Functional Description

Double throttle check valves are used to control flow rates in two separate lines (A,B) of a hydraulic circuit. The modular design provides six functional symbols. The valve body (1) has drilled channels and the throttle valve is built into channel A or B or into channels A and B. They restrict the fluid flow in one direction while providing reverse free-flow in the opposite direction. The throttling spool (2) is adjusted by means of a set screw (3) and each spool position corresponds with a certain area of passage. Fluid entering port A1 is throttled to port A2 via a groove and an annulus area. Fluid returning from port B2 shifts the valve seat (4) against the spring (5), thus creating a passage which allows reverse free-flow to port B1 (function of a check valve). The sandwich design enables simple stacking with other components of the same size. According to the valve arrangement, the meter-in or meter-out control is provided. The orientation of the throttle check valves in the valve body corresponds with the symbols shown on the name plate. The valve housing (1) is phosphate coated, the surfaces of the other parts are zinc coated.
Ordering Code

VSO1-04/M S

Throttle valves

Nominal size

Modular design

Seals

without designation

V

NBR

FPM (Viton)

Adjustment element

Hexagon set screw with locknut and protective cap

Functional Symbols

Meter-in control

A

P1 A1 B1 T1

B

P1 A1 B1 T1

C

P1 A1 B1 T1

Meter-out control

E

P1 A1 B1 T1

F

P1 A1 B1 T1

D

P1 A1 B1 T1

FOR PREFERRED TYPES SEE BOLD TYPING IN ORDERING CODE AND TABLE OF PREFERRED TYPES ON PAGE 5

Technical Data

<table>
<thead>
<tr>
<th></th>
<th>mm</th>
<th>04</th>
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<tr>
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</tr>
<tr>
<td>Maximum flow</td>
<td>US GPM (L/min)</td>
<td>6.6 (25)</td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>PSI (bar)</td>
<td>4641 (320)</td>
</tr>
<tr>
<td>Hydraulic fluid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td>°F (°C)</td>
<td>-22 ... +176 (-30 ... +80)</td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td>°F (°C)</td>
<td>-4 ... +176 (-20 ... +80)</td>
</tr>
<tr>
<td>for standard sealing (NBR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>for Viton seals (FPM)</td>
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<td></td>
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<tr>
<td>Viscosity range</td>
<td>SUS (mm²/s)</td>
<td>98 ... 1840 (20 ... 400)</td>
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<tr>
<td>Maximum degree of fluid contamination</td>
<td>Class 21/18/15 to ISO 4406 (1999).</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>lbs (kg)</td>
<td>1.76 (0.8)</td>
</tr>
<tr>
<td>Mounting position</td>
<td></td>
<td>optional</td>
</tr>
</tbody>
</table>
Δp-Q Characteristics

Measured at \( v = 166 \text{ SUS} \ (35 \text{ mm}^2/\text{s}) \) and \( t = 104 \degree \text{F} \ (40 \degree \text{C}) \)

Throttle valve

pressure difference related to flow

Check valve

pressure difference related to flow from A2 to A1 (from B2 to B1)

Throttle valve closed

Spare Parts

<table>
<thead>
<tr>
<th>Seal kit</th>
<th>Dimensions, quantity</th>
<th>Ordering number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>O-ring</td>
<td>Square ring</td>
</tr>
<tr>
<td>Standard NBR</td>
<td>18 x 2.65 NBR70 (2 pcs.)</td>
<td>7.65 x 1.68 (4 pcs.)</td>
</tr>
<tr>
<td></td>
<td>6.9 x 1.8 NBR70 (2 pcs.)</td>
<td>-</td>
</tr>
<tr>
<td>Viton</td>
<td>17.12 x 2.62 (2 pcs.)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>7.65 x 1.78 (4 pcs.)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>6.75 x 1.78 (2 pcs.)</td>
<td>-</td>
</tr>
</tbody>
</table>
Valve Dimensions

Dimensions in inches and millimeters (in brackets)

Typ VSO1-04/MAS
Typ VSO1-04/MES

Typ VSO1-04/MBS
Typ VSO1-04/MFS

Typ VSO1-04/MCS
Typ VSO1-04/MDS

Instalation Dimensions

1. Name plate
2. Set screw - inside hexagon 5 mm
   Clockwise rotation = flow decrease
   Counterclockwise rotation = flow increase
3. Locknut, hex. 10 mm
4. Protective cap
5. Square ring (4 pcs.) supplied with valve
6. Closing screw
7. 4 mounting holes

Required surface finish of interface

0.0004/0.01/0.01/100 mm

0.8 (Rmax, 6.3)
<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSO1-04/MCS</td>
<td>525-0043</td>
</tr>
<tr>
<td>VSO1-04/MDS</td>
<td>525-0046</td>
</tr>
</tbody>
</table>
Caution!

- The packing foil is recyclable.
- The plastic protective plate can be returned to manufacturer for disposal.
- A cover plate DK 1-04/32-x with the respective channel connection can be ordered separately - see catalogue HA 0003 - Cover plates.
- Mounting bolts M6x40 DIN 912-10.9 or studs must be ordered separately. Tightening torque 3.7 ft-lbs. (5 Nm).
- For applications outside these parameters, please consult the manufacturer.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.
Double throttle check valves
sandwich plates

2VS3-06

HA 5051
1/2003

Replaces
HA 5051 1/2000

Double throttle check valves are used to control flow rates in two separate lines (A, B) of a hydraulic circuit. The modular design provides six functional symbols. The throttle valve is built into channel A or B or into channels A and B. The valve restricts the fluid flow in one direction while providing reverse free-flow in the opposite direction. The throttling spool (2) is adjusted by means of a set screw (3) and each spool position corresponds with a certain passage area. Fluid entering port A1 is throttled to port A2 via a groove and an annulus area. Fluid returning from port B2 shifts the valve seat (4) against the spring (5), thus creating a passage which allows reverse free-flow to port B1 (function as a check valve).

The sandwich design enables simple stacking with other components of the same size. The separate O-ring plate (6) 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 horizontal axis. The orientation of the throttle check valves in the valve body corresponds with the symbols shown on the name plate. The set screw can be operated by a key, by a hand knob or by a hand knob with keylock.

The basic surface treatment of the valve housing is phosphate coated, whereas the surfaces of the other parts are zinc coated.

Functional Description

- Sandwich plate design for use in vertical stacking assemblies
- Meter-in or meter-out control as required
- Three possible arrangements:
  - throttle valve in channel A
  - throttle valve in channel B
  - throttle valves in channels A and B
- Flow adjustment - three adjustment elements
- Installation dimensions to ISO 4401:1994 and DIN 24 340-A6
- Subplates - see Catalogue HA 0002

Sandwich plate design for use in vertical stacking assemblies

Meter-in or meter-out control as required

Three possible arrangements:
- throttle valve in channel A
- throttle valve in channel B
- throttle valves in channels A and B

Flow adjustment - three adjustment elements

Installation dimensions to ISO 4401:1994 and DIN 24 340-A6

Subplates - see Catalogue HA 0002

Functional Description

Double throttle valves are used to control flow rates in two separate lines (A, B) of a hydraulic circuit. The modular design provides six functional symbols. The throttle valve is built into channel A or B or into channels A and B. The valve restricts the fluid flow in one direction while providing reverse free-flow in the opposite direction. The throttling spool (2) is adjusted by means of a set screw (3) and each spool position corresponds with a certain passage area. Fluid entering port A1 is throttled to port A2 via a groove and an annulus area. Fluid returning from port B2 shifts the valve seat (4) against the spring (5), thus creating a passage which allows reverse free-flow to port B1 (function as a check valve).
Ordering Code

2VS3-06-

Double throttle check valve

Nominal size

without designation

Seals
NBR
Viton

Adjustment element

S
Hexagon set screw with locknut and protective cap

R
Hand knob with scale

Z
Hand knob with scale and keylock

Functional symbol

A
valve in channel A

B
valve in channel B

C
valves in channels A and B

Notes:
① valve side
② subplate or manifold side
The orientation of the throttle check valves in the valve body corresponds with symbols shown on the name plate.

Technical Data

Nominal size
mm
06

Maximum flow rate
US GPM (L/min)
21.13 (80)

Maximum operating pressure
PSI (bar)
4641 (320)

Hydraulic fluid
Hydraulic oils of power classes HM, HV to CETOP RP 91 H in viscosity classes ISO VG 32, 46 and 68

Fluid temperature range for standard sealing (NBR)
°F (°C)
-22 ... +176 (-30 ... +80)

Fluid temperature range for Viton sealing (FPM)
°F (°C)
-4 ... +176 (-20 ... +80)

Viscosity range
SUS (mm²/s)
98 ... 1840 (20 ... 400)

Maximum degree of fluid contamination
Class 21/18/15 according to ISO 4406 (1999).

Weight
lbs (kg)
2.65 (1.2)

Mounting position
optional

Spare Parts

Seal kit

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions, quantity</th>
<th>Ordering number</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 x 2.65 NBR70</td>
<td>O-ring: 18.25 x 2.65 (2 pcs.)</td>
<td>525-9900</td>
</tr>
<tr>
<td>6.9 x 1.8 NBR70</td>
<td>Square ring: 9.25 x 1.8 (4 pcs.)</td>
<td>525-9940</td>
</tr>
<tr>
<td>17.12 x 2.62</td>
<td>Back-up ring: 6.73 x 9.43 x 1.14 (2 pcs.)</td>
<td>525-9900</td>
</tr>
<tr>
<td>9.25 x 1.78</td>
<td>-</td>
<td>525-9940</td>
</tr>
<tr>
<td>6.75 x 1.78</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Characteristics

Measured at \( v = 166 \text{ SUS (35 mm}^2/\text{s) and } t = 104 \text{ °F (40 °C)} \)

**Throttle valve** - Pressure difference related to flow

![Throttle valve graph](image)

**Check valve** - Pressure difference related to flow from A2 to A1 (from B2 to B1)

![Check valve graph](image)

**Preferred Types of Valves**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2VS3-06-CS</td>
<td>525-0023</td>
</tr>
</tbody>
</table>

**Caution!**

- The packing foil is recyclable.
- The transport plate is to be returned to the supplier.
- Mounting bolts must be ordered separately. Tightening torque is 6.6 ft-lbs (8.9 Nm).
- If the valve is used separately without a directional valve, a cover plate DK1-06/32-1 is to be ordered. This plate connects port A1 with B1 and A2 with B2 respectively (suitable for models 2VS3-06-Ax and 2VS3-06-Bx) - see catalogue Cover Plates and Crossover Cover Plates HA 0003.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.
Valve Dimensions  Dimensions in inches and millimetres (in brackets)

1 Name plate
2 Adjustment element - hexagon screw 5 mm with lock nut and protective cup
3 Adjustment element - hand knob with scale
4 Adjustment element - hand knob with scale and keylock
   With all adjustment elements:
   clockwise rotation reduces flow
   counter-clockwise rotation increases flow
5 Locknut (hex. 10 mm)
6 O-ring plate - supplied in delivery packet
7 Square ring 9.25x1.68 (4 pcs.) - supplied in delivery packet
8 Closing screw

ARGO-HYTOS a. s.  CZ - 543 15 Vrchlabí
Tel.: +420-499-403111, Fax: +420-499-403421
E-mail: sales.cz@argo-hytos.com
www.argo-hytos.com

Subject to alteration without notice!
Functional Description

Double throttle valves are used to control flow rates in two separate lines (A, B) of a hydraulic circuit. The valve body (1) has drilled channels and the throttle valve is built into channel A or B or into channels A and B. They restrict the fluid flow in one direction while providing reverse free-flow in the opposite direction. The throttling spool (2) is adjusted by means of set screw (3) and each spool position corresponds with a certain area of the flow passage.

Fluid entering port A1 is throttled to port A2 via a groove and an annulus area. Fluid entering port B2 shifts the valve seat (4) against the spring (5), thus creating a passage which allows reverse free-flow to port B1 (function of a check valve).

The modular design enables simple vertical stacking with other components of the same size. A separate O-ring plate (6) with fitted O-rings is mounted underneath the valve body, thus providing its sealing. 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 body by 180° around its x-axis.

The orientation of the throttle/check valves in the valve body corresponds with the symbols shown on the name plate.

The basic surface treatment of the valve housing (1) is phosphate coated, whereas the surfaces of the other parts are zinc coated.
Ordering Code

**VSO2-10/M**

- Double throttle check valve
- sandwich plate
- Nominal size
- Modular design

**Seals**
- no designation
- Standard (NBR)
- Viton (FPM)

**Adjustment element**
- Set screw with inside hexagon

**Functional symbols**

**A**

**B**

**C**

Notes:
1. valve side
2. subplate or manifold side
The orientation of the symbol shown on the name plate corresponds with the function of the valve (meter-out control).

FOR PREFERRED TYPES SEE BOLD TYPING IN ORDERING CODE

**Technical Data**

<table>
<thead>
<tr>
<th>Nominal size</th>
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<tbody>
<tr>
<td>Maximum flow rate</td>
<td>US GPM (L/min)</td>
<td>26.42 (100)</td>
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<tr>
<td>Maximum operating pressure</td>
<td>PSI (bar)</td>
<td>5076 (350)</td>
</tr>
<tr>
<td>Hydraulic fluid</td>
<td></td>
<td>Hydraulic fluids of power classes HM, HV to CETOP RP 91 H in viscosity classes ISO VG 32, 46 and 68</td>
</tr>
<tr>
<td>Fluid temperature range for standard sealing (NBR)</td>
<td>°F (°C)</td>
<td>-22 ... +176 (-30 ... +80)</td>
</tr>
<tr>
<td>Fluid temperature range for Viton sealing (FPM)</td>
<td>°F (°C)</td>
<td>-4 ... +176 (-20 ... +80)</td>
</tr>
<tr>
<td>Viscosity range</td>
<td>SUS (mm²/s)</td>
<td>98 ... 1840 (20 ... 400)</td>
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<tr>
<td>Maximum degree of fluid contamination</td>
<td></td>
<td>Class 21/18/15 according to ISO 4406 (1999).</td>
</tr>
<tr>
<td>Weight</td>
<td>lbs (kg)</td>
<td>4.725 (2.15)</td>
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<tr>
<td>Mounting position</td>
<td></td>
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</tbody>
</table>

**Preferred Types of Valves**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSO2-10/MCS</td>
<td>525-0123</td>
</tr>
</tbody>
</table>

**Caution!**

- The packing foil is recyclable.
- The protecting plate can be returned to the manufacturer.
- Tightening torque of the screws is 11.13 ft-lbs (15 Nm).
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.
## Characteristics

Measured at $v = 166$ SUS (35 mm$^2$/s) and $t = 104 \, ^{\circ}F (40 \, ^{\circ}C)$

### Throttle valve

Pressure difference $\Delta p$ related to flow from A1 to A2, (from B1 to B2)

### Check valve

Pressure difference $\Delta p$ related to flow from A2 to A1, (from B2 to B1)

### Spare Parts

#### Seal kit

<table>
<thead>
<tr>
<th>Typ</th>
<th>Dimensions, quantity</th>
<th>Ordering number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O-ring</td>
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<tr>
<td>Standard NBR</td>
<td>18 x 2.65 NBR70 (2 pcs.)</td>
<td>525-9930</td>
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<tr>
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<td>6.9 x 1.8 NBR70 (2 pcs.)</td>
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<tr>
<td>Viton</td>
<td>17.12 x 2.62 (2 pcs.)</td>
<td>525-9960</td>
</tr>
<tr>
<td></td>
<td>6.75 x 1.78 (2 pcs.)</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>12.42 x 1.78 (5 pcs.)</td>
<td>-</td>
</tr>
</tbody>
</table>
Valve Dimensions  Dimensions in inches and millimetres (in brackets)

Type VSO2-10/MCS

1 Name plate
2 Set screw with inside hexagon 5 mm
Clockwise rotation = flow increase
Counterclockwise rotation = flow decrease
3 Lock nut hex. 10 mm
4 Protective cap
5 Sealing ring (5 pcs.)
Standard (NBR) R 014S 12.42 x 1.68
Viton (FPM) 12.42 x 1.78 supplied in each delivery packet
6 4 mounting holes (Ø 6.4 mm)
7 O-ring plate

Turning the valve around the x-axis changes the meter-out control mode into the meter-in one.

Type VSO2-10/MAS

Type VSO2-10/MBS

Subject to alteration without notice!
Pressure compensated flow control valves are designed to provide adjustable controlled flow rates independent of changes in inlet and/or outlet pressure. 2-way valves are used in meter-in, meter-out or bleed-off and or parallel applications. The flow control valve consists basically of housing (1), throttling spool (2), spring (3), pressure compensator (4) and a hand knob (5) with adjustment mechanism.

Flow control valve VSS1-206-A
Fluid from port A1 passes through orifice area (6) of the throttling spool, proceeds through its internal bore to the orifice area (7) modulated via the metering edge of the pressure compensator (4) and onwards to port A2. The flow rate depends on the orifice area (6) and is determined by rotating the adjustment knob (5). The knob can be fixed at the adjusted position via tightening screw (9). The spring pushes both the throttling spool and the spool of the pressure compensator to their extreme positions and provided that there is no flow through the valve, holds the orifice area (7) fully open. An introduction of flow to port A1 exposes inlet pressure through bore (8) to the bottom area of the compensator spool and causes this spool to move in closing direction, thus decreasing the pressure difference at the orifice area (6) of the throttling spool. The movement of the compensator stops as soon as a new equilibrium is reached. The pressure compensator compares continuously the pressure difference at the orifice area (6) with the amount preset by the spring pretension and modulates the orifice area (6) accordingly, thus holding the flow rate constant.

Flow control valve VSS1-206-B
This type of valve functions on the same principle as the previous one, however, reverse free-flow from port A2 to port A1 is provided for by the built-in check valve. Connection of port A1 with port P1 is ensured by cover plate or by directional valve situated at the upper face of housing (1) - see Functional symbols (vertical stacking assemblies).

Flow control valve VSS1-206-C
This valve has the same function as the valve described above, the only difference being the changed flow direction, i.e. controlled flow in direction A2 → A1 and free-flow in direction A1 → A2. The basic surface treatment of the valve housing is phosphate coated, whereas the surface of the other parts are zinc coated.

Functional Description
Pressure compensated flow control valves are designed to provide adjustable controlled flow rates independent of changes in inlet and/or outlet pressure. 2-way valves are used in meter-in, meter-out or bleed-off and or parallel applications. The flow control valve consists basically of housing (1), throttling spool (2), spring (3), pressure compensator (4) and a hand knob (5) with adjustment mechanism.

Flow control valve VSS1-206-A
Fluid from port A1 passes through orifice area (6) of the throttling spool, proceeds through its internal bore to the orifice area (7) modulated via the metering edge of the pressure compensator (4) and onwards to port A2. The flow rate depends on the orifice area (6) and is determined by rotating the adjustment knob (5). The knob can be fixed at the adjusted position via tightening screw (9). The spring pushes both the throttling spool and the spool of the pressure compensator to their extreme positions and provided that there is no flow through the valve, holds the orifice area (7) fully open. An introduction of flow to port A1 exposes inlet pressure through bore (8) to the bottom area of the compensator spool and causes this spool to move in closing direction, thus decreasing the pressure difference at the orifice area (6) of the throttling spool. The movement of the compensator stops as soon as a new equilibrium is reached. The pressure compensator compares continuously the pressure difference at the orifice area (6) with the amount preset by the spring pretension and modulates the orifice area (6) accordingly, thus holding the flow rate constant.

Flow control valve VSS1-206-B
This type of valve functions on the same principle as the previous one, however, reverse free-flow from port A2 to port A1 is provided for by the built-in check valve. Connection of port A1 with port P1 is ensured by cover plate or by directional valve situated at the upper face of housing (1) - see Functional symbols (vertical stacking assemblies).

Flow control valve VSS1-206-C
This valve has the same function as the valve described above, the only difference being the changed flow direction, i.e. controlled flow in direction A2 → A1 and free-flow in direction A1 → A2. The basic surface treatment of the valve housing is phosphate coated, whereas the surface of the other parts are zinc coated.
### Ordering Code

- **VSS1-206-**
- Flow control valve
- 2-way design

#### Nominal size

<table>
<thead>
<tr>
<th>Flow rate in US GPM (L/min)</th>
<th>6.3</th>
<th>12</th>
<th>22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q = 1.66 (6.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q = 3.17 (12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q = 5.81 (22)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Seals
- NBR
- Viton

#### Model
- A-02 for subplate mounting - without check valve
- A-11 sandwich plate design - without check valve
- B-11 sandwich plate design - with check valve, meter-in mode
- C-11 sandwich plate design - with check valve, meter-out mode

---

### Functional Symbols

**A** - without check valve

**Model A-02**

**Model A-11**

**B** - with check valve, meter-in mode

**Model B-11**

**C** - with check valve, meter-out mode

**Model C-11**

* Typical application of the valve in stacking assembly *

* Directional valve must be ordered separately.

---

### Technical Data

<table>
<thead>
<tr>
<th>Nominal size</th>
<th>mm</th>
<th>06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum flow rate</td>
<td>US GPM (L/min)</td>
<td>1.66 (6.3)</td>
</tr>
<tr>
<td>Minimum flow rate</td>
<td>cu.in./min (cm³/min)</td>
<td>3.66 (60)</td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>PSI (bar)</td>
<td>4641 (320)</td>
</tr>
<tr>
<td>Minimum pressure drop</td>
<td>PSI (bar)</td>
<td>see performance curves</td>
</tr>
<tr>
<td>Hydraulic fluid</td>
<td></td>
<td>Hydraulic oils of power classes HM, HV to CETOP RP 91 H in viscosity classes ISO VG 32, 46 and 68</td>
</tr>
<tr>
<td>Fluid temperature range (NBR / Viton)</td>
<td>°F (°C)</td>
<td>-22 ... +176 (-30 ... +80) / -4 ... +176 (-20 ... +80)</td>
</tr>
<tr>
<td>Viscosity range</td>
<td>SUS (mm²/s)</td>
<td>98 ... 1840 (20 ... 400)</td>
</tr>
<tr>
<td>Maximum degree of fluid contamination</td>
<td></td>
<td>Class 20/17/14 according to ISO 4406 (1999).</td>
</tr>
<tr>
<td>for Q ≤ 0.26 US GPM (1 L/min)</td>
<td></td>
<td>Class 21/18/15 according to ISO 4406 (1999).</td>
</tr>
<tr>
<td>for Q &gt; 0.26 US GPM (1 L/min)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>lbs (kg)</td>
<td>1.8 (0.8)</td>
</tr>
<tr>
<td>Mounting position</td>
<td></td>
<td>optional</td>
</tr>
</tbody>
</table>
**p-Q Characteristics**

Measured at $v = 166$ SUS (35 mm²/s) and $t = 104$ °F (40 °C)

Flow rate dependent upon scale adjustment setting (flow control P → A)

**Model**

VSS1-206-6.3x-xx

[Graph showing flow rate dependent upon scale adjustment setting (flow control P → A)]

Flow rate dependent upon pressure

**Model**

VSS1-206-12x-xx

[Graph showing flow rate dependent upon pressure]
**p-Q Characteristics**

Measured at \( v = 166 \text{ SUS} \) (35 \( \text{mm}^2/\text{s} \)) and \( t = 104 \text{ °F} \) (40 °C)

Flow rate dependent upon scale adjustment setting (flow control P → A)  
Flow rate dependent upon pressure

**Model**  
VSS1-206-22x-xx

---

**Flow rate dependent upon scale adjustment setting**

**Scale division on valve**

![Scale division graph]

**Pressure drop across check valve during reverse flow** (A → P)

![Pressure drop graph]

Flow in US GPM (L/min)

Flow orifice closed

Flow orifice open

6.3

12

22
Valve Dimensions  Dimensions in inches and millimetres (in brackets)

Models A-11, B-11, C-11

Cover plate DK1-06/32-3 (see HA 0003)

1 Name plate
2 O-rings, Type Square ring 012 (9.25x1.68) (4pcs.) or compatible supplied in delivery packet
3 O-rings, Type Square ring 012 (9.25x1.68) (2pcs.) or compatible supplied in delivery packet
4 Adjustment mechanism:
   clockwise rotation - flow decrease
   counter-clockwise rotation - flow increase
5 Hole with set screw for fixing the handknob in set position

Models A-02

Required surface finish of interface

0.0004/0.010 in
0.01/0.100 mm
0.08 (Rmax. 6.3)
Caution!

- The packing foil is recyclable.
- The transport plate is to be returned to the supplier.
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.
Functional Description

Pressure compensated flow control valves VSS2-062 are designed to provide adjustable controlled flow rates independent of changes in pressure and temperature. They consist basically of housing (1), sleeve (2), throttling spool (3), spring (4), pressure compensator (5) and hand knob (7) with the respective setting mechanism. The valve housing is phosphate coated.

Flow control valve VSS2-062-xxQ/Jx0-1
(without external pilot closing of pressure compensator)
Flow throttling in direction A → B takes place at the throttling area (8) which can be adjusted by hand knob (7). To ensure the flow rate stability in port B, a pressure compensator (5) is located behind the throttling area (8).

The spring (4) pushes both the throttling spool (3) and the pressure compensator (5) into their extreme positions, and provided that there is no flow through the valve, holds the pressure compensator open.

An introduction of flow to port A exposes inlet pressure through orifice (9) to the bottom area of the compensator spool and causes this spool to move in closing direction, thus decreasing the pressure difference at the throttling area (8). The movement of the compensator spool stops as a new equilibrium is reached. The pressure compensator compares continuously the pressure difference at the throttling area (8) with the amount preset by the spring preloading and accomplishes the required control, thus holding the flow rate constant.
Flow control valve VSS2-206-x/JxA-1
(with external pilot closing of pressure compensator)

This model functions on the same principle as the previous one. However, with this type of valve, the bottom surface area of the compensator is connected to an external port P via orifice (10), rather than being internally connected to port A. This arrangement enables external pilot closing of pressure compensator, which function can be described using the circuit diagram shown.

When there is no flow through the valve (directional valve (11) in its middle position), pressure in port P acts at the bottom area of the compensator via orifice (10) and holds the compensator in its upper closed position. When the directional valve is shifted to its left position, the port A is connected to the system pressure, but the closed compensator avoids abrupt flow increase in port B. Hence, lunge of the actuator during start-up is prevented. The function of the compensator is the same, as the function described above. This model with external pilot closing of the compensator can only be used in meter-in circuits.

Reverse free-flow from port B to port A, with both types of the flow control valves, is provided for by a built-in check valve (6).

Ordering Code

<table>
<thead>
<tr>
<th>VSS2-206-</th>
<th>/J</th>
<th>-1</th>
</tr>
</thead>
</table>

Flow control valves

2-way design

Nominal size

Max. flow rate in US GPM (L/min)
- 0.42 (1.6) 1,6Q
- 0.85 (3.2) 3,2Q
- 1.66 (6.3) 06Q
- 4.23 (16) 16Q
- 8.45 (32) 32Q

Built-in check valve

Seals
- without designation NBR
- V FPM (Viton)

Design

Variant
- A with external pilot closing of the pressure compensator
- O without external pilot closing of the pressure compensator

Adjustment
- Z hand knob with keylock
- O hand knob without keylock

FOR PREFERRED TYPES SEE BOLD TYPING IN ORDERING CODE AND TABLE OF PREFERRED TYPES ON PAGE 3
**Technical Data**

<table>
<thead>
<tr>
<th></th>
<th>Nominal size</th>
<th>mm</th>
<th>06</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nominal size</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum flow</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>US GPM (L/min)</td>
<td>0.42</td>
<td>(1.6)</td>
<td>0.85</td>
</tr>
<tr>
<td>Maximum working pressure at port A</td>
<td>PSI (bar)</td>
<td>4641</td>
<td>(320)</td>
</tr>
<tr>
<td>Maximum working pressure at port B</td>
<td>PSI (bar)</td>
<td>4641</td>
<td>(320)</td>
</tr>
<tr>
<td>Pressure drop</td>
<td>PSI (bar)</td>
<td>123 ... 203</td>
<td>(8.5 ... 14)</td>
</tr>
<tr>
<td>Hydraulic fluid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for standard sealing (NBR)</td>
<td>°F (°C)</td>
<td>-22 ... +176</td>
<td>(-30 ... +80)</td>
</tr>
<tr>
<td>Fluid temperature range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for Viton seals (FPM)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>°F (°C)</td>
<td>-4 ... +176</td>
<td>(-20 ... +80)</td>
<td></td>
</tr>
<tr>
<td>Viscosity range</td>
<td>SUS (mm²/s)</td>
<td>98 ... 1840</td>
<td>(20 ... 400)</td>
</tr>
<tr>
<td>Maximum degree of fluid contamination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- for Q ≤ 0.26 US GPM (L/min)</td>
<td></td>
<td>Class 20/17/14 to ISO 4406 (1999).</td>
<td></td>
</tr>
<tr>
<td>- for Q &gt; 0.26 US GPM (L/min)</td>
<td></td>
<td>Class 21/18/15 to ISO 4406 (1999).</td>
<td></td>
</tr>
<tr>
<td>Permissible flow rate variation</td>
<td>%</td>
<td>± 5</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>lbs (kg)</td>
<td>2.418</td>
<td>(1.1)</td>
</tr>
<tr>
<td>Mounting position</td>
<td></td>
<td>optional</td>
<td></td>
</tr>
</tbody>
</table>

**Spare Parts**

**Seal kit**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions, quantity</th>
<th>Ordering number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard NBR</td>
<td>O-ring 9.25 x 1.68 NBR70 (4 pcs.)</td>
<td>521-0021</td>
</tr>
<tr>
<td></td>
<td>B BACK-UP RING 3.56 x 6.26 x 1.14 (1 pc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15 x 1.8 NBR70 (4 pcs.)</td>
<td>521-00032</td>
</tr>
<tr>
<td></td>
<td>9 x 1.8 NBR70 (1 pc.)</td>
<td>521-0004</td>
</tr>
<tr>
<td></td>
<td>4 x 1.75 (1 pc.)</td>
<td>521-0005</td>
</tr>
<tr>
<td></td>
<td>12.42 x 1.78 (1 pc.)</td>
<td>521-0005</td>
</tr>
<tr>
<td></td>
<td>15 x 1.8 (4 pcs.)</td>
<td>521-0005</td>
</tr>
<tr>
<td></td>
<td>9.25 x 1.78 90SH FPM SW (4 pcs.)</td>
<td>521-0005</td>
</tr>
<tr>
<td></td>
<td>4 x 1.75 (1 pc.)</td>
<td>521-0005</td>
</tr>
<tr>
<td></td>
<td>12.42 x 1.78 (1 pc.)</td>
<td>521-0005</td>
</tr>
<tr>
<td></td>
<td>9.25 x 1.78 FPM70 (1 pc.)</td>
<td>521-0005</td>
</tr>
</tbody>
</table>

**Preferred Types of Valves**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSS2-206-06Q/JZO-1</td>
<td>521-0032</td>
</tr>
<tr>
<td>VSS2-206-16Q/JZO-1</td>
<td>521-0004</td>
</tr>
<tr>
<td>VSS2-206-32Q/JZO-1</td>
<td>521-0005</td>
</tr>
</tbody>
</table>

**Functional Symbols**

Flow control valve: simplified
- without external pilot
- with external pilot

Flow control valve: detailed
- without external pilot
- with external pilot
p-Q Characteristics

Check Valve Characteristic $\Delta p = f(Q)$

Dependency Flow-Temperature
Characteristics $Q = f(p)$

Flow rate dependent upon pressure

Model 1,6Q

Model 3,2Q

Model 06Q

Model 16Q

Model 32Q

Inlet pressure in PSI (bar)
阀尺寸
尺寸以英寸和毫米（括号内）表示

1. 口A（进口）
2. 口B（出口）
3. 口P（孔径5.2毫米，单孔，允许外部补偿器的外部闭合，否则为沉孔定位O形圈）
4. 沉孔定位O形圈（T孔位置）
5. 品牌
6. 方形环012 - KANTSEAL（4件）
9.25x1.68 NBR70
7. 流量调节旋钮
8. 带手柄阀杆高度
9. 带手柄阀杆高度
10. 选定距离移除键

注意！
- 包装箔可回收利用。
- 固定螺栓M5x30 DIN 912-10.9（4件）必须单独订购。
- 螺栓的紧固扭矩为6.6 ft-lbs（8.9 Nm）。
- 本产品目录中提供的技术信息仅用于描述目的，不构成法律上保证产品性能的代表。

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www.argo-hytos.com

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Functional Description

3-way pressure compensated flow control valves are designed to provide adjustable controlled flow rates independent of changes in system pressure. The flow control valve consists basically of housing (1), throttling spool (2), pressure compensator (3), spring (4) and hand knob (5) with adjustment mechanism. Fluid from port P2 is divided into two parts, one part of flow passes through orifice area (6) of the throttling spool and onwards through bore P to port P1, the other part proceeds through orifice area (7) of the compensator to port T. The flow rate depends on the orifice area (6) and is determined by rotating the adjustment knob (5). The knob can be fixed at the set position via adjustment screw (8). The compensator compares continuously the pressure difference at the orifice area (6) with the amount preset by the spring pretension and modulates accordingly the orifice area (7) of the compensator which relieves the excessive flow to tank, thus holding the flow rate constant. The valve housing is phosphate coated, the surfaces of the other parts are zinc coated.
**Ordering Code**

VSS1-306-16-11

- Flow control valves
- 3-way design
- Valvesize
- Seal NBR
- Sandwich plate design without cover plate
- Flow rate Q = 4.2 US GPM (16 L/min)

**FOR PREFERRED TYPES SEE BOLD TYPING IN ORDERING CODE AND TABLE OF PREFERRED TYPES ON PAGE 3**

**Functional Symbols**

- Functional symbol of the valve
- Typical application of the valve in stacking assembly

**Technical Data**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Valve size</td>
<td>mm 06</td>
</tr>
<tr>
<td>Maximum flow</td>
<td>US GPM (L/min) 4.2 (16)</td>
</tr>
<tr>
<td>Minimum flow</td>
<td>cu.in./min (cm³/min) 3.66 (60)</td>
</tr>
<tr>
<td>Maximum operating pressure</td>
<td>PSI (bar) 4641 (320)</td>
</tr>
<tr>
<td>Hydraulic fluid</td>
<td>Hydraulic oils of power classes HM, HV to CETOP RP 91H in viscosity classes ISO VG 32, 46 and 68</td>
</tr>
<tr>
<td>Fluid temperature range for standard sealing (NBR)</td>
<td>°F (°C) -22 ... +176 (-30 ... +80)</td>
</tr>
<tr>
<td>Fluid temperature range for Viton seals (FPM)</td>
<td>°F (°C) -4 ... +176 (-20 ... +80)</td>
</tr>
<tr>
<td>Viscosity range</td>
<td>SUS (mm²/s) 98 ... 1840 (20 ... 400)</td>
</tr>
<tr>
<td>Maximum degree of fluid contamination</td>
<td>Class 21/18/15 to ISO 4406 (1999).</td>
</tr>
<tr>
<td>Permissible flow rate variation at pressure change 6 ... 100%</td>
<td>% ± 10</td>
</tr>
<tr>
<td>Weight</td>
<td>lbs (kg) 1.8 (0.8)</td>
</tr>
<tr>
<td>Mounting position</td>
<td>optional</td>
</tr>
</tbody>
</table>

*Directional valve must be ordered separately*
Characteristics

Measured at $v = 166$ SUS (35 mm$^2$/s) and $t = 104^\circ$F (40 °C)

**Flow rate dependent upon scale adjustment setting**

<table>
<thead>
<tr>
<th>Flow in US GPM (L/min)</th>
<th>Scale division on valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>(2)</td>
</tr>
<tr>
<td>1</td>
<td>(4)</td>
</tr>
<tr>
<td>1.5</td>
<td>(6)</td>
</tr>
<tr>
<td>2</td>
<td>(8)</td>
</tr>
<tr>
<td>2.5</td>
<td>(10)</td>
</tr>
<tr>
<td>3</td>
<td>(12)</td>
</tr>
<tr>
<td>3.5</td>
<td>(14)</td>
</tr>
<tr>
<td>4</td>
<td>(16)</td>
</tr>
</tbody>
</table>

**Flow rate dependent upon pressure**

<table>
<thead>
<tr>
<th>Pressure in PSI (bar)</th>
<th>Flow in US GPM (L/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.5</td>
</tr>
<tr>
<td>500</td>
<td>1</td>
</tr>
<tr>
<td>1000</td>
<td>2</td>
</tr>
<tr>
<td>1500</td>
<td>2.5</td>
</tr>
<tr>
<td>2000</td>
<td>3</td>
</tr>
<tr>
<td>2500</td>
<td>3.5</td>
</tr>
<tr>
<td>3000</td>
<td>4</td>
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</tbody>
</table>

**Spare Parts**

**Seal kit**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions, quantity</th>
<th>Ordering number</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-ring</td>
<td>24/20 (1pc.)</td>
<td></td>
</tr>
<tr>
<td>Standard NBR</td>
<td>8/4 1078 NBR80 (1 pc.)</td>
<td>417-9900</td>
</tr>
<tr>
<td></td>
<td>16 x 2 (1 pc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 x 2 (4 pcs.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14 x 2 (1 pc.)</td>
<td></td>
</tr>
<tr>
<td>Viton</td>
<td>19.3 x 2.4 (1 pc.)</td>
<td>417-9800</td>
</tr>
<tr>
<td></td>
<td>3 x 2.4 (1 pc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16 x 2 (1 pc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.25 x 1.78 (4 pcs.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14 x 2 (1 pc.)</td>
<td></td>
</tr>
</tbody>
</table>

**Preferred Types of Valves**

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSS1-306-16-11</td>
<td>417-0004</td>
</tr>
</tbody>
</table>
Valve Dimensions
Dimensions in inches and millimeters (in brackets)

Caution!

- The packing foil is recyclable.
- The transport plate is to be returned to the supplier.
- Mounting bolts M5x60 or assembly studs (4 pcs.) must be ordered separately. Tightening torque 6.6 ft-lbs (8.9 Nm).
- The technical information regarding the product presented in this catalogue is for descriptive purposes only. It should not be construed in any case as a guaranteed representation of the product properties in the sense of the law.

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