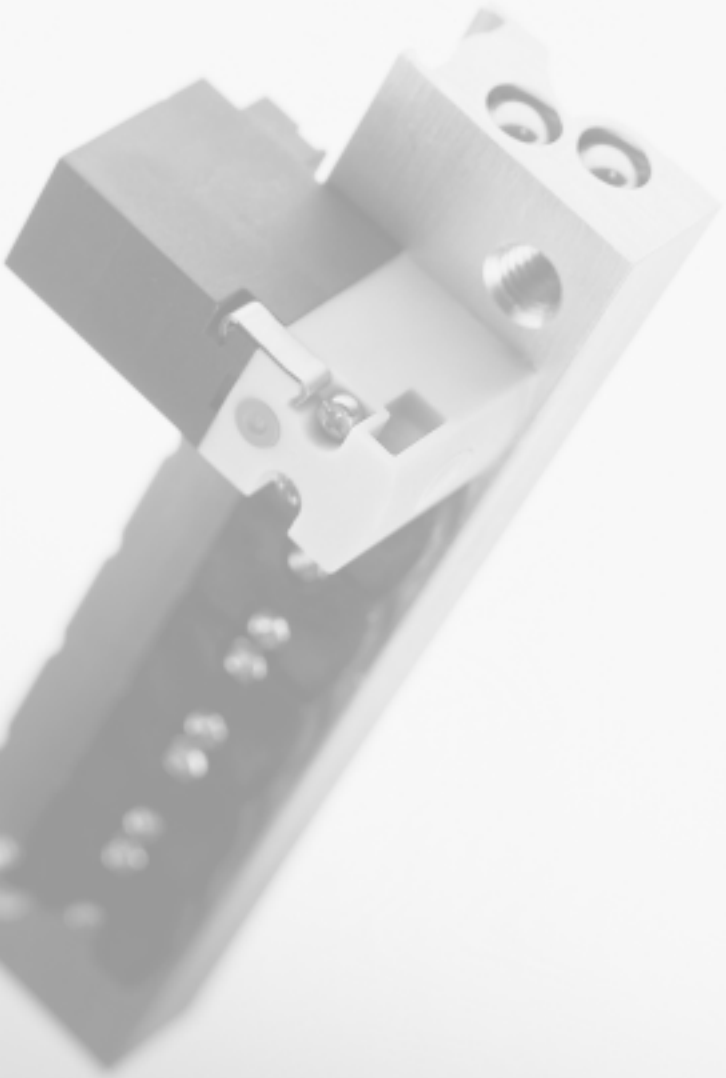
# Solenoid valves MH1, miniature

FESTO

# Complete product range for a variety of applications



**Extremely small**
The new miniaturised generation of poppet valves offers flow rates of 14 l/min in the 2/2-way version or 10 l/min in the 3/2-way version. Available either as an individual sub-base valve or pre-assembled on a PR manifold rail. In addition, mounting on a PR manifold rail enables very compact assembly. For increased requirements and speed, the bigger MH2 with a flow rate of up to 100 l/min is the ideal solution.

**Extremely versatile and fast**
The miniature valves can be linked together via a pneumatic multiple connector plate or electrical multi-pin connection. There is also a choice between horizontal electrical connections, on top and underneath. Furthermore, a connection for mounting on a PCB is available. All components are tested and assembled for Festo plug and work. Need a system to run as fast as possible? No problem! The response time of the miniature valves is an impressive 4 ms.

**Totally coordinated**
Festo offers an extensive product range including drives, rodless drives, mini slides, rotary drives and accessories under the umbrella term "compact". Perfectly coordinated and geared towards all production areas for the manufacture and processing of very small products. All the components comply with the proven quality standards from Festo and include the added value that only a global company can offer.

**Miniature valves not just for the electronics industry ...**

... but also for the light assembly, medical technology and semiconductor industries and wherever extremely compact and fast-switching valves or pilot valves are required for valves coming into contact with media (e.g. process industry). With response times of approx. 4 ms, these valves satisfy all requirements for speed. Vacuum functions can also be easily implemented. A 100% duty cycle and even a three-shift operation guarantee maximum cost-effectiveness.

With flow rates of 10 and14 l/min for the miniature valves, there is always sufficient volume for pilot control of process valves. The flow rate is also adequate for the wide range of compact cylinders, rotary drives and slides from Festo.
For increased requirements of up to 100 l/min: MH2.

**Operation with different pressures**

Vacuum operation

The flow direction of the MH1 valves is clearly defined and cannot be reversed.

This flow direction needs to be observed even when operating the valve with vacuum.

This is achieved by connecting the vacuum to port 3 or 2 (33 or 11).

Reverse operation

Reverse operation is not possible; the direction of flow cannot be reversed.

Note

Vacuum must not be connected to port 1.

2/2-way valve, MH...-2/2G-...

- Vacuum operation is established by connecting vacuum at port 2
- An ejector pulse can only be realised with another valve

3/2-way valve, MH...-3/2G-...

- Vacuum operation is established by connecting vacuum at port 3
- Venting (or pressurisation) takes place via port 1
- Normally open with vacuum operation

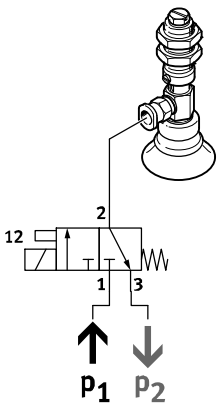
3/2-way valve, MH...-3/2O-...

- Vacuum operation is established by connecting vacuum at port 33
- Venting (or pressurisation) takes place via port 11
- Normally closed with vacuum operation

2x2/2-way valve, MHA1-2X2/2G-...

- Vacuum operation is established by connecting vacuum at port 11
- The ejector pulse is connected at port 1

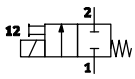
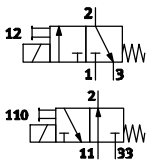
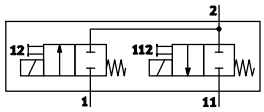
Example



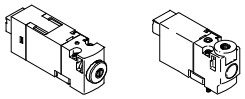
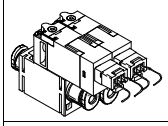
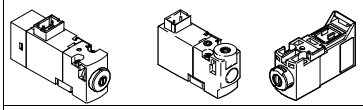
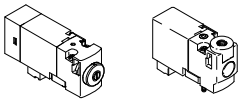

With the 3/2-way valve, normally closed, vacuum operation is established by connecting the vacuum (P2) to port 3 and connecting e.g. a silencer for venting (P1) to port 1.
This changes the normal position from "closed" to "open".

# Solenoid valves MH1, miniature

Product range overview

| Function | Circuit symbol | Version | Operating voltage | | | | ➔ Page/ Internet |
|---|---|---|---|---|---|---|---|
| | | | 5 V DC | 12 V DC | 24 V DC | 24 V AC | |
| **2/2-way valve** |  | **Standard nominal flow rate 14 l/min** | | | | | |
| | | Semi in-line valve | ■ | ■ | ■ | – | 10 |
| | | Sub-base valve without LED | ■ | ■ | ■ | – | 24 |
| | | | | | | | |
| | | **Standard nominal flow rate 30 l/min, controls vacuum or ejector pulse** | | | | | |
| | | Sub-base valve with LED | – | – | ■ | – | 60 |
| | | | | | | | |
| **3/2-way valve**[1)] |  | **Standard nominal flow rate 10 l/min** | | | | | |
| | | Semi in-line valve | ■ | ■ | ■ | – | 10 |
| | | Sub-base valve without LED | ■ | ■ | ■ | – | 24 |
| | | Sub-base valve with E-box | ■ | ■ | ■ | ■ | 37 |
| | | Sub-base valve with LED | – | – | ■ | – | 46 |
| | | | | | | | |
| | | | | | | | |
| **2x2/2-way valve** |  | **Standard nominal flow rate 30 l/min, controls vacuum and ejector pulse** | | | | | |
| | | Sub-base valve with LED | – | – | ■ | – | 60 |
| | | | | | | | |

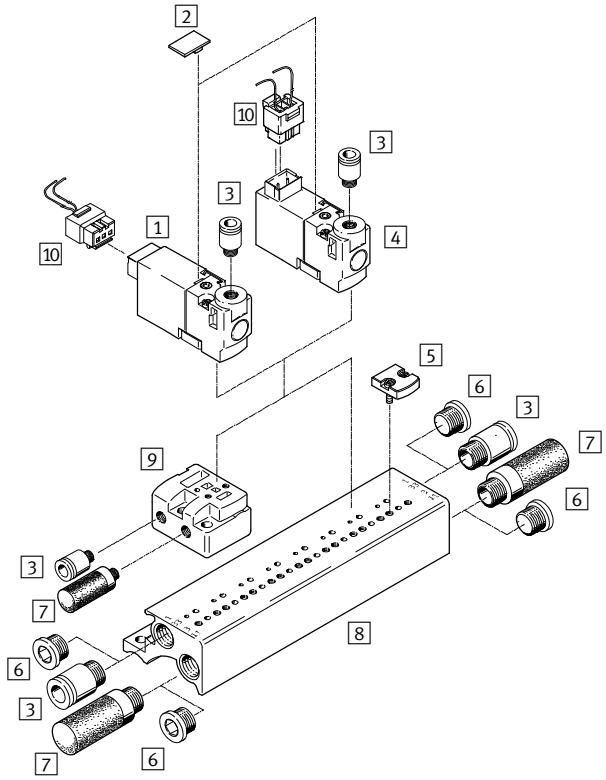
1) Can be used as a 2/2-way valve by sealing port 1 or 3

| Mounting options | | | | | |
|---|---|---|---|---|---|
| Design | | Semi in-line valve | Sub-base valve | | |
| Electrical connection | | Without LED | Without LED | With E-box | With LED |
| Plug connection at rear (HC) | | | | | |
|  | Individual sub-base | ■ | ■ | – | ■ |
| | Manifold assembly | ■ | ■ | – | ■ |
|  | Sub-base with 2x2/2-way valve fully assembled | – | – | – | ■ |
| | | | | | |
| Plug connection on top (TC) | | | | | |
|  | Individual sub-base | ■ | ■ | ■ | ■ |
| | Manifold assembly | ■ | ■ | ■ | ■ |
| | | | | | |
| Plug connection underneath (PI) | | | | | |
|  | Individual sub-base with plug base | ■ | ■ | – | ■ |
| | Manifold assembly with plug bases | ■ | ■ | – | ■ |
| | Manifold assembly with plug bases and electrical multi-pin plug | ■ | ■ | – | ■ |
| | Manifold assembly on PCB with soldering bases | ■ | ■ | – | ■ |
| | Manifold assembly on PCB with soldering bases and pneumatic multiple connector plate | – | ■ | – | ■ |

# Solenoid valves MH1, semi in-line valve

Peripherals overview

**Valves with plug connection at rear, plug connection on top**

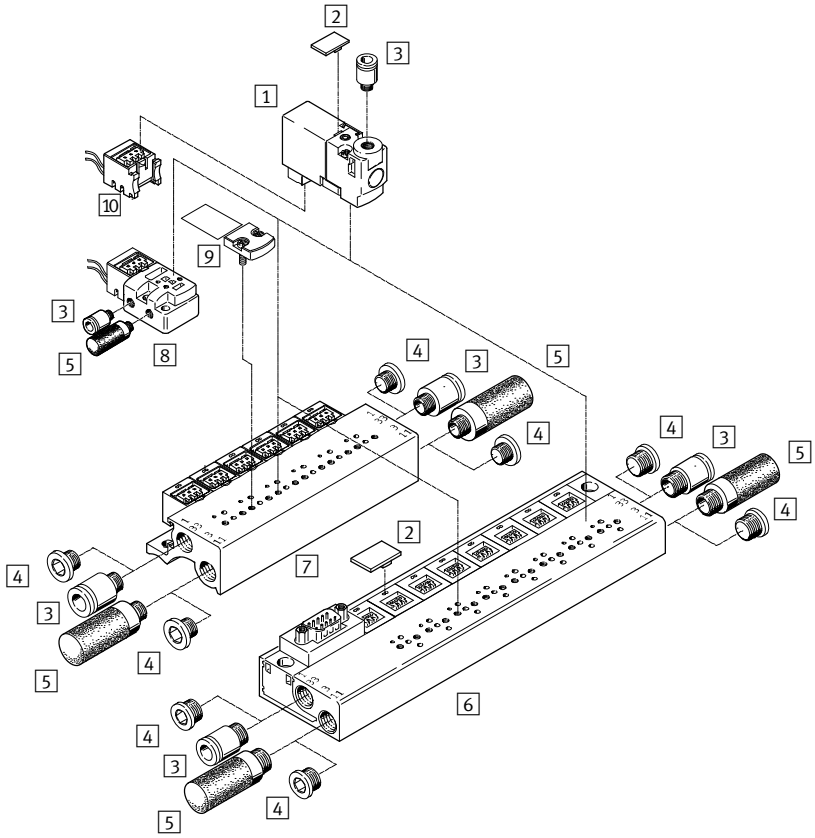



| Designation | Brief description | ➔ Page/Internet |
|---|---|---|
| 1 Solenoid valve | Valve with plug connection at rear | 16 |
| 2 Inscription label | For identifying the valve positions | 18 |
| 3 Push-in fitting | For connecting compressed air tubing with standard O.D. | 18 |
| 4 Solenoid valve | Valve with plug connection on top | 16 |
| 5 Blanking plate | For manifold rail without plug bases | 17 |
| 6 Blanking plug | For sealing ports that are not required | 18 |
| 7 Silencer | For exhaust ports | 18 |
| 8 Manifold rail | Without plug bases | 17 |
| 9 Individual sub-base | For valves with plug connection at rear, plug connection on top | 17 |
| 10 Plug socket with cable | Straight socket, connection pattern H, 3-pin | 19 |

# Solenoid valves MH1, semi in-line valve

Peripherals overview

## Valves with plug connection underneath

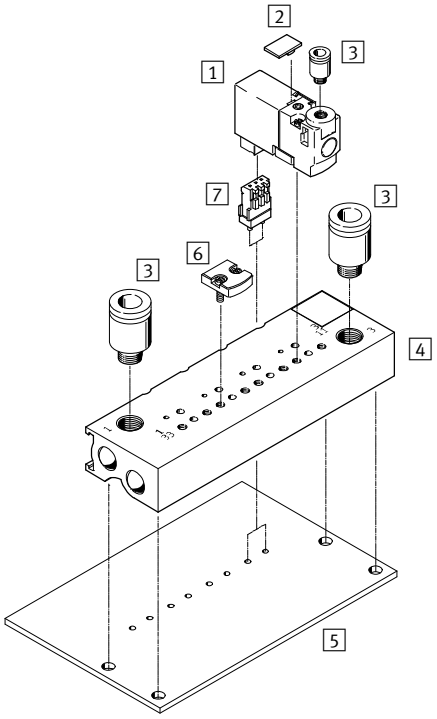



| Designation | Brief description | ➔ Page/Internet |
|---|---|---|
| 1 Solenoid valve | Valve with plug connection underneath | 16 |
| 2 Inscription label | For identifying the valve positions | 18 |
| 3 Push-in fitting | For connecting compressed air tubing with standard O.D. | 18 |
| 4 Blanking plug | For sealing ports that are not required | 18 |
| 5 Silencer | For exhaust ports | 18 |
| 6 Manifold rail | With plug bases and electrical multi-pin plug, Sub-D | 17 |
| 7 Manifold rail | With plug bases | 17 |
| 8 Individual sub-base | For valves with plug connection underneath | 17 |
| 9 Blanking plate | For manifold rail with plug bases | 17 |
| 10 Electrical plug-in base | Straight socket, connection pattern H, 3-pin | 19 |

# Solenoid valves MH1, semi in-line valve

Peripherals overview

**Valves with plug connection underneath, PCB mounting**




| Designation | Brief description | ➔ Page/Internet |
|---|---|---|
| 1 Solenoid valve | Valve with plug connection underneath | 16 |
| 2 Inscription label | For identifying the valve positions | 18 |
| 3 Push-in fitting | For connecting compressed air tubing with standard O.D. | 18 |
| 4 Manifold rail | Without plug bases, for PCB mounting | 17 |
| 5 PCB | Not included in the scope of delivery | – |
| 6 Blanking plate | For manifold rail without plug bases | 17 |
| 7 Soldering base | For PCB mounting, 3-pin | 19 |

# Solenoid valves MH1, semi in-line valve

Type codes

| MH | P | 1 | – | M | 4 | H | – | 3/2 | O | – | M3 | – | HC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Valve series | |
|---|---|
| MH | Miniature and fast-switching valves |

| Design | |
|---|---|
| P | Semi in-line valve |

| Size | |
|---|---|
| 1 | Flow rate 10 … 14 l/min |

| Drive system | |
|---|---|
| M | Solenoid, switching |

| Operating voltage | |
|---|---|
| 4 | 5 V DC |
| 5 | 12 V DC |
| 1 | 24 V DC |

| Manual override | |
|---|---|
| H | Non-detenting/detenting |

| Valve function | |
|---|---|
| 2/2 | 2/2-way valve |
| 3/2 | 3/2-way valve |

| Normal position | |
|---|---|
| G | Closed |
| O | Open |

| Pneumatic connection | |
|---|---|
| M3 | M3 thread |

| Electrical connection | |
|---|---|
| HC | Plug connection at rear<br>for plug socket NEBV-H1G2 |
| TC | Plug connection on top<br>for plug socket NEBV-H1G2 |
| PI | Plug connection underneath<br>for plug-in connection |

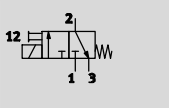
- Note

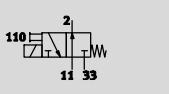
Further variants and accessories can be configured and ordered online using the modular product system.

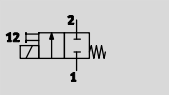
# Solenoid valves MH1, semi in-line valve

Technical data

Function



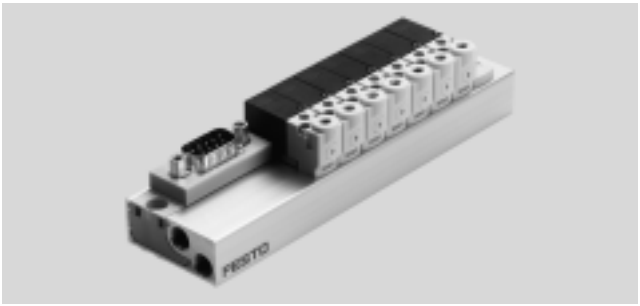




Voltage
5 V DC
12 V DC
24 V DC

Pressure
–0.9 ... +8 bar

Temperature range
–5 ... +40 °C



| General technical data | | | | |
|---|---|---|---|---|
| Type | | MHP1-...-2/2G-... | MHP1-...-3/2G-... | MHP1-...-3/2O-... |
| Valve function | | 2/2-way solenoid valve | 3/2-way solenoid valve | 3/2-way solenoid valve |
| | | Normally closed | Normally closed | Normally open |
| | | Single solenoid | Single solenoid | Single solenoid |
| Design | | Poppet valve with spring return | | |
| Sealing principle | | Soft | | |
| Actuation type | | Electric | | |
| Reset method | | Mechanical spring | | |
| Type of control | | Direct | | |
| Direction of flow | | Non-reversible | | |
| Suitability for vacuum | | Yes | – | – |
| Exhaust function | | No flow control | With flow control | With flow control |
| Manual override | | Non-detenting | | |
| Type of mounting | | On sub-base via through-hole | | |
| Mounting position | | Any | | |
| Nominal size | [mm] | 0.9 | 0.65 | 0.7 |
| Standard nominal flow rate | [l/min] | 14 (2 bar → 0 bar) | 10 | 10 |
| Grid dimension | [mm] | 10 | 10 | 10 |
| Pneumatic connection | 1 | Sub-base | Sub-base | – |
| | 2 | M3 | M3 | M3 |
| | 3 | – | Sub-base | – |
| | 11 | – | – | Sub-base |
| | 33 | – | – | Sub-base |
| Product weight | [g] | 10 | 10 | 10 |

| Operating and environmental conditions | | | | |
|---|---|---|---|---|
| Type | | MHP1-...-2/2G-... | MHP1-...-3/2G-... | MHP1-...-3/2O-... |
| 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 | [bar] | –0.9 ... +2 | 0 ... 8[1] | 0 ... 6[1] |
| Ambient temperature | [°C] | –5 ... +40 | | |
| Temperature of medium | [°C] | –5 ... +40 | | |
| Storage temperature | [°C] | –20 ... +60 | | |
| Corrosion resistance class CRC[2] | | 2 | | |
| Certification | | c UL us Recognized (OL) | | |
| | | c CSA us Recognized (OL) | | |

1) Vacuum operation possible with special connection method
2) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

# Solenoid valves MH1, semi in-line valve

Technical data

| Safety data | | | | |
|---|---|---|---|---|
| Operating voltage | | 5 V DC | 12 V DC | 24 V DC |
| Note on forced checking procedure | | Switching frequency min. 1/week | | |
| Max. positive test pulse with 0 signal | [µs] | – | – | 500 |
| Max. negative test pulse with 1 signal | [µs] | – | – | 400 |
| Resistance to shocks | | Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27 | | |
| Vibration resistance | | Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6 | | |

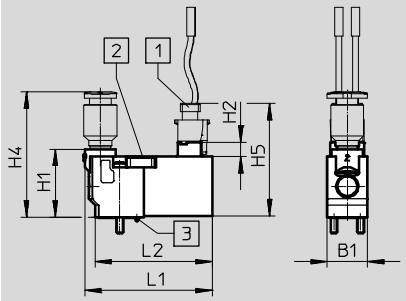
| Electrical data | | |
|---|---|---|
| Operating voltage | [V DC] | 5 |
| | [V DC] | 12 |
| | [V DC] | 24 |
| Permissible voltage fluctuations | [%] | ±10 |
| Connection type | | Plug connection |
| Power consumption | [W] | 1 |
| Duty cycle | [%] | 100 |
| Degree of protection to EN 60529 | | IP40 |

| Switching times and frequencies | | | | | |
|---|---|---|---|---|---|
| Type | | | MHP1-...-2/2G-... | MHP1-...-3/2G-... | MHP1-...-3/2O-... |
| Switching time | On | [ms] | 4 | 4 | 4 |
| | Off | [ms] | 5 | 4 | 4 |
| Maximum switching frequency | | [Hz] | 20 | 20 | 20 |

| Materials | |
|---|---|
| Housing | Reinforced PA, reinforced PPS |
| Sub-base | Aluminium |
| Seals | FPM, HNBR, NBR |
| Note on materials | RoHS-compliant |
| | Free of copper and PTFE |

**Dimensions** Download CAD data ➔ **www.festo.com**

Plug connection on top

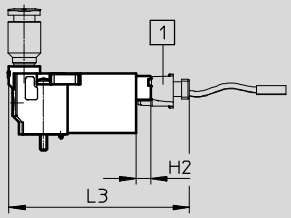



1 Plug socket NEBV-H1G2

2 Manual override

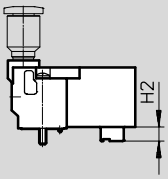
3 Coding pin

Plug connection at rear




1 Plug socket NEBV-H1G2

Plug connection underneath

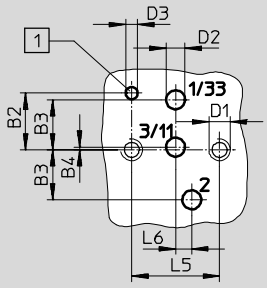



| Type | B1 | H1 | H2 | H4 | H5 | L1 | L2 | L3 |
|---|---|---|---|---|---|---|---|---|
| MHP1 | 9.8 | 16.5 | 3.6 | 30.5 | 27.4 | 31 | 28.5 | 44 |

# Solenoid valves MH1, semi in-line valve

Technical data

**Dimensions – Hole pattern on sub-bases** Download CAD data ➔ **www.festo.com**



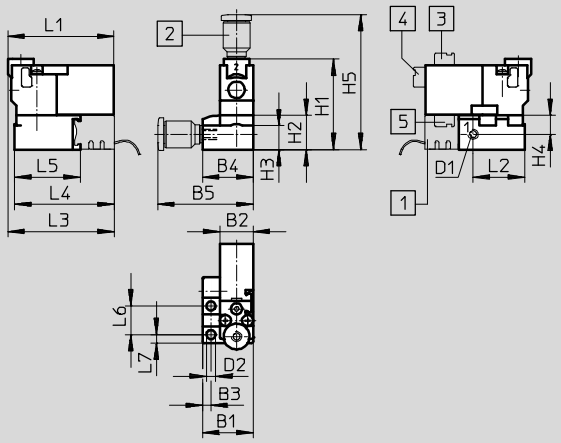

1 Hole for coding pin

- With semi in-line valves, port 2 is not used.
- If used as a 2/2-way valve, normally closed, port 3/11 are not used.
- If used as a 2/2-way valve, normally open, port 1/33 are not used.

| Type | B2 | B3 | B4 | D1 | D2 | D3 | L5 | L6 |
|---|---|---|---|---|---|---|---|---|
| MHP1 | 4.2 | 3.7 | 0.2 | M1.6 | 1.4 | 0.9 | 6.5 | 1.2 |

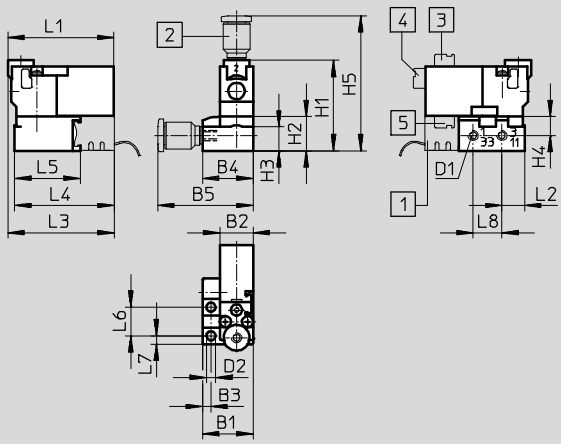
**Dimensions – Assembly on individual sub-base** Download CAD data ➔ **www.festo.com**

2/2-way valve




1 Plug base MHAP-PI
2 Fitting
3 Plug connection on top
4 Plug connection at rear
5 Plug connection underneath

3/2-way valve

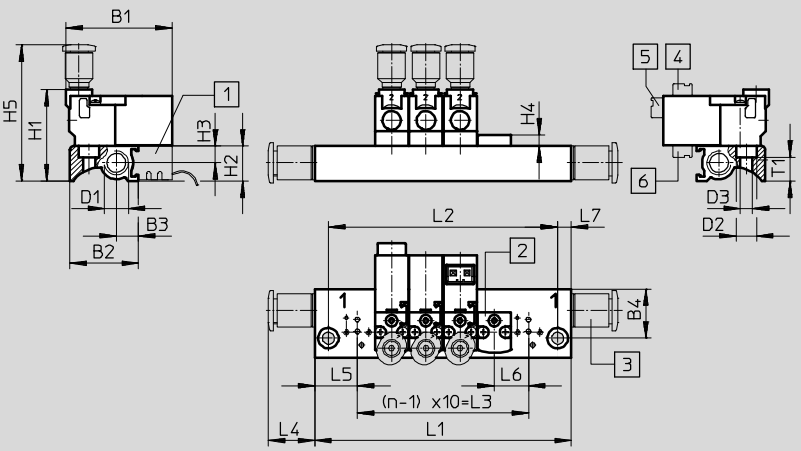



1 Plug base MHAP-PI
2 Fitting
3 Plug connection on top
4 Plug connection at rear
5 Plug connection underneath

| Type | B1 | B2 | B3 | B4 | B5 | D1 | D2 | H1 | H2 | H3 | H4 | H5 | L1 | L2 | L3 | L4 | L5 | L6 | L7 | L7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/2-way valve | 14.9 | 9.8 | 2.5 | 14.9 | 28 | M3 | 2.7 | 26.5 | 10 | 7 | 5.5 | 39.6 | 31 | 15.1 | 31.2 | 29.3 | 19.3 | 8.4 | 2.5 | 2.5 |
| 3/2-way valve | 14.9 | 9.8 | 2.5 | 14.9 | 28 | M3 | 2.7 | 26.5 | 10 | 7 | 5.5 | 39.6 | 31 | 6.7 | 31.2 | 29.3 | 19.3 | 8.4 | 2.5 | 8.4 |

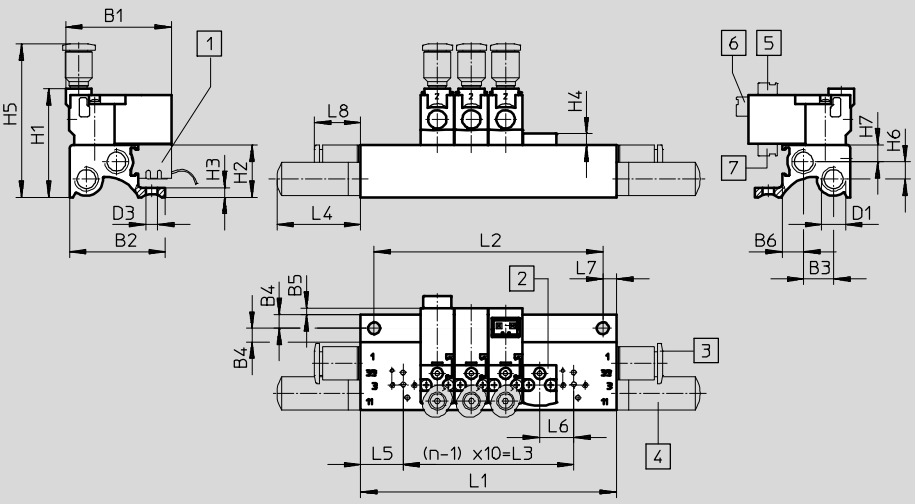
**Dimensions – Manifold assembly** Download CAD data ➔ **www.festo.com**

2/2-way valve




1 Plug base MHAP-PI
2 Blanking plate MHAP1
3 Fitting
4 Plug connection on top
5 Plug connection at rear
6 Plug connection underneath

3/2-way valve




1 Plug base MHAP-PI
2 Blanking plate MHAP1
3 Fitting
4 Silencer
5 Plug connection on top
6 Plug connection at rear
7 Plug connection underneath

| Type | B1 | B2 | B3 | B4 | B5 | B6 | D1 | D2 | D3 | H1 | H2 | H3 | H4 | H5 | H6 | H7 | L4 | L5 | L6 | L7 | L8 | T1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/2-way valve | 31 | 20 | 6.3 | 14.4 | – | – | M7 | 6 | 3.5 | 26.7 | 10.2 | 4.9 | 3.3 | 39.8 | – | – | 13.5 | 12.5 | 10 | 4 | – | 7 |
| 3/2-way valve | 31 | 28 | 8.8 | 4 | 1.9 | 6.3 | M7 | – | 3.5 | 31.8 | 15.3 | 2.8 | 3.3 | 44.9 | 5.1 | 4.9 | 24.5 | 12.5 | 10 | 4 | 13.5 | – |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 2 | 35 | 27 | 10 |
| 3 | 45 | 37 | 20 |
| 4 | 55 | 47 | 30 |
| 5 | 65 | 57 | 40 |
| 6 | 75 | 67 | 50 |
| 7 | 85 | 77 | 60 |
| 8 | 95 | 87 | 70 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 9 | 105 | 97 | 80 |
| 10 | 115 | 107 | 90 |
| 11 | 125 | 117 | 100 |
| 12 | 135 | 127 | 110 |
| 13 | 145 | 137 | 120 |
| 14 | 155 | 147 | 130 |
| 15 | 165 | 157 | 140 |

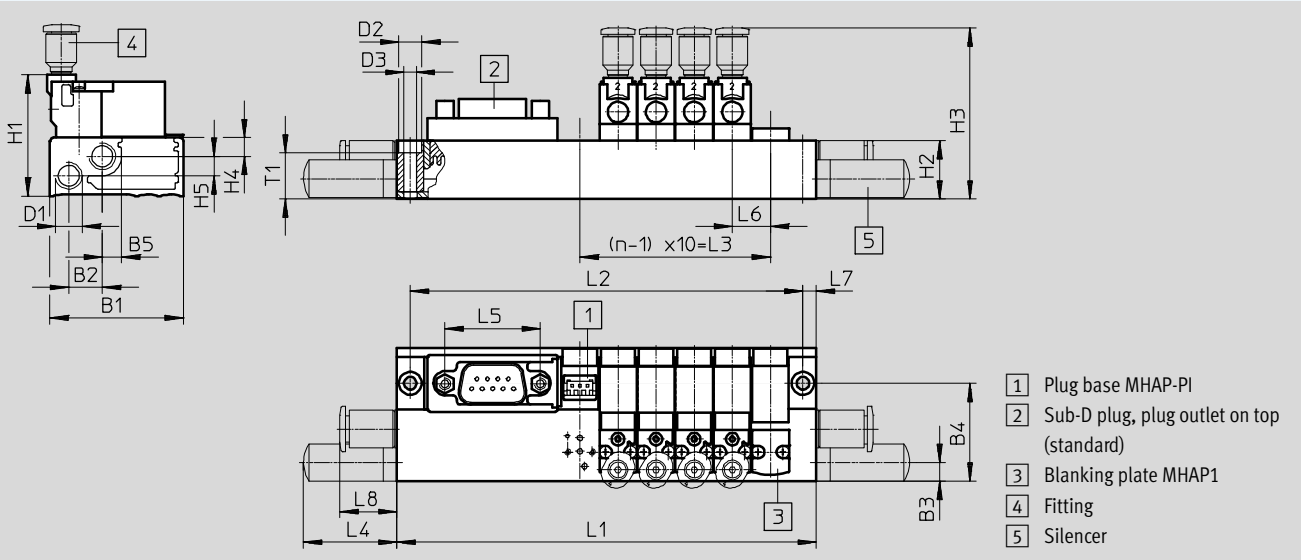
| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 16 | 175 | 167 | 150 |
| 17 | 185 | 177 | 160 |
| 18 | 195 | 187 | 170 |
| 19 | 205 | 197 | 180 |
| 20 | 215 | 207 | 190 |
| 21 | 225 | 217 | 200 |
| 22 | 235 | 227 | 210 |

# Solenoid valves MH1, semi in-line valve

Technical data

**Dimensions – Manifold assembly with electrical multi-pin plug** Download CAD data ➔ **www.festo.com**

3/2-way valve



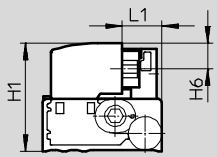

| Type | B1 | B2 | B3 | B4 | B5 | D1 | D2 | D3 | H1 | H2 | H3 | H4 | H5 | L4 | L5 | L6 | L7 | L8 | T1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHP1 | 35 | 8.8 | 5.3 | 25.7 | 5.2 | M7 | 6 | 3.3 | 31.8 | 15.3 | 44.9 | 4.9 | 5.1 | 54.5 | 25 | 10 | 3.5 | 15 | 12.1 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 2 | 70 | 63 | 10 |
| 4 | 90 | 83 | 30 |
| 6 | 110 | 103 | 50 |
| 8 | 130 | 123 | 70 |

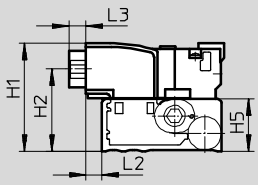
| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 10 | 172 | 165 | 90 |
| 12 | 192 | 185 | 110 |
| 14 | 212 | 205 | 130 |
| 16 | 232 | 225 | 150 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 18 | 252 | 245 | 170 |
| 20 | 272 | 265 | 190 |
| 22 | 292 | 285 | 210 |

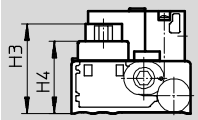
Plug outlet to pneumatic side




Plug outlet to electrical side



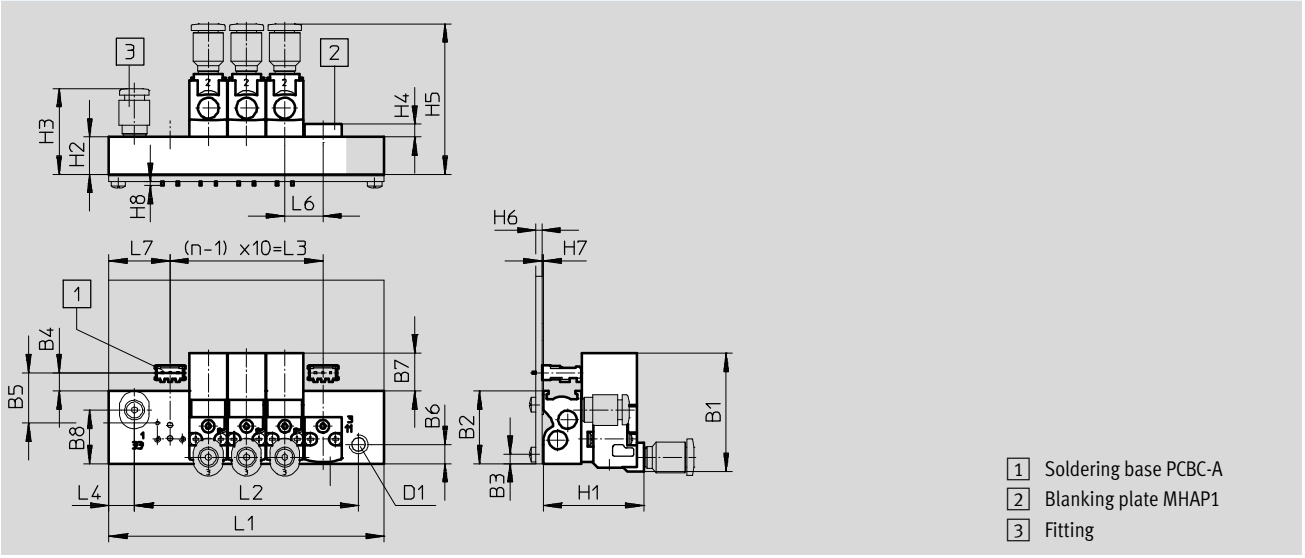

Plug outlet on top (standard)




| Type | H1 | H2 | H3 | H4 | H5 | H6 | L1 | L2 | L3 |
|---|---|---|---|---|---|---|---|---|---|
| MHP1 | 31.8 | 24.2 | 26.2 | 21.2 | 15.3 | 7.6 | 11.7 | 4.8 | 5 |

**Dimensions – Manifold assembly on PCB** Download CAD data ➔ **www.festo.com**

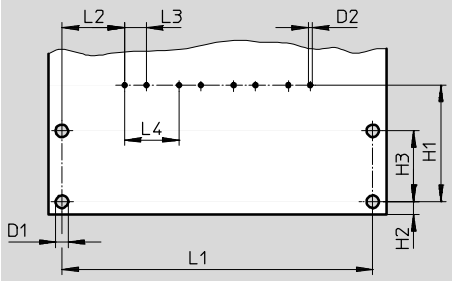
3/2-way valve




| Type | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | D1 | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | L4 | L6 | L7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHP1 | 31 | 19 | 2.4 | 4.8 | 13.2 | 5 | 9.9 | 14 | M5 | 26.3 | 9.8 | 22.4 | 3.3 | 39.4 | 1.5 | 0.4 | 1 | 6.7 | 10 | 16 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 2 | 42 | 28.6 | 10 |
| 4 | 62 | 48.6 | 30 |
| 6 | 82 | 68.6 | 50 |
| 8 | 102 | 88.6 | 70 |
| 10 | 122 | 108.6 | 90 |

Hole pattern on PCB




Note

The PCB is not included in the scope of delivery.

| Type | D1 | D2 | H1 | H2 | H3 | L2 | L3 | L4 |
|---|---|---|---|---|---|---|---|---|
| PCB | 2.3 | 0.7 | 21.4 | 2.4 | 13 | 11.5 | 4 | 10 |

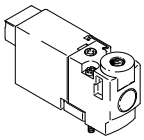
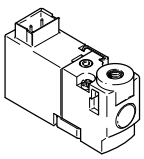
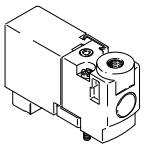
| Valve positions n | L1 ±0.1 |
|---|---|
| 2 | 37 |
| 4 | 57 |
| 6 | 77 |
| 8 | 97 |
| 10 | 117 |

# Solenoid valves MH1, semi in-line valve

Technical data

FESTO

**Ordering data**

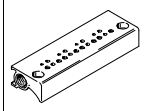
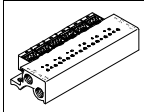
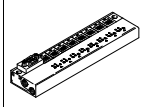
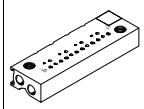
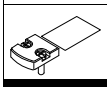
| | | Valve function | Normal position | | Part No. | Type |
|---|---|---|---|---|---|---|
| Solenoid valve | | | | | | |
|  | Plug connection at rear | 2/2-way solenoid valve | Closed | 5 V DC | **197045** | **MHP1-M4H-2/2G-M3-HC** |
| | | | | 12 V DC | **197046** | **MHP1-M5H-2/2G-M3-HC** |
| | | | | 24 V DC | **197047** | **MHP1-M1H-2/2G-M3-HC** |
| | | 3/2-way solenoid valve | Closed | 5 V DC | **197009** | **MHP1-M4H-3/2G-M3-HC** |
| | | | | 12 V DC | **197010** | **MHP1-M5H-3/2G-M3-HC** |
| | | | | 24 V DC | **197011** | **MHP1-M1H-3/2G-M3-HC** |
| | | | Open | 5 V DC | **197027** | **MHP1-M4H-3/2O-M3-HC** |
| | | | | 12 V DC | **197028** | **MHP1-M5H-3/2O-M3-HC** |
| | | | | 24 V DC | **197029** | **MHP1-M1H-3/2O-M3-HC** |
|  | Plug connection on top | 2/2-way solenoid valve | Closed | 5 V DC | **197048** | **MHP1-M4H-2/2G-M3-TC** |
| | | | | 12 V DC | **197049** | **MHP1-M5H-2/2G-M3-TC** |
| | | | | 24 V DC | **197050** | **MHP1-M1H-2/2G-M3-TC** |
| | | 3/2-way solenoid valve | Closed | 5 V DC | **197012** | **MHP1-M4H-3/2G-M3-TC** |
| | | | | 12 V DC | **197013** | **MHP1-M5H-3/2G-M3-TC** |
| | | | | 24 V DC | **197014** | **MHP1-M1H-3/2G-M3-TC** |
| | | | Open | 5 V DC | **197030** | **MHP1-M4H-3/2O-M3-TC** |
| | | | | 12 V DC | **197031** | **MHP1-M5H-3/2O-M3-TC** |
| | | | | 24 V DC | **197032** | **MHP1-M1H-3/2O-M3-TC** |
|  | Plug connection underneath | 2/2-way solenoid valve | Closed | 5 V DC | **197051** | **MHP1-M4H-2/2G-M3-PI** |
| | | | | 12 V DC | **197052** | **MHP1-M5H-2/2G-M3-PI** |
| | | | | 24 V DC | **197053** | **MHP1-M1H-2/2G-M3-PI** |
| | | 3/2-way solenoid valve | Closed | 5 V DC | **197015** | **MHP1-M4H-3/2G-M3-PI** |
| | | | | 12 V DC | **197016** | **MHP1-M5H-3/2G-M3-PI** |
| | | | | 24 V DC | **197017** | **MHP1-M1H-3/2G-M3-PI** |
| | | | Open | 5 V DC | **197033** | **MHP1-M4H-3/2O-M3-PI** |
| | | | | 12 V DC | **197034** | **MHP1-M5H-3/2O-M3-PI** |
| | | | | 24 V DC | **197035** | **MHP1-M1H-3/2O-M3-PI** |

- - Note

Valves of the type 3/2G and 3/2O must not be mixed on a manifold rail.

# Solenoid valves MH1, semi in-line valve

Technical data

| Ordering data | | | | | |
|---|---|---|---|---|---|
| | | | | Part No. | Type |
| Individual sub-base | | | | | |
|  | For valves with plug connection at rear or on top | For 2/2-way solenoid valve | 1 valve position | **197188** | **MHP1-AS-2-M3** |
| | | For 3/2-way solenoid valve | 1 valve position | **197184** | **MHP1-AS-3-M3** |
|  | For valves with plug connection underneath | For 2/2-way solenoid valve | 1 valve position | **197190** | **MHP1-AS-2-M3-PI** |
| | | For 3/2-way solenoid valve | 1 valve position | **197186** | **MHP1-AS-3-M3-PI** |
| Manifold rail, for valves with plug connection at rear or on top | | | | | |
|  | Without plug bases | For 2/2-way solenoid valve | 2 valves | **197196** | **MHP1-P2-2** |
| | | | 4 valves | **197197** | **MHP1-P4-2** |
| | | | 6 valves | **197198** | **MHP1-P6-2** |
| | | | 8 valves | **197200** | **MHP1-P8-2** |
| | | | 10 valves | **197201** | **MHP1-P10-2** |
| | | For 3/2-way solenoid valve | 2 valves | **197191** | **MHP1-PR2-3** |
| | | | 4 valves | **197192** | **MHP1-PR4-3** |
| | | | 6 valves | **197193** | **MHP1-PR6-3** |
| | | | 8 valves | **197194** | **MHP1-PR8-3** |
| | | | 10 valves | **197195** | **MHP1-PR10-3** |
| Manifold rail, for valves with plug connection underneath | | | | | |
|  | With plug bases | For 2/2-way solenoid valve | 2 valves | **197217** | **MHP1-P2-2-PI** |
| | | | 4 valves | **197218** | **MHP1-P4-2-PI** |
| | | | 6 valves | **197219** | **MHP1-P6-2-PI** |
| | | | 8 valves | **197220** | **MHP1-P8-2-PI** |
| | | | 10 valves | **197221** | **MHP1-P10-2-PI** |
| | | For 3/2-way solenoid valve | 2 valves | **197212** | **MHP1-PR2-3-PI** |
| | | | 4 valves | **197213** | **MHP1-PR4-3-PI** |
| | | | 6 valves | **197214** | **MHP1-PR6-3-PI** |
| | | | 8 valves | **197215** | **MHP1-PR8-3-PI** |
| | | | 10 valves | **197216** | **MHP1-PR10-3-PI** |
|  | With plug bases and electrical multi-pin plug, Sub-D, 9-pin | For 3/2-way solenoid valve | 4 valves | **197233** | **MHP1-PR4-3-PI-D9** |
| | | | 6 valves | **197234** | **MHP1-PR6-3-PI-D9** |
| | | | 8 valves | **197235** | **MHP1-PR8-3-PI-D9** |
| | With plug bases and electrical multi-pin plug, Sub-D, 25-pin | For 3/2-way solenoid valve | 10 valves | **197236** | **MHP1-PR10-3-PI-D25** |
|  | Without plug bases for PCB mounting | For 3/2-way solenoid valve | 2 valves | **197242** | **MHP1-PR2-3-PI-PCB** |
| | | | 4 valves | **197243** | **MHP1-PR4-3-PI-PCB** |
| | | | 6 valves | **197244** | **MHP1-PR6-3-PI-PCB** |
| | | | 8 valves | **197245** | **MHP1-PR8-3-PI-PCB** |
| | | | 10 valves | **197246** | **MHP1-PR10-3-PI-PCB** |
| Blanking plate | | | | | |
|  | For manifold rail without plug bases | | | **197257** | **MHAP1-BP-3** |
|  | For manifold rail with plug bases | | | **197258** | **MHAP1-BP-3-PI** |

- Note

Manifold rails with an uneven number of valves and for 11 ... 24 valves as well as further variants can be configured and ordered online using the MH1 modular product system.

- Note

Valves of the type 3/2G and 3/2O must not be mixed on a manifold rail.

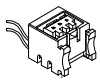
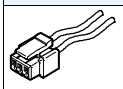
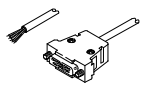
# Solenoid valves MH1, semi in-line valve

Technical data

FESTO

| Ordering data | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Part No. | Type | PU[1] |
| Blanking plug | | | | | | |
|  | For M3 thread | | | **30979** | **B-M3-S9** | **10** |
| | For M7 thread | | | **174309** | **B-M7** | **10** |
| | | | | | | |
| Silencer | | | | | | |
|  | M3 connecting thread | | | **1231120** | **AMTE-M-LH-M3** | **20** |
| | M7 connecting thread | | | **161418** | **UC-M7** | **1** |
| | | | | | | |
| Push-in fitting | | | | | | |
|  | M3 connecting thread | With internal hex | For tubing O.D. 3 mm | **153312** | **QSM-M3-3-I** | **10** |
| | | | For tubing O.D. 4 mm | **153314** | **QSM-M3-4-I** | **10** |
| | | With external hex | For tubing O.D. 3 mm | **153301** | **QSM-M3-3** | **10** |
| | | | For tubing O.D. 4 mm | **153303** | **QSM-M3-4** | **10** |
| | M5 connecting thread | With internal hex | For tubing O.D. 3 mm | **153313** | **QSM-M5-3-I** | **10** |
| | | | For tubing O.D. 4 mm | **153315** | **QSM-M5-4-I** | **10** |
| | | | For tubing O.D. 6 mm | **153317** | **QSM-M5-6-I** | **10** |
| | | With external hex | For tubing O.D. 3 mm | **153302** | **QSM-M5-3** | **10** |
| | | | For tubing O.D. 4 mm | **153304** | **QSM-M5-4** | **10** |
| | | | For tubing O.D. 6 mm | **153306** | **QSM-M5-6** | **10** |
| | M7 connecting thread | With internal hex | For tubing O.D. 4 mm | **153319** | **QSM-M7-4-I** | **10** |
| | | | For tubing O.D. 6 mm | **153321** | **QSM-M7-6-I** | **10** |
| | | | | | | |
| Inscription label | | | | | | |
|  | For identifying the valve positions | | | **197259** | **MH-BZ-80X** | **80** |

1) Packaging unit.

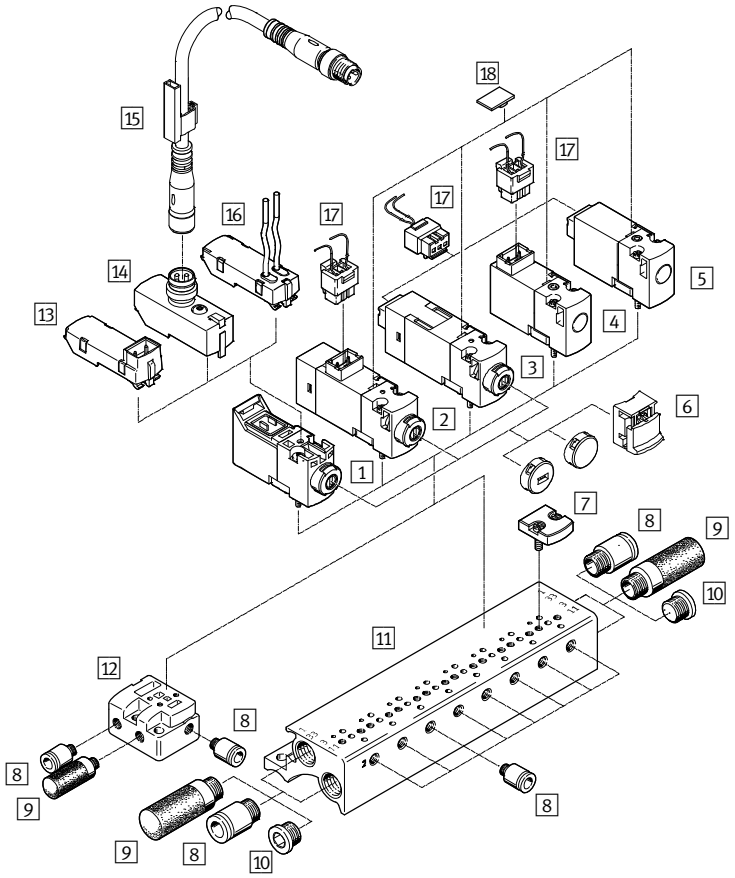
| Ordering data | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Part No. | Type | PU[1] |
| Soldering base | | | | | | |
|  | For manifold rail for valves with plug connection underneath for PCB mounting, 3-pin | | | **197261** | **PCBC-A-10** | **10** |
| | | | | **197262** | **PCBC-A-100** | **100** |
| Electrical plug-in base | | | | | | |
|  | For manifold rail, for valves with plug connection underneath | 2x flying leads<br>Open end<br>1-wire | 0.5 m | **197260** | **MHAP-PI** | **1** |
| | | | 1 m | **532182** | **MHAP-PI-1** | **1** |
| Plug socket with cable | | | | | | |
|  | Straight socket<br>Connection pattern H<br>3-pin | 2x flying leads<br>Open end<br>1-wire | 0.5 m | **566654** | **NEBV-H1G2-KN-0.5-N-LE2** | **1** |
| | | | 1 m | **566655** | **NEBV-H1G2-KN-1-N-LE2** | **1** |
| | | | 2.5 m | **566656** | **NEBV-H1G2-KN-2.5-N-LE2** | **1** |
| | | | 5 m | **566657** | **NEBV-H1G2-KN-5-N-LE2** | **1** |
| Connecting cable for manifold rail with electrical multi-pin plug | | | | | | |
|  | Straight socket, Sub-D, 9-pin | Cable<br>Open end<br>9-wire | 2.5 m | **531184** | **KMP6-09P-8-2,5** | **1** |
| | | | 5 m | **531185** | **KMP6-09P-8-5** | **1** |
| | | | 10 m | **531186** | **KMP6-09P-8-10** | **1** |
| | Straight socket, Sub-D, 25-pin | Cable<br>Open end<br>15-wire | 2.5 m | **530049** | **KMP6-25P-12-2,5** | **1** |
| | | | 5 m | **530050** | **KMP6-25P-12-5** | **1** |
| | | | 10 m | **530051** | **KMP6-25P-12-10** | **1** |
| | Straight socket, Sub-D, 25-pin | Cable<br>Open end<br>25-wire | 2.5 m | **530046** | **KMP6-25P-20-2,5** | **1** |
| | | | 5 m | **530047** | **KMP6-25P-20-5** | **1** |
| | | | 10 m | **530048** | **KMP6-25P-20-10** | **1** |

1) Packaging unit.

# Solenoid valves MH1, sub-base valve

Peripherals overview

**Valves with plug connection at rear, plug connection on top**

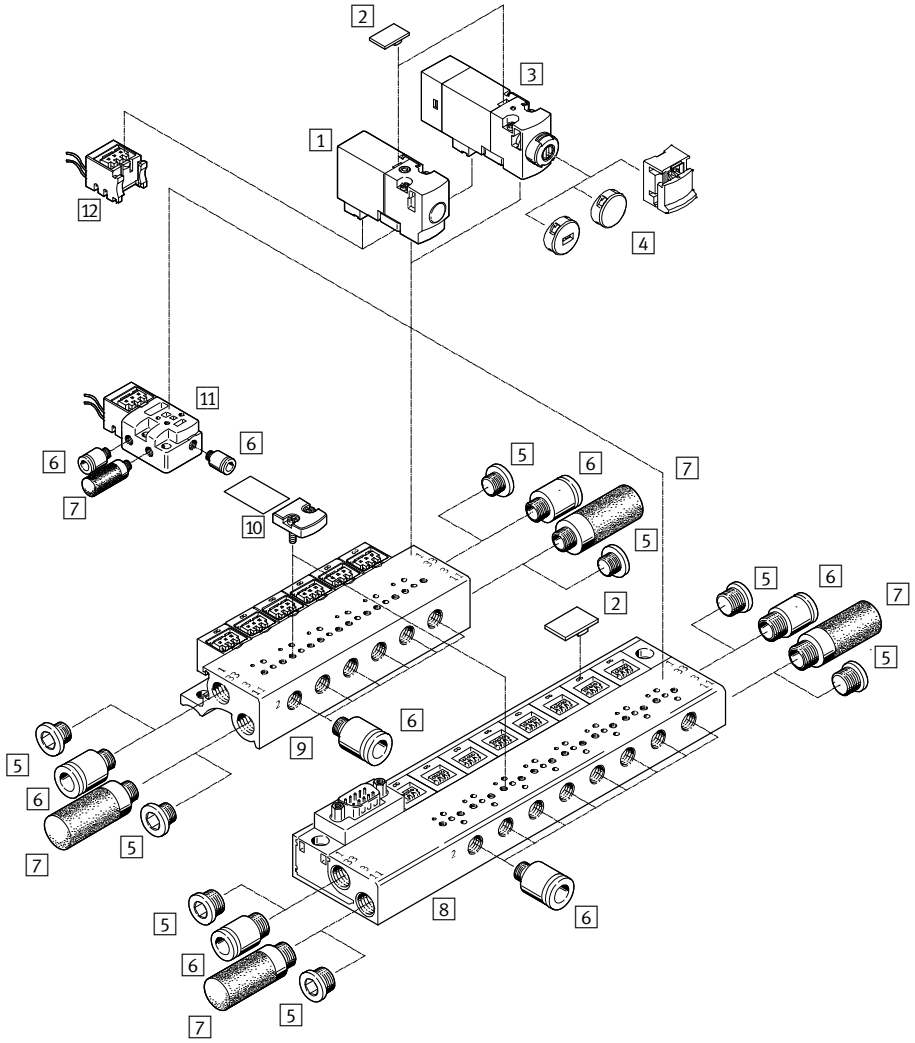



| Designation | | Brief description | ➔ Page/Internet |
|---|---|---|---|
| 1 | Solenoid valve | Valve without plug connection, with manual override | 41 |
| 2 | Solenoid valve | Valve with plug connection on top, with LED, with manual override | 54 |
| 3 | Solenoid valve | Valve with plug connection at rear, with LED, with manual override | 54 |
| 4 | Solenoid valve | Valve with plug connection on top, without LED, without manual override | 32 |
| 5 | Solenoid valve | Valve with plug connection at rear, without LED, without manual override | 32 |
| 6 | Cover cap | For manual override | 42, 56 |
| 7 | Blanking plate | For manifold rail without plug bases | 34, 42, 56 |
| 8 | Push-in fitting | For connecting compressed air tubing with standard O.D. | 34, 42, 56 |
| 9 | Silencer | For exhaust ports | 34, 42, 56 |
| 10 | Blanking plug | For sealing ports that are not required | 34, 42, 56 |
| 11 | Manifold rail | Without plug bases | 33, 41, 55 |
| 12 | Individual sub-base | For valves with plug connection at rear, plug connection on top | 33, 41, 55 |
| 13 | E-box | Plug connection pattern H/connection pattern S | 43 |
| 14 | E-box | Plug M8x1 | 43 |
| 15 | Connecting cable | Socket M8x1, 4-pin | 44 |
| 16 | E-box | Open end | 43 |
| 17 | Plug socket with cable | Straight socket, connection pattern H, 3-pin | 35, 44, 57 |
| 18 | Inscription label | For identifying the valve positions | 35, 57 |

# Solenoid valves MH1, sub-base valve

Peripherals overview

**Valves with plug connection underneath**

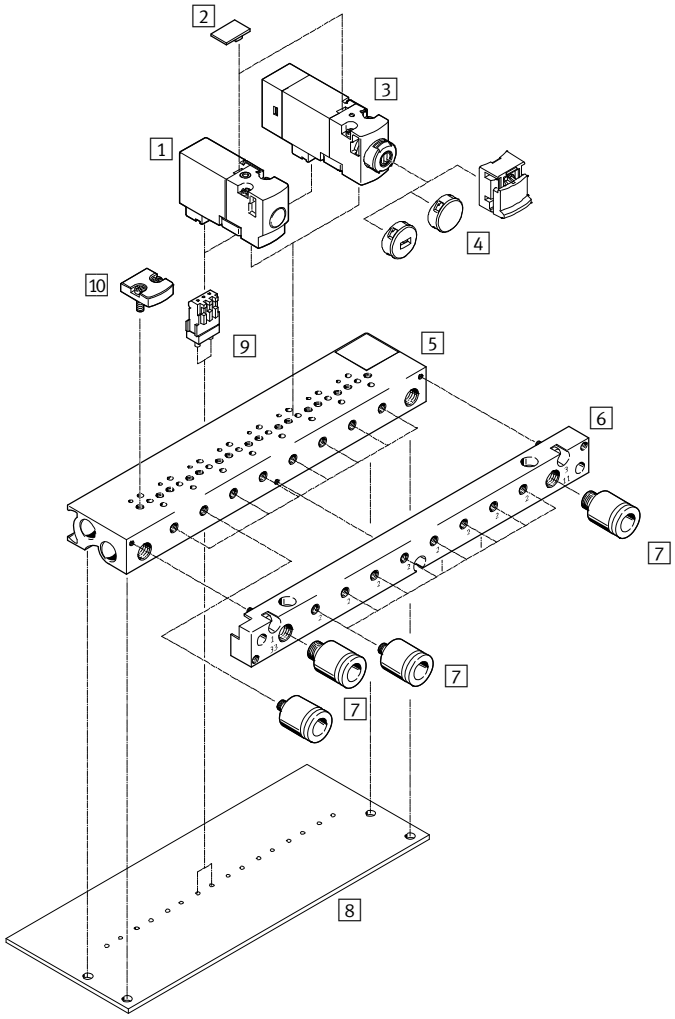



| Designation | Brief description | ➔ Page/Internet |
|---|---|---|
| 1 Solenoid valve | Valve with plug connection underneath, without LED | 32 |
| 2 Inscription label | For identifying the valve positions | 35, 57 |
| 3 Solenoid valve | Valve with plug connection underneath, with LED | 54 |
| 4 Cover cap | For manual override | 42, 56 |
| 5 Blanking plug | For sealing ports that are not required | 34, 56 |
| 6 Push-in fitting | For connecting compressed air tubing with standard O.D. | 34, 56 |
| 7 Silencer | For exhaust ports | 34, 56 |
| 8 Manifold rail | With plug bases | 33, 55 |
| 9 Manifold rail | With plug bases and electrical multi-pin plug | 33, 55 |
| 10 Blanking plate | For manifold rail with plug bases | 34, 56 |
| 11 Individual sub-base | For valves with plug connection underneath | 33, 55 |
| 12 Plug socket with cable | Straight socket, connection pattern H, 3-pin | 35, 57 |

# Solenoid valves MH1, sub-base valve

Peripherals overview

**Valves with plug connection underneath, PCB mounting**




| | | Brief description | ➔ Page/Internet |
|---|---|---|---|
| 1 | Solenoid valve | Plug connection underneath, without LED | 32 |
| 2 | Inscription label | For identifying the valve positions | 35, 57 |
| 3 | Sub-base valve | Plug connection underneath, with LED | 54 |
| 4 | Cover cap | For manual override | 42, 56 |
| 5 | Manifold rail | Without plug bases for PCB mounting | 33, 55 |
| 6 | Pneumatic multiple connector plate | Enables the tubing connection to be left in place on the PCB when changing the valve terminal (included in the scope of delivery) | – |
| 7 | Push-in fittings | For connecting compressed air tubing with standard O.D. | 34, 56 |
| 8 | PCB | Provided by the customer (not included in the scope of delivery) | – |
| 9 | Soldering base | For plug-in connection, 3-pin | 35, 57 |
| 10 | Blanking plate | For manifold rail without plug bases | 34, 56 |

# Solenoid valves MH1, sub-base valve without LED

Type codes

| MH | A | 1 | – | M | 4 | H | – | 3/2 | O | – | 0,6 | – | HC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Valve series | |
|---|---|
| MH | Miniature and fast-switching valves |

| Design | |
|---|---|
| A | Sub-base valve |

| Size | |
|---|---|
| 1 | Flow rate 10 … 14 l/min |

| Drive system | |
|---|---|
| M | Solenoid, switching |

| Operating voltage | |
|---|---|
| 4 | 5 V DC |
| 5 | 12 V DC |
| 1 | 24 V DC |

| Manual override | |
|---|---|
| H | Non-detenting |

| Valve function | |
|---|---|
| 2/2 | 2/2-way valve |
| 3/2 | 3/2-way valve |

| Normal position | |
|---|---|
| G | Closed |
| O | Open |

| Nominal width | |
|---|---|
| 0,6 | 0.65 mm |
| 0,9 | 0.9 mm |

| Electrical connection | |
|---|---|
| HC | Plug connection at rear<br>for plug socket NEBV-H1G2 |
| TC | Plug connection on top<br>for plug socket NEBV-H1G2 |
| PI | Plug connection underneath<br>for plug-in connection |

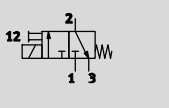
- Note

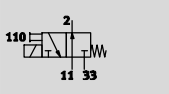
Further variants and accessories can be configured and ordered online using the modular product system.

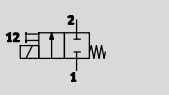
# Solenoid valves MH1, sub-base valve without LED

Technical data

Function



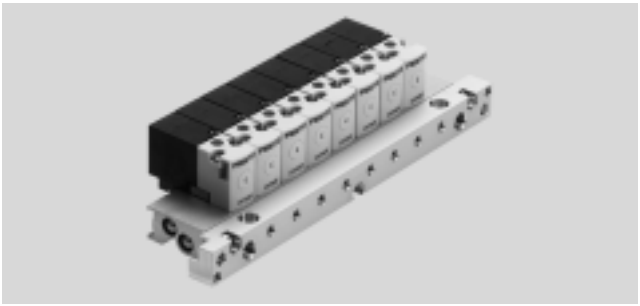




Voltage
5 V DC
12 V DC
24 V DC

Pressure
–0.9 … +8 bar

Temperature range
–5 … +40 °C



| General technical data | | | | |
|---|---|---|---|---|
| Type | | MHA1-...-2/2G-... | MHA1-...-3/2G-... | MHA1-...-3/2O-... |
| Valve function | | 2/2-way solenoid valve | 3/2-way solenoid valve | 3/2-way solenoid valve |
| | | Normally closed | Normally closed | Normally open |
| | | Single solenoid | Single solenoid | Single solenoid |
| Design | | Poppet valve with spring return | | |
| Sealing principle | | Soft | | |
| Actuation type | | Electric | | |
| Reset method | | Mechanical spring | | |
| Type of control | | Direct | | |
| Direction of flow | | Non-reversible | | |
| Suitability for vacuum | | Yes | – | – |
| Exhaust function | | No flow control | With flow control | With flow control |
| Manual override | | Non-detenting | | |
| Type of mounting | | On sub-base via through-hole | | |
| Mounting position | | Any | | |
| Nominal size | [mm] | 0.9 | 0.65 | 0.7 |
| Standard nominal flow rate | [l/min] | 14 | 10 | 10 |
| Grid dimension | [mm] | 10 | 10 | 10 |
| Pneumatic connection | 1 | Sub-base | Sub-base | – |
| | 2 | Sub-base | Sub-base | Sub-base |
| | 3 | – | Sub-base | – |
| | 11 | – | – | Sub-base |
| | 33 | – | – | Sub-base |
| Product weight | [g] | 10 | 10 | 10 |

| Operating and environmental conditions | | | | |
|---|---|---|---|---|
| Type | | MHA1-...-2/2G-... | MHA1-...-3/2G-... | MHA1-...-3/2O-... |
| 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 | [bar] | –0.9 … +2 | 0 … 8[1] | 0 … 6[1] |
| Ambient temperature | [°C] | –5 … +40 | | |
| Temperature of medium | [°C] | –5 … +40 | | |
| Storage temperature | [°C] | –20 … +60 | | |
| Corrosion resistance class CRC[2] | | 2 | | |
| Certification | | c UL us Recognized (OL) | | |
| | | c CSA us Recognized (OL) | | |

1) Vacuum operation possible with special connection method → 4

2) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

# Solenoid valves MH1, sub-base valve without LED

Technical data

| Safety data | | | | |
|---|---|---|---|---|
| Operating voltage | | 5 V DC | 12 V DC | 24 V DC |
| Note on forced checking procedure | | Switching frequency min. 1/week | | |
| Max. positive test pulse with 0 signal | [µs] | – | – | 500 |
| Max. negative test pulse with 1 signal | [µs] | – | – | 400 |
| Resistance to shocks | | Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27 | | |
| Vibration resistance | | Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6 | | |

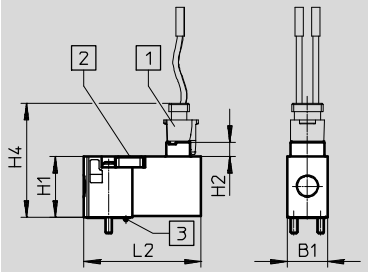
| Electrical data | | |
|---|---|---|
| Operating voltage | [V DC] | 5 |
| | [V DC] | 12 |
| | [V DC] | 24 |
| Permissible voltage fluctuations | [%] | ±10 |
| Connection type | | Plug connection |
| Power consumption | [W] | 1 |
| Duty cycle | [%] | 100 |
| Degree of protection to EN 60529 | | IP40 |

| Switching times and frequencies | | | | | |
|---|---|---|---|---|---|
| Type | | | MHA1-...-2/2G-... | MHA1-...-3/2G-... | MHA1-...-3/2O-... |
| Switching time | On | [ms] | 4 | 4 | 4 |
| | Off | [ms] | 5 | 4 | 4 |
| Maximum switching frequency | | [Hz] | 20 | 20 | 20 |

| Materials | |
|---|---|
| Housing | Reinforced PA, reinforced PPS |
| Sub-base | Aluminium |
| Seals | FPM, HNBR, NBR |
| Note on materials | RoHS-compliant |
| | Free of copper and PTFE |

**Dimensions** Download CAD data ➔ **www.festo.com**

Plug connection on top

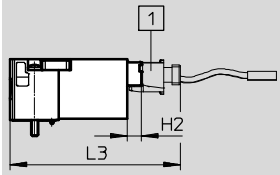



1 Plug socket NEBV-H1G2

2 Manual override

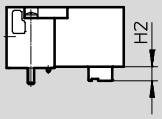
3 Coding pin

Plug connection at rear




1 Plug socket NEBV-H1G2

Plug connection underneath

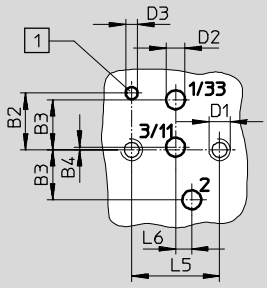



| Type | B1 | H1 | H2 | H4 | L2 | L3 |
|---|---|---|---|---|---|---|
| MHA1 | 9.8 | 14.7 | 3.6 | 27.7 | 28.5 | 41.5 |

# Solenoid valves MH1, sub-base valve without LED

Technical data

**Dimensions – Hole pattern on sub-bases** Download CAD data ➔ **www.festo.com**



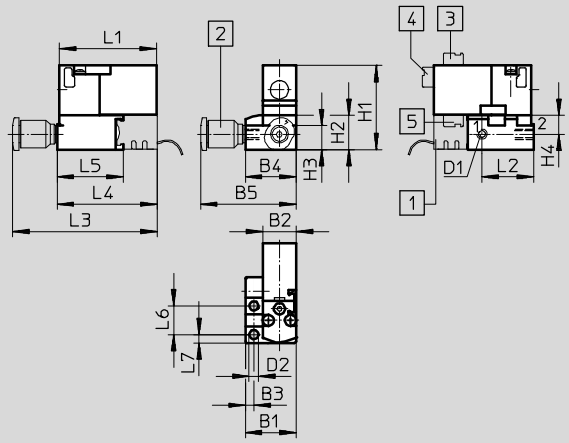

1 Hole for coding pin

- If used as a 2/2-way valve, normally closed, port 3/11 are not used.
- If used as a 2/2-way valve, normally open, port 1/33 are not used.

| Type | B2 | B3 | B4 | D1 | D2 | D3 | L5 | L6 |
|---|---|---|---|---|---|---|---|---|
| MHA1 | 4.2 | 3.7 | 0.2 | M1.6 | 1.4 | 0.9 | 6.5 | 1.2 |

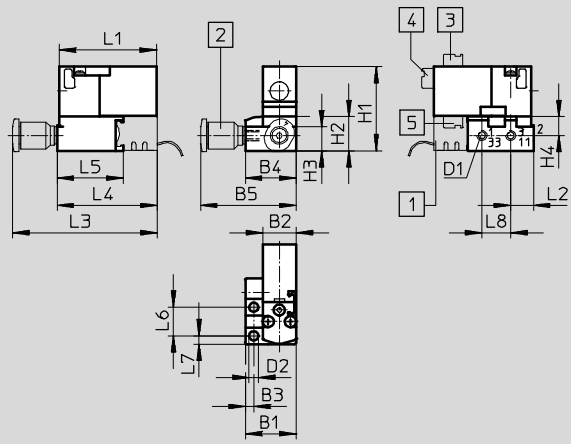
**Dimensions – Assembly on individual sub-base** Download CAD data ➔ **www.festo.com**

2/2-way valve




1 Plug base MHAP-PI
2 Fitting
3 Plug connection on top
4 Plug connection at rear
5 Plug connection underneath

3/2-way valve

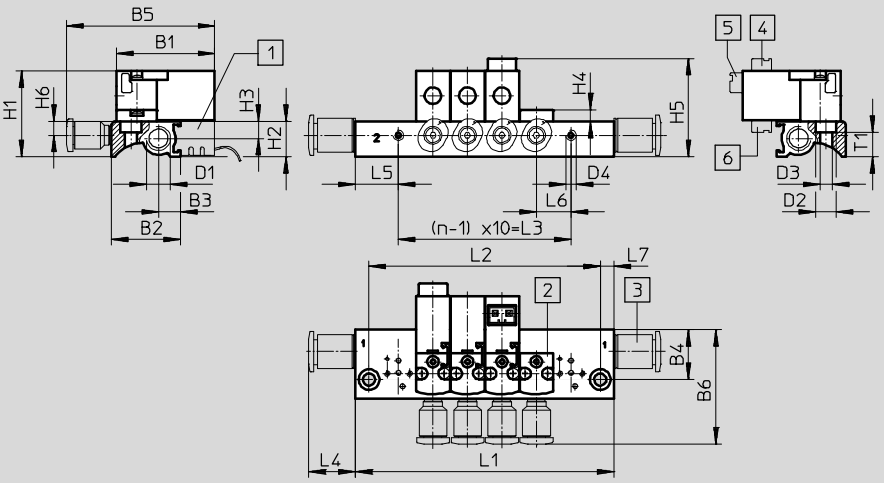



1 Plug base MHAP-PI
2 Fitting
3 Plug connection on top
4 Plug connection at rear
5 Plug connection underneath

| Type | B1 | B2 | B3 | B4 | B5 | D1 | D2 | H1 | H2 | H3 | H4 | L1 | L2 | L3 | L4 | L5 | L6 | L7 | L8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/2-way valve | 14.9 | 9.8 | 2.5 | 14.9 | 28 | M3 | 2.7 | 24.7 | 10 | 7 | 5.5 | 28.5 | 15.1 | 42.4 | 29.3 | 19.3 | 8.4 | 2.5 | – |
| 3/2-way valve | 14.9 | 9.8 | 2.5 | 14.9 | 28 | M3 | 2.7 | 24.7 | 10 | 7 | 5.5 | 28.5 | 6.7 | 42.4 | 29.3 | 19.3 | 8.4 | 2.5 | 8.4 |

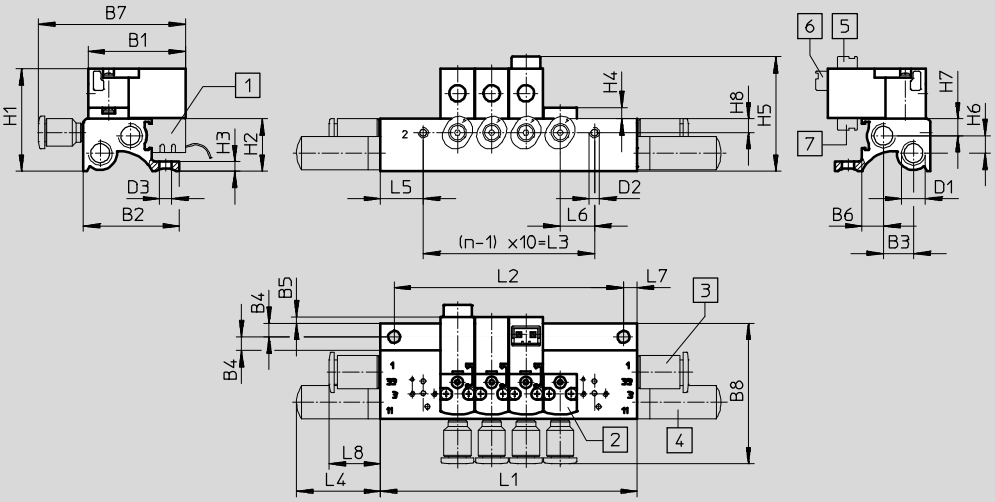
**Dimensions – Manifold assembly** Download CAD data ➔ **www.festo.com**

2/2-way valve




1 Plug base MHAP-PI
2 Blanking plate MHAP1
3 Fitting
4 Plug connection on top
5 Plug connection at rear
6 Plug connection underneath

3/2-way valve




1 Plug base MHAP-PI
2 Blanking plate MHAP1
3 Fitting
4 Silencer
5 Plug connection on top
6 Plug connection at rear
7 Plug connection underneath

| Type | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | D1 | D2 | D3 | D4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/2-way valve | 28.5 | 20 | 6.3 | 14.4 | 42.9 | 33.1 | – | – | M7 | 6 | 3.5 | M3 |
| 3/2-way valve | 28.5 | 28 | 8.8 | 4 | 1.9 | 6.3 | 42.9 | 41.1 | M7 | M3 | 3.5 | – |

| Type | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | L4 | L5 | L6 | L7 | L8 | T1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/2-way valve | 24.9 | 10.2 | 4.9 | 3.3 | 28.5 | 4 | – | – | 13.5 | 12.5 | 10 | 4 | – | 7 |
| 3/2-way valve | 30 | 15.3 | 2.8 | 3.3 | 33.6 | 5.1 | 4.9 | 4 | 24.5 | 12.5 | 10 | 4 | 13.5 | – |

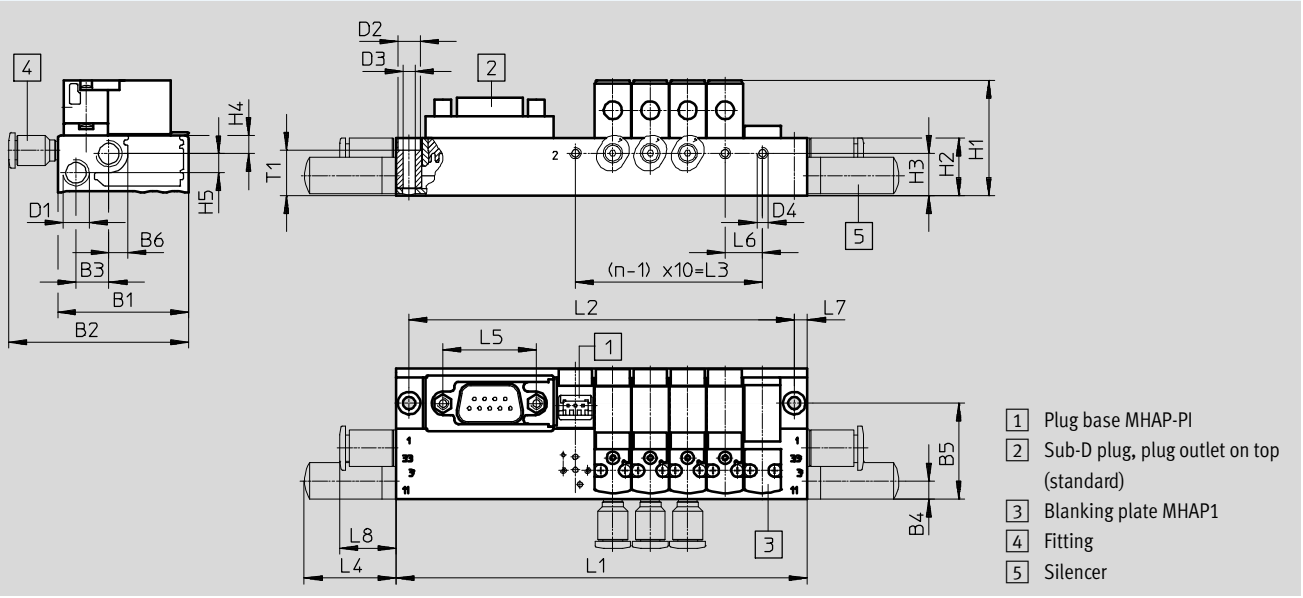
| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 2 | 35 | 27 | 10 |
| 3 | 45 | 37 | 20 |
| 4 | 55 | 47 | 30 |
| 5 | 65 | 57 | 40 |
| 6 | 75 | 67 | 50 |
| 7 | 85 | 77 | 60 |
| 8 | 95 | 87 | 70 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 9 | 105 | 97 | 80 |
| 10 | 115 | 107 | 90 |
| 11 | 125 | 117 | 100 |
| 12 | 135 | 127 | 110 |
| 13 | 145 | 137 | 120 |
| 14 | 155 | 147 | 130 |
| 15 | 165 | 157 | 140 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 16 | 175 | 167 | 150 |
| 17 | 185 | 177 | 160 |
| 18 | 195 | 187 | 170 |
| 19 | 205 | 197 | 180 |
| 20 | 215 | 207 | 190 |
| 21 | 225 | 217 | 200 |
| 22 | 235 | 227 | 210 |

**Dimensions – Manifold assembly with electrical multi-pin plug** Download CAD data ➔ **www.festo.com**

3/2-way valve




1 Plug base MHAP-PI
2 Sub-D plug, plug outlet on top (standard)
3 Blanking plate MHAP1
4 Fitting
5 Silencer

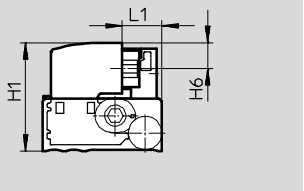
| Type | B1 | B2 | B3 | B4 | B5 | B6 | D1 | D2 | D3 | D4 | H1 | H2 | H3 | H4 | H5 | L4 | L5 | L6 | L7 | L8 | T1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHA1 | 35 | 48.1 | 8.8 | 5.3 | 25.7 | 5.2 | M7 | 6 | 3.3 | M3 | 30.8 | 15.3 | 11.3 | 4.9 | 5.1 | 24.5 | 25 | 10 | 3.5 | 15 | 12.1 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 2 | 70 | 63 | 10 |
| 4 | 90 | 83 | 30 |
| 6 | 110 | 103 | 50 |
| 8 | 130 | 123 | 70 |

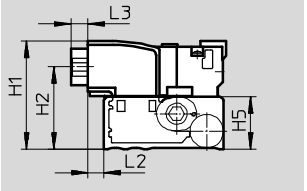
| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 10 | 172 | 165 | 90 |
| 12 | 192 | 185 | 110 |
| 14 | 212 | 205 | 130 |
| 16 | 232 | 225 | 150 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 18 | 252 | 245 | 170 |
| 20 | 272 | 265 | 190 |
| 22 | 292 | 285 | 210 |

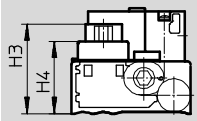
Plug outlet to pneumatic side




Plug outlet to electrical side




Plug outlet on top (standard)



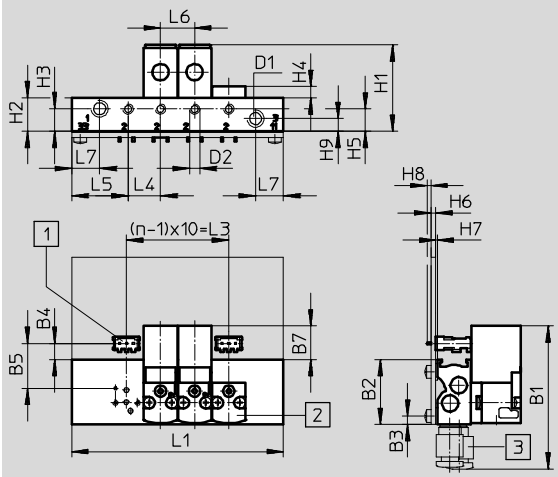

| Type | H1 | H2 | H3 | H4 | H5 | H6 | L1 | L2 | L3 |
|---|---|---|---|---|---|---|---|---|---|
| MHA1 | 31.8 | 24.2 | 26.2 | 21.2 | 15.3 | 7.6 | 11.7 | 4.8 | 5 |

# Solenoid valves MH1, sub-base valve without LED

Technical data

**Dimensions – Manifold assembly on PCB** Download CAD data ➔ **www.festo.com**

3/2-way valve, without pneumatic multiple connector plate




1 Soldering base PCBC-A
2 Blanking plate MHAP1
3 Fitting

Note

The PCB is not included in the scope of delivery.

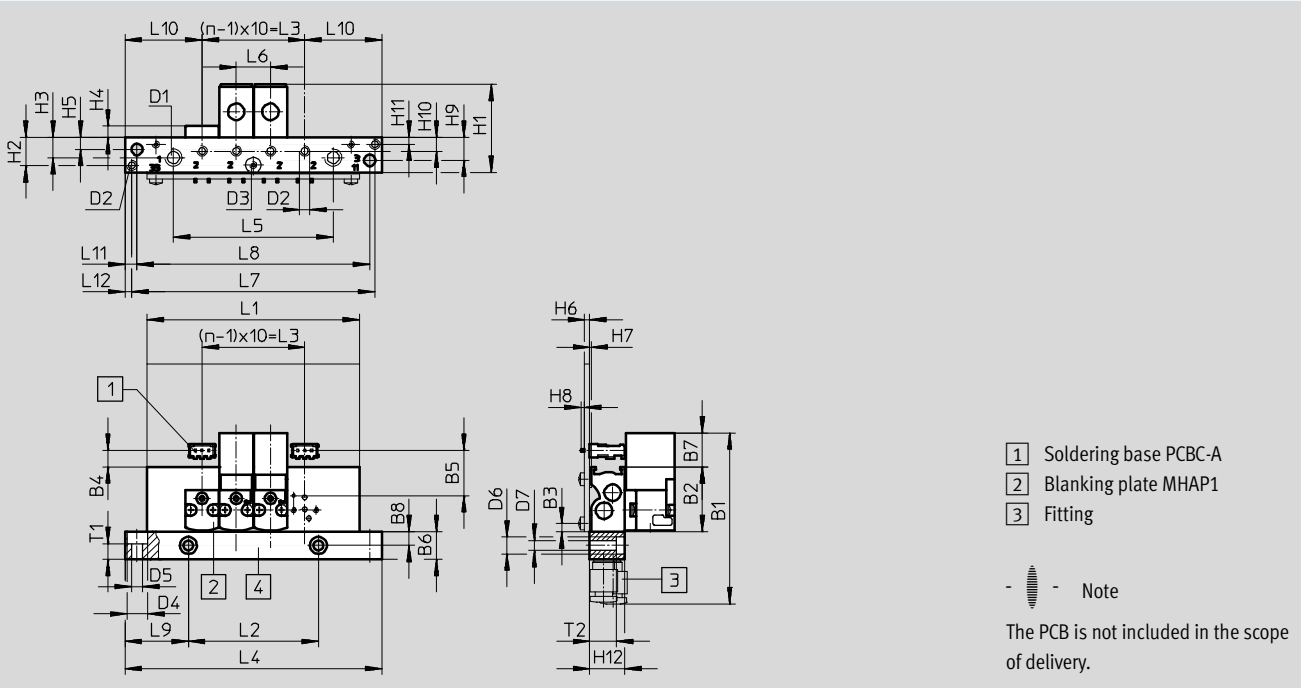
| Type | B1 | B2 | B3 | B4 | B5 | B7 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|
| Without pneumatic multiple connector plate | 42 | 19 | 2.4 | 4.8 | 13.2 | 9.9 | M5 | M3 |

| Type | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | L4 | L5 | L6 | L7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Without pneumatic multiple connector plate | 25.3 | 9.8 | 6.6 | 3.3 | 6.5 | 1.5 | 0.4 | 1 | 3.7 | 9.5 | 16.5 | 10 | 8.2 |

| Valve positions n | L1 ±0.15 | L3 |
|---|---|---|
| 2 | 42 | 10 |
| 4 | 62 | 30 |
| 6 | 82 | 50 |
| 8 | 102 | 70 |
| 10 | 122 | 90 |

**Dimensions – Manifold assembly on PCB** Download CAD data ➔ **www.festo.com**

3/2-way valve, with pneumatic multiple connector plate



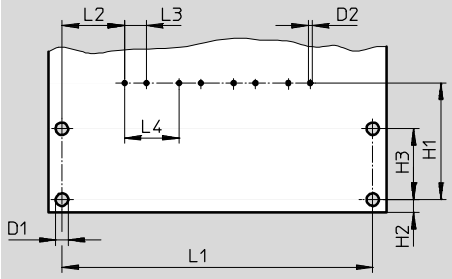

| Type | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| With pneumatic multiple connector plate | 49.5 | 19 | 2.4 | 4.8 | 13.2 | 8 | 9.9 | 4 | M5 | M3 | M2 | 6.1 | 3.3 | 5 | 2.9 |

| Type | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | H10 | H11 | H12 | L6 | L9 | L10 | L11 | L12 | T1 | T2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| With pneumatic multiple connector plate | 25.7 | 8.2 | 5.9 | 3.3 | 3.5 | 1.5 | 0.4 | 1 | 6.7 | 4 | 2 | 10.2 | 10 | 18.5 | 22.5 | 3.5 | 2 | 4.5 | 7.8 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 | L4 ±0.2 | L5 ±0.15 | L7 ±0.1 | L8 |
|---|---|---|---|---|---|---|---|
| 4 | 62 | 38 | 30 | 75 | 46.7 | 71 | 68 |
| 6 | 82 | 58 | 50 | 95 | 66.7 | 91 | 88 |
| 8 | 102 | 78 | 70 | 115 | 86.7 | 111 | 108 |
| 10 | 122 | 98 | 90 | 135 | 106.7 | 131 | 128 |

**Dimensions – Manifold assembly on PCB** Download CAD data ➔ **www.festo.com**

Hole pattern on PCB




Note

The PCB is not included in the scope of delivery.

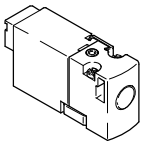
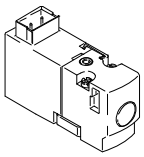
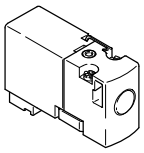
| Type | D1 | D2 | H1 | H2 | H3 | L2 | L3 | L4 |
|---|---|---|---|---|---|---|---|---|
| PCB | 2.3 | 0.7 | 21.4 | 2.4 | 13 | 11.5 | 4 | 10 |

| Valve positions n | L1<br>±0.1 |
|---|---|
| 2 | 37 |
| 4 | 57 |
| 6 | 77 |
| 8 | 97 |
| 10 | 117 |

# Solenoid valves MH1, sub-base valve without LED

Technical data

**Ordering data**

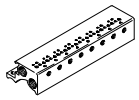
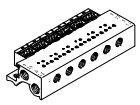
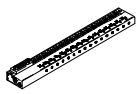
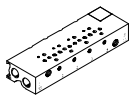
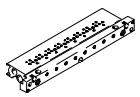
| | | Valve function | Normal position | | Part No. | Type |
|---|---|---|---|---|---|---|
| Solenoid valve | | | | | | |
|  | Plug connection at rear | 2/2-way solenoid valve | Closed | 5 V DC | **197036** | **MHA1-M4H-2/2G-0,9-HC** |
| | | | | 12 V DC | **197037** | **MHA1-M5H-2/2G-0,9-HC** |
| | | | | 24 V DC | **197038** | **MHA1-M1H-2/2G-0,9-HC** |
| | | 3/2-way solenoid valve | Closed | 5 V DC | **197000** | **MHA1-M4H-3/2G-0,6-HC** |
| | | | | 12 V DC | **197001** | **MHA1-M5H-3/2G-0,6-HC** |
| | | | | 24 V DC | **197002** | **MHA1-M1H-3/2G-0,6-HC** |
| | | | Open | 5 V DC | **197018** | **MHA1-M4H-3/2O-0,6-HC** |
| | | | | 12 V DC | **197019** | **MHA1-M5H-3/2O-0,6-HC** |
| | | | | 24 V DC | **197020** | **MHA1-M1H-3/2O-0,6-HC** |
|  | Plug connection on top | 2/2-way solenoid valve | Closed | 5 V DC | **197039** | **MHA1-M4H-2/2G-0,9-TC** |
| | | | | 12 V DC | **197040** | **MHA1-M5H-2/2G-0,9-TC** |
| | | | | 24 V DC | **197041** | **MHA1-M1H-2/2G-0,9-TC** |
| | | 3/2-way solenoid valve | Closed | 5 V DC | **197003** | **MHA1-M4H-3/2G-0,6-TC** |
| | | | | 12 V DC | **197004** | **MHA1-M5H-3/2G-0,6-TC** |
| | | | | 24 V DC | **197005** | **MHA1-M1H-3/2G-0,6-TC** |
| | | | Open | 5 V DC | **197021** | **MHA1-M4H-3/2O-0,6-TC** |
| | | | | 12 V DC | **197022** | **MHA1-M5H-3/2O-0,6-TC** |
| | | | | 24 V DC | **197023** | **MHA1-M1H-3/2O-0,6-TC** |
|  | Plug connection underneath | 2/2-way solenoid valve | Closed | 5 V DC | **197042** | **MHA1-M4H-2/2G-0,9-PI** |
| | | | | 12 V DC | **197043** | **MHA1-M5H-2/2G-0,9-PI** |
| | | | | 24 V DC | **197044** | **MHA1-M1H-2/2G-0,9-PI** |
| | | 3/2-way solenoid valve | Closed | 5 V DC | **197006** | **MHA1-M4H-3/2G-0,6-PI** |
| | | | | 12 V DC | **197007** | **MHA1-M5H-3/2G-0,6-PI** |
| | | | | 24 V DC | **197008** | **MHA1-M1H-3/2G-0,6-PI** |
| | | | Open | 5 V DC | **197024** | **MHA1-M4H-3/2O-0,6-PI** |
| | | | | 12 V DC | **197025** | **MHA1-M5H-3/2O-0,6-PI** |
| | | | | 24 V DC | **197026** | **MHA1-M1H-3/2O-0,6-PI** |

Note

Valves of the type 3/2G and 3/2O must not be mixed on a manifold rail.

# Solenoid valves MH1, sub-base valve without LED

Technical data

| Ordering data | | | | | |
|---|---|---|---|---|---|
| | | | | Part No. | Type |
| Individual sub-base | | | | | |
|  | For valves with plug connection at rear or on top | For 2/2-way solenoid valve | 1 valve position | **197187** | **MHA1-AS-2-M3** |
| | | For 3/2-way solenoid valve | 1 valve position | **197183** | **MHA1-AS-3-M3** |
|  | For valves with plug connection underneath | For 2/2-way solenoid valve | 1 valve position | **197189** | **MHA1-AS-2-M3-PI** |
| | | For 3/2-way solenoid valve | 1 valve position | **197185** | **MHA1-AS-3-M3-PI** |
| | | | | | |
| Manifold rail, for valves with plug connection at rear or on top | | | | | |
|  | Without plug bases | For 2/2-way solenoid valve | 2 valves | **197207** | **MHA1-P2-2-M3** |
| | | | 4 valves | **197208** | **MHA1-P4-2-M3** |
| | | | 6 valves | **197209** | **MHA1-P6-2-M3** |
| | | | 8 valves | **197210** | **MHA1-P8-2-M3** |
| | | | 10 valves | **197211** | **MHA1-P10-2-M3** |
| | | For 3/2-way solenoid valve | 2 valves | **197202** | **MHA1-PR2-3-M3** |
| | | | 4 valves | **197203** | **MHA1-PR4-3-M3** |
| | | | 6 valves | **197204** | **MHA1-PR6-3-M3** |
| | | | 8 valves | **197205** | **MHA1-PR8-3-M3** |
| | | | 10 valves | **197206** | **MHA1-PR10-3-M3** |
| | | | | | |
| Manifold rail, for valves with plug connection underneath | | | | | |
|  | With plug bases | For 2/2-way solenoid valve | 2 valves | **197227** | **MHA1-P2-2-M3-PI** |
| | | | 4 valves | **197228** | **MHA1-P4-2-M3-PI** |
| | | | 6 valves | **197229** | **MHA1-P6-2-M3-PI** |
| | | | 8 valves | **197230** | **MHA1-P8-2-M3-PI** |
| | | | 10 valves | **197231** | **MHA1-P10-2-M3-PI** |
| | | For 3/2-way solenoid valve | 2 valves | **197222** | **MHA1-PR2-3-M3-PI** |
| | | | 4 valves | **197223** | **MHA1-PR4-3-M3-PI** |
| | | | 6 valves | **197224** | **MHA1-PR6-3-M3-PI** |
| | | | 8 valves | **197225** | **MHA1-PR8-3-M3-PI** |
| | | | 10 valves | **197226** | **MHA1-PR10-3-M3-PI** |
|  | With plug bases and electrical multi-pin plug | For 3/2-way solenoid valve | 4 valves | **197238** | **MHA1-PR4-3-M3-PI-D9** |
| | | | 6 valves | **197239** | **MHA1-PR6-3-M3-PI-D9** |
| | | | 8 valves | **197240** | **MHA1-PR8-3-M3-PI-D9** |
| | | | 10 valves | **197241** | **MHA1-PR10-3-M3-PI-D25** |
|  | Without plug bases for PCB mounting | For 3/2-way solenoid valve | 2 valves | **197247** | **MHA1-PR2-3-M3-PI-PCB** |
| | | | 4 valves | **197248** | **MHA1-PR4-3-M3-PI-PCB** |
| | | | 6 valves | **197249** | **MHA1-PR6-3-M3-PI-PCB** |
| | | | 8 valves | **197250** | **MHA1-PR8-3-M3-PI-PCB** |
| | | | 10 valves | **197251** | **MHA1-PR10-3-M3-PI-PCB** |
|  | Without plug bases for PCB mounting, with pneumatic multiple connector plate | For 3/2-way solenoid valve | 4 valves | **197253** | **MHA1-PR4-3-PI-PCBM** |
| | | | 6 valves | **197254** | **MHA1-PR6-3-PI-PCBM** |
| | | | 8 valves | **197255** | **MHA1-PR8-3-PI-PCBM** |
| | | | 10 valves | **197256** | **MHA1-PR10-3-PI-PCBM** |

Note

Manifold rails with an uneven number of valves and for 11 ... 24 valves as well as further variants can be configured and ordered online using the MH1 modular product system.

Note

Valves of the type 3/2G and 3/2O must not be mixed on a manifold rail.

# Solenoid valves MH1, sub-base valve without LED

Technical data

**Ordering data**

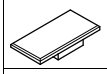
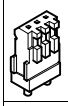
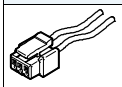
| | | | | Part No. | Type | PU[1] |
|---|---|---|---|---|---|---|
| Blanking plate for manifold rail | | | | | | |
|  | For manifold rail for valves with plug connection at rear or on top | | | **197257** | **MHAP1-BP-3** | **1** |
|  | For manifold rail with plug bases with valves with plug connection underneath | | | **197258** | **MHAP1-BP-3-PI** | **1** |
| Blanking plug | | | | | | |
|  | For M3 thread | | | **30979** | **B-M3-S9** | **10** |
| | For M5 thread | | | **3843** | **B-M5** | **10** |
| | For M7 thread | | | **174309** | **B-M7** | **10** |
| Silencer | | | | | | |
|  | M3 connecting thread | | | **1231120** | **AMTE-M-LH-M3** | **20** |
| | M5 connecting thread | Plastic design | | **165003** | **UC-M5** | **1** |
| | | Metal design | | **1205858** | **AMTE-M-LH-M5** | **20** |
| | M7 connecting thread | | | **161418** | **UC-M7** | **1** |
| Push-in fittings | | | | | | |
|  | M3 connecting thread | With internal hex | For tubing O.D. 3 mm | **153312** | **QSM-M3-3-I** | **10** |
| | | | For tubing O.D. 4 mm | **153314** | **QSM-M3-4-I** | **10** |
| | | With external hex | For tubing O.D. 3 mm | **153301** | **QSM-M3-3** | **10** |
| | | | For tubing O.D. 4 mm | **153303** | **QSM-M3-4** | **10** |
| | M5 connecting thread | With internal hex | For tubing O.D. 3 mm | **153313** | **QSM-M5-3-I** | **10** |
| | | | For tubing O.D. 4 mm | **153315** | **QSM-M5-4-I** | **10** |
| | | | For tubing O.D. 6 mm | **153317** | **QSM-M5-6-I** | **10** |
| | | With external hex | For tubing O.D. 3 mm | **153302** | **QSM-M5-3** | **10** |
| | | | For tubing O.D. 4 mm | **153304** | **QSM-M5-4** | **10** |
| | | | For tubing O.D. 6 mm | **153306** | **QSM-M5-6** | **10** |
| | M7 connecting thread | With internal hex | For tubing O.D. 4 mm | **153319** | **QSM-M7-4-I** | **10** |
| | | | For tubing O.D. 6 mm | **153321** | **QSM-M7-6-I** | **10** |

1) Packaging unit.

# Solenoid valves MH1, sub-base valve without LED

Technical data

FESTO

| Ordering data | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Part No. | Type | PU[1] |
| Inscription label | | | | | | |
|  | For solenoid valve | | | **197259** | **MH-BZ-80X** | **80** |
| | | | | | | |
| Soldering base | | | | | | |
|  | For plug-in connection, 3-pin | | | **197261** | **PCBC-A-10** | **10** |
| | | | | **197262** | **PCBC-A-100** | **100** |
| | | | | | | |
| Electrical plug-in base | | | | | | |
|  | Electrical plug-in base for plug-in connection, for 1 valve | 2x flying leads<br>Open end<br>1-wire | 0.5 m | **197260** | **MHAP-PI** | **1** |
| | | | 1 m | **532182** | **MHAP-PI-1** | **1** |
| | | | | | | |
| Plug socket with cable | | | | | | |
|  | Straight socket<br>Connection pattern H<br>3-pin | 2x flying leads<br>Open end<br>1-wire | 0.5 m | **566654** | **NEBV-H1G2-KN-0.5-N-LE2** | **1** |
| | | | 1 m | **566655** | **NEBV-H1G2-KN-1-N-LE2** | **1** |
| | | | 2.5 m | **566656** | **NEBV-H1G2-KN-2.5-N-LE2** | **1** |
| | | | 5 m | **566657** | **NEBV-H1G2-KN-5-N-LE2** | **1** |

1) Packaging unit.

# Solenoid valves MH1, sub-base valve with E-box

Type codes

| MH | A | 1 | – | M | 4 | R | – | 3/2 | G | – | 0,6 | – | P3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Valve series | |
|---|---|
| MH | Miniature and fast-switching valves |

| Design | |
|---|---|
| A | Sub-base valve |

| Size | |
|---|---|
| 1 | Flow rate 10 ... 14 l/min |

| Drive system | |
|---|---|
| M | Solenoid, switching |

| Operating voltage | |
|---|---|
| 4 | 5 V DC |
| 5 | 12 V DC |
| 1 | 24 V DC |
| 1A | 24 V AC |

| Manual override | |
|---|---|
| R | Non-detenting/detenting |

| Valve function | |
|---|---|
| 3/2 | 3/2-way valve |

| Normal position | |
|---|---|
| G | Closed |

| Nominal width | |
|---|---|
| 0,6 | 0.65 mm |

| Electrical connection | |
|---|---|
| P3 | Without plug connection |

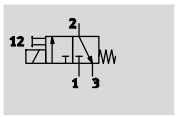
Note

Further variants and accessories can be configured and ordered online using the modular product system.

# Solenoid valves MH1, sub-base valve with E-box

Technical data

Function




Voltage
5 V DC
12 V DC
24 V DC
24 V AC

Pressure
+1.5 ... +8 bar

| General technical data | | |
|---|---|---|
| Valve function | | 3/2-way solenoid valve |
| | | Normally closed |
| | | Single solenoid |
| Design | | Poppet valve with spring return |
| Sealing principle | | Soft |
| Actuation type | | Electric |
| Reset method | | Mechanical spring |
| Type of control | | Direct |
| Direction of flow | | Non-reversible |
| Exhaust function | | With flow control |
| Manual override | | Non-detenting/detenting |
| Signal status display | | – |
| Type of mounting | | On sub-base via through-hole |
| Mounting position | | Any |
| Nominal size | [mm] | 0.65 |
| Standard nominal flow rate | [l/min] | 10 |
| Grid dimension | [mm] | 10 |
| Pneumatic connection | 1 | Sub-base |
| | 2 | Sub-base |
| | 3 | Sub-base |
| Product weight | [g] | 10 |

| Operating and environmental conditions | | | | | |
|---|---|---|---|---|---|
| Type | | MHA1-M4R-... | MHA1-M5R-... | MHA1-M1R-... | MHA1-M1AR-... |
| 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 | [bar] | 1.5 ... 8[1)] | | | |
| Ambient temperature | [°C] | –5 ... +40 | –5 ... +40 | –5 ... +50 | –5 ... +50 |
| Temperature of medium | [°C] | –5 ... +50 | –5 ... +50 | –5 ... +50 | –5 ... +50 |
| Restricted ambient and media temperature | [°C] | – | – | –5 ... +40 | – |
| | | – | – | Without holding current reduction | – |
| Storage temperature | [°C] | –20 ... +60 | –20 ... +60 | –20 ... +60 | –20 ... +60 |
| Corrosion resistance class CRC[1)] | | 2 | 2 | 2 | 2 |

1) Vacuum operation possible with special connection method → 4
2) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

# Solenoid valves MH1, sub-base valve with E-box

Technical data

| Safety data | | | | | |
|---|---|---|---|---|---|
| Operating voltage | | 5 V DC | 12 V DC | 24 V DC | 24 V AC |
| Note on forced checking procedure | | Switching frequency min. 1/week | | | |
| Max. positive test pulse with 0 signal | [µs] | – | – | 500 | – |
| Max. negative test pulse with 1 signal | [µs] | – | – | 400 | – |
| Resistance to shocks | | Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27 | | | |
| Vibration resistance | | Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6 | | | |

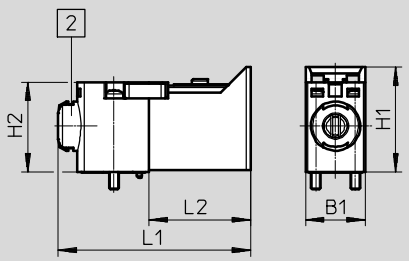
| Electrical data | | | | | |
|---|---|---|---|---|---|
| Type | | MHA1-M4R-... | MHA1-M5R-... | MHA1-M1R-... | MHA1-M1AR-... |
| Operating voltage | [V DC] | 5 | 12 | 24 | – |
| | [V AC] | – | – | – | 24, 50/60 Hz |
| Permissible voltage fluctuations | [%] | ±10 | ±10 | ±10 | ±10 |
| Connection type | | Plug connection | Plug connection | Plug connection | Plug connection |
| Power consumption | [W] | 1 | 1 | 1 | – |
| | [VA] | – | – | – | 1 |
| Duty cycle | [%] | 100 | 100 | 100 | 100 |
| Degree of protection to EN 60529 | | IP40 | IP40 | IP40 | IP40 |
| | | IP65 | IP65 | IP65 | – |

| Switching times and frequencies | | | | | | |
|---|---|---|---|---|---|---|
| Type | | | MHA1-M4R-... | MHA1-M5R-... | MHA1-M1R-... | MHA1-M1AR-... |
| Switching time | On | [ms] | 5 | 5 | 5 | 5 |
| | Off | [ms] | 5 | 5 | 5 | 10 |
| Maximum switching frequency | | [Hz] | 10 | 10 | 10 | 10 |

| Materials | |
|---|---|
| Housing | Reinforced PA, reinforced PPS |
| Sub-base | Aluminium |
| Seals | FPM, HNBR, NBR |
| Note on materials | RoHS-compliant |
| | Free of copper and PTFE |

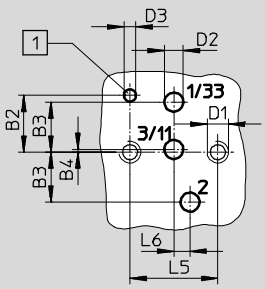
**Dimensions** Download CAD data ➔ **www.festo.com**

Valve




2 Manual override

Hole pattern on sub-bases

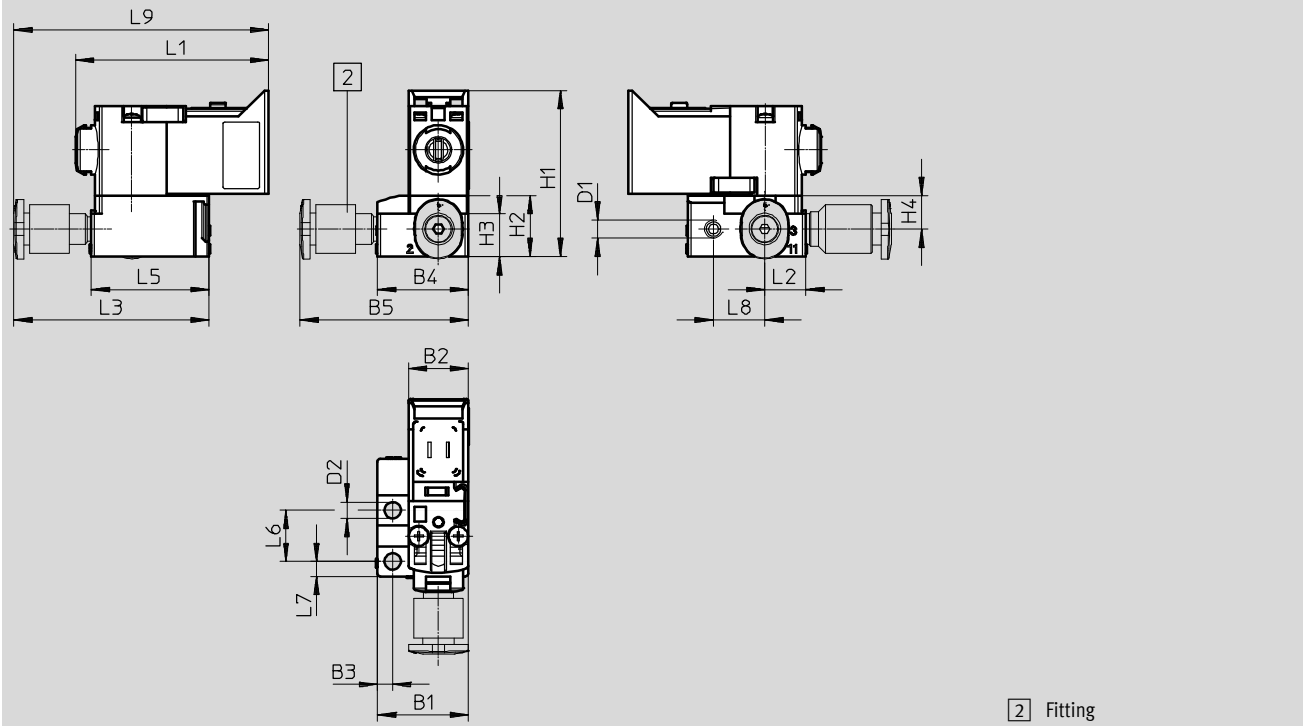



1 Hole for coding pin

- If used as a 2/2-way valve, normally closed, port 3/11 are not used.
- If used as a 2/2-way valve, normally open, port 1/33 are not used.

| Type | B1 | B2 | B3 | B4 | D1 | D2 | D3 | H1 | H2 | L1 | L2 | L5 | L6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHA1 | 9.8 | 4.2 | 3.7 | 0.2 | M1.6 | 1.4 | 0.9 | 17.2 | 14.7 | 31.7 | 16.7 | 6.5 | 1.2 |

**Dimensions – Assembly on individual sub-base** Download CAD data ➔ **www.festo.com**

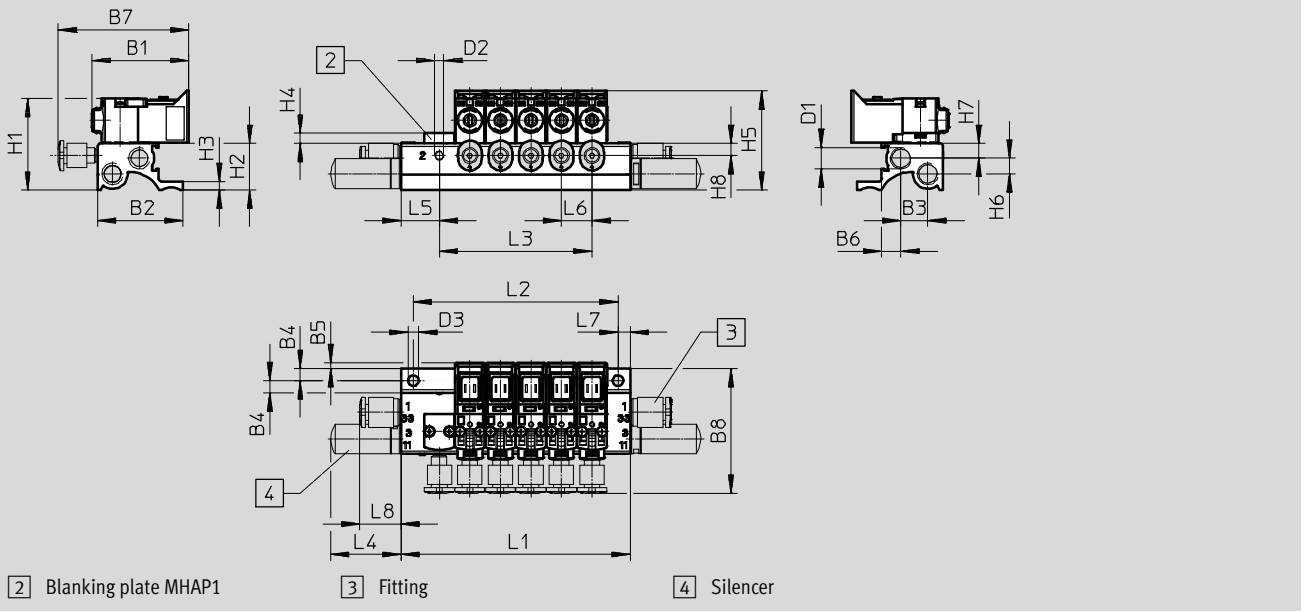



| Type | B1 | B2 | B3 | B4 | B5 | D1 | D2 | H1 | H2 | H3 | H4 | L1 | L2 | L3 | L5 | L6 | L7 | L8 | L9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/2-way valve | 14.9 | 9.8 | 2.5 | 14.9 | 27.6 | M3 | 2.7 | 27.2 | 10 | 7 | 5.5 | 31.7 | 6.7 | 32 | 19.3 | 8.4 | 2.5 | 8.4 | 42 |

# Solenoid valves MH1, sub-base valve with E-box

Technical data

**Dimensions – Manifold assembly** Download CAD data ➔ **www.festo.com**




2 Blanking plate MHAP1 3 Fitting 4 Silencer

| Type | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | D1 | D2 | D3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/2-way valve | 31.7 | 28 | 8.8 | 4 | 1.9 | 6.3 | 42.7 | 42 | M7 | M3 | 3.5 |

| Type | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | L4 | L5 | L6 | L7 | L8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/2-way valve | 30 | 15.3 | 2.8 | 3.3 | 32.5 | 5.1 | 4.9 | 4 | 23.1 | 12.5 | 10 | 4 | 13.5 |

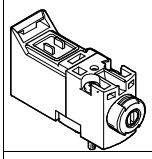
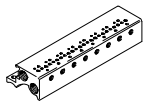
| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 2 | 35 | 27 | 10 |
| 3 | 45 | 37 | 20 |
| 4 | 55 | 47 | 30 |
| 5 | 65 | 57 | 40 |
| 6 | 75 | 67 | 50 |
| 7 | 85 | 77 | 60 |
| 8 | 95 | 87 | 70 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 9 | 105 | 97 | 80 |
| 10 | 115 | 107 | 90 |
| 11 | 125 | 117 | 100 |
| 12 | 135 | 127 | 110 |
| 13 | 145 | 137 | 120 |
| 14 | 155 | 147 | 130 |
| 15 | 165 | 157 | 140 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 16 | 175 | 167 | 150 |
| 17 | 185 | 177 | 160 |
| 18 | 195 | 187 | 170 |
| 19 | 205 | 197 | 180 |
| 20 | 215 | 207 | 190 |
| 21 | 225 | 217 | 200 |
| 22 | 235 | 227 | 210 |

# Solenoid valves MH1, sub-base valve with E-box

Technical data

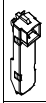
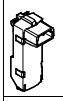
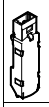
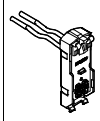
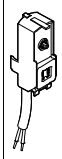
| Ordering data | | | | | | |
|---|---|---|---|---|---|---|
| | | Valve function | Normal position | | Part No. | Type |
| Solenoid valve | | | | | | |
|  | Without plug connection | 3/2-way solenoid valve | Closed | 5 V DC | **8025224** | **MHA1-M4R-3/2G-0,6-P3** |
| | | | | 12 V DC | **8025225** | **MHA1-M5R-3/2G-0,6-P3** |
| | | | | 24 V DC | **8025223** | **MHA1-M1R-3/2G-0,6-P3** |
| | | | | 24 V AC | **8025226** | **MHA1-M1AR-3/2G-0,6-P3** |
| Individual sub-base | | | | | | |
|  | Individual sub-base<br>Pneumatic connection: M3 thread | | | 1 valve position | **197183** | **MHA1-AS-3-M3** |
| Manifold rail | | | | | | |
|  | Manifold rail<br>Pneumatic connection: M3, M7 thread | | | 2 valve positions | **197202** | **MHA1-PR2-3-M3** |
| | | | | 4 valve positions | **197203** | **MHA1-PR4-3-M3** |
| | | | | 6 valve positions | **197204** | **MHA1-PR6-3-M3** |
| | | | | 8 valve positions | **197205** | **MHA1-PR8-3-M3** |
| | | | | 10 valve positions | **197206** | **MHA1-PR10-3-M3** |

- Note

Manifold rails with an uneven number of valves and for 11 ... 24 valves as well as further variants can be configured and ordered online using the MH1 modular product system.

| Ordering data | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Part No. | Type | PU[1] |
| Blanking plate for manifold rail | | | | | | |
|  | Vacant valve positions must be sealed with a blanking plate | | | **197257** | **MHAP1-BP-3** | **1** |
| | | | | | | |
| Cover cap for manual override | | | | | | |
|  | Function covered<br>The cover cap protects the manual override against accidental actuation | | | **540898** | **VMPA-HBV-B** | **10** |
|  | Function non-detenting<br>The cover cap prevents latching of the manual override | | | **540897** | **VMPA-HBT-B** | **10** |
|  | Function detenting<br>The cover cap enables the manual override to be actuated and latched without tools | | | **8002234** | **VAMC-L1-CD** | **10** |
| | | | | | | |
| Blanking plug | | | | | | |
|  | For M3 thread | | | **30979** | **B-M3-S9** | **10** |
| | For M7 thread | | | **174309** | **B-M7** | **10** |
| | | | | | | |
| Silencer | | | | | | |
|  | M3 connecting thread | | | **1231120** | **AMTE-M-LH-M3** | **20** |
| | M7 connecting thread | | | **161418** | **UC-M7** | **1** |
| | | | | | | |
| Push-in fittings | | | | | | |
|  | M3 connecting thread | With internal hex | For tubing O.D. 3 mm | **153312** | **QSM-M3-3-I** | **10** |
| | | | For tubing O.D. 4 mm | **153314** | **QSM-M3-4-I** | **10** |
| | | With external hex | For tubing O.D. 3 mm | **153301** | **QSM-M3-3** | **10** |
| | | | For tubing O.D. 4 mm | **153303** | **QSM-M3-4** | **10** |
| | M7 connecting thread | With internal hex | For tubing O.D. 4 mm | **153319** | **QSM-M7-4-I** | **10** |
| | | | For tubing O.D. 6 mm | **153321** | **QSM-M7-6-I** | **10** |

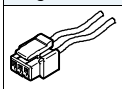
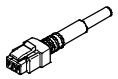
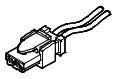
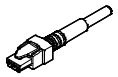
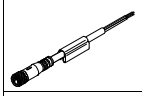
1) Packaging unit.

| Ordering data | | | | | | | |
|---|---|---|---|---|---|---|---|
| Design | Electrical connection | Contacts | Cable length [m] | Nominal operating voltage [V DC] | Holding current reduction | Part No. | Type |
| E-box with protective circuit | | | | | | | |
|  | Plug connection pattern H, angled | 2-pin | – | 12/24 | – | **566714** | **VAVE-L1-1VH2-LP** |
| | | | | 24 | ■ | **566716** | **VAVE-L1-1H2-LR** |
|  | Plug connection pattern H, straight | 2-pin | – | 12/24 | – | **566715** | **VAVE-L1-1VH3-LP** |
| | | | | 24 | ■ | **566717** | **VAVE-L1-1H3-LR** |
|  | Plug connection pattern S, angled | 2-pin | – | 12/24 | – | **566718** | **VAVE-L1-1VS2-LP** |
| | | | | 24 | ■ | **566720** | **VAVE-L1-1S2-LR** |
|  | Plug connection pattern S, straight | 2-pin | – | 12/24 | – | **566719** | **VAVE-L1-1VS3-LP** |
| | | | | 24 | ■ | **566721** | **VAVE-L1-1S3-LR** |
|  | Plug M8x1, angled | 4-pin | – | 12/24 | – | **573921** | **VAVE-L1-1VR1-LP** |
| | | | | 24 | ■ | **573920** | **VAVE-L1-1R8-LR** |
| | | 3-pin | – | 12/24 | – | **573919** | **VAVE-L1-1VR8-LP** |
| | | | | 24 | ■ | **573922** | **VAVE-L1-1R1-LR** |
|  | 2x flying leads, open end | 1-wire | 0.5 | 12/24 | – | **566722** | **VAVE-L1-1VL1-LP** |
| | | | | 24 | ■ | **566726** | **VAVE-L1-1L1-LR** |
| | | | 1 | 12/24 | – | **566723** | **VAVE-L1-1VL2-LP** |
| | | | | 24 | ■ | **566727** | **VAVE-L1-1L2-LR** |
| | | | 2.5 | 12/24 | – | **566724** | **VAVE-L1-1VL3-LP** |
| | | | | 24 | ■ | **566728** | **VAVE-L1-1L3-LR** |
| | | | 5 | 12/24 | – | **566725** | **VAVE-L1-1VL4-LP** |
| | | | | 24 | ■ | **566729** | **VAVE-L1-1L4-LR** |
|  | Cable, open end | 2-wire | 0.5 | 12/24 | – | **573941** | **VAVE-L1-1VK6-LP** |
| | | | | 24 | ■ | **573945** | **VAVE-L1-1K6-LR** |
| | | | 1 | 12/24 | – | **573942** | **VAVE-L1-1VK7-LP** |
| | | | | 24 | ■ | **573946** | **VAVE-L1-1K7-LR** |
| | | | 2.5 | 12/24 | – | **573943** | **VAVE-L1-1VK8-LP** |
| | | | | 24 | ■ | **573947** | **VAVE-L1-1K8-LR** |
| | | | 5 | 12/24 | – | **573944** | **VAVE-L1-1VK9-LP** |
| | | | | 24 | ■ | **573948** | **VAVE-L1-1K9-LR** |

# Solenoid valves MH1, sub-base valve with E-box

Technical data

**Ordering data**

| | Electrical connection 1 | Electrical connection 2 | Length | Part No. | Type |
|---|---|---|---|---|---|
| Plug socket with cable for plug connection pattern H | | | | | Technical data ➔ Internet: nebv |
|  | Straight socket<br>Connection pattern H<br>3-pin | 2x flying leads<br>Open end<br>1-wire | 0.5 m | **566654** | **NEBV-H1G2-KN-0.5-N-LE2** |
| | | | 1 m | **566655** | **NEBV-H1G2-KN-1-N-LE2** |
| | | | 2.5 m | **566656** | **NEBV-H1G2-KN-2.5-N-LE2** |
| | | | 5 m | **566657** | **NEBV-H1G2-KN-5-N-LE2** |
|  | Straight socket<br>Connection pattern H<br>3-pin | Cable<br>Open end<br>2-wire | 0.5 m | **566658** | **NEBV-H1G2-P-0.5-N-LE2** |
| | | | 1 m | **566659** | **NEBV-H1G2-P-1-N-LE2** |
| | | | 2.5 m | **566660** | **NEBV-H1G2-P-2.5-N-LE2** |
| | | | 5 m | **566661** | **NEBV-H1G2-P-5-N-LE2** |
| | | | | | |
| Plug socket with cable for plug connection pattern S | | | | | Technical data ➔ Internet: nebv |
|  | Straight socket<br>Connection pattern S<br>2-pin | 2x flying leads<br>Open end<br>1-wire | 0.5 m | **566662** | **NEBV-HSG2-KN-0.5-N-LE2** |
| | | | 1 m | **566663** | **NEBV-HSG2-KN-1-N-LE2** |
| | | | 2.5 m | **566664** | **NEBV-HSG2-KN-2.5-N-LE2** |
| | | | 5 m | **566665** | **NEBV-HSG2-KN-5-N-LE2** |
|  | Straight socket<br>Connection pattern S<br>2-pin | Cable<br>Open end<br>2-wire | 0.5 m | **566666** | **NEBV-HSG2-P-0.5-N-LE2** |
| | | | 1 m | **566667** | **NEBV-HSG2-P-1-N-LE2** |
| | | | 2.5 m | **566668** | **NEBV-HSG2-P-2.5-N-LE2** |
| | | | 5 m | **566669** | **NEBV-HSG2-P-5-LE2** |
| | | | | | |
| Connecting cable for plug M8x1 | | | | | |
| 4-pin | | | | | Technical data ➔ Internet: nebu |
|  | Straight socket<br>Plug coding type A, to EN<br>61076-2-104 | Cable<br>Open end<br>4-wire | 2.5 m | **541342** | **NEBU-M8G4-K-2.5-LE4** |
| | | | 5 m | **541343** | **NEBU-M8G4-K-5-LE4** |
|  | Angled socket<br>Plug coding type A, to EN<br>61076-2-104 | Cable<br>Open end<br>4-wire | 2.5 m | **541344** | **NEBU-M8W4-K-2.5-LE4** |
| | | | 5 m | **541345** | **NEBU-M8W4-K-5-LE4** |
| 3-pin | | | | | Technical data ➔ Internet: nebu |
|  | Straight socket<br>Plug coding type A, to EN<br>61076-2-104 | Cable<br>Open end<br>3-wire | 2.5 m | **541333** | **NEBU-M8G3-K-2.5-LE3** |
| | | | 5 m | **541334** | **NEBU-M8G3-K-5-LE3** |
|  | Angled socket<br>Plug coding type A, to EN<br>61076-2-104 | Cable<br>Open end<br>3-wire | 2.5 m | **541338** | **NEBU-M8W3-K-2.5-LE3** |
| | | | 5 m | **541341** | **NEBU-M8W3-K-5-LE3** |

# Solenoid valves MH1, sub-base valve with LED

Type codes

| MH | A | 1 | – | M | 1 | L | H | – | 3/2 | – | O | – | 0,6 | – | HC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Valve series | |
|---|---|
| MH | Miniature and fast-switching valves |

| Design | |
|---|---|
| A | Sub-base valve |

| Size | |
|---|---|
| 1 | Flow rate 10 … 14 l/min |

| Drive system | |
|---|---|
| M | Solenoid, switching |

| Operating voltage | |
|---|---|
| 1 | 24 V DC |

| Signal status display | |
|---|---|
| L | LED |

| Manual override | |
|---|---|
| H | Non-detenting/detenting |

| Valve function | |
|---|---|
| 3/2 | 3/2-way valve |

| Normal position | |
|---|---|
| G | Closed |
| O | Open |

| Nominal width | |
|---|---|
| 0,6 | 0.65 mm |

| Electrical connection | |
|---|---|
| HC | Plug connection at rear<br>for plug socket NEBV-H1G2 |
| TC | Plug connection on top<br>for plug socket NEBV-H1G2 |
| PI | Plug connection underneath<br>for plug-in connection |

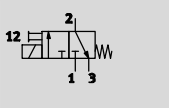
Note

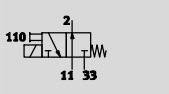
Further variants and accessories can be configured and ordered online using the modular product system.

# Solenoid valves MH1, sub-base valve with LED

Technical data

Function

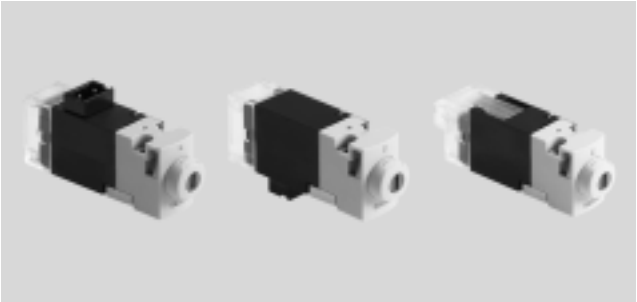



Voltage
24 V DC

Pressure
0 ... +8 bar

Temperature range
−5 ... +50 °C



| General technical data | | | |
|---|---|---|---|
| Type | | MHA1-M1LH-...-3/2G-... | MHA1-M1LH-...-3/2O-... |
| Valve function | | 3/2-way solenoid valve | 3/2-way solenoid valve |
| | | Normally closed | Normally open |
| | | Single solenoid | Single solenoid |
| Design | | Poppet valve with spring return | |
| Sealing principle | | Soft | |
| Actuation type | | Electric | |
| Reset method | | Mechanical spring | |
| Type of control | | Direct | |
| Direction of flow | | Non-reversible | |
| Exhaust function | | With flow control | |
| Manual override | | Non-detenting/detenting | |
| Signal status display | | LED | |
| Type of mounting | | On sub-base via through-hole | |
| Mounting position | | Any | |
| Nominal size | [mm] | 0.65 | 0.7 |
| Standard nominal flow rate | [l/min] | 10 | 10 |
| Grid dimension | [mm] | 10 | 10 |
| Pneumatic connection | 1 | Sub-base | – |
| | 2 | Sub-base | Sub-base |
| | 3 | Sub-base | – |
| | 11 | – | Sub-base |
| | 33 | – | Sub-base |
| Product weight | [g] | 11 | 11 |

| Operating and environmental conditions | | | |
|---|---|---|---|
| Type | | MHA1-M1LH-...-3/2G-... | MHA1-M1LH-...-3/2O-... |
| 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 | [bar] | 0 ... 8[1)] | 0 ... 6[1)] |
| Ambient temperature | [°C] | −5 ... +40 | |
| Temperature of medium | [°C] | −5 ... +40 | |
| Storage temperature | [°C] | −20 ... +60 | |
| Corrosion resistance class CRC[2)] | | 2 | |
| Certification | | c UL us Recognized (OL) | |
| | | c CSA us Recognized (OL) | |

1) Vacuum operation possible with special connection method ➔ 4
2) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

# Solenoid valves MH1, sub-base valve with LED

Technical data

| Safety data | |
|---|---|
| Note on forced checking procedure | Switching frequency min. 1/week |
| Resistance to shocks | Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27 |
| Vibration resistance | Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6 |

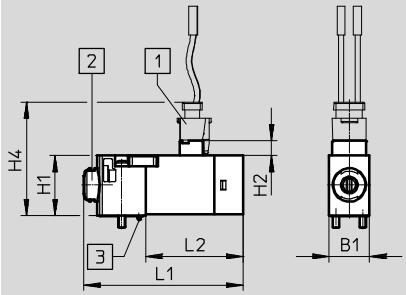
| Electrical data | | |
|---|---|---|
| Operating voltage | [V DC] | 24 |
| Permissible voltage fluctuations | [%] | ±10 |
| Connection type | | Plug connection |
| Power consumption | [W] | 1.1 |
| Duty cycle | [%] | 100 |
| Degree of protection to EN 60529 | | IP40 |

| Switching times and frequencies | | | |
|---|---|---|---|
| Switching time | On | [ms] | 4 |
| | Off | [ms] | 4 |
| Maximum switching frequency | | [Hz] | 20 |

| Materials | |
|---|---|
| Housing | Reinforced PA, reinforced PPS |
| Sub-base | Aluminium |
| Seals | FPM, HNBR, NBR |
| Note on materials | RoHS-compliant |
| | Free of copper and PTFE |

**Dimensions** Download CAD data ➔ **www.festo.com**

Plug connection on top

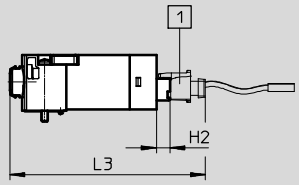



1 Plug socket NEBV-H1G2

2 Manual override

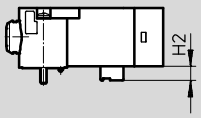
3 Coding pin

Plug connection at rear




1 Plug socket NEBV-H1G2

Plug connection underneath

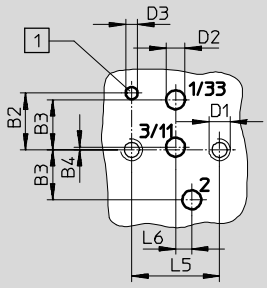



| Type | B1 | H1 | H2 | H4 | L1 | L2 | L3 |
|---|---|---|---|---|---|---|---|
| MHA1 | 9.8 | 14.7 | 3.6 | 27.7 | 38.7 | 23.7 | 51.7 |

# Solenoid valves MH1, sub-base valve with LED

Technical data

**Dimensions – Hole pattern on sub-bases** Download CAD data ➔ **www.festo.com**



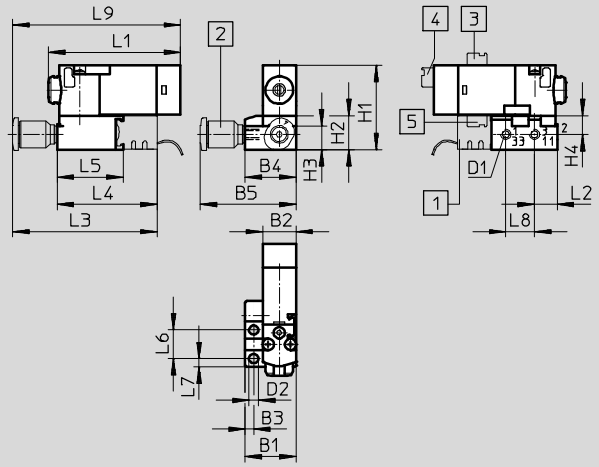

1 Hole for coding pin

- If used as a 2/2-way valve, normally closed, port 3/11 are not used.
- If used as a 2/2-way valve, normally open, port 1/33 are not used.

| Type | B2 | B3 | B4 | D1 | D2 | D3 | L5 | L6 |
|---|---|---|---|---|---|---|---|---|
| MHA1 | 4.2 | 3.7 | 0.2 | M1.6 | 1.4 | 0.9 | 6.5 | 1.2 |

**Dimensions – Assembly on individual sub-base** Download CAD data ➔ **www.festo.com**

3/2-way valve

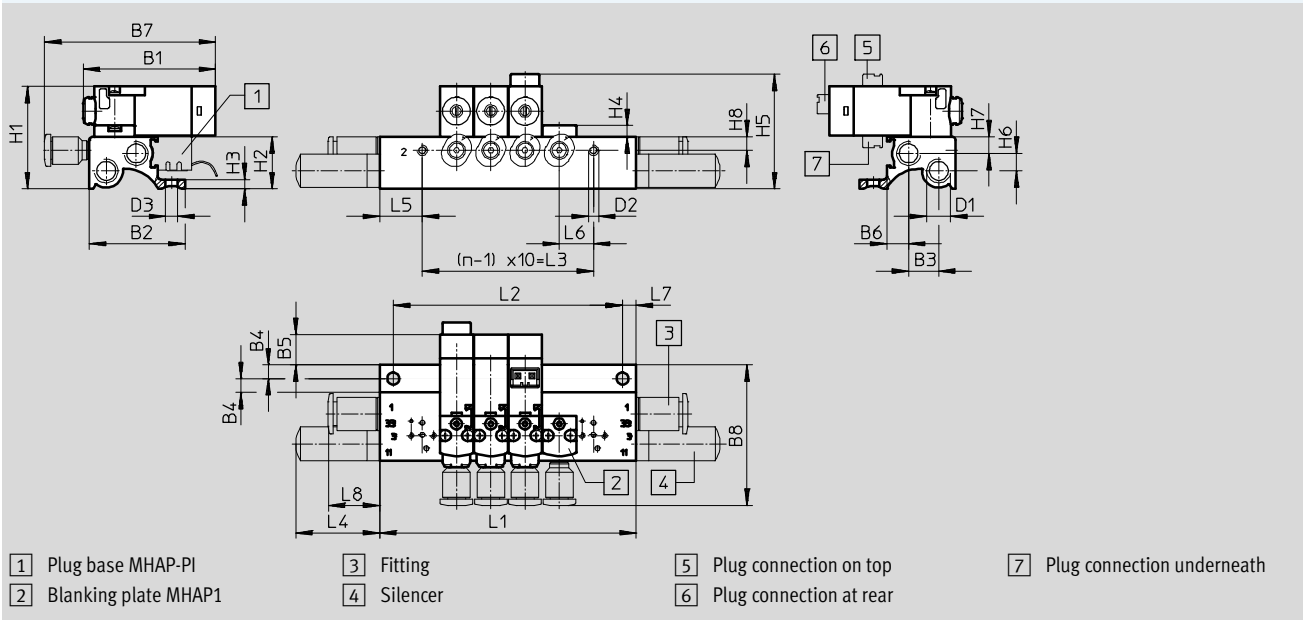



1 Plug base MHAP-PI
2 Fitting
3 Plug connection on top
4 Plug connection at rear
5 Plug connection underneath

| Type | B1 | B2 | B3 | B4 | B5 | D1 | D2 | H1 | H2 | H3 | H4 | L1 | L2 | L3 | L4 | L5 | L6 | L7 | L8 | L9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/2-way valve | 14.9 | 9.8 | 2.5 | 14.9 | 28 | M3 | 2.7 | 24.7 | 10 | 7 | 5.5 | 38.7 | 6.7 | 43.1 | 29.1 | 19.3 | 8.4 | 2.5 | 8.4 | 50.1 |

**Dimensions – Manifold assembly** Download CAD data ➔ **www.festo.com**

3/2-way valve




1 Plug base MHAP-PI
2 Blanking plate MHAP1
3 Fitting
4 Silencer
5 Plug connection on top
6 Plug connection at rear
7 Plug connection underneath

| Type | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3/2-way valve | 38.7 | 28 | 8.8 | 4 | 8.9 | 6.3 | 50 | 42 | M7 | M3 |

| Type | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | L4 | L5 | L6 | L7 | L8 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/2-way valve | 30 | 15.3 | 2.8 | 3.3 | 33.6 | 5.1 | 4.9 | 4 | 23.1 | 12.5 | 10 | 4 | 13.5 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 2 | 35 | 27 | 10 |
| 3 | 45 | 37 | 20 |
| 4 | 55 | 47 | 30 |
| 5 | 65 | 57 | 40 |
| 6 | 75 | 67 | 50 |
| 7 | 85 | 77 | 60 |
| 8 | 95 | 87 | 70 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 9 | 105 | 97 | 80 |
| 10 | 115 | 107 | 90 |
| 11 | 125 | 117 | 100 |
| 12 | 135 | 127 | 110 |
| 13 | 145 | 137 | 120 |
| 14 | 155 | 147 | 130 |
| 15 | 165 | 157 | 140 |

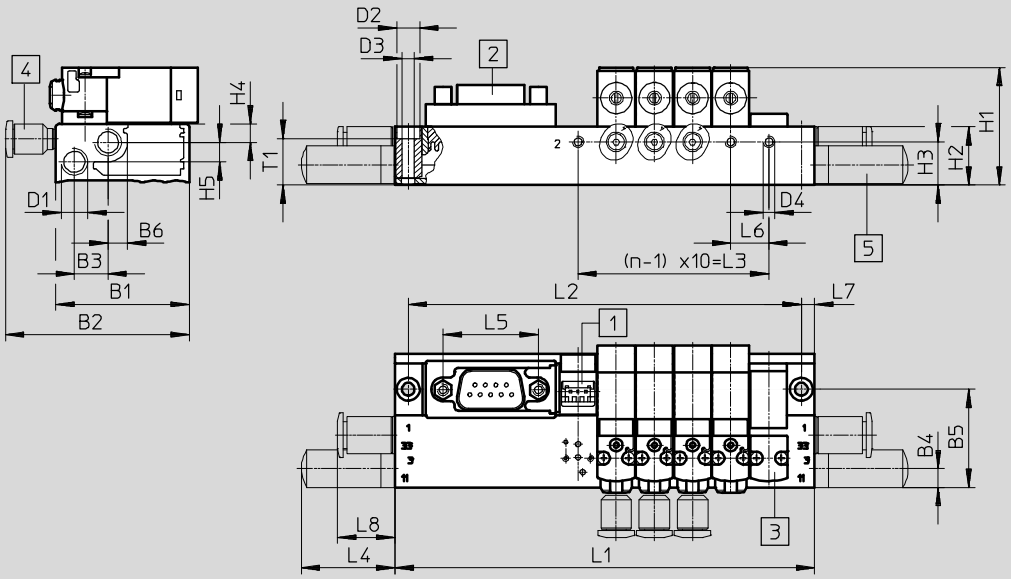
| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 16 | 175 | 167 | 150 |
| 17 | 185 | 177 | 160 |
| 18 | 195 | 187 | 170 |
| 19 | 205 | 197 | 180 |
| 20 | 215 | 207 | 190 |
| 21 | 225 | 217 | 200 |
| 22 | 235 | 227 | 210 |

# Solenoid valves MH1, sub-base valve with LED

Technical data

**Dimensions – Manifold assembly with electrical multi-pin plug** Download CAD data ➔ **www.festo.com**

3/2-way valve




1 Plug base MHAP-PI
2 Sub-D plug, plug outlet on top (standard)
3 Blanking plate MHAP1
4 Fitting
5 Silencer

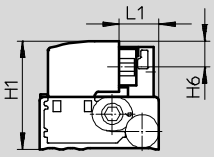
| Type | B1 | B2 | B3 | B4 | B5 | B6 | D1 | D2 | D3 | D4 | H1 | H2 | H3 | H4 | H5 | L4 | L5 | L6 | L7 | L8 | T1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MHA1 | 35 | 48.1 | 8.8 | 5.3 | 25.7 | 5.2 | M7 | 6 | 3.3 | M3 | 30.8 | 15.3 | 11.3 | 4.9 | 5.1 | 24.5 | 25 | 10 | 3.5 | 15 | 12.1 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 2 | 70 | 63 | 10 |
| 4 | 90 | 83 | 30 |
| 6 | 110 | 103 | 50 |
| 8 | 130 | 123 | 70 |

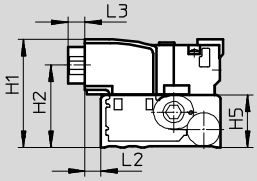
| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 10 | 172 | 165 | 90 |
| 12 | 192 | 185 | 110 |
| 14 | 212 | 205 | 130 |
| 16 | 232 | 225 | 150 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 |
|---|---|---|---|
| 18 | 252 | 245 | 170 |
| 20 | 272 | 265 | 190 |
| 22 | 292 | 285 | 210 |

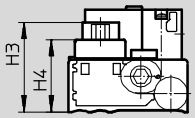
Plug outlet to pneumatic side




Plug outlet to electrical side



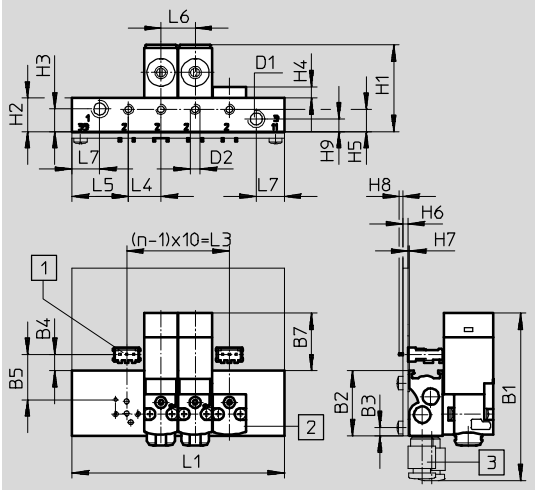

Plug outlet on top (standard)




| Type | H1 | H2 | H3 | H4 | H5 | H6 | L1 | L2 | L3 |
|---|---|---|---|---|---|---|---|---|---|
| MHA1 | 31.8 | 24.2 | 26.2 | 21.2 | 15.3 | 7.6 | 11.7 | 4.8 | 5 |

**Dimensions – Manifold assembly on PCB** Download CAD data ➔ **www.festo.com**

3/2-way valve, without pneumatic multiple connector plate




1 Soldering base PCBC-A
2 Blanking plate MHAP1
3 Fitting

- - Note

The PCB is not included in the scope of delivery.

| Type | B1 | B2 | B3 | B4 | B5 | B7 | D1 | D2 |
|---|---|---|---|---|---|---|---|---|
| Without pneumatic multiple connector plate | 49 | 19 | 2.4 | 4.8 | 13.2 | 16.9 | M5 | M3 |

| Type | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | L4 | L5 | L6 | L7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Without pneumatic multiple connector plate | 25.3 | 9.8 | 6.6 | 3.3 | 6.5 | 1.5 | 0.4 | 1 | 3.7 | 9.5 | 16.5 | 10 | 8.2 |

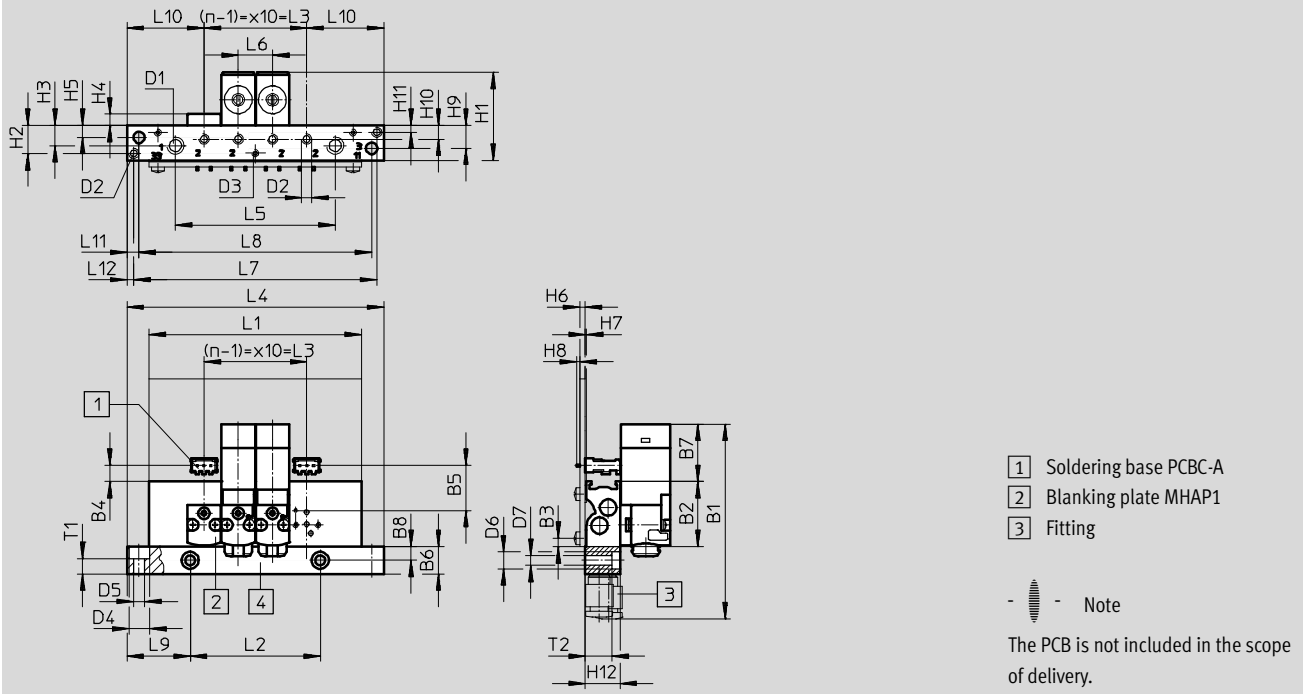
| Valve positions n | L1 ±0.15 | L3 |
|---|---|---|
| 2 | 42 | 10 |
| 4 | 62 | 30 |
| 6 | 82 | 50 |
| 8 | 102 | 70 |
| 10 | 122 | 90 |

# Solenoid valves MH1, sub-base valve with LED

Technical data

**Dimensions – Manifold assembly on PCB** Download CAD data ➔ **www.festo.com**

3/2-way valve, with pneumatic multiple connector plate




1 Soldering base PCBC-A
2 Blanking plate MHAP1
3 Fitting

- - Note

The PCB is not included in the scope of delivery.

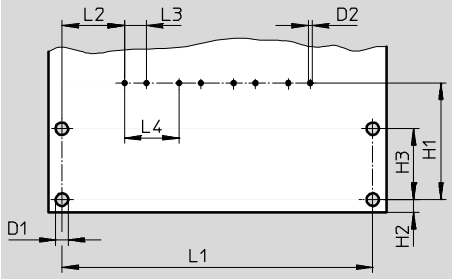
| Type | B1 | B2 | B3 | B4 | B5 | B6 | B7 | B8 | D1 | D2 | D3 | D4 | D5 | D6 | D7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| With pneumatic multiple connector plate | 56.5 | 19 | 2.4 | 4.8 | 13.2 | 8 | 16.9 | 4 | M5 | M3 | M2 | 6.1 | 3.3 | 5 | 2.9 |

| Type | H1 | H2 | H3 | H4 | H5 | H6 | H7 | H8 | H9 | H10 | H11 | H12 | L6 | L9 | L10 | L11 | L12 | T1 | T2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| With pneumatic multiple connector plate | 25.7 | 8.2 | 5.9 | 3.3 | 3.5 | 1.5 | 0.4 | 1 | 6.7 | 4 | 2 | 10.2 | 10 | 18.5 | 22.5 | 3.5 | 2 | 4.5 | 7.8 |

| Valve positions n | L1 ±0.15 | L2 ±0.1 | L3 | L4 ±0.2 | L5 ±0.15 | L7 ±0.1 | L8 |
|---|---|---|---|---|---|---|---|
| 4 | 62 | 38 | 30 | 75 | 46.7 | 71 | 68 |
| 6 | 82 | 58 | 50 | 95 | 66.7 | 91 | 88 |
| 8 | 102 | 78 | 70 | 115 | 86.7 | 111 | 108 |
| 10 | 122 | 98 | 90 | 135 | 106.7 | 131 | 128 |

**Dimensions – Manifold assembly on PCB** Download CAD data ➔ **www.festo.com**

Hole pattern on PCB




Note

The PCB is not included in the scope of delivery.

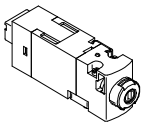
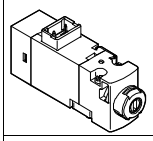
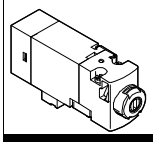
| Type | D1 | D2 | H1 | H2 | H3 | L2 | L3 | L4 |
|---|---|---|---|---|---|---|---|---|
| PCB | 2.3 | 0.7 | 21.4 | 2.4 | 13 | 11.5 | 4 | 10 |

| Valve positions n | L1<br>±0.1 |
|---|---|
| 2 | 37 |
| 4 | 57 |
| 6 | 77 |
| 8 | 97 |
| 10 | 117 |

# Solenoid valves MH1, sub-base valve with LED

Technical data

**Ordering data**

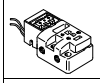
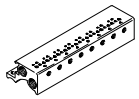
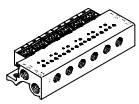
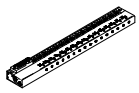
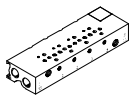
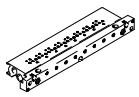
| | | Valve function | Normal position | | Part No. | Type |
|---|---|---|---|---|---|---|
| Solenoid valve | | | | | | |
|  | Plug connection at rear | 3/2-way solenoid valve | Closed | 24 V DC | **540443** | **MHA1-M1LH-3/2G-0,6-HC** |
| | | | Open | 24 V DC | **540440** | **MHA1-M1LH-3/2O-0,6-HC** |
|  | Plug connection on top | 3/2-way solenoid valve | Closed | 24 V DC | **540444** | **MHA1-M1LH-3/2G-0,6-TC** |
| | | | Open | 24 V DC | **540441** | **MHA1-M1LH-3/2O-0,6-TC** |
|  | Plug connection underneath | 3/2-way solenoid valve | Closed | 24 V DC | **540445** | **MHA1-M1LH-3/2G-0,6-PI** |
| | | | Open | 24 V DC | **540442** | **MHA1-M1LH-3/2O-0,6-PI** |

- - Note

Valves of the type 3/2G and 3/2O must not be mixed on a manifold rail.

# Solenoid valves MH1, sub-base valve with LED

Technical data

| Ordering data | | | | | |
|---|---|---|---|---|---|
| | | | | Part No. | Type |
| Individual sub-base | | | | | |
|  | For valves with plug connection at rear or on top | For 3/2-way solenoid valve | 1 valve position | **197183** | **MHA1-AS-3-M3** |
|  | For valves with plug connection underneath | For 3/2-way solenoid valve | 1 valve position | **197185** | **MHA1-AS-3-M3-PI** |
| | | | | | |
| Manifold rail, for valves with plug connection at rear or on top | | | | | |
|  | Without plug bases | For 3/2-way solenoid valve | 2 valves | **197202** | **MHA1-PR2-3-M3** |
| | | | 4 valves | **197203** | **MHA1-PR4-3-M3** |
| | | | 6 valves | **197204** | **MHA1-PR6-3-M3** |
| | | | 8 valves | **197205** | **MHA1-PR8-3-M3** |
| | | | 10 valves | **197206** | **MHA1-PR10-3-M3** |
| | | | | | |
| Manifold rail, for valves with plug connection underneath | | | | | |
|  | With plug bases | For 3/2-way solenoid valve | 2 valves | **197222** | **MHA1-PR2-3-M3-PI** |
| | | | 4 valves | **197223** | **MHA1-PR4-3-M3-PI** |
| | | | 6 valves | **197224** | **MHA1-PR6-3-M3-PI** |
| | | | 8 valves | **197225** | **MHA1-PR8-3-M3-PI** |
| | | | 10 valves | **197226** | **MHA1-PR10-3-M3-PI** |
|  | With plug bases and electrical multi-pin plug | For 3/2-way solenoid valve | 4 valves | **197238** | **MHA1-PR4-3-M3-PI-D9** |
| | | | 6 valves | **197239** | **MHA1-PR6-3-M3-PI-D9** |
| | | | 8 valves | **197240** | **MHA1-PR8-3-M3-PI-D9** |
| | | | 10 valves | **197241** | **MHA1-PR10-3-M3-PI-D25** |
|  | Without plug bases for PCB mounting | For 3/2-way solenoid valve | 2 valves | **197247** | **MHA1-PR2-3-M3-PI-PCB** |
| | | | 4 valves | **197248** | **MHA1-PR4-3-M3-PI-PCB** |
| | | | 6 valves | **197249** | **MHA1-PR6-3-M3-PI-PCB** |
| | | | 8 valves | **197250** | **MHA1-PR8-3-M3-PI-PCB** |
| | | | 10 valves | **197251** | **MHA1-PR10-3-M3-PI-PCB** |
|  | Without plug bases for PCB mounting, with pneumatic multiple connector plate | For 3/2-way solenoid valve | 4 valves | **197253** | **MHA1-PR4-3-PI-PCBM** |
| | | | 6 valves | **197254** | **MHA1-PR6-3-PI-PCBM** |
| | | | 8 valves | **197255** | **MHA1-PR8-3-PI-PCBM** |
| | | | 10 valves | **197256** | **MHA1-PR10-3-PI-PCBM** |

Note

Manifold rails with an uneven number of valves and for 11 ... 24 valves as well as further variants can be configured and ordered online using the MH1 modular product system.

Note

Valves of the type 3/2G and 3/2O must not be mixed on a manifold rail.

# Solenoid valves MH1, sub-base valve with LED

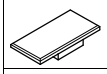
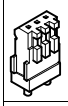
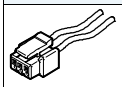
Technical data

**Ordering data**

| | | | | Part No. | Type | PU[1] |
|---|---|---|---|---|---|---|
| Blanking plate for manifold rail | | | | | | |
|  | For manifold rail for valves with plug connection at rear or on top | | | 197257 | MHAP1-BP-3 | 1 |
|  | For manifold rail with plug bases with valves with plug connection underneath | | | 197258 | MHAP1-BP-3-PI | 1 |
| Cover cap for manual override | | | | | | |
|  | Function covered<br>The cover cap protects the manual override against accidental actuation | | | 540898 | VMPA-HBV-B | 10 |
|  | Function non-detenting<br>The cover cap prevents latching of the manual override | | | 540897 | VMPA-HBT-B | 10 |
|  | Function detenting<br>The cover cap enables the manual override to be actuated and latched without tools | | | 8002234 | VAMC-L1-CD | 10 |
| Blanking plug | | | | | | |
|  | For M3 thread | | | 30979 | B-M3-S9 | 10 |
| | For M5 thread | | | 3843 | B-M5 | 10 |
| | For M7 thread | | | 174309 | B-M7 | 10 |
| Silencer | | | | | | |
|  | M3 connecting thread | | | 1231120 | AMTE-M-LH-M3 | 20 |
| | M5 connecting thread | Plastic design | | 165003 | UC-M5 | 1 |
| | | Metal design | | 1205858 | AMTE-M-LH-M5 | 20 |
| | M7 connecting thread | | | 161418 | UC-M7 | 1 |
| Push-in fittings | | | | | | |
|  | M3 connecting thread | With internal hex | For tubing O.D. 3 mm | 153312 | QSM-M3-3-I | 10 |
| | | | For tubing O.D. 4 mm | 153314 | QSM-M3-4-I | 10 |
| | | With external hex | For tubing O.D. 3 mm | 153301 | QSM-M3-3 | 10 |
| | | | For tubing O.D. 4 mm | 153303 | QSM-M3-4 | 10 |
| | M5 connecting thread | With internal hex | For tubing O.D. 3 mm | 153313 | QSM-M5-3-I | 10 |
| | | | For tubing O.D. 4 mm | 153315 | QSM-M5-4-I | 10 |
| | | | For tubing O.D. 6 mm | 153317 | QSM-M5-6-I | 10 |
| | | With external hex | For tubing O.D. 3 mm | 153302 | QSM-M5-3 | 10 |
| | | | For tubing O.D. 4 mm | 153304 | QSM-M5-4 | 10 |
| | | | For tubing O.D. 6 mm | 153306 | QSM-M5-6 | 10 |
| | M7 connecting thread | With internal hex | For tubing O.D. 4 mm | 153319 | QSM-M7-4-I | 10 |
| | | | For tubing O.D. 6 mm | 153321 | QSM-M7-6-I | 10 |

1) Packaging unit.

**Ordering data**

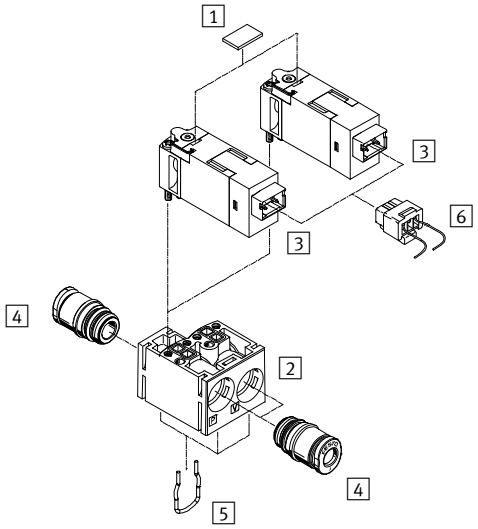
| | | | | Part No. | Type | PU[1] |
|---|---|---|---|---|---|---|
| Inscription label | | | | | | |
|  | For identifying the valve positions | | | **197259** | **MH-BZ-80X** | **80** |
| Soldering base | | | | | | |
|  | For plug-in connection, 3-pin | | | **197261** | **PCBC-A-10** | **10** |
| | | | | **197262** | **PCBC-A-100** | **100** |
| Electrical plug-in base | | | | | | |
|  | For manifold rail, for valves with plug connection underneath | 2x flying leads<br>Open end<br>1-wire | 0.5 m | **197260** | **MHAP-PI** | **1** |
| | | | 1 m | **532182** | **MHAP-PI-1** | **1** |
| Plug socket with cable | | | | | | |
|  | Straight socket<br>Connection pattern H<br>3-pin | 2x flying leads<br>Open end<br>1-wire | 0.5 m | **566654** | **NEBV-H1G2-KN-0.5-N-LE2** | **1** |
| | | | 1 m | **566655** | **NEBV-H1G2-KN-1-N-LE2** | **1** |
| | | | 2.5 m | **566656** | **NEBV-H1G2-KN-2.5-N-LE2** | **1** |
| | | | 5 m | **566657** | **NEBV-H1G2-KN-5-N-LE2** | **1** |

1) Packaging unit.

# Solenoid valves MH1, 2x2/2-way sub-base valve with LED

Peripherals overview

**2x2/2-way sub-base valve with LED**




| Designation | Brief description | ➔ Page/Internet |
|---|---|---|
| 1 Inscription label | For identifying the valve positions | 62 |
| 2 Sub-base | Included in the scope of delivery | – |
| 3 Solenoid valve | 2/2-way valve, normally closed | 62 |
| 4 Push-in cartridge | Included in the scope of delivery | 62 |
| 5 Clip | Included in the scope of delivery | – |
| 6 Plug socket with cable | Straight socket, connection pattern H, 3-pin | 62 |

# Solenoid valves MH1, 2x2/2-way sub-base valve with LED

Type codes

| MH | A | 1 | – | 2X2/2 | – | G | – | 1,5 | – | 333 |
|---|---|---|---|---|---|---|---|---|---|---|

| Valve series | |
|---|---|
| MH | Miniature and fast-switching valves |

| Design | |
|---|---|
| A | Sub-base valve |

| Size | |
|---|---|
| 1 | Flow rate 10 … 14 l/min |

| Valve function | |
|---|---|
| 2X2/2 | 2x2/2-way valve on sub-base |

| Normal position | |
|---|---|
| G | Closed |

| Nominal width | |
|---|---|
| 1,5 | 1.5 mm |

| Electrical connection | |
|---|---|
| – | With connection for 10 mm cartridge |
| 333 | With push-in connector for tubing O.D. 3 mm |
| 444 | With push-in connector for tubing O.D. 4 mm |
| 443 | With push-in connector for tubing O.D. 4 mm, port 2 with push-in connector for tubing O.D. 3 mm |

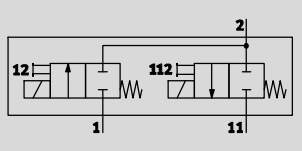
Note

Further variants and accessories can be configured and ordered online using the modular product system.

# Solenoid valves MH1, 2x2/2-way sub-base valve with LED

Technical data

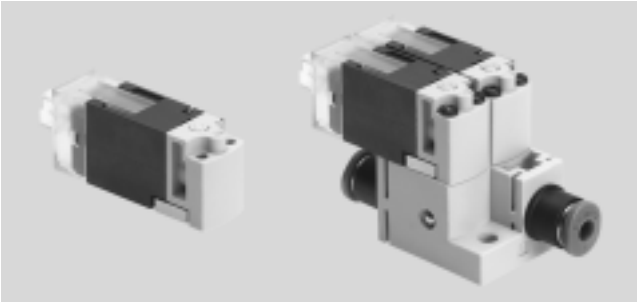
Function




Voltage
24 V DC

Pressure
–0.95 ... +1.5 bar

Temperature range
–5 ... +50 °C



| General technical data | | | | |
|---|---|---|---|---|
| Valve function | | | 2/2-way, single solenoid | 2x2/2-way, single solenoid |
| Design | | | Poppet valve with spring return | |
| Sealing principle | | | Soft | |
| Actuation type | | | Electric | |
| Reset method | | | Mechanical spring | |
| Type of control | | | Direct | |
| Direction of flow | | | Non-reversible | |
| Suitability for vacuum | | | Yes | |
| Exhaust function | | | No flow control | |
| Manual override | | | Non-detenting | |
| Signal status display | | | LED | |
| Type of mounting | | | On sub-base via through-hole | Via through-hole |
| Mounting position | | | Any | |
| Nominal size | | [mm] | 1.5 | |
| Standard nominal flow rate | | [l/min] | 30 | |
| Width | | [mm] | 10 | 20 |
| Grid dimension | | [mm] | 10 | 20 |
| Pneumatic connection | | 1 | – | QS3, QS4 |
| | | 11 | – | QS3, QS4 |
| | | 2 | – | QS3, QS4 |

| Operating and environmental conditions | | | |
|---|---|---|---|
| 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 | Port 1 | [bar] | 0 ... 1.5 |
| | Port 11 | [bar] | – 0.95 ... 0 |
| Ambient temperature | | [°C] | –5 ... +50 |
| Temperature of medium | | [°C] | –5 ... +50 |
| Storage temperature | | [°C] | –20 ... +60 |
| Corrosion resistance class CRC[1)] | | | 2 |
| CE marking (see declaration of conformity) | | | In accordance with EU EMC Directive[2)] |

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

# Solenoid valves MH1, 2x2/2-way sub-base valve with LED

Technical data

| Safety data | |
|---|---|
| Resistance to shocks | Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27 |
| Vibration resistance | Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6 |

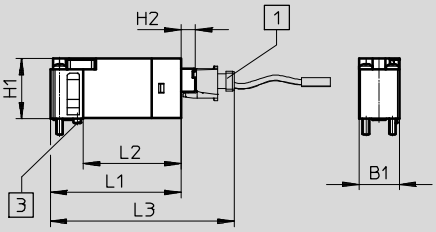
| Electrical data | | |
|---|---|---|
| Operating voltage | [V DC] | 24 ±10% |
| Connection type | | Plug connection |
| Power consumption | [W] | 3, following current reduction 0.7 |
| Duty cycle | [%] | 100 |
| Max. connecting cable length | [m] | 30 |
| | | |
| Degree of protection to EN 60529 | | |
| With plug socket NEBV-H1G2 | | IP40 |

| Switching times and frequencies | | | |
|---|---|---|---|
| Switching time | On | [ms] | 6 |
| | Off | [ms] | 6 |
| Maximum switching frequency | | [Hz] | 10 |

| Materials | |
|---|---|
| Housing | Reinforced PA, reinforced PPS |
| Screws | Steel |
| Seals | FPM, HNBR, NBR |
| Note on materials | RoHS-compliant |
| | Free of copper and PTFE |

**Dimensions** Download CAD data ➔ **www.festo.com**

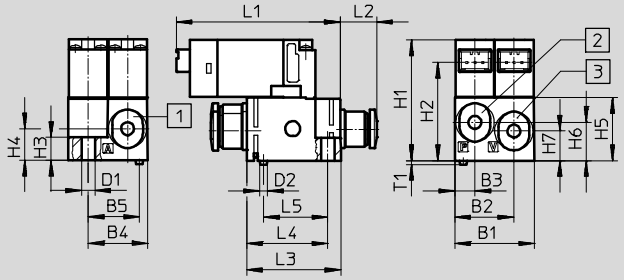
2/2-way valve




1 Plug socket NEBV-H1G2

3 Coding pin

2x2/2-way valve




1 Push-in connector 2

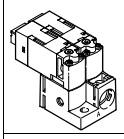
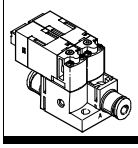
2 Push-in connector 1

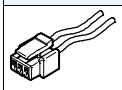
3 Push-in connector 11

| Type | B1 | B2 | B3 | B4 | B5 | D1 | D2 | H1 | H2 | H3 | H4 | H5 | H6 | H7 | L1 | L2 | L3 | L4 | L5 | T1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/2-way valve | 9.8 | – | – | – | – | – | – | 14.7 | 3.6 | – | – | – | – | – | 31.8 | 23.7 | 44.8 | – | – | – |
| 2x2/2-way valve | 20 | 14.9 | 5 | 15 | 13 | 3.4 | 2 | 30.7 | 26 | 5.9 | 8 | 16 | 9.7 | 7.5 | 41.8 | 9.2 | 23.8 | 20.6 | 16.3 | 1 |

# Solenoid valves MH1, 2x2/2-way sub-base valve with LED

Technical data

| Ordering data | | | | | |
|---|---|---|---|---|---|
| | | Weight [g] | Pneumatic connection | Part No. | Type |
| 2/2-way solenoid valve | | | | | |
|  | Plug connection at rear | 10 | Via sub-base | **557864** | **MHA1-M1LCH-2/2G-1.5-HC** |
| | | | | | |
| 2x2/2-way solenoid valve on sub-base | | | | | |
|  | Plug connection at rear | 26.3 | Connection for 10 mm cartridge | **563365** | **MHA1-2X2/2G-1,5** |
|  | Plug connection at rear | 30.6 | Push-in connector for tubing O.D. 3 mm | **562051** | **MHA1-2X2/2G-1,5-3-3-3** |
| | | 30.6 | Push-in connector for tubing O.D. 4 mm | **566175** | **MHA1-2X2/2G-1,5-4-4-4** |
| | | 30.6 | Push-in connector for tubing O.D. 4 mm, port 2 with push-in connector for tubing O.D. 3 mm | **560372** | **MHA1-2X2/2G-1,5-4-4-3** |

| Ordering data | | | | | | |
|---|---|---|---|---|---|---|
| | | | | Part No. | Type | PU[1] |
| Push-in fittings | | | | | | |
|  | 10 mm cartridge | Plastic | For tubing O.D. 3 mm | **132621** | **QSPKG10-3** | **10** |
| | | | For tubing O.D. 4 mm | **132622** | **QSPKG10-4** | **10** |
| | | | For tubing O.D. 6 mm | **132623** | **QSPKG10-6** | **10** |
| | | | | | | |
| Inscription label | | | | | | |
|  | For identifying the valve positions | | | **197259** | **MH-BZ-80X** | **80** |
| | | | | | | |
| Plug socket with cable | | | | | | |
|  | Straight socket Connection pattern H 3-pin | 2x flying leads Open end 1-wire | 0.5 m | **566654** | **NEBV-H1G2-KN-0.5-N-LE2** | **1** |
| | | | 1 m | **566655** | **NEBV-H1G2-KN-1-N-LE2** | **1** |
| | | | 2.5 m | **566656** | **NEBV-H1G2-KN-2.5-N-LE2** | **1** |
| | | | 5 m | **566657** | **NEBV-H1G2-KN-5-N-LE2** | **1** |

1) Packaging unit.