

## Solenoid/pneumatic valves, Tiger Classic

**FESTO**



Key features

| General                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Very sturdy poppet valve concept for all 3/2 and 5/2-way valves</li><li>• Pneumatic or electrical actuation with F solenoid coil</li><li>• With flow rates of up to 7500 l/min</li></ul> | <ul style="list-style-type: none"><li>• Pipe thread in sizes G1/8, G1/4, G1/2 and G3/4</li><li>• Tried-and-tested mounting using hollow bolt on PAL or PRS rail</li><li>• Optimised response times with patented U-ring and servo control</li></ul> |



**Note**

Valves for potentially explosive atmospheres (ATEX category) are not suitable for mounting on manifold rails PAL or manifold blocks PRS.

| Solenoid coils                                                                                                          |                                                                                                                       |                                                                                                                                      |                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| F solenoid coils                                                                                                        |                                                                                                                       |                                                                                                                                      |                                                                                                                                                         |
| <p>Voltage:</p> <ul style="list-style-type: none"><li>• 12 to 230 V DC</li><li>• 12 to 240 V AC (50 to 60 Hz)</li></ul> | <p>Power consumption:</p> <ul style="list-style-type: none"><li>• 4.1 to 5.5 W DC</li><li>• 3.85 to 9 VA AC</li></ul> | <ul style="list-style-type: none"><li>• Selected types conform to the ATEX directive for potentially explosive atmospheres</li></ul> | <ul style="list-style-type: none"><li>• Solenoid coil can be easily exchanged later</li><li>• Solenoid coil not included in scope of delivery</li></ul> |

| Variants                                                               |                                                                                                                        |                                                                                                    |                                                                                                                                          |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| VL/O-3-...                                                             | MFH-3-..., MOFH-3-...                                                                                                  |                                                                                                    | MFH-3-...-S                                                                                                                              |
| Depending on selected connections:<br>Normally closed or normally open | <ul style="list-style-type: none"><li>• MFH-3-...<br/>Normally closed</li><li>• MOFH-3-...<br/>Normally open</li></ul> | These valves can be converted from one function to the other by rotating the seal under the cover. | This valve type can be used within a range of 0 to 0.8 MPa and also as MOFH (through flow when not actuated) with a separate pilot line. |

| MFH-5-...-S                                                                                              |
|----------------------------------------------------------------------------------------------------------|
| The external pilot air connection means that these valves can also be used with low operating pressures. |

## Key features

### Manifold assembly

With PAL manifold rail



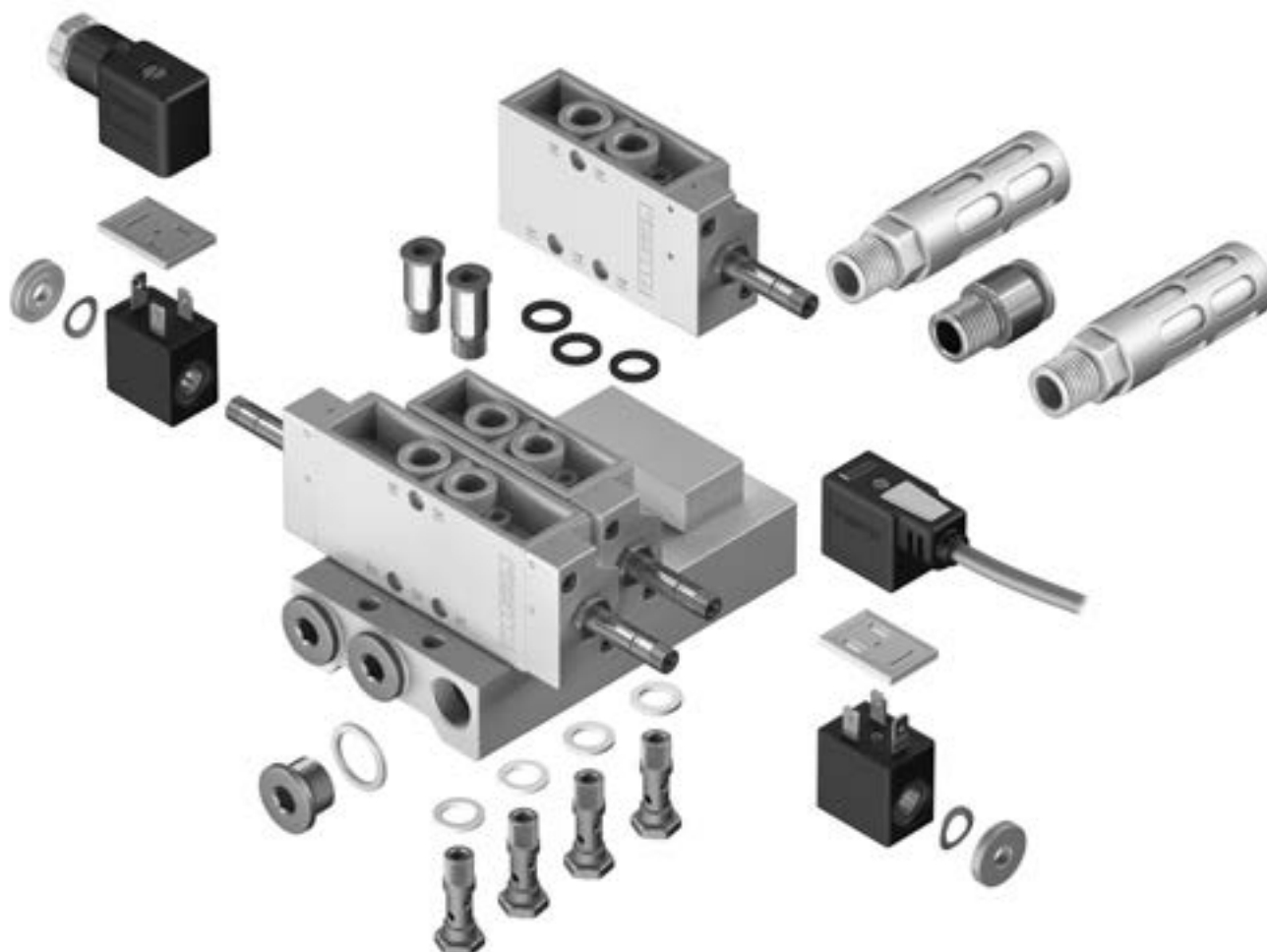
With PRS manifold block



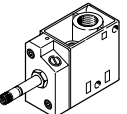
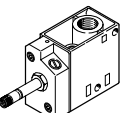
The Tiger Classic valves can be mounted on manifold rails PAL with common supply port or on manifold blocks PRS with common supply port and common exhausts. The valves are mounted on the rails and blocks with hollow bolts. The manifold rail and manifold block have 2 to 6 valve positions.

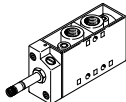
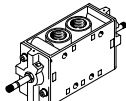
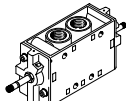
Vacant positions can be sealed on manifold rails PAL with cap nuts, or with cover plates on manifold blocks PRS.

A separate pressure level can be supplied to individual valves via hollow bolts with threaded connection.



Product range overview

| Function       | Design                                                                            | Type | Pneumatic connection | Operating voltage |                           |
|----------------|-----------------------------------------------------------------------------------|------|----------------------|-------------------|---------------------------|
|                |                                                                                   |      |                      | [V DC]            | [V AC]                    |
| 3/2-way valves | Solenoid valve                                                                    |      |                      |                   |                           |
|                |  | MFH  | G1/8                 | 12, 24, 42, 48    | 24, 42, 48, 110, 230, 240 |
|                |                                                                                   |      | G1/4                 |                   |                           |
|                |                                                                                   |      | G1/2                 |                   |                           |
|                |                                                                                   |      | G3/4                 |                   |                           |
|                |  | MOFH | G1/8                 | 12, 24, 42, 48    | 24, 42, 48, 110, 230, 240 |
|                |                                                                                   |      | G1/4                 |                   |                           |
|                |                                                                                   |      | G1/2                 |                   |                           |
|                |                                                                                   |      | G3/4                 |                   |                           |

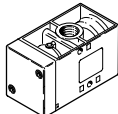
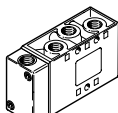
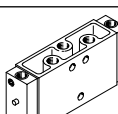
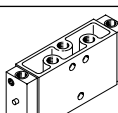
| Function       | Design                                                                              | Type | Pneumatic connection | Operating voltage |                           |
|----------------|-------------------------------------------------------------------------------------|------|----------------------|-------------------|---------------------------|
|                |                                                                                     |      |                      | [V DC]            | [V AC]                    |
| 5/2-way valves | Solenoid valve                                                                      |      |                      |                   |                           |
|                |    | MFH  | G1/8                 | 12, 24, 42, 48    | 24, 42, 48, 110, 230, 240 |
|                |                                                                                     |      | G1/4                 |                   |                           |
|                |                                                                                     |      | G1/2                 |                   |                           |
|                | Double solenoid valve                                                               |      |                      |                   |                           |
|                |   | JMFH | G1/8                 | 12, 24, 42, 48    | 24, 42, 48, 110, 230, 240 |
|                |                                                                                     |      | G1/4                 |                   |                           |
|                |                                                                                     |      | G1/2                 |                   |                           |
|                | Double solenoid valve with dominant signal                                          |      |                      |                   |                           |
|                |  | JMFH | G1/8                 | 12, 24, 42, 48    | 24, 42, 48, 110, 230, 240 |
|                |                                                                                     |      | G1/4                 |                   |                           |

## Product range overview

| Type           | Normal position |      | Pilot air supply |          | Reset method     |                   | → Page |
|----------------|-----------------|------|------------------|----------|------------------|-------------------|--------|
|                | Closed          | Open | Internal         | External | Pneumatic spring | Mechanical spring |        |
| Solenoid valve |                 |      |                  |          |                  |                   |        |
| MFH            | ■               | –    | ■                | ■        | –                | ■                 | 12     |
|                | ■               | –    | ■                | ■        | –                | ■                 |        |
|                | ■               | –    | ■                | ■        | –                | ■                 |        |
|                | ■               | –    | ■                | ■        | –                | ■                 |        |
| MOFH           | –               | ■    | ■                | –        | –                | ■                 | 12     |
|                | –               | ■    | ■                | –        | –                | ■                 |        |
|                | –               | ■    | ■                | –        | –                | ■                 |        |
|                | –               | ■    | ■                | –        | –                | ■                 |        |

| Type                                       | Pilot air supply |          | Reset method     |                   | → Page |
|--------------------------------------------|------------------|----------|------------------|-------------------|--------|
|                                            | Internal         | External | Pneumatic spring | Mechanical spring |        |
| Solenoid valve                             |                  |          |                  |                   |        |
| MFH                                        | ■                | ■        | –                | ■                 | 18     |
|                                            | ■                | ■        | –                | ■                 |        |
|                                            | ■                | ■        | –                | ■                 |        |
| Double solenoid valve                      |                  |          |                  |                   |        |
| JMFH                                       | ■                | ■        | –                | –                 | 24     |
|                                            | ■                | ■        | –                | –                 |        |
|                                            | ■                | ■        | –                | –                 |        |
| Double solenoid valve with dominant signal |                  |          |                  |                   |        |
| JMFDH                                      | –                | ■        | –                | –                 | 24     |
|                                            | –                | ■        | –                | –                 |        |

# Product range overview

| Function                                                                          | Design                                                                            | Type                                          | Pneumatic connection | Reset method                                                                      |                   | → Page/Internet |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------|----------------------|-----------------------------------------------------------------------------------|-------------------|-----------------|
|                                                                                   |                                                                                   |                                               |                      | Pneumatic spring                                                                  | Mechanical spring |                 |
| 3/2-way valves                                                                    |  | VL/O                                          | G1/8                 | –                                                                                 | ■                 | 31              |
|                                                                                   |                                                                                   |                                               | G1/4                 | –                                                                                 | ■                 |                 |
|                                                                                   |                                                                                   |                                               | G1/2                 | –                                                                                 | ■                 |                 |
|                                                                                   |                                                                                   |                                               | G3/4                 | –                                                                                 | ■                 |                 |
|                                                                                   |                                                                                   |                                               | 5/2-way valves       |  | VL                | G1/8            |
| G1/4                                                                              | –                                                                                 | ■                                             |                      |                                                                                   |                   |                 |
| G1/2                                                                              | –                                                                                 | ■                                             |                      |                                                                                   |                   |                 |
| Pneumatic double pilot valve                                                      |                                                                                   |                                               |                      |                                                                                   |                   |                 |
|  | JH                                                                                | G1/8                                          |                      | –                                                                                 | –                 | 41              |
|                                                                                   |                                                                                   | G1/4                                          |                      | –                                                                                 | –                 |                 |
|                                                                                   |                                                                                   | G1/2                                          |                      | –                                                                                 | –                 |                 |
|                                                                                   |                                                                                   | Pneumatic bistable valve with dominant signal |                      |                                                                                   |                   |                 |
|  | JDH                                                                               | G1/8                                          | –                    | –                                                                                 | 41                |                 |
|                                                                                   |                                                                                   | G1/4                                          | –                    | –                                                                                 |                   |                 |

## Type codes

| 001          | Series                                                                                        |  |
|--------------|-----------------------------------------------------------------------------------------------|--|
| <b>MCH</b>   | Solenoid valve, with armature tube for C solenoid coil, single solenoid, normally closed      |  |
| <b>MFH</b>   | Solenoid valve, with armature tube for F solenoid coil, single solenoid, normally closed      |  |
| <b>MOCH</b>  | Solenoid valve, with armature tube for C solenoid coil, single solenoid, normally open        |  |
| <b>MOFH</b>  | Solenoid valve, with armature tube for F solenoid coil, single solenoid, normally open        |  |
| <b>JMFH</b>  | Solenoid valve, with armature tube for F solenoid coil, double solenoid                       |  |
| <b>JMFDH</b> | Solenoid valve, with armature tube for F solenoid coil, with dominant signal, double solenoid |  |
| <b>JH</b>    | Pneumatic double pilot valve                                                                  |  |
| <b>JDH</b>   | Pneumatic double pilot valve with dominant signal                                             |  |
| <b>VL/O</b>  | Pneumatic valve, monostable, normally open or closed                                          |  |
| <b>VL</b>    | Pneumatic valve, monostable                                                                   |  |

| 002      | Valve function |  |
|----------|----------------|--|
| <b>3</b> | 3/2-way valve  |  |
| <b>5</b> | 5/2-way valve  |  |

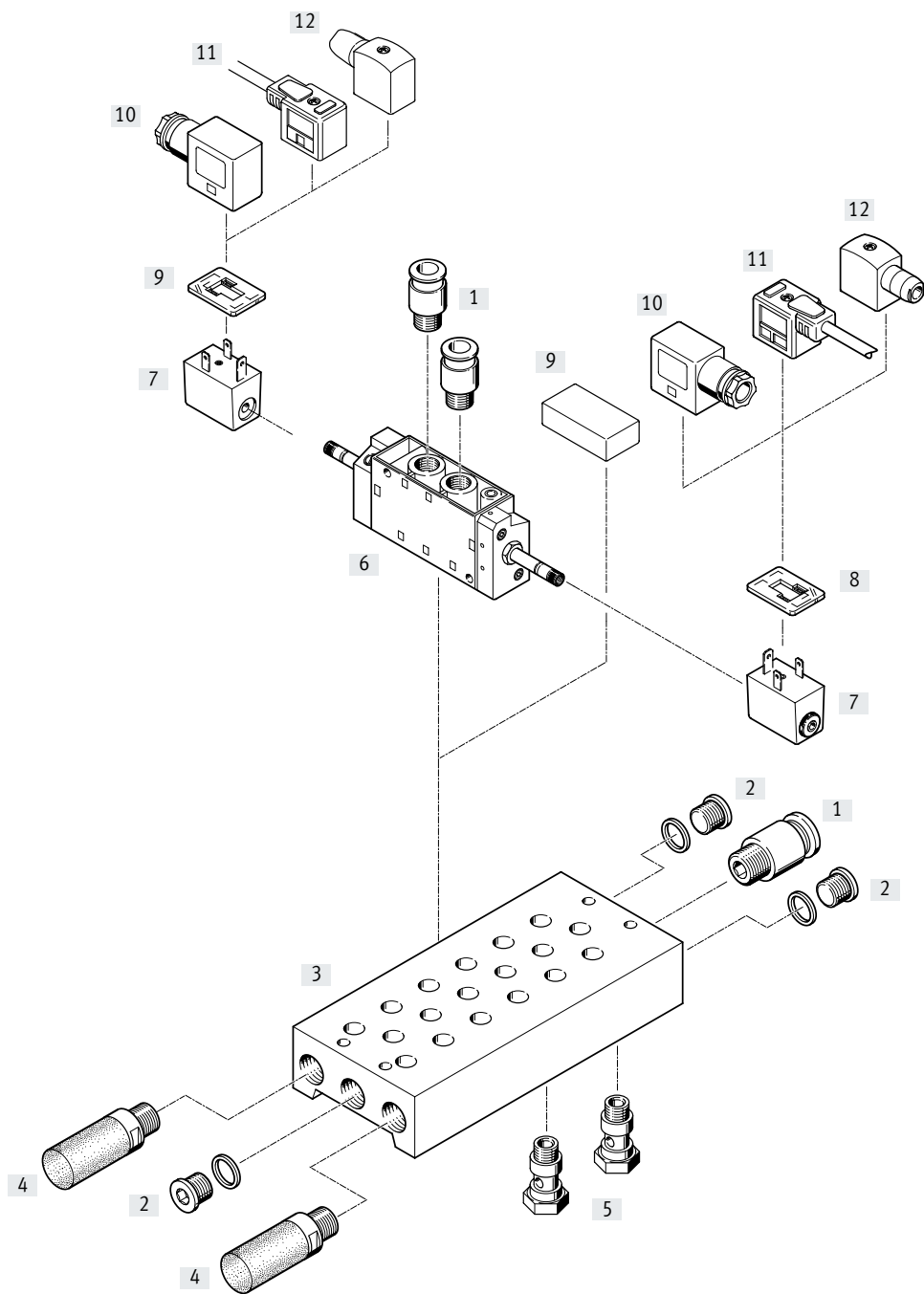
| 003        | Pneumatic connection |  |
|------------|----------------------|--|
| <b>G18</b> | G1/8                 |  |
| <b>G14</b> | G1/4                 |  |
| <b>G12</b> | G1/2                 |  |
| <b>G34</b> | G3/4                 |  |

| 004        | EU certification |  |
|------------|------------------|--|
|            | None             |  |
| <b>EX4</b> | II 2GD           |  |

| 005      | Pilot air |  |
|----------|-----------|--|
| <b>S</b> | External  |  |
|          | Internal  |  |

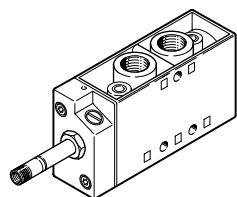
Peripherals overview solenoid valves

Mounting on manifold block

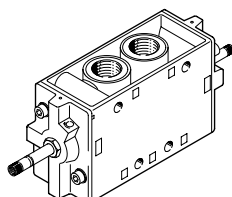


Variants

MFH-5...



JMFH-5...

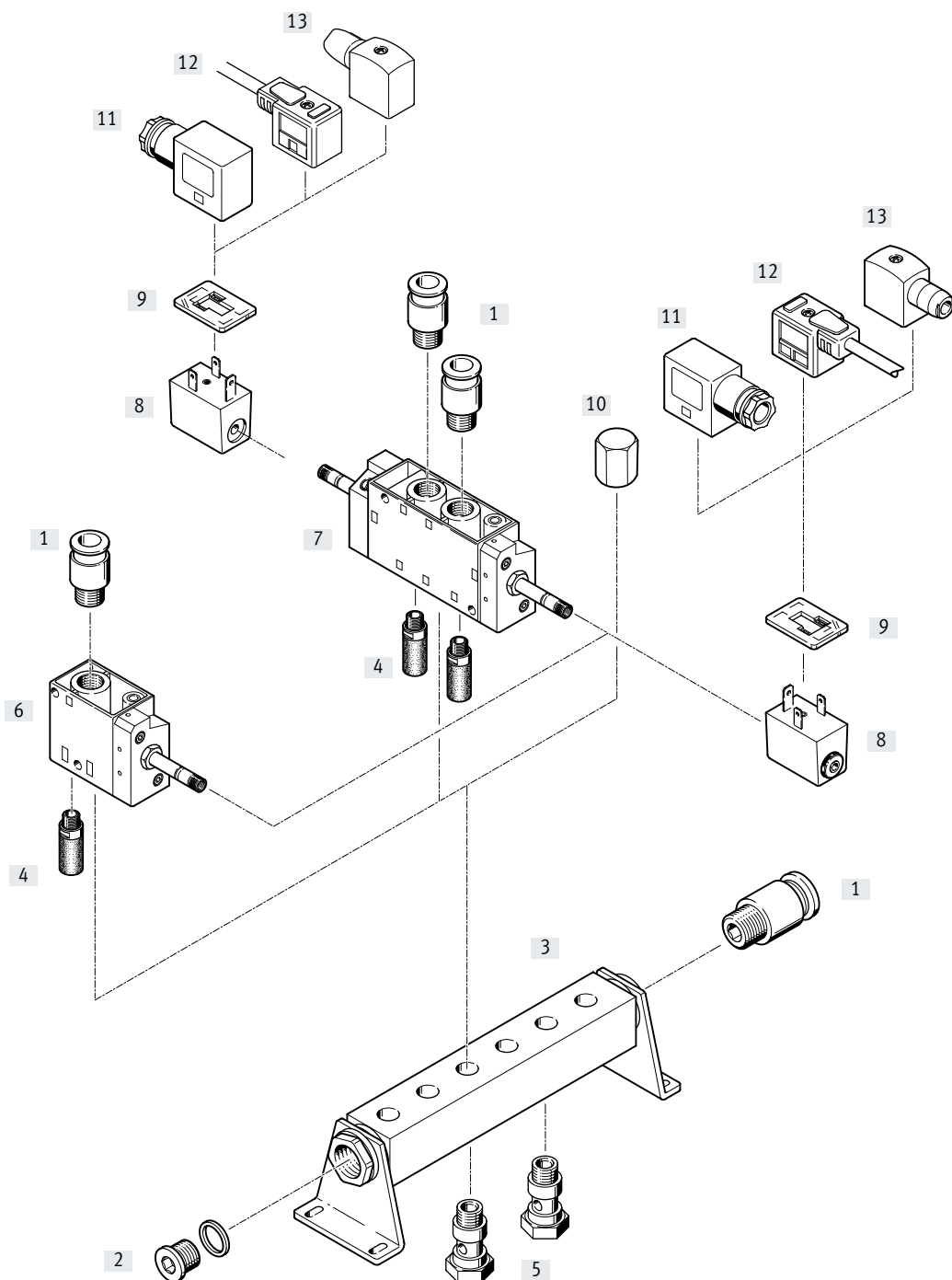


## Peripherals overview solenoid valves

| Accessories |                               | Brief description                                                     | → Page/Internet |
|-------------|-------------------------------|-----------------------------------------------------------------------|-----------------|
| [1]         | Push-in fitting<br>QS         | For connecting compressed air tubing with standard O.D.               | qs              |
| [2]         | Blanking plug<br>B            | 3 included in the scope of delivery of the manifold block PRS         | blanking plug   |
| [3]         | Manifold block<br>PRS         |                                                                       | 48              |
| [4]         | Silencer                      | For mounting in exhaust ports                                         | –               |
| [5]         | Hollow bolt<br>VT             | For distributing compressed air or for separate compressed air supply | 47              |
| [6]         | Solenoid valve<br>JMFH        | For F solenoid coil                                                   | –               |
| [7]         | F solenoid coil<br>MSFG, MSPW |                                                                       | 50              |
| [8]         | Illuminating seal<br>M...-LD  | For indicating the switching status                                   | 51              |
| [9]         | Cover plate<br>PRSB           | For covering a vacant position                                        | 49              |
| [10]        | Plug socket<br>MSSD-F         | For valves MFH, JMFH                                                  | 50              |
| [11]        | Connecting cable<br>KMF       | For valves MFH, JMFH                                                  | 50              |
| [12]        | Plug socket<br>MSSD-F-S       | For valves MFH, JMFH                                                  | 50              |

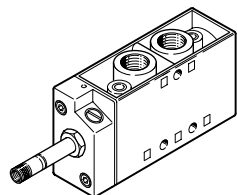
Peripherals overview solenoid valves

Mounting on manifold rail

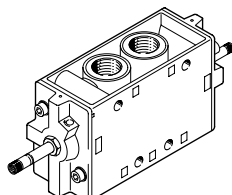


Variants

MFH-5-...



JMFH-5-...



## Peripherals overview solenoid valves

| Accessories |                               | Brief description                                                     | → Page/Internet |
|-------------|-------------------------------|-----------------------------------------------------------------------|-----------------|
| [1]         | Push-in fitting<br>QS         | For connecting compressed air tubing with standard O.D.               | qs              |
| [2]         | Blanking plug<br>B            | 1 included in the scope of delivery of the manifold rail PAL          | blanking plug   |
| [3]         | Manifold rail<br>PAL          |                                                                       | 46              |
| [4]         | Silencer                      | For mounting in exhaust ports                                         | –               |
| [5]         | Hollow bolt<br>VT             | For distributing compressed air or for separate compressed air supply | 47              |
| [6]         | Solenoid valve<br>MFH         | For F solenoid coil                                                   | 4               |
| [7]         | Solenoid valve<br>JMFH        | For F solenoid coil                                                   | 4               |
| [8]         | F solenoid coil<br>MSFG, MSPW |                                                                       | 50              |
| [9]         | Illuminating seal<br>M...-LD  | For indicating the switching status                                   | 51              |
| [10]        | Cap nut<br>VTM                | For blanking a vacant position                                        | 47              |
| [11]        | Plug socket<br>MSSD-F         | For valves MFH, JMFH                                                  | 50              |
| [12]        | Connecting cable<br>KMF       | For valves MFH, JMFH                                                  | 50              |
| [13]        | Plug socket<br>MSSD-F-S       | For valves MFH, JMFH                                                  | 50              |

## Data sheet – 3/2-way valves

-  Flow rate  
500 ... 7500 l/min
-  Voltage  
12, 24, 42, 48 V DC  
24, 42, 48, 110, 230,  
240 V AC

Sets of wearing parts → page 17



| General technical data             |                                                                                         |      |      |      |
|------------------------------------|-----------------------------------------------------------------------------------------|------|------|------|
| Pneumatic connection               | G1/8                                                                                    | G1/4 | G1/2 | G3/4 |
| Valve function                     | 3/2-way, single solenoid                                                                |      |      |      |
| Design                             | Poppet seat                                                                             |      |      |      |
| Overlap                            | Negative overlap                                                                        |      |      |      |
| Sealing principle                  | Soft                                                                                    |      |      |      |
| Actuation type                     | Electrical                                                                              |      |      |      |
| Reset method                       | Mechanical spring                                                                       |      |      |      |
| Type of control                    | Piloted                                                                                 |      |      |      |
| Pilot air supply                   | Internal or external                                                                    |      |      |      |
| Flow direction                     | Non-reversible (reversible/reversible with restrictions with external pilot air supply) |      |      |      |
| Exhaust function                   | Can be throttled                                                                        |      |      |      |
| Manual override                    | Detenting                                                                               |      |      |      |
| Type of mounting                   | Via through-hole or on manifold rail/manifold block <sup>1)</sup>                       |      |      |      |
| Mounting position                  | Any                                                                                     |      |      |      |
| Electrical connection              | Via F solenoid coil, to be ordered separately                                           |      |      |      |
| Port for venting hole              | M5 (only ATEX types)                                                                    |      |      |      |
| Pilot exhaust air port 82/84       | M5                                                                                      |      |      |      |
| Pilot air port 12                  | M5                                                                                      | M5   | G1/8 | G1/8 |
| b value                            | –                                                                                       | –    | 0.3  | –    |
| Nominal width [mm]                 | 5                                                                                       | 7    | 14   | 19   |
| Standard nominal flow rate [l/min] | 500                                                                                     | 800  | 3700 | 7500 |
| Product weight [g]                 | 240                                                                                     | 320  | 1100 | 1260 |

1) Types MFH-3-3/4- and MOFH-3-3/4- can only be mounted via through-hole

| Safety data                                 |                    |               |               |                |
|---------------------------------------------|--------------------|---------------|---------------|----------------|
| Type                                        | MFH- ... -EX       | MOFH- ... -EX | JMFH- ... -EX | JMFDH- ... -EX |
| Max. switching frequency [Hz]               | 3                  | –             | 25            | 16             |
| Max. positive test pulse with 0 signal [μs] | 2200               |               |               |                |
| Max. negative test pulse with 1 signal [μs] | 3700 <sup>1)</sup> |               |               |                |

1) Not valid for types MFH-3-3/4- and MOFH-3-3/4-

| ATEX                                              |                                             |
|---------------------------------------------------|---------------------------------------------|
| Type                                              | MFH- ... -EX, JMFH- ... -EX                 |
| ATEX category for gas                             | II 2G                                       |
| Type of ignition protection for gas               | Ex h IIC T4 Gb                              |
| ATEX category for dust                            | II 2D                                       |
| Type of ignition protection for dust              | Ex h IIIC T130°C Db                         |
| Explosion-proof ambient temperature [°C]          | –5 ≤ Ta ≤ +40                               |
| CE marking (see declaration of conformity)        | To EU Explosion Protection Directive (ATEX) |
| UKCA marking (see declaration of conformity)      | To UK EX instructions                       |
| Explosion protection certification outside the EU | EPL Db (GB)                                 |
|                                                   | EPL Gb (GB)                                 |
| Degree of protection                              | IP65 (in assembled state)                   |

## Data sheet – 3/2-way valves

| Operating and environmental conditions       |                           |       | G1/8                                                                                       | G1/4 | G1/2 | G3/4        | G1/8-EX      | G1/4-EX | G1/2-EX | G3/4-EX     |
|----------------------------------------------|---------------------------|-------|--------------------------------------------------------------------------------------------|------|------|-------------|--------------|---------|---------|-------------|
| Operating medium                             |                           |       | Compressed air to ISO 8573-1:2010 [7:4:4]                                                  |      |      |             |              |         |         |             |
| Pilot medium                                 |                           |       | Compressed air to ISO 8573-1:2010 [7:4:4] (with external pilot air supply)                 |      |      |             |              |         |         |             |
| Note on operating/pilot medium               |                           |       | Lubricated operation possible (in which case lubricated operation will always be required) |      |      |             |              |         |         |             |
| Operating pressure                           | Internal pilot air supply | [MPa] | 0.15 ... 0.8                                                                               |      |      | 0.2 ... 0.8 | 0.15 ... 0.8 |         |         | 0.2 ... 0.8 |
|                                              |                           | [bar] | 1.5 ... 8                                                                                  |      |      | 2 ... 8     | 1.5 ... 8    |         |         | 2 ... 8     |
|                                              | External pilot air supply | [MPa] | −0.095 ... 1                                                                               |      |      |             |              |         |         |             |
|                                              |                           | [bar] | −0.95 ... 10                                                                               |      |      |             |              |         |         |             |
| Pilot pressure (external pilot air supply)   |                           | [MPa] | 0.1 ... 0.8                                                                                |      |      |             |              |         |         |             |
|                                              |                           | [bar] | 1 ... 8                                                                                    |      |      |             |              |         |         |             |
| Ambient temperature                          | [°C]                      | [°C]  | −5 ... +40                                                                                 |      |      |             |              |         |         |             |
| Temperature of medium                        | [°C]                      | [°C]  | −10 ... +60                                                                                |      |      |             | −5 ... +40   |         |         |             |
| Storage temperature                          |                           | [°C]  | −20 ... +60                                                                                |      |      |             |              |         |         |             |
| Certification                                |                           |       | c UL us - Recognized (OL)                                                                  |      |      |             | –            |         |         |             |
| Note on materials                            |                           |       | RoHS-compliant                                                                             |      |      |             |              |         |         |             |
| Corrosion resistance class CRC <sup>1)</sup> |                           |       | 1                                                                                          |      |      |             |              |         |         |             |
| PWIS conformity                              |                           |       | VDMA24364-B1/B2-L                                                                          |      |      |             |              |         |         |             |

1) More information: [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

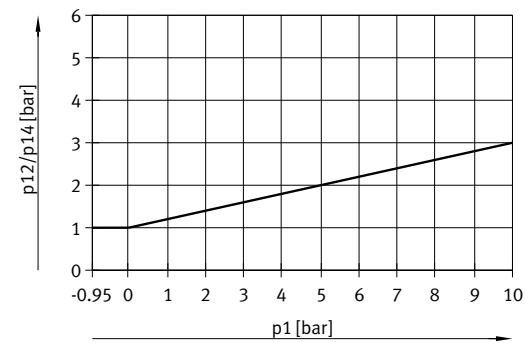
| Electrical data                  |                     |                                        |                                          |
|----------------------------------|---------------------|----------------------------------------|------------------------------------------|
| <b>F solenoid coil</b>           |                     |                                        |                                          |
| Electrical connection            |                     | Plug pins for plug sockets MSSD-F, KMF |                                          |
| Operating voltage                | Direct voltage      | [V DC]                                 | 12, 24, 42, 48                           |
|                                  | Alternating voltage | [V AC]                                 | 24, 42, 48, 110, 230, 240 (50 ... 60 Hz) |
| Characteristic coil data         | Direct voltage      | [W]                                    | 4.5                                      |
|                                  | Alternating voltage | [VA]                                   | Pull: 7.5<br>Hold: 6                     |
| Degree of protection to EN 60529 |                     | IP65 (in combination with plug socket) |                                          |

| Valve switching times [ms]       |        |      |        |      |        |      |        |      |
|----------------------------------|--------|------|--------|------|--------|------|--------|------|
| Pneumatic connection             | G1/8   |      | G1/4   |      | G1/2   |      | G3/4   |      |
| Normal position                  | Closed | Open | Closed | Open | Closed | Open | Closed | Open |
| <b>Internal pilot air supply</b> |        |      |        |      |        |      |        |      |
| On                               | 9      | 9    | 10     | 14   | 18     | 18   | 36     | 40   |
| Off                              | 29     | 29   | 29     | 41   | 90     | 90   | 32     | 29   |
| <b>External pilot air supply</b> |        |      |        |      |        |      |        |      |
| On                               | 9      | -    | 10     | -    | 18     | -    | 36     | -    |
| Off                              | 29     | -    | 29     | -    | 90     | -    | 32     | -    |

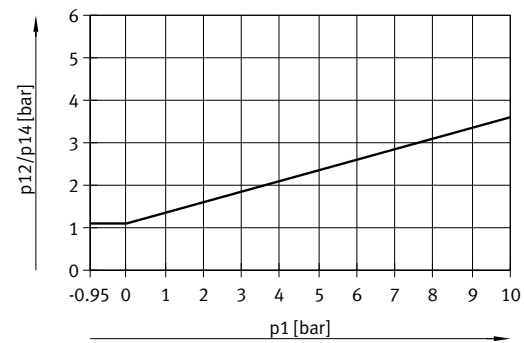
Data sheet – 3/2-way valves

Minimum pilot pressure  $p_{12}/p_{14}$  as a function of operating pressure  $p_1$  (external pilot air supply)

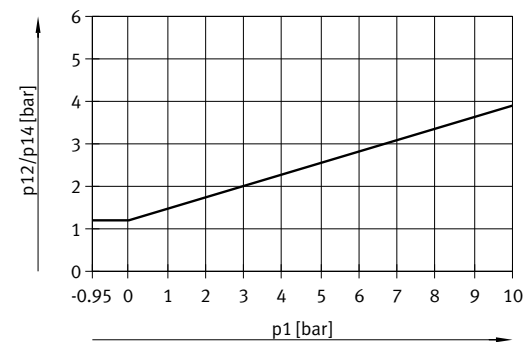
MFH-3-1/8-S



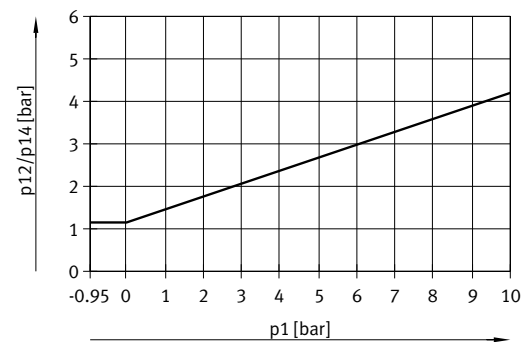
MFH-3-1/4-S



MFH-3-1/2-S

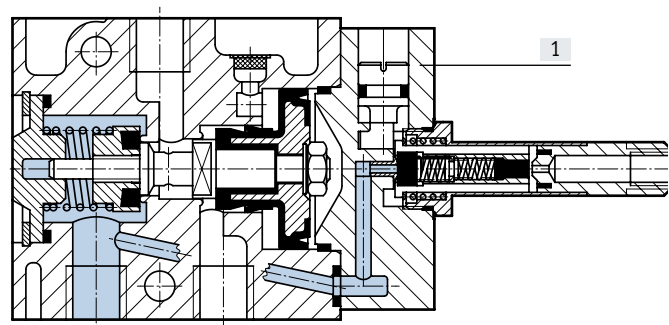


MFH-3-3/4-S



Materials

Sectional view

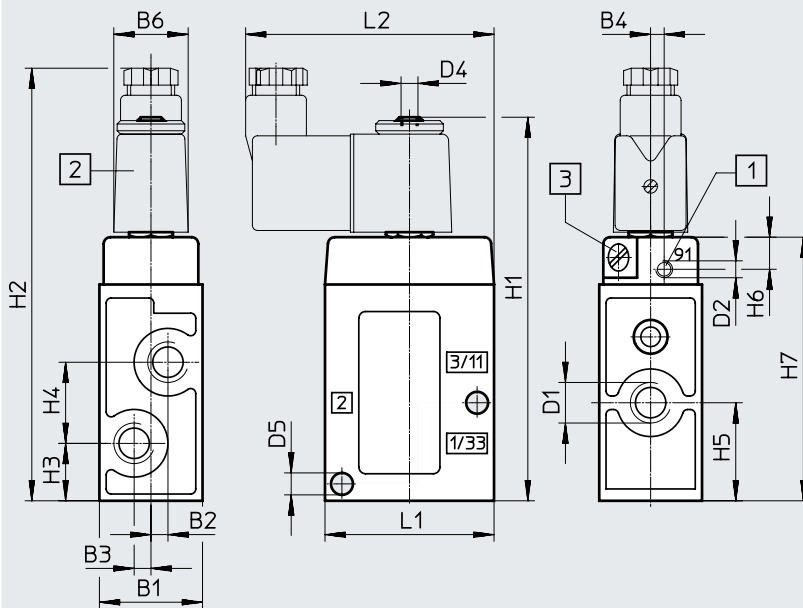


|     |         |                    |
|-----|---------|--------------------|
| [1] | Housing | Die-cast aluminium |
| -   | Seals   | NBR                |

## Data sheet – 3/2-way valves

## Dimensions

MFH, MOFH

Download CAD data → [www.festo.com](http://www.festo.com)

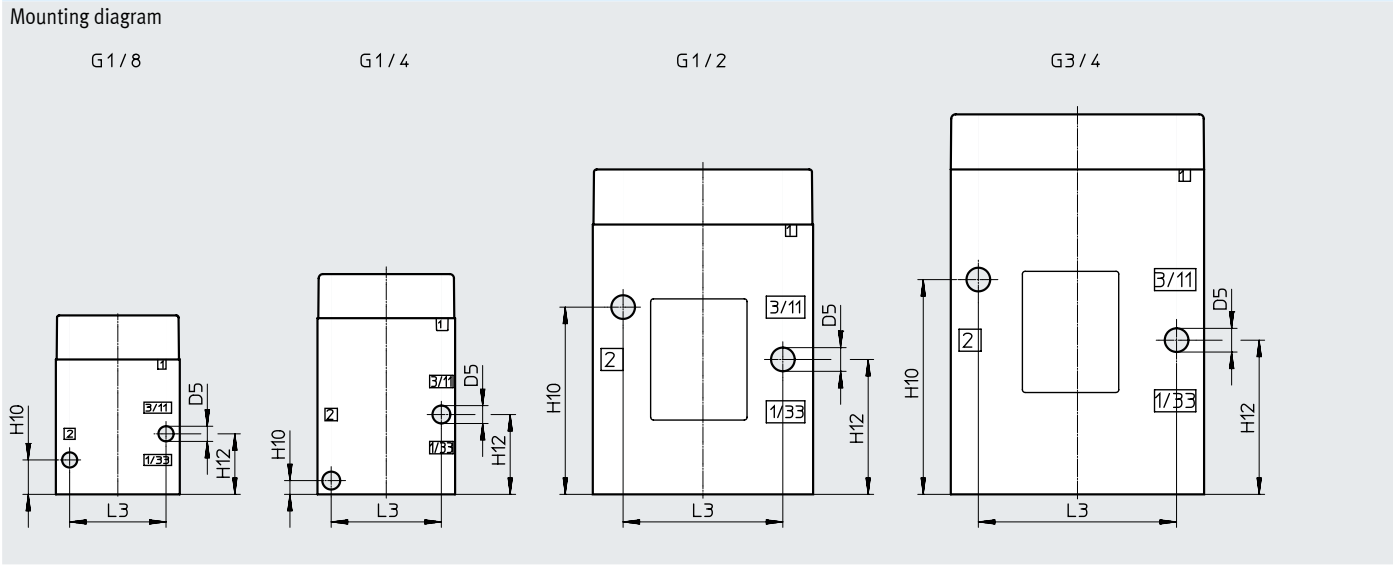
- [1] Additional connection for external pilot air with MFH-3-... /MOFH-3-...
- [2] Solenoid coil can be rotated 360°
- [3] Manual override can be turned 180°

| Type         | B1         | B2  | B3  | B4  | B6 | D1   | D2   | D4 | D5<br>Ø |
|--------------|------------|-----|-----|-----|----|------|------|----|---------|
| M...-3-1/8   | 26 +0.2    | 3.5 | 3.5 | –   | 22 | G1/8 | –    | M5 | 5.5     |
| M...-3-1/8-S |            |     |     | 2.7 |    |      | M5   |    |         |
| M...-3-1/4   | 30.4 ±0.15 | 5   | 5   | –   |    | G1/4 | –    | M5 | 6.5     |
| M...-3-1/4-S |            |     |     | 4   |    |      | M5   |    |         |
| M...-3-1/2   | 52 ±0.15   | 8   | 8   | –   |    | G1/2 | –    | M5 | 8.6     |
| M...-3-1/2-S |            |     |     | –   |    |      | G1/8 |    |         |
| M...-3-3/4   | 68 ±0.15   | 8   | 8   | –   |    | G3/4 | –    | M5 | 8.6     |
| M...-3-3/4-S |            |     |     | –   |    |      | G1/8 |    |         |

| Type         | H1  | H2  | H3       | H4       | H5       | H6   | H7  | L1       | L2   |
|--------------|-----|-----|----------|----------|----------|------|-----|----------|------|
| M...-3-1/8   | 97  | 111 | 12.5     | 19 ±0.15 | 22       | –    | 63  | 45 ±0.15 | 71   |
| M...-3-1/8-S |     |     |          |          |          | 9.5  |     |          |      |
| M...-3-1/4   | 112 | 126 | 17       | 24 ±0.15 | 29       | –    | 78  | 50 ±0.15 | 73.5 |
| M...-3-1/4-S |     |     |          | 24       |          | 9.5  |     | 50       |      |
| M...-3-1/2   | 151 | 165 | 30 ±0.15 | 38 ±0.15 | 49 ±0.15 | –    | 117 | 80 ±0.2  | 88.5 |
| M...-3-1/2-S |     |     | 30       | 38       |          | 10.5 |     | 80       |      |
| M...-3-3/4   | 171 | 187 | 34       | 44 ±0.15 | 56       | –    | 137 | 92 ±0.2  | 94.5 |
| M...-3-3/4-S |     |     |          | 44       |          | 11   |     | 92       |      |

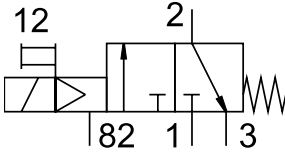
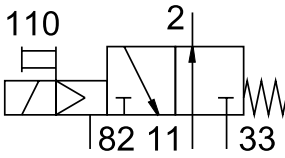
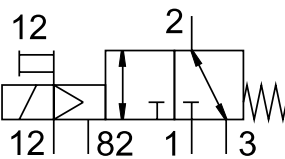
Data sheet – 3/2-way valves

Dimensions Download CAD data → [www.festo.com](http://www.festo.com)



| Type        | D5<br>Ø | H10  | H12 | L3       |
|-------------|---------|------|-----|----------|
| M...-3-1/8  | 5.5     | 12.5 | 22  | 35 ±0.15 |
| M...-3-1/8S |         |      |     |          |
| M...-3-1/4  | 6.5     | 5    | 29  | 40 ±0.15 |
| M...-3-1/4S |         |      |     |          |
| M...-3-1/2  | 8.6     | 68   | 49  | 58 ±0.2  |
| M...-3-1/2S |         |      |     |          |
| M...-3-3/4  | 8.6     | 78   | 56  | 72 ±0.2  |
| M...-3-3/4S |         |      |     |          |

## Data sheet – 3/2-way valves

| Ordering data                                                                       |                                                                                                                                                                    | Description        | Pneumatic connection       | ATEX category | Part no.              | Type |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------|---------------|-----------------------|------|
| Circuit symbol                                                                      |                                                                                                                                                                    |                    |                            |               |                       |      |
|    | Without F solenoid coil <sup>1)</sup> ,<br>internal pilot air supply                                                                                               | G1/8               | –                          | <b>7802</b>   | <b>MFH-3-1/8</b>      |      |
|                                                                                     |                                                                                                                                                                    |                    | ATEX category<br>→ Page 12 | <b>535897</b> | <b>MFH-3-1/8-EX</b>   |      |
|                                                                                     |                                                                                                                                                                    | G1/4               | –                          | <b>9964</b>   | <b>MFH-3-1/4</b>      |      |
|                                                                                     |                                                                                                                                                                    |                    | ATEX category<br>→ Page 12 | <b>535898</b> | <b>MFH-3-1/4-EX</b>   |      |
|                                                                                     |                                                                                                                                                                    | G1/2               | –                          | <b>9857</b>   | <b>MFH-3-1/2</b>      |      |
|                                                                                     |                                                                                                                                                                    |                    | ATEX category<br>→ Page 12 | <b>535899</b> | <b>MFH-3-1/2-EX</b>   |      |
| G3/4                                                                                | –                                                                                                                                                                  | <b>11967</b>       | <b>MFH-3-3/4</b>           |               |                       |      |
|                                                                                     | ATEX category<br>→ Page 12                                                                                                                                         | <b>536190</b>      | <b>MFH-3-3/4-EX</b>        |               |                       |      |
|    | Without F solenoid coil <sup>1)</sup> ,<br>internal pilot air supply                                                                                               | G1/8               | –                          | <b>7877</b>   | <b>MOFH-3-1/8</b>     |      |
|                                                                                     |                                                                                                                                                                    |                    | ATEX category<br>→ Page 12 | <b>535903</b> | <b>MOFH-3-1/8-EX</b>  |      |
|                                                                                     |                                                                                                                                                                    | G1/4               | –                          | <b>7876</b>   | <b>MOFH-3-1/4</b>     |      |
|                                                                                     |                                                                                                                                                                    |                    | ATEX category<br>→ Page 12 | <b>535904</b> | <b>MOFH-3-1/4-EX</b>  |      |
|                                                                                     |                                                                                                                                                                    | G1/2               | –                          | <b>7884</b>   | <b>MOFH-3-1/2</b>     |      |
|                                                                                     |                                                                                                                                                                    |                    | ATEX category<br>→ Page 12 | <b>535905</b> | <b>MOFH-3-1/2-EX</b>  |      |
| G3/4                                                                                | –                                                                                                                                                                  | <b>11969</b>       | <b>MOFH-3-3/4</b>          |               |                       |      |
|                                                                                     | ATEX category<br>→ Page 12                                                                                                                                         | <b>536192</b>      | <b>MOFH-3-3/4-EX</b>       |               |                       |      |
|  | Without F solenoid coil <sup>1)</sup> ,<br>external pilot air supply,<br>reversible (no restrictions with vacuum at port<br>1, restrictions with vacuum at port 3) | G1/8 <sup>2)</sup> | –                          | <b>7958</b>   | <b>MFH-3-1/8-S</b>    |      |
|                                                                                     |                                                                                                                                                                    |                    | ATEX category<br>→ Page 12 | <b>535900</b> | <b>MFH-3-1/8-S-EX</b> |      |
|                                                                                     |                                                                                                                                                                    | G1/4 <sup>3)</sup> | –                          | <b>7959</b>   | <b>MFH-3-1/4-S</b>    |      |
|                                                                                     |                                                                                                                                                                    |                    | ATEX category<br>→ Page 12 | <b>535901</b> | <b>MFH-3-1/4-S-EX</b> |      |
|                                                                                     |                                                                                                                                                                    | G1/2 <sup>4)</sup> | –                          | <b>7960</b>   | <b>MFH-3-1/2-S</b>    |      |
|                                                                                     |                                                                                                                                                                    |                    | ATEX category<br>→ Page 12 | <b>535902</b> | <b>MFH-3-1/2-S-EX</b> |      |
| G3/4 <sup>5)</sup>                                                                  | –                                                                                                                                                                  | <b>11968</b>       | <b>MFH-3-3/4-S</b>         |               |                       |      |
|                                                                                     | ATEX category<br>→ Page 12                                                                                                                                         | <b>536191</b>      | <b>MFH-3-3/4-S-EX</b>      |               |                       |      |

1) F solenoid coils → page 50

2) Restrictions with vacuum at port 3: (0 ... –0.7 bar)

3) Restrictions with vacuum at port 3: (0 ... –0.6 bar)

4) Restrictions with vacuum at port 3: (0 ... –0.55 bar)

5) Restrictions with vacuum at port 3: (0 ... –0.4 bar)

## Ordering data – Sets of wearing parts

| Pneumatic connection | Part no.      | Type             |
|----------------------|---------------|------------------|
| G1/8                 | <b>104206</b> | <b>MFH-3-1/8</b> |
| G1/4                 | <b>104207</b> | <b>MFH-3-1/4</b> |
| G1/2                 | <b>104208</b> | <b>MFH-3-1/2</b> |

## Data sheet – 5/2-way valves

-  Flow rate  
500 ... 3700 l/min
-  Voltage  
12, 24, 42, 48 V DC  
24, 42, 48, 110, 230,  
240 V AC

Sets of wearing parts → page 23



| General technical data       |          |                                                     |      |      |
|------------------------------|----------|-----------------------------------------------------|------|------|
| Pneumatic connection         |          | G1/8                                                | G1/4 | G1/2 |
| Valve function               |          | 5/2-way, single solenoid                            |      |      |
| Design                       |          | Poppet seat                                         |      |      |
| Overlap                      |          | Negative overlap                                    |      |      |
| Sealing principle            |          | Soft                                                |      |      |
| Actuation type               |          | Electrical                                          |      |      |
| Reset method                 |          | Mechanical spring                                   |      |      |
| Type of control              |          | Piloted                                             |      |      |
| Flow direction               |          | Not reversible                                      |      |      |
| Pilot air supply             |          | Internal or external                                |      |      |
| Exhaust function             |          | Can be throttled                                    |      |      |
| Manual override              |          | Detenting                                           |      |      |
| Type of mounting             |          | Via through-hole or on manifold rail/manifold block |      |      |
| Mounting position            |          | Any                                                 |      |      |
| Electrical connection        |          | Via F solenoid coil, to be ordered separately       |      |      |
| Port for venting hole        |          | M5 (only ATEX types)                                |      |      |
| Pilot exhaust air port 82/84 |          | M5                                                  |      |      |
| Pilot air port 14            |          | M5                                                  | M5   | G1/8 |
| b value                      |          | –                                                   | 0.19 | 0.32 |
| c value                      | [l/sbar] | –                                                   | 4.49 | –    |
| Nominal width                | [mm]     | 5                                                   | 7    | 14   |
| Standard nominal flow rate   | [l/min]  | 500                                                 | 1000 | 3700 |
| Product weight               | [g]      | 270                                                 | 290  | 1135 |

| Safety data                            |      |      |
|----------------------------------------|------|------|
| Max. switching frequency               | [Hz] | –    |
| Max. positive test pulse with 0 signal | [μs] | 2200 |
| Max. negative test pulse with 1 signal | [μs] | 3700 |

## Data sheet – 5/2-way valves

| Operating and environmental conditions       |                           |              | G1/8                                                                                       | G1/4         | G1/2         | G1/8-EX      | G1/4-EX      | G1/2-EX     |
|----------------------------------------------|---------------------------|--------------|--------------------------------------------------------------------------------------------|--------------|--------------|--------------|--------------|-------------|
| Operating medium                             |                           |              | Compressed air to ISO 8573-1:2010 [7:4:4]                                                  |              |              |              |              |             |
| Note on operating/pilot medium               |                           |              | Lubricated operation possible (in which case lubricated operation will always be required) |              |              |              |              |             |
| Operating pressure                           | Internal pilot air supply | [MPa]        | 0.18 ... 0.8                                                                               | 0.22 ... 0.8 | 0.2 ... 0.8  | 0.18 ... 0.8 | 0.22 ... 0.8 | 0.2 ... 0.8 |
|                                              |                           | [bar]        | 1.8 ... 8                                                                                  | 2.2 ... 8    | 2 ... 8      | 1.8 ... 8    | 2.2 ... 8    | 2 ... 8     |
|                                              | External pilot air supply | [MPa]        | 0 ... 1                                                                                    | 0 ... 0.8    | 0 ... 0.8    | 0 ... 1      | 0 ... 0.8    | 0 ... 1     |
|                                              |                           | [bar]        | 0 ... 10                                                                                   | 0 ... 8      | 0 ... 8      | 0 ... 10     | 0 ... 8      | 0 ... 10    |
| Pilot pressure (external pilot air supply)   | [MPa]                     | 0.12 ... 0.8 | 0.15 ... 0.8                                                                               | 0.15 ... 0.8 | 0.12 ... 0.8 | 0.15 ... 0.8 | 0.1 ... 0.8  |             |
|                                              | [bar]                     | 1.2 ... 8    | 1.5 ... 8                                                                                  | 1.5 ... 8    | 1.2 ... 8    | 1.5 ... 8    | 1 ... 8      |             |
| Ambient temperature                          | [°C]                      | −5 ... +40   |                                                                                            |              |              |              |              |             |
| Temperature of medium                        | [°C]                      | −10 ... +60  |                                                                                            |              |              | −5 ... +40   |              |             |
| Storage temperature                          | [°C]                      | −20 ... +60  |                                                                                            |              |              |              |              |             |
| Note on materials                            |                           |              | RoHS-compliant                                                                             |              |              |              |              |             |
| Corrosion resistance class CRC <sup>1)</sup> |                           |              | 1                                                                                          |              |              |              |              |             |
| Certification                                |                           |              | c UL us - Recognized (OL)                                                                  |              |              |              | –            |             |
| PWIS conformity                              |                           |              | VDMA24364-B1/B2-L                                                                          |              |              |              |              |             |

1) More information: [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

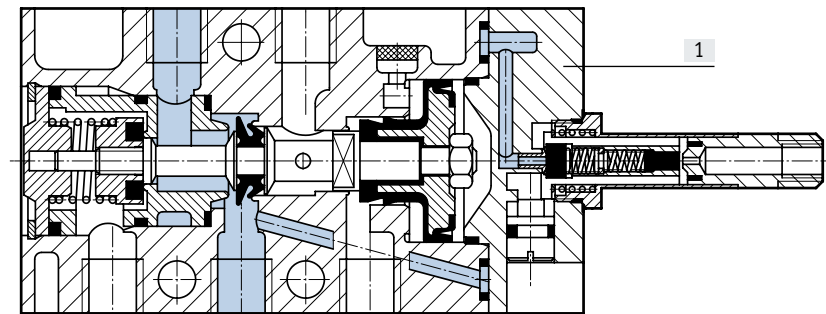
| Electrical data                  |                     |                                        |                                          |
|----------------------------------|---------------------|----------------------------------------|------------------------------------------|
| <b>F solenoid coil</b>           |                     |                                        |                                          |
| Electrical connection            |                     | Plug pins for plug sockets MSSD-F, KMF |                                          |
| Operating voltage                | Direct voltage      | [V DC]                                 | 12, 24, 42, 48                           |
|                                  | Alternating voltage | [V AC]                                 | 24, 42, 48, 110, 230, 240 (50 ... 60 Hz) |
| Characteristic coil data         | Direct voltage      | [W]                                    | 4.5                                      |
|                                  | Alternating voltage | [VA]                                   | Pull: 7.5<br>Hold: 6                     |
| Degree of protection to EN 60529 |                     | IP65 (in combination with plug socket) |                                          |

| Valve switching times [ms] |      |      |      |
|----------------------------|------|------|------|
| Pneumatic connection       | G1/8 | G1/4 | G1/2 |
| On                         | 8    | 9    | 21   |
| Off                        | 36   | 29   | 150  |

Data sheet – 5/2-way valves

Materials

Sectional view



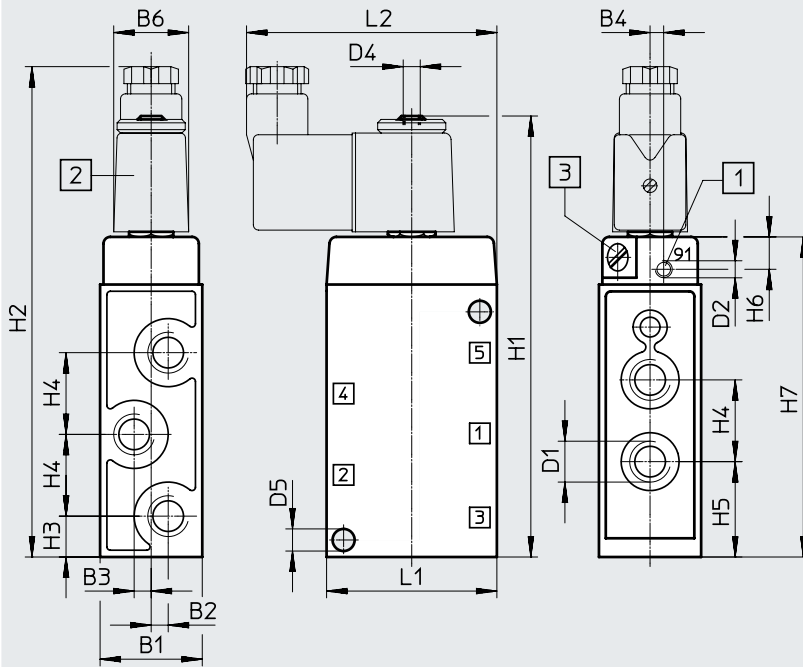
|     |         |                    |
|-----|---------|--------------------|
| [1] | Housing | Die-cast aluminium |
| –   | Seals   | NBR, TPE-U(PU)     |

## Data sheet – 5/2-way valves

## Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

MFH



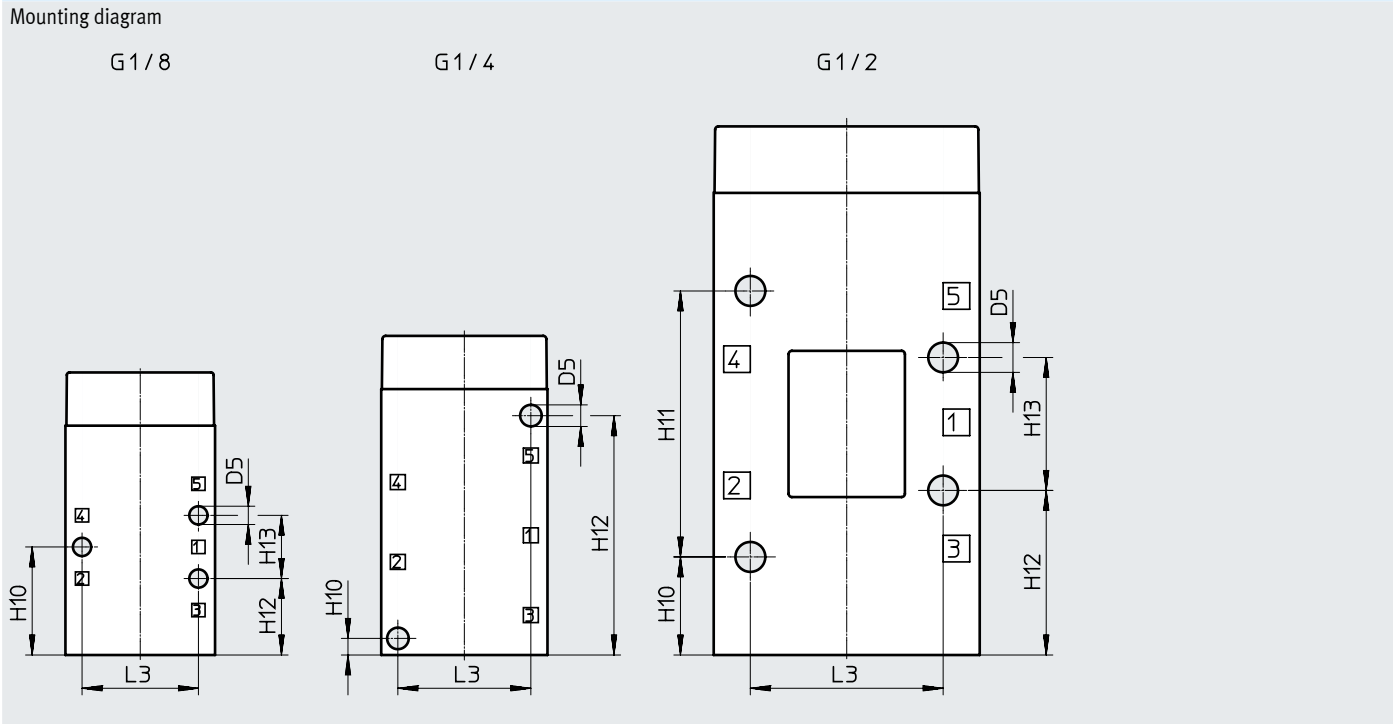
- [1] Additional connection for external pilot air with MFH-5-...-S
- [2] Solenoid coil can be rotated 360°
- [3] Manual override can be turned 180°

| Type        | B1        | B2        | B3        | B4  | B6 | D1   | D2   | D4 | D5<br>ø   |
|-------------|-----------|-----------|-----------|-----|----|------|------|----|-----------|
| MFH-5-1/8   | 26 ±0.2   | 3.5 ±0.15 | 3.5 ±0.15 | –   | 22 | G1/8 | M5   | M5 | 5.5       |
| MFH-5-1/8-S |           | 3.5       | 3.5       | 2.7 |    |      |      |    | 5.5 – 6.2 |
| MFH-5-1/4   | 30.4 ±0.1 | –         | 5 ±0.15   | –   |    | G1/4 | M5   |    | 6.5 ±0.14 |
| MFH-5-1/4-S |           |           |           | 4   |    |      |      |    | Min. 6.5  |
| MFH-5-1/2   | 52 ±0.15  | –         | 8         | –   |    | G1/2 | G1/8 |    | 8.5       |
| MFH-5-1/2-S |           |           |           |     |    |      |      |    |           |

| Type        | H1  | H2    | H3       | H4       | H5           | H6   | H7  | L1           | L2   |
|-------------|-----|-------|----------|----------|--------------|------|-----|--------------|------|
| MFH-5-1/8   | 117 | 131   | 13.5     | 19       | 23           | –    | 83  | 45 ±0.15     | 71   |
| MFH-5-1/8-S |     | 134   |          | 19 ±0.15 |              | 9.5  |     |              | 71.5 |
| MFH-5-1/4   | 128 | 143   | 12       | 24 ±0.15 | 28 +0.1/-0.2 | –    | 94  | 50 +0.4/-0.2 | 73.5 |
| MFH-5-1/4-S |     |       |          |          |              | 9.5  |     |              |      |
| MFH-5-1/2   | 192 | 208.5 | 32 ±0.15 | 38 ±0.15 | 51 ±0.15     | –    | 158 | 80 +0.4/-0.2 | 87.5 |
| MFH-5-1/2-S |     |       |          |          |              | 10.5 |     |              |      |

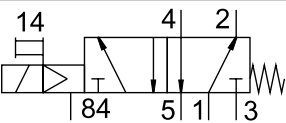
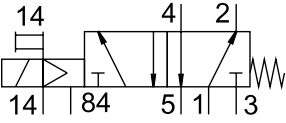
Data sheet – 5/2-way valves

Dimensions Download CAD data → [www.festo.com](http://www.festo.com)



| Type        | D5<br>ø   | H10  | H11      | H12  | H13      | L3       |
|-------------|-----------|------|----------|------|----------|----------|
| MFH-5-1/8   | 5.5       | 32.5 | -        | 23   | 19 ±0.15 | 35 ±0.15 |
| MFH-5-1/8-S | 5.5 – 6.2 |      |          |      |          |          |
| MFH-5-1/4   | 6.5 ±0.14 | 5    | -        | 72   | -        | 40 ±0.15 |
| MFH-5-1/4-S | Min. 6.5  |      |          |      |          |          |
| MFH-5-1/2   | 8.5       | 29.5 | 80 ±0.15 | 49.5 | 40 ±0.1  | 58 ±0.15 |
| MFH-5-1/2-S |           |      |          |      |          |          |

## Data sheet – 5/2-way valves

| Ordering data                                                                     |                                                                      |                      |                            |               |                       |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------|----------------------------|---------------|-----------------------|
| Circuit symbol                                                                    | Description                                                          | Pneumatic connection | ATEX category              | Part no.      | Type                  |
|  | Without F solenoid coil <sup>1)</sup> ,<br>internal pilot air supply | G1/8                 | –                          | <b>9982</b>   | <b>MFH-5-1/8</b>      |
|                                                                                   |                                                                      |                      | ATEX category<br>→ Page 12 | <b>535906</b> | <b>MFH-5-1/8-EX</b>   |
|                                                                                   |                                                                      | G1/4                 | –                          | <b>6211</b>   | <b>MFH-5-1/4</b>      |
|                                                                                   |                                                                      |                      | ATEX category<br>→ Page 12 | <b>535907</b> | <b>MFH-5-1/4-EX</b>   |
|                                                                                   |                                                                      | G1/2                 | –                          | <b>6420</b>   | <b>MFH-5-1/2</b>      |
|                                                                                   |                                                                      |                      | ATEX category<br>→ Page 12 | <b>535908</b> | <b>MFH-5-1/2-EX</b>   |
|  | Without F solenoid coil <sup>1)</sup> ,<br>external pilot air supply | G1/8                 | –                          | <b>10348</b>  | <b>MFH-5-1/8-S</b>    |
|                                                                                   |                                                                      |                      | ATEX category<br>→ Page 12 | <b>535909</b> | <b>MFH-5-1/8-S-EX</b> |
|                                                                                   |                                                                      | G1/4                 | –                          | <b>10349</b>  | <b>MFH-5-1/4-S</b>    |
|                                                                                   |                                                                      |                      | ATEX category<br>→ Page 12 | <b>535910</b> | <b>MFH-5-1/4-S-EX</b> |
|                                                                                   |                                                                      | G1/2                 | –                          | <b>35547</b>  | <b>MFH-5-1/2-S</b>    |
|                                                                                   |                                                                      |                      | ATEX category<br>→ Page 12 | <b>535911</b> | <b>MFH-5-1/2-S-EX</b> |

1) F solenoid coils → page 50

| Ordering data – Sets of wearing parts |               |                                 |
|---------------------------------------|---------------|---------------------------------|
| Pneumatic connection                  | Part no.      | Type                            |
| G1/8                                  | <b>104209</b> | <b>MFH-5-1/8<sup>1)2)</sup></b> |
| G1/4                                  | <b>104211</b> | <b>MFH-5-1/4<sup>3)4)</sup></b> |

- 1) Order assembly sleeve part no. 228389 separately  
 2) Use up to series E602  
 3) Order assembly sleeve part no. 229363 separately  
 4) Use from series 1/81

## Data sheet – 5/2-way valves, double solenoid valves

-  - Flow rate  
600 ... 4500 l/min
-  - Voltage  
12, 24, 42, 48 V DC  
24, 42, 48, 110, 230,  
240 V AC

Sets of wearing parts → page 29



| General technical data             |                                                     |      |      |
|------------------------------------|-----------------------------------------------------|------|------|
| Pneumatic connection               | G1/8                                                | G1/4 | G1/2 |
| Valve function                     | 5/2-way, double solenoid                            |      |      |
| Design                             | Poppet seat                                         |      |      |
| Overlap                            | Negative overlap                                    |      |      |
| Sealing principle                  | Soft                                                |      |      |
| Actuation type                     | Electrical                                          |      |      |
| Type of control                    | Piloted                                             |      |      |
| Flow direction                     | Not reversible                                      |      |      |
| Pilot air supply                   | Internal or external                                |      |      |
| Exhaust function                   | Can be throttled                                    |      |      |
| Manual override                    | Detenting                                           |      |      |
| Type of mounting                   | Via through-hole or on manifold rail/manifold block |      |      |
| Mounting position                  | Any                                                 |      |      |
| Electrical connection              | Via F solenoid coil, to be ordered separately       |      |      |
| Port for venting hole              | M5 (only ATEX types)                                |      |      |
| b value                            | –                                                   | –    | 0.3  |
| c value [l/sbar]                   | –                                                   | –    | 19.5 |
| Pilot exhaust air port 82/84       | M5                                                  |      |      |
| Pilot air port 12/14               | M5                                                  | M5   | G1/2 |
| Nominal width [mm]                 | 5                                                   | 7    | 14   |
| Standard nominal flow rate [l/min] | 600                                                 | 1100 | 4500 |
| Product weight [g]                 | 260                                                 | 530  | 1210 |

| Safety data                            |      |               |                |
|----------------------------------------|------|---------------|----------------|
| Type                                   |      | JMFH- ... -EX | JMFDH- ... -EX |
| Max. switching frequency               | [Hz] | 25            | 16             |
| Max. positive test pulse with 0 signal | [μs] | 2200          |                |
| Max. negative test pulse with 1 signal | [μs] | 3700          |                |

## Data sheet – 5/2-way valves, double solenoid valves

| Operating and environmental conditions       |                           |       |                                                                                            |      |              |              |         |             |
|----------------------------------------------|---------------------------|-------|--------------------------------------------------------------------------------------------|------|--------------|--------------|---------|-------------|
| Pneumatic connection                         |                           |       | G1/8                                                                                       | G1/4 | G1/2         | G1/8-EX      | G1/4-EX | G1/2-EX     |
| Operating medium                             |                           |       | Compressed air to ISO 8573-1:2010 [7:4:4]                                                  |      |              |              |         |             |
| Note on operating/pilot medium               |                           |       | Lubricated operation possible (in which case lubricated operation will always be required) |      |              |              |         |             |
| Operating pressure                           | Internal pilot air supply | [MPa] | 0.15 ... 0.8                                                                               |      | 0.2 ... 0.8  | 0.15 ... 0.8 |         | 0.2 ... 0.8 |
|                                              |                           | [bar] | 1.5 ... 8                                                                                  |      | 2 ... 8      | 1.5 ... 8    |         | 2 ... 8     |
|                                              | External pilot air supply | [MPa] | 0 ... 1                                                                                    |      | 0 ... 0.8    | 0 ... 1      |         | 0 ... 0.8   |
|                                              |                           | [bar] | 0 ... 10                                                                                   |      | 0 ... 8      | 0 ... 10     |         | 0 ... 8     |
|                                              | With dominant signal      | [MPa] | 0.25 ... 0.8                                                                               |      | –            | 0.25 ... 0.8 |         | –           |
|                                              |                           | [bar] | 2.5 ... 8                                                                                  |      | –            | 2.5 ... 8    |         | –           |
|                                              | Pilot pressure            | [MPa] | 0.12 ... 0.8                                                                               |      | 0.05 ... 0.8 | 0.12 ... 0.8 |         | 0.1 ... 0.8 |
|                                              |                           | [bar] | 1.2 ... 8                                                                                  |      | 0.5 ... 8    | 1.2 ... 8    |         | 1 ... 8     |
| Ambient temperature                          |                           | [°C]  | –5 ... +40                                                                                 |      |              |              |         |             |
| Temperature of medium                        |                           | [°C]  | –10 ... +60                                                                                |      |              | –5 ... +40   |         |             |
| Storage temperature                          |                           | [°C]  | –20 ... +60                                                                                |      |              |              |         |             |
| Certification                                |                           |       | c UL us - Recognized (OL)                                                                  |      |              | –            |         |             |
| Note on materials                            |                           |       | RoHS-compliant                                                                             |      |              |              |         |             |
| Corrosion resistance class CRC <sup>1)</sup> |                           |       | 1                                                                                          |      |              |              |         |             |
| PWIS conformity                              |                           |       | VDMA24364-B1/B2-L                                                                          |      |              |              |         |             |

1) More information: [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

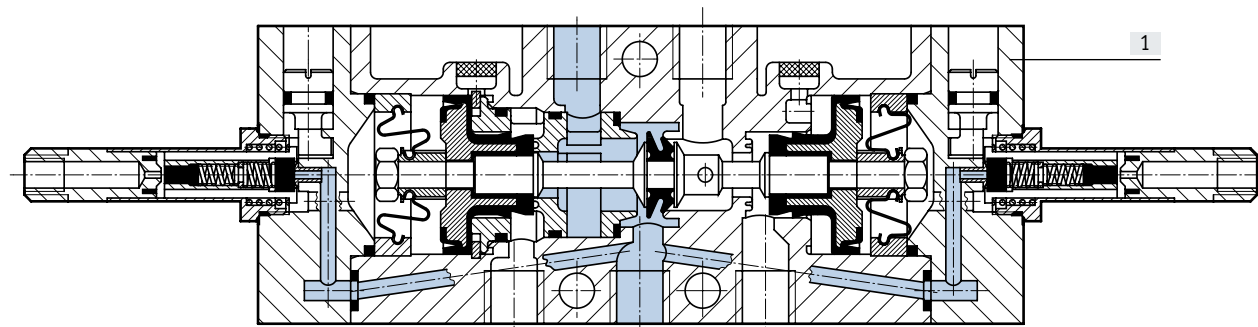
| Electrical data                  |                     |                                        |                                          |
|----------------------------------|---------------------|----------------------------------------|------------------------------------------|
| F solenoid coil                  |                     |                                        |                                          |
| Electrical connection            |                     | Plug pins for plug sockets MSSD-F, KMF |                                          |
| Operating voltage                | Direct voltage      | [V DC]                                 | 12, 24, 42, 48                           |
|                                  | Alternating voltage | [V AC]                                 | 24, 42, 48, 110, 230, 240 (50 ... 60 Hz) |
| Characteristic coil data         | Direct voltage      | [W]                                    | 4.5                                      |
|                                  | Alternating voltage | [VA]                                   | Pull: 7.5<br>Hold: 6                     |
| Degree of protection to EN 60529 |                     | IP65 (in combination with plug socket) |                                          |

| Valve switching times [ms] |  |      |                       |      |                       |                       |
|----------------------------|--|------|-----------------------|------|-----------------------|-----------------------|
| Pneumatic connection       |  | G1/8 | G1/4                  | G1/2 |                       |                       |
|                            |  |      | Dominant signal at 14 |      | Dominant signal at 14 | Dominant signal at 14 |
| Changeover                 |  | 10   | 16                    | 11   | 16                    | 20                    |

Data sheet – 5/2-way valves, double solenoid valves

Materials

Sectional view

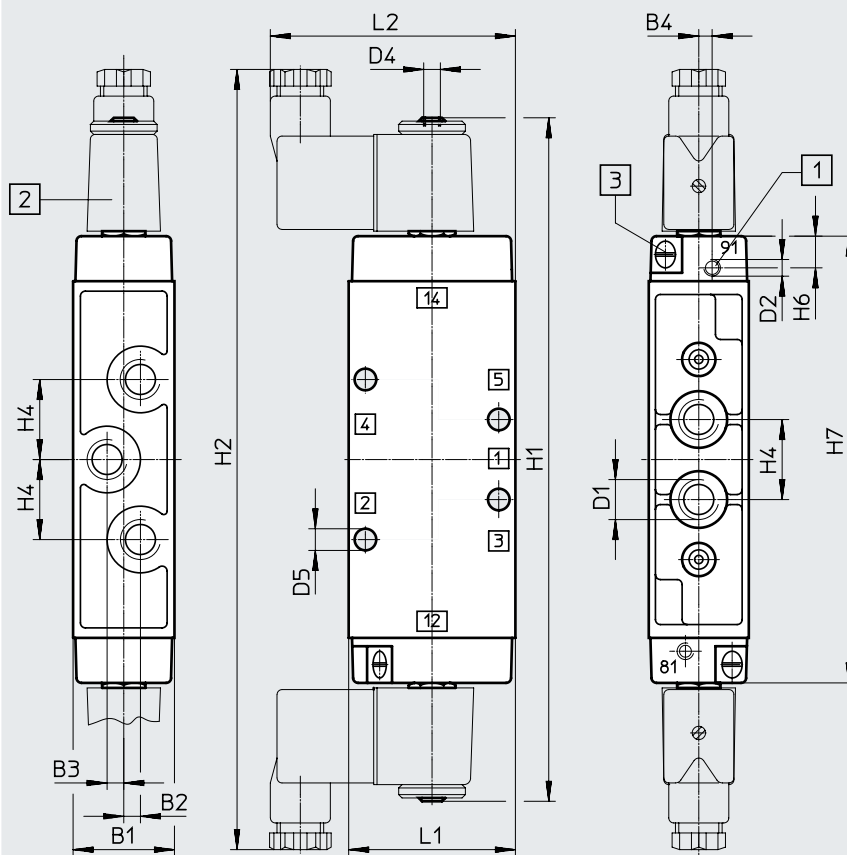


|     |         |                    |
|-----|---------|--------------------|
| [1] | Housing | Die-cast aluminium |
| –   | Seals   | NBR, TPE-U(PU)     |

## Data sheet – 5/2-way valves, double solenoid valves

## Dimensions

JMFH, JMFDH

Download CAD data → [www.festo.com](http://www.festo.com)

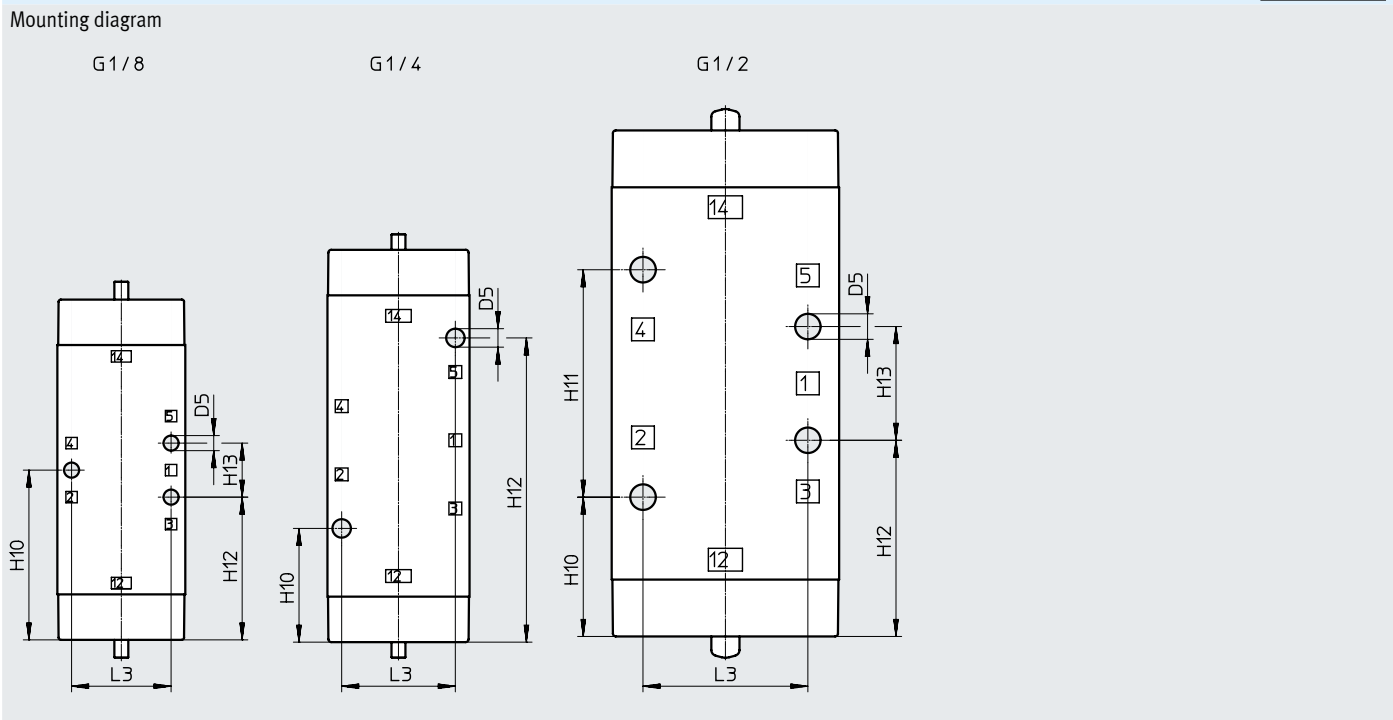
- [1] Additional connection for external pilot air with JMF...H-5-...-S
- [2] Solenoid coil can be rotated 360°
- [3] Manual override can be turned 180°

| Type           | B1        | B2        | B3        | B4  | D1   | D2   | D4 | D5<br>ø  |
|----------------|-----------|-----------|-----------|-----|------|------|----|----------|
| JMF...-5-1/8   | 26 +0.2   | 3.5 +0.15 | 3.5 +0.15 | –   | G1/8 | –    | M5 | 5.5      |
| JMF...-5-1/8-S |           |           |           | 2.7 |      | M5   |    |          |
| JMF...-5-1/4   | 30.4 ±0.1 | –         | 5         | –   | G1/4 | –    | M5 | Min. 6.5 |
| JMF...-5-1/4-S |           |           |           | 4   |      | M5   |    |          |
| JMF...-5-1/2   | 52        | –         | 8         | –   | G1/2 | –    | M5 | 9.6 +0.2 |
| JMF...-5-1/2-S | 52 ±0.15  |           |           |     |      | G1/8 |    | 8.5      |

| Type           | H1  | H2  | H4       | H6   | H7    | L1           | L2   |
|----------------|-----|-----|----------|------|-------|--------------|------|
| JMF...-5-1/8   | 184 | 217 | 19 ±0.15 | –    | 116.5 | 45 ±0.15     | 71.5 |
| JMF...-5-1/8-S |     |     |          | 9.5  |       |              |      |
| JMF...-5-1/4   | 202 | 235 | 24 -0.3  | –    | 134   | 50 +0.4/-0.2 | 74   |
| JMF...-5-1/4-S |     |     |          | 9.5  |       |              |      |
| JMF...-5-1/2   | 244 | 272 | 38       | –    | 176   | 80           | 88.5 |
| JMF...-5-1/2-S |     | 277 | 38 ±0.1  | 10.5 |       | 80 +0.4/-0.2 | 87.5 |

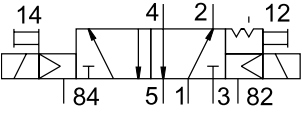
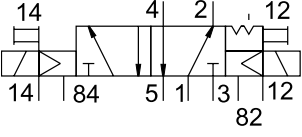
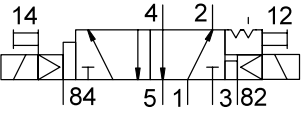
Data sheet – 5/2-way valves, double solenoid valves

Dimensions Download CAD data → [www.festo.com](http://www.festo.com)



| Type           | D5<br>ø  | H10 | H12  | H13 | L3 |
|----------------|----------|-----|------|-----|----|
| JMF...-5-1/8   | 5.5      | 19  | 58.3 | –   | 35 |
| JMF...-5-1/8-S |          |     |      |     |    |
| JMF...-5-1/4   | Min. 6.5 | 67  | 67   | –   | 40 |
| JMF...-5-1/4-S |          |     |      |     |    |
| JMF...-5-1/2   | 9.6 +0.2 | 40  | 88   | 80  | 58 |
| JMF...-5-1/2-S | 8.5      |     |      |     |    |

## Data sheet – 5/2-way valves, double solenoid valves

| Ordering data                                                                      |                                                                                                     |                      |                            |               |                        |
|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------|----------------------------|---------------|------------------------|
| Circuit symbol                                                                     | Description                                                                                         | Pneumatic connection | ATEX category              | Part no.      | Type                   |
|   | Without F solenoid coil <sup>1)</sup> ,<br>internal pilot air supply                                | G1/8                 | –                          | <b>8820</b>   | <b>JMFH-5-1/8</b>      |
|                                                                                    |                                                                                                     |                      | ATEX category<br>→ Page 12 | <b>535912</b> | <b>JMFH-5-1/8-EX</b>   |
|                                                                                    |                                                                                                     | G1/4                 | –                          | <b>10410</b>  | <b>JMFH-5-1/4</b>      |
|                                                                                    |                                                                                                     |                      | ATEX category<br>→ Page 12 | <b>535913</b> | <b>JMFH-5-1/4-EX</b>   |
|                                                                                    |                                                                                                     | G1/2                 | –                          | <b>10166</b>  | <b>JMFH-5-1/2</b>      |
|                                                                                    |                                                                                                     |                      | ATEX category<br>→ Page 12 | <b>535914</b> | <b>JMFH-5-1/2-EX</b>   |
|   | Without F solenoid coil <sup>1)</sup> ,<br>external pilot air supply                                | G1/8                 | –                          | <b>14008</b>  | <b>JMFH-5-1/8-S</b>    |
|                                                                                    |                                                                                                     |                      | ATEX category<br>→ Page 12 | <b>535915</b> | <b>JMFH-5-1/8-S-EX</b> |
|                                                                                    |                                                                                                     | G1/4                 | –                          | <b>14009</b>  | <b>JMFH-5-1/4-S</b>    |
|                                                                                    |                                                                                                     |                      | ATEX category<br>→ Page 12 | <b>535916</b> | <b>JMFH-5-1/4-S-EX</b> |
|                                                                                    |                                                                                                     | G1/2                 | –                          | <b>35548</b>  | <b>JMFH-5-1/2-S</b>    |
|                                                                                    |                                                                                                     |                      | ATEX category<br>→ Page 12 | <b>535917</b> | <b>JMFH-5-1/2-S-EX</b> |
|  | Without F solenoid coil <sup>1)</sup> ,<br>internal pilot air supply,<br>with dominant signal at 14 | G1/8                 | –                          | <b>8821</b>   | <b>JMFDH-5-1/8</b>     |
|                                                                                    |                                                                                                     |                      | ATEX category<br>→ Page 12 | <b>536193</b> | <b>JMFDH-5-1/8-EX</b>  |
|                                                                                    |                                                                                                     | G1/4                 | –                          | <b>10411</b>  | <b>JMFDH-5-1/4</b>     |
|                                                                                    |                                                                                                     |                      | ATEX category<br>→ Page 12 | <b>536194</b> | <b>JMFDH-5-1/4-EX</b>  |

1) F solenoid coils → page 50

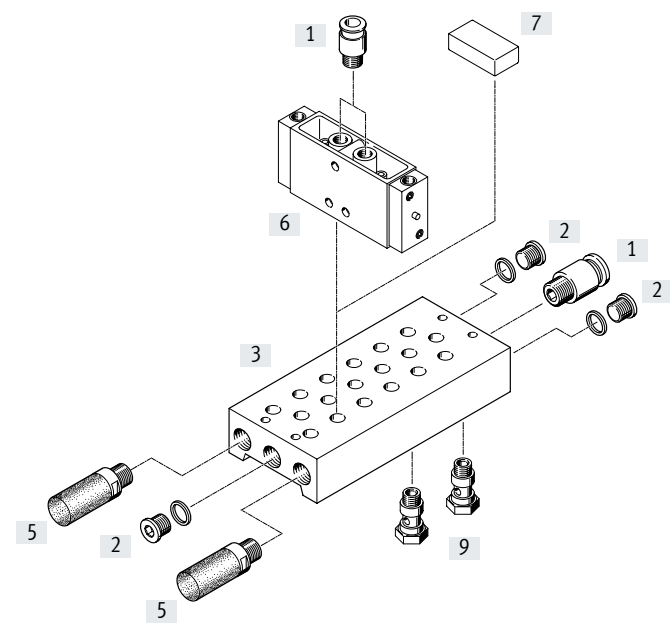
| Ordering data – Sets of wearing parts |               |                                |
|---------------------------------------|---------------|--------------------------------|
| Pneumatic connection                  | Part no.      | Type                           |
| G1/8                                  | <b>104891</b> | <b>JMFH-5-1/8<sup>1)</sup></b> |
| G1/4                                  | <b>104892</b> | <b>JMFH-5-1/4<sup>2)</sup></b> |

1) Order assembly sleeve part no. 228389 separately

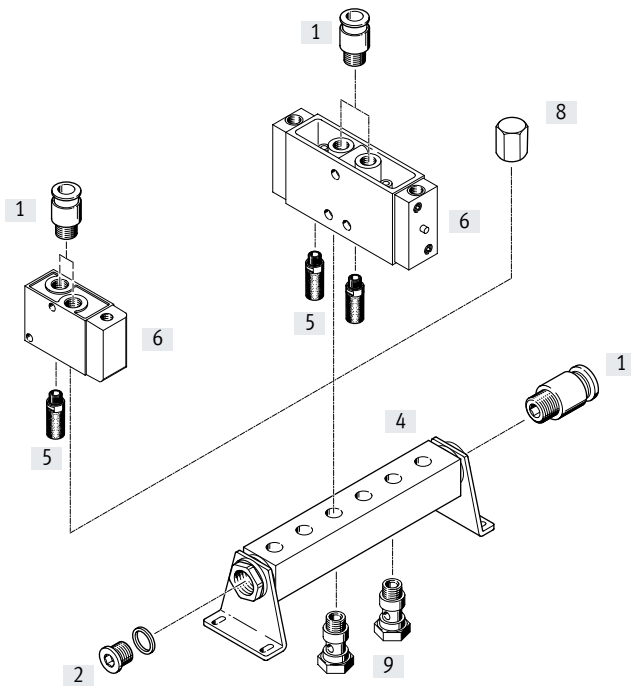
2) Order assembly sleeve part no. 229363 separately

Peripherals overview pneumatic valves

Mounting on manifold block



Mounting on manifold rail

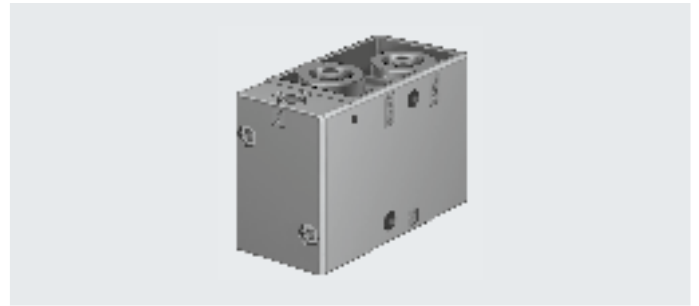


| Accessories |                           | Brief description                                                                                                             | → Page/Internet |
|-------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------|
| [1]         | Push-in fitting<br>QS     | For connecting compressed air tubing with standard O.D.                                                                       | quick star      |
| [2]         | Blanking plug<br>B        | 3 included in the scope of delivery of the manifold block PRS<br>1 included in the scope of delivery of the manifold rail PAL | blanking plug   |
| [3]         | Manifold block<br>PRS     |                                                                                                                               | 48              |
| [4]         | Manifold rail<br>PAL      |                                                                                                                               | 46              |
| [5]         | Silencer                  | For mounting in exhaust ports                                                                                                 | u               |
| [6]         | Pneumatic valve<br>VL, JH |                                                                                                                               |                 |
| [7]         | Cover plate<br>PRSB       | For covering a vacant position                                                                                                | 49              |
| [8]         | Cap nut<br>VTM            | For blanking a vacant position                                                                                                | 47              |
| [9]         | Hollow bolt<br>VT         | For distributing compressed air or for separate compressed air supply                                                         | 47              |

## Data sheet – 3/2-way valves

-  - Flow rate  
500 ... 7500 l/min

Sets of wearing parts → page 36



| General technical data             |                                                     |      |      |      |
|------------------------------------|-----------------------------------------------------|------|------|------|
| Pneumatic connection               | G1/8                                                | G1/4 | G1/2 | G3/4 |
| Valve function                     | 3/2-way, monostable                                 |      |      |      |
| Design                             | Poppet seat                                         |      |      |      |
| Overlap                            | Negative overlap                                    |      |      |      |
| Sealing principle                  | Soft                                                |      |      |      |
| Actuation type                     | Pneumatic                                           |      |      |      |
| Reset method                       | Mechanical spring                                   |      |      |      |
| Type of control                    | Direct                                              |      |      |      |
| Pilot air supply                   | External                                            |      |      |      |
| Flow direction                     | Reversible with restrictions                        |      |      |      |
| Exhaust function                   | Can be throttled                                    |      |      |      |
| Manual override                    | None                                                |      |      |      |
| Type of mounting                   | Via through-hole or on manifold rail/manifold block |      |      |      |
| Mounting position                  | Any                                                 |      |      |      |
| Port for venting hole              | M5 (only ATEX types)                                |      |      |      |
| Pilot air port 11 0/12             | G1/8                                                | G1/8 | G1/4 | G1/4 |
| b value                            | –                                                   | –    | 0.3  | –    |
| Nominal width [mm]                 | 5                                                   | 7    | 14   | 19   |
| Standard nominal flow rate [l/min] | 500                                                 | 800  | 3700 | 7500 |
| Product weight [g]                 | 150                                                 | 230  | 860  | 1200 |

| Safety data                                 |      |      |      |      |
|---------------------------------------------|------|------|------|------|
| Type                                        | G1/8 | G1/4 | G1/2 | G3/4 |
| Max. switching frequency [Hz]               | 12   | –    | –    | –    |
| Max. positive test pulse with 0 signal [μs] | 2200 |      |      |      |
| Max. negative test pulse with 1 signal [μs] | 3700 |      |      |      |

| ATEX                                              |                                             |
|---------------------------------------------------|---------------------------------------------|
| Type                                              | VL ... -EX, J- ... -EX                      |
| ATEX category for gas                             | II 2G                                       |
| Type of ignition protection for gas               | Ex h IIC T4 Gb                              |
| ATEX category for dust                            | II 2D                                       |
| Type of ignition protection for dust              | Ex h IIIC T130°C Db                         |
| Explosion-proof ambient temperature [°C]          | –10°C ≤ Ta ≤ +60°C                          |
| CE marking (see declaration of conformity)        | To EU Explosion Protection Directive (ATEX) |
| UKCA marking (see declaration of conformity)      | To UK EX instructions                       |
| Explosion protection certification outside the EU | EPL Db (GB)                                 |
|                                                   | EPL Gb (GB)                                 |

## Data sheet – 3/2-way valves

| Operating and environmental conditions       |                 |       | G1/8                                                                                       | G1/4 | G1/2 | G3/4 |
|----------------------------------------------|-----------------|-------|--------------------------------------------------------------------------------------------|------|------|------|
| Pneumatic connection                         |                 |       |                                                                                            |      |      |      |
| Operating medium                             |                 |       | Compressed air to ISO 8573-1:2010 [7:4:4]                                                  |      |      |      |
| Pilot medium                                 |                 |       | Compressed air to ISO 8573-1:2010 [7:4:4]                                                  |      |      |      |
| Note on operating/pilot medium               |                 |       | Lubricated operation possible (in which case lubricated operation will always be required) |      |      |      |
| Operating pressure                           | Normal position | [MPa] | −0.095 ... 1                                                                               |      |      |      |
|                                              | Closed          | [bar] | −0.95 ... 10                                                                               |      |      |      |
|                                              | Normally open   | [bar] | 0 ... 10                                                                                   |      |      |      |
| Pilot pressure                               |                 | [MPa] | 0.1 ... 1                                                                                  |      |      |      |
|                                              |                 | [bar] | 1 ... 10                                                                                   |      |      |      |
|                                              |                 |       | See diagram (max. 10 bar)                                                                  |      |      |      |
| Ambient temperature                          |                 |       | −10 ... +60                                                                                |      |      |      |
| Temperature of medium                        |                 |       | −10 ... +60                                                                                |      |      |      |
| Storage temperature                          |                 |       | −20 ... +60                                                                                |      |      |      |
| Note on materials                            |                 |       | RoHS-compliant                                                                             |      |      |      |
| Corrosion resistance class CRC <sup>1)</sup> |                 |       | 1                                                                                          |      |      |      |
| PWIS conformity                              |                 |       | VDMA24364-B1/B2-L                                                                          |      |      |      |

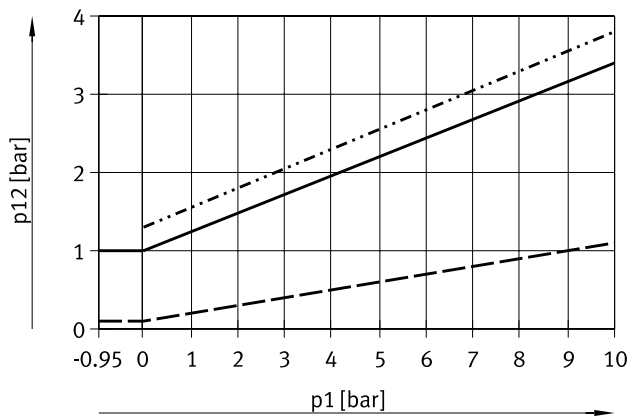
1) More information: [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

| Valve switching times [ms] |  | G1/8 | G1/4 | G1/2 | G3/4 |
|----------------------------|--|------|------|------|------|
| Pneumatic connection       |  |      |      |      |      |
| On                         |  | 4    | 7    | 17   | 12   |
| Off                        |  | 10   | 26   | 30   | 35   |

## Data sheet – 3/2-way valves

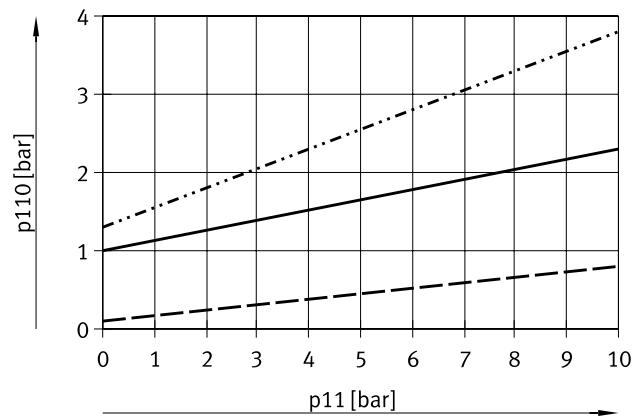
Minimum pilot pressure  $p_{12}/p_{14}/p_{110}$  as a function of operating pressure  $p_1/p_{11}$ 

VL/O-3-1/8 – normally closed



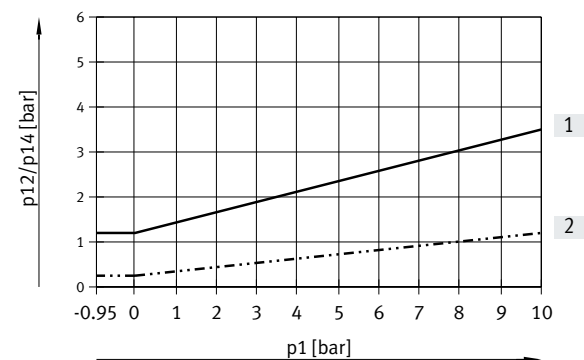
— Switch-on pressure  
 ..... Exhaust air flow control  
 --- Switch-off pressure

VL/O-3-1/8 – normally open



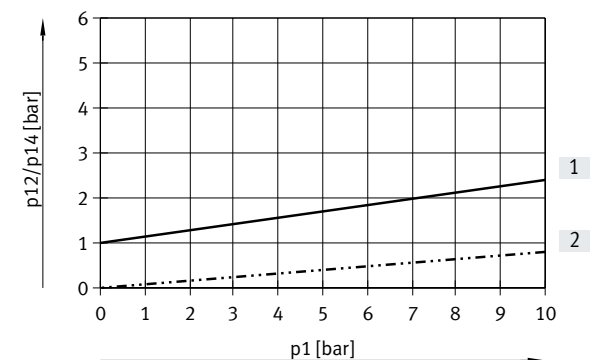
— Switch-on pressure  
 ..... Exhaust air flow control  
 --- Switch-off pressure

VL/O-3-1/4 – normally closed



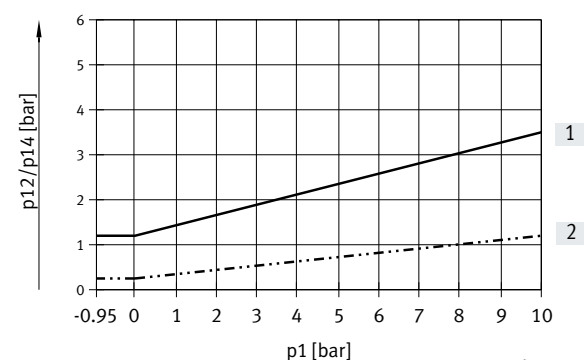
[1] Switch-on pressure  
 [2] Switch-off pressure

VL/O-3-1/4 – normally open



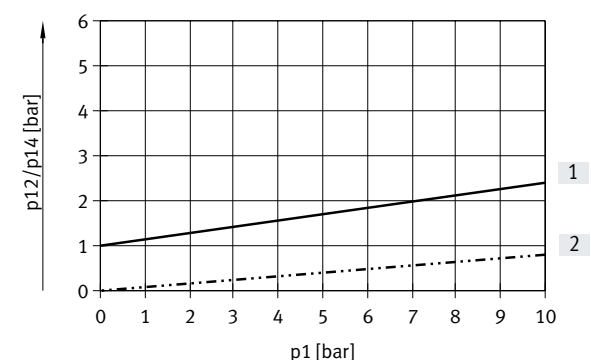
[1] Switch-on pressure  
 [2] Switch-off pressure

VL/O-3-1/2 – normally closed



[1] Switch-on pressure  
 [2] Switch-off pressure

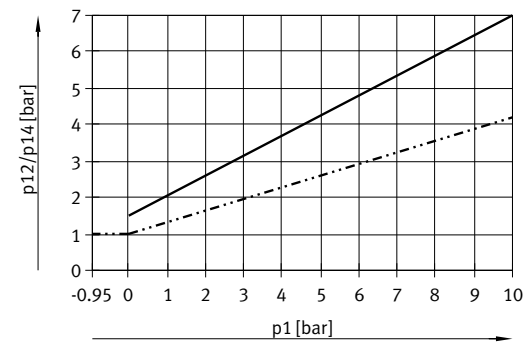
VL/O-3-1/2 – normally open



[1] Switch-on pressure  
 [2] Switch-off pressure

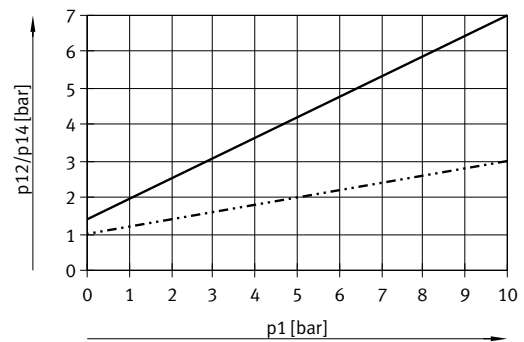
Data sheet – 3/2-way valves

VL/O-3-3/4 – normally closed



- Exhaust throttled
- Exhaust unthrottled

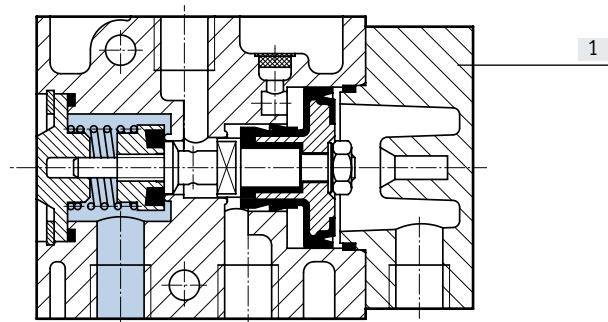
VL/O-3-3/4 – normally open



- Exhaust throttled
- Exhaust unthrottled

Materials

Sectional view



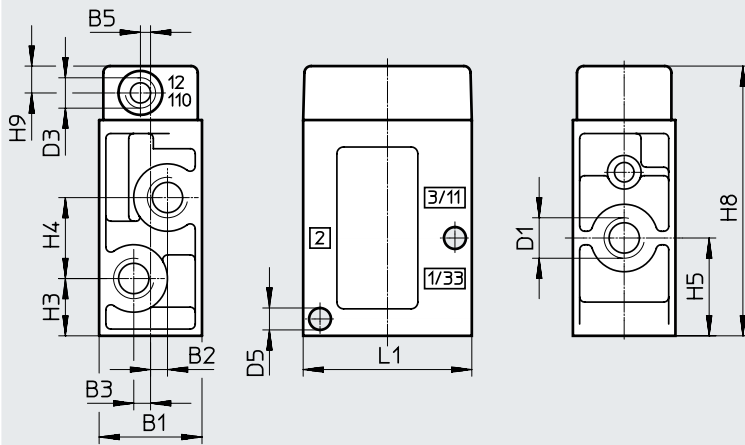
|     |         |                    |
|-----|---------|--------------------|
| [1] | Housing | Die-cast aluminium |
| -   | Seals   | NBR                |

## Data sheet – 3/2-way valves

## Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

VL/O



| Type       | B1   | B2  | B3  | B5 | D1   | D3   | D5<br>Ø | H3   | H4 | H5 | H8  | H9 | L1 |
|------------|------|-----|-----|----|------|------|---------|------|----|----|-----|----|----|
| VL/O-3-1/8 | 26   | 3.5 | 3.5 | 3  | G1/8 | G1/8 | 5.5     | 12.5 | 19 | 22 | 65  | 8  | 45 |
| VL/O-3-1/4 | 30.4 | 5   | 5   | –  | G1/4 | G1/8 | 6.5     | 17   | 24 | 29 | 80  | 8  | 50 |
| VL/O-3-1/2 | 52   | 8   | 8   | –  | G1/2 | G1/4 | 8.6     | 30   | 38 | 49 | 118 | 10 | 80 |
| VL/O-3-3/4 | 68   | 8   | 8   | –  | G3/4 | G1/4 | 8.6     | 34   | 44 | 56 | 138 | 10 | 92 |

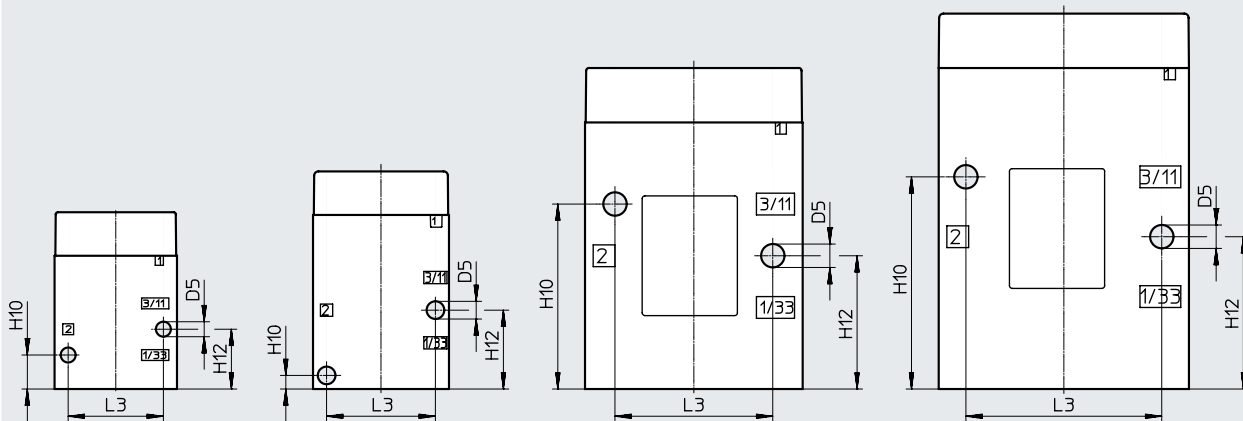
## Mounting diagram

G1/8

G1/4

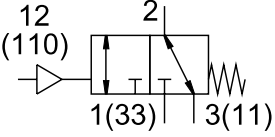
G1/2

G3/4



| Type       | D5<br>Ø | H10  | H12 | L3       |
|------------|---------|------|-----|----------|
| VL/O-3-1/8 | 5.5     | 12.5 | 22  | 35 ±0.15 |
| VL/O-3-1/4 | 6.5     | 5    | 29  | 40 ±0.15 |
| VL/O-3-1/2 | 8.6     | 68   | 49  | 58 ±0.2  |
| VL/O-3-3/4 | 8.6     | 78   | 56  | 72 ±0.2  |

# Data sheet – 3/2-way valves

| Ordering data                                                                    |                                                                                                                                                              |                      |                            |               |                        |
|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------|---------------|------------------------|
| Circuit symbol                                                                   | Description                                                                                                                                                  | Pneumatic connection | ATEX category              | Part no.      | Type                   |
|  | Reset method: mechanical, optionally normally open or normally closed reversible (no restrictions with vacuum at port 1, restrictions with vacuum at port 3) | G1/8 <sup>1)</sup>   | –                          | <b>7803</b>   | <b>VL/O-3-1/8-B</b>    |
|                                                                                  |                                                                                                                                                              |                      | ATEX category<br>→ Page 12 | <b>536028</b> | <b>VL/O-3-1/8-B-EX</b> |
|                                                                                  |                                                                                                                                                              | G1/4 <sup>2)</sup>   | –                          | <b>9984</b>   | <b>VL/O-3-1/4</b>      |
|                                                                                  |                                                                                                                                                              |                      | ATEX category<br>→ Page 12 | <b>536029</b> | <b>VL/O-3-1/4-EX</b>   |
|                                                                                  |                                                                                                                                                              | G1/2 <sup>3)</sup>   | –                          | <b>9983</b>   | <b>VL/O-3-1/2</b>      |
|                                                                                  |                                                                                                                                                              |                      | ATEX category<br>→ Page 12 | <b>536030</b> | <b>VL/O-3-1/2-EX</b>   |
|                                                                                  |                                                                                                                                                              | G3/4 <sup>4)</sup>   | –                          | <b>10049</b>  | <b>VL/O-3-3/4</b>      |
|                                                                                  |                                                                                                                                                              |                      | ATEX category<br>→ Page 12 | <b>536031</b> | <b>VL/O-3-3/4-EX</b>   |

- 1) Restrictions with vacuum at port 3: (0 ... –0.7 bar)
- 2) Restrictions with vacuum at port 3: (0 ... –0.6 bar)
- 3) Restrictions with vacuum at port 3: (0 ... –0.55 bar)
- 4) Restrictions with vacuum at port 3: (0 ... –0.4 bar)

| Ordering data – Sets of wearing parts |               |                     |
|---------------------------------------|---------------|---------------------|
| Pneumatic connection                  | Part no.      | Type                |
| G1/8                                  | <b>104222</b> | <b>VL/O-3-1/8-B</b> |
| G1/4                                  | <b>104207</b> | <b>VL/O-3-1/4</b>   |
| G1/2                                  | <b>104208</b> | <b>VL/O-3-1/2</b>   |

## Data sheet – 5/2-way valves

-  - Flow rate  
500 ... 3700 l/min

Sets of wearing parts → page 40



| General technical data             |                                                     |      |       |
|------------------------------------|-----------------------------------------------------|------|-------|
| Pneumatic connection               | G1/8                                                | G1/4 | G1/2  |
| Valve function                     | 5/2-way, monostable                                 |      |       |
| Design                             | Poppet seat                                         |      |       |
| Overlap                            | Negative overlap                                    |      |       |
| Sealing principle                  | Soft                                                |      |       |
| Actuation type                     | Pneumatic                                           |      |       |
| Reset method                       | Mechanical spring                                   |      |       |
| Type of control                    | Direct                                              |      |       |
| Pilot air supply                   | External                                            |      |       |
| Flow direction                     | Not reversible                                      |      |       |
| Manual override                    | None                                                |      |       |
| Exhaust function                   | Can be throttled                                    |      |       |
| Type of mounting                   | Via through-hole or on manifold rail/manifold block |      |       |
| Mounting position                  | Any                                                 |      |       |
| Port for venting hole              | M5 (only ATEX types)                                |      |       |
| Pilot air connection 14            | G1/8                                                | G1/8 | G1/4  |
| b value                            | –                                                   | –    | 0.32  |
| c value [l/sbar]                   | –                                                   | –    | 17.65 |
| Nominal width [mm]                 | 5                                                   | 7    | 14    |
| Standard nominal flow rate [l/min] | 500                                                 | 800  | 3700  |
| Product weight [g]                 | 220                                                 | 220  | 1070  |

| Safety data                                 |      |      |      |
|---------------------------------------------|------|------|------|
| Type                                        | G1/8 | G1/4 | G1/2 |
| Max. switching frequency [Hz]               | 12   | –    | –    |
| Max. positive test pulse with 0 signal [μs] | 2200 |      |      |
| Max. negative test pulse with 1 signal [μs] | 3700 |      |      |

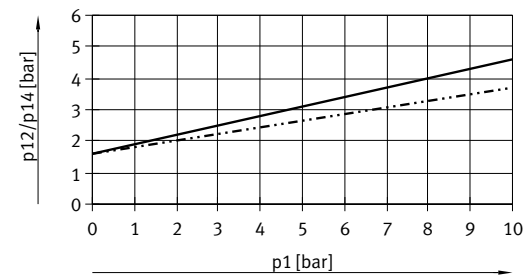
| Operating and environmental conditions       |       |                                                                                            |  |           |          |
|----------------------------------------------|-------|--------------------------------------------------------------------------------------------|--|-----------|----------|
| Pneumatic connection                         |       | G1/8                                                                                       |  | G1/4      | G1/2     |
| Operating medium                             |       | Compressed air to ISO 8573-1:2010 [7:4:4]                                                  |  |           |          |
| Pilot medium                                 |       | Compressed air to ISO 8573-1:2010 [7:4:4]                                                  |  |           |          |
| Note on operating/pilot medium               |       | Lubricated operation possible (in which case lubricated operation will always be required) |  |           |          |
| Operating pressure                           | [MPa] | 0 ... 1                                                                                    |  | 0 ... 0.8 | 0 ... 1  |
|                                              | [bar] | 0 ... 10                                                                                   |  | 0 ... 8   | 0 ... 10 |
| Pilot pressure                               | [MPa] | 0.12 ... 1                                                                                 |  |           |          |
|                                              | [bar] | 1.2 ... 10                                                                                 |  |           |          |
|                                              |       | See diagram (max. 10 bar)                                                                  |  |           |          |
| Ambient temperature                          | [°C]  | −10 ... +60                                                                                |  |           |          |
| Temperature of medium                        | [°C]  | −10 ... +60                                                                                |  |           |          |
| Storage temperature                          | [°C]  | −20 ... +60                                                                                |  |           |          |
| Note on materials                            |       | RoHS-compliant                                                                             |  |           |          |
| Corrosion resistance class CRC <sup>1)</sup> |       | 1                                                                                          |  |           |          |
| PWIS conformity                              |       | VDMA24364-B1/B2-L                                                                          |  |           |          |

1) More information: [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

Data sheet – 5/2-way valves

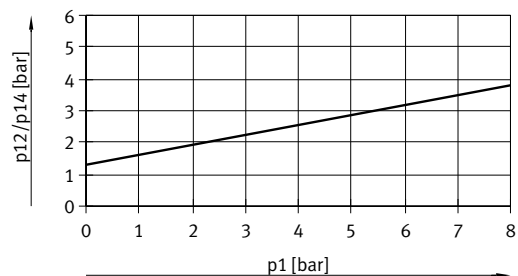
Minimum pilot pressure  $p_{12}/p_{14}$  as a function of operating pressure  $p_1$

VL-5-1/8

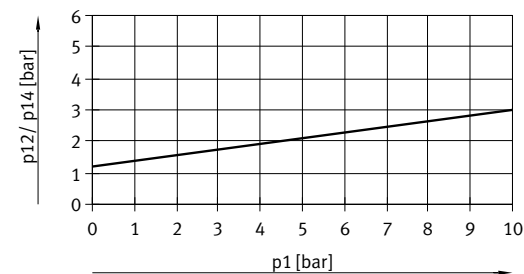


— Exhaust throttled  
- - - Exhaust unthrottled

VL-5-1/4



VL-5-1/2

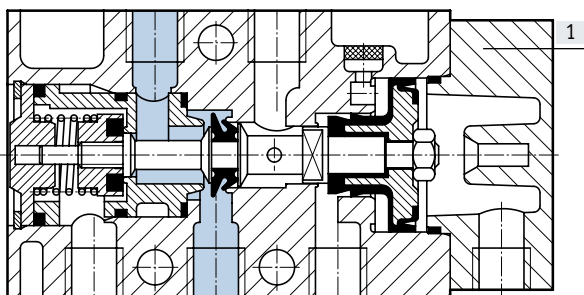


Valve switching times [ms]

| Pneumatic connection | G1/8 | G1/4 | G1/2 |
|----------------------|------|------|------|
| On                   | 5    | 7    | 3    |
| Off                  | 16   | 11   | 27   |

Materials

Sectional view



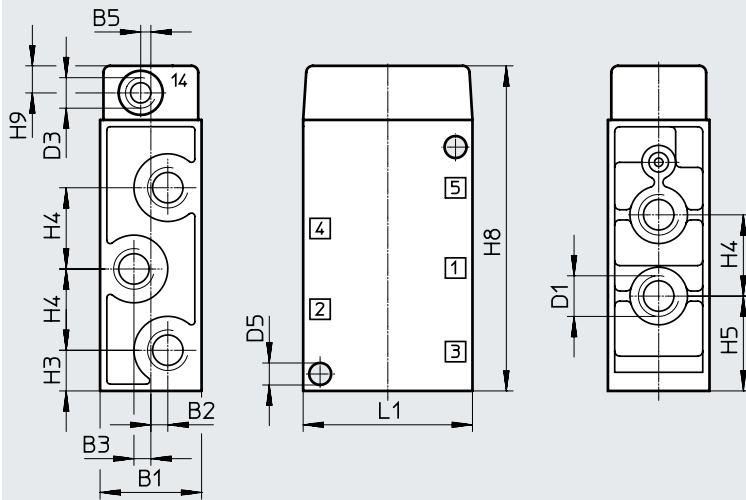
|     |         |                    |
|-----|---------|--------------------|
| [1] | Housing | Die-cast aluminium |
| -   | Seals   | NBR, TPE-U(PU)     |

## Data sheet – 5/2-way valves

## Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

VL



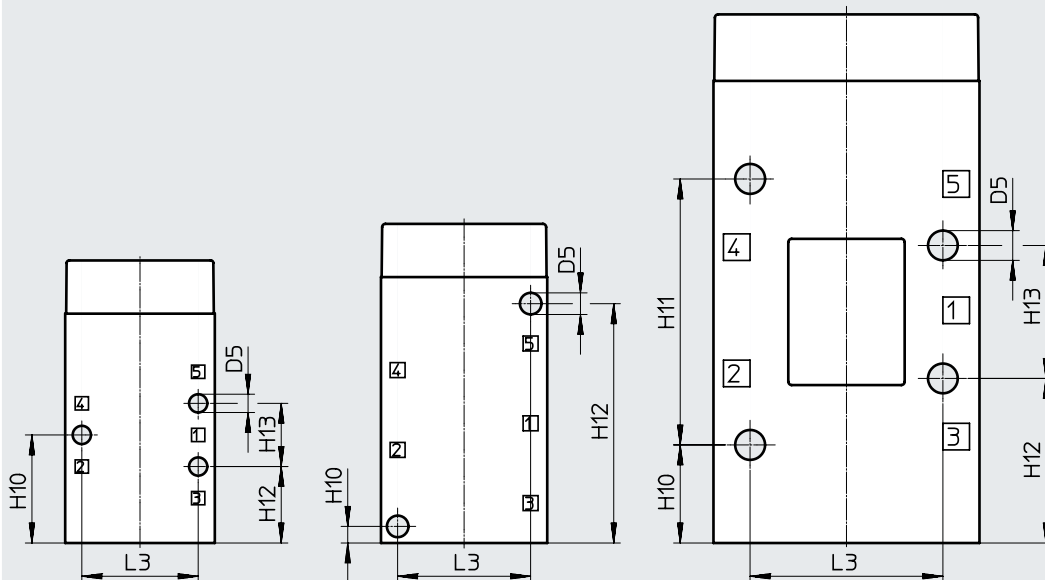
| Type     | B1        | B2  | B3  | B5 | D1   | D3   | D5<br>∅ | H3   | H4 | H5 | H8  | H9 | L1 |
|----------|-----------|-----|-----|----|------|------|---------|------|----|----|-----|----|----|
| VL-5-1/8 | 26        | 3.5 | 3.5 | 3  | G1/8 | G1/8 | 5.5     | 13.5 | 19 | 23 | 85  | 8  | 45 |
| VL-5-1/4 | 30.4 ±0.1 | –   | 5.2 | –  | G1/4 | G1/8 | 6.5     | 12   | 24 | 28 | 96  | 8  | 50 |
| VL-5-1/2 | 52        | –   | 8   | –  | G1/2 | G1/4 | 9       | 32   | 38 | 51 | 159 | 10 | 80 |

## Mounting diagram

G 1 / 8

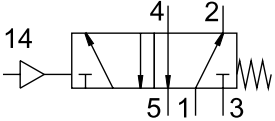
G 1 / 4

G 1 / 2



| Type     | D5<br>∅ | H10  | H11      | H12  | H13      | L3       |
|----------|---------|------|----------|------|----------|----------|
| VL-5-1/8 | 5.5     | 32.5 | –        | 23   | 19 ±0.15 | 35 ±0.15 |
| VL-5-1/4 | 6.5     | 5    | –        | 72   | –        | 40 ±0.15 |
| VL-5-1/2 | 9       | 29.5 | 80 ±0.15 | 49.5 | 40 ±0.1  | 58 ±0.15 |

## Data sheet – 5/2-way valves

| Ordering data                                                                    |                          |                      |                            |               |                    |
|----------------------------------------------------------------------------------|--------------------------|----------------------|----------------------------|---------------|--------------------|
| Circuit symbol                                                                   | Description              | Pneumatic connection | ATEX category              | Part no.      | Type               |
|  | Reset method: mechanical | G1/8                 | –                          | <b>9764</b>   | <b>VL-5-1/8</b>    |
|                                                                                  |                          |                      | ATEX category<br>→ Page 12 | <b>536032</b> | <b>VL-5-1/8-EX</b> |
|                                                                                  |                          | G1/4                 | –                          | <b>9199</b>   | <b>VL-5-1/4</b>    |
|                                                                                  |                          |                      | ATEX category<br>→ Page 12 | <b>536033</b> | <b>VL-5-1/4-EX</b> |
|                                                                                  |                          | G1/2                 | –                          | <b>9445</b>   | <b>VL-5-1/2</b>    |
|                                                                                  |                          |                      | ATEX category<br>→ Page 12 | <b>536034</b> | <b>VL-5-1/2-EX</b> |

| Ordering data – Sets of wearing parts |               |                                |
|---------------------------------------|---------------|--------------------------------|
| Pneumatic connection                  | Part no.      | Type                           |
| G1/8                                  | <b>104209</b> | <b>VL-5-1/8<sup>1)</sup></b>   |
| G1/4                                  | <b>104211</b> | <b>VL-5-1/4<sup>2)3)</sup></b> |
| G1/2                                  | <b>104212</b> | <b>VL-5-1/2</b>                |

- 1) Order assembly sleeve part no. 228389 separately  
2) Order assembly sleeve part no. 229363 separately  
3) Use from series 1/81

## Data sheet – 5/2-way valves, double pilot valves

-  - Flow rate  
600 ... 4500 l/min

Sets of wearing parts → page 45



| General technical data             |                                                     |      |           |
|------------------------------------|-----------------------------------------------------|------|-----------|
| Pneumatic connection               | G1/8                                                | G1/4 | G1/2      |
| Valve function                     | 5/2-way, bistable                                   |      |           |
| Design                             | Poppet seat                                         |      |           |
| Overlap                            | Negative overlap                                    |      |           |
| Sealing principle                  | Soft                                                |      |           |
| Actuation type                     | Pneumatic                                           |      |           |
| Type of control                    | Direct                                              |      |           |
| Pilot air supply                   | External                                            |      |           |
| Flow direction                     | Not reversible                                      |      |           |
| Exhaust function                   | Can be throttled                                    |      |           |
| Manual override                    | –                                                   | –    | Detenting |
| Type of mounting                   | Via through-hole or on manifold rail/manifold block |      |           |
| Mounting position                  | Any                                                 |      |           |
| Port for venting hole              | M5 (only ATEX types)                                |      |           |
| Pilot air port 12/14               | G1/8                                                | G1/8 | G1/4      |
| b value                            | –                                                   | –    | 0.3       |
| Nominal width [mm]                 | 5                                                   | 7    | 14        |
| Standard nominal flow rate [l/min] | 600                                                 | 1100 | 4500      |
| Product weight [g]                 | 330                                                 | 330  | 1130      |

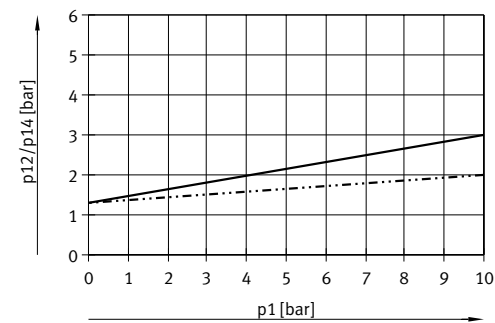
| Safety data                                 |      |      |      |
|---------------------------------------------|------|------|------|
| Type                                        | G1/8 | G1/4 | G1/2 |
| Max. switching frequency [Hz]               | 12   |      |      |
| Max. positive test pulse with 0 signal [μs] | 2200 |      |      |
| Max. negative test pulse with 1 signal [μs] | 3700 |      |      |

| Operating and environmental conditions       |                                                                                            |            |           |
|----------------------------------------------|--------------------------------------------------------------------------------------------|------------|-----------|
| Pneumatic connection                         | G1/8                                                                                       | G1/4       | G1/2      |
| Operating medium                             | Compressed air to ISO 8573-1:2010 [7:4:4]                                                  |            |           |
| Pilot medium                                 | Compressed air to ISO 8573-1:2010 [7:4:4]                                                  |            |           |
| Note on operating/pilot medium               | Lubricated operation possible (in which case lubricated operation will always be required) |            |           |
| Operating pressure                           | [MPa]                                                                                      | 0 ... 1    | 0 ... 0.8 |
|                                              | [bar]                                                                                      | 0 ... 10   | 0 ... 8   |
|                                              | With dominant signal                                                                       | [MPa]      | 0 ... 1   |
|                                              |                                                                                            | [bar]      | 0 ... 10  |
| Pilot pressure                               | [MPa]                                                                                      | 0 ... 0.8  | –         |
|                                              | [bar]                                                                                      | 0 ... 8    | –         |
|                                              | [MPa]                                                                                      | 0.12 ... 1 |           |
|                                              | [bar]                                                                                      | 1.2 ... 10 |           |
| With dominant signal                         | See diagram (max. 10 bar)                                                                  |            |           |
|                                              | [MPa]                                                                                      | 0.23 ... 1 | –         |
|                                              | [bar]                                                                                      | 2.3 ... 10 | –         |
|                                              |                                                                                            |            |           |
| Ambient temperature [°C]                     | –10 ... +60                                                                                |            |           |
| Temperature of medium [°C]                   | –10 ... +60                                                                                |            |           |
| Storage temperature [°C]                     | –20 ... +60                                                                                |            |           |
| Note on materials                            | RoHS-compliant                                                                             |            |           |
| Corrosion resistance class CRC <sup>1)</sup> | 1                                                                                          |            |           |
| PWIS conformity                              | VDMA24364-B1/B2-L                                                                          |            |           |

1) More information: [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

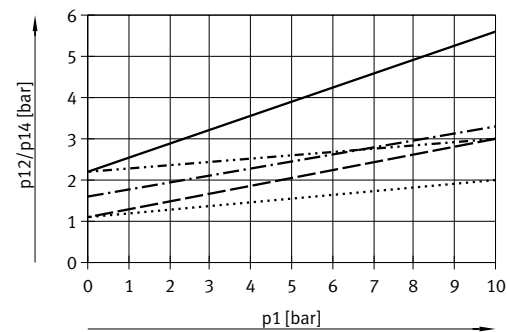
Data sheet – 5/2-way valves, double pilot valves

Minimum pilot pressure  $p_{12}/p_{14}$  as a function of operating pressure  $p_1$   
JH-5-1/8



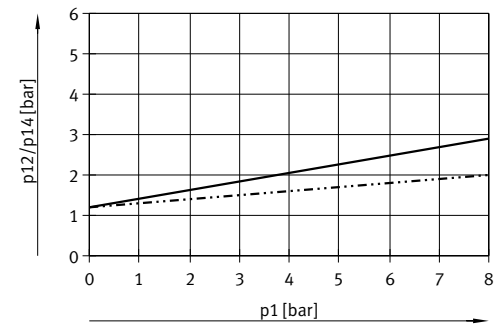
— Exhaust throttled  
- - - Exhaust unthrottled

JDH-5-1/8



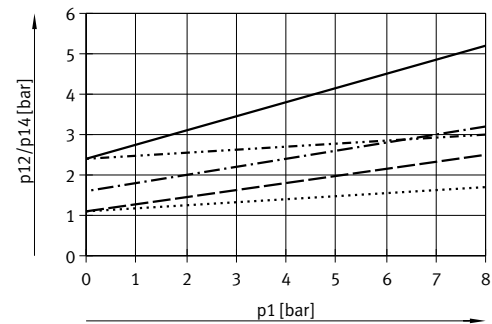
— Exhaust throttled  
- - - Exhaust unthrottled

JH-5-1/4



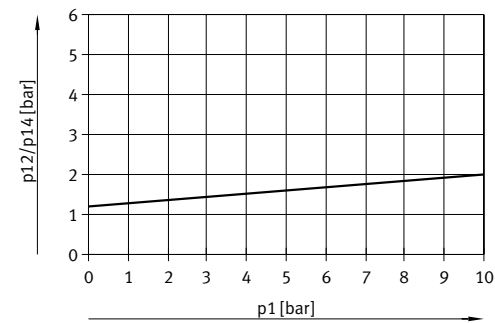
— Exhaust throttled  
- - - Exhaust unthrottled

JDH-5-1/4



— Exhaust throttled  
- - - Exhaust unthrottled

JH-5-1/2



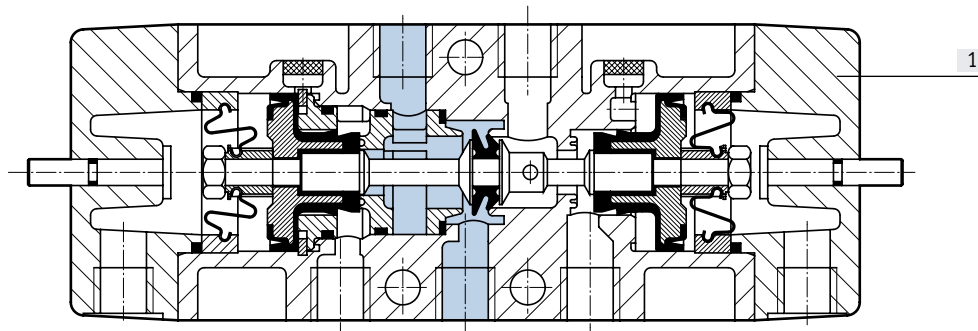
Valve switching times [ms]

| Pneumatic connection | G1/8 |                       | G1/4 |                       | G1/2 |                       |
|----------------------|------|-----------------------|------|-----------------------|------|-----------------------|
|                      |      | Dominant signal at 14 |      | Dominant signal at 14 |      | Dominant signal at 14 |
| Changeover           | 7    | 7                     | 7    | 12                    | 3    | –                     |

## Data sheet – 5/2-way valves, double pilot valves

## Materials

Sectional view

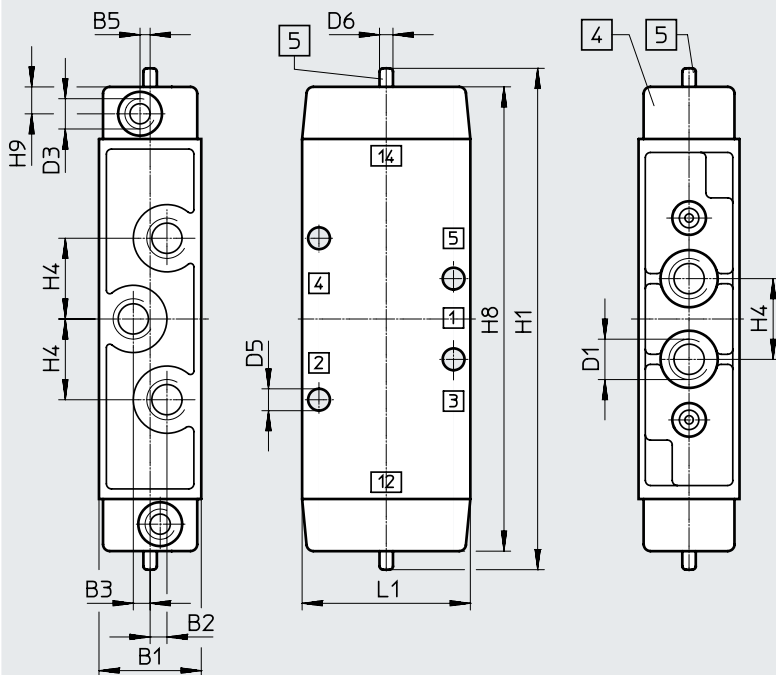


|             |                    |
|-------------|--------------------|
| [1] Housing | Die-cast aluminium |
| - Seals     | NBR, TPE-U(PU)     |

## Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

JH, JDH

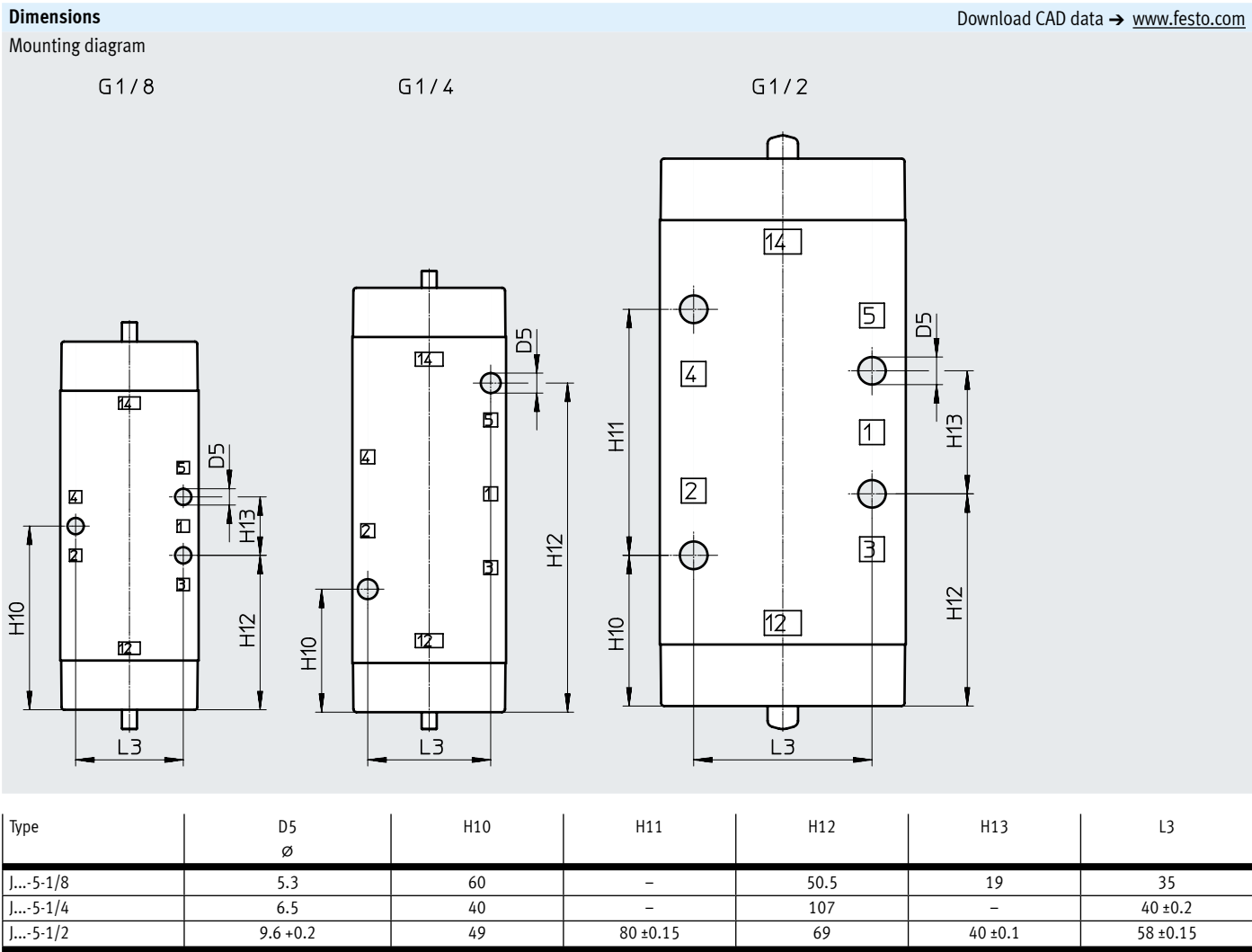


[4] Cover can be turned 180°

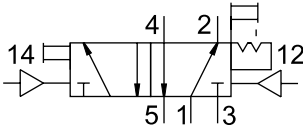
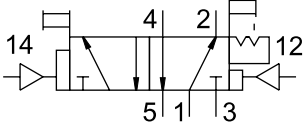
[5] Manual override

| Type       | B1   | B2  | B3  | B5 | D1   | D3   | D5<br>Ø  | D6<br>Ø | H1  | H4 | H8  | H9 | L1 |
|------------|------|-----|-----|----|------|------|----------|---------|-----|----|-----|----|----|
| J...-5-1/8 | 26   | 3.5 | 3.5 | 3  | G1/8 | G1/8 | 5.3      | 5       | 132 | 19 | 120 | 8  | 45 |
| J...-5-1/4 | 30.4 | –   | 5   | –  | G1/4 | G1/8 | 6.5      | 5       | 149 | 24 | 138 | 8  | 50 |
| J...-5-1/2 | 52   | –   | 8   | –  | G1/2 | G1/4 | 9.6 +0.2 | 9.9     | 193 | 38 | 178 | 10 | 80 |

Data sheet – 5/2-way valves, double pilot valves



## Data sheet – 5/2-way valves, double pilot valves

| Ordering data                                                                     |                            |                                       |                            |               |                              |          |      |
|-----------------------------------------------------------------------------------|----------------------------|---------------------------------------|----------------------------|---------------|------------------------------|----------|------|
| Circuit symbol                                                                    | Description                | Pneumatic connection                  | ATEX category              | Part no.      | Type                         |          |      |
|  |                            | G1/8                                  | –                          | <b>8823</b>   | <b>JH-5-1/8</b>              |          |      |
|                                                                                   |                            |                                       | ATEX category<br>→ Page 31 | <b>536035</b> | <b>JH-5-1/8-EX</b>           |          |      |
|                                                                                   |                            | G1/4                                  | –                          | <b>10408</b>  | <b>JH-5-1/4</b>              |          |      |
|                                                                                   |                            |                                       | ATEX category<br>→ Page 31 | <b>536036</b> | <b>JH-5-1/4-EX</b>           |          |      |
|                                                                                   |                            | G1/2                                  | –                          | <b>10165</b>  | <b>JH-5-1/2</b>              |          |      |
|                                                                                   |                            |                                       | ATEX category<br>→ Page 31 | <b>536037</b> | <b>JH-5-1/2-EX</b>           |          |      |
|  | With dominant signal at 14 | G1/8                                  | –                          | <b>8824</b>   | <b>JDH-5-1/8</b>             |          |      |
|                                                                                   |                            |                                       | ATEX category<br>→ Page 31 | <b>536038</b> | <b>JDH-5-1/8-EX</b>          |          |      |
|                                                                                   |                            | G1/4                                  | –                          | <b>10409</b>  | <b>JDH-5-1/4</b>             |          |      |
|                                                                                   |                            |                                       | ATEX category<br>→ Page 31 | <b>536039</b> | <b>JDH-5-1/4-EX</b>          |          |      |
|                                                                                   |                            | Ordering data – Sets of wearing parts |                            |               |                              |          |      |
|                                                                                   |                            | Pneumatic connection                  |                            |               |                              | Part no. | Type |
| G1/8                                                                              |                            |                                       |                            | <b>104891</b> | <b>JH-5-1/8<sup>1)</sup></b> |          |      |
| G1/4                                                                              |                            |                                       |                            | <b>104892</b> | <b>JH-5-1/4<sup>2)</sup></b> |          |      |

1) Order assembly sleeve part no. 228389 separately

2) Order assembly sleeve part no. 229363 separately

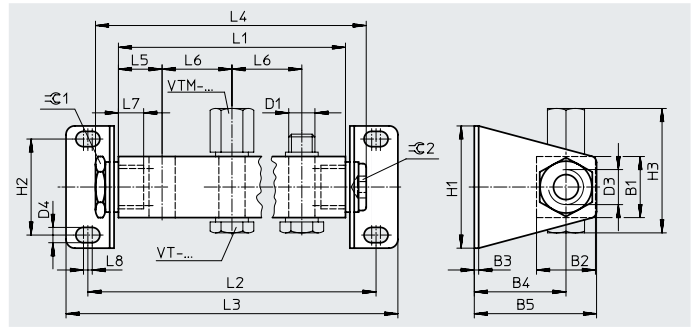
## Accessories

## Manifold rail PAL

Materials:

Rail: Anodised aluminium

Mounting bracket: Galvanised steel



| Type        | B1 | B2 | B3 | B4   | B5   | D1   | D3   | D4  | H1 | H2 | H3 | L5 | L6 | L7 | L8 | ⌀1 | ⌀2 |
|-------------|----|----|----|------|------|------|------|-----|----|----|----|----|----|----|----|----|----|
| PAL-1/8-... | 20 | 21 | 2  | 33.5 | 44.5 | G1/8 | G1/4 | 5.2 | 44 | 32 | 43 | 18 | 34 | 12 | 4  | 19 | 8  |
| PAL-1/4-... | 28 | 27 | 2  | 42   | 56   | G1/4 | G3/8 | 7   | 56 | 44 | 56 | 20 | 32 | 14 | 4  | 24 | 10 |
| PAL-1/2-... | 40 | 40 | 3  | 73   | 93   | G1/2 | G3/4 | 11  | 80 | 60 | 75 | 35 | 69 | 16 | 5  | 36 | 17 |

| No. of valve ports                            | L1  | L2  | L3  | L4  | Weight [g] | Part no. | Type        |
|-----------------------------------------------|-----|-----|-----|-----|------------|----------|-------------|
| <b>Pneumatic connection G1/8</b>              |     |     |     |     |            |          |             |
| 2                                             | 70  | 96  | 114 | 89  | 145        | 8601     | PAL-1/8-2   |
| 3                                             | 104 | 130 | 148 | 123 | 170        | 8602     | PAL-1/8-3   |
| 4                                             | 138 | 164 | 182 | 157 | 190        | 8603     | PAL-1/8-4   |
| 5                                             | 172 | 198 | 216 | 191 | 215        | 8604     | PAL-1/8-5   |
| 6                                             | 206 | 232 | 250 | 225 | 240        | 9767     | PAL-1/8-6   |
| <b>Pneumatic connection G1/4<sup>1)</sup></b> |     |     |     |     |            |          |             |
| 2                                             | 72  | 100 | 120 | 94  | 330        | 9188     | PAL-5-1/4-2 |
| 3                                             | 104 | 132 | 152 | 126 | 405        | 9189     | PAL-5-1/4-3 |
| 4                                             | 136 | 164 | 184 | 158 | 480        | 9190     | PAL-5-1/4-4 |
| 5                                             | 168 | 196 | 216 | 190 | 555        | 9191     | PAL-5-1/4-5 |
| 6                                             | 200 | 228 | 248 | 222 | 630        | 9192     | PAL-5-1/4-6 |
| <b>Pneumatic connection G1/2</b>              |     |     |     |     |            |          |             |
| 2                                             | 139 | 181 | 213 | 164 | 770        | 9492     | PAL-1/2-2   |
| 3                                             | 208 | 250 | 282 | 233 | 915        | 9493     | PAL-1/2-3   |
| 4                                             | 277 | 319 | 351 | 302 | 1 060      | 9494     | PAL-1/2-4   |
| 5                                             | 346 | 388 | 420 | 371 | 1 220      | 9495     | PAL-1/2-5   |
| 6                                             | 415 | 457 | 489 | 440 | 1 370      | 9496     | PAL-1/2-6   |

1) MOFH-3-1/4 is not suitable for manifold assembly

## Accessories

### Hollow bolt VT

For manifold rail PAL

Note on materials:

RoHS-compliant



| Ordering data        |            |                    |          |                          |
|----------------------|------------|--------------------|----------|--------------------------|
| Pneumatic connection | Weight [g] | Material           | Part no. | Type                     |
| G1/8                 | 6          | Chromated steel    | 8626     | VT-1/8                   |
| G1/8                 | 15         | Anodised aluminium | 5928     | VT-1/8-1 <sup>1)2)</sup> |
| G1/4                 | 15         | Chromated steel    | 206147   | VT-1/4-2                 |
| G1/2                 | 30         | Anodised aluminium | 9986     | VT-1/2                   |

1) For valves with G1/8 connection

2) Sealing rings included in the scope of delivery

### Cap nut VTM

For blanking vacant positions

Material:

Wrought aluminium alloy



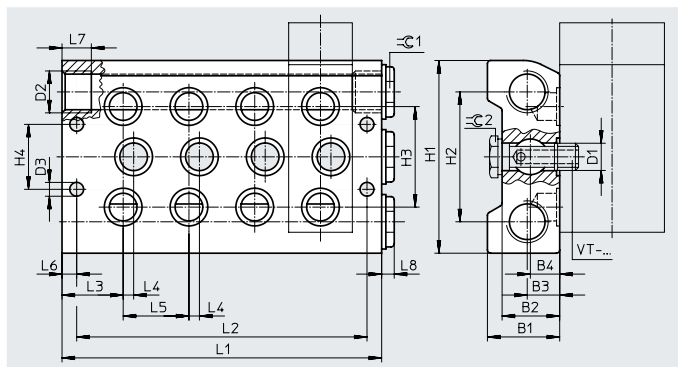
| Ordering data        |            |          |                       |  |
|----------------------|------------|----------|-----------------------|--|
| Pneumatic connection | Weight [g] | Part no. | Type                  |  |
| G1/8                 | 5          | 9768     | VTM-1/8 <sup>1)</sup> |  |
| G1/4                 | 7          | 3099     | VTM-1/4               |  |
| G1/2                 | 28         | 9987     | VTM-1/2               |  |

1) For valves with G1/8 connection

## Accessories

## Manifold block PRS

Material:  
Anodised aluminium



| Type        | B1   | B2   | B3   | B4   | D1   | D2   | D3  | H1 | H2 | H3 | H4 | L3   | L4 | L5   | L6 | L7 | L8 | ±G 1 | ±G 2 |
|-------------|------|------|------|------|------|------|-----|----|----|----|----|------|----|------|----|----|----|------|------|
| PRS-1/8-... | 28.5 | 22   | 12.5 | 10.8 | G1/8 | G3/8 | 6.6 | 80 | 56 | 38 | 28 | 23.5 | 7  | 27   | 7  | 12 | 5  | 8    | 14   |
| PRS-1/4-... | 34.5 | 27.5 | 14   | 14   | G1/4 | G1/2 | 6.6 | 92 | 62 | 48 | 31 | 29.2 | 5  | 31.4 | 7  | 14 | 6  | 10   | 17   |

| No. of valve ports               | L1    | L2    | Weight [g] | Part no. | Type        |
|----------------------------------|-------|-------|------------|----------|-------------|
| <b>Pneumatic connection G1/8</b> |       |       |            |          |             |
| 2                                | 81    | 67    | 360        | 11898    | PRS-1/8-2-B |
| 3                                | 108   | 94    | 460        | 11899    | PRS-1/8-3-B |
| 4                                | 135   | 121   | 625        | 11900    | PRS-1/8-4-B |
| 5                                | 162   | 148   | 650        | 11901    | PRS-1/8-5-B |
| 6                                | 189   | 175   | 750        | 11902    | PRS-1/8-6-B |
| <b>Pneumatic connection G1/4</b> |       |       |            |          |             |
| 2                                | 89.8  | 75.8  | 590        | 10185    | PRS-1/4-2   |
| 3                                | 121.2 | 107.2 | 750        | 10186    | PRS-1/4-3   |
| 4                                | 152.6 | 138.6 | 900        | 10187    | PRS-1/4-4   |
| 5                                | 184   | 170   | 1070       | 10188    | PRS-1/4-5   |
| 6                                | 215.4 | 201.4 | 1 230      | 10189    | PRS-1/4-6   |

## Hollow bolt VT

For manifold block PRS

Material:  
Chromated steel



| Ordering data        |            | Part no. | Type        |
|----------------------|------------|----------|-------------|
| Pneumatic connection | Weight [g] |          |             |
| G1/8                 | 17         | 11539    | VT-1/8-PRSK |
| G1/4                 | 32         | 9499     | VT-1/4-PRS  |

## Accessories

### Cover plate PRSB

For blanking vacant positions

Material:

Aluminium



| Ordering data        |            | Part no. | Type     |
|----------------------|------------|----------|----------|
| Pneumatic connection | Weight [g] |          |          |
| G1/8                 | 55         | 11687    | PRSB-1/8 |
| G1/4                 | 80         | 11688    | PRSB-1/4 |

### Hollow bolt VT

For separate compressed air supply on valve

Material:

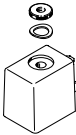
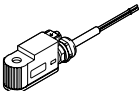
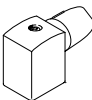
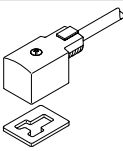
Chromated steel



| Ordering data        |            | Part no. | Type                       |
|----------------------|------------|----------|----------------------------|
| Pneumatic connection | Weight [g] |          |                            |
| G1/8                 | 16         | 12634    | VT-1/8-AJK-P               |
| G1/4                 | 24         | 12910    | VT-1/8-AJS-P <sup>1)</sup> |
| G1/4                 | 45         | 12635    | VT-1/4-AJ-P                |

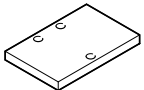
1) For valves with G1/8 connection

## Accessories

| Ordering data – Solenoid coils                                                     |                                                             |                                                                    |                     |          |                       |
|------------------------------------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------------------|---------------------|----------|-----------------------|
|                                                                                    | Description                                                 | Voltage                                                            | Cable length<br>[m] | Part no. | Type                  |
| F solenoid coils, without plug socket                                              |                                                             |                                                                    |                     |          |                       |
|    | –                                                           | 12 V DC                                                            | –                   | 34410    | MSFG-12-OD            |
|                                                                                    |                                                             | 24 V DC and 42 V AC, 50 ... 60 Hz                                  | –                   | 34411    | MSFG-24/42-50/60-OD   |
|                                                                                    |                                                             | 42 V DC                                                            | –                   | 34413    | MSFG-42-OD            |
|                                                                                    |                                                             | 24 V AC                                                            | –                   | 34415    | MSFW-24-50/60-OD      |
|                                                                                    |                                                             | 48 V AC, 50 ... 60 Hz                                              | –                   | 34418    | MSFW-48-50/60-OD      |
|                                                                                    |                                                             | 110 V AC, 50 ... 60 Hz and 120 V AC, 60 Hz                         | –                   | 34420    | MSFW-110-50/60-OD     |
|                                                                                    |                                                             | 230 V AC, 50 ... 60 Hz and 240 V AC, 60 Hz                         | –                   | 34422    | MSFW-230-50/60-OD     |
|                                                                                    |                                                             | 240 V AC, 50 ... 60 Hz                                             | –                   | 34424    | MSFW-240-50/60-OD     |
|                                                                                    | Explosion-proof                                             | 24 V DC                                                            | –                   | 536931   | MSFG-24-EX            |
|                                                                                    |                                                             | 24 V AC                                                            | –                   | 536932   | MSFW-24-50/60-EX      |
|                                                                                    |                                                             | 110 V AC                                                           | –                   | 536933   | MSFW-110-50/60-EX     |
|                                                                                    |                                                             | 230 V AC                                                           | –                   | 536934   | MSFW-230-50/60-EX     |
| F solenoid coils, cable with open end, 3-wire                                      |                                                             |                                                                    |                     |          |                       |
|    | Explosion-proof                                             | 24 V DC                                                            | 1                   | 8059804  | VACF-B-K1-1-1-EX4-M   |
|                                                                                    |                                                             |                                                                    | 5                   | 8059805  | VACF-B-K1-1-5-EX4-M   |
|                                                                                    |                                                             |                                                                    | 10                  | 8059806  | VACF-B-K1-1-10-EX4-M  |
|                                                                                    |                                                             |                                                                    | 20                  | 8059807  | VACF-B-K1-1-20-EX4-M  |
|                                                                                    |                                                             | 24 V AC                                                            | 1                   | 8059808  | VACF-B-K1-1A-1-EX4-M  |
|                                                                                    |                                                             |                                                                    | 5                   | 8059811  | VACF-B-K1-16B-1-EX4-M |
|                                                                                    |                                                             | 110 V AC                                                           | 5                   | 8059812  | VACF-B-K1-16B-5-EX4-M |
|                                                                                    |                                                             |                                                                    | 230 V AC            | 1        | 8059809               |
|                                                                                    |                                                             | 5                                                                  |                     | 8059810  | VACF-B-K1-3A-5-EX4-M  |
|                                                                                    |                                                             | Ordering data – Plug sockets/connecting cable for F solenoid coils |                     |          |                       |
|                                                                                    | Description                                                 | Voltage                                                            | Cable length<br>[m] | Part no. | Type                  |
| Plug socket without cable, cable connection with                                   |                                                             |                                                                    |                     |          |                       |
|  | Locking screws<br>(cable connector Pg9)                     | –                                                                  | –                   | 34431    | MSSD-F                |
|                                                                                    | Locking screws<br>(cable connector M16)                     | –                                                                  | –                   | 539710   | MSSD-F-M16            |
|  | Insulation displacement technology<br>(cable connector M16) | –                                                                  | –                   | 192746   | MSSD-F-S-M16          |
| Connecting cable                                                                   |                                                             |                                                                    |                     |          |                       |
|  | Signal status display with LED                              | 24 V DC                                                            | 2.5                 | 30935    | KMF-1-24DC-2.5-LED    |
|                                                                                    |                                                             |                                                                    | 5                   | 30937    | KMF-1-24DC-5-LED      |
|                                                                                    |                                                             |                                                                    | 10                  | 193458   | KMF-1-24DC-10-LED     |
|                                                                                    | Without signal status display                               | Up to 240 V                                                        | 2.5                 | 30936    | KMF-1-230AC-2.5       |
|                                                                                    |                                                             |                                                                    | 5                   | 30938    | KMF-1-230AC-5         |

## Accessories

| Ordering data – Illuminating seals                                                |                      |                                 |          | Data sheets → Internet: mf-ld |
|-----------------------------------------------------------------------------------|----------------------|---------------------------------|----------|-------------------------------|
|                                                                                   | Description          | Voltage                         | Part no. | Type                          |
|  | For F solenoid coils | 12 ... 24 V DC<br>230 V DC/V AC | 19143    | MF-LD-12-24DC                 |
|                                                                                   |                      |                                 | 19144    | MF-LD-230AC                   |

| Ordering data – Plate                                                             |                                                                                         |                    |                      |          |             |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------|----------------------|----------|-------------|
|                                                                                   | Description                                                                             |                    | Pneumatic connection | Part no. | Type        |
| <b>For wide solenoid coils</b>                                                    |                                                                                         |                    |                      |          |             |
|  | As spacer when using wider solenoid coils from other manufacturers (thickness: 6.35 mm) | For 3/2-way valves | G1/8                 | 541667   | MPL-TC-3-18 |
|                                                                                   |                                                                                         |                    | G1/4                 | 541669   | MPL-TC-3-14 |
|                                                                                   |                                                                                         | For 5/2-way valves | G1/8                 | 541668   | MPL-TC-5-18 |
|                                                                                   |                                                                                         |                    | G1/4                 | 541670   | MPL-TC-5-14 |