

Proportional Directional Control Valves Size 10



**Systemtechnik
GmbH**

**Direct actuated, electrically adjustable
Interface to DIN 24 340 and ISO 4401**

PN [p_{max.}] = 315 bar

7502255.06.03.06

Description (standard units)

Design

The proportional directional control valve, size 10, is based on the 5-chamber system and is in the form of a slide valve. The valve is actuated by proportional solenoids.

Application

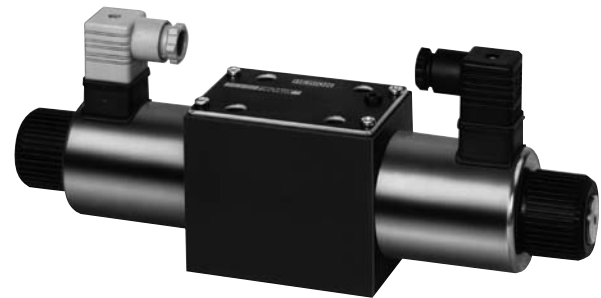
The proportional directional control valve can be used to control the direction and speed of hydraulic cylinders and hydraulic motors and is employed in cases where a servo valve would be too expensive and a normal directional control valve would not offer a sufficient range of functions. The electrical control allows the wide variety of motions to be executed simply and extremely precisely by means of the continuously-controllable signal. When using a pressure balance as intermediate unit, the proportional directional control valve can take over a flow control function.

Mounting

The units are bolted onto subplates and sealed by O-rings.

Line connection

Subplate, interface to DIN 24 340-A 10 and ISO 4401-AC-05-4-A.



Features

- Speed and direction control in accordance with setpoint specification
- Program control, remote control
- Spring-centred, pressure-controlled, robust design
- Inexpensive system solution
- With pressure balance, load-independent speed control
- Full pressure drop across valve is available also without pressure balance (up to 315 bar)

Type key

Proportional directional control valves

S	10	UP	10	G	O	...
					1	2	3		4

1 Symbol:	187	
	233	
	205	
	212	

- 2 Code: **016** - See characteristic curves
019 - See characteristic curves
- 3 Engineering version: **2**
- 4 Sealing material: **V** - FKM (e.g. Viton)

Subplate

P	S	10	G	...	001	...	O	O
				1		2		

- 1 Line connection: **4** - G 1/2 (Internal thread)
5 - G 3/4 to DIN ISO 228/1)
- 2 Engineering version: **2**

Parameters

Type	S 10 UP... 10 G...		
General parameters			
Description	Proportional directional control valve		
Symbol	See equipment survey		
Design	Direct operated spool valve		
Type of mounting	Flange		
Line connection	Subplate		
Mounting position	Valve axis horizontal		
Actuator type	Proportional solenoid		
Weight of valve	1 solenoid	[kg]	5.2
	2 solenoids		6.6
Weight of pressure balance I to III		[kg]	3.25
IV to VI			7.85
Weight of subplate	G 1/2	[kg]	2.0
	G 3/4		3.4
Ambient temperature range	ϑ_{amb}	[°C]	-20 ... +50
Size	10		
Hydraulic parameters			
Operating pressure range at P, A and B at T	p_{max}	[bar]	up to 315 up to 160
Pressure fluid temperature	ϑ_{max}	[°C]	+70
Viscosity range	ν	[mm ² /s]	12 ... 500
Max. flow	Q_{max}	[cm ³ /min]	See characteristic curve
Zero flow ($\Delta p = 100$ bar)	Q_{min}	[cm ³ /min]	100
Flow with pressure balance I and IV			200
with pressure balance II and V			300
with pressure balance III and VI			500
Pressure drop with pressure balance I and IV	Δp	[bar]	5
with pressure balance II and V			10
with pressure balance III and VI			20
Repeatability with dither ¹⁾ (referred to I_N)		[%]	≤ 3
Hysteresis			
S 10 UP, with pressure balance and dither ¹⁾	I_N	[%]	≤ 4
S 10 UP, without pressure balance with dither ¹⁾			≤ 4
Sensitivity of response with dither ¹⁾	I_N	[%]	≤ 1
Regulating time	0% ... 80%	[ms]	50
Filtration, absolute		[μm]	25
Electrical parameters of proportional solenoid			
Solenoid Cat. No.	7998		
Rated current	I_N	[mA]	2400
Rated power	P_{20}	[W]	19
Resistance	R_{20}	[Ω]	3.3
Duty cycle		[%]	100
Electrical connection	Connection to DIN 43 650 A		
Degree of protection to DIN 40 050	IP 65 with connector		
Electronic control unit	DC 05 / DC 05-XLT, pQ 11 and pQ 12 See Page 5		

¹⁾ Dither: Frequency 50 Hz, amplitude 15 % I_N

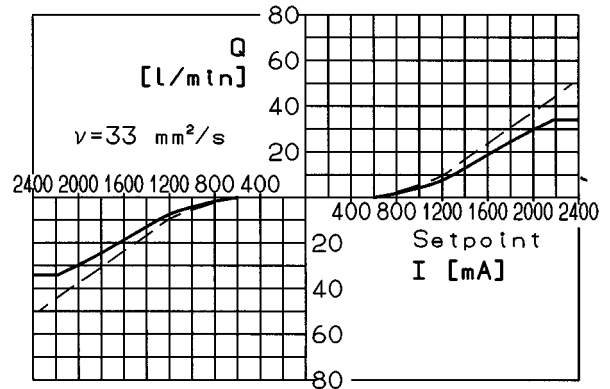
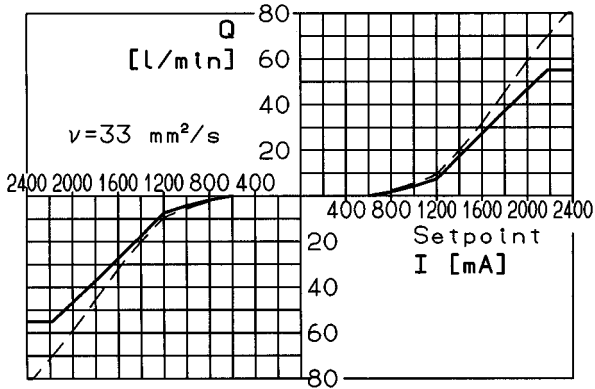
Characteristic curves

Proportional directional control valves

—— with pressure balance II and V
 - - - with pressure balance III and VI

S 10 UP 10 G 187 016 2 O V
 S 10 UP 10 G 233 016 2 O V
 S 10 UP 10 G 212 016 2 O V

S 10 UP 10 G 187 019 2 O V
 S 10 UP 10 G 233 019 2 O V
 S 10 UP 10 G 212 019 2 O V

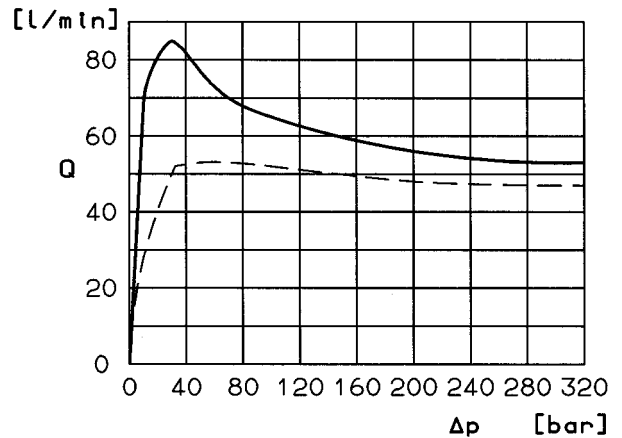
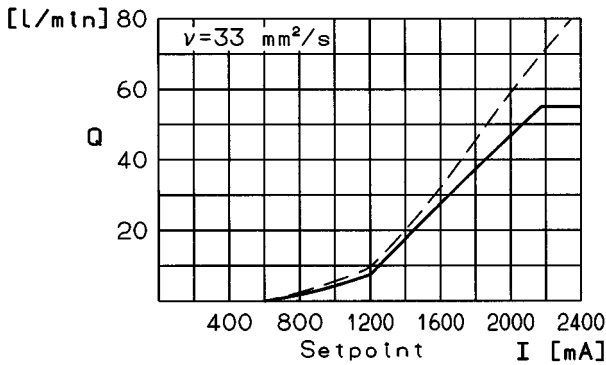


S 10 UP 10 G 205 016 2 O V

Limit of capacity without pressure balance

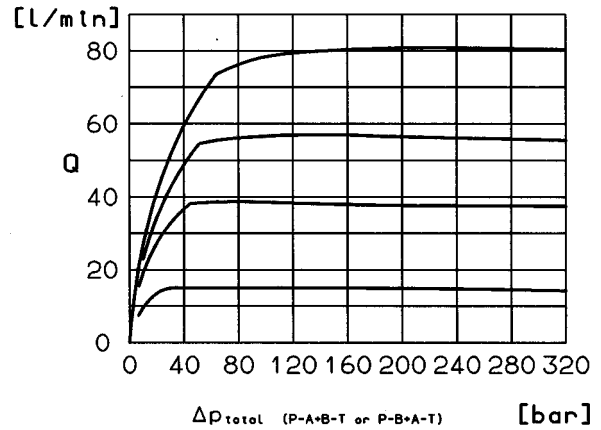
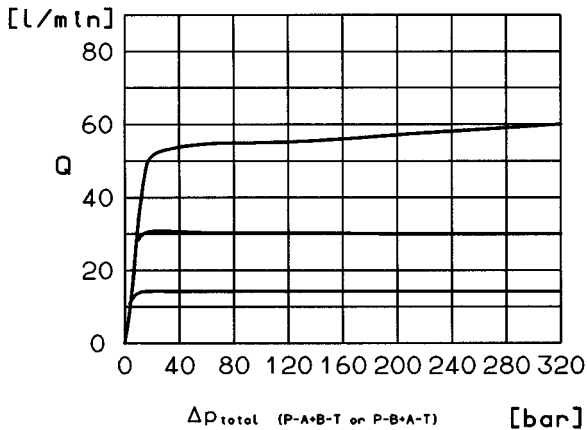
Proportional directional control valve
 —— with pressure balance II
 - - - with pressure balance III

Proportional directional control valve
 —— with code 016
 - - - with code 019



S 10 UP 10 G ... 016 2 O V
 with pressure balance II and V

S 10 UP 10 G ... 016 2 O V
 with pressure balance III and VI



Ordering

The units are designated by their type number. The composition of this number can be drawn from the type key. The standard versions are listed in the type survey. When ordering any of the standard versions, please state type number as well as catalog number to preclude possible misinterpretations.

When inquiring about or ordering units not listed in our type survey of this publication, the type number made up by you by means of the type key, however, will do. The corresponding catalog number will then be stated in our confirmation of order. O-rings are enclosed with flanged units. The pressure balance, subplate, drive electronics and mounting screws must be ordered separately.

Example of order

Proportional directional control valve Size 10, Symbol 187, Code 016, with pressure balance, corresponding subplate G 3/4 and electronic control unit.

Proportional directional control valve:

Type: S 10 UP 10 G 187 016 2 O V
Cat. No. **5204813.7998**

Pressure balance:

Cat. No. **6015529**

Subplate:

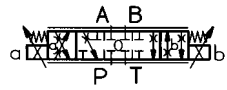

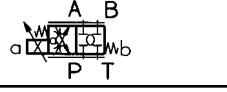
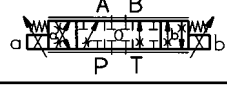
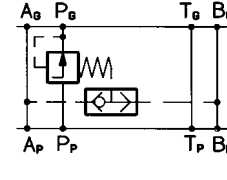
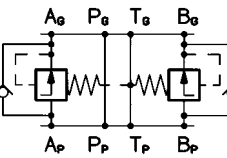
Type: P S 10 G 5 001 1 O O
Cat No. **2840036**

Mounting screws: (4 bolts required)

Socket head screws (M 6 x 110 DIN 912-10.9)
Cat. No. **0659221**

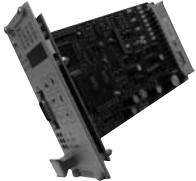

Electronic control unit see Page 5.

Equipment survey and possibilities of combination (standard versions)



Description	Symbol	Symbol-No.	Type	Cat. No.	Combination ¹⁾			
Proportional directional control valve		187	S 10 UP 10 G 187 016 2 O V S 10 UP 10 G 187 019 2 O V	5204813.7998 5205020.7998	X	X		
		233	S 10 UP 10 G 233 016 2 O V S 10 UP 10 G 233 019 2 O V	5204815.7998 5205021.7998	X	X		
		205	S 10 UP 10 G 205 016 2 O V	5205065.7998	X	X		
		212	S 10 UP 10 G 212 016 2 O V S 10 UP 10 G 212 019 2 O V	5204814.7998 5205022.7998	X		X	
Pressure balance I		Pressure balance at port P	Pressure drop per control edge Δp approx. 2,5 bar	6015528		X		
Pressure balance II			Pressure drop per control edge Δp ca. 5 bar	6015529			X	
Pressure balance III			Pressure drop per control edge Δp ca. 10 bar	6015530			X	
Pressure balance IV		Pressure balance at port A→T or B→T (return)	Pressure drop per control edge Δp ca. 2,5 bar	6015525			X	
Pressure balance V				Pressure drop per control edge Δp ca. 5 bar	6015526			X
Pressure balance VI				Pressure drop per control edge Δp ca. 10 bar	6015527			X
Subplates G 1/2 G 3/4	- -	- -	P S 10 G 4 001 2 O O P S 10 G 5 001 1 O O	1065184 2840036	X	X	X	
Mounting screws	Socket head screws (M 6 x 60 DIN 912-10.9) Socket head screws (M 6 x 110 DIN 912-10.9) Socket head screws (M 6 x 160 DIN 912-10.9)			0700411 0659221 0681899	X		X	

¹⁾ Possibilities of combination between proportional directional control valve, pressure balance, subplate and mounting screws.

Drive electronics

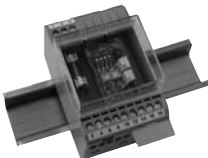

Drive electronics DC 05 / DC 05-XLT Digital amplifier with constant current regulator PWM Power supply: 18 ... 30 VDC, incl. residual ripple Ambient temperature ϑ_a : 0 ... +50 °C Weight: 0,4 kg Mounting position: Upright Free air circulation must be ensured Space requirement for installation of 19" card rack: 50 mm European format: 100 x 160 mm  	Type	Setpoint input (switchable)	Internal setpoints	Ramps	Terminal strip Form F DIN 41612	PID controller for external control loops	Cat. No.	For Further information, see script
		[V] [mA]	Pcs.	Pcs.	Number of pins			
	For proportional directional control valves Rated current I_N: 0 ... 1600 mA							
DC 05	2x0...±10V	0(4)...20 mA	4	4	48	● / ○ (switchable)	5150000 ¹⁾	7503503
DC 05-XLT	0...±10V		4	2	48	○	5150001 ¹⁾	7503504
			Functional compatible to pQ 03					

1) Pre-parametred electronics on request.

Drive electronics pQ 11 Plug-in amplifier with constant current regulator PWM Degree of protection: IP 65 Power supply: 18 ... 32 VDC, Residual ripple: ≤ 10 % Ambient temperature ϑ_a : -20 ... +50 °C Mounting position: Optional  	Setpoint input (switchable)	Type of connection		Weight	Cat. No.	For Further information, see script
	[V] [mA]	Connecting cable, 2 m	Connector acc. to DIN 43651	[kg]		
	For proportional valves with 2 solenoids 2 pQ 11 necessary Rated current I_N: 0 ... 2400 mA, allowed resistance of solenoid R_{20}: 2,5...4,5 Ω					
0 ... 10	0 (4)...20	●	○	0,18	5980085	
0 ... 10	0 (4)...20	○	●	0,18	5980081 ¹⁾	

Mark in table: ○ without, ● with

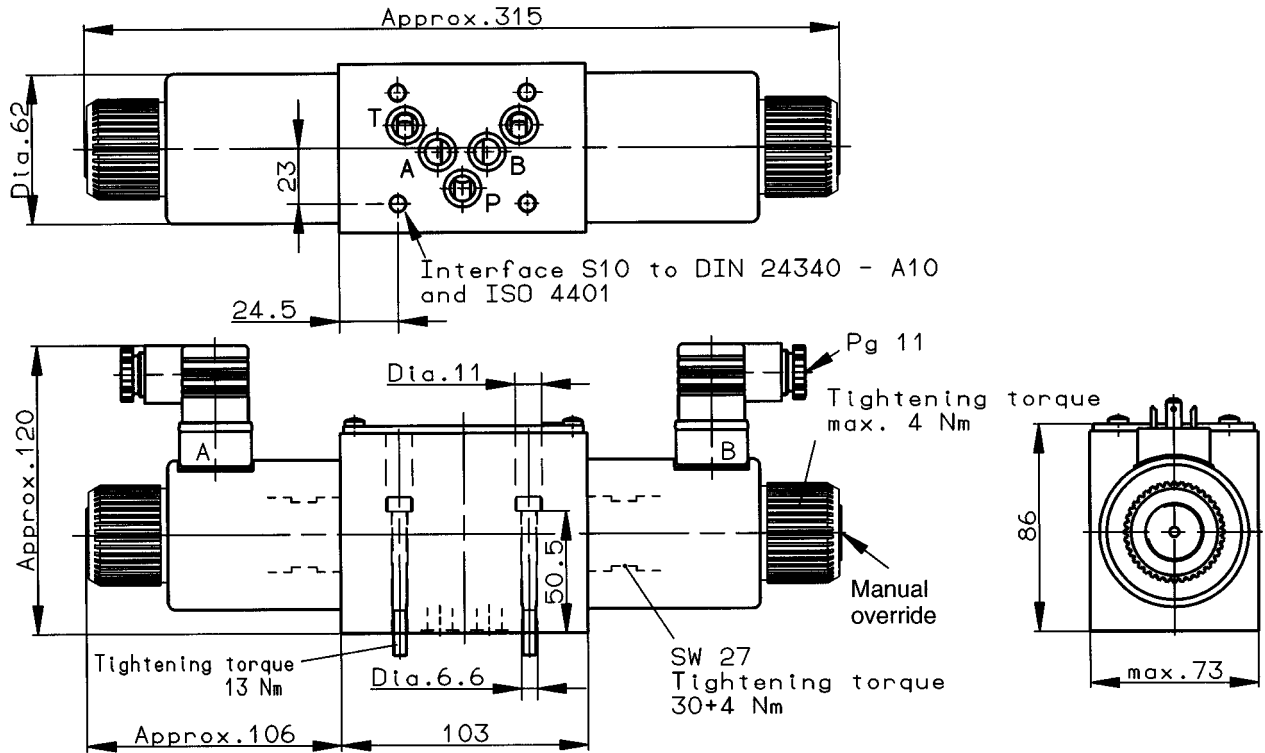
1) Cable connector to be ordered separately. Cat. No. **0660689**

Drive electronics pQ 12 Amplifier module with constant current regulator PWM Degree of protection: IP 65 Power supply: 18 ... 32 VDC, Residual ripple: ≤ 10 % Ambient temperature ϑ_a : -20 ... +50 °C Mounting position: Optional For attachment on mounting rail acc. to EN 50022  	Setpoint input (switchable)	Output currents		Cat. No.	For Further information, see script
	[V] [mA]	[mA]			
	For proportional valves with 2 solenoids 2 pQ 11 necessary				
0 ... 10	0 (4)...20	0 ... 1600 / 2400		5980126	

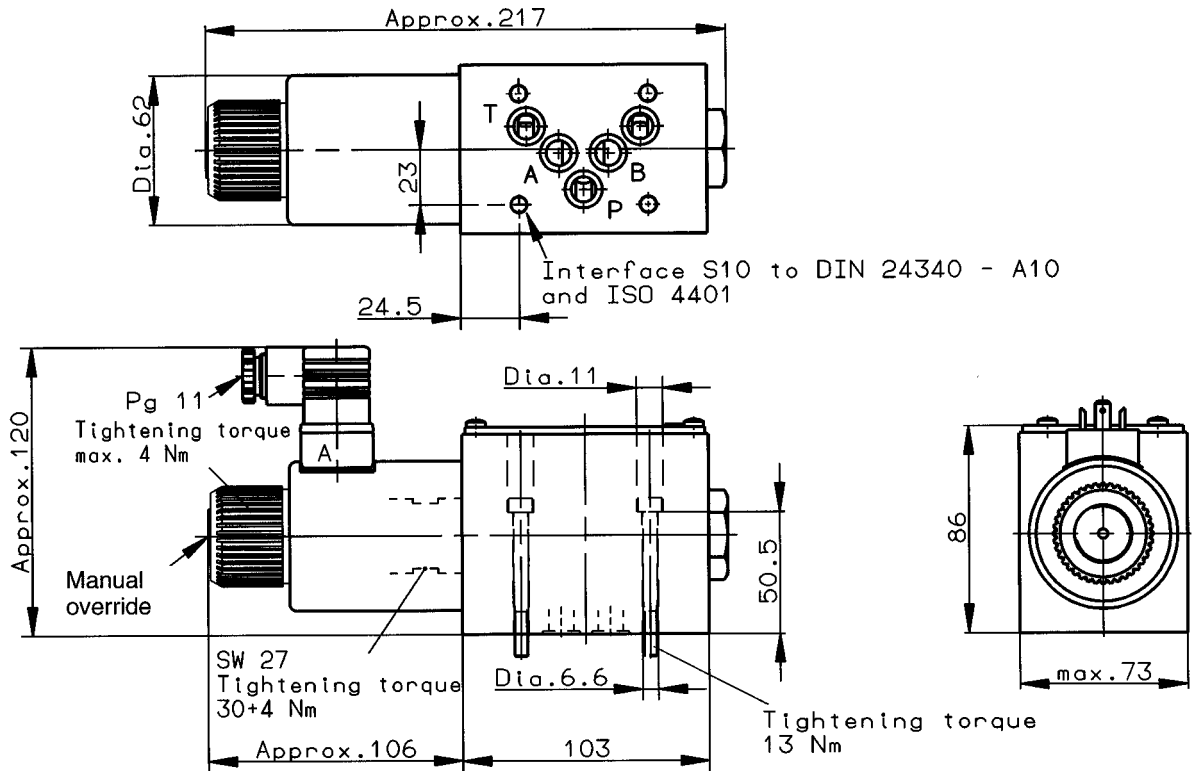
Dimensional drawings [mm]

Proportional directional control valve

S 10 UP 10 G 187 ... 2 O V
 S 10 UP 10 G 233 ... 2 O V
 S 10 UP 10 G 212 ... 2 O V



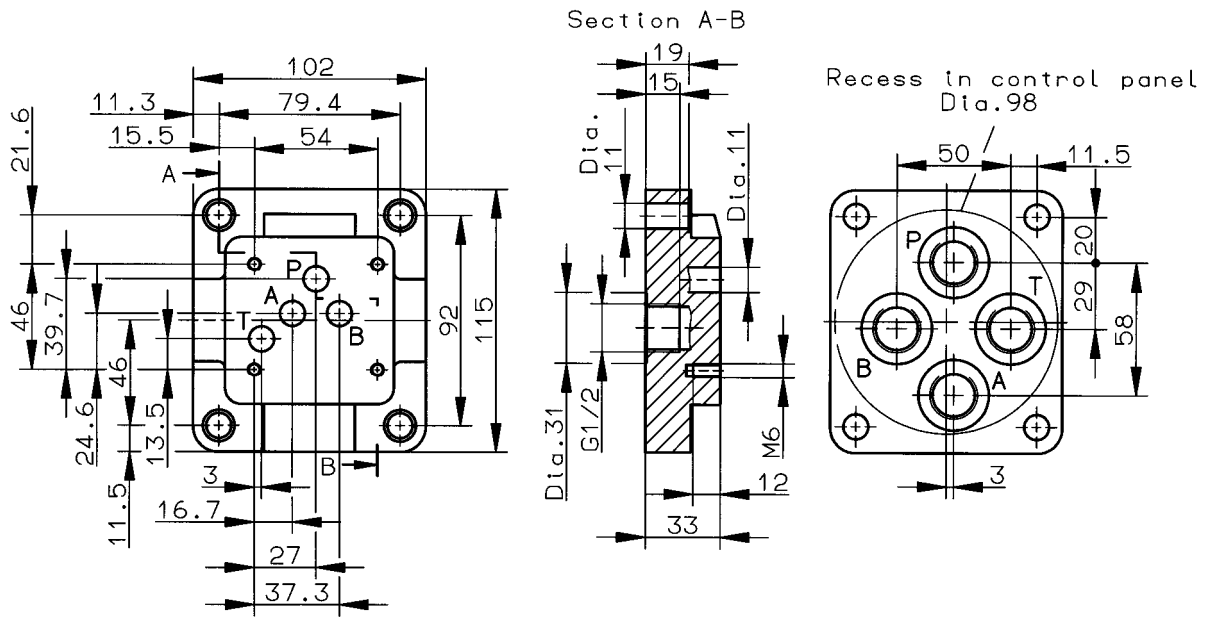
S 10 UP 10 G 205 ... 2 O V



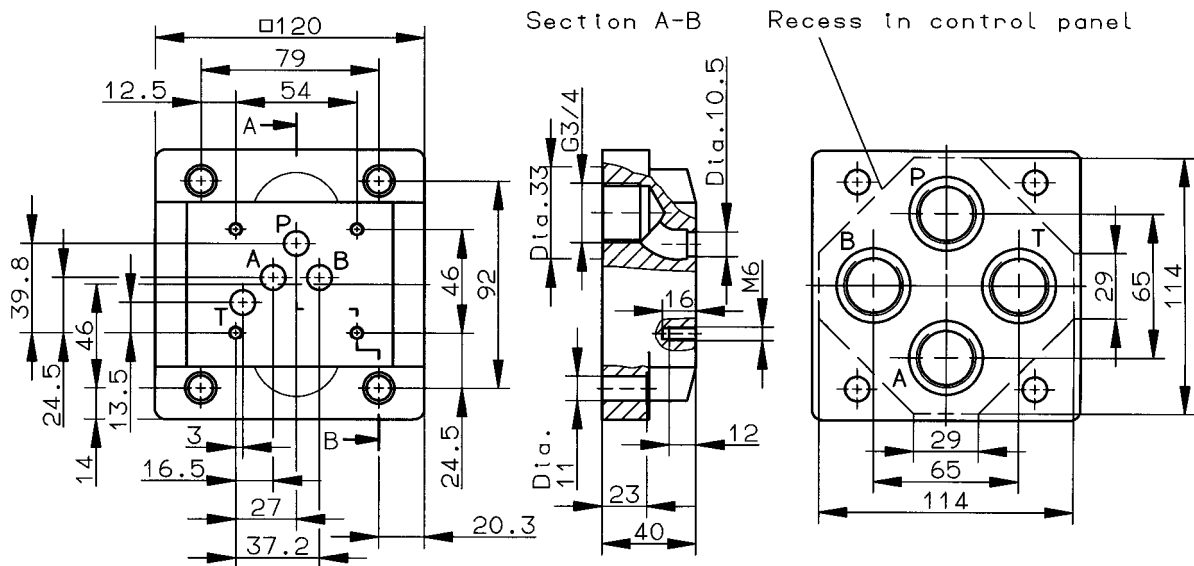
Dimensional drawings [mm]

Subplate, Size 10 with interface to DIN 24 340-A10 and ISO 4401-AC-05-4-A

Subplate 1
Cat. No. 1065184
G 1/2



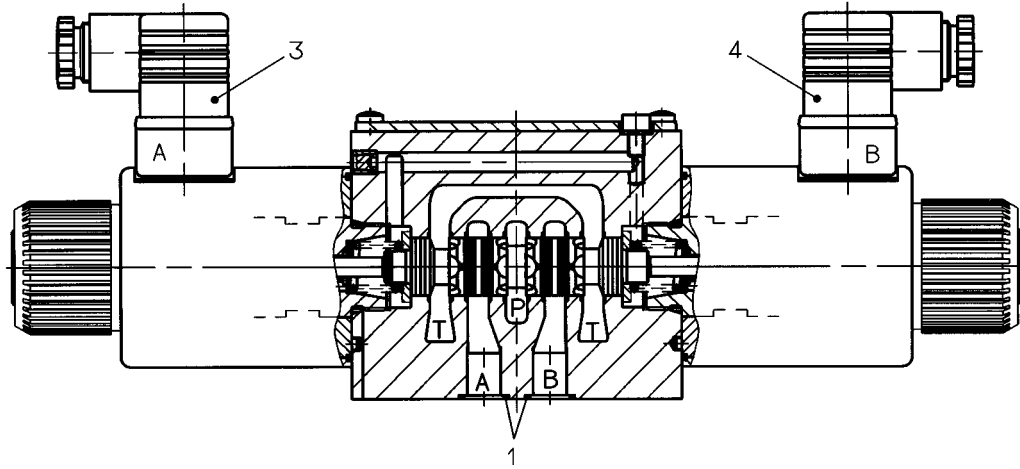
Subplate 2
Cat. No. 2840036
G 3/4



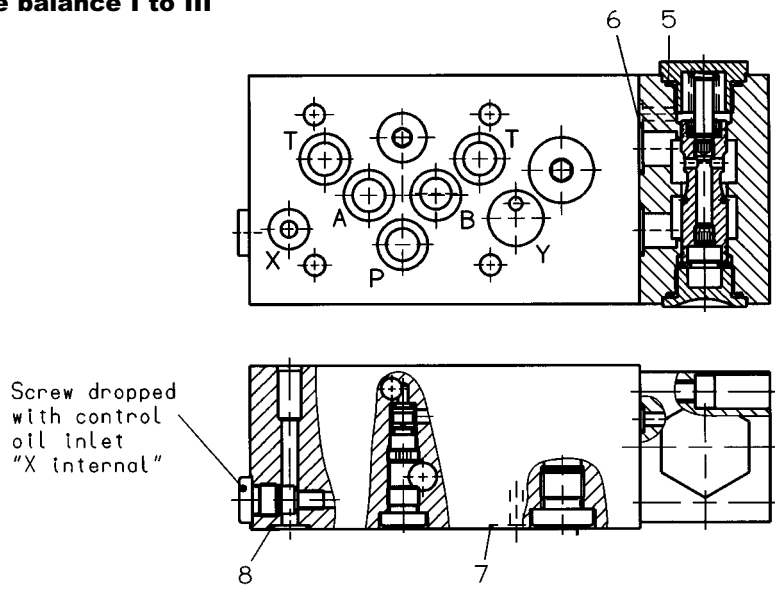
Spare part drawings

Proportional directional control valve

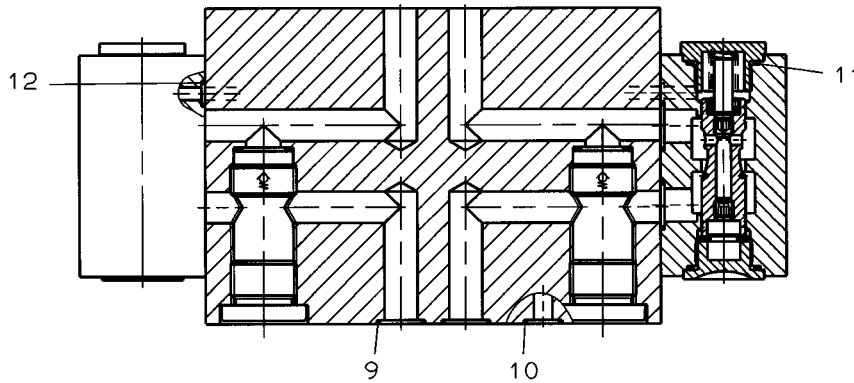
S 10 UP 10 G 187 ... 2 O V
S 10 UP 10 G 233 ... 2 O V
S 10 UP 10 G 212 ... 2 O V



With pressure balance I to III in port P



With pressure balance IV to VI in port B



Spare parts and mounting screws

Spare parts for directional control valve

Part	Qty.	Description	Cat. No.
1	5	O-ring (12.4 x 1.8)	0701623
3	1	Connector to DIN 43 650 Form A	0657859
4	1	Connector to DIN 43 650 Form B	0570275

Mounting screws without pressure balance

-	4	Socket head screws (M6 x 40 DIN 912-10.9)	0700411
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Mounting screws with pressure balance I to III

-	4	Socket head screws (M6 x 90 DIN 912-10.9)	0659221
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Mounting screws with pressure balance IV to VI

-	4	Socket head screws (M6 x 140 DIN 912-10.9)	0681899
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1 set of spare parts consists of parts 1, 3 and 4

Spare part kit for pressure balance

Part	Qty.	Description	Cat. No.
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Pressure balance I to III

Cat. No.: **6015528**

6015529

6015530

5-8	1	Spare part kit	0726874
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Pressure balance IV to VI

Cat. No.: **6015525**

6015526

6015527

9-12	1	Spare part kit	0726875
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Notes:
