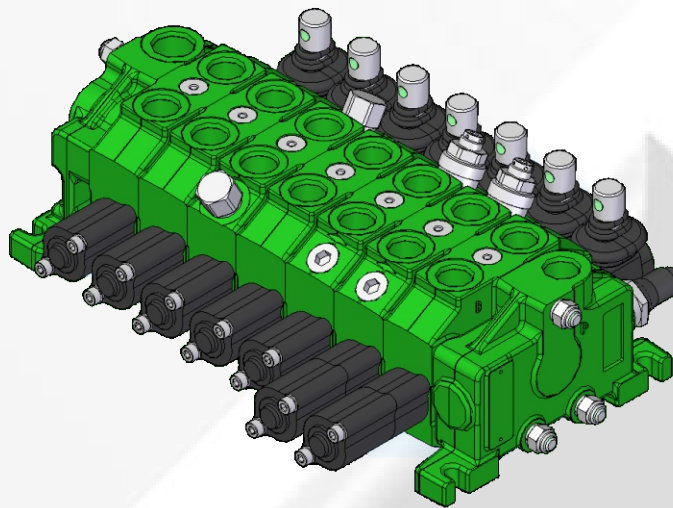


SECTIONAL VALVE

VD6A

Technical catalogue



E0.05.0610.02.02

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

salam  TM

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Page 45 - Spool positionings - C2 - C3 - C4 - C5 - C6 - C7 - C8

Page 46 - Spool positionings - R2 - R4 - R5 - R6 - R7 - R9 - C0

Page 47 - Spool positionings - F1 - F2 - F3 - F4 - F5 - F6 - F7 - F8

Page 48 - Spool positionings - D7 - D8 - D9 - M1 - M2 - M3

Page 49 - 50 - Spool positionings - CE - CM - CW - CD - PM

Page 51 - Spool positionings - G2 - G4 - G5 - G6 - G7 - G8

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Page 55 - WARRANTY



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

E0.05.1011.02.03

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 department.

GENERAL FEATURES

Among all hydraulic directional control valves used in the field of mobile equipment applications, the spool valve is the most popular. The sectional valve type allows construction flexibility. Salami VD6A directional control valve is modular construction and consists of an inlet section, up to 8 working modules and an outlet section. All these elements are secured in one block by means of tie-rods. (For more than 8 working modules please contact our sales dept.)

FEATURES

VD6A directional control valve has the following:

- cast-iron body (inlet section, working section, outlet section)
- parallel circuit, load check valve protection on each section
- series circuit, load check valve protection on each section (possibility of 2nd load check valve on series line)
- tandem circuit, load check valve protection on each section
- several types of mid modules
- possibility of venting valve
- possibility of power beyond configuration and possibility of closed center
- spool construction in steel, hardened and nickel-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
- interchangeability 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 350 bar - 5100 psi
- electric and external hydraulic piloted venting valve: located in the opposite cavity of the main relief valve, in the electric release is available as 12 or 24 Vdc and normally open or normally closed versions
- adjustable or fixed pressure compensated priority flow valve, electrical proportional operated or handwheel operated
- manual pressure switch valve
- 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 peak 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 peak pressure, 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.
- electric and external hydraulic piloted venting valve on port A or/and B
- 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 "B" ports orifice

Devices

- handle controls
- cross lever: allows to actuate 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
- several spool positioning devices to return the spool to neutral position or to lock the spool in working position

TECHNICAL DATA

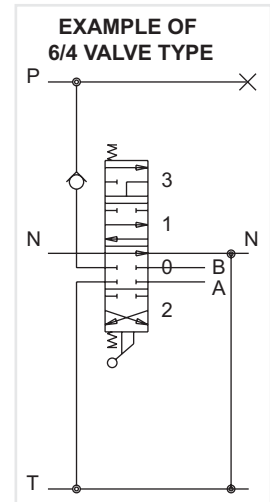
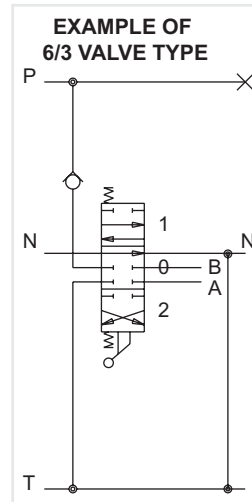
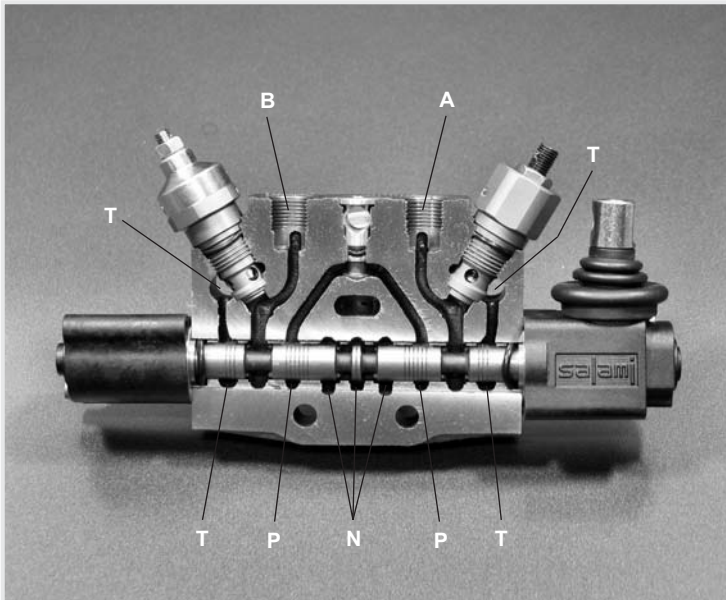
Spools	from 1 to 8 (for more working modules pls. contact our sales department)		
Nominal flow	Q	45 l/min	(12 gpm US)
 Max flow		60 l/min	(16 gpm US)
Max pressure	port P	350 bar	(5100 psi)
	ports A/B	350 bar	(5100 psi)
	port T	25 bar	(363 psi)
Internal leakage at 160 bar (2285 psi)	ports A/B → T	18 ÷ 25	cm ³ /min (1.1 ÷ 1.52 cu.in./min)
For lower leakage please contact our sales dept.			
Solenoid control 45W - 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 (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



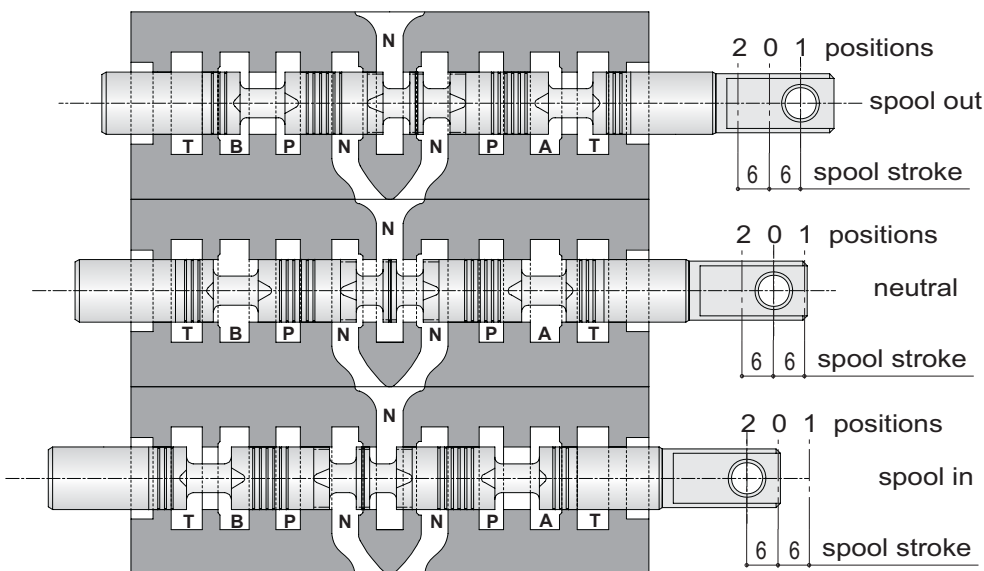
The picture show the P working module with the paths N - P - A - B - T.

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 (approximately 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. Depending 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 VD6A 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
3 ÷ 5 m/sec

inlet pipe
outlet pipe

19,7 ÷ 32,8 ft/sec
9,9 ÷ 16,4 ft/sec

inlet pipe
outlet pipe

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

$$* [v = \frac{21,2 \times Q}{d^2}]$$

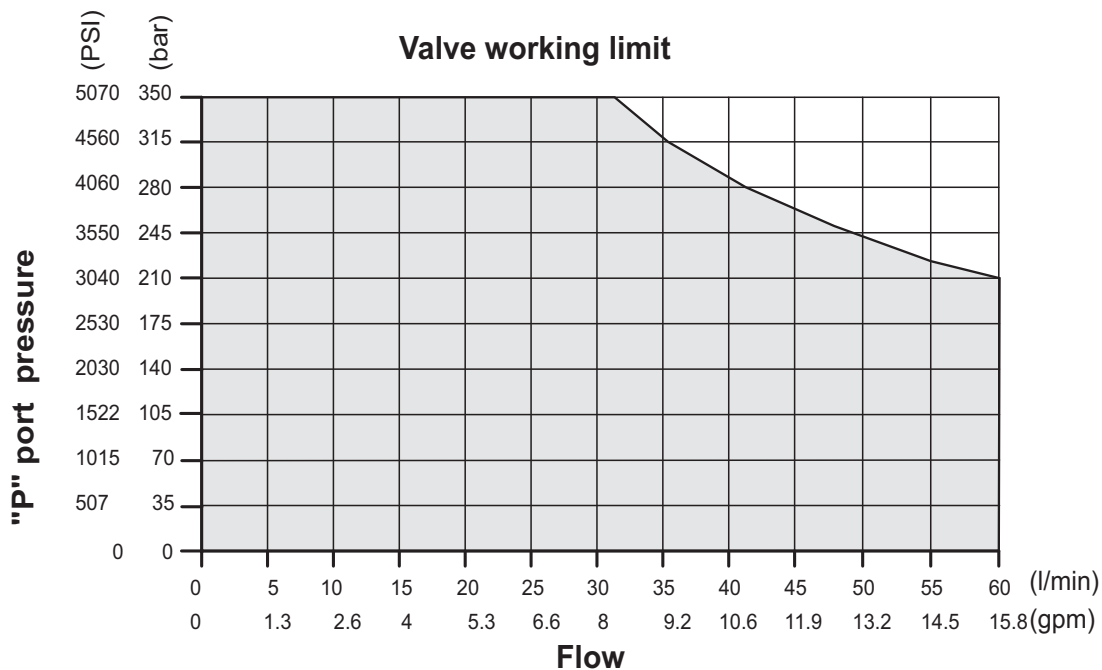
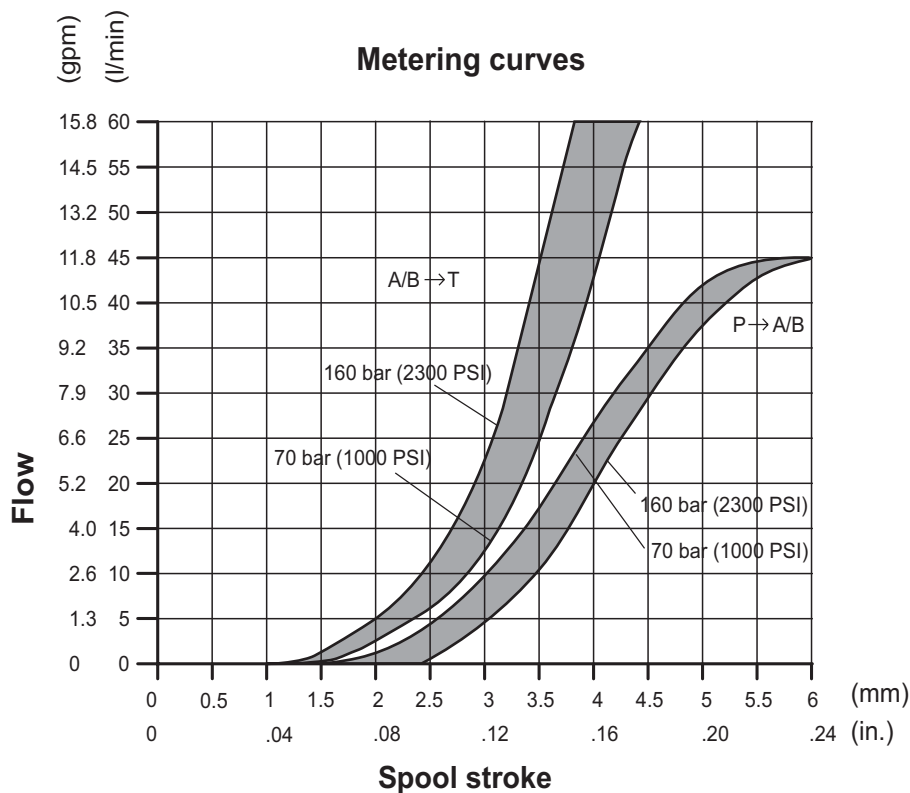
v = fluid speed [m/sec], Q = flow [l/min], d = pipe internal diameter [mm]



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

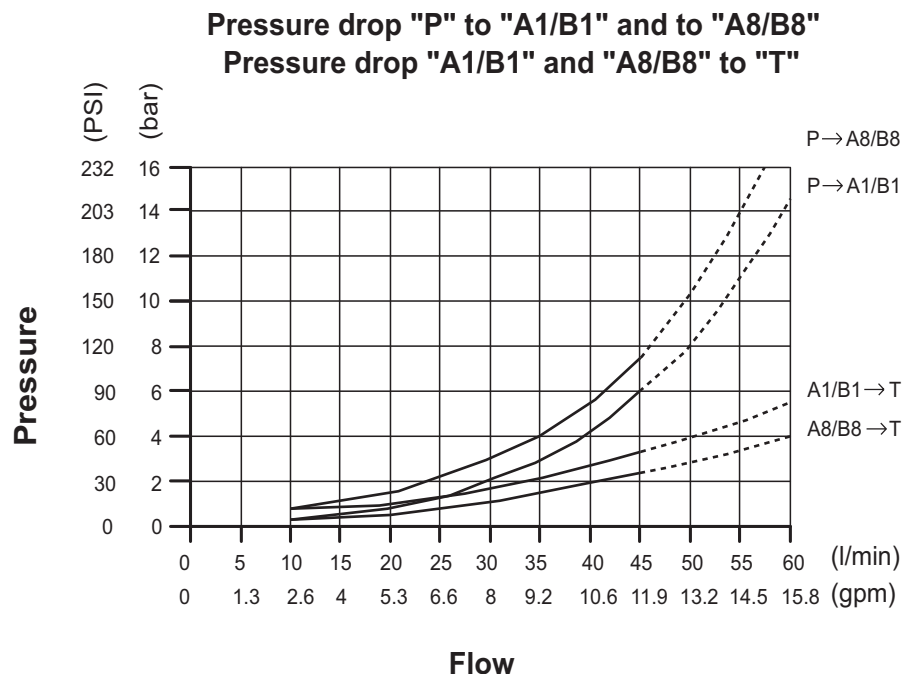
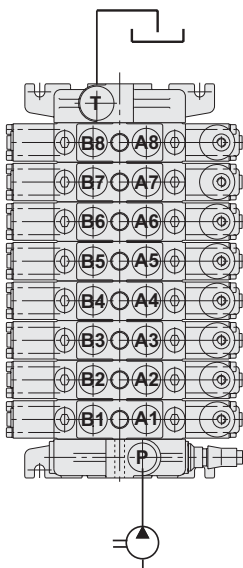
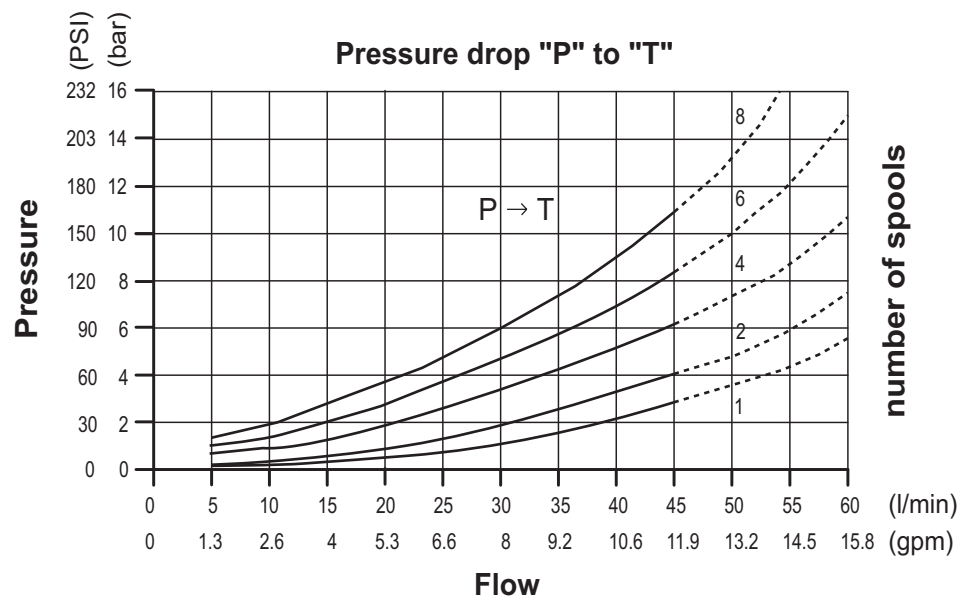
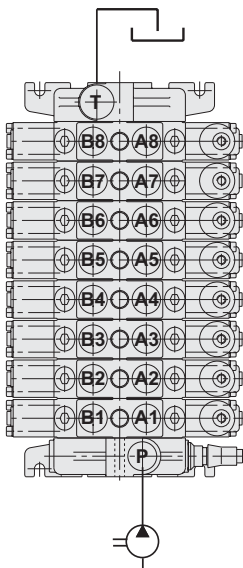


The data of this diagram have been obtained with a force of:
stroke beginning 80 N - stroke end 105 N and standard leakage data.

PERFORMANCE DATA

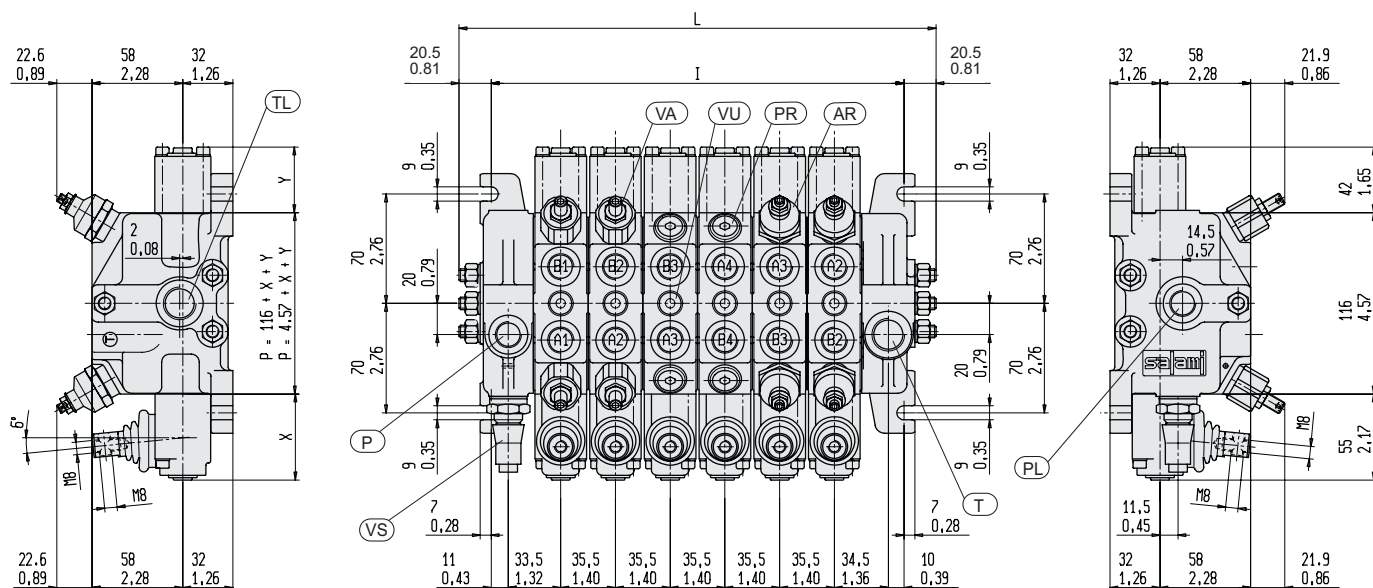
The characteristics in this catalogue are typical measured results.
During measuring a mineral based hydraulic oil with a viscosity of 16 cSt at a temperature of 50°C was used.

FOR FURTHER DETAILS PLEASE CONTACT OUR SALES DEPARTEMENT



DIMENSIONS FROM 1 TO 8 WORKING MODULES

In case of inlet with priority flow valve, adjustable or fixed setting, the inlet module is different. You can see it at page 11. Moreover you can have in your assembling series circuit working module and/or mid inlet module. You can see their different dimensions from page 16 to page 24. Finally you can see the dimensions of all spool controls and spool positionings from page 36 to page 51.



The drawing shown is just an example. The overall dimensions you read are valid for all the VD6A 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 which you have to add 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
- T** = top outlet port
- TL** = side outlet port
- A/B** = work ports
- VS** = main relief valve
- VA** = overload valve
- AR** = overload and anti-cavitation valve
- PR** = plug for auxiliary valve cavity
- VU** = load check valve

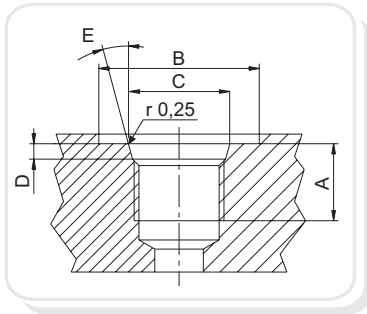
Spools		1	2	3	4	5	6	7	8
I	mm	89	124.5	160	195.5	231	266.5	302	337.5
	in	3.5	4.90	6.30	7.70	9.10	10.49	11.89	13.29
L	mm	130	165.5	201	236.5	272	307.5	343	378.5
	in	5.12	6.51	7.91	9.31	10.71	12.10	13.50	14.90
Weight	Kg.	5.56	7.7	9.8	11.9	14.1	16.3	18.4	20.5
	lb.	12.2	16.9	21.6	26.2	31	35.9	40.5	45.1

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

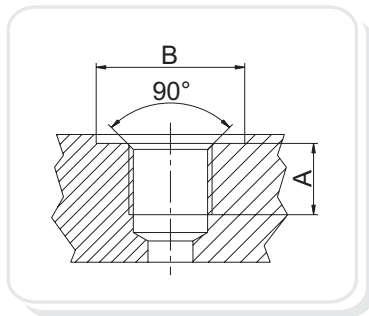
For smaller or bigger thread ports, please contact our sales department

PORTS

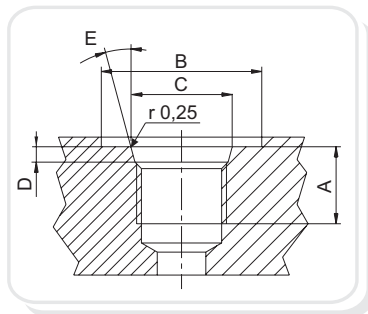
Following are standard ports. For different port types, please contact our sales department.



SAE UN-UNF (ISO 725)							
Dimensions		9/16 -18 UNF 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°	

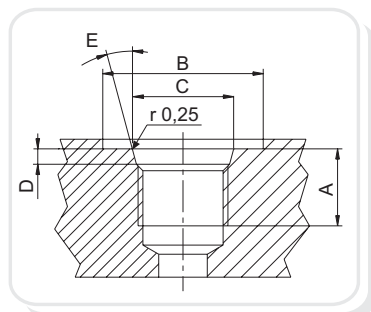


BSP (ISO 228)							
Dimensions		G1/4		G3/8		G1/2	
mm	In.						
A		14	0,55	14	0,55	16	0,63
B		19	1,75	23	1,91	27	1,06



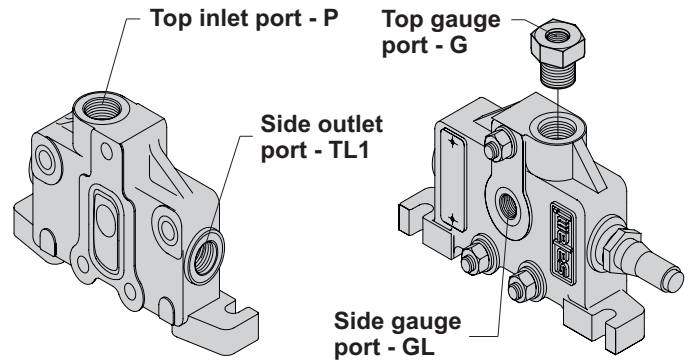
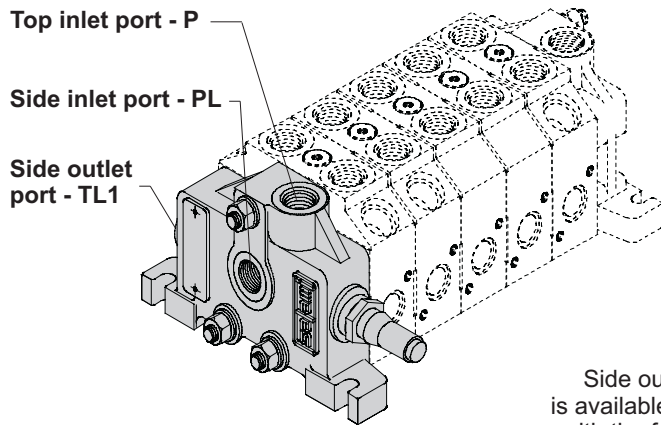
METRIC (ISO 262 - ISO 6149)*									
Dimensions		M18 x 1.5				M22 x 1.5			
mm	In.	ISO 262		ISO 6149		ISO 262		ISO 6149	
A		14	0.55	14,5	0,57	16	0,63	16	0,63
B		27,5	1.08	29	1,14	31,5	1,24	34	1,34
C				19,8	0,78			23,8	0,94
D				2.4	0.09			2.4	0.09

*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 MODULE (HYDRAULIC CIRCUITS)



Side outlet port (TL1)
is available only on this side
with the following threads:

BSP (ISO 228) - G 3/8
SAE UN-UNF (ISO725) - SAE 8

Top gauge port is obtained to add
special plug to inlet module comm. code 02,
and are available with the following threads:

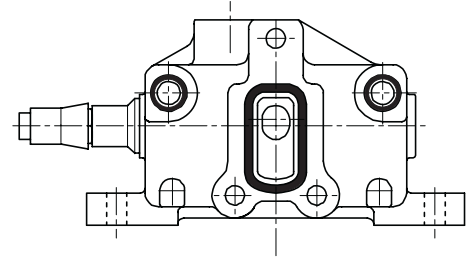
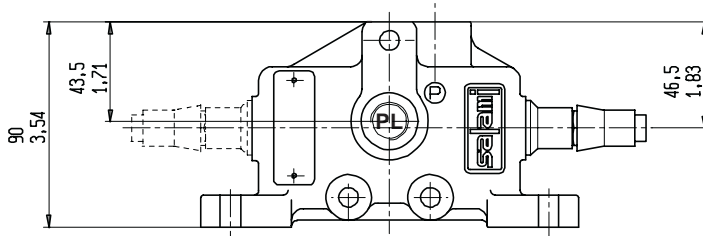
BSP (ISO 228) - G 1/4
SAE UN-UNF (ISO725) - SAE 4

COMMERCIAL CODES

<div>01</div> <div>Top inlet port</div> <div></div>	<div>02</div> <div>Side inlet port top inlet port plugged</div> <div></div>	<div>03</div> <div>Top and side inlet ports</div> <div></div>	<div>09</div> <div>Top inlet and side outlet (TL1) ports</div> <div></div> <div>TL1</div> <div>Available for quantity</div>	<div>10</div> <div>Side inlet and outlet (TL1) ports top ports plugged</div> <div></div> <div>TL1</div> <div>Available for quantity</div>
<div>21</div> <div>Top inlet port with side gauge port</div> <div></div>	<div>22</div> <div>Side inlet port with top gauge port</div> <div></div> <div>See drawing above</div>	<div>30</div> <div>Side inlet and outlet (TL1) ports with top gauge port</div> <div></div> <div>TL</div> <div>Available for quantity</div>		

INLET MODULES (DIMENSIONS)

IN ALL THESE COMMERCIAL CODES PORT SIZE ARE SHOWN ON PAGE 8

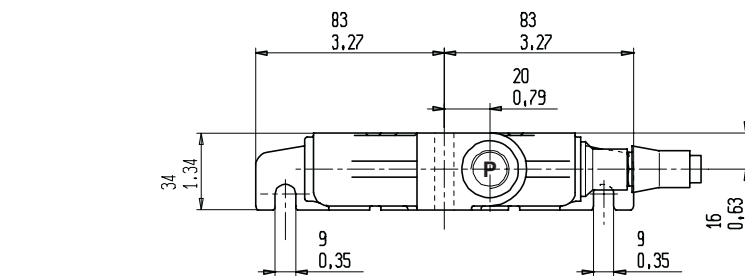


Standard inlet module is machined for the main relief valve assembled as shown in this drawing.

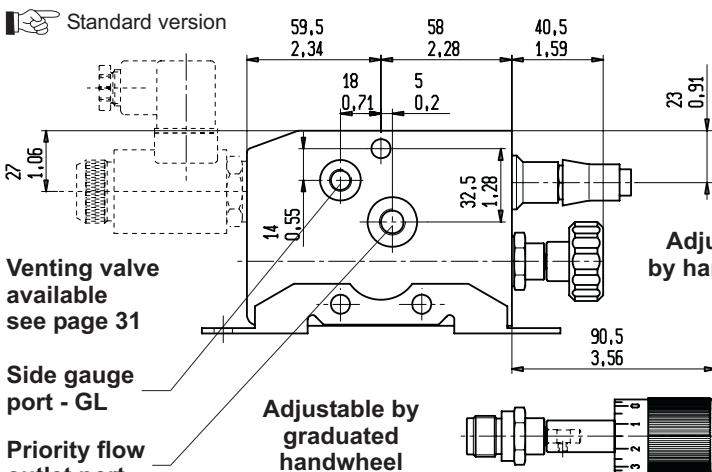
It is also possible to have the m.r.v. at the opposite side, you need to specify it in phase of order. You can have the venting valve too, electric operated or external hydraulic piloted.

It can be located on both side with or without m.r.v. In case of m.r.v., the venting valve is located at the opposite side.

Data sheets of valves for the inlet module from page 30 to page 31.



Standard version



Venting valve available see page 31

Side gauge port - GL

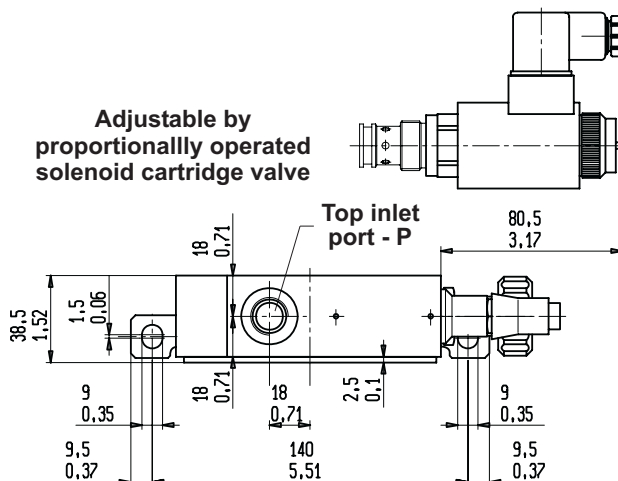
Priority flow outlet port - PF

Adjustable by graduated handwheel

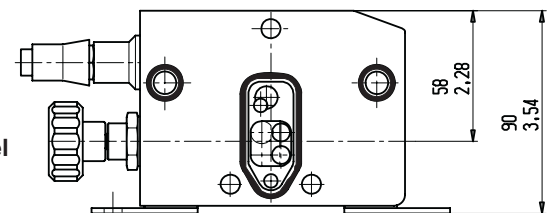
Adjustable by handwheel

Adjustable by proportionally operated solenoid cartridge valve

Top inlet port - P

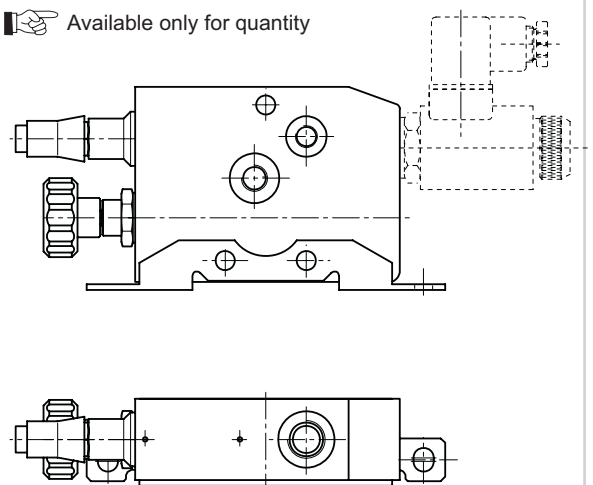


INLET MODULE with built-in priority flow valve (DIMENSIONS)




Available also with main relief valve and adjustable priority flow valve at the opposite side

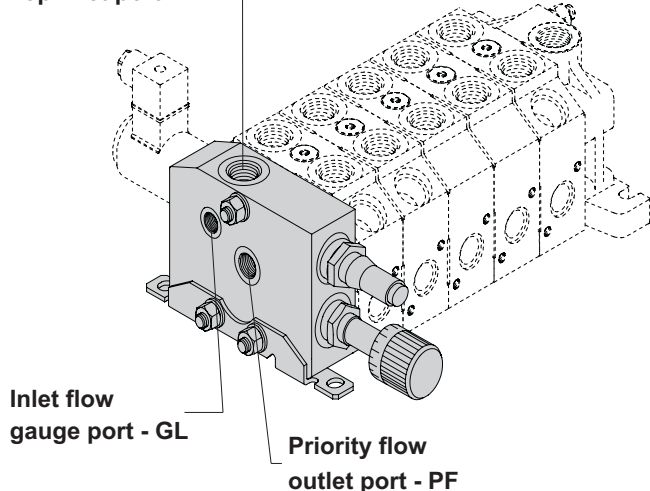
Available only for quantity



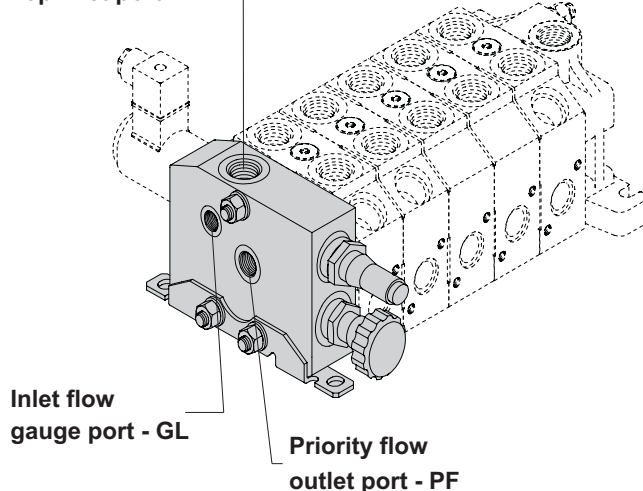
INLET MODULE WITH ADJUSTABLE PRIORITY FLOW VALVE

Inlet module with priority flow valve is available with priority flow which may go inside the directional control valve or be brought outside through the PF port.  In case of external priority flow, at the downstream, you can assemble any working module, in case of internal priority flow you need to assemble only the working modules of pages 19.

Top inlet port - P



Top inlet port - P

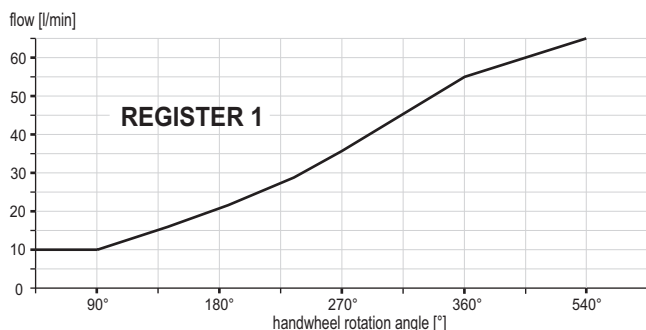


PORT SIZES	P	PF	GL
BSP ISO 228	G 3/8	G 1/4	G 1/8
METRIC ISO 262	M 18 x 1.5	M 14 x 1.5	M 12 x 1.5
SAE ISO 176	SAE#8 3/4 - 16 UNF	SAE#4 7/16 - 20 UNF	SAE#2 5/16-24 UNF

The p.f.v. on the inlet is available with two kinds of regulation ranges depending on two different types of internal register.

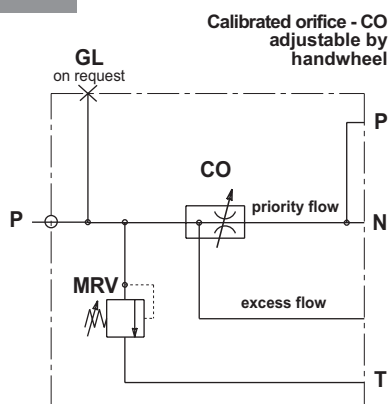
Pls. specify register 1 or 2 in the order.

Inlet flow gauge port GL available on request.



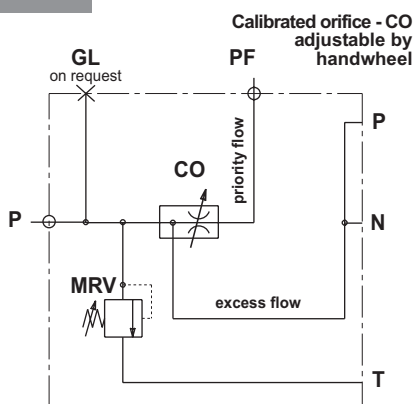
31

Top inlet port with internal adjustable priority flow



32

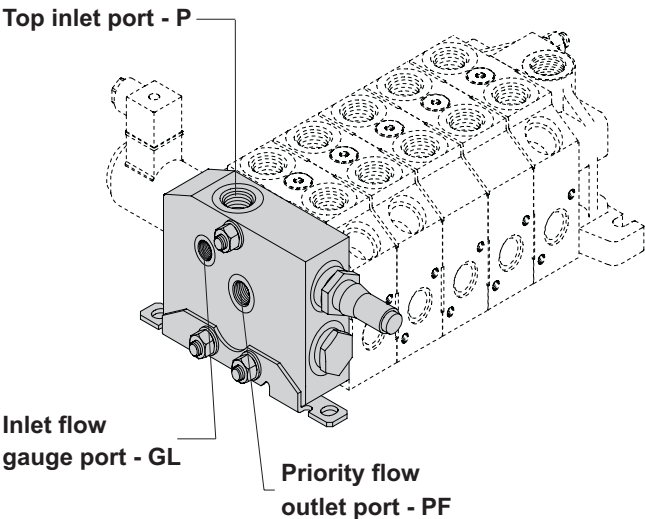
Top inlet port with external adjustable priority flow



INLET MODULE WITH FIXED PRIORITY FLOW VALVE

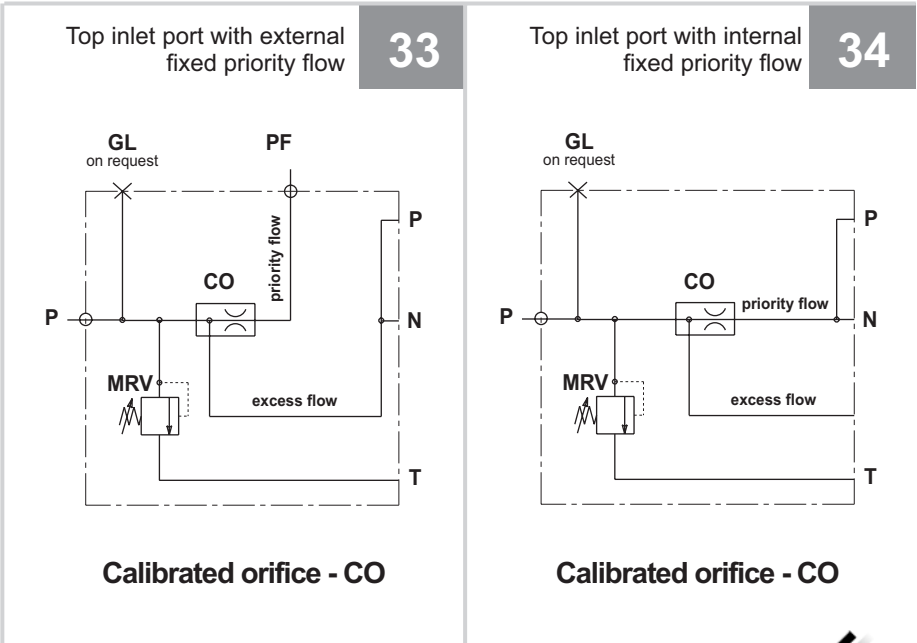
Inlet module with priority flow valve is available with priority flow which may go inside the directional control valve or be brought outside through the PF port. In case of external priority flow, at the downstream, you can assemble any working module, in case of internal priority flow you need to assemble only the working modules of pages 19.

Range of available priority flows:	
4	l/min - 1.06 gpm US
5	l/min - 1.32 gpm US
6.3	l/min - 1.66 gpm US
8	l/min - 2.11 gpm US
10.5	l/min - 2.77 gpm US
16.5	l/min - 4.36 gpm US




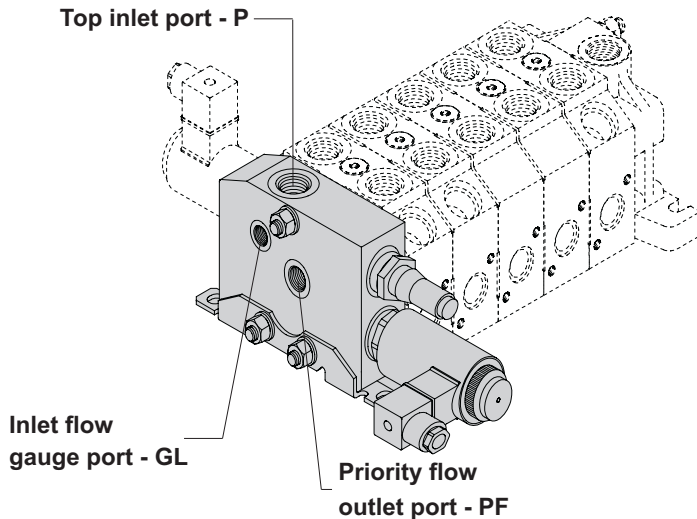
The p.f.v. on the inlet is available with six values of priority flows(as you can see in the table above), depending on six different types of calibrated orifices. Pls. specify your value in the order. Inlet flow gauge port **GL** available on request.

PORT SIZES	P	PF	GL
BSP ISO 228	G 3/8	G 1/4	G 1/8
METRIC ISO 262	M 18 x 1.5	M 14 x 1.5	M 12 x 1.5
SAE ISO 176	SAE#8 3/4 - 16 UNF	SAE#4 7/16 - 20 UNF	SAE#2 5/16-24 UNF

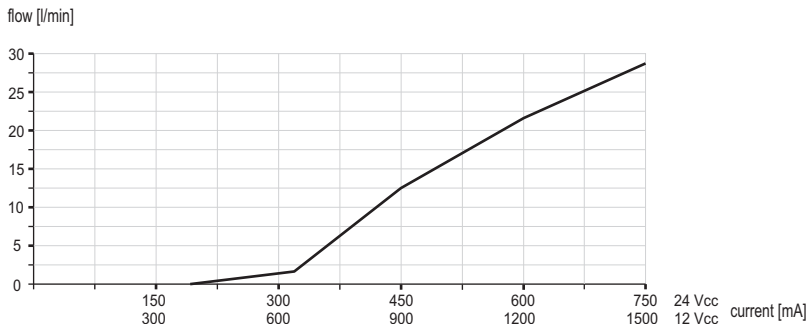


INLET MODULE WITH ELECTRICALLY ADJUSTABLE PRIORITY FLOW VALVE

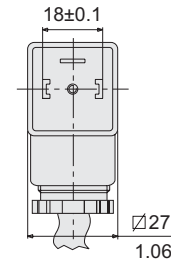
Inlet module with priority flow valve is available with priority flow which may go inside the directional control valve or be brought outside through the PF port.  In case of external priority flow, at the downstream, you can assemble any working module, in case of internal priority flow you need to assemble only the working modules of pages 19.



PORT SIZES	P	PF	GL
BSP ISO 228	G 3/8	G 1/4	G 1/8
METRIC ISO 262	M 18 x 1.5	M 14 x 1.5	M 12 x 1.5
SAE ISO 176	SAE#8 3/4 - 16 UNF	SAE#4 7/16 - 20 UNF	SAE#2 5/16-24 UNF



CONNECTOR
DIN 43650 - A/ISO 4400



Proportional controlled electric valve

DATI TECNICI/SPECIFICATIONS

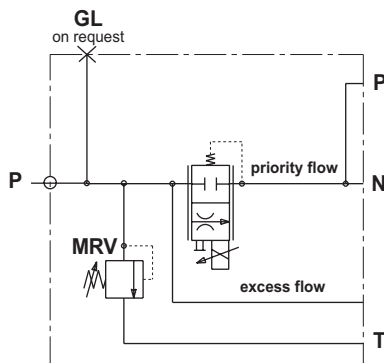
pressione max in 1:2:3/max pressure in 1:2:3	300 Bar
portata max/max flow	30 L/min
viscosità/oil viscosity/luido/fluid	vedi pag. 0.000.12
trafilamenti/oil leakage	250 cc/min
tensioni disponibili/available voltage	12-24 Vcc
corrente max 12 Vcc/max current 12 Vcc	1600mA
corrente max 24 Vcc/max current 24 Vcc	800mA
PWM	120 Hz
resistenza bobina a 20° C/coil resistance 20° C12 Vcc:4,2Ω - 24 Vcc:13,8Ω	
isteresi/hysteresis	5%
grado di protezione con connettore montato/protection index with standard connector	IP 65
coppia serraggio cartuccia/cartridge torque	30 Nm
coppia serraggio ghiera/torque ring nut	4 Nm
peso (con bobina)/weight (coil included)	0,56 Kg

Max adjustable flow

30 l/min - 7.92 gpm US

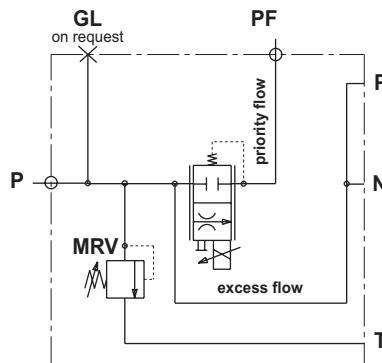
35

Top inlet port with adjustable priority flow inside



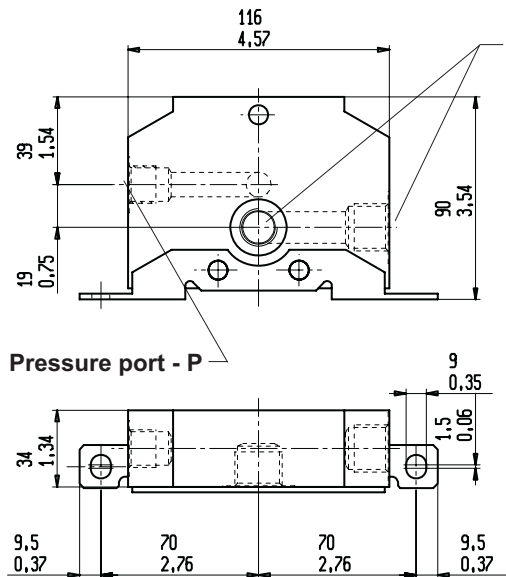
36

Top inlet port with adjustable priority flow outside



INLET MODULES

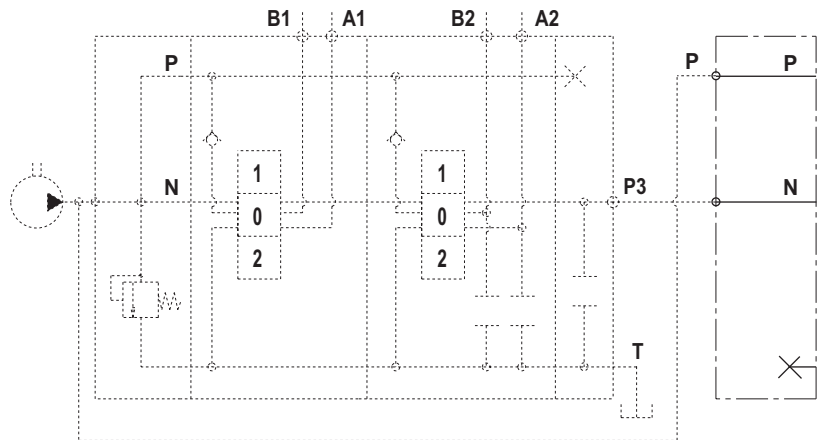
The back seal kit is the same of previous page



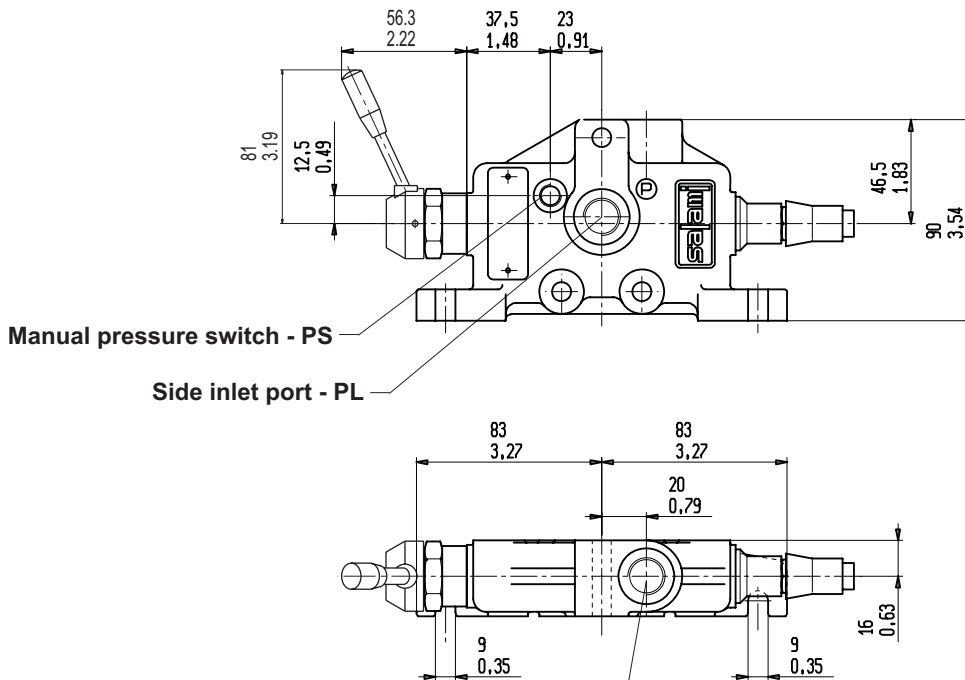
Feeding port from
power beyond - P3

Inlet module to realize parallel circuit between two different directional control valves. It must be located on the upstream valve.

43



The back seal kit is the same of previous page



Manual pressure switch - PS

Side inlet port - PL

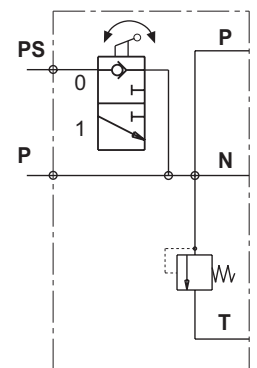
Top inlet port - P

P port size see page 8

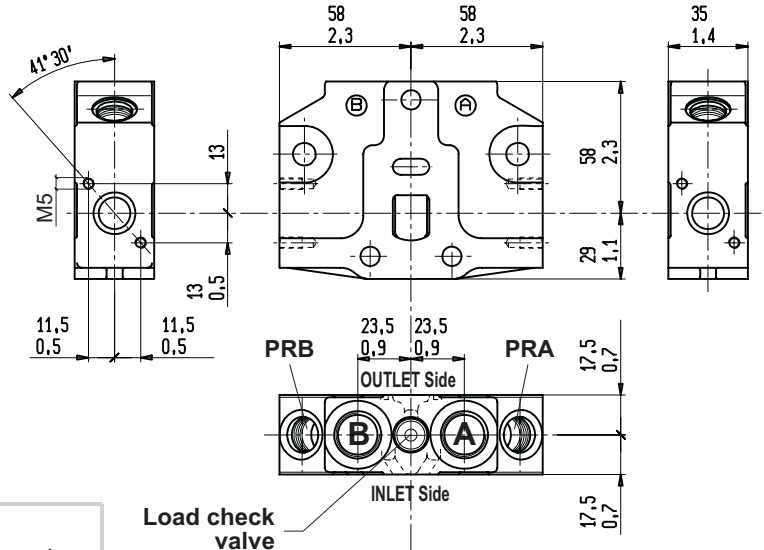
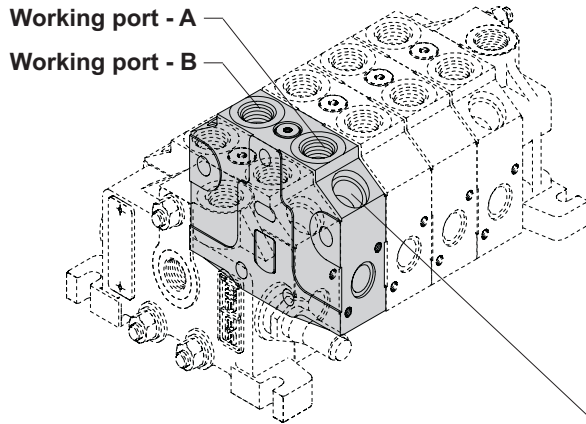
PORT SIZES	PS
BSP ISO 228	G 1/8
METRIC ISO 262	M 12 x 1.5
SAE ISO 176	SAE#2 5/16-24 UNF

Top inlet port with
manual pressure
switch on "B" side
and main relief
valve on "A" side
(see drw. besides)

51

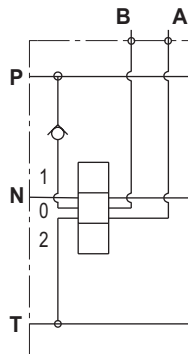


WORKING MODULE (PARALLEL CIRCUIT)

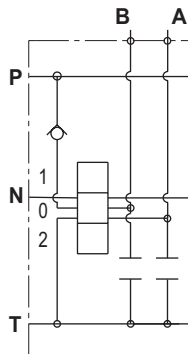


P

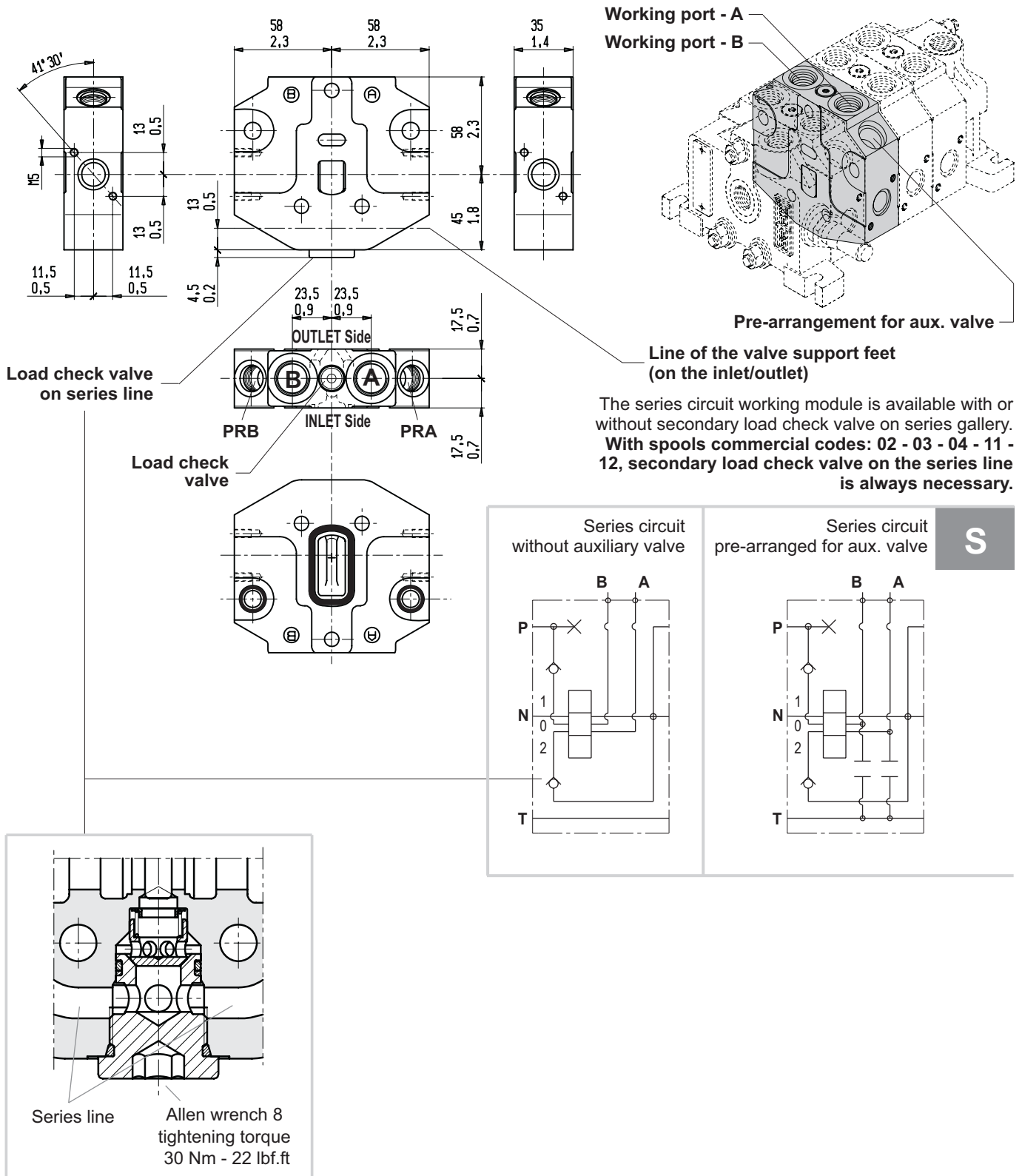
Parallel circuit
without auxiliary valve



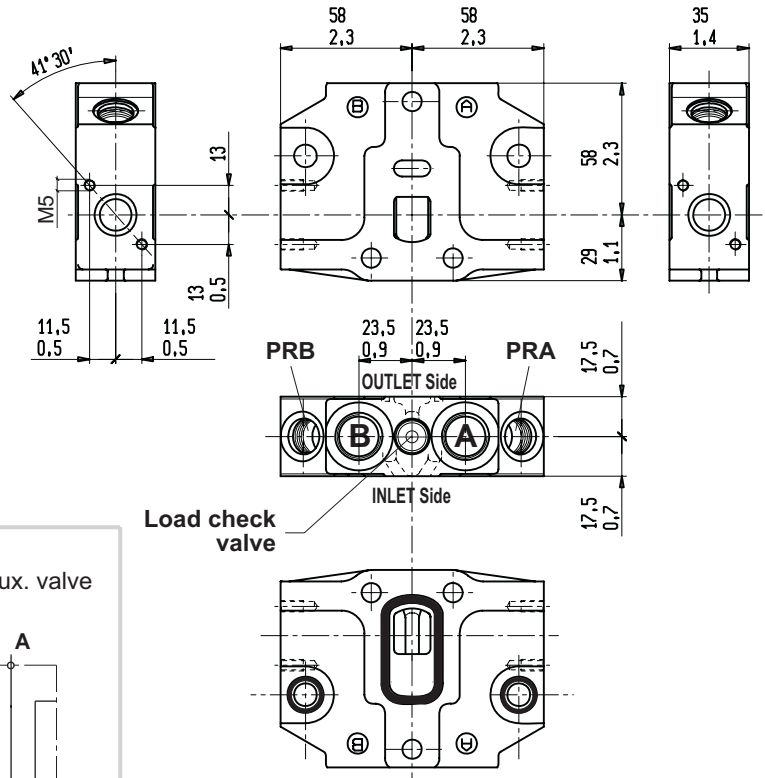
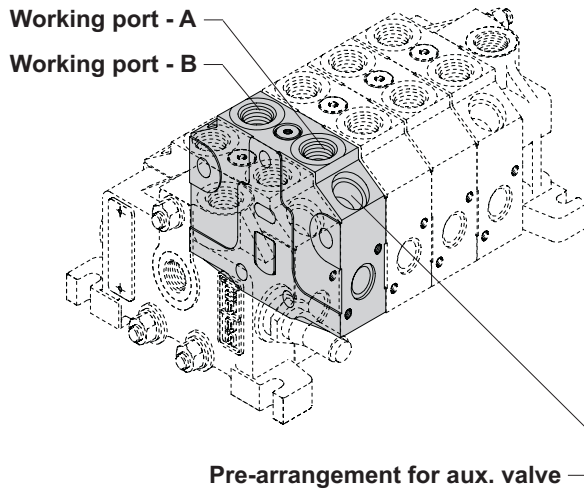
Parallel circuit
pre-arranged for aux. valve



WORKING MODULE (SERIES CIRCUIT)

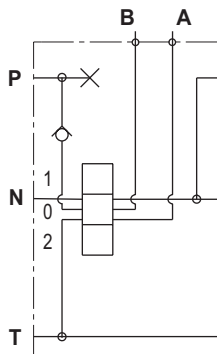


WORKING MODULE (TANDEM CIRCUIT)

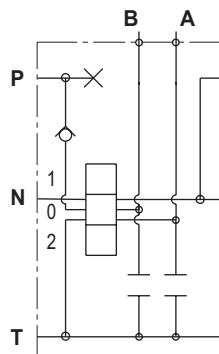


T

Tandem circuit
without auxiliary valve



Tandem circuit
pre-arranged for aux. valve

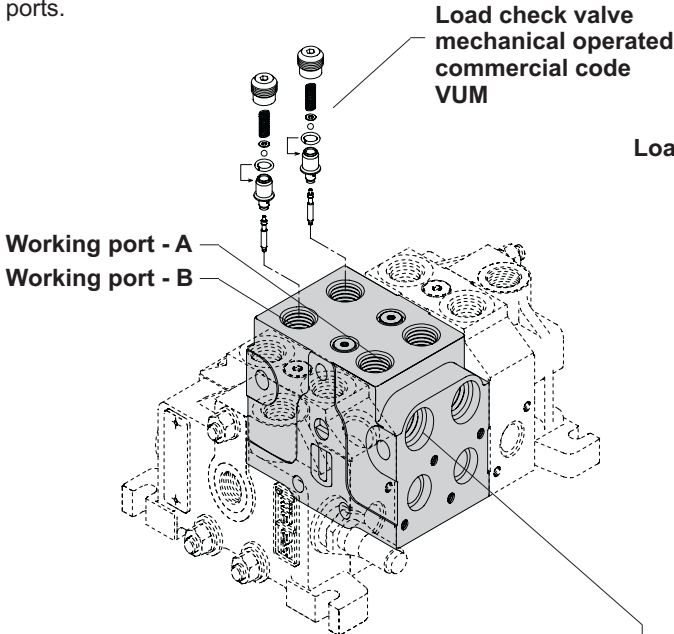
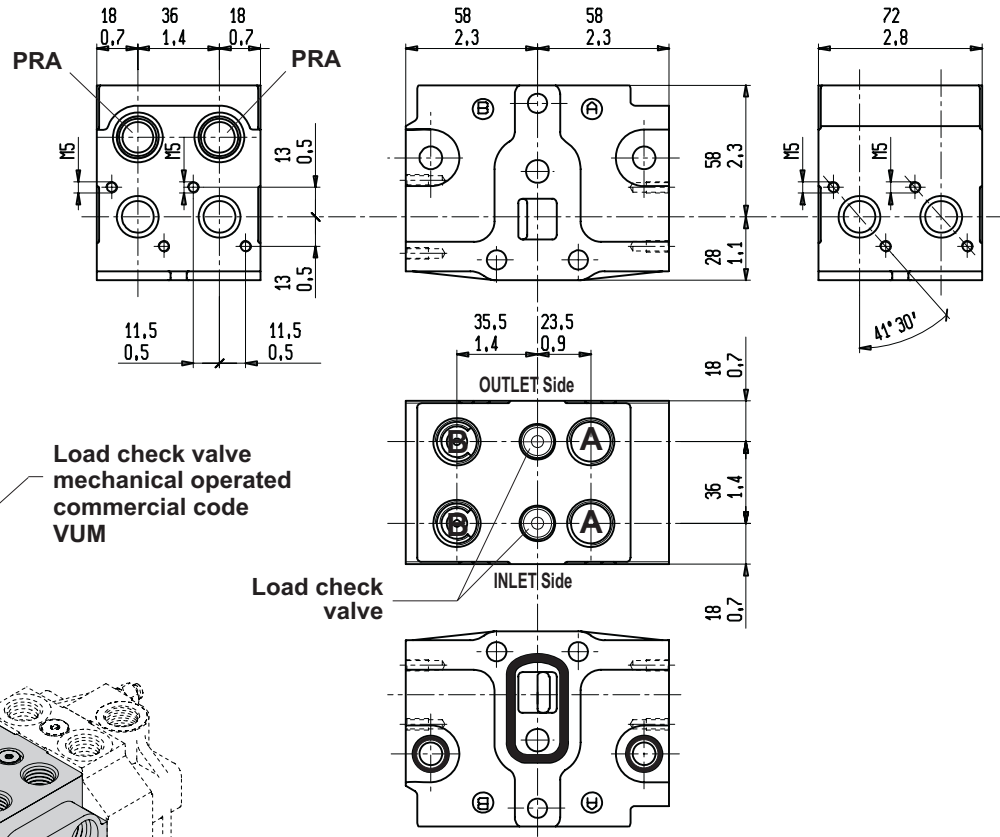


VD6A

DOUBLE WORKING MODULE (PARALLEL CIRCUIT) WITH LOAD CHECK VALVE MECHANICAL OPERATED ON "B" PORTS

This double working module with parallel circuit is built with a special machining to insert a load check valve piloted with a mechanical device into "B" ports. 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. This working module can be pre-arranged for auxiliary valves on "A" ports.

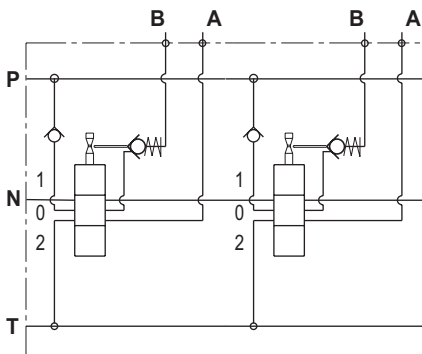


Auxiliary valves available are those from page 32 to page 34.

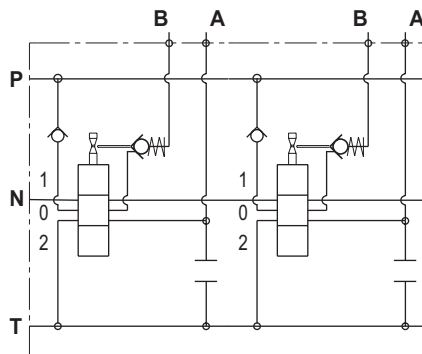
In any case this double working module is a non-standard release. For this reason in case you are interested you can contact our sales department and we suggest you to require an appropriate assembling and circuit drawing.

P

Parallel circuit
without auxiliary valve

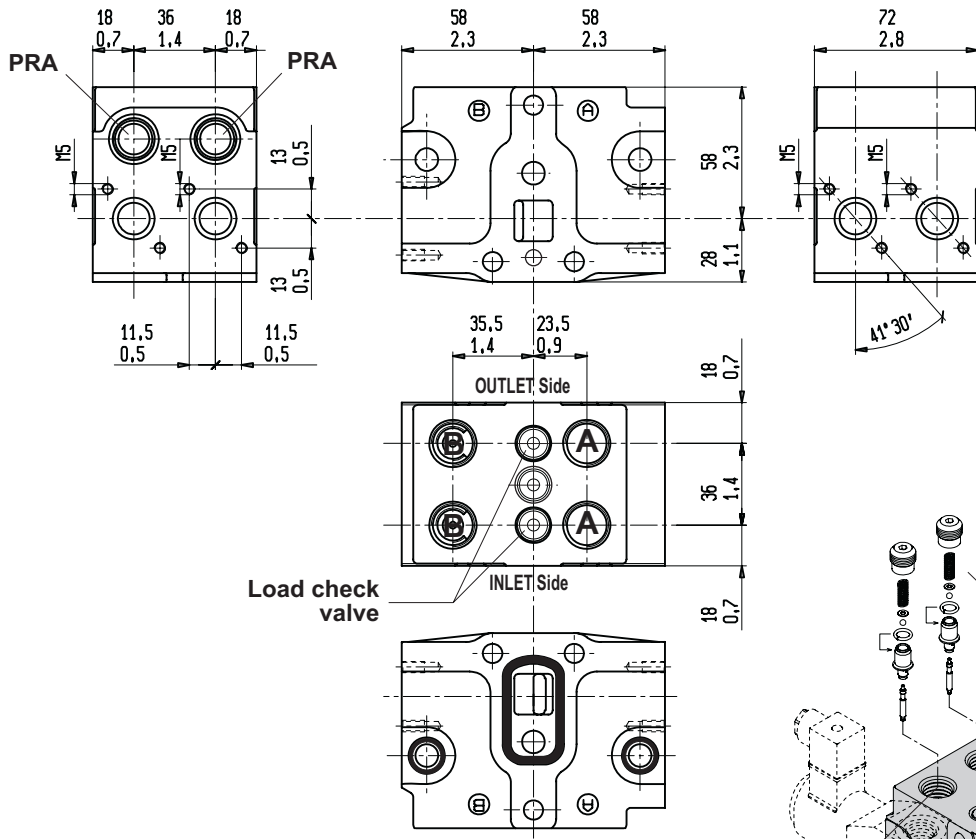


Parallel circuit
pre-arranged for aux. valves on "A" ports



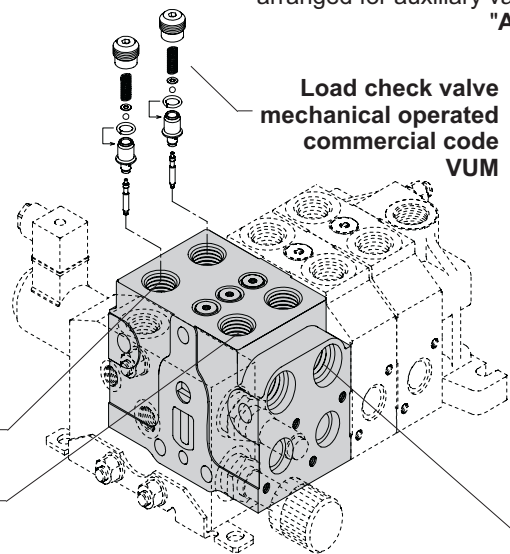
DOUBLE WORKING MODULE (TANDEM/PARALLEL CIRCUIT) WITH LOAD CHECK VALVE MECHANICAL OPERATED ON "B" PORTS

Assembling with inlet module with built-in priority flow valve (see page from 11 to 14)



This double working module with first section tandem circuit and second parallel circuit is built with a special machining to insert a load check valve piloted with a mechanical device into "B" ports. 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. This working module can be pre-arranged for auxiliary valves on "A" ports.

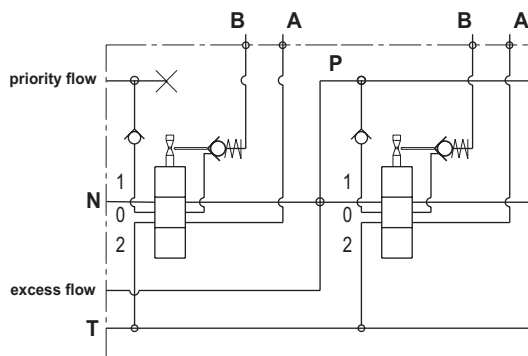


Auxiliary valves available are those from page 32 to page 34.

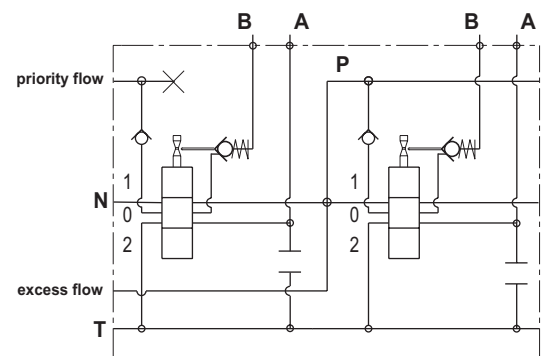
In any case this double working module is a non-standard release. For this reason in case you are interested you can contact our sales department and we suggest you to require an appropriate assembling and circuit drawing.

Pre-arrangement for aux. valve only on "A" ports

First section tandem circuit, second parallel circuit without auxiliary valve



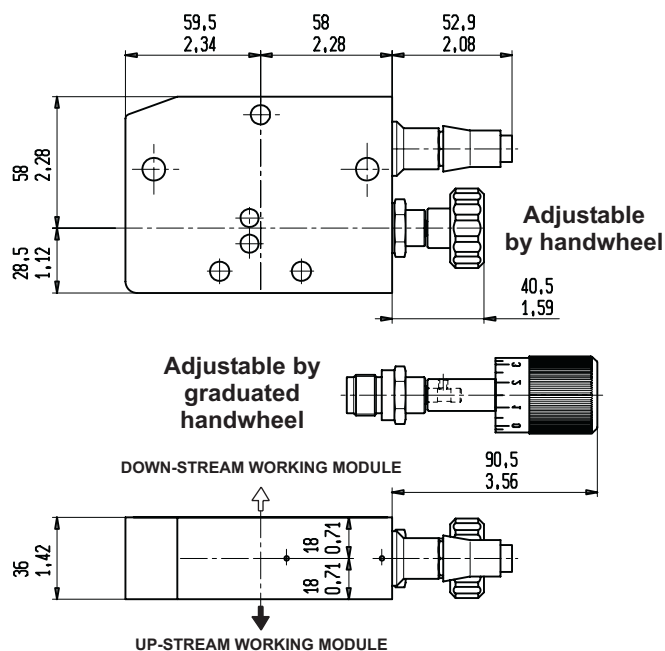
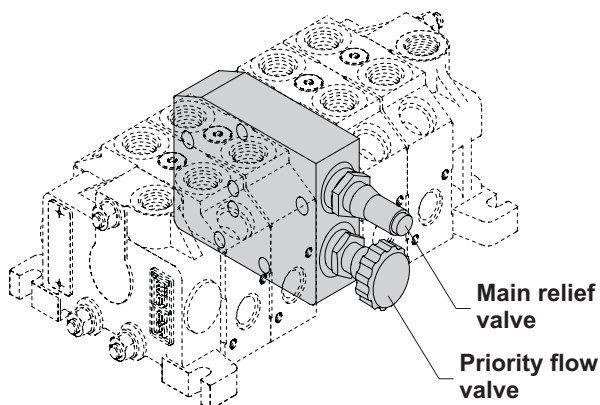
First section tandem circuit, second parallel circuit pre-arranged for aux. valves on "A" ports



T

MID WORKING MODULE WITH ADJUSTABLE PRIORITY FLOW VALVE

Mid working module with priority flow valve is available only with priority flow which go to the upstream working module. With this type of mid inlet you must assemble the working module of page 19.

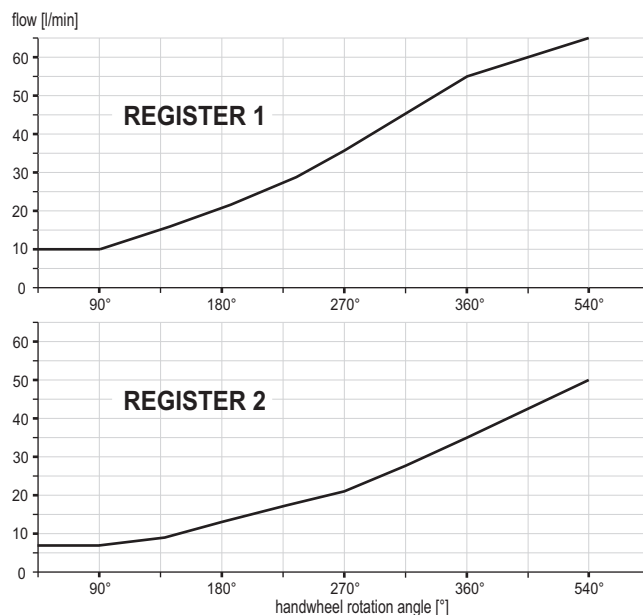
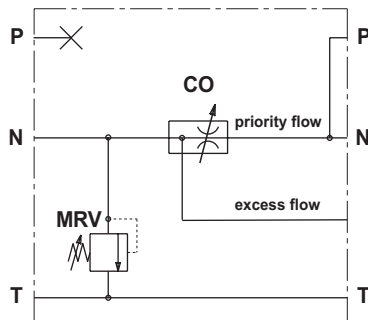


With this mid working module the priority and excess flows go always to the down-stream working module. For this reason at the down-stream you must assemble the working module of page 19. The p.f.v. is available with two kinds of regulation range depending of the valve register. Please specify register 1 or register 2 when you order.

I5

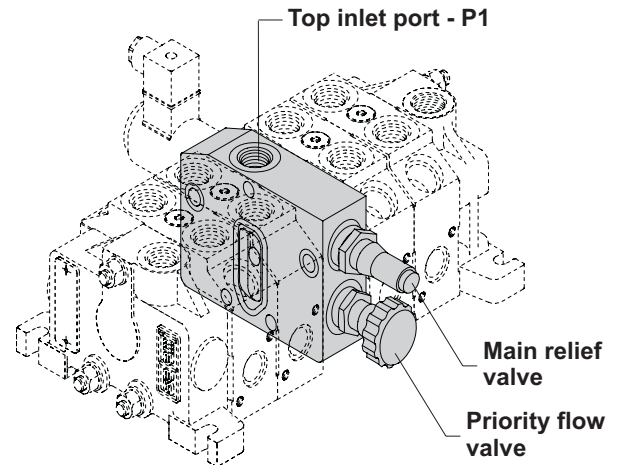
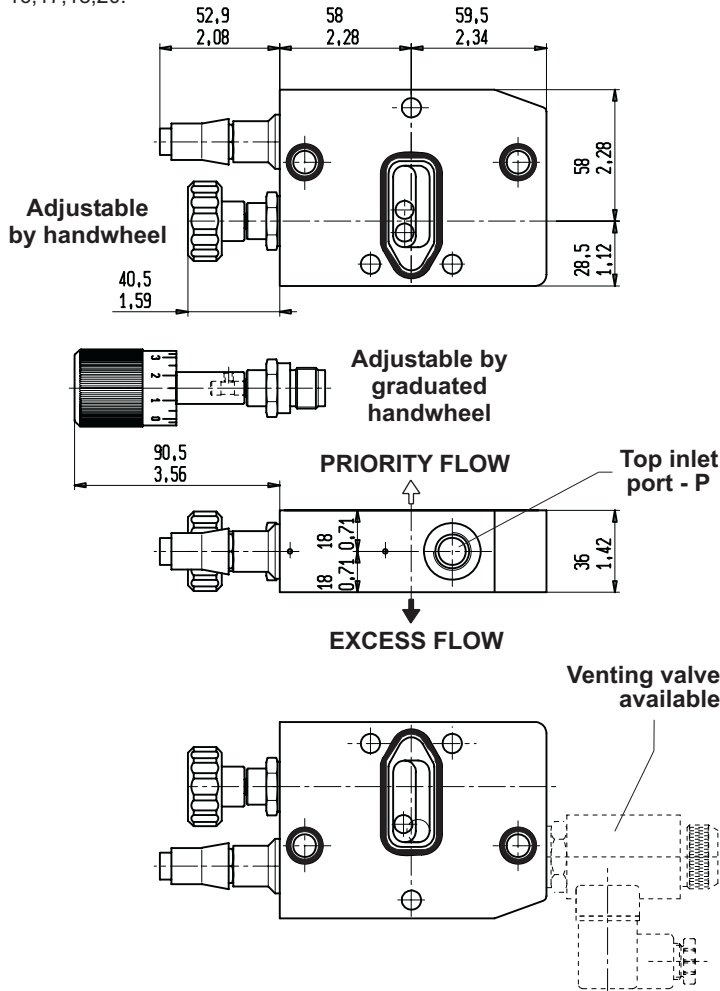
Mid inlet with adjustable priority flow valve inside

Calibrated orifice - CO
adjustable by
handwheel

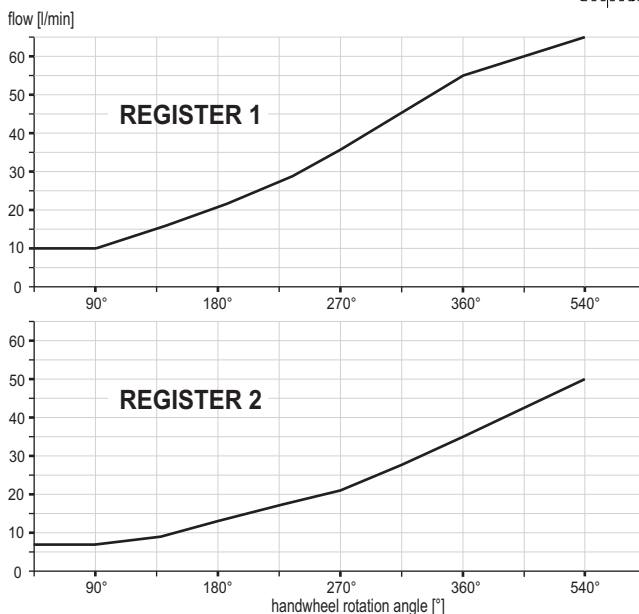
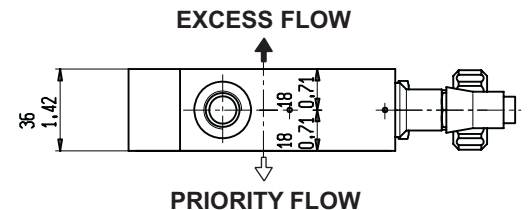


MID INLET MODULE WITH ADJUSTABLE PRIORITY FLOW VALVE

Mid inlet module with priority flow valve is available with priority flow which may go to the upstream working module or to the downstream working module, depending of assembling as shown in the drawing below. With this type of mid inlet you must assemble the working module of pages 16,17,18,20.



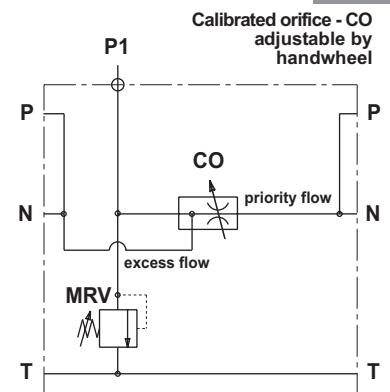
Just turning of 180° the mid inlet module you can decide where to manage the priority flow and the excess flow



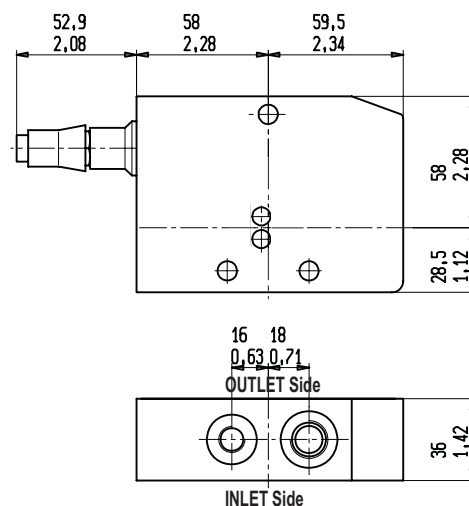
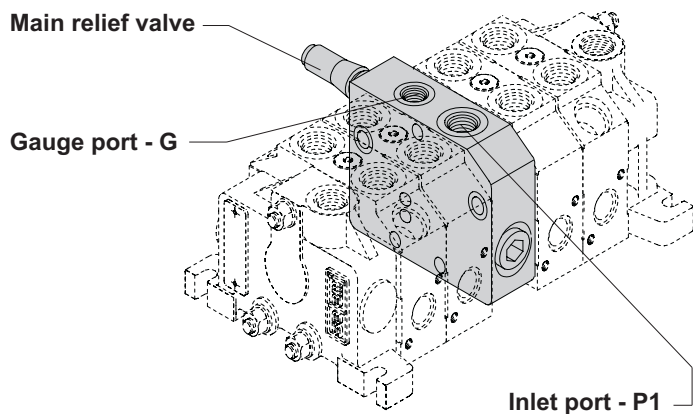
The p.f.v. is available with two kinds of regulation range depending of the valve register. Please specify register 1 or register 2 when you order.

Mid inlet with adjustable priority flow valve inside

16



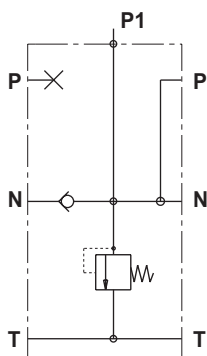
MID INLET MODULE (HYDRAULIC CIRCUITS)



Gauge port is available with the following threads:
BSP (ISO 228) - G 1/4
SAE UN-UNF (ISO725) - SAE 4

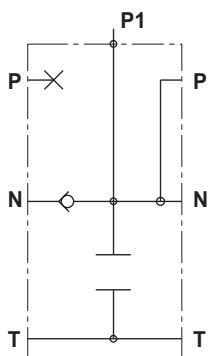
I1

Mid inlet for second pump with combining flows and main relief valve



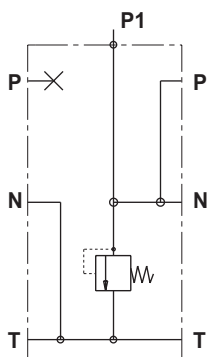
I2

Mid inlet for second pump with combining flows without main relief valve



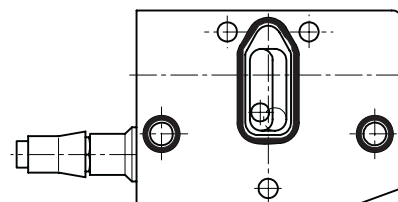
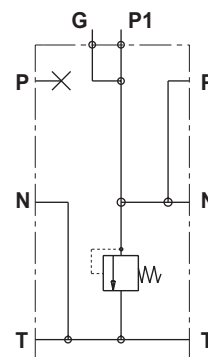
I3

Mid inlet for second pump with split flows and main relief valve

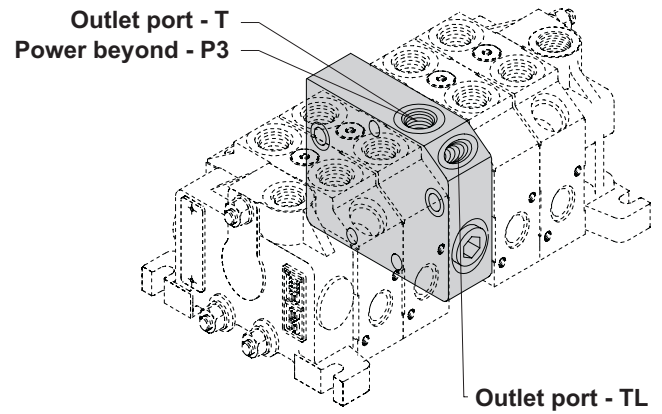
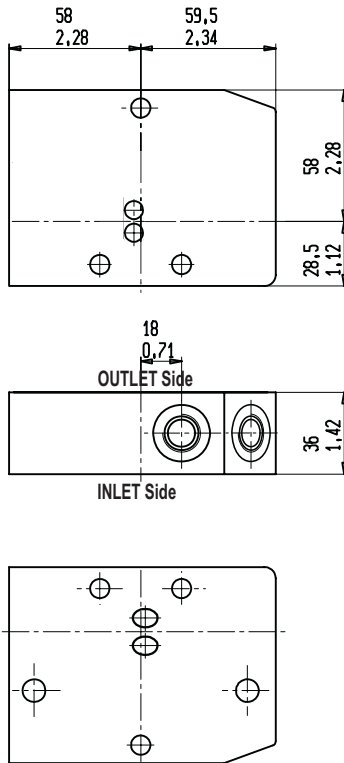



I4

Mid inlet for second pump with split flows and main relief valve + gauge port

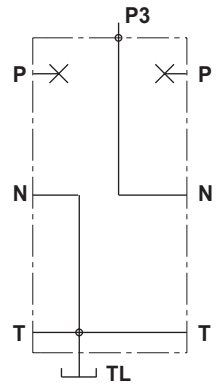


MID OUTLET MODULE (HYDRAULIC CIRCUITS)

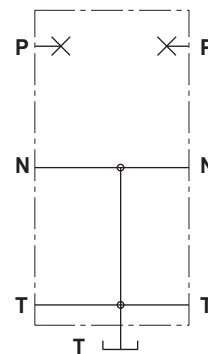


 In case of commercial code **19** the tank port is at the top "T"
In case of commercial codes **17** and **18** the top port is for the power beyond "P3" and the tank port is at the side "TL"

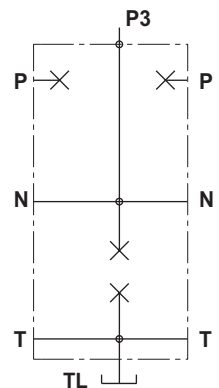
Mid outlet **17**



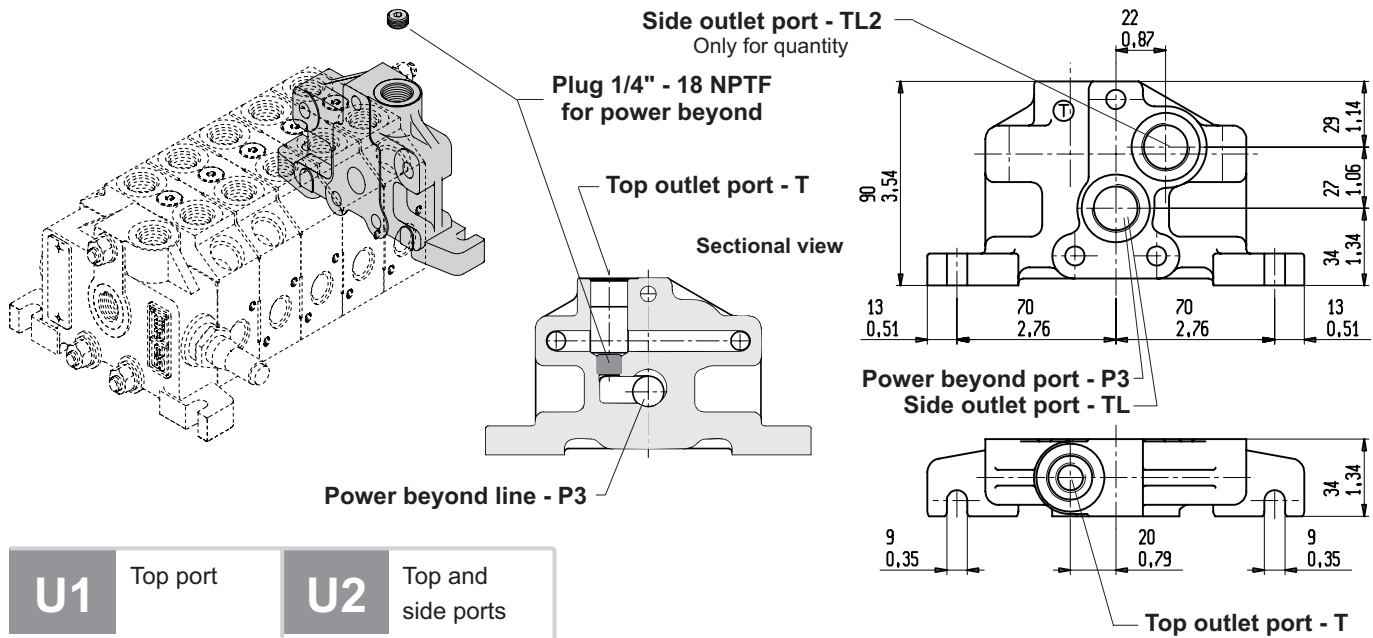
Mid outlet **19**

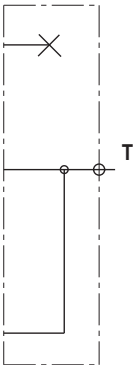
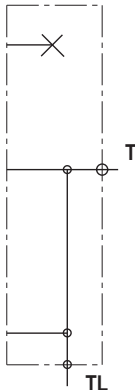
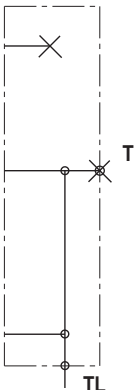
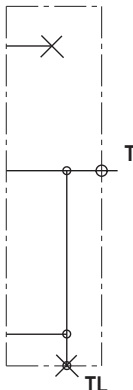
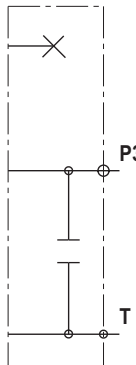
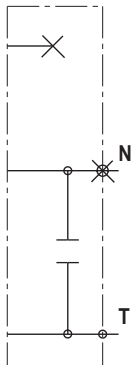


Mid outlet **18**



OUTLET MODULE (HYDRAULIC CIRCUITS)



U1	Top port	
U2	Top and side ports	
U3	Side port top port plugged	
U4	Top port side port plugged	
U5	Power beyond configuration (side P3)	
U7	Closed center circuit configuration	
U8	Outlet type necessary for electro-hydraulic controls, please go to page 42 to see the drawing and hydraulic scheme.	

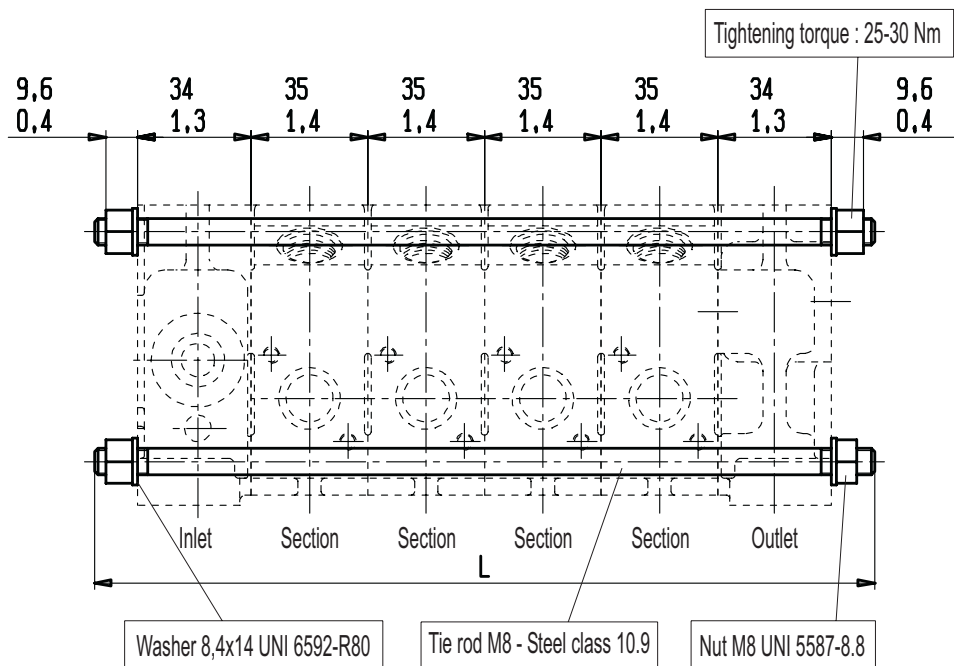
0,35

0,79

0,35

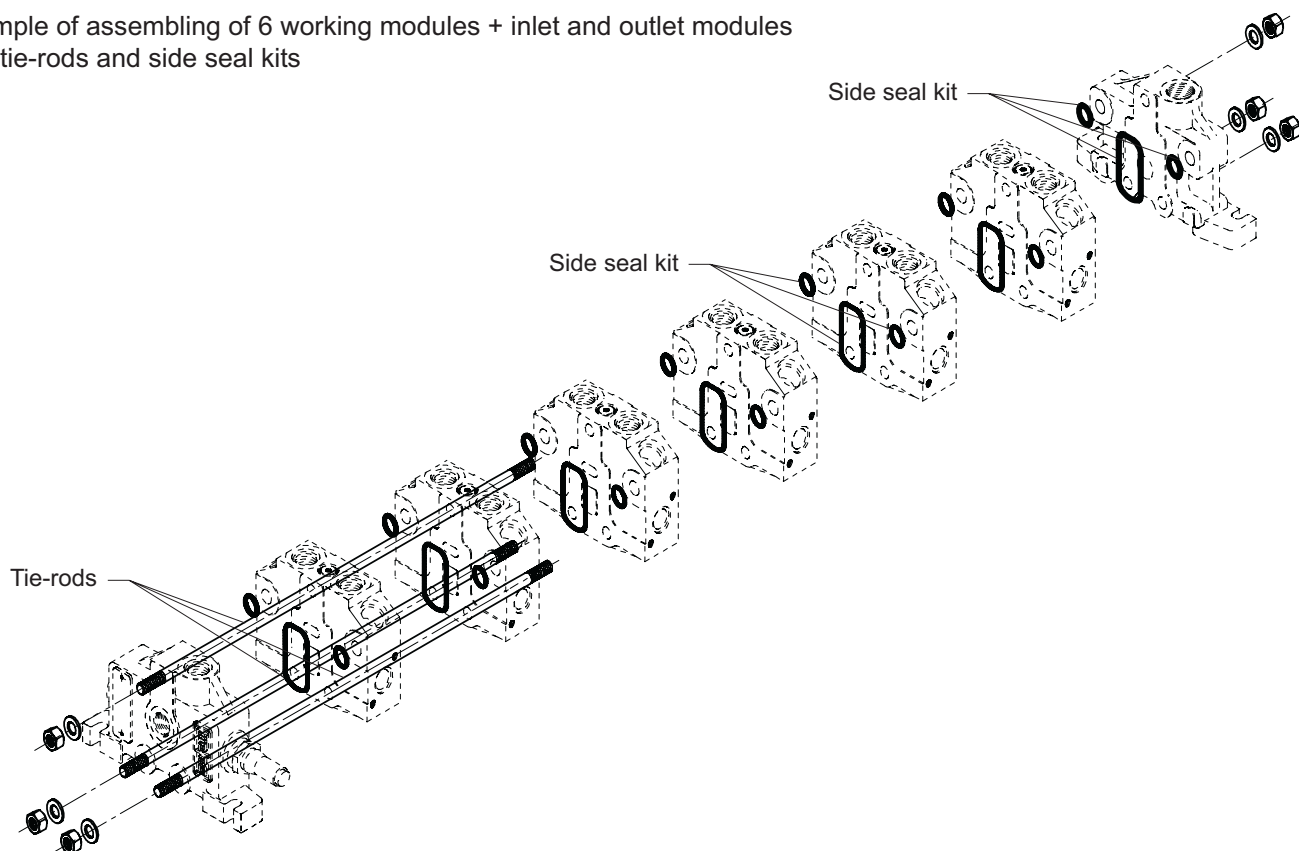
Top outlet port - T

ASSEMBLING TIE RODS

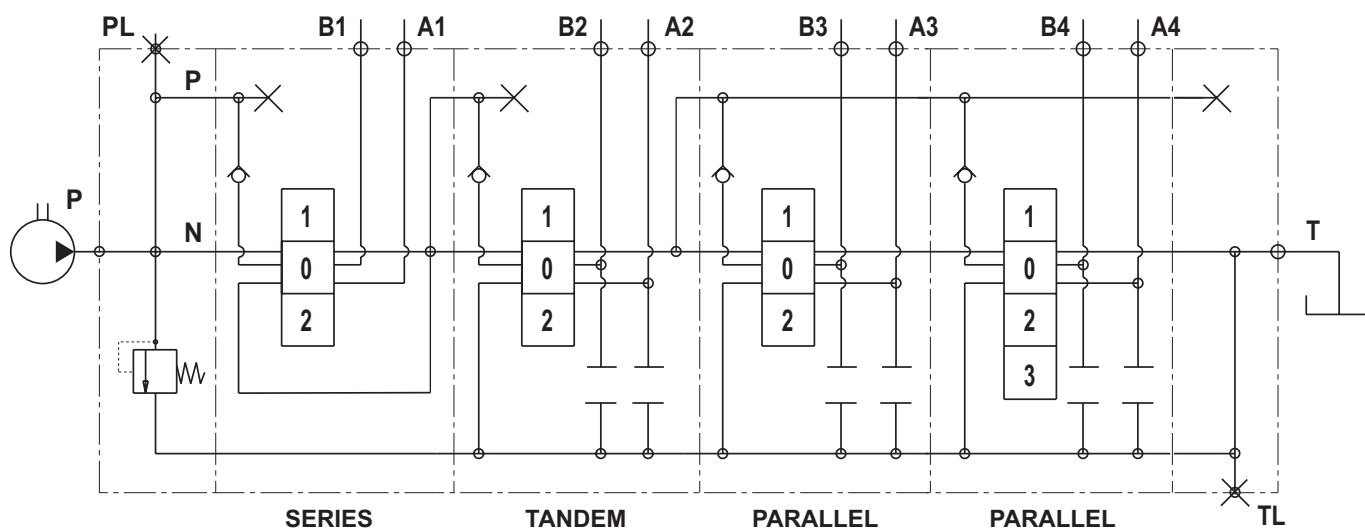


N° of sections	Length L
	mm. [inch]
1	128 [5.04]
2	162 [6.38]
3	198 [7.79]
4	235 [9.25]
5	271 [10.67]
6	305 [12.01]
7	343 [13.5]
8	377 [14.84]

Example of assembling of 6 working modules + inlet and outlet modules with tie-rods and side seal kits



CIRCUIT AND SPOOL TYPES



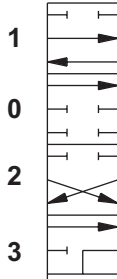
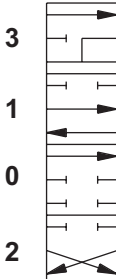
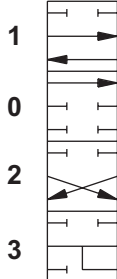
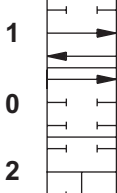
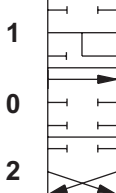
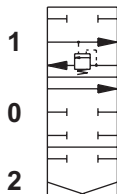
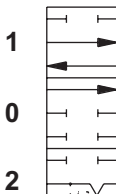
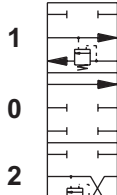
The circuits available are:

parallel type, series type, tandem type as shown in the picture above (tandem type for priority flow valve in the inlet module is available too, see page 19). You can have main relief valve or venting valve in the inlet (see page 11), the working sections can have pre-arrangement for auxiliary valves or not (you can mount venting valve too).

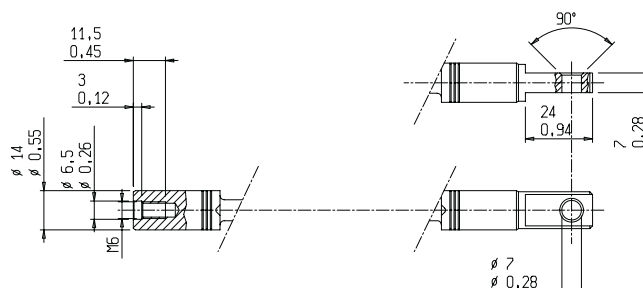
The spools can be 3 or 4 positions (as shown here below) moreover VD6A is available for power beyond just insert a plug 1/4" - 18 NPTF (see page 24).

As you can read at page 52, the spools can be types "A" nominal flow or "C" 2/3 of nominal flow.

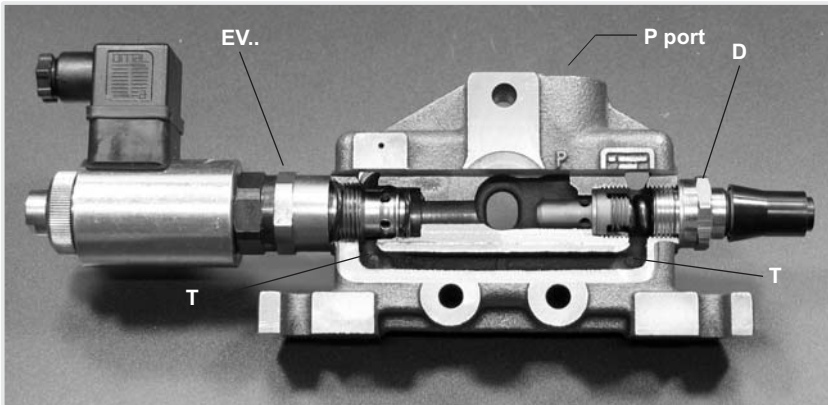
01		Double acting spool	Double acting motor spool		02
03		Double acting motor spool ("B" port blocked)	Double acting motor spool ("A" port blocked)		04
05		Single acting spool "A" working port	Single acting spool "B" working port		06

11		Double acting spool with float function in 3rd position (spool in)		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		18
52		Over center double acting spool "A" working port The stroke of this type of spool is ± 4.5 mm		53
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 39 and 40.



MAIN RELIEF VALVES

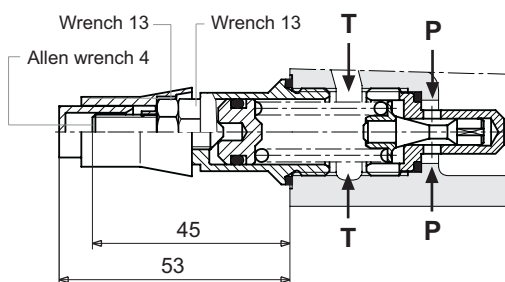
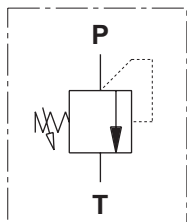


Max tightening torque:
 wrench 10 - 18 Nm
 wrench 13 - 24 Nm
 wrench 22 - 35 Nm
 wrench 24 - 30 Nm
 wrench 26 - 30 Nm
 wrench 27 - 30 Nm
 Allen wrench 6 - 30 Nm
 Allen wrench 8 - 30 Nm

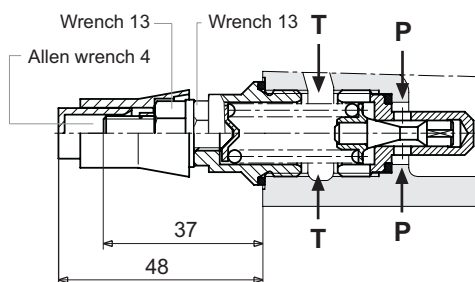
The main relief valve can be mounted on "A" or "B" side, in case of venting valve this is at the opposite side of the main relief. All the testing values of this page have been obtained with nominal flow of 35 L/min - 9.25 gpm, viscosity 16cST and oil temperature 50°C - 122°F.

D

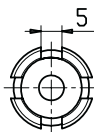
MAIN RELIEF VALVE DIRECT OPERATED
 (setting range from 51 to 350 bar - 740 to 5100 psi)
 available in two type, see drawing here below



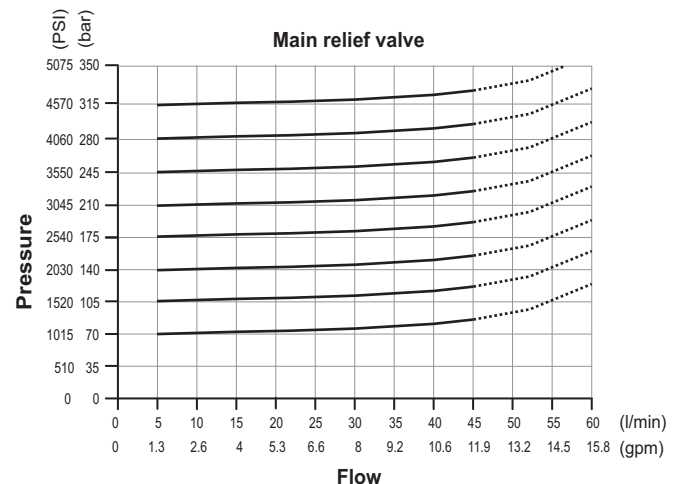
TYPE 1



TYPE 2

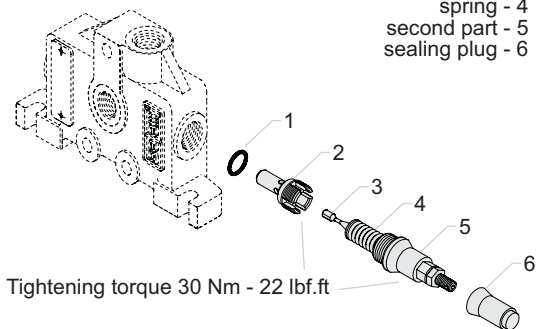


First part of the valve



This valve is built as shown in the drawing here below:

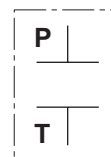
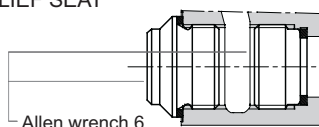
- washer - 1
- first part - 2
- shutter - 3
- spring - 4
- second part - 5
- sealing plug - 6



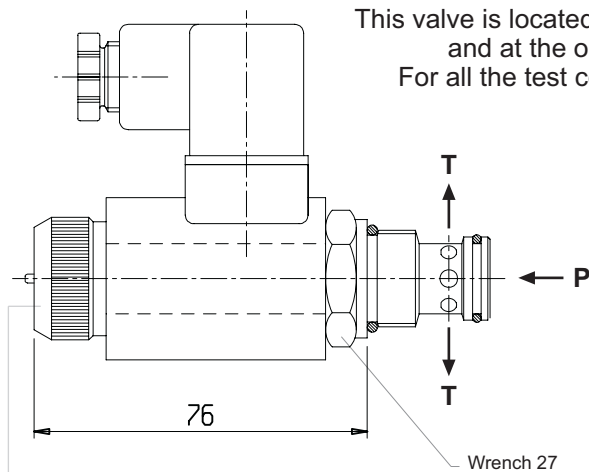
The only difference between the two types is the type 1 is adjustable without oil leaking.

W

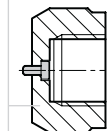
**PLUG FOR MAIN RELIEF SEAT
WITHOUT VALVE**



VENTING VALVES

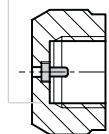


This valve is located in a different cavity from main relief valve and at the opposite side or without main relief.
For all the test conditions, please refer you to page 28.



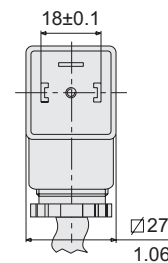
Unscrew the lock nut, inside there is a pin.

Push override



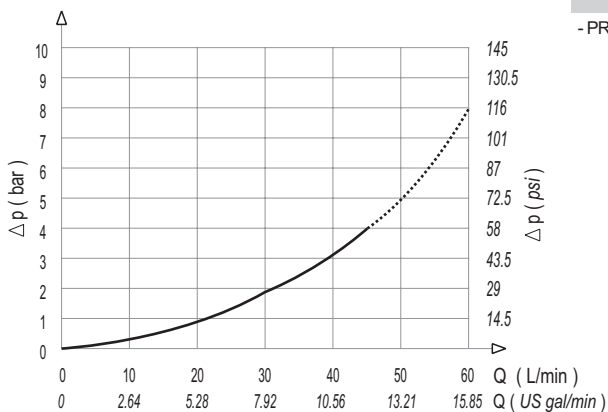
Turn the pin of 180° and screw the lock nut.
Tightening torque 4 Nm - 3 lbf.ft.

CONNECTOR
DIN 43650 - A/ISO 4400

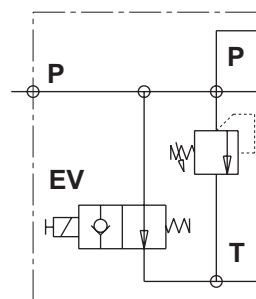


SPECIFICATIONS

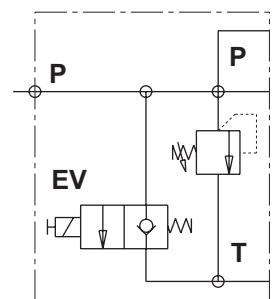
- MAX PRESSURE IN "P"	350 bar
- MAX FLOW	60 l/min
- OIL LEAKAGE-max pressure-46cST	0.25 cm ³ /min
- AVAILABLE VOLTAGE	12 - 24 Vcc
- COIL RESISTANCE	12Vdc:8.7Ω - 24Vdc:33Ω
- COIL POWER	28 W
- PROTECTION INDEX WITH STANDARD CONNECTOR	IP 65



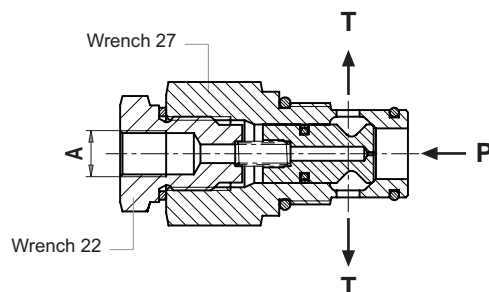
Normally opened



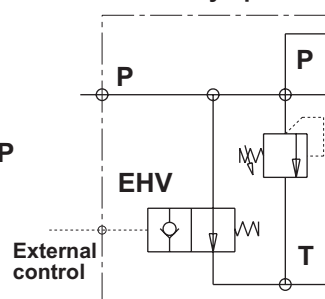
Normally closed



A	
available threads	
M10 x 1	SAE 6



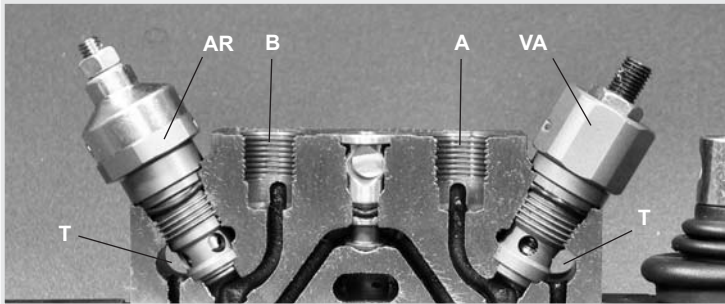
Normally opened



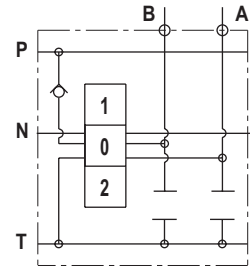
EHV

External hydraulic piloted venting valve

AUXILIARY VALVES

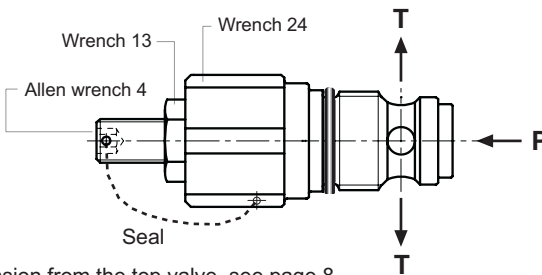
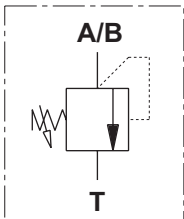


This picture shows the position of the auxiliary valves. For the tightening torque please see page 24.

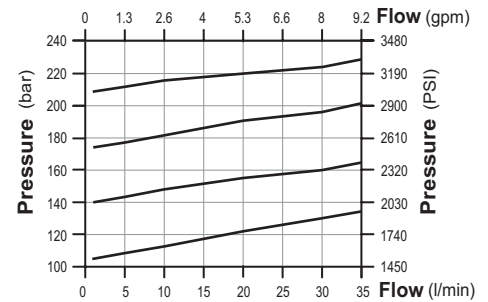


VA

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

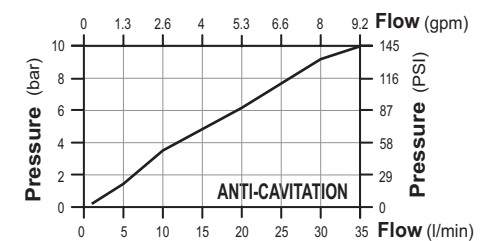
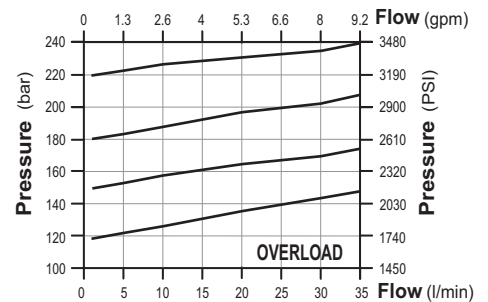
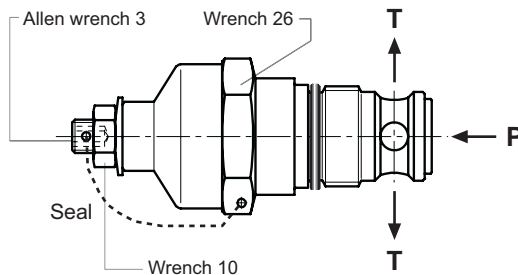
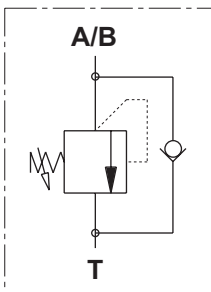


Dimension from the top valve, see page 8



AR

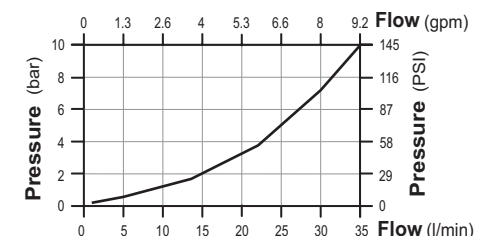
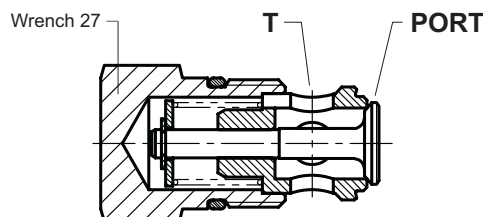
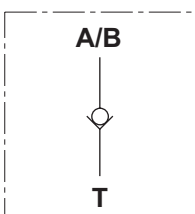
OVERLOAD AND ANTI-CAVITATION VALVE
(setting range from 50 to 350 bar - 725 to 5075 psi)



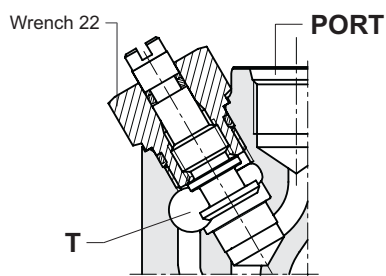
Both valves VA and AR are adjustable without oil leaking.
Further more, both have a security device to avoid valve sticking
Dimensions from the top valve, see page 8

VR

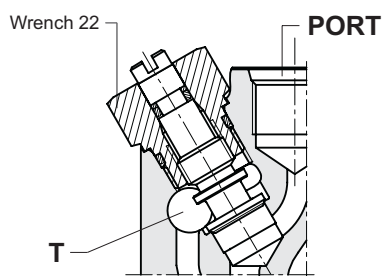
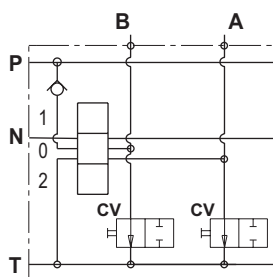
ANTI-CAVITATION VALVE



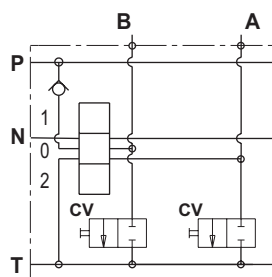
AUXILIARY VALVES



OPENED



CLOSED



CV

CONVERSION VALVE

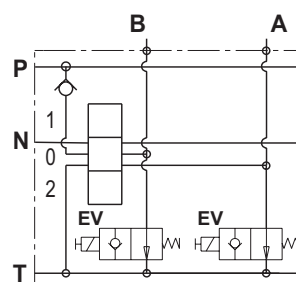
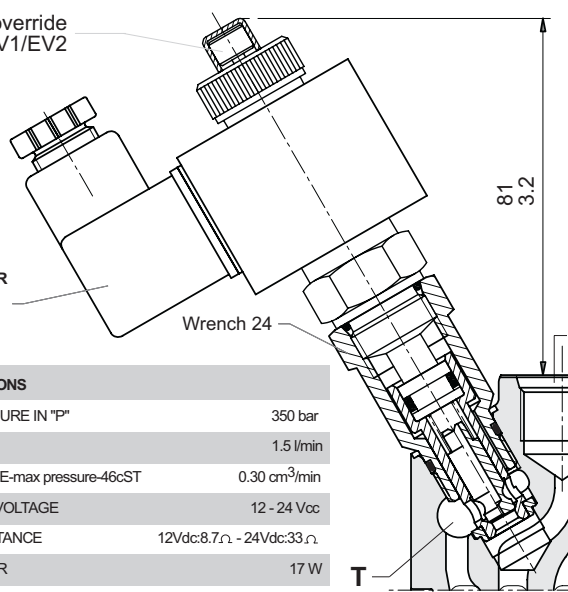
The conversion valve **CV** allows to obtain single acting function starting from double acting spool just connecting the port to tank. For example starting from a double acting spool to obtain a single acting "A" port function, we must open the **CV** valve sending "B" port to tank line.

Push override
only EV1/EV2

CONNECTOR
DIN 43650
A/ISO 4400
see page 29

SPECIFICATIONS

- MAX PRESSURE IN "P"	350 bar
- MAX FLOW	1.5 l/min
- OIL LEAKAGE-max pressure-46cST	0.30 cm ³ /min
- AVAILABLE VOLTAGE	12 - 24 Vdc
- COIL RESISTANCE	12Vdc:8.7Ω - 24Vdc:33Ω
- COIL POWER	17 W
- PROTECTION INDEX WITH STANDARD CONNECTOR	IP 65

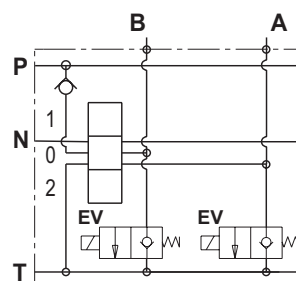


EV1

12 Vdc - Normally opened
Push override

EV2

24 Vdc - Normally opened
Push override

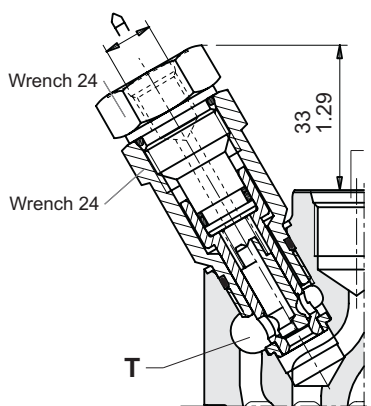


EV3

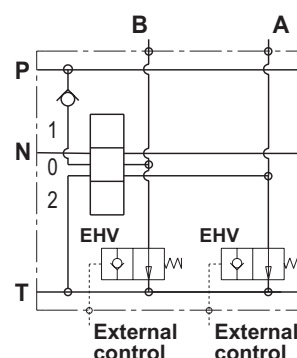
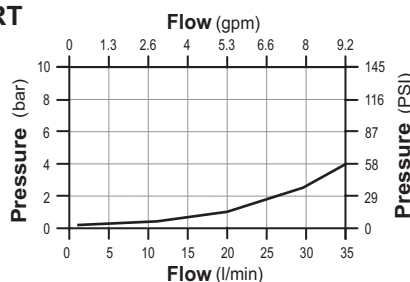
12 Vdc - Normally closed
Without override

EV4

24 Vdc - Normally closed
Without override



This performance data can be used for EV1,2,3,4 too. Because the solenoid valve is only a piloting device for the opening of the venting valve.



EHV

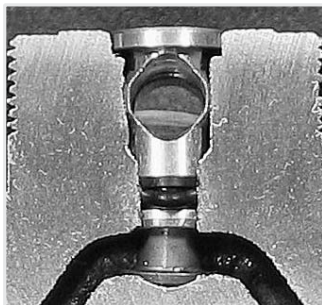
External piloted
venting valve

A

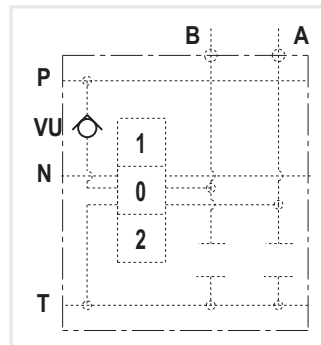
available threads

M10 x 1 SAE 6

OTHER VALVES

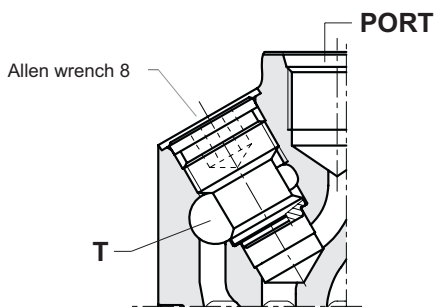
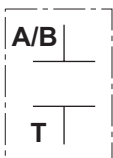


This is the load check valve VU which is built in every working module between ports and you need not to specify in phase of ordering because it is part of the module. In the series circuit working module you can have a secondary load check valve on the series line as you can see in the drawing of page 17.



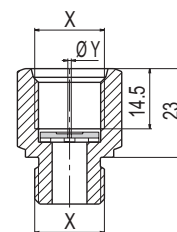
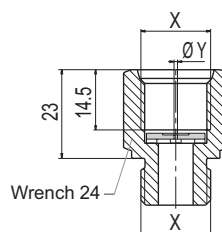
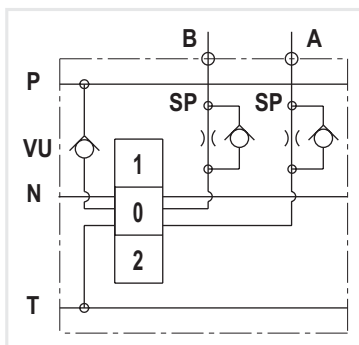
PR

PLUG FOR CAVITY



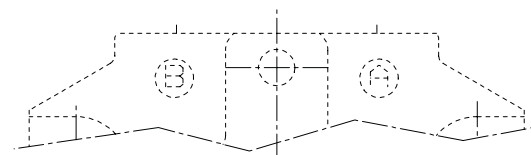
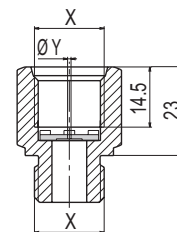
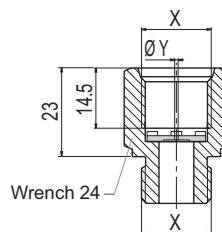
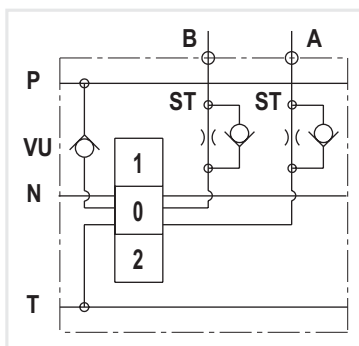
SP

Flow restrictor P → A/B



ST

Flow restrictor A/B → T

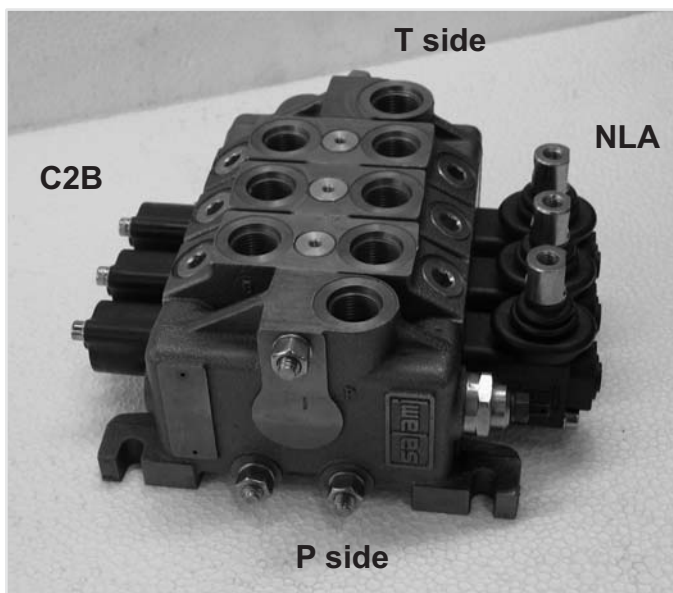


For tightening torque, please refer you to page 5.

X available threads			φ Y available measures		
*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.

SPOOL CONTROLS AND SPOOL POSITIONINGS

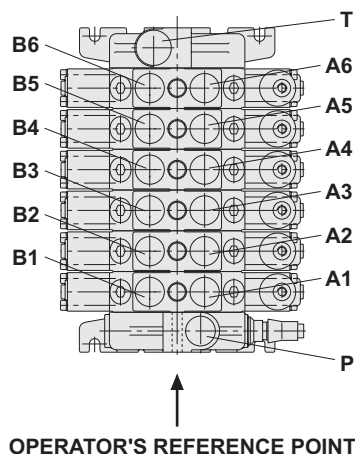


This picture shows the VD6A assembled, in this case you have a manual control "NL" on A side and a spring return in neutral position "C2" on B port side. In this case the manual control "NL" is used directly to have the spool movement, in other case, for example with electro-hydraulic control, there is only a safety lever. Considering that VD6A is a symmetrical valve, all spool controls and positionings can be placed on both sides A or B. In case of hydraulic 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.

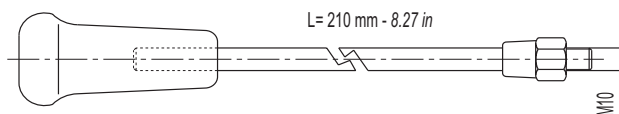
The drw. here below show the reference to fix A and B side from the point of view of the operator.



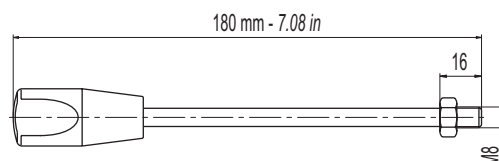
STANDARD SHAFTS

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

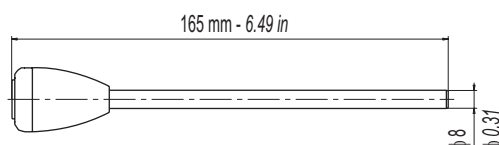
Shaft with ergonomic knob
for cross lever L1/L2
R202 8996 0



Shaft with threaded end
R202 9018 0



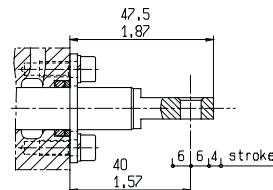
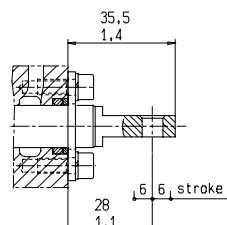
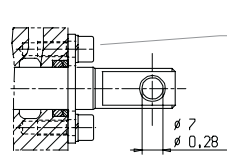
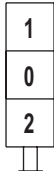
Shaft for clamp lever
R202 8839 0



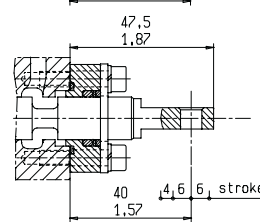
SPOOL CONTROLS

SL

Without lever box



For spool with float position
commercial code 12



For spool with float position
commercial code 11

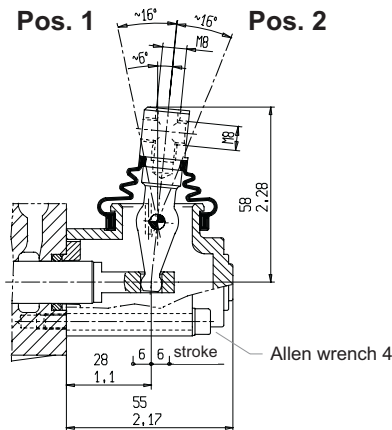
On request available with dust proof plate

NL

Standard
protected lever

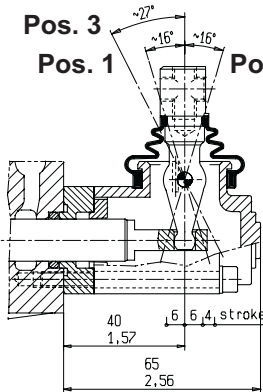


Pos. 1 **Pos. 2**



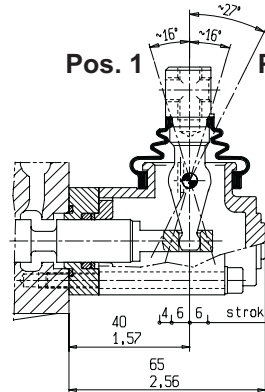
This lever can be assembled turned of 180°

Pos. 3 **Pos. 1** **Pos. 2**



For spool with float position
commercial code 12

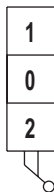
Pos. 1 **Pos. 2** **Pos. 3**



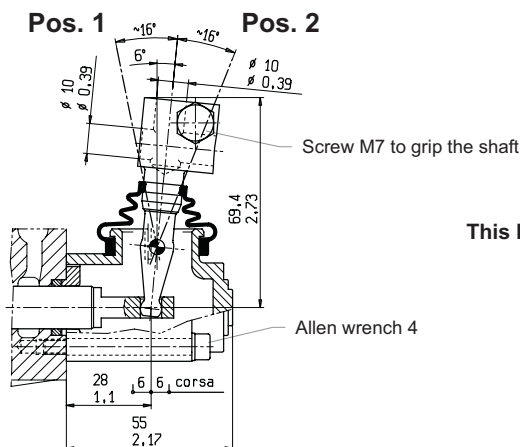
For spool with float position
commercial code 11

MP

Protected clamp lever



Pos. 1 **Pos. 2**



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

This lever can be assembled turned of 180°

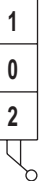
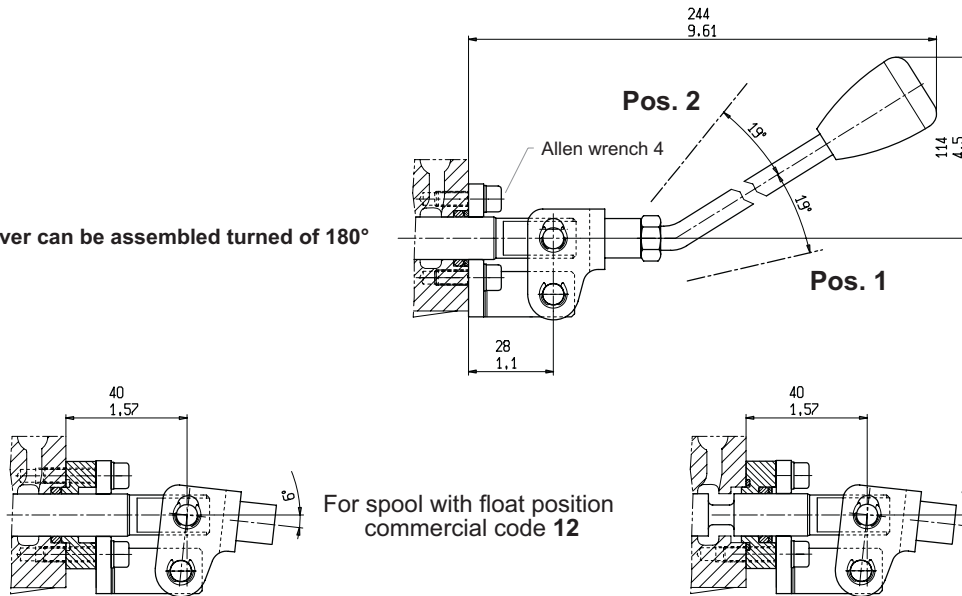
DIRECTIONAL CONTROL VALVE SECTIONAL TYPE

VD6A

PF

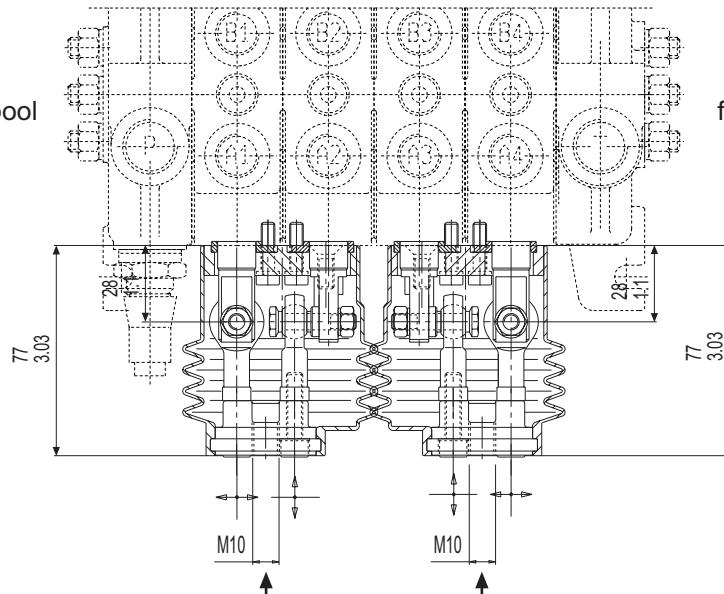
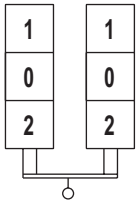
Not protected lever

This lever can be assembled turned of 180°

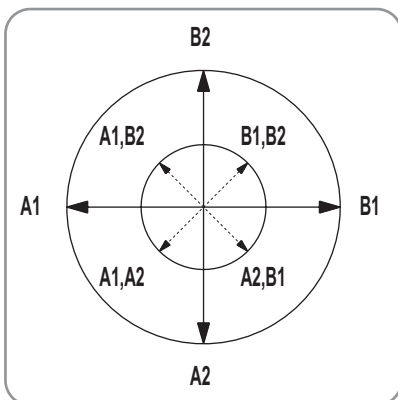


L2

Cross lever for 2 spools
fulcrum on down-stream spool

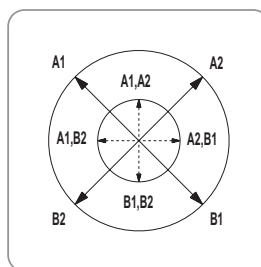


Standard movements
from the operator's reference point



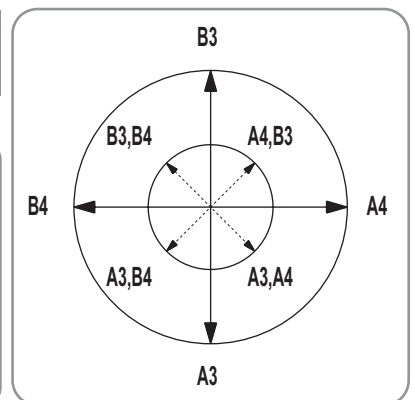
LX2

X movements direction
from the operator's
reference point



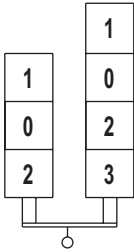
LX1

Standard movements
from the operator's reference point

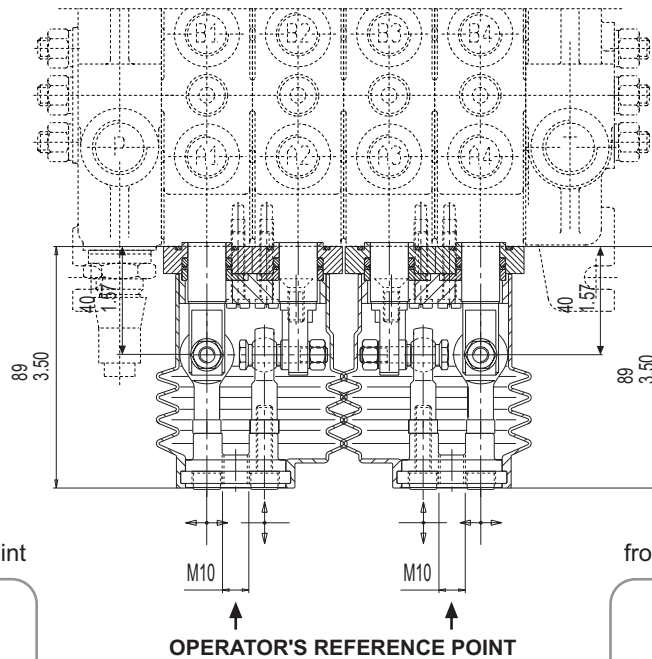
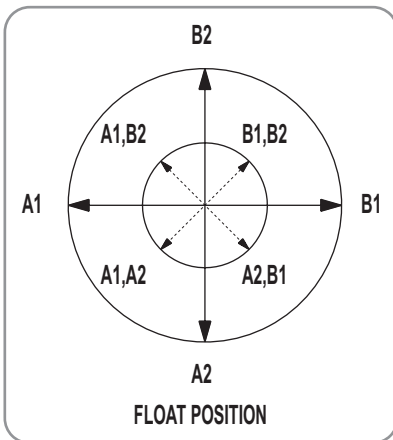


L4

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

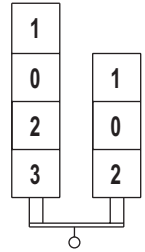


Standard movements
from the operator's reference point

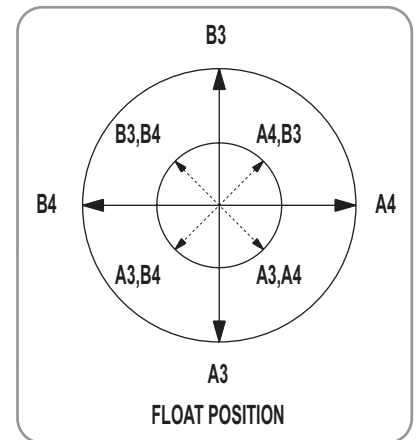


L3

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



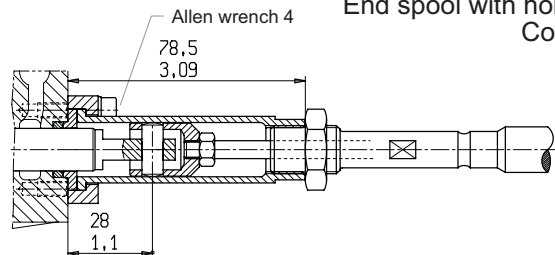
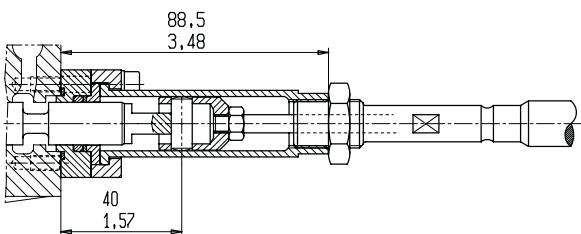
IMPORTANT

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.

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

TC

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



End spool with hole ϕ 7 mm.
Controls side



DIRECTIONAL CONTROL VALVE SECTIONAL TYPE

VD6A

E7

Working conditions for this control:

Flows up to 30 l/min (8 gpm)
Pressure up to 190bar (2750si)

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 (18gpm)
Pressure up to 2190ar (302750i)

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)

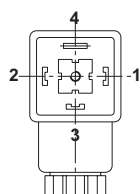
Electric push-pull control 3 positions
12 Vdc (coil power 45 Watt at 20°C)

E10

Working conditions for this control:

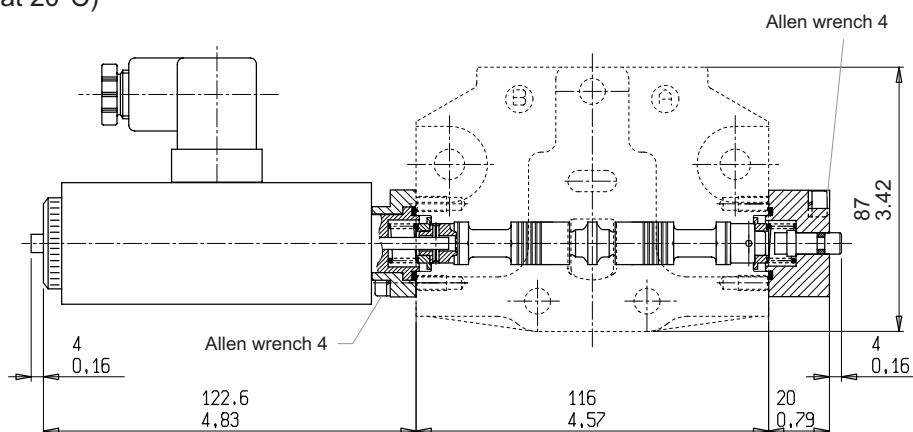
Flows up to 40 l/min (10.6 gpm)
Pressure up to 210 bar (3050 psi)

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)



SL

Without lever for electric push-pull control with override device

ES

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)

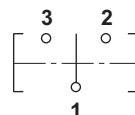
E12

Working conditions for this control:

Flows up to 50 l/min (13.2 gpm)
Pressure up to 210 bar (3050 psi)

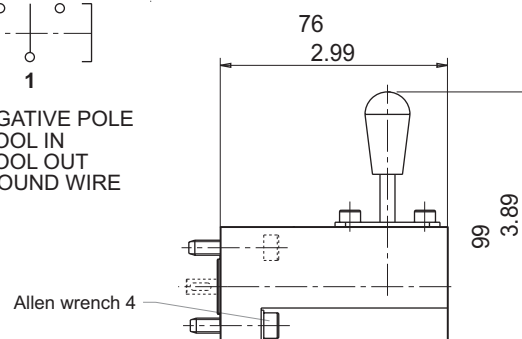
Electric push-pull control 3 positions
24 Vdc (coil power 60 Watt at 20°C)

ELECTRIC CONNECTIONS SCHEME



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

Emergency lever for electric push-pull control



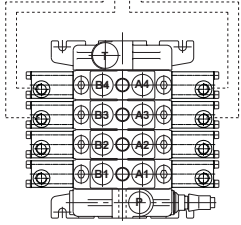
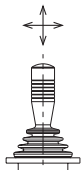
Important: this lever was realized as emergency lever and it'snot recommended a continuous use.

IP

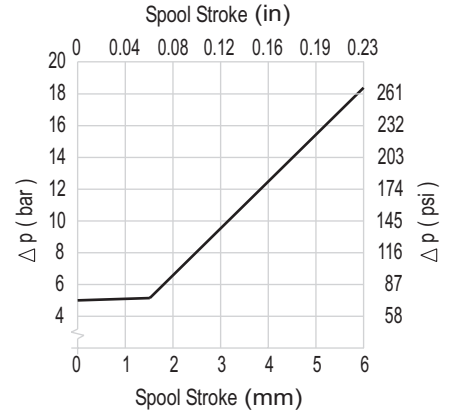
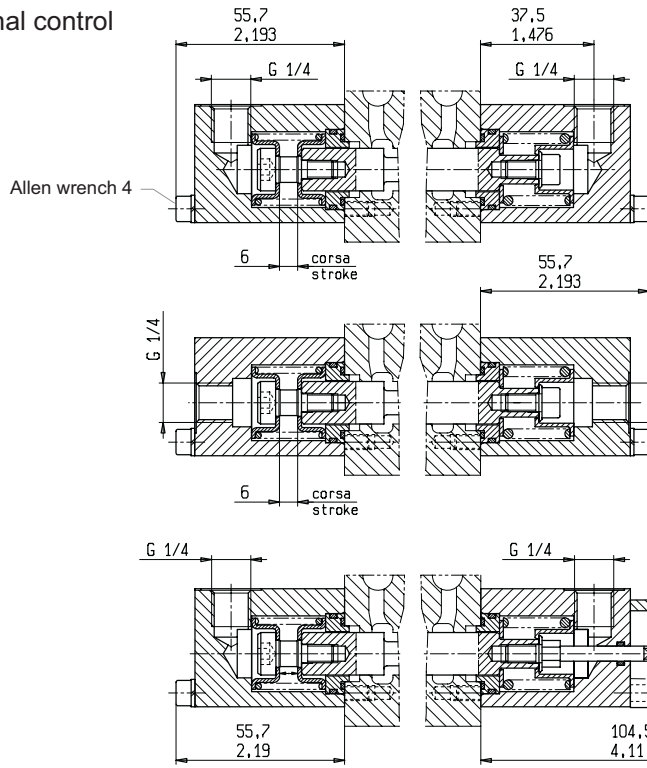
Hydraulic proportional control



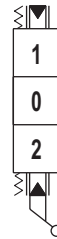
Salami hydraulic
2 axis joystick



Important:
when you order please specify top or side ports



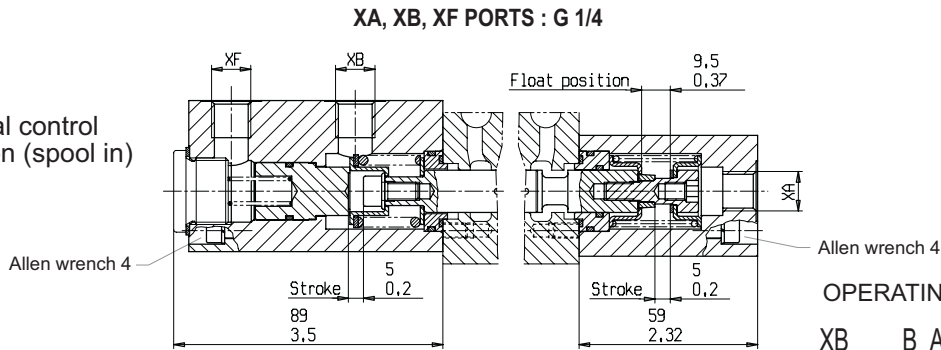
Hydraulic proportional control with emergency lever.
Available for q.ty please get in touch with our sales dept.



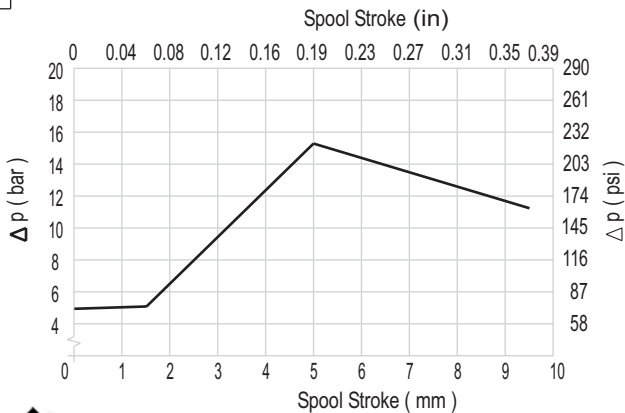
For more information please consult our catalogue SHRC hydraulic remote controls.

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

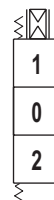
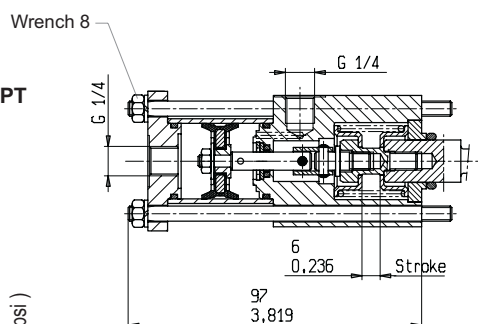
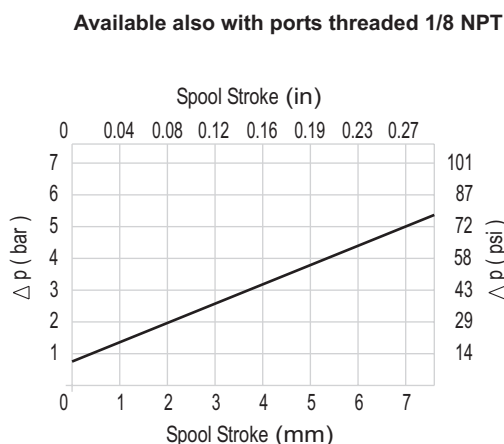
DIRECTIONAL CONTROL VALVE SECTIONAL TYPE

VD6A

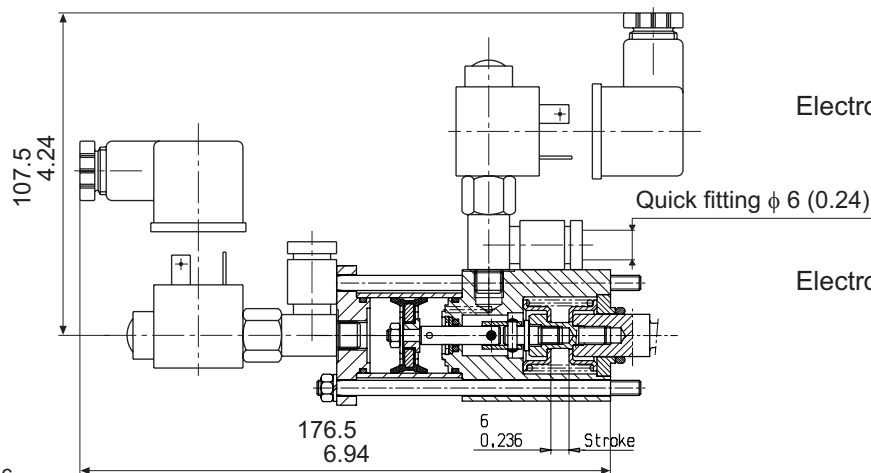
Thought for all truck hydraulic applications

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.

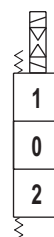


P1

Electro-pneumatic on-off control - 12 Vdc

P2

Electro-pneumatic on-off control - 24 Vdc

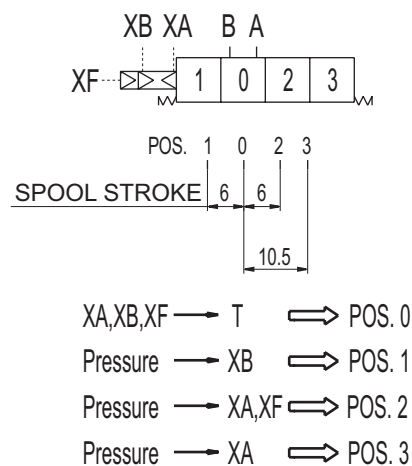


ELECTRICAL DATA

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

Starting from PP/P0 adding the electro-valves you get P1 or P2

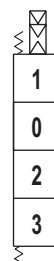
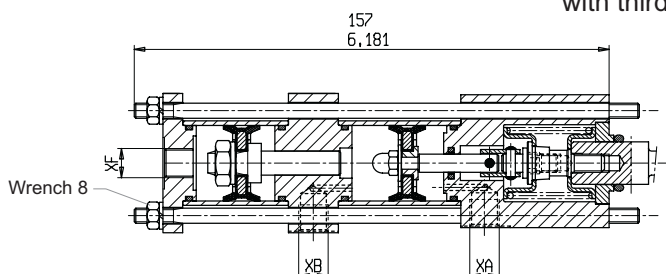
OPERATING SCHEME



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.

Preliminary specifications about electro-hydraulic controls

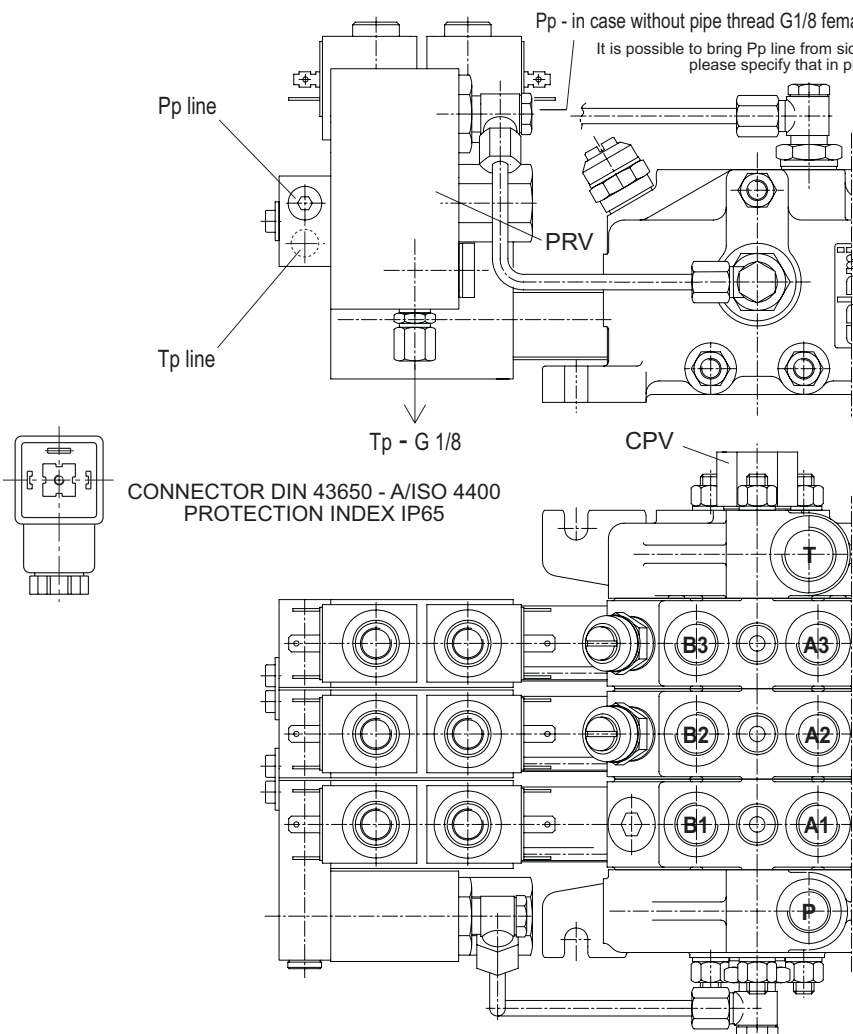
Before to introduce electro-hydraulic single modules it is necessary to specify the adding hydraulic components necessary for the right functioning of it. As you can see in the drawing and hydraulic scheme it needs a pressure reducing valve "PRV" at the inlet of piloting circuit that reduce the pressure 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 obtained also with external standard valves made by valve manufacturers, 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 26, "OUTLET MODULES", the outlet U8 is shown in the hydraulic scheme here below, remember that with a special sleeve instead of "CPV" valve you can change U8 in a power beyond outlet type "U5".



INDEX

PRV - pressure reducing valve

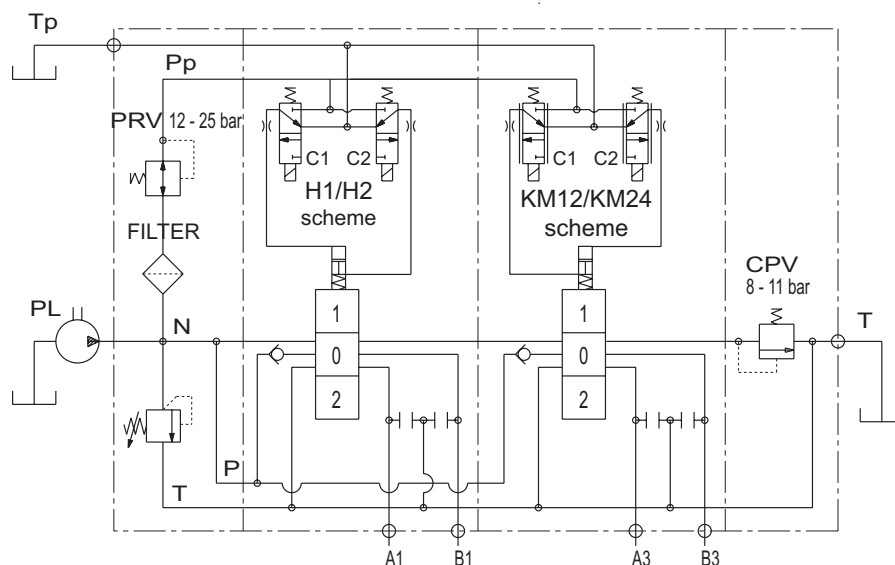
CPV - counter pressure valve

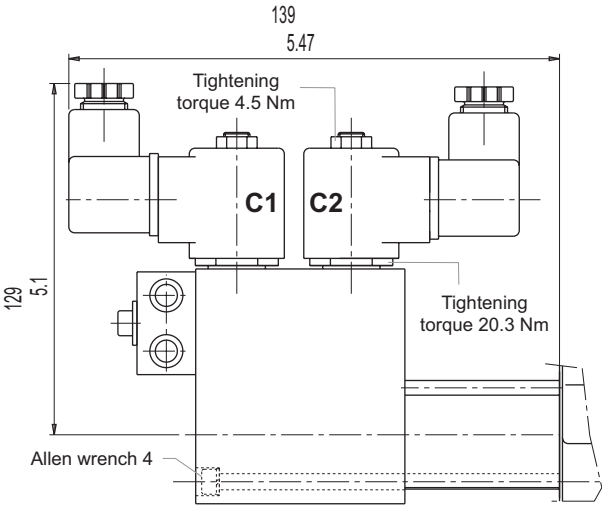
Pp - pressure piloting line

Tp - tank piloting line

P - P port

T - T port





OPERATING INSTRUCTIONS
please see the hydraulic circuit
of page before

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

TECHNICAL DATA

- | | |
|-----------------------|-------------|
| - MAX PRESSURE IN "P" | 70 bar |
| - MAX FLOW | 11 l/min |
| - AVAILABLE VOLTAGE | 12 - 24 Vcc |
| - POWER | 18 W (20°C) |

H1

ON-OFF
electro-hydraulic control
12 Vdc

H2

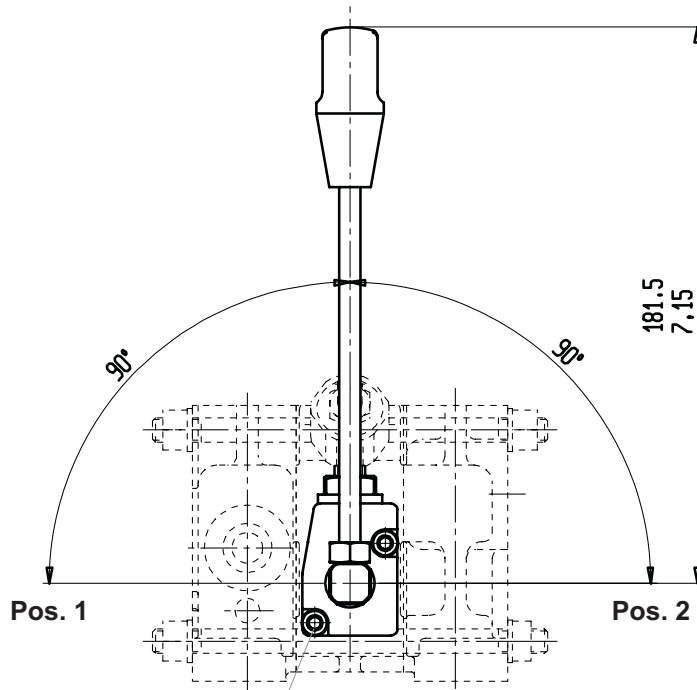
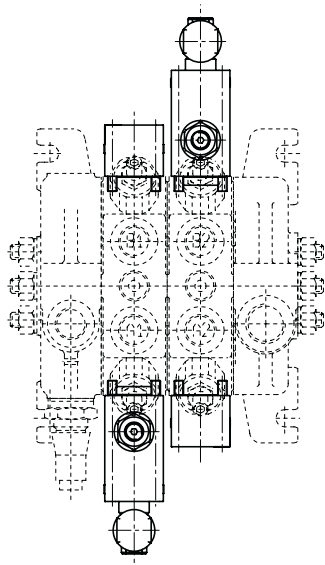
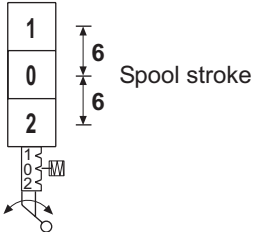
ON-OFF
electro-hydraulic control
24 Vdc

CR

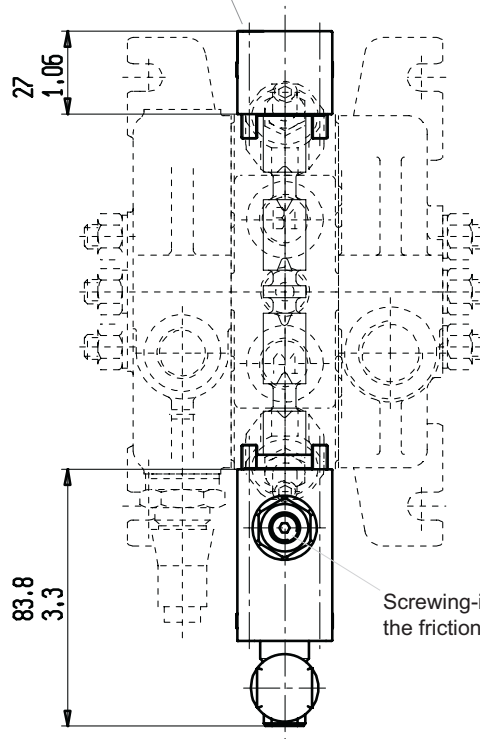
Rotary control, available for 1 working section or two working section but one at the opposite side of the other.
This device was realized for marine applications, so all the material components are corrosion proofing.

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



Allen wrench 4

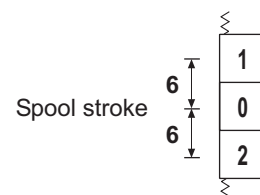
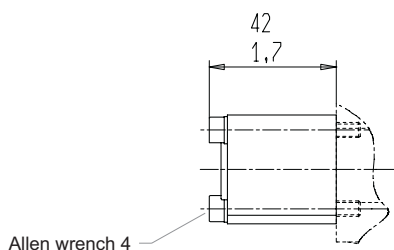


Screwing-in the socket hexagon 3 mm dowel,
the friction detent increase

SPOOL POSITIONINGS

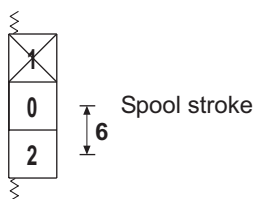
C2

Spring centered to neutral position



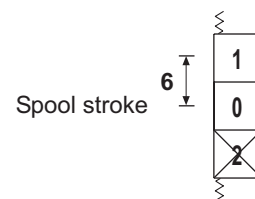
C5

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



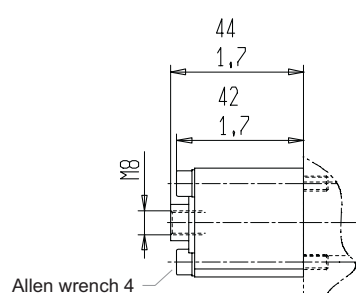
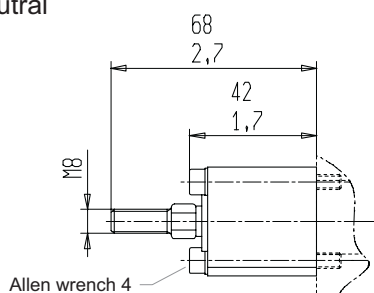
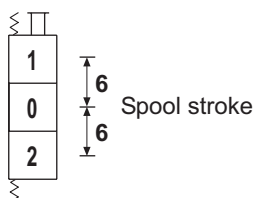
C6

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



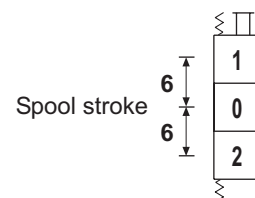
C3

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



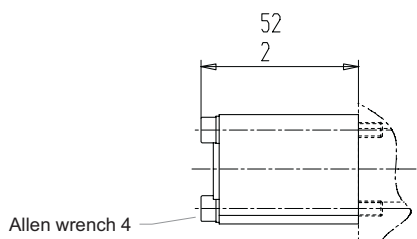
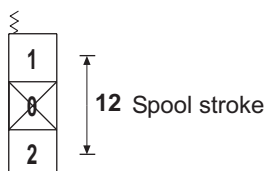
C4

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



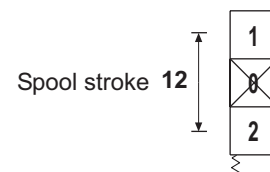
C7

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



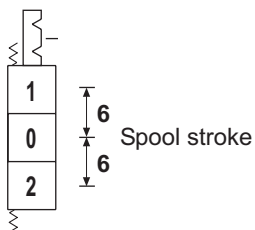
C8

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



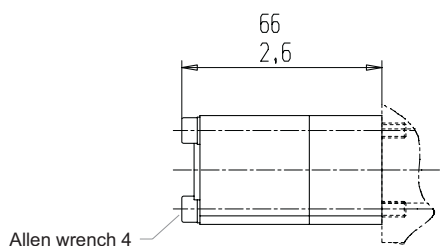
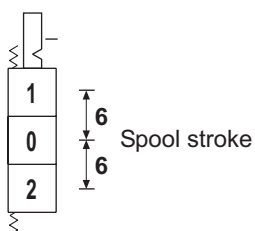
R2

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



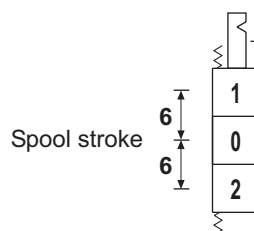
R5

Detent on pos. 2
with spring return in neutral



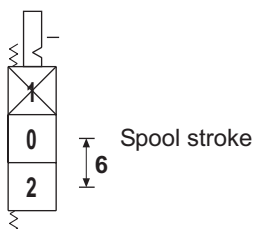
R4

Detent on pos. 1
with spring return in neutral



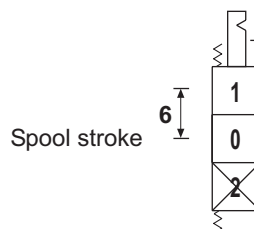
R6

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



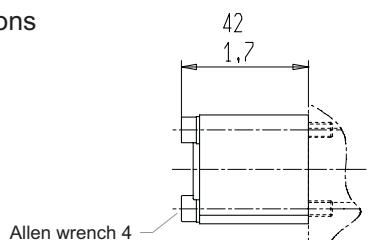
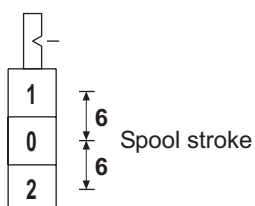
R7

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



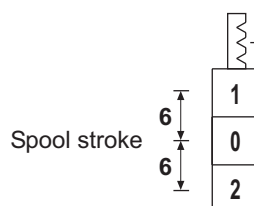
CO

Detent on each intermediate positions



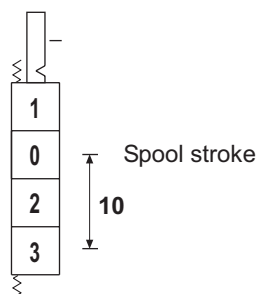
R9

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



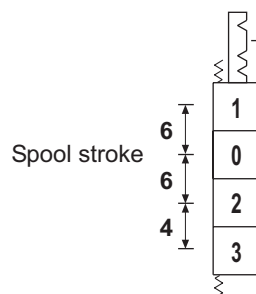
F1

Detent on pos. 3
with spring return in neutral



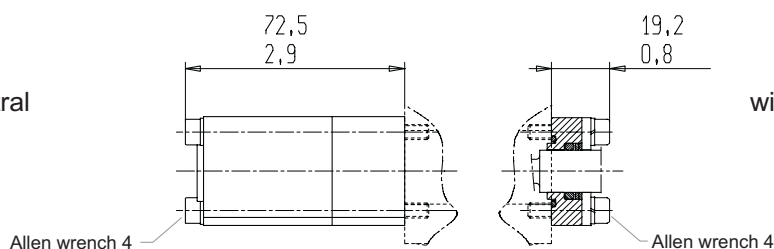
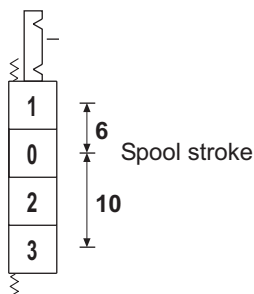
F2

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



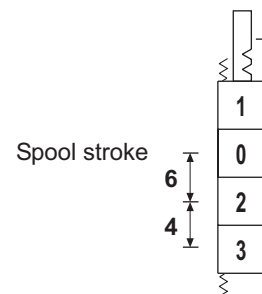
F3

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



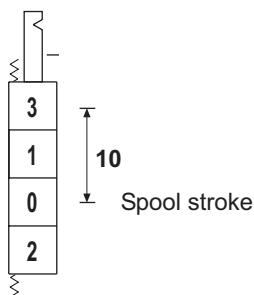
F4

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

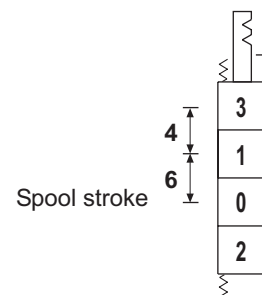


F5

Detent on pos. 3
with spring return in neutral

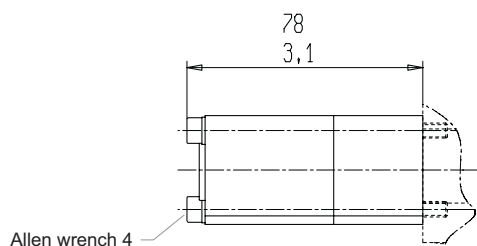
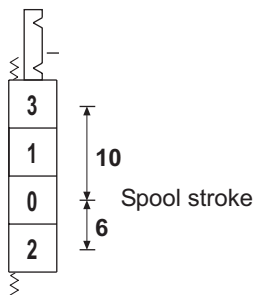


Detent on pos. 1/pos. 3
with spring return in neutral



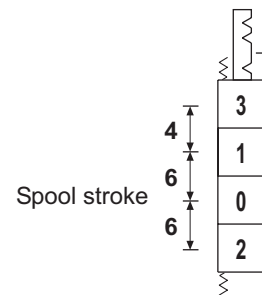
F7

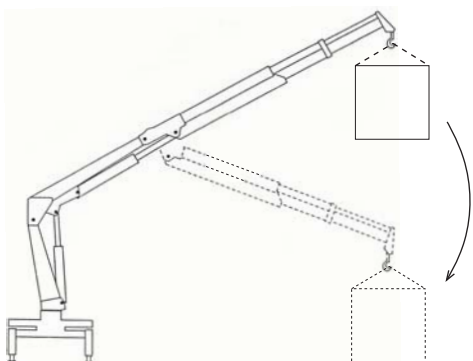
Detent on pos. 2/pos. 3
with spring return in neutral



F8

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



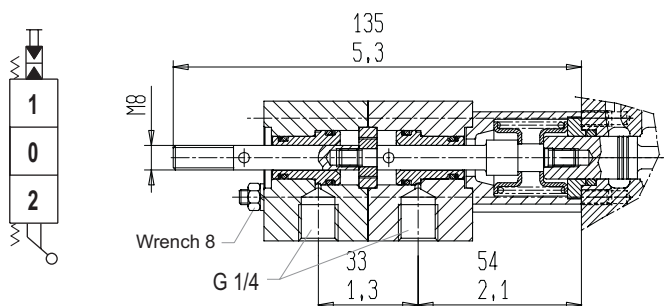


For manufacturers using load and overturning torque limiting device for hydraulically operated cranes, Salami VD6A valve is available with some devices that allow the manufacturer to supply a pressure signal inside itself. This pressure signal, acting on the area of a piston of 18 mm (0.71 inc.) diameter, 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.

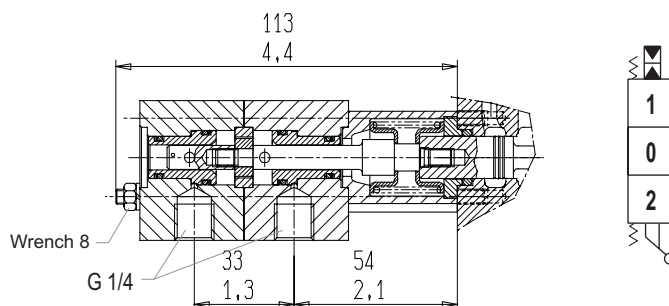
D9

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



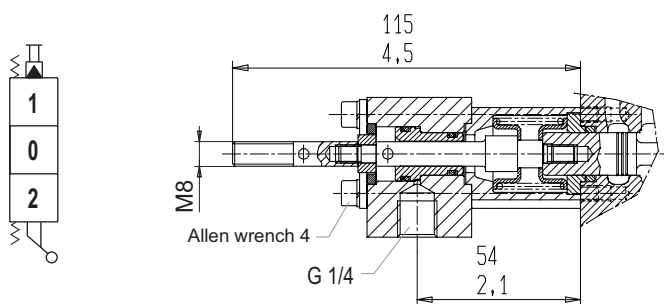
Device for spool positioning in 0 from the positions 1 and 2 by an external pressure signal.

M3



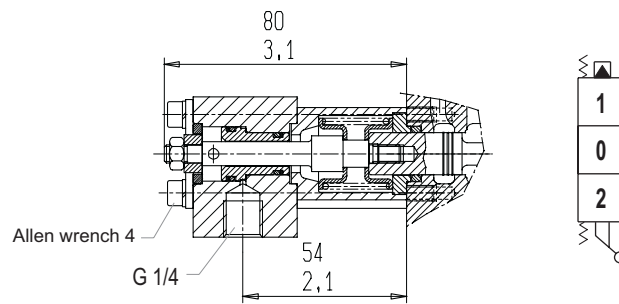
D8

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



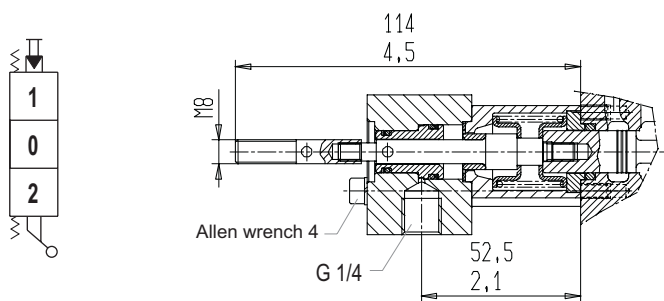
Device for spool positioning in 0 from the position 1 by an external pressure signal.

M1



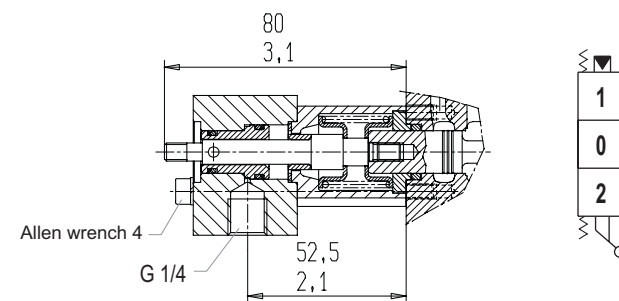
D7

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



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

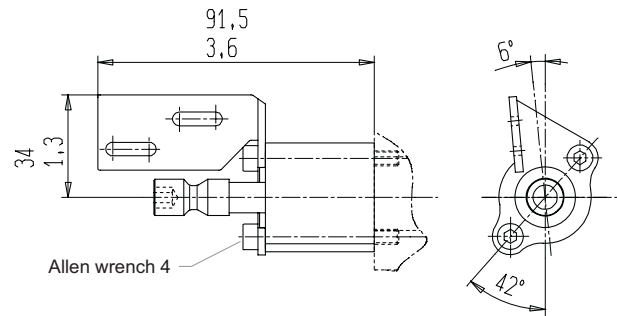
M2



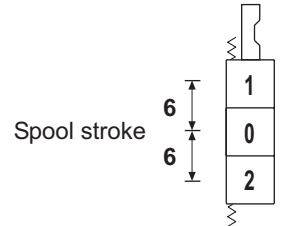
DIRECTIONAL CONTROL VALVE SECTIONAL TYPE

VD6A

CE



Pre-arrangement for electrical device

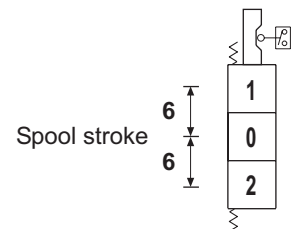
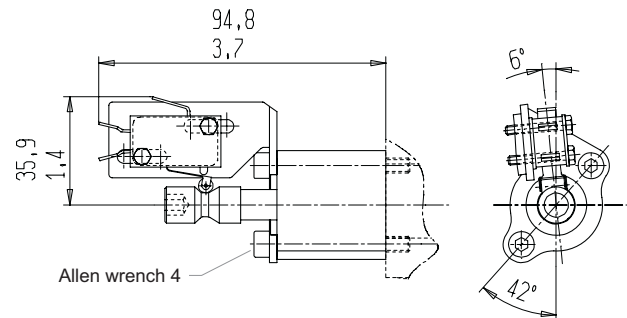


MICROSWITCH TYPE: SAIA - BURGESS XGK - 88

For more information please get in touch with our sales dept.

CM

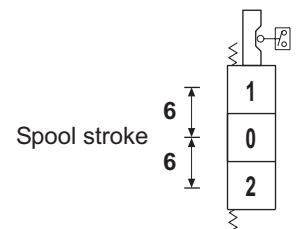
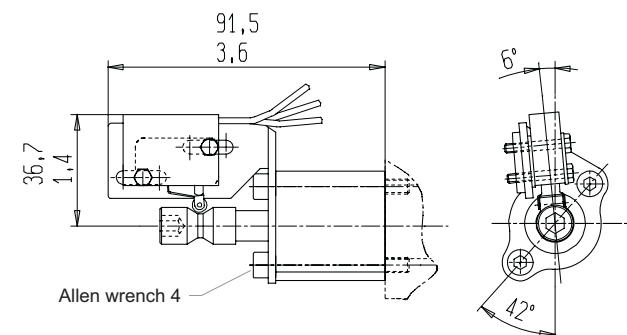
Spool positioning with microswitch to start an electric motor (available also for single acting spools)



PROTECTION INDEX
IP65

CW

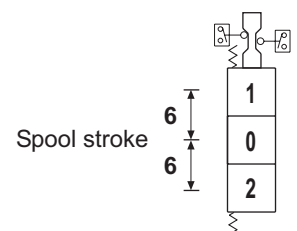
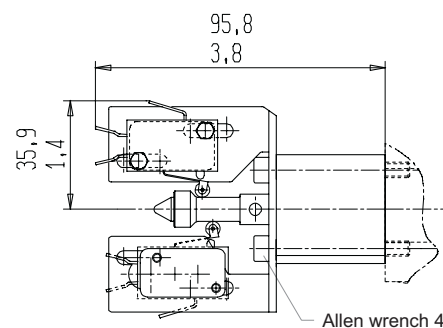
Spool positioning with waterproof microswitch to start an electric motor (available also for single acting spools)



PROTECTION INDEX
IP67

CD

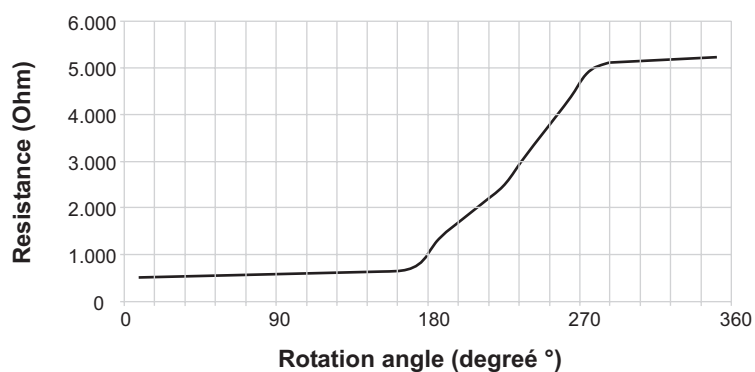
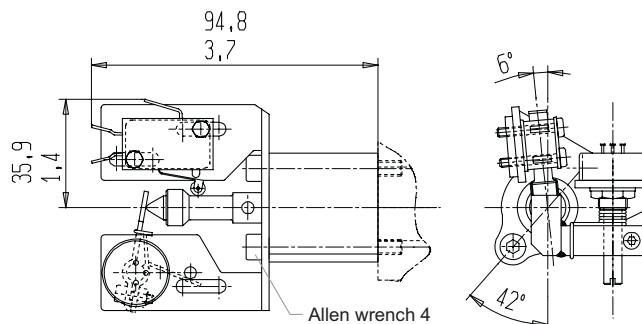
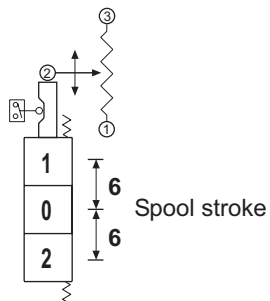
Spool positioning with double microswitch (available also for single acting spools)



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)



DIRECTIONAL CONTROL VALVE SECTIONAL TYPE

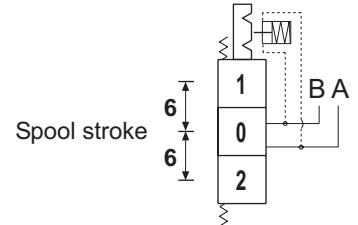
VD6A

IMPORTANT:

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

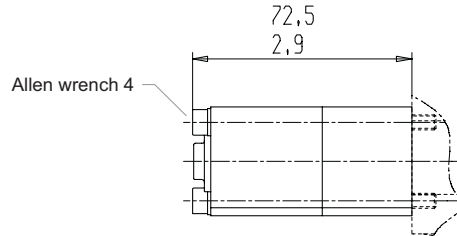
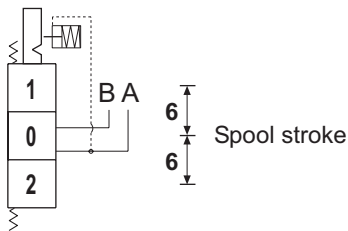
G2

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



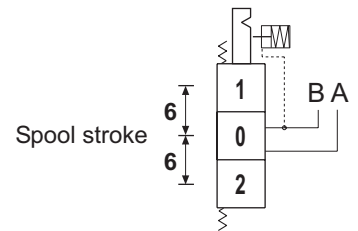
G5

Detent on pos. 2
with hydraulic kick-out



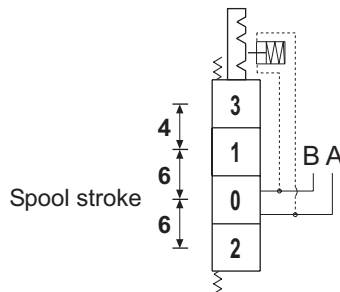
G4

Detent on pos. 1
with hydraulic kick-out



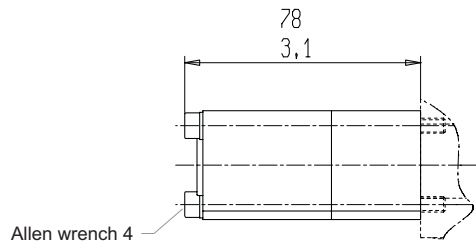
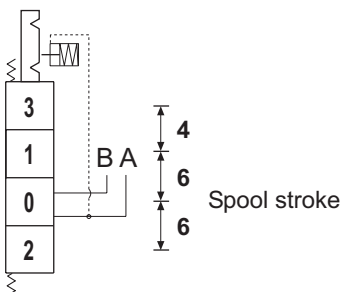
G6

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



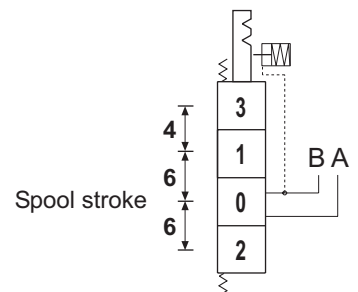
G8

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



VD6A 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 / I2 G G U1

INLET CONFIGURATION
See from page 10 to 15

MAIN RELIEF VALVE (PAG. 30)
D Direct main relief valve
W Without main relief valve

MAIN RELIEF VALVE SETTING (bar)
See page 30

VENTING VALVE
See page 31

**NUMBER OF IDENTICAL
CONSECUTIVE SECTIONS**

WORKING MODULES - CIRCUIT TYPE (PAG. 16 - 21)	
P	Parallel circuit working module (page 16)
S	Series circuit working module (page 17)
T	Tandem circuit working module (page 18)
P*	Paral. circ. working mod. for inlet with priority flow valve (page 19)
T*	Tandem circ. working mod. for inlet with priority flow valve (page 19)
P	Paral. circ. double working mod. with load check valve VUM (page 20)
T	Tandem circ. double working mod. with load check valve VUM (page 21)

SPOOL TYPES (PAG. 28 - 29)	
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. 28)	
A	Nominal flow
C	2/3 of the nominal flow

AUXILIARY VALVES (PAG. 32 - 34)	
VA	Adjustable overload valve (available settings at page 32)
AR	Adjustable overload and anti-cavitation valve (available settings at page 32)
VR	Anti-cavitation valve (page 32)
CV	Conversion valve (page 33)
PR	Pre-arrangement for auxiliary valve (page 34)
ST	Flow restrictor P ® A/B (page 34)
SP	Flow restrictor A/B ® T (page 34)
EV..	Electric venting valve (page 33)
EHV	External piloted venting valve (page 33)

PORTS (PAG. 9)	
G	GAS threaded
S	SAE threaded
M*	METRIC threaded
G*	JIS B 2351 threaded

MID INLET AND OUTLET CONFIGURATION
See hydraulic scheme and commercial codes of page 22 - 25

OUTLET CONFIGURATION
See hydraulic scheme and commercial codes of page 26

SPOOL POSITIONINGS	
Page 45	C2 - C3 - C4 - C5 - C6 - C7 - C8
Page 46	R2- R4 - R5 - R6 - R7 - R9 - C0
Page 47	F1 - F2 - F3 - F4 - F5 - F6 - F7 - F8
Page 48	D7 - D8 - D9 - M1 - M2 - M3
Page 49 - 50	CE - CM - CW - CD - PM
Page 51	G2 - G4 - G5 - G6 - G7 - G8

CONTROL SIDE (PAGE 35)

SPOOL CONTROLS	
	Without lever box page 36 - SL
	Handle controls from page 36 to 38
	NL - MP - PF - L1/L2 - LX1/LX2 - L1*/L2*
	Device for cable remote control page 39
	TC
	Direct electric control and emergency device page 39
	E7 - E8 - E9 - E10 - E11 - E12 - ES - SL
	Hydraulic controls page 40
	IP - IF
	Pneumatic and electro-pneumatic controls page 41
	PP/P0 - P1/P2 - PQ
	Electro-hydraulic controls pages 42 - 43
	H1/H2
	Device with cam and adjustable friction detent + rotary lever (page 44)
	CR

PORT ON WHICH THE VALVE IS MOUNTED (page 35)

For KM proportional electro-hydraulic controls
Please contact our technical dept.

*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 traceability of the product), we have adopted a new identification label starting from the 1st march 1995. Pls, see following example:

A			
B			
C		D	
E	sa ami	F	G

A = Product short description (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:



SALAMI 09/02
MADE IN ITALY 4010998
612271211 nr. 13
2PB 19S B25 B5

Product short description. _____
Salami part number and progressive number of assembling. _____
Production code (for Salami management). _____
Month and year of made: maybe in the future you can find this
type of production date in the label beside too. _____
Rotation sense. _____

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, overloading, 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) months 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 direct, indirect 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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telefax +39-0444-240204
salami.italia@salami.it



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telefax +34-93-6667826
info@salamispain.com



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69120 Vaux en Velin
Lyon
telefono +33-04-78809941
telefax +33-04-78803669
e.pasian@wanadoo.fr

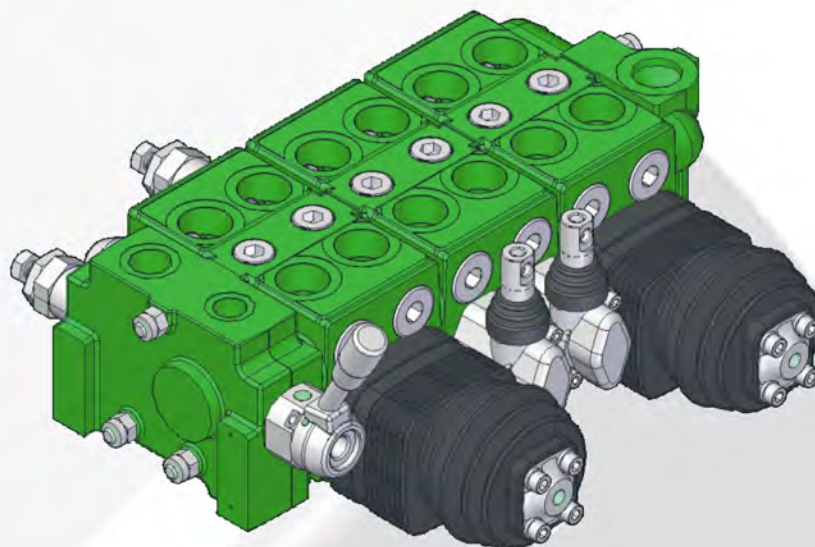


149 S0. Chenango St. Ext.,
GREEN, NY 13778
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Fax.: +1-607-6565704
info@salamihydraulics.com

SECTIONAL VALVE

VD8A

Technical catalogue



E0.06.0911.02.02

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

salam  TM

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Page 3 - Technical data - Working conditions
Page 4 - Operating principle
Page 5 - Hydraulic fluids - Installation - Filtration - Pipes
Page 6 - Performance data - Metering curves - Valve working limit
Page 7 - Performance data - Pressure drop "P" to "T" - Pressure drop "P" to "A/B" and "A/B" to "T"
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Page 9 - Ports
Page 10 - Inlet module (hydraulic circuits)
Page 11 - Inlet module (dimensions)
Page 12 - Inlet module with priority flow valve adjustable by power steering load
Page 13 - Inlet module with priority flow valve (fixed priority flow)
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Page 16 - Working module with adjustable or fixed priority flow valve pressure compensated
Page 17 - Single and double working module (series circuit)
Page 18 - Working module (tandem circuit)
Page 19 - Mid inlet module (hydraulic circuits)
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Page 25 - Venting valves (available as auxiliary valve too)
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Page 31 - Spool controls - SS - FL
Page 32 - Spool controls - L1/L2 - Standard shafts
Page 33 - Cable remote controls - D1 - TC
Page 33 - Direct electric push-pull control and emergency devices - E1/E2 - SL - ES
Page 34 - Hydraulic controls - IP - IF
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Page 41 - Spool positionings - D7 - D8 - D9 - M1 - M2 - M3
Page 42 - Spool positionings - CE - CM - CW - CD
Page 43 - Spool positionings - PM - G2 - G4 - G5
Page 44 - 45 - How to order - VD8A
Page 46 - Identification label
Page 47 - WARRANTY

E0.06.0911.02.02

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 department.

GENERAL FEATURES

Among all hydraulic directional control valves used in the field of mobile equipment applications, the spool valve is the most popular.

The sectional valve type allows construction flexibility. Salami VD8A directional control valve is modular construction and consist of an inlet section, up to 8 working modules and an outlet section. All these elements are secured in one block by means of tie-rods. (For more than 8 working modules please contact our sales dept.)

FEATURES

VD8A directional control valve has the following:

- cast-iron body (inlet section, working section, outlet section)
- parallel circuit, load check valve protection on each section
- series circuit, load check valve protection on each section (possibility of 2nd load check valve on series line)
- tandem circuit, load check valve protection on each section
- several types of mid modules
- 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
- interchangeability 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 and external piloted venting 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 (available also as venting valve for the ports A and B)
- 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: returns the spool 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

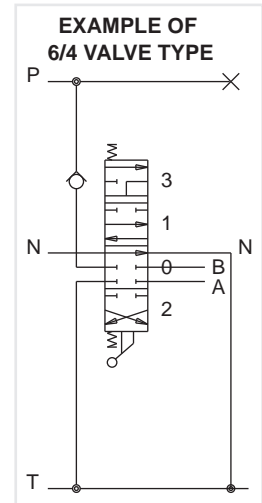
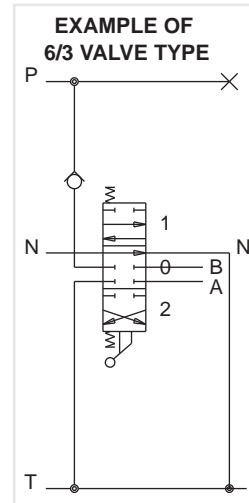
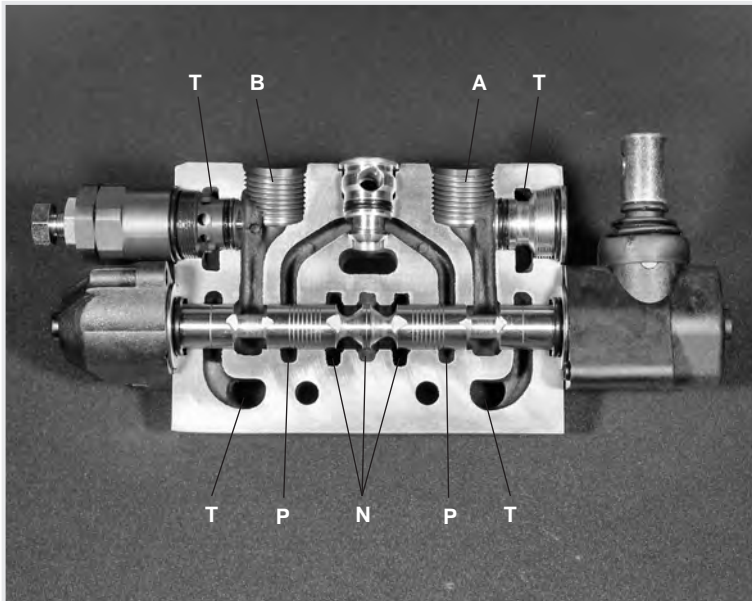
Spools	from 1 to 8 (for more working modules pls. contact our sales department)		
Nominal flow	Q	75 l/min	(20 gpm US)
Max flow*		90 l/min	(24 gpm US)
Max pressure	port P	350 bar	(5100 psi)
	ports A/B	350 bar	(5100 psi)
	port T*	25 bar	(363 psi)
Internal leakage at 160 bar (2285 psi)	ports A/B → T	25 ÷ 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 control - spool 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



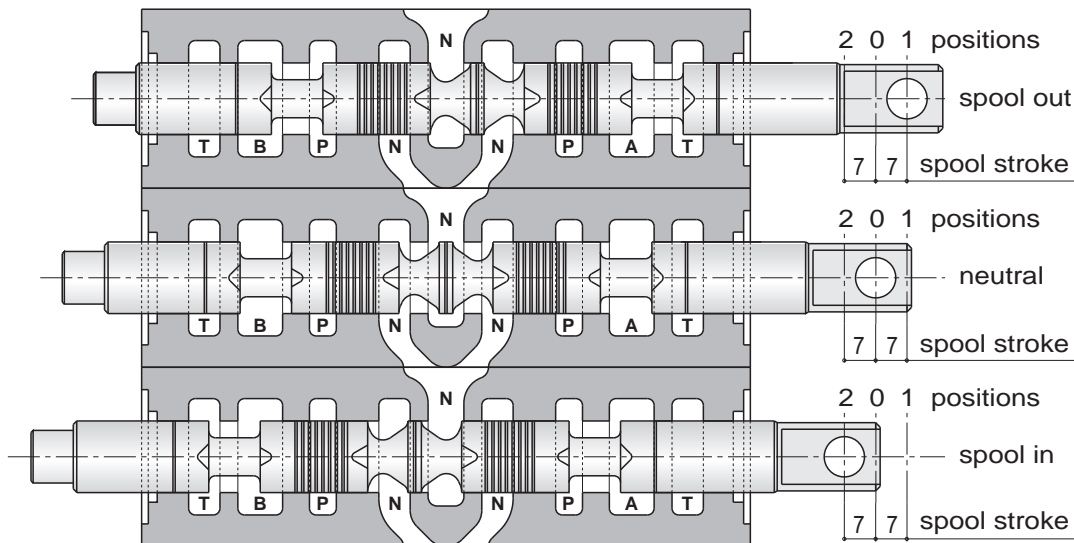
The picture show the P working module with the paths N - P - A - B - T.

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 (approximately 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. Depending 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 VD8A 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 3/4	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
3 ÷ 5 m/sec

inlet pipe
outlet pipe

19,7 ÷ 32,8 ft/sec
9,9 ÷ 16,4 ft/sec

inlet pipe
outlet pipe

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

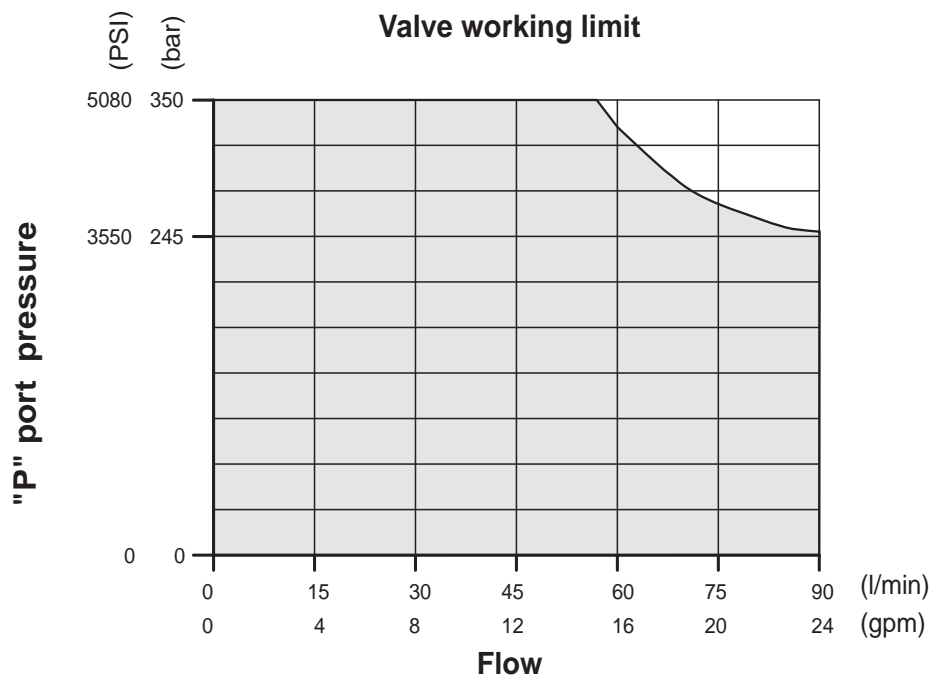
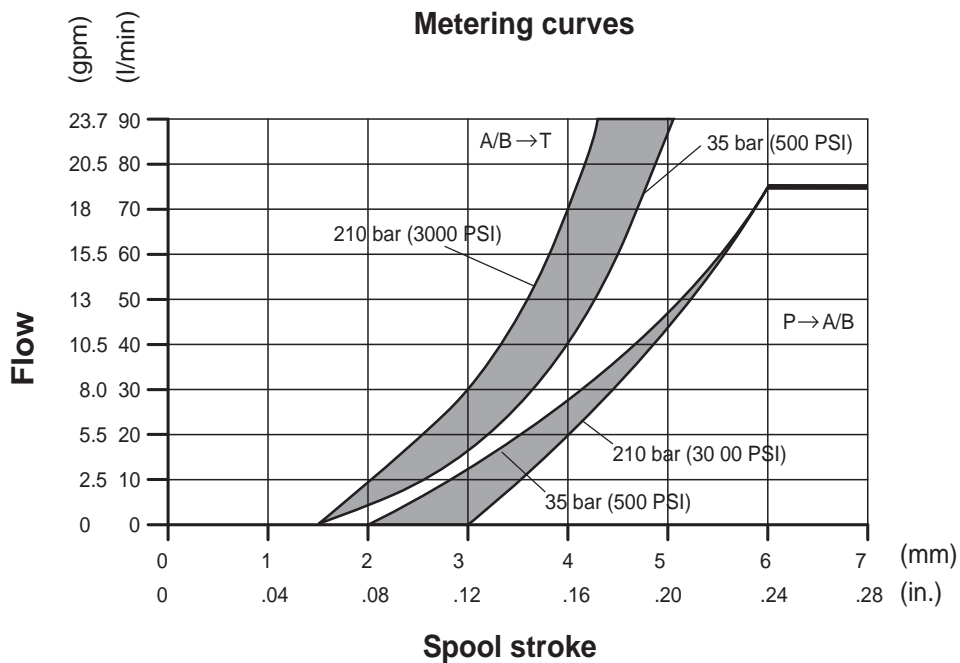
$$* [v = \frac{21,2 \times Q}{d^2}]$$

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

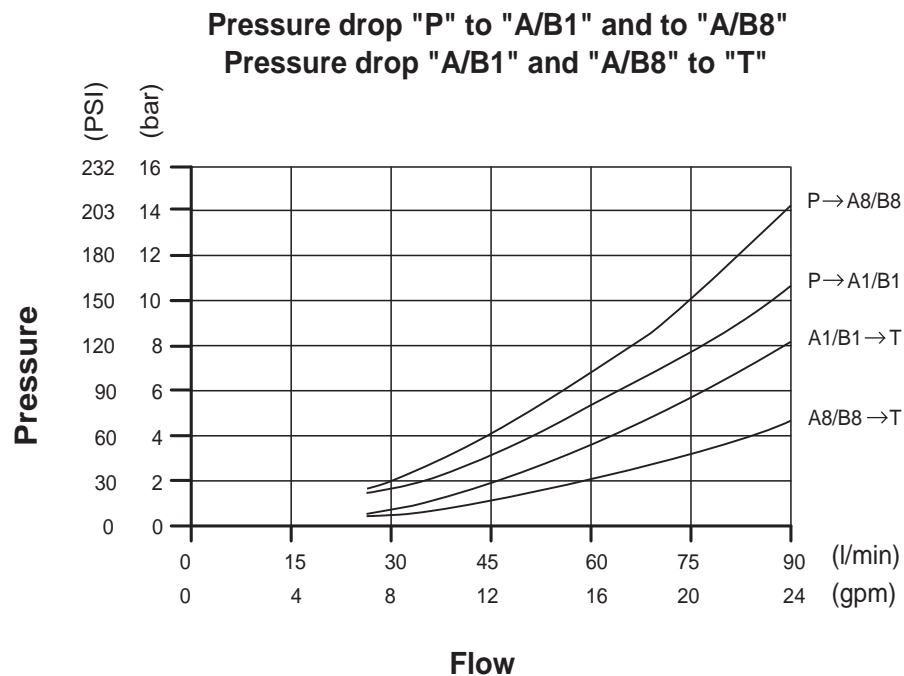
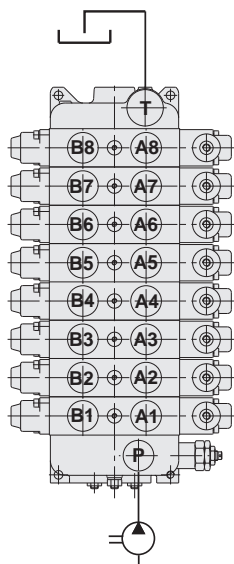
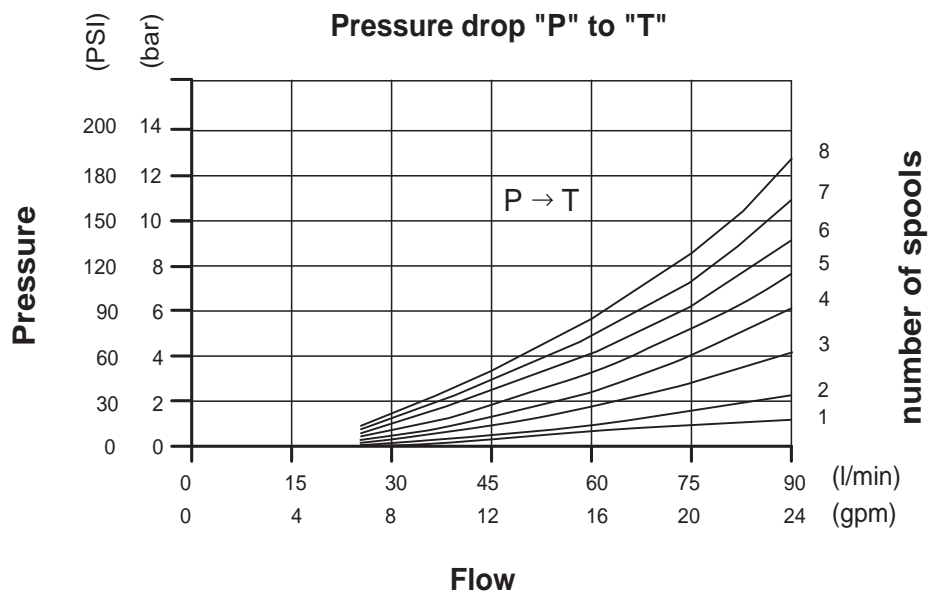
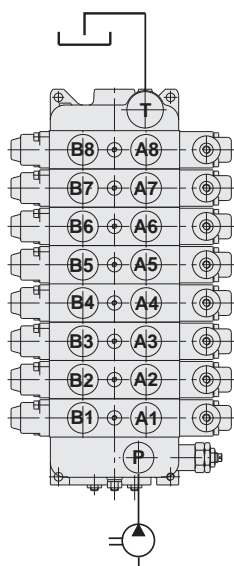


The data of this diagram have been obtained with a force of:
stroke beginning 120 N - stroke end 180 N and standard leakage data.

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



DIMENSIONS FROM 1 TO 8 WORKING MODULES

FIXING HOLES THREADS:

PORTS THREADED BSP (ISO 228) - M8x1.25 ISO 262

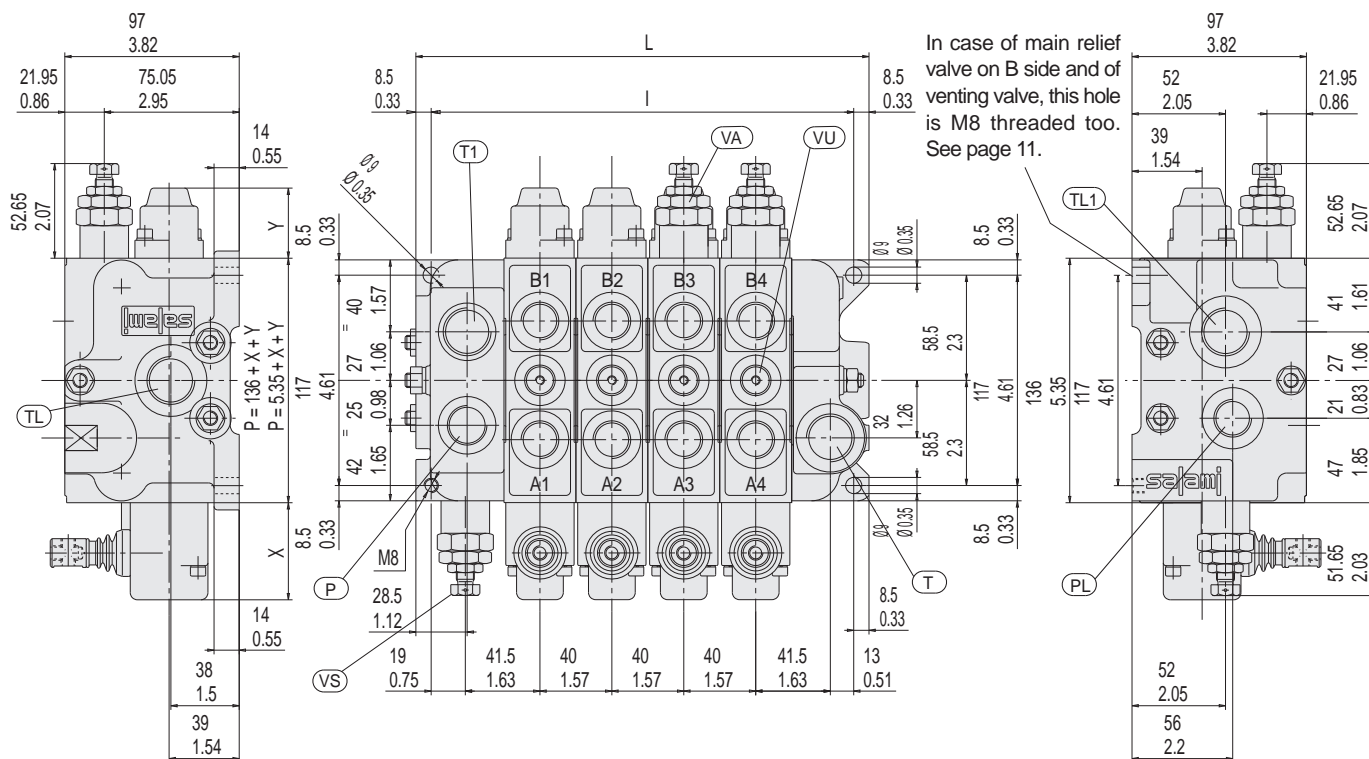
PORTS THREADED METRIC (ISO 262) - M8x1.25 ISO 262

PORTS THREADED SAE UN-UNF (ISO 725) - 5/16 18 UNC

PORTS THREADED BSPF O-RING BOSS (JIS B 2351) - M8x1.25 ISO 262

On request are available working modules with
distance between axis of 38 mm - 1.49 inch.

Please get in touch with our sales dept.



The drawing shown is just an example. The overall dimensions you read are valid for all the VD8A 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 which you have to add 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

T = top outlet port

TL = side outlet port

T1 = top outlet port*

TL1 = side outlet port*

A/B = work ports

VS = main relief valve (adjustable)

VA = overload valve

VU = load check valve

*Only in case of inlet and outlet first module
the end module is closed

Spools		1	2	3	4	5	6	7	8
I	mm	115	155	195	235	275	315	355	395
	in	4.53	6.10	7.68	9.25	10.83	12.40	13.97	15.55
L	mm	143.5	183.5	223.5	263.5	303.5	343.5	383.5	423.5
	in	5.65	7.22	8.80	10.37	11.95	13.52	15.10	16.67
Mass	kg	11	14.5	18	21.5	25	28.5	32	35.5
	lb	24.2	31.9	39.6	47.3	55	62.7	70.4	78.1

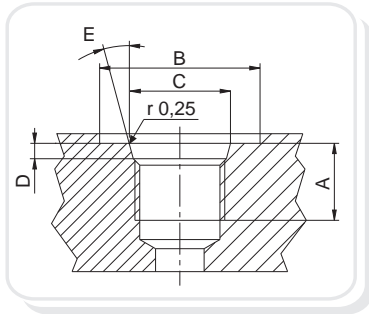
For different size and thread ports, please contact our sales department

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
BSPF JIS B 2351	G 1/2	G 3/4	G 1/2

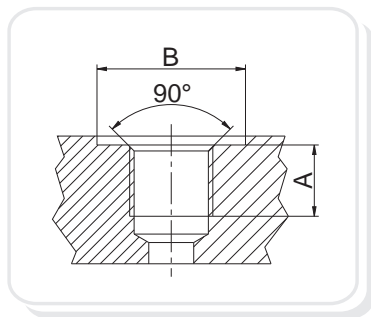
On request you can have all the ports **BSP ISO 228 - G 3/4**
in this case auxiliary valves are not available.

PORTS

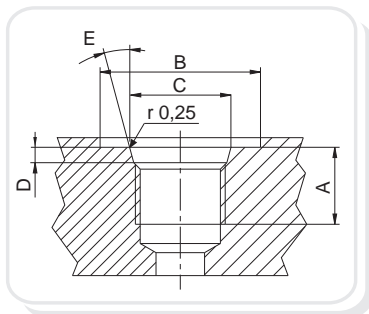
Following are standard ports. For different port types, please contact our sales department.



SAE UN-UNF (ISO 725)							
Dimensions		7/8 -14 UNF		1"1/16 -12 UN		1"5/16 -12 UN	
mm	In.	SAE10		SAE12		SAE16	
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°	

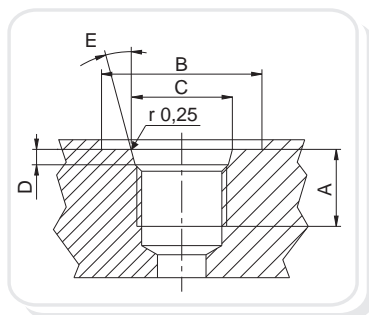


BSP (ISO 228)							
Dimensions		G1/2		G3/4		G1	
mm	In.						
A		16	0,63	18	0,71	20	0,79
B		27	1,06	33	1,30	40	1,57



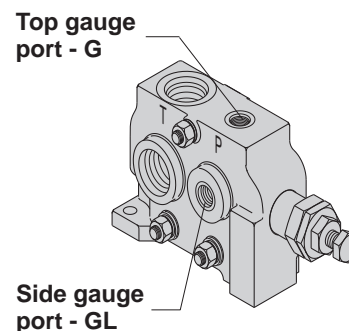
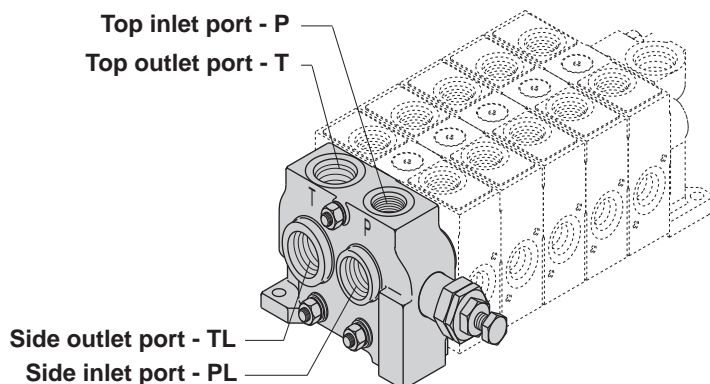
METRIC (ISO 262 - ISO 6149)*									
Dimensions		M22 x 1.5				M27 x 2			
mm	In.	ISO 262		ISO 6149		ISO 262		ISO 6149	
A		16	0,63	16	0,63	18	0,71	19	1,75
B		31,5	1,24	34	1,34	37,7	1,48	40	1,57
C				23,8	0,94			29,4	1,16
D				2,4	0,09			3,1	0,12

*Available for quantity, please contact our sales dept.



BSPF O-RING BOSS (JIS B 2351)							
Dimensions		G 1/2		G 3/4		G 1	
mm	In.						
A		16	0,63	17	0,67	21	0,83
B		34	1,34	45	1,77	51	2,01
C		22,6	0,89	29,8	1,17	35,8	1,41
D		2,5	0,10	3,5	0,14	3,5	0,14
E		15°		15°		15°	

INLET MODULE (HYDRAULIC CIRCUITS)

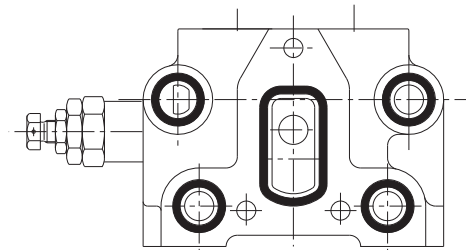
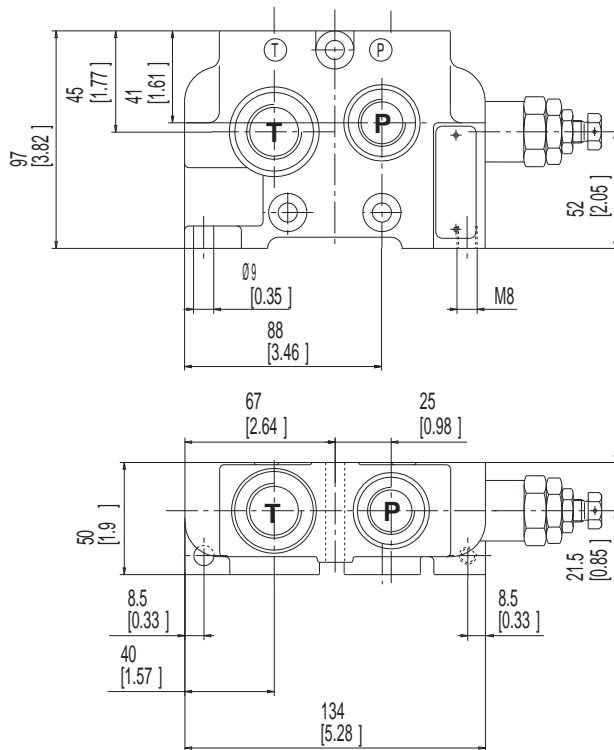


Gauge ports are available with the following threads:
BSP (ISO 228) - G 1/4
SAE UN-UNF (ISO725) - SAE 4

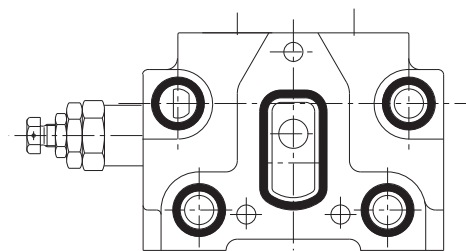
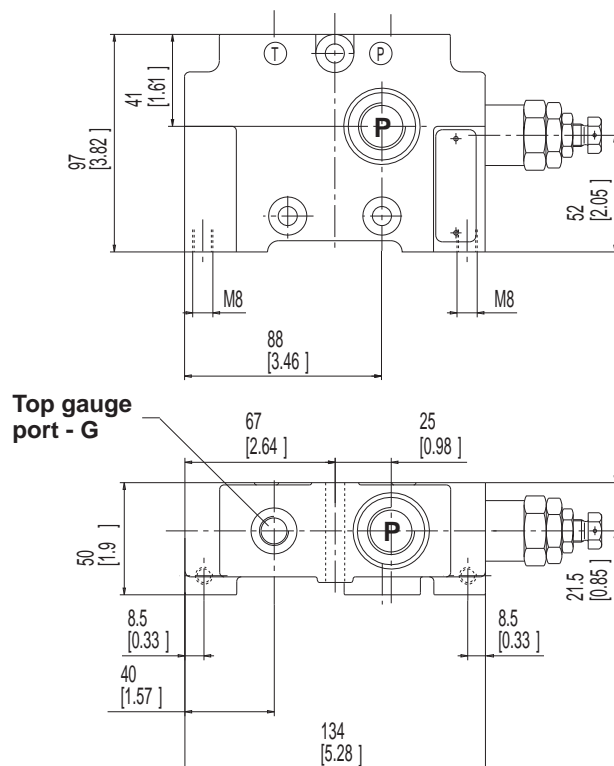
COMMERCIAL CODES

01 Top inlet port	02 Side inlet port top inlet port plugged	03 Top and side inlet ports	07 Top inlet and outlet ports	08 Side inlet and outlet ports top ports plugged
21 Top inlet port with side gauge port	22 Side inlet port with top gauge port	23 Top inlet port with top gauge port	27 Top inlet and outlet ports with side gauge port	28 Side inlet and outlet ports with top gauge port

**IN ALL THESE COMMERCIAL CODES PORT SIZE ARE SHOWN ON PAGE 8
PLEASE LOOK AT THE DIFFERENCES BETWEEN FIXING HOLES**



Inlet module:commercial codes
07 - 08 - 21 - 22 - 27 - 28
are built always with this dimensions drw.



Inlet module: commercial code 23 is built always with this dimensions drw. Moreover in case of venting valve or in case you need to put the main relief valve on "B" side this is the drawing.

INLET MODULE WITH PRIORITY FLOW VALVE ADJUSTABLE BY POWER STEERING LOAD

Top outlet port - T (41)

or

Top priority flow
outlet port - TPF (42)

Top inlet port - P

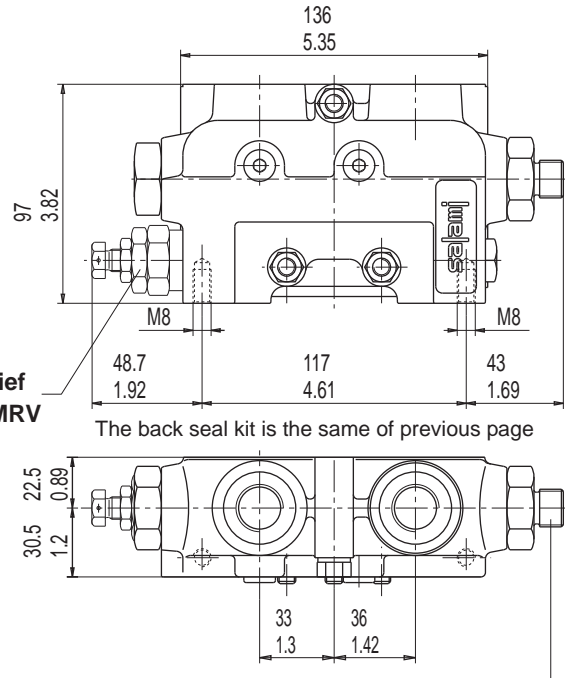
Inlet flow
gauge port - M

Priority flow
gauge port - PFGP

Priority flow port - PF

Priority flow
relief valve - PFRV

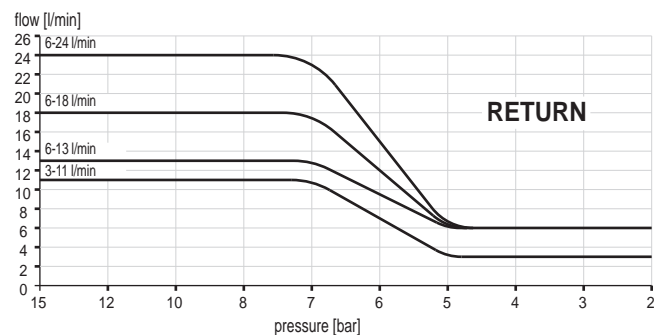
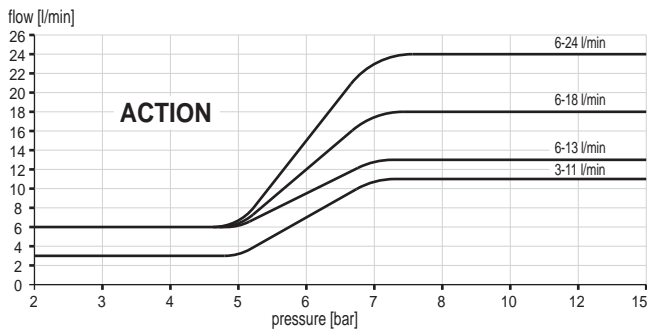
Main relief
valve - MRV



Priority flow port is available with
the following threads:

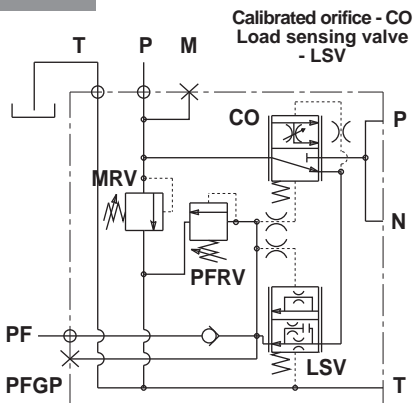
BSP (ISO 228) - G 1/4 or G 3/8
SAE UN-UNF (ISO 725) - SAE 4 or SAE 6

PORT SIZES	P	T	TPF
BSP ISO 228	G 1/2	G 3/4	G 3/8
BSP ISO 228	G 3/4	G 3/4	G 3/8
SAE ISO 176	SAE#10 7/8 - 14 UNF	SAE#10 7/8 - 14 UNF	SAE#6 9/16-18 UNF



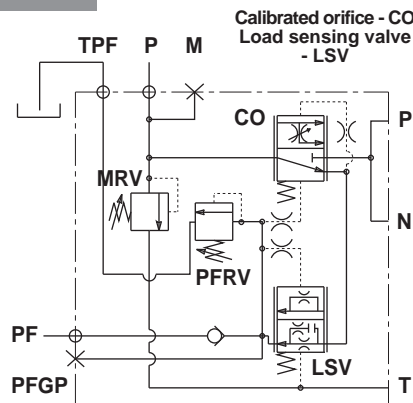
41

Top inlet and outlet ports
priority flow outlet port



42

Top inlet port and
priority flow outlet port

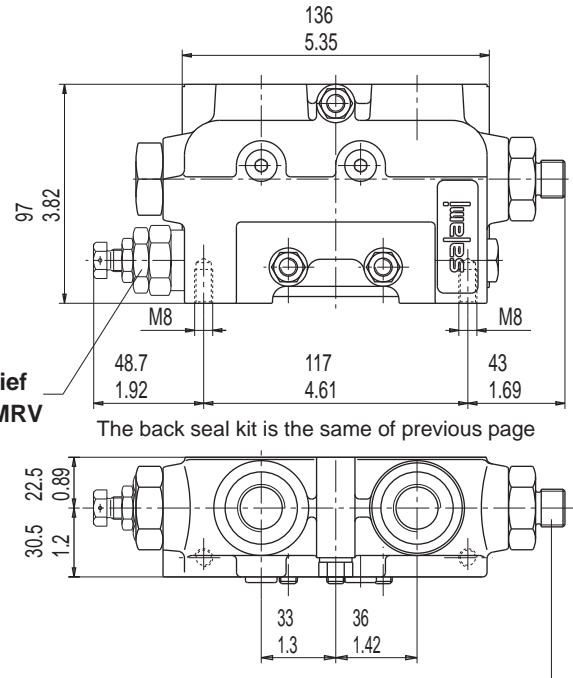
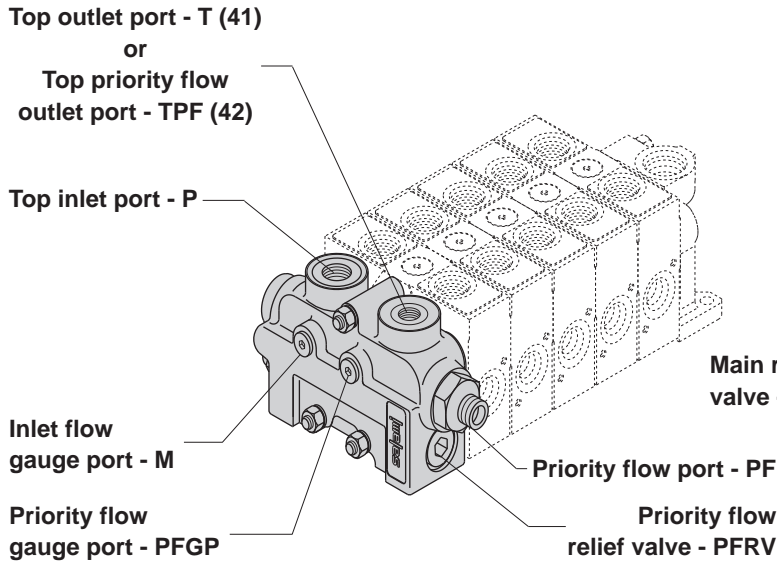


The built-in priority flow valve in this inlet module, supplies the oil to the power steering. This priority valve (PF port in dwg.) supplies always a stand by flow to the steering also when the unit is still. When the steering is operated the flow through the valve can increase or decrease according to the load induced by steering and setting range.

4 setting ranges are available:

from 3 to 11 l/min - from 0.79 to 2.9 US gpm
from 6 to 13 l/min - from 1.58 to 3.43 US gpm
from 6 to 18 l/min - from 1.58 to 4.75 US gpm
from 6 to 24 l/min - from 1.58 to 6.34 US gpm

INLET MODULE WITH PRIORITY FLOW VALVE (FIXED PRIORITY FLOW)



PORT SIZES	P	T	TPF
BSP ISO 228	G 1/2	G 3/4	G 3/8
BSP ISO 228	G 3/4	G 3/4	G 3/8
SAE ISO 176	SAE#10 7/8 - 14 UNF	SAE#10 7/8 - 14 UNF	SAE#6 9/16-18 UNF

Priority flow port is available with the following threads:

BSP (ISO 228) - G 1/4 or G 3/8
SAE UN-UNF (ISO 725) - SAE 4 or SAE 6

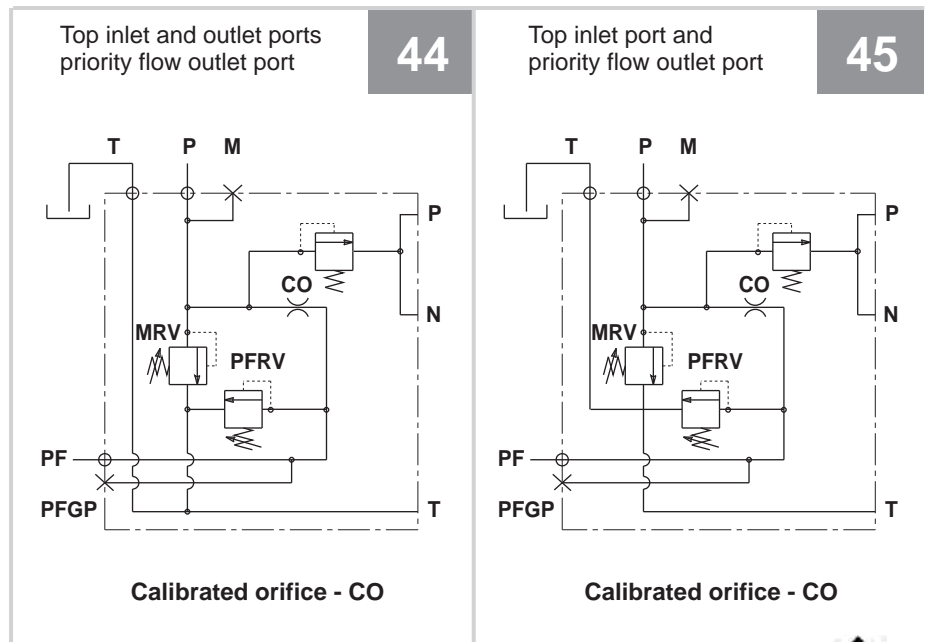
In this valve the pump flow goes trough a calibrated orifice, that allows to keep a priority constant flow value(PF). The exceeding pump flow goes to **P** line.

Priority flow values available are the following:

8 l/min - 2.11 gpm US

11 l/min - 2.90 gpm US

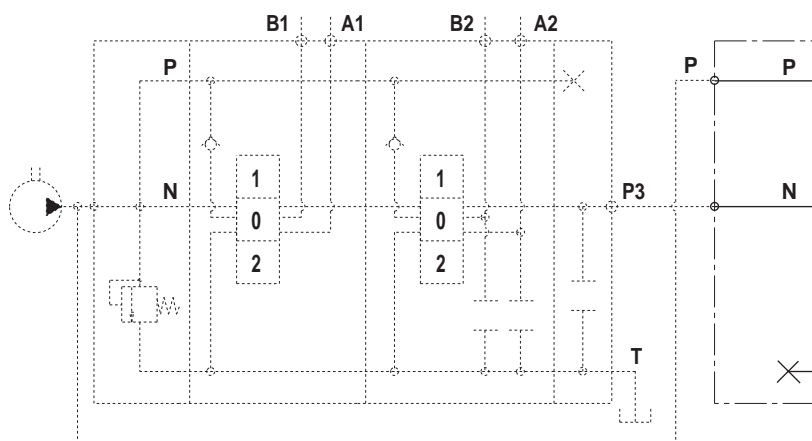
12.5 l/min - 3.30 gpm US



INLET MODULES

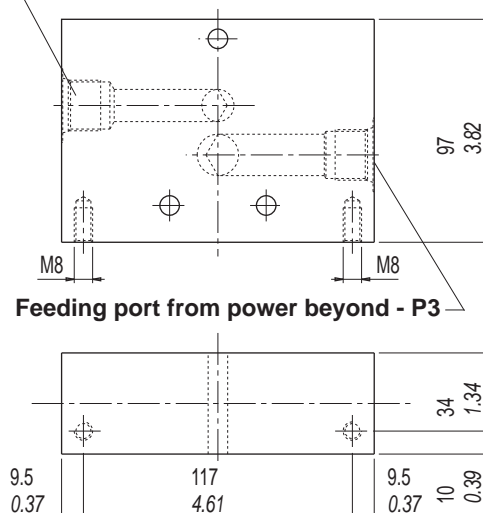
43

Inlet module to realize parallel circuit between two different directional control valves. It must be located on the upstream valve.



Pressure port - P

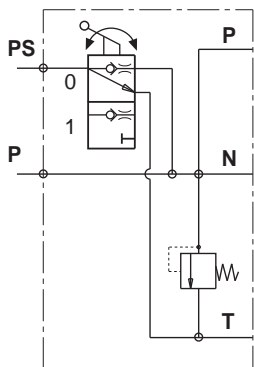
The back seal kit is the same of previous page



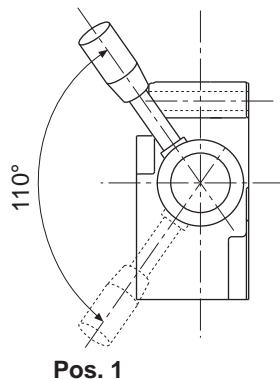
Feeding port from power beyond - P3

51

Top inlet port with manual pressure switch on "A" side and main relief valve on "B" side (see drw. besides)

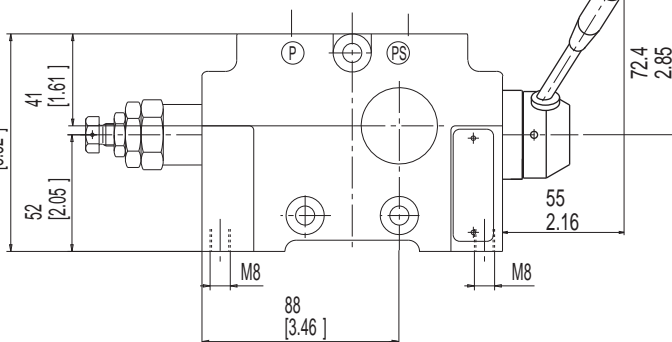


Pos. 0



Pos. 1

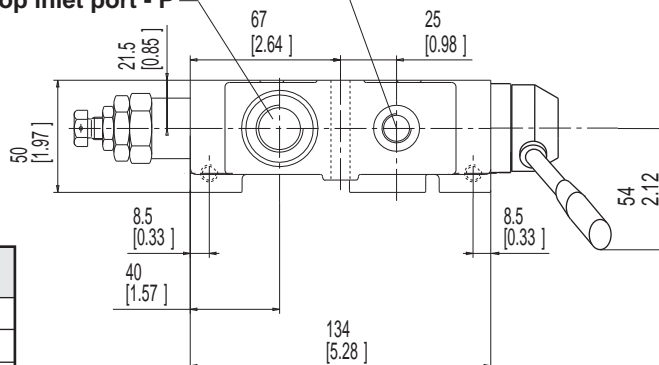
The back seal kit is the same of previous page



Important:
in 52 code P and PS ports
are reversed

Manual pressure switch - PS

Top inlet port - P



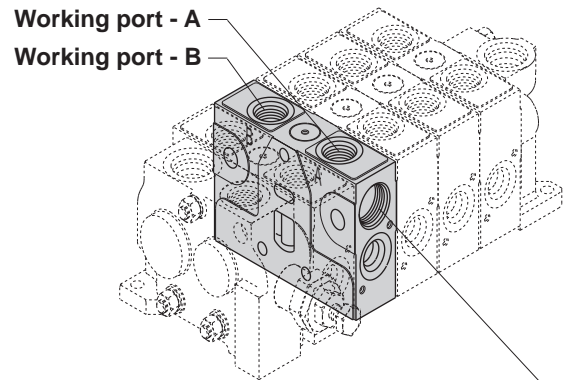
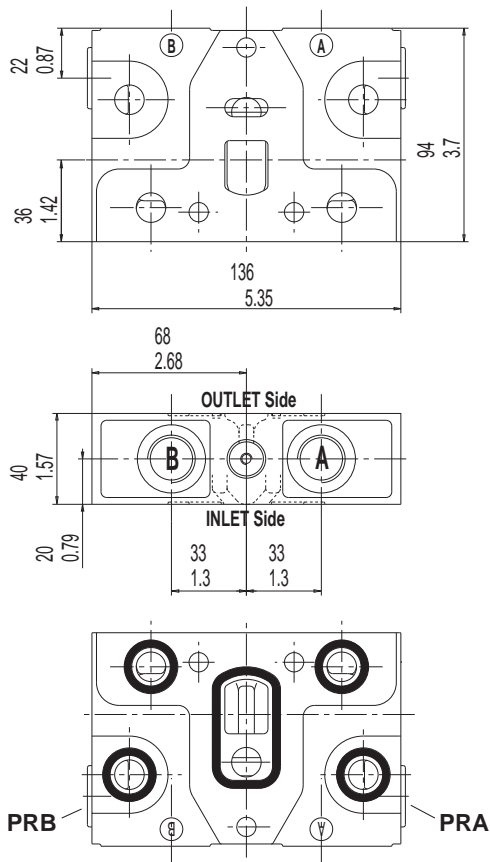
52

Top inlet port with manual pressure switch on "B" side and main relief valve on "A" side (same hydraulic circuit)

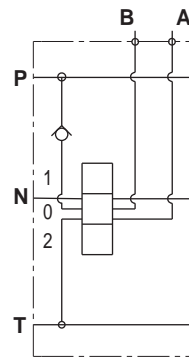
P port size see page 8

PORT SIZES	PS
BSP ISO 228	G 3/8
METRIC ISO 262	G 3/8
SAE ISO 176	SAE#6 9/16-18 UNF

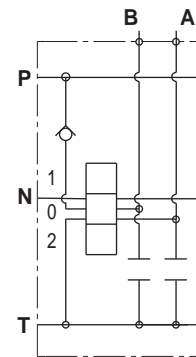
SINGLE AND DOUBLE WORKING MODULE (PARALLEL CIRCUIT)



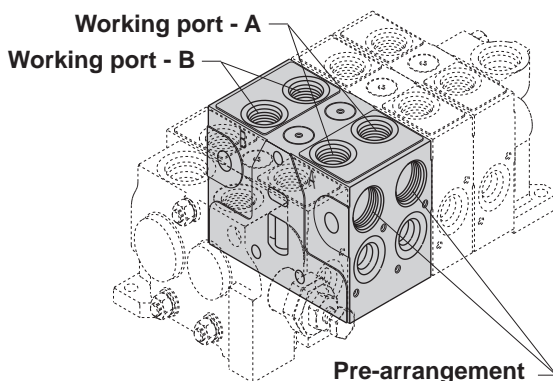
Parallel circuit
without auxiliary valve



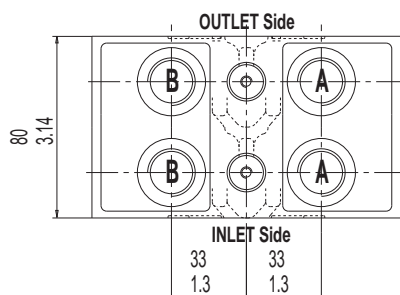
Parallel circuit
pre-arranged for aux. valve



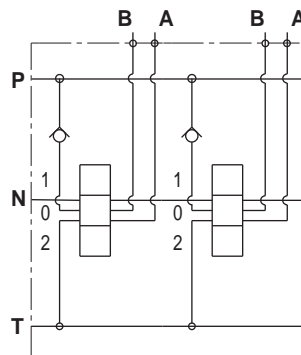
P



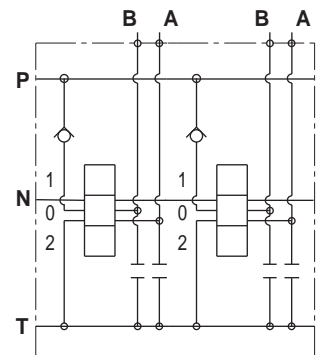
In phase of order you must specify single or double working module parallel circuit.



Parallel circuit
without auxiliary valve

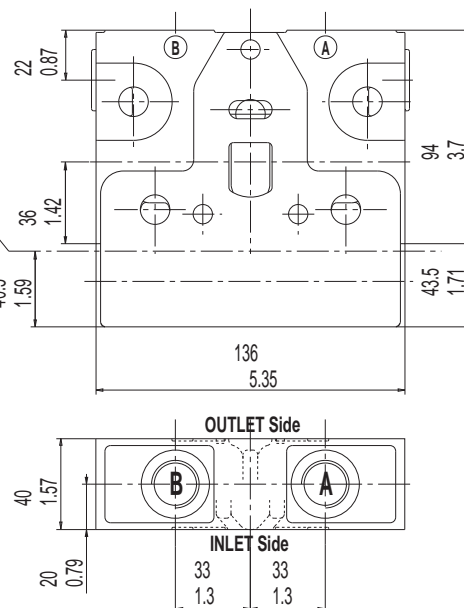
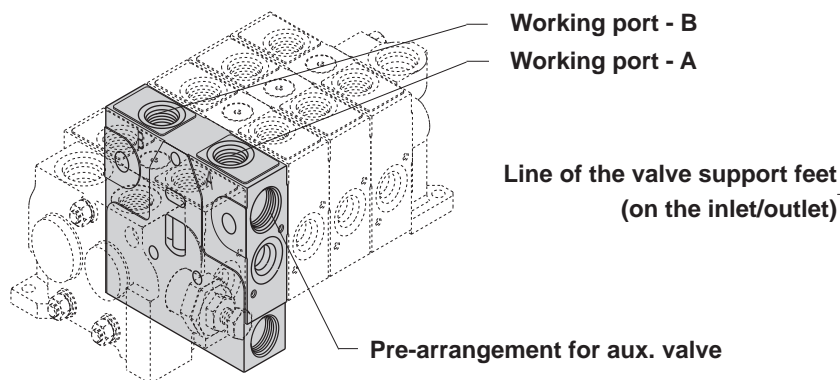


Parallel circuit
pre-arranged for aux. valve



P

WORKING MODULE WITH ADJUSTABLE OR FIXED PRIORITY FLOW VALVE PRESSURE COMPENSATED

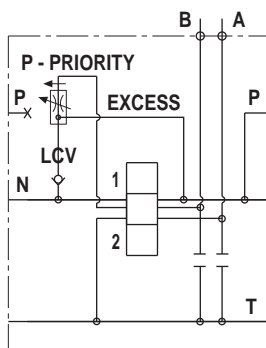


The back seal kit is the same of previous page

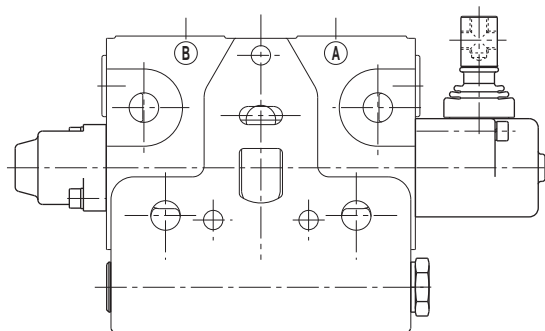
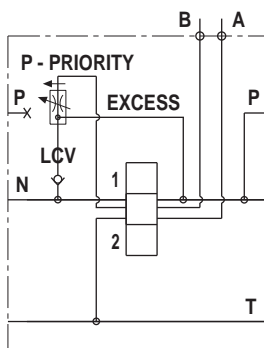
Important: the handle flow regulation is always available on "A" side
Available with or without load check valve - **LCV**

R

Fixed priority flow
pre-arranged for aux. valve



Fixed priority flow
without aux. valve

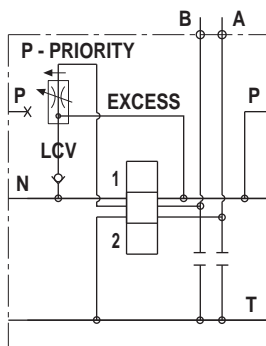


Available values of fixed flow

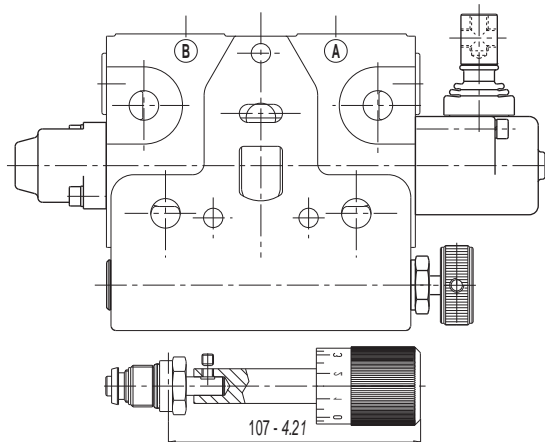
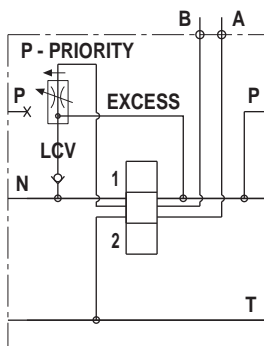
l/min	4.5	6	9	10	16
US gpm	1.9	1.6	2.4	2.6	4.2

R

Adjustable priority flow
pre-arranged for aux. valve

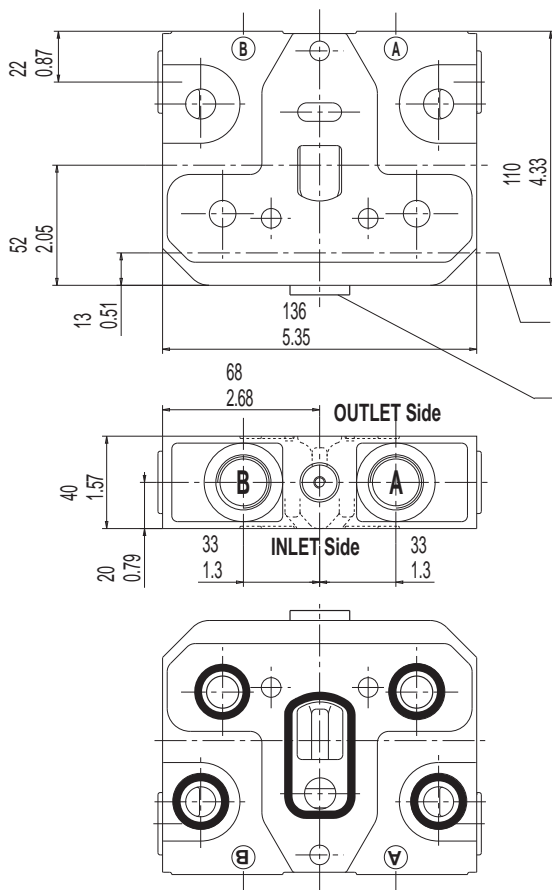


Adjustable priority flow
without aux. valve



Adjustable flow with **LCV** : 45 l/min - 12 US gpm
Adjustable flow without **LCV** : 60 l/min - 16 US gpm

SINGLE AND DOUBLE WORKING MODULE (SERIES CIRCUIT)



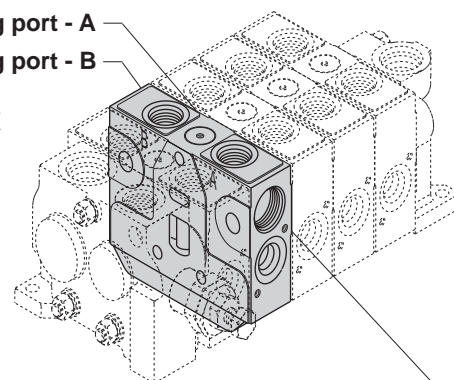
The series circuit working module is available with or without secondary load check valve on series gallery.
With spools commercial codes:
02 - 03 - 04 - 11 - 12
secondary load check valve on the series line, is always necessary

Line of the valve support feet
(on the inlet/outlet)

Load check valve
on series line

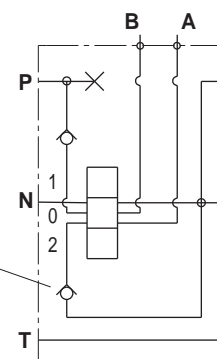
Working port - A

Working port - B

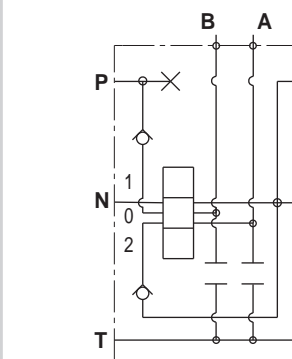


Pre-arrangement for aux. valve

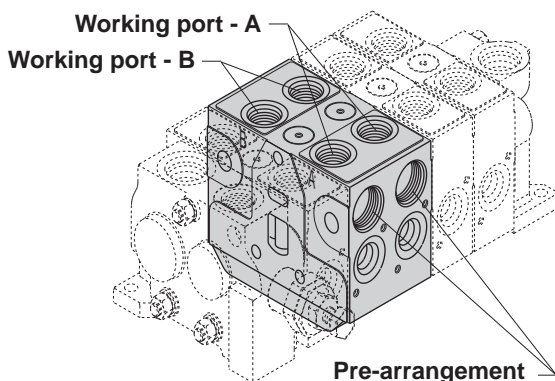
Series circuit
without auxiliary valve



Series circuit
pre-arranged for aux. valve



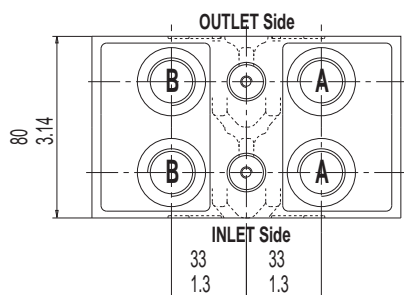
S



Working port - A

Working port - B

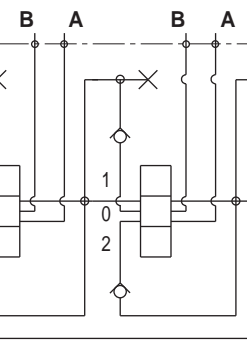
Pre-arrangement
for aux. valve



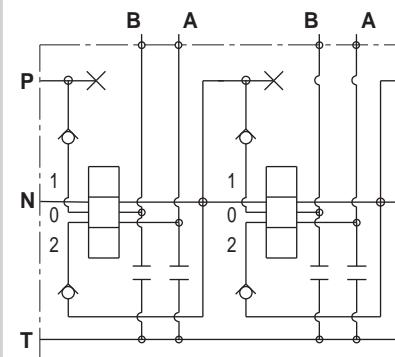
In phase of order you must specify single or double working module
series circuit.

Available only for quantity, please contact our sales dept.

Series circuit
without auxiliary valve

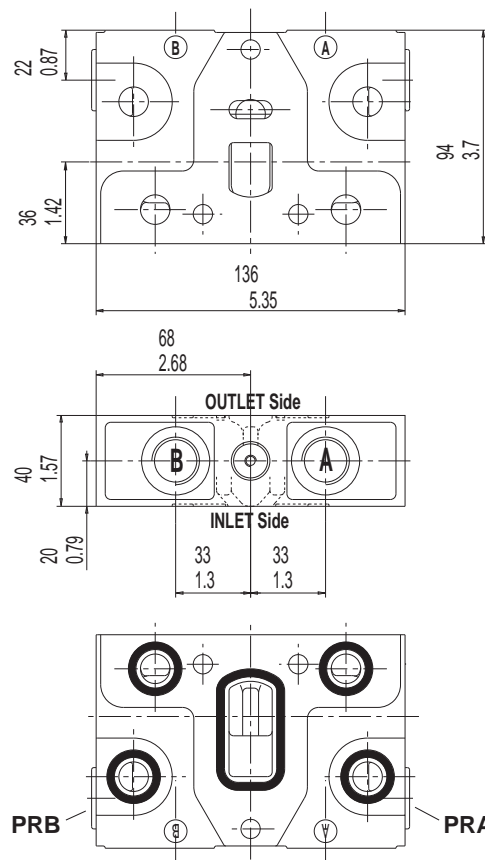
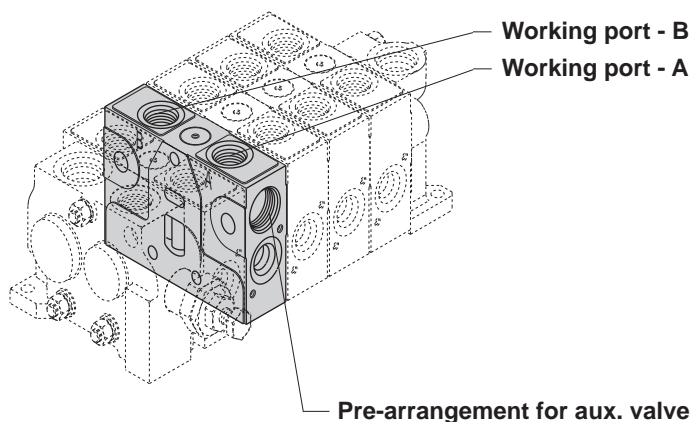


Series circuit
pre-arranged for aux. valve



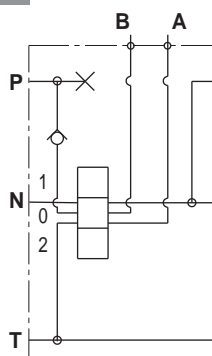
S

WORKING MODULE (TANDEM CIRCUIT)

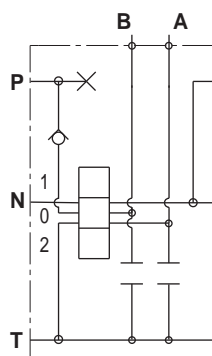


T

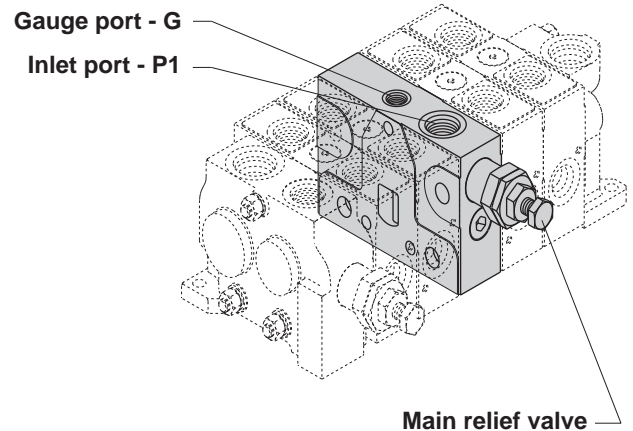
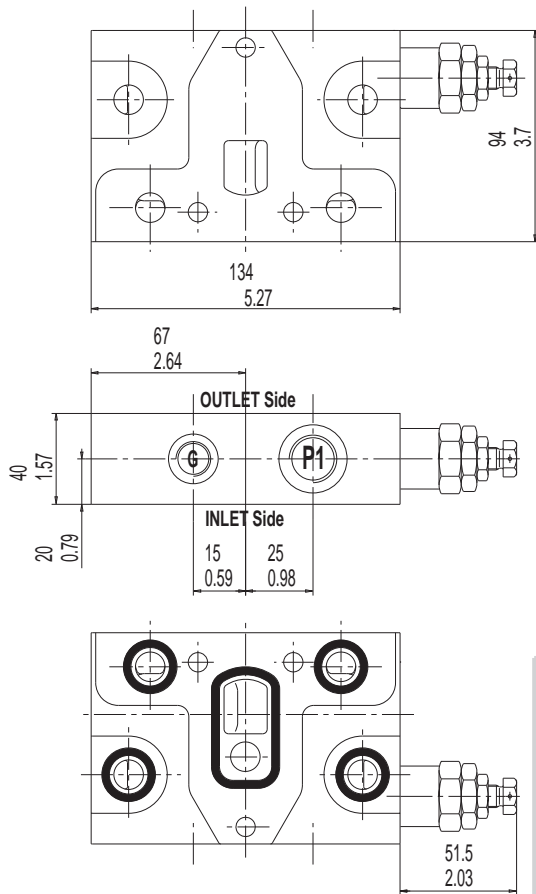
Tandem circuit
without auxiliary valve



Tandem circuit
pre-arranged for aux. valve



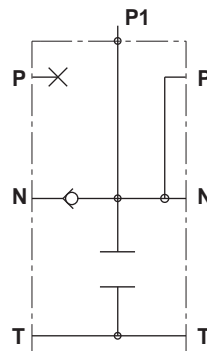
MID INLET MODULE (HYDRAULIC CIRCUITS)



Gauge port is available with the following threads:
BSP (ISO 228) - G 1/4
SAE UN-UNF (ISO725) - SAE 4

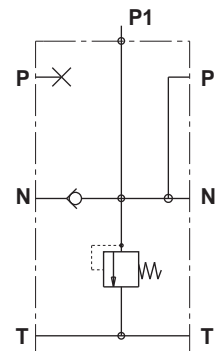
Mid inlet for second pump with combining flows without main relief valve

I2



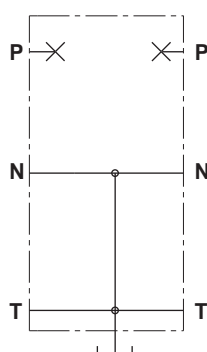
Mid inlet for second pump with combining flows and main relief valve

I1



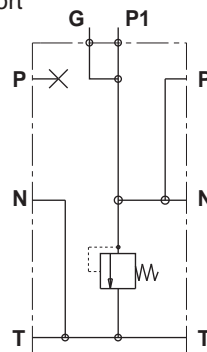
Mid outlet

I9



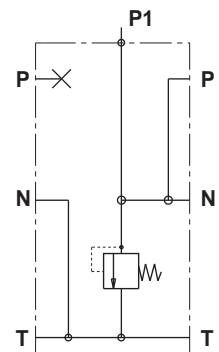
Mid inlet for second pump with split flows and main relief valve + gauge port

I4

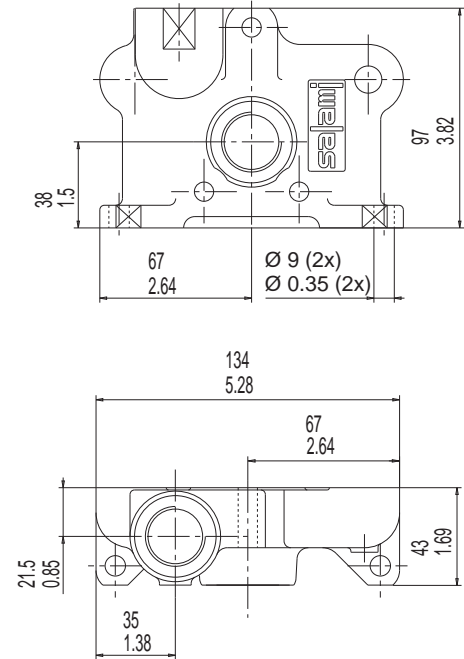
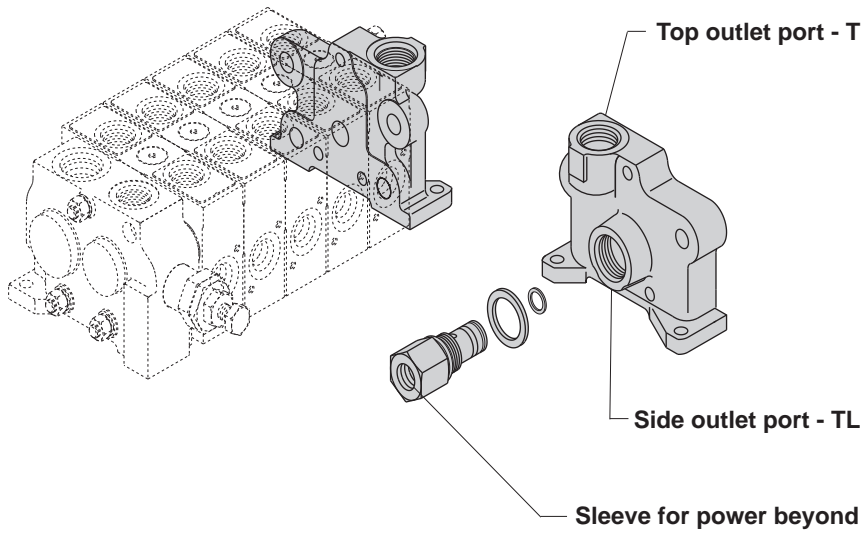


Mid inlet for second pump with split flows and main relief valve

I3

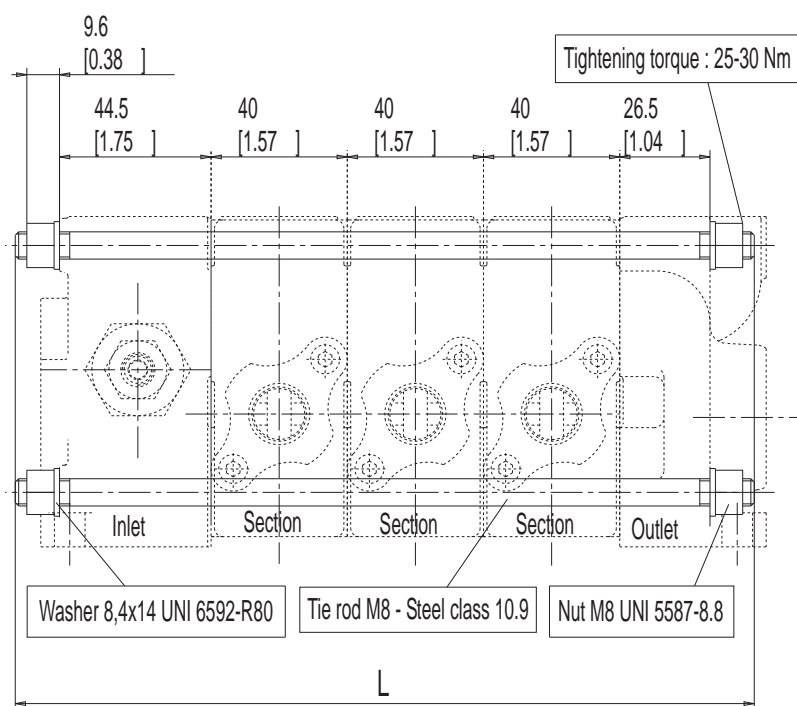


OUTLET MODULE (HYDRAULIC CIRCUITS)



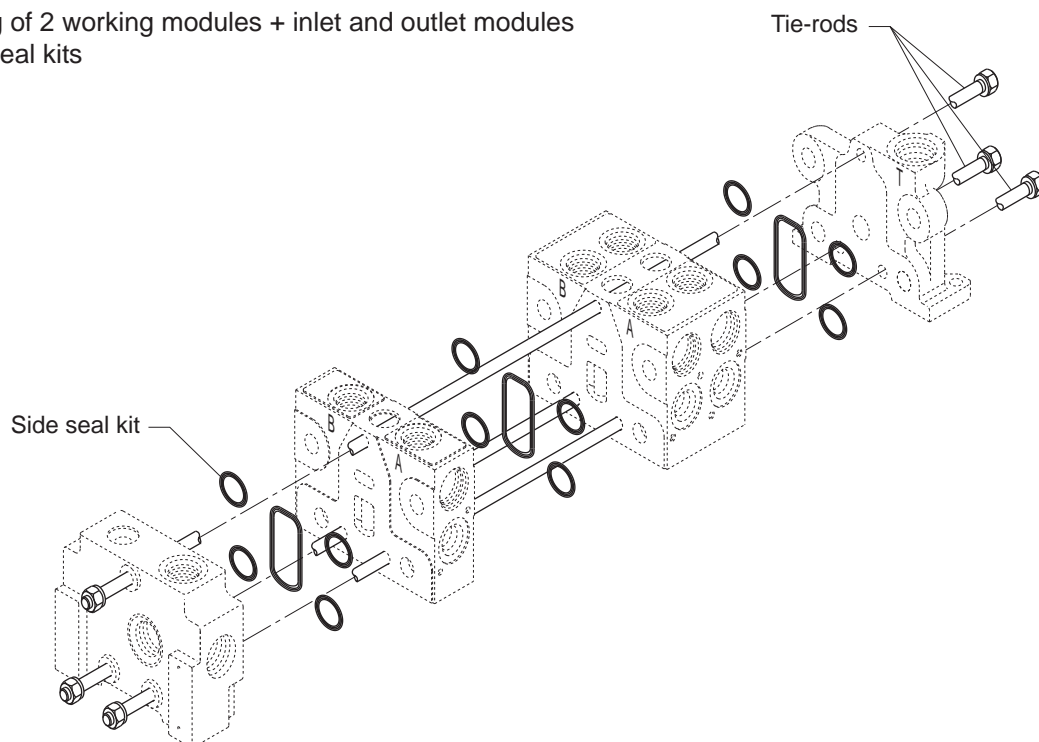
U0 Without port	U1 Top port	U2 Top and side ports			
U3 Side port top port plugged	U4 Top port side port plugged	U5 Power beyond configuration (side P3)	U7 Closed center circuit configuration	U8 <p>Outlet type necessary for electro-hydraulic controls, please go to page 36 to see the drawing and hydraulic scheme.</p>	

ASSEMBLING TIE RODS

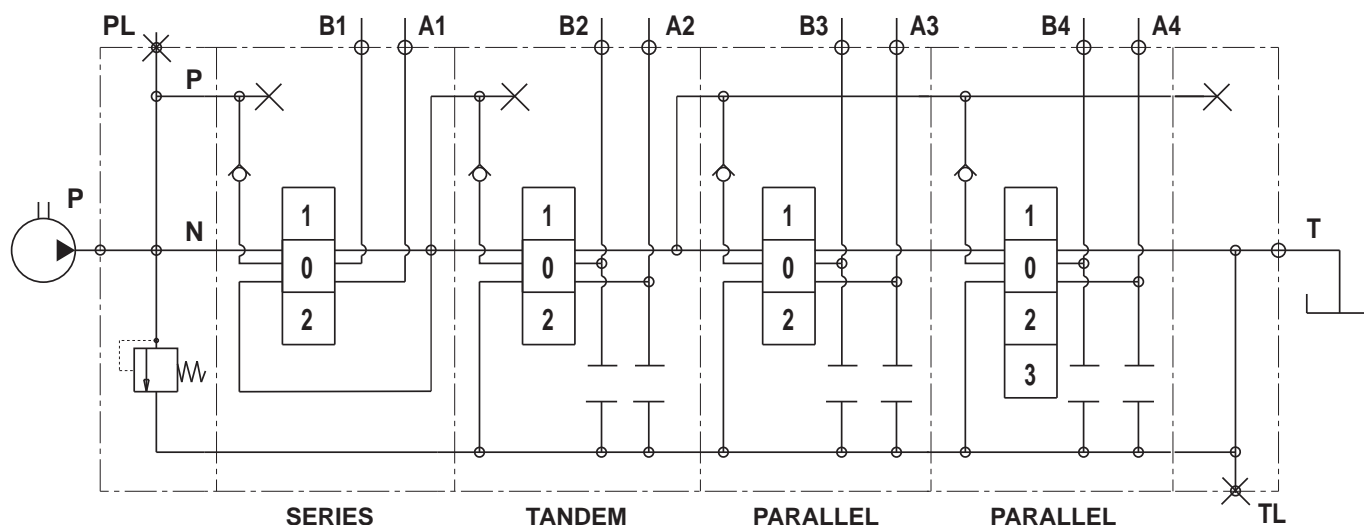


N° of sections	Length L
	mm. [inch]
1	137 [5.39]
2	177 [6.97]
3	217 [8.54]
4	257 [10.12]
5	297 [11.69]
6	337 [13.27]
7	377 [14.84]
8	417 [16.42]

Example of assembling of 2 working modules + inlet and outlet modules with tie-rods and side seal kits



CIRCUIT AND SPOOL TYPES



The circuits available are:

parallel type, series type, tandem type as shown in the picture above (tandem type with priority flow valve is available too, see page 16). You can have main relief valve or venting valve in the inlet (see page 14), the working sections can have pre-arrangement for auxiliary valves or not (you can mount venting valve too).

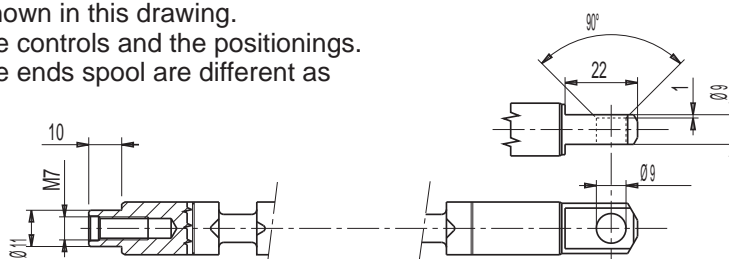
The spools can be 3 or 4 positions (as shown here below) moreover VD8A is available for power beyond just adding a sleeve (see page 20).

As you can read at page 44, the spools can be types "A" nominal flow or "C" 2/3 of nominal flow.

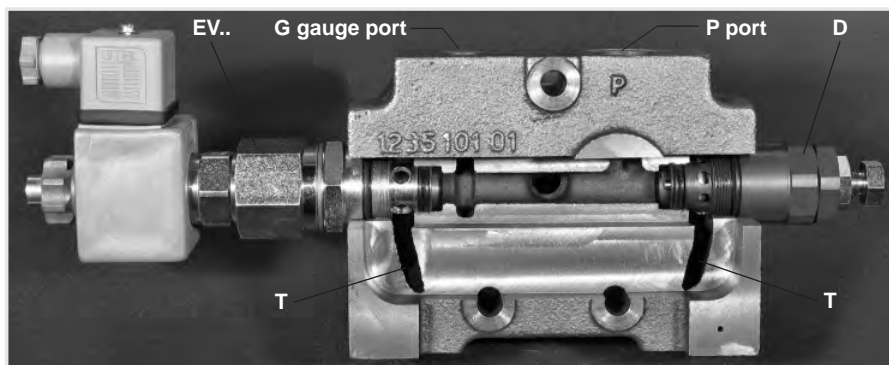
01		Double acting spool	Double acting motor spool		02
03		Double acting motor spool ("B" port blocked)	Double acting motor spool ("A" port blocked)		04
05		Single acting spool "A" working port	Single acting spool "B" working port		06

11		Double acting spool with float function in 3rd position (spool in)	Double acting spool with float function in 3rd position (spool out)		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	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 33 and 34.



MAIN RELIEF VALVES



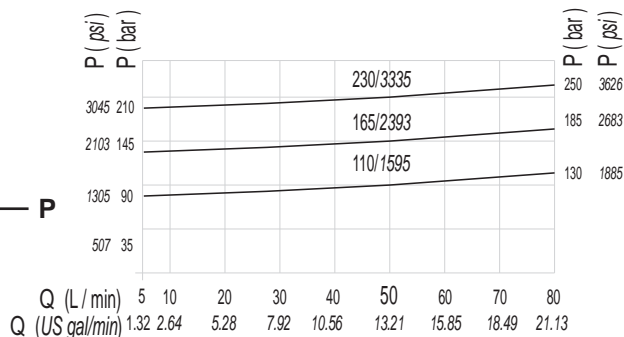
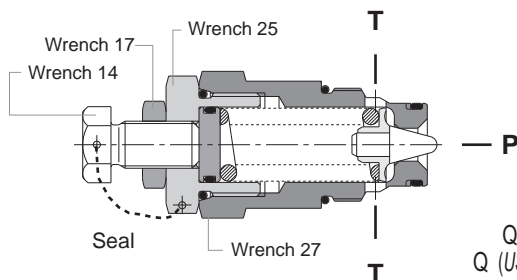
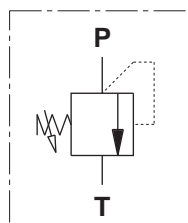
Max tightening torque:
wrench 13 - 24 Nm
wrench 17 - 27 Nm
wrench 25 - 35 Nm
wrench 27 - 40 Nm
wrench 30 - 75 Nm
Allen wrench 8 - 27 Nm



The main relief valve can be mounted on "A" or "B" 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 50 L/min - 13.21 gpm, viscosity 16cST and oil temperature 50°C - 122°F.

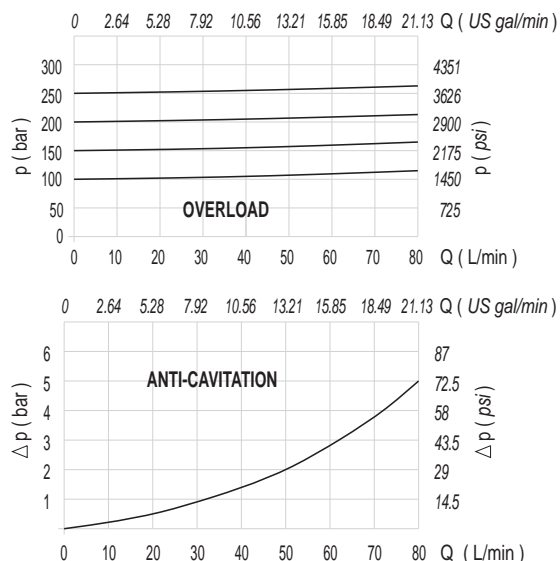
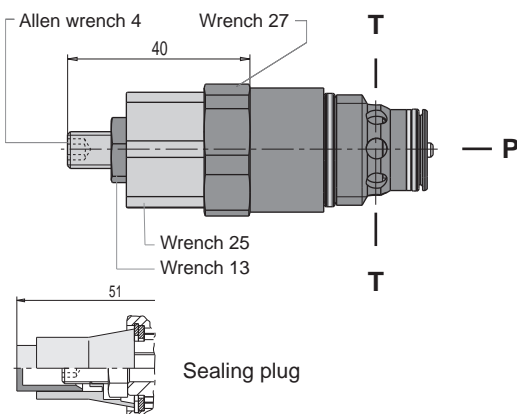
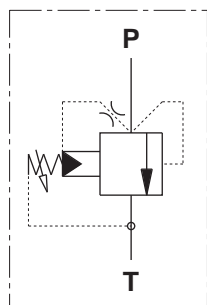
D

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



P

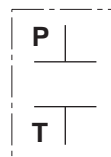
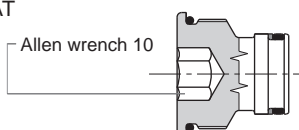
MAIN RELIEF VALVE PILOT OPERATED
(setting range from 25 to 280 bar - 362 to 4061 psi) first spring
(setting range from 100 to 400 bar - 1450 to 5800 psi) second spring



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

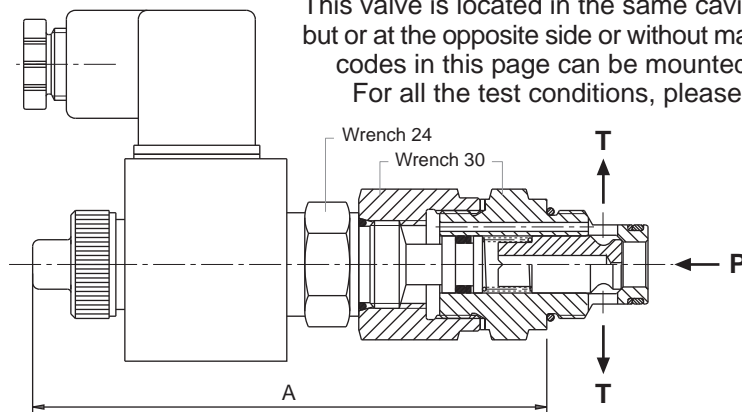
W

PLUG FOR MAIN RELIEF SEAT WITHOUT VALVE

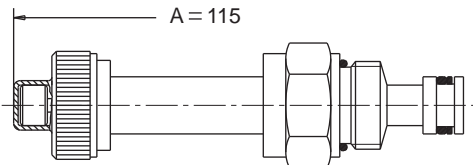
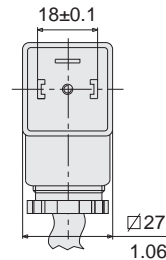


VENTING VALVES (AVAILABLE AS AUXILIARY VALVE TOO)

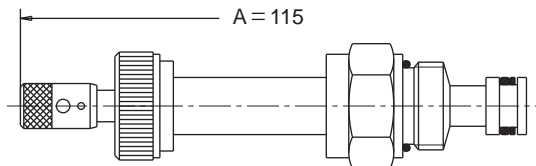
This valve is located in the same cavity of the main relief valve, but or at the opposite side or without main relief. All the commercial codes in this page can be mounted as auxiliary valve too.
For all the test conditions, please refer you to page 24.



CONNECTOR
DIN 43650 - A/ISO 4400



Push override



Push and twist override

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

EV1

12 Vdc - Normally opened
Push override

EV2

24 Vdc - Normally opened
Push override

EV3

12 Vdc - Normally closed
Without override

EV4

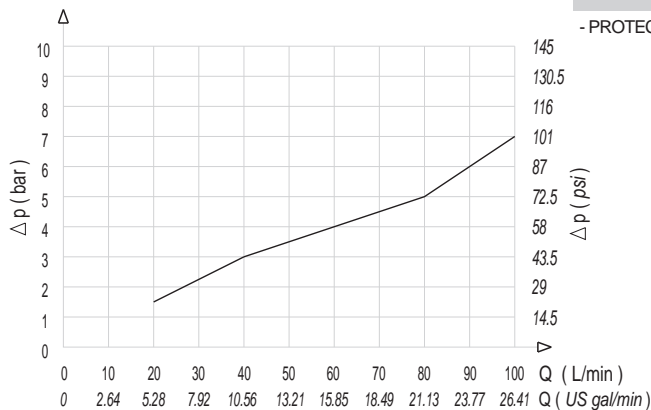
24 Vdc - Normally closed
Without override

EV5

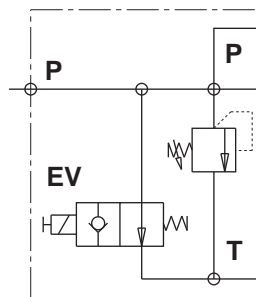
12 Vdc - Normally opened
Push and twist override

EV6

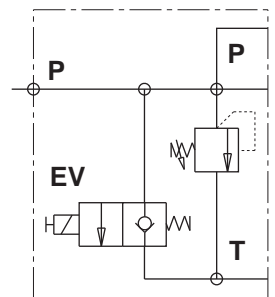
24 Vdc - Normally opened
Push and twist override



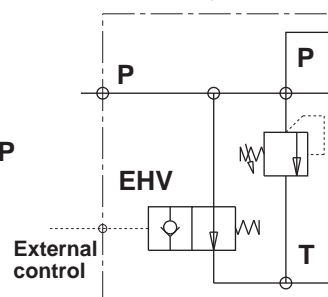
Normally opened



Normally closed



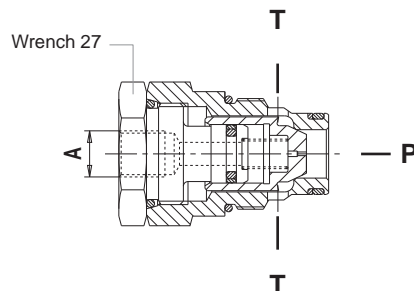
Normally opened



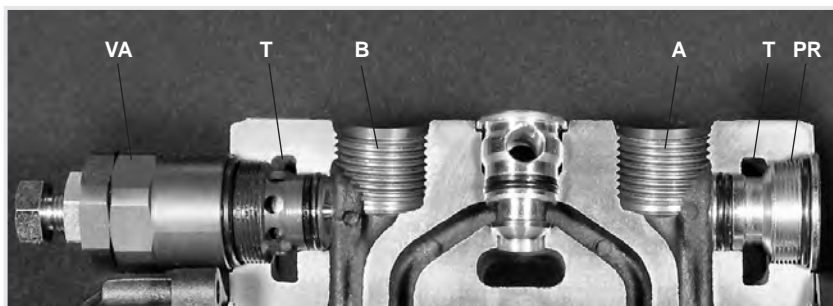
EHV

External piloted
venting valve

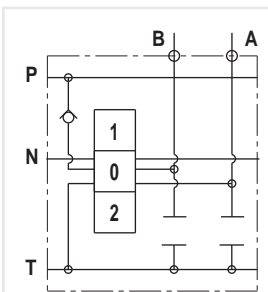
A available threads	
M10 x 1	SAE 6



AUXILIARY VALVES

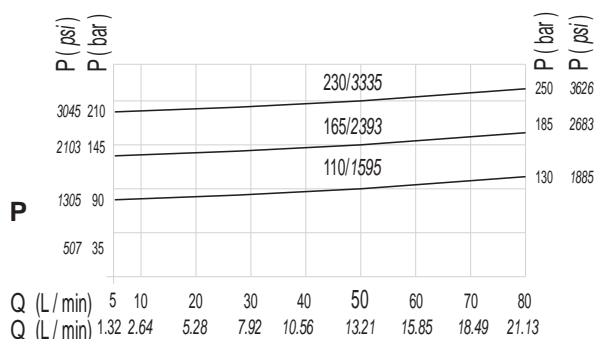
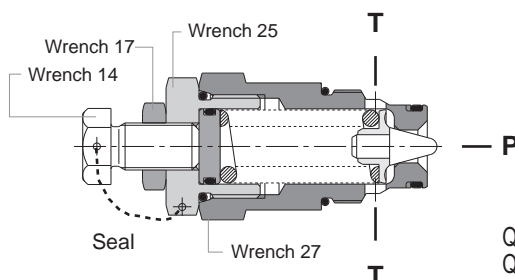
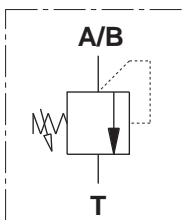


This picture shows the position of the auxiliary valves. For the tightening torque please see page 24.



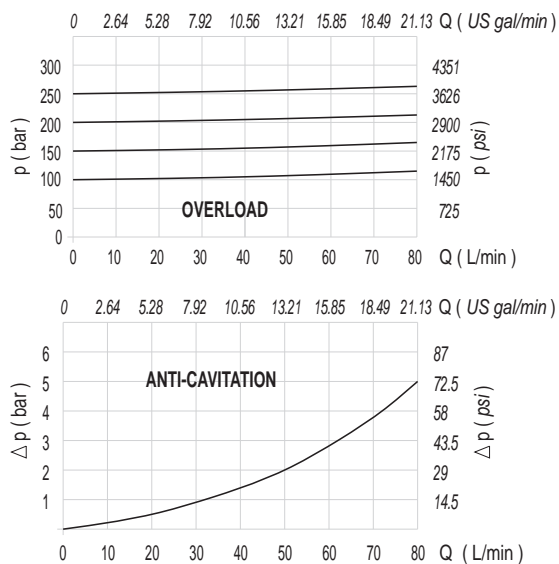
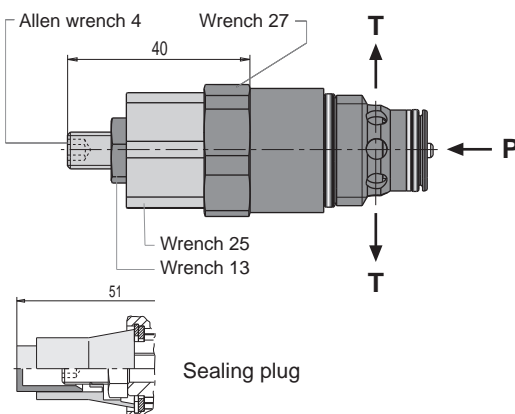
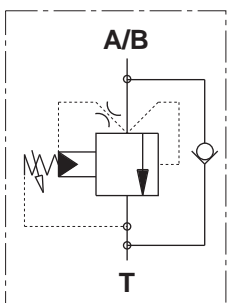
VA

OVERLOAD VALVE
(setting range from 25 to 250 bar - 362 to 3625 psi)



AR

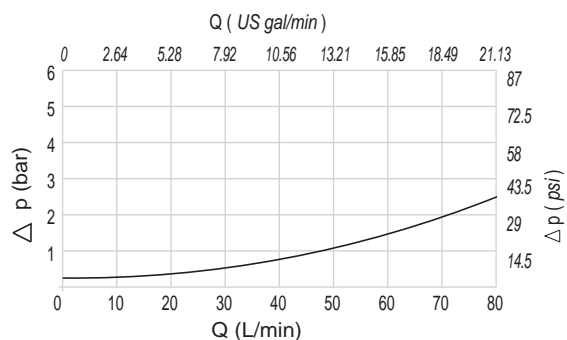
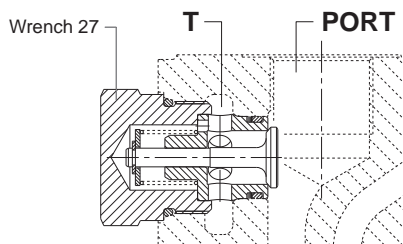
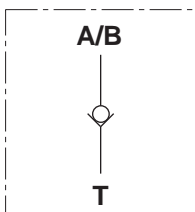
OVERLOAD AND ANTI-CAVITATION VALVE
(setting range from 25 to 280 bar - 362 to 4061 psi) first spring
(setting range from 100 to 400 bar - 1450 to 5800 psi) second spring



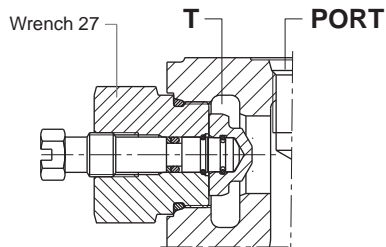
Both valves AR and VR are adjustable without oil leaking. Further more, both have a security device to avoid valve sticking

VR

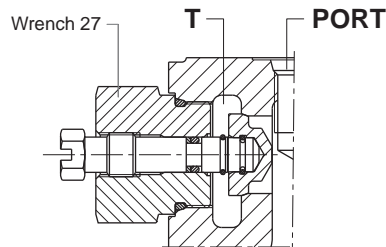
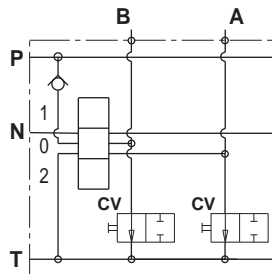
ANTI-CAVITATION VALVE



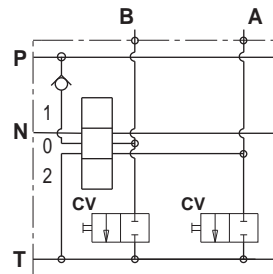
AUXILIARY VALVES



OPENED



CLOSED



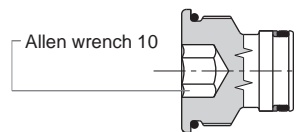
CV

CONVERSION VALVE

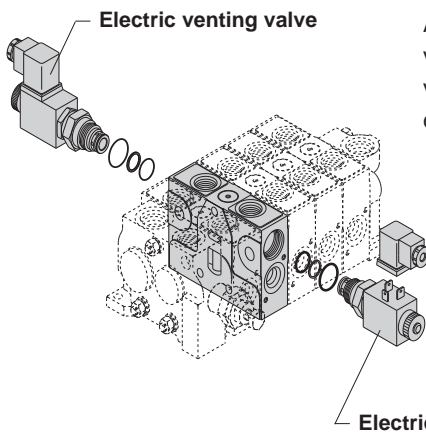
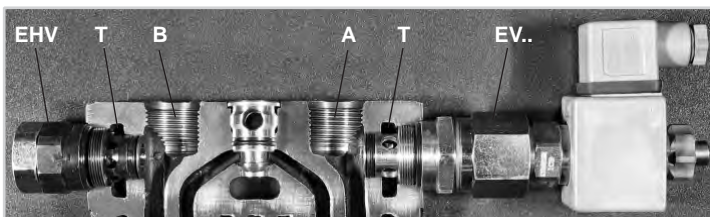
The conversion valve **CV** allows to obtain single acting function starting from double acting spool just connecting the port to tank. For example starting from a double acting spool to obtain a single acting "A" port function, we must open the **CV** valve sending "B" port to tank line.

PR

PLUG FOR CAVITY



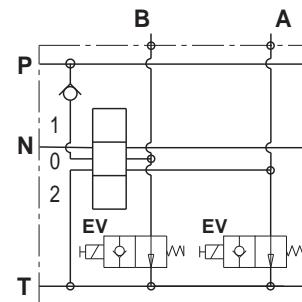
A/B
T



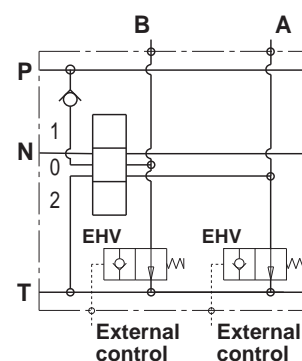
Electric venting valve

As you can read at page 25, all venting valve are also available as auxiliary venting valve, the commercial codes and technical data are the same of page 25.

Electric venting valve

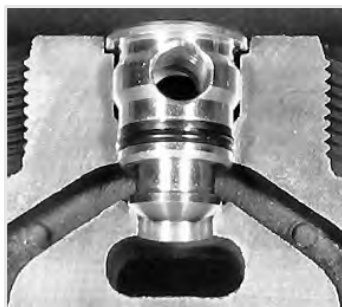


EV..



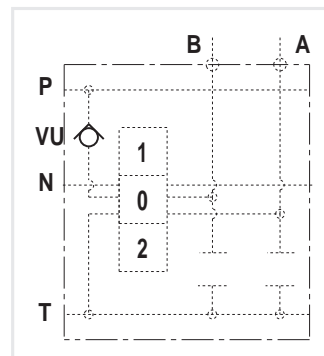
EHV

OTHER VALVES



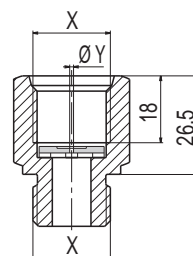
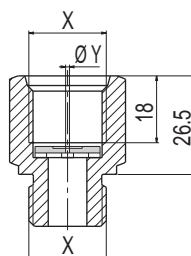
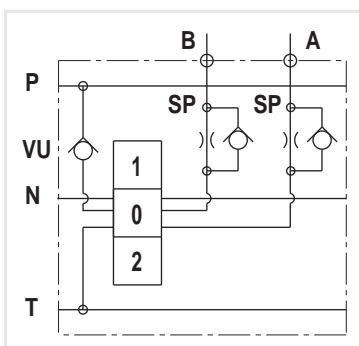
This is the load check valve VU which is built in every working module between ports and you need not to specify in phase of ordering because it is part of the module.

In the series circuit working module you can have another load check valve on the series line as you can see in the drawing of page 17.



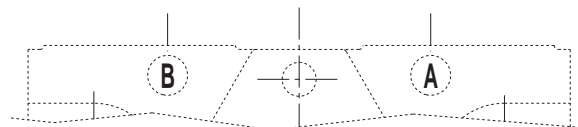
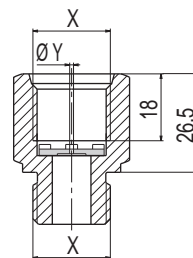
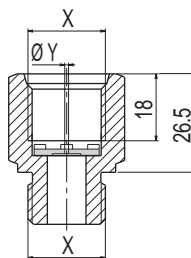
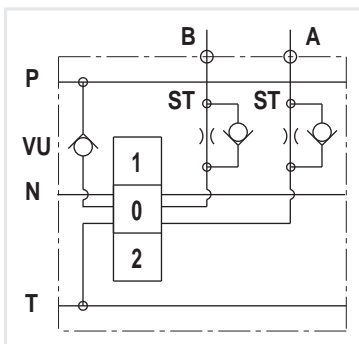
SP

Flow restrictor P → A/B



ST

Flow restrictor A/B → T



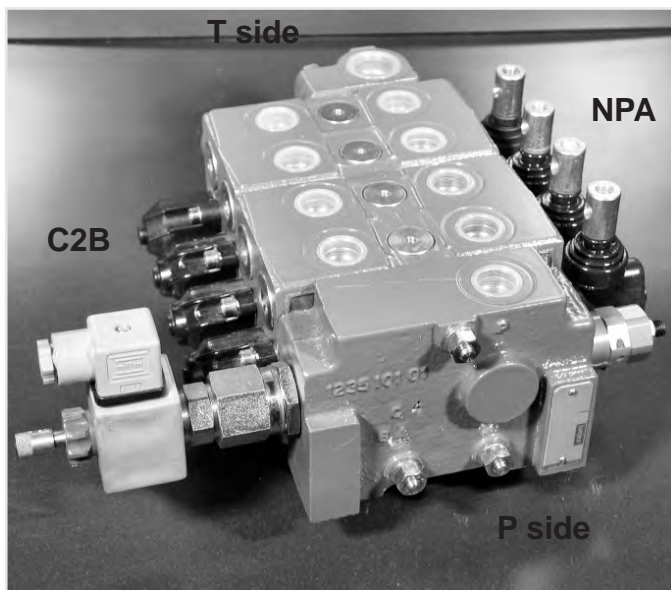
For tightening torque, please refer you to page 5.

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.



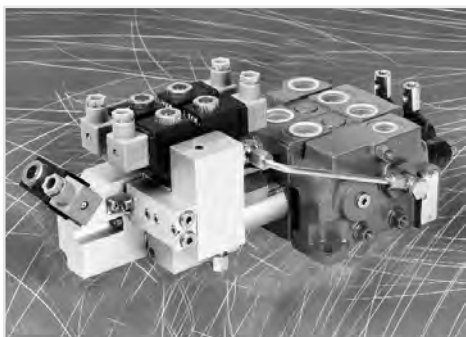
SPOOL CONTROLS AND SPOOL POSITIONINGS



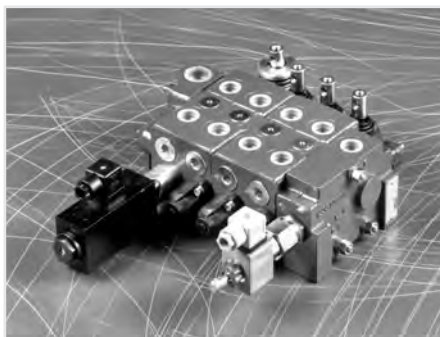
This picture shows the VD8A assembled, in this case you have a manual control "NP" on A side and a spring return in neutral position "C2" on B side. In this case the manual control "NP" is used directly to have the spool movement, in other case, for example with electro-hydraulic control, there is only a safety lever. Considering that VD8A 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 A or B 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.**

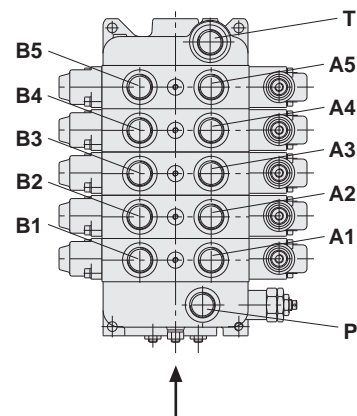
The drw. here below show the reference to fix A and B side from the point of view of the operator.



VD8A - 2 working modules
with electro-hydraulic controls
H1/H2 - H3/H4



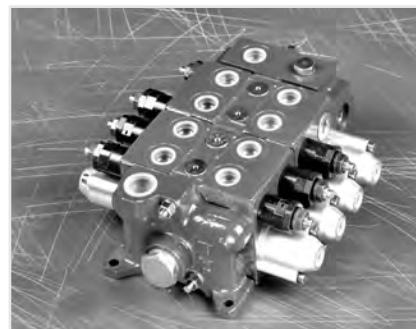
VD8A - 4 working modules (2 bi-blocks)
with miscellaneous of controls
NP - E7/E8 - C2 and EV on inlet m.



OPERATOR'S REFERENCE POINT



VD8A - 4 working modules
with electro-pneumatic control **P1/P2**

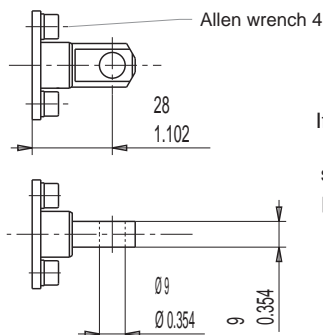
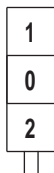


VD8A - 4 working modules
(2 bi-blocks) with hydraulic prop.
control **IP**

SPOOL CONTROLS

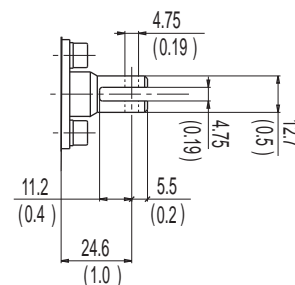
SL

Without lever box



Male version

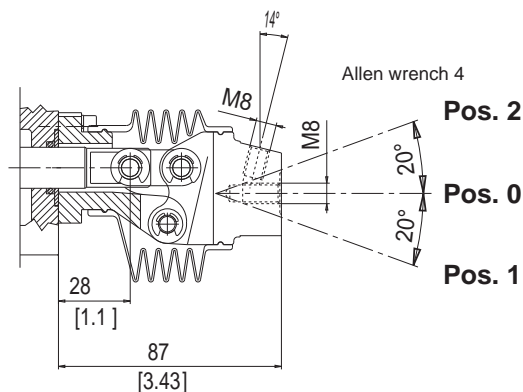
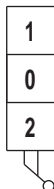
If you order SL we will supply the male version, which is the standard. For the female version please specify it when ordering.



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

NL

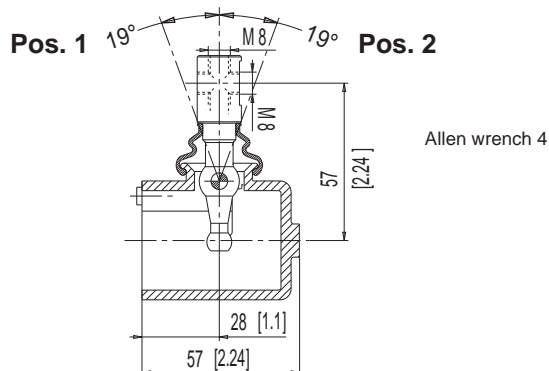
Low effort
protected lever



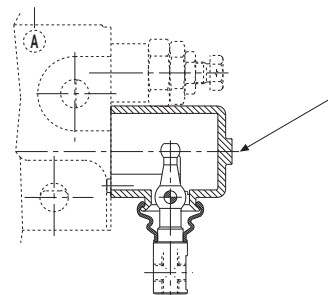
This lever can be assembled turned of 180°

NP

Standard
protected lever

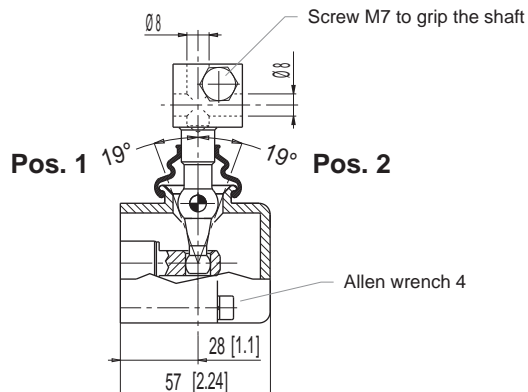


This lever can be assembled turned of 180°
In case of auxiliary valve it must be assembled
turned of 180° with reference to this axis

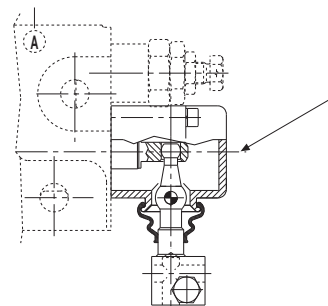


MP

Protected clamp lever

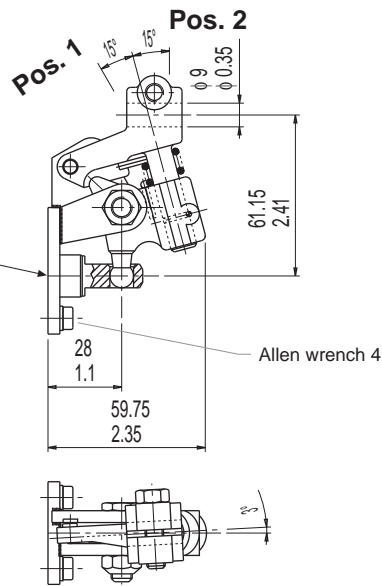


This lever can be assembled turned of 180°
In case of auxiliary valve it must be assembled
turned of 180° with reference to this axis

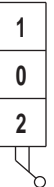


SS

This lever can be assembled turned of 180°
In case of auxiliary valve it must be assembled
turned of 180° with reference to this axis



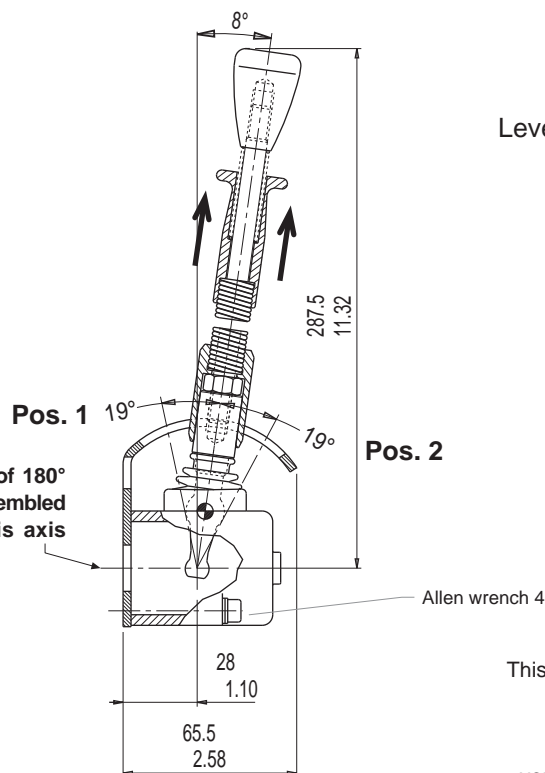
Lever with security locking in neutral pos.
Side shift to unlock



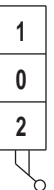
This lever with security locking in neutral pos.
has been created to avoid its accidental
movement caused by vibrations of the
application.

FL

This lever can be assembled turned of 180°
In case of auxiliary valve it must be assembled
turned of 180° with reference to this axis



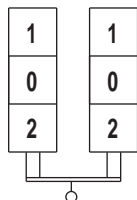
Lever with security locking in neutral pos.
Pull the grip to unlock.



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

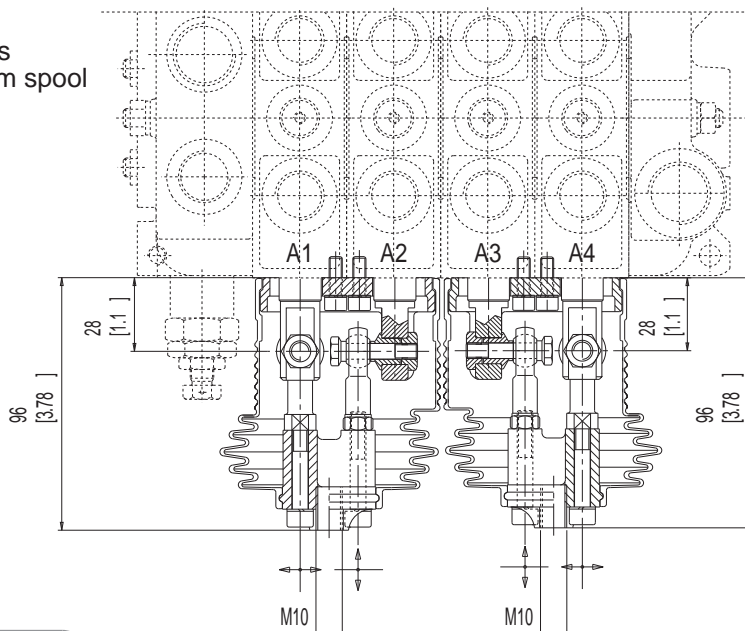
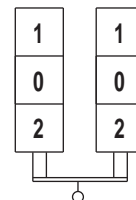
L2

Cross lever for 2 spools
fulcrum on down-stream spool

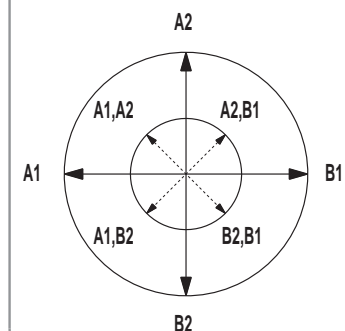


L1

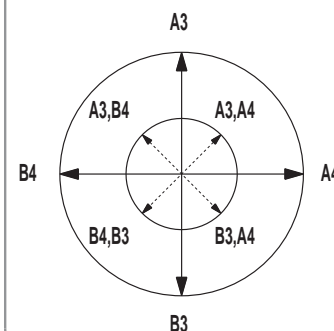
Cross lever for 2 spools
fulcrum on up-stream spool



L2 - WITH FULCRUM DOWN



L1 - WITH FULCRUM DOWN

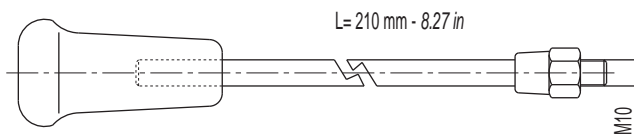


STANDARD SHAFTS

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

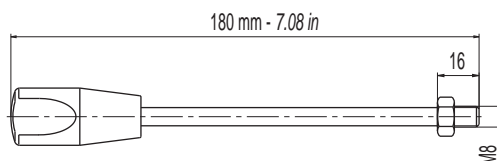
Shaft with ergonomic knob
for cross lever L1/L2

R202 8996 0



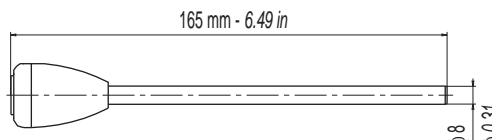
Shaft with threaded end

R202 9018 0



Shaft for clamp lever

R202 8839 0



DIRECTIONAL CONTROL VALVE SECTIONAL TYPE

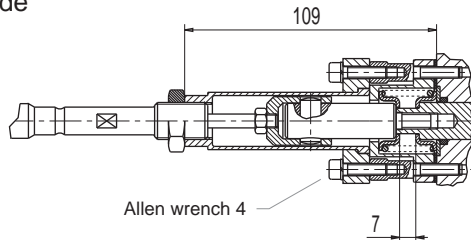
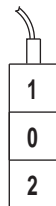
VD8A

D1

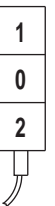
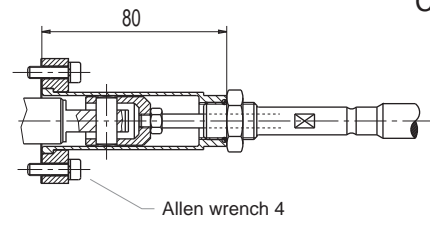
Devices for cable remote control for both the ends of spool.
For more details about cables, please consult our catalogue
cable remote controls.

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

SL

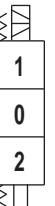
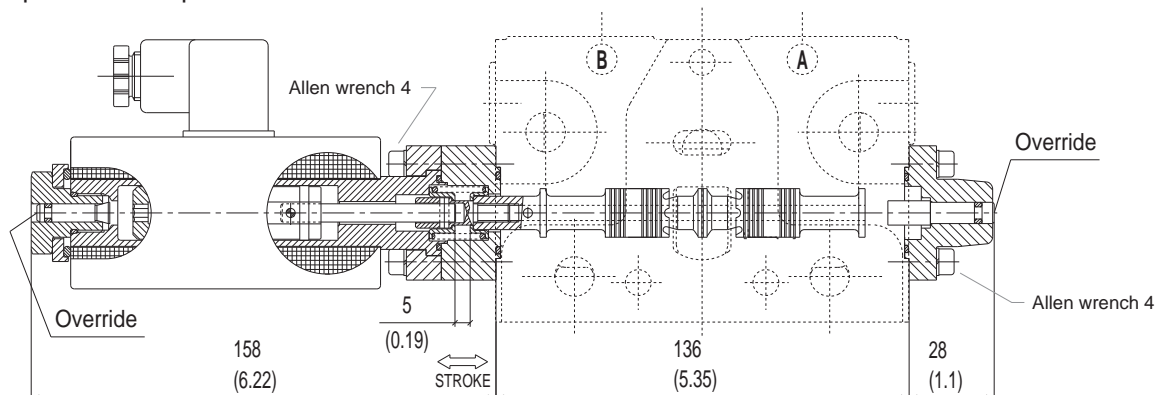
Electric push-pull control 3 positions
12 Vdc

The stroke for this control is of 5 mm,
for this reason the spools are different of standard.

Without lever for electric control
with override device

E2

Electric push-pull control 3 positions
24 Vdc

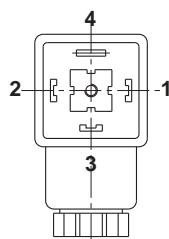


ELECTRICAL DATA

PUSH - PULL SOLENOID

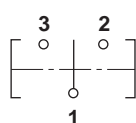
- VOLTAGE: 12Vdc OR 24Vdc
- COIL POWER: 60 Watt at 20°C
- PROTECTION INDEX WITH CONNECTOR: IP 65
- HEAVY DUTY 70%

ES



CONNECTOR
DIN 43650 - A/ISO 4400

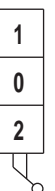
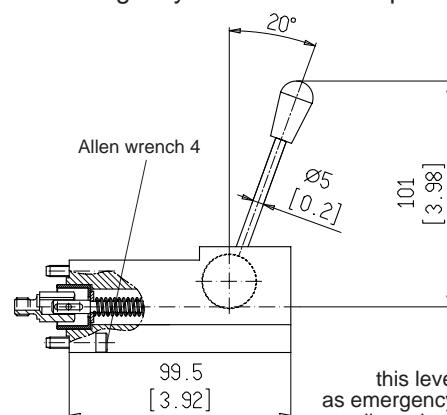
ELECTRIC CONNECTIONS SCHEME



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

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

Emergency lever for electric push-pull control



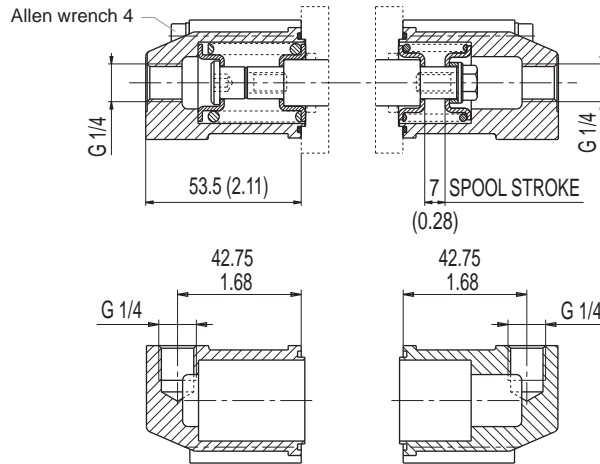
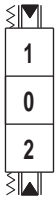
Important:
this lever was realized
as emergency lever and it's
not allowed a continuous use.

IP

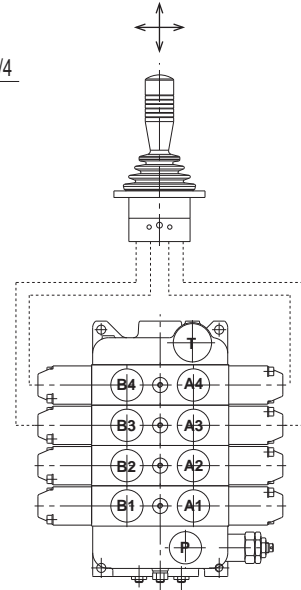
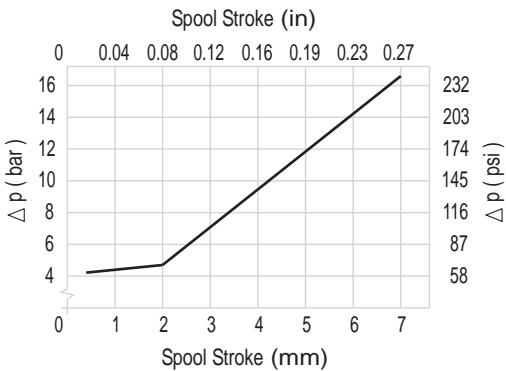
Important:

when you order please specify top or side ports

Hydraulic proportional control



Salami hydraulic
2 axis joystick

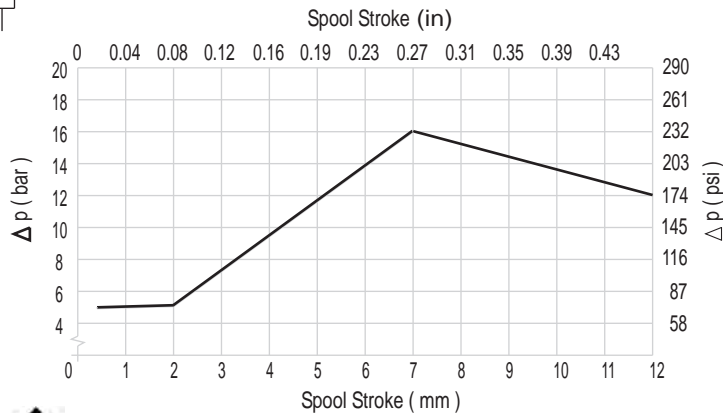
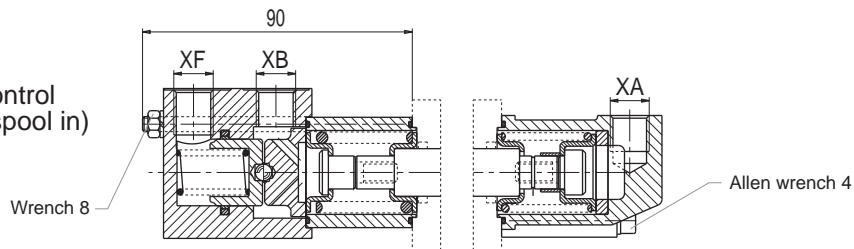


For more information please consult our catalogue
SHRC hydraulic remote controls.

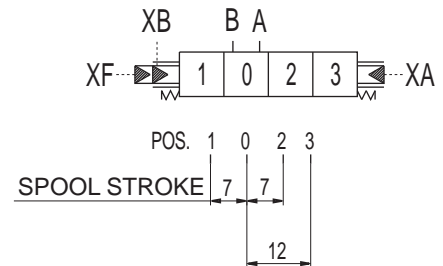
IF

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

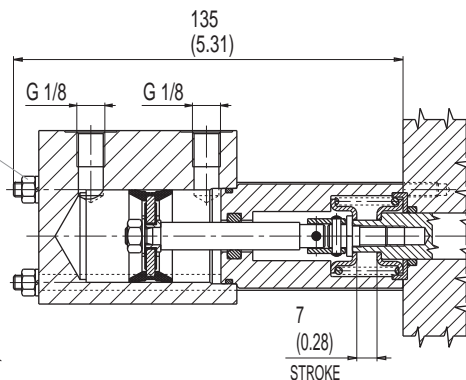
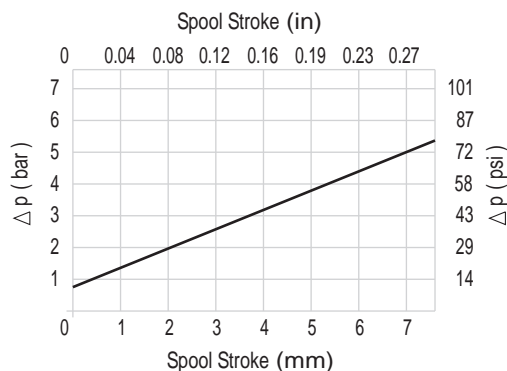
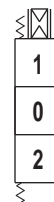
DIRECTIONAL CONTROL VALVE SECTIONAL TYPE

VD8A

Thought for all truck hydraulic applications

PP/P0

Pneumatic proportional/on-off control



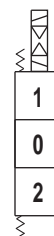
Pneumatic proportional/on-off control
This control is at the same time proportional and on-off type, it depends if you use a pneumatic remote control proportional type (with the characteristic curve of diagram), or on-off type.

P1

Electro-pneumatic on-off control - 12 Vdc

P2

Electro-pneumatic on-off control - 24 Vdc

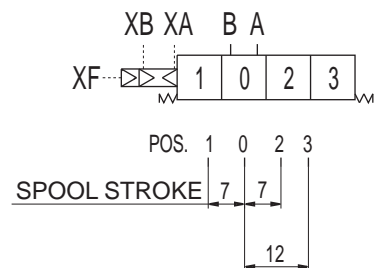


ELECTRICAL DATA

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

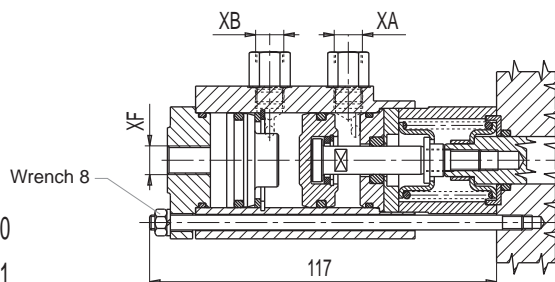
Starting from PP/PO adding the electro-valves you get P1 or P2

OPERATING SCHEME

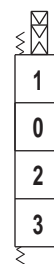


- XA, XB, XF → T ⇒ POS. 0
- Pressure → XB ⇒ POS. 1
- Pressure → XA, XF ⇒ POS. 2
- Pressure → XA ⇒ POS. 3

XA, XB, XF PORTS : G 1/4



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.

Preliminary specifications about electro-hydraulic controls

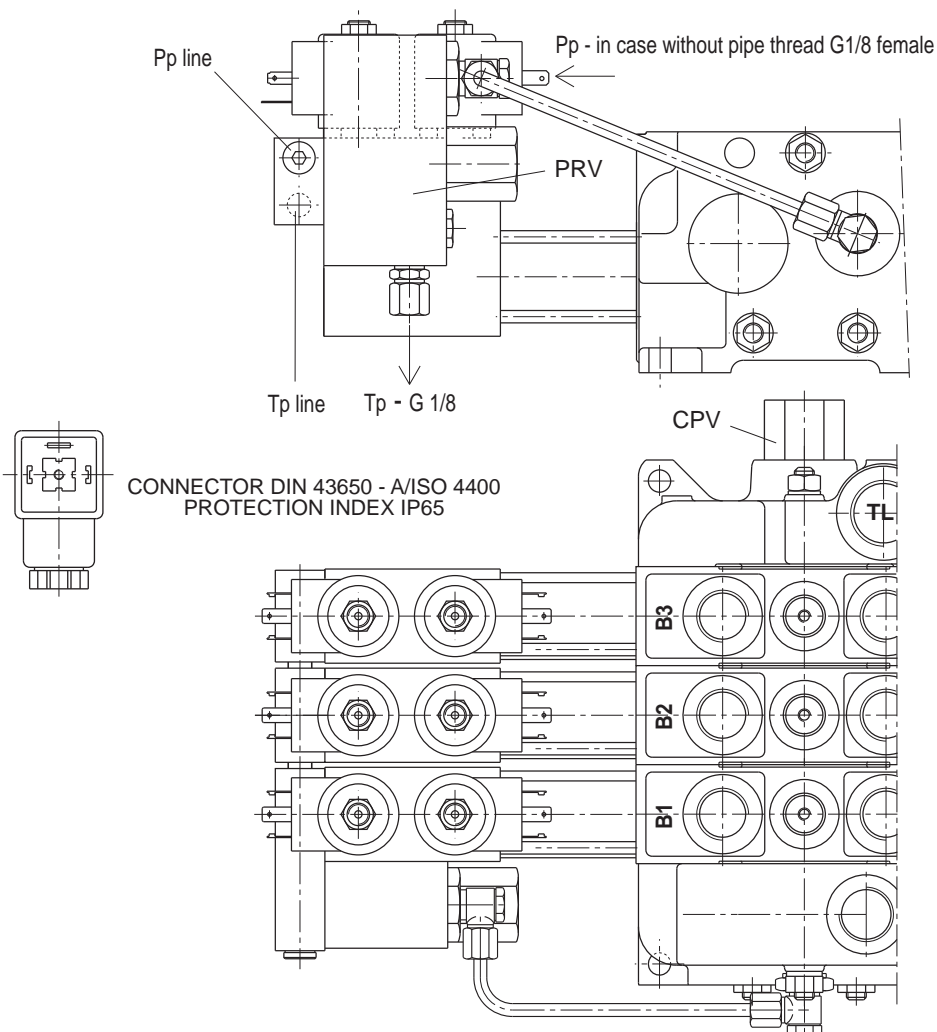
Before to introduce electro-hydraulic single modules it is necessary to specify the adding hydraulic components necessary for the right functioning of it. As you can see in the drawing and hydraulic scheme it needs a pressure reducing valve "PRV" at the inlet of piloting circuit that reduce the pressure 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 obtained also with external standard valves made by valve manufacturers, 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.

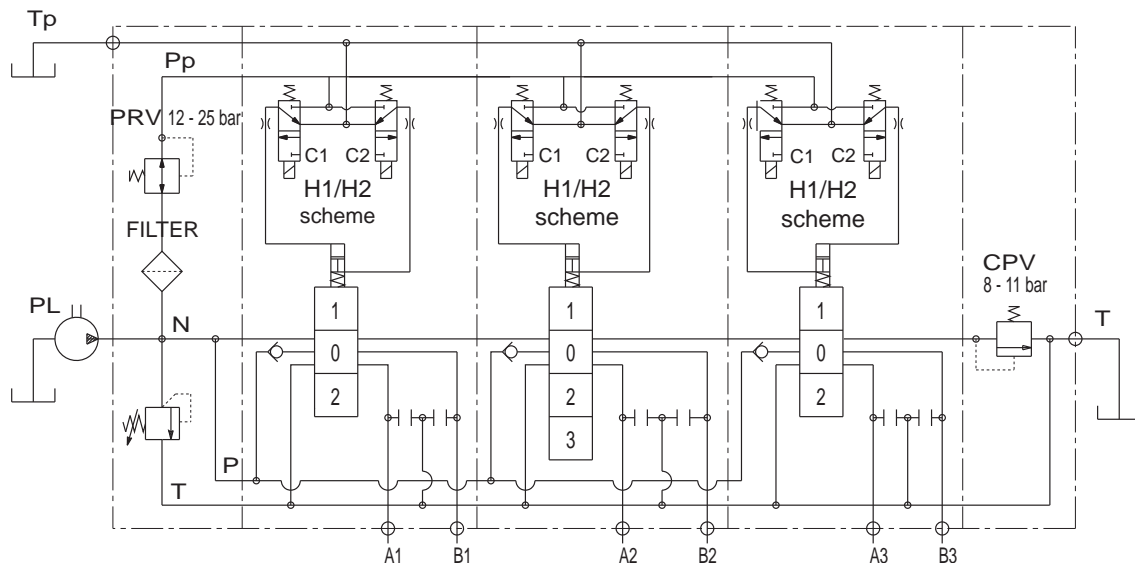
Our standard supply has the "Tp" port opened, we recommend to connect it directly to tank because a counter-pressure could be cause of malfunction.

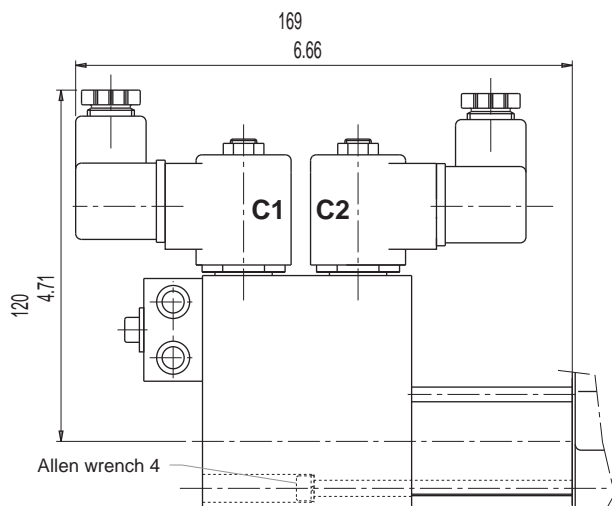
With reference to page 20, "OUTLET MODULES", the outlet U8 is shown in the hydraulic scheme here below, remember that with a special sleeve instead of "CPV" valve you can change U8 in a power beyond outlet type "U5".



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 \Rightarrow POS. 0
C1 coil energized \Rightarrow POS. 1
C2 coil energized \Rightarrow POS. 2

TECHNICAL DATA

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

H1

ON-OFF
electro-hydraulic control
12 Vdc

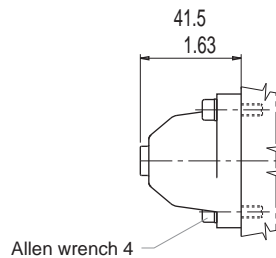
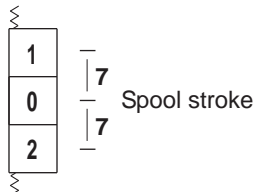
H2

ON-OFF
electro-hydraulic control
24 Vdc

SPOOL POSITIONINGS

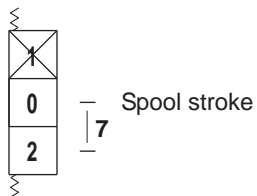
C2

Spring centered to neutral position



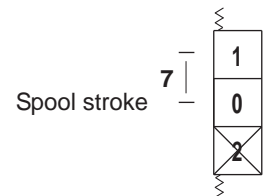
C5

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



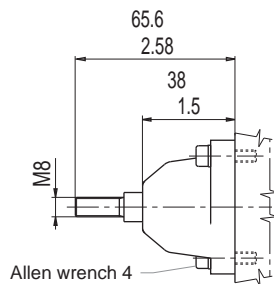
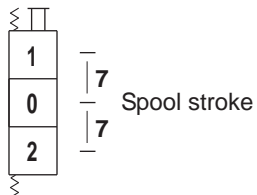
C6

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



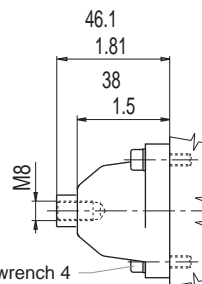
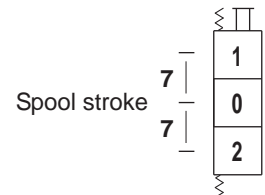
C3

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



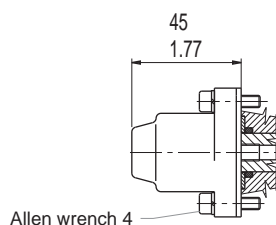
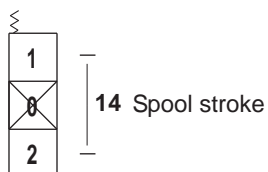
C4

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



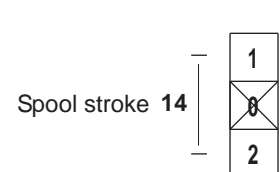
C7

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



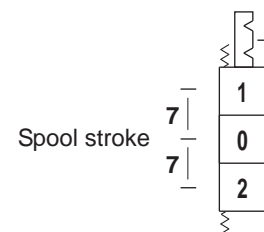
C8

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



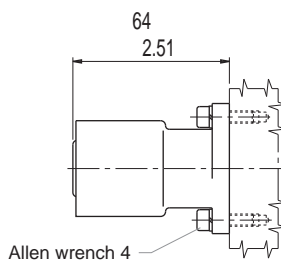
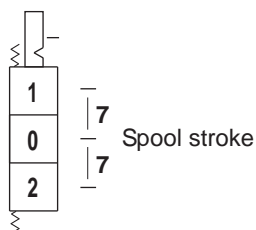
R2

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



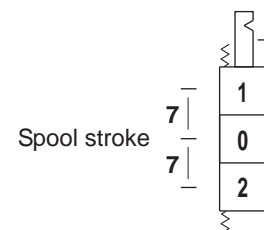
R5

Detent on pos. 2
with spring return in neutral



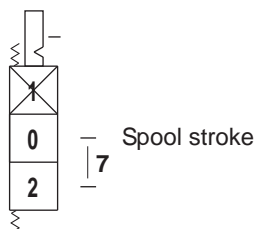
R4

Detent on pos. 1
with spring return in neutral



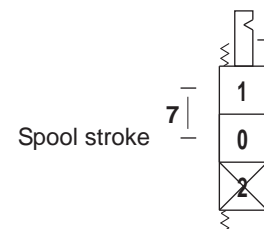
R6

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



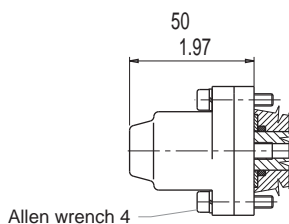
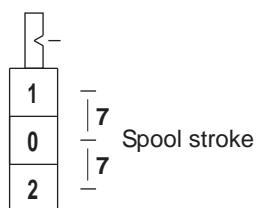
R7

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



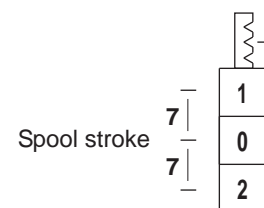
CO

Detent on each intermediate positions



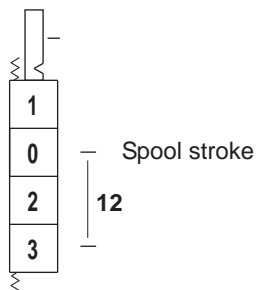
R9

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



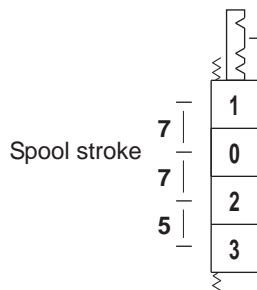
F1

Detent on pos. 3
with spring return in neutral



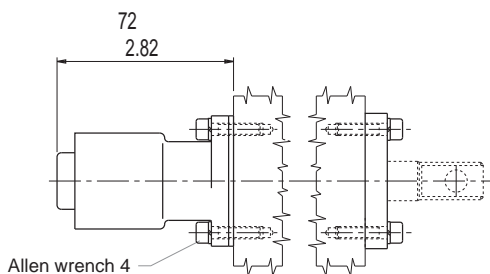
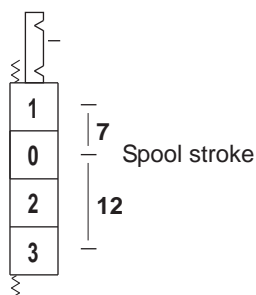
F2

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



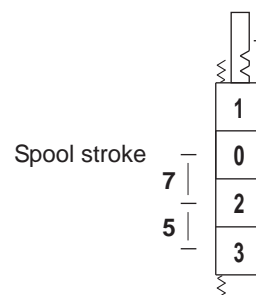
F3

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



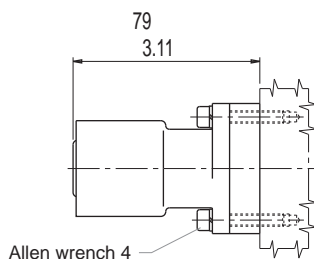
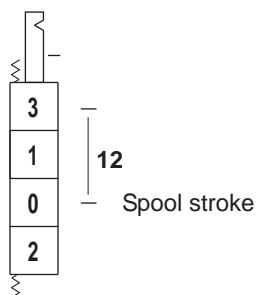
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Detent on pos. 2/pos. 3
with spring return in neutral



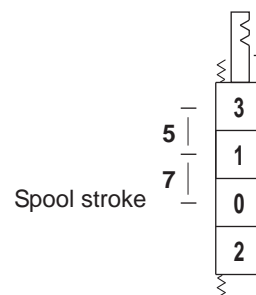
F5

Detent on pos. 3
with spring return in neutral



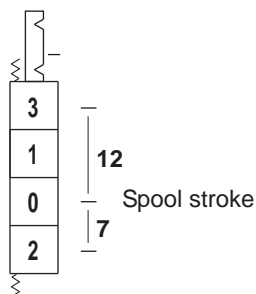
F6

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



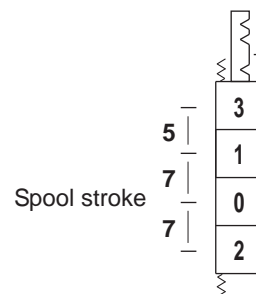
F7

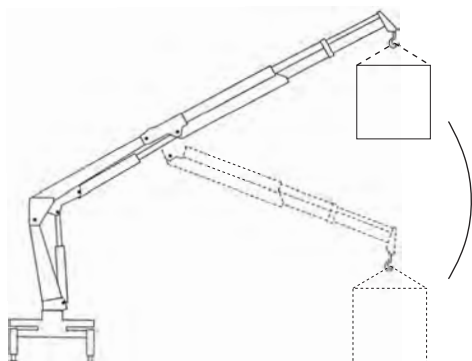
Detent on pos. 2/pos. 3
with spring return in neutral



F8

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



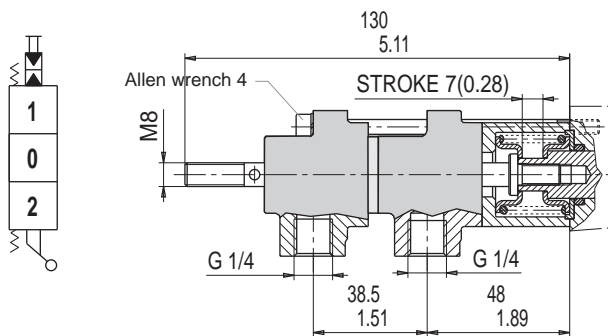


For manufacturers using load and overturning torque limiting device for hydraulically operated cranes, Salami VDM8 valve is available with some devices that allow the manufacturer to supply a pressure signal inside itself. This pressure signal, acting on the area of a piston of 18 mm (0.71 inc.) diameter, 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.

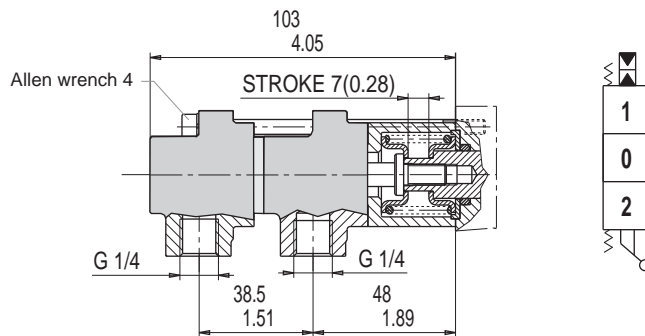
D9

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



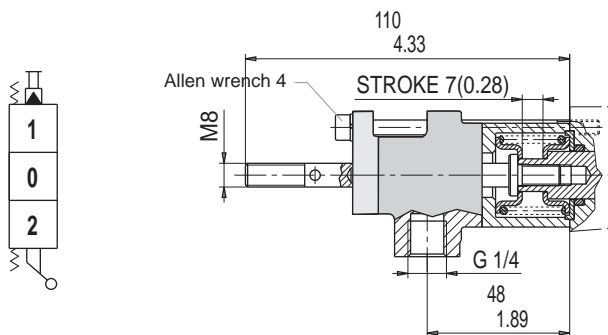
M3

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



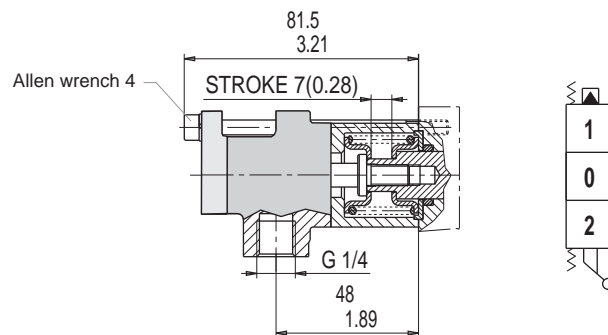
D8

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



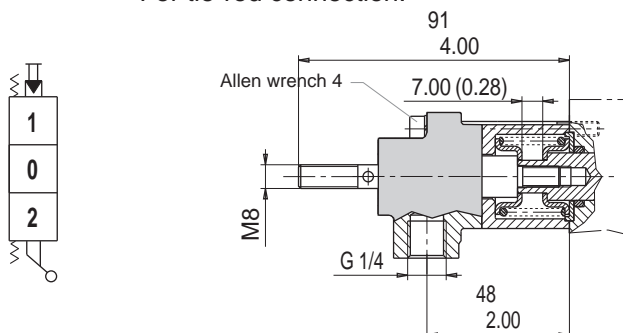
M1

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



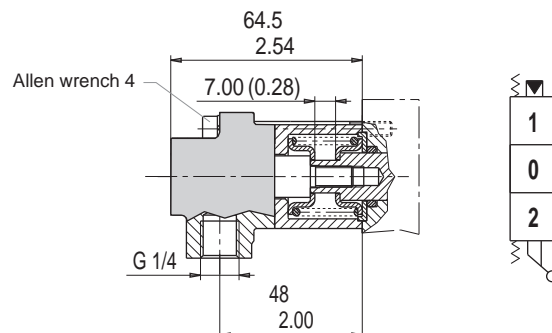
D7

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



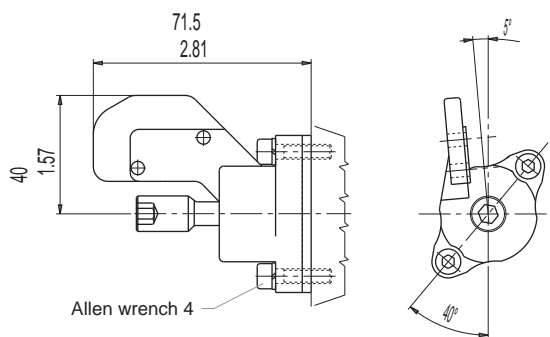
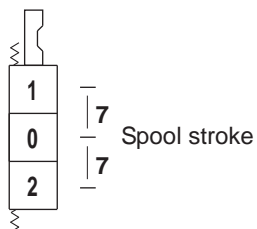
M2

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



CE

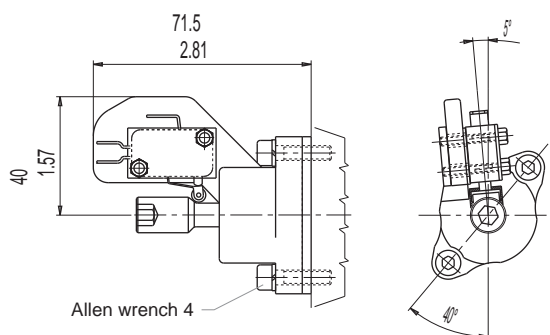
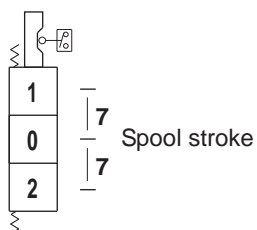
Pre-arrangement for
electrical device



CM

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

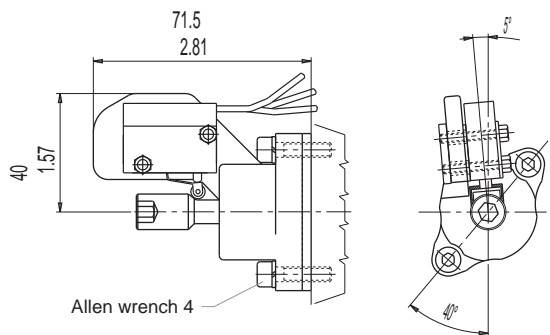
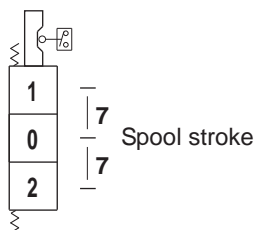
Spool positioning with microswitch
to start an electric motor
(available also for single acting spools)



PROTECTION INDEX
IP65

CW

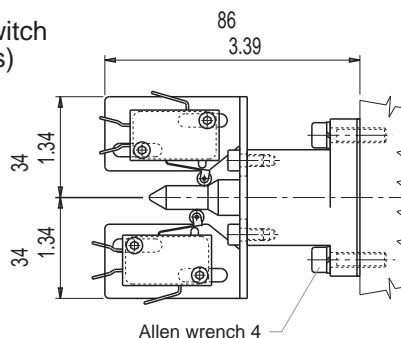
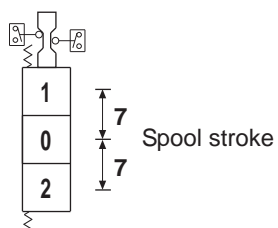
Spool positioning with waterproof
microswitch to start an electric motor
(available also for single acting spools)



PROTECTION INDEX
IP67

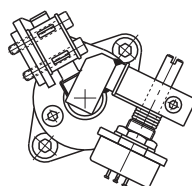
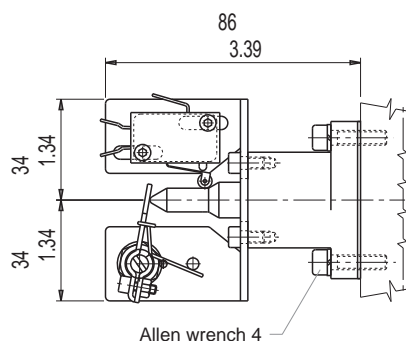
CD

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

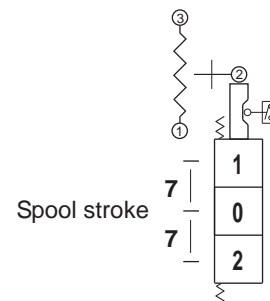
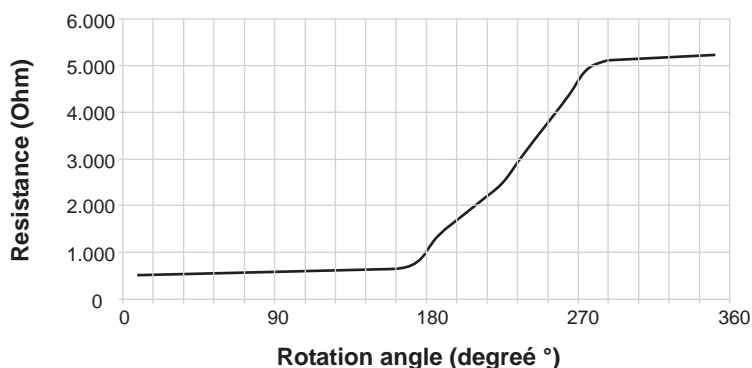


PROTECTION INDEX
IP65

PM



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

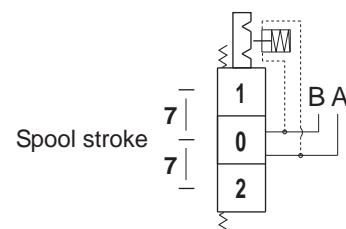


IMPORTANT:

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

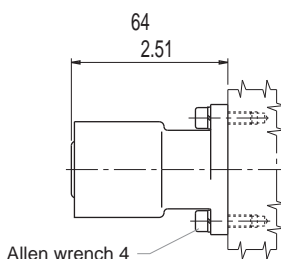
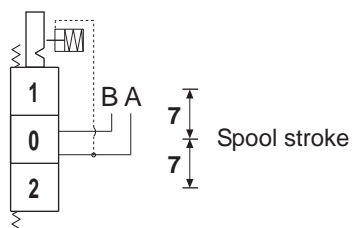
G2

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



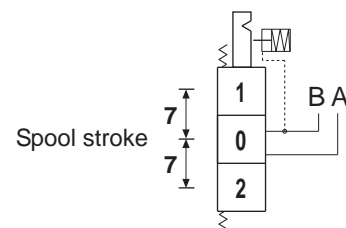
G5

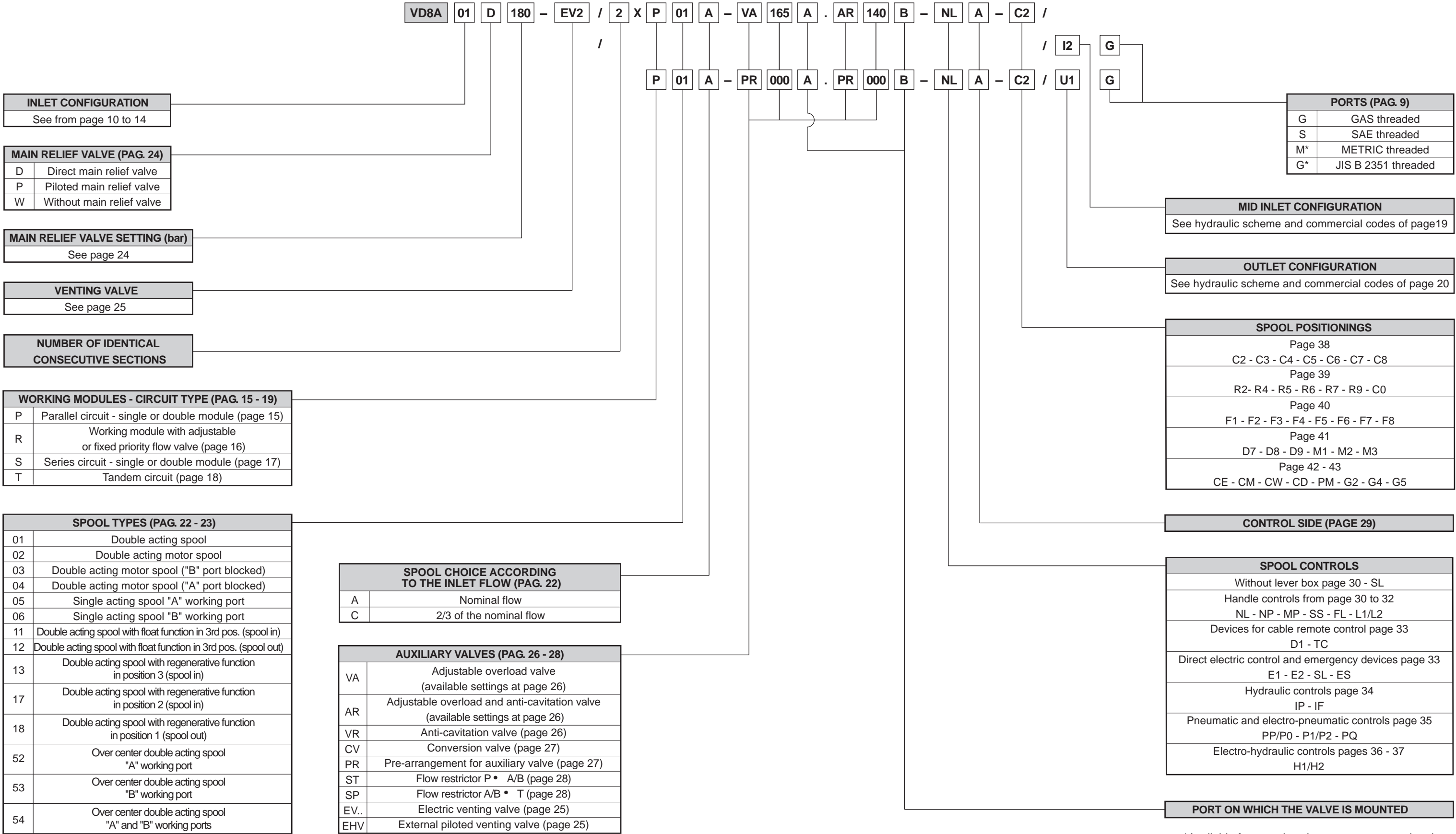
Detent on pos. 2
with hydraulic kick-out



G4

Detent on pos. 1
with hydraulic kick-out





*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 traceability of the product), we have adopted a new identification label starting from the 1st march 1995. Pls, see following example:

A			
B			
C		D	
E	sa amj	F	G

A = Product short description (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:

→
SALAMI 09/02
MADE IN ITALY 4010998
612271211 nr. 13
2PB 19S B25 B5

Product short description.

Salami part number and progressive number of assembling.

Production code (for Salami management).

Mounth and year of made: maybe in the future you can find this
type of production date in the label beside too.

Rotation sense.

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) months 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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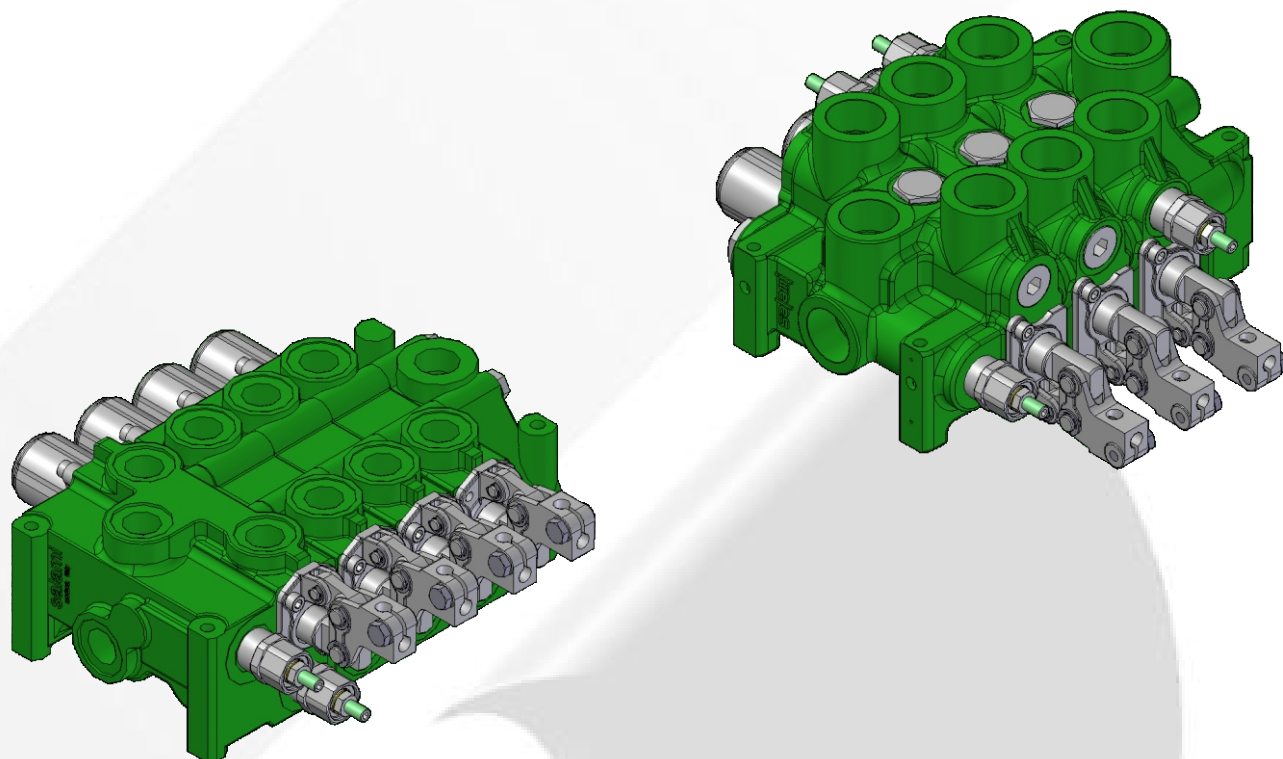


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info@salamihydraulics.com

SECTIONAL VALVES

VD10A - VD12A

Technical catalogue



E0.24.0710.02.01

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

salam  TM

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Page 3 - Features

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Page 6 - Features - Circuit types - Hydraulic fluids

Page 7 - Features

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Page 9 - VD10A - Performance data

Page 10 - VD10A - Available inlet and working module types

Page 11 - VD10A - End modules - Series circuit spools

Page 12 - VD12A - Dimensions from 1 to 8 working modules (standard release)

Page 13 - VD12A - Dimensions from 1 to 8 working modules (optimal release on request)

Page 14 - VD12A - Performance data

Page 15 - VD12A - Available circuit types

Page 16 - VD12A - Available circuit types

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Page 18 - Inlet modules (hydraulic circuits) - Main relief valves

Page 19 - Circuits types - Spool choice according to the inlet flow

Page 20 - Spool types

Page 21 - Auxiliary valves

Page 22 - Spool controls

Page 23 - Spool controls

Page 24 - Control side - Joystick for two spools

Page 25 - Spool positionings

Page 26 - Spool positionings

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Page 30 - How to order VD10A-VD12A

Page 31 - WARRANTY

E0.24.1011.02.02

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 department.

FEATURES

GENERAL

Among all hydraulic directional control valves used in the field of mobile equipment applications, the spool valve is the most popular.

The sectional valve type allows construction flexibility. Salami directional control valves are modular construction and consist of an inlet section, up to 10 working sections and an outlet section. All these elements are secured in one block by means of tie-rods.

Working sections consist of:

- a special cast-iron body
- a spool with a hardened surface, anticorrosion treated
- a device for the operation of the spool
- a spool centering device.

FEATURES

Salami directional control valves have the following features :

- Modular construction up to 10 sections
- Hydraulic circuits between the sections
 - parallel circuit
 - series circuit
 - tandem circuit
- several valve types with different spool types
- possibility of adding a second valve
- spool construction in steel, hardened and chromium-plated to obtain a higher surface hardness and a better corrosion resistance
- minimum tolerance between the spools and the body to obtain a minimum internal leakage
- interchangeability of all the spools
- possibility of auxiliary valve either on port A or B or on both
- several spool controls

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.

Piloted main relief valve : Controls the maximum pressure in the circuit when one or more spools are on end stroke. But, in comparison with the direct relief valve, it allows superior performances.

Port relief 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 when the spool is in neutral position.

FEATURES

Anti-cavitation check valve on port A or/and B: Avoids cavitation in the system, created by the inertia, when the spool is in neutral position.

Port relief and anti-cavitation check valve on port A or/and B: Allows the same functions as the 2 preceding valves

Port relief valve : Limits the working pressure at a lower setting than the principal main relief valve; protects ports A and/or B

Double-single acting conversion valve : This manual selector changes the working section from double to single acting (A port).

Flow limiting valve : Reduces the flow on A and B ports (pressure compensated).

• Devices

Manual safety device : Avoids accidental operation of the spool.

Electric safety device : Avoids accidental operation of the spool, operation only possible with electrical signal present.

Control device for microswitches : For the operation of D.C. motor driven pumps at one or more rotation speeds.

Anti-tilt device : Returns the spool automatically to the neutral position when the pressure reaches a pre-set value to avoid cranes from becoming unstable

Hydraulic kick-out : Returns the spool automatically to the neutral position when the preset pressure of port A or B is exceeded

Venting valve: Located on the inlet module side, it allows venting of the total flow when no spool is activated. The valve can be opened hydraulically or electrically.

Hydraulic switch: Located on the inlet module side, activated manually, allows the hydraulic block of an actuator.

FEATURES

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

VD10A - TECHNICAL DATA

Spools	from 1 to 8 (for more working modules pls. contact our sales department)		
Nominal flow	Q	120 l/min	(32 gpm US)
Max flow*		140 l/min	(37 gpm US)
Max pressure	port P	280 bar	(4000 psi)
	ports A/B	315 bar	(4500 psi)
	port T*	25 bar	(363 psi)
In case of series circuit, the values of nominal/max. flow and max pressure are different, please see at page XX			
Internal leakage at 160 bar (2285 psi)		ports A/B → T	40 ÷ 55 cm ³ /min (2.43 ÷ 3.34 cu.in./min)
For lower leakage please contact our sales department.			
Spool stroke (positions 1 and 2)		± 8.75 mm	(0,34 in.)
Spool stroke (position 4, float or regenerative)		± 8.75 + 6.75 mm	(0.34 + 0.26 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.			

VD12A - TECHNICAL DATA

Spools	from 1 to 8 (for more working modules pls. contact our sales department)		
Nominal flow	Q	180 l/min	(48 gpm US)
Max flow*		240 l/min	(63 gpm US)
Max pressure	port P	280 bar	(4000 psi)
	ports A/B	315 bar	(4500 psi)
	port T*	25 bar	(363 psi)
In case of series circuit, the values of nominal/max. flow and max pressure are different, please see at page XX			
Internal leakage at 160 bar (2285 psi)		ports A/B → T	40 ÷ 55 cm ³ /min (2.43 ÷ 3.34 cu.in./min)
For lower leakage please contact our sales department.			
Spool stroke (positions 1 and 2)		± 8.75 mm	(0,34 in.)
Spool stroke (position 4, float or regenerative)		± 8.75 + 6.75 mm	(0.34 + 0.26 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.			

WORKING CONDITIONS

HYDRAULIC FLUID		Mineral oil according to DIN 51524	
VISCOSITY			
Viscosity range		10 460 mm ² /sec. 0.015 0.713 sq.in./sec.	
Optimal viscosity		12 75 mm ² /sec. 0.019 0.116 sq.in./sec.	
TEMPERATURE			
Fluid range temperature		- 20 + 85° C - 4 + 185° F	
Suggested range		+30 + 60° C +86 + 140° F	
MAXIMUM CONTAMINATION LEVEL		NAS 1638: class 9 ISO 4406: 19/16	
MAXIMUM PRESSURE ON TANK (T) PORT		20 bar 300 psi	
ROOM TEMPERATURE		- 30 + 60° C - 22 + 140° F	
WORKING LIMITS		See diagrams	
PRESSURE DROPS		See diagrams	
For operation with fire resistant fluid, please contact our sales departement			

OPERATING PRINCIPLE

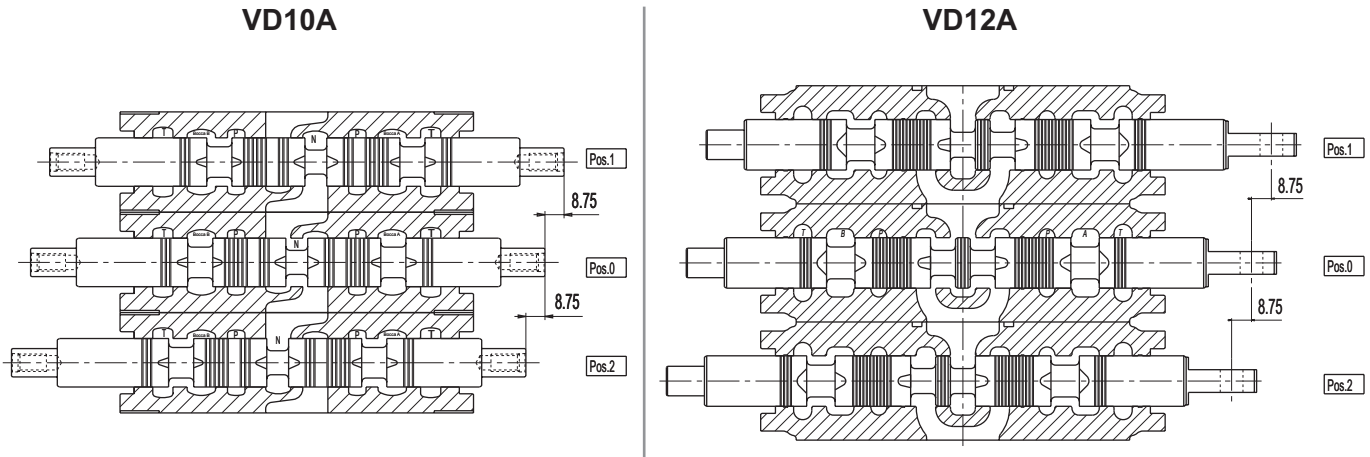
Salami directional control valves belong to the 6/3 (or 6/4) type; they can control 6 paths in 3 (or 4) spool positions simultaneously.

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 central path is gradually throttled and the connection between pump and implement, 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 check valve to the implement.

FEATURES



There are 3 characteristic phases in the spool stroke:

- a. the overlap phase (about 38% of the stroke) guarantees minimum internal leakages when it is in neutral position
- b. the progressive regulation phase (about 40% of the stroke) allows optimum metering
- c. residual phase (about 22% of the stroke)

CIRCUIT TYPES

For valve assemblies consisting of two or more working sections, the following types of circuits are available:

Parallel circuit : The spools, when activated simultaneously, will use full system pressure while dividing the available flow by the number of sections up to the maximum rating.

Series circuit : The spools, when activated simultaneously, will use full system flow while dividing the available pressure by the number of sections up to the maximum rating.

Tandem circuit : The actuated spool can use both full pressure and full flow. Down stream sections have no oil available.

Combined circuit : A combination of the above mentioned types of circuits.

HYDRAULIC FLUIDS

Usually a mineral-base oil with a good viscosity index should be used, preferably with good lubricating properties and corrosion, oxydation and foaming resistant.

Sometimes the fluids supplied by the manufacturers do not satisfy purity requirements (see WORKING CONDITIONS). It is therefore necessary to filter the fluid carefully before filling. Your supplier can give you the information about the 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 igroscopic salts.

For operation with fire resistant and ecological fluids, please contact our technical department.

FEATURES

INSTALLATION

When proceeding to mount the unit on the structure and to connect adaptors to work ports, it is necessary to comply with the values of tightening torques as indicated in the maintenance book. The attachment of linkages to spools should not affect their operation. The mounting position can be vertical or horizontal.

FILTRATION

The contamination of the fluid circulating 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 cleanliness of the system has been attained, it is necessary to limit any increase of contamination by installing an efficient filtration system.

PIPES

Pipes should be as short as possible, without restrictions or sharp bends (especially the return lines). Before connecting pipes to the adaptors 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, pipe diameters should be selected on the ground of the following values of the fluid velocity :

6 to 10 m/sec	: delivery pipe
3 to 5 m/sec.	: outlet pipe

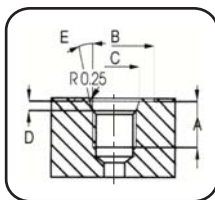
19.7 to 32.8 ft/sec	: delivery pipe
9.9 to 16.4 ft/sec	: outlet pipe

The lowest velocity in the pipes is required when the temperature range is wide and / or for continuous running.

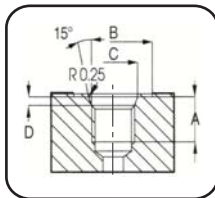
Alternatively, the highest velocity is required when the temperature range is more limited and / or for intermittent operations.

PORTS

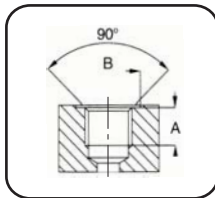
Following are standard ports. For other port types, please contact our sales department.



Dimensions		SAE UN-UNF (ISO 725)															
mm	in.	7/16-20 UNF SAE4		9/16-18 UNF SAE6		3/4-16 UNF SAE8		7/8-14 UNF SAE10		1 1/16-12 UN SAE12		1 5/16-12 UN SAE16		1 5/8-12 UN SAE20		1 7/8-12 UN SAE24	
A		12	0.47	13	0.51	15	0.59	17	0.67	20	0.79	20	0.79	20	0.79	20	0.79
B		21	0.83	25	0.98	30	1.18	34	1.34	41	1.61	49	1.92	58	2.28	65	2.56
C		12.4	0.49	15.6	0.61	20.6	0.81	23.9	0.94	29.2	1.15	35.5	1.40	43.5	1.71	49.5	1.95
D		2.4	0.09	2.5	0.10	2.5	0.10	2.5	0.10	3.3	0.13	3.3	0.13	3.3	0.13	3.3	0.13
E		12°						15°									

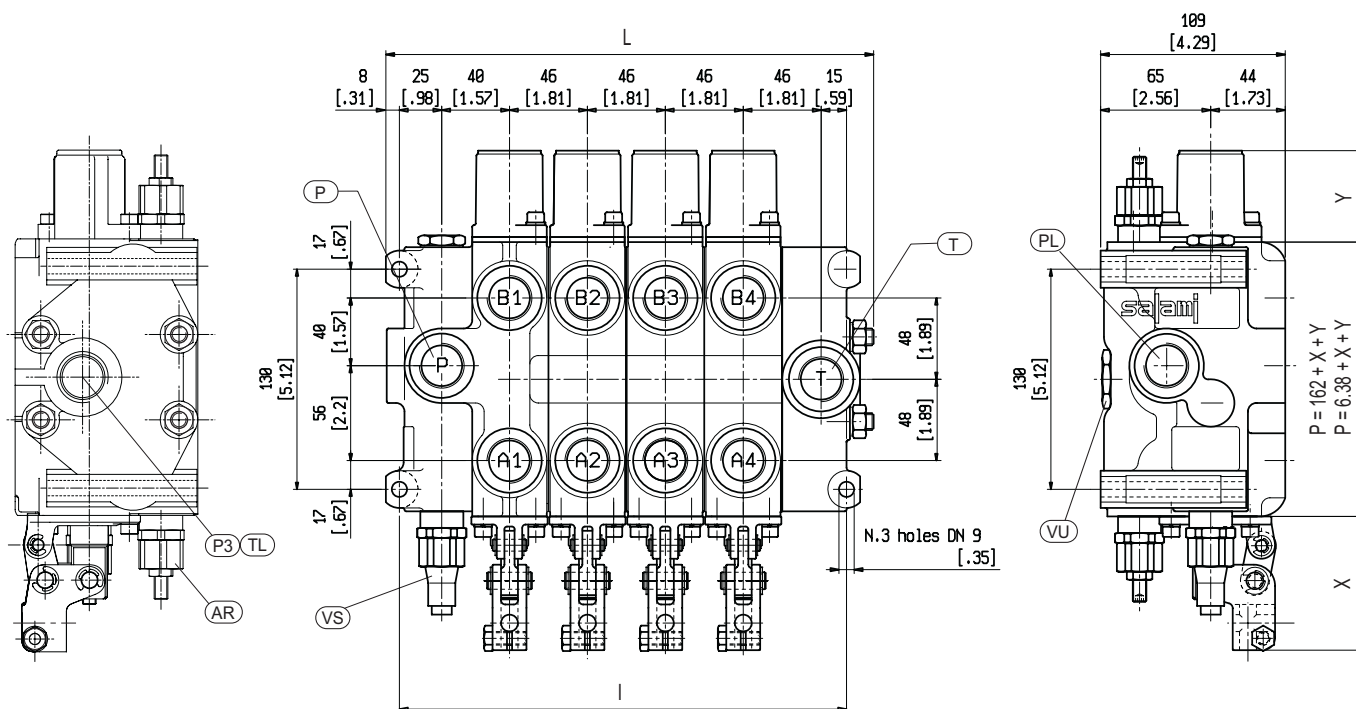


		METRIC (ISO 6149)															
Dimensions		M18X1,5				M22X1,5				M27X2				M33X2			
mm	in.	ISO 262		ISO 6149		ISO 262		ISO 6149		ISO 262		ISO 6149		ISO 262		ISO 6149	
A		14	0,55	14,5	0,57	16	0,63	16	0,63	18	0,71	19	1,75	20	0,79	19	0,75
B		27,5	1,08	29	1,14	31,5	1,24	34	1,34	37,7	1,48	40	1,57	45	1,77	46	1,81
C				19,8	0,78			23,8	0,94			29,4	1,16			35,4	1,39
D				2,4	0,09			2,4	0,09			3,1	0,12			3,1	0,12



Dimensions		BSP (ISO 228)															
mm	in.	G 1/8		G 1/4		G 3/8		G 1/2		G 3/4		G 1		G 1 1/4		G 1 1/2	
A		10	0,39	14	0,55	14	0,55	16	0,63	18	0,71	20	0,79	22	0,87	24	0,94
B (min)		15	0,59	19	0,75	23	0,91	27	1,06	33	1,30	40	1,57	50	1,97	56	2,20

DIMENSIONS FROM 1 TO 8 WORKING MODULES



The drawing shown is just an example. The overall dimensions you read are valid for all the VD12A except the parametric dimensions "L" and "I" depending of the number of working sections. The parametric dimension "P" depends on a fixed dimension of 162 mm (6.38 in.) to which you have to add 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
- T** = top outlet port
- TL** = side outlet port
- P3** = power beyond port
- A/B** = work ports
- VS** = main relief valve (adjustable)
- AR** = overload and anti-cavitation valve
- VU** = load check valve

Spools		1	2	3	4	5	6	7	8
I	mm	126	172	218	264	310	356	402	448
	in	4.96	6.77	8.58	10.39	12.20	14.01	15.82	17.63
L	mm	150	196	242	288	334	380	426	472
	in	5.90	7.71	9.52	11.33	13.14	14.96	16.77	19.44
Weight	Kg.	10.9	15.9	20.9	25.9	30.9	35.9	40.9	45.9
	lb.	23.98	34.98	45.98	56.98	67.98	78.98	89.98	100.98

For different size and thread ports, please contact our sales department

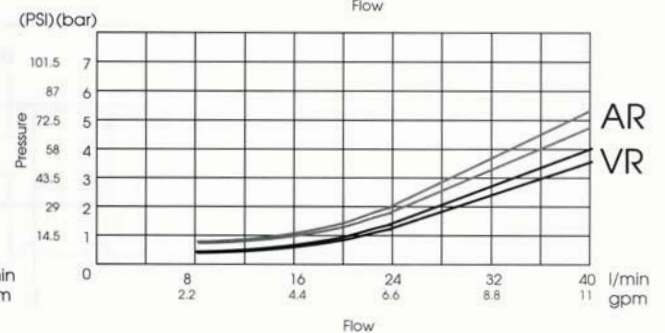
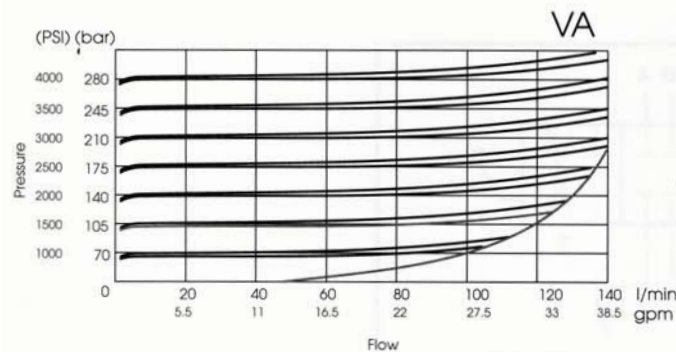
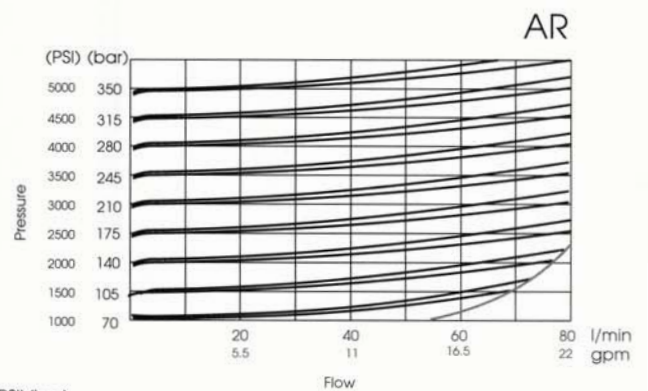
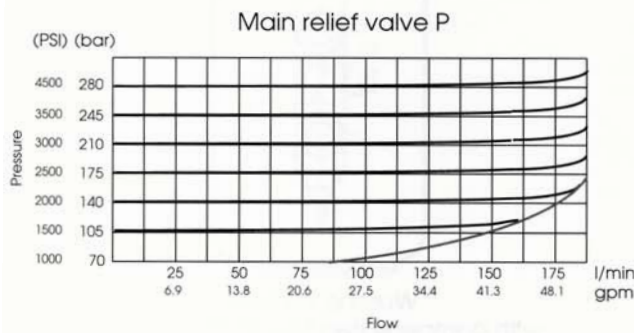
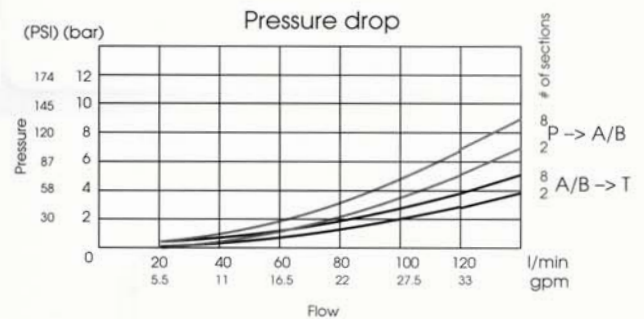
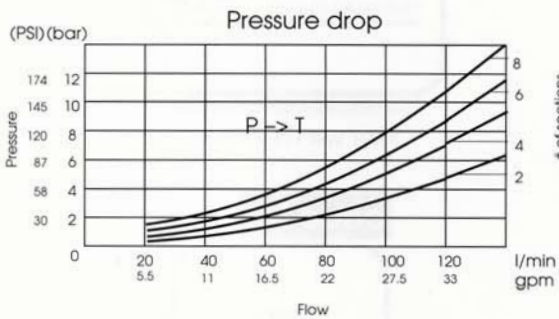
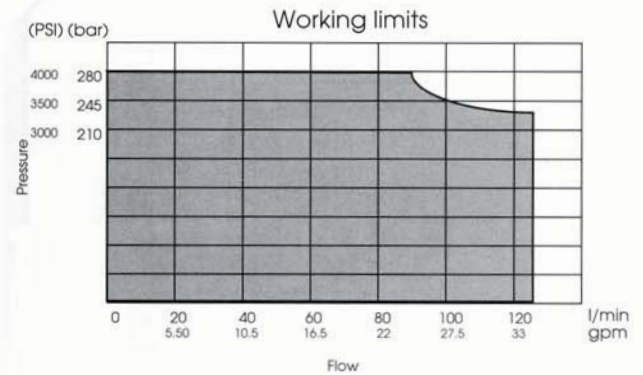
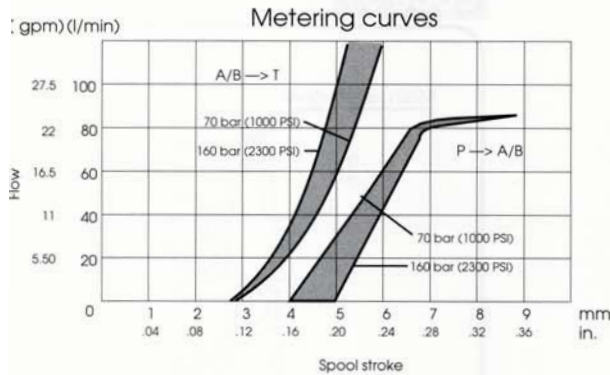
PORT SIZES	P - PL - P3	T	A - B
BSP ISO 228	G 3/4	G 1	G 3/4
SAE ISO 176	SAE#12 1-1/16 - 12 UN-2B	SAE#16 1-5/16 - 12 UN	SAE#12 1-1/16 - 12 UN-2B

For different port sizes, please contact our sales department.

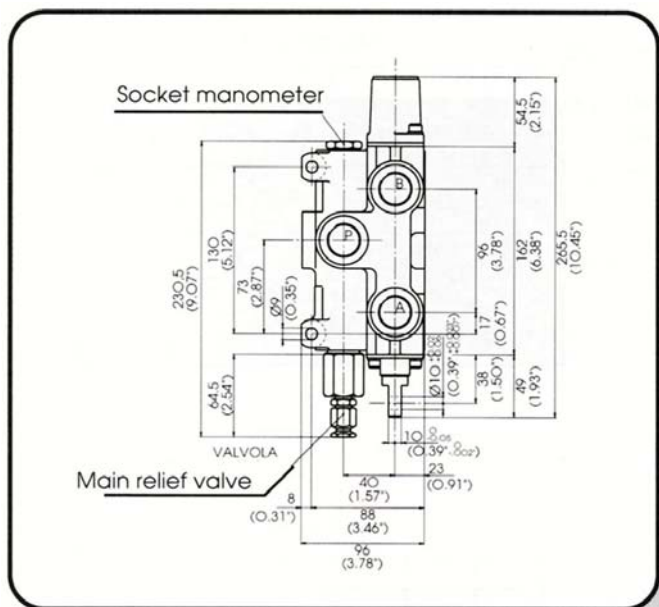
PERFORMANCE DATA

Performance curves
carried out with
oil viscosity at 16 cSt

Internal leakages
A/B → T 35cm³ /min. (2.14 cu. in./min)
at 200 bar (2860 psi) and 16 cSt

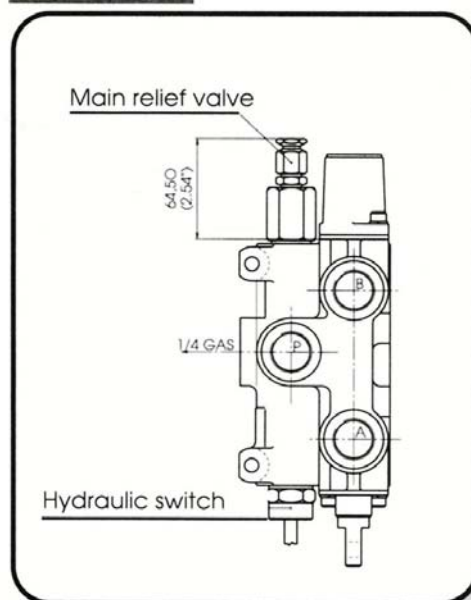


AVAILABLE INLET AND WORKING MODULE TYPES

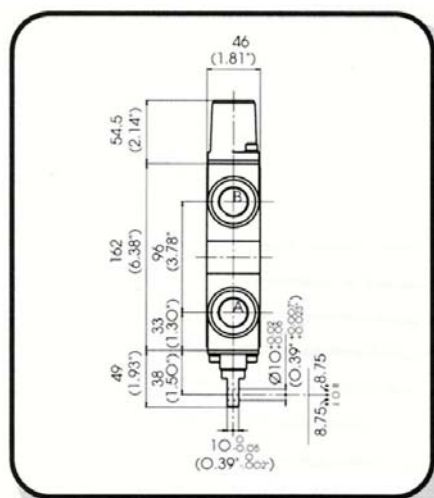


Inlet with working section

code 51

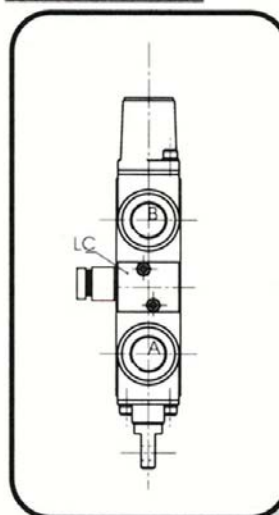


Inlet with hydraulic switch

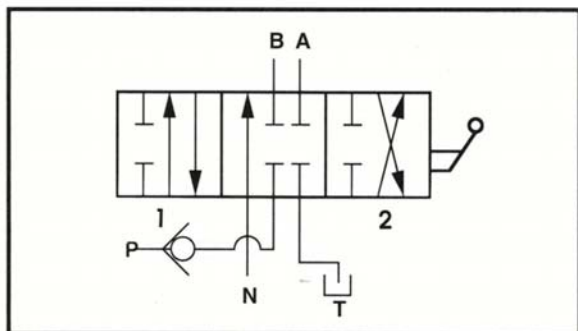


Working section

code LC

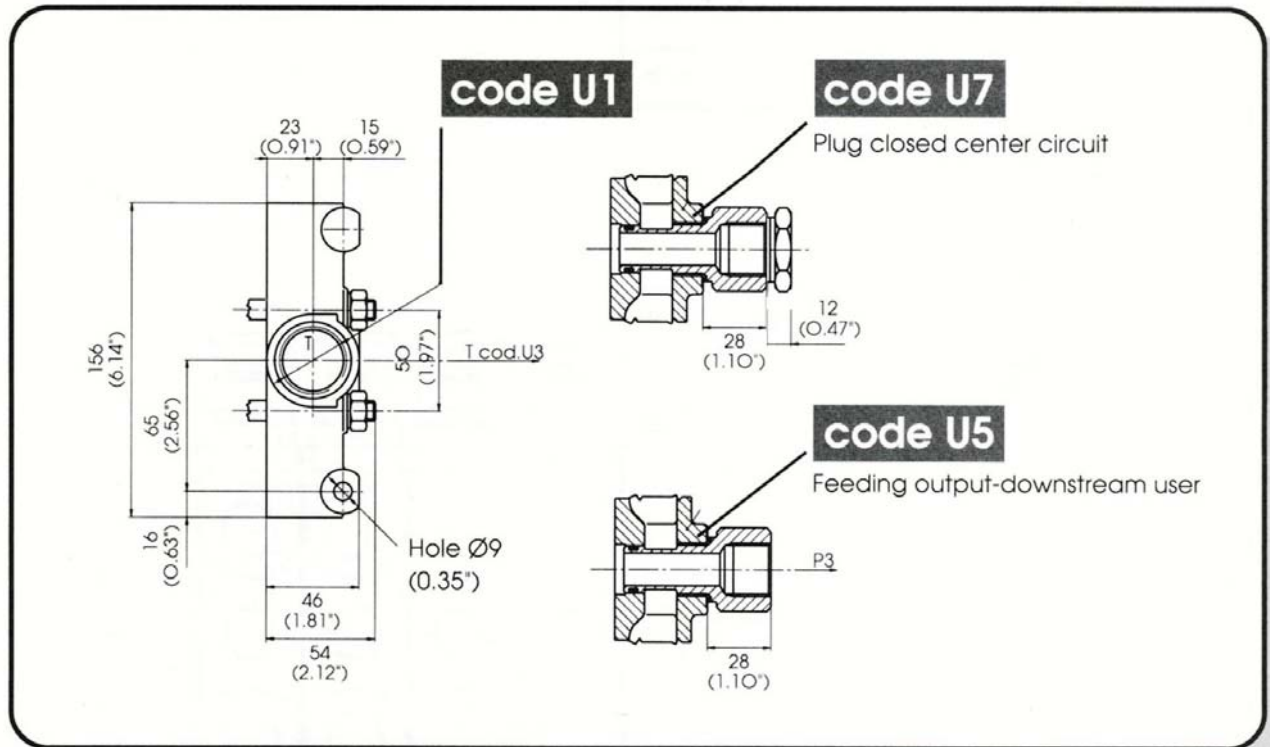


Working section
with compensated flow limiting valve

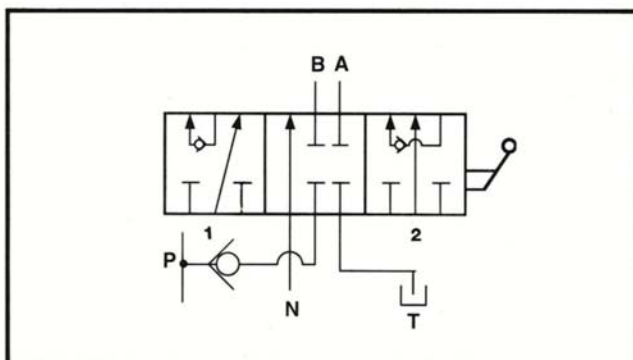


Double acting parallel circuit

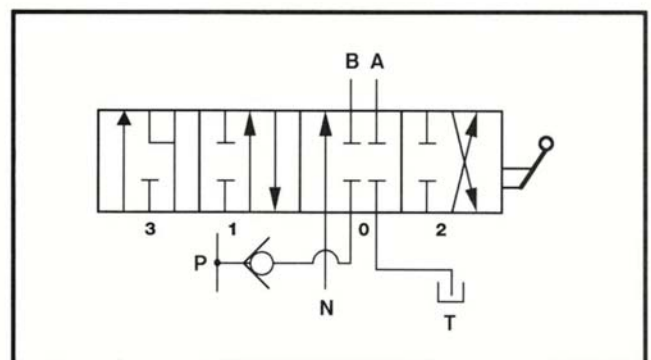
END MODULES



SERIES CIRCUIT SPOOL - FLOAT CIRCUIT SPOOL

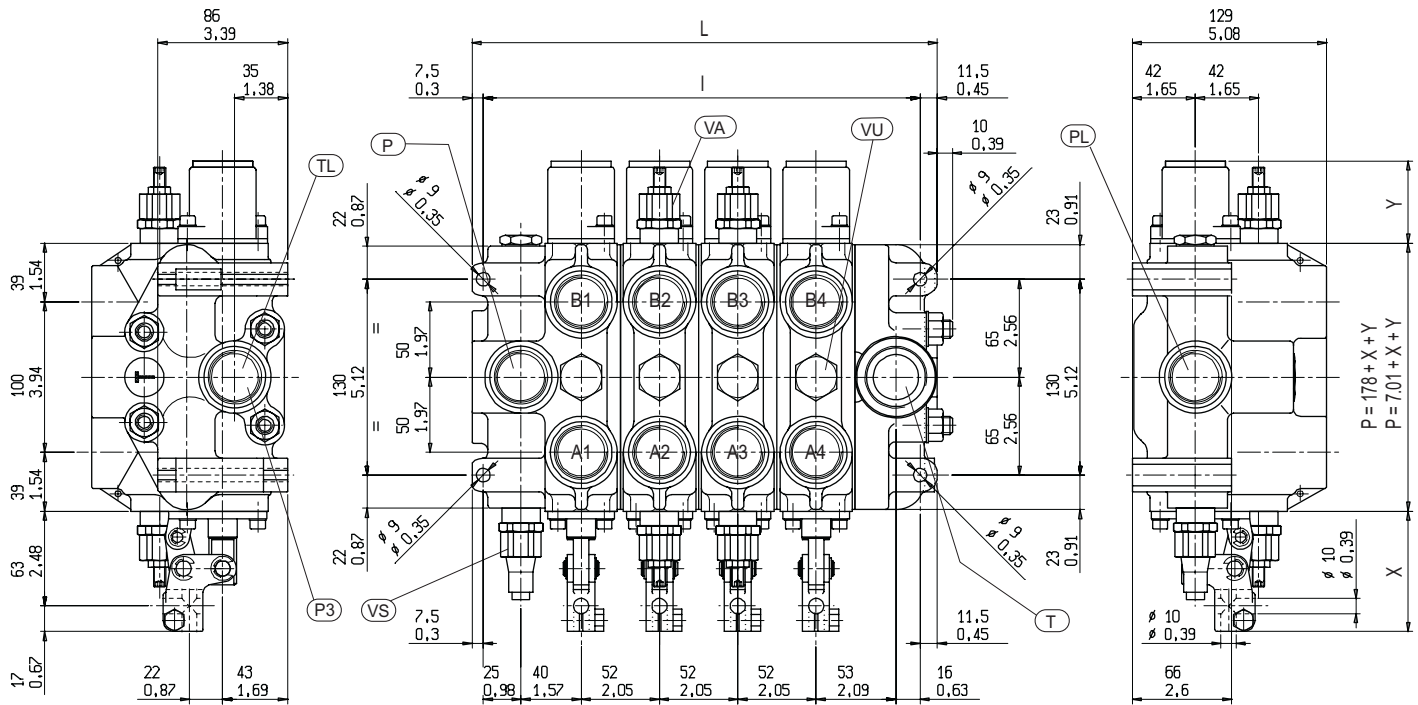


Double acting spool
for serie circuit



Double acting spool
with float spool position (spool out)

DIMENSIONS FROM 1 TO 8 WORKING MODULES RELEASE WITH CAST IRON INLET MODULE + WORKING SECTION (STANDARD)



The drawing shown is just an example. The overall dimensions you read are valid for all the VD12A except the parametric dimensions "L" and "I" depending of the number of working sections. The parametric dimension "P" depends on a fixed dimension of 178 mm (7.01 in.) to which you have to add 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
- T** = top outlet port
- TL** = side outlet port
- P3** = power beyond port
- A/B** = work ports
- VS** = main relief valve (adjustable)
- VA** = overload valve
- VU** = load check valve

Spools		1	2	3	4	5	6	7	8
I	mm	134	186	238	290	342	394	446	498
	in	5.27	7.32	9.37	11.42	9.10	13.46	17.56	19.61
L	mm	153	205	257	309	361	413	465	517
	in	6.02	8.07	10.12	12.16	14.21	16.26	18.31	20.35
Weight	Kg.	12.3	18.5	24.7	31	37.2	43.7	49.9	56.4
	lb.	27.12	40.79	54.46	68.36	82.03	96.36	110.03	124.36

For different size and thread ports, please contact our sales department

PORT SIZES	P - PL	T	TL - P3	A - B
BSP ISO 228	G 1	G 1	G 1	G 1
SAE ISO 176	SAE#16 1-5/16 - 12 UN	SAE#16 1-5/16 - 12 UN	SAE#16 1-5/16 - 12 UN	SAE#16 1-5/16 - 12 UN

On request you can have also T port **BSP ISO 228 - G 1 1/4**
or **SAE ISO 176 1-5/8 - 12 UN SAE 20**.

VD12A

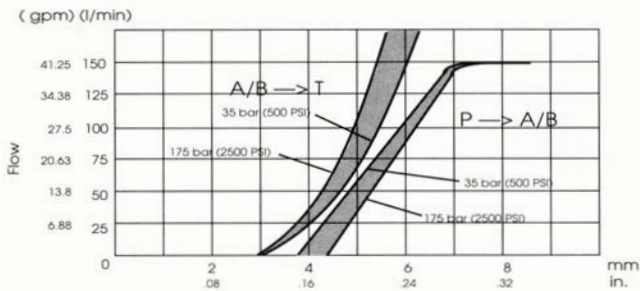
E0.24.1011.02.02

PERFORMANCE DATA

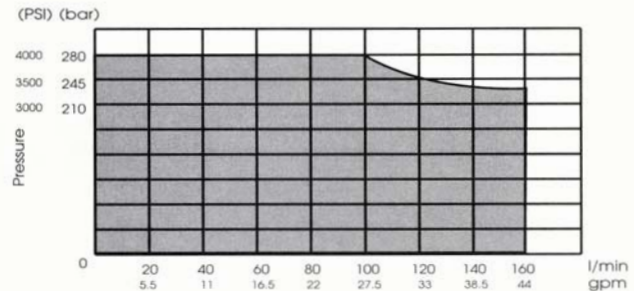
Performance curves
carried out with
oil viscosity at 16 cSt

Internal leakages
A/B → T 35cm³ /min. (2.14 cu./min)
at 200 bar (2900 psi) and 16 cSt

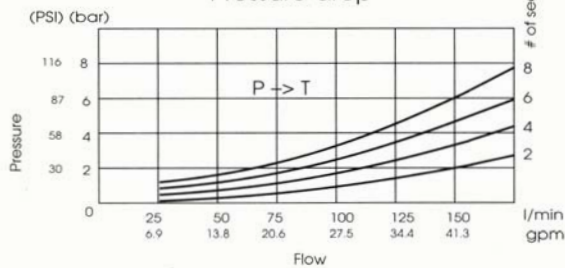
Metering curves



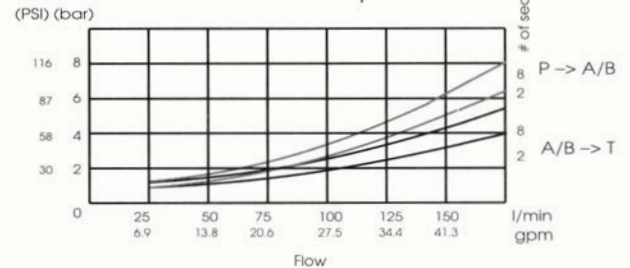
Working limits



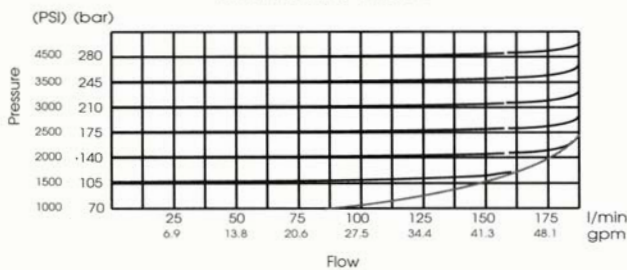
Pressure drop



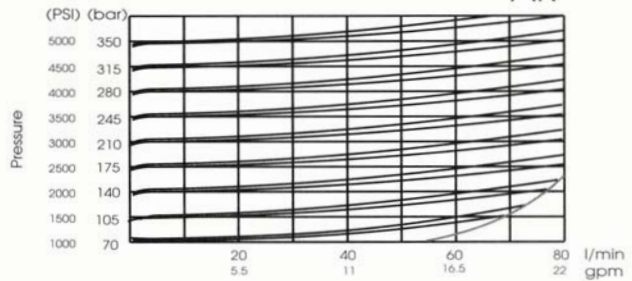
Pressure drop



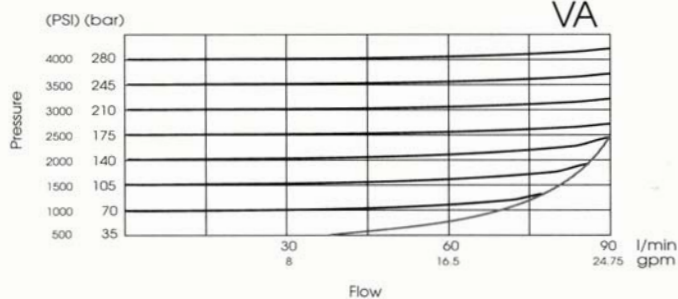
Main relief valve P



AR

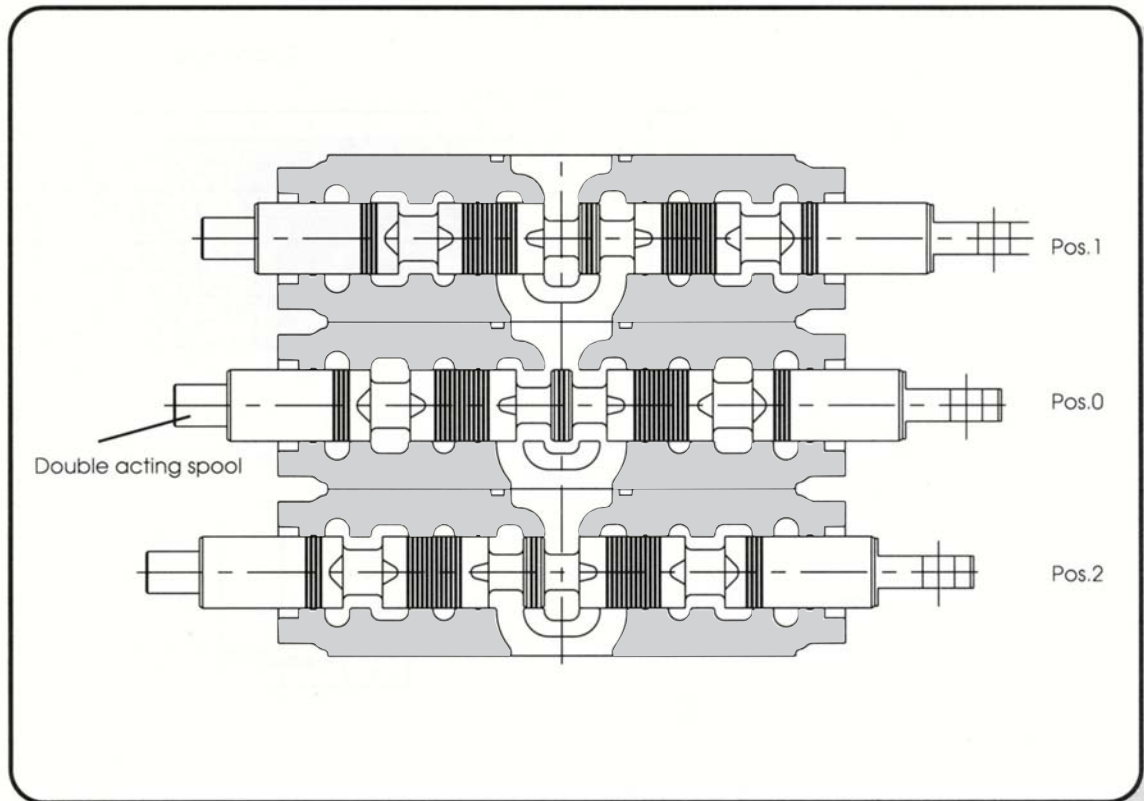


VA

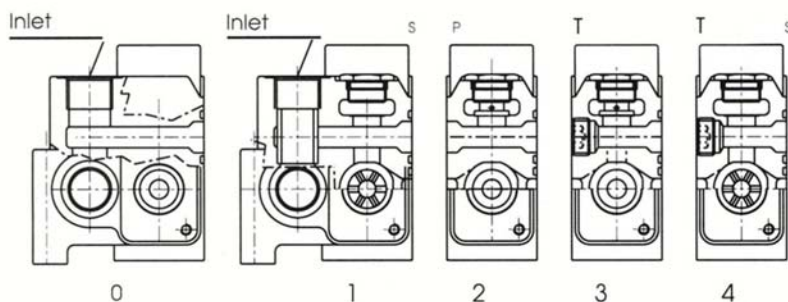


AVAILABLE CIRCUIT TYPES

PARALLEL CIRCUIT

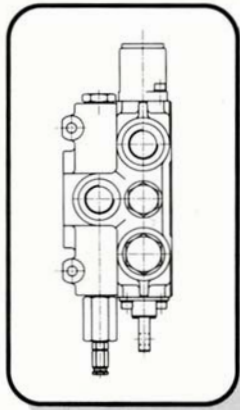


MIXED CIRCUIT

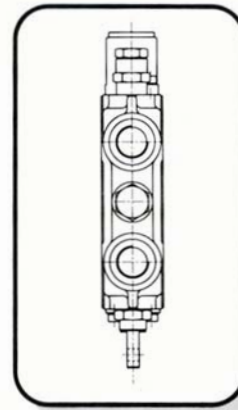


- 0 : Inlet with parallel circuit section (standard)
- 1. Inlet with serie circuit element
- 2. Parallel circuit section (standard)
- 3. Tandem circuit section
- 4. Serie circuit section

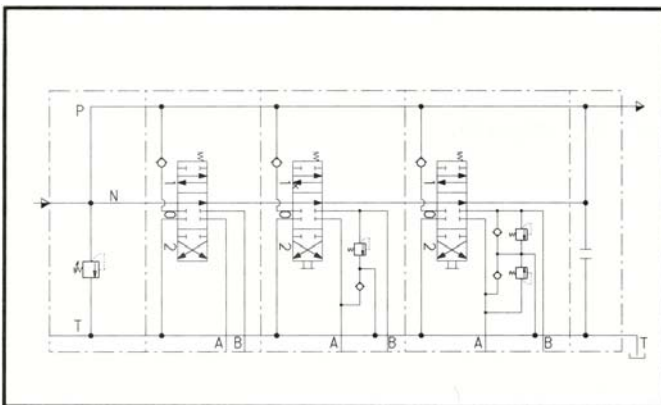
AVAILABLE CIRCUIT TYPES



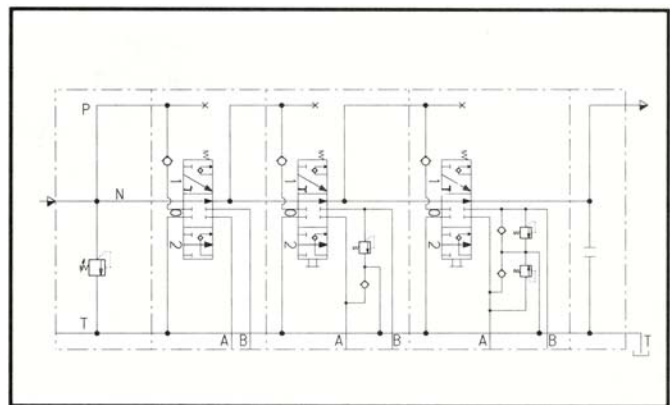
Inlet + working module



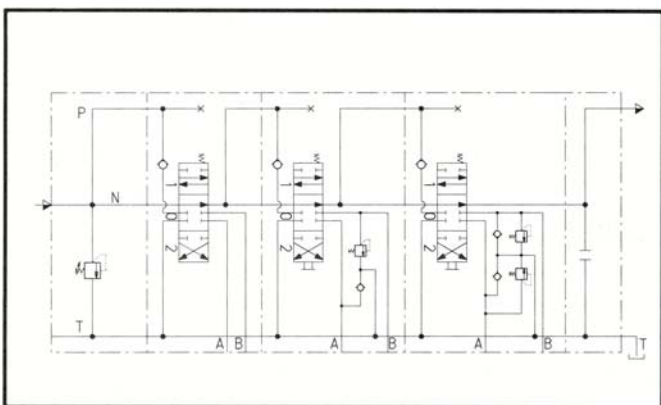
Working module



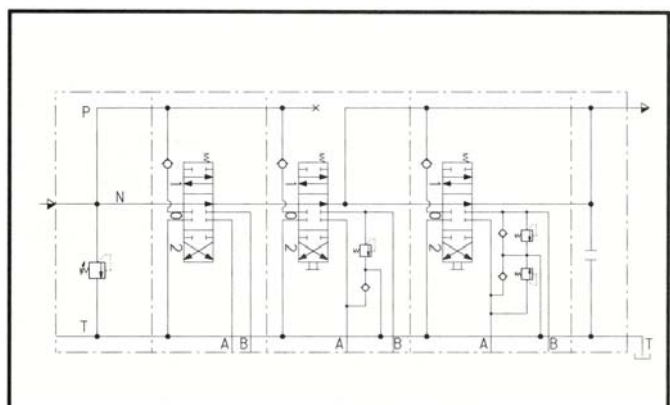
Parallel circuit



Series circuit

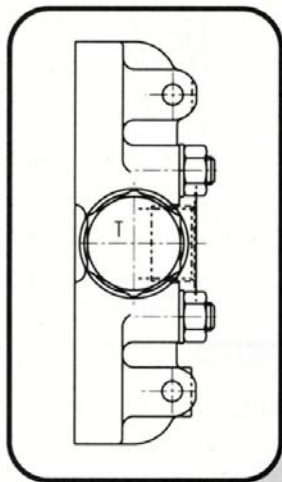


Tandem circuit



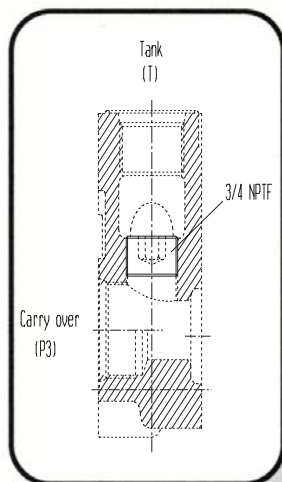
Mixed circuit

END MODULES



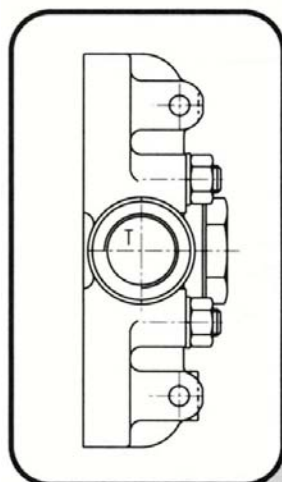
code U3

Side outlet port (plugged upper port)



code U5

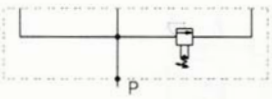
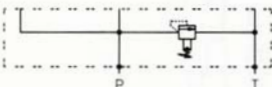
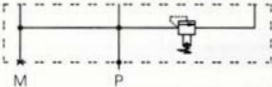
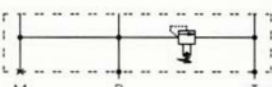
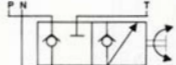
Power beyond configuration (P3 lateral)



code U7

Closed center circuit configuration

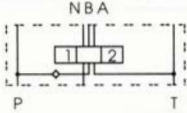
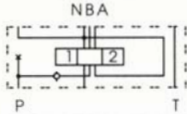
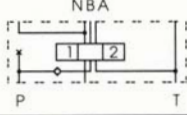
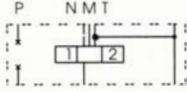
INLET MODULES

Code	Hydraulic symbol	Description			VD10A	VD12A
01		Top inlet port			•	•
02		Side inlet port (top port plugged)			•	•
03		Top and side inlet port			•	•
07		Top inlet and outlet port				
08		Side inlet and outlet port (top ports plugged)				
21		Top inlet port with gauge port			•	•
22		Side inlet port with gauge port			•	•
27		Top inlet and outlet port with gauge port				
28		Side inlet and outlet port with gauge port				
31	See page 14	Top inlet port with priority valve				
32	See page 14	Top inlet port with external priority valve				
51		Top inlet with hydraulic switch			•	

MAIN RELIEF VALVES

Code	Description			VD10A	VD12A	
D	With direct main relief valve			•	•	
P	With piloted main relief valve			•	•	
W	Without main relief valve			•	•	

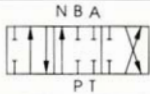
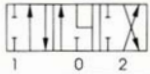
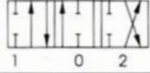
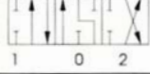
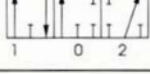

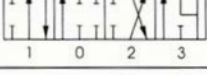
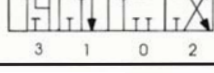

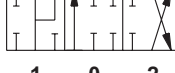
CIRCUIT TYPES

Code	Hydraulic symbol	Description			VD10A	VD12A
P		Parallel circuit			•	•
S		Series circuit			•	•
T		Tandem circuit			•	•
H		Circuit for hydraulic hammer				

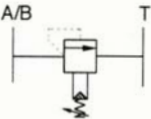
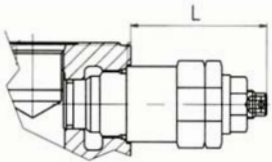
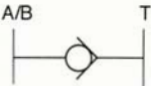
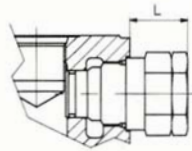
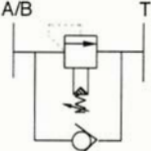
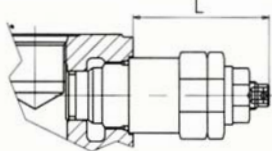
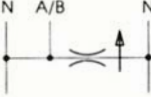
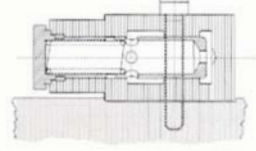
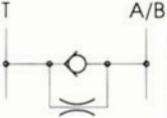
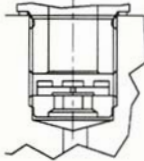
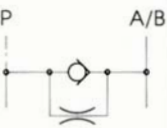
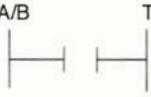
SPOOL CHOICE ACCORDING TO THE INLET FLOW

Code	Description			VD10A	VD12A
A	Nominal flow			•	•
C	2 / 3 of nominal flow			•	•

SPOOL TYPES

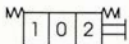
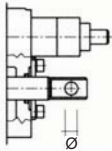
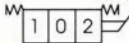
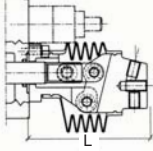
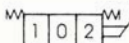
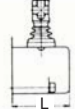
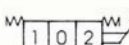
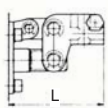
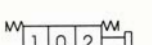
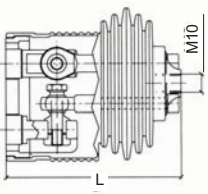

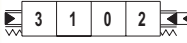

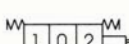
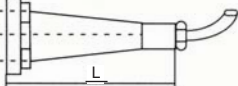

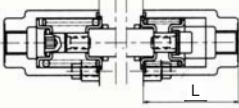
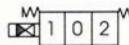
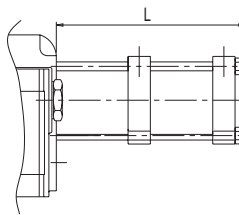
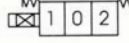
Code	Hydraulic symbol	Description			VD10A	VD12A
01		Double acting spool			•	•
02		Double acting motor spool			•	•
03		Double acting motor spool (B port blocked)			•	•
04		Double acting motor spool (A port blocked)			•	•
05		Single acting spool A working port			•	•
06		Single acting spool B working port			•	•
11		Double acting spool with third float position (spool in)				
12		Double acting spool with third float position (spool out)			•	•
17		Double acting spool with regenerative function in position 2 (spool in)				•
18		Double acting spool with regenerative function in position 1 (spool out)				•

AUXILIARY VALVES

Code	Hydraulic symbol	Description				VD10A	VD12A	
VA		Overload valve				• L=55 2.17"	• L=55 2.17"	
VR		Anticavitation valve				• L=7 0.28"	• L=7 0.28"	
AR		Overload and anticavitation				• L=71 2.80"	• L=71 2.80"	
LC		Flow limiting valve				•	•	
ST		Flow restrictor				Available like cartridge	Available like cartridge	
SP		Flow restrictor						
PR		Prearranged for auxiliary valves (plugged)				•	•	

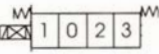
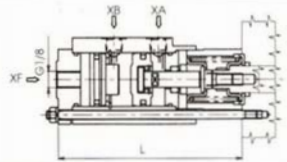
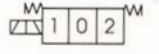
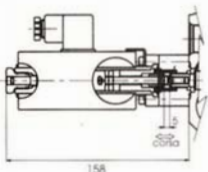
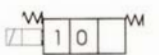
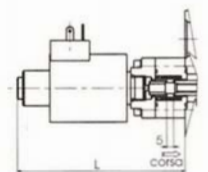
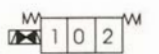
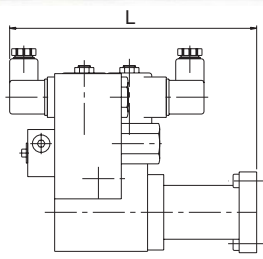
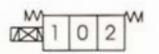
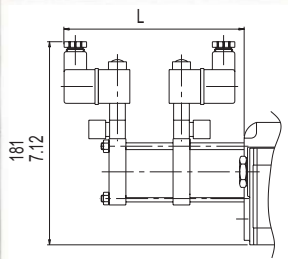
The valve code LC needs a modification on the module.
The valves code SA and SB are not included in the codification.
If one of those codes are requested, please add a technical note.

SPOOL CONTROLS

Code	Hydraulic symbol	Description				VD10A	VD12A
SL		Without lever				L=38 1.50" • ø=10 0.39"	L=38 1.50" • ø=10 0.39"
NL		With protected lever				• L=102 4.02"	• L=102 4.02"
NP		With protector lever (only when there are no auxiliary valves)					
ML		Not protected clamp levers				• L=79 3.11"	• L=79 3.11"
L1		Cross lever for 2 spools with fulcrum on up-stream spool (see pag. 40)				• L=80 3.15"	• L=80 3.15"
L2		Cross lever for 2 spools with fulcrum on down-stream spool (see pag. 40)				• L=80 3.15"	• L=80 3.15"
IF		Hydraulic proportional control with third float position (spool out)				• L=124 4.9	• L=124 4.9
TC		Cable control (with mounting kit on directional control valve)				• L=90 3.54"	• L=90 3.54"
IP		Hydraulic proportional min: 57 psi (4 bar) max: 357 psi (25 bar)				• L=75 2.95"	• L=75 2.95"
PP		Pneumatic proportional min: 35 psi (2.5 bar) max: 85 psi (6 bar)				• L=127 5	• L=127 5
PO		Pneumatic ON-OFF min: 50 psi (3.5 bar)				• L=127 5	• L=127 5

* Without rubber protection

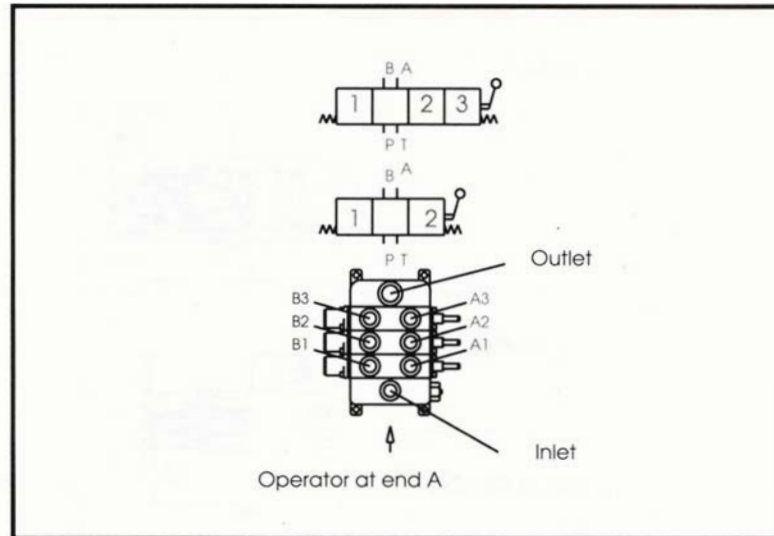
SPOOL CONTROLS

Code	Hydraulic symbol	Description				VD10A	VD12A
PQ		Pneumatic ON-OFF for pos. 3 6 bar \pm 0.5 87 psi \pm 7					
E1		Electric 3 positions ON-OFF 12V c.c.					
E2		Electric 3 positions ON-OFF 24V c.c.					
E3		Electric ON-OFF 12V c.c.					
E4		Electric push ON-OFF 24V c.c.					
H1		Electro hydraulic ON-OFF 12V c.c. (max 25 bar/362 PSI)				L=183 7.2	L=183 7.2
H2		Electro hydraulic ON-OFF 24V c.c. (max 25 bar/362 PSI)				L=183 7.2	L=183 7.2
P1		Electro pneumatic ON-OFF 12V c.c. (max 9 bar/130 PSI \pm 7)				L=160 6.3	L=160 6.3
P2		Electro pneumatic ON-OFF 24V c.c. (max 9 bar/130 PSI \pm 7)				L=160 6.3	L=160 6.3

CONTROL SIDE

Standard configuration
for :

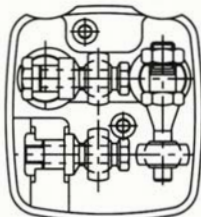
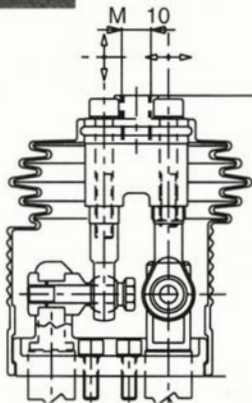
**VD10A
VD12A**



For other configurations, please contact our technical department.

JOYSTICK FOR TWO SPOOLS

code L1



INLET SPOOL 1 SPOOL 2

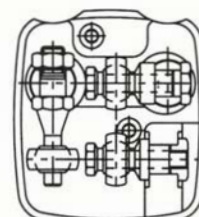
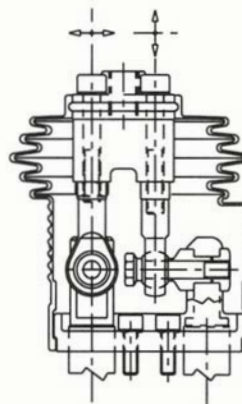
Spool 1 IN
Spool 2 OUT
Spool 1 OUT
Spool 2 IN

Fulcrum on spool 1 "L 1"

Spool 2 IN
Spool 1 IN
Spool 1 OUT
Spool 2 OUT

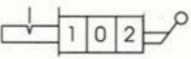
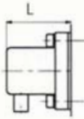
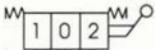
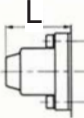
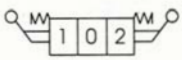
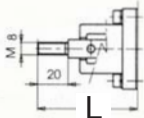
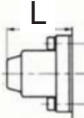
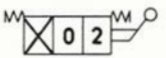
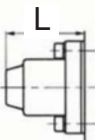
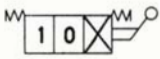
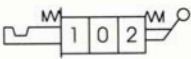
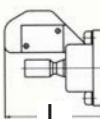

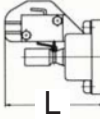
Fulcrum on spool 2 "L 2"

code L2


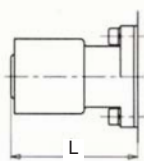
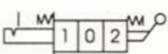
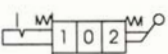
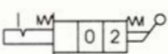
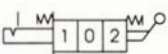

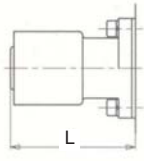




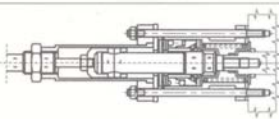
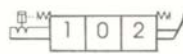



INLET SPOOL 1 SPOOL 2

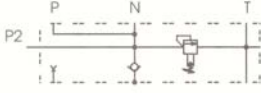
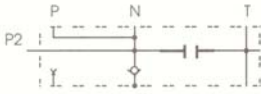
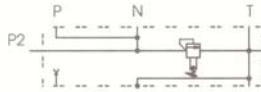
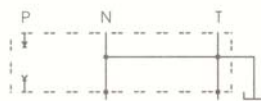
SPOOL POSITIONINGS

Code	Hydraulic symbol	Description				VD10A	VD12A
CO		With detent on each position				• L=66,5 2.58"	• L=66,5 2.58"
C2		Spring centered to neutral				• L=54 2.13"	• L=54 2.13"
C3		Spring centered to neutral with double control (screw tap)				• L=87 3.43"	• L=87 3.43"
C4		Spring centered to neutral with double control (screw female)					
C5		Two positions (neutral/spool-in) with spring return in neutral				• L=54 2.13"	• L=54 2.13"
C6		Two positions (neutral/spool-out) with spring return in neutral				• L=54 2.13"	• L=54 2.13"
CE		Pre-arrangement for electrical device				• L=98 3.86"	• L=98 3.86"
CM		Microswitch (for each spool) to start an electric motor (Max current = 10A at 250 Vca)				• L=98 3.86"	• L=98 3.86"
CW	The same assembling of "CM" with waterproof microswitch						

SPOOL POSITIONINGS

Code	Hydraulic symbol	Description				VD10A	VD12A
R2		Detent in spool in-out with spring return in neutral				• L=85 3.35"	• L=85 3.35"
R4		Detent on spool out with spring return in neutral				• L=85 3.35"	• L=85 3.35"
R5		Detent on spool in with spring return in neutral				• L=85 3.35"	• L=85 3.35"
R6		Detent on spool in 2 positions with spring return in neutral					
R7		Detent on spool out 2 positions with spring return in neutral				• L=85 3.35"	• L=85 3.35"
F5		Detent on float spool out with spring return in neutral				• L=89 3.50"	• L=89 3.50"
F6		Detent on float and spool out with spring return in neutral				• L=89 3.50"	• L=89 3.50"
F7		Detent on float and spool in with spring return in neutral				• L=89 3.50"	• L=89 3.50"
F8		Detent on float spool in-out with spring return in neutral				• L=89 3.50"	• L=89 3.50"
D1		Cable remote control cap side				• L=144 5.67"	• L=144 5.67"
G2		Detent on spool in-out position with hydraulic kick-out				• L=95 3.7	• L=95 3.7

MID MODULES

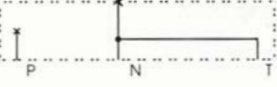

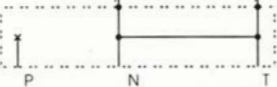

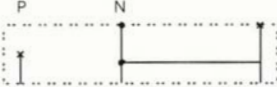
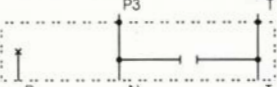
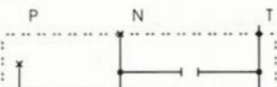
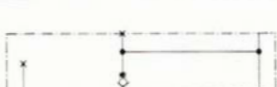
Code	Hydraulic symbol	Description			VD10A	VD12A	
I1		Mid inlet for second pump with combining flows and relief valve			*	*	
I2		Mid inlet for second pump with combining flows without main relief valve			*	*	
I3		Mid inlet for second pump with separating flows and main relief valve			*	*	
I4		I3 + gauge port			*	*	
I9		Mid outlet			*	*	

For the codes I1 - I3 - I4 , add in sequence the valve type (P = piloted or D = direct) and the corresponding setting (in bar).

EX : I4D250 = Mid inlet with separated flows and direct relief valve set at 250 bar (3600 psi) with gauge port.

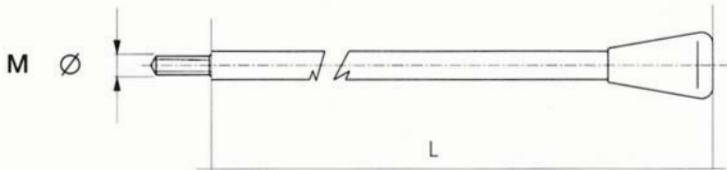
*Available for quantity, please contact our sales dept.

END MODULES

Code	Hydraulic symbol	Description			VD10A	VD12A
U0		Without port				
U1		Top outlet port			•	•
U2		Top and side outlet port			•	•
U3		Side outlet port (top port plugged)			•	•
U4		Top outlet port (side port plugged)			•	•
U5		Power beyond configuration (side P3)			•	•
U7		Closed center circuit configuration			•	•
U8		Top outlet section with back-pressure valve on neutral			•	•

STANDARD SHAFTS FOR PROTECTED LEVERS CODE NL

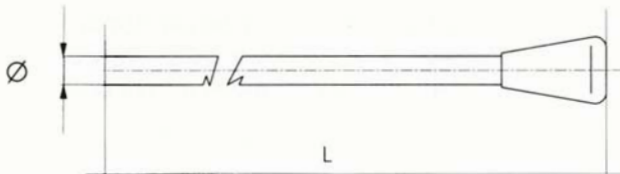
			VD10A	VD12A	
M			M10	M10	
L			240mm - 9.5"	240mm - 9.5"	



code LA

STANDARD SHAFTS FOR LEVERS CODE ML

			VD10A	VD12A
Ø			10	10
L			240	240



code LB

VD 10A 0 1 P 2 8 0 / 2 X P 0 1 A - V A 3 1 5 A - A R 2 5 0 B - N L A - C 2 /

Valve type

10A
12A

Inlet configuration module
(see pag. 18)

in phase of order please specify if you want VD12A with the inlet release of page 13.

Main relief valve (see pag. 18)

D	with direct main relief valve
P *	with piloted main relief valve
W	without main relief valve

Main relief valve setting (bar)

Quantity of identical consecutive sections

Circuit type (see pag. 19)

P	Parallel
S	Series
T	Tandem
H	Hammer

Spool type (see pag. 20)

Spool choice according to the inlet flow
(see pag. 19)

A	Nominal flow
C	2/3 of the nominal flow

Spool control (see pag. 22-23)

Control side (see pag. 24)

A	A port side
B	B port side

Spool positioning (see pag. 25-26)

End module (see pag. 28)

Mid module (see pag. 27)

Ports

G	GAS
M	METRIC
S	SAE thread
W	SAE flange

Port on which the valve is mounted

Valve setting (bar)

Ports valve (see pag. 21)

VA	Overload valve
VR	Anticavitation valve
AR	Overland and anticavitation valve
LC	Flow limiting valve
PR	Prearranged for valves (with plug)

1 X P 0 1 A - P R 0 0 0 A - P R 0 0 0 B - N L A - C 2 / U 1 G

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, overloading, 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) months 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 direct, indirect 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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