

# Assembly and Operating Manual

## EGP

### Electric Small Components Gripper



## Imprint

### Copyright:

This manual is protected by copyright. The author is SCHUNK GmbH & Co. KG. All rights reserved. Any reproduction, processing, distribution (making available to third parties), translation or other usage - even excerpts - of the manual is especially prohibited and requires our written approval.

### Technical changes:

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

**Document number:** 389476

**Version:** 11.00 | 31/03/2020 | en

© SCHUNK GmbH & Co. KG

All rights reserved.

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

SCHUNK GmbH & Co. KG  
Spann- und Greiftechnik

Bahnhofstr. 106 – 134  
D-74348 Lauffen/Neckar

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

info@de.schunk.com  
schunk.com

## Table of Contents

<b>1</b>	<b>General.....</b>	<b>5</b>
1.1	About this manual .....	5
1.1.1	Presentation of Warning Labels .....	5
1.1.2	Definition of Terms .....	5
1.1.3	Symbol definition.....	6
1.1.4	Applicable documents .....	6
1.1.5	Sizes .....	6
1.1.6	Variants.....	6
1.2	Warranty .....	6
1.3	Scope of delivery .....	6
1.4	Accessories .....	7
<b>2</b>	<b>Basic safety notes .....</b>	<b>8</b>
2.1	Appropriate use.....	8
2.2	Not intended use.....	8
2.3	Constructional changes .....	8
2.4	Spare parts .....	9
2.5	Gripper fingers .....	9
2.6	Ambient conditions and operating conditions .....	9
2.7	Personnel qualification.....	10
2.8	Personal protective equipment.....	10
2.9	Notes on safe operation .....	10
2.10	Transport .....	11
2.11	Malfunctions.....	11
2.12	Disposal .....	11
2.13	Fundamental dangers.....	12
2.13.1	Protection during handling and assembly .....	12
2.13.2	Protection during commissioning and operation .....	12
2.13.3	Protection against dangerous movements.....	13
2.13.4	Protection against electric shock.....	14
2.14	Notes on particular risks.....	14
<b>3</b>	<b>Technical data.....</b>	<b>17</b>
3.1	Connection data .....	17
3.1.1	EGP 25 .....	17
3.1.2	EGP 40 .....	18
3.1.3	EGP 50 .....	19
3.1.4	EGP 64 .....	20
3.2	Ambient conditions and operating conditions .....	21
<b>4</b>	<b>Design and description.....</b>	<b>22</b>
4.1	Design .....	22

4.1.1	Digital I/O variant .....	22
4.1.2	IO-Link variant .....	23
4.2	Description .....	23
4.3	Display .....	24
4.3.1	"Digital I/O" variant .....	24
4.3.2	"Speed (S)" variant .....	24
4.3.3	LED "READY" and "ERROR" .....	25
4.3.4	"IO-Link" variant .....	26
4.3.5	LED "POWER", "COM" and "STATUS" .....	26
<b>5</b>	<b>Assembly .....</b>	<b>27</b>
5.1	Installing and connecting.....	27
5.2	Connections.....	28
5.2.1	Mechanical connection.....	28
5.2.2	Electrical connection - Digital I/O variant.....	30
5.2.3	Electrical connection - "IO-Link" variant.....	30
5.3	Mounting the sensor .....	32
5.3.1	Overview of sensors .....	32
5.3.2	Mount inductive proximity switch IN 40 .....	32
5.3.3	Mount Flexible Position Sensor (FPS) .....	35
5.3.4	Mount the object distance sensor OAS .....	36
<b>6</b>	<b>Start-up .....</b>	<b>37</b>
6.1	"Digital I/O" variant .....	37
6.1.1	Adjust gripping force .....	37
6.1.2	Actuation of the digital inputs .....	38
6.2	IO-Link variant .....	39
<b>7</b>	<b>Troubleshooting .....</b>	<b>40</b>
7.1	Product does not move .....	40
7.2	Product does not execute a complete stroke.....	40
7.3	Product opens or closes jerkily.....	40
7.4	Gripping force too low.....	40
7.5	Opening and closing times are not achieved.....	41
7.6	Electrical signals are not transmitted .....	41
7.7	Faults indicated by LED Error (only with "Digital I/O" variant) .....	41
7.8	Faults indicated by LED STATUS (only with "IO-Link" variant) .....	41
<b>8</b>	<b>Maintenance .....</b>	<b>42</b>
8.1	Maintenance intervals.....	42
8.2	Lubricants and lubricating points .....	43
8.3	Disassembly and assembling .....	43
<b>9</b>	<b>EU-Declaration of Conformity .....</b>	<b>44</b>
<b>10</b>	<b>Translation of original declaration of incorporation .....</b>	<b>45</b>
<b>11</b>	<b>Annex to Declaration of Incorporation .....</b>	<b>46</b>

## 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.

#### **CAUTION**

##### **Material damage!**

Information about avoiding material damage.

#### 1.1.2 Definition of Terms

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

### 1.1.3 Symbol definition

The following symbols are used in this manual:

- Prerequisite for an action
- Action
  - ✓ Intermediate result
  - ✓ Final result

### 1.1.4 Applicable documents

- General terms of business \*
- Catalog data sheet of the purchased product \*
- Assembly and operating manuals of the accessories \*
- **IO-Link variant:** Software guide "SCHUNK gripper with IO-Link" \*

The documents marked with an asterisk (\*) can be downloaded on our homepage **[schunk.com](https://www.schunk.com)**

### 1.1.5 Sizes

This operating manual applies to the following sizes:

- EGP 25
- EGP 40
- EGP 50
- EGP 64

### 1.1.6 Variants

This operating manual applies to the following variations:

- EGP
- EGP Speed (S)
- EGP IO-Link

## 1.2 Warranty

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

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

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

## 1.3 Scope of delivery

The scope of delivery includes

- Electric Small Components Gripper EGP 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:

- Connection cable 4-pole, socket M8
  - angled, 5 m
  - angled, 10 m
  - straight, 5 m
  - straight, 10 m

---

#### NOTE

When using customer-supplied cable: at least 4 x 0.25 mm<sup>2</sup>

---

A wide range of accessories are available for this product  
For information regarding which accessory articles can be used with the corresponding product variants, see catalog data sheet.

## 2 Basic safety notes

### 2.1 Appropriate use

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

- The product may only be used within the scope of its technical data, [Technical data](#) [► 17].
- When implementing and operating components in safety-related parts of the control systems, the basic safety principles in accordance with DIN EN ISO 13849-2 apply. The proven safety principles in accordance with DIN EN ISO 13849-2 also apply to categories 1, 2, 3 and 4.
- The product is intended for installation in a machine. The applicable guidelines must be observed and complied with.
- 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

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 Constructional changes

#### Implementation of structural changes

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

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



## 2.4 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 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.

## 2.6 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, [Technical data](#) [► 17].

## 2.7 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:

<b>Trained electrician</b>	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.
<b>Qualified personnel</b>	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.
<b>Instructed person</b>	Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.
<b>Service personnel of the manufacturer</b>	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.

## 2.8 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.

## 2.9 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.

## **2.10 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.

## **2.11 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.

## **2.12 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.

## **2.13 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.

### **2.13.1 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.

### **2.13.2 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.

### 2.13.3 Protection against dangerous movements

#### Unexpected movements

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

- Switch off the energy supply, ensure that no residual energy remains and secure against inadvertent reactivation.
- The faulty actuation of connected drives may cause dangerous movements.
- Operating mistakes, faulty parameterization during commissioning or software errors may trigger dangerous movements.
- Never rely solely on the response of the monitoring function to avert danger. Until the installed monitors become effective, it must be assumed that the drive movement is faulty, with its action being dependent on the control unit and the current operating condition of the drive. Perform maintenance work, modifications, and attachments outside the danger zone defined by the movement range.
- To avoid accidents and/or material damage, human access to the movement range of the machine must be restricted. Limit/prevent accidental access for people in this area due through technical safety measures. The protective cover and protective fence must be rigid enough to withstand the maximum possible movement energy. EMERGENCY STOP switches must be easily and quickly accessible. Before starting up 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.

### 2.13.4 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.

#### 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.

### 2.14 Notes on particular risks



#### **DANGER**

#### **Danger from electric voltage!**

Touching live parts may result in death.

- Switch off the power supply before any assembly, adjustment or maintenance work and secure against being switched on again.
  - Only qualified electricians may perform electrical installations.
  - Check if de-energized, ground it and hot-wire.
  - Cover live parts.
-



## **⚠ DANGER**

### **Risk of fatal injury from suspended loads!**

Falling loads can cause serious injuries and even death.

- Stand clear of suspended loads and do not step within their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.
- Wear suitable protective equipment.



## **⚠ WARNING**

### **Risk of injury from objects falling and being ejected!**

Falling and ejected objects during operation can lead to serious injury or death.

- Take appropriate protective measures to secure the danger zone.



## **⚠ WARNING**

### **Risk of injury due to unexpected movements!**

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

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



## **⚠ WARNING**

### **Risk of injury from crushing and impacts!**

Serious injury could occur during the base jaw procedure and when breaking or loosening the gripper fingers.

- Wear suitable protective equipment.
- Do not reach into the open mechanism or the movement area of the product.



## **⚠ WARNING**

### **Risk of injury from sharp edges and corners!**

Sharp edges and corners can cause cuts.

- Use suitable protective equipment.



### **⚠ WARNING**

#### **Risk of burns through contact with hot surfaces!**

Surfaces of components can heat up severely during operation. Skin contact with hot surfaces causes severe burns to the skin.

- For all work in the vicinity of hot surfaces, wear safety gloves.
- Before carrying out any work, make sure that all surfaces have cooled down to the ambient temperature.



### **⚠ WARNING**

#### **Risk of injury from objects falling in the event of an energy supply failure**

In case of an energy supply failure, the gripping force decreases and a secure hold on the gripped workpiece cannot be guaranteed.

- Take suitable protective measures to secure the danger zone.



### 3 Technical data

#### 3.1 Connection data

##### 3.1.1 EGP 25

Designation	EGP		
	25		25-S
Supply voltage [VDC]	24		
Min. [VDC]	21.6		
Max. [VDC]	26.4		
Min. Supply current power supply unit [A] *	1.0		
Max. Current input [A]**	1.0		
Gripping force [%]	50	100	100
Current input in blocked state [A] ***	0.07	0.14	0.14
<b>Integrated electronic control unit</b>			
Communication interface	Digital I/O		
Number of digital inputs/outputs	2/2		

\* minimum supply current for reliable operation of product

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

\*\*\* 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.

### 3.1.2 EGP 40

Designation	EGP				
	40				40-S
Supply voltage [VDC]	24				
Min. [VDC]	21.6				
Max. [VDC]	26.4				
Min. Supply current power supply unit [A] *	1.0				
Max. Current input [A]**	2.0				
Gripping force [%]	25	50	75	100	100
Current input in blocked state [A] ***	0.05	0.10	0.15	0.20	0.20
Integrated electronic control unit					
Communication interface	Digital I/O				
Number of digital inputs/ outputs	2/2				

Designation	EGP 40 IO-Link			
Supply voltage [VDC]	24			
Min. [VDC]	21.6			
Max. [VDC]	26.4			
Min. Supply current power supply unit [A] *	1.0			
Max. Current input [A]**	2.0			
Gripping force [%]	25	50	75	100
Current input in blocked state [A] ***	0.05	0.10	0.15	0.2
End position detection tolerances [mm] (in delivery status / after stroke measurement)	±0.5			
Integrated electronic control unit				
Communication interface	IO-Link			
Specification:	V1.1			
Transmission rate	COM2			
Port	Class B			

\* minimum supply current for reliable operation of product

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

\*\*\* 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.

## 3.1.3 EGP 50

Designation	EGP 50			
Supply voltage [VDC]	24			
Min. [VDC]	21.6			
Max. [VDC]	26.4			
Min. Supply current power supply unit [A] *	2.0			
Max. Current input [A]**	2.0			
Gripping force [%]	25	50	75	100
Current input in blocked state [A] ***	0.07	0.15	0.22	0.3
Integrated electronic control unit				
Communication interface	Digital I/O			
Number of digital inputs/ outputs	2/2			
Designation	EGP 50 IO-Link			
Supply voltage [VDC]	24			
Min. [VDC]	21.6			
Max. [VDC]	26.4			
Min. Supply current power supply unit [A] *	2.0			
Max. Current input [A]**	2.0			
Gripping force [%]	25	50	75	100
Current input in blocked state [A] ***	0.07	0.15	0.22	0.3
End position detection tolerances [mm] (in delivery condition / after stroke measurement)	±0.5			
Integrated electronic control unit				
Communication interface	IO-Link			
Specification:	V1.1			
Transmission rate	COM2			
Port	Class B			

\* minimum supply current for reliable operation of product

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

\*\*\* 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.

### 3.1.4 EGP 64

Designation	EGP 64			
Supply voltage [VDC]	24			
Min. [VDC]	21.6			
Max. [VDC]	26.4			
Min. Supply current power supply unit [A] *	2.0			
Max. Current input [A]**	2.0			
Gripping force [%]	25	50	75	100
Current input in blocked state [A] ***	0.04	0.08	0.1	0.15

Designation	EGP 64 IO-Link			
Supply voltage [VDC]	24			
Min. [VDC]	21.6			
Max. [VDC]	26.4			
Min. Supply current power supply unit [A] *	2.0			
Max. Current input [A]**	2.0			
Gripping force [%]	25	50	75	100
Current input in blocked state [A] ***	0.04	0.08	0.1	0.15
End position detection tolerances [mm] (in delivery condition / after stroke measurement)	±0.5			
Integrated electronic control unit				
Communication interface	IO-Link			
Specification:	V1.1			
Transmission rate	COM2			
Port	Class B			

\* minimum supply current for reliable operation of product

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

\*\*\* 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.

### 3.2 Ambient conditions and operating conditions

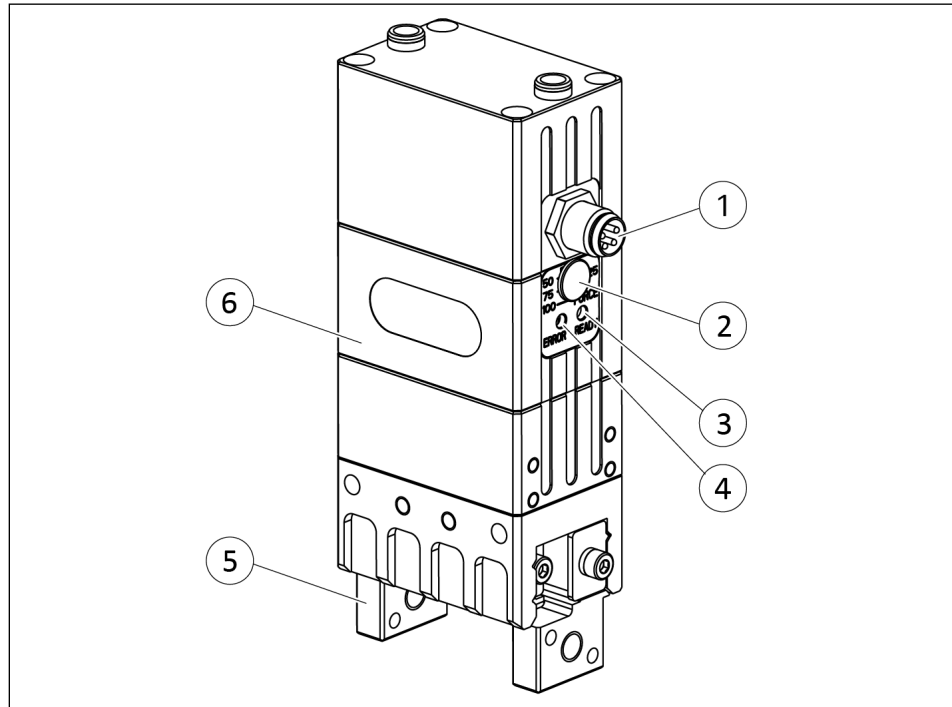
Designation	EGP 25 – 64
IP protection class (mechanical) *	30
IP protection class (electrical) * (only with center plug)	40
Noise emission [dB(A)]	≤ 70
Ambient temperature [°C]	
Min.	5
Max.	55

- \* For use in dirty ambient conditions (e.g. sprayed water, vapors, abrasion or processing dust) SCHUNK offers corresponding product options as standard. SCHUNK also offers customized solutions for special applications in dirty ambient conditions.

## 4 Design and description

### 4.1 Design

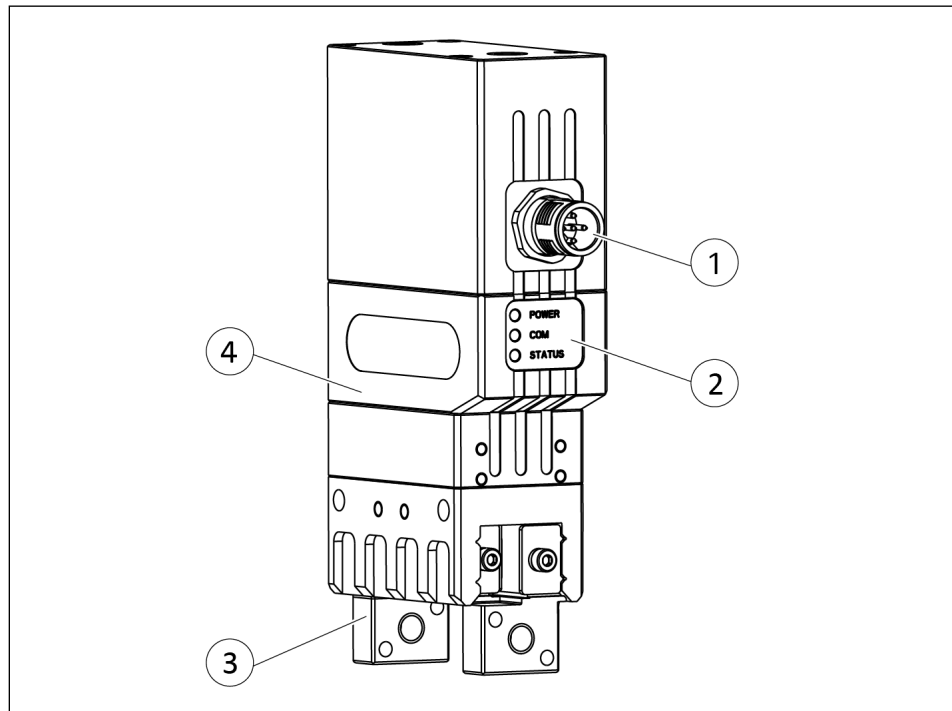
#### 4.1.1 Digital I/O variant



*Design EGP, Digital I/O*

1	"Power supply and control" connection plug
2	"Gripping force" rotary switch
3	LED READY
4	LED ERROR
5	Base jaw
6	Housing

#### 4.1.2 IO-Link variant



*Design EGP, IO-Link*

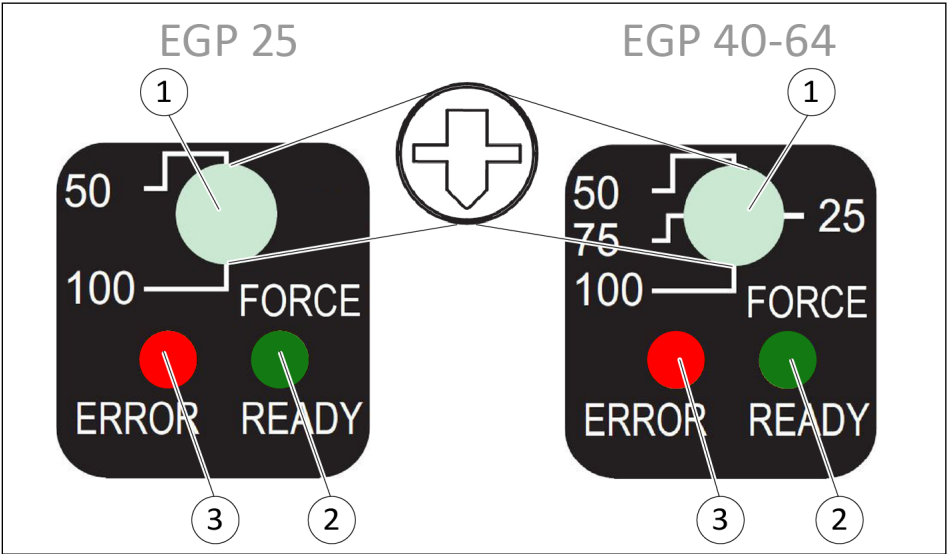
1	"IO-Link" connection plug
2	LED POWER, COM and STATUS
3	Base jaw
4	Housing

#### 4.2 Description

The product is a servo-electric 2-finger parallel gripper featuring high power density and integrated electronics.

### 4.3 Display

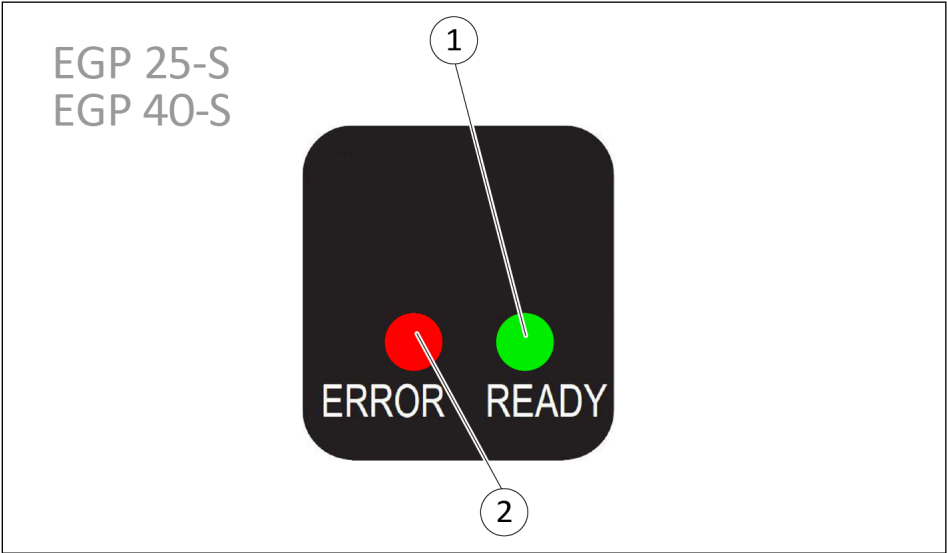
#### 4.3.1 "Digital I/O" variant



Function label EGP 25 and EGP 40-64

1	"Gripping force" rotary switch	3	LED "ERROR"
2	LED "READY"		

#### 4.3.2 "Speed (S)" variant



Function label EGP-Speed (S)

1	LED "READY"
2	LED "ERROR"



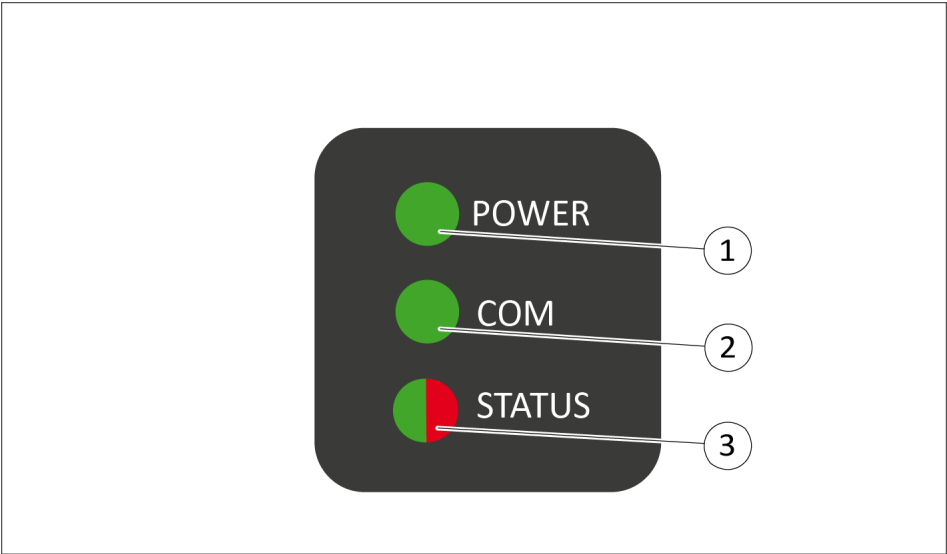
### 4.3.3 LED "READY" and "ERROR"

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

#### Acknowledge error

- Wait until the product has cooled down.
- Actuate both digital inlets, PIN 2 and PIN 4, with high.
- OR:  
Disconnect voltage supply and reconnect.
- ✓ LED "error" is extinguished and the error is acknowledged.

4.3.4 "IO-Link" variant



Function label

1	LED POWER
2	LED COM
3	LED STATUS

4.3.5 LED "POWER", "COM" and "STATUS"

Designation	Color	Function
POWER	Green	<ul style="list-style-type: none"><li>• <b>Lights up</b> if ready for operation</li><li>• <b>Does not light up</b> if logic or actuator voltage is reversed or not in the valid range.</li></ul>
COM	Green	<ul style="list-style-type: none"><li>• <b>Does not light up</b> if IO-Link communication is not active</li><li>• <b>Flashes</b> if IO-Link communication is active</li></ul>
STATUS	Green / Red	<ul style="list-style-type: none"><li>• <b>Does not light up</b> if electronics are not active or defective</li><li>• <b>Lights up green</b> if ready for operation</li><li>• <b>Lights up red</b> in case of a fault. Error message is communicated via IO-Link</li></ul>

## 5 Assembly

### 5.1 Installing and connecting



#### **⚠ WARNING**

##### **Risk of injury due to unexpected movements!**

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

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

#### **NOTE**

Ensure sufficient heat dissipation using the customer's mounting surface.

Mount the product so that sufficient cooling is guaranteed. The size of the cooling surface depends on the application. Avoid exposure to additional heat e.g. caused by attachments or by the attached axle.

A temperature malfunction may occur if the product reaches excessively high temperatures.

#### **"Digital I/O" variant**

- Check the evenness of the mounting surface, [Mechanical connection](#) [► 28].
- Screw the product to the machine/system, [Mechanical connection](#) [► 28].
  - ✓ If necessary, use appropriate connection elements (adapter plates).
  - ✓ Use centering sleeves from the enclosed accessory pack.
  - ✓ Observe the permissible depth of engagement.
  - ✓ Observe the tightening torque for the mounting screws.
- Secure the gripper fingers to the base jaws, [Mechanical connection](#) [► 28].
- Place the voltage supply and control cable on the M8 connector and screw the threaded ring tightly by hand, [Digital I/O variant](#) [► 22].
- Adjust gripping force if necessary, [Adjust gripping force](#) [► 37].
- Mount the sensor, [Mounting the sensor](#) [► 32].

#### **NOTE**

For further information on controlling the product, see section [Start-up](#) [► 37].

### IO-Link variant

- Check the evenness of the mounting surface, [Mechanical connection](#) [► 28].
- Screw the product to the machine/system, [Mechanical connection](#) [► 28].
  - ✓ If necessary, use appropriate connection elements (adapter plates).
  - ✓ Use centering sleeves from the enclosed accessory pack.
  - ✓ Observe the permissible depth of engagement.
  - ✓ Observe the tightening torque for the mounting screws.
- Secure the gripper fingers to the base jaws, [Mechanical connection](#) [► 28].
- Place cable for IO-Link on the M12 connector and tighten the threaded ring by hand, [IO-Link variant](#) [► 23].

### NOTE

For further information on parameterization and control of the product, see the section Commissioning [-IO-Link variant](#) [► 39].

## 5.2 Connections

### 5.2.1 Mechanical connection

#### Evenness of the mounting surface

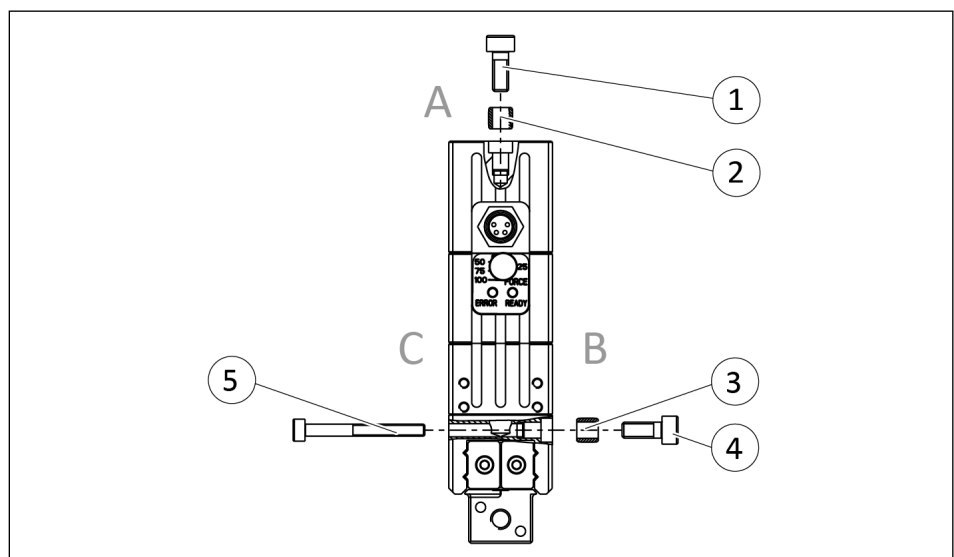
The values apply to the whole mounting surface to which the product is mounted.

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

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

#### Connections at the housing

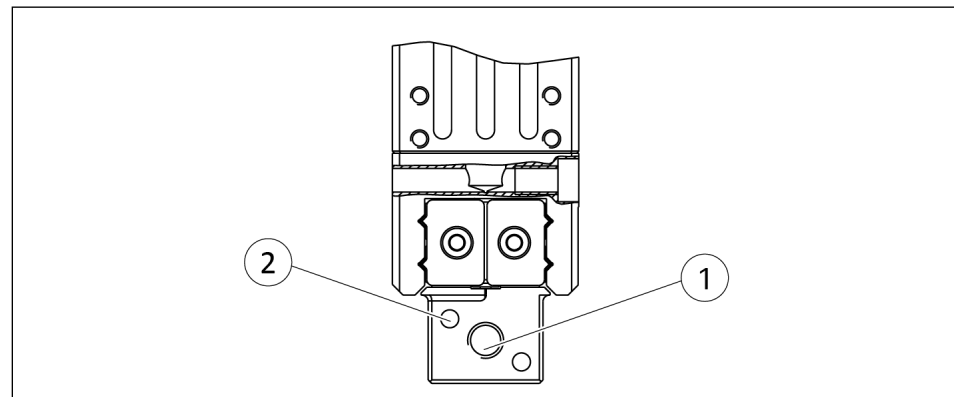
The product can be mounted from three sides.



*Assembly options*

*Screw-in depth and tightening torque*

Item	Mounting	EGP			
		25	40	50	64
Side A					
1	Mounting screw	M3	M4	M5	M5
	Max. depth of engagement [mm]	7.4	8.9	10.9	10.9
	Minimum screw-in depth [mm]	6.9	8.4	10.4	10.4
	Tightening torque [Nm]	1.2	3.1	6.1	6.1
2	Centering sleeve	Ø 5	Ø 6	Ø 8	Ø 8
Side B					
4	Mounting screw	M3	M4	M5	M5
	Max. depth of engagement [mm]	6.9	8.9	10.4	10.4
	Minimum screw-in depth [mm]	6.4	8.4	9.9	9.9
	Tightening torque [Nm]	1.2	3.1	6.1	6.1
3	Centering sleeve	Ø 5	Ø 6	Ø 8	Ø 8
Side C					
5	Mounting screw	M2.5	M3	M4	M4

**Connections at the base jaws**

*Mounting of the gripper finger*
*Screw-in depth and tightening torque*

Item	Mounting	EGP			
		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]	3.1	6.1	10	25
2	Bore holes for cylindrical pin [mm]	Ø 1.5	Ø 2.5	Ø 3	Ø 4

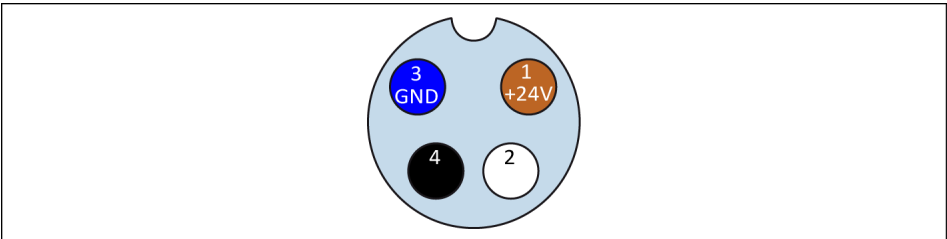
5.2.2 Electrical connection - Digital I/O variant

NOTE

Note on EMC conformity (in accordance with EN 61000-6-4:2007 + A1:2011):

- The product may only be used in DC distribution networks with an expansion of < 30 m.

Voltage supply and control



M8 connection plug for gripper (view of connection plug)

Connection assignment

Pin	Wire strand	Signal
1	Brown	+ 24 V
2	White	Open gripper
3	Blue	GND
4	Black	Close gripper

Components of the electrical connection

Connection	Plug connector EGP	Plug connector provided by the customer
Gripper	Connection plug 4- pin, M8	Connection cable 4-pin, M8 socket

Tightening torque of M8 plug connection: 50 cNm

5.2.3 Electrical connection - "IO-Link" variant

CAUTION

Risk of damage to the electronics!

A faulty connection can cause damage to the internal electronics.

- The supply network must be a network of type "PELV" for power and logic.
- Observe the PIN assignment of the connecting terminals.
- Make sure that all components are grounded correctly.

## NOTE

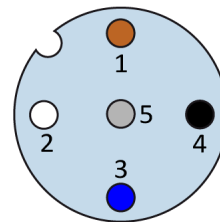
Note on EMC conformity (in accordance with EN 61000-6-4:2007 + A1:2011):

- The product may only be used in DC distribution networks with an expansion of < 30 m.

Components of the electrical connection

Plug connector gripper	Plug connector provided by the customer
Connector 5-pin, M12, A-coded	Connection cable 5-pin, M12 socket, A-coded

## Voltage supply and control



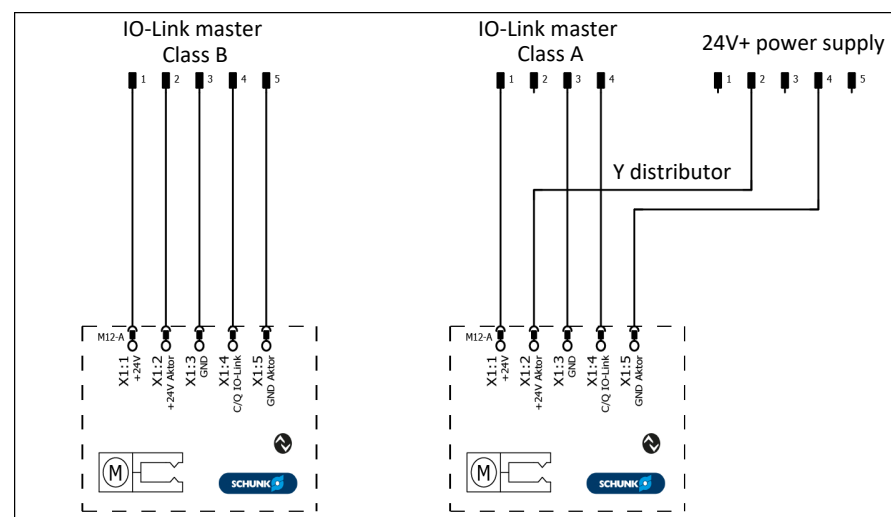
IO-Link cable assignment, 5-pin M12 port class B

Pin	Wire strand	Signal
1	Brown	+ 24 V
2	White	+ 24 V (actuator)
3	Blue	GND
4	Black	C/Q IO-Link
5	Grey	GND (actuator)

## NOTE

For information on actuation, see Software guide "SCHUNK gripper with IO-Link".

### 5.2.3.1 IO-Link connection diagram



### 5.3 Mounting the sensor

#### NOTE

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

The product is prepared for the use of sensors.

- For the exact type designations of suitable sensors, please see catalog datasheet and [Overview of sensors](#) [► 32].
- For technical data for the suitable sensors, see assembly and operating manual and catalog datasheet.
  - The assembly and operating manual and catalog datasheet are included in the scope of delivery for the sensors and are available at [schunk.com](http://schunk.com).
- Information on handling sensors is available at [schunk.com](http://schunk.com) or from SCHUNK contact persons.

#### 5.3.1 Overview of sensors

Designation	EGP			
	25	40	50	64
Inductive proximity switch IN 40	X	X	X	X
Flexible position sensor FPS-S 13		X	X	X
Optical distance sensor OAS	X	X	X	X

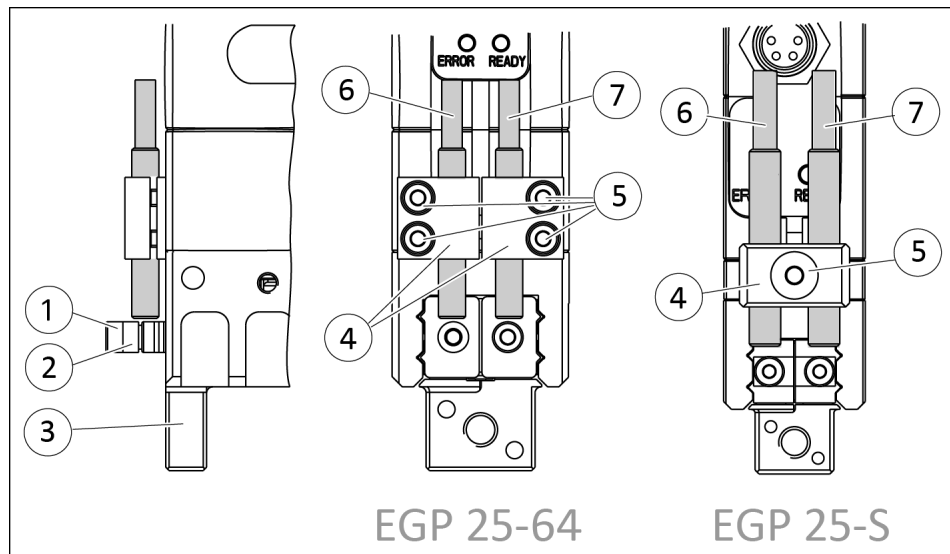
#### 5.3.2 Mount inductive proximity switch IN 40

The inductive proximity switches are mounted on the plug connectors side of the product. If the cable routing on this side is unfavorable for the customer-specific application, the inductive proximity switches can be mounted on the opposite side.

The screw heads and the spacer sleeve serve the purpose of querying by the inductive proximity switches and are mounted on the gripper fingers.



### 5.3.2.1 Mount inductive proximity switches



#### NOTE

The positions "Gripper opened" and "Gripper closed" are monitored without an additional spacer sleeve (2) via the screws (1).

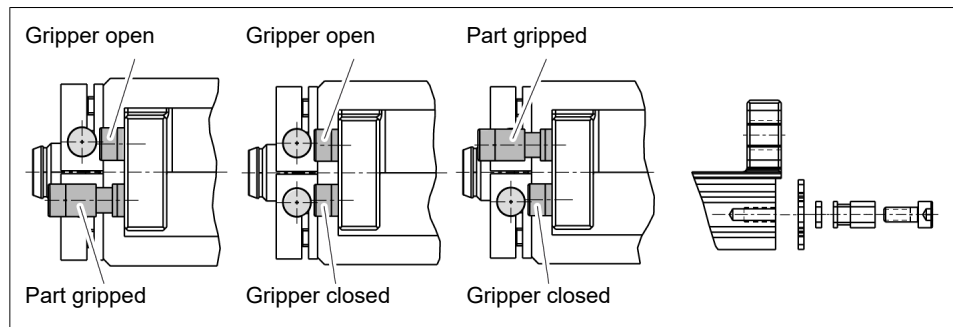
- **To monitor the position "Part gripped":** Screw the spacer sleeve (2) and scrow (1) from the accessory pack to the gripper finger (3). Tightening torque: 12.5 Ncm
- Screw on sensor holder (4).
  - ✓ Tighten screws (5) only slightly.
- Move product to the position "Gripper opened" .
- Slide sensor (6) into the sensor holder (4) and adjust the 0.2 mm distance to the screw head.
- Move product to the position "Gripper closed".
- Slide sensor (7) into the sensor holder (4) and adjust the 0.2 mm distance to the screw head.
- Tighten the screw (5) on the sensor holder (4). Tightening torque: 10 Ncm
- Connect both sensors (6)/(7).
- Bring the product in position and test the function.

### 5.3.2.2 Set the inductive proximity switch (IN)

The sensor is dampened by the screw heads.

If the screws are used without spacer sleeves, the positions "Gripper opened" and "Gripper closed" can be monitored.

If the spacer sleeve is used, the distance between the screw head and the gripper finger is greater. This enables e.g. the position "Gripper closed" to be varied or the position "Part gripped" to be monitored.



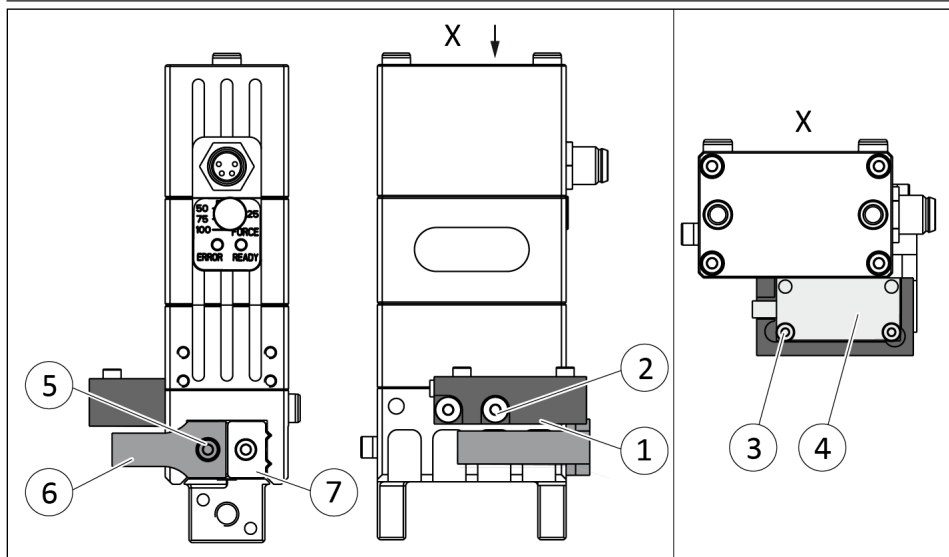
*Adjusting the sensor*

### 5.3.3 Mount Flexible Position Sensor (FPS)

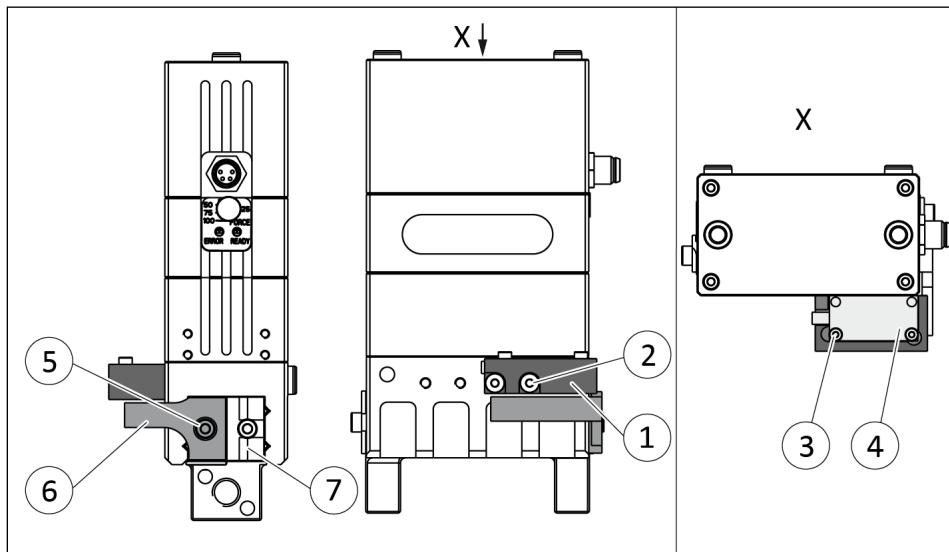
#### NOTE

The sensor cannot be used for sizes 25 and 25-S.

The sensor is mounted to the product using a holder. This holder is available from SCHUNK.



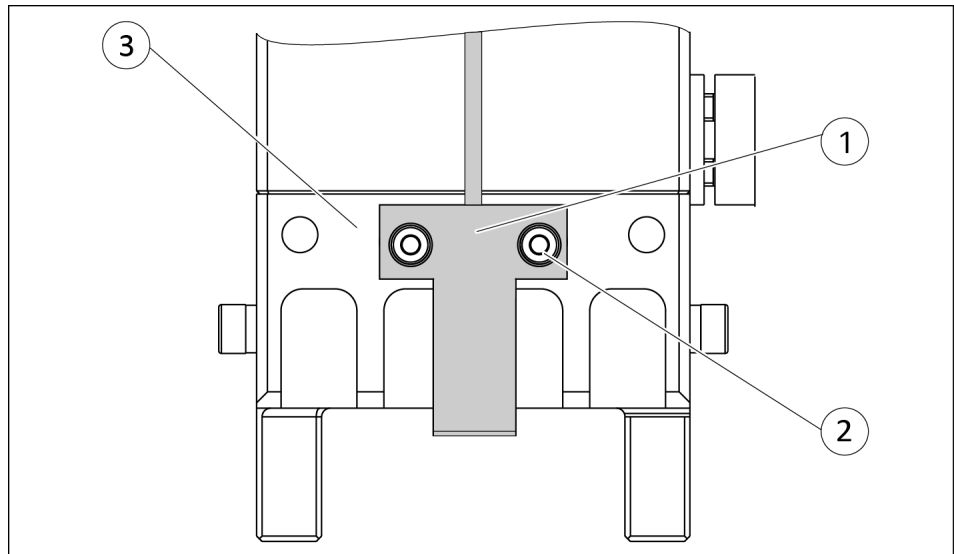
Size 40 and 50



Size 64

- Secure holder (1) with screws (2).
- Secure sensor (4) to holder (1) with screws (3).  
Tightening torque: 1 Ncm
- **Up to 12/2015:** Secure control cam (6) onto the cover (7) of the base jaw with screw (5).
- **As of 01/2016:** Secure control cam (6) directly to the base jaw with screw (5).
  - ✓ Ensure that the magnets in the control cam (6) are facing towards the sensor surface.
- Connect the torque sensor system controller and adjust the sensor (4), see Sensor Assembly and Operating Manual.

### 5.3.4 Mount the object distance sensor OAS



- Fix sensor (1) with screws (2) at the housing (3).  
Notice: The screws (2) are not included in the scope of delivery.
- Connect control unit output and adjust sensor, see sensor mounting and operating manual.

## 6 Start-up

### 6.1 "Digital I/O" variant

#### Overview

- Cable for voltage supply and control is attached to the product.
- Adjust gripping force, [Adjust gripping force](#) [► 37].
- Connect the product to PLC and voltage supply.
- Control product via digital inputs, [Actuation of the digital inputs](#) [► 38].  
Maintain a rest period between commands.

#### NOTE

- For a detailed description of incorporating the product into a control, see the documentation of the relevant control manufacturer.

#### 6.1.1 Adjust gripping force

#### NOTE

For the "Speed" variant, the gripping force is set to 100% in the factory and cannot be changed.

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

- Digital inputs "Opens gripper" and "Closes gripper" are not powered (low), [Actuation of the digital inputs](#) [► 38].
- Remove seal plug.
- Adjust gripping force with the "Gripping force" rotary switch. Do this using a suitable slit screwdriver with a blade at least 2 mm wide. **IMPORTANT! 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.
  - ✓ Protection Class IP 40 (electrical housing) is ensured only when the seal plug is mounted.

Item	Gripping force [%]	
	EGP 25	EGP 40-64
100 (default)	100	100
75		75
50	50	50
25		25

### 6.1.2 Actuation of the digital inputs

#### Truth table

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

Power consumption per digital inputs amounts to max.  $I=10\text{ mA}$ .

*Open/close digital inlets*

Function	Pin 2 (open)	Pin 4 (close)
De-energized drive (shutdown, motor is short-circuited)	0	0
Open the gripper	1	0
Close the gripper	0	1
Rectify error (shutdown, motor is short-circuited)	1	1

#### Rest period between two commands

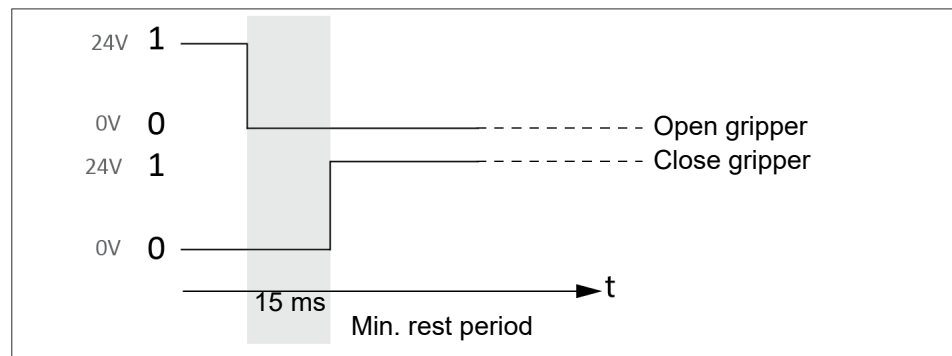
#### CAUTION

##### 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 Open Gripper/Close Gripper*

## 6.2 IO-Link variant

### NOTE

- The commissioning depends on the design of the IO-Link master. For further information on handling the IO-Link master, see the documentation of the relevant IO-Link master manufacturer.
- The gripping force is set via the "IO-Link" communication interface.

- The IO-Link Master is integrated in the PLC.
- The product is connected to the IO-Link master and voltage supply, [IO-Link connection diagram](#) [► 31].
- Make sure that the product is ready-to-operate and not reporting any errors. If necessary, rectify the error reported, [Troubleshooting](#) [► 40].
  - ✓ LED POWER lights up green.
  - ✓ LED COM flashes green.
  - ✓ LED STATUS lights up green for approx. 3 seconds, then red.
- Import IODD to the IO-Link master.  
Note: The IODD is available at [schunk.com](http://schunk.com) or via "IODDfinder" from the IO-Link Community.
- Configure product via IO-Link master device tool.  
Note: If the IO-Link master does not support IODD, the product can be parameterized via acyclic data exchange.
  - ✓ Parameterization was transferred to the product.
- Control product via PLC.

### NOTE

- For a detailed description of incorporating the product into a control, see the documentation of the relevant control manufacturer.
- For further information on parameterization, control and start-up behavior of the product, see Software guide "SCHUNK gripper with IO-Link".

## 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. <a href="#">Mechanical connection</a> [► 28] 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. <a href="#">Electrical connection - Digital I/O variant</a> [► 30]

### 7.2 Product does not execute a complete stroke

Possible cause	Corrective action
Dirt deposits between basic jaws and guidance.	Clean and lubricate product. <a href="#">Maintenance</a> [► 42]
Mounting surface is not sufficiently flat.	Check the evenness of the mounting surface. <a href="#">Mechanical connection</a> [► 28]
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
Too little grease in the mechanical guiding areas.	Clean and lubricate product. <a href="#">Maintenance</a> [► 42]
Mounting surface is not sufficiently flat.	Check the evenness of the mounting surface. <a href="#">Mechanical connection</a> [► 28]
Loading too large.	Check permissible weight and length of the gripper fingers. <a href="#">Technical data</a> [► 17]

### 7.4 Gripping force too low

Possible cause	Corrective action
Too much grease in the mechanical movement space.	Clean and lubricate product. <a href="#">Maintenance</a> [► 42]
Wrong gripping pre-selection.	Check adjustment of the gripping force. <a href="#">Adjust gripping force</a> [► 37] Check layout of the product. Meanwhile observe the maximum workpiece weight, see Catalog Data Sheet. <a href="#">Technical data</a> [► 17]



### 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 Electrical signals are not transmitted

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

### 7.7 Faults indicated by LED Error (only with "Digital I/O" variant)

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 flashes at 1.2 s intervals	<ul style="list-style-type: none"> <li>Wait until the product has cooled down.</li> <li>Actuate both digital inlets, "Opens gripper" and "Closes gripper" to high. OR: Disconnect voltage supply and reconnect.</li> <li>The "ERROR" LED goes out. The error is acknowledged.</li> </ul>
Warning overheating	LED lights up continuously	The warning disappears automatically when the product has cooled down.

### 7.8 Faults indicated by LED STATUS (only with "I/O-Link" variant)

Possible cause	LED "STATUS"	Corrective action
Fault requiring acknowledgment	LED lights up red	<ul style="list-style-type: none"> <li>Check device status via IO-Link.</li> <li>Take measures according to error message.</li> <li>Acknowledge error.</li> </ul> <p>See Software guide "SCHUNK gripper with IO-Link"</p>

## 8 Maintenance

### 8.1 Maintenance intervals

Interval (million cycles) for EGP 25 – 64	Maintenance work
1000 cycles or once per day	Travel an entire stroke.
2	Treat all grease areas with lubricant, <a href="#">Lubricants and lubricating points</a> [► 43]
2	Clean all parts thoroughly, check for damage and wear.

For extreme ambient and application conditions, shortened maintenance cycles can ensure the lifespan is maintained.

#### **CAUTION**

##### **Material damage due to hardening lubricants!**

Lubricants harden more quickly at temperatures above 60°C, leading to possible product damage.

- Reduce the lubricant intervals accordingly.

#### **CAUTION**

##### **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.

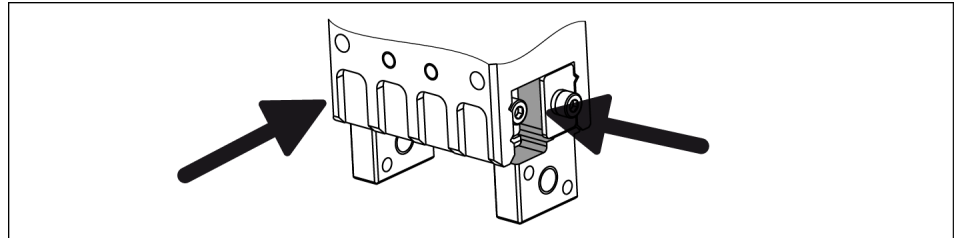
- Travel the full stroke every 1000 cycles or at least once daily.

## 8.2 Lubricants and lubricating points

SCHUNK recommends the listed lubricant.

During maintenance, treat all greasing areas with lubricant. Apply a thin film of lubricant using a lint-free cloth or brush.

Lubricant point	Lubricant
Metallic sliding surfaces	Isoflex-Topas NCA 52



*Position of the lubricating points*

## 8.3 Disassembly and assembling

This product must not be disassembled for maintenance.

### **CAUTION**

#### **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:	Electric Small Components Gripper EGP
ID number	0310900, 0310902, 0310940, 0310942, 0310960, 0310980, 1372735, 1383538, 1383545

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*

Dr.-Ing. Manuel  
Baumeister, Technology &  
Innovation, Mechatronics & Sensors

Lauffen/Neckar, April 2020

## 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/ Distributor	SCHUNK GmbH & Co. KG Spann- und Greiftechnik 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:	Electric Small Components Gripper / EGP / electric
ID number	0310900, 0310902, 0310940, 0310942, 0310960, 0310980, 1372735, 1383538, 1383545

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
-------------------	---

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*

Lauffen/Neckar, April 2020

Dr.-Ing. Manuel Baumeister, Technology &  
Innovation, Mechatronics & Sensors

## 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	Electric Small Components Gripper
Type designation	EGP
ID number	0310900, 0310902, 0310940, 0310942, 0310960, 0310980, 1372735, 1383538, 1383545

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		X	
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
1.3.3	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

<b>1.3</b>	<b>Protection against mechanical hazards</b>			
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
<b>1.4</b>	<b>Required characteristics of guards and protective devices</b>			
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
<b>1.5</b>	<b>Risks due to other hazards</b>			
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
<b>1.6</b>	<b>Maintenance</b>			
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	
1.6.4	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	