

HDS15 Series

Sectional Directional Control Valve



Sectional directional control valve HDS15 Standard valves



Contents

- General specifications
- Dimensional data
- Performances curves
- Inlet and outlet cover
- By-pass Solenoid valve -BP2-
- End cover
- Sectional body
- Spool chart
- Hydraulic circuits
- Spool action
- Spool positioner dimension
- Lever style
- Anti-shock and anticavitation valves
- Pneumatic controls
- Hydraulic controls
- Electro-hydraulic controls
- Solenoids for pilot electrovalves EHI-EHE
- Electro-hydraulic proportional controls
- Electromagnetic controls
- Intermediate sections

Electromagnetic control EMC - (ON-OFF)



Contents

- General Specifications
- Dimensional data
- Performance curves
- Operating limit
- Sectional body
- Spool chart
- Spool Action

Elements with pressure and flow control PQ



Contents

- General Specifications
- Sectional body K100
- Inlet cover T100
- Sectional body K88
- Inlet cover T88
- Sectional body K90
- Inlet cover T90
- Sectional body K91
- Sectional body K92
- Proportional flow control PFCR15
- By-Pass solenoid valve -BP3-
- End cover

HDS15 Series

Sectional Directional Control Valve



Standard valves

General Specifications

Technical specification	Metering unit system	
Max flow rate	l/min U.S.G.P.M.	60 15
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	14 0.854
Average	cm ³ /min Cu. In./min	7 0.427

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	1.8 3.96
1 spool section	kg LBS	2.5 5.5
End cover standard	kg LBS	0.8 1.76
End cover with T3 and H.P.C.O.	kg LBS	1.2 2.64

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, 2-3 or 4 position (float position), full open centre (motor spool) and other spool options.
- 2) Carry over.
- 3) Series connection and priority pressure.
- 4) Pressure compensated flow control.
- 5) Port release and anticavitation valves
- 6) Adjustable direct acting relief valve (Tamper-proof sealed on demand)
- 7) Complete 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
T₂: side outlet
T₃: side top outlet
3.1.0.2: spool position
P: pressure line
T: exhaust line
E: centre line (by pass).

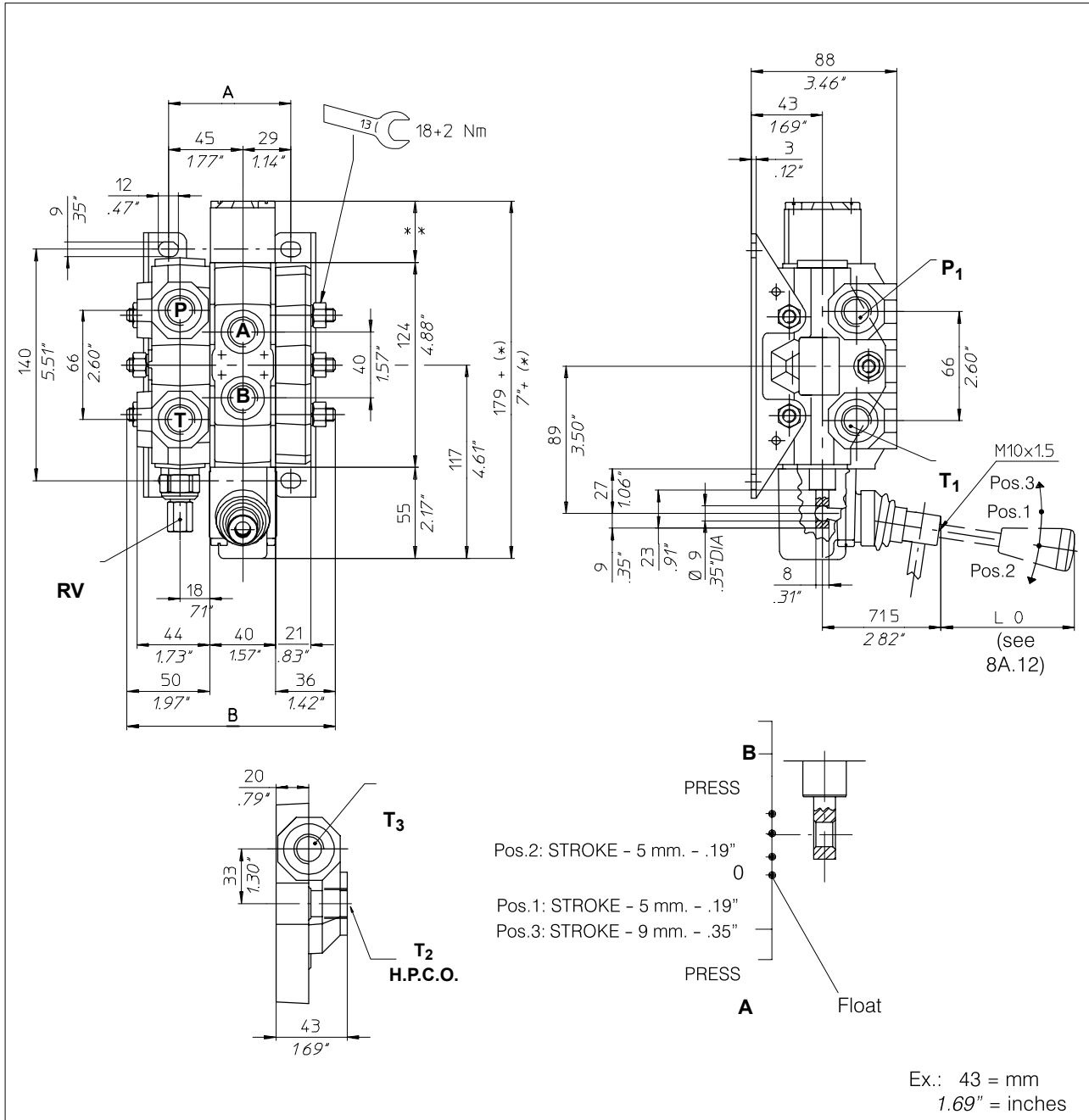
Dimensional data shown in mm and inches

HDS15 Series

Sectional Directional Control Valve



Dimensional data



N. of sections	1	2	3	4	5	6	7	8	9	10
Dimension A	74	114	154	194	234	274	314	354	394	434
	2.91"	4.49"	6.06"	7.63"	9.21"	10.78"	12.36"	13.93"	15.51"	17.08"
Dimension B	126	166	206	246	286	326	366	406	446	486
	4.96"	6.53"	8.11"	9.68"	11.26"	12.83"	14.40"	15.98"	17.56"	19.13"

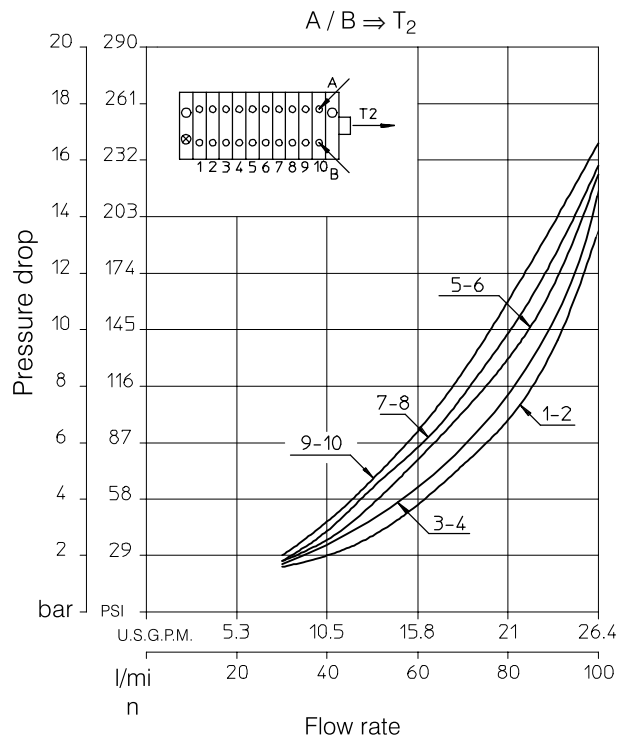
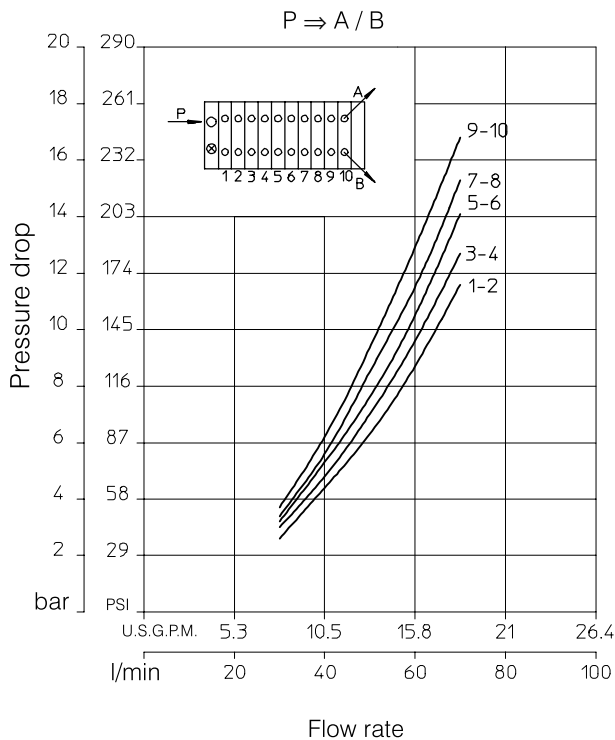
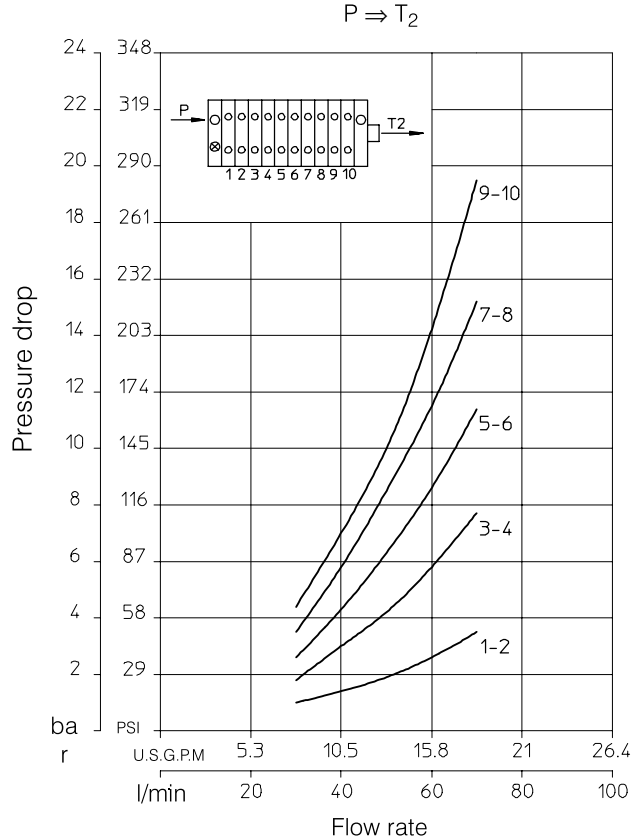
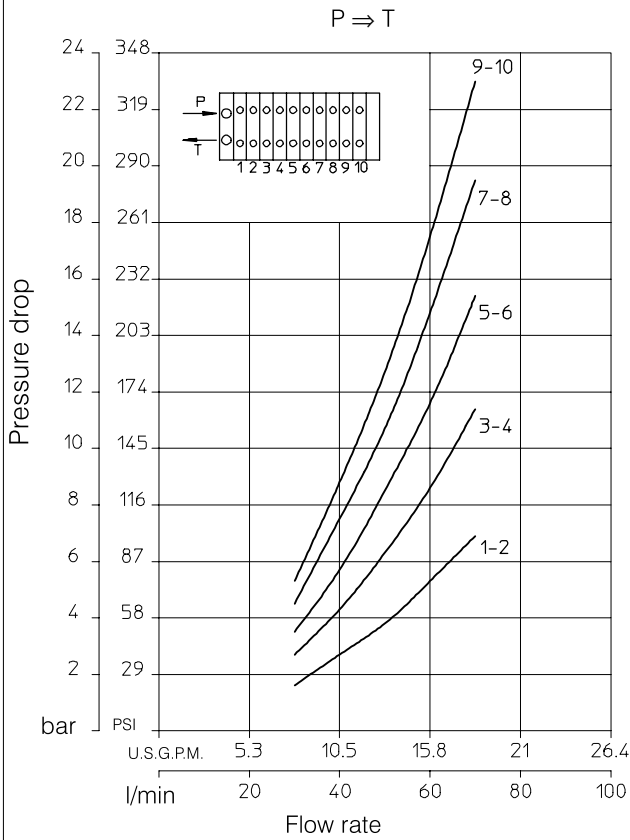
HDS15 Series

Sectional Directional Control Valve



Performance curves

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



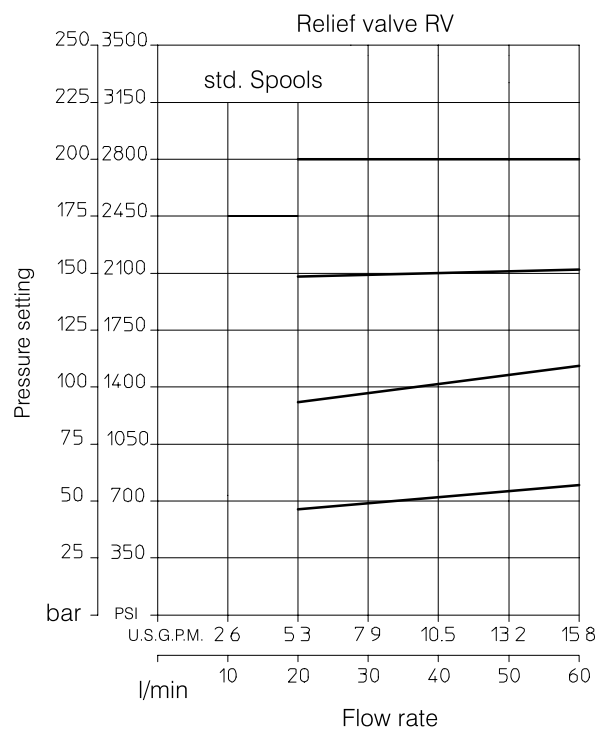
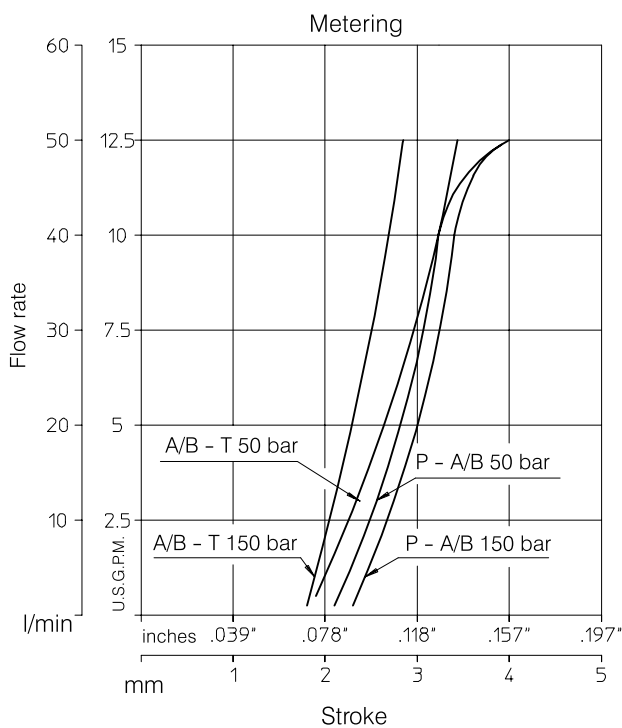
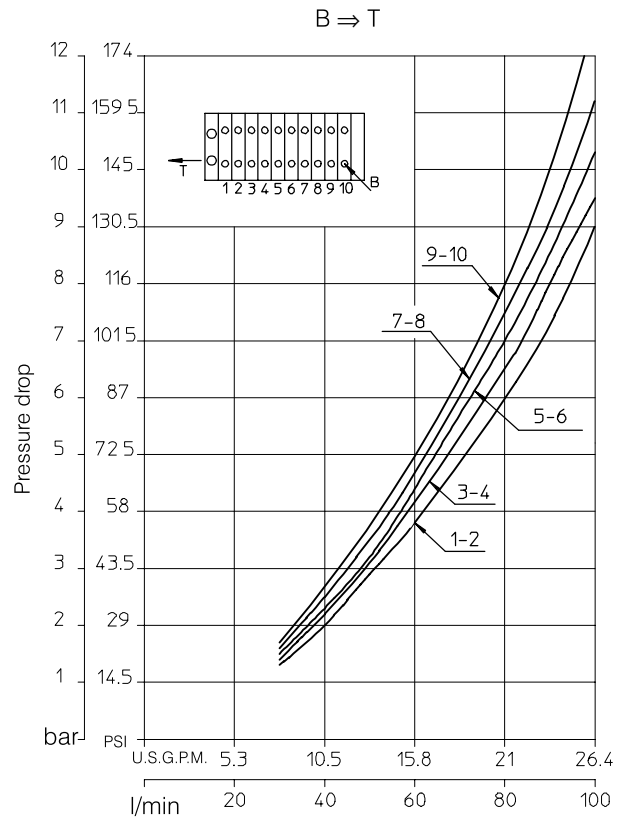
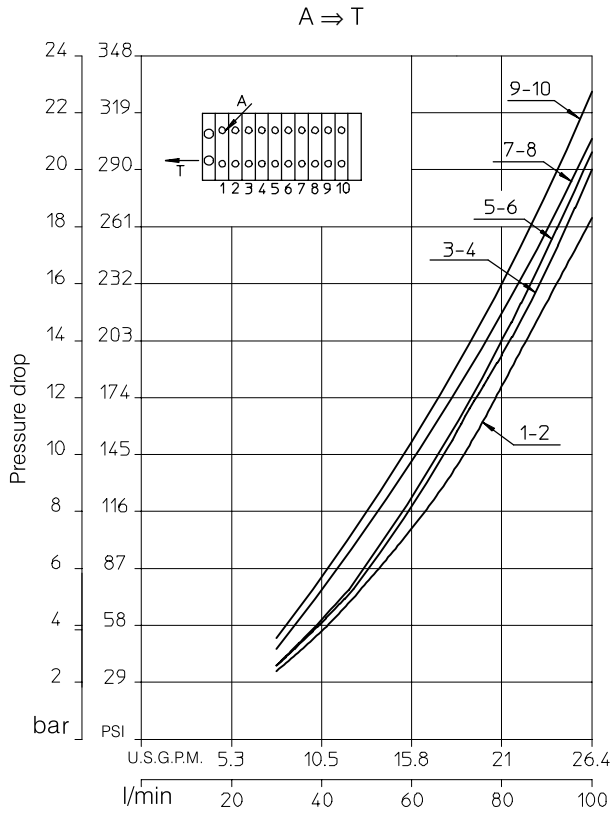
HDS15 Series

Sectional Directional Control Valve



Performance curves

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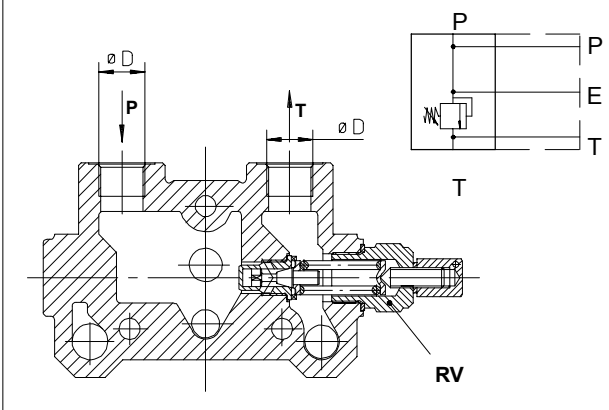


HDS15 Series



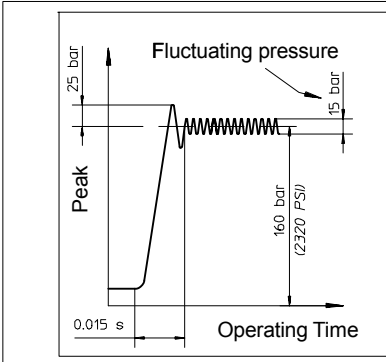
Sectional Directional Control Valve

Inlet and outlet Cover Adjustable direct acting Relief Valve RV



Inlet cover with P-T and RV		
Ø D (diameter)	Parallel circuit (standard)	For series and tandem circuit
M18X1.5	T01 *200.9312.1007.0	T41 *200.9312.1005.0
3/8" BSP	T02 *200.9312.2006.0	T42 *200.9312.2005.0
1/2" BSP Standard	T03 *200.9312.3011.0	T43 *200.9312.3008.0
SAE10	T05 *200.9312.8002.0	T45 *200.9312.8001.0

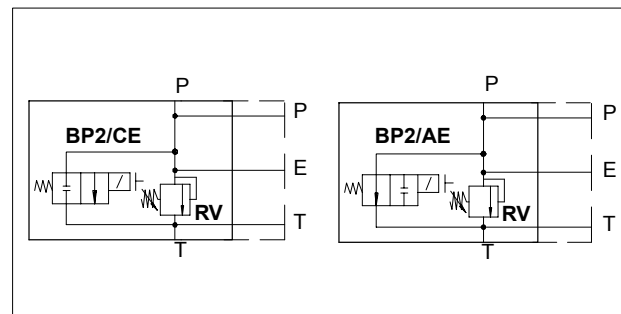
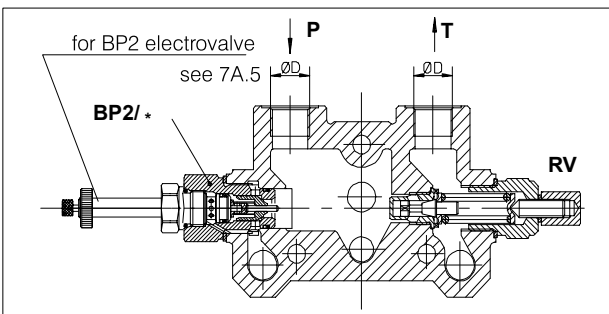
* Group code with RV set at standard pressure 150 bar (2100 PSI)



Relief valve setted 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

Unloading solenoid valve BP2/CE and BP2/AE



Inlet cover with P-T, RV, BY-PASS Solenoid Valve (without solenoid)

Ø D (diameter)	Parallel circuit			Series Circuit	Series Circuit		
	Inlet cover type	By-pass solenoid valve circuit	Inlet cover group code		Inlet cover group code	Ø D (diameter)	Inlet cover type
M18X1.5	T21	BP2/AE BP2/CE	200.9312.1015.0 200.9312.1016.0		M18X1.5	T121	BP2/A BP2/C
3/8" BSP	T22	BP2/AE BP2/CE	200.9312.2018.0 200.9312.2019.0		3/8" BSP	T122	BP2/A BP2/C
1/2" BSP Std	T23	BP2/AE BP2/CE	200.9312.3022.0 200.9312.3023.0	200.9312.3081.0 200.9312.3080.0	1/2" BSP Standard	T123	BP2/A BP2/C
SAE10	T25	BP2/AE BP2/CE	200.9312.8007.0 200.9312.8008.0		SAE10	T125	BP2/A BP2/C

HDS15 Series

Sectional Directional Control Valve



By-Pass solenoid valve - BP2 -

Normally closed with manual override

Open manually

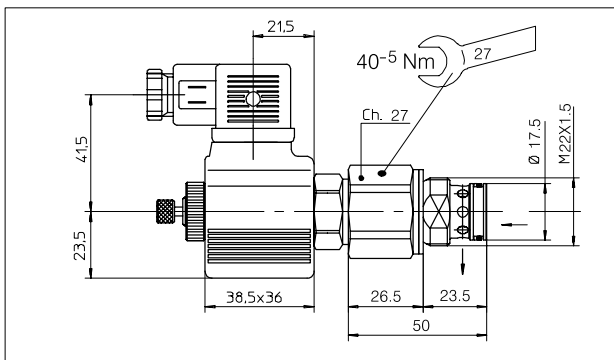
BP2/CE HDS15 p.m.	200.7572.0044.0	without coil
BP2/CE 13HC HDS15	200.9570.1003.3	12 V. D.C.
BP2/CE 23HC HDS15	200.9570.2003.4	24 V. D.C.

Normally open with manual override

Close manually

BP2/AE HDS15 p.m.	200.7572.0045.0	without coil
BP2/AE 13HC HDS15	200.9570.1003.4	12 V. D.C.
BP2/AE 23HC HDS15	200.9570.2003.5	24 V. D.C.

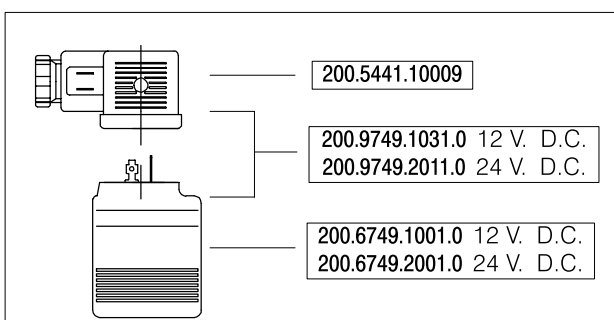
Dimension



BP2 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

Spare parts



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

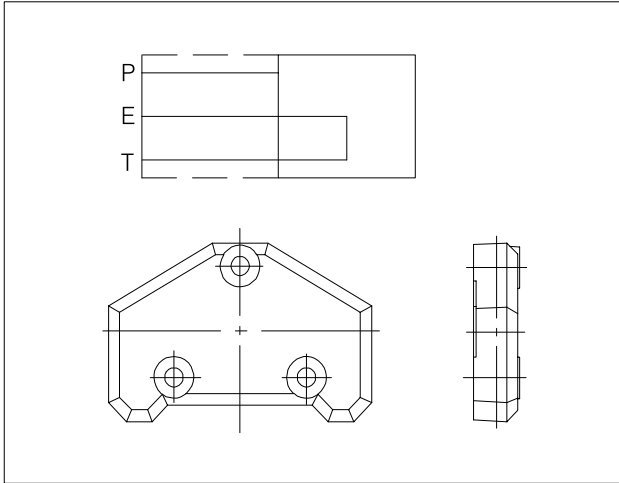
HDS15 Series

Sectional Directional Control Valve



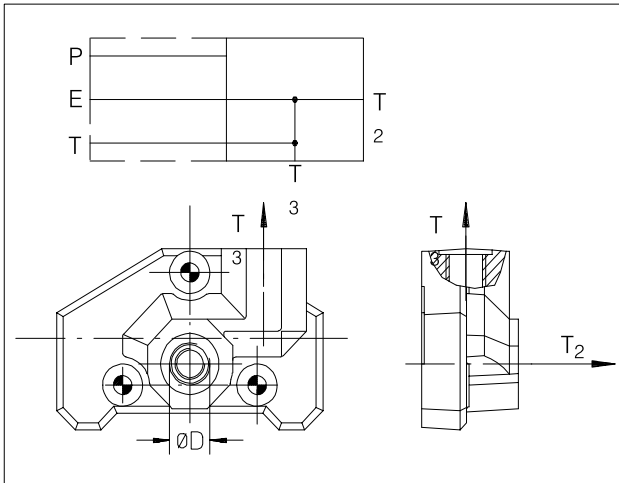
End Cover

Standard end cover



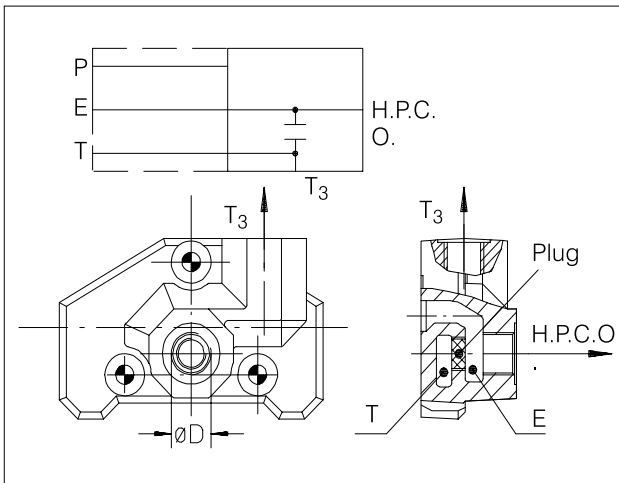
Code	
Standard circuit parallel	Optional circuit series and tandem
P31 200.6302.9010.0	P32 200.9302.9011.0

Cover with end outlet T₂ and T₃



Ø D (diameter)	Code	
	Standard circuit parallel	Optional circuit series and tandem
M18X1.5	P01 200.9302.1006.0	P41 200.9302.1004.0
3/8" BSP	P02 200.9302.2007.0	P42 200.9302.2005.0
1/2" BSP	P03 200.9302.3007.0	P43 200.9302.3005.0
SAE10	P05 200.9302.8003.0	P45 200.9302.8006.0
3/4" BSP	P09 200.9302.4001.0	P49 200.9302.4003.0

Cover with end outlet T₃ and H.P.C.O. (carry-over)



Ø D (diameter)	Code	
	Standard circuit parallel	Optional circuit series and tandem
M18X1.5	P11 200.9302.1003.0	P51 200.9302.1005.0
3/8" BSP	P12 200.9302.2004.0	P52 200.9302.2006.0
1/2" BSP	P13 200.9302.3004.0	P53 200.9302.3006.0
SAE10	P15 200.9302.8002.0	P55 200.9302.8004.0
3/4" BSP	P19 200.9302.4002.0	P59 200.9302.4004.0

HDS15 Series

Sectional Directional Control Valve



Sectional body

Standard circuit: parallel

Ø D	Code	
	Standard	Section with valve UC - OA - C
M18X1.5	K01 200.9413.1242.0	K11 200.9413.1243.0
3/8" BSP	K02 200.9413.2577.0	K12 200.9413.2578.0
1/2" BSP	K03 200.9413.3074.0	K13 200.9413.3075.0
SAE 10	K05 200.9413.8001.0	K15 200.9413.8002.0

cyl. A
cyl. B

Optional circuit: series and tandem

Ø D	Code	
	Standard	Section with valve UC - OA - C
M18X1.5	K41 200.9413.1244.0	K51 200.9413.1245.0
3/8" BSP	K42 200.9413.2579.0	K52 200.9413.2580.0
1/2" BSP	K43 200.9413.3076.0	K53 200.9413.3077.0
SAE10	K45 200.9413.8003.0	K55 200.9413.8004.0

cyl. A
cyl. B

Attention
In case of series, series-parallel and tandem connections, it is necessary to reverse the positioner and the lever group, even on standard parallel sections (see the indications on the side of the valve body)

HDS15 Series

Sectional Directional Control Valve



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

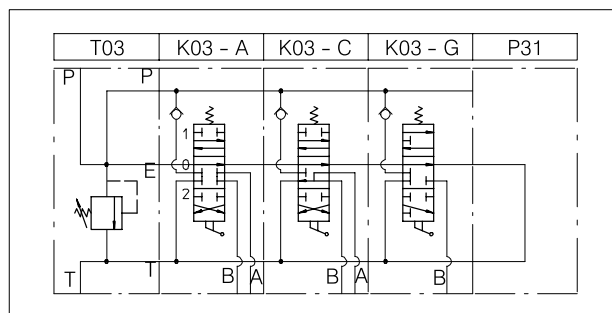
S Ss*		3 way - 3 position A: blocked E: open by pass
X Xs*		4 way - 3 position A/B: blocked series connection
Xc		4 way - 3 position A/B: to tank in neutral series connection
Z Zs*		4 way - 4 position 4 th float position
LsA **		4 way - 3 position A/B: blocked Load Sensing
LsC **		4 way - 3 position 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 40 l/min)

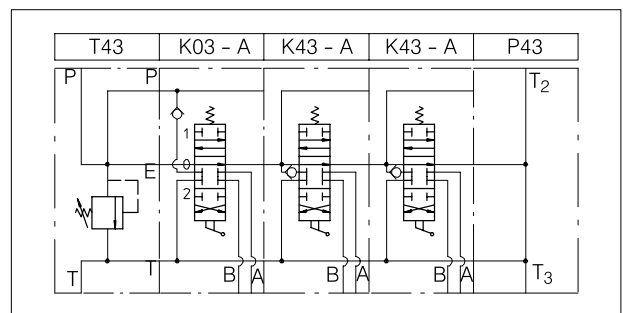
Note: For availability of L/S versions please contact our Sales Department

Hydraulic circuits

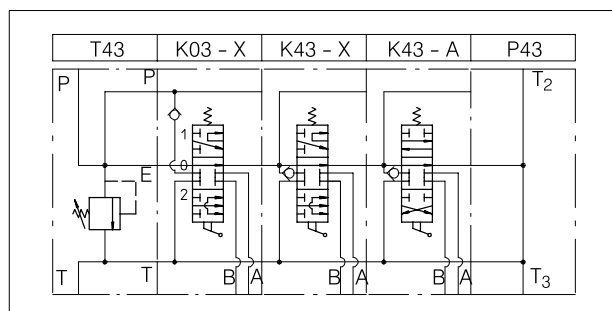
Standard parallel circuit



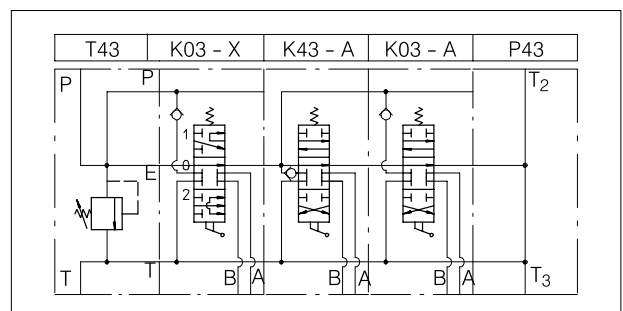
Optional tandem circuit



Optional series circuit



Combined parallel/series circuit



HDS15 Series

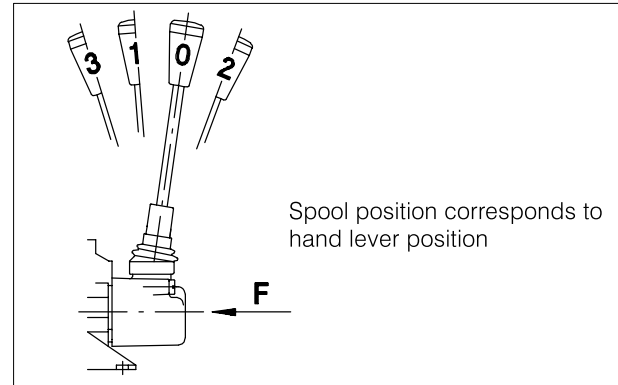
Sectional Directional Control Valve



Spool action

Type	Spool position				Stroke mm	Code
	3	1	0	2		
08		○	*	○	5	200.9686.1008.0
10		●	●	○	5	200.9686.3004.0
17		●	●	●	5	200.9686.2014.0
20		○	●	●	5	200.9686.3009.0
25			●	●	5	200.9686.2015.0
27		*		○	10	200.9686.1044.0
29			*	○	5	200.9686.3025.0
30		○	*	○	5	200.9686.1048.0
32		○	*	○	5	200.9686.1061.0
34		○	*	○	5	200.9686.1065.0
36		●		●	10	200.9686.2017.0
37		○		*	10	200.9686.1066.0
38		○	*		5	200.9686.1069.0
79		○	*	○	5	200.9686.1091.0
84		○	*	○	5	200.9686.1098.0
133		○	*	○	5	200.9686.1031.0
136	●	○	*	○	4- 5- 5	200.9686.4012.0

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

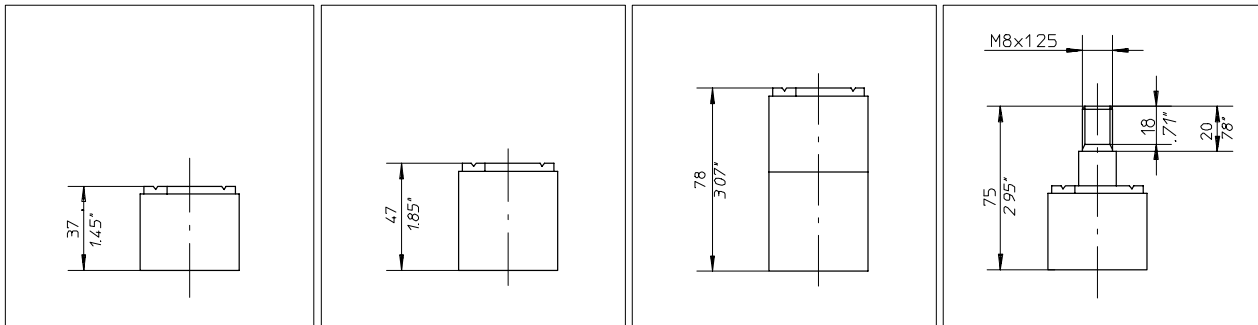


Force (F) for spool movement

Spool position control	F (N)
08	260
79	130
133 (standard)	190

Note: consult factory for other configurations.

Spool positioners dimensions



Spool positioners: 08 – 38 – 79 – 133	Spool positioners: 10 – 17 – 20 – 25 – 27 29 – 36 – 37	Spool positioners: 136 (Z spool type)	Spool positioners: 84
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Microswitch control

30 Microswitch operated with spool in pos. 1

32 Microswitch operated with spool in pos. 2

34 Microswitch operated with spool in pos. 1 and 2

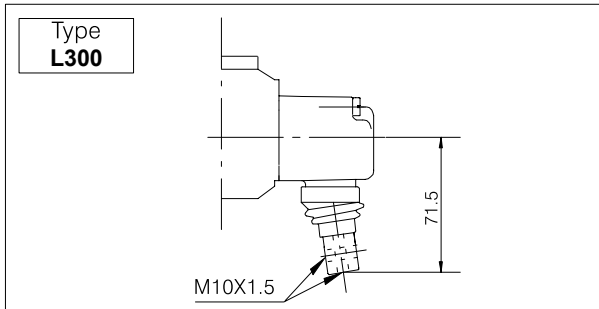
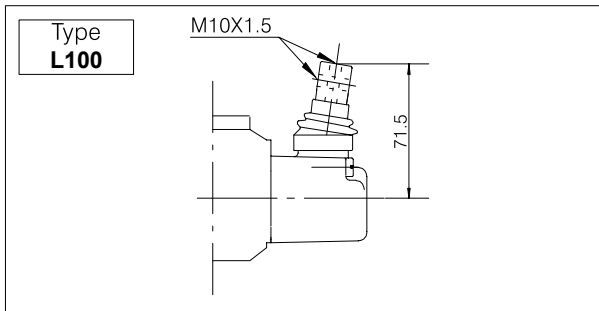
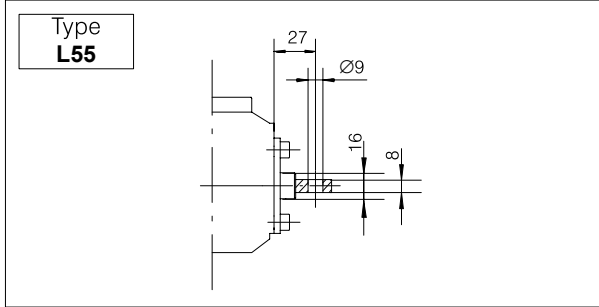
The microswitch code 200.9625.0001.0 is supplied only on customer's request.

HDS15 Series

Sectional Directional Control Valve

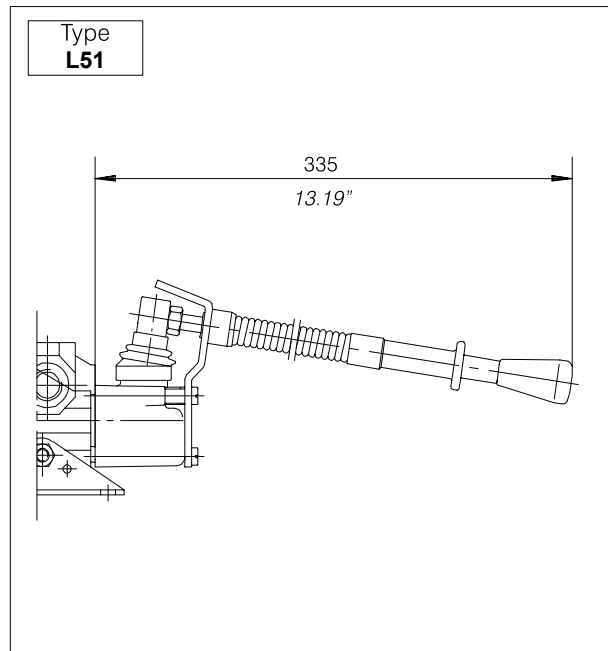
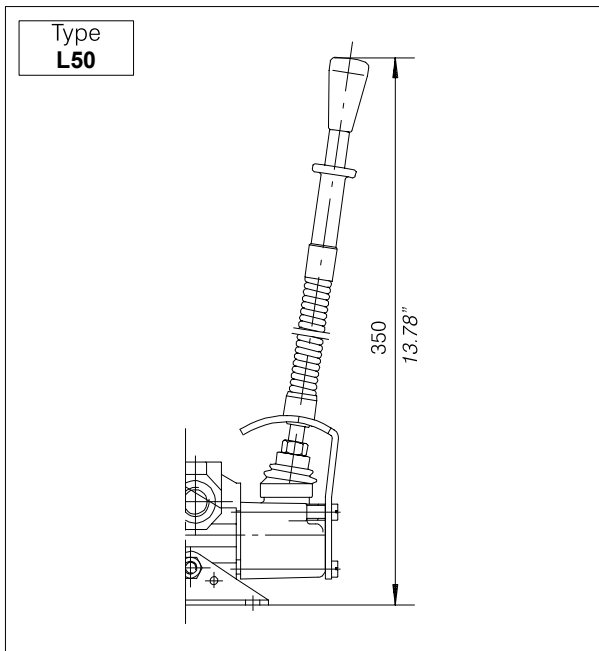


Lever styles



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

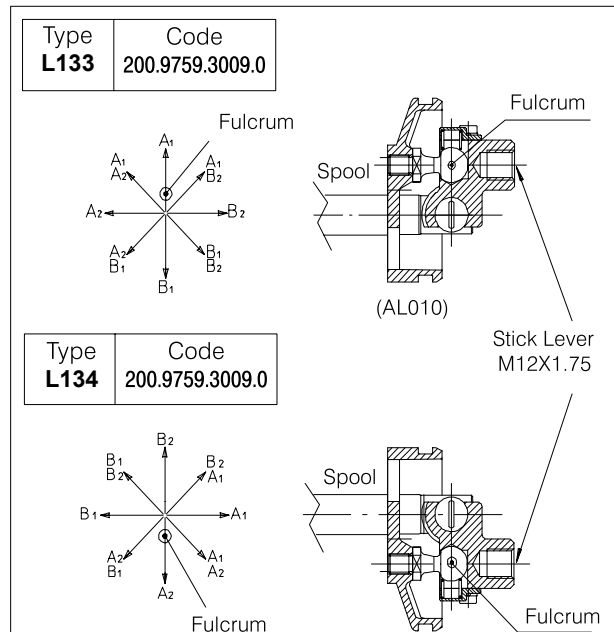
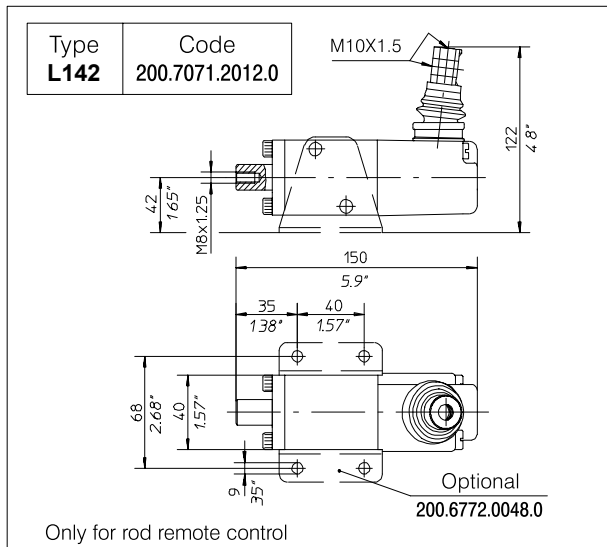
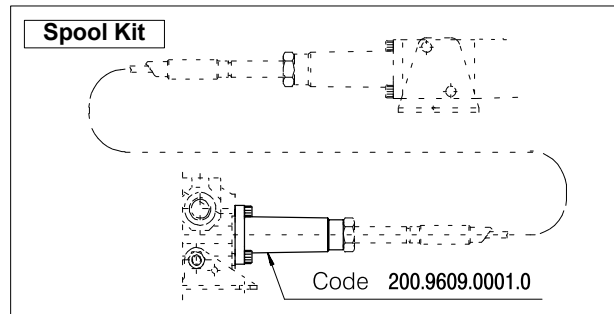
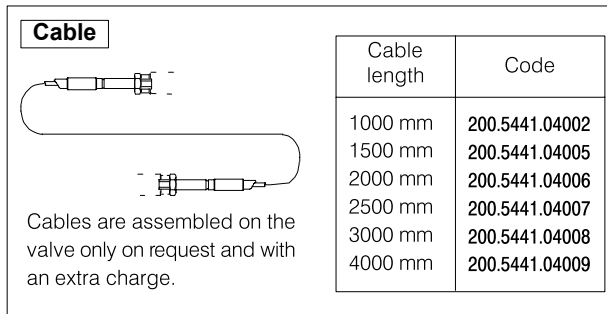
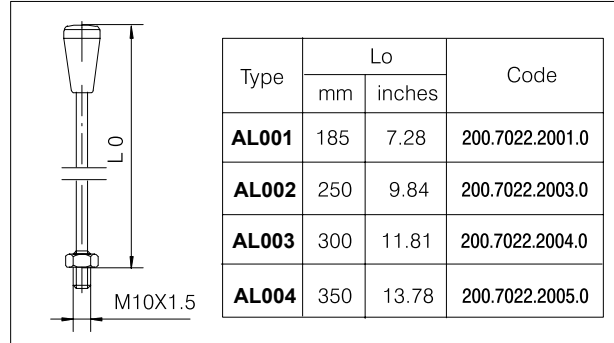
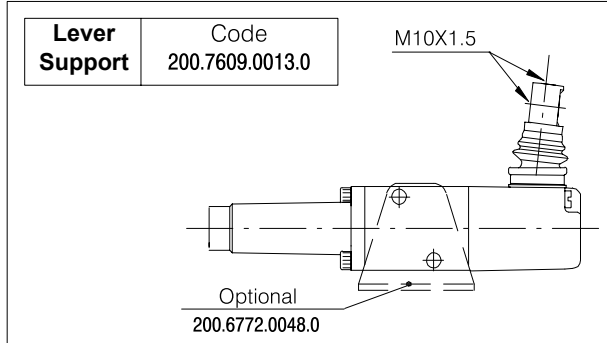


HDS15 Series

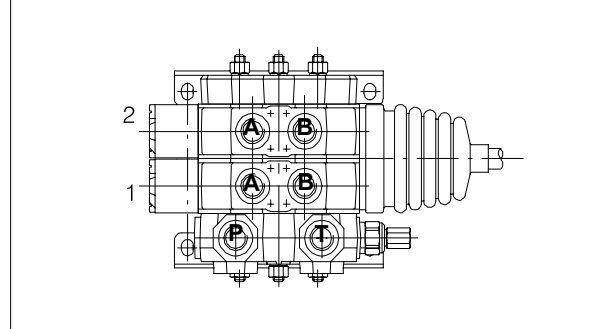
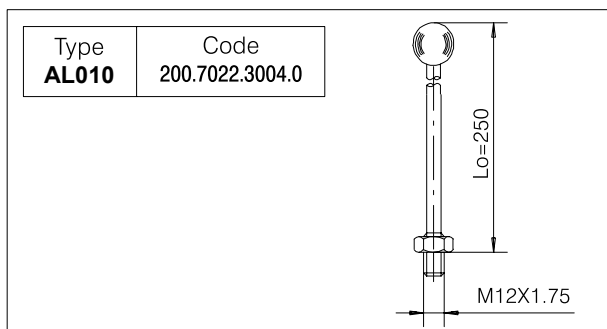
Sectional Directional Control Valve



Remote cable control



Cross joystick for dual axis control



HDS15 Series

Sectional Directional Control Valve



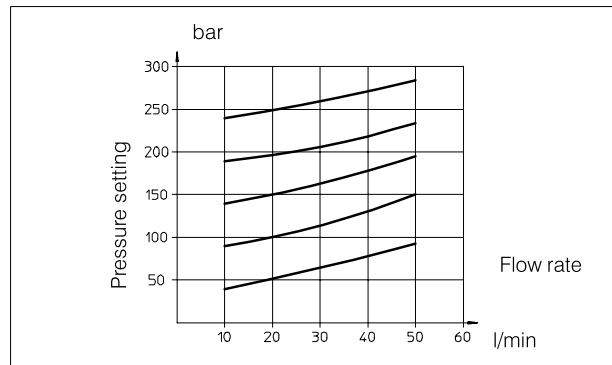
Anti-shock and anticavitation valves

Port relief valve settings

Range of Adjustment bar (PSI)	Spring colour	Std. setting bar (PSI)	Setting Code
30 - 130 (400 - 1850)	Yellow (YE)	60 (860)	06
131 - 320 (1850 - 4600)	Green (GR)	150 (2100)	15

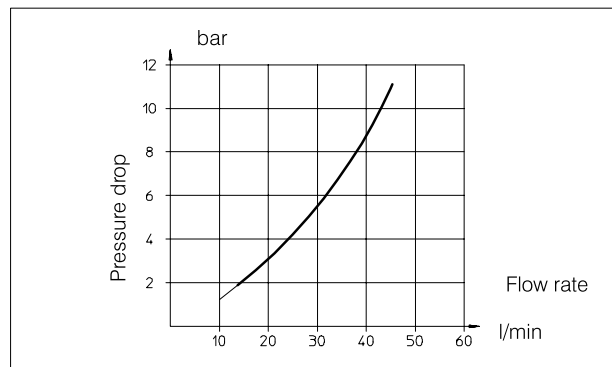
Port relief valve

Type
OA



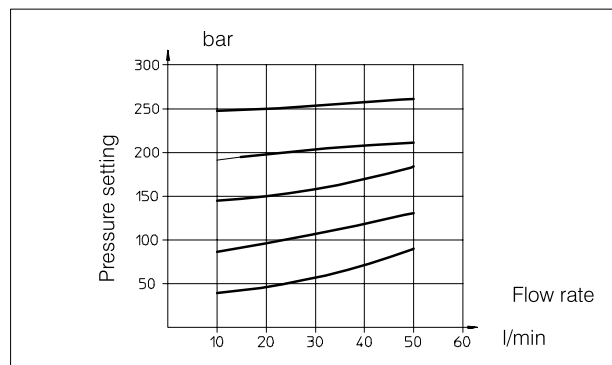
Anticavitation valve

Type
C



Combined port relief and anticavitation valve

Type
UC



HDS15 Series

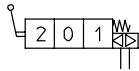
Sectional Directional Control Valve



Pneumatic controls

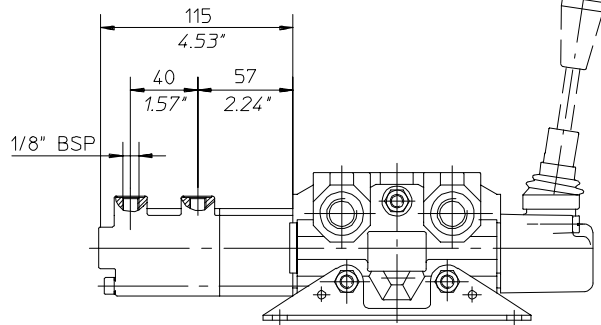
Pneumatic control ON-OFF

Type	Code
P 24	200.9686.5011.0



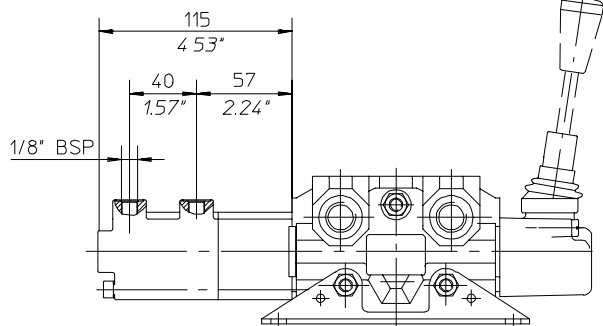
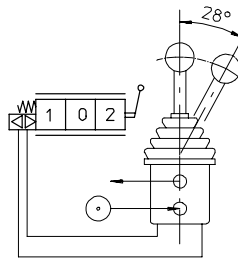
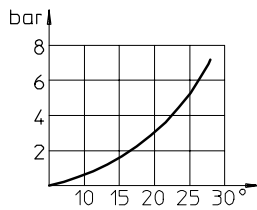
Operating conditions

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



Pneumatic proportional control

Type	Code
PP 150	200.9686.5009.0



Electro-pneumatic control ON-OFF

Type	Voltage	Code
EP 77	12 VDC	200.9686.6023.0
EP 78	24 VDC	200.9686.6026.0

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

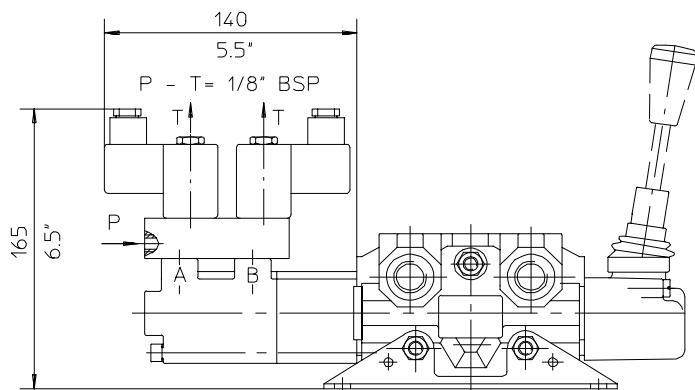
Voltage variation: -10% to + 15% of nominal voltage

Power consumption DC - 10 W

Electrical connection: DIN43650/A (2P + E)

Cable connection PG9

Protection class: IP65 (with connector)



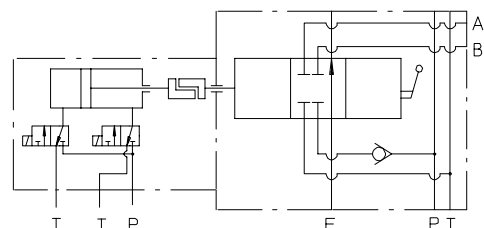
Operating conditions

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



HDS15 Series

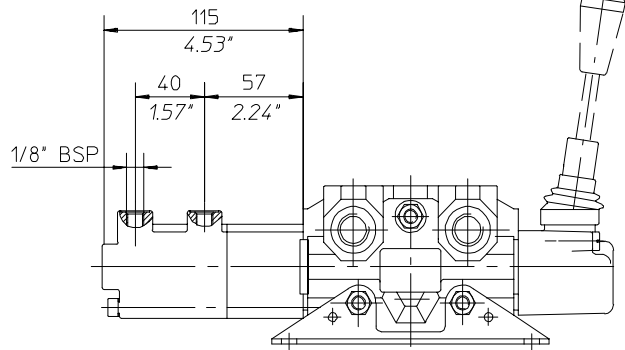
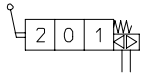
Sectional Directional Control Valve



Hydraulic controls

Hydraulic control ON-OFF

Type	Code
H 24	200.9686.5011.0

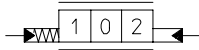


Operating conditions

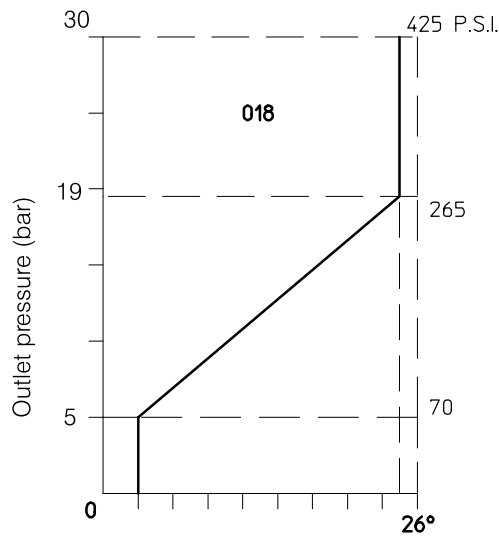
Pressure range: (bar): Min. 6 - Max. 15
(PSI): Min. 85 - Max. 215

Hydraulic proportional control

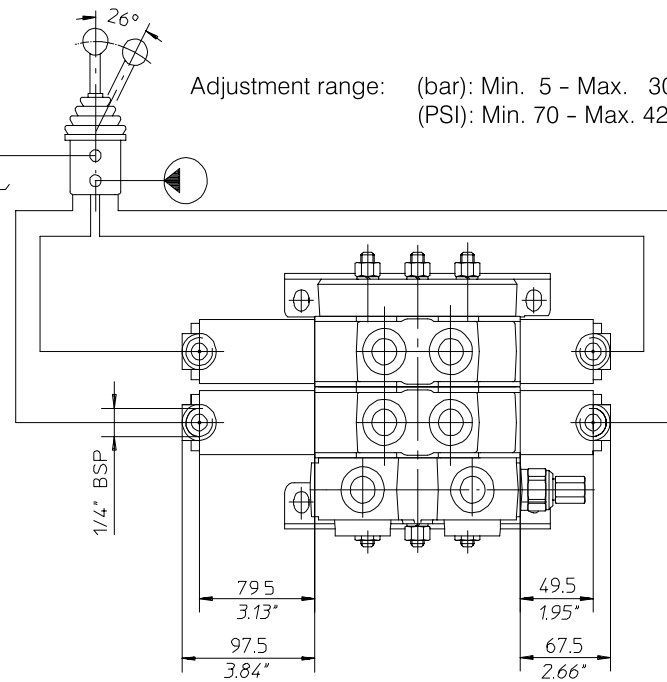
Type	Code
HP 50	200.9686.5019.0



Joystick adjustment diagram



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



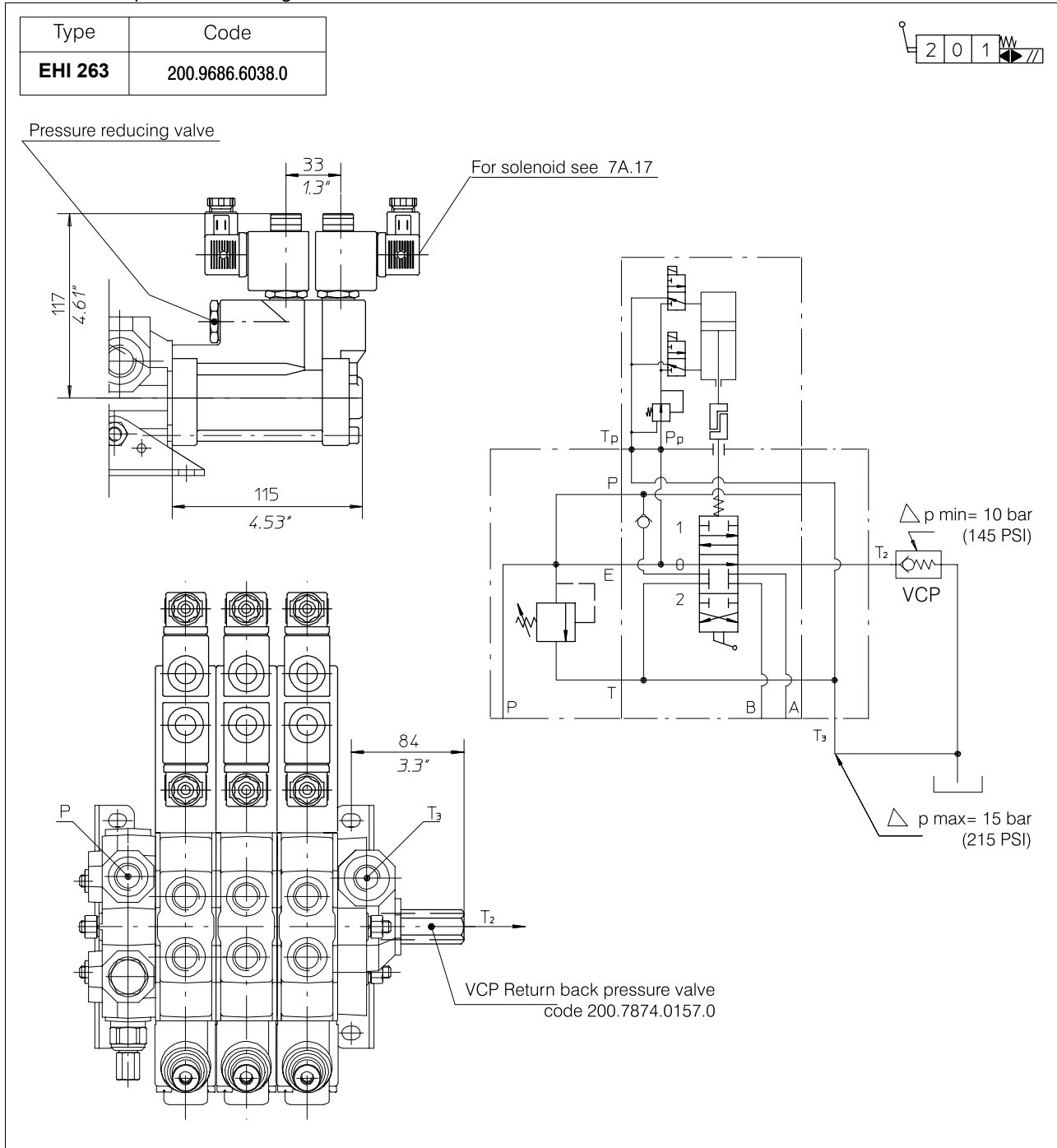
HDS15 Series

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 (4200 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)

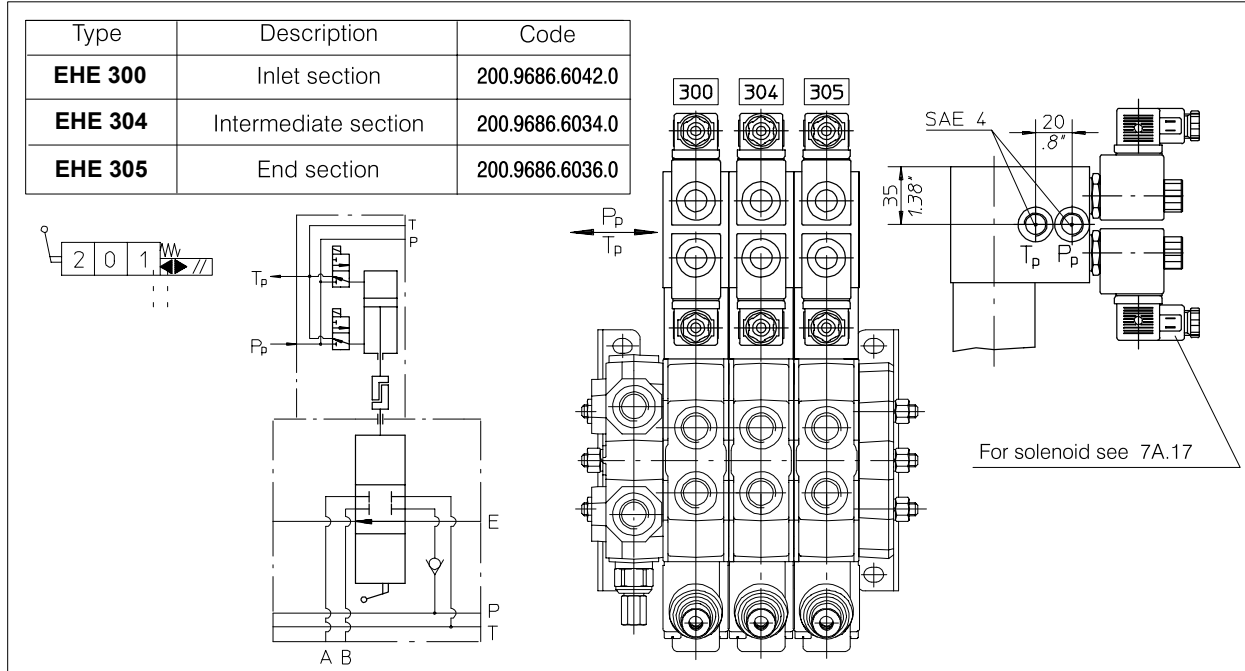
Leakage of pressure reducing
 valve (in neutral pos.) 100 ml/min (6.1 in³/min)
 Min. suggested filtration 25 micron
 Operating oil temperature min.-30°C- max. 90°C
 min.-22°F - max 194°F

HDS15 Series

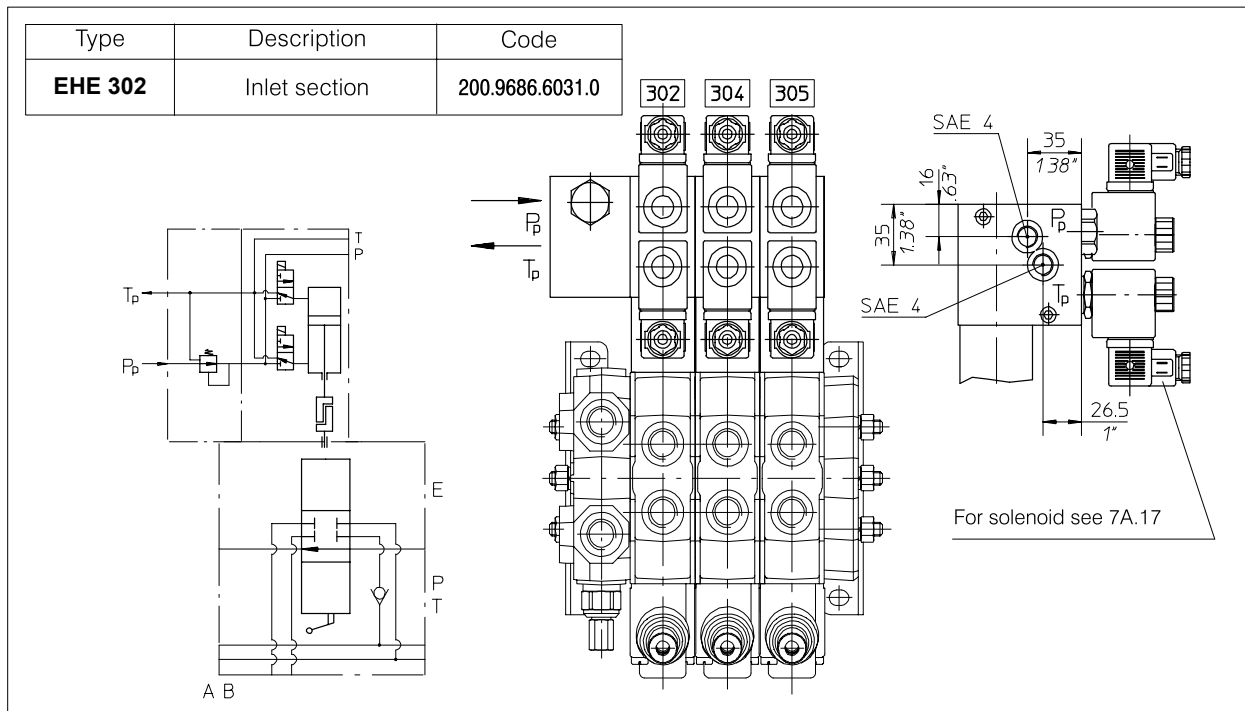


Sectional Directional Control Valve

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

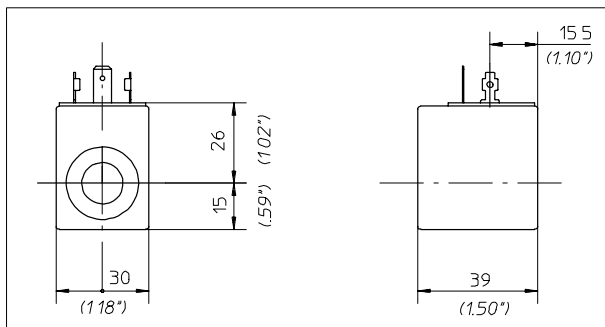
min. -22°F - max 194°F
 Leakage of pressure reducing valve (in neutral pos.) 100 ml/min (6.1 in³/min)
 Min. suggested filtration 25 micron

HDS15 Series

Sectional Directional Control Valve

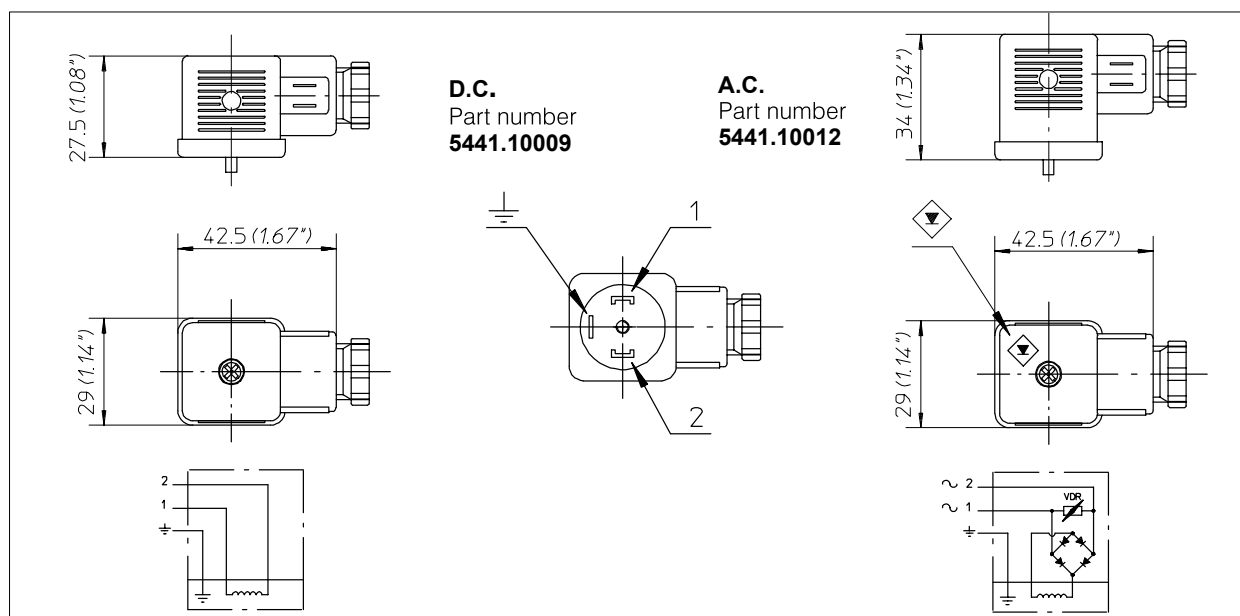


Solenoids for pilot electrovalves EHI-EHE



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



Armour clamp	Pg 9
Ø cable	6 – 8 mm
Diodes	1N 4007 GP
Overvoltage protection	VDR
Connector type	DIN 43650
Number of poles	2 + $\frac{1}{2}$
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

HDS15 Series

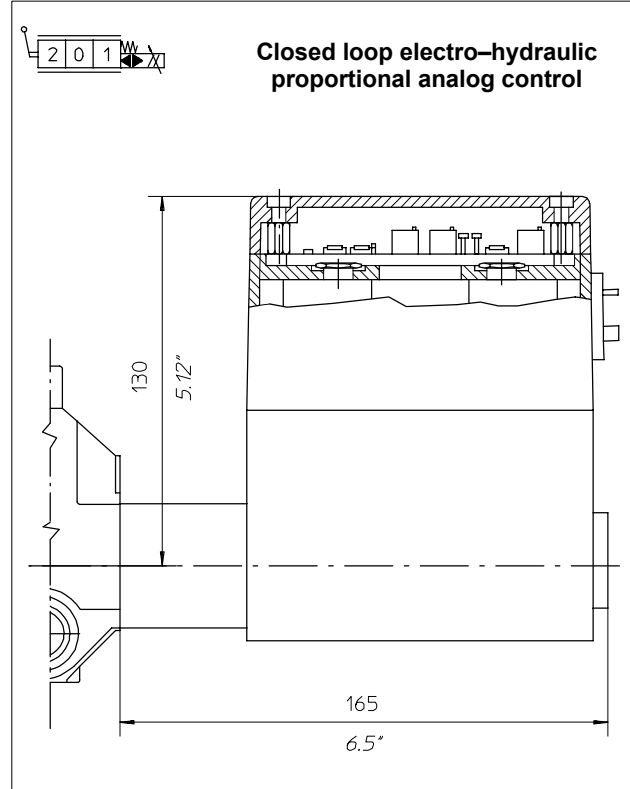
Sectional Directional Control Valve



Electro-hydraulic proportional control

Type	Description	Code
	Inlet cover with pressure reducing valve and electric by-pass	200.5333.20014
EHP 160	Inlet section	200.9686.6001.0
EHP 161	Intermediate section	200.9686.6003.0
EHP 162	End section	200.9686.6005.0

- 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



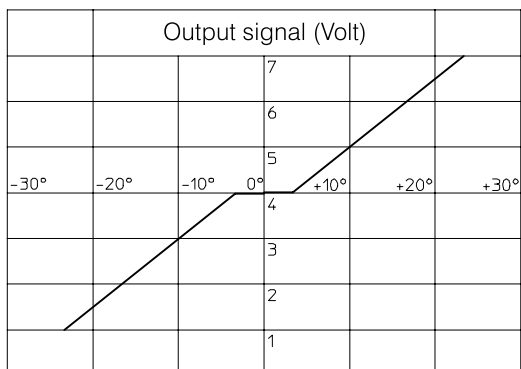
Mechanical and hydraulic features

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

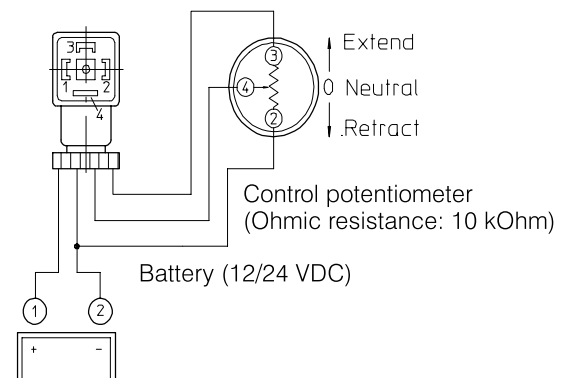
Supply voltage	12 - 24 VDC (12 - 24 VGS)
Control current range (PWM)	200 - 900 mA
Control potentiometer ohmic resistance	10 kΩ
Input voltage to the control potentiometer	8 V
Control voltage to the electronic circuit:	
neutral position	4 V
max. stroke A	6 V
max. stroke B	2 V

Joystick control characteristics



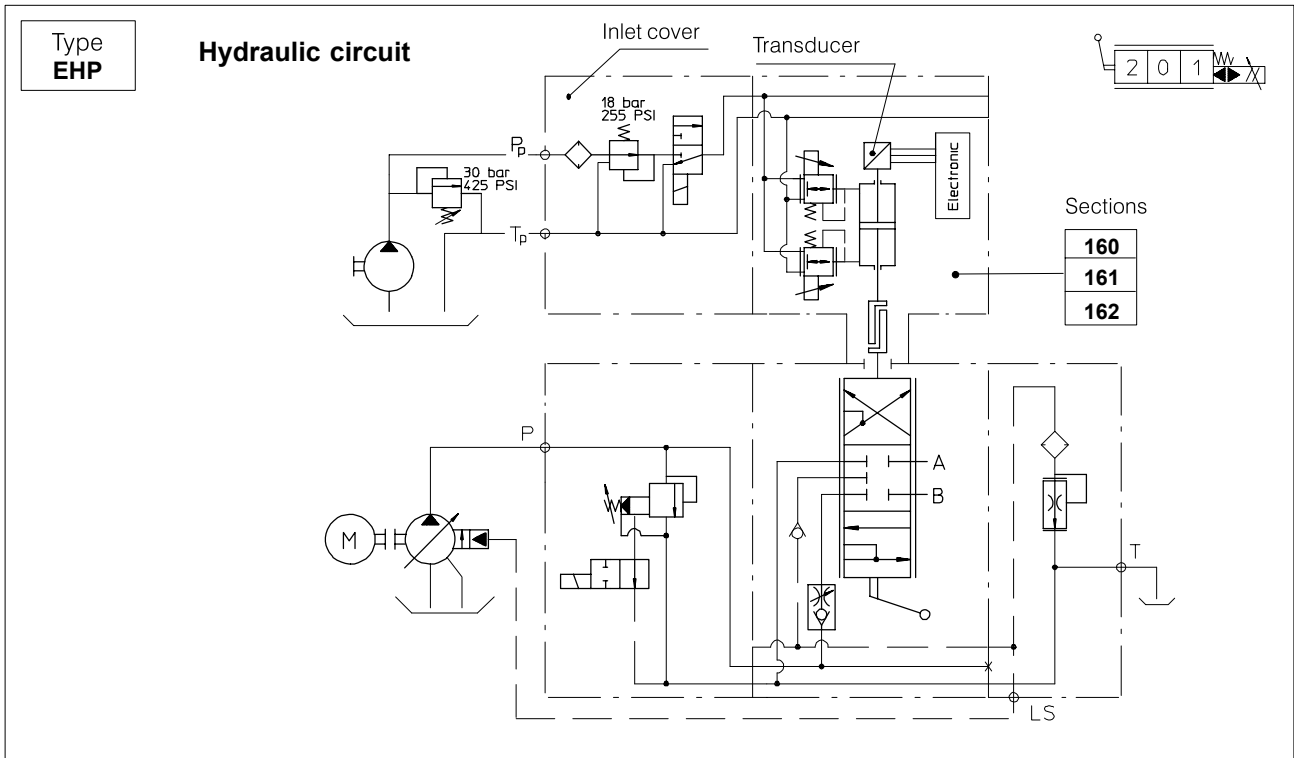
Electrical wiring

DIN 43650 connector

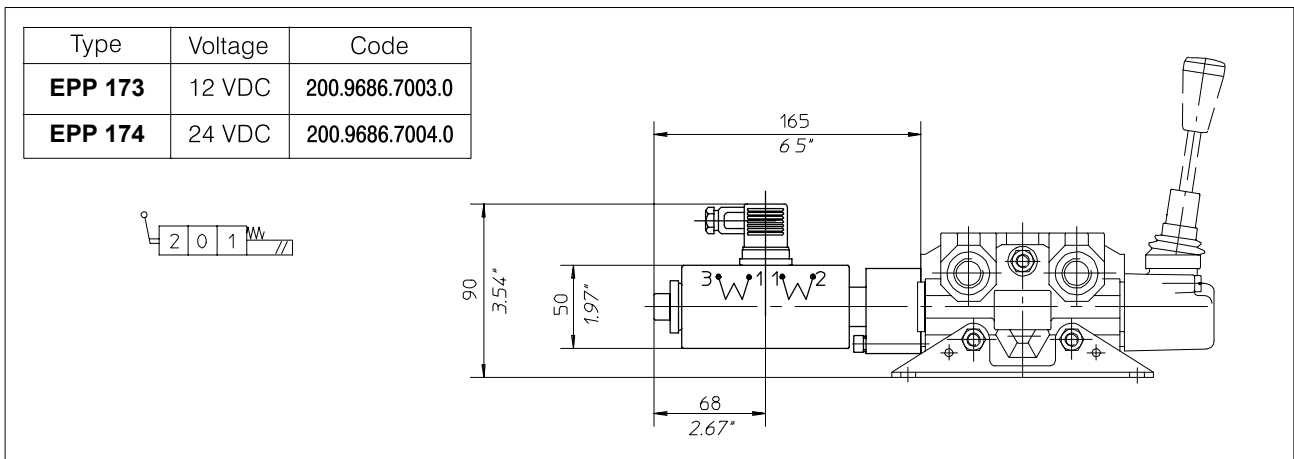


HDS15 Series

Sectional Directional Control Valve



Electromagnetic control



To be used with special spools only: the spool definition is different from the standard one because of the double "P", example A circuit = APP

173 174

Mechanical and hydraulic features

Max operating pressure 200 bar (2800 PSI)
 Max back pressure 5 bar (70 PSI)
 Max flow 40 l/min (15 U.S.G.P.M.)
 Operating oil temperature 80° C (180° F)

Electromagnetic specification

Input tension 12 V DC [24 V DC] ± 10%
 Power consumption 80 W

ED: 60%
 Ohms resistance: 1.25 Ω [5.8 Ω]
 Intensity of current 8 A (3.7 A)
 Ambient operating temperature range: ... -54° C/+60° C
 Average stabilized coil temperature operated continuously +160° C
 The a/m overage temperature is obtained with a nominal voltage of 12 V (24 V), with an ambient temperature of 25° C and with an electromagnet assembled on an hydraulic valve without oil circulation.
 Insulation class:
 following to VDE 0580 standard H
 Electrical connection:
 with Hirschmann connector per DIN 43650 IP 65

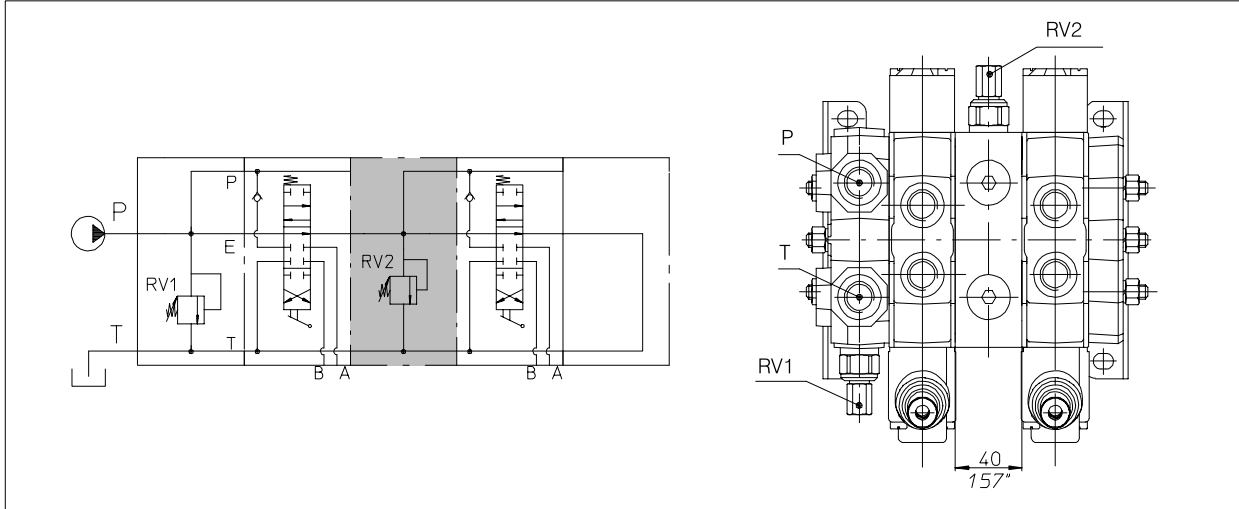
HDS15 Series



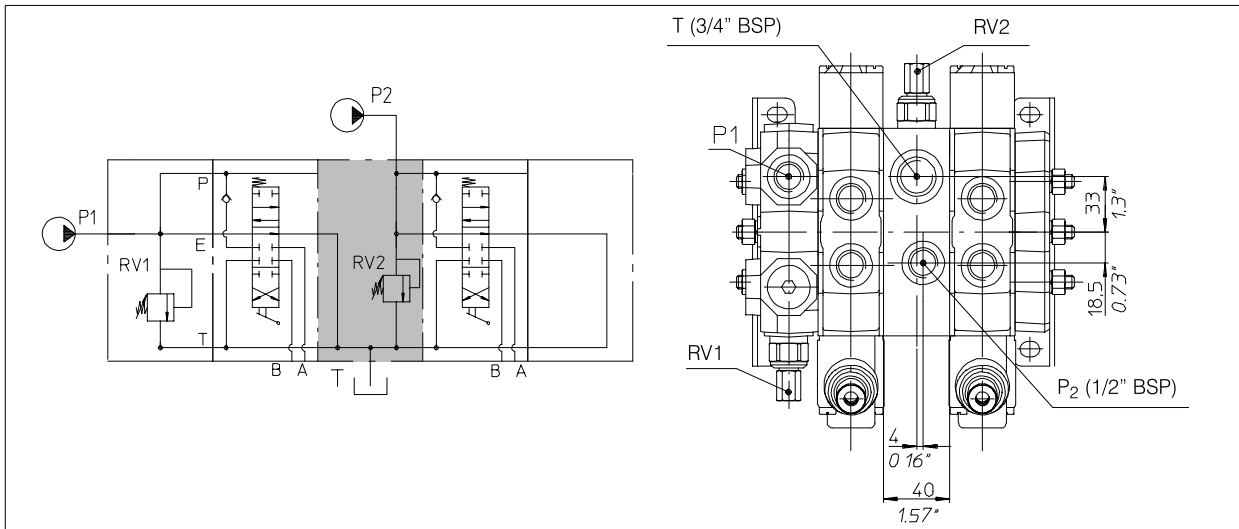
Sectional Directional Control Valve

Intermediate sections

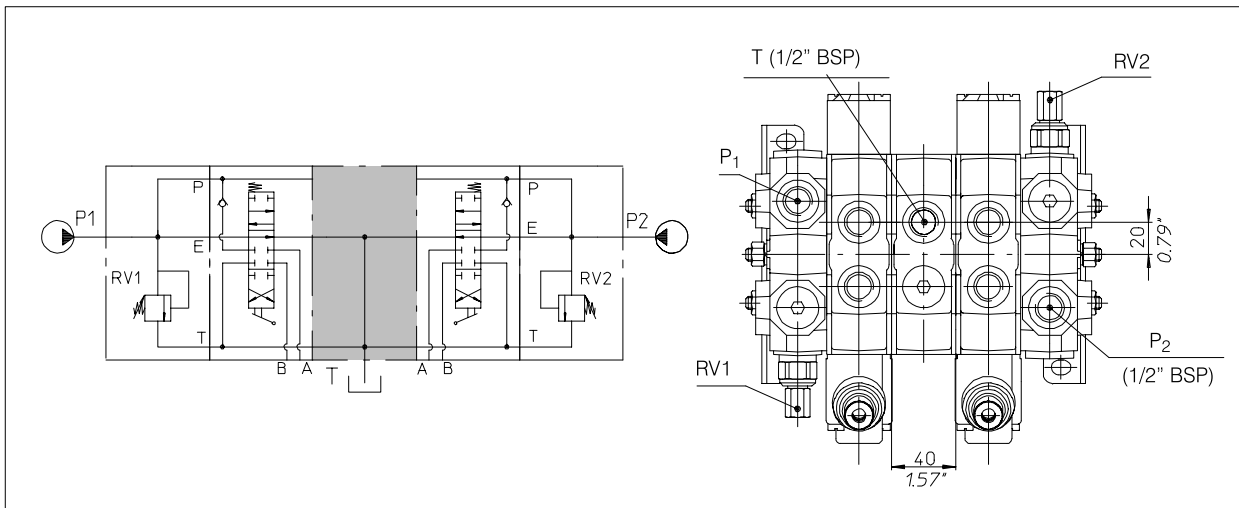
Section with relief valve K81



Section with intermediate inlet and outlet pump (with independent flows) K82



Section with outlet pump K83

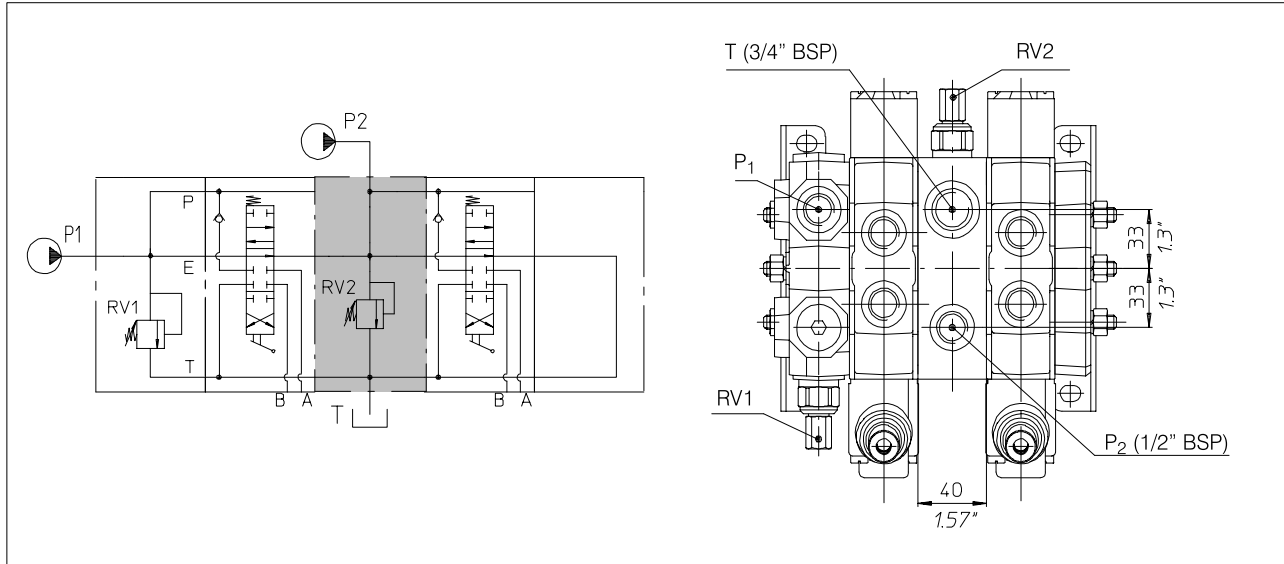


HDS15 Series

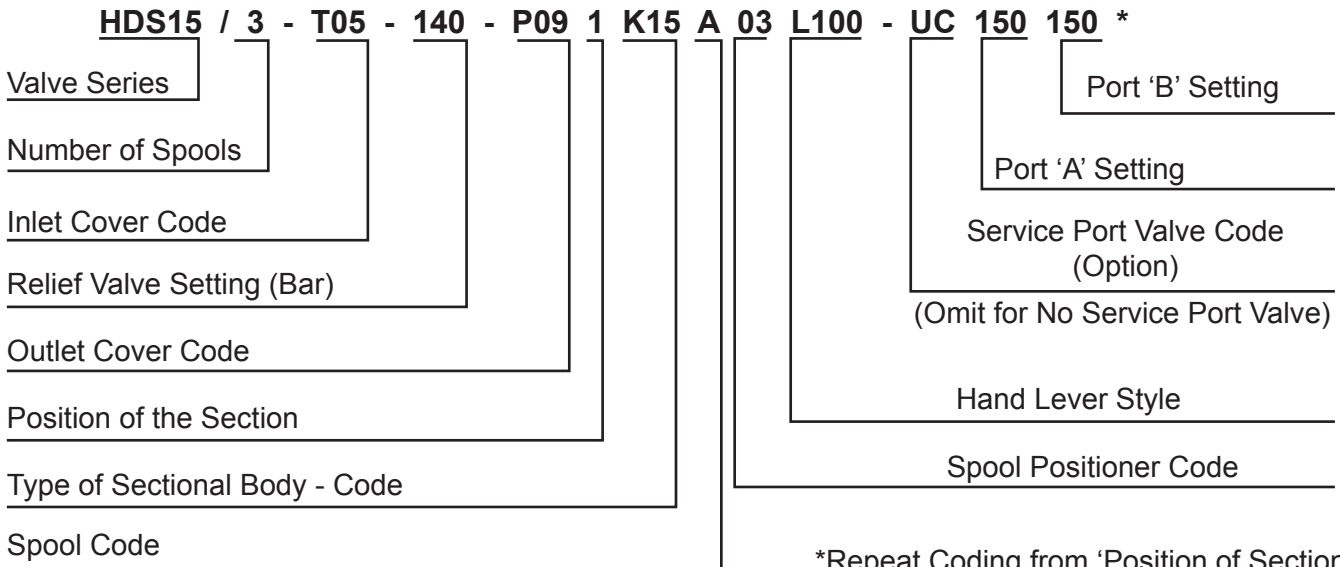
Sectional Directional Control Valve



Section with intermediate inlet and outlet pump
(with combined flow) K84



HOW TO ORDER



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