Micro valve
MV 15 - 30

Assembly and operating manual

Imprint

Technical changes:
We reserve the right to make alterations for the purpose of technical improvement.

Document number: GAS 380381

Edition: 01.03 |06/05/2015|en

Dear customer,

congratulations on choosing a SCHUNK product. By choosing SCHUNK, you have opted for the highest precision, top quality and best service.

You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.

SCHUNK products are inspiring.

Our detailed assembly and operation manual will support you.

Do you have further questions? You may contact us at any time – even after purchase.

Kindest Regards

Yours SCHUNK GmbH & Co. KG
Spann- und Greiftechnik

Bahnhofstr. 106 – 134
D-74348 Lauffen/Neckar

Tel. +49-7133-103-0
Fax +49-7133-103-2399

info@de.schunk.com
www.schunk.com

Reg. No. 003496 QM08

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1 About this manual

This instruction is an integral part of the product and contains important information for a safe and proper assembly, commissioning, operation, maintenance and help for easier trouble shooting.

Before using the product, read and note the instructions, especially the chapter "Basic safety notes".

1.1 Warnings

To make risks clear, the following signal words and symbols are used for safety notes.

⚠ DANGER

Danger for persons.
Non-compliance will inevitably cause irreversible injury or death.

⚠ WARNING

Dangers for persons.
Ignoring a safety note like this can lead to irreversible injury and even death.

⚠ CAUTION

Dangers for persons.
Non-observance can cause minor injuries.

NOTICE

Material damage
Information about avoiding material damage.

1.2 Applicable documents

- General terms of business
- Catalog data sheet of the purchased product

The documents listed here, can be downloaded on our homepage **www.schunk.com**

2 Basic safety notes

2.1 Intended use

The product is designed exclusively to control compressed air.

The product is intended for installation in a machine/system. The requirements of the applicable guidelines must be observed and complied with.

The product may be used only in the context of its defined application parameters (☞ 5, Page 9).

The product is not a safety component in accordance with the EC Machine Directive 2006/42/EC and must not be used in safety-relevant parts of machine control units.

2.2 Ambient conditions and operating conditions

- Make sure that the product has a sufficient size for the application.
- Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust. Exceptions are products that are designed especially for contaminated environments.

2.3 Product safety

Dangers arise from the product, if:

- the product is not used in accordance with its intended purpose.
- the product is not installed or maintained properly.
- the safety and installation notes are not observed.

Avoid any manner of working that may interfere with the function and operational safety of the product.

Wear protective equipment.

NOTE
More information are contained in the relevant chapters.

2.3.1 Protective equipment

Provide protective equipment per EC Machinery Directive.

2.3.2 Constructional changes, attachments, or modifications

Additional drill holes, threads, or attachments that are not offered as accessories by SCHUNK may be attached only with permission of SCHUNK.

2.4 Personnel qualification

The assembly, initial commissioning, maintenance, and repair of the product may be performed only by trained specialist personnel. Every person called upon by the operator to work on the product must have read and understood the complete assembly and operating manual, especially the chapter "Basic safety notes" (☞ 2, Page 5). This applies particularly to personnel only used occasionally, such as maintenance personnel.

2.5 The use of personal protective equipment

When installing or removing the product, observe the relevant health and safety at work rules and use the required personal protective equipment (protective gloves, safety boots and safety goggles).

2.6 Notes on particular risks

The general rule is:

- Remove the energy supplies before installation, modification, maintenance, or adjustment work.
- Ensure that no residual energy remains in the system.
- Do not move parts by hand when the energy supply is connected.
- Do not reach into the open mechanism or the movement area of the unit.
- Perform maintenance, modifications, and additions outside the danger zone.
- For all work, secure the product against accidental operation.
- Take particular care during maintenance and disassembly.
- Only qualified personnel may disassemble the product.

⚠ WARNING

Danger of damage to hearing and uncontrolled hose movement due to escaping compressed air!
If compressed air hoses are pulled off "under pressure", compressed air will escape under high pressure.

- Depressurize and vent elements carrying compressed air before removal.

⚠ WARNING

Warning: Risk of injury when the machine/system moves unexpectedly!
Remove the energy supplies before starting with assembly and adjustments.
Make sure that no residual energy remains in the system.

3 Warranty

If the product is used as intended, the warranty is valid for 24 months from the date of delivery from the production facility under the following conditions:

- Observe the applicable documents (☞ 1.2, Page 4)
- Observance of the ambient conditions and operating conditions (☞ 2.2, Page 5)

Parts touching the work piece and wearing parts are not part of the warranty.

4 Scope of delivery

The scope of delivery includes

- Micro Valve MV in the ordered model.

5 Technical data

Size	MV 15	MV 25	MV 30
Mechanical operating data			
Weight [kg]	0.038	0.045	0.122
Connection pneumatic hose internal [mm]	4	4	6
Operating temperature [°C] [1] Micro valve min. Valve cartridge max. (surface temperature) Screw cap max. (surface temperature) Fixed cover max. (surface temperature)	 -15 +80 +50 +80		
Sealing material	Viton - incompatible with hot water, steam, amines, organic acids and polar solvents		
Protection class IP Variants with fixed cover or screw cap without air duct Variants with screw cap and air duct	 40 65		
Electrical operating data			
Operating voltage	see data sheet / catalog		
Electrical connection	M8 plug, cable extension with open wire strand		
Outer diameter connection cable [mm]	3.1 ±0.15		
Power consumption [W]	see data sheet / catalog		
Operating data for compressed air connection			
Pressure medium	Filtered compressed air, dry or lubricated, compressed air purity classes acc. to ISO 8573-1:2010 [7:4:4]		
Function	3/2 or 2/2 directional control valve		
Pressure range	V, LP, P, see data sheet / catalog		
Nominal diameter [mm]	1.5	2.5	3.0
Nominal flow rate according to ISO 6358 [Nl/min]	45	135	175

[1] The operating temperature is the minimum ambient temperature of the micro valve and the maximum surface temperature of the corresponding component.
The maximum permissible ambient temperature depends on the installation situation and the duty cycle of the micro valve.
More technical data are included in the catalog data sheet. Whichever is the latest version.

6 Assembly and installation

6.1 Mechanical connection

NOTICE

Damage to the connection cable is possible!
The connection cable could be damaged by twisting when a valve cartridge with a fixed cover is mounted.

- The connection cable must be able to move freely when a valve cartridge with a fixed cover is screwed in.

Swivel fitting tightening torque

Connection with screws	max. tightening torque [Nm]
M3	0.7
M5	1.5
G1/8"	10.0
G1/4"	15.0

Comply with the following procedure when mounting the micro valve:

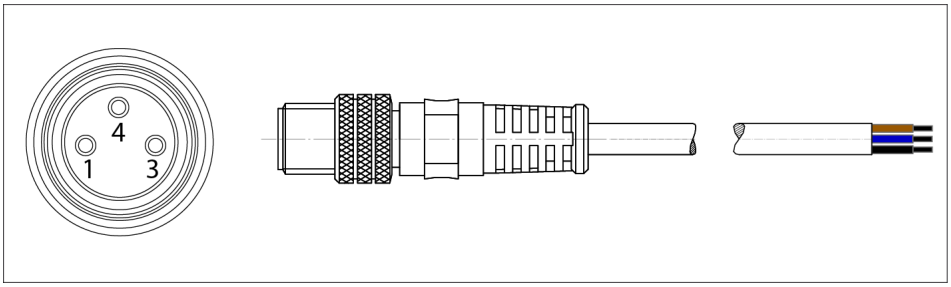
- If the micro valve is supplied as a complete component, dismantle the micro valve into its individual components and then install the individual components:
  - Dismantling the micro valve into its individual components, (☞ 6.3, Page 12).
  - Installing the individual components, (☞ 6.4, Page 12).
- If the micro valve is supplied in individual components, install the individual components, (☞ 6.4, Page 12).

6.2 Electrical connection

	***NOTICE*** **Damage to the cable is possible.** The bending radius of the cable is not allowed to be less than the minimum amount: • **Static:** 10 times the cable diameter. • **Dynamic:** 15 times the cable diameter, suitable for cable tracks.

NOTE

Route and secure the connection cable so there are no tensile and twisting forces on the valve cover. Tensile and twisting forces can cause the screw cap to come loose and lead to contact problems.



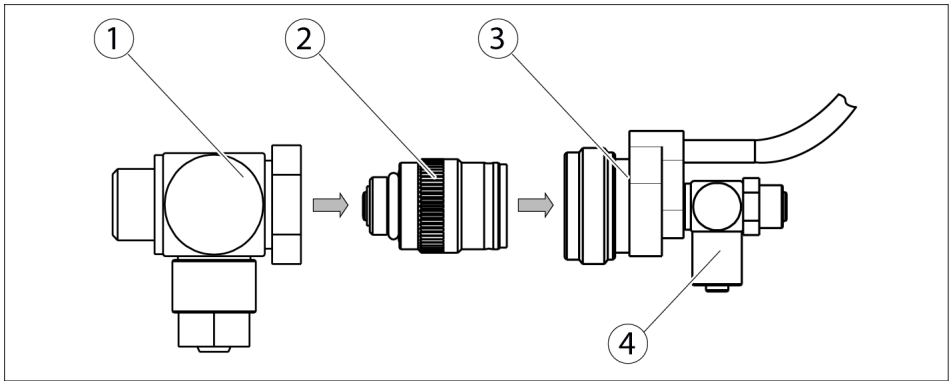
PIN allocation M8 plug and cable color table extension

PIN	Cable color	Assignment
1	Brown	n.c.
3	Blue	GND
4	Black	Control voltage, +24 VDC

Screw cap with LED:

If the connection cable of the micro valve has been connected correctly to the electrical power supply, the LED in the screw cap will light up when the 24 VDC voltage is applied.

6.3 Dismantling micro valve



Dismantling micro valve

1 Undo the knurled screw on the valve cover (3).

NOTE

In valves with fixed covers, the valve cover with connection cable cannot be removed.

2 Remove the valve cover (3) with connection cable and accessory (4).

3 Unscrew the valve cartridge (2) from the swivel fitting (1).

6.4 Installing and connecting the micro valve

⚠ WARNING

Risk of injury when working on the micro valve!

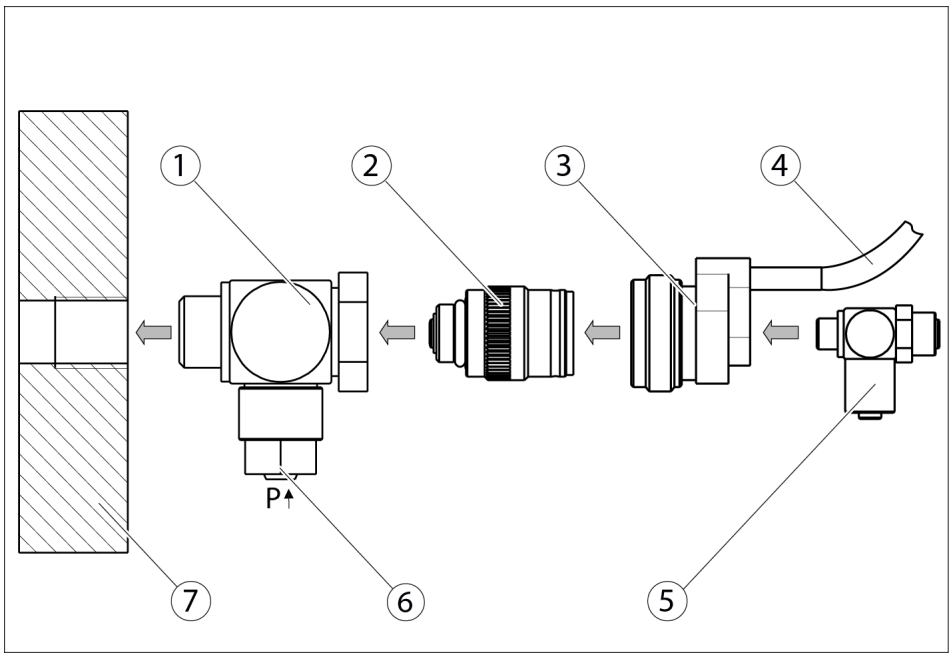
- Switch off the energy supply.
- Switch off the compressed air supply.

NOTICE

Damage to valve cartridges, valve cover and accessories!

Valve cartridge, valve cover and accessories can be damaged by using tools.

- Only install or remove the valve cartridge, valve cover and accessories by hand.



Micro valve

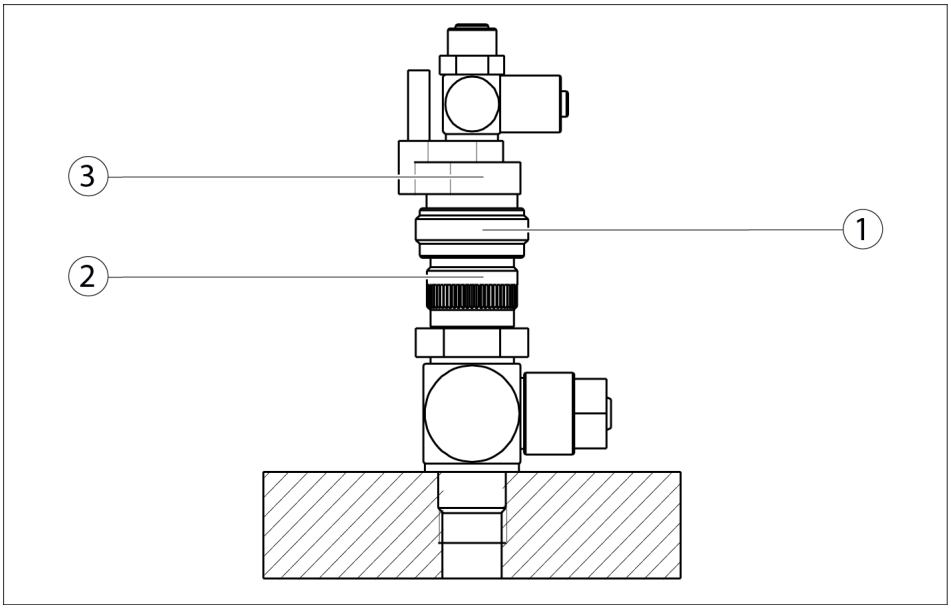
NOTE

Always install the micro valves in the following sequence, for example to avoid unscrewing the screw cap from the valve cartridge if an accessory is fitted subsequently.

1. Screw the hollow screw of the swivel fitting (1) **lightly** into the pneumatic unit (7), **without tightening**.
2. Turn the swivel fitting (1) to the desired position and hold it firmly.
3. Tighten the hollow screw of the swivel fitting (1) in this position
   Maximum torque, see *Swivel fitting tightening torque* table.
4. Screw the valve cartridge (2) into the swivel fitting (1) as far as possible
   Maximum torque 3 Nm.
5. Screw the accessory (5) into the valve cover (3)
   Maximum torque 3 Nm.
6. Put the valve cover (3) on the cartridge (2) with the connection cable (4) in the required position.
7. Push the valve cover (5) onto the cartridge (2) and screw tight with the knurled nut onto the cartridge (2)
   Maximum torque 3 Nm.
8. Connect the pneumatic hose to the pneumatic connection (6) of the swivel fitting (1).
9. Connect the micro valve to the electrical power supply, (☞ 6.2, Page 11).

6.5 Realigning the connection cable

	NOTICE
	Risk of damage to the contacts! The contacts can be damaged if the valve cover is screwed on firmly and the alignment of the connection cable changed. • Define the position of the connection cable when the valve cover is put on.



Valve cover

Carry out the following steps if the position of the connection cable should be changed:

1 Unscrew the knurled nut (1) of the valve cover (3) from the valve cartridge (2).

2 Remove the valve cover (3) from the valve cartridge (2).

3 Put on the valve cover (3) again with the connection cable in the required alignment and hold it in position.

4 Tighten the valve cover (3) on the valve cartridge (2) with the knurled nut (1).

6.6 Start-up

⚠ WARNING

Risk of injury due to objects falling or being ejected from the machine/automated system!

- Check whether all micro valves are tight prior to the start-up or restart.

Micro valves with the LP / P pressure range need a minimum supply pressure in order to work. These micro valves are only able to switch with this pressure support.

1 Supply pressure in the pressure range of the micro valve, see catalog data sheet.

2 Apply the operating voltage.

⇨ The LED on a screw cap lights up.

3 Check whether the micro valve opens.

⇨ The supply pressure is put through to the valve outlet.

4 Switch off the operating voltage.

⇨ The LED on a screw cap goes out.

5 Check whether the micro valve closes.

⇨ The valve outlet is separated from the supply pressure and, in the case of 3/2 control valves, is ventilated via the vent connection in the valve cover.

7 Troubleshooting

7.1 Valve does not open when switched on

Possible cause	Solution(s)
Compressed air supply is too low, micro valve only opens with pressure support depending on the design	Increase the supply pressure to the minimum operating pressure, (☞ 5, Page 9).
Micro valve not screwed in as far as possible	Check the thread of the swivel fitting, (☞ 6.4, Page 12). Screw in the valve cartridge completely.
Incorrect polarity (only possible with micro valve with a valve cover and recovery diode)	Make the correct connection assignment, (☞ 6.2, Page 11).
Supply voltage too low	Check the supply voltage, see catalog data sheet.

7.2 Valve is "not tight" when switched off

Possible cause	Solution(s)
Connection with screws or valve cartridge not tightened correctly	Tighten connections with screws of the individual components, (☞ 6.4, Page 12).
Foreign object on the sealing face or sealing contour	Clean the sealing face and sealing contour, (☞ 8, Page 17). Observe the incompatibility of the sealing material, (☞ 5, Page 9).
Supply pressure too high	Reduce the supply pressure to the maximum operating pressure, (☞ 5, Page 9).

8 Maintenance and care

NOTE

Contact SCHUNK service if changes take place on the micro valve that impair safety.

Micro valves are maintenance-free.

If the requirement on the compressed air are not complied with, clean the micro valve at the following points:

- The piston sealing face P and the sealing contour in the swivel fitting can be cleaned with a soft cloth. Do not use solvents.
- In the 3/2-way valve variant, blow out the piston sealing face R and the sealing contour in the valve cartridge with compressed air via opening R.

Notes

Notes