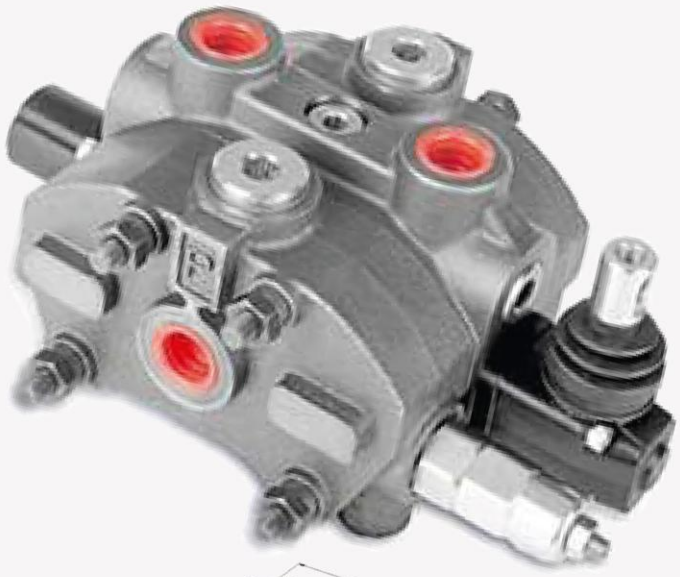
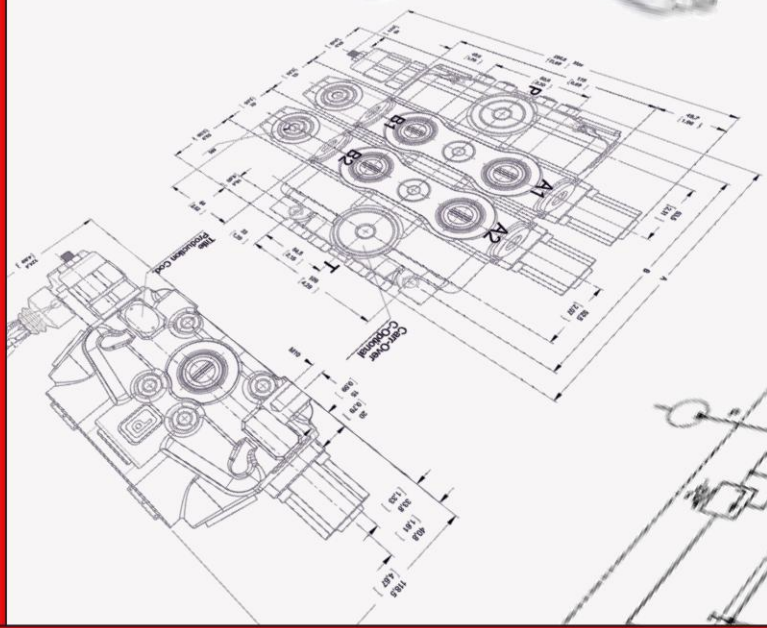
Gemma
AUTOMOTIVE

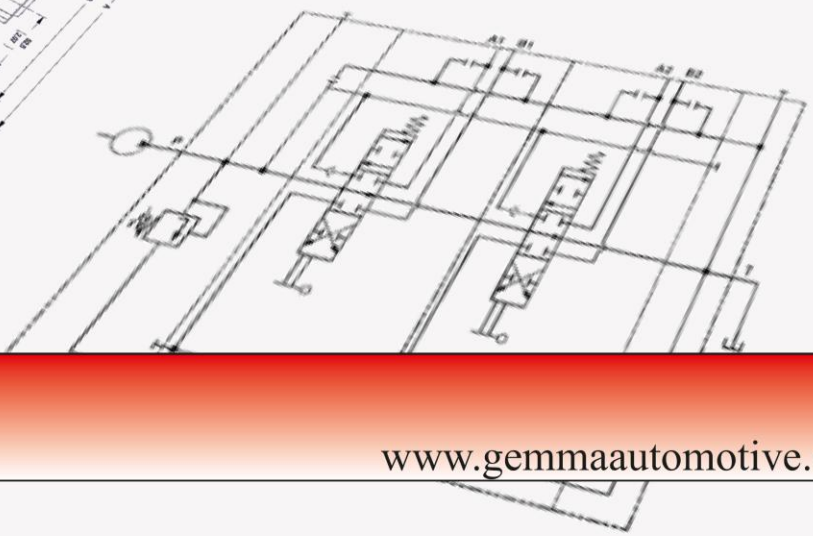
DETAILED TECHNICAL CATALOGUE

SECTIONAL DIRECTIONAL CONTROL VALVES





GM-PD120



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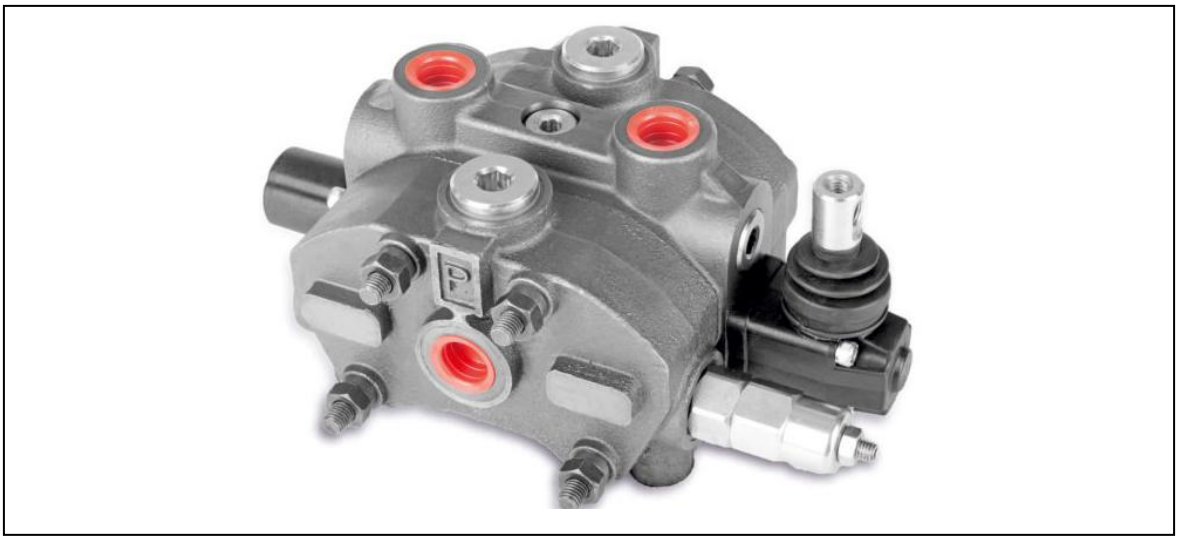
CE

TÜV International Certification
TÜV THÜRINGEN CERT ISO 9001:2008 15 100 96456 TIC



Contents

Additional Informations

Note:This catalog shows the product in the most standard configurations. For Other Configurations, more detailed information or special request, Please contact Customer Service Dept.

Warning! :All specifications of this catalog refer to the standard product at this date (12/2014) . GEMMA, oriented to a continuous improvement, reserves the right to discontinue, modify or revise the specifications, without notice.

GEMMA IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED BY AN INCORRECT USE OF THE PRODUCT.

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Working Conditions

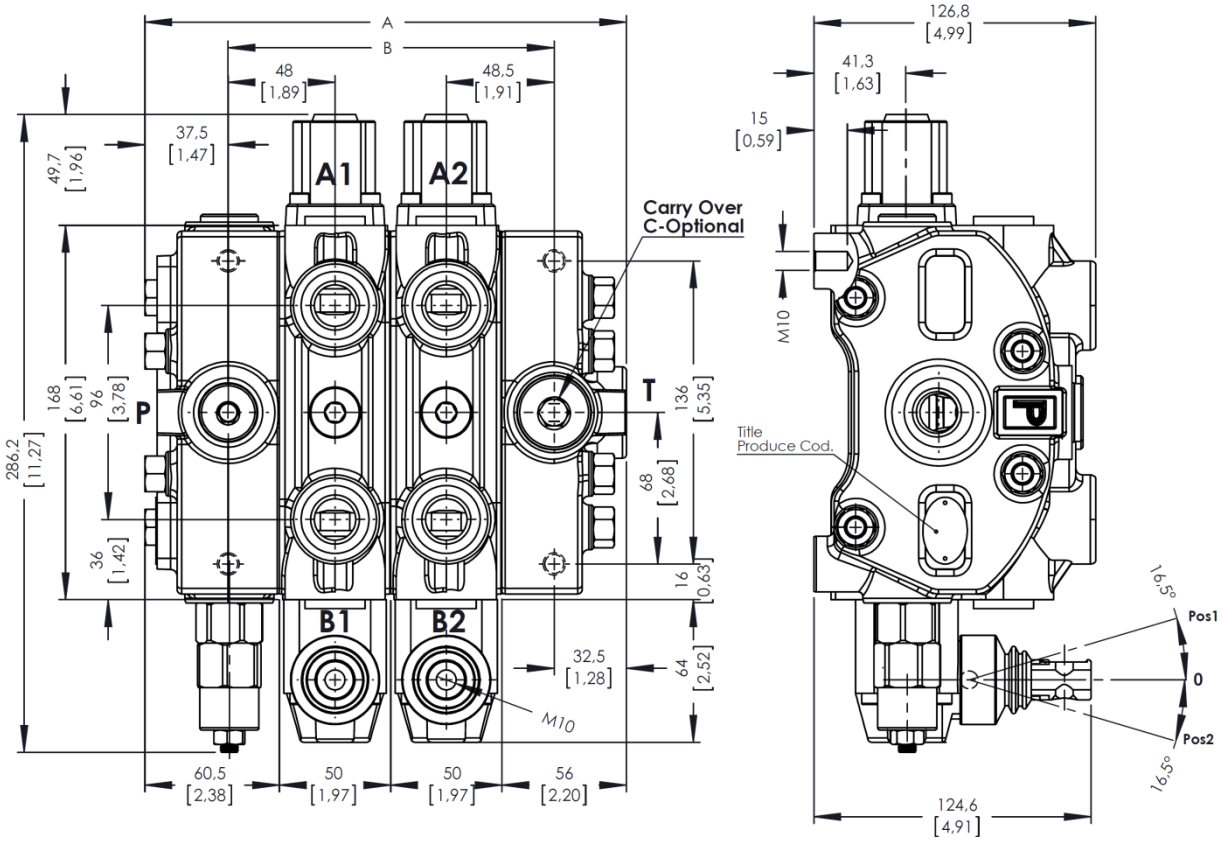
Nominal Flow Rating / Displacement	120 l/min	31 U.S.G.P.M
Maximum Working Pressure (Series Circuit)	210 Bar	3050 PSI
Maximum Working Pressure (Parallel Circuit)	315 Bar	4600 PSI
Max. Back Pressure	25 Bar	360 PSI
Oil Temperature with NBR Seals	-20 to 80 C˚	-4 to 176 F ˚
with FPM (Viton) Seals	-20 to 100 C˚	-4 to 212 F ˚
Oil Viskosity – Operating Range	From 15 to 75 mm2/s	From 15 to 75 cSt
Minumum / Maximum	12 / 400 mm2/s	12 / 400 cSt
Oil Filtration	≤30 µ	
Ambiant Temperature Range	-35 to 60 C˚	-31 to 140 F ˚
Number Of Spools	1 to 12	
Internal Leakage (at 100 bar (1450 PSI), 40C˚ (110 F˚), 46 cSt – A(B)—T)	4 cm3/min	0,24 in3/min
Max. Level Of Contamination	19/16 - ISO 4406	
Tie rod tightening torgue	40 Nm	30 Ibft

Not: This catalogue shows technical specifications measured with mineral oil of 46 mm2/s-46 cSt viscosity at 40 C˚ temparture.

Features

- Simple, compact and heavy duty designed sectional valves from 1 to 12 sections for open and closed center hydraulic systems.
- Optionaly Carry-Over port only tandem circuit.
- Fitted with a main pressure relief valve.
- Interchangeable spool diametre is 20 mm – 0,79 in.
- Available manual, pneumatic, hydraulic and electro-pneumatic spool control kits.

Dimensional Data



TYPE	A		B		Weight	
	mm	in	mm	in	Kg	lb
GM- PD120-1P	216,5	8,52	146,5	5,77	13.70	29.67
GM - PD120-2P	266,5	10,49	196,5	7,74	19.18	43.21
GM - PD120-3P	316,5	12,46	246,5	9,71	24.70	56.75
GM - PD120-4P	366.5	14,43	296,5	11,68	30.30	70.29
GM - PD120-5P	416,5	16,40	346,5	13,65	35.82	83.83
GM - PD120-6P	466.5	18,37	396,5	15,62	41.80	97.37
GM - PD120-7P	516,5	20,34	446,5	17,59	46.97	110.91
GM - PD120-8P	566.5	22,31	496,5	19,56	52.60	124.45
GM - PD120-9P	616,5	24,28	546,5	21,53	58.00	137.99
GM - PD120-10P	666.5	26,25	596,5	23,50	63.56	151.53
GM - PD120-11P	716,5	28,22	646,5	24,57	69.00	165.07
GM - PD120-12P	766.5	30,19	696,5	27,44	74.50	178.61

Standard Threads

PORT	BSP (Iso 228)		UN-UNF (Iso 11926-1)	Metric (Iso 262)
	1/2" Series	3/4"Series		
P Inlet	G 1/2	G 3/4	1 1/16-12 UN	M27x2
A-B Ports	G 1/2	G 3/4	7/8-14 UNF	M22x1.5
T Outlet	G 3/4	G 3/4	1 1/16-12 UN	M27x2
Pneumatic	G 1/4	G 1/4	NPTF 1/8 - 27	NPTF 1/8 - 27
Carry-Over	G 3/8	G 3/8	3/4-16 UNF	G 3/8

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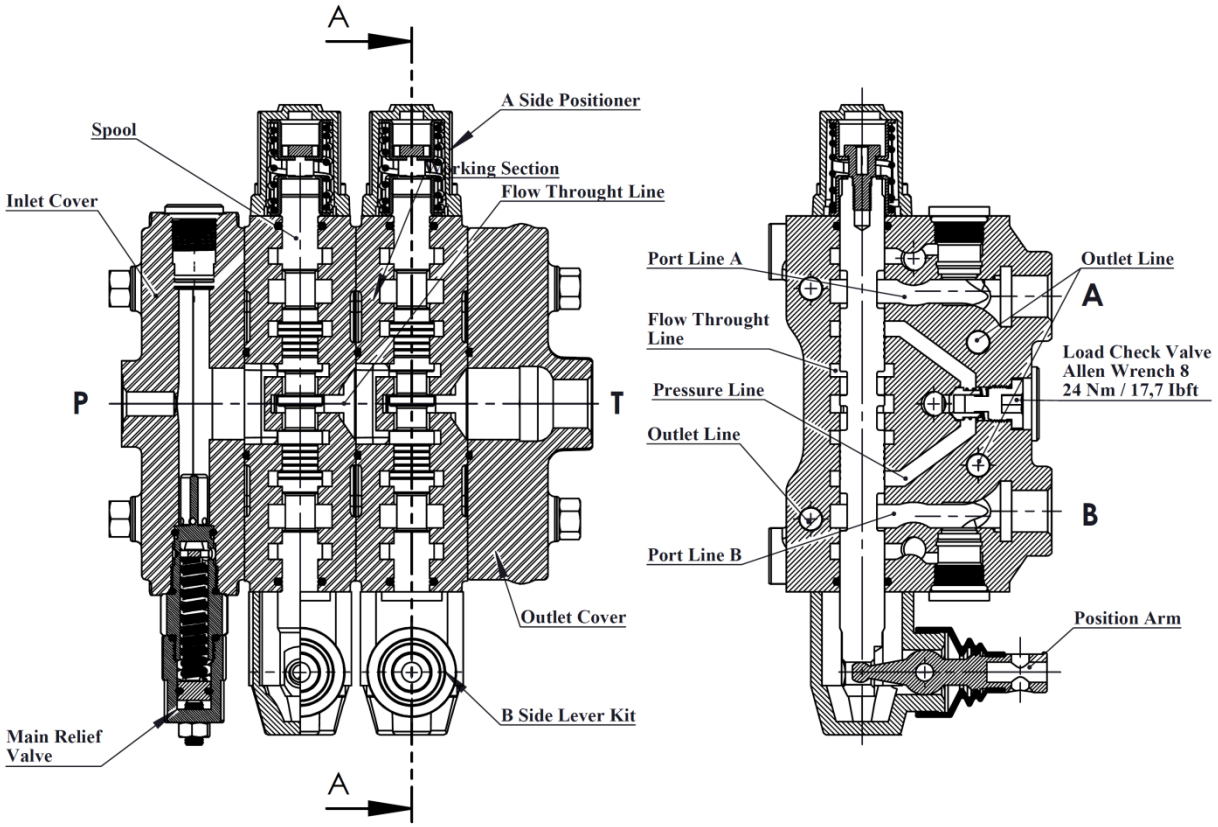
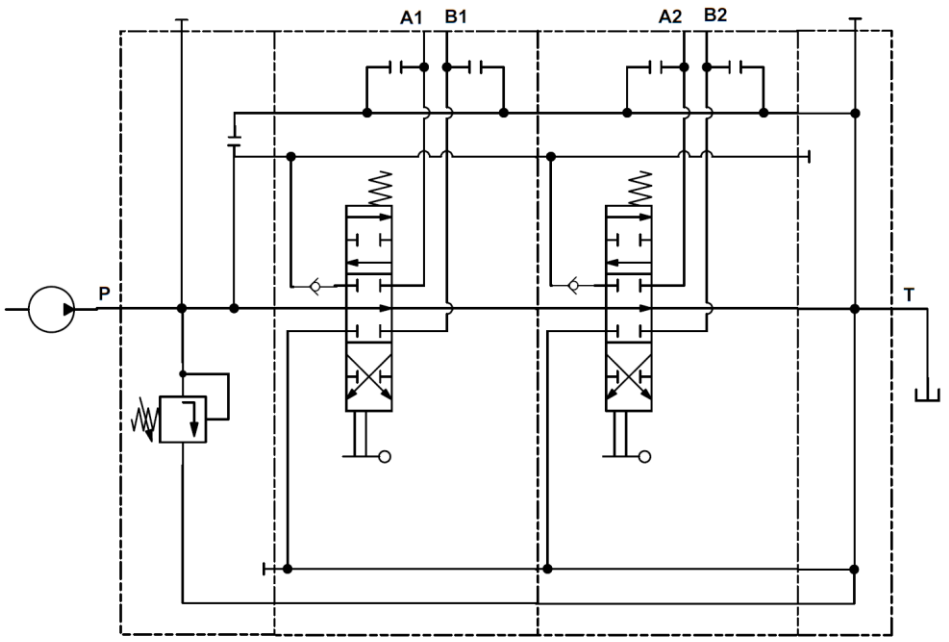
Hydraulic Circuit

Parallel



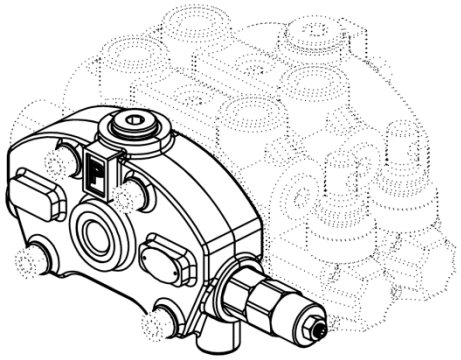


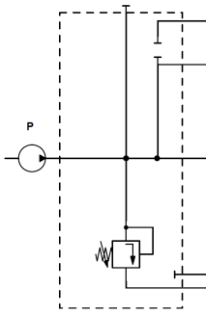
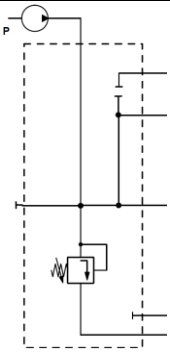
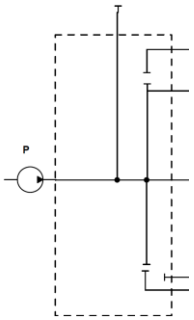
Code: GM PD120-2P (SD(LA)-SMR2-125-PP)/P-1A-STL-SR/ P-1A-STL-SR/ SO-PT1 / SGT

Hydraulic Circuit

Inlet Cover – Pump Side

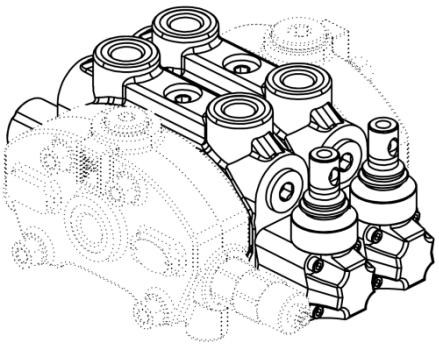
SD - Side inlet with direct pressure relief valve
TD - Top inlet with direct pressure relief valve
SP - Side inlet with relief valve blanking plug

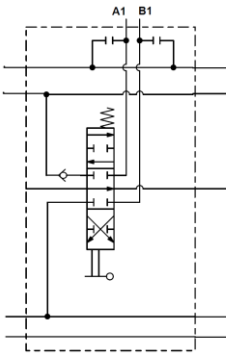


Type=SD	Type=TD	Type=SP
		

Working Sections

P – Parallel

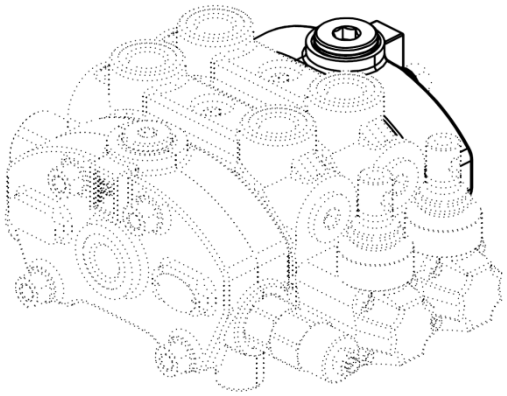


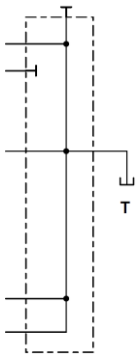
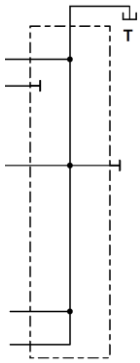
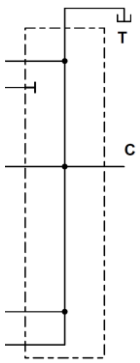
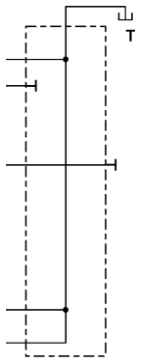
Type=P


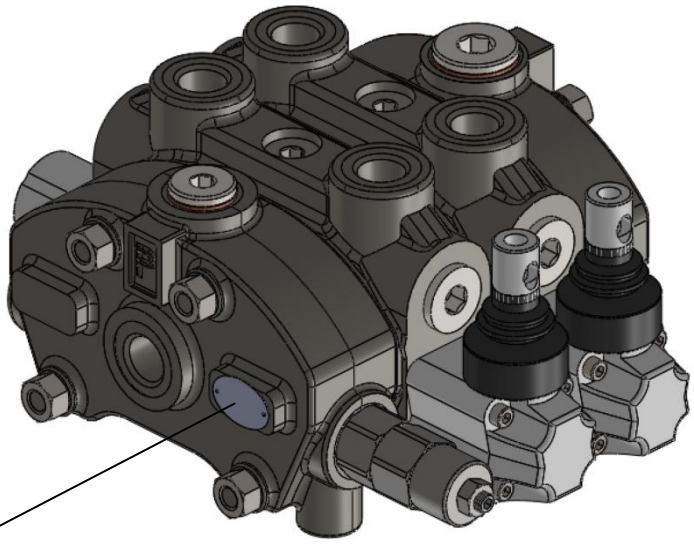
Hydraulic Circuit

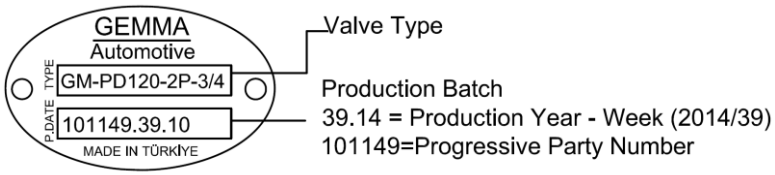
Outlet Cover (Tank Side)

SO - Side outlet
TO - Top outlet
TCO - Top outlet with carry—over
TC - Top outlet with closed centre



Type=SO	Type=TO	Type=TCO	Type=TC
			





Valve Type

Production Batch
39.14 = Production Year - Week (2014/39)
101149=Progressive Party Number

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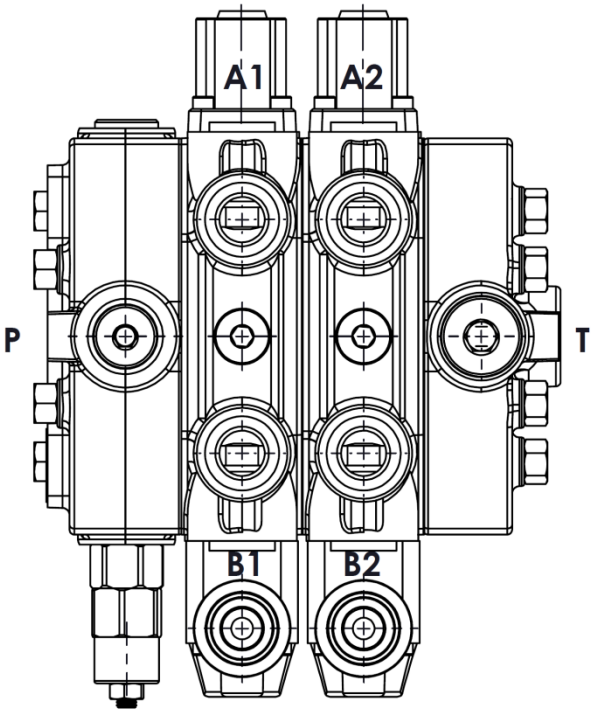
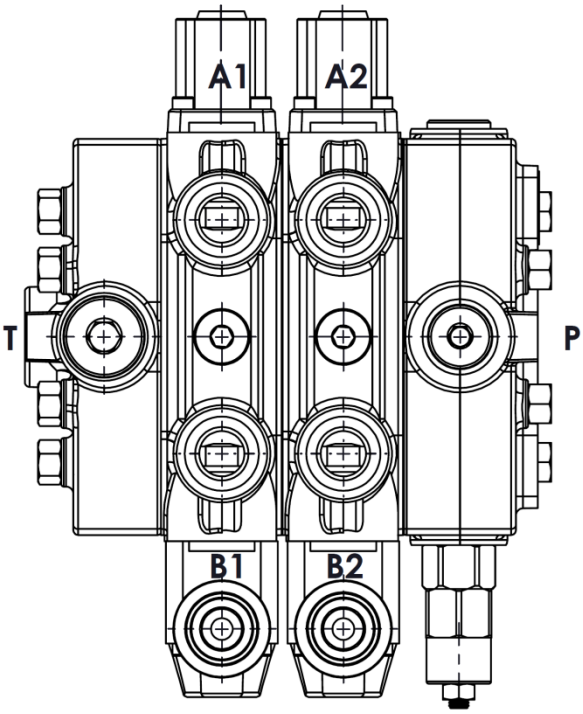
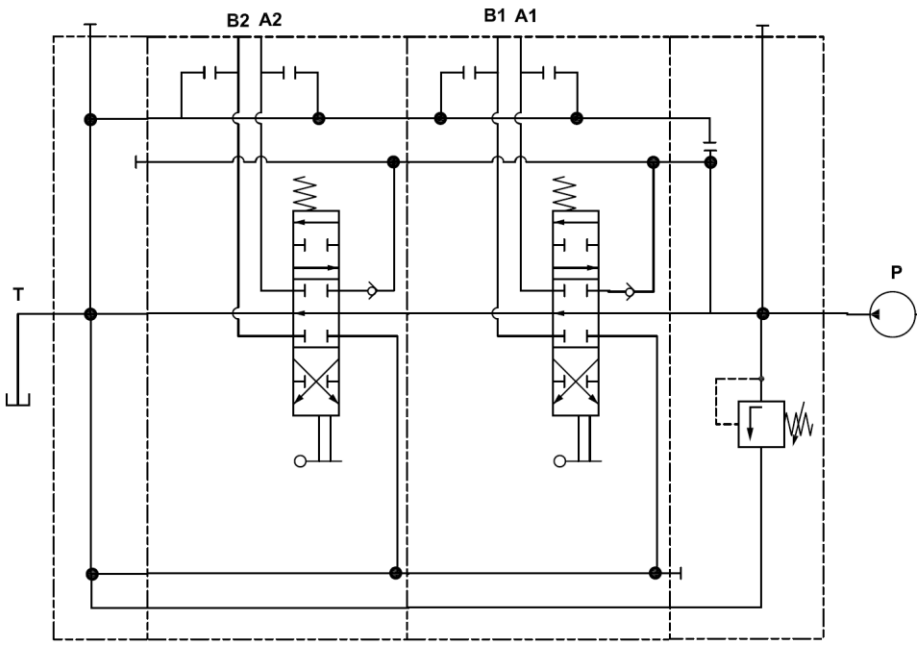
Hydraulic Circuit

Standard Configurations With Top Inlet And Outlet Ports - RH (Right Inlet)

A simmetrical body allows the reverse assembly of spool.







Code: GM PD120-2P (SD**(RA)**-SMR2-125-PP)/P-1A-STL-SR/ P-1A-STL-SR/ SO-PT1 /

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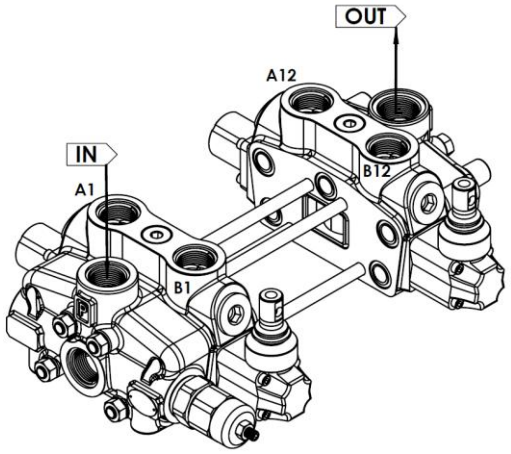
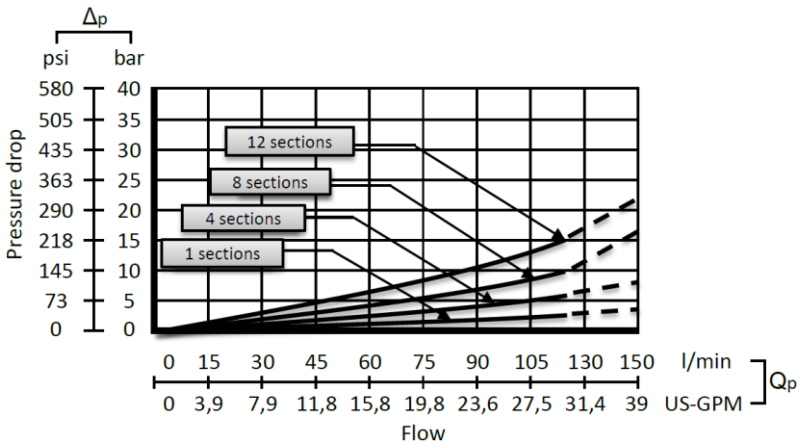
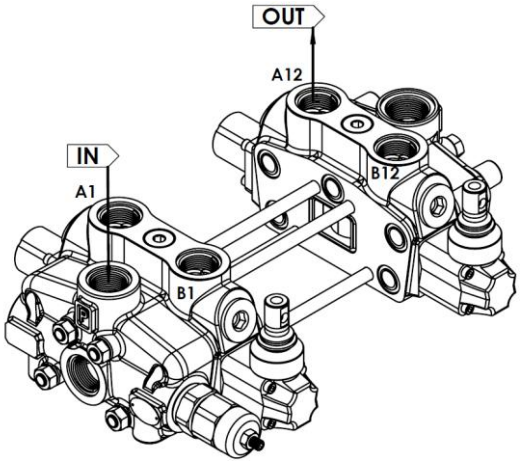
Performance Data And Curve

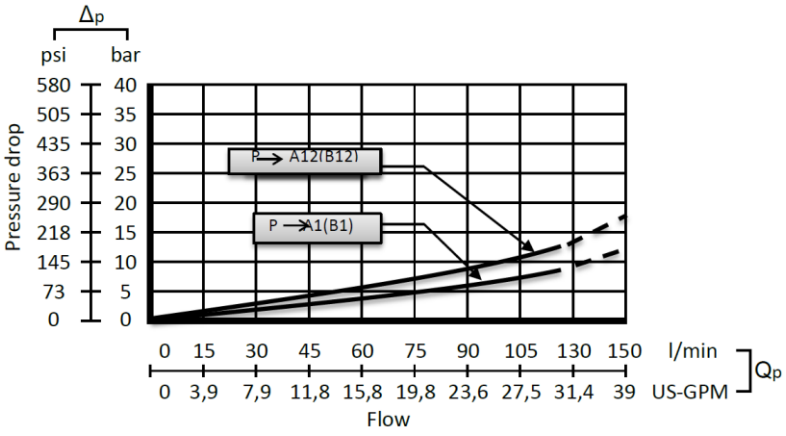
Open Center - Pressure Drop (P-T)



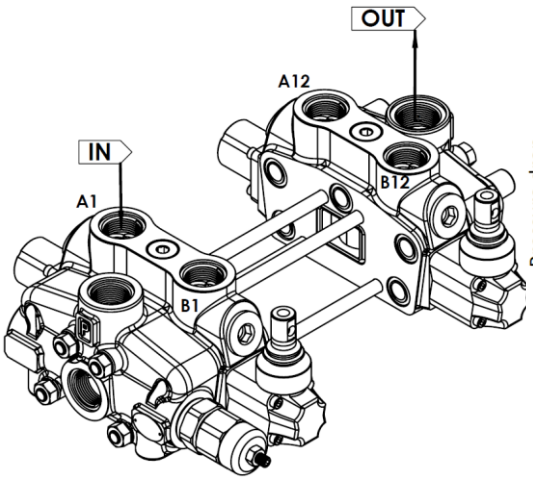


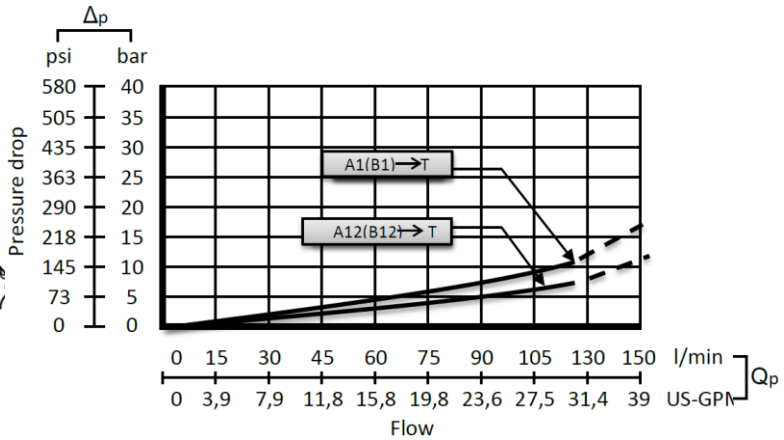
Inlet to Work Port - Pressure Drop (P-A/B)





Work Port to Outlet - Pressure Drop (A/B-T)





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Inlet Relief Options

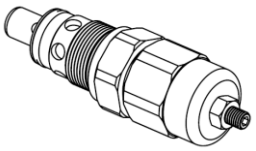
Direct Pressure Relief Valve

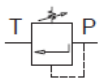
Code:

SMR2 – 125

→ Pressure Setting Bar in (Standard 125 bar)

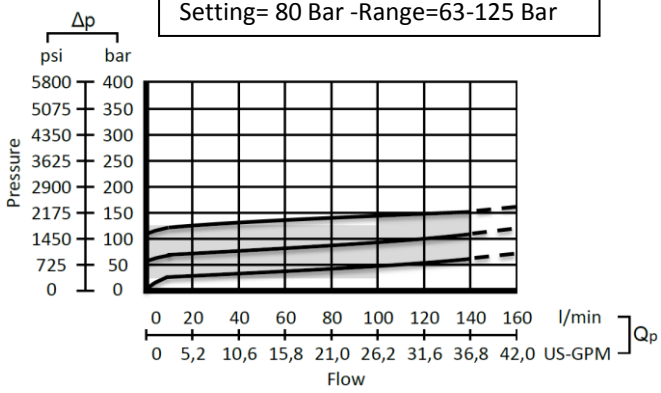
→ Standard Main Relief Spring Type -2



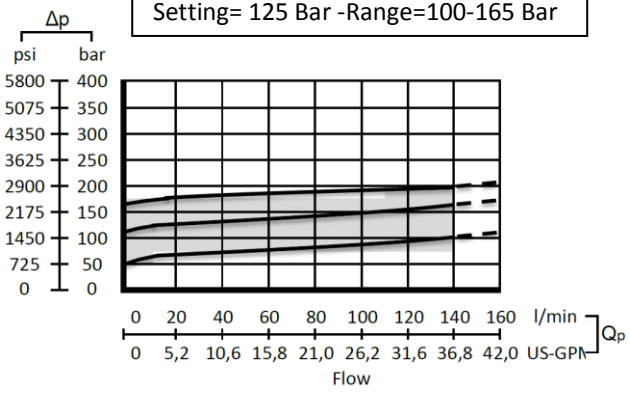


Performance Data:

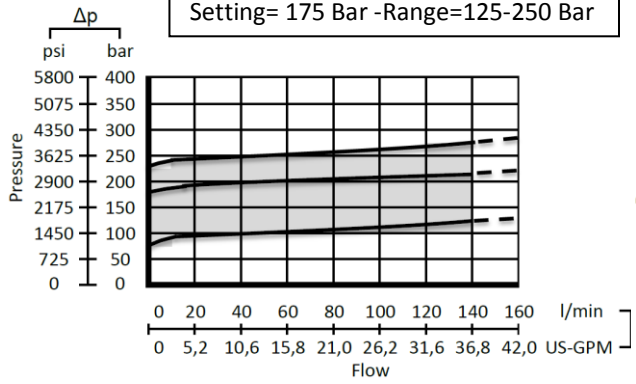
Spring Type Number : 1
Setting= 80 Bar -Range=63-125 Bar



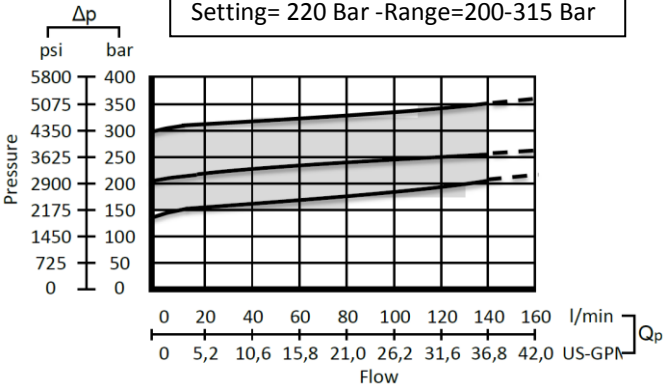
Spring Type Number : 2
Setting= 125 Bar -Range=100-165 Bar



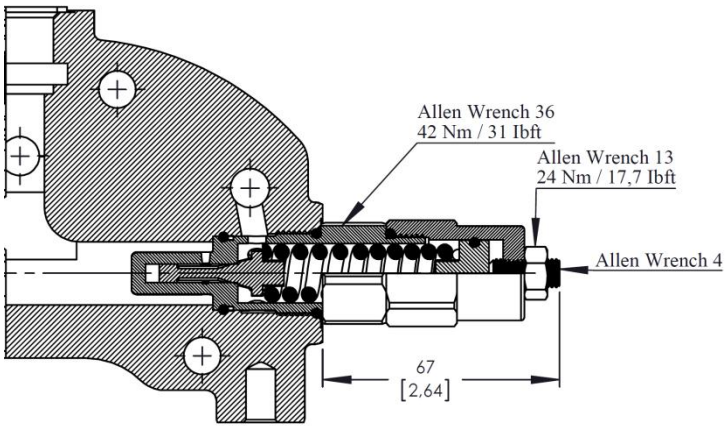
Spring Type Number : 3
Setting= 175 Bar -Range=125-250 Bar

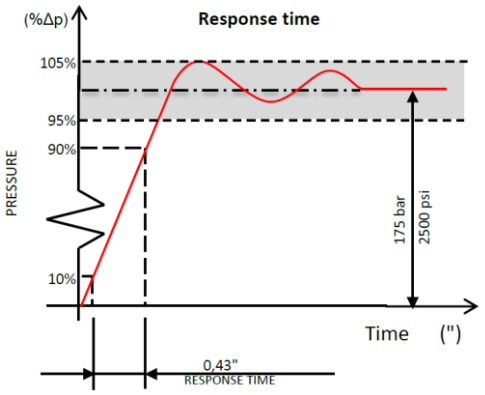


Spring Type Number : 4
Setting= 220 Bar -Range=200-315 Bar



Adjustment Type on Valve:





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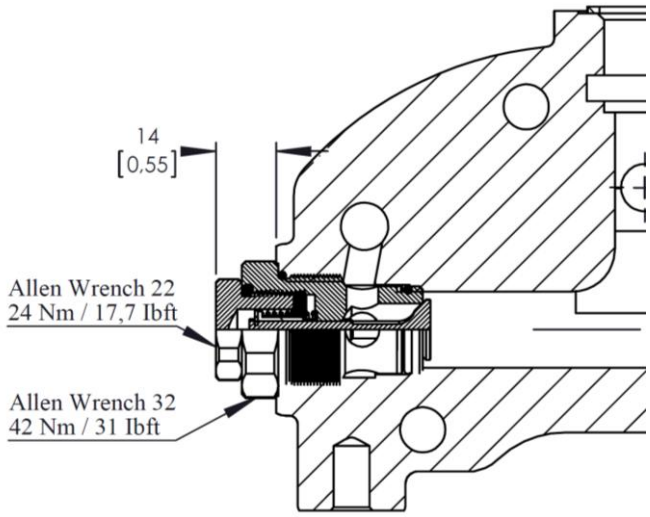
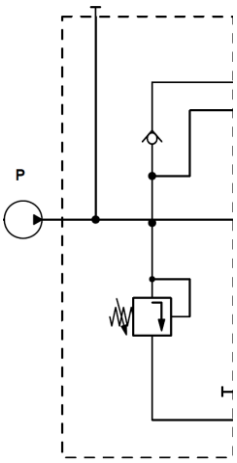
Inlet Relief Options

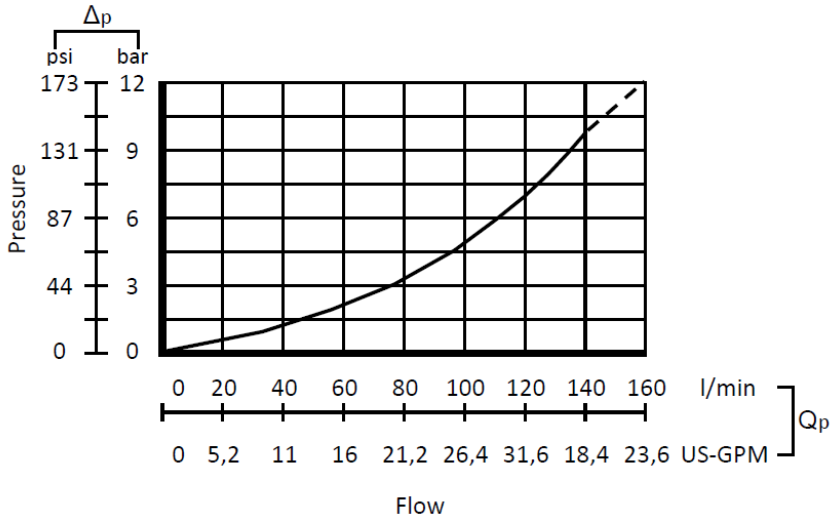
Direct Pressure Relief Valve

Kit No: **PAC**

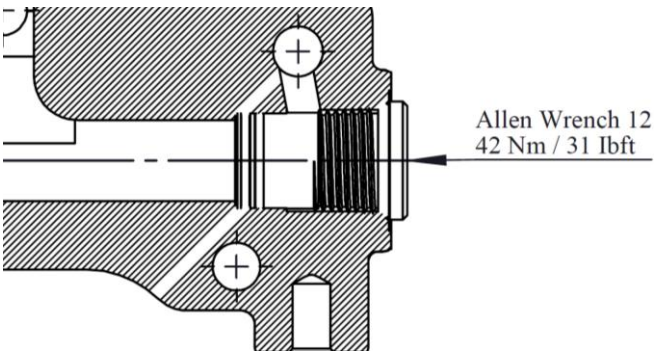
Sectional Appearance	Diagram
	

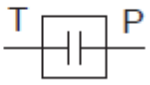
Performance Data

Pressure drop



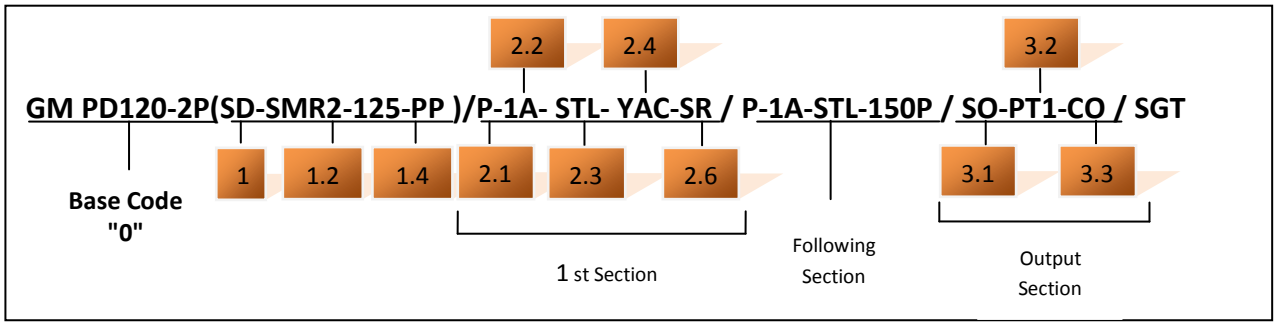
Relief Blanking Plug - SP

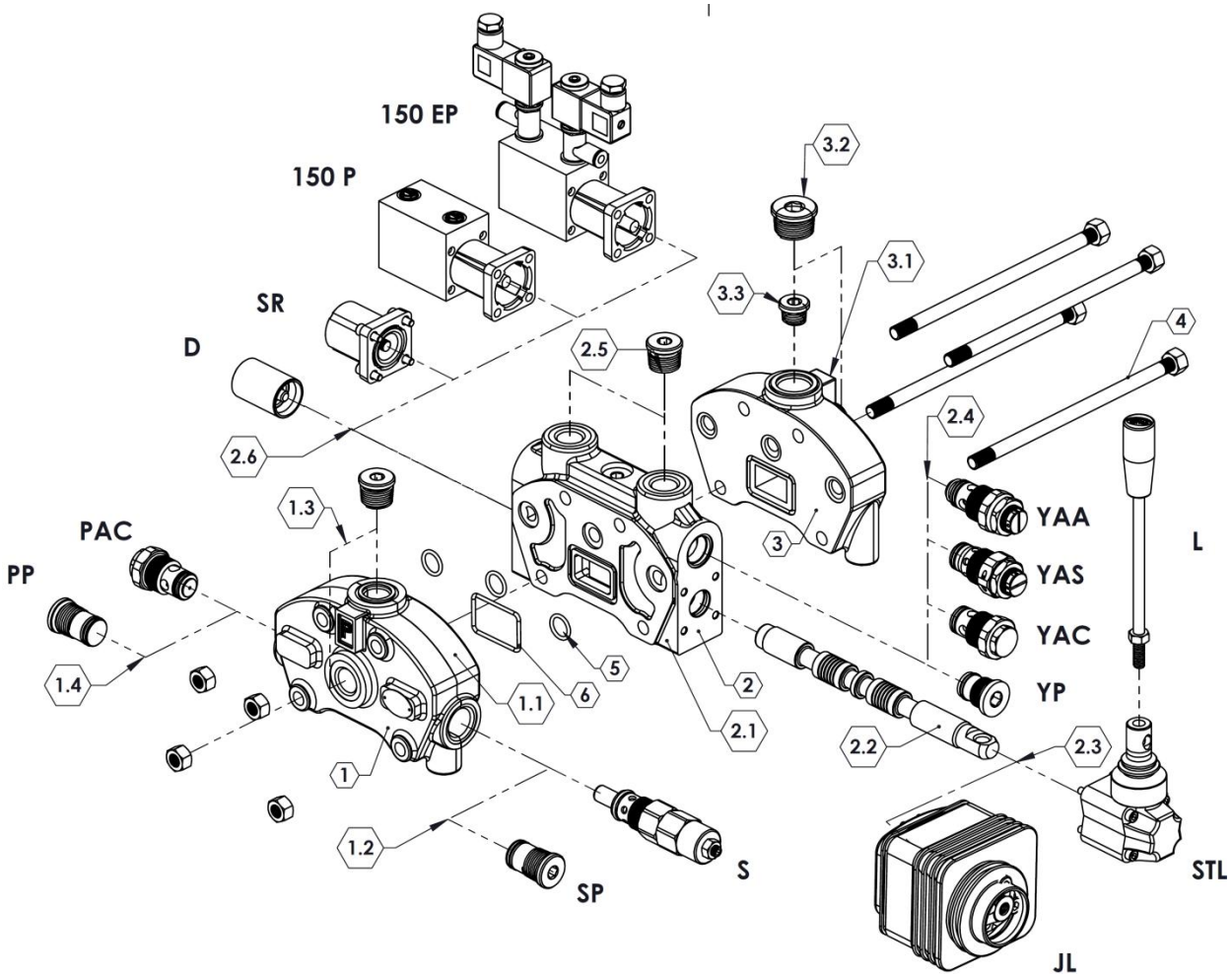




Ordering Codes

Order example





1-Inlet Section

GM PD120-2P PD120 =Valve Type-(PD)- Sectional
(120) - Max. Flow Rate
2P =Sections Quantity

SD = Side inlet with direct pressure relief valve (1SD120100)

TD = Top inlet with direct pressure relief valve (1TD120100)

SP = Side inlet with relief valve blanking plug (1SP120100)

2-Working Section

P = Parallel (2P120100)

3-Output Section

SO	= Side outlet	(3SO120100)
TO	= Top outlet	(3TO120100)
TCO	= Top outlet with carry—over	(3TCO120100)
TC	= Top outlet with closed centre	(3TC120100)

Ordering Codes

4-Assembling Kit

Tie rod kit for 1 section valve - (4TRK1120100)
Tie rod kit for 2 section valve - (4TRK2120100)
Tie rod kit for 3 section valve - (4TRK3120100)
Tie rod kit for 4 section valve - (4TRK4120100)
Tie rod kit for 5 section valve - (4TRK5120100)
Tie rod kit for 6 section valve - (4TRK6120100)
Tie rod kit for 7 section valve - (4TRK7120100)
Tie rod kit for 8 section valve - (4TRK8120100)
Tie rod kit for 9 section valve - (4TRK9120100)
Tie rod kit for 10 section valve - (4TRK10120100)
Tie rod kit for 11 section valve - (4TRK11120100)
Tie rod kit for 12 section valve - (4TRK12120100)

5-6-O_Ring Kit

5. -17.00x2.65 NBR 70 SH O-Ring seal (3 Qty.) (5MK150100)
6. -34.60x2.62 NBR 70 SH O-Ring seal (1 Qty.) (6MK150100)

1.*-Inlet Options

1.1 Inlet Cover
Body = Standard (11BS120100)
1.2 Inlet Relief
SMR1-080 – (12SMR1150080)–Range 63-125 bar Setting 80 bar
SMR2-125 – (12SMR2150120)–Range 100-160 bar Setting 125 bar
SMR3-175 – (12SMR3150175)–Range 125-250 bar Setting 175 bar
SMR4-220 – (12SMR4150220)–Range 200-315 bar Setting 220 bar
1.3 Ports Plug
PA1 =G1/2 Top and side input - (13PA1800100)
PA2= G3/4 Top and side input –(13PA2800100)
1.4 Inlet Valve
PAC = Inlet anti-cavitation valve –(14PAC150100)
PP(SP) = Relief valve blanking plug –(14PSP150100)

3.*- Working Options

3.1 Working Section
Body = Standard (31BS150100)
3.2 Output Plug
PT1 =G3/4 Top and Side output (32PT180100)
3.3 Circuits Options
CO =G1/8 Carry–Over Connector (33CO150100)

2.*- Working Options

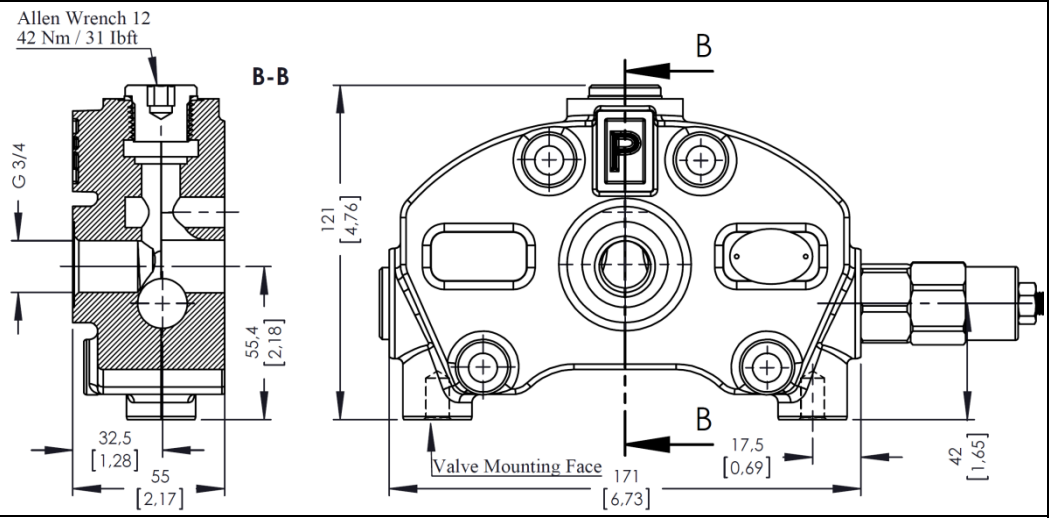
2.1 Working Section
PA= Without ports valve prearrangement, with parallel circuit - Body (21BSPA120100)
2.2 Spool Options
1A -(22SS120110) – 3 Positions ,Double acting
2A -(22SS120120) – 3 Positions ,Double acting A to tank B Blocked
3A -(22SS120130) – 3 Positions ,Double acting B to tank A blocked
4A -(22SS120140) – 3 Positions ,Double acting A and B tank
5A -(22SS120150) – 3 Positions ,Single acting on A (A to tank)
6A -(22SS120160) – 3 Positions ,Single acting on B (B to tank)
2.3 Lever Options
L =Standard HandLever (L=120mmxM10)-(7L040100)
JL=Joystick lever for two sections operation-(5JL 080100)
STL=Standard Lever –(23STL150100)
2.4 Port Relief Valves
Anti-Shock Valve
YAS (T1-50) – (24YAC150050)–Range 35-70 bar Setting 50 bar
YAS (T1-100) – (24YAC150100)–Range 63-220 bar Setting 100 bar
YAS (T1-200) – (24YAC150200)–Range 180-350 bar Setting 200 bar
Anti-Shock and Anti-Cavitation Valve
YAA (T1-63) – (24YAA150063)–Range 35-70 bar Setting 50 bar
YAA (T1-100) – (24YAA150100)–Range 63-220 bar Setting 100 bar
YAA (T1-200) – (24YAA150200)–Range 180-350 bar Setting 200 bar
YAC - Anti Cavitation– (24YAS150100)
YP- A and B ports valve blanking plug (24YP150100)
DST-A and B ports valve blanking plugs with connection to tank–(24DST150100)
2.5 Ports Plug Options
PL1 =Plug for single action spool for 2A-3A, G1/2 (25PL180100)
PL2 =Plug for single action spool for 2A-3A, G3/4 (25PL280100)
2.6 Spool Positioners
SR=Spring Return in neutral position – (26SR150100)
D =Detent in position 1, neutral and 2 -(26D150100)
150P=ON/OFF Pneumatic – (2645P150100)
150EP=12 VDC ON/OFF electro-pneumatic – (2680EP150112)
24 VDC ON/OFF electro-pneumatic – (2680EP150124)

Inlet Cover- Pump Side

LH Inlet Valve Options

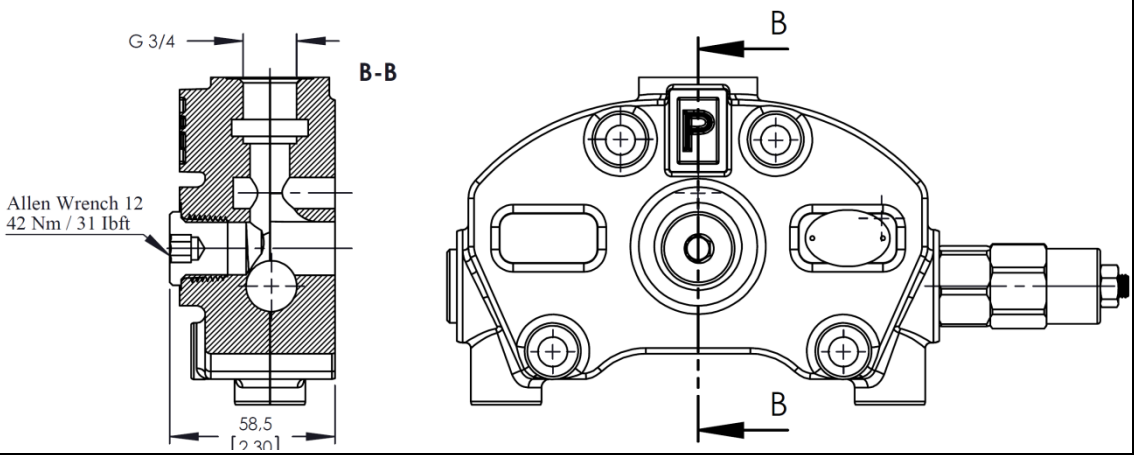
Type No:**SD**

Sectional Appearance

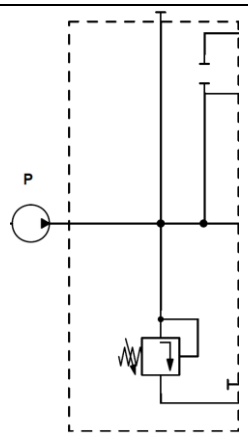
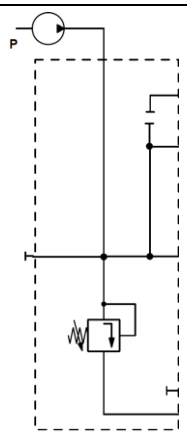


Type No:**TD**

Sectional Appearance



Hydraulic Diagram

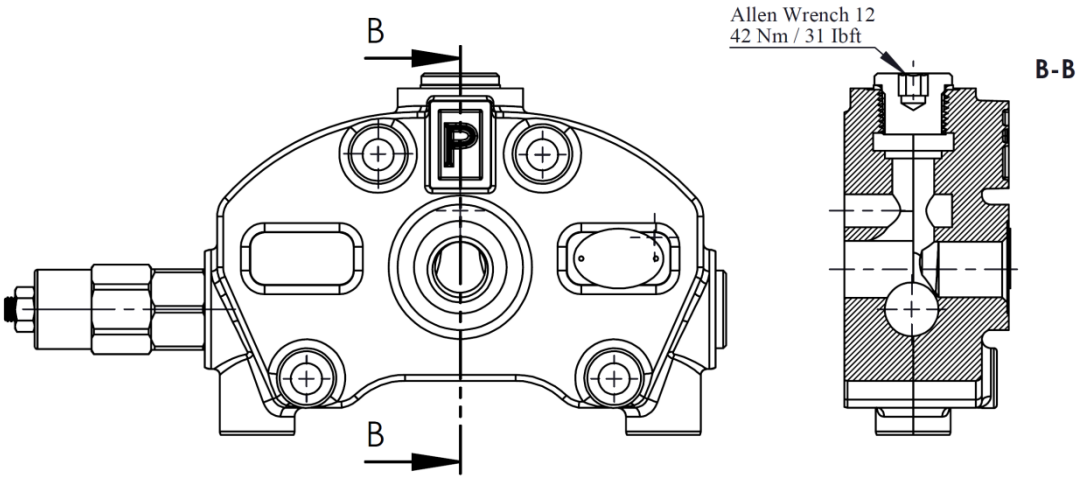
Type =**SD**	Type =**TD**
	

Inlet Cover- Pump Side

RH Inlet Valve Options

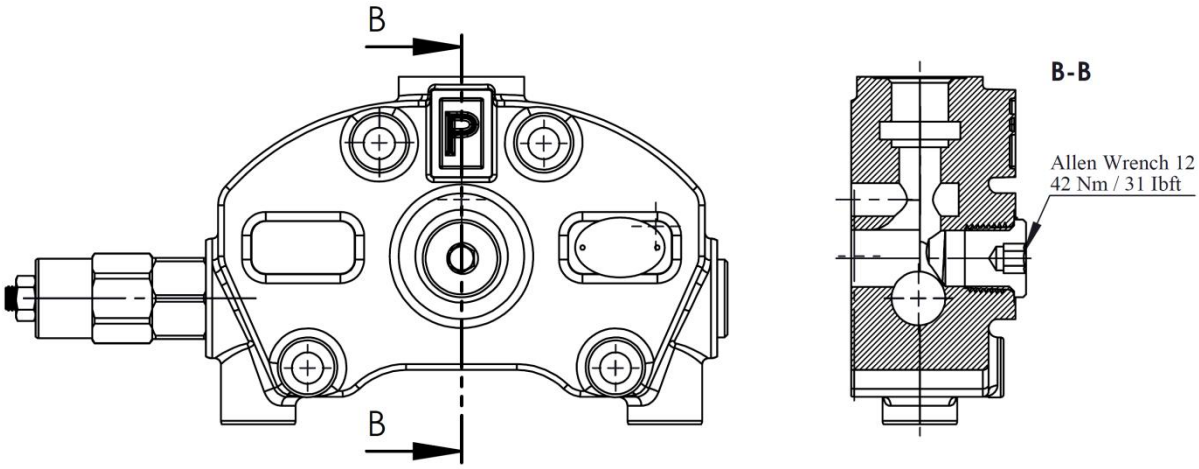
Type No:**RA**

Sectional Appearance

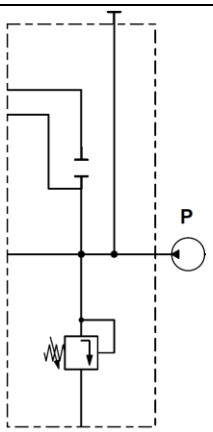
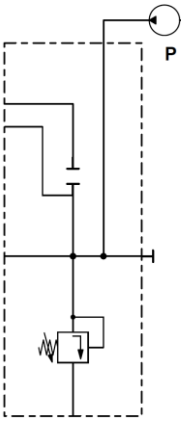


Type No:**RB**

Sectional Appearance

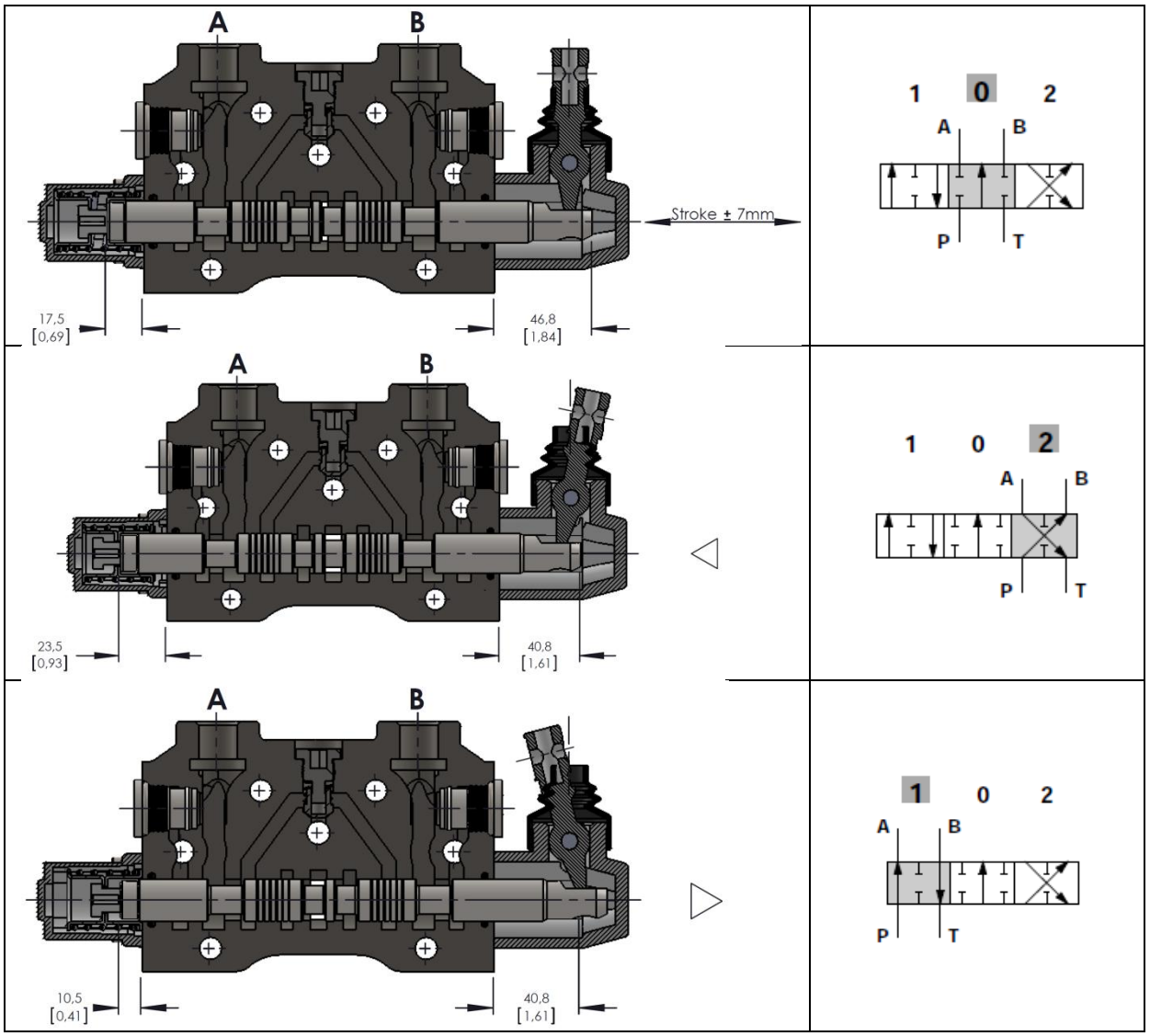


Hydraulic Diagram

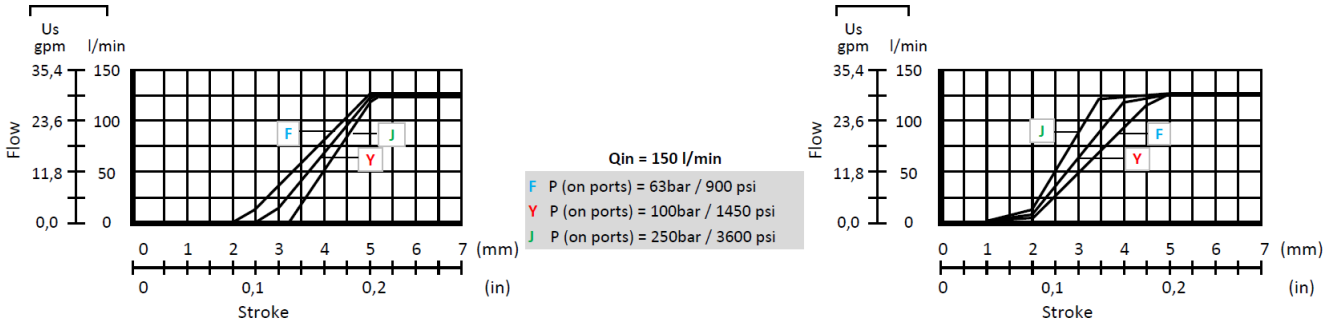
Type =**RA**	Type =**RB**
	

Spool Options

Spool Type - 1A

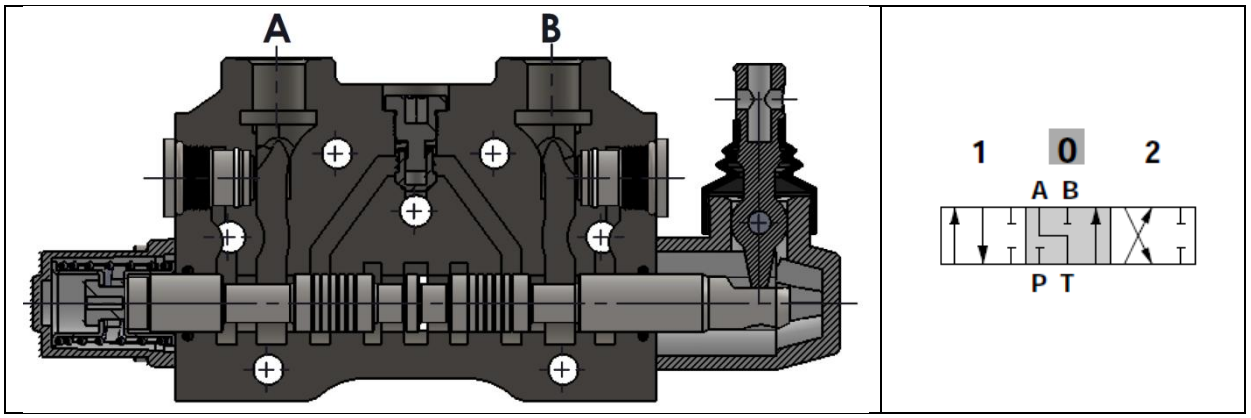


Performance Curve And Data:

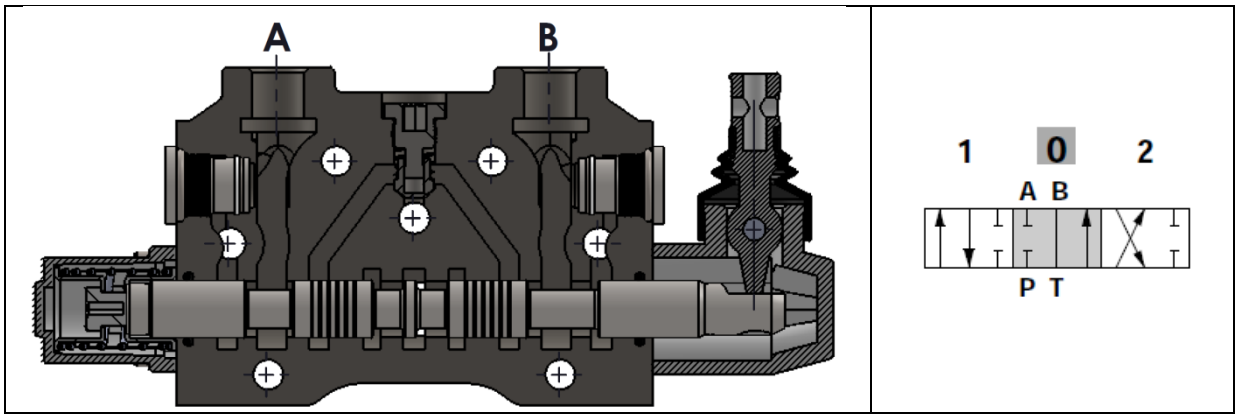


Spool Options

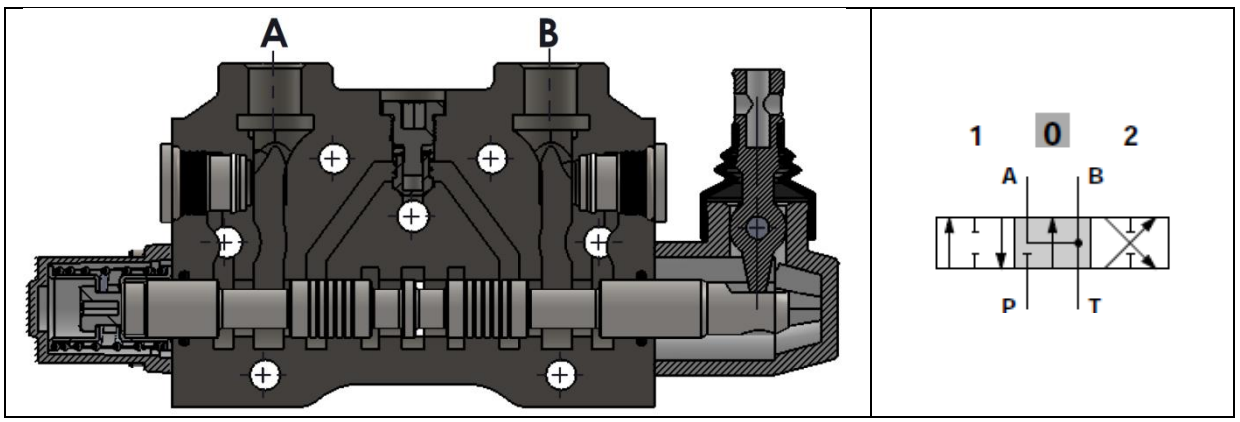
Spool Type - 2A



Spool Type - 3A

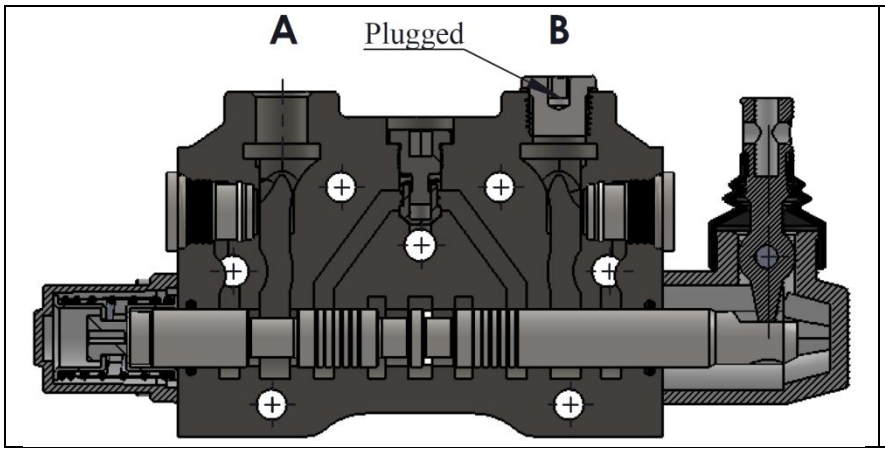


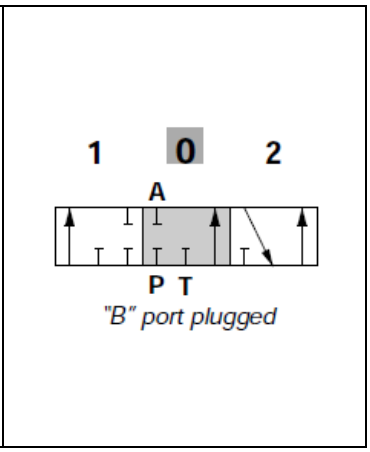
Spool Type - 4A



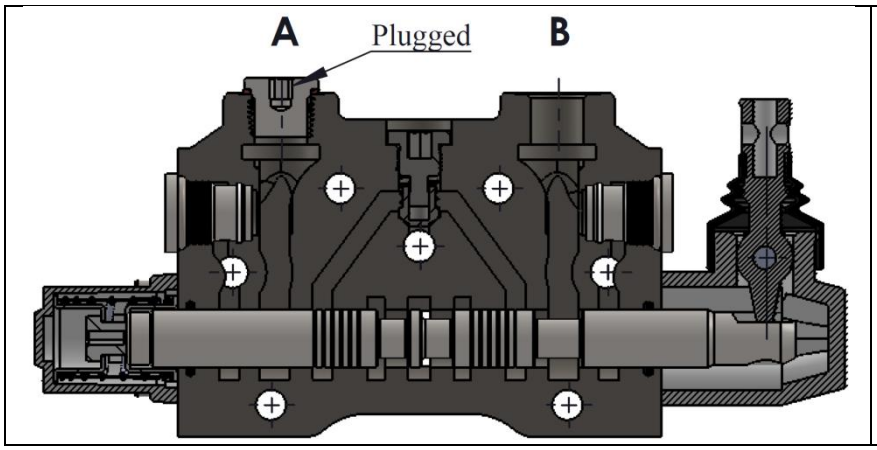
Spool Options

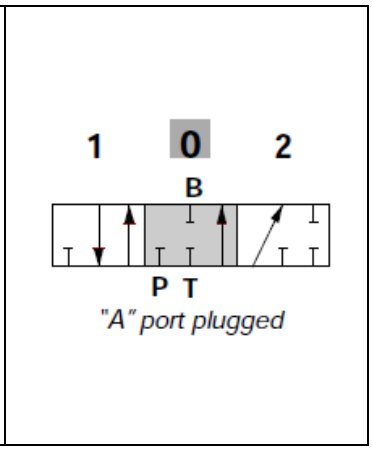
Spool Type - 5A





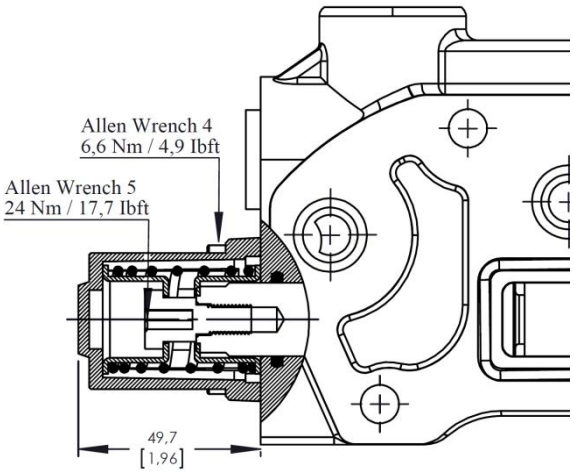
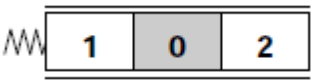
Spool Type - 6A



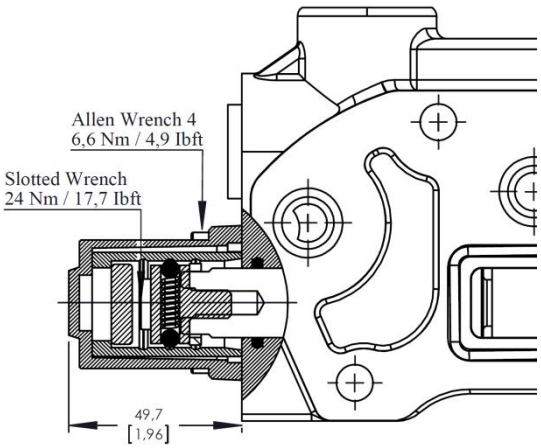
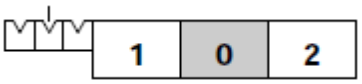


Spool Positioners – Side of Return

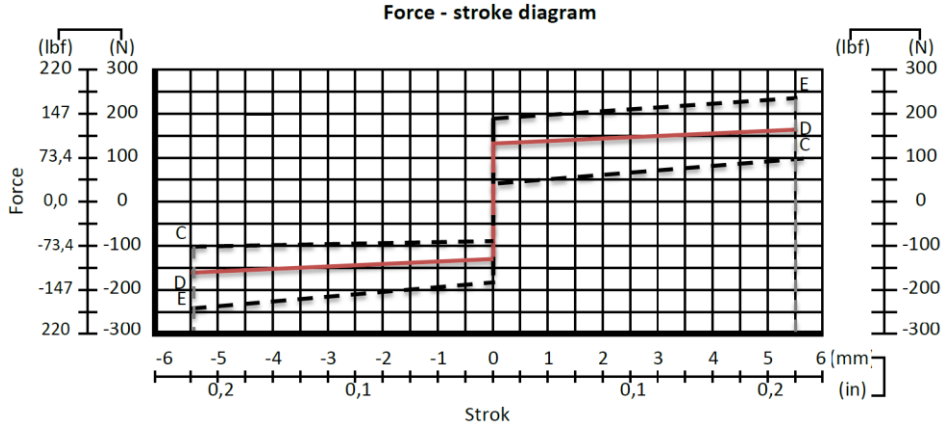
With Spring Return in Neutral Position

Kit No:**SR**	
Sectional Appearance	Diagram
	

With Detent

Kit No:**D**	
Sectional Appearance	Diagram
	

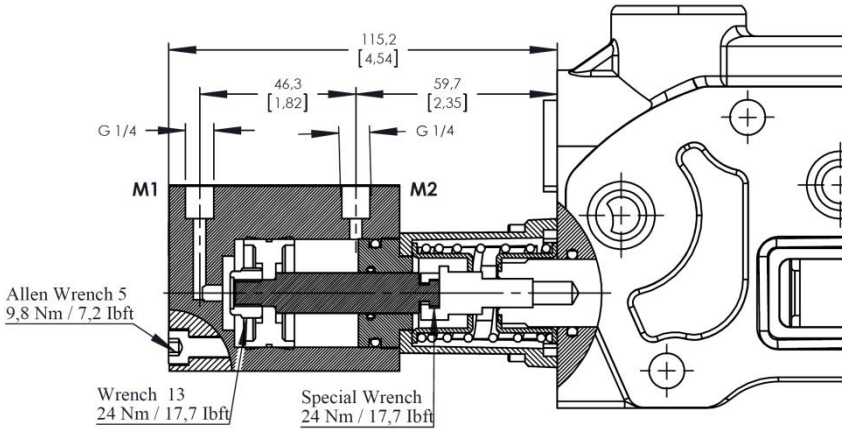
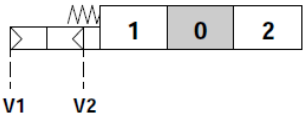
Force - stroke diagram



Spool Positioners – Side of Return

ON/OFF Pneumatic Control

Kit No: **150P**

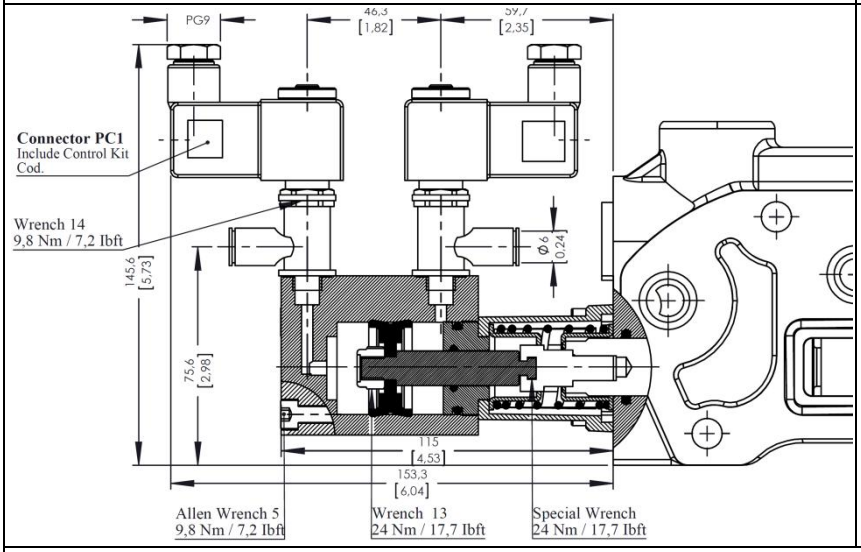
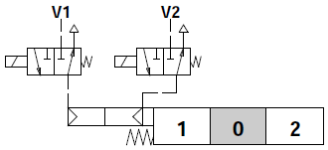
Sectional Appearance	Diagram
	

Operatig Features

Pilot Pressure .....: 6 Bar (Max. 10) / 87 Psi (Max. 145)

ON/OFF Electro-Pneumatic Control

Kit No:**150EP**

Sectional Appearance	Diagram
	

Operatig Features

Pilot Pressure .....: 6 Bar (Max. 10) / 87 Psi (Max. 145)

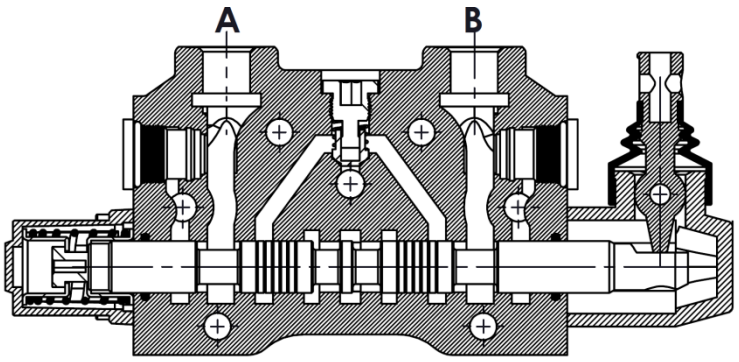
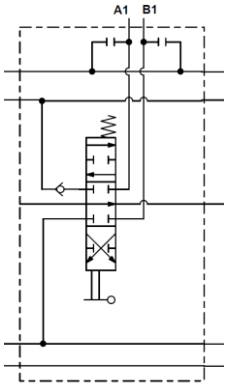
Selonoid Operating Features

Nominal Voltage.....: 12VDC / 24 VDC

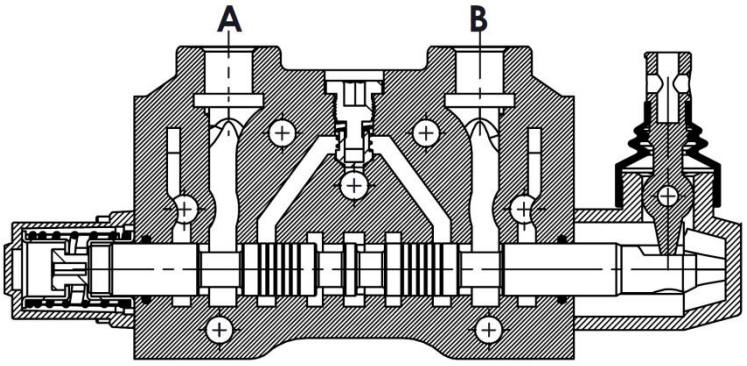
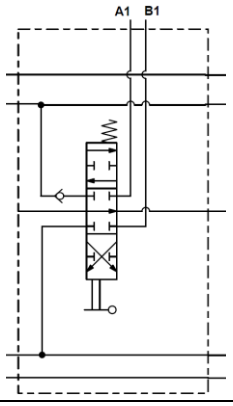
Power Rating.....: 6 W

Working Section Kit

With Port Valves Type

Kit No: **AA**	
Sectional Appearance	Diagram
	

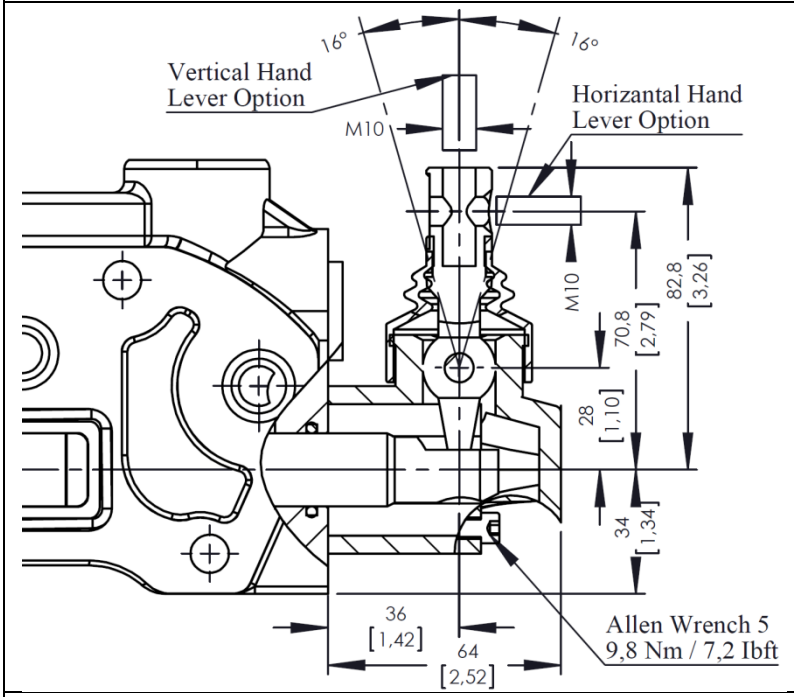
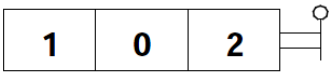
Without Port Valves Type

Kit No: **AB**	
Sectional Appearance	Diagram
	

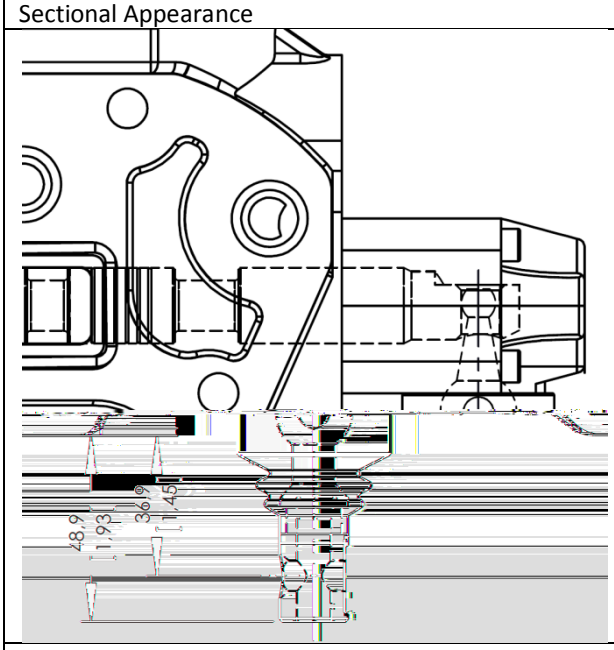
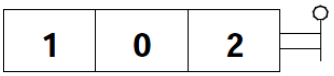
Spool Positioners – Side of Lever Control

Lever Controls

Kit No: **STL - L0**

Sectional Appearance	Diagram
	

Kit No: **STL - L180**

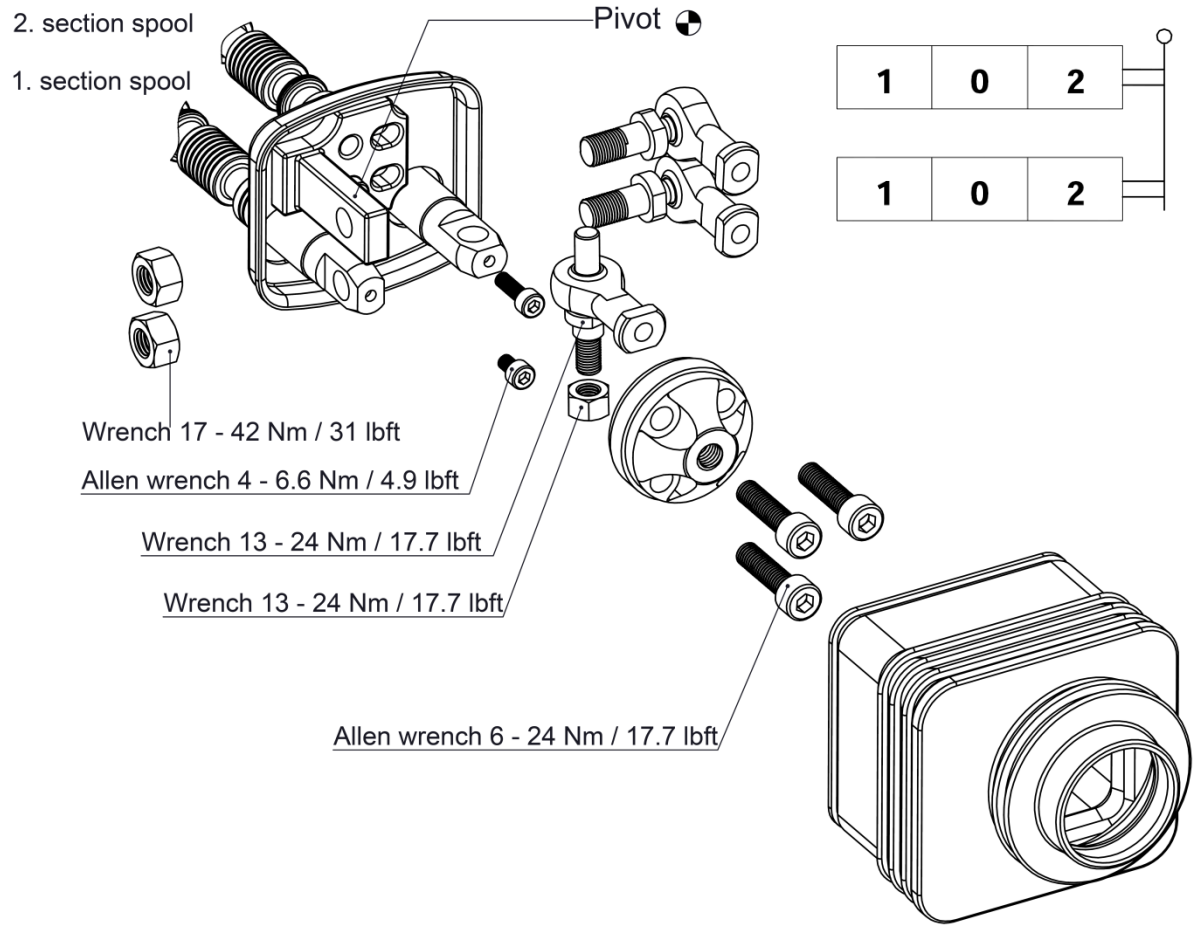
Sectional Appearance	Diagram
	

Note: Alluminium with protection arm lever pivot box, it can be rotated 180°.

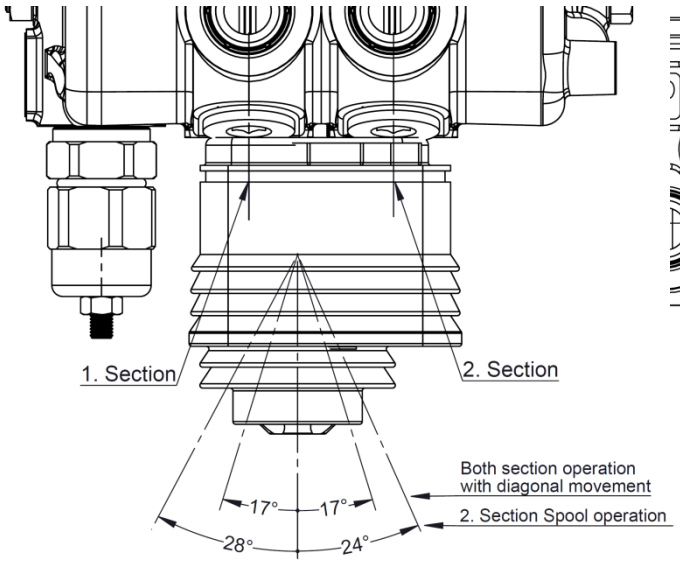
Spool Positioners – Side of Lever Control

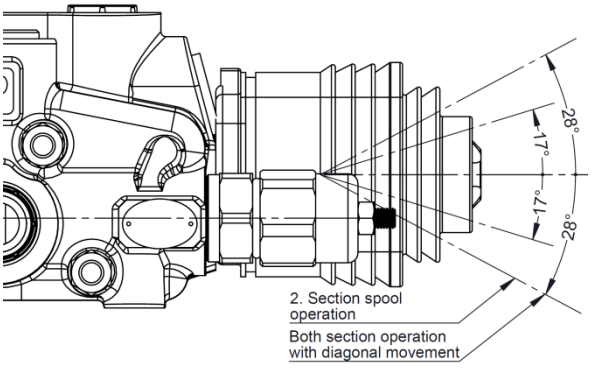
Lever Controls - Joystick

Kit No: **JL**	
Explode Appearance	Diagram



Operation Angle:



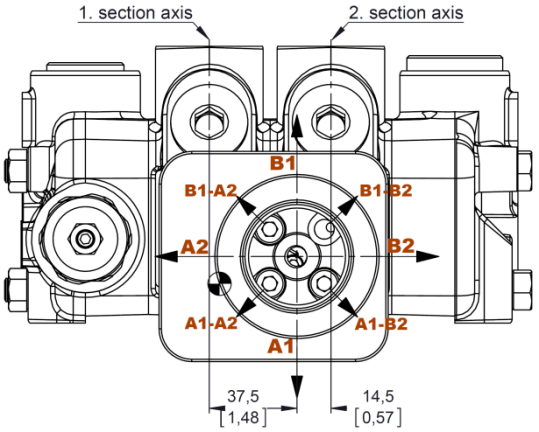


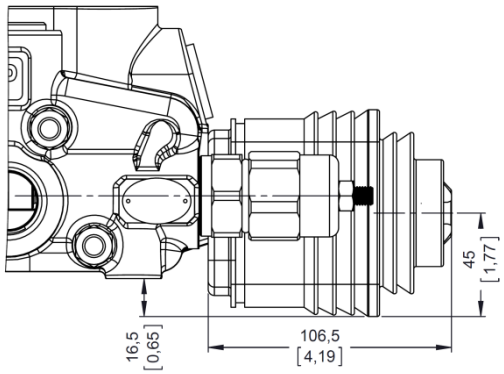
Spool Positioners – Side of Lever Control

Lever Controls - Joystick

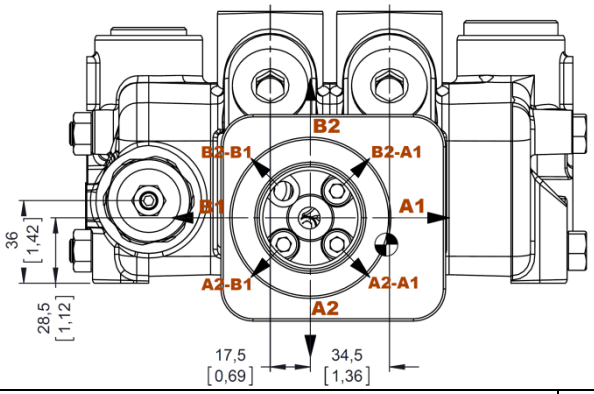
Dimensions and movement sceme

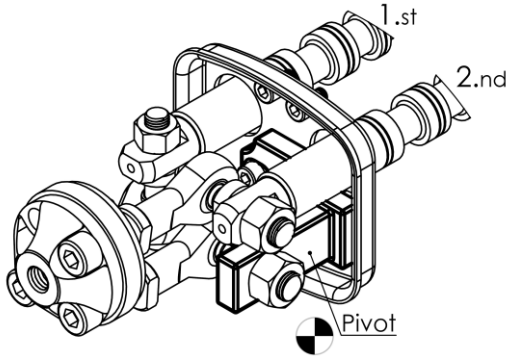
Type No:**JL1**	**Execution:** Pivod placed down on the Left



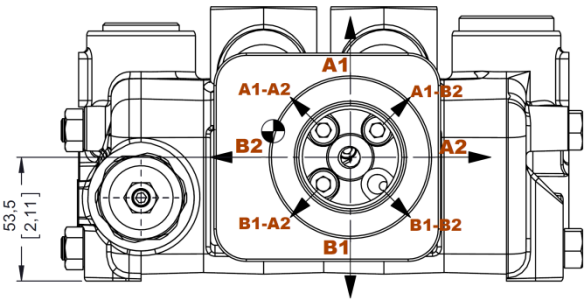


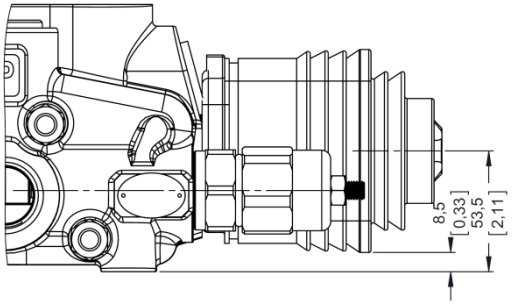
Type No:**JL2**	**Execution:**Pivod placed down on the right



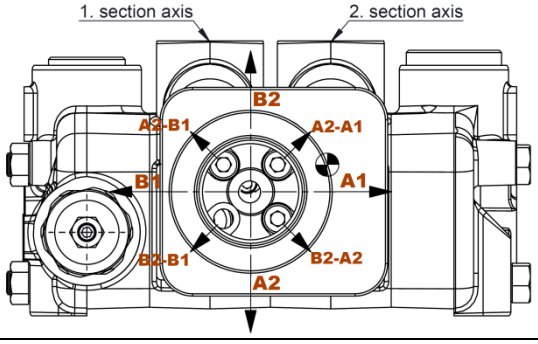


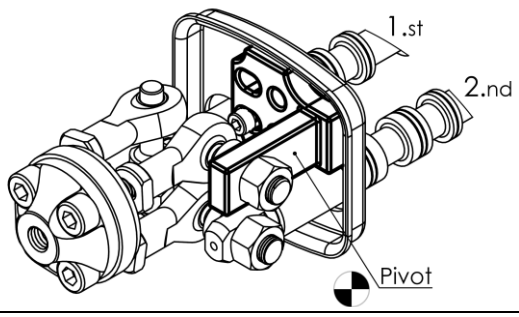
Type No:**JL3**	**Execution:**Pivod placed above on the Left





Type No:**JL4**	**Execution:**Pivod placed above on the right



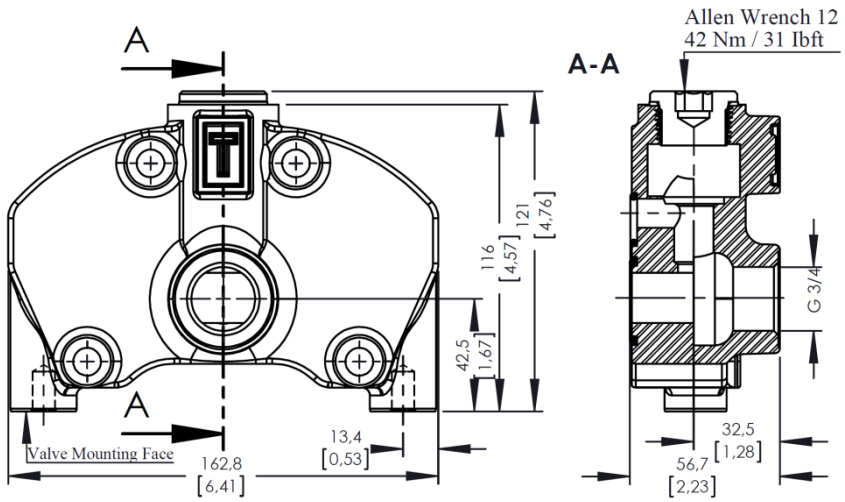


Outlet Cover- Tank Side

Output Cover Options

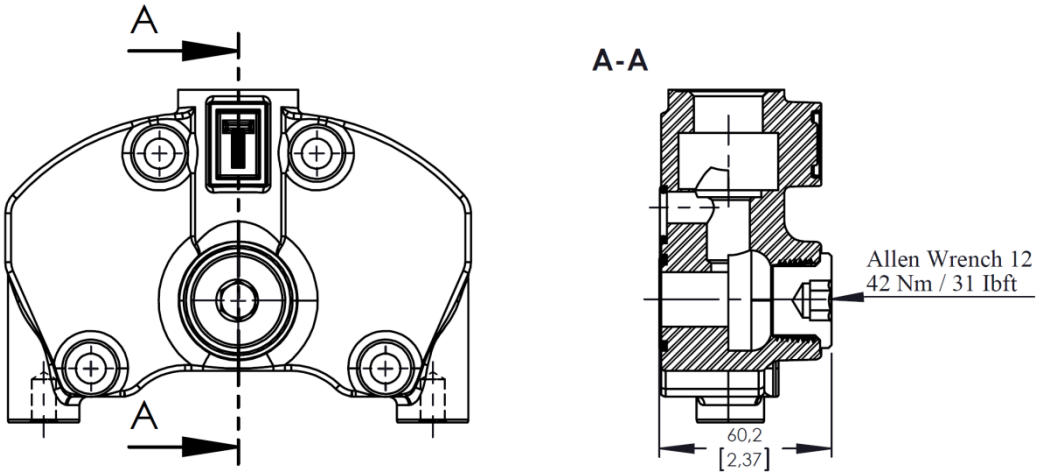
Type No:**SO**

Sectional Appearance

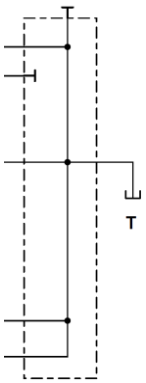
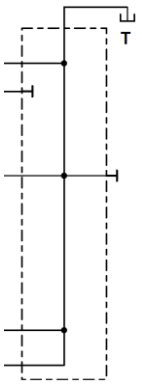


Type No:**TO**

Sectional Appearance



Hydraulic Diagram

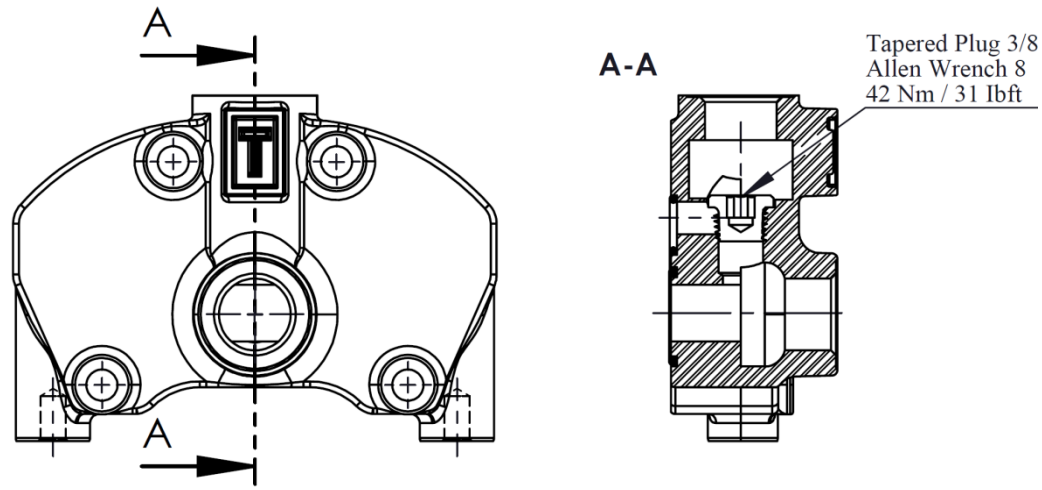
Type = **SO**	Type=**TO**
	

Outlet Cover- Tank Side

Output Cover Options

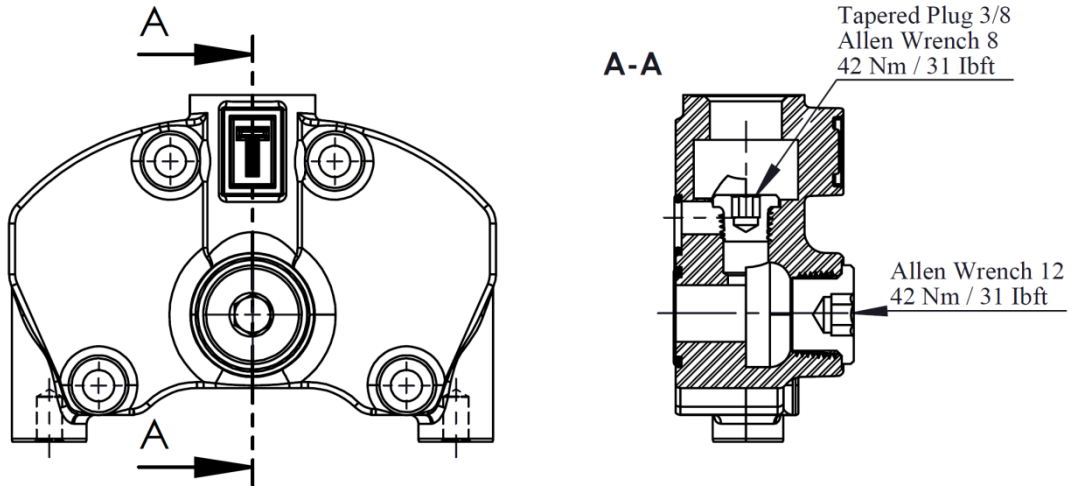
Type No:**TCO**

Sectional Appearance

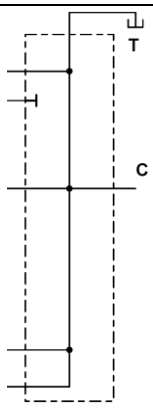
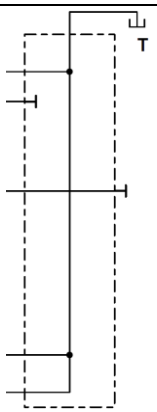


Type No:**TC**

Sectional Appearance



Hydraulic Diagram

Type = **TCO**	Type=**TC**
	

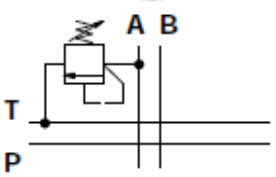
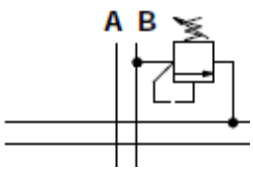
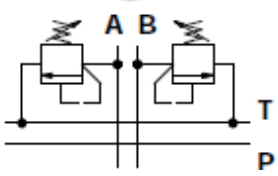
Port Valves Options

Anti Shock Valves

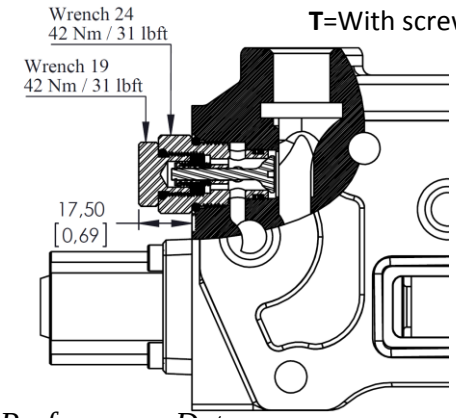
Code:

YAS –1(T1-100)

- Pressure setting in bar.
- Adjusting type **T**=With screw , **L**=Valve Set / Spring Type **(1,2,3)**
- **1**= Mounted Port A , **2**=Mounted Port B , **3**=Mounted Port A and B

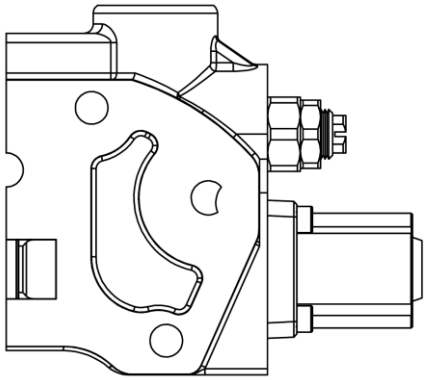
Hydraulic Diagram		
Kit No:**YAS1**	Kit No:**YAS2**	Kit No:**YAS3**
		

Adjustment Type on Valve:



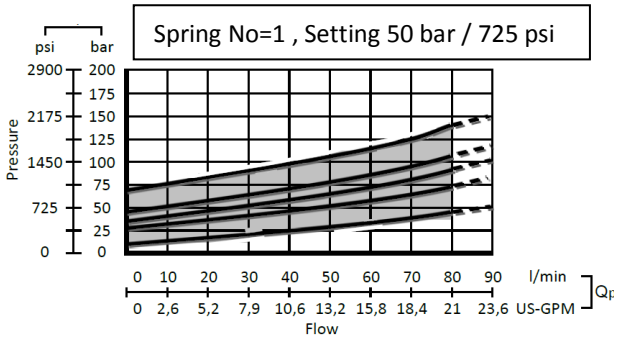
T=With screw

L=Valve set

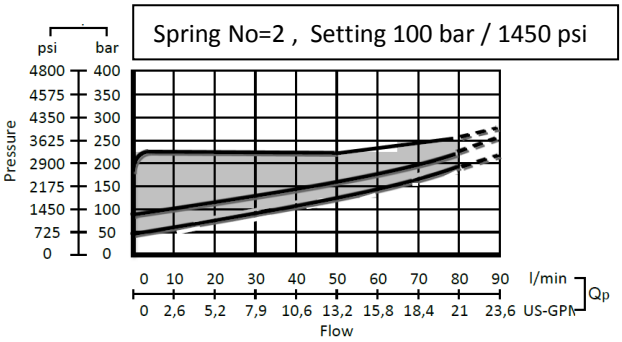


Performance Data:

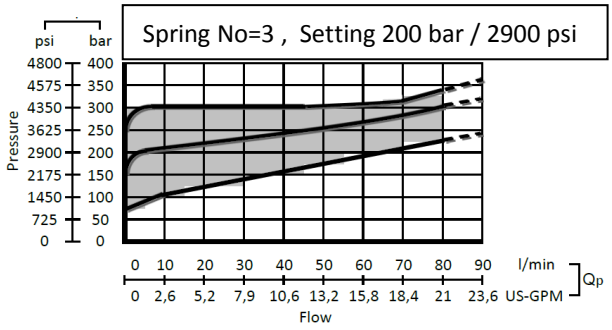
Spring No=1 , Setting 50 bar / 725 psi

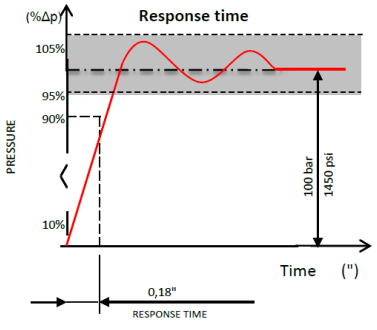


Spring No=2 , Setting 100 bar / 1450 psi



Spring No=3 , Setting 200 bar / 2900 psi





Gemma AUTOMOTIVE

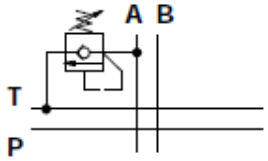
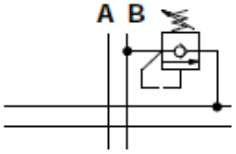
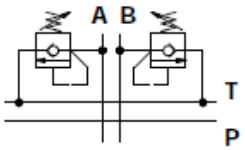
Port Valves Options

Anti shock And Anti Cavitation Valves

Code:

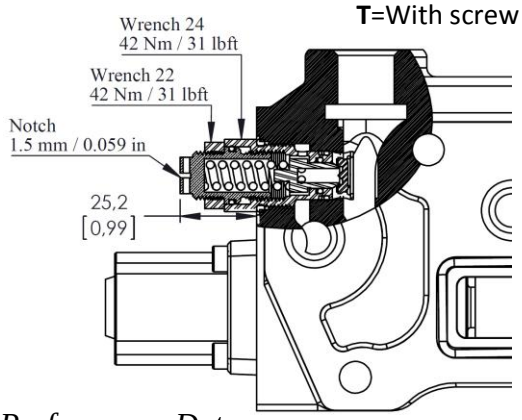
YAA –1(T1-100)

- Pressure setting in bar.
- Adjusting type **T**=With screw , **L**=Valve Set / Spring Type **(1,2,3)**
- **1**= Mounted Port A , **2**=Mounted Port B , **3**=Mounted Port A and B

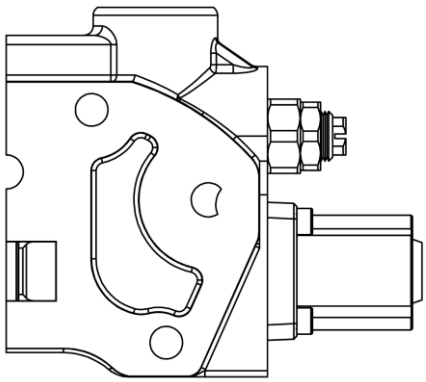
Hydraulic Diagram		
Kit No:**YAA1**	Kit No: **YAA 2**	Kit No: **YAA 3**
		

Adjustment Type on Valve:

T=With screw

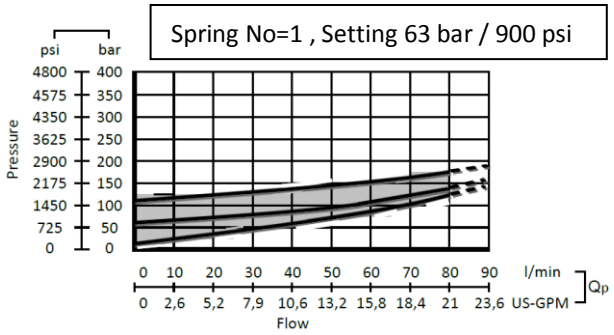


L=Valve set

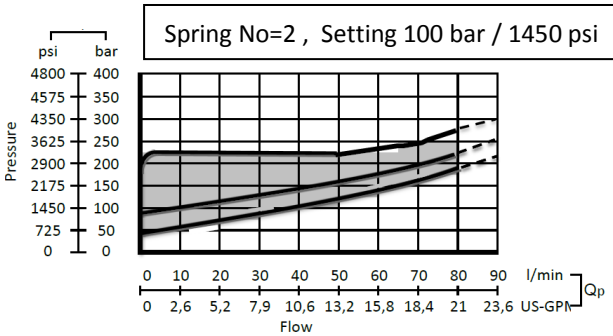


Performance Data:

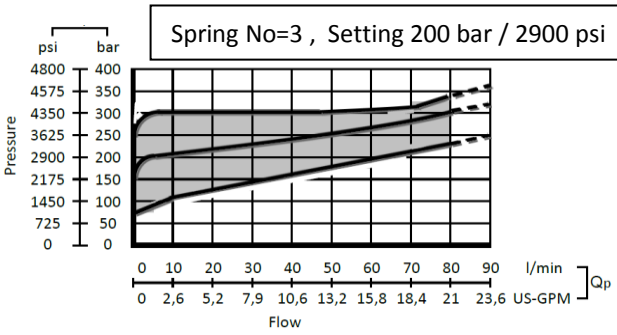
Spring No=1 , Setting 63 bar / 900 psi



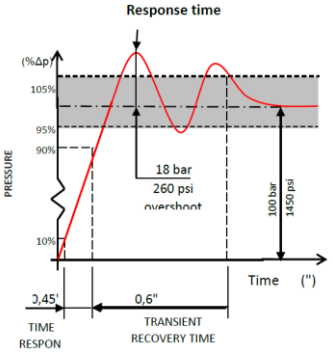
Spring No=2 , Setting 100 bar / 1450 psi



Spring No=3 , Setting 200 bar / 2900 psi



Response time

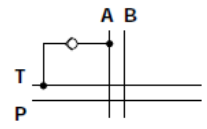
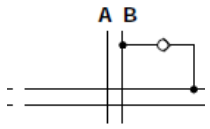
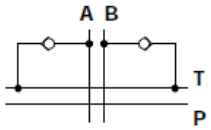


Port Valves Options

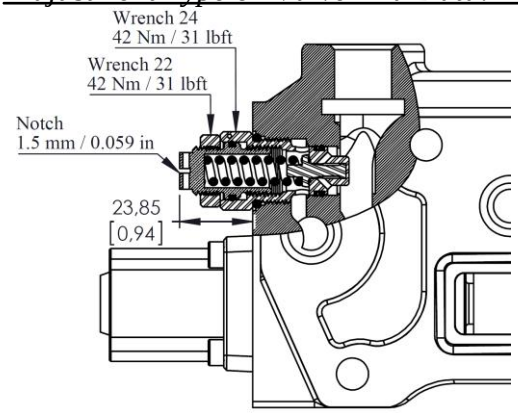
Anti Cavitation Valves

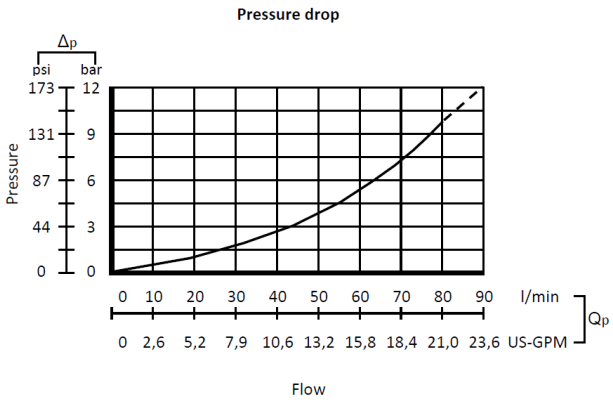
Code:

YAC – 1 → **1**= Mounted Port A , **2**=Mounted Port B , **3**=Mounted Port A and B

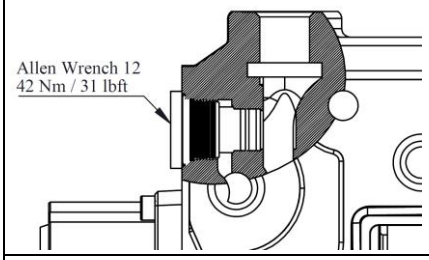
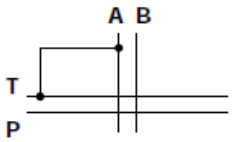
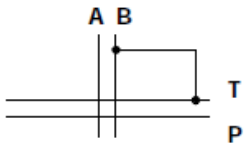
Hydraulic Diagram		
Kit No:**YAC1**	Kit No: **YAC 2**	Kit No: **YAC 3**
		

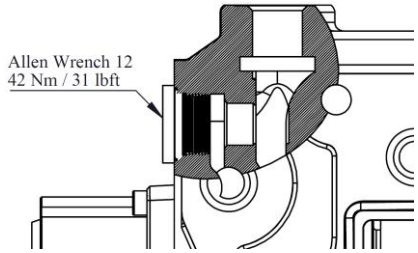
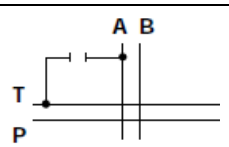
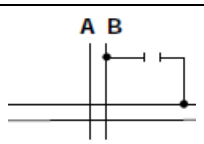
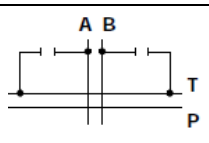
Adjustment Type on Valve And Data:





Valve Blaking

Plug with tank connection		
DST-1 *(1:Mounted port A – 2:Mounted port B)*		
Sectional Appearance	Hydraulic Diagram	
	DST1	DST2
		

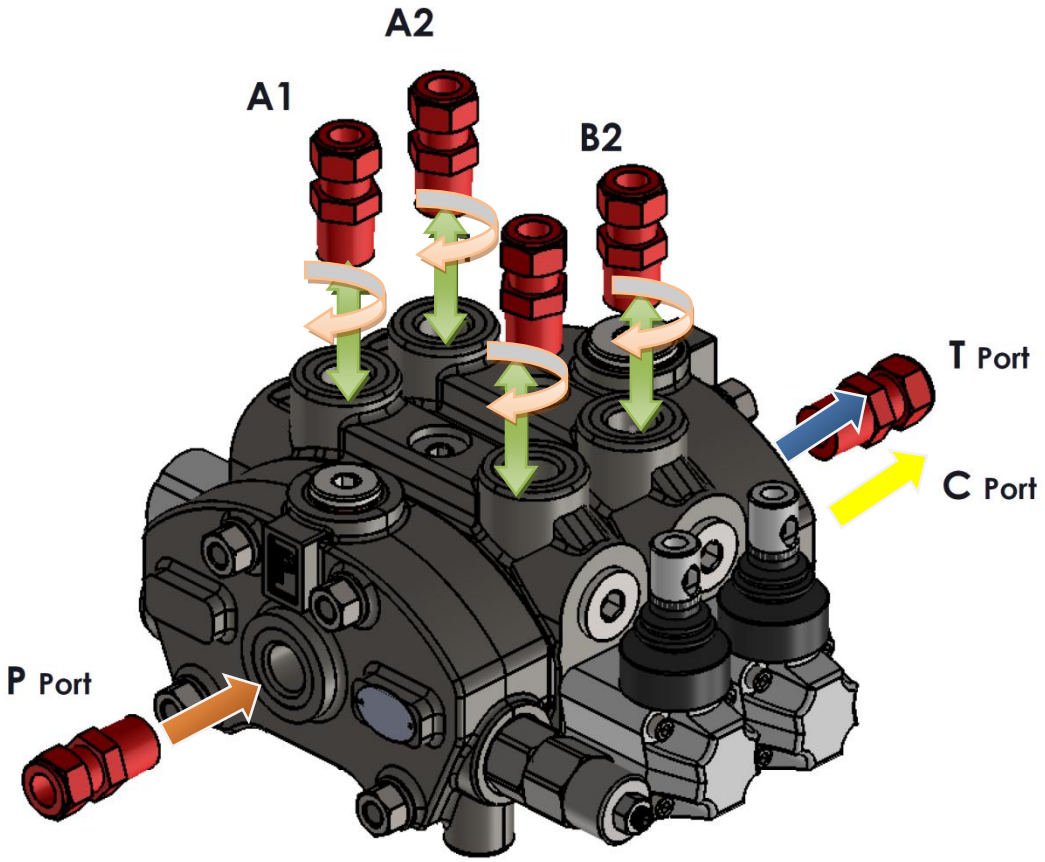
Plug			
YP-1 *(1:Mounted port A – 2:Mounted port B – 3:Mounted port A and B)*			
	YP1	YP2	YP3
			

Installation and Maintenance

The GM-PD120 valve is assembled and tested as per the technical specification of this catalog.

Before the final installation on your equipment, follow the below recommendation:

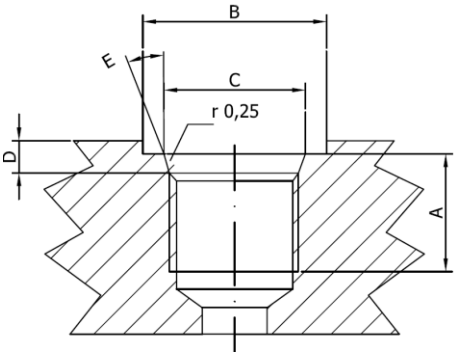
- The valve can be assembled in any position, in order to prevent body deformation and spool sticking mount the product on a flat surface;
- In order to prevent the possibility of water entering the lever box and spool control kit, do not use high pressure wash down directly on the valve;
- Prior to painting, ensure plastic port plugs are tightly in place.



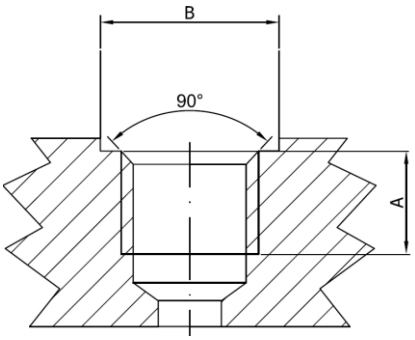
Therads Type	P Port	A and B Port	T Port
BSP (ISO 228/1)	G 1/2	G 1/2	G 3/4
With O--Ring seal	50 / *36.9*	50 / *36.9*	70 / *51.6*
With copper washer	60 / *44.3*	60 / *44.3*	70 / *51.6*
With steel and rubber washer	60 / *44.3*	60 / *44.3*	70 / *51.6*
BSP (ISO 228/1)	G 3/4	G 3/4	G 3/4
With O--Ring seal	70 / *51.6*	70 / *51.6*	70 / *51.6*
With copper washer	70 / *51.6*	70 / *51.6*	70 / *51.6*
With steel and rubber washer	70 / *51.6*	70 / *51.6*	70 / *51.6*
UN--UNF (ISO 11926--1)	11/16--12 UNF--2B	7/8--16 UNF--2B	11/16--12 UNF--2B
With O--Ring seal	95 / *70*	30 / *22.1*	95 / *70*

Technical Data

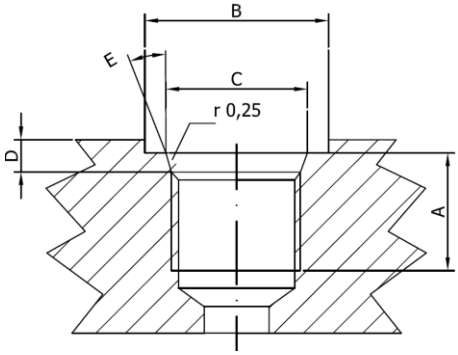
Ports Dimensional Data



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



BSP (ISO 228)						
Dimensions		G 1/2”		G 3/4		G 1	
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)					
Dimensions		M22x1,5 ISO 262		M27x2 ISO 262	
mm	in				
A		16	0,63	18	0,71
B		31,5	1,24	37,7	1,48