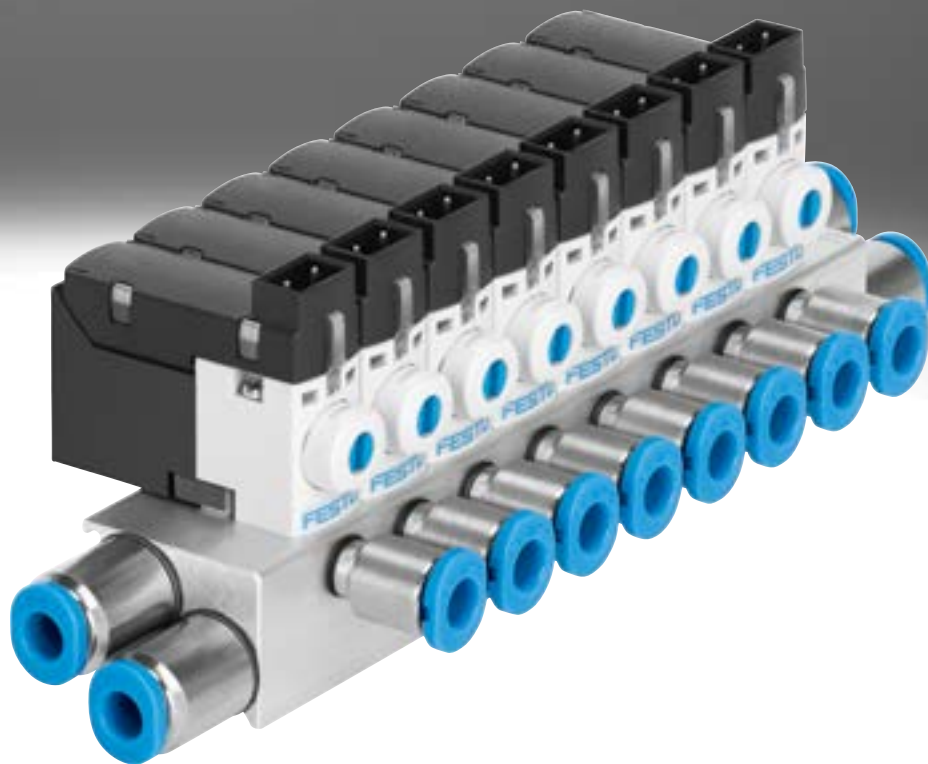


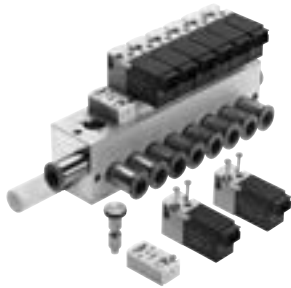
## Solenoid valves MH1, miniature

**FESTO**



## Key features

### Complete product range for a variety of applications



#### Extremely small

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

#### Extremely versatile and fast

The miniature valves can be linked together via a pneumatic multiple connector plate or electrical multi-pin connection. There is also a choice between horizontal electrical connections, on top and underneath. Another interesting variant: mounting on a circuit board including connection. All components are tested and assembled for Festo plug and work. And if a system needs to run as fast as possible, that's no problem! The response time of the miniature valves is 4 ms.

#### Totally coordinated

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

### Miniature valves not just for the electronics industry



They can also be used in the light assembly, medical technology and semiconductor industries and wherever extremely compact and fast-switching valves or pilot valves are required for valves coming into contact with media (e.g. process industry).

With response times of approx. 4 ms, these valves satisfy all requirements for speed. Vacuum functions can also be easily implemented. The 100% duty cycle and the three-shift operation guarantee maximum cost-effectiveness.

With flow rates of 10 and 14 l/min for the miniature valves, there is always sufficient volume for pilot control of process valves. The flow rate is also adequate for the wide range of compact cylinders, rotary drives and slides from Festo.

For increased requirements of up to 100 l/min: MH2.

## Key features – Pneumatic components

## Operation with different pressures

## Vacuum operation

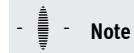
The flow direction of the MH1 valves is clearly defined and cannot be reversed.

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

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

## Reverse operation

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

**Note**

Vacuum must not be connected to port 1.

## 2/2-way valve

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

## 3/2-way valve

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

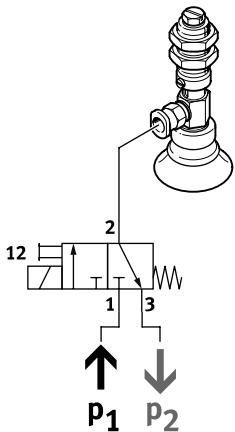
## 3/2-way valve

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

## 2x2/2-way valve

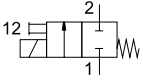
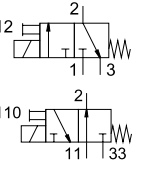
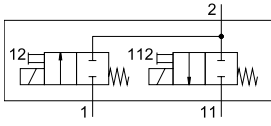
- Vacuum operation is realised by connecting vacuum at port 11
- The ejector pulse is connected at port 1

## Example

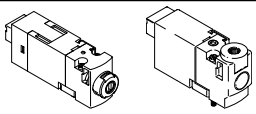
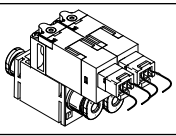
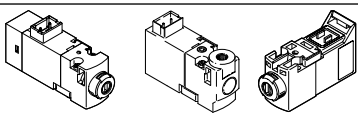
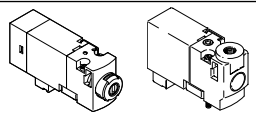


With the 3/2-way valve, normally closed, vacuum operation is realised by connecting the vacuum (P2) to port 3 and connecting e.g. a silencer for venting (P1) to port 1. This changes the normal position from "closed" to "open".

Product range overview

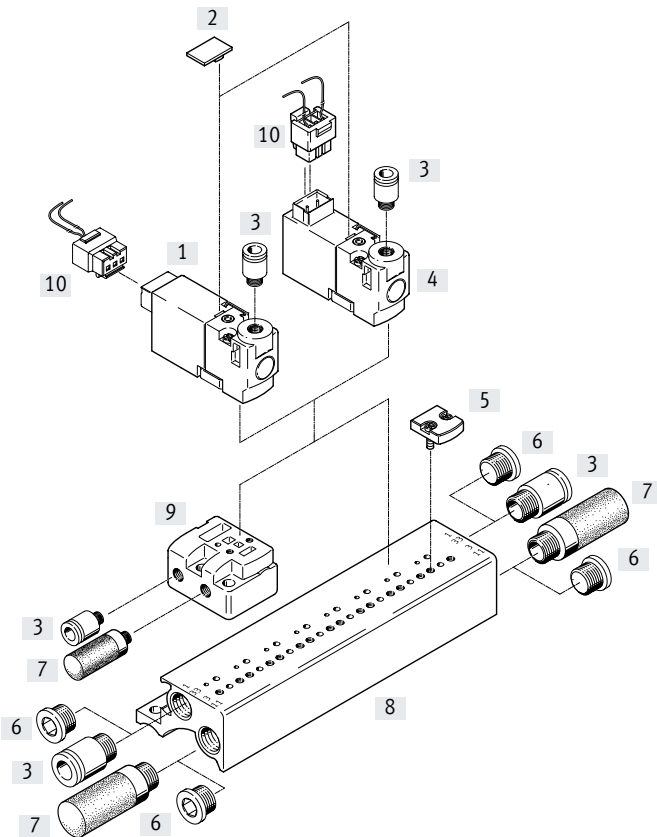
Function	Circuit symbol	Design	Operating voltage			→ Page/Internet
			5 V DC	12 V DC	24 V DC	
<b>2/2-way valve</b>		<b>Standard nominal flow rate 14 l/min</b>				
		Semi in-line valve	■	■	■	9
		Sub-base valve without LED	■	■	■	22
		<b>Standard nominal flow rate 30 l/min, controls vacuum or ejector pulse</b>				
		Sub-base valve with LED	-	-	■	55
<b>3/2-way valve<sup>1)</sup></b>		<b>Standard nominal flow rate 10 l/min</b>				
		Semi in-line valve	■	■	■	9
		Sub-base valve without LED	■	■	■	22
		Sub-base valve with E-box	■	■	■	34
		Sub-base valve with LED	-	-	■	42
<b>2x2/2-way valve</b>		<b>Standard nominal flow rate 30 l/min, controls vacuum and ejector pulse</b>				
		Sub-base valve with LED	-	-	■	55

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

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

## Peripherals overview

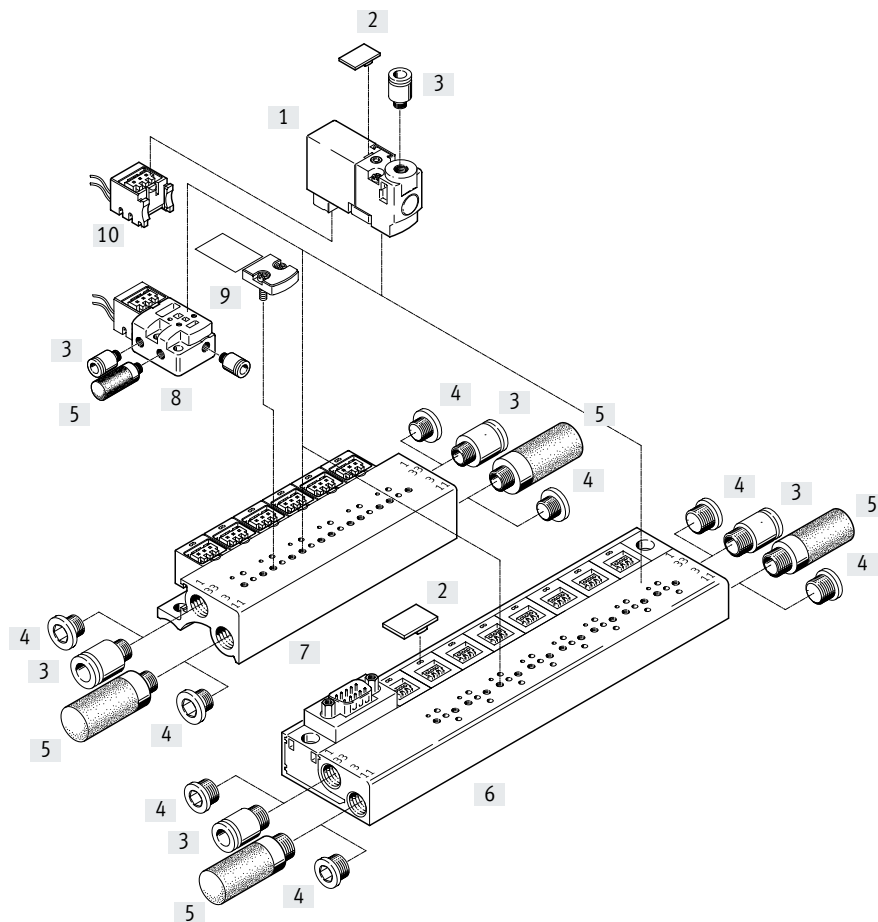
## Valves with plug connection at the rear, plug connection on top



Designation	Description	→ Page/Internet
[1] Solenoid valve	Valve with plug connection at the rear	15
[2] Inscription label	For identifying the valve positions	17
[3] Push-in fitting	For connecting compressed air tubing with standard O.D.	17
[4] Solenoid valve	Valve with plug connection on top	15
[5] Cover plate	For manifold rail without plug bases	16
[6] Blanking plug	For sealing unused connections	17
[7] Silencer	For exhaust ports	17
[8] Manifold rail	Without plug bases	16
[9] Individual sub-base	For valves with plug connection at the rear, plug connection on top	16
[10] Plug socket with cable	Straight socket, plug pattern H, 3-pin	18

## Peripherals overview

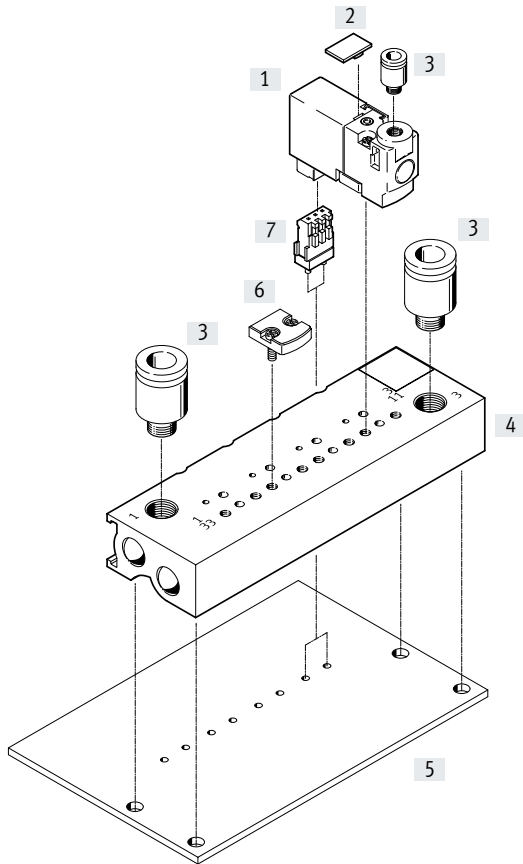
### Valves with plug connection underneath



Designation	Description	→ Page/Internet
[1] Solenoid valve	Valve with plug connection underneath	15
[2] Inscription label	For identifying the valve positions	17
[3] Push-in fitting	For connecting compressed air tubing with standard O.D.	17
[4] Blanking plug	For sealing unused connections	17
[5] Silencer	For exhaust ports	17
[6] Manifold rail	With plug bases and electrical multi-pin plug, Sub-D	16
[7] Manifold rail	With plug bases	16
[8] Individual sub-base	For valves with plug connection underneath	16
[9] Cover plate	For manifold rail with plug bases	16
[10] Electrical plug-in base	Straight socket, plug pattern H, 3-pin	18

## Peripherals overview

## Valves with plug connection underneath, PCB mounting




Designation	Brief description	→ Page/Internet
[1] Solenoid valve	Valve with plug connection underneath	15
[2] Inscription label	For identifying the valve positions	17
[3] Push-in fitting	For connecting compressed air tubing with standard O.D.	17
[4] Manifold rail	Without plug bases, for PCB mounting	16
[5] PCB	Not included in the scope of delivery	-
[6] Cover plate	For manifold rail without plug bases	16
[7] Soldering base	For PCB mounting, 3-pin	18

## Type codes

001		Series
MHP1	Solenoid valve MHP1	
MHA1	Solenoid valve MHA1	
002		Drive system
M	Solenoid, switching	
003		Nominal operating voltage
1	24 V DC	
4	5 V DC	
5	12 V DC	
004		Display
	None	
L	LED	
005		Manual override
H	Non-detenting	
R	Non-detenting, detenting	
006		Valve function
2/2	2/2-way valve	
3/2	3/2-way valve	
2X2/2	Double 2/2-way valve on sub-base	

007		Normal position
G	Closed	
O	Open	
008		Nominal size
0,6	0.65 mm	
0,9	0.9 mm	
1,5	1.5 mm	
009		Pneumatic connection
M3	Thread M3	
010		Electrical connection
	With connection for 10 mm cartridge	
HC	Rear plug connection for plug socket NEBV-H1G2	
TC	Plug connection on top for plug socket NEBV-H1G2	
PI	Plug connection underneath for plug-in connection	
P3	Without plug connection	
333	With push-in connector for tubing O.D. 3 mm	
444	With push-in connector for tubing O.D. 4 mm	
443	With push-in connector for tubing O.D. 4 mm, connection 2 with push-in connector for tubing O.D. 3 mm	

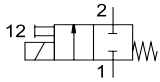
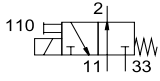
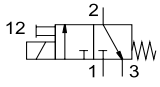
 - **Note**


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





## Datasheet

## Function



-  - Voltage  
5 V DC  
12 V DC  
24 V DC

-  - Pressure  
-0.9 ... +8 bar

-  - Temperature range  
-5 ... +40°C



General technical data				
Type	MHP1-...-2/2G-...	MHP1-...-3/2G-...	MHP1-...-3/2O-...	
Valve function	2/2-way solenoid valve		3/2-way solenoid valve	
	Normally closed		Normally closed	
	Single solenoid		Single solenoid	
Design	Poppet valve with spring return			
Sealing principle	Soft			
Actuation type	Electrical			
Reset method	Mechanical spring			
Type of control	Direct			
Direction of flow	Not reversible			
Suitability for vacuum	Yes	-	-	
Exhaust function	Cannot be throttled	Can be throttled	Can be throttled	
Manual override	Non-detenting			
Type of mounting	On sub-base via through-hole			
Mounting position	Any			
Nominal width	[mm]	0.9	0.65	0.7
Standard nominal flow rate	[l/min]	14 (2 bar > 0 bar)	10	10
Grid dimension	[mm]	10	10	10
Pneumatic connection	1	Sub-base	Sub-base	-
	2	M3	M3	M3
	3	-	Sub-base	-
	11	-	-	Sub-base
	33	-	-	Sub-base
Product weight	[g]	10	10	10

Operating and environmental conditions				
Type	MHP1-...-2/2G-...	MHP1-...-3/2G-...	MHP1-...-3/2O-...	
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]			
Note on the operating/pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)			
Operating pressure	[MPa]	-0.09 ... +0.2	0 ... 0.8 <sup>1)</sup>	0 ... 0.6 <sup>1)</sup>
	[bar]	-0.9 ... +2	0 ... 8 <sup>1)</sup>	0 ... 6 <sup>1)</sup>
	[psi]	-13.05 ... +29	0 ... 116 <sup>1)</sup>	0 ... 87 <sup>1)</sup>
Ambient temperature	[°C]	-5 ... +40		
Temperature of medium	[°C]	-5 ... +40		
Storage temperature	[°C]	-20 ... +60		
Corrosion resistance class CRC <sup>2)</sup>	2			
Certification	c UL us - Recognized (OL)			
	c CSA us - Recognized (OL)			

1) Vacuum operation possible with special connection method → page 4

2) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

## Datasheet

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

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

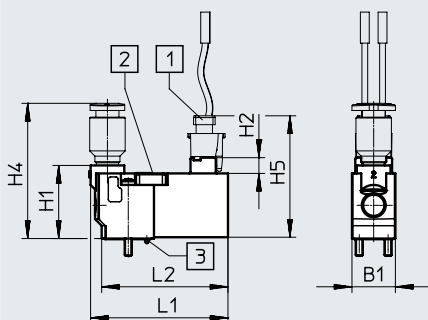
Switching times and frequencies					
Type			MHP1-...-2/2G-...	MHP1-...-3/2G-...	MHP1-...-3/20-...
Switching time	On	[ms]	4	4	4
	Off	[ms]	5	4	4
Maximum switching frequency		[Hz]	20	20	20

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

### Dimensions

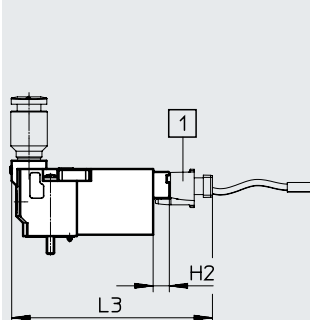
Download CAD data → [www.festo.com](http://www.festo.com)

Plug connection on top



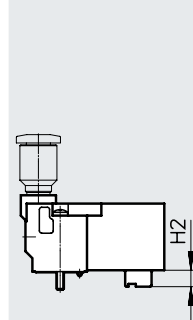
- [1] Plug socket NEBV-H1G2  
[2] Manual override  
[3] Coding pin

Plug connection at the rear



- [1] Plug socket NEBV-H1G2

Plug connection underneath

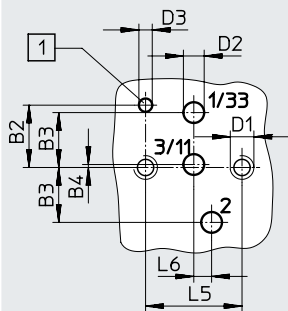


Type	B1	H1	H2	H4	H5	L1	L2	L3
MHP1	9.8	16.5	3.6	30.5	27.4	31	28.5	44

Datasheet

Dimensions – Hole pattern on sub-bases

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



[1] Hole for coding pin

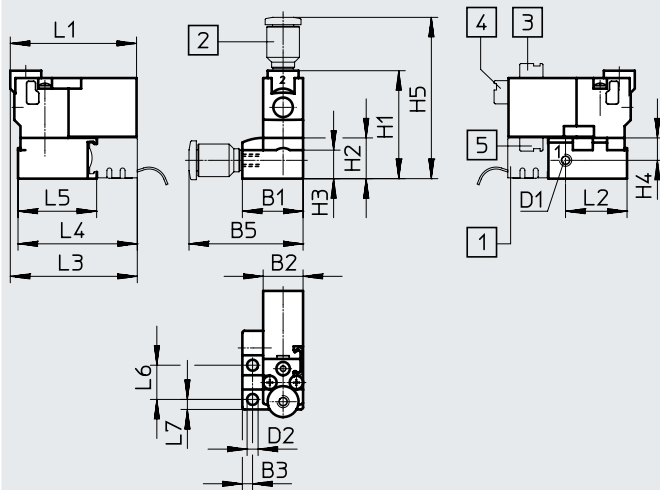
- With semi in-line valves, port 2 is not used.
- If used as a 2/2-way valve, normally closed, ports 3/11 are not used.
- If used as a 2/2-way valve, normally open, ports 1/33 are not used.

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

Dimensions – Assembly on individual sub-base

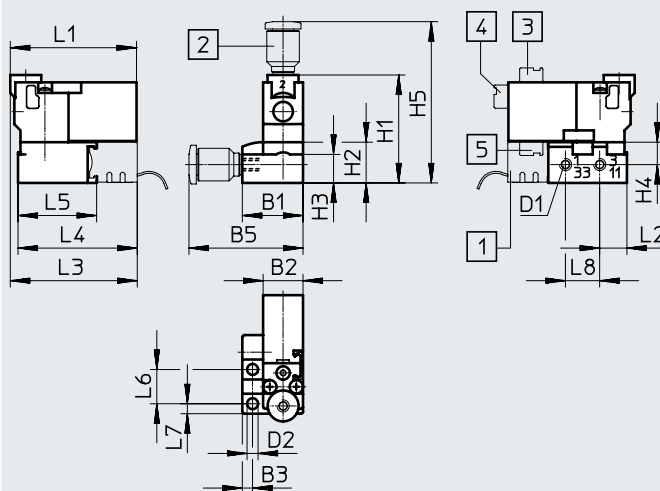
Download CAD data → [www.festo.com](http://www.festo.com)

2/2-way valve



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

3/2-way valve



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

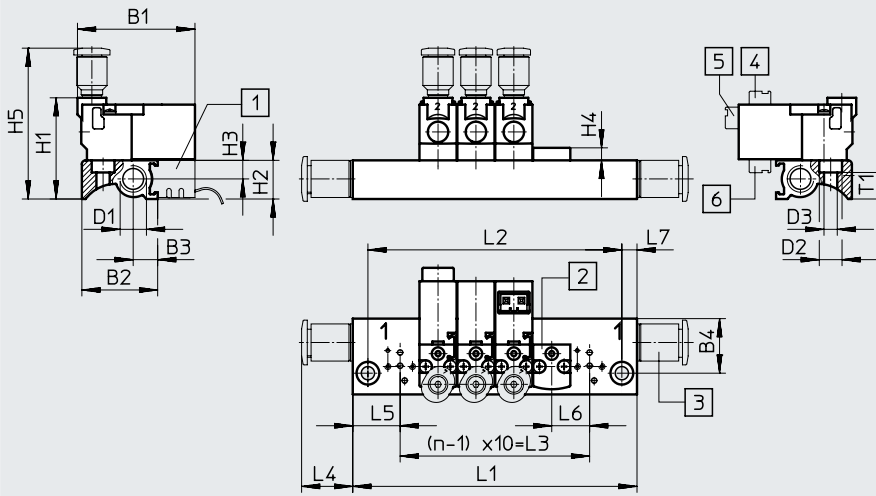
Type	B1	B2	B3	B5	D1	D2	H1	H2	H3	H4	H5	L1	L2	L3	L4	L5	L6	L7	L7
2/2-way valve	14.9	9.8	2.5	28	M3	2.7	26.5	10	7	5.5	39.6	31	15.1	31.2	29.3	19.3	8.4	2.5	2.5
3/2-way valve	14.9	9.8	2.5	28	M3	2.7	26.5	10	7	5.5	39.6	31	6.7	31.2	29.3	19.3	8.4	2.5	8.4

Datasheet

Dimensions – Manifold assembly

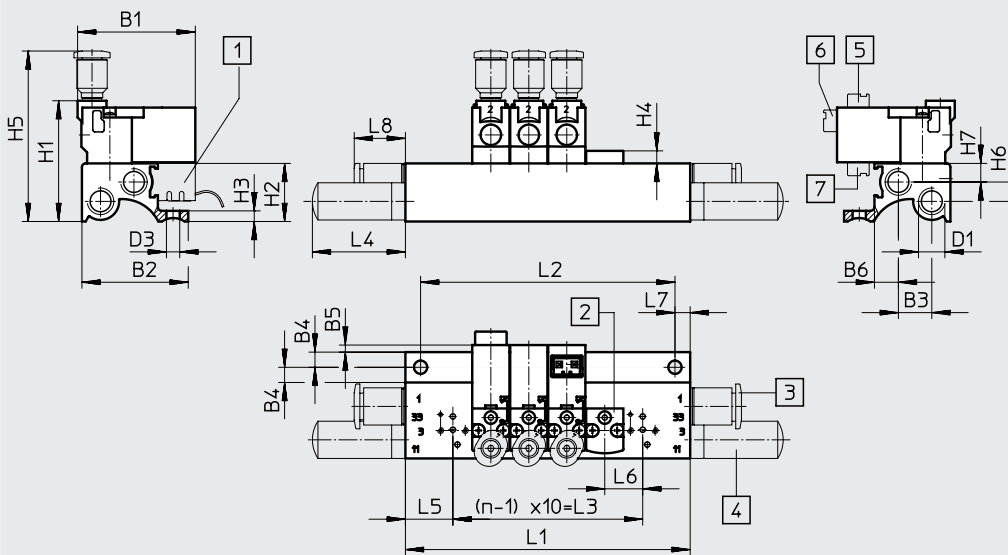
Download CAD data → [www.festo.com](http://www.festo.com)

2/2-way valve



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

3/2-way valve



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

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

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

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

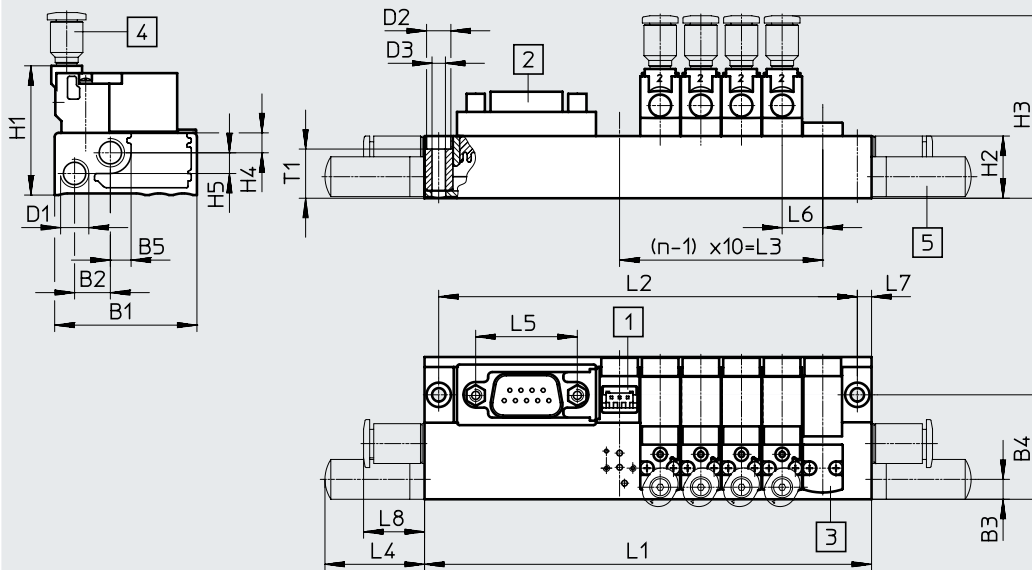
Valve positions n	L1 ±0.15	L2 ±0.1	L3
16	175	167	150
17	185	177	160
18	195	187	170
19	205	197	180
20	215	207	190
21	225	217	200
22	235	227	210

Datasheet

Dimensions – Manifold assembly with electrical multi-pin plug

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

3/2-way valve



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

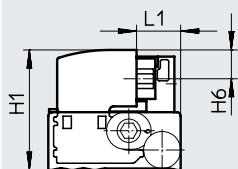
Type	B1	B2	B3	B4	B5	D1	D2	D3	H1	H2	H3	H4	H5	L4	L5	L6	L7	L8	T1
MHP1	35	8.8	5.3	25.7	5.2	M7	6	3.3	31.8	15.3	44.9	4.9	5.1	54.5	25	10	3.5	15	12.1

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

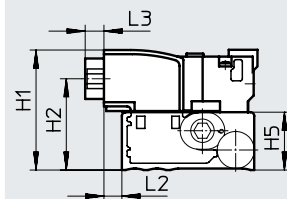
Valve positions n	L1 ±0.15	L2 ±0.1	L3
10	172	165	90
12	192	185	110
14	212	205	130
16	232	225	150

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

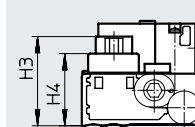
Plug outlet to the pneumatic side



Plug outlet to electrical side



Plug outlet on top (standard)



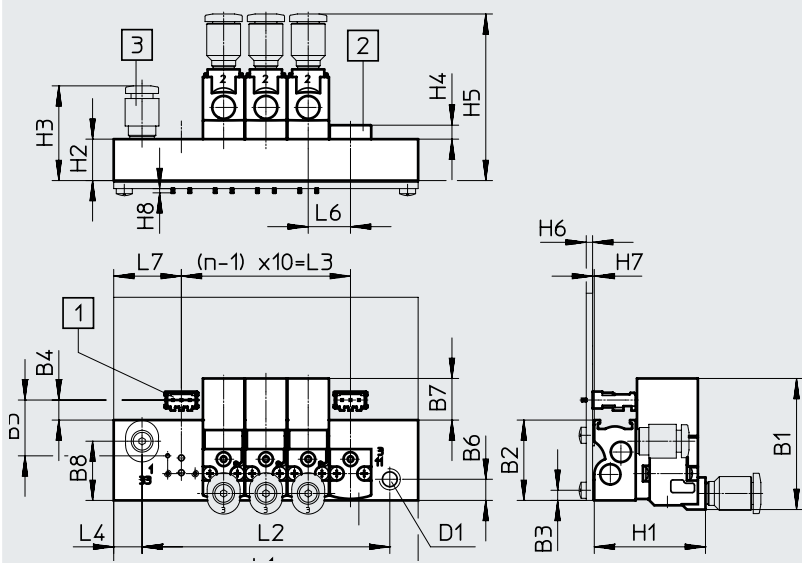
Type	H1	H2	H3	H4	H5	H6	L1	L2	L3
MHP1	31.8	24.2	26.2	21.2	15.3	7.6	11.7	4.8	5

Datasheet

Dimensions – Manifold assembly on PCB

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

3/2-way valve

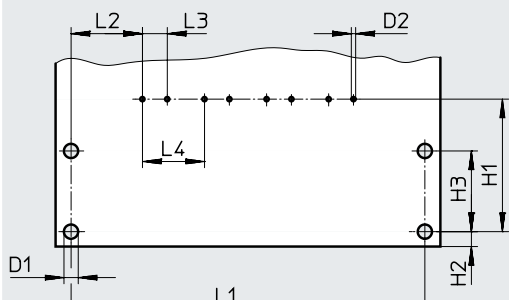



- [1] Soldering base PCBC-A
- [2] Cover plate MHAP1
- [3] Fitting

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

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

Hole pattern on PCB

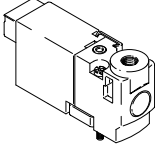
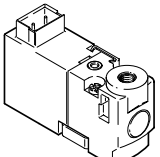
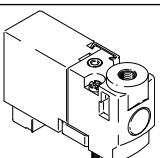



 **Note**  
The PCB is not included in the scope of delivery.

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

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



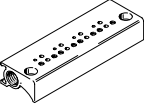
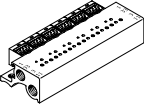
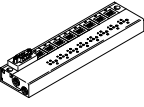
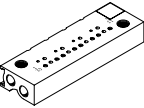


## Datasheet


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

 - **Note**


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

Datasheet

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

 - **Note**




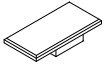
Manifold rails with an uneven number of valves and for 11 ... 24 valves as well as further variants can be configured and ordered online via the modular product system for MH1.

 - **Note**

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


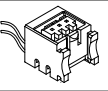
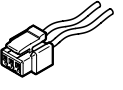
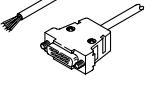


## Datasheet

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

1) Packaging unit.

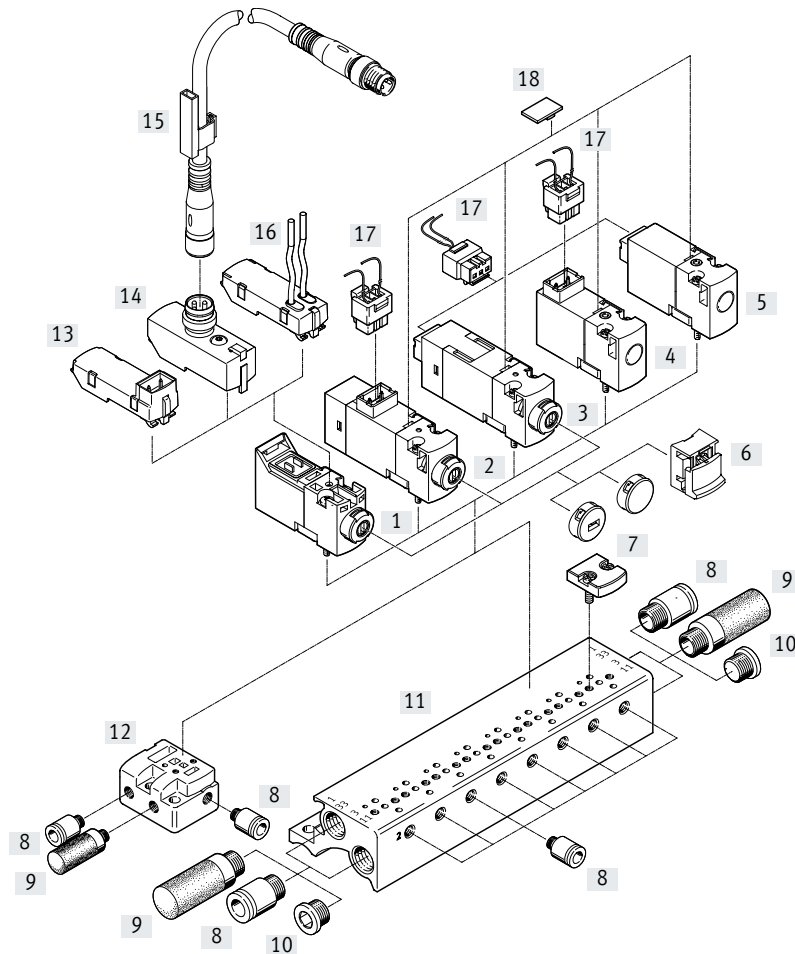
Datasheet

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

1) Packaging unit.

## Peripherals overview

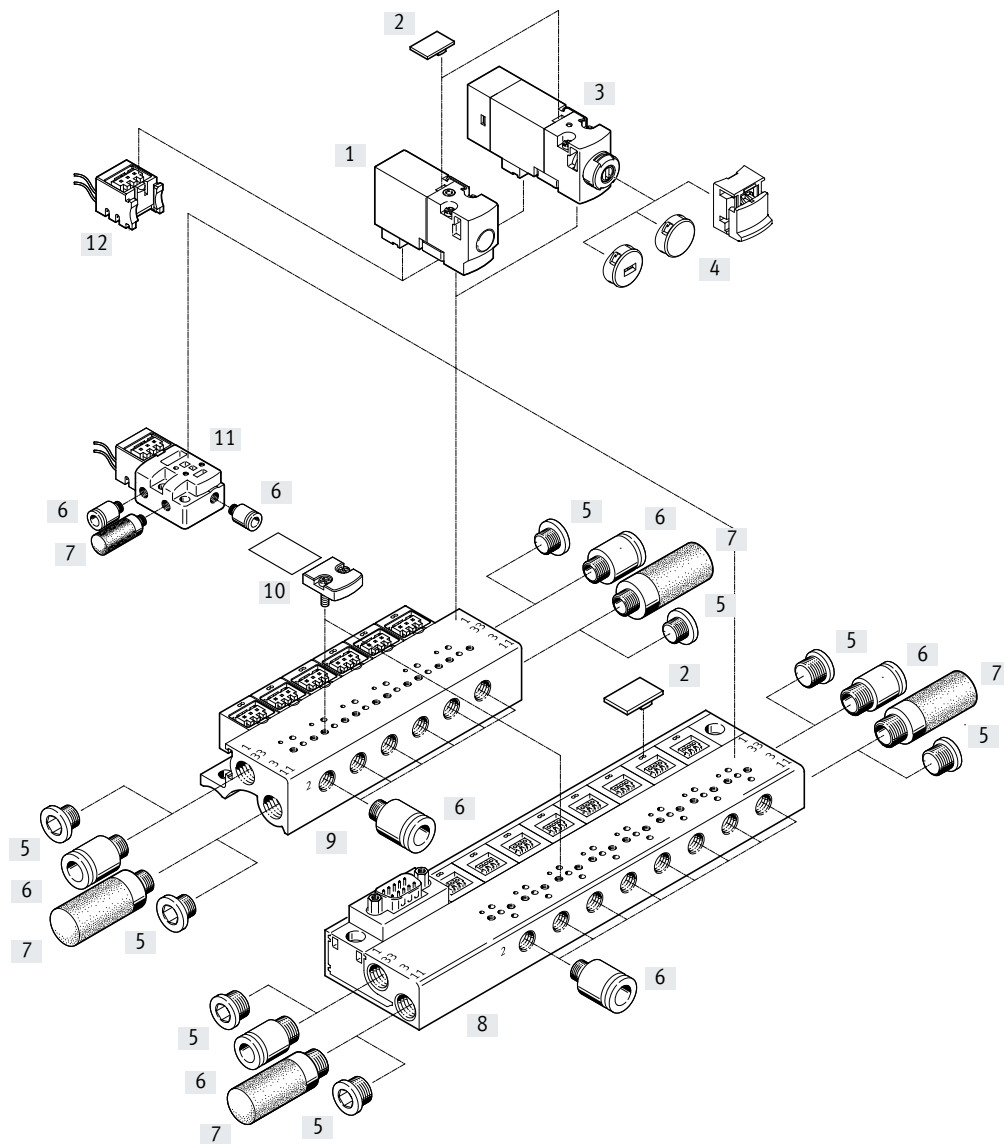
## Valves with plug connection at the rear, plug connection on top



Designation	Description	→ Page/Internet
[1] Solenoid valve	Valve without plug connection, with manual override	38
[2] Solenoid valve	Valve with plug connection on top, with LED, with manual override	50
[3] Solenoid valve	Valve with plug connection at the rear, with LED, with manual override	50
[4] Solenoid valve	Valve with plug connection on top, without LED, without manual override	30
[5] Solenoid valve	Valve with plug connection at the rear, without LED, without manual override	30
[6] Cover cap	For manual override	39, 52
[7] Cover plate	For manifold rail without plug bases	32, 39, 52
[8] Push-in fitting	For connecting compressed air tubing with standard O.D.	32, 39, 52
[9] Silencer	For exhaust ports	32, 39, 52
[10] Blanking plug	For sealing unused connections	32, 39, 52
[11] Manifold rail	Without plug bases	31, 38, 51
[12] Individual sub-base	For valves with plug connection at the rear, plug connection on top	31, 38, 51
[13] E-box	Plug connection pattern H/connection pattern S	40
[14] E-box	Plug M8x1	40
[15] Connecting cable	Socket M8x1, 4-pin	41
[16] E-box	Open end	40
[17] Plug socket with cable	Straight socket, plug pattern H, 3-pin	33, 41, 53
[18] Inscription label	For identifying the valve positions	33, 53

## Peripherals overview

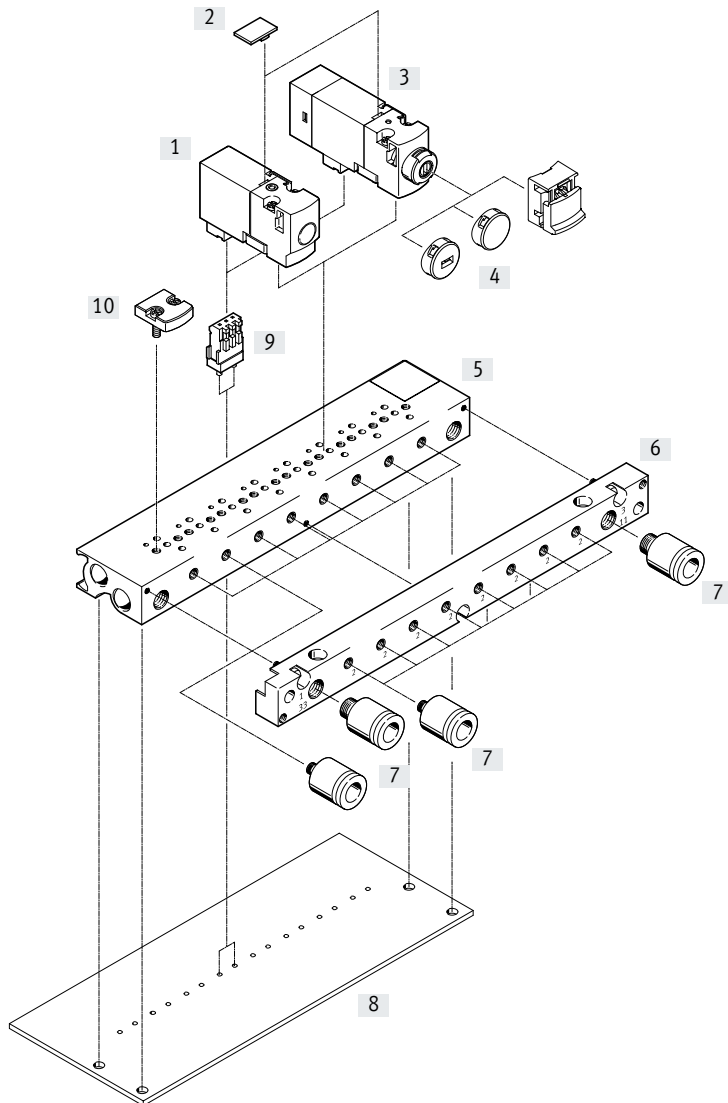
### Valves with plug connection underneath



Designation	Description	→ Page/Internet
[1] Solenoid valve	Valve with plug connection underneath, without LED	30
[2] Inscription label	For identifying the valve positions	33, 53
[3] Solenoid valve	Valve with plug connection underneath, with LED	50
[4] Cover cap	For manual override	39, 52
[5] Blanking plug	For sealing unused connections	32, 52
[6] Push-in fitting	For connecting compressed air tubing with standard O.D.	32, 52
[7] Silencer	For exhaust ports	32, 52
[8] Manifold rail	With plug bases	31, 51
[9] Manifold rail	With plug bases and electrical multi-pin plug	31, 51
[10] Cover plate	For manifold rail with plug bases	32, 52
[11] Individual sub-base	For valves with plug connection underneath	31, 51
[12] Plug socket with cable	Straight socket, plug pattern H, 3-pin	33, 53

## Peripherals overview

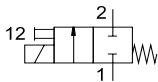
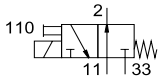
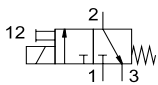
## Valves with plug connection underneath, PCB mounting



	Description	→ Page/Internet	
[1]	Solenoid valve	Plug connection underneath, without LED	30
[2]	Inscription label	For identifying the valve positions	33, 53
[3]	Sub-base valve	Plug connection underneath, with LED	50
[4]	Cover cap	For manual override	39, 52
[5]	Manifold rail	Without plug bases for PCB mounting	31, 51
[6]	Pneumatic multiple connector plate	Enables the tubing connection to be left in place on the PCB when changing the valve terminal (included in the scope of delivery)	–
[7]	Push-in fittings	For connecting compressed air tubing with standard O.D.	32, 52
[8]	PCB	Provided by the customer (not included in the scope of delivery)	–
[9]	Soldering base	For plug-in connection, 3-pin	33, 53
[10]	Cover plate	For manifold rail without plug bases	32, 52

## Datasheet

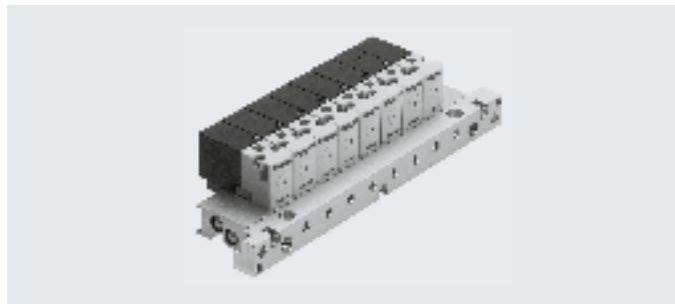
### Function



- - Voltage  
5 V DC  
12 V DC  
24 V DC

- - Pressure  
-0.9 ... +8 bar

- - Temperature range  
-5 ... +40°C



General technical data			
Type	MHA1-...-2/2G-...	MHA1-...-3/2G-...	MHA1-...-3/2O-...
Valve function	2/2-way solenoid valve	3/2-way solenoid valve	3/2-way solenoid valve
	Normally closed	Normally closed	Normally open
	Single solenoid	Single solenoid	Single solenoid
Design	Poppet valve with spring return		
Sealing principle	Soft		
Actuation type	Electrical		
Reset method	Mechanical spring		
Type of control	Direct		
Direction of flow	Not reversible		
Suitability for vacuum	Yes	-	-
Exhaust function	Cannot be throttled	Can be throttled	Can be throttled
Manual override	Non-detenting		
Type of mounting	On sub-base via through-hole		
Mounting position	Any		
Nominal width	[mm] 0.9	0.65	0.7
Standard nominal flow rate	[l/min] 14	10	10
Grid dimension	[mm] 10	10	10
Pneumatic connection	1 Sub-base	Sub-base	-
	2 Sub-base	Sub-base	Sub-base
	3 -	Sub-base	-
	11 -	-	Sub-base
	33 -	-	Sub-base
Product weight	[g] 10	10	10

Operating and environmental conditions			
Type	MHA1-...-2/2G-...	MHA1-...-3/2G-...	MHA1-...-3/2O-...
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]		
Note on the operating/pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	[MPa] -0.09 ... +0.2	0 ... 0.8 <sup>1)</sup>	0 ... 0.6 <sup>1)</sup>
	[bar] -0.9 ... +2	0 ... 8 <sup>1)</sup>	0 ... 6 <sup>1)</sup>
	[psij] -13.05 ... +29	0 ... 116 <sup>1)</sup>	0 ... 87 <sup>1)</sup>
Ambient temperature	[°C] -5 ... +40		
Temperature of medium	[°C] -5 ... +40		
Storage temperature	[°C] -20 ... +60		
Corrosion resistance class CRC <sup>2)</sup>	2		
Certification	c UL us - Recognized (OL)		
	c CSA us - Recognized (OL)		

1) Vacuum operation possible with special connection method → page 4

2) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

## Datasheet

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

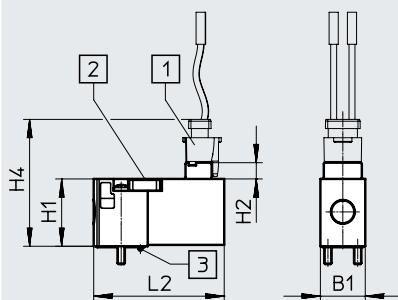
Electrical data		
Operating voltage	[V DC]	5
	[V DC]	12
	[V DC]	24
Permissible voltage fluctuations	[%]	$\pm 10$
Connection type		Plug connection
Power consumption	[W]	1
Duty cycle	[%]	100
Degree of protection to EN 60529		IP40

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

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

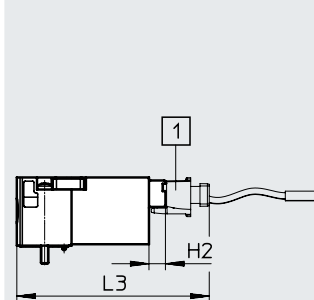
### Dimensions

Plug connection on top



- [1] Plug socket NEBV-H1G2  
[2] Manual override  
[3] Coding pin

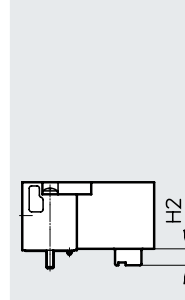
Plug connection at the rear



- [1] Plug socket NEBV-H1G2

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

Plug connection underneath

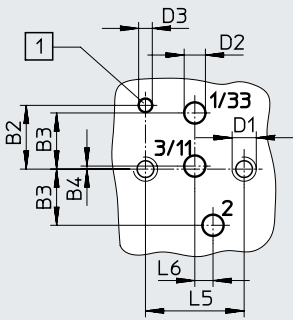


Type	B1	H1	H2	H4	L2	L3
MHA1	9.8	14.7	3.6	27.7	28.5	41.5

Datasheet

Dimensions – Hole pattern on sub-bases

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[1] Hole for coding pin

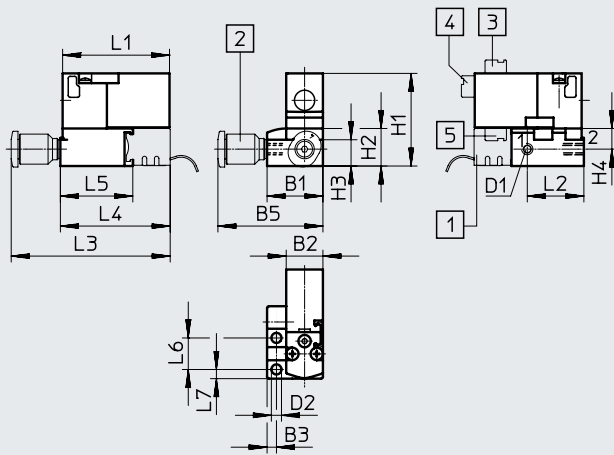
- If used as a 2/2-way valve, normally closed, ports 3/11 are not used.
- If used as a 2/2-way valve, normally open, ports 1/33 are not used.

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

Dimensions – Assembly on individual sub-base

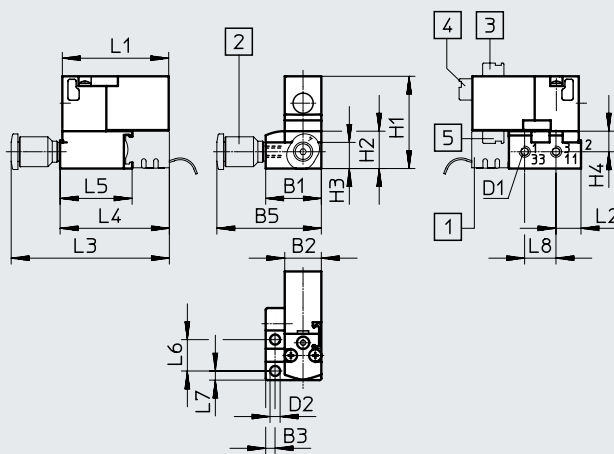
Download CAD data → [www.festo.com](http://www.festo.com)

2/2-way valve



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

3/2-way valve



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

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

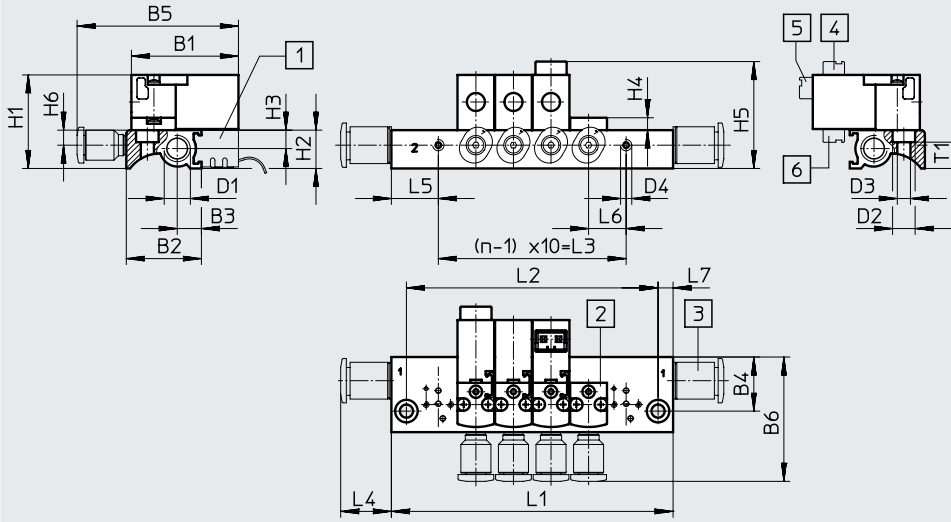


Datasheet

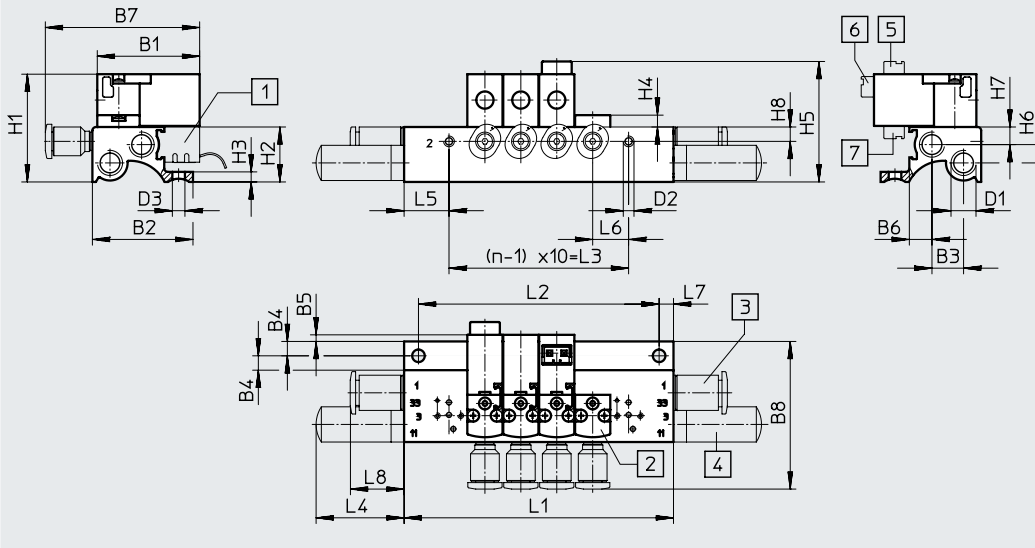
Dimensions – Manifold assembly

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

2/2-way valve



3/2-way valve



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

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

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

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

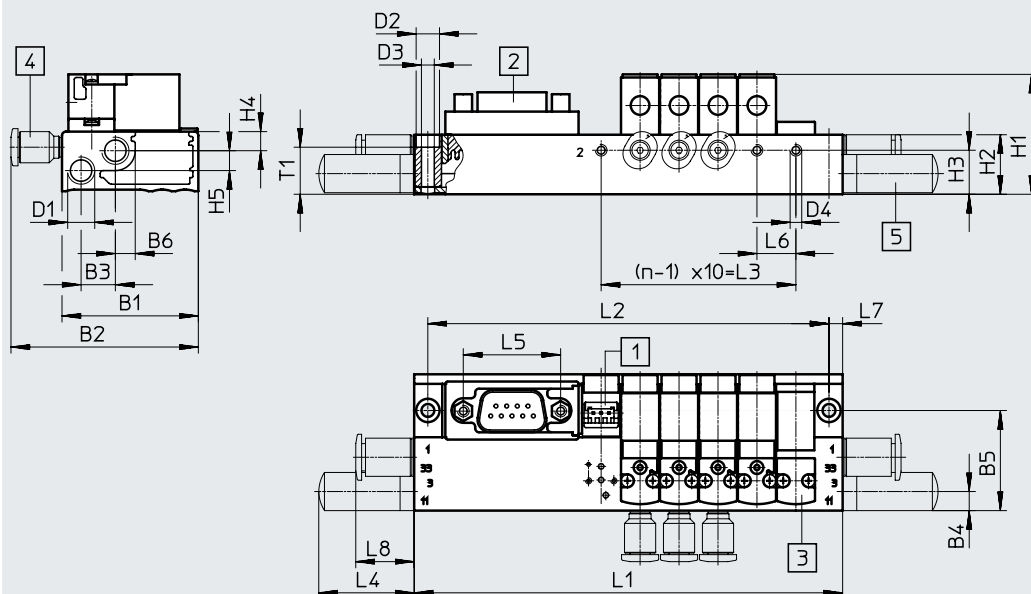
Valve positions n	L1 ±0.15	L2 ±0.1	L3
16	175	167	150
17	185	177	160
18	195	187	170
19	205	197	180
20	215	207	190
21	225	217	200
22	235	227	210

Datasheet

Dimensions – Manifold assembly with electrical multi-pin plug

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3/2-way valve



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

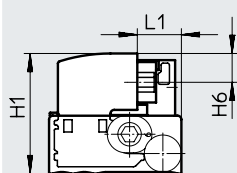
Type	B1	B2	B3	B4	B5	B6	D1	D2	D3	D4	H1	H2	H3	H4	H5	L4	L5	L6	L7	L8	T1
MHA1	35	48.1	8.8	5.3	25.7	5.2	M7	6	3.3	M3	30.8	15.3	11.3	4.9	5.1	24.5	25	10	3.5	15	12.1

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

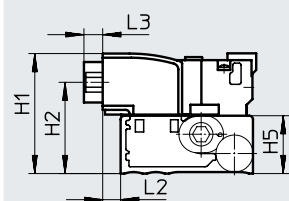
Valve positions n	L1 ±0.15	L2 ±0.1	L3
10	172	165	90
12	192	185	110
14	212	205	130
16	232	225	150

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

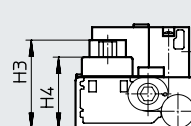
Plug outlet to the pneumatic side



Plug outlet to electrical side



Plug outlet on top (standard)



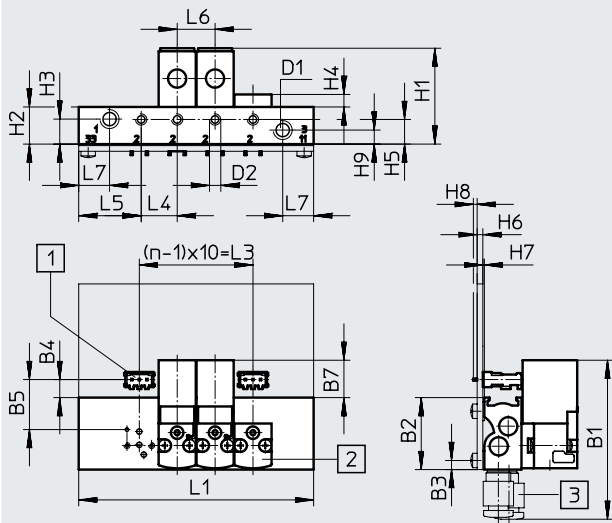
Type	H1	H2	H3	H4	H5	H6	L1	L2	L3
MHA1	31.8	24.2	26.2	21.2	15.3	7.6	11.7	4.8	5

Datasheet


Dimensions – Manifold assembly on PCB

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



- [1] Soldering base PCBC-A
- [2] Cover plate MHAP1
- [3] Fitting

 **Note**  
The PCB is not included in the scope of delivery.

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

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

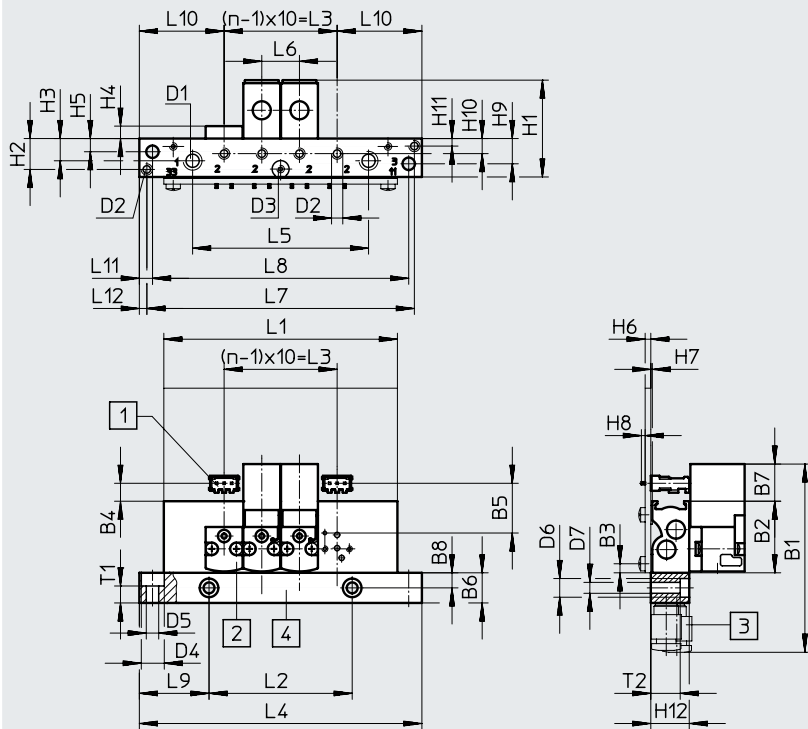
Valve positions n	L1	L3
	±0.15	
2	42	10
4	62	30
6	82	50
8	102	70
10	122	90

Datasheet

Dimensions – Manifold assembly on PCB

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



- [1] Soldering base PCBC-A
- [2] Cover plate MHAP1
- [3] Fitting

**Note**  
The PCB is not included in the scope of delivery.

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

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

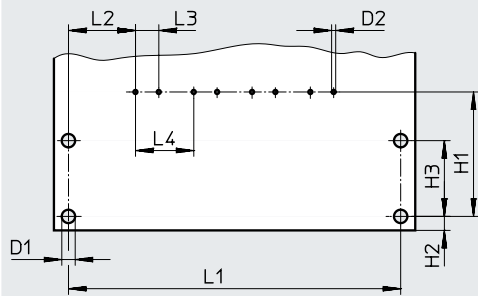
Valve positions n	L1 ±0.15	L2 ±0.1	L3	L4 ±0.2	L5 ±0.15	L7 ±0.1	L8
4	62	38	30	75	46.7	71	68
6	82	58	50	95	66.7	91	88
8	102	78	70	115	86.7	111	108
10	122	98	90	135	106.7	131	128

## Datasheet

## Dimensions – Manifold assembly on PCB

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Hole pattern on PCB

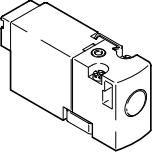
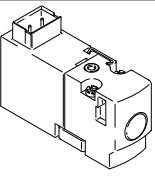
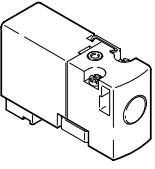
**Note**


The PCB is not included in the scope of delivery.

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



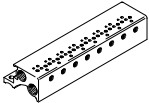
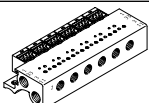
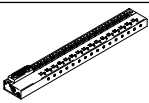
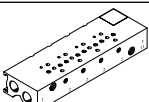
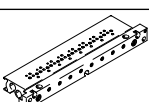
Valve positions n	L1 ±0.1
2	37
4	57
6	77
8	97
10	117


Datasheet

Ordering data		Valve function	Normal position		Part no.	Type
<b>Solenoid valve</b>						
	Plug connection at the rear	2/2-way solenoid valve	Closed	5 V DC	<b>197036</b>	<b>MHA1-M4H-2/2G-0.9-HC</b>
				12 V DC	<b>197037</b>	<b>MHA1-M5H-2/2G-0.9-HC</b>
				24 V DC	<b>197038</b>	<b>MHA1-M1H-2/2G-0.9-HC</b>
		3/2-way solenoid valve	Closed	5 V DC	<b>197000</b>	<b>MHA1-M4H-3/2G-0.6-HC</b>
				12 V DC	<b>197001</b>	<b>MHA1-M5H-3/2G-0.6-HC</b>
				24 V DC	<b>197002</b>	<b>MHA1-M1H-3/2G-0.6-HC</b>
			Open	5 V DC	<b>197018</b>	<b>MHA1-M4H-3/2O-0.6-HC</b>
				12 V DC	<b>197019</b>	<b>MHA1-M5H-3/2O-0.6-HC</b>
				24 V DC	<b>197020</b>	<b>MHA1-M1H-3/2O-0.6-HC</b>
	Plug connection on top	2/2-way solenoid valve	Closed	5 V DC	<b>197039</b>	<b>MHA1-M4H-2/2G-0.9-TC</b>
				12 V DC	<b>197040</b>	<b>MHA1-M5H-2/2G-0.9-TC</b>
				24 V DC	<b>197041</b>	<b>MHA1-M1H-2/2G-0.9-TC</b>
		3/2-way solenoid valve	Closed	5 V DC	<b>197003</b>	<b>MHA1-M4H-3/2G-0.6-TC</b>
				12 V DC	<b>197004</b>	<b>MHA1-M5H-3/2G-0.6-TC</b>
				24 V DC	<b>197005</b>	<b>MHA1-M1H-3/2G-0.6-TC</b>
			Open	5 V DC	<b>197021</b>	<b>MHA1-M4H-3/2O-0.6-TC</b>
				12 V DC	<b>197022</b>	<b>MHA1-M5H-3/2O-0.6-TC</b>
				24 V DC	<b>197023</b>	<b>MHA1-M1H-3/2O-0.6-TC</b>
	Plug connection underneath	2/2-way solenoid valve	Closed	5 V DC	<b>197042</b>	<b>MHA1-M4H-2/2G-0.9-PI</b>
				12 V DC	<b>197043</b>	<b>MHA1-M5H-2/2G-0.9-PI</b>
				24 V DC	<b>197044</b>	<b>MHA1-M1H-2/2G-0.9-PI</b>
		3/2-way solenoid valve	Closed	5 V DC	<b>197006</b>	<b>MHA1-M4H-3/2G-0.6-PI</b>
				12 V DC	<b>197007</b>	<b>MHA1-M5H-3/2G-0.6-PI</b>
				24 V DC	<b>197008</b>	<b>MHA1-M1H-3/2G-0.6-PI</b>
			Open	5 V DC	<b>197024</b>	<b>MHA1-M4H-3/2O-0.6-PI</b>
				12 V DC	<b>197025</b>	<b>MHA1-M5H-3/2O-0.6-PI</b>
				24 V DC	<b>197026</b>	<b>MHA1-M1H-3/2O-0.6-PI</b>


 **Note**  
 Valves types 3/2G and 3/2O must not be mixed on a manifold rail.

## Datasheet

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






 - **Note**

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

 - **Note**

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

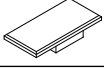
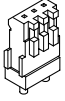
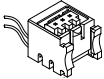
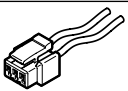
## Datasheet

Ordering data				Part no.	Type	PJ <sup>1)</sup>
<b>Cover plate for manifold rail</b>						
	For manifold rail for valves with plug connection at the rear or on top			197257	MHAP1-BP-3	1
	For manifold rail with plug bases for valves with plug connection underneath			197258	MHAP1-BP-3-PI	1
<b>Blanking plug</b>						
	For M3 thread			30979	B-M3-S9	10
	For M5 thread			3843	B-M5	10
	For M7 thread			174309	B-M7	10
<b>Silencer</b>						
	M3 connecting thread			1231120	AMTE-M-LH-M3	20
	M5 connecting thread	Polymer design		165003	UC-M5	1
		Metal design		1205858	AMTE-M-LH-M5	20
	M7 connecting thread			161418	UC-M7	1
<b>Push-in fittings</b>						
	M3 connecting thread	With internal hex	For tubing O.D. 3 mm	153312	QSM-M3-3-I	10
			For tubing O.D. 4 mm	153314	QSM-M3-4-I	10
		With external hex	For tubing O.D. 3 mm	153301	QSM-M3-3	10
			For tubing O.D. 4 mm	153303	QSM-M3-4	10
	M5 connecting thread	With internal hex	For tubing O.D. 3 mm	153313	QSM-M5-3-I	10
			For tubing O.D. 4 mm	153315	QSM-M5-4-I	10
			For tubing O.D. 6 mm	153317	QSM-M5-6-I	10
		With external hex	For tubing O.D. 3 mm	153302	QSM-M5-3	10
			For tubing O.D. 4 mm	153304	QSM-M5-4	10
			For tubing O.D. 6 mm	153306	QSM-M5-6	10
	M7 connecting thread	With internal hex	For tubing O.D. 4 mm	153319	QSM-M7-4-I	10
			For tubing O.D. 6 mm	153321	QSM-M7-6-I	10

1) Packaging unit.



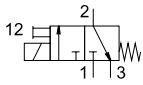
## Datasheet


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


1) Packaging unit.

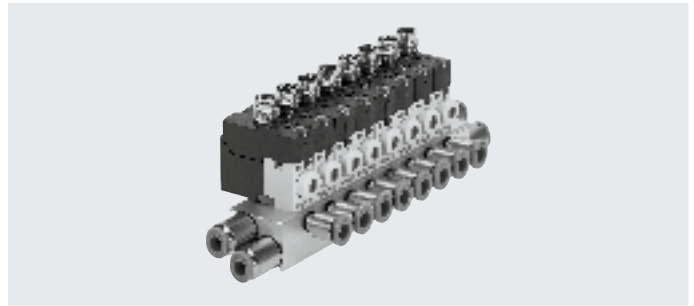
## Datasheet

### Function



-  - Voltage  
5 V DC  
12 V DC  
24 V DC

-  - Pressure  
+1.5 ... +8 bar



### General technical data

Valve function	3/2-way solenoid valve	
	Normally closed	
	Single solenoid	
Design	Poppet valve with spring return	
Sealing principle	Soft	
Actuation type	Electrical	
Reset method	Mechanical spring	
Type of control	Direct	
Direction of flow	Not reversible	
Exhaust function	Can be throttled	
Manual override	Non-detenting/detenting	
Signal status indication	-	
Type of mounting	On sub-base via through-hole	
Mounting position	Any	
Nominal width	[mm]	0.65
Standard nominal flow rate	[l/min]	10
Grid dimension	[mm]	10
Pneumatic connection	1	Sub-base
	2	Sub-base
	3	Sub-base
Product weight	[g]	10

### Operating and environmental conditions

Type	MHA1-M4R...	MHA1-M5R...	MHA1-M1R...
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]		
Note on the operating/pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	[MPa]	0.15 ... 0.8 <sup>1)</sup>	
	[bar]	1.5 ... 8 <sup>1)</sup>	
	[psi]	21.75 ... 116 <sup>1)</sup>	
Ambient temperature	[°C]	-5 ... +40	-5 ... +50
Temperature of medium	[°C]	-5 ... +50	-5 ... +50
Restricted ambient temperature and temperature of medium	[°C]	-	-5 ... +40
		-	Without holding current reduction
Storage temperature	[°C]	-20 ... +60	-20 ... +60
Corrosion resistance class CRC <sup>1)</sup>	2	2	2

1) Vacuum operation possible with special connection method → page 4

2) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

## Datasheet

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

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

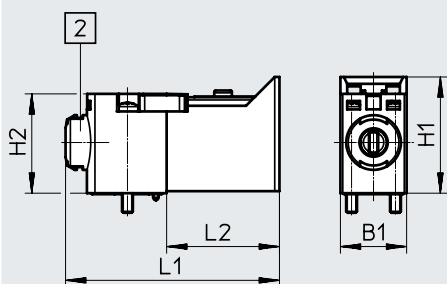
Switching times and frequencies					
Type		MHA1-M4R...	MHA1-M5R...	MHA1-M1R...	
Switching time	On	[ms]	5	5	5
	Off	[ms]	5	5	5
Maximum switching frequency		[Hz]	10	10	10

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

## Dimensions

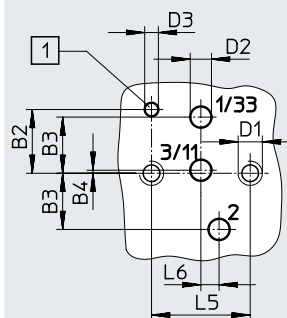
Download CAD data → [www.festo.com](http://www.festo.com)

Valve



[2] Manual override

Hole pattern on sub-bases



[1] Hole for coding pin

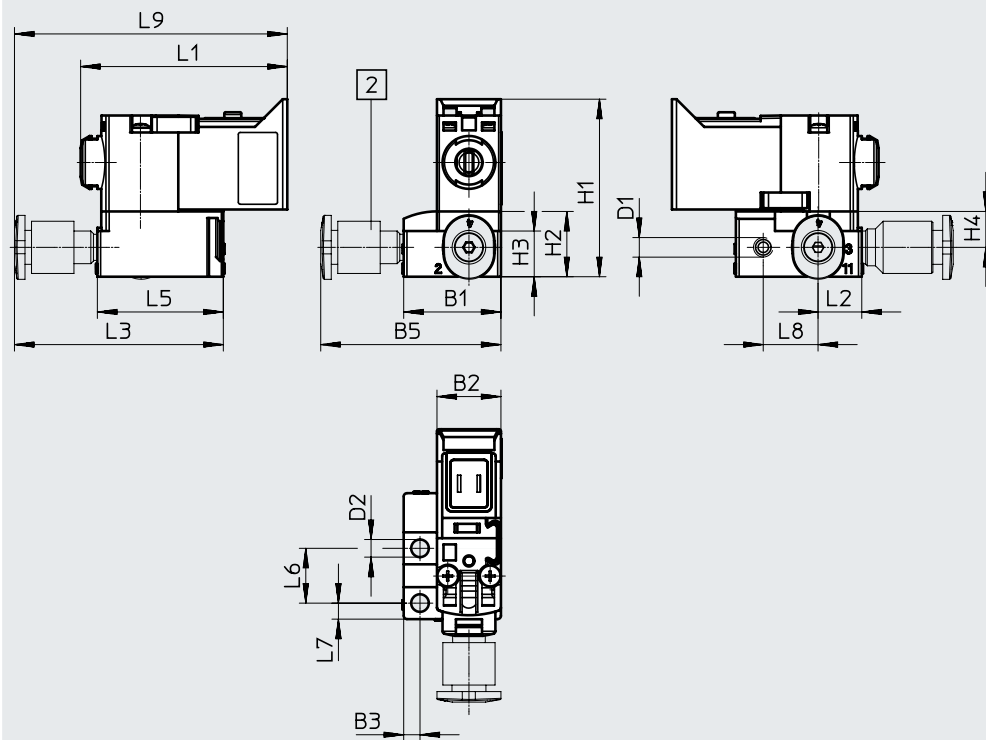
- If used as a 2/2-way valve, normally closed, ports 3/11 are not used.
- If used as a 2/2-way valve, normally open, ports 1/33 are not used.

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

Datasheet

Dimensions – Assembly on individual sub-base

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



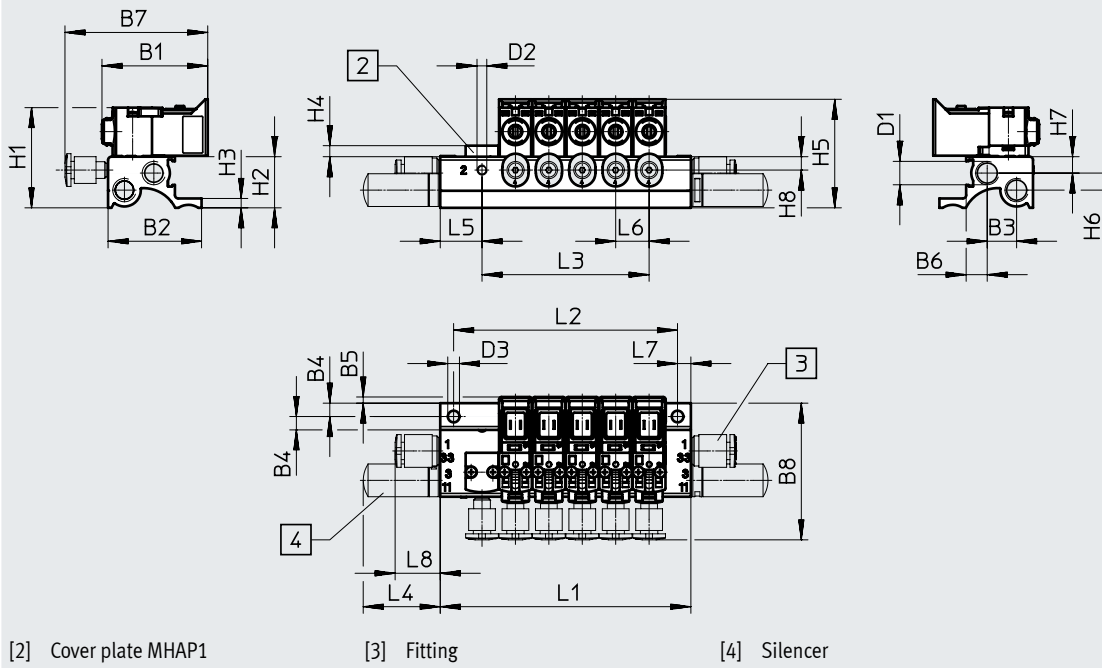
[2] Fitting

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

Datasheet

Dimensions – Manifold assembly

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



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

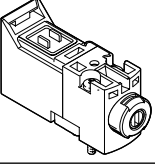

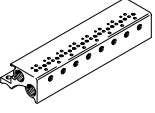
Type	H1	H2	H3	H4	H5	H6	H7	H8	L4	L5	L6	L7	L8
3/2-way valve	30	15.3	2.8	3.3	32.5	5.1	4.9	4	23.1	12.5	10	4	13.5


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

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

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








## Datasheet

Ordering data		Valve function	Normal position		Part no.	Type
<b>Solenoid valve</b>						
	Without plug connection	3/2-way solenoid valve	Closed	5 V DC	8025224	MHA1-M4R-3/2G-0.6-P3
				12 V DC	8025225	MHA1-M5R-3/2G-0.6-P3
				24 V DC	8025223	MHA1-M1R-3/2G-0.6-P3
<b>Individual sub-base</b>						
	Individual sub-base Pneumatic connection: M3 thread		1 valve position	197183	MHA1-AS-3-M3	
<b>Manifold rail</b>						
	Manifold rail Pneumatic connection: M3, M7 thread		2 valve positions	197202	MHA1-PR2-3-M3	
			4 valve positions	197203	MHA1-PR4-3-M3	
			6 valve positions	197204	MHA1-PR6-3-M3	
			8 valve positions	197205	MHA1-PR8-3-M3	
			10 valve positions	197206	MHA1-PR10-3-M3	

 **Note**






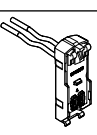

Manifold rails with an uneven number of valves and for 11 ... 24 valves as well as further variants can be configured and ordered online via the modular product system for MH1.

## Datasheet

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

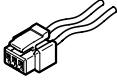
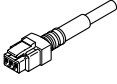
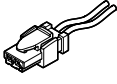
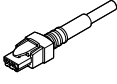


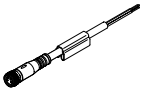
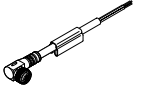
1) Packaging unit.

Datasheet

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

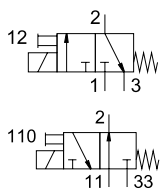





## Datasheet

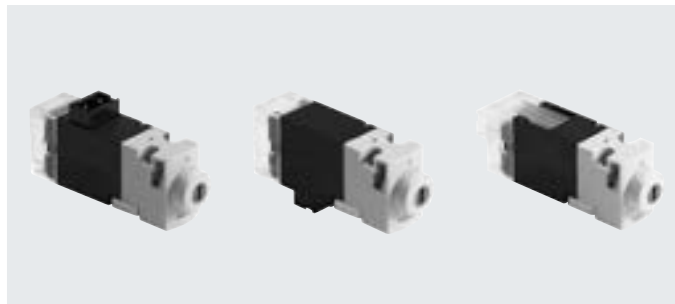
Ordering data					
	Electrical connection 1	Electrical connection 2	Length	Part no.	Type
<b>Plug socket with cable for plug connection pattern H</b>					Datasheets → Internet: nebv
	Straight socket Plug pattern H 3-pin	2x flying leads Open end 1-wire	0.5 m	566654	NEBV-H1G2-KN-0.5-N-LE2
			1 m	566655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

## Datasheet

### Function



-  - Voltage  
24 V DC
-  - Pressure  
0 ... +8 bar
-  - Temperature range  
-5 ... +50°C



General technical data			
Type		MHA1-M1LH-...-3/2G-...	MHA1-M1LH-...-3/2O-...
Valve function		3/2-way solenoid valve	3/2-way solenoid valve
		Normally closed	Normally open
		Single solenoid	Single solenoid
Design		Poppet valve with spring return	
Sealing principle		Soft	
Actuation type		Electrical	
Reset method		Mechanical spring	
Type of control		Direct	
Direction of flow		Not reversible	
Exhaust function		Can be throttled	
Manual override		Non-detenting/detenting	
Signal status indication		LED	
Type of mounting		On sub-base via through-hole	
Mounting position		Any	
Nominal width	[mm]	0.65	0.7
Standard nominal flow rate	[l/min]	10	10
Grid dimension	[mm]	10	10
Pneumatic connection			
	1	Sub-base	-
	2	Sub-base	Sub-base
	3	Sub-base	-
	11	-	Sub-base
	33	-	Sub-base
Product weight	[g]	11	11

Operating and environmental conditions			
Type		MHA1-M1LH-...-3/2G-...	MHA1-M1LH-...-3/2O-...
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on the operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)	
Operating pressure			
	[MPa]	0 ... 0.8 <sup>1)</sup>	0 ... 0.6 <sup>1)</sup>
	[bar]	0 ... 8 <sup>1)</sup>	0 ... 6 <sup>1)</sup>
	[psij]	0 ... 116 <sup>1)</sup>	0 ... 87 <sup>1)</sup>
Ambient temperature	[°C]	-5 ... +40	
Temperature of medium	[°C]	-5 ... +40	
Storage temperature	[°C]	-20 ... +60	
Corrosion resistance class CRC <sup>2)</sup>		2	
Certification		c UL us - Recognized (OL)	
		c CSA us - Recognized (OL)	

1) Vacuum operation possible with special connection method → page 4

2) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

## Datasheet

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

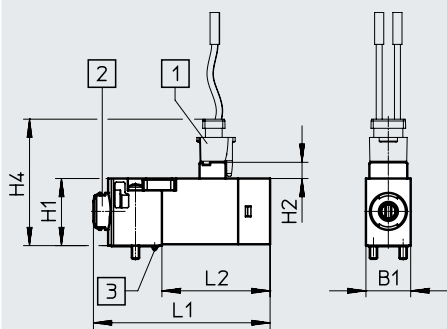
Electrical data		
Operating voltage	[V DC]	24
Permissible voltage fluctuations	[%]	±10
Connection type		Plug connection
Power consumption	[W]	1.1
Duty cycle	[%]	100
Degree of protection to EN 60529		IP40

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

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

### Dimensions

Plug connection on top

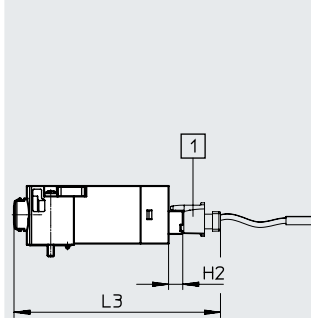


[1] Plug socket NEBV-H1G2

[2] Manual override

[3] Coding pin

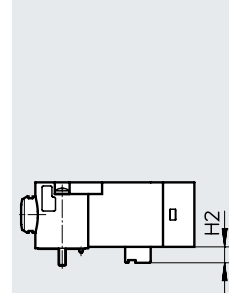
Plug connection at the rear



[1] Plug socket NEBV-H1G2

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

Plug connection underneath

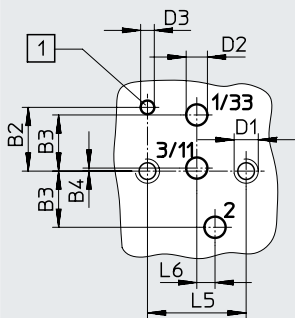


Type	B1	H1	H2	H4	L1	L2	L3
MHA1	9.8	14.7	3.6	27.7	38.7	23.7	51.7

Datasheet

Dimensions – Hole pattern on sub-bases

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



[1] Hole for coding pin

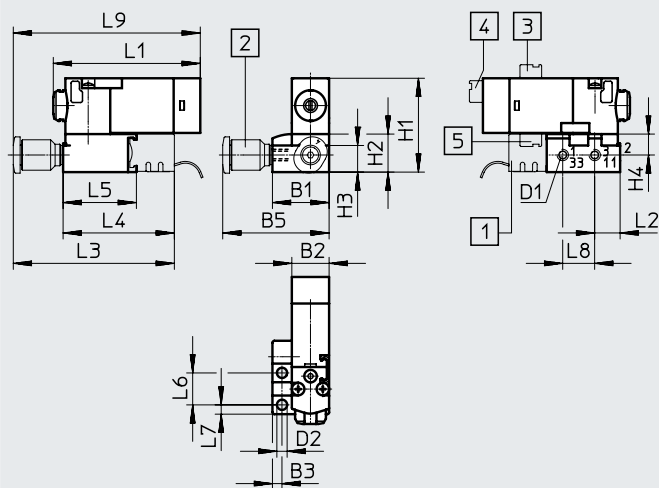
- If used as a 2/2-way valve, normally closed, ports 3/11 are not used.
- If used as a 2/2-way valve, normally open, ports 1/33 are not used.

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

Dimensions – Assembly on individual sub-base

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

3/2-way valve



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

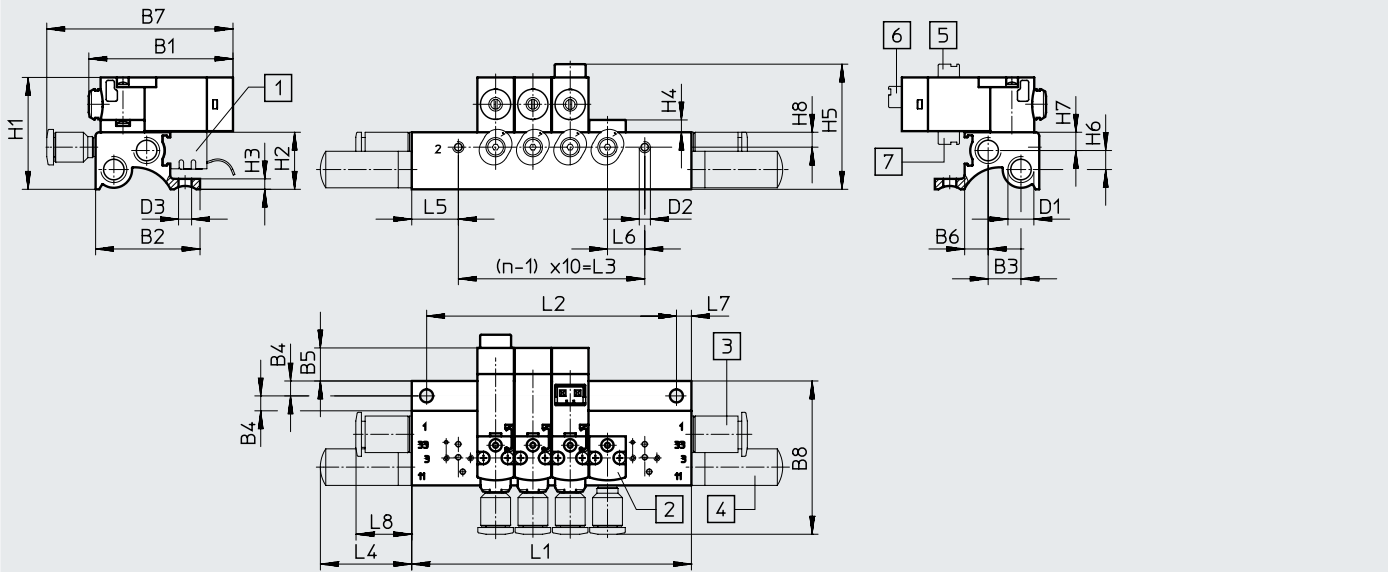
Type	B1	B2	B3	B5	D1	D2	H1	H2	H3	H4	L1	L2	L3	L4	L5	L6	L7	L8	L9
3/2-way valve	14.9	9.8	2.5	28	M3	2.7	24.7	10	7	5.5	38.7	6.7	43.1	29.1	19.3	8.4	2.5	8.4	50.1

Datasheet

Dimensions – Manifold assembly

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

3/2-way valve



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

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

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

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

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

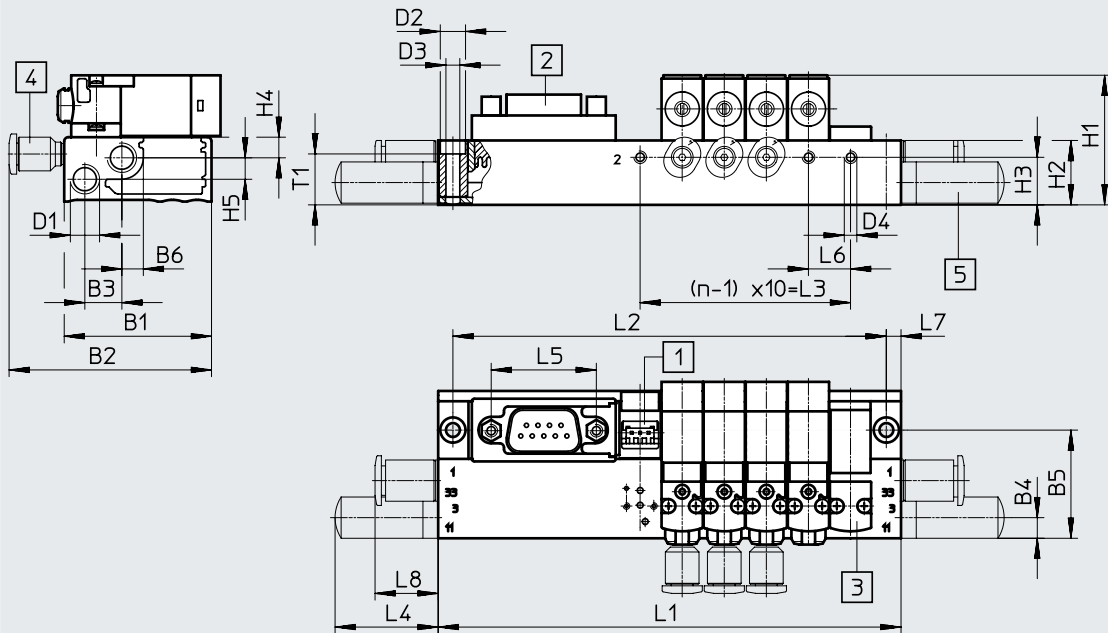
Valve positions n	L1	L2	L3
	±0.15	±0.1	
16	175	167	150
17	185	177	160
18	195	187	170
19	205	197	180
20	215	207	190
21	225	217	200
22	235	227	210

Datasheet

Dimensions – Manifold assembly with electrical multi-pin plug

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

3/2-way valve



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

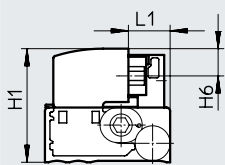
Type	B1	B2	B3	B4	B5	B6	D1	D2	D3	D4	H1	H2	H3	H4	H5	L4	L5	L6	L7	L8	T1
MHA1	35	48.1	8.8	5.3	25.7	5.2	M7	6	3.3	M3	30.8	15.3	11.3	4.9	5.1	24.5	25	10	3.5	15	12.1

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

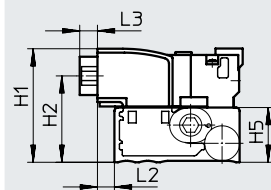
Valve positions n	L1 ±0.15	L2 ±0.1	L3
10	172	165	90
12	192	185	110
14	212	205	130
16	232	225	150

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

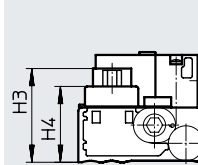
Plug outlet to the pneumatic side



Plug outlet to electrical side



Plug outlet on top (standard)



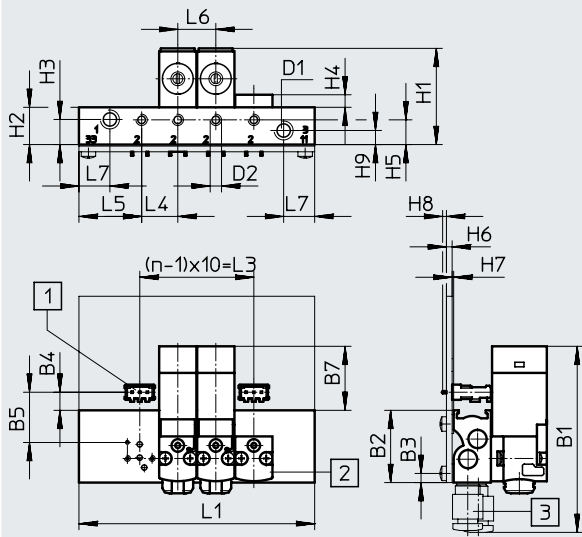
Type	H1	H2	H3	H4	H5	H6	L1	L2	L3
MHA1	31.8	24.2	26.2	21.2	15.3	7.6	11.7	4.8	5

Datasheet


Dimensions – Manifold assembly on PCB

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

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



- [1] Soldering base PCBC-A
- [2] Cover plate MHAP1
- [3] Fitting

 **Note**  
The PCB is not included in the scope of delivery.

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

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

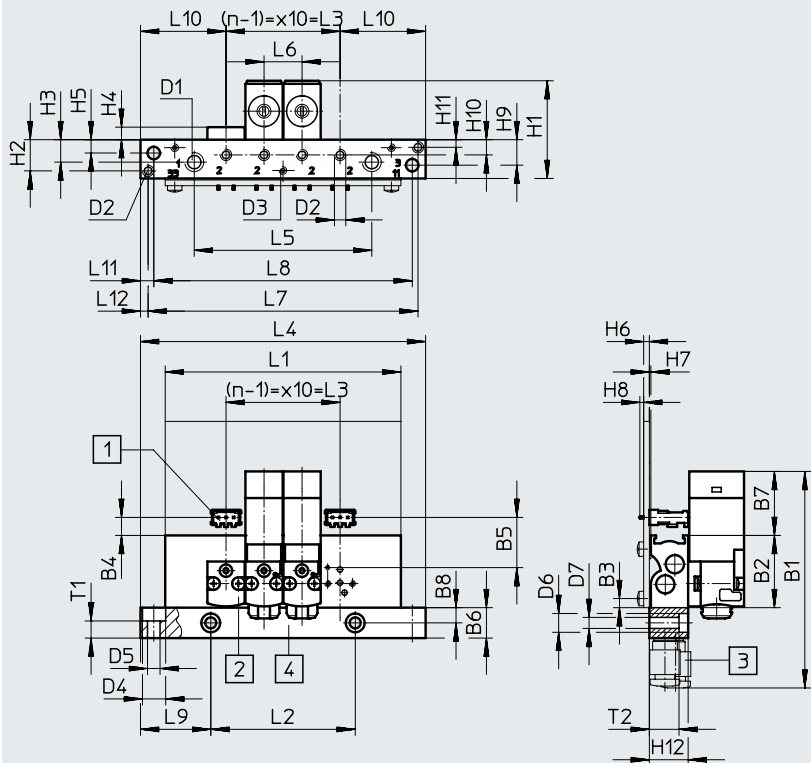
Valve positions n	L1 ±0.15	L3
2	42	10
4	62	30
6	82	50
8	102	70
10	122	90

Datasheet

Dimensions – Manifold assembly on PCB

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

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



- [1] Soldering base PCBC-A
- [2] Cover plate MHAP1
- [3] Fitting

**Note**  
The PCB is not included in the scope of delivery.

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

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

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

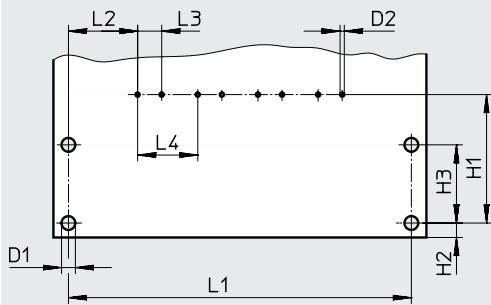


Datasheet

Dimensions – Manifold assembly on PCB

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

Hole pattern on PCB

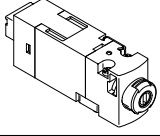
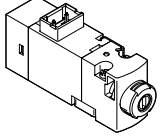
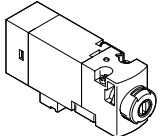



**Note**  
The PCB is not included in the scope of delivery.

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



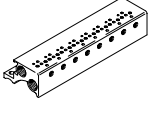
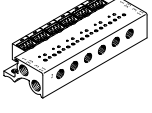
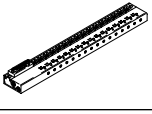
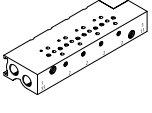
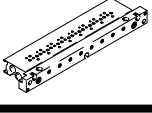
Valve positions n	L1 ±0.1
2	37
4	57
6	77
8	97
10	117


## Datasheet

Ordering data		Valve function	Normal position		Part no.	Type
<b>Solenoid valve</b>						
	Plug connection at the rear	3/2-way solenoid valve	Closed	24 V DC	<b>540443</b>	<b>MHA1-M1LH-3/2G-0.6-HC</b>
			Open	24 V DC	<b>540440</b>	<b>MHA1-M1LH-3/20-0.6-HC</b>
	Plug connection on top	3/2-way solenoid valve	Closed	24 V DC	<b>540444</b>	<b>MHA1-M1LH-3/2G-0.6-TC</b>
			Open	24 V DC	<b>540441</b>	<b>MHA1-M1LH-3/20-0.6-TC</b>
	Plug connection underneath	3/2-way solenoid valve	Closed	24 V DC	<b>540445</b>	<b>MHA1-M1LH-3/2G-0.6-PI</b>
			Open	24 V DC	<b>540442</b>	<b>MHA1-M1LH-3/20-0.6-PI</b>

 **Note**  
Valves types 3/2G and 3/20 must not be mixed on a manifold rail.

## Datasheet

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









 - **Note**

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

 - **Note**

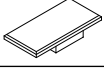

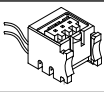
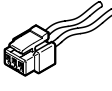
Valves types 3/2G and 3/2O must not be mixed on a manifold rail.

## Datasheet

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

1) Packaging unit.

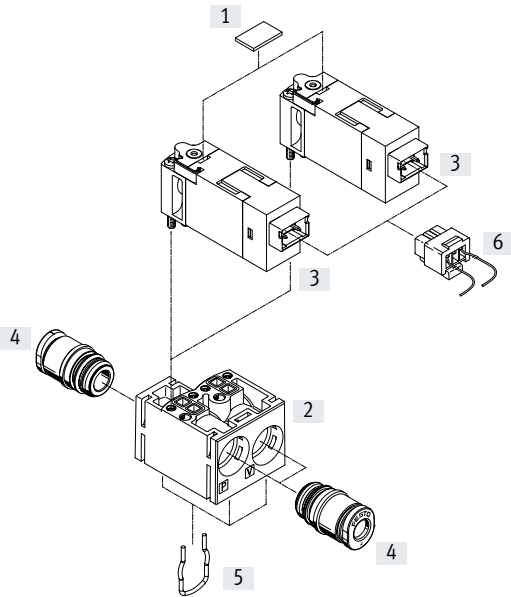
## Datasheet

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

1) Packaging unit.

## Peripherals overview

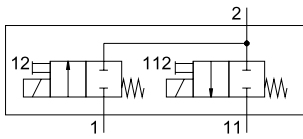
### 2x2/2-way sub-base valve with LED






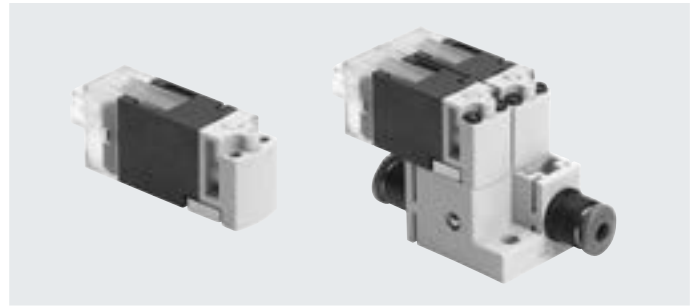
Designation	Description	→ Page/Internet
[1] Inscription label	For identifying the valve positions	57
[2] Sub-base	Included in the scope of delivery	-
[3] Solenoid valve	2/2-way valve, normally closed	57
[4] Push-in cartridge	Included in the scope of delivery	57
[5] Clip	Included in the scope of delivery	-
[6] Plug socket with cable	Straight socket, plug pattern H, 3-pin	57

## Datasheet

## Function



-  Voltage  
24 V DC
-  Pressure  
- 0.95 ... +1.5 bar
-  Temperature range  
-5 ... +50°C



## General technical data

Valve function	2/2-way	2x2/2-way, single solenoid	
Design	Poppet valve with spring return		
Sealing principle	Soft		
Actuation type	Electrical		
Reset method	Mechanical spring		
Type of control	Direct		
Direction of flow	Not reversible		
Suitability for vacuum	Yes		
Exhaust function	Cannot be throttled		
Manual override	Non-detenting		
Signal status indication	LED		
Type of mounting	On sub-base via through-hole	Via through-hole	
Mounting position	Any		
Nominal width	[mm]	1.5	
Standard nominal flow rate	[l/min]	30	
Width	[mm]	10	20
Grid dimension	[mm]	10	20
Pneumatic connection	1	-	QS3, QS4
	11	-	QS3, QS4
	2	-	QS3, QS4

## Operating and environmental conditions

Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]		
Note on the operating/pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	Port 1	[bar]	0 ... 1.5
	Port 11	[bar]	- 0.95 ... 0
Ambient temperature	[°C]	-5 ... +50	
Temperature of medium	[°C]	-5 ... +50	
Storage temperature	[°C]	-20 ... +60	
Corrosion resistance class CRC <sup>1)</sup>	2		
Certification	RCM mark		
CE marking (see declaration of conformity)	To EU EMC Directive <sup>2)</sup>		
	To EU RoHS Directive <sup>2)</sup>		
UKCA marking (see declaration of conformity)	To UK instructions for EMC <sup>2)</sup>		
	To UK RoHS instructions <sup>2)</sup>		

1) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

2) For information about the area of use, see the declaration of conformity at: [www.festo.com/catalogue/...](http://www.festo.com/catalogue/...) → Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

## Datasheet

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

Electrical data	
Operating voltage	[V DC] 24 ±10%
Connection type	Plug connection
Power consumption	[W] 3, following current reduction 0.7
Duty cycle	[%] 100
Max. cable length	[m] 30

Degree of protection to EN 60529	
With plug socket NEBV-H1G2	IP40

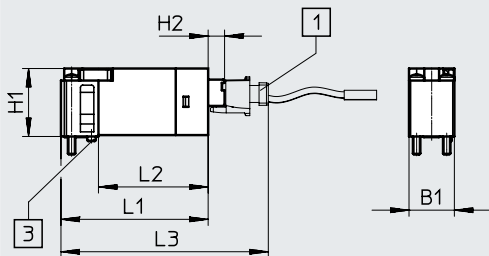
Switching times and frequencies		
Switching time	On [ms]	6
	Off [ms]	6
Maximum switching frequency	[Hz]	10

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

### Dimensions

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

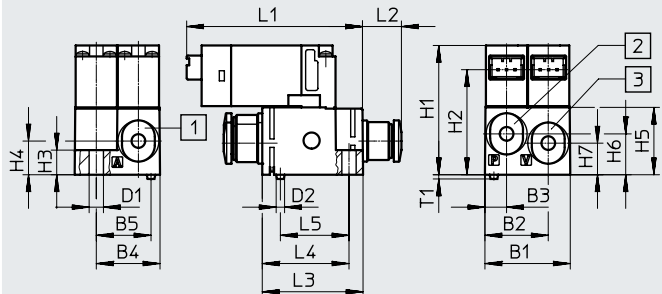
#### 2/2-way valve



[1] Plug socket NEBV-H1G2

[3] Coding pin

#### 2x2/2-way valve



[1] Push-in connector 2

[2] Push-in connector 1


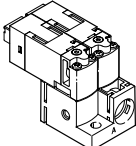
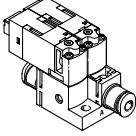


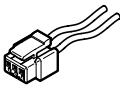
[3] Push-in connector 11

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

1) Packaging unit.



## Datasheet

Ordering data		Weight [g]	Pneumatic connection	Part no.	Type	
<b>2/2-way solenoid valve</b>						
	Plug connection at the rear	10	Via sub-base	557864	MHA1-M1LCH-2/2G-1.5-HC	
<b>2x2/2-way solenoid valve on sub-base</b>						
	Plug connection at the rear	26.3	Connection for 10 mm cartridge	563365	MHA1-2X2/2G-1.5	
	Plug connection at the rear	30.6	Push-in connector for tubing O.D. 3 mm	562051	MHA1-2X2/2G-1.5-3-3-3	
		30.6	Push-in connector for tubing O.D. 4 mm	566175	MHA1-2X2/2G-1.5-4-4-4	
		30.6	Push-in connector for tubing O.D. 4 mm, port 2 with push-in connector for tubing O.D. 3 mm	560372	MHA1-2X2/2G-1.5-4-4-3	
<b>Ordering data</b>						
				Part no.	Type	PJ <sup>1)</sup>
<b>Push-in fittings</b>						
	10 mm cartridge	Polymer	For tubing O.D. 3 mm	132621	QSPKG10-3	10
			For tubing O.D. 4 mm	132622	QSPKG10-4	10
			For tubing O.D. 6 mm	132623	QSPKG10-6	10
<b>Inscription label</b>						
	For identifying the valve positions			197259	MH-BZ-80X	80
<b>Plug socket with cable</b>						
	Straight socket Plug pattern H 3-pin	2x flying leads Open end 1-wire	0.5 m	566654	NEBV-H1G2-KN-0.5-N-LE2	1
			1 m	566655	NEBV-H1G2-KN-1-N-LE2	1
			2.5 m	566656	NEBV-H1G2-KN-2.5-N-LE2	1
			5 m	566657	NEBV-H1G2-KN-5-N-LE2	1

1) Packaging unit.