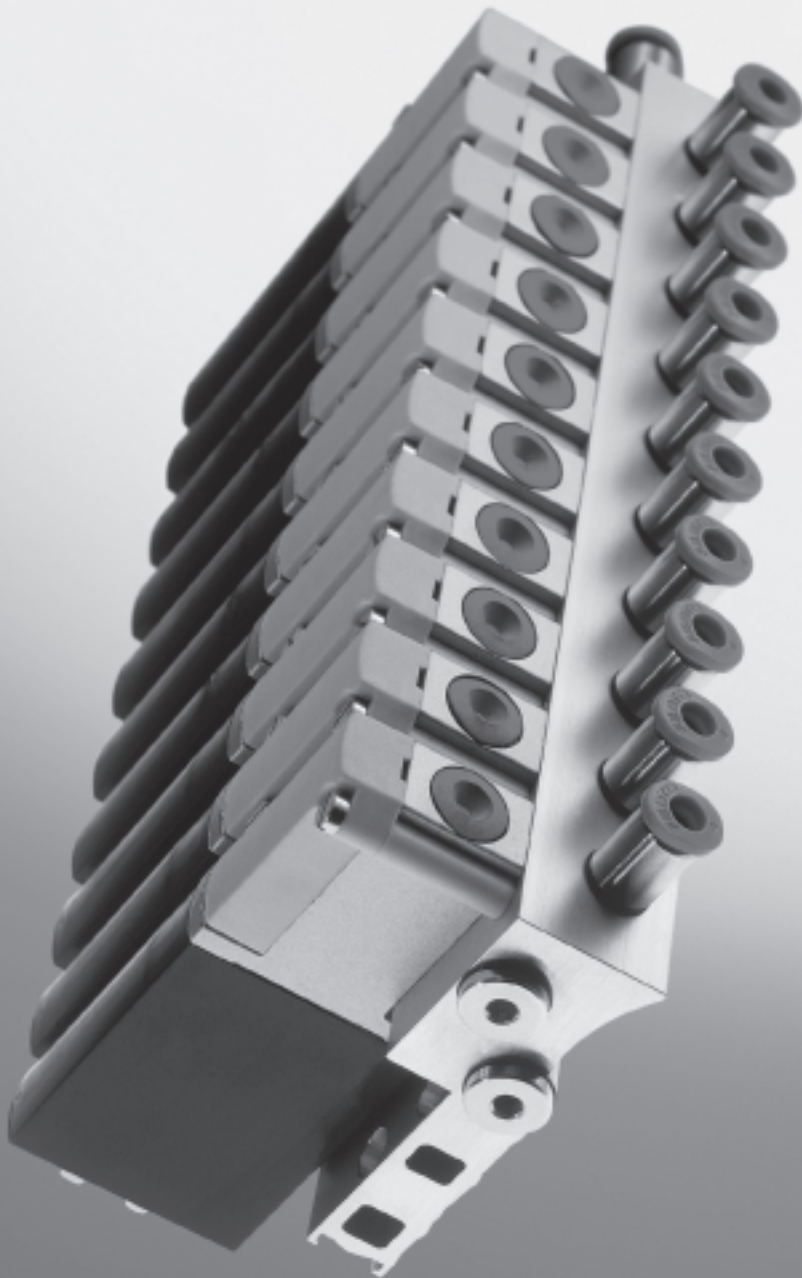


Solenoid valves MH2/MH3/MH4, fast-switching valves

FESTO

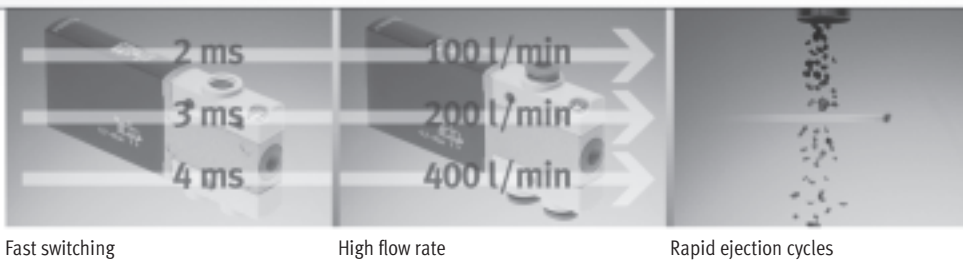


- Directly actuated valves
- Rapid response times down to 2 ms
- Standard nominal flow rate 100 ... 400 l/min
- Compact design
- Flexible construction of valve manifolds
- Free of copper and PTFE

Fast-switching valves from Festo: More than just fast switching

The fast-switching professionals with response times down to 2 milliseconds

Speed, dynamic response and precision are in demand more than ever in modern automation. The solution lies in pneumatic components, that offer shorter cycle times in return for comparatively low investment costs for the components. Maximum process reliability, robustness and service life are guaranteed.



High speed in production

Fast-switching valves are a true technological gem when it comes to high-speed applications. With response times ≤ 2 ms and a repetition accuracy ≤ 0.2 ms, they represent the pinnacle of what is technologically achievable – even in 24-hour continuous operation with over 500 million cycles.

Fast-switching valves are easily retrofitted into existing systems or can be used as a pacesetter for newly designed systems. They have a compact design that provides high component density. Indispensable for sorting parts by means of air ejector, in flap control systems, for gluing, dosing, packaging and, of course, suitable for vacuum applications as well.

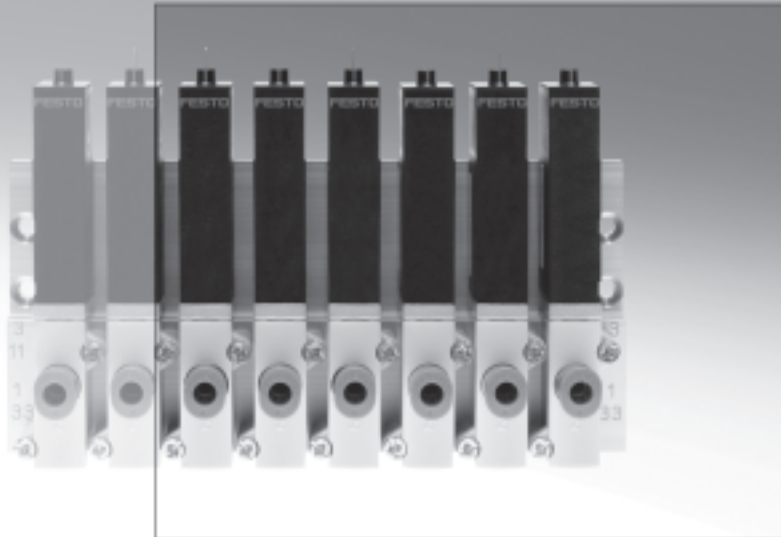
Faster switching

The extremely short response times facilitate short cycle times. Extremely precise switching makes it possible to control process sequences accurately.

High output and very good machine utilisation are also guaranteed. Good repetition accuracy of response times ensures consistent processes, improves process and part quality and reduces rejects and rework.

Faster installation

Thanks to the various connection options such as threads or integrated QS push-in connectors and the different mounting options for individual valves or the valve manifold, the installation can be optimised to suit local conditions and space requirements can be reduced to a minimum. Fast-switching valves can be used directly in the application without additional protective measures. As a result, very short pneumatic lines guarantee short signal paths and fast response times.



- Variants with and without fast-switching electronics as 3/2-way and 5/2-way valves
- Shortest possible response times with maximum repetition accuracy and outstanding service life
- Directly actuated poppet valve with IP65 protection

Advantages for design

- Very high cycle rates
- Extremely short cycle times
- Maximum repetition accuracy
- Vacuum-compatible thanks to directly actuated poppet valve
- Flexible design principle
- Direct actuation via standard PLC possible
- Direct mounting in the application with IP65 protection

Advantages for purchasing

- Everything from a single source
- Low ordering costs
- No additional mounting components
- No costs for additional power outputs
- Use of standard PLCs
- Increased system productivity

Advantages for installation

- Easy installation
- Direct pneumatic connection via integrated QS connections
- Reduced assembly costs with pre-assembled cables
- No additional protection required thanks to IP65



Fast and precise – sturdy and economical

High performance, process stability and extremely simple handling

MH fast-switching valves increase cycle rates and improve process and part quality with their excellent repetition accuracy.



Precise switching with high power ...

... for fast and precision-pulsed operation

Built-in fast-switching electronics

- All 3/2- and 5/2-way valves are available with built-in fast-switching electronics.
- This enables constant dynamic response independent of temperature or supply voltage fluctuations.
- With Festo plug & work®, installation is simple, and no additional electronics or pneumatics know-how is necessary.

Optimised equipment and processes

- On-site assembly thanks to IP65 – insensitive to dust and humidity.
- Direct actuation with 24 V DC/1 A – use of PLC standard outputs.
- With an extremely long service life of 500 million cycles, three-layer continuous operation and being maintenance-free, you get optimum efficiency.

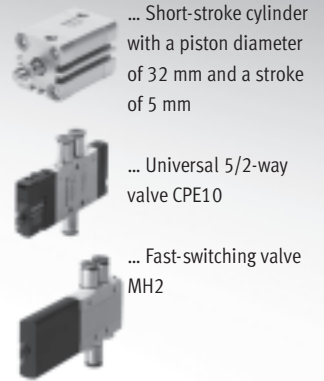
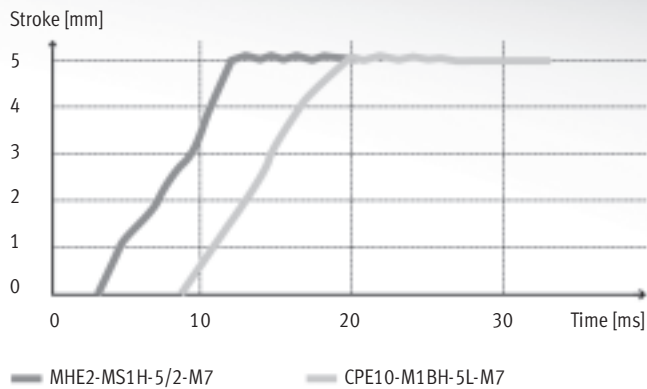
Key features

- Repetition accuracy ≤ 0.2 ms for exact dispensing/bonding, for example.
- Switching time ≤ 2 ms makes for short cycle times and very quick response characteristics.
- 10 mm width enables compact assembly.
- Variably connectable as an individual valve, a semi in-line or manifold mounted variant, facilitating customised installation.
- IP65 protection enables direct mounting during use without requiring additional protective measures.
- Easy installation via direct actuation from the standard PLC with 24 V DC/1 A.

Fast valves and an optimised control loop system – two guarantees for success

To generate speed in pneumatics, the combination of valve and cylinder must be perfectly harmonised. With the right combination, efficiency can be improved by 30%. Cylinders with small diameters and short strokes need fast valves.

Short-stroke cylinder ADN-32-5 – 30% faster with a fast-switching valve



| Valve type | | CPE10 | MH2-5/2 |
|---------------------|---------|-------|------------|
| Flow rate | [l/min] | 350 | 100 |
| Valve response time | [ms] | 16 | 1.7 |
| Cycle time | [ms] | 20 | 14 |
| | [%] | 100 | 70 |
| Result | | | 30% faster |

Small and fast – a good combination

With a small cylinder volume, particularly in the case of short-stroke cylinders, the response time is crucial. In the example shown here, the combination with a fast-switching valve is 30% faster. In concrete terms, this means that the cylinder actuated using the fast-switching valve is already in the end position before movement of the cylinder in combination with the universal valve even begins.

The result is a significant increase in system efficiency and economy – with a comparable space requirement and weight for both valves, low air consumption and a ten-fold increase in the service life of the fast-switching valve.

Length means losses – Focus on tubing

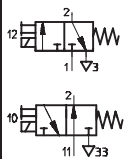
Short tubing is a key factor when it comes to pneumatic efficiency. Reducing the tubing length from 1 m to 0.5 m, for example, improves the max. possible flow rate by 20%. A tube length greater than 2 m results in losses of up to 50%. Use of the next largest tube is recommended in this case.

Small and local – The clever alternative

Short tubes with a small diameter are ideal for installation of valves close to the cylinder. The small and light fast-switching valves are suitable for direct mounting in the application – thanks also to their IP65 protection. The use of smaller and lighter fittings also reduces the weight – and improves the efficiency of moving systems in particular.

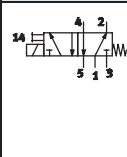
Solenoid valves MH2, fast-switching valves

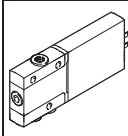
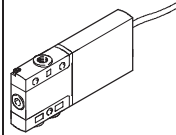
Product range overview

| Function | Circuit symbol | Design | Response time [ms] | | Operating voltage [V DC] | Free of copper and PTFE | → Page/Internet |
|-----------------------------|---|--------------------|--------------------|---|--------------------------|-------------------------|-----------------|
| | | | 2 | 7 | | | |
| 3/2-way valve ²⁾ | Standard nominal flow rate 100 l/min | | | | | | |
| |  | Individual valve | ■ ¹⁾ | ■ | 24 | ■ | 10 |
| | | Semi in-line valve | ■ ¹⁾ | ■ | 24 | ■ | 20 |
| | | Sub-base valve | ■ ¹⁾ | ■ | 24 | ■ | 32 |

1) Response time of 2 ms only with voltage of 24 V DC and plug vanes or moulded-in cable

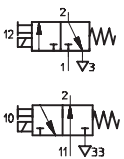
2) Can be used as a 2/2 way valve by sealing connection 3 or 33

| Function | Circuit symbol | Design | Response time [ms] | | Operating voltage [V DC] | Free of copper and PTFE | → Page/Internet |
|---------------|---|--------------------|--------------------|-----|--------------------------|-------------------------|-----------------|
| | | | Off | On | | | |
| 5/2-way valve | Standard nominal flow rate 100 l/min | | | | | | |
| |  | Individual valve | 1.7 | 1.9 | 24 | ■ | 15 |
| | | Semi in-line valve | 1.7 | 1.9 | 24 | ■ | 26 |
| | | Sub-base valve | 1.7 | 1.9 | 24 | ■ | 38 |

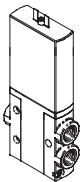
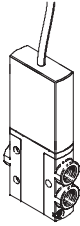
| Mounting options | | | | | | | |
|---|---------------------|---------|--------------------|---------|----------------|---------|---|
| Design | Individual valve | | Semi in-line valve | | Sub-base valve | | |
| Valve function | 3/2-way | 5/2-way | 3/2-way | 5/2-way | 3/2-way | 5/2-way | |
| Plug vanes | | | | | | | |
|  | Direct mounting | ■ | ■ | - | - | - | - |
| | Individual sub-base | - | - | ■ | ■ | ■ | ■ |
| | Manifold mounting | - | - | ■ | ■ | ■ | ■ |
| Moulded-in cable | | | | | | | |
|  | Direct mounting | ■ | ■ | - | - | - | - |
| | Individual sub-base | - | - | - | - | ■ | ■ |
| | Manifold mounting | - | - | - | - | ■ | ■ |

Solenoid valves MH3, fast-switching valves

Product range overview

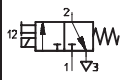
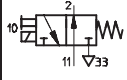
| Function | Circuit symbol | Design | Response time [ms] | | Operating voltage [V DC] | Free of copper and PTFE | → Page/Internet |
|-----------------------------|---|--------------------|--------------------|---|--------------------------|-------------------------|-----------------|
| | | | 3 | 8 | | | |
| 3/2-way valve ¹⁾ | Standard nominal flow rate 200 l/min | | | | | | |
| |  | Individual valve | ■ | ■ | 24 | ■ | 46 |
| | | Semi in-line valve | ■ | ■ | 24 | ■ | 51 |
| | | Sub-base valve | ■ | ■ | 24 | ■ | 58 |

1) Can be used as a 2/2 way valve by sealing connection 3 or 33

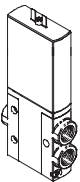
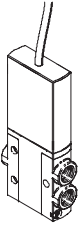
| Mounting options | | | | |
|---|---------------------|--------------------|----------------|---|
| Design | Individual valve | Semi in-line valve | Sub-base valve | |
| Plug vanes | | | | |
|  | Direct mounting | ■ | - | - |
| | Individual sub-base | - | ■ | ■ |
| | Manifold mounting | - | ■ | ■ |
| Moulded-in cable | | | | |
|  | Direct mounting | ■ | - | - |
| | Individual sub-base | - | ■ | ■ |
| | Manifold mounting | - | ■ | ■ |

Solenoid valves MH4, fast-switching valves

Product range overview

| Function | Circuit symbol | Design | Response time [ms] | | Operating voltage [V DC] | Free of copper and PTFE | → Page/Internet |
|-----------------------------|---|--------------------|--------------------|---|--------------------------|-------------------------|-----------------|
| | | | 3.5 | 9 | | | |
| 3/2-way valve ¹⁾ | Standard nominal flow rate 400 l/min | | | | | | |
| |  | Individual valve | ■ | ■ | 24 | ■ | 2 / 3.2-67 |
| | | Semi in-line valve | ■ | ■ | 24 | ■ | 71 |
| |  | Sub-base valve | ■ | ■ | 24 | ■ | 78 |

1) Can be used as a 2/2 way valve by sealing connection 3 or 33

| Mounting options | | | | |
|---|---------------------|------------------|--------------------|----------------|
| Design | | Individual valve | Semi in-line valve | Sub-base valve |
| Plug vanes | | | | |
|  | Direct mounting | ■ | - | - |
| | Individual sub-base | - | ■ | ■ |
| | Manifold mounting | - | ■ | ■ |
| Moulded-in cable | | | | |
|  | Direct mounting | ■ | - | - |
| | Individual sub-base | - | ■ | ■ |
| | Manifold mounting | - | ■ | ■ |

Solenoid valves MH2, fast-switching valves

Type codes

FESTO

| | | MH | P | 2 | - | M | S | 5 | H | - | 3/2 | - | O | - | M5 | - | TC | |
|------------------------------|---|----|---|---|---|---|---|---|---|---|-----|---|---|---|----|---|----|--|
| Valve family | | | | | | | | | | | | | | | | | | |
| MH | Fast-switching valves | | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | | |
| E | Individual valve | | | | | | | | | | | | | | | | | |
| P | Semi in-line valve | | | | | | | | | | | | | | | | | |
| A | Sub-base valve | | | | | | | | | | | | | | | | | |
| Size | | | | | | | | | | | | | | | | | | |
| 2 | Flow rate 90 to 100 l/min | | | | | | | | | | | | | | | | | |
| Drive function | | | | | | | | | | | | | | | | | | |
| M | Solenoid, switching | | | | | | | | | | | | | | | | | |
| Response time | | | | | | | | | | | | | | | | | | |
| - | 7 ms | | | | | | | | | | | | | | | | | |
| S | 2 ms | | | | | | | | | | | | | | | | | |
| Operating voltage | | | | | | | | | | | | | | | | | | |
| 1 | 24 V DC | | | | | | | | | | | | | | | | | |
| Manual override | | | | | | | | | | | | | | | | | | |
| H | Non-detenting | | | | | | | | | | | | | | | | | |
| Valve function | | | | | | | | | | | | | | | | | | |
| 3/2 | 3/2-way valve | | | | | | | | | | | | | | | | | |
| 5/2 | 5/2-way valve | | | | | | | | | | | | | | | | | |
| Normal position | | | | | | | | | | | | | | | | | | |
| G | Closed | | | | | | | | | | | | | | | | | |
| O | Open | | | | | | | | | | | | | | | | | |
| Pneumatic connection | | | | | | | | | | | | | | | | | | |
| 2 | Nominal size 2 mm | | | | | | | | | | | | | | | | | |
| M5 | Thread M5 | | | | | | | | | | | | | | | | | |
| M7 | Thread M7 | | | | | | | | | | | | | | | | | |
| QS4 | Push-in connector for 4 mm O.D. tubing | | | | | | | | | | | | | | | | | |
| Electrical connection | | | | | | | | | | | | | | | | | | |
| - | Plug vanes for plug socket KMYZ... | | | | | | | | | | | | | | | | | |
| K | Moulded-in cable, 2.5 m long | | | | | | | | | | | | | | | | | |

Application-optimised directional control valves
Fast-switching valves

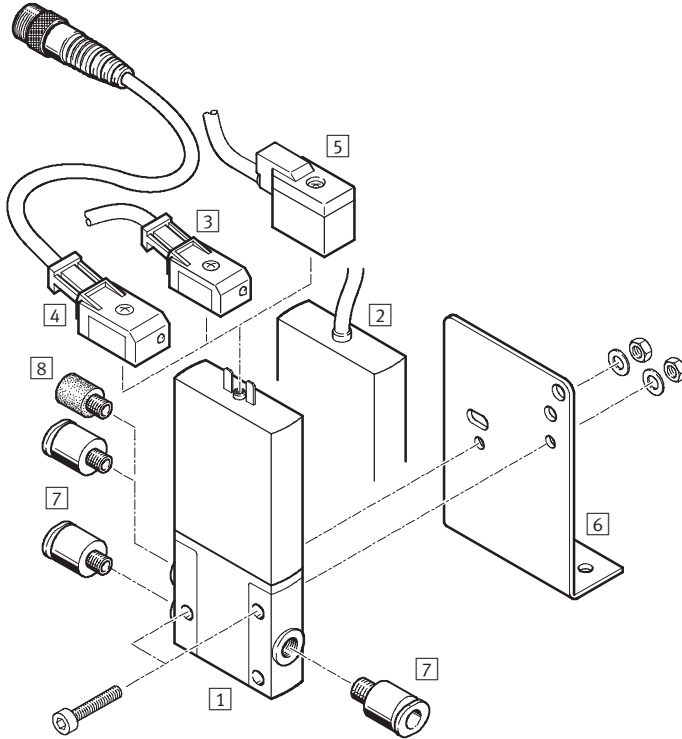
3.2

Solenoid valves MHE2, fast-switching valves

Peripherals overview – Individual valve, 3/2-way valve

FESTO

Connection with plug vanes – Connection with moulded-in cable



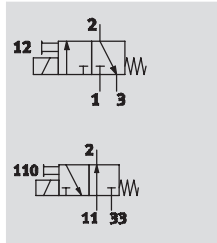
| Valves and accessories | | |
|------------------------|--------------------------------------|---|
| | Brief description | → Page/Internet |
| 1 | Individual valve MHE2-... | With plug vanes 2 / 3.2-11 |
| 2 | Individual valve MHE2-...-K | With moulded-in cable 2 / 3.2-11 |
| 3 | Plug socket with cable KMYZ-3 (IP65) | With LED and PUR cable 44 |
| 4 | Plug socket with cable KMYZ-3 (IP65) | With LED, PUR cable and M8 plug 44 |
| 5 | Plug socket with cable KMYZ-4 (IP40) | With PVC cable 44 |
| 6 | Mounting bracket MHE2-BG-L | – 2 / 3.2-13 |
| 7 | Push-in fittings QS | For connecting compressed air tubing with standard O.D. quicks tar |
| 8 | Silencer UC | For fitting in exhaust ports uc |

Solenoid valves MHE2, fast-switching valves



Technical data – Individual valve, 3/2-way valve

Function



Voltage
24 V DC



Pressure
-0.9 ... +8 bar



Temperature range
-5 ... +60 °C



| General technical data | | |
|----------------------------|---------|--|
| Valve function | | 3/2 way, single solenoid ¹⁾ |
| Design | | Pressure-relieved poppet valve |
| Sealing principle | | Soft |
| Control type | | Electric |
| Actuation type | | Direct |
| Direction of flow | | Reversible with restrictions ²⁾ |
| Exhaust function | | With flow control |
| Manual override | | Non-detenting |
| Assembly position | | Any |
| Grid dimension | [mm] | 14 (minimum clearance 4 mm) |
| Nominal diameter | [mm] | 2 |
| Standard nominal flow rate | [l/min] | 100 |
| Type of mounting | | Via through-holes |
| Pneumatic connection | | Connecting thread M7 |
| | | Push-in fitting for tubing O.D. 4 mm |
| Product weight | [g] | 60 |

1) Can be used as a 2/2 way valve by sealing connection 3 or 33

2) There may be slight leakage in the pressure range -0.5 to +0.5 bar

| Operating and environmental conditions | | |
|--|-------|--|
| Operating medium | | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm |
| | | Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] | -0.9 ... +8 |
| Operating pressure, reversible | [bar] | -0.9 ... 0 |
| Ambient temperature | [°C] | -5 ... +60 (100% duty cycle) |
| Temperature of medium | [°C] | -5 ... +60 (100% duty cycle) |
| Corrosion resistance class CRC | | 2 ¹⁾ |
| Certification | | c UL us - Recognized (OL) |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Solenoid valves MHE2, fast-switching valves

Technical data – Individual valve, 3/2-way valve



Application-optimised directional control valves
Fast-switching valves

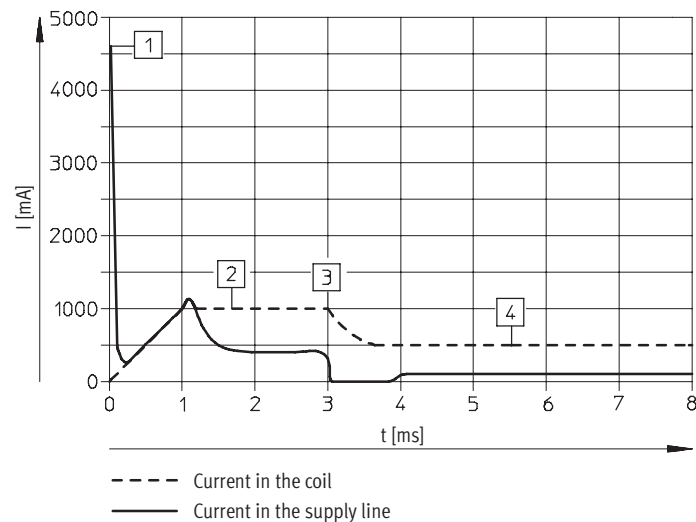
3.2

| Electrical data | | |
|--|--------|--|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes or moulded-in cable |
| Power consumption | | |
| With fast-switching electronics | [W] | 5 for 3 ms approx. (pull 1 A), then 1.25 W |
| Without fast-switching electronics | [W] | 2.88 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMYZ-3 | | IP65 |
| With plug socket with cable KMYZ-3 and plug M8 | | IP65 |
| With plug socket with cable KMYZ-4 | | IP40 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| With fast-switching electronics | | |
| Switching time on/off | [ms] | 1.7/2 +10% ... -30% |
| Maximum switching frequency | [Hz] | 330 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |
| Without fast-switching electronics | | |
| Switching time on/off | [ms] | 7/3.5 |
| Maximum switching frequency | [Hz] | 130 |

1) The ambient temperature must be limited as from 125 Hz.

Current path for valves with fast-switching electronics



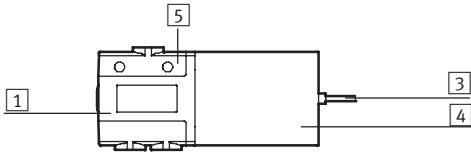
- 1) Capacitor charging
- 2) Controlled coil current 1 A
- 3) Drop to holding current
- 4) Controlled holding current 0.5 A

Solenoid valves MHE2, fast-switching valves

Technical data – Individual valve, 3/2-way valve



Materials



| | | |
|-------------------|------------------|--|
| 1 | Body | Die-cast zinc, coated |
| 3 | Cable sheath | Polyurethane |
| 4 | Coil housing | Polyamide |
| 5 | Connection piece | Polyamide |
| - | Seals | Nitrile rubber/ hydrogenated nitrile rubber |
| Note on materials | | Free of copper and PTFE |

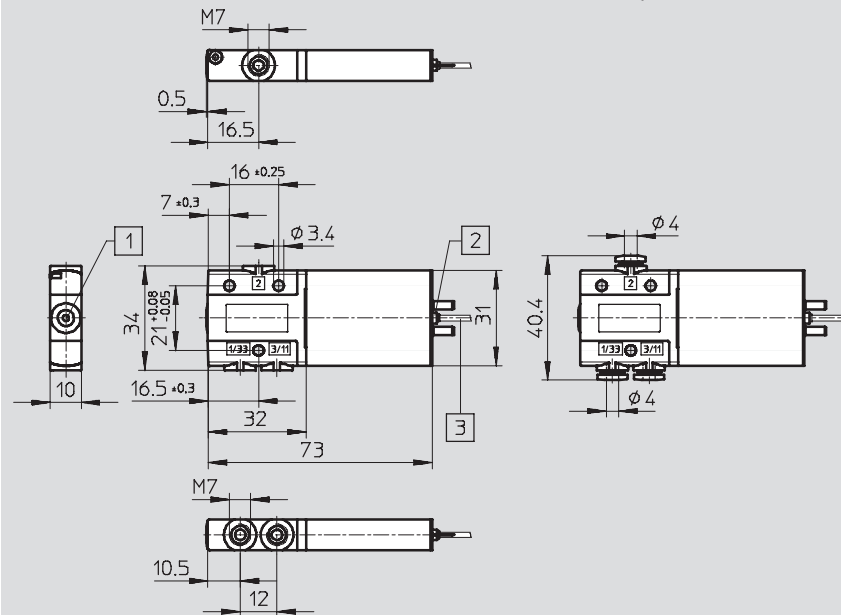
Dimensions

Download CAD data → www.festo.com/en/engineering

Valve with plug vanes or moulded-in cable

MHE2-...-M7

MHE2-...-QS4

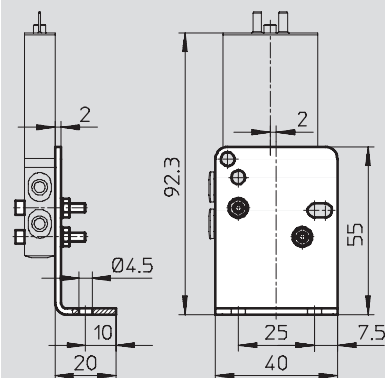


1 Manual override, non-detenting

2 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4

3 Cable 2.5 m

Mounting bracket MHE2-BG-L



Solenoid valves MHE2, fast-switching valves



Technical data – Individual valve, 3/2-way valve

Application-optimised directional control valves
Fast-switching valves

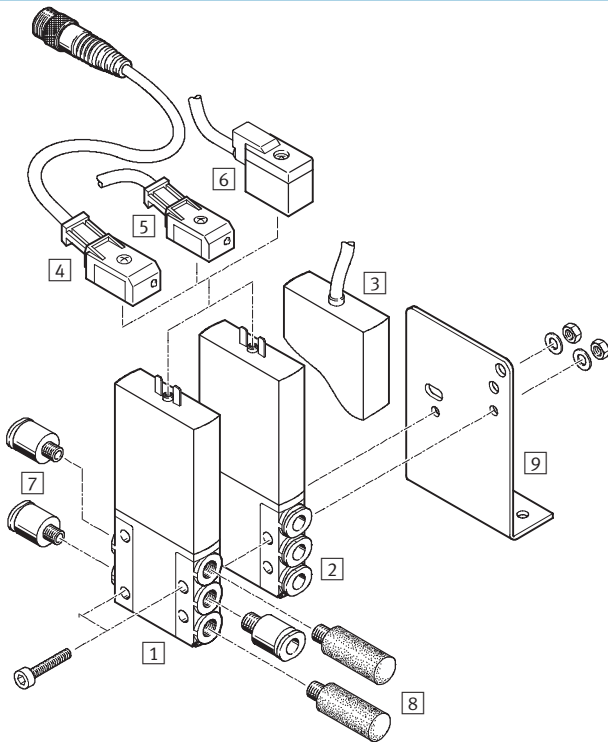
3.2

| Ordering data – Valves | | | | | |
|---|-------------------|-----------------|----------------------|---------------|----------------------|
| Electrical connection | Operating voltage | Normally closed | | Normally open | |
| | | Part No. | Type | Part No. | Type |
| Response time 2 ms | | | | | |
| Connecting thread M7 | | | | | |
| Plug vanes | 24 V DC | 196 131 | MHE2-MS1H-3/2G-M7 | 196 151 | MHE2-MS1H-3/2O-M7 |
| Cable | | 196 133 | MHE2-MS1H-3/2G-M7-K | 196 153 | MHE2-MS1H-3/2O-M7-K |
| Push-in connector QS 4 | | | | | |
| Plug vanes | 24 V DC | 196 135 | MHE2-MS1H-3/2G-QS4 | 196 155 | MHE2-MS1H-3/2O-QS4 |
| Cable | | 196 137 | MHE2-MS1H-3/2G-QS4-K | 196 157 | MHE2-MS1H-3/2O-QS4-K |
| Response time 7 ms | | | | | |
| Connecting thread M7 | | | | | |
| Plug vanes | 24 V DC | 196 130 | MHE2-M1H-3/2G-M7 | 196 150 | MHE2-M1H-3/2O-M7 |
| Cable | | 196 132 | MHE2-M1H-3/2G-M7-K | 196 152 | MHE2-M1H-3/2O-M7-K |
| Push-in connector QS 4 | | | | | |
| Plug vanes | 24 V DC | 196 134 | MHE2-M1H-3/2G-QS4 | 196 154 | MHE2-M1H-3/2O-QS4 |
| Cable | | 196 136 | MHE2-M1H-3/2G-QS4-K | 196 156 | MHE2-M1H-3/2O-QS4-K |
| Ordering data – Product-specific accessories | | | | | |
| Designation | Part No. | Type | | | |
| Mounting bracket | 196 165 | MHE2-BG-L | | | |

Solenoid valves MHE2, fast-switching valves

Peripherals overview – Individual valve, 5/2-way valve

Connection with plug vanes – Connection with moulded-in cable

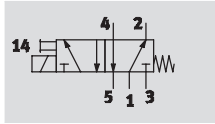


| Valves and accessories | | Brief description | → Page/Internet |
|------------------------|---|---|-----------------|
| 1 | Individual valve MHE2-...QS-4 | With plug vanes and connection QS-4 | 2 / 3.2-16 |
| 2 | Individual valve MHE2-...-M7 | With plug vanes and connection M7 | 2 / 3.2-16 |
| 3 | Individual valve MHE2-...-K | With moulded-in cable | 2 / 3.2-16 |
| 4 | Plug socket with cable KMYZ-3 (IP65) | With LED, PUR cable and M8 plug | 44 |
| 5 | Plug socket with cable KMYZ-3 (IP65) | With LED and PUR cable | 44 |
| 6 | Plug socket with cable KMYZ-4 (IP40) | With PVC cable | 44 |
| 7 | Push-in fittings QS | For connecting compressed air tubing with standard external diameters | quicks tar |
| 8 | Silencer UC | For fitting in exhaust ports | uc |
| 9 | Mounting bracket MHE2-BG-L | – | 2 / 3.2-18 |


Solenoid valves MHE2, fast-switching valves

Technical data – Individual valve, 5/2-way valve

Function



 - Voltage
24 V DC

 - Pressure
-0.9 ... +8 bar

 - Temperature range
-5 ... +60 °C



General technical data

| | | |
|----------------------------|---------|--|
| Valve function | | 5/2, single solenoid |
| Design | | Pressure-relieved poppet valve |
| Sealing principle | | Soft |
| Control type | | Electric |
| Actuation type | | Direct |
| Direction of flow | | Reversible with restrictions ²⁾ |
| Exhaust function | | With flow control |
| Manual override | | Non-detenting |
| Assembly position | | Any |
| Grid dimension | [mm] | 14 (minimum clearance 4 mm) |
| Nominal diameter | [mm] | 2 |
| Standard nominal flow rate | [l/min] | 90 |
| Type of mounting | | Via through-holes |
| Pneumatic connection | | Connecting thread M7 |
| | | Push-in fitting for tubing O.D. 4 mm |
| Product weight | [g] | 65 |

Operating and environmental conditions

| | | |
|--------------------------------|-------|--|
| Operating medium | | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm |
| | | Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] | -0.9 ... +8 |
| Ambient temperature | [°C] | -5 ... +60 (100% duty cycle) |
| Temperature of medium | [°C] | -5 ... +60 (100% duty cycle) |
| Corrosion resistance class CRC | | 2 ¹⁾ |
| Certification | | c UL us - Recognised (OL) |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

2) With reversible operation leakage may occur.

Solenoid valves MHE2, fast-switching valves

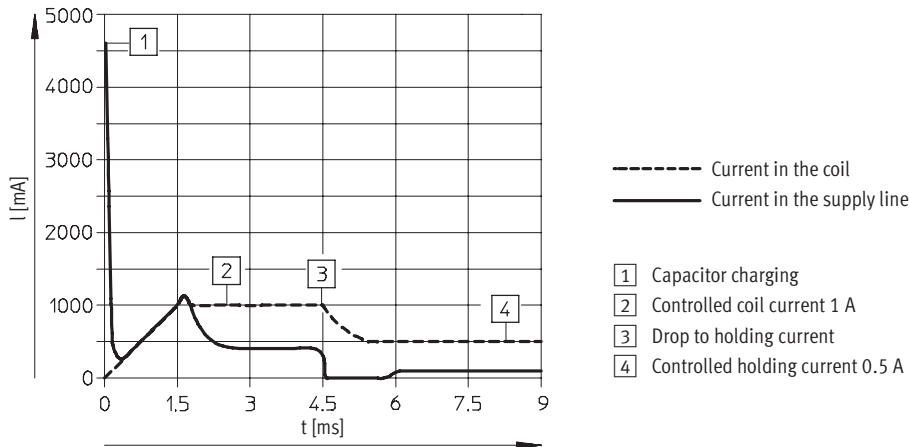
Technical data – Individual valve, 5/2-way valve

| Electrical data | | |
|--|--------|--------------------------------|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes or moulded-in cable |
| Power consumption | | |
| Low-current phase | [W] | 1.625 |
| High-current phase | [W] | 6.5 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMYZ-3 | | IP65 |
| With plug socket with cable KMYZ-3 and plug M8 | | IP65 |
| With plug socket with cable KMYZ-4 | | IP40 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| Response time on | [ms] | 1.9 +10% ... -30% |
| Response time off | [ms] | 1.7 +10% ... -30% |
| Maximum switching frequency | [Hz] | 300 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |

1) The ambient temperature must be limited as from 100 Hz.

Current path



Solenoid valves MHE2, fast-switching valves

Technical data – Individual valve, 5/2-way valve

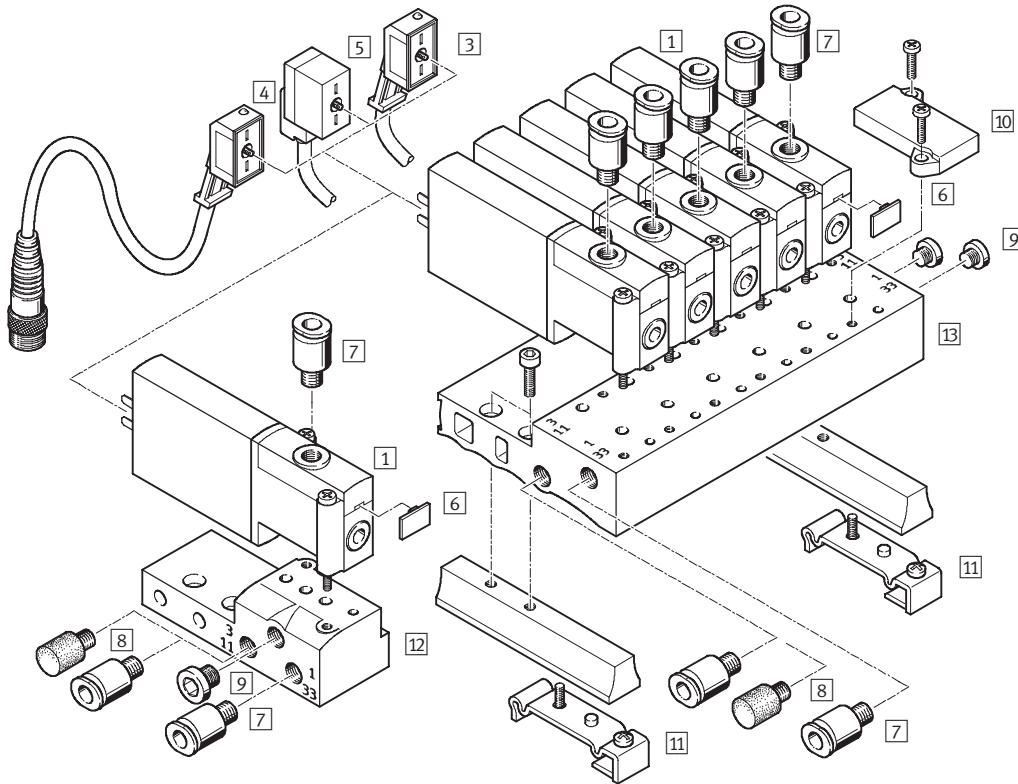
| Ordering data – Valves | | | |
|------------------------|-------------------|----------|----------------------|
| Electrical connection | Operating voltage | Part No. | Type |
| Connecting thread M7 | | | |
| Plug vanes | 24 V DC | 525113 | MHE2-MS1H-5/2-M7 |
| Cable | | 525115 | MHE2-MS1H-5/2-M7-K |
| Push-in connector QS 4 | | | |
| Plug vanes | 24 V DC | 525117 | MHE2-MS1H-5/2-QS-4 |
| Cable | | 525119 | MHE2-MS1H-5/2-QS-4-K |

| Ordering data – Product-specific accessories | | | |
|--|----------|-----------|--|
| Designation | Part No. | Type | |
| Mounting bracket | 196 165 | MHE2-BG-L | |

Solenoid valves MHP2, fast-switching valves

Peripherals overview – Semi in-line valve, 3/2-way valve

Connection with plug vanes – Connection with moulded-in cable ...-K



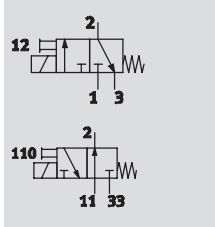
| Valves and accessories | | → Page/Internet |
|------------------------|--------------------------------------|-----------------|
| | Brief description | |
| 1 | Semi in-line valve MHP2-... | 2 / 3.2-21 |
| 2 | Semi in-line valve MHP2-...-K | 2 / 3.2-21 |
| 3 | Plug socket with cable KMYZ-3 (IP65) | 44 |
| 4 | Plug socket with cable KMYZ-3 (IP65) | 44 |
| 5 | Plug socket with cable KMYZ-4 (IP40) | 44 |
| 6 | Inscription label MH-BZ-80X | 44 |
| 7 | Push-in fittings QS | quick star |
| 8 | Silencer UC | uc |
| 9 | Blanking plug B | 44 |
| 10 | Blanking plate MHAP2-BP-3 | 44 |
| 11 | Hat-rail mounting MHAP2-BG-NRH-35 | 44 |
| 12 | Individual sub-base MHA2-AS-3-M5 | 2 / 3.2-24 |
| 13 | Manifold block MHP2-PR...-3 | 2 / 3.2-24 |

Solenoid valves MHP2, fast-switching valves

Technical data – Semi in-line valve, 3/2-way valve

FESTO

Function



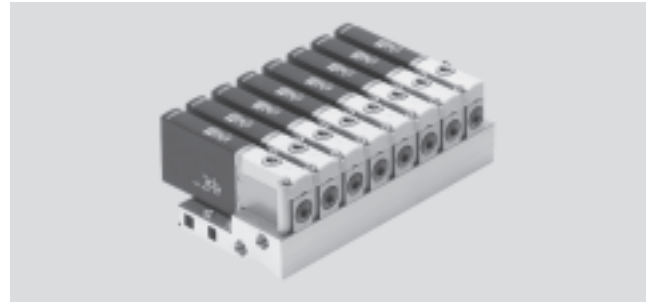
Voltage
24 V DC



Pressure
-0.9 ... +8 bar



Temperature range
-5 ... +40 °C



| General technical data | |
|----------------------------|--|
| Valve function | 3/2 way, single solenoid ¹⁾ |
| Design | Pressure-relieved poppet valve |
| Sealing principle | Soft |
| Control type | Electric |
| Actuation type | Direct |
| Direction of flow | Reversible with restrictions ²⁾ |
| Exhaust function | With flow control |
| Manual override | Non-detenting |
| Assembly position | Any |
| Grid dimension | [mm] 14 |
| Nominal diameter | [mm] 2 |
| Standard nominal flow rate | [l/min] 100 |
| Type of mounting | On sub-base/manifold |
| Pneumatic connection | Connecting thread M5 |
| | Push-in fitting for tubing O.D. 4 mm |
| Product weight | [g] 50 |

1) Can be used as a 2/2 way valve by sealing connection 3 or 33

2) There may be slight leakage in the pressure range -0.5 to +0.5 bar

| Operating and environmental conditions | |
|--|--|
| Operating medium | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm |
| | Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] -0.9 ... +8 |
| Operating pressure, reversible | [bar] -0.9 ... 0 |
| Ambient temperature | [°C] -5 ... +40 (100% duty cycle) |
| Temperature of medium | [°C] -5 ... +40 (100% duty cycle) |
| Corrosion resistance class CRC | 2 ¹⁾ |
| Certification | c UL us - Recognised (OL) |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Application-optimised directional control valves
Fast-switching valves

3.2

Solenoid valves MHP2, fast-switching valves

Technical data – Semi in-line valve, 3/2-way valve



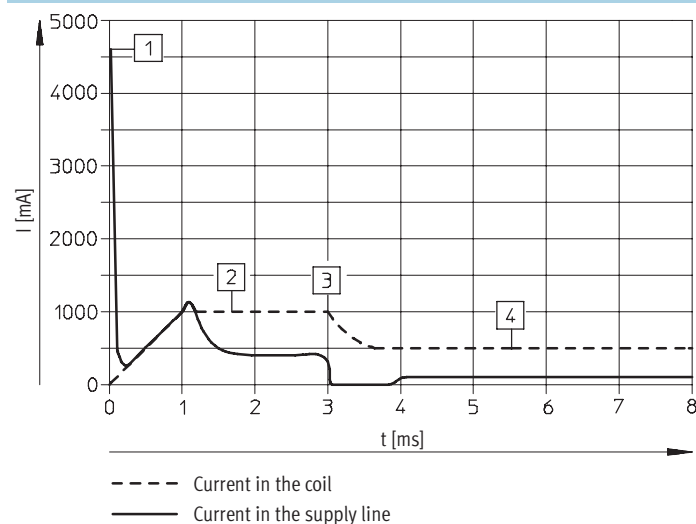
Application-optimised directional control valves
Fast-switching valves
3.2

| Electrical data | | |
|--|--------|--|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes |
| Power consumption | | |
| With fast-switching electronics | [W] | 5 for 3 ms approx. (pull 1 A), then 1.25 W |
| Without fast-switching electronics | [W] | 2.88 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMH | | IP40 |
| With plug socket with cable KMYZ-3 | | IP65 |
| With plug socket with cable KMYZ-3 and plug M8 | | IP65 |
| With plug socket with cable KMYZ-4 | | IP40 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| With fast-switching electronics | | |
| Switching time on/off | [ms] | 1.7/2 +10% ... -30% |
| Maximum switching frequency | [Hz] | 330 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |
| Without fast-switching electronics | | |
| Switching time on/off | [ms] | 7/3.5 |
| Maximum switching frequency | [Hz] | 130 |

1) The ambient temperature must be limited from 100 Hz.

Current path for valves with fast-switching electronics



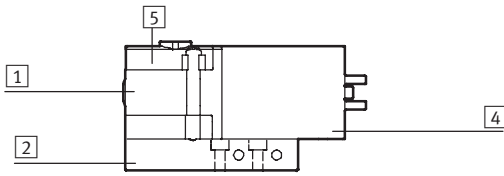
- 1) Capacitor charging
- 2) Controlled coil current 1 A
- 3) Drop to holding current
- 4) Controlled holding current 0.5 A

Solenoid valves MHP2, fast-switching valves

Technical data – Semi in-line valve, 3/2-way valve



Materials

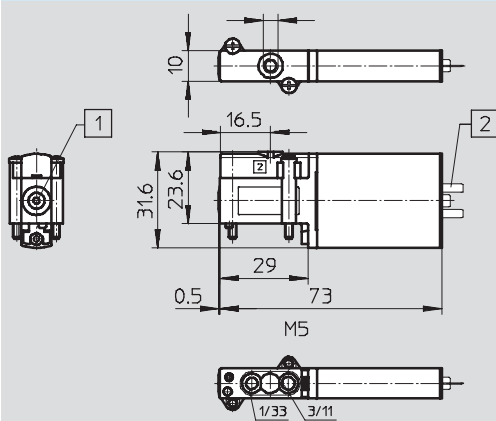


| | | |
|-------------------|------------------|---|
| 1 | Body | Die-cast zinc |
| 2 | Sub-base | Manifold block: Aluminium Individual sub-base: Die-cast zinc |
| 3 | Cable sheath | Polyurethane |
| 4 | Coil housing | Polyamide |
| 5 | Connection piece | Polyamide |
| - | Seals | Nitrile rubber/ hydrogenated nitrile rubber |
| Note on materials | | Free of copper and PTFE |

Dimensions

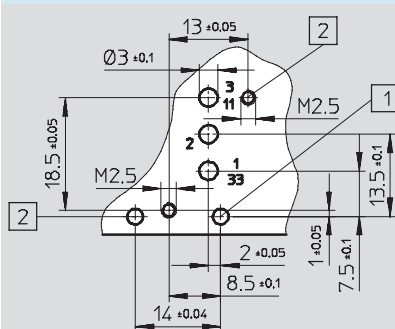
Download CAD data → www.festo.com/en/engineering

Valve with plug vanes



- 1 Manual override, non-detenting
- 2 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4

Port pattern on sub-bases



- 1 Hole for coding pin, 1.7^{+0.2} mm deep
- 2 Mounting thread, 4.6⁺¹ mm deep

Solenoid valves MHP2, fast-switching valves

Technical data – Semi in-line valve, 3/2-way valve

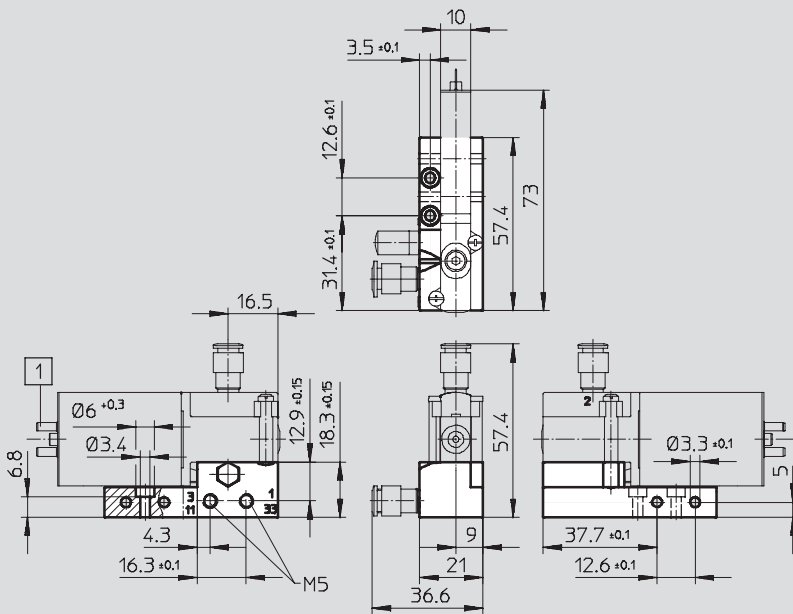


Application-optimised directional control valves
Fast-switching valves
3.2

Dimensions

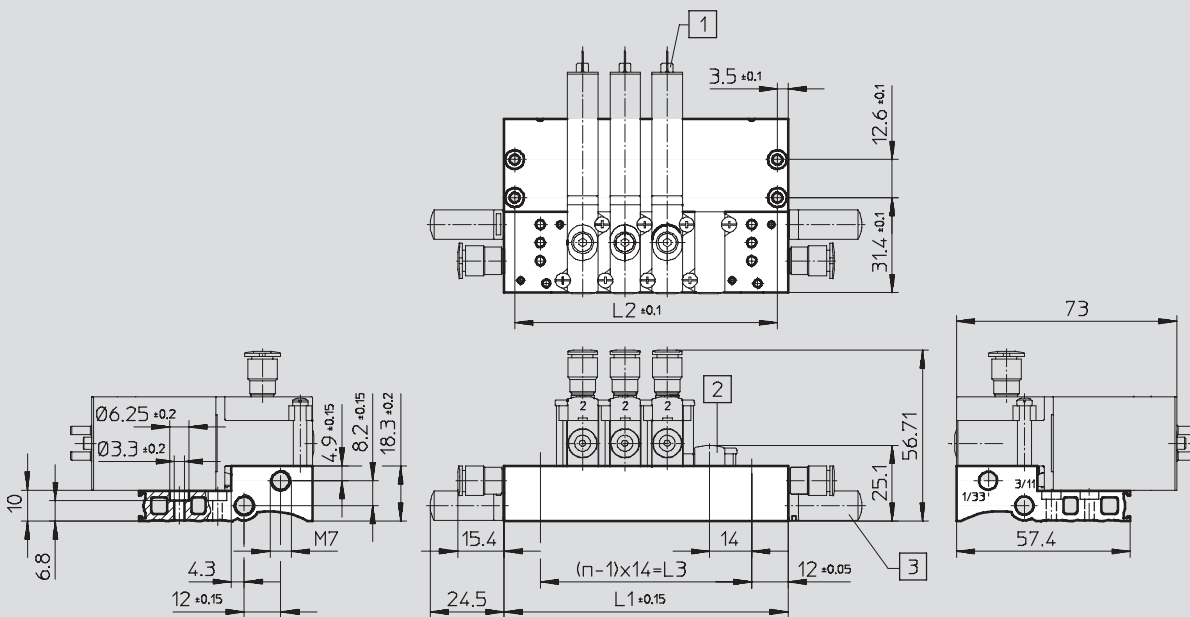
Download CAD data → www.festo.com/en/engineering

Individual sub-base



1 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4

Manifold mounting



1 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4
2 Blanking plate MHAP2-BP-3
3 Silencer UC

| Valve positions n | L1 | L2 | L3 |
|-------------------|----|----|----|
| 2 | 38 | 31 | 14 |
| 3 | 52 | 45 | 18 |
| 4 | 66 | 59 | 42 |

| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|----|
| 5 | 80 | 73 | 56 |
| 6 | 94 | 87 | 70 |
| 7 | 108 | 101 | 84 |

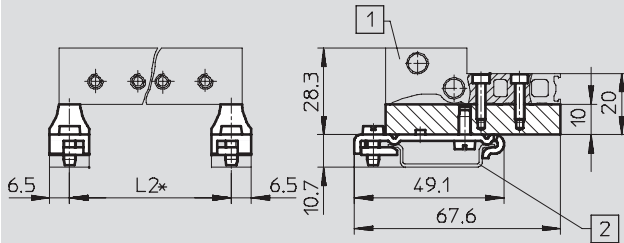
| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|-----|
| 8 | 122 | 115 | 98 |
| 9 | 136 | 129 | 112 |
| 10 | 150 | 143 | 126 |

Solenoid valves MHP2, fast-switching valves



Technical data – Semi in-line valve, 3/2-way valve

H-rail mounting MHAP-BG-NRH-35



- 1 Manifold block
- 2 Mounting rail NRH-35-2000

* See dimensions table for manifold block used

| Valve positions n | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-------------------|----|----|----|----|----|-----|-----|-----|-----|
| L1 | 38 | 52 | 66 | 80 | 94 | 108 | 122 | 136 | 150 |
| L2 | 31 | 45 | 59 | 73 | 87 | 101 | 115 | 129 | 143 |
| L3 | 14 | 28 | 42 | 56 | 70 | 84 | 98 | 112 | 126 |

Ordering data – Valves

| Electrical connection | Operating voltage | Normally closed | | Normally open | |
|-----------------------|-------------------|-----------------|------|---------------|------|
| | | Part No. | Type | Part No. | Type |

Response time 2 ms

| Connecting thread M5 | | | | | |
|----------------------|---------|---------|-------------------|---------|-------------------|
| Plug vanes | 24 V DC | 196 123 | MHP2-MS1H-3/2G-M5 | 196 143 | MHP2-MS1H-3/2O-M5 |

Response time 7 ms

| Connecting thread M5 | | | | | |
|----------------------|---------|---------|------------------|---------|------------------|
| Plug vanes | 24 V DC | 196 122 | MHP2-M1H-3/2G-M5 | 196 142 | MHP2-M1H-3/2O-M5 |

- - Note

Type 3/2G and type 3/2O valves must not be mixed on a manifold block.

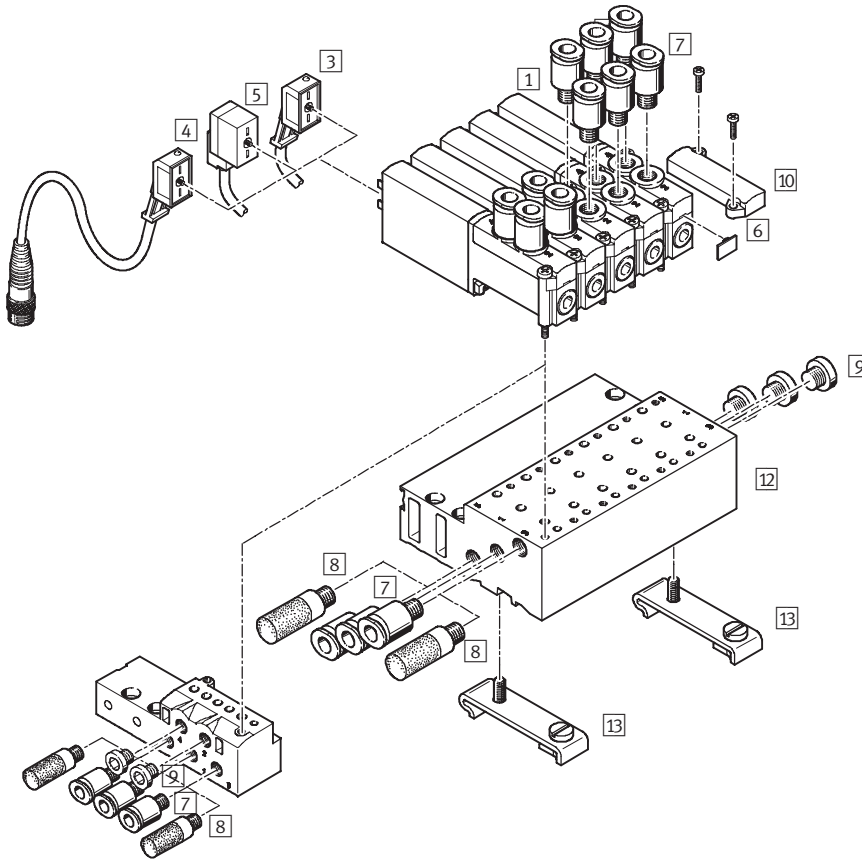
Ordering data – Product-specific accessories

| Designation | Part No. | Type |
|------------------------|-----------|---------------------|
| Valves with plug vanes | | |
| Individual sub-base | 197 438 | MHA2-AS-3-M5 |
| Manifold block for ... | 2 valves | 197 442 MHP2-PR2-3 |
| | 4 valves | 197 443 MHP2-PR4-3 |
| | 6 valves | 197 444 MHP2-PR6-3 |
| | 8 valves | 197 445 MHP2-PR8-3 |
| | 10 valves | 197 446 MHP2-PR10-3 |

Solenoid valves MHP2, fast-switching valves

Peripherals overview – Semi in-line valve, 5/2-way valve

Connection with plug vanes – Connection with moulded-in cable ...-K

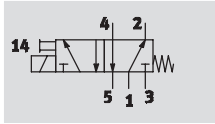


| Valves and accessories | | |
|------------------------|---------------------------------------|---|
| | Brief description | → Page/Internet |
| 1 | Semi in-line valve MHP2-... | With plug vanes 2 / 3.2-27 |
| 3 | Plug socket with cable KMYZ-3 (IP65) | With LED and PUR cable 44 |
| 4 | Plug socket with cable KMYZ-3 (IP65) | With LED, PUR cable and M8 plug 44 |
| 5 | Plug socket with cable KMYZ-4 (IP40) | With PVC cable 44 |
| 6 | Inscription label MH-BZ-80X | For identifying the valves 44 |
| 7 | Push-in fittings QS | For connecting compressed air tubing with standard external diameters quick star |
| 8 | Silencer UC | For fitting in exhaust ports uc |
| 9 | Blanking plug B | For sealing unused ports 44 |
| 10 | Blanking plate MHAP2-BP-5 | For sealing vacant positions 44 |
| 11 | Individual sub-base MHA2-AS-3-M5 | For semi in-line valve; the individual sub-base is also used for the sub-base valve, the output port must in this case be sealed with a blanking plug 2 / 3.2-31 |
| 12 | Manifold block MHP2-PR...-5 | For semi in-line valve 2 / 3.2-31 |
| 13 | H-rail mounting CPV10/14-VI-BG-NRH-35 | – 44 |

Solenoid valves MHP2, fast-switching valves

Technical data – Semi in-line valve, 5/2-way valve

Function



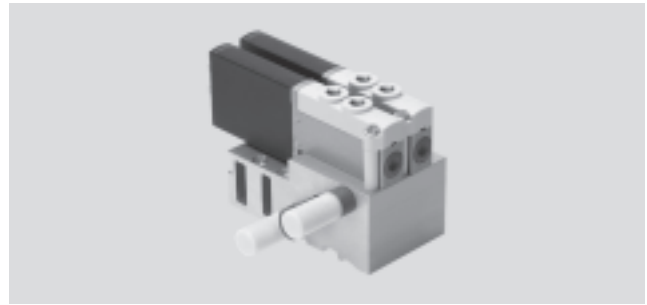
Voltage
24 V DC



Pressure
-0.9 ... +8 bar



Temperature range
-5 ... +40 °C



| General technical data | |
|----------------------------|--|
| Valve function | 5/2, single solenoid |
| Design | Pressure-relieved poppet valve |
| Sealing principle | Soft |
| Control type | Electric |
| Actuation type | Direct |
| Direction of flow | Reversible with restrictions ²⁾ |
| Exhaust function | With flow control |
| Manual override | Non-detenting |
| Assembly position | Any |
| Grid dimension | [mm] 14 |
| Nominal diameter | [mm] 2 |
| Standard nominal flow rate | [l/min] 90 |
| Type of mounting | On sub-base/manifold |
| Pneumatic connection | Connecting thread M5 |
| | Push-in fitting for tubing O.D. 4 mm |
| Product weight | [g] 65 |

| Operating and environmental conditions | |
|--|--|
| Operating medium | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm |
| | Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] -0.9 ... +8 |
| Ambient temperature | [°C] -5 ... +40 (100% duty cycle) |
| Temperature of medium | [°C] -5 ... +40 (100% duty cycle) |
| Corrosion resistance class CRC | 2 ¹⁾ |
| Certification | c UL us - Recognised (OL) |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

2) With reversible operation leakage may occur.

Solenoid valves MHP2, fast-switching valves

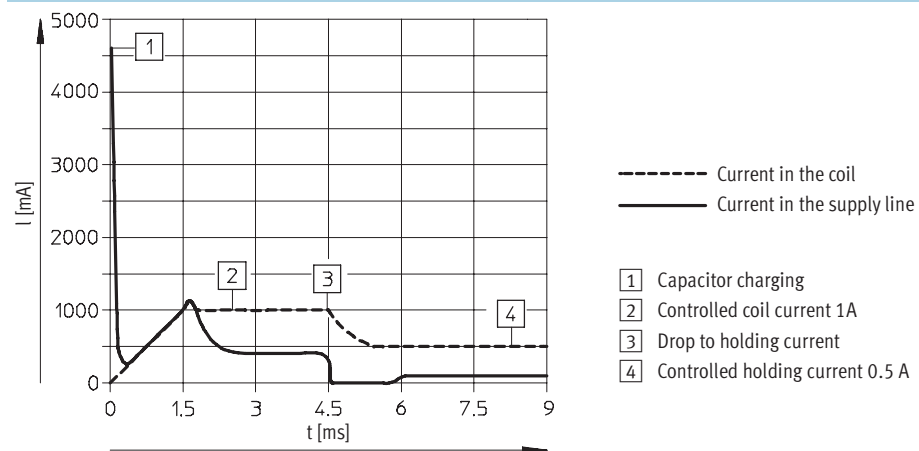
Technical data – Semi in-line valve, 5/2-way valve

| Electrical data | | |
|--|--------|------------|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes |
| Power consumption | | |
| Low-current phase | [W] | 1.625 |
| High-current phase | [W] | 6.5 |
| Protection class to EN 60529 | | |
| With plug socket with cable KMYZ-3 | | IP65 |
| With plug socket with cable KMYZ-3 and plug M8 | | IP65 |
| With plug socket with cable KMYZ-4 | | IP40 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| Response time on | [ms] | 1.9 +10% ... -30% |
| Response time off | [ms] | 1.7 +10% ... -30% |
| Maximum switching frequency | [Hz] | 300 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |

1) The ambient temperature must be limited as from 75 Hz.

Current path

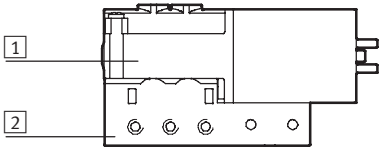


Solenoid valves MHP2, fast-switching valves

Technical data – Semi in-line valve, 5/2-way valve



Materials



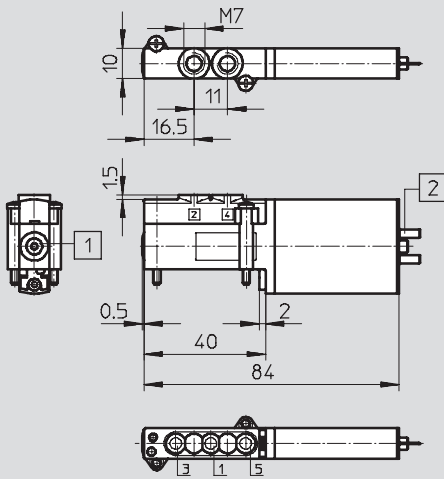
| | | |
|-------------------|----------|--|
| 1 | Body | Die-cast zinc, coated |
| 2 | Sub-base | Die-cast zinc |
| - | Seals | Nitrile rubber/ hydrogenated nitrile rubber |
| - | Screws | Galvanised steel |
| Note on materials | | Free of copper and PTFE |

Dimensions

Download CAD data → www.festo.com/en/engineering

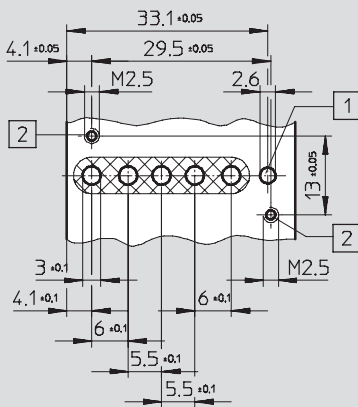
Valve with plug vanes or moulded-in cable ...-K

MHP2-...-M5




- 1 Manual override, non-detenting
- 2 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4

Port pattern on sub-bases



- 1 Hole for coding pin, 1.7 mm deep
- 2 Mounting thread, 4.6 mm deep

 Note
Semi in-line valves do not require ports 2 and 4.

Solenoid valves MHP2, fast-switching valves

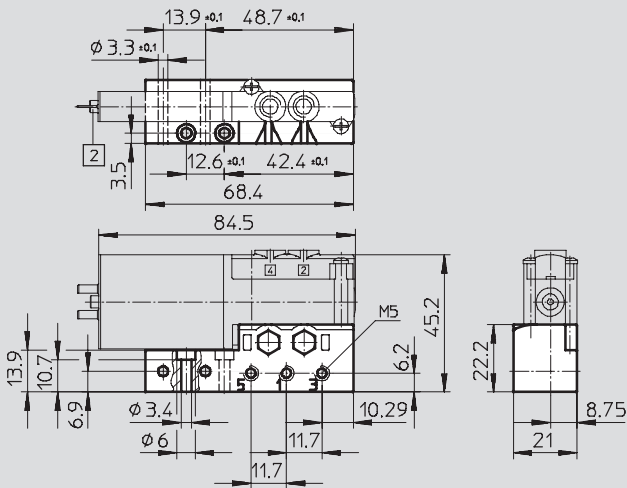
Technical data – Semi in-line valve, 5/2-way valve

Application-optimised directional control valves
Fast-switching valves

Dimensions

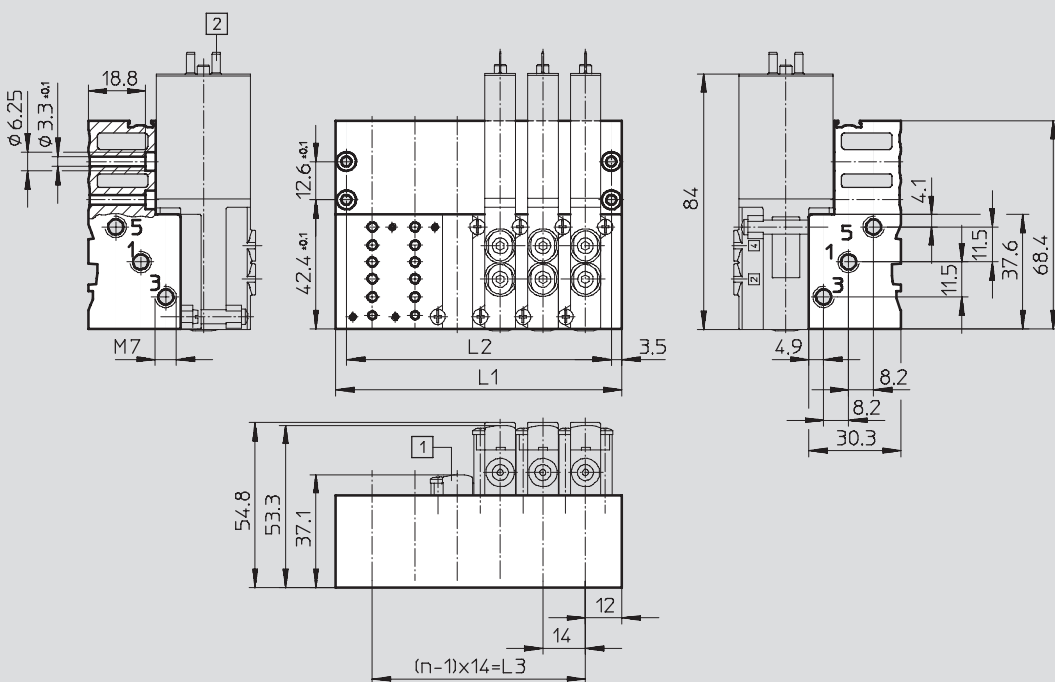
Download CAD data → www.festo.com/en/engineering

Individual sub-base



2 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4

Manifold mounting



1 Blanking plate MHAP2-BP-5

2 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4

| Valve positions n | L1 | L2 | L3 |
|-------------------|----|----|----|
| 2 | 38 | 31 | 14 |
| 3 | 52 | 45 | 18 |
| 4 | 66 | 59 | 42 |

| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|----|
| 5 | 80 | 73 | 56 |
| 6 | 94 | 87 | 70 |
| 7 | 108 | 101 | 84 |

| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|-----|
| 8 | 122 | 115 | 98 |
| 9 | 136 | 129 | 112 |
| 10 | 150 | 143 | 126 |

Solenoid valves MHP2, fast-switching valves

Technical data – Semi in-line valve, 5/2-way valve

| Ordering data – Valves | | | |
|------------------------|-------------------|----------|------------------|
| Electrical connection | Operating voltage | Part No. | Type |
| Connecting thread M5 | | | |
| Plug vanes | 24 V DC | 525 105 | MHP2-MS1H-5/2-M5 |

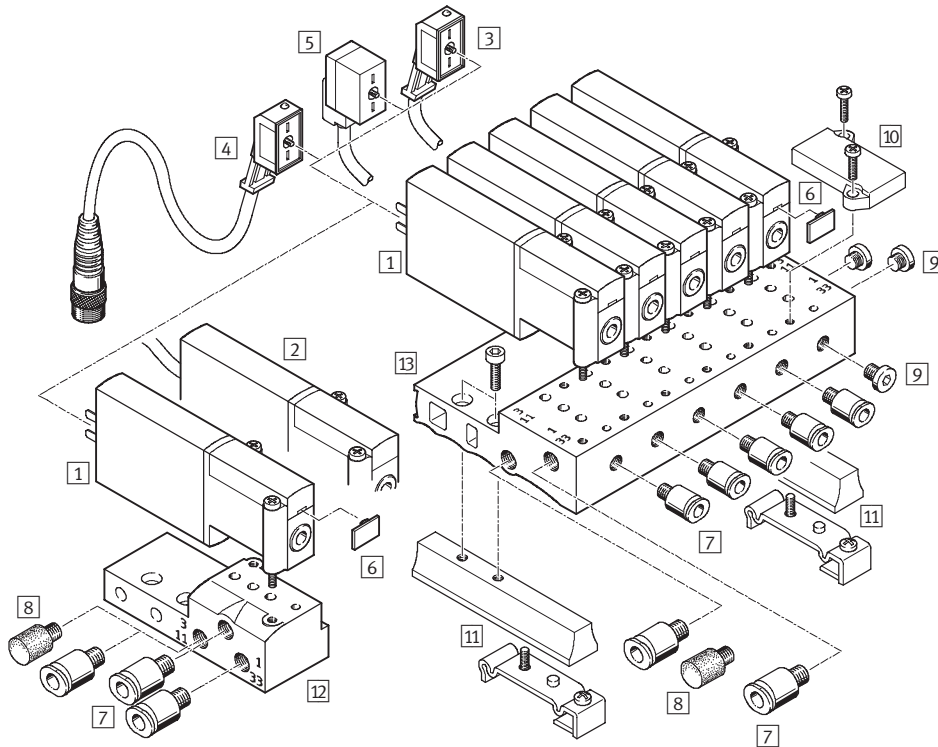
| Ordering data – Product-specific accessories | | | |
|--|-----------|----------|--------------|
| Designation | | Part No. | Type |
| Valve with plug vanes | | | |
| Individual sub-base | | 525 120 | MHA2-AS-5-M5 |
| Manifold block for ... | 2 valves | 525 122 | MHP2-PR2-5 |
| | 4 valves | 525 123 | MHP2-PR4-5 |
| | 6 valves | 525 124 | MHP2-PR6-5 |
| | 8 valves | 525 125 | MHP2-PR8-5 |
| | 10 valves | 525 126 | MHP2-PR10-5 |

Solenoid valves MHA2, fast-switching valves

Peripherals overview – Sub-base valve, 3/2-way valve

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Connection with plug vanes – Connection with moulded-in cable ...-K



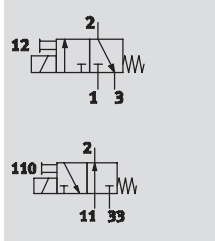
| Valves and accessories | | |
|------------------------|----------------------------------|---|
| | Brief description | → Page/Internet |
| 1 | Sub-base valve MHA2-... | With plug vanes 2 / 3.2-33 |
| 2 | Sub-base valve MHA2-...-K | With moulded-in cable 2 / 3.2-33 |
| 3 | Plug socket KMYZ-3 (IP 65) | With LED and PUR cable 44 |
| 4 | Plug socket KMYZ-3 (IP 65) | With LED, PUR cable and M8 plug 44 |
| 5 | Plug socket KMYZ-4 (IP 40) | With PVC cable 44 |
| 6 | Inscription label MH-BZ-80X | For identifying the valves 44 |
| 7 | Push-in fittings QS | For connecting compressed air tubing with standard O.D.P. quick star |
| 8 | Silencer UC | For fitting in exhaust ports uc |
| 9 | Blanking plug B | For sealing unused ports 44 |
| 10 | Blanking plate MHAP2-BP-3 | For sealing vacant positions 44 |
| 11 | H-rail mounting MHAP2-BG-NRH-35 | – 44 |
| 12 | Individual sub-base MHA2-AS-3-M5 | For sub-base valve 2 / 3.2-36 |
| 13 | Manifold block MHA2-PR...-3-M5 | For sub-base valve 2 / 3.2-36 |

Solenoid valves MHA2, fast-switching valves

FESTO

Technical data – Sub-base valve, 3/2-way valve

Function



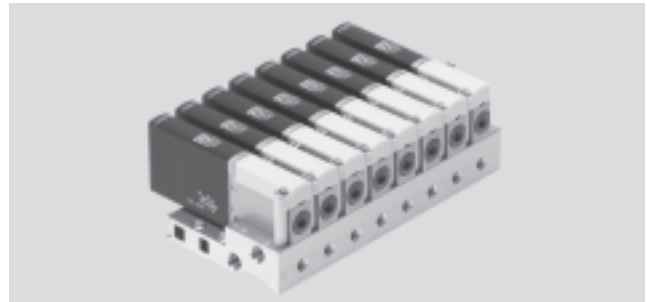
Voltage
24 V DC



Pressure
-0.9 ... +8 bar



Temperature range
-5 ... +40 °C



| General technical data | |
|----------------------------|--|
| Valve function | 3/2 way, single solenoid ¹⁾ |
| Design | Pressure-relieved poppet valve |
| Sealing principle | Soft |
| Control type | Electric |
| Actuation type | Direct |
| Direction of flow | Reversible with restrictions ²⁾ |
| Exhaust function | With flow control |
| Manual override | Non-detenting |
| Assembly position | Any |
| Grid dimension | [mm] 14 |
| Nominal diameter | [mm] 2 |
| Standard nominal flow rate | [l/min] 100 |
| Type of mounting | On sub-base/manifold |
| Pneumatic connection | Connecting thread M5 or M7 |
| Product weight | [g] 50 |

- 1) Can be used as a 2/2 way valve by sealing connection 3 or 33
 2) There may be slight leakage in the pressure range -0.5 to +0.5 bar

| Operating and environmental conditions | |
|--|--|
| Operating medium | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm |
| | Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] -0.9 ... +8 |
| Operating pressure, reversible | [bar] -0.9 ... 0 |
| Ambient temperature | [°C] -5 ... +40 (100% duty cycle) |
| Temperature of medium | [°C] -5 ... +40 (100% duty cycle) |
| Corrosion resistance class CRC | 2 ¹⁾ |
| Certification | c UL us - Recognised (OL) |

- 1) Corrosion resistance class 2 according to Festo standard 940 070
 Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Solenoid valves MHA2, fast-switching valves

Technical data – Sub-base valve, 3/2-way valve



Application-optimised directional control valves
Fast-switching valves

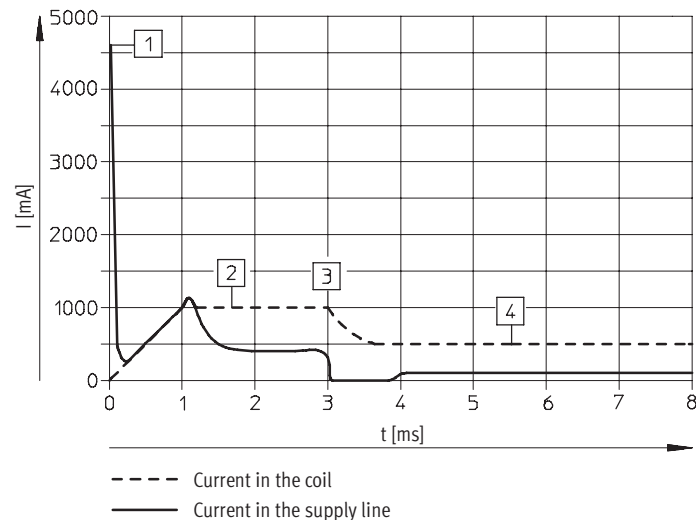
3.2

| Electrical data | | |
|--|--------|--|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes or moulded-in cable |
| Power consumption | | |
| With fast-switching electronics | [W] | 5 for 3 ms approx. (pull 1 A), then 1.25 W |
| Without fast-switching electronics | [W] | 2.88 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMH | | IP40 |
| With plug socket with cable KMYZ-3 | | IP65 |
| With plug socket with cable KMYZ-3 and plug M8 | | IP65 |
| With plug socket with cable KMYZ-4 | | IP40 |
| With plug base MHAP-PI | | IP40 |
| With Sub-D connector plug | | IP40 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| With fast-switching electronics | | |
| Switching time on/off | [ms] | 1.7/2 +10% ... -30% |
| Maximum switching frequency | [Hz] | 330 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |
| Without fast-switching electronics | | |
| Switching time on/off | [ms] | 7/3.5 |
| Maximum switching frequency | [Hz] | 130 |

1) The ambient temperature must be limited as from 100 Hz.

Current path for valves with fast-switching electronics



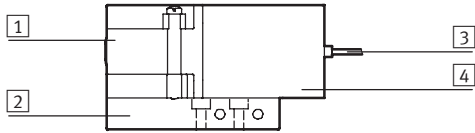
- 1 Capacitor charging
- 2 Controlled coil current 1 A
- 3 Drop to holding current
- 4 Controlled holding current 0.5 A

Solenoid valves MHA2, fast-switching valves

Technical data – Sub-base valve, 3/2-way valve



Materials

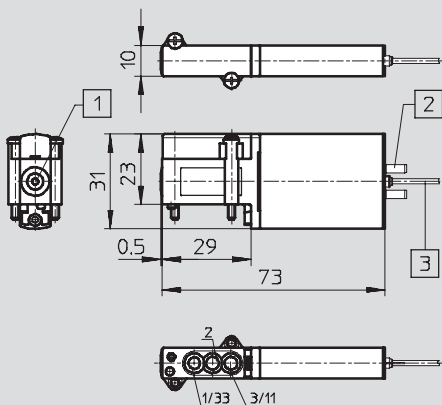


| | | |
|-------------------|--------------|---|
| 1 | Body | Die-cast zinc, coated |
| 2 | Sub-base | Manifold block: Aluminium Individual sub-base: Die-cast zinc |
| 3 | Cable sheath | Polyurethane |
| 4 | Coil housing | Polyamide |
| - | Seals | Nitrile rubber/ hydrogenated nitrile rubber |
| Note on materials | | Free of copper and PTFE |

Dimensions

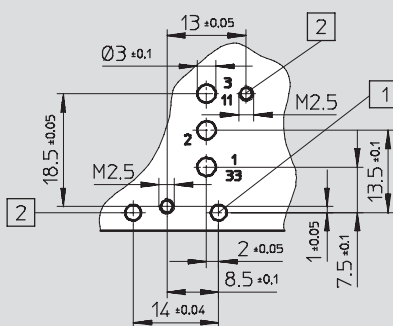
Download CAD data → www.festo.com/en/engineering

Valve with plug vanes or moulded-in cable ...-K



- 1 Manual override, non-detenting
- 2 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4
- 3 Cable 2.5 m

Port pattern on sub-bases



- 1 Hole for coding pin, 1.7^{+0.2} mm deep
- 2 Mounting thread, 4.6⁺¹ mm deep

Solenoid valves MHA2, fast-switching valves

Technical data – Sub-base valve, 3/2-way valve

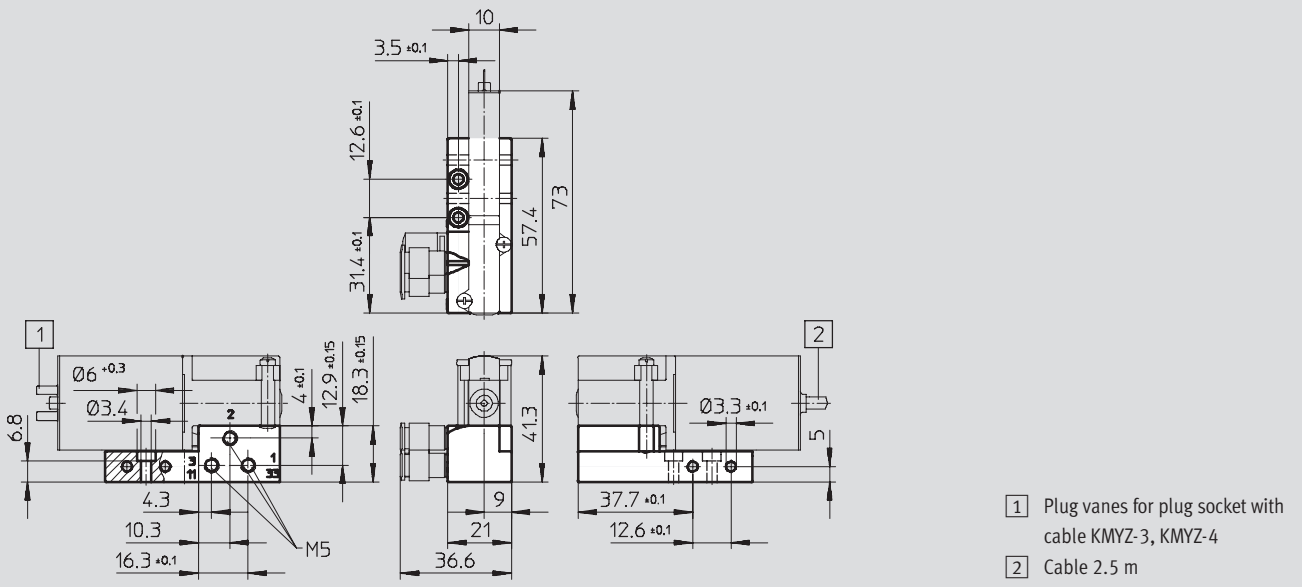


Application-optimised directional control valves
Fast-switching valves
3.2

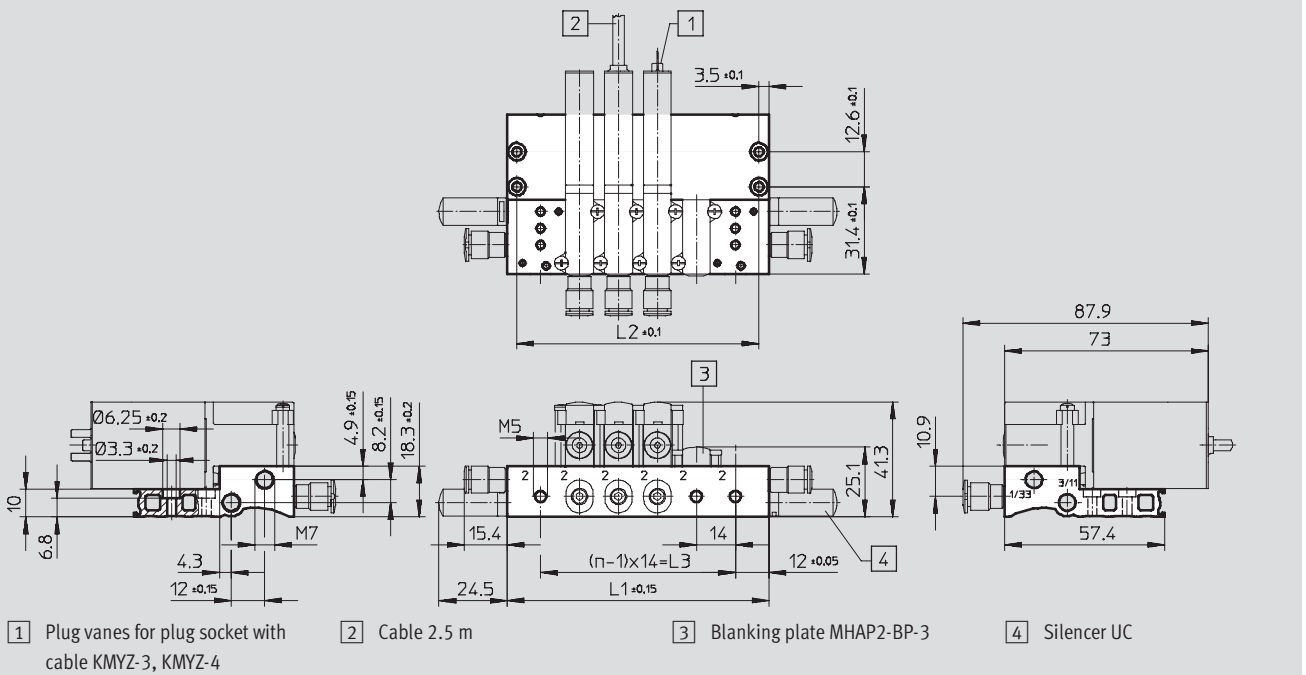
Dimensions

Download CAD data → www.festo.com/en/engineering

Individual sub-base



Manifold mounting



| Valve positions n | L1 | L2 | L3 |
|-------------------|----|----|----|
| 2 | 38 | 31 | 14 |
| 3 | 52 | 45 | 18 |
| 4 | 66 | 59 | 42 |


| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|----|
| 5 | 80 | 73 | 56 |
| 6 | 94 | 87 | 70 |
| 7 | 108 | 101 | 84 |

| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|-----|
| 8 | 122 | 115 | 98 |
| 9 | 136 | 129 | 112 |
| 10 | 150 | 143 | 126 |

Solenoid valves MHA2, fast-switching valves

Technical data – Sub-base valve, 3/2-way valve

| Ordering data – Valves | | | | | |
|---------------------------|-------------------|-----------------|--------------------|---------------|--------------------|
| Electrical connection | Operating voltage | Normally closed | | Normally open | |
| | | Part No. | Type | Part No. | Type |
| Response time 2 ms | | | | | |
| Plug vanes | 24 V DC | 196 119 | MHA2-MS1H-3/2G-2 | 196 139 | MHA2-MS1H-3/2O-2 |
| Cable | 24 V DC | 196 121 | MHA2-MS1H-3/2G-2-K | 196 141 | MHA2-MS1H-3/2O-2-K |
| Response time 7 ms | | | | | |
| Plug vanes | 24 V DC | 196 118 | MHA2-M1H-3/2G-2 | 196 138 | MHA2-M1H-3/2O-2 |
| Cable | 24 V DC | 196 120 | MHA2-M1H-3/2G-2-K | 196 140 | MHA2-M1H-3/2O-2-K |

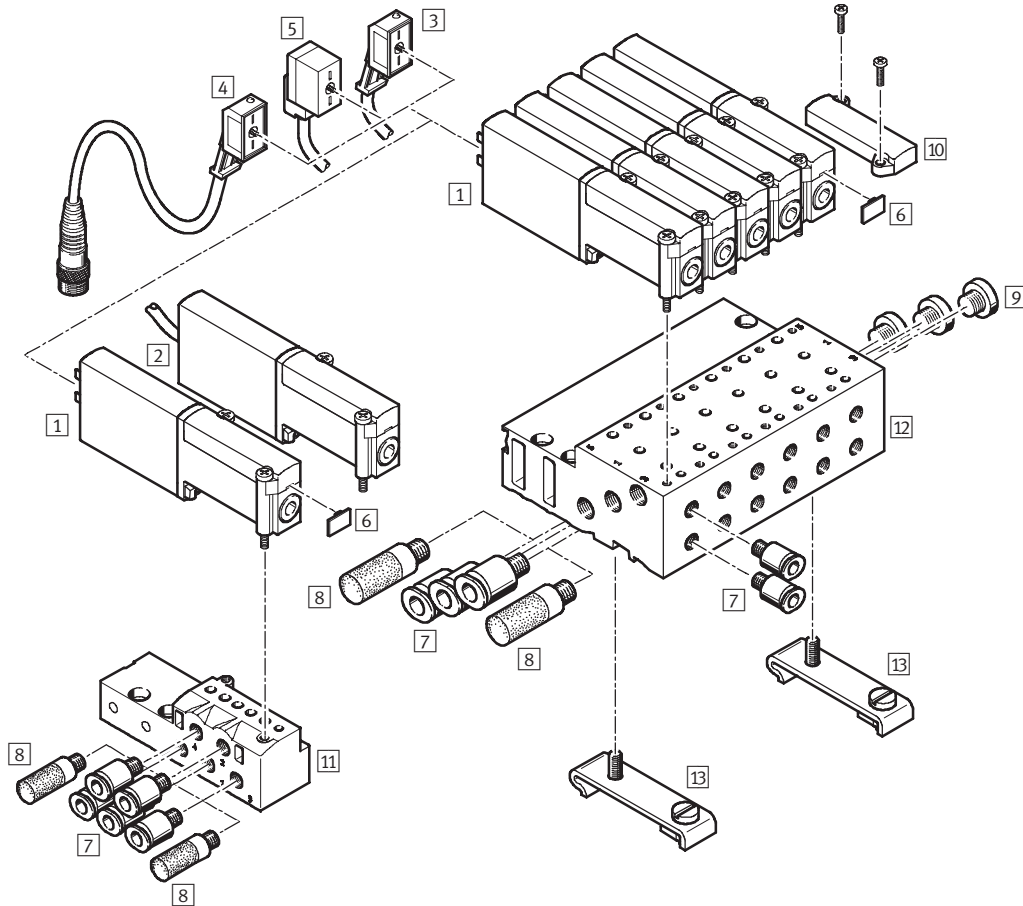
 Note
Type 3/2G and type 3/2O valves must not be mixed on a manifold block.

| Ordering data – Product-specific accessories | | |
|--|-----------|------------------------|
| Designation | Part No. | Type |
| Valves with plug vanes or cable | | |
| Individual sub-base | 197 438 | MHA2-AS-3-M5 |
| Manifold for ... | 2 valves | 197 447 MHA2-PR2-3-M5 |
| | 4 valves | 197 448 MHA2-PR4-3-M5 |
| | 6 valves | 197 449 MHA2-PR6-3-M5 |
| | 8 valves | 197 450 MHA2-PR8-3-M5 |
| | 10 valves | 197 451 MHA2-PR10-3-M5 |

Solenoid valves MHA2, fast-switching valves

Peripherals overview – Sub-base valve, 5/2-way valve

Connection with plug vanes – Connection with moulded-in cable ...-K



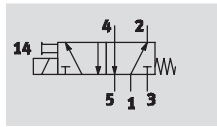
| Valves and accessories | | |
|------------------------|--|--|
| | Brief description | → Page/Internet |
| 1 | Sub-base valve MHA2-... | With plug vanes 39 |
| 2 | Sub-base valve MHA2-...-K | With moulded-in cable 39 |
| 3 | Plug socket KMYZ-3 (IP 65) | With LED and PUR cable 44 |
| 4 | Plug socket KMYZ-3 (IP 65) | With LED, PUR cable and M8 plug 44 |
| 5 | Plug socket KMYZ-4 (IP 40) | With PVC cable 44 |
| 6 | Inscription label MH-BZ-80X | For identifying the valves 44 |
| 7 | Push-in fittings QS | For connecting compressed air tubing with standard external diameters quick star |
| 8 | Silencer UC | For fitting in exhaust ports uc |
| 9 | Blanking plug B | For sealing unused ports 44 |
| 10 | Blanking plate MHAP2-BP-5 | For sealing vacant positions 44 |
| 11 | Individual sub-base MHA2-AS-5-M5 | For sub-base valve 43 |
| 12 | Manifold block MHA2-PR...-5-M5 | For sub-base valve 43 |
| 13 | H-rail mounting CPV10/14-VI-BG-NRH-35 | - 44 |




Solenoid valves MHA2, fast-switching valves

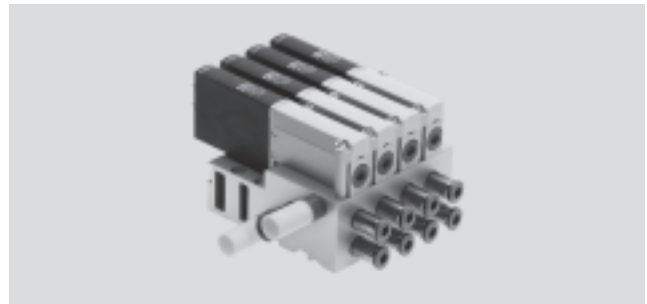
Technical data – Sub-base valve, 5/2-way valve

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Function



-  Voltage
24 V DC
-  Pressure
-0.9 ... +8 bar
-  Temperature range
-5 ... +40 °C



| General technical data | |
|--|--|
| Valve function | 5/2, single solenoid |
| Design | Pressure-relieved poppet valve |
| Sealing principle | Soft |
| Control type | Electric |
| Actuation type | Direct |
| Direction of flow | Reversible with restrictions ²⁾ |
| Exhaust function | With flow control |
| Manual override | Non-detenting |
| Assembly position | Any |
| Grid dimension | [mm] 14 |
| Nominal diameter | [mm] 2 |
| Standard nominal flow rate | [l/min] 90 |
| Type of mounting | On sub-base/manifold |
| Max. tightening torque, valve mounting | [Nm] 0.4 |
| Pneumatic connection | Sub-base |
| Product weight | [g] 65 |

| Operating and environmental conditions | |
|--|---|
| Operating medium | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] -0.9 ... +8 |
| Ambient temperature | [°C] -5 ... +40 (100% duty cycle) |
| Temperature of medium | [°C] -5 ... +40 (100% duty cycle) |
| Corrosion resistance class CRC | 2 ¹⁾ |
| Certification | c UL us - Recognised (OL) |

- 1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
- 2) There may be slight leakage in the pressure range -0.5 to +0.5 bar.

Solenoid valves MHA2, fast-switching valves

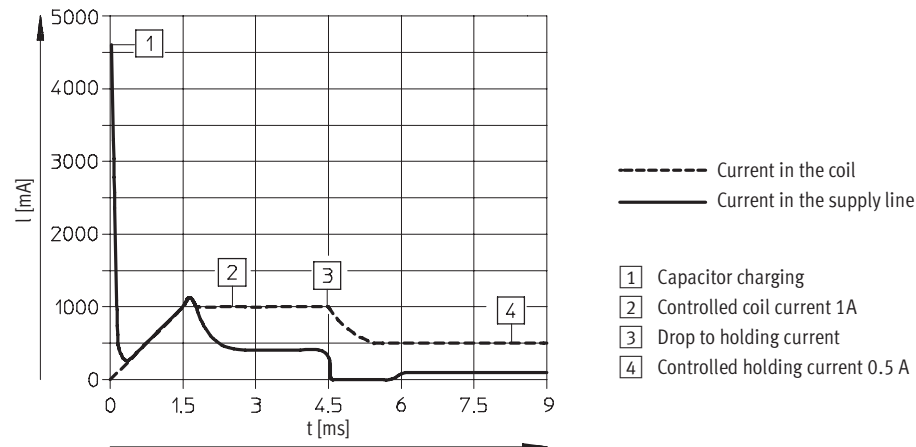
Technical data – Sub-base valve, 5/2-way valve

| Electrical data | | |
|--|--------|--------------------------------|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes or moulded-in cable |
| Power consumption | | |
| Low-current phase | [W] | 1.625 |
| High-current phase | [W] | 6.5 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMYZ-3 | | IP65 |
| With plug socket with cable KMYZ-3 and plug M8 | | IP65 |
| With plug socket with cable KMYZ-4 | | IP40 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| Response time on | [ms] | 1.9 +10% ... -30% |
| Response time off | [ms] | 1.7 +10% ... -30% |
| Maximum switching frequency | [Hz] | 300 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |

1) The ambient temperature must be limited as from 125 Hz.

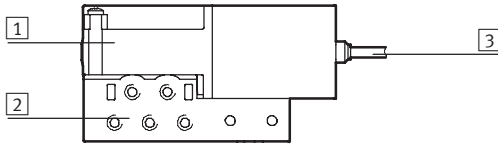
Current path



Solenoid valves MHA2, fast-switching valves

Technical data – Sub-base valve, 5/2-way valve

Materials

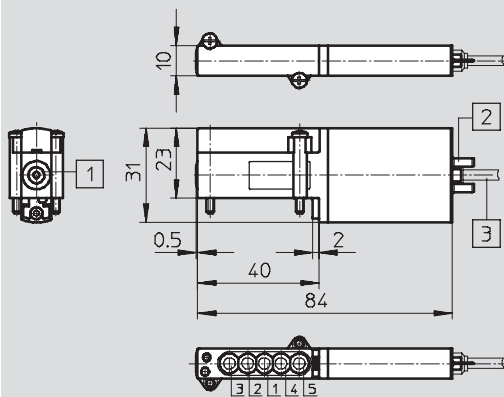


| | | |
|-------------------|--------------|--|
| 1 | Body | Die-cast zinc |
| 2 | Sub-base | Die-cast zinc |
| 3 | Cable sheath | Polyurethane |
| - | Seals | Nitrile rubber/ hydrogenated nitrile rubber |
| Note on materials | | Free of copper and PTFE |

Dimensions

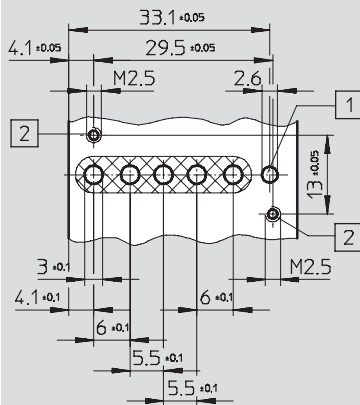
Download CAD data → www.festo.com

Valve with plug vanes or moulded-in cable ...-K




- 1 Manual override, non-detenting
- 2 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4
- 3 Cable 2.5 m

Port pattern on sub-bases



- 1 Hole for coding pin, 1.7 mm deep
- 2 Mounting thread, 4.6 mm deep

 Note
Semi in-line valves do not require ports 2 and 4.

Solenoid valves MHA2, fast-switching valves

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Technical data – Sub-base valve, 5/2-way valve


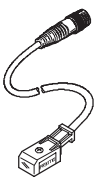






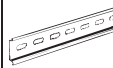
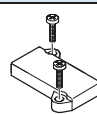
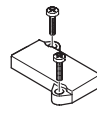

| Ordering data – Valves | | | |
|------------------------|-------------------|-----------------|--------------------------|
| Electrical connection | Operating voltage | Normally closed | |
| | | Part No. | Type |
| Plug vanes | 24 V DC | 525101 | MHA2-MS1H-5/2-2 |
| Cable | 24 V DC | 525103 | MHA2-MS1H-5/2-2-K |

| Ordering data – Product-specific accessories | | | |
|--|-----------|----------------|-----------------------|
| Designation | | Part No. | Type |
| Individual sub-base | | 525 120 | MHA2-AS-5-M5 |
| Manifold for ... | 2 valves | 525 127 | MHA2-PR2-5-M5 |
| | 4 valves | 525 128 | MHA2-PR4-5-M5 |
| | 6 valves | 525 129 | MHA2-PR6-5-M5 |
| | 8 valves | 525 130 | MHA2-PR8-5-M5 |
| | 10 valves | 525 131 | MHA2-PR10-5-M5 |

Solenoid valves MH2, fast-switching valves

Accessories

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| Ordering data | | Part No. | Type | | | Part No. | Type |
|---|-----------------|------------------------|---------------------------|--|--|----------|------|
| Plug socket with cable (IP65) with LED and PUR cable | | | | | | | |
|  | 2.5 m | 193 693 | KMYZ-3-24DC-2,5-LED-PUR-B | | | | |
| | 5 m | 193 695 | KMYZ-3-24DC-5-LED-PUR-B | | | | |
| | 10 m | 196 066 | KMYZ-3-24DC-10-LED-PUR-B | | | | |
| Plug socket with cable (IP65) with LED, PUR cable and M8 plug | | | | | | | |
|  | 0.5 m | 525 654 | KMYZ-3-24-M8-0,5-LED-PUR | | | | |
| | 2.5 m | 525 655 | KMYZ-3-24-M8-2.5-LED-PUR | | | | |
| H-rail mounting (3/2-way valves) | | | | | | | |
|  | | 525 053 | MHAP2-BG-NRH-35 | | | | |
| H-rail mounting (5/2-way valves) | | | | | | | |
|  | | 162 556 | CPV10/14-VI-BG-NRH-35 | | | | |
| Blanking plug B | | | | | | | |
|  | M5 | 3 843 | B-M5 ²⁾ | | | | |
| | M7 | 174 309 | B-M7 ²⁾ | | | | |
| Silencer UC | | | | | | | |
|  | | → Internet: uc | | | | | |
| Plug socket with cable (IP40) with PVC cable | | | | | | | |
|  | 0.5 m | 193 690 | KMYZ-4-24DC-0,5-B | | | | |
| | 2.5 m | 193 691 | KMYZ-4-24DC-2.5-B | | | | |
| Inscription label | | | | | | | |
|  | | 197 289 | MH-BZ-80X ¹⁾ | | | | |
| H-rail | | | | | | | |
|  | 2 m | 35 430 | NRH-35-2000 | | | | |
| Blanking plate (3/2-way valves) | | | | | | | |
|  | Plug connection | 197 470 | MHAP-BP-3 | | | | |
| | Plug base | 197 471 | MHAP-BP-3-PI | | | | |
| Blanking plate (5/2-way valves) | | | | | | | |
|  | | 525 132 | MHAP-BP-5 | | | | |
| Push-in fittings QS | | | | | | | |
|  | | → Internet: quick star | | | | | |

1) Scope of delivery 80 pieces

2) Scope of delivery 10 pieces

Solenoid valves MH3, fast-switching valves

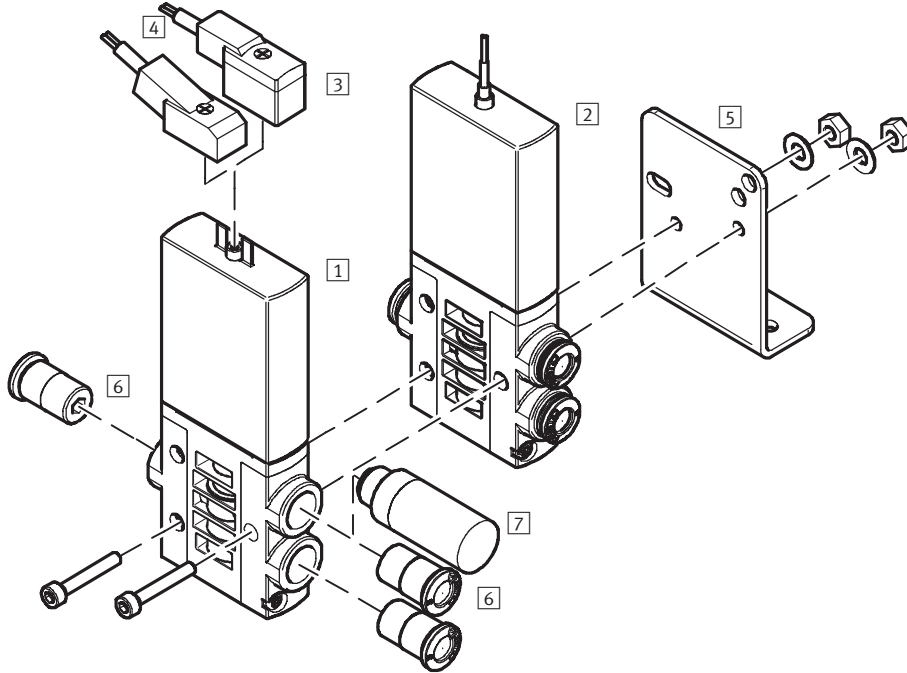
Type codes

| | | | | | | | | | | | | | | | | | |
|------------------------------|---|----|---|---|---|---|---|---|---|---|-----|---|---|---|-----|---|---|
| | | MH | P | 3 | - | M | S | 1 | H | - | 3/2 | - | 0 | - | QS6 | - | K |
| Valve family | | | | | | | | | | | | | | | | | |
| MH | Fast-switching valves | | | | | | | | | | | | | | | | |
| Design | | | | | | | | | | | | | | | | | |
| E | Individual valve | | | | | | | | | | | | | | | | |
| P | Semi in-line valve | | | | | | | | | | | | | | | | |
| A | Sub-base valve | | | | | | | | | | | | | | | | |
| Size | | | | | | | | | | | | | | | | | |
| 3 | Flow rate 200 l/min | | | | | | | | | | | | | | | | |
| Drive function | | | | | | | | | | | | | | | | | |
| M | Solenoid, switching | | | | | | | | | | | | | | | | |
| Response time | | | | | | | | | | | | | | | | | |
| - | 8 ms | | | | | | | | | | | | | | | | |
| S | 3 ms | | | | | | | | | | | | | | | | |
| Operating voltage | | | | | | | | | | | | | | | | | |
| 1 | 24 V DC | | | | | | | | | | | | | | | | |
| Manual override | | | | | | | | | | | | | | | | | |
| H | Non-detenting | | | | | | | | | | | | | | | | |
| Valve function | | | | | | | | | | | | | | | | | |
| 3/2 | 3/2-way valve | | | | | | | | | | | | | | | | |
| Normal position | | | | | | | | | | | | | | | | | |
| G | Closed | | | | | | | | | | | | | | | | |
| O | Open | | | | | | | | | | | | | | | | |
| Pneumatic connection | | | | | | | | | | | | | | | | | |
| 3 | Nominal size 3 mm | | | | | | | | | | | | | | | | |
| 1/8 | G1/8 thread | | | | | | | | | | | | | | | | |
| QS6 | Push-in connector for 6 mm O.D. tubing | | | | | | | | | | | | | | | | |
| Electrical connection | | | | | | | | | | | | | | | | | |
| - | Plug vanes for plug socket KMYZ-... | | | | | | | | | | | | | | | | |
| K | Moulded-in cable, 2.5 m long | | | | | | | | | | | | | | | | |

Solenoid valves MHE3, fast-switching valves

Peripherals overview – Individual valve

Connection with plug vanes – Connection with moulded-in cable



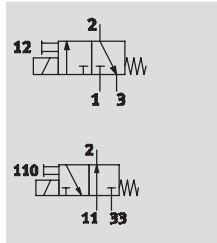
| Valves and accessories | | |
|------------------------|--|---|
| | Brief description | → Page/Internet |
| 1 | Individual valve MHE3-... | With plug vanes 2 / 3.2-47 |
| 2 | Individual valve MHE3-...-K | With cable 2 / 3.2-47 |
| 3 | Plug socket with cable KMYZ-4 (IP 40) | With PVC cable 64 |
| 4 | Plug socket with cable KMYZ-3 (IP 65) | With LED, PUR cable, with M8 plug or open end 64 |
| 5 | Mounting bracket MHE2-BG-L | – 2 / 3.2-50 |
| 6 | Push-in fittings QS | For connecting compressed air tubing with standard O.D. quick star |
| 7 | Silencer UC | For fitting in exhaust ports uc |

Solenoid valves MHE3, fast-switching valves

Technical data – Individual valve

FESTO

Function



Voltage
24 V DC

Pressure
-0.9 ... +8 bar

Temperature range
-5 ... +60 °C



| General technical data | | |
|----------------------------|---------|--|
| Valve function | | 3/2 way, single solenoid ¹⁾ |
| Design | | Pressure-relieved poppet valve |
| Sealing principle | | Soft |
| Control type | | Electric |
| Actuation type | | Direct |
| Direction of flow | | Reversible with restrictions ²⁾ |
| Exhaust function | | With flow control |
| Manual override | | Non-detenting |
| Assembly position | | Any |
| Grid dimension | [mm] | 19 (minimum distance 5 mm) |
| Nominal diameter | [mm] | 3 |
| Standard nominal flow rate | [l/min] | 200 |
| Type of mounting | | Via through-holes |
| Pneumatic connection | | Connecting thread G1/8 |
| | | Push-in fitting for tubing O.D. 6 mm |
| Product weight | [g] | 120 |

1) Can be used as a 2/2 way valve by sealing connection 3 or 33

2) There may be slight leakage in the pressure range -0.5 to +0.5 bar

| Operating and environmental conditions | | |
|--|-------|--|
| Operating medium | | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm |
| | | Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] | -0.9 ... +8 |
| Operating pressure, reversible | [bar] | -0.9 ... 0 |
| Ambient temperature | [°C] | -5 ... +60 |
| Temperature of medium | [°C] | -5 ... +60 |
| Corrosion resistance class CRC | | 2 ¹⁾ |
| Certification | | c UL us - Recognised (OL) |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Solenoid valves MHE3, fast-switching valves

Technical data – Individual valve



Application-optimised directional control valves
Fast-switching valves

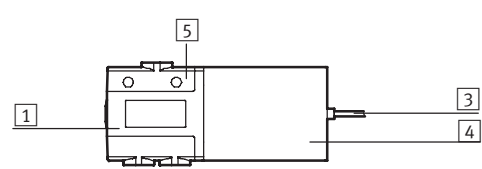
3.2

| Electrical data | | |
|--|--------|--------------------------------|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes or moulded-in cable |
| Power consumption | | |
| With fast-switching electronics | [W] | Pull: 6.5 Hold: 1.6 |
| Without fast-switching electronics | [W] | 3.7 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMYZ-3 | | IP65 |
| With plug socket with cable KMYZ-3 and plug M8 | | IP65 |
| With plug socket with cable KMYZ-4 | | IP40 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| With fast-switching electronics | | |
| Switching time on/off | [ms] | 3/2.3 +10% ... -30% |
| Maximum switching frequency | [Hz] | 280 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |
| Without fast-switching electronics | | |
| Switching time on/off | [ms] | 8/4.5 |
| Maximum switching frequency | [Hz] | 130 |

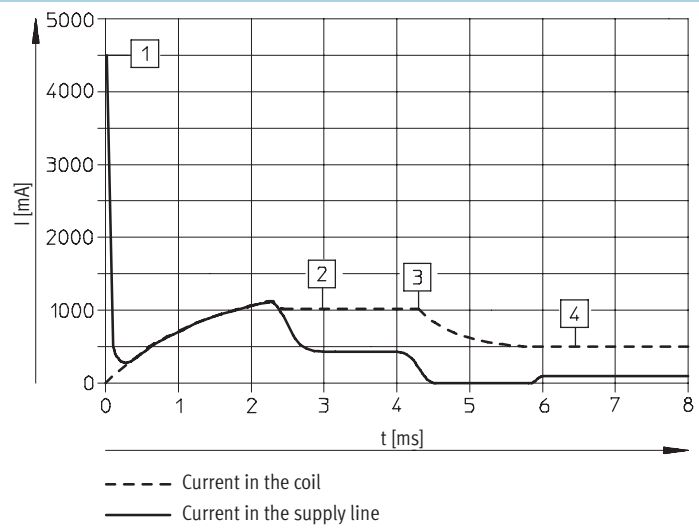
1) The ambient temperature must be limited as from 90 Hz.

Materials



| | | |
|---|-------------------|-------------------------|
| 1 | Body | Die-cast zinc, coated |
| 3 | Cable sheath | Polyurethane |
| 4 | Coil housing | Polyamide |
| 5 | Connection piece | Polyamide |
| - | Seals | Nitrile rubber |
| | Note on materials | Free of copper and PTFE |

Current path for valves with fast-switching electronics



- 1 Capacitor charging
- 2 Controlled coil current 1 A
- 3 Drop to holding current
- 4 Controlled holding current 0.5 A

Solenoid valves MHE3, fast-switching valves

Technical data – Individual valve

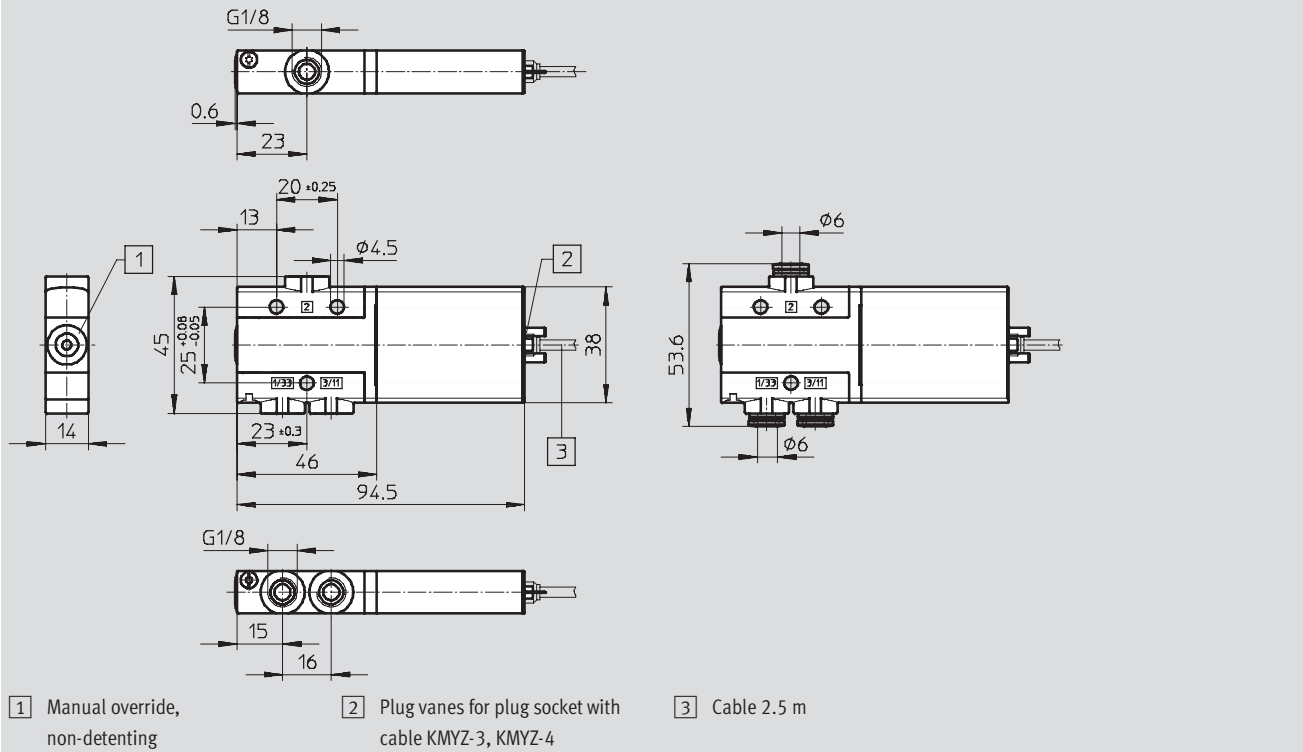


Dimensions

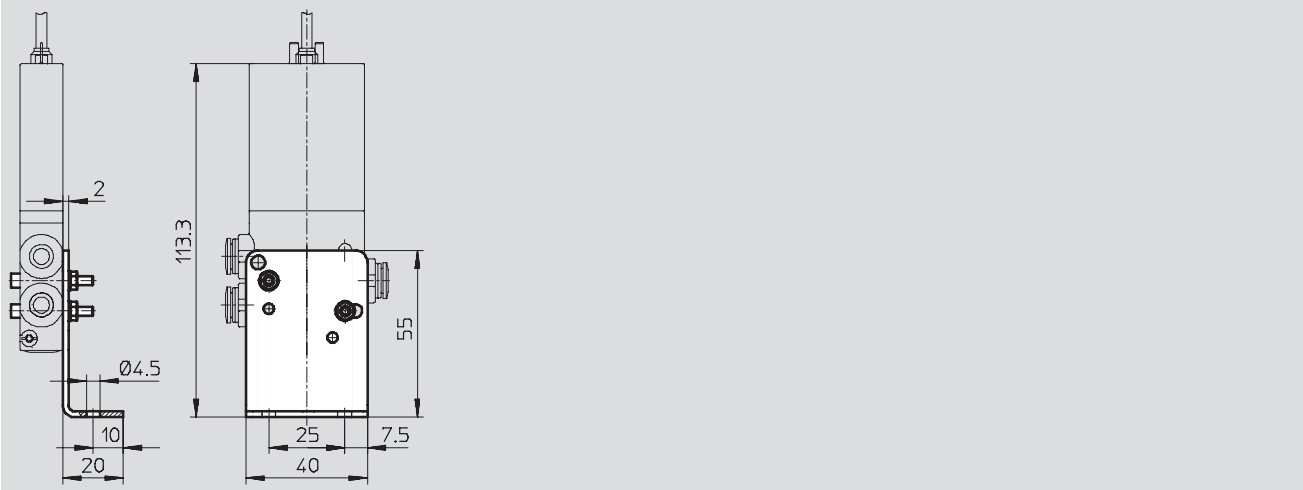
Download CAD data → www.festo.com/en/engineering

Valve with connecting thread G1/8

Valve with push-in fitting QS 6



Mounting bracket MHE2-BG-L



Application-optimised directional control valves
Fast-switching valves

3.2

Solenoid valves MHE3, fast-switching valves

Technical data – Individual valve



Application-optimised directional control valves
Fast-switching valves

3.2

| Ordering data – Valves | | | | | |
|-----------------------------------|-------------------|-----------------|----------------------------------|---------------|----------------------------------|
| Electrical connection | Operating voltage | Normally closed | | Normally open | |
| | | Part No. | Type | Part No. | Type |
| Response time 3/2.3 ms | | | | | |
| Connecting thread G $\frac{1}{8}$ | | | | | |
| Plug vanes | 24 V DC | 525 147 | MHE3-MS1H-3/2G- $\frac{1}{8}$ | 525 167 | MHE3-MS1H-3/2O- $\frac{1}{8}$ |
| Cable | 24 V DC | 525 149 | MHE3-MS1H-3/2G- $\frac{1}{8}$ -K | 525 169 | MHE3-MS1H-3/2O- $\frac{1}{8}$ -K |
| Push-in connector QS 6 | | | | | |
| Plug vanes | 24 V DC | 525 151 | MHE3-MS1H-3/2G-QS6 | 525 171 | MHE3-MS1H-3/2O-QS6 |
| Cable | 24 V DC | 525 153 | MHE3-MS1H-3/2G-QS6-K | 525 173 | MHE3-MS1H-3/2O-QS6-K |
| Response time 8/4.5 ms | | | | | |
| Connecting thread G $\frac{1}{8}$ | | | | | |
| Plug vanes | 24 V DC | 525 146 | MHE3-M1H-3/2G- $\frac{1}{8}$ | 525 166 | MHE3-M1H-3/2O- $\frac{1}{8}$ |
| Cable | 24 V DC | 525 148 | MHE3-M1H-3/2G- $\frac{1}{8}$ -K | 525 168 | MHE3-M1H-3/2O- $\frac{1}{8}$ -K |
| Push-in connector QS 6 | | | | | |
| Plug vanes | 24 V DC | 525 150 | MHE3-M1H-3/2G-QS6 | 525 170 | MHE3-M1H-3/2O-QS6 |
| Cable | 24 V DC | 525 152 | MHE3-M1H-3/2G-QS6-K | 525 172 | MHE3-M1H-3/2O-QS6-K |

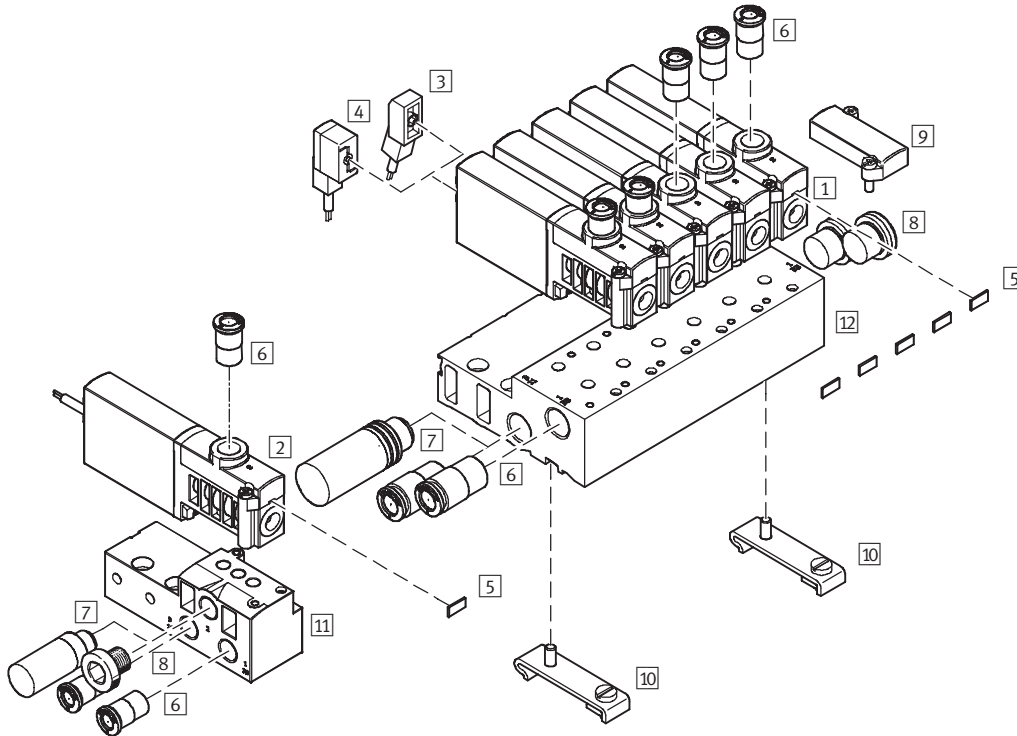
| Ordering data – Product-specific accessories | | | | |
|--|------------|-----------------|----------|-----------|
| Designation | Weight [g] | CRC | Part No. | Type |
| Mounting bracket | 55 | 2 ¹⁾ | 196 165 | MHE2-BG-L |

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Solenoid valves MHP3, fast-switching valves

Peripherals overview – Semi in-line valve

Connection with plug vanes – Connection with moulded-in cable



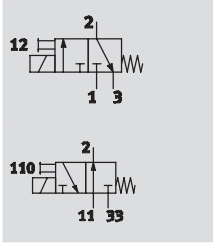
| Valves and accessories | | Brief description | → Page/Internet |
|------------------------|--|---|-----------------|
| 1 | Semi in-line valve MHP3-... | With plug vanes | 52 |
| 2 | Semi in-line valve MHP3-...-K | With cable | 52 |
| 3 | Plug socket with cable KMYZ-4 (IP 40) | With PVC cable | 64 |
| 4 | Plug socket with cable KMYZ-3 (IP 65) | With LED, PUR cable, with M8 plug or open end | 64 |
| 5 | Inscription label MH-BZ-80X | For identifying the valves | 64 |
| 6 | Push-in fittings QS | For connecting compressed air tubing with standard O.D. | quick star |
| 7 | Silencer UC | For fitting in exhaust ports | uc |
| 8 | Blanking plug B | For sealing unused ports | 64 |
| 9 | Blanking plate MHAP3-BP-3 | For sealing vacant positions | 64 |
| 10 | H-rail mounting CPV10/14-VI-BG-NRH-35 | – | 64 |
| 11 | Individual sub-base MHA3-AS-3-1/8 | For semi in-line valve; the individual sub-base is also used for the sub-base valve, the output port must in this case be sealed with a blanking plug | 55 |
| 12 | Manifold block MHP3-PR...-3 | For semi in-line valve | 55 |

Solenoid valves MHP3, fast-switching valves


Technical data – Semi in-line valve


FESTO

Function



-  - Voltage
24 V DC

-  - Pressure
-0.9 ... +8 bar

-  - Temperature range
-5 ... +40 °C



| General technical data | | |
|----------------------------|---------|--|
| Valve function | | 3/2 way, single solenoid ¹⁾ |
| Design | | Pressure-relieved poppet valve |
| Sealing principle | | Soft |
| Control type | | Electric |
| Actuation type | | Direct |
| Direction of flow | | Reversible with restrictions ²⁾ |
| Exhaust function | | With flow control |
| Manual override | | Non-detenting |
| Assembly position | | Any |
| Grid dimension | [mm] | 19 |
| Nominal diameter | [mm] | 3 |
| Standard nominal flow rate | [l/min] | 200 |
| Type of mounting | | On sub-base or manifold, via through-hole |
| Pneumatic connection | | Connecting thread G1/8 |
| | | Push-in fitting for tubing O.D. 6 mm |
| Product weight | [g] | 120 |

- 1) Can be used as a 2/2 way valve by sealing connection 3 or 33
 2) There may be slight leakage in the pressure range -0.5 to +0.5 bar

| Operating and environmental conditions | | |
|--|-------|--|
| Operating medium | | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm |
| | | Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] | -0.9 ... +8 |
| Operating pressure, reversible | [bar] | -0.9 ... 0 |
| Ambient temperature | [°C] | -5 ... +40 |
| Temperature of medium | [°C] | -5 ... +40 |
| Corrosion resistance class CRC | | 2 ¹⁾ |
| Certification | | c UL us - Recognised (OL) |

- 1) Corrosion resistance class 2 according to Festo standard 940 070
 Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Solenoid valves MHP3, fast-switching valves

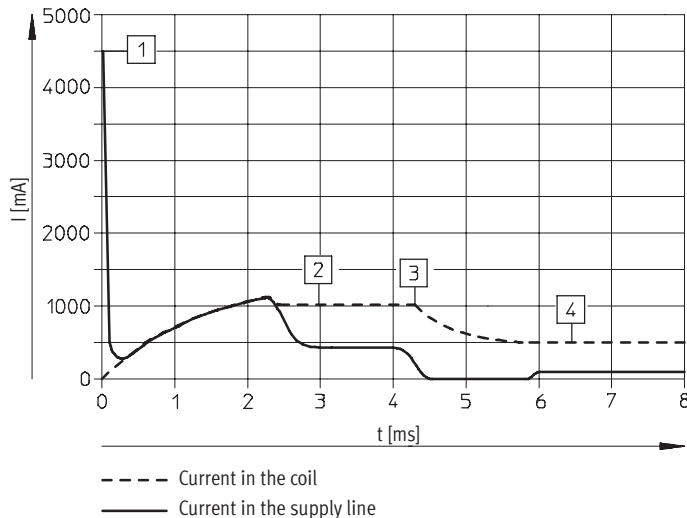
Technical data – Semi in-line valve

| Electrical data | | |
|--|--------|--------------------------------|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes or moulded-in cable |
| Power consumption | | |
| With fast-switching electronics | [W] | Pull: 6.5 Hold: 1.6 |
| Without fast-switching electronics | [W] | 3.7 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMYZ-3 | | IP65 |
| With plug socket with cable KMYZ-3 and plug M8 | | IP65 |
| With plug socket with cable KMYZ-4 | | IP40 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| With fast-switching electronics | | |
| Switching time on/off | [ms] | 3/2.3 +10% ... -30% |
| Maximum switching frequency | [Hz] | 280 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |
| Without fast-switching electronics | | |
| Switching time on/off | [ms] | 8/4.5 |
| Maximum switching frequency | [Hz] | 130 |

1) The ambient temperature must be limited as from 100 Hz.

Current path for valves with fast-switching electronics

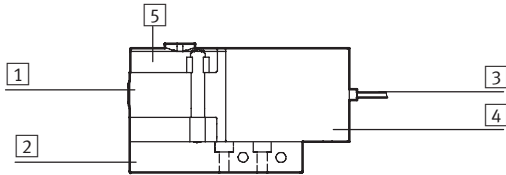


- 1) Capacitor charging
- 2) Controlled coil current 1 A
- 3) Drop to holding current
- 4) Controlled holding current 0.5 A

Solenoid valves MHP3, fast-switching valves

Technical data – Semi in-line valve

Materials



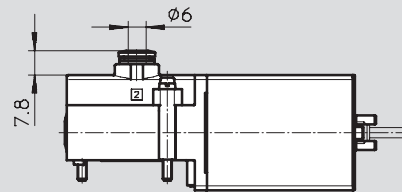
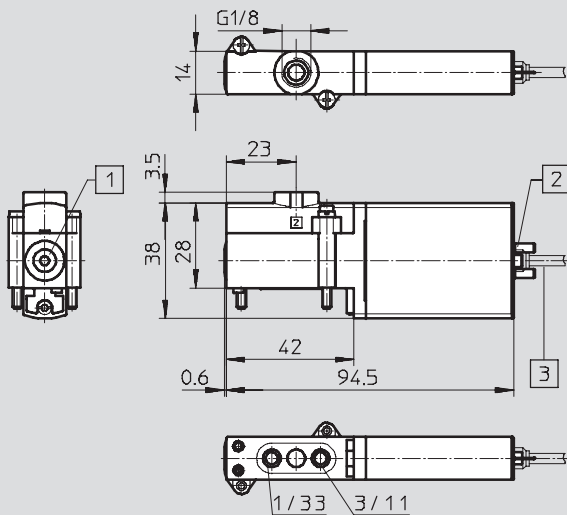
| | | |
|---|-------------------|---|
| 1 | Body | Die-cast zinc, coated |
| 2 | Sub-base | Manifold block: Aluminium Individual sub-base: Die-cast zinc |
| 3 | Cable sheath | Polyurethane |
| 4 | Coil housing | Polyamide |
| 5 | Connection piece | Polyamide |
| - | Seals | Nitrile rubber |
| | Note on materials | Free of copper and PTFE |

Dimensions

Download CAD data → www.festo.com

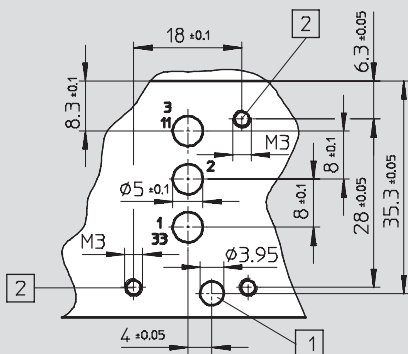
Valve with connecting thread G1/8

Valve with push-in fitting QS 6



- 1 Manual override, non-detenting
- 2 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4
- 3 Cable 2.5 m

Port pattern on sub-bases



- - Note

Semi in-line valves do not require port 2.
If used as a 2/2-way valve, normally closed, port 3/11 is not required.
If used as a 2/2-way valve, normally open, port 1/33 is not required.

- 1 Hole for coding pin, 2 mm deep
- 2 Mounting thread, 8 mm deep

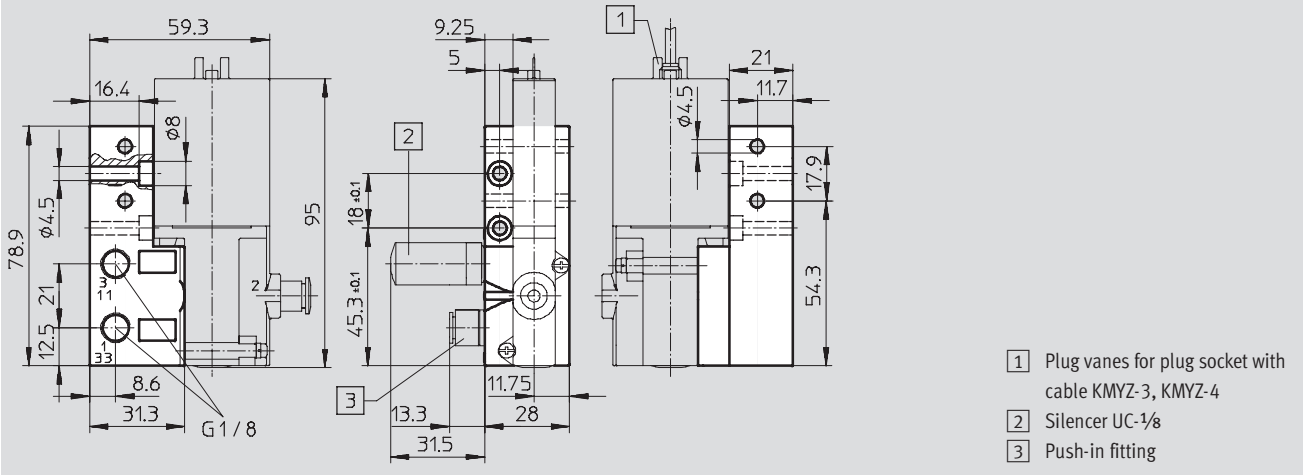
Solenoid valves MHP3, fast-switching valves

Technical data – Semi in-line valve

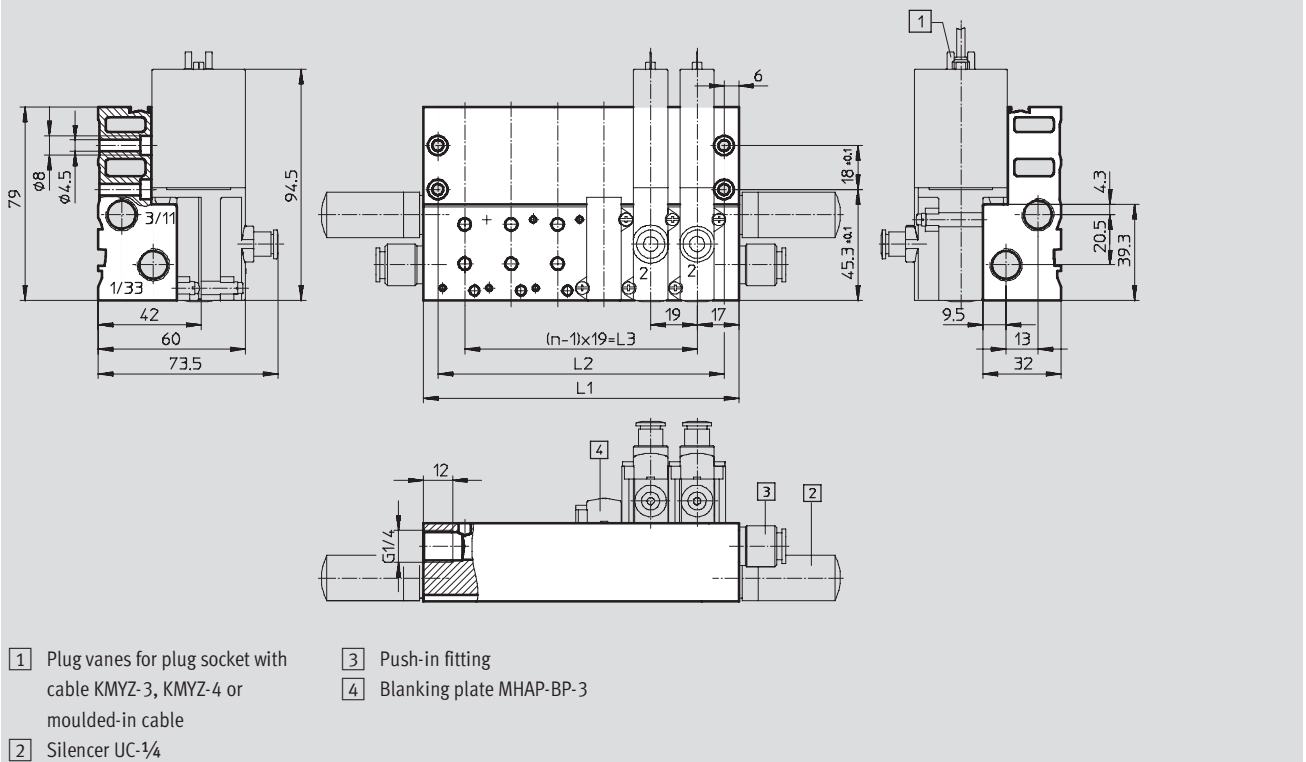
Dimensions

Download CAD data → www.festo.com

Individual sub-base



Manifold mounting



| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|----|
| 2 | 53 | 41 | 19 |
| 4 | 91 | 79 | 57 |
| 6 | 129 | 117 | 95 |

| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|-----|
| 8 | 167 | 155 | 133 |
| 10 | 205 | 193 | 171 |

Solenoid valves MHP3, fast-switching valves

Technical data – Semi in-line valve

Dimensions Download CAD data → www.festo.com

H-rail mounting CPV10/14-VI-BG-NRH-35


1 Manifold block
2 Mounting rail NRH-35

| Type | Valve positions n | L1 |
|-------------|-------------------|-----|
| MHAP3-PR2-3 | 2 | 53 |
| MHAP3-PR4-3 | 4 | 91 |
| MHAP3-PR6-3 | 6 | 129 |

| Type | Valve positions n | L1 |
|--------------|-------------------|-----|
| MHAP3-PR8-3 | 8 | 167 |
| MHAP3-PR10-3 | 10 | 205 |

Ordering data – Valves

| Electrical connection | Operating voltage | Normally closed | | Normally open | |
|-------------------------------|-------------------|-----------------|----------------------|---------------|----------------------|
| | | Part No. | Type | Part No. | Type |
| Response time 3/2.3 ms | | | | | |
| Connecting thread G1/8 | | | | | |
| Plug vanes | 24 V DC | 525 139 | MHP3-MS1H-3/2G-1/8 | 525 159 | MHP3-MS1H-3/20-1/8 |
| Cable | 24 V DC | 525 141 | MHP3-MS1H-3/2G-1/8-K | 525 161 | MHP3-MS1H-3/20-1/8-K |
| Push-in connector QS 6 | | | | | |
| Plug vanes | 24 V DC | 525 143 | MHP3-MS1H-3/2G-QS6 | 525 163 | MHP3-MS1H-3/20-QS6 |
| Cable | 24 V DC | 525 145 | MHP3-MS1H-3/2G-QS6-K | 525 165 | MHP3-MS1H-3/20-QS6-K |
| Response time 8/4.5 ms | | | | | |
| Connecting thread G1/8 | | | | | |
| Plug vanes | 24 V DC | 525 138 | MHP3-M1H-3/2G-1/8 | 525 158 | MHP3-M1H-3/20-1/8 |
| Cable | 24 V DC | 525 140 | MHP3-M1H-3/2G-1/8-K | 525 160 | MHP3-M1H-3/20-1/8-K |
| Push-in connector QS 6 | | | | | |
| Plug vanes | 24 V DC | 525 142 | MHP3-M1H-3/2G-QS6 | 525 162 | MHP3-M1H-3/20-QS6 |
| Cable | 24 V DC | 525 144 | MHP3-M1H-3/2G-QS6-K | 525 164 | MHP3-M1H-3/20-QS6-K |

-  - Note
Type 3/2G and type 3/20 valves must not be mixed on a manifold block.

Solenoid valves MHP3, fast-switching valves

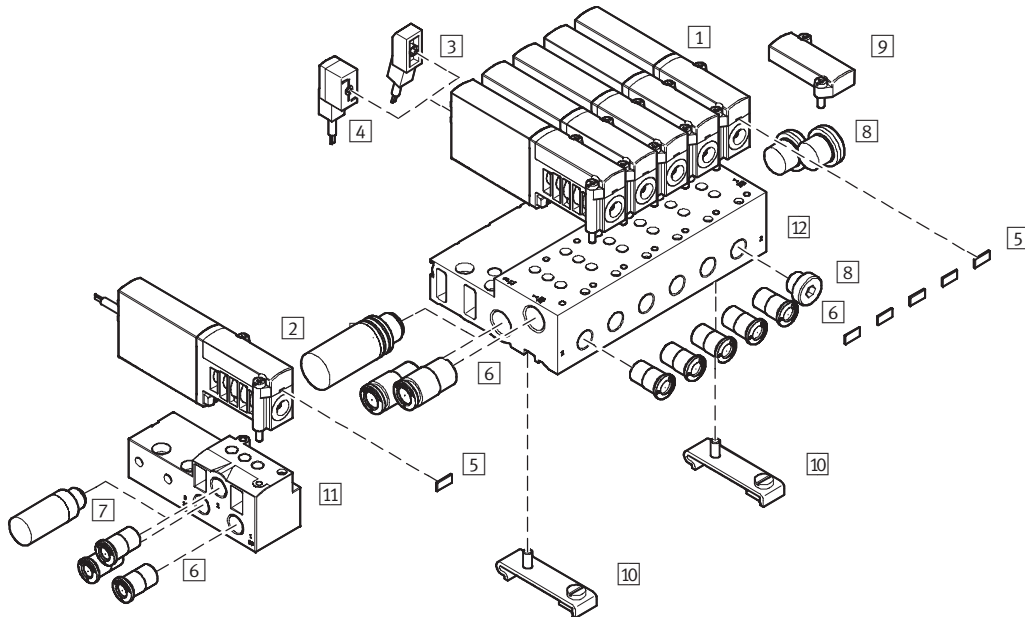
Technical data – Semi in-line valve

| Ordering data – Product-specific accessories | | | |
|--|-----------|----------|---------------|
| Designation | | Part No. | Type |
| Individual sub-base | | | |
| For semi in-line valve | | 525 214 | MHA3-AS-3-1/8 |
| Manifold block | | | |
| For semi in-line valve | 2 valves | 525 216 | MHP3-PR2-1/8 |
| | 4 valves | 525 217 | MHP3-PR4-1/8 |
| | 6 valves | 525 218 | MHP3-PR6-1/8 |
| | 8 valves | 525 219 | MHP3-PR8-1/8 |
| | 10 valves | 525 220 | MHP3-PR10-1/8 |

Solenoid valves MHA3, fast-switching valves

Peripherals overview – Sub-base valve

Connection with plug vanes – Connection with moulded-in cable

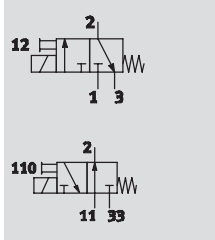


| Valves and accessories | | |
|------------------------|--|---|
| | Brief description | → Page/Internet |
| 1 | Sub-base valve MHA3-... | With plug vanes 59 |
| 2 | Sub-base valve MHA3-...-K | With cable 59 |
| 3 | Plug socket with cable KMYZ-4 (IP 40) | With PVC cable 64 |
| 4 | Plug socket with cable KMYZ-3 (IP 65) | With LED, PUR cable, with M8 plug or open end 64 |
| 5 | Inscription label MH-BZ-80X | For identifying the valves 64 |
| 6 | Push-in fittings QS | For connecting compressed air tubing with standard O.D. quick star |
| 7 | Silencer UC | For fitting in exhaust ports uc |
| 8 | Blanking plug B | For sealing unused ports 64 |
| 9 | Blanking plate MHAP3-BP-3 | For sealing vacant positions 64 |
| 10 | H-rail mounting CPV10/14-VI-BG-NRH-35 | – 64 |
| 11 | Individual sub-base MHA3-AS-3-1/8 | For sub-base valve 62 |
| 12 | Manifold block MHA3-PR...-3-1/8 | For sub-base valve 62 |

Solenoid valves MHA3, fast-switching valves

Technical data – Sub-base valve

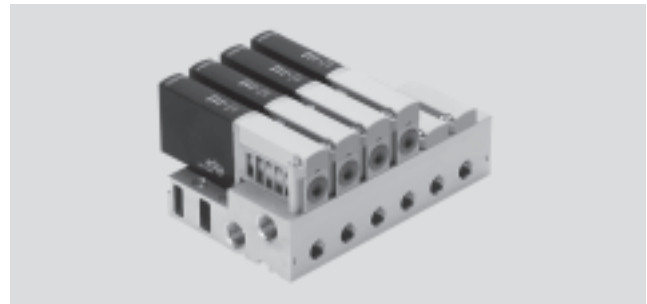
Function



- - Voltage
24 V DC

- - Pressure
-0.9 ... +8 bar

- - Temperature range
-5 ... +40 °C



| General technical data | |
|----------------------------|--|
| Valve function | 3/2 way, single solenoid ¹⁾ |
| Design | Pressure-relieved poppet valve |
| Sealing principle | Soft |
| Control type | Electric |
| Actuation type | Direct |
| Direction of flow | Reversible with restrictions ²⁾ |
| Exhaust function | With flow control |
| Manual override | Non-detenting |
| Assembly position | Any |
| Grid dimension | [mm] 19 |
| Nominal diameter | [mm] 3 |
| Standard nominal flow rate | [l/min] 200 |
| Type of mounting | On sub-base or manifold, via through-hole |
| Pneumatic connection | Connecting thread G1/8 |
| Product weight | [g] 120 |

- 1) Can be used as a 2/2 way valve by sealing connection 3 or 33
 2) There may be slight leakage in the pressure range -0.5 to +0.5 bar

| Operating and environmental conditions | |
|--|---|
| Operating medium | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] -0.9 ... +8 |
| Operating pressure, reversible | [bar] -0.9 ... 0 |
| Ambient temperature | [°C] -5 ... +40 |
| Temperature of medium | [°C] -5 ... +40 |
| Corrosion resistance class CRC | 2 ¹⁾ |
| Certification | c UL us - Recognised (OL) |

- 1) Corrosion resistance class 2 according to Festo standard 940 070
 Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Solenoid valves MHA3, fast-switching valves

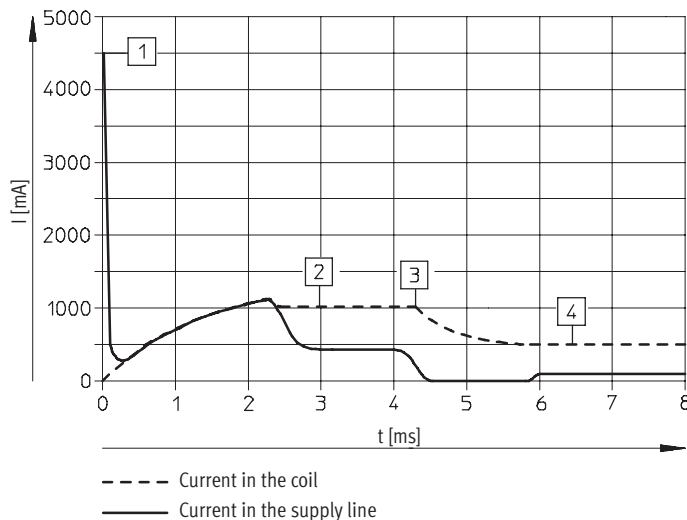
Technical data – Sub-base valve

| Electrical data | | |
|--|--------|--------------------------------|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes or moulded-in cable |
| Power consumption | | |
| With fast-switching electronics | [W] | Pull: 6.5 Hold: 1.6 |
| Without fast-switching electronics | [W] | 3.7 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMYZ-3 | | IP65 |
| With plug socket with cable KMYZ-3 and plug M8 | | IP65 |
| With plug socket with cable KMYZ-4 | | IP40 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| With fast-switching electronics | | |
| Switching time on/off | [ms] | 3/2.3 +10% ... -30% |
| Maximum switching frequency | [Hz] | 280 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |
| Without fast-switching electronics | | |
| Switching time on/off | [ms] | 8/4.5 |
| Maximum switching frequency | [Hz] | 130 |

1) The ambient temperature must be limited as from 100 Hz.

Current path for valves with fast-switching electronics

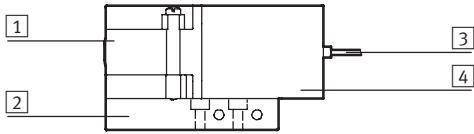


- 1 Capacitor charging
- 2 Controlled coil current 1 A
- 3 Drop to holding current
- 4 Controlled holding current 0.5 A

Solenoid valves MHA3, fast-switching valves

Technical data – Sub-base valve

Materials

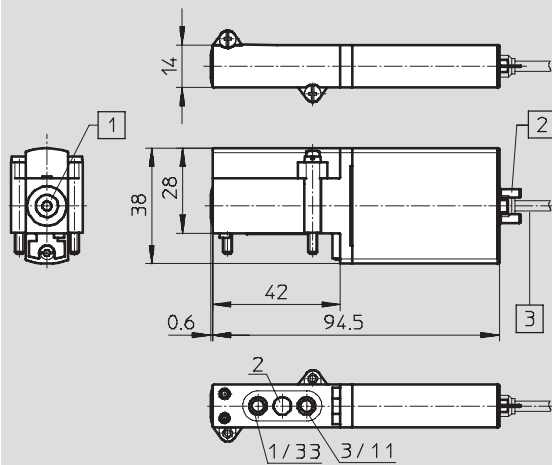


| | | |
|-------------------|--------------|---|
| 1 | Body | Die-cast zinc, coated |
| 2 | Sub-base | Manifold block: Aluminium Individual sub-base: Die-cast zinc |
| 3 | Cable sheath | Polyurethane |
| 4 | Coil housing | Polyamide |
| - | Seals | Nitrile rubber/ hydrogenated nitrile rubber |
| Note on materials | | Free of copper and PTFE |

Dimensions

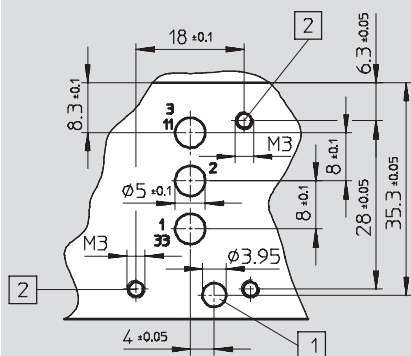
Download CAD data → www.festo.com

Valve



- 1 Manual override, non-detenting
- 2 Plug vanes for plug socket with cable KMYZ-3, KMYZ-4
- 3 Cable 2.5 m

Port pattern on sub-bases



- 1 Hole for coding pin, 2 mm deep
- 2 Mounting thread, 8 mm deep

Note

Semi in-line valves do not require port 2.

If used as a 2/2-way valve, normally closed, port 3/11 is not required.

If used as a 2/2-way valve, normally open, port 1/33 is not required.

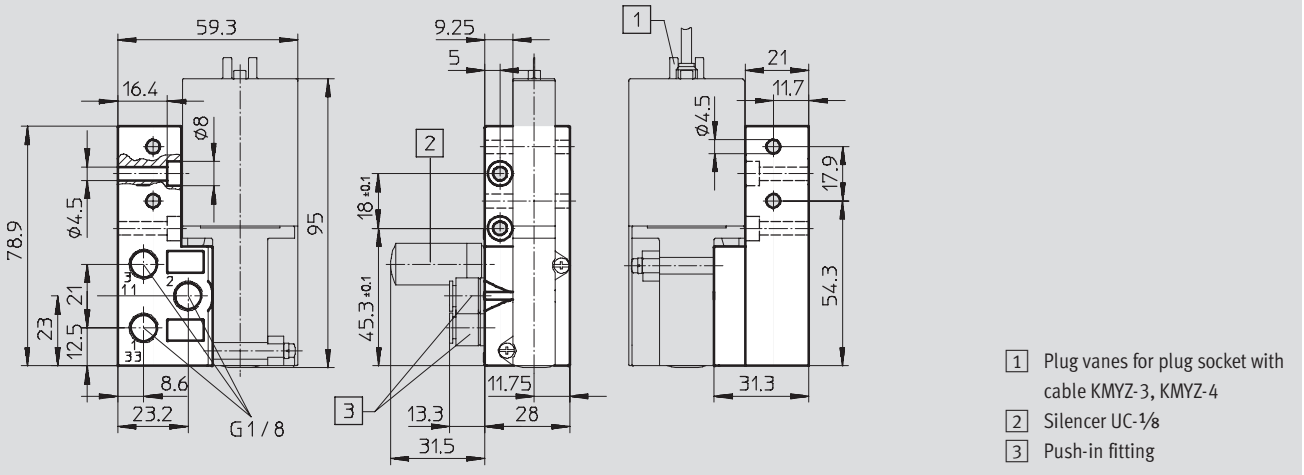
Solenoid valves MHA3, fast-switching valves

Technical data – Sub-base valve

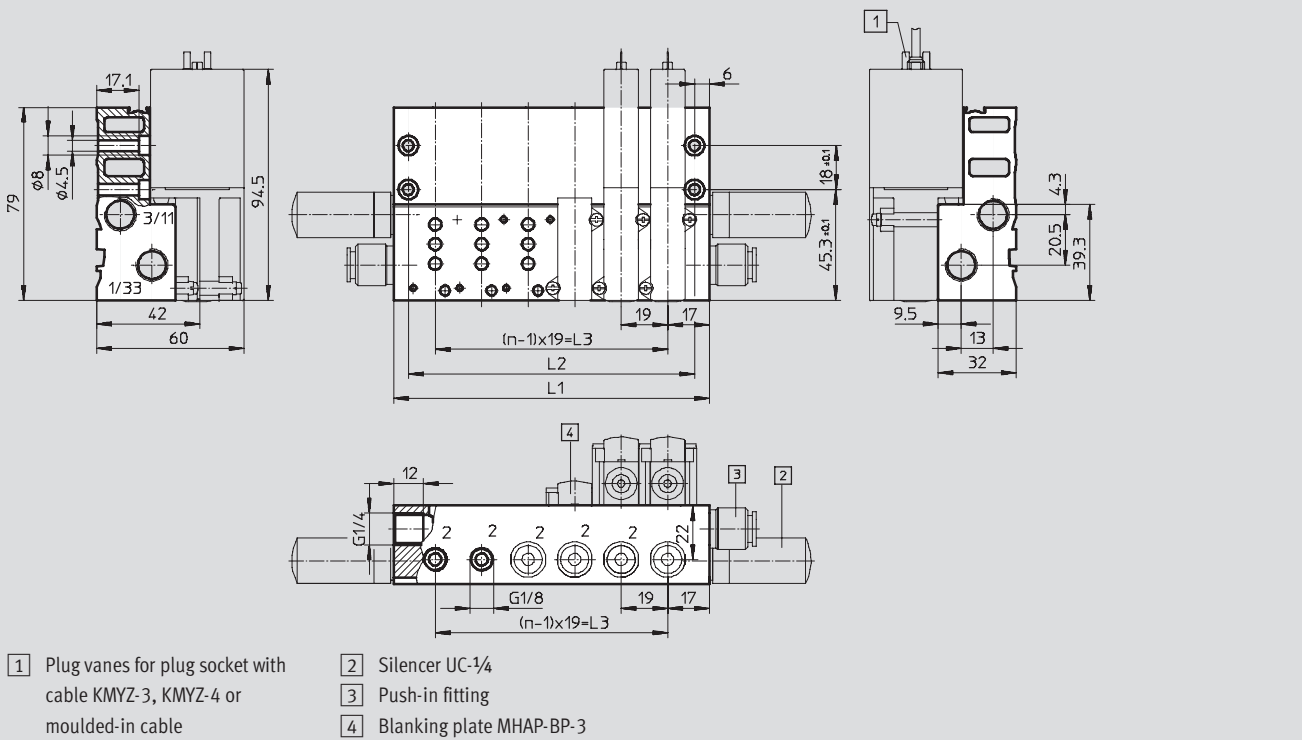
Dimensions

Download CAD data → www.festo.com

Individual sub-base



Manifold mounting



| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|----|
| 2 | 53 | 41 | 19 |
| 4 | 91 | 79 | 57 |
| 6 | 129 | 117 | 95 |

| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|-----|
| 8 | 167 | 155 | 133 |
| 10 | 205 | 193 | 171 |

Solenoid valves MHA3, fast-switching valves

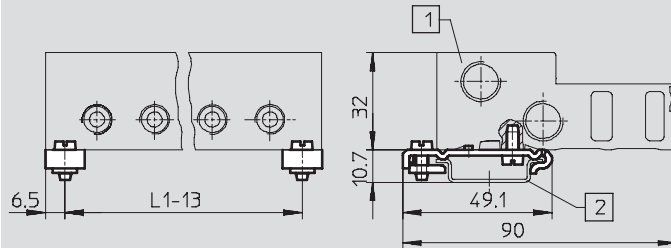
Technical data – Sub-base valve

FESTO

Dimensions

Download CAD data → www.festo.com

H-rail mounting CPV10/14-VI-BG-NRH-35



- 1 Manifold block
- 2 Mounting rail NRH-35

| Type | Valve positions n | L1 |
|-------------|-------------------|-----|
| MHAP3-PR2-3 | 2 | 53 |
| MHAP3-PR4-3 | 4 | 91 |
| MHAP3-PR6-3 | 6 | 129 |

| Type | Valve positions n | L1 |
|--------------|-------------------|-----|
| MHAP3-PR8-3 | 8 | 167 |
| MHAP3-PR10-3 | 10 | 205 |

Ordering data – Valves

| Electrical connection | Operating voltage | Normally closed | | Normally open | |
|-------------------------------|-------------------|-----------------|--------------------|---------------|--------------------|
| | | Part No. | Type | Part No. | Type |
| Response time 3/2.3 ms | | | | | |
| Plug vanes | 24 V DC | 525 135 | MHA3-MS1H-3/2G-3 | 525 155 | MHA3-MS1H-3/20-3 |
| Cable | 24 V DC | 525 137 | MHA3-MS1H-3/2G-3-K | 525 157 | MHA3-MS1H-3/20-3-K |
| Response time 8/4.5 ms | | | | | |
| Plug vanes | 24 V DC | 525 134 | MHA3-M1H-3/2G-3 | 525 154 | MHA3-M1H-3/20-3 |
| Cable | 24 V DC | 525 136 | MHA3-M1H-3/2G-3-K | 525 156 | MHA3-M1H-3/20-3-K |

-  - Note

Type 3/2G and type 3/20 valves must not be mixed on a manifold block.





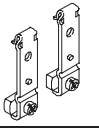





Ordering data – Product-specific accessories

| Designation | Part No. | Type |
|----------------------------|-----------|-----------------------|
| Individual sub-base | | |
| For sub-base valve | 525 214 | MHA3-AS-3-1/8 |
| Manifold block | | |
| For sub-base valve | 2 valves | 525 221 MHA3-PR2-1/8 |
| | 4 valves | 525 222 MHA3-PR4-1/8 |
| | 6 valves | 525 223 MHA3-PR6-1/8 |
| | 8 valves | 525 224 MHA3-PR8-1/8 |
| | 10 valves | 525 225 MHA3-PR10-1/8 |

Solenoid valves MH3, fast-switching valves

Accessories

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| Ordering data | | Part No. | Type | Ordering data | | Part No. | Type |
|---|-------------------------------|----------------|--|---|---------|------------------------|-------------------------|
| Plug socket with cable (IP65) with LED and PUR cable | | | | Plug socket with cable (IP40) with PVC cable | | | |
|  | 2.5 m | 193 693 | KMYZ-3-24-2,5-LED-PUR-B |  | 0.5 m | 193 690 | KMYZ-4-24-0,5-B |
| | 5 m | 193 695 | KMYZ-3-24-5-LED-PUR-B | | 2.5 m | 193 691 | KMYZ-4-24-2.5-B |
| | 10 m | 196 066 | KMYZ-3-24-10-LED-PUR-B | | | | |
| Plug socket with cable (IP65) with LED, PUR cable and M8 plug | | | | Inscription label | | | |
|  | 0.5 m | 525 654 | KMYZ-3-24-M8-0,5-LED-PUR |  | 197 259 | | MH-BZ-80X ¹⁾ |
| | 2.5 m | 525 655 | KMYZ-3-24-M8-2.5-LED-PUR | | | | |
| H-rail mounting | | | | H-rail | | | |
|  | | 162 556 | CPV10/14-VI-BG-NRH-35 |  | 2 m | 35 430 | NRH-35-2000 |
| Blanking plug B | | | | Blanking plate | | | |
|  | G ¹ / ₈ | 3 569 | B- ¹ / ₈ ²⁾ |  | 525 226 | | MHAP3-BP-3 |
| | G ¹ / ₄ | 3 568 | B- ¹ / ₄ ²⁾ | | | | |
| Silencer UC | | | | Push-in fittings QS | | | |
|  | | → Internet: uc | |  | | → Internet: quick star | |

1) Scope of delivery 80 pieces

2) Scope of delivery 10 pieces

Solenoid valves MH4, fast-switching valves

Type codes

MH P 4 - M S 1 H - 3/2 - 0 - QS8

Valve family

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

Design

| | |
|---|--------------------|
| E | Individual valve |
| P | Semi in-line valve |
| A | Sub-base valve |

Size

| | |
|---|---------------------|
| 4 | Flow rate 400 l/min |
|---|---------------------|

Drive function

| | |
|---|---------------------|
| M | Solenoid, switching |
|---|---------------------|

Response time

| | |
|---|--------|
| - | 9 ms |
| S | 3.5 ms |

Operating voltage

| | |
|---|---------|
| 1 | 24 V DC |
|---|---------|

Manual override

| | |
|---|---------------|
| H | Non-detenting |
|---|---------------|

Valve function

| | |
|-----|---------------|
| 3/2 | 3/2-way valve |
|-----|---------------|

Normal position

| | |
|---|--------|
| G | Closed |
| O | Open |

Pneumatic connection

| | |
|-----|--|
| 4 | Nominal size 4 mm |
| 1/4 | G1/4 thread |
| QS8 | Push-in connector for 8 mm O.D. tubing |

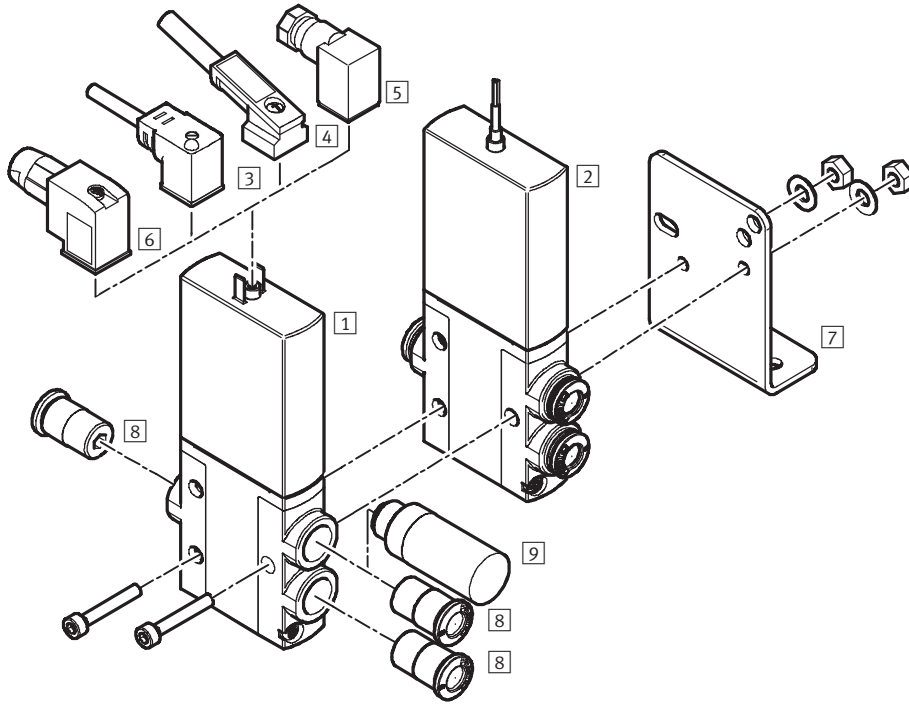
Electrical connection

| | |
|---|-------------------------------------|
| - | Plug vanes for plug socket KMEB-... |
| K | Moulded-in cable, 2.5 m long |

Solenoid valves MHE4, fast-switching valves

Peripherals overview – Individual valve

Connection with plug vanes – Connection with moulded-in cable



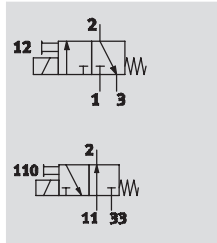
| Valves and accessories | | |
|------------------------|---|---|
| | Brief description | → Page/Internet |
| 1 | Individual valve MHE4-... | With plug vanes 2 / 3.2-67 |
| 2 | Individual valve MHE4-...-K | With cable 2 / 3.2-67 |
| 3 | Plug socket with cable KMEB-1 (IP65) | PVC cable, with or without LED 84 |
| 4 | Plug socket with cable KMEB-2 (IP65) | With LED, without LED; PUR cable, with or without LED 84 |
| 5 | Plug socket MSSD-EB (IP65) | With clamping screw 84 |
| 6 | Plug socket MSSD-EB-S-M14 (IP65) | With insulation displacement connector 84 |
| 7 | Mounting bracket MHE2-BG-L | – 2 / 3.2-70 |
| 8 | Push-in fittings QS | For connecting compressed air tubing with standard O.D. quick star |
| 9 | Silencer UC | For fitting in exhaust ports uc |

Solenoid valves MHE4, fast-switching valves

Technical data – Individual valve

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Function



Voltage
24 V DC



Pressure
-0.9 ... +8 bar



Temperature range
-5 ... +60 °C



| General technical data | | |
|----------------------------|---------|--|
| Valve function | | 3/2 way, single solenoid ¹⁾ |
| Design | | Pressure-relieved poppet valve |
| Sealing principle | | Soft |
| Control type | | Electric |
| Actuation type | | Direct |
| Direction of flow | | Reversible with restrictions ²⁾ |
| Exhaust function | | With flow control |
| Manual override | | Non-detenting |
| Assembly position | | Any |
| Grid dimension | [mm] | 24 |
| Nominal diameter | [mm] | 4 |
| Standard nominal flow rate | [l/min] | 400 |
| Type of mounting | | Via through-holes |
| Pneumatic connection | | Connecting thread G1/8 |
| | | Push-in fitting for tubing O.D. 8 mm |
| Product weight | [g] | 270 |

1) Can be used as a 2/2 way valve by sealing connection 3 or 33

2) There may be slight leakage in the pressure range -0.5 to +0.5 bar

| Operating and environmental conditions | | |
|--|-------|--|
| Operating medium | | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm |
| | | Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] | -0.9 ... +8 |
| Operating pressure, reversible | [bar] | -0.9 ... 0 |
| Ambient temperature | [°C] | -5 ... +60 |
| Temperature of medium | [°C] | -5 ... +60 |
| Corrosion resistance class CRC | | 2 ¹⁾ |
| Certification | | c UL us - Recognised (OL) |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Solenoid valves MHE4, fast-switching valves

Technical data – Individual valve



Application-optimised directional control valves
Fast-switching valves

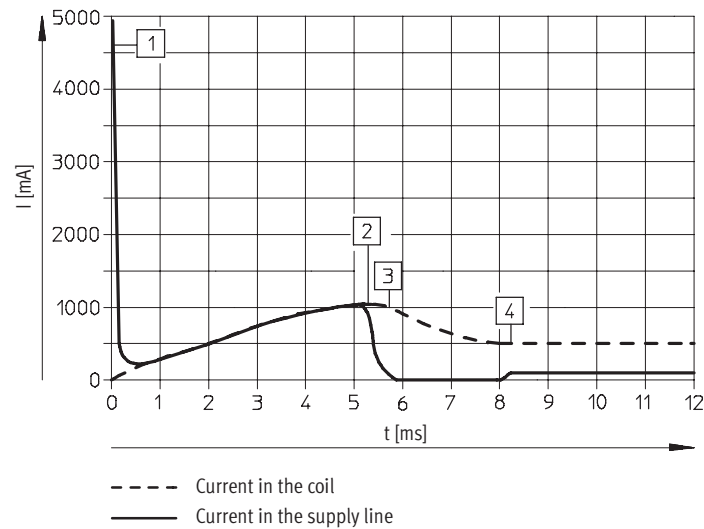
3.2

| Electrical data | | |
|------------------------------------|--------|--------------------------------|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes or moulded-in cable |
| Power consumption | | |
| With fast-switching electronics | [W] | Pull: 8.5 Hold: 2.125 |
| Without fast-switching electronics | [W] | 5,6 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMEB | | IP65 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| With fast-switching electronics | | |
| Switching time on/off | [ms] | 3.5/3.5 +10% ... -30% |
| Maximum switching frequency | [Hz] | 210 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |
| Without fast-switching electronics | | |
| Switching time on/off | [ms] | 9/5 |
| Maximum switching frequency | [Hz] | 120 |

1) The ambient temperature must be limited as from 90 Hz.

Current path for valves with fast-switching electronics



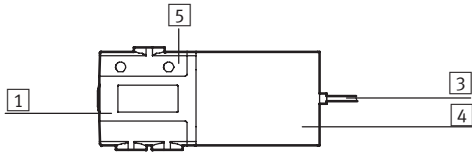
- 1 Capacitor charging
- 2 Controlled coil current 1 A
- 3 Drop to holding current
- 4 Controlled holding current 0.5 A

Solenoid valves MHE4, fast-switching valves

Technical data – Individual valve



Materials



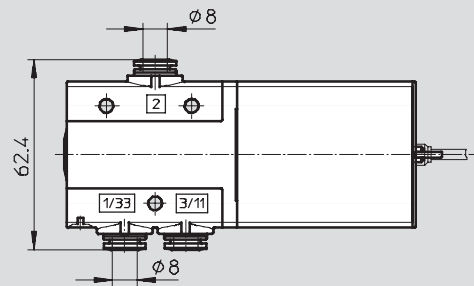
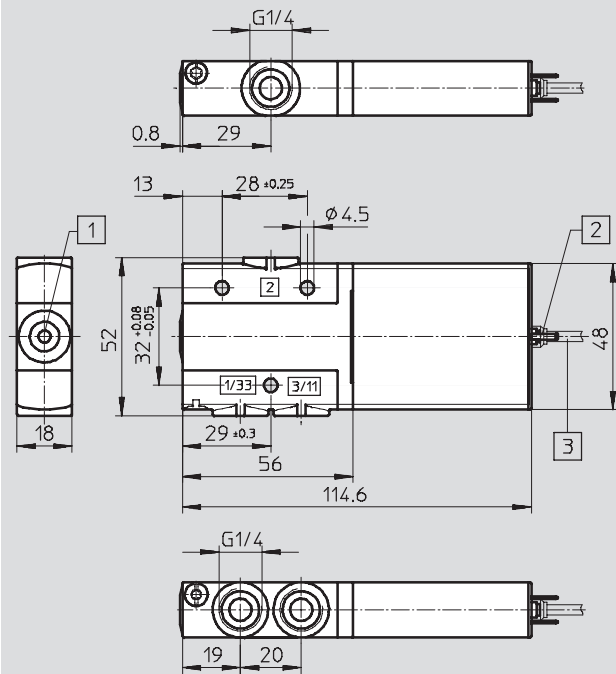
| | | |
|-------------------|------------------|-------------------------|
| 1 | Body | Die-cast zinc, coated |
| 3 | Cable sheath | Polyurethane |
| 4 | Coil housing | Polyamide |
| 5 | Connection piece | Polyamide |
| - | Seals | Nitrile rubber |
| Note on materials | | Free of copper and PTFE |

Dimensions

Download CAD data → www.festo.com/en/engineering

Valve with connecting thread G1/4

Valve with push-in fitting QS 8

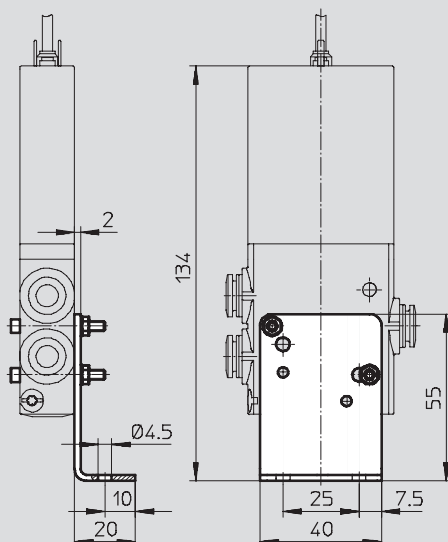


1 Manual override, non-detenting

2 Plug vanes for plug socket with cable KMEB

3 Cable 2.5 m

Mounting bracket MHE2-BG-L



Solenoid valves MHE4, fast-switching valves

Technical data – Individual valve



| Ordering data – Valves | | | | | |
|-----------------------------------|-------------------|-----------------|----------------------------------|---------------|----------------------------------|
| Electrical connection | Operating voltage | Normally closed | | Normally open | |
| | | Part No. | Type | Part No. | Type |
| Response time 3.5/3.5 ms | | | | | |
| Connecting thread G $\frac{1}{4}$ | | | | | |
| Plug vanes | 24 V DC | 525 187 | MHE4-MS1H-3/2G- $\frac{1}{4}$ | 525 207 | MHE4-MS1H-3/2O- $\frac{1}{4}$ |
| Cable | 24 V DC | 525 189 | MHE4-MS1H-3/2G- $\frac{1}{4}$ -K | 525 209 | MHE4-MS1H-3/2O- $\frac{1}{4}$ -K |
| Push-in connector QS 8 | | | | | |
| Plug vanes | 24 V DC | 525 191 | MHE4-MS1H-3/2G-QS8 | 525 211 | MHE4-MS1H-3/2O-QS8 |
| Cable | 24 V DC | 525 193 | MHE4-MS1H-3/2G-QS8-K | 525 213 | MHE4-MS1H-3/2O-QS8-K |
| Response time 9/5 ms | | | | | |
| Connecting thread G $\frac{1}{4}$ | | | | | |
| Plug vanes | 24 V DC | 525 186 | MHE4-M1H-3/2G- $\frac{1}{4}$ | 525 206 | MHE4-M1H-3/2O- $\frac{1}{4}$ |
| Cable | 24 V DC | 525 188 | MHE4-M1H-3/2G- $\frac{1}{4}$ -K | 525 208 | MHE4-M1H-3/2O- $\frac{1}{4}$ -K |
| Push-in connector QS 8 | | | | | |
| Plug vanes | 24 V DC | 525 190 | MHE4-M1H-3/2G-QS8 | 525 210 | MHE4-M1H-3/2O-QS8 |
| Cable | 24 V DC | 525 192 | MHE4-M1H-3/2G-QS8-K | 525 212 | MHE4-M1H-3/2O-QS8-K |

| Ordering data – Product-specific accessories | | | | |
|--|------------|-----------------|----------|-----------|
| Designation | Weight [g] | CRC | Part No. | Type |
| Mounting bracket | 55 | 2 ¹⁾ | 196 165 | MHE2-BG-L |

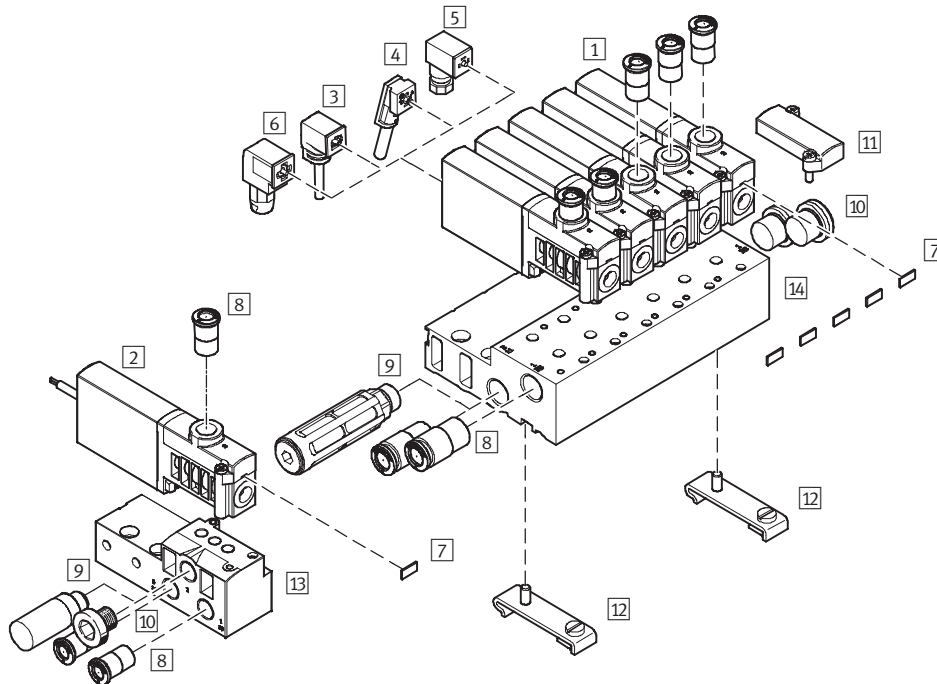
1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Solenoid valves MHP4, fast-switching valves

Peripherals overview – Semi in-line valve

Connection with plug vanes – Connection with moulded-in cable



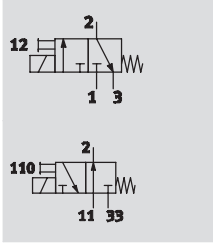
| Valves and accessories | | Brief description | → Page/Internet |
|------------------------|--|---|-----------------|
| 1 | Semi in-line valve MHP4-... | With plug vanes | 72 |
| 2 | Semi in-line valve MHP4-...-K | With cable | 72 |
| 3 | Plug socket MSSD-EB (IP65) | With clamping screw | 84 |
| 4 | Plug socket MSSD-EB-S-M14 (IP65) | With insulation displacement connector | 84 |
| 5 | Plug socket with cable KMEB-1 (IP65) | PVC cable, with or without LED | 84 |
| 6 | Plug socket with cable KMEB-2 (IP65) | PUR cable, with or without LED | 84 |
| 7 | Inscription label MH-BZ-80X | For identifying the valves | 84 |
| 8 | Push-in fittings QS | For connecting compressed air tubing with standard O.D. | quick star |
| 9 | Silencer UC | For fitting in exhaust ports | uc |
| 10 | Blanking plug B | For sealing unused ports | 84 |
| 11 | Blanking plate MHAP4-BP-3 | For sealing vacant positions | 84 |
| 12 | H-rail mounting CPV10/14-VI-BG-NRH-35 | – | 84 |
| 13 | Individual sub-base MHA4-AS-3-1/4 | For semi in-line valve; the individual sub-base is also used for the sub-base valve, the output port must in this case be sealed with a blanking plug | 75 |
| 14 | Manifold block MHP4-PR...-3 | For semi in-line valve | 75 |

Solenoid valves MHP4, fast-switching valves


Technical data – Semi in-line valve


FESTO

Function



-  - Voltage
24 V DC

-  - Pressure
-0.9 ... +8 bar

-  - Temperature range
-5 ... +40 °C



| General technical data | | |
|----------------------------|---------|--|
| Valve function | | 3/2 way, single solenoid ¹⁾ |
| Design | | Pressure-relieved poppet valve |
| Sealing principle | | Soft |
| Control type | | Electric |
| Actuation type | | Direct |
| Direction of flow | | Reversible with restrictions ²⁾ |
| Exhaust function | | With flow control |
| Manual override | | Non-detenting |
| Assembly position | | Any |
| Grid dimension | [mm] | 24 |
| Nominal diameter | [mm] | 4 |
| Standard nominal flow rate | [l/min] | 400 |
| Type of mounting | | On sub-base or manifold, via through-hole |
| Pneumatic connection | | Connecting thread G1/4 |
| | | Push-in fitting for tubing O.D. 8 mm |
| Product weight | [g] | 270 |

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

2) There may be slight leakage in the pressure range -0.5 to +0.5 bar

| Operating and environmental conditions | | |
|--|-------|--|
| Operating medium | | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm |
| | | Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] | -0.9 ... +8 |
| Operating pressure, reversible | [bar] | -0.9 ... 0 |
| Ambient temperature | [°C] | -5 ... +40 |
| Temperature of medium | [°C] | -5 ... +40 |
| Corrosion resistance class CRC | | 2 ¹⁾ |
| Certification | | c UL us - Recognised (OL) |

1) Corrosion resistance class 2 according to Festo standard 940 070

Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Solenoid valves MHP4, fast-switching valves

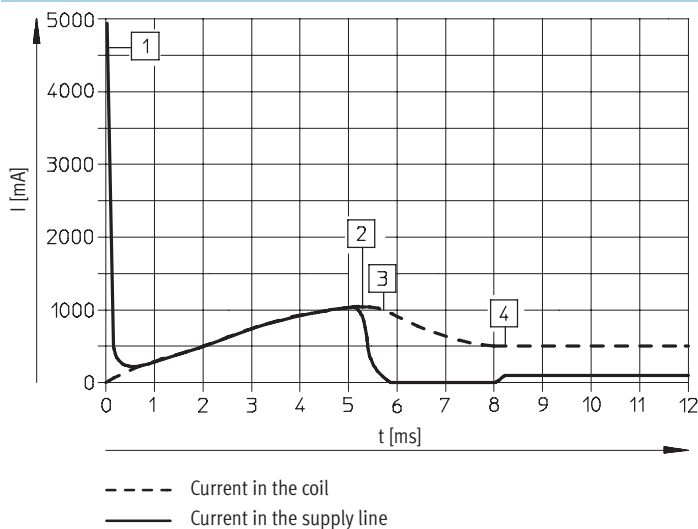
Technical data – Semi in-line valve

| Electrical data | | |
|------------------------------------|--------|--------------------------------|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes or moulded-in cable |
| Power consumption | | |
| With fast-switching electronics | [W] | Pull: 8.5 Hold: 2.125 |
| Without fast-switching electronics | [W] | 5.6 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMEB | | IP65 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| With fast-switching electronics | | |
| Switching time on/off | [ms] | 3.5/3.5 +10% ... -30% |
| Maximum switching frequency | [Hz] | 210 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |
| Without fast-switching electronics | | |
| Switching time on/off | [ms] | 9/5 |
| Maximum switching frequency | [Hz] | 120 |

1) The ambient temperature must be limited as from 100 Hz.

Current path for valves with fast-switching electronics



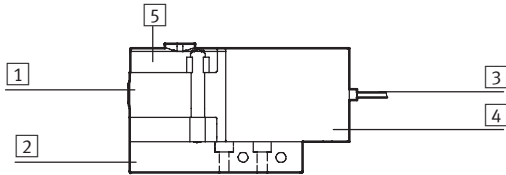
- 1) Capacitor charging
- 2) Controlled coil current 1 A
- 3) Drop to holding current
- 4) Controlled holding current 0.5 A

Solenoid valves MHP4, fast-switching valves

Technical data – Semi in-line valve



Materials



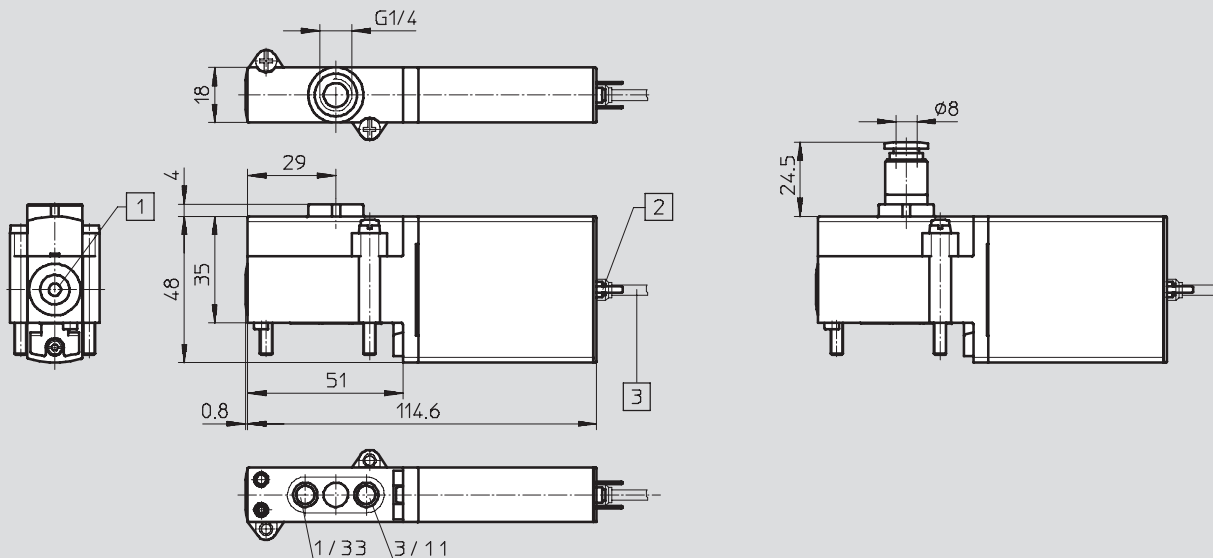
| | | |
|-------------------|------------------|---|
| 1 | Body | Die-cast zinc, coated |
| 2 | Sub-base | Manifold block: Aluminium Individual sub-base: Die-cast zinc |
| 3 | Cable sheath | Polyurethane |
| 4 | Coil housing | Polyamide |
| 5 | Connection piece | Polyamide |
| - | Seals | Nitrile rubber |
| Note on materials | | Free of copper and PTFE |

Dimensions

Download CAD data → www.festo.com

Valve with connecting thread G1/4

Valve with push-in fitting QS 8

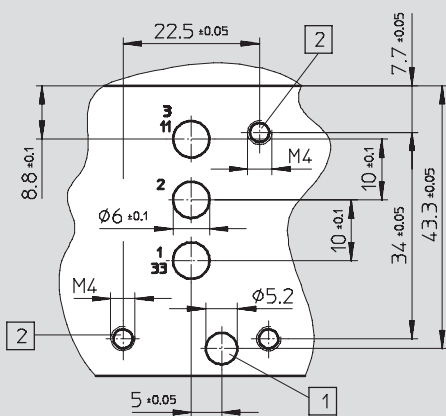


1 Manual override, non-detentting

2 Plug vanes for plug socket with cable KMEB

3 Cable 2.5 m

Port pattern on sub-bases



- 1 Hole for coding pin, 2.5 mm deep
- 2 Mounting thread, 13 mm deep

- - Note

Semi in-line valves do not require port 2.
If used as a 2/2-way valve, normally closed, port 3/11 is not required.
If used as a 2/2-way valve, normally open, port 1/33 is not required.

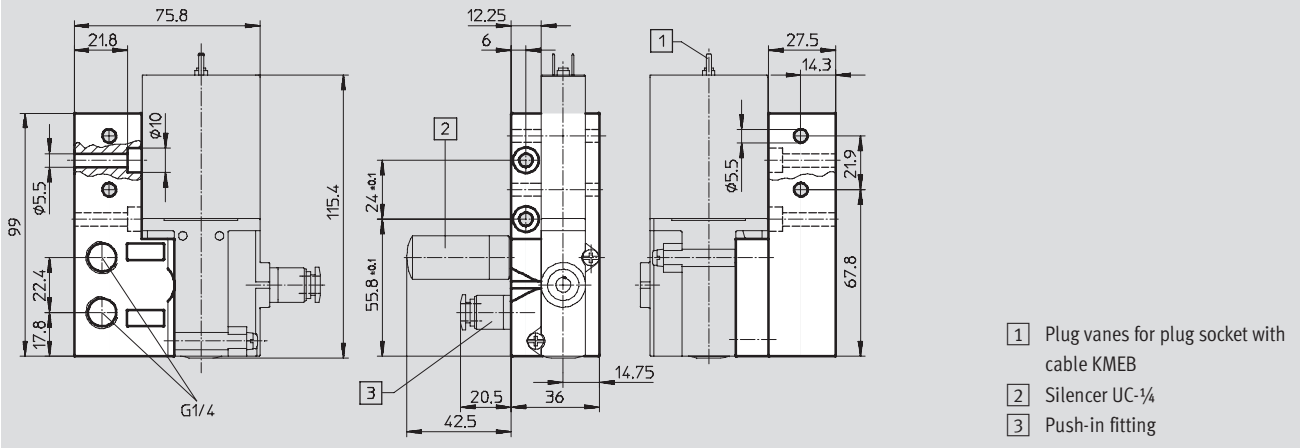
Solenoid valves MHP4, fast-switching valves

Technical data – Semi in-line valve

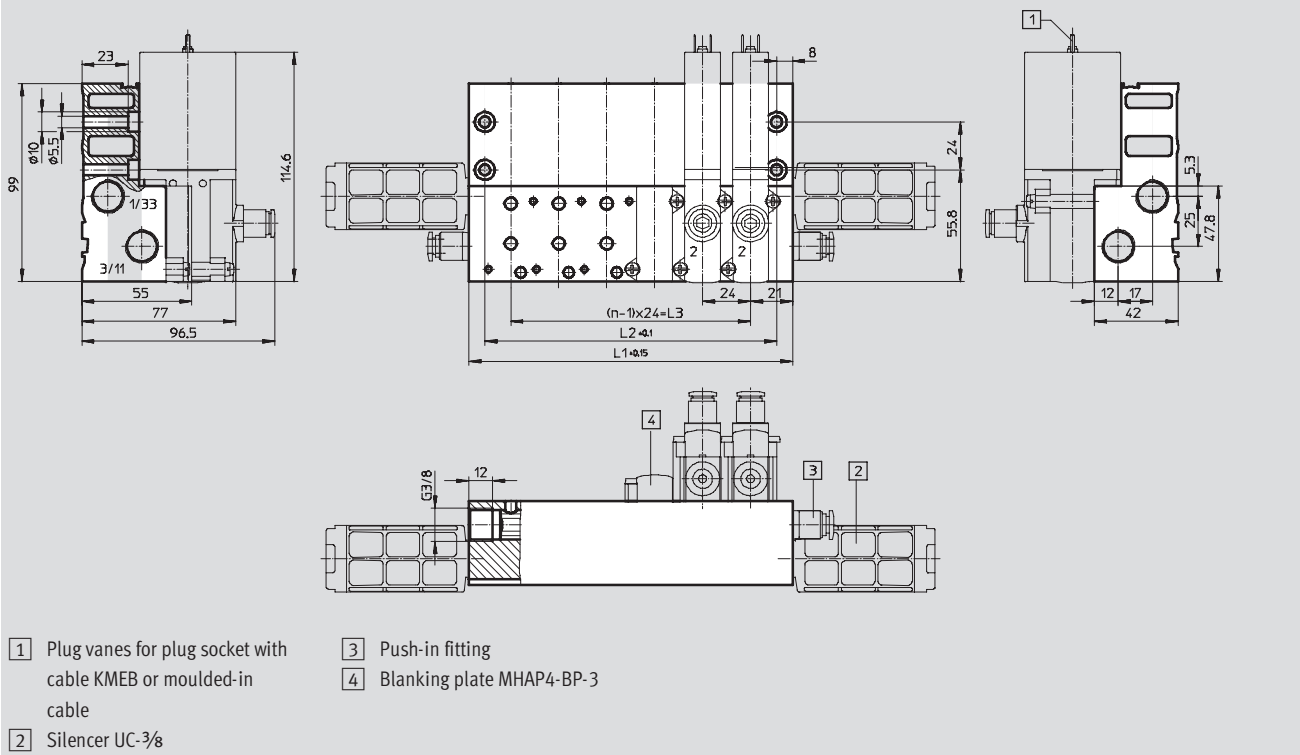
Dimensions

Download CAD data → www.festo.com

Individual sub-base



Manifold mounting



| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|-----|
| 2 | 66 | 50 | 24 |
| 4 | 114 | 98 | 72 |
| 6 | 162 | 146 | 120 |

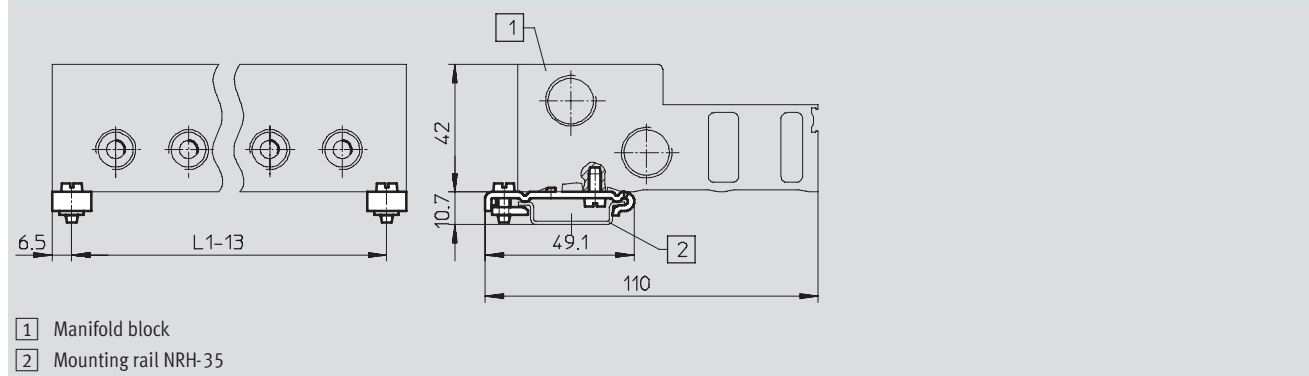
| Valve positions n | L1 | L2 | L3 |
|-------------------|-----|-----|-----|
| 8 | 210 | 194 | 168 |
| 10 | 258 | 242 | 216 |

Solenoid valves MHP4, fast-switching valves

Technical data – Semi in-line valve

Dimensions Download CAD data → www.festo.com

H-rail mounting CPV10/14-VI-BG-NRH-35




| Type | Valve positions n | L1 |
|-----------------|-------------------|-----|
| MHA4/MHP4-PR2-3 | 2 | 66 |
| MHA4/MHP4-PR4-3 | 4 | 114 |
| MHA4/MHP4-PR6-3 | 6 | 162 |

| Type | Valve positions n | L1 |
|------------------|-------------------|-----|
| MHA4/MHP4-PR8-3 | 8 | 210 |
| MHA4/MHP4-PR10-3 | 10 | 258 |

Ordering data – Valves

| Electrical connection | Operating voltage | Normally closed | | Normally open | |
|-----------------------------------|-------------------|-----------------|----------------------------------|---------------|----------------------------------|
| | | Part No. | Type | Part No. | Type |
| Response time 3.5/3.5 ms | | | | | |
| Connecting thread G $\frac{1}{4}$ | | | | | |
| Plug vanes | 24 V DC | 525 179 | MHP4-MS1H-3/2G- $\frac{1}{4}$ | 525 199 | MHP4-MS1H-3/2O- $\frac{1}{4}$ |
| Cable | 24 V DC | 525 181 | MHP4-MS1H-3/2G- $\frac{1}{4}$ -K | 525 201 | MHP4-MS1H-3/2O- $\frac{1}{4}$ -K |
| Push-in connector QS 8 | | | | | |
| Plug vanes | 24 V DC | 525 183 | MHP4-MS1H-3/2G-QS8 | 525 203 | MHP4-MS1H-3/2O-QS8 |
| Cable | 24 V DC | 525 185 | MHP4-MS1H-3/2G-QS8-K | 525 205 | MHP4-MS1H-3/2O-QS8-K |
| Response time 9/5 ms | | | | | |
| Connecting thread G $\frac{1}{4}$ | | | | | |
| Plug vanes | 24 V DC | 525 178 | MHP4-M1H-3/2G- $\frac{1}{4}$ | 525 198 | MHP4-M1H-3/2O- $\frac{1}{4}$ |
| Cable | 24 V DC | 525 180 | MHP4-M1H-3/2G- $\frac{1}{4}$ -K | 525 200 | MHP4-M1H-3/2O- $\frac{1}{4}$ -K |
| Push-in connector QS 8 | | | | | |
| Plug vanes | 24 V DC | 525 182 | MHP4-M1H-3/2G-QS8 | 525 202 | MHP4-M1H-3/2O-QS8 |
| Cable | 24 V DC | 525 184 | MHP4-M1H-3/2G-QS8-K | 525 204 | MHP4-M1H-3/2O-QS8-K |

-  - Note
Type 3/2G and type 3/2O valves must not be mixed on a manifold block.

Solenoid valves MHP4, fast-switching valves

Technical data – Semi in-line valve

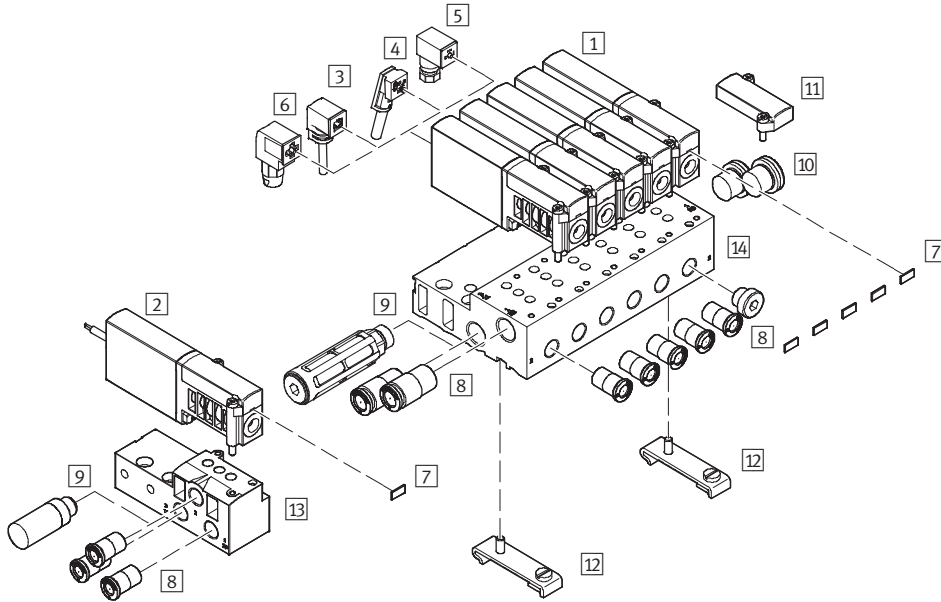
| Ordering data – Product-specific accessories | | | |
|--|-----------|----------|---------------|
| Designation | | Part No. | Type |
| Individual sub-base | | | |
| For semi in-line valve | | 525 227 | MHA4-AS-3-1/4 |
| Manifold block | | | |
| For semi in-line valve | 2 valves | 525 229 | MHP4-PR2-3 |
| | 4 valves | 525 230 | MHP4-PR4-3 |
| | 6 valves | 525 231 | MHP4-PR6-3 |
| | 8 valves | 525 232 | MHP4-PR8-3 |
| | 10 valves | 525 233 | MHP4-PR10-3 |

Solenoid valves MHA4, fast-switching valves

Peripherals overview – Sub-base valve

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Connection with plug vanes – Connection with moulded-in cable

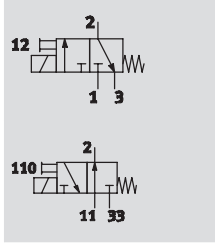





| Valves and accessories | | |
|------------------------|--|---|
| | Brief description | → Page/Internet |
| 1 | Sub-base valve MHA4-... | With plug vanes 84 |
| 2 | Sub-base valve MHA4-...-K | With cable 84 |
| 3 | Plug socket with cable KMEB-1 (IP65) | PVC cable, with or without LED 84 |
| 4 | Plug socket with cable KMEB-2 (IP65) | PUR cable, with or without LED 84 |
| 5 | Plug socket MSSD-EB (IP65) | With clamping screw 84 |
| 6 | Plug socket MSSD-EB-S-M14 (IP65) | With insulation displacement connector 84 |
| 7 | Inscription label MH-BZ-80X | For identifying the valves 84 |
| 8 | Push-in fittings QS | For connecting compressed air tubing with standard O.D. quick star |
| 9 | Silencer UC | For fitting in exhaust ports uc |
| 10 | Blanking plug B | For sealing unused ports 84 |
| 11 | Blanking plate MHAP4-BP-3 | For sealing vacant positions 84 |
| 12 | H-rail mounting CPV10/14-VI-BG-NRH-35 | – 84 |
| 13 | Individual sub-base MHA4-AS-3-1/4 | For sub-base valves 82 |
| 14 | Manifold block MHA4-PR...-3 | For sub-base valves 82 |

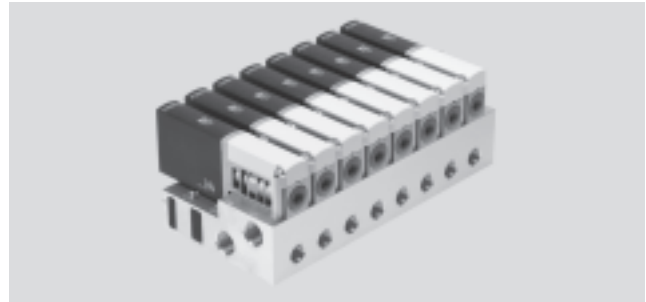
Solenoid valves MHA4, fast-switching valves

Technical data – Sub-base valve

Function



-  Voltage
24 V DC
-  Pressure
-0.9 ... +8 bar
-  Temperature range
-5 ... +40 °C



| General technical data | |
|----------------------------|---|
| Valve function | 3/2 way, single solenoid ¹⁾ |
| Design | Pressure-relieved poppet valve |
| Sealing principle | Soft |
| Control type | Electric |
| Actuation type | Direct |
| Direction of flow | Reversible with restrictions ²⁾ |
| Exhaust function | With flow control |
| Manual override | Non-detenting |
| Assembly position | Any |
| Grid dimension | [mm] 24 |
| Nominal diameter | [mm] 4 |
| Standard nominal flow rate | [l/min] 400 |
| Type of mounting | On sub-base or manifold, via through-hole |
| Pneumatic connection | Connecting thread G ¹ / ₄ |
| Product weight | [g] 270 |

1) Can be used as a 2/2 way valve by sealing connection 3 or 33
 2) There may be slight leakage in the pressure range -0.5 to +0.5 bar

| Operating and environmental conditions | |
|--|---|
| Operating medium | Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm Vacuum, grade of filtration 40 µm |
| Operating pressure | [bar] -0.9 ... +8 |
| Operating pressure, reversible | [bar] -0.9 ... 0 |
| Ambient temperature | [°C] -5 ... +40 |
| Temperature of medium | [°C] -5 ... +40 |
| Corrosion resistance class CRC | 2 ¹⁾ |
| Certification | c UL us - Recognised (OL) |

1) Corrosion resistance class 2 according to Festo standard 940 070
 Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Solenoid valves MHA4, fast-switching valves

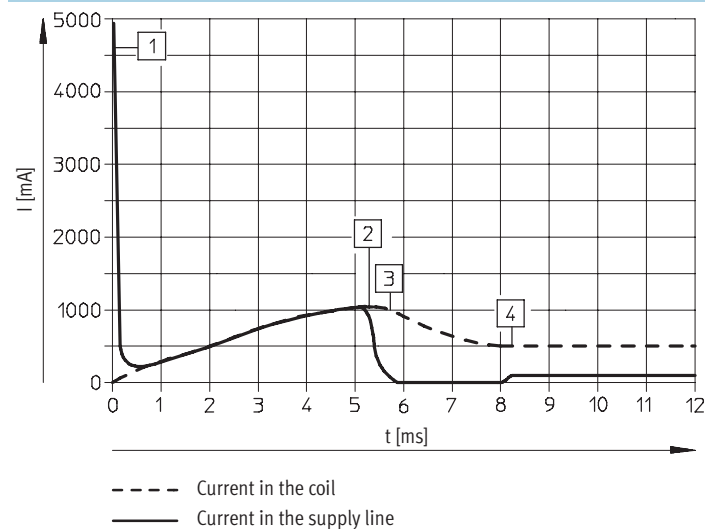
Technical data – Sub-base valve

| Electrical data | | |
|------------------------------------|--------|--------------------------------|
| Operating voltage | [V DC] | 24 ±10% |
| Type of connection | | Plug vanes or moulded-in cable |
| Power consumption | | |
| With fast-switching electronics | [W] | Pull: 8.5 Hold: 2.125 |
| Without fast-switching electronics | [W] | 5.6 |
| Protection class to EN 60529 | | |
| With moulded-in cable | | IP65 |
| With plug socket with cable KMEB | | IP65 |

| Response times and switching frequencies | | |
|--|------|-------------------------------------|
| With fast-switching electronics | | |
| Switching time on/off | [ms] | 3.5/3.5 +10% ... -30% |
| Maximum switching frequency | [Hz] | 210 ¹⁾ |
| CE symbol | | In accordance with EU EMC Directive |
| Without fast-switching electronics | | |
| Switching time on/off | [ms] | 9/5 |
| Maximum switching frequency | [Hz] | 120 |

1) The ambient temperature must be limited as from 100 Hz.

Current path for valves with fast-switching electronics

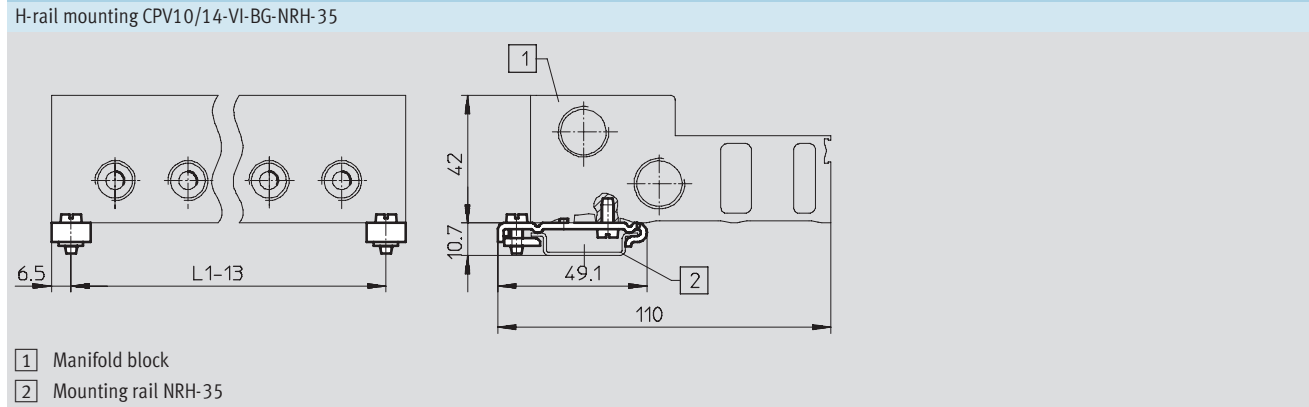


- 1) Capacitor charging
- 2) Controlled coil current 1 A
- 3) Drop to holding current
- 4) Controlled holding current 0.5 A

Solenoid valves MHA4, fast-switching valves


Technical data – Sub-base valve

Dimensions Download CAD data → www.festo.com



| Type | Valve positions n | L1 | Type | Valve positions n | L1 |
|-----------------|-------------------|-----|------------------|-------------------|-----|
| MHA4/MHP4-PR2-3 | 2 | 66 | MHA4/MHP3-PR8-3 | 8 | 210 |
| MHA4/MHP4-PR4-3 | 4 | 114 | MHA4/MHP4-PR10-3 | 10 | 258 |
| MHA4/MHP4-PR6-3 | 6 | 162 | | | |

| Ordering data – Valves | | | | | |
|---------------------------------|-------------------|-----------------|--------------------|---------------|--------------------|
| Electrical connection | Operating voltage | Normally closed | | Normally open | |
| | | Part No. | Type | Part No. | Type |
| Response time 3.5/3.5 ms | | | | | |
| Plug vanes | 24 V DC | 525 175 | MHA4-MS1H-3/2G-4 | 525 195 | MHA4-MS1H-3/2O-4 |
| Cable | 24 V DC | 525 177 | MHA4-MS1H-3/2G-4-K | 525 197 | MHA4-MS1H-3/2O-4-K |
| Response time 9/5 ms | | | | | |
| Plug vanes | 24 V DC | 525 174 | MHA4-M1H-3/2G-4 | 525 194 | MHA4-M1H-3/2O-4 |
| Cable | 24 V DC | 525 176 | MHA4-M1H-3/2G-4-K | 525 196 | MHA4-M1H-3/2O-4-K |

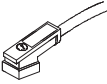

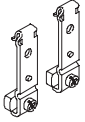


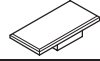


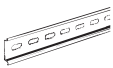


-  - Note
Type 3/2G and type 3/2O valves must not be mixed on a manifold block.

| Ordering data – Product-specific accessories | | | |
|--|-----------|---------------|---------------|
| Designation | Part No. | Type | |
| Individual sub-base | | | |
| For sub-base valve | 525 227 | MHA4-AS-3-1/4 | |
| Manifold block | | | |
| For sub-base valve | 2 valves | 525 234 | MHA4-PR2-1/4 |
| | 4 valves | 525 235 | MHA4-PR4-1/4 |
| | 6 valves | 525 236 | MHA4-PR6-1/4 |
| | 8 valves | 525 237 | MHA4-PR8-1/4 |
| | 10 valves | 525 238 | MHA4-PR10-1/4 |

Solenoid valves MH4, fast-switching valves

Accessories

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| Ordering data | | | |
|---|----------|-------------------------|---------------------|
| | Part No. | Type | |
| Plug socket with cable (IP65) with PUR cable | | | |
|  | 2.5 m | 174 844 | KMEB-2-24-2,5-LED |
| | 5 m | 174 845 | KMEB-2-24-5-LED |
| | 2.5 m | 174 846 | KMEB-2-230-2,5 |
| | 5 m | 174 847 | KMEB-2-230-5 |
| Plug socket with screw terminal | | | |
|  | 151 687 | MSSD-EB | |
| H-rail mounting | | | |
|  | 162 556 | CPV10/14-VI-BG-NRH-35 | |
| Blanking plug B | | | |
|  | G1/4 | 3 568 | B-1/4 ²⁾ |
| | G3/8 | 3 570 | B-3/8 ²⁾ |
| Silencer UC | | | |
|  | | → Internet: uc | |
| Inscription label | | | |
|  | 197 259 | MH-BZ-80X ¹⁾ | |
| Plug socket with cable (IP65) with PVC cable | | | |
|  | 2.5 m | 151 688 | KMEB-1-24-2,5-LED |
| | 5 m | 151 689 | KMEB-1-24-5-LED |
| | 10 m | 193 457 | KMEB-1-24-10-LED |
| | 2.5 m | 151 690 | KMEB-1-230AC-2,5 |
| | 5 m | 151 691 | KMEB-1-230AC-5 |
| Plug sockets with insulation displacement connector | | | |
|  | 192 745 | MSSD-EB-S-M14 | |
| H-rail | | | |
|  | 2 m | 35 430 | NRH-35-2000 |
| Blanking plate | | | |
|  | 525 239 | MHAP4-BP-3 | |
| Push-in fittings QS | | | |
|  | | → Internet: quick star | |

1) Scope of delivery 80 pieces

2) Scope of delivery 10 pieces

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