8 Sectional directional control valves HDS11

8A Standard valves

Contents

8A.1 General specifications

Technical specification		
Max flow rate	l/min U.S.G.P.M.	45 12
Max continuous operating pressure supply port P	bar PSI	250 3600
Max intermittent peak pressure work port A/B	bar PSI	320 4600
Max back pressure tank port T	bar PSI	30 430
Oil temperature	° C ° F	-10 to +80 14 to 180
Oil viscosity	mm^2/s	16 to 75
Oil filtration	µ	⩽30

Spool leakage at 100 bar (1450 PSI), Temp. 50° C (120° F), viscosity 27 mm^2/s:		
Maximum	cm^3/min Cu. In./min	12 0.854
Average	cm^3/min Cu. In./min	6 0.427

Number of spools	1 to 10
Adjustable direct operated relief valve (tamper-proof seal available on request)	RV
Load hold check valve in each section	LC
Cartridge anti-shock, anti-cavitation and service relief valve	OA-UC-C
Mechanical release check valve	RSM1

8A.1.1 Weight

Version	kg	lb
Inlet with RV and P	1	2.21
1 spool section (standard without options)	1.30	2.86
End cover standard	065	1.43
End cover with T and H.P.C.O.	075	1.65

8A.1.2 Material specification:

Body: High strength cast-iron.
Spool: Hardened steel - Chrome plated.
Seals: Buna “N”.

8A.1.3 Standard features:

1) Internal load holding check valves (prevent reverse flow through valve when shifting)
2) Parallel circuit.
3) Balanced interchangeable spools (provides minimum leakage, smooth operation)
4) Wide selections inlets, work ports, and outlets threaded ports.
5) Negative overlapping of the spool.

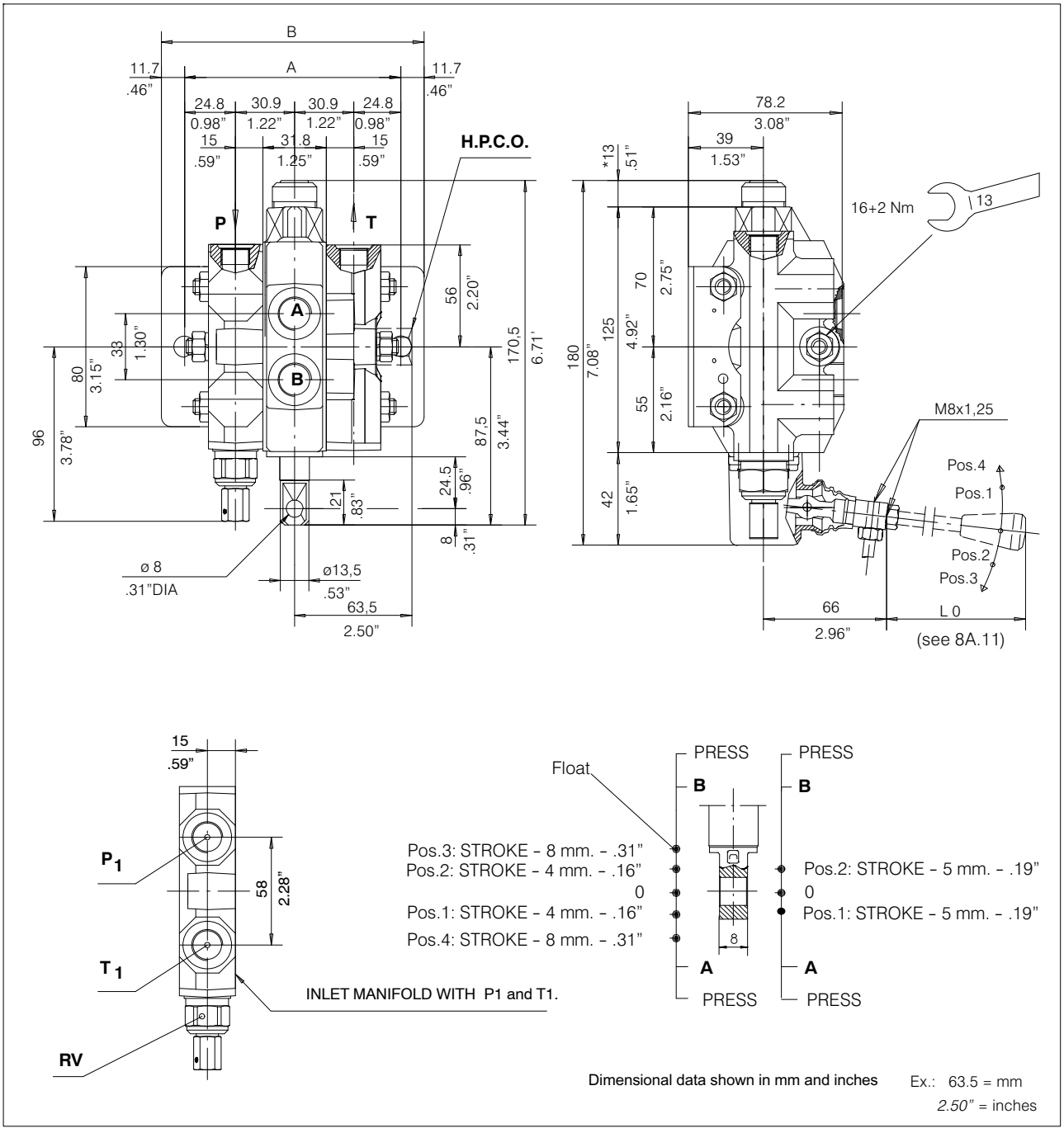
8A.1.4 Optional features available:

1) Open or closed centre positions, 3 or 4 way operations, 3 or 4 position (float position), full open centre (motoring spool) and other spool options.
2) Carry over.
3) Series connection and priority pressure.
4) Pressure compensated flow control.
5) Complete lever assembly.

8A.1.5 Symbols:

P: inlet port
T: outlet port
A/**B**: work ports
H.P.C.O.: carry-over
RV: relief valve
P_1T_1: top inlet and outlet
3.10.2: spool position
P: pressure line
T : exhaust line
E: centre line (by pass).

8A.2 Dimensional data

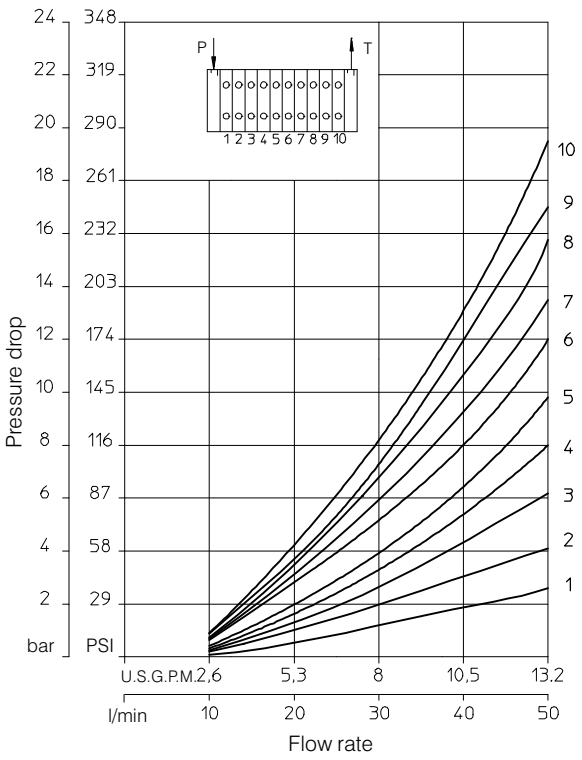


N. of sections		1	2	3	4	5	6	7	8	9	10
Dimension	A	111.4	143.2	175	206.8	238.6	270.4	302.2	334	365.8	397.6
		4.38"	5.64"	6.89"	8.14"	9.39"	1064"	11.90"	13.15"	14.40"	15.65"
	B	134.8	166.6	198.4	230.2	262	293.8	325.6	357.4	389.2	421
		5.31"	6.56"	7.81"	9.06"	10.31"	11.57"	12.82"	14.07"	15.32"	16.57"

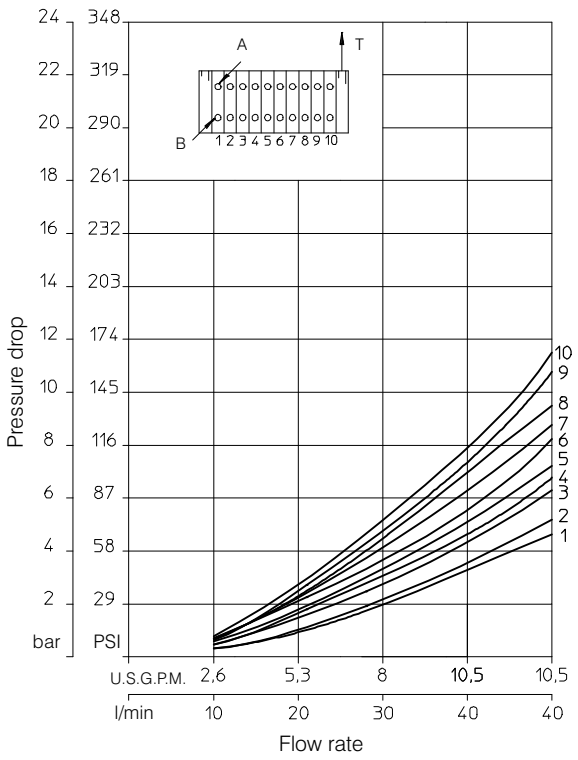
8A.3 Performance curves

Oil: Shell Tellus T37
Temperature: 50° C (120° F)
Viscosity: 27 mm^2/s

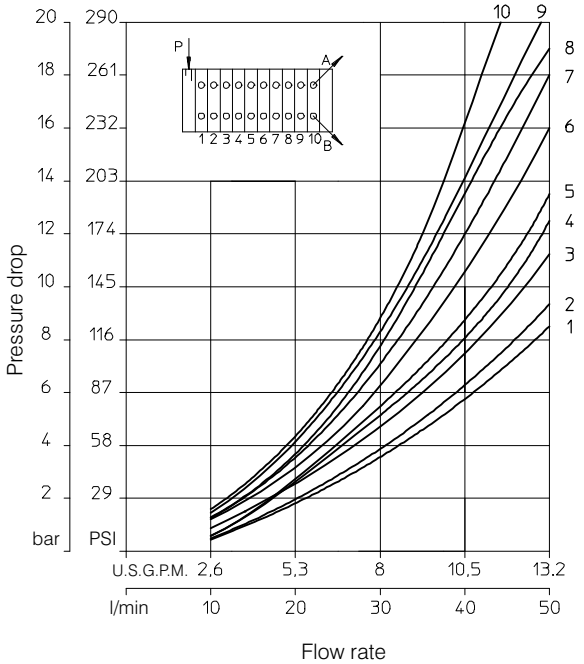
P ⇒ T



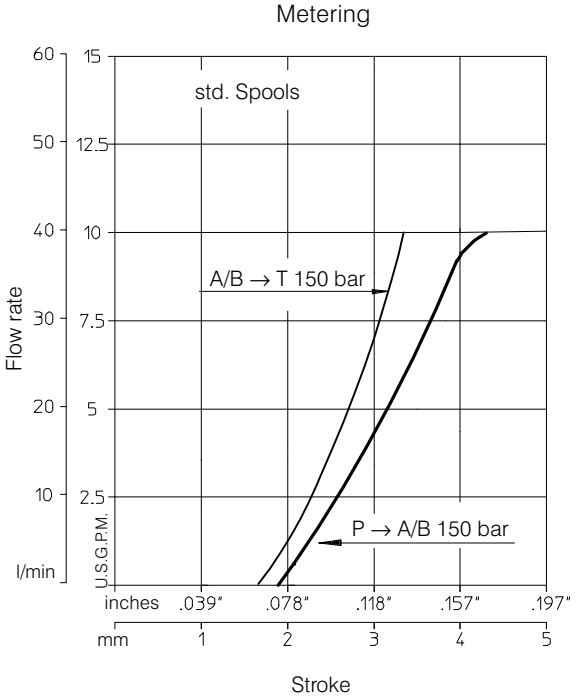
A - B ⇒ T



P ⇒ A - B

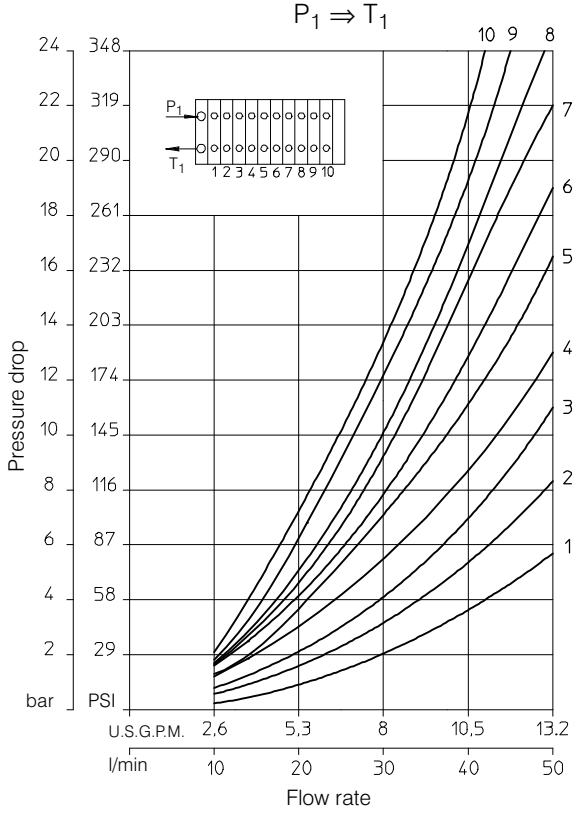


Metering

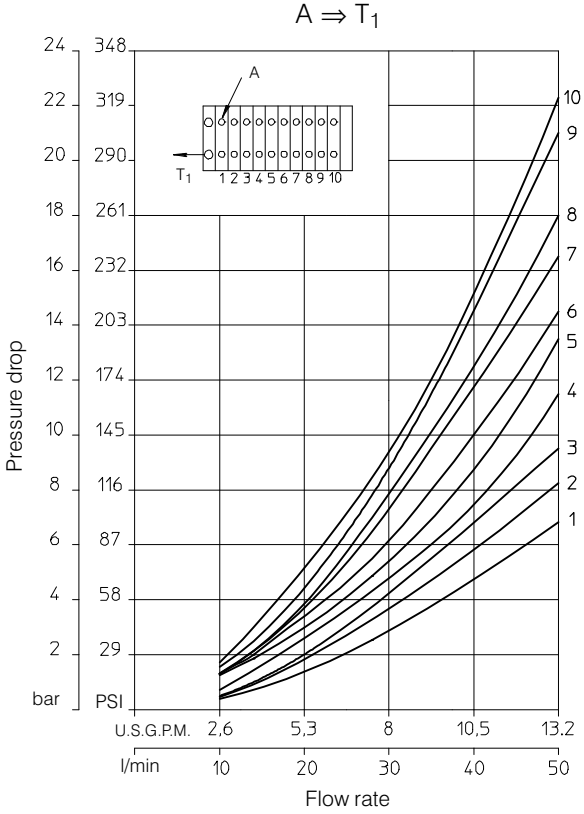


Oil: Shell Tellus T37
Temperature: 50° C (120° F)
Viscosity: 27 mm^2/s

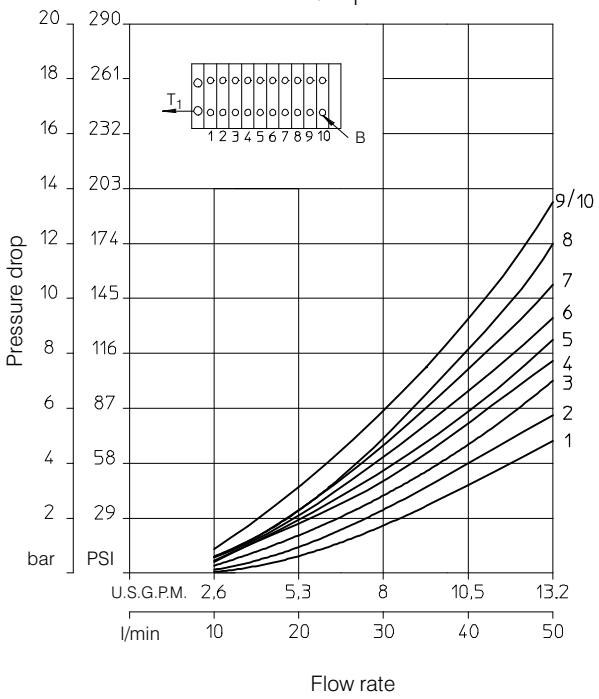
$P_1 \Rightarrow T_1$



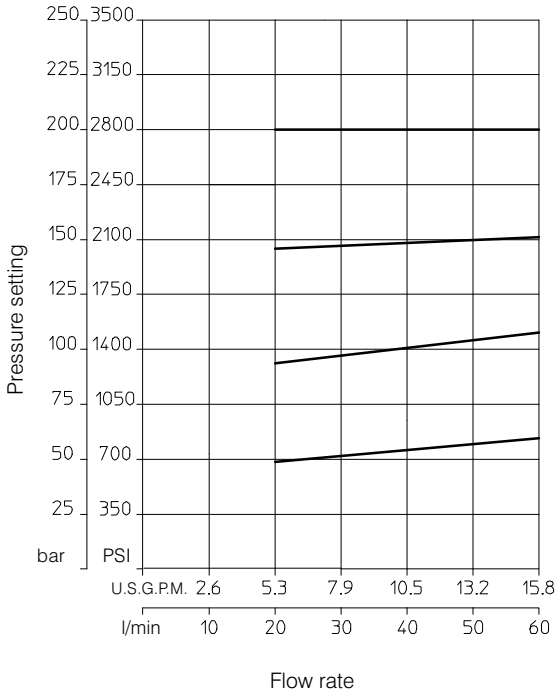
$A \Rightarrow T_1$



$B \Rightarrow T_1$

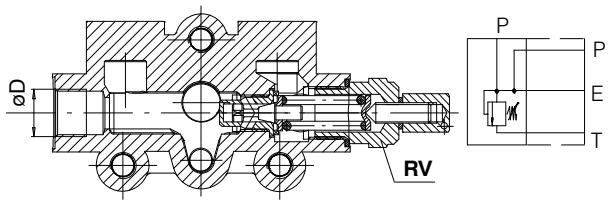


Relief Valve RV



8A.4 Inlet and outlet covers

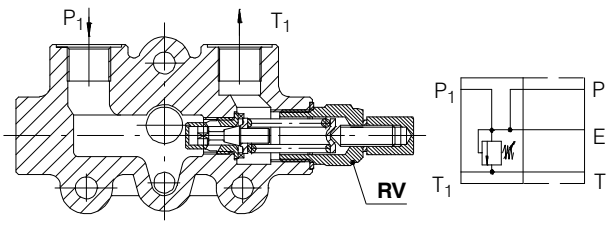
8A.4.1 Inlet manifold (standard) with P and RV



* Inlet section code with RV set at standard pressure: 150 bar (2100 PSI)

∅ D	Type	Code
SAE6	**T06**	* 200931060020
SAE8	**T07**	* 200931070030
3/8" BSP	**T09**	* 200931020020
M18X1.5	**T10**	* 200931010030

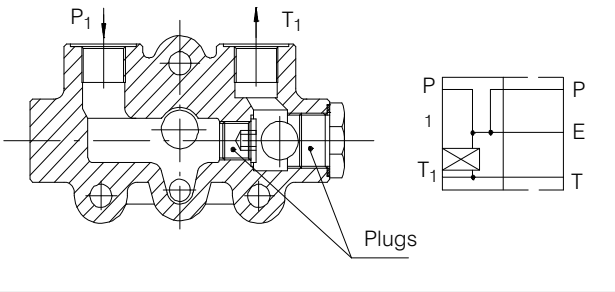
8A.4.2 Inlet manifold with P_1 - T_1 - RV



* Inlet section code with RV set at standard pressure: 150 bar (2100 PSI)

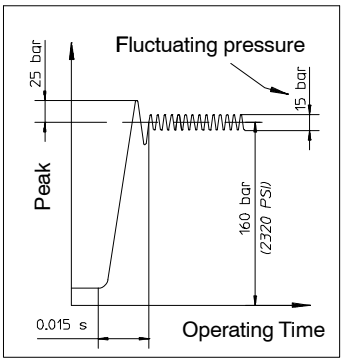
∅ D	Type	Code
SAE6	**T11**	* 200931060030
SAE8	**T12**	* 200931070020
3/8" BSP	**T14**	* 200931020030
M18X1.5	**T15**	* 200931010020

8A.4.3 Inlet manifold with P_1 - T_1



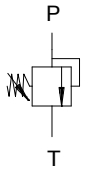
∅ D	Type	Code
SAE6	**T16**	200931060040
SAE8	**T17**	200931070050
3/8" BSP	**T19**	200931020040
M18X1.5	**T20**	200931010040

8A.5 Adjustable direct acting pressure Relief Valve RV



Relief valve set at 30 l/min (8 U.S.G.P.M.)

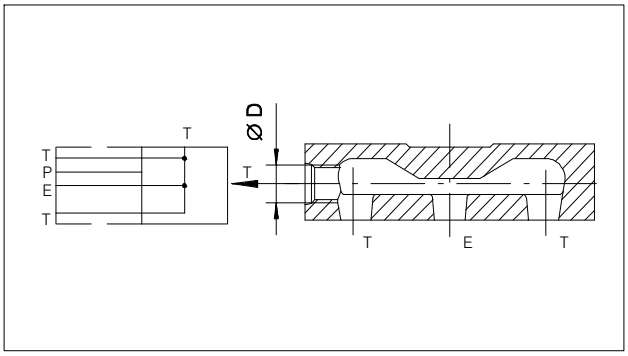
Pressure set range bar (PSI)	Std. setting bar (PSI)	Setting Code	Spring colour
30 - 95 (400 - 1300)	60 (860)	**06**	Yellow (YE)
96 - 210 (1300 - 3000)	150 (2100)	**15**	Green (GR)
** 211 - 320 (3000 - 4600)	260 (3700)	**26**	Blue (BL)



** The maximum operating pressure for each valve series is indicated in the "Technical specification" at the first page of each valve section.

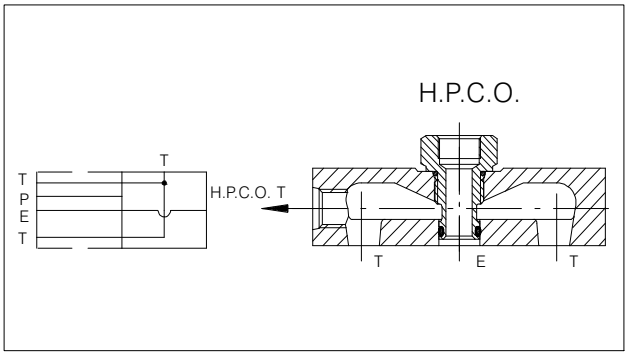
8A.6 End covers

8A.6.1 Outlet manifold (std) with T and open center



Ø D	Type	Code
SAE6	**P01**	200630060011
SAE8	**P02**	200630070010
3/8" BSP	**P04**	200630020011
M18X1.5	**P05**	200630010010

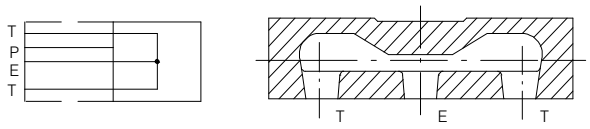
8A.6.2 Outlet manifold with T and H.P.C.O. (power beyond)



Ø D	Type	Code
SAE6	**P06**	200930060020
SAE8	**P07**	200930070020
3/8" BSP	**P09**	200930020020
M18X1.5	**P10**	200930010020

8A.6.3 Outlet manifold with open center

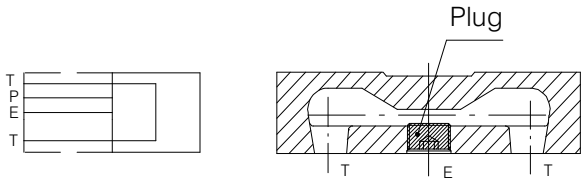
Type	Code*
P11	200630090010



To be used with P1 and T1 on the inlet manifold

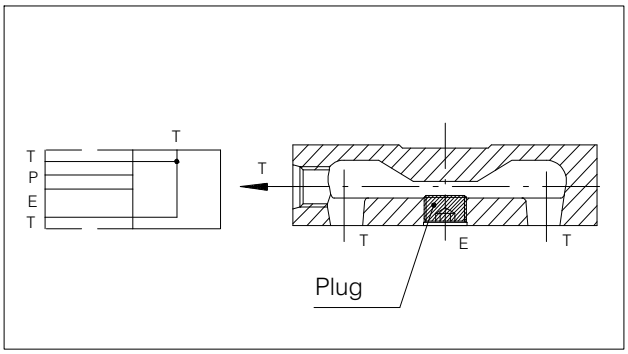
8A.6.4 Outlet manifold with closed center

Type	Code*
P12	200930090020



To be used with P1 and T1 on the inlet manifold

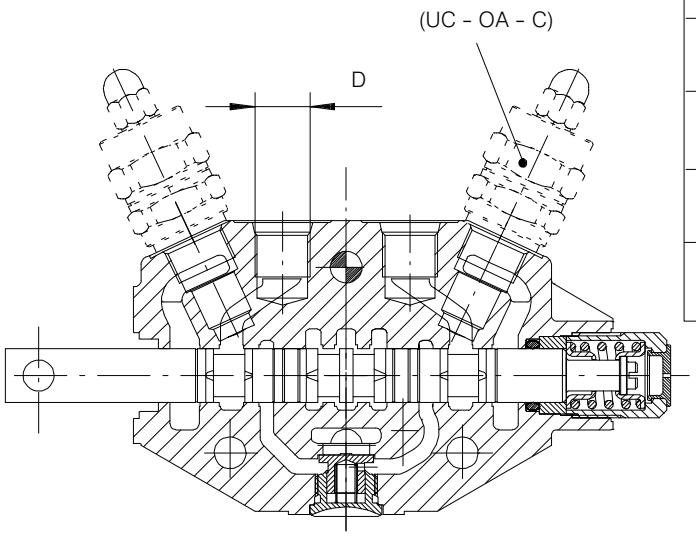
8A.6.5 Outlet manifold with T and closed center



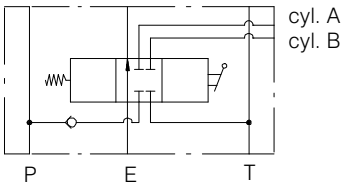
Ø D	Type	Code
SAE6	**P13**	200930060030
SAE8	**P14**	200930070030
3/8" BSP	**P16**	200930020030
M18X1.5	**P17**	200930010030

8A.7 Sectional bodies

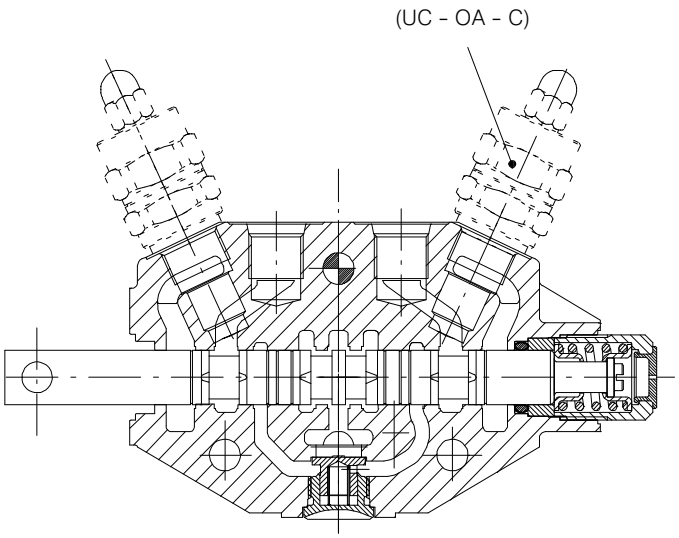
8A.7.1 Standard circuit: parallel



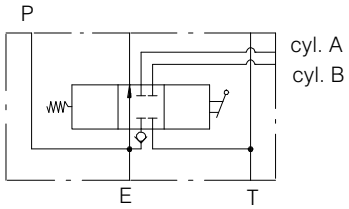
Ø D	Type/Code	
	Standard	Section with valve UC - OA - C
SAE6	**K01** 200941360510	**K06** 200941360530
SAE8	**K02** 200941370270	**K07** 200941370280
3/8" BSP	**K04** 200941326240	**K09** 200941326250
M18X1.5	**K05** 200941312720	**K10** 200941312730



8A.7.2 Optional circuit: series and tandem



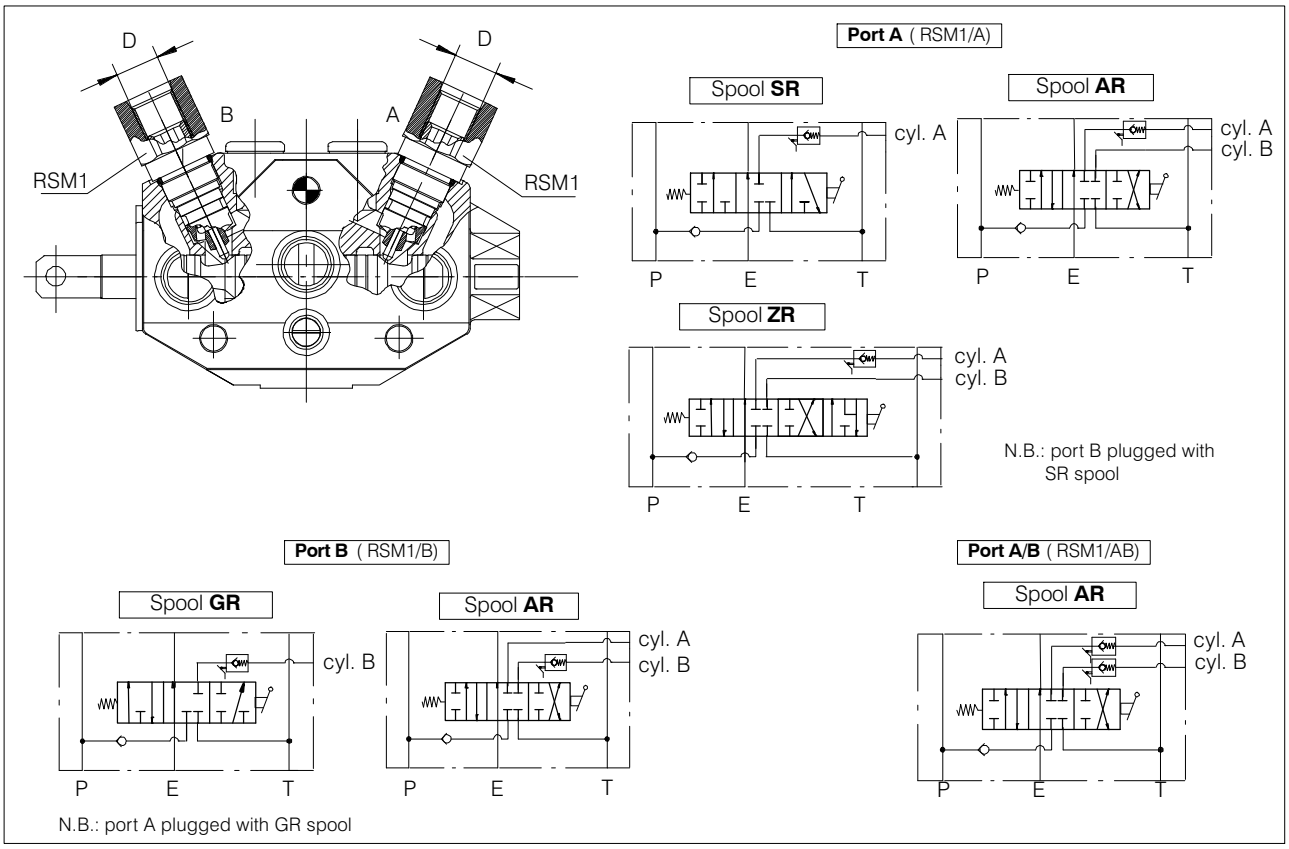
Ø D	Type/Code	
	Standard	Section with valve UC - OA - C
SAE6	**K47** 200941360520	**K52** 200941360540
SAE8	**K48** 200941370290	**K53** 200941370300
3/8" BSP	**K50** 200941326260	**K55** 200941326270
M18X1.5	**K51** 200941312740	**K56** 200941312750



Note: Body code consist of machined casting, seals and hold check valve only. Not to be used for complete valve order.

8A.7.3 Check valves with mechanical release RSM1 on A/B ports

The check valve taper seal is released by means of a taper on the spool and by a push rod.



8A.7.4 Directional control valve bodies for RSM1 valve

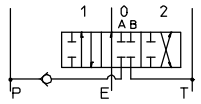
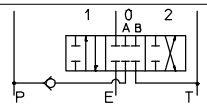
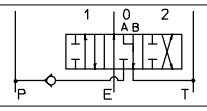
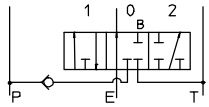
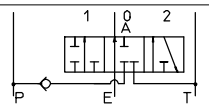
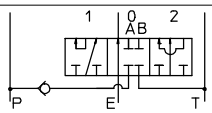
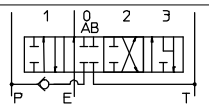
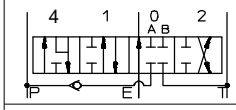
Ø D	RSM1/A		RSM1/B	RSM1/A-B	RSM1 Code
	Spool SR-AR	Spool ZR	Spool GR-AR	Spool AR	
	Type/Code	Type/Code	Type/Code	Type/Code	
SAE6	**K65** 200941360610		**K66*** 200941360620		200787601920
3/8" BSP	**K63** 200941320340	**K40**** 200941320330	**K64*** 200941320350	**K62*** 200941390140	200787601910
M18X1.5	**K60** 200941312790	**K70**** 200941310460	**K61*** 200941312800		200787601900

***** : K61 - K62 - K64 - K66 need special lever L153 - L353

** : K40 - K70 need special lever L175-L375

Note: Body code consist of machined casting, seals and hold check valve only. Not to be used for complete valve order.

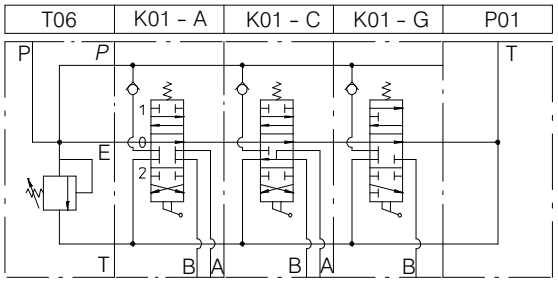
8A.8 Spool charts

Spool scheme	Spool features	Type
	4 way - 3 position A/B closed E open by pass	A AR**
	High metering spool (max flow suggested 15 l/min.)	AS
	4 way - 3 position A/B-E closed	B
	4 way - 3 position A/B to tank in neutral E open by pass	C
	3 way - 3 position B closed E open by pass	G GR**
	3 way - 3 position A closed E open by pass	S SR**
	4 way - 3 position series connection	X
	4 way - 4 position 4th floating position	Z ZR**
	4 way - 4 position 4th floating position	WW *

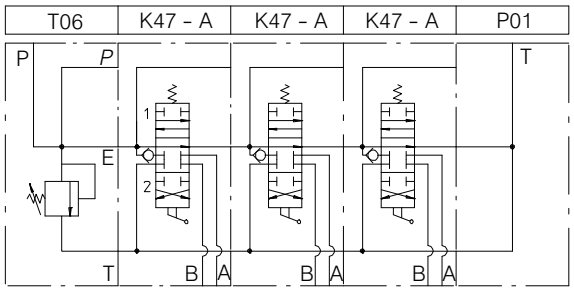
* : "WW" spool require special body (K...), positioner (240) and lever (L192)
** : special body required

8A.9 Hydraulic circuits

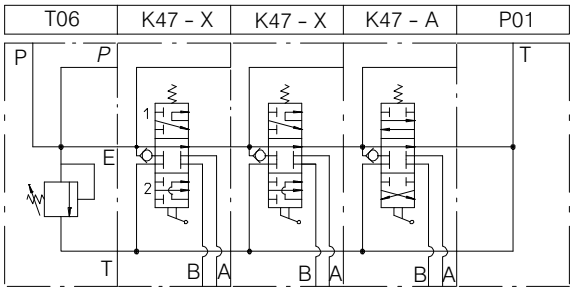
Standard parallel circuit



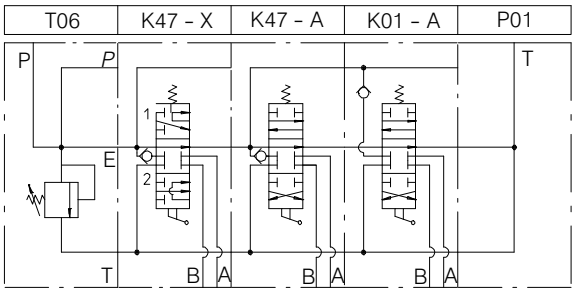
Optional tandem circuit



Optional series circuit

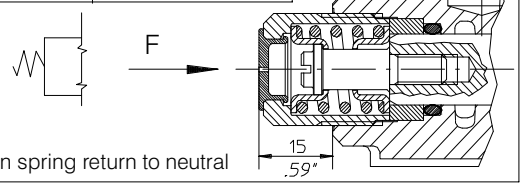


Combined parallel/series circuit



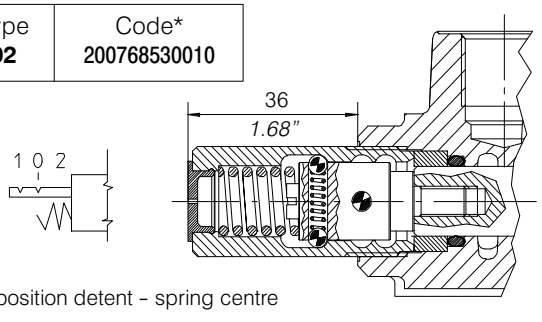
8A.10 Spool positioners

F (N)	Type	Code*
200	**01** STD	200768510010
140	**79**	200768510920



3 position spring return to neutral

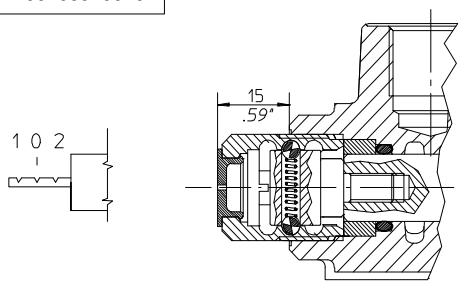
Type	Code*
02	200768530010



2 position detent - spring centre

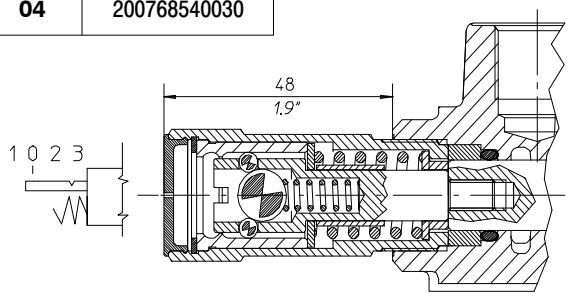
* : code without plastic plug; plastic plug code: 2006780.0008.0
Code F (N)**: force in Newton (N) needed to operate the spool

Type	Code*
03	**200768520010**



3 position detent

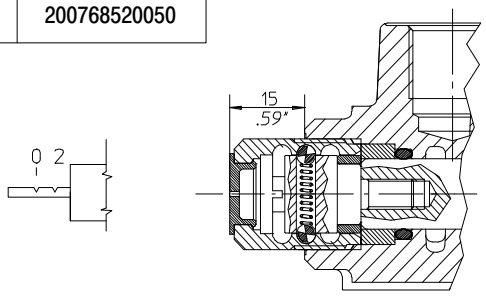
Type	Code
04	**200768540030**



4 position float

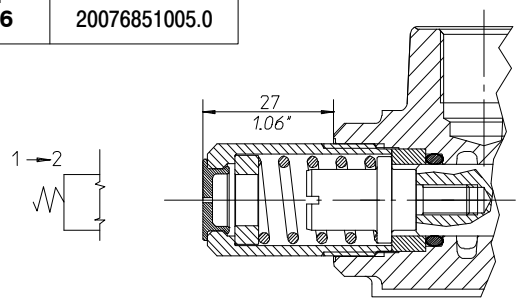
Plastic plug code: **2006780.0009.0**

Type	Code*
05	**200768520050**



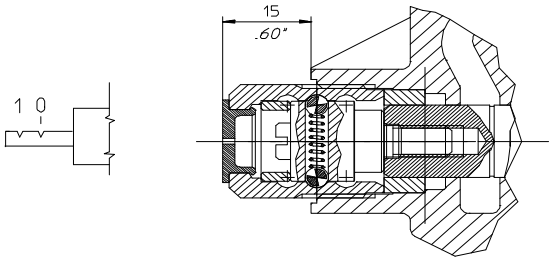
2 position detent

Type	Code*
06	**20076851005.0**



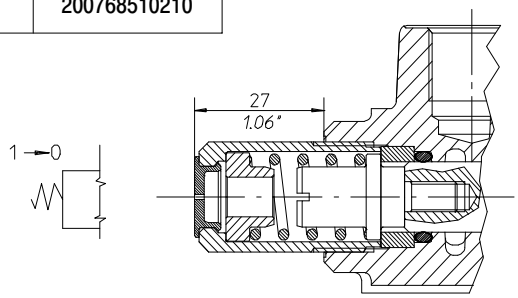
2 position spring return

Type	Code*
07	**2007685.2027.0**



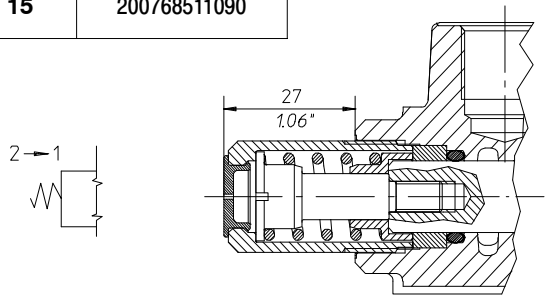
2 position detent

Type	Code*
12	**200768510210**



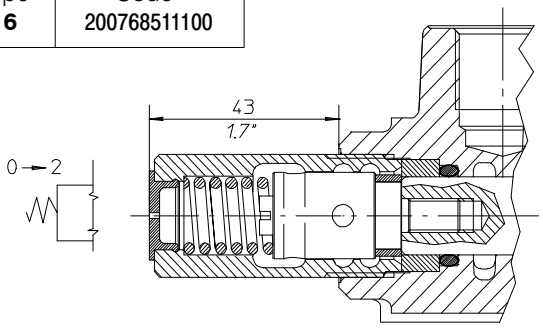
2 position spring return

Type	Code*
15	**200768511090**



2 position spring return

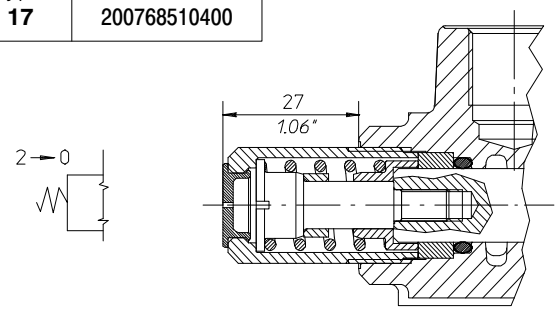
Type	Code*
16	**200768511100**



2 position spring return

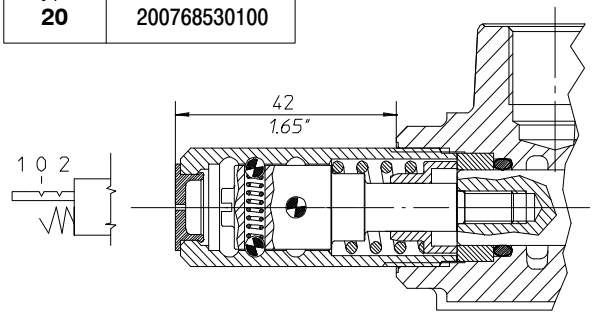
* : code without plastic plug; plastic plug code: **2006780.0008.0**

Type	Code*
17	**200768510400**



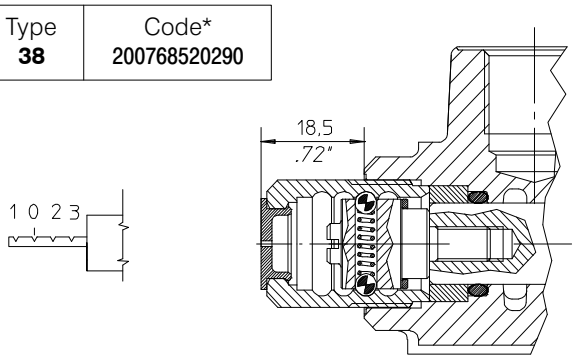
2 position spring return

Type	Code*
20	**200768530100**



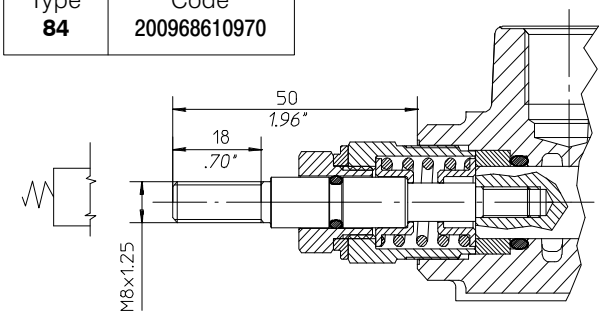
2 position detent + spring return

Type	Code*
38	**200768520290**



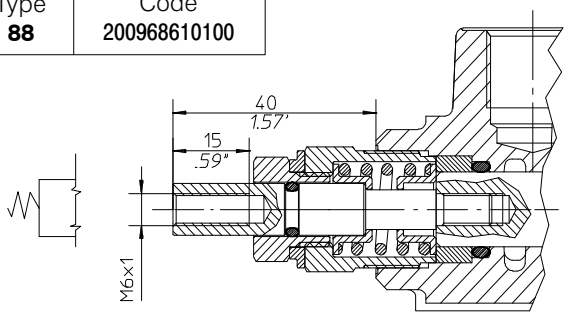
4 position detent

Type	Code
84	**200968610970**



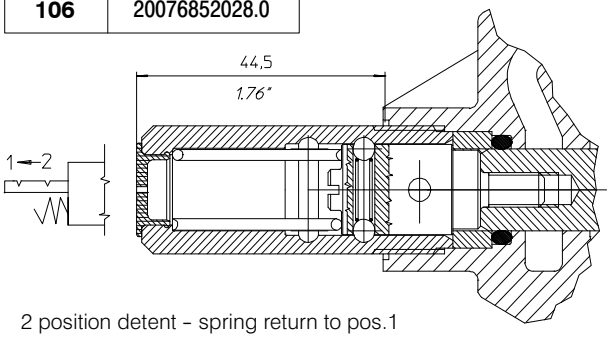
3 position spring return

Type	Code
88	**200968610100**



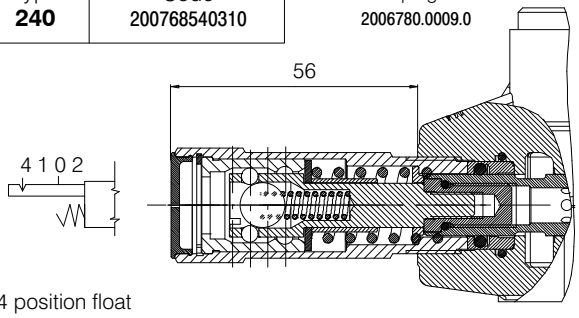
3 position spring return to neutral

Type	Code*
106	**20076852028.0**



2 position detent - spring return to pos.1

Type	Code	Plastic plug code:
240	**200768540310**	**2006780.0009.0**

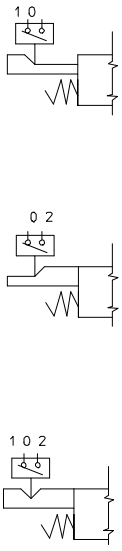


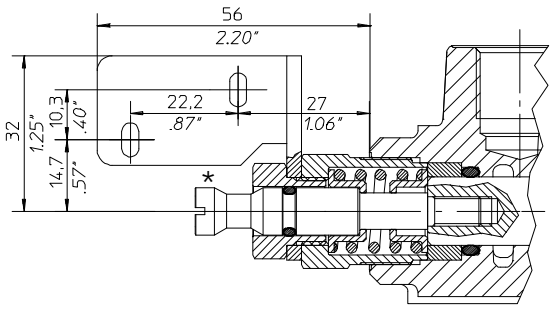
4 position float
only for “WW” float spool

* : code without plastic plug; plastic plug code: **2006780.0008.0**

8A.10.1 Microswitch control on each single element

Type	Code	
30	200968610500	Microswitch is operated when the spool is in pos. 1
32	200968610600	Microswitch is operated when the spool is in pos. 2
34	200968610640	Microswitch is operated when the spool is in pos. 1 and 2



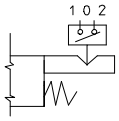


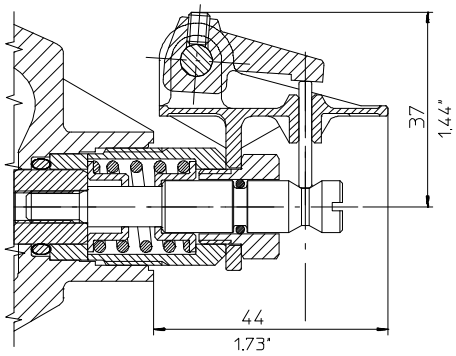
* The microswitch is supplied only on customer's request

8A.10.2 Single microswitch control for multi-sectional valves (from 1st up to second-last element).

Type	Code
39 (MSF)	200968611390

Microswitch is operated when the spool is in pos. 1 and 2

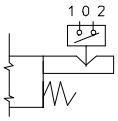


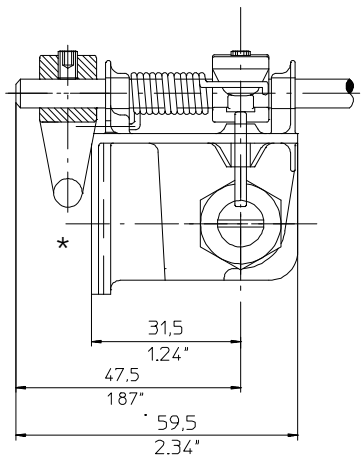


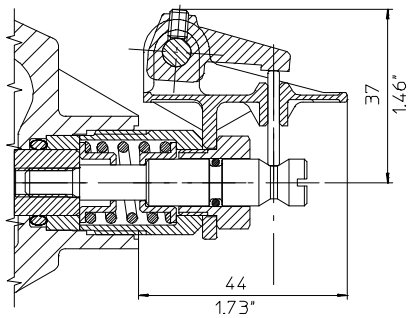
8A.10.3 Single microswitch control for multi - sectional valves (last element, T side).

Type	Code
40 (MFL)	200968611400

Microswitch is operated when the spool is in pos. 1 and 2







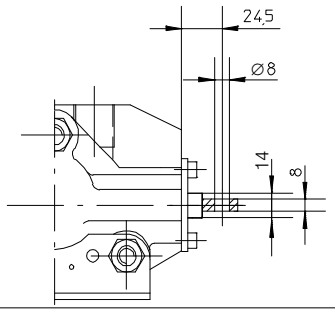
* The microswitch is supplied only on customer's request

1 - Positioner 40 must be assembled only on the last element near T port

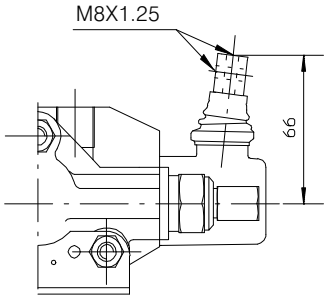
2 - Positioner 40 require T port plugged. Use T1 on inlet cover

8A.11 Lever styles

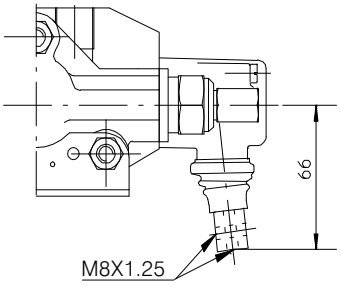
Type **L55**



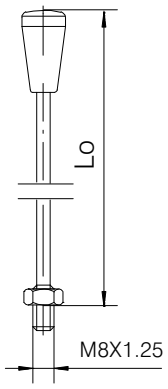
Type **L100**
Type **L175***
Type **L192****



Type **L300**
Type **L375***
Type **L392****



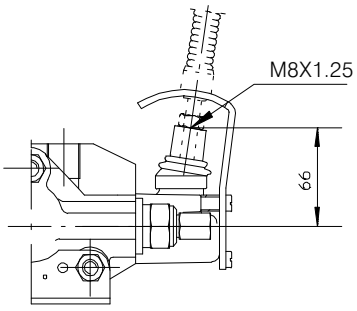
*: L175 - L375 only for “Z” spool application
**: L192 - L392 only for “WW” spool application



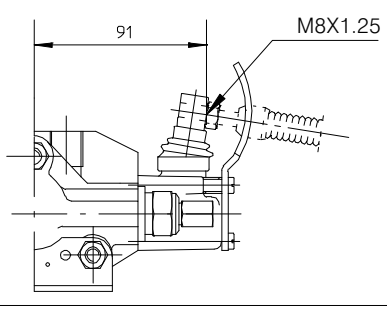
Lo		Type	Code
mm	inches		
150	5.90	**AL001**	200702210190
200	7.87	**AL002**	200702210030
250	9.84	**AL003**	200702210050
300	11.81	**AL004**	200702210060

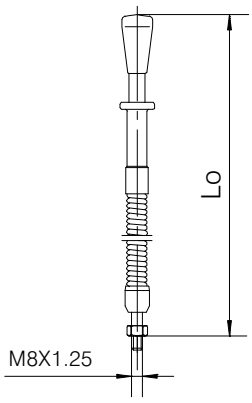
8A.11.1 Safety levers

Type **L140**



Type **L150**

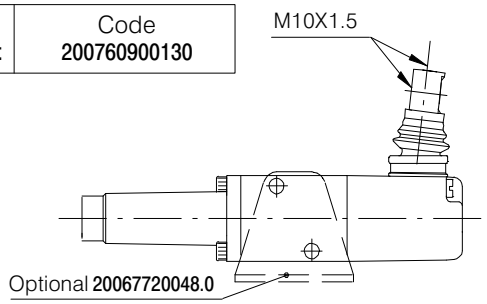


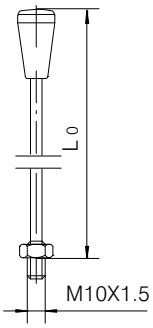


Lo		Type	Code
mm	inches		
160	6.30	**AL014**	200702210090
180	7.08	**AL018**	200702210110

8A.11.2 Remote cable control

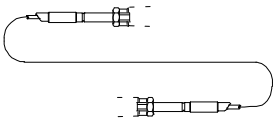
Lever Support	Code 200760900130





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

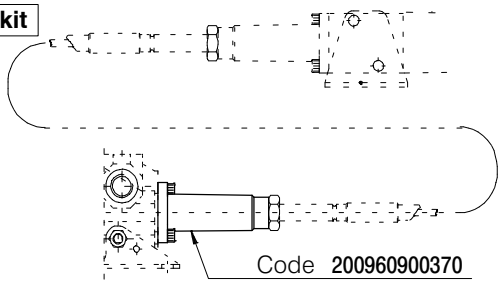
Cable



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

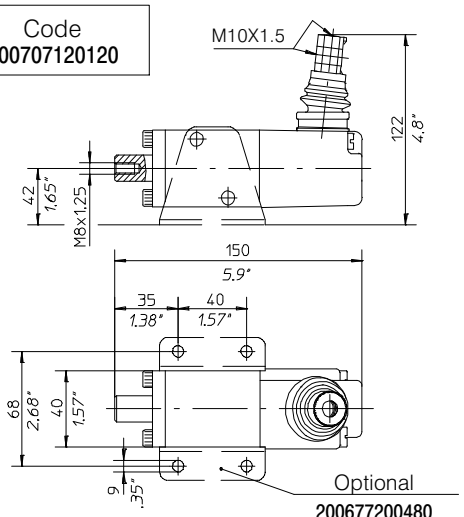
Cable length	Code
1000 mm	200544104002
1500 mm	200544104005
2000 mm	200544104006
2500 mm	200544104007
3000 mm	200544104008
4000 mm	200544104009

Spool kit



* only for "Z" spool application

Type **L142**	Code 200707120120

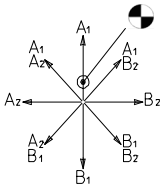


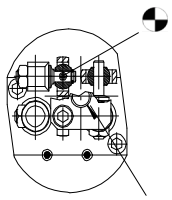
Only for rod remote control

Type **L133**	Code 200975920070

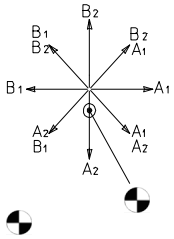
Type **L188***	Code 200975920240

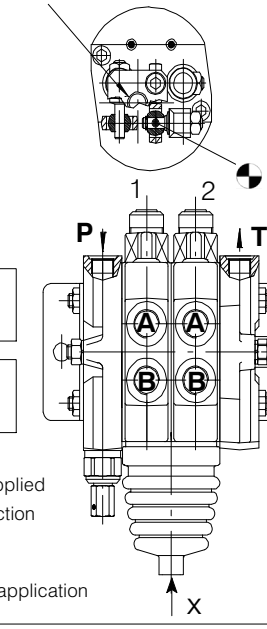
View from X





View from X





Type **L134**	Code 200975920070

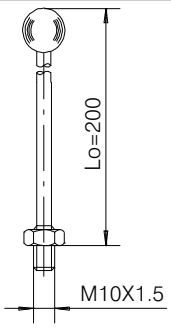
Type **L189***	Code 200975920240

L133-L134-L188-L189 are supplied complete with rubber boot protection

L188* - L189*: only for "Z" spool application

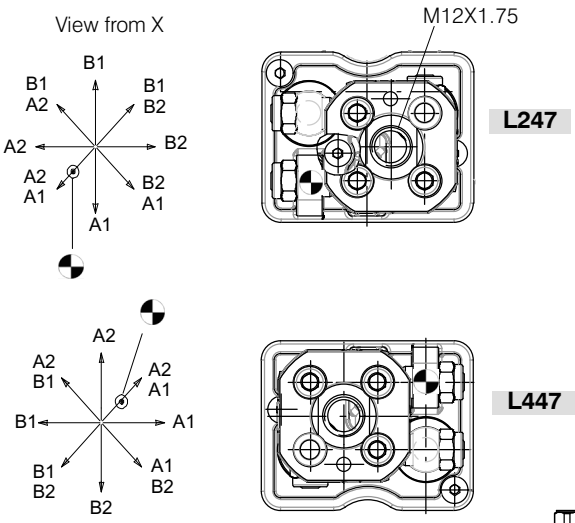
8A.11.3 Cross joystick for dual axis spool control

Type **AL038**	Code 200702220180

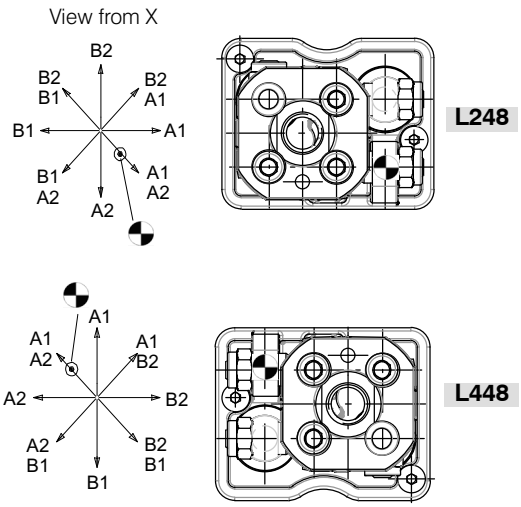


8A.11.4 Cross joystick for dual axis spool control

Type	Code
L247–L447	200975920040



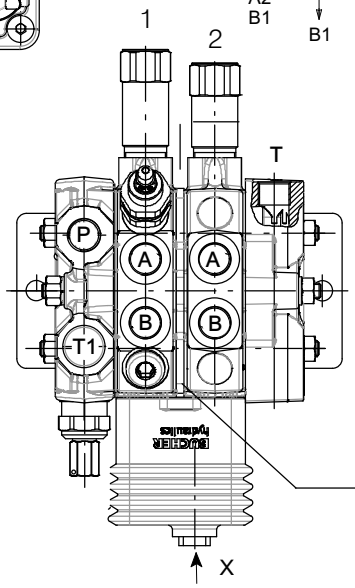
Type	Code
L248–L448	200975920050



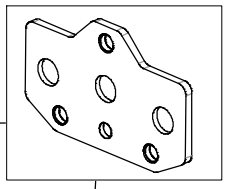
L247-L447-L248-L448 are supplied complete with rubber boot protection

Lever AL010 (M12x1.75) code 200702230040

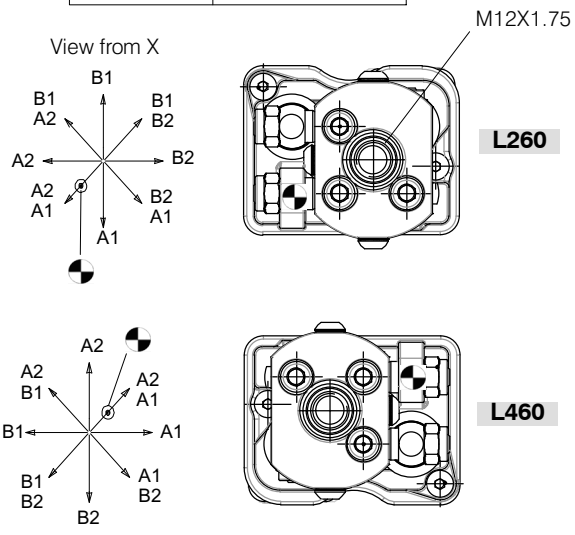
Pivot

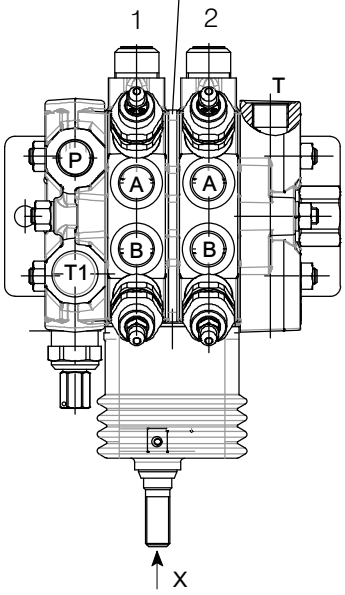


Spacer plate code 200964900470, necessary for L247 - L447 - L248 - L448 - L260 - L460



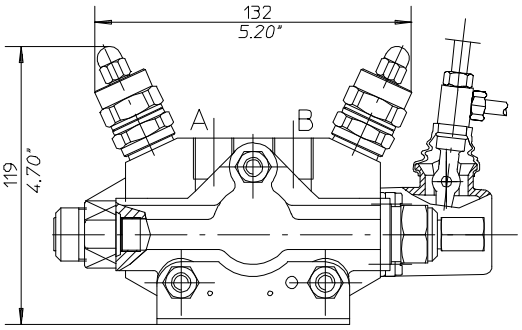
Type	Code
L260–L460	200975920411





L260–L460 are supplied complete with rubber boot protection

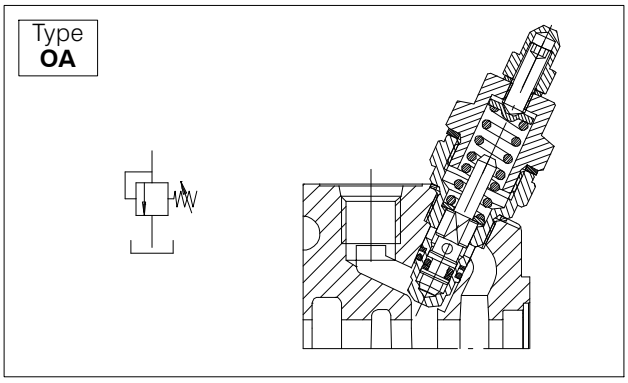
8A.12 Port relief and anti-cavitation valves

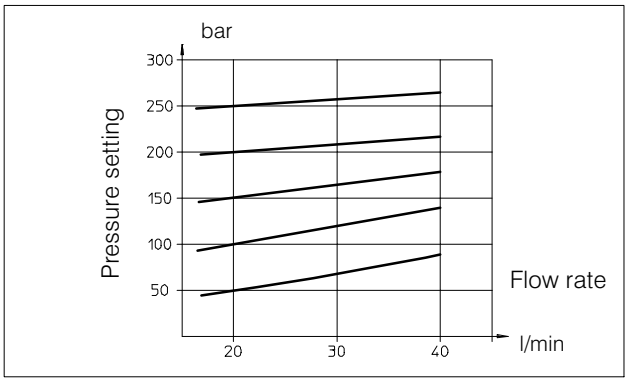


Port relief valve settings

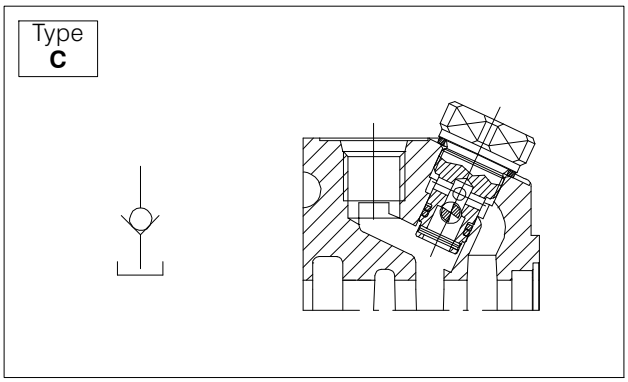
Pressure set range bar (PSI)	Std. Setting bar (PSI)	Type	Spring colour
30 - 130 (400 - 1850)	60 (860)	**06**	Yellow (YE)
130 - 300 (1850 - 4600)	150 (2100)	**15**	Green (GR)

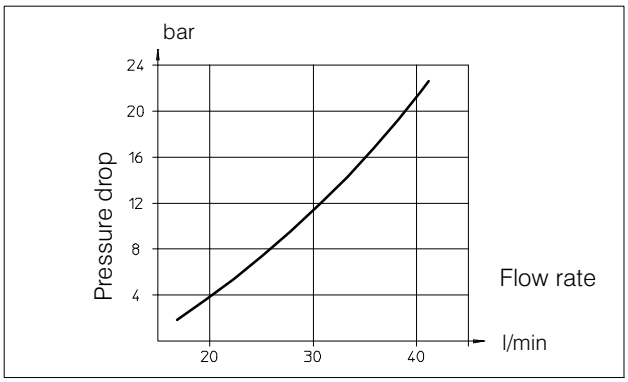
8A.12.1 Port relief valve



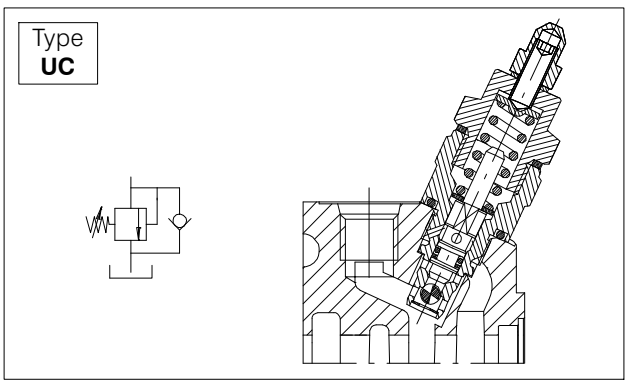


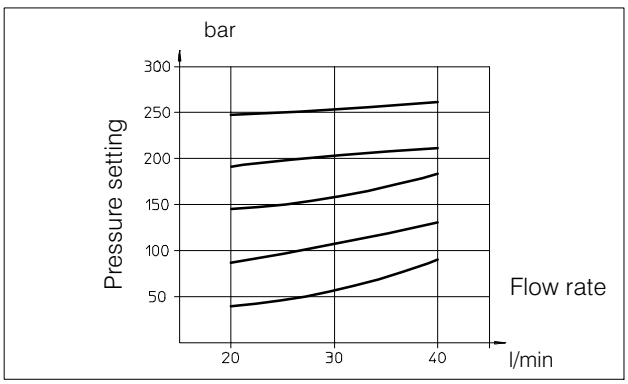
8A.12.2 Anti-cavitation valve





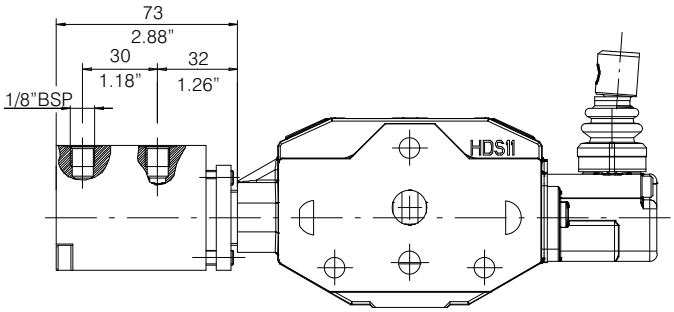
8A.12.3 Combined port relief and anti-cavitation valve





8A.13 Hydraulic-Pneumatic control ON-OFF

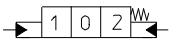
Type	Code
HP 24	200968650490

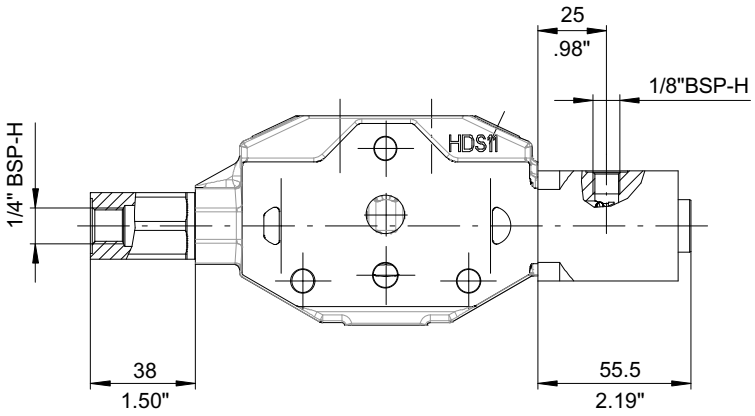


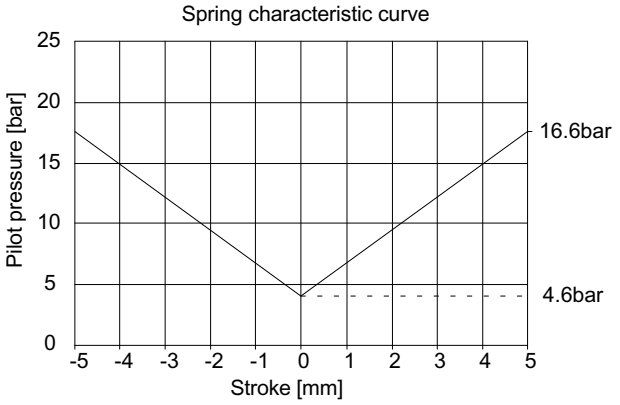
Operating conditions
Hydraulic control:
Pressure range: (bar) Min. 6 - Max. 15
(PSI) Min. 85 - Max. 215
Pneumatic control:
Pressure range: (bar) Min. 6 - Max. 10
(PSI) Min. 85 - Max. 145

8A.14 Hydraulic control

Type	Code
HP50	200968650583

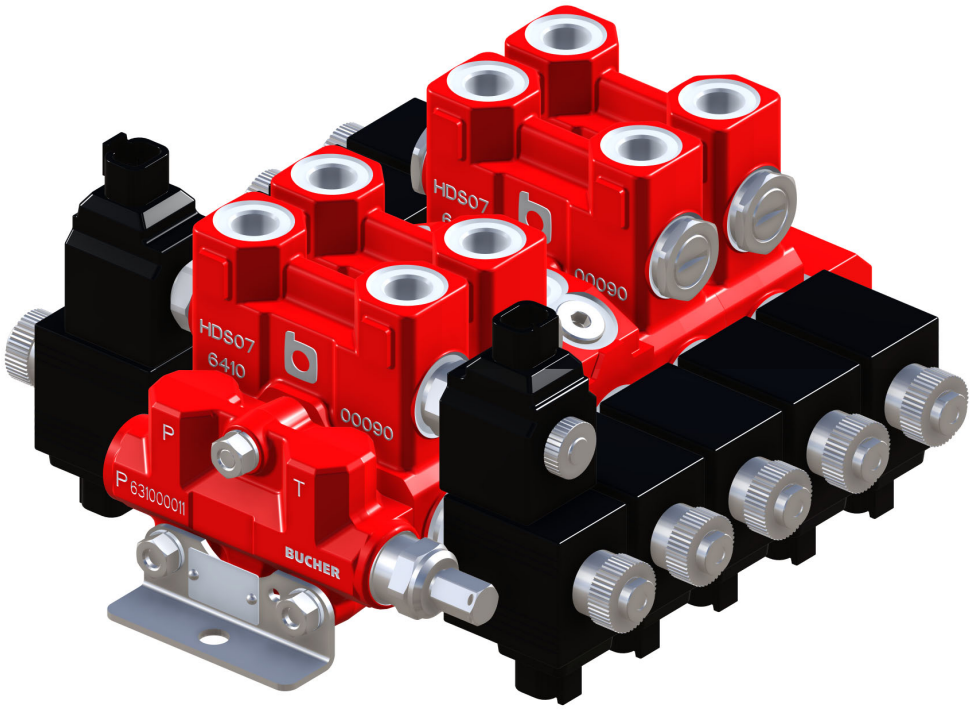






Operating conditions
Hydraulic control:
Pressure range: (bar) Min. 4.6 - Max. 16.6
(PSI) Min. 67 - Max. 241

8B Electromagnetic control EMC (ON-OFF)



Contents

8B.1 General specifications

Technical specification		
Max flow rate	l/min U.S.G.P.M.	40 11
Max continuous operating pressure supply port P	bar PSI	250 3600
Max intermittent peak pressure work port A/B	bar PSI	320 4600
Max back pressure on the channel “T”	bar PSI	20 290
Oil temperature	° C ° F	-10 to +80 14 to 180
Oil viscosity	mm^2/sec	20 to 50
Oil filtration	µ	⩽25

Spool leakage at 100 bar (1450 PSI), Temp. 50° C (120° F), viscosity 27 mm^2/sec:		
Maximum	cm^3/min Cu. In./min	16 1.138
Average	cm^3/min Cu. In./min	12 0.854

Number of spools	1 to 10
Adjustable direct operated relief valve (tamper-proof seal available on request)	RV
Load hold check valve in each section	LC
Cartridge anti-shock, anti-cavitation and service relief valve	OA-UC-C

8B.1.1 Material specification:

Body: High strength cast-iron.
Spool: Hardened steel.
Seals: Buna “N”.

8B.1.2 Optional features available

Series circuit;
Load sensing circuit;
Spool 3-way or 4-way at 2-3 positions;
Port relief and anti-cavitation valves -OA-UC-C-
Cross port relief valve - AA-
Pilot - Actuated Check Valve - RP-

* for non indicated tension valves, please contact our Sales Department

8B.1.3 Ports

P-T-P_1-T_1-A-B-HPCO . . . . . (M18X1.5 - 3/8”BSP -SAE6 - SAE8)

8B.1.4 Input voltages

Continuous Current . . . . . 12VDC - 24VDC *

8B.1.5 Solenoid specification

Technical specification		
Continuous current voltage	V. D.C.	12 (24) +5% -10%
Power consumption	Watt (W)	36 (37)
Intensity of current	Ampere (A)	3 (1.55)
Resistance	Ohm (Ω)	4 (15.5)
Duty cycle (continuous)	ED	100%
Stabilized temperature at nominal voltage	° C	110
Ambient temperature	° C	-20 to +40

Protection class . . . . . IP65 (DIN 40050)
Coil insulation . . . . . class H (VDEO 0580)
STD. connection . . . . . (DIN 43650)
Manual override.
Explosion-proof version on demand.

8B.1.6 Mechanical specification

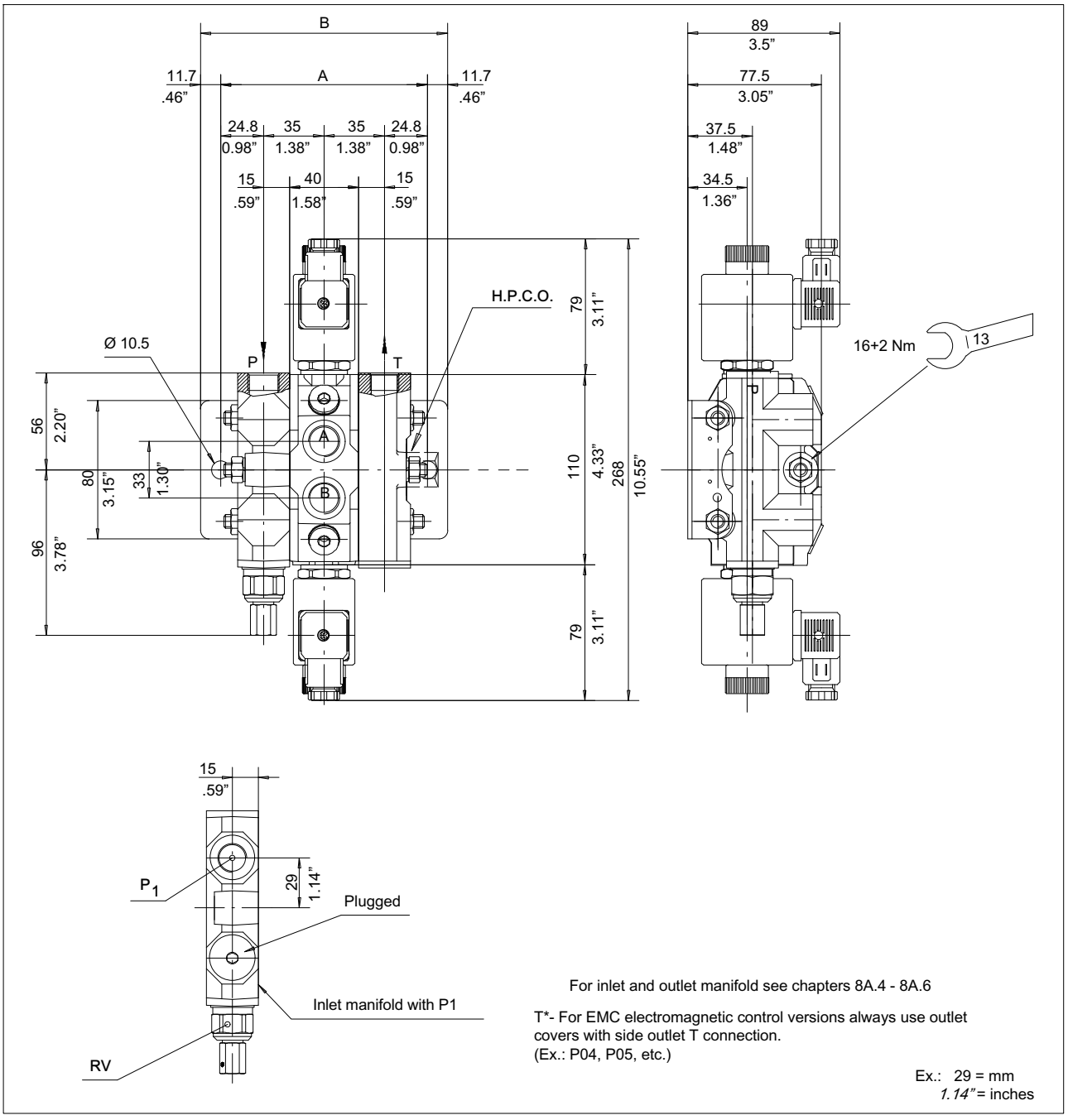
Spool diameter . . . . . 10 mm
Spool stroke . . . . . 2.50 mm
Overlapping . . . . . 1.25 mm
Internal passage . . . . . 10 mm
Dimensional section (width) . . . . . 40 mm

8B.1.7 Weight

Version	kg	lb
Inlet with RV and P	10	2.23
1 spool section with 2 solenoid	2.50	5.50
1 spool with 1 solenoid	2.10	4.62
End cover with T and HPCO	075	1.65

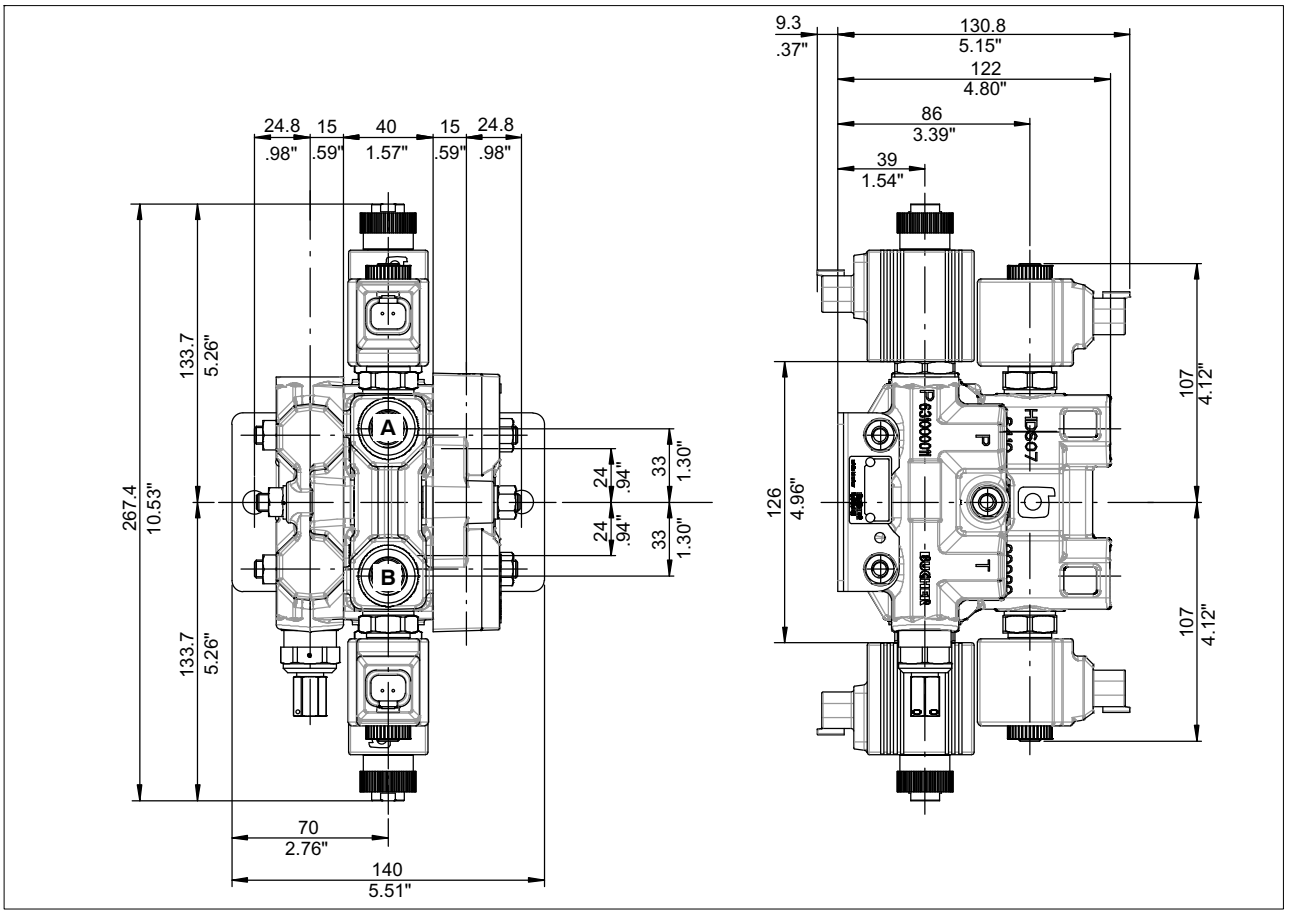
8B.2 Dimensional data

8B.2.1 Standard circuit: parallel

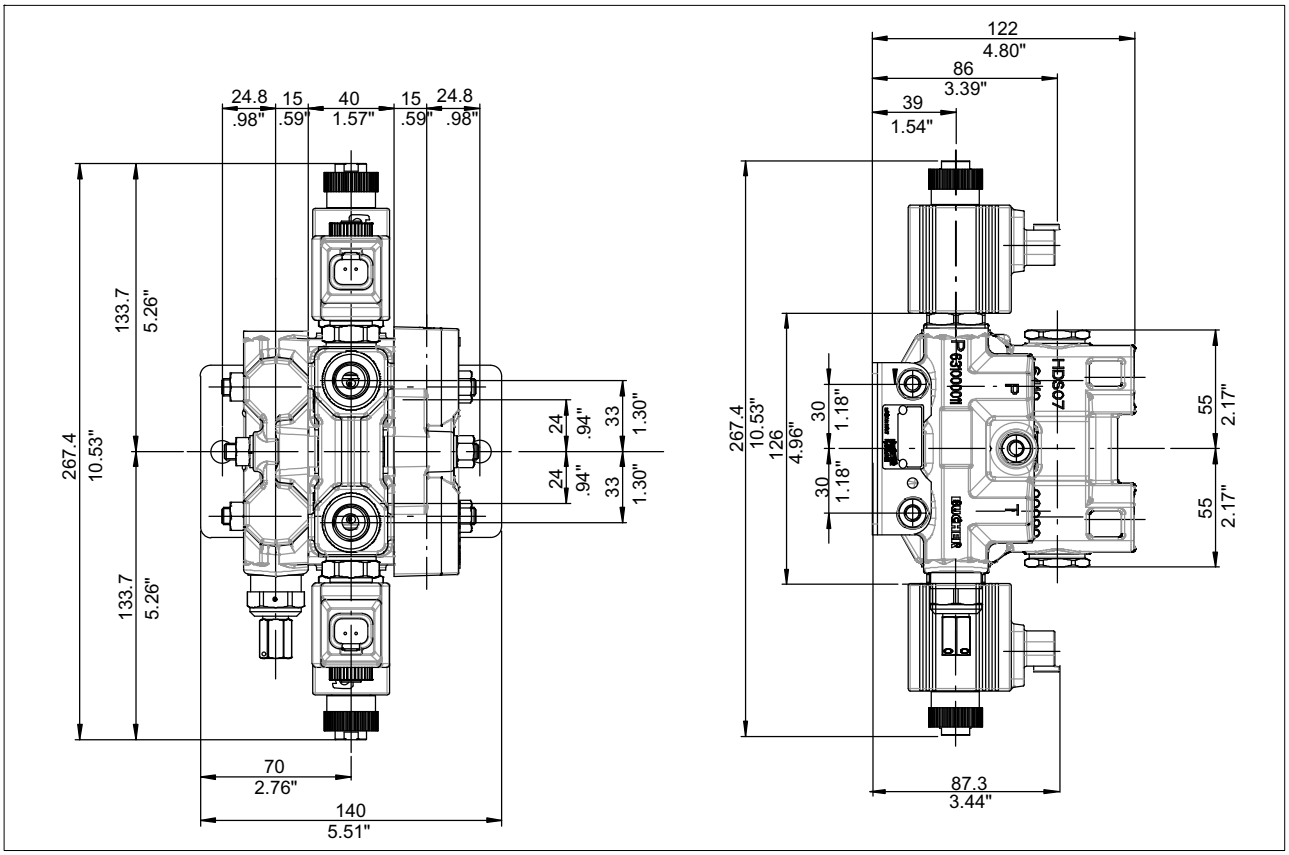


N. of sections		1	2	3	4	5	6	7	8	9	10
Dimension	**A**	119.6	159.6	199.6	239.6	279.6	319.6	359.6	399.6	439.6	479.6
		4.71"	6.28"	7.86"	9.43"	1101"	12.58"	14.16"	15.73"	17.31"	18.88"
	B	143	183	223	263	303	343	383	423	463	503
		5.63"	7.20"	8.78"	10.35"	11.93"	13.50"	1508"	16.65"	18.23"	19.80"

8B.2.2 Version with SP.../AB valves



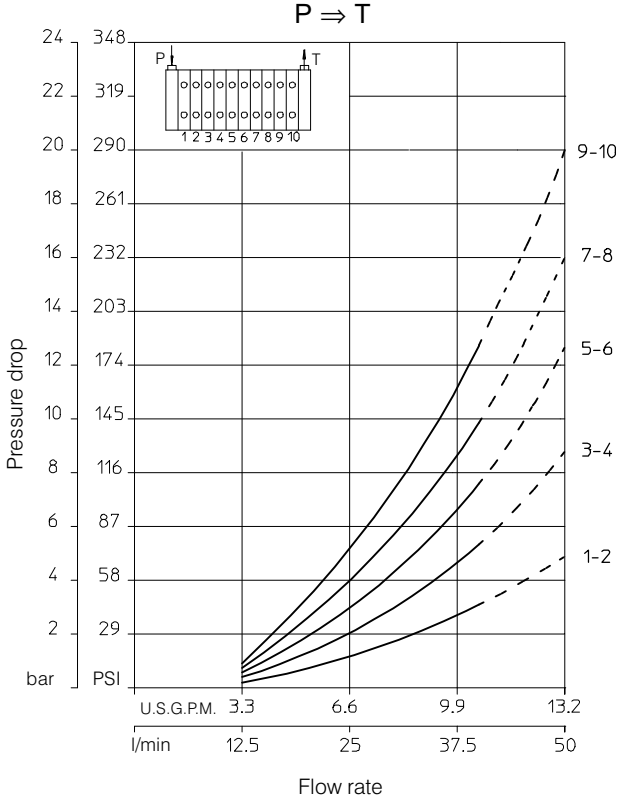
8B.2.3 Version with RP/AB valves



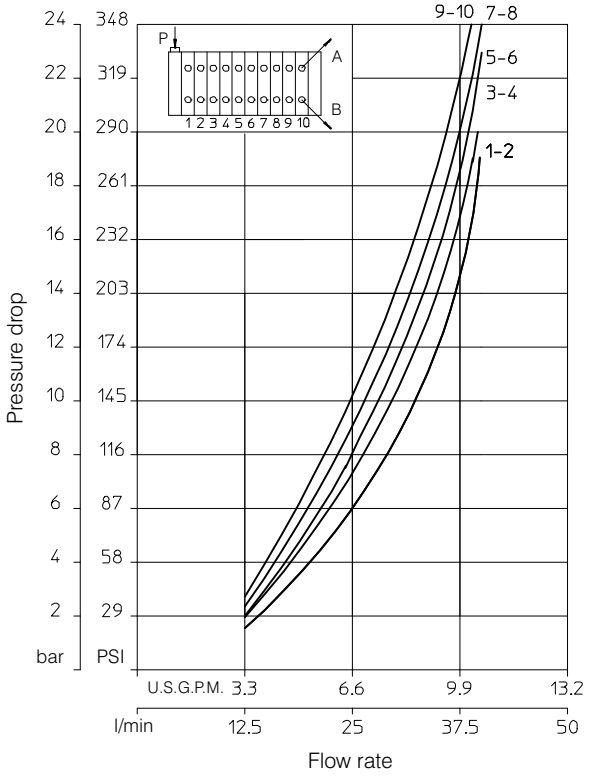
8B.3 Performance curves

Oil: Shell Tellus T37
Temperature: 50°C (120°F)
Viscosity: 27 mm^2/sec

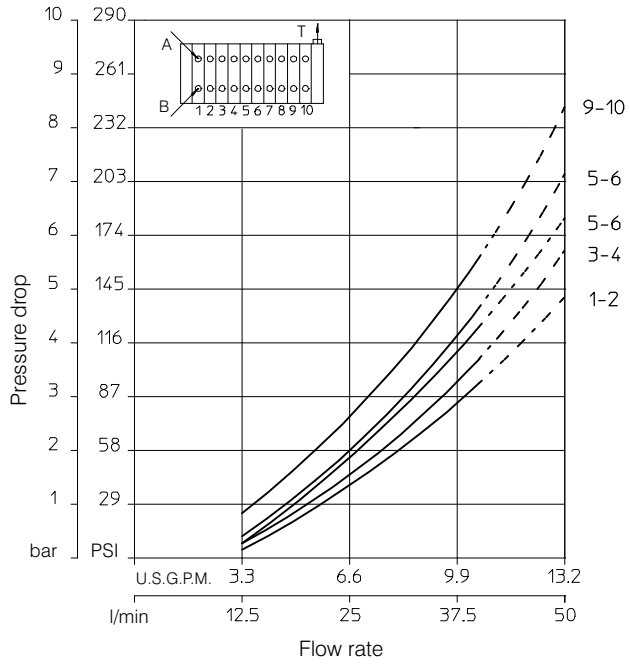
P ⇒ T



P ⇒ A/B



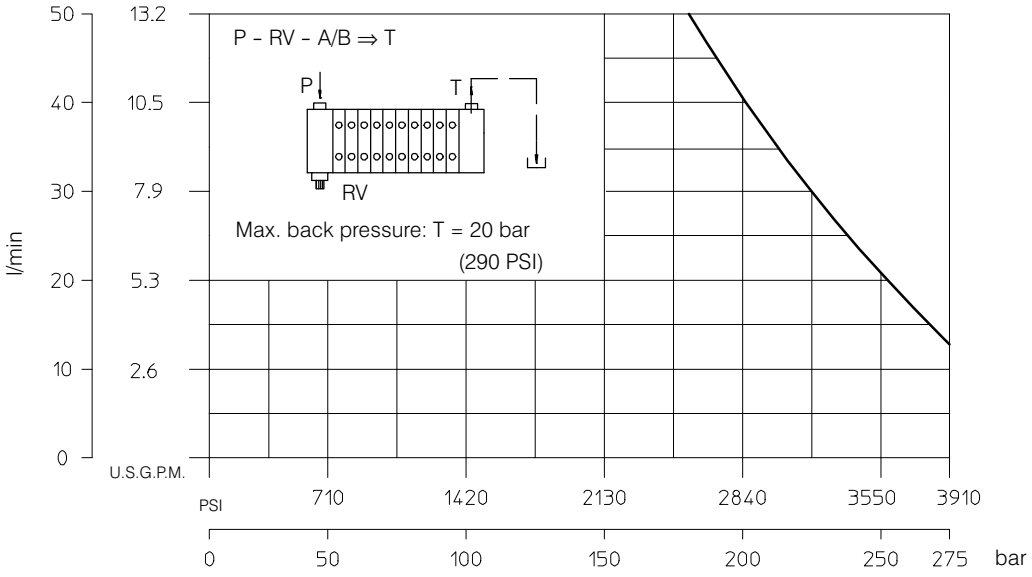
A/B ⇒ T



8B.4 Operating limits

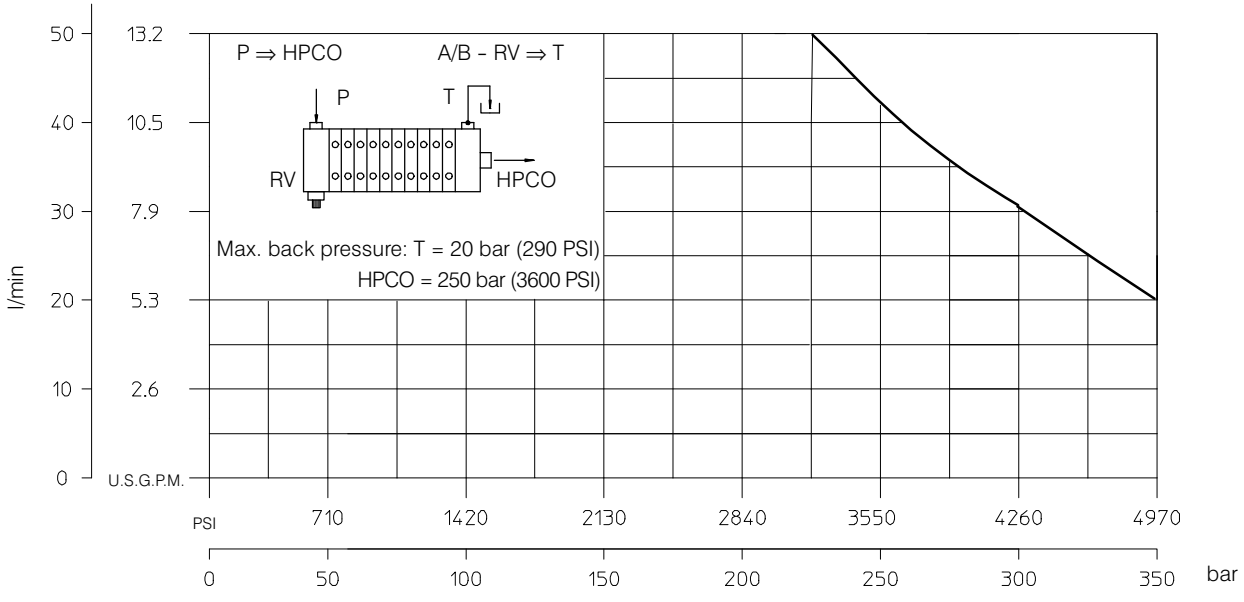
Oil: Shell Tellus T37
Temperature: 50°C (120°F)
Viscosity: 27 mm^2/sec
Tested with voltage V = -10%

Standard Circuit



Operating Pressure

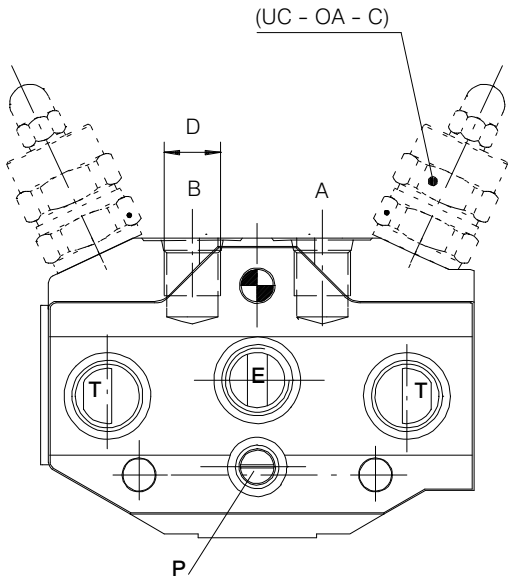
Carry–over Circuit



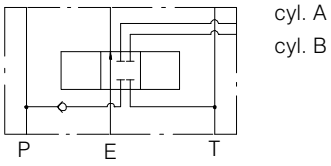
Operating Pressure

8B.5 Sectional bodies

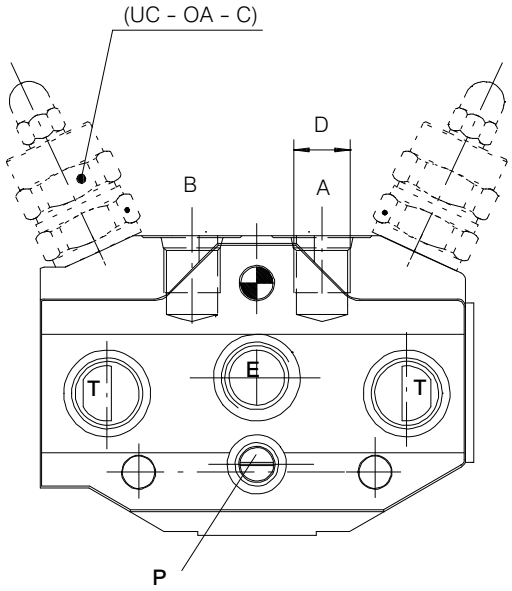
8B.5.1 Standard circuit: parallel



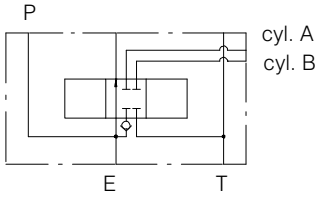
Ø D	Type/Code	
	Standard	Section with valve UC- OA- C
SAE6	**K201** 200941360550	**K211** 200941360600
SAE8	**K202** 200941370310	**K212** 200941370320
3/8" BSP	**K204** 200941326280	**K214** 200941326290
M18X1.5	**K205** 200941312760	**K215** 200941312770



8B.5.2 Optional circuit: series and tandem

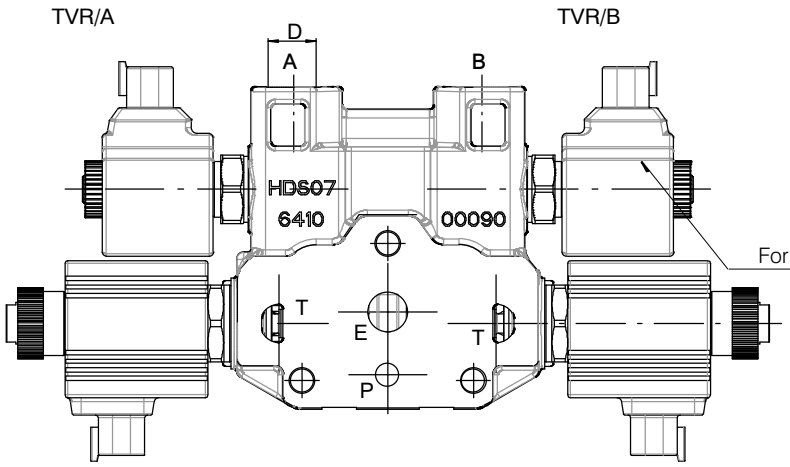


Ø D	Type/Code	
	Standard	Section with valve UC- OA- C
SAE6	**K247** 200941360660	**K252** 200941360700
SAE8	**K248** 200941370390	**K253** 200941370420
3/8" BSP	**K250** 200941320420	**K255** 200941320360
M18X1.5	**K251** 200941310340	**K256** 200941310370



Note: Body code consist of machined casting, seals and hold check valve only. Not to be used for complete valve order.

8B.5.3 Element version with SP817/ TVR valves for standard parallel version

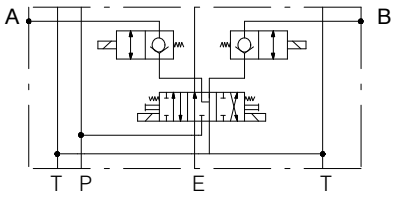


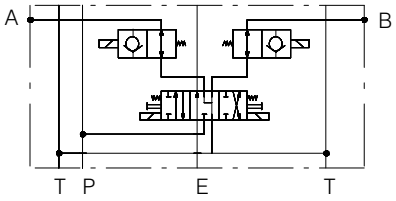
For SP/SPE817 solenoid valve see chapter 8B.10

Ø D	Type
SAE6	**KH701**
3/8" BSP	**KH704**
M18X1.5	**KH705**

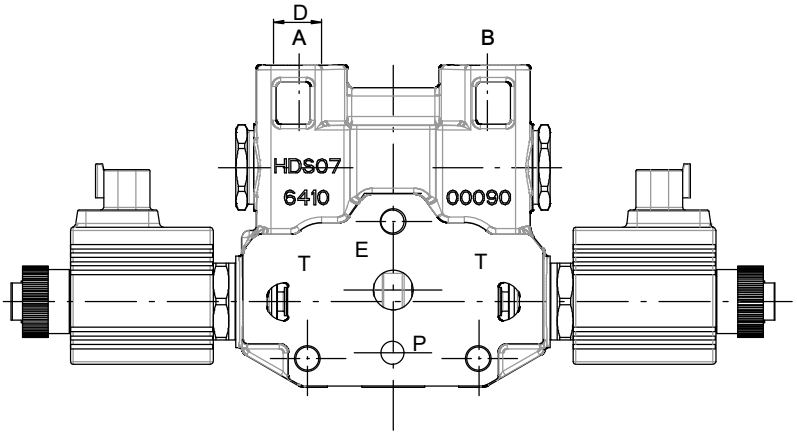
Normally open	Type
Double on A-B	**TOR/A-B**
Single on A	**TOR/A**
Single on B	**TOR/B**

Normally closed	Type
Double on A-B	**TVR/A-B**
Single on A	**TVR/A**
Single on B	**TVR/B**



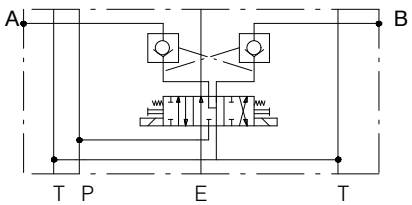


8B.5.4 Element version with RP/AB valves for standard parallel version

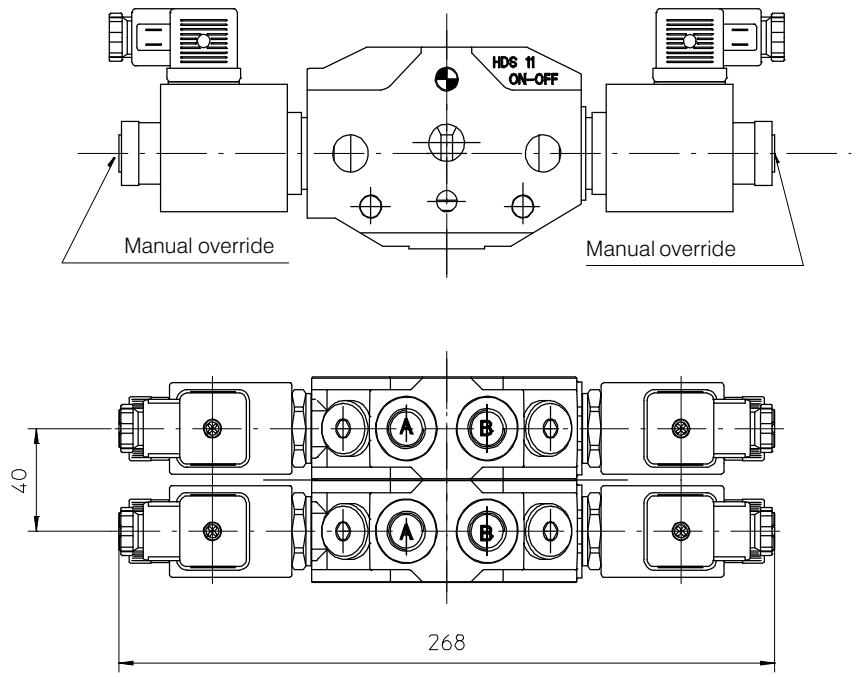


Ø D	Type
SAE6	**KH711**
3/8" BSP	**KH714**
M18X1.5	**KH715**

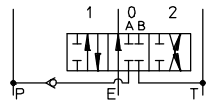
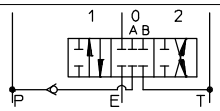
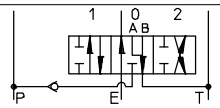
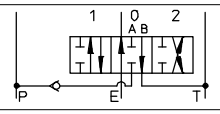
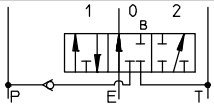
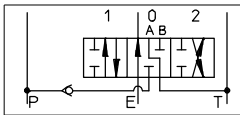
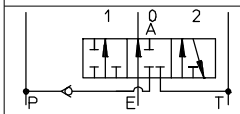
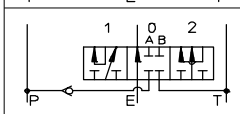
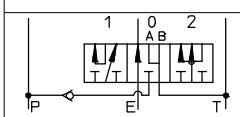
Pilot check valve	Type
Double on A-B	**RP/A-B**
Single on A	**RP/A**
Single on B	**RP/B**



8B.5.5 Emergency manual override



8B.6 Spool charts

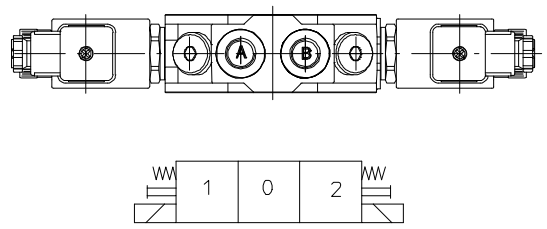
Spool scheme	Spool features	Type
	4 way - 3 position A/B closed E open by pass	**AE**
	4 way - 3 position A/B-E closed	**BE**
	4 way - 3 position A/B to tank in neutral E open by pass	**CE**
	4 way - 3 position A closed B to tank in neutral	**DE**
	3 way - 3 position B closed E open by pass	**GE**
	4 way - 3 position B closed A to tank in neutral	**LE**
	3 way - 3 position A closed E open by pass	**SE**
	4 way - 3 position A/B closed series connection	**XE***
	4 way - 3 position A/B to tank in neutral series connection	**XCE***

* series body required
** special body required

8B.7 Spool actions

8B.7.1 Double-Solenoid spring-centered valves

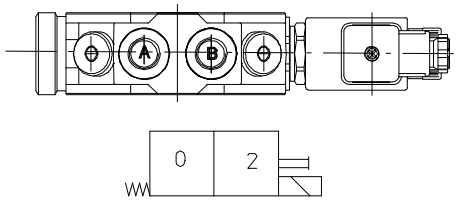
Type **01E**



8B.7.2 Single Solenoid spring offset valves

Type **02E**

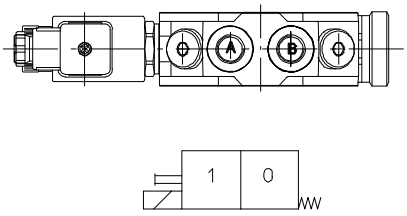
Solenoid at port “B” end of body



8B.7.3 Single Solenoid spring offset valves

Type **03E**

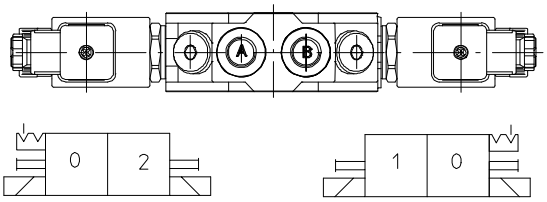
Solenoid at port “A” end of body



8B.7.4 Double Solenoid, two detent position valves*

Type **04E**

Type **05E**



* Available only on request

8B.8 4th Floating position

8B.8.1 Main features

Max operating pressure: . . . . . 250 bar
Max admitted flow: . . . . . 35 l/min

Average leakage: 30 cm^3/min (100 bar, 50°C, 27 mm^2s^{-1})
Solenoid power: . . . . . 48 Watt (12-24 Vdc)

8B.8.2 General specification

- Pressure drops with 35 lt/min:

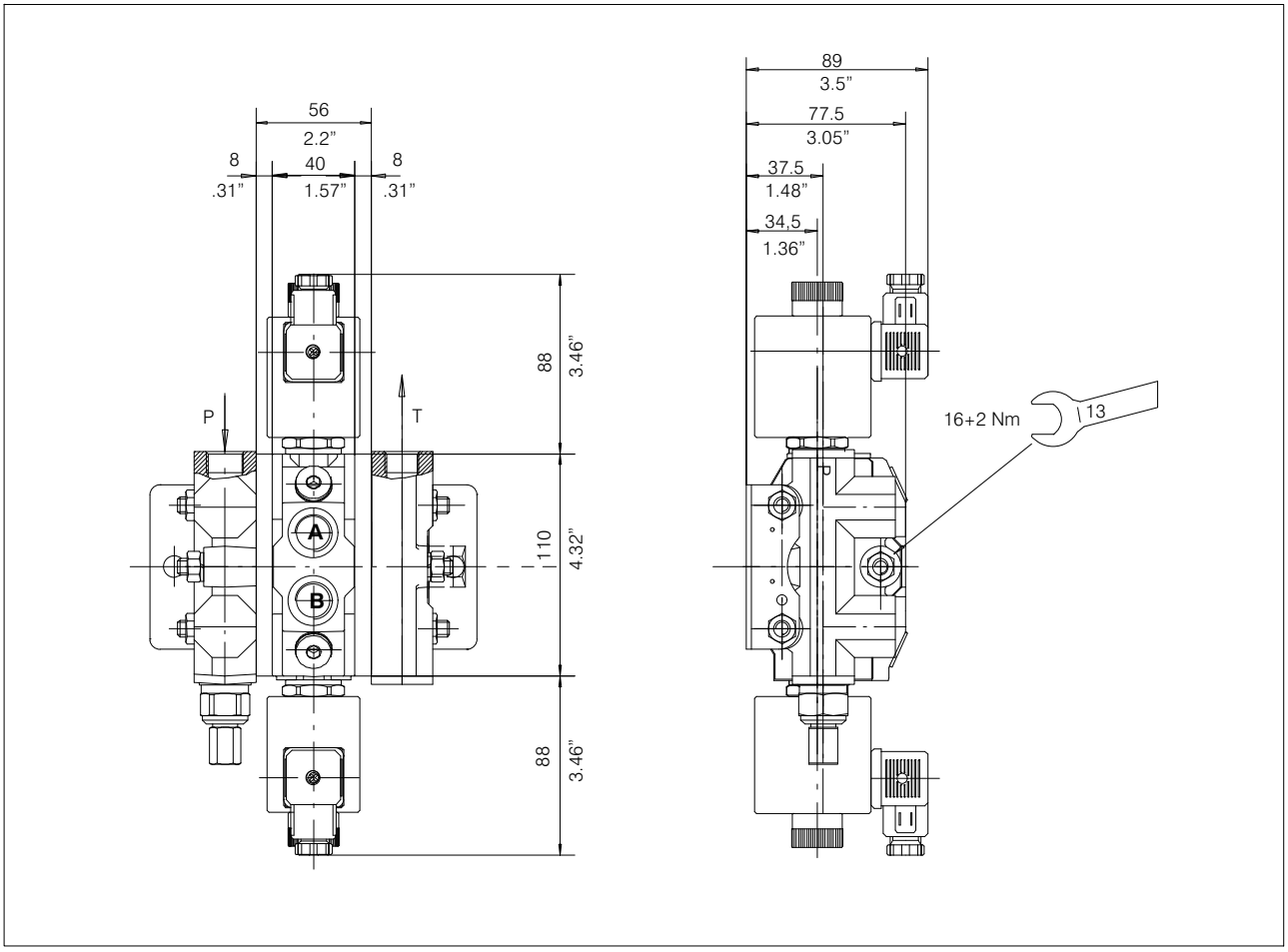
Pos 0
P ⇒T . . . . . 2 bar

Pos 1 and 2
P ⇒ A / P ⇒ B . . . . . 9 bar
B ⇒ T / A ⇒ T . . . . . 5.5 bar

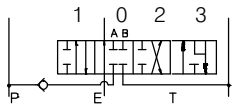
Pos 3 (4th floating position)
A ⇒ T / B ⇒ T . . . . . 12.5 bar

- Parallel circuit, electric operated
- Compatible for assembling on HDS11 valve series
- Intermediate spacers 15 mm width needed
- In case the directional control valve consists of 2 or more sections, we suggest to position the section (or the sections) with 4th floating position as last section in the pack close to the "T" outlet cover.
- In the electric 4th floating position it is necessary to use always the cover with "T" side outlet (ex. P04, P05, etc.)
- To be used, if possible, in circuits without the carry-over version (on the contrary please contact our Sales Department)
- The 4th floating position must always be realized as from the "0" neutral position with both solenoids not energized.
- It is not possible to have versions with OA-C-UC valves with the 4th floating position section.

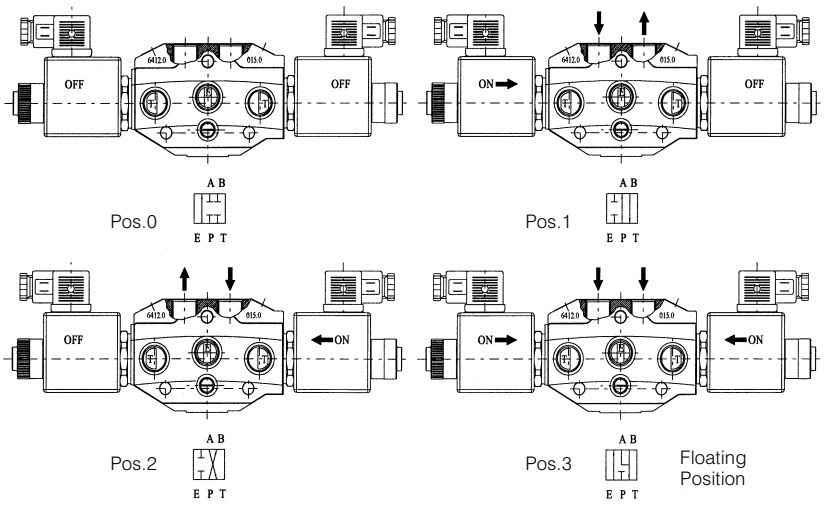
8B.8.3 Dimensional data



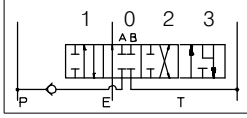
8B.8.4 Hydraulic circuit



	Sol.A	Sol.B
Pos. 0		
Pos. 1	●	
Pos. 2		●
Pos. 3	●	●



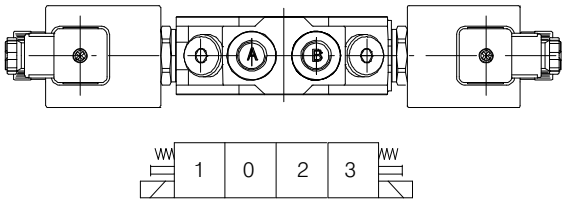
8B.8.5 Spool chart

Spool scheme	Spool features	Type
	4 way - 4 position 4th floating electric position	**ZE***

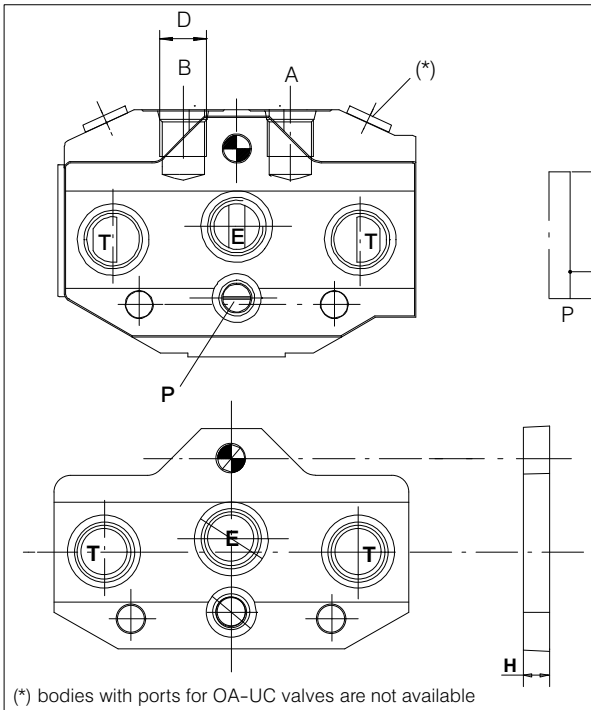
* Special body required

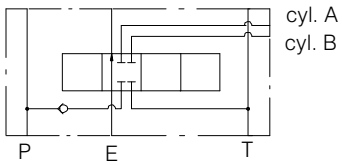
8B.8.6 Spool action

Type **08E** Double–Solenoid spring–centered valves + 4th floating position



8B.8.7 Sectional body and manifold





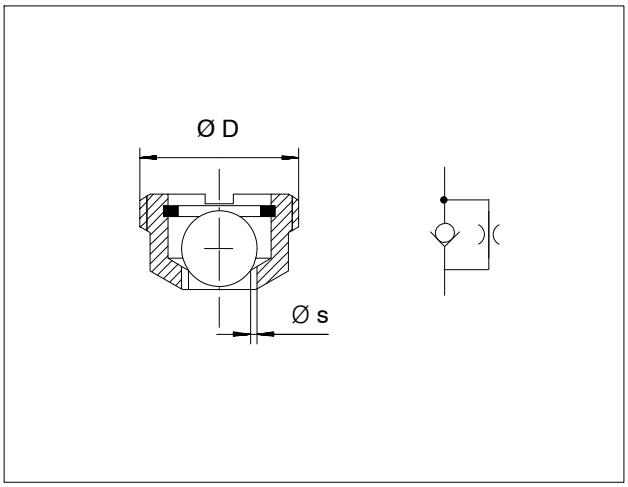
Ø D	Type/Code Standard
SAE6	**K225** **200941360710**
SAE8	**K226** **200941370430**
3/8" BSP	**K227** **200941326330**
M18X1.5	**K228** **200941312890**

H	Code
8 mm	**200764900350**

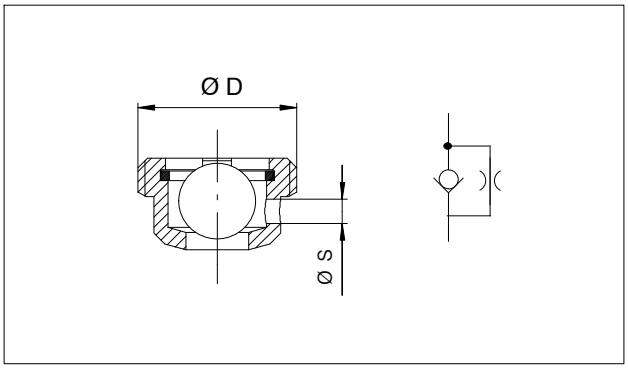
(*) bodies with ports for OA-UC valves are not available

8B.9 Cartridge valves

8B.9.1 Flow control valve series VS

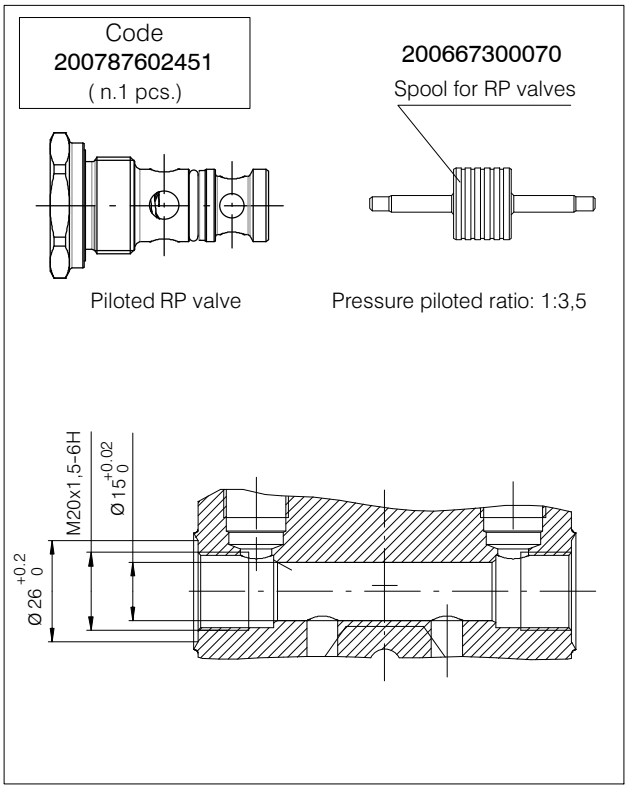


Ø D	Valve type	Code	Ø s
M18X1,5	**VS4**	200787200430	1.4
	VS6	200787200450	2
	VS11	200787200330	2.5
3/8" BSP	**VS15**	200787200370	1.4 (Ø 6.5)
	VS16	200787200380	1.4
	VS17	200787200390	1.4 (Ø 7.2)
	VS39	200787201660	2.5
SAE6	**VS18**	200787200400	1.5
	VS25	200787201040	2
	VS26	200787201050	2



Ø D	Valve type	Code	Ø s
M18x1,5	**VS105**	200787201690	0.5
	VS108	200787201700	0.8
	VS112	200787201710	1.2
	VS116	200787201720	1.6
	VS125	200787201730	2.5
3/8" BSP	**VS225**	200787201740	2.5
SAE6	**VS625**	200787201750	2.5

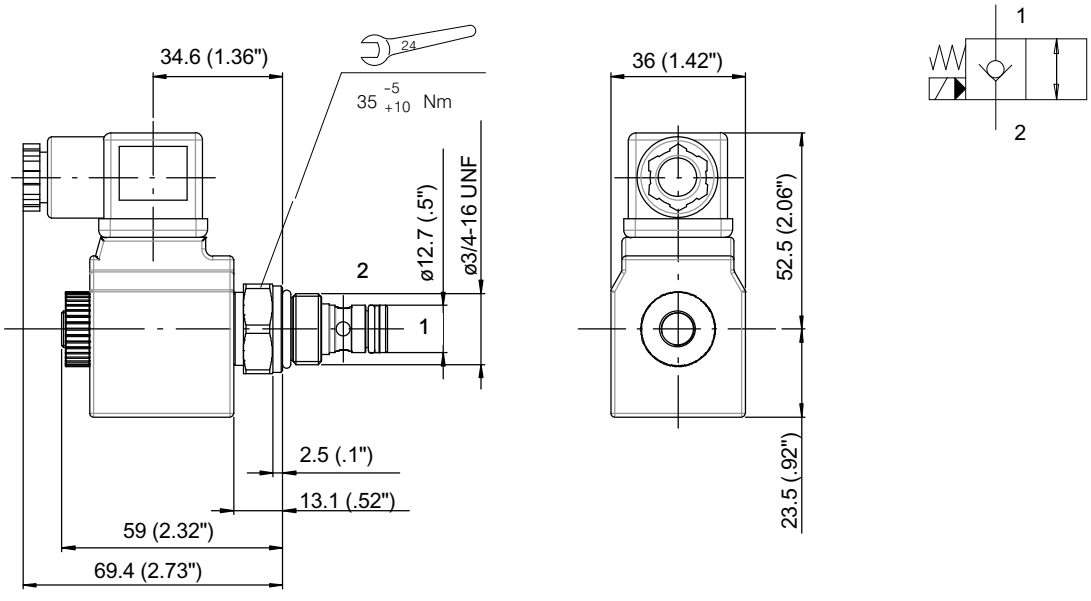
8B.9.2 Piloted check valve



8B.10 Solenoid operated directional valve:

SP817/22-TVR

Normally closed - Pilot type
Poppet type, bi-directional flow admitted



Weight (complete valve): 0.390 Kg

Directional valve without coil and connector

SP817/22-TVR P.M.	200757200750

Complete solenoid valve for D.C. current

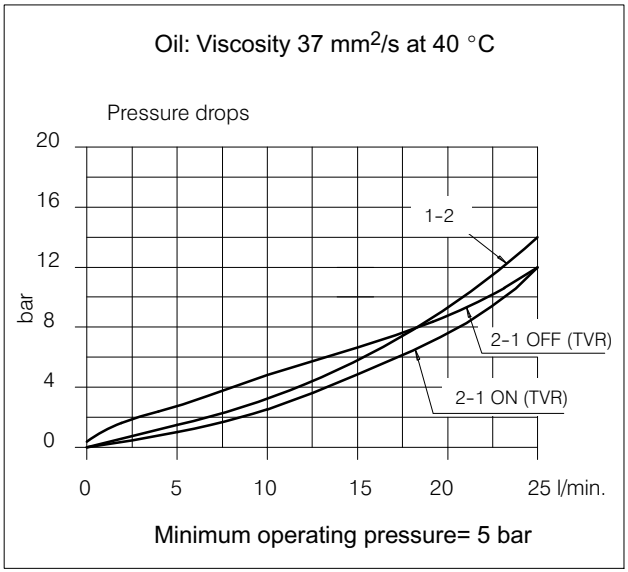
SP817/22-TVR/13-HC	200957010044
SP817/22-TVR/23-HC	200957020046

Electric performances	
Max. pressure	300 bar
	4356 PSI
Max. flow	25 l/min.
	6.66 U.S.G.P.M.
Rated power	22 Watt
Intermittence	ED= 100%
Voltage tolerance	± 10%
Internal leakage	0-5 drops/min.
Temperature range	-20/+90° C
Connector type	DIN 43650
Time to open (50-210 bar)	15-100 ms.
Time to close (50-210 bar)	15-100 ms.
O-Ring replacement kit	200974200140

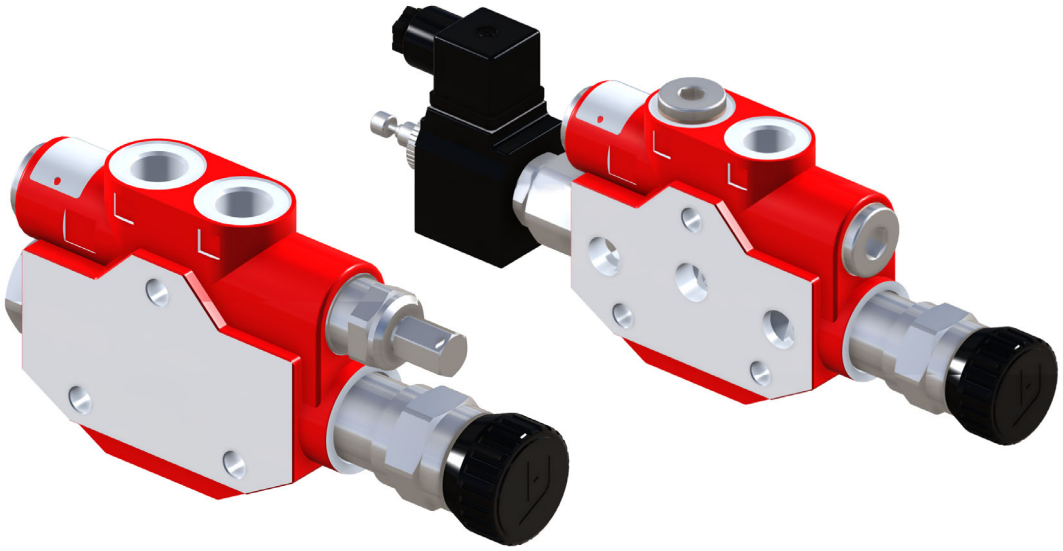
Coil voltage

	D.C.	
Volt	12 V.	24 V.
Type	13	23

Directional valve without coil and connector



8C Elements with pressure and flow control PQ



Contents

8C.1 General specifications

Max continuous operating pressure
supply port P . . . . . 250 bar
Max intermittent peak pressure
work port A/B . . . . . 320 bar
Max back pressure tank port T . . . . . 30 bar
Nominal flow . . . . . max. 50 l/min

Adjustable setting flow range on 350° turning-knob:
Min flow . . . . . 0 l/min
Max flow (input) . . . . . 40 l/min

Fixed priority flow . . . . . VDPF = 0 to 40 l/min
Adjustable priority flow . . . . . VDP 06 = 0 to 6 l/min
. . . . . VDP 12 = 0 to 12 l/min
. . . . . VDP 25 = 0 to 25 l/min
. . . . . VDP 40 = 0 to 40 l/min
Control accuracy . . . . . ± 5 %
Pressure difference Δp . . . . . max. 6 bar
Oil temperature range . . . . . -10° to +80° C
Viscosity range . . . . . 16 to 75 mm^2/sec
Recommended filtration . . . . . ⩽25 micron

Adjustable direct acting:
Relief valve on the lines . . . . . Inlet flow: RV1
. . . . . Priority flow: RV2
. . . . . Residual flow: RV3

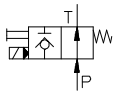
By-pass solenoid valve BP3/AE
. . . . . BP3/CE

8C.2 Sectional body K100

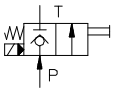
8C.2.1 Application variation

Intermediate section with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.

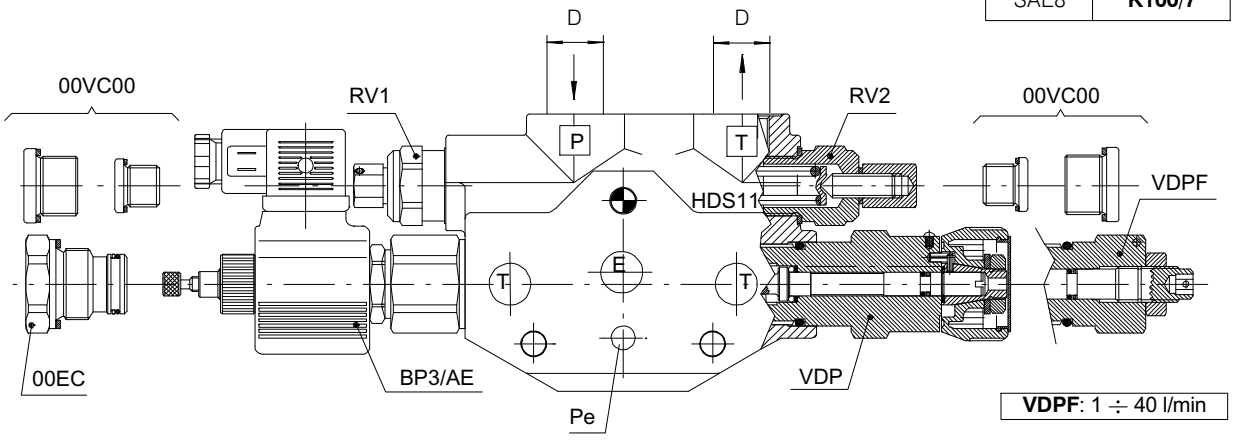
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



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



Ø D	Type
M18X1.5	**K100/1**
3/8" BSP	**K100/2**
SAE8	**K100/7**



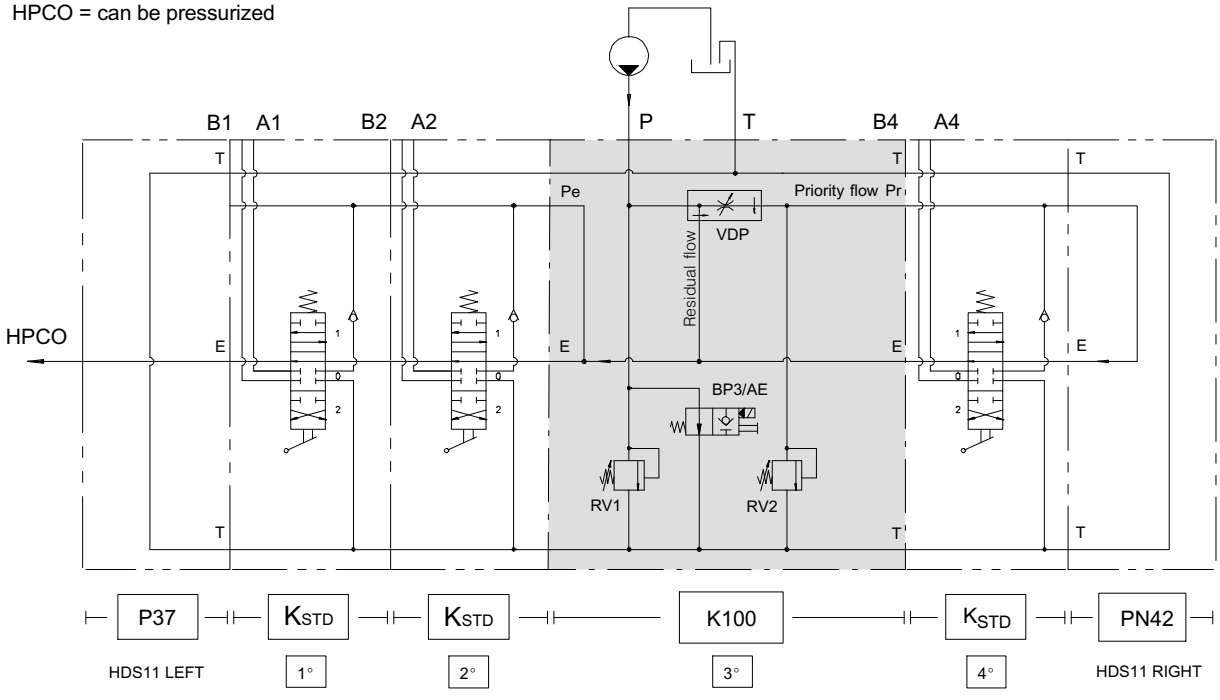
VDPF: 1 ÷ 40 l/min

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

Flow set range (l/min)	Standard Setting l/min	Flow regulator Type
0 ÷ 6	6	VDP 06
0 ÷ 12	12	VDP 12
0 ÷ 25	25	VDP 25
0 ÷ 40	40	VDP 40

8C.2.2 Scheme example

HPCO = can be pressurized

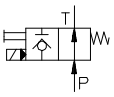


8C.3 Inlet cover T100

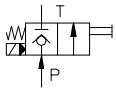
8C.3.1 Application variation

Inlet cover with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.

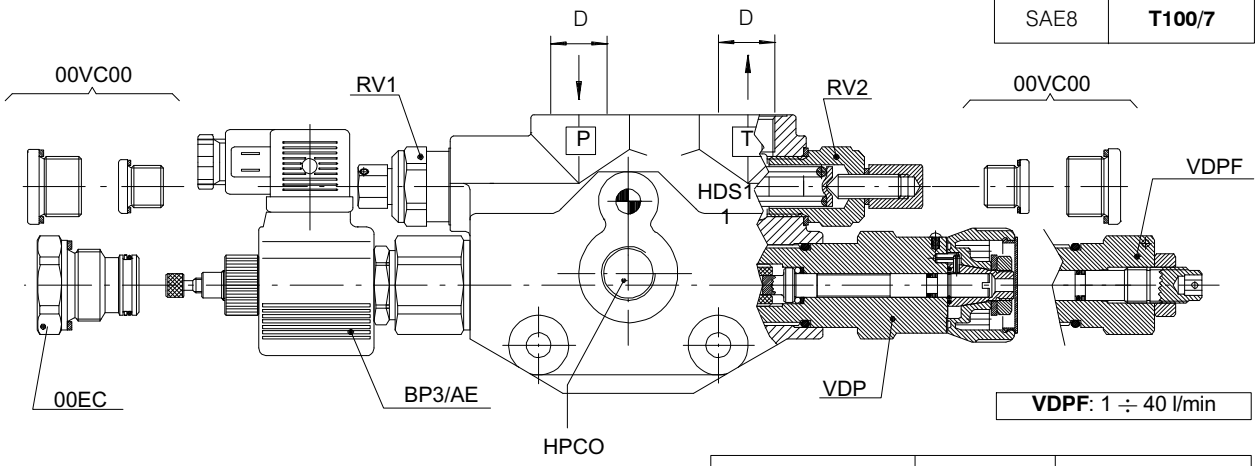
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



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



Ø D	Type
M18X1.5	**T100/1**
3/8" BSP	**T100/2**
SAE8	**T100/7**



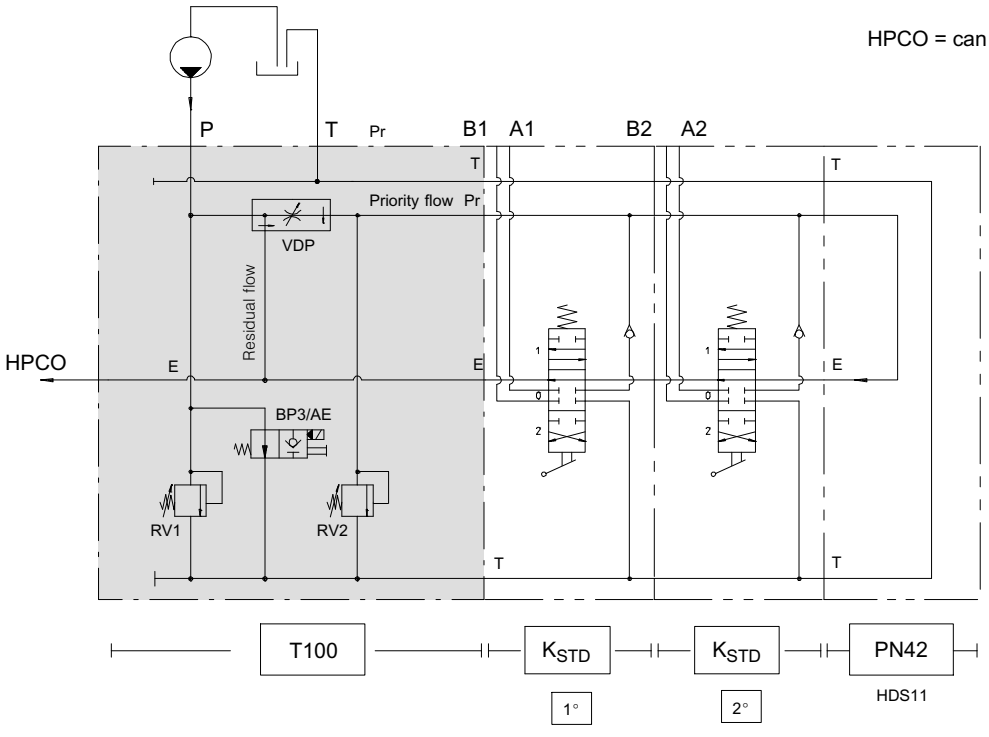
VDPF: 1 ÷ 40 l/min

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

Pressure set range (l/min)	Standard Setting l/min	Flow regulator Type
0.5 ÷ 6	6	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5 ÷ 40	40	**VDP 40**

8C.3.2 Scheme example

HPCO = can be pressurized

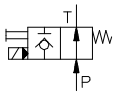


8C.4 Sectional body K88

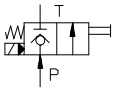
8C.4.1 Application variation

Intermediate section with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.

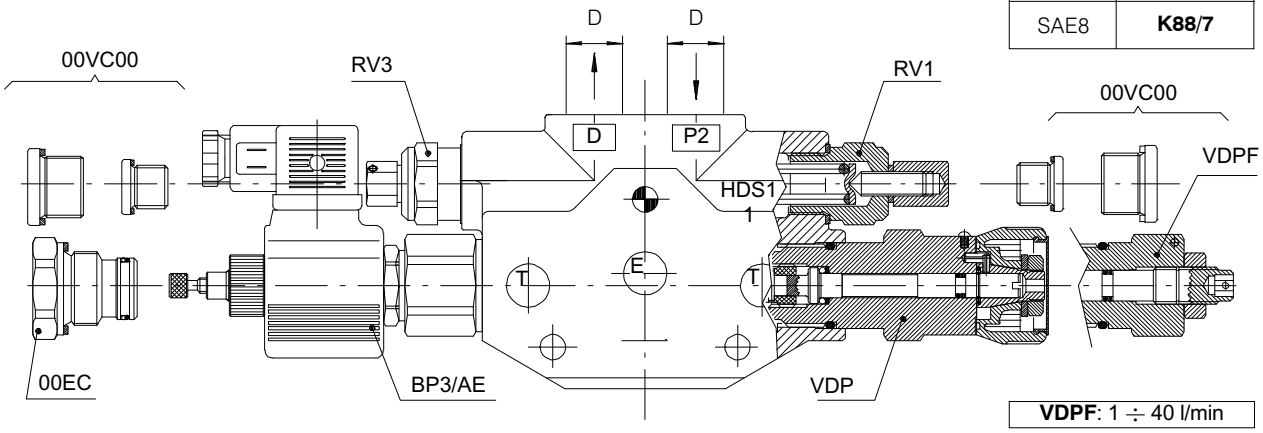
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



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



Ø D	Type
M18X1.5	**K88/1**
3/8" BSP	**K88/2**
SAE8	**K88/7**



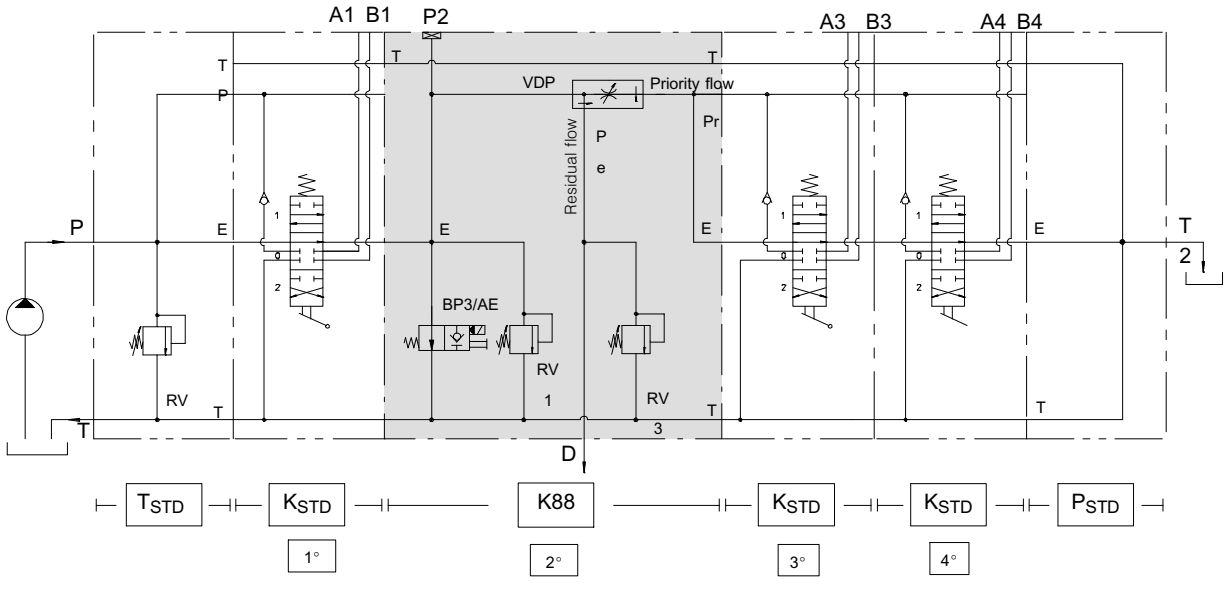
VDPF: 1 ÷ 40 l/min

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

Flow set range (l/min)	Standard Setting l/min	Flow regulator Type
0.5 ÷ 6	6	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5 ÷ 40	40	**VDP 40**

8C.4.2 Scheme example

D = excessed flow can be pressurized

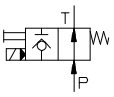


8C.5 Inlet cover T88

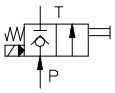
8C.5.1 Application variation

Inlet cover with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.

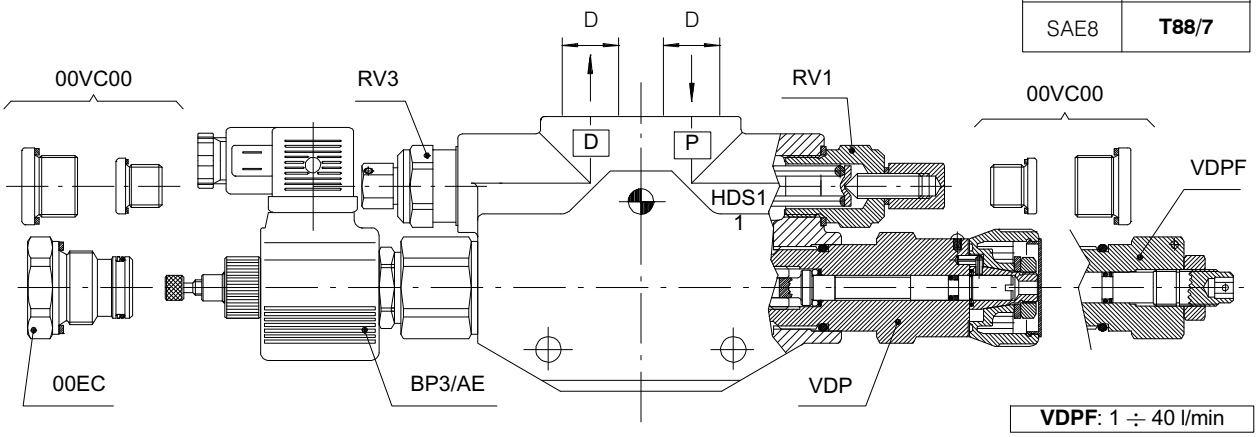
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



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



Ø D	Type
M18X1.5	**T88/1**
3/8" BSP	**T88/2**
SAE8	**T88/7**



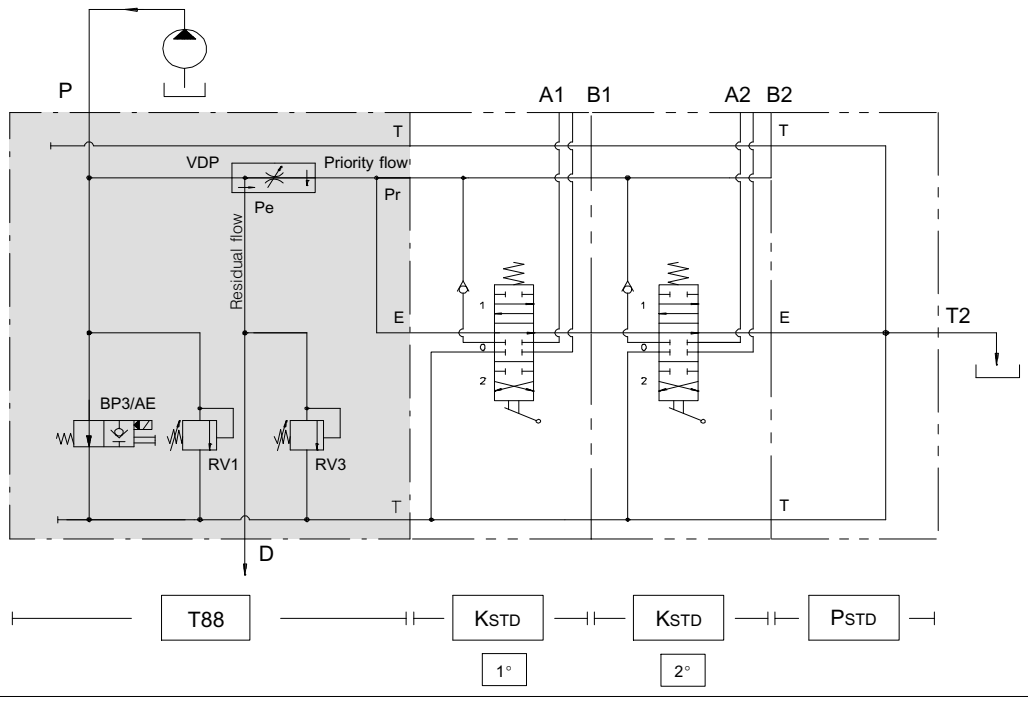
VDPF: 1 ÷ 40 l/min

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

Flow set range (l/min)	Standard Setting l/min	Flow regulator Type
0.5 ÷ 6	6	VDP 06
0.5 ÷ 12	12	VDP 12
0.5 ÷ 25	25	VDP 25
0.5 ÷ 40	40	VDP 40

8C.5.2 Scheme example

D = excessed flow can be pressurized

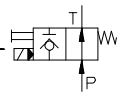


8C.6 Sectional body K90

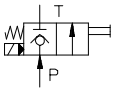
8C.6.1 Application variation

Intermediate section with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.
Excess flow to tank.

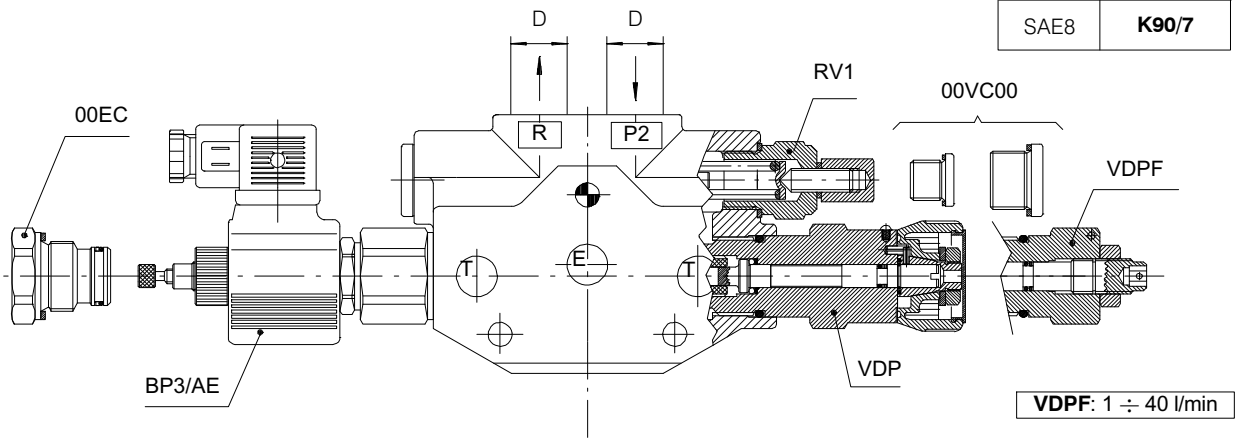
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



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



Ø D	Type
M18X1.5	**K90/1**
3/8" BSP	**K90/2**
SAE8	**K90/7**



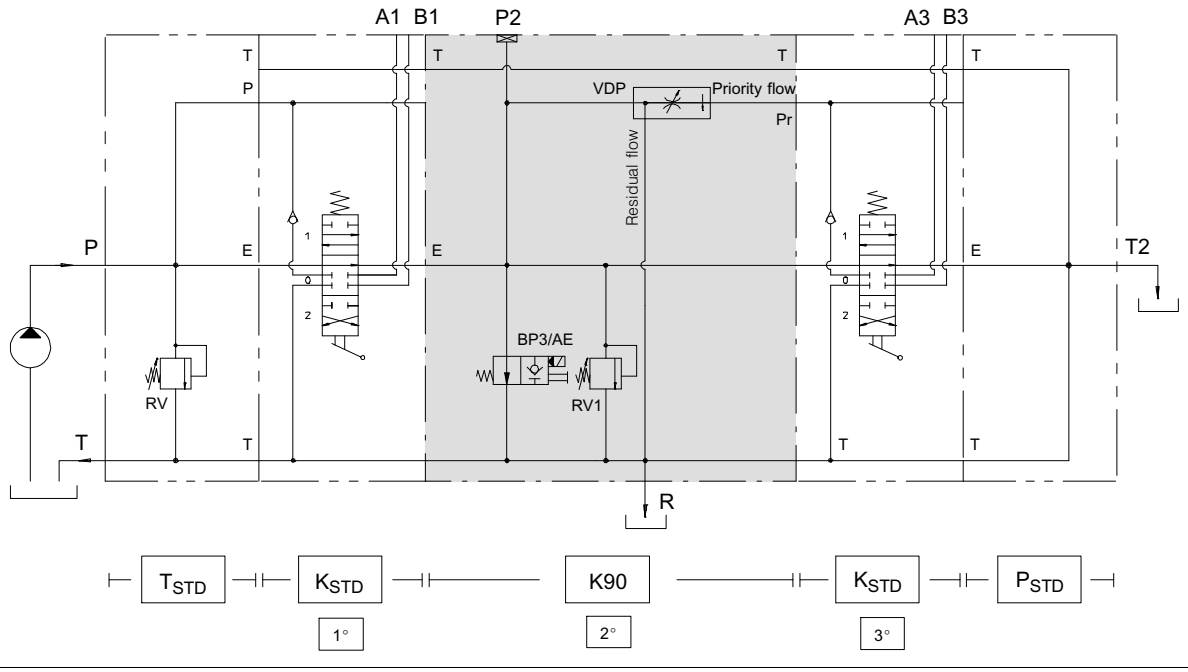
VDPF: 1 ÷ 40 l/min

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

Flow set range (l/min)	Standard Setting l/min	Flow regulator Type
0.5 ÷ 6	6	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5 ÷ 40	40	**VDP 40**

8C.6.2 Scheme example

Port R = Tank connection (cannot be pressurized)

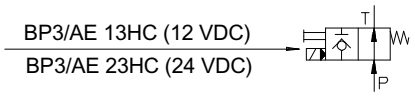


8C.7 Inlet cover T90

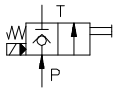
8C.7.1 Application variation

Inlet cover with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve. Excess flow to tank.

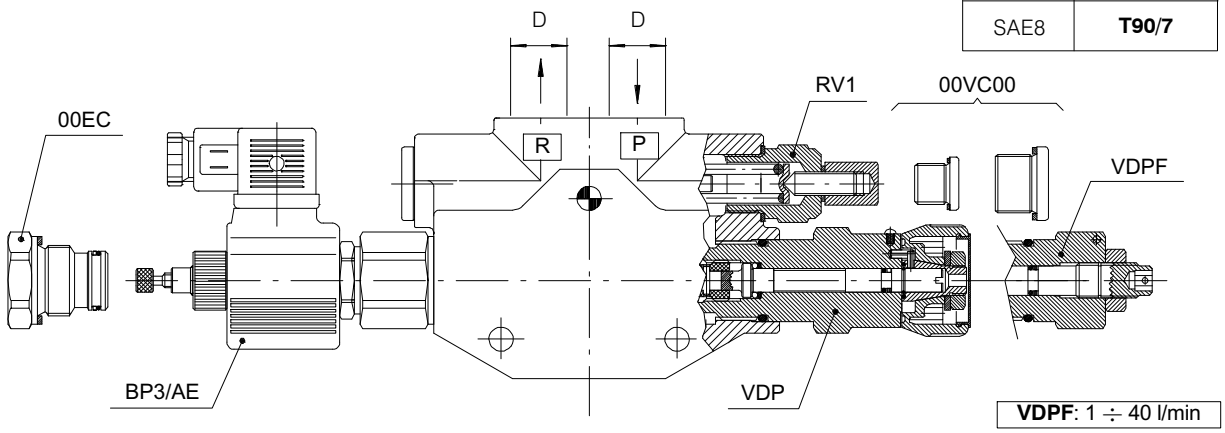
BP3/AE 13HC (12 VDC)
BP3/AE 23HC (24 VDC)



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



Ø D	Type
M18X1.5	**T90/1**
3/8" BSP	**T90/2**
SAE8	**T90/7**



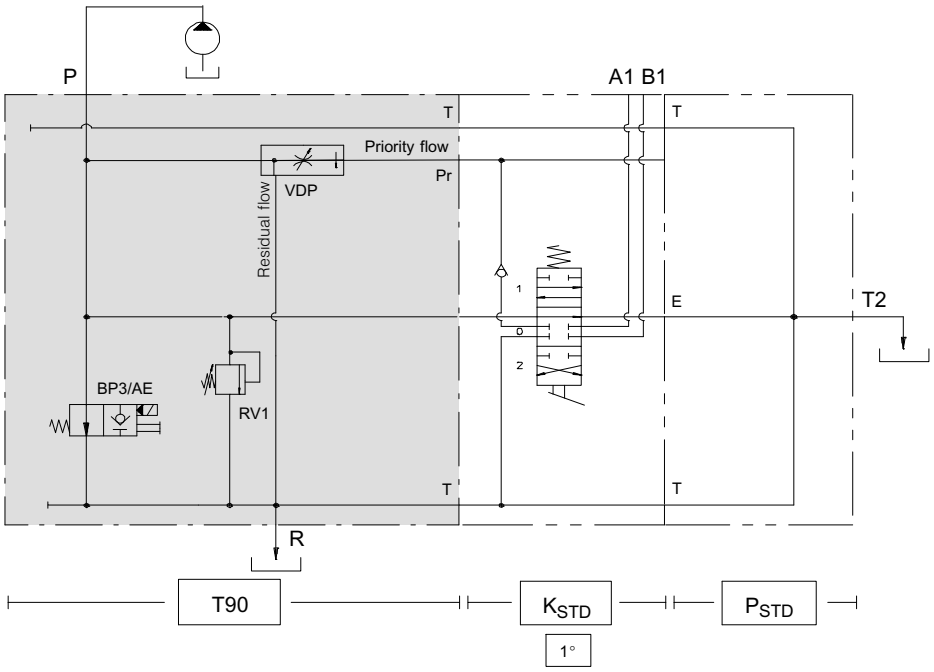
VDPF: 1 ÷ 40 l/min

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

Flow set range (l/min)	Standard Setting l/min	Flow regulator Type
0.5 ÷ 6	6	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5 ÷ 40	40	**VDP 40**

8C.7.2 Scheme example

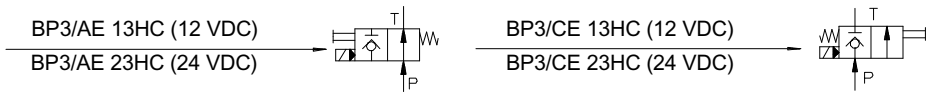
Port R = Tank connection (cannot be pressurized)



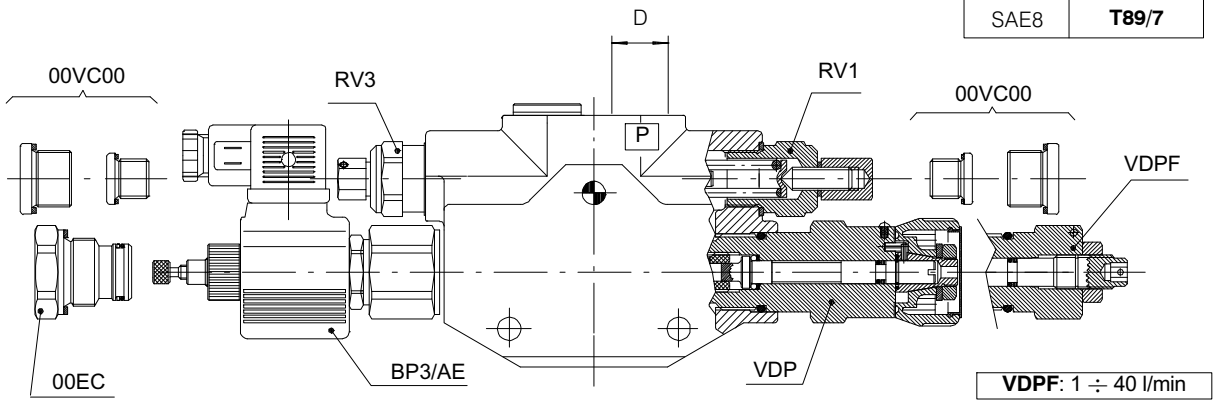
8C.8 Inlet cover T89*

8C.8.1 Application variation

Inlet cover with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.



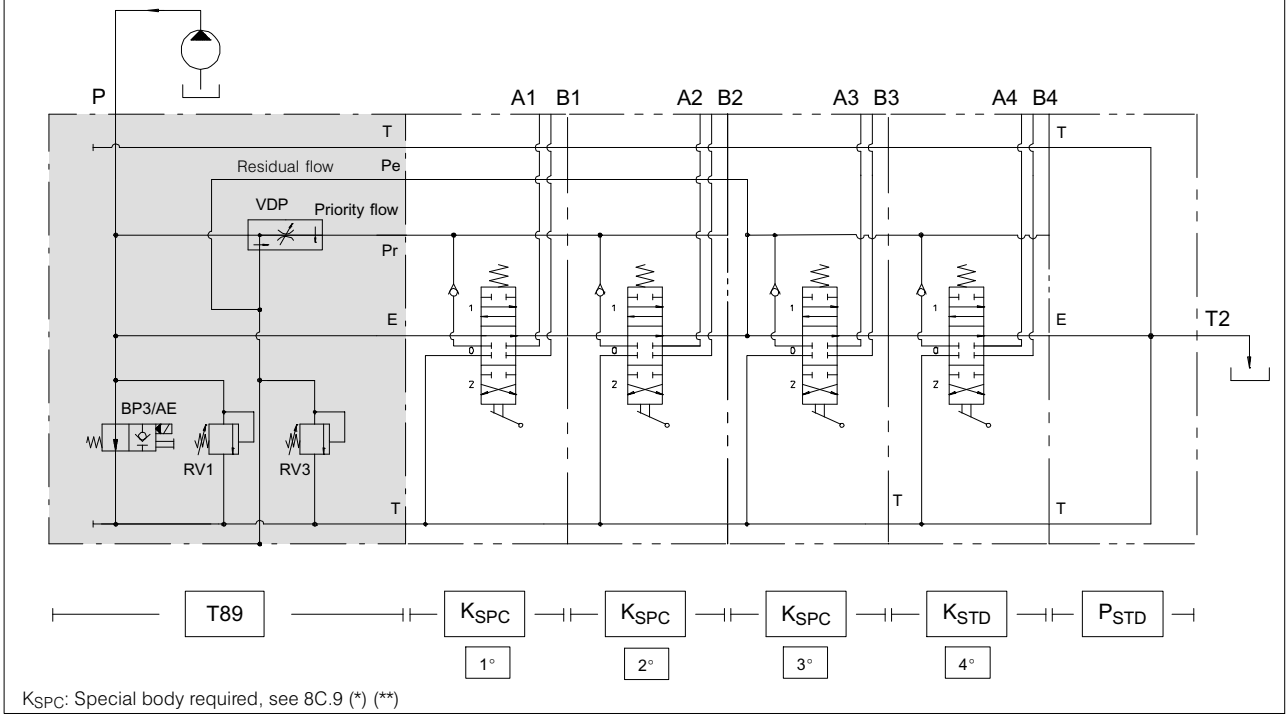
Ø D	Type
M18X1.5	**T89/1**
3/8" BSP	**T89/2**
SAE8	**T89/7**



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

Flow set range (l/min)	Standard Setting l/min	Flow regulator Type
0.5 ÷ 6	6	**VDP 06**
0.5 ÷ 12	12	**VDP 12**
0.5 ÷ 25	25	**VDP 25**
0.5 ÷ 40	40	**VDP 40**

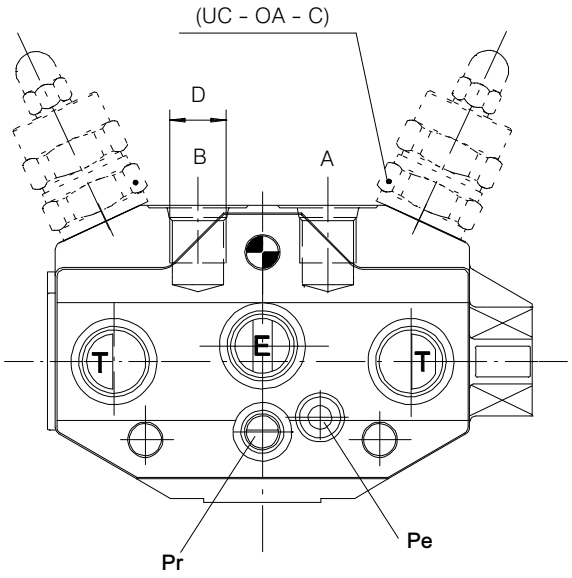
8C.8.2 Scheme example



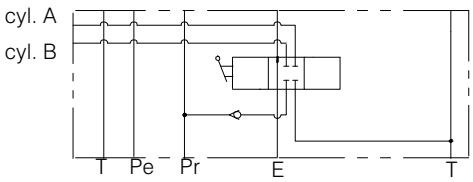
K_{SPC}: Special body required, see 8C.9 (*) (**)

8C.9 Special sectional bodies

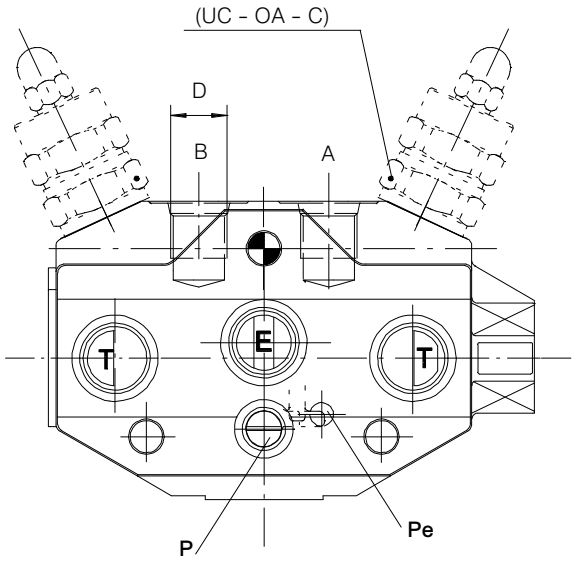
8C.9.1 Special element (priority flow): to be used only with T89 (*) inlet cover



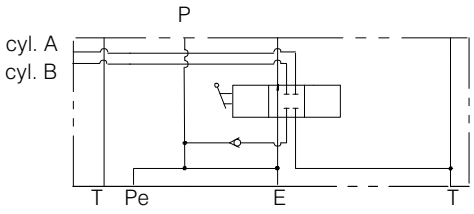
Ø D	Type/Code	
	Standard	Section with valve UC - OA - C
SAE6	**K111** 200941360640	**K27** 200941360560
SAE8	**K112** 200941370380	**K24** 200941370370
3/8" BSP	**K113** 200941320410	**K58** 200941320400
M18X1.5	**K114** 200941310330	**K59** 200941310320



8C.9.2 Special element (residual flow): to be used only with T89 (**) inlet cover



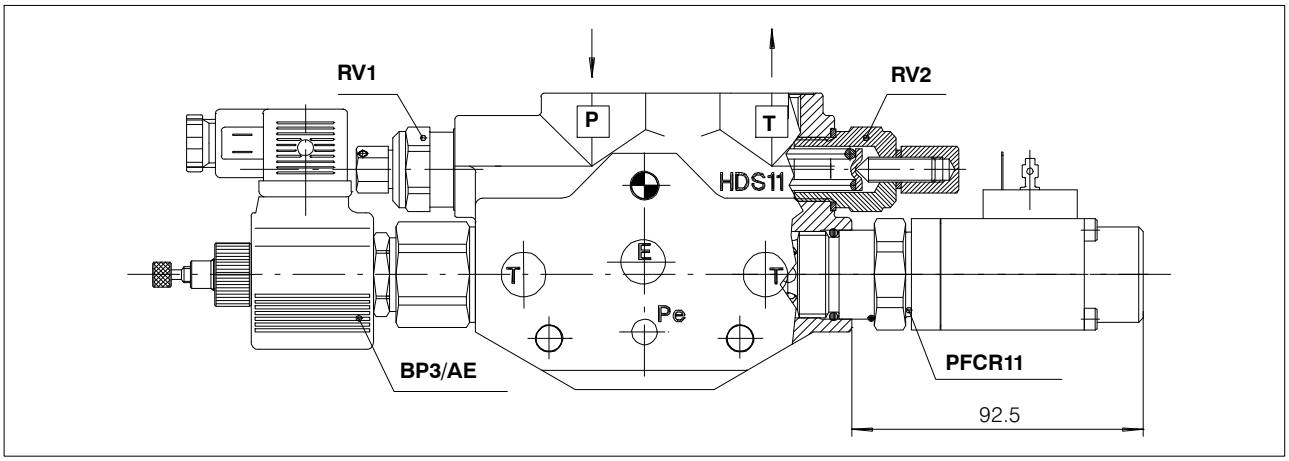
Ø D	Type/Code	
	Standard	Section with valve UC - OA - C
SAE6	**K116** 200941360630	**K81** 200941360590
SAE8	**K117** 200941370360	**K82** 200941370350
3/8" BSP	**K118** 200941320390	
M18X1.5	**K119** 200941310310	**K86** 200941310300



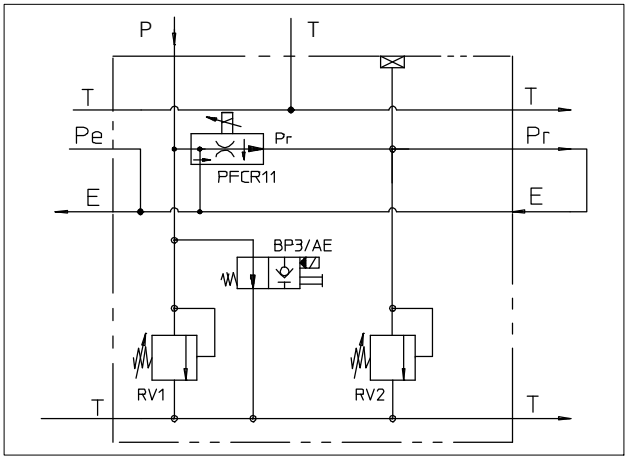
Note: Body code consist of machined casting, seals and hold check valve only. Not to be used for complete valve order.

8C.10 Proportional flow control PFCR11

8C.10.1 Example of application on K100 body



8C.10.2 Example of hydraulic scheme K100



8C.10.3 Electric performances

Coil according to	VDE 0580	
Connector type	DIN 43650	
Duty rating	ED= 100%	
Suggested dither	0-150 Hertz (*)	
Insulation class	IP54 (DIN 40050) without connector	
	IP65 (DIN 40050) with connector	
Coil winding class	F	
Voltage ±5%	12 V (DC)	24 V (DC)
Max current	2.25 A.	1.08 A.
Resistance at 20°C	2.8 Ohm	12.7 Ohm
Nominal power	17.2 Watt	17.4Watt
Insurance	90 mH armature falling down	406 mH armature rising

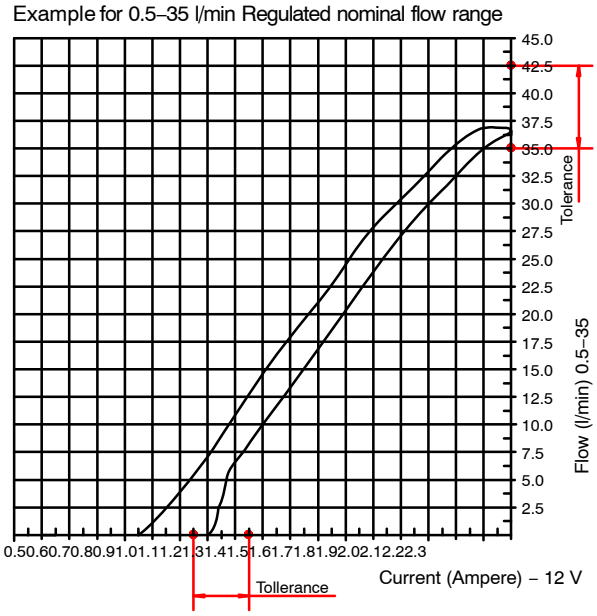
8C.10.4 Code

Flow l/min	Voltage	Type	Code**
14	12 V	PFCR11/V2-14-P2-13	200788000110
14	24 V	PFCR11/V2-14-P2-23	200788000120
35	12 V	PFCR11/V8-35-P2-13	200788000070
35	24 V	PFCR11/V8-35-P2-23	200788000080

8C.10.5 Hydraulic performances

Max. pressure	270 bar
Max. recommended pressure	230 bar
Regulated flow range	0.5 - 14 l/min
	0.5 - 35 l/min
Temperature range	-5/+70° C

8C.10.6 Current/flow regulated diagram



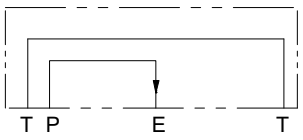
Performances obtained in 60+60 seconds under the following conditions:
12 VDC Proportional Coil
Pressure on priority flow channel: 100 bar
No pressure on the residual flow channel:
Minimum current: 0 Amp. -Maximum current: 2.3 Amp.
Inlet flow: 56 l/min
Ramp UP: 0 sec - Ramp DOWN: 0 sec
Oil temp: 50° C - Oil viscosity: 32 mm2/s at 40° C

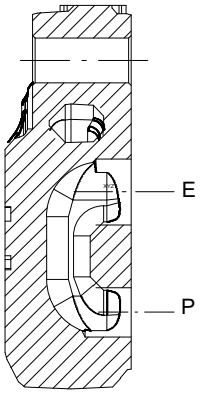
(* frequence could affect the valve seal)
(**code without connector)

8C.11 End cover for K100 and T100

8C.11.1 Right cover

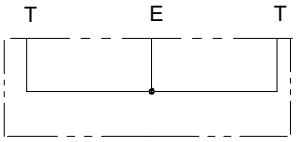
Type	Code
PN42	200630290331

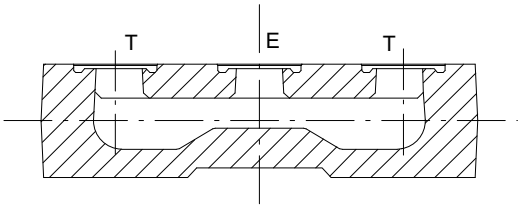




8C.11.2 Standard left cover

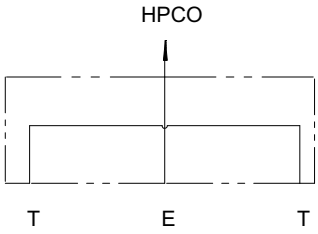
Type	Code
PF31	200730090040

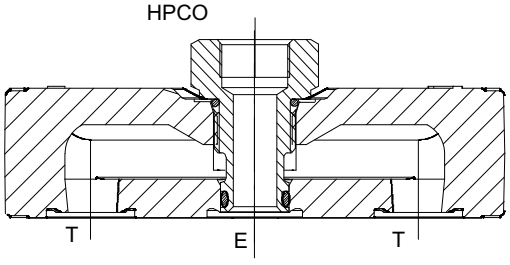




8C.11.3 Carry-over left cover

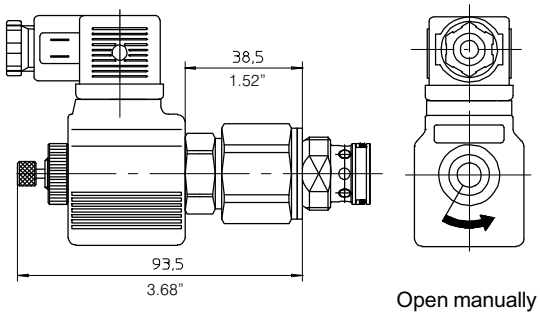
∅ D	Type	Code
3/8” BSP	**P37**	200930020150
M18X1.5	**P38**	200930010050

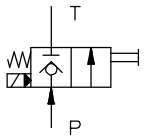




8C.12 By-Pass solenoid valve - BP3 -

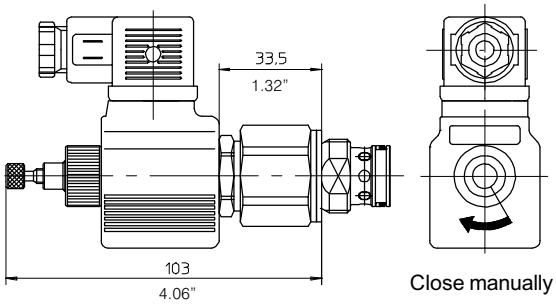
8C.12.1 Normally closed with manual override

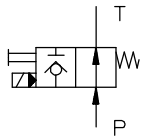




Voltage	Type	Code
without coil	**BP3/CE HDS11PQ p.m.**	200757200480
12 V. D.C.	**BP3/CE 13-HC27 HDS11PQ**	200957010074
24 V. D.C.	**BP3/CE 23-HC27 HDS11PQ**	200957020071

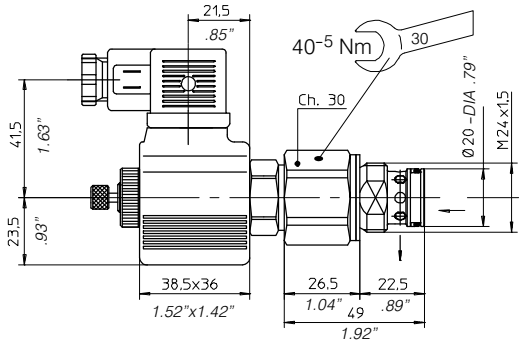
8C.12.2 Normally open with manual override





Voltage	Type	Code
without coil	**BP3/AE HDS11PQ p.m.**	200757200490
12 V. D.C.	**BP3/AE 13-HC27 HDS11PQ**	200957010083
24 V. D.C.	**BP3/AE 23-HC27 HDS11PQ**	200957020072

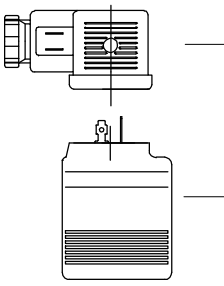
8C.12.3 Dimension



8C.12.4 BP3 Solenoid valve performances

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

8C.12.5 Spare parts



200544110009

200674910100 12 V. D.C.
200674920080 24 V. D.C.

8C.12.6 Coil specifications

Voltage	12	24	V. D.C.
Power	27.2	27	Watt
Resistance (Ambient Temp.)	5.3	21.3	Ohm
Resistance (Stabilized Temp.)	8	32	Ohm
Current (Ambient Temp.)	2.2	1.12	Ampere
Current (Stabilized Temp.)	1.5	0.75	Ampere

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Classification: 430.300.000