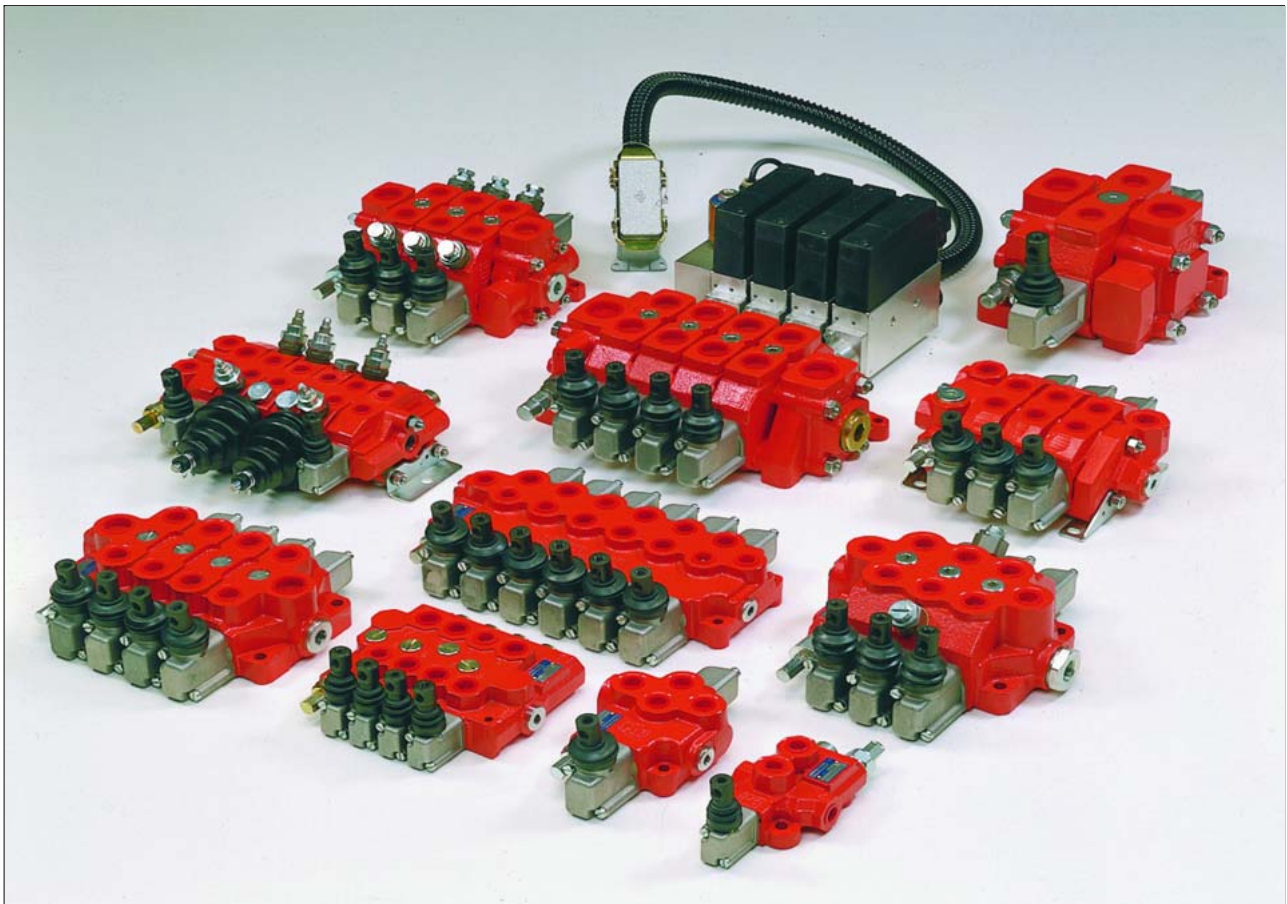


## Monobloc and Sectional Directional Control Valves



motion and progress

## 10 Sectional directional control valves HDS20



### Contents

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## 10.1 General specifications

Technical specification		
Max flow rate	l/min U.S.G.P.M.	80 21
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	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	16 1.138
Average	cm <sup>3</sup> /min Cu. In./min	10 0.712
Lower values on demand (to be agreed with our Sales Dept..)		

Number of spools	1 to 10
Adjustable direct acting 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

### 10.1.1 Weight

Version	kg	lb
Inlet with RV	2.2	4.85
1 spool section	3.4	7.50
End cover standard	1.9	4.18

### 10.1.2 Material specification:

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

### 10.1.3 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 selection inlets, work ports, and outlets threaded ports.
- 5) Negative overlapping of the spool.

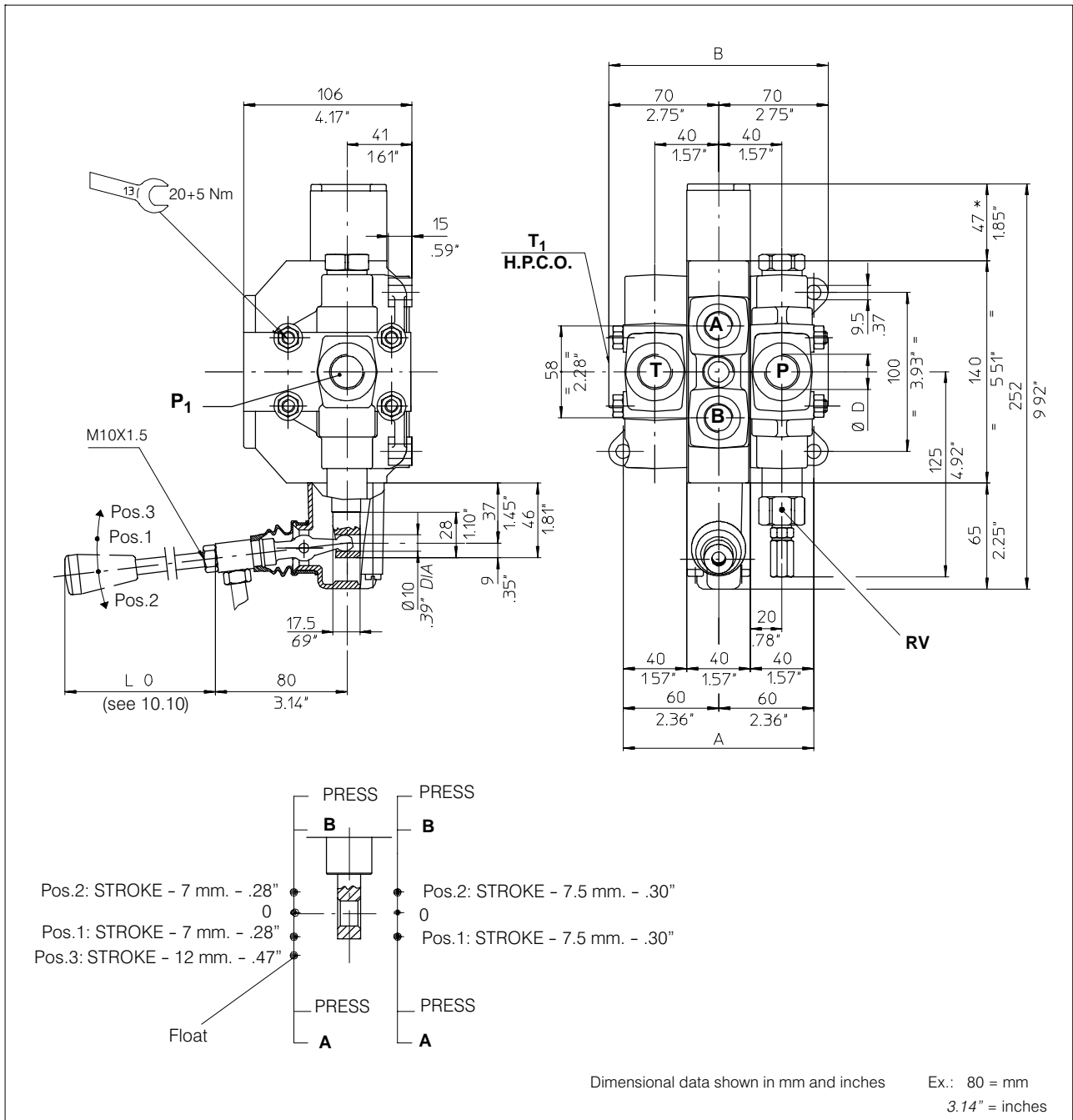
### 10.1.4 Optional features available:

- 1) Open or closed centre circuit, 3 or 4 way operations, 3 or 4 position (floating position), full open centre (motor spool) and other spool options.
- 2) Carry over.
- 3) Series connection and priority pressure.
- 4) Compensated lever assembly.

### 10.1.5 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>**: side inlet and outlet  
 3.1.0.2: spool position  
**P**: pressure line  
**T**: exhaust line  
**E**: centre line (by pass).

10.2 Dimensional data

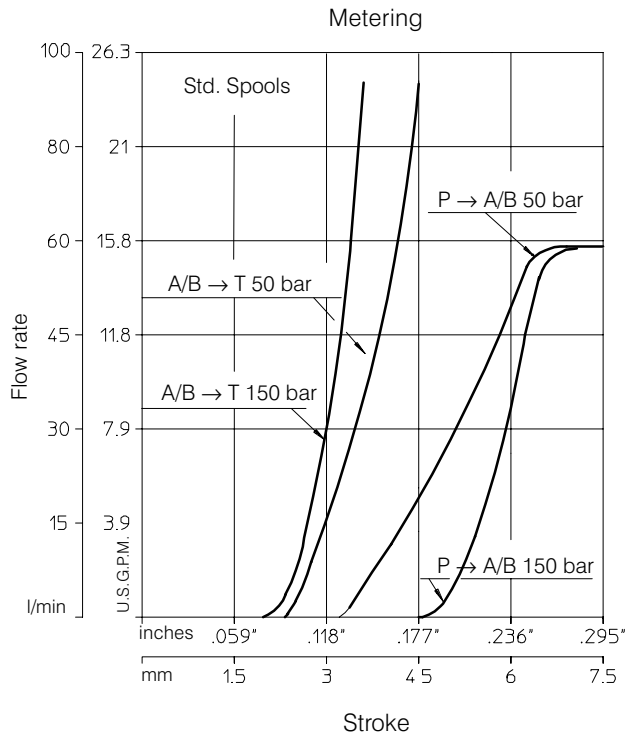
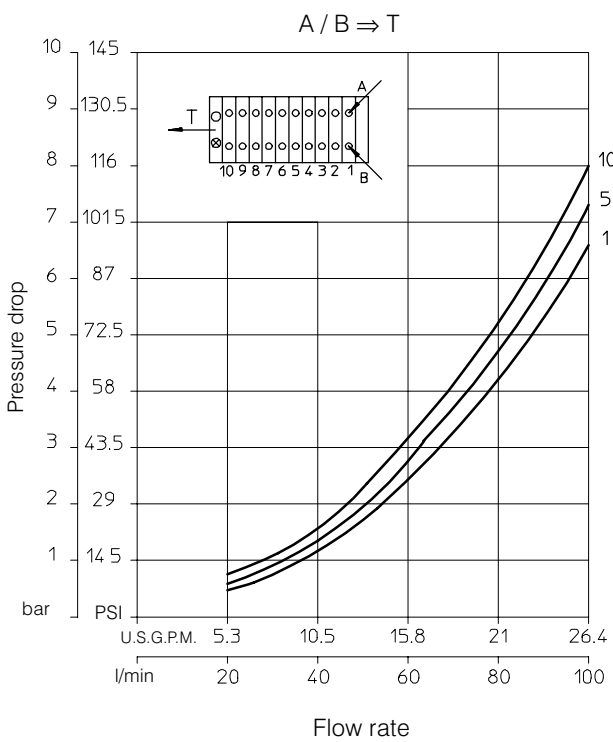
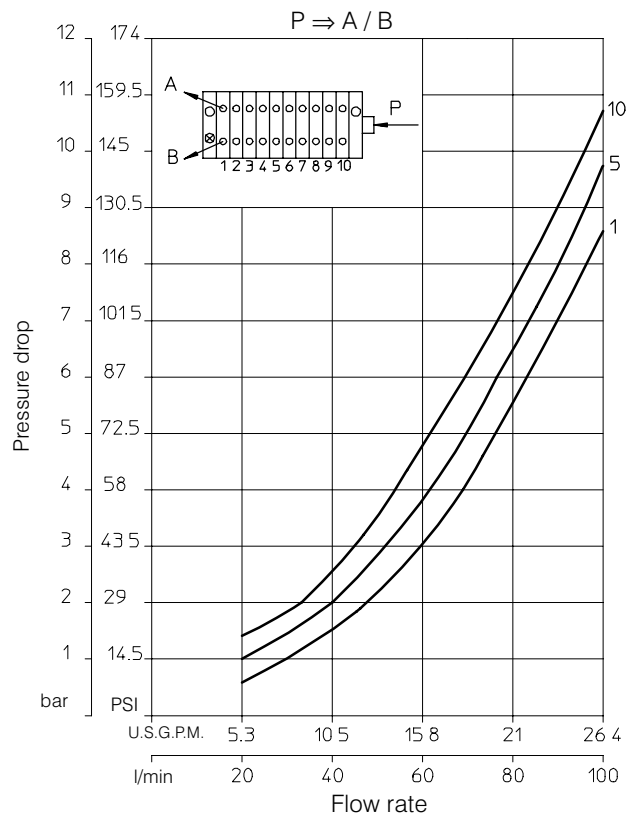
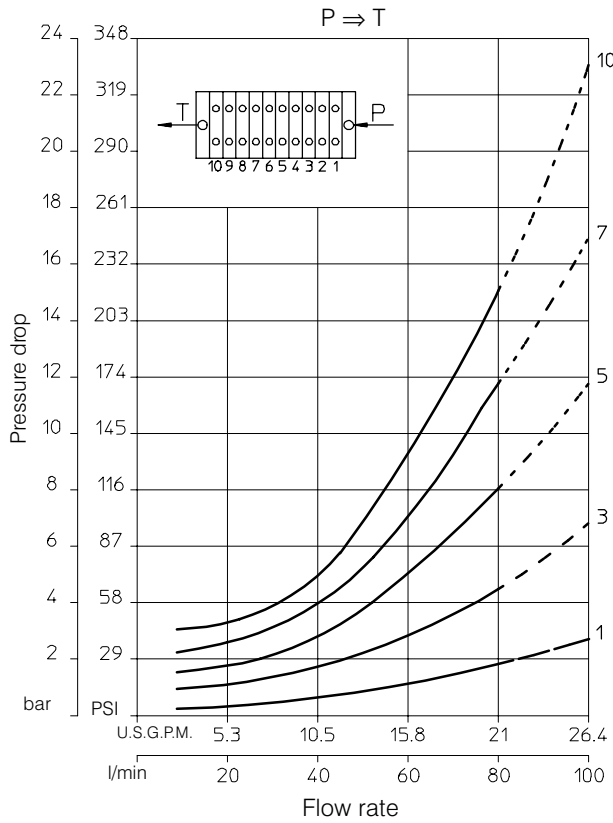


N. of sections		1	2	3	4	5	6	7	8	9	10
Dimension	A	120	160	200	240	280	320	360	400	440	480
		4.72"	6.30"	7.87"	9.45"	11"	12.60"	14.17"	15.74"	17.32"	18.90"
Dimension	B	140	180	220	260	300	340	380	420	460	500
		5.51"	7.08"	8.66"	10.23"	11.81"	13.38"	14.96"	16.53"	18.11"	19.68"

10.3 Performance curves

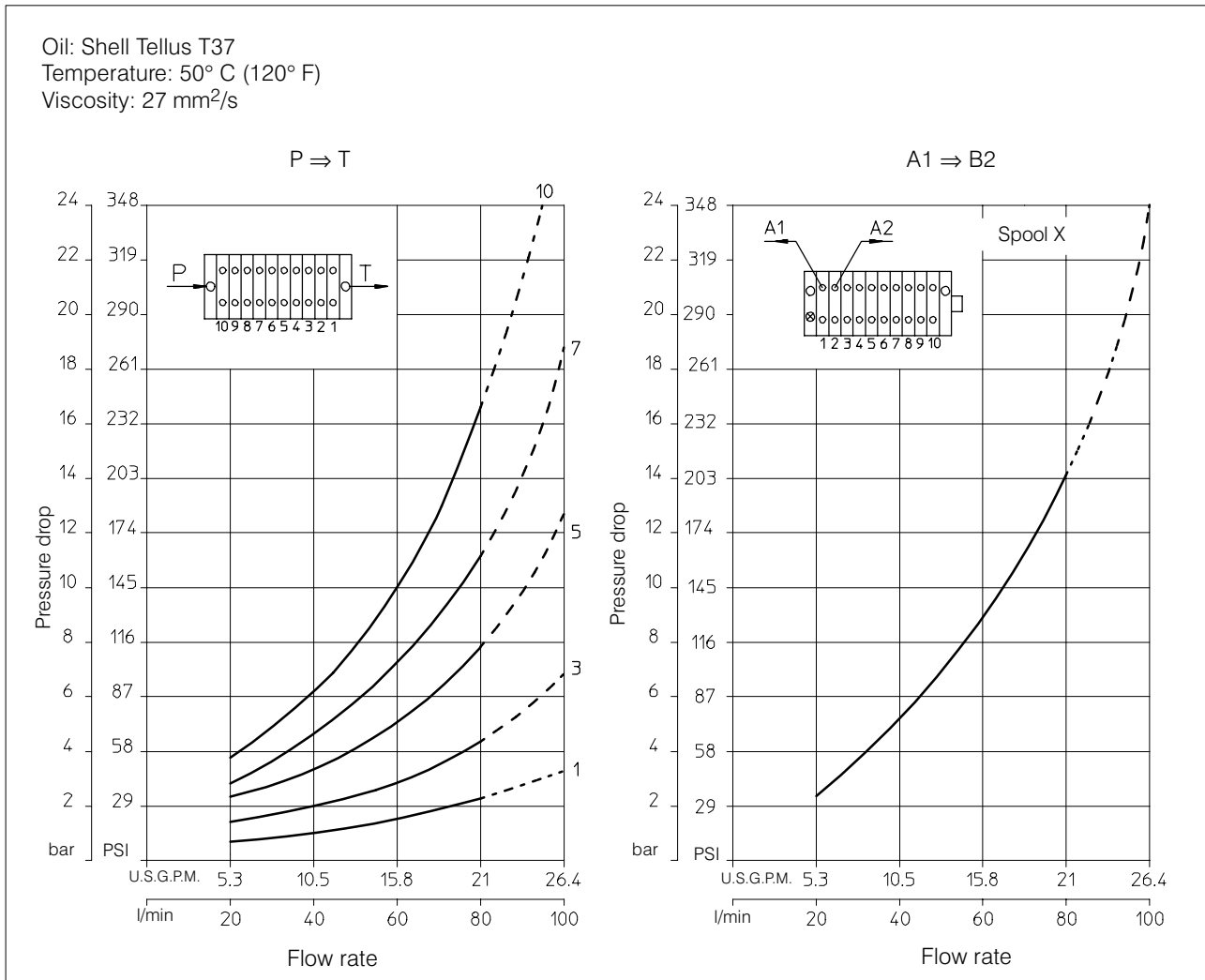
10.3.1 Parallel circuit

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

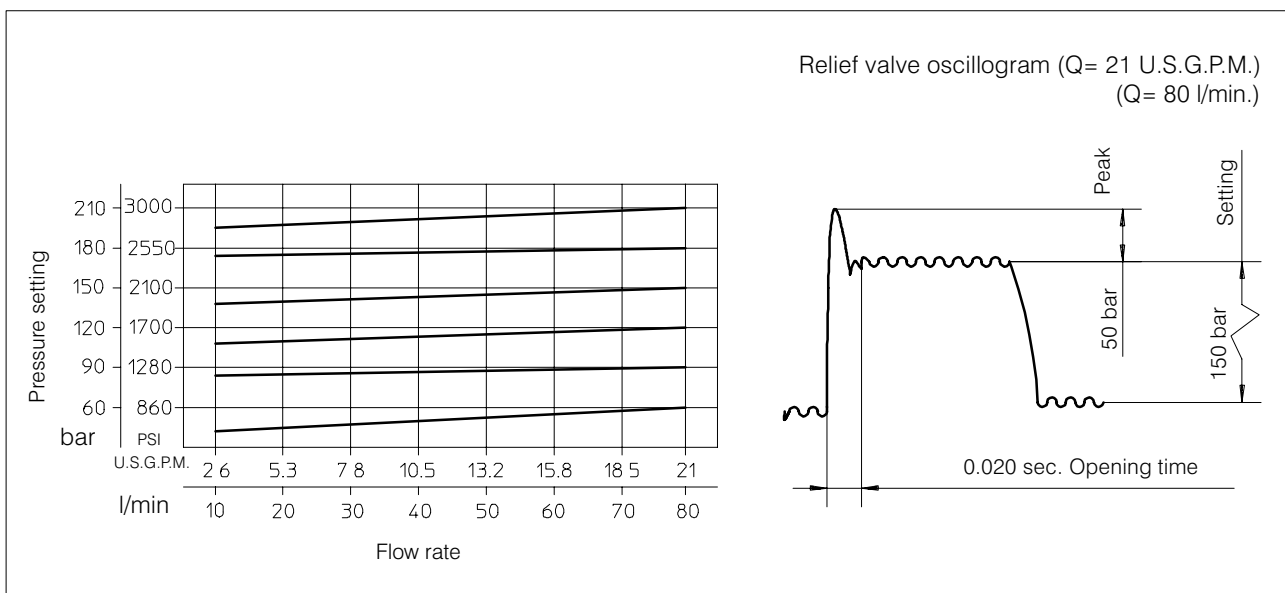


10.3.2 Series circuit

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



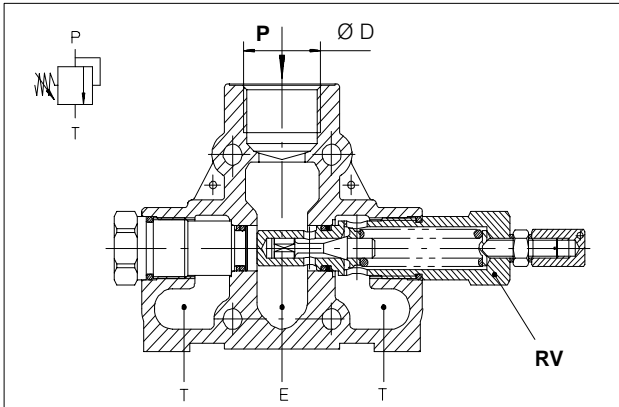
10.3.3 Transient hydraulic characteristics  
 Relief Valve RV



**10.4 Inlet covers**

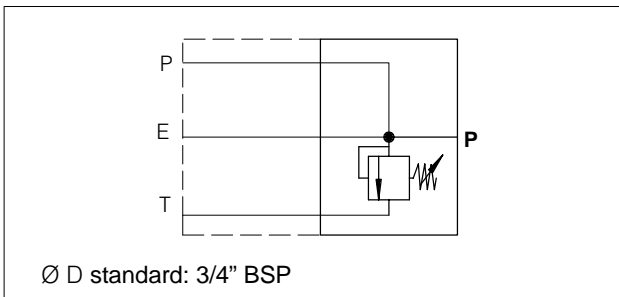
**10.4.1 Adjustable direct acting Relief Valve RV**

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



Pressure set range bar (PSI)	Std. setting bar (PSI)	Type	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)

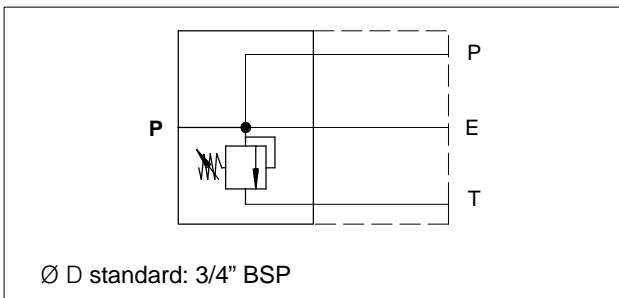
**10.4.2 Right inlet manifold (standard) with P and RV for parallel circuit**



Ø D	Type	Code
M22X1.5	<b>T01</b>	* 200.9314.9001.0
3/4" BSP	<b>T02</b>	* 200.7314.4001.0
SAE12	<b>T04</b>	* 200.9314.9002.0

\* Group code with RV set at standard pressure 150 bar (2100 PSI)

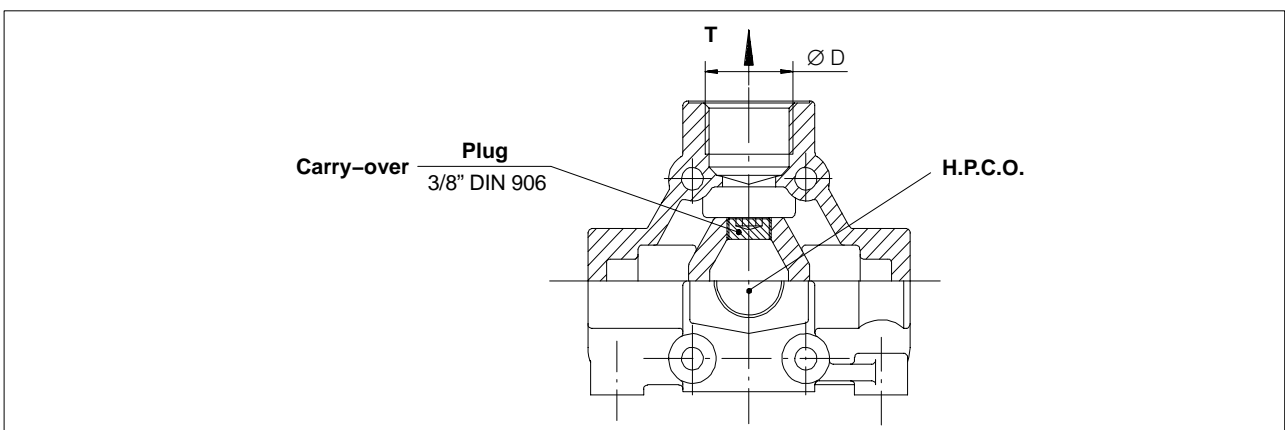
**10.4.3 Left inlet manifold with P and RV (standard on series circuit)**



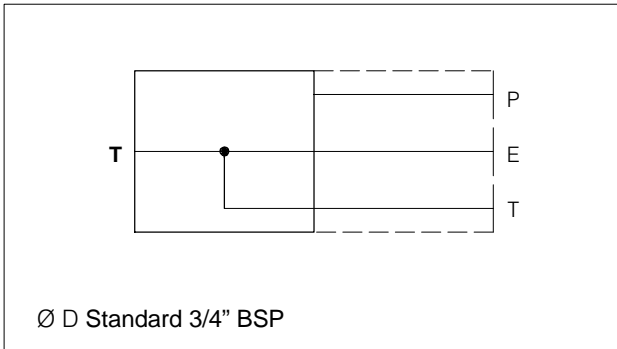
Ø D	Type	Code
M22X1.5	<b>T09</b>	* 200.9314.9003.0
3/4" BSP	<b>T10</b>	* 200.9314.4002.0
SAE12	<b>T12</b>	* 200.9314.9004.0

\* Group code with RV set at standard pressure 150 bar (2100 PSI)

**10.5 End covers**

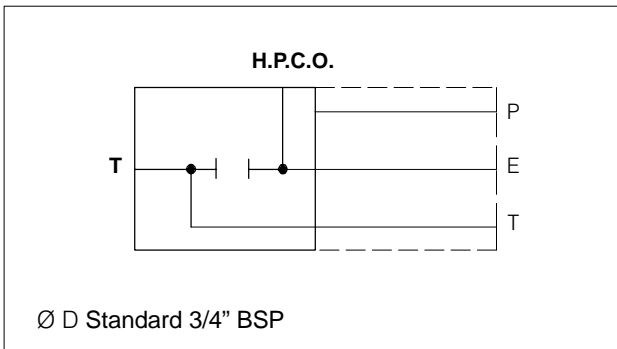


10.5.1 Left outlet cover with T for parallel circuit (Standard)



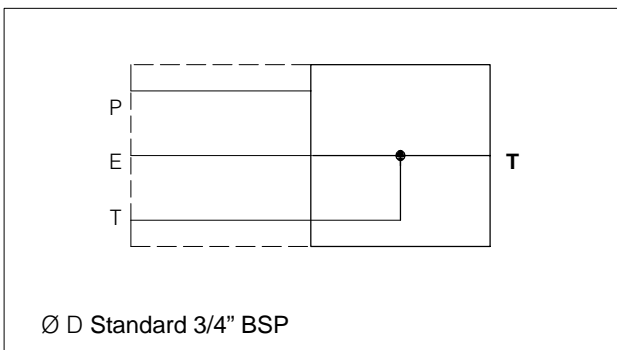
Ø D	Type	Code
M22X1.5	<b>P01</b>	200.9304.9001.0
3/4" BSP std	<b>P02</b>	200.9304.4001.0
SAE12	<b>P04</b>	200.9304.9002.0

10.5.2 Left outlet cover with T and carry-over H.P.C.O.



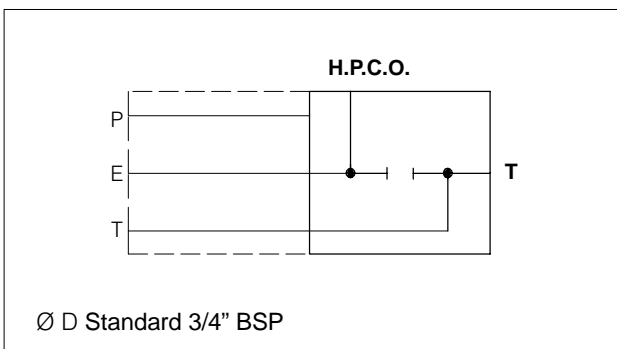
Ø D	Type	Code
M22X1.5	<b>P05</b>	200.9304.9003.0
3/4" BSP std	<b>P06</b>	200.9304.4002.0
SAE12	<b>P08</b>	200.9304.9004.0

10.5.3 Right outlet cover with T (standard on series circuit)



Ø D	Type	Code
M22X1.5	<b>P09</b>	200.6304.9005.0
3/4" BSP std	<b>P10</b>	200.6304.4003.0
SAE12	<b>P12</b>	200.6304.9006.0

10.5.4 Right outlet cover with T and carry-over H.P.C.O.



Ø D	Type	Code
M22X1.5	<b>P13</b>	200.9304.9007.0
3/4" BSP std	<b>P14</b>	200.9304.4004.0
SAE12	<b>P16</b>	200.9304.9008.0



10.6 Sectional bodies

10.6.1 Standard circuit: parallel

Ø D	Type/Code	
	Standard	Section with valve UC - OA - C
M18X1.5	<b>K01</b> 200.9415.1002.0	<b>K05</b> 200.9415.1003.0
1/2" BSP std	<b>K02</b> 200.9415.3007.0	<b>K06</b> 200.9415.3008.0
SAE 10	<b>K04</b> 200.9415.8002.0	<b>K08</b> 200.9415.8003.0

10.6.2 Optional circuit: series and tandem

Ø D	Type/Code	
	Standard	Section with valve UC - OA - C
M18X1.5	<b>K46</b> 200.9415.1004.0	<b>K50</b> 200.9415.1005.0
1/2" BSP std	<b>K47</b> 200.9415.3009.0	<b>K51</b> 200.9415.3010.0
SAE10	<b>K49</b> 200.9415.8004.0	<b>K53</b> 200.9415.8005.0

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

**10.7 Spool charts**

Spool scheme	Spool features	Type
	4 way - 3 position A/B: blocked E: open by pass	<b>A</b> <b>AS*</b>
	4 way - 3 position A/B: blocked E: closed	<b>B</b>
	4 way - 3 position A/B to tank in neutral E: open by pass	<b>C</b> <b>CS*</b>
	4 way - 3 position A: blocked B: to tank in neutral	<b>D</b>
	3 way - 3 position B: blocked E: open by pass	<b>G</b> <b>GS*</b>
	4 way - 3 position B: blocked A: to tank in neutral	<b>L</b>
	4 way - 3 position with regenerative spool in 2 <sup>nd</sup> pos.	<b>R**</b>

\*\*: special body required

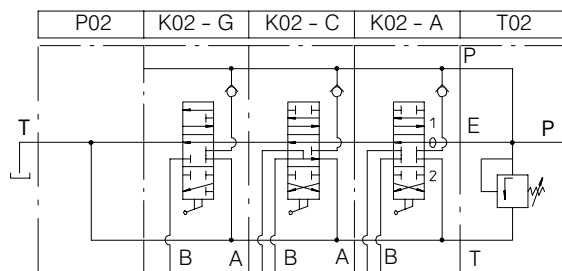
	3 way - 3 position A: blocked E: open by pass	<b>S</b> <b>SS*</b>
	4 way - 3 position A/B: blocked series connection	<b>X</b>
	4 way - 3 position A/B: to tank in neutral series connection	<b>XC</b>
	4 way - 4 position 4 <sup>th</sup> float position	<b>Z</b>
	4 way - 3 position A/B: blocked Load Sensing	<b>LSA</b> <b>**</b>
	4 way - 3 position A/B: to tank in neutral Load Sensing	<b>LSC</b> <b>**</b>
	3 way - 3 position B: blocked Load Sensing	<b>LSG</b> <b>**</b>
	3 way - 3 position A: blocked Load Sensing	<b>LSS</b> <b>**</b>

\*: high metering spool (max flow suggested 50 l/min)

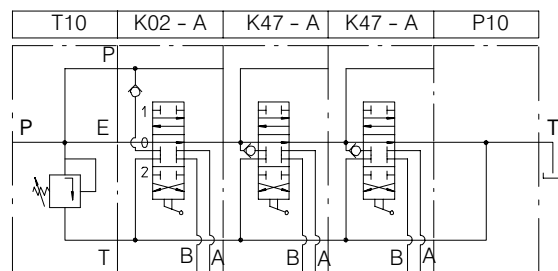
Note: For availability of L/S versions please contact our Sales Department

**10.8 Hydraulic circuits**

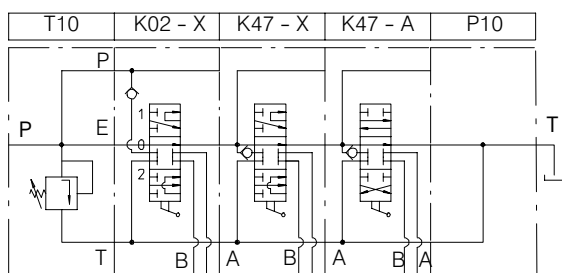
**10.8.1 Standard parallel circuit**



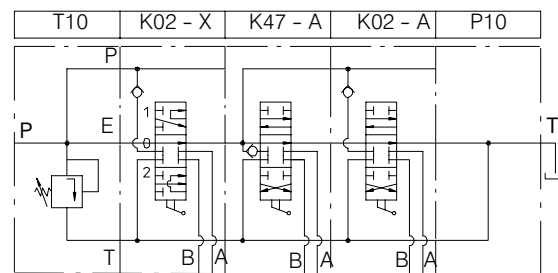
**10.8.3 Optional tandem circuit**



**10.8.2 Optional series circuit**



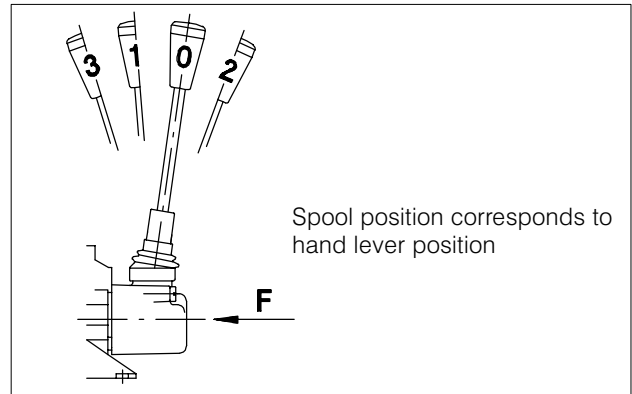
**10.8.4 Combined parallel/series circuit**



**10.9 Spool actions**

Spool position				Stroke mm	Type	Code
3	1	0	2			
	○	*	○	7.5	<b>01</b>	200.9686.1002.0
	●	●	○	7.5	<b>02</b>	200.9686.3002.0
	●	●	●	7.5	<b>03</b>	200.9686.2002.0
		●	●	7.5	<b>05</b>	200.9686.2004.0
	*		○	15	<b>06</b>	200.9686.1004.0
	●	●		7.5	<b>07</b>	200.9686.2007.0
	○	*		7.5	<b>09</b>	200.9686.1011.0
	●		●	15	<b>11</b>	200.9686.2009.0
	○	●	●	7.5	<b>19</b>	200.9686.3008.0
	○	*	○	7.5	<b>24</b>	200.9686.5013.0
	○	*	○	7.5	<b>31</b>	200.9686.1054.0
	○	*	○	7.5	<b>46</b>	200.9686.1076.0
	○	*	○	7.5	<b>47</b>	200.9686.1078.0
	○	*	○	7.5	<b>50</b>	200.9686.5020.0
	○	*	○	7.5	<b>56</b>	200.9686.1086.0
	○	*	○	7.5	<b>83</b>	200.9686.1096.0
●	○	*	○	5 - 7 - 7	<b>128</b>	200.9686.4009.0

- \* Initial hand lever position
- Hand lever in detent position
- Spring return position of hand lever

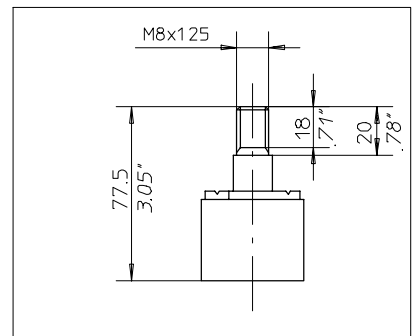
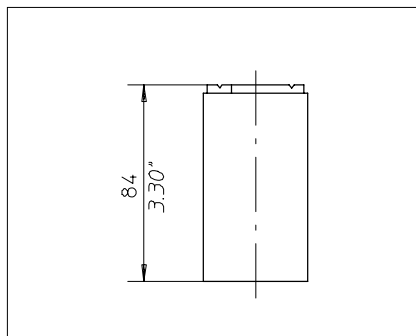
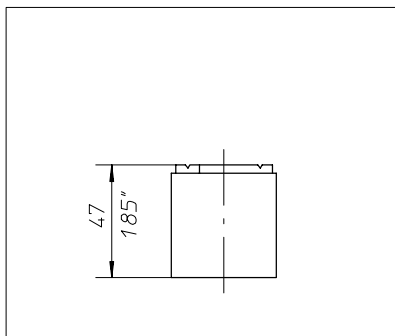


F (N) = force in Newton (N) needed to operate the spool

F (N)	Spool position control type
350	<b>01</b> (standard)
280	<b>56</b>

Note: consult factory for different configurations.

**10.9.1 Spool positioners dimensions**



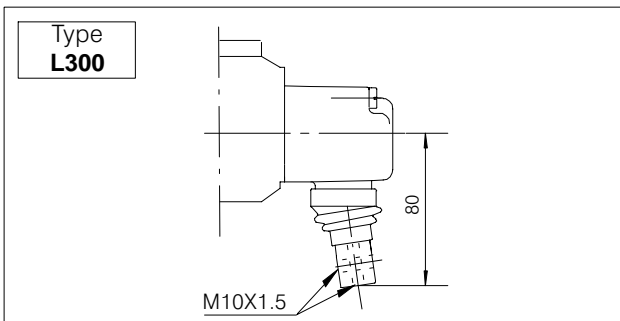
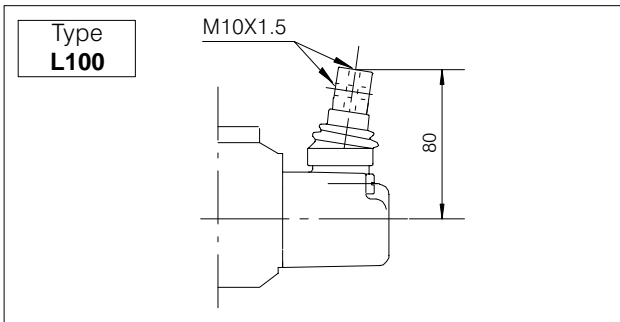
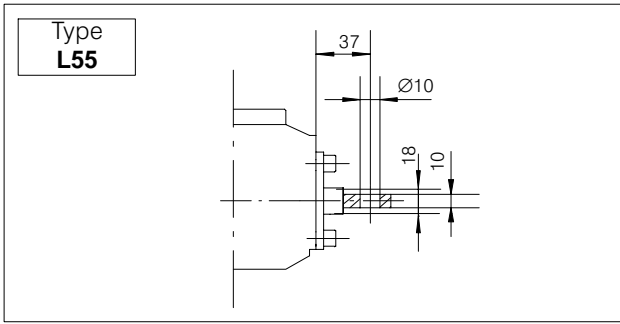
Spool positioners: <b>01 - 02 - 03 - 05 - 06</b> <b>07 - 09 - 11 - 19 - 56</b>	Spool positioner: <b>128</b> (Z spool type)	Spool positioner: <b>83</b>
--	---	--------------------------------

**10.9.2 Microswitch control**

Type <b>31</b>	Microswitch is operated when the spool is in pos.1 and 2	
Type <b>46</b>	Microswitch is operated when the spool is in pos.1	
Type <b>47</b>	Microswitch is operated when the spool is pos.2	

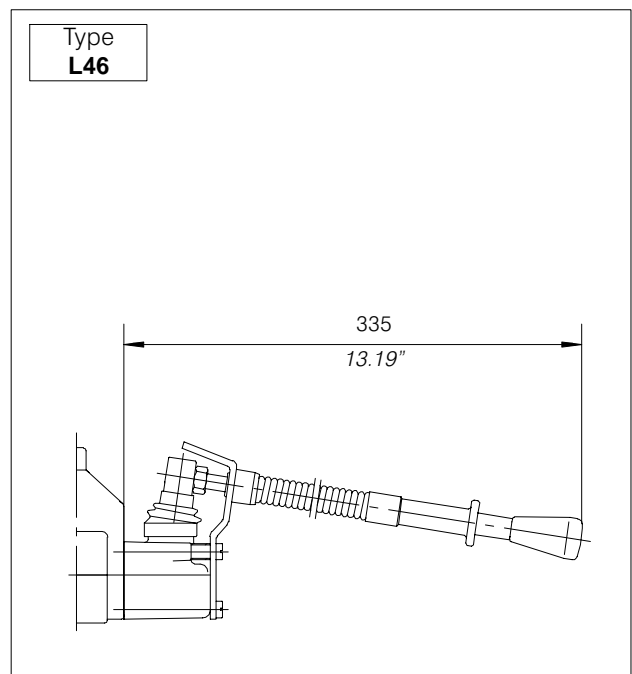
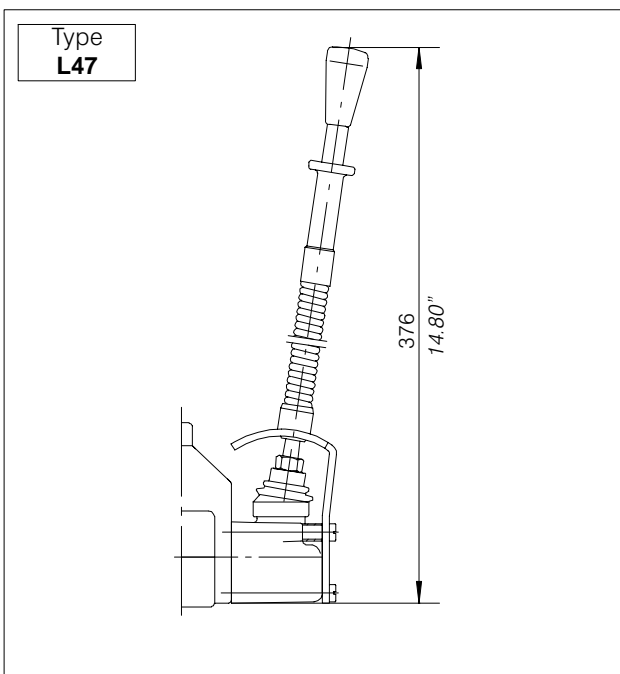
The microswitch is supplied only on customer's request.

10.10 Lever styles



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

10.10.1 Safety levers



10.10.2 Remote cable control

<b>Lever Support</b>	Code 7609.0013.0
----------------------	---------------------

M10X1.5

Optional 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 200.9609.0002.0

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

M10X1.5

122  
4.8"

42  
1.65"

M8x1.25

150  
5.9"

35  
1.38"

40  
1.57"

68  
2.68"

40  
1.57"

35

Optional  
200.6772.0048.0

Only for rod remote control

<b>Type L133</b>	Code 200.9759.3007.0
------------------	-------------------------

Fulcrum

(AL010) Stick Lever M12X1.75

Fulcrum

10.10.3 Cross joystick for dual axis control

<b>Type AL010</b>	Code 200.7022.3004.0
-------------------	-------------------------

Lo=250

M12x1.75

<b>Type L134</b>	Code 200.9759.3007.0
------------------	-------------------------

1 2

T A A P

B B

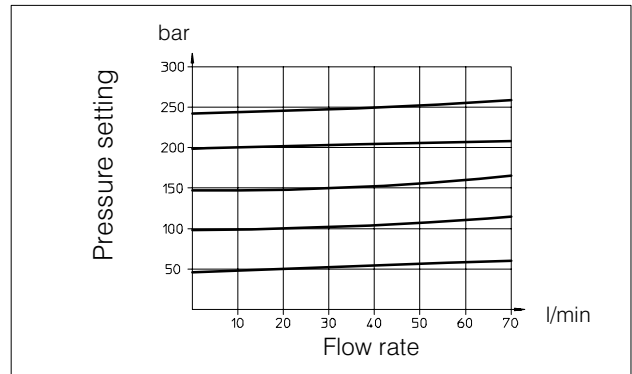
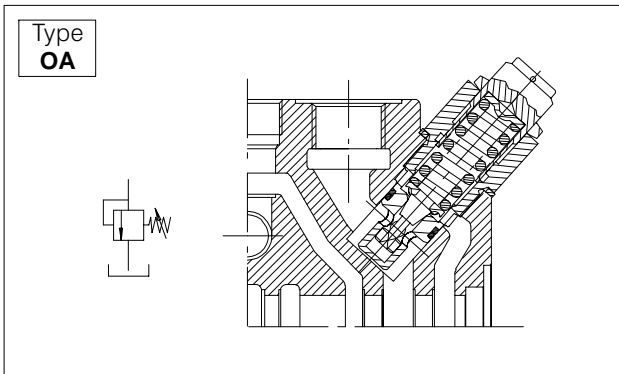
L133-L134 are supplied complete with rubber boot protection

10.11 Anti-shock and anti-cavitation valves

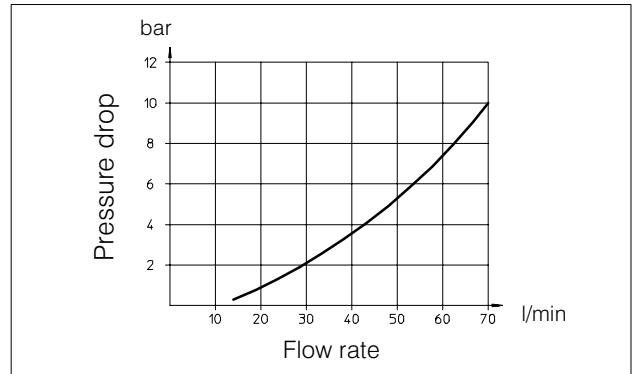
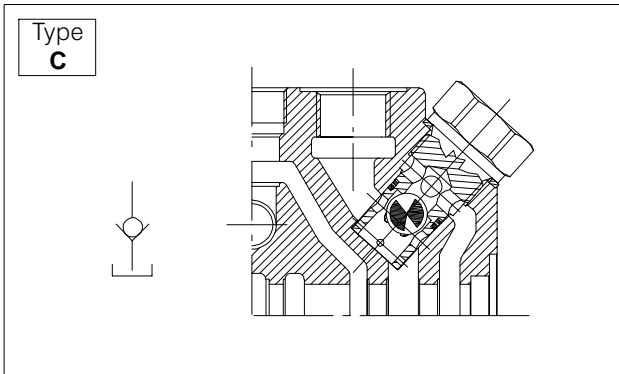
Port relief valve settings

Pressure set range bar (PSI)	Std. setting bar (PSI)	Type	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)

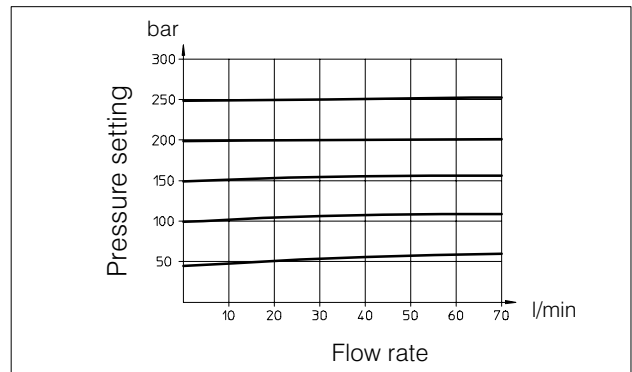
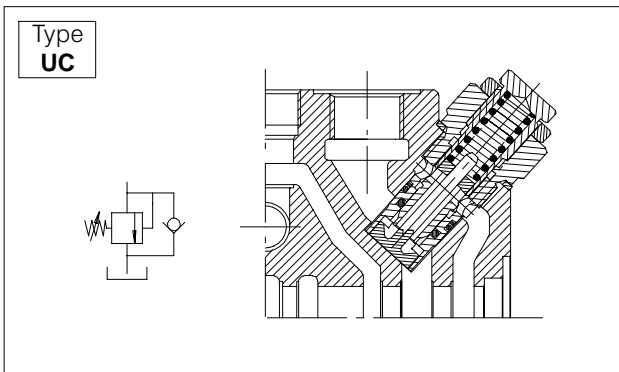
10.11.1 Port relief valve



10.11.2 Anti-cavitation valve



10.11.3 Combined port relief and anti-cavitation valve



**10.12 Hydraulic-Pneumatic control ON-OFF**

Type	Code
<b>HP 24</b>	<b>200.9686.5013.0</b>

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

**10.13 Pneumatic controls**

**10.13.1 Pneumatic proportional control**

Type	Code
<b>PP 151</b>	<b>200.9686.5010.0</b>

**10.13.2 Electro-pneumatic control ON-OFF**

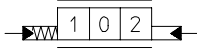
Voltage	Type	Code
12 VDC	<b>EP 77</b>	<b>200.9686.6024.0</b>
24 VDC	<b>EP 78</b>	<b>200.9686.6027.0</b>

Electrical data  
 Insulation class H - 180° C (356° F)  
 Encapsulation material: nylon  
 Temperature range:  
 -10° C to 80° C (14° F to 170° F)  
 Duty cycle: 100% at 68° F ambient  
 Voltage variation: -10% to + 15% of nominal voltage  
 Power consumption DC - 10 W  
 Electrical connection: DIN43650/A (2P + E)  
 Cable connection PG9  
 Protection class: IP65 (with connector)

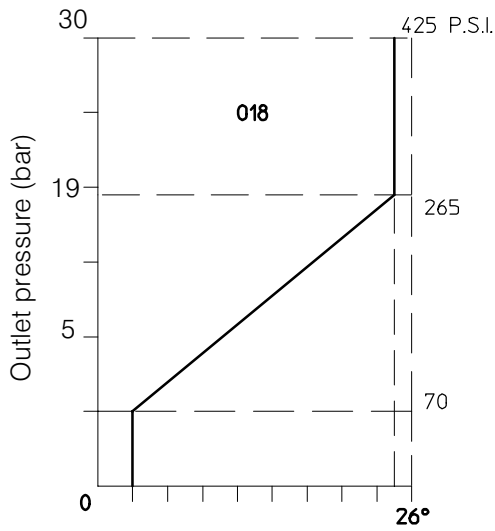
Operating conditions  
 Pressure range: (bar): Min. 6 - Max. 10  
 (PSI): Min. 85 - Max. 145  
 Ambient temperature: -10° C to 50° C (14° F to 122° F)  
 Response time: 6 - 8 milliseconds  
 Mounting in any position

10.14 Hydraulic Proportional control

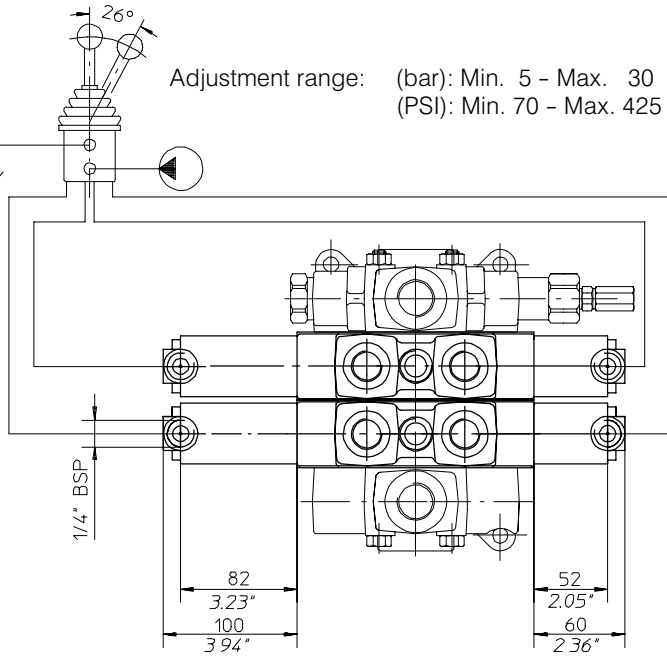
Type	Code
<b>HP 50</b>	200.9686.5020.0



Joystick adjustment diagram



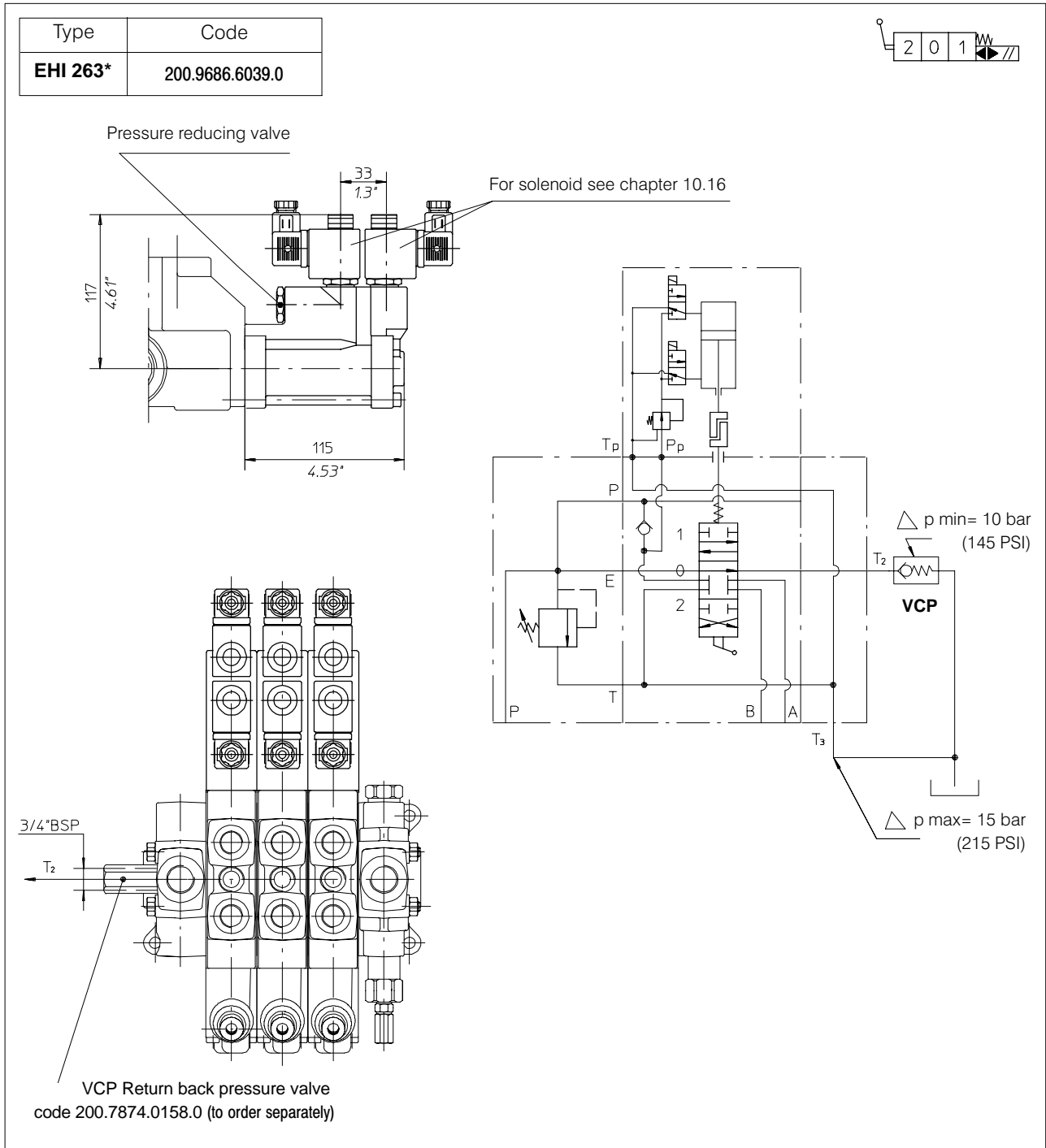
Adjustment range: (bar): Min. 5 - Max. 30  
(PSI): Min. 70 - Max. 425





**10.15 Electro-Hydraulic controls**

**10.15.1 Electro-hydraulic control internal pilot version  
ON-OFF with pressure reducing valve**



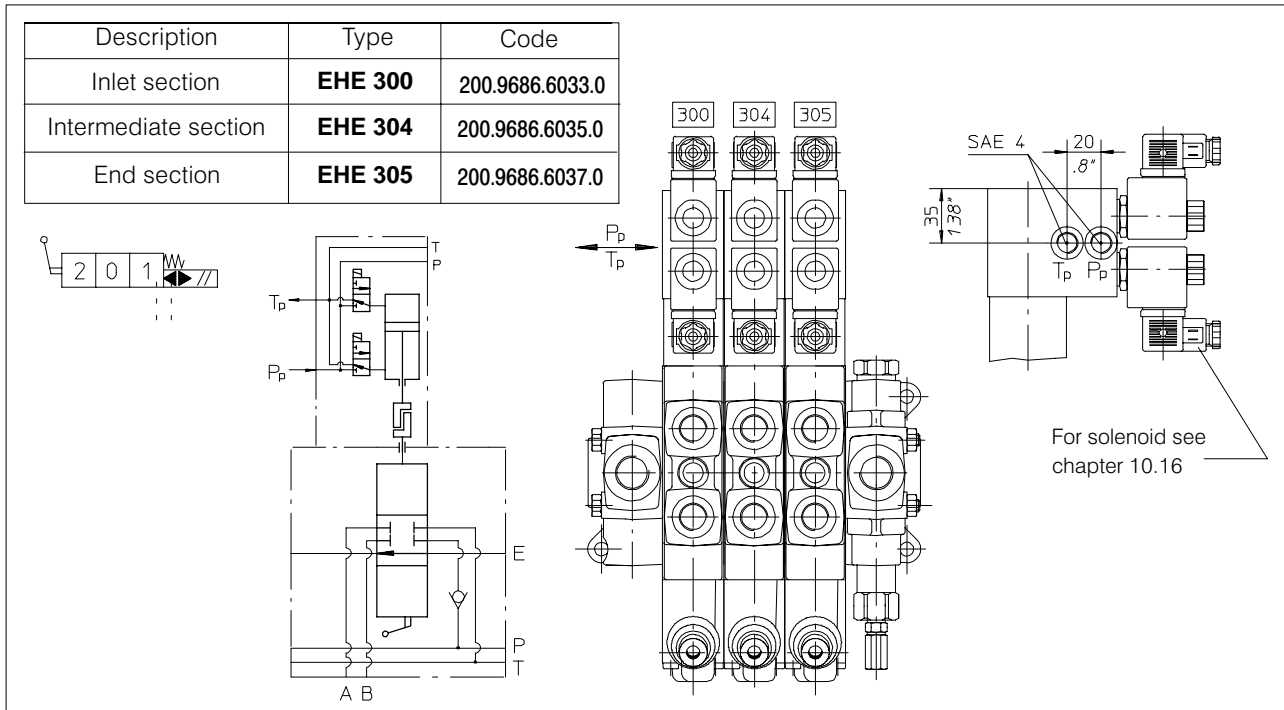
**Mechanical and hydraulic features**

Max pressure on  $P_p$  port . . . . . 300 bar (4300 PSI)  
 Reduced pressure after  
 pressure reducing valve . . . . . 10 bar (145 PSI)  
 Fixed delivery on  $P_p$   
 pilot line . . . . . 1 l/min (0.26 U.S.G.P.M)

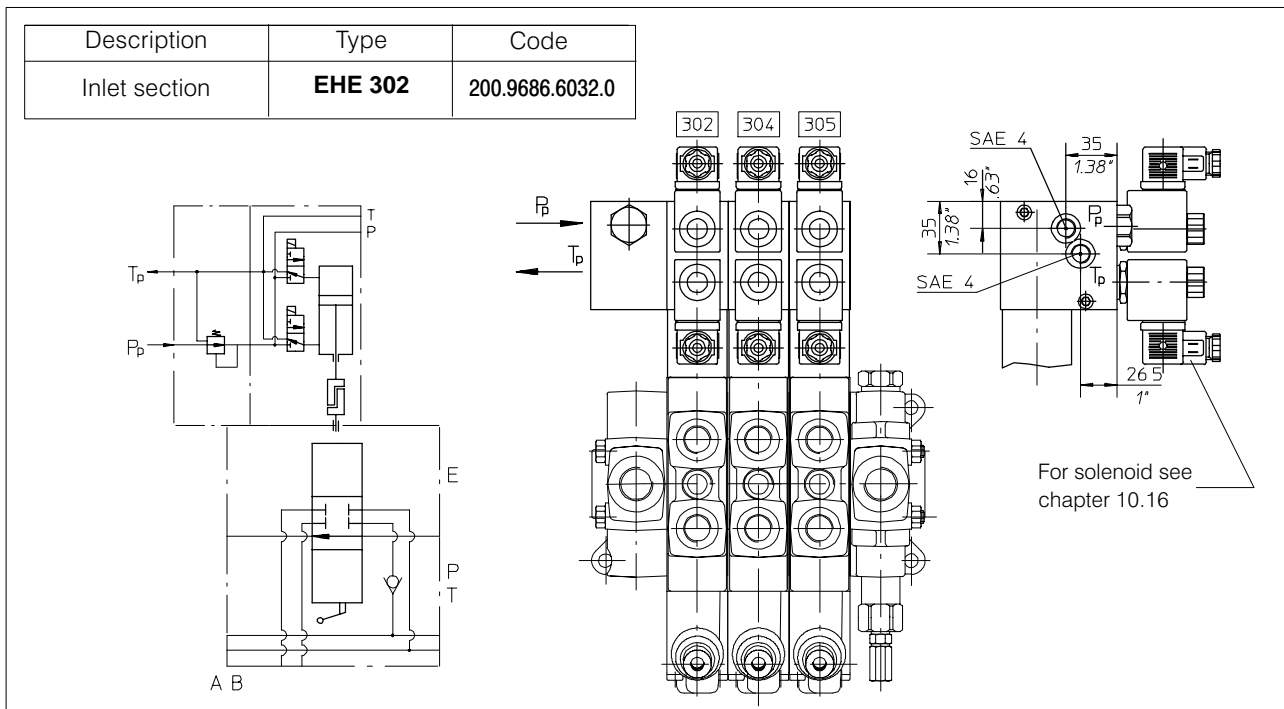
Leakage of pressure reducing  
 valve (in neutral pos.) . . . . . 100 ml/min ( 6.1 in<sup>3</sup>/min )  
 Min. suggested filtration . . . . . 25 micron  
 Operating oil temperature . . . . . min. -30°C - max 90°C  
 . . . . . min. -22°F - max 194°F

\* EHI263 version special body required

10.15.2 Electro-hydraulic control external pilot version ON-OFF



10.15.3 Electro-hydraulic control external pilot version ON-OFF with pressure reducing valve on inlet manifold

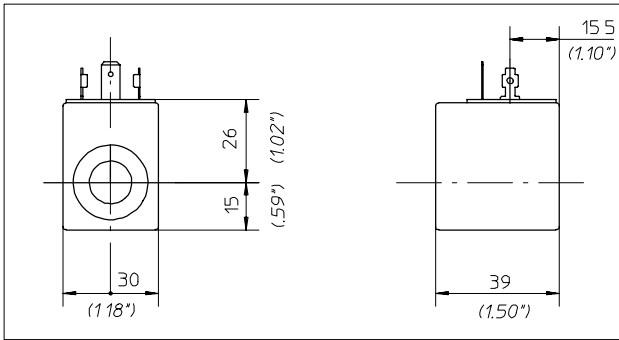


Mechanical and hydraulic features

Pilot pressure with pressure reducing valve ..... 12 bar (175 PSI)  
 Pilot flow to each working section: 1 l/min (0.26 U.S.G.P.M.)  
 Operating oil temperature ..... min. -30°C - max. 90°C

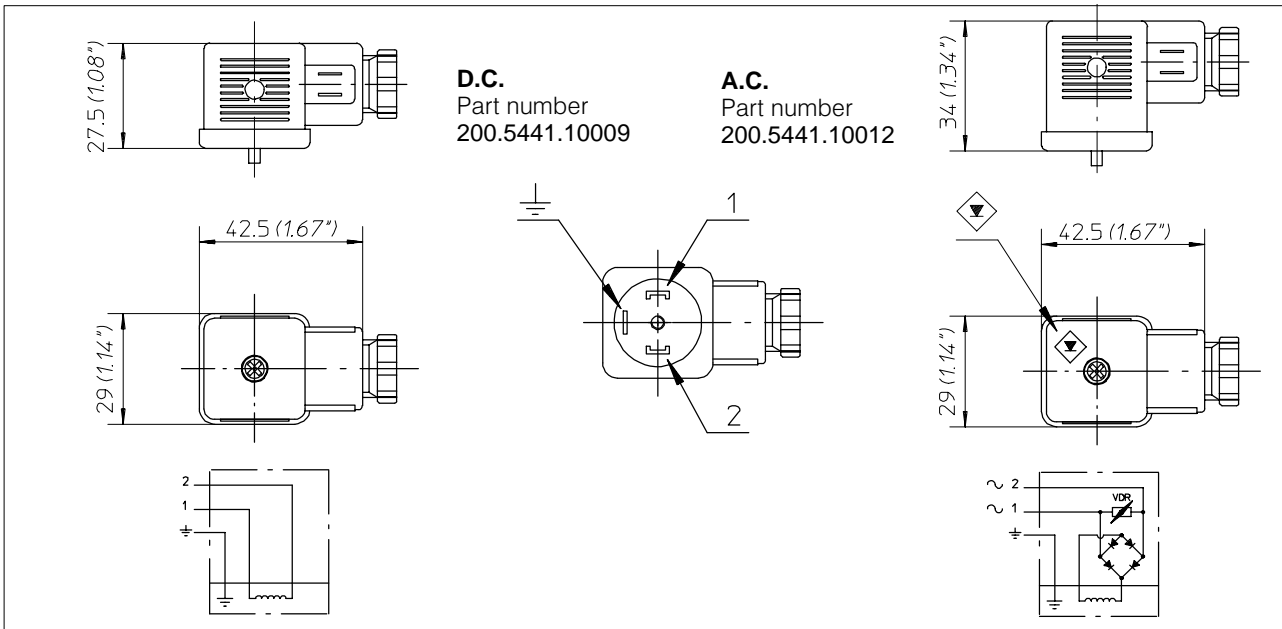
..... min. -22°F - max 194°F  
 Leakage of pressure reducing valve (in neutral pos.) ..... 100 ml/min (6.1 in<sup>3</sup>/min)  
 Min. suggested filtration ..... 25 micron

**10.16 Solenoids for pilot electrovalves EHI-EHE**



Wire class	F (VDE 0580)
Coil insulation	IP65 (DIN 40050)
Duty rating	ED 100%
Stabilized temperature	70 °C
Voltage tolerance	± 10%

Supply voltage	Nominal coil voltage	Power (Watt)	Resistance (Ohm)		Current (Ampere)		Coil code
			Ambient temp.	Stabilized temp.	Ambient temp.	Stabilized temp.	
12 V. DC	12 V. DC	18.7	7.7	10.8	1.56	1.11	200.6749.1003.0
24 V. DC	24 V. DC	18.6	31	41.4	0.77	0.58	200.6749.2003.0
24 V. AC	21.6 V. DC	17.3	27	36	0.80	0.60	200.6748.2003.0
110 V. AC	98 V. DC	15.6	630	825	0.157	0.120	200.6748.4003.0
220 V. AC	198 V. DC	15.7	2500	3300	0.08	0.06	200.6748.6003.0

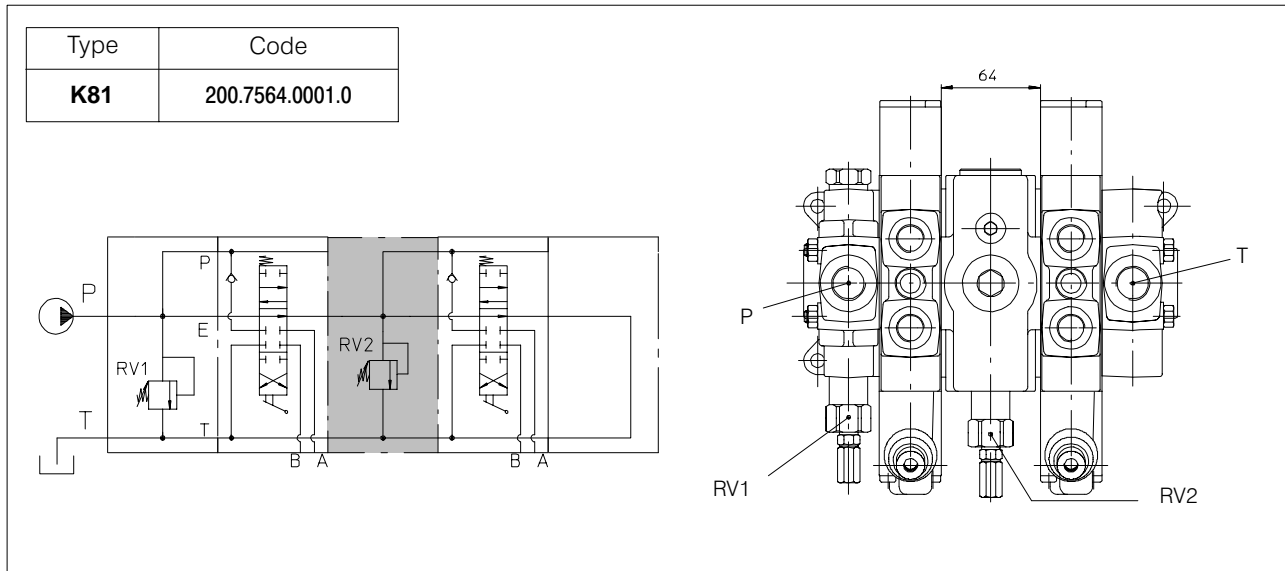


Armour clamp	Pg 9
Ø cable	6 - 8 mm
Diodes	1N 4007 GP
Overvoltage protection	VDR
Connector type	DIN 43650
Number of poles	2 + $\perp$
Supply voltage	max. 220 V
Nom. capacity at contacts	10 Ampere

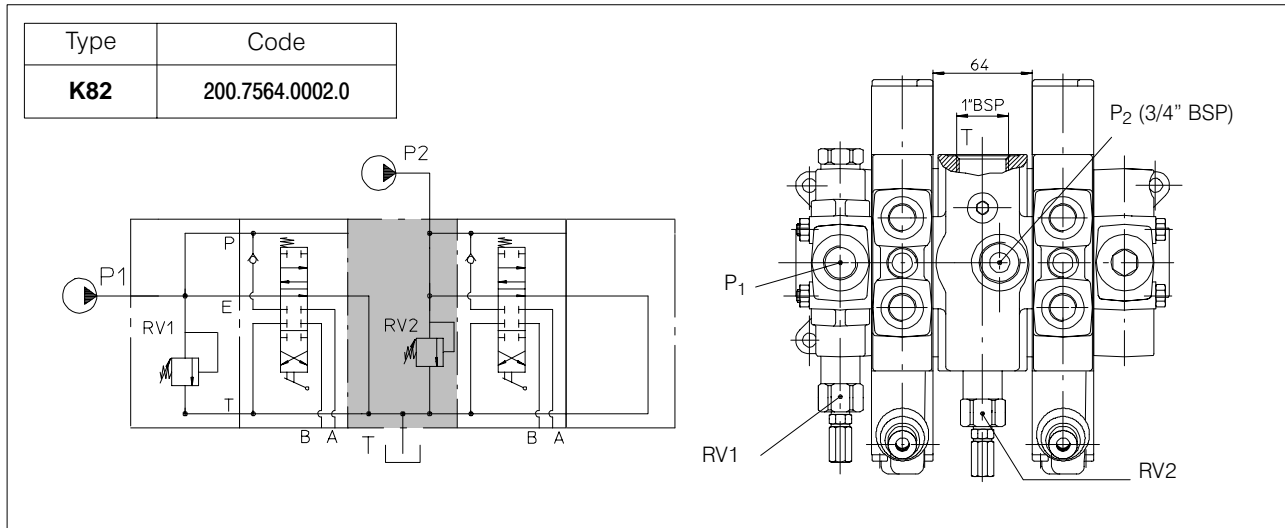
Max capacity at contacts	16 Ampere
Resistance at contacts	≥ 4 mOhm
Max section of cable	1.5 mm <sup>2</sup>
Outer material	Glass fibre reinforced nylon
Protection factor	IP65 (DIN 40050)
Insulation class	C (VDE 0110)
Temperature range	-40° +90°C

**10.17 Intermediate sections**

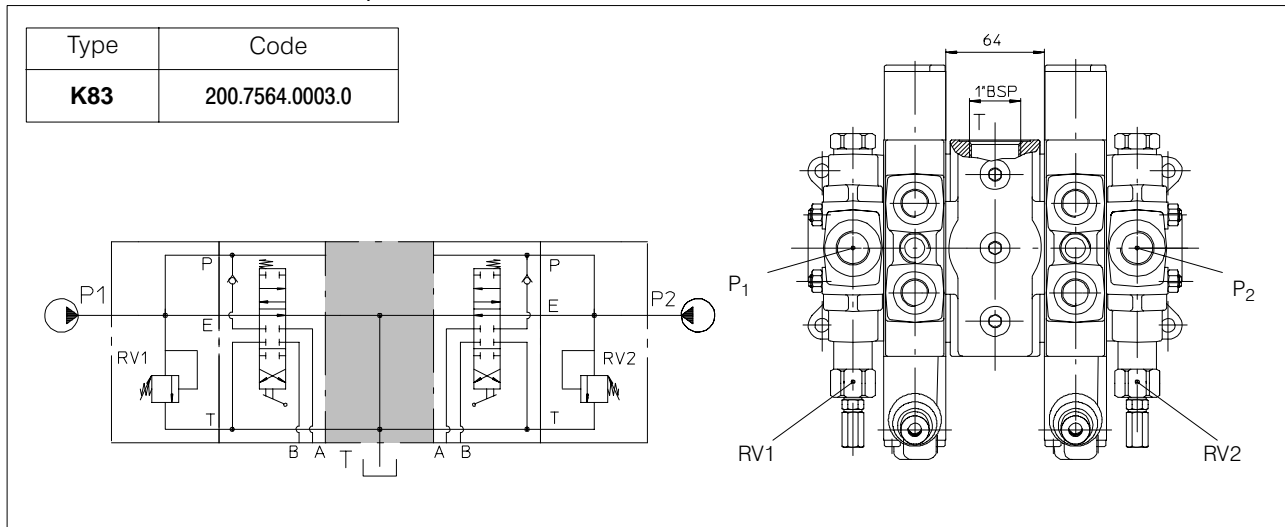
**10.17.1 Section with relief valve**



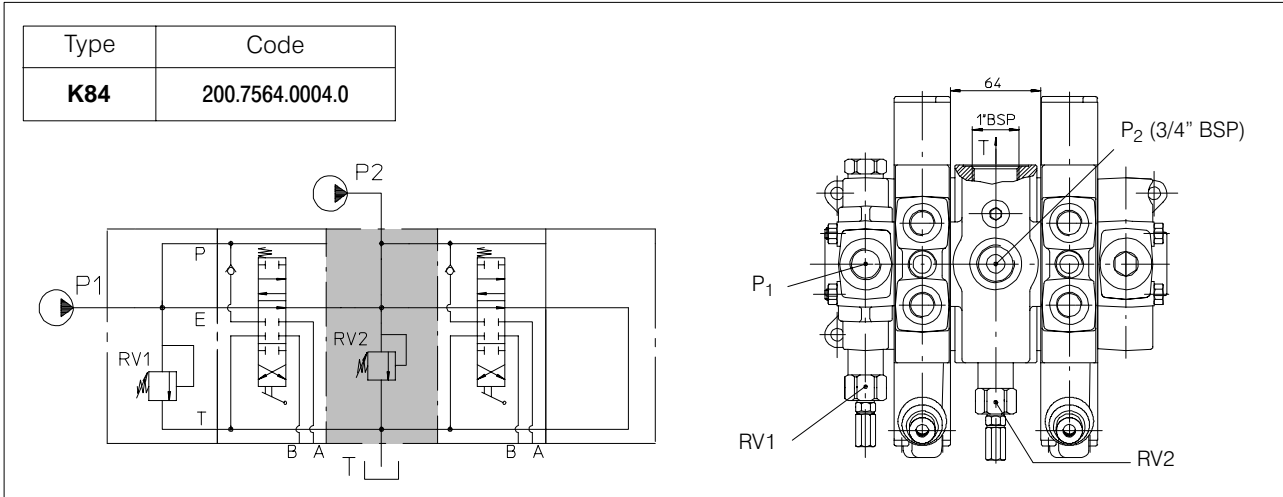
**10.17.2 Section with intermediate inlet pressure and outlet return ports (with independent flows)**



**10.17.3 Section with outlet return port**



10.17.4 Section with intermediate inlet pressure and outlet return ports (with combined flows)



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