Assembly and Operating Manual EGS

Electric 2-finger parallel swivel unit





Superior Clamping and Gripping

Imprint

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

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Dear Customer,

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

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

Best regards,

Your SCHUNK team

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



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1 General

1.1 About this manual

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

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

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

In addition to these instructions, the documents listed under ▶ 1.1.2 [□ 6] are applicable.

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

1.1.1 Presentation of Warning Labels

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



Dangers for persons!

Non-observance will inevitably cause irreversible injury or death.



Dangers for persons! Non-observance can lead to irreversible injury and even death.



Dangers for persons! Non-observance can cause minor injuries.

ΝΟΤΙCΕ

Material damage!

Information about avoiding material damage.



1.1.2 Applicable documents

- General terms of business *
- Catalog data sheet of the purchased product *
- Assembly and operating manuals of the accessories *

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

1.1.3 Sizes

This operating manual applies to the following sizes:

- EGS 25
- EGS 40

1.2 Warranty

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

- Observe the maximum service life. ▶ 3 [□ 21]
- Observe the ambient conditions and operating conditions, ▶ 2.5 [□ 9]
- Observe the specified maintenance and lubrication intervals, ▶ 7 [□ 46]

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

1.3 Scope of delivery

The scope of delivery includes

- Electric 2-finger parallel swivel unit EGS in the version ordered
- Assembly and Operating Manual
- Accessory pack

1.4 Accessories

The following accessories, which must be ordered separately, are required for the product:

- 2x connection cable 4-pole, socket M8
 - angled, 5 m
 - angled, 10 m
 - straight, 5 m
 - straight, 10 m

NOTE

When using customer-supplied cable: min. 4 x 0.25 mm²

A wide range of accessories are available for this product

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

1.4.1 Spare parts packages

Spare parts packages allow for the maintenance and repair of individual components. For information on the range of the spare parts packages, see www.schunk.com > Service.

The following spare parts packages are available for this product:

- Spare part package "Swiveling stop"
- Spare part package "Sensor bracket"

Swiveling stop

Size	ID number
EGS 25	1380497
EGS 40	1399835

Sensor bracket

Size	ID number
EGS 25	1380491
EGS 40	1399828



2 Basic safety notes

2.1 Intended 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, ▶ 3 [¹ 21].
- The product is intended for installation in a machine/automated system. The applicable guidelines for the machine/automated system must be observed and complied with.
- The product is intended for industrial and industry-oriented use. Its use outside enclosed spaces is only permitted if suitable protective measures are taken against outdoor exposure. The product is not suitable for use in salty air.
- The product can be used within the permissible load limits and technical data for holding workpieces during simple machining operations, but is not a clamping device according to EN 1550:1997+A1:2008.
- Appropriate use of the product includes compliance with all instructions in this manual.
- Any utilization that exceeds or differs from the appropriate use is regarded as misuse.

2.2 Constructional changes

Implementation of structural changes

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.

2.3 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.

2.4 Gripper fingers

Requirements of gripper fingers

Accumulated energy can make the product unsafe and risk the danger of serious injuries and considerable material damage.

- Execute the gripper fingers in such a way that the product reaches either the "open" or "closed" position in a de-energized state.
- Only change gripper fingers if no residual energy can be released.
- Make sure that the product and the top jaws are a sufficient size for the application.

2.5 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 Link Daten Umgebungs- und Einsatzbedingungen.

- Make sure that the product and the top jaws are a sufficient size for the application.
- Ensure that maintenance and lubrication intervals are observed, ▶ 7 [□ 46].

2.5.1 Electromagnetic compatibility

The product meets the requirements of the EMC act of the inner-European market, among other requirements. The product has passed the EMC test as per the following standards:

Standard	Title
EN 61000-6-2 (2006)	EMC: Generic standard – Interference immunity in industrial environments
EN 61000-6-3 (2011)	EMC: Generic standards - emitted interference for living area, business and commercial areas and small businesses

The product must be installed using interference-free cables and in a way that meets EMC requirements in order to ensure interference-free operation.



Interference variables:

The electromagnetic compability with pulse-shaped inference variables has been verified and confirmed according to the following standards:

Standard	Title
EN 61000-4-2 (2008)	Test and measurement procedures - Testing the interference immunity to discharging of static electricity
EN 61000-4-4 (2008)	Test and measurements procedures - Testing the interference immunity to fast transient electric interference variables/burst
EN 61000-4-5 (2014)	Test and measurement procedures - Testing the interference immunity to surge voltages

Sinusoidal interference variables:

The electromagnetic compability with sinusoidal interference variables has been verified and confirmed according to the following standards:

Standard	Title
EN 61000-4-3 (2011)	Test and measurement procedures - Testing the interference immunity to electromagnetic high frequency fields
EN 61000-4-6 (2014)	Test and measurement procedures - interference immunity to conducted interference variables induced by high frequency fields

Emission of radio interference

The emission of radio interference has been verified and confirmed according to the following standards:

Standard	Title
EN 61000-6-3 (2011)	EMC: Generic standards - emitted interference for living area, business and commercial areas and small businesses

2.5.2 Environmental conditions

Requirements for transport and storage

The following information applies if the product is transported and stored in the original package.

Mechanical Environmental Conditions Standard: IEC 60721-3-2 (1997-02) Title: Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities, Section 2: Transportation. Class 2M3 applies.

Climatic Environmental Conditions Standard: IEC 60721-3-2 (version 1997-02) Title: Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities, Section 2: Transportation. Class 2K4 applies.

The aforementioned standards result in the following parameters for the essential environmental conditions:

Standard	Title
According to EN 60068-2-1	Test method - test A: cold
According to EN 60068-2-2	Test method - test B: dry heat

Requirements during
operationThe following overview shows the permissible environmental
conditions for the product.

Mechanical Environmental Conditions Standard: IEC 60721-3-3 (1995-09) Title: Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities, Section 3: Stationary use at weather-protected locations. Class 3M7 applies.

Climatic Environmental Conditions Standard: IEC 60721-3-3 (1995-09) Title: Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities, Section 3: Stationary use at weather-protected locations. Class 3K3 applies

The product has been tested for the essential environmental conditions according to the following standards:

Standard	Title
According to EN 60068-2-1	Test method - test A: cold
According to EN 60068-2-2	Test method - test B: dry heat



The product may only be used in the following locations if additional measures are taken:

- In locations with a high level of ionizing radiation
- In locations with difficult operating conditions, e.g., due to caustic fumes, gases, oils or chemicals
- In facilities requiring special monitoring, e.g., in particularly atrisk areas

The product must also not be used in potentially explosive zones. If the product is subjected to unacceptably large impacts or vibrations, suitable measures must be taken to reduce the amplitude or acceleration of such disturbances. Vibration-damping or vibration-absorbing systems are to be used in such cases.

Tests with regard to ambient conditions

Tests with regard to mechanical environmental conditions The electronics integrated in the product has been tested with respect to mechanical environmental conditions according to the following standards:

Standard	Title
EN 60068-2-6 (2008-10)	Test method - test Fc: oscillation (sinusoidal)
EN 60068-2-27 (2010-02)	Test method - test Ea and guidelines: shock
EN 60068-2-64 (2009-04)	Test method - test Fh: broadband noises



2.6	Personnel qualification
	Inadequate qualifications of the personnel
	If the personnel working with the product is not sufficiently qualified, the result may be serious injuries and significant property damage.
	 All work may only be performed by qualified personnel.
	• Before working with the product, the personnel must have read and understood the complete assembly and operating manual.
	 Observe the national safety regulations and rules and general safety instructions.
	The following personal qualifications are necessary for the 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.
2.7	Personal protective equipment
	Use of personal protective equipment
	Personal protective equipment serves to protect staff against danger which may interfere with their health or safety at work.
	 When working on and with the product, observe the occupational health and safety regulations and wear the required personal protective equipment.
	Observe the valid safety and accident prevention regulations.
	 Wear protective gloves to guard against sharp edges and corners or rough surfaces.
	 Wear heat-resistant protective gloves when handling hot surfaces.
	 Wear protective gloves and safety goggles when handling hazardous substances.
	• Wear close-fitting protective clothing and also wear long hair in a hairnet when dealing with moving components.

2.8 Notes on safe operation

Incorrect handling of the personnel

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

- Avoid any manner of working that may interfere with the function and operational safety of the product.
- Use the product as intended.
- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. This does not apply to products that are designed for special environments.
- Eliminate any malfunction immediately.
- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention and environmental protection regulations regarding the product's application field.

2.9 Transport

Handling during transport

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

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

2.10 Malfunctions

Behavior in case of malfunctions

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



2.11 Disposal

Handling of disposal

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

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

2.12 Fundamental dangers

General

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

2.12.1 Protection during handling and assembly Incorrect handling and assembly

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

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

Incorrect lifting of loads

Falling loads may cause serious injuries and even death.

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

2.12.2 Protection during commissioning and operation Falling or violently ejected components

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

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

2.12.3 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 conected 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.

2.12.4 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.



2.12.5 Protection against magnetic and electromagnetic fields Work in areas with magnetic and electromagnetic fields

Magnetic and electromagnetic fields can lead to serious injuries.

- Persons with pace-makers, metal implants, metal shards, or hearing aids require the consent of a physician before entering areas in which components of the electric drive and control systems are mounted, started up, and operated.
- Persons with pace-makers, metal implants, metal shards, or hearing aids require the consent of a physician before entering areas in which magnetic grippers or motor parts with permanent magnets are stored, repaired, or assembled.
- Do not operate high-frequency or radio devices in the proximity of electric components of the drive system and their feed lines. If the use of such devices is necessary:

When starting up the electric drive and control system, check the machine or automated system for possible failures when such systems are used at different intervals and in different states of the control system. A special additional EMC test may be necessary if the system has a high risk potential.

2.13 Notes on particular risks



\Lambda 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.



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.



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.



A WARNING

Risk of injury due to unexpected movements!

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

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



Risk of injury from sharp edges and corners!

Sharp edges and corners can cause cuts.

• Use suitable protective equipment.





A 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.



A 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

Designation		EGS 25 EGS 40						
Supply voltage [VDC]	24							
Min.				21	L.6			
Max.				26	5.4			
Gripper data								
Min. Supply current power supply unit [A]*				1	.0			
Max. Current input [A] **	1.0 2.0							
Gripping force switch [position]	10	100 50		100	75	50	25	
Gripping force [%]	10	100 50		100	75	50	25	
Current input in blocked state [A] ***	0.	.4	0	.2	0.2	0.15	0.1	0.075
Swiveling axis data								
Min. Supply current power supply unit [A] *		1.0			2.0			
Max. Current input [A] **	1.0 2.0			0				
Speed of rotation switch [position]	100 75 50 25		100	75	50	25		
Speed of rotation [%]	100	75	50	25	100	75	50	25
Current input in blocked state [A] ***		0.4 0.4			4			

* minimum supply current for reliable operation of product

** maximum power consumption in the acceleration phase (max. t = 50 ms)

*** Power consumption in blocked state (in gripper end position or while gripping a workpiece or in swivel end position) with active command "Open Gripper" or "Close Gripper" or "swivel counter-clockwise" or "swivel clockwise"

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

Ambient conditions and operating conditions

Designation	EGS 25 - 40
Ambient temperature [°C]	
min.	+5
max.	+55
IP rating * (mechanical)	30
IP rating * (electrical, only with seal plug)	40
Noise emission [dB(A)]	≤ 70

* 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.

Warranty

Designation	EGS
Warranty duration [months]	24
or maximum cycles [mil.]*	10

* A cycle consists of a complete gripping process: "Open gripper" and "Close gripper".



4 Design and description

4.1 Design



Design

1	Swiveling axis connector	8	Swiveling stop
2	Rotary switch "swivel speed"	9	Switching lug
3	LED "swiveling axis"	10	Sensor bracket slider
4	Housing	11	Base jaw
5	Sensor bracket	12	LED "gripper"
6	Scale	13	Rotary switch "gripping force"
7	Pointer stop	14	Gripper connector

4.2 Description

The product is an electrical 2-finger parallel gripping rotary unit with two separately controllable axis.

4.3 Function label

EGS Size 25



Function label EGS 25

1	Rotary switch "gripping force"	3	LED "READY"
2	Rotary switch "swivel speed"	4	LED "ERROR"

EGS Size 40



Function label EGS 40

1	Rotary switch "gripping force"	3	LED "READY"
2	Rotary switch "swivel speed"	4	LED "ERROR"



4.3.1 Rotary switch gripping force and swivel speed

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

Via the "swivel speed" rotary switch, the RPM specification for the speed controller is set by changing the swivel speed.

The "Gripping force" and "swivel speed" rotary switches are accessible after removing the seal plug.

Both rotary switches have latching positions.

In order to change the gripping force and swivel speed, PIN 2 and PIN 4 must be de-energized (low), truth table [\square 27].

Item	EGS	5 25	EGS	40	
	Gripping force [%]	Swiveling speed [%]	Gripping force [%]	Swiveling speed [%]	
100 (default)	100	100	100	100	
75	-	75	75	75	
50	50	50	50	50	
25	-	25	25	25	



	4.3.2 L	.ED
Designation	Color	Function
READY	Green	Indicates whether the voltage is connected.
		• 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.
		• 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.
		 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 warning.
		 The product enters an idle phase until it has cooled down. The commands "Open gripper", "Close gripper", "Rotate counterclockwise" and "Rotate clockwise" are not processed
		 The error must be acknowledged.
		• Blinks rapidly (at approx. 0.6 s intervals), when the "Gripping force" rotary switch or swivel speed is between two switching positions.
		 Is automatically deleted when the "Gripping force" and "Pivoting speed" rotary switches are on one switching position.
Acknowledge er	ror 1	 Wait until the product has cooled down.
0		2. Actuate both digital inlets, PIN 2 and PIN 4, with high.
	3	3. OR:
		Disconnect voltage supply and reconnect.

122 IED

 $\checkmark~$ LED "error" is extinguished and the error is acknowledged.

4.4 Anti-Windup regulator

In order to ensure the same movement shape of the swiveling axis, an Anti-Windup regulator is integrated.

Every time the voltage supply for the swiveling axis is switched on, an adaption phase for the blockage recognition of the anti-windup regulator is run.

During the initial swiveling cycles, the rotating angles for rotation in a counter clockwise and a clockwise direction are compared and stored if they match.

The adaption phase may take several swiveling motions. If a blockage occurs during a swivelling motion in the adaption phase, the swiveling axis may behave differently than upon successful completion of the adaption phase.

If the blockage becomes loose during the swiveling motion, the swiveling speed is higher than the set swiveling speed for a short period of time. This is particularly noticeable when the swiveling speed is set to 25% or 50%.

The Anti-Windup regulator is only active after successfully completing the adaption process.

4.5 Actuation

Truth table

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

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

Function	PIN 2 (open or UZS)	PIN 4 (close or GUZS)
De-energized gripper or swivel operation (shutdown, motor is short-circuited)	0	0
Open gripper/pivot swiveling axis counter clockwise (GUZS)	1	0
Close gripper/pivot swiveling axis counter clockwise (UZS)	0	1
Rectify error (shutdown, motor is short-circuited)	1	1

Open/close and swivel digital inlets

Rest period between two commands

NOTICE

Material damage due to faulty control!

The internal electronics can be damaged by two commands following too quickly in succession.

• 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



Example swiveling counter-clockwise / swiveling clockwise

Mechanical linking of
the axesNote: as the swiveling axis and the gripper unit are not
mechanically decoupled, the axes/both functions on each other
may be influenced. In doing so, the swiveling axis may move as
slightly when actuating the gripper, if it is not being actively
controlled.

4.6 Definition swivel direction



Swivel direction

- The scale provides a reference for the swivel direction.
 - Swivel clockwise (CW) angular position drops
 - Swivel anti-clockwise (ACW) angular position rises

5 Assembly and settings

5.1 Installing and connecting



A WARNING

Risk of injury due to unexpected movements!

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

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

NOTICE

Risk of damage to the electronics!

If pressure is exerted on the rotary switch while the gripping force is being set, the product can be damaged.

- Use a suitable slot screwdriver with a 1.5 2 mm blade.
- Exert no axial pressure on the axis of the "Gripping force" rotary switch.

NOTICE

Damage due to incorrect speed setting!

If the product approaches the end position too hard, it may be damaged.

• Set the speed so that the product travels without impact into the end position.

NOTE

Ensure sufficient heat dissipation via 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.

NOTE

In temperature-critical applications, for instance in a park position, axles not required can be switched off by setting PIN2 and PIN4 to logical "low." This can cause the product temperature to reduce.



1. Check the evenness of the mounting surface, ▶ 5.2.1 [¹] 32].

NOTE

In order to ensure a smooth operation, the product must be grounded using the conductive housing.

To do so, screw the product onto a conductive surface to which a grounding cable is screwed.

- 2. Screw the product to the machine/system, ▶ 5.2.1 [□ 32].
 - Use suitable connecting elements (adapter plates) if necessary.
 - ✓ Observe the permissible depth of engagement.
 - ✓ Observe the tightening torque of the mounting screws.
- 3. Screw gripper finger onto the product,

▶ 5.2.1 [🗋 32].

- 4. Place the "Grip" voltage supply and control cable on the M8 connection plug and screw it tightly by hand, ▶ 5.2.2 [□ 34].
- 5. Place the "Swivel" voltage supply and control cable on the M8 connection plug and screw it tightly by hand, ▶ 5.2.2 [□ 34].
- 6. Mount and connect the sensor, ▶ 5.3 [□ 36].
- 7. Adjust the sensor, ▶ 5.5 [□ 38].
 - ✓ Adjust angle of rotation.
 - ✓ Adjust the sensor holder.
 - ✓ Adjust the sensor.
- 8. If necessary, adjust swiveling speed, ▶ 4.3.1 [□ 25].
 - ✓ Remove center plug.
 - ✓ Adjusting the swiveling speed
 - ✓ Insert center plug.
- 9. Adjust gripping force, if necessary, ▶ 4.3.1 [¹ 25].
 - ✓ Remove center plug.
 - ✓ Adjust gripping force.
 - ✓ Insert center plug.

NOTE

Protection Class IP 40 (electrical housing) is ensured only when the seal plug is mounted.

• Replace the seal plug after adjusting.

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 base jaws



Connections at the base jaws

Item	Mounting	EGS 25	EGS 40
1	Thread in base jaws	M4	M5
	Tightening torque [Nm]	3.1	6.1
2	Bore holes for cylindrical pin	Ø 1.5	Ø 2.5



Connections at the housing

The product can be mounted from three sides.



Connections at the housing

ltem	Mounting	EGS 25	EGS 40
Side A			
1	Mounting screw	M4	M5
	Max. depth of engagement from locating surface [mm]	6	9
	Tightening torque [Nm]	3.1	6.1
2	Centering sleeve	Ø6	Ø 8
Side B			
3	Mounting screw	M4	M5
	Max. depth of engagement from locating surface [mm]	6	9
	Tightening torque [Nm]	3.1	6.1
4	Centering sleeve	Ø6	Ø 8
Side C			
5	Mounting screw	M3	M4
	Tightening torque [Nm]	1.2	3.1

5.2.2 Electrical connection

NOTICE

Material damage due to incorrect assembly!

- When connecting the cable, do not exceed the maximum tightening torque of 0.8 Nm for the cable.
- Make sure that the connections are not stressed due to pulling or pressure forces or due to vibrations. Apply the corresponding strain relief devices if required.

NOTE

When using customer-supplied cable: at least 4 x 0.25 mm²

The gripper and the swivel axes are controlled separately. In order to use both axes, both connectors for voltage supply and control must be connected.

Voltage supply and control



M8 connection plug for gripper and swivel axis (view of plug)

Connection assignment gripper

PIN	Wire strand	Signal
1	Brown	+ 24 V
2	White	Opens gripper
3	Blue	GND
4	Black	Closes gripper

Connection assignment swivel axis

PIN	Wire strand	Signal
1	Brown	+ 24 V
2	White	Pivot swiveling axis counter clockwise (GUZS), ▶ 4.6 [□ 29]
3	Blue	GND
4	Black	Pivot swiveling axis clockwise (UZS), ▶ 4.6 [□ 29]

Connection	Plug connector EGS	Plug connector provided by the customer
Grippers	Plug connector 4- pole, M8	Connection cable 4-pole, socket M8
Swiveling axis	Plug connector 4- pole, M8	Connection cable 4-pole, socket M8

Components of the electrical connection



5.3 Notes to sensors

NOTE

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

• Information about the operation of sensors at schunk.com or at the SCHUNK contact persons.

NOTE

- Do not use the sensor as a safety component.
- Do not pull on the cable of the sensor.
- Secure the cable and connection plug so that they are not taught and cannot move during operation.
- Do not exceed the permitted bending radius of the cable.
- Do not allow the sensor to come into contact with hard objects and chemicals (e. g., nitric acid, chromic acid and sulfuric acid).

Туре	Induct	Inductive proximity switch						
	IN 30K	IN 30K-S-M8-PNP						
Diameter	3 mm	3 mm						
Type of switching	PNP							
Switching function	Closer							
			1 4 3					
	1	Brown		+ 10 to 30 VDC				
	4	Black		Output				
	3	Blue		GND				

5.4 Prepare product for angle of rotation 30-135° and 215-270°

Angles of rotation of 30°–270° and various workpiece sizes can be monitored with the sensors.

For angles of rotation of 30°–135° and 215°–270°, four switching lugs are required. For an angle of rotation of 135°–215°, only two switching lugs are required.

In the delivery state, an angle of rotation of 135°–215° is prepared. Two switching lugs are on one side and two retaining plates with spacers are fitted on the other side of the gripper finger.

In order to prepare the product for an angle of rotation of 30°– 135° or 215°–270° the two retaining places with spacers on the side of the gripper finger must be replaced with two switching lugs from the accessory kit.

Procedure when changing the angle of rotation of $135^{\circ}-215^{\circ}$ to $30^{\circ}-135^{\circ}$ or $215^{\circ}-270^{\circ}$:



- 1. Loosen screw (1) and remove the retaining plates with the spacers (3).
- Mount two additional switching lugs (4) from the accessory kit using the screws (1) on the side of the gripper finger. Insert one small sleeve (2) with a diameter of 4 mm as a spacer between each screw (1) and switching lug (4). Note: The sleeve (2) is pre-assembled on the cover housing.



Example, sensor monitoring 90° and 270°

5.5 Angle of rotation, sensor bracket and setting sensor



A WARNING

Risk of injury due to unexpected movements!

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

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



Angle of rotation, sensor bracket and setting sensor

NOTE

If a sensor bracket (8) is in the way when sliding a swivel stop (5) or a swivel stop (5) is in the way when sliding a sensor bracket (8), the order of these parts in the circular groove can be changed.

To do this, the associated T-nuts are removed from the groove and placed back in. For removing and placing back in, the circular groove has an expansion between 285°-330°.

If the basic setting of the product is not to be used, switching lugs must be mounted before calibration or swivel stops and sensor brackets changed, ▶ 5.4 [□ 37].

Proceed as follows during configuration:

- 1. If necessary, change swivel stops and sensor brackets.
- 2. Adjust angle of rotation
- 3. Installing and configuring the sensor
- 4. Adjusting the sensor
- 5. Adjusting the slider

Adjust angle of rotation

To adjust the angle of rotation, the swivel end positions are adjusted using the swivel stops (5). The swivel stops (5) are fixed with screws (1) in the circular groove.

- 1. Loosen screws (1) until the swivel stop (5) can be slid into the groove.
- 2. Align product to the first swivel position and slide the swivel stop (5) up to the pointer stop (9).
- 3. Tighten screw (1), in order to fix the swivel stop (5). Tightening torque: 0.68 Nm at EGS 25, 1.2 Nm at EGS 40
- 4. Proceed identically with the second swivel stop in the second swivel position.

Installing and configuring the sensor

The sensors are fixed in the sensor bracket (8) with the screws (2).

- 1. Loosen screw (2) until the slide (7) can be moved axially with the sensor.
- 2. Slide sensor into the slide (7) until it is flush with the top edge of the slide (7).

Distance to switching lug: approx. 0.5 mm

Tighten screw (2).
 Tightening torque: 0.08 Nm at EGS 25, 0.1 Nm at EGS 40

Adjusting the sensor.

The sensor brackets (8) are fixed using the screw (6) in the circular groove.

- 1. Align product to the first swivel position.
- 2. Loosen screw (6) until the sensor bracket (8) can be slid into the groove.
- 3. Align sensor bracket (8) so that one switching lug (4) is above each sensor.
- 4. Tighten screw (6) in order to fix the sensor bracket (8). Tightening torque: 0.3 Nm
- 5. Proceed identically with the second sensor bracket in the second swivel position.

Adjusting the slider

- 1. Undo the screw (2).
- 2. In order to set the sensor for "Workpiece gripper", for instance, grip the workpiece manually with the application-specific fingers and push the slide (7) axially to the switching lug (4) until the sensor switches.
- 3. Tighten screw (2) in order to fix the sensor in the sensor bracket (8).
 - Tightening torque: 0.08 Nm at EGS 25, 0.1 Nm at EGS 40
- 4. Proceed identically for the second gripper position and the second swivel position with the other sensors.



5.6 Logic table

The allocation of sensors S1 to S4 to the angles of rotation or to the positions of the gripper finger are shown in logic tables.



Example, angle of rotation range 30° - 135° and 215° - 270°

Total- angle of rotation	Stop 1 gripper open		Stop 1 gripper closed			Stop 2 gripper closed			Stop 2 gripper open							
30°-135° or	S1	Х	S3		S1		S3		S1		S3		S1		S3	Х
215°-270°	S2		S4		S2	X	S4		S2		S4	X	S2		S4	
		Four switching lugs are required!														





The **X** in the table represents each dampened sensor (logic high).

Example, angle of rotation 135° - 215°

Total angle of rotation	Stop 1 gripper open		Stop 1 gripper closed			Stop 2 gripper closed				Stop 2 gripper open						
135°-215°	S1	X	S3		S1		S3		S1		S3		S1		S3	X
	S2		S4		S2	X	S4		S2		S4	X	S2		S4	
		Two switching lugs are required!														

The **X** in the table represents each dampened sensor (logic high).



6 Troubleshooting

6.1 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. ▶ 5.2.1 [☐ 32]
	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. ▶ 5.2.2 [□ 34]

6.2 Product does not execute a complete stroke

Possible cause	Corrective action
Dirt deposits between basic jaws and guidance.	Clean and lubricate product. 7 [D 46]
Mounting surface is not sufficiently flat.	Check the evenness of the mounting surface. ▶ 5.2.1 [☐ 32]
Breakage of components, e.g. by overloading.	Send the product to SCHUNK with a repair order.

6.3 Product opens or closes jerkily

Possible cause	Corrective action
Too little grease in the mechanical guiding areas.	Clean and lubricate product. ▶ 7 [□ 46]
Mounting surface is not sufficiently flat.	Check the evenness of the mounting surface. ▶ 5.2.1 [☐ 32]
Loading too large.	Check permissible weight and length of the gripper fingers.▶ 3 [□ 21]

Possible cause	Corrective action
Too much grease in the mechanical movement space.	Clean and lubricate product. ▶ 7 [□ 46]
Wrong gripping pre-selection.	Check rotary switch setting. ▶ 5.2.2 [□ 34]
	Check layout of the product. Meanwhile observe the maximum workpiece weight, see Catalog Data Sheet. ▶ 3 [□ 21]

6.4 Gripping force too low

6.5 Opening and closing times are not achieved

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

6.6 Product does not perform the full rotating angle

Possible cause	Corrective action
Dirt deposits between pointer stop and housing top section with scale.	Clean product.
A component is broken e.g. due to overloading.	Send the product to SCHUNK with a repair order.

6.7 Product rotates jerkily

Possible cause	Corrective action
Dirt deposits between pointer stop and housing top section with scale.	Clean product.
Mounting surface is not sufficiently flat.	Check the evenness of the mounting surface.
Loading too large.	Check permissible manageable mass moment of inertia see catalog data sheet.

6.8 Swivel times are not achieved

Possible cause	Corrective action
Loading too large. Check perr	Check permissible weight and length of the gripper fingers.
Workpiece too neavy.	Check permissible manageable mass moment of inertia see catalog data sheet.
Incorrect speed pre-selection.	Verify setting on the "Swivel speed" rotary switch, ▶ 4 [□ 23] and ▶ 4.3.1 [□ 25].

Possible cause	Corrective action
Cable connected incorrectly.	Check that pin terminal is seated properly. ▶ 5.2.2 [☐ 34]
Strands swapped.	Check pin allocation. ▶ 5.2.2 [□ 34]

6.9 Electric signals are not transmitted?

6.10 Faults which are displayed via LED Error

Notes on the malfunctions, ▶ 4.3.2 [¹] 26].

7 Maintenance



A WARNING

Risk of injury due to unexpected movements!

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

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

7.1 Maintenance intervals

Interval (million cycles) for EGS 25 - 40	Maintenance work
1000 cycles or once per day	Travel an entire stroke.
2	Treat all grease areas with Iubricant, ▶ 7.2 [□ 47]
2	Clean all parts thoroughly, check for damage and wear
20	Changing swiveling stop, ▶ 7.3 [□ 48]
as required	Changing sensor bracket, ▶ 7.4 [□ 49]

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

NOTICE

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.

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.

7.2 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	Klübersynth UH1 14-151 *



Position of the greasing areas

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

NOTE

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

The product contains the following components, the lubricants/ foreign substances of which are **not** food compliant:

Greasing area	Lubricant
Motor mount	Commercially available bearing
	grease
Pinion bearing EGS 40 variants	Commercially available bearing
	grease



7.3 Changing swiveling stop



Disassembling

- 1. Read the position of the swiveling stop (2) off the scale and mark it if necessary.
- 2. Remove the screws (3).
- 3. Remove the swiveling stop (2) carefully. Note: leave the circular T-nut (1) in the slot.
- 4. Remove the swiveling stop (4) in the same way.

Assembling

- Fasten the swiveling stop (2) to the circular T-nut using screws (3). Tighten the screws (3) only slightly.
- 2. Push the swiveling stop (2) in the slot to the marked position.
- 3. Tighten the screws (3).
 - ✓ Observe the tightening torque, see following table.
- 4. Install the swiveling stop (4) in the same way.
- 5. Check the angle of rotation and readjust it if necessary.

Tightening torque [Nm]

ltem	Designation	EGS	
		25	40
3	Screw [Nm]	0.68	1.2

7.4 Changing the sensor bracket



Disassembling

- 1. Read off the position of the sensor bracket (4) from the scale and mark it if necessary.
- 2. Undo the screws (2).
- 3. Carefully pull the sensors (6) out downwards.
- 4. Remove the screw (5).
- Carefully remove the sensor bracket (2).
 Note: leave the circular T-nut (1) in the slot.
- 6. Remove the sensor bracket (7) in the same way.

Assembling

- Fasten the sensor bracket (4) with the screw (5) to the circular-T-nut (1). Tighten the screw (5) only slightly.
- 2. Carefully push the sensors (6) from below into the sensor bracket. Make sure that the sensors (6) are flush with the upper edges of the slides (3) and the LEDs point to the front.
- 3. Tighten the screws (2) slightly. Note: the distance of the slides (3) to the cam switch should be approx. 0.5 mm.
- 4. Tighten the screws (2).
 - ✓ Observe the tightening torque, see following table.
- 5. Push the sensor bracket (4) in the slot to the position marked.
- 6. Tighten the screw (5).
 - ✓ Observe the tightening torque, see following table.
- 7. Install the sensor bracket (7) in the same way.
- 8. Check the function of the sensors by swiveling them several times and readjusting them if necessary.



Tightening torque [Nm]

ltem	Designation	EGS	
		25	40
2	Screw [Nm]	0.08	0.1
5	Screw [Nm]	0.3	0.3

8 Translation of the 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 Clamping and gripping technology
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:	Electric 2-finger parallel swivel unit / EGS / electric
ID number	0310820; 1321043

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, January 2023

Dr.-Ing. Manuel Baumeister, Technology & Innovation

9 UKCA declaration of incorporation

in accordance with the Supply of Machinery (Safety) Regulations 2008.

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

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 "Supply of Machinery (Safety) Regulations 2008". The declaration shall be rendered invalid if modifications are made to the product.

Product designation:	Electric 2-finger parallel swivel unit / EGS / electric
ID number	0310820; 1321043

The partly completed machine may not be put into operation until it has been confirmed that the machine into which the partly completed machine is to be installed complies with the provisions of the "Supply of Machinery (Safety) Regulations 2008".

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: Marcel Machado, address: refer to manufacturer's address

Dr.-Ing. Manuel Baumeister, Technology & Innovation

Lauffen/Neckar, January 2023

10 EU-Declaration of Conformity

Manufacturer/ Distributor	SCHUNK GmbH & Co. KG Clamping and gripping technology Bahnhofstr. 106 - 134 D-74348 Lauffen/Neckar
Product designation:	Electric 2-finger parallel swivel unit EGS
ID number	0310820; 1321043

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

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

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

EN IEC 61000-6-4:2019 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

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

Signature: see original declaration

Dr.-Ing. Manuel Baumeister, Technology & Innovation

Lauffen/Neckar, January 2023

11 UKCA declaration of Conformity

Manufacturer/	SCHUNK Intec Limited
Distributor	Clamping and gripping technology
	3 Drakes Mews, Crownhill
	MK8 0ER Milton Keynes

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

Product designation:Electric 2-finger parallel swivel unit EGSID number0310820; 1321043

• Electromagnetic Compatibility Regulations 2016

Applied harmonized standards, especially:

EN IEC 61000-6-2:2019	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments
EN IEC 61000-6-4:2019	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

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

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

Lauffen/Neckar, January 2023

Dr.-Ing. Manuel Baumeister, Technology & Innovation

12 Annex to declaration of Incorporation

in accordance with 2006/42/EC, Appendix II, no. 1 B

as well as

in accordance with the Supply of Machinery (Safety) Regulations 2008.

1. Description of the basic safety and health protection requirements, as per 2006/42/EC, Annex I and per the Supply of Machinery (Safety) Regulations 2008, that apply to and are fulfilled for the scope of the incomplete machine:

Product designation	Electric 2-finger parallel swivel unit
Type designation	EGS
ID number	0310820; 1321043

To be provided by the System Integrator for the overall mach	ine	₩
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	Х	
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	Protection against mechanical hazards		
1.3.3	Risks due to falling or ejected objects		Х
1.3.4	Risks due to surfaces, edges or angles	X	
1.3.5	Risks related to combined machinery		Х
1.3.6	Risks related to variations in operating conditions		Х
1.3.7	Risks related to moving parts	X	
1.3.8	Choice of protection against risks arising from moving parts		Х
1.3.8.1	Moving transmission parts	X	
1.3.8.2	Moving parts involved in the process		Х
1.3.9	Risks of uncontrolled movements		X

1.4	Required characteristics of guards and protective devices		
1.4.1	General requirements		Х
1.4.2	Special requirements for guards		Х
1.4.2.1	Fixed guards		Х
1.4.2.2	Interlocking movable guards		Х
1.4.2.3	Adjustable guards restricting access		Х
1.4.3	Special requirements for protective devices		Х

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	×	(
1.5.11	External radiation	×	(
1.5.12	Laser radiation	×	(
1.5.13	Emissions of hazardous materials and substances			X
1.5.14	Risk of being trapped in a machine	×	(
1.5.15	Risk of slipping, tripping or falling	×	(
1.5.16	Lightning			X

1.6	Maintenance		
1.6.1	Machinery maintenance	Х	
1.6.2	Access to operating positions and servicing points	Х	
1.6.3	Isolation of energy sources	Х	



1.6	Maintenance			
1.6.4	Operator intervention		Х	
1.6.5	Cleaning of internal parts		Х	
1.7	Information			
1.7.1	Information and warnings on the machinery		Х	
1.7.1.1	Information and information devices		Х	
1.7.1.2	Warning devices		Х	
1.7.2	Warning of residual risks		Х	
1.7.3	Marking of machinery	Х		
1.7.4	Instructions	Х		
1.7.4.1	General principles for the drafting of instructions	Х		
1.7.4.2	Contents of the instructions	Х		
1.7.4.3	Sales literature	Х		
	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			Х
2.2.1	Portable fixing and other impact machinery			Х
2.3	Machinery for working wood and material with similar physical characteristics			Х
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		Х	

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