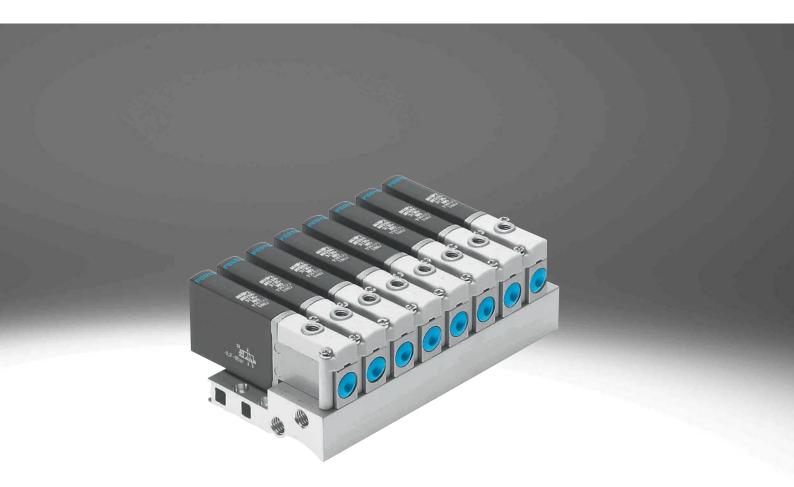
# Solenoid valves MH2, MH3, MH4, fast-switching valves





### Key features

#### Fast-switching valves from Festo: it's not just the switching that's fast

Pros that switch as fast as 2 milliseconds

Speed, dynamic response and precision are more sought after than ever before in modern automation. The solution lies in pneumatic components. The result: shorter cycle times in return for comparatively low investment costs for the components. Maximum process reliability, sturdiness and service life are guaranteed. High speed in production

The fast-switching valves are a technological treat for all things high-speed. With switching times  $\leq 2$  ms and a repetition accuracy  $\leq 0.2$  ms, they represent the pinnacle of what is technologically achievable worldwide – even in 24-hour continuous operation with over 500 million cycles. Simple to retrofit in existing systems, or setting the pace for newly designed systems. Naturally compact, including maximum component density. Indispensable for sorting parts using an air ejector, in flap control systems, for gluing, dispensing, packaging and, of course, also suitable for pick & place vacuum applications, for example (continuous holding not possible).

#### Faster switching

Extremely short switching times enable short cycle times. Extremely precise switching makes it possible to control the timing of process sequences accurately.

High output and very good machine utilisation are included. Excellent repetition accuracy of switching times ensures consistent processes, improves process and part quality and reduces rejects and rework.

#### Faster installation

With a variety of connection options such as thread or integrated push-in tubing connectors and a range of mounting options for individual valves or valve manifold assembly, the installation can be perfectly adapted to onsite circumstances while the footprint is kept to a minimum. Fast-switching valves can be used directly in the application without additional protective measures. As a result, very short pneumatic lines guarantee short signal paths and fast response times.

### Key features

#### Fast-switching valves from Festo: it's not just the switching that's fast



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

#### Advantages for designers



- Very high cycle rates
- Extremely short cycle times
- Maximum repetition accuracy
- Suitable for vacuum thanks to di-
- rectly actuated poppet valve (time limited)
- Flexible design principle
- Direct activation via standard PLC possible
- Direct mounting in the application with IP65 protection

#### Advantages for purchasers



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

#### Advantages for installation



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

### Key features

#### Fast and precise - sturdy and economical

High performance, process stability and extremely easy handling

Fast-switching valves MH increase switching frequencies and improve process and part quality with their excellent repetition accuracy.

# Integrated: the fast-switching electronics

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

#### Optimised: systems and processes

- On-site assembly thanks to IP65 not sensitive to dust and humidity
- Direct activation with 24 V DC/1 A use of PLC standard outputs
- With an extremely long service life of 500 million cycles, and continuous three-shift operation with no need for maintenance, optimum efficiency comes as standard!

#### Key features

- Repetition accuracy ≤ 0.2 ms for accurate dispensing/bonding, for example
- Switching time ≤ 3 ms for short cycle times and very quick response characteristics
- 10 mm width for compact assembly
- Choice of connections as an individual valve, semi in-line or sub-base variant, enabling need-optimised installation
- Degree of protection IP65 enables direct mounting in the application without additional safeguarding
- Easy installation via direct activation from the standard PLC with 24 V DC/1 A

#### Small and fast – a good combination

The switching time plays a crucial role with small cylinder volumes, especially with short-stroke cylinders. In the adjacent example, the combination with a fast-switching valve is 30% faster. In concrete terms, this means that the cylinder controlled using the fast-switching valve is already in the end position before the cylinder with the universal valve even begins to move.

This equates to a significant increase in both the efficiency and the economy of the system, especially when taking into account that the two valves have comparable space requirements and weight, and the fast-switching valve uses less air and lasts 10 times as long!

# Fast valves and an optimised control chain – two guarantees for success

To generate speed in pneumatics, the valve and cylinder must be perfectly matched. The correct combination can result in a 30% increase in efficiency. Cylinders with small diameters and short strokes need fast valves!

# Length means losses – focus on tubing

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

# Small and nearby – the clever alternative

Short tubing with a small diameter is ideal for mounting valves close to the cylinder. The small and light fast-switching valves are suitable for direct mounting in the application, thanks also to their degree of protection IP65. By using them together with smaller and lighter fittings, the weight is reduced, too. This results in particular in an improvement in the efficiency of moving systems.

## Product range overview

Function	Circuit symbol	Design	Switching time [ms]				Operating voltage	Free of copper and	→ Page/
			Off <sup>2)</sup>	On <sup>2)</sup>	Off	On	[V DC]	PTFE	Internet
3/2-way valve <sup>1)</sup>	Standard nominal flo	ow rate 100 l/min							
	2	Individual valve	2	1.7	3.5	7	24		9
		Semi in-line valve	2	1.7	3.5	7	24		22
	1 3	Sub-base valve	2	1.7	3.5	7	24	-	39

Can be used as a 2/2-way valve by sealing port 3 or 33
 With integrated fast-switching electronics

Function	Circuit symbol	Design	Switching time [ms]		Operating voltage	Free of copper and	→ Page/
			Off	On	[V DC]	PTFE	Internet
5/2-way valve	Standard nominal flo	tandard nominal flow rate 100 l/min					
		Individual valve	1.7	1.9	24		16
		Semi in-line valve	1.7	1.9	24		31
		Sub-base valve	1.7	1.9	24	•	48

Mounting options							
Design	Individual valve		Semi in-line valv	/e	Sub-base valve		
Valve function		3/2-way	5/2-way	3/2-way	5/2-way	3/2-way	5/2-way
Plug vanes							
	Direct mounting			-	-	-	-
	Individual sub-base	-	-		•		•
	Manifold assembly	-	-	•			
Moulded-in cable							
$\sim$	Direct mounting			-	-	-	-
	Individual sub-base	-	-	-	-	-	•
and a state of the	Manifold assembly	-	_	-	-	•	

### Solenoid valves MH3, fast-switching valves

## Product range overview

Function	Circuit symbol	Design	Switching time [ms]				Operating voltage	Free of copper and	→ Page/
			Off <sup>2)</sup>	On <sup>2)</sup>	Off	On	[V DC]	PTFE	Internet
3/2-way valve <sup>1)</sup>	Standard nominal flo	ow rate 200 l/min							
Ī	2	Individual valve	2.8	2.3	4.5	8.3	24		56
		Semi in-line valve	2.8	2.3	4.5	8.3	24		63
	1 3	Sub-base valve	2.8	2.3	4.5	8.3	24	•	72
	2								

Can be used as a 2/2-way valve by sealing port 3 or 33
 With integrated fast-switching electronics

Mounting options				
Design		Individual valve	Semi in-line valve	Sub-base valve
Plug vanes				
	Direct mounting	•	-	-
	Individual sub-base	-		•
	Manifold assembly	_	•	•
Moulded-in cable				
	Direct mounting	•	-	-
d	Individual sub-base	-		•
	Manifold assembly	_	•	•

## Product range overview

Function	Circuit symbol	Design	Switching time [ms]				Operating voltage	Free of copper and	→ Page/
			Off <sup>2)</sup>	On <sup>2)</sup>	Off	On	[V DC]	PTFE	Internet
3/2-way valve <sup>1)</sup>	Standard nominal flo	ow rate 400 l/min							
	2	Individual valve	3.5	3.5	5	10.5	24		81
		Semi in-line valve	3.5	3.5	5	10.5	24		86
		Sub-base valve	3.5	3.5	5	10.5	24	•	95

Can be used as a 2/2-way valve by sealing port 3 or 33
 With integrated fast-switching electronics

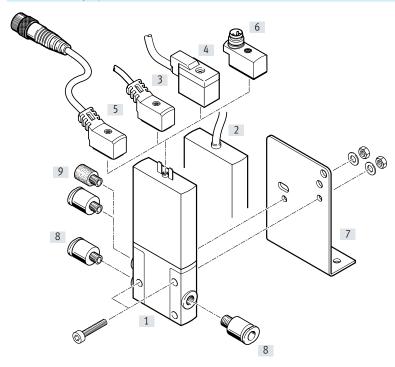
Mounting options				
Design		Individual valve	Semi in-line valve	Sub-base valve
Plug vanes				
	Direct mounting		-	-
	Individual sub-base	-		
	Manifold assembly	-	•	•
Moulded-in cable				
11	Direct mounting		-	-
d	Individual sub-base	-		•
	Manifold assembly	-	•	•

## Type codes

001	Series				
MHA2	Solenoid valve MHA2				
MHE2	Solenoid valve MHE2				
MHP2	Solenoid valve MHP2				
MHA3	Solenoid valve MHA3				
MHE3	Solenoid valve MHE3				
MHP3	Solenoid valve MHP3				
MHA4	Solenoid valve MHA4				
MHE4	Solenoid valve MHE4				
MHP4	Solenoid valve MHP4				
002	Drive system				
М	Solenoid, switching				
003	Nominal operating voltage				
1	24 V DC				
004	Manual override				
Н	Non-detenting				
005	Melus for star				
005	Valve function				
3/2	3/2-way valve				
5/2	5/2-way valve				

006	Normal position	
	5/2-way valve	
G	Closed	
0	Open	
007	Pneumatic connection	
2	Sub-base, nominal width 2 mm	
3	Sub-base, nominal width 3 mm	
4	Sub-base, nominal width 4 mm	
1/8	Thread G1/8	
1/4	Thread G1/4	
M5	Thread M5	
M7	Thread M7	
QS-4	Push-in connector, 4 mm	
QS-6	Push-in connector 6 mm	
QS-8	Push-in connector 8 mm	
008	Electrical connection	
	Plug tabs	
К	Moulded cable, 2.5 m long	

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



Desig	nation	Description	→ Page/Internet
[1]	Individual valve MHE2	With plug vanes	14
[2]	Individual valve MHE2K	With moulded-in cable, IP55	14
[3]	Connecting cable NEBV	PUR cable, signal status indication with LED, IP65	15
[4]	Plug socket with cable KMYZ-4	PVC cable, without signal status indication, IP50	15
[5]	Connecting cable NEBV	PUR cable, signal status indication with LED, plug M8x1 3-pin, IP65	15
[6]	Adapter VAVE-C8	For connecting the valves via connecting cable M8 3-pin or 4-pin, IP65	15
[7]	Mounting bracket MHE2-BG-L	For wall mounting	15
[8]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	15
[9]	Silencer UC	For fitting in exhaust ports	15

#### Solenoid valves MHE2, fast-switching valves

### Datasheet - Individual valve, 3/2-way valve







- **L** - Pressure -0.09 ... +0.8 MPa

Temperature range
 -5 ... +60°C



#### General technical data

Sellerat technicat auta		
Valve function		3/2 way, single solenoid <sup>1)</sup>
Design		Pressure relief poppet valve
Overlap		Negative overlap
Sealing principle		Soft
Reset method		Mechanical spring
Actuation type		Electrical
Type of control		Direct
Direction of flow		Reversible with restrictions <sup>2)</sup>
Exhaust function		Can be throttled
Manual override		Non-detenting
Mounting position		Any
Width	[mm]	10
Grid dimension	[mm]	14
Note on grid dimension		Minimum distance between the valves is 4 mm
Nominal width	[mm]	2
Standard nominal flow rate	[l/min]	100
Type of mounting		Via through-hole
Pneumatic connection		M7 connecting thread
		Push-in connector for tubing O.D. 4 mm
Product weight	[g]	60

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

2) Slight leakage can occur in the pressure range -0.8 bar to +0.5 bar.

## Datasheet - Individual valve, 3/2-way valve

#### Operating and environmental conditions

			With fast-switching electronics	Without fast-switching electronics				
Operating medium			Compressed air to ISO 8573-1:2010 [7:4:4]					
Note on the operating/pilot medium			Lubricated operation possible (in which cas	e lubricated operation will always be required)				
Operating pressure		[MPa]	-0.09 +0.8					
		[bar]	-0.9 +8					
	Reversible	[MPa]	-0.09 +0.1					
		[bar]	-0.9 +1	-0.9 +1				
		[psi]	-13.05 +14.5					
Ambient temperature		[°C]	-5 +60					
Temperature of medium		[°C]	-5 +60					
Restricted ambient temperature and temperature of me	edium		As a function of switching frequency (see	-				
			graph)					
Corrosion resistance class CRC <sup>1)</sup>			2	2				
CE marking (see declaration of conformity)			To EU EMC Directive <sup>2)</sup>	-				
KC mark			KC EMC	-				
Certification			c UL us - Recognized (OL)	c UL us - Recognized (OL)				
			RCM	-				
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					

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 EC declaration of conformity at: www.festo.com/catalogue/mh2 -> 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.

#### Electrical data

			With fast-switching electronics	Without fast-switching electronics
Electrical connection		-	2-pin plug or cable	
Operating voltage		[V DC]	24	
Permissible voltage fluctuations			±10%	
Power consumption		[W]	5 for approx. 3 ms (high-current phase,	2.88
			inrush current 1 A)	
		[W]	1.25 (low-current phase)	-
Reverse polarity protection			Bipolar	-
Duty cycle		[%]	100	100
Additional functions			Spark arresting	-
			Holding current reduction	-
			Protective circuit	-
Degree of protection to EN 60529	Electrical connection: 2-pin plug		IP65	IP65
	Electrical connection: cable		IP55	IP55

#### Switching times and frequencies

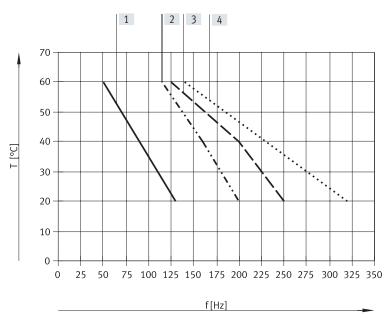
			With fast-switching electronics	Without fast-switching electronics
Switching time	On	[ms]	1.7	7
	Off	[ms]	2	3.5
Tolerance for switching time	On	[%]	+1030	-
	Off	[%]	+1030	-
Switching time variation from 1 Hz upwards		[ms]	0.2	-
Maximum switching frequency		[Hz]	330	130

Materials

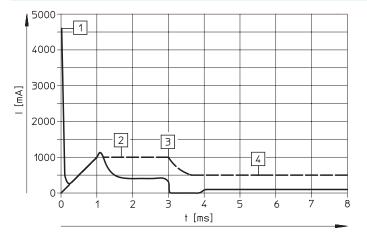
Coated die-cast zinc
PUR
HNBR, NBR
Galvanised steel
Free of copper and PTFE
RoHS-compliant
VDMA24364-B1/B2-L

### Datasheet - Individual valve, 3/2-way valve

#### Restricted ambient temperature and temperature of medium as a function of switching frequency



Current curve for valves with fast-switching electronics (MHE2-MS1H)



------ Internal current in the coil

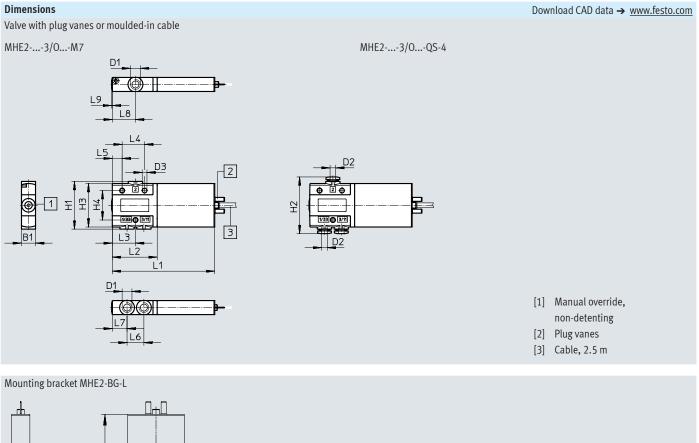
External current in the supply line

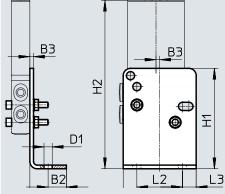
- [1] Manifold, 6 valves, unpressurised
- [2] Manifold, 6 valves, through-flow, 0.6 MPa
- [3] Individual valve, unpressurised
- [4] Individual valve, through-flow,0.6 MPa

[1] Capacitor charging

- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A

# Datasheet - Individual valve, 3/2-way valve





Туре	B1	B2	B3	D1	D2 Ø	D3 Ø	H1	H2	H3	H4	L1	L2	L3	L4	L5	L6	L7	L8	L9
MHE23/0M7	10	-	-	M7	-	3.4	34	-	31	21	73	32	16.5	16	7	12	10.5	16.5	0.5
MHE23/0QS-4	10	-	-	-	4	3.4	34	40.4	31	21	73	32	16.5	16	7	12	10.5	16.5	0.5
MHE2-BG-L	20	10	2	4.5	-	-	55	92.3	-	-	40	25	7.5	-	-	-	-	-	-

### Solenoid valves MHE2, fast-switching valves

## Datasheet – Individual valve, 3/2-way valve

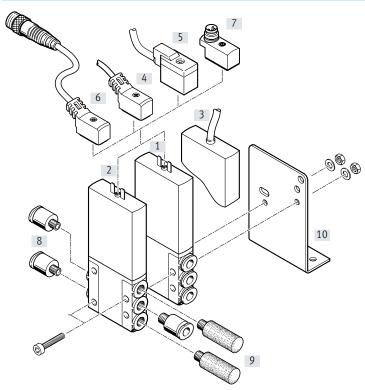
Ordering data						
					Part no.	Туре
Valves						
$\overline{ \land}$	Electrical connection:	With fast-switching	Pneumatic connection: thread	Normally open	196151	MHE2-MS1H-3/20-M7
	2-pin plug	electronics, switching	M7	Normally closed	196131	MHE2-MS1H-3/2G-M7
		time 2 ms	Pneumatic connection: push-in	Normally open	196155	MHE2-MS1H-3/20-QS-4
			connector for tubing O.D. 4 mm	Normally closed	196135	MHE2-MS1H-3/2G-QS-4
Ŷ		Without fast-switching	Pneumatic connection: thread	Normally open	196150	MHE2-M1H-3/20-M7
		electronics, switching	M7	Normally closed	196130	MHE2-M1H-3/2G-M7
		time 7 ms	Pneumatic connection: push-in	Normally open	196154	MHE2-M1H-3/20-QS-4
			connector for tubing O.D. 4 mm	Normally closed	196134	MHE2-M1H-3/2G-QS-4
$\sim$	Electrical connection:	With fast-switching	Pneumatic connection: thread	Normally open	196153	MHE2-MS1H-3/20-M7-K
	cable	electronics, switching	M7	Normally closed	196133	MHE2-MS1H-3/2G-M7-K
A B B B		time 2 ms	Pneumatic connection: push-in	Normally open	196157	MHE2-MS1H-3/20-QS-4-K
<b>2</b> 02			connector for tubing O.D. 4 mm	Normally closed	196137	MHE2-MS1H-3/2G-QS-4-K
-		Without fast-switching	Pneumatic connection: thread	Normally open	196152	MHE2-M1H-3/20-M7-K
		electronics, switching	M7	Normally closed	196132	MHE2-M1H-3/2G-M7-K
		time 7 ms	Pneumatic connection: push-in	Normally open	196156	MHE2-M1H-3/20-QS-4-K
			connector for tubing O.D. 4 mm	Normally closed	196136	MHE2-M1H-3/2G-QS-4-K

## Datasheet – Individual valve, 3/2-way valve

Ordering data					Part no.	Туре
Connecting cable (for	r valves with 2-pin plug)					Datasheets $\rightarrow$ Internet: net
	2-pin socket,	PUR cable,	Signal status	Length 2.5 m	8047671	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1
	open cable end 2-wire	degree of protection	indication with LED	Length 5 m	8047672	NEBV-Z4WA2L-P-E-5-N-LE2-S1
//	open cable end 2 wire	IP65		Length 10 m	8047672	NEBV-Z4WA2L-P-E-10-N-LE2-S1
		PVC cable,	Without signal status	Length 0.5 m	193690	KMYZ-4-24-0.5-B
L.		degree of protection	indication	Length 2.5 m	193691	KMYZ-4-24-2.5-B
Ē.		IP40	indication	Length 2.5 m	175071	NW12 4 24 2.5 D
A CONTRACTOR	2-pin socket, plug	PUR cable,	Signal status	Length 0.5 m	8047673	NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
E THE ME IN	M8x1 3-pin	degree of protection IP65	indication with LED	Length 2.5 m	8047674	NEBV-Z4WA2L-P-E-2.5-N-M8G3-S1
Adapter (for valves w	<b>/ith 2-pin plug)</b> 2-pin socket	Signal status	Plug M8, 3-pin		571686	VAVE-C8-1R8
		indication with LED	Plug M8, 4-pin		573194	VAVE-C8-1R1
Wall mounting		·			· · · · · · · · · · · · · · · · · · ·	
	Mounting bracket				196165	MHE2-BG-L
~						
Silencer						Datasheets $\rightarrow$ Internet:
$\sim$	Push-in sleeve with O.D.	4 mm		1 piece	165006	UC-QS-4H
	With M7 threaded conne	ection		1 piece	161418	UC-M7
ON MARKEN AND AND AND AND AND AND AND AND AND AN				50 pieces	534218	UC-M7-50
						Datasheets → Internet:
Push-in fitting						
Push-in fitting	Male thread M7 with int	ernal hex for tubing O.D.	4 mm	10 pieces	153319	QSM-M7-4-I
Push-in fitting	Male thread M7 with int	ernal hex for tubing O.D.	4 mm	10 pieces 100 pieces	153319 133006	QSM-M7-4-I QSM-M7-4-I-100
Push-in fitting	Male thread M7 with int	ernal hex for tubing O.D.	4 mm 6 mm			
Push-in fitting	Male thread M7 with int	-		100 pieces	133006	QSM-M7-4-I-100
Push-in fitting		ernal hex, push-in	6 mm	100 pieces 10 pieces	133006 153321	QSM-M7-4-I-100 QSM-M7-6-I
Push-in fitting	Male thread M7 with ext	ernal hex, push-in	6 mm	100 pieces10 pieces10 pieces	133006 153321 186352	QSM-M7-4-I-100 QSM-M7-6-I QSML-M7-4

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

### Connection with plug vanes – Connection with moulded-in cable

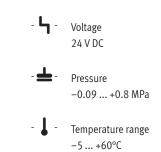


Desig	nation	Description	→ Page/Internet
[1]	Individual valve MHE2QS-4	With plug vanes and push-in connector for standard O.D. tubing	21
[2]	Individual valve MHE2M7	With plug vanes and connection M7	21
[3]	Individual valve MHE2K	With moulded-in cable, IP55	21
[4]	Connecting cable NEBV	PUR cable, signal status indication with LED, IP65	21
[5]	Plug socket with cable KMYZ-4	PVC cable, without signal status indication, IP50	21
[6]	Connecting cable NEBV	PUR cable, signal status indication with LED, plug M8x1 3-pin, IP65	21
[7]	Adapter VAVE-C8	For connecting the valves via connecting cable M8 3-pin or 4-pin, IP65	21
[8]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	21
[9]	Silencer UC	For fitting in exhaust ports	21
[10]	Mounting bracket MHE2-BG-L	For wall mounting	21

## Datasheet – Individual valve, 5/2-way valve



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#### General technical data

General lechnical data		
Valve function		5/2-way, single solenoid
Design		Pressure relief poppet valve
Overlap		Negative overlap
Sealing principle		Soft
Reset method		Mechanical spring
Actuation type		Electrical
Type of control		Direct
Direction of flow		Not reversible
Exhaust function		Can be throttled
Manual override		Non-detenting
Mounting position		Any
Width	[mm]	10
Grid dimension	[mm]	14
Note on grid dimension		Minimum distance between the valves is 4 mm
Nominal width	[mm]	2
Standard nominal flow rate	[l/min]	90
Type of mounting		Via through-hole
Pneumatic connection		M7 connecting thread
		Push-in connector for tubing O.D. 4 mm
Max. tightening torque of fitting	[Nm]	2
Product weight	[g]	70

## Datasheet - Individual valve, 5/2-way valve

#### 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	[MPa]	-0.09 +0.8
	[bar]	-0.9 +8
Ambient temperature	[°C]	-5+60
Temperature of medium	[°C]	-5 +60
Restricted ambient temperature and temperature of medium		As a function of switching frequency (see graph)
Corrosion resistance class CRC <sup>1)</sup>		2
CE marking (see declaration of conformity)		To EU EMC Directive <sup>2)</sup>
KC mark		KC EMC
Certification		c UL us - Recognized (OL)
		RCM
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

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 EC declaration of conformity at: www.festo.com/catalogue/mh2 -> 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.

Electrical data					
Electrical connection			2-pin plug		Cable
Operating voltage		[V DC]	24		
Permissible voltage fluctuations [%]		±10			
Power consumption	Low-current phase	[W]	1.625		
	High-current phase	[W]	6.5		
Reverse polarity protection			Bipolar		
Duty cycle		[%]	100		
Additional functions			Spark arresting		
			Holding current reduction		
			Protective circuit		
Degree of protection to EN 6	0529		IP65		IP55

#### Switching times and frequencies

Switching time	On	[ms]	1.9
	Off	[ms]	1.7
Tolerance for switching time	On	[%]	+1030
	Off	[%]	+1030
Switching time variation from 1 Hz		[ms]	0.2
upwards			
Maximum switching frequency		[Hz]	300

Materials

Housing	Coated die-cast zinc
Cable sheath	PUR
Seals	HNBR, NBR
Screws	Galvanised steel
Note on materials	Free of copper and PTFE
	RoHS-compliant
PWIS conformity	VDMA24364-B1/B2-L

Manifold, 6 valves, unpressurised
 Manifold, 6 valves, through-flow,

Individual valve, unpressurised

[4] Individual valve, through-flow,

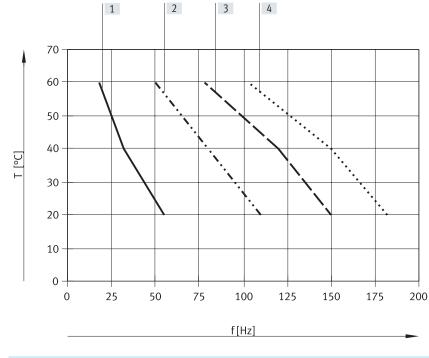
0.6 MPa

0.6 MPa

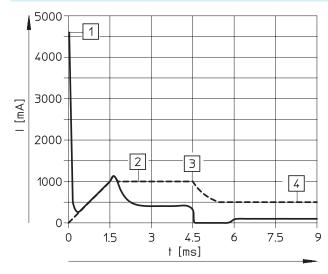
[3]

## Datasheet – Individual valve, 5/2-way valve

#### Restricted ambient temperature and temperature of medium as a function of switching frequency



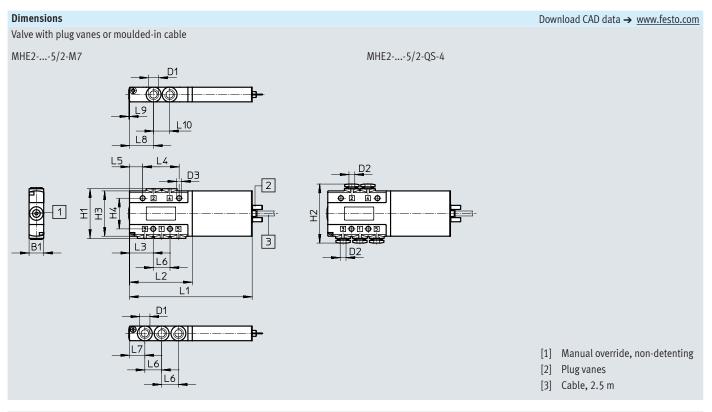
Current curve for valves with fast-switching electronics (MHE2-MS1H)



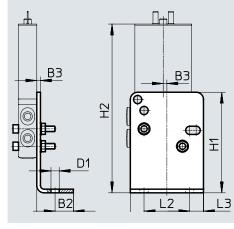
Internal current in the coil
 External current in the supply line

- [1] Capacitor charging
- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A

### Datasheet - Individual valve, 5/2-way valve



#### Mounting bracket MHE2-BG-L



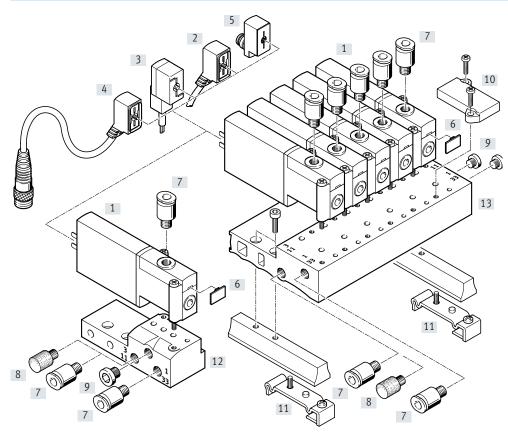
Туре	B1	B2	B3	D1	D2 Ø	D3 Ø	H1	H2	H3	H4	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
MHE25/2-M7	10	-	-	M7	-	3.4	34	-	31	21	84	43	16.3	25	9	11.5	10.5	16.5	0.5	11
MHE25/2-QS-4	10	-	-	-	4	3.4	34	40.4	31	21	84	43	16.3	25	9	11.5	10.5	16.5	0.5	11
MHE2-BG-L	20	10	2	4.5	-	-	55	92.3	-	-	40	25	7.5	-	-	-	-	-	-	-

## Datasheet – Individual valve, 5/2-way valve

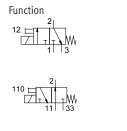
Ordering data					Part no.	Туре
Valves						
	Electrical connection:	With fast-switching	Pneumatic connection:		525113	MHE2-MS1H-5/2-M7
	2-pin plug	electronics, switching time 2 ms	Pneumatic connection: tubing O.D. 4 mm	push-in connector for	525117	MHE2-MS1H-5/2-QS-4
	Electrical connection:	With fast-switching	Pneumatic connection:	thread M7	525115	MHE2-MS1H-5/2-M7-K
A COLOR	cable	electronics, switching time 2 ms	Pneumatic connection: tubing O.D. 4 mm	Pneumatic connection: push-in connector for		MHE2-MS1H-5/2-QS-4-K
Composition askla (for	ushuse with 2 sizes (us)					
Connecting cable (for	valves with 2-pin plug)		C: 1.1.1.		00/7/74	Datasheets $\rightarrow$ Internet: nebv
	2-pin socket,	PUR cable, degree of	Signal status Length 2.5 m		8047671	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1
//	open cable end 2-wire	protection IP65	indication with LED	Length 5 m	8047672	NEBV-Z4WA2L-P-E-5-N-LE2-S1
		DVC coble de recent	Without cirrent start	Length 10 m	8047670	NEBV-Z4WA2L-P-E-10-N-LE2-S1
L		PVC cable, degree of protection IP40	Without signal status indication	Length 0.5 m	193690	KMYZ-4-24-0.5-B
			Indication	Length 2.5 m	193691	КМҮZ-4-24-2.5-В
<u>s</u>	2-pin socket, plug	PUR cable, degree of	Signal status	Length 0.5 m	8047673	NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
C. M. L.V.	M8x1 3-pin	protection IP65	indication with LED	Length 2.5 m	8047674	NEBV-Z4WA2L-P-E-2.5-N-M8G3-S1
Adapter (for valves wi					574 ( 0 (	
	2-pin socket	Signal status indica- tion with LED	Plug M8, 3-pin Plug M8, 4-pin		571686 573194	VAVE-C8-1R8 VAVE-C8-1R1
Wall mounting	Mounting bracket		1		196165	MHE2-BG-L
Silencer						Datasheets → Internet: uc
	Push-in sleeve with O.D.	4 mm		1 piece	165006	UC-QS-4H
	With M7 threaded conne	ection		1 piece	161418	UC-M7
				50 pieces	534218	UC-M7-50
Push-in fitting						Datasheets → Internet: gs
	Male thread M7 with int	ernal hex for tubing O D	4 mm	10 pieces	153319	QSM-M7-4-I
				100 pieces	133006	QSM-M7-4-I-100
			6 mm	10 pieces	153321	QSM-M7-6-I
	Male thread M7 with ext	ernal hex nuch in	4 mm	10 pieces	186352	QSML-M7-4
	L-fitting rotatable throug			10 pieces		
			6 mm		130773	QSML-M7-4-100
			6 mm	10 pieces	186353	QSML-M7-6
			<u> </u>	100 pieces	130774	QSML-M7-6-100

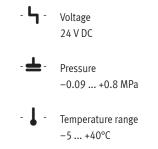
## Peripherals overview – Semi in-line valve, 3/2-way valve

#### Connection via plug vanes



Desig	nation	Description	→ Page/Internet
[1]	Semi in-line valve MHP2	With plug vanes	29
[2]	Connecting cable NEBV	PUR cable, signal status indication with LED, IP65	29
[3]	Plug socket with cable KMYZ-4	PVC cable, without signal status indication, IP50	29
[4]	Connecting cable NEBV	PUR cable, signal status indication with LED, plug M8x1 3-pin, IP65	29
[5]	Adapter VAVE-C8	For connecting the valves via connecting cable M8 3-pin or 4-pin, IP65	29
[6]	Inscription label MH-BZ-80X	For identifying the valves	30
[7]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	30
[8]	Silencer UC	For fitting in exhaust ports	30
[9]	Blanking plug B	For sealing unused ports	30
[10]	Cover plate MHAP2-BP-3	For sealing vacant positions	29
[11]	H-rail mounting MHAP2-BG-NRH-35	For mounting the manifold block on H-rails to EN 60715	29
[12]	Individual sub-base MHA2-AS-3-M5	For semi in-line valve, the individual sub-base is also used for the sub-base valve; here the outlet port must be sealed with a blanking plug	29
[13]	Manifold block MHP2-PR3	For semi in-line valves	29







#### General technical data

Valve function		3/2 way, single solenoid <sup>1)</sup>
Design		Pressure relief poppet valve
Overlap		Negative overlap
Sealing principle		Soft
Reset method		Mechanical spring
Actuation type		Electrical
Type of control		Direct
Direction of flow		Reversible with restrictions <sup>2)</sup>
Exhaust function		Can be throttled
Manual override		Non-detenting
Mounting position		Any
Width	[mm]	10
Grid dimension	[mm]	14
Note on grid dimension		Minimum distance between the valves is 4 mm
Nominal width	[mm]	2
Standard nominal flow rate	[l/min]	100
Type of mounting		On PR rail
Pneumatic connection	2	M5 connecting thread
	1, 3, 11, 33	Sub-base
Product weight	[g]	60

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

2) Slight leakage can occur in the pressure range -0.8 bar to +0.5 bar.

#### Operating and environmental conditions

			With fast-switching electronics	Without fast-switching electronics	
Operating medium			Compressed air to ISO 8573-1:2010 [7:4:4	i]	
Note on the operating/pilot medium			Lubricated operation possible (in which ca	se lubricated operation will always be required)	
Operating pressure		[MPa]	-0.09 +0.8		
		[bar]	-0.9 +8		
	Reversible	[MPa]	-0.09 +0.1		
		[bar]	-0.9 +1		
		[psi]	-13.05 +14.5		
Ambient temperature		[°C]	-5 +40		
Temperature of medium		[°C]	-5 +40		
Restricted ambient temperature and temperature of	medium		As a function of switching frequency (see g	raph)	
Corrosion resistance class CRC <sup>1)</sup>			2		
CE marking (see declaration of conformity)			To EU EMC Directive <sup>2)</sup>	-	
KC mark			KC EMC	-	
Certification			c UL us - Recognized (OL)	c UL us - Recognized (OL)	
			RCM	-	
Shock resistance			Shock test with severity level 2 to FN 9420	17-5 and EN 60068-2-27	
Vibration resistance			Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6		

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 EC declaration of conformity at: www.festo.com/catalogue/mh2 → 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.

#### Electrical data

		With fast-switching electronics	Without fast-switching electronics
Electrical connection		Plug, 2-pin	
Operating voltage	[V DC]	24	
Permissible voltage fluctuations	[%]	±10	
Power consumption	[W]	5 for approx. 3 ms (high-current phase, in-	2.88
		rush current 1 A)	
	[W]	1.25 (low-current phase)	-
Reverse polarity protection		Bipolar	-
Duty cycle	[%]	100	100
Additional functions		Spark arresting	-
		Holding current reduction	-
		Protective circuit	-
Degree of protection to EN 60529		IP65	IP65

#### Switching times and frequencies

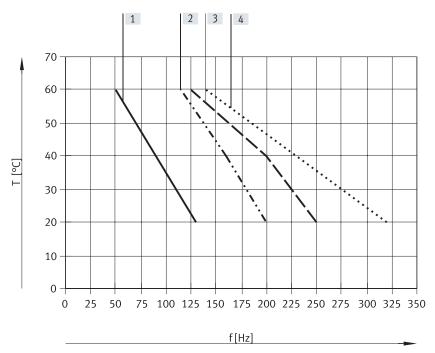
			With fast-switching electronics	Without fast-switching electronics
Switching time	On	[ms]	1.7	7
	Off	[ms]	2	3.5
Tolerance for switching time	On	[%]	+1030	-
	Off	[%]	+1030	-
Switching time variation from 1 Hz		[ms]	0.2	-
upwards				
Maximum switching frequency		[Hz]	330	130

#### Materials

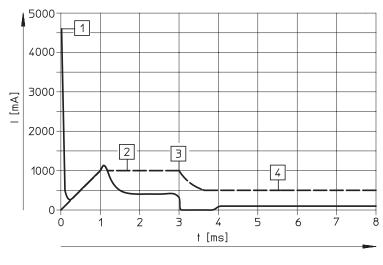
Housing	Coated die-cast zinc
Seals	HNBR, NBR
Screws	Galvanised steel
Note on materials	Free of copper and PTFE
	RoHS-compliant
PWIS conformity	VDMA24364-B1/B2-L

I

### Restricted ambient temperature and temperature of medium as a function of switching frequency



#### Current curve for valves with fast-switching electronics (MHP2-MS1H)

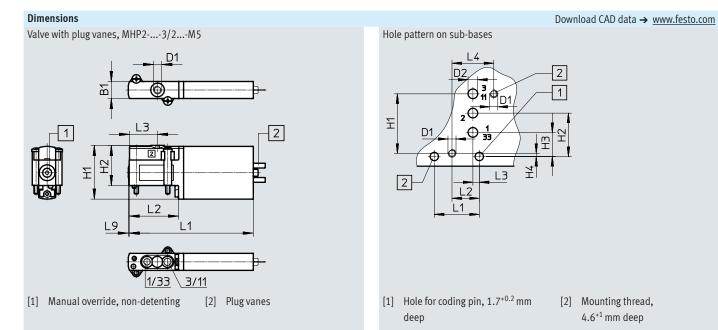


------ Internal current in the coil

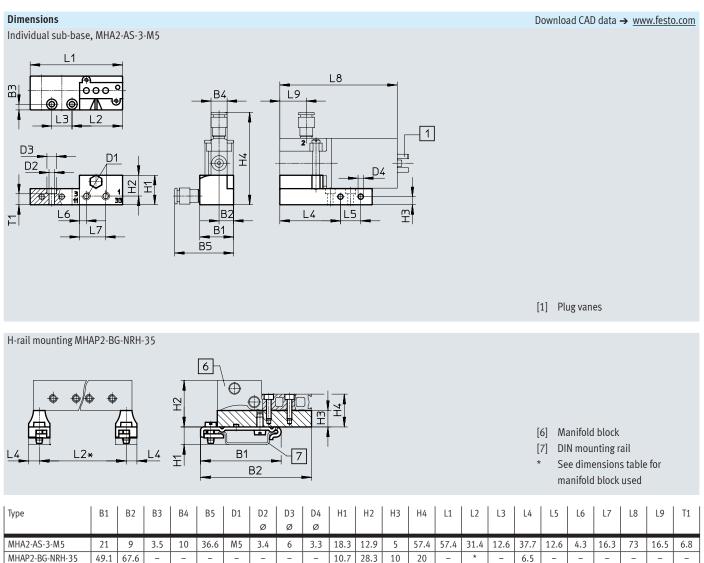
External current in the supply line

- [1] Manifold, 6 valves, unpressurised
- [2] Manifold, 6 valves, through-flow,0.6 MPa
- [3] Individual valve, unpressurised[4] Individual valve, through-flow, 0.6 MPa

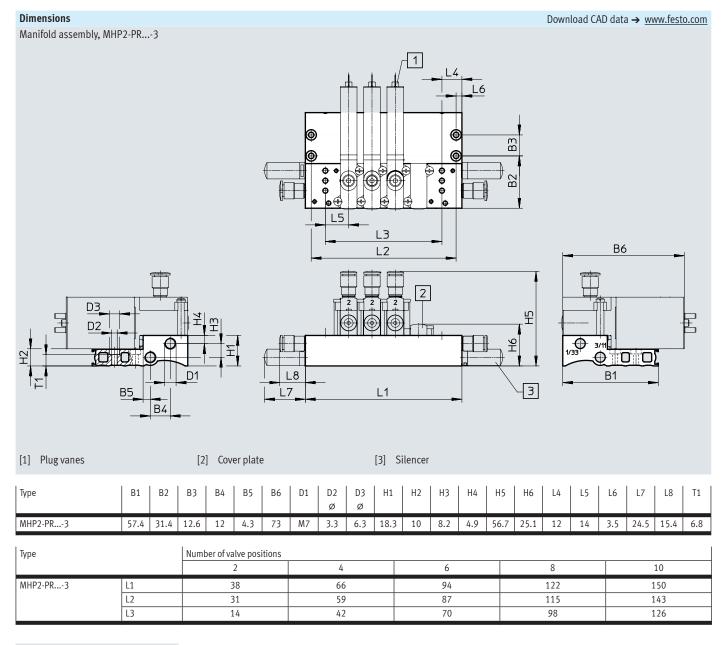
- [1] Capacitor charging
- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A



Туре	B1	D1	D2 Ø	H1	H2	H3	H4	L1	L2	L3	L4	L9
MHP23/2M5	10	M5	-	31.6	23.6	-	-	73	29	16.5	-	0.5
Hole pattern	-	M2.5	3	18.5	13.5	7.5	1	14	8.5	2	13	-



\* See dimensions table for manifold block used



Valve types 3/2G and 3/20 must not be mixed on one manifold block.

- Note

-

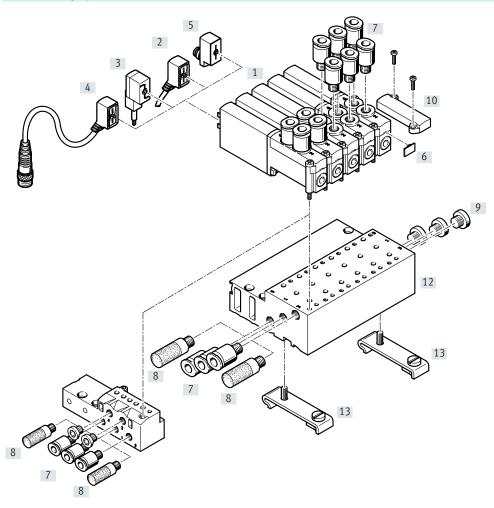
Ordering data					Part no.	Туре
Valves					rantino.	Type
	With fast-switching electronics	Switching time on	Normally open		196143	MHP2-MS1H-3/20-M5
		1.7 ms	Normally closed		196123	MHP2-MS1H-3/2G-M5
	Without fast-switching electronics	Switching time on	Normally open		196142	MHP2-M1H-3/20-M5
		7 ms	Normally closed		196122	MHP2-M1H-3/2G-M5
Manifold will		·	·			
Manifold rail	Individual sub-base <sup>1)</sup>			1	407/20	MUAD AC D ME
	Pneumatic connection: thread M5			1 valve position	197438	MHA2-AS-3-M5
	Manifold block			2 valve positions	197442	MHP2-PR2-3
	Pneumatic connection: thread M7			4 valve positions	197443	MHP2-PR4-3
				6 valve positions	197444	MHP2-PR6-3
				8 valve positions	197445	MHP2-PR8-3
				10 valve positions	197446	MHP2-PR10-3
Cover plate						
	Vacant valve positions must be sea	led with a cover plate	e		197470	МНАР2-ВР-3
Connecting cable						Datasheets → Internet: net
	2-pin socket,	PUR cable, degree	Signal status	Length 2.5 m	8047671	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1
	open cable end 2-wire	of protection IP65	indication with LED	Length 5 m	8047672	NEBV-Z4WA2L-P-E-5-N-LE2-S1
				Length 10 m	8047670	NEBV-Z4WA2L-P-E-10-N-LE2-S1
		PVC cable, degree	Without signal	Length 0.5 m	193690	КМҮZ-4-24-0.5-В
		of protection IP40	status indication	Length 2.5 m	193691	КМҮZ-4-24-2.5-В
<u> </u>	2-pin socket, plug M8x1 3-pin	PUR cable, degree	Signal status	Length 0.5 m	8047673	NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
A CONTRACTOR		of protection IP65	indication with LED	Length 2.5 m	8047674	NEBV-Z4WA2L-P-E-2.5-N-M8G3-S1
✓						
Adapter	2 nin coskat	Cignal status in 1	Diug MQ 2		F74/0/	
	2-pin socket	Signal status indi- cation with LED	Plug M8, 3-pin Plug M8, 4-pin		571686 573194	VAVE-C8-1R8 VAVE-C8-1R1
H-rail mounting	·	·	·			
	For 3/2-way solenoid valves				525053	MHAP2-BG-NRH-35
H-rail						
le l	To EN 60715			2 m	35430	NRH-35-2000

1) Seal ports 2 and 4 on the individual sub-base with blanking plugs. These ports on the individual sub-base have no function when using semi in-line valves.

Ordering data					
				Part no.	Туре
Silencer					Datasheets → Internet: uc
	With threaded connection	M5	1 piece	165003	UC-M5
			50 pieces	534217	UC-M5-50
COL MARK		M7	1 piece	161418	UC-M7
			50 pieces	534218	UC-M7-50
Push-in fitting					Datasheets → Internet: qs
	Male thread M5 with internal hex for tubing O.D.	4 mm	10 pieces	153315	QSM-M5-4-I
		6 mm	10 pieces	153317	QSM-M5-6-I
	Male thread M7 with internal hex for tubing O.D.	4 mm	10 pieces	153319	QSM-M7-4-I
			100 pieces	133006	QSM-M7-4-I-100
		6 mm	10 pieces	153321	QSM-M7-6-I
	Male thread M5 with external hex, push-in L-fitting rotatable through 360 <sup>°</sup> , for tubing O.D.	4 mm	10 pieces	153333	QSML-M5-4
			100 pieces	130771	QSML-M5-4-100
		6 mm	10 pieces	153335	QSML-M5-6
			100 pieces	130772	QSML-M5-6-100
	Male thread M7 with external hex, push-in L-fitting	4 mm	10 pieces	186352	QSML-M7-4
	rotatable through 360°, for tubing O.D.		100 pieces	130773	QSML-M7-4-100
		6 mm	10 pieces	186353	QSML-M7-6
			100 pieces	130774	QSML-M7-6-100
		I	1	1	
Blanking plug					
A	For thread M5		10 pieces	3843	B-M5
	For thread M7		10 pieces	174309	B-M7
			<b>`</b>		
Inscription label					
	For solenoid valve		80 pieces in a	197259	MH-BZ-80X
			frame		

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

#### Connection via plug vanes



Desig	nation	Description	→ Page/Internet	
[1]	Semi in-line valve MHP2	With plug vanes	37	
[2]	Connecting cable NEBV	PUR cable, signal status indication with LED, IP65	37	
[3]	Plug socket with cable KMYZ-4	PVC cable, without signal status indication, IP50	37	
[4]	Connecting cable NEBV	PUR cable, signal status indication with LED, plug M8x1 3-pin, IP65	37	
[5]	Adapter VAVE-C8	For connecting the valves via connecting cable M8 3-pin or 4-pin, IP65	37	
[6]	Inscription label MH-BZ-80X	For identifying the valves	38	
[7]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	38	
[8]	Silencer UC	For fitting in exhaust ports	38	
[9]	Blanking plug B	For sealing unused ports	38	
[10]	Cover plate MHAP2-BP-5	For sealing vacant positions	37	
[11]	Individual sub-base MHA2-AS-5-M5	For semi in-line valve, the individual sub-base is also used for sub-base valves and must be sealed with a blanking plug here	37	
[12]	Manifold block MHP2-PR5	For semi in-line valves	37	
[13]	H-rail mounting CPV10/14-VI-BG-NRH-35	For mounting the manifold block on H-rails to EN 60715	37	

### Solenoid valves MHP2, fast-switching valves

## Datasheet – Semi in-line valve, 5/2-way valves







- **-** Pressure -0.09 ... +0.8 MPa

- **Temperature range** -5 ... +40°C



#### General technical data

Valve function		5/2-way, single solenoid
Design		Pressure relief poppet valve
Overlap		Negative overlap
Sealing principle		Soft
Reset method		Mechanical spring
Actuation type		Electrical
Type of control		Direct
Direction of flow		Not reversible
Exhaust function		Can be throttled
Manual override		Non-detenting
Mounting position		Any
Width	[mm]	10
Grid dimension	[mm]	14
Note on grid dimension		Minimum distance between the valves is 4 mm
Nominal width	[mm]	2
Standard nominal flow rate	[l/min]	90
Type of mounting		On PR rail
Max. tightening torque for valve mounting	[Nm]	0.4
Pneumatic connection	1, 3, 5	Sub-base
	2,4	M5 connecting thread
Max. tightening torque of fitting	[Nm]	1.5
Product weight	[g]	70

#### 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	[MPa]	-0.09 +0.8
	[bar]	-0.9 +8
Ambient temperature	[°C]	-5 +40
Temperature of medium	[°C]	-5 +40
Restricted ambient temperature and temperature of medium		As a function of switching frequency
Corrosion resistance class CRC <sup>1)</sup>		2
CE marking (see declaration of conformity)		To EU EMC Directive <sup>2)</sup>
KC mark		KC EMC
Certification		c UL us - Recognized (OL)
		RCM
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

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.

For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/mh2 
 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.

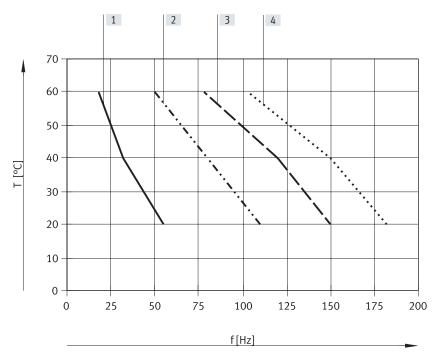
Electrical data			
Electrical connection			Plug, 2-pin
Operating voltage [V DC]		[V DC]	24
Permissible voltage fluctuati	ons	[%]	±10
Power consumption	Low-current phase	[W]	1.625
	High-current phase	[W]	6.5
Reverse polarity protection			Bipolar
Duty cycle		[%]	100
Additional functions			Spark arresting
			Holding current reduction
			Protective circuit
Degree of protection to EN 60	0529		IP65

#### Switching times and frequencies

Switching time	On	[ms]	1.9
	Off	[ms]	1.7
Tolerance for switching time	On	[%]	+1030
	Off	[%]	+1030
Maximum switching frequency		[Hz]	300
Switching time variation from 1 Hz		[ms]	0.2
upwards			

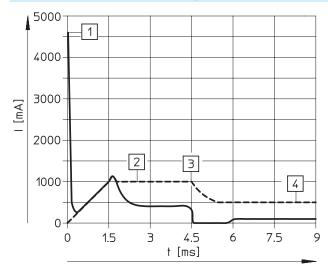
Materials	
Housing	Coated die-cast zinc
Seals	HNBR, NBR
Screws	Galvanised steel
Note on materials	Free of copper and PTFE
	RoHS-compliant
PWIS conformity	VDMA24364-B1/B2-L

#### Restricted ambient temperature and temperature of medium as a function of switching frequency



- [1] Manifold, 6 valves, unpressurised
- [2] Manifold, 6 valves, through-flow,0.6 MPa
- [3] Individual valve, unpressurised[4] Individual valve, through-flow, 0.6 MPa

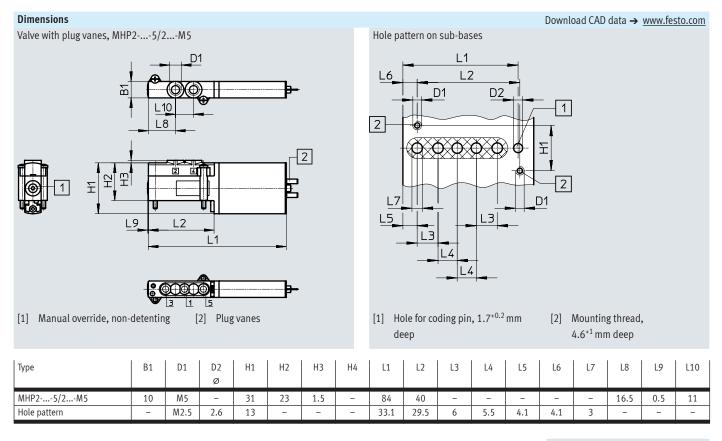
Current curve for valves with fast-switching electronics (MHP2-MS1H)



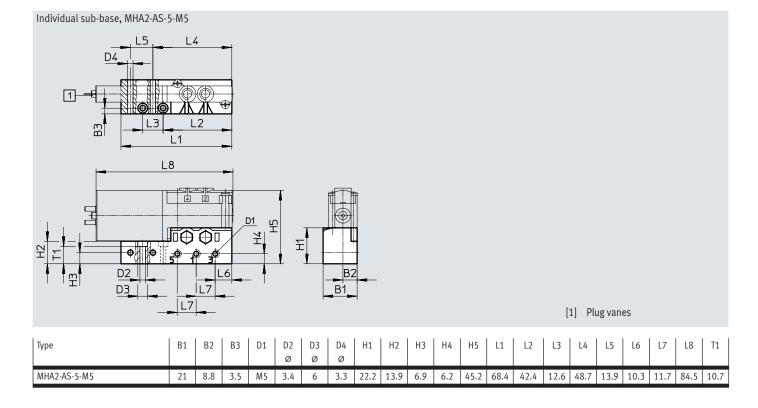
Internal current in the coil
 External current in the supply line

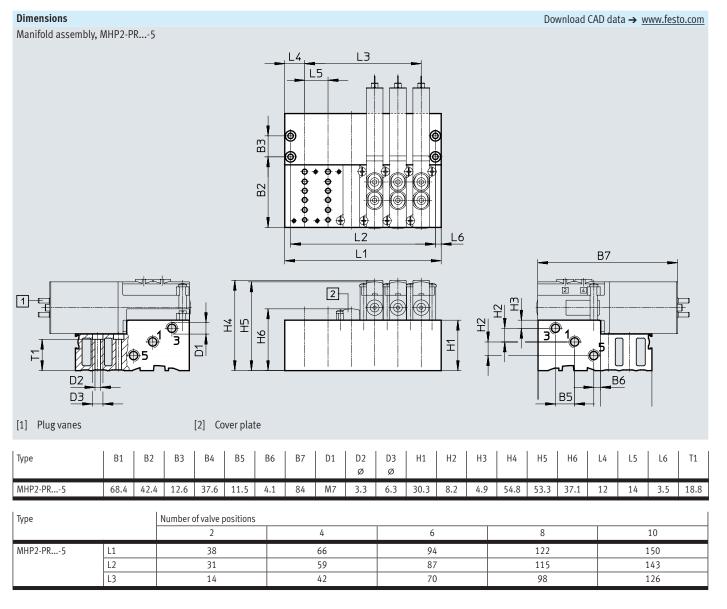
[1] Capacitor charging

- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A



- **Note** Ports 2 and 4 are not required with semi in-line valves.





# Datasheet – Semi in-line valve, 5/2-way valve

Ordering data					Part no.	Туре
Valves					T dit no.	турс
Valves	With fast-switching electronics	Switching time on 1.5	9 ms		525105	MHP2-MS1H-5/2-M5
Manifold rail	Individual sub-base <sup>1)</sup>			1 valve position	525120	MHA2-AS-5-M5
	Pneumatic connection: thread N	15			525120	MIRA2-A3-3-M3
A CONTRACTOR	Manifold block			2 valve positions	525122	MHP2-PR2-5
	Pneumatic connection 1, 3, 5: th	read M7		4 valve positions	525123	MHP2-PR4-5
				6 valve positions	525124	MHP2-PR6-5
				8 valve positions	525125	MHP2-PR8-5
				10 valve positions	525126	MHP2-PR10-5
Cover plate		1 1 11 11				
	Vacant valve positions must be s	sealed with a cover plat	e.		525132	MHAP2-BP-5
Connecting cable			1	1		Datasheets → Internet: nebv
	2-pin socket,	PUR cable, degree of		Length 2.5 m	8047671	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1
	open cable end 2-wire	protection IP65	indication with LED	Length 5 m	8047672	NEBV-Z4WA2L-P-E-5-N-LE2-S1
				Length 10 m	8047670	NEBV-Z4WA2L-P-E-10-N-LE2-S1
_files		PVC cable, degree of		Length 0.5 m	193690	KMYZ-4-24-0.5-B
		protection IP40	status indication	Length 2.5 m	193691	КМҮZ-4-24-2.5-В
	2-pin socket, plug M8x1 3-pin	PUR cable, degree of	Signal status	Length 0.5 m	8047673	NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
C. Market Market		protection IP65	indication with LED	Length 2.5 m	8047674	NEBV-Z4WA2L-P-E-2.5-N-M8G3-S1
			-			
Adapter	- 1	1	1 .			
	2-pin socket	Signal status	Plug M8, 3-pin		571686	VAVE-C8-1R8
		indication with LED	Plug M8, 4-pin		573194	VAVE-C8-1R1
H-rail mounting	1					
	For 5/2-way solenoid valves				162556	CPV10/14-VI-BG-NRH-35
H-rail				1		
	To EN 60715			2 m	35430	NRH-35-2000

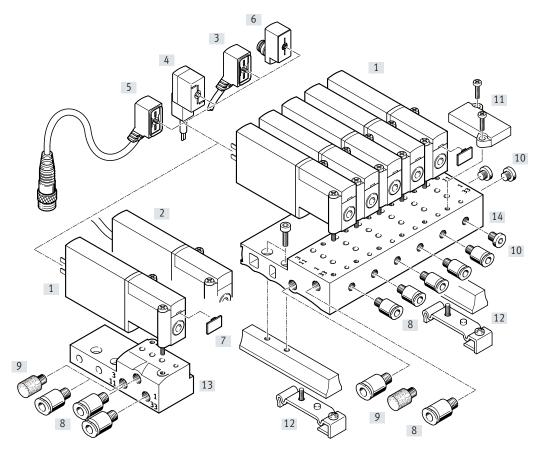
1) Seal ports 2 and 4 on the individual sub-base with blanking plugs. These ports on the individual sub-base have no function when using semi in-line valves.

# Datasheet – Semi in-line valve, 5/2-way valve

Ordering data					
				Part no.	Туре
Silencer					Datasheets → Internet: uc
	With threaded connection	M5	1 piece	165003	UC-M5
			50 pieces	534217	UC-M5-50
		M7	1 piece	161418	UC-M7
			50 pieces	534218	UC-M7-50
Push-in fitting					Datasheets → Internet: qs
	Male thread M5 with internal hex for tubing O.D.	4 mm	10 pieces	153315	QSM-M5-4-I
		6 mm	10 pieces	153317	QSM-M5-6-I
	Male thread M7 with internal hex for tubing O.D.	4 mm	10 pieces	153319	QSM-M7-4-I
			100 pieces	133006	QSM-M7-4-I-100
		6 mm	10 pieces	153321	QSM-M7-6-I
	Male thread M5 with external hex, push-in L-fitting	4 mm	10 pieces	153333	QSML-M5-4
	rotatable through 360°, for tubing O.D.		100 pieces	130771	QSML-M5-4-100
		6 mm	10 pieces	153335	QSML-M5-6
			100 pieces	130772	QSML-M5-6-100
	Male thread M7 with external hex, push-in L-fitting	4 mm	10 pieces	186352	QSML-M7-4
	rotatable through 360°, for tubing O.D.		100 pieces	130773	QSML-M7-4-100
		6 mm	10 pieces	186353	QSML-M7-6
			100 pieces	130774	QSML-M7-6-100
		I	1	1	
Blanking plug					
A	For thread M5		10 pieces	3843	B-M5
	For thread M7		10 pieces	174309	B-M7
			<b>`</b>		
Inscription label					
	For solenoid valve		80 pieces in a	197259	MH-BZ-80X
$\leq$			frame		

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



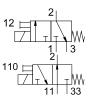


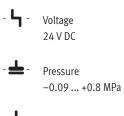
Desig	nation	Description	→ Page/Internet
[1]	Sub-base valve MHA2	With plug vanes	46
[2]	Sub-base valve MHA2K	With moulded-in cable, IP55	46
[3]	Connecting cable NEBV	PUR cable, signal status indication with LED, IP65	46
[4]	Plug socket with cable KMYZ-4	PVC cable, without signal status indication, IP50	46
[5]	Connecting cable NEBV	PUR cable, signal status indication with LED, plug M8x1 3-pin, IP65	46
[6]	Adapter VAVE-C8	For connecting the valves via connecting cable M8 3-pin or 4-pin, IP65	47
[7]	Inscription label MH-BZ-80X	For identifying the valves	47
[8]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	47
[9]	Silencer UC	For fitting in exhaust ports	47
[10]	Blanking plug B	For sealing unused ports	47
[11]	Cover plate MHAP2-BP-3	For sealing vacant positions	46
[12]	H-rail mounting MHAP2-BG-NRH-35	For mounting the manifold block on H-rails to EN 60715	47
[13]	Individual sub-base MHA2-AS-3-M5	For sub-base valve	46
[14]	Manifold block MHA2-PR3-M5	For sub-base valve	46

### Solenoid valves MHA2, fast-switching valves

# Datasheet – Sub-base valve, 3/2-way valve







Temperature range
 -5 ... +40°C



#### General technical data

Valve function		3/2 way, single solenoid <sup>1)</sup>
Design		Pressure relief poppet valve
Overlap		Negative overlap
Sealing principle		Soft
Reset method		Mechanical spring
Actuation type		Electrical
Type of control		Direct
Direction of flow		Reversible with restrictions
Exhaust function		Can be throttled
Manual override		Non-detenting
Mounting position		Any
Width	[mm]	10
Grid dimension	[mm]	14
Note on grid dimension		Minimum distance between the valves is 4 mm
Nominal width	[mm]	2
Standard nominal flow rate	[l/min]	100
Type of mounting		On sub-base
Pneumatic connection		Sub-base
Product weight	[g]	60

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

#### Operating and environmental conditions

			With fast-switching electronics	Without fast-switching electronics			
Operating medium			Compressed air to ISO 8573-1:2010 [7:4:4]				
Note on the operating/pilot medium			Lubricated operation possible (in whi	ich case lubricated operation will always be required)			
Operating pressure		[MPa]	-0.09 +0.8				
		[bar]	-0.9 +8				
	Reversible	[MPa]	-0.09 +0.1				
		[bar]	-0.9 +1				
		[psi]	-13.05 +14.5				
Ambient temperature		[°C]	-5 +40				
Temperature of medium		[°C]	-5 +40				
Restricted ambient temperature and temperature of	medium		As a function of switching frequency (see graph)				
Corrosion resistance class CRC <sup>1)</sup>			2				
CE marking (see declaration of conformity)			To EU EMC Directive <sup>2)</sup>	-			
KC mark			KC EMC	-			
Certification			c UL us - Recognized (OL)	c UL us - Recognized (OL)			
			RCM	-			
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				

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 EC declaration of conformity at: www.festo.com/catalogue/mh2 -> 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.

#### Electrical data

			With fast-switching electronics	Without fast-switching electronics
Electrical connection			2-pin plug or cable	
Operating voltage		[V DC]	24	
Permissible voltage fluctuations		[%]	±10	
Power consumption		[W]	5 for approx. 3 ms (high-current phase,	2.88
			inrush current 1 A)	
		[W]	1.25 (low-current phase)	-
Reverse polarity protection			Bipolar	-
Duty cycle		[%]	100	100
Additional functions			Spark arresting	-
			Holding current reduction	-
			Protective circuit	-
Degree of protection to EN 60529	Electrical connection: 2-pin plug		IP65	IP65
	Electrical connection: cable		IP55	IP55

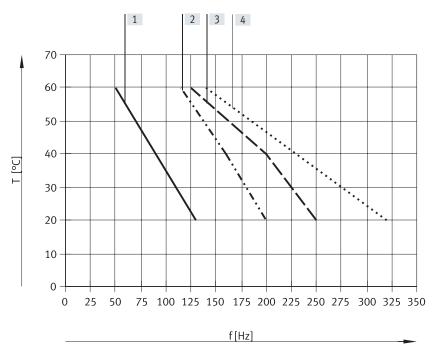
#### Switching times and frequencies

			With fast-switching electronics	Without fast-switching electronics
Switching time	On	[ms]	1.7	7
	Off	[ms]	2	3.5
Tolerance for switching time	On	[%]	+1030	-
	Off	[%]	+1030	-
Switching time variation from 1 Hz		[ms]	0.2	-
upwards				
Maximum switching frequency		[Hz]	330	130

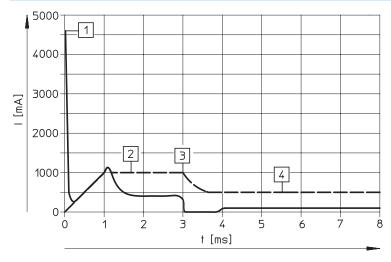
Materials

Housing	Coated die-cast zinc
Cable sheath	PUR
Seals	HNBR, NBR
Screws	Galvanised steel
Note on materials	Free of copper and PTFE
	RoHS-compliant
PWIS conformity	VDMA24364-B1/B2-L

#### Restricted ambient temperature and temperature of medium as a function of switching frequency



#### Current curve for valves with fast-switching electronics (MHA2-MS1H)



----- Internal current in the coil

External current in the supply line

- [1] Manifold, 6 valves, unpressurised
- [2] Manifold, 6 valves, through-flow, 0.6 MPa
- [3] Individual valve, unpressurised[4] Individual valve, through-flow, 0.6 MPa

- [1] Capacitor charging
- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A

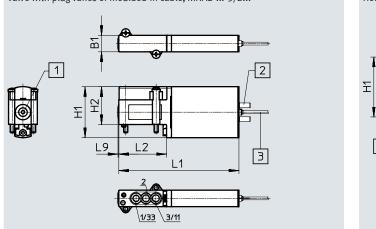
#### Dimensions

Valve with plug vanes or moulded-in cable, MHA2-...-3/2...

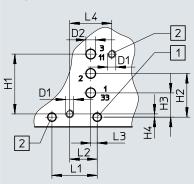
[1] Manual override, non-detenting

Hole pattern on sub-bases

Download CAD data → <u>www.festo.com</u>



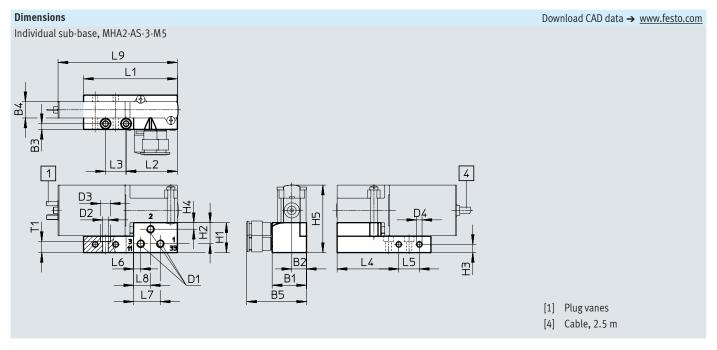
[2] Plug vanes[3] Cable, 2.5 m



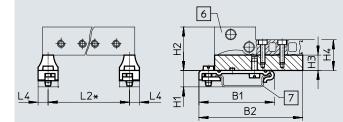
[1]	Hole for coding pin, 1.7 <sup>+0.2</sup> mm	[2]
	deep	

[2] Mounting thread,4.6<sup>+1</sup> mm deep

Туре	B1	D1	D2 Ø	H1	H2	H3	H4	L1	L2	L3	L4	L9
MHA23/2	10	-	-	31	23	-	-	73	29	-	-	0.5
Hole pattern	-	M2.5	3	18.5	13.5	7.5	1	14	8.5	2	13	-



H-rail mounting MHAP2-BG-NRH-35





[7] DIN mounting rail\* See dimensions table for

manifold block used

Туре	B1	B2	B3	B4	B5	D1	D2 Ø	D3 Ø	D4 Ø	H1	H2	H3	H4	H5
MHA2-AS-3-M5	21	9	3.5	10	36.6	M5	3.4	6	3.3	18.3	12.9	5	4	41.3
MHAP2-BG-NRH-35	49.1	67.6	-	-	-	-	-	-	-	10.7	28.3	10	20	20
Tura		1		12		I			1	17	1.0			T1
Туре	LI		L2	L3	L4		L5	L6		L7	L8	L9		T1
MHA2-AS-3-M5	57.4	3	1.4	12.6	37.	7	12.6	4.3	1	.6.3	10.3	73	3	6.8
MHAP2-BG-NRH-35	-		*	-	6.5	5	-	-		-	-	-		-

\* See dimensions table for manifold block used

#### Dimensions Download CAD data $\rightarrow$ <u>www.festo.com</u> Manifold assembly, MHA2-PR...-3-M5 4 -1 B3 0 0 0 0 **⊕ ⊕** Β6 Β7 2 ł Ψ D2 H H H Ψ \_1/33 6 6 3/ ۲ ¢ ¢ 0 0 0 18 15 B1 3 L3 B 17 L1 [1] Plug vanes [2] Cover plate [3] Silencer [4] Cable, 2.5 m Туре Β1 B2 Β3 Β4 Β5 B6 Β7 D1 D2 D3 D4 H1 H2 H3 H4 Η5 Η6 H7 ø ø Ø MHP2-PR...-3-M5 57.4 31.4 12.6 12 4.3 87.9 73 Μ7 3.3 6.3 M5 18.3 10 8.2 4.9 10.9 41.3 25.1 L4 L7 L8 Туре L5 L6 T1 MHP2-PR...-3-M5 24.5 6.8 12 14 3.5 15.4 Number of valve positions Туре 4 6 8 10 2 MHP2-PR...-3-M5 38 66 94 122 150 L1 L2 31 59 87 115 143 L3 14 42 70 98 126

- 📲 - Note

Valve types 3/2G and 3/2O must not be mixed on one manifold block.

Ordering data						
					Part no.	Туре
/alves						
$\sim$	Electrical connection:	With fast-switching el	ectronics,	Normally open	196139	MHA2-MS1H-3/20-2
	2-pin plug	switching time 2 ms		Normally closed	196119	MHA2-MS1H-3/2G-2
		Without fast-switching	g electronics,	Normally open	196138	MHA2-M1H-3/20-2
1		switching time 7 ms		Normally closed	196118	MHA2-M1H-3/2G-2
	Electrical connection:	With fast-switching el	ectronics,	Normally open	196141	MHA2-MS1H-3/20-2-K
	cable	switching time 2 ms		Normally closed	196121	MHA2-MS1H-3/2G-2-K
		Without fast-switching	g electronics,	Normally open	196140	MHA2-M1H-3/20-2-K
3		switching time 7 ms		Normally closed	196120	MHA2-M1H-3/2G-2-K
Aanifold rail						
	Individual sub-base			1 valve position	197438	MHA2-AS-3-M5
	Pneumatic connection:	thread M5				
	Manifold block			2 valve positions	197447	MHA2-PR2-3-M5
	Pneumatic connection 1			4 valve positions	197448	MHA2-PR4-3-M5
	Pneumatic connection 2	2: thread M5		6 valve positions	197449	MHA2-PR6-3-M5
				8 valve positions	197450	MHA2-PR8-3-M5
				10 valve positions	197451	MHA2-PR10-3-M5
Cover plate						
Î	Vacant valve positions r	nust be sealed with a co	over plate.		197470	MHAP2-BP-3
Connecting cable (for v	alves with 2-pin plug)					Datasheets $\rightarrow$ Internet: no
	2-pin socket.	PUR cable, degree of	Signal status	Length 2.5 m	8047671	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1
	open cable end	protection IP65	indication with	Length 5 m	8047672	NEBV-Z4WA2L-P-E-5-N-LE2-S1
	2-wire		LED	Length 10 m	8047670	NEBV-Z4WA2L-P-E-10-N-LE2-S1
		PVC cable, degree of	Without signal	Length 0.5 m	193690	KMYZ-4-24-0.5-B
L.		protection IP40	status	Length 2.5 m	193691	KMYZ-4-24-2.5-B
		F	indication	2011311 213 111	175071	
<b>A</b>	2-pin socket,	PUR cable, degree of	Signal status	Length 0.5 m	8047673	NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
	plug M8x1 3-pin	protection IP65	indication with	Length 2.5 m	8047674	NEBV-Z4WA2L-P-E-2.5-N-M8G3-S1
			LED		004/0/4	NLDV-24WA2L-F-E-2.3-N-W003-31
La						
¥						

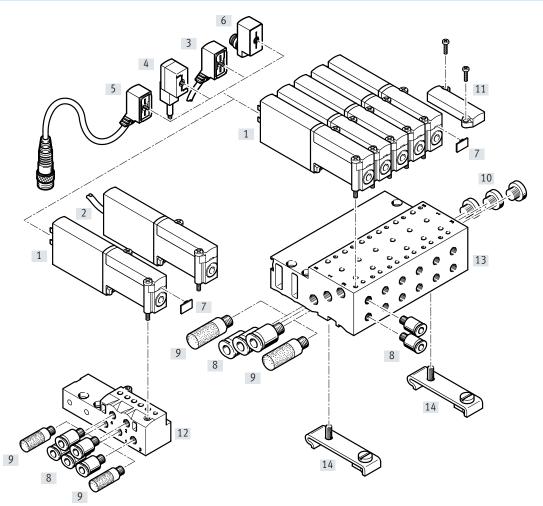
- 🌡 - Note

Valve types 3/2G and 3/2O must not be mixed on one manifold block.

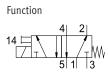
Ordering data					1 -	1-
				·	Part no.	Туре
Adapter (for valves wi	th 2-pin plug)					
	· · ·	Signal status	Plug M8, 3-pin		571686	VAVE-C8-1R8
	i	ndication with LED	D Plug M8, 4-pin		573194	VAVE-C8-1R1
			1		I	
H-rail mounting						
	For 3/2-way solenoid valves			525053	MHAP2-BG-NRH-35	
H-rail						
	To EN 60715			2 m	35430	NRH-35-2000
				2 111	55750	NAT-55-2000
	L				1	1
Silencer						Datasheets → Internet: uc
	With threaded connection		M5	1 piece	165003	UC-M5
				50 pieces	534217	UC-M5-50
			M7	1 piece	161418	UC-M7
				50 pieces	534218	UC-M7-50
			1			
Push-in fitting						Datasheets → Internet: qs
	Male thread M5 with internal hex for	tubing O.D.	4 mm	10 pieces	153315	QSM-M5-4-I
			6 mm	10 pieces	153317	QSM-M5-6-I
	Male thread M7 with internal hex for	tubing O.D.	4 mm	10 pieces	153319	QSM-M7-4-I
				100 pieces	133006	QSM-M7-4-I-100
			6 mm	10 pieces	153321	QSM-M7-6-I
	Male thread M5 with external hex, pu	ush-in L-fitting	4 mm	10 pieces	153333	QSML-M5-4
	rotatable through 360°, for tubing 0.			100 pieces	130771	QSML-M5-4-100
			6 mm	10 pieces	153335	QSML-M5-6
			0 mm	100 pieces	130772	QSML-M5-6-100
	Male thread M7 with external hex, pu	uch-in L-fitting	4 mm	10 pieces	186352	QSML-M7-4
	rotatable through 360°, for tubing O.		4 1111	10 pieces	130773	QSML-M7-4
		0.	6 mm	100 pieces	130773	QSML-M7-6
			0 11111			
				100 pieces	130774	QSML-M7-6-100
					-	
Blanking plug						
	For thread M5			10 pieces	3843	B-M5
	For thread M7			10 pieces	174309	B-M7
Inscription label						
	For solenoid valve			80 pieces in a frame	197259	MH-BZ-80X

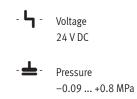
# Peripherals overview – Sub-base valve, 5/2-way valve

### Connection with plug vanes – Connection with moulded-in cable



Desig	nation	Description	→ Page/Internet
[1]	Sub-base valve MHA2	With plug vanes	54
[2]	Sub-base valve MHA2K	With moulded-in cable, IP55	54
[3]	Connecting cable NEBV	PUR cable, signal status indication with LED, IP65	54
[4]	Plug socket with cable KMYZ-4	PVC cable, without signal status indication, IP50	54
[5]	Connecting cable NEBV	PUR cable, signal status indication with LED, plug M8x1 3-pin, IP65	54
[6]	Adapter VAVE-C8	For connecting the valves via connecting cable M8 3-pin or 4-pin, IP65	55
[7]	Inscription label MH-BZ-80X	For identifying the valves	55
[8]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	55
[9]	Silencer UC	For fitting in exhaust ports	55
[10]	Blanking plug B	For sealing unused ports	55
[11]	Cover plate MHAP2-BP-5	For sealing vacant positions	54
[12]	Individual sub-base MHA2-AS-5-M5	For sub-base valve	54
[13]	Manifold block MHA2-PR5-M5	For sub-base valve	54
[14]	H-rail mounting CPV1 0/14-VI-BG-NRH-35	For mounting the manifold block on H-rails to EN 60715	55





- J - Temperature range -5 ... +40°C



#### General technical data

Valve function5/2-way, single solenoidDesignPressure relief poppet valveOverlapNegative overlapSealing principleSoftReset methodMechanical springActuation typeElectricalType of controlDirectDirection of flowNot reversibleExhaust functionCan be throttledManual overrideNon-detentingMounting positionAnyWidth[mm]Iof end grid dimension[mm]Note on grid dimension[mm]Note on grid dimension[mm]Vape of mounting0Standard nominal flow rate[l/min]Yupe of mountingOn PR railMax, tightening torque for valve mounting[Nm]0, 40, 4			
OverlapNegative overlapSealing principleSoftReset methodMechanical springActuation typeElectricalType of controlDirectDirection of flowNot reversibleExhaust functionCan be throttledManual overrideNon-detentingMounting positionAnyWidth[mm]Grid dimension[mm]Note on grid dimensionMinimum distance between the valves is 4 mmNominal width[mm]2Standard nominal flow rateType of mountingOn PR rail	Valve function		5/2-way, single solenoid
Sealing principleSoftReset methodMechanical springActuation typeElectricalType of controlDirectDirection of flowNot reversibleExhaust functionCan be throttledManual overrideNon-detentingMounting positionAnyWidth[mm]Grid dimension[mm]Vote on grid dimension[mm]Nominal width[mm]Standard nominal flow rate[l/min]Type of mountingOn PR rail	Design		Pressure relief poppet valve
Reset methodMechanical springActuation typeElectricalType of controlDirectDirection of flowNot reversibleExhaust functionCan be throttledManual overrideNon-detentingMounting positionAnyWidth[mm]Grid dimension[mm]IdStandard nominal flow rateNominal width[mm]Standard nominal flow rate[I/min]Type of mountingOn PR rail	Overlap		Negative overlap
Actuation typeElectricalType of controlDirectDirection of flowNot reversibleExhaust functionCan be throttledManual overrideNon-detentingMounting positionAnyWidth[mm]10Grid dimensionGrid dimension[mm]Note on grid dimensionMinimum distance between the valves is 4 mmNominal width[mm]2Standard nominal flow rateType of mountingOn PR rail	Sealing principle		Soft
Type of controlDirectDirection of flowNot reversibleExhaust functionCan be throttledManual overrideNon-detentingMounting positionAnyWidth[mm]10Grid dimensionGrid dimension[mm]Note on grid dimensionMinimum distance between the valves is 4 mmNominal width[mm]2Standard nominal flow rate[//min]Type of mountingOn PR rail	Reset method		Mechanical spring
Direction of flowNot reversibleExhaust functionCan be throttledManual overrideNon-detentingMounting positionAnyWidth[mm]10Grid dimension[mm]Note on grid dimension[mm]Nominal width[mm]2Standard nominal flow rate[I/min]Type of mountingOn PR rail	Actuation type		Electrical
Exhaust functionCan be throttledManual overrideNon-detentingMounting positionAnyWidth[mm]10Grid dimension[mm]14Note on grid dimensionMinimum distance between the valves is 4 mmNominal width[mm]2Standard nominal flow rate[l/min]90Type of mountingOn PR rail	Type of control		Direct
Manual override       Non-detenting         Mounting position       Any         Width       [mm]       10         Grid dimension       [mm]       14         Note on grid dimension       Minimum distance between the valves is 4 mm         Nominal width       [mm]       2         Standard nominal flow rate       [I/min]       90         Type of mounting       On PR rail	Direction of flow		Not reversible
Mounting position       Any         Width       [mm]       10         Grid dimension       [mm]       14         Note on grid dimension       Minimum distance between the valves is 4 mm         Nominal width       [mm]       2         Standard nominal flow rate       [I/min]       90         Type of mounting       On PR rail	Exhaust function		Can be throttled
Width     [mm]     10       Grid dimension     [mm]     14       Note on grid dimension     Minimum distance between the valves is 4 mm       Nominal width     [mm]     2       Standard nominal flow rate     [l/min]     90       Type of mounting     On PR rail	Manual override		Non-detenting
Grid dimension     [mm]     14       Note on grid dimension     Minimum distance between the valves is 4 mm       Nominal width     [mm]     2       Standard nominal flow rate     [l/min]     90       Type of mounting     On PR rail	Mounting position		Any
Note on grid dimension     Minimum distance between the valves is 4 mm       Nominal width     [mm]     2       Standard nominal flow rate     [l/min]     90       Type of mounting     On PR rail	Width	[mm]	10
Nominal width     [mm]     2       Standard nominal flow rate     [l/min]     90       Type of mounting     On PR rail	Grid dimension	[mm]	14
Standard nominal flow rate     [l/min]     90       Type of mounting     On PR rail	Note on grid dimension		Minimum distance between the valves is 4 mm
Type of mounting On PR rail	Nominal width	[mm]	2
	Standard nominal flow rate	[l/min]	90
Max. tightening torque for valve mounting [Nm] 0.4	Type of mounting		On PR rail
	Max. tightening torque for valve mounting	[Nm]	0.4
Pneumatic connection Sub-base	Pneumatic connection		Sub-base
Product weight [g] 70	Product weight	[g]	70

#### 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	[MPa]	-0.09+0.8
	[bar]	-0.9 +8
Ambient temperature	[°C]	-5+40
Temperature of medium	[°C]	-5 +40
Restricted ambient temperature and temperature of medium		As a function of switching frequency (see graph)
Corrosion resistance class CRC <sup>1)</sup>		2
CE marking (see declaration of conformity)		To EU EMC Directive <sup>2)</sup>
KC mark		KC EMC
Certification		c UL us - Recognized (OL)
		RCM
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

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 EC declaration of conformity at: www.festo.com/catalogue/mh2 → 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.

Electrical data Electrical connection			2-pin plug Cable				
Operating voltage		[V DC]	24				
Permissible voltage fluctuati	ons	[%]	±10				
Power consumption	Low-current phase	[W]	1.625				
	High-current phase	[W]	6.5				
Reverse polarity protection			Bipolar				
Duty cycle		[%]	100				
Additional functions			Spark arresting				
			Holding current reduction				
			Protective circuit				
Degree of protection to EN 6	0529		IP65		IP55		

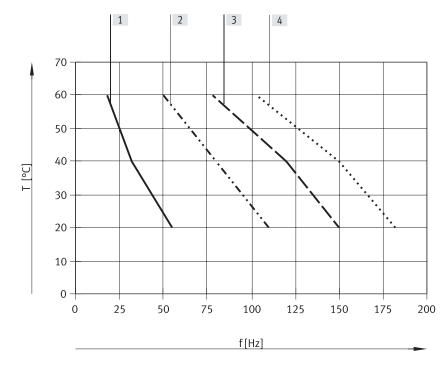
#### Switching times and frequencies

Switching time	On	[ms]	1.9
	Off	[ms]	1.7
Tolerance for switching time	On	[%]	+1030
	Off	[%]	+1030
Maximum switching frequency		[Hz]	300
Switching time variation from 1 Hz		[ms]	0.2
upwards			

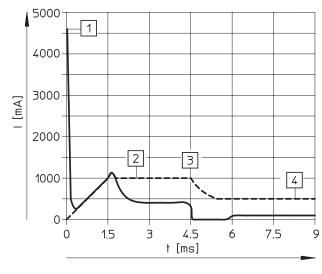
Materials
Housing

Housing	Coated die-cast zinc
Cable sheath	PUR
Seals	HNBR, NBR
Screws	Galvanised steel
Note on materials	Free of copper and PTFE
	RoHS-compliant
PWIS conformity	VDMA24364-B1/B2-L

#### Restricted ambient temperature and temperature of medium as a function of switching frequency



Current curve for valves with fast-switching electronics (MHA2-MS1H)

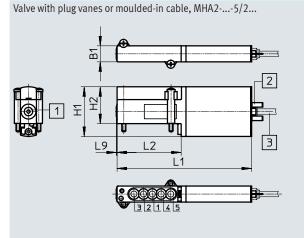


Internal current in the coil
 External current in the supply line

- [1] Capacitor charging
- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A

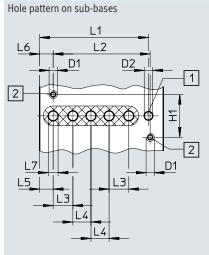
- Manifold, 6 valves, unpressurised
   Manifold, 6 valves, through-flow, 0.6 MPa
- [3] Individual valve, unpressurised
- [4] Individual valve, through-flow, 0.6 MPa

#### Dimensions



[2] Plug vanes

[3] Cable, 2.5 m



[1] Hole for coding pin, 1.7<sup>+0.2</sup> mm deep

[2] Mounting thread,4.6<sup>+1</sup> mm deep

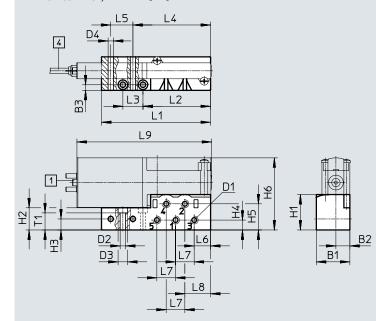
Download CAD data → <u>www.festo.com</u>

Туре	B1	D1	D2 Ø	H1	H2	L1	L2	L3	L4	L5	L6	L7	L9
MHA25/2	10	-	-	31	23	84	40	-	-	-	-	-	0.5
Hole pattern	-	M2.5	2.6	13	-	33.1	29.5	6	5.5	4.1	4.1	3	-

#### Dimensions

Individual sub-base, MHA2-AS-5-M5

[1] Manual override, non-detenting



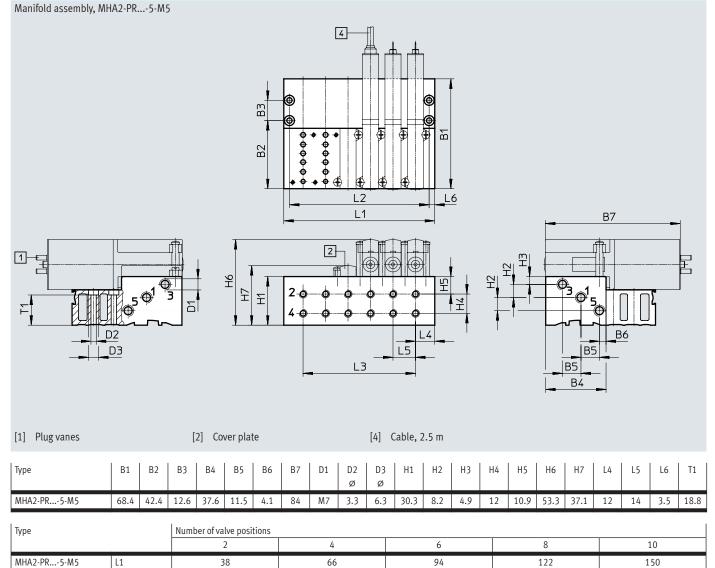
Download CAD data → <u>www.festo.com</u>

# [1] Plug vanes[4] Cable, 2.5 m

Туре	B1	B2	B3	D1	D2 Ø	D3 Ø	D4 Ø	H1	H2	H3	H4	H5	H6
MHA2-AS-5-M5	21	8.8	3.5	M5	3.4	6	3.3	22.2	13.9	6.9	6.2	16.4	45.2
Туре	L1	L2	2	L3	L4	L5		L6	L7	L8		L9	T1
MHA2-AS-5-M5	68.4	42.	4	12.6	48.7	13.9	)	10.3	11.7	16.2	8	4.5	10.7



Download CAD data → <u>www.festo.com</u>



L2

L3

### Solenoid valves MHA2, fast-switching valves

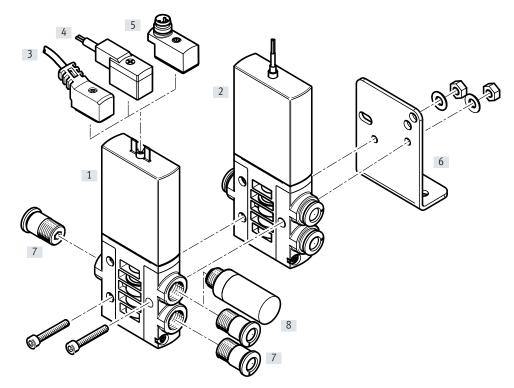
# Datasheet – Sub-base valve, 5/2-way valve

Ordering data						
					Part no.	Туре
alves						
	Electrical connection: plug vanes	With fast-switching el	ectronics, switching ti	ne 2 ms	525101	MHA2-MS1H-5/2-2
	Electrical connection: cable	With fast-switching el	ectronics, switching ti	ne 2 ms	525103	MHA2-MS1H-5/2-2-K
Manifold rail			-	-		
	Individual sub-base Pneumatic connection: thread M	5		1 valve position	525120	MHA2-AS-5-M5
	Manifold block			2 valve positions	525127	MHA2-PR2-5-M5
	Pneumatic connection 1, 3, 5: th	read M7		4 valve positions	525128	MHA2-PR4-5-M5
	Pneumatic connection 2, 4: threa	ad M5		6 valve positions	525129	MHA2-PR6-5-M5
No le				8 valve positions	525130	MHA2-PR8-5-M5
				10 valve positions	525131	MHA2-PR10-5-M5
over plate						
	Vacant valve positions must be s	ealed with a cover plate	е.		525132	MHAP2-BP-5
Connecting cable (for	valves with 2-pin plug)					Datasheets → Internet: n
	2-pin socket,	PUR cable, degree of	Signal status	Length 2.5 m	8047671	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1
ll ll	open cable end 2-wire	protection IP65	indication with LED	Length 5 m	8047672	NEBV-Z4WA2L-P-E-5-N-LE2-S1
				Length 10 m	8047670	NEBV-Z4WA2L-P-E-10-N-LE2-S1
		PVC cable, degree of	Without signal	Length 0.5 m	193690	КМҮZ-4-24-0.5-В
		protection IP40	status indication	Length 2.5 m	193691	КМҮZ-4-24-2.5-В
AND THE REAL PROPERTY OF	2-pin socket, plug M8x1 3-pin	PUR cable, degree of protection IP65	Signal status indication with LED	Length 0.5 m Length 2.5 m	8047673 8047674	NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1 NEBV-Z4WA2L-P-E-2.5-N-M8G3-S1

Ordering data					Part no.	Туре
Adapter (for valves with	2-nin nlug)					1.012
	2-pin socket	Signal status	Plug M8, 3-pin		571686	VAVE-C8-1R8
	2 philodeket	indication with LED	Plug M8, 4-pin		573194	VAVE-C8-1R1
<b>•</b>						
H-rail mounting						
	For 5/2-way solenoid valves				162556	CPV10/14-VI-BG-NRH-35
H-rail	T 54 (0745				07/00	
	To EN 60715			2 m	35430	NRH-35-2000
Silencer						Datasheets → Internet: uc
	With threaded connection		M5	1 piece	165003	UC-M5
				50 pieces	534217	UC-M5-50
			M7	1 piece 50 pieces	161418	UC-M7
					534218	UC-M7-50
Push-in fitting				1	1	Datasheets → Internet: qs
	Male thread M5 with internal hex f	or tubing O.D.	4 mm	10 pieces	153315	QSM-M5-4-1
			6 mm	10 pieces	153317	QSM-M5-6-1
	Male thread M7 with internal hex f	or tubing O.D.	4 mm	10 pieces	153319	QSM-M7-4-I
			(	100 pieces	133006	QSM-M7-4-I-100
		.1.1.1.00	6 mm	10 pieces	153321	QSM-M7-6-1
	Male thread M5 with external hex, rotatable through 360°, for tubing		4 mm	10 pieces	153333	QSML-M5-4
6		0.0.		100 pieces	130771	QSML-M5-4-100
			6 mm	10 pieces	153335	QSML-M5-6
	Male thread M7 with external hex,	much in I fitting	4	100 pieces	130772	QSML-M5-6-100
	rotatable through 360°, for tubing		4 mm	10 pieces	186352	QSML-M7-4 QSML-M7-4-100
		0.0.	6 mm	100 pieces	130773	QSML-M7-4-100 QSML-M7-6
			0 11111	10 pieces	186353	
				100 pieces	130774	QSML-M7-6-100
Blanking plug						
	For thread M5			10 pieces	3843	B-M5
	For thread M7			10 pieces	3843	B-M5 B-M7
	Tor tillead M7			10 pieces	174509	D-W/
				·		·
Inscription label						
	For solenoid valve			80 pieces in a	197259	MH-BZ-80X
				frame		

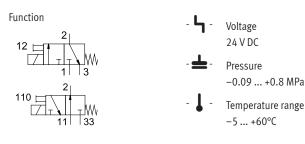
# Peripherals overview - Individual valve

# Connection with plug vanes - Connection with moulded-in cable



Designation		Description	→ Page/Internet
[1]	Individual valve MHE3	With plug vanes	61
[2]	Individual valve MHE3K	With moulded-in cable, IP65	61
[3]	Connecting cable NEBV	PUR cable, signal status indication with LED, IP65	62
[4]	Plug socket with cable KMYZ-4	PVC cable, without signal status indication, IP50	62
[5]	Adapter VAVE-C8	For connecting the valves via connecting cable M8 3-pin or 4-pin, IP65	62
[6]	Mounting bracket MHE2-BG-L	For wall mounting	62
[7]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	62
[8]	Silencer UC	For fitting in exhaust ports	62

# Datasheet - Individual valve





#### General technical data

	3/2 way, single solenoid <sup>1)</sup>
	Pressure relief poppet valve
	Negative overlap
	Soft
	Mechanical spring
	Electrical
	Direct
	Reversible with restrictions <sup>2)</sup>
	Can be throttled
	Non-detenting
	Any
[mm]	14
[mm]	19
	Minimum distance between the valves is 5 mm
[mm]	3
[l/min]	200
	Via through-hole
	Connecting thread G1/8
	Push-in connector for tubing O.D. 6 mm
[g]	120
	[mm] [mm] [l/min]

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

2) Slight leakage can occur in the pressure range -0.8 bar to +0.5 bar.

#### Operating and environmental conditions

		With fast-switching electronics	Without fast-switching electronics
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)
Ambient temperature	[°C]	-5 +60	
Temperature of medium	[°C]	-5 +60	
Restricted ambient temperature and temperature of medium		As a function of switching frequency	-
Corrosion resistance class CRC <sup>1)</sup>		2	2
CE marking (see declaration of conformity)		To EU EMC Directive <sup>2)</sup>	-
KC mark		KC EMC	-
Certification		c UL us - Recognized (OL)	c UL us - Recognized (OL)
		RCM	-
Shock resistance		Shock test with severity level 2 to FN 942017	7-5 and EN 60068-2-27
Vibration resistance		Transport application test with severity level	2 to FN 942017-4 and EN 60068-2-6

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 EC declaration of conformity at: www.festo.com/catalogue/mh2 -> 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 - Individual valve

#### Operating and environmental conditions

			With fast-switching electronics	Without fast-switching electronics
Operating pressure		[MPa]	-0.09 +0.8	
		[bar]	-0.9 +8	
	Reversible	[MPa]	-0.09 +0.1	
		[bar]	-0.9 +1	
		[psi]	-13.05 +14.5	
Operating pressure for		[MPa]	-0.09 +0.8	
• MHE3-M1H-3/20-1/8-K		[bar]	-0.9 +8	
• MHE3-M1H-3/20-QS-6	Reversible	[MPa]	-0.09 +0.1	
• MHE3-MS1H-3/20-1/8-K		[bar]	-0.9 +1	
• MHE3-MS1H-3/20-QS-6		[psi]	-13.05 +14.5	

#### Electrical data

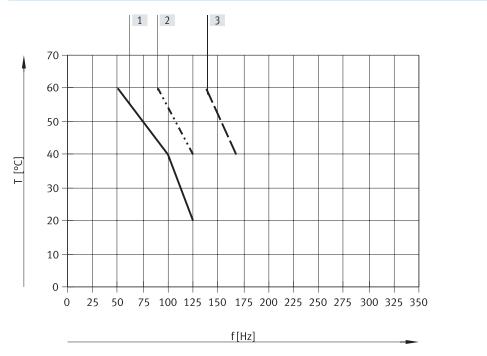
		With fast-switching electronics	Without fast-switching electronics
Electrical connection		2-pin plug or cable	
Operating voltage	[V DC]	24	
Permissible voltage fluctuations	[%]	±10	
Power consumption	[W]	6.5 for approx. 4.5 ms (high-current phase, inrush current 1 A)	3.7
	[W]	1.6 (low-current phase)	-
Reverse polarity protection		Bipolar	-
Duty cycle	[%]	100	100
Additional functions		Spark arresting	-
		Holding current reduction	-
		Protective circuit	-
Degree of protection to EN 60529		IP65	IP65

#### Switching times and frequencies With fast-switching electronics Without fast-switching electronics On 2.3 8.3 Switching time [ms] Off [ms] 2.8 4.5 +10 ... -30 Tolerance for switching time On [%] -Off [%] +10 ... -50 Switching time variation from 1 Hz [ms] 0.2 upwards [Hz] Maximum switching frequency 280 130

Materials	
Housing	Coated die-cast zinc
Cable sheath	PUR
Seals	HNBR, NBR
Screws	Galvanised steel
Note on materials	Free of copper and PTFE
	RoHS-compliant
PWIS conformity	VDMA24364-B1/B2-L

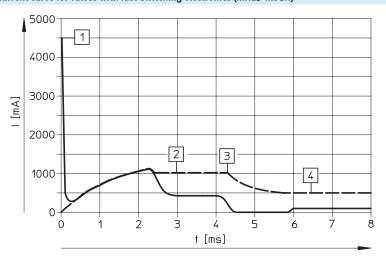
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### Datasheet – Individual valve



#### Restricted ambient temperature and temperature of medium as a function of switching frequency

Current curve for valves with fast-switching electronics (MHE3-MS1H)



------ Internal current in the coil

External current in the supply line

0.6 MPa [3] Individual valve, unpressurised

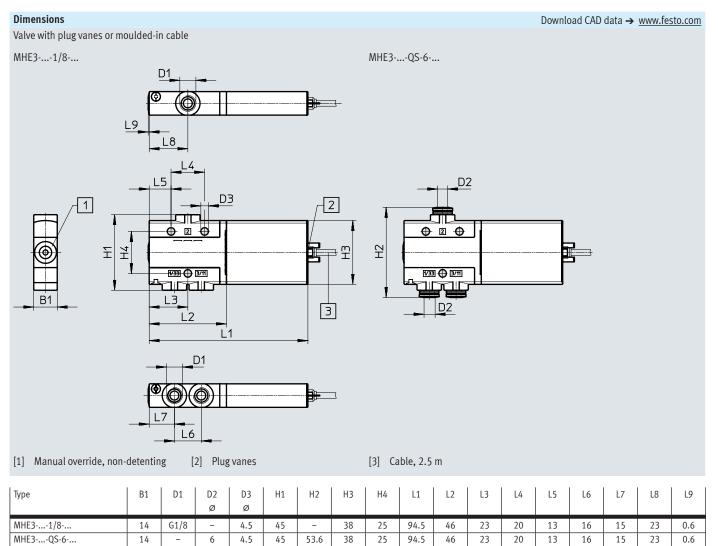
[1] Manifold, 6 valves, unpressurised

[2] Manifold, 6 valves, through-flow,

No restrictions for individual valve, through-flow, 0.6 MPa.

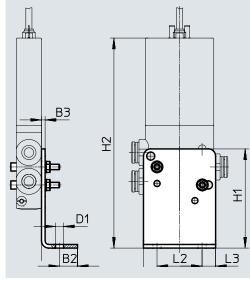
- [1] Capacitor charging
- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A

### Datasheet – Individual valve



#### Dimensions

Mounting bracket MHE2-BG-L



Туре	B1	B2	B3	D1	H1	H2	L1	L2	L3
MHE2-BG-L	20	10	2	4.5	55	113.3	40	25	7.5

Download CAD data → www.festo.com

# Datasheet - Individual valve

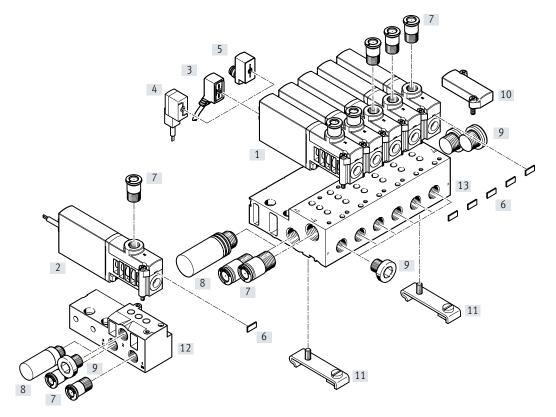
Ordering data						
					Part no.	Туре
Valves						
	Electrical connec-	With fast-switching	Pneumatic connection: thread	Normally open	525167	MHE3-MS1H-3/20-1/8
	tion: 2-pin plug	electronics, switching	G1/8	Normally closed	525147	MHE3-MS1H-3/2G-1/8
2ª		time 2.3 ms	Pneumatic connection:	Normally open	525171	MHE3-MS1H-3/20-QS-6
			push-in connector for tubing O.D. 6 mm	Normally closed	525151	MHE3-MS1H-3/2G-QS-6
		Without fast-switching	Pneumatic connection: thread	Normally open	525166	MHE3-M1H-3/20-1/8
		electronics, switching	G1/8	Normally closed	525146	MHE3-M1H-3/2G-1/8
		time 8.3 ms	Pneumatic connection:	Normally open	525170	MHE3-M1H-3/20-QS-6
			push-in connector for tubing	Normally closed	525150	MHE3-M1H-3/2G-QS-6
			0.D. 6 mm			
$\sim$	Electrical connec-	With fast-switching	Pneumatic connection: thread	Normally open	525169	MHE3-MS1H-3/20-1/8-K
	tion: cable	electronics, switching	G1/8	Normally closed	525149	MHE3-MS1H-3/2G-1/8-K
and a second		time 2.3 ms	Pneumatic connection: push-in connector for tubing O.D. 6 mm	Normally closed	525153	MHE3-MS1H-3/2G-QS-6-K
		Without fast-switching	Pneumatic connection: thread	Normally open	525168	MHE3-M1H-3/20-1/8-K
		electronics, switching	G1/8	Normally closed	525148	MHE3-M1H-3/2G-1/8-K
		time 8.3 ms	Pneumatic connection: push-in connector for tubing	Normally closed	525152	MHE3-M1H-3/2G-QS-6-K
			0.D. 6 mm			

# Datasheet – Individual valve

Ordering data						
					Part no.	Туре
Connecting cable (for	valves with 2-pin plug)					Datasheets → Internet: nebv
ll l	2-pin socket,	PUR cable, degree of	Signal status	Length 2.5 m	8047671	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1
	open cable end 2-wire	protection IP65	indication with LED	Length 5 m	8047672	NEBV-Z4WA2L-P-E-5-N-LE2-S1
				Length 10 m	8047670	NEBV-Z4WA2L-P-E-10-N-LE2-S1
s.		PVC cable, degree of	Without signal	Length 0.5 m	193690	KMYZ-4-24-0.5-B
		protection IP40	status indication	Length 2.5 m	193691	КМҮZ-4-24-2.5-В
	2-pin socket, plug M8x1	PUR cable, degree of	Signal status	Length 0.5 m	8047673	NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
A CONTRACTOR	3-pin	protection IP65	indication with LED	Length 2.5 m	8047674	NEBV-Z4WA2L-P-E-2.5-N-M8G3-S1
Adapter (for valves wi	ith 2-pin plug)					
<u> </u>	2-pin socket	Signal status indication	Plug M8, 3-pin		571686	VAVE-C8-1R8
		with LED	Plug M8, 4-pin		573194	VAVE-C8-1R1
Wall mounting	Mounting bracket				196165	MHE2-BG-L
Silencer						Datasheets → Internet: u
	Push-in sleeve with O.D. 6	mm		1 piece	165007	UC-QS-6H
	With threaded connection	G1/8		1 piece	161419	UC-1/8
				50 pieces	534219	UC-1/8-50
Push-in fitting						Datasheets → Internet: qs
	Male thread G1/8 with exte	ernal hex for tubing O.D.	6 mm	10 pieces	186096	QS-G1/8-6
				100 pieces	132037	QS-G1/8-6-100
			8 mm	10 pieces	186098	QS-G1/8-8
				50 pieces	132038	QS-G1/8-8-50
	Male thread G1/8 with exte	ernal hex, push-in I-fitting	6 mm	10 pieces	186117	QSL-G1/8-6
	rotatable through 360°, for			100 pieces	132049	QSL-G1/8-6-100
			8 mm	10 pieces	192049	QSL-G1/8-8
				50 pieces	132050	QSL-G1/8-8-50
				Jo pieces	152050	432 01/0-0-30

# Peripherals overview - Semi in-line valve

#### Connection with plug vanes – Connection with moulded-in cable

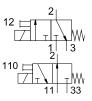


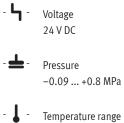
Desig	nation	Description	→ Page/Internet
[1]	Semi in-line valve MHP3	With plug vanes	70
[2]	Semi in-line valve MHP3K	With moulded-in cable, IP65	70
[3]	Connecting cable NEBV	PUR cable, signal status indication with LED, IP65	70
[4]	Plug socket with cable KMYZ-4	PVC cable, without signal status indication, IP50	70
[5]	Adapter VAVE-C8	For connecting the valves via connecting cable M8 3-pin or 4-pin, IP65	70
[6]	Inscription label MH-BZ-80X	For identifying the valves	71
[7]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	71
[8]	Silencer UC	For fitting in exhaust ports	71
[9]	Blanking plug B	For sealing unused ports	71
[10]	Cover plate MHAP3-BP-3	For sealing vacant positions	70
[11]	H-rail mounting CPV10/14-VI-BG-NRH-35	For mounting the manifold block on H-rails to EN 60715	71
[12]	Individual sub-base MHA3-AS-3-1/8	For semi in-line valves; the individual sub-base is also used for sub-base valves and must be sealed with a blanking plug here	70
[13]	Manifold block MHA3-PR	For semi in-line valves	70

### Solenoid valves MHP3, fast-switching valves

### Datasheet - Semi in-line valve







-5 ... +40°C



#### General technical data

Valve function			3/2 way, single solenoid <sup>1)</sup>
Design			Pressure relief poppet valve
Overlap			Negative overlap
Sealing principle			Soft
Reset method			Mechanical spring
Actuation type			Electrical
Type of control			Direct
Direction of flow			Reversible with restrictions <sup>2)</sup>
Exhaust function			Can be throttled
Manual override			Non-detenting
Mounting position			Any
Width		[mm]	14
Grid dimension		[mm]	19
Note on grid dimension			Minimum distance between the valves is 5 mm
Nominal width		[mm]	3
Standard nominal flow rate		[l/min]	200
Type of mounting			On PR rail
Pneumatic connection	2		Connecting thread G1/8, push-in connector for tubing O.D. 6 mm
	1, 11, 3, 33		Sub-base
Product weight		[g]	120

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

2) Slight leakage can occur in the pressure range -0.8 bar to +0.5 bar.

#### Operating and environmental conditions

-			With fast-switching electronics	Without fast-switching electronics		
Operating medium			Compressed air to ISO 8573-1:2010 [7:4:4]			
Note on the operating/pilot medium			Lubricated operation possible (in which c	ase lubricated operation will always be required)		
Operating pressure		[MPa]	-0.09 +0.8			
		[bar]	-0.9 +8			
	Reversible	[MPa]	-0.09 +0.1			
		[bar]	-0.9 +1			
		[psi]	-13.05 +14.5			
Ambient temperature		[°C]	-5 +40			
Temperature of medium		[°C]	-5 +40			
Restricted ambient temperature and temperature	of medium		As a function of switching frequency	-		
Corrosion resistance class CRC <sup>1)</sup>			2	2		
CE marking (see declaration of conformity)			To EU EMC Directive <sup>2)</sup>	-		
KC mark			KC EMC	-		
Certification			c UL us - Recognized (OL)	c UL us - Recognized (OL)		
			RCM	-		
Shock resistance	Shock resistance			Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27		
Vibration resistance			Transport application test with severity le	vel 2 to FN 942017-4 and		
			EN 60068-2-6			

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 EC declaration of conformity at: www.festo.com/catalogue/mh21 -> 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.

#### Electrical data

		With fast-switching electronics	Without fast-switching electronics
Electrical connection		2-pin plug or cable	
Operating voltage	[V DC]	24	
Permissible voltage fluctuations	[%]	±10	
Power consumption	[W]	6.5 (high-current phase)	3.7
	[W]	1.6 (low-current phase)	-
Reverse polarity protection		Bipolar	-
Duty cycle	[%]	100	100
Additional functions		Spark arresting	-
		Holding current reduction	-
		Protective circuit	-
Degree of protection to EN 60529		IP65	IP65

#### Switching times and frequencies

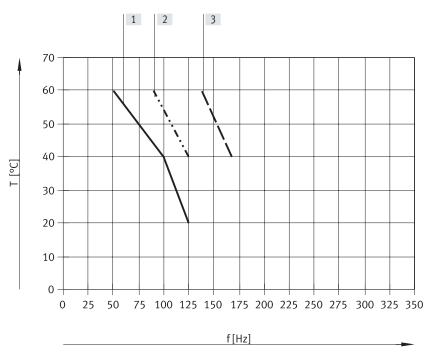
			With fast-switching electronics	Without fast-switching electronics
Switching time	On	[ms]	2.3	8.3
	Off	[ms]	2.8	4.5
Tolerance for switching time	On	[%]	+1030	-
	Off	[%]	+1050	-
Switching time variation from 1 Hz		[ms]	0.2	-
upwards				
Maximum switching frequency		[Hz]	280	130

#### Materials

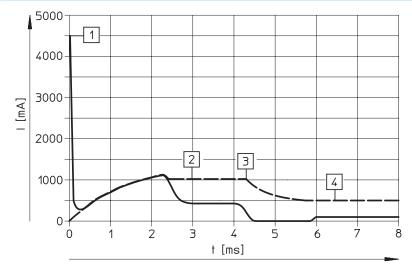
Coated die-cast zinc
PUR
HNBR, NBR
Galvanised steel
Free of copper and PTFE
RoHS-compliant
VDMA24364-B1/B2-L

1









------ Internal current in the coil

External current in the supply line

- [1] Manifold, 6 valves, unpressurised
- [2] Manifold, 6 valves, through-flow, 0.6 MPa

[3] Individual valve, unpressurised

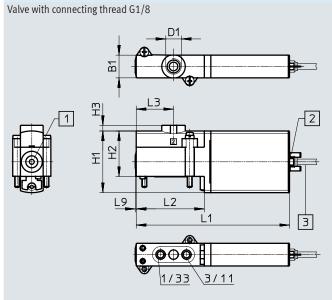
No restrictions for individual valve, through-flow, 0.6 MPa.

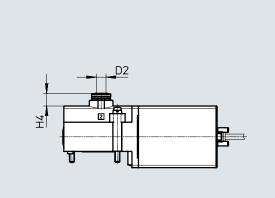
- [1] Capacitor charging
- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A

Download CAD data → <u>www.festo.com</u>

### Datasheet - Semi in-line valve

#### Dimensions





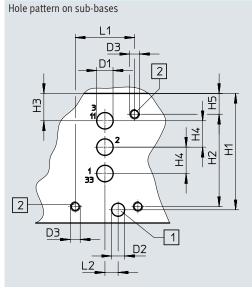
Valve with push-in connector for tubing O.D. 6 mm

[1] Manual override, non-detenting [2] Plug vanes

[3] Cable, 2.5 m

Туре	B1	D1	D2 Ø	H1	H2	H3	H4	L1	L2	L3	L9
MHP33/2	14	G1/8	6	38	28	3.5	7.8	94.5	42	23	0.6



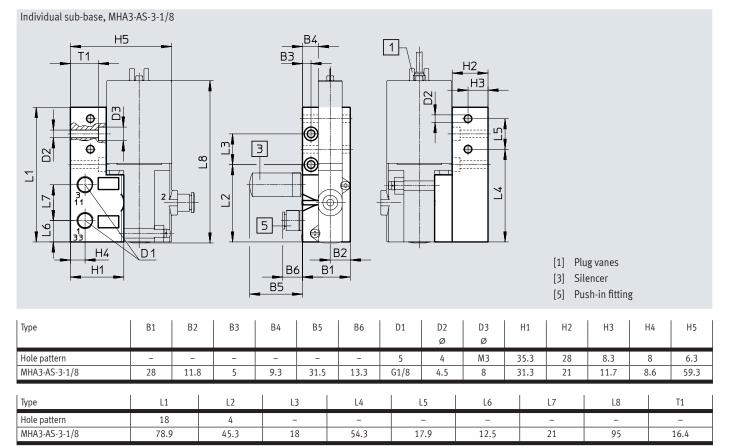


[1] Hole for coding pin, 2mm deepIf used as a 2<br/>closed, ports[2] Mounting thread, 8 mm deepopen, ports



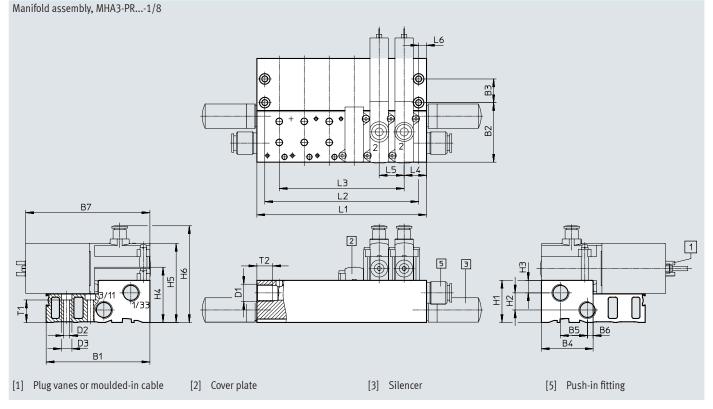
With semi in-line valves, port 2 is not used. If used as a 2/2-way valve, normally closed, ports 3/11 are not used. If used as a 2/2-way valve, normally open, ports 1/33 are not used.

Download CAD data → www.festo.com

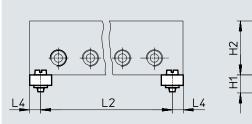


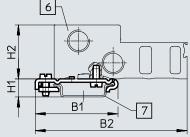
#### Dimensions

Download CAD data → <u>www.festo.com</u>



H-rail mounting CPV1 0/14-VI-BG-NRH-35





[6] Manifold block[7] DIN mounting rail

Туре	B1	B2	B3	B4	B5	B6	B7	D1	D2 Ø	D3 Ø	H1	H2	H3	H4	H5	H6	L4	L5	L6	T1	T2
MHA3-PR1/8	79	45.3	18	39.3	20.5	4.3	94.5	G1/4	4.5	8	32	13	9.5	42	60	73.5	17	19	6	17.1	12
CPV1 0/14-VI-BG	49.1	90	-	-	-	-	-	-	-	-	10.7	32	-	-	-	-	6.5	-	-	-	-

Туре		Number of valve positions				
		2	4	6	8	10
MHA3-PR1/8	L1	53	91	129	167	205
	L2	41	79	117	155	193
	L3	19	57	95	133	171
CPV1 0/14-VI-BG	L2	40	78	116	154	192

- 📲 - Note

Valve types 3/2G and 3/2O must not be mixed on one manifold block.

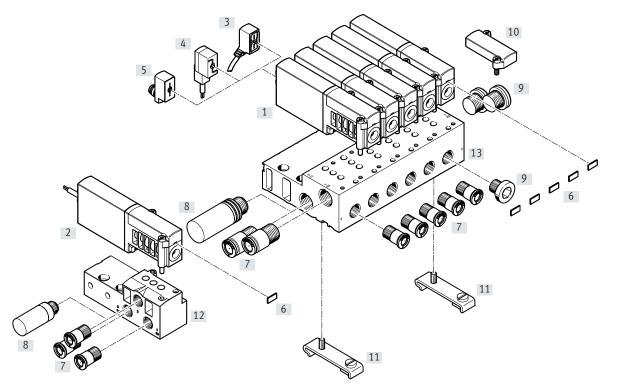
					Part no.	Туре
Valves		,				
	Electrical connection:	With fast-switching	Pneumatic connection: thread	Normally open	525159	MHP3-MS1H-3/20-1/8
	2-pin plug	electronics, switch-	G1/8	Normally closed	525139	MHP3-MS1H-3/2G-1/8
2		ing time 2.3 ms	Pneumatic connection:	Normally closed	525143	MHP3-MS1H-3/2G-QS-6
<b></b>			push-in connector for tubing			
			0.D. 6 mm			
		Without fast-switch-	Pneumatic connection: thread	Normally open	525158	MHP3-M1H-3/20-1/8
		ing electronics,	G1/8	Normally closed	525138	MHP3-M1H-3/2G-1/8
		switching time	Pneumatic connection:	Normally closed	525142	MHP3-M1H-3/2G-QS-6
		8.3 ms	push-in connector for tubing			
			0.D. 6 mm			
$\sim$	Electrical connection:	With fast-switching	Pneumatic connection:	Normally closed	525145	MHP3-MS1H-3/2G-QS-6-K
	cable	electronics, switch-	push-in connector for tubing			
A a a u		ing time 2.3 ms	0.D. 6 mm			
2000						
Manifold rail						
	Individual sub-base <sup>1)</sup>			1 valve position	525214	MHA3-AS-3-1/8
	Pneumatic connection	thread C1/0		I valve position	525214	мпаз-аз-з-1/8
		: tilledu G1/6				
	Manifold block <sup>1)</sup>			2 valve positions	525221	MHA3-PR2-3-1/8
	Pneumatic connection	1, 11, 3, 33: thread G	1/4	4 valve positions	525222	MHA3-PR4-3-1/8
	Pneumatic connection		-/-	6 valve positions	525223	MHA3-PR6-3-1/8
		2. 111000 01/0			525223	
$\overline{\mathbf{v}}$				8 valve positions		MHA3-PR8-3-1/8
				10 valve positions	525225	MHA3-PR10-3-1/8
Cover plate						
	Vacant valve positions	must be sealed with a	cover plate		525226	MHAP3-BP-3
		must be sealed with a	cover plate.		525220	
0						
C						
Connecting cable (fo	or valves with 2-pin plug)		1			Datasheets → Internet: neb
Connecting cable (fo	2-pin socket,	PUR cable, degree of	-	Length 2.5 m	8047671	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1
Connecting cable (fo	2-pin socket, open cable end,	PUR cable, degree of protection IP65	Signal status indication with LED	Length 5 m	8047672	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1 NEBV-Z4WA2L-P-E-5-N-LE2-S1
Connecting cable (fo	2-pin socket,	protection IP65	LED	Length 5 m Length 10 m		NEBV-Z4WA2L-P-E-2.5-N-LE2-S1
Connecting cable (fo	2-pin socket, open cable end,	-	LED	Length 5 m	8047672	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1 NEBV-Z4WA2L-P-E-5-N-LE2-S1
Connecting cable (fo	2-pin socket, open cable end,	protection IP65	LED	Length 5 m Length 10 m	8047672 8047670	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1
Connecting cable (fo	2-pin socket, open cable end,	PVC cable, degree of protection IP40	LED Without signal status	Length 5 m Length 10 m Length 0.5 m	8047672 8047670 193690	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B
Connecting cable (fo	2-pin socket, open cable end,	protection IP65 PVC cable, degree of	LED Without signal status	Length 5 m Length 10 m Length 0.5 m	8047672 8047670 193690	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B
Connecting cable (fo	2-pin socket, open cable end, 2-wire	PVC cable, degree of protection IP40	LED Without signal status indication	Length 5 m Length 10 m Length 0.5 m Length 2.5 m	8047672 8047670 193690 193691	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B
Connecting cable (fo	2-pin socket, open cable end, 2-wire 2-pin socket, plug	PVC cable, degree of protection IP40 PUR cable, degree of	LED Without signal status indication Signal status indication with	Length 5 m Length 10 m Length 0.5 m Length 2.5 m Length 0.5 m	8047672 8047670 193690 193691 8047673	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B           NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
Connecting cable (fo	2-pin socket, open cable end, 2-wire 2-pin socket, plug	PVC cable, degree of protection IP40 PUR cable, degree of	LED Without signal status indication Signal status indication with	Length 5 m Length 10 m Length 0.5 m Length 2.5 m Length 0.5 m	8047672 8047670 193690 193691 8047673	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B           NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
Connecting cable (fo	2-pin socket, open cable end, 2-wire 2-pin socket, plug	PVC cable, degree of protection IP40 PUR cable, degree of	LED Without signal status indication Signal status indication with	Length 5 m Length 10 m Length 0.5 m Length 2.5 m Length 0.5 m	8047672 8047670 193690 193691 8047673	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B           NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
Connecting cable (fo	2-pin socket, open cable end, 2-wire 2-pin socket, plug	PVC cable, degree of protection IP40 PUR cable, degree of	LED Without signal status indication Signal status indication with	Length 5 m Length 10 m Length 0.5 m Length 2.5 m Length 0.5 m	8047672 8047670 193690 193691 8047673	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B           NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
CTA NO	2-pin socket, open cable end, 2-wire 2-pin socket, plug M8x1 3-pin	PVC cable, degree of protection IP40 PUR cable, degree of	LED Without signal status indication Signal status indication with	Length 5 m Length 10 m Length 0.5 m Length 2.5 m Length 0.5 m	8047672 8047670 193690 193691 8047673	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B           NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
C THE NOT	2-pin socket, open cable end, 2-wire 2-pin socket, plug M8x1 3-pin with 2-pin plug)	Protection IP65 PVC cable, degree of protection IP40 PUR cable, degree of protection IP65	LED Without signal status indication Signal status indication with LED	Length 5 m Length 10 m Length 0.5 m Length 2.5 m Length 0.5 m	8047672 8047670 193690 193691 8047673 8047674	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B           NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1           NEBV-Z4WA2L-P-E-2.5-N-M8G3-S1
Connecting cable (fo	2-pin socket, open cable end, 2-wire 2-pin socket, plug M8x1 3-pin	Protection IP65 PVC cable, degree of protection IP40 PUR cable, degree of protection IP65	LED Without signal status indication Signal status indication with LED Plug M8, 3-pin	Length 5 m Length 10 m Length 0.5 m Length 2.5 m Length 0.5 m	8047672 8047670 193690 193691 8047673 8047674 571686	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B           NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1           NEBV-Z4WA2L-P-E-2.5-N-M8G3-S1           VAVE-C8-1R8
	2-pin socket, open cable end, 2-wire 2-pin socket, plug M8x1 3-pin with 2-pin plug)	Protection IP65 PVC cable, degree of protection IP40 PUR cable, degree of protection IP65	LED Without signal status indication Signal status indication with LED	Length 5 m Length 10 m Length 0.5 m Length 2.5 m Length 0.5 m	8047672 8047670 193690 193691 8047673 8047674	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B           NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1           NEBV-Z4WA2L-P-E-2.5-N-M8G3-S1

1) Seal port 2 with a blanking plug. These ports have no function when using semi in-line valves.

Ordering data				Part no.	Туре
H-rail mounting				ruit no.	.,,,,,
	For manifold block		162556	CPV10/14-VI-BG-NRH-35	
H-rail					
	To EN 60715		2 m	35430	NRH-35-2000
Silencer					Datasheets → Internet: u
	Push-in sleeve with O.D. 6 mm	1 piece	165007	UC-QS-6H	
	With threaded connection	G1/8	1 piece	161419	UC-1/8
ON MARKEN STATE			50 pieces	534219	UC-1/8-50
		G1/4	1 piece	165004	UC-1/4
			20 pieces	534220	UC-1/4-20
Push-in fitting				40(00)	Datasheets $\rightarrow$ Internet: c
S)	Male thread G1/8 with external hex for tubing O.D.	6 mm	10 pieces	186096	QS-G1/8-6
		8 mm 8 mm 10 mm	100 pieces	132037	QS-G1/8-6-100
			10 pieces	186098	QS-G1/8-8
			50 pieces	132038	QS-G1/8-8-50
	Male thread G1/4 with external hex for tubing O.D.		10 pieces	186099	QS-G1/4-8
			50 pieces	132040	QS-G1/4-8-50
			10 pieces	186101	QS-G1/4-10
			50 pieces	132041	QS-G1/4-10-50
	Male thread G1/8 with external hex, push-in L-fitting rotatable through 360 <sup>9</sup> , for tubing O.D.	6 mm	10 pieces	186117	QSL-G1/8-6
			100 pieces	132049	QSL-G1/8-6-100
		8 mm	10 pieces	186119	QSL-G1/8-8
			50 pieces	132050	QSL-G1/8-8-50
	Male thread G1/4 with external hex, push-in L-fitting	8 mm	10 pieces	186120	QSL-G1/4-8
	rotatable through 360°, for tubing O.D.		50 pieces	132052	QSL-G1/4-8-50
		10 mm	10 pieces	186122	QSL-G1/4-10
			50 pieces	132053	QSL-G1/4-10-50
Diauking alway					
Blanking plug	Earthroad C1/9		10 pieces	25/9	D 1/9
A MA	For thread G1/8 For thread G1/4		10 pieces 10 pieces	3568 3569	B-1/8 B-1/4
( S) Jan		TO hieres	2202	D-1/4	
			I		
Inscription label					
	For solenoid valve		80 pieces in a frame	197259	MH-BZ-80X

### Peripherals overview - Sub-base valve

#### Connection with plug vanes – Connection with moulded-in cable

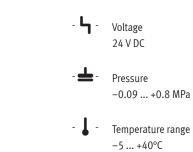


Desig	nation	Description	→ Page/Internet
[1]	Sub-base valve MHA3	With plug vanes	78
[2]	Sub-base valve MHA3K	With moulded-in cable, IP65	78
[3]	Connecting cable NEBV	PUR cable, signal status indication with LED, IP65	78
[4]	Plug socket with cable KMYZ-4	PVC cable, without signal status indication, IP50	78
[5]	Adapter VAVE-C8	For connecting the valves via connecting cable M8 3-pin or 4-pin, IP65	78
[6]	Inscription label MH-BZ-80X	For identifying the valves	79
[7]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	79
[8]	Silencer UC	For fitting in exhaust ports	79
[9]	Blanking plug B	For sealing unused ports	79
[10]	Cover plate MHAP3-BP-3	For sealing vacant positions	78
[11]	H-rail mounting CPV10/14-VI-BG-NRH-35	For mounting the manifold block on H-rails to EN 60715	79
[12]	Individual sub-base MHA3-AS-3-1/8	For sub-base valve	78
[13]	Manifold block MHA3-PR3-1/8	For sub-base valve	78

## Solenoid valves MHA3, fast-switching valves

# Datasheet – Sub-base valve







#### General technical data

Valve function		3/2 way, single solenoid <sup>1)</sup>
Design		Pressure relief poppet valve
Overlap		Negative overlap
Sealing principle		Soft
Reset method		Mechanical spring
Actuation type		Electrical
Type of control		Direct
Direction of flow		Reversible with restrictions <sup>2)</sup>
Exhaust function		Can be throttled
Manual override		Non-detenting
Mounting position		Any
Width	[mm]	14
Grid dimension	[mm]	19
Note on grid dimension		Minimum distance between the valves is 5 mm
Nominal width	[mm]	3
Standard nominal flow rate	[l/min]	200
Type of mounting		On PR rail, via through-hole
Pneumatic connection		Sub-base
Product weight	[g]	120

Can be used as a 2/2-way valve by sealing port 3 or 33
 Slight leakage can occur in the pressure range -0.8 bar to +0.5 bar.

#### Operating and environmental conditions

			With fast-switching electronics	Without fast-switching electronics				
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 +0.8					
		[bar]	-0.9 +1					
	Reversible	[MPa]	-0.09 +0.1					
		[bar]	-0.9 +1					
		[psi]	-13.05 +14.5					
Ambient temperature		[°C]	-5 +40					
Temperature of medium		[°C]	-5 +40					
Restricted ambient temperature and temperature	of medium		As a function of switching frequency	-				
Corrosion resistance class CRC <sup>1)</sup>			2	2				
CE marking (see declaration of conformity)	·		To EU EMC Directive <sup>2)</sup>	-				
KC mark			KC EMC	-				
Certification			c UL us - Recognized (OL)	c UL us - Recognized (OL)				
			RCM	-				
Shock resistance			Shock test with severity level 2 to FN 942	017-5 and EN 60068-2-27				
Vibration resistance			Transport application test with severity le	vel 2 to FN 942017-4 and				
			EN 60068-2-6					

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 EC declaration of conformity at: www.festo.com/catalogue/mh2 -> 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.

#### Electrical data

		With fast-switching electronics	Without fast-switching electronics
Electrical connection		2-pin plug or cable	
Operating voltage	[V DC]	24	
Permissible voltage fluctuations	[%]	±10	
Power consumption	[W]	6.5 for approx. 4.5 ms (high-current phase,	3.7
		inrush current 1 A)	
	[W]	1.6 (low-current phase)	-
Reverse polarity protection		Bipolar	-
Duty cycle	[%]	100	100
Additional functions		Spark arresting	-
		Holding current reduction	-
		Protective circuit	-
Degree of protection to EN 60529		IP65	IP65

#### Switching times and frequencies

			With fast-switching electronics	Without fast-switching electronics
Switching time	On	[ms]	2.3	8.3
	Off	[ms]	2.8	4.5
Tolerance for switching time	On	[%]	+1030	-
	Off	[%]	+1050	-
Switching time variation from 1 Hz		[ms]	0.2	-
upwards				
Maximum switching frequency		[Hz]	280	130

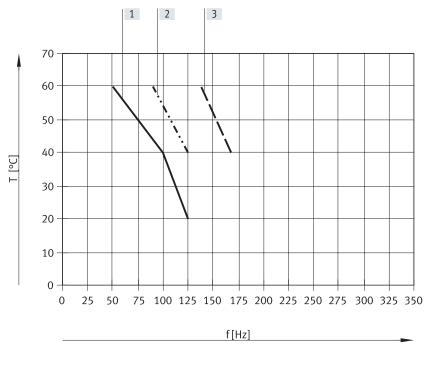
#### Materials

Housing	Coated die-cast zinc
Cable sheath	PUR
Seals	HNBR, NBR
Screws	Galvanised steel
Note on materials	Free of copper and PTFE
	RoHS-compliant
PWIS conformity	VDMA24364-B1/B2-L

1

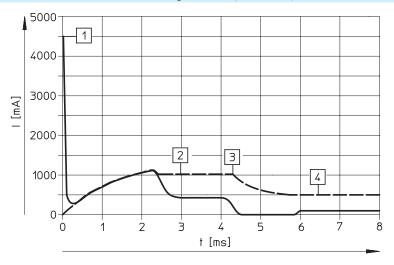
## Solenoid valves MHA3, fast-switching valves

# Datasheet – Sub-base valve



### Restricted ambient temperature and temperature of medium as a function of switching frequency

Current curve for valves with fast-switching electronics (MHA3-MS1H)



------ Internal current in the coil

External current in the supply line

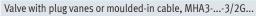
- [1] Manifold, 6 valves, unpressurised
- [2] Manifold, 6 valves, through-flow, 0.6 MPa

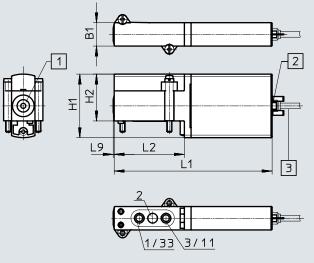
[3] Individual valve, unpressurised

No restrictions for individual valve, through-flow, 0.6 MPa.

- [1] Capacitor charging
- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A

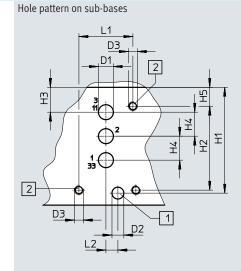
## Dimensions







[2] Plug vanes[3] Cable, 2.5 m



[1] Hole for coding pin, 2mm deep

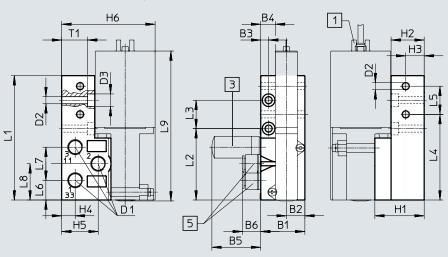
[2] Mounting thread, 8 mm deep

Download CAD data → <u>www.festo.com</u>

Туре	B1	D1	D2 Ø	D3 Ø	H1	H2	H3	H4	H5	L1	L2	L9
MHA33/2G	14	-	-	-	38	28	-	-	-	94.5	42	0.6
Hole pattern	-	5	4	M3	35.3	28	8.3	8	6.3	18	4	-

#### Dimensions

Individual sub-base, MHA3-AS-3-1/8



Download CAD data → <u>www.festo.com</u>

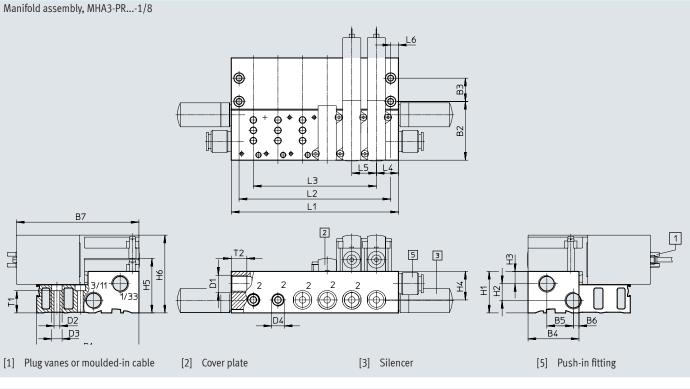
[1] Plug vanes

[3] Silencer[5] Push-in fitting

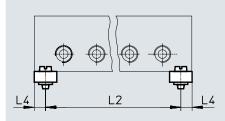
Туре	B1	B2	B3	Β4	B5	B6	D1	D2 Ø	D3 Ø	H1	H2	H3	H4	H5	H6
MHA3-AS-3-1/8	28	11.8	5	9.3	31.5	13.3	G1/8	4.5	8	31.3	21	11.7	8.6	23.2	59.3
Туре	L1		L2	L3		L4	L5		L6	L7		L8	L9		T1
MHA3-AS-3-1/8	78.9		45.3	18		54.3	17.9		12.5	21		23	95		16.4

### Dimensions

Download CAD data → <u>www.festo.com</u>

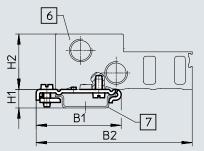


H-rail mounting CPV1 0/14-VI-BG-NRH-35



L3

L2



#### [6] Manifold block [7] DIN mounting rail

133

155

Туре	B1	B2	B3	B4	B5	B6	B7	D1	D2 Ø	D3 Ø	D4 Ø	H1	H2	H3	H4	H5	H6
MHA3-PR1/8 CPV1 0/14-VI-BG	79 49.1	45.3 90	18 -	39.3 -	20.5	4.3	94.3 -	G1/4 -	4.5 -	8 -	G1/8 -	32 10.7	13 32	9.5 -	22	42	60 -
Туре		L4				L5 L6 L						T1			T2		
MHA3-PR1/8 CPV1 0/14-VI-BG		17 6.5				19 6 				17.1			12				
Type Number of valve positions						4			6			8			10		
MHA3-PR1/8	L1 L2			53 41			91 79			129 117			167 155			205 193	

57

79

19

41

CPV1 0/14-VI-BG-...

95

117

171

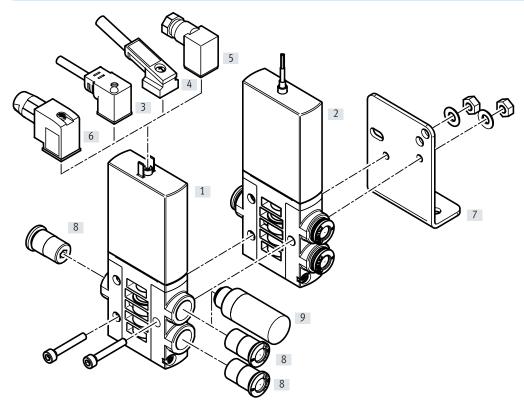
193

					-	1-
					Part no.	Туре
alves						
	Electrical connection: 2-pin plug	With fast-switching time 2.3 ms	electronics, switching	Normally closed	525135	MHA3-MS1H-3/2G-3
		Without fast-switch switching time 8.3	•	Normally closed	525134	MHA3-M1H-3/2G-3
	Electrical connection: cable	With fast-switching time 2.3 ms	electronics, switching	Normally closed	525137	MHA3-MS1H-3/2G-3-K
		Without fast-switch switching time 8.3		Normally closed	525136	MHA3-M1H-3/2G-3-K
anifold rail						
	Individual sub-base Pneumatic connection: thread G1	/8		1 valve position	525214	MHA3-AS-3-1/8
	Manifold block			2 valve positions	525221	MHA3-PR2-3-1/8
	Pneumatic connection 1, 11, 3, 3	3: thread G1/4		4 valve positions	525222	MHA3-PR4-3-1/8
	Pneumatic connection 2: thread G	1/8		6 valve positions	525223	MHA3-PR6-3-1/8
<b>e</b>				8 valve positions	525224	MHA3-PR8-3-1/8
				10 valve positions	525225	MHA3-PR10-3-1/8
1						
F						
onnecting cable (for	r valves with 2-pin plug)					Datasheets → Internet:
nnecting cable (for	r valves with 2-pin plug) 2-pin socket,	PUR cable,	Signal status	Length 2.5 m	8047671	Datasheets → Internet: I
nnecting cable (for	1 1 8	PUR cable, degree of	Signal status indication with LED	Length 2.5 m Length 5 m	8047671 8047672	
nnecting cable (for	2-pin socket,			-		NEBV-Z4WA2L-P-E-2.5-N-LE2-S1
nnecting cable (for	2-pin socket,	degree of		Length 5 m	8047672	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1 NEBV-Z4WA2L-P-E-5-N-LE2-S1
innecting cable (for	2-pin socket,	degree of protection IP65	indication with LED	Length 5 m Length 10 m	8047672 8047670	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1
onnecting cable (for	2-pin socket,	degree of protection IP65 PVC cable, degree	indication with LED Without signal	Length 5 m Length 10 m Length 0.5 m	8047672 8047670 193690	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B
onnecting cable (for	2-pin socket, open cable end 2-wire	degree of protection IP65 PVC cable, degree of protection IP40	indication with LED Without signal status indication	Length 5 m Length 10 m Length 0.5 m Length 2.5 m	8047672 8047670 193690 193691	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B
STAR AND STAR	2-pin socket, open cable end 2-wire 2-pin socket, plug M8x1 3-pin	degree of protection IP65 PVC cable, degree of protection IP40 PUR cable, degree of	indication with LED Without signal status indication Signal status	Length 5 m Length 10 m Length 0.5 m Length 2.5 m Length 0.5 m	8047672 8047670 193690 193691 8047673	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B           NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1
onnecting cable (for	2-pin socket, open cable end 2-wire 2-pin socket, plug M8x1 3-pin	degree of protection IP65 PVC cable, degree of protection IP40 PUR cable, degree of	indication with LED Without signal status indication Signal status	Length 5 m Length 10 m Length 0.5 m Length 2.5 m Length 0.5 m	8047672 8047670 193690 193691 8047673	NEBV-Z4WA2L-P-E-2.5-N-LE2-S1           NEBV-Z4WA2L-P-E-5-N-LE2-S1           NEBV-Z4WA2L-P-E-10-N-LE2-S1           KMYZ-4-24-0.5-B           KMYZ-4-24-2.5-B           NEBV-Z4WA2L-P-E-0.5-N-M8G3-S1

Ordering data				Part no.	Туре
H-rail mounting					
	For manifold block			162556	CPV10/14-VI-BG-NRH-35
H-rail					
	To EN 60715		2 m	35430	NRH-35-2000
Silencer					Datasheets → Internet: uc
Shencer	With threaded connection	G1/8	1 piece	161419	UC-1/8
		01/0	50 pieces	534219	UC-1/8-50
		G1/4	1 piece	165004	UC-1/4
		01,	20 pieces	534220	UC-1/4-20
Push-in fitting					Datasheets → Internet: qs
	Male thread G1/8 with external hex for tubing O.D.	6 mm	10 pieces	186096	QS-G1/8-6
			100 pieces	132037	QS-G1/8-6-100
		8 mm	10 pieces	186098	QS-G1/8-8
			50 pieces	132038	QS-G1/8-8-50
	Male thread G1/4 with external hex for tubing O.D.	8 mm	10 pieces	186099	QS-G1/4-8
	male thread 01/4 with external nex for tubing 0.D.		50 pieces	132040	QS-G1/4-8-50
		10 mm	10 pieces	186101	QS-G1/4-10
			50 pieces	132041	QS-G1/4-10-50
	Male thread G1/8 with external hex, push-in L-fitting	6 mm	10 pieces	186117	QSL-G1/8-6
	rotatable through 360° for tubing O.D.		100 pieces	132049	QSL-G1/8-6-100
		8 mm	10 pieces	186119	QSL-G1/8-8
			50 pieces	132050	QSL-G1/8-8-50
	Male thread G1/4 with external hex, push-in L-fitting	8 mm	10 pieces	186120	QSL-G1/4-8
	rotatable through 360°, for tubing O.D.		50 pieces	132052	QSL-G1/4-8-50
		10 mm	10 pieces	186122	QSL-G1/4-10
			50 pieces	132053	QSL-G1/4-10-50
Blanking plug					
	For thread G1/8		10 pieces	3568	B-1/8
	For thread G1/4		10 pieces	3569	B-1/4
			- I		
Inscription label					
	For solenoid valve		80 pieces in a frame	197259	MH-BZ-80X

# Peripherals overview - Individual valve

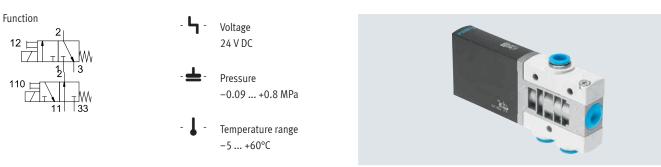
# Connection with plug vanes - Connection with moulded-in cable



Desig	nation	Description	→ Page/Internet
[1]	Individual valve MHE4	With plug vanes	84
[2]	Individual valve MHE4K	With moulded-in cable, IP65	84
[3]	Plug socket with cable KMEB-1 (IP65)	PVC cable, with or without LED	85
[4]	Plug socket with cable KMEB-2 (IP65)	With LED, without LED; PUR cable, with or without LED	85
[5]	Plug socket MSSD-EB (IP65)	With clamping screw	85
[6]	Plug socket MSSD-EB-S-M14 (IP65)	With insulation displacement connector	85
[7]	Mounting bracket MHE2-BG-L	For wall mounting	85
[8]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	85
[9]	Silencer UC	For fitting in exhaust ports	85

## Solenoid valves MHE4, fast-switching valves

## Datasheet - Individual valve



#### General technical data

General technical data		
Valve function		3/2 way, single solenoid <sup>1)</sup>
Design		Pressure relief poppet valve
Overlap		Negative overlap
Sealing principle		Soft
Reset method		Mechanical spring
Actuation type		Electrical
Type of control		Direct
Direction of flow		Reversible with restrictions <sup>2)</sup>
Exhaust function		Can be throttled
Manual override		Non-detenting
Mounting position		Any
Width	[mm]	18
Grid dimension	[mm]	24
Note on grid dimension		Minimum distance between the valves is 6 mm
Nominal width	[mm]	4
Standard nominal flow rate	[l/min]	400
Type of mounting		Via through-hole
Pneumatic connection		Connecting thread G1/4
		Push-in connector for tubing O.D. 8 mm
Product weight	[g]	270

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

2) Slight leakage can occur in the pressure range –0.8 bar to +0.5 bar.

#### Operating and environmental conditions

			With fast-switching electronics	Without fast-switching electronics
Operating medium			Compressed air to ISO 8573-1:2010 [	7:4:4]
Note on the operating/pilot medium			Lubricated operation possible (in which	ch case lubricated operation will always be required)
Operating pressure		[MPa]	-0.09 +0.8	
		[bar]	-0.9 +8	
	Reversible	[MPa]	-0.09 +0.1	
		[bar]	-0.9 +1	
		[psi]	-13.05 +14.5	
Ambient temperature		[°C]	-5 +60	
Temperature of medium		[°C]	-5 +60	
Corrosion resistance class CRC <sup>1)</sup>			2	
CE marking (see declaration of conformity)			To EU EMC Directive <sup>2)</sup>	-
KC mark			KC EMC	-
Certification			c UL us - Recognized (OL)	c UL us - Recognized (OL)
			RCM	-
Shock resistance			Shock test with severity level 2 to FN 9	942017-5 and EN 60068-2-27
Vibration resistance			Transport application test with severit	y level 2 to FN 942017-4 and
			EN 60068-2-6	

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 EC declaration of conformity at: 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 - Individual valve

#### Electrical data

		With fast-switching electronics	Without fast-switching electronics
Electrical connection		2-pin plug or cable	
Operating voltage	[V DC]	24	
Permissible voltage fluctuations	[%]	±10	
Power consumption	[W]	8.5 (high-current phase)	5.6
	[W]	2.125 (low-current phase)	-
Reverse polarity protection		Bipolar	-
Duty cycle	[%]	100	100
Additional functions		Spark arresting	-
		Holding current reduction	-
		Protective circuit	-
Degree of protection to EN 60529		IP65	IP65

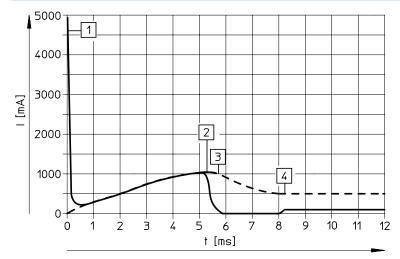
#### Switching times and frequencies

			With fast-switching electronics	Without fast-switching electronics
Switching time	On	[ms]	3.5	10.5
	Off	[ms]	3.5	5
Tolerance for switching time	On	[%]	+1030	-
	Off	[%]	+1040	-
Switching time variation from 1 Hz		[ms]	0.3	-
upwards				
Maximum switching frequency		[Hz]	210	120

#### Materials

Housing	Coated die-cast zinc
Cable sheath	PUR
Seals	HNBR, NBR
Screws	Galvanised steel
Note on materials	Free of copper and PTFE
	RoHS-compliant
PWIS conformity	VDMA24364-B1/B2-L

#### Current curve for valves with fast-switching electronics (MHE4-MS1H)



------ Internal current in the coil

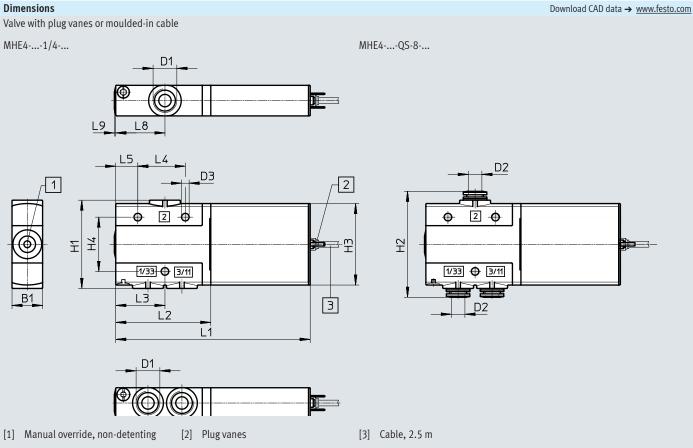
- External current in the supply line

- [1] Capacitor charging
- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A

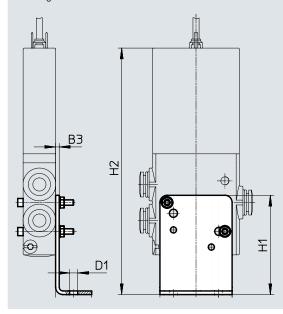
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# Datasheet - Individual valve

## Dimensions



Mounting bracket MHE2-BG-L



Туре	B1	B2	B3	D1	D2 Ø	D3 Ø	H1	H2	H3	H4	L1	L2	L3	L4	L5	L6	L7	L8	L9
MHE41/4	18	-	-	G1/4	-	4.5	56	-	48	32	114.6	56	29	28	13	20	19	29	0.8
MHE4QS-8	18	-	-	-	8	4.5	52	62.4	48	32	114.6	56	29	28	13	20	19	29	0.8
MHE2-BG-L	20	10	2	4.5	-	-	55	134	-	-	40	25	7.5	-	-	-	-	-	-

# Datasheet – Individual valve

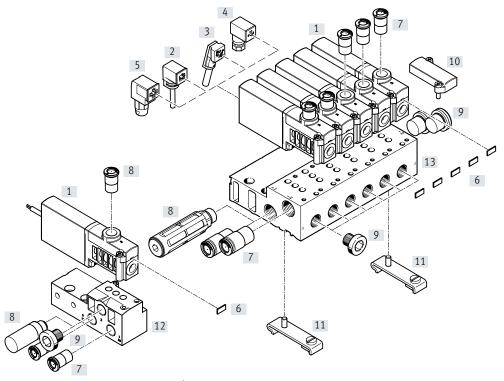
Ordering data						
					Part no.	Туре
Valves						
<i></i> ,	Electrical connec-	With fast-switching	Pneumatic connection: thread	Normally open	525207	MHE4-MS1H-3/20-1/4
	tion: 2-pin plug	electronics, switching	G1/4	Normally closed	525187	MHE4-MS1H-3/2G-1/4
0 0		time 3.5 ms	Pneumatic connection:	Normally open	525211	MHE4-MS1H-3/20-QS-8
₩×			push-in connector for tubing	Normally closed	525191	MHE4-MS1H-3/2G-QS-8
			0.D. 8 mm			
		Without fast-switching	Pneumatic connection: thread	Normally open	525206	MHE4-M1H-3/20-1/4
		electronics, switching	G1/4	Normally closed	525186	MHE4-M1H-3/2G-1/4
		time 10.5 ms	Pneumatic connection:	Normally open	525210	MHE4-M1H-3/20-QS-8
			push-in connector for tubing	Normally closed	525190	MHE4-M1H-3/2G-QS-8
			0.D. 8 mm			
$\sim$	Electrical connec-	With fast-switching	Pneumatic connection: thread	Normally closed	525189	MHE4-MS1H-3/2G-1/4-K
	tion: cable	electronics, switching	G1/4			
		time 3.5 ms	Pneumatic connection:	Normally open	525213	MHE4-MS1H-3/20-QS-8-K
			push-in connector for tubing	Normally closed	525193	MHE4-MS1H-3/2G-QS-8-K
			0.D. 8 mm			
		Without fast-switching	Pneumatic connection: thread	Normally open	525208	MHE4-M1H-3/20-1/4-K
		electronics, switching	G1/4	Normally closed	525188	MHE4-M1H-3/2G-1/4-K
		time 10.5 ms				

# Datasheet - Individual valve

Pigg socket with cable (for values with 2-pin plog)     PNC cable, degree of protection (Prot cable, degree of protection)     Length 2.5 m     151680     KMEE-1-24-2.5 LED       Signal data, indication with LDD     Frill cable, degree of protection (open cable of 3 wite Signal data, indication with LDD     PRC cable, degree of protection (Prot cable, degree of protection)     Length 2.5 m     151680     KMEE-1-24-2.5 LED       Signal data, indication with LDD     Frill cable, degree of protection (prot cable or d) avite Signal data, indication with LDD     PRC cable, degree of protection (Prot Signal data, indication with LDD)     Length 2.5 m     174645     KMEE-1-24-2.5 LED       Signal data, indication with LDD     Signal data, indication with LDD     Cable cheatm TF-10 (PL), degree of protection (Pos)     Length 0.5 m     177677     KMEE-2-24-M12-0.5-LED       Pigg socket for values with 2-pin plug)     Screer terminal Degree of protection (Pos)     3-pin     151687     MSSD-EB       Without signal data, indication     Screer terminal Degree of protection (Pos)     3-pin     151687     MSSD-EB       Well mounting     For mounting between plug socket (without signal status indication) and value     151717     MEB-10-12-240C       Well mounting bracket     Screered transion PE     8 mm     1 piece     156604     UC-1/4       Screered transion PE     Screered transion PE     9 mm     1 piece     156610     UC-1/4       Screered transion PE	Ordering data					Part no.	Туре
3-ps socker, open cable end 3 wire Signal status indication with LDD         PVC cable, degree of protection PPS         Lengh 3.5 m         9.51688         KMEE 3-24-5.4ED           4-pin socker, open cable end 3 wire Signal status indication with LDD         PVR cable, degree of protection PPS         Image 3.5 m         1.70484         KMEE 3-24-5.1ED           4-pin socker, open cable end 3 wire Signal status indication with LDD         Cable sheath DPC-U (PL), degree of protection PPS         Length 0.5 m         1.70484         KMEE 3-24-5.1ED           4-pin socker, open cable end 3 wire Signal status indication with LDD         Cable sheath DPC-U (PL), degree of protection PPS         Length 0.5 m         1.70487         KMEE 3-24-5.1ED           4-pin socker, open cable end 3 wire Signal status indication with LDD         Cable sheath DPC-U (PL), degree of protection PPS         Length 0.5 m         1.70487         KMEE 3-24-5.1ED           4-pin socker, without signal status indication         Screer teminini Degree of protection PPS         Spin         1.51687         MSSD-EB         MSSD-EB           4-pin         Degree of protection PPS         Ppin         1.51687         MSSD-EB         MSSD-EB           4-pin         Degree of protection PPS / Degree of	Plug socket with cable	e (for valves with 2-pin plug)					71
Spent calle and 3 wite Signal status indication with LED open calle and 3 wite Signal status indication with LED         P65 P10 cable, degree of protection P65         Length 10 m Length 2,5 m         174844         KMEB-3.24-5.1ED           Image: Comparison of the cable and 3 wite Signal status indication with LED         P10 cable, degree of protection P65         Length 3 m         174844         KMEB-3.24-5.1ED           Image: Comparison of the cable, degree of protection P65         Spin acket, plug M12 5.pin Signal status indication         Cable sheart TPE-U(P0), degree of protection P65         177877         KMEB-3.24-N12-0.5-LED           Image: Comparison of the cable, degree of protection P65         Spin 151687         MSSD-EB         151687           Image: Comparison of the cable, degree of protection P65         Spin 151687         MSSD-EB         151777           Image: Comparison of the cable, degree of protection P65         Spin 151687         MSSD-EB         151777           Image: Comparison of the cable, degree of protection P65         Spin 151687         MSSD-EB         151777           Image: Comparison of the cable, degree of protection P65         Spin 151687         MSSD-EB         151777           Image: Comparison of the cable, degree of protection P65         Spin 151687         MEB-12-24DC         151777           Image: Comparison of the cable, degree of protection P65         Spin 151665         MHE2.B6-L         151777			PVC cable, degree of	protection	Length 2.5 m	151688	KMEB-1-24-2.5-LED
Image: Signal status indication with LEDPIR cable, degree of protectionImage: Signal status indication with LEDPIR cable, degree of protectionImage: Signal status indication with LEDPIR cable, degree of protectionImage: Signal status indication with LEDPIR cable, degree of protectionImage: Signal status indication with LEDPIR cable, degree of protectionImage: Signal status indication with LEDPIR cable, degree of protectionImage: Signal status indication with LEDPIR cable, degree of protectionImage: Signal status indicationMIRE-3-24-M12-0.5-LEDImage: Signal status indication with LEDScree terminal Degree of protection IP653-3 pin177677MIRE-3-24-M12-0.5-LEDImage: Signal status indicationScree terminal Degree of protection IP673-9 pin192745MSSD-EB-M14Image: Signal status indicationScree terminal Degree of protection IP673-9 pin192745MSSD-EB-M14Image: Signal status indicationScree terminal Degree of protection IP673-9 pin192745MSSD-EB-M14Image: Signal status indicationScree terminal Degree of protection IP67192145MIEB-LD-12-24DCImage: Signal status indicationScree terminal Degree of protection IP67192145MIEB-LD-12-24DCImage: Signal status indicationScree terminal Degree of protection IP67192145MIEB-LD-12-24DCImage: Signal status indicationScree terminal PE192145MIEB-LD-12-24DCImage: Signal status indicationScree terminal PE192145MIEB-26-4.Image: Signal status indicationSc	· · ·						
<ul> <li></li></ul>	$ \Psi $	Signal status indication with LED					
Operation         Operation and Swite Signal status indication with LED         PP65         Length 5 m         174845         KKEB-2:24-5-LED           Signal status indication with LED         Cable sheath TPE-U (PU), degree of protection PP65         Length 0.5 m         177677         KKEB-2:24-5-LED           Plag socket (for values with 2-pin plag)         Screev terminal Degree of protection PP65         3 pin         151667         MSSD-EB           Plag socket (for values with 2-pin plag)         Screev terminal Degree of protection PP65         4 -pin         192745         MSSD-EB           Without signal status indication         Screev terminal Degree of protection P65         4 -pin         192745         MSSD-EB           Weithout signal status indication         Screev terminal Degree of protection P65         4 -pin         192745         MSSD-EB           Weithout signal status indication         Screeve of protection P65         Insultation displanement technology         192745         MSSD-EB           Wall mounting         Mounting bracket         Insultation displanement technology         192715         MEB-LD-12-24DC           Wall mounting         Mounting bracket         Screeved trunnion PE         196165         MHE2-86-4           Silencer         Screeved trunnion PE         Screeved trunnion PE         1 piece         175611         UC Q2-8H		4-pin socket,	PUR cable, degree o	f protection	~		
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PE         20 pieces         534220         UC-1/4-20           Datasheets -> Internet           Push-in fitting           Male thread with external hex         G1/4         8 mm         10 pieces         186099         QS-G1/4-8           Image: Solution of the external hex         G1/4         8 mm         10 pieces         132040         QS-G1/4-8-50           Image: Solution of the external hex         G1/4         8 mm         10 pieces         186101         QS-G1/4-10-50           Image: Solution of the external hex         G1/4         8 mm         10 pieces         186120         QSI-G1/4-8-50           Image: Solution of the external hex         G1/4         8 mm         10 pieces         132041         QS-G1/4-10-50           Image: Solution of the external hex         G1/4         8 mm         10 pieces         132052         QSI-G1/4-8-50           Image: Solution of the external hex         G1/4         8 mm         10 pieces         132053         QSI-G1/4-8-50           Image: Solution of the external hex         G1/4         8 mm         10 pieces         132053         QSI-G1/4-10-50           Image: Solution of the external hex         Image: Solution of the external hex         Image: Solution of the external hex         Image: Solution of the external hex <td></td> <td>Threaded connection, polymer design</td> <td></td> <td>G1/4</td> <td>1 niece</td> <td>165004</td> <td>UC-1/4</td>		Threaded connection, polymer design		G1/4	1 niece	165004	UC-1/4
Push-in fitting         Datasheets -> Internet           Image: Data in the internet inte		included connection, potymer design		01/4			
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For thread G1/4         10 pieces         3569         B-1/4           Inscription label         Image: Note that the second se	Blanking plug						
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For solenoid valve 80 pieces 197259 MH-BZ-80X	inscription label	The second secon					
		For solenoid valve			80 pieces	197259	MH-BZ-80X

# Peripherals overview - Semi in-line valve

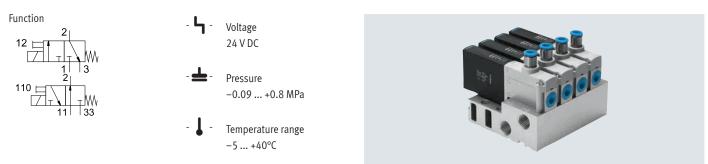
## Connection via plug vanes



Desig	nation	Description	→ Page/Internet
[1]	Semi in-line valve MHP4	With plug vanes	92
[2]	Plug socket MSSD-EB (IP65)	With clamping screw	93
[3]	Plug socket MSSD-EB-S-M14 (IP65)	With insulation displacement connector	93
[4]	Plug socket with cable KMEB-1 (IP65)	PVC cable, with or without LED	93
[5]	Plug socket with cable KMEB-2 (IP65)	PUR cable, with or without LED	93
[6]	Inscription label MH-BZ-80X	For identifying the valves	94
[7]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	94
[8]	Silencers UC	For fitting in exhaust ports	94
[9]	Blanking plug B	For sealing unused ports	94
[10]	Cover plate MHAP4-BP-3	For sealing vacant positions	92
[11]	H-rail mounting CPV10/14-VI-BG-NRH-35	For mounting the manifold block on H-rails to EN 60715	93
[12]	Individual sub-base MHA4-AS-3-1/4	For semi in-line valves; the individual sub-base is also used for sub-base valves; the extra connection must be sealed with a plug here	92
[13]	Manifold block MHA4-PR1/4	For semi in-line valves	92

## Solenoid valves MHP4, fast-switching valves

# Datasheet – Semi in-line valve



#### General technical data

Valve function			3/2 way, single solenoid <sup>1)</sup>
Design			Pressure relief poppet valve
Overlap			Negative overlap
Sealing principle			Soft
Reset method			Mechanical spring
Actuation type			Electrical
Type of control			Direct
Direction of flow			Reversible with restrictions <sup>2)</sup>
Exhaust function			Can be throttled
Manual override			Non-detenting
Mounting position			Any
Width		[mm]	18
Grid dimension		[mm]	24
Note on grid dimension			Minimum distance between the valves is 6 mm
Nominal width		[mm]	4
Standard nominal flow rate		[l/min]	400
Type of mounting			On PR rail
Pneumatic connection	2		Connecting thread G1/4, push-in connector for tubing O.D. 8 mm
	1, 11, 3, 33		Sub-base
Product weight		[g]	270

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

2) Slight leakage can occur in the pressure range -0.8 bar to +0.5 bar.

#### Operating and environmental conditions

			With fast-switching electronics	Without fast-switching electronics
Operating medium			Compressed air to ISO 8573-1:2010 [	7:4:4]
Note on the operating/pilot medium			Lubricated operation possible (in which	ch case lubricated operation will always be required)
Operating pressure		[MPa]	-0.09 +0.8	
		[bar]	-0.9 +8	
	Reversible	[MPa]	-0.09 +0.1	
		[bar]	-0.9 +1	
		[psi]	-13.05 +14.5	
Ambient temperature		[°C]	-5 +40	
Temperature of medium		[°C]	-5 +40	
Corrosion resistance class CRC <sup>1)</sup>			2	
CE marking (see declaration of conformity)			To EU EMC Directive <sup>2)</sup>	-
KC mark			KC EMC	-
Certification			c UL us - Recognized (OL)	c UL us - Recognized (OL)
			RCM	-
Shock resistance			Shock test with severity level 2 to FN 9	942017-5 and EN 60068-2-27
Vibration resistance			Transport application test with severit EN 60068-2-6	y level 2 to FN 942017-4 and

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 EC declaration of conformity at: www.festo.com/catalogue/mh2 → 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.

Electrical data			
		With fast-switching electronics	Without fast-switching electronics
Electrical connection		Plug, 2-pin	
Operating voltage	[V DC]	24	
Permissible voltage fluctuations	[%]	±10	
Power consumption	[W]	8.5 (high-current phase)	5.6
	[W]	2.125 (low-current phase)	-
Reverse polarity protection		Bipolar	-
Duty cycle	[%]	100	100
Additional functions		Spark arresting	-
		Holding current reduction	-
		Protective circuit	-
Degree of protection to EN 60529		IP65	IP65

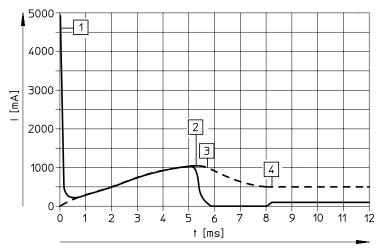
#### Switching times and frequencies

			With fast-switching electronics	Without fast-switching electronics
Switching time	On	[ms]	3.5	10.5
	Off	[ms]	3.5	5
Tolerance for switching time	On	[%]	+1030	-
	Off	[%]	+1040	-
Switching time variation from 1 Hz		[ms]	0.3	-
upwards				
Maximum switching frequency		[Hz]	210	120

Materials	
Housing	Coated die-cast zinc
Seals	HNBR, NBR
Screws	Galvanised steel
Note on materials	Free of copper and PTFE
	RoHS-compliant
PWIS conformity	VDMA24364-B1/B2-L

1

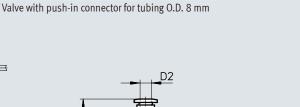
## Current curve for valves with fast-switching electronics (MHP4-MS1H)



Internal current in the coil
 External current in the supply line

#### Dimensions

Valve with connecting thread G1/4 D1 Ы nn i L3 Ψ. 1 2 HZ Ξ Ľ 1 L9\_ L2 З L1 ത Ð . \3/11 1/33



[1] Capacitor charging

[2]

[3]

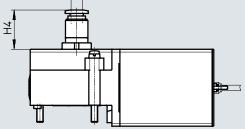
[4]

Controlled coil current 1 A

Holding current reduction

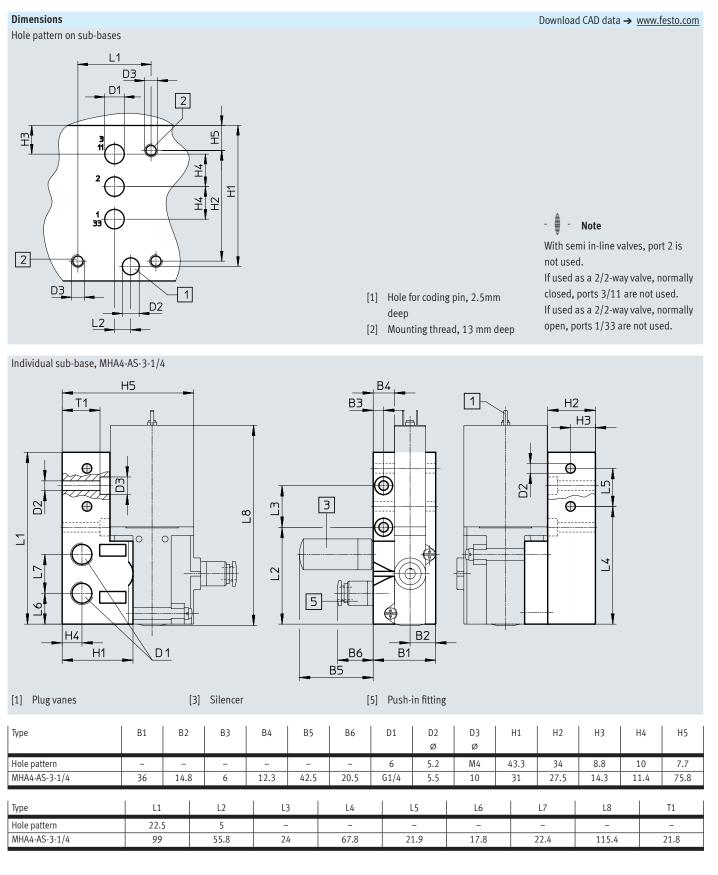
Controlled holding current 0.5 A

Download CAD data → <u>www.festo.com</u>



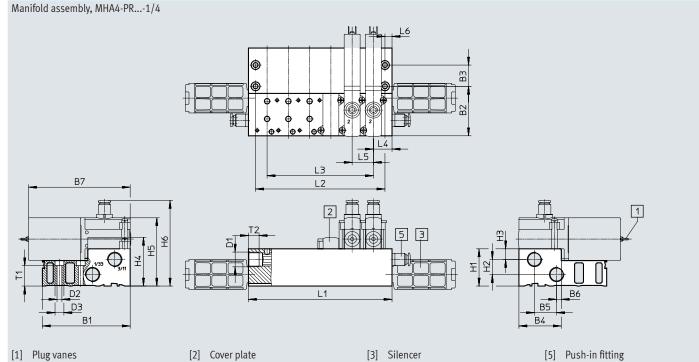
[1] Manual override, non-detenting [2] Plug vanes

Туре	B1	D1	D2 Ø	H1	H2	H3	H4	L1	L2	L3	L9
MHP43/2	18	G1/4	8	48	35	4	24.5	114.6	51	29	0.8

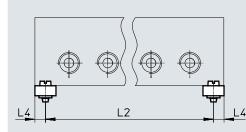


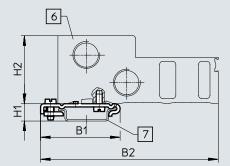
#### Dimensions

Download CAD data → <u>www.festo.com</u>



H-rail mounting CPV1 0/14-VI-BG-NRH-35







Туре	B1	B2	B3	B4	B5	B6	Β7	D1	D2 Ø	D3 Ø	H1	H2	H3	H4	H5	H6	L4	L5	L6	T1	T2
MHA4-PR1/4	99	55.8	24	47.8	25	5.3	114.6	G3/8	5.5	10	42	17	12	55	77	96.5	21	24	8	23	12
CPV1 0/14-VI-BG	49.1	110	-	-	-	-	-	-	-	-	10.7	42	-	-	-	-	6.5	-	-	-	-

Туре		Number of valve positions	lumber of valve positions									
		2	4	6	8	10						
MHA4-PR1/4	L1	66	114	162	210	258						
	L2	50	98	146	194	242						
	L3	24	72	120	168	216						
CPV1 0/14-VI-BG	L2	53	101	149	197	245						

## - 📲 - Note

Valve types 3/2G and 3/20 must not be mixed on one manifold block.

## Solenoid valves MHP4, fast-switching valves

# Datasheet – Semi in-line valve

-					Part no.	Туре
/alves						
	Electrical connec-	With fast-switching	Pneumatic connection: thread	Normally open	525199	MHP4-MS1H-3/20-1/4
J J	tion: 2-pin plug	electronics, switching	G1/4	Normally closed	525179	MHP4-MS1H-3/2G-1/4
R R		time 3.5 ms	Pneumatic connection: push-in connector for tubing O.D. 8 mm	Normally closed	525183	MHP4-MS1H-3/2G-QS-8
		Without fast-switching	Pneumatic connection: thread	Normally open	525198	MHP4-M1H-3/20-1/4
		electronics, switching time 10.5 ms	G1/4	Normally closed	525178	MHP4-M1H-3/2G-1/4
Manifold rail	Individual sub-bas Pneumatic connec			1 valve position	525227	MHA4-AS-3-1/4
	Manifold block <sup>1)</sup>			2 valve positions	525234	MHA4-PR2-3-1/4
		tion 1, 11, 3, 33: thread G	3/8	4 valve positions	525235	MHA4-PR4-3-1/4
	Pneumatic connec	tion 2: thread G1/4		6 valve positions	525236	MHA4-PR6-3-1/4
				8 valve positions	525237	MHA4-PR8-3-1/4
				10 valve positions	525238	MHA4-PR10-3-1/4
Cover plate						
	Vacant valve posit	Vacant valve positions must be sealed with a cover plate.				MHAP4-BP-3

1) Seal port 2 with a blanking plug. These ports have no function when using semi in-line valves.

- 🗍 - Note

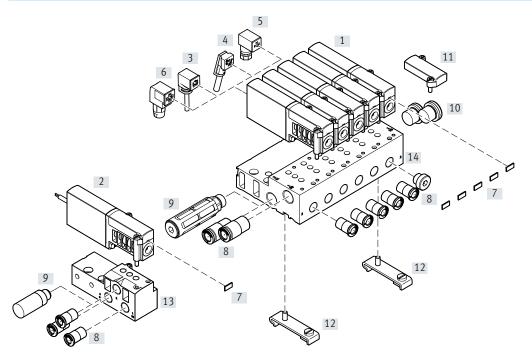
Valve types 3/2G and 3/2O must not be mixed on one manifold block.

Ordering data				Part no.	Туре
lug socket with ca				Turt no.	ijpe
	3-pin socket,	PVC cable, degree of protection	Length 2.5 m	151688	KMEB-1-24-2.5-LED
	open cable end 3-wire	IP65	Length 5 m	151689	KMEB-1-24-5-LED
Ŭ,	Signal status indication with LED		Length 10 m	193457	KMEB-1-24-10-LED
<i>ħ</i>	4-pin socket,	PUR cable, degree of protection	Length 2.5 m	174844	KMEB-2-24-2.5-LED
n Sull	open cable end 3-wire	IP65	Length 5 m	174845	KMEB-2-24-5-LED
	Signal status indication with LED		Length 9 m	1,1015	
	5-pin socket, plug M12 5-pin Signal status indication with LED	Cable sheath TPE-U (PU), degree of protection IP65	Length 0.5 m	177677	KMEB-2-24-M12-0.5-LED
lug socket	Angled socket	Screw terminal	3-pin	151687	MSSD-EB
T P	Without signal status indication	Degree of protection IP65			
		Insulation displacement	4-pin	192745	MSSD-EB-S-M14
		technology			
		Degree of protection IP67			
luminating seal					
	For mounting between plug socket (wi	thout signal status indication) and valve		151717	MEB-LD-12-24DC
				1,51,17	
-rail mounting					
	For manifold block			162556	CPV10/14-VI-BG-NRH-35
l roll					
-rail				25/26	
fer -	To EN 60715		2 m	35430	NRH-35-2000

					Part no.	Туре
ilencer						Datasheets → Interne
~	Push-in sleeve	Screwed trunnion	8 mm	1 piece	175611	UC-QS-8H
		PE	-			
	Threaded connection, polymer design	Screwed trunnion	G1/4	1 piece	165004	UC-1/4
		PE		20 pieces	534220	UC-1/4-20
		Housing	G3/8	1 piece	2309	U-3/8
		Polyacetal		20 pieces	534224	U-3/8-20
sh-in fitting						Datasheets → Interne
	Male thread with external hex	G1/4	8 mm	10 pieces	186099	QS-G1/4-8
				50 pieces	132040	QS-G1/4-8-50
			10 mm	10 pieces	186101	QS-G1/4-10
				50 pieces	132041	QS-G1/4-10-50
		G3/8	10 mm	10 pieces	186102	QS-G3/8-10
				50 pieces	132044	QS-G3/8-10-50
			12 mm	10 pieces	186103	QS-G3/8-12
				20 pieces	132045	QS-G3/8-12-20
	Push-in L-fitting, rotatable through 360°, male thread with external hex	G1/4	8 mm	10 pieces	186120	QSL-G1/4-8
				50 pieces	132052	QSL-G1/4-8-50
			10 mm	10 pieces	186122	QSL-G1/4-10
				50 pieces	132053	QSL-G1/4-10-50
		G3/8	10 mm	10 pieces	186123	QSL-G3/8-10
				20 pieces	132056	QSL-G3/8-10-20
			12 mm	10 pieces	186124	QSL-G3/8-12
				20 pieces	132057	QSL-G3/8-12-20
lanking plug						
<u></u>	For thread G1/4			10 pieces	3569	B-1/4
O Maria	For thread G3/8			10 pieces	3570	B-3/8
scription label						
	For solenoid valve			90 pieces	107050	
				80 pieces	197259	MH-BZ-80X

# Peripherals overview - Sub-base valve

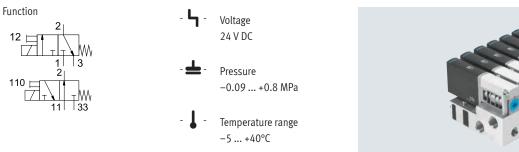
## Connection with plug vanes – Connection with moulded-in cable



Desig	nation	Description	→ Page/Internet
[1]	Sub-base valves MHA4	With plug vanes	101
[2]	Sub-base valves MHA4K	With moulded-in cable, IP65	101
[3]	Plug socket with cable KMEB-1 (IP65)	PVC cable, with or without LED	102
[4]	Plug socket with cable KMEB-2 (IP65)	PUR cable, with or without LED	102
[5]	Plug socket MSSD-EB (IP65)	With clamping screw	102
[6]	Plug socket MSSD-EB-S-M14 (IP65)	With insulation displacement connector	102
[7]	Inscription label MH-BZ-80X	For identifying the valves	103
[8]	Push-in fittings QS	For connecting compressed air tubing with standard O.D.	103
[9]	Silencer UC	For fitting in exhaust ports	103
[10]	Blanking plug B	For sealing unused ports	103
[11]	Cover plate MHAP4-BP-3	For sealing vacant positions	101
[12]	H-rail mounting CPV10/14-VI-BG-NRH-35	For mounting the manifold block on H-rails to EN 60715	102
[13]	Individual sub-base MHA4-AS-3-1/4	For sub-base valves	101
[14]	Manifold block MHA4-PR1/4	For sub-base valves	101

## Solenoid valves MHA4, fast-switching valves

## Datasheet - Sub-base valve





#### General technical data

Valve function			3/2 way, single solenoid <sup>1)</sup>
Design			Pressure relief poppet valve
Overlap			Negative overlap
Sealing principle			Soft
Reset method			Mechanical spring
Actuation type			Electrical
Type of control			Direct
Direction of flow			Reversible with restrictions <sup>2)</sup>
Exhaust function			Can be throttled
Manual override			Non-detenting
Mounting position			Any
Width		[mm]	18
Grid dimension		[mm]	24
Note on grid dimension			Minimum distance between the valves is 6 mm
Nominal width		[mm]	4
Standard nominal flow rate		[l/min]	400
Type of mounting			On PR rail
Pneumatic connection	1, 11, 2, 3, 33		Sub-base
Product weight		[g]	270

Can be used as a 2/2-way valve by sealing port 3 or 33
 Slight leakage can occur in the pressure range -0.8 bar to +0.5 bar.

# Datasheet – Sub-base valve

#### Operating and environmental conditions

			With fast-switching electronics	Without fast-switching electronics			
Operating medium			Compressed air to ISO 8573-1:2010 [	7:4:4]			
Note on the operating/pilot medium			Lubricated operation possible (in which	ch case lubricated operation will always be required)			
Operating pressure		[MPa]	-0.09 +0.8				
	[bar]		-0.9 +8				
	Reversible	[MPa]	-0.09 +1				
		[bar]	-0.9 +1				
		[psi]	-13.05 +14.5				
Ambient temperature		[°C]	-5 +40				
Temperature of medium		[°C]	-5 +40				
Corrosion resistance class CRC <sup>1)</sup>			2				
CE marking (see declaration of conformity)			To EU EMC Directive <sup>2)</sup>	-			
KC mark			KC EMC	-			
Certification			c UL us - Recognized (OL)	c UL us - Recognized (OL)			
			RCM	-			
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				

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 EC declaration of conformity at: www.festo.com/catalogue/mh2 -> 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.

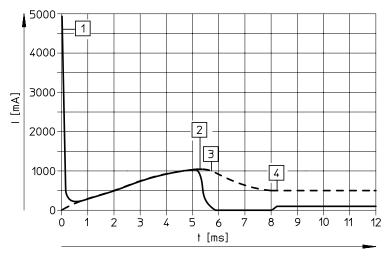
Electrical data			
		With fast-switching electronics	Without fast-switching electronics
Electrical connection		2-pin plug or cable	
Operating voltage	[V DC]	24	
Permissible voltage fluctuations	[%]	±10	
Power consumption	[W]	8.5 (high-current phase)	5.6
	[W]	2.125 (low-current phase)	-
Reverse polarity protection		Bipolar	-
Duty cycle	[%]	100	100
Additional functions		Spark arresting	-
		Holding current reduction	-
		Protective circuit	-
Degree of protection to EN 60529		IP65	IP65

#### Switching times and frequencies

			With fast-switching electronics	Without fast-switching electronics
Switching time	On	[ms]	3.5	10.5
	Off	[ms]	3.5	5
Tolerance for switching time	On	[%]	+1030	-
	Off	[%]	+1040	-
Switching time variation from 1 Hz		[ms]	0.3	-
upwards				
Maximum switching frequency		[Hz]	210	120

Materials	
Housing	Coated die-cast zinc
Cable sheath	PUR
Seals	HNBR, NBR
Screws	Galvanised steel
Note on materials	Free of copper and PTFE
	RoHS-compliant
PWIS conformity	VDMA24364-B1/B2-L

#### Current curve for valves with fast-switching electronics (MHA4-MS1H)

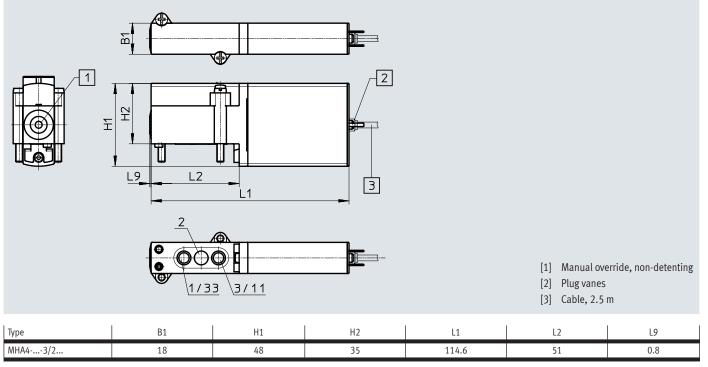


----- Internal current in the coil

- External current in the supply line

#### Dimensions

Valve with plug vanes or moulded-in cable, MHA4-...-3/2...



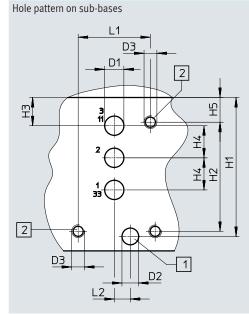
- [1] Capacitor charging
- [2] Controlled coil current 1 A
- [3] Holding current reduction
- [4] Controlled holding current 0.5 A

Download CAD data → <u>www.festo.com</u>

Download CAD data → <u>www.festo.com</u>

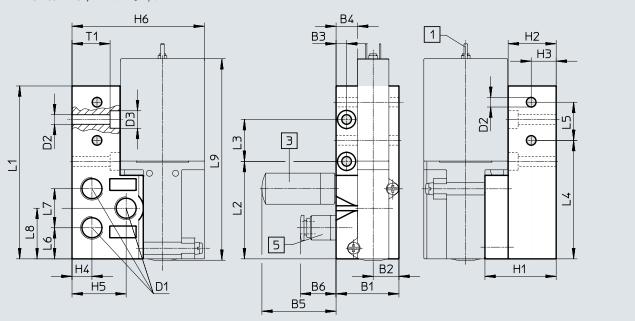
# Datasheet – Sub-base valve

#### Dimensions

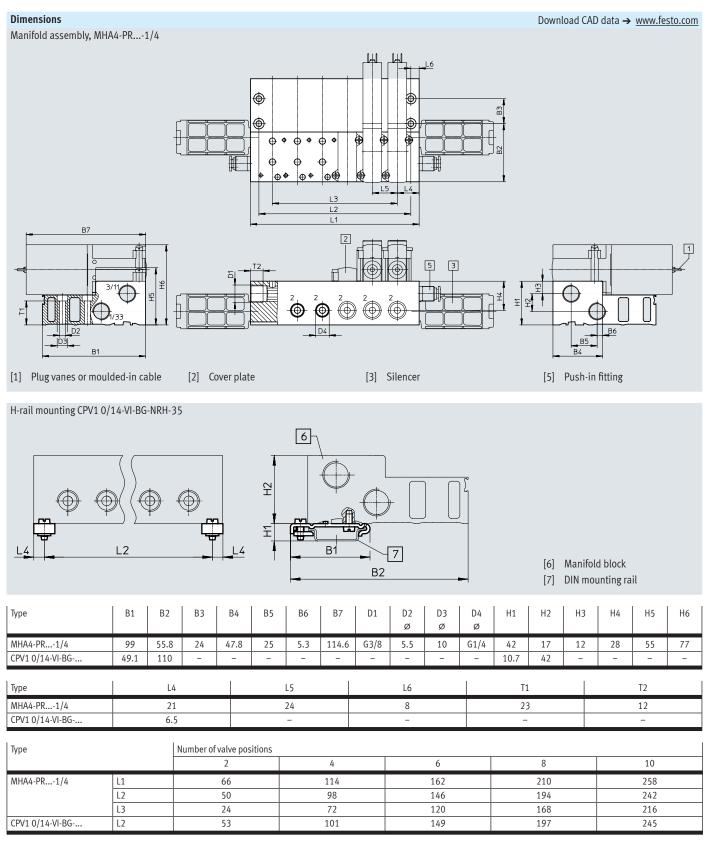


 Hole for coding pin, 2.5mm deep
 Mounting thread, 13 mm deep

Individual sub-base, MHA4-AS-3-1/4



[1] Plug vanes			[3] Si	lencer			[5]	Push-i	in fitting						
Туре	B1	B2	B3	B4	B5	B6	D1	D2 Ø	D3 Ø	H1	H2	H3	H4	H5	H6
Hole pattern MHA4-AS-3-1/4	- 36	- 14.8	- 6	- 12.3	- 42.5	20.5	6 G1/4	5.2 5.5	M4 10	43.3 40.8	34 27.5	8.8 14.3	10 11.4	7.7 31	- 75.8
Туре	L1		L2	L3		L4	L5		L6	L7		L8	L9		T1
Hole pattern	22.5		5	-		-	-		-	-		-	-		-
MHA4-AS-3-1/4	99		55.8	24		67.8	21.9		17.8	22.4		29	115.4	t I	21.8



## Solenoid valves MHA4, fast-switching valves

# Datasheet – Sub-base valve

Ordering data				Part no.	Туре
Valves					
	Electrical connection: 2-pin plug	With fast-switching electronics, switching time 3.5 ms	Normally closed	525175	MHA4-MS1H-3/2G-4
		Without fast-switching electronics, switching time 10.5 ms	Normally closed	525174	MHA4-M1H-3/2G-4
	Electrical connection: cable	With fast-switching electronics, switching time 3.5 ms	Normally closed	525177	MHA4-MS1H-3/2G-4-K
		Without fast-switching electronics,	Normally open	525196	MHA4-M1H-3/20-4-K
<b>U</b>		switching time 10.5 ms	Normally closed	525176	MHA4-M1H-3/2G-4-K
	Pneumatic connection: thread	G1/4			
	Pheumatic connection: thread	61/4			
	Manifold block	22 thread $C2/9$	2 valve positions	525234	MHA4-PR2-3-1/4
	Pneumatic connection 1, 11, 3 Pneumatic connection 2: threa		4 valve positions	525235	MHA4-PR4-3-1/4
		d 01/4	6 valve positions 8 valve positions	525236 525237	MHA4-PR6-3-1/4 MHA4-PR8-3-1/4
$\checkmark$			10 valve positions		MHA4-PR10-3-1/4
				525250	MILA-1 K10-2-1/4
Cover plate					
	Vacant valve positions must be sealed with a cover plate.			525239	MHAP4-BP-3

## - 🗍 - Note

Valve types 3/2G and 3/20 must not be mixed on one manifold block.

				Part no.	Туре
Plug socket with ca	ble (for valves with plug vanes)				
	3-pin socket,	PVC cable, degree of protection	Length 2.5 m	151688	KMEB-1-24-2.5-LED
	open cable end 3-wire	IP65	Length 5 m	151689	KMEB-1-24-5-LED
$\forall$	Signal status indication with LED		Length 10 m	193457	KMEB-1-24-10-LED
Ĵ.	4-pin socket,	PUR cable, degree of protection	Length 2.5 m	174844	KMEB-2-24-2.5-LED
	open cable end 3-wire Signal status indication with LED	IP65	Length 5 m	174845	KMEB-2-24-5-LED
	5-pin socket, plug M12 5-pin Signal status indication with LED	Cable sheath TPE-U (PU), degree of protection IP65	Length 0.5 m	177677	KMEB-2-24-M12-0.5-LED
Plug socket (for val	ves with plug vanes)				
	Angled socket	Screw terminal	3-pin	151687	MSSD-EB
$\gamma$	Without signal status indication	Degree of protection IP65			
$\checkmark$		Insulation displacement	4-pin	192745	MSSD-EB-S-M14
		technology			
		Degree of protection IP67			
Illuminating seal					
	For mounting between plug socket (wi	thout signal status indication) and valve		151717	MEB-LD-12-24DC
	To mounting between plug socket (wi		151717	MLD-LD-12-240C	
H-rail mounting					
	For manifold block		162556	CPV10/14-VI-BG-NRH-35	
H-rail					
[]]]	To EN 60715		2 m	35430	NRH-35-2000

# Solenoid valves MHA4, fast-switching valves

# Datasheet – Sub-base valve

					Part no.	Туре
ilencer						Datasheets → Interne
	Push-in sleeve	Screwed trunnion PE	8 mm	1 piece	175611	UC-QS-8H
	Threaded connection, polymer design	Screwed trunnion	G1/4 G3/8	1 piece	165004	UC-1/4
		PE		20 pieces	534220	UC-1/4-20
		Housing		1 piece	2309	U-3/8
		POM		20 pieces	534224	U-3/8-20
ush-in fitting						Datasheets → Interne
s D	Male thread with external hex	G1/4	8 mm	10 pieces	186099	QS-G1/4-8
				50 pieces	132040	QS-G1/4-8-50
			10 mm	10 pieces	186101	QS-G1/4-10
				50 pieces	132041	QS-G1/4-10-50
		G3/8	10 mm	10 pieces	186102	QS-G3/8-10
				50 pieces	132044	QS-G3/8-10-50
			12 mm	10 pieces	186103	QS-G3/8-12
				20 pieces	132045	QS-G3/8-12-20
	Push-in L-fitting, rotatable through 360°,	G1/4	8 mm	10 pieces	186120	QSL-G1/4-8
	male thread with external hex			50 pieces	132052	QSL-G1/4-8-50
			10 mm	10 pieces	186122	QSL-G1/4-10
				50 pieces	132053	QSL-G1/4-10-50
		G3/8	10 mm	10 pieces	186123	QSL-G3/8-10
				20 pieces	132056	QSL-G3/8-10-20
			12 mm	10 pieces	186124	QSL-G3/8-12
				20 pieces	132057	QSL-G3/8-12-20
Blanking plug				40	2540	
(O)	For thread G1/4		10 pieces	3569	B-1/4	
	For thread G3/8		10 pieces	3570	B-3/8	
	1			1		
nscription label						
	For solenoid valve			80 pieces	197259	MH-BZ-80X

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