



Assembly and Operating Manual

MTB VB

Valve box

Translation of Original Operating
Manual

Imprint

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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

Customer Management

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Please read the operating manual in full and keep it close to the product.

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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.

In addition to these instructions, the documents listed under ▶ 1.1.4 [6] are applicable.

NOTE: The illustrations in this manual are intended to provide a basic understanding and may deviate from the actual version.

1.1.1 Presentation of Warning Labels

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



⚠ DANGER

Dangers 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 Definition of Terms

The term "product" replaces the product name on the title page in this manual.

1.1.3 Symbol definition

The following symbols are used in this manual:

■ Prerequisite for an action

1. Action 1

2. Action 2

⇒ Intermediate results

⇒ Final results

▶ 1.1.3 [6]: chapter number and [page number] in hyperlinks

1.1.4 Applicable documents

- General terms of business *
- Catalog data sheet of the purchased product *
- Assembly and operating manual of the sensor MMS 22-PI1 *

The documents labeled with an asterisk (*) can be downloaded from schunk.com/downloads.

1.1.5 Sizes

This operating manual applies to the following sizes:

- MTB VB-3V (3 valves)
- MTB VB-5V (5 valves)

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 maximum service life
- Observe the ambient conditions and operating conditions, ▶ 2.3 [8]
- Observe the specified maintenance intervals, ▶ 7 [24]

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

Performance	MTB VB
Cycles, maximum number *	10 [mil.]

Tab.: Performance

*) One cycle comprises one complete procedure: "open valve" and "close valve".

1.3 Scope of delivery

The scope of delivery includes

- Valve box MTB VB in the ordered size
- Connection cable
- Safety information (product-specific instructions available online)

1.4 Accessories

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.

Mounting frame

The mounting frame enables easy mounting of the valve box, ▶ 5.4 [📄 22].

Content:

- Mounting frame
- Locking screws
- Plug connections
- Mounting screws

Blow-off nozzle

The mounted blow-off nozzle enables automated cleaning of chips, liquids and dust from the machining area.

2 Basic safety notes

2.1 Intended use

The valve box is used to control pneumatic actuators. The MMS22-PI2 magnetic position sensor can be used to monitor their switching status. In addition, the workspace can be blown free using a blow-off nozzle (optional accessory) and compressed air.

- The product may only be used within the scope of its technical data, ▶ 3 [13].
- The product is intended for installation in a machine/ automated system. The applicable guidelines for the machine/ automated system must be observed and complied with.
- The product is intended for industrial use.
- Appropriate use of the product includes compliance with all instructions in this manual.
- Any utilization that exceeds or differs from the appropriate use is regarded as misuse.

2.2 Constructional changes

Implementation of structural changes

Modifications, changes or reworking, e.g. additional threads, holes, or safety devices, can damage the product or impair its functionality or safety.

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

2.3 Ambient conditions 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, ▶ 3 [13].

2.4 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.

The following personal qualifications are necessary for the various activities related to the product:

Trained electrician

Due to their technical training, knowledge and experience, trained electricians are able to work on electrical systems, recognize and avoid possible dangers and know the relevant standards and regulations.

Qualified personnel

Due to its technical training, knowledge and experience, qualified personnel is able to perform the delegated tasks, recognize and avoid possible dangers and knows the relevant standards and regulations.

Instructed person

Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.

Service personnel of the manufacturer

Due to its technical training, knowledge and experience, service personnel of the manufacturer is able to perform the delegated tasks and to recognize and avoid possible dangers.

2.5 Personal protective equipment

Use of personal protective equipment

Personal protective equipment serves to protect staff in the event of a danger that may interfere with their health or safety at work.

- When working on and with the product, observe the occupational health and safety regulations and wear the required personal protective equipment.
- Observe the valid safety and accident prevention regulations.
- Wear protective gloves to guard against sharp edges and corners and rough surfaces.
- Wear heat-resistant protective gloves when handling hot surfaces.
- Wear protective gloves and safety goggles when handling hazardous substances.
- Wear close-fitting protective clothing and place a hairnet over long hair when dealing with moving components.
- Wear hearing protection in case of increased noise level.

2.6 Notes on safe operation

An incorrect manner of working can make the product unsafe and risks serious injuries and considerable material damage.

- Avoid any manner of working that may interfere with the function and operational safety of the product.
- Use the product as intended.
- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. Products for special ambient conditions are excluded.
- Rectify malfunctions as soon as they occur.
- Observe the care and maintenance instructions.
- Observe the information on the safety data sheets of the additives and lubricants.
- Observe the current safety, accident prevention, and environmental protection regulations for the application field of the product.

2.7 Malfunctions

Behavior in case of malfunctions

- Immediately remove the product from operation and report the malfunction to the responsible departments/persons.
- Order appropriately trained personnel to rectify the malfunction.
- Do not recommission the product until the malfunction has been rectified.
- Test the product after a malfunction to establish whether it still functions properly and no increased risks have arisen.

2.8 Disposal

Handling of disposal

The incorrect handling of disposal may impair the product's safety and cause serious injuries as well as considerable material and environmental harm.

- Follow local regulations on dispatching product components for recycling or proper disposal.

2.9 Notes on particular risks



⚠ CAUTION

Risk of injury due to loss of compressed air!

Failure of the product will result in loss of compressed air and may cause injury.

- During operation, take suitable protective measures to secure the danger zone.



⚠ CAUTION

Risk of injury due to the sharp edges of the blow-off nozzle!

Sharp edges can cause injuries.

- During operation, take suitable protective measures to secure the danger zone.
- Keep your distance from moving components.



⚠ CAUTION

Hearing damage due to noise!

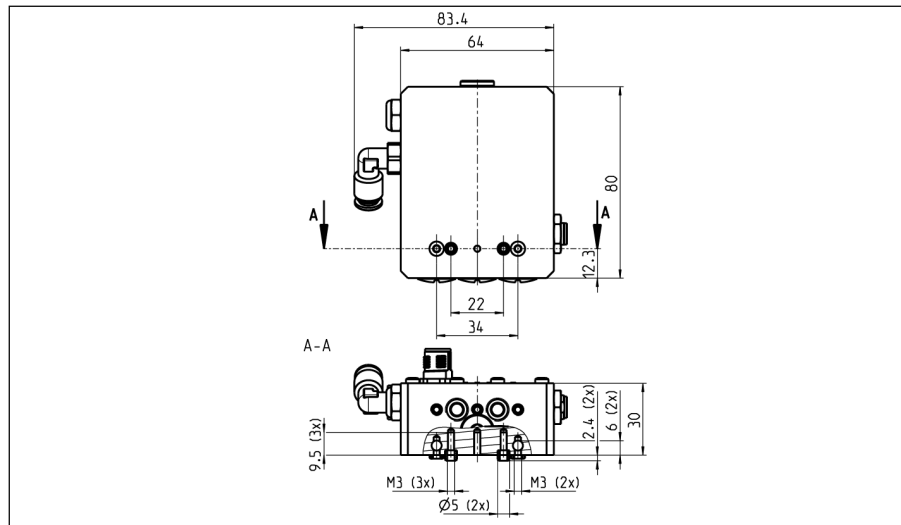
The noise occurring in the work area can cause hearing damage.

- Wear hearing protection during work that generates a particularly high noise level.

3 Technical data

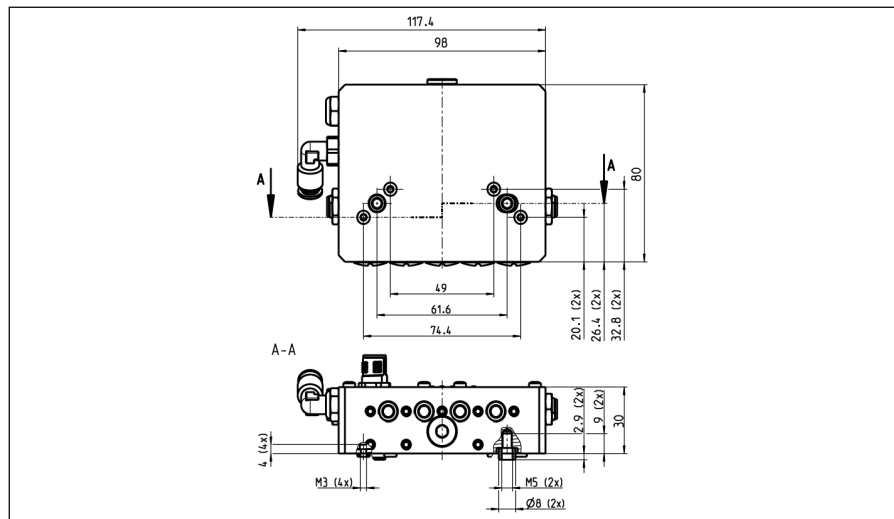
Dimensions

MTB VB-3V



Dimensions, Valve box MTB VB-3V

MTB VB-5V



Dimensions, Valve box MTB VB-5V

Basic data

Designation	MTB VB
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:2010 [3:4:3]
Nominal operating pressure [bar]	6
Minimum pressure [bar]	2.5
Max. pressure [bar]	7
Supply voltage [VDC]	24
Min. [VDC]	21.6
Max. [VDC]	26.4
Maximum current input [mA]	500
Nominal current [mA]	170

Ambient conditions and operating conditions

Designation	MTB VB
Ambient temperature [°C]	
min.	+5
max.	+50
Protection class IP	67
Noise emission [dB(A)]	≤70
– with blow-off nozzle	>70

Auxiliary materials and lubricants used

Component	Manufacturer	Designation Lubricant/ Auxiliary material
Lubricant on the valves	TECNOLUBESEAL SRL, Via G. Galilei, 7 I-37029 San Pietro in Cariano VR	UNIFLOR 8512S-FG
Seals, valve box	Bremer & Leguil GmbH Am Burgacker 30 - 42 47051 Duisburg info@bremer-leguil.de www.bremer-leguil.de	SCHUNK grease 1

Details on the SCHUNK lubricant designations are available at schunk.com/lubricants

The product contains food-compliant lubricants as standard. **The requirements of standard EN 1672-2:2020 are not fully met. The relevant NSF certificates are available at <https://info.nsf.org/USDA/Listings.asp>.**

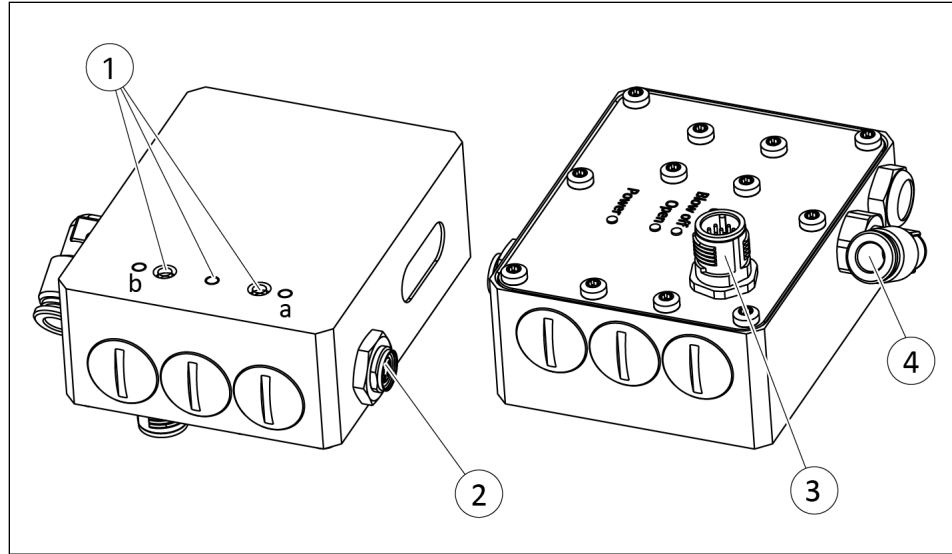
NOTE

- Change contaminated food-compliant lubricant.
- Observe information in the safety data sheet from the lubricant manufacturer.

4 Design and description

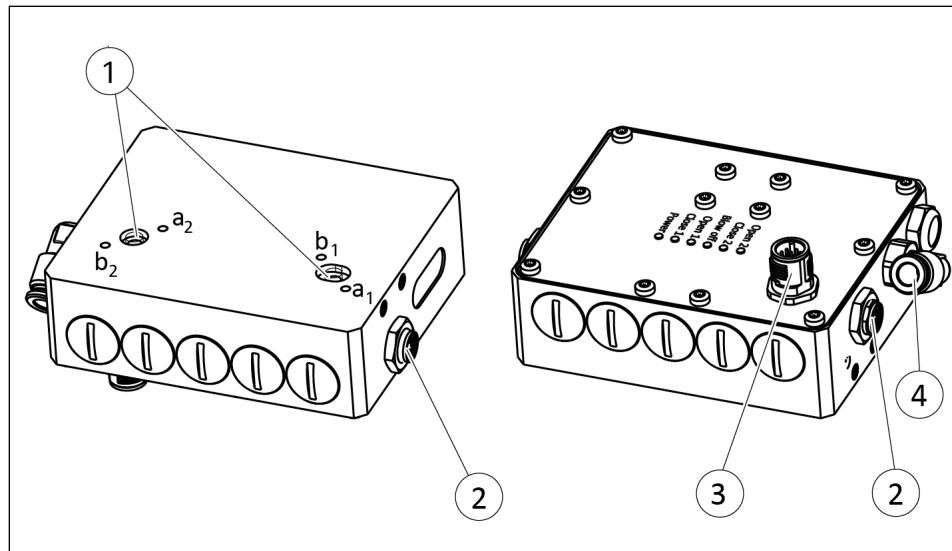
4.1 Design

MTB VB-3V



Design Valve box MTB VB-3V

MTB VB-5V



Design Valve box MTB VB-5V

- | | |
|-------|---|
| 1 | Mounting thread |
| 2 | Sensor connection for MMS 22-PI2 |
| 3 | M12 plug, A-coded, 12-pin, voltage supply and control |
| 4 | Plug connector compressed air connection, hose \varnothing 6 mm |
| a / b | Hose-free direct air connections |

4.2 Description

The valve box enables the control of pneumatic actuators, e.g. SCHUNK grippers.

An adjustable sensor reports the position of the actuator via two digital outputs. The switch positions of the sensor can be set. For more information, see ▶ 5.3.1 [📄 20].

The outgoing air from a blow-off nozzle can be used to remove chips or coolant from the workpiece. The blow-off nozzle is available as an accessory, ▶ 1.4 [📄 7].

4.3 Display

MTB VB-3V

Valve box MTB VB-3V includes the following LEDs:

Designation	Color	Description
"Close" LED	Orange	<ul style="list-style-type: none"> Lights up when direct air connection "b" is active.
LED "Blow off"	Orange	<ul style="list-style-type: none"> Lights up when air escapes from the blow-off nozzle.
LED "Open"	Orange	<ul style="list-style-type: none"> Lights up when direct air connection "a" is active.
LED "Power"	Green	<ul style="list-style-type: none"> Lights up if ready for operation. Does not light up if supply voltage polarity is reversed or voltage is not in the valid range.

MTB VB-5V

Valve box MTB VB-5V includes the following LEDs:

Designation	Color	Description
"Close 1" LED "Close 2" LED	Orange	<ul style="list-style-type: none"> Lights up when direct air connection b1" / "b2" is active.
LED "Blow off"	Orange	<ul style="list-style-type: none"> Lights up when air escapes from the blow-off nozzle.
"Open 1" LED "Open 2" LED	Orange	<ul style="list-style-type: none"> Lights up when direct air connection "a1" / "a2" is active.
LED "Power"	Green	<ul style="list-style-type: none"> Lights up if ready for operation. Does not light up if supply voltage polarity is reversed or voltage is not in the valid range.

5 Assembly

5.1 Installing and connecting



⚠ WARNING

Risk of injury due to unexpected movements!

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.

NOTE

- Observe the requirements for the compressed air supply, ▶ 3 [📄 13].
- Failure of the valve box will result in the loss of compressed air.

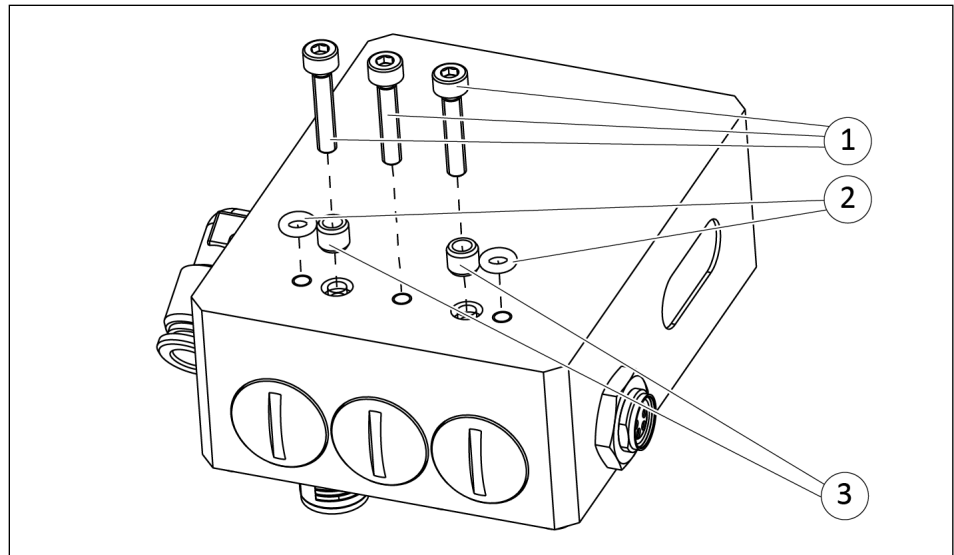
Overview

1. Fasten product to application, ▶ 5.2 [📄 18].
2. Connect the compressed air hose (Ø 6 mm) to the plug connector (4), ▶ 4 [📄 15].
3. Insert the voltage supply and control cable onto the connector (3) and screw these in so they are hand-tight.

5.2 Mechanical connection

MTB VB-3V

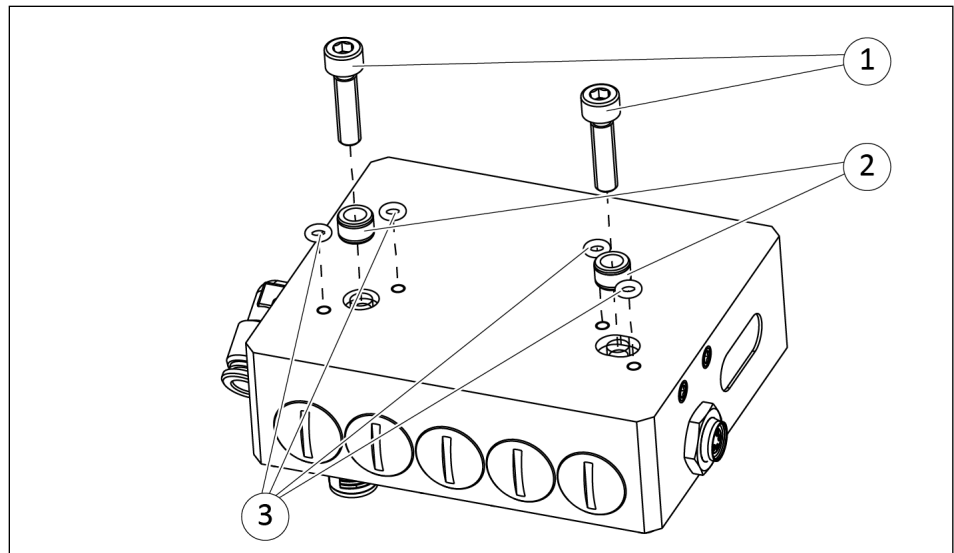
Three threads are provided for mounting the product.



Assembly of the product, MTB VB-3V

MTB VB -5V

Two threads are provided for mounting the product.



Assembly of the product, MTB VB-5V

Dimensions

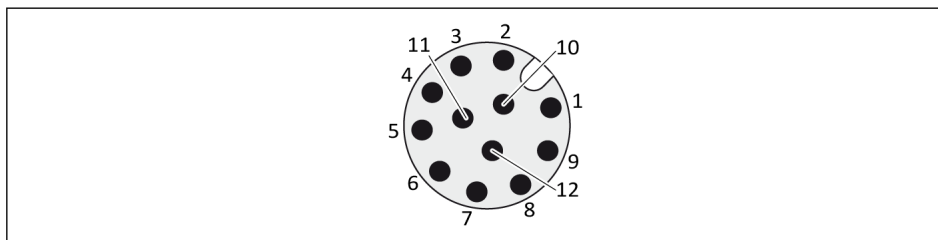
Item	Mounting	MTB VB	
		3V	5V
1	Mounting screw	3x M3	2x M5
	Max. depth of engagement from locating surface [mm]	9	8.5
	Mounting screw according to standard	DIN EN ISO 4762 Max. strength class 8.8	
2	O-ring	2x Ø3x1.5	4x Ø3x1.5
3	Centering sleeve	2x Ø5	2x Ø8

Mounting the product to the application

1. Insert O-rings (2) and centering sleeves (3) in the application.
2. Position the product on the application.
3. Fasten product with screws (1).
 - ⇒ Observe the tightening torque for the mounting screws.

5.3 Electrical connection

On the valve box there is an M12 plug for voltage supply of the sensors and for control of the product.



Pin allocation M12 connector, A-coded

No.	Signal	
	MTB VB-3V	MTB VB-5V
1	+24 VDC	+24 VDC
2	GND	GND
3	Sensor actuator, position A	Sensor actuator 1, position A
4	Sensor actuator, position B	Sensor actuator 1, position B
5	-	Sensor actuator 2, position A
6	-	Sensor actuator 2, position B
7	Teach function, sensor actuator	Teach function, sensor actuator 1
8	-	Teach function, sensor actuator 2
9	Switching, actuator	Switching, actuator 1
10	-	Switching, actuator 2
11	Release signal	Release signal
12	Switching blow-off nozzle	Switching blow-off nozzle

5.3.1 Control of the digital signals

Truth table

The truth table shows the actuation of the digital inputs during possible commands by the superordinated control unit.

Power consumption per digital inputs amounts to max. I=10 mA.

Actuator and blow-off nozzle control

Function	Pin 9 switching, actuator	Pin 11 release signal **	Pin 12 switching, blow-off nozzle
Actuator powerless	*	0	*
a active ***	0	1	*
b active ***	1	1	*
Blow-off nozzle deactivated	*	1	0
Blow-off nozzle activated	*	1	1

Tab.: Truth table for actuator and blow-off nozzle control, MTB VB-3V

Function	Pin 9 switching, actuator 1	Pin 10 switching, actuator 2	Pin 11 release signal **	Pin 12 switching, blow-off nozzle
Actuator powerless	*	*	0	*
a1 active ***	0	*	1	*
b1 active ***	1	*	1	*
a2 active ***	*	0	1	*
b2 active ***	*	1	1	*
Blow-off nozzle deactivated	*	*	1	0
Blow-off nozzle activated	*	*	1	1

Tab.: Truth table, actuator and blow-off nozzle control, MTB VB-5V

* State is not relevant for the described function.

** **Activating pin 11 leads to immediate execution of the function!**

*** **Switching of connections a/b or a1 /b1 and a2/b2 is always complementary. The switches cannot be controlled independently of one another!**

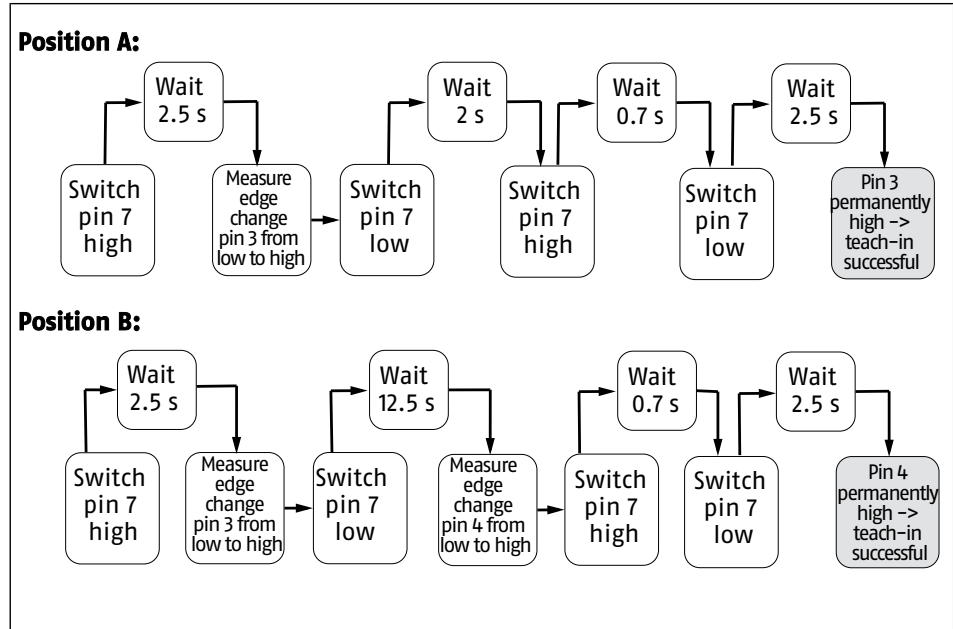
0: max. 12 V (low)

1: min. 18 V (high)

Control of sensor

Note: The following figure shows the teach sequence of the sensor for actuator 1. The following pin assignment applies to actuator 2:

Pin 3 corresponds to pin 5,
 pin 4 corresponds to pin 6,
 pin 7 corresponds to pin 8



Procedure for sensor teach-in, actuator 1

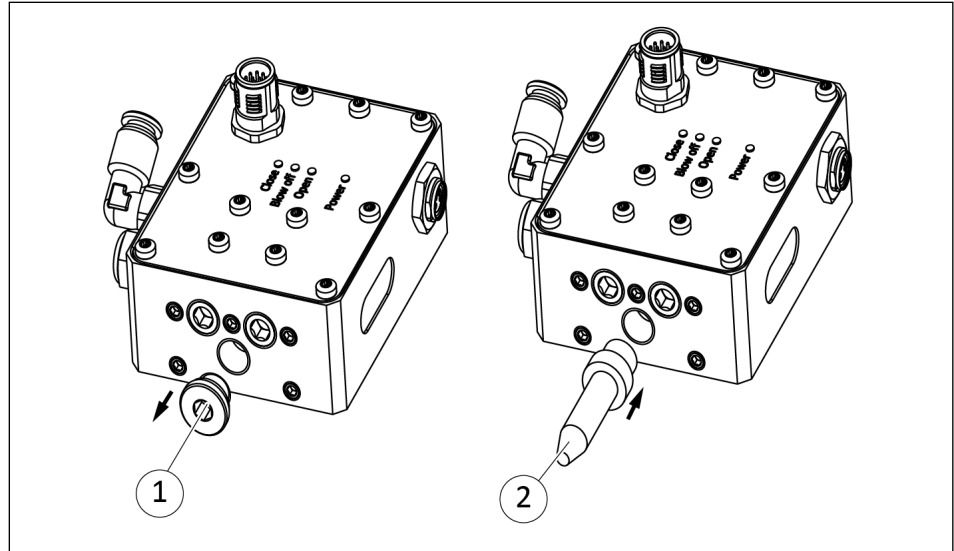
Note: Repeat the above procedure if other positions require teach-in subsequently. For troubleshooting instructions, see the operating manual for the sensor.

5.4 Mounting accessories

NOTE

The following sections describe mounting the accessories for MTB VB-3V, for MTB VB-5V carry out the assembly in the same way.

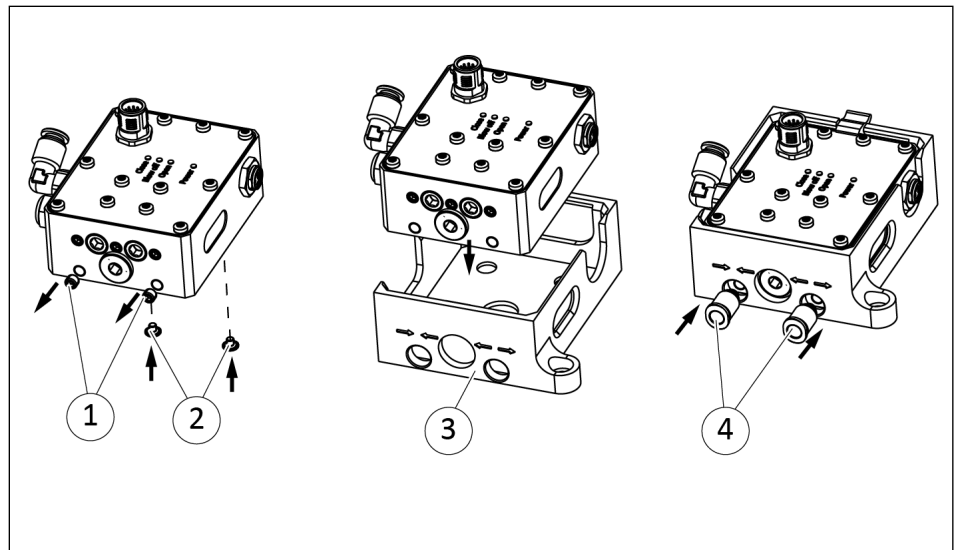
Mounting the blow-off nozzle



Mounting of the blow-off nozzle, example for MTB VB-3V displayed here

1. Remove the locking screw (1).
2. Screw in the blow-off nozzle (2) and tighten until hand-tight.

Mounting the mounting frame



Mounting of the mounting frame, example for MTB VB-3V displayed here

1. Unscrew the set-screws (1). Screw the screw plugs (2) on the underside into the direct air connections "a" and "b", ► 4.1 [15].
2. Insert the valve box into the mounting frame (3).
3. Mount the plug connections (4).

6 Troubleshooting

6.1 Electrical signals are not transmitted

Possible cause	Corrective action
Cable connected incorrectly.	Check round connector for correct fit.
Strands swapped.	Check pin allocation.

6.2 Product does not move

Possible cause	Corrective action
Power supply connected incorrectly.	Check the power supply. ▶ 5.3 [📄 19]
Compressed air can escape.	Check compressed air lines.
Supply voltage too low.	Check the compressed air supply.

NOTE

For further information, see the Assembly and Operating Manual for the sensor.

7 Maintenance



⚠ WARNING

Risk of injury due to unexpected movements!

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.



⚠ WARNING

Risk of injury due to contact with lubricants!

Lubricant may cause irritation and allergic reactions if it contacts the skin or eyes.

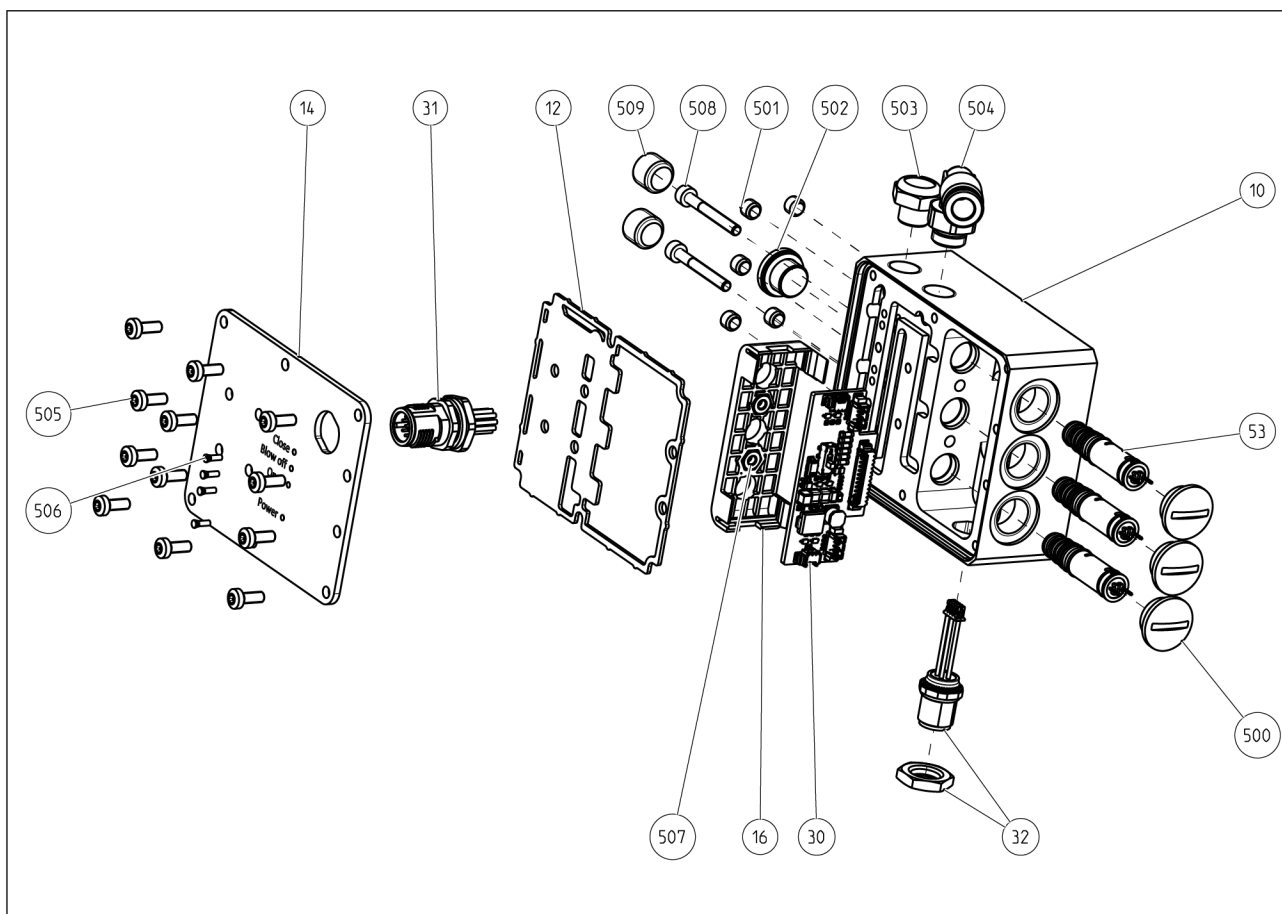
- Avoid contact between lubricant and skin or eyes.
- Wear safety goggles and protective gloves.
- Observe information on the safety data sheet of the lubricant.

Maintenance interval

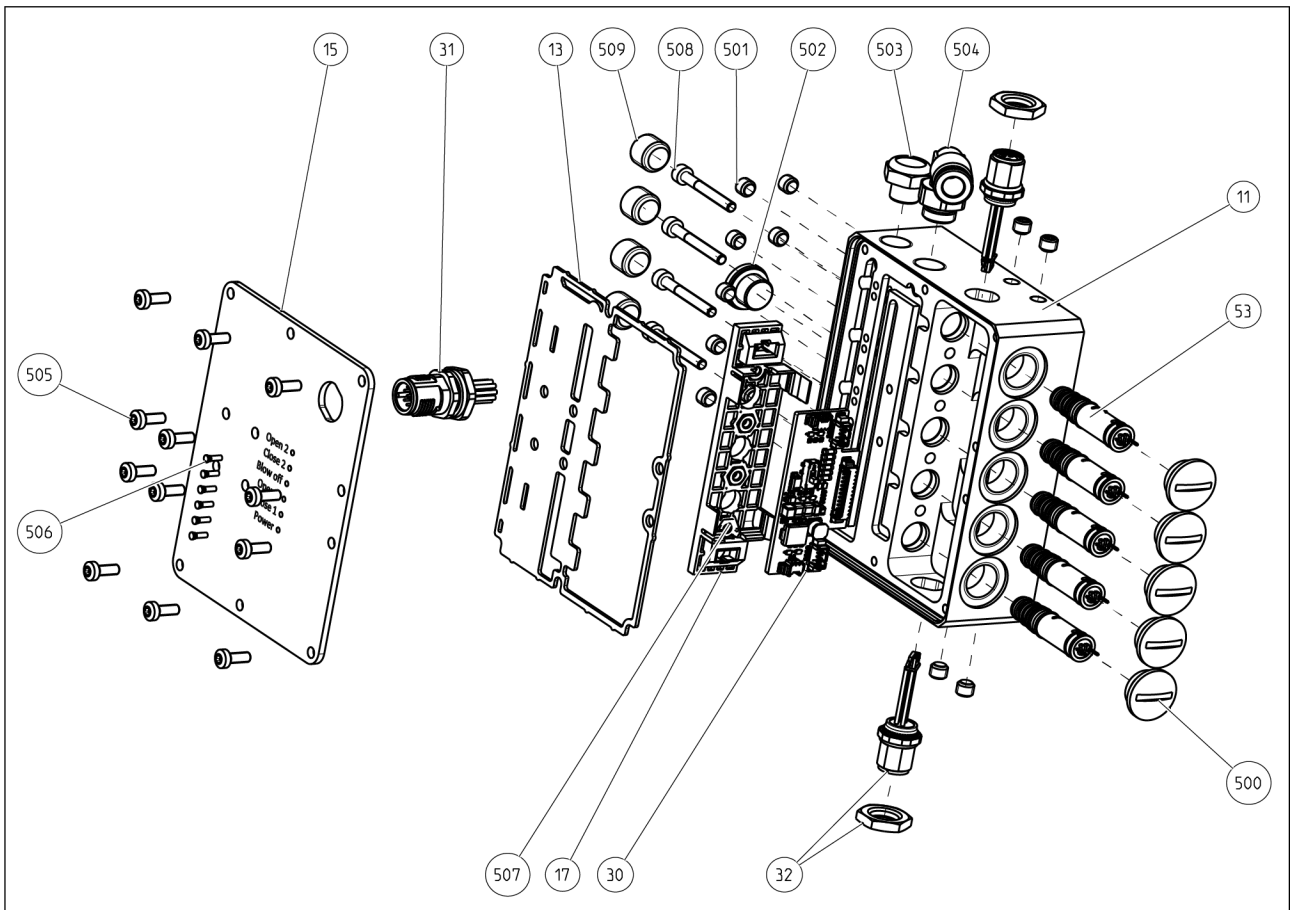
Interval (million cycles) for MTB VB	Maintenance work
as required	Inspect the product for damage. Send damaged products to SCHUNK for repair. OR: Change valve box.
10	Change valve box.

Repair work may only be carried out by SCHUNK!

7.1 Assembly drawing



Assembly drawing MTB VB-3V



Assembly drawing MTB VB-5V

8 Certificate of Conformity

Manufacturer/
Distributor

SCHUNK SE & Co. KG
Spanntechnik | Greiftechnik | Automatisierungstechnik
Bahnhofstr. 106 – 134
D-74348 Lauffen/Neckar

We hereby declare on our sole authority that the product meets the requirements of the following directives/standards/specifications.

The declaration shall be rendered invalid if modifications are made to the product.

Product designation: Valve box / MTB VB

ID number: 1490859, 1490865

Applied standards:

EN IEC 61000-6-2:2019 Electromagnetic compatibility (EMC) – Part 6-2:
Generic standards – Immunity standard for industrial environments

EN 61000-6-4:2007 +
A1:2011 Electromagnetic compatibility (EMC) – Part 6-4: Generic standards –
Emission standard for industrial environments
(IEC 61000-6-4:2006 + A1:2010);

EN ISO 12100:2010 Safety of machinery – General principles for design –
Risk assessment and risk reduction

EN ISO 4414:2010 Pneumatic fluid power – General rules and safety requirements for
systems and their components

Signature: see original declaration

Lauffen/Neckar, May 2024

Dr.-Ing. Manuel Baumeister,
Head of Systems Engineering,
Technology & Innovation

9 Information on the RoHS Directive, REACH Regulation and Substances of Very High Concern (SVHC)

RoHS Directive

SCHUNK products are classified as "large-scale stationary installations" or as "large-scale stationary industrial tools" within the meaning of Directive 2011/65/EU and its extension 2015/863/EU "on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)", or fulfill their intended function only as part of one. Therefore products from SCHUNK do not fall within the scope of the directive at this time.

REACH Regulation

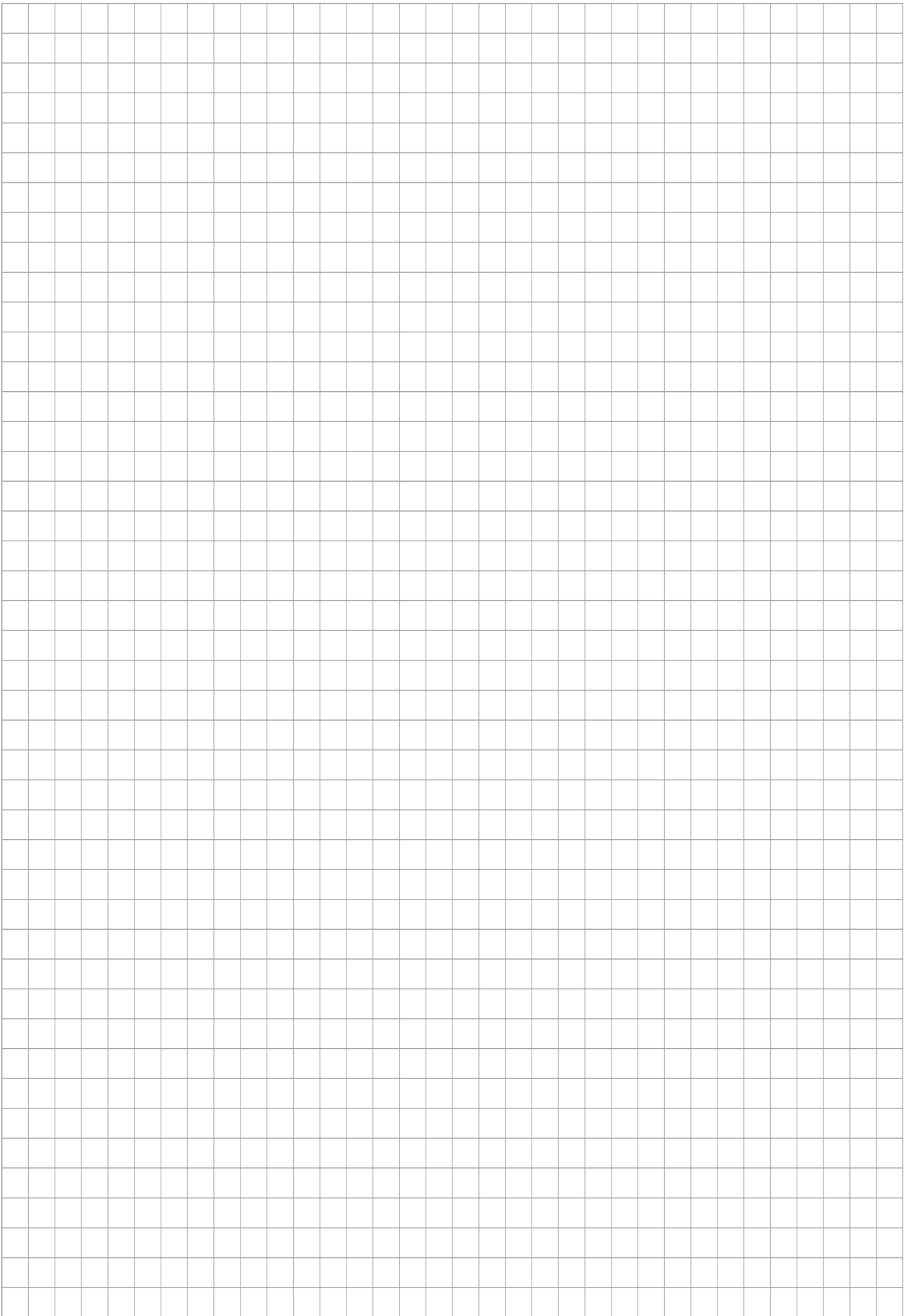
Products from SCHUNK fully comply with the regulations of Regulation (EC) No. 1907/2006 "concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)" and its amendment 2022/477. SCHUNK attaches great importance to completely avoiding chemicals of concern to humans and the environment wherever possible.

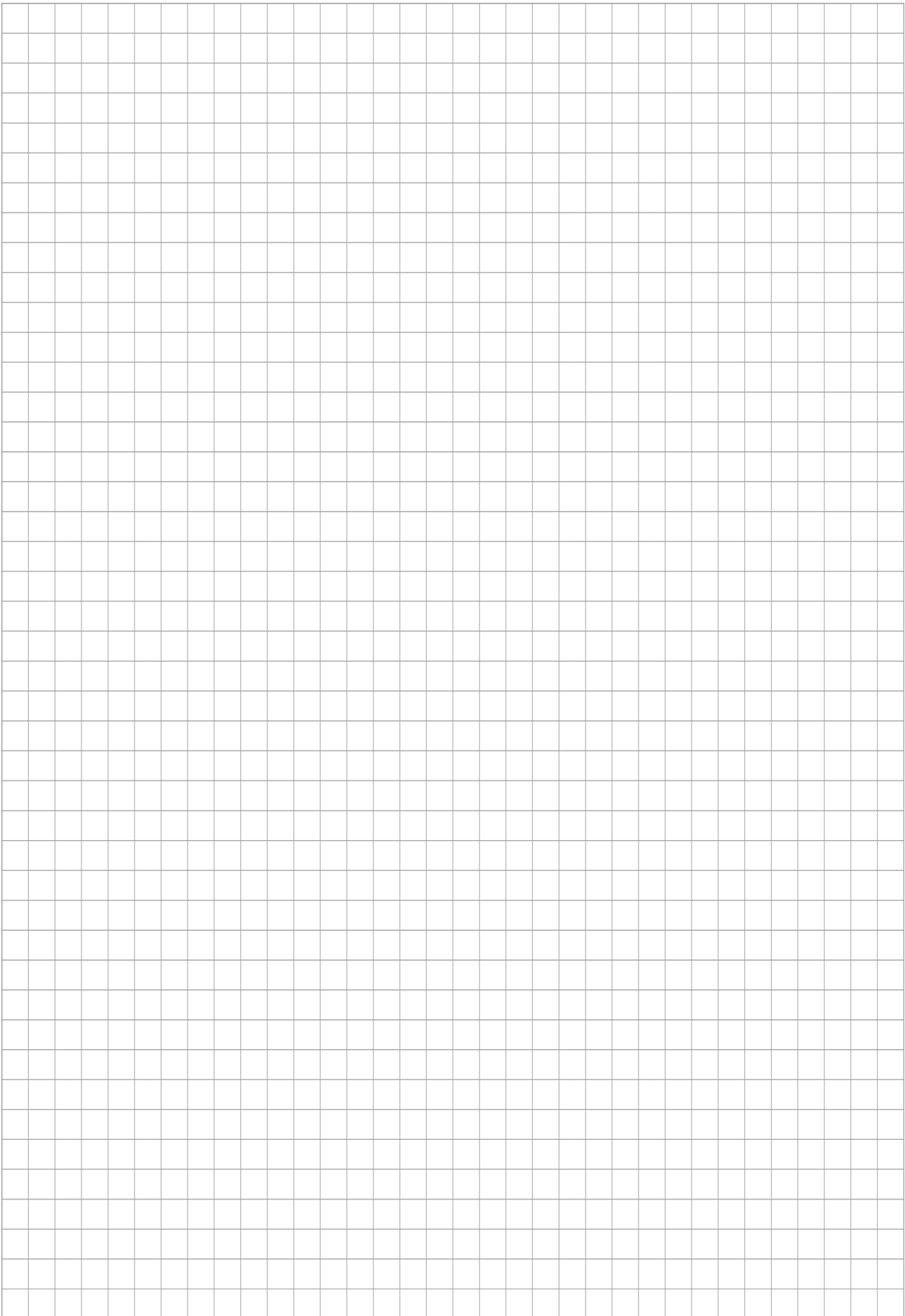
Only in rare exceptional cases do SCHUNK products contain SVHC substances on the candidate list with a mass content above 0.1%. In accordance with Article. 33 (1) of Regulation (EC) No. 1907/2006, SCHUNK complies with its duty to "communicate information on substances in articles" and lists the components concerned and the substances used in an overview that can be viewed at [schunk.com\SVHC](https://www.schunk.com/SVHC).

Signature: see original declaration

Lauffen/Neckar, May 2024

Dr.-Ing. Manuel Baumeister,
Head of Systems Engineering,
Technology & Innovation









SCHUNK SE & Co. KG
Spanntechnik | Greiftechnik | Automatisierungstechnik

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