

HDS20 Series

Sectional Directional Control Valve



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HDS20 Series

Sectional Directional Control Valve



General Specifications

Technical specification	Metering unit system	
Max flow rate	l/min U.S.G.P.M.	80 21
Max operating pressure	bar PSI	320 4600
Max back pressure	bar PSI	30 400
Oil temperature	° C ° F	-10 to +80 14 to 180
Oil viscosity	° E cSt	2.4 to 10 16 to 75
Oil filtration	μ	≤ 30

Spool leakage at 100 bar (1450 PSI), Temp. 50° C (120° F), viscosity 27 cSt:

Maximum	cm ³ /min Cu. In./min	16 1.138
Average	cm ³ /min Cu. In./min	10 0.712
Lower values on demand (to be agreed with our Sales Dpt.)		

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, anticavitation and service relief valve	OA-UC-C

Weight

Technical specification	Metering unit systems	
Inlet with RV	kg LBS	2.2 4.85
1 spool section	kg LBS	3.4 7.50
End cover standard	kg LBS	1.9 4.18

Material specification:

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

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.

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.

Symbols:

P: inlet port
T: outlet port
A/B: work ports
H.P.C.O.: carry-over
RV: relief valve
P₁T₁: side inlet and outlet
3.1.0.2: spool position
P: pressure line
T: exhaust line
E: centre line (by pass).

Dimensional data shown in mm and inches

HDS20 Series

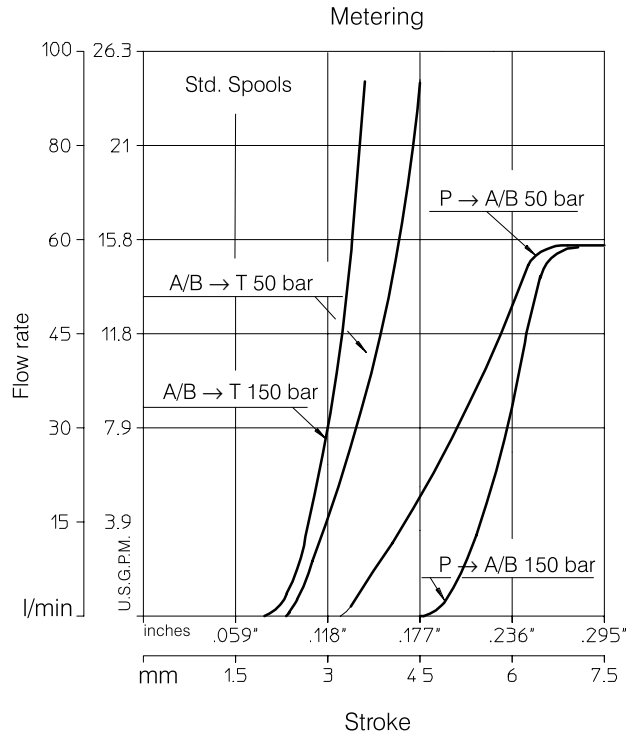
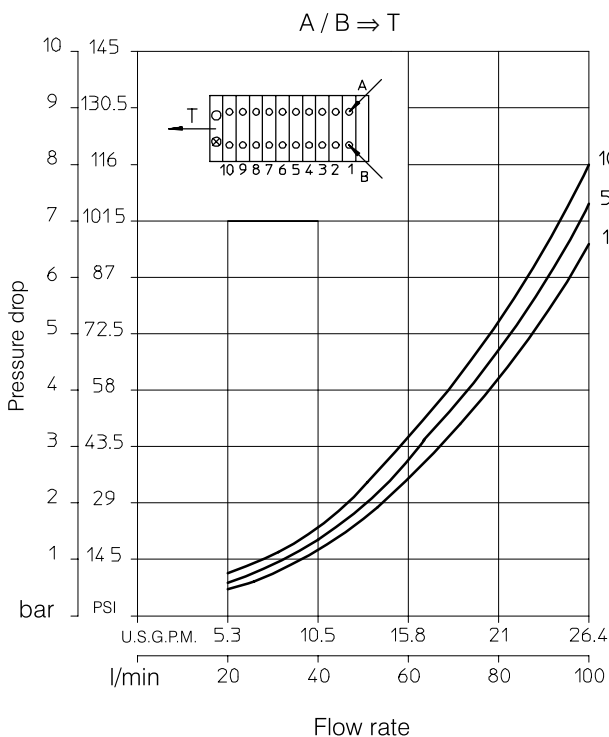
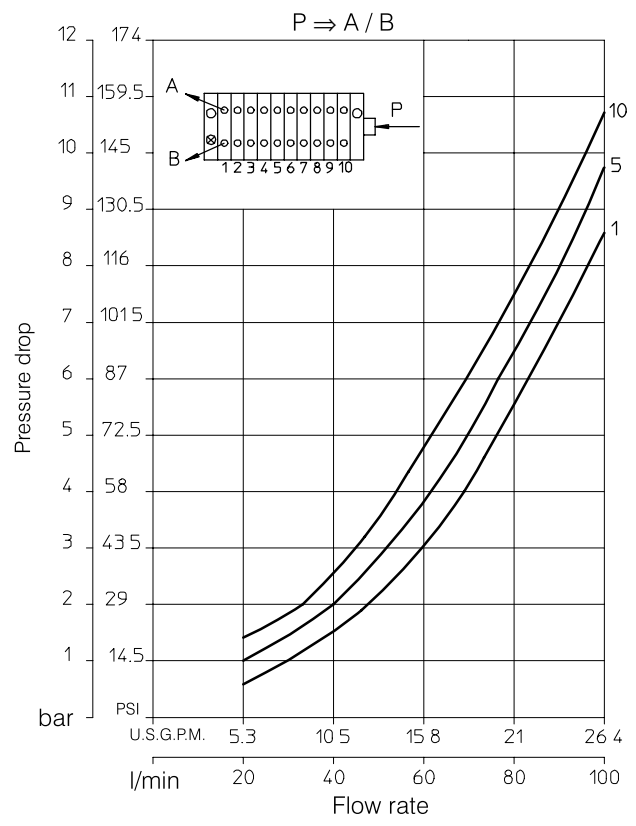
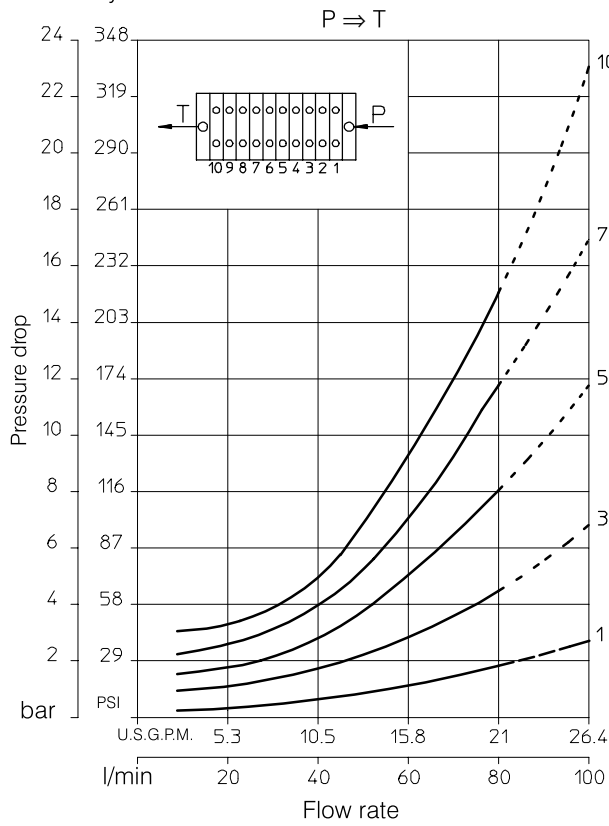
Sectional Directional Control Valve



Performance curves

Parallel circuit

Oil: Shell Tellus T37
 Temperature: 50° C (120° F)
 Viscosity: 27 cSt



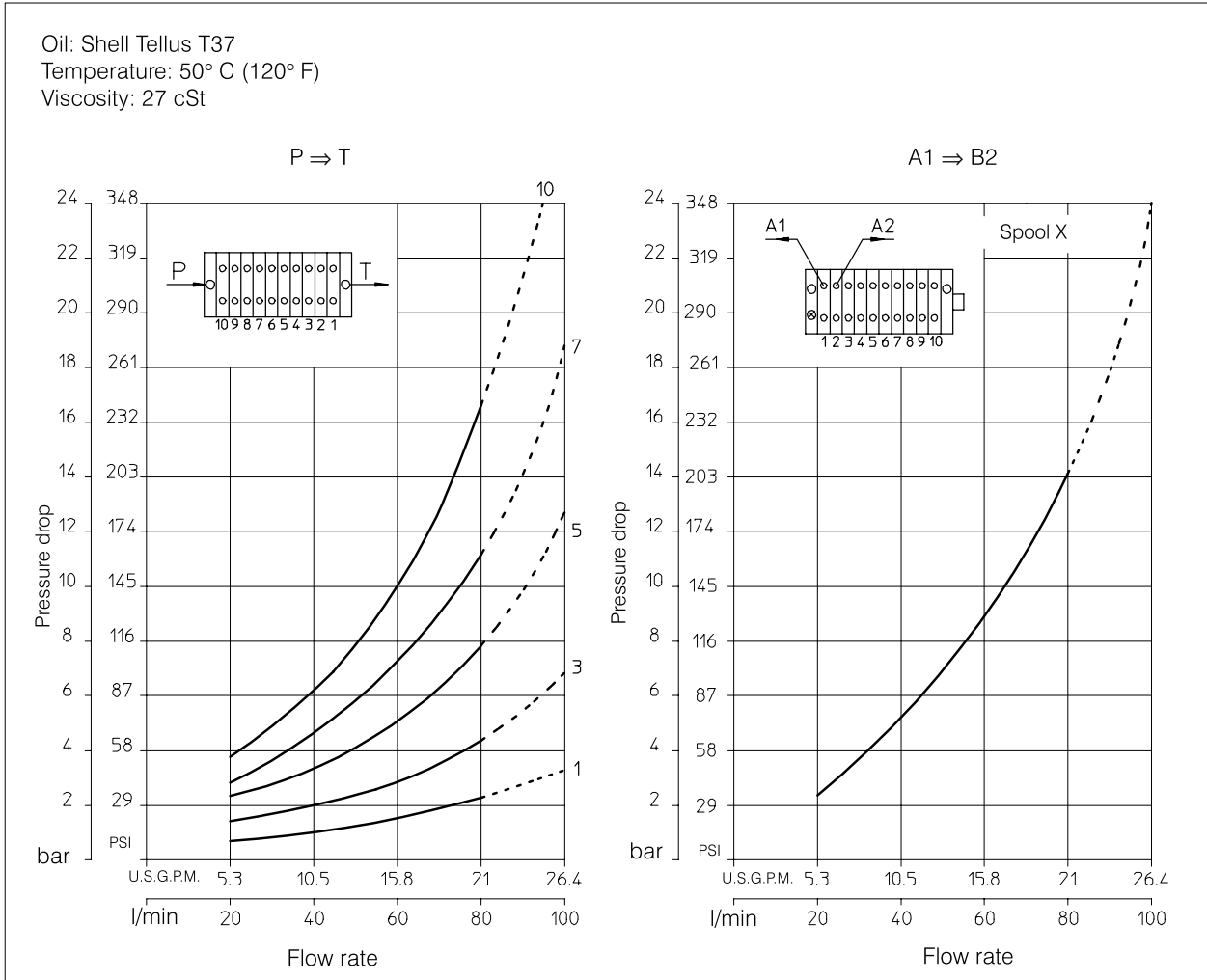
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Sectional Directional Control Valve

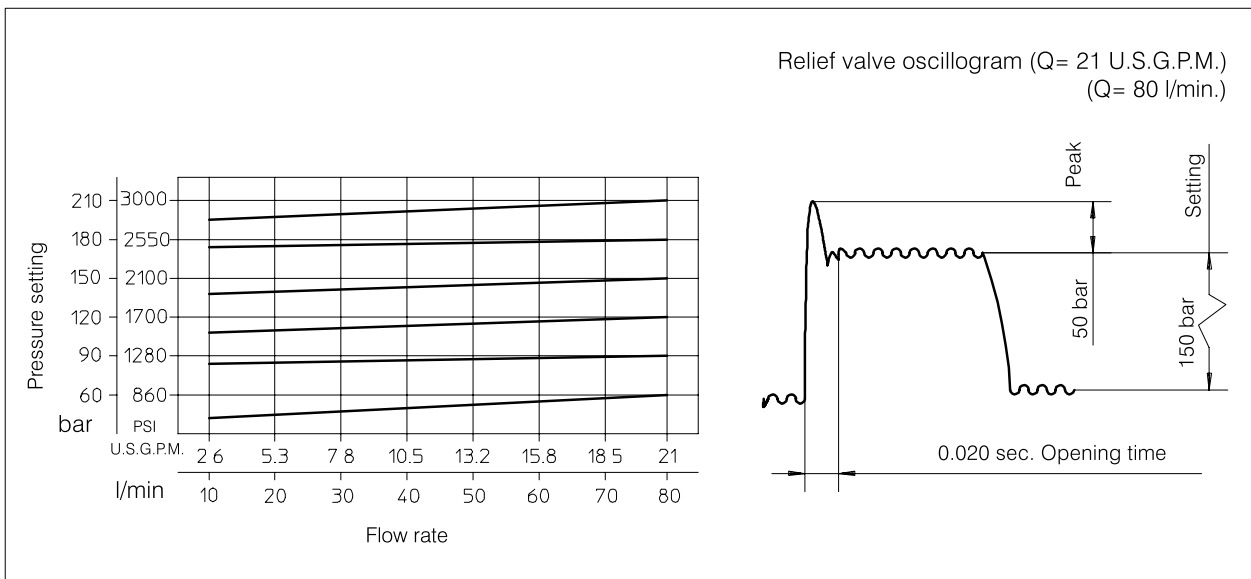


Series circuit

Oil: Shell Tellus T37
 Temperature: 50° C (120° F)
 Viscosity: 27 cSt



Transient hydraulic characteristics Relief Valve RV



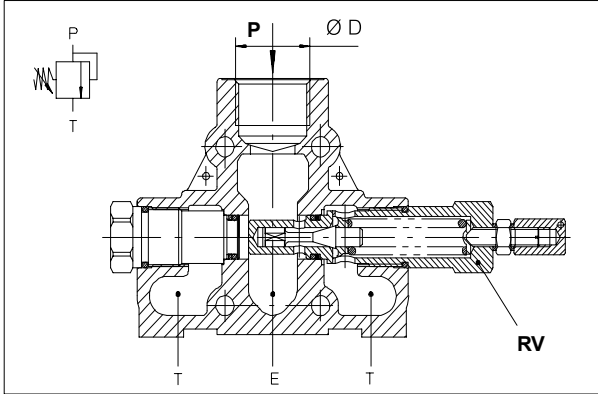
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Sectional Directional Control Valve



Inlet Cover

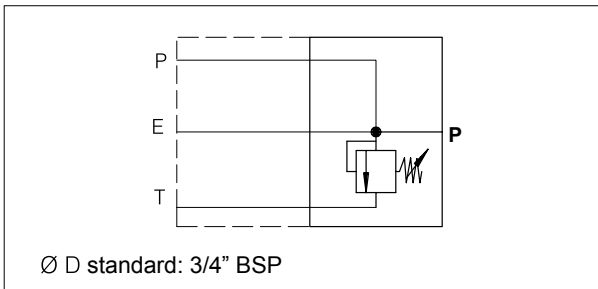
Adjustable direct acting Relief Valve RV



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

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

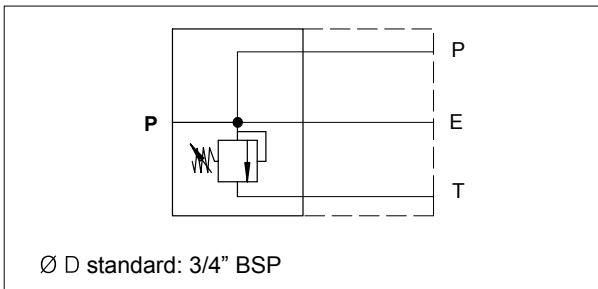
Right inlet manifold (standard) with P and RV for parallel circuit



Ø D (diameter)	Code
M22X1.5	T01 * 200.9314.9001.0
3/4" BSP	T02 * 200.7314.4001.0
SAE12	T04 * 200.9314.9002.0

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

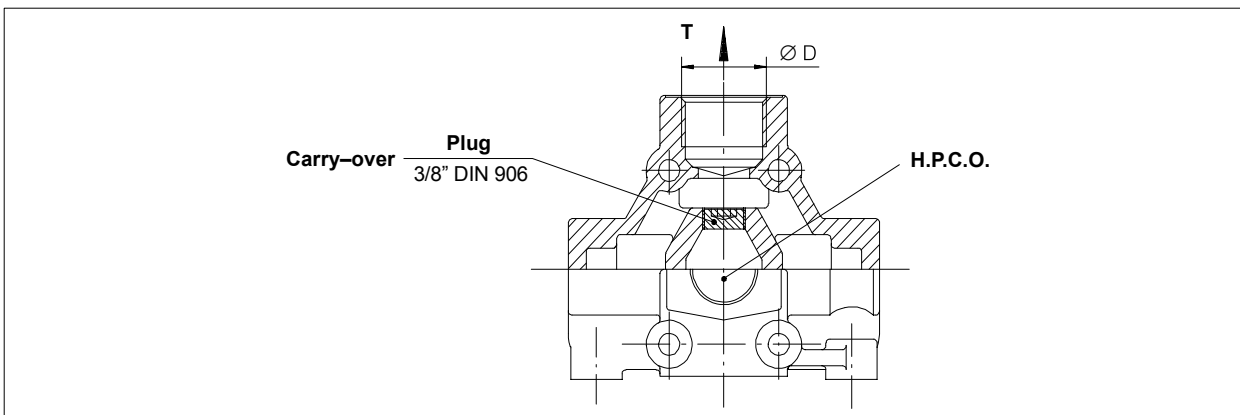
Left inlet manifold with P and RV (standard on series circuit)



Ø D (diameter)	Code
M22X1.5	T09 * 200.9314.9003.0
3/4" BSP	T10 * 200.9314.4002.0
SAE12	T12 * 200.9314.9004.0

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

End Cover

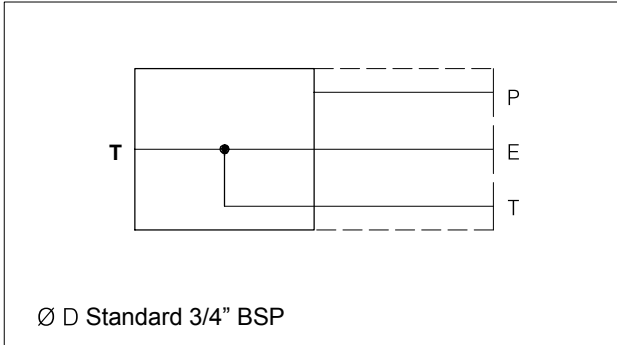


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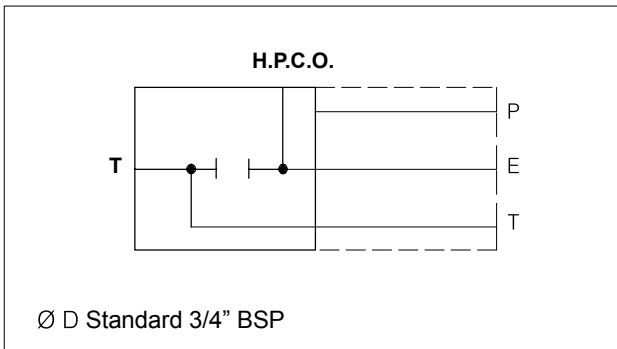
Sectional Directional Control Valve

Left outlet cover with T for parallel circuit
(Standard)



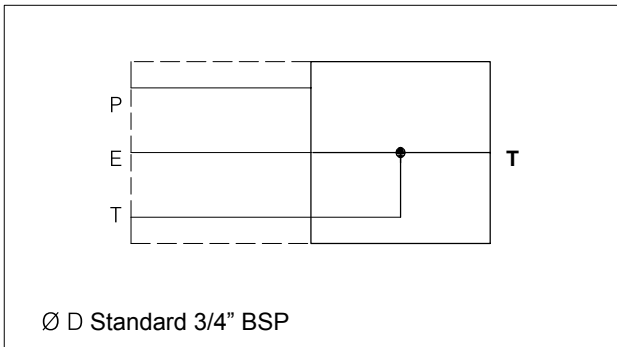
Ø D (diameter)	Code
M22X1.5	P01 200.9304.9001.0
3/4" BSP std	P02 200.9304.4001.0
SAE12	P04 200.9304.9002.0

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



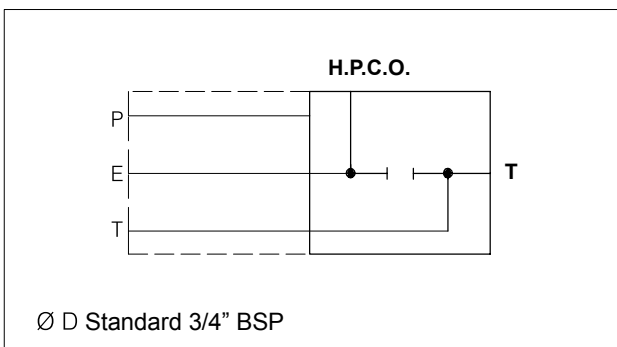
Ø D (diameter)	Code
M22X1.5	P05 200.9304.9003.0
3/4" BSP std	P06 200.9304.4002.0
SAE12	P08 200.9304.9004.0

Right outlet cover with T (standard on series circuit)



Ø D (diameter)	Code
M22X1.5	P09 200.6304.9005.0
3/4" BSP std	P10 200.6304.4003.0
SAE12	P12 200.6304.9006.0

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



Ø D (diameter)	Code
M22X1.5	P13 200.9304.9007.0
3/4" BSP std	P14 200.9304.4004.0
SAE12	P16 200.9304.9008.0

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Sectional body

Standard circuit: parallel

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

Optional circuit: series and tandem

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

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Spool chart

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

**: special body required

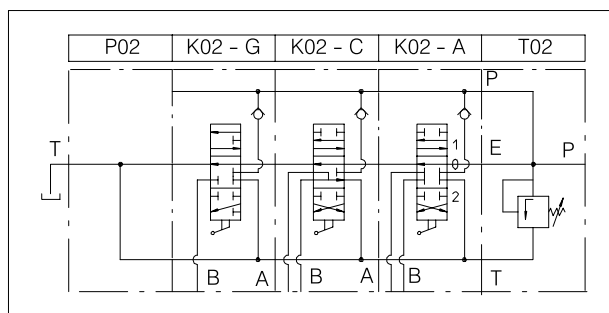
S Ss*		3 way - 3 position A: blocked E: open by pass
X		4 way - 3 position series connection
Xc		4 way - 3 position A/B: to tank in neutral
Z		4 way - 4 position 4 th float position
LsA **		4 way - 3 position A/B: blocked Load Sensing
LsC **		4 way - 3 position A/B: to tank in neutral Load Sensing
LsG **		3 way - 3 position B: blocked Load Sensing
LsS **		3 way - 3 position A: blocked Load Sensing

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

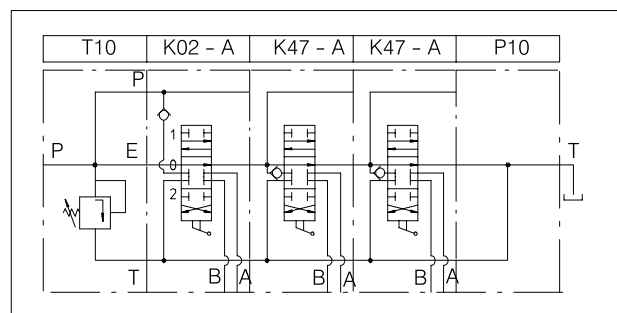
Note: For availability of L/S versions please contact our Sales Department

Hydraulic circuits

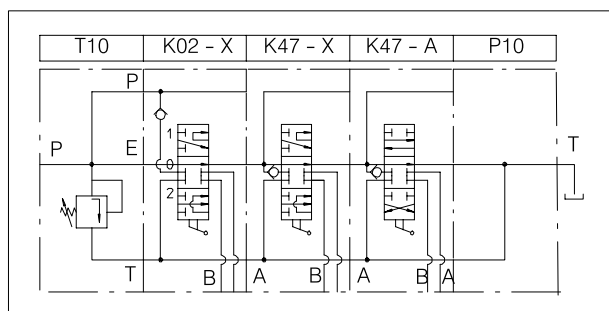
Standard parallel circuit



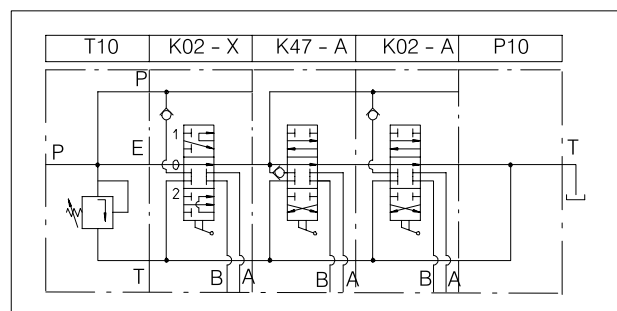
Optional tandem circuit



Optional series circuit



Combined parallel/series circuit



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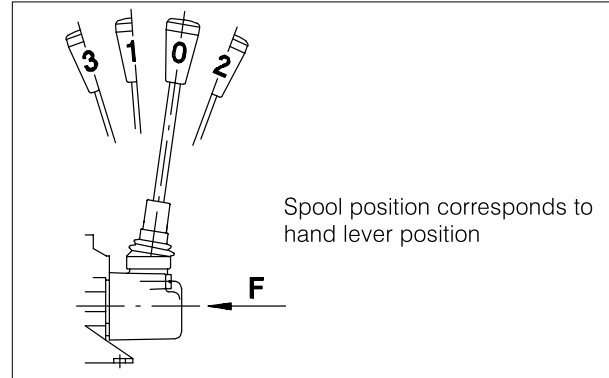
Sectional Directional Control Valve



Spool action

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

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

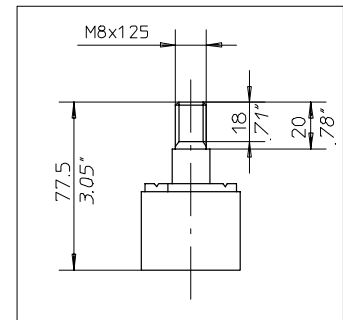
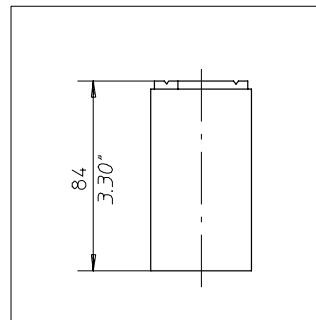
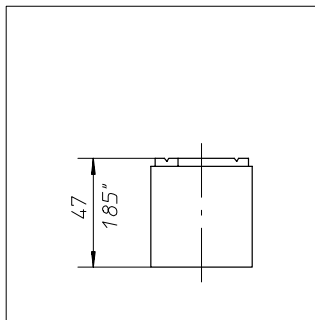


Force (F) for spool movement

Spool position control	F (N)
01 (standard)	350
56	280

Note: consult factory for other configurations.

Spool positioners dimensions



Spool positioners:
01 - 02 - 03 - 05 - 06
07 - 09 - 11 - 19 - 56

Spool positioners:
128
(Z spool type)

Spool positioners:
83

Microswitch control

31	Microswitch operated with spool in pos.1 and 2	
46	Microswitch operated with spool in pos.1	
47	Microswitch operated with spool in pos.2	

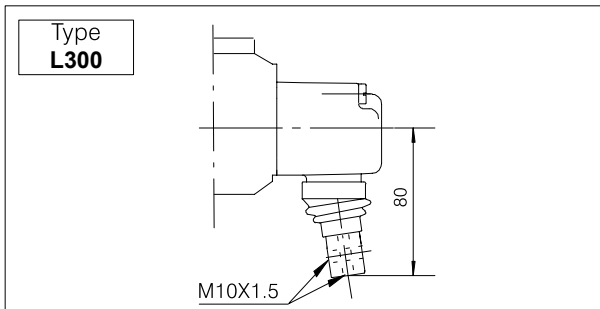
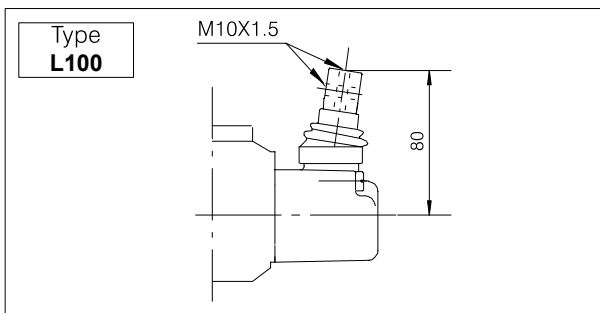
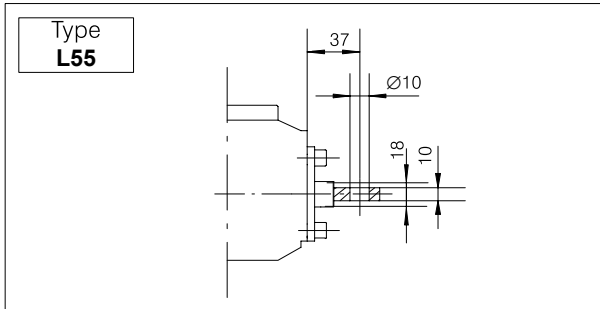
The microswitch code 200.9625.0001.0 is supplied only on customer's request.

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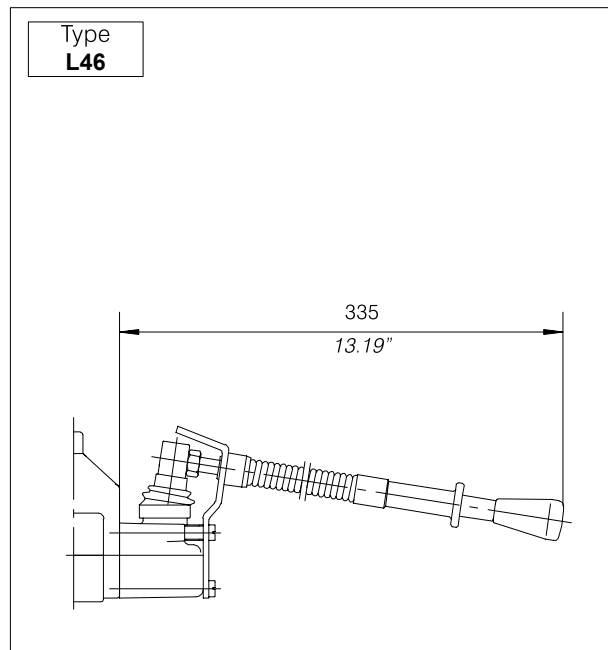
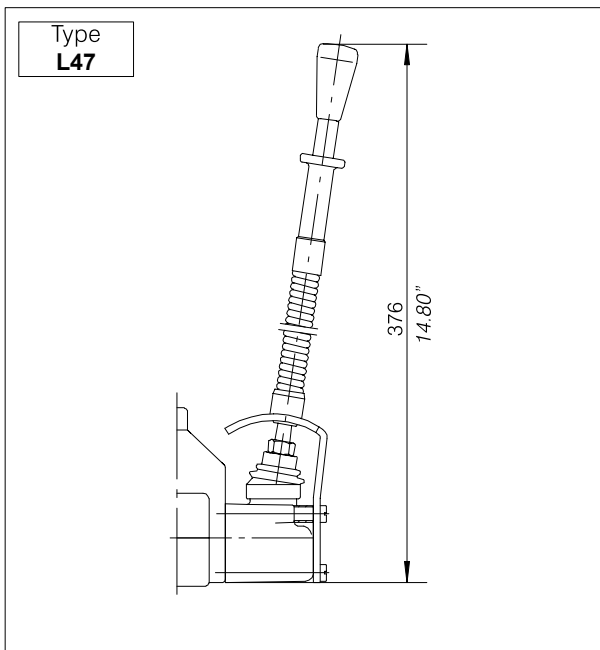


Lever styles



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

Safety levers



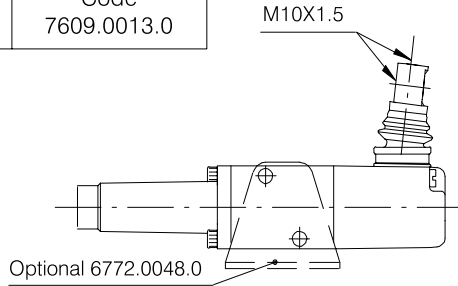
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Remote cable control

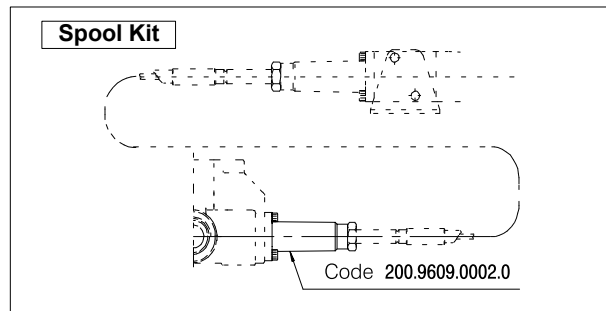
Lever Support	Code 7609.0013.0
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Type	Lo		Code
	mm	inches	
AL001	185	7.28	200.7022.2001.0
AL002	250	9.84	200.7022.2003.0
AL003	300	11.81	200.7022.2004.0
AL004	350	13.78	200.7022.2005.0

Cable	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.



Type	Code
L142	200.7071.2012.0

Only for rod remote control

Type	Code
L133	200.9759.3007.0

Cross joystick for dual axis control

Type	Code
AL010	200.7022.3004.0

Type	Code
L134	200.9759.3007.0

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Sectional Directional Control Valve

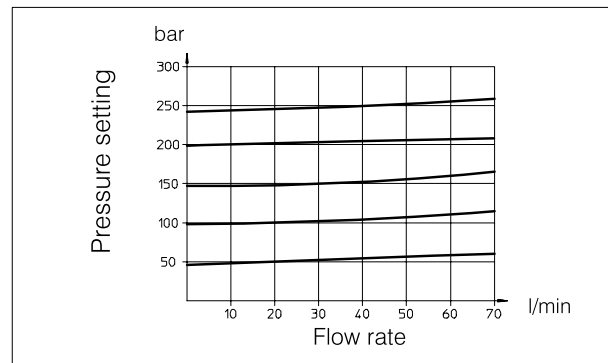
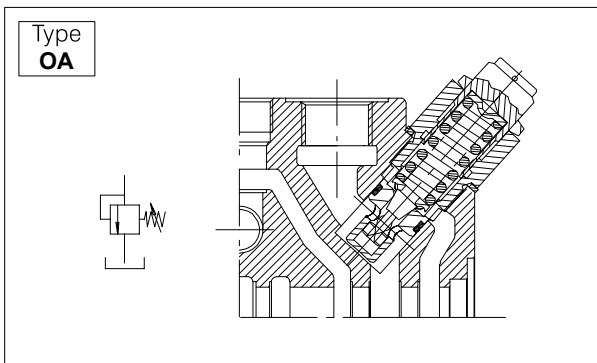


Anti-shock and anticavitation valves

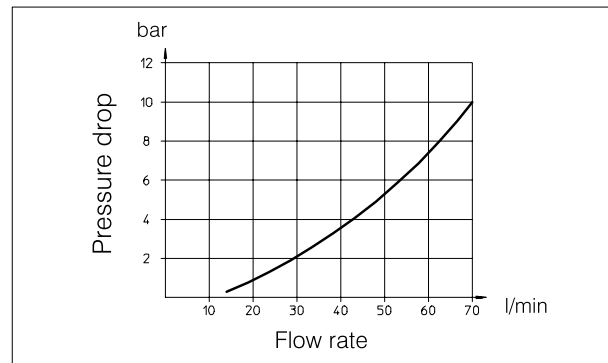
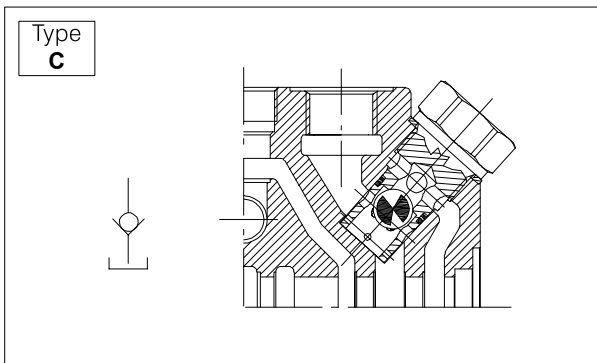
Port relief valve settings

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

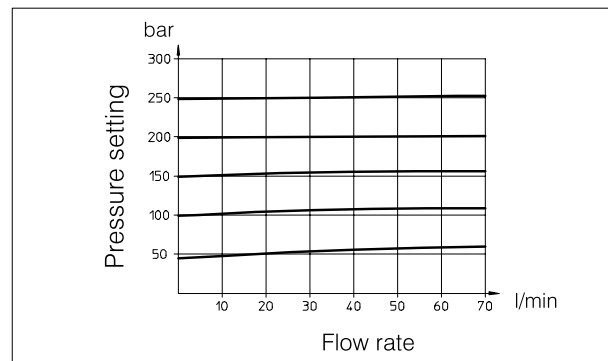
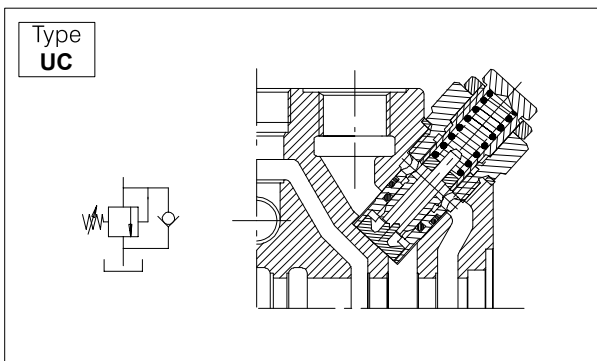
Port relief valve



Anticavitation valve



Combined port relief and anticavitation valve



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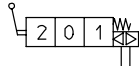
Sectional Directional Control Valve



Pneumatic controls

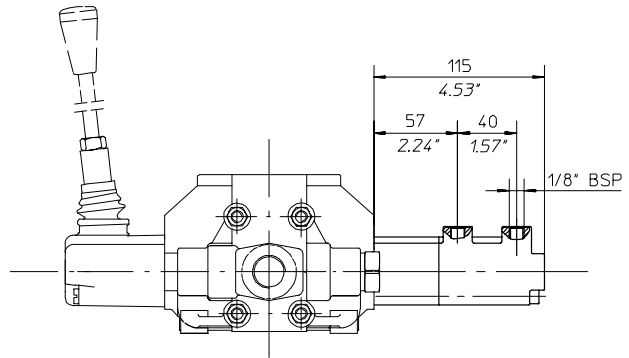
Pneumatic control ON-OFF

Type	Code
P 24	200.9686.5013.0



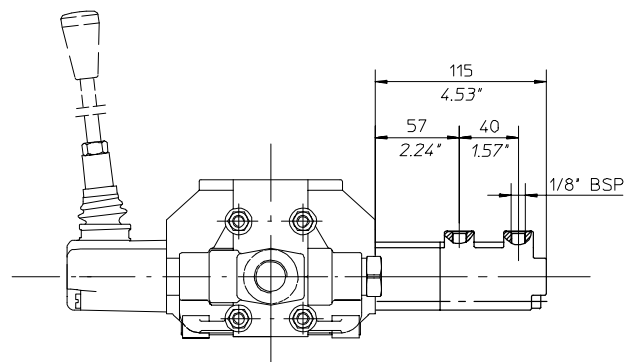
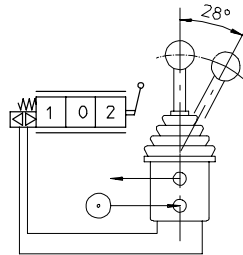
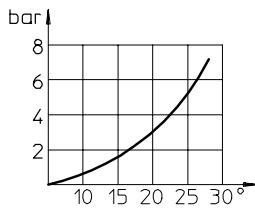
Operating conditions

Pressure range: (bar): Min. 6 - Max. 10
(PSI): Min. 85 - Max. 145



Pneumatic proportional control

Type	Code
PP 151	200.9686.5010.0



Electro-pneumatic control ON-OFF

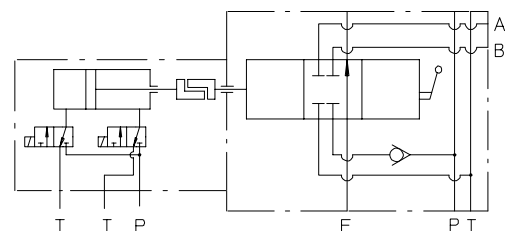
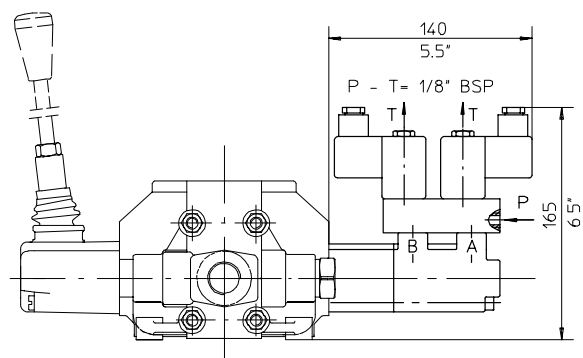
Type	Voltage	Code
EP 77	12 VDC	200.9686.6024.0
EP 78	24 VDC	200.9686.6027.0

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



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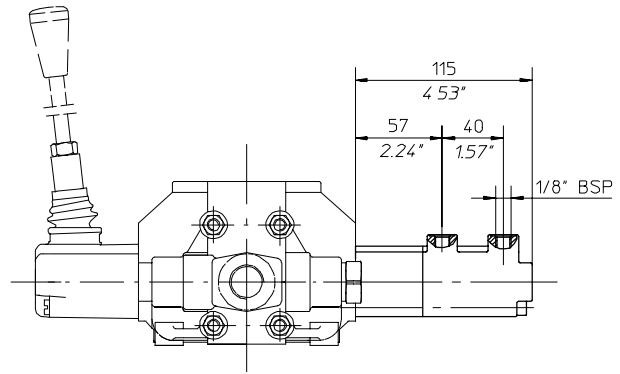
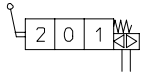


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Hydraulic controls

Hydraulic control ON-OFF

Type	Code
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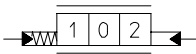


Operating conditions

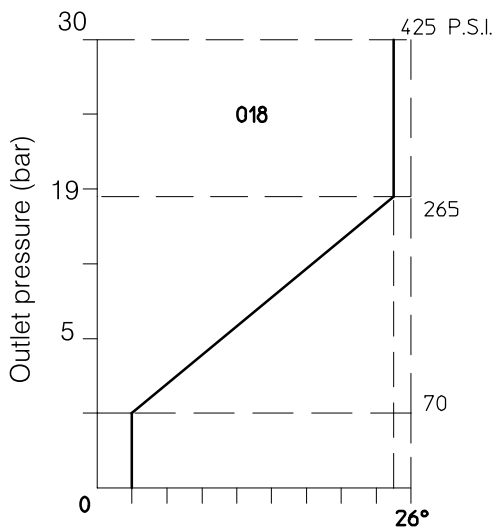
Pressure range: (bar): Min. 6 - Max. 15
(PSI): Min. 85 - Max. 215

Hydraulic proportional control

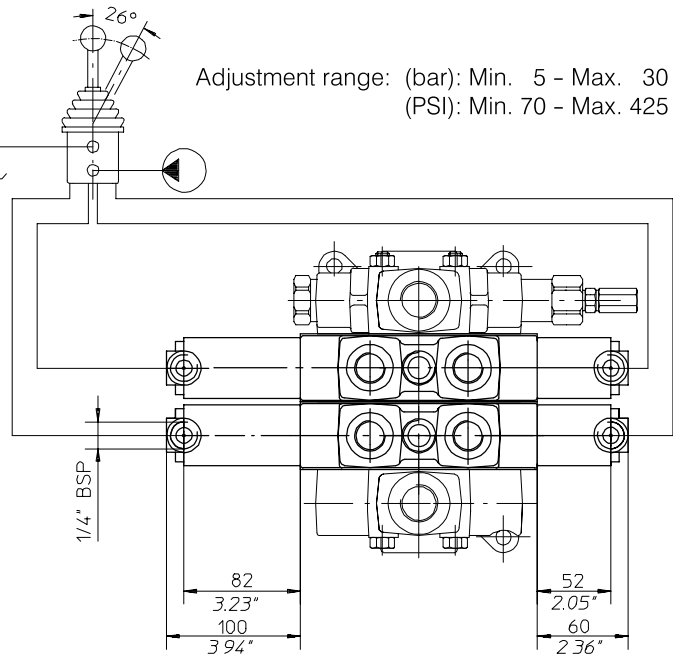
Type	Code
HP 50	200.9686.5020.0



Joystick adjustment diagram



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



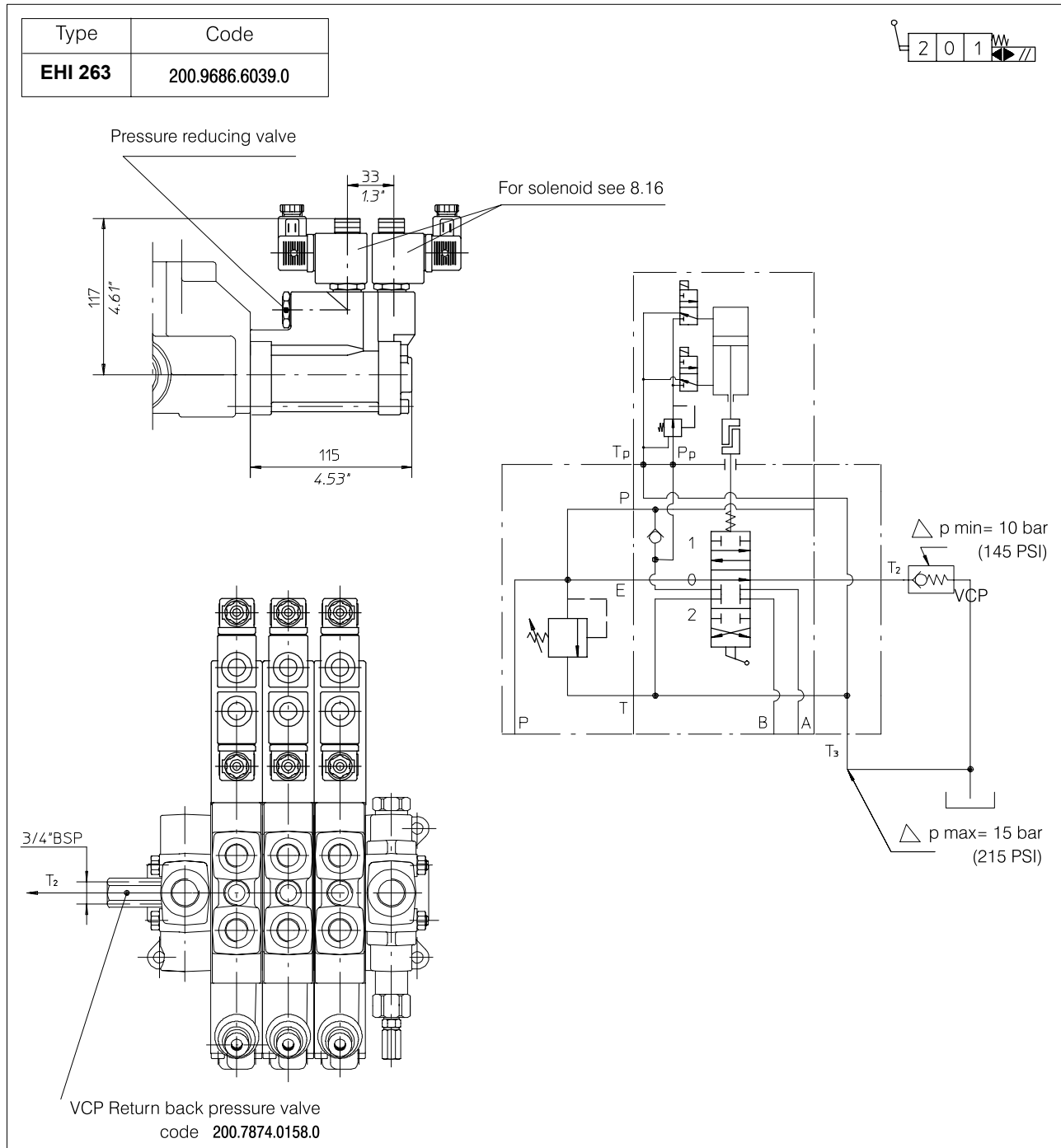
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Sectional Directional Control Valve



Electro-hydraulic controls

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)

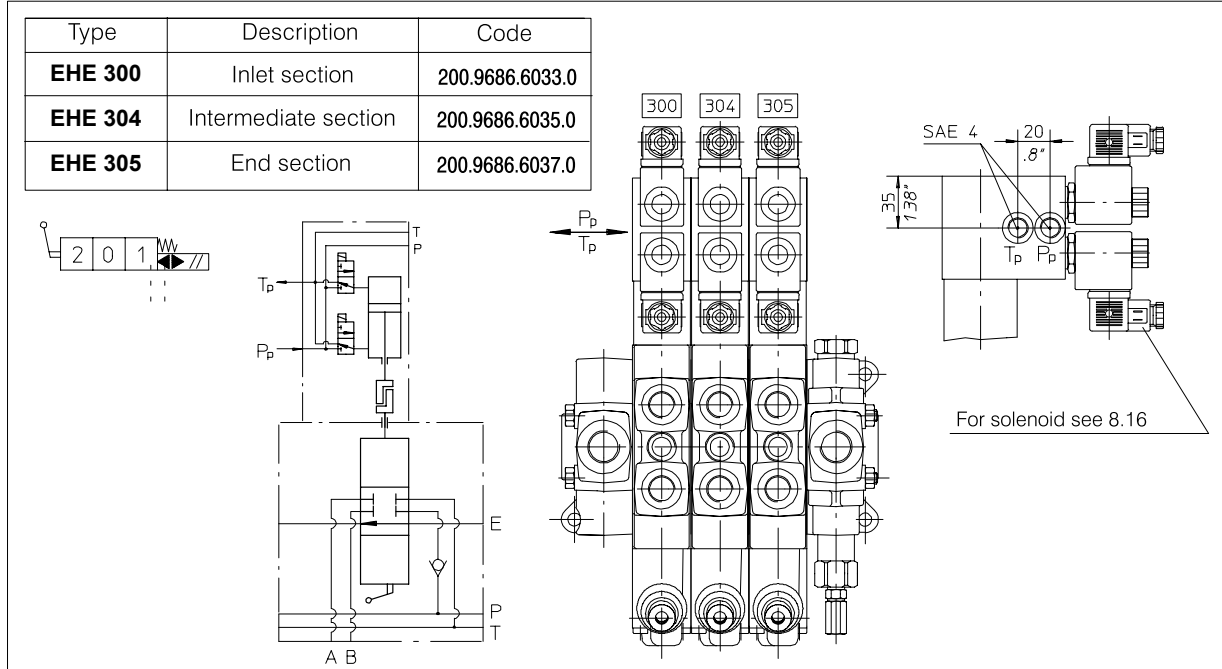
Leakage of pressure reducing
 valve (in neutral pos.) 100 ml/min (6.1 in³/min)
 Min. suggested filtration 25 micron
 Operating oil temperature min.-30°C- max 90°C
 min.-22°F - max 194°F

HDS20 Series

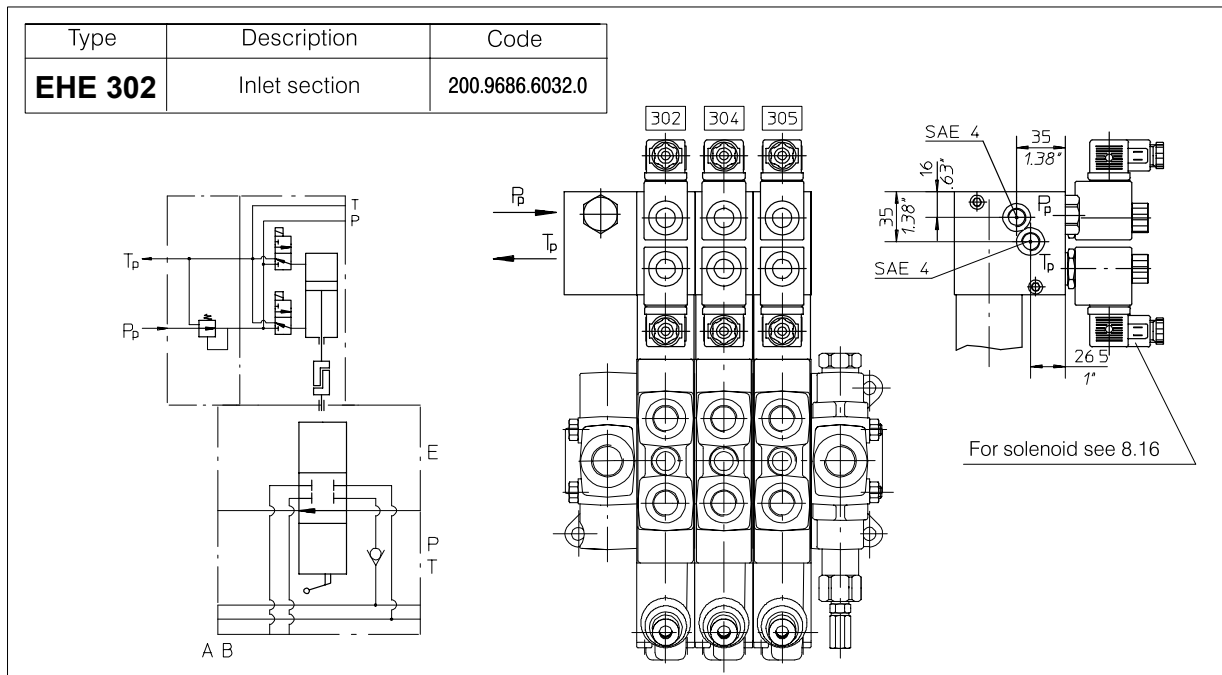


Sectional Directional Control Valve

Electro-hydraulic control external pilot version
ON-OFF



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

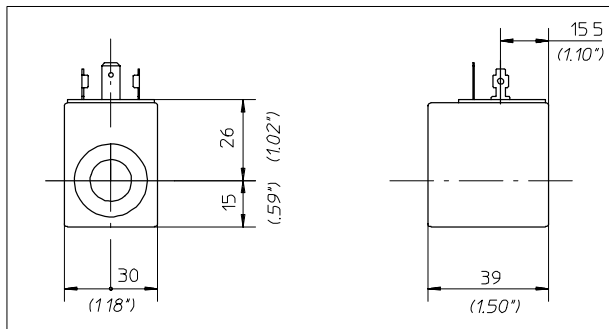
..... min.-22°F - max 194°F
Leakage of pressure reducing
valve (in neutral pos.) 100 ml/min (6.1 in³/min)
Min. suggested filtration 25 micron

HDS20 Series

Sectional Directional Control Valve



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%

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

D.C.
Part number
200.5441.10009

A.C.
Part number
200.5441.10012

Armour clamp	Pg 9
Ø cable	6 – 8 mm
Diodes	1N 4007 GP
Overvoltage protection	VDR
Connector type	DIN 43650
Number of poles	2 + ⚡
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 mm²
Outer material	Glass fibre reinforced nylon
Protection factor	IP65 (DIN 40050)
Insulation class	C (VDE 0110)
Temperature range	-40° +90 °C

HDS20 Series

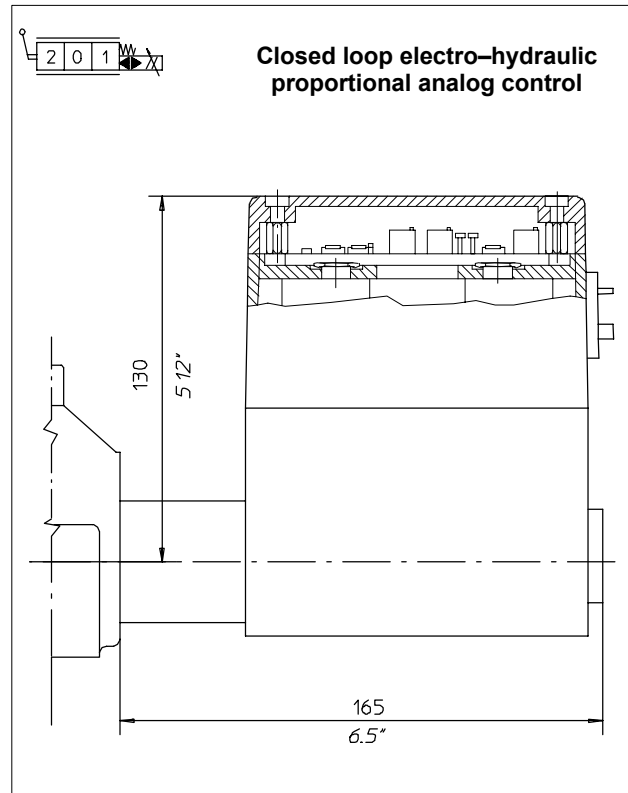
Sectional Directional Control Valve



Electro-hydraulic proportional control

Type	Description	Code
	Inlet cover with pressure reducing valve and electric by-pass	200.5333.20014
EHP 160	Inlet section	200.9686.6002.0
EHP 161	Intermediate section	200.9686.6004.0
EHP 162	End section	200.9686.6006.0

- High response accuracy, as a function of the input signal.
- Low hysteresis and high repeatability.
- The system is unaffected by disturbance forces, such as stiction of the driven sliding spool, change in oil temperature or varying dynamic flow forces



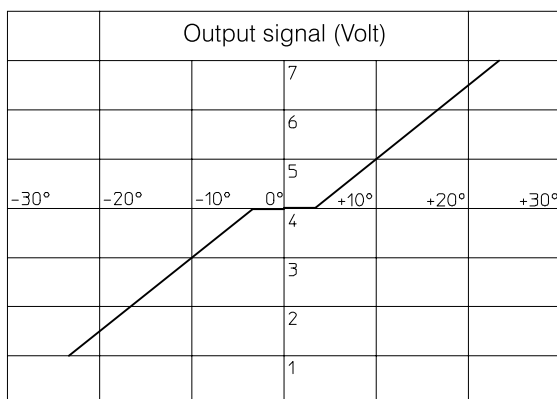
Mechanical and hydraulic features

Pilot pressure (reduced)	16 - 18 bar (220 PSI)
Pilot flow to each working section	1 l/min (0.26 GPM)
Max leakage	0.4 l/min (2.3 c.i./min)
Response time from neutral to max. stroke	180 ms
Response time from max stroke to neutral	80 ms
Min. suggested filtration	25 micron

Electric features

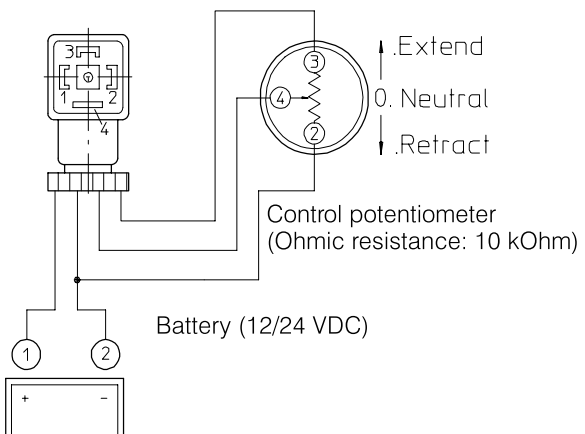
Supply voltage	12 - 24 VDC (12 - 24 VGS)
Control current range (PWM)	200 - 900 mA
Control potentiometer ohmic resistance	10 k Ω
Input voltage to the control potentiometer	8 V
Control voltage to the electronic circuit:	
neutral position	4 V
max. stroke A	6 V
max. stroke B	2 V

Joystick control characteristics



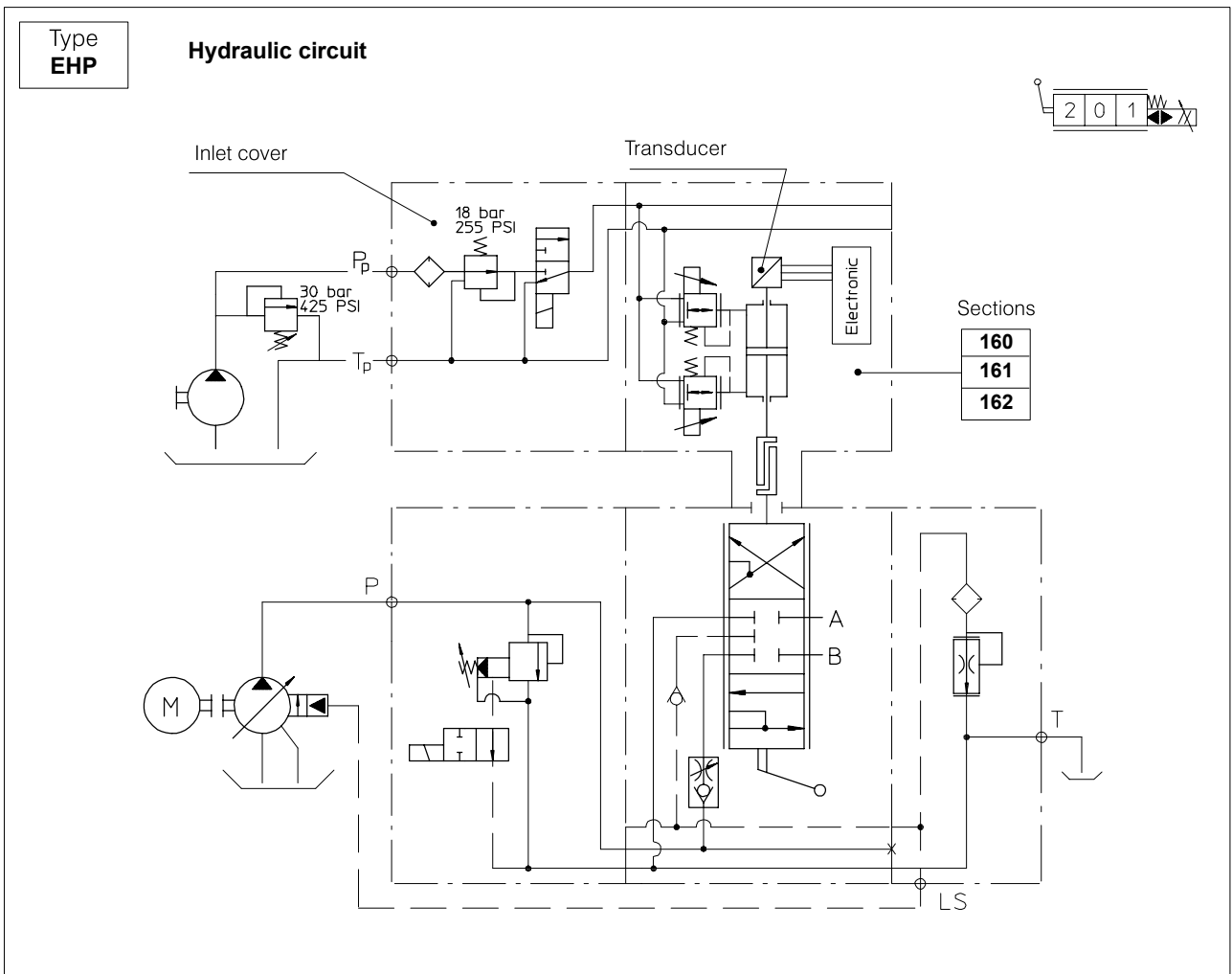
Electrical wiring

DIN 43650 connector



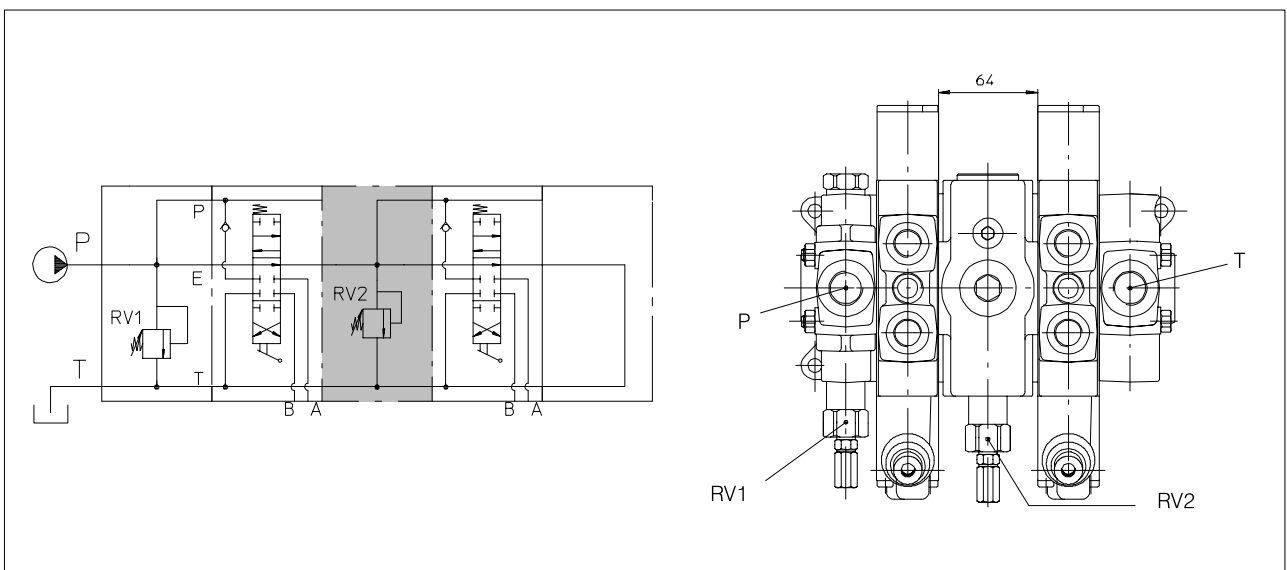
HDS20 Series

Sectional Directional Control Valve



Intermediate sections

Section with relief valve K81

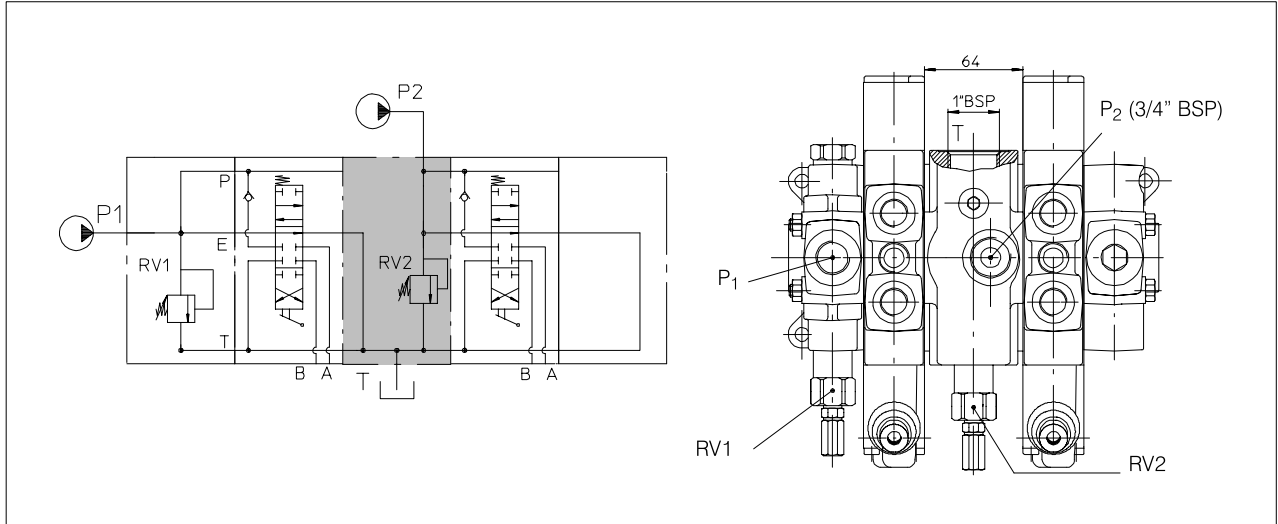


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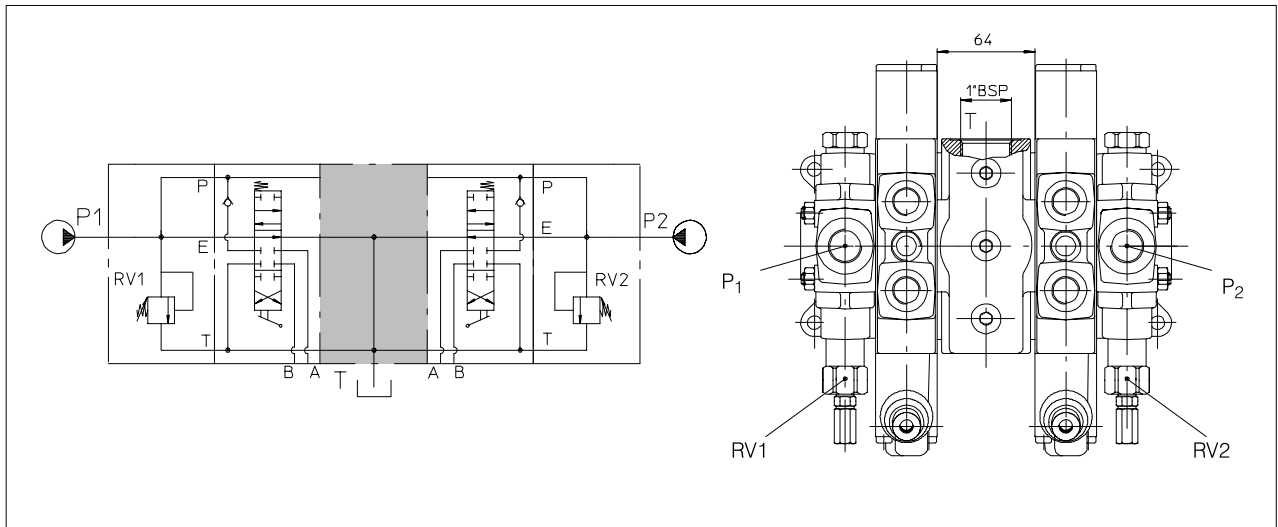


Sectional Directional Control Valve

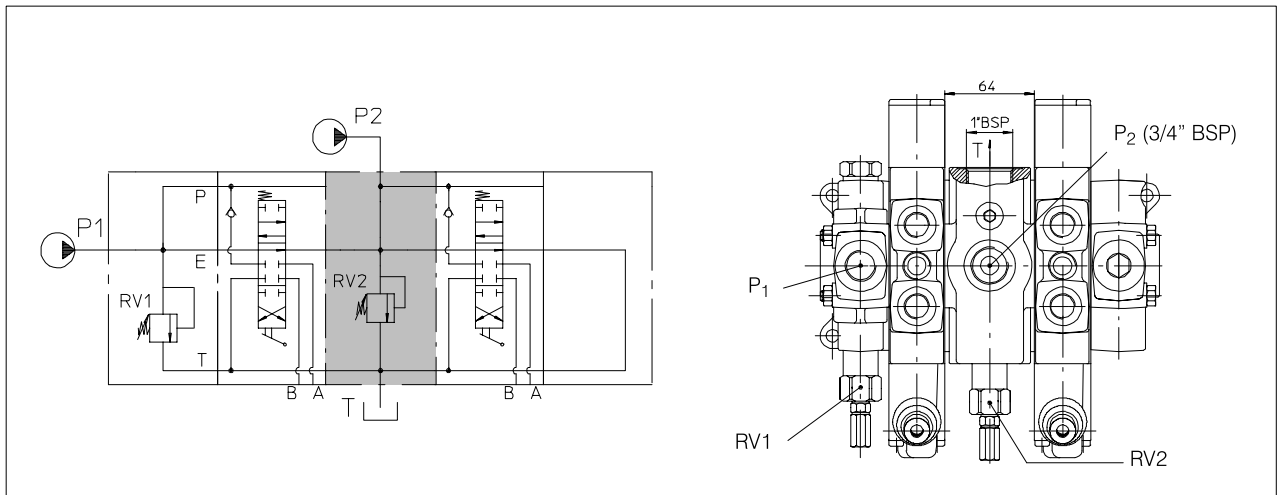
Section with intermediate inlet and outlet pump
(with independent flows) K82 - Code: 200.7564.002.0



Section with outlet pump K83 - Code: 200.7564.003.0



Section with intermediate inlet and outlet pump
(with combined flows) K84 - Code: 200.7564.0004.0

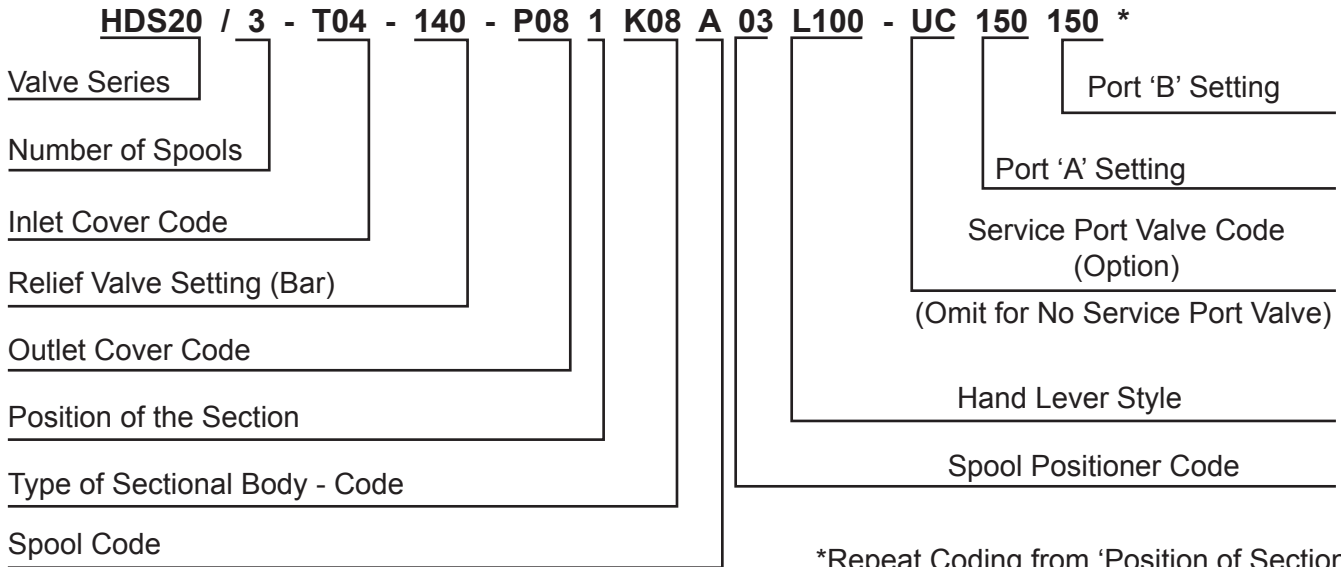


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Sectional Directional Control Valve



HOW TO ORDER



*Repeat Coding from 'Position of Section' for Subsequent Valve Sections