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Double throttle/check valve

RA 27506/02.03 1/6
Replaces: 06.98

Model Z2FS 6

Nominal size 6
Series 4X
Maximum operating pressure 315 bar (4600 PSI)
Maximum flow 80 L/min (21 GPM)

Table of contents

Features

- Sandwich plate valve
- Porting pattern to DIN 24 340 Form A, **without** locating pin hole (standard)
- Porting pattern to ISO 4401-**3**, NFPA T3.4.1M R1 and ANSI B93.7 **D 03**
- Four adjustment elements:
  - Screw with locknut and protective cap
  - Lockable rotary knob with scale
  - Spindle with internal hexagon and scale
  - Rotary knob with scale
- For limiting the main or pilot flow of two actuator connections
- For meter-in or meter-out control

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Ordering details

Z2FS	6		– 4X/	V		*

Double throttle/check valve

Nominal size 6 = **6**

Throttle/check valve ports A and B = – [1]
Throttle/check valve port A = **A**
Throttle/check valve port B = **B**

Adjustment element
Screw with locknut and protective cap = **2**
Lockable rotary knob with scale = **3** [2]
Spindle with internal hexagon and scale = **5**
Rotary knob with scale = **7**

Further details in clear text

No code = **Without** locating pin hole
/60 [3] = **With** locating pin hole

V = FKM seals (other seals on request)
⚠ Attention!
The compatibility of the seals and pressure fluid has to be taken into account!

1Q = With fine control
2Q = Standard version

4X = Series 40 to 49
(40 to 49: unchanged installation and connection dimensions)

[1] Has the same adjustment elements on ports A and B

[2] H-key with Material No. **R900008158** is included within the scope of supply

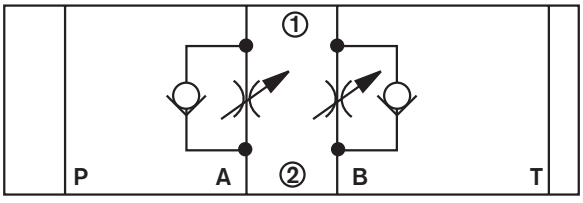
[3] Locating pin 3 x 8 DIN EN ISO 8752, Material No. **R900005694** (separate order)

Standard types

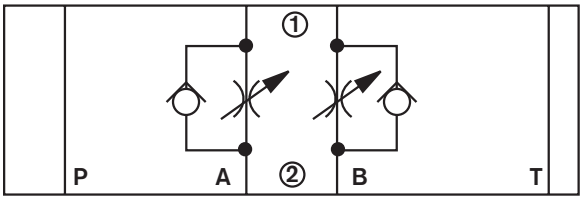
Type	Material No.
Z2FS 6 A2-4X/1QV	**R900581526**
Z2FS 6-A2-4X/2QV	**R900439389**
Z2FS 6-B2-4X/1QV	**R900438760**
Z2FS 6-B2-4X/2QV	**R900440565**
Z2FS 6-2-4X/1QV	**R900481623**
Z2FS 6-2-4X/2QV	**R900481624**

Symbol (① = component side, ② = subplate side)

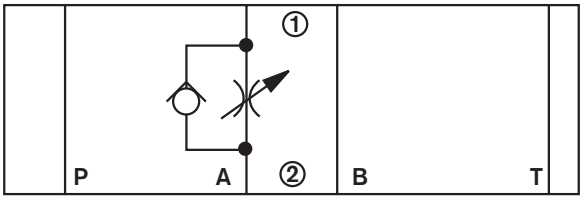
Z2FS 6 –.. –4X/.. (meter-in)



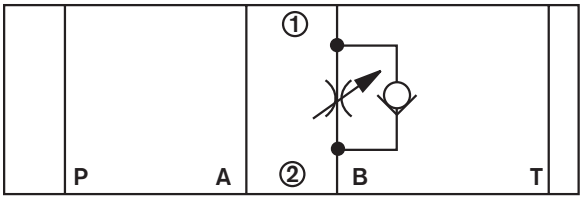
Z2FS 6 –.. –4X/.. (meter-out)



Z2FS 6 A.. –4X/.. (meter-out)



Z2FS 6 B ..–4X/.. (meter-in)



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Functional decription, cross-section

Valves type Z2FS 6 are double throttle/check valves of sandwich plate design.

They are used to limit the main or pilot flow of one or two actuators.

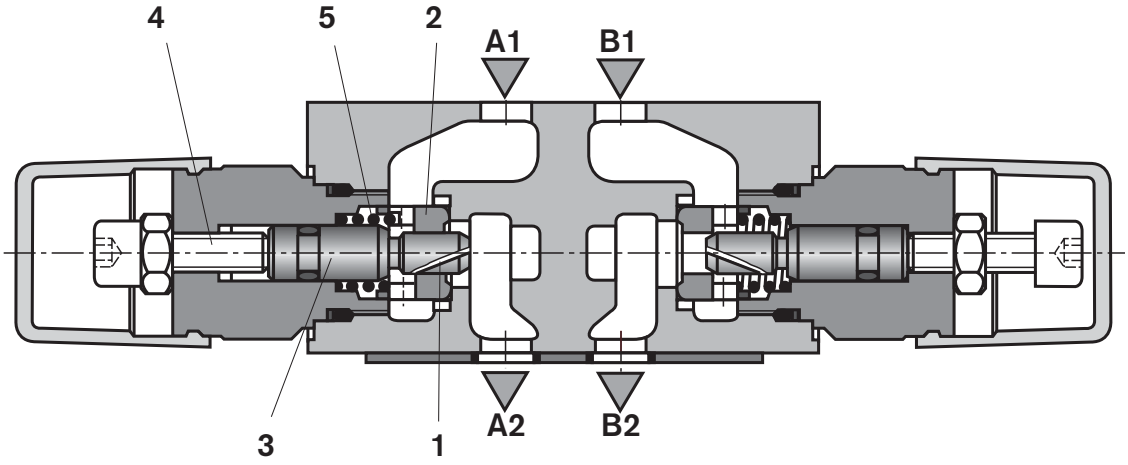
Two symmetrically arranged throttle/check valves limit the flow in one direction and allow free-flow in the opposite direction.

For meter-in control fluid passes from port A1 to port A2 via the throttling point (1), which is made up of the valve seat (2) and the throttling spool (3). The throttling spool (3) is axially adjustable via the adjustment screw (4), thus allowing the throttling point (1) to be adjusted.

Flow flowing back from the actuator port A2 moves the valve seat (2) against spring (5) in the direction of the throttling spool (3), causing the valve to act as a check valve and allowing free-flow. Depending upon the way in which the valve is installed, the throttling effect can be arranged as a meter-in or meter-out control.

Limiting the main fluid flow (version ..2Q..)
In order to change the velocity of an actuator (main fluid flow), the double throttle/check valve is installed between the directional valve and the subplate.

Limiting the pilot fluid flow (version ..1Q..)
In pilot operated directional control valves, the double throttle/check valve is installed as a pilot choke adjustment (pilot fluid flow). It is fitted between the main valve and the pilot valve.



Type Z2FS 6 –2–4X/… (meter-in)

Technical data (for applications outside these parameters, please consult us!)

General		
Installation		Optional
Ambient temperature range	°C (°F)	–20 to +80 (–4 to 176)
Weight	kg (lbs)	Approx. 0.8 (1.8)
Hydraulic		
Maximum operating pressure	bar (PSI)	315 (4600)
Maximum flow	L/min (GPM)	80 (21.1)
Pressure fluid		Mineral oil (HL, HLP) to DIN 51 524; Fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic ester); Other pressure fluids on request
Pressure fluid temperature range	°C (°F)	–20 to +80 (–4 to 176)
Viscosity range	mm^2/s (SUS)	10 to 800 (60 to 3710)
Cleanliness class to ISO code		Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 (C) class 20/18/15 [1]

[1] The cleanliness class stated for the components must be adhered to in hydraulic systems.
Effective filtration prevents faults from occurring and at the same time increases the component service life.
For the selection of filters see catalogue sheets RE 50 070, RE 50 076 and RE 50 081.

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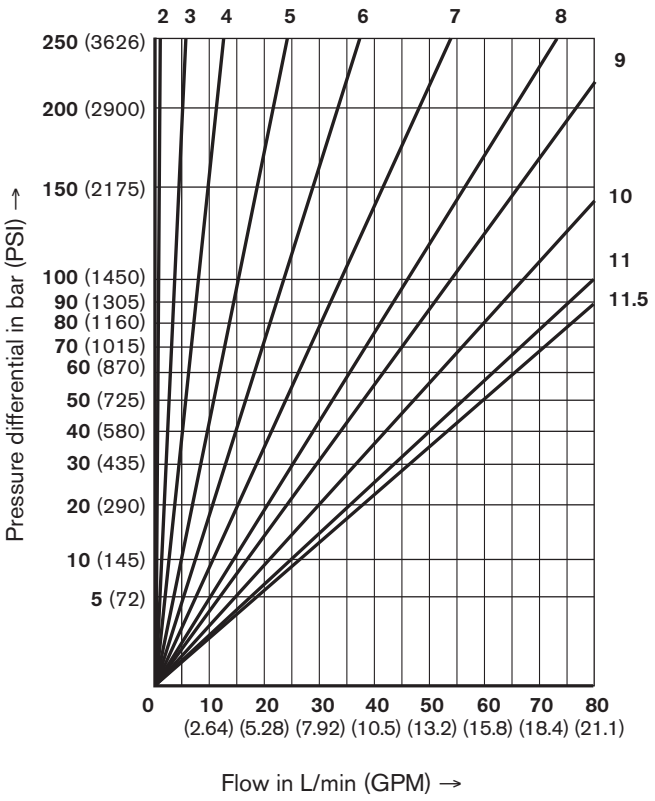
Characteristic curves – measured with HLP46, ϑ_{oil} = 40 °C ± 5 °C (104 °F ±41 °F)

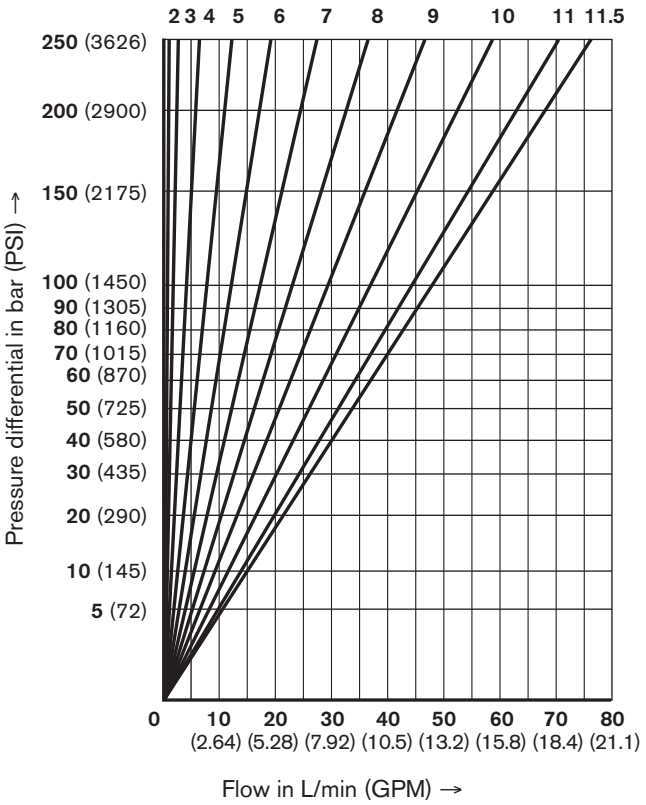
Δp–q_V–characterisic curves – Type Z2FS 6 ..–4X/**2**QV

Throttle setting in turns

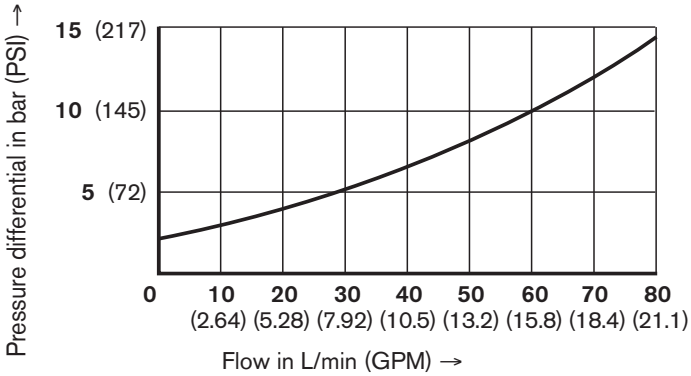


Δp–q_V–characterisic curves – Type Z2FS 6 ..–4X/**1**QV

Throttle setting in turns



Δp–q_V–characteristic curves over the check valve (throttle closed)



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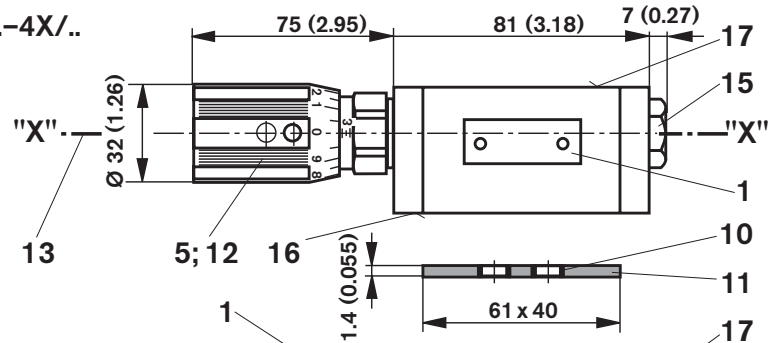
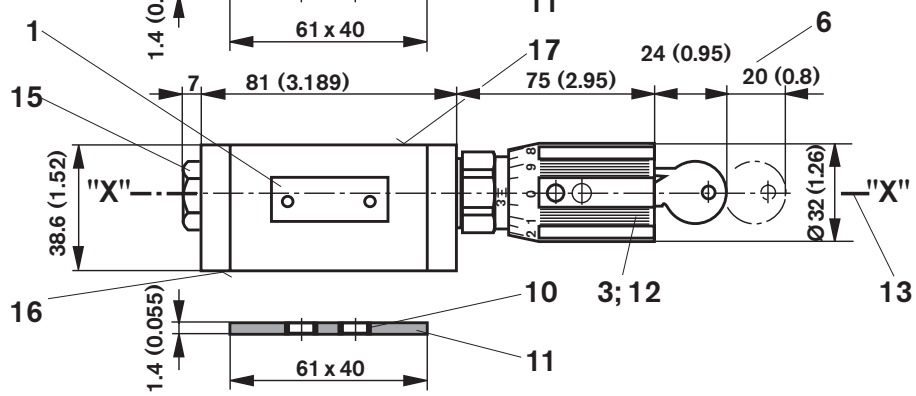
Unit dimensions – dimensions in millimeters (inches)

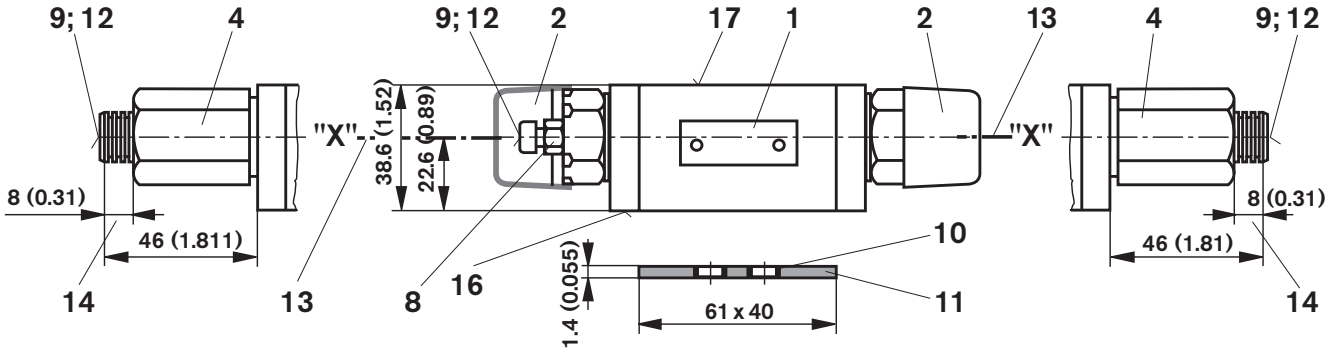
Type Z2FS 6 A..–4X/..

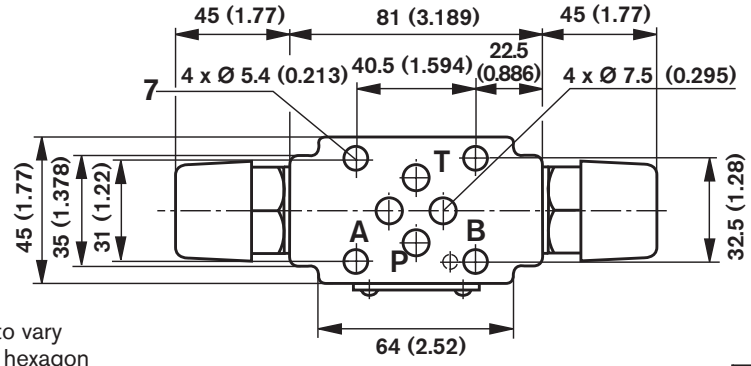


Type Z2FS 6 B..–4X/..



Type Z2FS 6 –..–4X/..

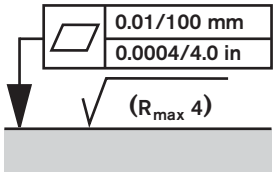




1 Name plate
2 Adjustment element “2”
3 Adjustment element “3”
4 Adjustment element “5”
5 Adjustment element “7”
6 Space required to remove the key
7 Valve fixing holes
8 Locknut 10A/F
9 Adjustment screw/spindle to vary flow cross-section (internal hexagon 5A/F)
10 Identical seal rings for ports A, B, P and T
11 Seal ring plate
12 For all adjustment elements: Anti-clockwise = increases flow Clockwise = decreases flow
13 To change from meter-in to meter-out, rotate the unit about the “X“ – “X“ axis
14 Stroke
15 Plug 22A/F

Valve fixing screws
M5 DIN 912-10.9 (10-24 UNC), tightening torque M_A = 8.9 Nm (6.5 lb-ft), must be ordered separately

16 Porting pattern to ISO 4401 and CETOP-RP 121 H with locating pin hole Ø 3 x 5 mm (0.118 in x 0.196 in) deep for locating pin Ø 3 x 8 (0.118 in x 0.324 in) DIN EN ISO 8752, Material No. **R900005694** (separate order)



Required surface finish of the mating piece

17 Porting pattern to ISO 4401 and CETOP-RP 121 H with locating pin hole Ø 4 x 4 mm (0.157 in x 0.157 in) deep

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Notes

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RE 27 518/08.97

Replaces: 08.93

engineering
mannesmann
Rexroth

Double throttle/check valve Type Z2FS 10

Nominal size 10
Series 3X
Maximum operating pressure 315 bar
Maximum flow 160 L/min

H/A/D 5556/96•

Type Z2FS 10 –5-3X/.V

Contents

Features

- Sandwich plate valve
- Porting pattern to DIN 24 340 form A, ISO 4401 and CETOP–RP 121 H
- For limiting the main or pilot fluid flow of 2 actuator connections
- 3 adjustment elements:
  - Lockable rotary knob with scale
  - Spindle with internal hexagon and scale
  - Rotary knob with scale
- For meter-in or meter-out control

Ordering details

Z2FS	10		–3X/	V	*

Double throttle/check valve

Nominal size 10 = **10**

Throttle/check valve ports A and B = **–** [1]
Throttle/check valve port A = **A**
Throttle/check valve port B = **B**

Adjustment element
Lockable rotary knob with scale = **3** [2]
Spindle with internal hexagon, locknut and protective cap = **5**
Rotary knob with scale = **7**

[1] Has the same adjustment elements on ports A and B.

[2] H-key with material no. 00008158 is included with the scope of supply

Preferred types and standard components are highlighted in the RPS (Rexroth Price list Standard).

Further details in clear text

V = FPM seals (other seals on request)

⚠ Attention!
The compatibility of the seals and pressure fluid has to be taken into account!

No code = (With two throttle/check valves) Meter-in /meter-out throttling, (this valve can be turned)

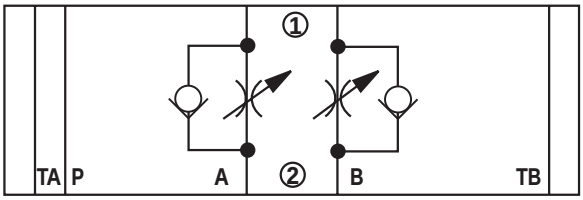
S = (...A.–3X/S) meter-in on port A
(...B.–3X/S) meter-in on port B

S2 = (...A.–3X/S2) meter-out on port A
(...B.–3X/S2) meter-out on port B

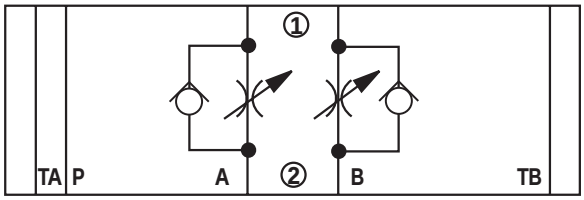
3X = Series 30 to 39
(30 to 39: unchanged installation and connection dimensions)

Symbols (① = valve side, ② = sub-plate)

Z2FS 10 ..–3X/.. (meter-in)



Z2FS 10 ..–3X/.. (meter-out)



Function, section

Valve type Z2FS 10 is a double throttle/check valve in sandwich plate design.

It is used to limit the main or pilot flow of one or two actuators.

Two symmetrically arranged throttle/check valves limit the flow in one direction and allow free-flow in the oppostie direction.

For meter-in control fluid passes from port A1 to port A2 via the throttling point (1), which is made up to the valve seat (2) and the throttling spool (3.1). The throttling spool (3.1) is axially adjustable via the spindle (4), thus allowing the throttling point (1) to be adjusted.

At the same time the fluid in port A1 reaches spool side (6) via bore (5). The pressure present in addition to the spring force holds the throttle spool (3.1) in its throttling position.

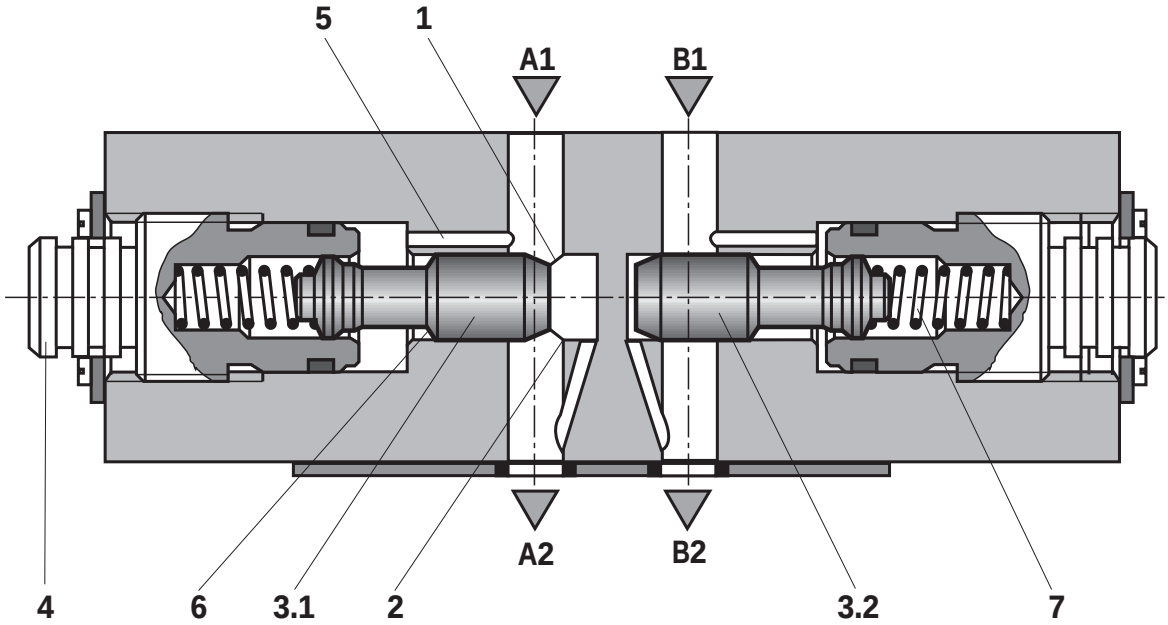
Flow flowing back from the service port B2 moves the throttle spool (3.2) against the spring (7) causing the valve to act as a check valve and allowing free-flow. Depending upon the way in which the valve is installed, the throttling effect can be arranged as a meter-in or meter-out control.

Limiting the main fluid flow

In order to change the velocity of an actuator (main fluid flow), the double throttle/check valve is installed between the directional valve and the sub-plate.

Limiting the pilot fluid flow

In pilot operated directional control valves, the double/throttle check valve is installed as a pilot choke adjustment (pilot fluid flow). It is fitted between the main valve and the pilot valve.



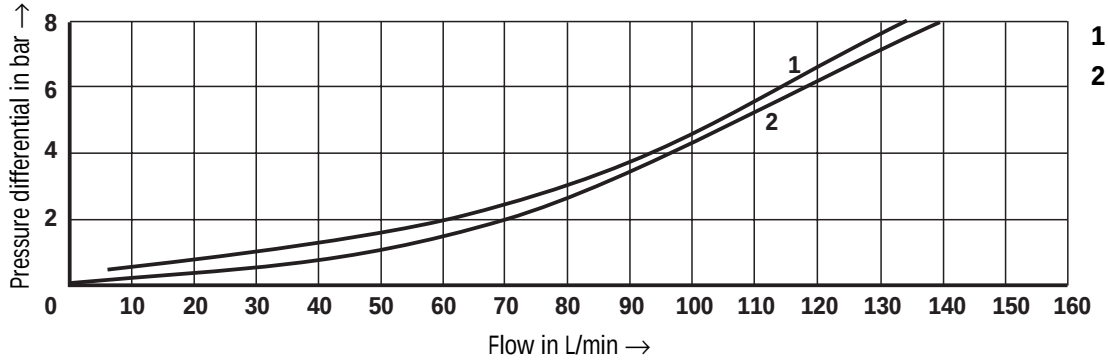
Type Z2FS 10 –5–3X/.V (meter-in)

Technical data (for applications outside these parameters, please consult us!)

Pressure fluid		Mineral oil (HL, HLP) to DIN 51 524; Fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil); HEPG (polyglycol); HEES (synthetic ester); other fluids on request
Pressure fluid temperature range	°C	– 20 to + 80 (for FPM seals)
Viscosity range	mm^2/s	10 to 800
Degree of contaminaion		Maximum permissible degree of contamination of the fluid is to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$.
Maximum working pressure	bar	315
Maximum flow	L/min	160
Weight	kg	approx. 3.1

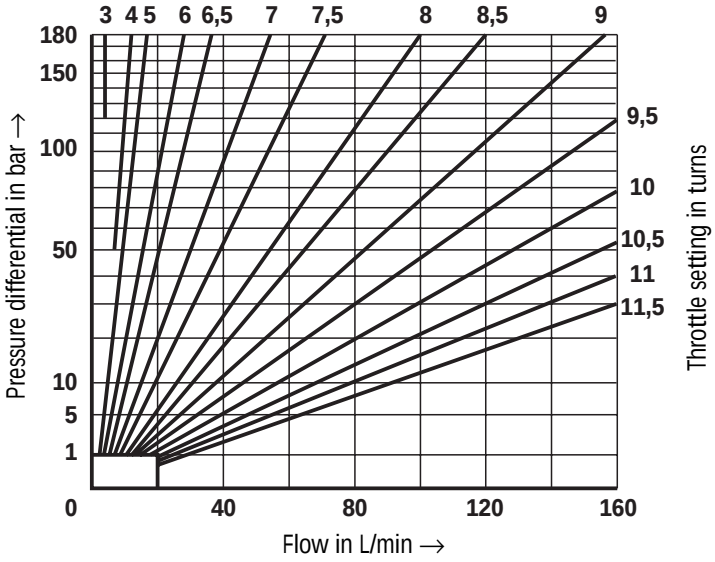
Characterisic curves (measured at $\nu = 41\ mm^2/s$ and $\vartheta = 50\ °C$)

Pressure differential Δp in relation to the flow q_V across the check valve

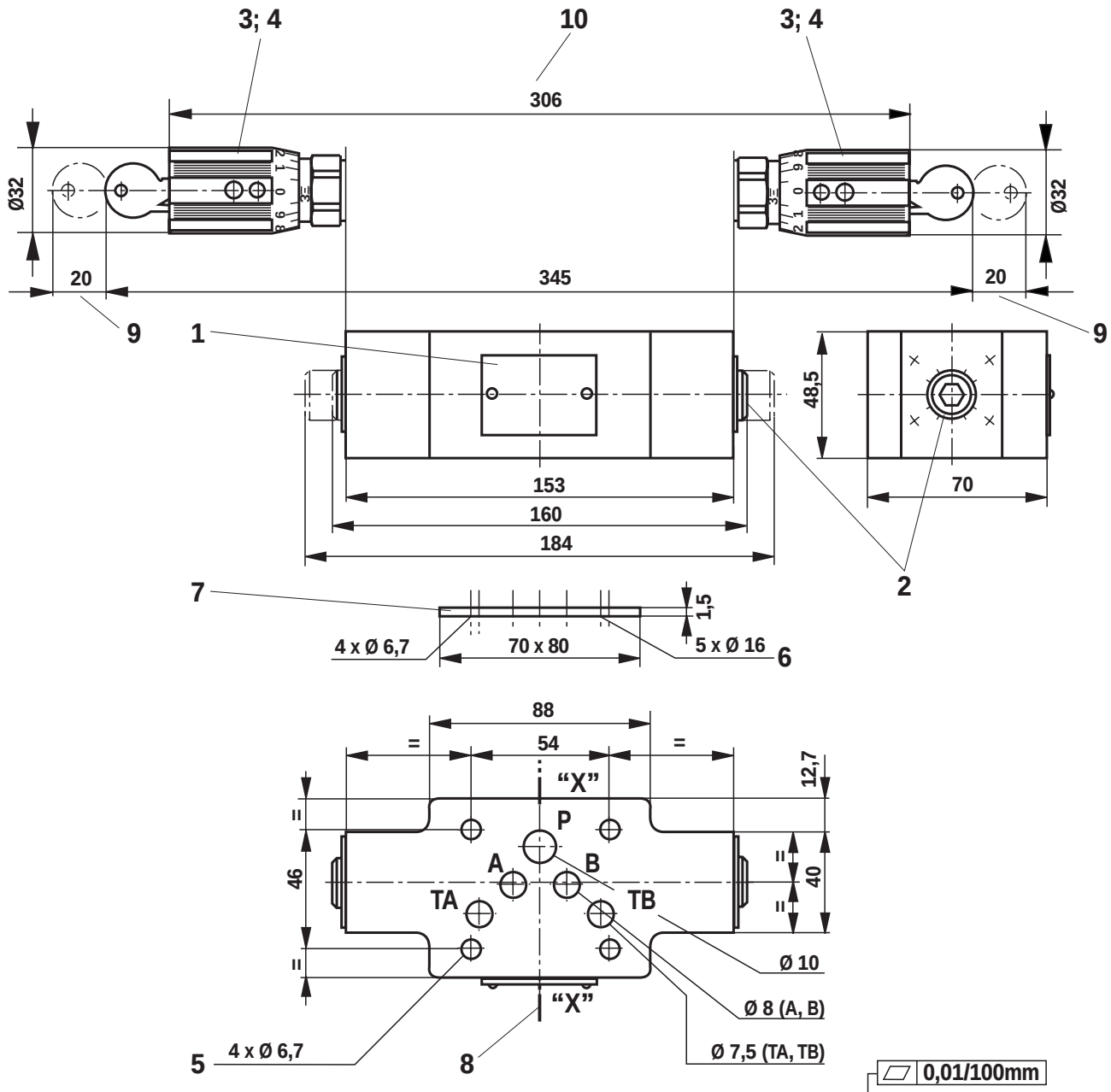


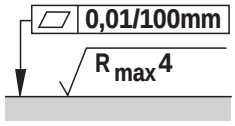
1 Throttle closed
2 Throttle open

Pressure differential Δp in relation to the flow q_V at constant throttle setting



Unit dimensions: type Z2FS 10 –.–3X/… (Dimensions in mm)





Required surface finish of mating piece

⚠ Attention!
Where drillings for X and Y ports are required order version **SO30**!
(e.g. for pilot operated directional valve size 10)

1 Name plate

2 Adjustment "5"
Spindle to set flow cross-section (internal hexagon 8 A/F)
- turn anti-clockwise = increases flow
- turn clockwise = decreases flow

3 Adjustment "3"

4 Adjustment "7"

5 4 through holes for valve fixing screws

6 R-ring 13 x 1.6 x 2 for ports A, B, P, TA, TB

7 R-ring plate

8 To change from meter-in to meter-out, rotate the unit about the "X"–"X" axis

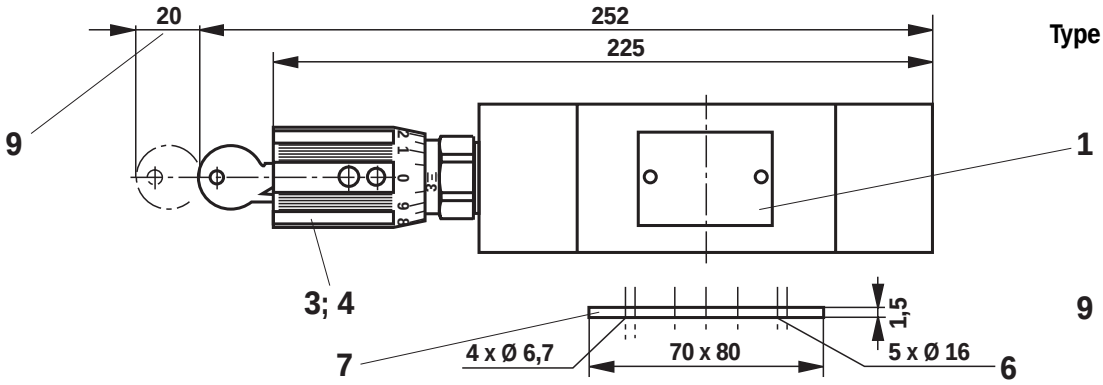
9 Space required to remove key

10 Only for adjustment "7"

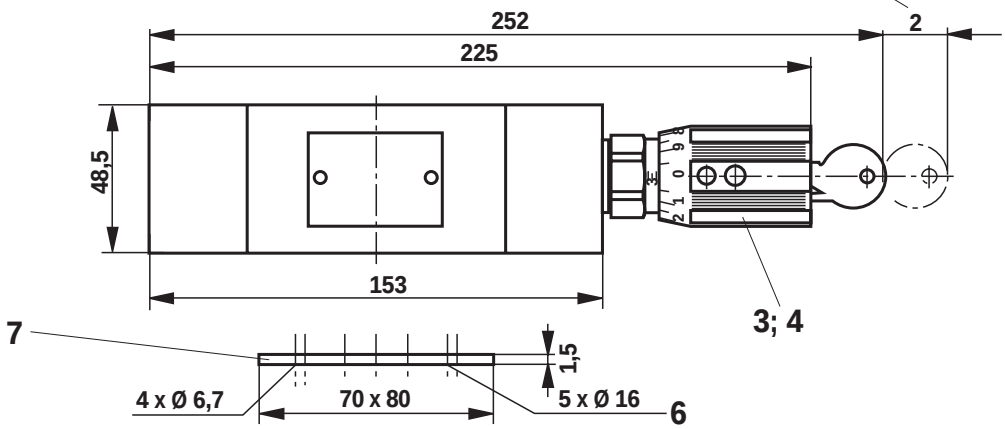
Valve fixing screws
M6 DIN 912-10.9,
tightening torque M_A = 15.5 Nm
must be ordered separately.

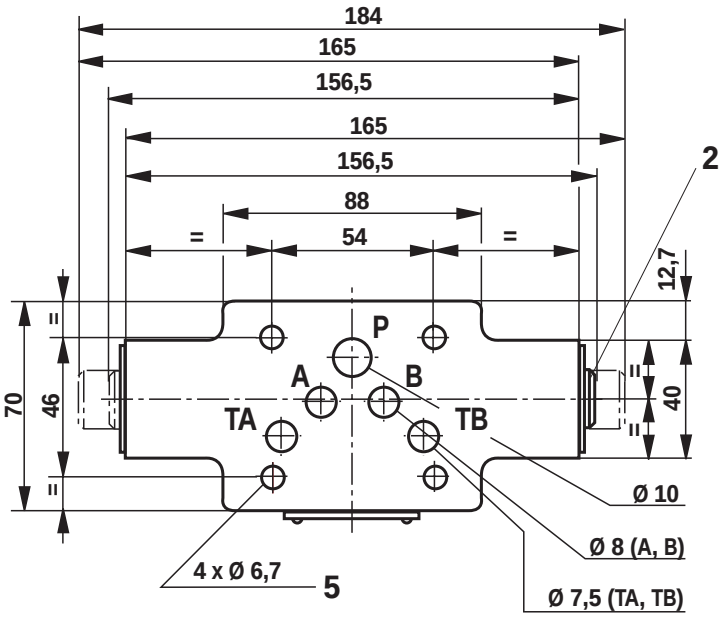
Unit dimensions: types Z2FS 10 A… and Z2FS 10 B… (Dimensions in mm)

Type Z2FS 10 A.–3X/…

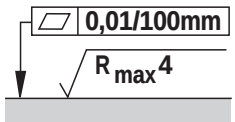


Type Z2FS 10 B.–3X/…





⚠ Attention!
Where drillings for X and Y ports are required order version **SO30**!
(e.g. for pilot operated directional valve size 10)



Required surface finish of mating piece

1 Name plate

2 Adjustment "5"
Spindle to set flow cross-section (internal hexagon 8 A/F)
- turn anti-clockwise = increases flow
- turn clockwise = decreases flow

3 Adjustment "3"

4 Adjustment "7"

5 4 through holes for fixing screws

6 R-ring 13 x 1.6 x 2 for ports A, B, P, TA, TB

7 R-ring plate

9 Space required to remove key

Valve fixing screws
M6 DIN 912-10.9,
tightening torque M_A = 15.5 Nm
must be ordered separately.

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Notes

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Fax: (01480) 219052

The specified data is for product description purposes only and may not be deemed to be guaranteed unless expressly confirmed in the contract.

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Throttle check valve

RE 27526/04.08 1/8
Replaces: 11.02

Type Z2FS


tb0221

Size 16
Component series 3X
Maximum operating pressure 350 bar *[5076 psi]*
Maximum flow 250 l/min *[66 US gpm]*

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Features

- Sandwich plate valve
- Porting pattern to ISO 4401-07-07-0-05 and NFPA T3.5.1 R2-D07
- For limiting the flow in 2 actuator ports
- Adjustment element: Spindle with hexagon socket
- For meter-in or meter-out throttling

Information on available spare parts:
www.boschrexroth.com/spc

Ordering code

Z2FS	16		8	–3X		*

Throttle check valve, sandwich plate design

Size 16 = 16

Throttle check valve Side A and B = –
Throttle check valve Side A = A
Throttle check valve Side B = B

Adjustment element
Spindle with hexagon socket = 8

Component series 30 to 39 = 3X
(30 to 39: unchanged installation and connection dimensions)

Further details in clear text

Seal material
No code = NBR seals
V = FKM seals
(other seals on request)

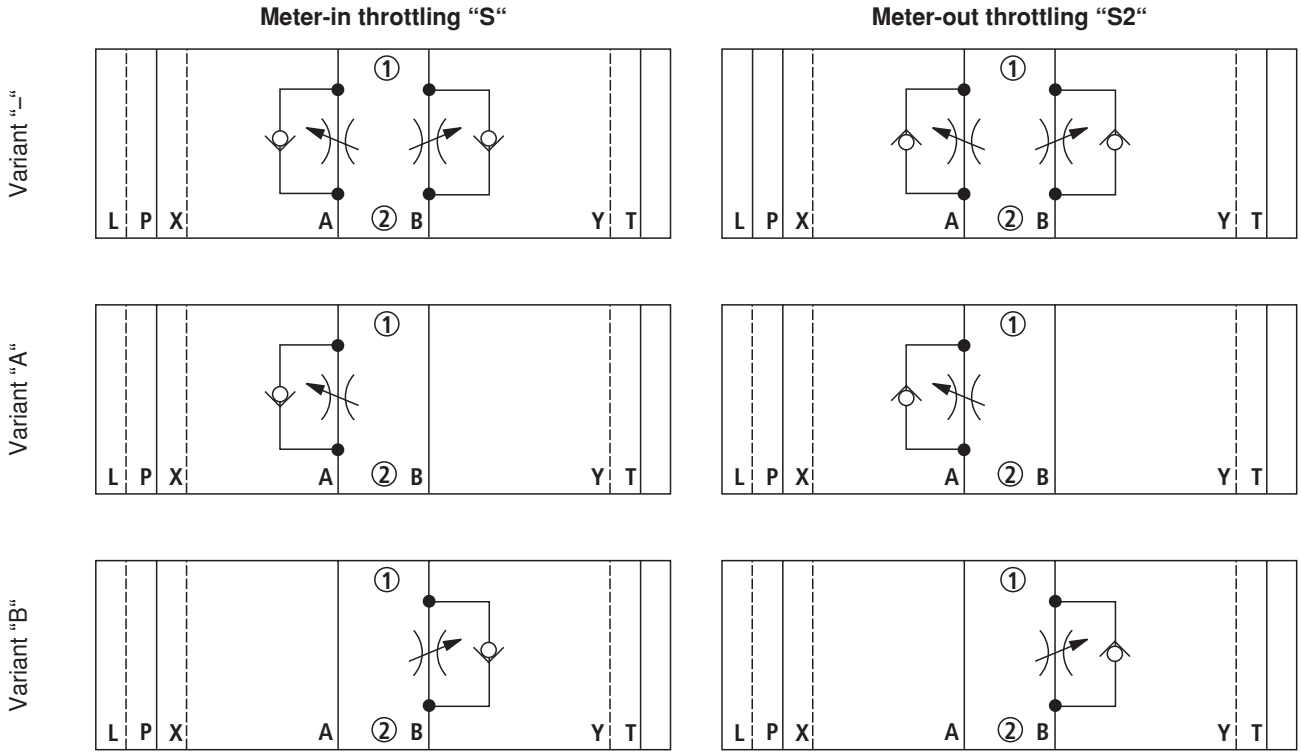
⚠ Attention!
Observe compatibility of seals with hydraulic fluid used

S = (…A8–3X/S) meter-in throttling on side A
(…B8–3X/S) meter-in throttling on side B
(…–8–3X/S) meter-in throttling on sides A and B

S2 = (…A8–3X/S2) meter-out throttling on side A
(…B8–3X/S2) meter-out throttling on side B
(…–8–3X/S2) meter-out throttling on sides A and B

Standard types and components are given in the EPS (standard price list).

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



Function, section

Valves of type Z2FS are throttle check valves of sandwich plate design. They are used to limit the flow in one or two actuator ports.

Two throttle check valves, which are arranged symmetrically to each other, limit flows (through adjustable throttle spools) in one direction and allow free return flow in the opposite direction.

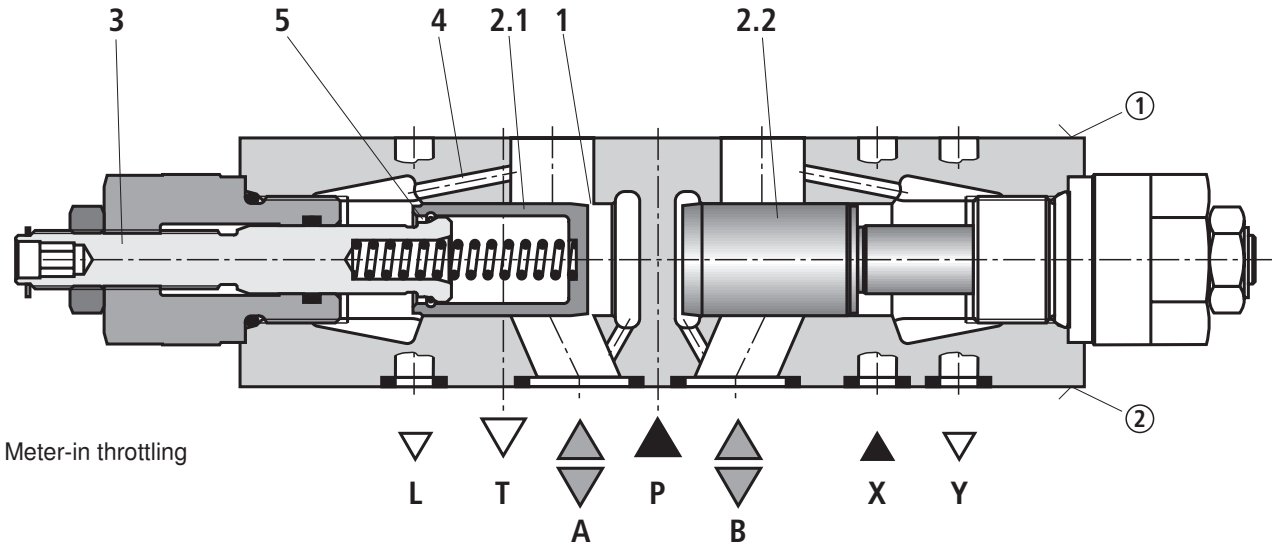
In the case of meter-in throttling the hydraulic fluid is fed through channel A1 via throttling point (1) to actuator A2. The throttle spool (2.1) can be axially adjusted by means of spindle (3), thus allowing throttling point (1) to be adjusted.

At the same time, the hydraulic fluid present in channel A1 gets via bore (4) to spool side (5). Together with the spring force, the applied pressure holds the throttle spool (2.1) in the throttling position.

The hydraulic fluid returning from actuator B2 shifts throttle spool (2.2). The valve then acts as check valve with free flow. Depending on the variant (“S“ or “S2“) throttling can be effective in the inflow or outflow.

Flow limitation

To change the velocity of an actuator, the throttle check valve is to be installed between the directional valve and the subplate.



Meter-in throttling

① = component side
② = plate side

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Technical data (for applications outside these parameters, please consult us!)

General

Weight	kg *[lbs]*	ca. 4.7 *[10.4]*
Installation orientation		Optional
Ambient temperature range	°C *[°F]*	–30 to +80 *[–22 to +176]* (NBR seals) –20 to +80 *[–4 to +176]* (FKM seals)

Hydraulic

Maximum operating pressure	bar *[psi]*	350 *[5076]*
Maximum flow	l/min *[US gpm]*	250 *[66]*
Hydraulic fluid		Mineral oil (HL, HLP) to DIN 51524 [1]; fast bio-degradable hydraulic fluids to VDMA 24568 (see also RE 90221); HETG (rape seed oil) [1]; HEPG (polyglycols) [2]; HEES (synthetic esters) [2]; other hydraulic fluids on request
Hydraulic fluid temperature range	°C *[°F]*	–30 to +80 *[–22 to +176]* (NBR seals) –20 to +80 *[–4 to +176]* (FKM seals)
Viscosity range	mm^2/s *[SUS]*	2.8 to 380 *[13 to 1760]*
Permissible max. degree of contamination of the hydraulic fluid - cleanliness class to ISO 4406 (c)		Class 20/18/15 [3]

[1] Suitable for NBR and FKM seals

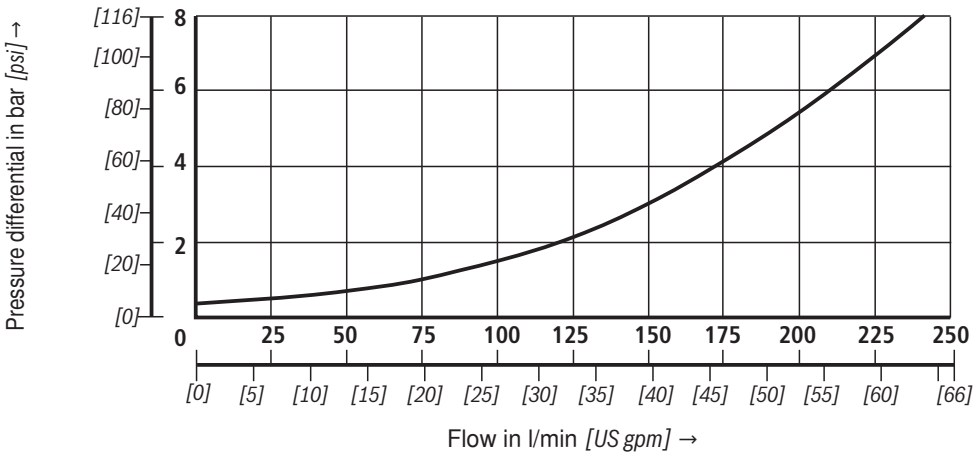
[2] Suitable only for FKM seals

[3] The cleanliness classes specified for components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, prolongs the service life of components.

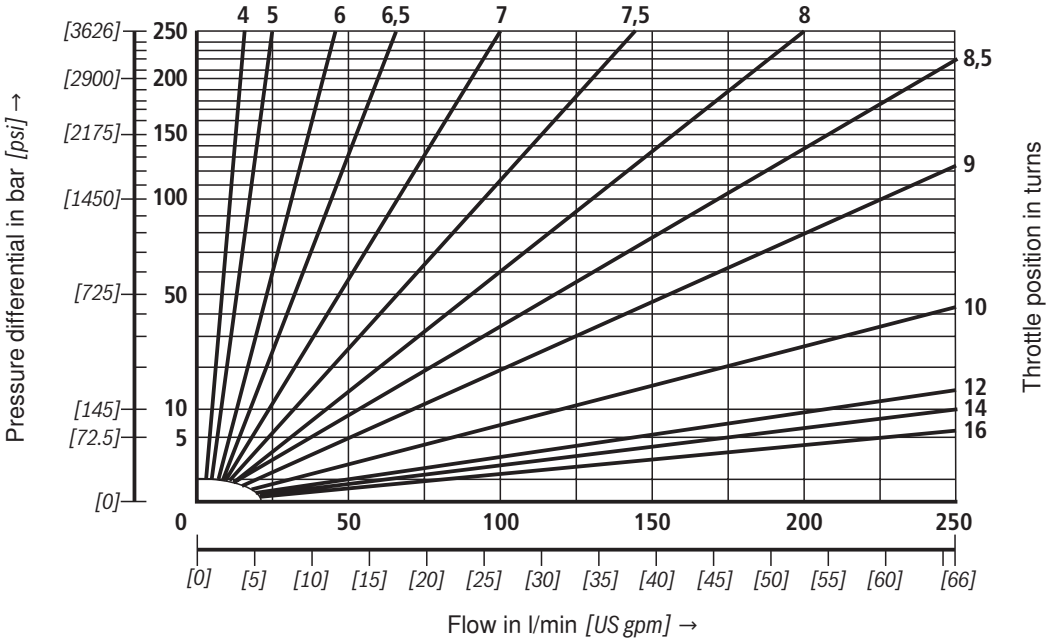
For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

Characteristic curves (measured with HLP46, $\vartheta_{oil\ (\nu\ =\ 190\ SUS)}$ = 40 °C ±5 °C *[104 °F ± 9 °F]*)

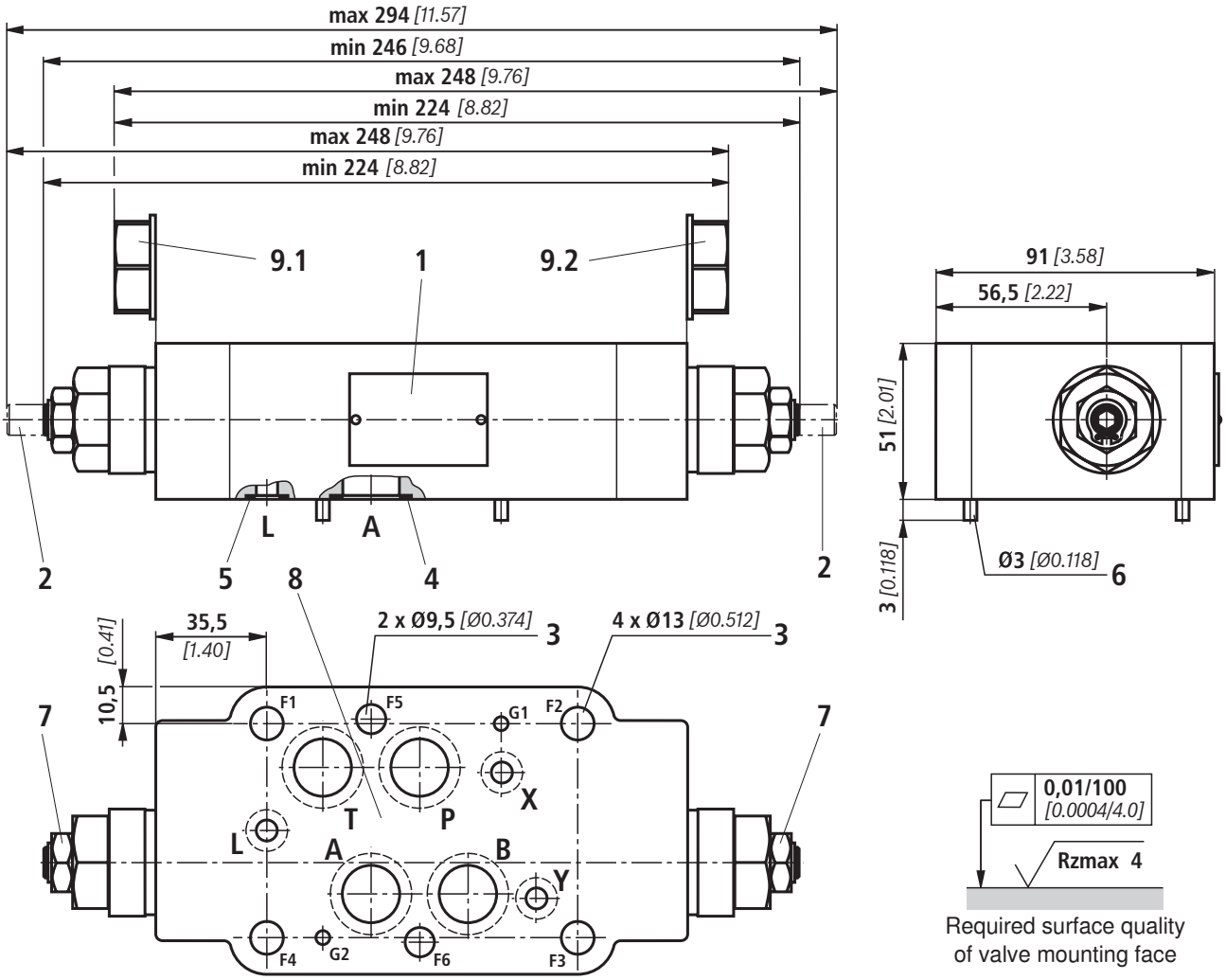
Δp-q_V characteristic curves (through check valve, with closed throttle)



Δp-q_V characteristic curves (throtlte position constant)



Unit dimensions (dimensions in mm *[inch]*)



Required surface quality of valve mounting face

1 Nameplate

2 Type of adjustment “8“
Spindle for adjusting the flow cross-section (hexagon socket 6 A/F)
- Turning counter-clockwise = larger flow
- Turning clockwise = smaller flow

3 Through-bores for valve mounting

4 Identical seal rings for ports A, B, P, T

5 Identical seal rings for ports X, Y, L

6 Locating pin (included in the sope of supply)

7 Hexagon 19 A/F, tightening torque M_T = 25 Nm *[18.4 ft-lbs]*

8 Porting pattern to ISO 4401-07-07-0-05 and NFPA T3.5.1 R2-D07

9.1 Plug screw on variant “B“

9.2 Plug screw on variant “A“

Valve mounting screws (separate order)

– Metric
4 hexagon socket head cap screws ISO 4762 - M10 - 10.9-flZn-240h-L
2 hexagon socket head cap screws ISO 4762 - M6 - 10.9-flZn-240h-L

– UNC
4 hexagon socket head cap screws 3/8-16 UNC
2 hexagon socket head cap screws 1/4-20 UNC

☞ **Note!**
The length and tightening torque of valve mounting screws must be calculated taking account of the components mounted above and below the sandwich plate valve.

Notes

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