

Assembly and Operating Manual

Co-act EGP-C

Electrical small components gripper for collaborative operations



Superior Clamping and Gripping



Imprint

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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](#) [► 6] 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.

NOTICE

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 Applicable documents

- General terms of business*
- Catalog data sheet of the purchased product *
- **Variant-URID, UREK:** Software Manual "SCHUNK Software module for URCap, Co-act EGP-C in UREK/URID variants" *
- DGUV certificate, certificate no. MF 17009 *
- Assembly and operating manuals of the accessories *

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

1.1.4 Sizes

This operating manual applies to the following sizes:

- Co-act EGP-C 25
- Co-act EGP-C 40
- Co-act EGP-C 50
- Co-act EGP-C 64

1.1.5 Variants

This operating manual applies to the following variations:

- Co-act EGP-C FCR7 (FANUC CR-7 iA, connection via EE interface)
- Co-act EGP-C KETI (KUKA iiwa, media flange inside electrical)
- Co-act EGP-C KTOE (KUKA iiwa, media flange touch electrical)
- Co-act EGP-C KMFE (KUKA iiwa, media flange electrical)
- Co-act EGP-C URID (Universal Robots, with feed-through)
- Co-act EGP-C UREK (Universal Robots, external cabling)
- Co-act EGP-C TMID (Techman Robot, with feed-through)
- Co-act EGP-C TMEK (Techman Robot, external cabling)
- Co-act EGP-C CR15 (FANUC CR-15iA, external cabling)
- Co-act EGP-C AUBO (AUBO Robotics i5, with feed-through)
- Co-act EGP-C SCR35 (SIASUN SCR 3 and SCR 5, with feed-through)
- Co-act EGP-C HCR (Hanwha Collaborative Robots, with feed-through)
- Co-act EGP-C M1013 (DOOSAN Robot, with feed-through)

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 ambient conditions and operating conditions, [Ambient conditions and operating conditions](#) [► 24]
- Observe the specified maintenance intervals, [Maintenance](#) [► 48]

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

1.3 Scope of delivery

The scope of delivery includes

- Electrical small components gripper for collaborative operations Co-act EGP-C in the version ordered
- Assembly and Operating Manual
- Accessory pack

1.4 Accessories

The following accessories, which are to be ordered separately, are available for the product:

- Gripper fingers

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

2 Basic safety notes

2.1 Appropriate use

The product is designed exclusively for gripping and temporarily holding workpieces or objects.

- The product is intended for installation in a machine or as an end effector of a robot, including for HRC (human-robot collaboration) applications. The applicable guidelines must be observed and complied with.
- The product may only be used within the scope of its technical data.
- The product is intended for industrial use.
- Appropriate use of the product includes compliance with all instructions in this manual.

2.2 Not intended use

It is not intended use if the product is used, for example, as a pressing tool, stamping tool, lifting gear, guide for tools, cutting tool, clamping device or a drilling tool.

- Any utilization that exceeds or differs from the appropriate use is regarded as misuse.

2.3 Product safety

The product represents the latest developments in technology and the recognized safety rules. However, the product can pose hazards if, for example:

- the product is not used as intended,
- the product is not installed or maintained properly,
- the safety and installation instructions are not observed,
- the safety application conditions (SAC) are not observed, or safety regulations of the equal value are not taken into account (see chapter [Obligations of the operator/integrator](#) [► 10]), or
- the power supply fails or is changed.

Notes on power supply failure

When power is lost, the gripper fingers of the product can move freely, and their ability to maintain a hold on the load is not guaranteed. Therefore, the integrator or operator must ensure that releasing the load can not pose any hazard.

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

2.4 Obligations of the operator/integrator

The operator / integrator must ensure that:

- the product is only used as intended,
- the product is only operated in an impeccable, functional condition and is regularly inspected to make sure it is working properly,
- the operating manual is always available in a legible condition and in its entirety at the machine's application location
- only sufficiently qualified and authorized personnel operate and maintain the product,
- this personnel is regularly trained in all relevant questions relating to operational safety and environmental protection, and is familiar with the operating manual, particularly the safety information contained therein.

In particular, the operator / integrator must ensure that the following requirements and instructions for safe operation with a robot are met.

NOTE

Safety is only guaranteed if the following safety application conditions (SAC) are met:

Alternatively, the integrator / operator can implement their own risk-reducing measures and evaluate them as part of their risk analysis. Implementation of a risk analysis is vital in any event.

The following SACs are divided into **general SAC-Gs** and **product-specific SAC-Ps**.

- **SAC-Gs** refer to the interface of the product to or on the overall system. Since the configuration of the overall SCHUNK system is not known, these SAC-Gs are usually provided as a recommendation.
SAC-Gs that are not indicated below as a recommendation, must be followed or replaced by equivalent risk-mitigating measures.
- **SAC-Ps** refer to the product Co-act EGP-C and must be complied with or replaced by equivalent risk-mitigating measures.

| SAC | Content |
|------------------------------|---|
| SAC-05-G (Recommendation) | The integrator must ensure that the safety of the robot system is verified in accordance with the standards/sections of standards applicable to the defined application. |
| SAC-06-G (Recommendation) | For the operation of the product within a robot system, separate safety checks must be carried out for the other components of the robot system (e.g. robot arm, gantry, or manipulator). These safety checks, the product's safety check/certificate of conformity, and the process of taking into account the applicable safety application rules for the entire system (measures for risk reduction from the risk assessment of the overall system), serve as reference checks for integrating the robot system. |
| | ⇒ For additional information, see chapter: Start-up [► 45] |
| SAC-07-G (Recommendation) | The integrator must ensure that any dangerous contact with moving parts of the robot cell is eliminated. |
| | ⇒ For additional information, see chapter: Protection against dangerous movements [► 18] |
| SAC-08-G (Recommendation) | The integrator must ensure that in the event of a collision within the robot system (e.g. with the robot arm, gripper, workpiece), the robot system is able to reliably detect the collision and respond accordingly. |
| SAC-09-G (Recommendation) | The integrator must specify/observe the settings for commissioning the robot. |
| | ⇒ For additional information, see chapter: Start-up [► 45] Commissioning checklist [► 54] |
| SAC-10-G | The integrator must ensure that the product is only used within the scope of its technical data. |
| | ⇒ For additional information, see chapter: Ambient conditions and operating conditions [► 24] Notes on safe operation [► 15] |
| SAC-11-G (Recommendation) | Robots should be equipped with a visual display that indicates when the robot is in collaborative operation mode. |
| SAC-12-G | The integrator must carefully observe the shape of the workpiece, gripping force, alignment when the workpiece is gripped, travel height, path and speed of the product in order to minimize the risk of workpiece loss. |
| | ⇒ For additional information, see chapter: Commissioning checklist [► 54] |
| SAC-03-P | Only clean and decommission the product when it is switched off. |

| SAC | Content |
|----------|---|
| | ⇒ For additional information, see chapter: Fundamental dangers [► 17] |
| SAC-04-P | As part of the risk analysis of the overall system, a maximum permissible workpiece weight must be determined for the application. Important factors here are workpiece parameters such as shape and weight, as well as application parameters, such as travel height and speed. This maximum approved workpiece weight must not be exceeded. |
| | ⇒ For additional information, see chapter: Technical data [► 20] |
| SAC-05-P | Any accidental, unnecessary or unintentional activation of the product must be prevented. |
| | ⇒ For additional information, see chapter: Protection during handling and assembly [► 17] Protection against dangerous movements [► 18] |
| SAC-06-P | To ensure inherent safety levels, it is necessary to take into account the structural design of the fingers: <ul style="list-style-type: none"> • If possible, the gripper fingers should be designed so that unintentional engagement with the gripper fingers is not possible. • The gripper fingers may not have sharp edges or rough surfaces that could pose a hazard. • The relevant requirements (e.g. BG Recommendations, ISO/TS 15066, etc.) must be observed. Compliance with bio-mechanical limits must be verified. • If this is not possible, the integrator / operator must undertake further risk mitigation measures. |
| | ⇒ For additional information, see chapter: Gripper fingers [► 12] Commissioning checklist [► 54] |
| SAC-07-P | The design of the gripper fingers must allow positive gripping to minimize the risk of loss of the workpiece in a de-energized state. If this is not possible, the integrator / operator must undertake further risk mitigation measures. |
| | ⇒ For additional information, see chapter: Gripper fingers [► 12] |
| SAC-08-P | The integrator must bear in mind that a drop in the supply voltage could lead to workpiece loss. |
| | ⇒ For additional information, see chapter: Technical data [► 20] |

| SAC | Content |
|----------|---|
| SAC-09-P | This product is not designed for handling hot or cold workpieces. When handling hot or cold workpieces, heat transfer to the product must be prevented, which may result in the ambient temperature falling below or exceeding the permissible contact temperature. You can find further information in ISO 13732-1/-3. |
| | ⇒ For additional information, see chapter: Technical data [► 20] |
| SAC-10-P | The product may become damaged if in contact with acidic or alkaline substances. |
| | ⇒ For additional information, see chapter: Ambient conditions and operating conditions [► 24] |
| SAC-11-P | The integrator must ensure that the product is grounded. For this purpose, the mechanical connection must be made electrically conductive. |
| | ⇒ For additional information, see chapter: Mechanical connection [► 27] Protection against electric shock [► 19] |
| SAC-12-P | The product is equipped with a safety fuse as a safety component, which may not be replaced under any circumstances. Send products to SCHUNK for repair. |

2.5 Constructional changes

Implementation of structural changes

Via modifications, 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.
- Only use the product with the collision protection cover installed by SCHUNK.

2.6 Gripper fingers

Requirements for the gripper fingers

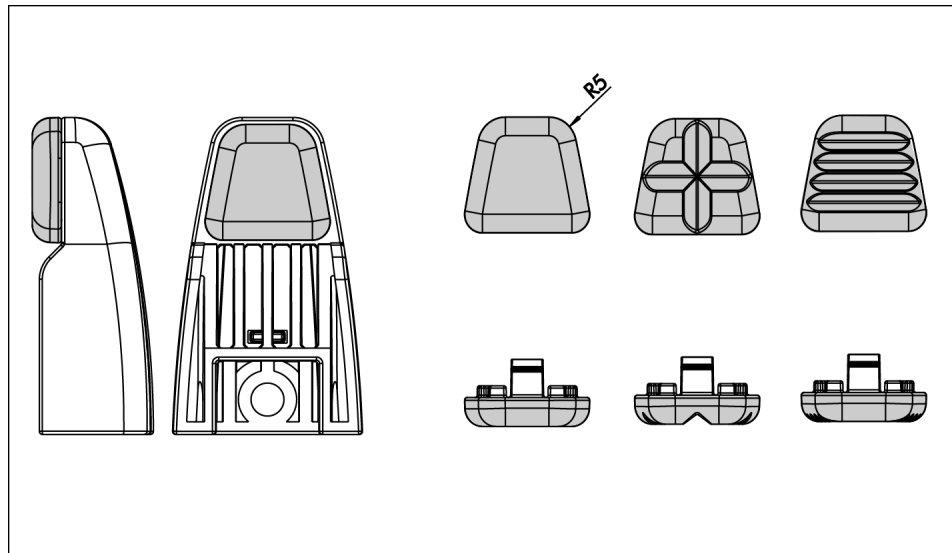
Stored energy within the product creates the risk of serious injuries and significant property damage.

- Arrange the gripper fingers in a way that the product reaches either the position "open" or "closed" in a de-energized state.
- Only exchange the gripper fingers when no residual energy remains in the product.
- Make sure that the product and the top jaws are a sufficient size for the application.

- When operating the robotic system without a protective fence, the gripper fingers must be designed so that bio-mechanical limits are not exceeded, e. g. upon contact between gripper fingers and persons or the workplace.
Compliance with bio-mechanical limits must be verified by the integrator.
- Design the radii and surfaces of the gripper fingers so that they comply with the requirements of collaborative workstations (e. g. BG/BGIA recommendations for risk assessment in accordance with the Machine Directive "Designing workstations with collaborating robots").

Notes and examples for designing the gripper fingers

- All edges should be rounded – including in the Z direction. If possible, make roundings greater than 5 mm.
- If possible, ensure form fitting.
- If possible, implement elastic workpiece parts or elastic inlays.



Examples of gripper finger shapes

The previous section contains the requirements from SAC-06-P, SAC-07-P, [Obligations of the operator/integrator](#) [► 10]

2.7 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. See also [Ambient conditions and operating conditions](#) [► 24].

The previous section contains the requirements from SAC-10-G, SAC-09-P, SAC-10-P, [Obligations of the operator/integrator](#) [► 10]

2.8 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.

2.9 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.

2.10 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.

What to do in an emergency

- In the event of an emergency, disconnect the product from the power supply and manually move the gripper fingers to the "gripper open" position.

The previous section contains the requirements from SAC-10-G, [Obligations of the operator/integrator](#) [► 10]

2.11 Transport

Handling during transport

Incorrect handling during transport can make the product unsafe and risk the danger of serious injuries and considerable material damage.

- During transport and handling, secure the product to prevent it from falling.
- Do not walk under suspended loads.

2.12 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.

What to do in an emergency

- In the event of an emergency, disconnect the product from the power supply and manually move the gripper fingers to the "gripper open" position.

2.13 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.

2.14 Fundamental dangers

General

- Observe safety distances where they were defined in the risk assessment by the integrator / operator.
- Never deactivate safety devices.
- Disconnect power sources before installation, modification or calibration. Ensure that no residual energy remains in the system.
- Do not reach into the movement area of the product during operation.

The previous section contains the requirements from SAC-03-P, [Obligations of the operator/integrator](#) [► 10]

2.14.1 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 can cause serious injuries and even death.

- Do not step under or within the swivel range of suspended loads, as determined by the integrator / operator as part of the risk analysis.
- Never move loads without supervision.
- Do not leave suspended loads unattended.

The previous section contains the requirements from SAC-05-P, [Obligations of the operator/integrator](#) [► 10]

2.14.2 Protection against dangerous movements

Unexpected movements

Residual energy in the system may cause serious injuries while working with the product.

- EMERGENCY STOP switches must be easily and quickly accessible. Before commissioning the machine or automated system, check that the EMERGENCY STOP system is working. Prevent operation of the machine if this protective equipment does not function correctly.

The previous section contains the requirements from SAC-07-G, SAC-05-P, [Obligations of the operator/integrator](#) [► 10]

2.14.3 Protection against electric shock

Work on electrical equipment

Touching live parts may result in death.

- Work on the electrical equipment may only be carried out by qualified electricians in accordance with the electrical engineering regulations.
- Lay electrical cables properly, e. g. in a cable duct or a cable bridge. Observe standards.
- Before connecting or disconnecting electrical cables, switch off the power supply and check that the cables are free of voltage. Secure the power supply against being switched on again.
- Before switching on the product, check that the protective earth conductor is correctly attached to all electrical components according to the wiring diagram.
- Check whether covers and protective devices are fitted to prevent contact with live components.
- Do not touch the product's terminals when the power supply is switched on.

The previous section contains the requirements from SAC-11-P, [Obligations of the operator/integrator](#) [► 10]

Possible electrostatic energy

Components or assembly groups may become electrostatically charged. When the electrostatic charge is touched, the discharge may trigger a shock reaction leading to injuries.

- The operator must ensure that all components and assembly groups are included in the local potential equalisation in accordance with the applicable regulations.
- While paying attention to the actual conditions of the working environment, the potential equalisation must be implemented by a specialist electrician according to the applicable regulations.
- The effectiveness of the potential equalisation must be verified by executing regular safety measurements.

3 Technical data

3.1 Type key

| | Co-act | EGP - C - 40 - N - N-KTOE |
|---|--------|---------------------------|
| Collaborative actuator | | |
| Electrical small components grippers | | |
| DGUV-certified unit | | |
| Size | | |
| 25 40 50 64 | | |
| not assigned | | |
| not assigned | | |
| Robot and flange interface * | | |
| * Variants, see the following table | | |

| Product variant | Robot and flange interface |
|-----------------|---|
| FCR7 | FANUC CR-7 iA connection via EE interface |
| KETI | KUKA iiwa media flange electric inside |
| KTOE | KUKA iiwa media flange touch electric |
| KMFE | KUKA iiwa media flange electric |
| URID | Universal Robots with feed-through (electr. tool interface) |
| UREK | Universal Robots external cabling |
| TMID | Techman Robot with feed-through (electr. tool interface) |
| TMEK | Techman Robot external cabling |
| CR15 | FANUC CR-15iA external cabling |
| AUBO | AUBO Robotics i5 with feed-through (electr. tool interface) |
| SCR35 | SIASUN SCR 3 and SCR 5 with feed-through (electr. tool interface) |

| Product variant | Robot and flange interface |
|-----------------|--|
| HCR | Hanwha Collaborative Robots with feed-through (electr. tool interface) |
| M1013 | DOOSAN Robot with feed-through (electr. tool interface) |

NOTE

The product's ID number is located on the name plate. The catalog data sheet contains the assignment of the ID number of the listed product variants.

3.2 Connection data

Size 25, 40

| Designation | Co-act EGP-C | | | | | |
|--|--------------|------|------|------|------|------|
| | 25 | | 40 | | | |
| Supply voltage [VDC] | 24 | | | | | |
| Min. [VDC] | 21.6 | | | | | |
| Max. [VDC] | 26.4 | | | | | |
| Min. Supply current power supply unit [A] * | | | | | | |
| • Variante: KETI, KTOE | - | | 1.0 | | | |
| • Variante: FCR7, UREK, CR 15, HCR, M1013 | 1.0 | | 1.0 | | | |
| • Variante: URID, TMID, TMEK, UBO, SCR 35 | 0.6 | | 0.6 | | | |
| Max. Current input [A]** | | | | | | |
| • Variante: KETI, KTOE | - | | 2.0 | | | |
| • Variante: FCR7, UREK, CR15, HCR | 2.0 | | 2.0 | | | |
| • Variante: URID, TMID, TMEK, AUBO, SCR 35 | 0.6 | | 0.6 | | | |
| Max. Workpiece weight [kg] in force-fit gripping *** | 0.2 | | 0.7 | | | |
| Gripping force [%] | 50 | 100 | 100 | 75 | 50 | 25 |
| Current input in blocked state [A] **** | 0.07 | 0.14 | 0.20 | 0.15 | 0.10 | 0.05 |

Size 50, 64

| Designation | Co-act EGP-C | | | | | | | |
|--|--------------|------|------|------|------|-----|------|------|
| | 50 | | | | 64 | | | |
| Supply voltage [VDC] | 24 | | | | | | | |
| Min. [VDC] | 21.6 | | | | | | | |
| Max. [VDC] | 26.4 | | | | | | | |
| Min. Supply current power supply unit [A] * | 2.0 | | | | 2.0 | | | |
| Max. Current input [A]** | 2.0 | | | | 2.0 | | | |
| Max. Workpiece weight [kg] in force-fit gripping *** | 1.05 | | | | 1.15 | | | |
| Gripping force [%] | 100 | 75 | 50 | 25 | 100 | 75 | 50 | 25 |
| Current input in blocked state [A] *** | 0.3 | 0.22 | 0.15 | 0.07 | 0.15 | 0.1 | 0.08 | 0.04 |

* minimum supply current for reliable operation of product

** maximum current input in the acceleration phase
(max. t = 50 ms)

*** Higher values can be achieved in positive locking,
depending on the maximum moment load (see catalog data
sheet). The maximum workable workpiece weight shall be
determined as part of a risk assessment by the integrator /
operator, [Obligations of the operator/integrator](#) [► 9].

**** Current input in blocked state (in gripper end position or
while gripping a workpiece) with active command "Open
Gripper" or "Close Gripper"

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

*The previous section contains the requirements from SAC-04-P,
SAC-08-P, [Obligations of the operator/integrator](#) [► 10]*

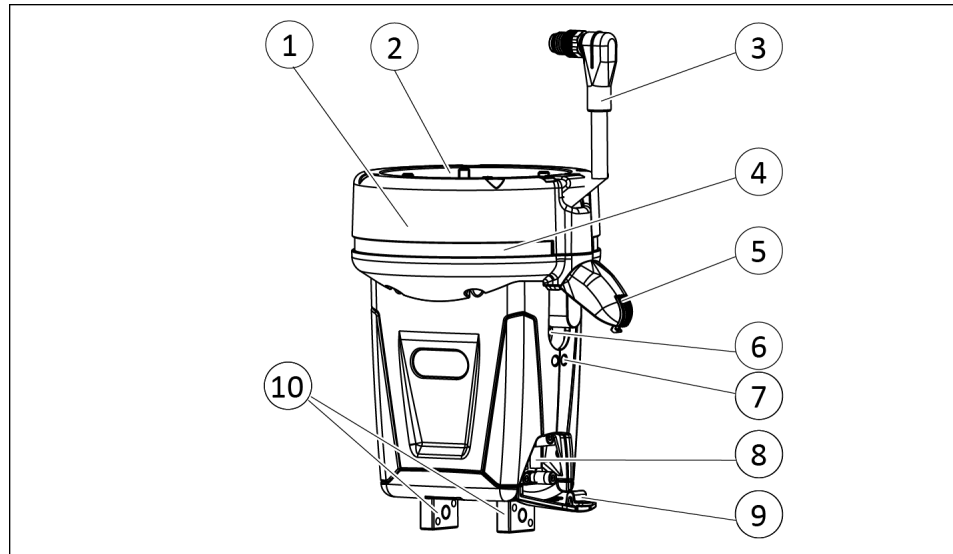
3.3 Ambient conditions and operating conditions

| Designation | Co-act EGP-C |
|----------------------------------|--------------|
| IP protection class (mechanical) | 30 |
| IP protection class (electrical) | 40 |
| Noise emission [dB(A)] | ≤ 70 |
| Ambient temperature [°C] | |
| Min. | 5 |
| Max. | 55 |
| Relative air humidity [%] | |
| Max. | 95 |

The previous section contains the requirements from SAC-10-G, [Obligations of the operator/integrator](#) [► 10]

4 Design and description

4.1 Design



Design Co-act EGP-C

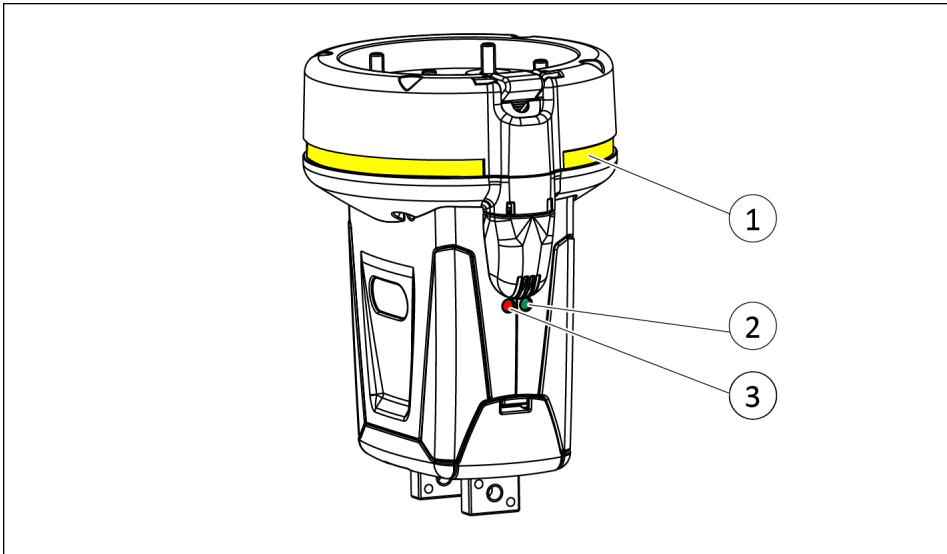
| | |
|----|---|
| 1 | Collision protection cover |
| 2 | Flange for connecting the robot |
| 3 | Connector for voltage supply and actuation of the product (design depends on robot type) |
| 4 | LED light band |
| 5 | Service flap |
| 6 | "Gripping force" rotary switch |
| 7 | LED |
| 8 | Sensors |
| 9 | Service flap (not at size 25) |
| 10 | Base jaws |

4.2 Description

The product is a servo-electric 2-finger parallel gripper featuring high power density for collaborative operation with

- integrated electronics,
- collision protection cover,
- integrated sensor system and
- adapter flange for robots.

4.3 Display



Status displays

| | | |
|-----|----------------|---|
| 1 * | LED light band | freely-configurable, application-specific display, Actuation [► 40] |
| 2 | LED READY | Status display of the product |
| 3 | LED ERROR | |

* Only for variants FCR7, UREK, TMEK, HCR, KETI, KTOE, KMFE

| Designation | Color | Function |
|-------------|-------|--|
| READY | Green | Indicates whether the voltage is connected. |
| | | <ul style="list-style-type: none"> • Lights up as long as voltage is present in the product. • Does not light up if there is no voltage in the product. |
| ERROR | Red | Indicates whether there is a warning or an error. |
| | | <ul style="list-style-type: none"> • Does not light up when there is no warning or error and the product is ready to operate. • Lights up when there is an "excessive temperature" warning. <ul style="list-style-type: none"> – The phase current of the motor is limited to I_{duration}. – The closing and opening times can increase. – Is automatically extinguished when the warning no longer exists. • Blinks slowly (at approx. 1.2 s intervals) when there is an "excessive temperature" error. <ul style="list-style-type: none"> – The product enters an idle phase until it has cooled down. The commands <i>Open gripper</i> and <i>Close gripper</i> are not processed. – The error must be acknowledged. • Blinks rapidly (at approx. 0.6 s intervals), when the Gripping force rotary switch is between two switching positions. |

5 Assembly and settings

5.1 Installing and connecting

Overview

- Check the evenness of the mounting surface, [Mechanical connection](#) [► 27].
- Attach the product to the robot, [Mechanical connection](#) [► 27].
 - ✓ Observe the tightening torque for the mounting screws.
- Secure the gripper fingers to the base jaws, [Install gripper fingers](#) [► 31].
- Optional, based on design: Connect the cable for power supply and actuation, [Electrical connection](#) [► 33].
- Adjust the sensor, if necessary, [Adjust the sensors](#) [► 43].
- Adjust gripping force, if necessary, [Adjust gripping force](#) [► 41].

5.2 Mechanical connection

Evenness of the mounting surface

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

Requirements for evenness of the mounting surface (Dimensions in mm)

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

Electrically conductive

The mounting surface must be electrically conductive to ensure the grounding of the product.

The previous section contains the requirements from SAC-11-P, [Obligations of the operator/integrator](#) [► 10]

Connections at the product

The product has an ISO flange that makes it possible to fasten it to the robot. The dimensions of the ISO flange vary depending on the product variant and depending on the robot type.

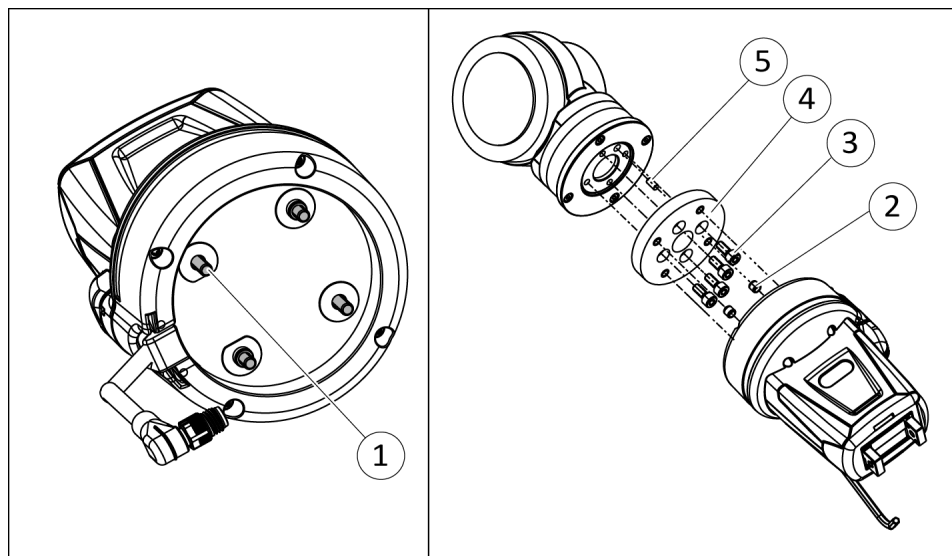
| Connection version | Product variant, Type key [► 20] |
|--------------------|--|
| ISO flange 31.5 | Co-act EGP-C FCR7 Co-act EGP-C M1013 |

| Connection version | Product variant, Type key [► 20] |
|--------------------|---|
| ISO flange 50 | Co-act EGP-C KETI Co-act EGP-C KMFE Co-act EGP-C KTOE Co-act EGP-C URID Co-act EGP-C UREK Co-act EGP-C TMID Co-act EGP-C TMEK Co-act EGP-C CR15 Co-act EGP-C AUBO Co-act EGP-C SCR35 Co-act EGP-C HCR |

NOTE

The product's ID number is located on the name plate. The catalog data sheet contains the assignment of the ID number of the listed product variants.

Connection variant: ISO flange 31.5



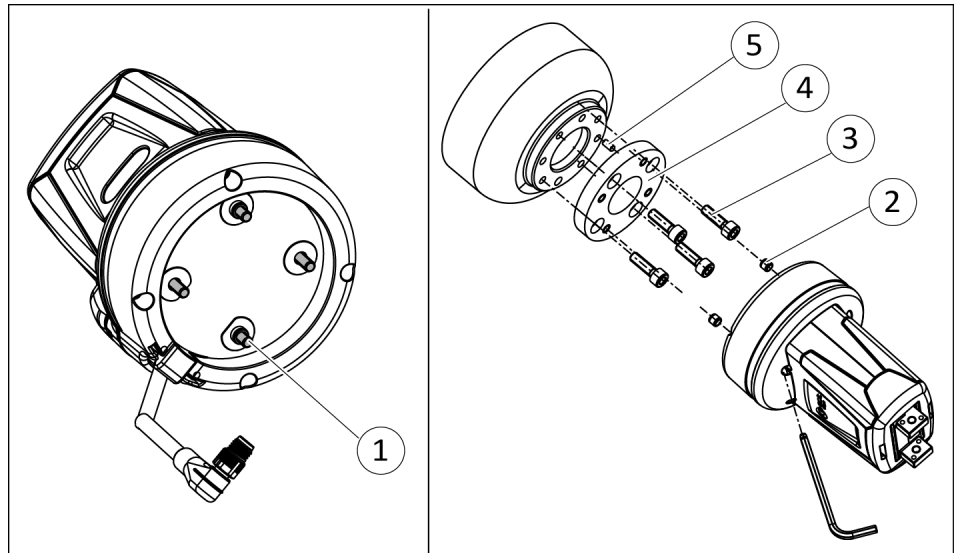
Installation of the product on the robot with ISO flange, bolt pitch circle \varnothing 31.5

| Item | Mounting | Co-act EGP-C |
|------|------------------------|----------------------|
| 1 | Mounting screw | M4 x 18 |
| 2 * | Centering sleeve [mm] | \varnothing 6 |
| 3 * | Mounting screw | M5 x 10 |
| | Tightening torque [Nm] | 6.1 |
| 4 * | ISO-Flange | ISO 9409-1-31.5-4-M5 |
| 5 * | Centering pin [mm] | \varnothing 5 |

* Contained in accessory pack.

Note: The mounting screws (1) are already pre-assembled on the product. A ball-head Allen key required for installation with a working angle of 30° is included in the accessory pack.

Connection variant: ISO flange 50



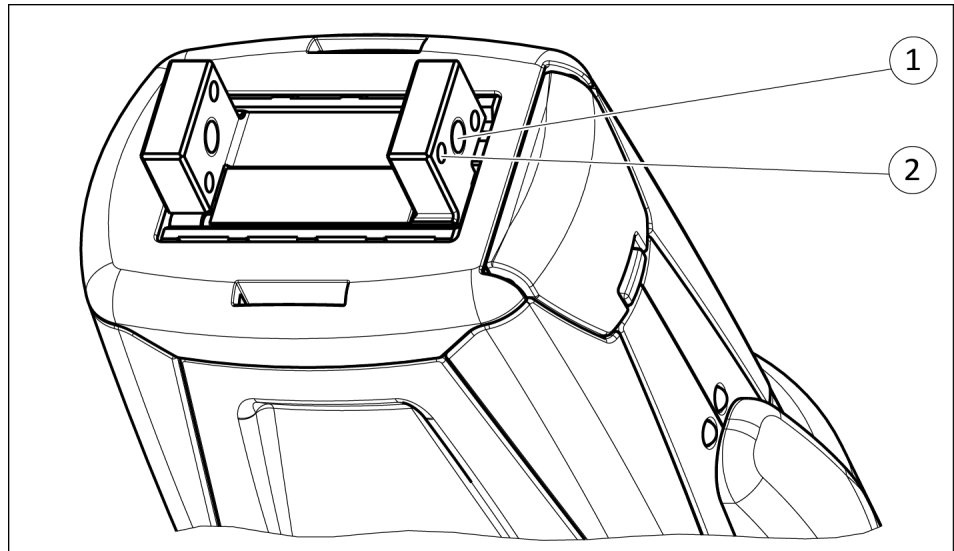
Installation of the product on the robot with ISO flange, bolt pitch circle $\varnothing 50$

| Item | Mounting | Co-act EGP-C |
|------|------------------------|--------------------|
| 1 | Mounting screw | M4 x 18 |
| 2 * | Centering sleeve [mm] | $\varnothing 6$ |
| 3 * | Mounting screw | M6 x 10 |
| | Tightening torque [Nm] | 10 |
| 4 * | ISO-Flange | ISO 9409-1-50-4-M6 |
| 5 * | Centering pin [mm] | $\varnothing 6$ |

* Contained in accessory pack.

Note: The mounting screws (1) are already pre-assembled on the product. A ball-head Allen key required for installation with a working angle of 30° is included in the accessory pack.

Connections at the base jaws



Connections at the base jaws

Screw-in depth and tightening torque

| Item | Designation | Co-act EGP-C | | | |
|------|---|--------------|-------|-----|-----|
| | | 25 | 40 | 50 | 64 |
| 1 | Thread in base jaws | M4 | M5 | M6 | M8 |
| | Max. depth of engagement from locating surface [mm] | 4 | 6 | 8 | 10 |
| | Max. tightening torque of the mounting screws [Nm] | | | | |
| | – Steel gripper fingers: | 3.1 | 6.1 | 10 | 25 |
| | – Plastic gripper fingers: | 2.0 | 4.3 | 5 | 5 |
| 2 | Bore holes for cylindrical pin [mm] | Ø 1.5 | Ø 2.5 | Ø 3 | Ø 4 |

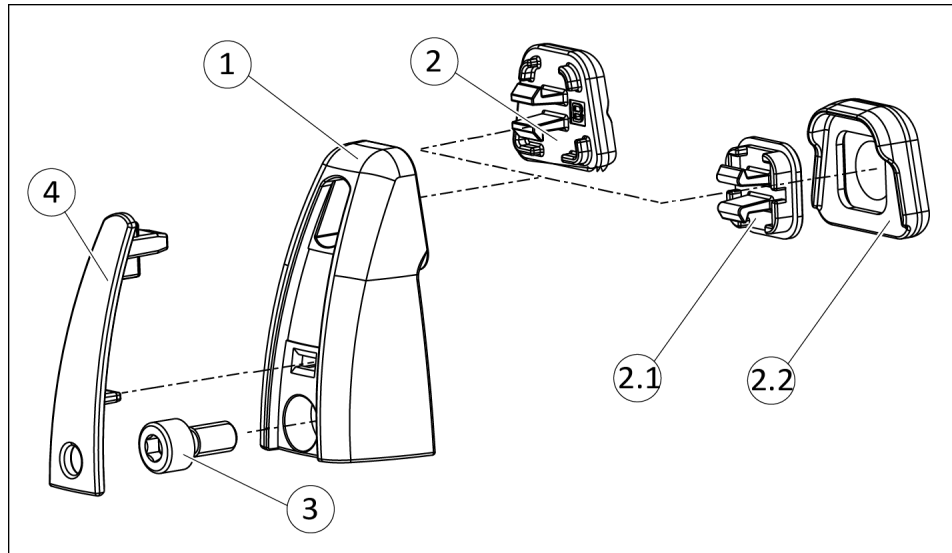
Further information on installation, [Install gripper fingers](#) [► 31].

5.2.1 Install gripper fingers

NOTE

Gripper fingers are available as accessories from SCHUNK, see the catalog data sheet for further information.

Variant: standard gripper fingers

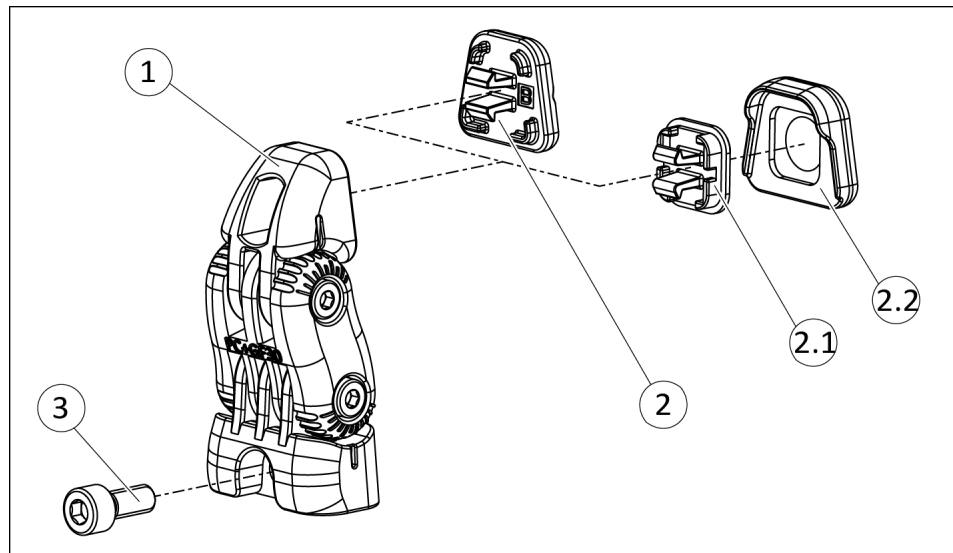


- Fasten gripper finger (1) to the base jaw using the screw (3).
 - ✓ Observe the permissible depth of engagement.
 - ✓ Observe the tightening torque for the mounting screws.
 - ✓ Information on tightening torque and depth of engagement, [Mechanical connection](#) [► 30].
- Clip the inlay (2) to the gripper finger (1).
OR: Clip inlay (2.1) to the gripper finger (1) and attach silicone cover (2.2).
- Clip the cover (4) to the gripper finger (1).

Variant: Flexible gripper finger

NOTE

The flexible gripper finger is only suitable for test purposes. Do not use in continuous operation.



- Fasten gripper finger (1) to the base jaw using the screw (3).
 - ✓ Observe the permissible depth of engagement.
 - ✓ Observe the tightening torque for the mounting screws.
 - ✓ Information on tightening torque and depth of engagement, [Mechanical connection](#) [► 30].
- Clip the inlay (2) to the gripper finger (1).
OR: Clip inlay (2.1) to the gripper finger (1) and attach silicone cover (2.2).

5.3 Electrical connection

5.3.1 Connection assignment

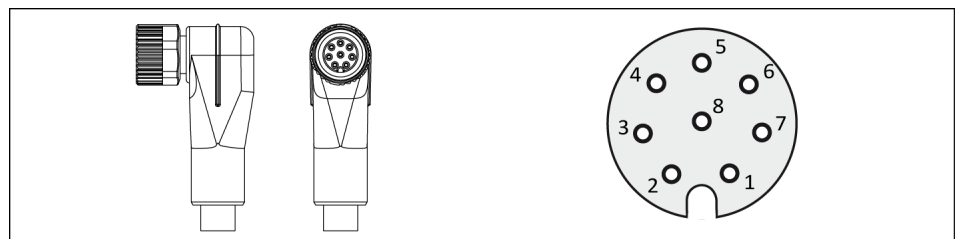
Based on product variant – depending on the robot type – the product has one of the following connections.

| No. | Connection version | Product variant, Type key [► 20] |
|-----|---|--|
| 1 | M8 socket, 8-pin | Co-act EGP-C URID Co-act EGP-C AUBO Co-act EGP-C SCR35 |
| 2 | M12 connector, 17-pin | Co-act EGP-C KTOE |
| 3 | Cable with wire strands | Co-act EGP-C UREK Co-act EGP-C FCR7 Co-act EGP-C TMEK Co-act EGP-C CR15 |
| 4 | KUKA media flange inside electrical | Co-act EGP-C KETI |
| 5 | M8 connector, 8-pin and M8 connector, 3-pin | Co-act EGP-C KMFE |
| 6 | M8 connector, 8-pin | Co-act EGP-C TMID Co-act EGP-C M1013 |
| 7 | M12 connector, | Co-act EGP-C HCR |

NOTE

The product's ID number is located on the name plate. The catalog data sheet contains the assignment of the ID number of the listed product variants.

Connection version 1: M8 socket, 8-pin



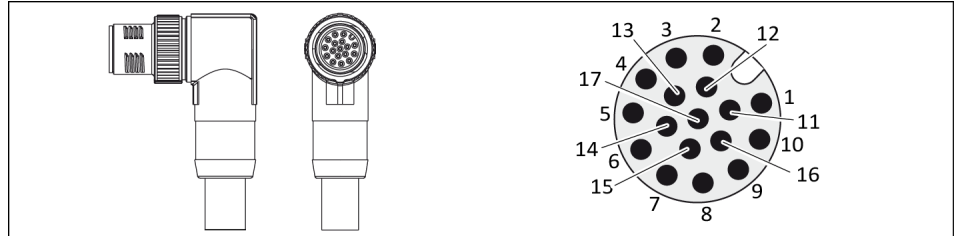
M8 socket, 8-pin

Connection assignment

| Pin | Wire strand | Signal | Interface Robot |
|-----|-------------|----------|--------------------|
| 1 | White | n.c. | Analog Input AI 2 |
| 2 | Brown | n.c. | Analog Input AI 3 |
| 3 | Green | Sensor 2 | Digital input DI 9 |
| 4 | Yellow | Sensor 1 | Digital input DI 8 |
| 5 | Grey | +24 VDC | 12 / 24 V |

| Pin | Wire strand | Signal | Interface Robot |
|-----|-------------|----------------|---------------------|
| 6 | Pink | Closes gripper | Digital output DO 9 |
| 7 | Blue | Opens gripper | Digital output DO 8 |
| 8 | Red | GND | GND |

Connection version 2: M12 connector, 17-pin

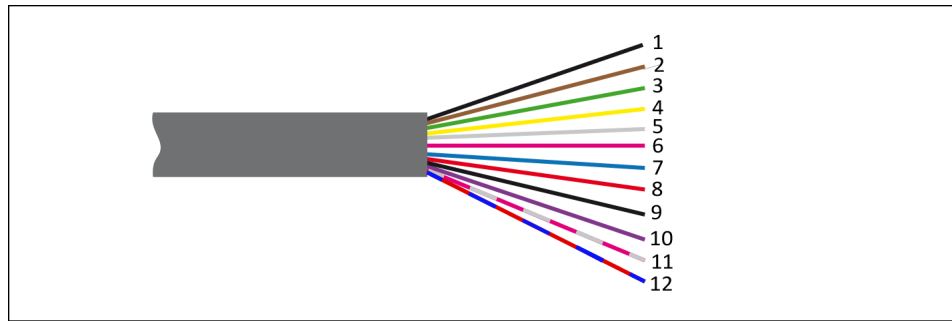


M12 connector, 17-pin

Connection assignment

| Pin | Wire strand | Signal | KUKA Connector X3 |
|-----|----------------|--|----------------------|
| 1 | Brown | Closes gripper | MF_Output_0 |
| 2 | Blue | Digital input DI 2 (LED light band) | MF_Output_3 |
| 3 | White | Sensor 4 (optional) | MF_Input_3 |
| 4 | Green | n.c. | MF_Input_4 |
| 5 | Pink | GND | GND_24V |
| 6 | Yellow | n.c. | GND_24V |
| 7 | Black | +24 VDC | Output_VCC |
| 8 | Grey | n.c. | Output_VCC |
| 9 | Red | n.c. | Output_VCC |
| 10 | Violet | Sensor 1 | MF_Input_0 |
| 11 | Grey/Pink | Opens gripper | MF_Output_1 |
| 12 | Red/Blue | Digital input DI 1 (LED light band) | MF_Output_2 |
| 13 | White / Green | Sensor 3 (optional) | MF_Input_2 |
| 14 | Brown / Green | n.c. | GND_24V |
| 15 | White / Yellow | n.c. | Output_VCC |
| 16 | Yellow / Brown | Sensor 2 | MF_Input_3 |
| 17 | White / Grey | n.c. | GND_24V |

Connection version 3: cable with wire strands

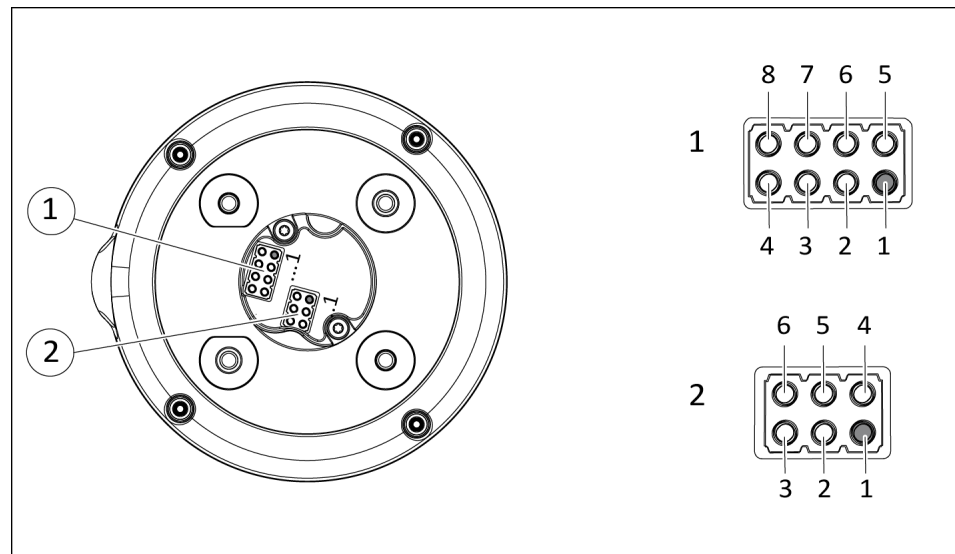


Cable with 12 wire strands

Connection assignment

| No. | Wire strand | Signal |
|-----|-------------|---------------------------------|
| 1 | White | Digital input DI 2 |
| 2 | Brown | Digital input DI 1 |
| 3 | Green | Sensor 2 |
| 4 | Yellow | Sensor 1 |
| 5 | Grey | Sensor 4 (optional, on request) |
| 6 | Pink | Sensor 3 (optional, on request) |
| 7 | Blue | Closes gripper |
| 8 | Red | Opens gripper |
| 9 | Black | n.c. |
| 10 | Violet | n.c. |
| 11 | Grey/Pink | GND |
| 12 | Red/Blue | +24 VDC |

Connection version 4: KUKA media flange inside electrical

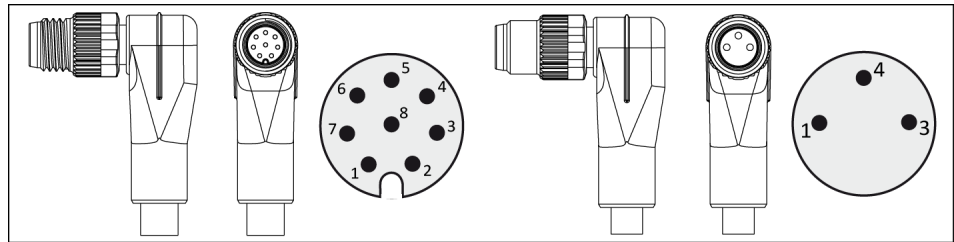


KUKA media flange inside electrical

Connection assignment

| Pin | Signal | KUKA-plug of Inside electrical | KUKA-plug X76 |
|-------------------------------|---------------------|--------------------------------|---------------|
| Connector (1), Digital inputs | | | |
| 1 | Sensor 2 | 13 CTR_2_5 | 5 |
| 2 | Sensor 4 (optional) | 16 CTR_3_8 | 8 |
| 3 | Sensor 3 (optional) | 15 CTR_3_7 | 7 |
| 4 | Closes gripper | 9 CTR_1_1 | 1 |
| 5 | Digital input DI 2 | 14 CTR_2_6 | 6 |
| 6 | Digital input DI 1 | 11 CTR_1_3 | 3 |
| 7 | Opens gripper | 10 CTR_1_2 | 2 |
| 8 | Sensor 1 | 12 CTR_2_4 | 4 |
| Connector (2), voltage supply | | | |
| 1 | GND | 8 GND2 | B |
| 2 | +24 V DC | 7 POWER2 | A |
| 3 | +24 V DC | 7 POWER2 | A |
| 4 | GND | 8 GND2 | B |
| 5 | GND | 8 GND2 | B |
| 6 | +24 V DC | 7 POWER2 | A |

Connection version 5: M8 connector, 8-pin and M8 connector, 3-pin

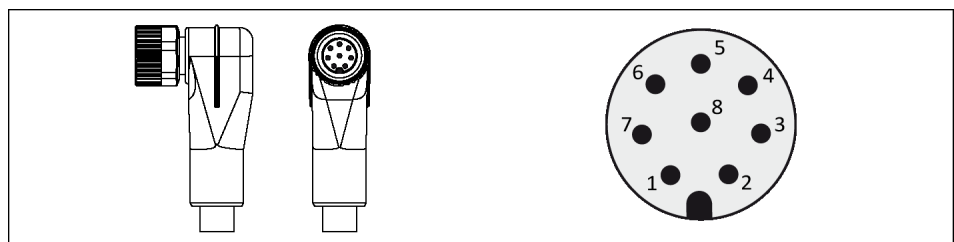


M8 connector, 8-pin and M8 connector, 3-pin

Connection assignment

| Pin | Wire strand | Signal |
|----------------------------|-------------|---------------------|
| M8 connector, 8-pin | | |
| 1 | White | Closes gripper |
| 2 | Brown | Opens gripper |
| 3 | Green | Digital input DI 1 |
| 4 | Yellow | Sensor 1 |
| 5 | Grey | Sensor 2 |
| 6 | Pink | Digital input DI 2 |
| 7 | Blue | Sensor 3 (optional) |
| 8 | Red | Sensor 4 (optional) |
| M8 connector, 3-pin | | |
| 1 | Brown | +24 VDC |
| 3 | Blue | GND |
| 4 | Black | n.c. |

Connection version 6: M8 connector, 8-pin



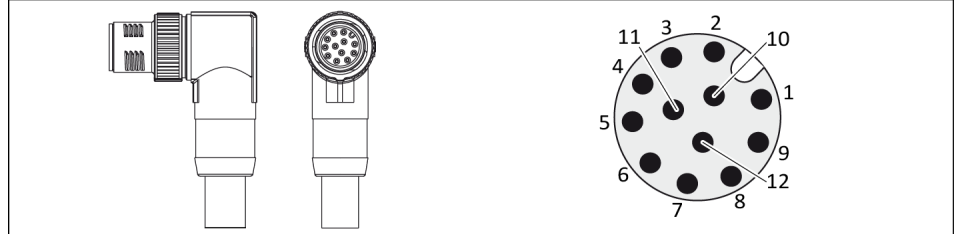
M8 connector, 8-pin

Connection assignment

| Pin | Wire strand | Signal | Interface Robot |
|-----|-------------|----------------|---------------------|
| 1 | White | +24 VDC | +24 V |
| 2 | Brown | Sensor 1 | Digital input DI 0 |
| 3 | Green | Sensor 2 | Digital input DI 1 |
| 4 | Yellow | n.c. | Digital input DI 2 |
| 5 | Grey | Opens gripper | Digital output DO 0 |
| 6 | Pink | Closes gripper | Digital output DO 1 |

| Pin | Wire strand | Signal | Interface Robot |
|-----|-------------|--------|---------------------|
| 7 | Blue | n.c. | Digital output DO 2 |
| 8 | Red | GND | GND |

Connection version 7: M12 connector,



M12 connector,

Connection assignment

| Pin | Signal | Interface Robot |
|-----|-----------------|---------------------|
| 1 | +24 VDC | 0/12/24 VDC |
| 2 | GND | GND |
| 3 | Closes gripper | Digital output DO 0 |
| 4 | Opens gripper | Digital output DO 1 |
| 5 | Digital input 2 | Digital output DO 2 |
| 6 | Digital input 1 | Digital output DO 3 |
| 7 | Sensor 1 | Digital input DI 0 |
| 8 | Sensor 2 | Digital input DI 1 |
| 9 | n.c. | Digital input DI 2 |
| 10 | n.c. | Digital input DI 3 |
| 11 | n.c. | Analog Input AI 0 |
| 12 | n.c. | Analog Input AI 1 |

5.3.2 Actuation

Truth table

The following truth tables show the actuation of the digital inputs during possible commands by the superordinated control unit.

Current input per digital input amounts to max. $I=10\text{ mA}$.

Depending on the connection variant, the digital inputs are used differently, [Connection assignment](#) [► 33].

NOTE

For variant URID, the digital inputs are listed in switching type "NPN".

Actuation Opens gripper / Closes gripper

| Function | Digital input | |
|--|---------------|----------------|
| | Opens gripper | Closes gripper |
| De-energized drive (shutdown, motor is short-circuited) | 0 | 0 |
| Opens gripper | 1 | 0 |
| Closes gripper | 0 | 1 |
| Rectify error (shutdown, motor is short-circuited) | 1 | 1 |

Rest period between two commands

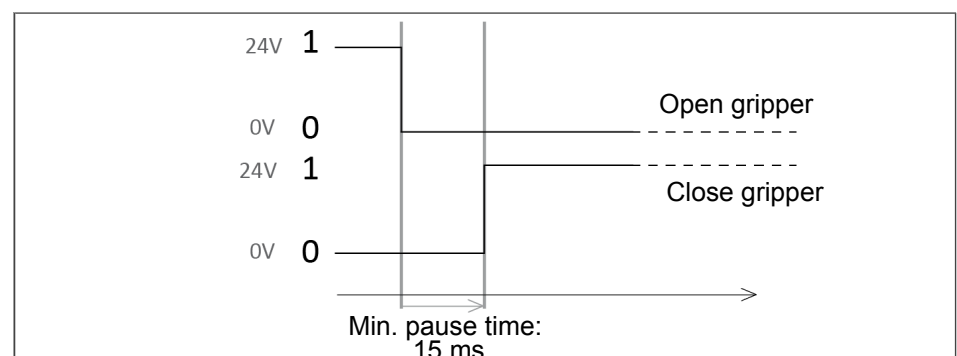
NOTICE

Material damage due to faulty control!

Inputting twice can damage internal electronics.

- Maintain a rest period between commands.

The following graph shows the minimum rest period that must be kept between two commands.



Example Opens gripper / Closes gripper

Actuation LED light band

| Function | Digital input | |
|-----------------------------------|---------------|------|
| | DI 2 | DI 1 |
| LED light band is not lighting up | 0 | 0 |
| LED light band shines green | 1 | 0 |
| LED light band shines yellow | 0 | 1 |
| LED light band shines red | 1 | 1 |

NOTE

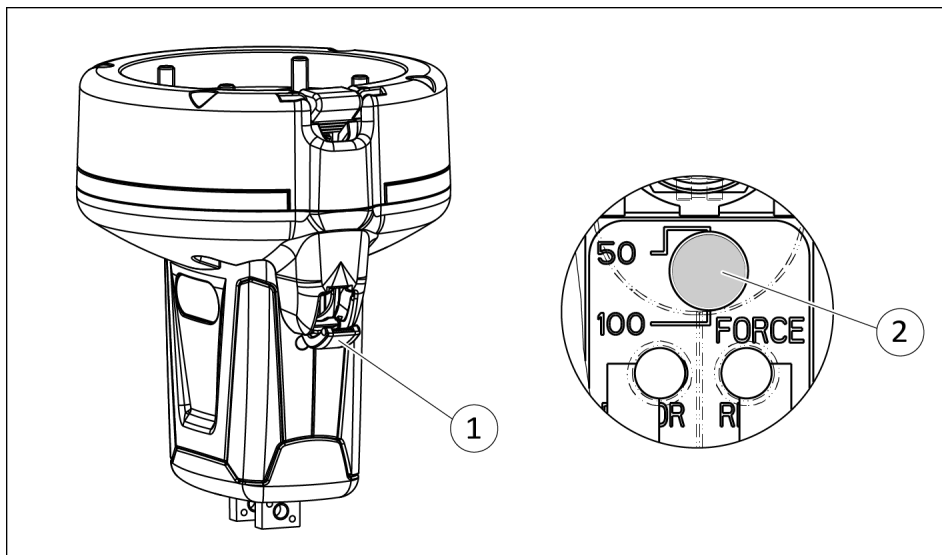
The brightness values of the LED colors were preconfigured in the factory.

5.4 Adjust gripping force

The gripping force is changed by altering the current limitation via the "Gripping force" rotary switch.

In order to change the gripping force, inputs "Opens gripper" and "Closes gripper" must be de-energized (low), [Actuation](#) [► 39].

5.4.1 Size 25, 50, 64

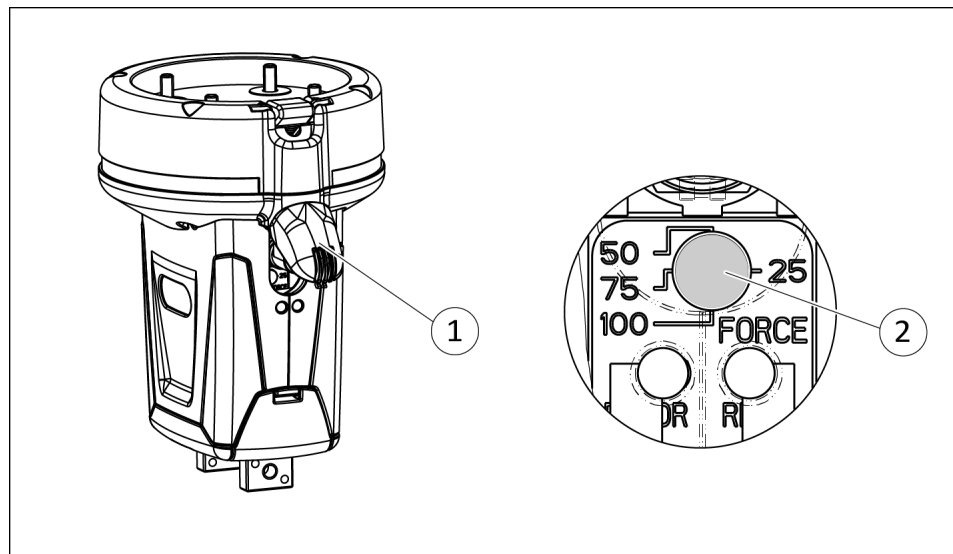


Access to "Gripping force" rotary switch

- Digital inputs "Opens gripper" and "Closes gripper" are not powered (low), [Actuation](#) [► 39].
- Carefully open service flap (1) from below.
- Remove seal plug (2).
- Adjust gripping force on the "Gripping force" rotary switch. Do this using a suitable slot screwdriver with a blade at least 2 mm wide. **NOTICE! Do not exert axial pressure on the axis of the rotary switch.**
- Note: The "Gripping force" rotary switch has two set positions.
- Insert seal plug (2).
- Close service flap (1).

| Item | Gripping force [%] |
|----------------|--------------------|
| 100 (standard) | 100 |
| 50 | 50 |

5.4.2 Size 40



Access to "Gripping force" rotary switch

- Digital inputs "Opens gripper" and "Closes gripper" are not powered (low), [Actuation](#) [► 39].
- Open service flap (1).
- Remove seal plug (2).
- Adjust gripping force on the "Gripping force" rotary switch. Do this using a suitable slot screwdriver with a blade at least 2 mm wide. **NOTICE! Do not exert axial pressure on the axis of the rotary switch.**
Note: The "Gripping force" rotary switch has four set positions.
- Insert seal plug (2).
- Close service flap (1).

| Item | Gripping force [%] |
|----------------|--------------------|
| 100 (standard) | 100 |
| 75 | 75 |
| 50 | 50 |
| 25 | 25 |

5.5 Adjust the sensors

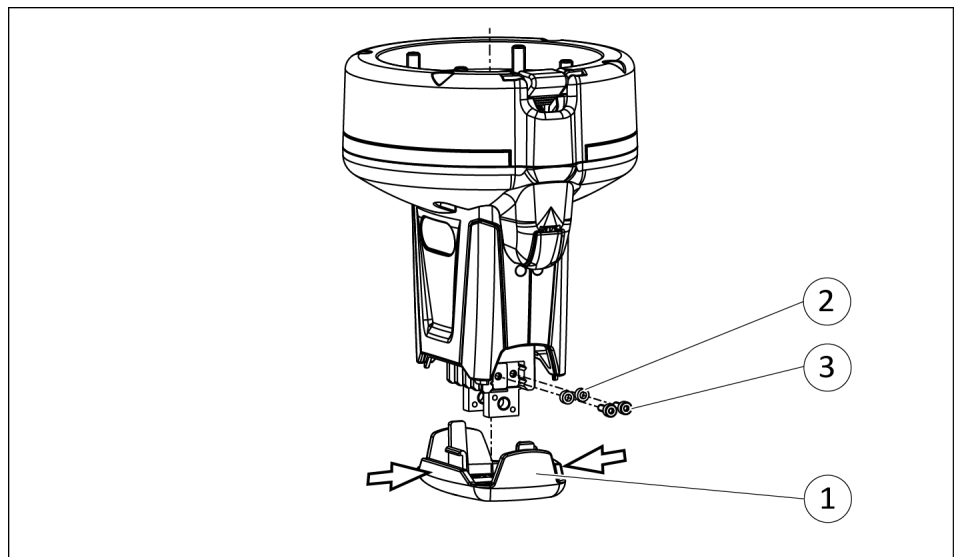
In the delivery state the sensors come mounted on the product, the positions "open" and "closed" are configured.

Sensors only need to be adjusted if the position "Part gripped" is to be monitored.

5.5.1 Size 25

NOTE

To monitor the position "Part gripped", a spacer sleeve must be installed. The spacer sleeve and the required longer screw are included in the accessory pack.



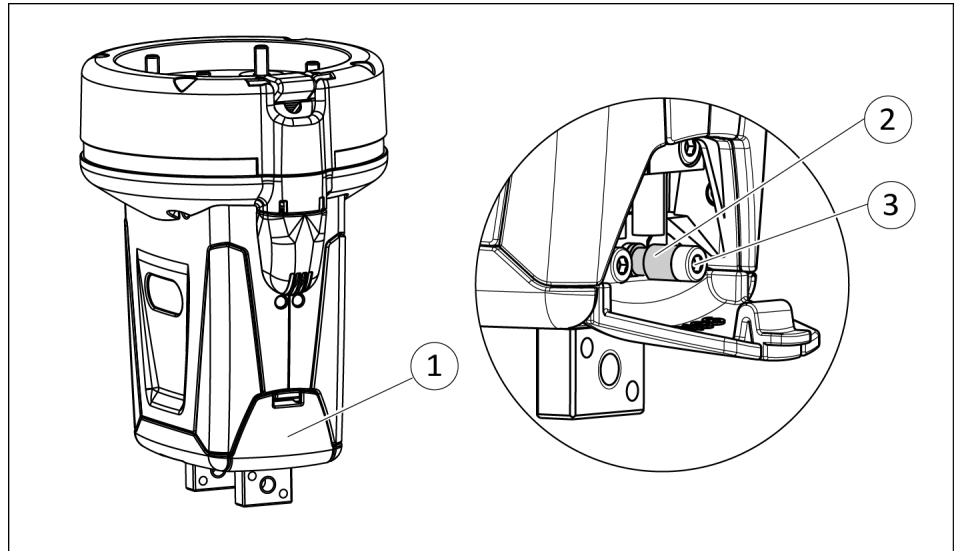
Adjust the sensor

- Carefully push cover (1) inside to the marked positions (arrow) and pull down.
- Unscrew screws (3).
- Secure spacer sleeve (2) to the base jaw with the screw from the accessory pack.
Tightening torque: 12.5 Ncm
- Put product in the position in which it is to be set.
- Monitor the "Part gripped" position and test the function.
- Set cover (1) in the collision protection cover and push it upwards until it is securely locked.

5.5.2 Size 40, 50, 64

NOTE

To monitor the position "Part gripped", a spacer sleeve must be installed. The spacer sleeve and the required longer screw are included in the accessory pack.



Adjust the sensor

- Open service flap (1).
- Unscrew screws (3).
- Secure spacer sleeve (2) to the base jaw with the screw from the accessory pack.
Tightening torque: 12.5 Ncm
- Put product in the position in which it is to be set.
- Monitor the "Part gripped" position and test the function.
- Close service flap (1).

6 Start-up

Carrying out the commissioning, the risk assessment and the documentation of the safety verification for integration must be carried out upon every modification of the customer-specific application (e.g. when gripping other workpieces).

If existing settings can be adopted (e.g. if grip width and risk potential due to workpiece weight remain unchanged), this can be substantiated as non-critical by performing the risk assessment again. The information / queries in the checklist ([Commissioning checklist](#) [► 54]) must be taken into account in the risk assessment.

In order to facilitate the integration of the product in a machine, a gantry or a robot system, it is possible to use the checklist ([Commissioning checklist](#) [► 54]) to check and document the main points of integration.

NOTE

The checklist does not lead to full compliance with the legal requirements applicable to the end effector, [Commissioning checklist](#) [► 54].

The previous section contains the requirements from SAC-06-G, SAC-09-G, [Obligations of the operator/integrator](#) [► 10]

7 Troubleshooting

7.1 Product does not move

| Possible cause | Corrective action |
|---|---|
| Base jaws jam in housing, e.g. mounting surface is not sufficiently even. | Check the evenness of the mounting surface. Mechanical connection [► 27] Loosen the mounting screws of the product and actuate the product again. |
| Sensor incorrectly set. / Sensor is misaligned. | Adjust sensor so that it does not obstruct the traverse path of the product. Distance to the querying mechanics: approx. 0.2 mm |
| Power supply connected incorrectly. | Check the power supply. Electrical connection [► 33] |
| Internal fuse has triggered. | Send the product to SCHUNK with a repair order. |

7.2 Product does not execute a complete stroke

| Possible cause | Corrective action |
|--|---|
| Mounting surface is not sufficiently flat. | Check the evenness of the mounting surface. Mechanical connection [► 27] |
| Breakage of components, e.g. by overloading. | Send the product to SCHUNK with a repair order. |

7.3 Product opens or closes jerkily

| Possible cause | Corrective action |
|--|--|
| Mounting surface is not sufficiently flat. | Check the evenness of the mounting surface. Mechanical connection [► 27] |
| Loading too large. | Check permissible weight and length of the gripper fingers. Technical data [► 20] |

7.4 Gripping force too low

| Possible cause | Corrective action |
|-------------------------------|---|
| Wrong gripping pre-selection. | Check rotary switch setting. Electrical connection [► 33] Check layout of the product. Meanwhile observe the maximum workpiece weight, see Catalog Data Sheet. Technical data [► 20] |

7.5 Opening and closing times are not achieved

| Possible cause | Corrective action |
|--------------------|---|
| Loading too large. | Check permissible weight and length of the gripper fingers. |

7.6 Electric signals are not transmitted?

| Possible cause | Corrective action |
|------------------------------|--|
| Cable connected incorrectly. | Check that the plug is connected properly. Electrical connection [► 33] |
| Strands swapped. | Check pin allocation. Electrical connection [► 33] |

7.7 Faults which are displayed via LED Error

| Possible cause | LED "Error" | Corrective action |
|--|-------------------------------|--|
| Rotary switch is in an intermediate position | LED blinks at 0.6 s intervals | Turn rotary switch to a marked position. |
| Error overheating | LED blinks at 1.2 s intervals | Let product cool down and acknowledge error. Acknowledge error [► 47] |
| Warning overheating | LED glows continuously | The warning is automatically deleted when the product has cooled down. |

7.8 Acknowledge error

- Wait until the product has cooled down.
- Actuate both digital inlets, "Opens gripper" and "Closes gripper", with high.
OR:
Disconnect voltage supply and reconnect.
- ✓ The "ERROR" LED goes out. The error is acknowledged.

8 Maintenance

This product must not be disassembled for maintenance.

| Maintenance interval | Maintenance work |
|--------------------------------|--|
| 1000 cycles or once per day | Travel an entire stroke. |
| | Check the gripper fingers for correct positioning or damage. |
| 2 million cycles | Inspect the product for damage. Send damaged products to SCHUNK for repair. |

NOTICE

Damage to property caused by insufficient lubrication!

Continuously traveling short strokes when the product is inadequately lubricated risks damaging it by causing it to run dry.

- Travel the full stroke every 1000 cycles or at least once daily.

NOTICE

Material damage due to improper disassembly!

Incorrect works can cause damage to the mechanics and internal electronics.

- Disassembly or opening of the product is not permitted.
- Only allow SCHUNK to repair the product.

9 EU-Declaration of Conformity

| | |
|------------------------------|--|
| Manufacturer/ Distributor | SCHUNK GmbH & Co. KG Spann- und Greiftechnik Bahnhofstr. 106 – 134 D-74348 Lauffen/Neckar |
| Product designation: | Electrical small components gripper for collaborative operations Co-act EGP-C |
| ID number | 1321170, 1321171, 1321172, 1326452, 1326453, 1326454, 1326455, 1326456, 1326459, 1326460, 1326462, 1326464, 1326467, 1326468, 1327881, 1327883, 1327884, 1345426, 1345430, 1345434, 1359018, 1362939, 1372938, 1374363, 1375931, 1386531, 1386711, 1400578 |

We hereby declare on our sole authority that the product meets the requirements of the following directive at the time of declaration.

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

- **EMC Directive 2014/30/EU**

Directive of the European Parliament and the Council of February 26, 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility

Applied harmonized standards, especially:

| | |
|-----------------------------|---|
| EN 61000-6-2 (2005) | Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments IEC 61000-6-2: 2005 |
| 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); |

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

Signature: see original declaration

p.p. Helge Schneider, Dipl.-Ing. (FH),
Business Unit Collaborative & Service Robotic,
Head of Technology & Engineering

Lauffen/Neckar, July 2019

10 Translation of original declaration of incorporation

in terms of the Directive 2006/42/EG, Annex II, Part 1.B of the European Parliament and of the Council on machinery.

Manufacturer/ SCHUNK GmbH & Co. KG Spann- und Greiftechnik
Distributor Bahnhofstr. 106 – 134
D-74348 Lauffen/Neckar

We hereby declare that on the date of the declaration the following partly completed machine complied with all basic safety and health regulations found in the directive 2006/42/EC of the European Parliament and of the Council on machinery. The declaration is rendered invalid if modifications are made to the product.

Product designation: Electrical small components gripper for collaborative operations / Co-act EGP-C / electric

ID number 1321170, 1321171, 1321172, 1326452, 1326453, 1326454, 1326455, 1326456, 1326459, 1326460, 1326462, 1326464, 1326467, 1326468, 1327881, 1327883, 1327884, 1345426, 1345430, 1345434, 1359018, 1362939, 1372938, 1374363, 1375931, 1386531, 1386711, 1400578

The partly completed machine may not be put into operation until conformity of the machine into which the partly completed machine is to be installed with the provisions of the Machinery Directive (2006/42/EC) is confirmed.

Applied harmonized standards, especially:

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

EN ISO 10218-1:2011 Robots and robotic devices - Safety requirements - Part 1: Robots

EN ISO 10218-2:2011 Robots and robotic devices - Safety requirements - Part 2: Robot systems and integration

Applied technical specification:

ISO /TS 15066:2016 Robots and robotic devices – Collaborative robots / Power and force limiting applications

The manufacturer agrees to forward on demand the relevant technical documentation for the partly completed machinery in electronic form to national authorities.

The relevant technical documentation according to Annex VII, Part B, belonging to the partly completed machinery, has been created.

Person authorized to compile the technical documentation:
Robert Leuthner, Address: see manufacturer's address

Signature: see original declaration

p.p. Helge Schneider, Dipl.-Ing. (FH),
Business Unit Collaborative & Service Robotic,
Head of Technology & Engineering

Lauffen/Neckar, July 2019

11 Annex to Declaration of Incorporation

according 2006/42/EG, Annex II, No. 1 B

1. Description of the essential health and safety requirements pursuant to 2006/42/EC, Annex I that are applicable and that have been fulfilled with:

| | |
|---------------------|--|
| Product designation | Electrical small components gripper for collaborative operations |
| Type designation | Co-act EGP-C |
| ID number | 1321170, 1321171, 1321172, 1326452, 1326453, 1326454, 1326455, 1326456, 1326459, 1326460, 1326462, 1326464, 1326467, 1326468, 1327881, 1327883, 1327884, 1345426, 1345430, 1345434, 1359018, 1362939, 1372938, 1374363, 1375931, 1386531, 1386711, 1400578 |

| | |
|---|---|
| To be provided by the System Integrator for the overall machine | ↓ |
| Fulfilled for the scope of the partly completed machine | ↓ |
| Not relevant | ↓ |

| 1.1 | Essential Requirements | | | |
|-------|--|---|---|---|
| 1.1.1 | Definitions | | X | |
| 1.1.2 | Principles of safety integration | | X | |
| 1.1.3 | Materials and products | | X | |
| 1.1.4 | Lighting | X | | |
| 1.1.5 | Design of machinery to facilitate its handling | | X | |
| 1.1.6 | Ergonomics | | | X |
| 1.1.7 | Operating positions | X | | |
| 1.1.8 | Seating | | | X |

| 1.2 | Control Systems | | | |
|---------|---|---|---|---|
| 1.2.1 | Safety and reliability of control systems | | | X |
| 1.2.2 | Control devices | X | | |
| 1.2.3 | Starting | | | X |
| 1.2.4 | Stopping | | | |
| 1.2.4.1 | Normal stop | X | | |
| 1.2.4.2 | Operational stop | | | X |
| 1.2.4.3 | Emergency stop | | X | |
| 1.2.4.4 | Assembly of machinery | X | | |
| 1.2.5 | Selection of control or operating modes | X | | |
| 1.2.6 | Failure of the power supply | | | X |

| 1.3 | Protection against mechanical hazards | | | |
|-------|---------------------------------------|--|--|---|
| 1.3.1 | Risk of loss of stability | | | X |
| 1.3.2 | Risk of break-up during operation | | | X |

| | | | | |
|------------|--|---|---|---|
| 1.3 | Protection against mechanical hazards | | | |
| 1.3.3 | Risks due to falling or ejected objects | | | X |
| 1.3.4 | Risks due to surfaces, edges or angles | | X | |
| 1.3.5 | Risks related to combined machinery | X | | |
| 1.3.6 | Risks related to variations in operating conditions | | X | |
| 1.3.7 | Risks related to moving parts | | X | |
| 1.3.8 | Choice of protection against risks arising from moving parts | X | | |
| 1.3.8.1 | Moving transmission parts | X | | |
| 1.3.8.2 | Moving parts involved in the process | | | X |
| 1.3.9 | Risks of uncontrolled movements | | | X |
| 1.4 | Required characteristics of guards and protective devices | | | |
| 1.4.1 | General requirements | X | | |
| 1.4.2 | Special requirements for guards | X | | |
| 1.4.2.1 | Fixed guards | X | | |
| 1.4.2.2 | Interlocking movable guards | X | | |
| 1.4.2.3 | Adjustable guards restricting access | X | | |
| 1.4.3 | Special requirements for protective devices | X | | |
| 1.5 | Risks due to other hazards | | | |
| 1.5.1 | Electricity supply | | X | |
| 1.5.2 | Static electricity | | X | |
| 1.5.3 | Energy supply other than electricity | X | | |
| 1.5.4 | Errors of fitting | | X | |
| 1.5.5 | Extreme temperatures | | | X |
| 1.5.6 | Fire | | X | |
| 1.5.7 | Explosion | | X | |
| 1.5.8 | Noise | | X | |
| 1.5.9 | Vibrations | | X | |
| 1.5.10 | Radiation | | | X |
| 1.5.11 | External radiation | | X | |
| 1.5.12 | Laser radiation | X | | |
| 1.5.13 | Emissions of hazardous materials and substances | | | X |
| 1.5.14 | Risk of being trapped in a machine | X | | |
| 1.5.15 | Risk of slipping, tripping or falling | X | | |
| 1.5.16 | Lightning | | X | |
| 1.6 | Maintenance | | | |
| 1.6.1 | Machinery maintenance | | | X |
| 1.6.2 | Access to operating positions and servicing points | X | | |
| 1.6.3 | Isolation of energy sources | X | | |

| | | | | |
|------------|----------------------------|---|---|--|
| 1.6 | Maintenance | | | |
| 1.6.4 | Operator intervention | | X | |
| 1.6.5 | Cleaning of internal parts | X | | |

| | | | | |
|------------|---|---|---|---|
| 1.7 | Information | | | |
| 1.7.1 | Information and warnings on the machinery | | X | |
| 1.7.1.1 | Information and information devices | | X | |
| 1.7.1.2 | Warning devices | | | X |
| 1.7.2 | Warning of residual risks | X | | |
| 1.7.3 | Marking of machinery | | X | |
| 1.7.4 | Instructions | | X | |
| 1.7.4.1 | General principles for the drafting of instructions | | X | |
| 1.7.4.2 | Contents of the instructions | | X | |
| 1.7.4.3 | Sales literature | | X | |

| | | | | |
|-------|--|---|--|---|
| | The classification from Annex 1 is to be supplemented from here forward. | | | |
| 2 | Supplementary essential health and safety requirements for certain categories of machinery | X | | |
| 2.1 | Foodstuffs machinery and machinery for cosmetics or pharmaceutical products | | | X |
| 2.2 | Portable hand-held and/or guided machinery | | | X |
| 2.2.1 | Portable fixing and other impact machinery | | | X |
| 2.3 | Machinery for working wood and material with similar physical characteristics | | | X |
| 3 | Supplementary essential health and safety requirements to offset hazards due to the mobility of machinery | X | | |
| 4 | Supplementary essential health and safety requirements to offset hazards due to lifting operations | X | | |
| 5 | Supplementary essential health and safety requirements for machinery intended for underground work | X | | |
| 6 | Supplementary essential health and safety requirements for machinery presenting particular hazards due to the lifting of persons | X | | |

12 Appendix

12.1 Commissioning checklist

NOTE

The integrator can use the following checklist to describe and take the commissioning settings into account.

The checklist does not lead to full compliance with the legal requirements applicable to the end effector, [Start-up](#) [► 45].

relevant /
implemented

Identify product:

Check the settings for accuracy using the application-specific documents and document them. ☐

Designation / ID no.: _____

Gripping type: ☐ I.D. gripping ☐ O.D. gripping

Gripping force adjustment [%]: _____

Installation position: ☐ suspended ☐ upright ☐ other:

Tool centre point (TCP): _____

Acceleration of the product [m/s^2]: +/- X : ____ +/- Y : ____ +/- Z : ____

Number of cycles per minute: _____

relevant /
implemented

Identify gripper fingers:

Get the required information from the application-specific documentation or measure/determine it directly and document it. ☐

Finger height (top edge of gripper to contact point of workpiece) [mm]:

Projection [mm]: _____

Holding principle: ☐ force-fit gripping ☐ form-fit (Prisma)

Weight of a gripper finger [g]: _____

Gripper finger material: _____

Gripper finger shape: _____

Gripper finger surface: _____

Are the material, shape, and surface of the gripper fingers compliant with ISO/TS 15066? ☐

Finger tips material: _____

Finger tips shape: _____

Finger tips surface: _____

Are the material, shape, and surface of the finger tips compliant with ISO/TS 15066? ☐

relevant /
implemented**Identify workpiece:**

Get the required information from the application-specific documentation or measure/determine it directly and document it. ☐

Designation / revision: _____

Workpiece material: _____

Workpiece weight [kg]: _____

Dimensions [mm]: _____

Hub opened [mm]: _____

Grip width of the workpiece [mm]: _____

Residual stroke = Space between fingers

in "Gripper open" position – grip width workpiece, residual stroke [mm]:

Special/specific hazards (fragile, sharp edges, hot, etc.):

Identify ambient conditions:

Get the required information from the application-specific documentation or measure it directly and document it. Verify the values using the corresponding operating manual/specifications. ☐

Ambient temperature [°C]: _____

Required IP protection type:

Air humidity [%]: _____

Contamination level: _____

Ambient influences:

☐ Warmth ☐ Coldness ☐ Coolant ☐ Abrasive dust

☐ Other: _____

Check protective potential equalisation:

- Check consistency of the protective conductor system according to IEC 60204-1. ☐

After switching on the voltage supply, check:

- The circuits and equipment for the emergency stop function are functional and meet the requirements of the (task-based) risk assessment. ☐

Check requirements for secure holding of the workpiece:

- Supply voltage and the control signal for gripping is on for the required duration (24 VDC / high signal). For further information, see the application-specific documents (e. ☐
For further information, see the application-specific documents (e.g. diagrams, operating manual, specifications).
- Supply voltage and drive voltage is at 24 VDC (+/- 10%). If necessary, provide supplementary safety measures. ☐
Measure: _____
- Rest period between two commands is maintained (open / close). ☐
To do this, check the application software for control according to specified criteria. Determine successful implementation based on a test run.

relevant /
implemented

During teaching / setup, check the implementation of the defined safety measures with regard to the traverse path:

Examples of task-based considerations show the following sub-items.

- The traverse path matches the requirements of the layout drawing. The alignment of the product prevents workpiece loss even when high dynamic forces are involved (emergency stop). ☐
Example: For parallel grippers with straight gripper fingers, the X-axis of the gripper is aligned with the direction of travel.
- Unusual workpiece dimensions were taken into account when aligning the product. The alignment prevents workpiece loss even with long workpieces (bar shapes). ☐
The risk of workpiece loss is minimized (e.g. by aligning the product correctly)
Measure: _____
- In the event of a workpiece loss, the programmed traverse path does not create a dangerous trajectory, especially not in the direction of the operator/persons (e.g. ☐
due to slowed down speed during movements towards the operator (persons);
danger-reducing alignment of the product / workpiece;
avoidance of unnecessary travel height, and similar measures.
- Ensure that the traverse path and height are optimised to prevent collisions with the head. ☐
Note: Collision with the head should be completely precluded. It may be necessary to implement further and/or supplementary safety measures determined during the (task-based) risk assessment.
Supplementary safety measures: _____
- The specific hazards of the workpiece have been taken into account (e.g. fragile, sharp, hot workpieces). ☐

- The control signal for releasing the workpiece is possible only at defined locations. Outside these locations, the control is locked. ☐
 - When empty, the gripper fingers are closed. ☐
The closing process before or during an empty traverse does not cause any danger.
 - The traverse path does not cause any hazards. ☐
Note: It may be necessary to implement supplementary safety measures determined during the (task-based) risk assessment.
Supplementary safety measures:
-

relevant /
implemented

Check the retraction function in the event of an emergency:

Test the retraction function in the event of an emergency during commissioning and once a year: ☐

1. Switch off the supply voltage to the product.
2. Secure it to prevent reactivation.
3. Ensure that the equipment is de-energized: status LED "READY" and "ERROR" are off.
4. Move the gripper fingers manually.
-> If the product is too stiff, return the product to SCHUNK for repair.
-> If not, continue as follows:
5. Remove the safety measures taken to prevent reactivation.
6. Switch on the supply voltage of the product.

Note: If necessary, a device could be installed on the gripper fingers to facilitate this manual test. However, this device itself must not cause a hazardous situation. This must be determined from the (task-based) risk assessment and during operation.

Observe the robot system during operation:

- Collisions are identified and the system reacts accordingly. ☐
- Hazardous collisions are prevented and avoided. ☐

Applied standards:

The integration and operation of the application (including product) has been implemented according to applicable standards / standard parts:

☐

- ISO 12100
- ISO 10218
- ISO/TS 15066
- IEC 60204-1
- further applicable standards/standard parts or technical specifications

The document-related documents for the verification are archived:

- Declaration of Incorporation
- Declaration of Conformity
- Operating manual (if necessary, safety manual, checklists, and similar)

☐☐

Date of the check:

Name of the checker:

Signature:

This image shows a full page of blank graph paper. The grid consists of thin, light gray horizontal and vertical lines that intersect to form small squares across the entire surface. There are no margins, text, or other markings on the paper.

