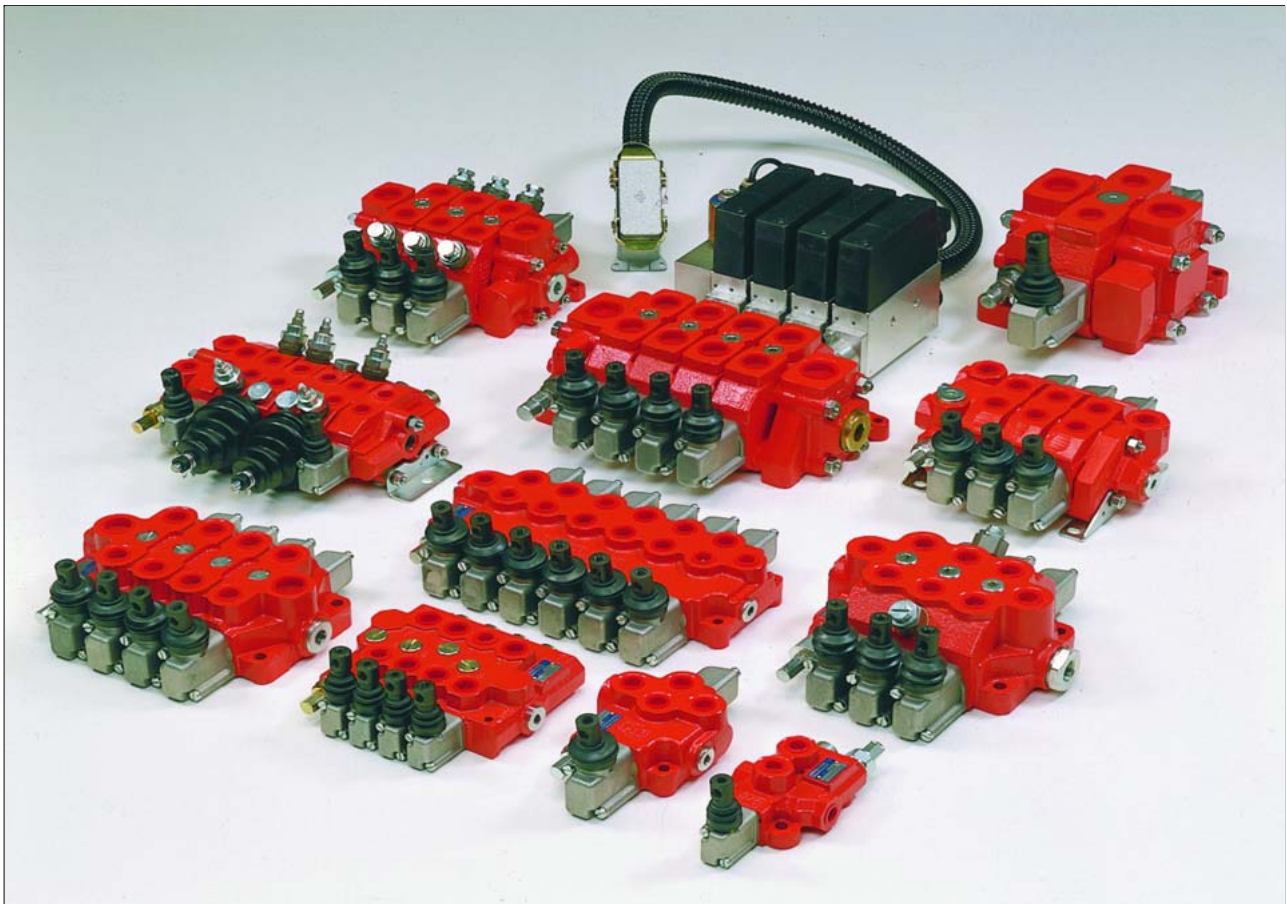


## Monobloc and Sectional Directional Control Valves



motion and progress

**8 Sectional directional control valves HDS11**

**8A Standard valves** ..... p.101



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## 8A Standard valves

### 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 <sup>2</sup> /s	16 to 75
Oil filtration	μ	≤ 30

Spool leakage at 100 bar (1450 PSI), Temp. 50° C (120° F), viscosity 27 mm <sup>2</sup> /s:		
Maximum	cm <sup>3</sup> /min Cu. In./min	12 0.854
Average	cm <sup>3</sup> /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	0.65	1.43
End cover with T and H.P.C.O.	0.75	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.

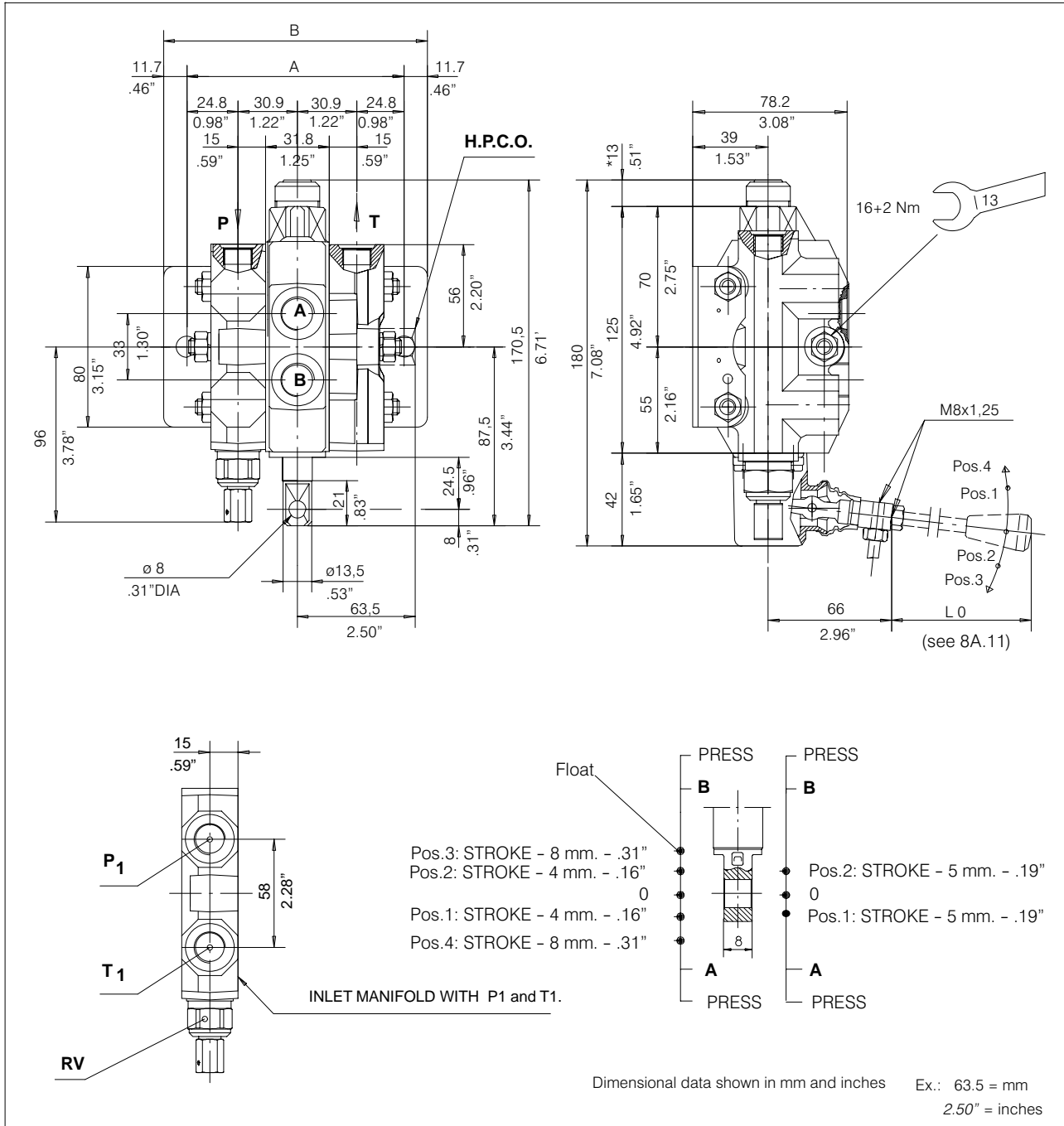
#### 8A.1.4 Optional features available:

- 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<sub>1</sub>T<sub>1</sub>**: top inlet and outlet  
 3.1.0.2: spool position  
**P**: pressure line  
**T**: exhaust line  
**E**: centre line (by pass).

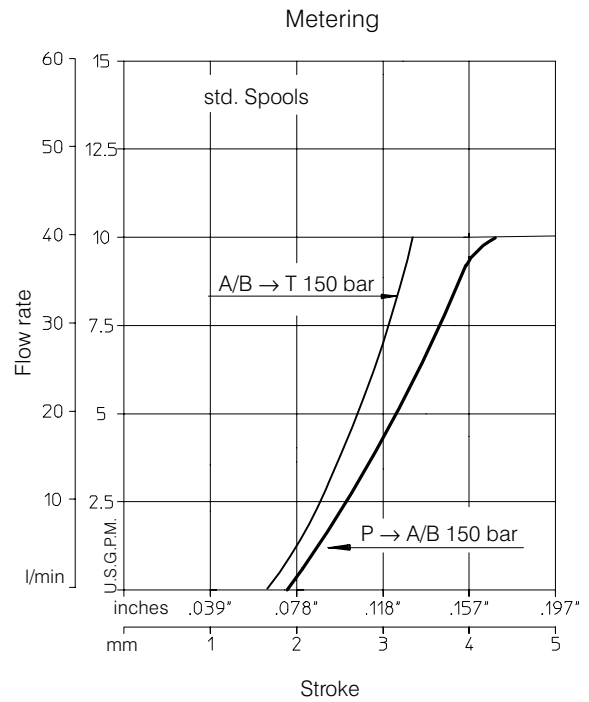
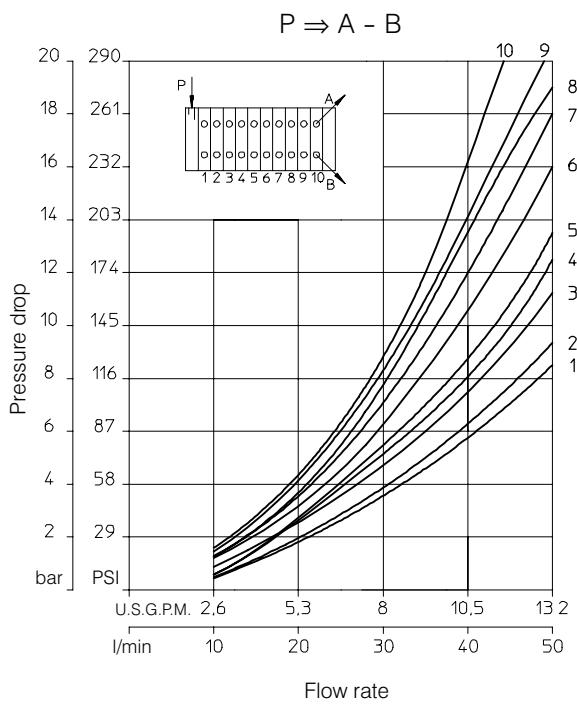
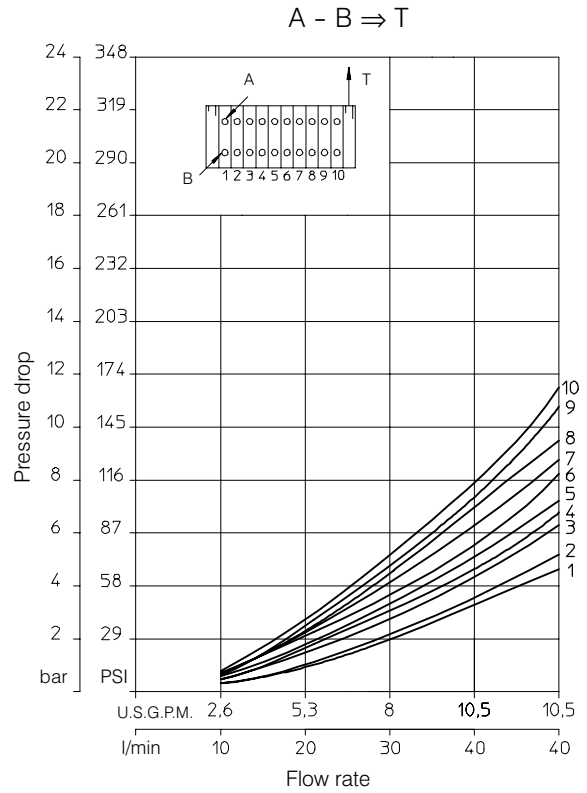
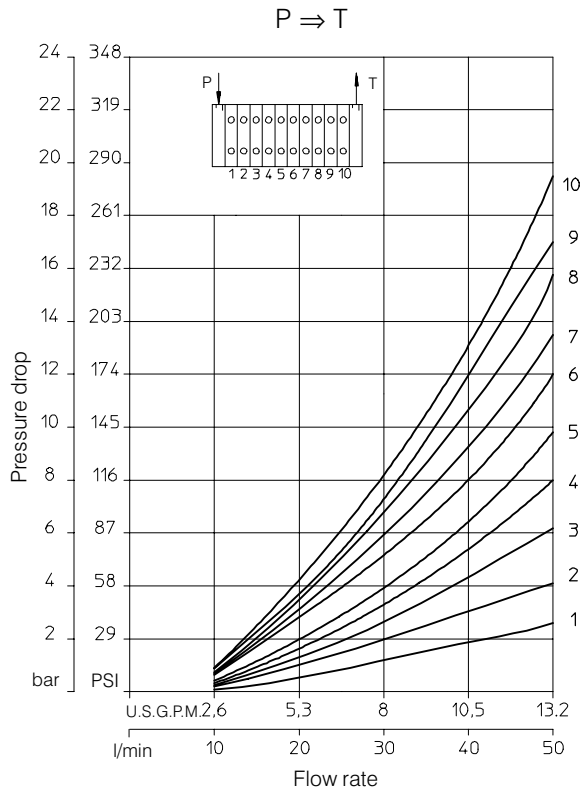
8A.2 Dimensional data



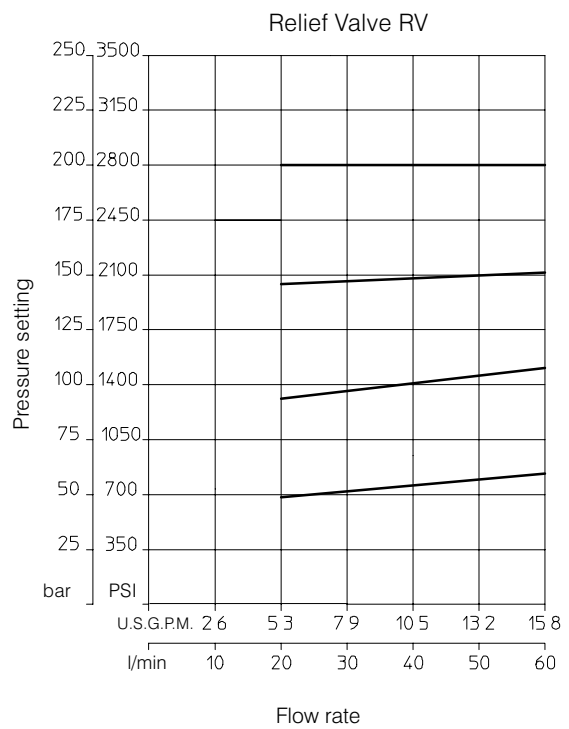
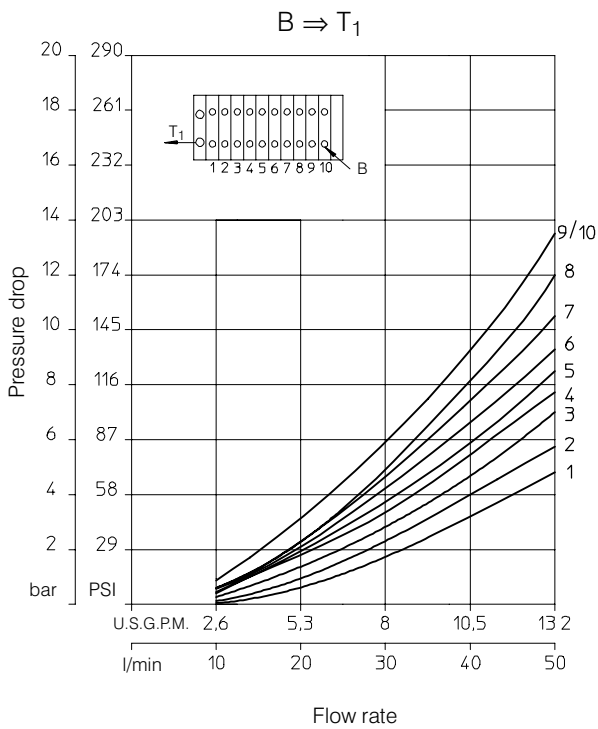
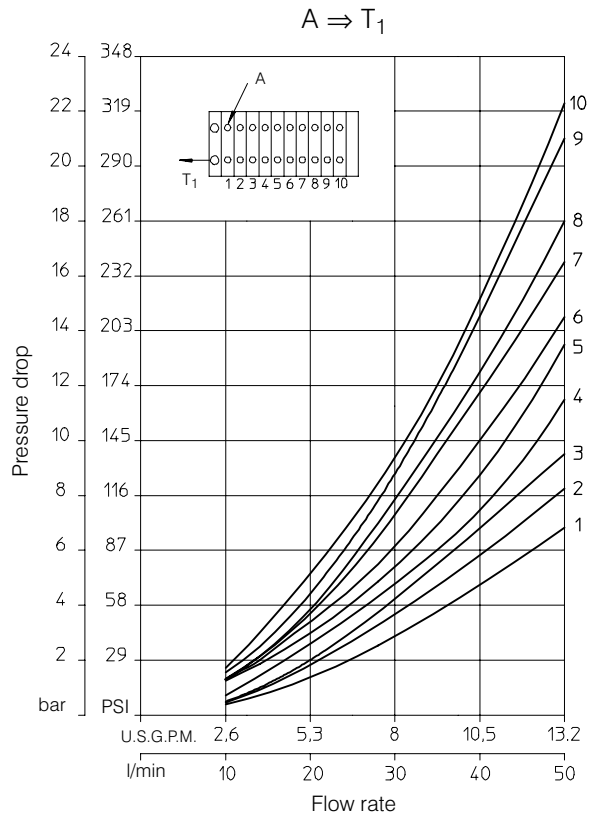
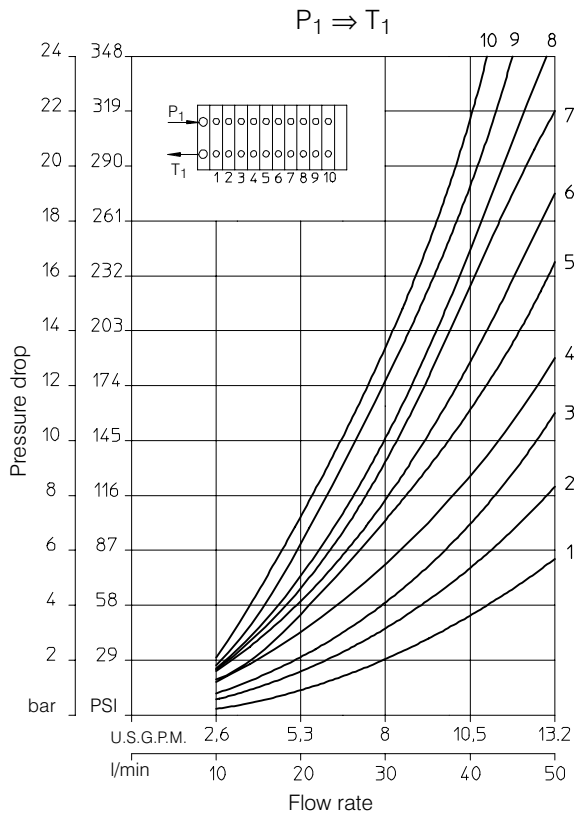
N. of sections		1	2	3	4	5	6	7	8	9	10
Dimension	A	111.4	143.2	175	206.8	238.6	270.4	302.2	334	365.8	397.6
		4.38"	5.64"	6.89"	8.14"	9.39"	10.64"	11.90"	13.15"	14.40"	15.65"
Dimension	B	134.8	166.6	198.4	230.2	262	293.8	325.6	357.4	389.2	421
		5.31"	6.56"	7.81"	9.06"	10.31"	11.57"	12.82"	14.07"	15.32"	16.57"

8A.3 Performance curves

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

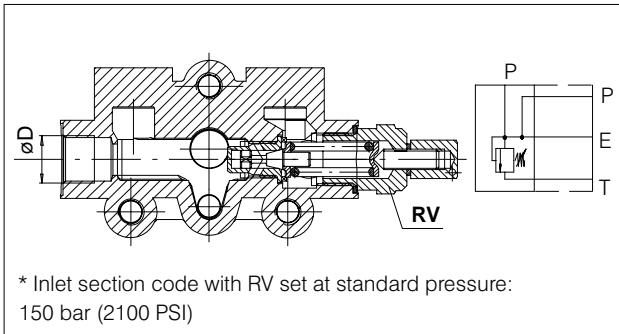


Oil: Shell Tellus T37  
 Temperature: 50° C (120° F)  
 Viscosity: 27 mm<sup>2</sup>/s



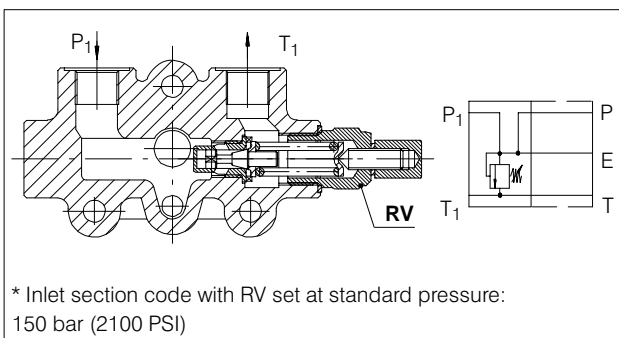
### 8A.4 Inlet and outlet covers

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



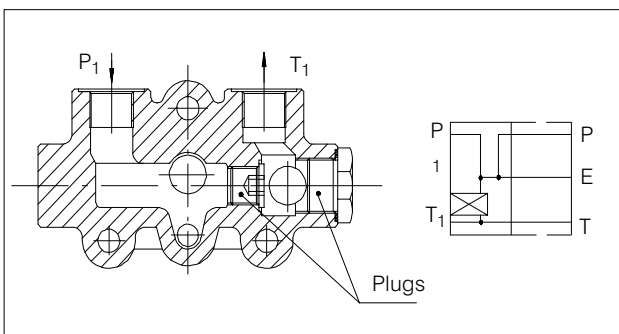
Ø D	Type	Code
SAE6	<b>T06</b>	* 200.9310.6002.0
SAE8	<b>T07</b>	* 200.9310.7003.0
3/8" BSP	<b>T09</b>	* 200.9310.2002.0
M18X1.5	<b>T10</b>	* 200.9310.1003.0

#### 8A.4.2 Inlet manifold with P<sub>1</sub> – T<sub>1</sub> – RV



Ø D	Type	Code
SAE6	<b>T11</b>	* 200.9310.6003.0
SAE8	<b>T12</b>	* 200.9310.7002.0
3/8" BSP	<b>T14</b>	* 200.9310.2003.0
M18X1.5	<b>T15</b>	* 200.9310.1002.0

#### 8A.4.3 Inlet manifold with P<sub>1</sub> – T<sub>1</sub>



Ø D	Type	Code
SAE6	<b>T16</b>	200.9310.6004.0
SAE8	<b>T17</b>	200.9310.7005.0
3/8" BSP	<b>T19</b>	200.9310.2004.0
M18X1.5	<b>T20</b>	200.9310.1004.0

### 8A.5 Adjustable direct acting pressure Relief Valve RV

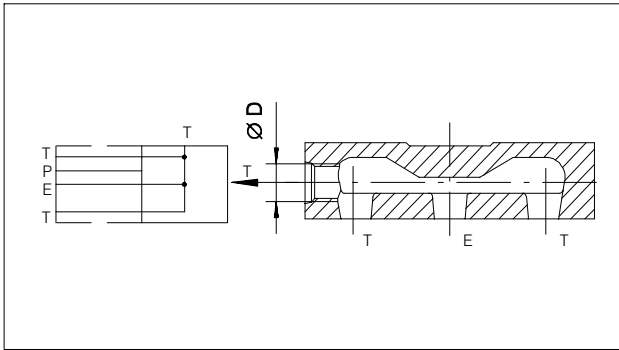
Relief valve set at 30 l/min (8 U.S.G.P.M.)

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



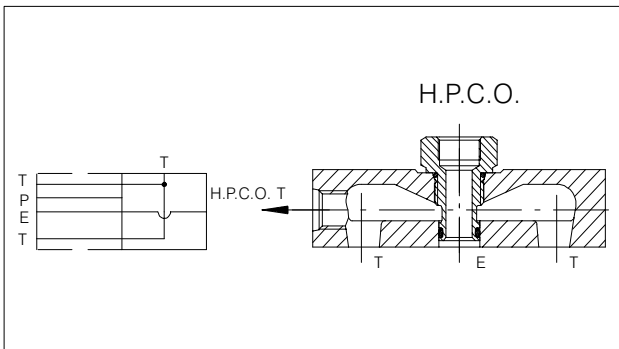
**8A.6 End covers**

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



Ø D	Type	Code
SAE6	<b>P01</b>	200.6300.6001.1
SAE8	<b>P02</b>	200.6300.7001.0
3/8" BSP	<b>P04</b>	200.6300.2001.1
M18X1.5	<b>P05</b>	200.6300.1001.0

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



Ø D	Type	Code
SAE6	<b>P06</b>	200.9300.6002.0
SAE8	<b>P07</b>	200.9300.7002.0
3/8" BSP	<b>P09</b>	200.9300.2002.0
M18X1.5	<b>P10</b>	200.9300.1002.0

**8A.6.3 Outlet manifold with open center**

Type	Code*
<b>P11</b>	200.6300.9001.0

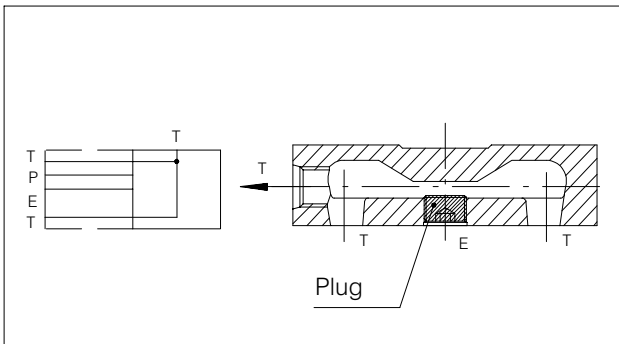
To be used with P1 and T1 on the inlet manifold

**8A.6.4 Outlet manifold with closed center**

Type	Code*
<b>P12</b>	200.9300.9002.0

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	<b>P13</b>	200.9300.6003.0
SAE8	<b>P14</b>	200.9300.7003.0
3/8" BSP	<b>P16</b>	200.9300.2003.0
M18X1.5	<b>P17</b>	200.9300.1003.0



**8A.7 Sectional bodies**

**8A.7.1 Standard circuit: parallel**

Ø D	Type/Code	
	Standard	Section with valve UC - OA - C
SAE6	<b>K01</b> 200.9413.6051.0	<b>K06</b> 200.9413.6053.0
SAE8	<b>K02</b> 200.9413.7027.0	<b>K07</b> 200.9413.7028.0
3/8" BSP	<b>K04</b> 200.9413.2624.0	<b>K09</b> 200.9413.2625.0
M18X1.5	<b>K05</b> 200.9413.1272.0	<b>K10</b> 200.9413.1273.0

cyl. A  
cyl. B

**8A.7.2 Optional circuit: series and tandem**

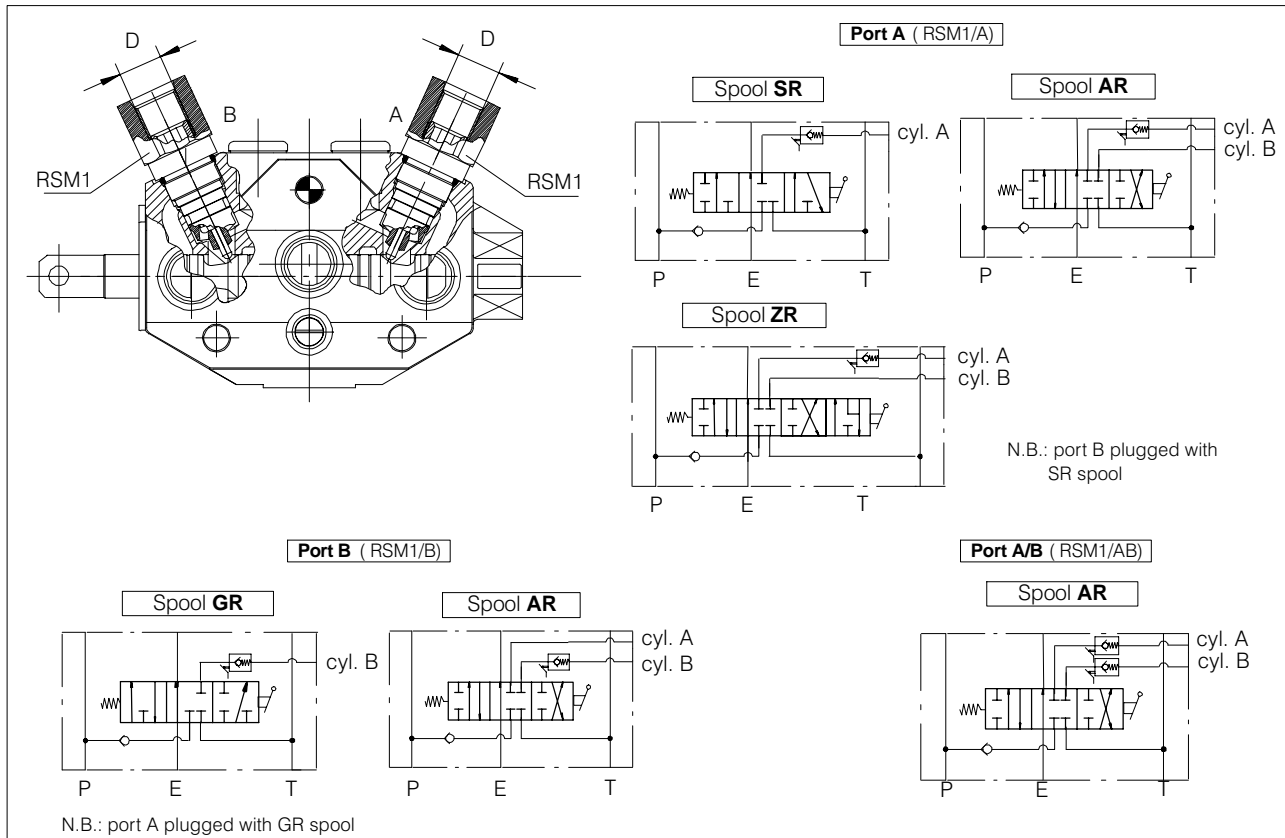
Ø D	Type/Code	
	Standard	Section with valve UC - OA - C
SAE6	<b>K47</b> 200.9413.6052.0	<b>K52</b> 200.9413.6054.0
SAE8	<b>K48</b> 200.9413.7029.0	<b>K53</b> 200.9413.7030.0
3/8" BSP	<b>K50</b> 200.9413.2626.0	<b>K55</b> 200.9413.2627.0
M18X1.5	<b>K51</b> 200.9413.1274.0	<b>K56</b> 200.9413.1275.0

cyl. A  
cyl. B

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

∅ 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	<b>K65</b> 200.9413.6061.0	—	<b>K66*</b> 200.9413.6062.0	<b>K62*</b> 200.9413.9014.0	200.7876.0192.0
3/8" BSP	<b>K63</b> 200.9413.2034.0	<b>K40**</b> 200.9413.2033.0	<b>K64*</b> 200.9413.2035.0		200.7876.0191.0
M18X1.5	<b>K60</b> 200.9413.1279.0	<b>K70**</b> 200.9413.1046.0	<b>K61*</b> 200.9413.1280.0		200.7876.0190.0

\* : 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

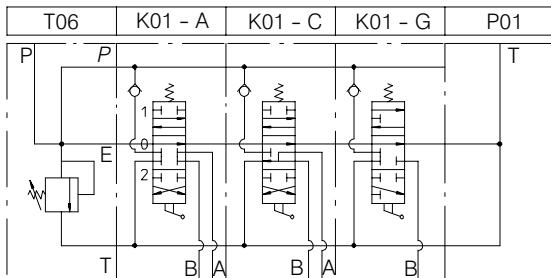
Spool scheme	Spool features	Type
	4 way - 3 position A/B closed E open by pass	<b>A</b> <b>AR**</b>
	High metering spool (max flow suggested 15 l/min.)	<b>AS</b>
	4 way - 3 position A/B-E closed	<b>B</b>
	4 way - 3 position A/B to tank in neutral E open by pass	<b>C</b>
	3 way - 3 position B closed E open by pass	<b>G</b> <b>GR**</b>

	3 way - 3 position A closed E open by pass	<b>S</b> <b>SR**</b>
	4 way - 3 position series connection	<b>X</b>
	4 way - 4 position 4 <sup>th</sup> floating position	<b>Z</b> <b>ZR**</b>
	4 way - 4 position 4 <sup>th</sup> floating position	<b>WW</b> *

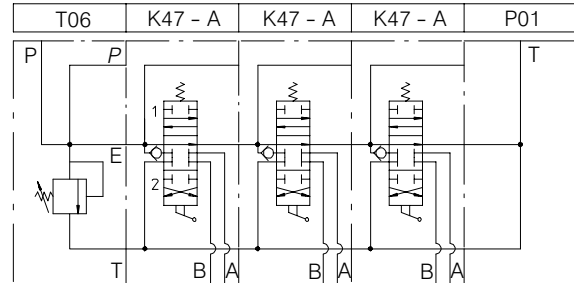
\* : "WW" spool require special body (K...), positioner (240) and lever (L192)  
\*\* : special body required

### 8A.9 Hydraulic circuits

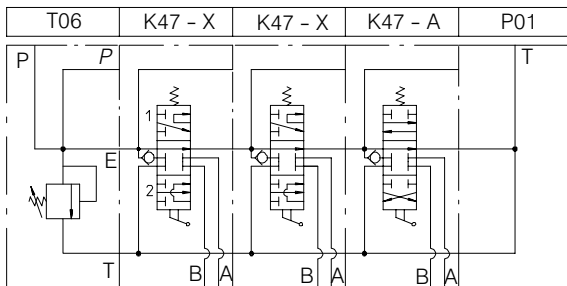
Standard parallel circuit



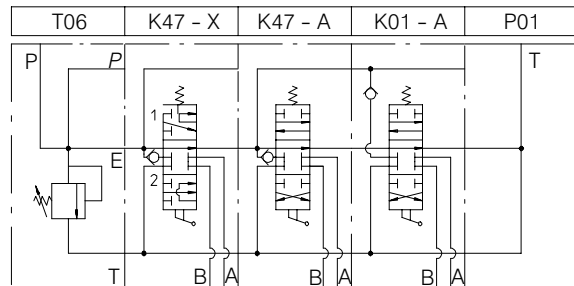
Optional tandem circuit



Optional series circuit



Combined parallel/series circuit



### 8A.10 Spool positioners

F (N)	Type	Code*
200	<b>01</b> STD	200.7685.1001.0
140	<b>79</b>	200.7685.1092.0

3 position spring return to neutral

Type	Code*
<b>02</b>	200.7685.3001.0

2 position detent - spring centre

\* : code without plastic plug; plastic plug code: 200.6780.0008.0

Code F (N)\*\*: force in Newton (N) needed to operate the spool

Type <b>03</b>	Code* 200.7685.2001.0
-------------------	--------------------------

3 position detent

Type <b>04</b>	Code 200.7685.4003.0
-------------------	-------------------------

4 position float

Plastic plug code: 200.6780.0009.0

Type <b>05</b>	Code* 200.7685.2005.0
-------------------	--------------------------

2 position detent

Type <b>06</b>	Code* 200.7685.1005.0
-------------------	--------------------------

2 position spring return

Type <b>07</b>	Code* 200.7685.2027.0
-------------------	--------------------------

2 position detent

Type <b>12</b>	Code* 200.7685.1021.0
-------------------	--------------------------

2 position spring return

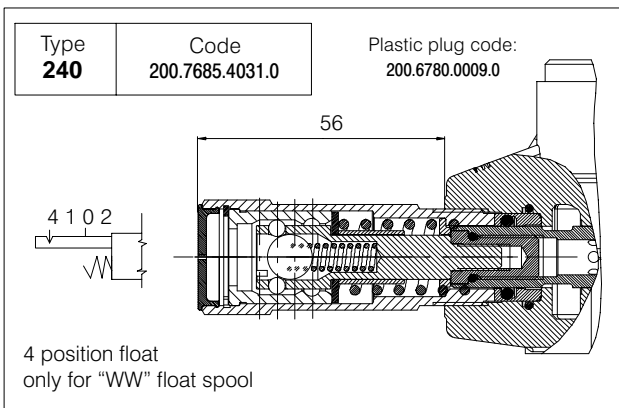
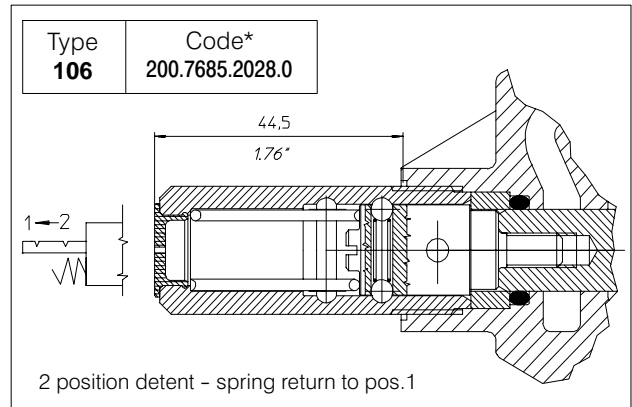
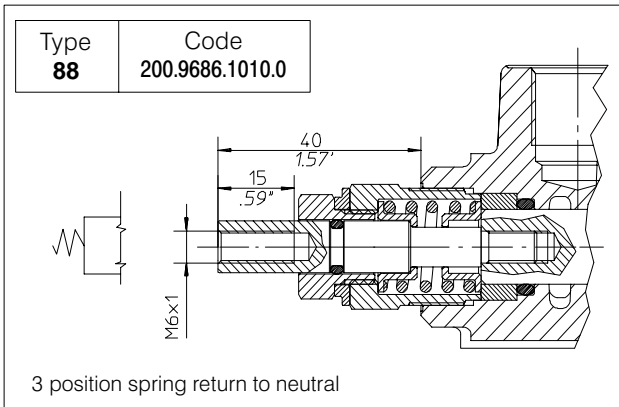
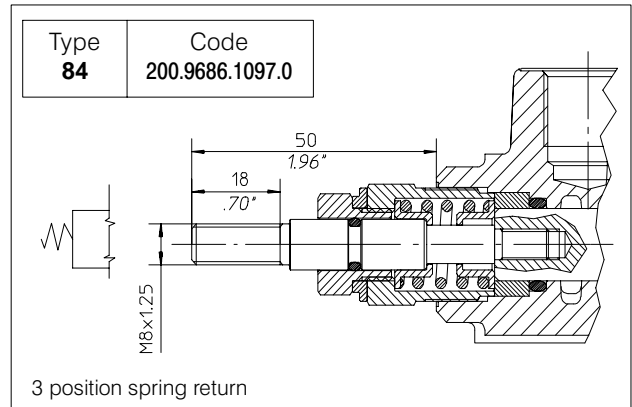
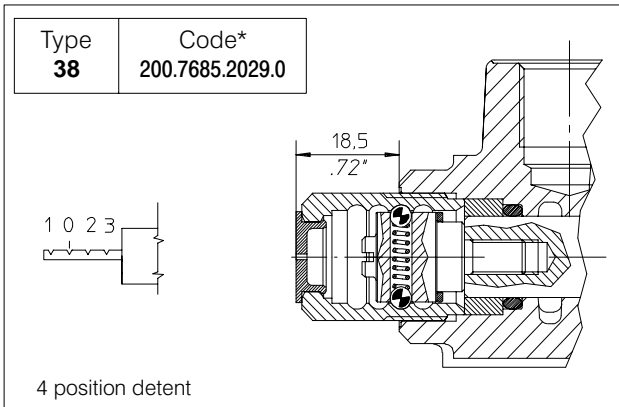
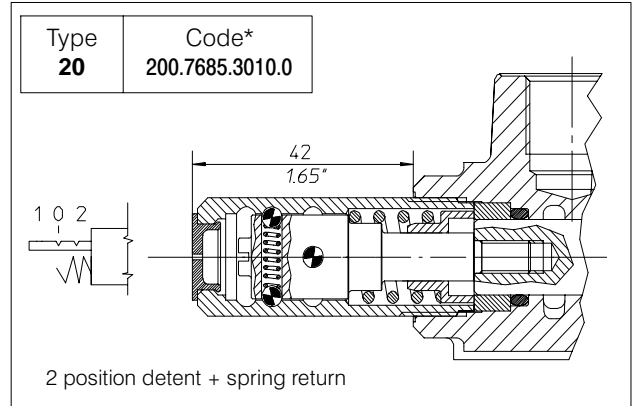
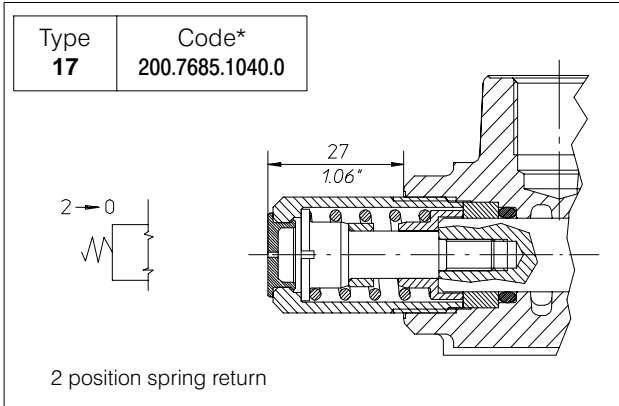
Type <b>15</b>	Code* 200.7685.1109.0
-------------------	--------------------------

2 position spring return

Type <b>16</b>	Code* 200.7685.1110.0
-------------------	--------------------------

2 position spring return

\* : code without plastic plug; plastic plug code: 200.6780.0008.0



\* : code without plastic plug; plastic plug code: 200.6780.0008.0

8A.10.1 Microswitch control on each single element

Type <b>30</b>	Code 200.9686.1050.0	Microswitch is operated when the spool is in pos. 1		
Type <b>32</b>	Code 200.9686.1060.0	Microswitch is operated when the spool is in pos. 2		
Type <b>34</b>	Code 200.9686.1064.0	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 1<sup>st</sup> up to second-last element).

Type <b>39 (MSF)</b>	Code 200.9686.1139.0			
-------------------------	-------------------------	--	--	--

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).

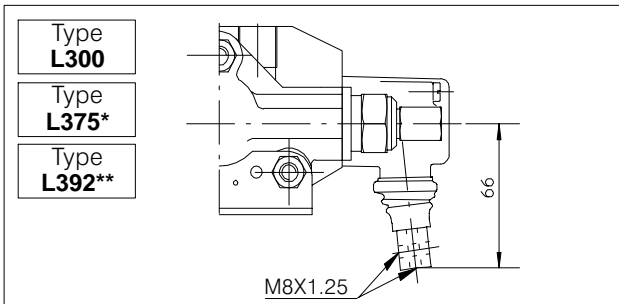
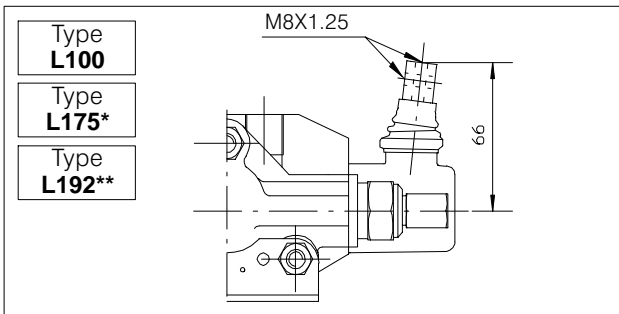
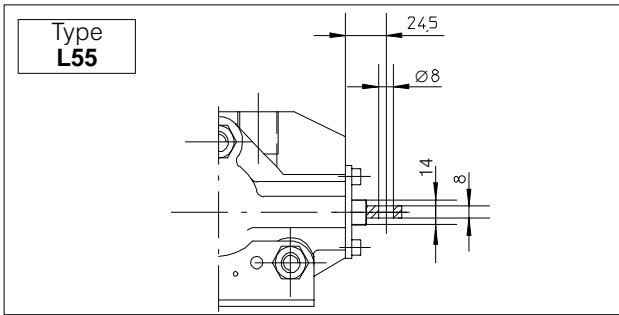
Type <b>40 (MFL)</b>	Code 200.9686.1140.0			
-------------------------	-------------------------	--	--	--

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

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

\* The microswitch is supplied only on customer's request

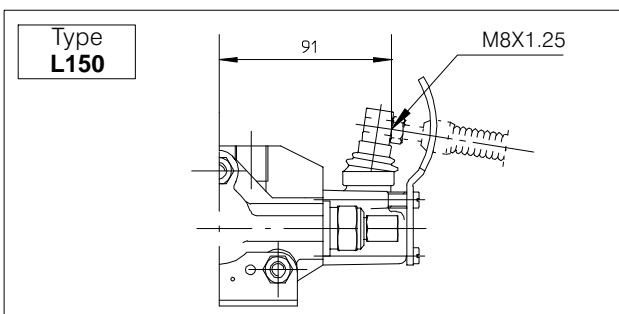
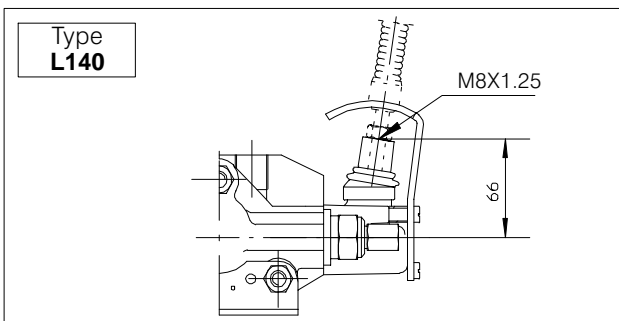
**8A.11 Lever styles**



Lo		Type	Code
mm	inches		
150	5.90	<b>AL001</b>	200.7022.1019.0
200	7.87	<b>AL002</b>	200.7022.1003.0
250	9.84	<b>AL003</b>	200.7022.1005.0
300	11.81	<b>AL004</b>	200.7022.1006.0

\*: L175 - L375 only for "Z" spool application  
 \*\*: L192 - L392 only for "WW" spool application

**8A.11.1 Safety levers**



Lo		Type	Code
mm	inches		
160	6.30	<b>AL014</b>	200.7022.1009.0
180	7.08	<b>AL018</b>	200.7022.1011.0



8A.11.2 Remote cable control

<b>Lever Support</b>	Code 200.7609.0013.0
----------------------	-------------------------

M10X1.5

Optional  
200.6772.0048.0

Lo		Type	Code
mm	inches		
185	7.28	<b>AL001</b>	200.7022.2001.0
250	9.84	<b>AL002</b>	200.7022.2003.0
300	11.81	<b>AL003</b>	200.7022.2004.0
350	13.78	<b>AL004</b>	200.7022.2005.0

M10X1.5

<b>Cable</b>	Cable length	Code
--------------	--------------	------

1000 mm	200.5441.04002
1500 mm	200.5441.04005
2000 mm	200.5441.04006
2500 mm	200.5441.04007
3000 mm	200.5441.04008
4000 mm	200.5441.04009

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

<b>Spool kit</b>	Code 200.9609.0037.0 200.9609.0039.0*
------------------	---

\* only for "Z" spool application

<b>Type L142</b>	Code 200.7071.2012.0
------------------	-------------------------

M10X1.5

122 4/8"

42 1/65"

MBx1.25

150 5.9"

35 1.38"

40 1.57"

68 2.68"

40 1.57"

9 .35"

Optional  
200.6772.0048.0

Only for rod remote control

<b>Type L133</b>	Code 200.9759.2007.0	<b>Type L188*</b>	Code 200.9759.2024.0
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View from X

Fulcrum

A<sub>1</sub> A<sub>2</sub> B<sub>1</sub> B<sub>2</sub>

Stick Lever (AL038) M10X1.5

View from X

Fulcrum

B<sub>1</sub> B<sub>2</sub> A<sub>1</sub> A<sub>2</sub>

Stick Lever M10X1.5

Fulcrum

<b>Type L134</b>	Code 200.9759.2007.0
<b>Type L189*</b>	Code 200.9759.2024.0

P 1 2 T

A A B B

X

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

<b>Type AL038</b>	Code 200.7022.2018.0
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Lo=200

M10X1.5

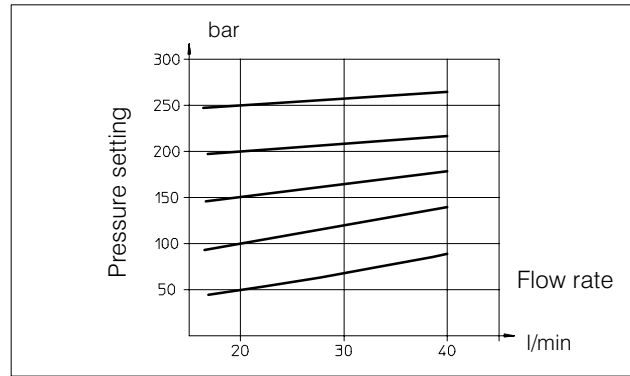
**8A.12 Port relief and anti-cavitation valves**

Port relief valve settings

Pressure set range bar (PSI)	Std. Setting bar (PSI)	Type	Spring colour
30 - 130 (400 - 1850)	60 (860)	<b>06</b>	Yellow (YE)
131 - 320 (1850 - 4600)	150 (2100)	<b>15</b>	Green (GR)

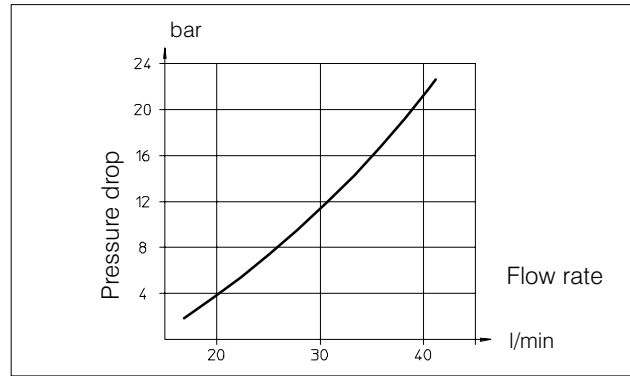
**8A.12.1 Port relief valve**

Type **OA**



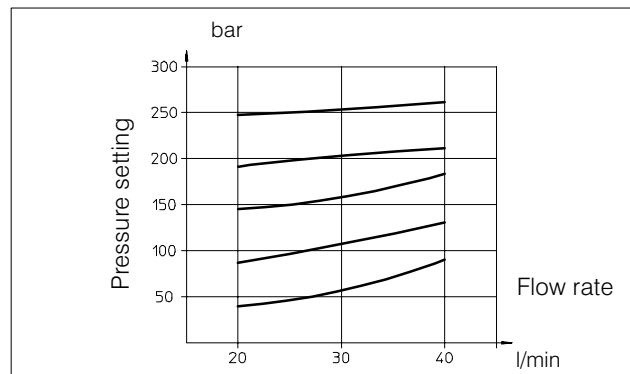
**8A.12.2 Anti-cavitation valve**

Type **C**



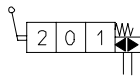
**8A.12.3 Combined port relief and anti-cavitation valve**

Type **UC**

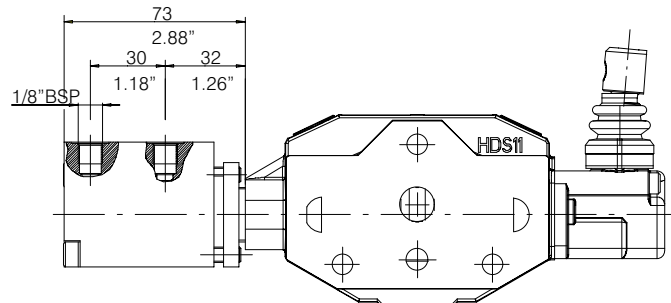


**8A.13 Hydraulic-Pneumatic control ON-OFF**

Type	Code
<b>HP 24</b>	200.9686.5049.0



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



## 8B Electromagnetic control EMC (ON-OFF)

### 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 <sup>2</sup> /sec	20 to 50
Oil filtration	μ	≤ 25

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

#### 8B.1.3 Ports

P-T-P<sub>1</sub>-T<sub>1</sub>-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) ± 10%
Power consumption	Watt (W)	29
Intensity of current	Ampere (A)	2.4 (1.4)
Resistance	Ohm (Ω)	5 (19.5)
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

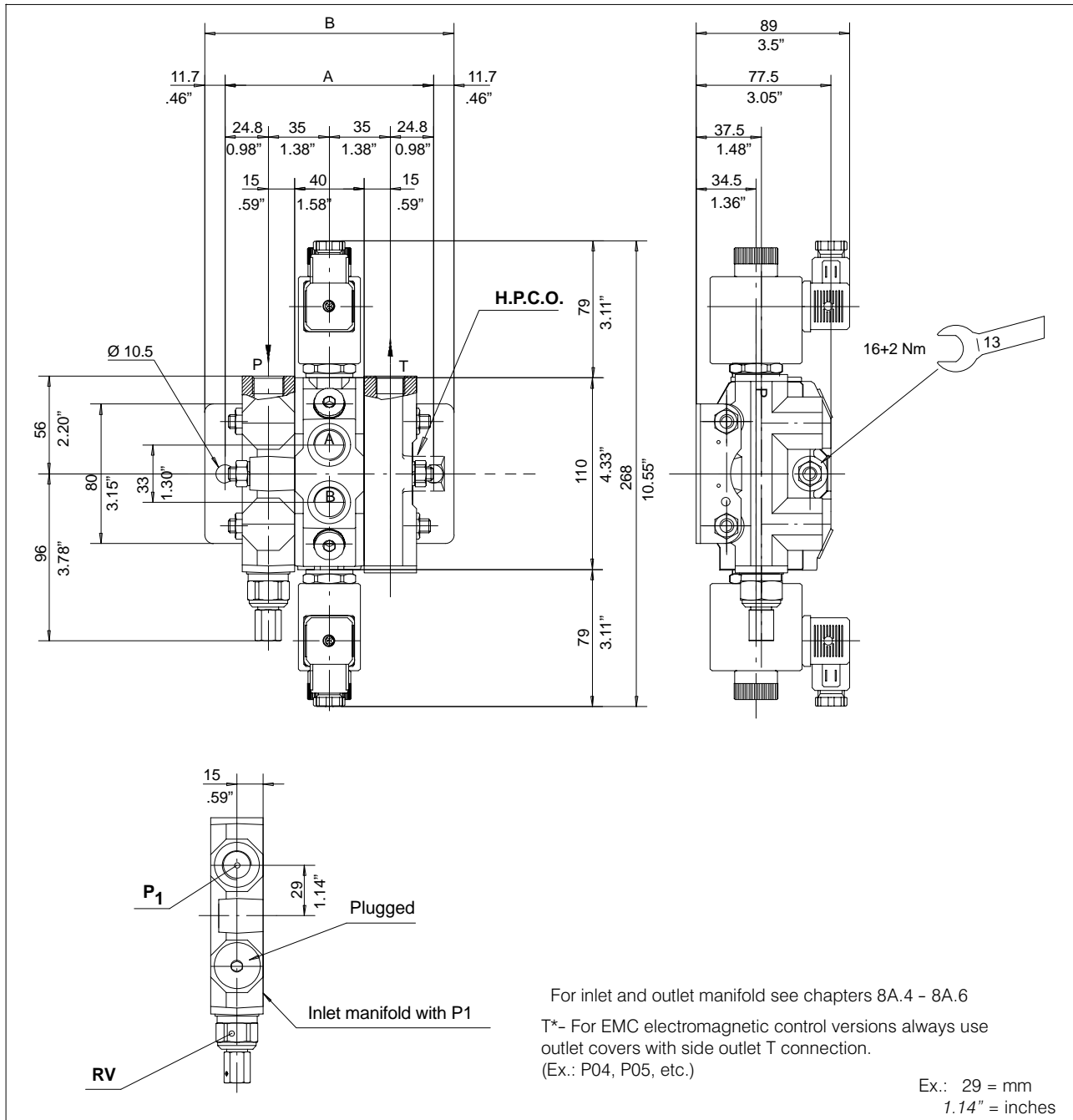
Spool diameter ..... 10 mm  
Spool stroke ..... 2.50 mm  
Overlapping ..... 1.25 mm  
Internal passage ..... 10 mm  
Dimensional section (width) ..... 40 mm

#### 8B.1.7 Weight

Version	kg	lb
Inlet with RV and P	1.0	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	0.75	1.65

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

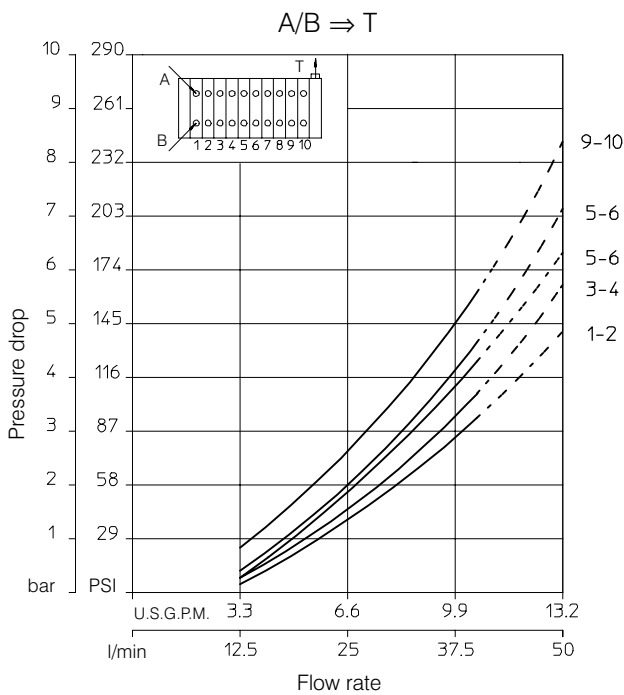
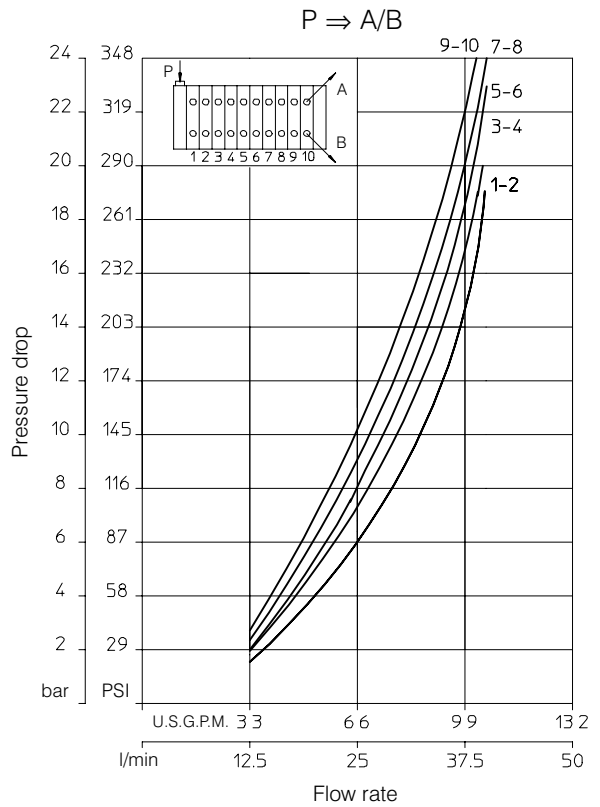
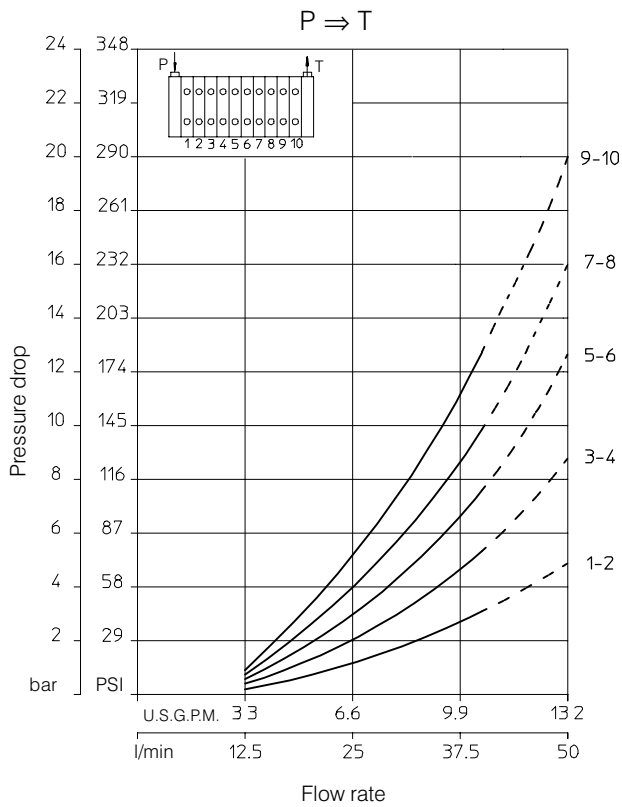
8B.2 Dimensional data



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"	11.01"	12.58"	14.16"	15.73"	17.31"	18.88"
Dimension	B	143	183	223	263	303	343	383	423	463	503
		5.63"	7.20"	8.78"	10.35"	11.93"	13.50"	15.08"	16.65"	18.23"	19.80"

**8B.3 Performance curves**

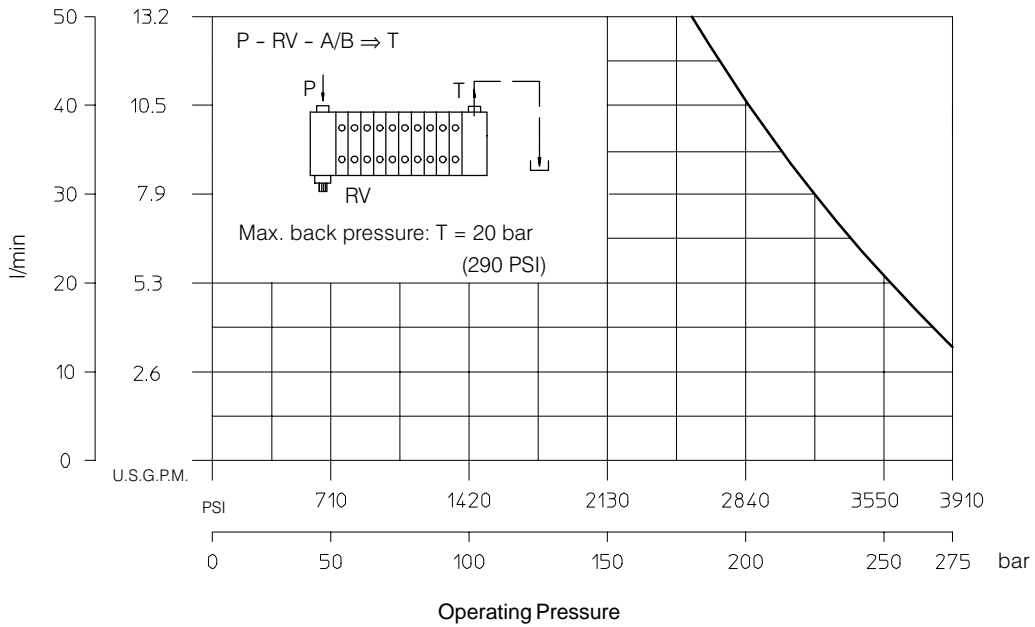
Oil: Shell Tellus T37  
 Temperature: 50°C (120°F)  
 Viscosity: 27 mm<sup>2</sup>/sec



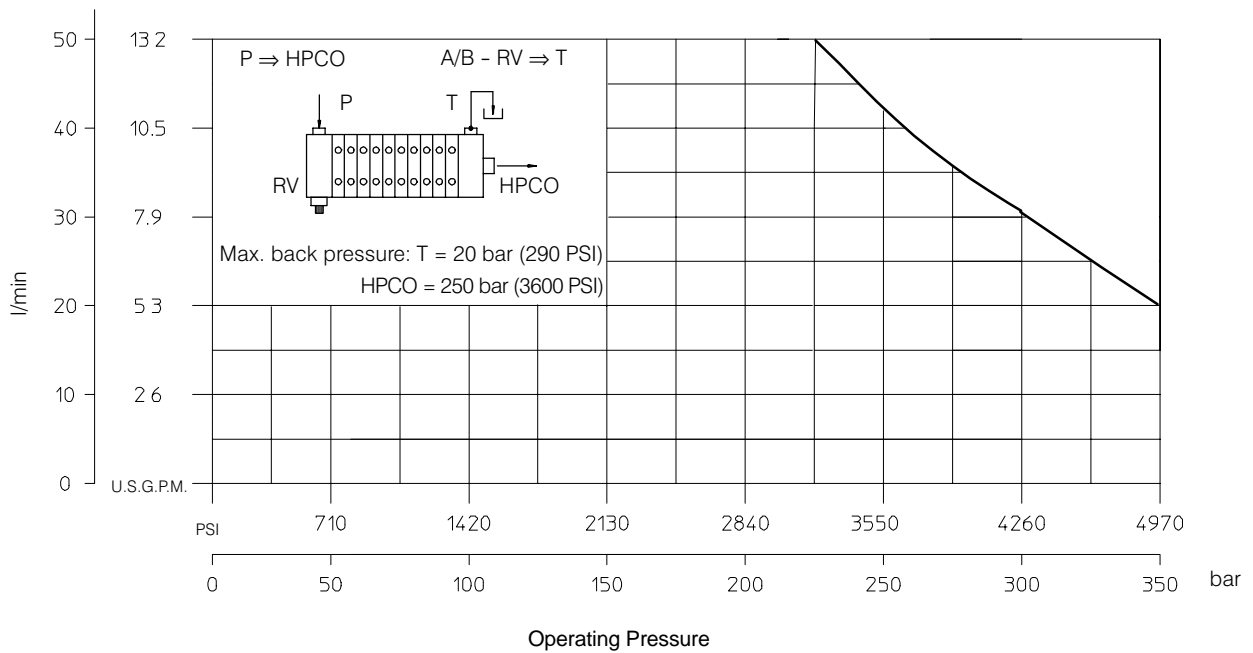
**8B.4 Operating limits**

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

**Standard Circuit**



**Carry-over Circuit**





**8B.5 Sectional bodies**

**8B.5.1 Standard circuit: parallel**

Ø D	Type/Code	
	Standard	Section with valve UC- OA- C
SAE6	<b>K201</b> 200.9413.6055.0	<b>K211</b> 200.9413.6060.0
SAE8	<b>K202</b> 200.9413.7031.0	<b>K212</b> 200.9413.7032.0
3/8" BSP	<b>K204</b> 200.9413.2628.0	<b>K214</b> 200.9413.2629.0
M18X1.5	<b>K205</b> 200.9413.1276.0	<b>K215</b> 200.9413.1277.0

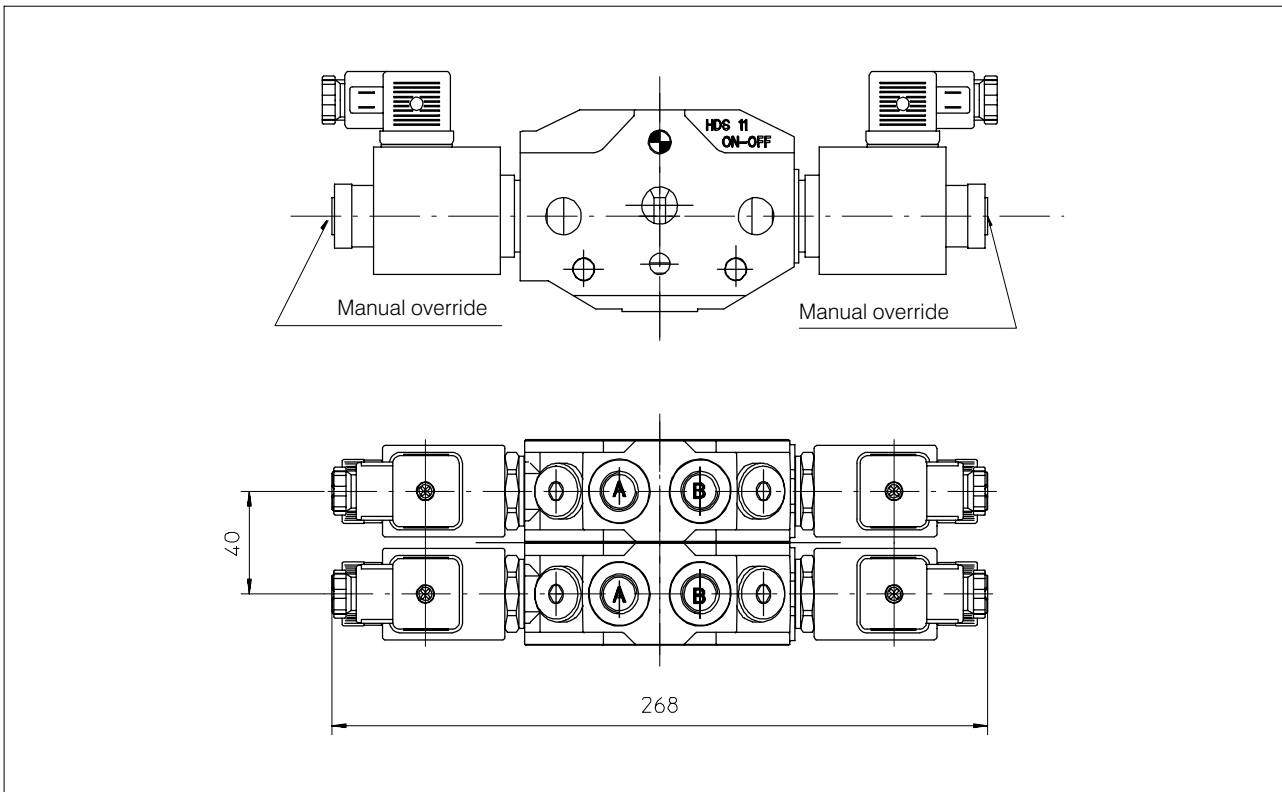
cyl. A  
cyl. B

**8B.5.2 Optional circuit: series and tandem**

Ø D	Type/Code	
	Standard	Section with valve UC- OA- C
SAE6	<b>K247</b> 200.9413.6066.0	<b>K252</b> 200.9413.6070.0
SAE8	<b>K248</b> 200.9413.7039.0	<b>K253</b> 200.9413.7042.0
3/8" BSP	<b>K250</b> 200.9413.2042.0	<b>K255</b> 200.9413.2036.0
M18X1.5	<b>K251</b> 200.9413.1034.0	<b>K256</b> 200.9413.1037.0

cyl. A  
cyl. B

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



**8B.6 Spool charts**

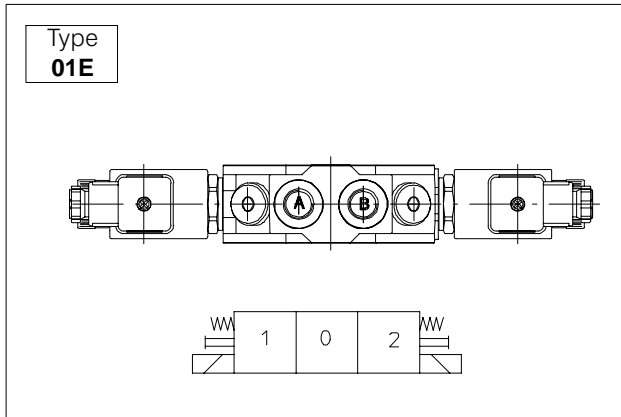
Spool scheme	Spool features	Type
	4 way - 3 position A/B closed E open by pass	<b>AE</b>
	4 way - 3 position A/B-E closed	<b>BE</b>
	4 way - 3 position A/B to tank in neutral E open by pass	<b>CE</b>
	4 way - 3 position A closed B to tank in neutral	<b>DE</b>
	3 way - 3 position B closed E open by pass	<b>GE</b>
	4 way - 3 position B closed A to tank in neutral	<b>LE</b>
	3 way - 3 position A closed E open by pass	<b>SE</b>

	4 way - 3 position A/B closed series connection	<b>XE*</b>
	4 way - 3 position A/B to tank in neutral series connection	<b>XCE*</b>
	4 way - 3 position A/B closed Load Sensing	<b>LAE**</b>
	4 way - 3 position A/B to tank in neutral Load Sensing	<b>LCE**</b>
	3 way - 3 position B closed Load Sensing	<b>LGE**</b>
	3 way - 3 position A closed Load Sensing	<b>LSE**</b>
* series body required ** special body required		

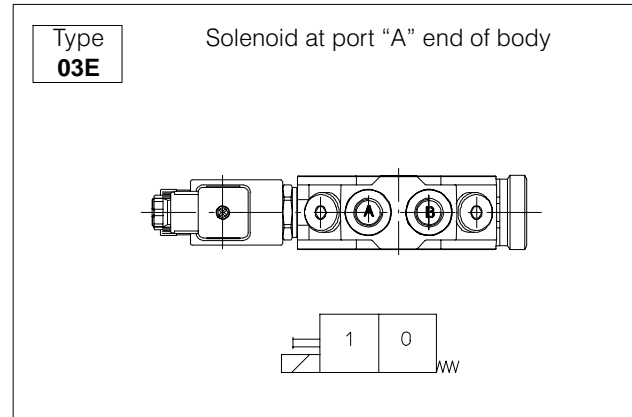
Note: For availability of L/S versions please contact our Sales Department

**8B.7 Spool actions**

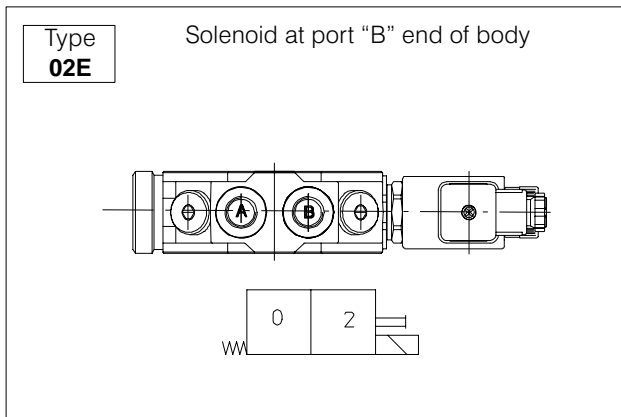
**8B.7.1 Double-Solenoid spring-centered valves**



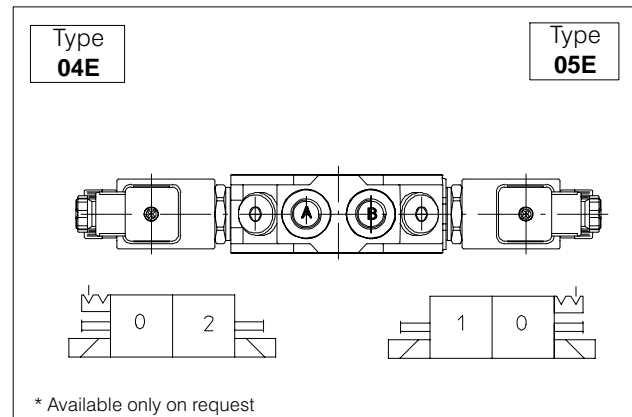
**8B.7.3 Single Solenoid spring offset valves**



**8B.7.2 Single Solenoid spring offset valves**



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



\* Available only on request

**8B.8 4<sup>th</sup> Floating position**

**8B.8.1 Main features**

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

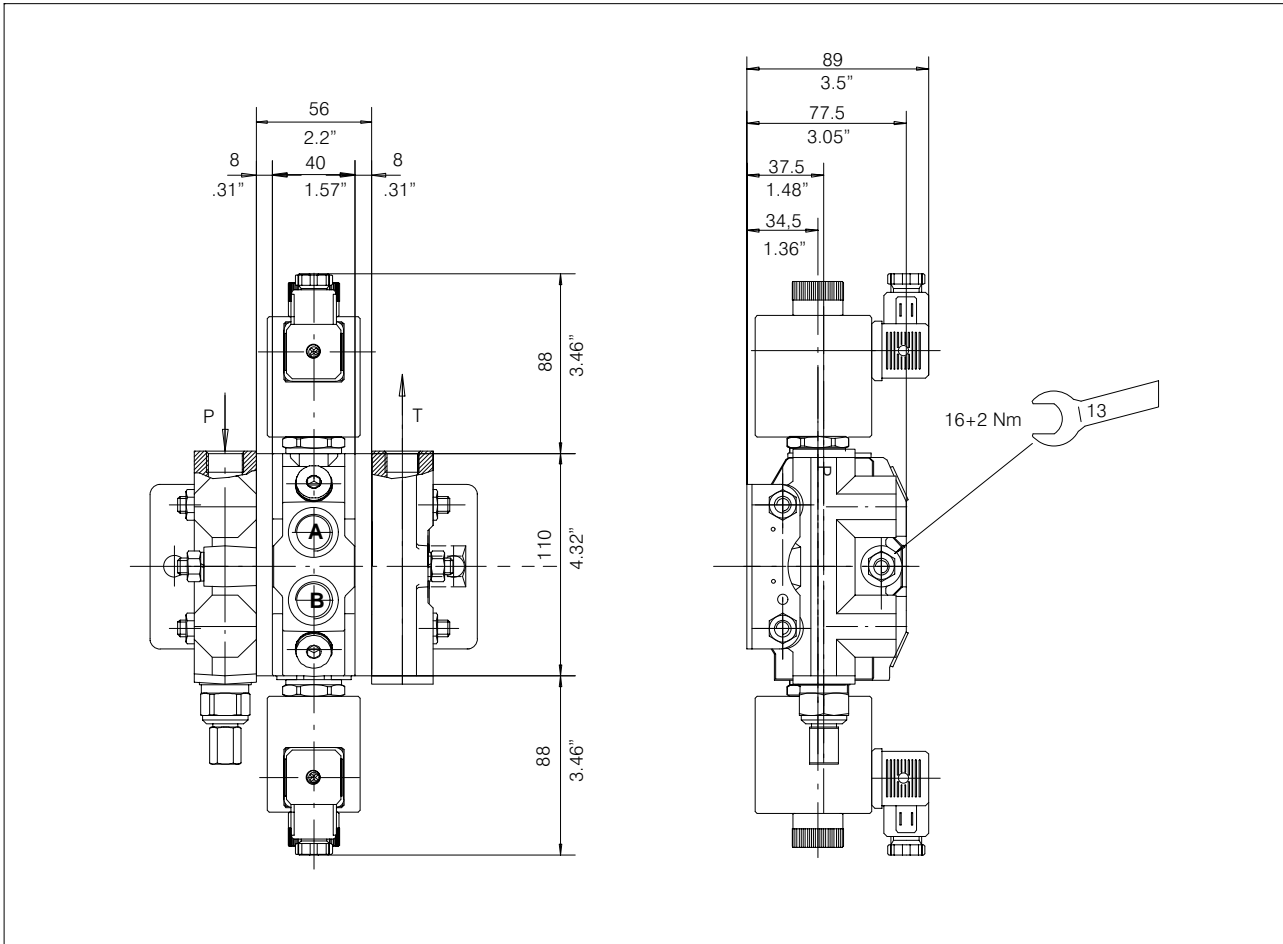
Average leakage: 30 cm<sup>3</sup>/min (100 bar, 50°C, 27 mm<sup>2</sup>s<sup>-1</sup>)  
 Solenoid power: ..... 48 Watt (12-24 Vdc)

**8B.8.2 General specification**

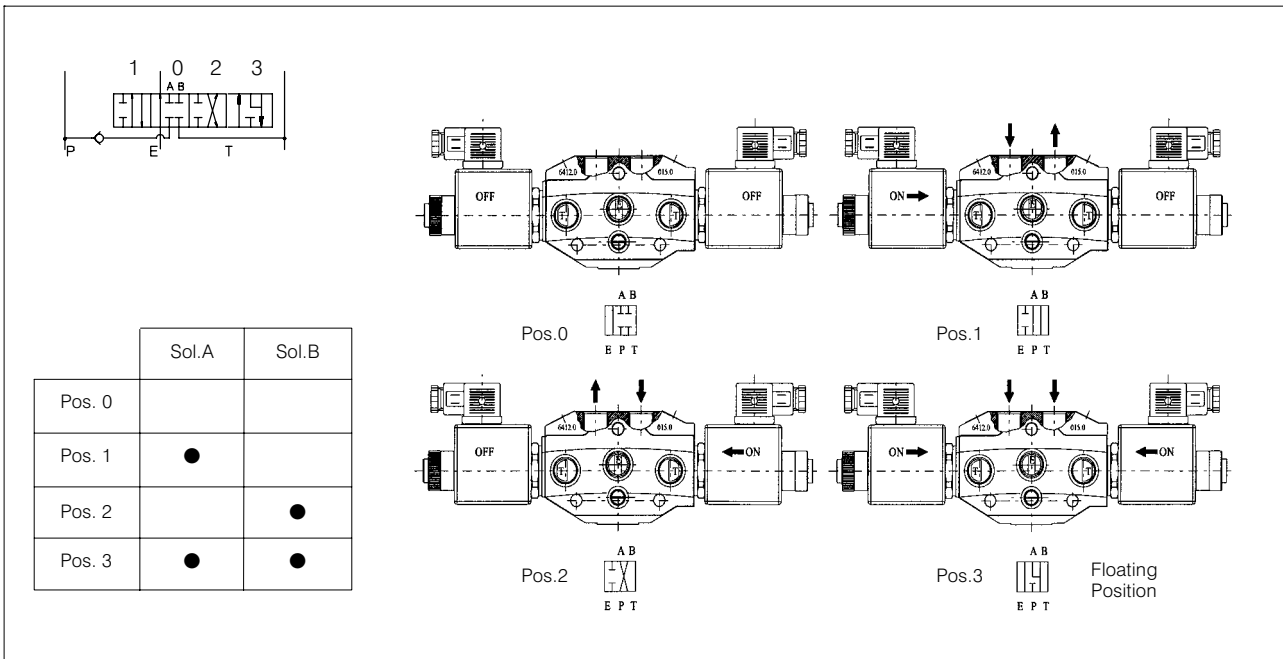
- Pressure drops with 35 lt/min:
- Pos 0
- P ⇒ T ..... 2 bar
- Pos 1 and 2
- P ⇒ A / P ⇒ B ..... 9 bar
- B ⇒ T / A ⇒ T ..... 5.5 bar
- Pos 3 (4<sup>th</sup> floating position)
- A ⇒ T / B ⇒ T ..... 12.5 bar
- Parallel circuit, electric operated
- Compatible for assembling on HDS11 valve series
- Intermediate 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 4<sup>th</sup> floating position as last section in the pack close to the "T" outlet cover.
- In the electric 4<sup>th</sup> 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 4<sup>th</sup> 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 4<sup>th</sup> floating position section.

8B.8.3 Dimensional data



8B.8.4 Hydraulic circuit

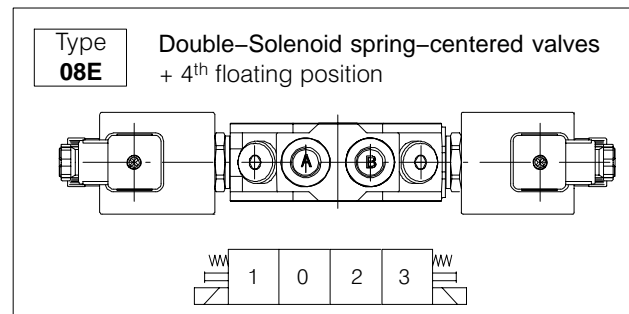


8B.8.5 Spool chart

Spool scheme	Spool features	Type
	4 way - 4 position 4 <sup>th</sup> floating electric position	<b>ZE*</b>

\* Special body required

8B.8.6 Spool action



8B.8.7 Sectional body and manifold

Ø D	Type/Code
	Standard
SAE6	<b>K225</b> 200.9413.6071.0
SAE8	<b>K226</b> 200.9413.7043.0
3/8" BSP	<b>K227</b> 200.9413.2633.0
M18X1.5	<b>K228</b> 200.9413.1289.0

H	Code
8 mm	200.7649.0035.0

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

8C Elements with pressure and flow control PQ

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<sup>2</sup>/sec  
 Recommended filtration ..... ≤ 25 micron

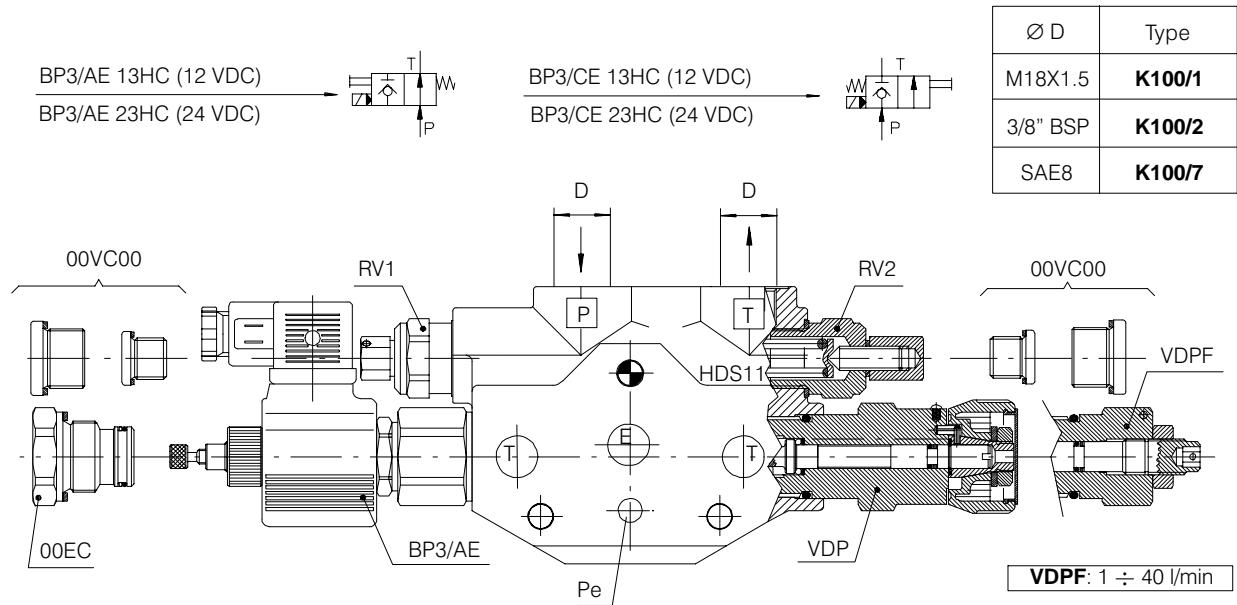
Adjustable direct acting:  
 Relief valve on the lines ..... Inlet flow: RV1  
 ..... Priority flow: RV2  
 ..... Residual flow: RV3

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

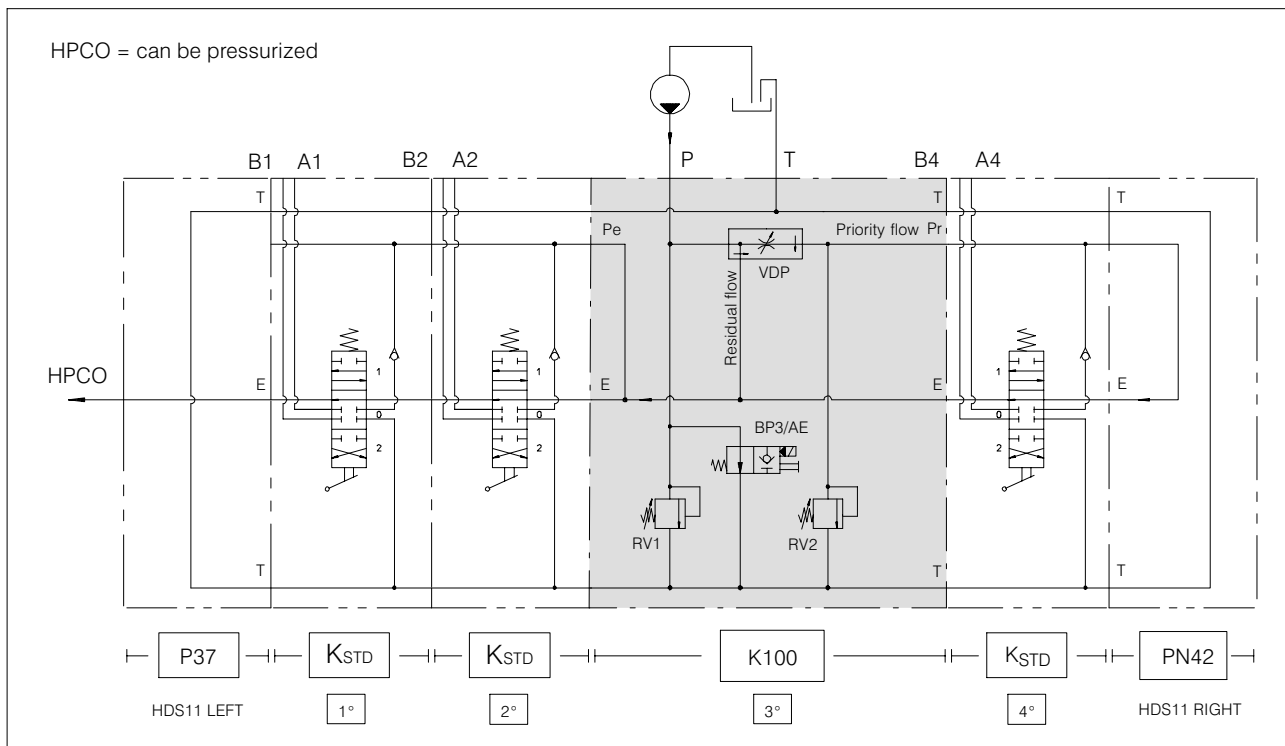
**8C.2 Sectional body K100**

**8C.2.1 Application variation**

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



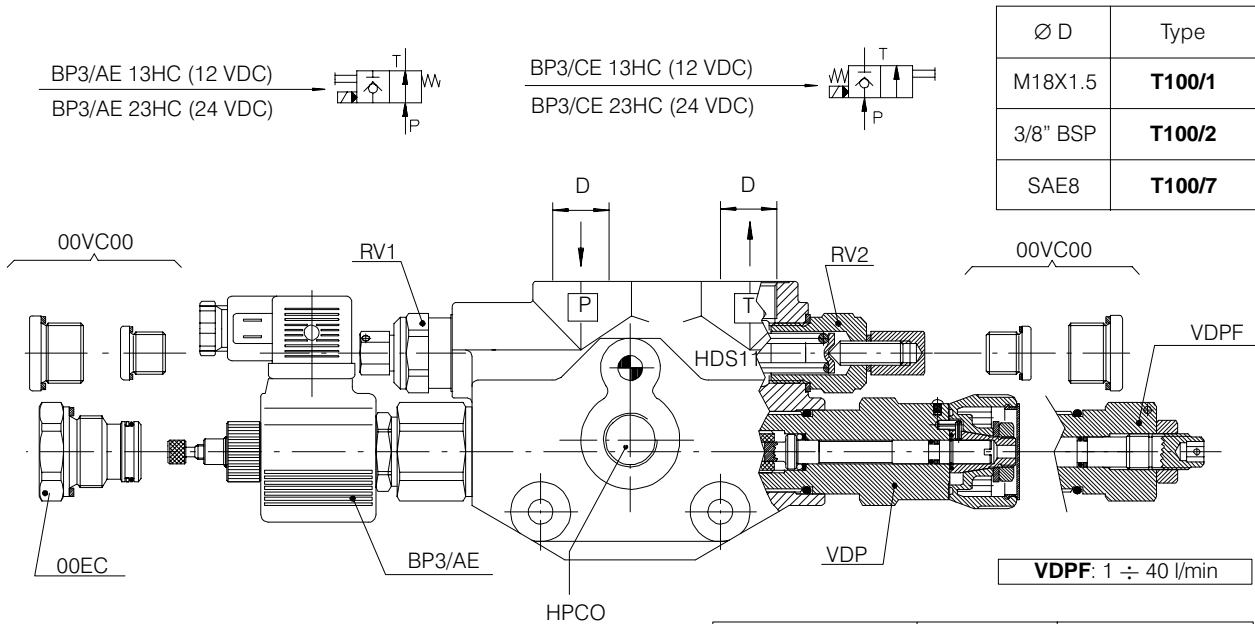
**8C.2.2 Scheme example**



**8C.3 Inlet cover T100**

**8C.3.1 Application variation**

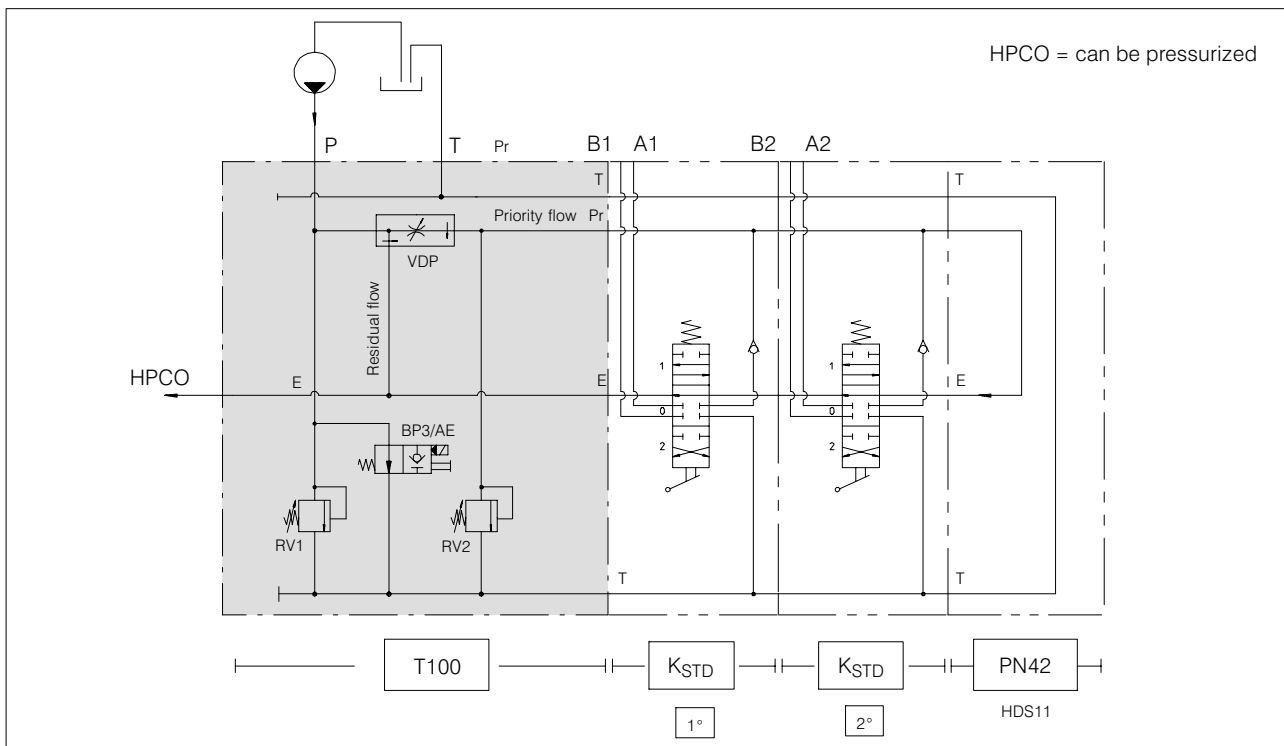
Inlet cover with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.



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

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

**8C.3.2 Scheme example**

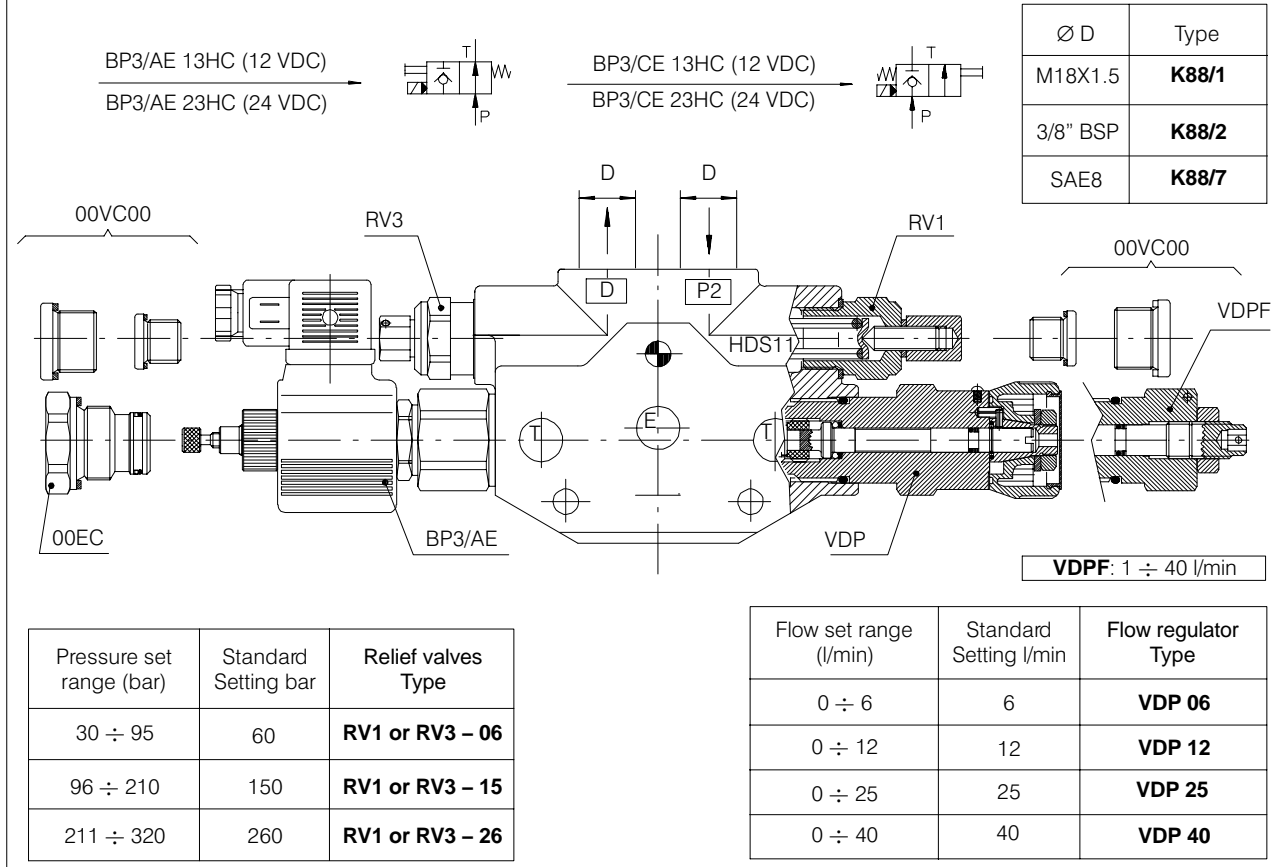




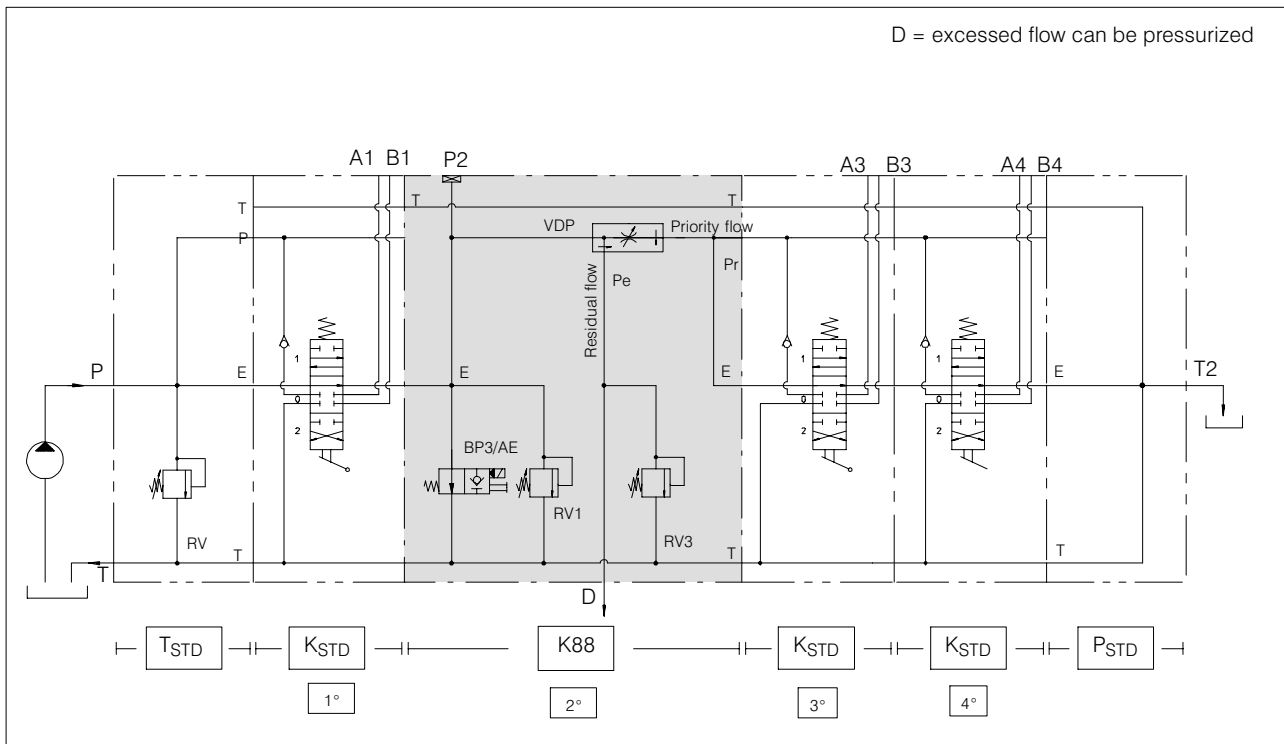
**8C.4 Sectional body K88**

**8C.4.1 Application variation**

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



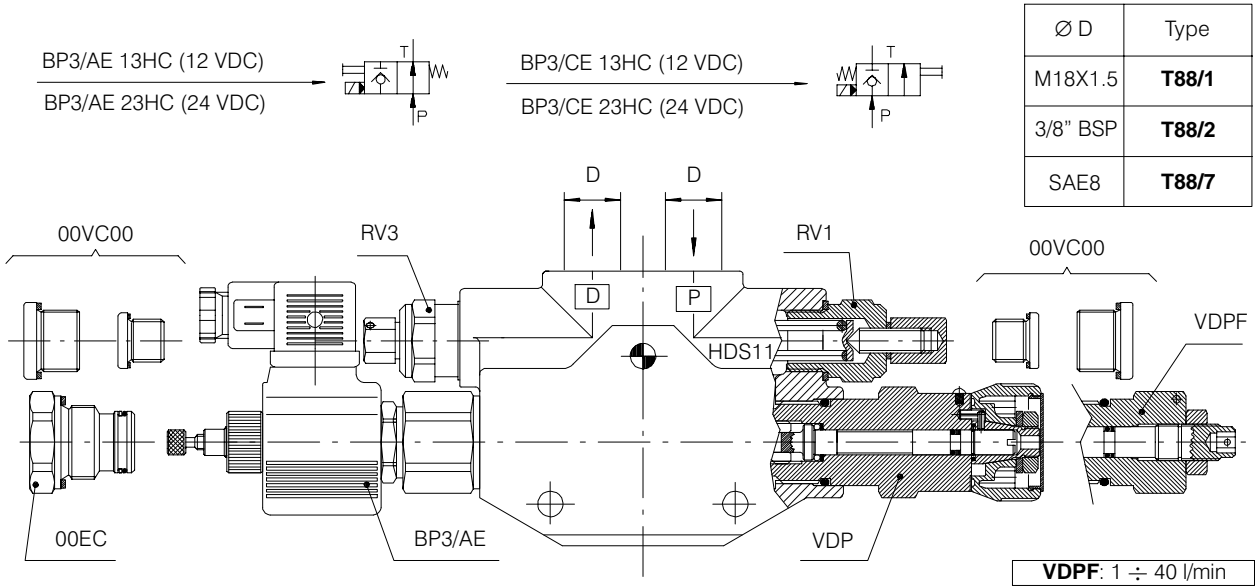
**8C.4.2 Scheme example**



**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.

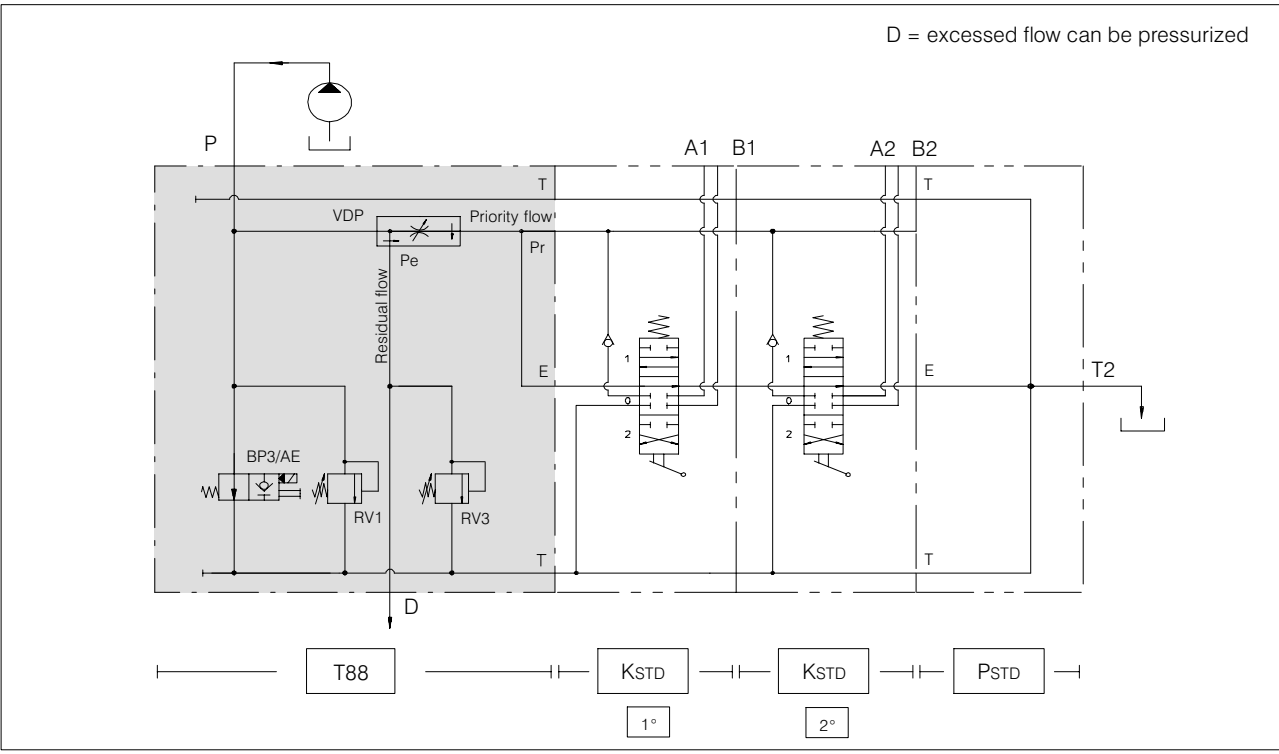


**VDPF: 1 ÷ 40 l/min**

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

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

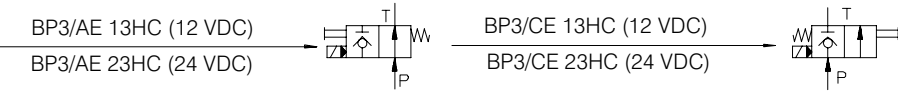
**8C.5.2 Scheme example**



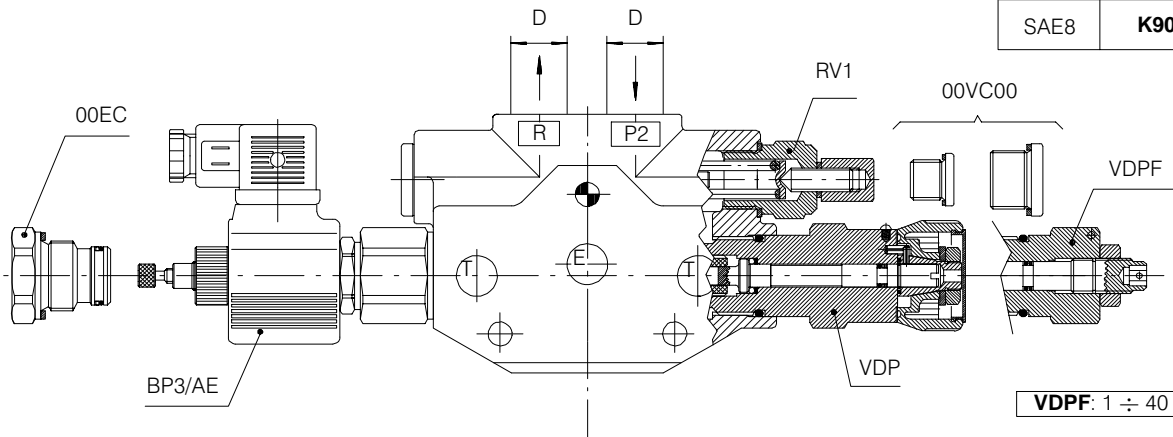
**8C.6 Sectional body K90**

**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.



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

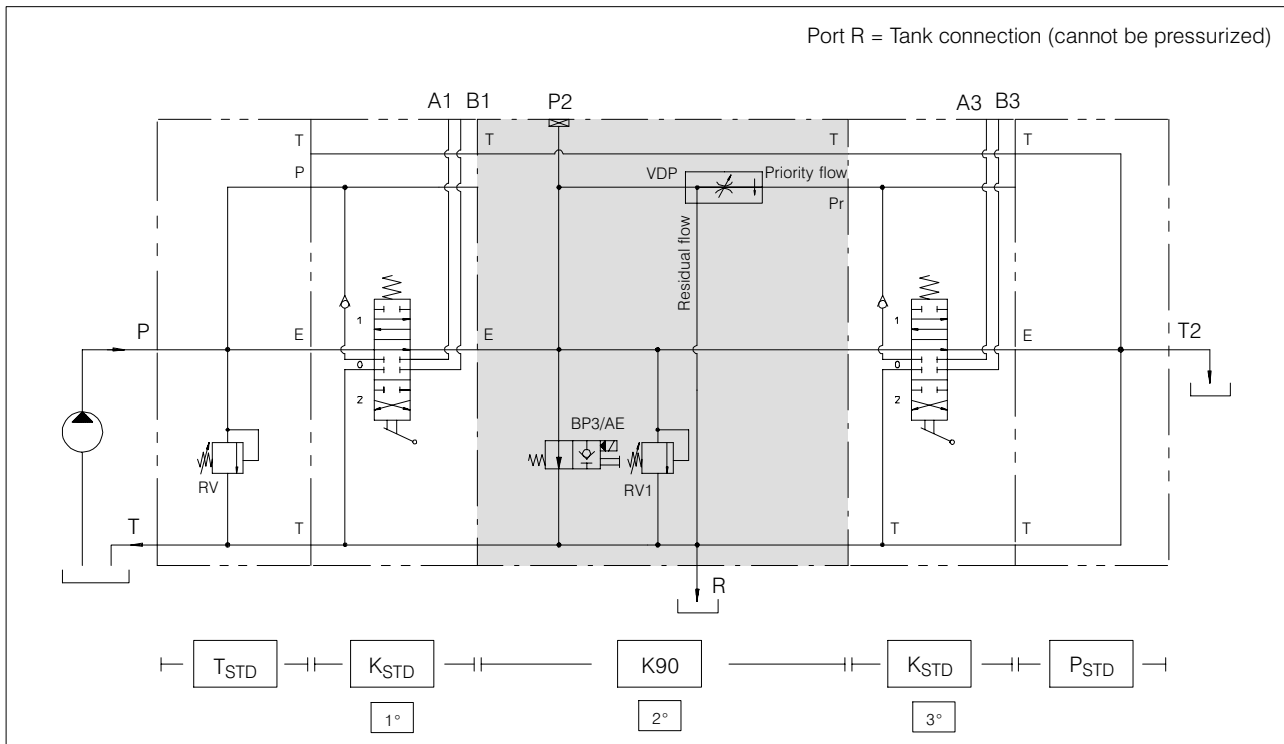


**VDPF: 1 ÷ 40 l/min**

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

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

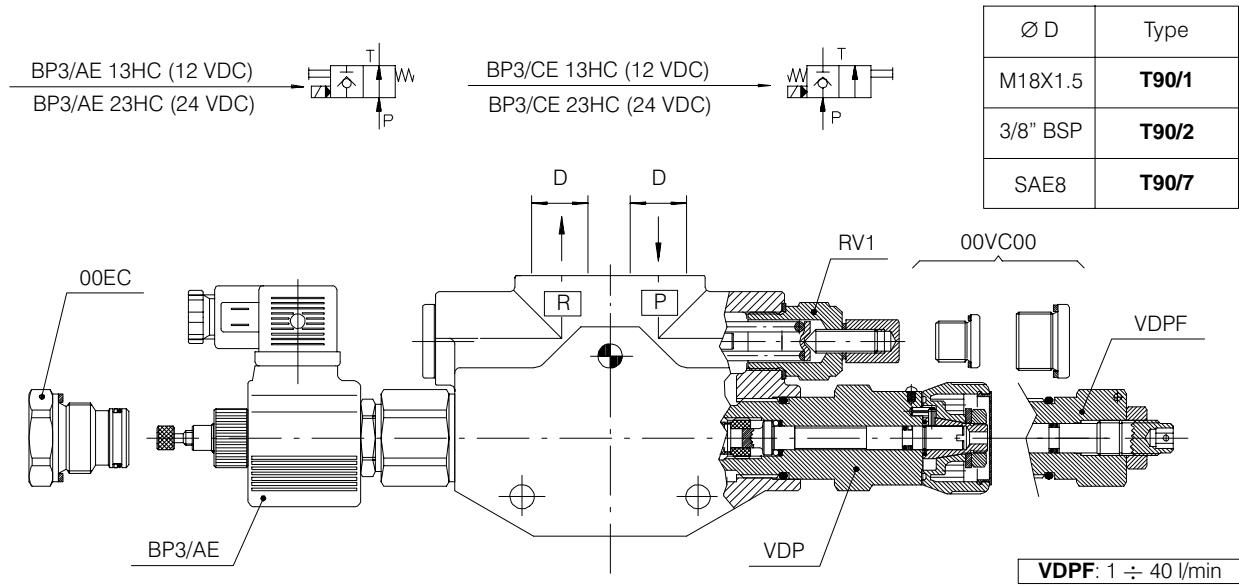
**8C.6.2 Scheme example**



**8C.7 Inlet cover T90**

**8C.7.1 Application variation**

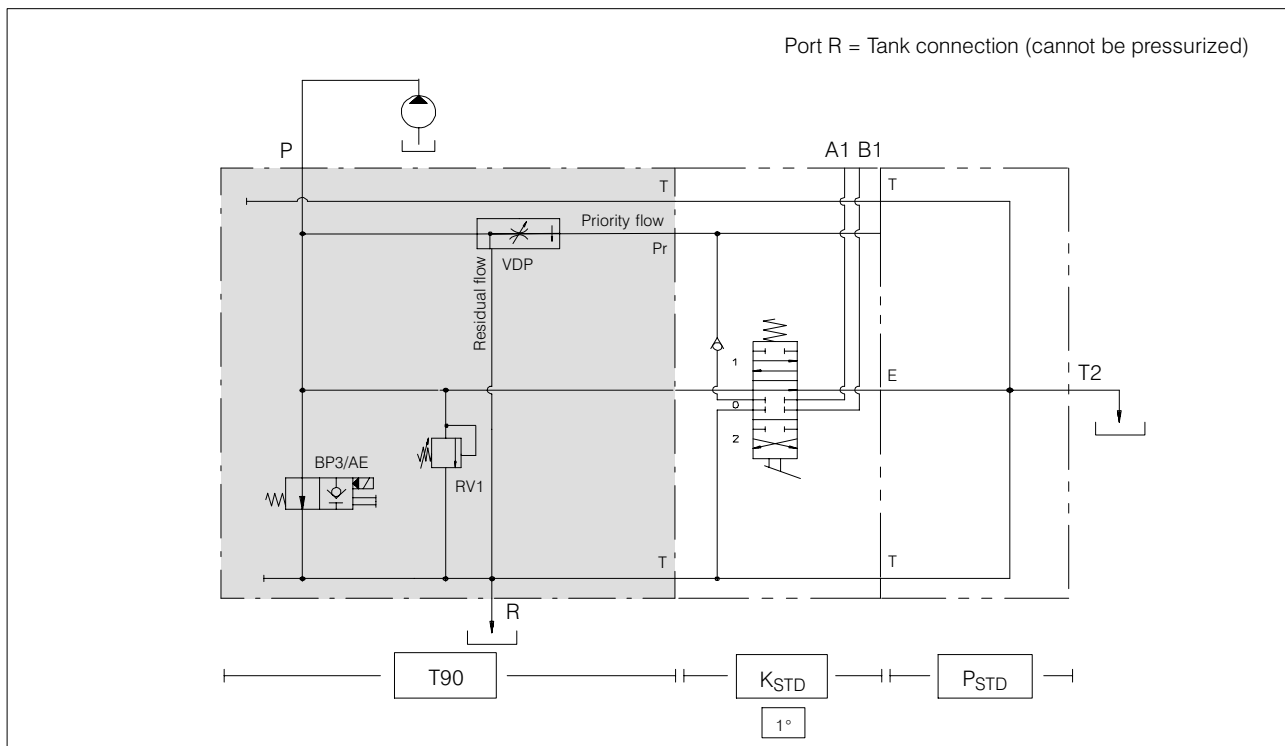
Inlet cover with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve. Excess flow to tank.



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

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

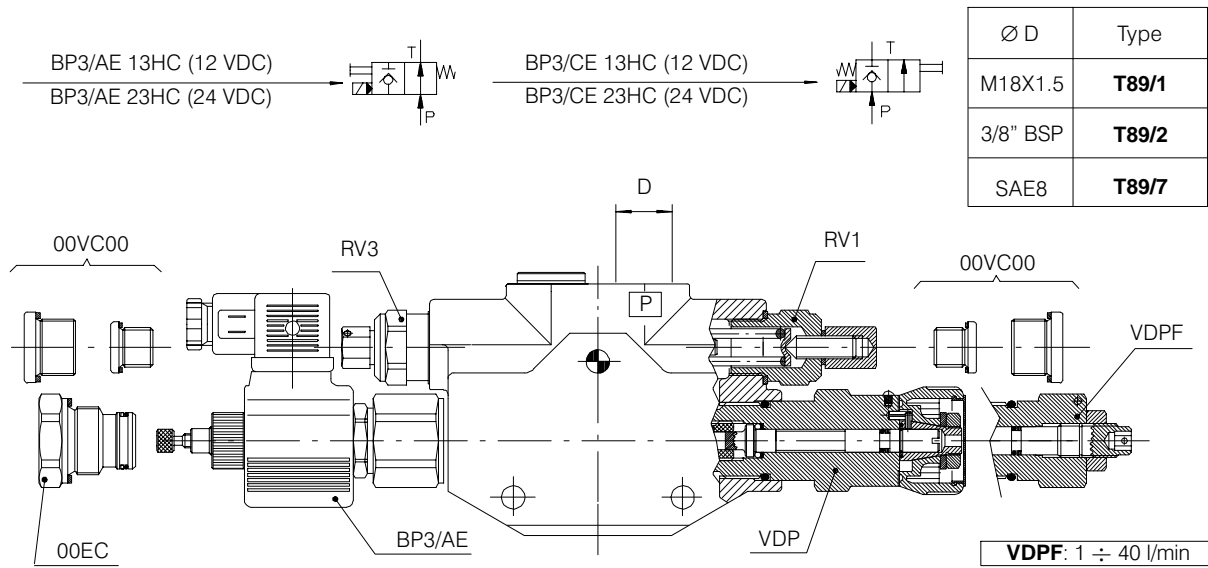
**8C.7.2 Scheme example**



**8C.8 Inlet cover T89\***

**8C.8.1 Application variation**

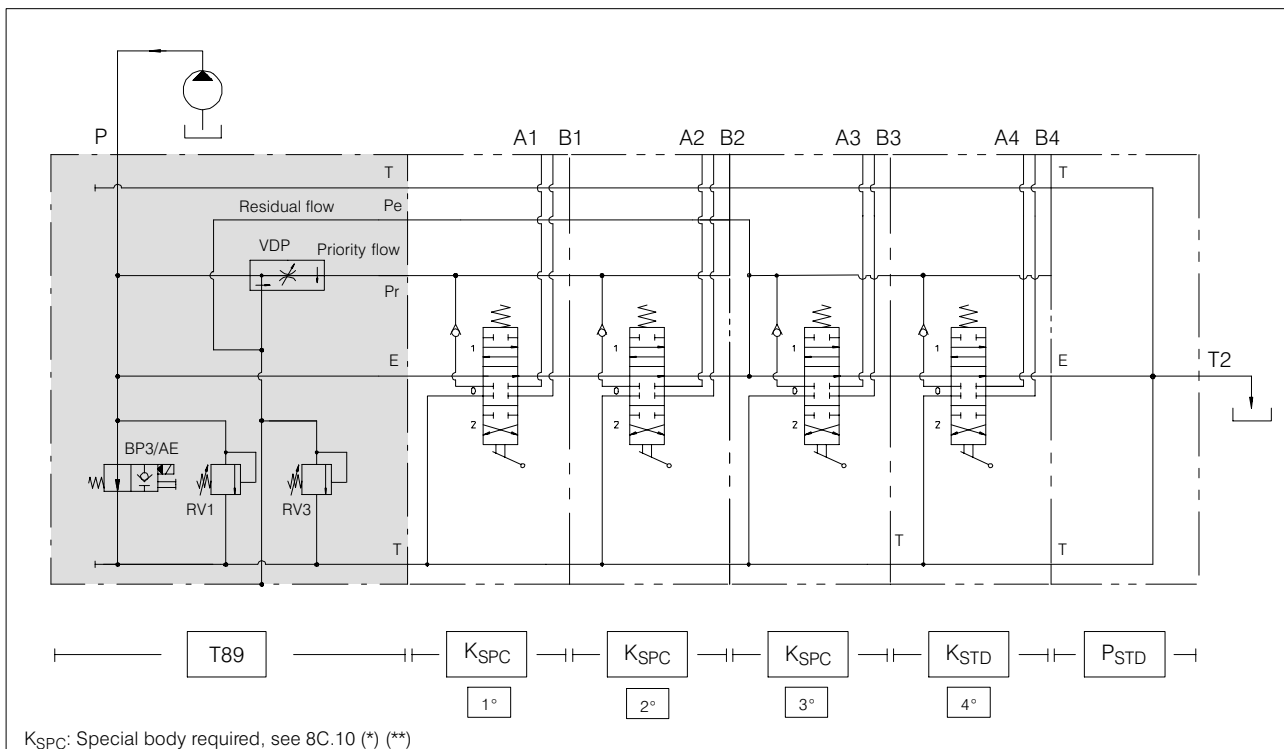
Inlet cover with priority flow divider pressure compensated valve, pressure relief valves and by-pass valve.



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

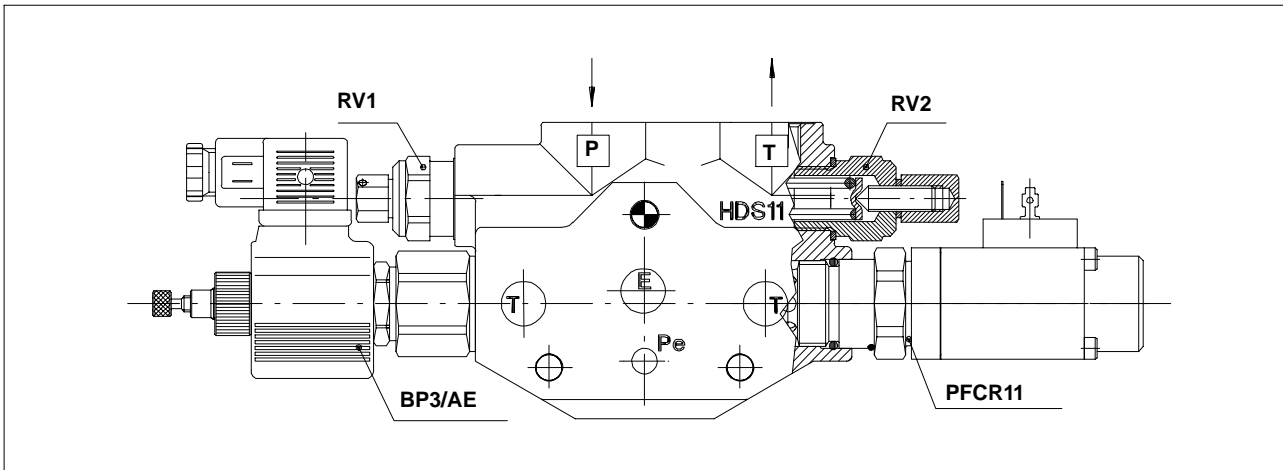
Flow set range (l/min)	Standard Setting l/min	Flow regulator Type
0 ÷ 6	6	<b>VDP 06</b>
0 ÷ 12	12	<b>VDP 12</b>
0 ÷ 25	25	<b>VDP 25</b>
0 ÷ 40	40	<b>VDP 40</b>

**8C.8.2 Scheme example**

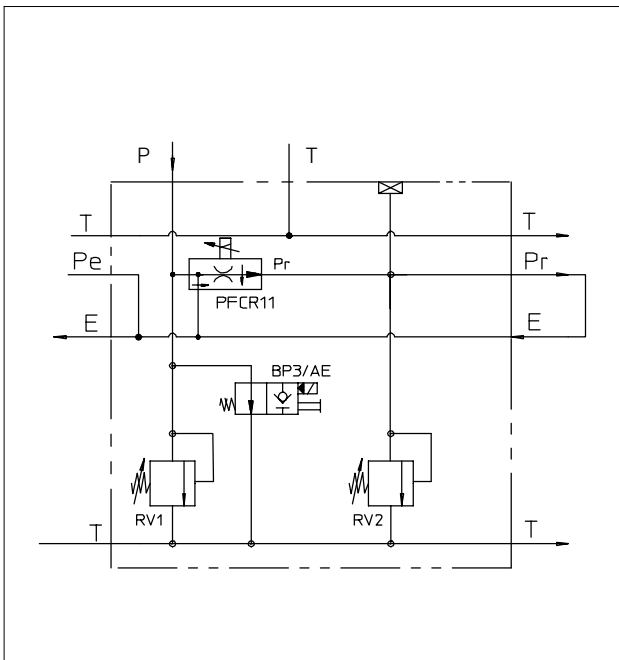


### 8C.9 Proportional flow control PFCR11

#### 8C.9.1 Example of application on K100 body



#### 8C.9.2 Example of hydraulic scheme K100



#### 8C.9.3 Electric performances

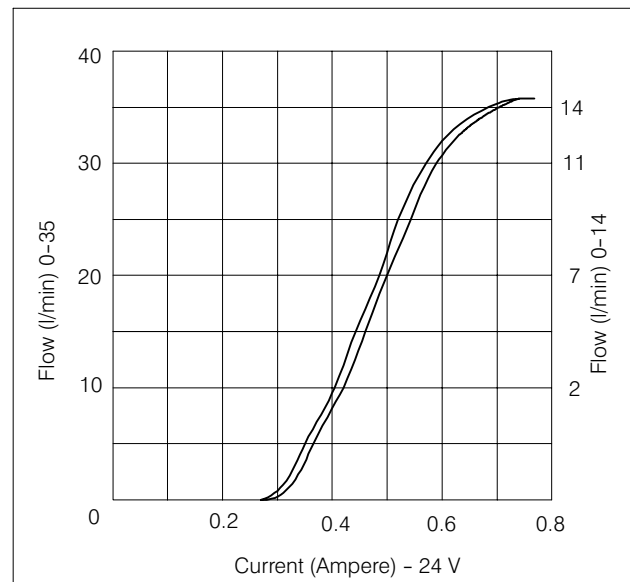
Coil according to	VDE 0580		
Connector type	DIN 43650		
Max. current	0.75 A (24 V. DC)		
Duty rating	ED= 100%		
Suggested dither	110 Hz		
Insulation class with std. plug	IP54 (DIN 40050)		

Voltage ± 5%	12	24	V (DC)
Nominal current	1.25	0.68	Ampere
Resistance at 20°C	7.2	24.6	Ohm
Nominal power	17.2	17.4	Watt

#### 8C.9.4 Hydraulic performances

Max. pressure	270 bar
Max. recommended pressure	230 bar
Regulated flow range	0 - 14 l/min
	0 - 35 l/min
Temperature range	-5/+70° C

#### 8C.9.5 Current/flow regulated diagram



#### 8C.9.6 Code

Flow l/min	Voltage	Type	Code*
14	12 V	<b>PFCR11/V2-14-P2-13</b>	200.7880.0011.0
14	24 V	<b>PFCR11/V2-14-P2-23</b>	200.7880.0012.0
35	12 V	<b>PFCR11/V8-35-P2-13</b>	200.7880.0007.0
35	24 V	<b>PFCR11/V8-35-P2-23</b>	200.7880.0008.0

(\*code without connector)

**8C.10 Special sectional bodies**

8C.10.1 Special element (priority flow): to be used only with T89 (\*) inlet cover

Ø D	Type/Code	
	Standard	Section with valve UC - OA - C
SAE6	<b>K111</b> 200.9413.6064.0	<b>K27</b> 200.9413.6056.0
SAE8	<b>K112</b> 200.9413.7038.0	<b>K24</b> 200.9413.7037.0
3/8" BSP	<b>K113</b> 200.9413.2041.0	<b>K58</b> 200.9413.2040.0
M18X1.5	<b>K114</b> 200.9413.1033.0	<b>K59</b> 200.9413.1032.0

8C.10.2 Special element (residual flow): to be used only with T89 (\*\*) inlet cover

Ø D	Type/Code	
	Standard	Section with valve UC - OA - C
SAE6	<b>K116</b> 200.9413.6063.0	<b>K81</b> 200.9413.6059.0
SAE8	<b>K117</b> 200.9413.7036.0	<b>K82</b> 200.9413.7035.0
3/8" BSP	<b>K118</b> 200.9413.2039.0	<b>K83</b> 200.9413.2038.0
M18X1.5	<b>K119</b> 200.9413.1031.0	<b>K86</b> 200.9413.1030.0

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



**8C.11 By-Pass solenoid valve - BP3 -**

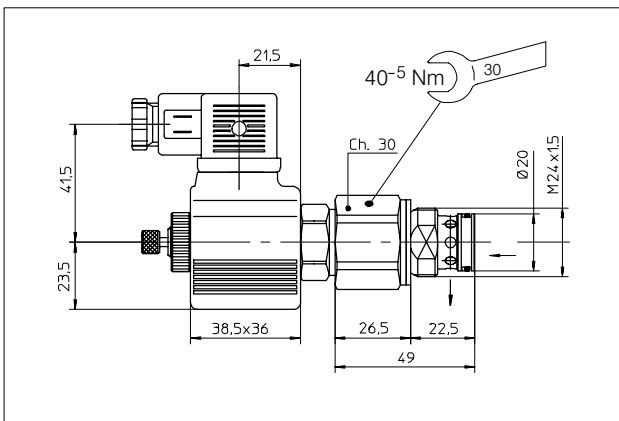
**8C.11.1 Normally closed with manual override**

Voltage	Type	Code
without coil	<b>BP3/CE HDS11PQ p.m.</b>	200.7572.0048.0
12 V. D.C.	<b>BP3/CE 13HC HDS11PQ</b>	200.9570.1003.5
24 V. D.C.	<b>BP3/CE 23HC HDS11PQ</b>	200.9570.2003.6

**8C.11.2 Normally open with manual override**

Voltage	Type	Code
without coil	<b>BP3/AE HDS11PQ p.m.</b>	200.7572.0049.0
12 V. D.C.	<b>BP3/AE 13HC HDS11PQ</b>	200.9570.1003.6
24 V. D.C.	<b>BP3/AE 23HC HDS11PQ</b>	200.9570.2003.7

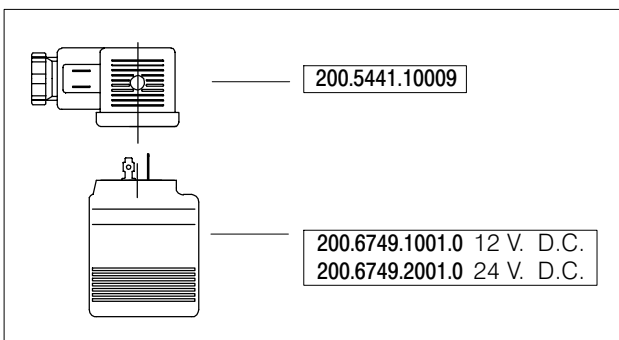
**8C.11.3 Dimension**



**8C.11.4 BP3 Solenoid valve performances**

Max. pressure	315 bar
Max. flow	60 l/min
Power	22 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.11.5 Spare parts**

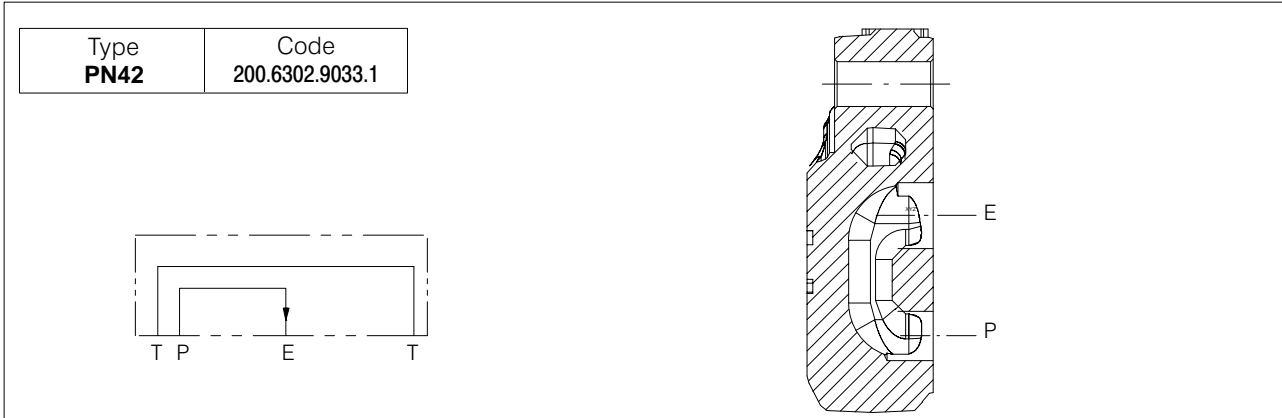


**8C.11.6 Coil specifications**

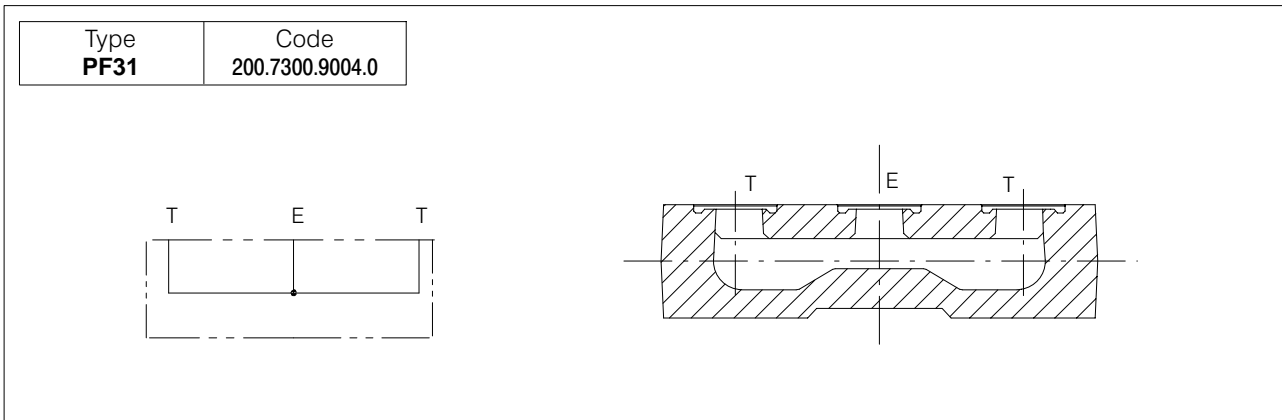
Voltage	12	24	V. D.C.
Power	22.8	22.5	Watt
Resistance (Ambient Temp.)	6.3	25.6	Ohm
Resistance (Stabilized Temp.)	8.9	36.4	Ohm
Current (Ambient Temp.)	1.9	0.94	Ampere
Current (Stabilized Temp.)	1.35	0.66	Ampere

**8C.12 End cover for K100 and T100**

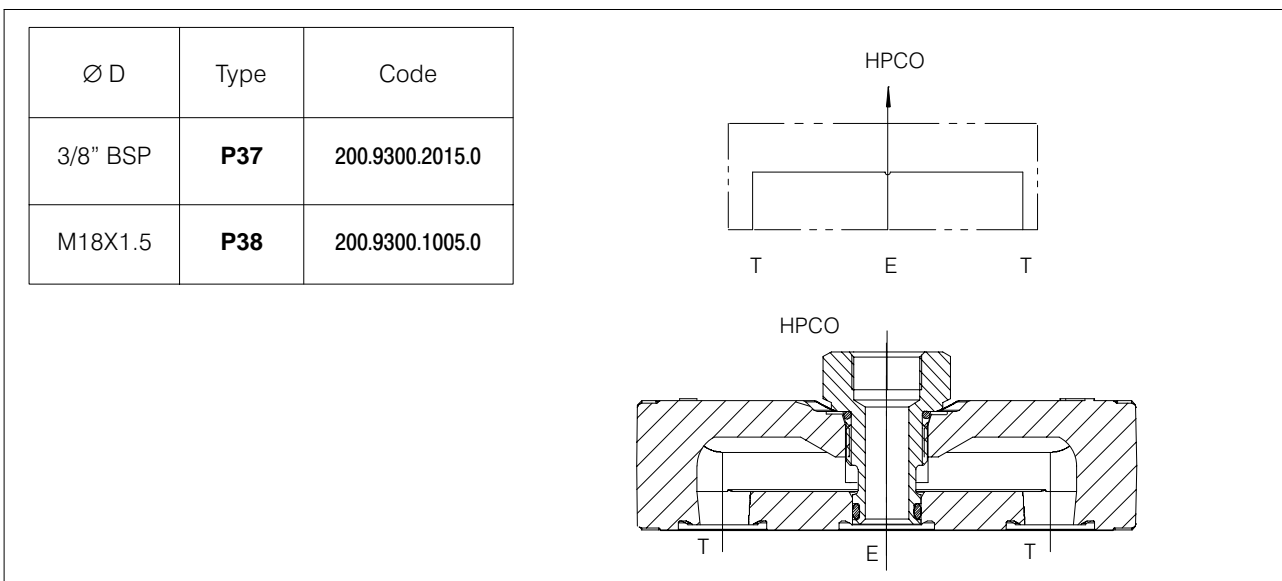
8C.12.1 Right cover



8C.12.2 Standard left cover



8C.12.3 Carry-over left cover



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