

# Proportional Directional Control Valves Size 6



**Systemtechnik  
GmbH**

**Direct operated, position-controlled  
Interface to DIN 24 340 and ISO 4401**

**PN [p<sub>max.</sub>] = 315 bar**

7501719.06.03.06

## Description (standard units)

### Design

The proportional directional control valve, size 6, is based on the 5-chamber system and is in the form of a slide valve. The valve setting is monitored by a displacement measurement system and fed to the position control loop as an actual value. Interference variables are eliminated, ensuring that the selected setpoint is always precisely achieved. The actual position value is monitored by an inductive differential transformer with built-in electronic circuitry.

### 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.

### Mounting

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

### Line connection

Subplate, interface to DIN 24 340-A 6 and ISO 4401-AB-03-4-A.



## Features

- Speed and direction control in accordance with setpoint specification
- Program control, remote control
- Spring-centred, robust design
- Inexpensive system solution
- High repetition accuracy and low hysteresis, thanks to position control

## Type key

### Proportional directional control valve

<b>S</b>	<b>6</b>	<b>UR</b>	<b>10</b>	<b>G</b>	...	...	...	<b>O</b>	...
					1	2	3		4

1 Symbol:	<b>187</b>	
	<b>233</b>	
	<b>212</b>	

- 2 Code No.: **018** - See characteristic curve  
**019** - See characteristic curve
- 3 Engineering version: **4**
- 4 Sealing material: **V** - FKM (e.g. Viton)

### Subplate

<b>P</b>	<b>S</b>	<b>6</b>	<b>G</b>	...	<b>001</b>	...	<b>O</b>	<b>O</b>
				1		2		

- 1 Line connection: **2** - G 1/4 (Internal thread)  
**3** - G 3/8 to DIN ISO 228/1)
- 3 Engineering version: **2**

## Parameters

Type designation	S 6 UR ...
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### General parameters

Designation	Proportional directional control valve		
Symbol	See type survey		
Design	Spool-type valve, direct operated, position-controlled		
Type of mounting	Flange		
Line connection	Subplate		
Mounting position	Valve axis horizontal (see mounting drawings)		
Type of actuator	Proportional solenoid, position-controlled		
Weight - Valve		[kg]	2.8
Weight - Subplate	G 1/4	[kg]	1
	G 3/8	[kg]	1
Ambient temperature	$\vartheta_u$	[°C]	-20 ... +50
Nominal size	NG		6

### Hydraulic parameters

Operating pressure range at P, A and B at T	$p_{max}$	[bar]	up to 315
	$p_{max}$		up to 160
Pressure fluid temperature	$\vartheta_m$ max.	[°C]	+70
Viscosity range	$\nu$	[mm <sup>2</sup> /s]	12 ... 500
Zero flow ( $\Delta p = 100$ bar)	$Q_l$	[cm <sup>3</sup> /min]	< 30
Max. flow	$Q_{max}$		See characteristic curve
Repeatability <sup>1)</sup>		[%]	< 1
Hysteresis <sup>1)</sup>		[%]	< 1
Sensitivity of response <sup>1)</sup>		[%]	< 0,1
Width of backlash <sup>1)</sup>		[%]	< 0,1
Floating time	Q = 0%...100%	[ms]	30
	Q = 100%...0%	[ms]	40
Filteration, absolute		[ $\mu$ m]	25

### Electrical parameters of proportional solenoid

Rated current	$I_N$	[mA]	1600
Resistance	$R_{20}$	[ $\Omega$ ]	5.7
Duty cycle	ED	[%]	100
Electric connection	Connector to DIN 43 650 A		
Degree of protection to DIN 40 050	IP 65 (with connector)		
Drive electronics with module for position control	See Page 5		

### Electrical parameters of displacement sensor

System	Inductive differential transformer with integrated electronics		
Supply voltage		[V]	19.2 ... 28.8
Residual ripple	< 5%		
Current consumption	max.	[mA]	40
Output voltage		[V]	7,5 $\pm$ 3,9
Temperature range		[°C]	0 ... 50

### Connection of displacement sensor

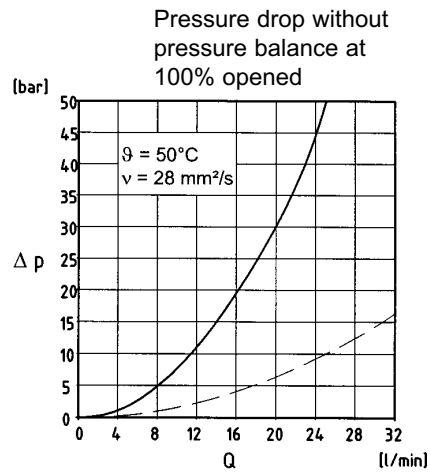
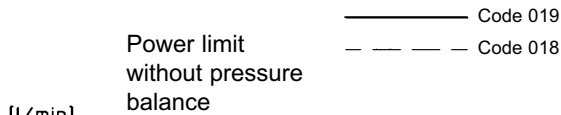
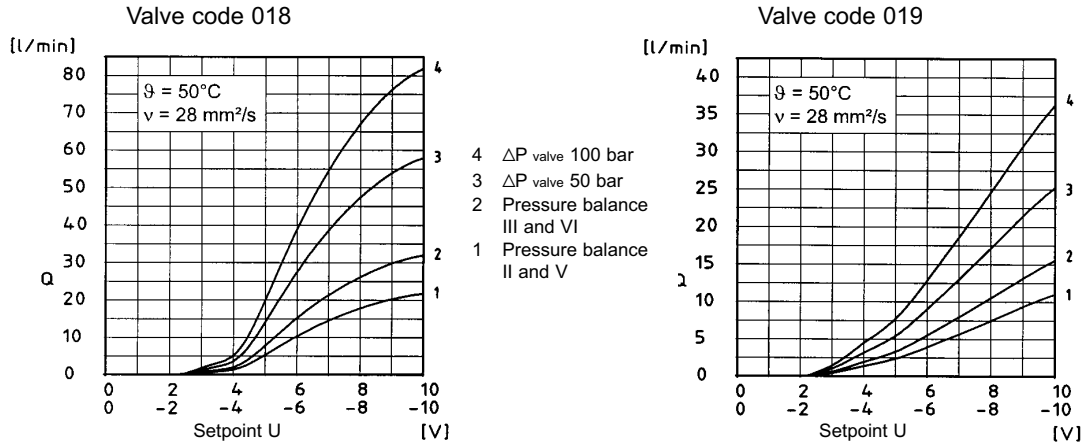
Connector	4-pin
Cable gland	M 12 x 1
Degree of protection to DIN 40 050	IP 65
Connector/Metal 90° (connector with cable, 2 m)	Cat. No. <b>0661748</b> Cat. No. <b>0681824</b>

<sup>1)</sup> referred to max. setpoint U = 10 V

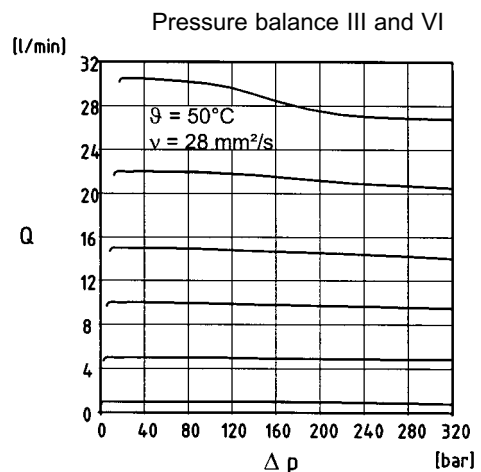
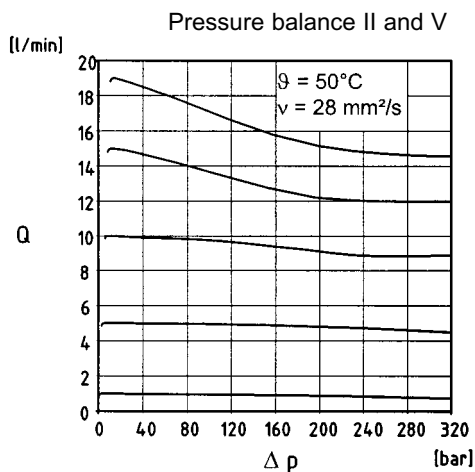
### Connecting cable for displacement sensor

Cable	Displacement sensor-Amplifier		
Type of cable	Screened, 3-core		
Cable length	max.	[m]	75
Cross-section	min per core	[mm <sup>2</sup> ]	0.5
Resistance	max.	[Ω/m]	0.05
Capacitance max.	Core - core	[pF/m]	160
	Core - screen	[pF/m]	350
Type	e.g. LIYCY		

### Characteristic curves



Valve code 018



## 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 code, 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 6, Symbol 187, with characteristic curve Code No. 018, pressure balance, subplate G 1/4 and drive electronics.

### Proportional directional control valve:

Type: S 6 UR 10 G 187 018 4 O V  
Cat. No. **5205002.9000**

### Pressure balance:

Cat. No. **6015190**

### Subplate:

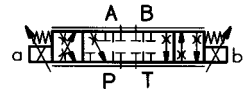
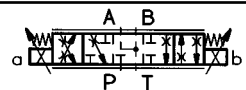
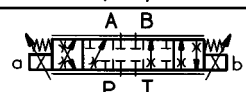
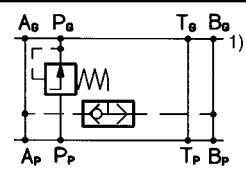
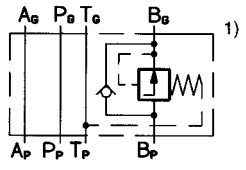
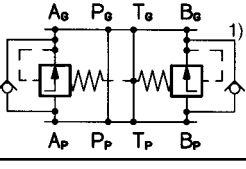
Type: P S 6 G 2 024 2 O O  
Cat. No. **1065173**

### Mounting screws: (4 bolts required)

Cylinder screws (M 5 x 70 DIN 912-10.9)  
Cat. No. **0662315**

Drive electronics to be ordered separately, see Page 5.

## Type survey and possibilities of combination (standard versions)

Designation	Symbol	Symbol-No.	Type	Cat. No.	Combination <sup>2)</sup>		
Proportional directional control valve		187	S 6 UR 10 G 187 018 4 O V S 6 UR 10 G 187 019 4 O V	<b>5205002.9000</b> <sup>3)</sup> <b>5205003.9000</b> <sup>3)</sup>	X	X	
		233	S 6 UR 10 G 233 018 4 O V S 6 UR 10 G 233 019 4 O V	<b>5205009.9000</b> <sup>3)</sup> <b>5205010.9000</b> <sup>3)</sup>	X	X	
		212	S 6 UR 10 G 212 018 4 O V S 6 UR 10 G 212 019 4 O V	<b>5205007.9000</b> <sup>3)</sup> <b>5205008.9000</b> <sup>3)</sup>	X		X
Pressure balance II		Pressure balance at port P		<b>6015189</b>		X	
Pressure balance III				<b>6015190</b>		X	
Pressure balance II		Pressure balance at port B → T (return flow)		<b>0723311</b>			X
Pressure balance V		Pressure balance at port A → T; B → T (return flow)		<b>6015532</b>			X
Pressure balance VI				<b>6015533</b>			X
Subplates G 1/4	-	-	P S 6 G 2 024 2 O O	<b>1065173</b>	X	X	X
G 3/8	-	-	P S 6 G 3 001 2 O O	<b>1065183</b>	X	X	X
Mounting screws	Socket head screws (M 5 x 30 DIN 912-10.9) Socket head screws (M 5 x 70 DIN 912-10.9) Socket head screws (M 5 x 110 DIN 912-10.9)			<b>0700387</b> <b>0662315</b> <b>0661664</b>	X		X

1) Port designation at symbol subscript "G" = device side, Index "P" = plate side

2) Possibilities of combination between proportional directional control valve, subplate and mounting screws

3) Solenoid Cat. No. **9000** comprises solenoid a = 7293, solenoid b = 7298

## 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  $\vartheta_a$ : 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		
<b>For proportional directional control valves Rated current <math>I_N</math>: 0 ... 1600 mA</b>							
DC 05	2x0...±10V	0(4)...20 mA	4	4	48	● / ○ (switchable)	<b>5150000</b> <sup>1)</sup> 7503503
DC 05-XLT	0...±10V		4	2	48	○	<b>5150001</b> <sup>1)</sup> 7503504
			Functional compatible to pQ 03				

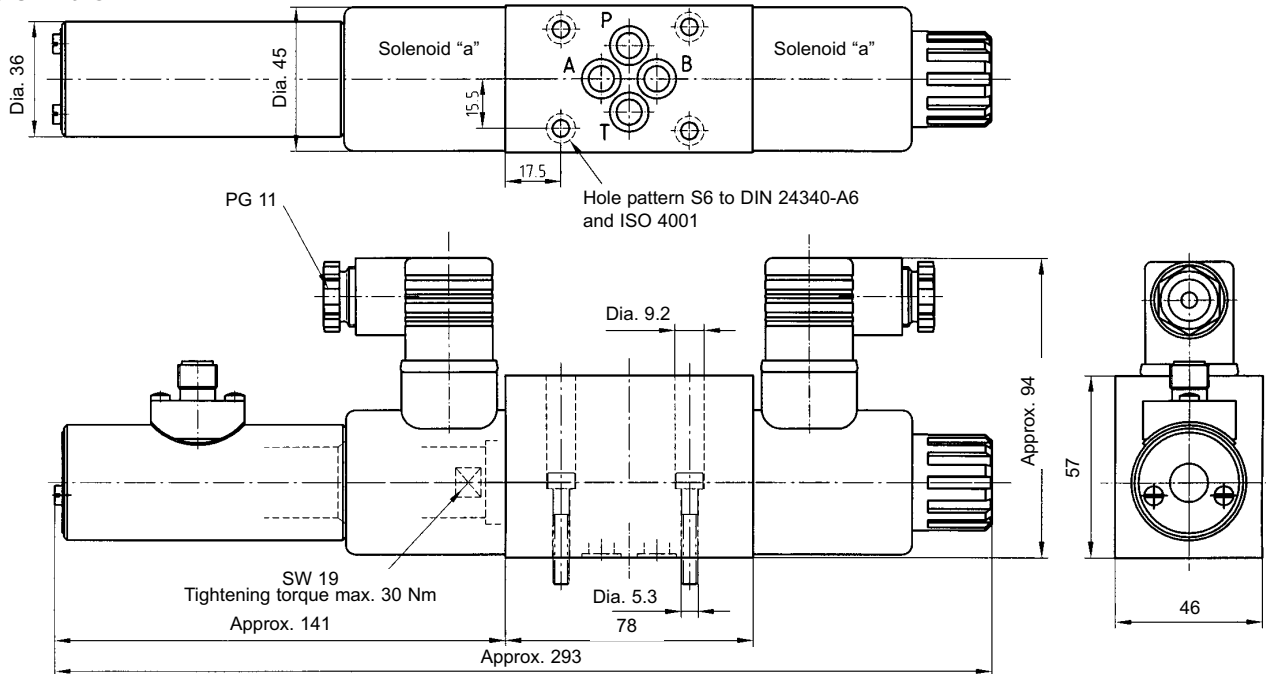
1) Pre-parametered electronics on request.

## Mounting and dimensional drawings [mm]

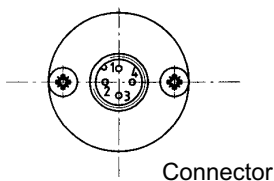
Flange-mounting design, horizontal

### Proportional directional control valve

S 6 UR 10 G ...



### Electronic displacement sensor



Screening

CE

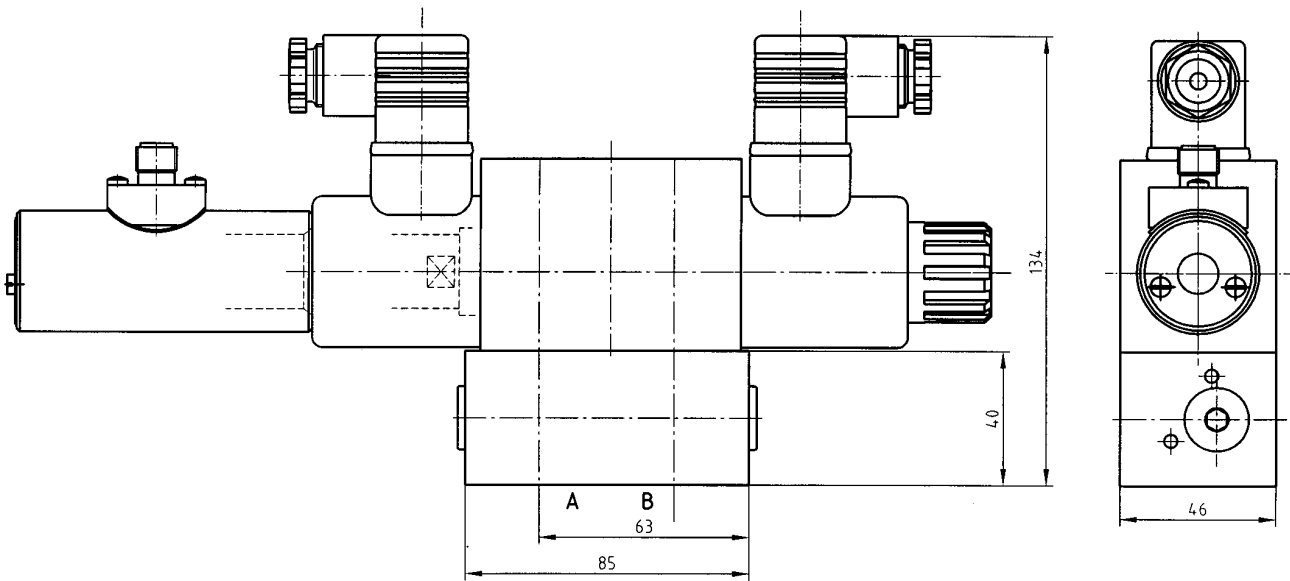
Output 7.5 ± 3.9 V 1  
Power supply 24 V 2  
Earth 3



**Dimensional drawings** [mm]

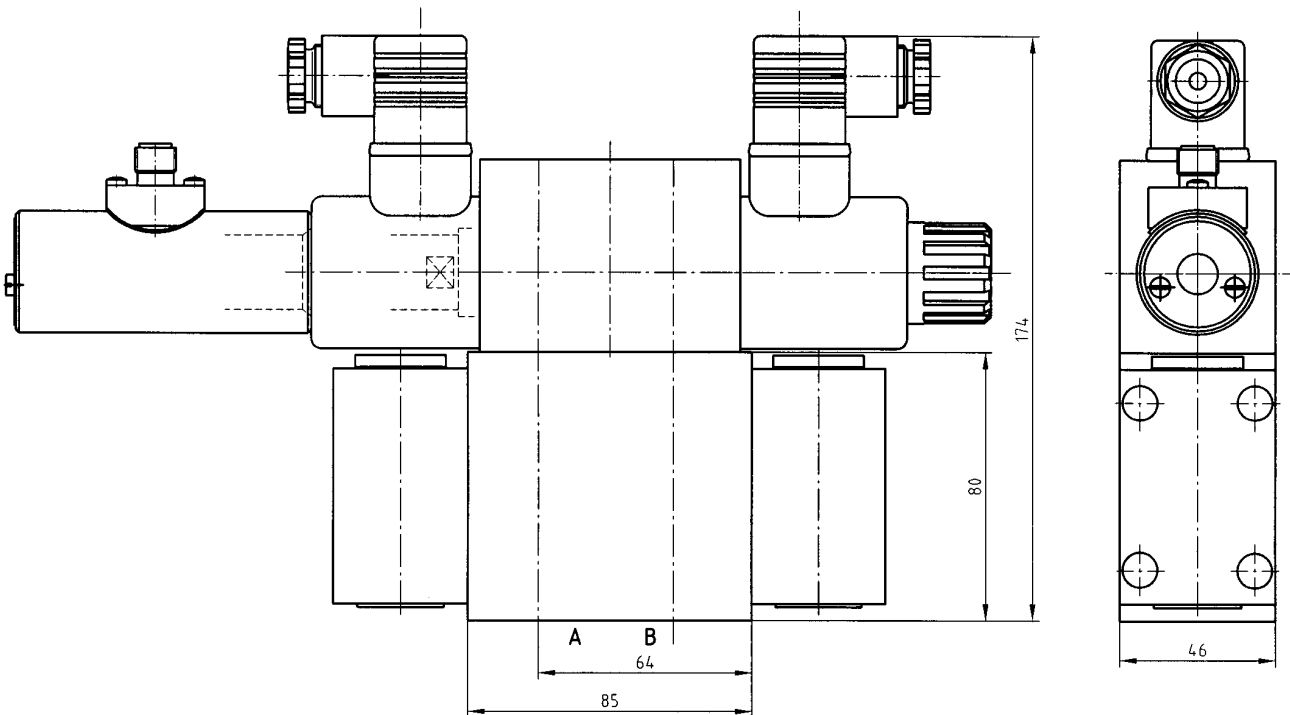
**Proportional directional control valve with pressure balance in port P or B → T**

S 6 UR 10 G 187 ... 4 O V  
S 6 UR 10 G 233 ... 4 O V  
S 6 UR 10 G 212 ... 4 O V



**Proportional directional control valve with pressure balance in port A → T or B → T (return flow)**

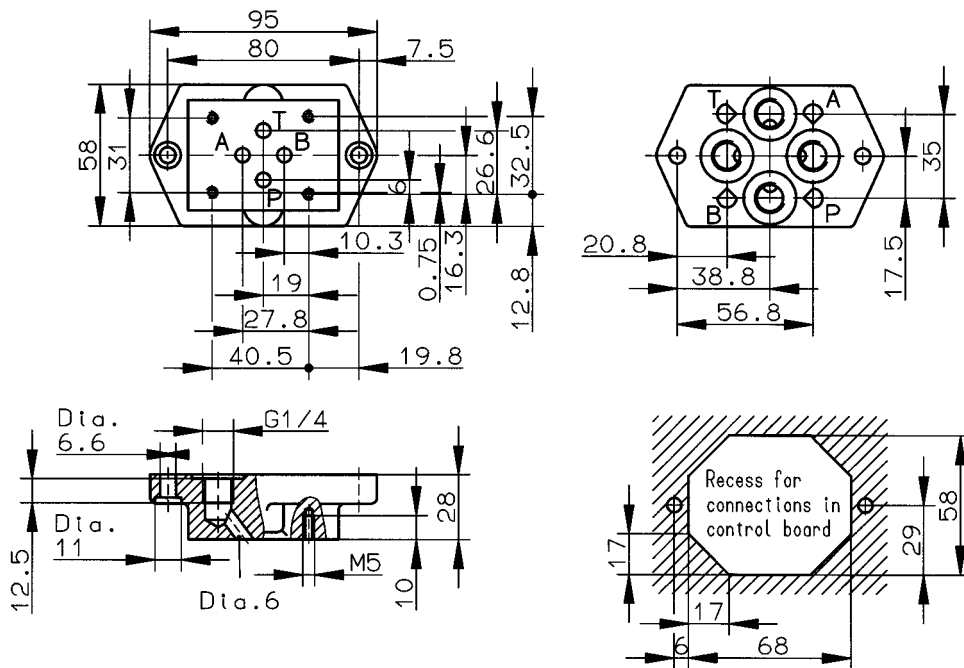
S 6 UR 10 G 212 ... 4 O V



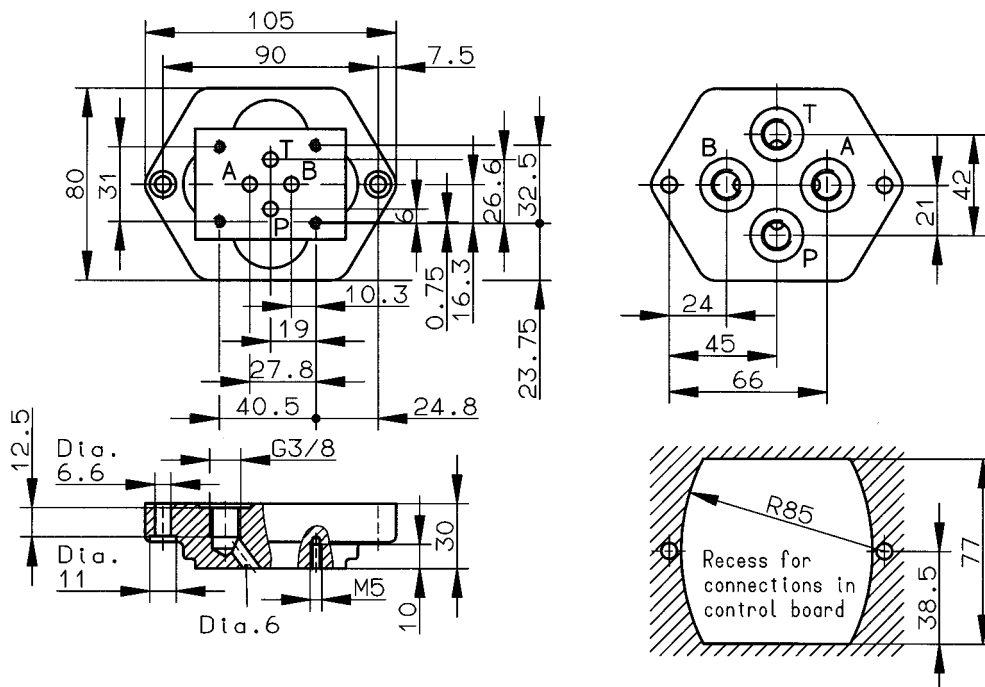
**Dimensional drawings** [mm]

**Subplate** with interface to DIN 24 340-A6 and ISO 4401-AB-03-4-A

**G 1/4**



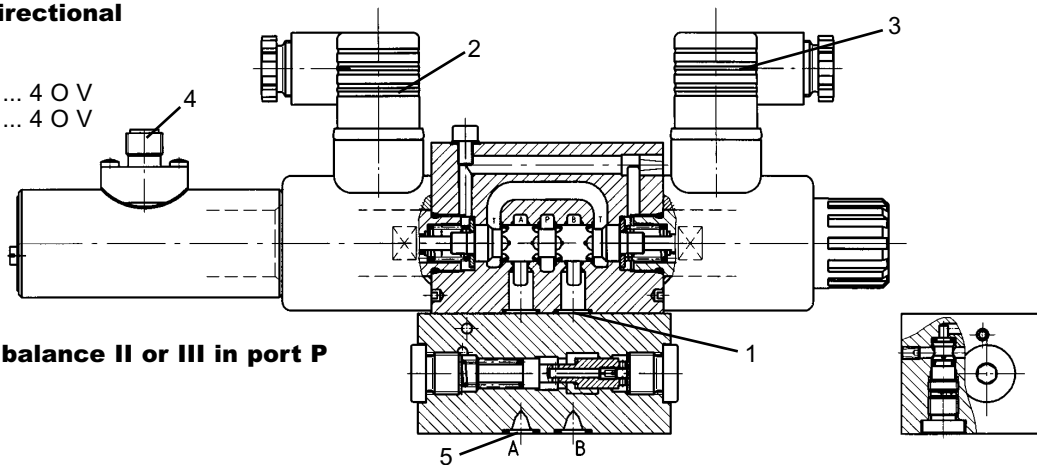
**G 3/8**



## Spare parts drawing

### Proportional directional control valve

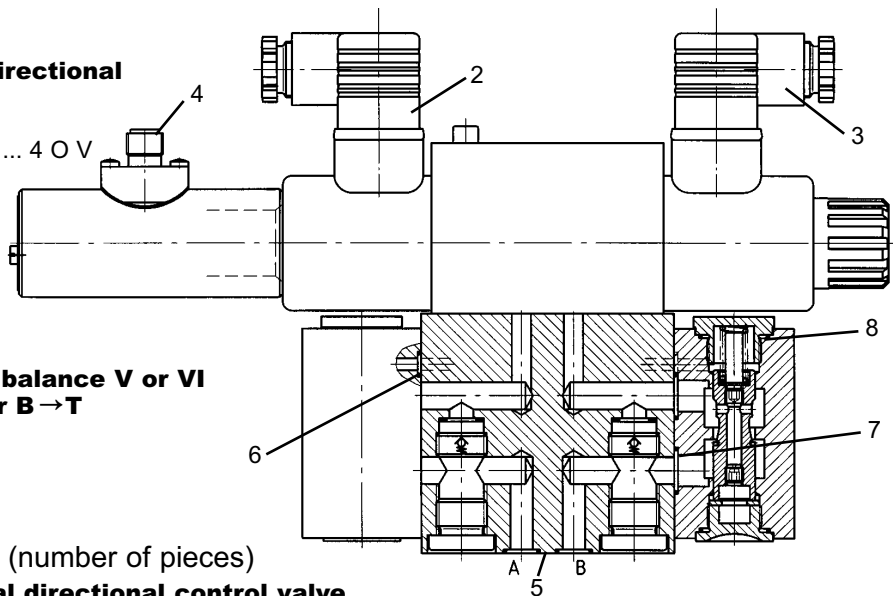
S 6 UR 10 G 187 ... 4 O V  
S 6 UR 10 G 233 ... 4 O V



With pressure balance II or III in port P

### Proportional directional control valve

S 6 UR 10 G 212 ... 4 O V



With pressure balance V or VI  
in port A → T or B → T  
(return flow)

### Spare parts (number of pieces) for proportional directional control valve

Part	Description	S 6 UR 10 G 187 ... 4 O V	S 6 UR 10 G 233 ... 4 O V	S 6 UR 10 G 212 ... 4 O V	Cat. No.
		With pressure balance in port P	With pressure balance in port B → T	With pressure balance in port A → T; B → T	
1	O-ring (9.2 x 1.8)	4	4	4	<b>0701728</b>
2	Connector	1	1	1	<b>0657859</b>
3	Connector	1	1	1	<b>0570275</b>
4	Connector for displacement sensor 90°/metal	1	1	1	<b>0661748</b>
4	Connector for displacement sensor 90° with 2 m cable	1	1	1	<b>0681824</b>
<b>Spare part kits</b>					
Cat. No.		<b>0726676</b>	<b>0726676</b>	<b>0726676</b>	-
Wearing parts per set		1	1	1	-

### With pressure balance

-	Pressure balance II	1	-	-	<b>6015189</b>
-	Pressure balance III	1	-	-	<b>6015190</b>
-	Pressure balance II	-	1	-	<b>0723311</b>
-	Pressure balance V	-	-	1	<b>6015532</b>
-	Pressure balance VI	-	-	1	<b>6015533</b>
5	O-ring (9,2 x 1,8)	4	4	4	<b>0701728</b>
<b>Spare part kits</b>					
Cat. No.		<b>0726871</b>	<b>0726871</b>	<b>0726872</b>	-
Wearing parts per set		5	5	5 to 8	-