

## 4/2 and 4/3 Directional Control Valve, Manually Operated

### RPR3-04

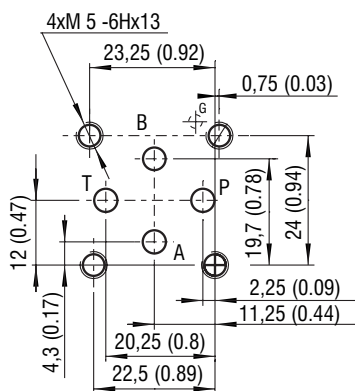
Size 04 (D 02) •  $Q_{max}$  30 l/min ( 8 GPM) •  $p_{max}$  320 bar (4600 PSI)



#### Technical Features

- › Direct acting directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 02)
- › High transmitted hydraulic power up to 320 bar with optimized design to minimize pressure drop
- › Three chamber housing design for production cost saving
- › Manual lever and actuating section can be rotated in 90° increments for flexible installation
- › Wide range of interchangeable spools available
- › Springless, detented valves available, valve holds last selected position, available for all spools
- › In the standard version the valve body is phosphated. The steel parts are zinc coated (240 h corrosion protection in NSS acc. to ISO 9227). With optional increased surface corrosion protection of the whole valve 520 h in NSS, e.g. for mobile applications.

ISO 4401-02-01-0-05



Ports P, A, B, T - max.  $\varnothing$ 4.5 mm (0.18 in)

Model Code	Z11	R11	J15
Symbol			

#### Technical Data

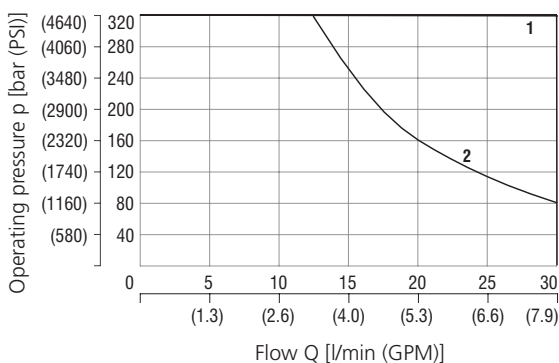
Valve size	04 (D02)	
Max. flow	l/min (GPM)	30 (7.9)
Max. operating pressure at ports P, A & B	bar (PSI)	320 (4640)
Max. operating pressure at port T	bar (PSI)	100 (1450)
Operating force	N (lbf)	< 40 (9)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)
Service life	cycles	10 <sup>6</sup>
Weight	kg (lbs)	1 (2.20)

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface	SMT_0019	Size 04
Spare parts	SP_8010	

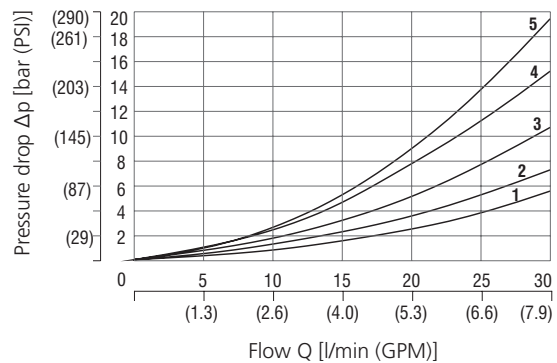
#### Characteristics measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

#### Operating limits

Operating limits for maximum hydraulic power and rated lever force.



#### Pressure drop related to flow rate

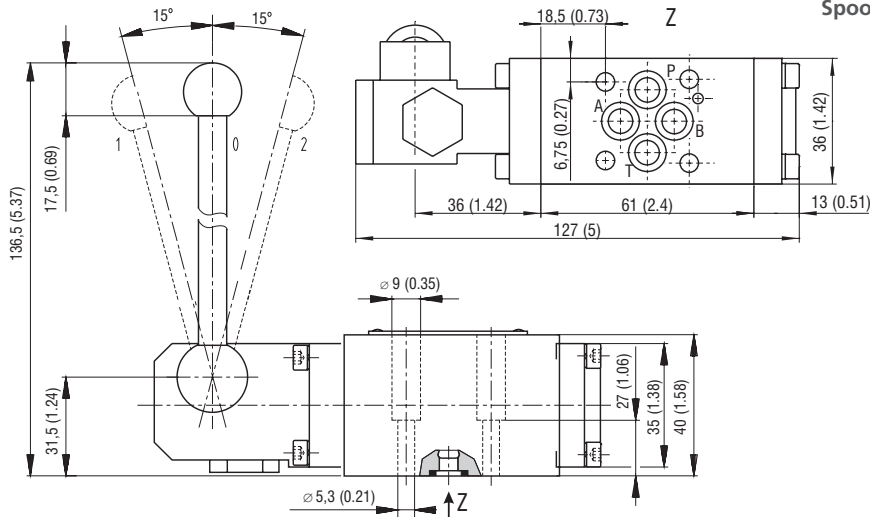


1	Z11	2	L21	1	C15	1	Y35
1	C11	1	Y31	1	H15	1	Y75
1	H11	1	Y71	1	P15	1	J15
1	P11	1	R11	1	Y15	1	J75
1	Y11	1	A51	1	B15	1	R25
1	B11	1	R21	1	L15		
2	L11	1	Z15	1	L25		

	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11, Z15	3	2	2	2		B11, B15	3	3	2	1	
C11, C15	5	5	4	4	3	L11, L15	3	2	1	2	4
H11, H15	3	3	2	2	3	L21, L25	2	2	3	3	4
P11, P15	1	1	1	3		Y71, Y75	3	1			
Y11, Y15	3	3	1	1		A51, J75	2	2			
Y31, Y35, R11	3	3	2	2		J15, R21, R25	3	3	2	2	

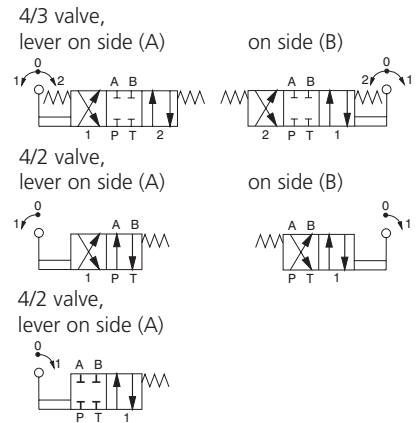
For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

**Dimensions** in millimeters (inches)



Mounting screws 5+1 Nm (3.7+0.7 lbf.ft)  
M5 x 35 DIN 912-10.9 - not supplied

**Spool position according to the position of hand lever**

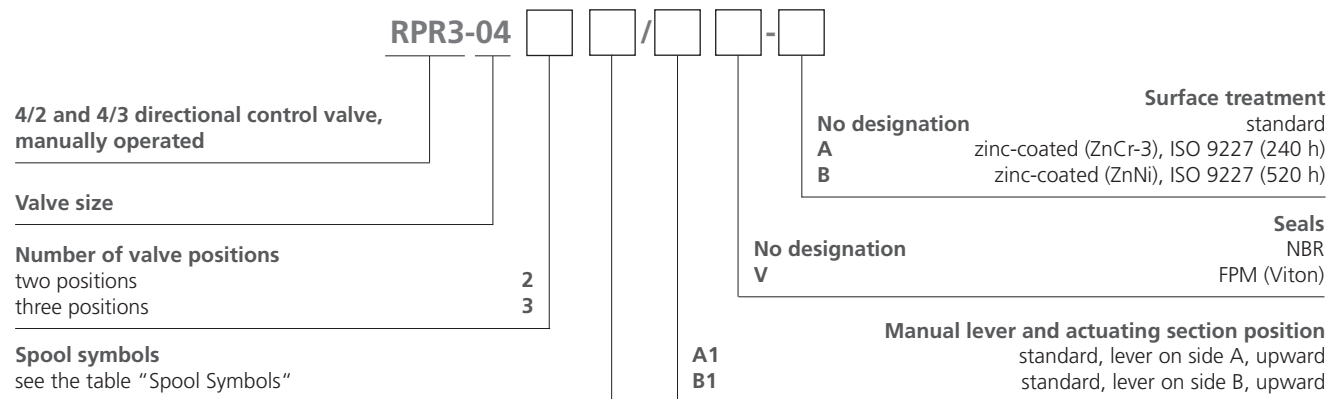


Manual lever and actuating section are shown in the most frequently used standard position. Both elements can be rotated in 90° increments. For other positions of lever and actuating section contact our technical support.

**Spool Symbols**

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			Z15			R11		
C11			C15			A51		
H11			H15			R21		
P11			P15			J15		
Y11			Y15			J75		
B11			B15			P55		
L11			L15			R25		
L21			L25			X11		
Y31			Y35					
Y71			Y75					

**Ordering Code**

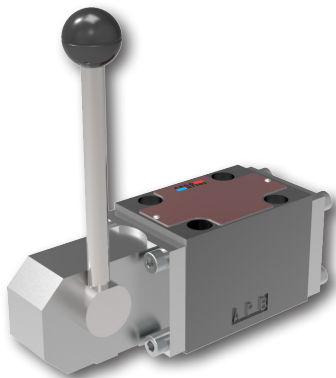


The port restrictor plugs can be ordered separately from the spare parts data sheet HA 8010. The table of spool connections is an overview of preferred and commonly produced types. Contact our technical support for their identification, feasibility and operating limits.

## 4/2 and 4/3 Directional Control Valve, Manually Operated

### RPR3-06

Size 06 (D03) •  $Q_{max}$  80 l/min (21 GPM) •  $p_{max}$  350 bar (5100 PSI)

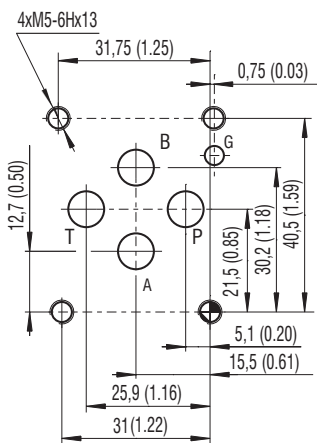


#### Technical Features

- Direct acting manually operated directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- High transmitted hydraulic power up to 350 bar, optimized design for minimized pressure drop
- Three chamber housing design for production cost saving
- Manual lever and actuation element can be rotated in 90° increments for flexible installation
- Wide range of interchangeable spools available
- Springless, detented valves available, valve holds last selected position, available for all spools
- In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227
- Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

Model Code	Z11	R11	J15
Symbol			

#### ISO 4401-03-02-0-05



Ports P, A, B, T - max  $\varnothing$ 7.5 mm (0.29 in)

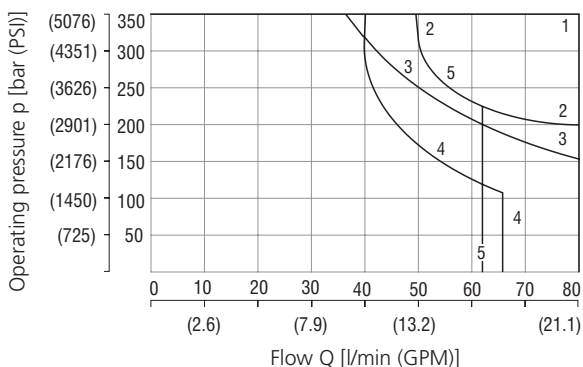
#### Technical Data

Valve size	06 (D03)	
Max. flow	l/min (GPM)	80 (21.1)
Max. operating pressure at ports P, A, B	bar (PSI)	350 (5080)
Max. operating pressure at port T	bar (PSI)	100 (1450)
Operating force	N (lbf)	< 50 (11.2)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)
Service life	cycles	10 <sup>6</sup>
Weight	kg (lbs)	1.6 (3.53)
	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface	SMT_0019	Size 06
Spare parts	SP_8010	

#### Characteristics measured at $v = 32 \text{ mm}^2/\text{s}$ (156 SUS)

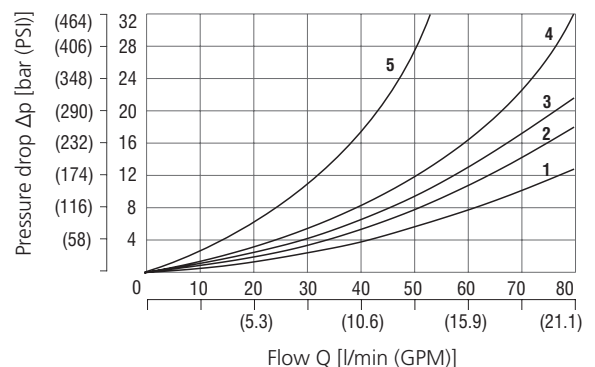
#### Operating limits

Operating limits for maximum hydraulic power and rated lever force.



A51	3	H15	1	R11	1
B11	5	J15	1	Y11	2
B15	1	J75	1	Y15	1
C11	4	P11	1	Z11	1
C15	1	P15	1	Z15	1
H11	3				

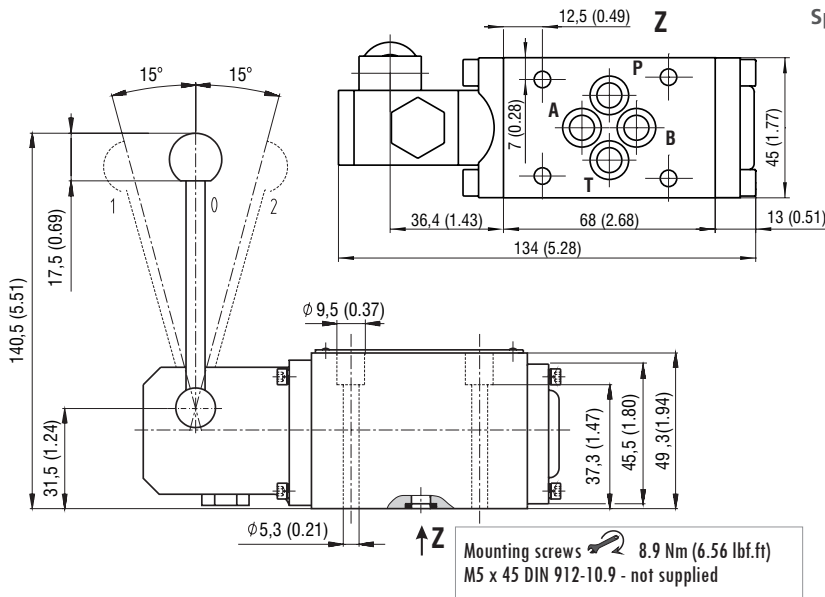
#### Pressure drop related to flow rate



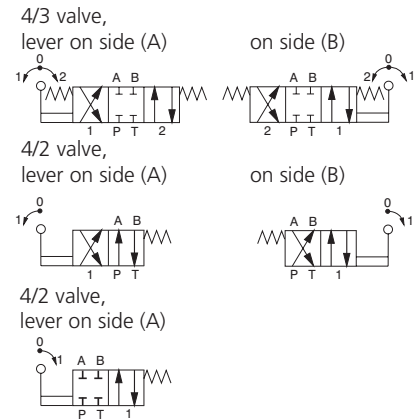
	P-A	P-B	A-T	B-T	P-T
Z11, Z15, B11, B15R11, J15	2	2	3	3	
C11, C15	3	3	4	3	5
H11, H15	2	2	2	2	3
P11, P15	1	1	3	3	
Y11, Y15	2	2	2	2	
A51, J75	2	2			

For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)

**Dimension** in millimeters (inches)



**Spool position according to the position of hand lever**

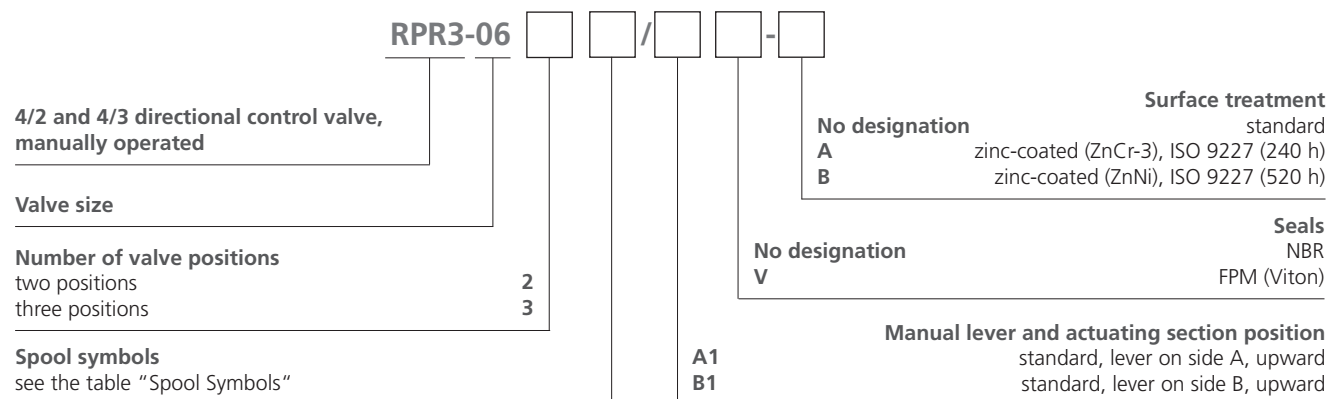


Manual lever and actuating section are shown in the most frequently used standard position. Both elements can be rotated in 90° increments. For other positions of lever and actuating section contact our technical support.

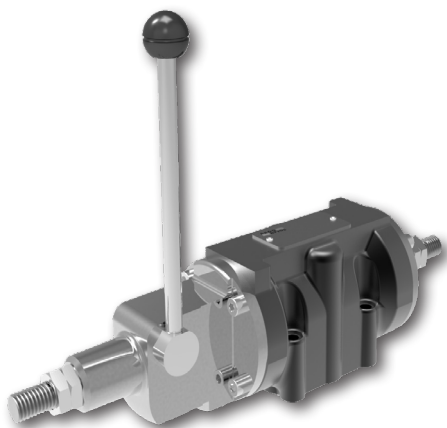
**Spool Symbols**

Type	Symbol	Interposition	Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			B15			X11		
C11			Y14			X21		
H11			Z21			C55		
P11			P11			Z15		
Y11			H11			Z55		
B11			C51			Y55		
L21			Z11			J15		
Z15			H51			J75		
C15			Y11			P55		
H15			R11			R25		
P15			A51			X15		
Y15			R21					

**Ordering Code**

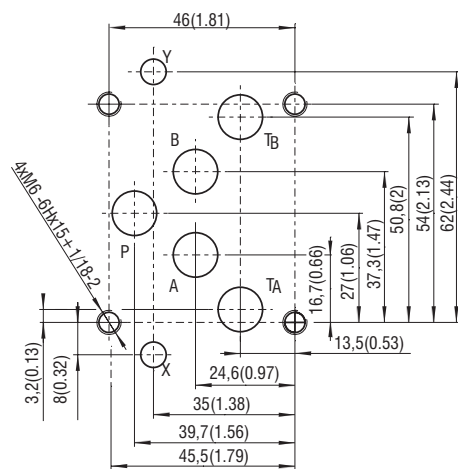


The port restrictor plugs can be ordered separately from the spare parts data sheet HA 8010. The table of spool connections is an overview of preferred and commonly produced types. Contact our technical support for their identification, feasibility and operating limits.


**Technical Features**

- › Directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 05)
- › High transmitted hydraulic power up to 350 bar with optimized design to minimize pressure drops
- › Three chamber housing design for production cost saving
- › Manual lever and actuation element can be rotated in 90° increments for flexible installation
- › Wide range of interchangeable spools available
- › Springless, detented valves available, valve holds last selected position, available for all spools
- › Spool end position sensing option
- › Spool stroke limit option
- › In the standard version, the valve housing is phosphated and steel parts zinc-coated for 240 h salt spray protection acc. to ISO 9227
- › Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray)

Model Code	Z11	Z11 with Sensors	R11	J15
Symbol				

**ISO 4401-05-04-0-05**

 Ports P, A, B, T - max  $\varnothing$ 11.2 mm ( 0.44 in)

**Technical Data**

Valve size	10 (D05)	
Max. flow	l/min (GPM)	140 (37)
Max. operating pressure at ports P, A, B	bar (PSI)	350 (5080)
Max. operating pressure at port T	bar (PSI)	100 (1450) 50 (725) for versions with sensor
Operating force	N (lbf)	< 40 (9)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)
Service life	cycles	106
Weight	kg (lbs)	3.4 (7.5)

Technical Data Sensor and Connector		S1, S4
Rated power supply voltage	V	24 DC
Power supply voltage range	V	10 ... 30 DC
Rated current	mA	200
Enclosure type of sensor to EN 60529		IP 67
Switching frequency	Hz	1000
Ambient temperature range	°C (°F)	-25 ... +80 (-13 ... +176)

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface	SMT_0019	Size 10
Spare parts	SP_8010	

## Ordering Code

<b>RPR1 -10</b> <input type="text"/> <input type="text"/> / <input type="text"/> - <input type="text"/> - <input type="text"/> - <input type="text"/> / <input type="text"/> <input type="text"/> - <input type="text"/> - <input type="text"/>	
<b>4/2 and 4/3 directional control valve, manually operated</b>	
<b>Valve size</b>	
<b>Number of valve positions</b> two positions <b>2</b> three positions <b>3</b>	
<b>Spool symbols</b> see the table "Spool Symbols"	
<b>Spool flow rate</b> directional control valve spool <b>No designation</b> prop. spool, nominal flow 30 l/min (7.9 GPM) <b>30</b> prop. spool, nominal flow 60 l/min (15.8 GPM) <b>60</b>	
<b>Manual lever and actuating section position</b> standard, lever on side A, upward <b>A1</b> standard, lever on side B, upward <b>B1</b>	
<b>Stroke limit option</b> without stroke limiter <b>0</b> with stroke limiter, side A <b>SLA</b> with stroke limiter, side A <b>SLB</b> with stroke limiter, side A and B <b>SLC</b>	
	<b>Surface treatment</b> <b>No designation</b> standard <b>A</b> zinc-coated (ZnCr-3), ISO 9227 (240 h) <b>B</b> zinc-coated (ZnNi), ISO 9227 (520 h)
	<b>Seals</b> <b>No designation</b> NBR <b>V</b> FPM (Viton)
	<b>Spool and position sensor type</b> <b>No designation</b> without sensor <b>S1</b> normally-open sensor <b>S4</b> normally closed sensor
	<b>Spool position sensor supply voltage</b> <b>No designation</b> without sensor <b>24</b> rated supply voltage, 24 V DC
	<b>Spool position sensor</b> <b>0</b> without spool position sensor <b>A</b> one spool position sensor, side A <b>B</b> one spool position sensor, side B <b>C</b> one spool position sensor, side A and B

The port restrictor plugs can be ordered separately from the spare parts data sheet SP\_8010.

Mounting bolts M6 x 45 DIN 912-10.9 or studs must be ordered separately. Tightening torque is 14 Nm (10.3 lbf.ft).

Besides the commonly used valve versions shown other special models are available. Contact our technical support for their identification, feasibility and operating limits.

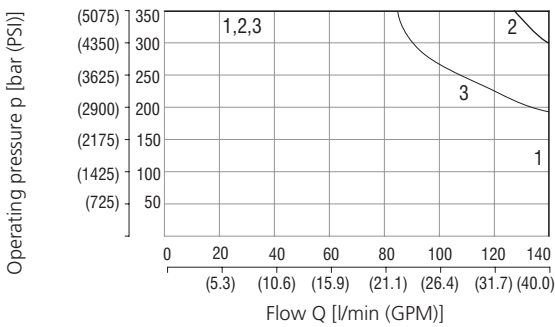
## Spool Symbols

Type	Symbol	Interposition	Type	Symbol	Interposition
Z11			P15		
C11			R11		
H11			R21		
P11			Z15		
Y11			J15		
C15			R25		
H15			Y15		
Z11			Y11		

**Characteristics** measured at  $v = 32 \text{ mm}^2/\text{s}$  (156 SUS)

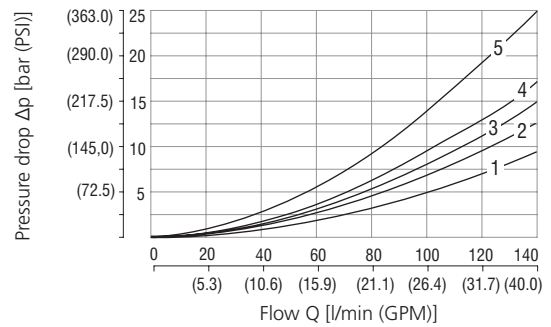
**Operating limits (Directional valve)**

Operating limits for maximum hydraulic power and rated lever force



Z11	1	H11	1	For operating limits under conditions and flow directions other than shown contact our technical support. Admissible operating limits may be considerably lower with only one direction of flow (A or B plugged, or without flow.)
Y11	1	C11	3	
P11	1	R11	2	

**Pressure drop related to flow rate**

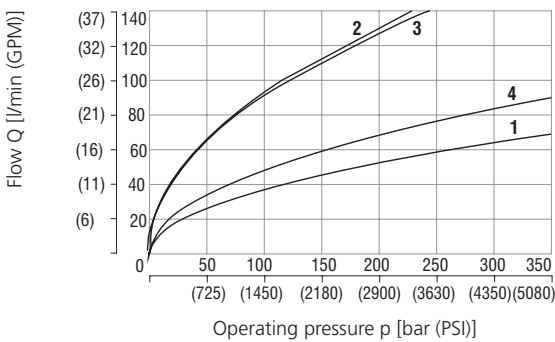


	P-A	P-B	A-T	B-T	P-T		P-A	P-B	A-T	B-T	P-T
Z11	1	1	3	3		H11	1	1	1	1	3
Y11	1	1	2	2		C11	1	1	3	3	5
P11	1	1	3	3		R11	1	1	4	4	

**Operating limits (Proportional valve)**

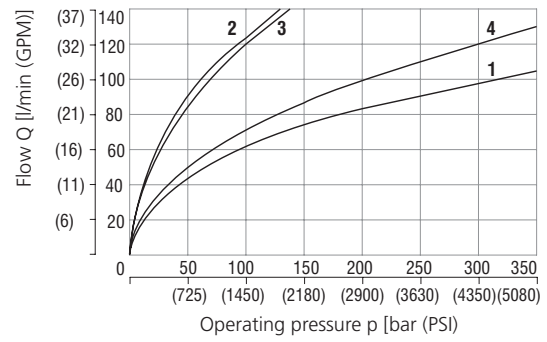
Operating limits for maximum hydraulic power and rated lever force

30 l/min (7.9 GPM)



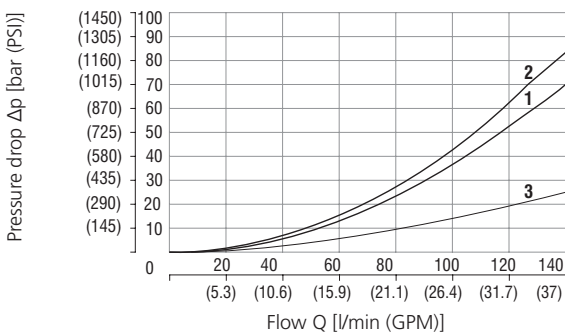
s	50% [2.3mm (0.09in)]	100% [4.6mm (0.18in)]
Z11/30	1	2
Y11/30	3	4

60 l/min (15.8 GPM)



s	50% [2.3mm (0.09in)]	100% [4.6mm (0.18in)]
Z11/60	1	2
Y11/60	3	4

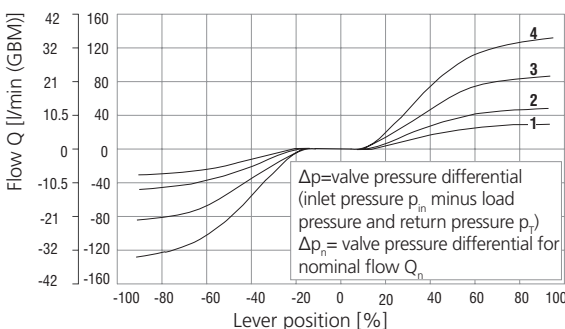
**Pressure drop related to flow rate**



	P-A	P-B	A-T	B-T
Z11/30	1	1	2	2
Y11/30	1	1	2	2
Z11/60	3	3	3	3
Y11/60	3	3	3	3

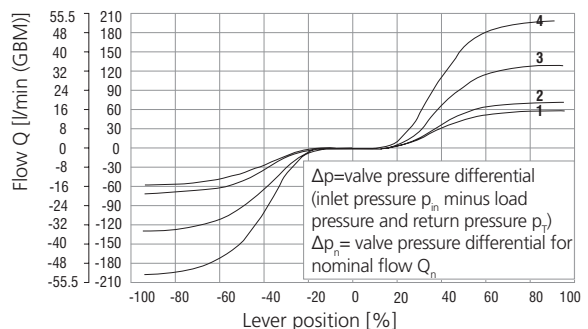
**Proportional Valve Actuation Characteristics**

**Proportional spool flow rate 30 l/min (7.9 GPM)**



1	$\Delta p_n = 10 \text{ bar (145 PSI)}$	3	$\Delta p = 160 \text{ bar (2321 PSI)}$
2	$\Delta p = 50 \text{ bar (725 PSI)}$	4	$\Delta p = 350 \text{ bar (5076 PSI)}$

**Proportional spool flow rate 60 l/min (15.8 GPM)**

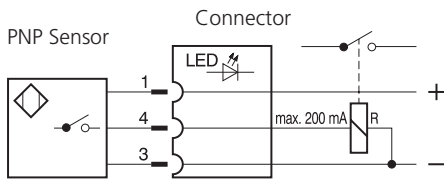


1	$\Delta p_n = 10 \text{ bar (145 PSI)}$	3	$\Delta p = 160 \text{ bar (2321 PSI)}$
2	$\Delta p = 50 \text{ bar (725 PSI)}$	4	$\Delta p = 350 \text{ bar (5076 PSI)}$

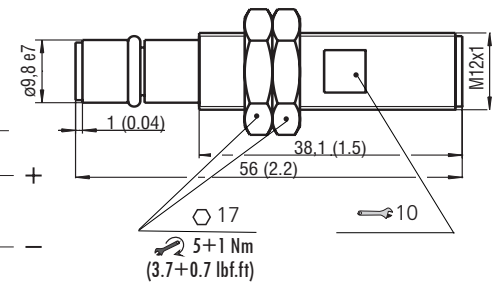
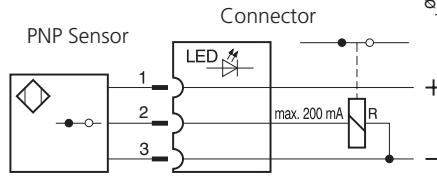


**Technical Data - Sensor** in millimeters (inches)

**S1** Circuit diagram of the normally - OPEN sensor



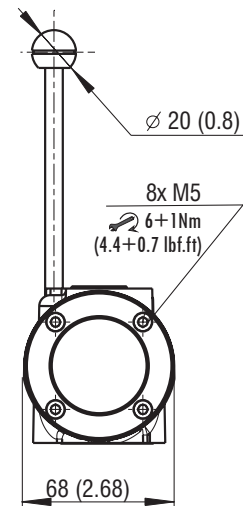
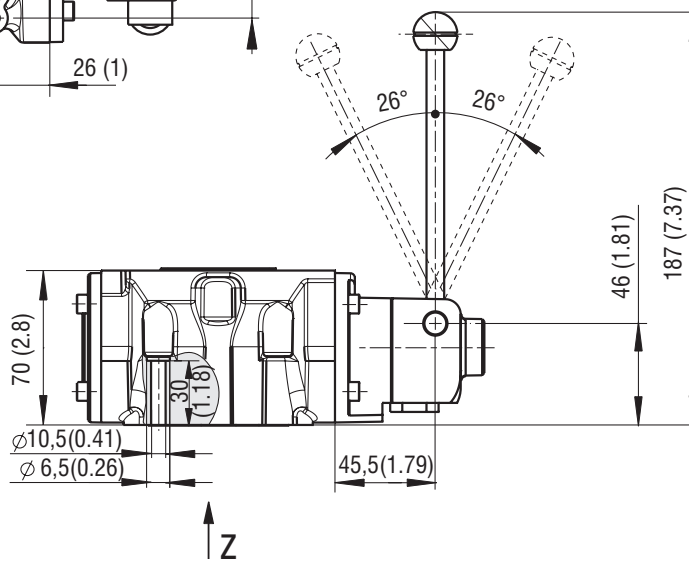
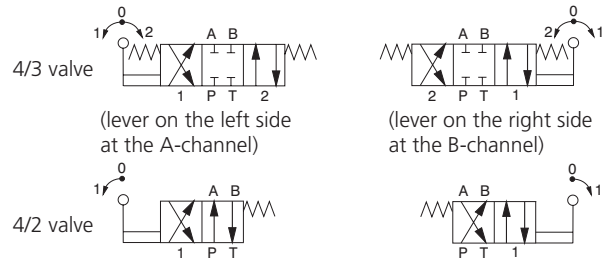
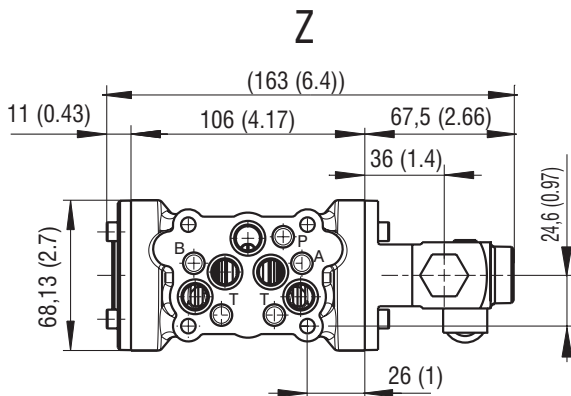
**S4** Circuit diagram of the normally - CLOSED sensor



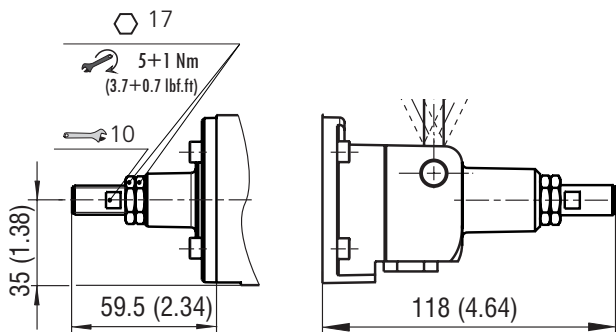
**Dimensions** in millimeters (inches)

**RPR1-10\*/A1-0-0**  
without stroke limiter and position sensor

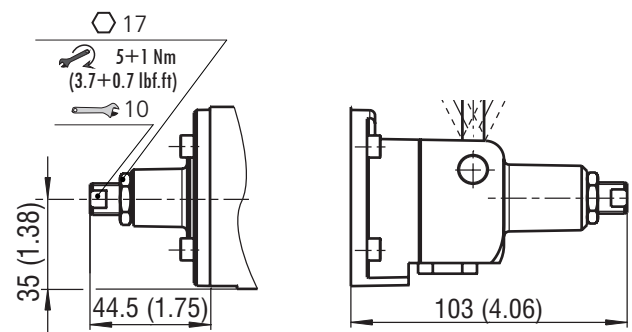
**Spool position according to the position of hand lever**



**RPR1-10\*/A(B,C)**  
Position sensor



**RPR1-10\*/SL\***  
Stroke limiter



Manual lever and actuating section are shown in the most frequently used standard position. Both elements can be rotated in 90° increments. For other positions of lever and actuating section contact our technical support.