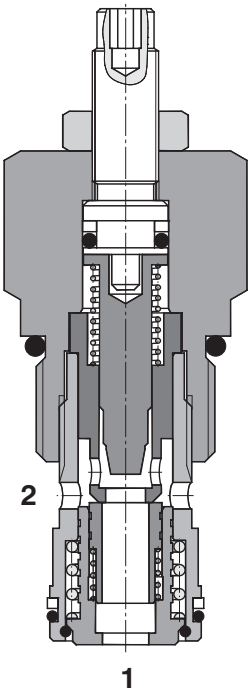
SF2C2A-K2/I

M27x2 • Q_{max} 60 l/min (16 GPM) • p_{max} 350 bar (5100 PSI)



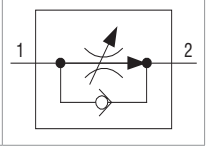
Technical Features

- Set flow rate independent of load pressure and temperature changes
- Adjusted flow rate depends on the orifice area and adjusted differential pressure
- Integrated reverse flow check valve
- Hardened precision parts
- High flow capacity
- Quiet and modulated response to load changes
- Used in meter-in, meter-out or bleed-off applications
- Wide range of flow rate options
- In the standard version, the valve is zinc-coated (240 h corrosion protection in NSS acc. to ISO 9227)

Functional Description

This pressure compensated hydraulic flow regulating valve with fixed orifice and variable spring setting are designed to control flow rates independently of pressure and temperature changes, especially in systems where only small movements due to load changing are required.
The flow rate stabilization is provided by a pressure compensator in the direction from P1 to P2. The regulated flow decreases with clockwise rotation of the adjustment screw, and increases with counter-clockwise rotation. The desired setting can be locked down. The valve will maintain the set flow regardless of pressure variations on the regulated or inlet port.

Symbol

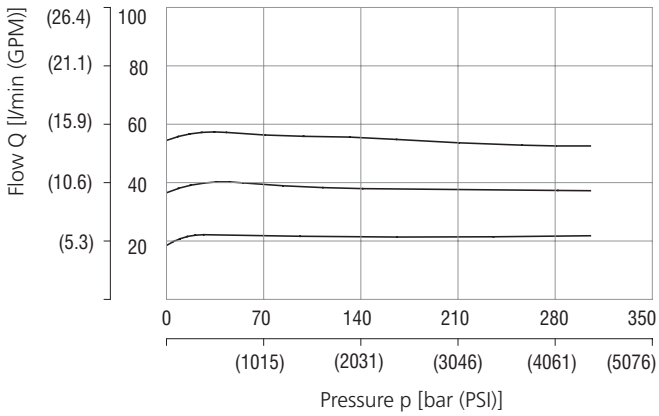


Technical Data

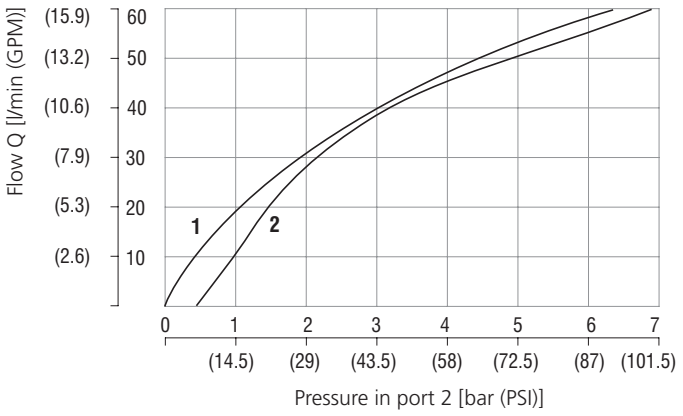
Valve size / Cartridge cavity		M27x2 / K2	
Nominal flow rates		4	6
Adjustment range	l/min (GPM)	4 - 40 (1.06 - 10.57)	6 - 60 (1.59 - 15.85)
Max. operating pressure	bar (PSI)	350 (5080)	
Fluid temperature range (NBR)	°C (°F)	-20 .... +90 (-4 ... +194)	
Weight	kg (lbs)	0.3 (0.66)	
	Datasheet	Type	
General information	GI_0060	Products and operating conditions	
Valve bodies In-line mounted	SB_0018	SB-K2*	
Cavity details	SMT_0019	SMT-K2*	
Spare parts	SP_8010		

Characteristics measured at ν = 40 mm²/s (195 SUS)

Regulated flow related to input pressure
Flow direction 1 - 2 (regulated flow)

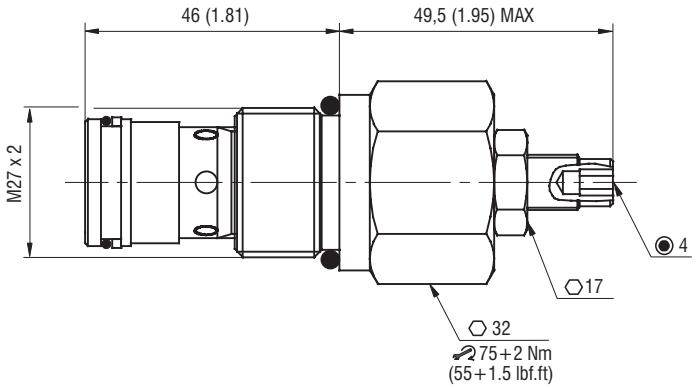


Flow rate 2 - 1 related to input pressure (2)
(flow rate through the open check valve)



1	Needle restrictor open
2	Needle restrictor closed

Dimensions in millimeters (inches)



Ordering Code

SF2C2A-K2/l ☐ **S** ☐ - ☐

2-Way flow regulator with reverse flow check, pressure compensated — **M27x2**

Adjustable flow range
4 - 40 l/min (1.06 - 10.57 GPM) — **4**
6 - 60 l/min (1.59 - 15.85 GPM) — **6**

Adjustment option
allen key (hex. 4), without protective cap

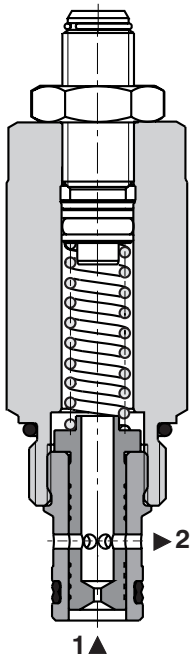
Seals
No designation NBR
V FPM (Viton)

Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240 h)

Screw-in Cartridge Flow Control Valve with 2-Way Pressure Compensator

SF22A-A2/H

3/4-16 UNF • Q_{max} 21 l/min (6 GPM) • p_{max} 350 bar (5100 PSI)

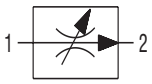


Technical Features

- Set volumetric flow is independent of load pressure and temperature changes
- The flow rate depends on the selected flow range and set pressure drop
- Three flow ranges
- Fast and smooth response to load changes
- Precisely manufactured parts and a hardened spool of compensator
- Possible meter-in, meter-out or bleed-off (serial) connection to an applicator
- Flow adjustable by allen key or rotating plastic handle
- In the standard version, the valve is zinc-coated for 240 h protection in NSS acc. to ISO 9227

Functional Description

Screw-in cartridge flow control valve with 2-way pressure compensator is designed for speed control of actuator in applications, where the minimum fluctuation of velocity is acceptable during load changes. The 2-way pressure compensator spool maintains constant pressure drop on the valve by throttling and thus a constant flow in the flow direction 1 → 2. The volumetric flow is independent of pressure changes in ports 1 and 2. Flow adjustment, in the range given by the nozzle diameter, is performed by changing the pressure drop, by means of spring compression with adjusting screw.
The regulated flow increases with clockwise rotation of the adjusting screw. In the opposite flow direction 2 → 1 the valve works as a flow restrictor and the pressure compensator spool is inactive.

Symbol	

Technical Data

Valve size / Cartridge cavity		3/4-16 UNF-2A / A2 (C-8-2)		
Nominal flow rates		2	6	12
Adjustment range	l/min (GPM)	0.5-3.2 (0.1-0.8)	3-8.5 (0.8-2.3)	8-21 (2.1-5.6)
Max. operating pressure	bar (PSI)	350 (5080)		
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)		
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)		
Weight	kg (lbs)	0.19 (0.42)		

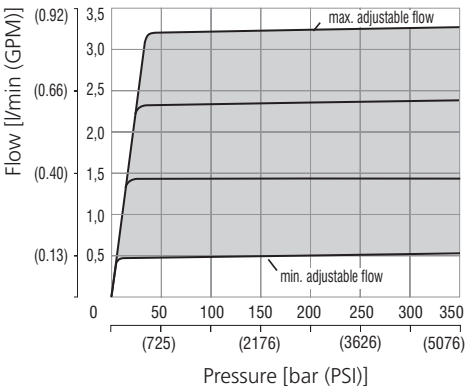
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Valve bodies	In-line mounted	SB_0018	SB-A2-*
	Sandwich mounted	SB-04(06)_0028	SB-*A2*
Cavity details / Form tools		SMT_0019	SMT-A2*
Spare parts		SP_8010	

Characteristics measured at ν = 32 mm²/s (156 SUS)

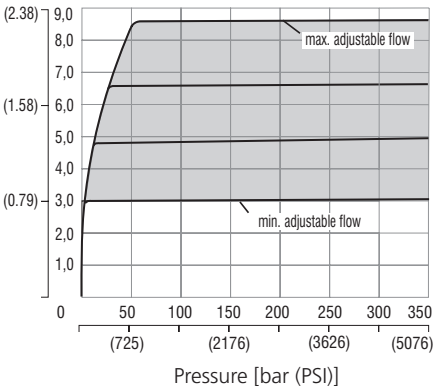
Regulated flow related to input pressure

Flow direction 1 - 2 (regulated flow)

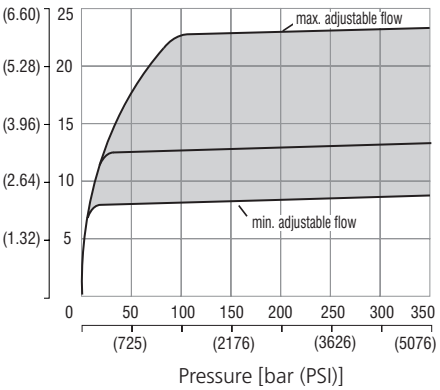
Flow rate 2



Flow rate 6



Flow rate 12

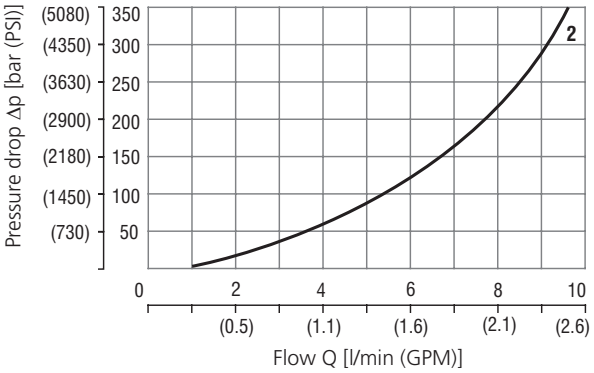


Characteristics measured at ν = 32 mm²/s (156 SUS)

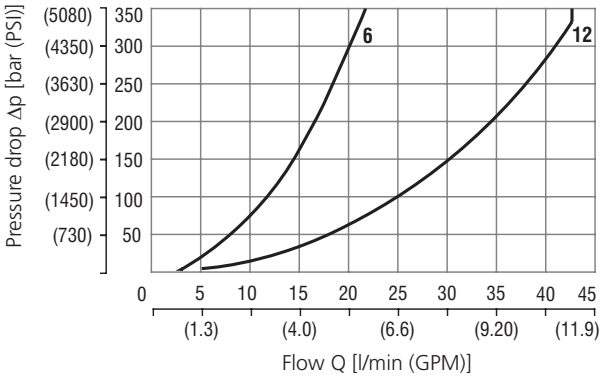
Pressure drop related to flow rate

Flow direction 2 - 1 (throttling without compensation)

Flow rate 2

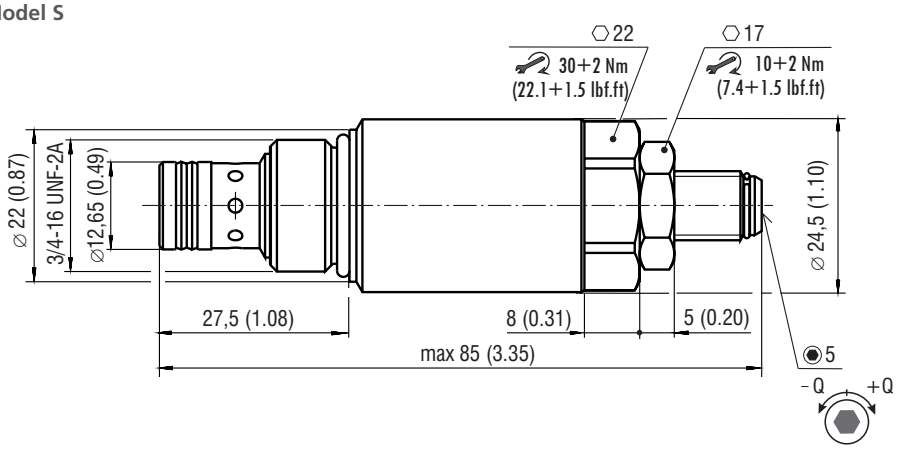


Flow rates 6, 12

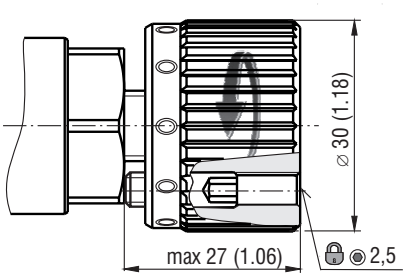


Dimensions in millimeters (inches)

Model S



Model RS



Ordering Code

SF22A-A2/H ☐ ☐ ☐ - ☐

2-Way flow regulator, pressure compensated

Valve cavity
3/4-16 UNF-2A (C-8-2)

Model
High performance

Flow rate

0.5 - 3.2 l/min	(0.1 - 0.8 GPM)	**2**
3 - 8.5 l/min	(0.8 - 2.3 GPM)	**6**
8 - 21 l/min	(2.1 - 5.6 GPM)	**12**

Adjustment option

S	allen key (hex. 5), without protective cap
RS	hand screw, metal

Seals

No designation	NBR
V	FPM (Viton)

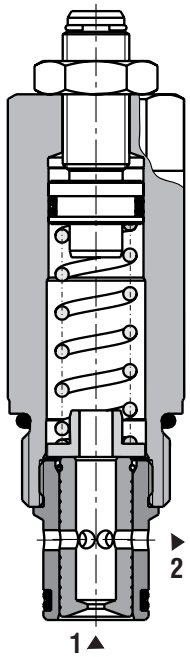
Surface treatment

A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

Screw-in Cartridge Flow Control Valve with 2-Way Pressure Compensator

SF22A-B2/H

7/8-14 UNF • Q_{max} 40 l/min (11 GPM) • p_{max} 350 bar (5100 PSI)

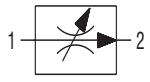


Technical Features

- Set volumetric flow is independent of load pressure and temperature changes
- The flow rate depends on the selected flow range and set pressure drop
- Three flow ranges
- Fast and smooth response to load changes
- Precisely manufactured parts and a hardened compensator spool
- Possible meter-in, meter-out or bleed-off (serial) connection to an applicator
- Flow adjustable by allen key or rotating plastic handle
- In the standard version, the valve is zinc-coated for 240 h protection in NSS acc. to ISO 9227

Functional Description

Screw-in cartridge flow control valve with 2-way pressure compensator is designed for speed control of actuator in applications, where the minimum fluctuation of velocity is acceptable during load changes.
The 2-way pressure compensator spool maintains constant pressure drop on the valve by throttling and thus a constant flow in the flow direction 1 → 2. The volumetric flow is independent of pressure changes in ports 1 and 2. Flow adjustment, in the range given by the nozzle diameter, is performed by changing the pressure drop, by means of spring compression with adjusting screw.
The regulated flow increases with clockwise rotation of the adjusting screw. In the opposite flow direction 2 → 1 the valve works as a flow restrictor and the pressure compensator spool is inactive.

Symbol	

Technical Data

Valve size / Cartridge cavity		7/8-14 UNF-2A / B2 (C-10-2)		
Nominal flow rates		12	20	40
Adjustment range	l/min (GPM)	3.2-12 (0.8-3.2)	5.1-20 (1.4-5.3)	5.0-41 (1.3-10.8)
Max. operating pressure	bar (PSI)	350 (5080)		
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)		
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)		
Weight	kg (lbs)	0.22 (0.49)		

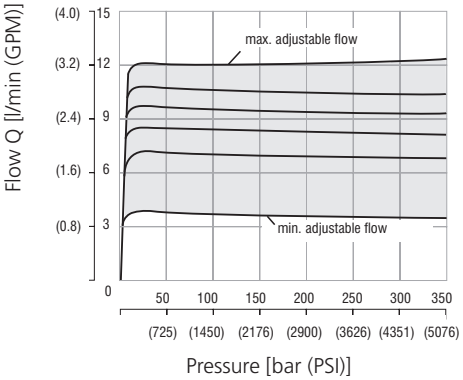
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Valve bodies	In-line mounted	SB_0018	SB-B2-*
	Sandwich mounted	SB-04(06)_0028	SB-*B2*
Cavity details / Form tools		SMT_0019	SMT-B2*
Spare parts		SP_8010	

Characteristics measured at ν = 32 mm²/s (156 SUS)

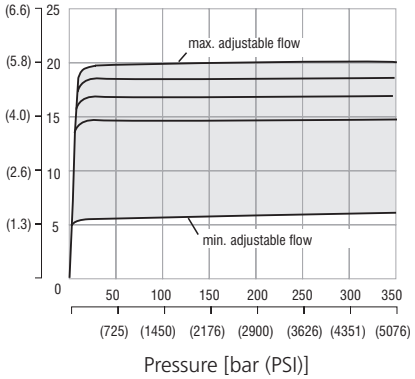
Regulated flow related to input pressure

Flow direction 1 - 2 (regulated flow)

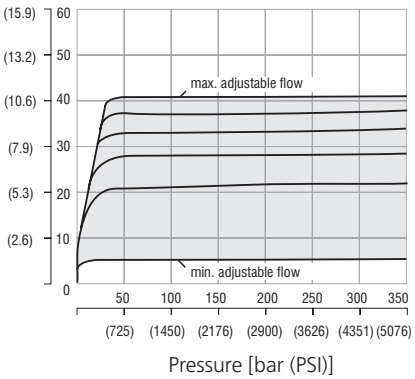
Flow rate 12



Flow rate 20



Flow rate 40

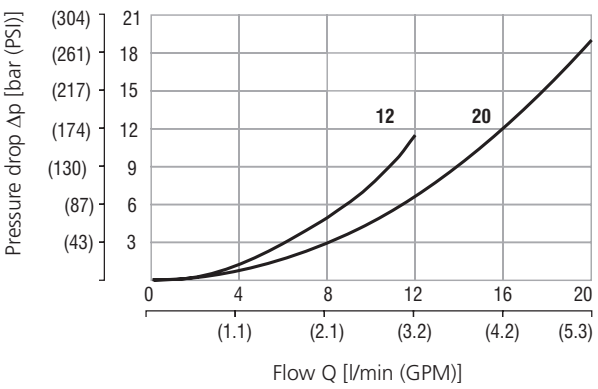


Characteristics measured at ν = 32 mm²/s (156 SUS)

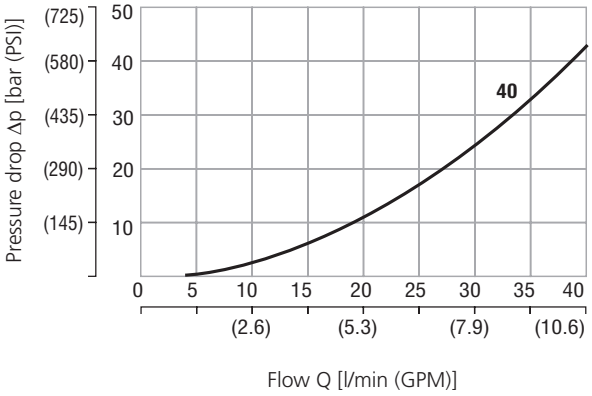
Pressure drop related to flow rate

Flow direction 2 - 1 (throttling without compensation)

Flow rates 12, 20

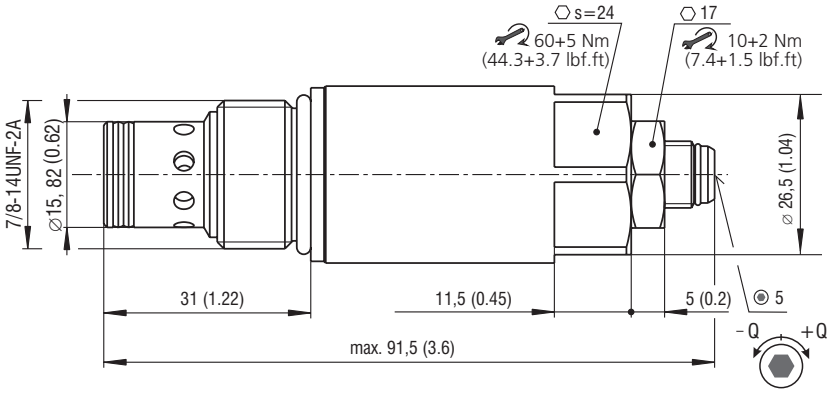


Flow rate 40

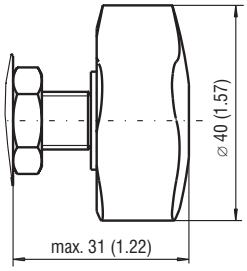


Dimensions in millimeters (inches)

Model S



Model RP



Ordering Code

SF22A - B2 / H □ □ □ - □

2-Way flow regulator, pressure compensated

Valve cavity
7/8-14 UNF (C-10-2)

Model
High performance

Flow rate

3.2 - 12 l/min (0.8 - 3.2 GPM)	**12**
5.1 - 20 l/min (1.4 - 5.3 GPM)	**20**
5.0 - 41 l/min (1.3 - 10.8 GPM)	**40**

Adjustment option

S	allen key (hex. 5), without protective cap
RP	hand screw, plastic

Seals

No designation	NBR
V	FPM (Viton)

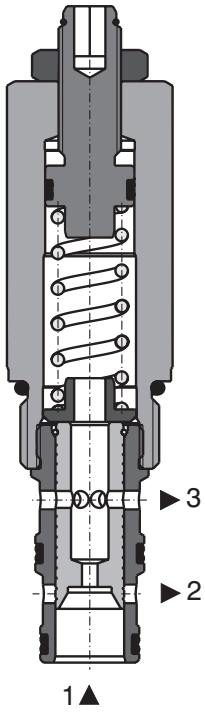
Surface treatment

A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

Screw-in Cartridge Flow Control Valve with 3-Way Pressure Compensator

SF32A-B3/H

7/8-14 UNF • Q_{max} 50 l/min (13 GPM) • p_{max} 350 bar (5100 PSI)

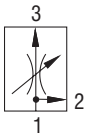


Technical Features

- Set volumetric flow is independent of load pressure and temperature changes
- The flow rate depends on the selected flow range and set pressure drop
- Four flow ranges
- Fast and smooth response to load changes
- Precisely manufactured parts and a hardened compensator spool
- Possible meter-in connection to an applicator
- Flow adjustable by allen key or rotating plastic handle
- In the standard version, the valve is zinc-coated for 240 h protection in NSS acc. to ISO 9227

Functional Description

Screw-in cartridge flow control valve with 3-way pressure compensator is designed for speed control of actuator in applications, where the minimum fluctuation of velocity is acceptable during load changes. The spool of 3-way pressure compensator maintains constant pressure drop on the valve by dividing flow and thus a constant flow in the flow direction 1 → 3. The excess fluid is discharged through port 2 back to the tank. The volumetric flow is independent of pressure changes in ports 1 and 3. Flow adjustment, in the range given by nozzle diameter, is performed by changing the pressure drop, by means of spring compression with adjusting screw. The regulated flow increases with clockwise rotation of the adjusting screw. If the port 2 in the block is closed, the pressure compensator will operate as a 2-way. In the opposite flow direction 3 → 1 the valve works as a flow restrictor and the pressure compensator spool is inactive. The valve can also be used as a flow divider with a priority constant flow in the direction 1 → 3.

Symbol	

Technical Data

Valve size / Cartridge cavity		7/8-14 UNF-2A / B3 (C-10-3)			
Max. inlet flow (port 1)	l/min (GPM)	50 (13.2)			
Nominal flow rates		10	14	22	30
Adjustment range	l/min (GPM)	5 -10 (1.2 - 2.6)	6 - 14 (1.6 - 3.7)	11 - 22 (2.9 - 5.8)	17 - 30 (4.5 - 7.9)
Max. operating pressure	bar (PSI)	350 (5080)			
Fluid temperature range (NBR)	°C (°F)	-30... + 100 (-22 ... +212)			
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)			
Weight	kg (lbs)	0.24 (0.52)			

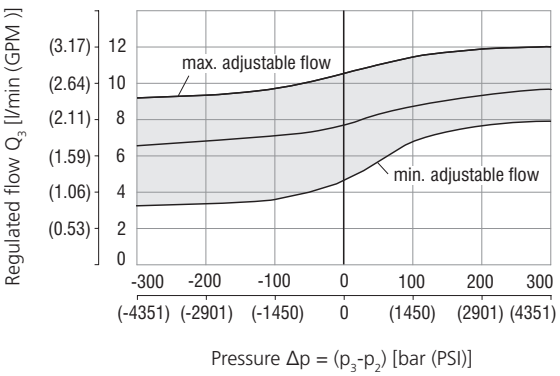
		Datasheet	Type
General Information		GI_0060	Products operating conditions
Valve bodies	In-line mounted	SB_0018	SB-B3*
	Sandwich mounted	SB-04(06)_0028	SB-*B3*
Cavity details / Form tools		SMT_0019	SMT-B3*
Spare parts		SP_8010	

Characteristics measured at ν = 32 mm²/s (156 SUS)

Regulated flow related to input pressure
Measured at constant inlet flow Q_1 = 50 l/min (13.21 GPM)

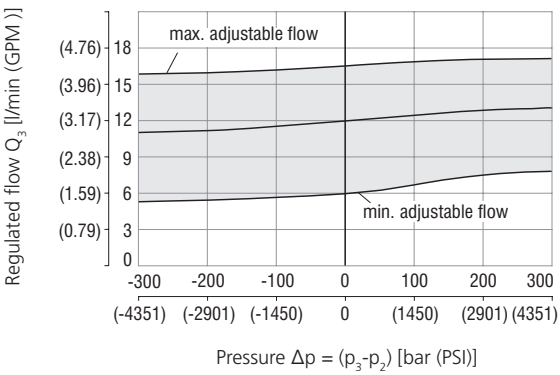
Flow rate 10

By-pass pressure higher than regulated pressure $p_2 > p_3$ | Regulated pressure higher than by-pass pressure $p_3 > p_2$



Flow rate 14

By-pass pressure higher than regulated pressure $p_2 > p_3$ | Regulated pressure higher than by-pass pressure $p_3 > p_2$

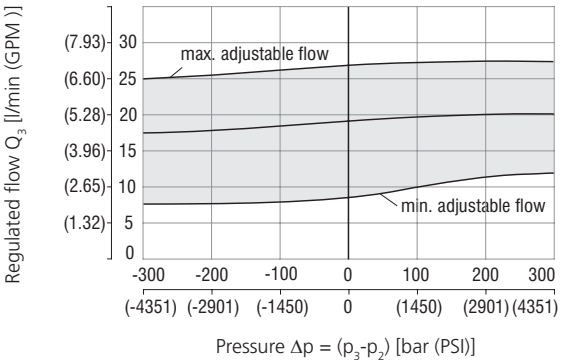


Characteristics measured at ν = 32 mm²/s (156 SUS)

Regulated flow related to input pressure
Measured at constant inlet flow Q_1 = 50 l/min (13.21 GPM)

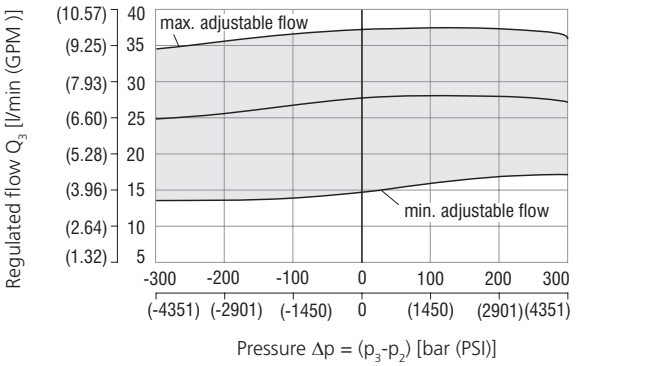
Flow rate 22

By-pass pressure higher than regulated pressure $p_2 > p_3$ | Regulated pressure higher than by-pass pressure $p_3 > p_2$



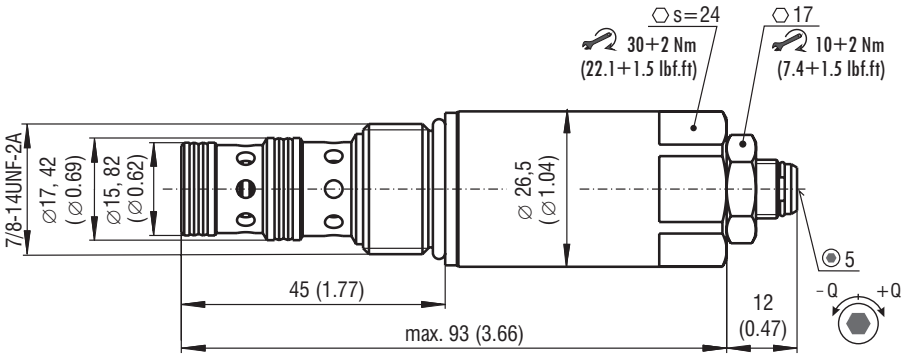
Flow rate 30

By-pass pressure higher than regulated pressure $p_2 > p_3$ | Regulated pressure higher than by-pass pressure $p_3 > p_2$

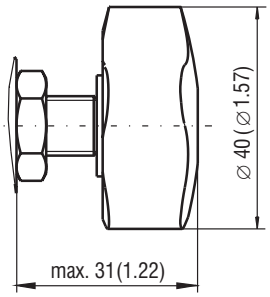


Dimensions in millimeters (inches)

Model S



Model RP



Ordering Code

SF32A-B3 / H ☐ ☐ ☐ - ☐

3-Way flow regulator, pressure compensated

Valve cavity
7/8-14 UNF (C-10-3)

Model
High performance

Flow rate

5 - 10 l/min (1.3 - 2.6 GPM)	**10**
6 - 14 l/min (1.6 - 3.7 GPM)	**14**
11 - 22 l/min (2.9 - 5.8 GPM)	**22**
17 - 30 l/min (4.5 - 7.9 GPM)	**30**

Adjustment option

S	allen key (hex. 5), without protective cap
RP	hand screw, plastic

Seals

No designation	NBR
V	FPM (Viton)

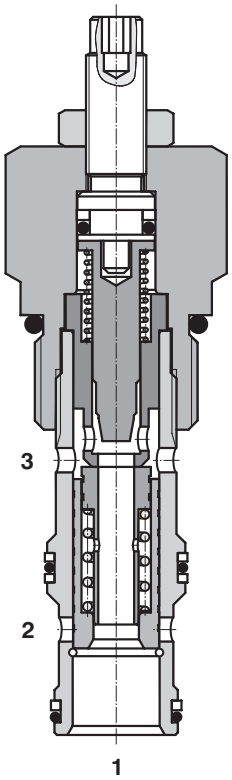
Surface treatment

A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

3-Way Flow Regulator, Pressure Compensated

SF32A-K3/I

M27x2 • Q_{max} 90 l/min (24 GPM) • p_{max} 350 bar (5100 PSI)

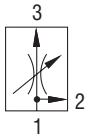


Technical Features

- By-pass flow regulator, set flow rate independent of load pressure and temperature changes
- Adjusted flow rate depends on the orifice area and adjusted differential pressure
- Hardened precision parts
- High flow capacity
- Quiet and modulated response to load changes
- Used in meter-in applications
- Wide range of flow rate options
- In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

A fixed-orifice, pressure compensated hydraulic flow regulating valve in the form of a screw-in cartridge with variable spring setting. It can be used as a priority flow regulator or a 2-way flow regulator when the by-pass port (2) is blocked.
This valve maintains a constant priority flow from port 1 to port 3 based on the adjustment, regardless of pressure changes downstream on port 3. Excessive flow is directed to port 2.

Symbol	

Technical Data

Valve size / Cartridge cavity		M27x2 / K3	
Max. inlet flow (port 1)	l/min (GPM)	90 (23.78)	
Nominal flow rates		4	6
Adjustment range	l/min (GPM)	4 - 40 (1.06 - 10.57)	6 - 60 (1.59 - 15.85)
Max. operating pressure	bar (PSI)	350 (5080)	
Fluid temperature range (NBR)	°C (°F)	-20 .... +90 (-4 ... +194)	
Mass	kg (lbs)	0.16 (0.35)	

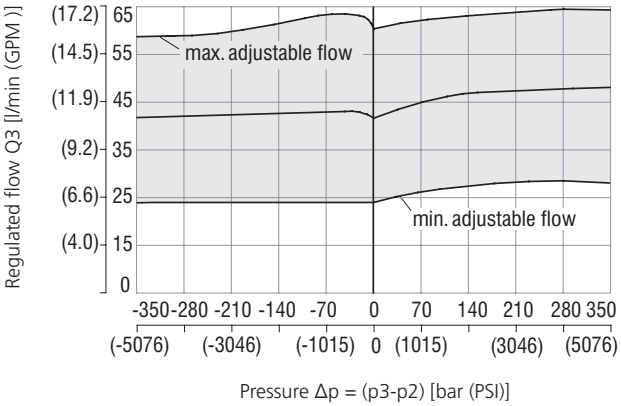
	Datasheet	Type
General information	GI_0060	Products and operating conditions
Valve bodies In-line mounted	SB_0018	SB-K3*
Cavity details	SMT_0019	SMT-K3*
Spare parts	SP_8010	

Characteristics measured at ν = 40 mm²/s (195 SUS)

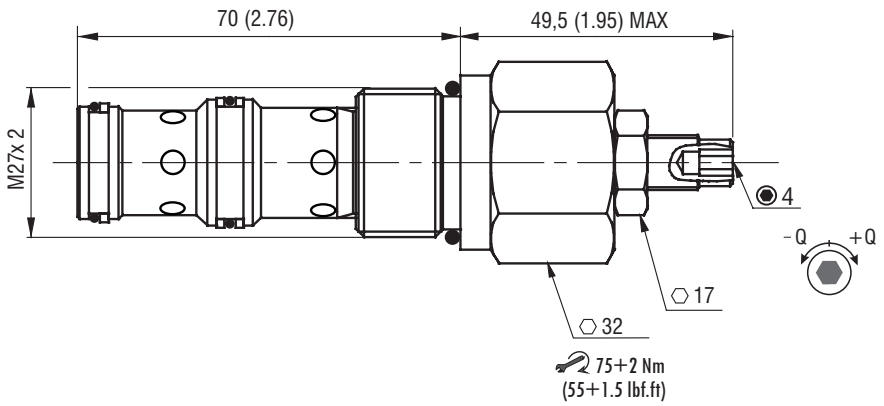
Regulated flow related to input pressure
Measured at constant inlet flow Q_1 = 50 l/min (13.21 GPM)

By-pass pressure higher than regulated pressure $p_2 > p_3$

Regulated pressure higher than by-pass pressure $p_3 > p_2$



Dimensions in millimeters (inches)



Ordering Code

SF32A-K3/I ☐ **S** ☐ - ☐

3-Way flow regulator, pressure compensated — **M27x2**

Adjustable flow range
4 - 40 l/min (1.06 - 10.57 GPM) **4**
6 - 60 l/min (1.59 - 15.85 GPM) **6**

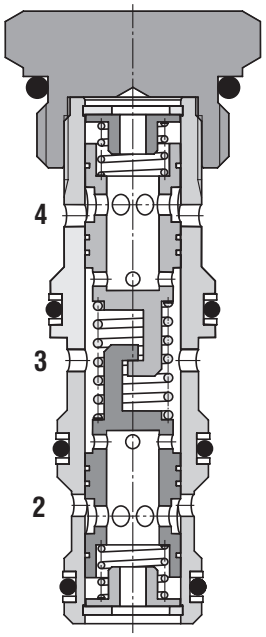
Seals
No designation NBR
V FPM (Viton)

Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240 h)

Adjustment option
allen key (hex. 4), without protective cap

SFD2F-B4/I

7/8-14 UNF • Q_{max} 40 l/min (11 GPM) • p_{max} 350 bar (5100 PSI)

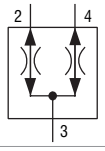


Technical Features

- Divides pump flow to operate two actuators under different load conditions
- Re-combines the return flows to synchronize actuator movement
- Division and combination of flows largely independent of the load
- Used for synchronisation controls and differential lock
- High accuracy under load and pressure imbalance
- High flow capacity
- Flow variation ± 10% with the maximum variation of pressure and inlet flow
- In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

The inlet flow passes through the two orifices in the valve housing, then through the spools and out of the radial holes in the sleeve. The matched orifices and compensating springs ensure that the flow is divided equally, excess flow in either direction causes the spool to move and close the radial holes in the sleeve until pressure balance is restored. In the reverse direction the spools shift closer together and regulate the inflow through the radial ports.

Symbol	

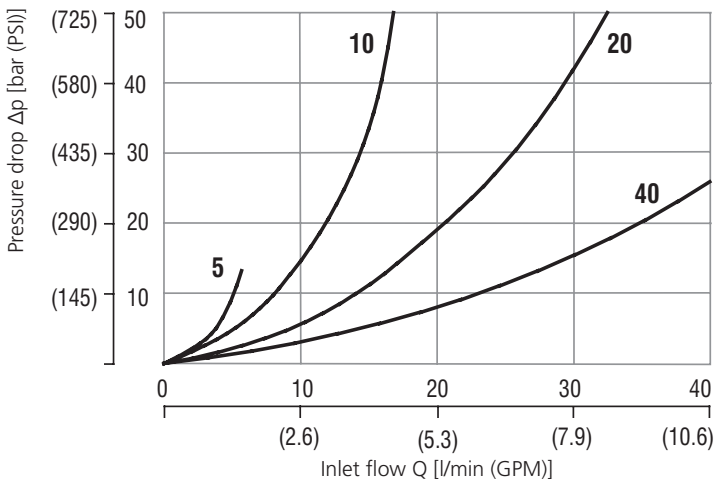
Technical Data

Valve size / Cartridge cavity		7/8-14 UNF-2A / B4
Max. flow	l/min (GPM)	40 (10.6)
Max. operating pressure	bar (PSI)	350 (5080)
Fluid temperature range (NBR)	°C (°F)	-20 .... +90 (-4 ... +194)
Division ratio	%	50 / 50 standard
Max. flow variation	%	± 10
Mass	kg (lbs)	0.10 (0.22)

		Datasheet	Type
General information		GI_0060	Products and operating conditions
Valve bodies	In-line mounted	SB_0018	SB-B4*
	Sandwich mounted	SB-04(06)_0028	SB-*B4*
Cavity details / Form tools		SMT_0019	SMT-B4*
Spare Parts		SP_8010	

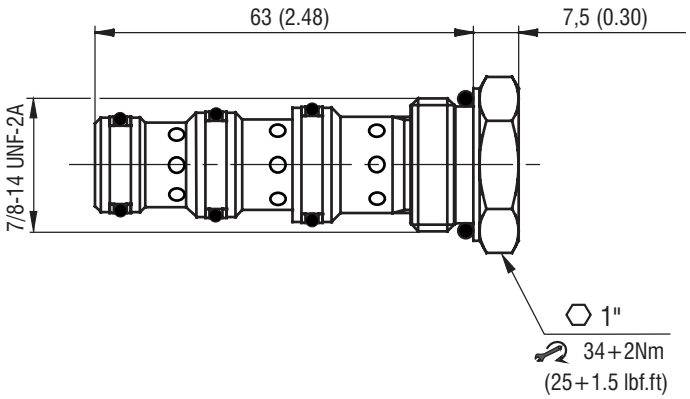
Characteristics measured at ν = 40 mm²/s (195 SUS)

Pressure drop related to inlet flow rate



Notice: When used in cylinders select the size to suite the return flow rate.
Blocking one leg will result in a large reduction in flow from the other. Valves with higher working pressures are available.
Contact the main office for details.

Dimensions in millimeters (inches)



Ordering Code

SFD2F-B4 / l □ □ - □

Flow divider - combiner valve
7/8-14 UNF

Flow rate (inlet flow)

2 - 5 l/min	(0.5 -1.3 GPM)	**5**
3.3 - 10 l/min	(0.9 - 2.6 GPM)	**10**
7 - 20 l/min	(1.9 - 5.3 GPM)	**20**
15 - 40 l/min	(4.0 - 10.6 GPM)	**40**

Seals

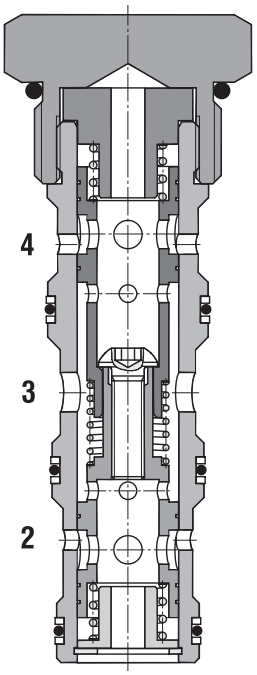
No designation	NBR
V	FPM (Viton)

Surface treatment

A	zinc-coated (ZnCr-3), ISO 9227 (240 h)

SFD2F-D4/I

1-5/16-12 UN • Q_{max} 150 l/min (40 GPM) • p_{max} 350 bar (5100 PSI)

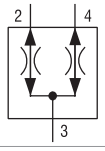


Technical Features

- Divides pump flow to operate two actuators under different load conditions
- Re-combines the return flows to synchronize actuator movement
- Division and combination of flows largely independent of the load
- Used for synchronisation controls and differential lock
- High accuracy under load and pressure imbalance
- High flow capacity
- Flow variation ± 10% with the maximum variation of pressure and inlet flow
- In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

The inlet flow passes through the two orifices in the valve housing, then through the spools and out of the radial holes in the sleeve. The matched orifices and compensating springs ensure that the flow is divided equally, excess flow in either direction causes the spool to move and close the radial holes in the sleeve until pressure balance is restored. In the reverse direction the spools shift closer together and regulate the inflow through the radial ports.

Symbol	

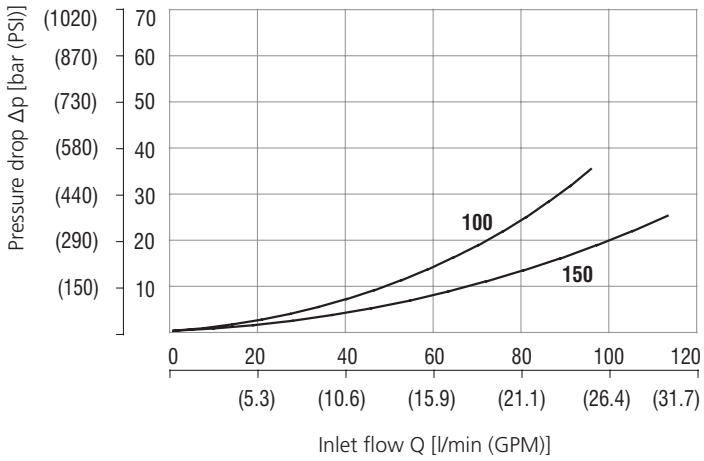
Technical Data

Valve size / Cartridge cavity		1-5/16-12 UN-2A / D4
Max. flow	l/min (GPM)	150 (39.6)
Max. operating pressure	bar (PSI)	350 (5080)
Fluid temperature range (NBR)	°C (°F)	-20 .... +90 (-4 ... +194)
Division ratio	%	50 / 50 standard
Max. flow variation	%	± 10
Mass	kg (lbs)	0.36 (0.79)

		Datasheet	Type
General information		GI_0060	Products and operating conditions
Valve bodies	In-line mounted	SB_0018	SB-D4*
Cavity details		SMT_0019	SMT-D4*
Spare parts		SP_8010	

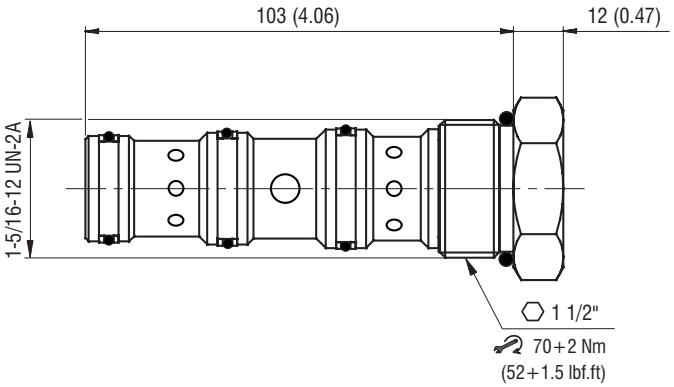
Characteristics measured at ν = 40 mm²/s (195 SUS)

Pressure drop related to inlet flow rate



Notice: When used in cylinders select the size to suite the return flow rate. Blocking one leg will result in a large reduction in flow from the other. Valves with higher working pressures are available. Contact the main office for details.

Dimensions in millimeters (inches)



Ordering Code

SFD2F-D4 / I ☐ ☐ - ☐

Flow divider - combiner valve
1-5/16-12 UNF

Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240 h)

Flow rate (inlet flow)

33 - 100 l/min	(8.7 -26.4 GPM)	**100**
50 - 150 l/min	(13.2 - 39.6 GPM)	**150**

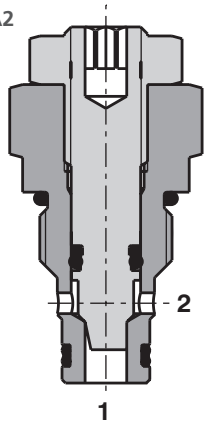
Seals

No designation	NBR
V	FPM (Viton)

ST2(C)1A-A2

3/4-16 UNF • Q_{max} 20 l/min (5 GPM) • p_{max} 320 bar (4600 PSI)

ST21A-A2



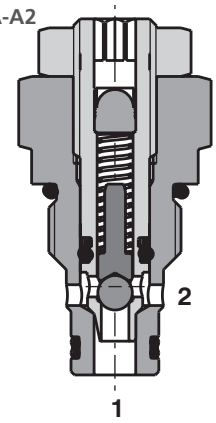
Technical Features

- Reverse flow check option
- Hardened precision parts
- Fine low-torque adjustment
- Linear adjustment and positive seat overlap
- Optionally adjustable by allen key or hand screw
- Desired settings may be locked down
- In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

A hydraulic flow restrictor valve in the form of a screw-in cartridge with an optional by-pass check valve.
After loosening the lock nut the valve may be unscrewed up to the red marked safety notch.
NOTICE:
Beyond the marking, the valve may get completely unscrewed, leading to leakage.

ST2C1A-A2



Model Code	ST21A-A2	ST2C1A-A2
Symbol		

Technical Data

Valve size / Cartridge cavity		3/4-16 UNF-2A / A2 (C-8-2)
Max. flow	l/min (GPM)	20 (5.3)
Max. operating pressure	bar (PSI)	320 (4600)
Fluid temperature range (NBR)	°C (°F)	-30 ...+100 (-22 ...+212)
Mass	kg (lbs)	0.2 (0.44)

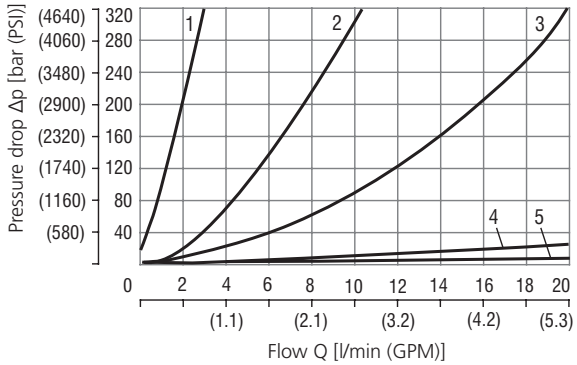
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Valve bodies	In-line mounted	SB_0018	SB-A2*
	Sandwich mounted	SB-04(06)_0028	SB-*A2*
Cavity details / Form tools		SMT_0019	SMT-A2*
Spare parts		SP_8010	

Characteristics measured at ν = 32 mm²/s (156 SUS)

Pressure drop related to flow rate

Flow direction 2→1

ST21A-A2/L20*, ST2C1A-A2/L20*

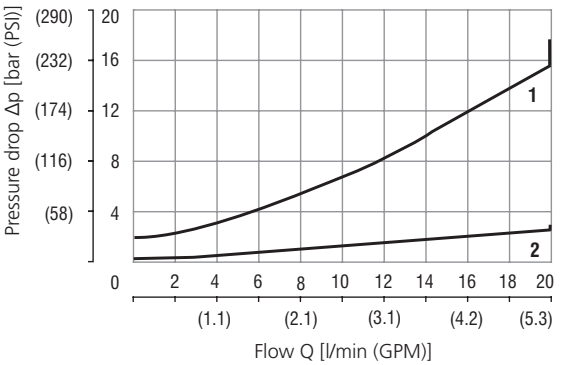


Number of turns of the adjustment screw				
1	2	3	4	5

Check valve pressure drop related to flow rate

Flow direction 1→2

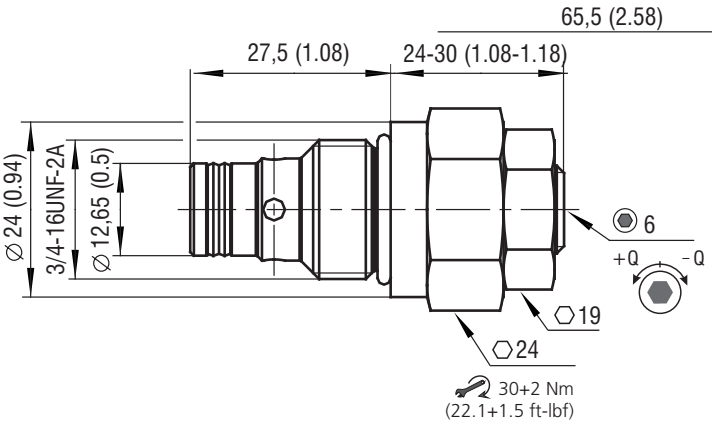
ST2C1A-A2/L20*



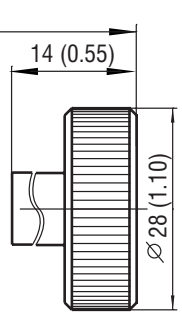
Trottle valve closed	Trottle valve opened
1	2

Dimensions in millimeters (inches)

Model S



Model RS



Ordering Code

ST2 [ ] - A2 / L 20 [ ] [ ] - [ ]

Needle - restrictor valve

without reverse flow check **1A**
with reverse flow check (by-pass check valve) **C1A**

Valve cavity
3/4-16 UNF-2A (C-8-2)

Version
Lightline

Flow rate
20 lpm (5 GPM)

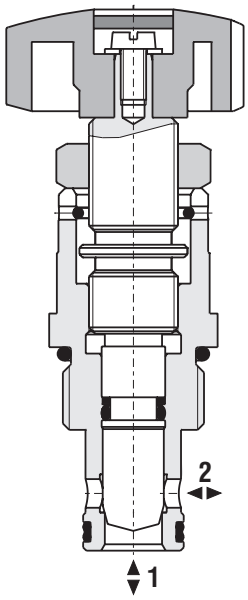
Adjustment option
S allen key (hex. 6), without protective cap
RS hand screw, metal

Seals
No designation NBR
V FPM (Viton)

Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240h)
B zinc-coated (ZnNi), ISO 9227 (520h)

ST21A-B2

7/8-14 UNF • Q_{max} 140 l/min (37 GPM) • p_{max} 350 bar (5100 PSI)



Technical Features

› Hardened precision parts
› Fine low-torque adjustment
› Linear adjustment and positive seat overlap
› Optionally adjustable by hand screw
› Desired settings may be locked down
› In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

A hydraulic flow restrictor valve in the form of a screw-in cartridge. The valve restricts flow in both directions, making it ideal for fine control of an uncompensated system or for use as a shut-off valve.

Model Code	ST21A-B2
Symbol	

Technical Data

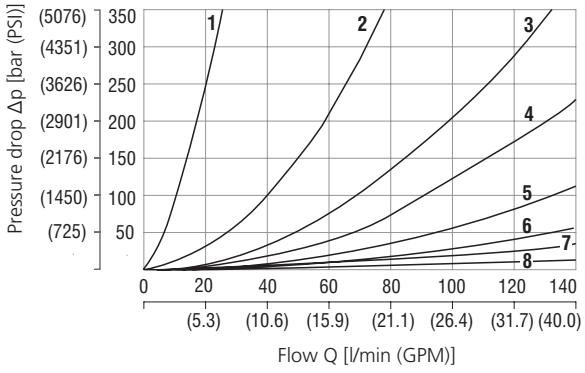
Valve size / Cartridge cavity		7/8-14 UNF-2A / B2 (C-10-2)
Max. flow	l/min (GPM)	140 (37)
Max. operating pressure	bar (PSI)	350 (5076)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Weight	kg (lbs)	0.3 (0.66)

		Datasheet	Type
General information		GI_0060	Products and operating conditions
Valve bodies	In-line mounted	SB_0018	SB-B2*
	Sandwich mounted	SB-04(06)_0028	SB-*B2*
Cavity details / Form tools		SMT_0019	SMT-B2*
Spare parts		SP_8010	

Characteristics measured at ν = 32 mm²/s (156 SUS)

Pressure drop related to flow rate

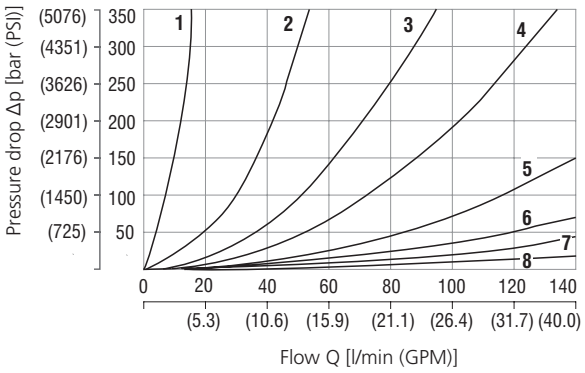
Flow direction 1 - 2



Number of half turns (180°) of the adjust. screw							
1	2	3	4	5	6	7	8

Pressure drop related to flow rate

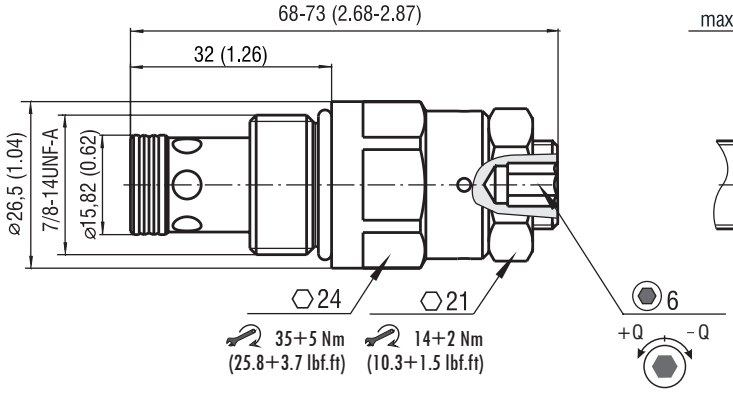
Flow direction 2 - 1



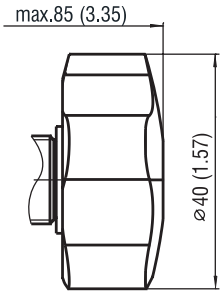
Number of half turns (180°) of the adjust. screw							
1	2	3	4	5	6	7	8

Dimensions in millimeters (inches)

Model S



Model RP



Ordering Code

ST21A-B2 / H 140 □ □ - □

Needle - restrictor valves

Valve cavity
7/8-14 UNF (C-10-2)

Version
High performance

Flow rate
140 l/min (37 GPM) **140**

Adjustment option
S allen key (hex. 6), without protective cap
RP hand screw, plastic

Seals
No designation NBR
V FPM (Viton)

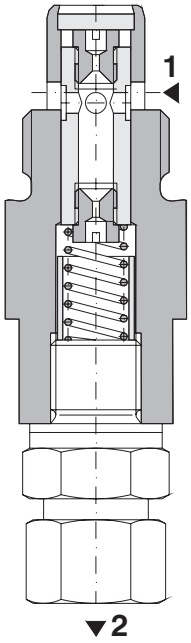
Surface treatment
A zinc-coated (ZnCr-3), ISO 9227 (240h)
B zinc-coated (ZnNi), ISO 9227 (520h)

2-Way Flow Regulator, Pressure Compensated, Not Adjustable

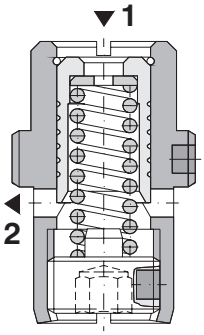
VSK

M18 x 1.5 / M22 x 1.5 / G 3/8 • Q_{max} 15 l/min (4 GPM) • p_{max} 320 bar (4600 PSI)

VSK4



VSK2



Technical Features

- Set flow rate independent of load pressure and temperature changes
- Adjusted flow rate depends on the orifice area
- Hardened precision parts
- Quiet and modulated response to load changes
- Used in meter-in, meter out, or bleed-off applications
- Two design models for in-block installation
- Wide selection of throttling orifices
- The housing of the VSK2 valve is withouth surface treatment, the VSK4 housing is phosphated. All the other parts are zinc-coated.

Functional Description

The pressure compensated flow control valves VSK are designed to control flow rates independently of pressure and temperature, especially in systems where only small movements due to load changes are required. The flow rate stabilization is provided by a pressure compensator in the direction from 1 to 2.
In the direction 2 - 1, the valve works as an ordinary throttle valve without pressure compensation.
The set flow rate is constant and depends on the orifice area – see the respective characteristics.

Symbol

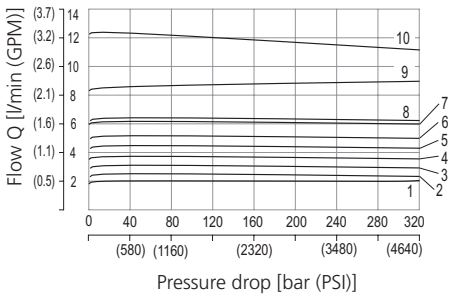
Technical Data

Valve type		VSK2	VSK4
Valve size		M18 x 1.5 or G 3/8	M22 x 1.5
Max. flow	l/min (GPM)	15 (3.96)	11.5 (3.04)
Max. operating pressure	bar (PSI)	320 (4640)	
Fluid temperature range	°C (°F)	-30 ... +120 (-22 ... +248)	
Weight	kg (lbs)	0.025 (0.055)	0.200 (0.44)
	Datasheet	Type	
General information	GI_0060	Products and operating conditions	
Spare parts	SP_8010		

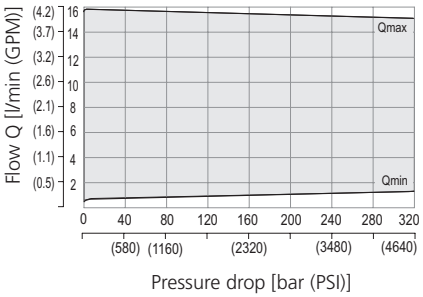
Characteristics measured at ν = 32 mm²/s (156 SUS)

Regulated flow as a function of valve pressure drop for individual orifice diameters

Flow direction 1 - 2 (regulated flow) VSK4

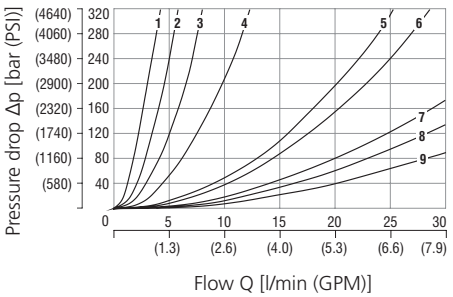


Flow direction 1 - 2 (regulated flow) VSK2



Pressure drop related to flow rate

Flow direction 2 - 1
(throttling without compensation)
VSK4 (orifice diameter (mm/100))



1 → 2										
VSK4	Orifice diameter (mm/100)									
No.	1	2	3	4	5	6	7	8	9	10
∅ orifice	100	110	120	130	140	150	160	180	200	250

The flow through VSK-2 valve can be set in the marked area according to selected combination of orifice diameter and set pressure drop of the valve by preloaded spring of compensator spool. (It is impossible to change a position of adjusting screw after mechanical securing.) The flow range for individual orifice diameters – see table on the 2nd page.

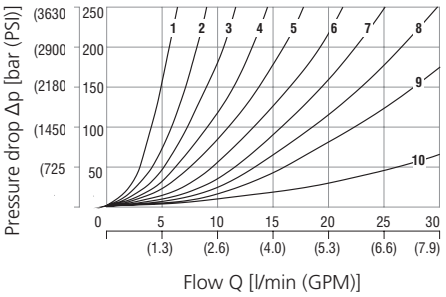
2 → 1	Orifice diameter (mm/100)				
No.	1	2	3	4	5
∅ orifice	55	80	100	120	160
No.	6	7	8	9	
∅ orifice	180	210	230	260	

Characteristics measured at ν = 32 mm²/s (156 SUS)

Pressure drop related to flow rate

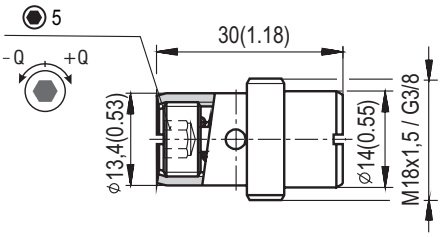
Flow direction 2 - 1 (throttling without compensation)
VSK2 (orifice diameter (mm/100))

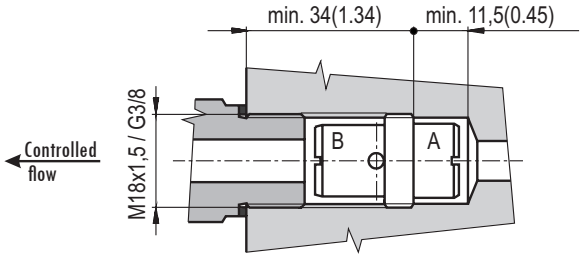
2 → 1	Orifice diameter (mm/100)				
No.	1	2	3	4	5
⌀ orifice	100	110	120	130	140
No.	6	7	8	9	10
⌀ orifice	150	160	180	200	250



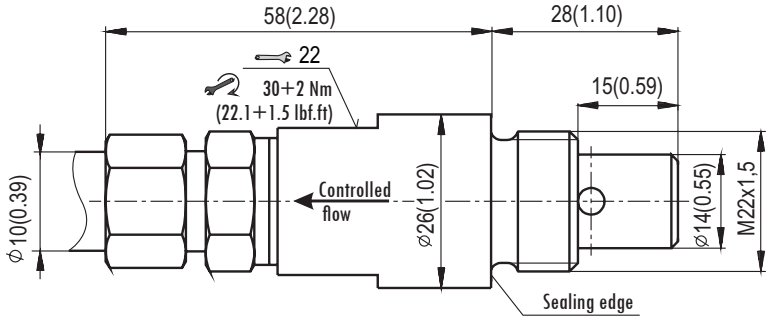
Dimensions in millimeters (inches)

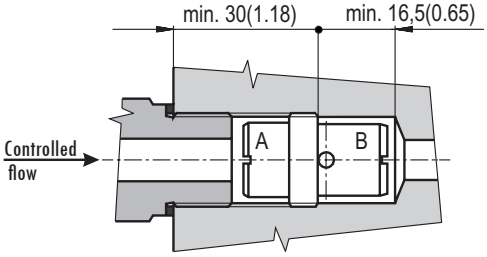
VSK2-M2-x





VSK4-M4-x





Approximate Flow Rates Corresponding to Orifice Diameter

VSK2		VSK4	
Orifice diameter [mm/100]	Flow range l/min (GPM) at 32 bar (464 PSI) adjusted to customer spec. at manufacturer	Orifice diameter [mm/100]	Flow range l/min (GPM) at input presure 32 bar (464 PSI)
55	0.3 - 0.6 (0.08 - 0.16)	100	2.1 (0.56)
80	1.4 - 1.7 (0.37 - 0.45)	110	2.4 (0.63)
100	1.8 - 2.4 (0.48 - 0.63)	120	3.0 (0.79)
120	3.1 - 4.0 (0.82 - 1.06)	130	3.8 (1.01)
160	5.5 - 6.5 (1.46 - 1.72)	140	4.3 (1.14)
180	5.6 - 7.1 (1.48 - 1.88)	150	4.9 (1.30)
210	8.5 - 10.8 (2.25 - 2.86)	160	6.3 (1.67)
230	10.7 - 13.3 (2.83 - 3.52)	180	6.6 (1.75)
260	12.0 - 16.4 (3.17 - 4.34)	200	8.7 (2.30)
		250	12.5 (3.31)

Ordering Code

VSK ☐ - ☐ - ☐ - ☐

2-Way flow regulator, pressure compensated, not adjustable

Model

screw-in cartridge	**2**
pipe mounted / screw-in cartridge	**4**

Connection threads

metric thread	(M18 x 1.5 for VSK2)	**M2**
metric thread	(M22 x 1.5 for VSK4)	**M4**
pipe thread	(G 3/8 only for VSK2)	**G4**

Surface treatment

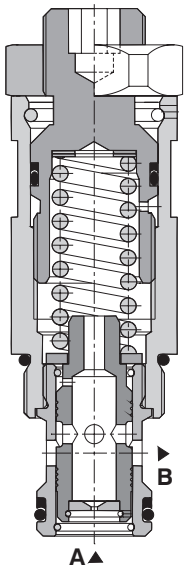
No designation	VSK2 housing without surface treatment VSK4 housing is phosphated steel parts zinc-coated (ZnCr-3), ISO 9227 (240 h)
A*	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B*	zinc-coated (ZnNi), ISO 9227 (520 h)

*only for VSK4

VSK2	055	080	100	-	120	-	-	-	160	180	-	210	230	-	260
VSK4	-	-	100	110	120	130	140	150	160	180	200	-	-	250	-

VSS3-062/S

M22 x 1.5 • Q_{max} 40 l/min (11 GPM) • p_{max} 320 bar (4600 PSI)

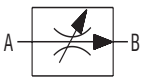


Technical Features

- Set flow rate independent of load pressure and temperature changes
- Adjusted flow rate depends on the orifice area and set differential pressure
- Hardened precision parts
- High flow capacity
- Quiet and modulated response to load changes
- Used in meter-in, meter out, or bleed-off applications
- Wide range of flow rate options
- Adjustable by allen key or hand screw
- In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

This pressure compensated, hydraulic flow regulator in the form of a screw-in cartridge with fixed orifice and variable spring setting is designed to control flow rates independently of pressure and temperature, especially in systems where only small movements due to load changes are required. The flow rate stabilization is provided by a pressure compensator in the direction from A to B. The valve will maintain the set flow regardless of pressure variations on the regulated or inlet port.
In flow direction B - A, the valve works as an ordinary throttle valve without pressure compensation. The regulated flow increases with clockwise rotation of the adjustment screw and descreases with counter-clockwise rotation. The desired settings can be locked down.
The valve will maintain the set flow regardless of pressure variations on the regulated or inlet port.

Symbol	

Technical Data

Valve size / Cartridge cavity		M22x1.5 / QG2						
Nominal flow rates	l/min	1.6	2.5	4	6.3	10	16	20
	(GPM)	(0.4)	(0.7)	(1.1)	(1.7)	(2.6)	(4.2)	(5.3)
Max. operating pressure	bar (PSI)	320 (4640)						
Fluid temperature range (NBR)	°C (°F)	-30 ... +80 (-22 ... +176)						
Fluid temperature range (FPM)	°C (°F)	-20 ... +80 (-4 ... +176)						
Mass	kg (lbs)	0.19 (0.42)						

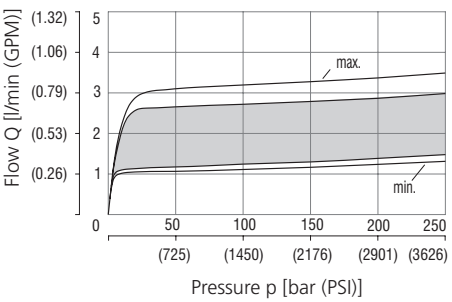
		Datasheet	Type
General information		GI_0060	Products and operating conditions
Valve bodies	In-line mounted	SB_0018	SB-QG2-*
	Sandwich mounted	SB-04(06)_0028	SB-*QG2*
Cavity details / Form tools		SMT_0019	SMT-QG2*
Spare parts		SP_8010	

Characteristics measured at ν = 32 mm²/s (156 SUS)

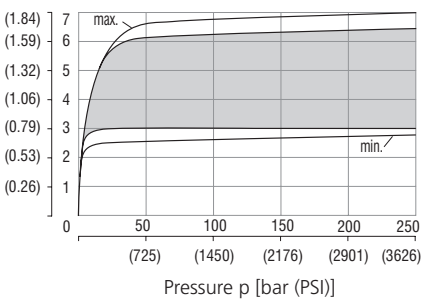
Regulated flow related to input pressure

Flow direction A - B (regulated flow)

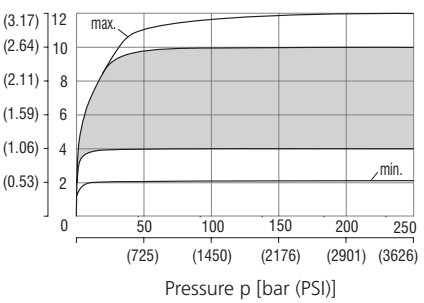
Flow rate 1.6



Flow rate 2.5



Flow rate 4

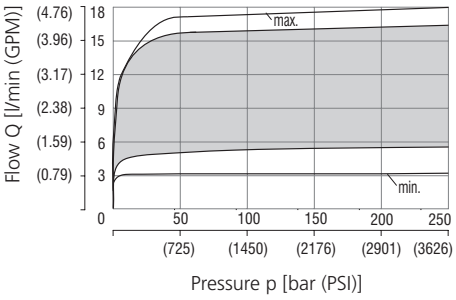


Characteristics measured at ν = 32 mm²/s (156 SUS)

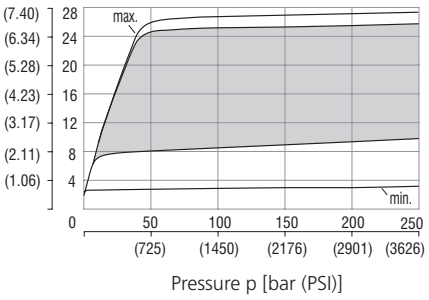
Regulated flow related to input pressure

Flow direction A - B (regulated flow)

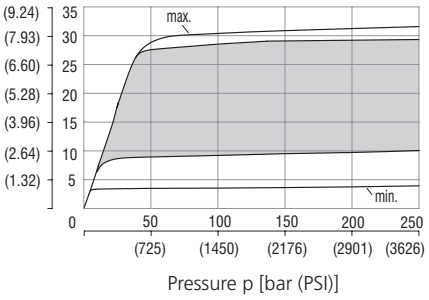
Flow rate 6.3



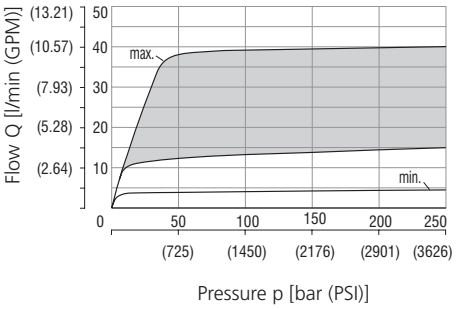
Flow rate 10



Flow rate 16

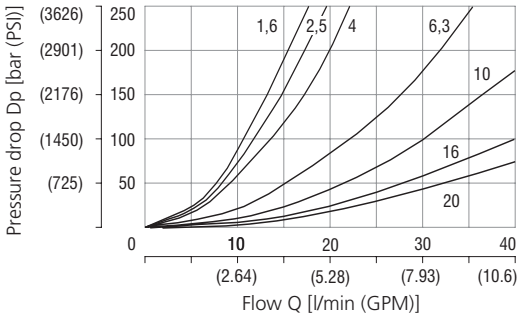


Flow rate 20



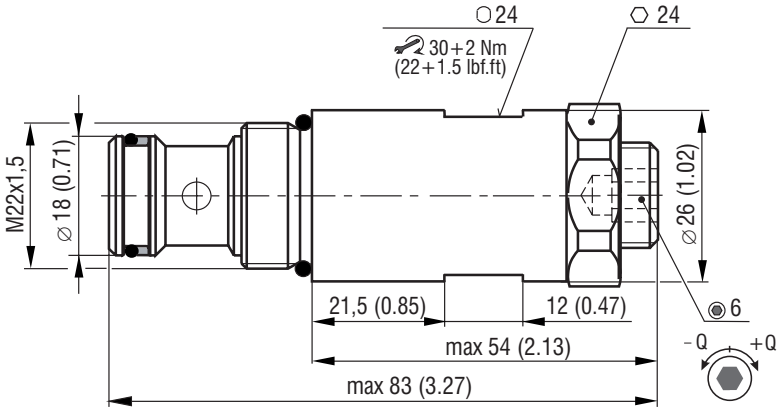
Pressure drop related to flow rate

Flow direction B - A
(throttling without compensation)

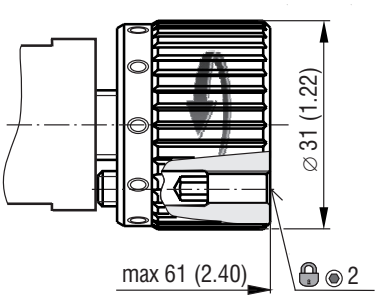


Dimensions in millimeters (inches)

Model S



Model RS



Ordering Code

VSS3-062/S- ☐ ☐ ☐ - ☐

2-Way flow regulator, pressure compensated
M22x1.5

Model
screw-in cartridge

Flow rate

1.4 - 2.7 l/min	(0.4 - 0.7 GPM)	**1.6**
3 - 6 l/min	(0.8 - 1.6 GPM)	**2.5**
4 - 10 l/min	(1.1 - 2.6 GPM)	**4**
5 - 16 l/min	(1.3 - 4.2 GPM)	**6.3**
8 - 25 l/min	(2.1 - 6.6 GPM)	**10**
9 - 28 l/min	(2.4 - 7.4 GPM)	**16**
12 - 40 l/min	(3.2 - 10.6 GPM)	**20**

Adjustment option

S	allen key (hex. 6), without protective cap
RS	hand screw, metal-short

Seals

No designation	NBR
V	FPM (Viton)

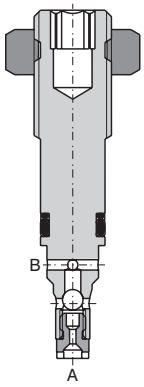
Surface treatment

A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

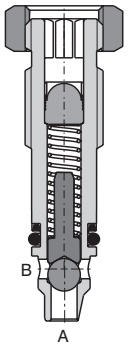
VSV2

M12x1 • Q_{max} 20 l/min (5 GPM) • p_{max} 320 bar (4600 PSI)

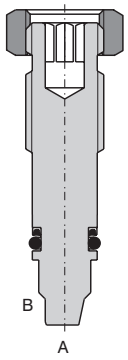
VSV2-QC2/J2



VSV2-QC2/J1



VSV2-QC2/1

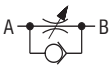


Technical Features

- Reverse flow check option
- Hardened precision parts
- Fine low-torque adjustment
- Linear adjustment and positive seat overlap
- Optionally adjustable by allen key or hand screw
- Desired settings may be locked down
- In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227

Functional Description

A hydraulic flow restrictor valve in the form of a screw-in cartridge with an optional by-pass check valve. After loosening the lock nut the valve may be unscrewed up to the red marked safety notch. Beyond the marking, the valve may get completely unscrewed, leading to leakage.

Model Code	VSV2-QC2/1	VSV2-QC2/J1	VSV2-QC2/J2
Symbol			

Technical Data

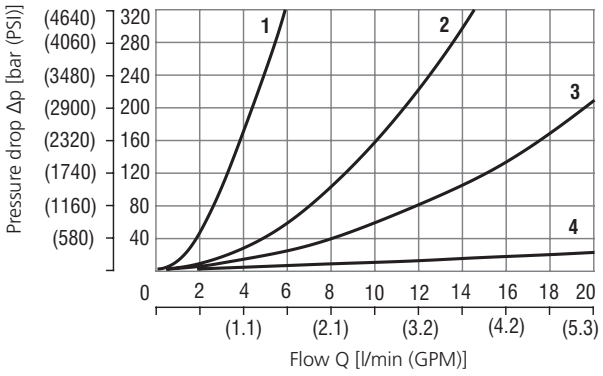
Valve size / Cartridge cavity		M12x1 / QC2
Max. flow	l/min (GPM)	20 (5.3)
Max. operating pressure	bar (PSI)	320 (4640)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Mass	kg (lbs)	0.11 (0.24)

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Cavity details	SMT_0019	SMT-QC2*
Spare parts	SP_8010	

Characteristics measured at ν = 32 mm²/s (156 SUS)

Pressure drop related to flow rate

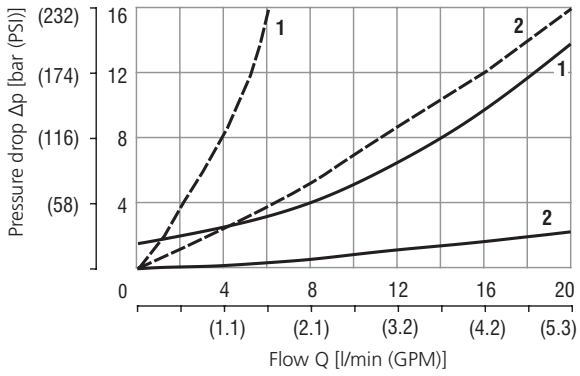
Flow direction B→A VSV2-QC2/1, VSV2-QC2/J1
Flow direction A→B VSV2-QC2/1, VSV2-QC2/J2



Number of turns of the adjustment screw			
1	2	3	4

Pressure drop related to flow rate

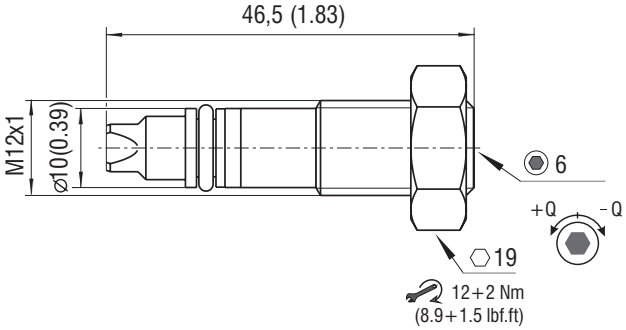
Flow direction A→B (free flow) VSV2-QC2/J1
Flow direction B→A VSV2-QC2/J2



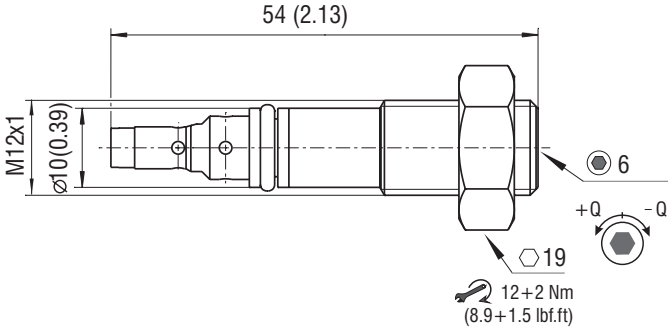
Throttle valve closed	Throttle valve opened
1	2

Dimensions in millimeters (inches)

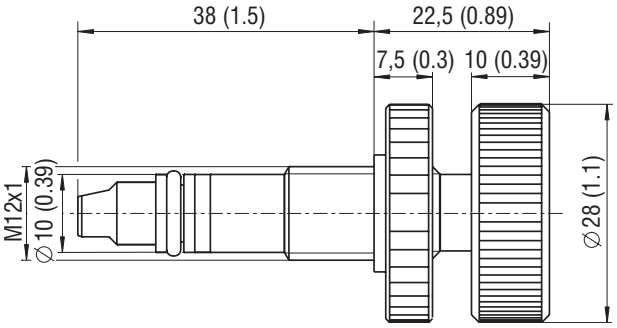
Models S: VSV2-QC2/1, VSV2-QC2/J1



Model S: VSV2-QC2/J2



Model RS: VSV2-QC2/1, VSV2-QC2/J1, VSV2-QC2/J2



Ordering Code

VSV2 - QC2 / □ □ □ - □

Needle - restrictor valve with reverse flow check, fine adjustable — **M12x1**

Model

without check valve	**1**
with check valve, unregulated flow A → B	**J1**
with check valve, unregulated flow B → A	**J2**

Seals

No designation	NBR

Surface treatment

No designation	without surface treatment
A	zinc-coated (ZnCr-3), ISO 9227 (240h)
B	zinc-coated (ZnNi), ISO 9227 (520h)

Adjustment option

S	allen key (hex. 6), without protective cap
RS	hand screw, metal

2VS3-06

Size 06 (D03) • Q_{max} 80 l/min (21 GPM) • p_{max} 320 bar (4600 PSI)

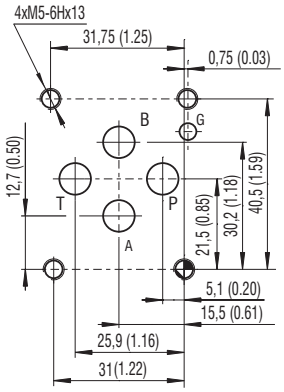
Technical Features

- Restrictor valve with reverse flow check, mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- Meter-in or meter-out flow control
- Leak-free closing in one or two service ports
- Linear adjustment and positive seat overlap
- Desired settings may be locked down
- Optionally adjustable by allen key with protective cap, or by hand screw
- In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227 and the valve body is phosphated

Functional Description

Dual hydraulic flow restrictor valves with an optional by-pass check valve are used to control flow rates in two separate lines (A, B) of a hydraulic circuit. The modular design provides six functional versions. The valve restricts the fluid flow in one direction while providing free reverse flow in the opposite direction. The throttle is adjusted by a set screw, which can be operated by a key, a hand screw, or a hand screw with key lock.
The sandwich design supports stacking with other components of the same size.
The separate O-ring plate provides sealing of the valve on a connecting surface. Depending on the valve installation it functions as a meter-in or meter-out flow control device. Changing the valve from meter-in to meter-out mode can be done by turning the valve by 180° around its horizontal. The orientation of the throttle check valve(s) in the valve body corresponds with the symbol on the nameplate.

ISO 4401-03-02-0-05



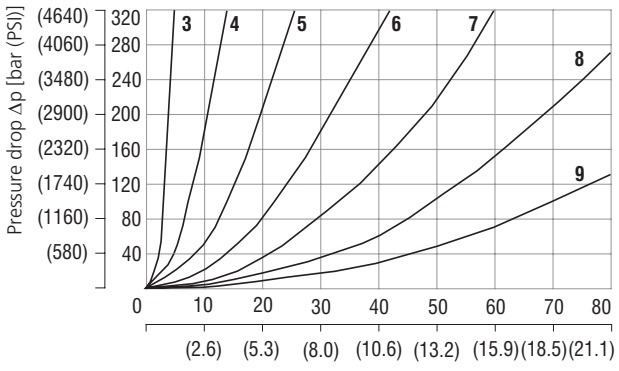
Ports P, A, B, T - max ∅ 7.5 mm (0.29 in)

Technical Data

Valve size		06 (D03)
Max. flow	l/min (GPM)	80 (21.1)
Max. operating pressure	bar (PSI)	320 (4640)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... 212)
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... 248)
Weight	kg (lbs)	1.2 (2.65)
	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface	SMT_0019	Size 06
Spare parts	SP_8010	

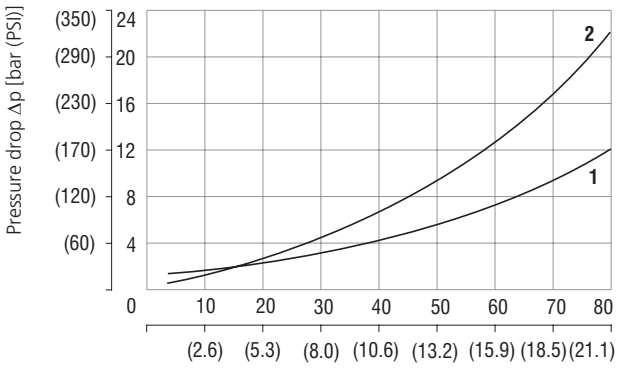
Characteristics measured at ν = 32 mm²/s (156 SUS)

Pressure drop related to flow rate



Number of turns of the adjustment screw						
3	4	5	6	7	8	9

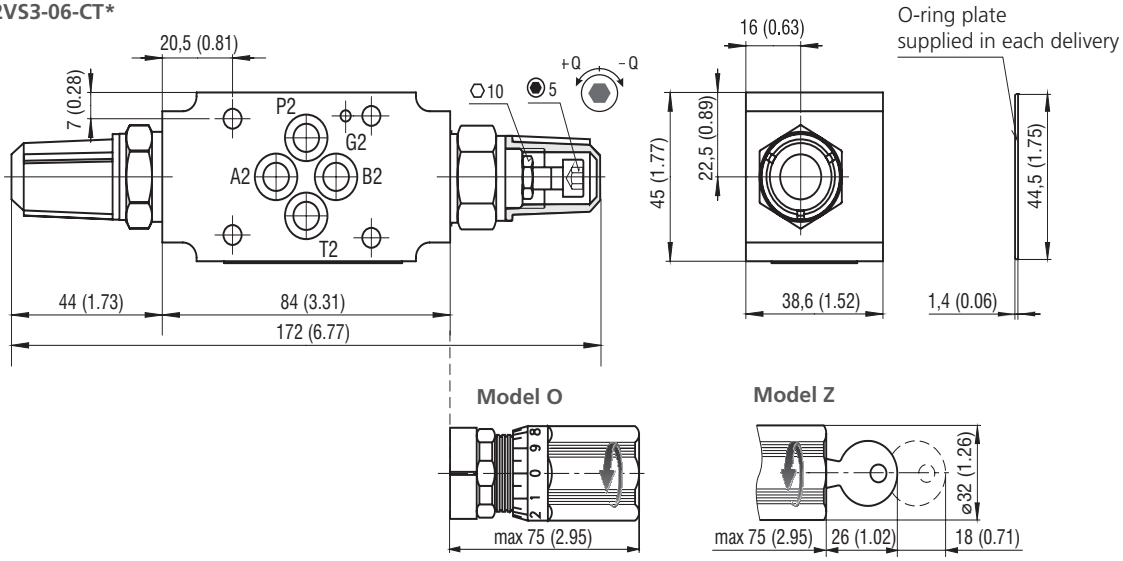
Check valve pressure drop related to flow rate



Throttle valve closed	Throttle fully open
1	2

Dimensions in millimeters (inches)

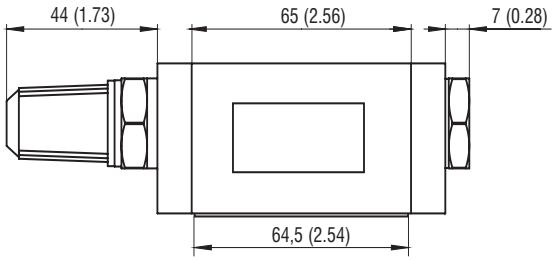
Model 2VS3-06-CT*



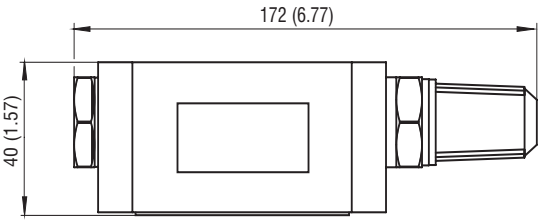
Model O

Model Z

Model 2VS3-06-AT*

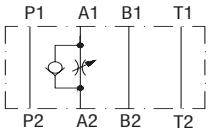


Model 2VS3-06-BT*

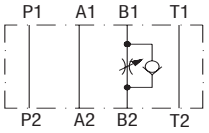


Functional Symbols

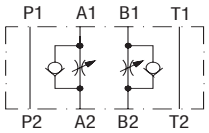
A



B



C



Notice: The orientation of the symbol on the name plate corresponds with the valve function.
With the separate O-ring plate the valve body may be mounted 180° rotated, which changes the valve function from meter-in to meter-out.

Ordering Code

2VS3 - 06 - ☐ ☐ ☐ - ☐

Restrictor valve with reverse flow check, modular

Valve size

Functional symbols
check valve in line A, meter-in* — **A**
check valve in line B, meter-in* — **B**
check valve in line A and B, meter-in* — **C**

Seals
No designation NBR
V FPM (Viton)

Adjustment option
T allen key (hex. 5), with protective cap
O non-lockable cylindrical hand screw
Z lockable cylindrical hand screw

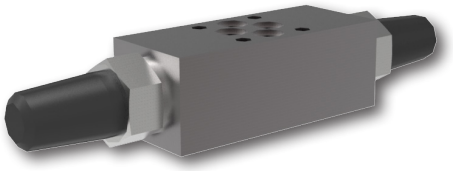
Surface treatment
No designation standard
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

*see table of functional symbols

Changing the valve's function from meter-in to meter-out is accomplished by mounting the valve rotated 180° around its horizontal axis.

VSO1-04/M

Size 04 (D02) • Q_{max} 25 l/min (7 GPM) • p_{max} 320 bar (4600 PSI)



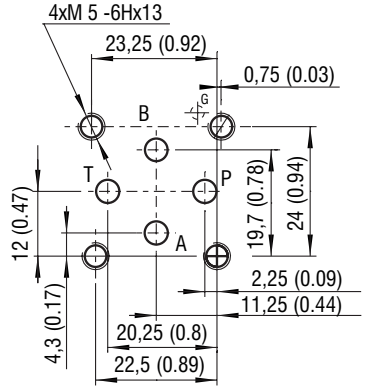
Technical Features

- Restrictor valve with reverse flow check, mounting interface acc. to ISO 4401, DIN 24340 (CETOP 02)
- Meter-in or meter-out flow control
- Leak-free closing in one or two service ports
- Linear adjustment and positive seat overlap
- Desired settings may be locked down
- Optionally adjustable by allen key, with protective cap
- In the standard version, the valve is zinc-coated for 240 h protection acc. to ISO 9227 and the valve body is phosphated

Functional Description

Dual hydraulic flow restrictor valves with optional by-pass check valves are used to control flow rates in two separate lines (A, B) of a hydraulic circuit. The modular design provides six functional versions. The valve restricts the fluid flow in one direction while providing unobstructed reverse flow in the opposite direction. The throttling is adjusted by a key. The sandwich design supports stacking with other components of the same size. Depending on the valve installation it functions as a meter-in or meter-out flow control device. The orientation of the check valve(s) in the valve body corresponds with the symbol on the nameplate.

ISO 4401-02-01-0-05



Ports P, A, B, T - max. ∅ 4.5 mm (0.18 in)

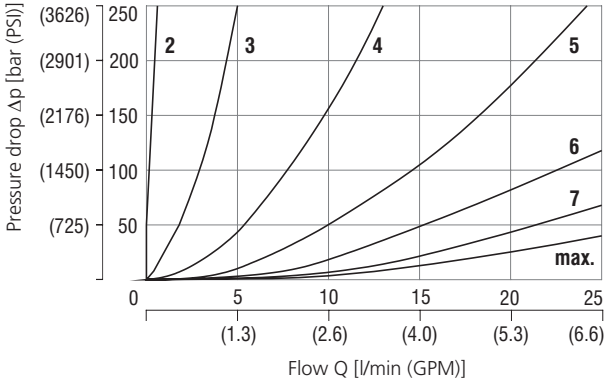
Technical Data

Valve size		04 (D02)
Max. flow	l/min (GPM)	25 (6.6)
Max. operating pressure	bar (PSI)	320 (4640)
Fluid temperature range (NBR)	°C (°F)	-30 .... +100 (-22 ... +212)
Fluid temperature range (FPM)	°C (°F)	-20 .... +120 (-4 ... +248)
Mass	kg (lbs)	0.8 (1.76)

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

Characteristics measured at ν = 32 mm²/s (156 SUS)

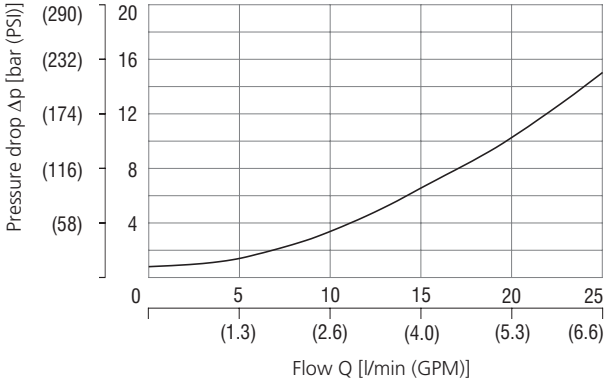
Pressure drop related to flow rate



Number of turns of the adjustment screw						
2	3	4	5	6	7	max.

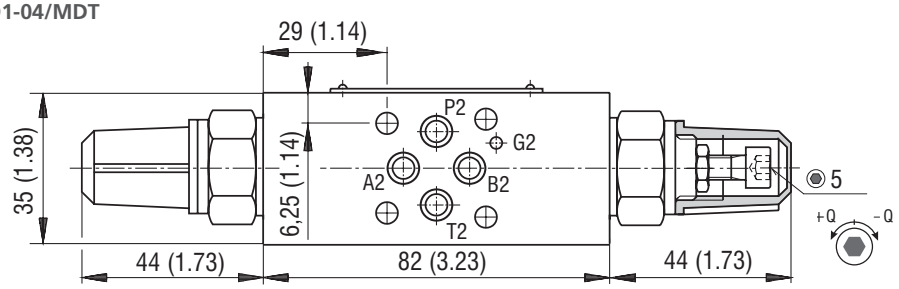
Check valve pressure drop related to flow rate

Throttle valve closed

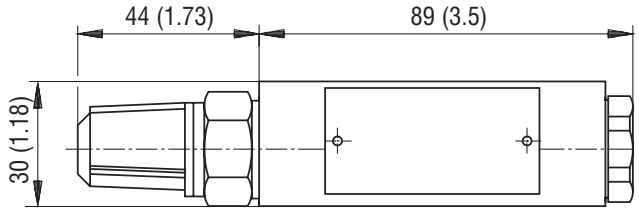


Dimensions in millimeters (inches)

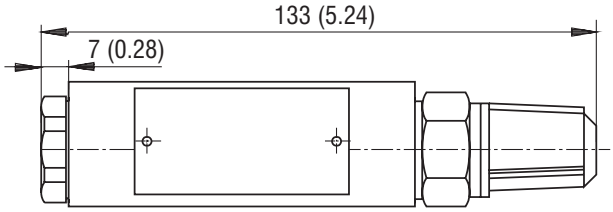
Model
VSO1-04/MCT
VSO1-04/MDT



Model
VSO1-04/MAT
VSO1-04/MET

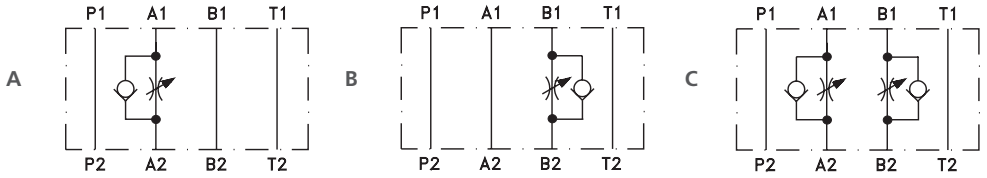


Model
VSO1-04/MBT
VSO1-04/MFT

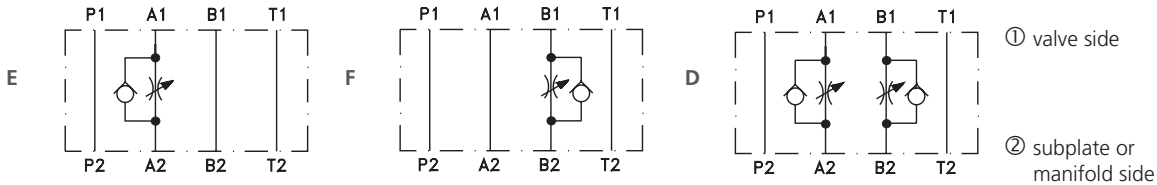


Functional Symbols

Meter-in control



Meter-out control



Notice: The orientation of the symbol on the name plate corresponds with the valve function.

Ordering Code

VSO1 - 04 / M [ ] [ ] [ ] - [ ]

Restrictor valve with reverse flow check

Valve size

Modular, sandwich plate

Functional symbols

check valve in line A, meter-in*	**A**
check valve in line B, meter-in*	**B**
check valve in line A and B, meter-in*	**C**
check valve in line A, meter-out*	**E**
check valve in line B, meter-out*	**F**
check valve in line A and B, meter-out*	**D**

*see table of functional symbols

Seals

No designation	NBR
V	FPM (Viton)

Adjustment option

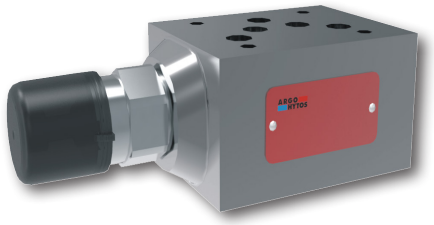
T	allen key (hex. 5), with protective cap

Surface treatment

No designation	body phosphated, steel parts
	zinc-coated (ZnCr-3), ISO 9227 (240 h)
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

VSO3-10/M

Size 10 (D05) • Q_{max} 160 l/min (42 GPM) • p_{max} 350 bar (5100 PSI)



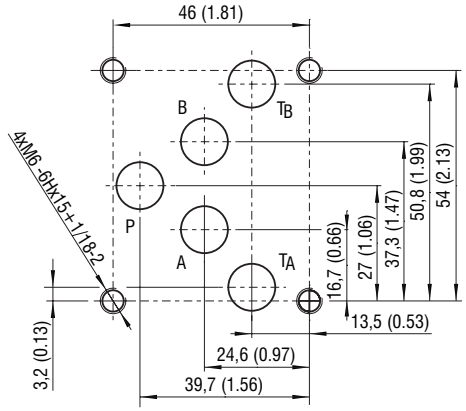
Technical Features

- Restrictor valve with reverse flow check with subplate mounting surface acc. to ISO 4401, DIN 24340 (CETOP 05) standards
- Meter-in or meter-out flow control
- Leak-free closure in one or two service ports
- Linear adjustment and positive seat closing
- Desired settings may be locked down
- Adjustment option with allen head and protective cup
- In the standard version, the valve is zinc coated for 240 h protection acc. to ISO 9227 and valve body is phosphated

Functional Description

Dual hydraulic flow restrictor valve with by pass check valve option are used to control flow rates in two separate lines (A,B) of a hydraulic circuit. The modular design provides six functional versions. The valve restricts the fluid flow in one direction while providing reverse free-flow in the opposite direction. The throttling is adjusted by means of a set screw.
The sandwich design enables simple stacking with other components of the same size.
The separate o-ring plate with fitted o-rings provides sealing of the valve connecting surface.
According to the valve arrangement, the meter-in or meter-out control is provided. Changing the meter-in mode into the meter-out mode can be done by turning the valve by 180° around its x-axis. The orientation of the throttle check valves in the valve body corresponds with the symbols shown on the nameplate. The set screw can be operated by a key, handknob or by a handknob with key lock.

ISO 4401-05-04-0-05



Ports P, A, B, T - max ∅11.2 mm (0.44 in)

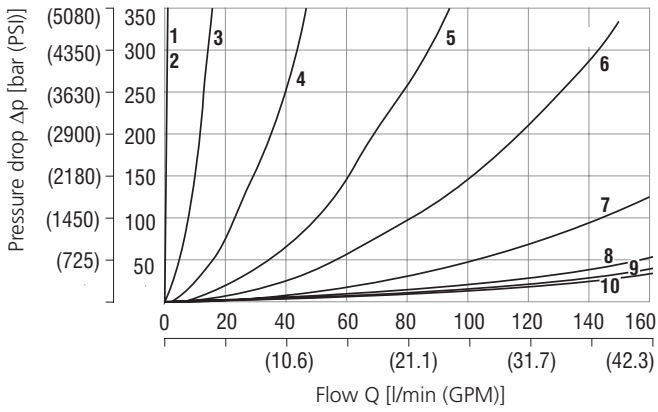
Technical Data

Valve size		10 (D05)
Max. flow	l/min (GPM)	160 (42)
Max. operating pressure	bar (PSI)	350 (5080)
Fluid temperature range (NBR)	°C (°F)	-30 .... +100 (-22 ... +212)
Fluid temperature range (FPM)	°C (°F)	-20 .... +120 (-4 ... +248)
Weight	kg (lbs)	2.15 (4.74)

	Datasheet	Type
General information	GI_0060	products and operating conditions
Mounting interface	SMT_0019	Size 06
Spare parts	SP_8010	

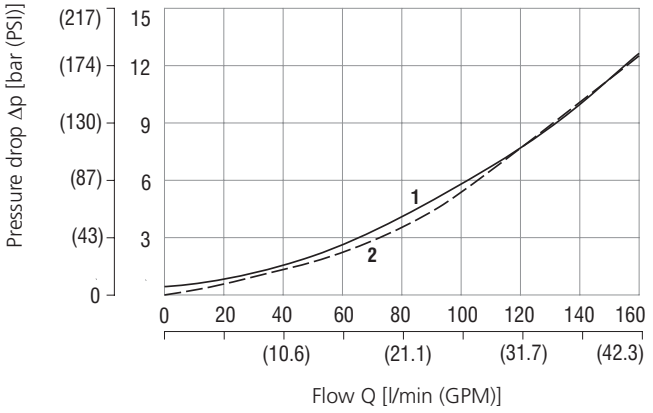
Characteristics measured at ν = 32 mm²/s (156 SUS)

Pressure drop related to flow rate



Number of turns the screw									
2	3	4	5	6	7	8	9	10	11

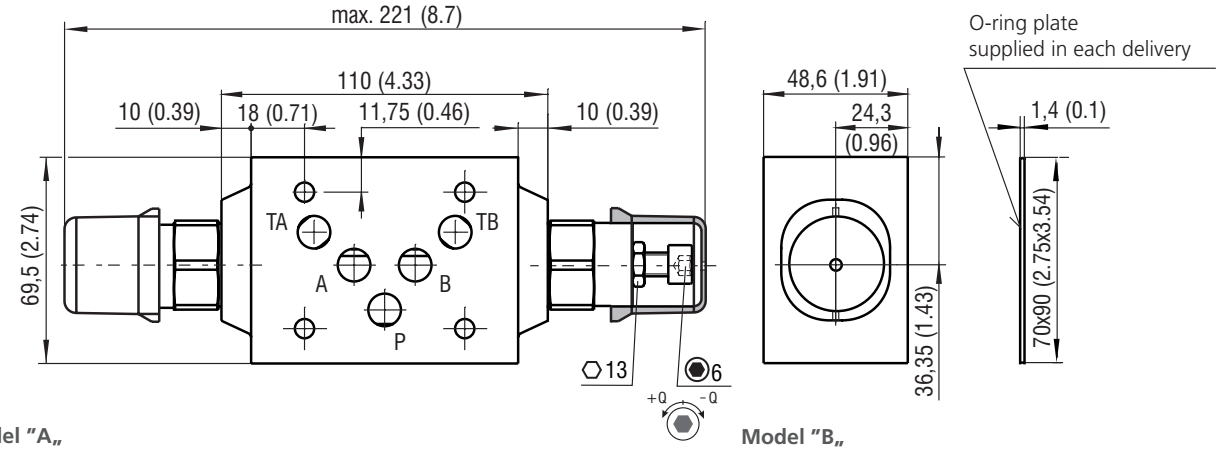
Check valve pressure drop related to flow rate



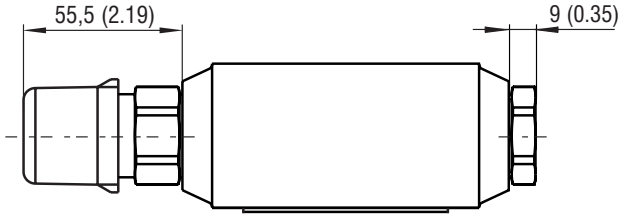
Throttle valve closed	Throttle fully open
1	2

Dimensions in millimeters (inches)

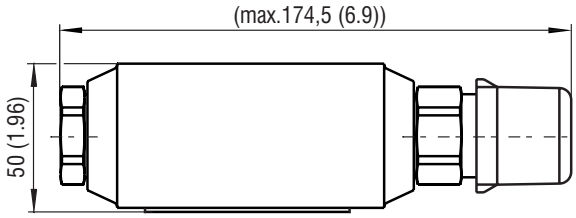
Model "C„



Model "A„

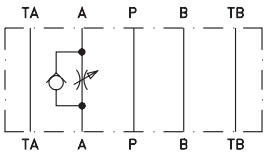


Model "B„

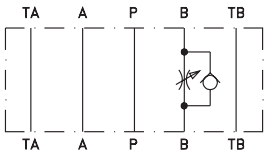


Functional symbols

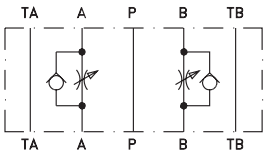
VSO3-10/MA



VSO3-10/MB



VSO3-10/MC



Caution!
The orientation of the symbol shown on the name plate corresponds with the function of the valve.
The separate o-ring plate allows to turn arround the body. The meter-out throttling can be changed to the meter-in throttling by simple rotating the plate only at MC type. At the types MA and MB, the valve position in channels A and B is changed due to the one axis symmetry of the mounting interface of modular plate. This can be solved by ordering the opposite type (see table below) or by additional changing the valve and end plug positions each other.
Recommended types depending on valve position and throttling mode:

Type / valve in channel	Meter-out throttling	Meter-in throttling
MA / A	VSO3-10/MA	VSO3-10/MB, turn the plate
MB / B	VSO3-10/MB	VSO3-10/MA, turn the plate
MC / A, B	VSO3-10/MC	VSO3-10/MC, turn the plate

Ordering Code

VSO3 - 10 / M ☐ ☐ ☐ - ☐

Restrictor valve with reverse flow check, modular

Valve size

Modular design

Functional symbols
Check valve in line A, meter-out **A**
Check valve in line B, meter-out **B**
Check valve in line A and B, meter-out **C**

T — **Adjustment option**
allen head (hex.5) with protective cap

Seals
No designation NBR
V FPM (Viton)

Surface treatment
No designation phosphated body, valve for 240 h salt spray test (ISO 9227)
A body and valve for 240 h salt spray test (ISO 9227)
B body and valve for 520 h salt spray test (ISO 9227)

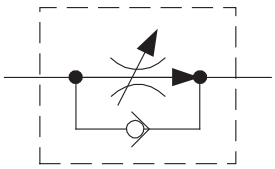
The valves are assembled in meter-out version.
To get meter-in version for variant MC with valves in both channels, just turn it.
Remember: the channels A and B are changed in meter-in version.
It is important when meter-in is required for variant MA or MB.

VSS1-206

Size 06 (D03) • Q_{max} 22 l/min (6 GPM) • p_{max} 320 bar (4600 PSI)

Technical Features

- Mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03) for use in vertical stacking assemblies
- Set flow rate independent of load pressure and temperature changes
- Meter-in, meter-out or bleed-off flow control
- Integrated reverse flow check valve
- Adjusted flow rate depends on the orifice area and adjusted differential pressure
- Wide range of flow rate options
- Quiet and modulated response to load changes
- Adjustable by metallic hand screw
- Fine low-torque adjustment
- In the standard version, the steel parts are zinc-coated for 240 h protection acc. to ISO 9227 and the valve body is phosphated



Functional Description

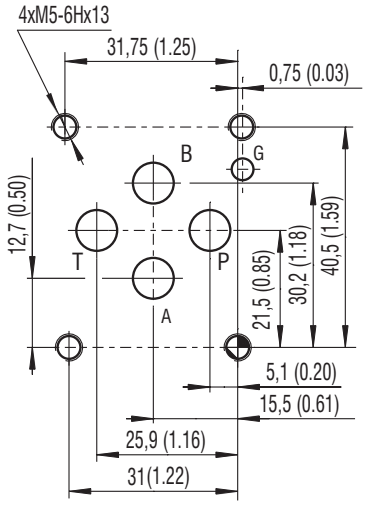
Pressure compensated flow control valves are designed to provide adjustable controlled flow rates independently of changes in inlet and/or outlet pressure. 2-Way valves are used in meter-in, meter-out or bleed-off applications or in parallel arrangement.
The flow control valve consists of a housing, a throttling spool, an internal spring, the pressure compensator and a hand screw for adjustment.

Flow control valve VSS1-206-A
Provides regulated flow from the pump inlet to the consumer. Version A* is delivered without reverse free flow check valve. The version is available as a vertical stack close-off valve or as a sandwich plate.

Flow control valve VSS1-206-B
This valve functions on the same principle as the previous one, however, reverse free flow from port A2 to port A1 is provided by the built-in check valve.

Flow control valve VSS1-206-C
This valve functions as the valve described above, the only difference being the changed flow direction. The flow is controlled in the direction of A2 to A1 and free flow in the direction A1 to A2.

ISO 4401-03-02-0-05



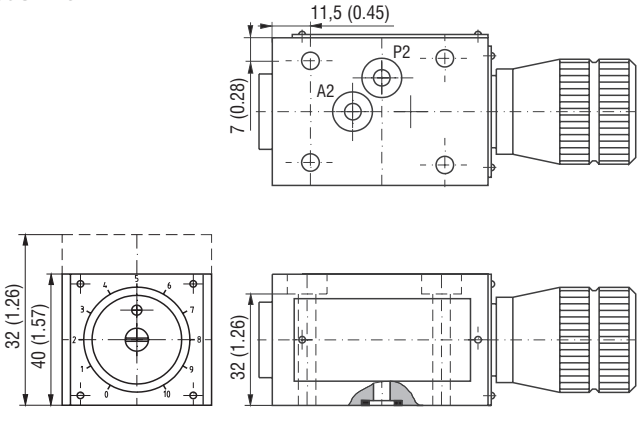
Ports P, A, B, T - max ∅7.5 mm (0.29in)

Technical Data

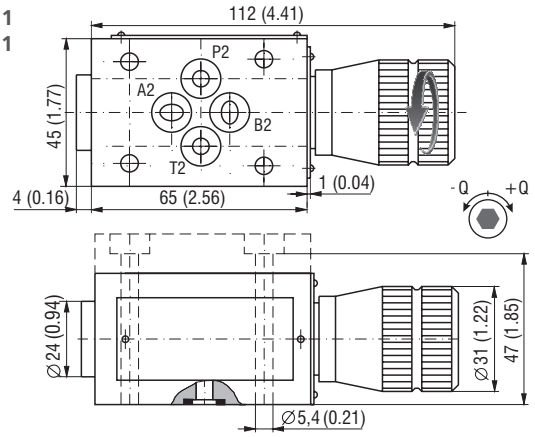
Valve size		06 (D03)		
Max. flow	l/min (GPM)	22 (5.8)		
Max. operating pressure	bar (PSI)	320 (4640)		
Nominal flow rates	l/min (GPM)	6.3 (1.7)	12 (3.2)	22 (5.8)
Min. flow rates	cm^3 ($inch^3$) /min	60 (3.7)		
Fluid temperature range (NBR)	°C (°F)	-30 .... +100 (-22 ... +212)		
Fluid temperature range (FPM)	°C (°F)	-20 .... +120 (-4 ... +248)		
Maximum degree of fluid contamination	for Q ≤ (1 l/min)	Class 20/17/14 according to ISO 4406		
	for Q > (1 l/min)	Class 21/18/15 according to ISO 4406		
Max. flow rate variation at pressure change (for Q > 2.5 Q_{min} and p = 6...100% p_{max})	%	± 5		
Mass	kg (lbs)	0.8 (1.76)		
	Datasheet	Type		
General information	GI_0060	Products and operating conditions		
Mounting interface / tolerances	SMT_0019	ISO 4401-03-02-0-05 DIN 2430 (CETOP 03)		
Spare parts	SP_8010			

Dimensions in millimeters (inches)

Model A-02

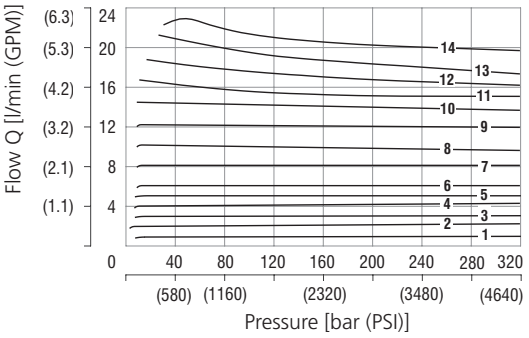


Models A-11
B-11
C-11



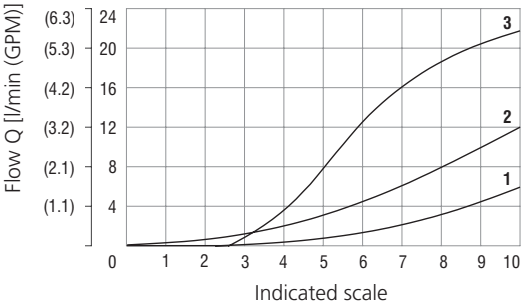
Characteristics measured at ν = 32 mm²/s (156 SUS)

Regulated flow related to input pressure



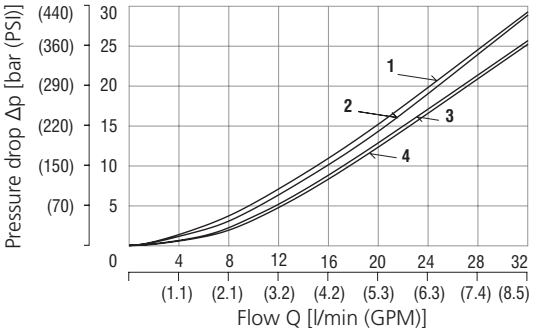
No.	Flow rate		
1	6.3		
2	6.3	12	22
3	6.3		
4	6.3	12	22
5	6.3		
6	6.3	12	22
7		12	22
8		12	22
9		12	22
10			22
11			22
12			22
13			22
14			22

Flow rate related to indicated scale



No.	Model	
1	VSS1-206-6.3x-xx	Flow control P → A
2	VSS1-206-12x-xx	
3	VSS1-206-22x-xx	

Pressure drop related to flow rate



No.	Flow rate	
1		Flow orifice closed
2	6.3	Flow orifice open
3	12	
4	22	

Functional Symbols

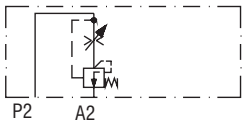
Model

A - without check valve

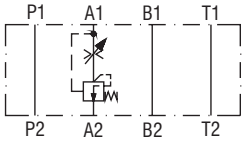
B - with check valve, meter-in mode

C - with check valve, meter-out mode

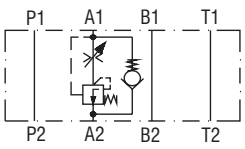
A-02



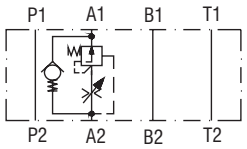
A-11

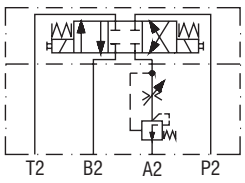


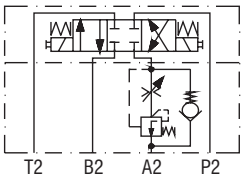
B-11

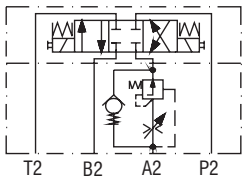


C-11









Typical application of the valve in a stacking assembly*

* Directional valve must be ordered separately.

Ordering Code

VSS1-2 06 - ☐ ☐ RS ☐ - ☐

2-Way flow regulator with reverse flow check, pressure compensated, modular

Valve size

Flow rate

6.3 l/min (1.7 GPM)	**6.3**
12 l/min (3.2 GPM)	**12**
22 l/min (5.8 GPM)	**22**

Model

subplate mounted - without check valve	**A-02**
sandwich plate - without check valve	**A-11**
sandwich plate - with check valve, meter-in mode	**B-11**
sandwich plate - with check valve, meter-out mode	**C-11**

Surface treatment

No designation	body phosphated, steel parts zinc-coated (ZnCr-3), ISO 9227 (240 h)
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

Seals

No designation	NBR
V	FPM (Viton)

Adjustment option

hand screw, metal

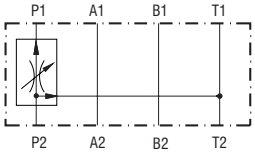
VSS1-306

Size 06 (D03) • Q_{max} 16 l/min (4 GPM) • p_{max} 320 bar (4600 PSI)

Technical Features

- Subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03) for use in vertical stacking assemblies
- Set flow rate independent of load pressure and temperature changes
- Meter-in flow control
- Adjusted flow rate depends on the orifice area and adjusted differential pressure
- Quiet and modulated response to load changes
- Adjustable by metallic hand screw
- Fine low-torque adjustment
- In the standard version, the steel parts are zinc-coated for 240 h protection acc. to ISO 9227 and the valve body is phosphated

Functional Description



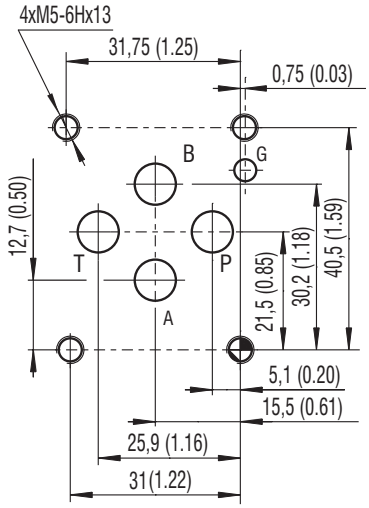
ISO 4401-03-02-0-05

3-Way pressure compensated flow control valves are designed to provide adjustable, controlled flow rates independently of changes in system pressure. The priority flow supplies the consumer port and excessive flow returs to the tank port.
The flow control valve consists of a housing, a throttling spool, a pressure compensator, an internal spring and a hand screw to adjust the flow setting.

Technical Data

Valve size		06 (D03)	
Max. flow	l/min (GPM)	16 (4)	
Max. operating pressure	bar (PSI)	320 (4640)	
Nominal flow rates	l/min (GPM)	16 (4.2)	20 (5.3)
Min. flow rates	cm^3 ($inch^3$)/min	60 (3.7)	
Fluid temperature range (NBR)	°C (°F)	-30 .... +100 (-22 ... +212)	
Fluid temperature range (FPM)	°C (°F)	-20 .... +120 (-4 ... +248)	
Maximum degree of fluid contamination	for Q ≤ (1 l/min) for Q > (1 l/min)	Class 20/17/14 according to ISO 4406 Class 21/18/15 according to ISO 4406	
Max. flow rate variation at pressure change (for Q > 2.5 Q_{min} and p = 6...100% p_{max})	%	± 10	
Mass	kg (lbs)	0.8 (1.76)	

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface / tolerances	SMT_0019	ISO 4401-03-02-0-05 DIN 24340 (CETOP 03)
Spare parts	SP_8010	

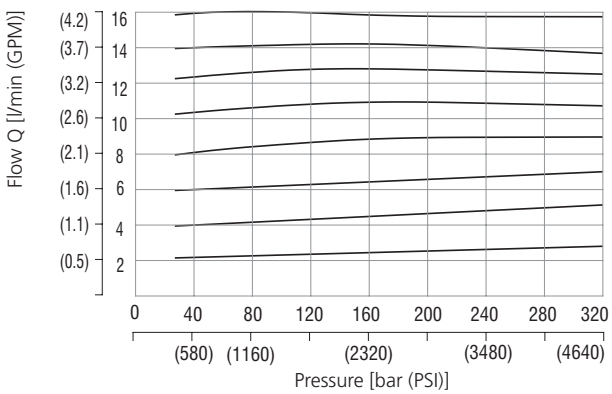


Ports P, A, B, T - max ∅7.5 mm (0.29 in)

Characteristics measured at ν = 32 mm²/s (156 SUS)

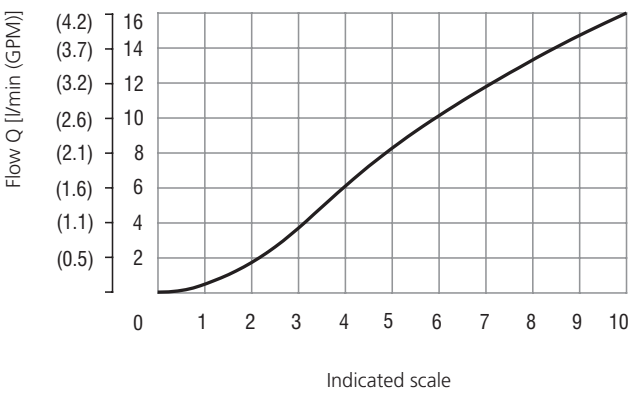
Regulated flow related to input pressure

Flow direction P2 - P1



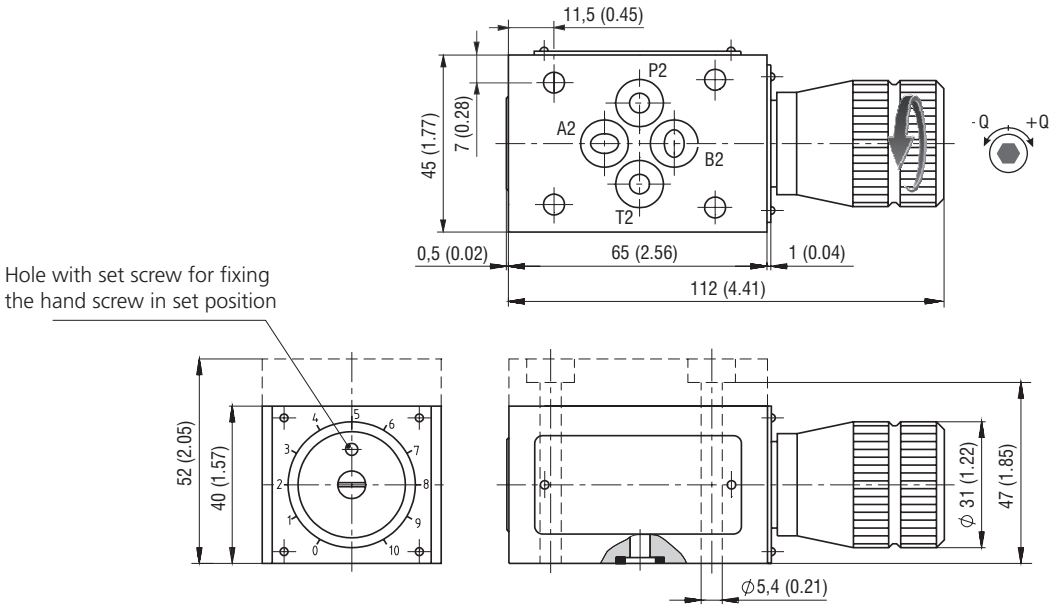
Flow rate related to indicated scale

Flow direction P2 - P1



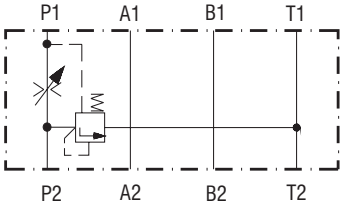
Subject to change · VSS1-306_5033_1en_02/2016

Dimensions in millimeters (inches)



Functional symbols

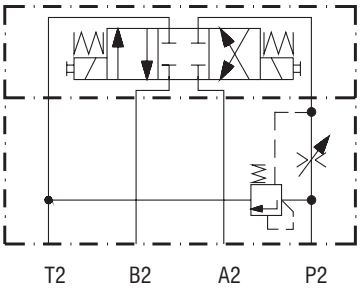
Functional symbol of the valve



① valve side

② subplate or manifold side

Typical application of the valve in stacking assembly*



* Directional valve must be ordered separately.

Ordering Code

VSS1-3 06 - ☐ 11 RS ☐ - ☐

3-Way flow regulator, pressure compensated, modular

Valve size

Flow rate
16 l/min (4.2 GPM) **16**
20 l/min (5.3 GPM) **20**

Model
sandwich plate - without blanking plate

Surface treatment
No designation body phosphated, steel parts
zinc-coated (ZnCr-3), ISO 9227 (240 h)
A zinc-coated (ZnCr-3), ISO 9227 (240 h)
B zinc-coated (ZnNi), ISO 9227 (520 h)

Seals
No designation NBR
V FPM (Viton)

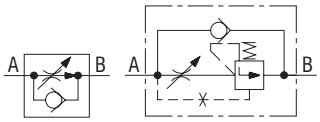
Adjustment option
hand screw, metal

2-Way Flow Regulator with Reverse Flow Check, Pressure Compensated, Subplate Mounted

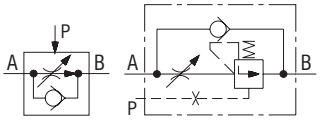
VSS2-206

Size 06 (D03) • Q_{max} 32 l/min (9 GPM) • p_{max} 320 bar (4600 PSI)

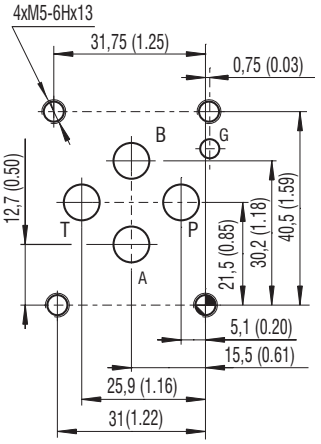
with internal pilot



with external pilot



ISO 4401-03-02-0-05



Ports P, A, B, T
max ∅ 7.5 mm (0.29 in)

Technical Features

- Subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- Set flow rate independent of load pressure and temperature changes
- Meter-in, meter-out or bleed-off flow control
- Externally or internally piloted pressure compensator
- Adjusted flow rate depends on the orifice area and adjusted differential pressure
- Wide range of flow rate options
- Quiet and modulated response to load changes
- Adjustment option with non-lockable or lockable cylindrical
- Fine low-torque adjustment
- In the standard version, the steel parts are zinc-coated for 240 h protection acc. to ISO 9227 and the valve body is phosphated

Functional Description

Pressure compensated flow control valves **VSS2-206** are designed to provide adjustable, controlled flow rate independently of changes in pressure and temperature.
The flow control valve consists of a housing, a throttling spool, an internal spring, the pressure compensator and a hand screw for adjustment.
Flow control valve **VSS2-206-xxQ/JxO** - internally piloted pressure compensator:
The valve senses load pressure inside the valve. Flow throttling in direction A to B can be adjusted by the hand screw. To ensure flow rate stability in port B, a pressure compensator is located behind the throttling area.
Flow control valve **VSS2-206-xxQ/JxA** - externally piloted pressure compensator:
The mounting surface area of the valve is connected to an external load sensing port P. This arrangement enables external piloting of the pressure compensator. The function is described by the circuit diagram shown.

Technical Data

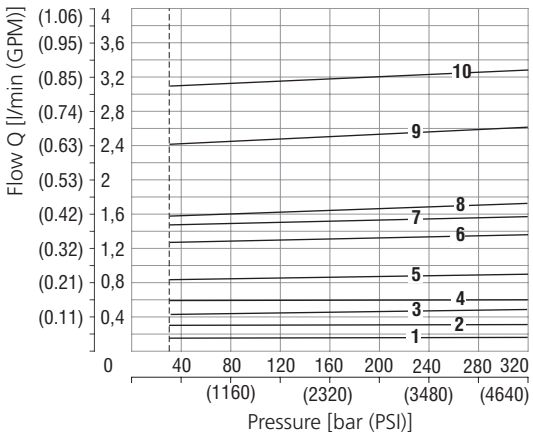
Valve size		06 (D03)					
Max. flow	l/min (GPM)	32 (8.5)					
Max. operating pressure	bar (PSI)	320 (4640)					
Nominal flow rates	l/min (GPM)	0.6 (0.2)	1.6 (0.4)	3.2 (0.8)	6.3 (1.7)	16 (4.2)	32 (8.5)
Min. flow rates	cm³/min (inch³/min)	10 (0.6)	15 (0.9)	20 (1.2)	25 (1.5)	60 (3.7)	250 (15.3)
Fluid temperature range (NBR)	°C (°F)	-30 .... +100 (-22 ... +212)					
Fluid temperature range (FPM)	°C (°F)	-20 .... +120 (-4 ... +248)					
Maximum degree of fluid contamination	for Q ≤ (1 l/min) for Q > (1 l/min)	Class 20/17/14 according to ISO 4406 Class 21/18/15 according to ISO 4406					
Max. flow rate variation at pressure change (for Q > 2.5 Q_{min} and p = 6...100% p_{max})	%	± 5					
Mass	kg (lbs)	1.1 (2.43)					

	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface / tolerances	SMT_0019	ISO 4401-03-02-0-05 DIN 2430 (CETOP 03)
Spare parts	SP_8010	

Characteristics measured at ν = 32 mm²/s (156 SUS)

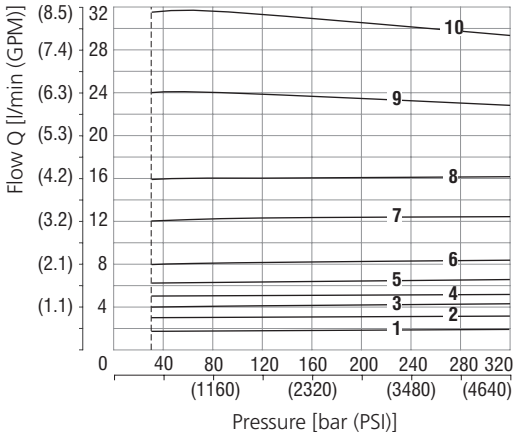
Regulated flow related to input pressure

Model 0.6Q, 1.6Q, 3.2Q



No.	Model
1	0.6Q
2	0.6Q
3	0.6Q
	1.6Q
	3.2Q
4	0.6Q
5	1.6Q
6	1.6Q
7	3.2Q
8	1.6Q
9	3.2Q
10	3.2Q

Model 6.3Q, 16Q, 32Q

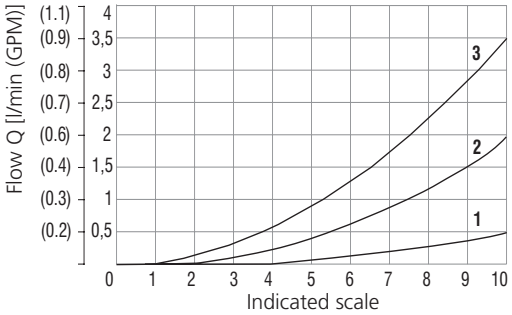


No.	Model
1	6.3Q
2	6.3Q
3	16Q
4	6.3Q
5	6.3Q
6	16Q
	32Q
7	16Q
8	16Q
	32Q
9	32Q
10	32Q

Characteristics measured at ν = 32 mm²/s (156 SUS)

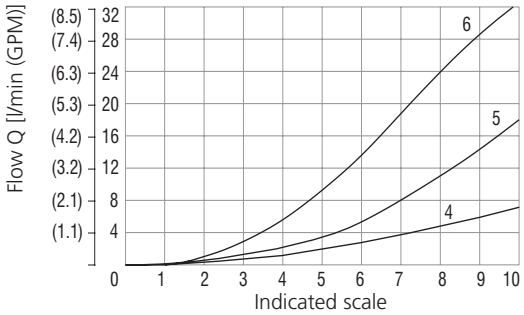
Flow rate related to indicated scale Flow direction A → B

Model 0.6Q, 1.6Q, 3.2Q

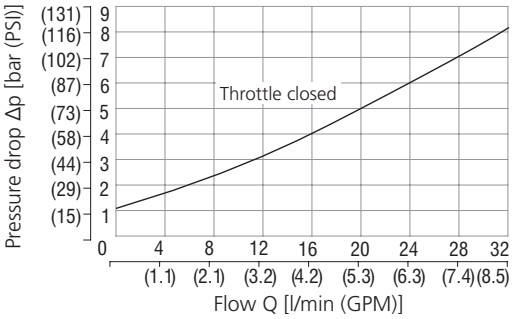


Flow control A → B	
No.	Model
1	VSS2-206-0.6Q-xx
2	VSS2-206-1.6Q-xx
3	VSS2-206-3.2Q-xx
4	VSS2-206-6.3Q-xx
5	VSS2-206-16Q-xx
6	VSS2-206-32Q-xx

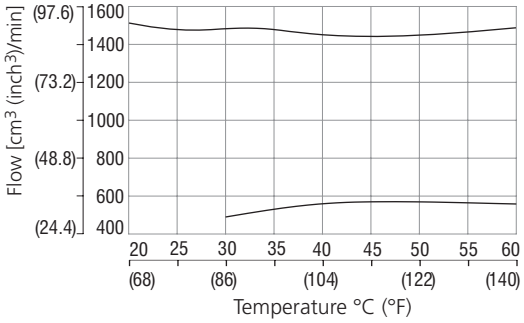
Model 6.3Q, 16Q, 32Q



Pressure drop related to flow rate Free flow check valve B → A

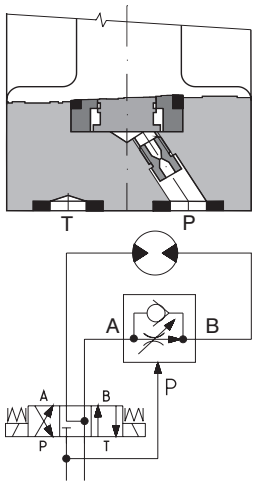


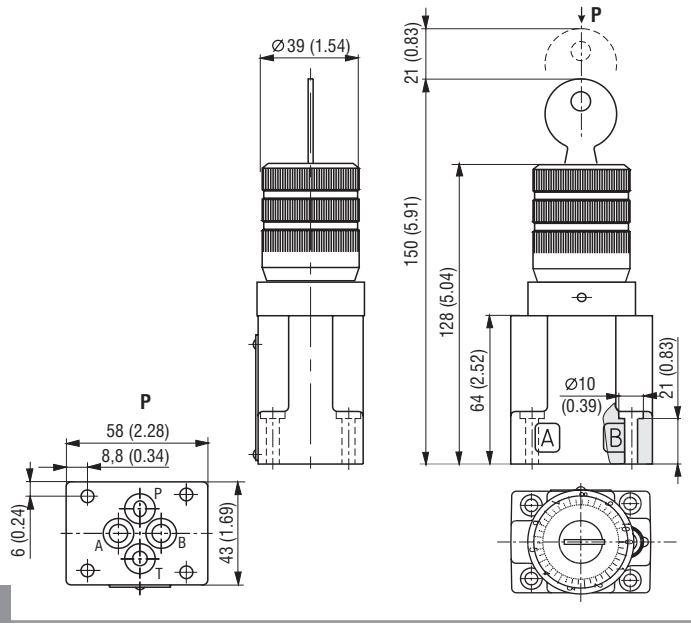
Set flow difference related to temperature



Dimensions in millimeters (inches)

Flow control valve VSS2-206-x/JxAx-x
with externally piloted pressure compensator





Ordering Code

VSS2-2 06 - ☐ / ☐ ☐ ☐ ☐ ☐ - ☐

2-Way flow regulator with reverse flow check, pressure compensated, subplate mounted

Valve size

Flow rate

0.6 l/min (0.2 GPM)	**0.6Q**
1.6 l/min (0.4 GPM)	**1.6Q**
3.2 l/min (0.9 GPM)	**3.2Q**
6.3 l/min (1.7 GPM)	**6.3Q**
16 l/min (4.2 GPM)	**16Q**
32 l/min (8.6 GPM)	**32Q**

Model

subplate mounted - without check valve	**O**
subplate mounted - with check valve	**J**

Adjustment option

O	non-lockable cylindrical hand screw
Z	lockable cylindrical hand screw

Pressure compensator pilot design

A	external pilot
O	internal pilot

Seals

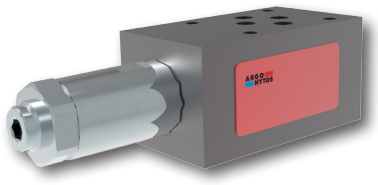
No designation	NBR
V	FPM (Viton)

Surface treatment

No designation	body phosphated, steel parts
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnCr-3), ISO 9227 (240 h) zinc-coated (ZnNi), ISO 9227 (520 h)

VSS3-062/M

Size 06 (D03) • Q_{max} 40 l/min (11 GPM) • p_{max} 320 bar (4600 PSI)



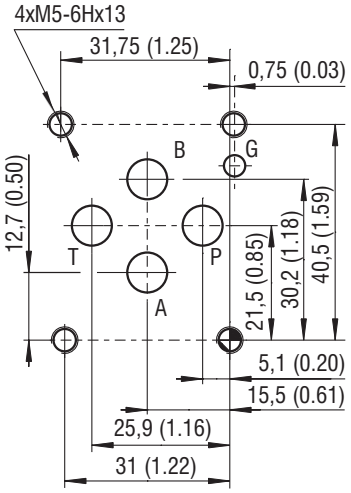
Technical Features

- 2-Way flow regulator, pressure compensated, with mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03)
- Set flow rate independent of load pressure and temperature changes
- Adjusted flow rate depends on the orifice area and set differential pressure
- Hardened precision parts
- High flow capacity
- Quiet and modulated response to load changes
- Used in meter-in, meter-out, or bleed-off applications
- Wide range of flow rate options
- Adjustable by allen key or hand screw
- In the standard version, the valve is zinc coated for 240 h protection acc. to ISO 9227 and the valve body is phosphated

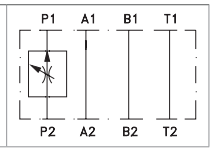
Functional Description

This pressure compensated, hydraulic flow regulator in the form of a sandwich plate with fixed orifice and variable spring setting is designed to control flow rates independently of pressure and temperature, especially in systems where only small movements due to load changes are required. The flow rate stabilization is provided by a pressure compensator in the direction from P2 to P1. The valve will maintain the set flow regardless of pressure variations on the regulated or inlet port.
The regulated flow increases with clockwise rotation of the adjustment screw, the counter-clockwise rotation decreases the flow rate. Desired settings can be locked down.

ISO 4401-03-02-0-05



Ports P, A, B, T max ∅ 7.5 mm (0.29 in)

Symbol	

Technical Data

Valve size		06 (D03)						
Max. flow	l/min (GPM)	40 (11)						
Max. operating pressure	bar (PSI)	320 (4640)						
Nominal flow rates	l/min	1.6	2.5	4	6.3	10	16	20
	(GPM)	(0.4)	(0.7)	(1.1)	(1.7)	(2.6)	(4.2)	(5.3)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)						
Fluid temperature range (FPM)	°C (°F)	-20 ... +120 (-4 ... +248)						
Mass - model MP06	kg (lbs)	1.12 (2.46)						

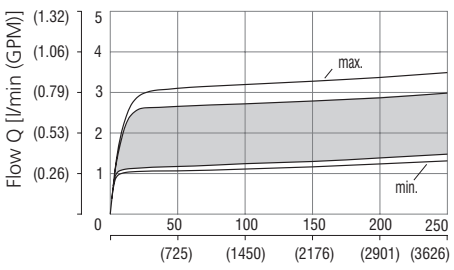
	Datasheet	Type
General information	GI_0060	Products and operating conditions
Mounting interface	SMT_0019	Size 06
Spare parts	SP_8010	

Characteristics measured at ν = 32 mm²/s (156 SUS)

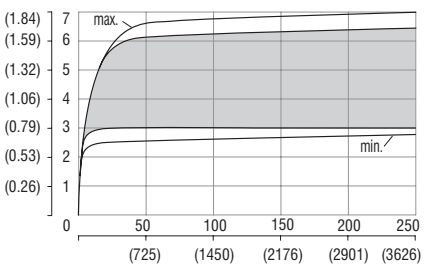
Regulated flow related to input pressure

Flow direction P2 - P1 (regulated flow)

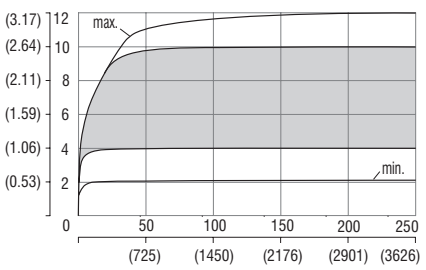
Flow rate 1.6



Flow rate 2.5



Flow rate 4

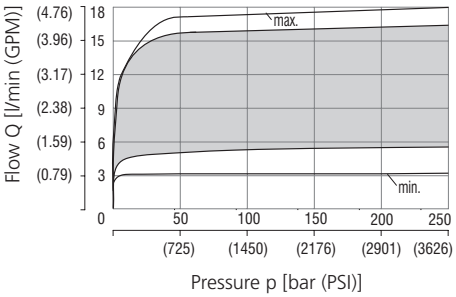


Characteristics measured at ν = 32 mm²/s (156 SUS)

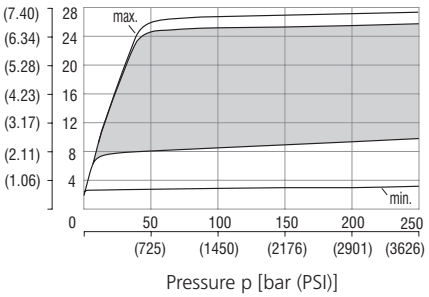
Regulated flow related to input pressure

Flow direction P2 - P1 (regulated flow)

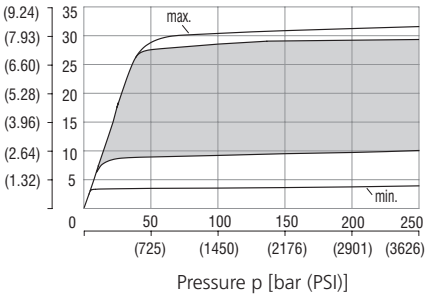
Flow rate 6.3



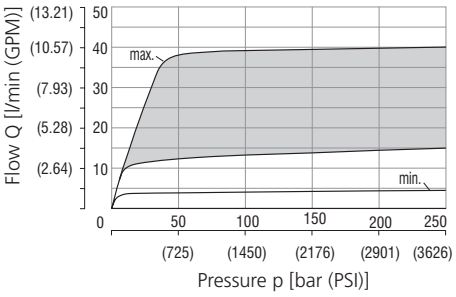
Flow rate 10



Flow rate 16

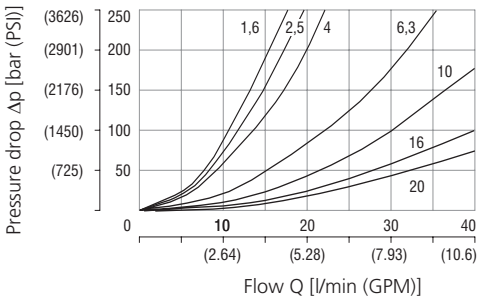


Flow rate 20



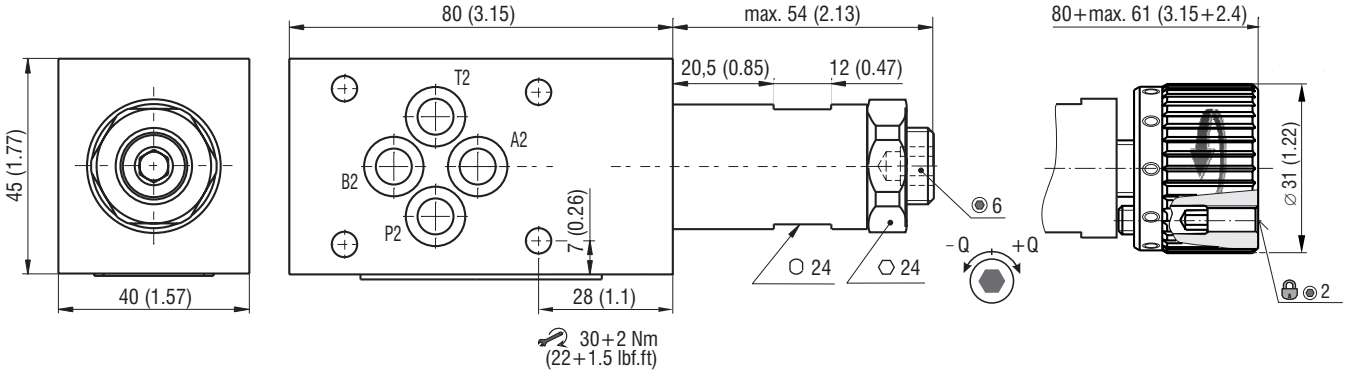
Pressure drop related to flow rate

Flow direction P1 - P2
(throttling without compensation)



Dimensions in millimeters (inches)

Model S



Model RS

Ordering Code

VSS3-062 / MP06 - □ □ □ - □

2-Way flow regulator, pressure compensated **M22x1.5**

Model
modular, valve function from P2 to P1

Flow rate

1.4 - 2.7 l/min	(0.4 - 0.7 GPM)	**1.6**
3 - 6 l/min	(0.8 - 1.6 GPM)	**2.5**
4 - 10 l/min	(1.1 - 2.6 GPM)	**4**
5 - 16 l/min	(1.3 - 4.2 GPM)	**6.3**
8 - 25 l/min	(2.1 - 6.6 GPM)	**10**
9 - 28 l/min	(2.4 - 7.4 GPM)	**16**
12 - 40 l/min	(3.2 - 10.6 GPM)	**20**

Adjustment option

S	allen key (hex. 6), without protective cap
RS	hand screw, metal-short

Seals

No designation	NBR
V	FPM (Viton)

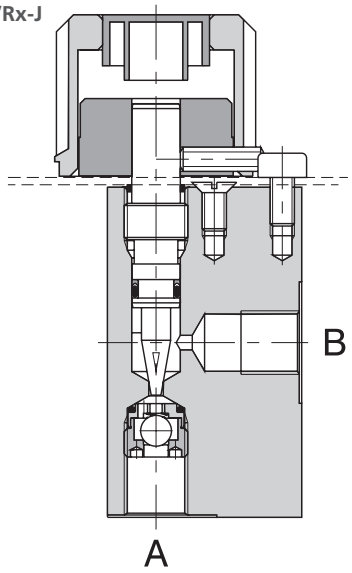
Surface treatment

No des.	body phosphated, steel parts
	zinc-coated (ZnCr-3), ISO 9227 (240 h)
A	zinc-coated (ZnCr-3), ISO 9227 (240 h)
B	zinc-coated (ZnNi), ISO 9227 (520 h)

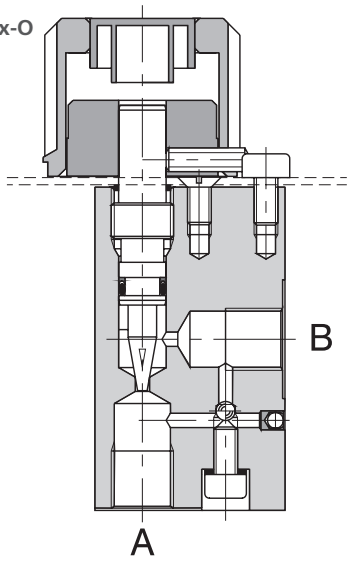
VSO1-04/R

In-line G1/4 • Q_{max} 20 l/min (5 GPM) • p_{max} 100 bar (1500 PSI)

VSO1-04/Rx-J



VSO1-04/Rx-O

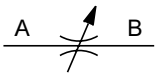
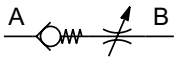
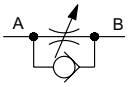


Technical Features

- Reverse flow check option
- Hardened precision parts
- Fine low-torque adjustment
- Linear adjustment and positive seat overlap
- In the standard version, the valve body is made of aluminum, all parts are without surface treatment.

Functional Description

Hydraulic flow restrictor valve with optional by-pass or serial check valve. The adjustment sensitivity of the flow rate is determined by the selected respective seat diameter in the range between 2 and 3.5 mm.
The rotation of the hand screw is limited to just under one revolution by the hard stop on the mounting bolt. The flow rate can be adjusted within that range of rotation.
The simple fine throttle valve can be fitted with a check valve VJO1-06/SG (see data sheet 5004) installed in series. For a more unobstructed reverse flow through the valve, the model VSO1-04/Rx-O with a parallel ball valve may be used.
The connection threads in the valve body support installation in line or hose assemblies.
The valve is designed to be attached on the back side of a control panel by two M6 bolts. The outer bolt with the cylindrical head functions at the same time as the hard stop for the hand screw. The attached plate for panel installation can be removed by first de-assembling the hand screw.

Model Code	VSO1-04/Rx	VSO1-04/Rx-J	VSO1-04/Rx-O
Symbol			

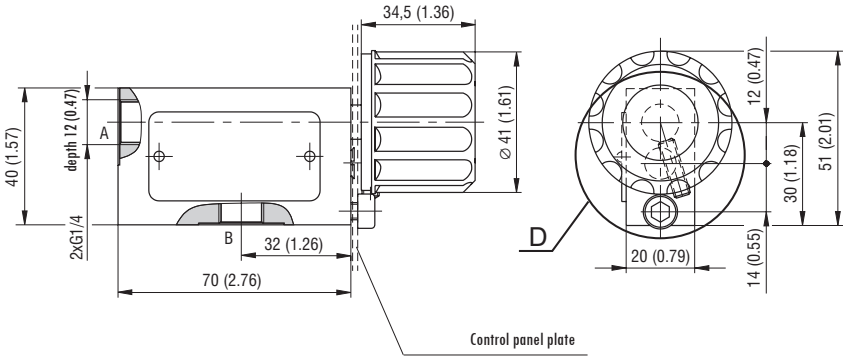
Technical Data

Valve size		In-line 04
Max. flow	l/min (GPM)	20 (5.3)
Max. operating pressure	bar (PSI)	100 (1450)
Fluid temperature range (NBR)	°C (°F)	-30 ... +100 (-22 ... +212)
Mass	kg (lbs)	0.22 (0.49)

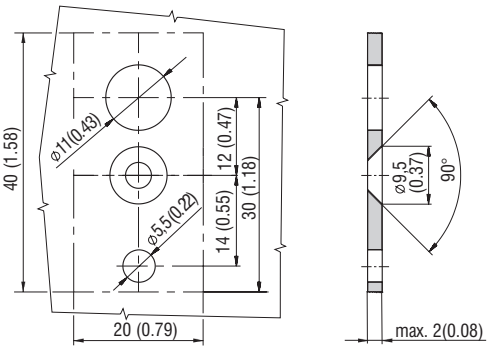
	Datasheet	Type
General information	GI_0060	Products and operating conditions
Spare parts	SP_8010	

Dimensions in millimeters (inches)

VSO1-04/R



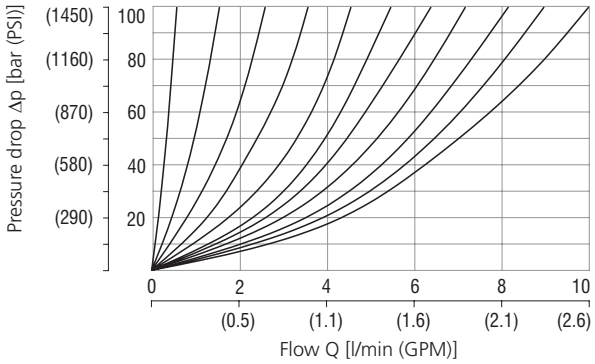
Control panel plate
Detail D - Installation dimensions



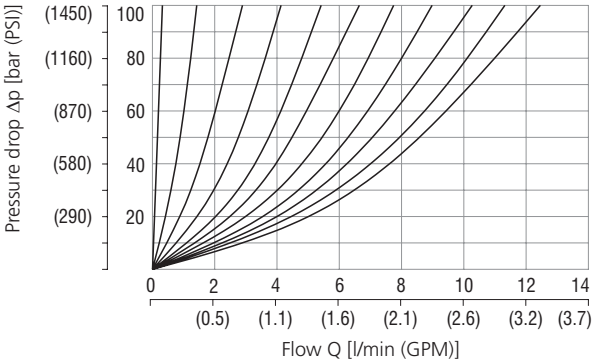
Characteristics measured at ν = 32 mm²/s (156 SUS)

Pressure drop related to flow rate
The characteristics were measured at the hand screw set to 30°.

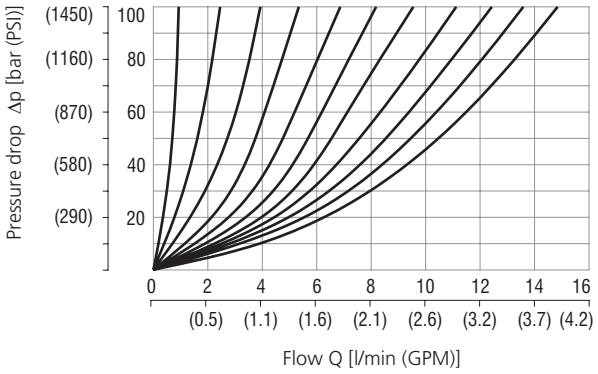
Seat diameter 2 mm (0.08 in)



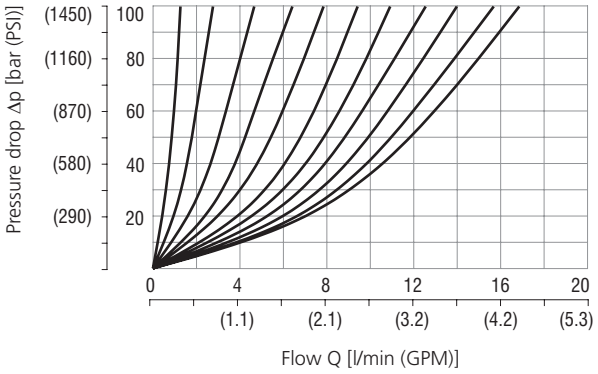
Seat diameter 2.5 mm (0.10 in)



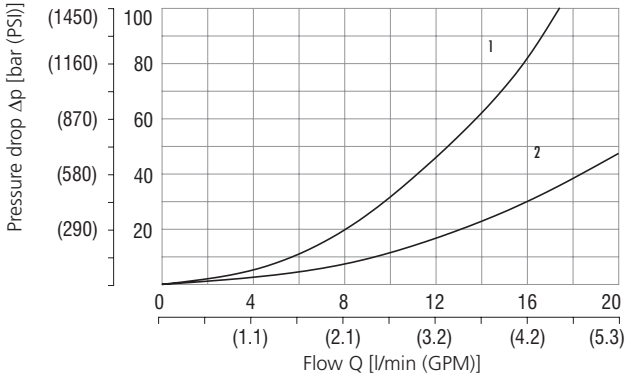
Seat diameter 3 mm (0.12 in)



Seat diameter 3.5 mm (0.14 in)



Model VSO1-04/R2-O, direction B - A (free flow)



1	Throttle valve closed
2	Throttle valve open

Ordering Code

VSO1-04 / R □ - □ □ - □

Needle - restrictor valve with reverse flow check, fine adjustable

In-line design

Seat diameter

2.0 mm (0.08 in)	**2**
2.5 mm (0.10 in)	**2.5**
3.0 mm (0.12 in)	**3**
3.5 mm (0.14 in)	**3.5**

Other seat diameters upon request.

Model

No designation	without check valve
J	with check valve in series
O	with check valve in parallel

Connecting threads

G G thread, G1/4

Seals

No designation standard NBR