MODEL : V10

MOBILE DIRECTIONAL CONTROL VALVES

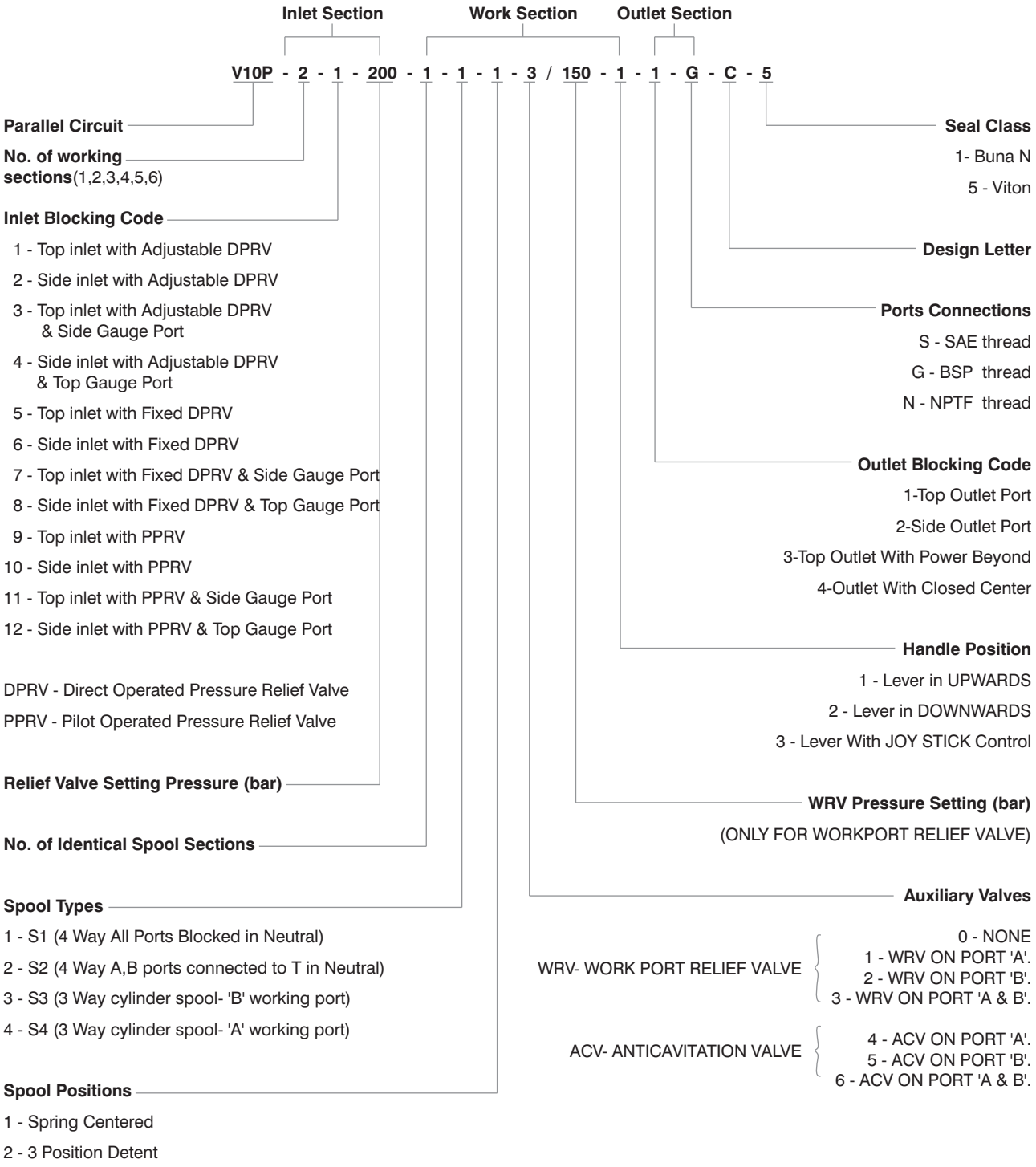
SPECIFICATIONS	
Flow Rate[1]	12 GPM (45 lit/min)
Pressure control range	Minimum depends on flow
	Maximum- 4600psi(315 bar)
Port threads	Standard : SAE - 6 (Work Ports A&B)
	SAE - 8 (Inlet-P / Outlet-T / Conversion Port - PB or PC)
	Optional : 1) BSP 3/8" (Inlet - P / Work Ports - A & B)
	BSP 1/2" (Outlet - T / Conversion Port - PB or PC)
	2) METRIC M18 x 1.5 P (Inlet - P / Work Ports - A & B)
	M22 x 1.5 P (Outlet-T / Conversion Port - PB or PC)
Fluid	Mineral oil
Fluid temperature range	-20° C to +100°C (For viton)
	-20°C to 8o°C (For Buna-N)
Viscosity	12 to 400 cST
Operating viscosity	15 cST to 75 cST
Fluid Cleanliness	10 microns (Nominal)
No. of work sections	1-12
Weight (approx.)	
Inlet section	1.5 kg
Outlet section	1.3 kg
Work section	1.8 kg
Mounting Position	Not restricted

1) The maximum flow thru a directional control valve assembly is determined by the maximum allowable pressure drop acceptable to application.

WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE. This document and other information from Veljan Hydrair, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current catalogue due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met. The products described herein, including without limitation, product features, specifications, designs, availability and pricing are subjected to change by Veljan Hydrair and its subsidiaries at any time without notice.

V20P MODEL / ORDERING CODE

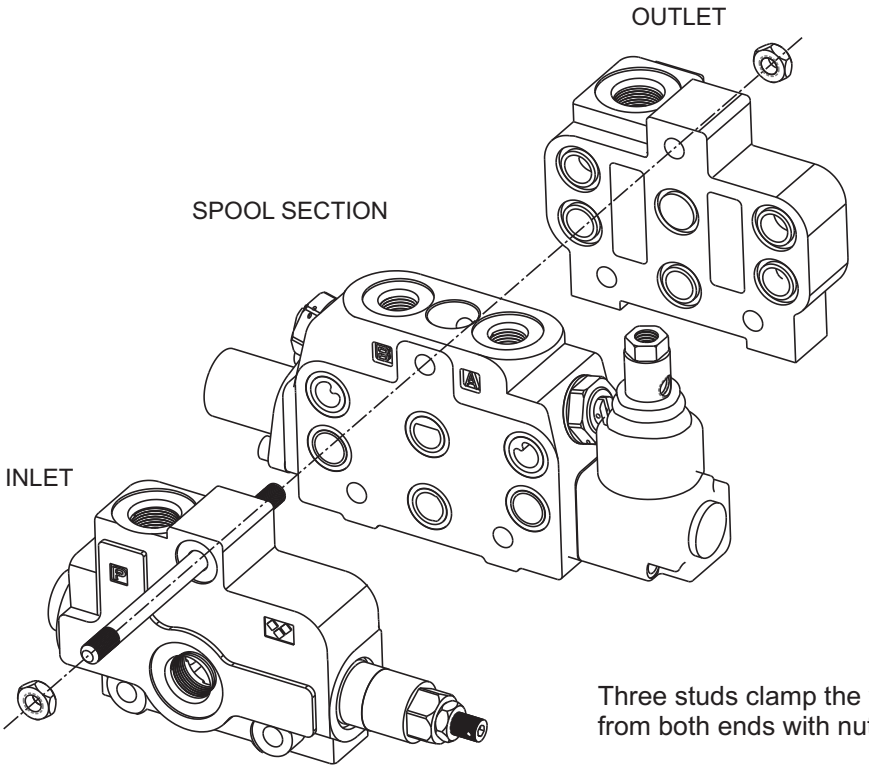


NOTE:- 1. Order of Spool Section Sequence will be followed as per given Model code Sequence.
2. Straight Handle will be Supplied as Standard.

Example: V10P-1-1-240-1113/150-1-1-G-C-5 : Single S1(All Ports Blocked in Neutral) Spool Section Valve having Work Port relief Valves in A& B Ports set to 150bar,

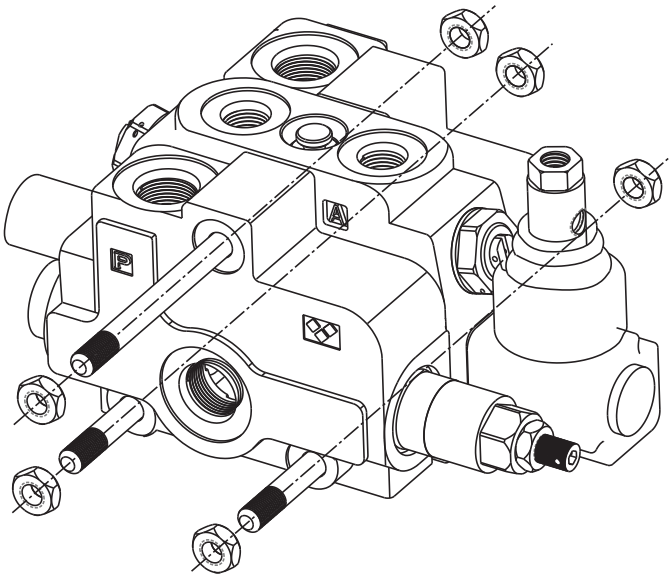
Top inlet Port with Adjustable DPRV Pre set to 240 bar, Standard Straight Lever upwards with Right side Inlet, Top Outlet Port with BSP Threading & Viton Seals

ASSEMBLY STUD LENGTH SPECIFICATIONS:



Three studs clamp the valve from both ends with nuts

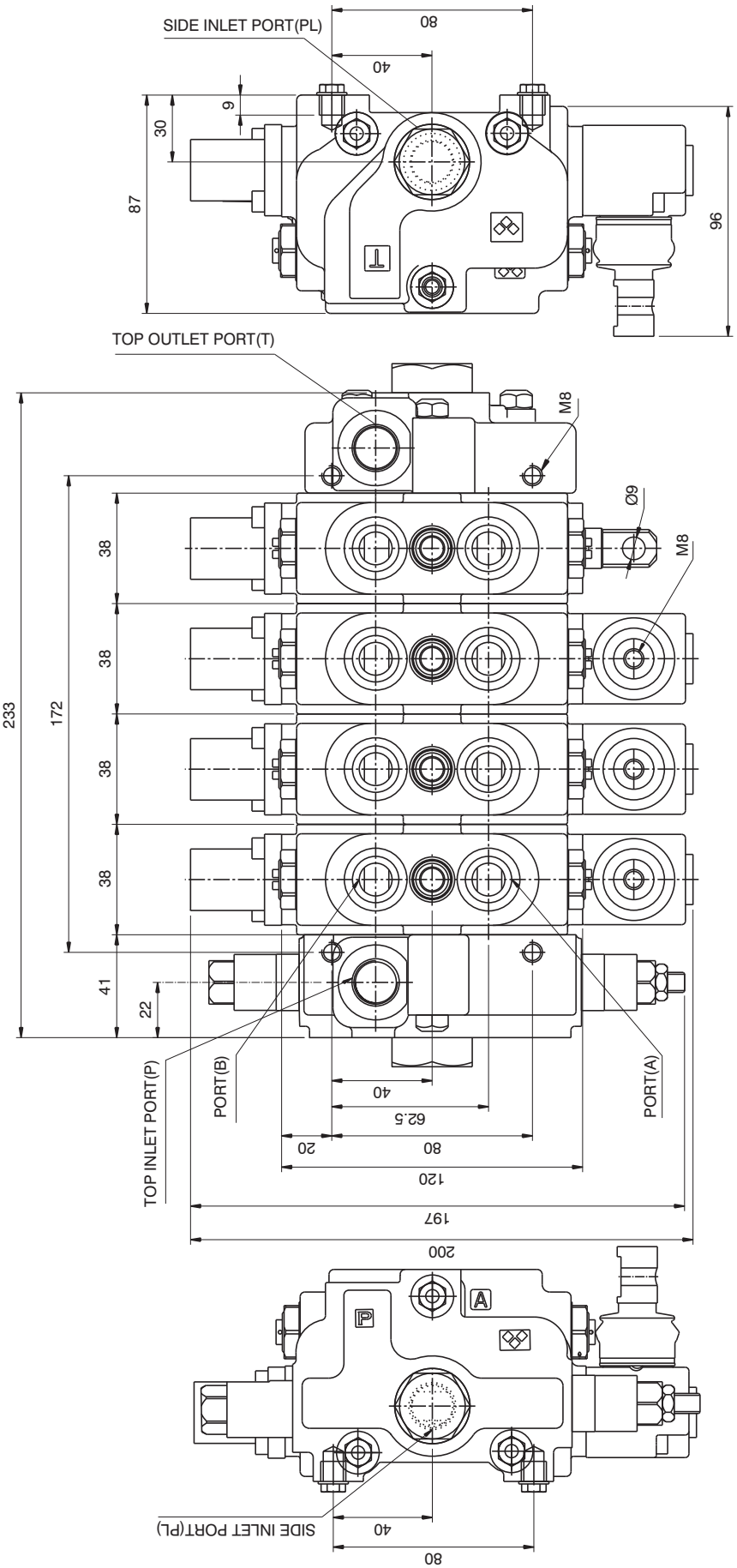
Tie rod clamping torque - 3.0 kgf (30 Nm)



No.of work sections	1	2	3	4	5	6	7	8	9	10	11	12
mm	118	156	194	232	270	308	346	384	422	460	498	536
Inches	4.6	6.1	7.6	9.1	10.6	12.1	13.6	15.1	16.6	18.1	19.6	21.1

NOTE: Each valve unit is assembled with 3 - studs with nuts

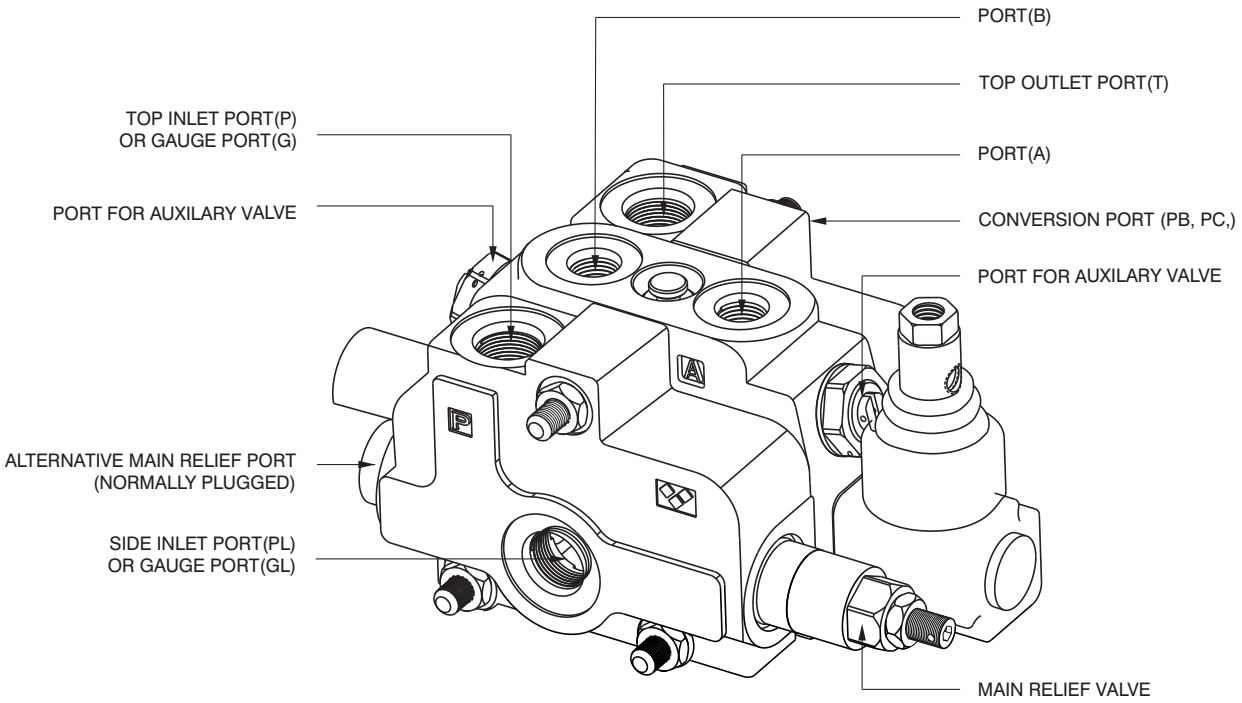
ASSEMBLED MOBILE VALVE UNIT

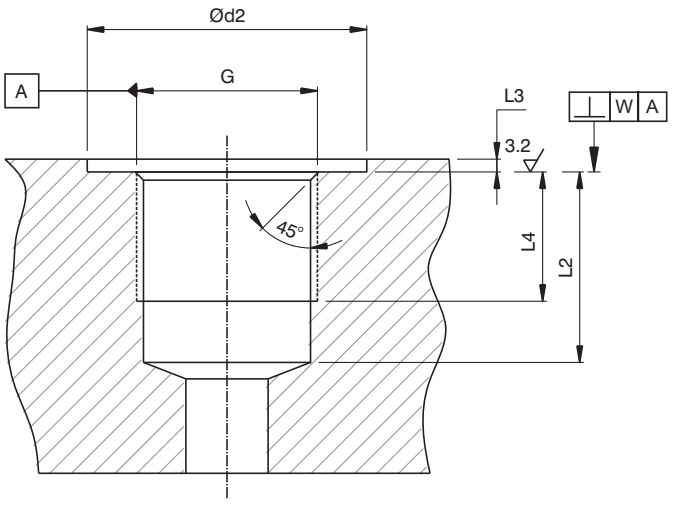


No.of Work Sections(n)		1	2	3	4	5	6	7	8	9	10	11	12
	kg	5.1	7.3	9.6	12.1	14.5	17.0	19.4	21.7	24	26.3	28.6	30.9
	lb	11.2	16.9	21.16	26.67	31.96	37.47	42.71	11.2	47.8	11.2	57.98	68.1

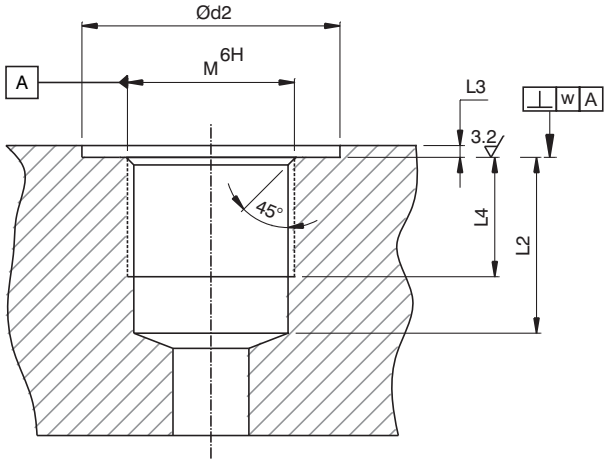
No.of Work Sections(n)	1	2	3	4	5	6	7	8	9	10	11	12
X(mm)	118.5	156.5	194.5	232.5	270.5	308.5	346.5	384.5	422.5	460.5	498.5	536.5
X(in)	4.66	6.16	7.66	9.15	10.65	12.15	13.65	15.15	16.65	18.15	19.65	21.15
Y(mm)	58	96	134	172	210	248	286	324	362	400	438	476
Y(in)	2.28	3.78	5.28	6.77	8.27	9.76	11.26	12.76	14.26	15.76	17.26	18.76

STANDARD PORT THREADING

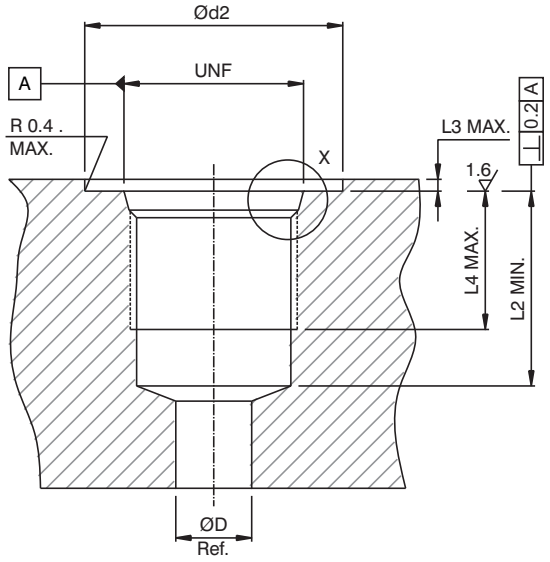




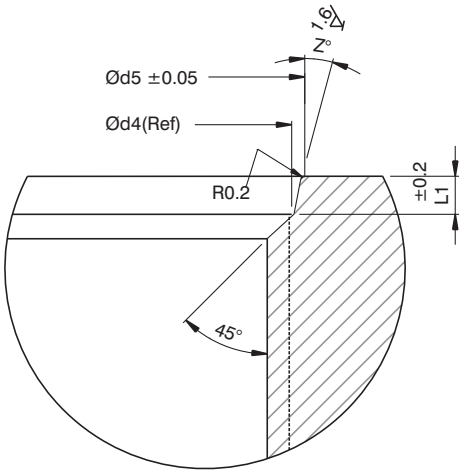
BSP (ISO-228-1)		
Dimensions mm	G 3/8	G 1/2
Ød2	23.0	40.0
L3	2.0	2.5
L4	12.0	14.0
L2	18.5	22.0
W	0.1	0.2



METRIC(ISO-261)		
Dimensions mm	M27 x 2.0	M33 x 2.0
Ød2	24.0	28.0
L3	2.0	2.5
L4	12.0	14.0
L2	18.5	20.5
W	0.1	0.1



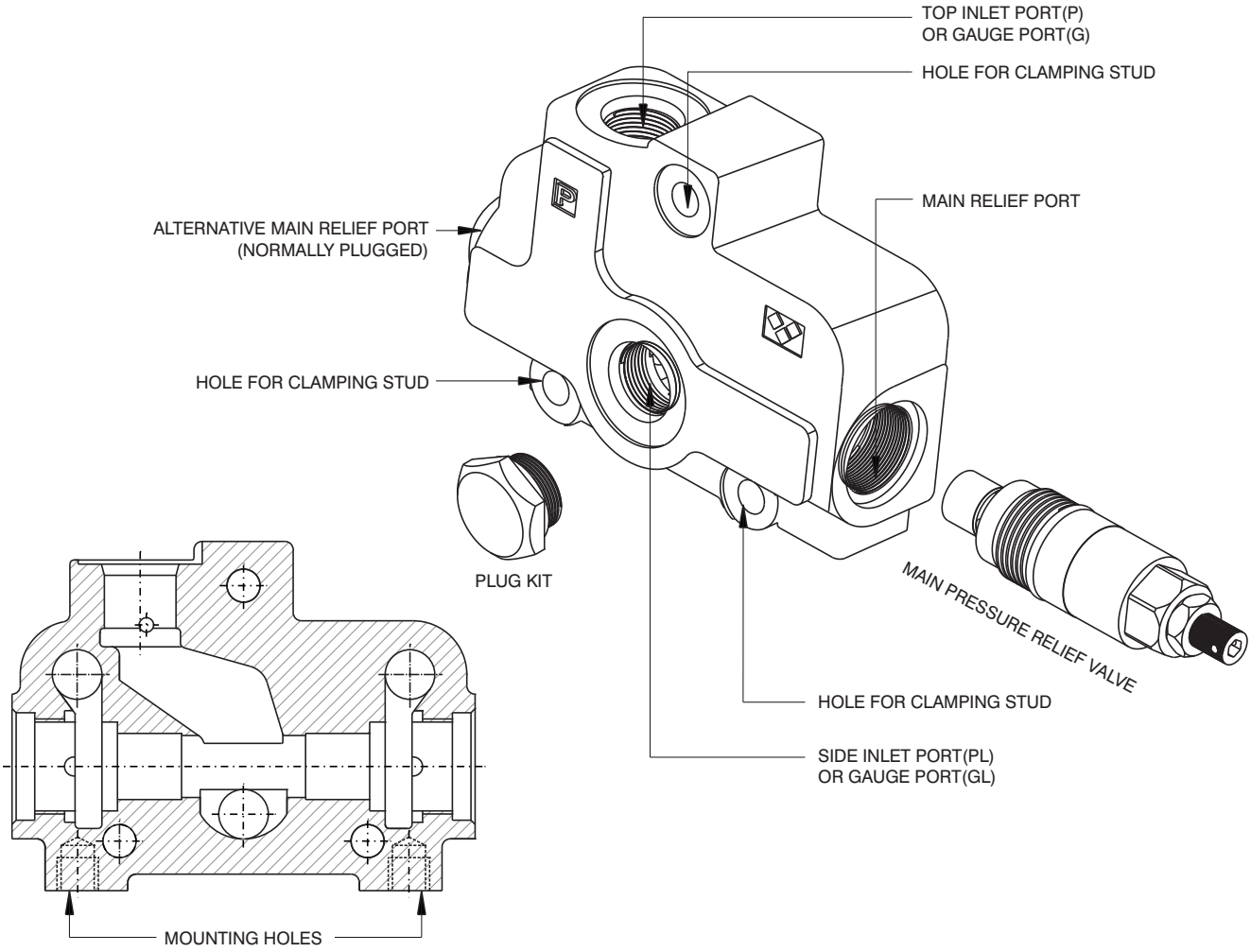
SAE UN-UNF(ISO-11926-1)		
Dimensions mm	9/16 - 18UNF SAE6	3/4 - 16 UNF SAE 8
ØM	11.91	16.6
TAP DRILL SIZE Ød1	12.75 / 13.08	31.03/31.50
Ød2	25.0	30.0
ØD	7.5	10.0
Ød4	14.55	19.20
Ød5	15.70	20.65
L1	2.7	2.7
L2	15.5	17.5
L3	1.6	2.4
L4	12.7	14.3
Z°	12°	15°



DETAIL 'X'

INLET SECTION

Made from SG Iron having high resistance to wear, seizure and excellent vibration damping capacity, the inlet covers are designed to provide a variety of port sizes and locations for increasing adaptability. All unused ports must be plugged. The Inlet cover has provision for Main Relief Valve from both sides giving a choice of using it for work port-A or for work port-B. If a gauge port is required a port plug may be drilled and tapped for a 1/4" NPTF and installed in the unused inlet port.



SECTIONAL DRAWING

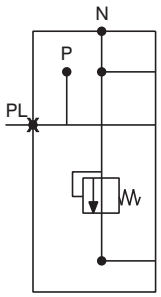
Inlet section is the entry point for the pressurised fluid. From this section the fluid flows through different work sections up to the outlet section. The inlet cover is provided with an option of two inlet ports - one in the front and one at the top. There are three through holes provided for the studs to clamp all the sections of mobile valve unit. Two tapped mounting holes are provided at the bottom (another two tapped holes are provided on the bottom of outlet section) for fixing the valve unit firmly to a base on the machine.

There are two ports provided for main relief valve which limits the maximum pressure in work section A or B depending on the port in which the relief valve is placed. A plug can be provided to block the flow from the unused inlet port. There are options of this plug such as providing a NPTF thread for a pressure gauge. Two drain passages are provided on either side which internally carry the drain from main relief valve to the outlet cover tank port through the work sections.

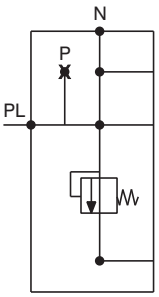
The position of the inlet cover with respect to the mounting on the machine depends on the customer requirement and accordingly the mounting hole position, relief valve position, inlet and outlet positions will change. Though options have been provided to minimize plumbing by the customer, it is beneficial if it is customized depending on the application and VELJAN will provide required technical support.

INLET BLOCK CODING

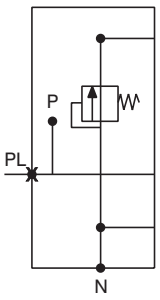
P1 Top Inlet Port



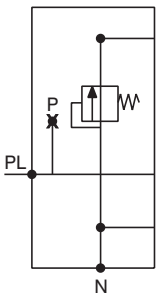
P2 Side Inlet Port



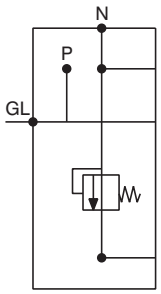
P3 Top Inlet Port



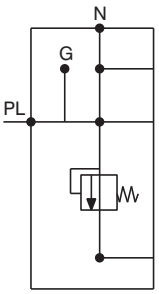
P4 Side Inlet Port



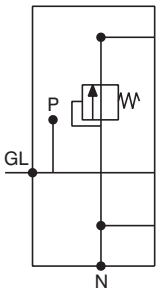
P5 Top Inlet with side gauge port



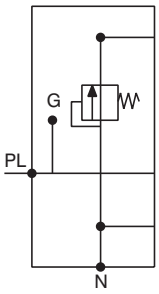
P6 Side Inlet Top gauge Port



P7 Top Inlet with side gauge port



P8 Side Inlet with Top gauge Port



P1 : Pressure oil from pump is connected to Top Inlet Port (P) and side inlet port (PL) is plugged. Main Relief valve is placed in one of the relief valve ports and the alternate relief port is plugged with no relief cavity plug (N)

P2 : Pressure oil from pump is connected to side Inlet Port (PL) and top inlet port (P) is plugged. Main Relief valve is placed in one of the relief valve ports and the alternate relief port is plugged with no relief cavity plug (N)

P3 : Same as 'P1' but with main relief valve located in alternate port and the other relief port plugged.

P4 : Same as 'P2' but with main relief valve located in alternate port and the other relief port plugged.

P5 : Pressure oil from pump is connected to Top Inlet Port (P) and pressure gauge connection provided on side inlet port (GL). Main Relief valve is placed in one of the relief valve ports and the alternate relief port is plugged with no relief cavity plug (N)

P6 : Pressure oil from pump is connected to side Inlet Port (PL) and pressure gauge connection provided on top inlet port (G). Main Relief valve is placed in one of the relief valve ports and the alternate relief port is plugged with no relief cavity plug (N)

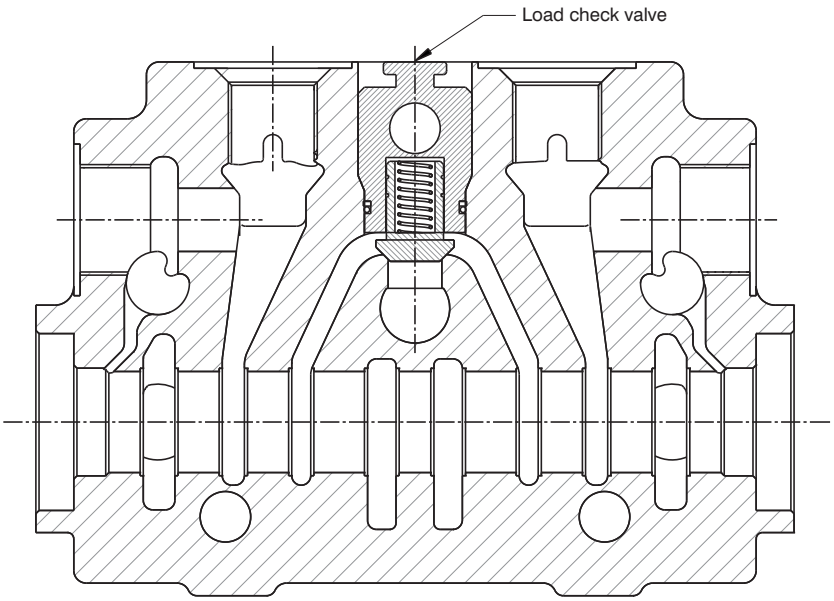
P7 : Same as 'P5' but with main relief valve located in alternate port and the other relief port plugged.

P8 : Same as 'P6' but with main relief valve located in alternate port and the other relief port plugged.

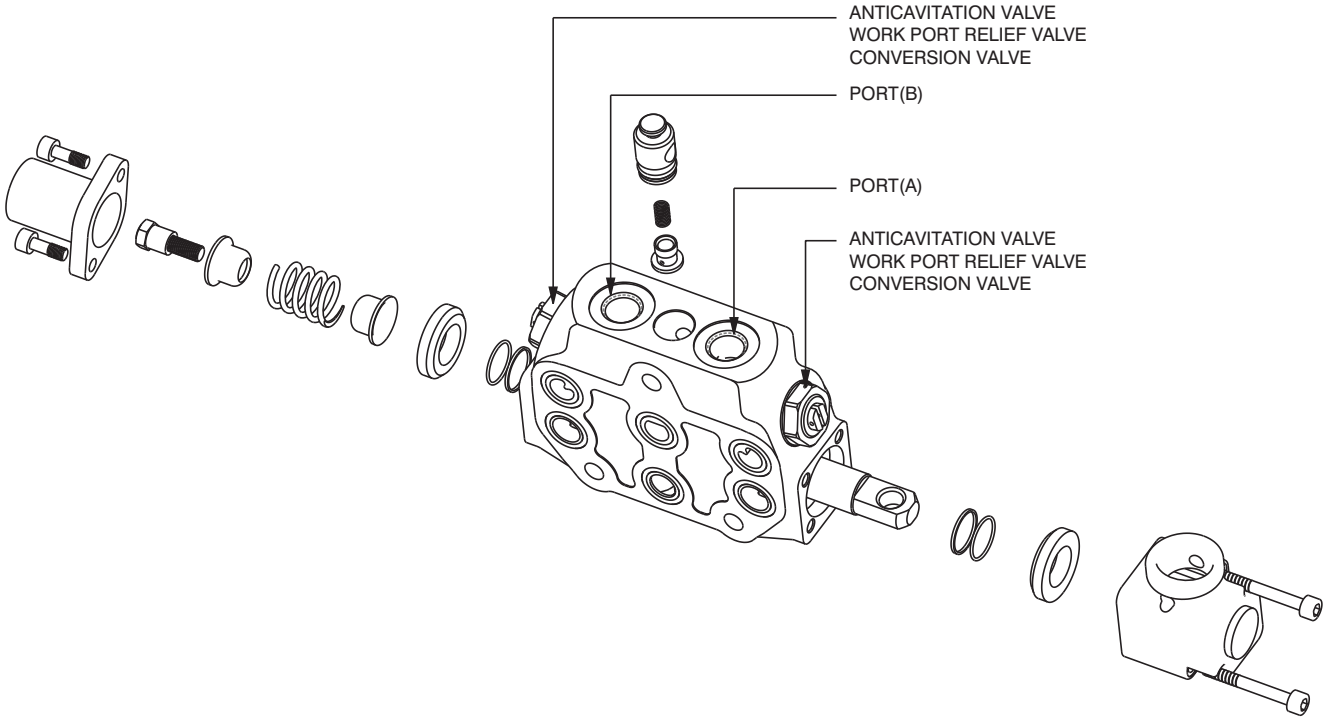
WORK SECTION

Model V10M work sections are precisely machined from SG iron having high resistance to wear and seizure, excellent vibration and damping capacity. This model offers a standard configuration of manually operating parallel circuit. Spools are hardened, chrome-plated for long life and resistance for corrosion.

Looking from the inlet section side, the two ports on the work section top face are named as port-A for left side port and port-B for the right side port. Auxiliary ports are provided to fix anti cavitation valves to either or both of the work ports A & B.



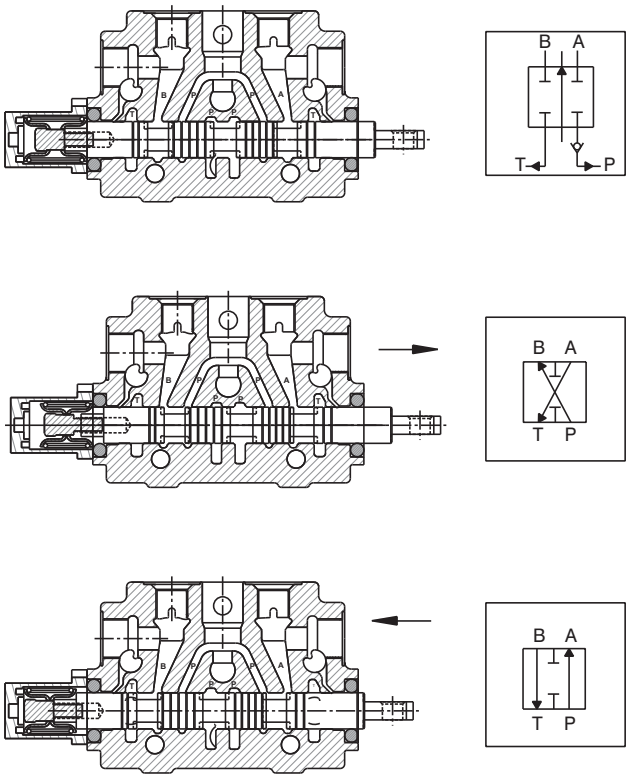
SECTIONAL DRAWING



SPOOL POSITIONS

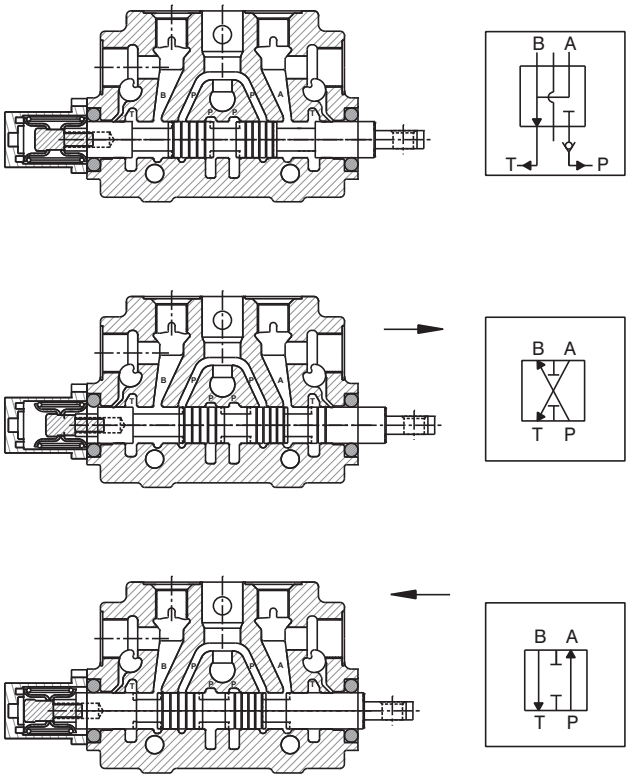
SPOOL TYPE : S01

NEUTRAL POSITION



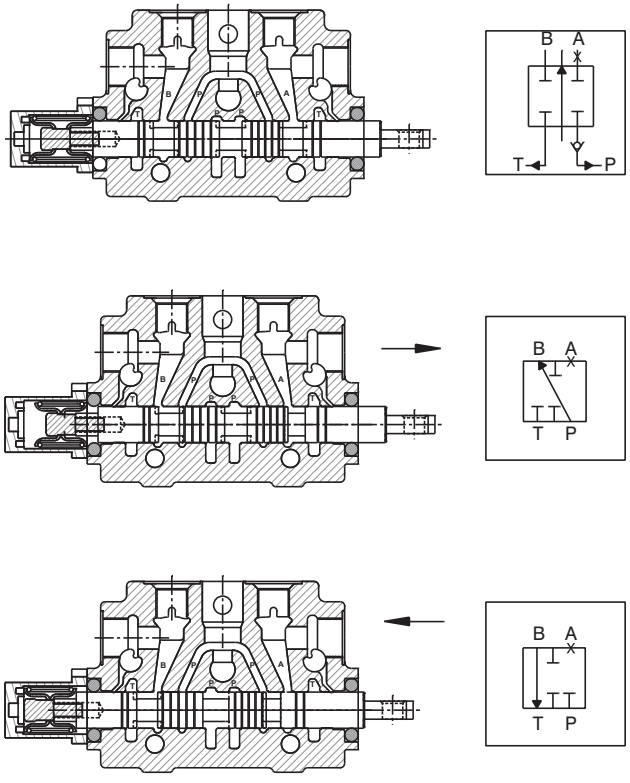
SPOOL TYPE : S02

NEUTRAL POSITION



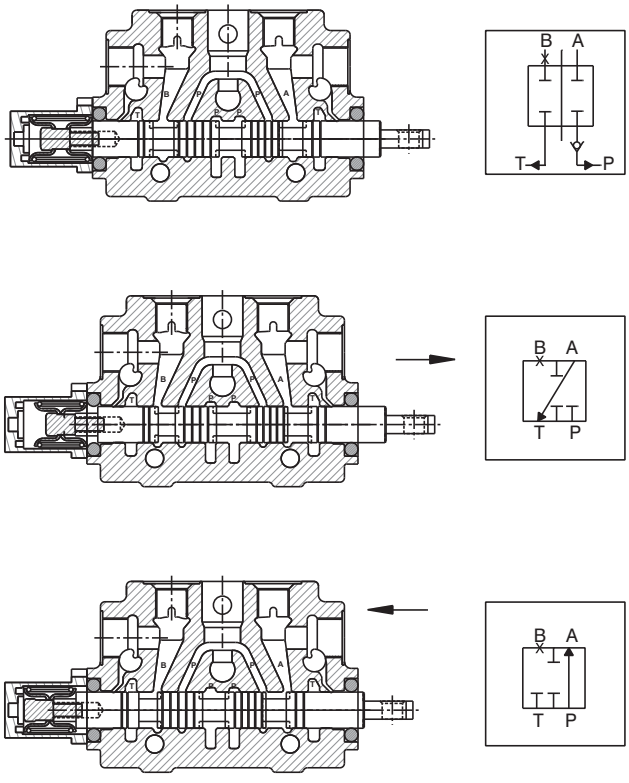
SPOOL TYPE : S03

NEUTRAL POSITION

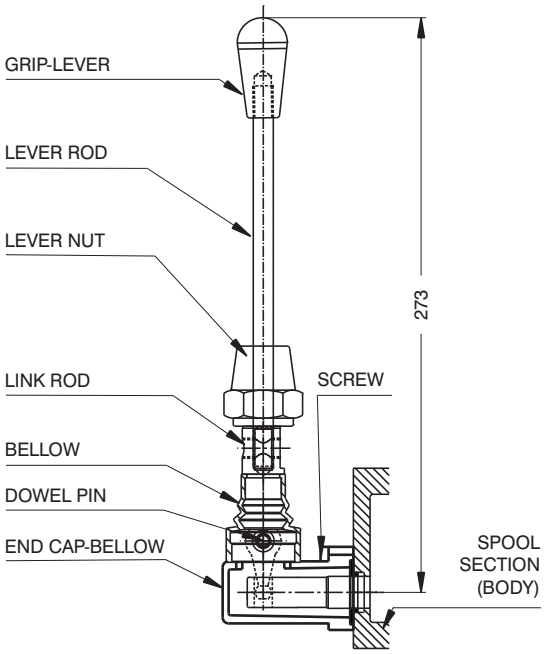


SPOOL TYPE : S04

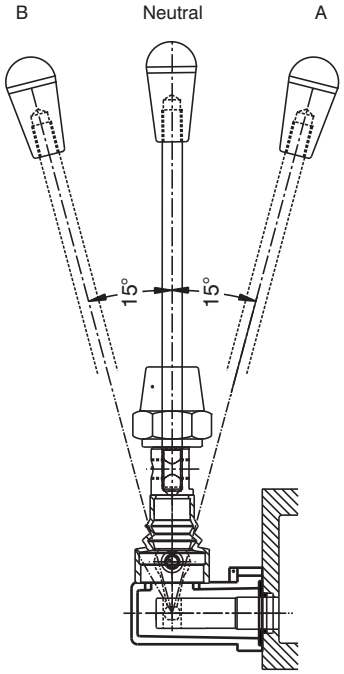
NEUTRAL POSITION



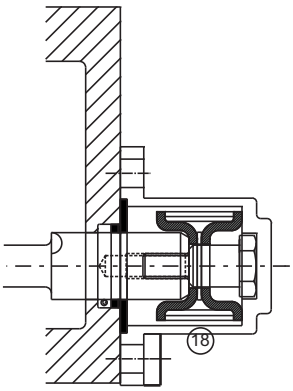
LEVER



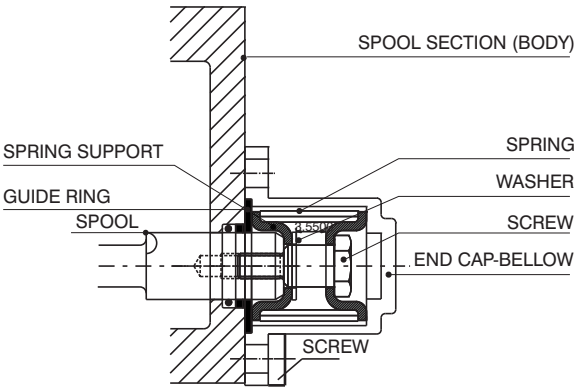
LEVER CENTRE POSITION



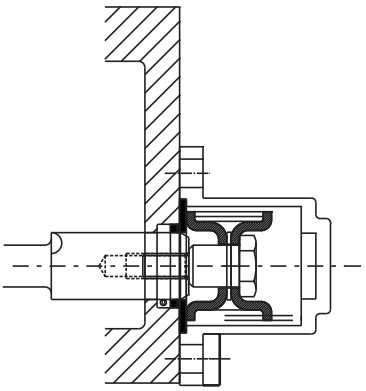
LEVER 3 POSITION



FORWARD POSITION (A)



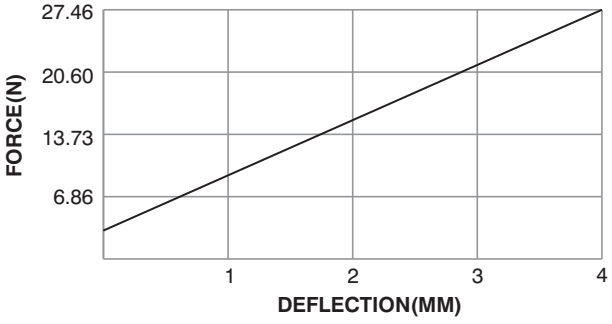
NEUTRAL POSITION



BACKWARD POSITION (B)

Spool is assembled on one side with lever assembly and on the other side with spring and spring supports housed in an end cap. At the neutral condition lever position is 90° and it moves 15^0 either side from centre for forward and backward positions. Linearly the spool will move 6.8 mm length on either side from the centre position. The spring force brings the lever to the neutral position when released from either forward or backward position. Operators conversant with mobile valves can control the oil flow rate by intermediate positioning of the lever to achieve speed control of hydraulic / motor. The operator can also get trained to move more than one lever at a time assisted by the design and placement of the work sections.

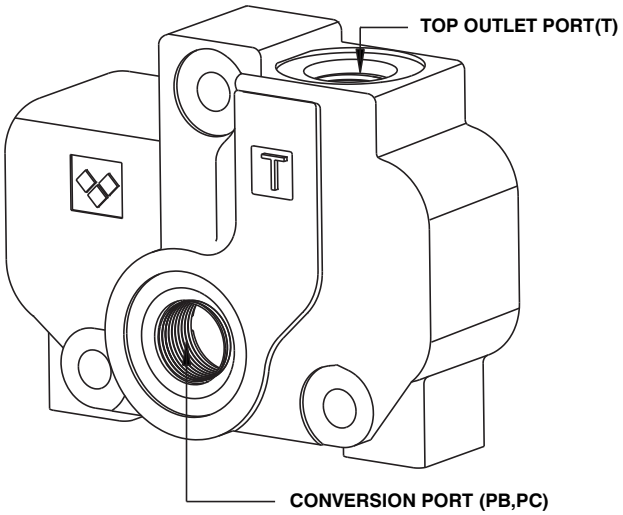
SPRING RATE

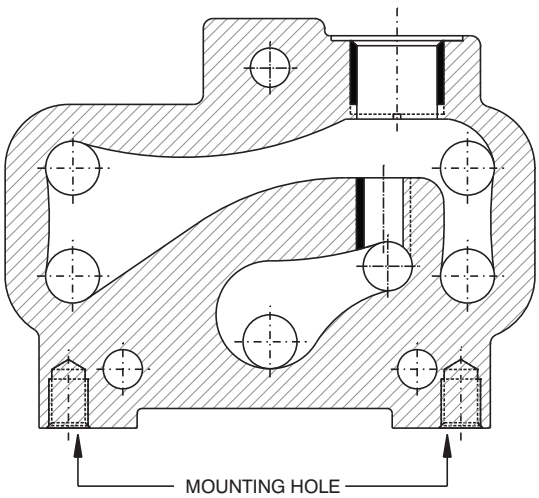


$$\text{SPRING RATE} = \frac{\text{Load}}{\text{Deflection}}$$

OUTLET SECTION

Made from SG Iron having high resistance to wear, seizure and excellent vibration damping capacity, the Outlet covers are designed to provide a variety of Port sizes and locations for increasing adaptability. It has Top outlet port for channeling return oil from hydraulic cylinder / motor to the tank. An additional Conversion Port on side is for Power beyond, Closed center, Turn around options. When all the work section spools are in neutral position, pressurised oil from the inlet section will flow through to the conversion port.





SECTIONAL DRAWING

The tank connections from the ports-A/B of the work sections gets connected to the drain ports in body, conversion port & top port of the outlet body and also to the outlet port in the inlet body for a common drain.

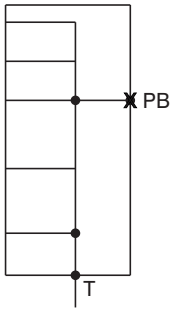
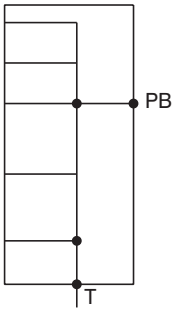
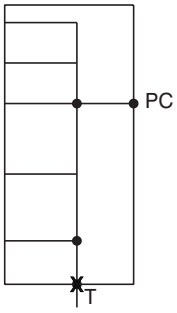
The conversion port allows optional paths to the hydraulic circuit as required by the user. These options reduce the hydraulic piping assemblies. Three types of plugs are available.

1) DIRECT CONNECTION TO THE TANK : The hydraulic oil from the inlet port of inlet section passes through the open centers of spools in the neutral position and reaches the conversion port from where it is channeled to the tank.

2) POWER BEYOND SLEEVE (PB): The hydraulic pressure oil from the inlet port of inlet section is made available as input for another mobile valve unit down stream. In a power beyond circuit the up stream valve will always have priority. Hydraulic oil will only be available to the downstream valve when all valve spools in the up stream valve are in neutral. When the pressure requirements of up stream and down stream valves are the same, pressure relief is provided in up stream valve. When the pressure requirements are different, two independent relief valves are provided - one each in the upstream and down stream inlet sections. When conversion port is used for Power Beyond option, alternate tank outlet port is used for channeling return oil.

3) CLOSED CENTRE PLUG (PC) : This is installed when using a variable displacement pump. Assuming all other optional outlet ports are closed, the closed center plug will block pump flow when all the valve spools are in neutral. High pressure is maintained at the control valve inlet. The maximum system pressure is set with the compensator adjustment on the pump. The maximum pressure in the mobile valve is limited by the main relief valve setting.

OUTLET BLOCK CODING

T1 Top outlet Port	T2 Top Outlet Port	T3 Closed center confuguration
		

TOP OUTLET PORT :

Return oil from work sections is channeled to tank through top outlet port (T) and conversion port (PB) is plugged.

POWER BEYOND :

Return oil from work sections is channeled to tank through top outlet port (T) and Power Beyond sleeve (PB) is installed in conversion port.

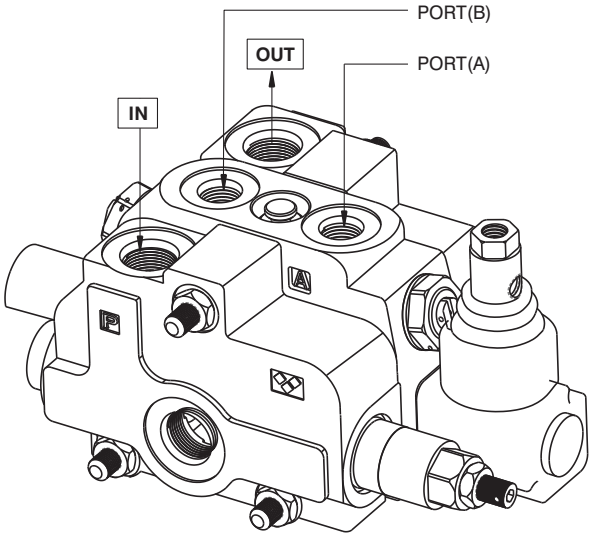
CLOSED CENTER PLUG :

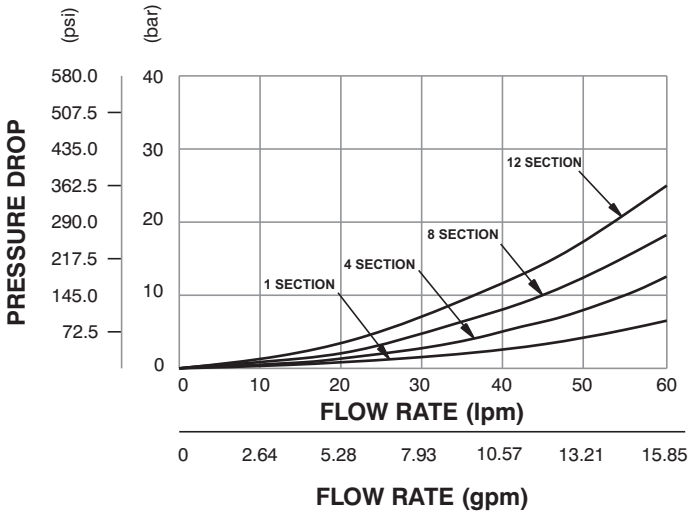
Closed center plug (PC) is installed in conversion port and top outlet port (T) is plugged.

PERFORMANCE CURVE

OPEN CENTER PRESSURE DROP :

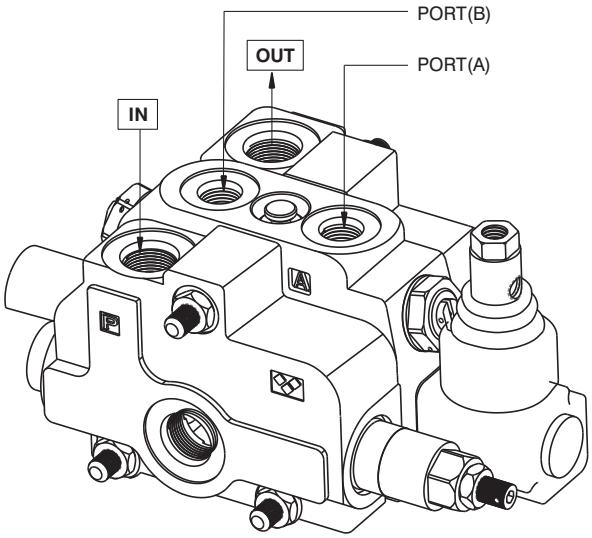
Typical pressure drop in 1 to 12 section valve assemblies using inlet to outlet (Pressure drop "P" to "T")

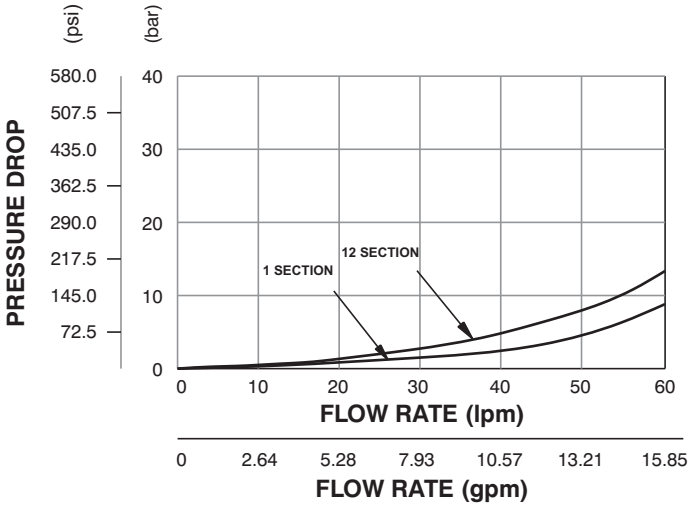




INLET TO WORK PORT PRESSURE DROP :

Typical pressure drop in 1 to 12 section valve assemblies using inlet to work port A & B (Pressure drop "P" to "A/B").

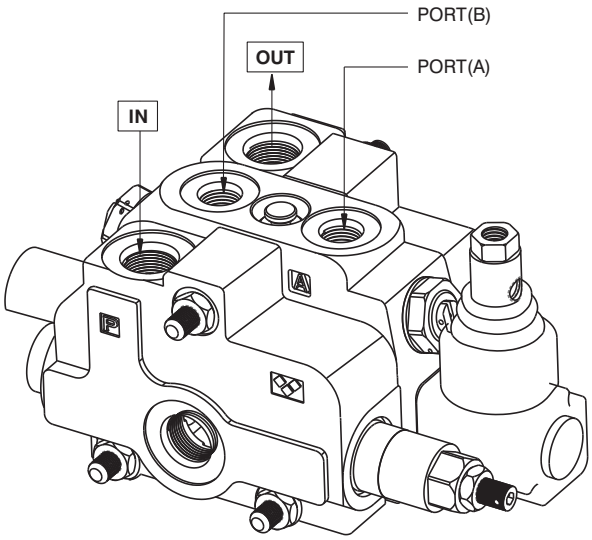


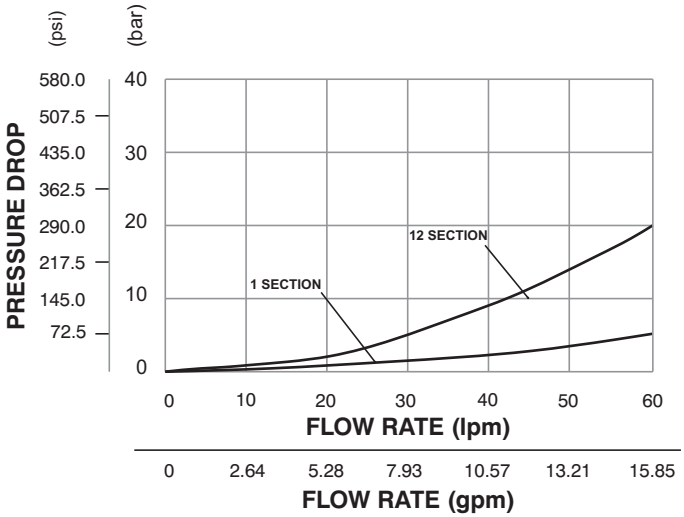


PERFORMANCE CURVE

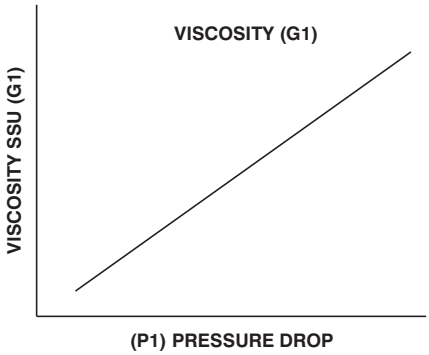
WORK PORT TO OUT PORT PRESSURE DROP:

Typical pressure drop in 1to 6 section valve assemblies using work port to outlet (Pressure drop "A/B" to "T").





Viscosity of oil can affect the performance curves. Pressure drop is affected by viscosity as shown below



We can find pressure drop P_2 for any oil with viscosity G2

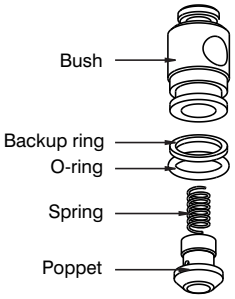
Pressure drop $P_2 = P1 \times \frac{G2}{G1}$

Viscosity(SSU)	75	150	200	250	300	350	400
% of △ P(Approx)	93	111	119	126	132	137	141

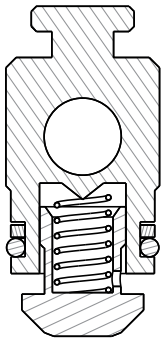
INSTALLATION AND MAINTENANCE

LOAD CHECK VALVE :

Load check valve provided in each work section allows flow from P to the working port connected. It checks the flow in the reverse direction, ie. from working port to P. In stacked valves the check valve protects pump from reverse flow not only from its working ports but also from other down stream working ports.



LOAD CHECK VALVE ASSEMBLY



SECTIONAL DRAWING

FIELD PROBLEMS:-

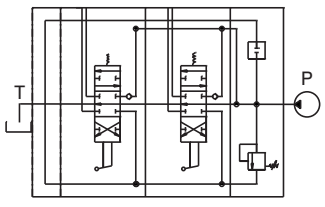
Sl.no.	Problem	Reason	Remedy
1.	External leakages	Worn or damaged seals	Relpace
2.	Flow or pressure reduced	Increased clearance between spool & body	New spools to be provided
3.	Piston not holding load while lever is shifting position	Leakage of load check valves	Try to clean & polish seating areas of check valve and replace if this dosen't work
4.	Pressure not building in working ports.	Pressure relief valve or pump to be verified	Check setting of relief valve. Also check pump & system circuit.

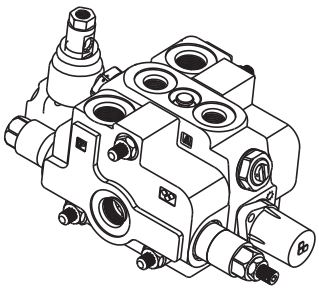
Grease moving parts of lever assembly and spool positioning parts in end cap whenever work section spool operation becomes sticky.

INLET SIDE

The standard mobile valve is provided with inlet section to the right of the first spool section viewed from the lever side.

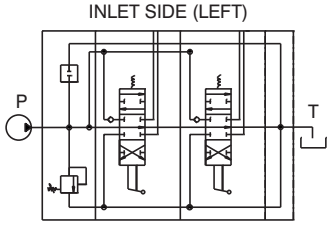
INLET SIDE (RIGHT)

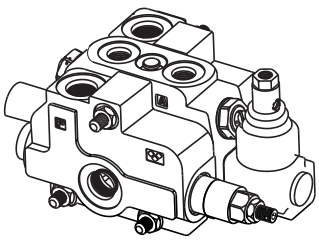




Optionally, some times application requires lever to the left of the inlet body. This is provided, however, correct mounting of the valve to be assured with the changed mounting configuration compare to the standard inlet cover to the right. The relief valve assembly side depending up on customer requirement.

INLET SIDE (LEFT)

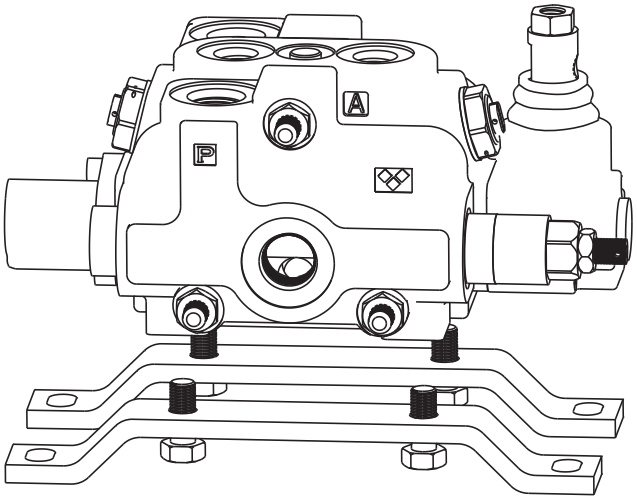


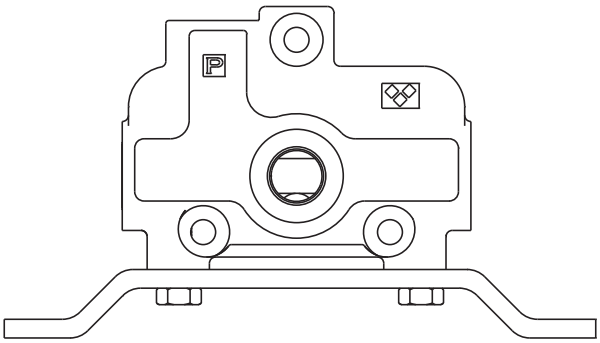


INSTALLATION AND MAINTENANCE

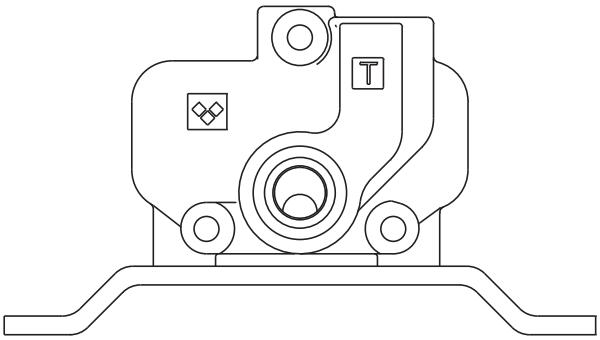
MOUNTING BRACKET :

For mounting of stacked valve units, tapped holes are provided in the inlet & outlet covers. However, whenever a customer needs different centre distances brackets can be used as shown in figures below. Provide fitment dimensions if bracket supply needed from VELJAN.





INLET WITH MOUNTING BRACKET



OUTLET WITH MOUNTING BRACKET