

Check valve, pilot operated

Type Z2S

RE 21553

Edition 2015-11

Replaces: 07.10



- ▶ Size 10
- ▶ Component series 3X
- ▶ Maximum operating pressure 315 bar [4568 psi]
- ▶ Maximum flow 120 l/min [31.7 US gpm]

Features

- ▶ Sandwich plate valve for use in vertical stackings
- ▶ Porting pattern according to ISO 4401-05-04-0-05, ISO 4401-05-05-0-05 and NFPA T3.5.1 R2-2002 D05
- ▶ For the leakage-free blocking of one or two actuator ports, optional
- ▶ Various cracking pressures
- ▶ With pre-opening (standard); without pre-opening (optional)
- ▶ Check valve installation sets available individually
- ▶ Special versions upon request

Contents

Features	1
Ordering codes	2
Symbols	3
Function, sections, circuit example	4 ... 6
Technical data	7
Characteristic curves	8
Dimensions	9
Inductive position switch type QM	10
Mating connectors	11
Additional information	12

Ordering codes

01	02	03	04	05	06	07	08	09	10	11
Z2S	10			-	3X	/				*

01	Check valve, sandwich plate	Z2S
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02	Size 10	10
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Leakage-free blocking

03	In channel A and B	-
	In channel A	A
	In channel B	B

Cracking pressure

04	1.5 bar [21.7 psi]	1
	3 bar [43.5 psi]	2
	6 bar [87.0 psi]	3
	10 bar [145.0 psi]	4

05	Component series 30 ... 39 (30 ... 39: unchanged installation and connection dimensions)	3X
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Corrosion resistance (outside; thick film passivation according to DIN 50979 – Fe//Zn8//Cn//T0)

06	None (valve housing primed)	no code
	Improved corrosion protection (240 h salt spray test according to EN ISO 9227)	J3

Seal material

07	NBR seals	no code
	FKM seals	V
	Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	

Additional pilot oil ports X and Y¹⁾

08	Without X and Y	no code
	With X and Y	XY

Spool position monitoring²⁾

09	Without position switch	no code
	- Inductive position switch type QM (version "3" only)	
	Monitored spool position "a"	QMA
	Monitored spool position "b"	QMB

Special version

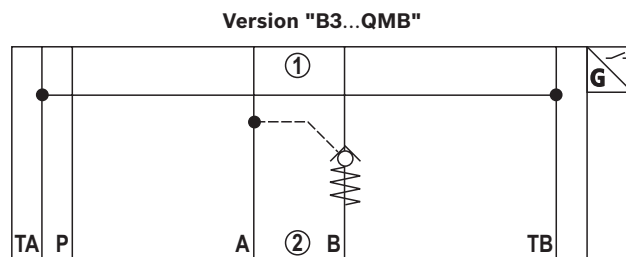
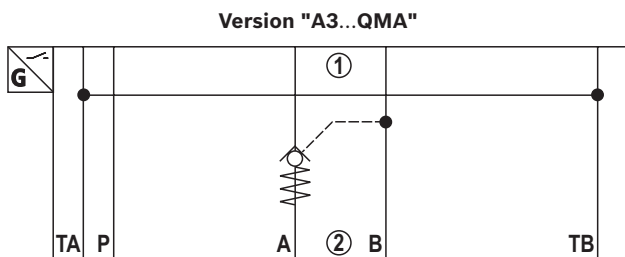
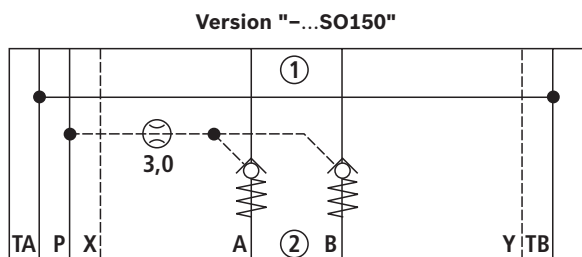
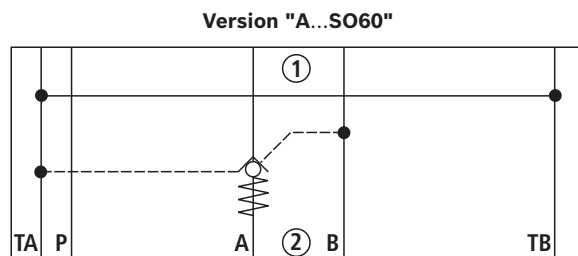
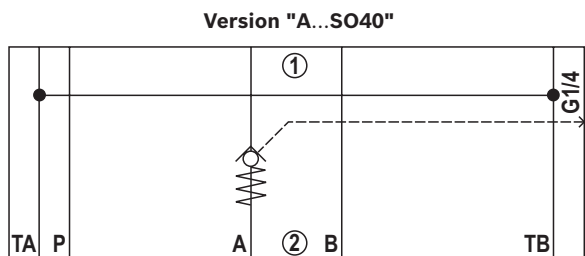
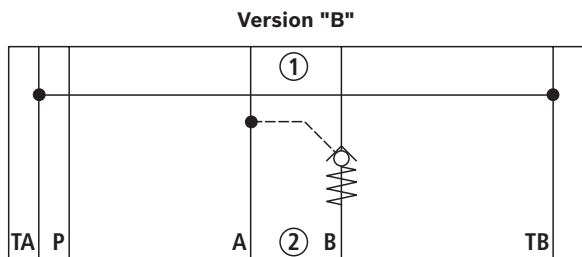
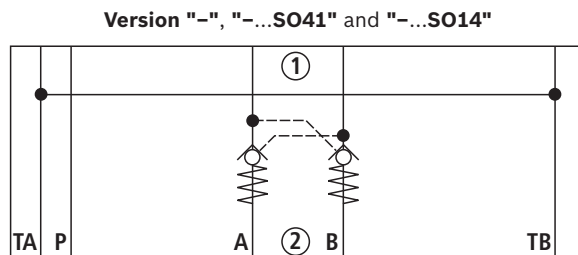
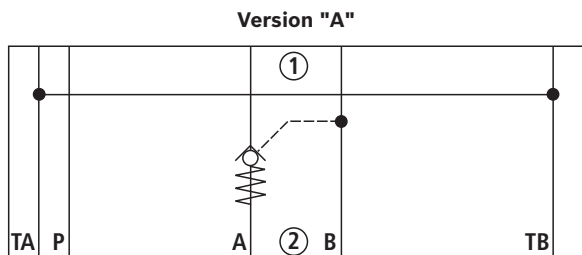
10	Without	no code
	Check valve with stroke limitation	SO14
	Control open by external port G1/4 (only version "A" and "B")	SO40
	Without pre-opening	SO41
	Control spool unloaded to port T	SO60
	With pre-opening and control open from channel P	SO150
	For symbols (examples), see page 3	

11	For further information, see the plain text	*
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¹⁾ In version "SO150", ports X and Y are already in place.
(No ordering code required)

²⁾ Only with version "3" (cracking pressure 6 bar) and on side with leakage-free blocking. E.g. Z2S 10 **A3-3X/QMA**

Symbols (1) = component side, (2) = plate side



Notice:
 Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.

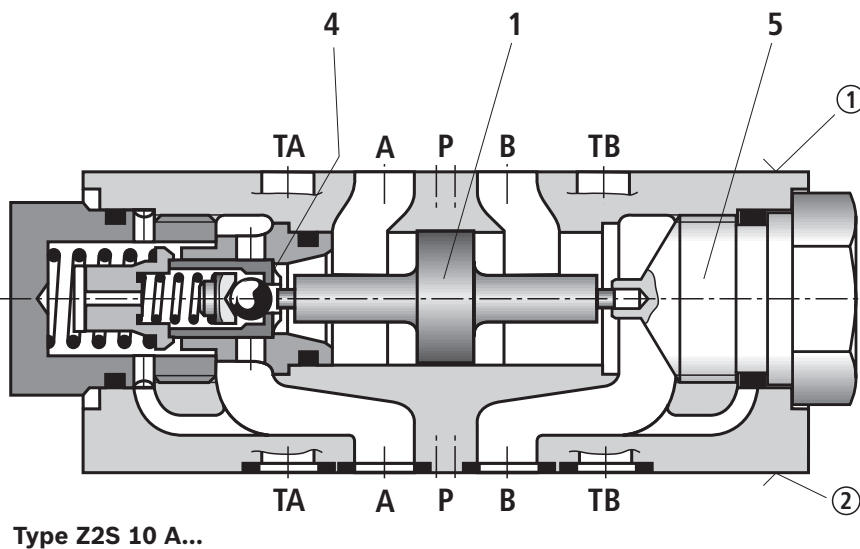
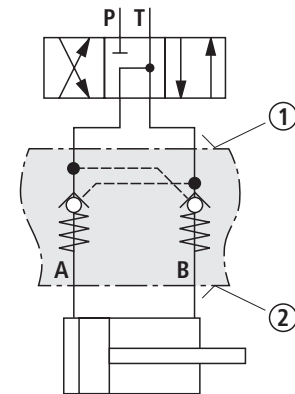
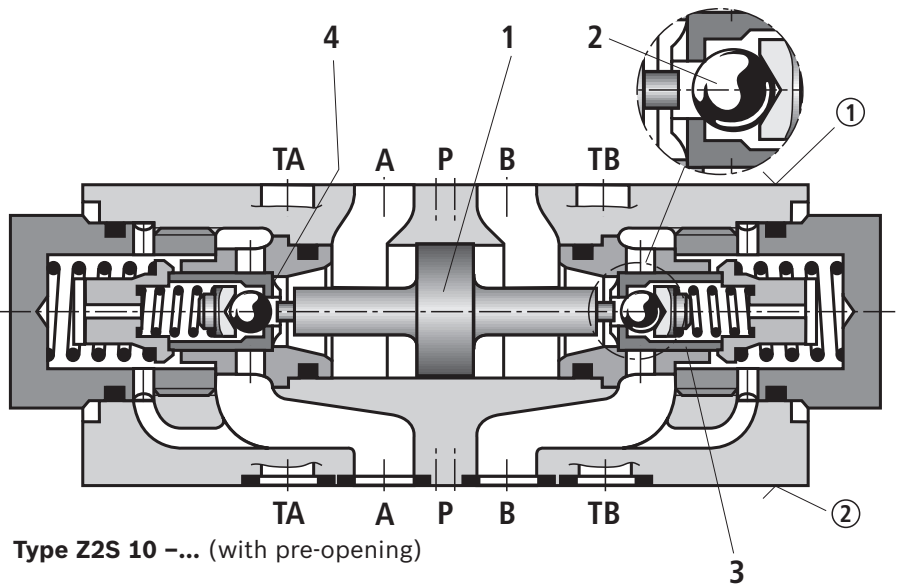
Function, sections, circuit example

The isolator valve type Z2S is a releasable check valve in sandwich plate design. It is used for the leakage-free blocking of one or two actuator ports, also in case of longer standstill times. In direction A① to A② or B① to B②, there is a free flow; in the opposite direction, the flow is blocked. If, for example, there is a flow through the valve in direction A① to A②, the control spool (1) is moved in the direction of the B side, opens the ball seat valve (2) and then pushes the poppet (3) off its seat. Hydraulic fluid can now flow from B② to B①.

In order to allow the ball seat valve (2) to be safely closed, the control spool (1) must be hydraulically unloaded (see circuit example). Due to the pre-opening, there is a damped decompression of the pressurized liquid. Thus, possible switching shocks are avoided.

Pre-opening

- ▶ The two-stage set-up with an increased control open ratio means even low pilot pressure can be unloaded securely.
- ▶ Avoidance of switching shocks due to dampened decompression of the pressure volume on the actuator side.

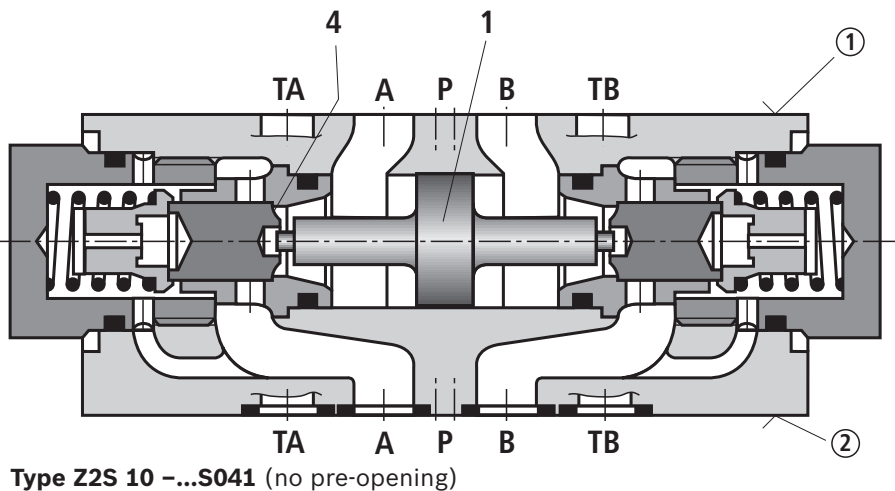
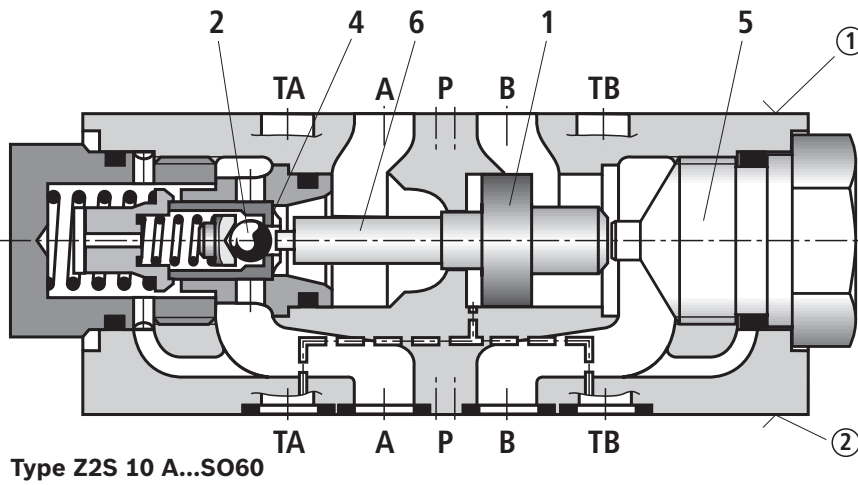
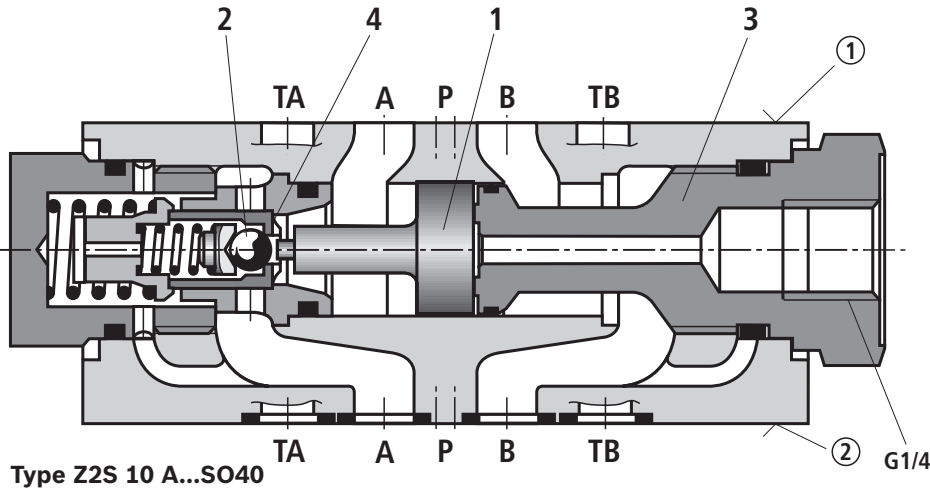


- ① = component side
- ② = plate side

- 1 Control spool, area A_2
- 2 Ball, area A_3
- 4 Poppet, area A_1
- 5 Stop

Notice:
 Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.

Function, sections

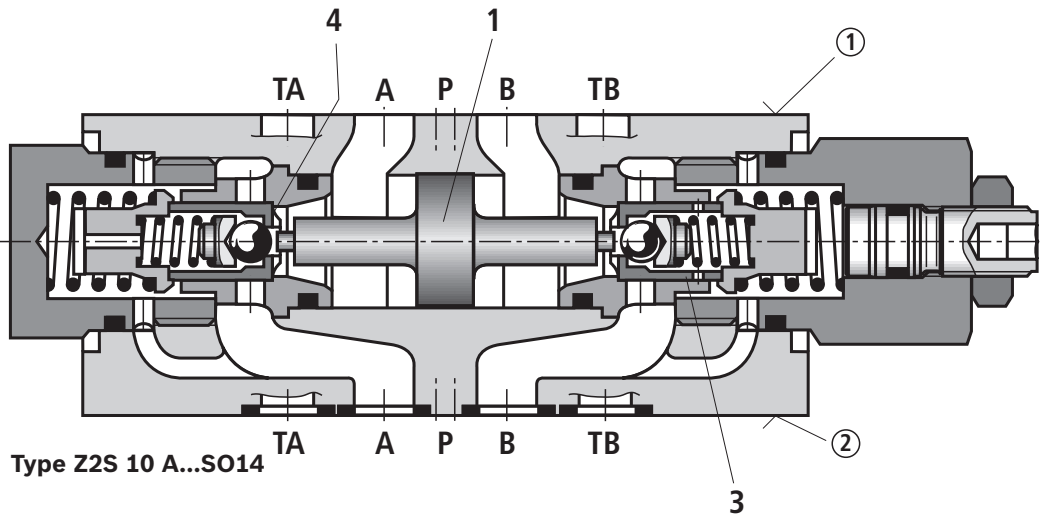


- ① = component side
- ② = plate side
- 1 Control spool, area A_2
- 2 Ball, area A_3
- 4 Poppet, area A_1
- 5 Stop
- 6 Control spool, area A_4

Notices:

- ▶ In valves without pre-opening, sudden unloading of pent-up pressure volume may occur. Resulting switching shocks may lead to premature wear on installed components, as well as noise formation.
- ▶ Deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.

Function, sections



① = component side
② = plate side

1 Control spool, area A_2
4 Poppet, area A_1

Technical data

(For applications outside these values, please consult us!)

general		
Weight	kg [lbs]	Approx. 3 [6.6]
Installation position		Any
Ambient temperature range	°C [°F]	-30 ... +80 [-22 ... +176] (NBR seals) -20 ... +80 [-4 ... +176] (FKM seals)

hydraulic		
Maximum operating pressure	bar [psi]	315 [4568]
Cracking pressure in free direction		see characteristic curves page 8
Maximum flow	l/min [US gpm]	120 [31.7]
Direction of flow		See symbols page 3
Hydraulic fluid		See table below
Hydraulic fluid temperature range (at the valve service ports)	°C [°F]	-30 ... +80 [-22 ... +176] (NBR seals) -20 ... +80 [-4 ... +176] (FKM seals)
Viscosity range	mm ² /s [SUS]	2.8 ... 500 [35 ... 2320]
Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c)		Class 20/18/15 ¹⁾
Area ratio	▶ Without pre-opening	A ₁ /A ₂ ~ 1/3 (see sectional drawing page 4 ... 6)
	▶ With pre-opening	A ₃ /A ₂ ~ 1/11.5 (see sectional drawing page 5 and 6)
	▶ Version "SO60"	A ₁ /A ₄ ~ 1/6 (see sectional drawing page 5)

Hydraulic fluid	Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils	HL, HLP, HLPD, HVL, HLPD	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ insoluble in water	HETG	ISO 15380	90221
		HEES		
	▶ soluble in water	HEPG	ISO 15380	
Flame-resistant	▶ water-free	HFDU, HFDR	ISO 12922	90222
	▶ containing water	HFC (Fuchs Hydrotherm 46M, Petrofer Ultra Safe 620)	ISO 12922	90223



Important information on hydraulic fluids:

- ▶ For more information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- ▶ The flash point of the hydraulic fluid used must be 40 K higher than the maximum solenoid surface temperature.

▶ Flame-resistant – containing water:

- Maximum pressure differential per control edge 50 bar
- Pressure pre-loading at the tank port > 20 % of the pressure differential, otherwise increased cavitation
- Life cycle as compared to operation with mineral oil HL, HLP 50 to 100 %

¹⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components. Available filters can be found at www.boschrexroth.com/filter.



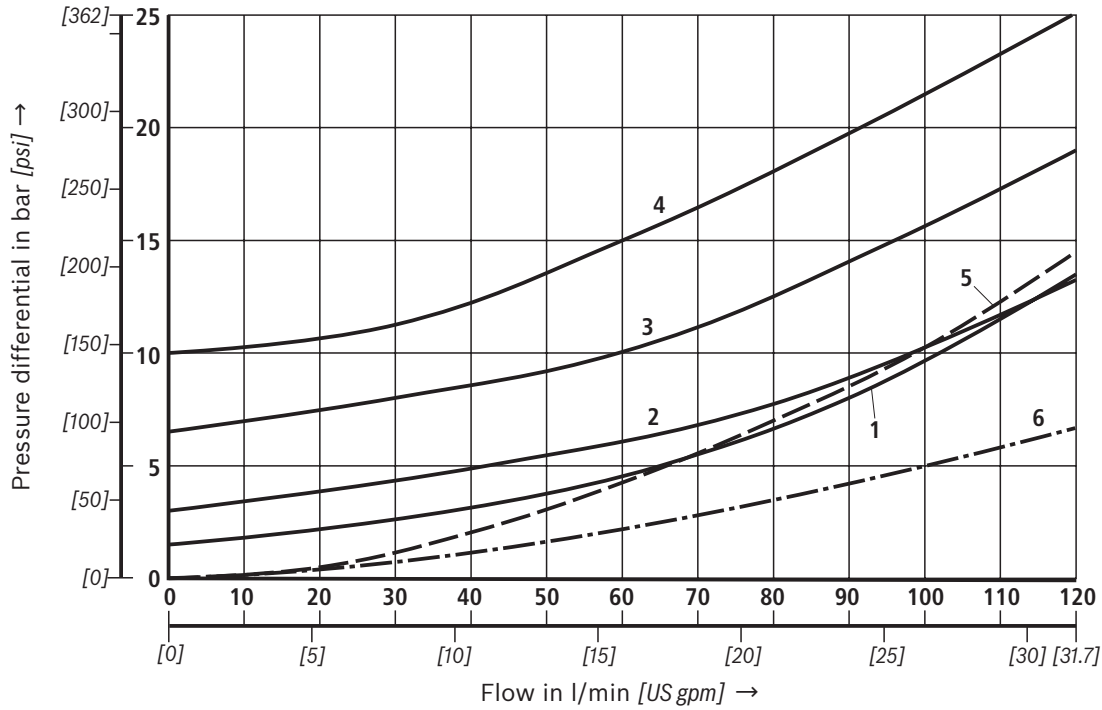
Notice:

Selection of optimal sealing material (see ordering code page 2) also depends on the type of hydraulic fluid used.

Characteristic curves

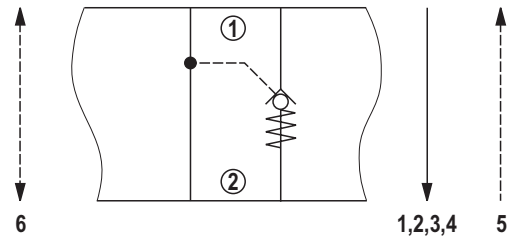
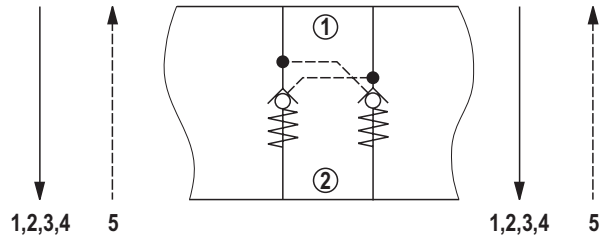
(measured with HLP46, $\vartheta_{oil} = 40 \pm 5 \text{ }^\circ\text{C}$ [$104 \pm 9 \text{ }^\circ\text{F}$])

Δp - q_v characteristic curves

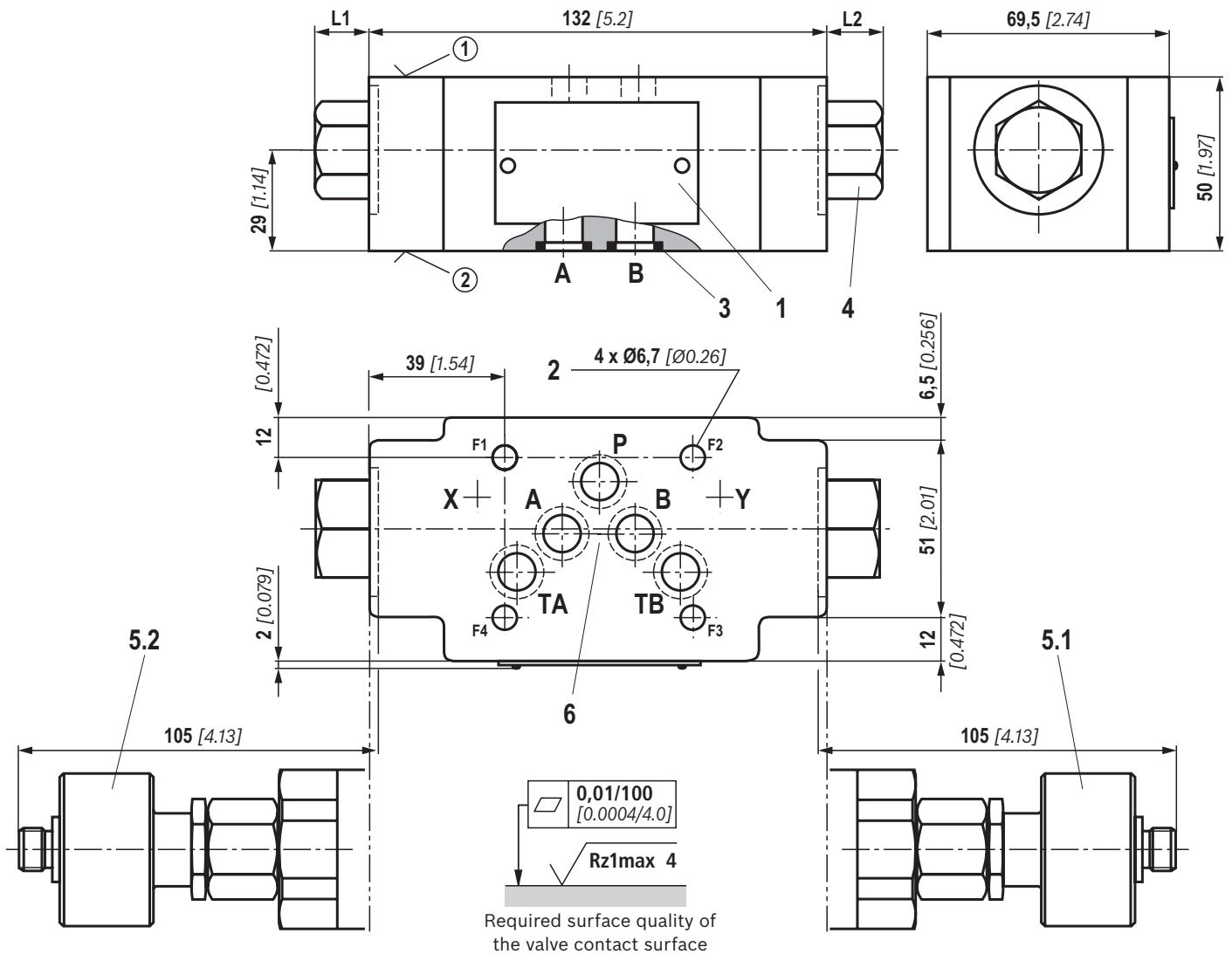


Cracking pressure:

- 1 1.5 bar [21.7 psi]
- 2 3 bar [43.5 psi]
- 3 6 bar [87.0 psi]
- 4 10 bar [145.0 psi]
- 5 Check valve controlled open via control spool
- 6 Free flow (without check valve use), version "A" and "B"



Dimensions
(dimensions in mm [inch])



	"SO14"	"no code"	"SO40"		"SO41"	"SO60"	"SO150"
			Version "A"	Version "B"			
L1 in mm [inch]	13.5 [0.53]	13.5 [0.53]	6.5 [0.26]	13.5 [0.53]	13.5 [0.53]	13.5 [0.53]	13.5 [0.53]
L2 in mm [inch]	38.5 [1.52]	13.5 [0.53]	13.5 [0.53]	6.5 [0.26]	13.5 [0.53]	13.5 [0.53]	13.5 [0.53]

- ① component side
- ② plate side
- 1 Name plate
- 2 Through hole for valve mounting
- 3 Identical seal rings for ports A, B, P, TA, and TB
- 4 Plug screw SW30, tightening torque $M_A = 40^{+5}$ Nm [29.5^{+3.7} ft-lbs]
- 5.1 Version with position switch "QMA" (circuitry see page 10)
- 5.2 Version with position switch "QMB" (circuitry see page 10)
- 6 Porting pattern according to ISO 4401-05-04-0-05, ISO 4401-05-05-0-05 and NFPA T3.5.1 R2-2002 D05; deviating from ISO 4401, port T is called TA and port T1 is called TB in this data sheet.

Valve mounting screws (separate order)
4 hexagon socket head cap screws ISO 4762 - M6 - 10.9
4 hexagon socket head cap screws 1/4-20 UNC



Notice:

The length of the valve mounting screws of the sandwich plate valve must be selected according to the components mounted under and over the isolator valve. Depending on the application, screw type and tightening torque must be adjusted to the circumstances. Please ask Rexroth for screws with the required length.

Inductive position switch type QM: Electrical connection

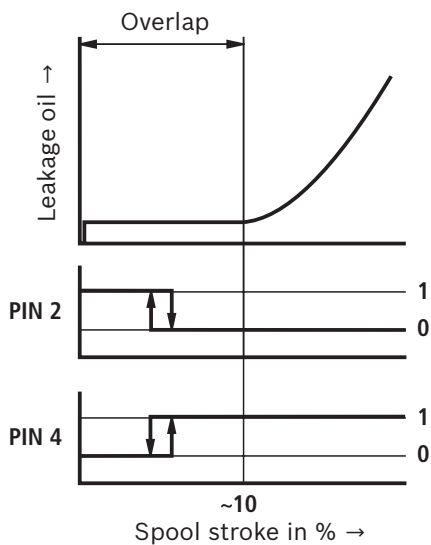
The electric connection is realized via a 4-pole mating connector (separate order, see page 11) with connection thread M12 x 1.

Connection voltage:	24 V +30 %/-15 %, direct voltage
Admissible residual ripple:	≤ 10 %
Load capacity:	Maximum 400 mA
Switching outputs:	PNP transistor outputs, load between switching outputs and GND

Pinout:

1	+24 V
2	Switching output: 400 mA
3	0 V, GND
4	Switching output: 400 mA

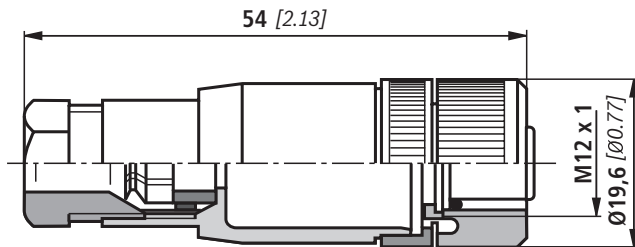
Inductive position switch type QM: Switching logics



Mating connectors (dimensions in mm [inch])

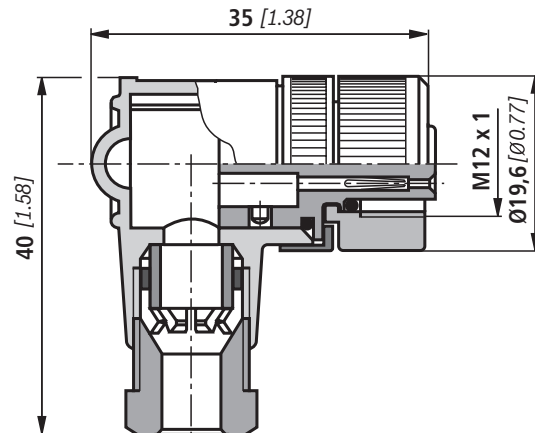
Mating connector suitable for K24 4-pole, M12 x 1 with screw connection, cable gland Pg 9.

Material no. **R900031155**



Mating connector suitable for K24 4-pole, M12 x 1 with screw connection, cable gland Pg 9, angled. Housing rotatable by 4 x 90° in relation to the contact insert.

Material no. **R900082899**



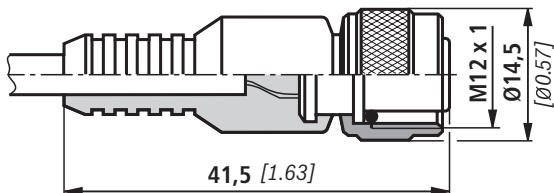
Mating connector suitable for K24-3m 4-pole, M12 x 1 with potted-in PVC cable, 3 m long.

Line cross-section: 4 x 0.34 mm²

Core marking:

1	brown
2	white
3	blue
4	black

Material no. **R900064381**



For further information refer to data sheet 08006.

Further information

- | | |
|--|--|
| ▶ Subplates | Data sheet 45052 |
| ▶ Inductive position switch and proximity sensors (contactless) | Data sheet 24830 |
| ▶ Smoothly switching version | Data sheet 23183 |
| ▶ Hydraulic fluids on mineral oil basis | Data sheet 90220 |
| ▶ Environmentally compatible hydraulic fluids | Data sheet 90221 |
| ▶ Flame-resistant, water-free hydraulic fluids | Data sheet 90222 |
| ▶ Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC) | Data sheet 90223 |
| ▶ Reliability characteristics according to EN ISO 13849 | Data sheet 08012 |
| ▶ Hexagon socket head cap screw, metric/UNC | Data sheet 08936 |
| ▶ Hydraulic valves for industrial applications | Operating instructions 07600-B |
| ▶ General product information on hydraulic products | Data sheet 07008 |
| ▶ Assembly, commissioning and maintenance of industrial valves | Data sheet 07300 |
| ▶ Selection of filters | www.boschrexroth.com/filter |
| ▶ Information on available spare parts | www.boschrexroth.com/spc |

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