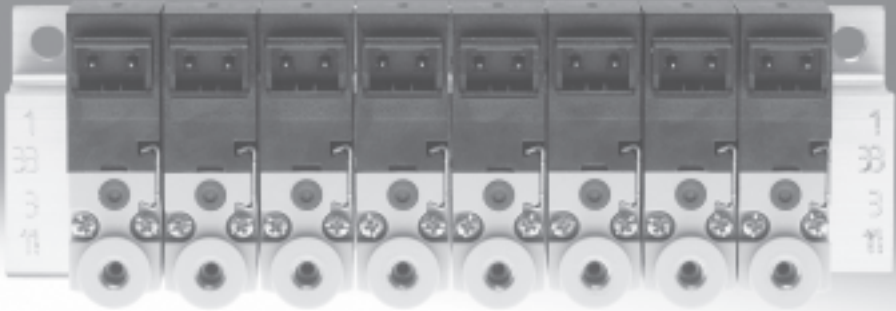
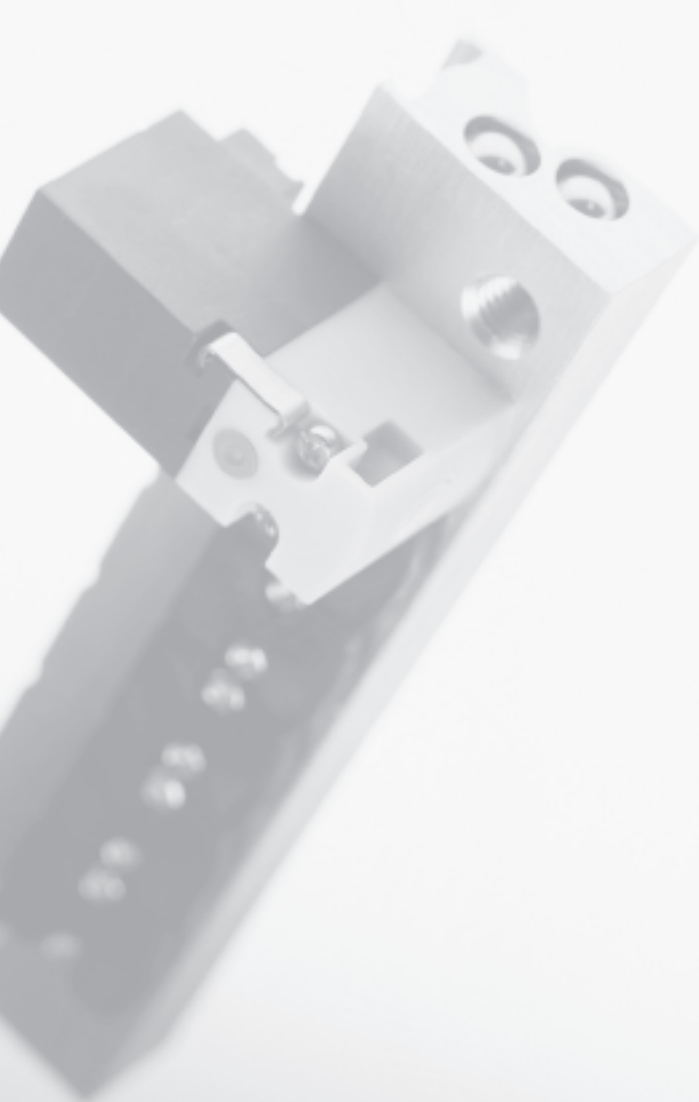


Solenoid valves MH1, miniature



Complete product range for a wide range of applications

FESTO



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. Either as an individual sub-base 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 plug. There is also a choice between horizontal electrical connections, on top and underneath. Furthermore, a connection for mounting on a PCB is available. All components are tested and assembled for Festo plug and work[®]. Need a system to run as fast as possible? No problem! The response time of the miniature valves is an impressive 4 ms.

Totally coordinated

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

Miniature valves not just for the electronics industry ...

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

With flow rates of 10 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 Festo's wide range of compact cylinders, rotary drives and slides.

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



New
2x2/2-way valve

Solenoid valves MH1, miniature

Product range overview



Function	Circuit symbol	Version	Voltage [V DC]			→ Page/ Internet
			5	12	24	
2/2-way valve		Standard nominal flow rate 14 l/min				
		Semi in-line valve	■	■	■	6
		Sub-base valve	■	■	■	18
		Standard nominal flow rate 30 l/min, controls vacuum or ejector pulse				
Sub-base valve	-	-	■	35		
3/2-way valve ¹⁾		Standard nominal flow rate 10 l/min				
		Semi in-line valve	■	■	■	6
		Sub-base valve	■	■	■	18
		Sub-base valve with LED	-	-	■	18
2x2/2-way valve		Standard nominal flow rate 30 l/min, controls vacuum and ejector pulse				
		Sub-base valve with LED	-	-	■	35


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

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

Solenoid valves MH1, miniature

Type codes

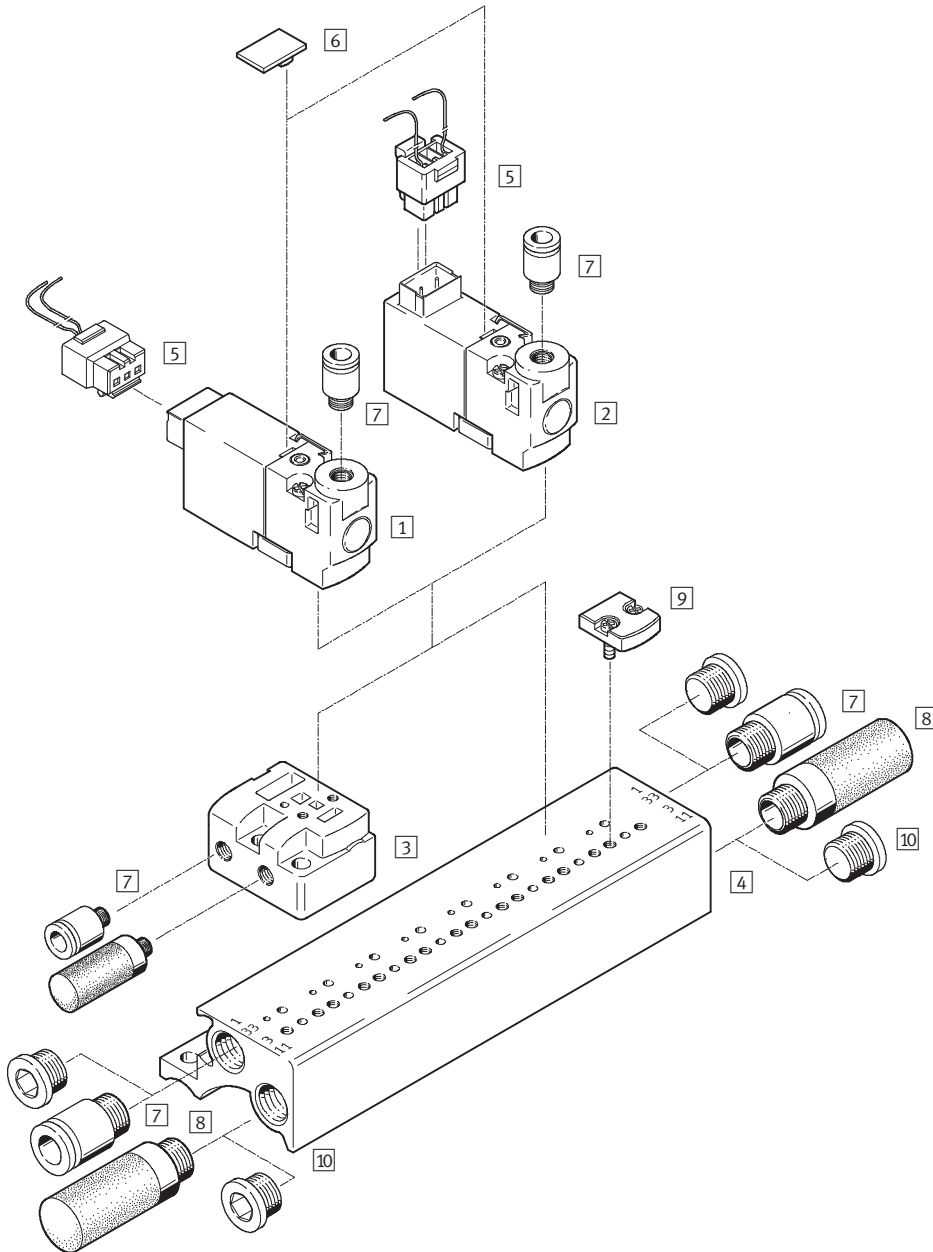
		MH	A	1	-	M	4	L	H	-	3/2	-	0	-	M3	-	HC	
Valve family																		
MH	Miniature and fast-switching valves																	
Design																		
P	Semi in-line valve																	
A	Sub-base valve																	
Size																		
1	Flow rate 10 ... 14 l/min																	
Drive type																		
M	Solenoid, switching																	
Operating voltage																		
4	5 V DC																	
5	12 V DC																	
1	24 V DC																	
Signal status display																		
-	No																	
L	LED																	
Manual override																		
H	Non-detenting/detenting																	
Valve function																		
2/2	2/2-way valve																	
3/2	3/2-way valve																	
Normal position																		
G	Closed																	
0	Open																	
Pneumatic connection																		
0.6	Nominal size 0.65 mm																	
0.9	Nominal size 0.9 mm																	
M3	M3 thread																	
Electrical connection																		
HC	Plug connection at rear for plug socket KMH																	
TC	Plug connection on top for plug socket KMH																	
PI	Plug connection underneath for plug-in connection																	

-  - Note
Further variants and accessories can be configured and ordered using the modular system.

Solenoid valves MHP1, miniature

Peripherals overview – Semi in-line valve, valve manifold

Plug connection at rear ...-HC, plug connection on top ...-TC



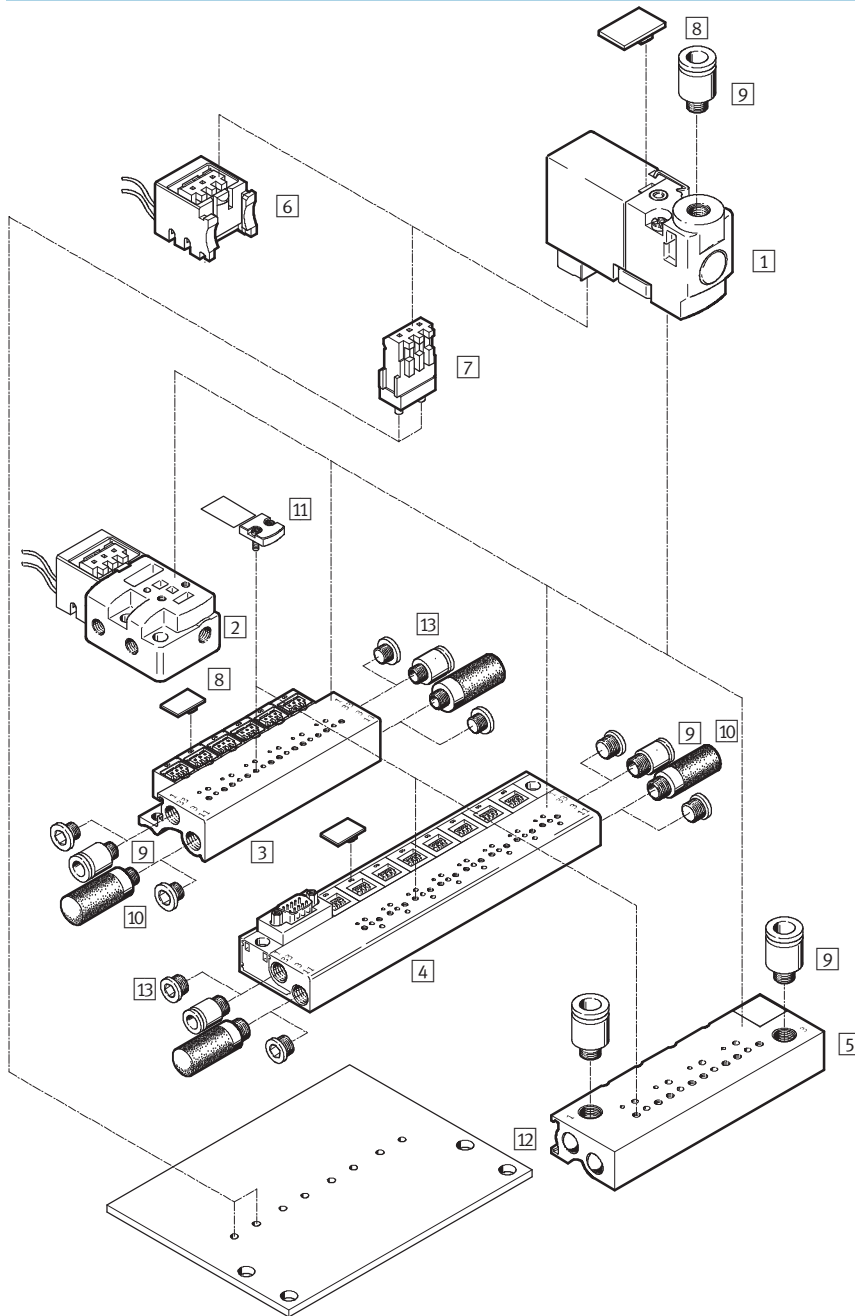
Accessories		→ Page/ Internet	→ Page/ Internet
1	Semi in-line valve MHP1-...-HC	9	6
2	Semi in-line valve MHP1-...-TC	9	7
3	Individual sub-base MHP1-AS-3-M3	12	8
4	Manifold block MHP1-PR...-3	12	9
5	Plug socket with cable KMH	37	10
			6
			7
			8
			9
			10
			37
			qs
			uc
			37
			37

Solenoid valves MHP1, miniature

Peripherals overview – Semi in-line valve, valve terminal

FESTO

Plug connection underneath ...-PI

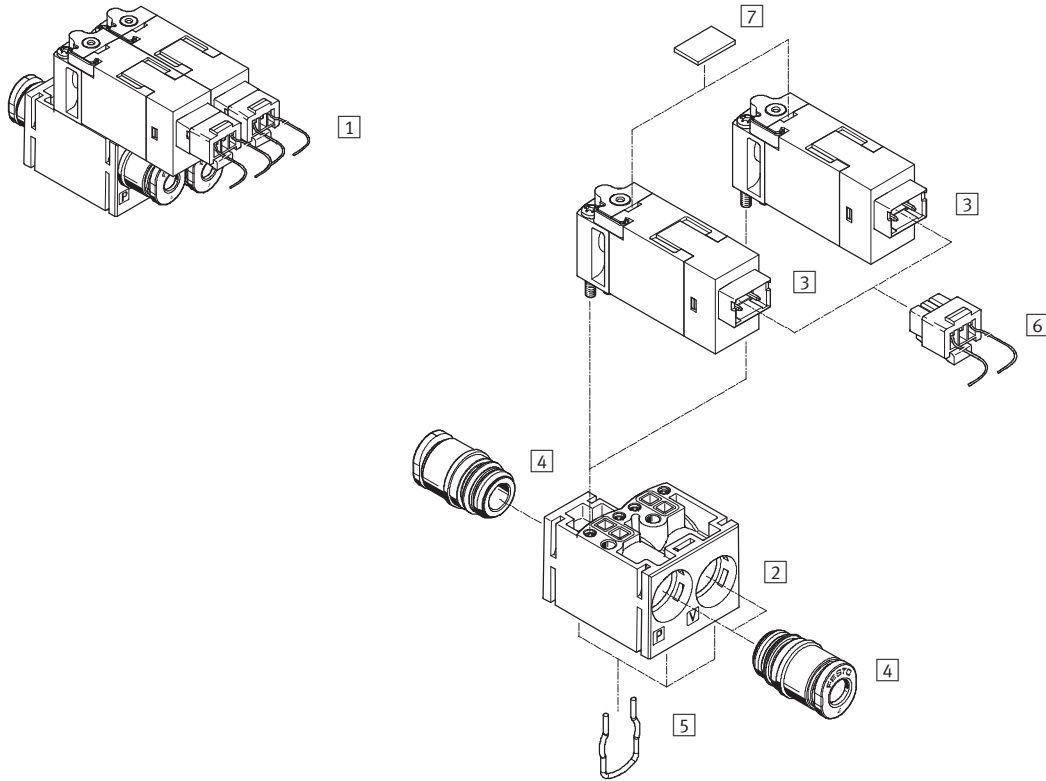


Accessories		→ Page/ Internet	→ Page/ Internet
1	Semi in-line valve MHP1-...-PI	9	
2	Individual sub-base MHP1-AS-3-M3-PI	12	
3	Manifold block MHP1-PR...-3-PI with plug bases	12	
4	Manifold block MHP1-PR...-3-PI-D... with plug bases and electrical multi-pin plug	14	
5	Manifold block MHP1-PR...-3-PI-PCB for mounting on PCB	15	
6	Plug base MHAP-PI	37	
			7
			37
			qs
			uc
			37
			15
			37

Solenoid valves MHP1, miniature

Peripherals overview – 2x2/2-way valve

2x2/2-way valve



Accessories

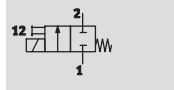
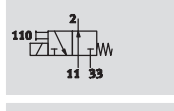
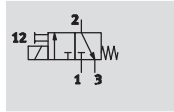
	→ Page/ Internet		→ Page/ Internet
1	Solenoid valve MHA1-2x2/2G-1,5-...	35	
2	Sub-base	-	
3	Solenoid valve MHA1-M1LCH-2/2G-1.5-HC	35	
4	Push-in cartridge	-	
			5
			6
			7

Solenoid valves MHP1, miniature

Technical data – Semi in-line valve

FESTO

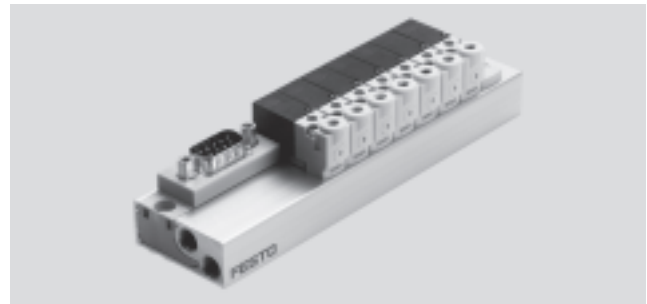
Function



- - Voltage
5, 12, 24 V DC

- - Pressure
-0.9 ... +8 bar

- - Temperature range
-5 ... +50 °C



General technical data					
Valve function		2/2-way, single solenoid		3/2-way, single solenoid	
Constructional design		Poppet valve with spring return			
Sealing principle		Soft			
Actuation type		Electric			
Reset method		Mechanical spring			
Type of pilot control		Direct			
Direction of flow		Non-reversible			
Exhaust function		-		With flow control	
Manual override		Non-detenting			
Type of mounting		On sub-base via through-holes			
Mounting position		Any			
Nominal size		[mm]	0.9	0.65	
Standard nominal flow rate		[l/min]	14 (2 bar → 0 bar)		10
Grid dimension		[mm]	10	10	
Pneumatic connection	Individual sub-base	1, 33	M3	M3	
		2	M3	M3	
		3, 11	-	M3	
	Manifold assembly	1, 33	M7	M7	
		2	M3	M3	
		3, 11	-	M7	
Product weight		[g]	10	10	

Operating and environmental conditions					
Valve function		2/2-way, single solenoid		3/2-way, single solenoid	
Operating medium		Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm		Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm	
		Vacuum, grade of filtration 40 µm		-	
Operating pressure range	Normally closed	[bar]	-0.9 ... +2	0 ... 8 ¹⁾	
	Normally open	[bar]	-	0 ... 6 ¹⁾	
Ambient temperature	Individual mounting	[°C]	-5 ... +50		
	Manifold assembly	[°C]	-5 ... +40		
Temperature of medium	Individual mounting	[°C]	-5 ... +50		
	Manifold assembly	[°C]	-5 ... +40		
Storage temperature		[°C]	-20 ... +60		
Corrosion resistance class CRC		2 ²⁾			

1) Vacuum operation possible with special connection method

2) Corrosion resistance class 2 as per Festo standard 940 070

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

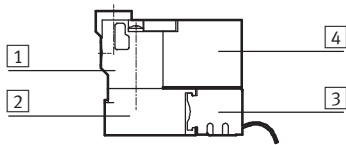
Solenoid valves MHP1, miniature

Technical data – Semi in-line valve

Electrical data		
Valve function		2/2-way, single solenoid 3/2-way, single solenoid
Operating voltage	[V DC]	5 ±10%, 12 ±10% or 24 ±10%
Type of connection		Plug connection
Power consumption	[W]	1
Duty cycle		100%
Protection class to EN 60529		
With plug socket KMH		IP40
With plug base MHAP-PI		
With soldering base PCBC-A		
With Sub-D connector plug		

Response times and switching frequencies		
Valve function		2/2-way, single solenoid 3/2-way, single solenoid
Response time on/off	[ms]	4/5 4/4
Maximum switching frequency	[Hz]	20

Materials



1	Housing	Polyphenylene sulphide
2	Sub-base	Aluminium
3	Plug base	Polyamide
4	Coil housing	Polyamide
-	Seals	Fluoro elastomer, nitrile rubber, hydrogenated nitrile rubber
Note on materials		Free of copper and PTFE

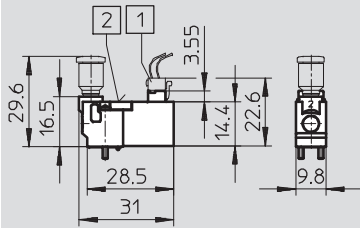
Solenoid valves MHP1, miniature

Technical data – Semi in-line valve

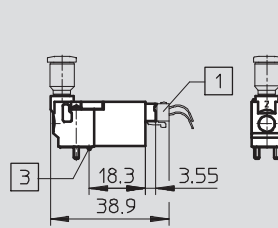
Dimensions

Download CAD data → www.festo.com

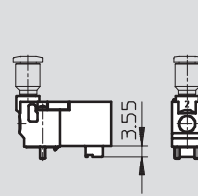
Plug connection on top



Plug connection at rear

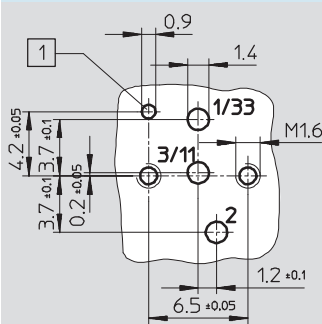


Plug connection underneath



- 1 Plug socket KMH...
- 2 Manual override
- 3 Coding pin

Hole pattern on sub-bases



- 1 Hole for coding pin

-  - Note

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

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

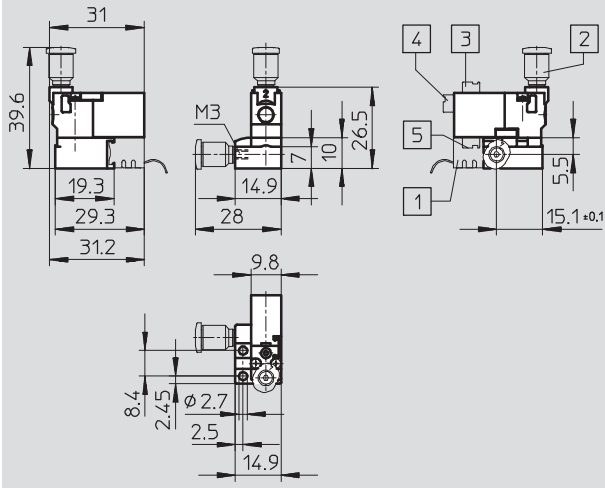
Solenoid valves MHP1, miniature

Technical data – Semi in-line valve

Dimensions – 2/2-way valve

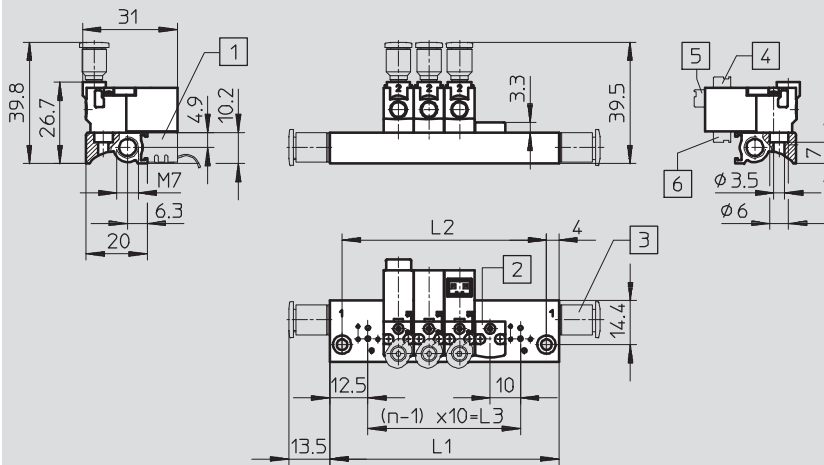
Download CAD data → www.festo.com

Individual sub-base



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

Manifold assembly



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

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

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

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

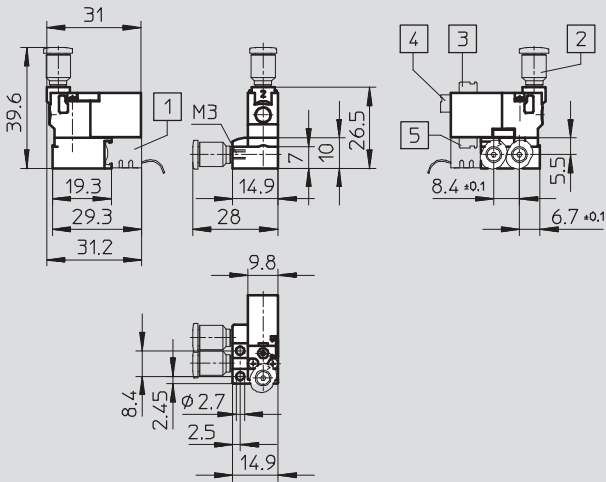
Solenoid valves MHP1, miniature

Technical data – Semi in-line valve

Dimensions – 3/2-way valve

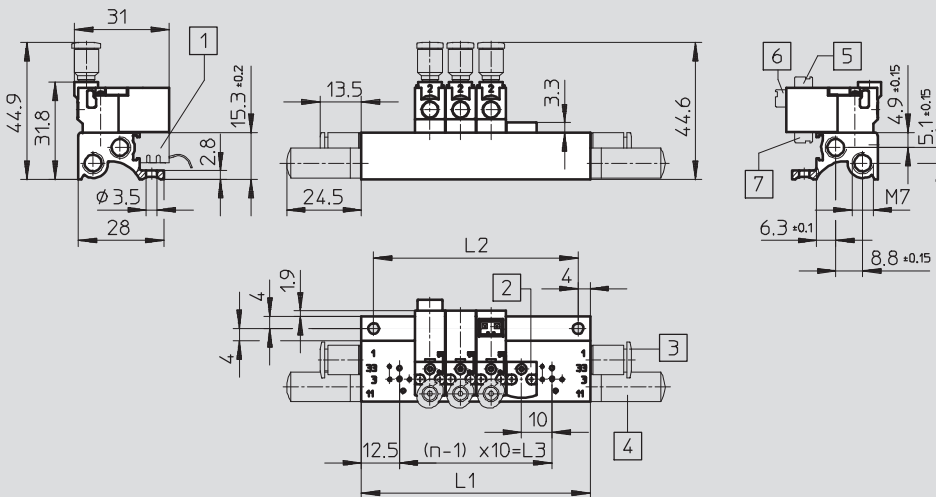
Download CAD data → www.festo.com

Individual sub-base



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

Manifold assembly



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

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

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

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

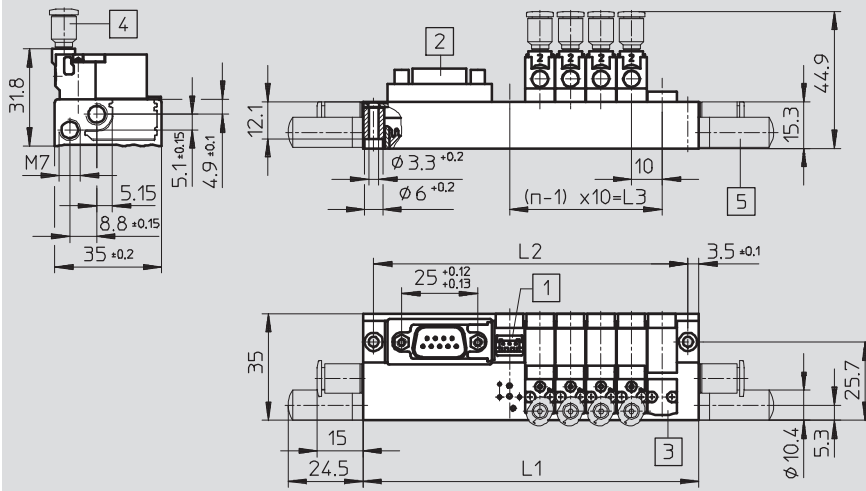
Solenoid valves MHP1, miniature

Technical data – Semi in-line valve

Dimensions – 3/2-way valve

Download CAD data → www.festo.com

Manifold assembly with electrical multi-pin plug



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

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

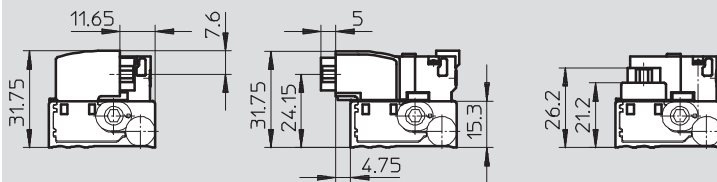
Valve positions n	L1 ±0.15	L2 ±0.1	L3
18	252	245	170
20	272	265	190
22	292	285	210

Electrical multi-pin plug – Plug directions

To pneumatic side

To electrical side

To top (standard)



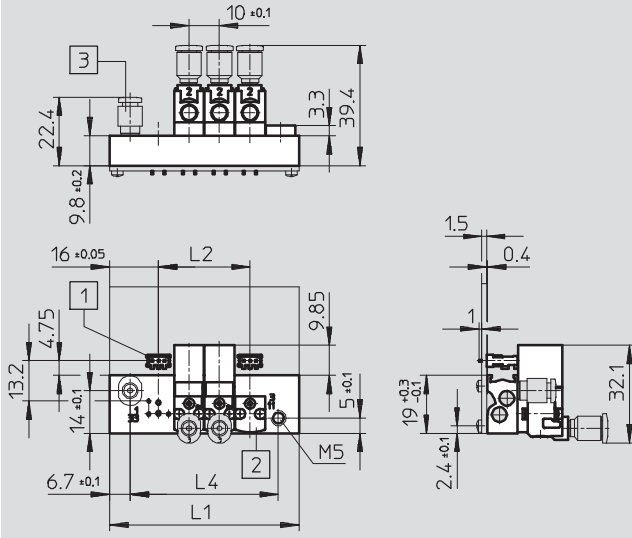
Solenoid valves MHP1, miniature

Technical data – Semi in-line valve

Dimensions – 3/2-way valve

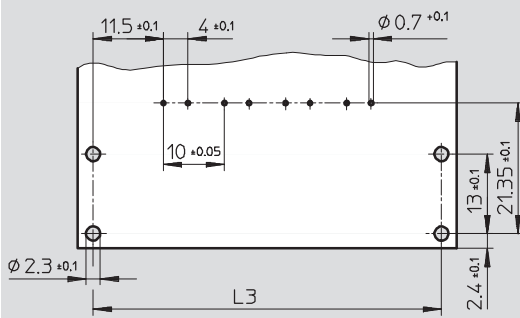
Download CAD data → www.festo.com


Manifold assembly on PCB



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

Hole pattern on PCB




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

Valve positions n	L1 ±0.15	L2	L3 ±0.1	L4 ±0.1
2	42	10	37	28.6
4	62	30	57	48.6
6	82	50	77	68.6
8	102	70	97	88.6
10	122	90	117	108.6


Solenoid valves MHP1, miniature

Technical data – Semi in-line valve

Ordering data – 2/2-way valves			
Electrical connection	Operating voltage	Normally closed	
		Part No.	Type
M3 connecting thread			
Plug connection at rear	5 V DC	197 045	MHP1-M4H-2/2G-M3-HC
	12 V DC	197 046	MHP1-M5H-2/2G-M3-HC
	24 V DC	197 047	MHP1-M1H-2/2G-M3-HC
Plug connection on top	5 V DC	197 048	MHP1-M4H-2/2G-M3-TC
	12 V DC	197 049	MHP1-M5H-2/2G-M3-TC
	24 V DC	197 050	MHP1-M1H-2/2G-M3-TC
Plug connection underneath	5 V DC	197 051	MHP1-M4H-2/2G-M3-PI
	12 V DC	197 052	MHP1-M5H-2/2G-M3-PI
	24 V DC	197 053	MHP1-M1H-2/2G-M3-PI

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

Ordering data – Product-specific accessories			
Designation		Part No.	Type
Valves with plug connection at rear or on top			
Individual sub-base		197 188	MHP1-AS-2-M3
Manifold block for ...	2 valves	197 196	MHP1-P2-2
	4 valves	197 197	MHP1-P4-2
	6 valves	197 198	MHP1-P6-2
	8 valves	197 200	MHP1-P8-2
	10 valves	197 201	MHP1-P10-2
Valves with plug connection underneath			
Individual sub-base		197 190	MHP1-AS-2-M3-PI
Manifold block with plug bases for ...	2 valves	197 217	MHP1-P2-2-PI
	4 valves	197 218	MHP1-P4-2-PI
	6 valves	197 219	MHP1-P6-2-PI
	8 valves	197 220	MHP1-P8-2-PI
	10 valves	197 221	MHP1-P10-2-PI

 Note
Manifold blocks with an uneven number of valves and for 11 ... 22 valves as well as further variants can be configured and ordered using the MH1 modular product system.

Solenoid valves MHP1, miniature

Technical data – Semi in-line valve

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Ordering data – 3/2-way valves					
Electrical connection	Operating voltage	Normally closed		Normally open	
		Part No.	Type	Part No.	Type
M3 connecting thread					
Plug connection at rear	5 V DC	197 009	MHP1-M4H-3/2G-M3-HC	197 027	MHP1-M4H-3/2O-M3-HC
	12 V DC	197 010	MHP1-M5H-3/2G-M3-HC	197 028	MHP1-M5H-3/2O-M3-HC
	24 V DC	197 011	MHP1-M1H-3/2G-M3-HC	197 029	MHP1-M1H-3/2O-M3-HC
Plug connection on top	5 V DC	197 012	MHP1-M4H-3/2G-M3-TC	197 030	MHP1-M4H-3/2O-M3-TC
	12 V DC	197 013	MHP1-M5H-3/2G-M3-TC	197 031	MHP1-M5H-3/2O-M3-TC
	24 V DC	197 014	MHP1-M1H-3/2G-M3-TC	197 032	MHP1-M1H-3/2O-M3-TC
Plug connection underneath	5 V DC	197 015	MHP1-M4H-3/2G-M3-PI	197 033	MHP1-M4H-3/2O-M3-PI
	12 V DC	197 016	MHP1-M5H-3/2G-M3-PI	197 034	MHP1-M5H-3/2O-M3-PI
	24 V DC	197 017	MHP1-M1H-3/2G-M3-PI	197 035	MHP1-M1H-3/2O-M3-PI



Note

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

Ordering data – Product-specific accessories		
Designation	Part No.	Type
Valves with plug connection at rear or on top		
Individual sub-base	197 184	MHP1-AS-3-M3
Manifold block for ...	2 valves	197 191 MHP1-PR2-3
	4 valves	197 192 MHP1-PR4-3
	6 valves	197 193 MHP1-PR6-3
	8 valves	197 194 MHP1-PR8-3
	10 valves	197 195 MHP1-PR10-3
Valves with plug connection underneath		
Individual sub-base	197 186	MHP1-AS-3-M3-PI
Manifold block with plug bases for ...	2 valves	197 212 MHP1-PR2-3-PI
	4 valves	197 213 MHP1-PR4-3-PI
	6 valves	197 214 MHP1-PR6-3-PI
	8 valves	197 215 MHP1-PR8-3-PI
	10 valves	197 216 MHP1-PR10-3-PI
Manifold block with plug bases and electrical multi-pin plug for ...	4 valves	197 233 MHP1-PR4-3-PI-D9
	6 valves	197 234 MHP1-PR6-3-PI-D9
	8 valves	197 235 MHP1-PR8-3-PI-D9
	10 valves	197 236 MHP1-PR10-3-PI-D25
Manifold block for mounting on PCB for ...	2 valves	197 242 MHP1-PR2-3-PI-PCB
	4 valves	197 243 MHP1-PR4-3-PI-PCB
	6 valves	197 244 MHP1-PR6-3-PI-PCB
	8 valves	197 245 MHP1-PR8-3-PI-PCB
	10 valves	197 246 MHP1-PR10-3-PI-PCB



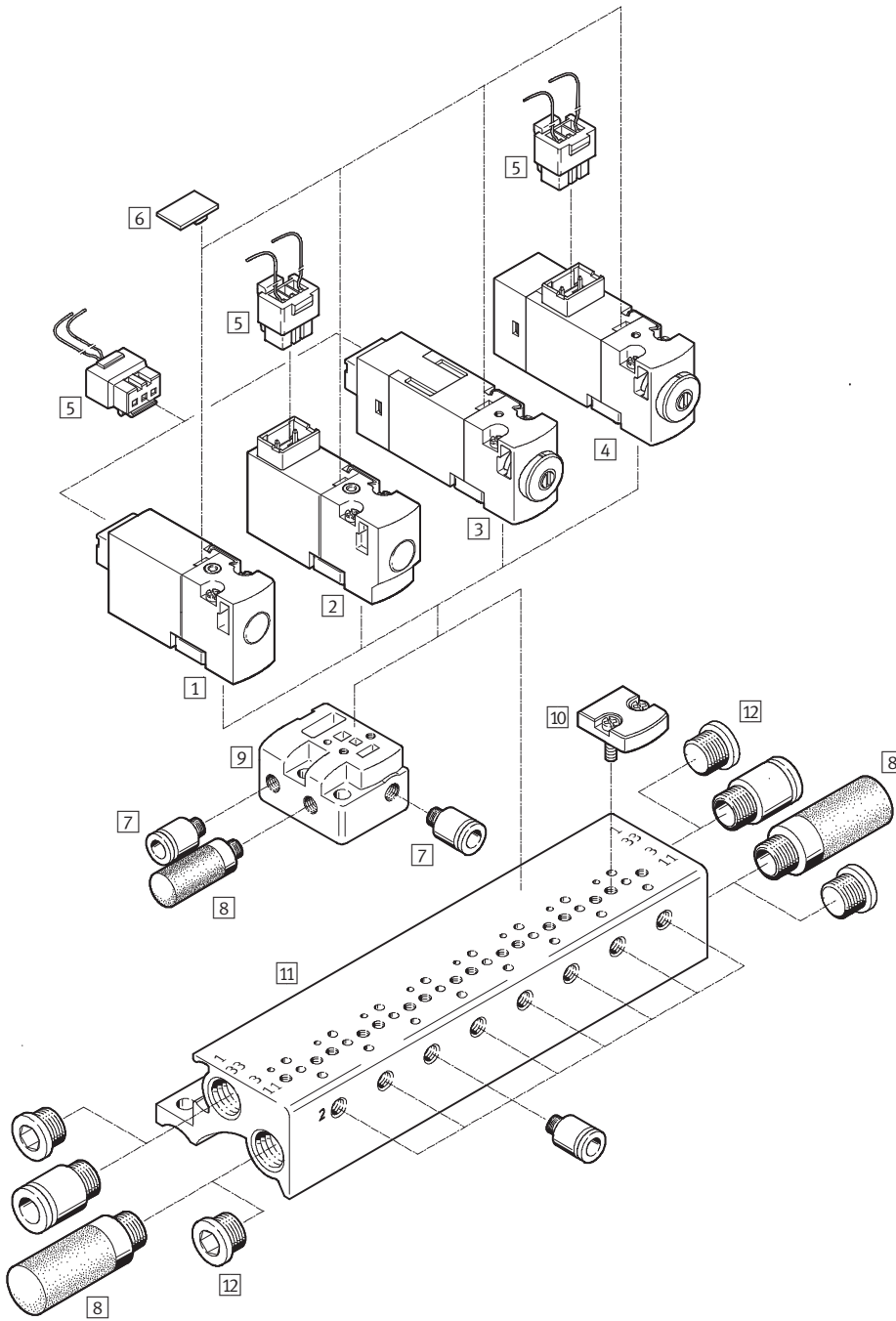
Note

Manifold blocks with an uneven number of valves and for 11 ... 22 valves as well as further variants can be configured and ordered using the MH1 modular product system.

Solenoid valves MHA1, miniature

Peripherals overview – Sub-base valve, valve manifold

Plug connection at rear ...-HC, plug connection on top ...-TC

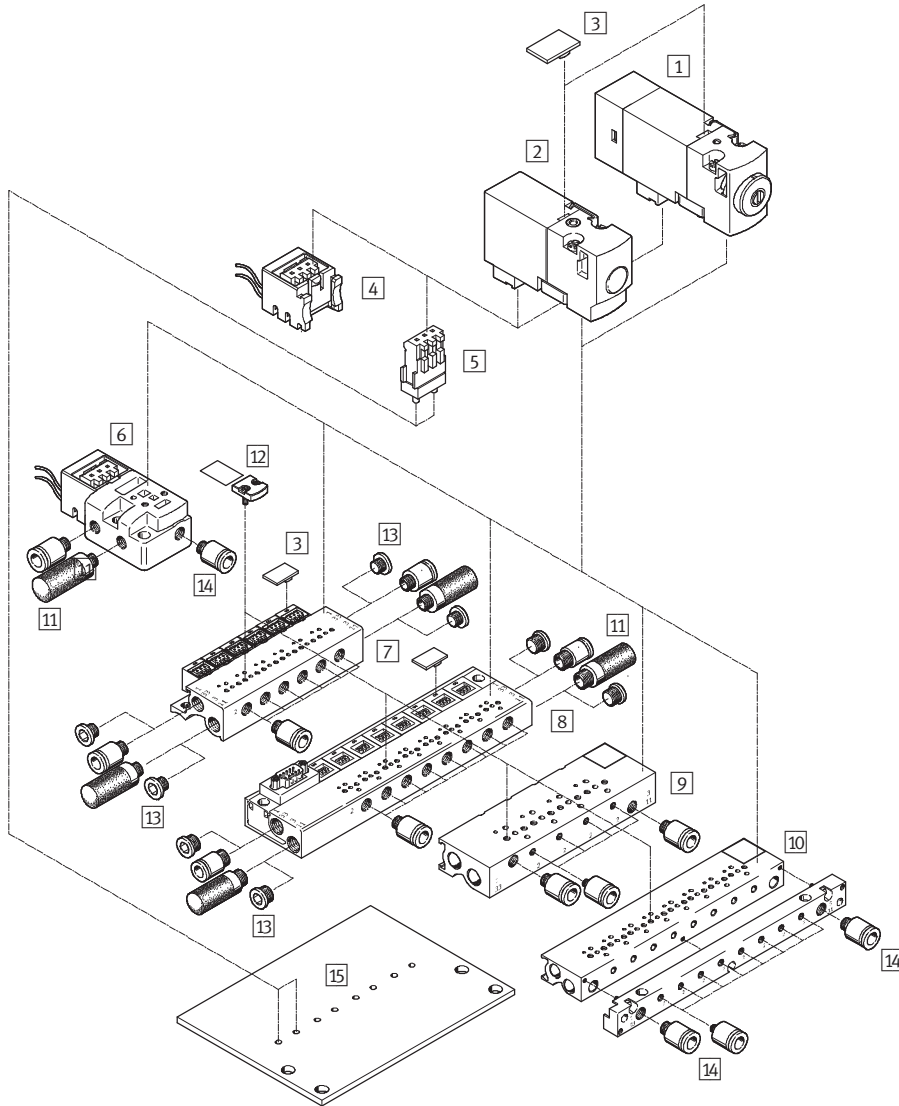


Accessories		→ Page/Internet		→ Page/Internet
1	Sub-base valve MHA1-...-HC	20	7	Push-in fittings QS/QSM
2	Sub-base valve MHA1-...-TC	20	8	Silencer UC
3	Sub-base valve MHA1-...-HC with LED	28	9	Individual sub-base MHA1-AS-3-M3
4	Sub-base valve MHA1-...-TC with LED	28	10	Blanking plate MHAP1-BP-3 for sealing vacant positions
5	Plug socket with cable KMH	37	11	Manifold block MHA1-PR...-3
6	Inscription label MH-BZ-80X	37	12	Blanking plug B

Solenoid valves MHA1, miniature

Peripherals overview – Sub-base valve, valve terminal

Plug connection underneath ...-PI



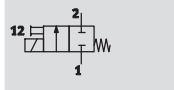
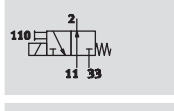
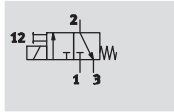
Accessories		→ Page/Internet			→ Page/Internet
1	Sub-base valve MHA1-...-PI with LED	28	9	Manifold block MHA1-PR...-3-M3-PI-PCB for mounting on PCB	25
2	Sub-base valve MHA1-...-PI	20	10	Manifold block MHA1-PR...-3-M3-PI-PCBM for mounting on PCB with pneumatic multiple connector plate	25
3	Inscription label MH-BZ-80X	37	11	Silencer UC	uc
4	Plug base MHAP-PI	37	12	Blanking plate MHAP1 for sealing vacant positions	37
6	Individual sub-base MHA1-AS-3-M3-PI with plug base	22	13	Blanking plug B	37
7	Manifold block MHA1-PR...-3-M3-PI with plug bases	22	14	Push-in fittings QS	qs
8	Manifold block MHA1-PR...-3-M3-PI-D... with plug bases and electrical multi-pin plug	24	15	PCB (user-specific)	25

Solenoid valves MHA1, miniature

Technical data – Sub-base valve

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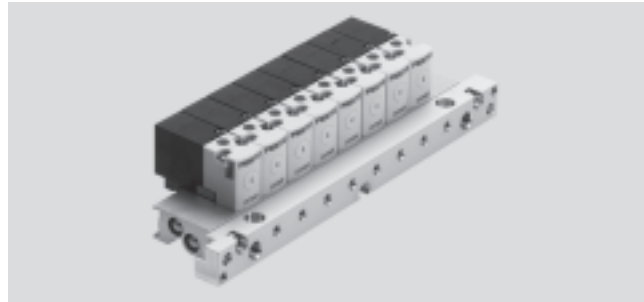
Function



- - Voltage
5, 12, 24 V DC

- - Pressure
-0.9 ... +8 bar

- - Temperature range
-5 ... +50 °C



General technical data			
Valve function		2/2-way, single solenoid	3/2-way, single solenoid
Constructional design		Poppet valve with spring return	
Sealing principle		Soft	
Actuation type		Electric	
Reset method		Mechanical spring	
Type of pilot control		Direct	
Direction of flow		Non-reversible	
Exhaust function		-	With flow control
Manual override		Non-detenting	
Type of mounting		On sub-base via through-holes	
Mounting position		Any	
Nominal size		[mm] 0.9	0.65
Standard nominal flow rate		[l/min] 14 (2 bar → 0 bar)	10
Grid dimension		[mm] 10	10
Pneumatic connection	Individual sub-base	1, 33	M3
		2	-
		3, 11	M3
	Manifold assembly	1, 33	M7
		2	-
		3, 11	M7 (PCB: M5)
Product weight		[g] 10	10

Operating and environmental conditions			
Valve function		2/2-way, single solenoid	3/2-way, single solenoid
Operating medium		Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm Vacuum, grade of filtration 40 µm	Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm
Operating pressure range	Normally closed	[bar] -0.9 ... +2	0 ... 8 ¹⁾
	Normally open	[bar] -	0 ... 6 ¹⁾
Ambient temperature	Individual mounting	[°C] -5 ... +50	
	Manifold assembly	[°C] -5 ... +40	
Temperature of medium	Individual mounting	[°C] -5 ... +50	
Temperature of medium	Manifold assembly	[°C] -5 ... +40	
Storage temperature		[°C] -20 ... +60	
Corrosion resistance class CRC		2 ²⁾	

1) Vacuum operation possible with special connection method

2) Corrosion resistance class 2 as per Festo standard 940 070

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

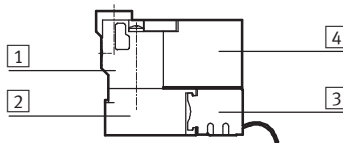
Solenoid valves MHA1, miniature

Technical data – Sub-base valve

Electrical data		
Valve function	2/2-way, single solenoid	3/2-way, single solenoid
Operating voltage [V DC]	5 ±10%, 12 ±10% or 24 ±10%	
Type of connection	Plug connection	
Power consumption [W]	1	
Duty cycle [%]	100	
Protection class to EN 60529		
With plug socket KMH	IP40	
With plug base MHAP-PI		
With soldering base PCBC-A		
With Sub-D connector plug		

Response times and switching frequencies		
Valve function	2/2-way, single solenoid	3/2-way, single solenoid
Response time on/off [ms]	4/5	4/4
Maximum switching frequency [Hz]	20	

Materials



1	Housing	Polyphenylene sulphide
2	Sub-base	Aluminium
3	Plug base	Polyamide
4	Coil housing	Polyamide
-	Seals	Fluoro elastomer, nitrile rubber, hydrogenated nitrile rubber
Note on materials		Free of copper and PTFE

Dimensions

Download CAD data → www.festo.com

Plug connection on top

Plug connection at rear

Plug connection underneath

1 Plug socket KMH-...
 2 Manual override
 3 Coding pin

Hole pattern on sub-bases

1 Hole for coding pin

- - Note

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

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

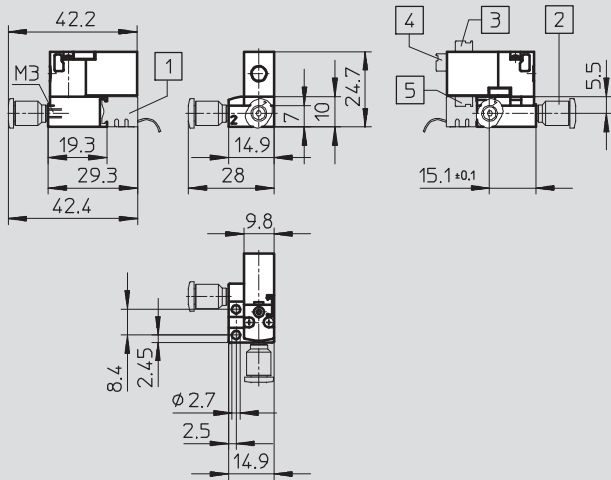
Solenoid valves MHA1, miniature

Technical data – Sub-base valve

Dimensions – 2/2-way valve

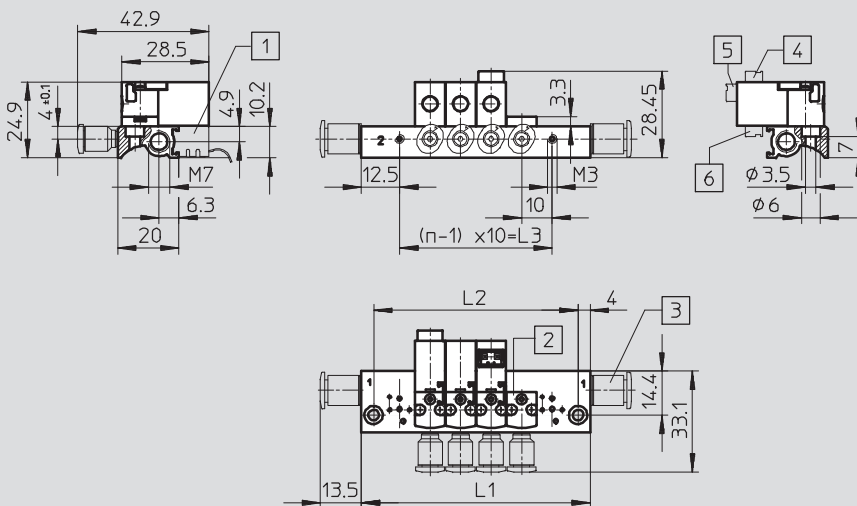
Download CAD data → www.festo.com

Individual sub-base



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

Manifold assembly



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

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

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

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

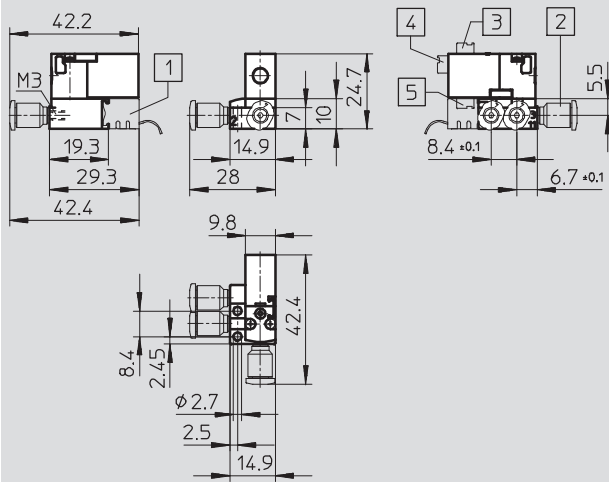
Solenoid valves MHA1, miniature

Technical data – Sub-base valve

Dimensions – 3/2-way valve

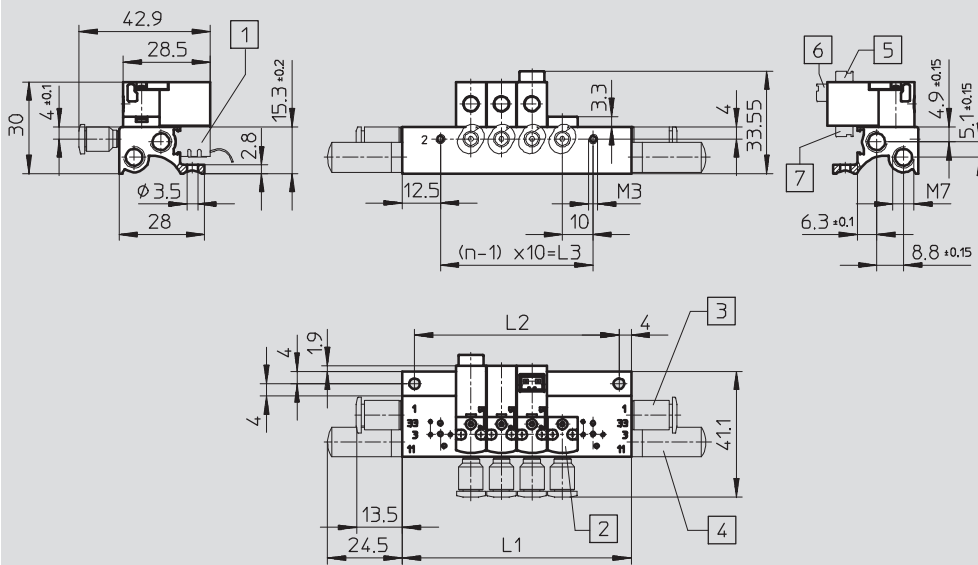
Download CAD data → www.festo.com

Individual sub-base



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

Manifold assembly



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

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

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

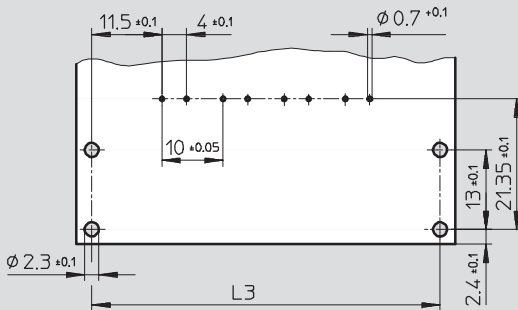
Valve positions n	L1 ±0.15	L2 ±0.1	L3
16	175	167	150
17	185	177	160
18	195	187	170
19	205	197	180
20	215	207	190
21	225	217	200
22	235	227	210

Solenoid valves MHA1, miniature

Technical data – Sub-base valve

Dimensions

Hole pattern on PCB



Note

The PCB is not included in the scope of delivery.

Ordering data – 2/2-way valves

Electrical connection	Operating voltage	Normally closed	
		Part No.	Type
M3 connecting thread			
Plug connection at rear	5 V DC	197 036	MHA1-M4H-2/2G-0,9-HC
	12 V DC	197 037	MHA1-M5H-2/2G-0,9-HC
	24 V DC	197 038	MHA1-M1H-2/2G-0,9-HC
Plug connection on top	5 V DC	197 039	MHA1-M4H-2/2G-0,9-TC
	12 V DC	197 040	MHA1-M5H-2/2G-0,9-TC
	24 V DC	197 041	MHA1-M1H-2/2G-0,9-TC
Plug connection underneath	5 V DC	197 042	MHA1-M4H-2/2G-0,9-PI
	12 V DC	197 043	MHA1-M5H-2/2G-0,9-PI
	24 V DC	197 044	MHA1-M1H-2/2G-0,9-PI



Note

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

Ordering data – Product-specific accessories

Designation	Part No.	Type
Valves with plug connection at rear or on top		
Individual sub-base	197 187	MHA1-AS-2-M3
Manifold block for ...	2 valves	197 207 MHA1-P2-2-M3
	4 valves	197 208 MHA1-P4-2-M3
	6 valves	197 209 MHA1-P6-2-M3
	8 valves	197 210 MHA1-P8-2-M3
	10 valves	197 211 MHA1-P10-2-M3
Valves with plug connection underneath		
Individual sub-base	197 189	MHA1-AS-2-M3-PI
Manifold block with plug bases for ...	2 valves	197 227 MHA1-P2-2-M3-PI
	4 valves	197 228 MHA1-P4-2-M3-PI
	6 valves	197 229 MHA1-P6-2-M3-PI
	8 valves	197 230 MHA1-P8-2-M3-PI
	10 valves	197 231 MHA1-P10-2-M3-PI



Note

Manifold blocks with an uneven number of valves and for 11 ... 22 valves as well as further variants can be configured and ordered using the MH1 modular product system.

Solenoid valves MHA1, miniature

Technical data – Sub-base valve

Ordering data – 3/2-way valves					
Electrical connection	Operating voltage	Normally closed		Normally open	
		Part No.	Type	Part No.	Type
M3 connecting thread					
Plug connection at rear	5 V DC	197 000	MHA1-M4H-3/2G-0,6-HC	197 018	MHA1-M4H-3/2O-0,6-HC
	12 V DC	197 001	MHA1-M5H-3/2G-0,6-HC	197 019	MHA1-M5H-3/2O-0,6-HC
	24 V DC	197 002	MHA1-M1H-3/2G-0,6-HC	197 020	MHA1-M1H-3/2O-0,6-HC
Plug connection on top	5 V DC	197 003	MHA1-M4H-3/2G-0,6-TC	197 021	MHA1-M4H-3/2O-0,6-TC
	12 V DC	197 004	MHA1-M5H-3/2G-0,6-TC	197 022	MHA1-M5H-3/2O-0,6-TC
	24 V DC	197 005	MHA1-M1H-3/2G-0,6-TC	197 023	MHA1-M1H-3/2O-0,6-TC
Plug connection underneath	5 V DC	197 006	MHA1-M4H-3/2G-0,6-PI	197 024	MHA1-M4H-3/2O-0,6-PI
	12 V DC	197 007	MHA1-M5H-3/2G-0,6-PI	197 025	MHA1-M5H-3/2O-0,6-PI
	24 V DC	197 008	MHA1-M1H-3/2G-0,6-PI	197 026	MHA1-M1H-3/2O-0,6-PI



Note

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

Ordering data – Product-specific accessories		
Designation	Part No.	Type
Valves with plug connection at rear or on top		
Individual sub-base	197 183	MHA1-AS-3-M3
Manifold block for ...	2 valves	197 202 MHA1-PR2-3-M3
	4 valves	197 203 MHA1-PR4-3-M3
	6 valves	197 204 MHA1-PR6-3-M3
	8 valves	197 205 MHA1-PR8-3-M3
	10 valves	197 206 MHA1-PR10-3-M3
Valves with plug connection underneath		
Individual sub-base	197 185	MHA1-AS-3-M3-PI
Manifold block with plug bases for ...	2 valves	197 222 MHA1-PR2-3-M3-PI
	4 valves	197 223 MHA1-PR4-3-M3-PI
	6 valves	197 224 MHA1-PR6-3-M3-PI
	8 valves	197 225 MHA1-PR8-3-M3-PI
	10 valves	197 226 MHA1-PR10-3-M3-PI
Manifold block with plug bases and electrical multi-pin plug for ...	4 valves	197 238 MHA1-PR4-3-M3-PI-D9
	6 valves	197 239 MHA1-PR6-3-M3-PI-D9
	8 valves	197 240 MHA1-PR8-3-M3-PI-D9
	10 valves	197 241 MHA1-PR10-3-M3-PI-D25
Manifold block for mounting on PCB for ...	2 valves	197 247 MHA1-PR2-3-M3-PI-PCB
	4 valves	197 248 MHA1-PR4-3-M3-PI-PCB
	6 valves	197 249 MHA1-PR6-3-M3-PI-PCB
	8 valves	197 250 MHA1-PR8-3-M3-PI-PCB
	10 valves	197 251 MHA1-PR10-3-M3-PI-PCB
Manifold block for mounting on PCB with pneumatic multiple connector plate for ...	4 valves	197 253 MHA1-PR4-3-PI-PCBM
	6 valves	197 254 MHA1-PR6-3-PI-PCBM
	8 valves	197 255 MHA1-PR8-3-PI-PCBM
	10 valves	197 256 MHA1-PR10-3-PI-PCBM



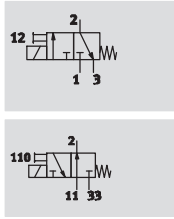
Note




Manifold blocks with an uneven number of valves and for 11 ... 22 valves as well as further variants can be configured and ordered using the MH1 modular product system.

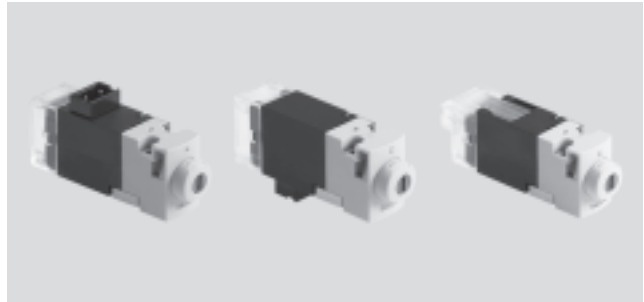
Solenoid valves MHA1, miniature

Technical data – Sub-base valve with LED

Function



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



General technical data			
Valve function		3/2-way, single solenoid	
Constructional design		Poppet valve with spring return	
Sealing principle		Soft	
Actuation type		Electric	
Reset method		Mechanical spring	
Type of pilot control		Direct	
Direction of flow		Non-reversible	
Exhaust function		With flow control	
Manual override		Non-detenting/detenting	
Signal status display		LED	
Type of mounting		On sub-base via through-holes	
Mounting position		Any	
Nominal size		[mm]	0.65
Standard nominal flow rate		[l/min]	10
Grid dimension		[mm]	10
Pneumatic connection	Individual sub-base	1, 33	M3
		2	M3
		3, 11	M3
	Manifold assembly	1, 33	M7
		2	M3
		3, 11	M7
Product weight		[g]	11

Operating and environmental conditions			
Valve function		3/2-way, single solenoid	
Operating medium		Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm	
Operating pressure range	Normally closed	[bar]	0 ... 8 ¹⁾
	Normally open	[bar]	0 ... 6 ¹⁾
Ambient temperature	Individual mounting	[°C]	-5 ... +50
	Manifold assembly	[°C]	-5 ... +40
Temperature of medium	Individual mounting	[°C]	-5 ... +50
	Manifold assembly	[°C]	-5 ... +40
Storage temperature		[°C]	-20 ... +60
Corrosion resistance class CRC		2 ²⁾	

1) Vacuum operation possible with special connection method

2) Corrosion resistance class 2 as per Festo standard 940 070

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

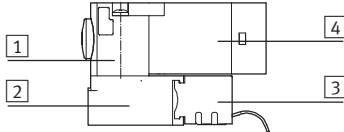
Solenoid valves MHA1, miniature

Technical data – Sub-base valve with LED

Electrical data		
Valve function		3/2-way, single solenoid
Operating voltage	[V DC]	24 ±10%
Type of connection		Plug connection
Power consumption	[W]	1.1
Protection class to EN 60529		
With plug socket KMH		IP40
With plug base MHAP-PI		
With soldering base PCBC-A		
With Sub-D connector plug		

Response times and switching frequencies		
Valve function		3/2-way, single solenoid
Response time on/off	[ms]	4/4
Maximum switching frequency	[Hz]	20

Materials



1	Housing	Polyphenylene sulphide
2	Sub-base	Aluminium
3	Plug base	Polyamide
4	Coil housing	Polyamide
-	Seals	Fluoro elastomer, nitrile rubber, hydrogenated nitrile rubber
Note on materials		Free of copper and PTFE

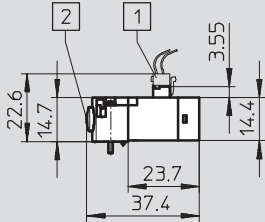
Solenoid valves MHA1, miniature

Technical data – Sub-base valve with LED

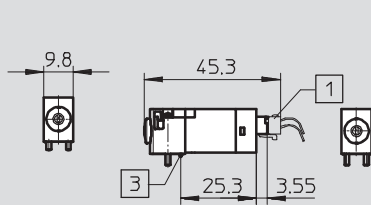
Dimensions

Download CAD data → www.festo.com

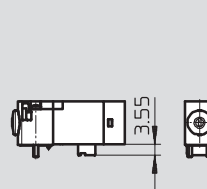
Plug connection on top



Plug connection at rear

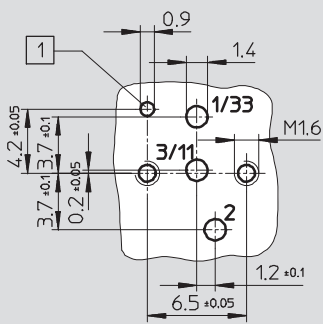


Plug connection underneath



- 1 Plug socket KMH...
- 2 Manual override
- 3 Coding pin

Hole pattern on sub-bases



- 1 Hole for coding pin



Note

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

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

Solenoid valves MHA1, miniature

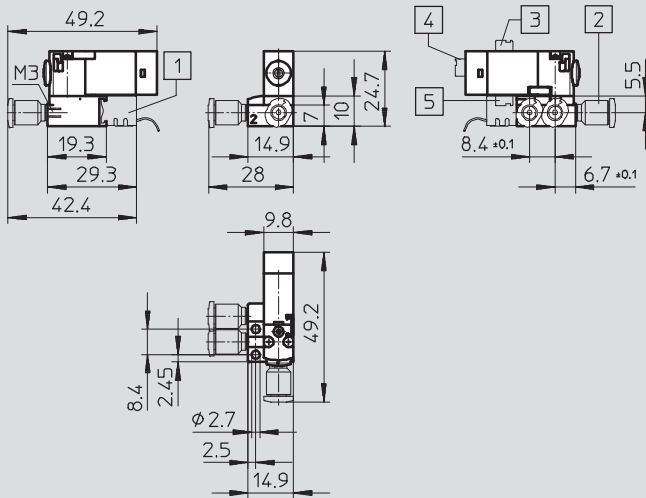
Technical data – Sub-base valve with LED

FESTO

Dimensions – 3/2-way valve

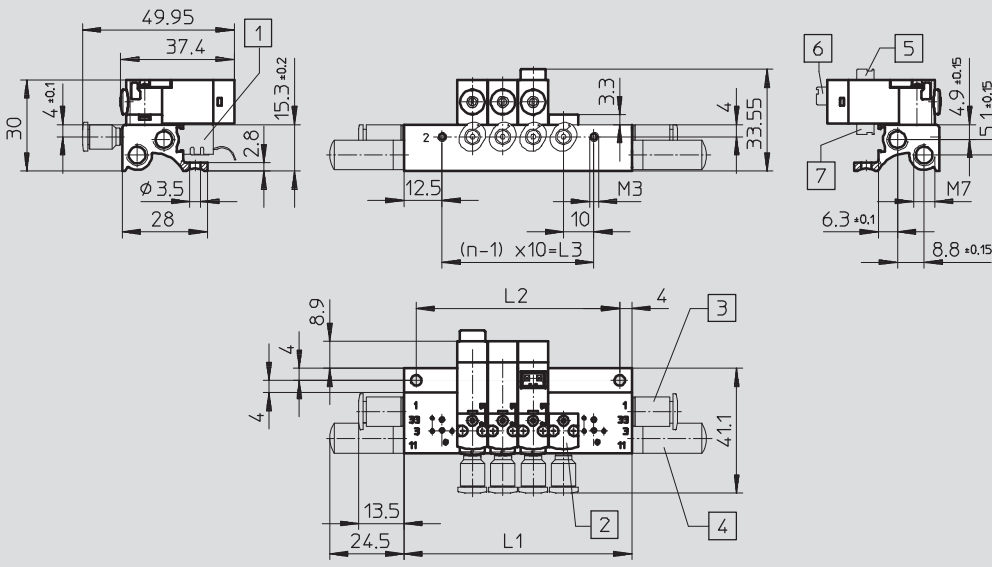
Download CAD data → www.festo.com

Individual sub-base



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

Manifold assembly



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

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

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

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

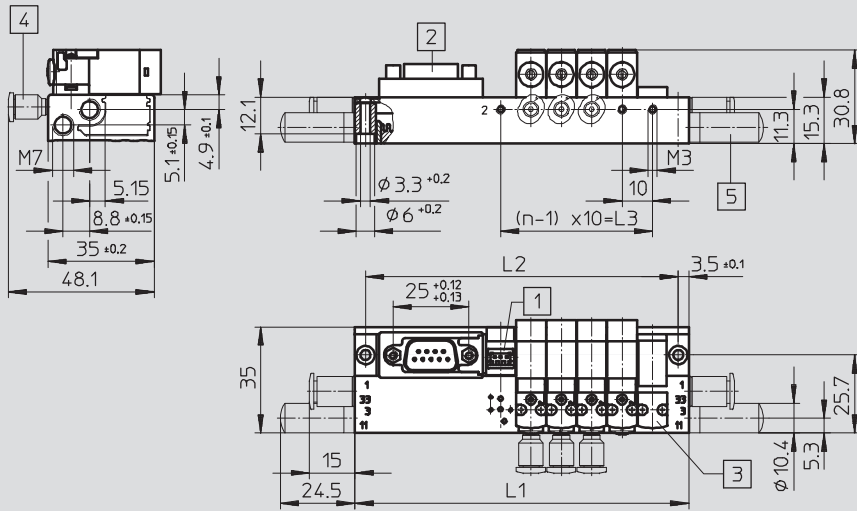
Solenoid valves MHA1, miniature

Technical data – Sub-base valve with LED

Dimensions – 3/2-way valve

Download CAD data → www.festo.com

Manifold assembly with electrical multi-pin plug



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

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

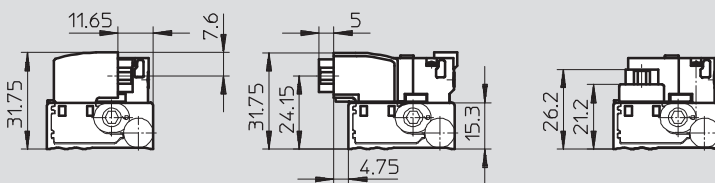
Valve positions n	L1 ±0.15	L2 ±0.1	L3
18	252	245	170
20	272	265	190
22	292	285	210

Electrical multi-pin plug – Plug directions

To pneumatic side

To electrical side

To top (standard)



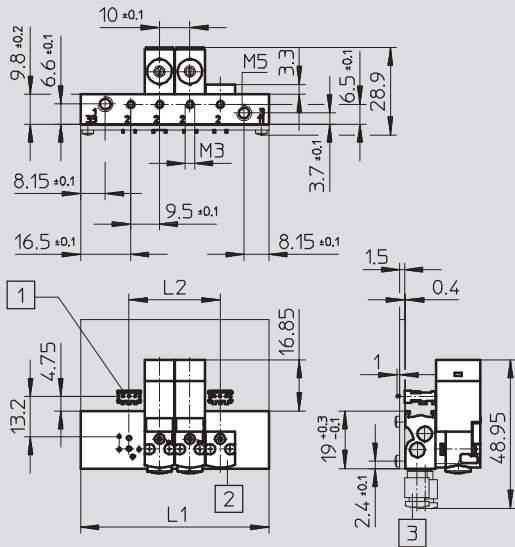
Solenoid valves MHA1, miniature

Technical data – Sub-base valve with LED

Dimensions – 3/2-way valve

Download CAD data → www.festo.com

Manifold assembly on PCB



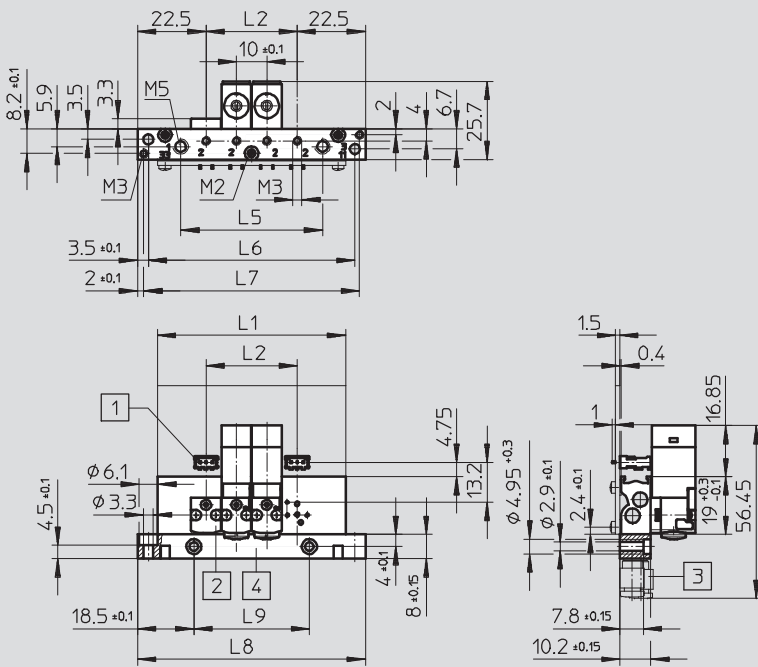
- 1 Soldering base PCBC-A...
- 2 Blanking plate MHAP1
- 3 Fitting QSM-...

 Note

The PCB is not included in the scope of delivery.

Hole pattern on PCB → 34

Manifold assembly with pneumatic multiple connector plate on PCB



- 1 Soldering base PCBC-A...
- 2 Blanking plate MHAP1
- 3 Fitting QSM-...
- 4 Removable pneumatic multiple connector plate

 Note

The PCB is not included in the scope of delivery.

Hole pattern on PCB → 34

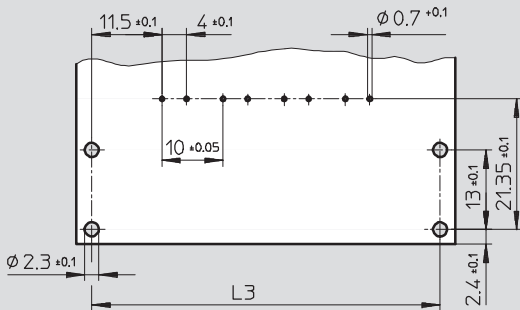
Valve positions n	L1 ±0.15	L2	L3 ±0.1	L5 ±0.15	L6	L7 ±0.1	L8 ±0.2	L9 ±0.1
2	42	10	37	-	-	-	-	-
4	62	30	57	46.7	68	71	75	38
6	82	50	77	66.7	88	91	95	58
8	102	70	97	86.7	108	111	115	78
10	122	90	117	106.7	128	131	135	98

Solenoid valves MHA1, miniature

Technical data – Sub-base valve with LED

Dimensions

Hole pattern on PCB



Note

The PCB is not included in the scope of delivery.

Ordering data – 3/2-way valves

Electrical connection	Operating voltage	Normally closed		Normally open	
		Part No.	Type	Part No.	Type
M3 connecting thread					
Plug connection at rear	24 V DC	540 443	MHA1-M1LH-3/2G-0,6-HC	540 440	MHA1-M1LH-3/2O-0,6-HC
Plug connection on top	24 V DC	540 444	MHA1-M1LH-3/2G-0,6-TC	540 441	MHA1-M1LH-3/2O-0,6-TC
Plug connection underneath	24 V DC	540 445	MHA1-M1LH-3/2G-0,6-PI	540 442	MHA1-M1LH-3/2O-0,6-PI



Note

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

Ordering data – Product-specific accessories

Designation	Part No.	Type
Valves with plug connection at rear or on top		
Individual sub-base	197 183	MHA1-AS-3-M3
Manifold block for ...	2 valves	197 202 MHA1-PR2-3-M3
	4 valves	197 203 MHA1-PR4-3-M3
	6 valves	197 204 MHA1-PR6-3-M3
	8 valves	197 205 MHA1-PR8-3-M3
	10 valves	197 206 MHA1-PR10-3-M3
Valves with plug connection underneath		
Individual sub-base	197 185	MHA1-AS-3-M3-PI
Manifold block with plug bases for ...	2 valves	197 222 MHA1-PR2-3-M3-PI
	4 valves	197 223 MHA1-PR4-3-M3-PI
	6 valves	197 224 MHA1-PR6-3-M3-PI
	8 valves	197 225 MHA1-PR8-3-M3-PI
	10 valves	197 226 MHA1-PR10-3-M3-PI
Manifold block with plug bases and electrical multi-pin plug for ...	4 valves	197 238 MHA1-PR4-3-M3-PI-D9
	6 valves	197 239 MHA1-PR6-3-M3-PI-D9
	8 valves	197 240 MHA1-PR8-3-M3-PI-D9
	10 valves	197 241 MHA1-PR10-3-M3-PI-D25
Manifold block for mounting on PCB for ...	2 valves	197 247 MHA1-PR2-3-M3-PI-PCB
	4 valves	197 248 MHA1-PR4-3-M3-PI-PCB
	6 valves	197 249 MHA1-PR6-3-M3-PI-PCB
	8 valves	197 250 MHA1-PR8-3-M3-PI-PCB
	10 valves	197 251 MHA1-PR10-3-M3-PI-PCB
Manifold block for mounting on PCB with pneumatic multiple connector plate for ...	4 valves	197 253 MHA1-PR4-3-PI-PCBM
	6 valves	197 254 MHA1-PR6-3-PI-PCBM
	8 valves	197 255 MHA1-PR8-3-PI-PCBM
	10 valves	197 256 MHA1-PR10-3-PI-PCBM



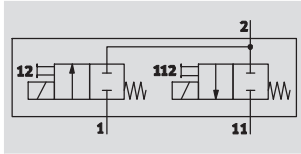
Note

Manifold blocks with an uneven number of valves and for 11 ... 22 valves as well as further variants can be configured and ordered using the MH1 modular product system.

Solenoid valves MHA1, miniature

Technical data – 2x2/2-way sub-base valve with LED

Function



2x2/2-way valve



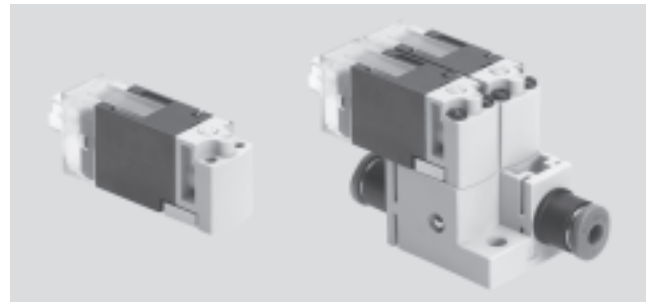
Voltage
24 V DC



Pressure
– 0.95 ... +1.5 bar



Temperature range
–5 ... +50 °C



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

Operating and environmental conditions		
Valve function	2/2-way, single solenoid	2x2/2-way, single solenoid
Operating medium	Filtered compressed air, lubricated or unlubricated, grade of filtration 40 µm	
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	2 ¹⁾	

1) Corrosion resistance class 2 as per Festo standard 940 070

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

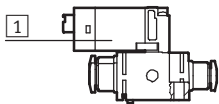
Electrical data		
Valve function	2/2-way, single solenoid	2x2/2-way, single solenoid
Operating voltage	[V DC] 24 ±10%	
Type of connection	Plug connection	
Power consumption	[W] 3, following current reduction 0.7	
Max. length of connecting cable	[m] 30	
Protection class to EN 60529		
With plug socket KMH	IP40	

Solenoid valves MHA1, miniature

Technical data – 2x2/2-way sub-base valve with LED

Response times and switching frequencies		
Valve function	2/2-way, single solenoid	2x2/2-way, single solenoid
Response time on/off	[ms]	6/2
Maximum switching frequency	[Hz]	10

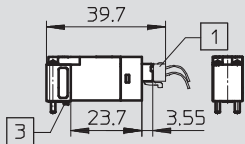
Materials



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

Dimensions – 2/2-way valve

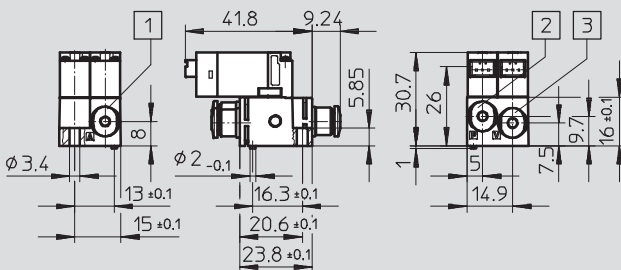
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- 1 Plug socket KMH...
- 3 Coding pin

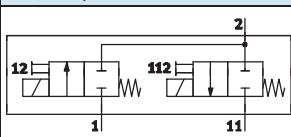
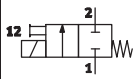
Dimensions – 2x2/2-way valve

Download CAD data → www.festo.com



- 1 Push-in fitting 2
- 2 Push-in fitting 1
- 3 Push-in fitting 11

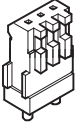
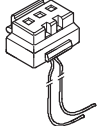









Ordering data – 2x2/2-way valve

Circuit symbol	Normal position	Push-in fitting for 1/11/2 [mm]	Weight [g]	Part No.	Type
2x2/2-way valve					
	2x closed	4/4/3	30.6	560 372	MHA1-2X2/2G-1,5-4-4-3
		4/4/4	30.6	566 175	MHA1-2X2/2G-1,5-4-4-4
		3/3/3	30.6	562 051	MHA1-2X2/2G-1,5-3-3-3
2/2-way valve					
	Closed	–	10	557 864	MHA1-M1LCH-2/2G-1.5-HC

Solenoid valves MH1, miniature

Accessories

FESTO

		Part No.	Type			Part No.	Type
Soldering base				Plug socket with cable (IP40)			
		197 261	PCBC-A-10 ¹⁾		0.5 m	197 263	KMH-0,5
		197 262	PCBC-A-100 ²⁾		1 m	197 264	KMH-1
Plug base (IP40)				Inscription label			
		197 260	MHAP-PI			197 259	MH-BZ-80X ³⁾
Blanking plug B				Blanking plate			
	M5	3843	B-M5 ⁴⁾		Plug connection	197 257	MHAP1-BP-3
	M7	174 309	B-M7 ⁴⁾		Plug base	197 258	MHAP1-BP-3-PI
Silencer UC				Push-in fittings QS/QSM			
		→ Internet: uc				→ Internet: quick star	
Connecting cable KMP6 (up to 8 valves)				Connecting cable KMP6 (up to 12 valves)			
	2.5 m	531 184	KMP6-09P-8-2,5		2.5 m	530 049	KMP6-25P-12-2,5
	5 m	531 185	KMP6-09P-8-5		5 m	530 050	KMP6-25P-12-5
	10 m	531 186	KMP6-09P-8-10		10 m	530 051	KMP6-25P-12-10
Connecting cable KMP6 (up to 22 valves)							
	2.5 m	530 046	KMP6-25P-22-2,5				
	5 m	530 047	KMP6-25P-22-5				
	10 m	530 048	KMP6-25P-22-10				

1) Scope of delivery 10 pieces

2) Scope of delivery 100 pieces

3) Scope of delivery 80 pieces

4) Scope of delivery 10 pieces