGE: 12Vdc OR 24Vdc
- COIL POWER: 6 Watt at 20°C
- PROTECTION INDEX WITH CONNECTOR: IP 65

Starting from PP/PO adding the electro-valves you get P1 or P2

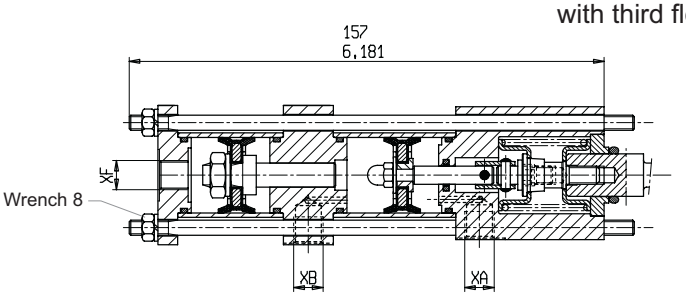
OPERATING SCHEME



XA, XB, XF PORTS : G 1/4

PQ

Pneumatic on-off control with third float position (spool in)

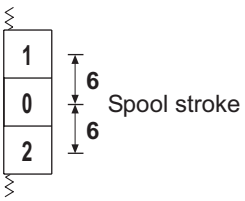


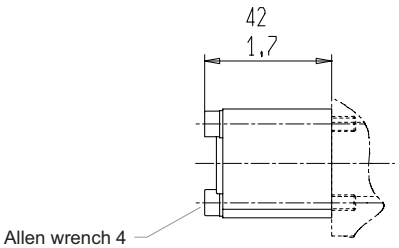
For electro-pneumatic control with third float position, please get in touch with our sales dept.

SPOOL POSITIONINGS

C2

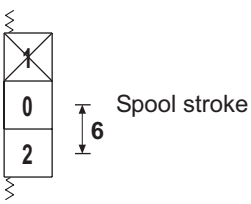
Spring centered to neutral position





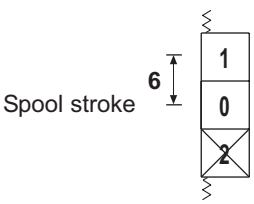
C5

Two positions (neutral/pos. 2)
with spring return in neutral



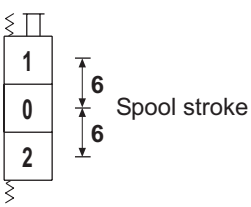
C6

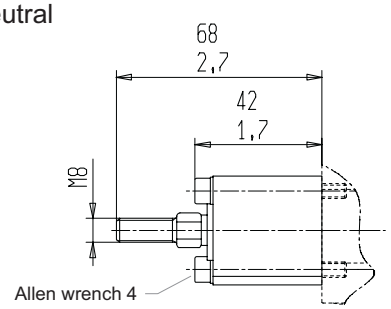
Two positions (neutral/pos. 1)
with spring return in neutral

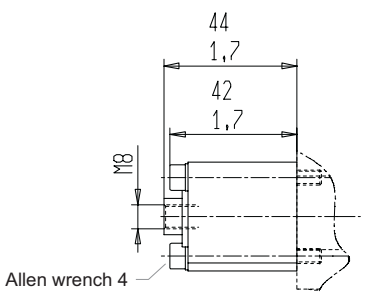


C3

Spring centered to neutral
(threaded male pivot
for remote control)

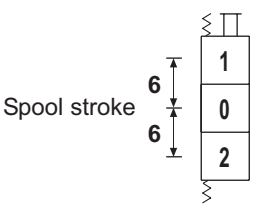






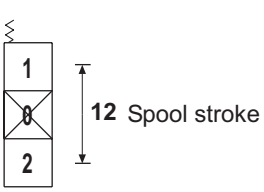
C4

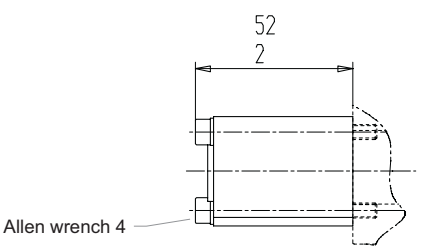
Spring centered to neutral
(threaded female pivot
for remote control)



C7

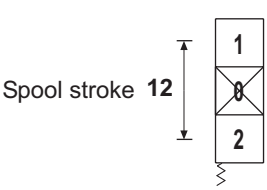
Two positions (pos. 1/pos. 2)
with spring return in pos. 1





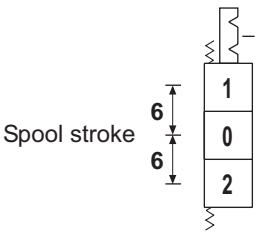
C8

Two positions (pos1/pos. 2)
with spring return in pos. 2



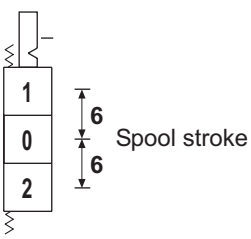
R2

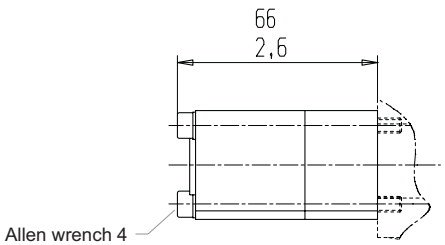
Detent on pos. 1/pos. 2
with spring return in neutral



R5

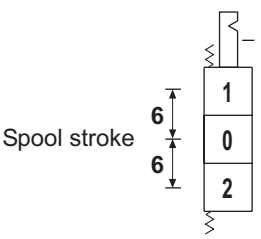
Detent on pos. 2
with spring return in neutral





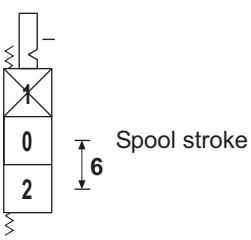
R4

Detent on pos. 1
with spring return in neutral



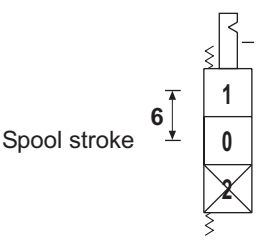
R6

Two positions with detent on pos. 2
with spring return in neutral



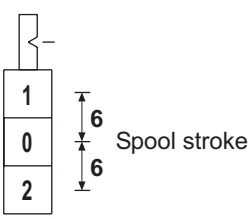
R7

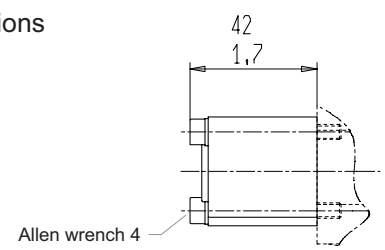
Two positions with detent on pos. 1
with spring return in neutral



CO

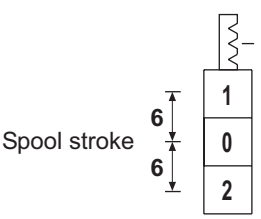
Detent on each intermediate positions





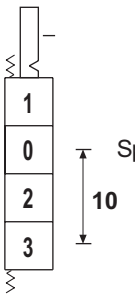
R9

Detent on pos. 1/pos. 2
and neutral position



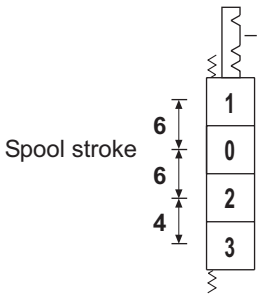
F1

Detent on pos. 3
with spring return in neutral



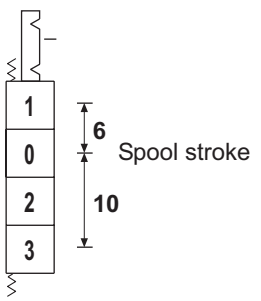
F2

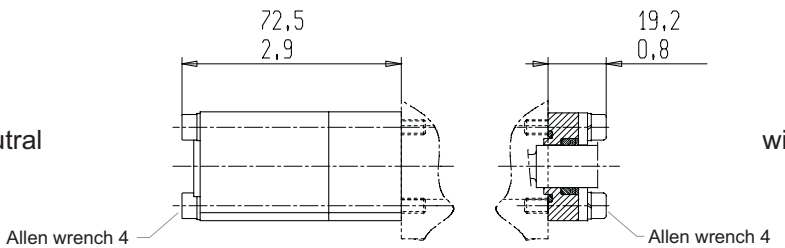
Detent on pos. 1/pos. 2/pos. 3
with spring return in neutral



F3

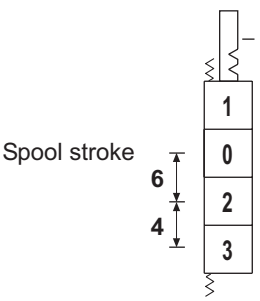
Detent on pos. 1/pos. 3
with spring return in neutral





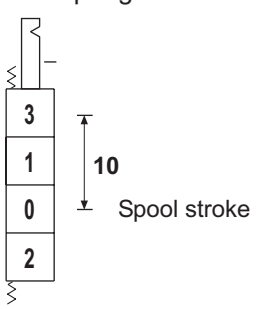
F4

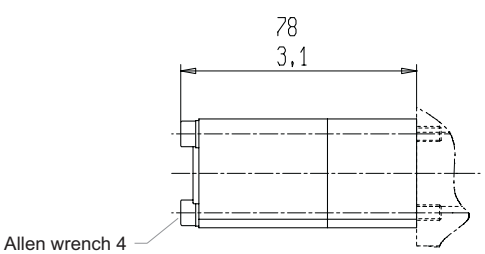
Detent on pos. 2/pos. 3
with spring return in neutral



F5

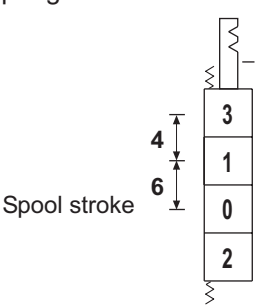
Detent on pos. 3
with spring return in neutral





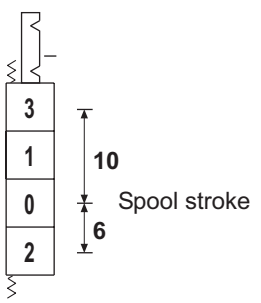
F6

Detent on pos. 1/pos. 3
with spring return in neutral



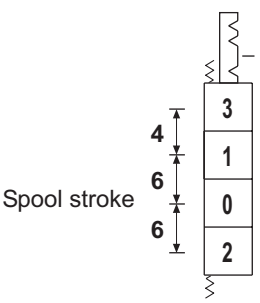
F7

Detent on pos. 2/pos. 3
with spring return in neutral



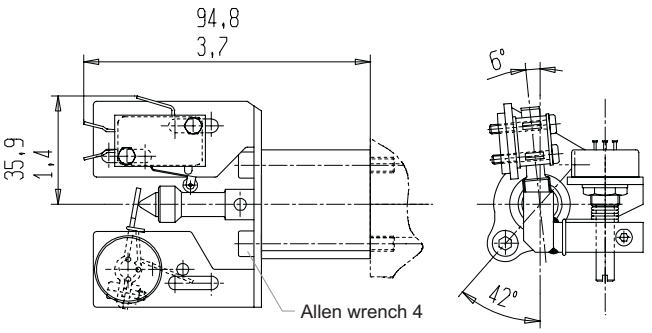
F8

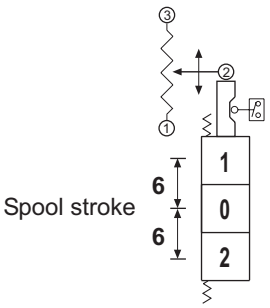
Detent on pos. 1/pos. 2/pos. 3
with spring return in neutral

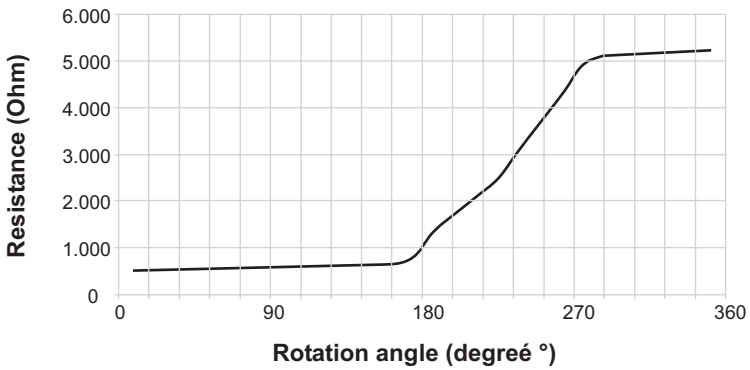


PM

Spool positioning with microswitch to start an electric motor and potentiometer to run up speed motor (available also for single acting spools)

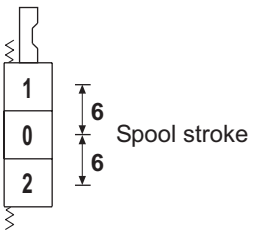


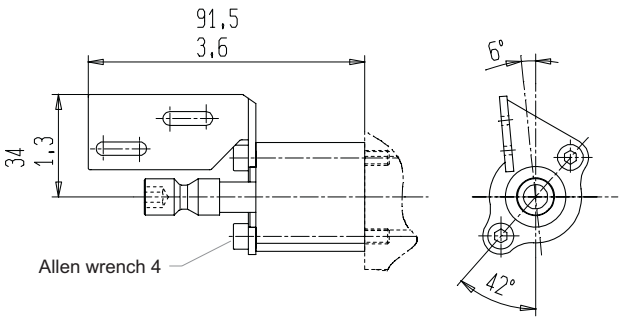




CE

Pre-arrangement for electrical device

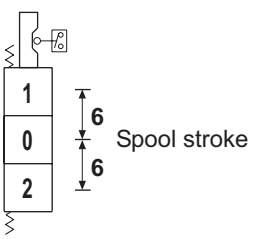


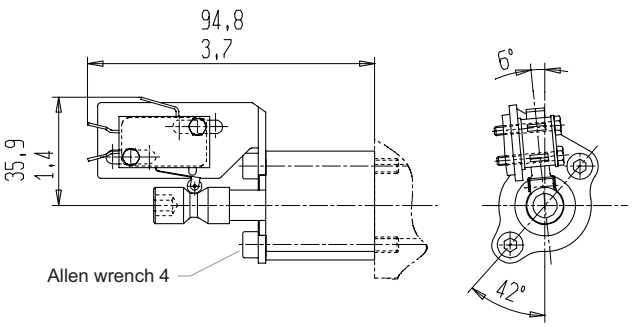


MICROSWITCH TYPE: SAIA - BURGESS XGK - 88
For more information please get in touch with our sales dept.

CM

Spool positioning with microswitch to start an electric motor (available also for single acting spools)

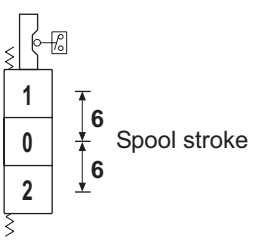


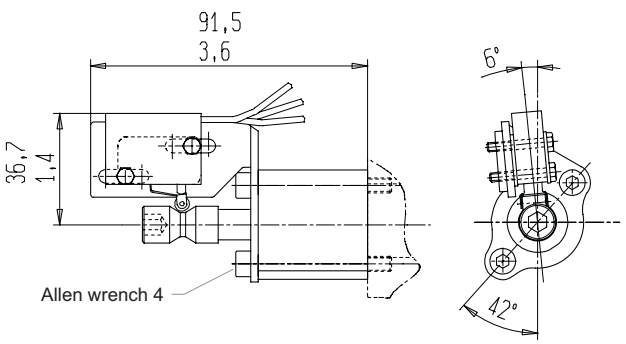


PROTECTION INDEX
IP65

CW

Spool positioning with waterproof microswitch to start an electric motor (available also for single acting spools)

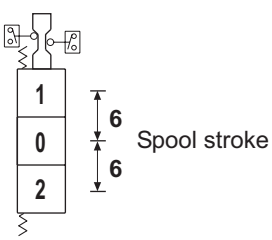


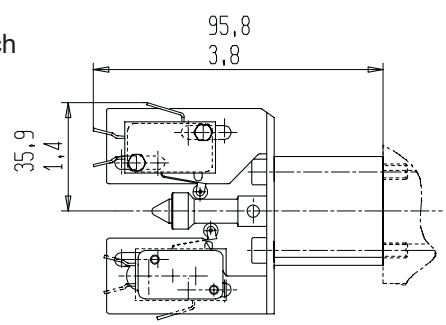


PROTECTION INDEX
IP67

CD

Spool positioning with double microswitch (available also for single acting spools)



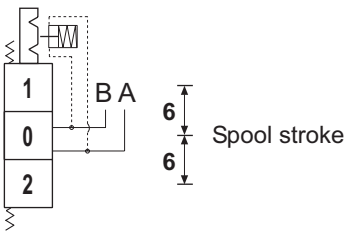


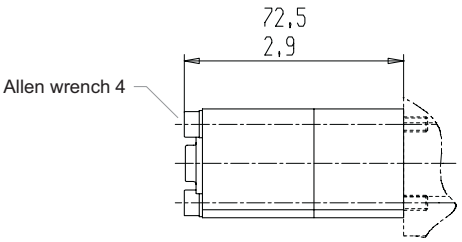
PROTECTION INDEX
IP65

IMPORTANT:
When you order, please specify the setting pressure of the device.
With this type of spool positiong a special machining of the body is required.

G2

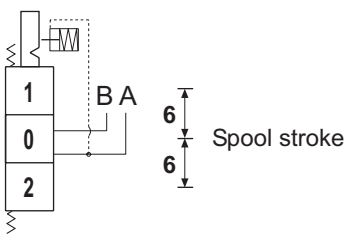
Detent on pos. 1/pos. 2
with hydraulic kick-out





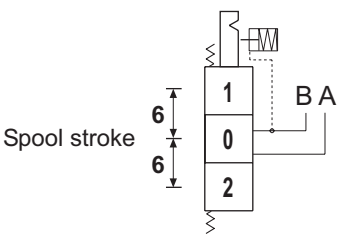
G5

Detent on pos. 2
with hydraulic kick-out



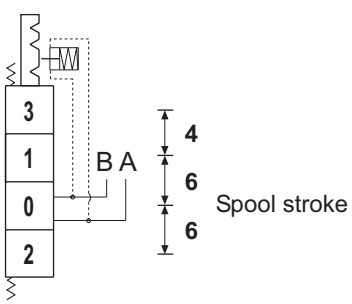
G4

Detent on pos. 1
with hydraulic kick-out



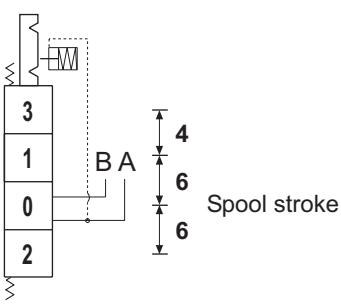
G6

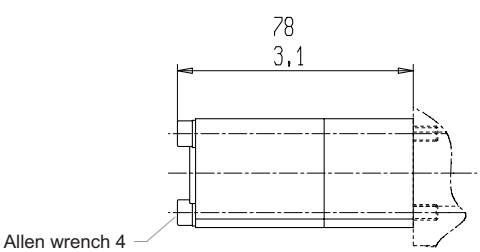
Detent on pos. 1/pos. 2/pos. 3
with hydraulic kick-out
on pos. 1 and pos. 2
and manual release on pos. 3



G8

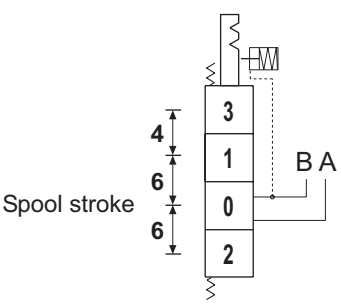
Detent on pos. 2/pos. 3
with hydraulic kick-out
on pos. 2
and manual release on pos. 3





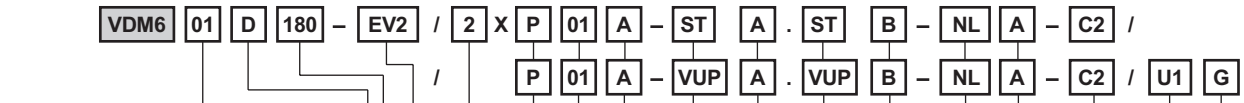
G7

Detent on pos. 1/pos. 3
with hydraulic kick-out
on pos. 1
and manual release on pos. 3



How to order/VDM6

DIRECTIONAL CONTROL VALVE MONOBLOCK TYPE



INLET CONFIGURATION
See page 11

MAIN RELIEF VALVE (PAG. 16)	
D	Direct main relief valve
W	Without main relief valve

MAIN RELIEF VALVE SETTING (bar)
See page 16

VENTING VALVE
See page 17

NUMBER OF IDENTICAL CONSECUTIVE SECTIONS

CIRCUIT TYPES (PAG. 12)	
P	Parallel circuit
T	Tandem circuit (only the first section)

SPOOL TYPES (PAG. 14 - 15)	
01	Double acting spool
02	Double acting motor spool
03	Double acting motor spool ("B" port blocked)
04	Double acting motor spool ("A" port blocked)
05	Single acting spool "A" working port
06	Single acting spool "B" working port
11	Double acting spool with float function in 3rd pos. (spool in)
12	Double acting spool with float function in 3rd pos. (spool out)
13	Double acting spool with regenerative function in position 3 (spool in)
17	Double acting spool with regenerative function in position 2 (spool in)
18	Double acting spool with regenerative function in position 1 (spool out)
52	Over center double acting spool "A" working port
53	Over center double acting spool "B" working port
54	Over center double acting spool "A" and "B" working ports

SPOOL CHOICE ACCORDING TO THE INLET FLOW (PAG. 14)	
A	Nominal flow
C	2/3 of the nominal flow

AUXILIARY VALVES (PAG. 18 - 19)	
VUP	Hydraulic piloted load check valve (available only for quantity)
ST	Flow restrictor P® A/B
SP	Flow restrictor A/B® T

PORTS (PAG. 10)	
G	GAS threaded
S	SAE threaded
M*	METRIC threaded

OUTLET CONFIGURATION
See page 11

SPOOL POSITIONINGS
Page 28 C2 - C3 - C4 - C5 - C6 - C7 - C8
Page 29 R2- R4 - R5 - R6 - R7 - R9 - C0
Page 30 F1 - F2 - F3 - F4 - F5 - F6 - F7 - F8
Page 31 - 32 PM - CE - CM - CW - CD
Page 33 G2 - G4 - G5 - G6 - G7 - G8

CONTROL SIDE (PAGE 20)

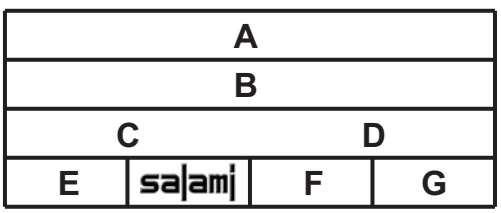
SPOOL CONTROLS
Without lever box page 21 - SL
Handle controls from page 21 to 23 NL - MP - PF - FL - L1/L2 - L3/L4
Devices for rotary control page 24 CR
Devices for cable remote control page 25 TC
Direct electric control and emergency devices page 25 E7 - E8 - E9 - E10 - ES - SL
Hydraulic controls page 26 IP - IF
Pneumatic and electro-pneumatic controls page 27 PP/P0 - P1/P2 - PQ

PORT ON WHICH THE VALVE IS MOUNTED

*Available for quantity, please contact our sales dept.

DESCRIPTION OF THE NEW PRODUCT IDENTIFICATION LABEL

Based on the firm certification ISO 9001 - UNI EN 29001, section 4.8 (identification and tracebility of the product), we have adopted a new identification label starting from the 1st march 1995. Pls, see following example:



A = Product short descritpion (eg. VD8A/FDD/U4G).

B = Customer part number.

C = Salami part number (eg. 6235 0025 0).

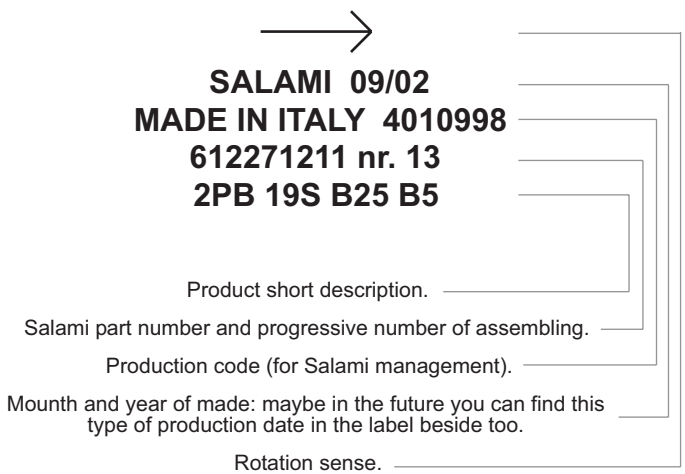
D = Production code (for Salami management)

E = Rotation sense (only for pumps).

F = Production date (see data sheet here below)

G = Progressive number of assembling.

Only for pumps 2PB and 2PZ (except triple 2PB) the identification product is marked on the top of the pump body as shown here below:



ASSEMBLED	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
JANUARY	7A	8M	9M	0M	1M	2M	3M	4M	5M	6M	7M	08M	09M	10M	11M	12M
FEBRUARY	7B	8N	9N	0N	1N	2N	3N	4N	5N	6N	7N	08N	09N	10N	11N	12N
MARCH	7C	8P	9P	0P	1P	2P	3P	4P	5P	6P	7P	08P	09P	10P	11P	12P
APRIL	7D	8Q	9Q	0Q	1Q	2Q	3Q	4Q	5Q	6Q	7Q	08Q	09Q	10Q	11Q	12Q
MAY	7E	8R	9R	0R	1R	2R	3R	4R	5R	6R	7R	08R	09R	10R	11R	12R
JUNE	7F	8S	9S	0S	1S	2S	3S	4S	5S	6S	7S	08S	09S	10S	11S	12S
JULY	7G	8T	9T	0T	1T	2T	3T	4T	5T	6T	7T	08T	09T	10T	11T	12T
AUGUST	7H	8U	9U	0U	1U	2U	3U	4U	5U	6U	7U	08U	09U	10U	11U	12U
SEPTEMBER	7I	8V	9V	0V	1V	2V	3V	4V	5V	6V	7V	08V	09V	10V	11V	12V
OCTOBER	7J	8Z	9Z	0Z	1Z	2Z	3Z	4Z	5Z	6Z	7Z	08Z	09Z	10Z	11Z	12Z
NOVEMBER	7K	8X	9X	0X	1X	2X	3X	4X	5X	6X	7X	08X	09X	10X	11X	12X
DECEMBER	7L	8Y	9Y	0Y	1Y	2Y	3Y	4Y	5Y	6Y	7Y	08Y	09Y	10Y	11Y	12Y

WARRANTY

- We warrant products sold by us to be free from defects in material and workmanship.

- Our sole obligation to buyer under this warranty is the repair or replacement, at our option, of any products or parts thereof which, under normal use and proper maintenance, have proven defective in material or workmanship, this warranty does not cover ordinary wear and tear, abuse, misuse, averloading, alteration.

- No claims under this warranty will be valid unless buyer notifies SALAMI in writing within a reasonable time of the buyer's discovery of such defects,but in no event later than twelve (12) mounths from date of shipment to buyer.

- Our obligation under this warranty shall not include any transportation charges or cost of installation, replacement, field repair, or other charges related to returning products to us; or any liability for directs, indirects or consequential damage or delay.If requested by us, products or parts for which a warranty claim is made are to be returned transportation prepaid to our factory. The risk of loss of any products or parts thereof returned to SALAMI will be on buyer.

- No employee or representative is authorized to change any warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of SALAMI.

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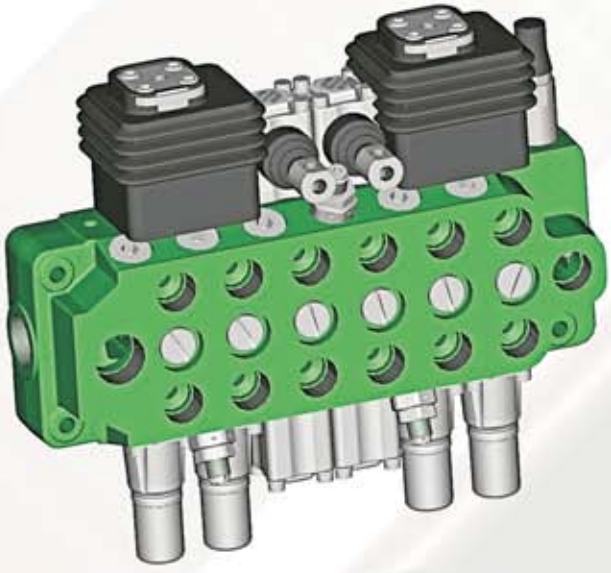
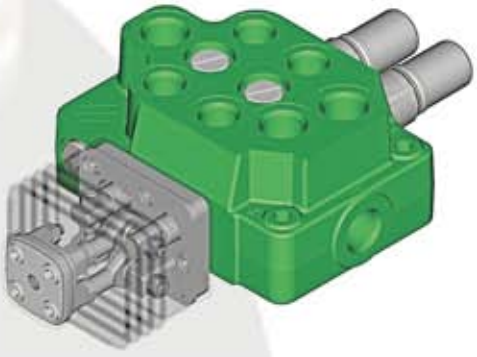
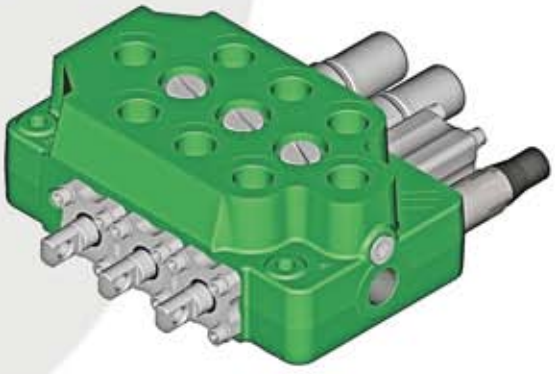
VDM6A - MONOBLOCK DIRECTIONAL CONTROL VALVE

Technical catalogue







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COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
=ISO 9001/2000=

salami™

INDEX

When in our catalogues you will find this symbol, please read carefully

E0.34.1011.02.02

The data in this catalogue refers to the standard product.
The policy of Salami S.p.A. consists of a continuous improvement of its products.It reserves the right to change the specifications of the different products whenever necessary and without giving prior information.
If any doubts, please get in touch with our sales departement.

GENERAL FEATURES

Among all hydraulic directional control valves used in the field of mobile equipment applications, the spool valve is the most popular. The monoblock valve type offers an excellent performance price ratio.

FEATURES

VDM6A directional control valve has the following:
- cast-iron monoblock construction up to 7 working sections
- parallel circuit, load check valve protection on each section
- series circuit, load check valve protection on each section (series line realized inside of the spool) **UNDER CONSTRUCTION**
- tandem circuit, load check valve protection on each section **UNDER CONSTRUCTION**
- possibility of venting valve
- possibility of power beyond configuration and possibility of closed center
- possibility of power beyond electrically operated
- spool construction in steel, hardened and nichel-plated to obtain a higher surface hardness and a better corrosion resistance
- several types of spool: double, single acting, spool motor, float position etc.
- minimum tolerance between the spools and the body to obtain a minimum internal leakage
- interchangeabilty of all the spools
- possibility of auxiliary valve either on port A or B or on both
- several spool control devices and spool positioning devices

VALVE AND DEVICE TYPES

In order to meet the most stringent demands and to offer a wider range of applications, the following types of valves and devices are available:

Valves
- direct main relief valve: controls the maximum pressure in the circuit when one or more spools are on end stroke located on "A" port side, can be:
  direct type version up to 370 bar - *5400 psi*
- electric operated venting valve to cut the pump flow, is available as 12 or 24 Vdc and normally opened or normally closed version
- overload valve on port A or/and B:set at a higher value (in comparison with the main relief valve), it protects the working ports from peack pressure
- overload and anticavitation valve on port A or/and B:set at a higher value (in comparison with the main relief valve), it protects the working ports from peack pressure, moreover the anticavitation valve avoids cavitation caused by the inertial turning of motor
- anticavitation valve on port A or/and B: the anticavitation valve avoids cavitation caused by the inertial rotation of motor
- conversion valve on A or/and B port, allows to obtain single acting function starting from double acting spool
- fixed flow restrictor: directly fitted on the "A/B" ports orifice
- load check valve mechanically operated directly fitted on the A and/or B port
  (with this valve the VDM6A is available only with manual control)
- electric operated venting valve to switch from std. to power beyond circuit or from power beyond to std. circuit

Devices
- handle controls
- cross lever: allows to acting two spools with one manual joystick
- cable remote control
- control device for microswitches: for the operation with electric d.c. motor driven pumps at one or more rotation speeds
- hydraulic kick-out: returns the spool automatically to the neutral position when the pre-set pressure of port "A" or "B" is exceeded
- pneumatic proportional control available also with float position
- electropneumatic control
- hydraulic proportional control available also with float position
- direct electric on-off control with emergency manual device
- electrohydraulic on-off and proportional control
- several spool positionings device to return the spool to neutral position or to lock the spool in working position

TECHNICAL DATA

Spools		from 1 to 7 (for more working modules pls. contact our sales department)	
Nominal flow	Q	45 l/min	(*12 gpm US*)
☞ Max flow		60 l/min	(*16 gpm US*)
Max pressure	port P	370 bar	(*5400 psi*)
	ports A/B	370 bar	(*5400 psi*)
	☞ port T	25 bar	(*363 psi*)
Internal leakage at 160 bar (*2285 psi*)	ports A/B → T	18 ÷ 25 cm^3/min	(*1.1 ÷ 1.52 cu.in./min*)
For lower leakage please contact our sales dept.			
Solenoid control 45W - 60W the leakage is		70 ÷ 90 cm^3/min	(*4.3 ÷ 5.49 cu.in./min*)
Solenoid control 31W the leakage is		100 ÷ 120 cm^3/min	(*6.1 ÷ 7.32 cu.in./min*)
Spool stroke (positions 1 and 2)		± 6 mm	(*0,236 in.*)
Spool stroke (positions 1 and 2) spool 05 and 06		± 5 mm	(*0,197 in.*)
Spool stroke (position 4, float or regenerative)		± 5 + 3 mm	(*0.236 + 0.118 in.*)
For direct solenoid control - spool stroke		± 2.5 mm	(*0,098 in.*)

☞ In case you need flows from 45 l/min to 60 l/min please contact our sales dept.

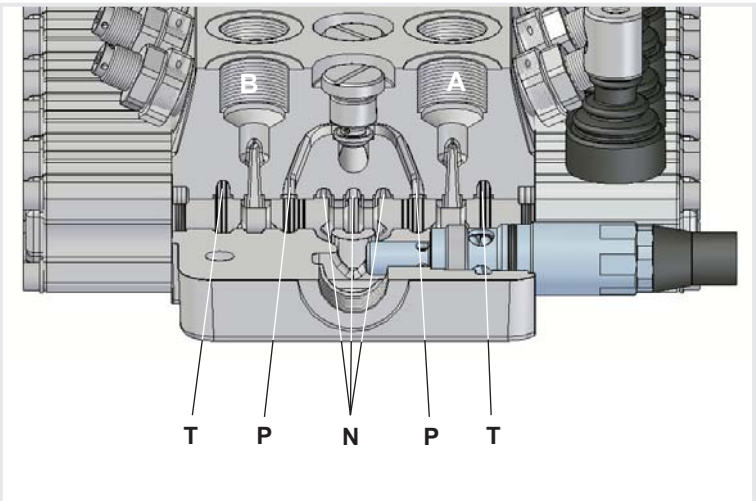
☞ For higher back pressure please contact our sales dept.

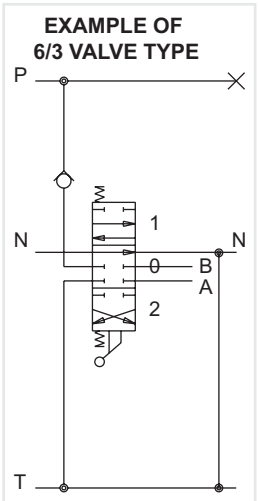
Nominal flow meaning: flow causing 1 bar (*14.5 psi*) pressure drop each section, with spools in neutral position

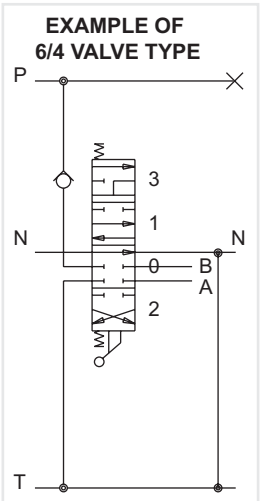
WORKING CONDITIONS

Hydraulic fluid		mineral oil according to DIN 51524	
Viscosity			
	viscosity range	10...400 mm^2/sec	(*0.15...7.13 sq.in./sec*)
	optimal viscosity	12...75 mm^2/sec	(*0.19...1.16 sq.in./sec*)
Temperature			
	fluid range temperature	-20...85 °C	(*-4...185 °F*) NBR seals
	suggested range	30...60 °C	(*86...140 °F*) NBR seals
Maximum contamination level		NAS 1683: class 9	ISO 4406: 19/16
Room temperature		-30...60 °C	(-22...140 °F)
Working limits		see diagrams at page 6	
Pressure drop		see diagrams at page 7	
For operation with fire resistant fluid, please contact our sales department			

OPERATING PRINCIPLE

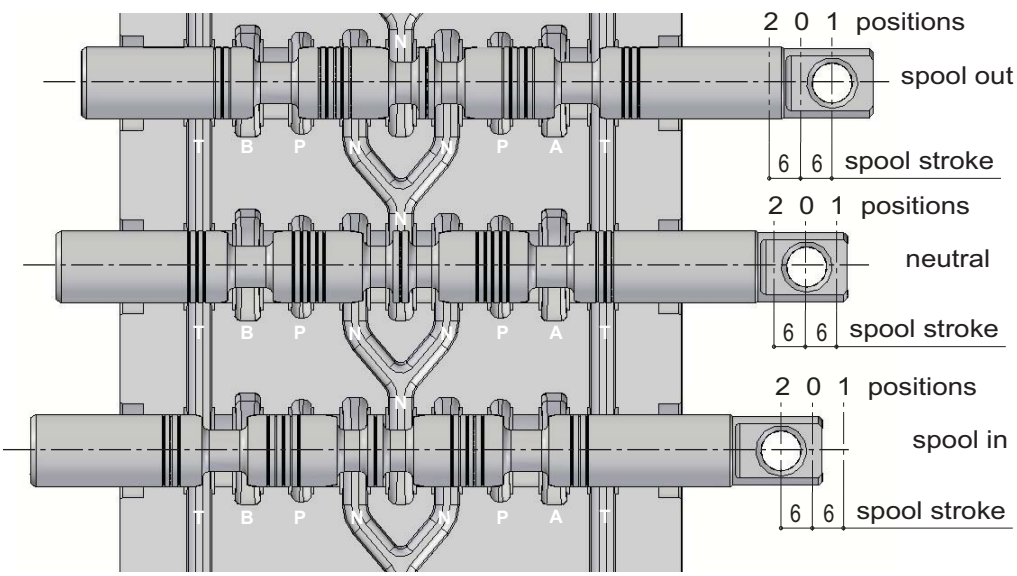






The picture show the P working module with the paths N - P - A - B - T.

Salami directional control valves belong to the 6/3 (or 6/4) type; they can control 6 gallery in 3 (or 4) spool positions simultaneously.
They are open circuit types: when the spool is in neutral position, the fluid flows directly to the tank with minimum internal pressure drops (approximatively 1 bar / 14.5 psi for each spool at nominal flow).
When the spool is moved from this position, the neutral gallery is gradually throttled and the connection between pump and actuator, through the corresponding port, is made.
When pressure exceeds the value of the pressure existing in port A or B, the fluid flows through the load check valve to the actuator.



IMPORTANT
Looking at this side of the spool, we usually say: spool in when the spool is pushed into the valve and spool out when it is pulled out of the valve.
Independing on assembling of the spool on "A" or "B" side

There are two characteristic phases in the spool stroke (6 mm - 0,236 in.):
a) the overlap phase (about 18% of the stroke) guarantees minimum internal leakages in neutral position;
b) the progressive flow regulation phase (82% of the stroke).
Both pictures show a 6/3 valve type with double acting spool only as principle of functioning.
Salami VDM6A is available in different solutions.

HYDRAULIC FLUIDS

Usually a mineral-base oil with a good viscosity index should be used, preferably with good lubricating properties and corrosion, oxidation and foaming resistant.
Sometimes the fluids supplied by the manufacturers do not satisfy purity requirements (see page 3 WORKING CONDITIONS). It is therefore necessary to filter the fluid carefully before filling. Your supplier can give you the information about NAS class of its fluids. To maintain the proper purity class, the use of filters of high dirt capacity with clogging indicator is recommended.
Under humidity conditions it is necessary to use hygroscopic salts.
For operation with fire resistant and ecological fluids, please contact our technical department.

INSTALLATION

When proceeding to mount the unit on the structure and to connect fittings to work ports, it is necessary to comply with the values of tightening torques.
The attachment of linkages to spools should not affect their operation. The mounting position can be vertical with inlet module on the top or horizontal.

Standard tightening torques - Nm / *lbft*

FITTING TYPE	P and PL ports	A and B ports	T and TL ports
BSP (ISO 228/1)	G 3/8	G 3/8	G 1/2
with o-ring seal	**30 / *22.1***	**30 / *22.1***	**50 / *36.9***
with copper washer	40 / *29.5*	40 / *29.5*	**60 / *44.2***
with steel washer	**40 / *29.5***	**40 / *29.5***	**60 / *44.2***
SAE	**SAE 8 (3/4-16 UNF)**	**SAE 8 (3/4-16 UNF)**	**SAE 10 (7/8-14 UNF)**
with o-ring seal	**30 / *22.1***	**30 / *22.1***	**60 / *44.2***

FILTRATION

The contamination of the fluid in the system greatly affects the life of the unit. Above all, contamination may result in irregular operation, wear of seals in valve housings and failures. Once the initial contamination level of the system has been reached, it is necessary to limit any increase of contamination installing an efficient filtration system (see working conditions page 3).

PIPES

Pipes should be as short as possible, without restrictions or sharp bends (especially the return lines). Before connecting pipes to the fittings of the corresponding components, make sure that they are free from burrs and other contamination.
As a first approximation, for a mobile machine with standard length pipes, their width should guarantee the following values of fluid speed*:

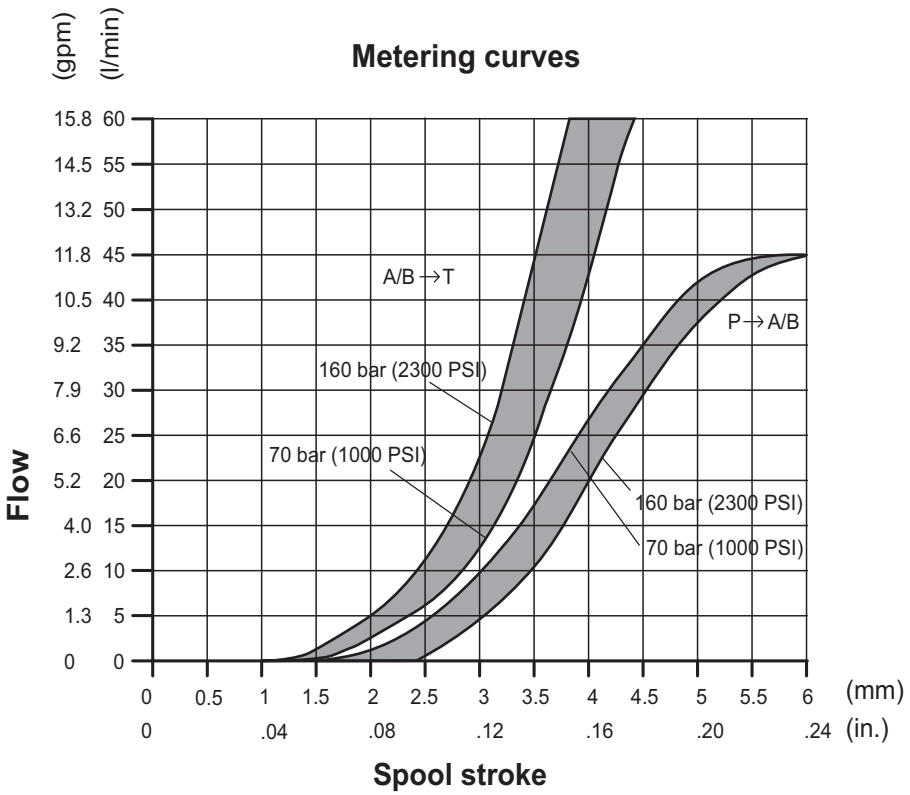
6 ÷ 10 m/sec	inlet pipe	19,7 ÷ 32,8 ft/sec	inlet pipe
3 ÷ 5 m/sec	outlet pipe	9,9 ÷ 16,4 ft/sec	outlet pipe

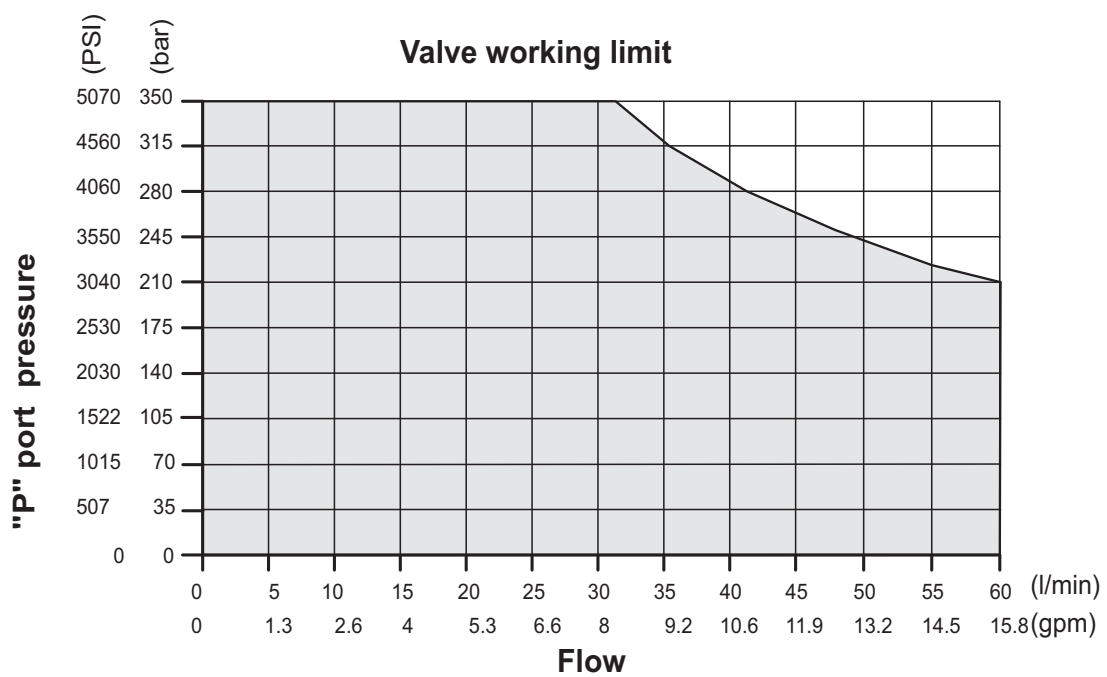
the lowest values of fluid speed are required in case of wide temperature range and/or for continuous duty.

* $[v = \frac{21{,}2 \times Q}{d^2}$ v = fluid speed [m/sec], Q = flow [l/min], d = pipe internal diameter [mm]

PERFORMANCE DATA

The characteristics in this catalogue are typical measured results.
During measuring a mineral based hydraulic oil with a viscosity of 16 cSt at a temperature of 50°C was used.
FOR FURTHER DETAILS PLEASE CONTACT OUR SALES DEPARTEMENT





The data of this diagram have been obtained with a force of:
stroke beginning 80 N - stroke end 105 N and standard leakage data.

PERFORMANCE DATA

The characteristics in this catalogue are typical measured results.
During measuring a mineral based hydraulic oil with a viscosity of 16 cSt at a temperature of 50°C was used.

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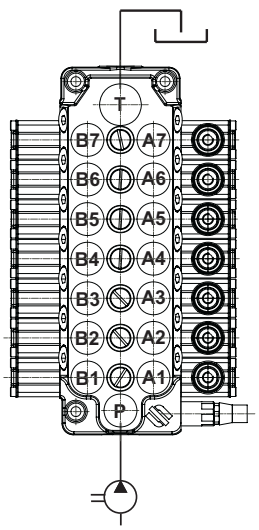
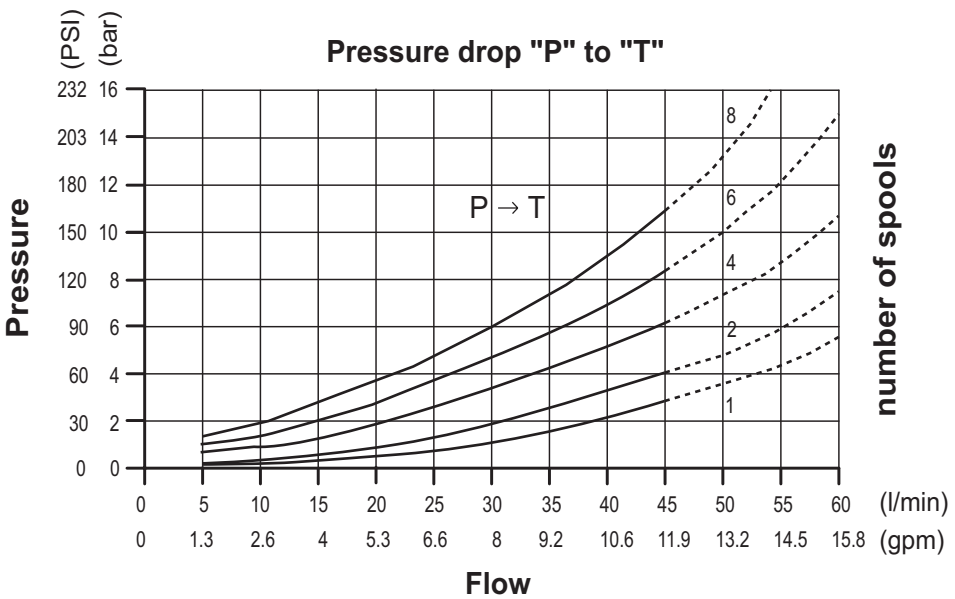
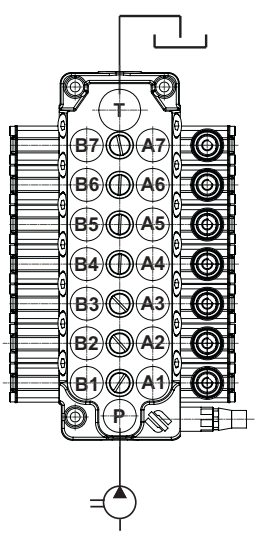
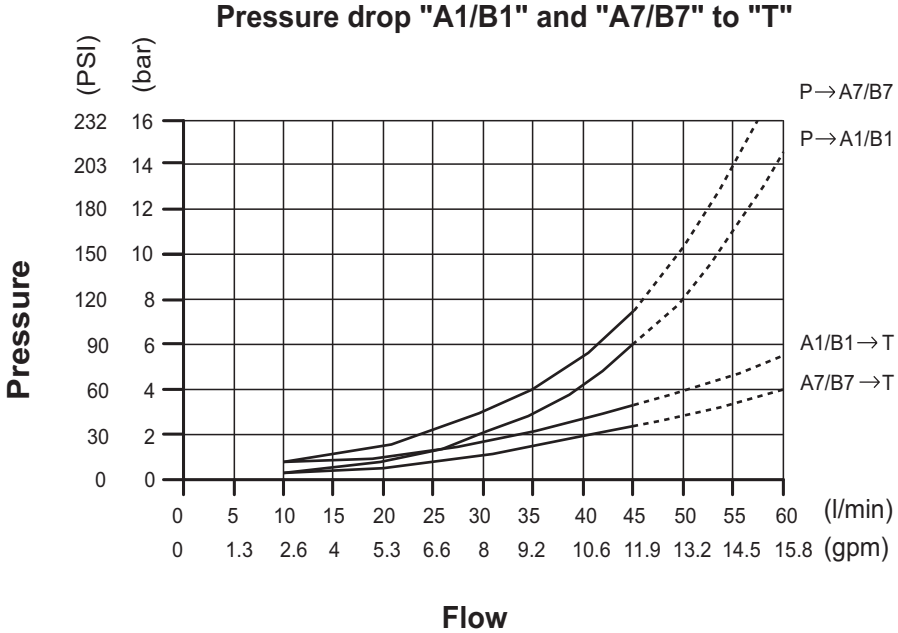






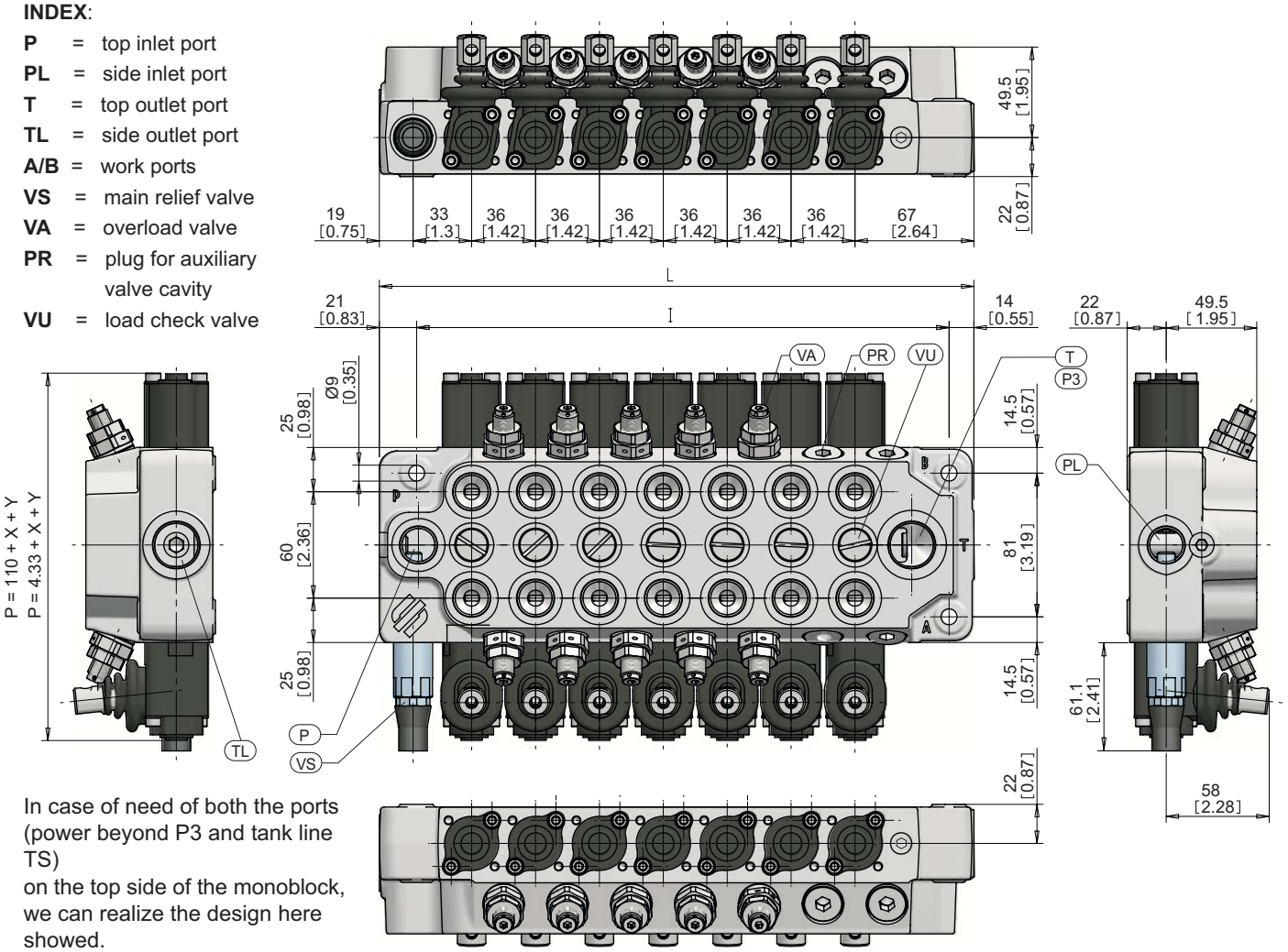


DIMENSIONS FROM 1 TO 7 SECTIONS MONOBLOCK

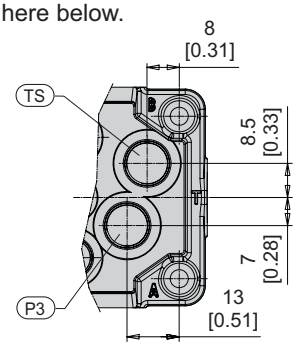
You can see the dimensions of all spool controls and spool positionings from page 36 to page 51.

INDEX:

P = top inlet port
PL = side inlet port
T = top outlet port
TL = side outlet port
A/B = work ports
VS = main relief valve
VA = overload valve
PR = plug for auxiliary valve cavity
VU = load check valve



In case of need of both the ports (power beyond P3 and tank line TS)
on the top side of the monoblock, we can realize the design here showed.
Available threads in accordance with the table here below.



The drawing shown is just an example.The overall dimensions you read are valid for all the VDM6A except the parametric dimensions "L" and "I" depending of the number of working sections.The parametric dimension "P" depends on a fixed dimension of 110 mm (4.33 in.) to wich you have to add the "X" and "Y" dimensions that you can find in the spool controls and spool positionings pages.

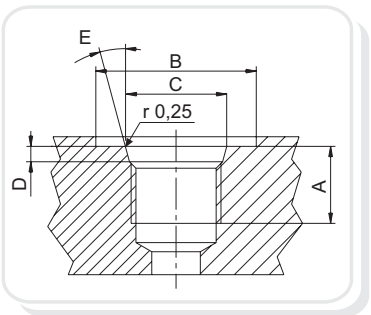
Spools		1	2	3	4	5	6	7
I	mm	84	120	156	192	228	264	300
	in	*3.31*	*4.72*	*6.14*	*7.56*	*8.98*	*10.39*	*11.81*
L	mm	119	155	191	227	263	299	335
	in	*4.68*	*6.10*	*7.52*	*8.94*	*10.35*	*11.77*	*13.19*

PORT SIZES	P - PL - P3 - TS	T - TL	A - B
BSP ISO 228	G 3/8	G 1/2	G 3/8
SAE ISO 176	SAE#8 3/4 - 16 UNF	SAE#10 7/8 - 14 UNF	SAE#8 3/4 - 16 UNF
ISO 262 - ISO 6149	M 18 x 1.5 ○	M 22 x 1.5	M 18 x 1.5
BSPF JIS B 2351	G 3/8	G 1/2	G 3/8

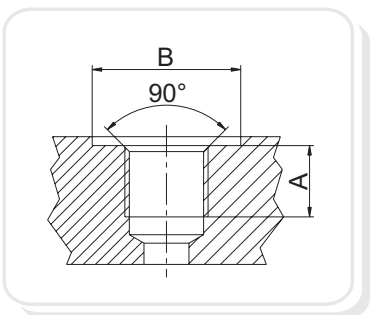
For smaller or bigger thread ports, please contact our sales department

PORTS

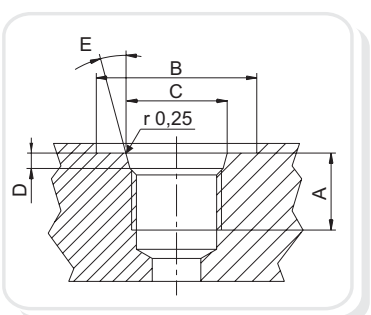
Following are standard ports. For different port types, please contact our sales department.



SAE UN-UNF (ISO 725)						
Dimensions		9/16 -18 UNF SAE6		3/4 - 16 UNF SAE8		7/8 - 14 UNF SAE10	
mm	In.						
A		13	0,51	15	0,59	17	0,67
B		25	0.83	30	1,18	34	1,34
C		15.6	0.61	20.6	0.81	23.9	0.94
D		2,5	0,10	2.5	0.10	2.5	0.10
E		15°		15°		15°	

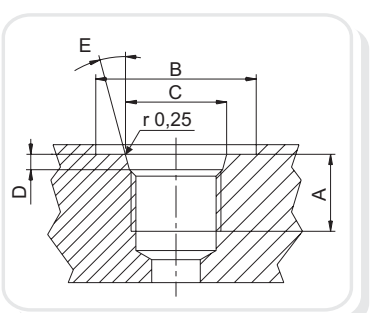


BSP (ISO 228)						
Dimensions		G1/4		G3/8		G1/2	
mm	In.						
A		14	0,55	14	0,55	16	0,63
B		19	1,75	23	1,91	27	1,06



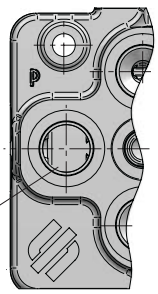
METRIC (ISO 262 - ISO 6149)*								
Dimensions		M18 x 1.5				M22 x 1.5			
mm	In.	ISO 262		ISO 6149		ISO 262		ISO 6149	
A		14	0.55	14,5	0,57	16	0,63	16	0,63
B		27,5	1.08	29	1,14	31,5	1,24	34	1,34
C				19,8	0,78			23,8	0,94
D				2,4	0.09			2,4	0,09

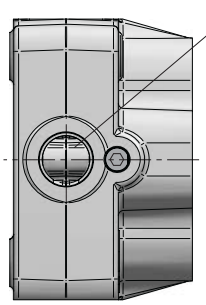
*Available for quantity, please contact our sales dept.

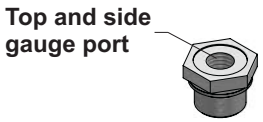


BSPF O-RING BOSS (JIS B 2351)						
Dimensions		G 1/4		G 3/8		G 1/2	
mm	In.						
A		12	0,47	12	0,47	16	0,63
B		24	0,94	28	1,10	34	1,34
C		15.6	0,61	18.6	0,73	22.6	0,89
D		2,5	0,10	2,5	0,10	2,5	0,10
E		15°		15°		15°	

INLET TYPES

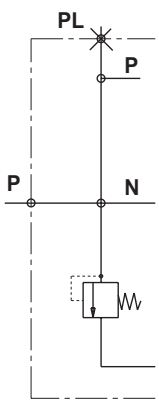




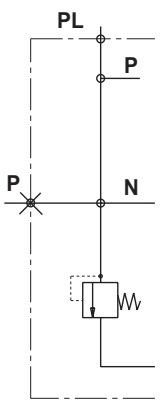


To obtain 21 and/or 22 commercial codes, we use a plug with the gauge port on the top,
Both in case of BSPP and SAE threads.

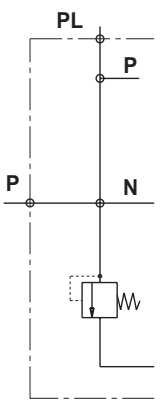
01 Top port side port plugged



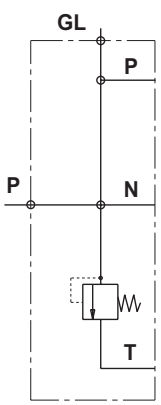
02 Side port top port plugged



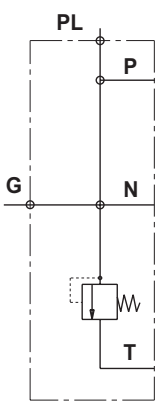
03 Top and side ports



21 Top inlet port with side gauge port



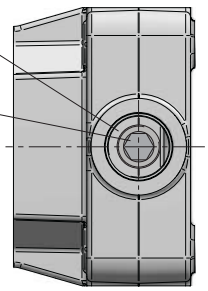
22 Side inlet port with top gauge port



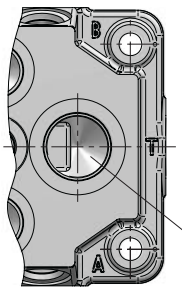
OUTLET TYPES

Side outlet port - TL

Dowel
1/4 - 18 NPTF



To obtain U5 and U7 configurations, starting from standard monoblock, it needs to insert a dowel 1/4 - 18 NPTF threaded to interrupt the N line.

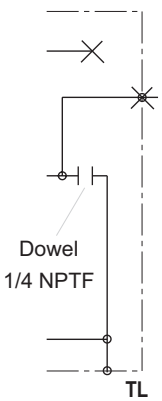


Top outlet port - T
Top power beyond port - P3

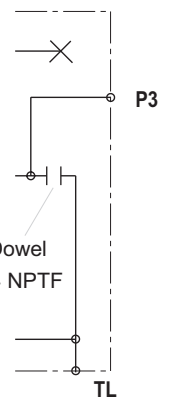
Outlet type necessary for electro-hydraulic controls, please go to page 24 to see the drawing and hydraulic scheme.

U8

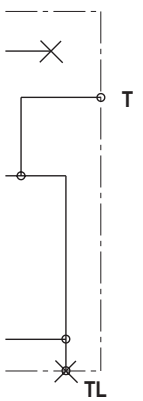
U7 Closed center configuration



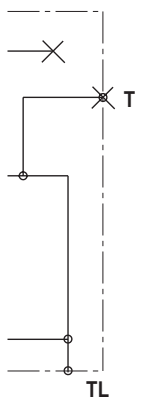
U5 Power beyond configuration (side P3)



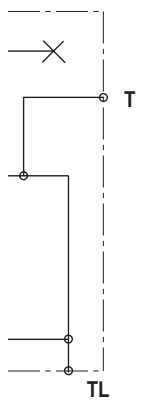
U4 Top port side port plugged



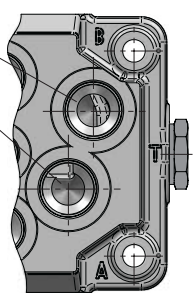
U3 Side port top port plugged



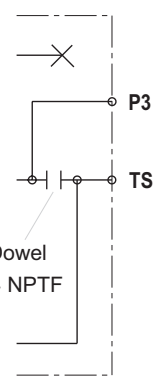
U2 Top and side ports



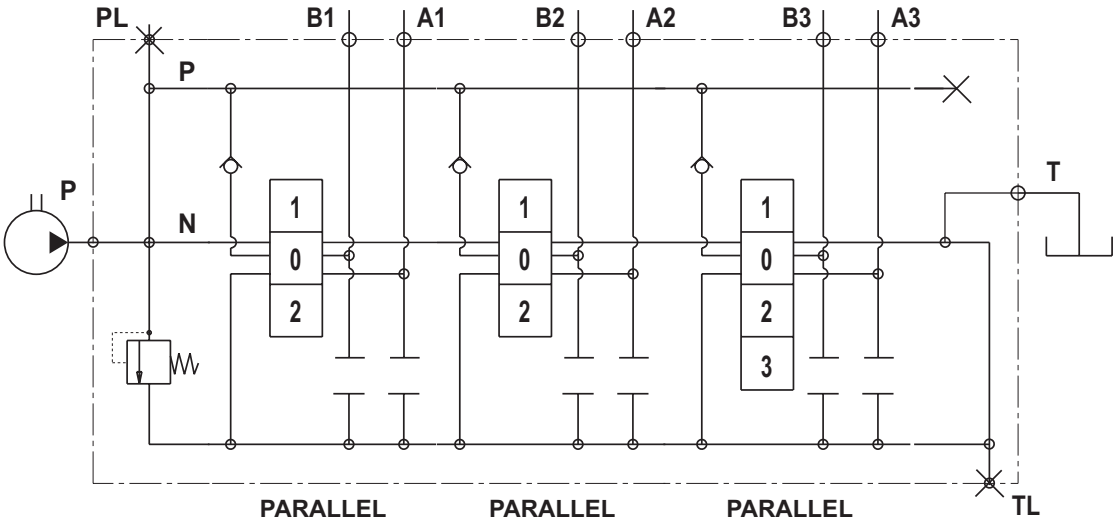
Top outlet port - TS
Top power beyond port - P3



U9 Power beyond configuration
Ports on the top side



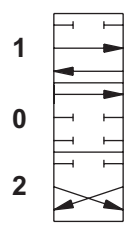
CIRCUIT AND SPOOL TYPES



SERIES AND TANDEM CIRCUIT, UNDER CONSTRUCTIONS

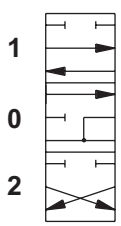
Available circuit parallel, as shown in the picture above. You can have main relief valve or venting valve in the inlet(see page xx), the working sections can have pre-arrangement for auxiliary valves.
The spools can be 3 or 4 positions (as sown here below) moreover VDM6A is available for power beyond just insert a plug 1/4" - 18 NPTF (see page xx).
As you can read at page 52, the spools can be types "A" nominal flow or "C" 2/3 of nominal flow.

01



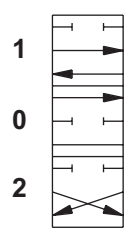
Double acting spool

Double acting motor spool



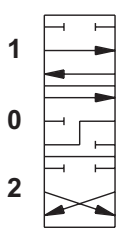
02

03



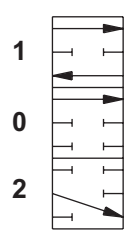
Double acting motor spool ("B" port blocked)

Double acting motor spool ("A" port blocked)



04

05

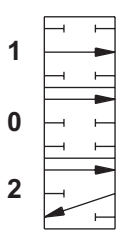


Single acting spool "A" working port

With this type of spool the stroke is 5 mm

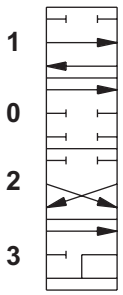
Single acting spool "B" working port

With this type of spool the stroke is 5 mm



06

11

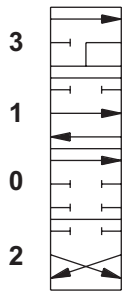


Double acting spool with float function in 3rd position (spool in)

With this type of spool a special machining of the body is required

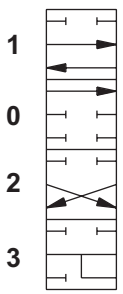
Double acting spool with float function in 3rd position (spool out)

With this type of spool a special machining of the body is required



12

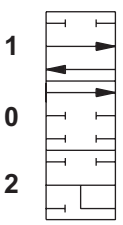
13



Double acting spool with regenerative function in 3rd position (spool in)

With this type of spool a special machining of the body is required

17

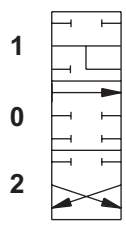


Double acting spool with regenerative function in position 2 (spool in)

With this type of spool a special machining of the body is required

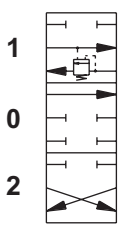
Double acting spool with regenerative function in position 1 (spool out)

With this type of spool a special machining of the body is required



18

52

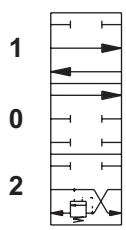


Over center double acting spool "A" working port

UNDER CONSTRUCTION

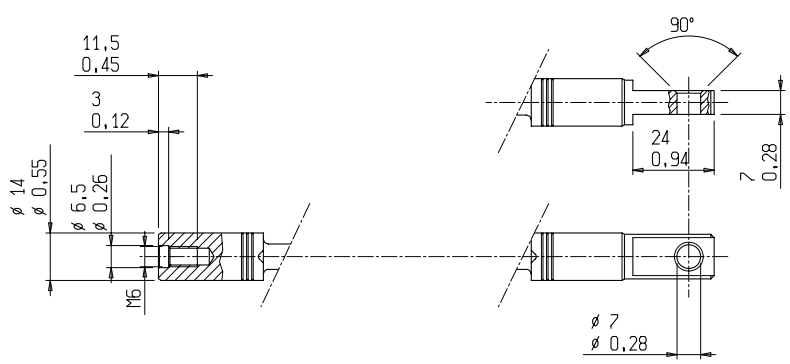
Over center double acting spool "B" working port

UNDER CONSTRUCTION

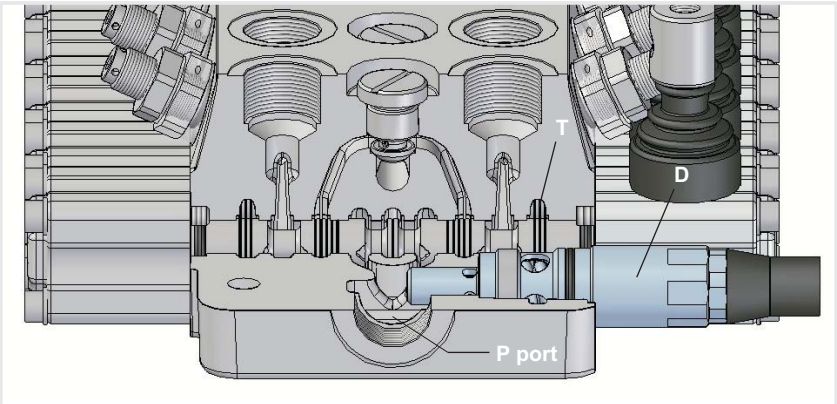


53

Salami standard spools have the ends as shown in this drawing. These ends spool are necessary to join it the controls and the positionings.With direct electric, hydraulic controls and in case of joystick control the ends spool are different as you can see at pages xx and xx.



MAIN RELIEF VALVE

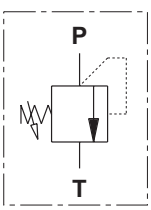


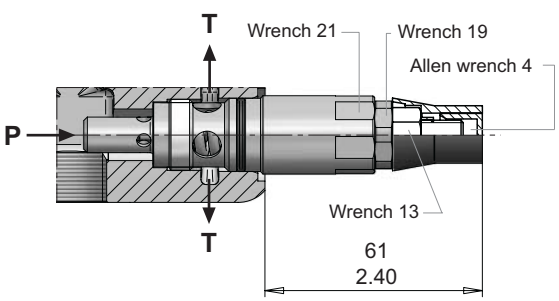
Max tightening torque:
wrench 10 - 18 Nm
wrench 13 - 24 Nm
wrench 22 - 35 Nm
wrench 24 - 30 Nm
wrench 26 - 30 Nm
wrench 27 - 30 Nm
Allen wrench 6 - 30 Nm
Allen wrench 8 - 30 Nm

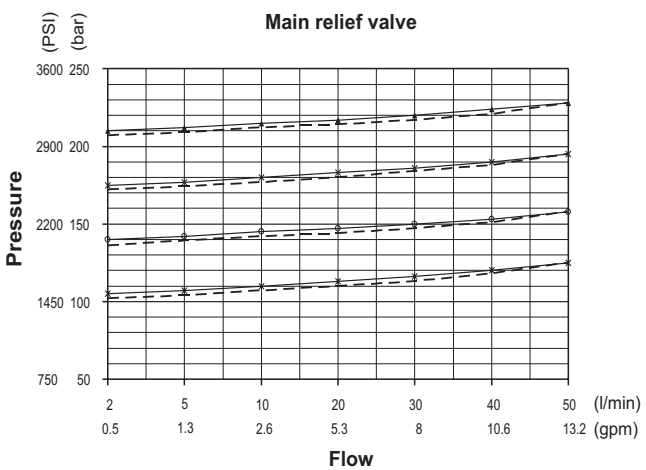
The main relief valve can be mounted only on "A" side, in case of venting valve this is at the opposite side of the main relief.All the testing values of this page have been obtained with nominal flow of 35 L/min - *9.25 gpm*, viscosity 16cST and oil temperature 50°C - *122°F.*

D

MAIN RELIEF VALVE DIRECT OPERATED
(setting range from 51 to 350 bar - *740 to 5100 psi*)



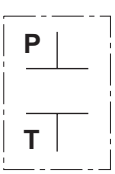


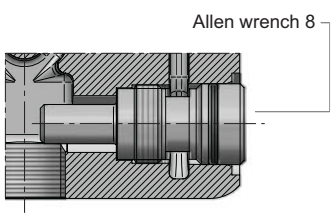


Wrench 21 - tightening torque 30 Nm - 22 lbf.ft
This valve is adjustable without oil leaking.

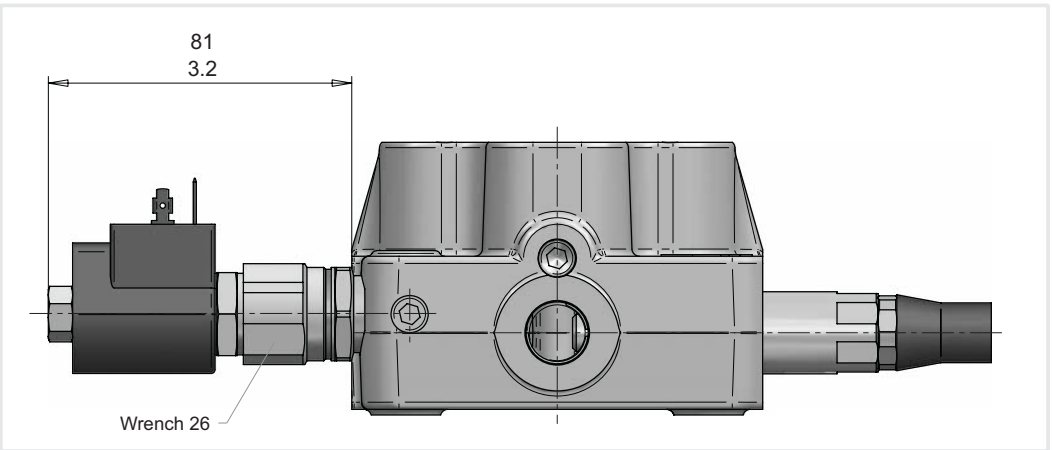
W

PLUG FOR MAIN RELIEF SEAT
WITHOUT VALVE





VENTING VALVES



EV1
12 Vdc - Normally opened
Without override

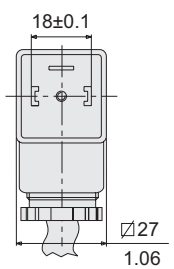
EV2
24 Vdc - Normally opened
Without override

EV3
12 Vdc - Normally closed
Without override

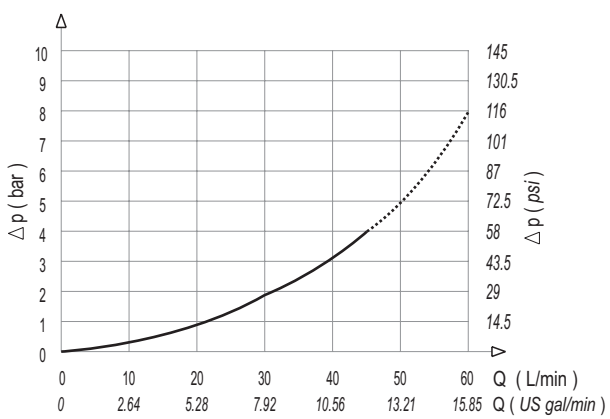
EV4
24 Vdc - Normally closed
Without override

This valve is located in a different cavity from main relief valve and at the opposite side or without main relief. For all the test conditions, please refer you to page 28.

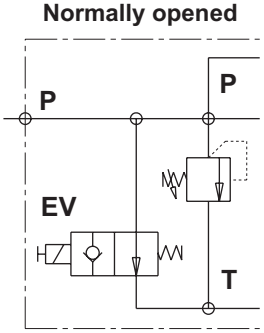
CONNECTOR
DIN 43650 - A/ISO 4400



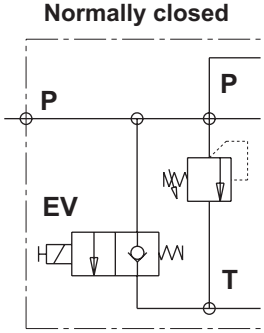
SPECIFICATIONS	
- MAX PRESSURE IN "P"	280 bar
- MAX FLOW	60 l/min
- OIL LEAKAGE-max pressure-32cST	131 cm^3/min
- VISCOSITY RANGE	3 to 647 cST
- FILTRATION	ISO 18/16/13
- AVAILABLE VOLTAGE	12 - 24 Vcc
- COIL POWER	20 W
- PROTECTION INDEX WITH STANDARD CONNECTOR	IP 65



Normally opened



Normally closed



ELECTRIC POWER BEYOND VALVE

EPB1

12 Vdc - Normally opened
Without override

EPB2

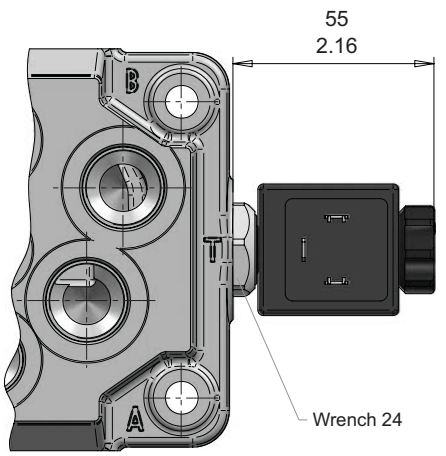
24 Vdc - Normally opened
Without override

EPB3

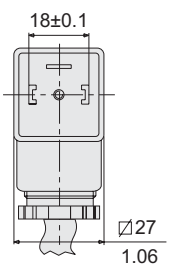
12 Vdc - Normally closed
Without override

EPB4

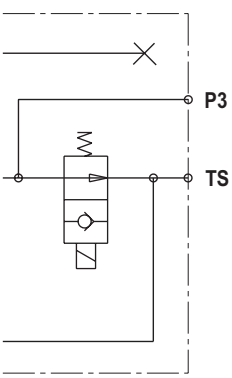
24 Vdc - Normally closed
Without override



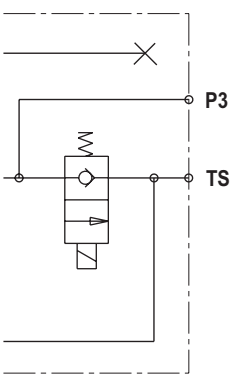
CONNECTOR
DIN 43650 - A/ISO 4400



Normally opened



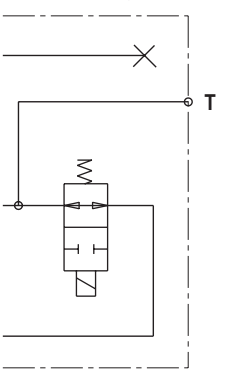
Normally closed



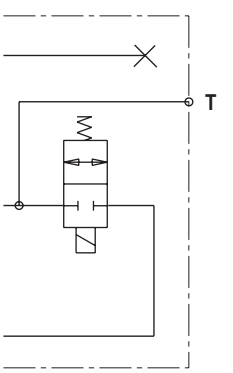
SPECIFICATIONS	
- MAX PRESSURE IN "P"	350 bar
- MAX FLOW	40 l/min
- OIL LEAKAGE-max pressure-46 cST	0.30 cm^3/min
- AVAILABLE VOLTAGE	12 - 24 Vcc
- COIL RESISTANCE	12Vdc:8.7Ω - 24Vdc:33Ω
- COIL POWER	17 W
- PROTECTION INDEX WITH STANDARD CONNECTOR	IP 65

ELECTRICAL SAFETY DEVICE

Normal working circuit

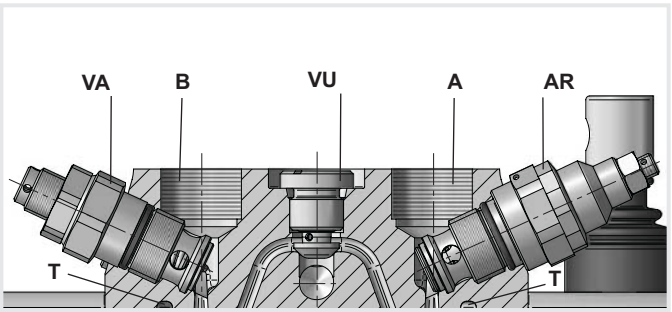


Lowering blocked off



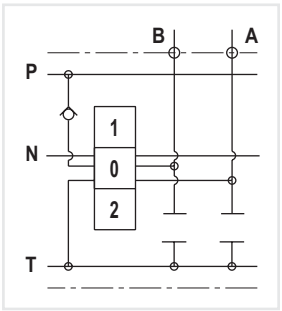
Expecially tought for forklift truck:
in order to preserve the truck safety, we can close the download line coming from the working ports.With this solution we can avoid accidental movement of the forks, especially when they are kept lifted.

AUXILIARY VALVES



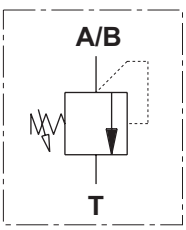
This picture shows the position of the auxiliary valves. For the tightening torque please see page 24.

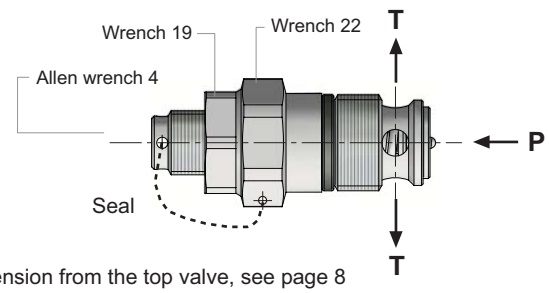
The load check valve VU is built in every working section between ports and you need not to specify it in phase of ordering because it is part of the module.



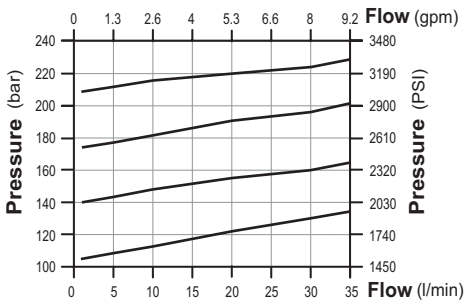
VA

OVERLOAD VALVE
(setting range from 50 to 275 bar - *725 to 4000 psi*)



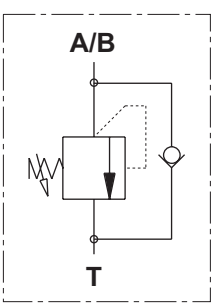


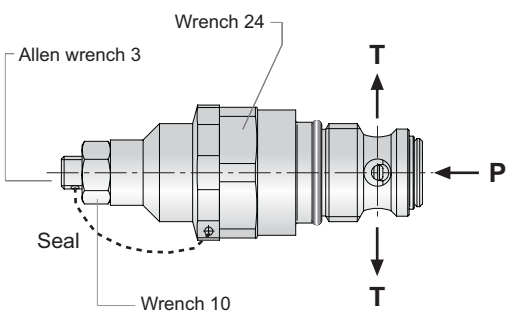
Dimension from the top valve, see page 8

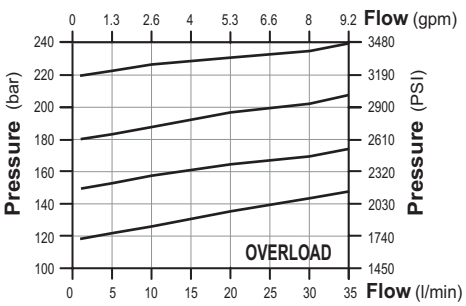


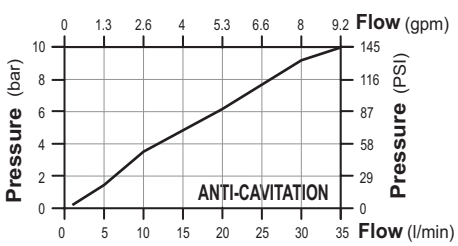
AR

OVERLOAD AND ANTI-CAVITATION VALVE
(setting range from 50 to 350 bar - *725 to 5075 psi*)





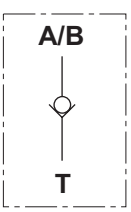


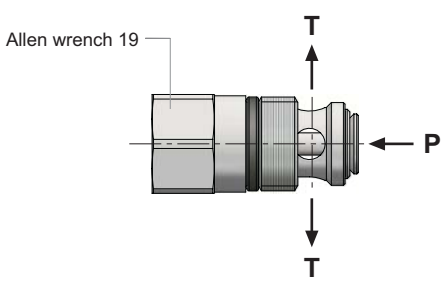


Both valves VA and AR are adjustable without oil leaking.
Further more, both have a security device to avoid valve sticking
Dimensions from the top valve, see page 8

VR

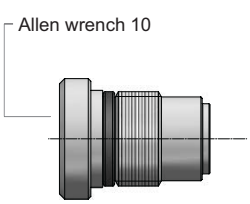
ANTI-CAVITATION VALVE

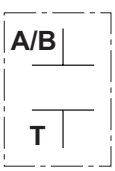




PR

PLUG FOR CAVITY



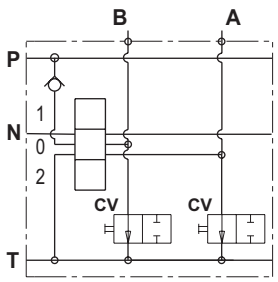


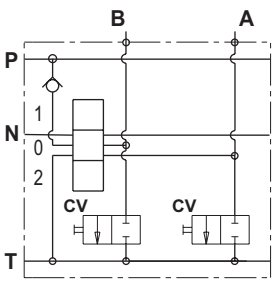
AUXILIARY VALVES

CV

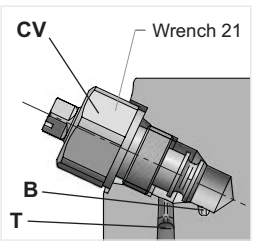
CONVERSION VALVE

The conversion valve **CV** allows to obtain single acting function starting from double acting spool just connecting the port to tank.For example starting from a double acting spool to obtain a single acting "**A**" port function, we must open the **CV** valve sending "**B**" port to tank line.

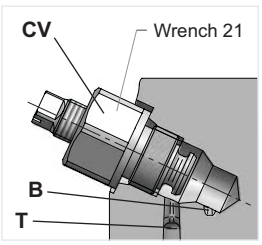




CLOSED



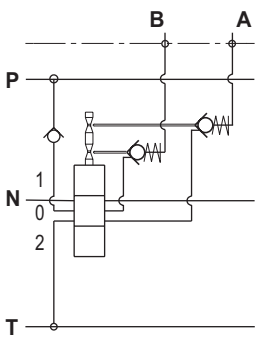
OPENED

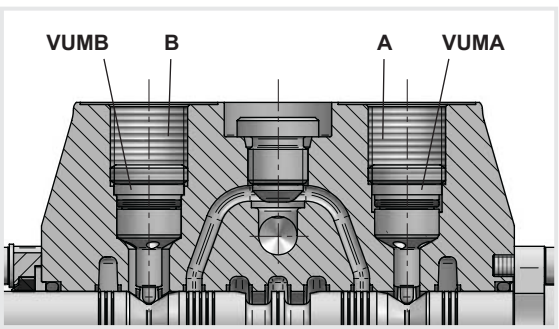


VUM

LOAD CHECK VALVE MECHANICAL OPERATED

This working section is built with a special machining on the working port/ports to insert a load check valve piloted with a mechanical device into "**A**" and/or "**B**" port.When the spool is moved, a cam is pushed up by a tapered profile causing the starting opening of **VUM**. This type of circuit is created for customers which need to control the load in position when the spool returns in position 0.Moreover the mechanical device to pilot the **VUM** guarantees a very good metering.
In this working section you can't have other auxiliary valves.



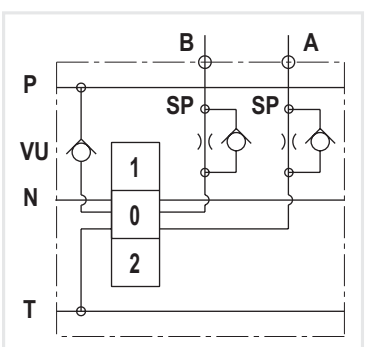


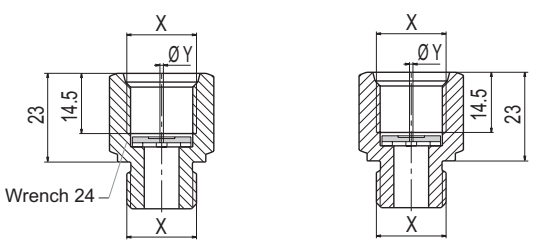
Pay attention:

to insert these valves you need of a special machined monoblock.

SP

Flow restrictor P ⟶ A/B



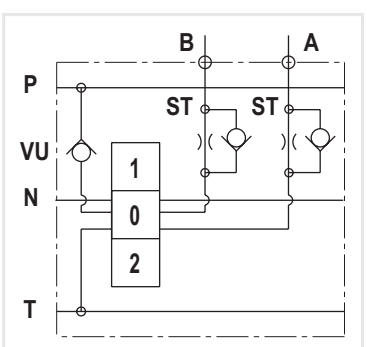


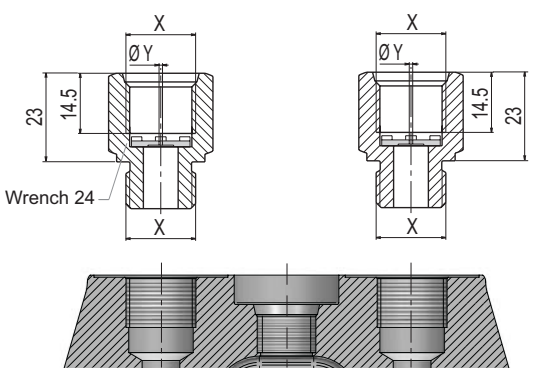
X available threads			ϕ Y available measures		
*M18 x 1.5	SAE 8	G 3/8	ϕ 1.10	ϕ 1.25	ϕ 1.50

*Available for quantity, please contact our sales dept.

ST

Flow restrictor A/B ⟶ T





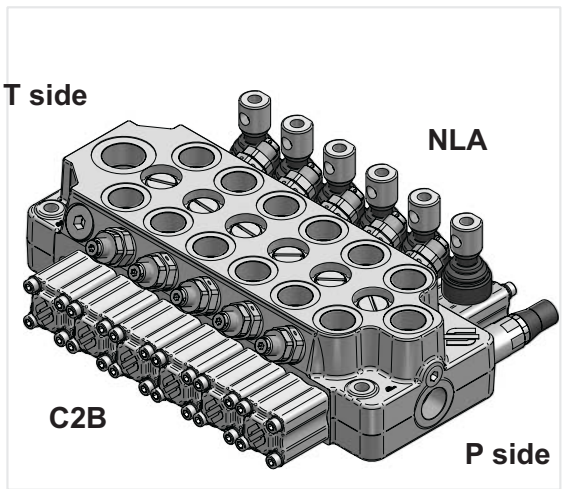
For tightening torque, please refer you to page 5.

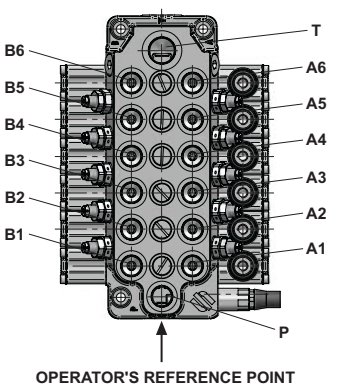
SPOOL CONTROLS AND SPOOL POSITIONINGS

This picture shows the VDM6A assembled, in this case you have a manual control "NL" on A side and a spring return in neutral position "C2" on B port side.In this case the manual control "NL" is used directly to have the spool movement, in other case, for example with electro-hydraulic control, there is only a safety lever. Considering that VDM6A is a simmetrical valve, all spool controls and positionings can be placed on both sides A or B.In case of hydraulick kick-out or in case of spools types 13 - 17 - 18, you can also decide A or B port side but after that this is the final position because with this type of control and spools the working module have a special machining.

In this and following pages you can find all spool controls and spool positionings, they are all assembled with socket hexagon head screw or in some case hexagon head screw:
M5 x 0.8 with tightening torque of 4.5 ± 0.5 Nm.

The drw. here below show the reference to fix A and B side from the point of view of the operator.

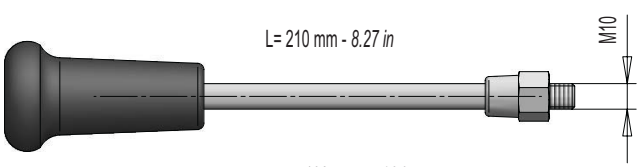




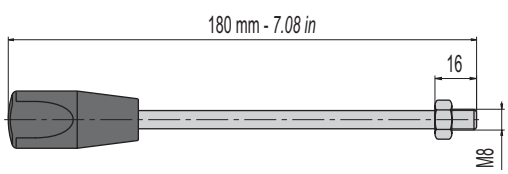
STANDARD SHAFTS

For different diameter and/or length, please get in touch with our sales dept.

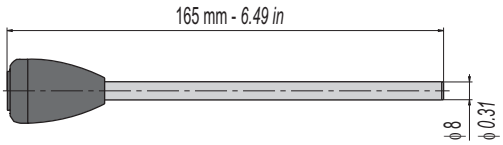
Shaft with ergonomic knob
for cross lever L1/L2
R202 8996 0



Shaft with threaded end
R202 9018 0



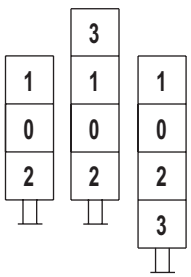
Shaft for clamp lever
R202 8839 0

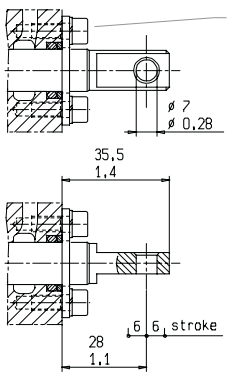


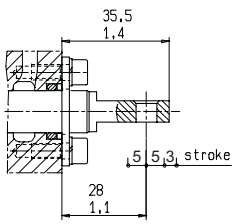
SPOOL CONTROLS

SL

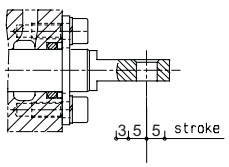
Without lever box







For spool with float position commercial code **12**

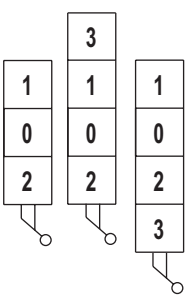


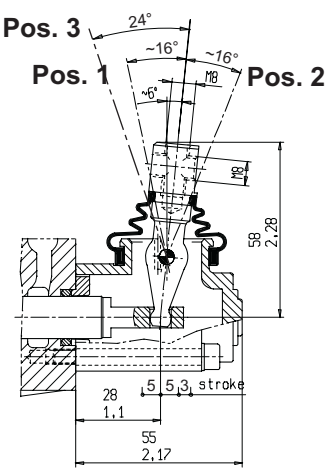
For spool with float position commercial code **11**

On request available with dust proof plate

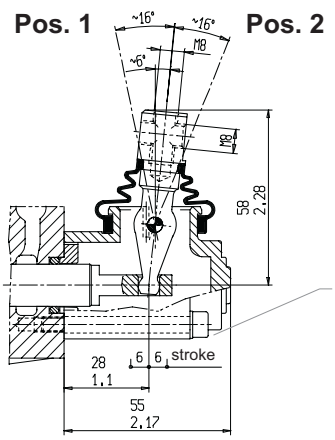
NL

Standard protected lever

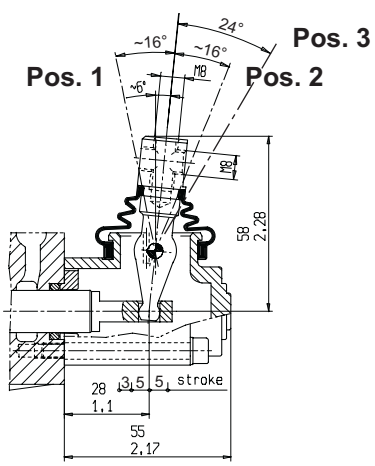




For spool with float position commercial code **12**



This lever can be assembled turned of 180°

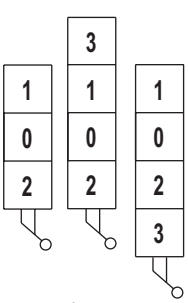


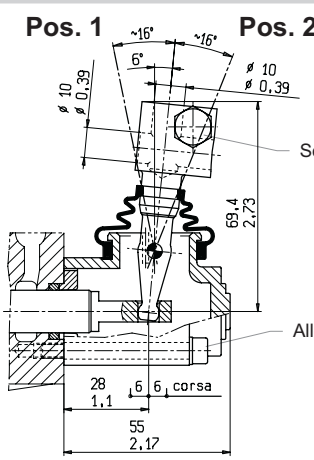
For spool with float position commercial code **11**

MP

On request available for spools with float position: commercial codes 11 and 12 as shown in the drawing above

Protected clamp lever

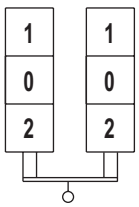


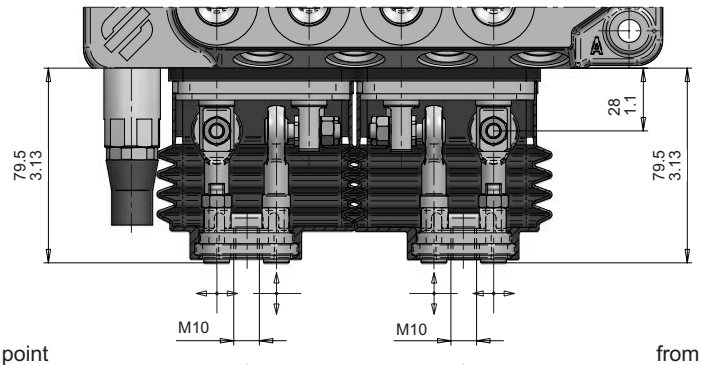


This lever can be assembled turned of 180°

L2

Cross lever for 2 spools
fulcrum on down-stream spool

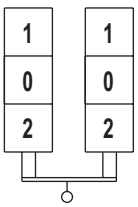




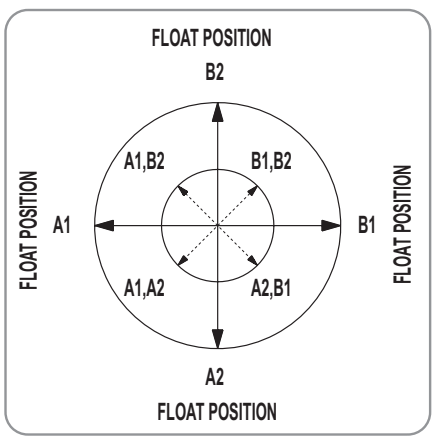
OPERATOR'S REFERENCE POINT

L1

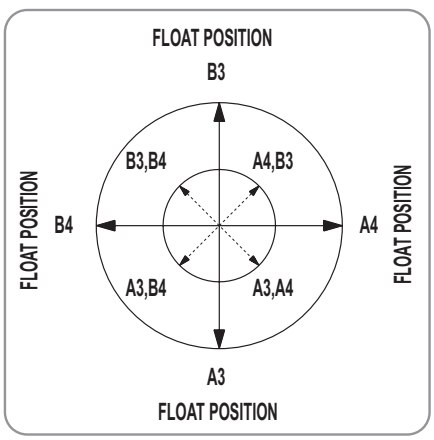
Cross lever for 2 spools
fulcrum on up-stream spool



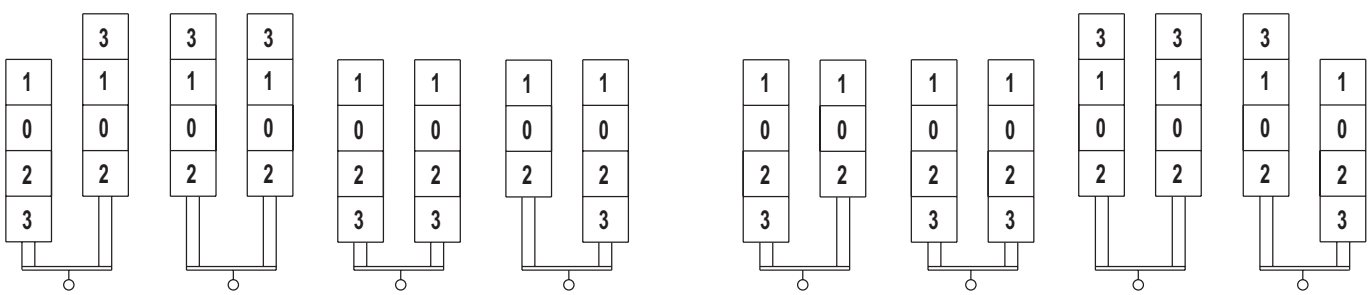
Standard movements
from the operator's reference point



Standard movements
from the operator's reference point



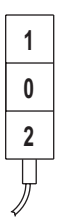
With both L1 and L2 cross levers you can do the 1 and 2 standard working positions, but you can do also the third working position.
Below some of the movement options you can have.

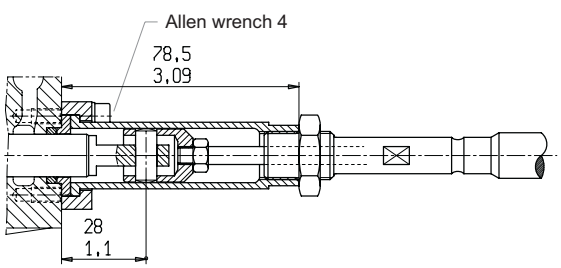


TC

Devices for cable remote control.For more details about cables, please consult our catalogue cable remote controls.

End spool with hole ϕ 7 mm.Control side.





Also for spool with (float-in) and (float-out) positions commercial codes **11 - 12**

E7

Working conditions for this control:
Flows up to 30 l/min (8 *gpm*)
Pressure up to 190bar (2750*si*)

Electric push-pull control 3 positions
12 Vdc (coil power 31Watt at 20°C)

E8

Working conditions for this control:
Flows up to 30l/min (18*gpm*)
Pressure up to 2190ar (302750*i*)

Electric push-pull control 3 positions
24 Vdc (coil power 31 Watt at 20°C)

E9

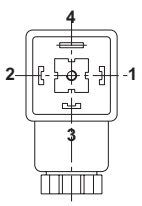
Working conditions for this control:
Flows up to 40 l/min (10.6 *gpm*)
Pressure up to 210 bar (3050 *psi*)

Electric push-pull control 3 positions
12 Vdc (coil power 45 Watt at 20°C)

E10

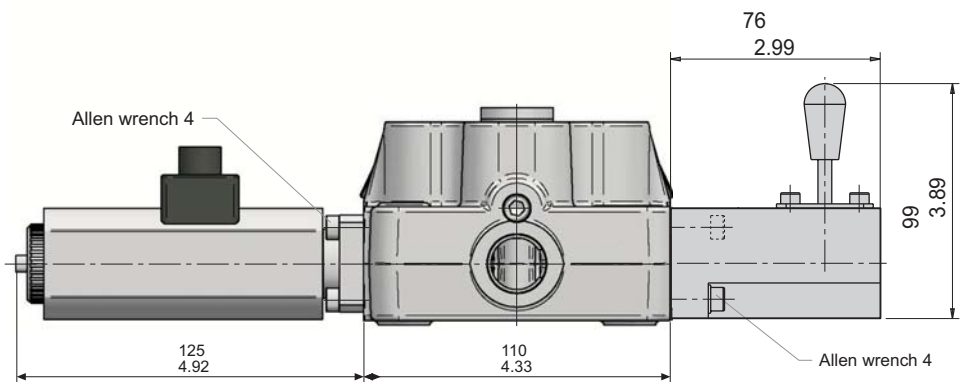
Working conditions for this control:
Flows up to 40 l/min (10.6 *gpm*)
Pressure up to 210 bar (3050 *psi*)

Electric push-pull control 3 positions
24 Vdc (coil power 45 Watt at 20°C)



CONNECTOR
DIN 43650 - A/ISO 4400

To avoid an excessive wearing of the contacts, depending on the sparking of these parts, we suggest a suitable protection(for example diodes)



E11

Working conditions for this control:
Flows up to 50 l/min (13.2 *gpm*)
Pressure up to 210 bar (3050 *psi*)

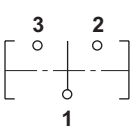
Electric push-pull control 3 positions
12 Vdc (coil power 60 Watt at 20°C)

E12

Working conditions for this control:
Flows up to 50 l/min (13.2 *gpm*)
Pressure up to 210 bar (3050 *psi*)

Electric push-pull control 3 positions
24 Vdc (coil power 60 Watt at 20°C)

ELECTRIC CONNECTIONS SCHEME



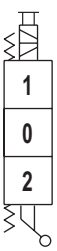
1) NEGATIVE POLE
2) SPOOL IN
3) SPOOL OUT
4) GROUND WIRE

ELECTRIC DATA
- COIL POWER: 31 Watt at 20°C
- HEAVY DUTY 100%
- COIL POWER: 60 Watt at 20°C
- HEAVY DUTY 60%
- COIL POWER: 45 Watt at 20°C
- HEAVY DUTY 80%
- PROTECTION INDEX WITH CONNECTOR: IP 65

The available spools are from 01 to 06.
The working data aside are referred to the working conditions of page 3.

ES

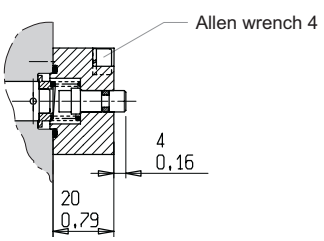
Emergency lever for electric push-pull control

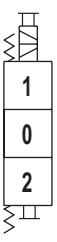


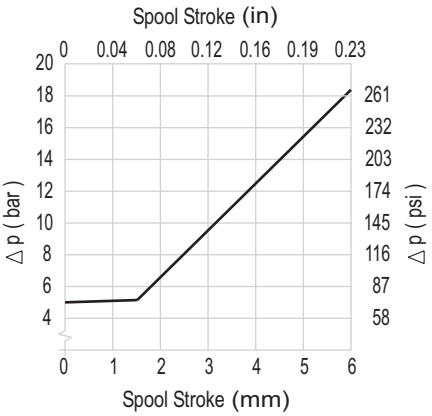
Important: this lever was realized as emergency lever and it'isnot recommended a continuos use.

SL

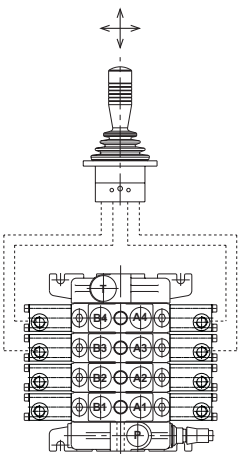
Without lever for electric push-pull control with override device







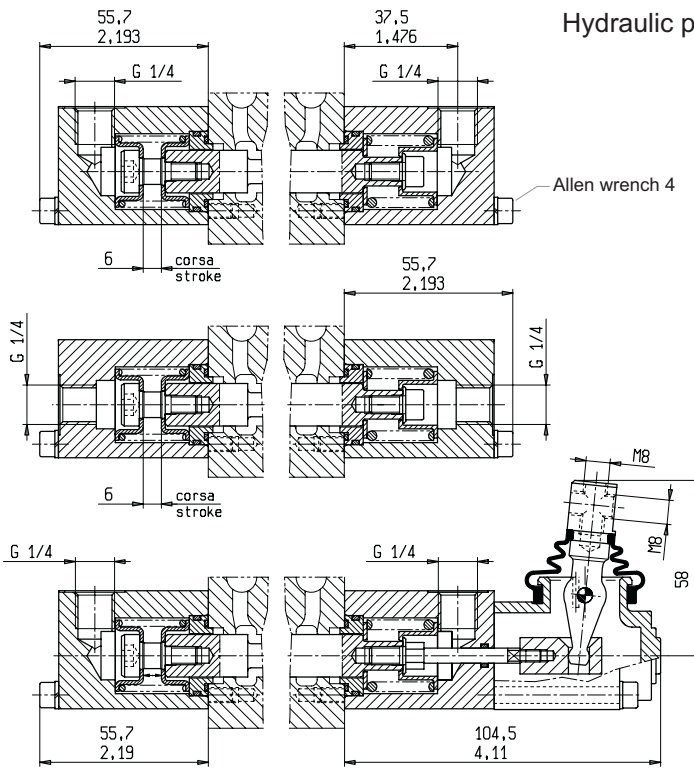
Salami hydraulic
2 axis joystick



Important:
when you order please specify top or side ports

IP

Hydraulic proportional control



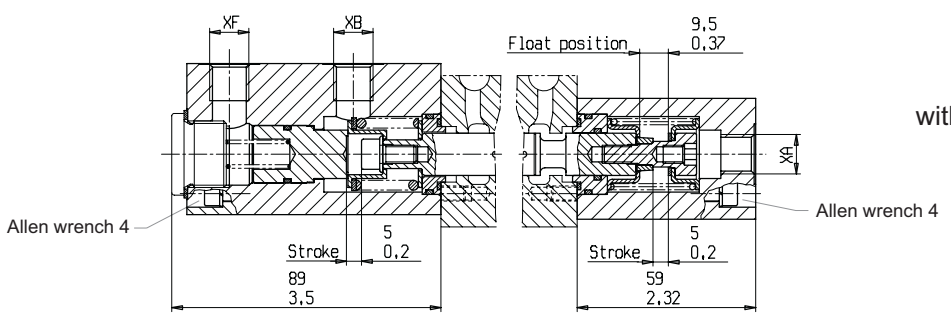
Hydraulic proportional control with emergency lever. Available for q.ty please get in touch with our sales dept.

For more information please consult our catalogue SHRC hydraulic remote controls.

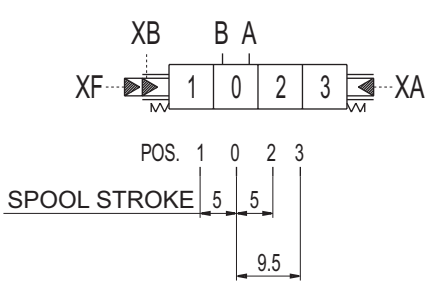
XA, XB, XF PORTS : G 1/4

IF

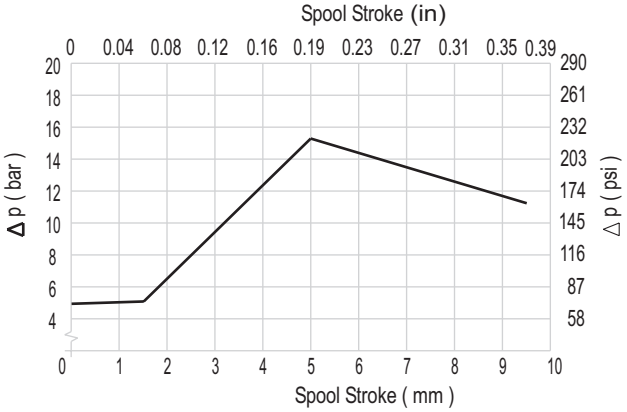
Hydraulic proportional control with third float position (spool in)



OPERATING SCHEME



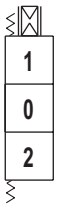
XA,XB,XF → T ⇨ POS. 0
Pressure → XB ⇨ POS. 1
Pressure → XA,XF ⇨ POS. 2
Pressure → XA ⇨ POS. 3

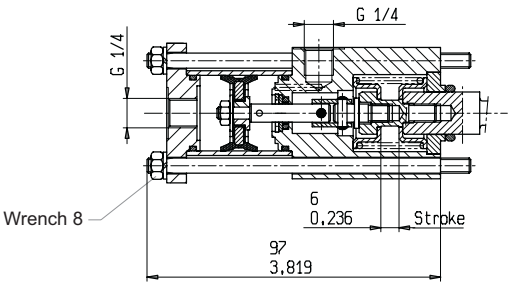


Thought for all truck hydraulic applications

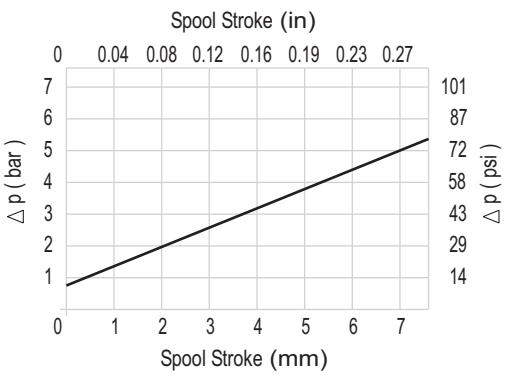
PP/P0

Pneumatic proportional/on-off control





Available also with ports threaded 1/8 NPT



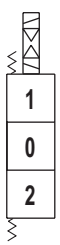
Pneumatic proportional/on-off control
This control is at the same time proportional and on-off type, it depends if you use a pneumatic remote control proportional type(with the characteristic curve of diagram), or on-off type.

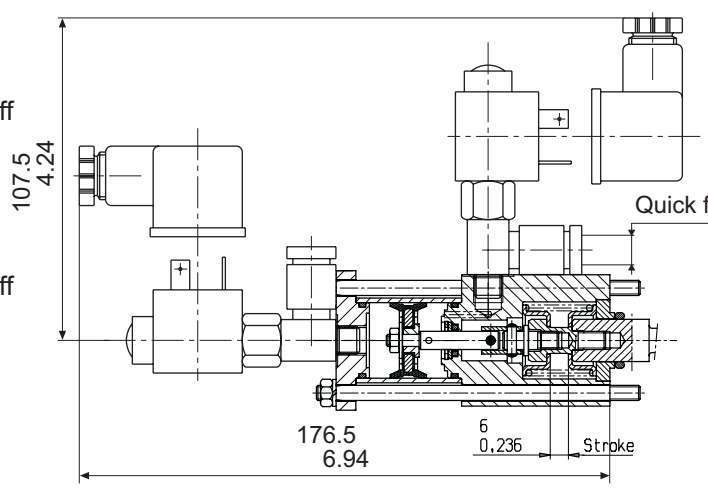
P1

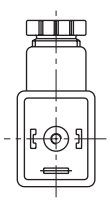
Electro-pneumatic on-off control - 12 Vdc

P2

Electro-pneumatic on-off control - 24 Vdc







CONNECTOR
DIN 43650 - A/ISO 4400

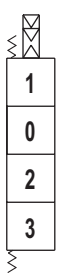
Starting from PP/PO adding the electro-valves you get P1 or P2

ELECTRICAL DATA

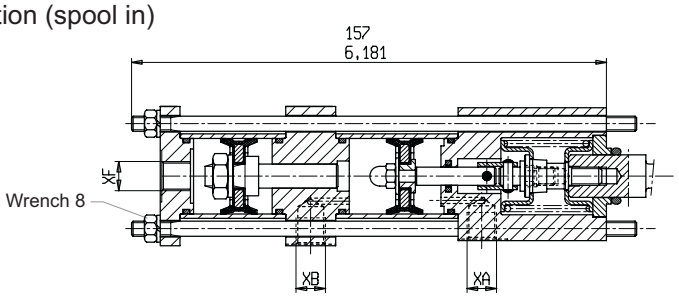
- VOLTAGE: 12Vdc OR 24Vdc
- COIL POWER: 6 Watt at 20°C
- PROTECTION INDEX WITH CONNECTOR: IP 65

PQ

Pneumatic on-off control with third float position (spool in)

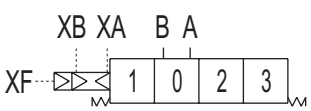


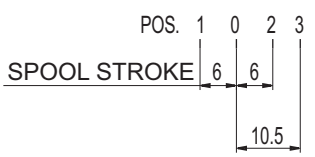
XA, XB, XF PORTS : G 1/4



For electro-pneumatic control with third float position, please get in touch with our sales dept.

OPERATING SCHEME



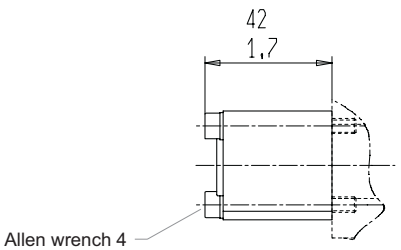


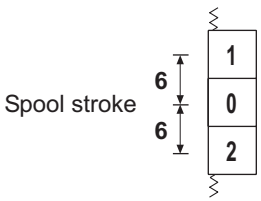
XA,XB,XF → T ⇨ POS. 0
Pressure → XB ⇨ POS. 1
Pressure → XA,XF ⇨ POS. 2
Pressure → XA ⇨ POS. 3

SPOOL POSITIONINGS

C2

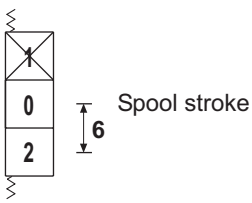
Spring centered to neutral position





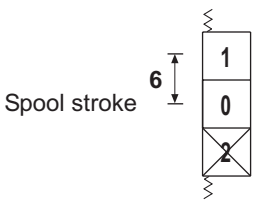
C5

Two positions (neutral/pos. 2)
with spring return in neutral



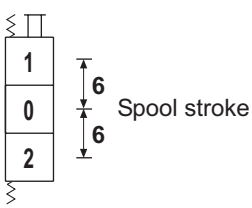
C6

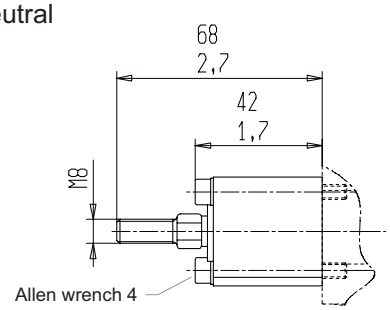
Two positions (neutral/pos. 1)
with spring return in neutral



C3

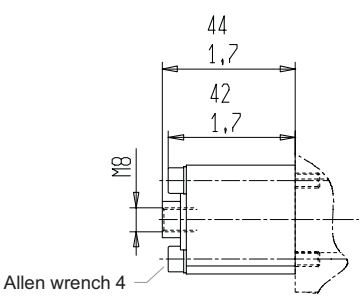
Spring centered to neutral
(pivot threaded male
for remote control)

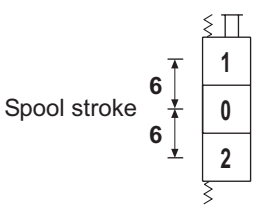




C4

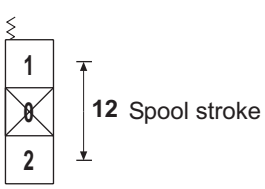
Spring centered to neutral
(pivot threaded female
for remote control)

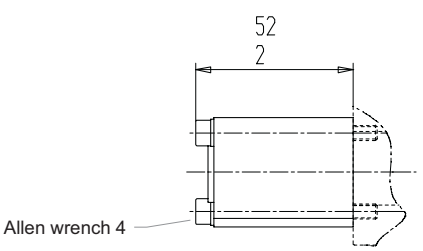




C7

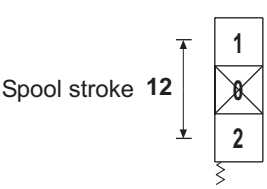
Two positions (pos. 1/pos. 2)
with spring return in pos. 1





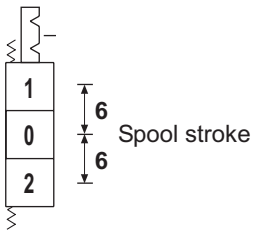
C8

Two positions (pos1/pos. 2)
with spring return in pos. 2



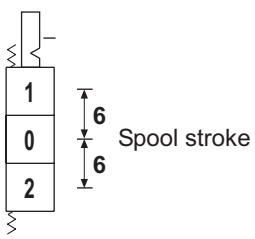
R2

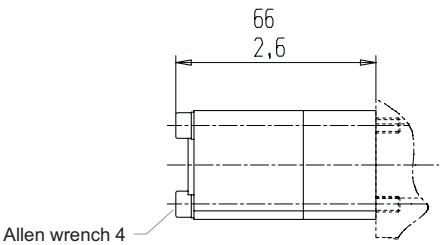
Detent on pos. 1/pos. 2
with spring return in neutral



R5

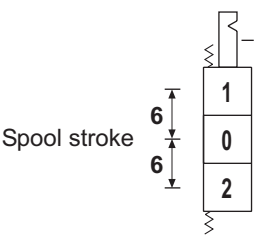
Detent on pos. 2
with spring return in neutral





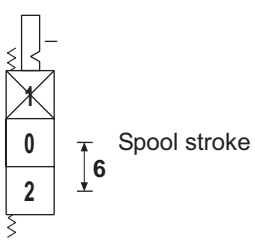
R4

Detent on pos. 1
with spring return in neutral



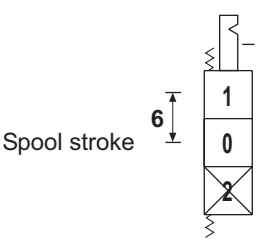
R6

Two positions with detent on pos. 2
with spring return in neutral



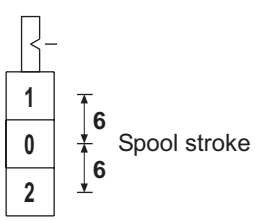
R7

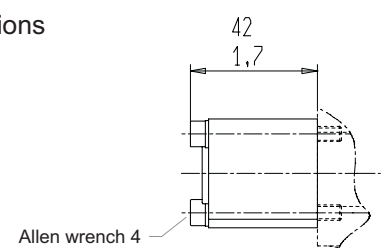
Two positions with detent on pos. 1
with spring return in neutral



CO

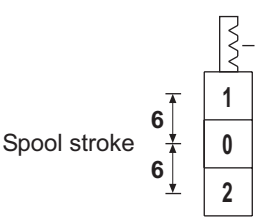
Detent on each intermediate positions





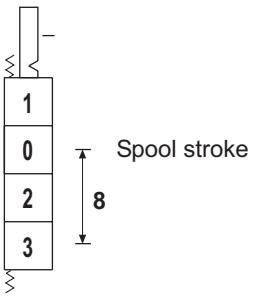
R9

Detent on pos. 1/pos. 2
and neutral position



F1

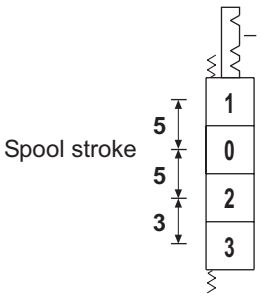
Detent on pos. 3
with spring return in neutral



F2

Detent on pos. 1/pos. 2/pos. 3
with spring return in neutral

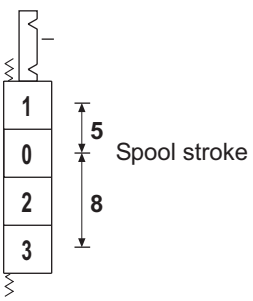
UNDER CONSTRUCTION



F3

UNDER CONSTRUCTION

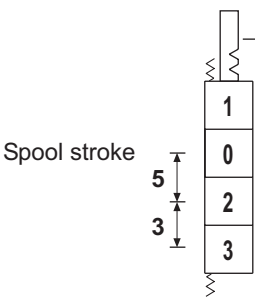
Detent on pos. 1/pos. 3
with spring return in neutral

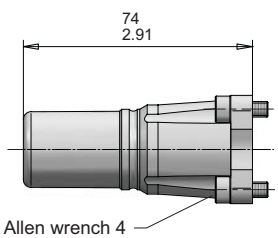


F4

UNDER CONSTRUCTION

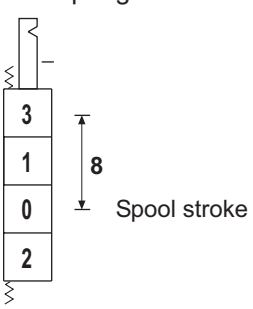
Detent on pos. 2/pos. 3
with spring return in neutral





F5

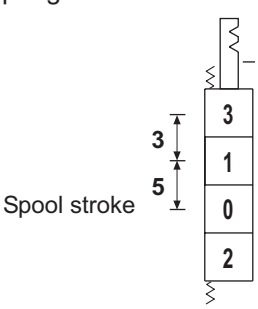
Detent on pos. 3
with spring return in neutral



F6

UNDER CONSTRUCTION

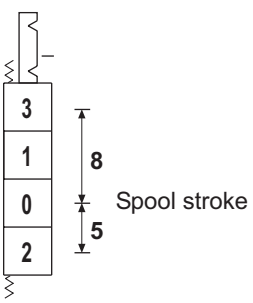
Detent on pos. 1/pos. 3
with spring return in neutral



F7

UNDER CONSTRUCTION

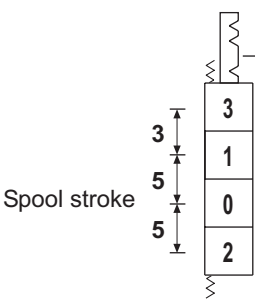
Detent on pos. 2/pos. 3
with spring return in neutral

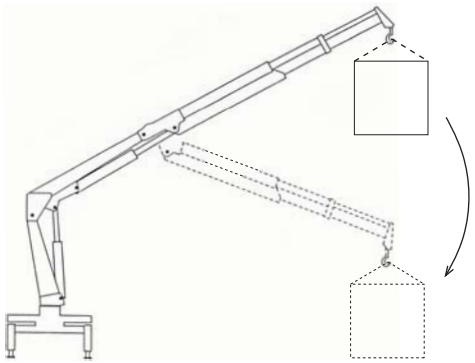


F8

UNDER CONSTRUCTION

Detent on pos. 1/pos. 2/pos. 3
with spring return in neutral

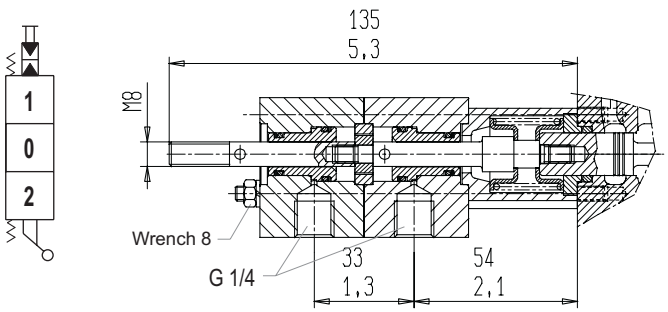




For manifacturers using load and overturning torque limiting device for hydraulically operated cranes, Salami VD6A valve is available with some devices that allow the manifacturer to supply a pressure signal inside itself.This pressure signal, acting on the area of a piston of 18 mm(0.71 inc.) diameter, reacts to the force of the manual control bringing back the spool at the position 0.
These devices are only available in combination with manual control.

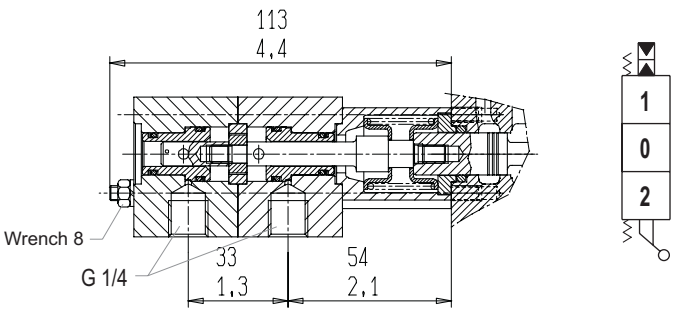
D9

Device for spool positioning in 0 from the positions 1 and 2 by an external pressure signal. For tie-rod connection.



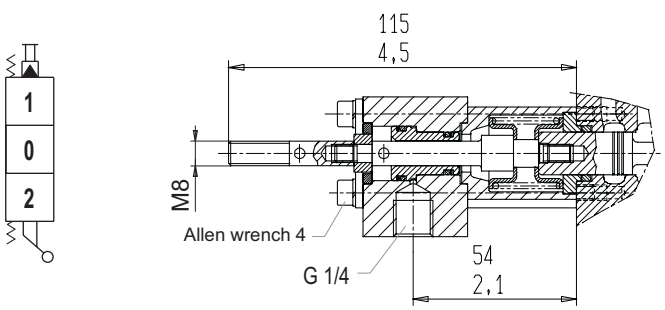
M3

Device for spool positioning in 0 from the positions 1 and 2 by an external pressure signal.



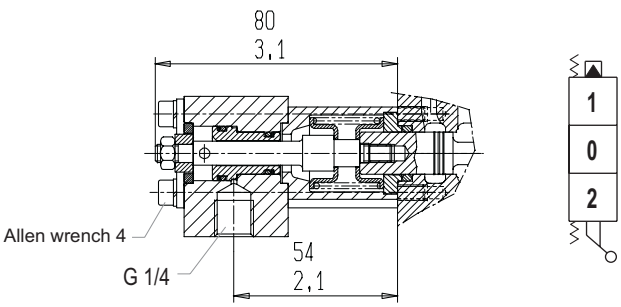
D8

Device for spool positioning in 0 from the position 1 by an external pressure signal. For tie-rod connection.



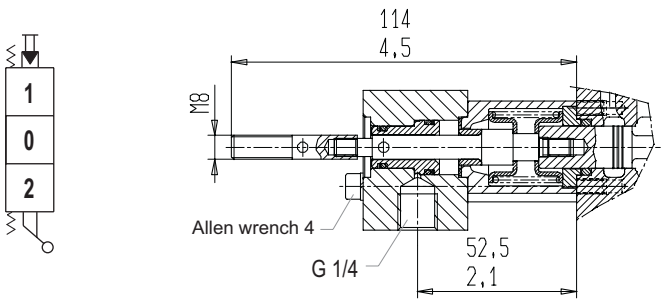
M1

Device for spool positioning in 0 from the position 1 by an external pressure signal.



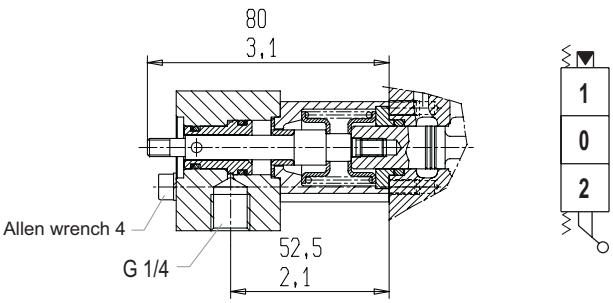
D7

Device for spool positioning in 0 from the position 2 by an external pressure signal. For tie-rod connection.



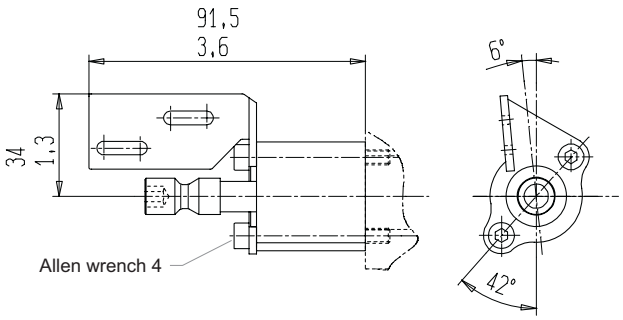
M2

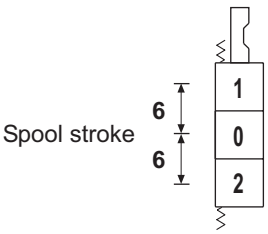
Device for spool positioning in 0 from the position 2 by an external pressure signal.



CE

Pre-arrangement for electrical device



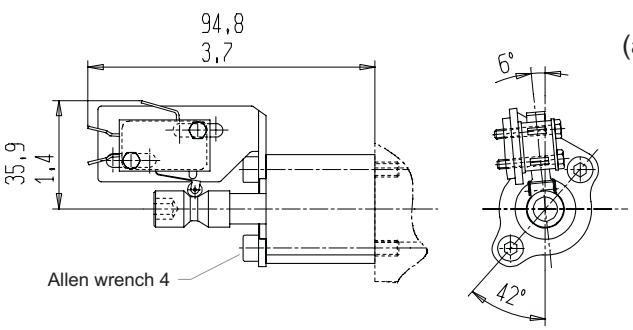


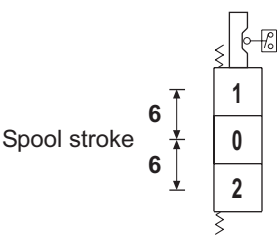
MICROSWITCH TYPE: SAIA - BURGESS XGK - 88
For more information please get in touch with our sales dept.

CM

Spool positioning with microswitch to start an electric motor (available also for single acting spools)

PROTECTION INDEX
IP65

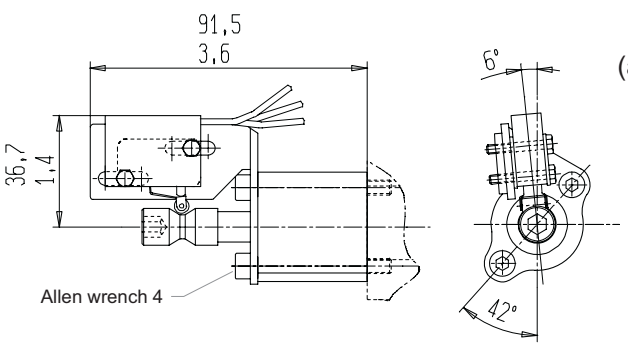


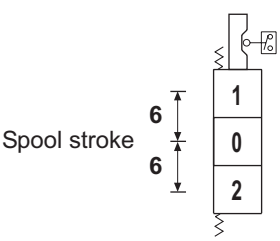


CW

Spool positioning with waterproof microswitch to start an electric motor (available also for single acting spools)

PROTECTION INDEX
IP67

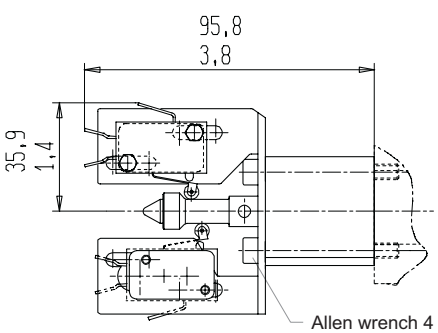


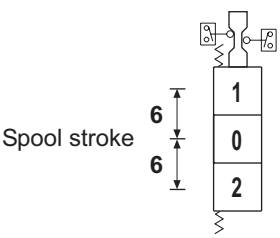


CD

Spool positioning with double microswitch (available also for single acting spools)

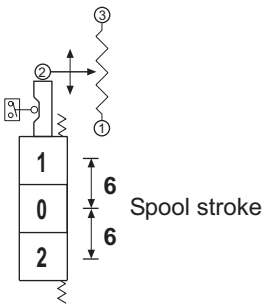
PROTECTION INDEX
IP65



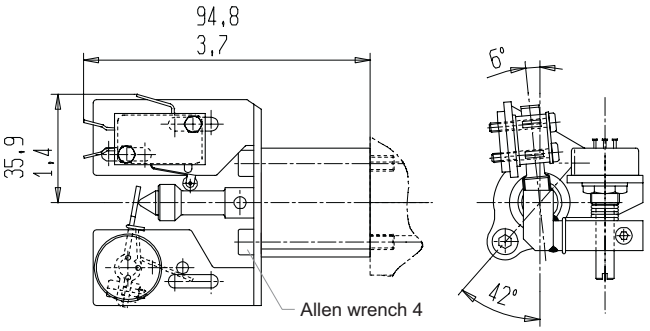


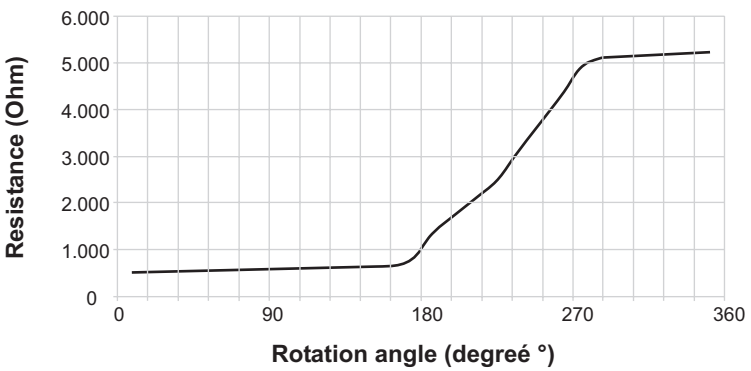
PM

Spool positioning with microswitch to start
an electric motor and potentiometer
to run up speed motor
(available also for single acting spools)



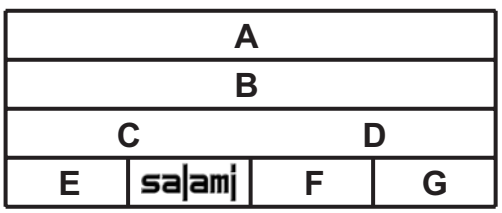
Spool stroke





DESCRIPTION OF THE NEW PRODUCT IDENTIFICATION LABEL

Based on the firm certification ISO 9001 - UNI EN 29001, section 4.8 (identification and tracebility of the product), we have adopted a new identification label starting from the 1st march 1995. Pls, see following example:



A = Product short descritpion (eg. VD8A/FDD/U4G).

B = Customer part number.

C = Salami part number (eg. 6235 0025 0).

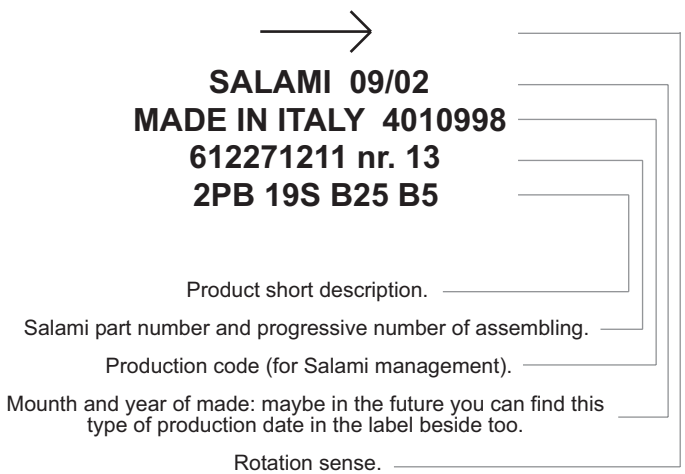
D = Production code (for Salami management)

E = Rotation sense (only for pumps).

F = Production date (see data sheet here below)

G = Progressive number of assembling.

Only for pumps 2PB and 2PZ (except triple 2PB) the identification product is marked on the top of the pump body as shown here below:



ASSEMBLED	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
JANUARY	7A	8M	9M	0M	1M	2M	3M	4M	5M	6M	7M	08M	09M	10M	11M	12M
FEBRUARY	7B	8N	9N	0N	1N	2N	3N	4N	5N	6N	7N	08N	09N	10N	11N	12N
MARCH	7C	8P	9P	0P	1P	2P	3P	4P	5P	6P	7P	08P	09P	10P	11P	12P
APRIL	7D	8Q	9Q	0Q	1Q	2Q	3Q	4Q	5Q	6Q	7Q	08Q	09Q	10Q	11Q	12Q
MAY	7E	8R	9R	0R	1R	2R	3R	4R	5R	6R	7R	08R	09R	10R	11R	12R
JUNE	7F	8S	9S	0S	1S	2S	3S	4S	5S	6S	7S	08S	09S	10S	11S	12S
JULY	7G	8T	9T	0T	1T	2T	3T	4T	5T	6T	7T	08T	09T	10T	11T	12T
AUGUST	7H	8U	9U	0U	1U	2U	3U	4U	5U	6U	7U	08U	09U	10U	11U	12U
SEPTEMBER	7I	8V	9V	0V	1V	2V	3V	4V	5V	6V	7V	08V	09V	10V	11V	12V
OCTOBER	7J	8Z	9Z	0Z	1Z	2Z	3Z	4Z	5Z	6Z	7Z	08Z	09Z	10Z	11Z	12Z
NOVEMBER	7K	8X	9X	0X	1X	2X	3X	4X	5X	6X	7X	08X	09X	10X	11X	12X
DECEMBER	7L	8Y	9Y	0Y	1Y	2Y	3Y	4Y	5Y	6Y	7Y	08Y	09Y	10Y	11Y	12Y

DIRECTIONAL CONTROL VALVE
MONOBLOCK TYPE

How to order/VDM6A

VDM6A | 01 | D | 180 | – | EV2 | / | 2 | X | P | 01 | A | – | VA | 165 | A | . | AR | 140 | B | – | NL | A | – | C2 | /

/

P | 01 | A | – | PR | 000 | A | . | PR | 000 | B | – | NL | A | – | C2 | / | U1 | G | – | EPB1

INLET CONFIGURATION
See from page 10

MAIN RELIEF VALVE (PAG. 14)

D	Direct main relief valve
W	Without main relief valve

MAIN RELIEF VALVE SETTING (bar)
See page 14

VENTING VALVE
See page 15

NUMBER OF IDENTICAL CONSECUTIVE SECTIONS

WORKING SECTIONS - CIRCUIT TYPE (PAG. 12)

P	Parallel circuit working section

SPOOL TYPES (PAG. 12 - 13)

01	Double acting spool
02	Double acting motor spool
03	Double acting motor spool ("B" port blocked)
04	Double acting motor spool ("A" port blocked)
05	Single acting spool "A" working port
06	Single acting spool "B" working port
11	Double acting spool with float function in 3rd pos. (spool in)
12	Double acting spool with float function in 3rd pos. (spool out)
13	Double acting spool with regenerative function in position 3 (spool in)
17	Double acting spool with regenerative function in position 2 (spool in)
18	Double acting spool with regenerative function in position 1 (spool out)

SPOOL CHOICE ACCORDING TO THE INLET FLOW (PAG. 12)

A	Nominal flow
C	2/3 of the nominal flow

AUXILIARY VALVES

VA	Adjustable overload valve (available settings at page 17)
AR	Adjustable overload and anti-cavitation valve (available settings at page 17)
VR	Anti-cavitation valve (page 17)
CV	Conversion valve (page 18)
PR	Pre-arrangement for auxiliary valve (page 17)
ST	Flow restrictor P ® A/B (page 18)
SP	Flow restrictor A/B ® T (page 18)
VUM	Mech. operated load check valve (page 18)

ELECTRIC POWER BEYOND VALVE
See page 16

PORTS (PAG. 8)

G	GAS threaded
S	SAE threaded
M*	METRIC threaded
G*	JIS B 2351 threaded

OUTLET CONFIGURATION
See hydraulic scheme and commercial codes of page 11

SPOOL POSITIONINGS

Page 25 C2 - C3 - C4 - C5 - C6 - C7 - C8
Page 26 R2- R4 - R5 - R6 - R7 - R9 - C0
Page 27 F1 - F2 - F3 - F4 - F5 - F6 - F7 - F8
Page 28 D7 - D8 - D9 - M1 - M2 - M3
Page 29 - 30 CE - CM - CW - CD - PM

CONTROL SIDE (PAGE 19)

SPOOL CONTROLS

Without lever box page 20 - SL
Handle controls from page 20 to 21 NL - MP - L1/L2
Device for cable remote control page 22 TC
Direct electric control and emergency device page 22 E7 - E8 - E9 - E10 - E11 - E12 - ES - SL
Hydraulic controls page 23 IP - IF
Pneumatic and electro-pneumatic controls page 24 PP/P0 - P1/P2 - PQ

PORT ON WHICH THE VALVE IS MOUNTED (page 19)

*Available for quantity, please contact our sales dept.

For more information: WWW.SALAMI.IT

WARRANTY

- We warrant products sold by us to be free from defects in material and workmanship.

- Our sole obligation to buyer under this warranty is the repair or replacement, at our option, of any products or parts thereof which, under normal use and proper maintenance, have proven defective in material or workmanship, this warranty does not cover ordinary wear and tear, abuse, misuse, averloading, alteration.

- No claims under this warranty will be valid unless buyer notifies SALAMI in writing within a reasonable time of the buyer's discovery of such defects,but in no event later than twelve (12) mounths from date of shipment to buyer.

- Our obligation under this warranty shall not include any transportation charges or cost of installation, replacement, field repair, or other charges related to returning products to us; or any liability for directs, indirects or consequential damage or delay.If requested by us, products or parts for which a warranty claim is made are to be returned transportation prepaid to our factory. The risk of loss of any products or parts thereof returned to SALAMI will be on buyer.

- No employee or representative is authorized to change any warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of SALAMI.

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export@salami.it - www.salami.it

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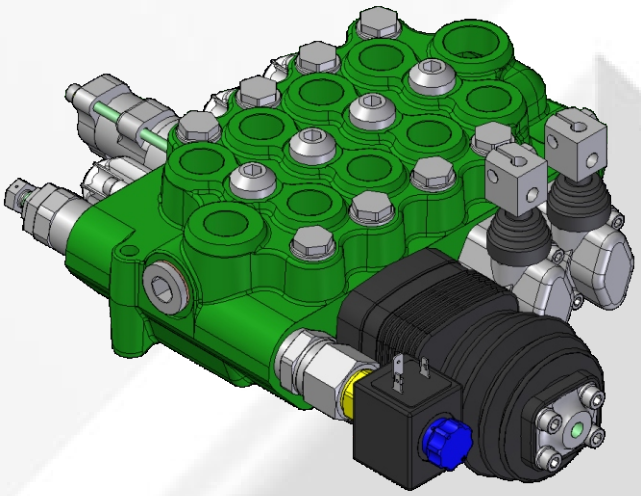
GREEN, NY 13778
Tel.: +1-607-6565702
Fax.: +1-607-6565704
info@salamihydraulics.com

MONOBLOCK VALVE

VDM8

Technical catalogue



E0.01.0911.02.03

COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
=ISO 9001/2000=

salami™

INDEX

E0.01.0911.02.03

GENERAL FEATURES

Among all hydraulic directional control valves used in the field of mobile equipment applications, the spool valve is the most popular.
The monoblock valve type offers an excellent performance price ratio.

FEATURES

VDM8 directional control valve has the following:
- cast-iron monoblock construction up to 5 spools
- parallel circuit, load check valve protection on each section
- possibility of venting valve
- possibility of power beyond configuration
- spool construction in steel, hardened and chromium-plated to obtain a higher surface hardness and a better corrosion resistance
- several types of spool: double, single acting, spool motor, float position etc.
- minimum tolerance between the spools and the body to obtain a minimum internal leakage
- interchangeabilty of all the spools
- possibility of auxiliary valve either on port A or B or on both
- several spool control devices and spool positioning devices

VALVE AND DEVICE TYPES

In order to meet the most stringent demands and to offer a wider range of applications, the following types of valves and devices are available:

Valves
- direct main relief valve: controls the maximum pressure in the circuit when one or more spools are on end stroke located on "A" or "B" port side, can be:
  direct type version up to 260 bar - *3700 psi*
  pilot operated with anticavitation version up to 350 bar - *5000 psi*
- electric by-pass valve: located in the opposite cavity of the main relief valve and is available as 12 or 24 Vdc and normally open or normally closed versions
- overload and anticavitation valve on port A or/and B: set at a higher value (in comparison with the main relief valve), it protects the working ports from load induced pressures, avoids cavitation in the system created by the inertia.
- anti-cavitation check valve on port A or/and B: avoids cavitation in the system created by the inertia.
- flow restrictor: directly fitted on the "A/B" ports orifice

Devices
- handle controls
- handle safety devices: avoids accidental operation of the spool
- cross lever: allows to acting two spools with one manual joystick
- cable remote control
- control device for microswitches: for the operation with electric d.c. motor driven pumps at one or more rotation speeds
- hydraulic kick-out: the spool returns automatically to the neutral position when the preset pressure of port "A" or "B" is exceeded
- anti-tilt device: the spool returns automatically in neutral position when the pressure reaches a pre-set value to avoid cranes from becoming unstable
- pneumatic proportional control
- electropneumatic control
- hydraulic proportional control
- direct electric on-off control with emergency manual device
- electrohydraulic on-off and proportional control
- several spool positionings device to return the spool to neutral position or to lock the spool on working position

TECHNICAL DATA

Spools	from 1 to 5		
Nominal flow Max flow*	Q	75 l/min 90 l/min	(*20 gpm US*) (*24 gpm US*)
Max pressure	port P ports A/B port T*	350 bar 350 bar 25 bar	(*5100 psi*) (*5100 psi*) (*363 psi*)
Internal leakage at 160 bar (*2285 psi*)	ports A/B → T	25 ÷ 35 cm^3/min	(*1.52 ÷ 2.13 cu.in./min*)
For lower leakage please contact our sales dept.			
In case of solenoid control the leakage is		120 ÷ 160 cm^3/min	(*7.32 ÷ 9.76 cu.in./min*)
Spool stroke (positions 1 and 2)		± 7 mm	(*0,28 in.*)
Spool stroke (position 4, float or regenerative)		± 7 + 5 mm	(*0.28 + 0.19 in.*)
For solenoid spool control - stroke		± 5 mm	(*0,19 in.*)

*In case you need the max flow please contact our sales dept.

*For higher back pressure please contact our sales dept.

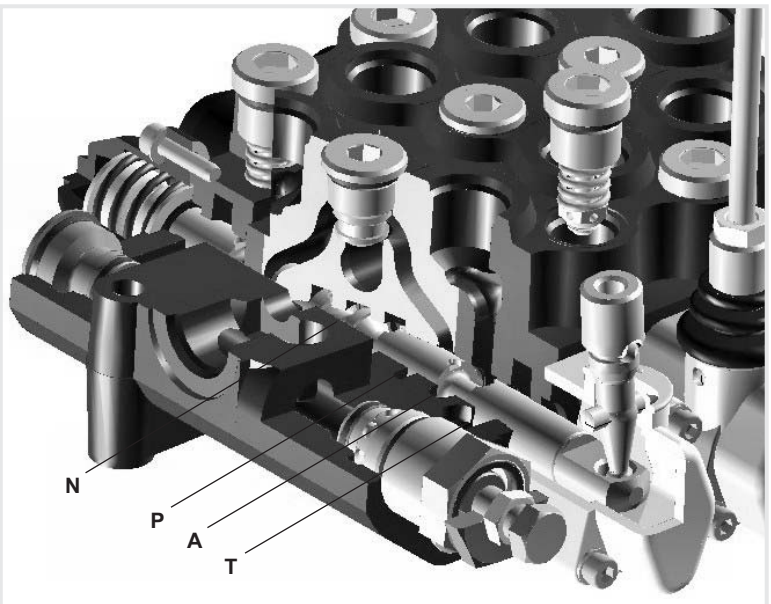
All technical data carried out using mineral oil with viscosity of 16 cSt and contamination level 19/16 as ISO 4406.

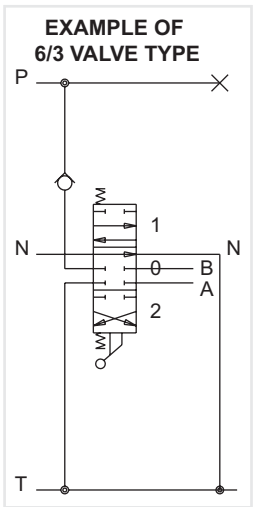
Nominal flow meaning: flow causing 1 bar (*14.5 psi*) pressure drop each section, with spools in neutral position

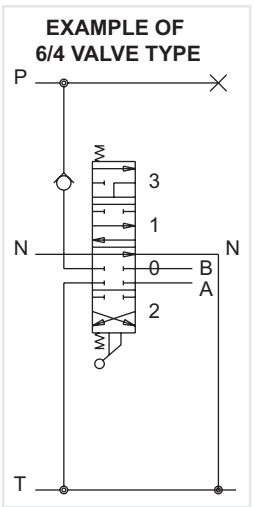
WORKING CONDITIONS

Hydraulic fluid	mineral oil according to DIN 51524		
Viscosity			
	viscosity range	10...400 mm^2/sec	(*0.15...7.13 sq.in./sec*)
	optimal viscosity	12...75 mm^2/sec	(*0.19...1.16 sq.in./sec*)
Temperature			
	fluid range temperature	-20...85 °C	(*-4...185 °F*) NBR seals
	suggested range	30...60 °C	(*86...140 °F*) NBR seals
Maximum contamination level		NAS 1683: class 9	ISO 4406: 19/16
Room temperature		-30...60 °C	(-22...140 °F)
Working limits		see diagrams at page 6	
Pressure drop		see diagrams at page 7	
For operation with fire resistant fluid, please contact our sales department			

OPERATING PRINCIPLE

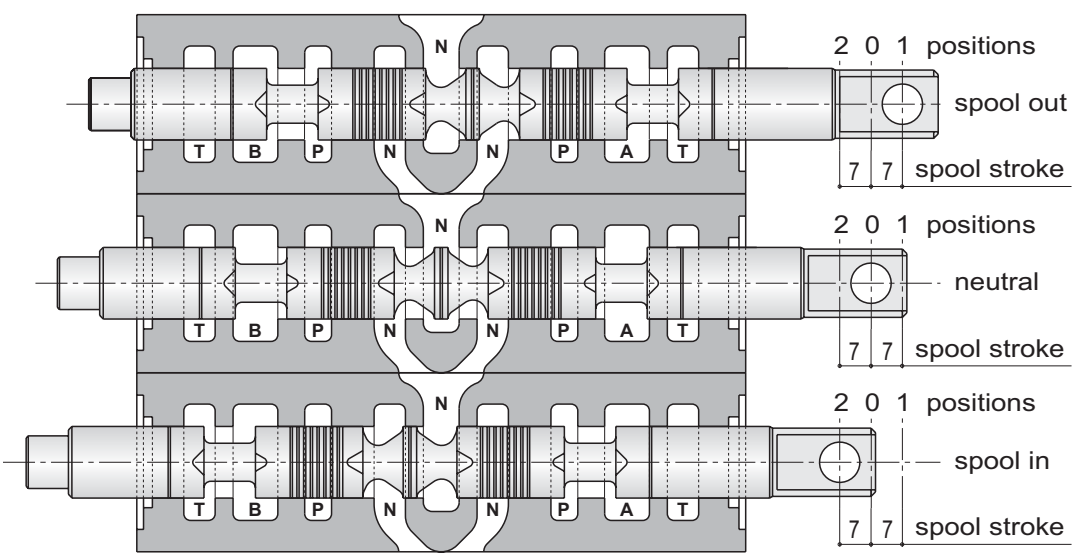






The picture show the paths N - P - A - T, the other paths are simmetrical

Salami directional control valves belong to the 6/3 (or 6/4) type; they can control 6 gallery in 3 (or 4) spool positions simultaneously.
They are open circuit types: when the spool is in neutral position, the fluid flows directly to the tank with minimum internal pressure drops (approximatively 1 bar / 14.5 psi for each spool at nominal flow).
When the spool is moved from this position, the neutral gallery is gradually throttled and the connection between pump and actuator, through the corresponding port, is made.
When a pressure exceeds the value of the pressure existing in port A or B, the fluid flows through the load check valve to the actuator.



IMPORTANT
Looking at this side of the spool, we usually say: spool in when the spool is pushed into the valve and spool out when it is pulled out of the valve.
Independing on assembling of the spool on "A" or "B" side

There are two characteristic phases in the spool stroke (7 mm - 0,275 in.):
a) the overlap phase (about 18% of the stroke) guarantees minimum internal leakages in neutral position;
b) the progressive flow regulation phase (82% of the stroke).
Both pictures show a 6/3 valve type with double acting spool only as principle of functioning.
Salami VDM8 is available in different solutions.

INSTALLATION

When proceeding to mount the unit on the structure and to connect fittings to work ports, it is necessary to comply with the values of tightening torques.
The attachment of linkages to spools should not affect their operation. The mounting position can be vertical with inlet module on the top or horizontal.

Standard tightening torques - Nm / *lbft*

FITTING TYPE	P and PL ports	A and B ports	T and TL ports
BSP (ISO 228/1)	G 3/4	G 1/2	G 3/4
with o-ring seal	**60 / *44.2***	50 / *36.9*	**60 / *44.2***
with copper washer	70 / *51.6*	60 / *44.3*	70 / *51.6*
with steel washer	70 / *51.6*	60 / *44.3*	70 / *51.6*
SAE	**SAE 10 (7/8-14 UNF)**	SAE 10 (7/8-14 UNF)	SAE 12 (1 1/16-12 UN)
with o-ring seal	**60 / *44.2***	60 / *44.2*	95 / *70.1*

FILTRATION

The contamination of the fluid in the system greatly affects the life of the unit. Above all, contamination may result in irregular operation, wear of seals in valve housings and failures. Once the initial contamination level of the system has been reached, it is necessary to limit any increase of contamination installing an efficient filtration system (see working conditions page 3).

PIPES

Pipes should be as short as possible, without restrictions or sharp bends (especially the return lines). Before connecting pipes to the fittings of the corresponding components, make sure that they are free from burrs and other contamination.
As a first approximation, for a mobile machine with standard length pipes, their width should guarantee the following values of fluid speed*:

6 ÷ 10 m/sec	inlet pipe
3 ÷ 5 m/sec	outlet pipe

19,7 ÷ 32,8 ft/sec	inlet pipe
9,9 ÷ 16,4 ft/sec	outlet pipe

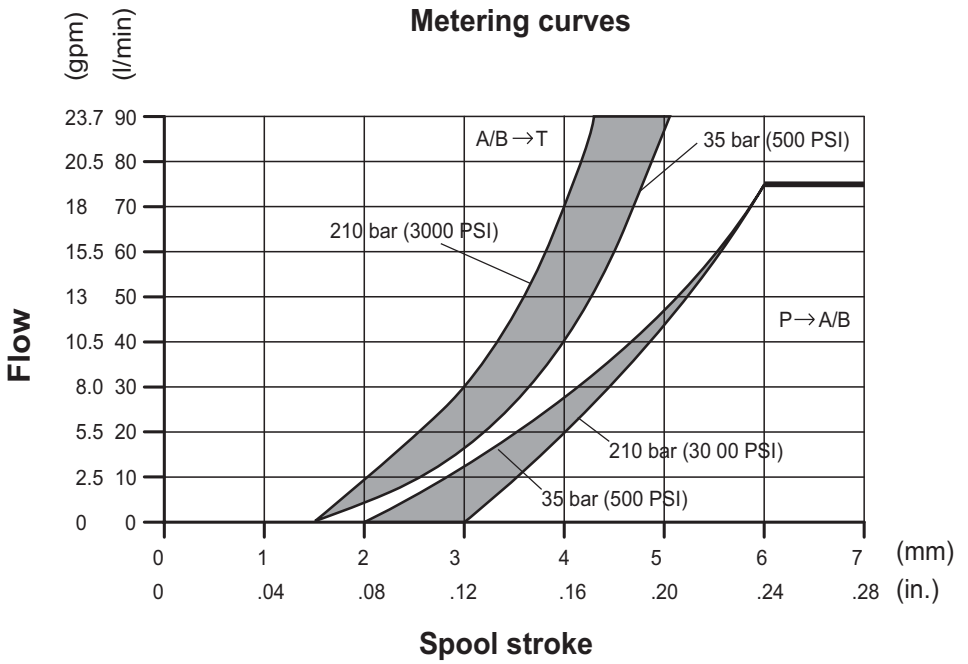
the lowest values of fluid speed are required in case of wide temperature range and/or for continuous duty.

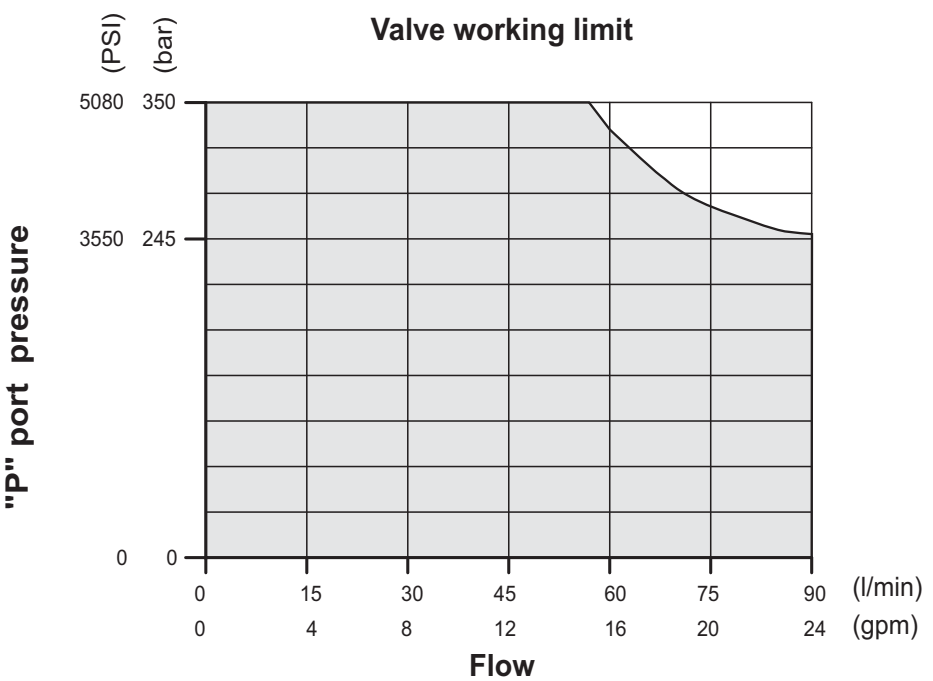
* $[v = \frac{21{,}2 \times Q}{d^2}$ v = fluid speed [m/sec], Q = flow [l/min], d = pipe internal diameter [mm]

PERFORMANCE DATA

The characteristics in this catalogue are typical measured results.
During measuring a mineral based hydraulic oil with a viscosity of 16 cSt at a temperature of 50°C was used.

FOR FURTHER DETAILS PLEASE CONTACT OUR SALES DEPARTEMENT



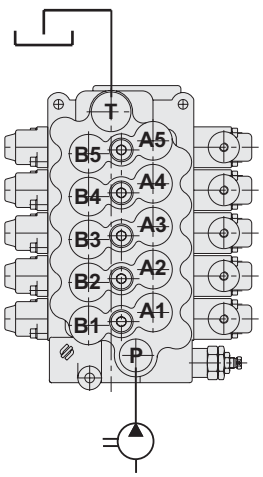


The data of this diagram have been obtained by a manual control using an effort:
stroke beginning 120 N - stroke end 180 N and standard leakage data.

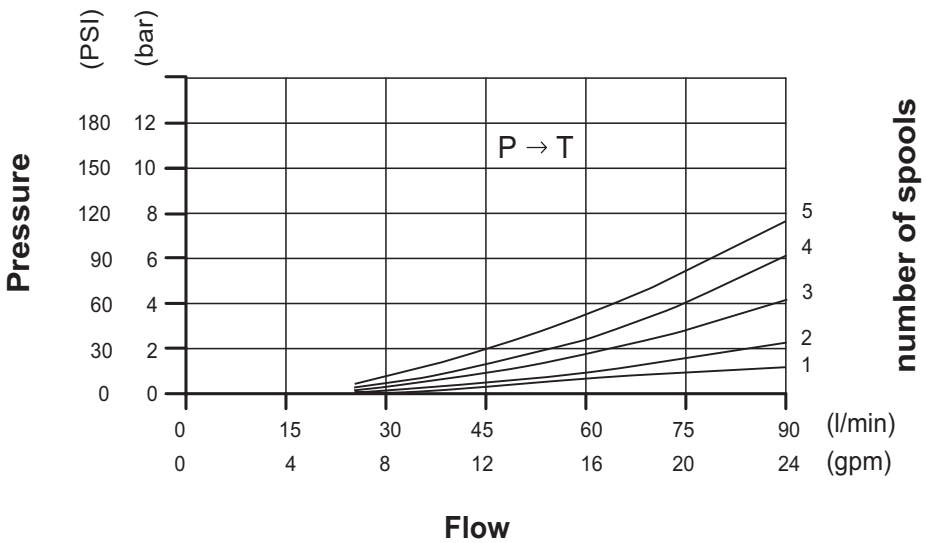
PERFORMANCE DATA

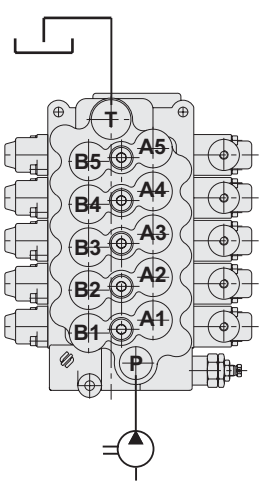
The characteristics in this catalogue are typical measured results.
During measuring a mineral based hydraulic oil with a viscosity of 16 cSt at a temperature of 50°C was used.

FOR FURTHER DETAILS PLEASE CONTACT OUR SALES DEPARTEMENT

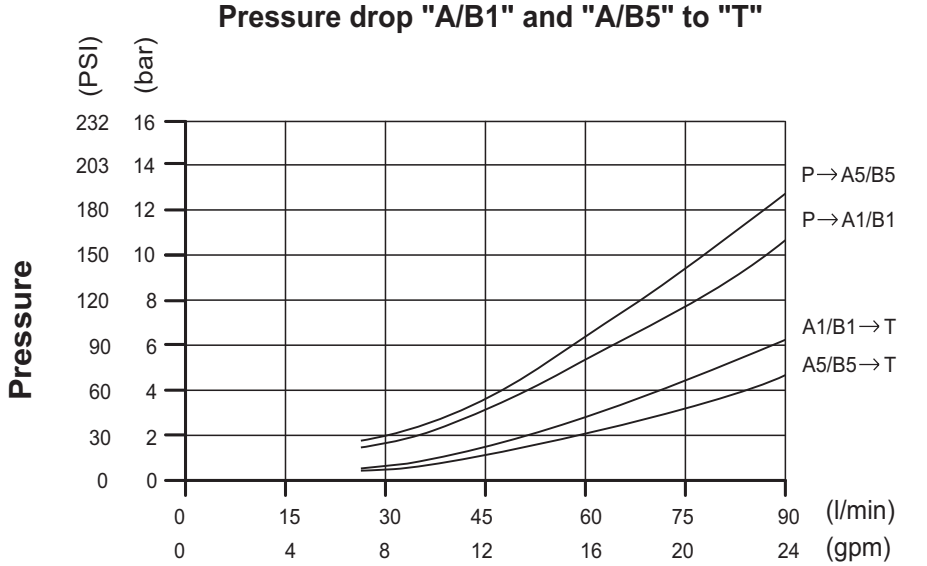


Pressure drop "P" to "T"

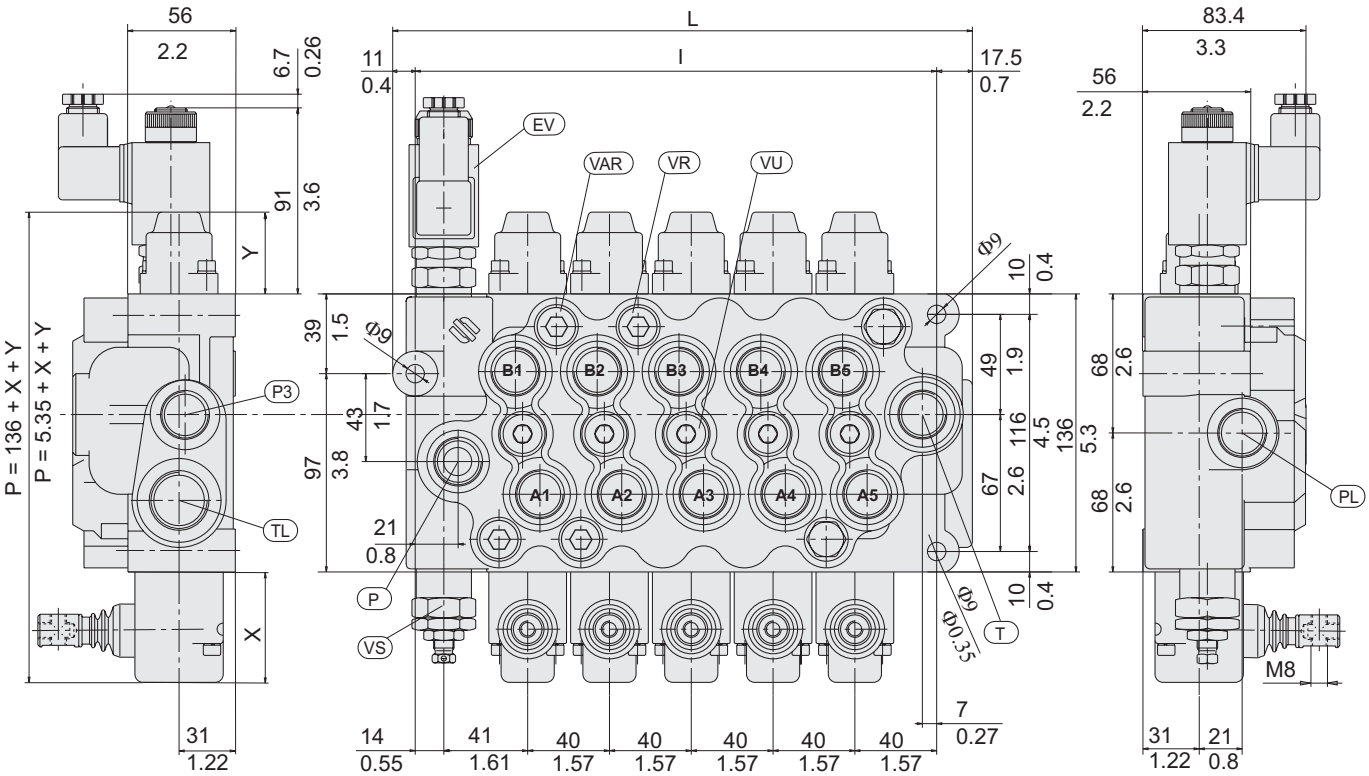




Pressure drop "P" to "A/B1" and to "A/B5"
Pressure drop "A/B1" and "A/B5" to "T"



DIMENSIONS FROM 2 TO 5 SECTIONS MONOBLOCK



The drawing shown is just an example.The overall dimensions you read are valid for all the VDM8 except the parametric dimensions "L" and "I" depending of the number of working sections.The parametric dimension "P" depends on a fixed dimension of 136 mm (11 in.) to wich you have to had the "X" and "Y" dimensions that you can find in the spool controls and spool positionings pages.

INDEX:

- **P** = top inlet port
- **PL** = side inlet port
- **P3** = side outlet port for power beyond
- **T** = top outlet port
- **TL** = side outlet port
- **A/B** = work ports
- **VS** = main relief valve(adjustable)
- **EV1** = venting valve 12 V normally open
- **EV2** = venting valve 24 V normally open
- **EV3** = venting valve 12 V normally closed
- **EV4** = venting valve 24 V normally closed
- **VAR** = overload and anti-cavitation valve
- **VR** = anti-cavitation valve
- **VU** = load check valve

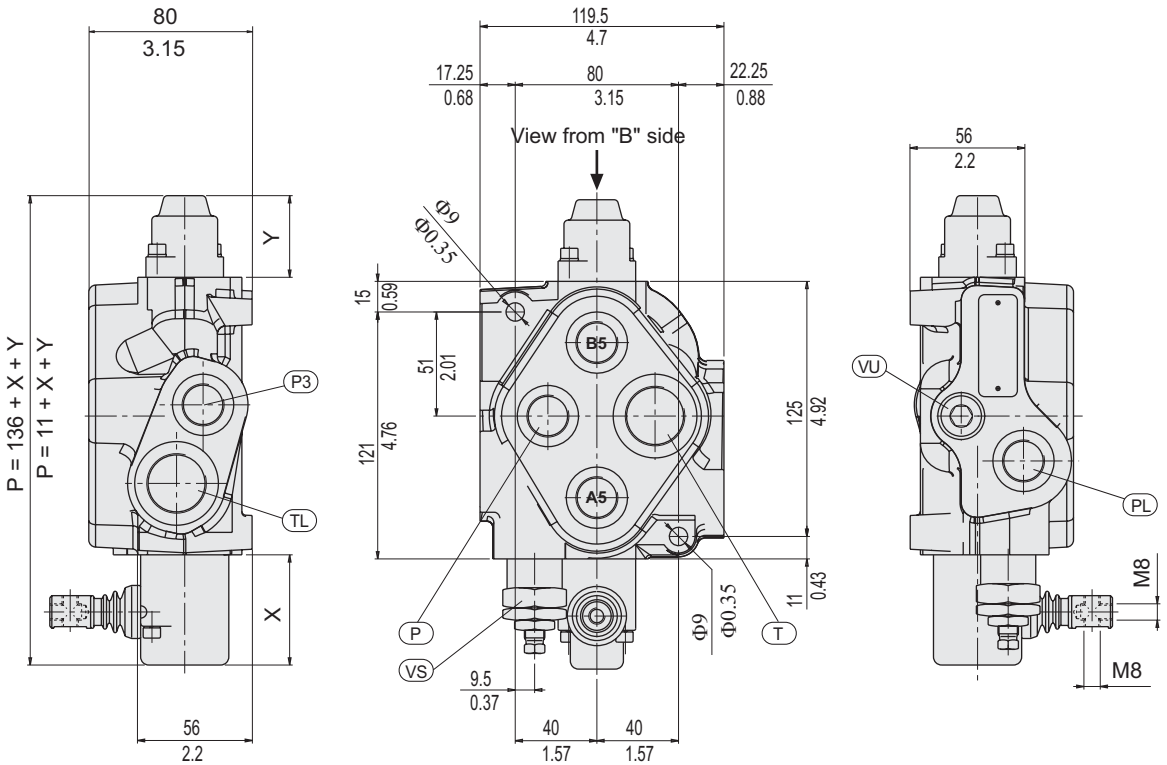
6 spools valve not yet available

Spools		1	2	3	4	5	6
I	mm	/	135	175	215	255	/
	in	/	5,31	6,89	8,46	10,03	/
L	mm	/	163.5	203.5	243.5	283.5	/
	in	/	6.43	8.01	9.59	11,16	/

For different size and thread ports
contact our sales departement

PORT SIZES	P - PL - P3	T - TL	A - B
BSP ISO 228	G 1/2	G 3/4	G 1/2
SAE ISO 176	SAE#10 7/8 - 14 UNF	SAE#12 1-1/16 - 12 UNF	SAE#10 7/8 - 14 UNF
ISO 262 - ISO 6149	M 22 x 1.5	M 27 x 2	M 22 x 1.5

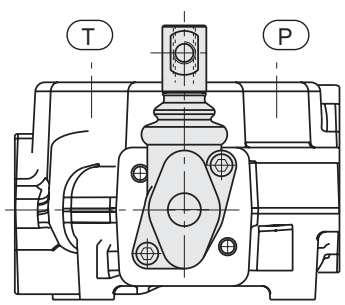
DIMENSIONS FOR 1 SECTION MONOBLOCK



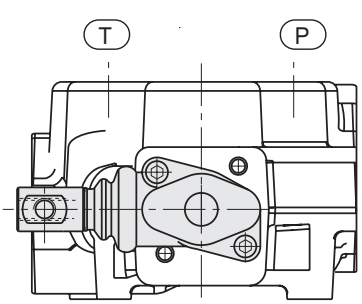
The parametric dimension "P" depends on a fixed dimension of 136 mm (11 in.) to which you have to had the "X" and "Y" dimensions that you can find in the spool controls and spool positionings pages. In this monoblock the main relief valve can be assembled only on "A" side, you can assemble venting valve option only instead of main relief and not in combination with it, moreover only on "B" side you can assemble the levers as show in the drawings here below.

INDEX:

P = top inlet port
PL = side inlet port
P3 = side outlet port for power beyond
T = top outlet port
TL = side outlet port
A/B = work ports
VS = main relief valve(adjustable)
VU = load check valve



Views from "B" side



PORT SIZES	P - PL - P3	T - TL	A - B
BSP ISO 228	G 1/2	G 3/4	G 1/2
SAE ISO 176	SAE#10 7/8 - 14 UNF	SAE#12 1-1/16 - 12 UNF	SAE#10 7/8 - 14 UNF
ISO 262 - ISO 6149	M 22 x 1.5	M 27 x 2	M 22 x 1.5

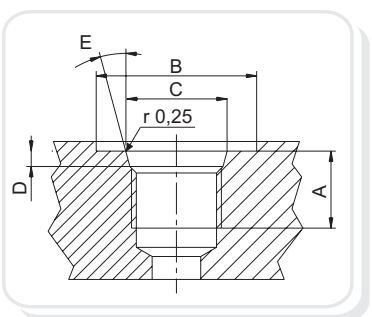
Monoblocks with all ports threaded G3/4 or SAE 12 are available, please specify in phase of order.

HYDRAULIC FLUIDS

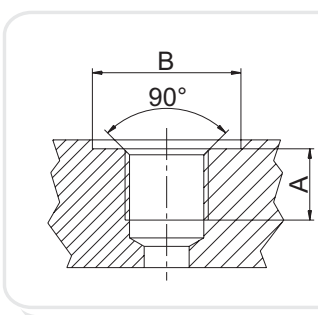
Usually a mineral-base oil with a good viscosity index should be used, preferably with good lubricating properties and corrosion, oxidation and foaming resistant.
Sometimes the fluids supplied by the manufacturers do not satisfy purity requirements (see page 3 WORKING CONDITIONS). It is therefore necessary to filter the fluid carefully before filling. Your supplier can give you the information about NAS class of its fluids. To maintain the proper purity class, the use of filters of high dirt capacity with clogging indicator is recommended.
Under humidity conditions it is necessary to use hygroscopic salts.
For operation with fire resistant and ecological fluids, please contact our technical department.

PORTS

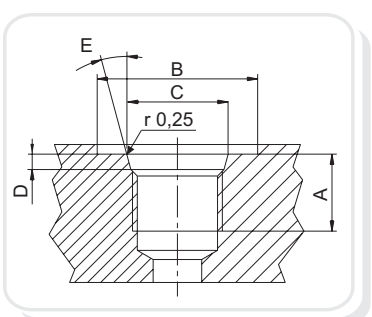
Following are standard ports. For different port types, please contact our sales department.



SAE UN-UNF (ISO 725)						
Dimensions		7/8 -14 UNF SAE10		1”1/16 -12 UN SAE12		1”5/16 -12 UN SAE16	
mm	In.						
A		17	0,67	20	0,79	20	0,79
B		34	1,34	41	1,61	49	1,92
C		23,9	0,94	29,2	1,15	35,5	1,40
D		2,5	0,10	3,3	0,13	3,3	0,13
E		15°		15°		15°	



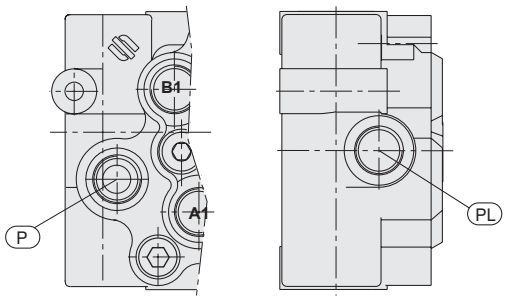
BSP (ISO 228)						
Dimensions		G1/2		G3/4		G1	
mm	In.						
A		16	0,63	18	0,71	20	0,79
B		27	1,06	33	1,30	40	1,57



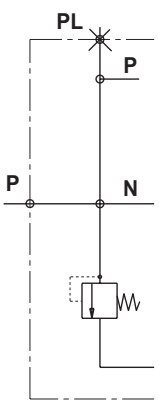
METRIC (ISO 262 - ISO 6149)*									
Dimensions		M22 x 1.5				M27 x 2			
mm	In.	ISO 262		ISO 6149		ISO 262		ISO 6149	
A		16	0.63	16	0,63	18	0,71	19	1,75
B		31,5	1.24	34	1,34	37,7	1,48	40	1,57
C				23,8	0,94			29,4	1,16
D				2,4	0.09			3,1	0,12

*Available for quantity, please contact our sales dept.

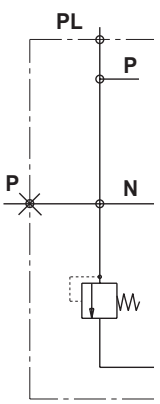
INLET AND OUTLET TYPES



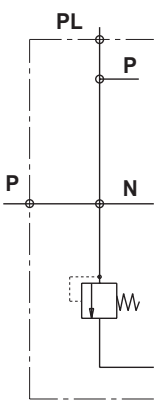
01 Top port side port plugged

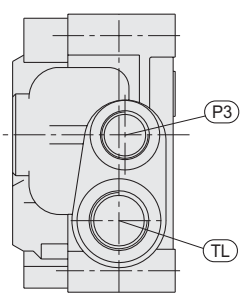


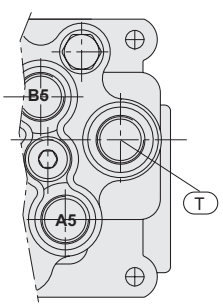
02 Side port top port plugged

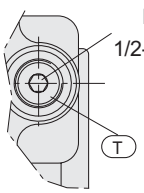


03 Top and side ports





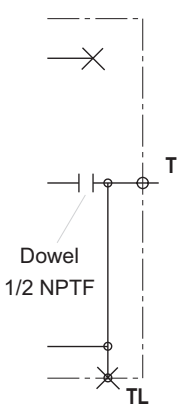




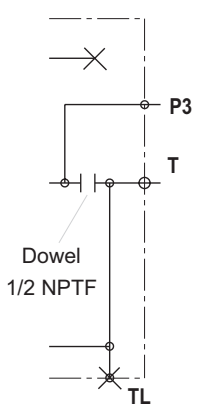
To obtain U5 and U7 configurations, starting from standard monoblock, it needs to insert a dowel 1/2 NPTF threaded to interrupt the N line.

U8 Outlet type necessary for electro-hydraulic controls, please go to page 24 to see the drawing and hydraulic scheme.

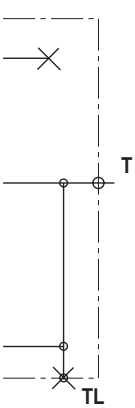
U7 Closed center configuration



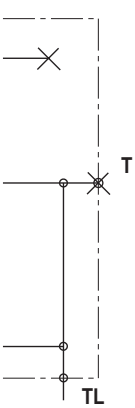
U5 Power beyond configuration (side P3)



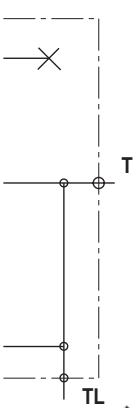
U4 Top port side port plugged



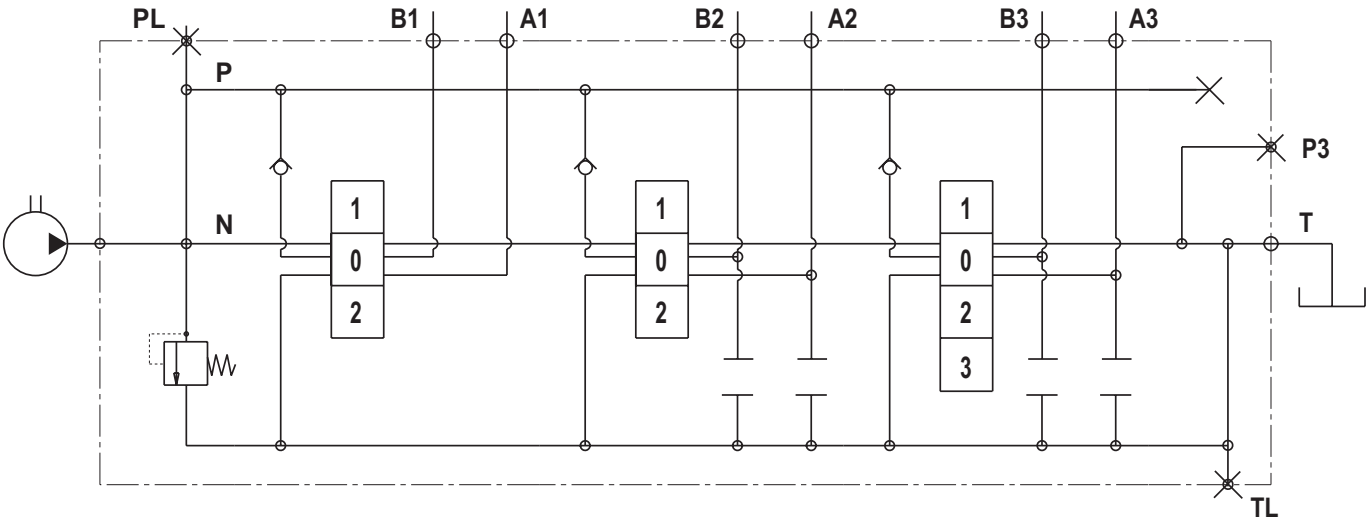
U3 Side port top port plugged



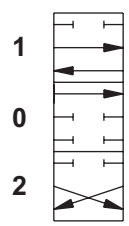
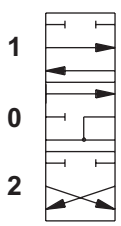
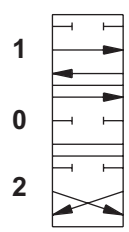
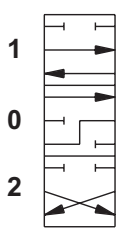
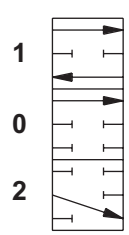
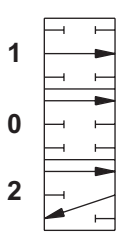
U2 Top and side ports



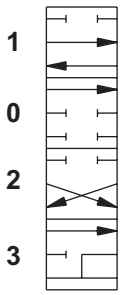
CIRCUIT AND SPOOL TYPES



This is the standard circuit between working sections: the circuit is always parallel type, as shown in the picture above you can have main relief valve in the inlet(see page 14), the working sections can have pre-arrangement for auxiliary valves or not,
the spools can be 3 or 4 positions (as sown here below) moreover VDM8 is always pre-arranged for carry over just adding a dowel 3/8" NPTF.
As you can read at page 34, the spools can be types "A" nominal flow or "C" 2/3 of nominal flow.

01		Double acting spool	Double acting motor spool		02
03		Double acting motor spool ("B" port blocked)	Double acting motor spool ("A" port blocked)		04
05		Single acting spool "A" working port	Single acting spool "B" working port		06

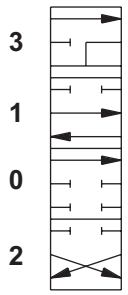
11



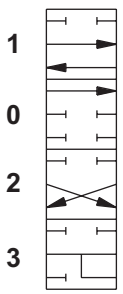
Double acting spool with float function in 3rd position (spool in)

12

Double acting spool with float function in 3rd position (spool out)



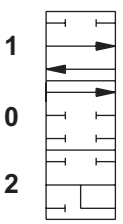
13



Double acting spool with regenerative function in 3rd position (spool in)

With this type of spool a special machining of the body is required

17

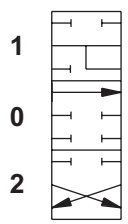


Double acting spool with regenerative function in position 2 (spool in)

With this type of spool a special machining of the body is required

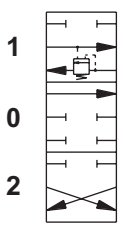
Double acting spool with regenerative function in position 1 (spool out)

With this type of spool a special machining of the body is required



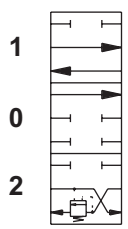
18

52



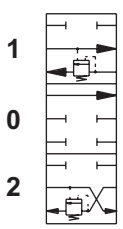
Over center double acting spool "A" working port

Over center double acting spool "B" working port



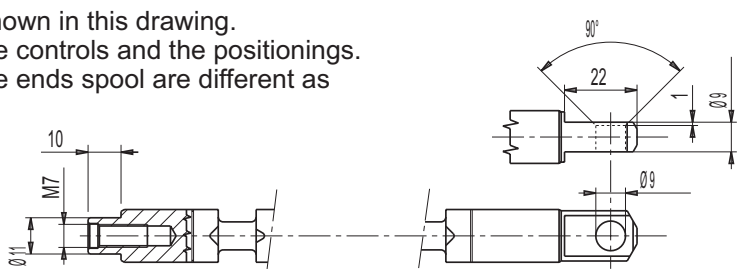
53

54

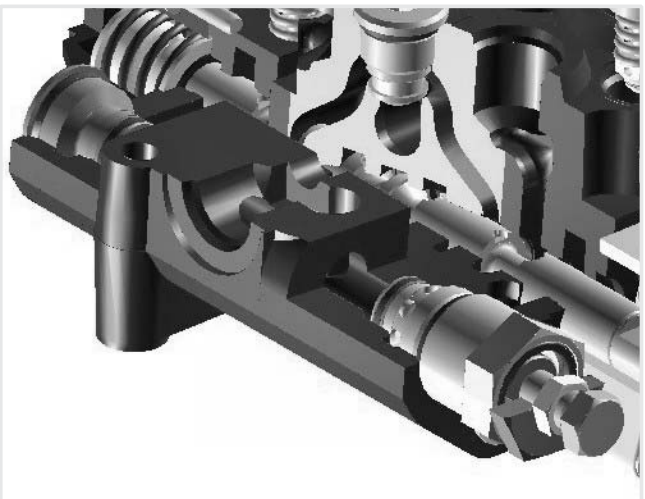


Over center double acting spool "A and B" working ports

Salami standard spools have the ends as shown in this drawing.
These ends spool are necessary to join it the controls and the positionings.
With direct electric and hydraulic controls the ends spool are different as you can see at pages 23 and 24.



MAIN RELIEF VALVES

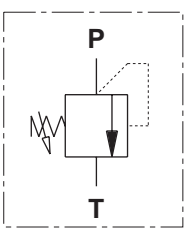


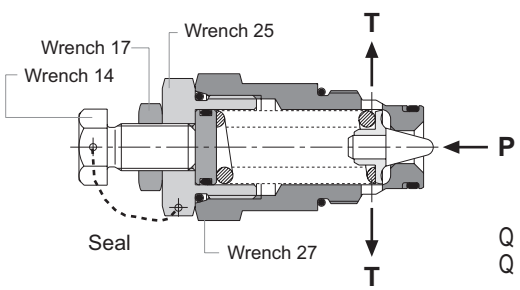
As you can see in the picture beside, the main relief valve can be mounted on "A" or "B" side because the VDM8 is always pre-arranged in this way(except the VDM8 - 1 section monoblock where the valve is always on "A" side).In the opposite side of the main relief valve you must mount a plug that you find in this page.All the testing values of this page have been obteined with nominal flow of 50 L/min - *13.21 gpm*, viscosity 16cST and oil temperature 50°C - *122°F.*

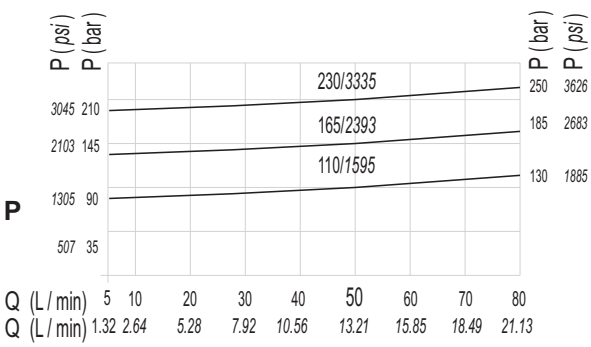
Max tightening torque:
wrench 13 - 24 Nm
wrench 17 - 27 Nm
wrench 25 - 35 Nm
wrench 27 - 40 Nm
wrench 30 - 75 Nm
Allen wrench 8 - 27 Nm

D

MAIN RELIEF VALVE DIRECT OPERATED
(setting range from 25 to 250 bar - *362 to 3625 psi*)

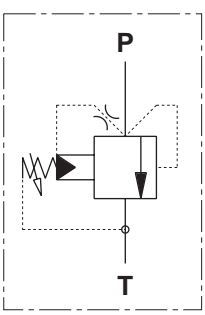


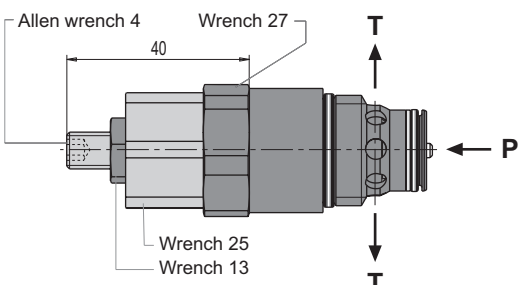


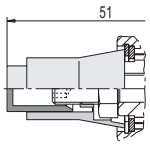


P

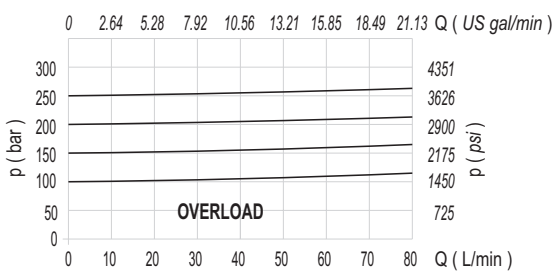
MAIN RELIEF VALVE PILOT OPERATED
(setting range from 25 to 280 bar - *362 to 4061 psi*) first spring
(setting range from 100 to 400 bar - *1450 to 5800 psi*) second spring

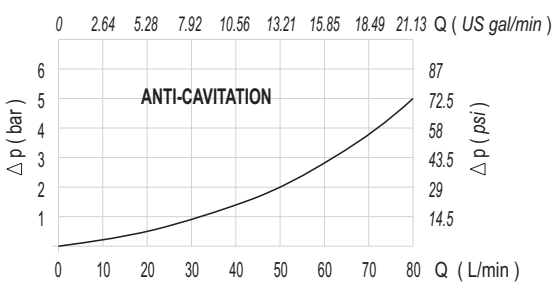






Sealing plug

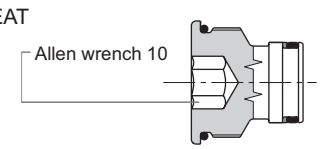


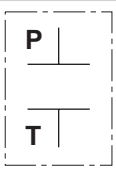


Both valves **D** and **P** are adjustable without oil leaking.
Further more, both have a security device to avoid valve sticking

W

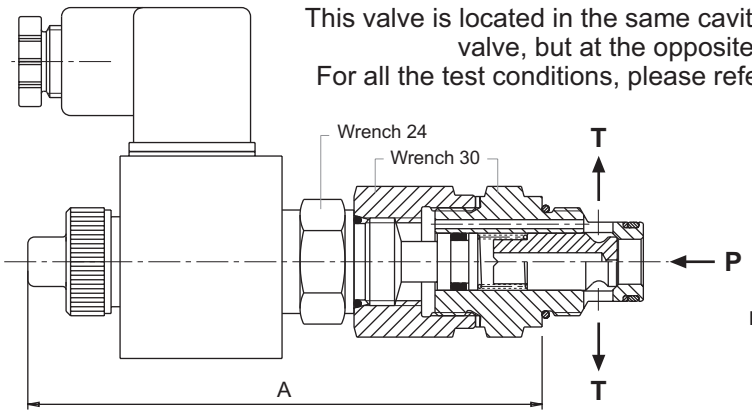
PLUG FOR MAIN RELIEF SEAT
WITHOUT VALVE

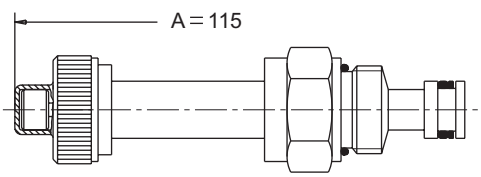




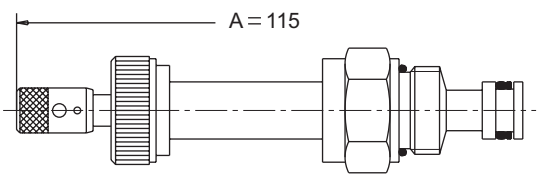
VENTING VALVES

This valve is located in the same cavity of the main relief valve, but at the opposite side.
For all the test conditions, please refer you to page 14.



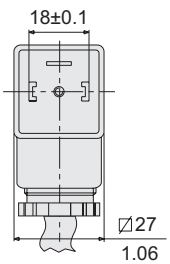


Push override

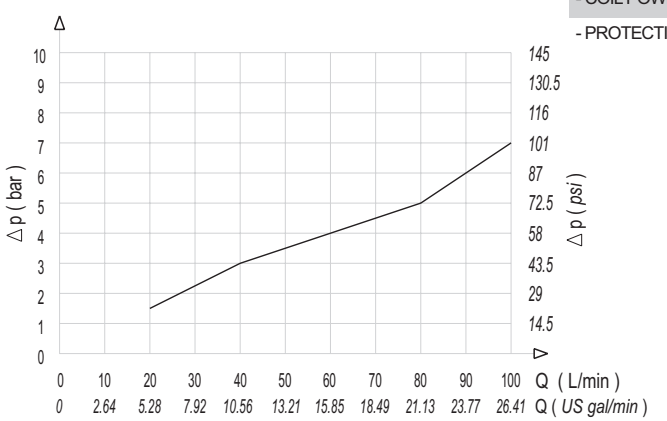


Push and twist override

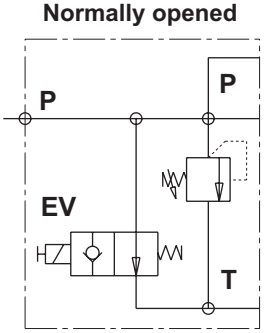
CONNECTOR
DIN 43650 - A/ISO 4400



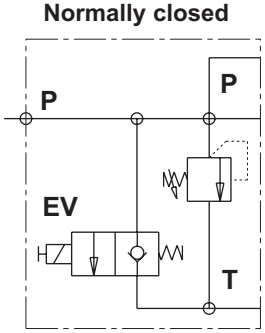
SPECIFICATIONS	
- MAX PRESSURE IN "P"	350 bar
- MAX FLOW	75 l/min
- OIL LEAKAGE-max pressure-46cST	1 cm^3/min
- AVAILABLE VOLTAGE	12 - 24 Vcc
- COIL RESISTANCE	12Vdc:8.7Ω - 24Vdc:33Ω
- COIL POWER	17 W
- PROTECTION INDEX WITH STANDARD CONNECTOR	IP 65



Normally opened



Normally closed



EV1
12 Vdc - Normally opened
Push override

EV2
24 Vdc - Normally opened
Push override

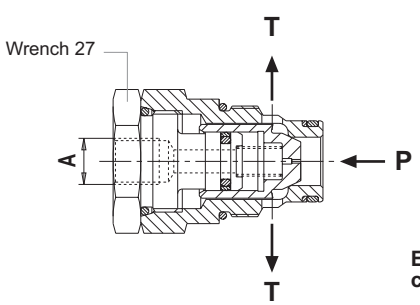
EV3
12 Vdc - Normally closed
Without override

EV4
24 Vdc - Normally closed
Without override

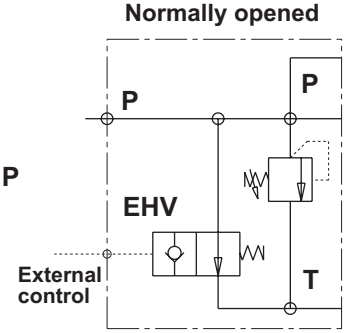
EV5
12 Vdc - Normally opened
Push and twist override

EV6
24 Vdc - Normally opened
Push and twist override

A available threads	
M10 x 1	SAE 6



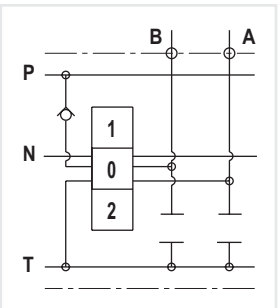
Normally opened



EHV
External piloted
venting valve

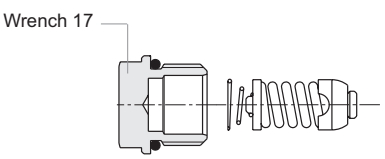
AUXILIARY VALVES

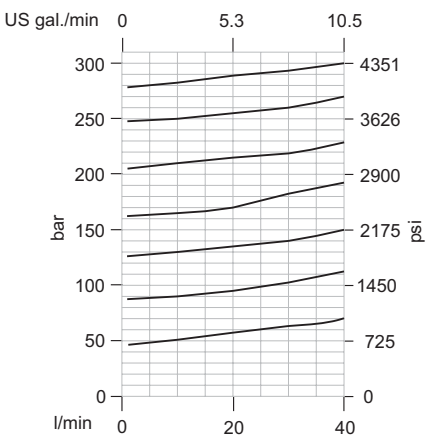
This picture shows the position of the auxiliary valves .For the tightening torque please see page 14.



AR

AR - Not adjustable overload and anti-cavitation valve

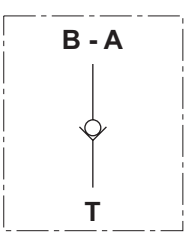


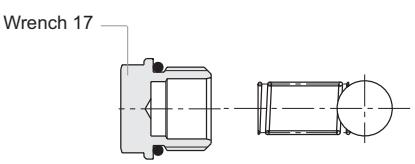


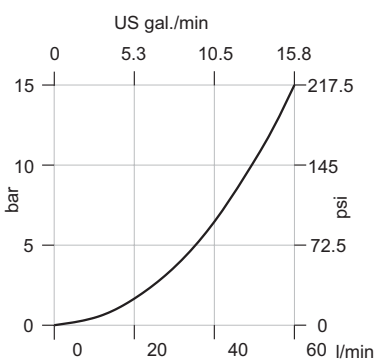
AVAILABLE SETTINGS																		
bar	25	32	40	50	63	80	100	125	140	160	175	190	210	230	250	280	315	350
psi	*362*	*464*	*580*	*725*	*910*	*1160*	*1450*	*1810*	*2000*	*2300*	*2530*	*2715*	*3000*	*3300*	*3600*	*4000*	*4569*	*5076*

VR

VR - Anti-cavitation valve

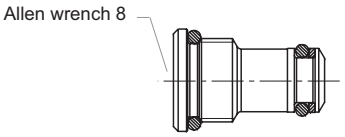


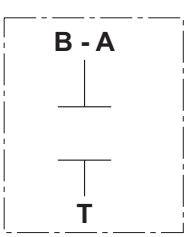




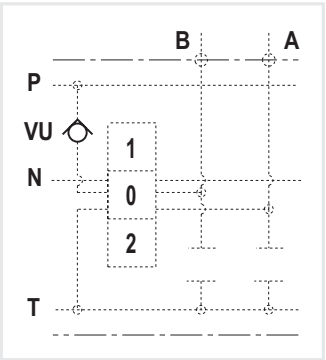
PR

PR - Plug for cavity

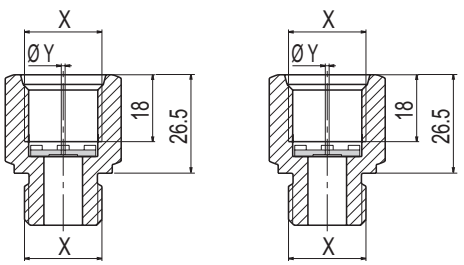


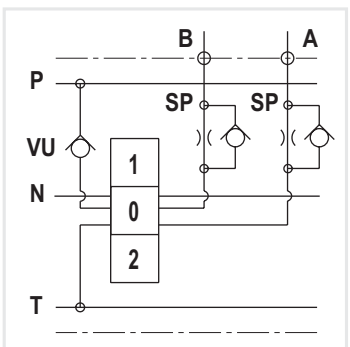


OTHER VALVES



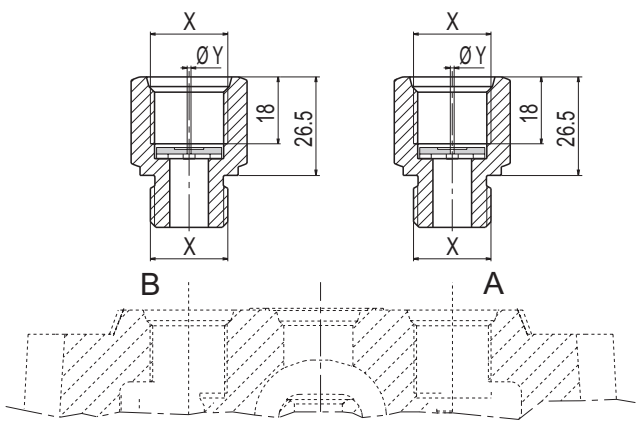
This is the load check valve VU which is built in every section between ports for the monoblock from 2 to 5 sections and you need not to specify in phase of ordering because it is part of the monoblock.
This valve has in the VDM8 - 1 section, another position, as you can see in the drawing of page 9.

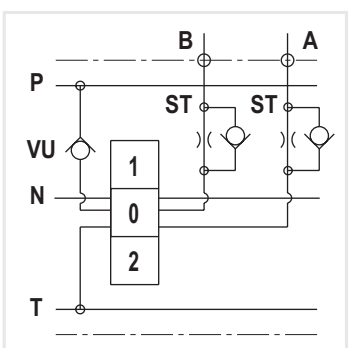




SP

Flow restrictor P ⟶ A/B





ST

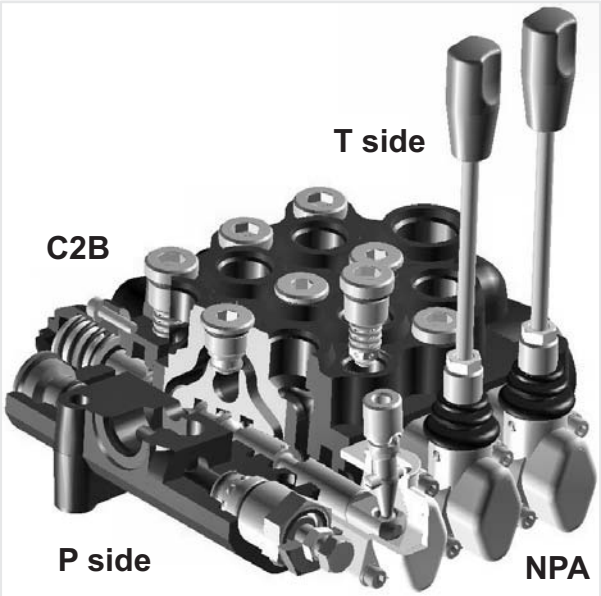
Flow restrictor A/B ⟶ T

For tightening torque, please refer you to page 5.

X available threads			ϕ Y available measures					
*M22 x 1.5	SAE 10	G 1/2	ϕ 2	ϕ 2.5	ϕ 2.75	ϕ 3	ϕ 3.25	ϕ 4.5

*Available for quantity, please contact our sales dept.

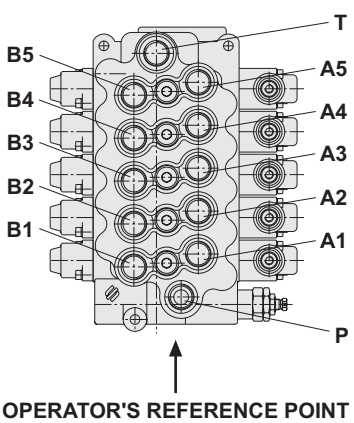
SPOOL CONTROLS AND SPOOL POSITIONINGS

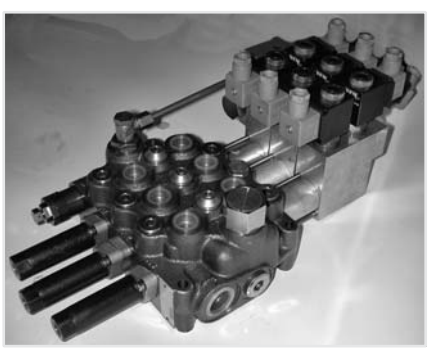


This picture shows the VDM8 assembled, in this case you have a manual control "NP" on A side and a spring return in neutral position "C2" on B side.In this case the manual control "NP" is used directly to have the spool movement, in other case, for example with electro-hydraulic control, there is only a safety lever. Considering that VDM8 is a simmetrical valve, all spool controls and positionings can be placed on both sides A or B.In case of hydraulic kick-out "G2 - G4 - G5" and with spools types 13 - 17 - 18, you can also decide from A or B side but after that this is the final position because with this type of control and spools the monoblock have a special machining.

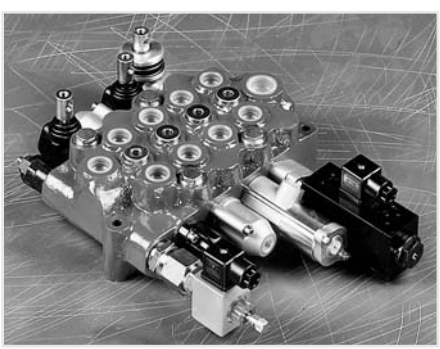
In this and following pages you can find all spool controls and spool positionings, they are all assembled with socket hexagon head screw or in some case hexagon head screw: **M5 x 0.8 with tightening torque of 4.5 ± 0.5 Nm.**

The drw. here below show the reference to fix A and B side from the point of view of the operator.





VDM8 - 3 working sections
with electro-hydraulic controls
H1/H2 - H3/H4

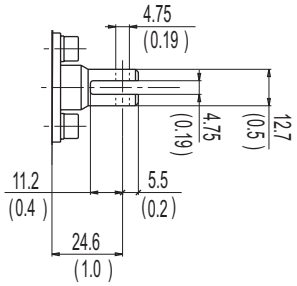


VDM8 - assembling for exhibitions
with miscellaneous of controls
IP - NP - E7/E8 - LS - C2

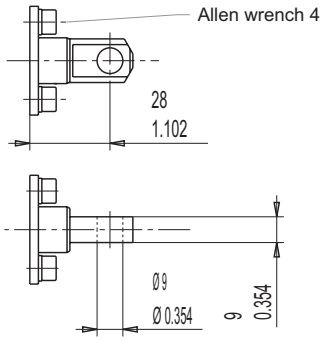
VDM8 - 3 working sections
with pneumatic prop. control **PP** and
electro-pneumatic control **P1/P2**

VDM8 - 5 working sections
with hydraulic prop. control **IP** and
hydraulic prop. control with float pos. **IF**

SPOOL CONTROLS



Female version
available for spools from 01 to 06
for the other spools please get in touch
with our sales dept.

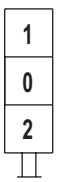


Male version

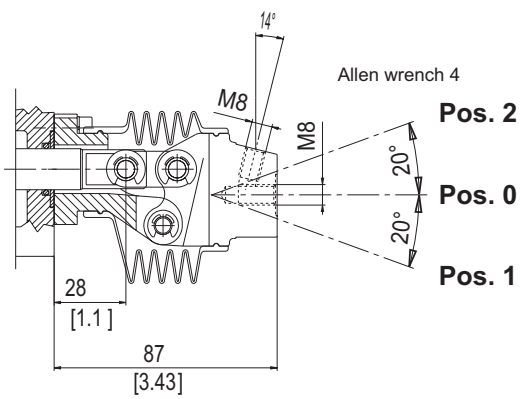
SL

Without lever box

If you order SL we will supply the male version, which is the standard.For the female version please specify it when ordering.



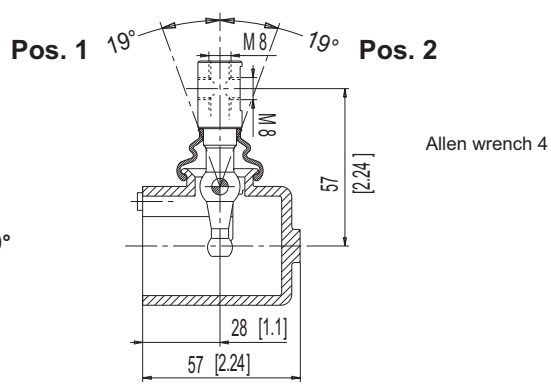
This lever can be assembled turned of 180°



NL

Low effort
protected lever

This lever can be assembled turned of 180°

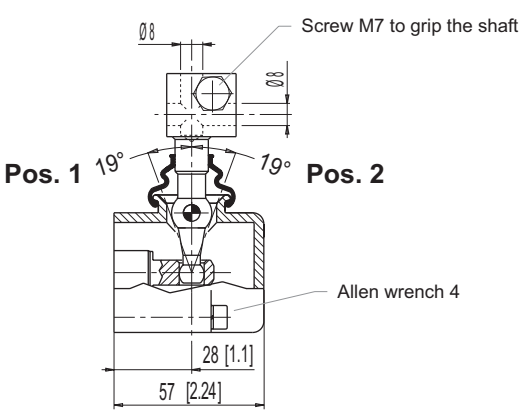


Allen wrench 4

NP

Standard
protected lever

This lever can be assembled turned of 180°



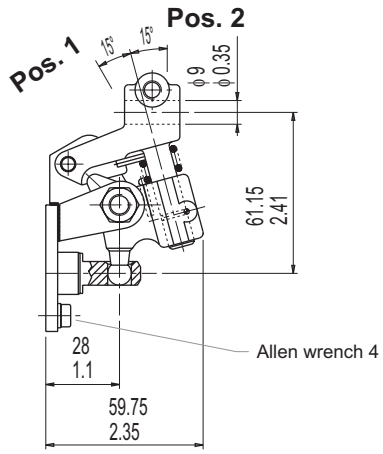
MP

Protected clamp lever

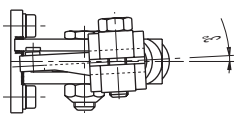
SS

Lever with security locking in neutral pos.
Side shift to unlock

This lever with security locking in neutral pos. has been created to avoid its accidental movement caused by vibrations of the application.



This lever can be assembled turned of 180°

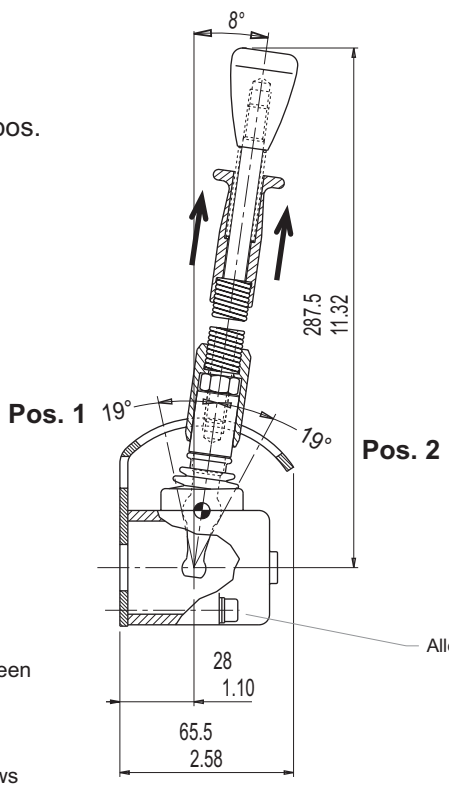


Necessary side shift to release the security locking

FL

Lever with security locking in neutral pos.
Pull the grip to unlock.

This lever with security locking in neutral has been created to avoid its accidental movement caused by vibrations of the application.
Before to put the lever in positions 1 and 2 you must release it by pulling it as per the arrows



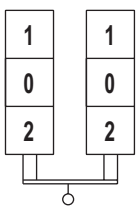
This lever can be assembled turned of 180°

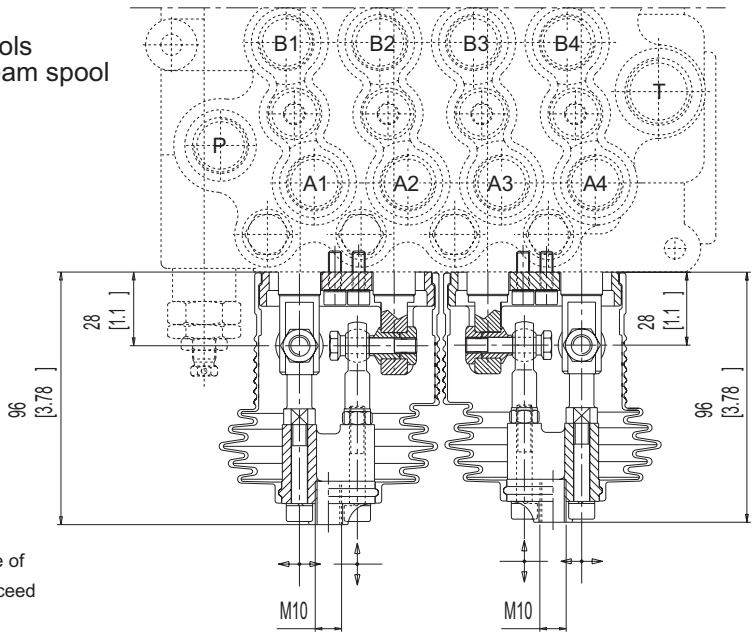
L2

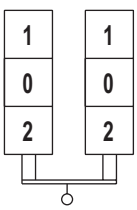
Cross lever for 2 spools
fulcrum on down-stream spool

L1

Cross lever for 2 spools
fulcrum on up-stream spool

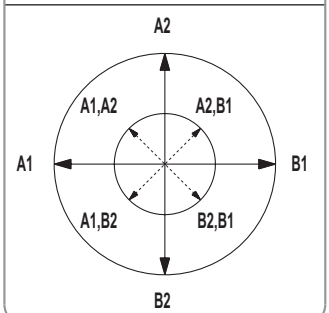




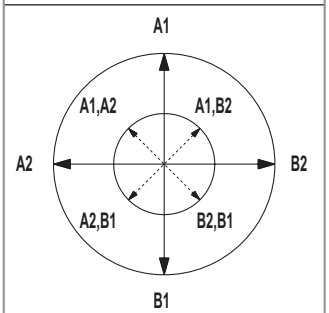


For VDM8 we suggest the use of L1* and L2* in order not to exceed the fixing plane dimension.

L2 - WITH FULCRUM DOWN

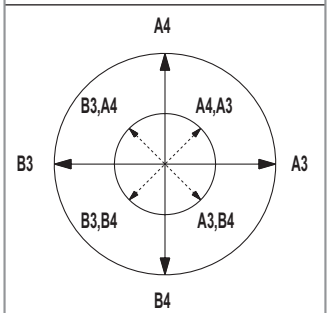


L1* - WITH FULCRUM TOP



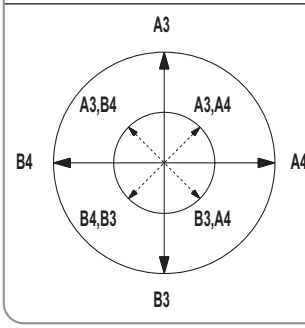
L2 turned 180°

L2* - WITH FULCRUM TOP



L1 turned 180°

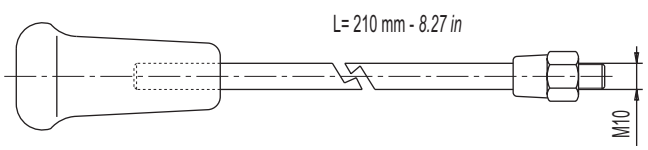
L1 - WITH FULCRUM DOWN



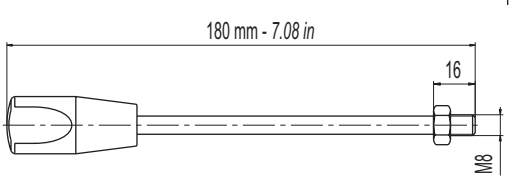
STANDARD SHAFTS

For different diameter and/or length, please get in touch with our sales dept.

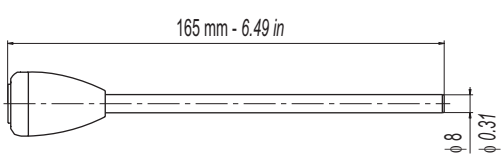
Shaft with ergonomic knob
for cross lever L1/L2
R202 8996 0



Shaft with threaded end
R202 9018 0



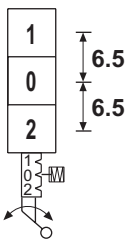
Shaft for clamp lever
R202 8839 0



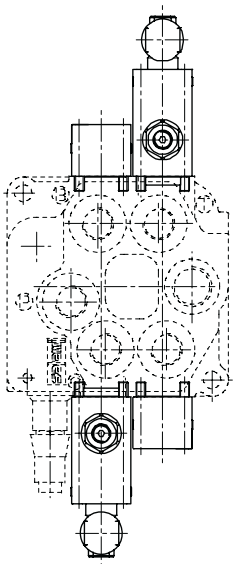
CR

Rotary control, available for 1 working section or two working section but one at the opposite side of the other.
This device is realized for marine applications, so all the material components are corrosion proofing.
This control uses special type spools, available types
are: 01 - 02.Mountable on both side (A or B).

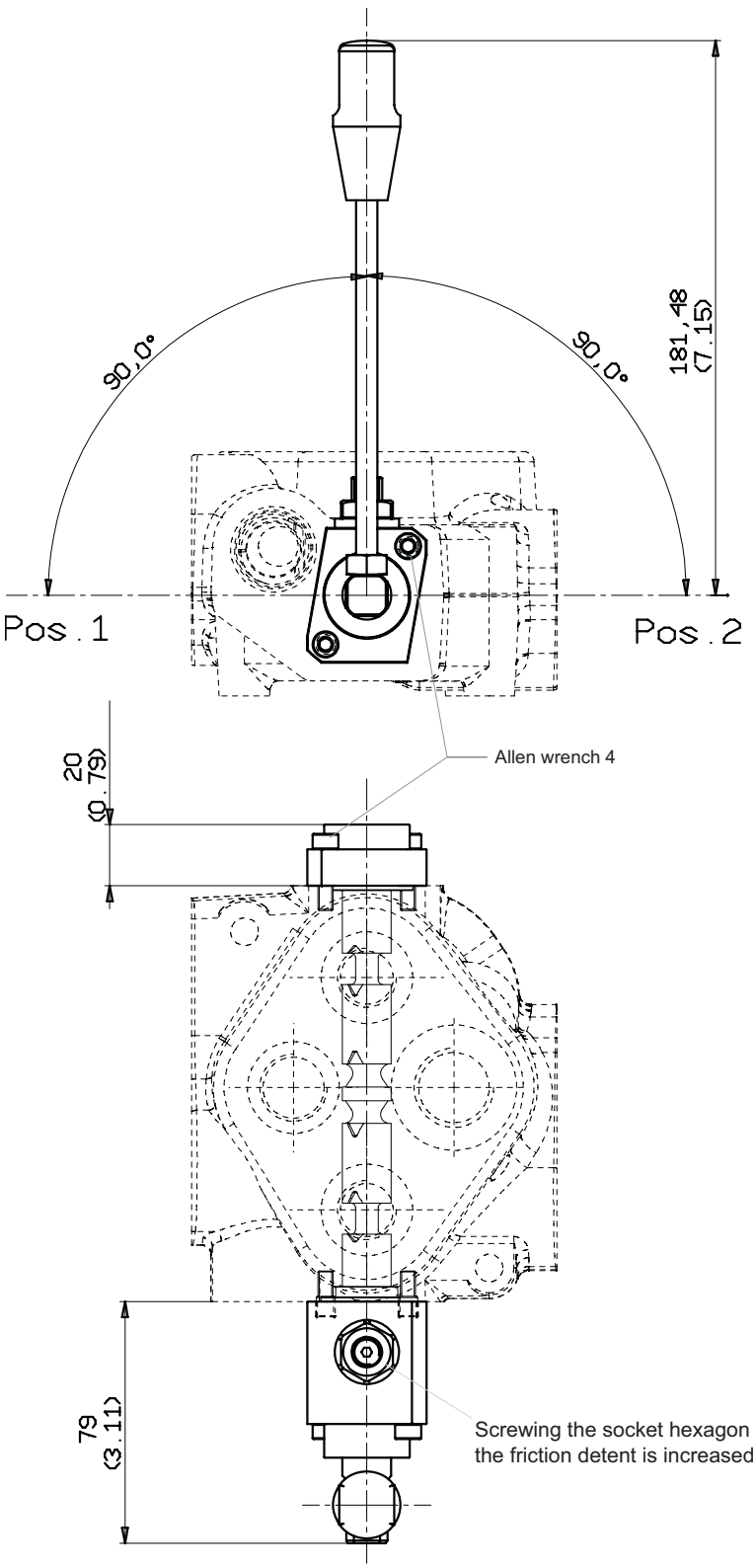
Device with cam
and adjustable friction
detent + rotary lever



Spool stroke



The two sections drawing shows
a VDM6 valve, but it is only an example
to explain the assembling feature.

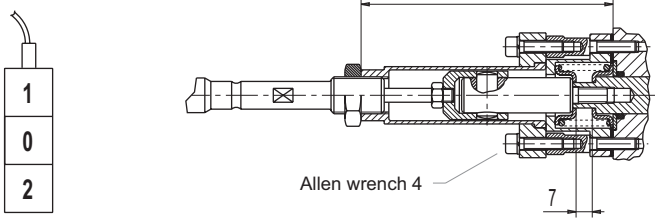


D1

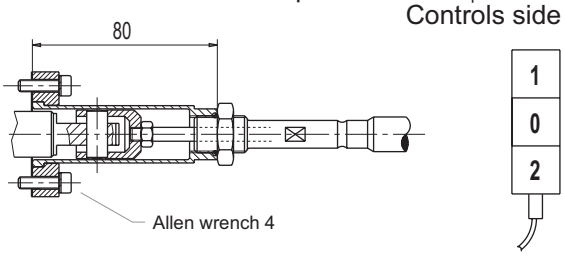
Devices for cable remote control for both the ends of spool.
For more details about cables, please consult our catalogue cable remote controls.

TC

End spool with threaded hole M7
Positionings side



End spool with hole ϕ 9 mm.
Controls side



E1

Working conditions for this control:
Flows up to 70 l/min - *18.5 US gpm*
Pressure up to 240 bar - *3500 psi*

Electric push-pull control 3 positions
12 Vdc

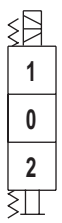
The stroke for this control is of 5 mm,
for this reason the spools are different of standard.
The available spools are from 01 to 06.

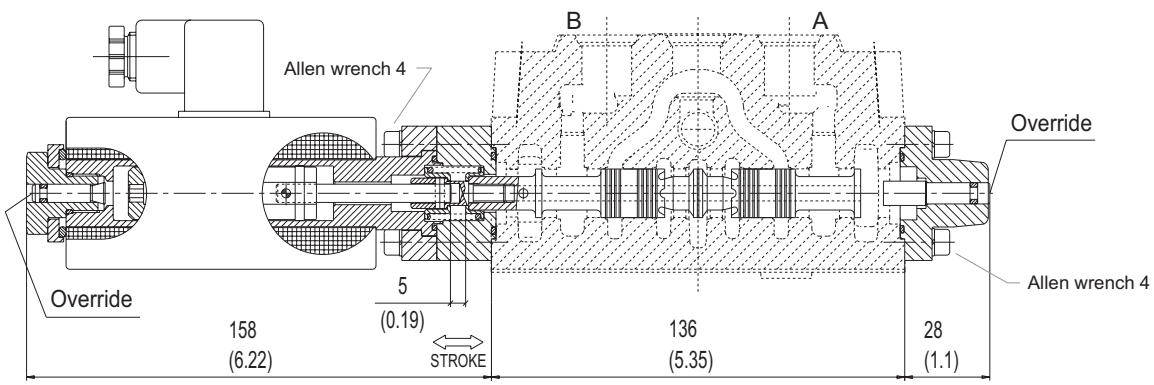
SL

Without lever for electric control
with override device

E2

Electric push-pull control 3 positions
24 Vdc

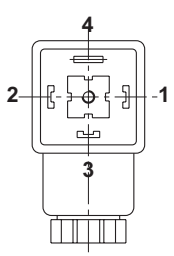




ELECTRICAL DATA

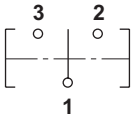
PUSH - PULL SOLENOID

- VOLTAGE: 12Vdc OR 24Vdc
- COIL POWER: 60 Watt at 20°C
- PROTECTION INDEX WITH CONNECTOR: IP 65
- HEAVY DUTY 70%



CONNECTOR
DIN 43650 - A/ISO 4400

ELECTRIC CONNECTIONS SCHEME

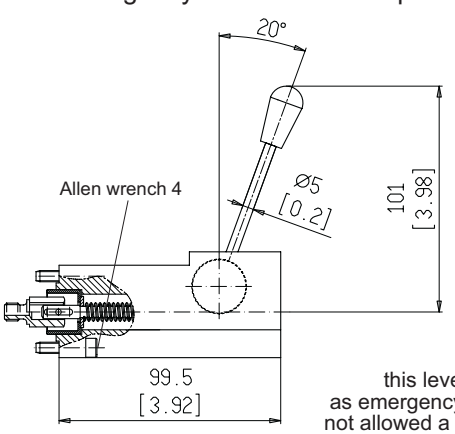


1) NEGATIVE POLE
2) SPOOL IN
3) SPOOL OUT
4) GROUND WIRE

To avoid an excessive were of the contacts, depending on the sparking of these parts, we suggest a suitable protection(for example diodes)

ES

Emergency lever for electric push-pull control

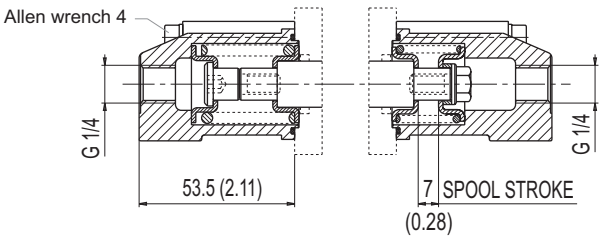


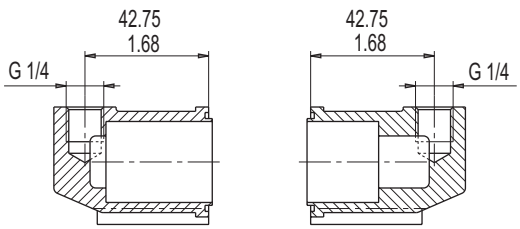
Important:
this lever was realized as emergency lever and it's not allowed a continuos use.

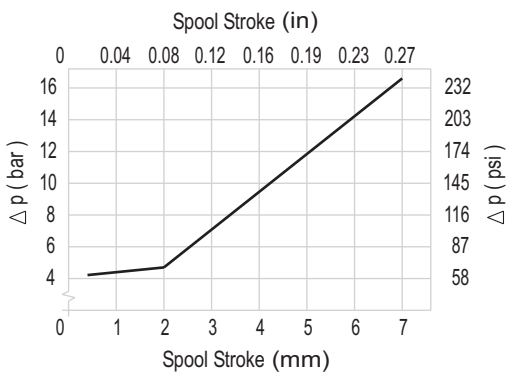
IP

Important:
when you order please specify top or side ports

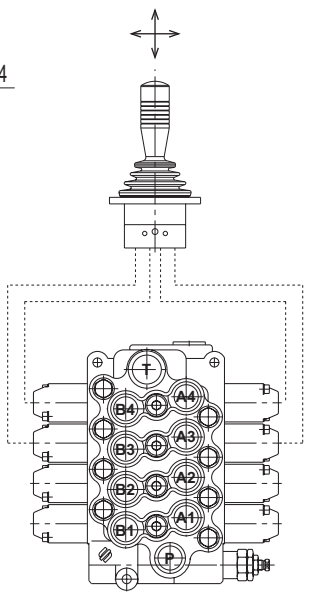
Hydraulic proportional control







Salami hydraulic
2 axis joystick

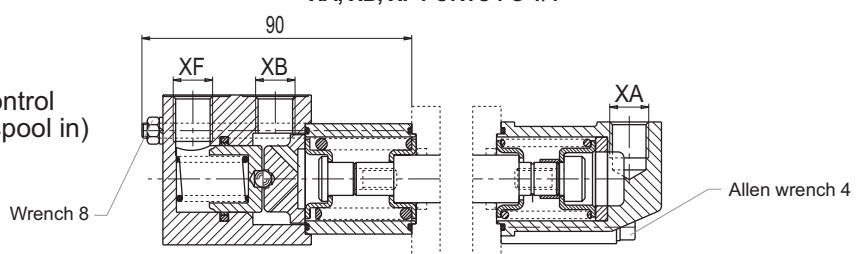


For more information please consult our catalogue
SHRC hydraulic remote controls.

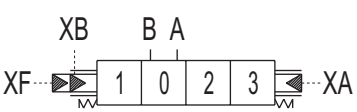
IF

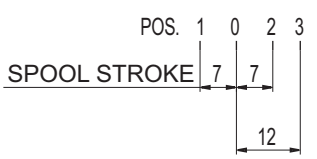
XA, XB, XF PORTS : G 1/4

Hydraulic proportional control
with third float position (spool in)

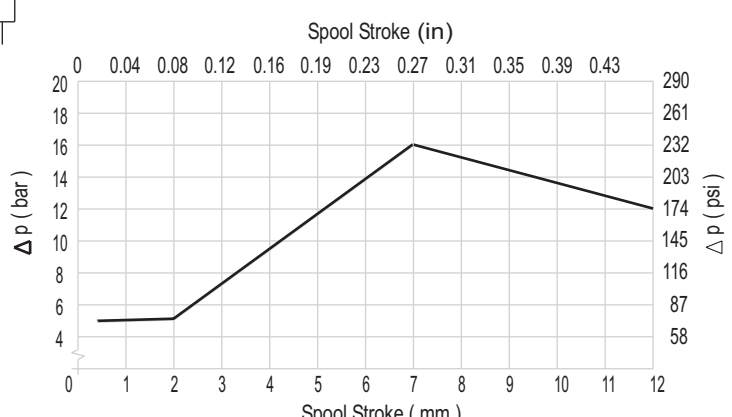


OPERATING SCHEME





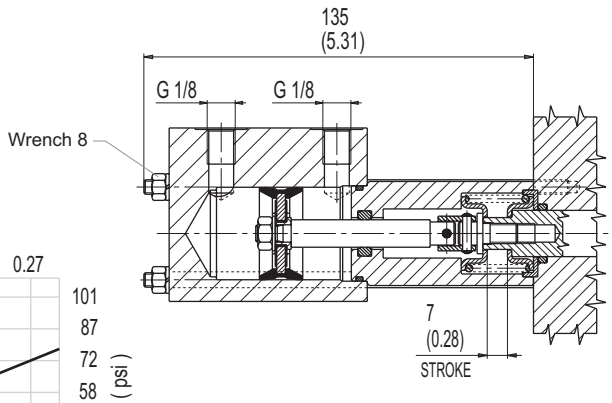
XA,XB,XF → T ⇨ POS. 0
Pressure → XB ⇨ POS. 1
Pressure → XA,XF ⇨ POS. 2
Pressure → XA ⇨ POS. 3

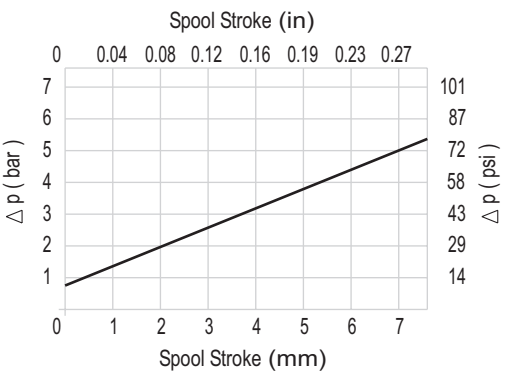


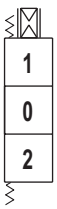
Thought for all truck hydraulic applications

PP/P0

Pneumatic proportional/on-off control







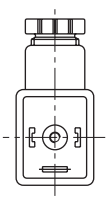
Pneumatic proportional/on-off control
This control is at the same time proportional and on-off type, it depends if you use a pneumatic remote control proportional type(with the characteristic curve of diagram), or on-off type.

P1

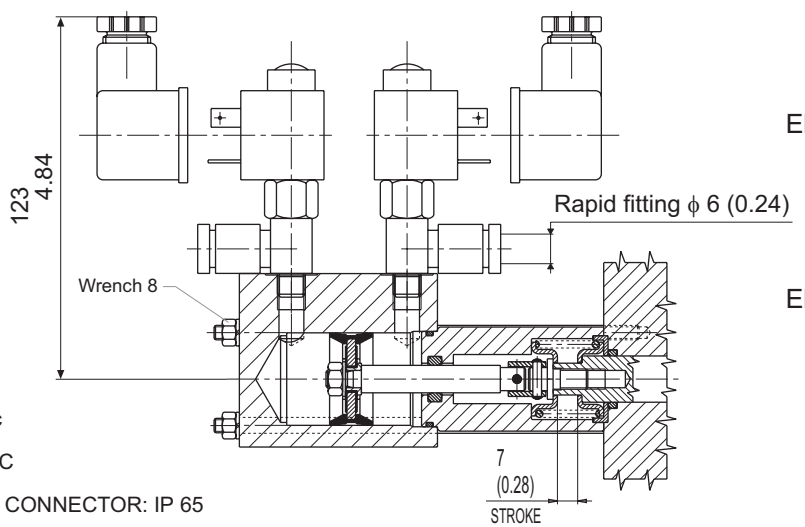
Electro-pneumatic on-off control - 12 Vdc

P2

Electro-pneumatic on-off control - 24 Vdc



CONNECTOR
DIN 43650 - A/ISO 4400



ELECTRICAL DATA

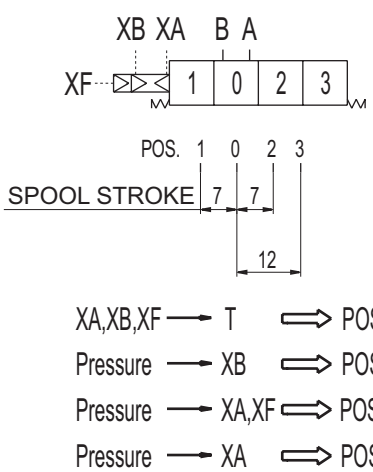
- VOLTAGE: 12Vdc OR 24Vdc
- COIL POWER: 6 Watt at 20°C
- PROTECTION INDEX WITH CONNECTOR: IP 65

Starting from PP/PO adding the electro-valves you get P1 or P2

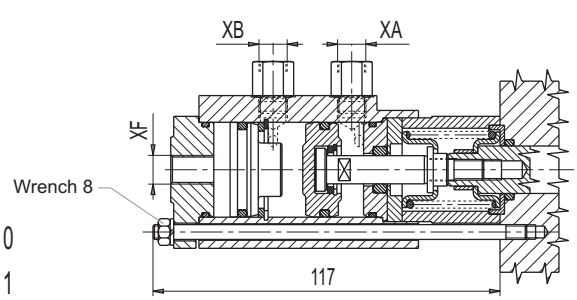
PQ

Pneumatic on-off control with third float position (spool in)

OPERATING SCHEME



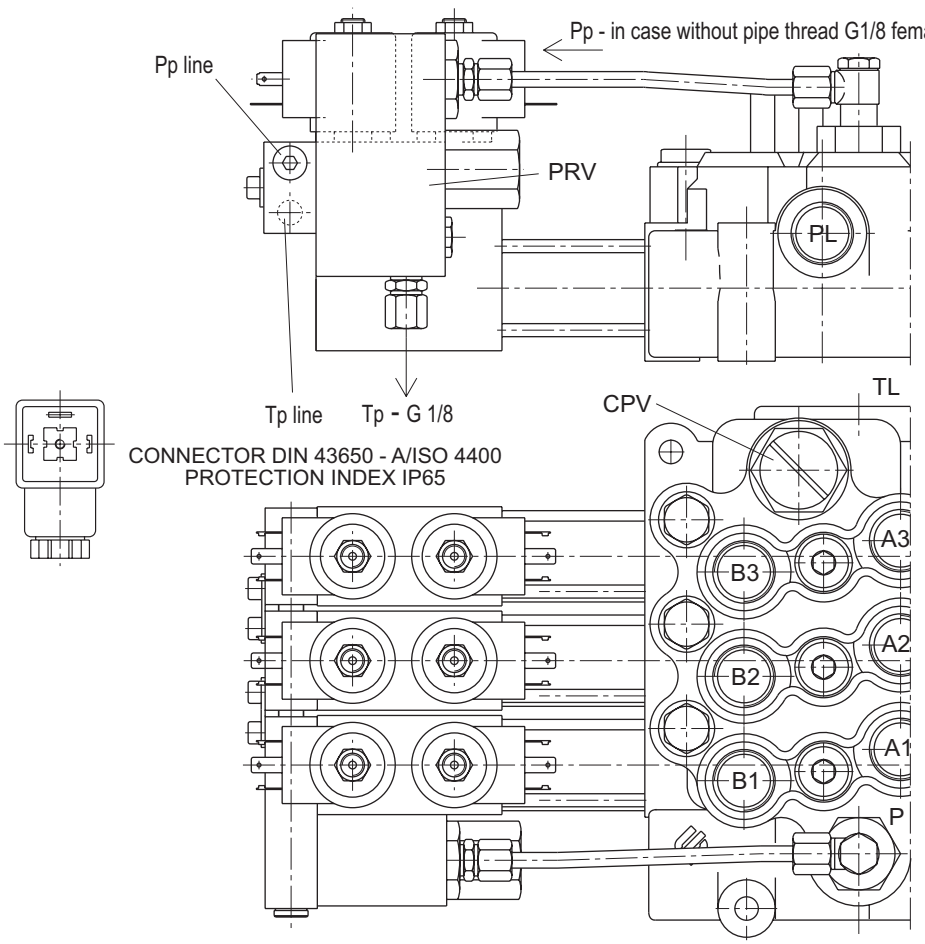
XA, XB, XF PORTS : G 1/4



For electro-pneumatic control with third float position, please get in touch with our sales dept.

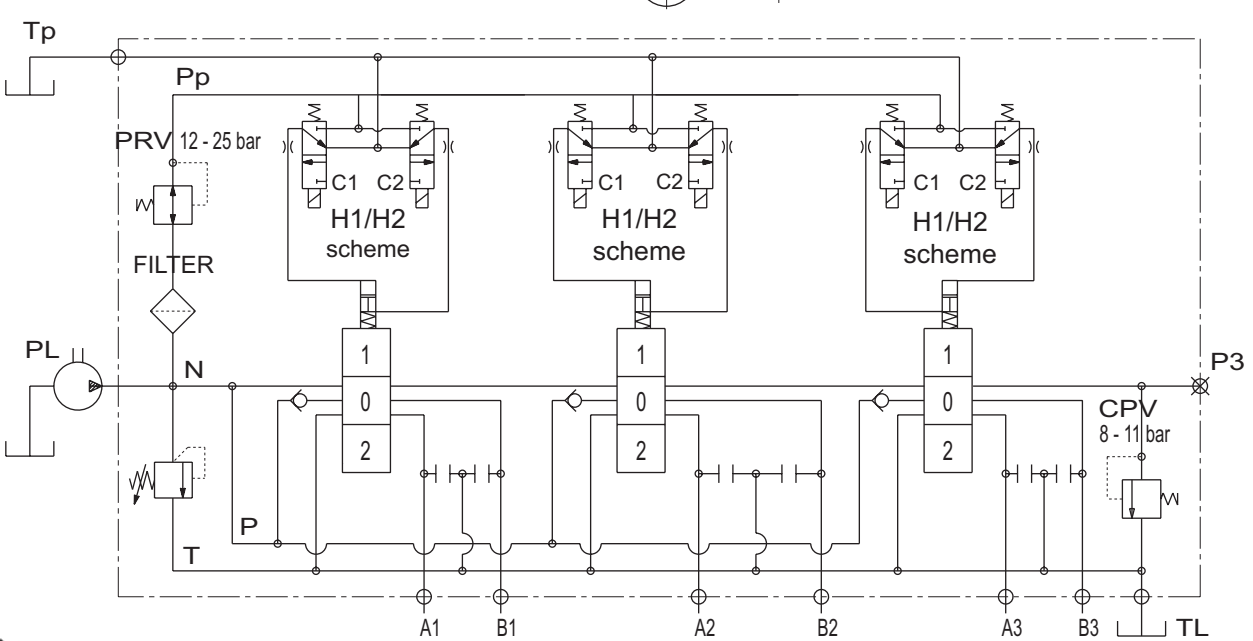
Preliminary specifications about electro-hydraulic controls

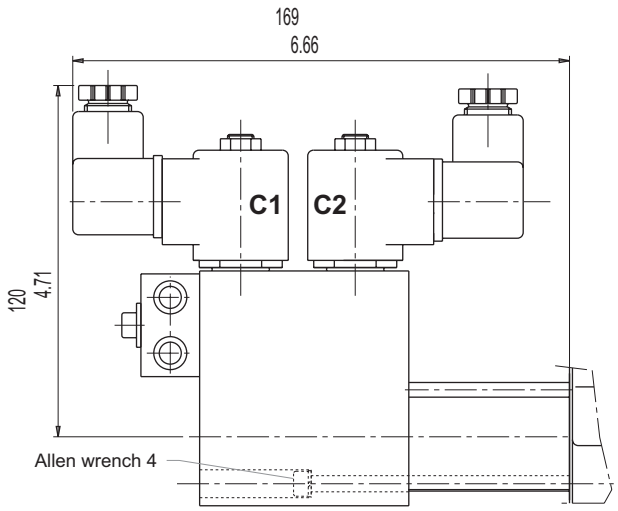
Before to introduce electro-hydraulic single modules it is necessary to specify the adding hydraulic components necessary for the right functioning of it.As you can see in the drawing and hydraulic scheme it needs a pressure reducing valve "PRV" at the inlet of piloting circuit that reduce the pressure of "P" line at the max value of 25 bar (363 psi), a back pressure "CPV" on neutral line that assure a min. pressure of 8 bar (116 psi) and some accessories as fittings, pipe and filter.The pressure reduction at the piloting circuit inlet and the minimum value of neutral line can be obteined also with external standard valves made by valve manufacturer, for this reason Salami electro-hydraulic controls can be supplied without "PRV" and "CPV".
In this case is necessary to specify it in phase of order.
Our standard supply has the "Tp" port opened, we recommend to connect it directly to tank because a counter-pressure could be cause of malfunction.
With reference to page 9, "INLET AND OUTLET TYPES", the outlet U8 is shown in the hydraulic scheme here below, remember that with a special plug instead of "CPV" valve you can change U8 in a power beyond outlet type "U5".



INDEX

PRV - pressure reducing valve
CPV - counter pressure valve
Pp - pressure piloting line
Tp - tank piloting line
PL - P port
TL - T port





OPERATING INSTRUCTIONS
please see the hydraulic circuit
of page before

C1 - C2	coils de-energized	⇨ POS. 0
C1	coil energized	⇨ POS. 1
C2	coil energized	⇨ POS. 2

TECHNICAL DATA

- MAX PRESSURE IN "P"	30 bar
- MAX FLOW	2 l/min
- AVAILABLE VOLTAGE	12 - 24 Vcc
- COIL RESISTANCE	12Vdc:7.2Ω - 24Vdc:41.5Ω
- POWER	14 W (20°C)

H1

ON-OFF
electro-hydraulic control
12 Vdc

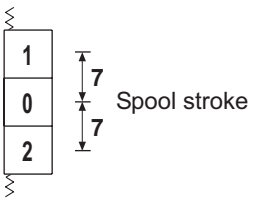
H2

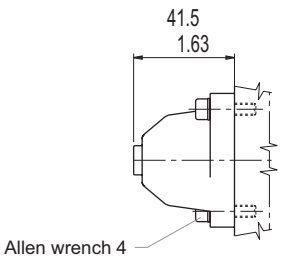
ON-OFF
electro-hydraulic control
24 Vdc

SPOOL POSITIONINGS

C2

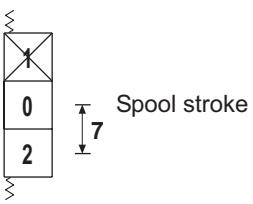
Spring centered to neutral position





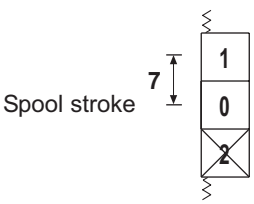
C5

Two positions (neutral/pos. 2)
with spring return in neutral



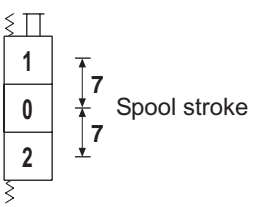
C6

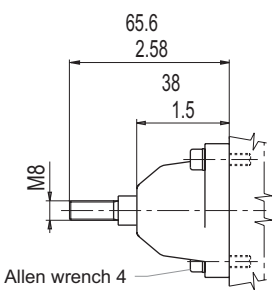
Two positions (neutral/pos. 1)
with spring return in neutral

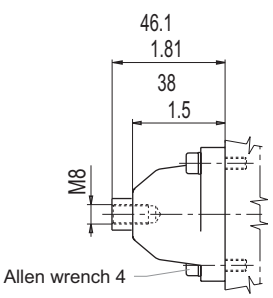


C3

Spring centered to neutral
(pivot threaded male
for remote control)

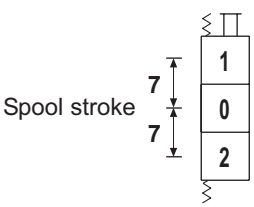






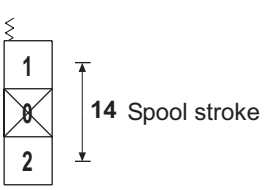
C4

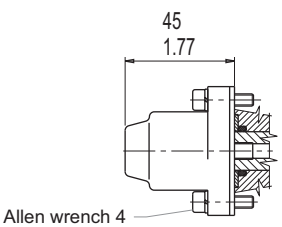
Spring centered to neutral
(pivot threaded female
for remote control)



C7

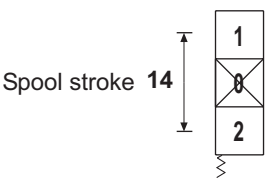
Two positions (pos. 1/pos. 2)
with spring return in pos. 1





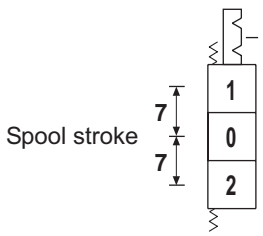
C8

Two positions (pos1/pos. 2)
with spring return in pos. 2



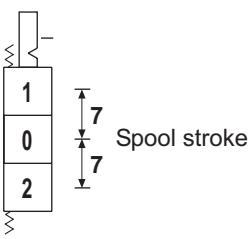
R2

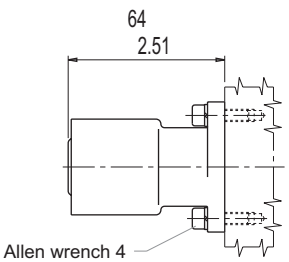
Detent on pos. 1/pos. 2
with spring return in neutral



R5

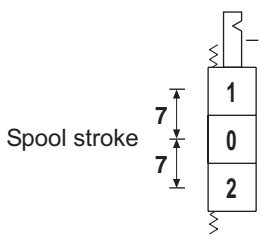
Detent on pos. 2
with spring return in neutral





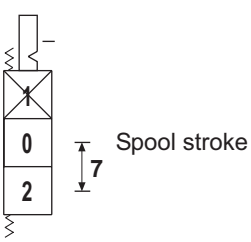
R4

Detent on pos. 1
with spring return in neutral



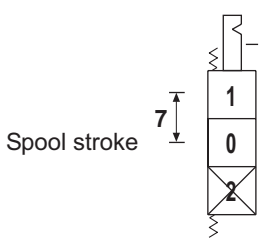
R6

Two positions with detent on pos. 2
with spring return in neutral



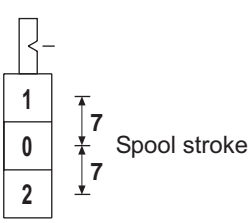
R7

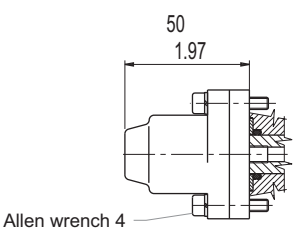
Two positions with detent on pos. 1
with spring return in neutral



CO

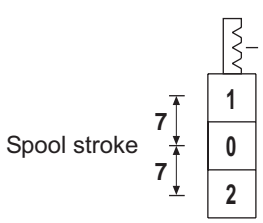
Detent on each intermediate positions





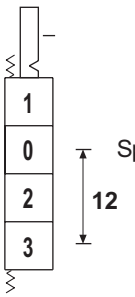
R9

Detent on pos. 1/pos. 2
and neutral position



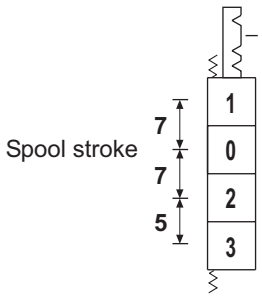
F1

Detent on pos. 3
with spring return in neutral



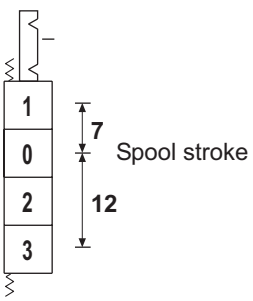
F2

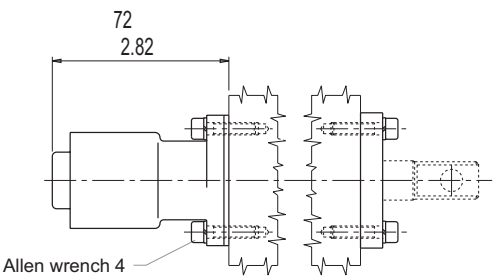
Detent on pos. 1/pos. 2/pos. 3
with spring return in neutral



F3

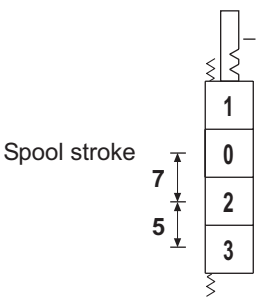
Detent on pos. 1/pos. 3
with spring return in neutral





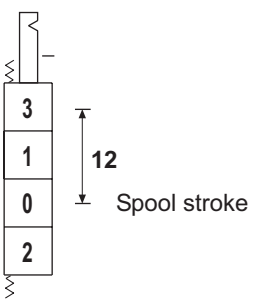
F4

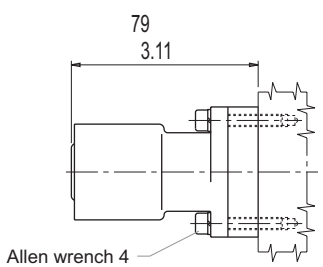
Detent on pos. 2/pos. 3
with spring return in neutral



F5

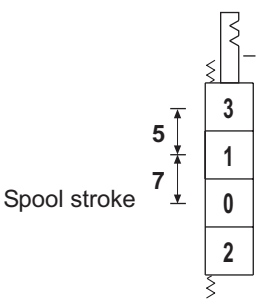
Detent on pos. 3
with spring return in neutral





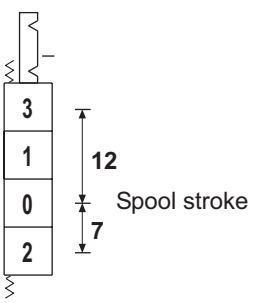
F6

Detent on pos. 1/pos. 3
with spring return in neutral



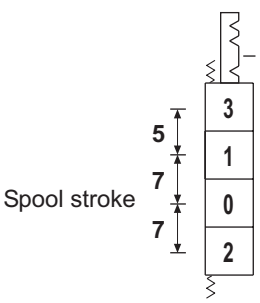
F7

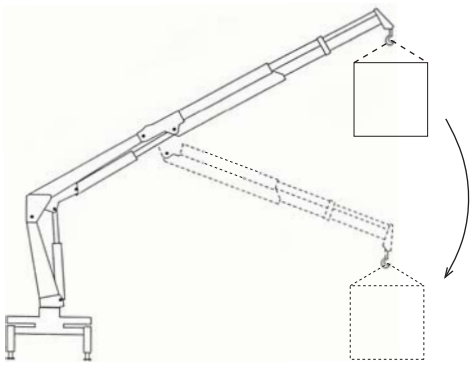
Detent on pos. 2/pos. 3
with spring return in neutral



F8

Detent on pos. 1/pos. 2/pos. 3
with spring return in neutral

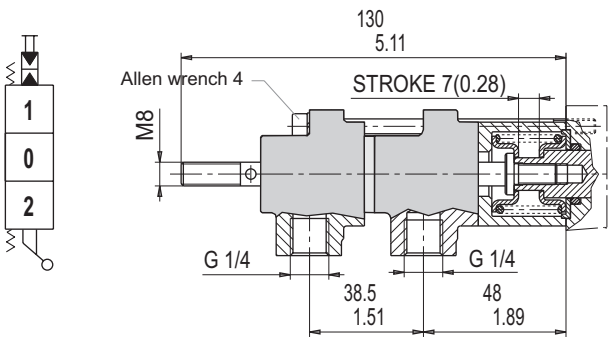




For manifacturers using load and overturning torque limiting device for hydraulically operated cranes, Salami VDM8 valve is available with some devices that allow the manifacturer to supply a pressure signal inside itself.This pressure signal, acting on the area of a piston of 18 mm(0.71 inc.) diameter, reacts to the force of the manual control bringing back the spool at the position 0.
These devices are only available in combination with manual control.

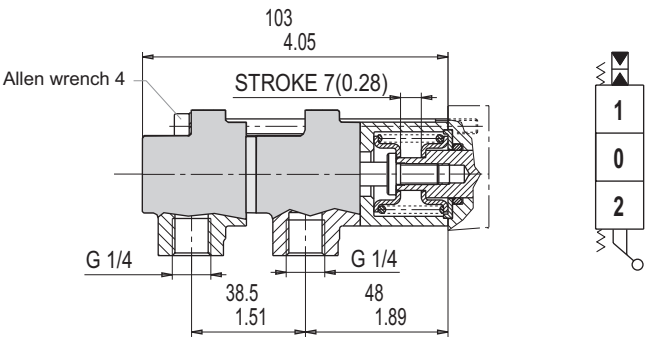
D9

Device for spool positioning in 0 from the positions 1 and 2 by an external pressure signal. For tie-rod connection.



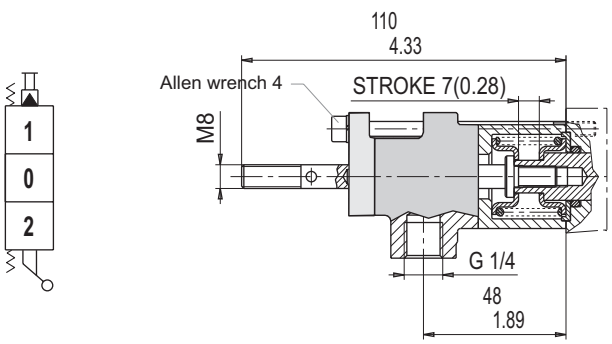
M3

Device for spool positioning in 0 from the positions 1 and 2 by an external pressure signal.



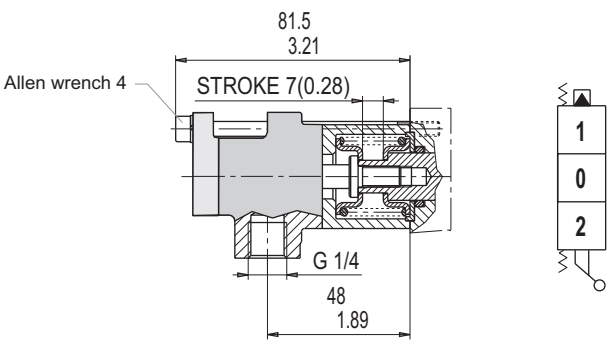
D8

Device for spool positioning in 0 from the position 1 by an external pressure signal. For tie-rod connection.



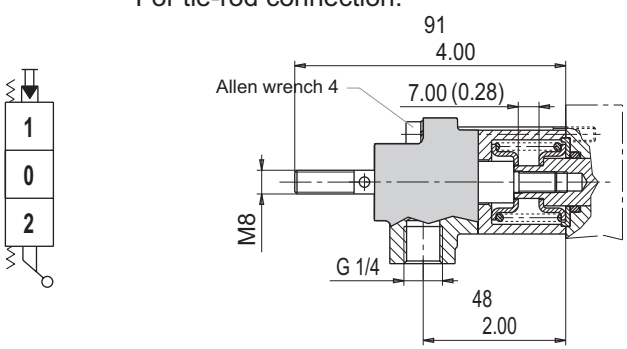
M1

Device for spool positioning in 0 from the position 1 by an external pressure signal.



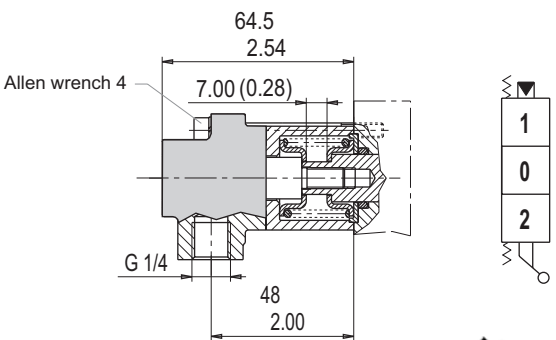
D7

Device for spool positioning in 0 from the position 2 by an external pressure signal. For tie-rod connection.



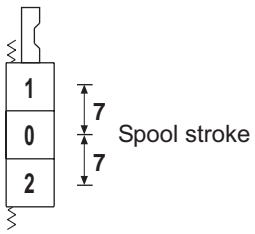
M2

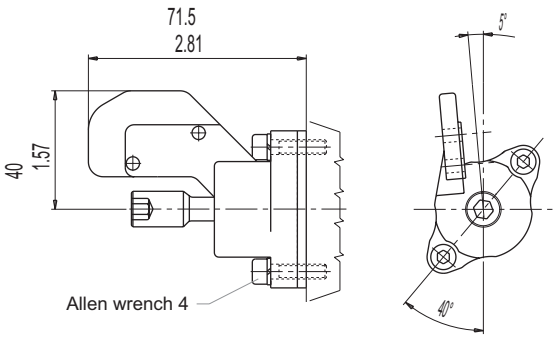
Device for spool positioning in 0 from the position 2 by an external pressure signal.



CE

Pre-arrangement for electrical device

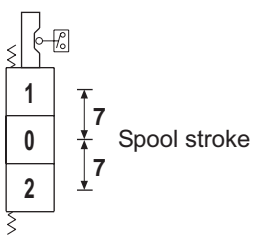


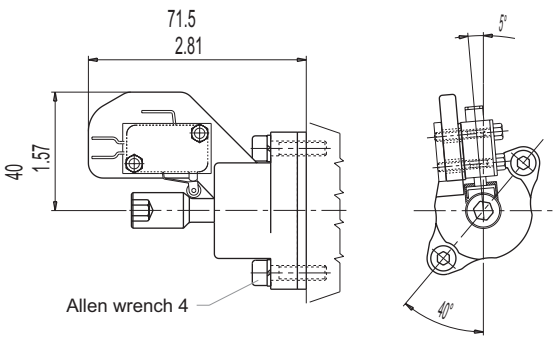


MICROSWITCH TYPE: SAIA - BURGESS XGK - 88
For more information please get in touch with our sales dept.

CM

Spool positioning with microswitch to start an electric motor (available also for single acting spools)

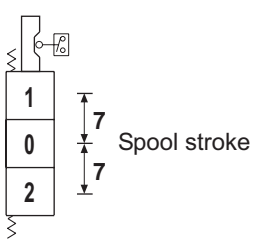


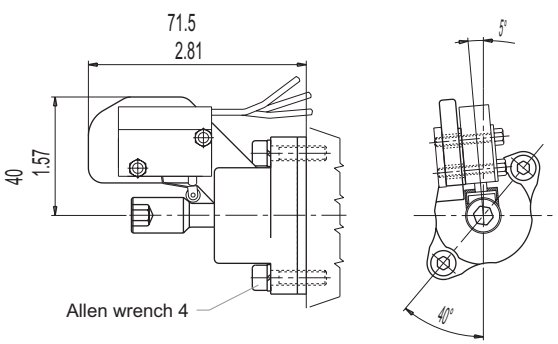


PROTECTION INDEX
IP65

CW

Spool positioning with waterproof microswitch to start an electric motor (available also for single acting spools)

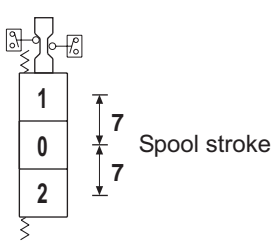


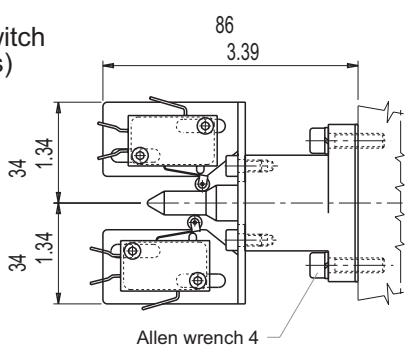


PROTECTION INDEX
IP67

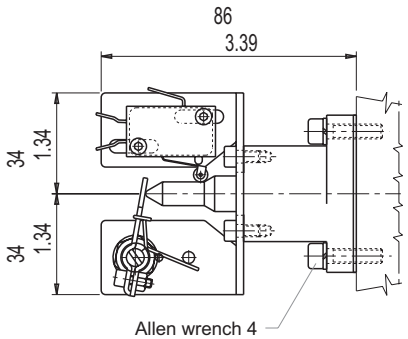
CD

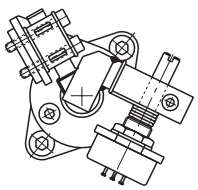
Spool positioning with double microswitch (available also for single acting spools)





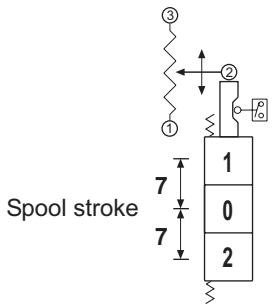
PROTECTION INDEX
IP65

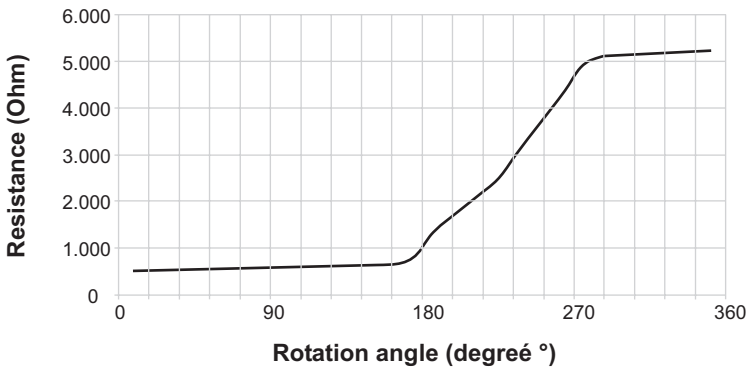




PM

Spool positioning with microswitch to start an electric motor and potentiometer to run up speed motor (available also for single acting spools)

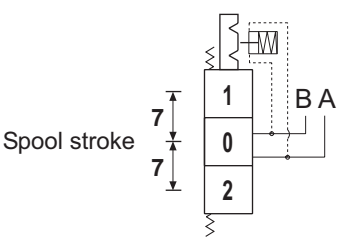


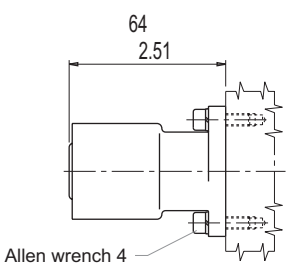


IMPORTANT:
When you order, please specify the setting pressure of the device.
With this type of spool positiong a special machining of the body is required.

G2

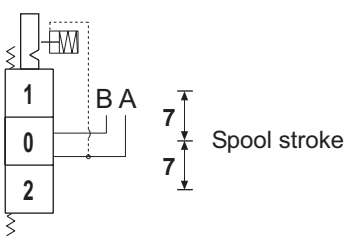
Detent on pos. 1/pos. 2 with hydraulic kick-out





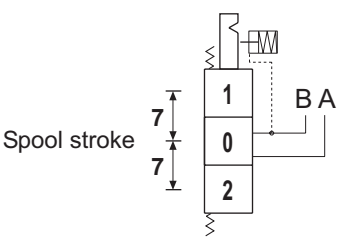
G5

Detent on pos. 2 with hydraulic kick-out



G4

Detent on pos. 1 with hydraulic kick-out



How to order/VDM8

DIRECTIONAL CONTROL VALVE MONOBLOCK TYPE

VDM8 | 01 | D | 180 | – | EV2 | / | 2 | X | P | 01 | A | – | VA | 165 | A | . | AR | 140 | B | – | NL | A | – | C2 | /

/ | P | 01 | A | – | PR | 000 | A | . | PR | 000 | B | – | NL | A | – | C2 | / | U1 | G

INLET CONFIGURATION
See page 11

MAIN RELIEF VALVE (PAG. 14)	
D	Direct main relief valve
P	Piloted main relief valve
W	Without main relief valve

MAIN RELIEF VALVE SETTING (bar)
See page 14

VENTING VALVE
See page 15

NUMBER OF IDENTICAL CONSECUTIVE SECTIONS

PARALLEL CIRCUIT

SPOOL TYPES (PAG. 12 - 13)	
01	Double acting spool
02	Double acting motor spool
03	Double acting motor spool ("B" port blocked)
04	Double acting motor spool ("A" port blocked)
05	Single acting spool "A" working port
06	Single acting spool "B" working port
11	Double acting spool with float function in 3rd pos. (spool in)
12	Double acting spool with float function in 3rd pos. (spool out)
13	Double acting spool with regenerative function in position 3 (spool in)
17	Double acting spool with regenerative function in position 2 (spool in)
18	Double acting spool with regenerative function in position 1 (spool out)
52	Over center double acting spool "A" working port
53	Over center double acting spool "B" working port
54	Over center double acting spool "A" and "B" working ports

SPOOL CHOICE ACCORDING TO THE INLET FLOW (PAG. 12)	
A	Nominal flow
C	2/3 of the nominal flow

AUXILIARY VALVES (PAG. 16 - 17)	
AR	Not adjustable overload and anti-cavitation valve (available settings at page 16)
VR	Anti-cavitation valve
PR	Pre-arrangement for auxiliary valve
ST	Flow restrictor P ® A/B
SP	Flow restrictor A/B ® T

PORTS (PAG. 10)	
G	GAS threaded
S	SAE threaded
M*	METRIC threaded

OUTLET CONFIGURATION
See page 11

SPOOL POSITIONINGS
Page 28 C2 - C3 - C4 - C5 - C6 - C7 - C8
Page 29 R2- R4 - R5 - R6 - R7 - R9 - C0
Page 30 F1 - F2 - F3 - F4 - F5 - F6 - F7 - F8
Page 31 D7 - D8 - D9 - M1 - M2 - M3
Page 32 - 33 CE - CM - CW - CD - PM - G2 - G4 - G5

CONTROL SIDE (PAGE 18)

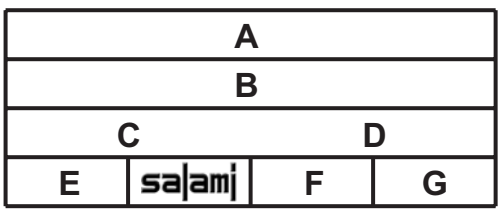
SPOOL CONTROLS
Without lever box page 19 - SL
Handle controls from page 19 to 21 NL - NP - MP - SS - FL - L1/L2 - L1*/L2*
Devices for rotary control page 22 CR
Devices for cable remote control page 23 D1 - TC
Direct electric control and emergency devices page 23 E1 - E2 - SL - ES
Hydraulic controls page 24 IP - IF
Pneumatic and electro-pneumatic controls page 25 PP/P0 - P1/P2 - PQ
Electro-hydraulic controls pages 26 - 27 H1/H2

PORT ON WHICH THE VALVE IS MOUNTED

*Available for quantity, please contact our sales dept.

DESCRIPTION OF THE NEW PRODUCT IDENTIFICATION LABEL

Based on the firm certification ISO 9001 - UNI EN 29001, section 4.8 (identification and tracebility of the product), we have adopted a new identification label starting from the 1st march 1995. Pls, see following example:



A = Product short descritpion (eg. VD8A/FDD/U4G).

B = Customer part number.

C = Salami part number (eg. 6235 0025 0).

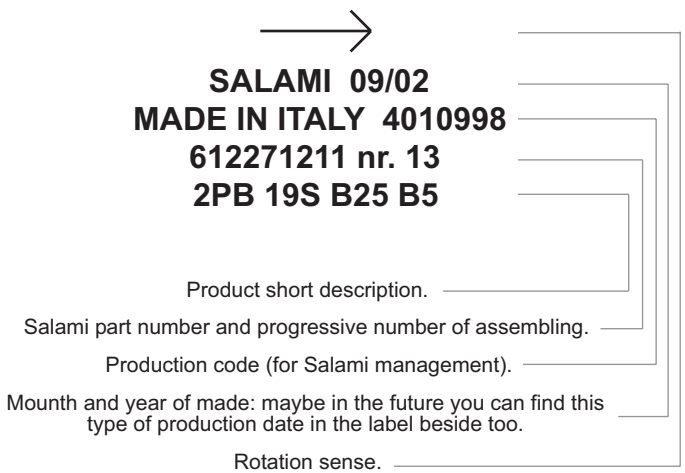
D = Production code (for Salami management)

E = Rotation sense (only for pumps).

F = Production date (see data sheet here below)

G = Progressive number of assembling.

Only for pumps 2PB and 2PZ (except triple 2PB) the identification product is marked on the top of the pump body as shown here below:



ASSEMBLED	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
JANUARY	7A	8M	9M	0M	1M	2M	3M	4M	5M	6M	7M	08M	09M	10M	11M	12M
FEBRUARY	7B	8N	9N	0N	1N	2N	3N	4N	5N	6N	7N	08N	09N	10N	11N	12N
MARCH	7C	8P	9P	0P	1P	2P	3P	4P	5P	6P	7P	08P	09P	10P	11P	12P
APRIL	7D	8Q	9Q	0Q	1Q	2Q	3Q	4Q	5Q	6Q	7Q	08Q	09Q	10Q	11Q	12Q
MAY	7E	8R	9R	0R	1R	2R	3R	4R	5R	6R	7R	08R	09R	10R	11R	12R
JUNE	7F	8S	9S	0S	1S	2S	3S	4S	5S	6S	7S	08S	09S	10S	11S	12S
JULY	7G	8T	9T	0T	1T	2T	3T	4T	5T	6T	7T	08T	09T	10T	11T	12T
AUGUST	7H	8U	9U	0U	1U	2U	3U	4U	5U	6U	7U	08U	09U	10U	11U	12U
SEPTEMBER	7I	8V	9V	0V	1V	2V	3V	4V	5V	6V	7V	08V	09V	10V	11V	12V
OCTOBER	7J	8Z	9Z	0Z	1Z	2Z	3Z	4Z	5Z	6Z	7Z	08Z	09Z	10Z	11Z	12Z
NOVEMBER	7K	8X	9X	0X	1X	2X	3X	4X	5X	6X	7X	08X	09X	10X	11X	12X
DECEMBER	7L	8Y	9Y	0Y	1Y	2Y	3Y	4Y	5Y	6Y	7Y	08Y	09Y	10Y	11Y	12Y

WARRANTY

- We warrant products sold by us to be free from defects in material and workmanship.

- Our sole obligation to buyer under this warranty is the repair or replacement, at our option, of any products or parts thereof which, under normal use and proper maintenance, have proven defective in material or workmanship, this warranty does not cover ordinary wear and tear, abuse, misuse, averloading, alteration.

- No claims under this warranty will be valid unless buyer notifies SALAMI in writing within a reasonable time of the buyer's discovery of such defects,but in no event later than twelve (12) mounths from date of shipment to buyer.

- Our obligation under this warranty shall not include any transportation charges or cost of installation, replacement, field repair, or other charges related to returning products to us; or any liability for directs, indirects or consequential damage or delay.If requested by us, products or parts for which a warranty claim is made are to be returned transportation prepaid to our factory. The risk of loss of any products or parts thereof returned to SALAMI will be on buyer.

- No employee or representative is authorized to change any warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of SALAMI.

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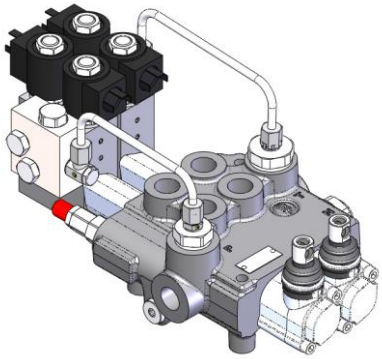
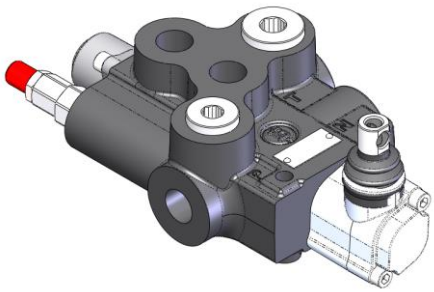
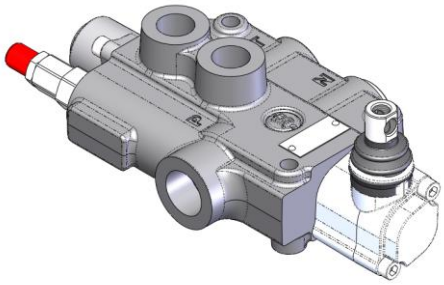
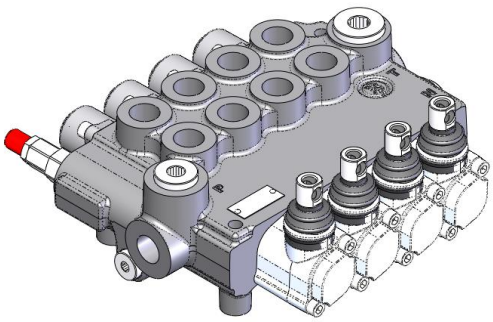
info@salamihydraulics.com

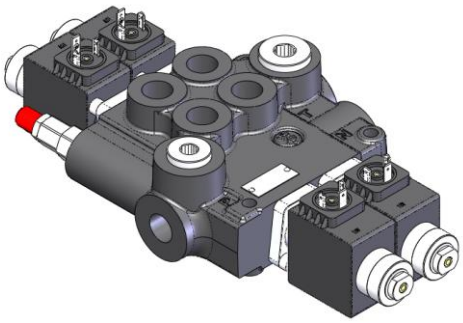
Z80

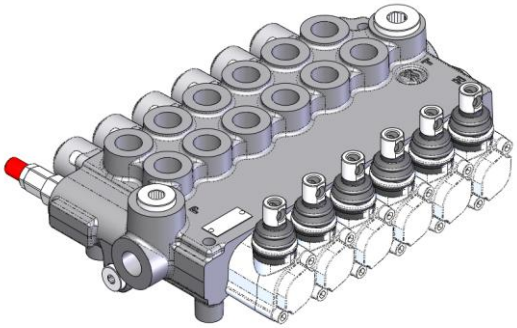












Features

Simple compact and heavy duty designed monoblock from 1 to 6 sections for open and closed centre hydraulic systems.

- Fitted with a main pressure relief valve and a load check valve (optionally individual check valve per spool).
- Available with parallel and tandem circuit
- Optional power beyond port for parallel and tandem circuit
- Diameter 18 mm *0.71 in* interchangeable spools.
- A wide variety of options
- Floating spools and kits, regenerative spools and kits do not require additional machining on the body
- Actuation – manual, pneumatic, electro-pneumatic, hydraulic, electro-hydraulic, with solenoid and remote with flexible cables spool control kits.

Additional information

This catalogue shows the product in the most standard configuration. For special requests please contact sales.

WARNING!

All specifications of this catalogue refer to the standard product at this date. Badestnost, oriented in continuous improvement, reserves the right to discontinue, modify or revise specifications, without notice.

First edition 09-2025

Working conditions

Nominal flow rating		80 l/min	*21.1 US gpm*
Operating pressure (max.)	*parallel and tandem*	315 bar	*46000 psi*
Back pressure (max.)	*outlet port T, static*	35 bar	*508 psi*
Internal leakage (min.) A(B) to T	*Δp = 100 bar (1450 psi) fluid and valve at 40 °C (104 °F)*	8 cm^3/min	*0.48 in^3/min*
Hydraulic fluid		Mineral based oil	
Fluid temperature	*with NBR seals*	from -20 °C to 80 °C	*from -4 °F to 176 °F*
	with FPM (Viton) seals	from -20 °C to 100 °C	*from -4 °F to 212 °F*
Viscosity	*operating range*	from 15 to 75 mm^2/s	*from 15 to 75 cSt*
	min.	12 mm^2/s	*12 cSt*
	max.	400 mm^2/s	*400 cSt*
Permisable degree of fluid contamination		-/19/16 - ISO 4406	*NAS 1683 - class 10*
Ambient temperature	with mechanical devices	from -40 °C to 60 °C	*from -40 °F to 140 °F*
	with pneumatic and hydraulic devices devices	from -30 °C to 60 °C	*from -22 °F to 140 °F*
	with electric devices	from -20 °C to 50 °C	*from -4 °F to 140 °F*

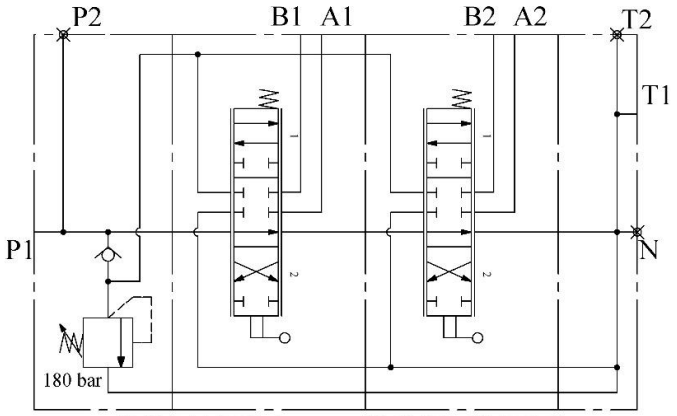
Standard threads

Refernce standard					
		BSP	UN-UNF	Metric	NPTF
Thread according to		ISO 228/1	ISO 263	ISO 262	Ansi B1.20.3
		BS 2779	ANSI B1.1 unified		
Cavity dimension according to	ISO	1179	11926	9974-1	
	SAE		J1926	J2244	J476a
	DIN 3852-2 (Shape X or Y)			3852-1 (Shape X or Y)	

Port threadings and codes				
Codes:	G	S	NPTF	M
Main ports	BSP	UN-UNF	NPTF	Metric
Inlet P	G1/2	7/8-14 (SAE10)	1/2NPTF	M22x1.5
Outlet port T	G3/4	1 1/16-12 (SAE12)	3/4NPTF	M26x1.5
Working ports A and B	G1/2	7/8-14 (SAE10)	1/2NPTF	M22x1.5
Control pilot ports				
Pneuamtic	1/8-27 NPTF	1/8-27 NPTF	1/8-27 NPTF	1/8-27 NPTF
Hydraulic	G1/4	9/16-18 (SAE6)	9/16-18 (SAE6)	G1/4

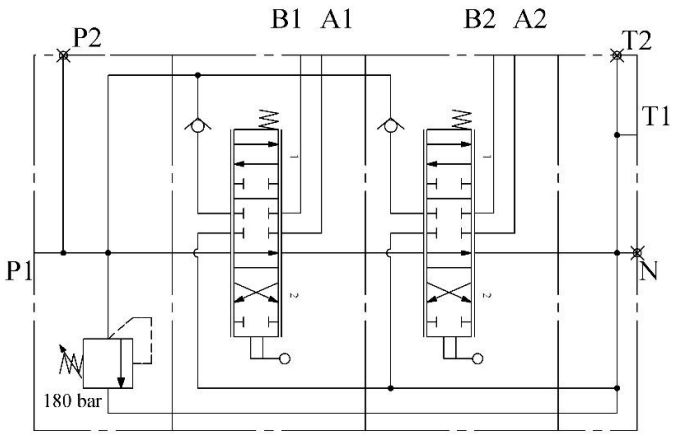
Hydraulic circuits

Standard configuration – parallel body, common check valve – 1 to 6 spools



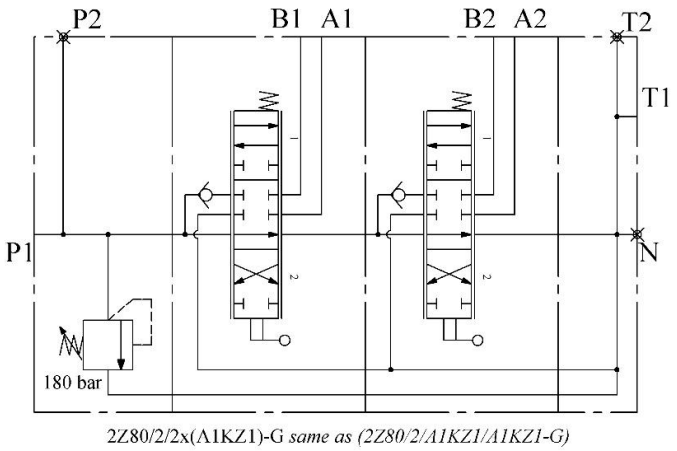
02Z80/2x(A1KZ1)-G *same as (02Z80/A1KZ1/A1KZ1-G)*

Standard configuration – parallel body, individual check valve – 1 to 6 spools



2Z80/1/2x(A1KZ1)-G *same as (2Z80/1/A1KZ1/A1KZ1-G)*

Standard configuration – tandem body, individual check valve – 1 to 6 spools

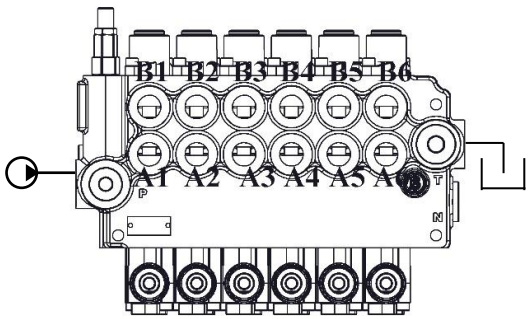


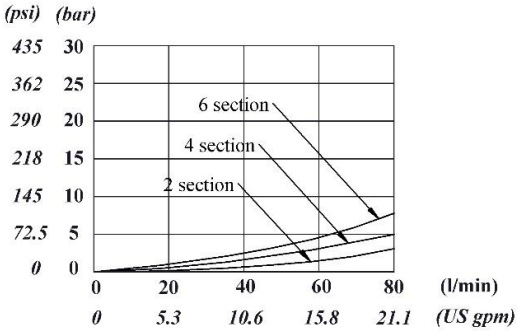
2Z80/2/2x(A1KZ1)-G *same as (2Z80/2/A1KZ1/A1KZ1-G)*

Performance data

Open centre

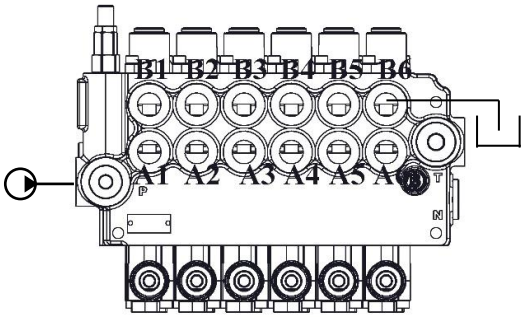
From side inlet to side outlet

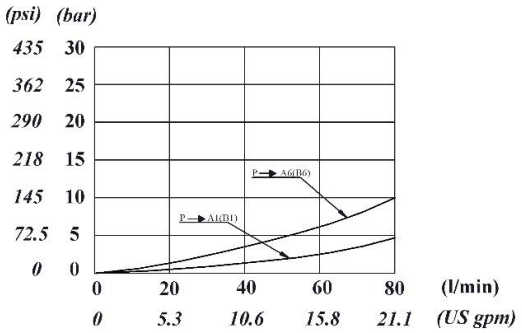




Inlet to work port

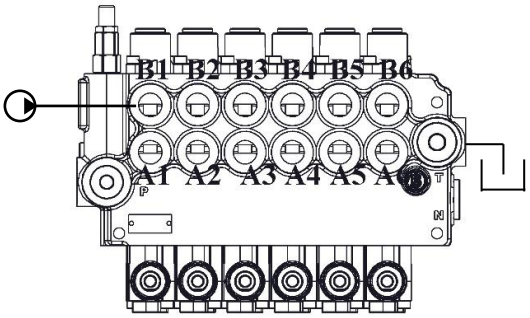
From side inlet to A port spool in position 2 or B port spool in position 1

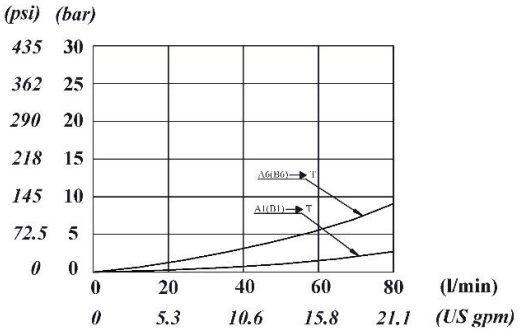




Work port to outlet

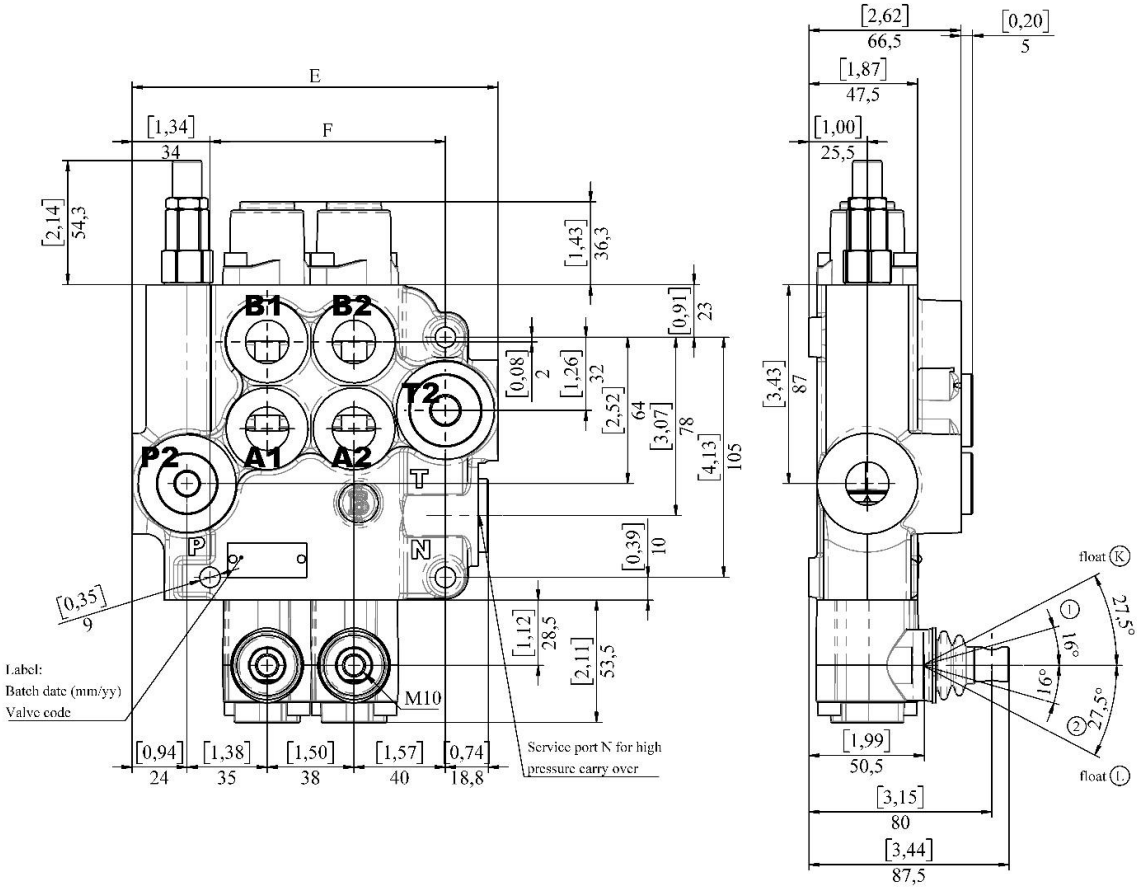
From A port spool in position 1 or B port spool in position 2 to side outlet





Dimensions

This drawing refers to a directional control valve with 2 working sections with common check valve

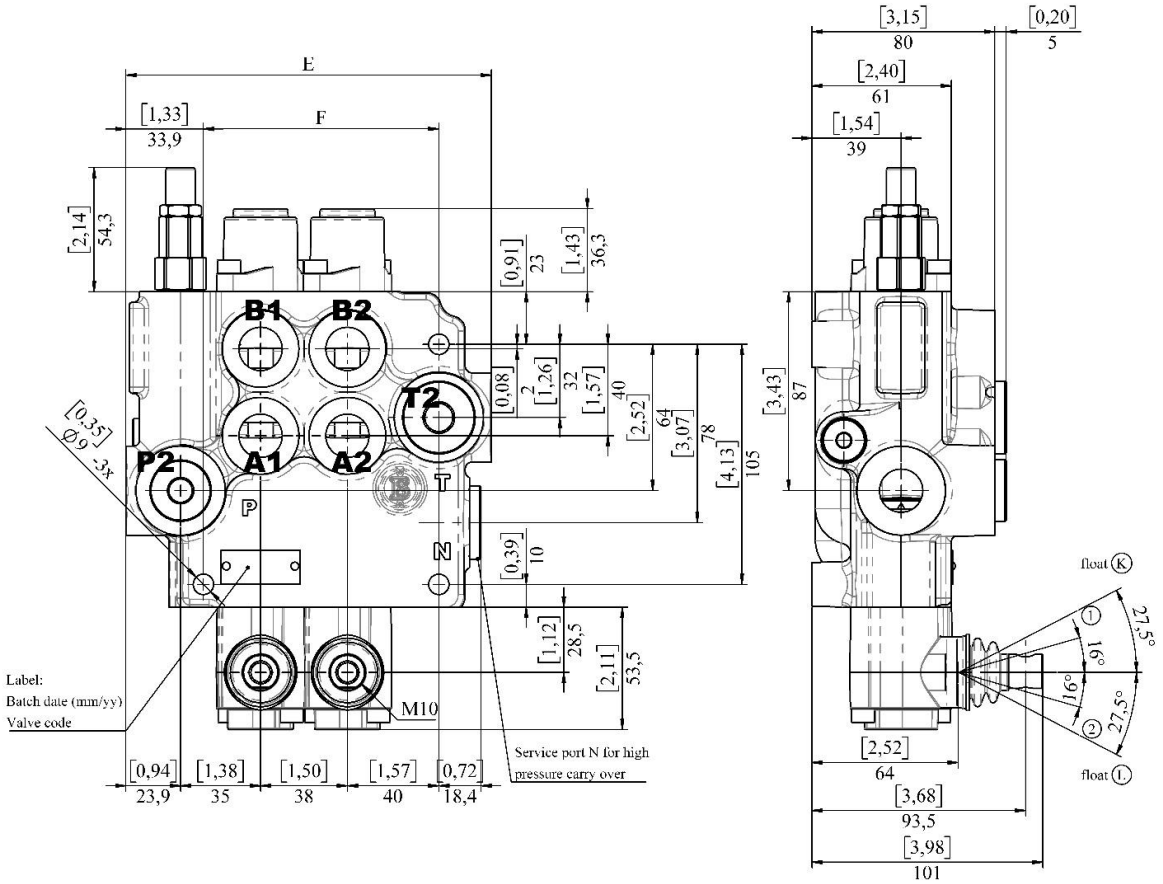


Note:Float K is presented on the drawing above just to show the convention for direction, Z80 can have float K (spool out) only in right hand version of the valve. For example code will be (Z80R/K16KZ1-G)

TYPE	E		F		Weight	
	mm	*in*	mm	*in*	kg	*lb*
Z80	111	*4.37*	65	*2.56*	3.90	*8.6*
Z80PT	122	4.80	65.00	2.56	4.55	10.03
02Z80	160	*6.30*	103	*4.06*	6.75	*14.9*
03Z80	198	*7.80*	141	*5.55*	9.05	*19.9*
04Z80	236	*9.29*	179	*7.0*	11.15	*24.6*
05Z80	274	*10.8*	217	*8.5*	13.45	*29.6*
06Z80	312	*12.3*	255	*10.0*	15.55	*34.3*

Dimensions

This drawing refers to a directional control valve with 2 working sections with individual check valve per spool (refer to next page for the body with individual check valves)



Note:Float K is presented on the drawing above just to show the convention for direction, Z80 can have float K (spool out) only in right hand version of the valve. For example code will be (Z80R/K16KZ1-G)

TYPE	E		F		Weight	
	mm	*in*	mm	*in*	kg	*lb*
Z80	111	*4.37*	65	*2.56*	3.90	*8.6*
Z80PT	122	*4.80*	65	*2.56*	4.55	*10.0*
2Z80	160	*6.30*	103	*4.06*	7.20	*15.9*
3Z80	198	*7.80*	141	*5.55*	9.5	*20.9*
4Z80	236	*9.29*	179	*7.0*	11.60	*25.6*
5Z80	274	*10.8*	217	*8.5*	13.90	*30.6*
6Z80	312	*12.3*	255	*10.0*	16.00	*35.3*

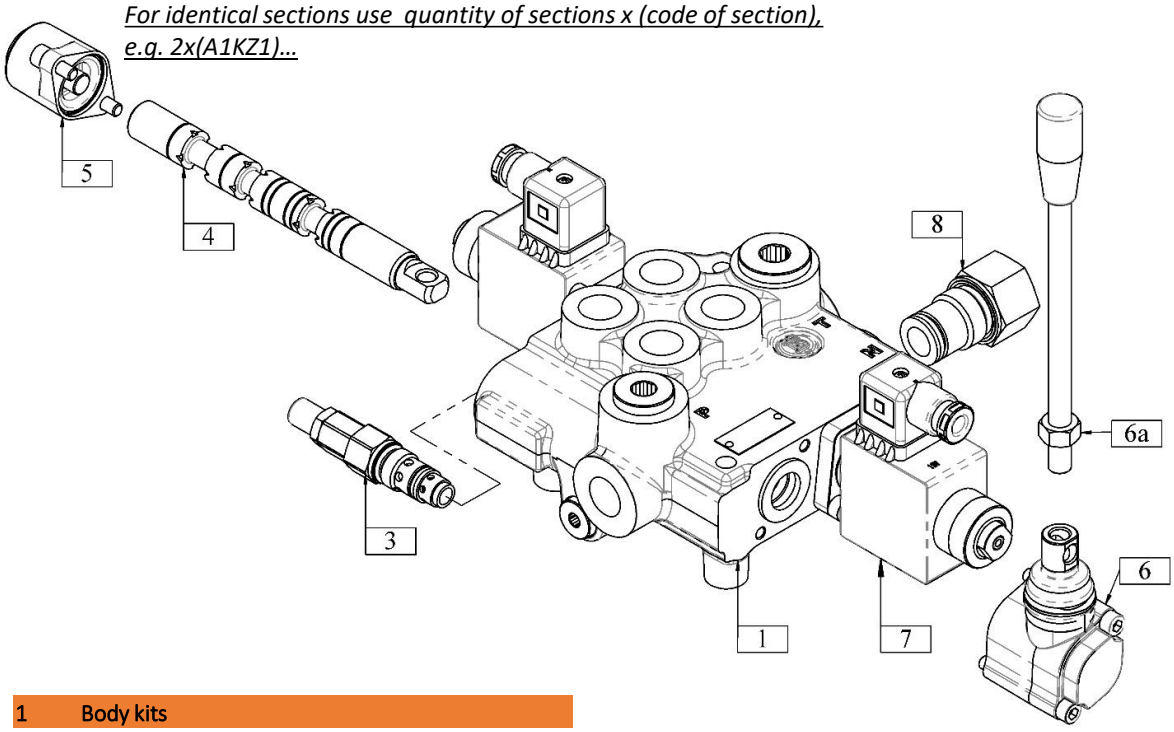
Order code, complete

First section *Following sections*

2Z80/1/ (D4-280-FV)/A 1 KZ1/A ES3- 12V(C)–C2–G - Zn

1 2 3 4 5 6 7 8 10 11

For identical sections use quantity of sections x (code of section), e.g. 2x(A1KZ1)...



1 Body kits	
Type	*Description*
Z80	*Parallel, 1 section*
Z80PT	*Parallel, 1 section with side and top ports*
Z80CV	*Parallel, 1 section (3-and 4- way valve with single spool and extra plug)*
02Z80	*Parallel, 2 section, common check valve*
03Z80	*Parallel, 3 section, common check valve*
04Z80	*Parallel, 4 section, common check valve*
05Z80	*Parallel, 5 section, common check valve*
06Z80	*Parallel, 6 section, common check valve*
2Z80/1/	*Parallel, 2 section, individual check valves*
3Z80/1/	*Parallel, 3 section, individual check valves*
4Z80/1/	*Parallel, 4 section, individual check valves*
5Z80/1/	*Parallel, 5 section, individual check valves*
6Z80/1/	*Parallel, 6 section, individual check valves*
2Z80/2/	*Tandem, 2 section, individual check valves*
3Z80/2/	*Tandem, 3 section, individual check valves*
4Z80/2/	*Tandem, 4 section, individual check valves*
5Z80/2/	*Tandem, 5 section, individual check valves*
6Z80/2/	*Tandem, 6 section, individual check valves*

Valve bodies for "K" pressure release positioners (31-32-33-42-46) and spools "k" (kick out bodies)

2ZK80/1/	*Parallel, 2 section, individual check valves*
3ZK80/1/	*Parallel, 3 section, individual check valves*
4ZK80/1/	*Parallel, 4 section, individual check valves*
5ZK80/1/	*Parallel, 5 section, individual check valves*
6ZK80/1/	*Parallel, 6 section, individual check valves*
2ZK80/2/	*Tandem, 2 section, individual check valves*
3ZK80/2/	*Tandem, 3 section, individual check valves*
4ZK80/2/	*Tandem, 4 section, individual check valves*
5ZK80/2/	*Tandem, 5 section, individual check valves*
6ZK80/2/	*Tandem, 6 section, individual check valves*

2 Position with respect to pump inlet	
omit	*Left hand configuration, pump port is on the left-hand side with respect to control*
R	*Right hand configuration, pump port is on the right-hand side with respect to control*

Order code, continue

3	Inlet relief options
Type	*Description*
omit	*Range 120-250 bar / 1740 to 3625 psi* standard setting at 180 bar / 2610 *psi*
(D2-120)	*Range 50-120 bar / 725 to 1740 psi* standard setting at 120 bar / *1740 psi*
(120-250)	*Range 120-250 bar / 1740 to 3625 psi* setting other than 180 bar / 2610 *psi*
(D4-220)	*Range 220-315 bar / 3190 to 4570 psi* standard setting at 220 bar / *3190 psi*
(sok)	*Without check valve*
(svp)	*Relief valve blanking plug*
(FV)	*Fixed valve setting and steel cap nut*

Standard setting is referred to 12 l/min flow, example for relief valve with a preset valve at 250 bar with cap nut without check valve (D4-250-sok-FV)

4	Spool options
Type	*Description*
A	*Double acting, 3 position, with A and B closed in pos. 0*
Af	*Double acting, 3 position, with A and B closed in pos. 0, fine metering*
B	*Single acting on A, 3 positions, B plugged, requires a plug.*
C	*Single acting on B, 3 positions, A plugged, requires a plug.*
D	*Double acting, 3 position, with A and B opened to tank in pos. 0*
E	*Double acting, 3 position, B opened to tank in pos. 0*
F	*Double acting, 3 position, A opened to tank in pos. 0*
M	*Double acting, 3 position, blocked by-pass channel for closed center circuit*
Special spools for particular positioner kits	
Us	*Double acting, 4 positions, regenerative position in between pos. 0 and position 2, spool in*
K	*Double acting, 4 positions, floating circuit in 4th position with spool out, only available in left hand configuration*
L	*Double acting, 4 positions, floating circuit in 4th position with spool in, only available in right hand configuration*
Ak	*Double acting, 3 position, with A and B closed in pos. 0 for pressure release option (kick out)*
Bk	*Single acting on A, 3 positions, B plugged, requires a plug; for pressure release option (kick out)*
Ck	*Single acting on B, 3 positions, A plugged, requires a plug; for pressure release option (kick out)*
Dk	*Double acting, 3 position, with A and B opened to tank in pos. 0 for pressure release option (kick out)*
Ek	*Double acting, 3 position, B opened to tank in pos. 0 for pressure release option (kick out)*
Fk	*Double acting, 3 position, A opened to tank in pos. 0 for pressure release option (kick out)*
Lk	*Double acting, 4 positions, floating circuit in 4th position with spool in, only available in left hand configuration with pressure release (kick out) from pos. 1 and pos. 2 (requires kit 42)*
Kk	*Double acting, 4 positions, floating circuit in 4th position with spool out, only available in right hand configuration with pressure release (kick out) from pos. 1 and pos.2 (requires kit 46)*
Uk	*Double acting, 4 positions, regenerative position in between pos. 0 and position 2, spool in with pressure release (kick out) from pos. 2 (requires kit 1732)*

5	Spool positioners (side B)
Type	*Description*
1	*With spring return in pos. 0*
1C	*With spring return in pos. 0, soft spring*
1Z	*With spring return in pos. 0 and pin with M8 male thread for dual control*
1rAB	*With spring return in pos. 0 and stroke adjustments both directions*
1E	*With spring return in pos. 0 and microswtich included*
1D(M8)	*With spring return in pos 0 and pin with M8 female thread for dual control*
1T	*With spring return in pos. 0 with teton (push piston)*
14	*Spring return in pos. 0, no microswitch kit included*
4	*2 positions, with spring return in pos. 0 from pos. 2*
5	*2 positions, with spring return in pos. 0 from pos. 1*
6	*2 positions, with spring return in pos. 1 from pos. 2*
7	*2 positions, with spring return in pos. 2 from pos. 1*

Order code, continue

7Z	*2 positions, with spring return in pos. 2 from pos. 1 and pin with M8 male thread for dual control*
7T	*2 positions, with spring return in pos. 2 from pos. 1 with teton (push piston)*
7D(M8)	*2 positions, with spring return in pos. 2 from pos. 1, and pin with M8 female thread for dual control*
7zS1	*2 positions, with spring return in pos. 2 from pos. 1 with special tie rod kit M8 for dual control*
8	*Detent in positions 0, 1 and 2*
8Z	*Detent in positions 0, 1 and 2, and pin with M8 male thread for dual control*
8F	*Friction detent with infinite positions limit with pos. 0, 1 and 2*
9	*Detent in positions 1 and 0*
10	*Detent in positions 0 and 2*
11	*Detent in positions 1 and 2*
11B	*Detent in positions 1 and 2, and spring return to pos. 0*
2	*With detent in position 1 and spring return in pos. 0*
3	*With detent in position 2 and spring return in pos. 0*
3D(M8)	*With detent in position 2 and spring return in pos. 0 and pin with M8 female thread for dual control*
6B3	*2 positions, with spring return in pos. 2 from pos. 1 with detent in pos. 2*
7B2	*2 positions, with spring return in pos. 1 from pos. 2 with detent in pos. 1*
1V2	*With spring return in pos. 0 for flexible cable control*
8V2	*Detent in positions 0, 1 and 2 for flexible cable control*
1H	*Proportional hydraulic control- single side*
1P	*ON/OFF pneumatic control*
1EP	*ON/OFF electro-pneumatic control*
1ED3	*ON/OFF electro-hydraulic control*
Particular positioner kits for special spools	
6	*2 positions, with spring return in pos. 1 from pos. 2 for spool Us*
17	*4 position with spring return to pos. 0 from pos. 2, soft stop at (regenerative) before pos. 2 and detent in pos. 1*
12	*4 position with spring return in pos. 0 and detent in float position - only for spool L*
13	*Detent in 4 positions - only for spool L*
16	*4 position with spring return in pos. 0 and detent in float position - only for spool K*
15	*Detent in 4 positions - only for spool K*
31	*3 position detent with pressure release (kick out) from pos. 1 and 2*
32	*3 position detent with pressure release (kick out) from pos. 1 and spring return from pos. 2*
33	*3 position detent with pressure release (kick out) from pos. 2 and spring return from pos. 1*
42	*4 position detent with pressure release (kick out) from pos. 1 and 2 only for spool Lk*
46	*4 position detent with pressure release (kick out) from pos. 1 and 2 only for spool Kk*
1732	*4 position with spring return to pos. 0 from pos. 2, soft stop at (regenerative) before pos. 2 and detent in pos. 1 with pressure release from it (kick out) to pos. 0*
6	**Spool controls (side A)**
	without lever box, with plate
KZ	*Lever box for M10*
KZe	*Lever box for M10, extreme conditions*
KZT	*Lever box for M8 with teton (push piston)*
KI	*Lever box, collet type, horizontal Ø9 mm*
KY	*Lever box, collet type, vertical Ø9 mm*
*Adding a **0** after the first part of the code will make the execution rotated 180°, lever will face the bottom of the valve, not the ports eg. **KZ0***	
KZV	*Safety lever box, vertical configuration*
KZH	*Safety lever box, horizontal configuration*
SLP	*without lever box with dustproof plate*
V1	*Flexible cable connection*
ju+1	*Joystick lever for 2 sections with pivot 1 o-clock*
ju+2	*Joystick lever for 2 sections with pivot at 11 o-clock*
ju+3	*Joystick lever for 2 sections with pivot 7 o-clock*
ju+4	*Joystick lever for 2 sections with pivot at 5 o-clock*
Optional ball type handle (jb+...), and custom lengths	
6a	**Handle options**
1	*M10x170*
Custom lengths and bends available	
7	**Complete controls**
ES	*Single acting solenoid kit*
A26	*Control with rotation (CW-CCW)*

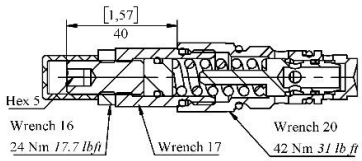
Order code, continue

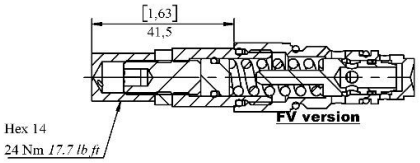
7a	**Coil specifications**
12V	*12V coil*
24V	*24V coil*
12V	*12V DT coil*
24V	*24V DT coil*
7b	**Connectors**
	By default, connectors are not included
(C)	*Connector for the particular coil is included*
8	**Outlet port options**
	BSP G3/4 plug on port N
C	*Closed center plug*
C2	*G3/4 high pressure carry-over sleeve*
C2(12)	*G1/2 high pressure carry-over sleeve*
C2(S)	*For SAE threading - SAE12 high pressure carry-over sleeve*
C2(NPTF)	*For NPTF threading - 3/4NPTF high pressure carry-over sleeve*
VRE	*Back pressure valve*
9	**Inlet outlet selection**
	Side ports open, plugs on top ports P2&T2, standard configuration (omit in valve description)
22	*Top ports open, plugs on side ports*
12	*Side inlet, top outlet, else plugged*
21	*Top inlet, side outlet, else plugged*
10	**Valve Threading - refer to page 3**
11	**Coating and plating**
	Valve body is phoshpated, steel parts Zn plated, spools either Ni, or Cr plating (omit in valve description)
Zn	Valve body - Zinc plated
BP	Painting

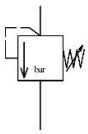
Inlet relief options

D4-280-sok-FV

- Steel cap nut for pre-set pressure
- sok – without check valve
- Pressure setting, if not specified – standard pressure setting per spring (p.8)
- Adjustable spring type (2, 3, and 4)

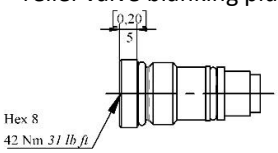


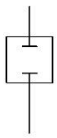




Note: Check valve is not shown

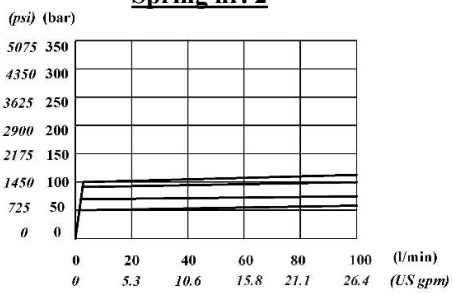
sok– relief valve blanking plug



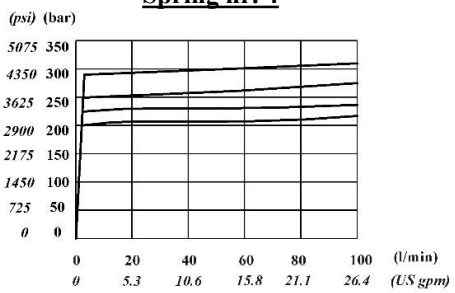


Relief valve type "D" performance characteristics

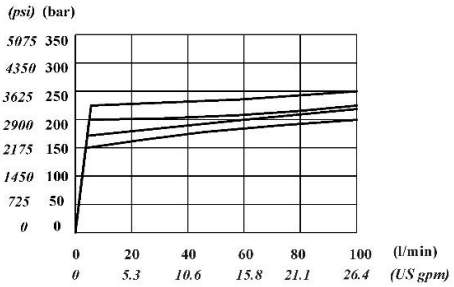
Spring nr. 2



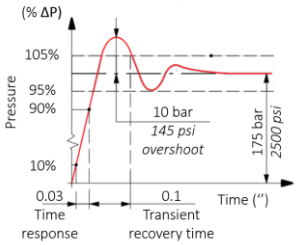
Spring nr. 4



Spring nr. 3

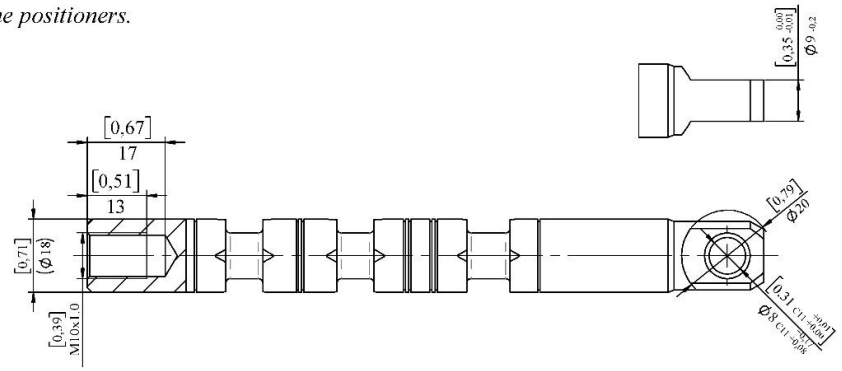


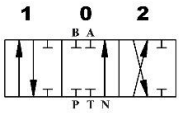
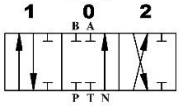
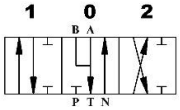
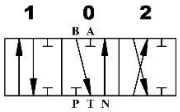
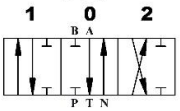
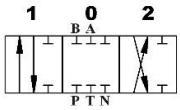
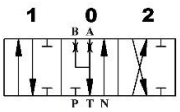
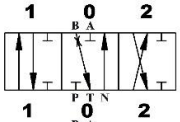
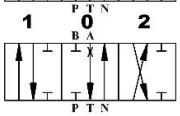
Time response

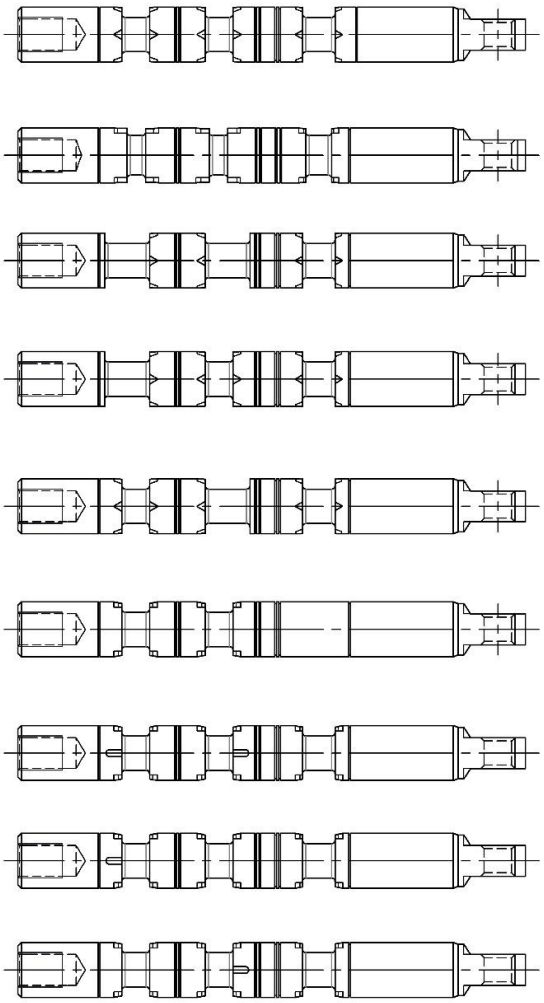


Spool options:

Badestnost standard spool have the ends shown in the drawing below. These end spool are necessary to join it the controls and the positioners.

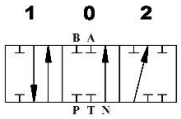


	**A**	Double acting spool, work ports closed in neutral position.
	**Af**	Double acting spool, high metering, work ports closed in neutral position.
	**D**	Double acting spool, work ports open to tank in neutral position.
	**E**	Double acting spool, work port B open to tank in neutral position.
	**F**	Double acting spool, work port A open to tank in neutral position.
	**M**	Double acting spool, closed center, work ports closed in neutral.
	**Dd**	Double acting spool, closed center, work ports partially open to tank
	**Ed**	Double acting spool, closed center, work port B partially open to tank
	**Fd**	Double acting spool, closed center, work port A partially open to tank



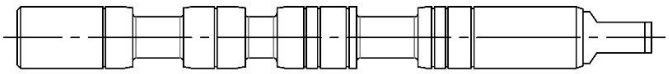
Spool options, continue

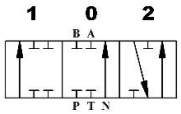
Single acting spools



B

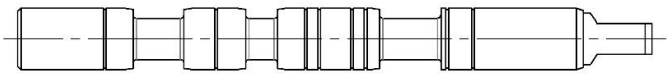
Single acting on A, 3 position, B plugged



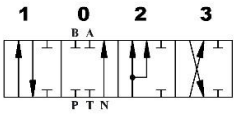


C

Single acting on B, 3 positons, A plugged

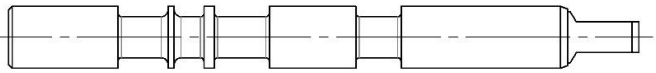


Regenerative spools



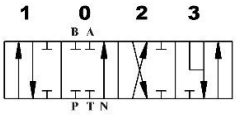
Us

Double acting, 4 positions, regenerative position



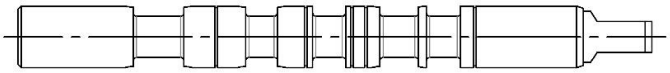
Spool Us requires spool positioner - 6 or 17, and it is available to valves ONLY with left hand configuration (P on left with respect to lever control)

Floating spools

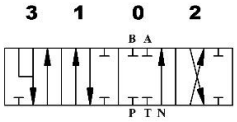


L

Double acting, 4 positions, floating circuit in 4th postion with spool in

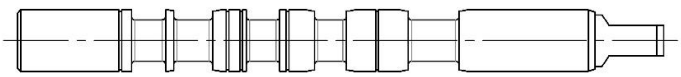


Spool L requires spool positioner - 12 or 13, and it is available to valves ONLY with "R" right hand configuration (P on right with respect to lever control



K

Double acting, 4 positions, floating circuit in 4th postion with spool out



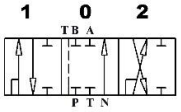
Spool K requires spool positioner - 16 or 15, and it is available to valves ONLY with left hand configuration (P on left with respect to lever control)

All spools have "R" version for right version of the valve, exceptions are Us, K and L.
To order right hand version of a spools, add "R" behind the spool description e.g. AR, BR, CR, etc.
To order low leakage version of spools, add "n" behind the spool description e.g. An, Bn, Cn, etc.

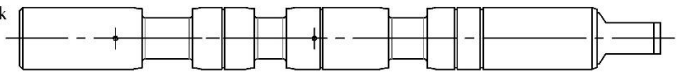
Spool options, continue

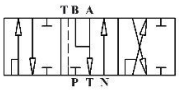
*Spools for pressure release detent kits "kick out" – require additionally machined valve body (**ZK**)*

Standard double acting

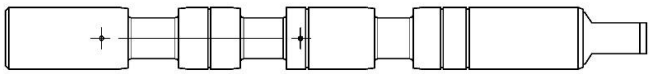


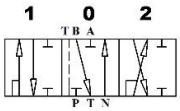
Ak Double acting spool, work ports closed in neutral position.



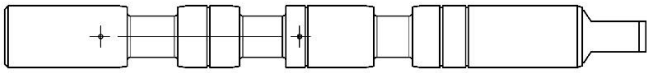


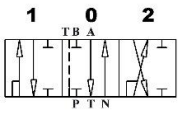
Dk Double acting spool, work ports open to tank in neutral position.



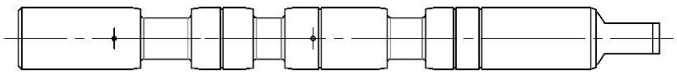


Ek Double acting spool, work port B open to tank in neutral position.

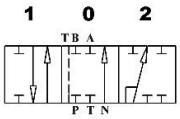




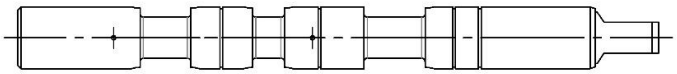
Fk Double acting spool, work port A open to tank in neutral position.

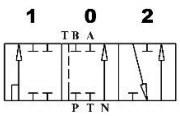


Single acting

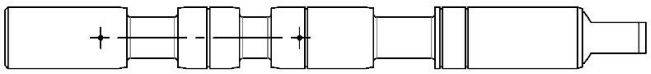


Bk Single acting on A, 3 position, B plugged





Ck Single acting on B, 3 positons, A plugged

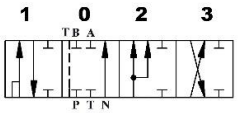


All spools have "R" version for right version of the valve, exceptions are Uk, Kk and Lk.
To order right hand version of a spools, add "R" behind the spool description e.g. AkR, BkR, CkR, etc.
To order low leakage version of spools, add "n" behind the spool description e.g. Akn, Bkn, Ckn, etc.

Spool options, continue

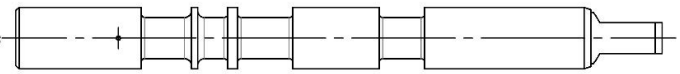
*Spools for pressure release detent kits "kick out" – require additionally machined valve body (**ZK**)*

Regenerative



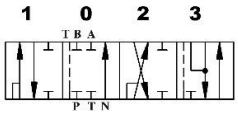
Uk

Double acting, 4 positions, regenerative position



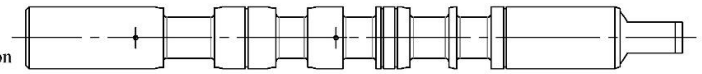
Spool Uk requires spool positioner – 1732 and it is available to valves ONLY with left hand configuration (P on left with respect to lever control)

Floating

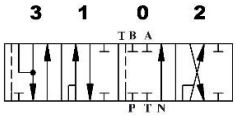


Lk

Double acting, 4 positions, floating circuit in 4th postion with spool in

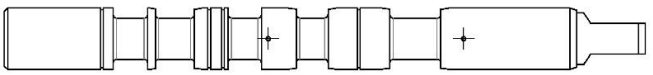


Spool Lk requires spool positioner - 42 and it is available to valves ONLY with "R" right hand configuration (P on right with respect to lever control



Kk

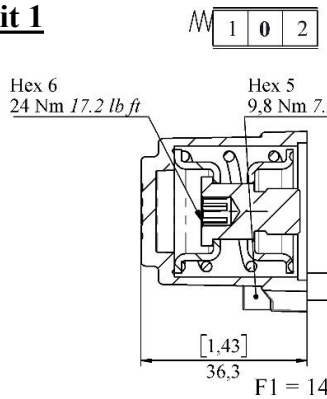
Double acting, 4 positions, floating circuit in 4th postion with spool out



Spool Kk requires spool positioner - 46 and it is available to valves ONLY with left hand configuration (P on left with respect to lever control)

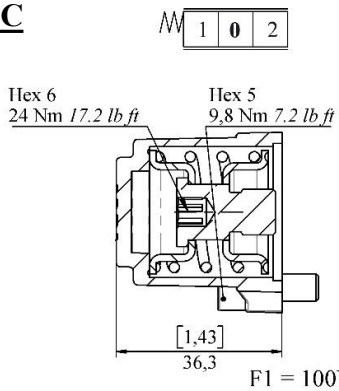
Spool positioners (B-side)

Kit 1



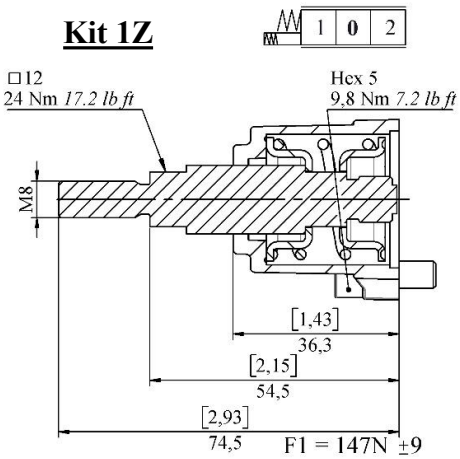
F1 = 147N ±9
F2 = 229N ±10

Kit 1C



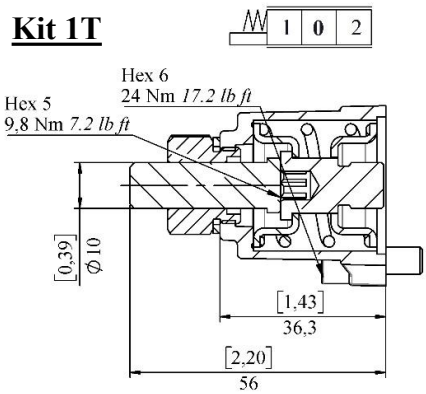
F1 = 100N ±9
F2 = 130N ±10

Kit 1Z



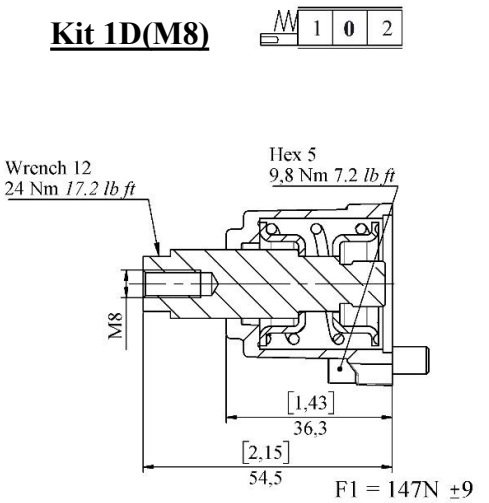
F1 = 147N ±9
F2 = 229N ±10

Kit 1T



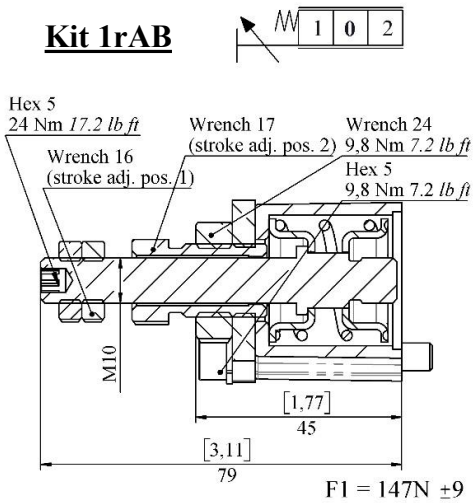
F1 = 147N ±9
F2 = 229N ±10

Kit 1D(M8)



F1 = 147N ±9
F2 = 229N ±10

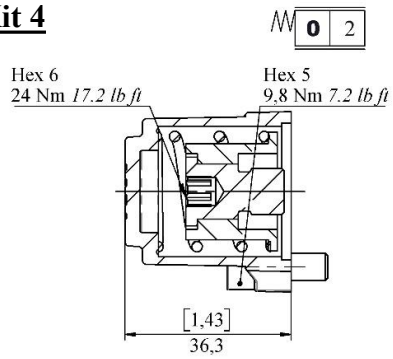
Kit 1rAB



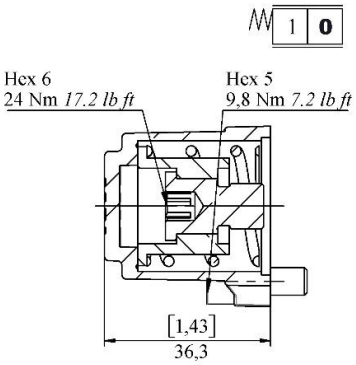
F1 = 147N ±9
F2 = 229N ±10

Spool positioners (B-side)

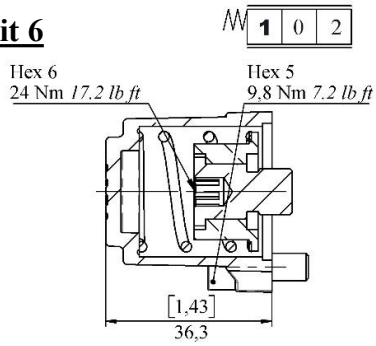
Kit 4



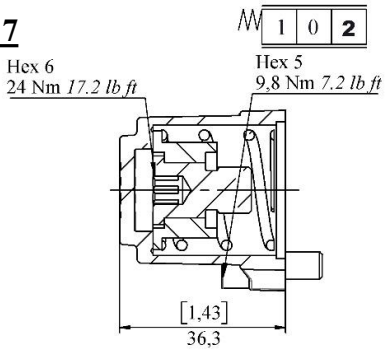
Kit 5



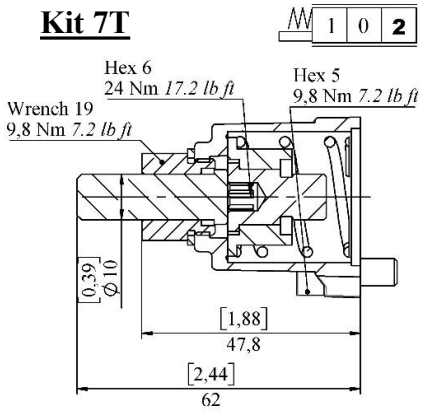
Kit 6



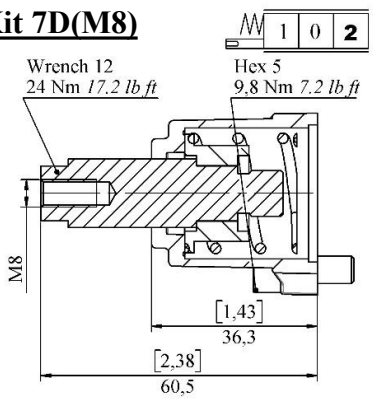
Kit 7



Kit 7T

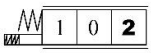


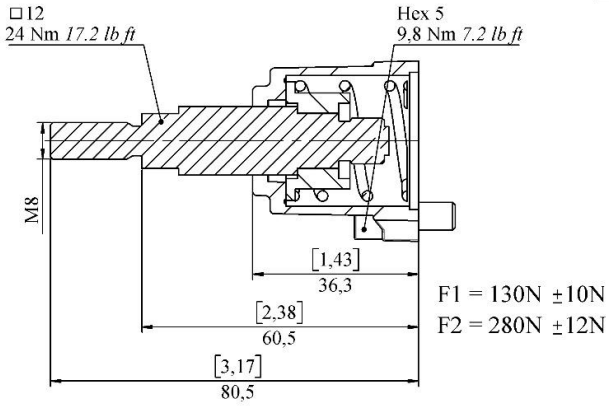
Kit 7D(M8)



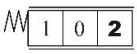
Spool positioners (B-side)

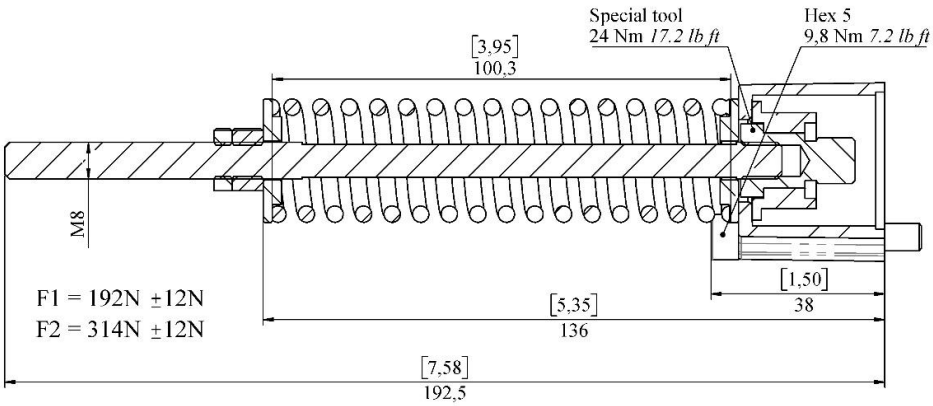
Kit 7Z



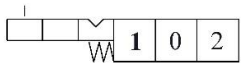


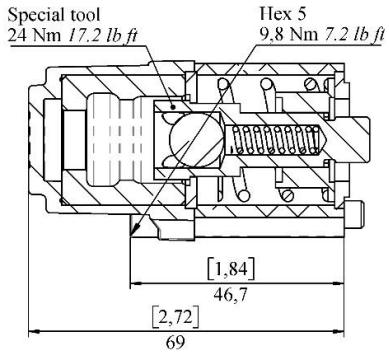
Kit 7zS1



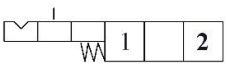


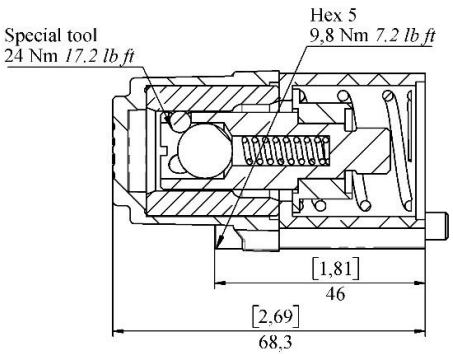
Kit 6B3





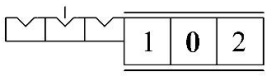
Kit 7B2

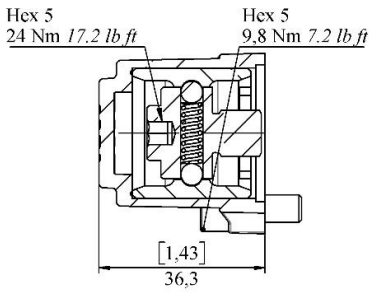




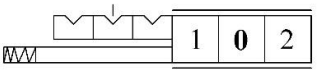
Spool positioners (B-side)

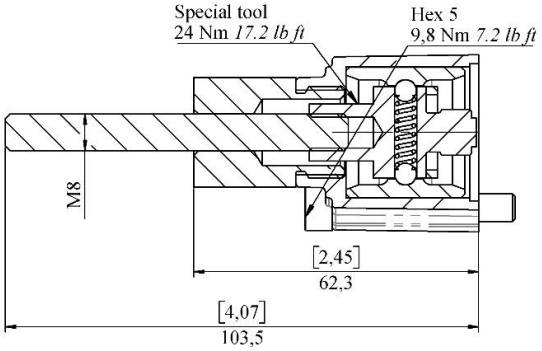
Kit 8



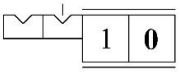


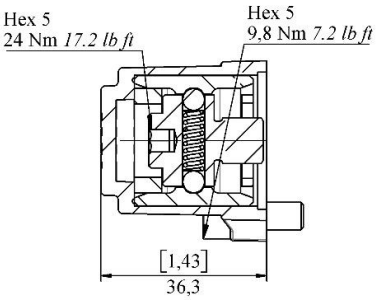
Kit 8Z



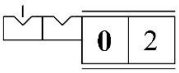


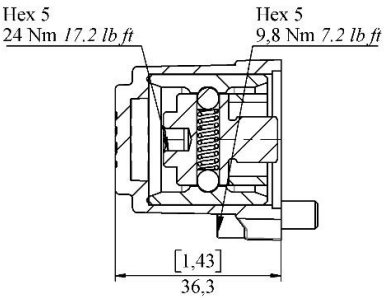
Kit 9



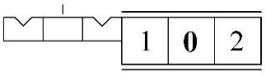


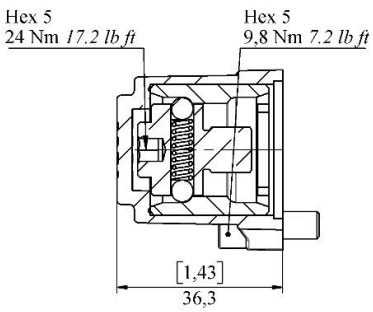
Kit 10



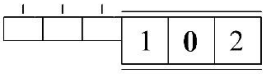


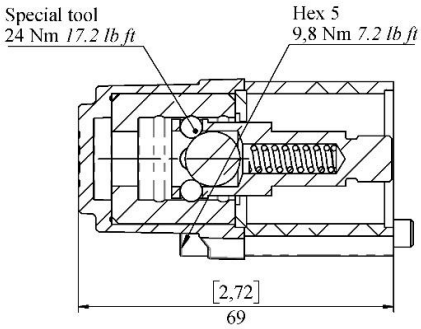
Kit 11





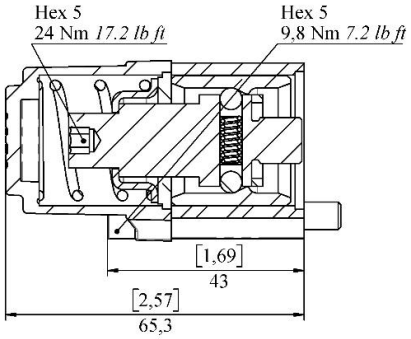
Kit 8F

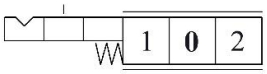




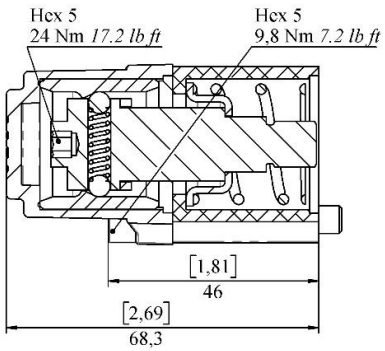
Spool positioners (B-side)

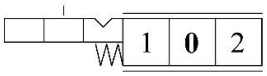
Kit 2: *3 position, spring return from pos. 2 to pos. 0 and detent in pos. 1*



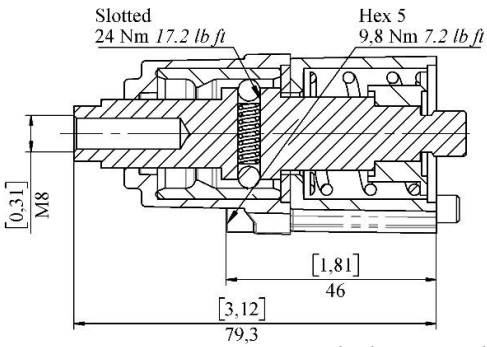


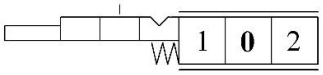
Kit 3: *3 position, spring return from pos. 1 and detent in pos. 2*



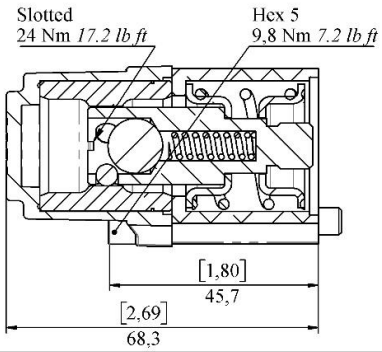


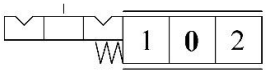
Kit 3D(M8): *3 position, spring return from pos. 1 and detent in pos. 2 and pin with thread M8 for dual control*





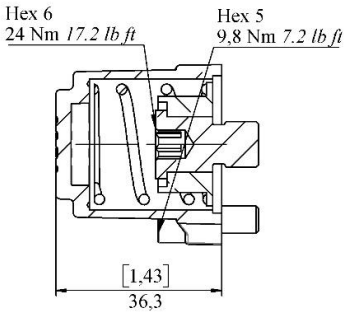
Kit 11B: *2 position, with detent in both positions and spring return to neutral from either direction*

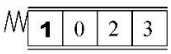




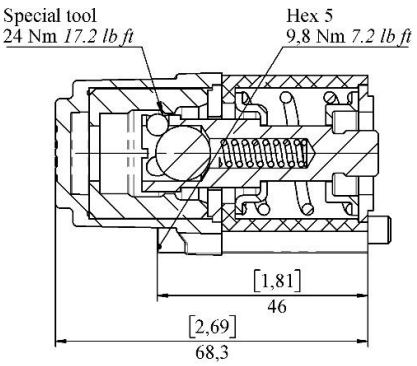
Particular spool positioners kits for regenerative spools

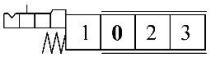
Kit 6 for Us





Kit 17

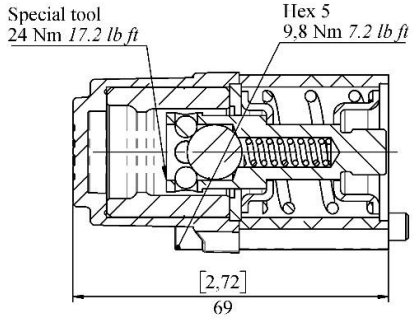


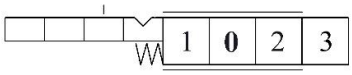


Regen can be used only on standard configuration valve with left inlet (with respect to the lever)

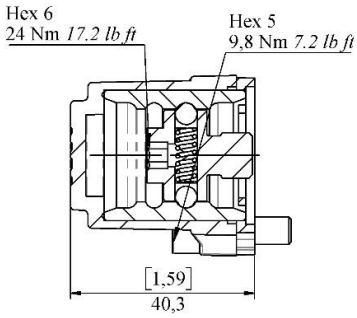
Particular spool positioners kits for floating spool L (float when spool IN)

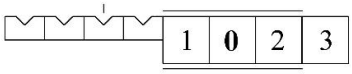
Kit 12: *four position, return to neutral from 1 and 2 and detent in float*



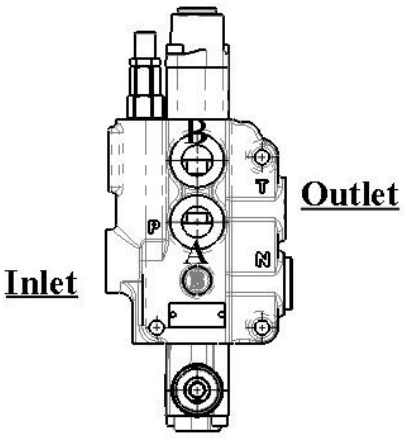


Kit 13: *four position detent*

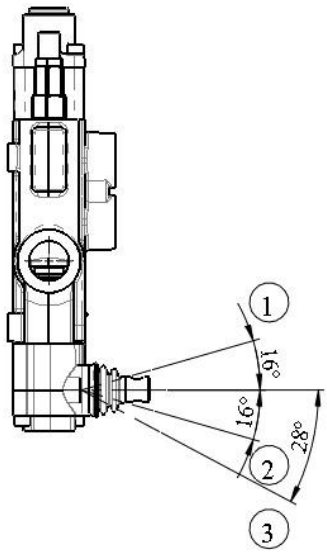




Limitations of floating sections for Z80 for kits 12 and 13



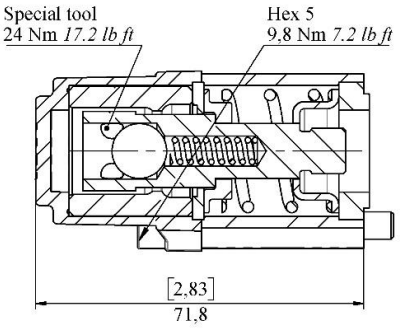
Z80/L12KZ1-G

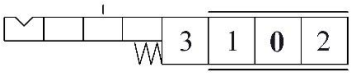


*Floating spool **IN** (L12 and L13) can be used only on standard configuration valve with left inlet (with respect to the lever)*

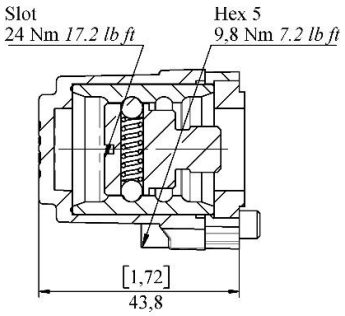
Particular spool positioners kits for floating spool K (float when spool OUT)

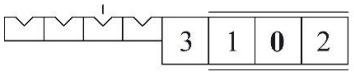
Kit 16: *four position, return to neutral from 1 and 2 and detent in float*



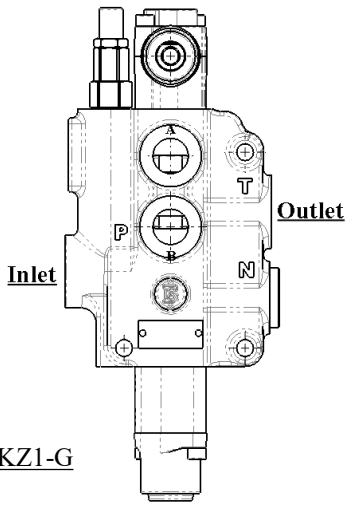


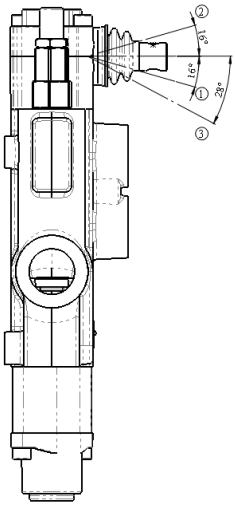
Kit 15: *four position detent*





Limitations of floating sections for Z80 for kits 16 and 15



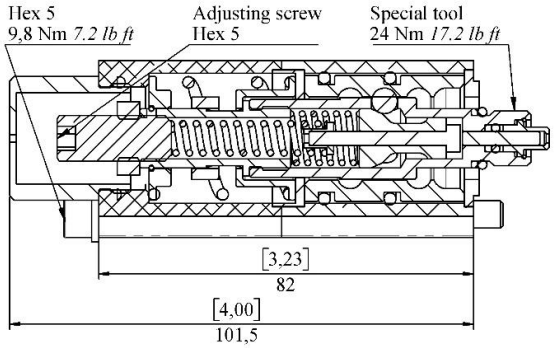


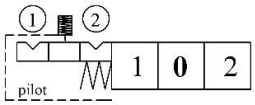
Z80R/K16KZ1-G

Floating spool OUT (K16 and K13) can be used only on "R" configuration valve with right inlet (with respect to the lever)

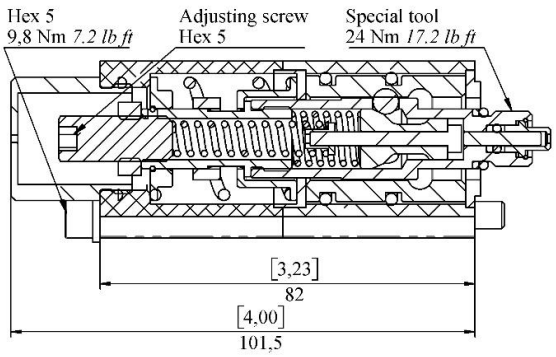
Particular spool positioners kits for pressure release kits (kick out)

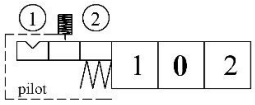
Kit 31: *3 position with detent and pressure release from pos. 1 and pos. 2*



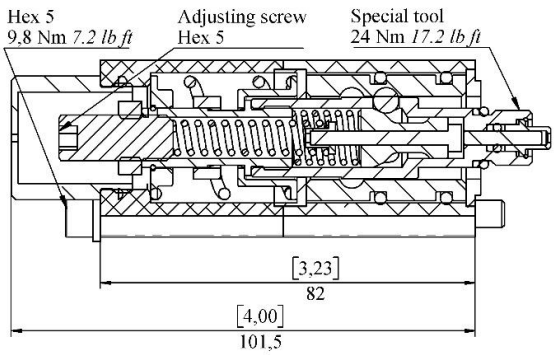


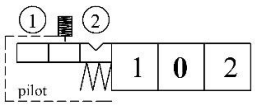
Kit 32: *3 position with detent and pressure release from pos. 1 and spring return from pos. 2*





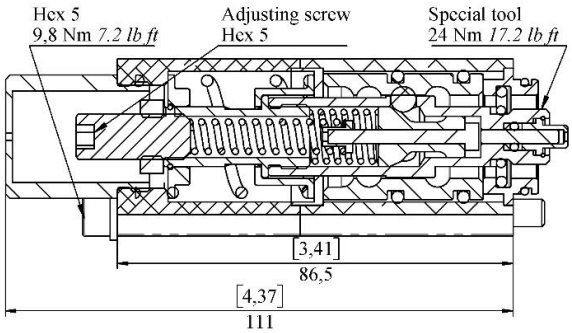
Kit 33: *3 position with detent and pressure release from pos. 2 and spring return from pos. 1*

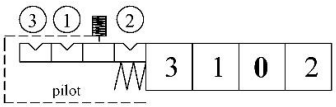




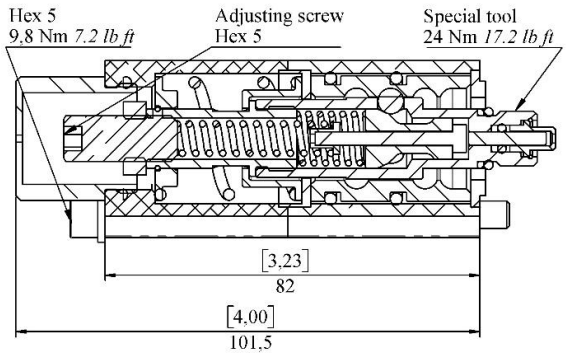
Particular spool positioners kits for pressure release kits (kick out)

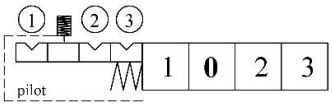
Kit 46: *four position, pressure release from pos. 1 and pos. 2 to pos. 0, float spool out; can be used only on "R" valve (right inlet)*



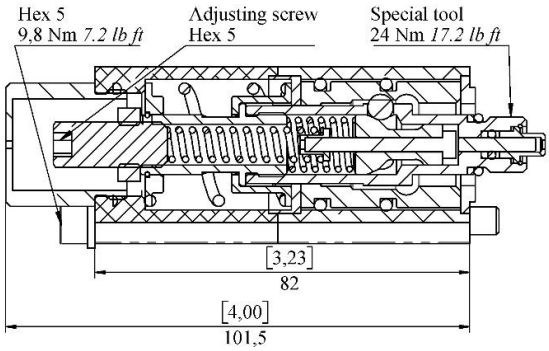


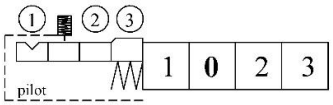
Kit 42: *four position, pressure release from pos. 1 and pos. 2 to pos. 0, float spool in; can be used only on standard valve (left inlet)*





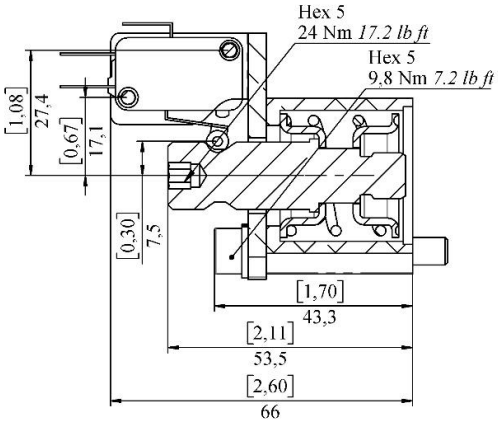
Kit 1732: *four position, pressure release from pos. 1 and spring return from pos. 2 (soft stop) and pos. 3 (regenerative position); can be used only on standard valve (left inlet)*

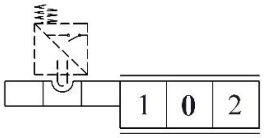




Particular spool positioners kits for microswitch

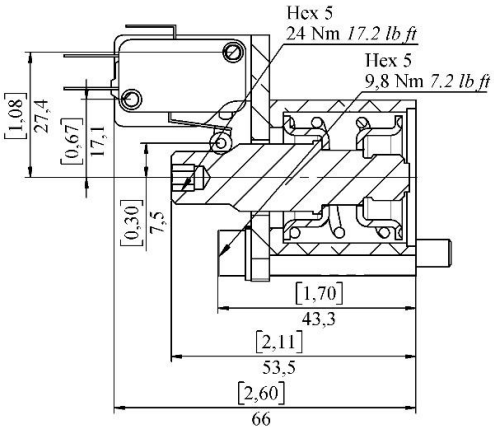
Kit 1E for *double acting spool A or D*

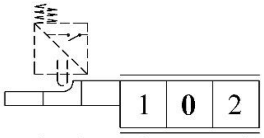




For double acting spool A

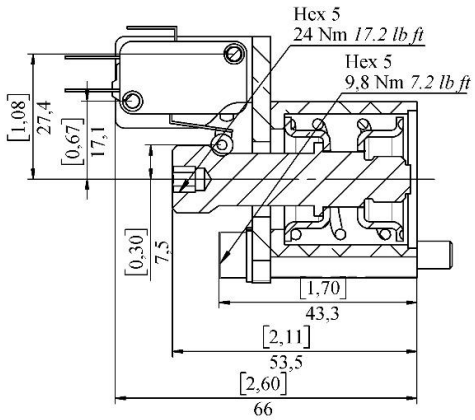
Kit 1E for *single acting spool B*

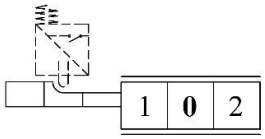




For single acting spool B

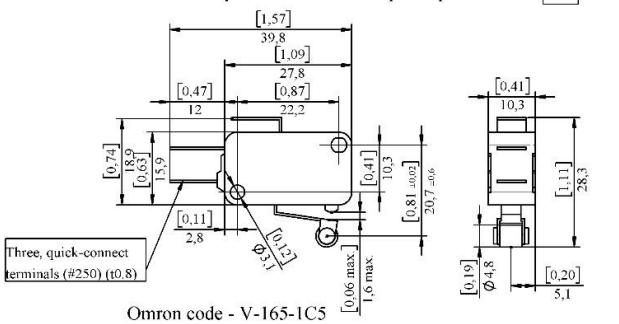
Kit 1E for *single acting spool C*





For single acting spool C

Microswich specification for spool positioner 1E

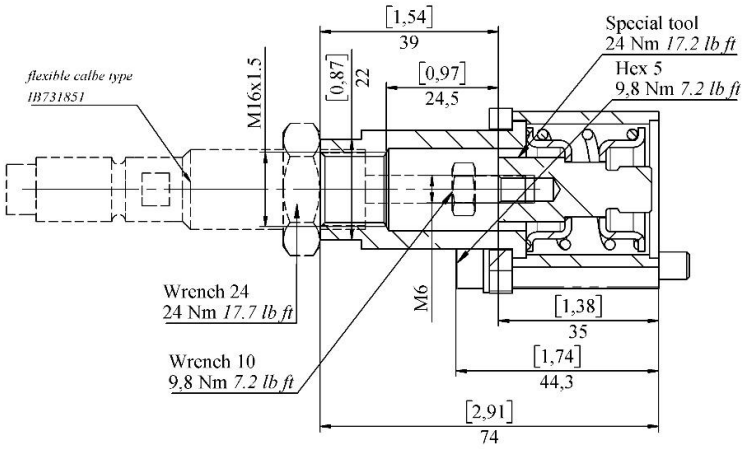


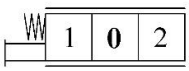
Omron code - V-165-1C5

Needs a special bracket to be assembled with spool positioners

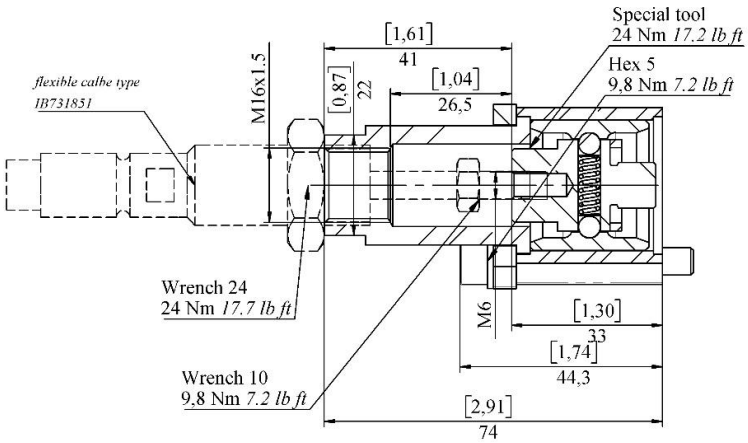
Spool positioner for flexible cable connection (side B)

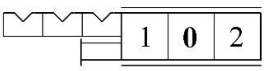
Kit 1V2





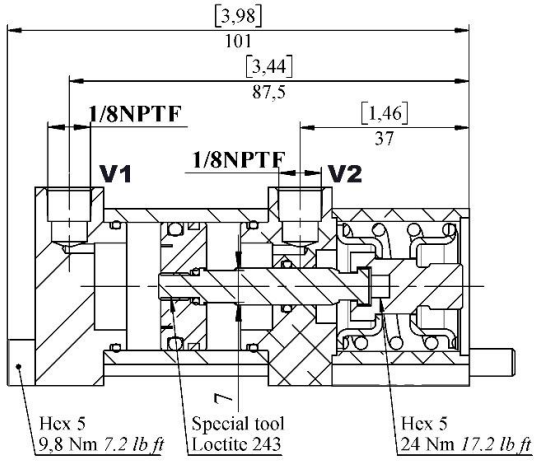
Kit 8V2

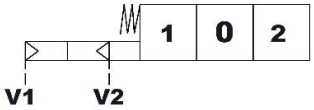




More information regarding controls, cable lengths, and ordering codes see page for flexible cable control V1 (Side A)

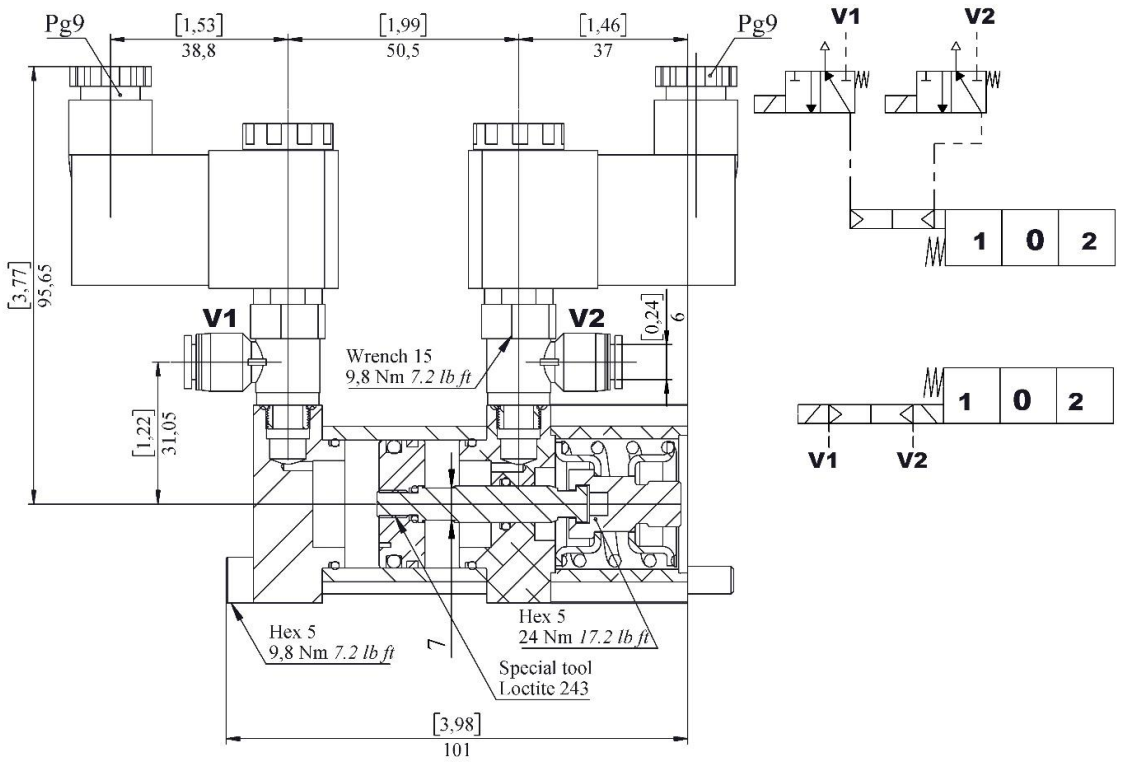
ON/OFF Pneumatic kit - P



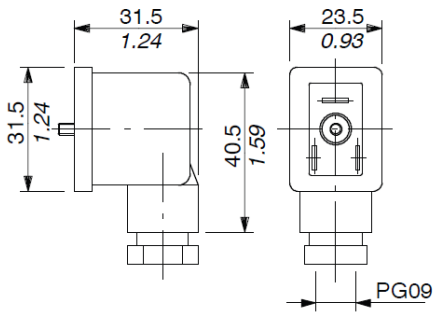


Operating features		
Pilot pressure	min	6 bar / *87 psi*
	max.	10 bar / *145 psi*

ON/OFF Electro pneumatic kit - PE



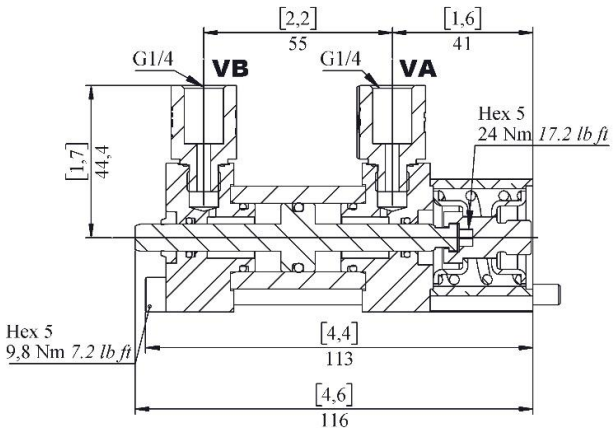
Connector specifications:

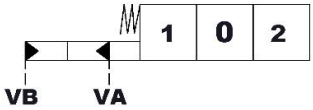


Operating features		
Pilot pressure	min	6 bar / *87 psi*
	max.	10 bar / *145 psi*
COIL specifications		
Nominal voltage tolerance		±10 %
Power rating		4,8 W
Nominal current		0,4 A - 12 VDC
		0,2 A - 24 VDC
Coil insulation		Class F
Weather protection		IP65
Duty cycle		100%

Connector is always included in 1EP control

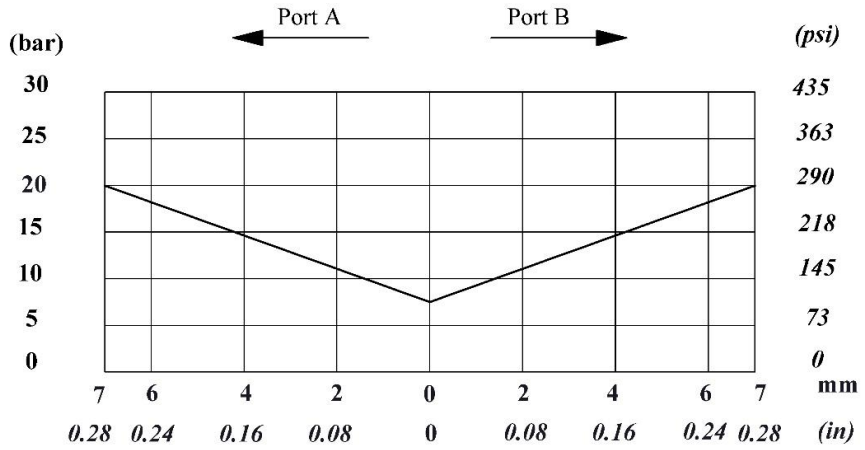
Proportional hydraulic, single side kit - H





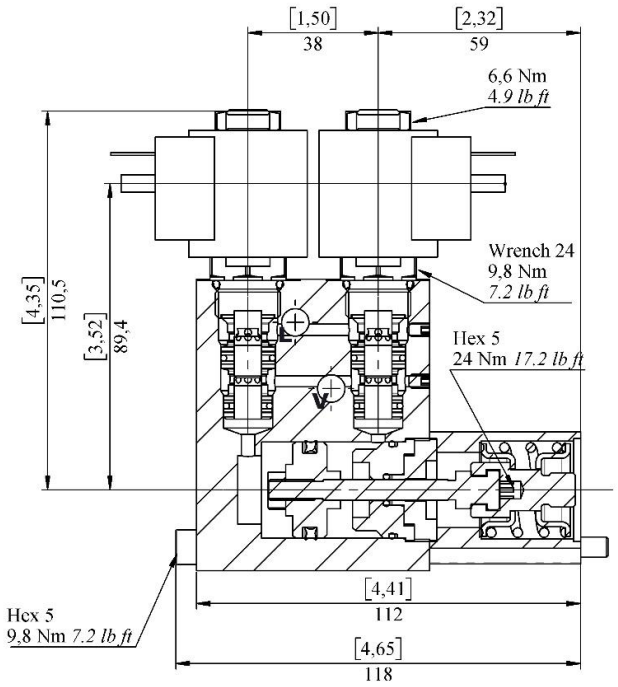
Operating features	
Pilot pressure	max. 50 bar / *725 psi*

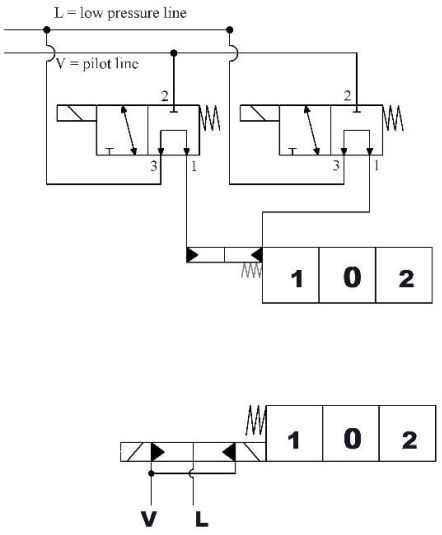
Pilot pressure - stroke diagram



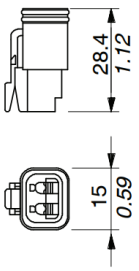
ON/OFF electro-hydraulic kit - 1ED3

With spring return to neutral position

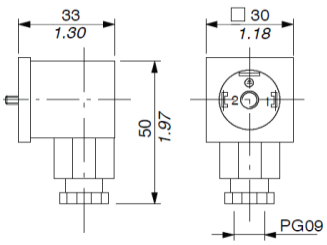




Connector specifications
2 poles, type Deutsch DT06-2S
Male housing with female ends



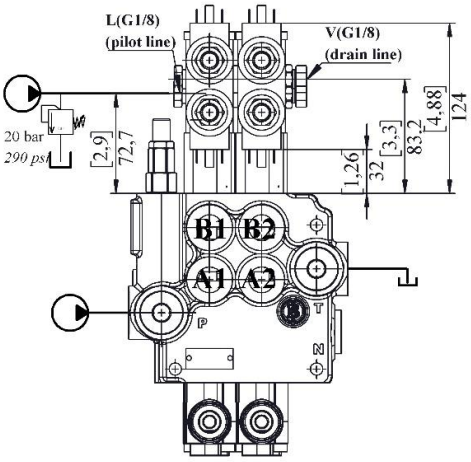
Connector specifications
2P+T according to
ISO 4400 / EN175301-803

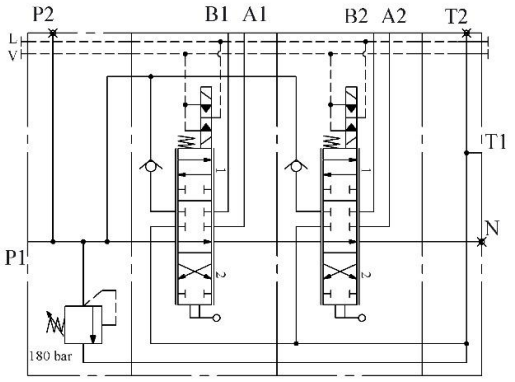


Operating features		
Pilot pressure	min	10 bar / *145 psi*
	max.	50 bar / *725 psi*
Back pressure on drain L	max.	25 bar / *360 psi*

COIL specifications	
Nominal voltage tolerance	±10 %
Power rating	21 W
Nominal current	1,75 A - 12 VDC
	0,87 A - 24 VDC
Coil insulation	Class F
Weather protection	IP65
Duty cycle	100%

ON/OFF electro-hydraulic kit - 1ED3 with external drain



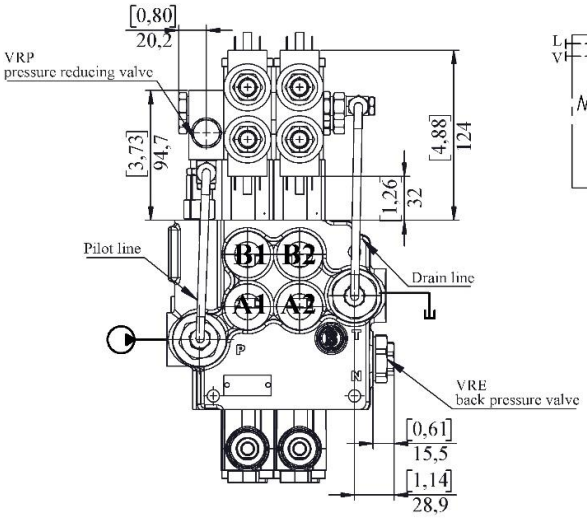


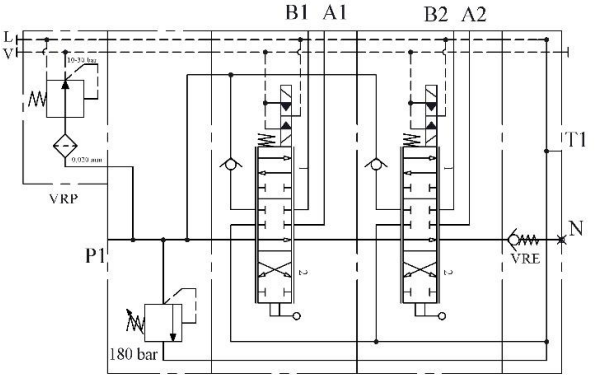
Description example:

2Z80/1/2x(A1ED3KZ1)-12V-G

ON/OFF electro-hydraulic kit - 1ED3 with pilot and drain lines

Kit consists of pressure reducing valve, VRP, back pressure valve VRE and pipes



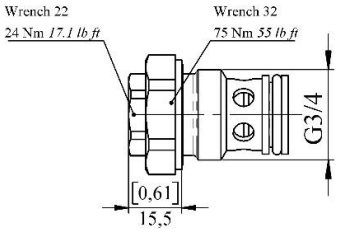


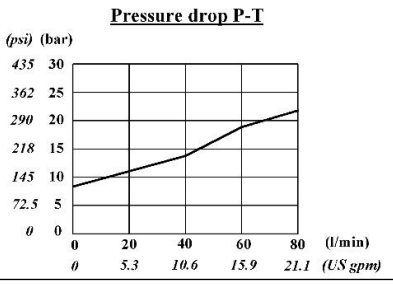
Description example:

2Z80/1/VRP/2x(A1ED3KZ1)-VRE-12V-G

Back pressure valve (VRE) specifications

Valve is assembled on the bypass flow port N to provide pilot pressure to the actuator

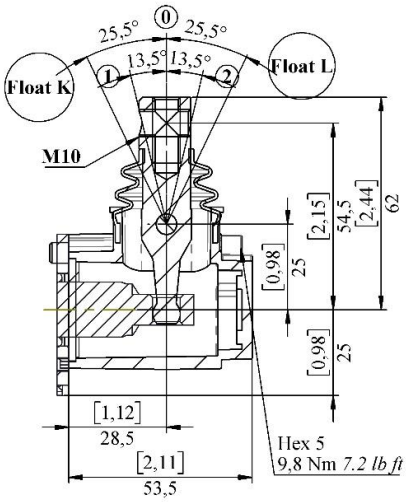


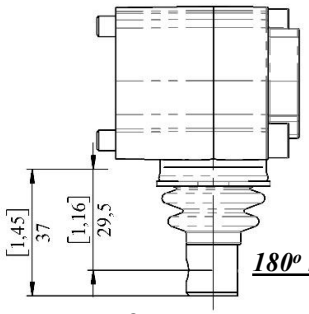


Lever control (Side A) – *aluminum cap, with protection booth lever pivot box*

1 | 0 | 2

Type KZ & KZe



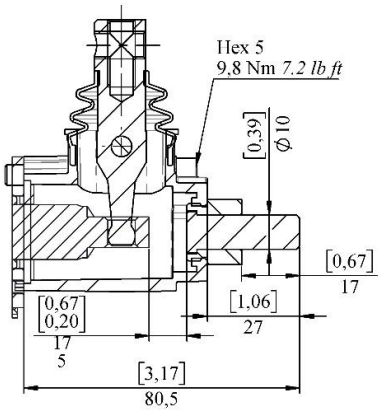


180º rotated – KZ0

Float L &K only available in certain configuration refer to pages – 19 & 20

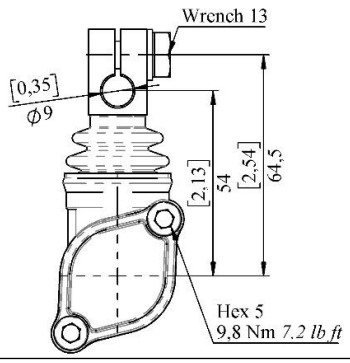
Kit KZT

1 | 0 | 2



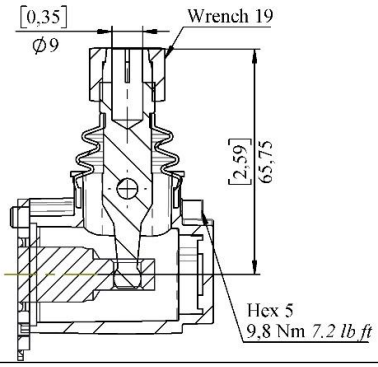
Type KI

1 | 0 | 2



Type KY

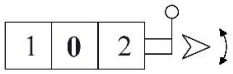
1 | 0 | 2

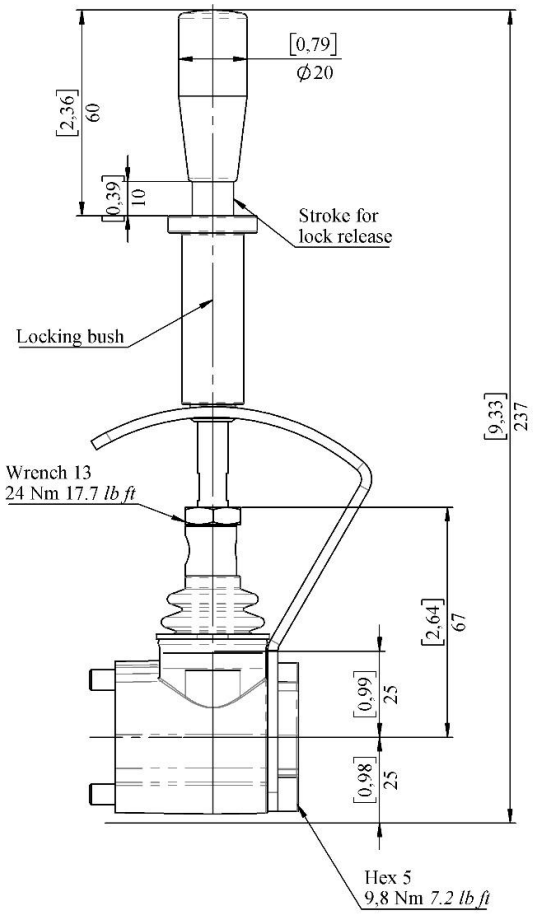


Special lever controls (side A)

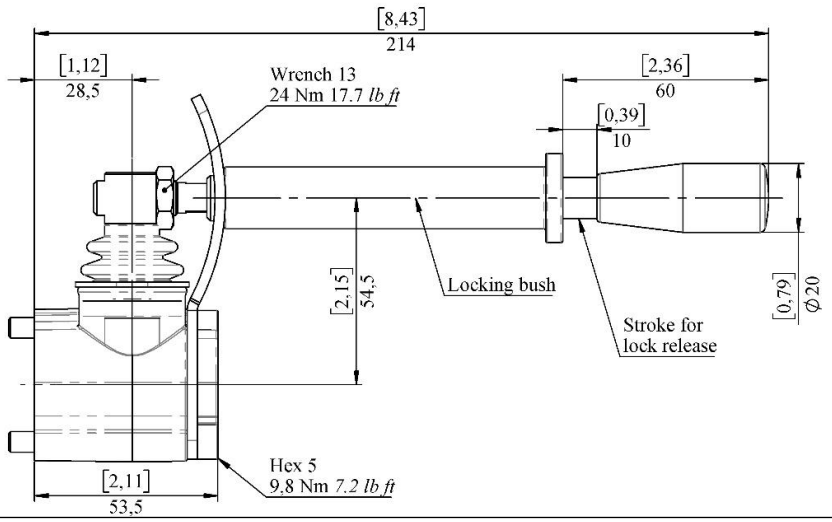
Safety levers with lock in neutral complete with hand lever; lift hand lever knob to operate.

Type KZV



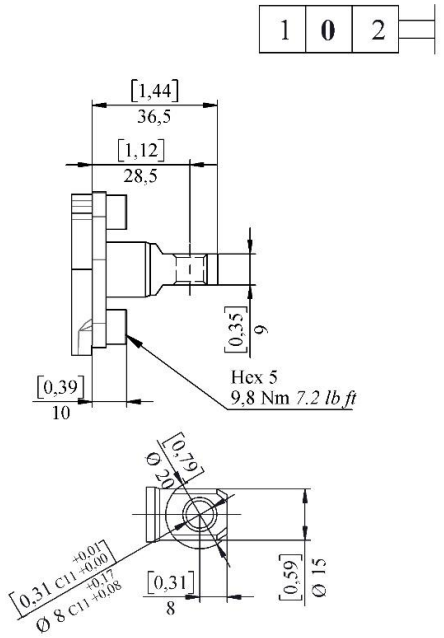


Type KZH

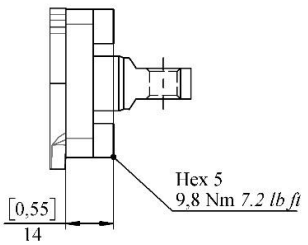


Other control arrangements (side A)

If in the order code side A is left blank, omit control type will be supplied:

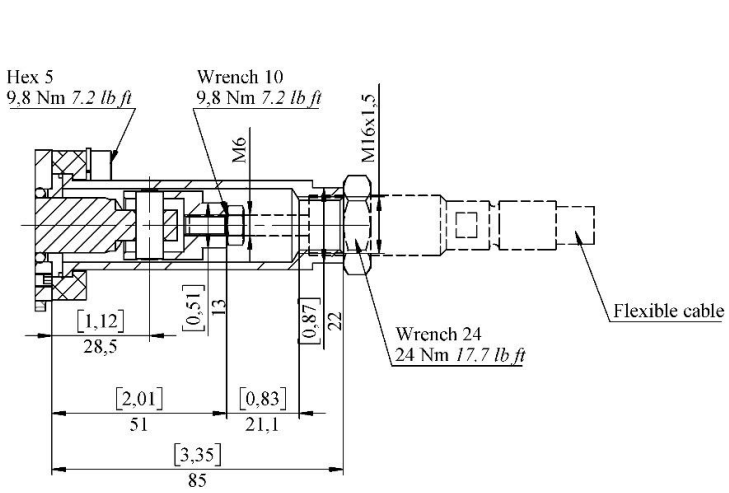


Type SLP

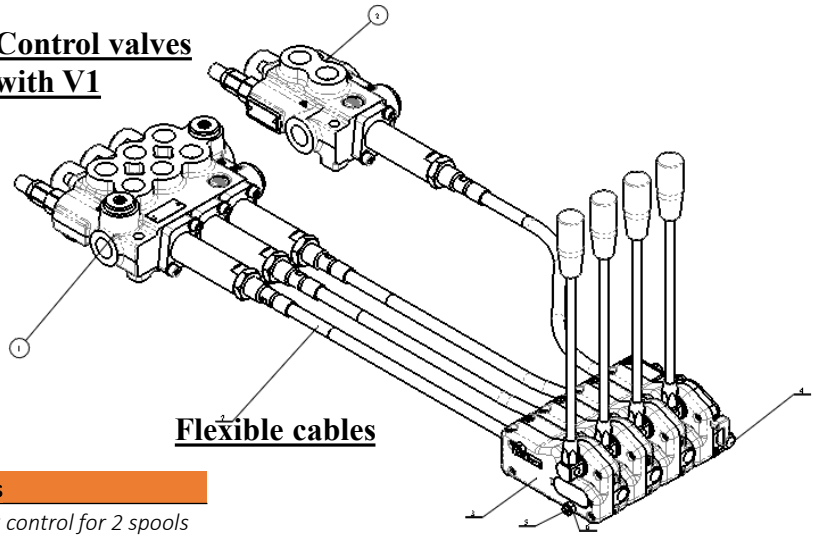


Mechanical control with dust-proof plate

Cable remote control – V1



Control valves with V1

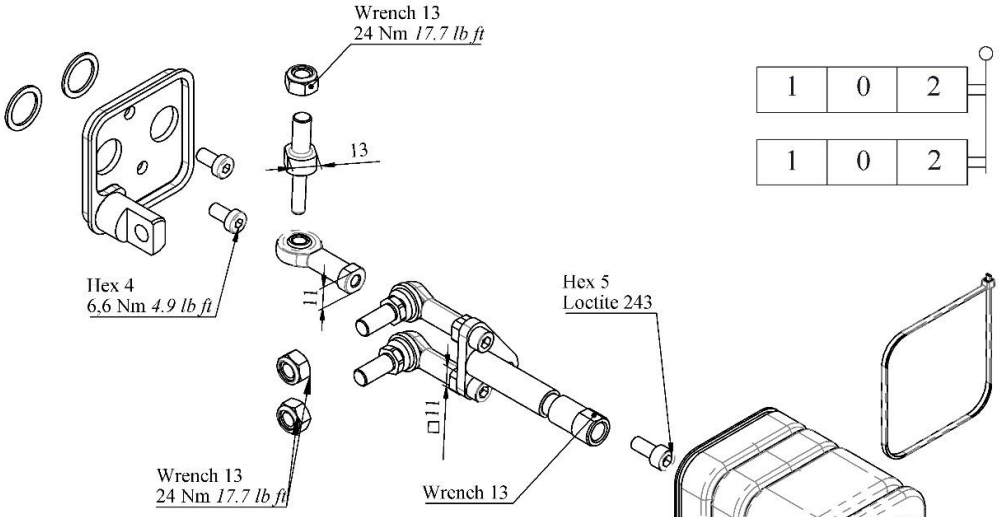


Flexible cables

Controls for flexible cables	
3335	*Mechanical joystick control for 2 spools without buttons*
3375	*Mechanical joystick control for 2 spools with 1 button*
6008	*Mechanical joystick control for 2 spools with 2 buttons*
IS 3047	*Single lever control*
IS 3076	*Single lever control with antireverse lock*
Flexible cable opitons code + length	
IT-731133	*1.00 m*
IT-731134	*1.50 m*
IT-731135	*2.00 m*
IT-731136	*2.50 m*
IT-731137	*3.00 m*
IT-731138	*3.50 m*
IT-731139	*4.00 m*

Remote controls

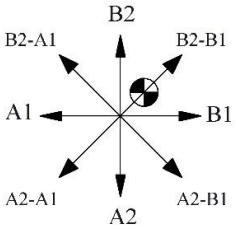
Mechanical joystick for two section control



There are different types of hand levers, with different end executions - cylindrical handle, ball type handle, etc. has to be specified with order.

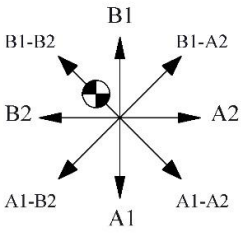
Type j+1

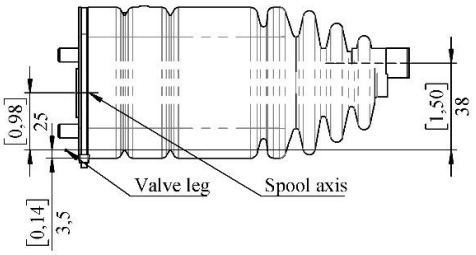
Pivot is above right



Type j+2

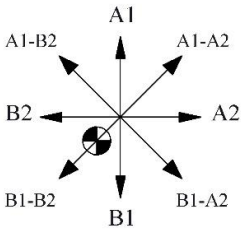
Pivot is above left





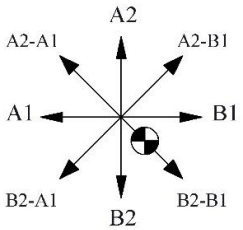
Type j+3

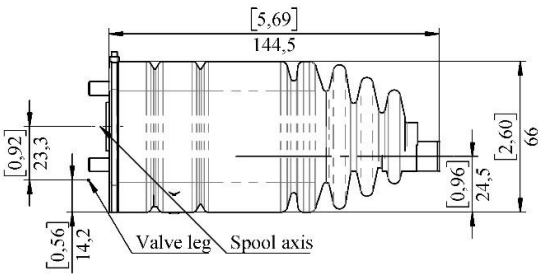
Pivot is bottom left



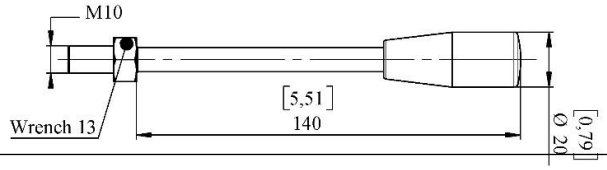
Type j+4

Pivot is bottom right





Standard hand lever dimensions



Example order code with standard lever:

2Z80/1/(A1A1)(ju+3)-G

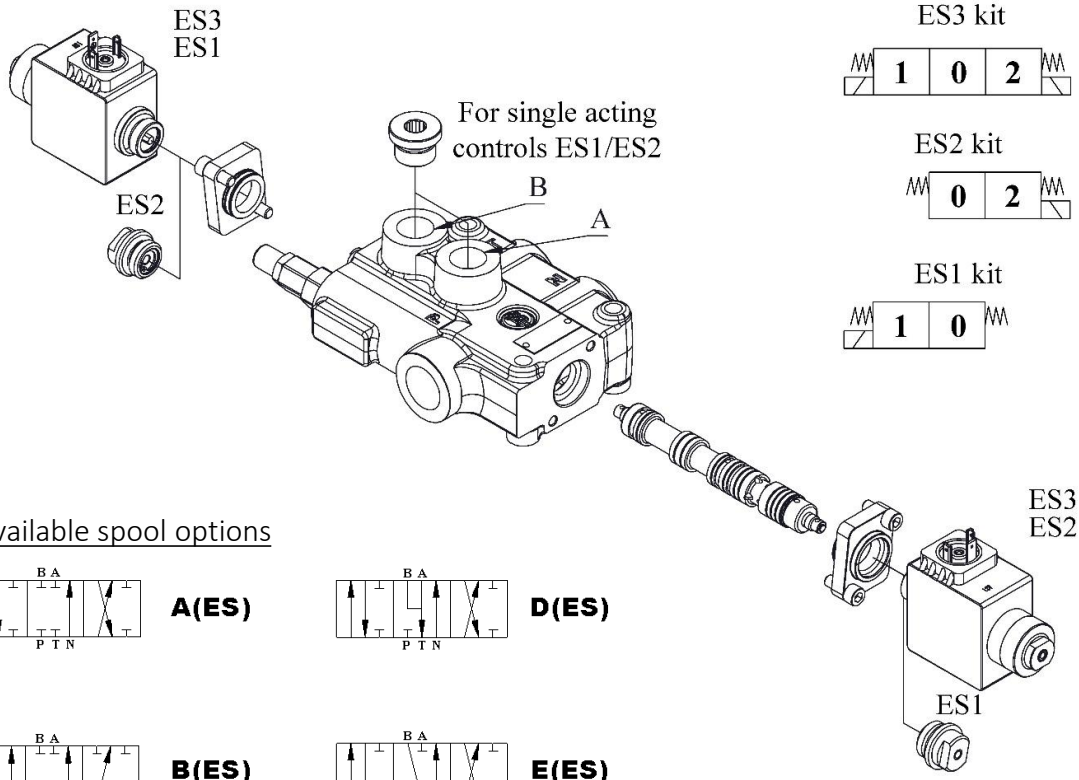
alternative (same as)

2Z80/1/(2xA1)(ju+3)-G

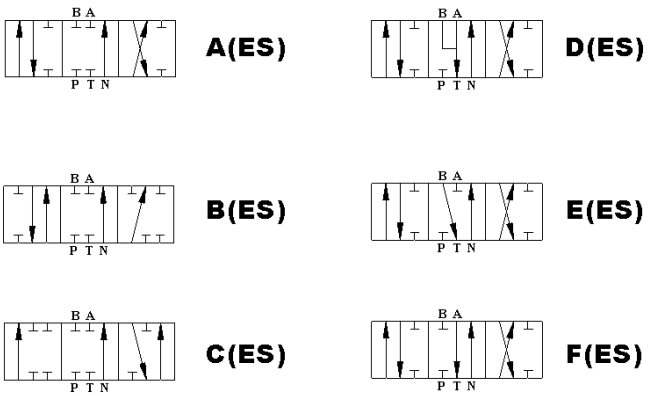
Complete control – single acting ON/OFF solenoid control

Complete control – ES3 / ES2 / ES1

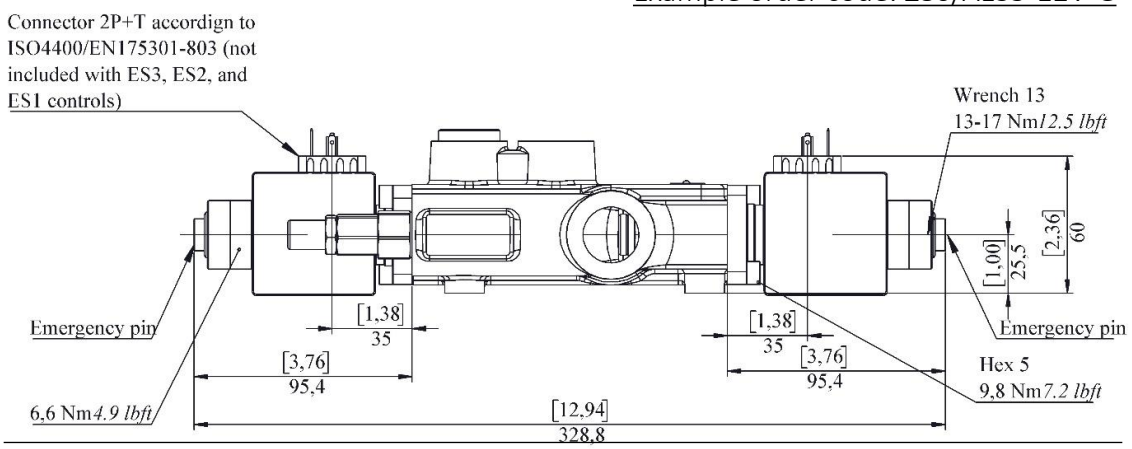
Direct control by two single acting solenoid with spring return to neutral position (ES3) or one single acting solenoid (ES1 or 2); available for 1 to 6 spools, including valve bodies with individual check valves (both parallel and tandem version).



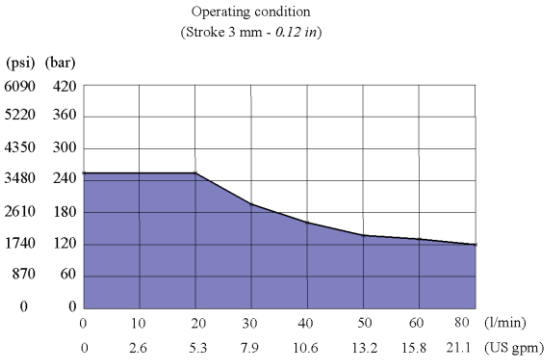
Available spool options



Example order code: Z80/AES3-12V-G



Complete control – single acting ON/OFF solenoid control



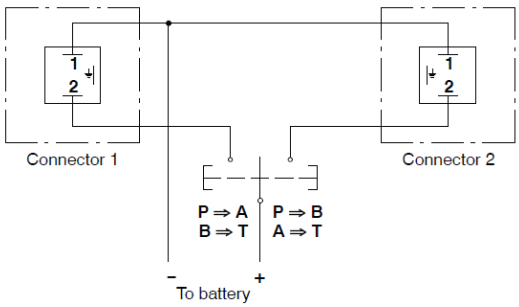
Operating features

Internal leakage (min.) A(B) to T Δp = 100 bar (1450 psi) fluid and valve at 40 oC (104 oF)	min. 15 cm^3/min *0.91 in^3/min*

COIL specifications

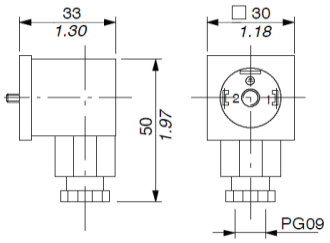
Nominal voltage tolerance	±10 %
Power rating	60 W
Current	5 A - 12 VDC
	2.5 A - 24 VDC
Weather protection	IP65
Coil insulation	Class H
Duty cycle	100%

Electric wiring example

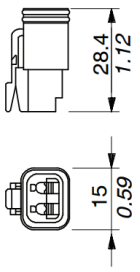


Connector specifications per type of coils available

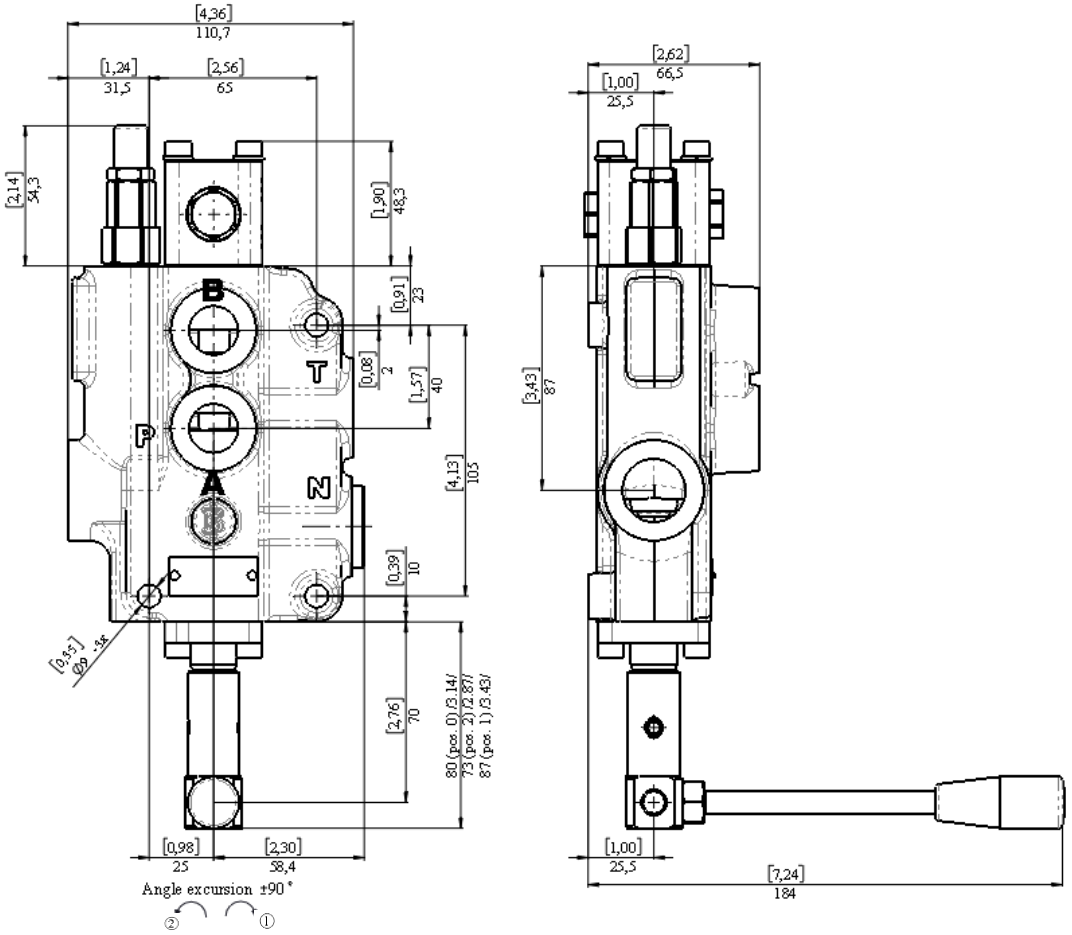
2P+T according to ISO 4400 / EN175301-803

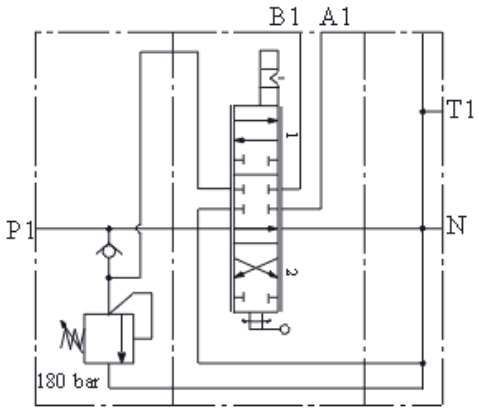


Connector specifications 2 poles, type Deutsch DT06-2S Male housing with female ends



Complete control – Rotary control A26



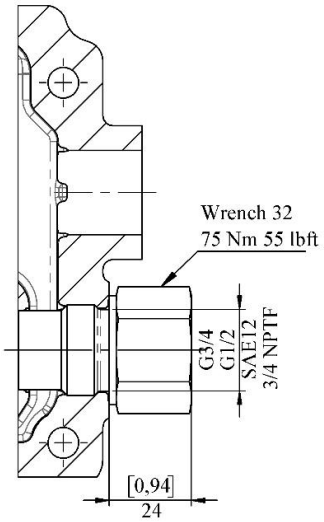


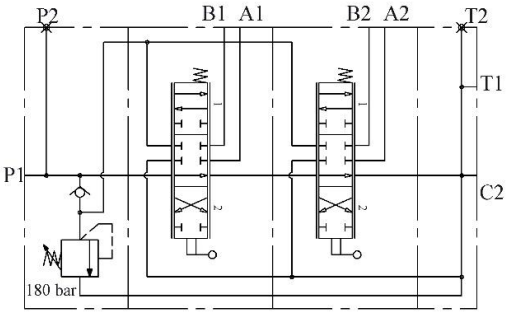
Example order code: Z80/AmL26-G

Outlet port options

It is possible to have open centre, closed centre and high-pressure carry-over (power beyond)
If in the order code before the thread specification port N is plugged with standard G3/4 plug

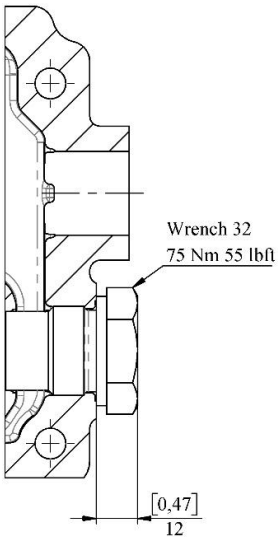
C2 - with carry-over (high pressure carry over)

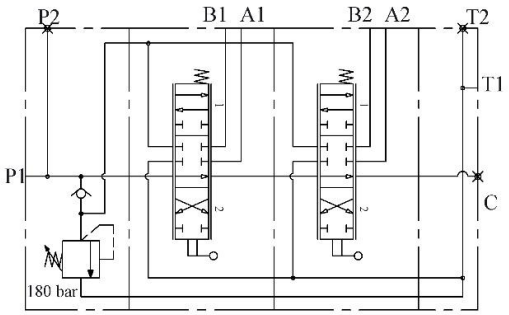




Example order code 02Z80/2x(A1KZ1)-C2-G

C – closed center

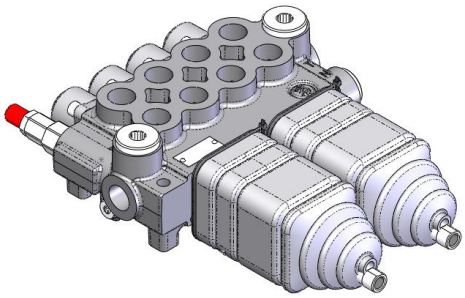


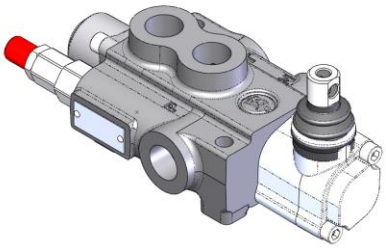


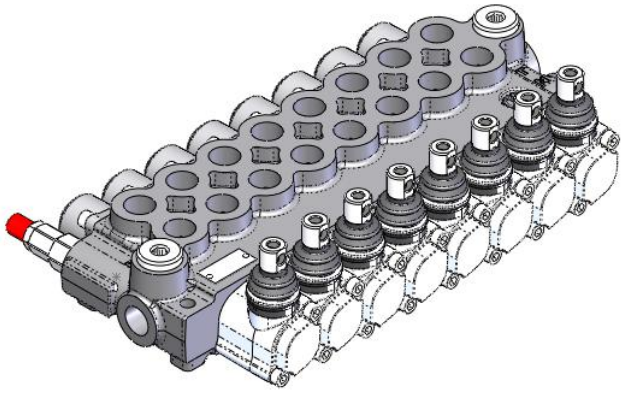
Example order code: 02Z80/2x(A1KZ1)-C-G

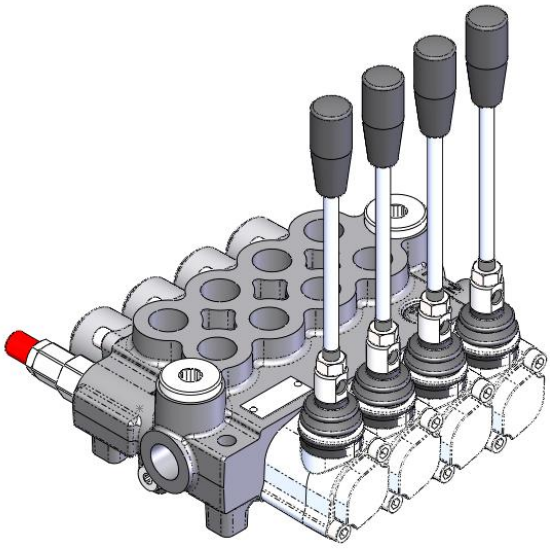
Notes

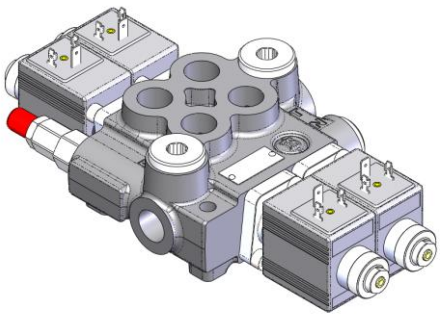
Z50











Z50

Simple compact and heavy duty designed monoblock from 1 to 8 sections for open and closed centre hydraulic systems.

- Fitted with a main pressure relief valve and a load check valve (individual check valve per spool – maximum 4 spools).
- Available with parallel and tandem circuit (only on 2, 3 and 4 spool valves)
- Optional power beyond port for parallel and tandem circuit
- Diameter 16 mm *0.63 in* interchangeable spools.
- A wide variety of options
- Floating spools and kits, regenerative spools and kits do not require additional machining on the body
- Actuation – manual, pneumatic, electro-pneumatic, hydraulic, electro-hydraulic, with solenoid and remote with flexible cable spool control kits.

Additional information

This catalogue shows the product in the most standard configuration. For special requests please contact sales.

WARNING!

All specifications of this catalogue refer to the standard product at this date. Badestnost, oriented to continuous improvement, reserves the right to discontinue, modify or revise specifications without notice.

First edition 08-2024

Working conditions

Nominal flow rating		50 l/min	*13.2 US gpm*
Operating pressure (max.)	*parallel and tandem*	315 bar	*4600 psi*
Back pressure (max.)		35 bar	*508 psi*
Internal leakage (min.) A(B) to T	*Δp = 100 bar (1450 psi) fluid and valve at 40 °C (104 °F)*	7 cm^3/min	*0.42 in^3/min*
Hydraulic fluid		Mineral based oil	
Fluid temperature	*with NBR seals*	from -20 °C to 80 °C	*from -4 °F to 176 °F*
	with FPM (Viton) seals	from -20 °C to 100 °C	*from -4 °F to 212 °F*
Viscosity	*operating range*	from 15 to 75 mm^2/s	*from 15 to 75 cSt*
	min.	12 mm^2/s	*12 cSt*
	max.	400 mm^2/s	*400 cSt*
Permisable degree of fluid contamination		-/19/16 - ISO 4406	*NAS 1683 - class 10*
Ambient temperature	with mechanical devices	from -40 °C to 60 °C	*from -40 °F to 140 °F*
	with pneumatic and hydraulic devices devices	from -30 °C to 60 °C	*from -22 °F to 140 °F*
	with electric devices	from -20 °C to 50 °C	*from -4 °F to 140 °F*

Standard threads

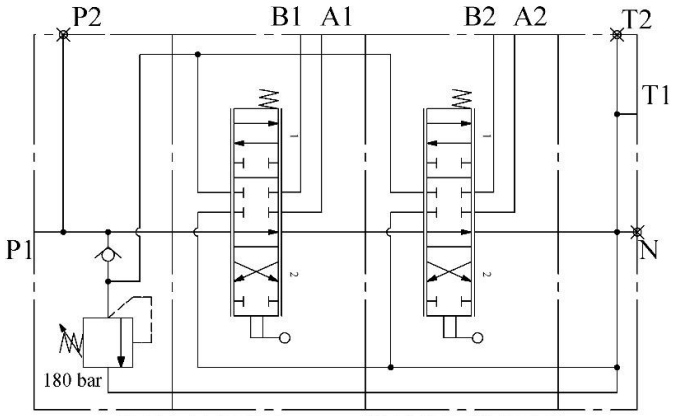
		Refernce standard			
		BSP	UN-UNF	Metric	NPTF
Thread according to		ISO 228/1	ISO 263	ISO 262	Ansi B1.20.3
		BS 2779	ANSI B1.1 unified		
Cavity dimension according to	ISO	1179	11926	9974-1	
	SAE		J1926	J2244	J476a
	DIN	3852-2 (Shape X or Y)		3852-1 (Shape X or Y)	

Port threadings and codes

Codes:	G	G38	G12	S	S8	M
Main ports	BSP	BSP	BSP	UN-UNF	UN-UNF	Metric
Inlet P and outlet T	G1/2	G3/8	G1/2	7/8-14 (SAE10)	3/4-16 (SAE8)	M22x1.5
Working ports A and B	G3/8	G3/8	G1/2	3/4-16 (SAE8)	3/4-16 (SAE8)	M18x1.5
Control pilot ports						
Pneuamtic	1/8-27 NPTF	1/8-27 NPTF	1/8-27 NPTF	1/8-27 NPTF	1/8-27 NPTF	1/8-27 NPTF
Hydraulic	G1/4	G1/4	G1/4	9/16-18 (SAE6)	9/16-18 (SAE6)	G1/4

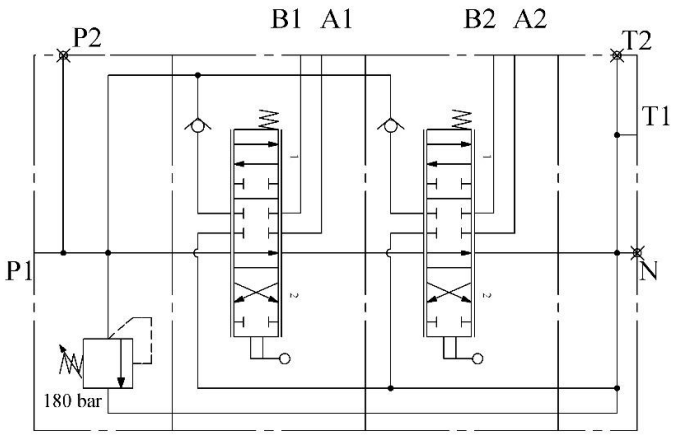
Hydraulic circuits

Standard configuration – parallel body, common check valve (available 1 to 8 spools)



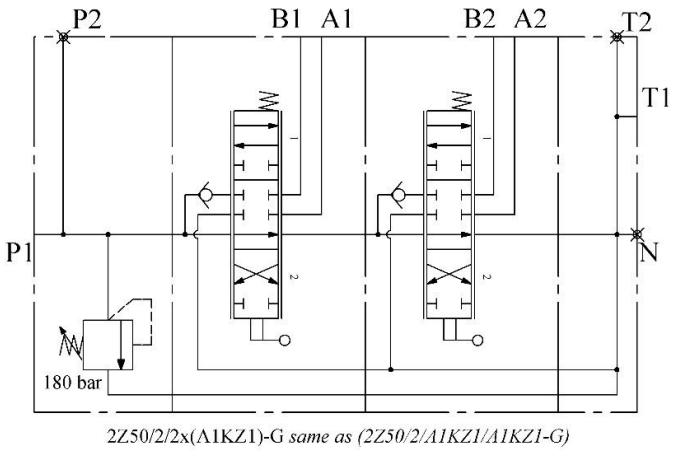
02Z50/2x(A1KZ1)-G *same as (02Z50/A1KZ1/A1KZ1-G)*

Standard configuration – parallel body, individual check valve (available 2 to 4 spools)



2Z50/1/2x(A1KZ1)-G *same as (2Z50/1/A1KZ1/A1KZ1-G)*

Standard configuration – tandem body, individual check valve (available 2 to 4 spools)

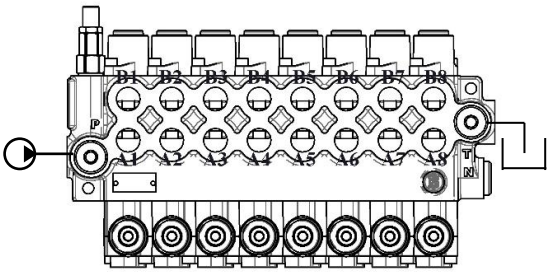


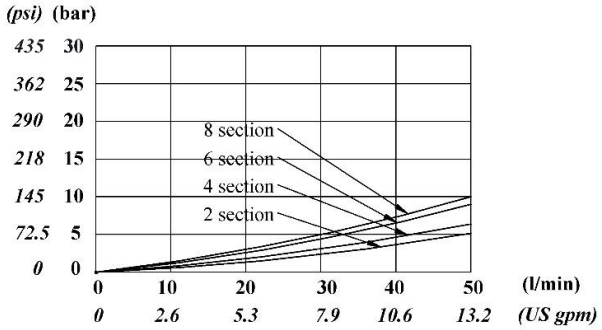
2Z50/2/2x(A1KZ1)-G *same as (2Z50/2/A1KZ1/A1KZ1-G)*

Performance data

Open centre

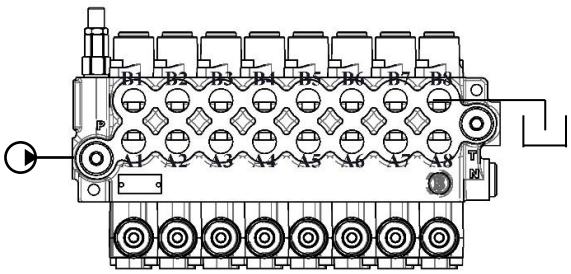
From side inlet to side outlet

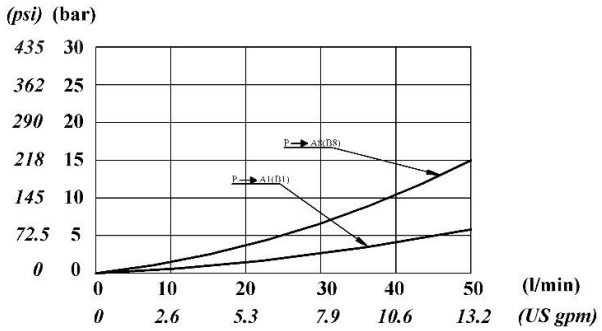




Inlet to work port

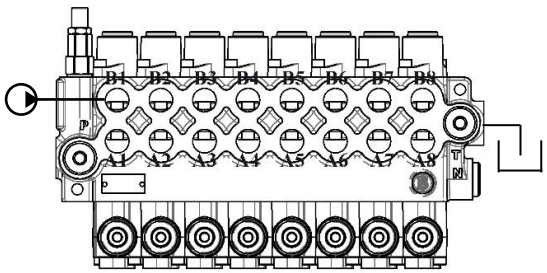
From side inlet to A port spool in position 2 or B port spool in position 1

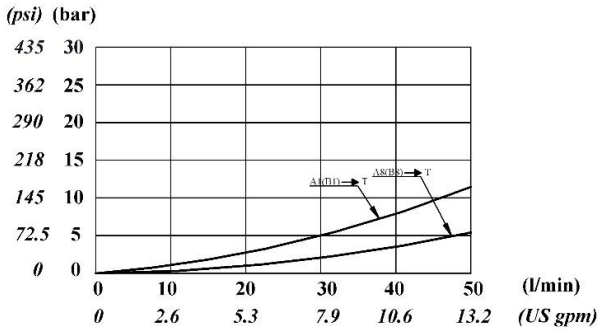




Work port to outlet

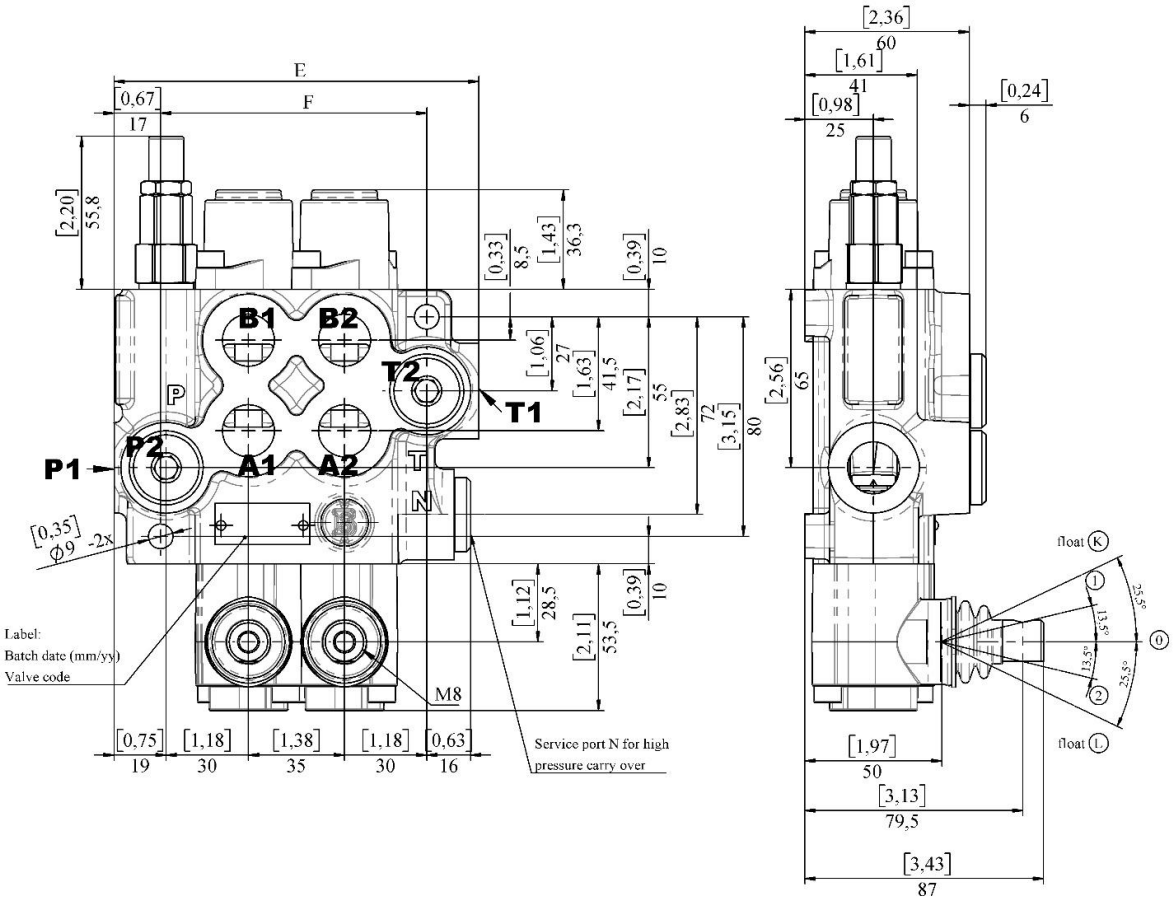
From A port spool in position 1 or B port spool in position 2 to side outlet





Dimensions

This drawing refers to a directional control valve with 2 working sections with common check valve (refer to next page for the body with individual check valves)

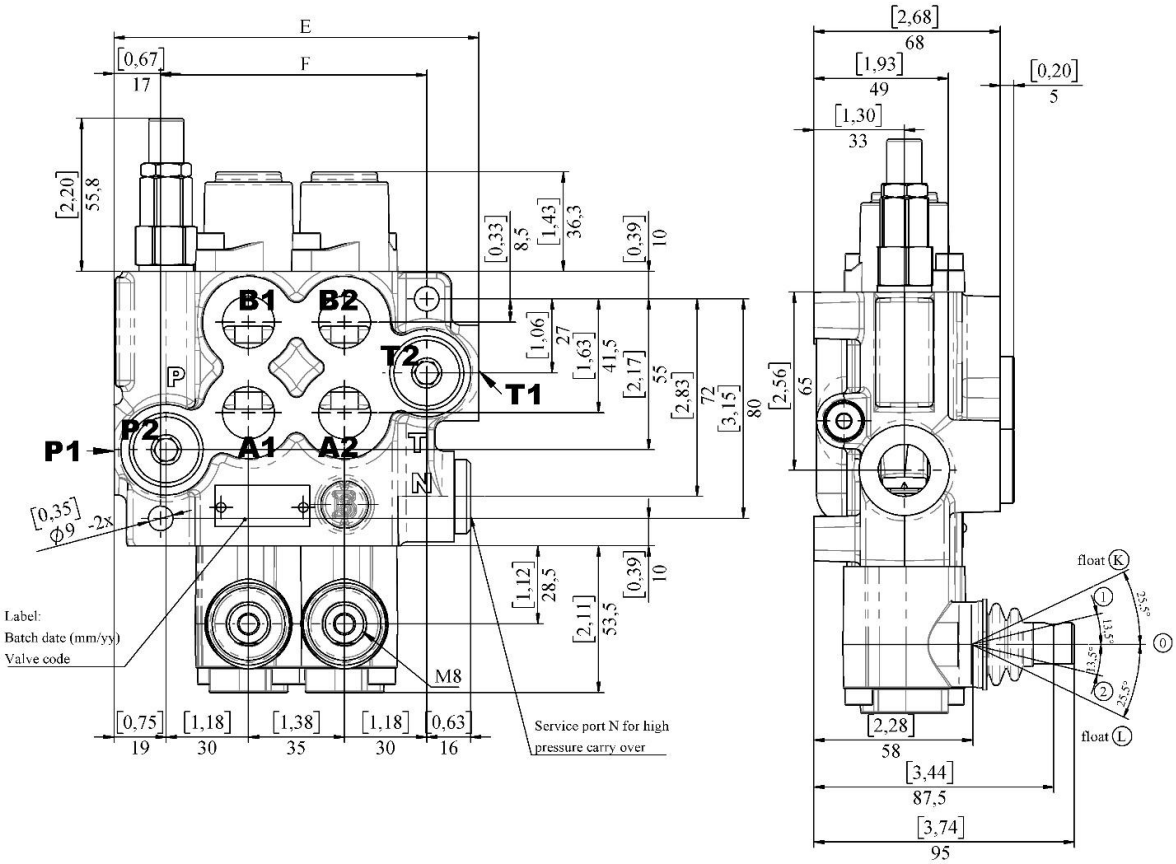


Float position L is shown just as a convention for direction, Z50 can have float- spool in **only** in right hand version – refer to page 20

TYPE	E		F		Weight	
	mm	*in*	mm	*in*	kg	*lb*
Z50	88	*3.46*	60	*2.36*	2.50	*5.5*
02Z50	133	*5.24*	97	*3.82*	4.10	*9.0*
03Z50	168	*6.61*	132	*5.20*	5.5	*12.1*
04Z50	203	*7.99*	167	*6.6*	6.90	*15.2*
05Z50	238	*9.4*	202	*8.0*	8.30	*18.3*
06Z50	273	*10.7*	237	*9.3*	9.70	*21.4*
07Z50	308	*12.1*	272	*10.7*	11.10	*24.5*
08Z50	343	*13.5*	307	*12.1*	12.50	*27.6*

Dimensions

This drawing refers to a directional control valve with 2 working sections with individual check valve per spool



Float position L is shown just as a convention for direction, Z50 can have float- spool in **only** in right hand version – refer to page 20

TYPE	E		F		Weight	
	mm	*in*	mm	*in*	kg	*lb*
2Z50	133	*5.24*	97	*3.82*	4.10	*9.0*
3Z50	168	*6.61*	132	*5.20*	5.5	*12.1*
4Z50	203	*7.99*	167	*6.6*	6.90	*15.2*

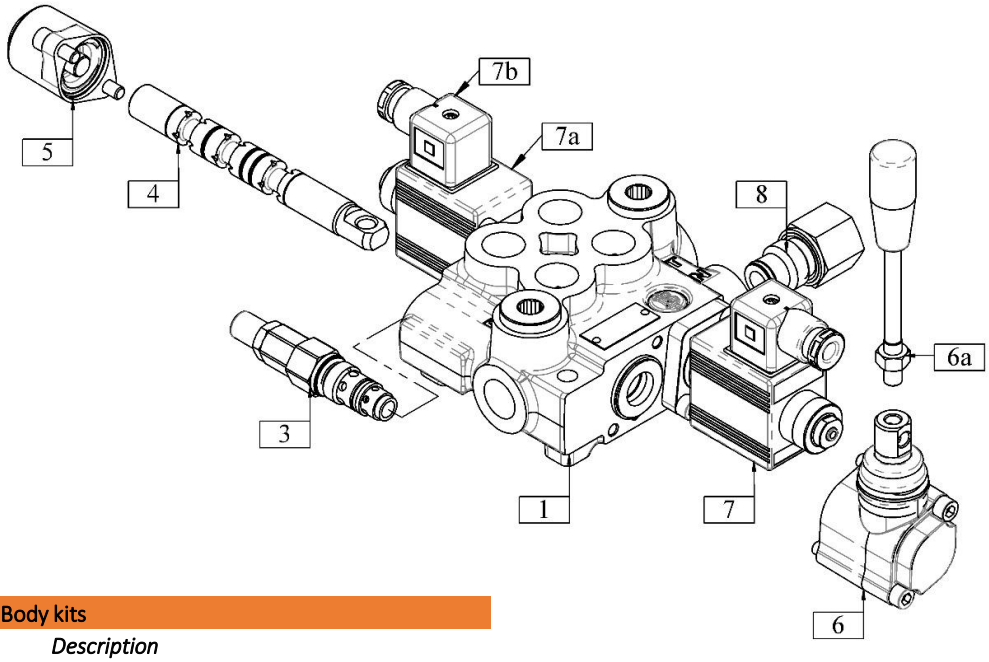
Order code, complete

First section *Following sections*

02Z50 (D4-280-FV)/A 1 KZ1/A ES3–12V(C)–C2 – G - Zn

1	2	3	4	5	6	7	8	10	11

For identical sections use quantity of sections x (code of section), e.g. 2x(A1KZ1)...



1	Body kits
Type	*Description*
Z50	Parallel, 1 section
02Z50	Parallel, 2 section, common check valve
03Z50	Parallel, 3 section, common check valve
04Z50	Parallel, 4 section, common check valve
05Z50	Parallel, 5 section, common check valve
06Z50	Parallel, 6 section, common check valve
07Z50	Parallel, 7 section, common check valve
08Z50	Parallel, 8 section, common check valve
2Z50/1/	Parallel, 2 section, individual load checks
3Z50/1/	Parallel, 3 section, individual load checks
4Z50/1/	Parallel, 4 section, individual load checks
2Z50/2/	Tandem, 2 section, individual load checks
3Z50/2/	Tandem, 3 section, individual load checks
4Z50/2/	Tandem, 4 section, individual load checks

2	Position with respect to pump inlet
omit	*Left hand configuration, pump port is on the left hand side with respect to control*
R	*Right hand configuration, pump port is on the right hand side with respect to control*

3	Inlet relief options
Type	*Description*
omit	*Range 120-250 bar / 1740 to 3625 psi* standard setting at 180 bar / 2610 *psi*
(D2-120)	*Range 50-120 bar / 725 to 1740 psi* standard setting at 120 bar / *1740 psi* *pressure range has to be always specified*
(120-250)	*Range 120-250 bar / 1740 to 3625 psi* setting other than 180 bar / 2610 *psi*
(D4-220)	*Range 220-315 bar / 3190 to 4570 psi* standard setting at 220 bar / *3190 psi* *pressure range has to be always specified*
(sok)	*Without check valve*
(svp)	*Relief valve blanking plug*
(FV)	*Fixed valve setting and steel cap nut*

Standard setting is referred to 12 l/min flow, example for relief valve with a preset valve at 250 bar with cap nut without check valve (D4-250-sok-FV)

Order code, continue

4	Spool options
Type	*Description*
A	*Double acting, 3 position, with A and B closed in pos. 0*
As	*Double acting, 3 position, with A and B closed in pos. 0, fine metering*
B	*Single acting on A, 3 positions, B plugged, requires a plug.*
C	*Single acting on B, 3 positions, A plugged, requires a plug.*
D	*Double acting, 3 position, with A and B opened to tank in pos. 0*
E	*Double acting, 3 position, B opened to tank in pos. 0*
F	*Double acting, 3 position, A opened to tank in pos. 0*
Dd	*Double acting, 3 position, with A and B partially open to tank in pos. 0*
Ed	*Double acting, 3 position, B partially opened to tank in pos. 0*
Fd	*Double acting, 3 position, A partially opened to tank in pos. 0*
M	*Double acting, 3 position, blocked by-pass channel for closed center circuit*
Special spools for particular positioner kits	
Us	*Double acting, 4 positions, regenerative position in between pos. 0 and position 2, spool in*
K	*Double acting, 4 positions, floating circuit in 4th position with spool out, only available in left hand configuration*
L	*Double acting, 4 positions, floating circuit in 4th position with spool in, only available in right hand configuration*

5	Spool positioners (side B)
Type	*Description*
1	*With spring return in pos. 0*
1C	*With spring return in pos. 0, soft spring*
1Z	*With spring return in pos. 0 and pin with M8x1 male thread for dual control*
1rAB	*With spring return in pos. 0 and stroke adjustments both directions*
1zS1	*With spring return in pos. 0 and pin with M8 male thread for dual control*
1D(M6)	*With spring return in pos 0 and pin with M6 female thread for dual control*
1E	*With spring return in pos. 0, includes microswitch kit*
14	*Spring return in pos. 0, no microswitch kit included*
14C	*Spring return in pos. 0, soft spirng, no microswitch kit included*
4	*2 positions, with spring return in pos. 0 from pos. 2*
5	*2 positions, with spring return in pos. 0 from pos. 1*
6	*2 positions, with spring return in pos. 1 from pos. 2*
7	*2 positions, with spring return in pos. 2 from pos. 1*
7Z	*2 positions, with spring return in pos. 2 from pos. 1 and pin with M8x1 male thread for dual control*
7T	*2 positions, with spring return in pos. 2 from pos. 1 with teton (push piston)*
7D(M6)	*2 positions, with spring return in pos. 2 from pos. 1, and pin with M6 female thread for dual control*
7zS1	*2 positions, with spring return in pos. 2 from pos. 1 with special tie rod kit M8 for dual control*
8	*Detent in positions 0, 1 and 2*
8Z	*Detent in positions 0, 1 and 2, and pin with M8 male thread for dual control*
9	*Detent in positions 1 and 0*
10	*Detent in positions 0 and 2*
11	*Detent in positions 1 and 2*
11B	*Detent in positions 1 and 2, and spring return to pos. 0*
2	*With detent in position 1 and spring return in pos. 0*
3	*With detent in position 2 and spring return in pos. 0*
1V2	*With spring return in pos. 0 for flexible cable control*
8V2	*Detent in positions 0, 1 and 2 for flexible cable control*
1H	*Proportional hydraulic control- single side*
1P	*ON/OFF pneumatic control*
1EP	*ON/OFF electro-pneumatic control*
1ED3	*ON/OFF electro-hydraulic control*
Particular positioner kits for special spools	
17	*4 position with spring return to pos. 0 from pos. 2, soft stop at (regenerative) before pos. 2 and detent in pos. 1*
12	*4 position with spring return in pos. 0 and detent in float position - only for spool L*
13	*Detent in 4 positions - only for spool L*
16	*4 position with spring return in pos. 0 and detent in float position - only for spool K*
15	*Detent in 4 positions - only for spool K*

Order code, continue

6	Spool controls (side A)
	without lever box, with plate
KZ	*Lever box for M8*
KZ(M10)	*Lever box for M10*
KZT	*Lever box for M8 with teton (push piston)*
KI	*Lever box, collet type, horizontal Ø9 mm*
KY	*Lever box, collet type, vertical Ø9 mm*
KZ(rA)	*Lever box, with stroke limiter*
KZe	*Lever box for M8, extreme conditions*
KZe(M10)	*Lever box for M10, extreme conditions*

*Adding a **0** after the first part of the code will make the execution rotated 180° , lever will face the bottom of the valve, not the ports eg. **KZ0***

KZV	*Safety lever box, vertical configuration*
KZH	*Safety lever box, horizontal configuration*
SLP	*without lever box with dustproof plate*
V1	*Flexible cable connection*
ju+1	*Joystick lever for 2 sections with pivot above right, standard cylindrical handle*
ju+2	*Joystick lever for 2 sections with pivot above left, standard cylindrical handle*
ju+3	*Joystick lever for 2 sections with pivot bottom left, standard cylindrical handle*
ju+4	*Joystick lever for 2 sections with pivot bottom right, standard cylindrical handle*

Optional ball type handle (jb+...), and custom lengths

6a	Handle options
1	*Depending on lever kit M8x150 or M10x170*

Custom lengths and bends available

7	Complete controls
1ESD	*Double acting solenoid kit, standard version with lock/unlock lever kit K1*
ES	*Single acting solenoid kits - ES3/ES2/ES1*
A26	*Control with rotation (CW-CCW)*

7a	Coil specifications
12V	*12V coil, for ISO4400 connector*
24V	*24V coil, for ISO4400 connector*
12V(DT)	*12V coil, for Deutsch connector*
24V(DT)	*24V coil, for Deutsch connector*

Exact coil specifications follow in the catalog

7b	Connectors
omit	*By default connectros are not included, except in 1ESD control and electro-pneuamtic control 1EP*
(C)	*Connector for the particular coil is included*

8	Outlet port options
omit	*BSP G1/2 plug on port N*
C	*Closed center plug*
C2	*For BSP threading - G1/2 high pressure carry-over sleeve*
C2(38)	*For BSP threading - G3/8 high pressure carry-over sleeve*
C2(S)	*For SAE threading - SAE10 high pressure carry-over sleeve*
C2(NPTF)	*For NPTF threading - 1/2NPTF high pressure carry-over sleeve*
C2D	*High pressure carry-over kit, direct connection*
VRE	*Back pressure valve*

9	Inlet outlet selection
omit	*Side inlet, side outlet, others plugged*
22	*Top inlet, top outlet, others plugged*
12	*Side inlet, top outlet, others plugged*
21	*Top inlet, side outlet, others plugged*

10	Valve Threading - refer to page 3

11	Coating and plating
omit	*Valve body is phoshpated, steel parts zinc plated, spools either Ni, or Cr plating (omit in valve description)*
Zn	*Valve body - Zinc plated*
BP	*Painting, standard black, others optional*

Inlet relief options

D4-280-sok-FV

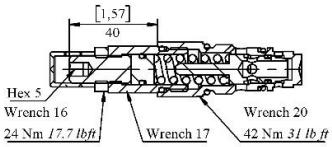
(FV) - Steel cap nut for pre-set pressure

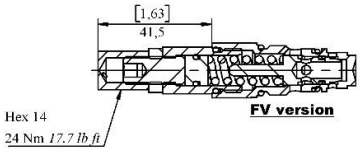
(sok) – without load check valve

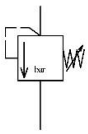
Pressure setting, if not specified – standard pressure setting per spring (p.8)

Adjustable spring type (2 and 4)

Pressure setting within the range 120-250 bar / 1740 to 3625 psi, by default uses spring no.3 and does not require to be specified in the ordering code e.g. (150)

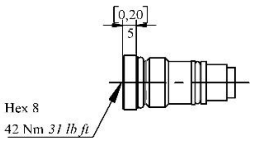


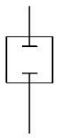




Note: Check valve is not shown

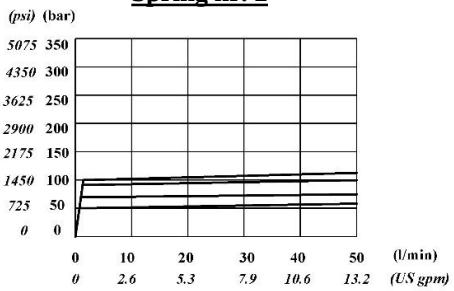
svp– relief valve blanking plug



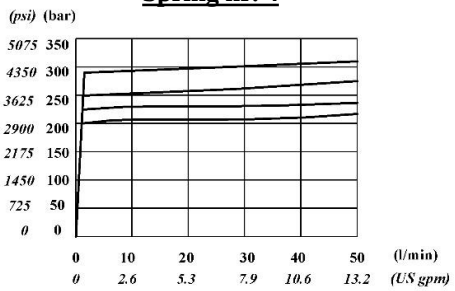


Relief valve type "D" performance characteristics

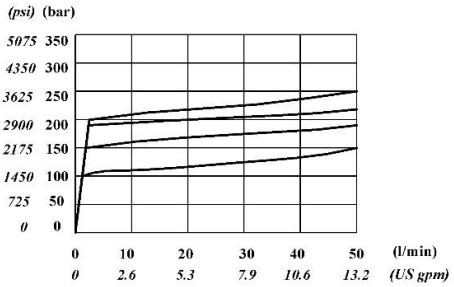
Spring nr. 2



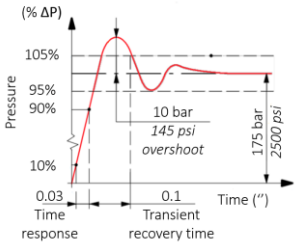
Spring nr. 4



Spring nr. 3

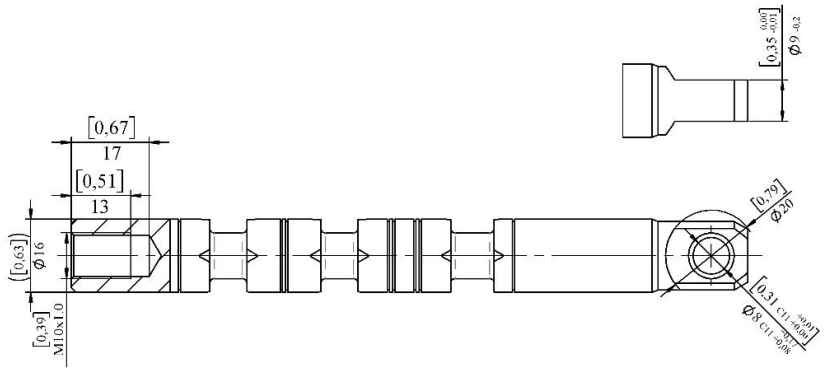


Time response

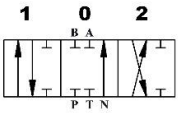
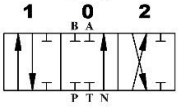
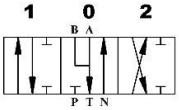
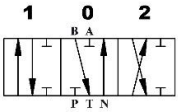
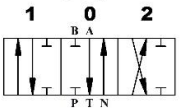
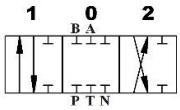
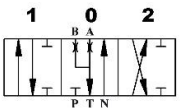
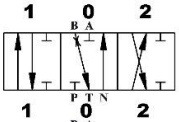
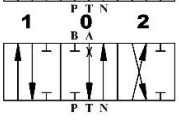


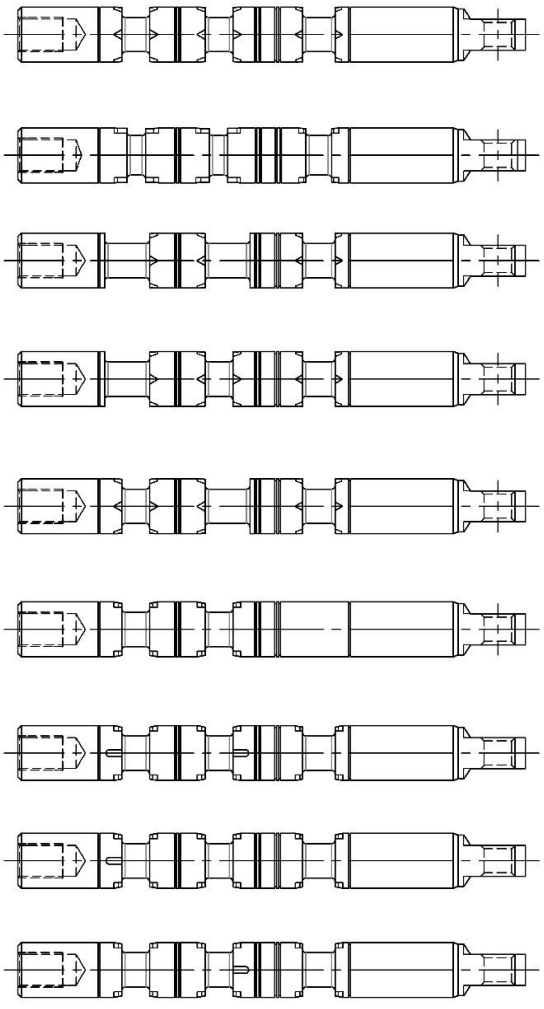
Spool options:

Badestnost standard spool have the end shown in the drawing below.



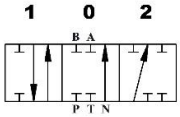
Double acting spools

	**A**	Double acting spool, work ports closed in neutral position.
	**As**	Double acting spool, high metering, work ports closed in neutral position.
	**D**	Double acting spool, work ports open to tank in neutral position.
	**E**	Double acting spool, work port B open to tank in neutral position.
	**F**	Double acting spool, work port A open to tank in neutral position.
	**M**	Double acting spool, closed center, work ports closed in neutral.
	**Dd**	Double acting spool, closed center, work ports partially open to tank
	**Ed**	Double acting spool, closed center, work port B partially open to tank
	**Fd**	Double acting spool, closed center, work port A partially open to tank

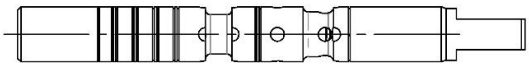


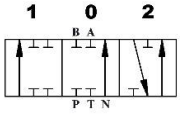
Spool options, continue

Single acting spools

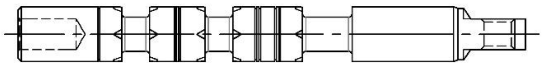


B Single acting on A, 3 position, B plugged

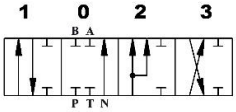




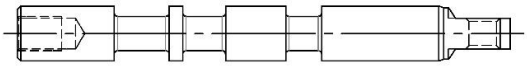
C Single acting on B, 3 positons, A plugged



Regenerative spools

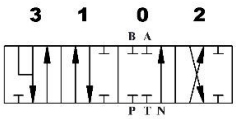


Us Double acting, 4 positions, regenerative position

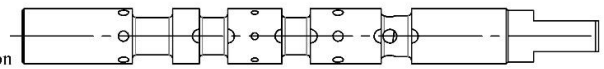


Spool U requires spool positioner - 6 or 17, and it is available to valves ONLY with left hand configuration (P on left with respect to lever control)

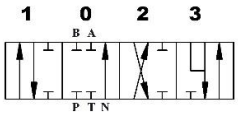
Floating spools



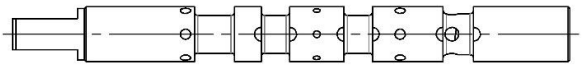
K Double acting, 4 positions, floating circuit in 4th postion with spool out



Spool K requires spool positioner - 16 or 15, and it is available to valves ONLY with left hand configuration (P on left with repsect to lever control)



L Double acting, 4 positions, floating circuit in 4th postion with spool in



Spool L requires spool positioner - 12 or 13, and it is available to valves ONLY with "R" right hand configuration (P on right with respect to lever control

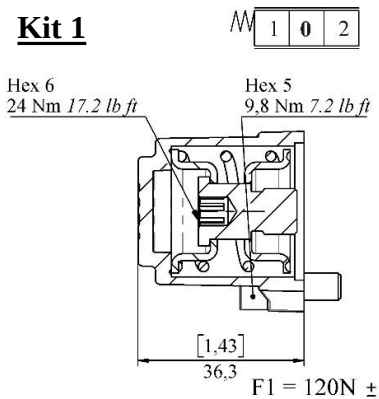
All spools have "R" version for right version of the valve, exceptions are Us, K and L.

*To order right hand version of a spools, add "**R**" behind the spool description e.g. AR, BR, CR, etc.*

*To order low leakage version of spools, add "**n**" behind the spool description e.g. An, Bn, Cn, etc.*

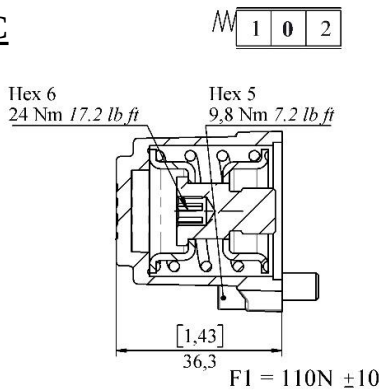
Spool positioners (B-side)

Kit 1



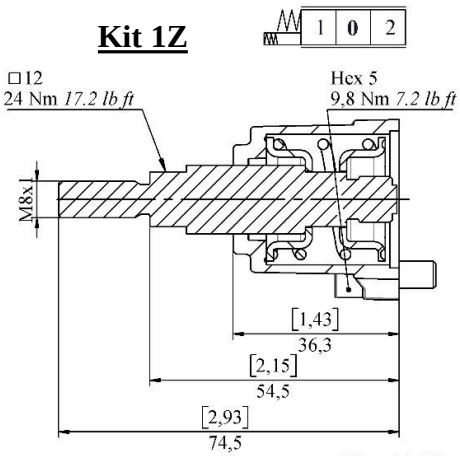
F1 = 120N ±10
F2 = 170N ±12

Kit 1C



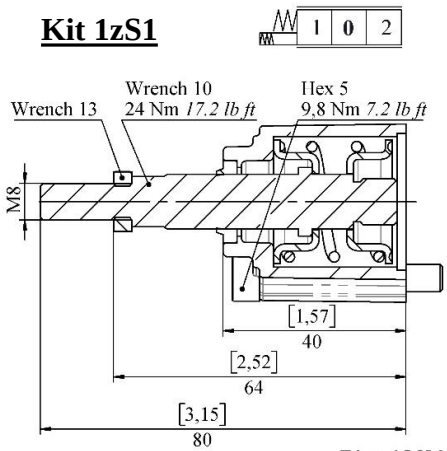
F1 = 110N ±10
F2 = 150N ±10

Kit 1Z



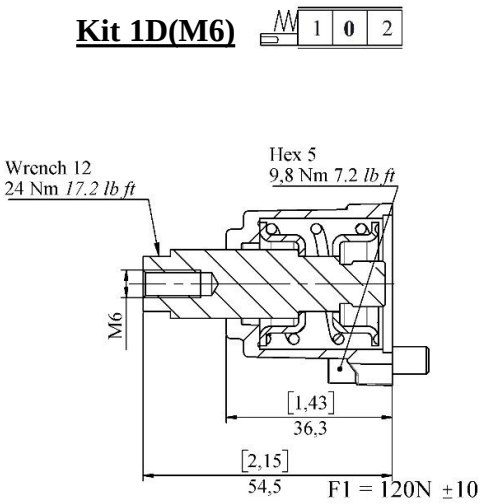
F1 = 120N ±10
F2 = 170N ±12

Kit 1zS1



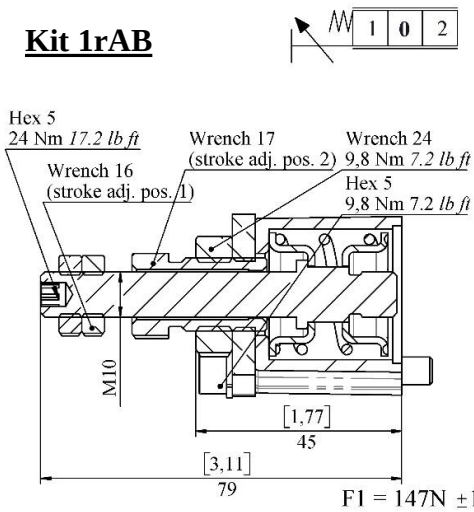
F1 = 120N ±10
F2 = 170N ±12

Kit 1D(M6)



F1 = 120N ±10
F2 = 170N ±12

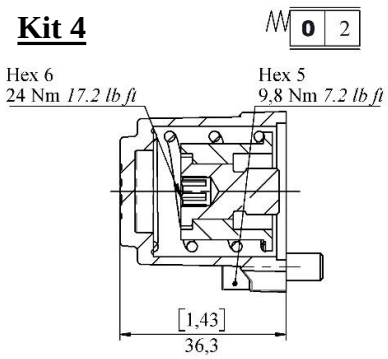
Kit 1rAB



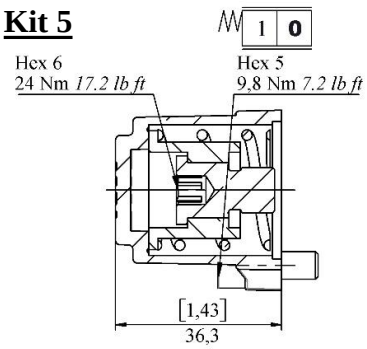
F1 = 147N ±10
F2 = 229N ±12

Spool positioners (B-side)

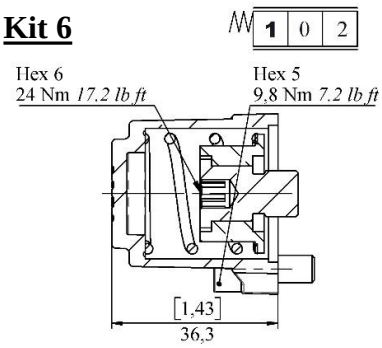
Kit 4



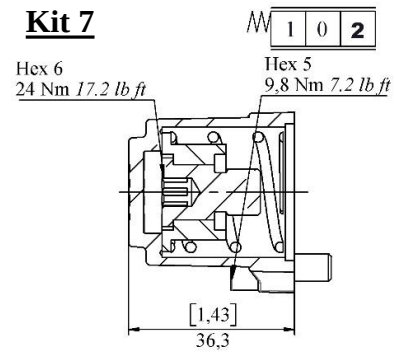
Kit 5



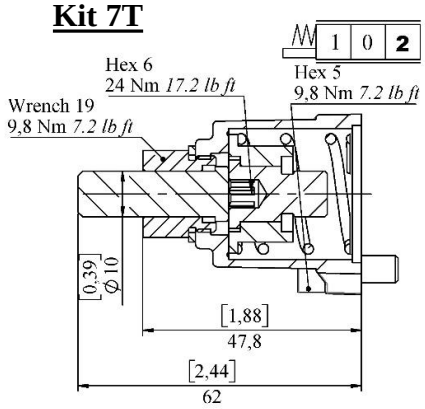
Kit 6



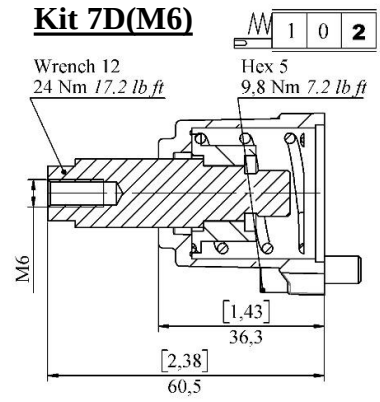
Kit 7



Kit 7T

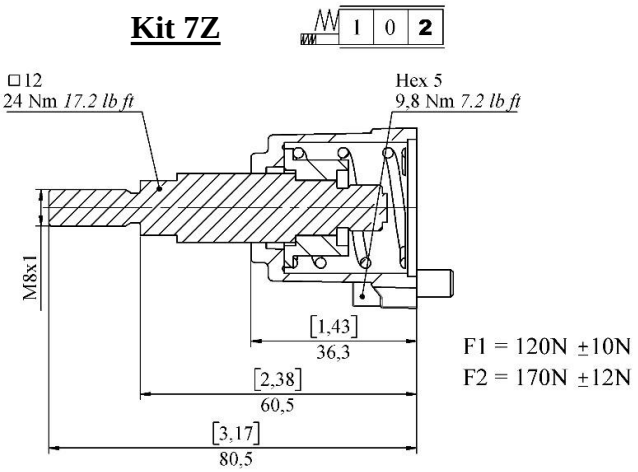


Kit 7D(M6)

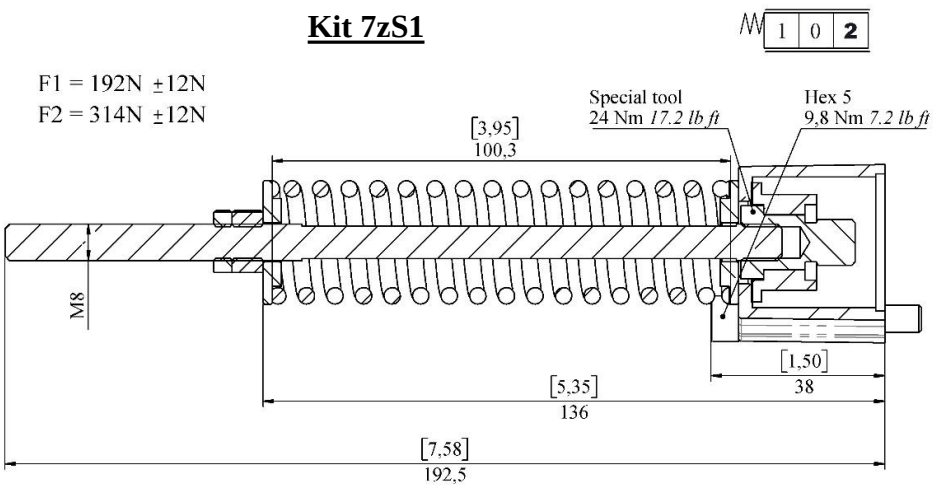


Spool positioners (B-side)

Kit 7Z

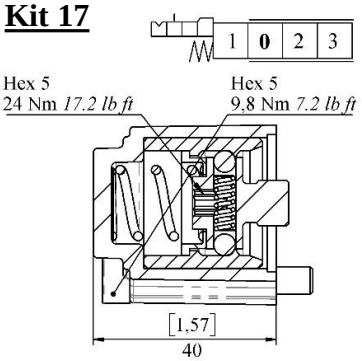


Kit 7zS1

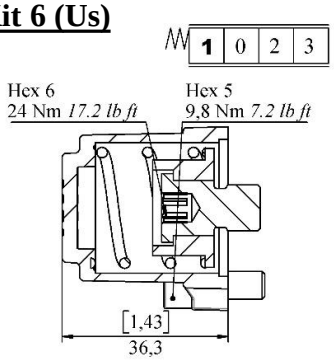


Particular kits for regenerative spool Us

Kit 17

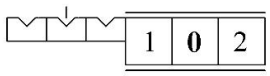


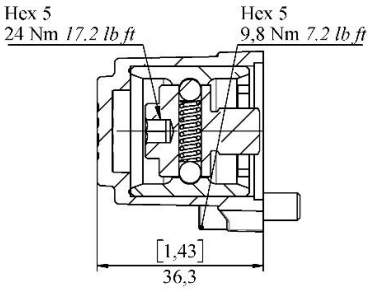
Kit 6 (Us)



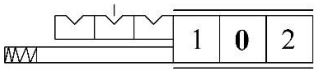
Spool positioners (B-side)

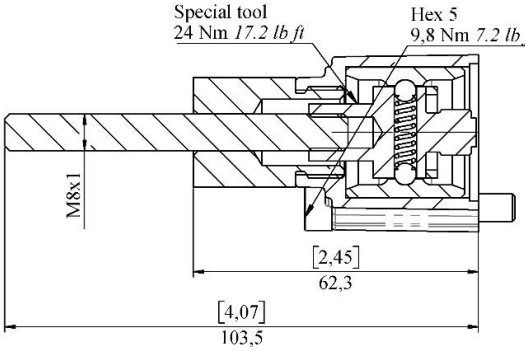
Kit 8



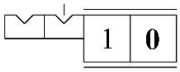


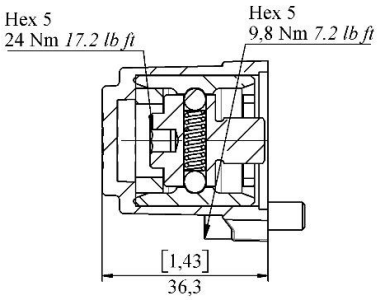
Kit 8Z



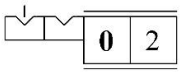


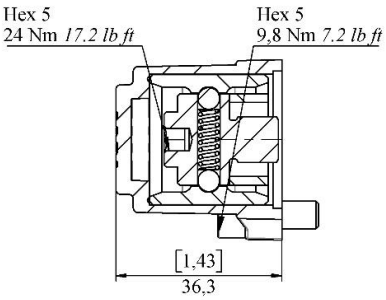
Kit 9



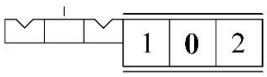


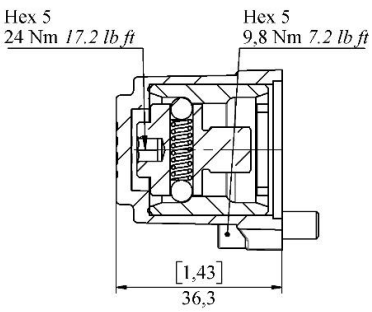
Kit 10





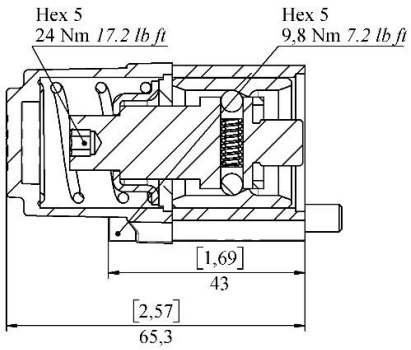
Kit 11

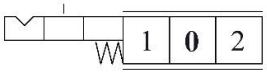




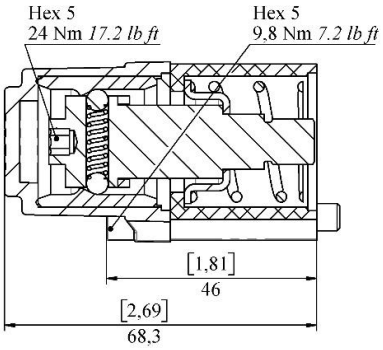
Spool positioners (B-side)

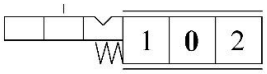
Kit 2: *3 position, spring return from pos. 2 to pos. 0 and detent in pos. 1*



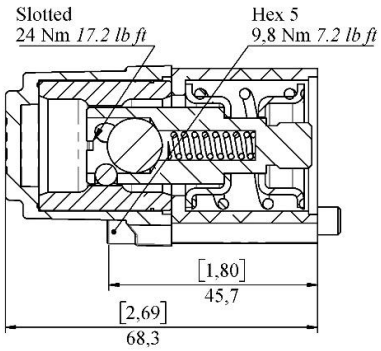


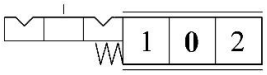
Kit 3: *3 position, spring return from pos. 1 and detent in pos. 2*





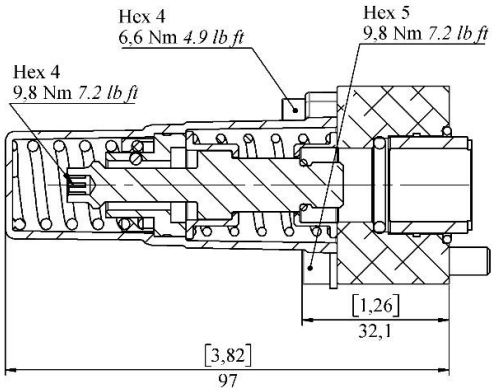
Kit 11B: *2 position, with detent in both positions and spring return to neutral from either direction*

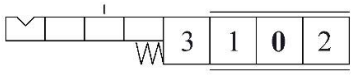




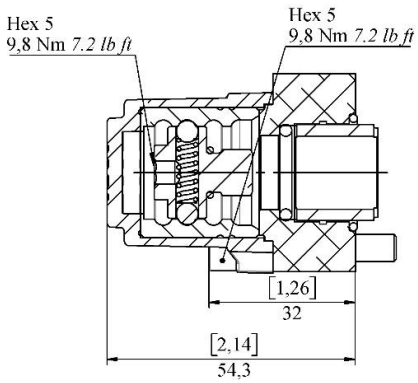
Particular spool positioners kits for floating spool K (float when spool OUT)

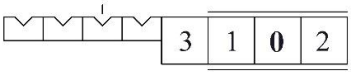
Kit 16: *four position, return to neutral from 1 and 2 and detent in float*



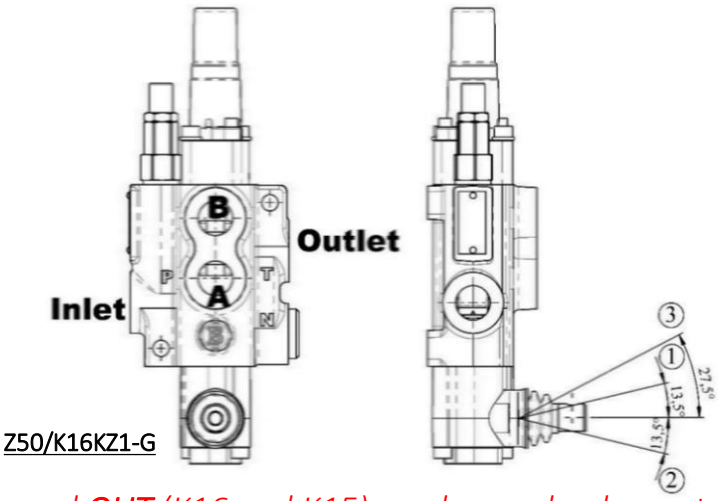


Kit 15: *four position detent*





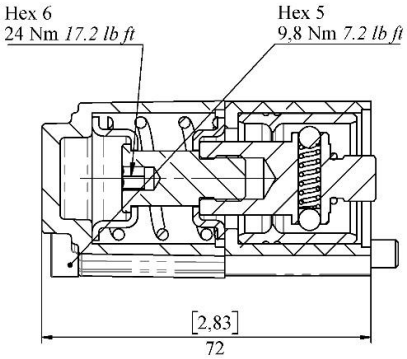
Limitations of floating sections for Z50

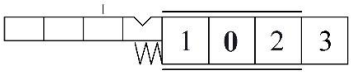


*Floating spool **OUT** (K16 and K15) can be used only on standard configuration with left inlet (with respect to the lever)*

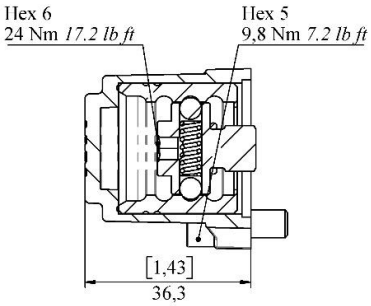
Particular spool positioners kits for floating spool L (float when spool IN)

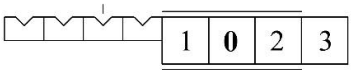
Kit 12: *four position, return to neutral from 1 and 2 and detent in float*



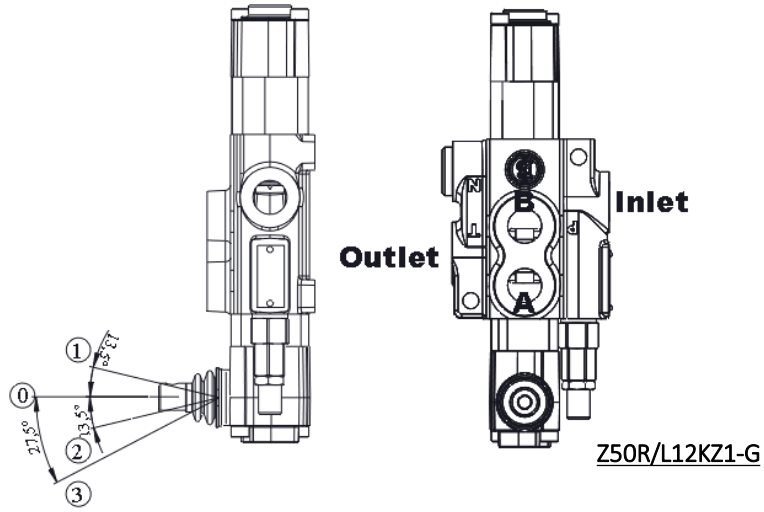


Kit 13: *four position detent*





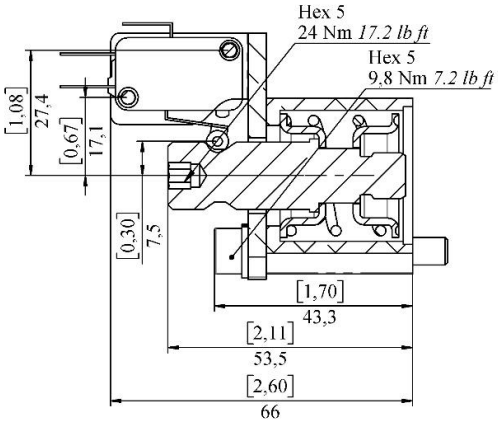
Limitations of floating sections for Z50

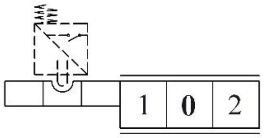


*Floating spool **IN** (L12 and L13) can be used only on "R" configuration valve with right inlet (with respect to the lever)*

Particular spool positioners kits for microswitch

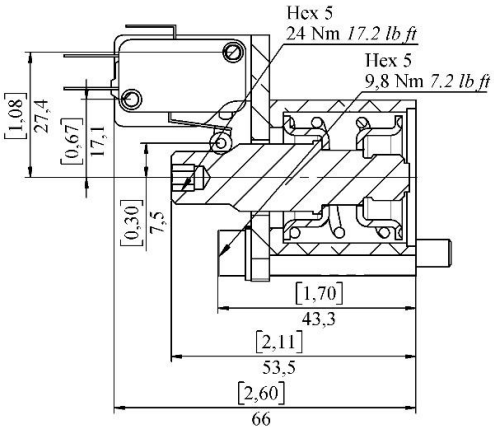
Kit 1E for *double acting spool A or D*

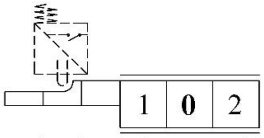




For double acting spool A

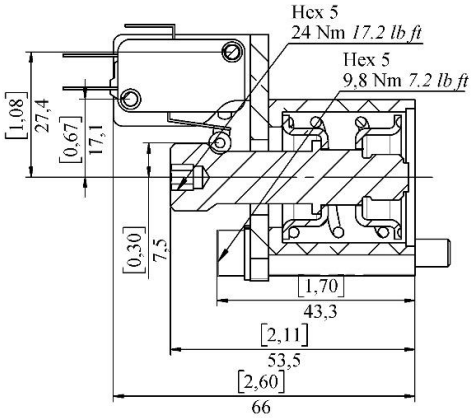
Kit 1E for *single acting spool B*

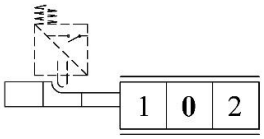




For single acting spool B

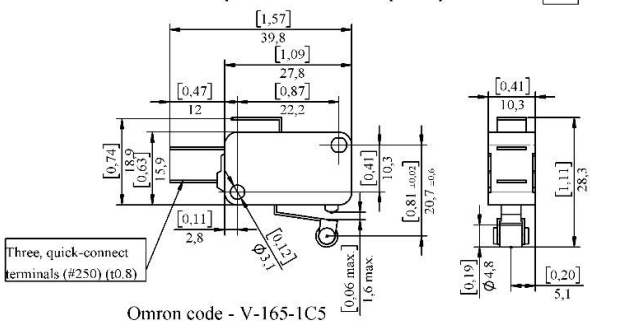
Kit 1E for *single acting spool C*





For single acting spool C

Microswich specification for spool positioner 1E

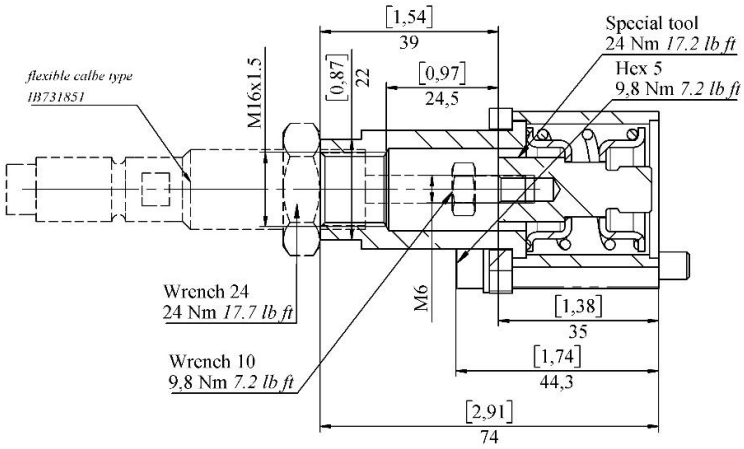


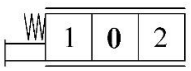
Omron code - V-165-1C5

Needs a special bracket to be assembled with spool positioners

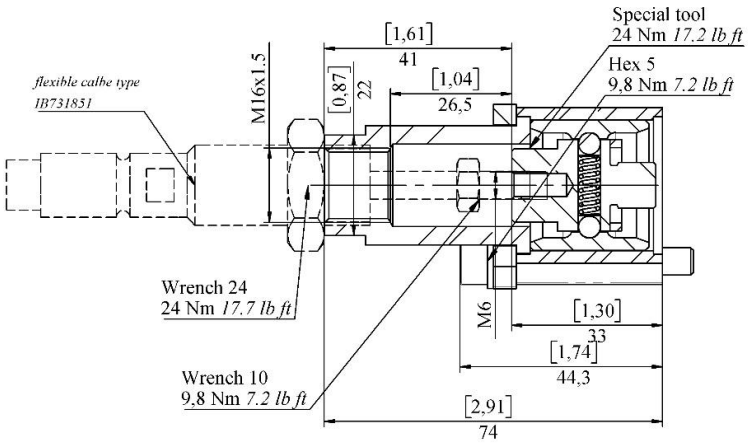
Spool positioner for flexible cable connection (side B)

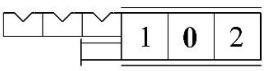
Kit 1V2





Kit 8V2

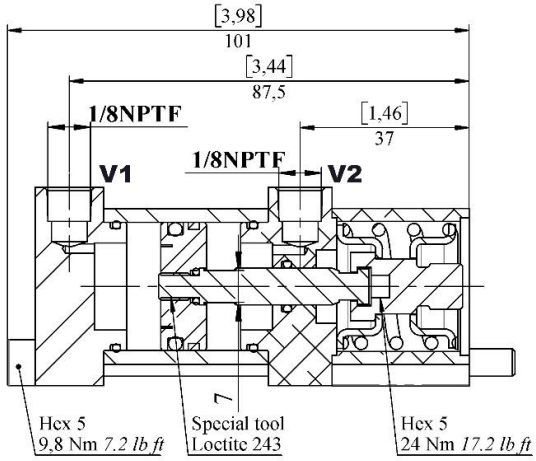


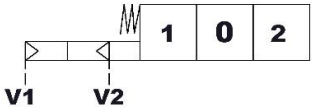


More information regarding controls, cable lengths, and ordering codes see page for flexible cable control V1 (Side A)

ON/OFF Pneumatic kit - 1P

With spring return to neutral position

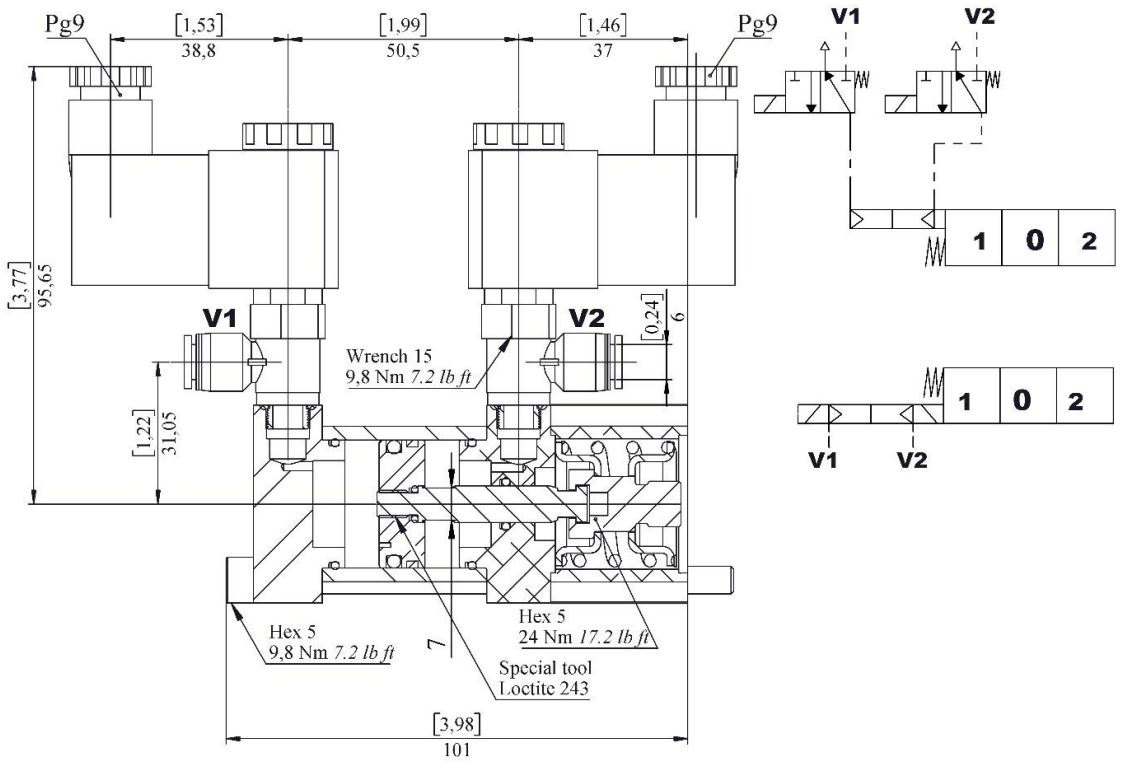




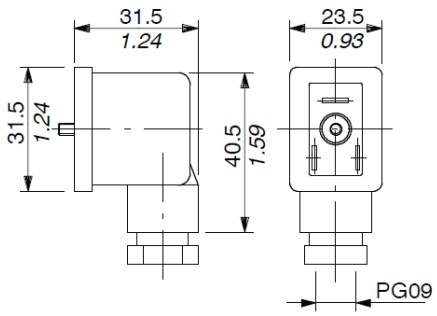
Operating features		
Pilot pressure	min	5,5 bar / *73 psi*
	max.	10 bar / *145 psi*

ON/OFF Electro pneumatic kit – 1EP

With spring return to neutral position



Connector specifications:

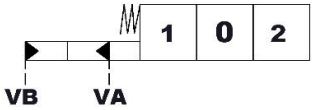


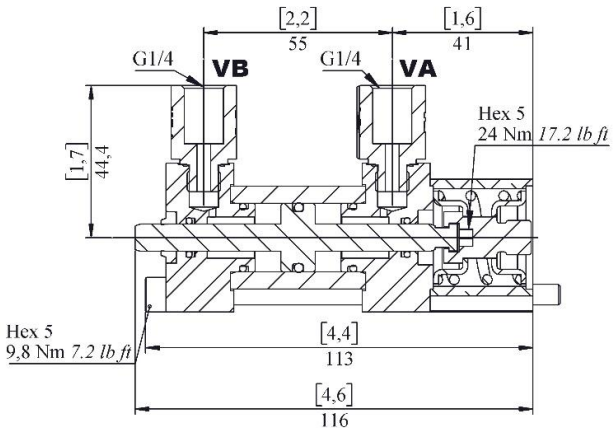
Operating features		
Pilot pressure	min	5,5 bar / *73 psi*
	max.	10 bar / *145 psi*
COIL specifications		
Nominal voltage tolerance		±10 %
Power rating		4,8 W
Nominal current		0,4 A - 12 VDC
		0,2 A - 24 VDC
Coil insulation		Class F
Weather protection		IP65
Duty cycle		100%

Connector is always included in 1EP control

Proportional hydraulic, single side kit - H

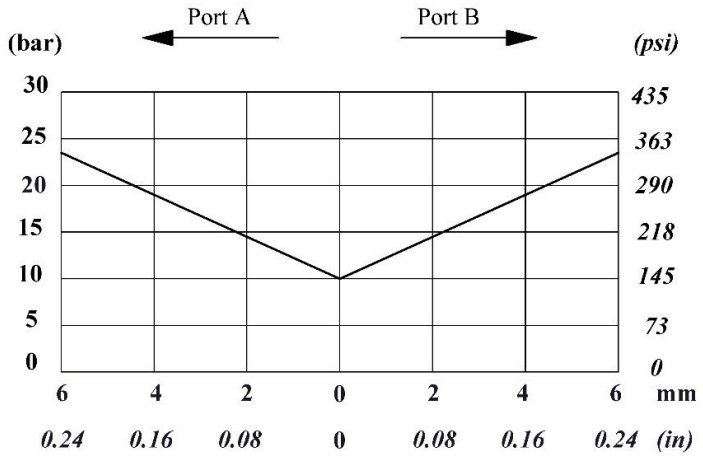
With spring return to neutral position





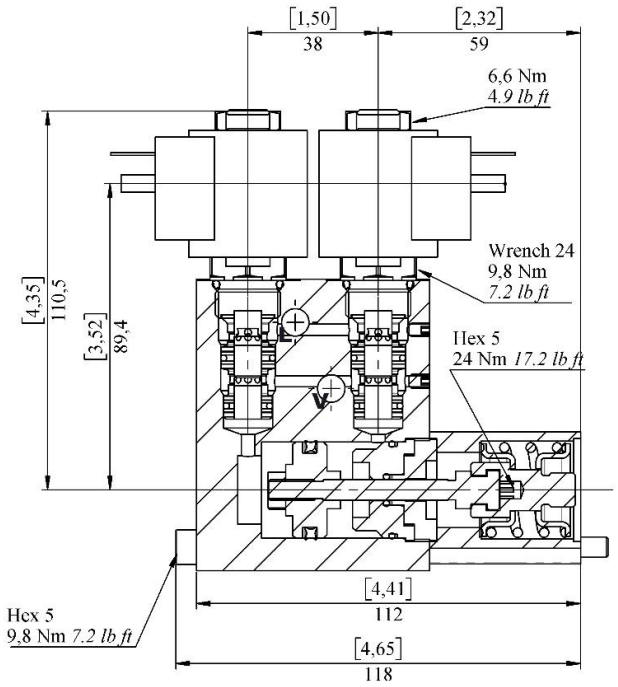
Operating features		
Pilot pressure	max.	50 bar / *725 psi*

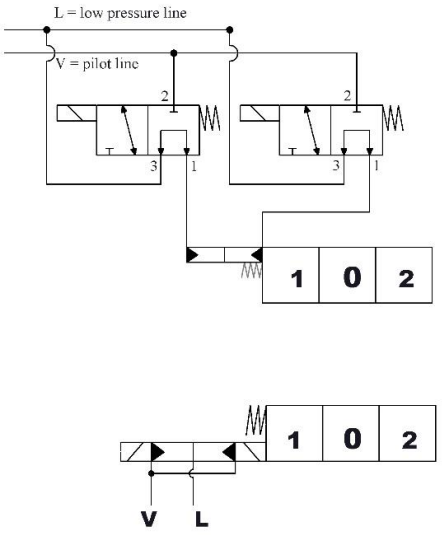
Pilot pressure - stroke diagram



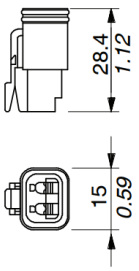
ON/OFF electro-hydraulic kit - 1ED3

With spring return to neutral position

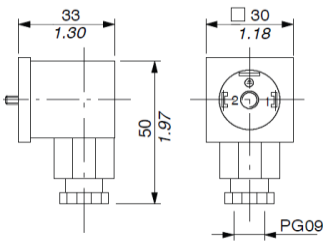




Connector specifications
2 poles, type Deutsch DT06-2S
Male housing with female ends



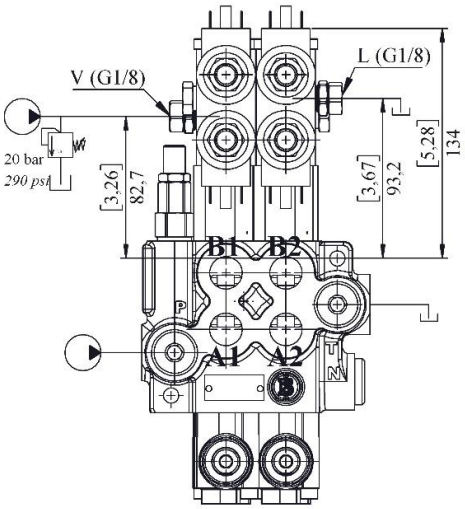
Connector specifications
2P+T according to
ISO 4400 / EN175301-803

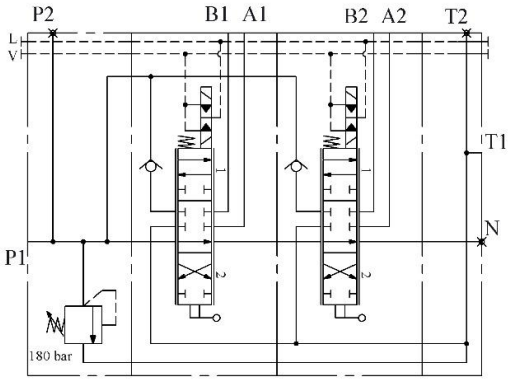


Operating features		
Pilot pressure	min	10 bar / *145 psi*
	max.	50 bar / *725 psi*
Back pressure on drain L	max.	25 bar / *360 psi*

COIL specifications	
Nominal voltage tolerance	±10 %
Power rating	21 W
Nominal current	1,75 A - 12 VDC
	0,87 A - 24 VDC
Coil insulation	Class F
Weather protection	IP65
Duty cycle	100%

ON/OFF electro-hydraulic kit - 1ED3 with external drain



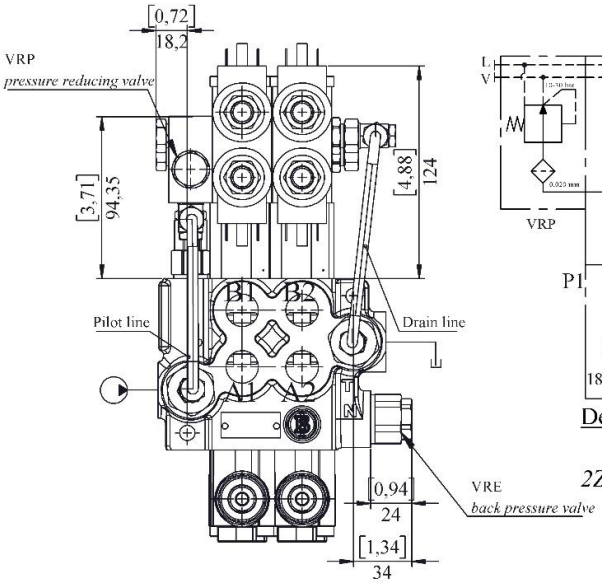


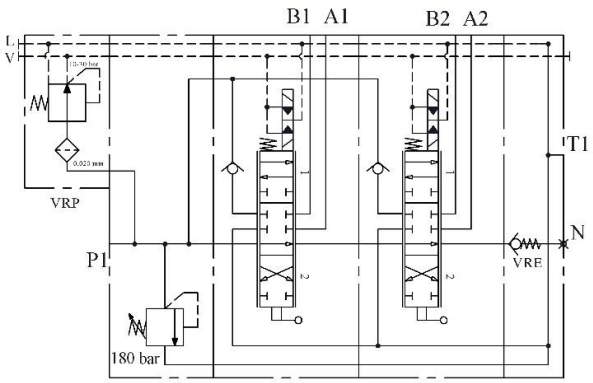
Description example:

2Z50/1/2x(A1ED3KZ1)-12V-G

ON/OFF electro-hydraulic kit - 1ED3 with pilot and drain lines

Kit consists of pressure reducing valve, VRP, back pressure valve VRE and pipes



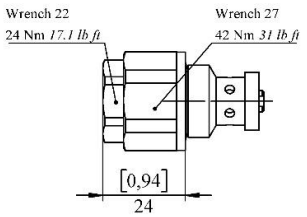


Description example:

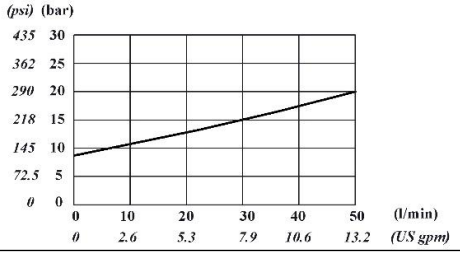
2Z50/1/VRP/2x(A1ED3KZ1)-VRE-12V-G

Back pressure valve (VRE) specifications

Valve is assembled on the bypass flow port N to provide pilot pressure to the actuator



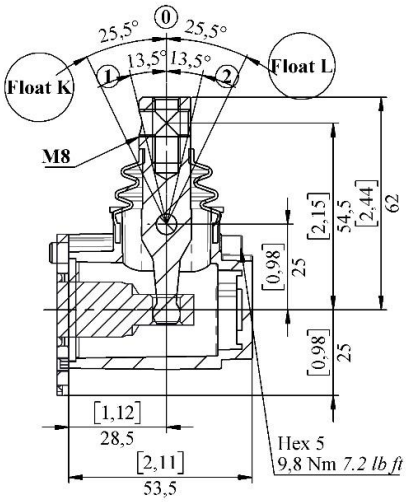
Pressure drop P-T

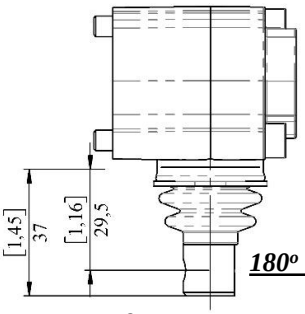


Lever control (Side A) – *aluminum cap, with protection booth lever pivot box*

Type KZ & KZe

1 | 0 | 2



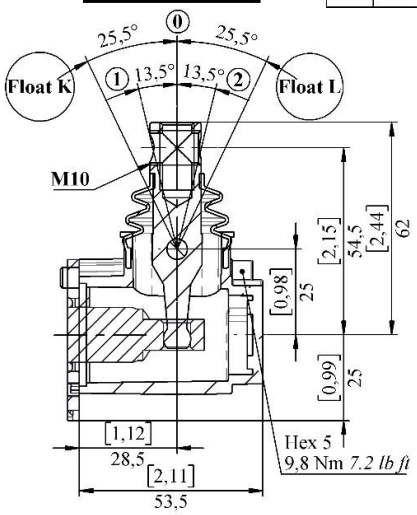


180º rotated – KZ0

Float L &K only available in certain configuration refer to pages – 19 & 20

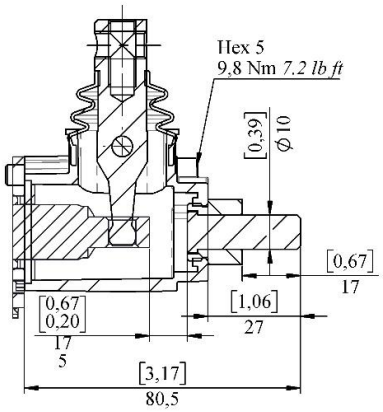
Type KZ(M10) & KZe(M10)

1 | 0 | 2



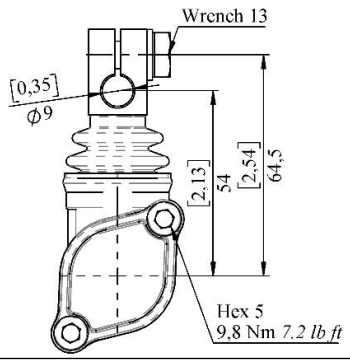
Kit KZT

1 | 0 | 2



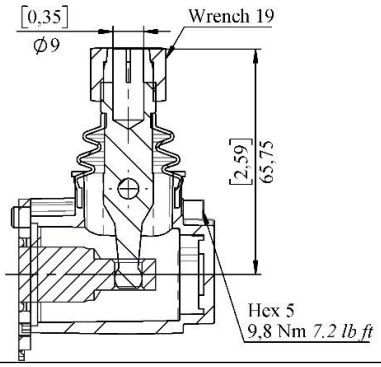
Type KI

1 | 0 | 2



Type KY

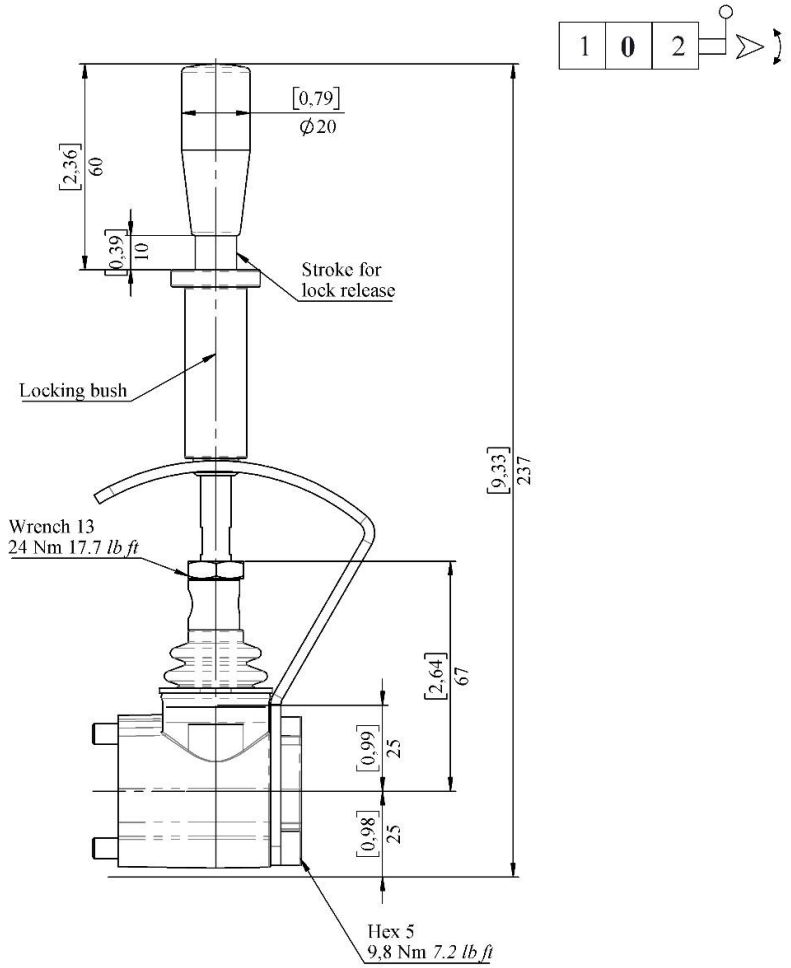
1 | 0 | 2



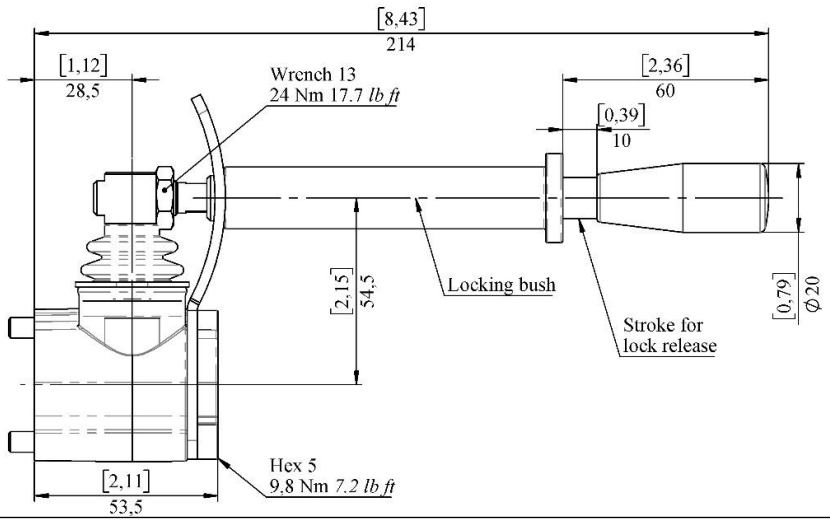
Special lever controls (side A)

Safety levers with lock in neutral complete with hand lever; lift hand lever knob to operate.

Type KZV

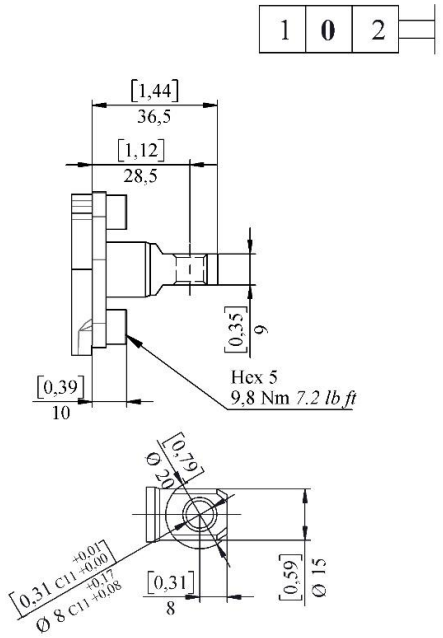


Type KZH

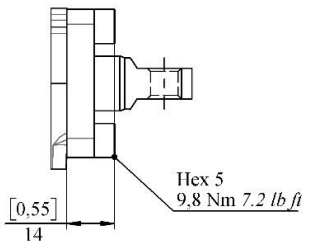


Other control arrangements (side A)

If in the order code side A is left blank, omit control type will be supplied:

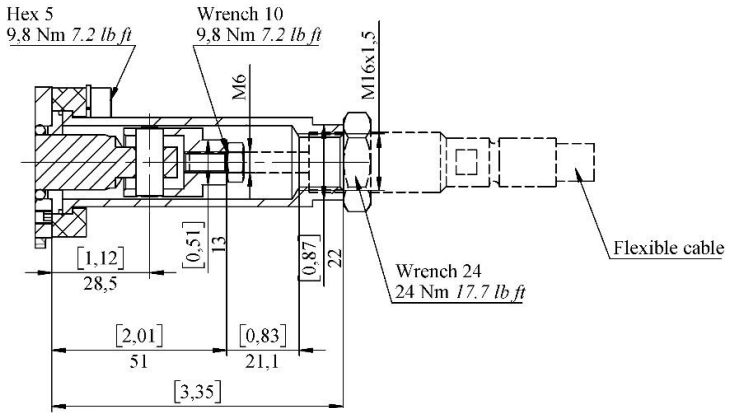


Type SLP

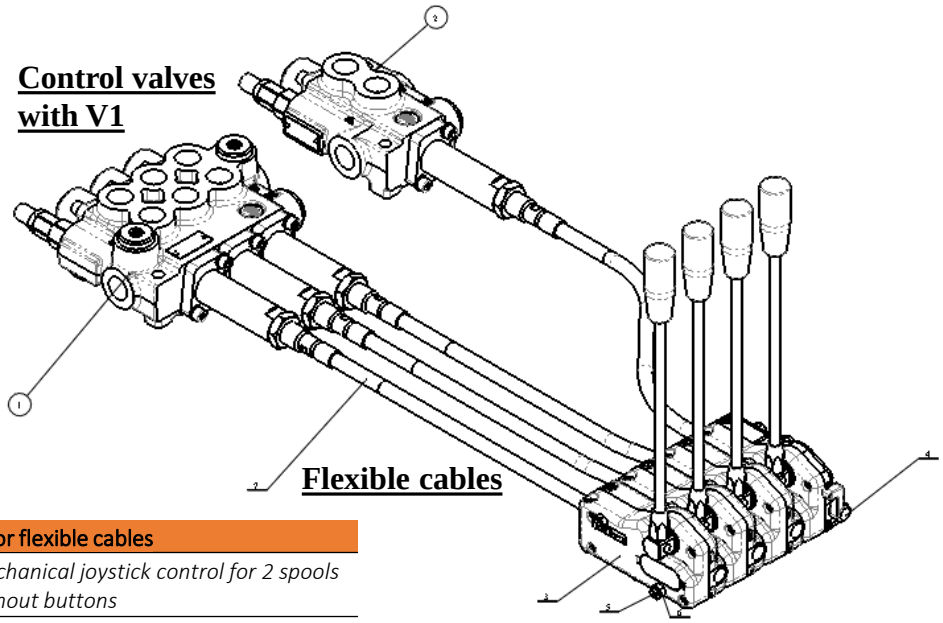


Mechanical control with dust-proof plate

Cable remote control – V1



Control valves with V1

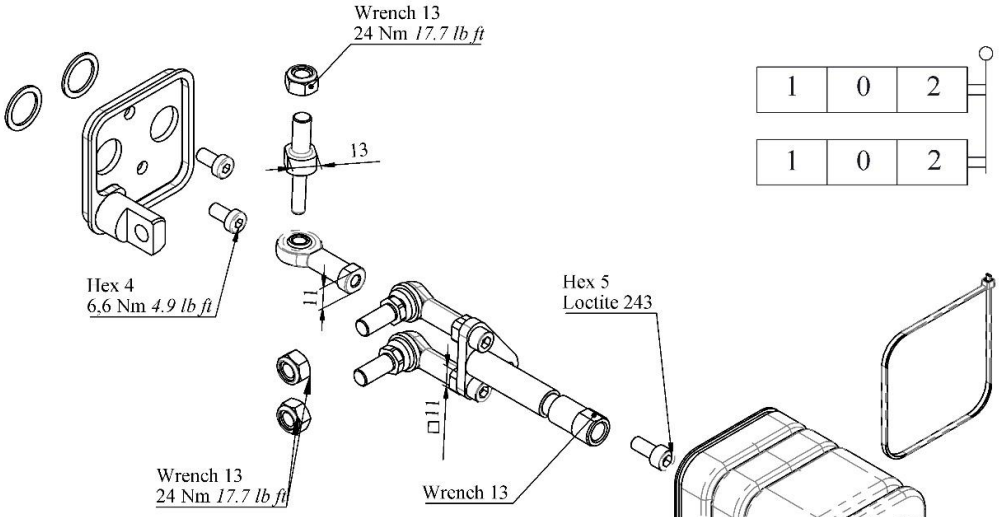


Flexible cables

Remote controls

Controls for flexible cables	
3335	*Mechanical joystick control for 2 spools without buttons*
3375	*Mechanical joystick control for 2 spools with 1 button*
6008	*Mechanical joystick control for 2 spools with 2 buttons*
IS 3047	*Single lever control*
IS 3076	*Single lever control with antireverse lock*
Flexible cable opitons code + length	
IT-731133	*1.00 m*
IT-731134	*1.50 m*
IT-731135	*2.00 m*
IT-731136	*2.50 m*
IT-731137	*3.00 m*
IT-731138	*3.50 m*
IT-731139	*4.00 m*

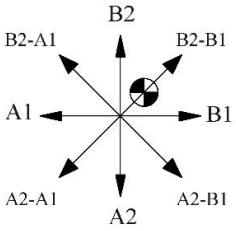
Mechanical joystick for two section control



There are different types of hand levers, with different end executions - cylindrical handle, ball type handle, etc. has to be specified with order.

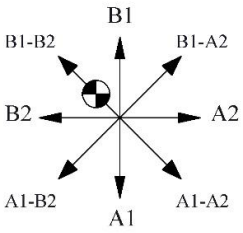
Type j+1

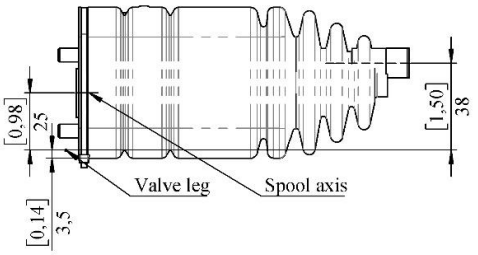
Pivot is above right



Type j+2

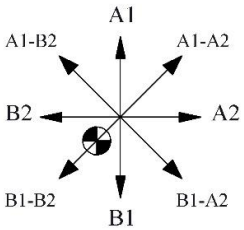
Pivot is above left





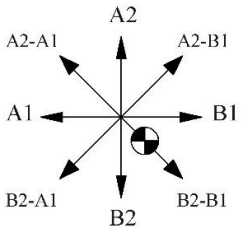
Type j+3

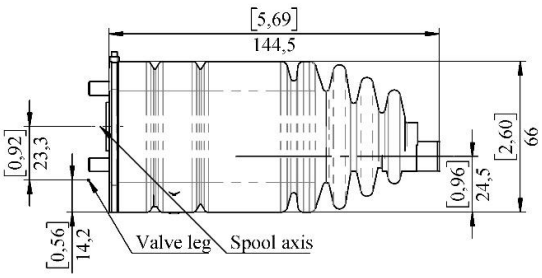
Pivot is bottom left



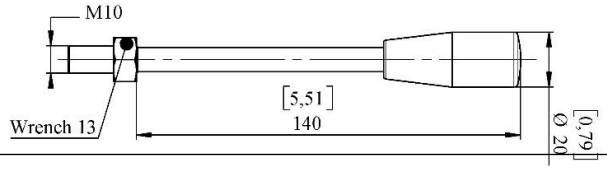
Type j+4

Pivot is bottom right





Standard hand lever dimensions



Example order code with standard lever:

02Z50/(A1A1)(ju+3)-G

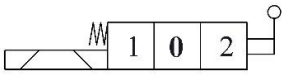
alternative (same as)

02Z50/(2xA1)(ju+3)-G

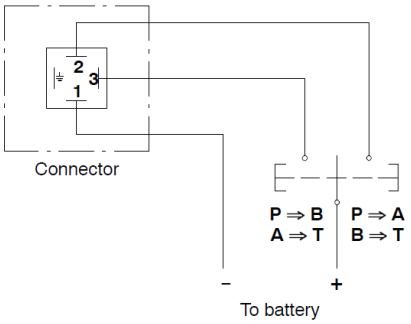
Complete control – double acting ON/OFF solenoid control

Complete control – 1ESDK1

Direct control by double acting solenoid with spring return to neutral position, available for 1 to 8 spools, including 2, 3, and 4 spool valve bodies with individual check valves (both parallel and tandem version).



Electric wiring example



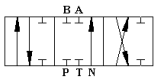
Operating features

Internal leakage (min.) A(B) to T Δp = 100 bar (1450 psi) fluid and valve at 40 oC (104 oF)	min. 15 cm^3/min *0.91 in^3/min*

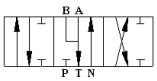
COIL specifications

Nominal voltage tolerance	±10 %
Power rating	53 W
Coil insulation	Class H
Duty cycle	100%

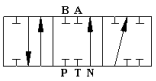
Available spool options



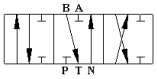
A(1ESD)



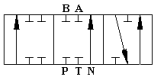
D(1ESD)



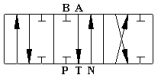
B(1ESD)



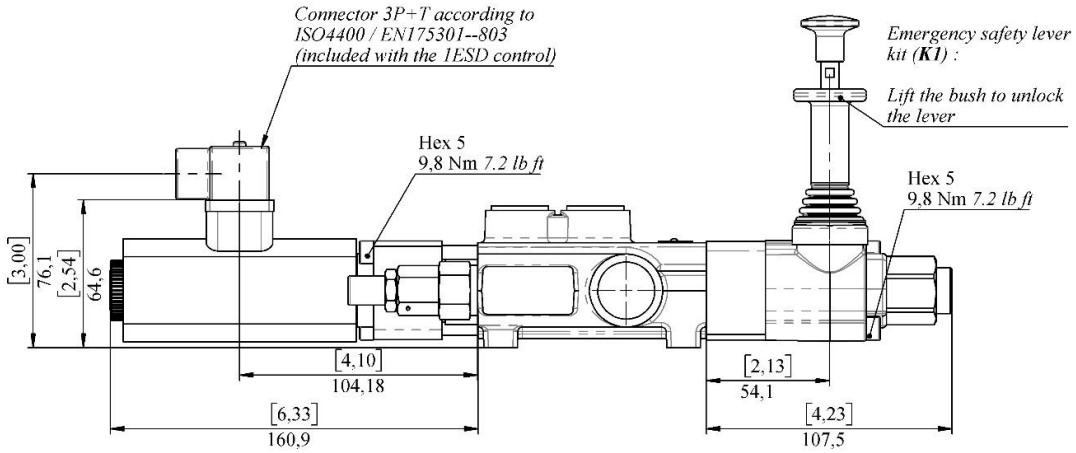
E(1ESD)



C(1ESD)



F(1ESD)

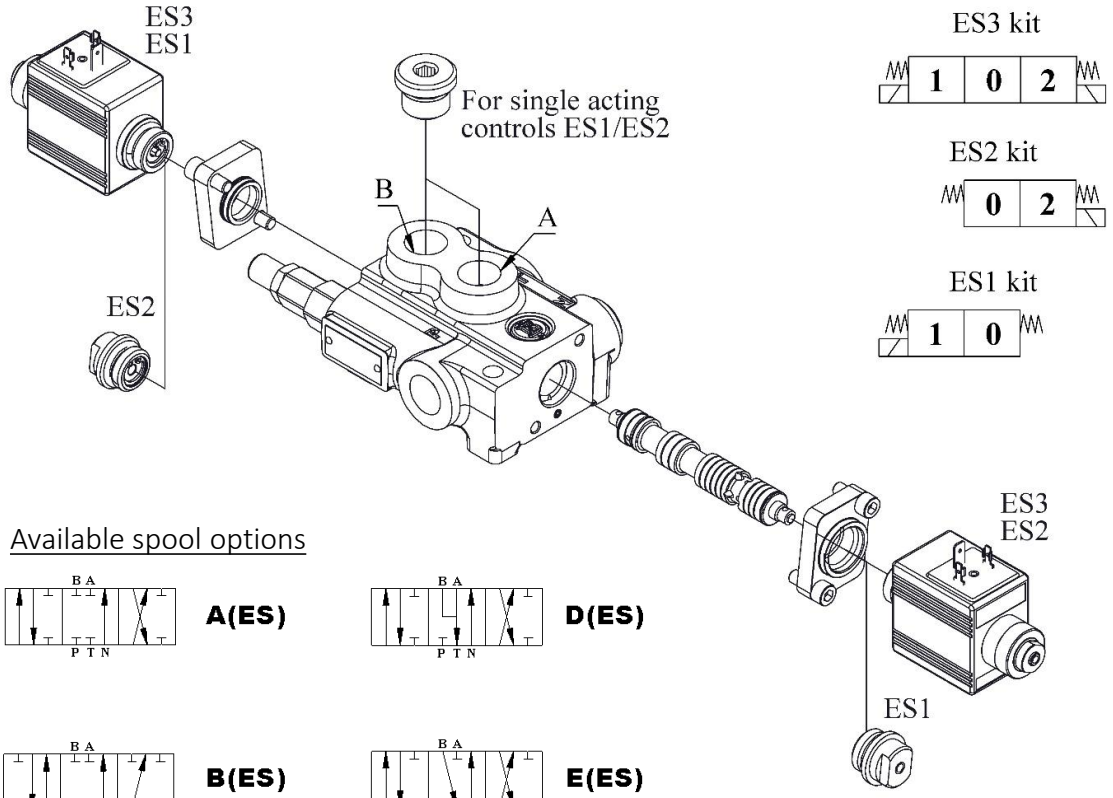


Example order code: Z50(140)/A1ESDK1-24V-G12

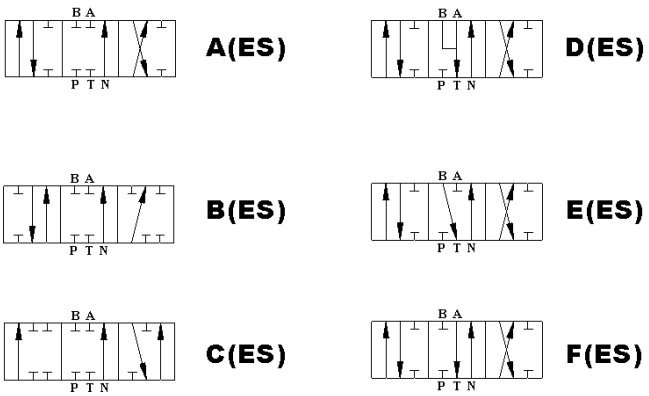
Complete control – single acting ON/OFF solenoid control

Complete control – ES3 / ES2 / ES1

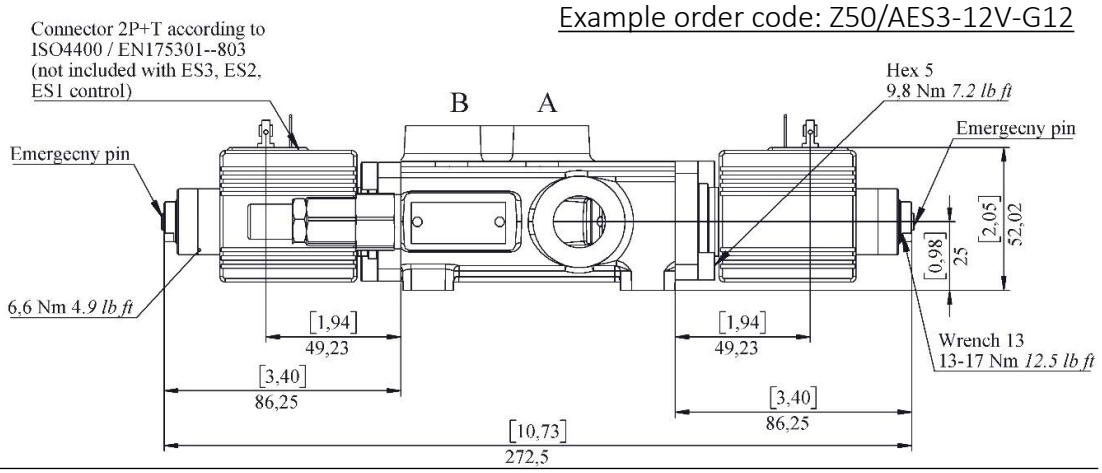
Direct control by two single acting solenoid with spring return to neutral position (ES3) or one single acting solenoid (ES1 or 2); available for 1 to 8 spools, including 2, 3, and 3 spool valve bodies with individual check valves (both parallel and tandem version).



Available spool options

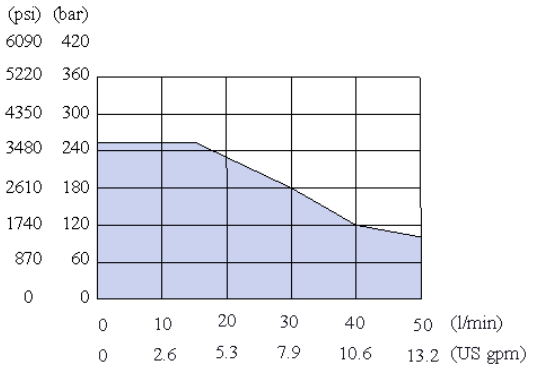


Example order code: Z50/AES3-12V-G12



Complete control – single acting ON/OFF solenoid control

Operating conditions



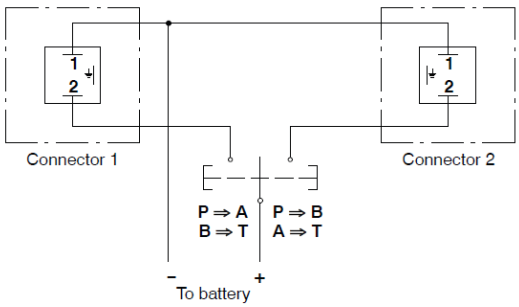
Operating features

Internal leakage (min.) A(B) to T Δp = 100 bar (1450 psi) fluid and valve at 40 oC (104 oF)	min. 15 cm^3/min *0.91 in^3/min*

COIL specifications

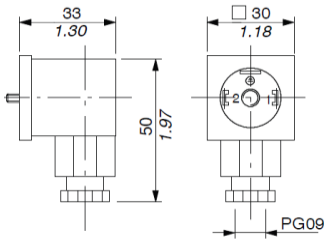
Nominal voltage tolerance	±10 %
Power rating	36 W
Current	3 A - 12 VDC
	1,5 A - 24 VDC
Weather protection	IP65
Coil insulation	Class H
Duty cycle	100%

Electric wiring example

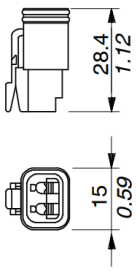


Connector specifications per type of coils available

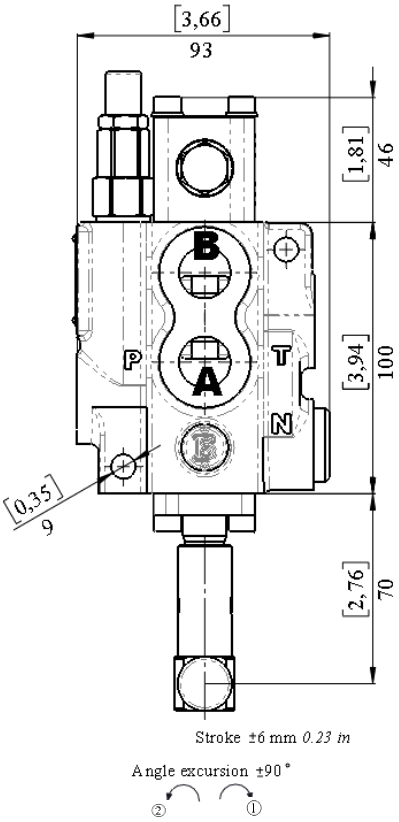
2P+T according to ISO 4400 / EN175301-803

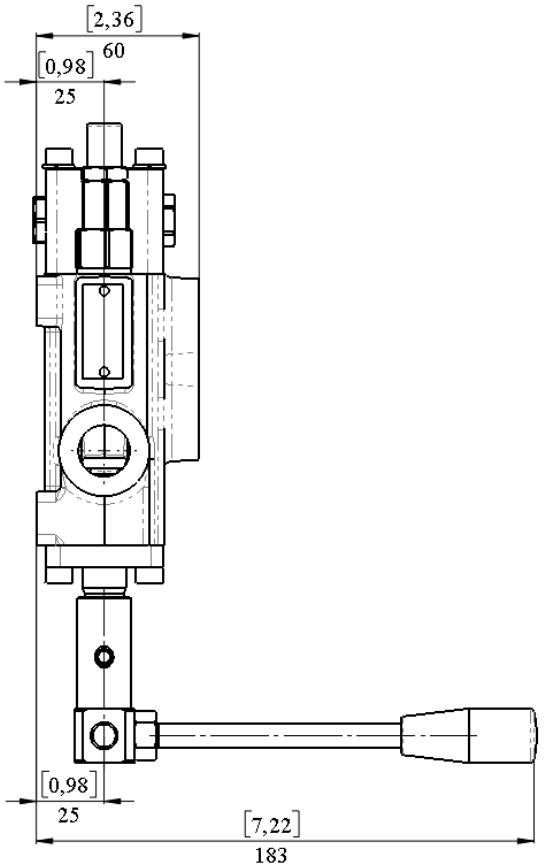


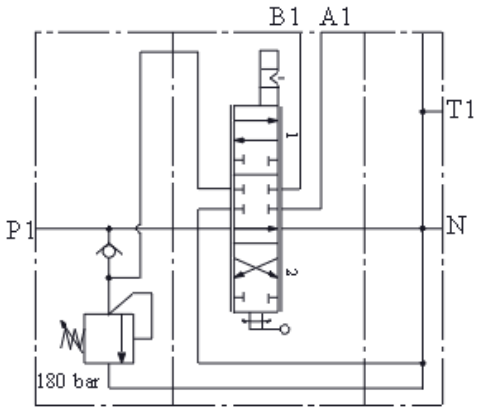
Connector specifications 2 poles, type Deutsch DT06-2S Male housing with female ends



Complete control – Rotary control A26





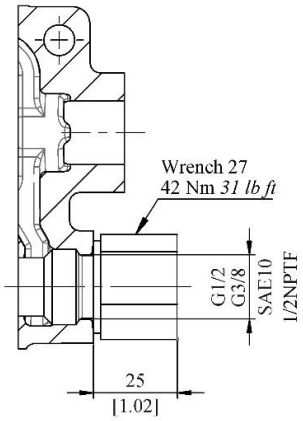


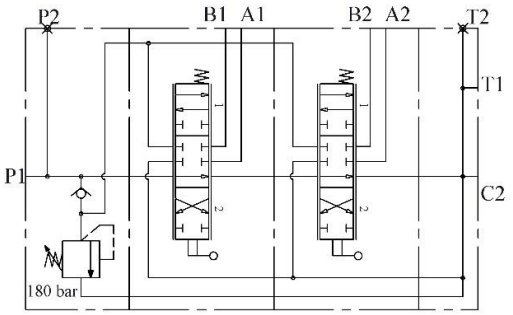
Example order code: Z50/AmL26-G

Outlet port options

It is possible to have open centre, closed centre and high pressure carry-over (power beyond)
If in the order code before the thread specification port N is plugged with standard G1/2 plug

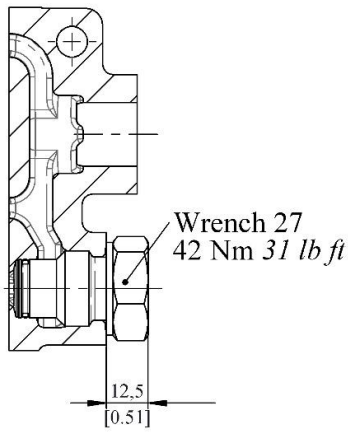
C2 - with carry-over (high pressure carry over)

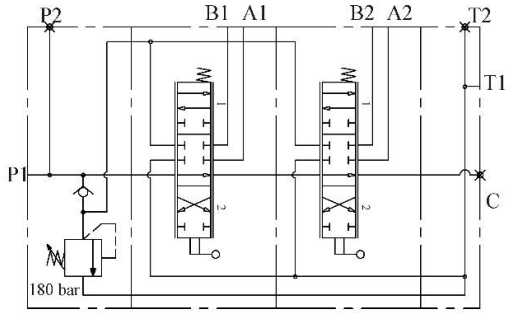




Example order code 02Z50/2x(A1KZ1)-C2-G

C – closed center





Example order code: 02Z50/2x(A1KZ1)-C-G

C2D - Direct high pressure carry-over