Assembly and operating manual

VB

Valve block

Superior Clamping and Gripping

SCHUNK

Imprint

Technical changes:

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

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Dear Customer,

thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

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1 General

1.1 About this manual

This manual contains important information for a safe and appropriate use of the product.

This manual is an integral part of the product and must be kept accessible for the personnel at all times.

Before starting work, the personnel must have read and understood this operating manual. Prerequisite for safe working is the observance of all safety instructions in this manual.

Illustrations in this manual are provided for basic understanding and may differ from the actual product design.

In addition to these instructions, the documents listed under Applicable documents [▶ 5] are applicable.

1.1.1 Presentation of Warning Labels

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

⚠ DANGER

Danger for persons!

Non-observance will inevitably cause irreversible injury or death.

⚠ WARNING

Dangers for persons!

Non-observance can lead to irreversible injury and even death.

⚠ CAUTION

Dangers for persons!

Non-observance can cause minor injuries.

CAUTION

Material damage!

Information about avoiding material damage.

1.1.2 Applicable documents

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

The documents marked with an asterisk (*) can be downloaded on our homepage **schunk.com**

1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the ex-works delivery date under the following conditions:

- Observe the specified maintenance and lubrication intervals
- Observe the ambient conditions and operating conditions

Parts touching the workpiece and wear parts are not included in the warranty.

1.3 Scope of delivery

The scope of delivery includes

- Valve block VB in the version ordered
- Assembly and Operating Manual

1.4 Accessories

A VB25 accessory kit is required for each valve block.

Content of the accessory pack:

- Connection cable
- O-ring (14x1.5)
- G1/8 locking screw

A wide range of accessories are available for this product

For information regarding which accessory articles can be used with the corresponding product variants, see catalog data sheet.

2 Basic safety notes

2.1 Intended use

The product may exclusively be used for controlling compressed air.

- The product is intended for installation in a machine/system. The applicable guidelines must be observed and complied with.
- The product may only be used within the scope of its technical data, Technical data [▶ 8].

Any other use or use exceeding that specified is regarded as inappropriate use. The manufacturer assumes no liability for any resulting damage.

2.2 Inappropriate use

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.

2.3 Environmental and operating conditions

Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span.

- Make sure that the product is used only in the context of its defined application parameters, Technical data [▶ 8].
- 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.

2.4 Constructional changes

Implementation of structural changes

By conversions, changes, and reworking, e.g. additional threads, holes, or safety devices can impair the functioning or safety of the product or damage it.

- Structural changes should only be made with the written approval of SCHUNK.

2.5 Personnel qualification

Inadequate qualifications of the personnel

If the personnel working with the product is not sufficiently qualified, the result may be serious injuries and significant property damage.

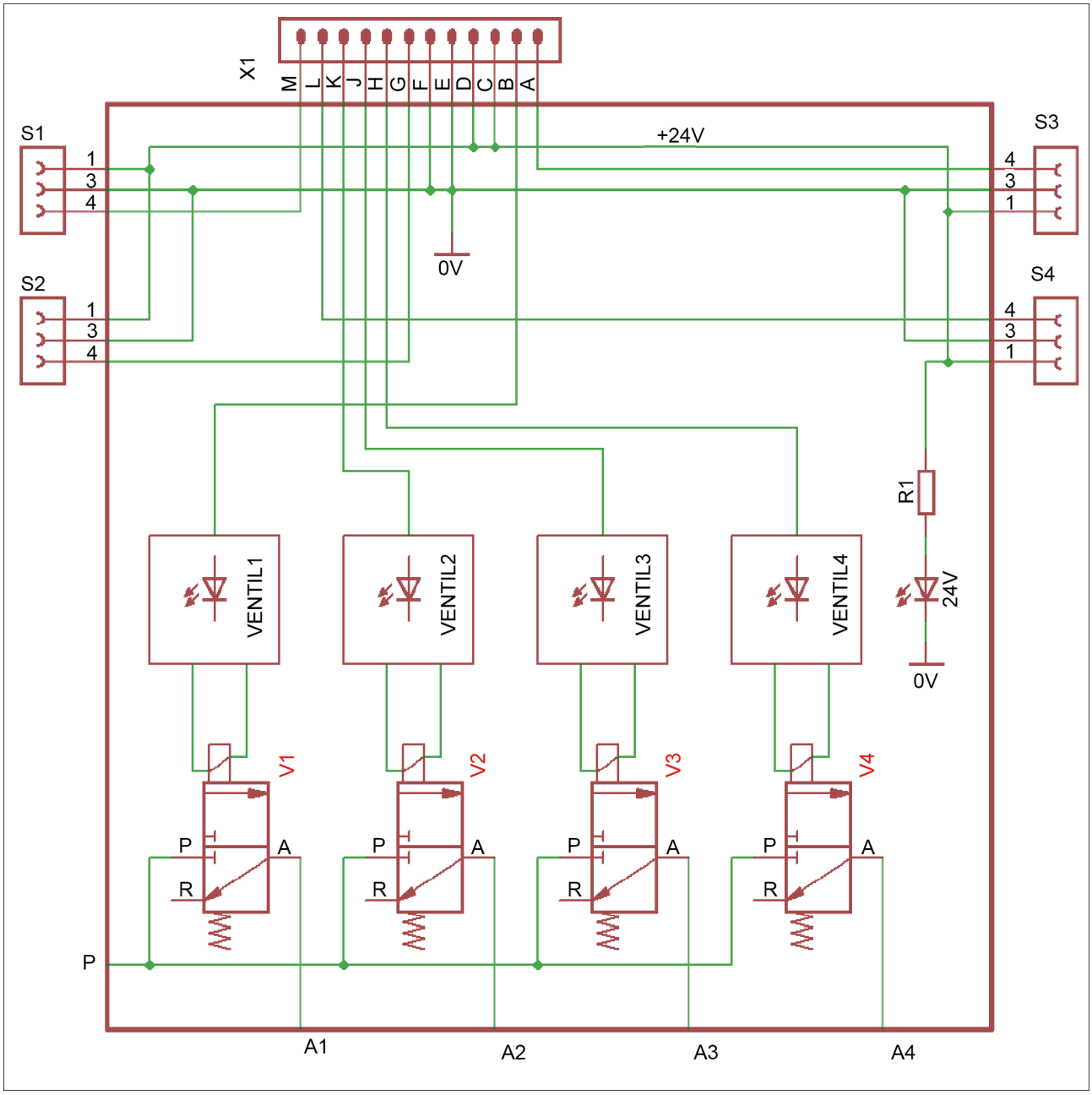
- All work may only be performed by qualified personnel.
- Before working with the product, the personnel must have read and understood the complete assembly and operating manual.
- Observe the national safety regulations and rules and general safety instructions.

3 Technical data

Size	25
Mechanical operating data	
Weight [g]	450
Number of valves	2 to 4 MV 25 valves
Dimensions [mm]	85 x 85 x 28
Ambient temperature [°C] Min. Max.	 -15 40
Sealing material	Viton - incompatible with hot water, steam, amines, organic acids and polar solvents
Protection class	IP 50 in installed condition with cover plate
Switching times [ms]	6 depending on the supply voltage
Electrical operating data	
Operating voltage [V]	24 ± 10 %
Electrical connection	M14 circular plug, 12-pin
Sensor connections	Four M8 circular plugs, 3-pin, on the side. Two sensor sockets at top upon request
Power consumption per valve	Switch-on phase of 0 to 15 ms: 4.5 W power drop after 15 ms: 2.5 W
Control inputs	Input impedance level of 6.8 kΩ
Operating data for compressed air connection	
Pressure medium	Filtered compressed air, 40µm, dry, oil free, compressed air purity classes ISO 8573-1 7 4 2
Function	3/2 directional control valve
Supply pressure range	2 to 8 bar. Other supply pressures upon request
Compressed air connection	G 1/8
Nominal flow rate Qn	135 Nl/min per output according to ISO 6358
Leakage rate per valve [mNl/min]	8

More technical data is included in the catalog data sheet.
Whichever is the latest version.

4 Electrical and pneumatic block diagram



5 Assembly

5.1 Installation notes

⚠ WARNING

Risk of injury when working on the module!

- Switch off the energy supply.
- Switch off the electrical and pneumatic signals.

CAUTION

The electronic components on the circuit board can be destroyed by electrostatic discharge.

- Make sure the valve block is only touched by the metal frame and the circuit board is not touched at all after removing the ESD packaging for the assembly of the valve block.

NOTE

- Observe the requirements for the compressed air supply, Technical data [▶ 8].
- In case of compressed air loss (cutting off the energy line), the components lose their dynamic effects and do not remain in a secure position. However, the use of a SDV-P pressure maintenance valve is recommended in this case in order to maintain the dynamic effect for some time. Product variants are also offered with mechanical gripping force via springs, which also ensure a minimum clamping force in the event of a pressure drop.

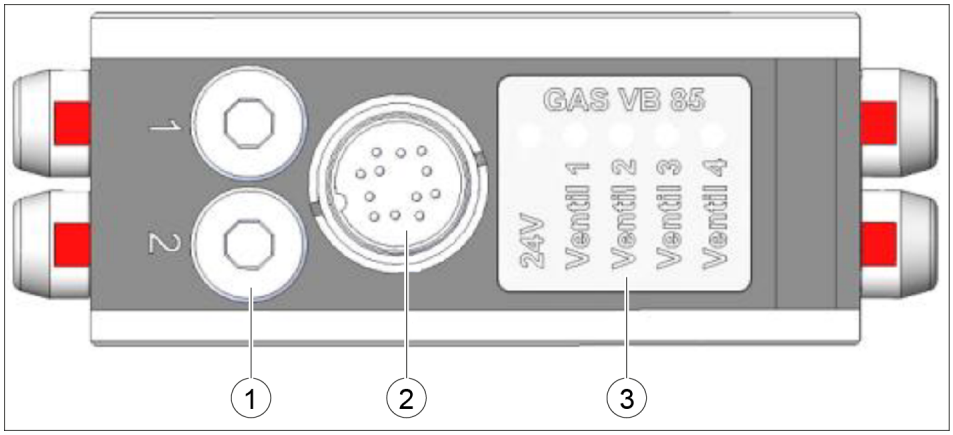
NOTE

The following procedure is to be strictly observed for the installation of the valve block:

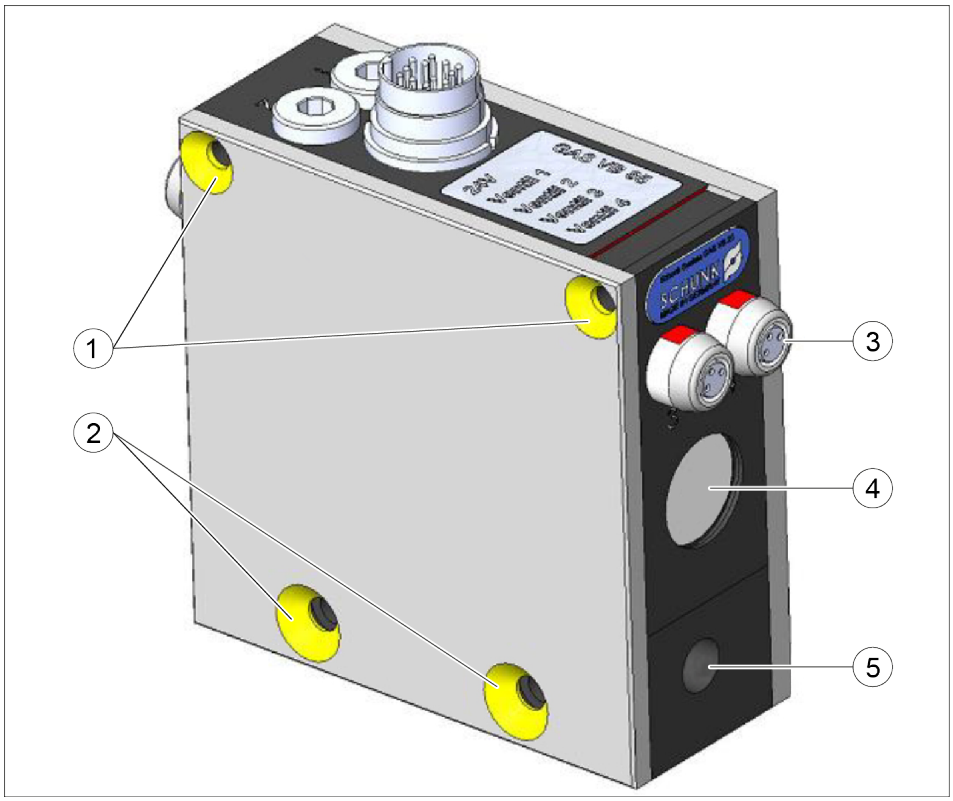
- The valve cartridge and accessories are supplied separately and must be assembled on site.
- The description of the installation is based on a fully equipped valve block with MV 25 micro valves.

5.2 Mechanical connection

5.2.1 VB 25 valve block overview

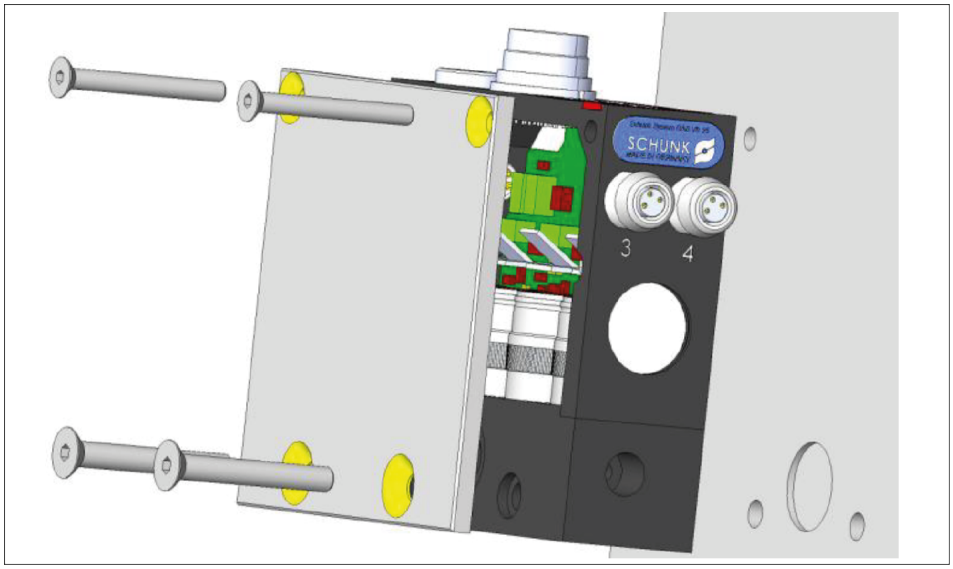


1	G1/8" locking screws for alternative position of the S1 and S2 sensor sockets
2	12-pin plug
3	Display field with indicator lights



1	2 x fixing bore for screw (M4 x 35)
2	2 x fixing bore for screw (M5 x 35)
3	M8 sensor sockets
4	Sound absorber for exhaust air R
5	Supply air connection P

5.2.2 Valve block assembly

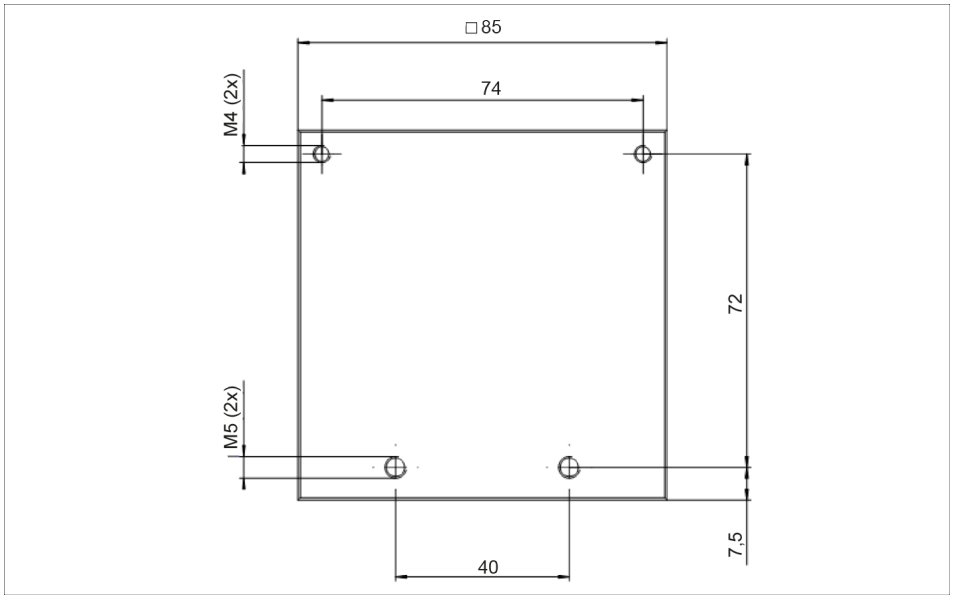


CAUTION

The 14 x 1.5 O-ring for the air feed-through can fall out.

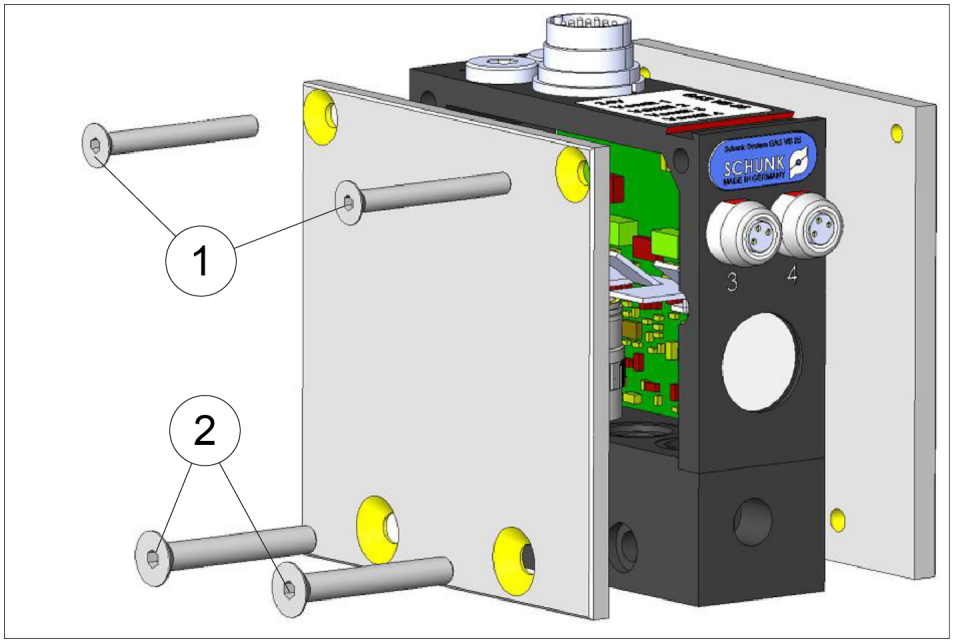
- Check whether the O-ring is there before applying the cover plate.

The valve block is mounted in the control cabinet or machine / automated system with the mounting screws (2 x M5 x 35 and 2 x M4 x 35, ISO 10642). The cover plate on the front side serves as housing end plate.



Valve block drilling pattern

5.2.3 Assembly of a series of several valve blocks



- Unscrew the screws (1) with a 2.5 mm Allen key and the screws (2) with a 3.0 mm Allen key.
- Remove the valve cover from both sides.

CAUTION

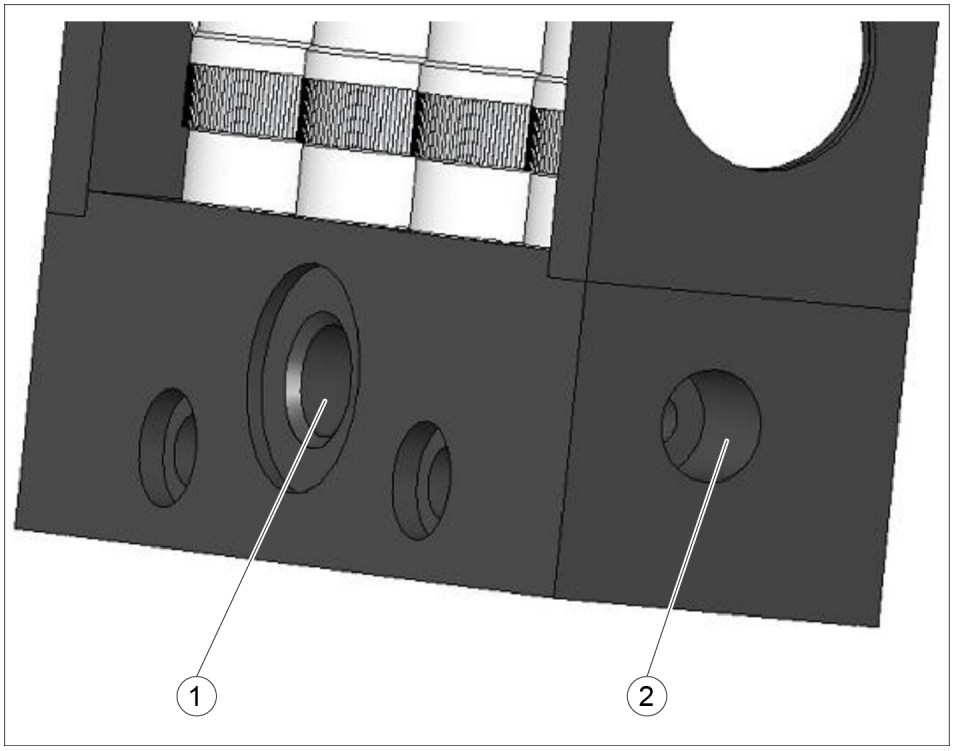
The 14 x 1.5 O-ring for the air feed-through can fall out.

- Check whether the O-ring is there before connecting the valve blocks.

- Connect the valve blocks by means of "metal/guide rods".
- Integrate the VB 25 multiple block in the machine/automated system or control cabinet with connecting elements/screws.

Several valve blocks can be connected to each other. Each block can be supplied by the central pressure supply in the event of a multiple series connection.

5.2.4 Connections on the VB 25 valve block



1	Feed-through P	2	Connection P

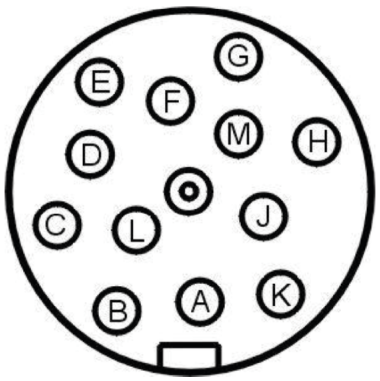
Install the compressed air supply (G1/8 thread size).
The compressed air supply is possible from both sides. Seal unused supply openings with a locking screw.
The compressed air supply is transferred from valve block to valve block through a through-bore.

5.3 Electrical connection

CAUTION

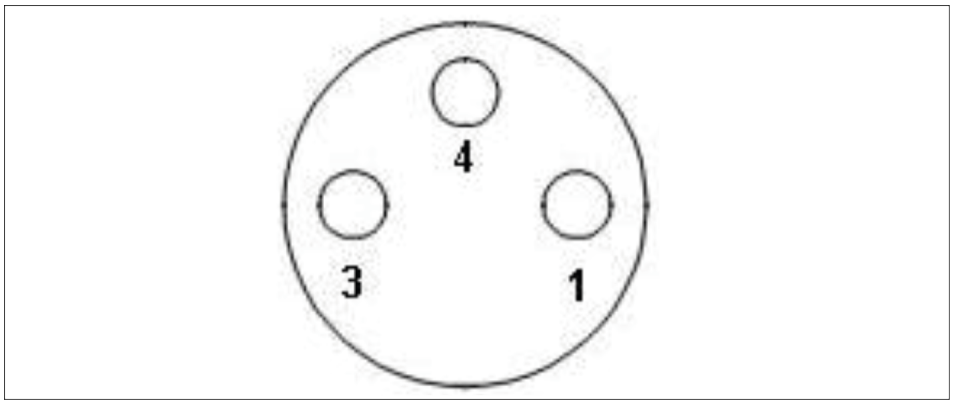
Damage to the valve block due to a faulty electrical connection!

Observe the maximum values of the electrical supply
Technical data [▶ 8].



Designation	Color	Pin no.	Level
+24 V	gn	C	24 V ± 10 %
+24 V	ye	D	24 V ± 10 %
GND	gr	E	0 V
GND	pk	F	0 V
Switching signal, valve 1	bn	B	Inactive = 0 V..2 V Active = 4 V.. 26 V
Switching signal, valve 2	pr	K	Inactive = 0 V..2 V Active = 4 V.. 26 V
Switching signal, valve 3	bk	J	Inactive = 0 V..2 V Active = 4 V.. 26 V
Switching signal, valve 4	rd	H	Inactive = 0 V..2 V Active = 4 V.. 26 V
Sensor output 1	rdbu	M	Sensor signal
Sensor output 2	bu	G	Sensor signal
Sensor output 3	wh	A	Sensor signal
Sensor output 4	grpk	L	Sensor signal

➢ Mount 12-pin circular plug for power supply.



Sensor socket view on plug side

1	+24 V	3	GND	4	Signal

➢ Mount circular plug for the sensors.

The connection assignment of the M8 sensor socket on the valve block corresponds to the standard connection assignment of a 3-pin sensor.

5.4 Start-up

⚠ WARNING

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

- Check whether all screw connections are tight prior to the start-up or restart.

- The valve block with a pressure range of 2 - 8 bar requires a minimum supply pressure of 2 bar in order to switch the valves.

➢ Create the supply pressure within the pressure range of the valve (see data sheet/catalog).

➢ Apply the operating voltage (☞ data sheet/catalog).

➢ Switch on switching signals 1 to 4.

✓ The supply pressure is put through to the valve outlet of the actuated valves.

➢ Switch off switching signals 1 to 4.

✓ The valve outlet is separated from the supply pressure and, in the case of 3/2 directional control valves, is ventilated by means of the lateral sound absorbers in the valve block housing.

6 Troubleshooting

6.1 24 V operating voltage display does not light up

Possible cause	Corrective action
Incorrect supply voltage polarity or supply voltage not connected.	Make the correct connection assignment as described in chapter 7.3.

6.2 Display for valve does not light up

Possible cause	Corrective action
Valve is not actuated or actuated with an insufficient level.	Actuate the valve.

6.3 24 V and valve display light up, valve does not switch supply pressure to the output

Possible cause	Corrective action
Supply pressure is too low.	Increase the supply pressure to the minimum operating pressure.

6.4 Valve block not tight when valves are switched off

Possible cause	Corrective action
Supply pressure is too high.	Reduce the supply pressure to the maximum operating pressure.
Assembly error	Check the sealing elements and locking screws.

7 Maintenance and Care

The valve block is maintenance free if used appropriately.