



# Assembly and operating manual CMS Manual change system

Translation of Original Operating Manual

Hand in hand for tomorrow

# 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** Tel. +49-7133-103-2503 Fax +49-7133-103-2189 cmg@de.schunk.com



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 ▶ 1.1.2 [□ 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.



# A DANGER

#### Dangers for persons!

Non-observance will inevitably cause irreversible injury or death.



# A WARNING

Dangers for persons!

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



## 

#### 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 labeled with an asterisk (\*) can be downloaded from **schunk.com**.

#### **1.1.3 Sizes**

This operating manual applies to the following sizes:

- CMS 040
- CMS 050
- CMS 063
- CMS 080
- CMS 100
- CMS 125

#### 1.1.4 Variants

This operating manual applies to the following variations:

- CMS -K: Manual change head
- CMS -A: Manual change adapter
- CMS -A-N: Manual change adapter with special bolt-on pattern (same pitch circle, larger thread)
- CMS -K-B: Manual change head basic version without integrated air feed-throughs and without monitoring options
- CMS -A-B: Manual change head basic version without integrated air feed-throughs

#### **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 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.

#### **1.4** Scope of delivery

The scope of delivery includes

- Manual change head CMS-K or manual change adapter CMS-A in the version ordered
- Accessory kit (not with basic version –B)
  - Locking screws for radial air feed-throughs (number and dimensions vary depending on size)
  - O-rings for axial feed-through (number and dimensions vary depending on size)

# 2 Basic safety notes

## 2.1 Intended use

- The manual change system CMS consisting of a manual change head CMS-K and a manual change adapter CMS-A is intended for rapid changing of parts and automation components, e.g. grippers on a robot.
- The manual change system CMS is not part of the load.
- The manual change head CMS-K is mounted on an industrial robot. The manual change adapter CMS-A is mounted on the end effector.
- CMS-A and CMS-K are connected with a quick-release system.
- Connection of optional modules to head and adapter and inductive sensors to head (not with basic version).

#### **Operating conditions** • Use in covered or closed areas

- Use in non-explosive areas
- Pass through air only. No corrosive and flammable gases permitted.
- The product may only be used within the scope of its technical data, Link Technische Daten.
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.

## 2.2 Not intended use

Any use that exceeds or differs from the appropriate use is regarded as misuse. This includes in particular:

- Use of the CMS as lifting equipment
- Outdoor use
- Use in potentially explosive areas

#### **2.3 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.

#### 2.4 Spare parts

#### Use of unauthorized spare parts

Using unauthorized spare parts can endanger personnel and damage the product or cause it to malfunction.

• Use only original spare parts or spares authorized by SCHUNK.

#### **2.5** 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, Link Technische Daten.

#### 2.6 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<br/>various activities related to the product:Trained electricianDue to their technical training, knowledge and experience,<br/>trained electricians are able to work on electrical systems

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

delegated tasks and possible dangers due to improper behaviour 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.

## 2.7 Personal protective equipment

#### Use of personal protective equipment

Personal protective equipment serves to protect staff against danger which 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 or 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 also wear long hair in a hairnet when dealing with moving components.

#### 2.8 Notes on safe operation

#### Incorrect handling of the personnel

Incorrect handling and assembly may impair the product's safety and cause 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. This does not apply to products that are designed for special environments.
- Eliminate any malfunction immediately.
- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention and environmental protection regulations regarding the product's application field.

#### 2.9 Transport

#### Handling during transport

Incorrect handling during transport may impair the product's safety and cause serious injuries and considerable material damage.

- When handling heavy weights, use lifting equipment to lift the product and transport it by appropriate means.
- Secure the product against falling during transportation and handling.
- Stand clear of suspended loads.

#### 2.10 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.

## 2.11 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.

#### 2.12 Fundamental dangers

#### General

- Observe safety distances.
- Never deactivate safety devices.
- Before commissioning the product, take appropriate protective measures to secure the danger zone.
- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- If the energy supply is connected, do not move any parts by hand.
- Do not reach into the open mechanism or movement area of the product during operation.

#### 2.12.1 Protection during handling and assembly

#### Incorrect handling and assembly

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Have all work carried out by appropriately qualified personnel.
- For all work, secure the product against accidental operation.
- Observe the relevant accident prevention rules.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

#### **Incorrect lifting of loads**

Falling loads may cause serious injuries and even death.

- Stand clear of suspended loads and do not step into their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.

## 2.12.2 Protection during commissioning and operation Falling or violently ejected components

Falling and violently ejected components can cause serious injuries and even death.

- Take appropriate protective measures to secure the danger zone.
- Never step into the danger zone during operation.

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## 2.13 Notes on particular risks

## A 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.



## A WARNING

#### Risk of crushing due to objects falling or thrown out!

If a component breaks during operation or when pressure drops, the load can no longer be held. Items may fall or be thrown out, causing serious injury..

- Check the product for damage before operation. Repair if necessary.
- Observe the maintenance intervals.
- Do not operate the product with defective and / or damaged seals. Replace defective and / or damaged seals immediately.
- Take appropriate protective measures to secure the danger zone.



## A WARNING

#### Risk of crushing due to objects falling or thrown out!

If the maximum permissible load is exceeded, the product can no longer hold the load. This load can be thrown out and lead to serious injuries.

- Ensure that the permissible load is not exceeded.
- Take appropriate protective measures to secure the danger zone.



## A WARNING

#### Danger of crushing due to falling objects!

When transporting, assembling, disassembling and servicing, the product may fall down if the position changes unintentionally and result in serious injury.

Wear suitable protective equipment.

# 3 Technical data

## 3.1 Name plate



1	Product designation
2	ID
3	Serial number
4	Data matrix code

Scan code or enter serial number on the web and get all the product information: operating manuals, spare parts packages, software updates and much more.

For further information, visit **schunk.com/serialisierung** A separate app may be required for scanning with a mobile phone.

## 3.2 Basic Data

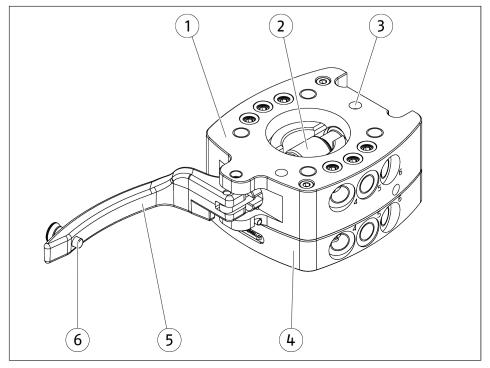
#### Permitted loading assuming the following conditions

Designation	CMS												
	040	050	063	080	100	125							
Pitch diameter [mm]	40	50	63	80	100	125							
CMS-K Weight [kg]	0.16	0.27	0.49	0.75	1.52	3.09							
CMS-K-B Weight [kg]	0.16	0.27	0.49	0.77	1.52	3.18							
CMS-AWeight [kg]	0.09	0.14	0.27	0.43	1.04	1.72							
CMS-A-N Weight [kg]	0.09	0.14	0.27	0.42	1.03	1.7							
CMS-A-B Weight [kg]	0.09	0.15	0.3	0.47	1.11	1.85							
Repeatability [mm]	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02							
Max. dynamic torsional moment [Nm]	15	27	48	75	230	465							
Max. dynamic bending moment [Nm]	22.5	35	75	115	230	478							
Max. dynamic tensile force [N]	350	450	500	800	1200	1500							
Pneumatic feed-through (max. 8 bar)	4 x M5	6 x M5	6 x G1/8''	9 x G1/8''	12 x G1/8''	12 x G1/4''							

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

# 4 Design and description

## 4.1 Design



- 1 Manual change head CMS-K (robot-side)
- 2 Lock bolt
- 3 Fitting for cylindrical pin for angular alignment
- 4 Manual change adapter CMS-A (gripper-side, end effector)
- 5 Hand lever
- 6 Suspended bolt

#### 4.2 Description

The manual change system CMS, consisting of a manual change head CMS-K and a manual change adapter CMS-A, can be locked and unlocked with a hand lever.

The lock bolt, which can be operated via the hand lever, connects CMS-K and CMS-A fast, free from play and form-fitting.

Integrated pneumatic feed-throughs reliably supply the tool with compressed air and vacuum.

For vacuum feed-through, the lip seals must be rotated.

## **5** Assembly

## 5.1 Installing and connecting



## A WARNING

#### Risk of injury due to improperly carried out assembly!

Improperly carried out assembly work can lead to severe injuries and property damage.

- Before beginning work, ensure sufficient assembly clearance.
- Secure components from falling down or over.
- Ensure that all work has been carried out in accordance with the specifications in these instructions.
- Observe tightening torques.
- 1. Check the evenness of the mounting surface, ▶ 5.2 [□ 18].
- **2.** Attach the product to the robot,  $\triangleright$  5.2 [ $\Box$  18].
  - ⇒ Observe the maximal tightening torque, admissible screw-in depth and, if necessary, strength class.
- **3.** Mount sensors if necessary, ▶ 5.3 [□ 20].
- **4.** Mount optional modules if necessary, ▶ 5.4 [□ 21]

## 5.2 Mechanical connection

# Evenness of the mounting surface

Adapter plate

requirements

The values apply to the whole mounting surface to which the product is mounted.

Edge length	Permissible unevenness
< 100	< 0.02
> 100	< 0.05

Tab.: Requirements for evenness of the mounting surface (Dimensions in mm) An adapter plate can be used for mounting the CMS-K on the robot and the end effector on the CMS-A. An adapter plate is necessary if the screw connection pattern of the CMS has to be adapted to the customer's equipment (robot flange, end effector). IMPORTANT! Only use adapter plates if they have bore holes and recesses that match the product exactly. Precise assembly is a prerequisite for proper functioning. The adapter plate must meet the following requirements:

- The adapter plate requires bores for the mounting screws with sufficient thread depth for mounting on the robot.
- The adapter plate requires centering recesses for dowel pins with sufficient depth so that no gap is created during assembly.
- Depending on the robot flange, the adapter plate requires a centering plate on the robot side and a centering recess at the interface to the CMS-K robot side.
- Depending on the end effector, the adapter plate requires a centering plate on the CMS-A tool side and a centering recess at the interface to the end effector.
- For sizes with an external piston stroke control, the adapter plate requires a recess adapted to the sensor outlet.

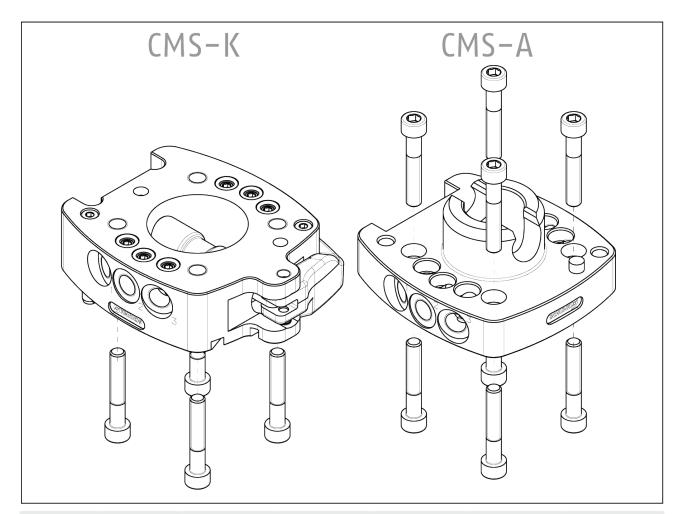
The catalog data sheet contains detailed information and precise manufacturing instructions for possible adapter plate design.

#### NOTE

The manual change head and adapter (CMS-K and CMS-A) have a drilling pattern as per DIN ISO 9409-1 and can therefore be mounted on most robots without additional adapter plates. Screws are not included in the scope of delivery!

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#### Assembly



Size	Fitting of	CMS-K	CMS-K-B	CMS-A	CMS-A-B	CMS-A-N						
040	below	1	matching ISO 9409-1-40-4-M6									
	above		– Ø40, 4x M4									
050	below	1	matching ISO 94	+09-1-50-4-M	6	Ø50, 4x M8						
	above		-	Ø50,4	+х M4	Ø50, 4x M6						
063	below	I	matching ISO 9409-1-63-4-M6									
	above		•х M4	Ø63, 4x M6								
080	below	r	matching IS0 9409-1-80-6-M8									
	above		-	Ø80,4	Ø80, 4x M8							
100	below	n	matching ISO 9409-1-100-6-M8									
	above		-	Ø100,	4x M6	Ø100, 4x M8						
125	below	n	matching ISO 9409-1-125-6-M10									
	above		Ø125, 6x M10									

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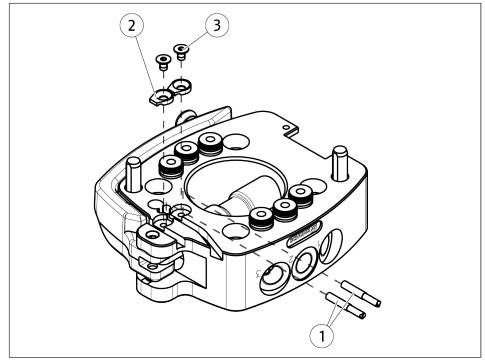
## 5.3 Mounting inductive proximity switch IN 30K-S-M8

#### NOTE

Observe the assembly and operating manual of the sensor for mounting and connecting.

The product is prepared for the use of the inductive sensor **IN 30K-S-M8**.

- For technical data for the suitable sensors, see Assembly and Operating Manual and catalog data sheet.
  - The Assembly and Operating Manual and catalog data sheet are included in the scope of delivery for the sensors and are available at schunk.com.
- Information on handling sensors is available at schunk.com or from SCHUNK contact persons.



- 1. Slide sensors (1) up to the stop in the groove.
- 2. Insert the clamping bracket (2) into the groove.
- 3. Tighten screws (3).
  - ⇒ Max. tightening torque: 0.2 Nm

## CAUTION

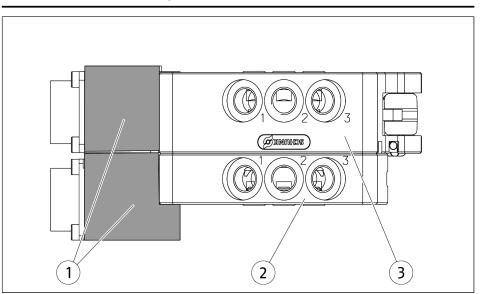
# Possible risk of damage to the sensor and cable during assembly!

Route the sensor cable in such a way that there is no tensile strain on the cable or sensor and the cable cannot become entrapped.

## **5.4** Attachment options for optional modules

#### NOTE

When attaching the optional modules, it can be that the optional module (1) does not connect flush to the manual change adapter (2) or the manual change head (3).



For more information on mounting and screw-on options for option modules, refer to the catalog data sheet.



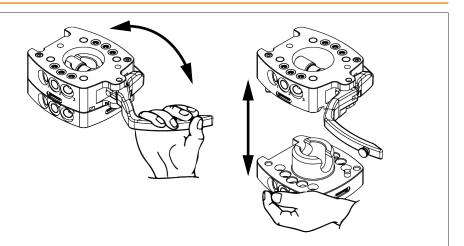
# 6 **Operation**

## A 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.



To unlock, open the hand lever maxSe&Ofe the manual change adapte

Unlocking / locking

# 6.1 Unlocking



#### A WARNING

#### Danger of crushing due to falling objects!

When unlocking, the end effector can fall down when the hand levers are fully open and in an unfavorable end position and lead to serious injuries.

- Before unlocking secure the end effector against falling.
- Wear suitable protective equipment.



## A WARNING

#### Risk of injury from particles thrown out!

When unlocking, dirt particles can be thrown out and lead to serious eye injuries.

- Before unlocking, depressurize system and vent.
- Wear suitable protective equipment.

#### NOTE

Grease the lock bolt if it does not move freely

- 1. Secure the CMS-A against falling down.
- 2. Pull the suspended bolt on the hand lever.
- 3. Turn the hand lever 180° until it stops (unlock).
  - ▷ CMS-K and CMS-A can be pulled apart in the axial direction.

#### 6.2 Locking



### 

#### Danger of crushing due to moving parts.

Fingers and hands can be crushed when locking the manual change system.

- Proceed with caution when locking.
- Do not place fingers between the hand lever, manual change head and manual change adapter.
- **1.** Move the hand lever into the open position.
- 2. CMS-K and CMS-A one inside the other in this position.
- 3. Close the hand lever and snap in the suspended bolt into the bore hole.
  - $\Rightarrow$  Lock is in effect.

## 7 Maintenance

#### 7.1 Notes

#### Original spare parts

Use only original spare parts of SCHUNK when replacing spare and wear parts.

## 7.2 Maintenance intervals

Maintenance interval	Maintenance work
regularly (on each change)	Perform a visual inspection. The product must be free of swarf and dirt.
1000 changing processes *)	Clean all parts thoroughly, check for damage and wear.
	Oil and grease any uncoated steel or moving parts that are exposed
	Grease suspended bolts at the contact surfaces to CMS–K and CMS–A
as required	Send damaged products to SCHUNK for repair.

\*) Information refers to use under normal operating and ambient conditions.

## 7.3 Lubricants/Lubrication points

During maintenance, treat all greased areas with lubricant. Thinly apply lubricant with a lint-free cloth.

SCHUNK recommends the lubricants listed.

Lubricant point	Lubricant
Metallic sliding surfaces	Rivolta F.L.G. GT-2

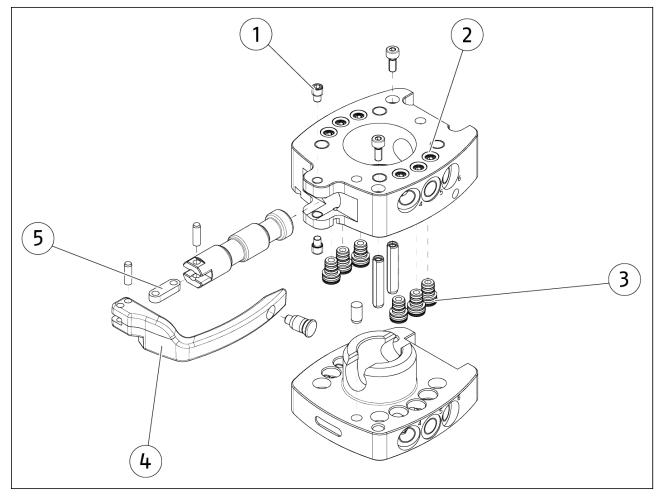
The product contains food-compliant lubricants as standard. The requirements of standard EN 1672-2:2020 are not fully met.

#### NOTE

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

## 7.4 Spare and wearing parts

The following figure is an example image. It serves for illustration and assignment of the spare parts. Variations are possible depending on size and variant.



#### Tab.: Wear parts

Item	Designation	CMS													
		040	050	063	080	100	125								
1	Designation	Guide screw	Guide screw	Guide screw	Guide screw	Guide screw	Guide screw								
	ID	1544336	1544339	1544339	1544339	1544339	1544343								
	Amount	2	2	2	2	2	2								
2	Designation	0-ring Ø4 mm	0−ring Ø4 mm	0−ring Ø5.5 mm	0-ring Ø5.5 mm	0-ring Ø8 mm	0−ring Ø8 mm								
	ID	9942290	9942290	9984192	9984192	9937276	9937276								
	Amount	4	6	6	9	12	12								
3	Designation	signation Sealing Sea pin p		Sealing pin	Sealing pin	Sealing pin	Sealing pin								
	ID	1544312	1544312	1544315	1544315	1544332	1544335								
	Amount	4	6	6	9	12	12								

ltem	Designation	CMS												
		040	050	063	080	100	125							
4	Designation	Seal kit												
	ID	1551974	1551976	1551979	1552000	1552001	1552003							
	Amount in Seal kit	4	6	6	9	12	12							
5	Designation	Hand lever with detent pin												
	ID	1548020	1548021	1548023	1548025	1548028	1548041							
6	Designation	Bolt lug	Bolt lug Bolt lug		Bolt lug	Bolt lug	Bolt lug							
	ID	1544222	1544223	1544223	1544224	1544225	1544228							

# 8 EU-Declaration of Conformity

in accordance with Directive 2001/95/EC (General Product Safety).

Manufacturer/	SCHUNK SE & Co. KG
Distributor	Toolholding and Workholding   Gripping Technology   Automation
	Technology
	Bahnhofstr. 106 – 134
	D-74348 Lauffen/Neckar

We hereby declare that the product described below complies with the requirements of Directive 2001/95/EC and is safe for use in accordance with these conditions. The declaration shall be rendered invalid if modifications are made to the product.

Product designation: Manual change system / CMS

Related technical standards and specifications:

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

Person authorized to compile the technical documentation: Stefanie Walter, Address: see manufacturer's address

Signed for and on behalf of: SCHUNK SE & Co. KG

Signature: see original declaration

Lauffen/Neckar, October 2023

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

# **9 UKCA Declaration of Conformity**

Manufacturer/ Distributor SCHUNK Intec Limited Clamping and gripping technology 3 Drakes Mews, Crownhill MK8 OER Milton Keynes

We hereby declare on our sole authority that the product meets the requirements of the following directives at the time of the declaration. The declaration is rendered invalid if modifications are made to the product.

Product designation: Manual change system / CMS

#### • General Product Safety Regulations 2005, 2005 No. 1803

Applied harmonized standards, especially:

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

Person authorized to compile the technical documentation: Marcel Machado, address: refer to manufacturer's address

Signed for and on behalf of: SCHUNK SE & Co. KG

Lauffen/Neckar, October 2023

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

# 10 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.

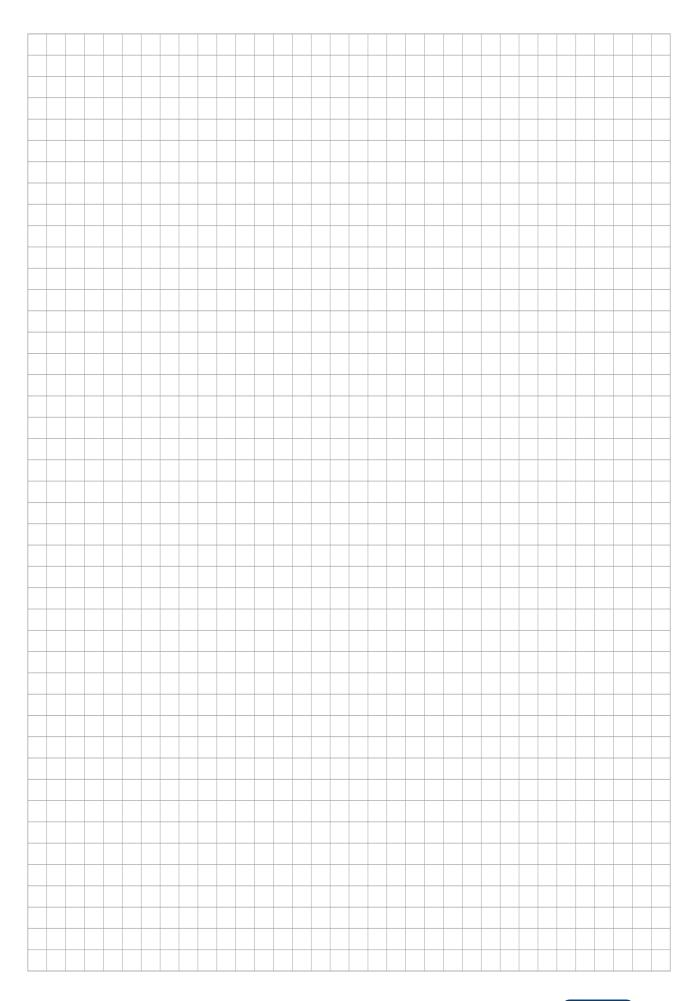
Only in rare exceptional cases do SCHUNK products contain SVHC substances on the candidate list with a mass content above 0.1%. In accordance with Article. 33 (1) of Regulation (EC) No. 1907/2006, SCHUNK complies with its duty to "communicate information on substances in articles" and lists the components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

Signature: see original declaration

Lauffen/Neckar, October 2023

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

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