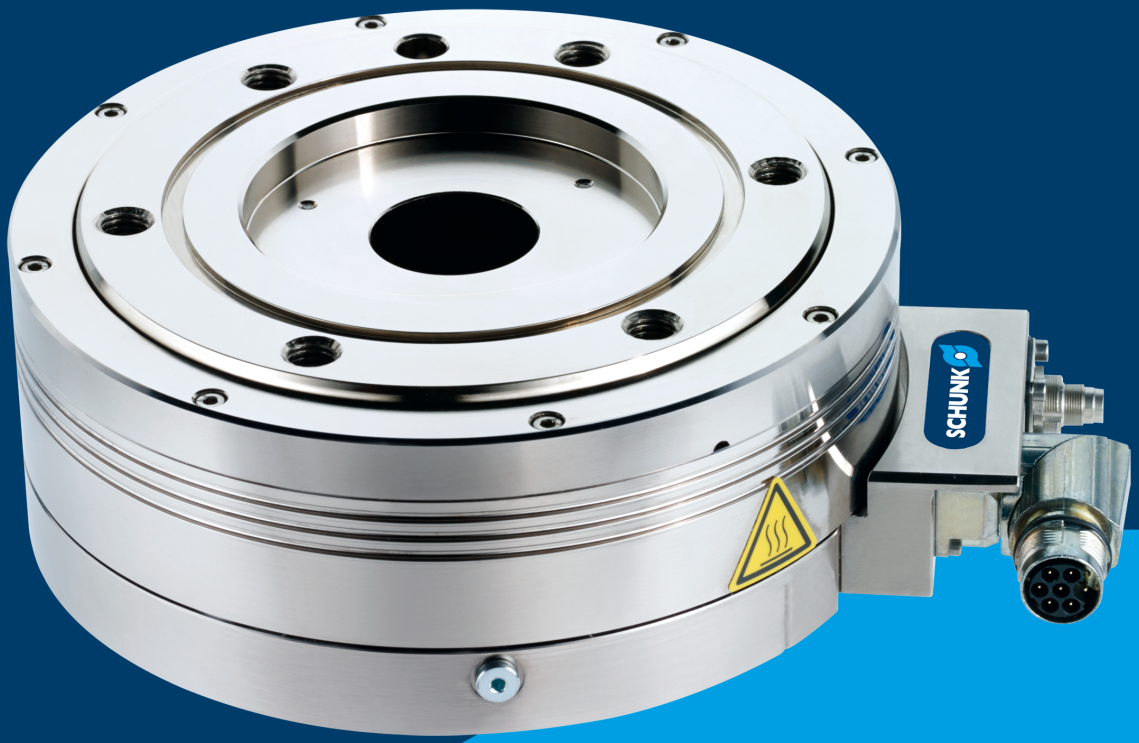

Assembly and Operating Manual
ERS 135 – 210 / 560V
Electrical turning unit with torque motor

Translation of Original Operating Manual

Hand in hand for tomorrow

Imprint

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

Document number: 389064

Version: 09.00 | 03/02/2025 | en

Dear Customer,

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

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

Best regards,

Your SCHUNK team

Customer Management
Tel. +49-7133-103-2503
Fax +49-7133-103-2189
cmg@de.schunk.com

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

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1 General

1.1 About this manual

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

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

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

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

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

1.1.1 Presentation of Warning Labels

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

⚠ DANGER

Dangers for persons!

Non-observance will inevitably cause irreversible injury or death.

⚠ WARNING

Dangers for persons!

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

⚠ CAUTION

Dangers for persons!

Non-observance can cause minor injuries.

CAUTION

Material damage!

Information about avoiding material damage.

1.1.2 Applicable documents

- General terms of business*
- Catalog data sheet of the purchased product*
- Assembly and Operating manuals of the accessories*
- Start-up instructions for ERS on IndraDrive CS *
- Start-up instructions for SIEMENS SINAMICS converter *
- Drive controller documentation

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

1.1.3 Sizes

This operating manual applies to the following sizes:

- ERS135, 560 V
- ERS170, 560 V
- ERS210, 560 V

1.1.4 Versions

This operating manual applies to the following variations:

- ERS
- ERS with pneumatic holding brake
- ERS with rotary feed-through (DDF)
- ERS with protection class IP54

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

- Electrical turning unit with torque motor ERS in the version ordered

Additionally for the variant with pneumatic brake:

- 2x micro valve, MVK 15 3/2
- Y distributor, 2x M8 3-pin to 1x M8 3-pin
- Sensor cable, connector M8 3-pin to open wire strands, length 1.5 m
- Safety information (product-specific instructions available online)

1.4 Accessories

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

- Power and sensor cables
- Drive controller

Drive controller

SCHUNK can offer advice on drive parameter settings for the following drive controllers: BOSCH (EcoDrive CS, IndraDrive and IndraDrive CS) and Siemens (Sinamics S120).

SCHUNK provides motor data sheets for operating the product on other drive controllers and can provide support with commissioning on request. Comprehensive support cannot be guaranteed.

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

2 Basic safety notes

2.1 Intended use

The product was designed to rotate loads, workpieces and objects.

The poduct may only be operated in combination with a controller.

- The product may only be used within the scope of its technical data.
- 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.
- 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

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

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

2.4 Spare parts

Use of unauthorized spare parts

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

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

2.5 Ambient conditions and operating conditions

Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span.

- Make sure that the product is used only in the context of its defined application parameters, ▸ 3 [🗋 17].

2.5.1 Electromagnetic compatibility

The product conforms to the requirements of the EMC directive EU 2014/30 and satisfies the requirements of the following standards:

Standard	Title
EN 61000-6-2 (2005)	Immunity for industrial environments
EN 61000-6-3 (2011)	Interference emissions in residential, commercial, industrial and light industrial environments
EN 61000-6-4 (2007)	Emission standard for industrial environments

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.

2.13 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.

⚠ DANGER

Risk of injury due to magnetic fields

The integrated high performance permanent magnets can represent a risk to persons with an active or passive implant.

- Persons with heart pace-makers, active or passive implants are prohibited from entering the area of the magnetic field.

⚠ 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 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

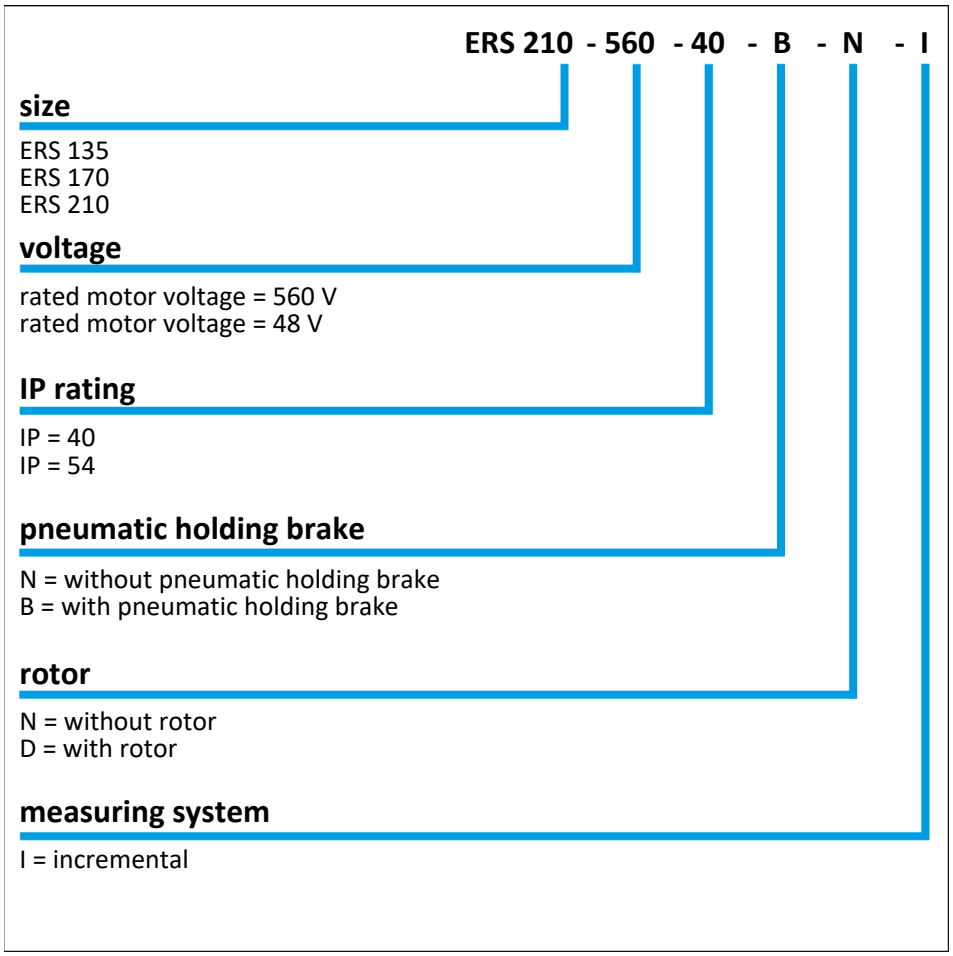
Risk of injury due to moving parts if these are controlled incorrectly

Possible causes for control errors:

- Incorrect cabling or wiring
- Removal of safety devices
- Software errors
- Sensor and signal transmitter errors
- Entry of incorrect parameters prior to start-up
- Defective product

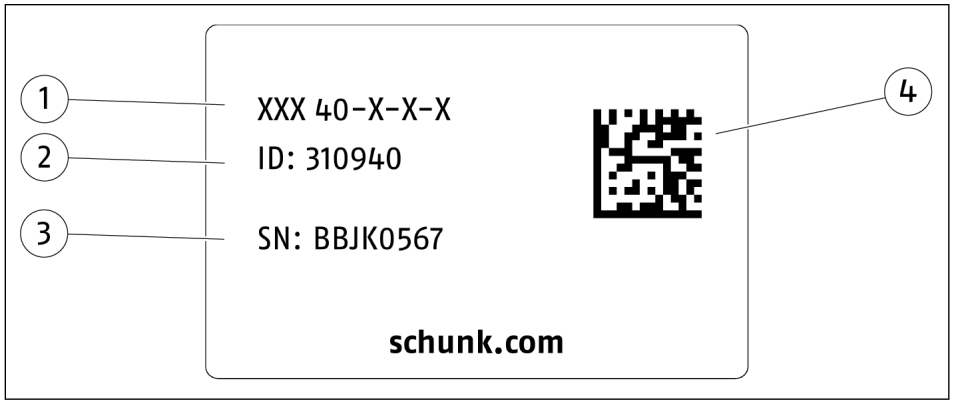
3 Technical data

3.1 Type key



Type key

3.2 Name plate



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

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

For further information, visit **schunk.com/serialisierung**

A separate app may be required for scanning with a mobile phone.

3.3 Basic data

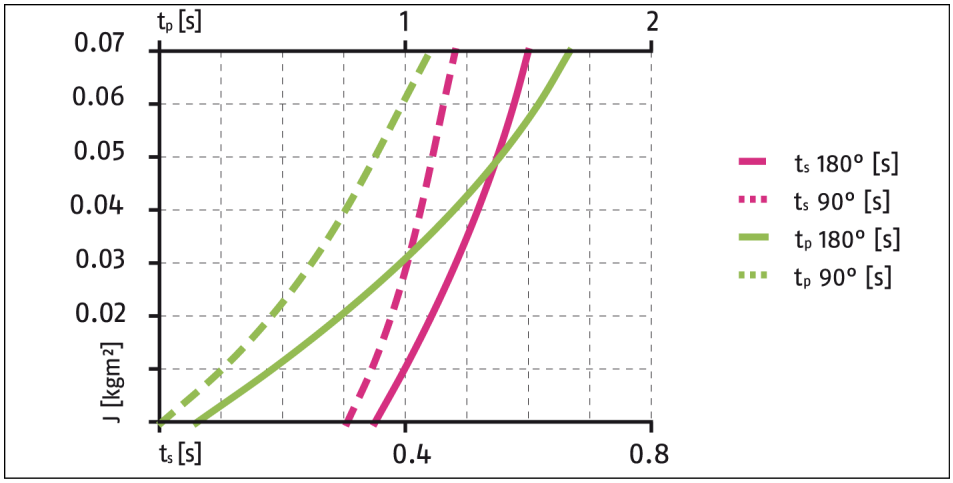
Designation	ERS 560V		
	135	170	210
Mechanical operating data			
Weight [kg]	2.7	4.7	7.8
Dimension	137 x 63	170 x 66	210 x 77
Ambient temperature [°C]			
Min.		+5	
Max.		+55	
IP rating		40	
IP54 variant		54	
Heat conduction surface [mm²]	57686	49302	37363
Mass moment of inertia of rotating parts [kgm²]	0.001431	0.003859	0.011278
Max. permissible mass moment of inertia [kgm²]	0.072	0.20	0.6
Rotation range [°]		>360 (turning endlessly)	
Repeat accuracy [°]*		0.01	
Permissible operating mode		S1 – continuous operation**	
Specifications for the integrated motor			
Motor type		Synchronous	
Circuit		Star	
Temperature sensor (type)		KTY84-130	
Max. permissible operating temperature [°C]		+95	
Insulation class		Class F DIN 57530	
Output shaft power P_n [kW]	0.24	0.37	0.63
Intermediate circuit voltage U_{ZK} [V]		560	
Rated torque M_n [Nm]***	2.5	5.0	10
Nominal current [A_{rms}]	1.2	1.6	1.68
Peak current I_{max} [A_{rms}]	3.8	5.65	5.67
Torque constant K [Nm/A_{rms}]	1.9	3.1	5.6
Rated speed n_n [rpm]	1000	700	600
Max. speed n_{max} [rpm]	2300	1600	1000
Winding resistance (phase-phase) R20 [ohm]	26.5	17.1	16.6
Winding inductivity (phase-phase) L20 [mH]	42.68	24.9	58.12
Number of pole pairings N	15		16

Designation	ERS 560V		
	135	170	210
Specifications for the integrated measuring system			
Type	1V sin-cos signal (analog), magnetic measuring system with reference track		
Measuring system	Incremental		
Power supply [VDC]	5 ±10%		
Mean current input [mA]	25		
Number of poles	160	216	
* Distribution of the end positions of 100 successive motions. When approaching from the same direction.			
** Applies only if the preconditions in chapter "Mechanical connection" are fulfilled, ▸ 5.2.1 [🗋 33]. Otherwise, S6 – continuous mode with intermittent load is the permitted operating mode.			
*** The rated torque is reduced for the DDF and IP54 variants.			

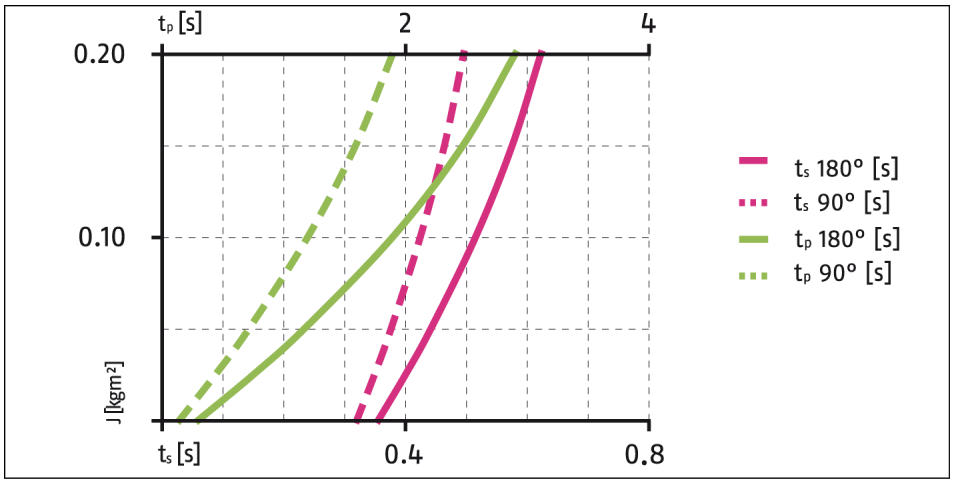
More technical data is included in the catalog data sheet. Whichever is the latest version.

3.4 Diagram for variants without DDF and without IP54

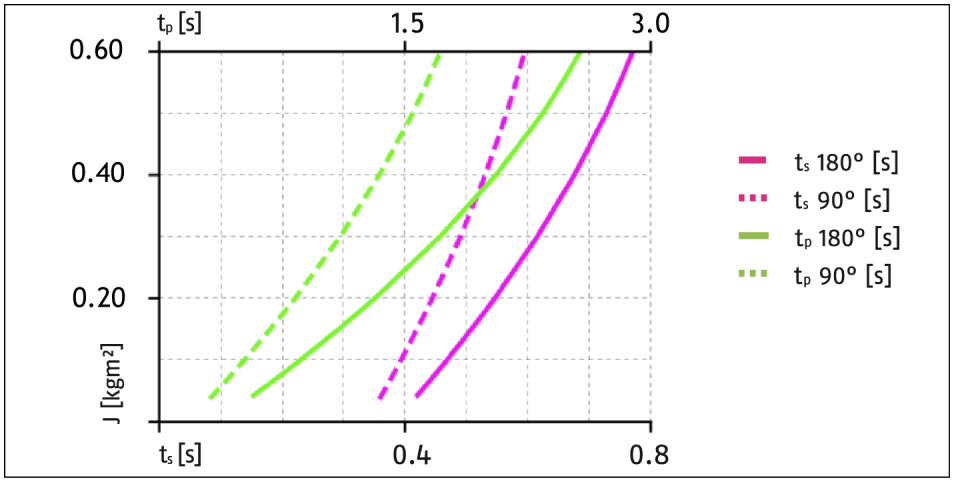
Swiveling time diagram



Swiveling time diagram ERS 135 560V



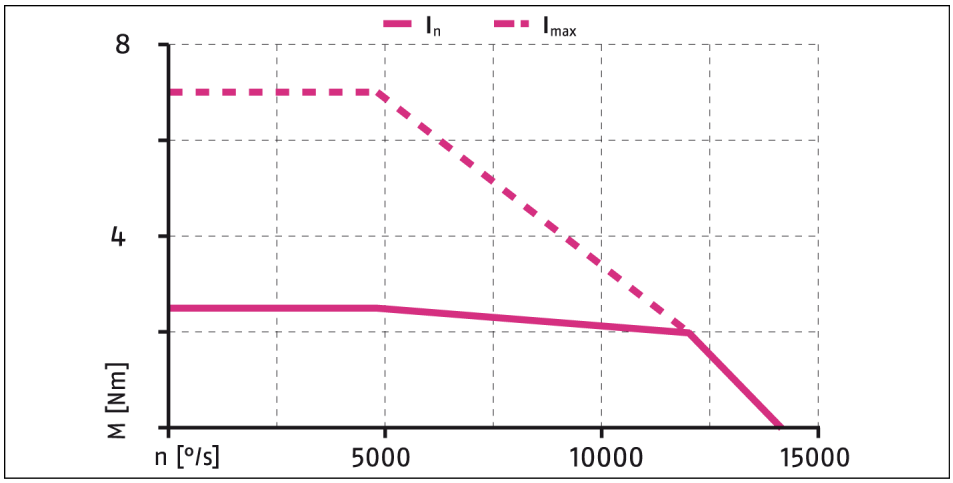
Swiveling time diagram ERS 170 560V



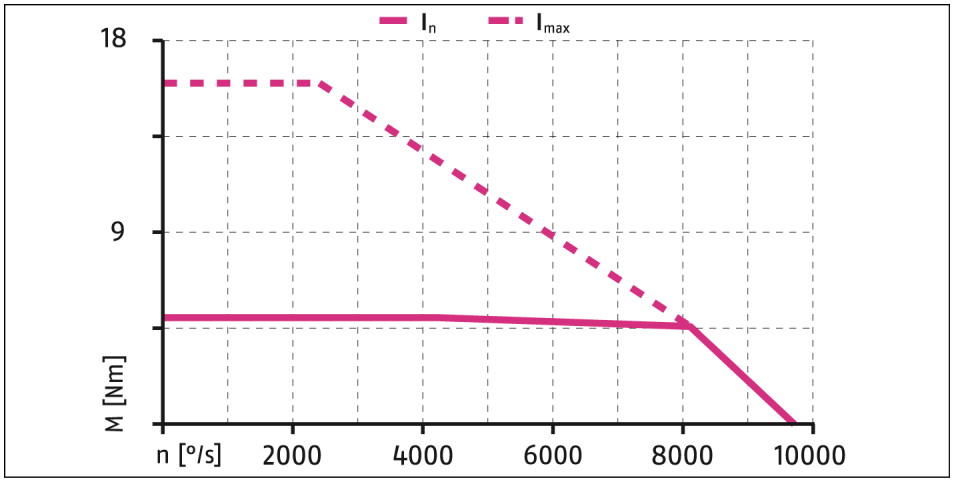
Swiveling time diagram ERS 210 560V

t_s	swing time	t_p	pulse off time

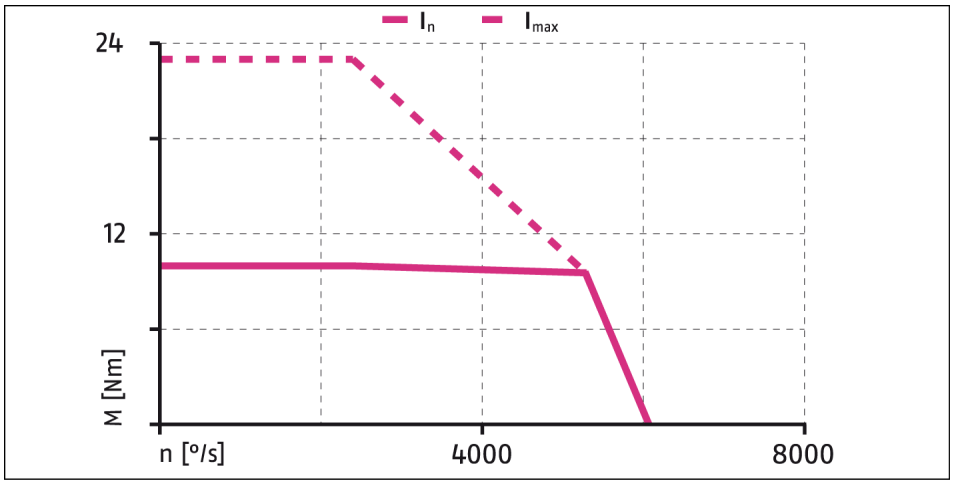
Torque characteristic curve



Torque characteristic ERS 135 560V



Torque characteristic curve ERS 170 560V



Torque characteristic curve ERS 210 560V

3.5 Pneumatic holding brake variant

without micro valve

Designation	ERS		
	135	170	210
Brake torque [Nm]	2.5	5.0	10.0
Opening/closing time of the brake at 4.5 bar [ms]			
Opening	100	200	100
Closing	100	200	100
Air connection specifications	Thread M5, depth 8mm		
Pressure medium	Filtered compressed air, oiled or dry, compressed air purity acc. to ISO 8573-1:2010 [7:4:4]		
Operating pressure P [bar]	4.5 – 6		

Tab.: Pneumatic brake without micro valve MV15

with micro valve

Designation	ERS		
	135	170	210
Brake torque [Nm]	2.5	5.0	10.0
Opening/closing time of the brake at 4.5 bar [ms]			
Opening	100	200	100
Closing	100	200	100
Hose connection diameter internal [mm]	4		
Pressure medium	Filtered compressed air, oiled or dry, compressed air purity acc. to ISO 8573-1:2010 [7:4:4]		
Operating pressure P [bar]	4.5 – 6		
Power consumption [W]	2.8		
Nominal voltage [VDC]	24 (+10% / –5%)		

Tab.: Pneumatic brake with micro valve MV15

3.6 Rotary feed-through (DDF) variant

Designation	ERS	
	170	210
Rated torque M_n [Nm]	4.7	9.3
Max. speed n_{max} [rpm]	250	250
No. of fluid feed-throughs	1	
Max. pressure [bar]	8	
Max. flow quantity [l/min]	220	
Number of signal feed-throughs (incl. each 1x- power supply)	8	
Max. Voltage [V]	24	
Max. current [A] (per connection plug)	2	

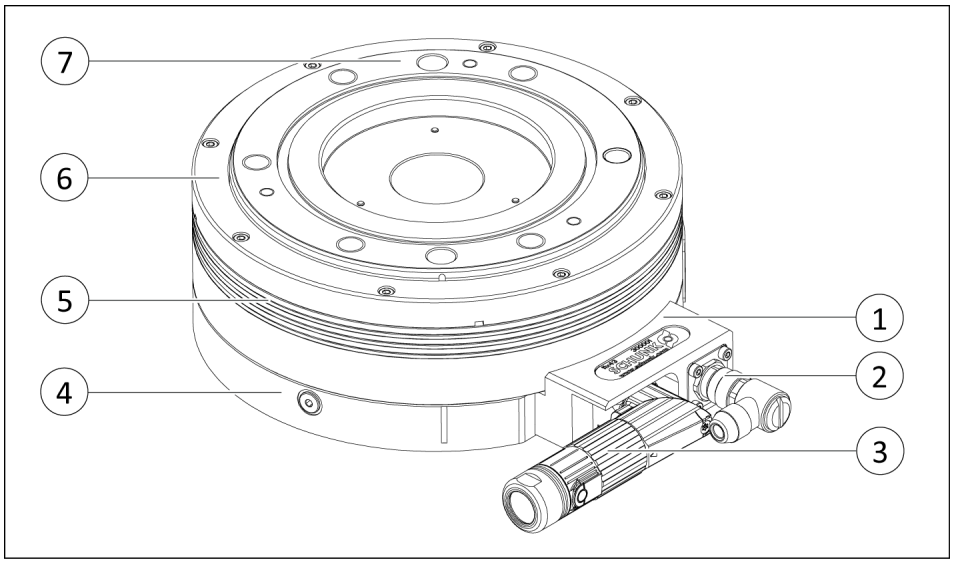
3.7 SCHUNK power and sensor cable

Cable type	Power	Transducer
Number of wires/cross-section	4x0.75 mm² + 2x0.25 mm²	8x0.25 mm²
Max. voltage [V]	600	24
Shielded	yes	yes
Shield around individual wire strands	no	yes
Twisted	no	yes
Temperature application range [°C]	+5 to +55	+5 to +55
Max. cable length [m]	20	20
Cable track compatible		
Minimum bending radius	7.5 times the cable diameter	

The catalog data sheet contains further information on the cable as well as a drawing of it.

4 Design and description

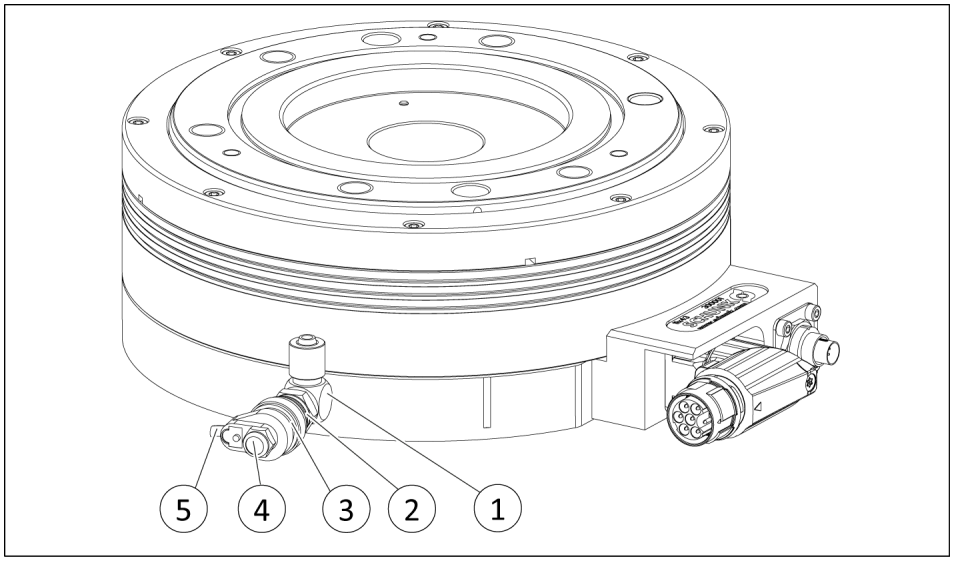
4.1 Design



ERS components

1	Connection plug flange	5	Bearing flange (fixed)
2	Connection plug (encoder system)	6	Sealing flange (fixed)
3	Connection plug (motor)	7	Rotor (moving)
4	Basic carrier (fixed)		

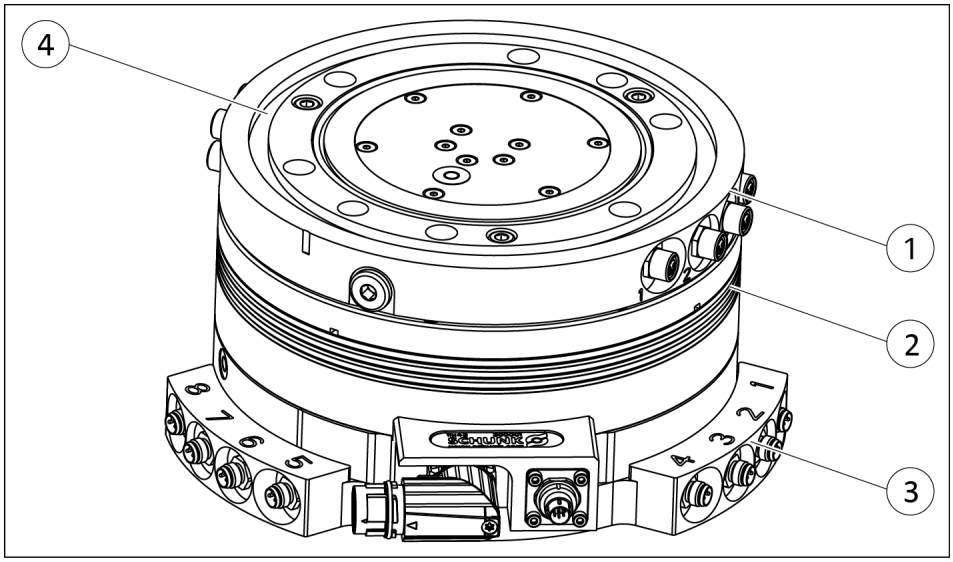
4.1.1 Pneumatic holding brake variant



Micro valve MV15

1	Swivel fitting	4	Sound absorber
2	Cartridge	5	Connection cable
3	Valve cover		

4.1.2 Rotary feed-through (DDF) variant



Assembly of the DDF

1	"Output side" flange
2	Basic module
3	"Input side" connection baseplate
4	Centering groove

4.2 Description

The product is an electrical turning unit with torque motor and a center bore. The center bore can be used as a media feed-through.

The product has an integrated position measuring system and a temperature sensor.

The product must be operated using a drive controller. The following operating modes can be set.

- Current-controlled
- Speed-controlled
- Position-controlled

The product is stored with the aid of a four point bearing. This bearing is lubricated via one-time grease lubrication.

Under normal operating conditions, the grease lubrication is sufficient for 20,000 operating hours, ▶ 7.1 [🗋 47].

Rotary feed-through (DDF) variant

The variant with rotary feed-through (DDF), for sizes 170 and 210, is a combined pneumatic and electrical feed-through to supply products on the ERS assembly.

Pneumatic holding brake variant

For the variant with pneumatic holding brake, the rotary module is held in the current position. To do this, the pneumatic holding brake applies the rated torque for holding position at standstill.

NOTE

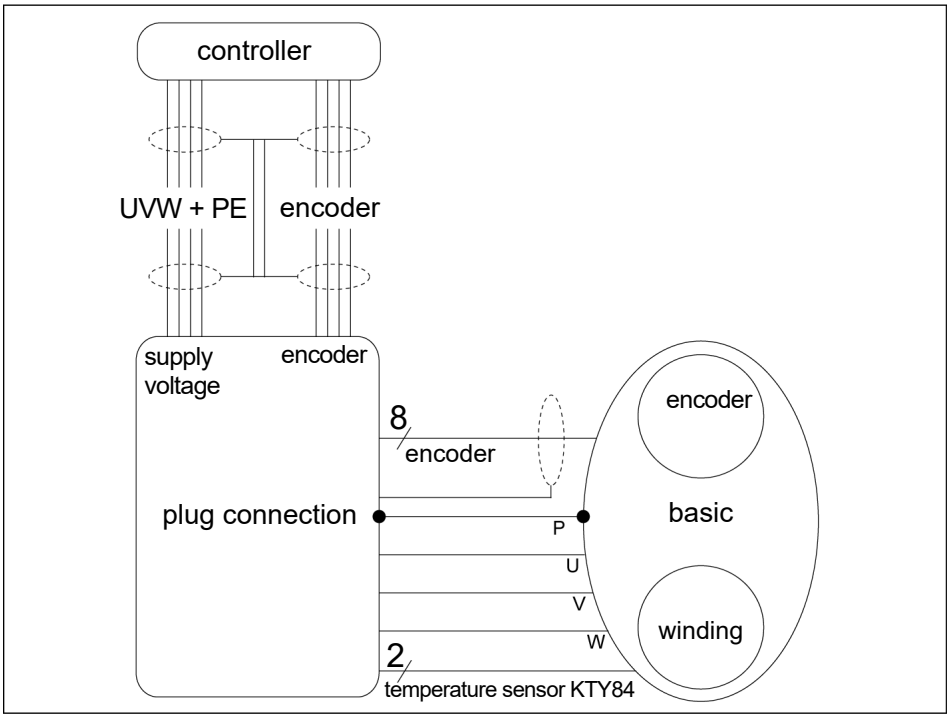
The pneumatic holding brake is not a service brake.

The pneumatic holding brake is actuated using the micro valve. The micro valve is closed if there is no voltage at the micro valve. In this state, the pneumatic holding brake is active. The micro valve is opened if there is voltage at the micro valve. In this state, the pneumatic holding brake is inactive.

Protection class IP54 variant

With the protection class IP54 variant, an additional seal is built in between the bearing flange and the rotor. During assembly, a seal must also be attached in the groove on the top and bottom of the ERS, to ensure the IP54 protection class is achieved.

Connection diagram



ERS schematic diagram

The schematic diagram shows the connection diagram of the product between drive, encoder and drive controller.

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.

In order to achieve protection class IP 40, design the connection structure so that no chips, cooling water or dirt can enter the turning unit's connection area from the working area.

1. Protection class IP54 variant: insert seal into the groove, ▸ 5.2.1.2 [🗋 37].
2. Mount the product on a surface with good thermal conductive properties, ▸ 5.2.1 [🗋 33].
3. Check the flatness of the mounting surface, ▸ 5.2.1 [🗋 33].
4. Screw the turning unit to the machine/system, ▸ 5.2.1 [🗋 33].
   - ⇨ Make sure that the interfaces to attachments are clean and undamaged.
   - ⇨ Use suitable connecting elements (adapter plates) if necessary.
   - ⇨ Observe the permissible depth of engagement.
   - ⇨ Observe the tightening torque for the mounting screws.
5. Connect the turning unit electrically, ▸ 5.2.2 [🗋 38].
   - ⇨ Screw the connection plug for power and sensor cable to the turning unit.
   - ⇨ Connect the power and sensor cable to the drive controller.
6. Pneumatic holding brake variant: assemble and connect micro valve, ▸ 5.1.1.2 [🗋 30].
7. Assemble attachment output side.

5.1.1 Pneumatic holding brake variant

⚠ WARNING

Risk of injury when working on the micro valve!

Severe injuries can be caused with active power and compressed air supply.

- Switch off the energy supply.
- Switch off the compressed air supply.

CAUTION

Damage to valve cartridges, valve cover and accessories!

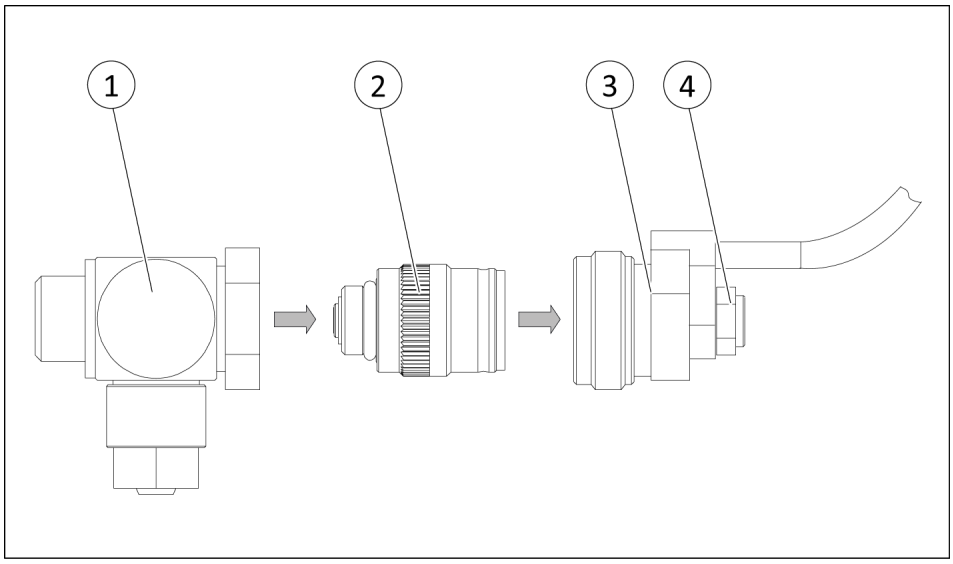
Valve cartridge, valve cover and accessories can be damaged by using tools.

- Only install or remove the valve cartridge, valve cover and accessories by hand.

Comply with the following procedure when mounting the micro valve:

- If the micro valve is supplied as a complete component, dismantle the micro valve into its individual components and then install the individual components:
  - Dismantling the micro valve into its individual components, ▸ 5.1.1.1 [🗋 30].
  - Installing the individual components, ▸ 5.1.1.2 [🗋 30].
- If the micro valve is supplied in individual components, install the individual components, ▸ 5.1.1.2 [🗋 30].
- Change the position of the screw cable, ▸ 5.1.1.3 [🗋 31].

5.1.1.1 Dismantling micro valve



Dismantling micro valve

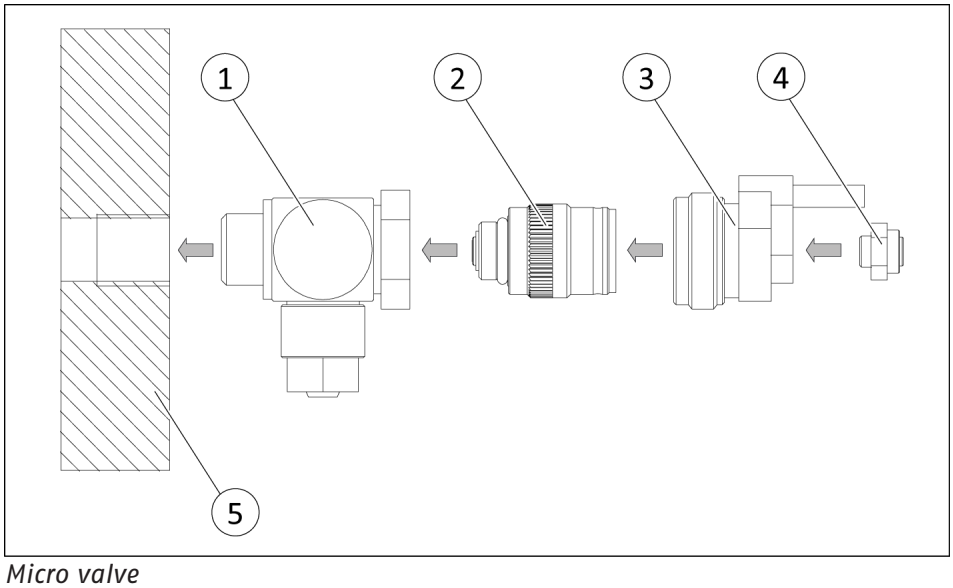
1. Undo the knurled screw on the valve cover (3).

NOTE

In valves with fixed covers, the valve cover with connection cable cannot be removed.

2. Remove the valve cover (3) with connection cable and sound absorber (4).
3. Unscrew the valve cartridge (2) from the swivel fitting (1).

5.1.1.2 Installing the micro valve



Micro valve

NOTE

Always carry out the assembly of the micro valve in the following order, for example to avoid unscrewing the screw cap from the valve cartridge if an accessory is fitted subsequently.

1. Screw the hollow screw of the swivel fitting (1) lightly into the pneumatic unit (5), without tightening.
2. Turn the swivel fitting (1) to the desired position and hold it firmly.
3. Tighten the hollow screw of the swivel fitting (1) in this position, maximum tightening torque 1.5 Nm.
4. Screw the valve cartridge (2) into the swivel fitting (1) as far as possible, maximum tightening torque 3 Nm.
5. Screw the sound absorber (4) into the valve cover (3), maximum tightening torque: 3 Nm.
6. Put the valve cover (3) on the cartridge (2) with the connection cable in the required position.
7. Push the valve cover (3) onto the cartridge (2) and screw tight with the knurled nut onto the cartridge (2), maximum torque: 3 Nm.
8. Connect the pneumatic hose to the pneumatic connection of the swivel fitting (1).
9. Push the Y-distributor onto the M8 plug of the connection cable and screw tight.
10. Push the cable extension onto the Y-distributor and screw tight.
11. Connect the cable extension to the electrical power supply, ▶ 5.2.2 [🗋 38].
12. Route the connection cable and cable extension and secure.

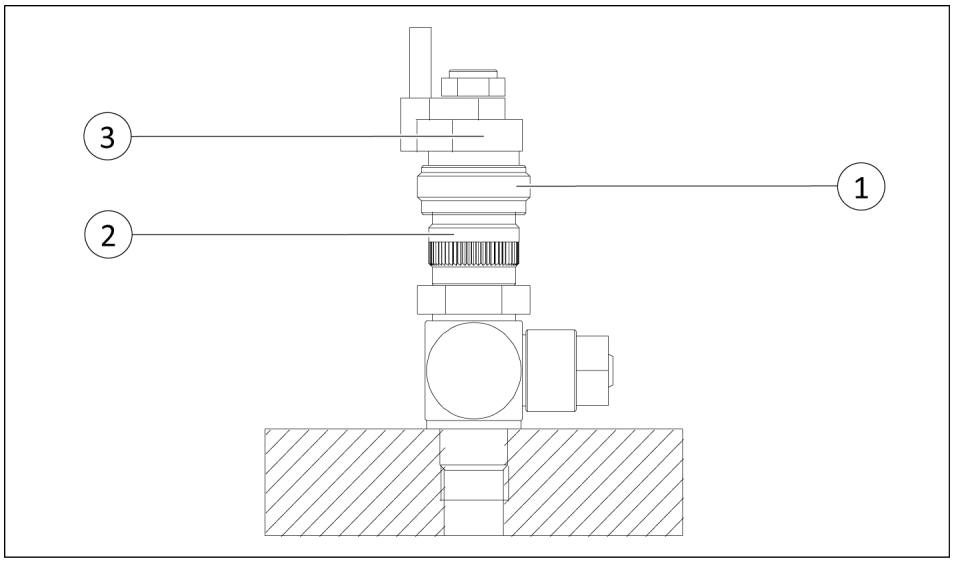
5.1.1.3 Changing the position of the connection cable

CAUTION

Risk of damage to the contacts!

The contacts can be damaged if the valve cover is screwed on firmly and the alignment of the connection cable changed.

- Define the position of the connection cable when the valve cover is put on.

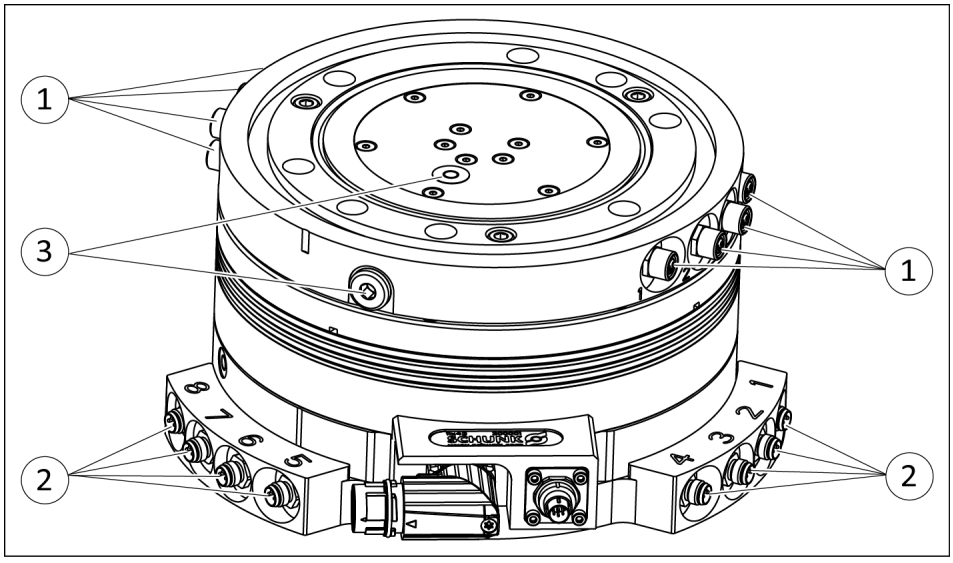


Valve cover

1. Unscrew the knurled nut (1) of the valve cover (3) from the valve cartridge (2).
2. Remove the valve cover (3) from the valve cartridge (2).
3. Put on the valve cover (3) again with the connection cable in the required alignment and hold it in position.
4. Tighten the valve cover (3) on the valve cartridge (2) with the knurled nut (1).

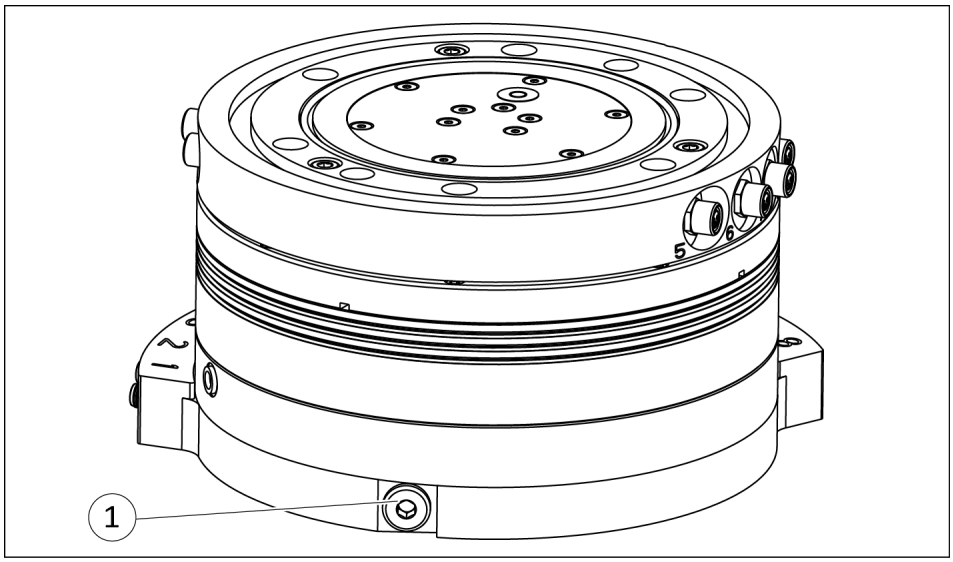
5.1.2 Rotary feed-through (DDF) variant

For the media feed-through, electrical connections and air connections are available with the rotary feed-through (DDF) variant.



Connections

1	Output-side connections
2	Input-side connections
3	Output-side air connections (Hose-free direct connection)



Air connection

1 Input-side air connection

5.2 Connections

5.2.1 Mechanical connection

NOTE

The ERS rotary unit must be mounted on a surface with good thermal conductive properties, which corresponds to the following sizes at minimum:

Size 135: 0.1024m²

Size 170: 0.0772m²

Size 210: 0.1296m²

Evenness of the mounting surface

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

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

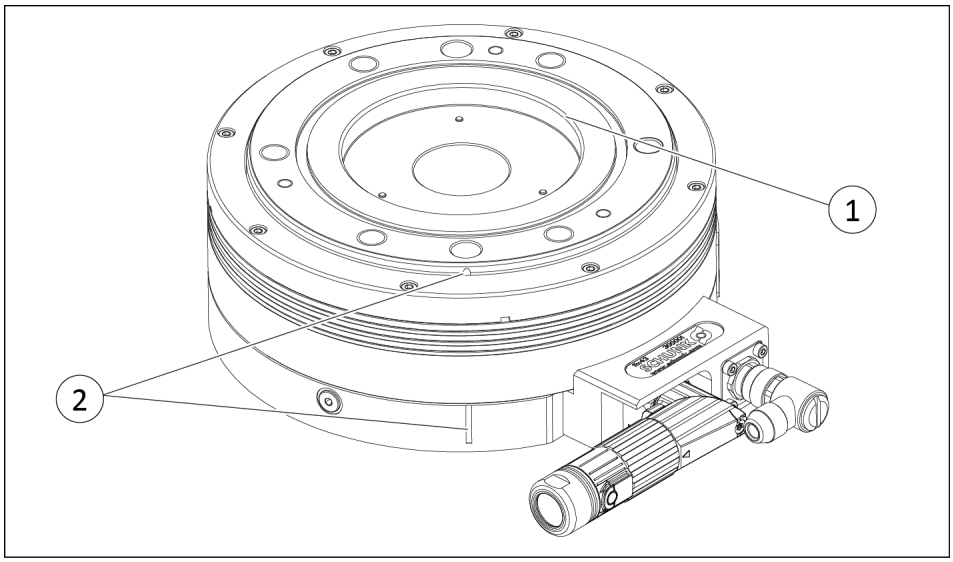
Tab.: Requirements for evenness of the mounting surface (Dimensions in mm)

NOTE

When mounting the product, the following must be observed:

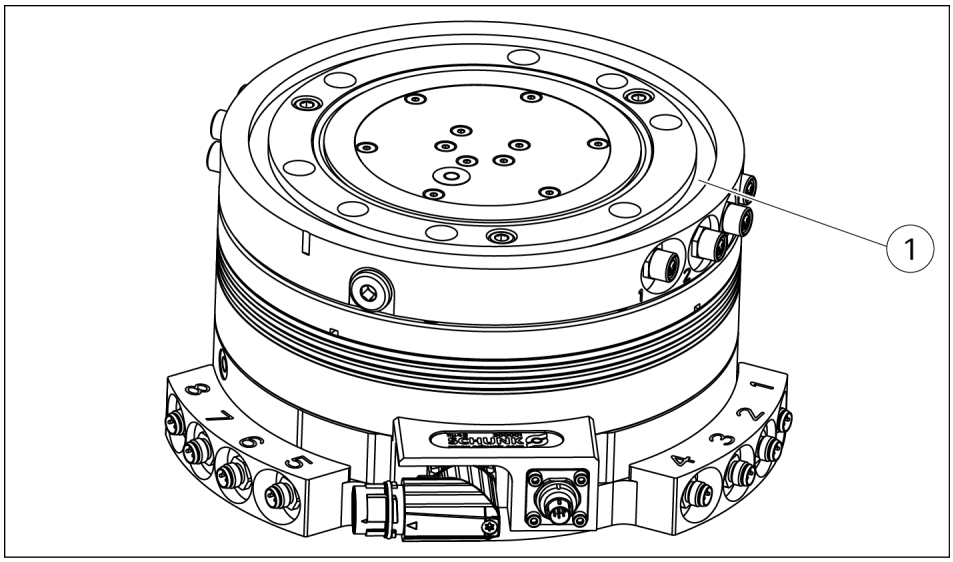
- Position of the reference marks and thereby the zero pulse of the sensor system

See catalog for dimensions to design the adapter plate, shape and positional tolerances for radial and axial run-out.



Position of the reference marks and run-out accuracy acceptance

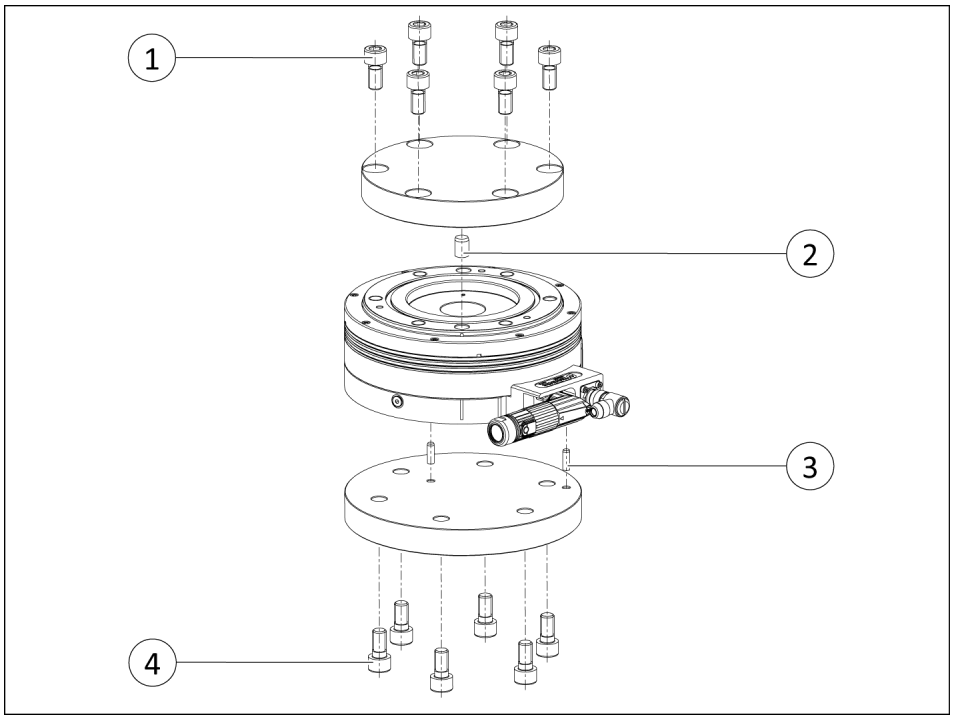
1	Centering surface for run-out accuracy acceptance	2	Reference marks for zero pulse



Centering groove

1	Centering groove

With the rotary feed-through (DDF) variant, the run-out accuracy is accepted using the centering groove.



Assembly view

Item	Description	ERS		
		135	170	210
1	Mounting screws	M8	M10	M10
	Tightening torque [Nm]	24	48	48
	Max. depth of engagement from locating surface [mm]	10	10	10
2	Centering pin	Ø8	Ø10	Ø10
3	Centering pins	Ø5	Ø5	Ø5
4	Mounting screws	M8	M10	M12
	Tightening torque [Nm]	24	48	84
	Max. depth of engagement from locating surface [mm]	13	14	18

5.2.1.1 Pneumatic holding brake variant

⚠ WARNING

Risk of injury due to unexpected movement of the machine/ system!

The pneumatic holding brake is not a service brake and only applies the rated torque for holding position at standstill. With active pneumatic holding brake and correspondingly high moment load, components may move unexpectedly causing severe injury.

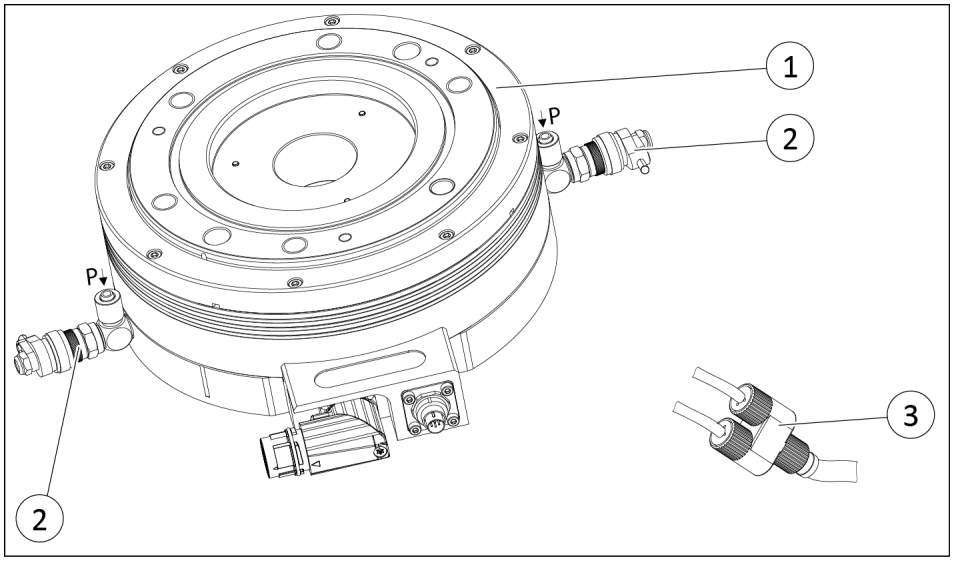
- Do not use the pneumatic holding brake as a service brake.
- Do not use the pneumatic holding brake as a safety component.

⚠ WARNING

Risk of injury when working on the micro valve!

Severe injuries can be caused with active power and compressed air supply.

- Switch off the energy supply.
- Switch off the compressed air supply.



Rotary module with micro valve

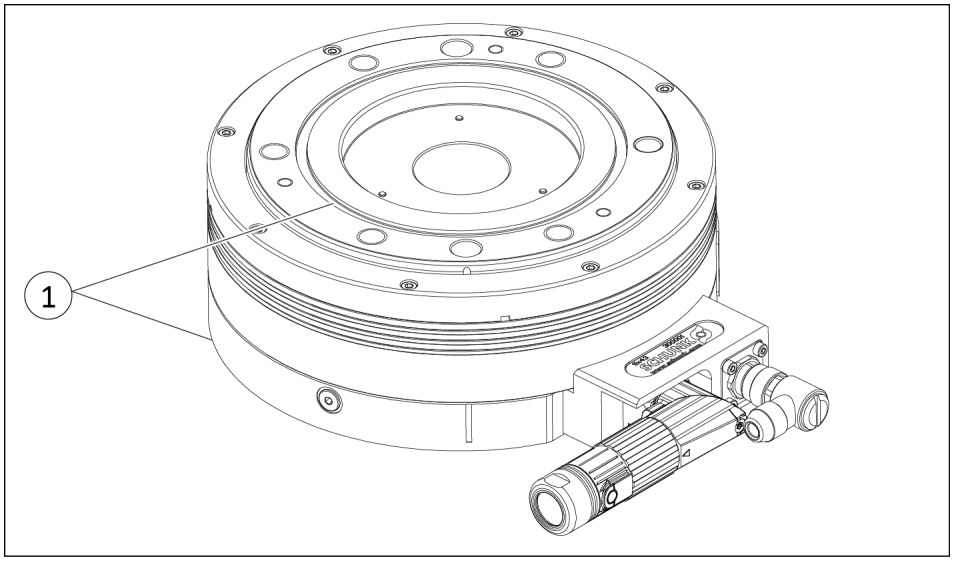
1	Rotary module
2	Micro valve
3	Y distributor

With the pneumatic holding brake variant, both micro valves must be mounted and used at all times. The micro valves are supplied with electricity via the Y distributor.

NOTE

If both micro valves are not used, the time set in the parameter sets for filling the pistons is exceeded.

5.2.1.2 Protection class IP54 variant



Sealing groove

In order to achieve protection class IP54, a seal (NBR70 0-ring) must be inserted at the top and bottom of the product.

Size	ID		
NBR70 0-ring	135	170	210
Ø33x2	9942376	–	–
Ø74x2	9907467	–	–
Ø50x2	–	9871512	–
Ø103x2	–	9907464	–
Ø60x2	–	–	9611058
Ø140x2	–	–	9937935

Tab.: ID number of the 0-ring

5.2.2 Electrical connection

⚠ DANGER

Risk of fatal injuries due to electric shock!

If the power supply is not switched off before working on the product, the drive controller is not separated from the power cables, or cables are connected incorrectly, fatal injury may be caused from electric shock.

- Switch off energy supply before carrying out all assembly, adjustment and maintenance work and secure against re-connection.
- Only allow qualified electricians to work on electrical automated systems.
- Disconnect the drive controller from the power supply. The intermediate circuit capacitors must be discharged. Wait for approx. 15 minutes for the capacitors to discharge.
- Observe order when connecting the cables (first ground cable, then conductors).

CAUTION

Damage to the connection cable is possible!

If the following preconditions are not observed when installing the connection cables, the connection cable may become damaged

- Install connection cables free from tensile and torsion loads. If necessary, use cable guide chains.
- Comply with the minimum bending radius (7.5 times the cable diameter).
- Install the connection cable so that the motor's range of rotation and function are not impaired.

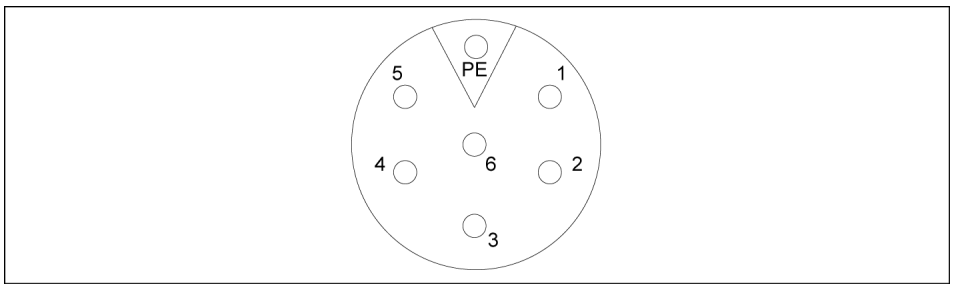
CAUTION

Material damage possible to lines!

If the following prerequisites are not observed for installation of lines, the lines may be damaged.

- When installing the lines, observe the specifications in the line manufacturer data sheet.
- During operation of the axes across the full stroke too, make sure that the lines do not become crushed, sheared or torn off.
- Install the power cable and measuring system lines in separate cable tracks.

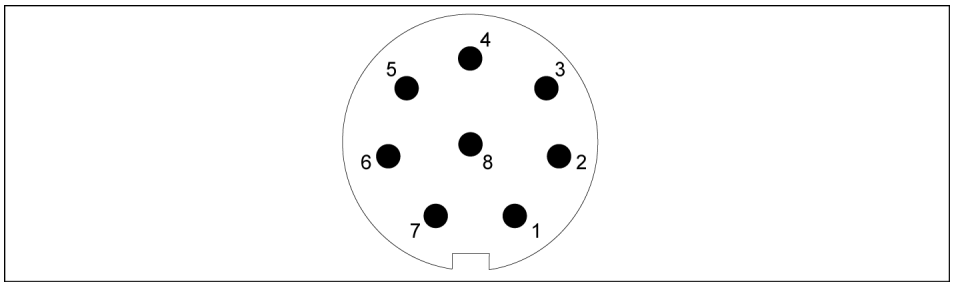
Connection assignment, power connector



Power connector, M17

Pin	Signal	Pin	Signal
PE	Ground/motor housing	4	N. C.
1	U	5	Temperature sensor 1
2	V	6	Temperature sensor 2
3	W		

Sensor plug connection assignment



Sensor plug, M9

Pin	Signal	Pin	Signal
1	A (SIN +)	5	Z (Ref +)
2	/A (SIN –)	6	/Z (Ref –)
3	B (COS +)	7	GND
4	/B (COS –)	8	Vcc

Bosch power and sensor cables connection assignment

The cable colors and designations in the following tables apply to the SCHUNK connection cable.

Function	Signal	Cable designation
Power	U	Black A1 (U)
	V	Black A2 (V)
	W	Black A3 (W)
	PE	Green /Yellow
Temperature sensor	T1	Red
	T2	Blue

Function	Signal	Pin allocation – 15-pin Sub-D socket
Encoder	/Z (Ref –)	Pin 3
	Z (Ref +)	Pin 4
	/B (COS –)	Pin 5
	B (COS +)	Pin 6
	A (SIN +)	Pin 7
	/A (SIN –)	Pin 8
	GND	Pin 10
	Vcc	Pin 12

Function	Signal	Pin allocation – 15-pin Sub-D socket
Encoder	A (SIN +)	Pin 2
	/A (SIN –)	Pin 3
	GND	Pin 4
	B (COS +)	Pin 5
	/B (COS –)	Pin 6
	Z (Ref +)	Pin 9
	/Z (Ref –)	Pin 10
	Vcc	Pin 12

Siemens power and sensor cables connection assignment

Function	Signal	Pin allocation – Siemens circular plug
Power	U	U2
	V	V2
	W	W2
	PE	Earth

Function	Signal	Pin allocation – 12-pole M23 pin terminal
Encoder	/B (COS –)	Pin 1
	Vcc	Pin 2
	Z (Ref +)	Pin 3
	/Z (Ref –)	Pin 4
	A (SIN +)	Pin 5
	/A (SIN –)	Pin 6
	B (COS +)	Pin 8
	GND	Pin 10

5.2.2.1 Pneumatic holding brake variant

CAUTION

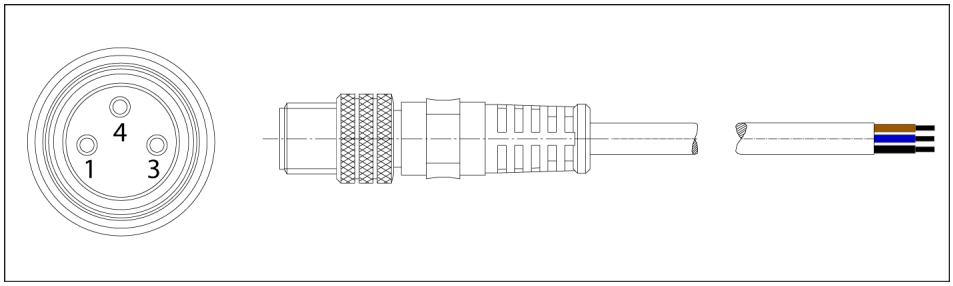
Damage to the cable is possible.

The bending radius of the cable is not allowed to be less than the minimum amount:

- **Static:** 10 times the cable diameter.
- **Dynamic:** 15 times the cable diameter, suitable for cable tracks.

NOTE

Route and secure the connection cable so there are no tensile and twisting forces on the valve cover. Tensile and twisting forces can cause the screw cap to come loose and lead to contact problems.



PIN allocation M8 plug and cable color cable extension

PIN	Cable color	Assignment
1	Brown	n.c.
3	Blue	GND
4	Black	Control voltage, + 24 VDC

Screw cap with LED:
If the connection cable of the micro valve has been connected correctly to the electrical power supply, the LED in the screw cap will light up when the 24 VDC voltage is applied.

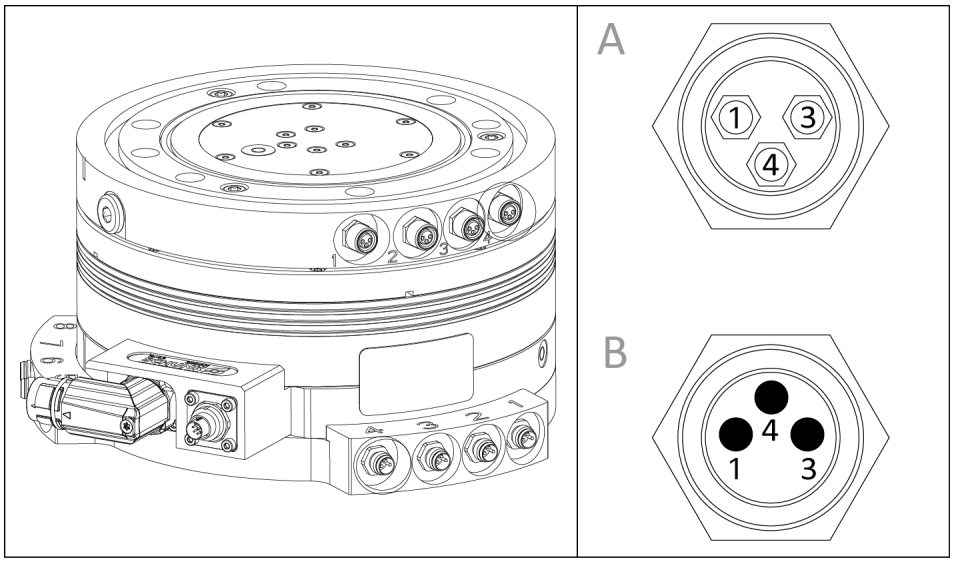
Connection to Bosch Rexroth IndraDrive

Terminal	Cable color	Assignment
X6-3	Black	+24 VDC
X6-4	Blue	GND

Connection to Siemens Safe Brake Relay

Terminal	Cable color	Assignment
BR+	Black	+24 VDC
BR-	Blue	GND

5.2.2.2 Rotary feed-through (DDF) variant



Rotary feed-through electrical connections

A	M8 socket, 3-pin		
B	M8 connector, 3-pin		
1	+24V	4	Signal
3	GND		

With the rotary feed-through (DDF) variant, there are 8 connections on the input side and 8 connections on the output side of the product (in each case 4 sleeves and 4 connection plugs). If the voltage is applied on the input side at a connection, the voltage is available at all connection plugs.

6 Troubleshooting

6.1 Product not turning

Possible cause	Corrective action
Interruption in the supply line.	Check the supply lines for defects.
	Check electrical connection. ▸ 5.2.2 [🗋 38]
No motion release	Check the settings of the drive controller.
Drive controller defective.	**DANGER Risk of fatal injuries due to electric shock!** Check whether there is voltage at the drive controller's output.
	If there is no voltage: Check connection assignment, see drive controller operating manual. ▸ 5.2.2 [🗋 38]
Communication between higher-level controller and converter interrupted.	Check communication.
Rotor mechanically blocked.	Check mechanics.
	Check that the mounting surface is flat. ▸ 5.2.1 [🗋 33]
Encoder defective.	Check encoder and encoder connection.
	If defective: Replace component or send it to SCHUNK for repair. For encoders with safety functionality, see "Safety Manual MSAC200ERT-DQ V01.00".
Short-circuit between turns in the motor.	Check terminal resistances with a multimeter. ▸ 3 [🗋 17]
	If the difference between the individual motor phases is larger than 0.1 Ohm: Replace component or send it to SCHUNK for repair.
Short-circuit to ground due to moisture or short-circuit to ground due to electrical malfunction.	Check protective conductor.
	If the product has a ground leak while the power cable is disconnected: Check the electrical connections and connectors for ground leakage.
	Replace component or send it to SCHUNK for repair.
Incorrect phase connections.	Check electrical connection. ▸ 5.2.2 [🗋 38]
Drive controller settings are incorrect.	Check the parameters and setting values, see operating manual for the drive controller.

Possible cause	Corrective action
Motor phases or encoder signals confused.	Check electrical connection. ▶ 5.2.2 [🗋 38]
	Check the encoder signals and the shielding of the sensor cable.

6.2 Product is having control difficulties.

Possible cause	Corrective action
Driver controller is not optimally adjusted.	Check the settings (direction of rotation of motor and encoder direction of counting).

6.3 Product is vibrating.

Possible cause	Corrective action
Load inertia is too high.	Check the dimensioning.
	Reduce the load.
	Check the settings on the drive controller.
Drive controller is not optimally adjusted.	Check the settings on the drive controller.

6.4 Bearing noise

Possible cause	Corrective action
Incorrect assembly.	Check that the mounting surface is flat. ▶ 5.2.1 [🗋 33]
Bearing defective due to overload.	Replace component or send it to SCHUNK for repair.

6.5 Error message for the winding temperature

Possible cause	Corrective action
Electrical connection to the temperature sensor faulty.	Check resistance between drive controller and temperature sensor.
	If necessary: Replace electrical connection.
Temperature sensor defective.	Check the resistance of the temperature sensor.
	If the resistance at room temperature is larger than 630 Ohm: Replace component or send it to SCHUNK for repair.
Thermal motor overload.	Reduce the load.
	Mount the motor on heat-conducting materials to dissipate excess motor heat.
Rotor mechanically blocked.	Check mechanics.

Possible cause	Corrective action
	Check that the mounting surface is flat. ▸ 5.2.1 [🗋 33]
Encoder signals are faulty; encoder line shielding is not connected.	Check the encoder's power supply.
	Check the encoder signals and the shielding of the sensor cable.
Electrical connection to the temperature sensor faulty.	Check resistance between drive controller and temperature sensor.
	If necessary: Replace the electrical connection.
Motor overload.	Check the dimensioning.
	Reduce the load.
Overvoltage or undervoltage is present.	Check the settings on the drive controller.
	Check the output power supply.

7 Maintenance

7.1 Maintenance intervals

⚠ DANGER

Risk of fatal injuries due to electric shock!

If the electrical connections are released from the live product, arcing may be the result.

- Before working on the product, switch off the energy supply.
- Only have work performed on the product by an expert electrician.

Interval [Mio. cycles] for ERS 135 – 210	Maintenance work
2.5	Check bearings for noise, ▸ 7.2 [🗋 47].
2.5	Dry clean all parts thoroughly, check for damage and wear, ▸ 7.2 [🗋 47].
20	Grease all bearings, ▸ 7.2 [🗋 47].
20	Replace all seals, ▸ 7.3 [🗋 48].

7.2 Servicing the product

NOTE

For maintenance work or repairs, send the product along with a repair order to SCHUNK.

visual inspection

The regular visual inspection of all supply lines is required for the perfect operation of the product.

1. Perform a visual inspection on all supply cables.
2. If supply lines are defective, put the machine/system out of operation immediately.
3. Replace damaged connection cables.

Acoustic bearing inspection

Bearing noise	Further procedure
Smooth noise	Product can continue to be operated.
Rough grinding noise	The motor is not set up correctly:

Bearing noise	Further procedure
	• Check the evenness at mounting surfaces. ▸ 5.2.1 [🗋 33]
Loud and rough noise or motor not running smoothly	The motor is not set up correctly: • Check the evenness at mounting surfaces. ▸ 5.2.1 [🗋 33]
	Bearings defective: • Replace component or send it to SCHUNK for repair.

7.3 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.

8 Translation of original declaration of incorporation

in terms of the Directive 2006/42/EG, Annex II, Part 1 Section B.

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

We hereby declare that the partly completed machine described below

Product designation:	Electrical turning unit with torque motor / ERS 135 – 210 / 560V / electric
ID number	0310146 … 0310224

meets the following basic occupational health and safety of the Machinery Directive 2006/42/EC:

No. 1.1.1, No. 1.1.2, No. 1.1.3, No. 1.1.5, No. 1.3.2, No. 1.5.1, No. 1.5.2; No. 1.5.4, No. 1.5.6, No. 1.5.8, No. 1.5.10, No. 1.5.11, No. 1.5.13

The partly completed machinery may not be put into operation until it has been confirmed that the machine into which the partly completed machinery is to be installed complies with the provisions of the Machinery Directive (2006/42/EC). The declaration shall be rendered invalid if modifications are made to the product.

The product also complies with **LVD Directive (2014/35/EU)**.

Applied harmonized standards, especially:

EN ISO 12100:2010	Safety of machinery – General principles for design – Risk assessment and risk reduction
EN 60204–1: 2018	Safety of machines – Electrical equipment of machines, Part 1: General requirements
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
ISO 9409–1:2004–03	Manipulating industrial robots – Mechanical interfaces – Part 1: plates

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

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

Signature: see original declaration

Lauffen/Neckar, January 2025

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

9 UKCA declaration of incorporation

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

Manufacturer/ Distributor	SCHUNK Intec Limited Clamping and gripping technology 3 Drakes Mews, Crownhill MK8 0ER Milton Keynes
Product designation:	Electrical turning unit with torque motor / ERS 135 – 210 / 560V / electric
ID number	0310146 … 0310224

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.

Electrical Equipment (Safety) Regulations 2016

Applied harmonized standards, especially:

EN 60204-1: 2018	Safety of machines – Electrical equipment of machines, Part 1: General requirements
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
EN ISO 12100:2010	Safety of machinery – General principles for design – Risk assessment and risk reduction
ISO 9409-1:2004-03	Manipulating industrial robots – Mechanical interfaces – Part 1: plates

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".

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

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

Lauffen/Neckar, January 2025

Dr.-Ing. Manuel Baumeister,
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10 Information on the RoHS Directive, REACH Regulation and Substances of Very High Concern (SVHC)

RoHS Directive

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

REACH Regulation

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

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

Signature: see original declaration

Lauffen/Neckar, January 2025

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