Movement by Perfection



# ZAtop

## Gearless synchronous internal rotor motor

**SM205.40A**
**SM205.45A**

**Issue 2026/10**

**Original operating instructions**
**Store for future use!**

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ZIEHL-ABEGG

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# 1 Introduction

## 1.1 Liability

Compliance with the following specifications serves to ensure product safety. Should the information specified especially with regard to general safety, transport, storage, assembly, operating conditions, start-up, service, maintenance, cleaning and disposal/recycling not be observed, safe operation of the product may not be guaranteed posing a possible danger to life and limb of users and third parties. Thus, deviations from the specifications below can lead to the loss of legal materials defect liability as well as to the buyer's liability for the product rendered unsafe by deviation from the specifications.

## 1.2 Validity and meaning of the instructions

These instructions apply to the elevator machines.SM205.40A-45A

The model range can be identified by the type designation, see *Motor rating plate, page 11*.

These instructions apply only to the product ZIEHL-ABEGG and not to the complete system. If additional devices are used or installed, the respective instructions must be observed.

The instructions provide guidelines for safe work.

▷ Store the instructions so that they are accessible to all persons who work with the product.
▷ Pass the instructions on to subsequent users.
▷ Read and follow the instructions in full.

## 1.3 Target group of the instructions

The target group of these instructions are transport personnel, fitters who have been instructed in mechanical and electrical engineering, electricians, electrically instructed personnel, start-up and maintenance personnel, see *Requirements placed on the personnel, page 5*.

## 1.4 Applicable documents

Observe the following documents for instructions:

- Order confirmation
- Design
- Instructions for the frequency inverter
- Assembly instructions A-TIAxx_xx for spare parts
  Latest versions of the A-TIA at: https://www.ziehl-abegg.com/bal

# 2 Safety instructions

## 2.1 Intended use

The product is not ready for use, but designed as an elevator machine consisting of a motor, traction sheave, brake and absolute encoder for rope elevators with and without a machine room. The product is a gearless elevator machine.

The instructions are part of the product. The product is only intended for use according to these instructions.

## 2.2 Requirements placed on the personnel

The client of the required measures in the product life cycle is responsible for ensuring that the personnel carrying out the work are sufficiently qualified.

| Personnel | Minimum requirements, knowledge and experience |
|---|---|
| Planners and project designers | They are responsible for the project planning of the complete system. They have knowledge of applicable standards, legal requirements and safety regulations. |
| Transport personnel | They can deal safely with industrial trucks, loads and transport regulations. They can identify and avoid hazards that can occur when transporting the product. They have also been instructed and trained in the necessary protective equipment and protective measures to use. |
| Assembly personnel | They can deal safely with tools, loads and assembly instructions. They can identify and avoid hazards during assembly of the product. They have also been instructed and trained in the necessary protective equipment and protective measures to use. |
| Electrician | They have technical training in the field of electrical engineering. They can identify and avoid hazards associated with electricity. They have also been instructed and trained in the necessary protective equipment and protective measures to use.<br>They comply with the technical regulations and have the following electrotechnical knowledge:<br>▫ Read and fully understand electronic connection diagrams.<br>▫ Understand all relationships regarding the safety devices.<br>▫ Are familiar with the function and design of the electrical components used. |
| Electrically trained personnel | Personnel instructed or supervised by a qualified electrician. They can identify and avoid hazards associated with electricity. They have been instructed in the assigned tasks and possible hazards in the event of improper conduct. They have also been instructed and trained in the necessary protective equipment and protective measures to use. |
| Start-up technician | They handle the entire system safely. They can identify and avoid hazards that may occur during start-up. They have also been instructed and trained in the necessary protective equipment and protective measures to use. |
| Maintenance personnel | They handle the entire system safely. They can identify and avoid hazards that may occur during service and maintenance. They have also been instructed and trained in the necessary protective equipment and protective measures to use. They can detect and avoid hazards associated with electricity. |

## 2.3 Live parts

Touching live parts poses a risk of death due to electric shock.

▷ Do NOT touch connection points of wires, terminal points, parts of the motor winding, or the capacitor.
▷ Disconnect the product from the power supply before carrying out any work and secure it against being switched back on.
▷ The safe isolation from the supply must be checked using a two-pole voltage detector.
▷ Do NOT insert objects or limbs through openings.
▷ Use the product according to the IP degree of protection.
▷ Check the product for damage; do NOT use the product if the insulation is defective.

## 2.4 Powerful magnetic fields

Strong magnetic fields are generated in the brake and could lead to life-threatening danger for persons with pacemakers.

▷ Do NOT allow persons with pacemakers to come near the elevator machine.
▷ Disconnect the product from the power supply before carrying out any work and secure it against being switched back on.
▷ Check the product for damage.

## 2.5 Protective device

Reaching into the nip guard, rope retainer or rope guard during operation can cause serious injury.

▷ DO NOT reach into the machine while the elevator machine is in operation.
▷ Wait for the product to come to a standstill.

## 2.6 Do not touch the ropes

Touching the ropes during operation can cause serious injury.

▷ Operate the product with the traction sheave cover, rope guard or rope retainer.
▷ DO NOT touch the ropes while the elevator machine is in operation.
▷ Wait for the product to come to a standstill.

## 2.7 Rotating parts

At high speeds and in poor lighting, rotating parts are not visible and can cause serious injury

▷ DO NOT put the product into operation if protective devices are missing.
▷ Observe the safety distances in the danger area.
▷ DO NOT place any objects or limbs in the traction sheave pull-in range.

## 2.8 Automatic restart

When working on the product with voltage applied, the product can start up again automatically and cause serious injuries.

▷ Switch off the product. Before working on the product, ensure that it is de-energised and secured against being switched on again.

## 2.9 Modifications and spare parts

Unauthorised modifications and unauthorised spare parts can lead to serious injuries.

▷ Do NOT modify the product.
▷ Before making changes, obtain written approval from ZIEHL-ABEGG.
▷ Use spare parts from ZIEHL-ABEGG.

## 2.10 Do not disassemble components

Dismantling components can cause serious injury.

▷ DO NOT remove or decommission any components, e.g. traction sheave cover, brake release monitoring.

## 2.11 Protect the product from contamination

Contamination on the product and safety-relevant components can lead to serious injuries.

▷ Protect the product from dust, dirt, welding work and water. Cover the product when working in or on the elevator.
▷ Remove any assembly residue in the machine room or elevator shaft.
▷ Do NOT expose the brakes and traction sheave to lubricants; in particular, the rotor braking surface and the grooves of the traction sheave must be clean.
▷ DO NOT clean electrical components, e.g. microswitches, with water or other liquids.

## 2.12 Hot surfaces

Hot surfaces on the product can cause burns.

▷ Allow the product to cool down before starting work.
▷ Wear protective equipment, e.g. safety gloves.

## 2.13 Explosion hazard

The product becomes hot during operation and can cause an explosive atmosphere to explode.

▷ Do NOT use the product in an explosive atmosphere.

## 2.14 Excessive vibrations

Increased vibrations can lead to failure and shorten the service life of the product.

▷ Ensure low vibration operation and avoid system resonances.

## 2.15 Welding work

Welding work in the machine room or elevator shaft can result in material damage.

▷ DO NOT use the product as a grounding point for welding.

## 2.16 Electrostatic charge

Electrostatic charging can lead to material damage.

▷ Discharge yourself before working on electrical components, e.g. by touching grounded metallic parts.
▷ Do NOT touch the pins of the encoder line or electronics pins.

## 2.17 Impacts and shocks

Handle the product with care. Impacts and shocks lead to visible and invisible material damage.

▷ Transport the product in its original packaging.
▷ Do NOT step on the product.

## 2.18 Ambient conditions

Excessively high or low temperatures or excessively high ambient humidity may result in material damage to the brake, operating brake or emergency brake.

▷ Observe the specified ambient temperatures, see *Ambient conditions, page 89*.
▷ Observe the specified air humidity, see *Ambient conditions, page 89*.

## 2.19 Subsequent coating

Subsequent coating of the product can lead to material damage.

▷ Do NOT coat the product without consulting ZIEHL-ABEGG.

# 3 Transport and storage

Personnel qualifications: Transport personnel

## 3.1 Transport

**⚠ WARNING** **Crushing hazard due to suspended loads and uncontrolled moving parts.**

▷ Wear safety helmet, safety gloves and safety shoes.
▷ Observe the loads during transport.
▷ Do NOT walk or reach under suspended loads.
▷ Set down the load when you leave the work area.

**⚠ WARNING** **Serious injuries resulting from the allowed diagonal pull of the suspension points being exceeded.**

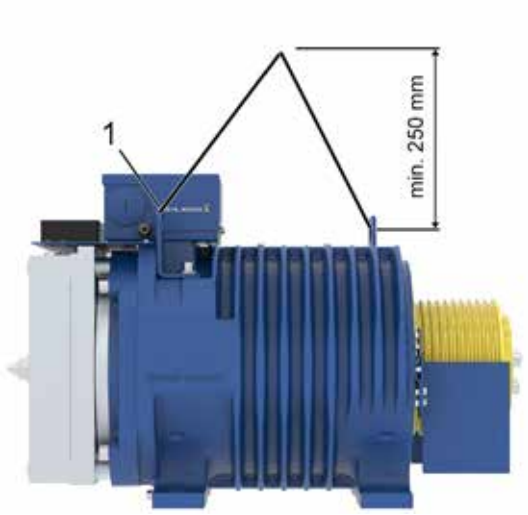
▷ Check the alignment of the suspension points and adjust to the correct position, if necessary.
▷ DO NOT exceed the allowed 45° diagonal pull for the suspension points.

The suspension points are not identical. Position the suspension points as follows:

- Suspension points on the brake: The suspension point with the longer bent tab.

- Suspension point on the traction sheave: The suspension point with the shorter bent tab.

The bent side of the suspension points points towards the brake.




| | |
|---|---|
| *1* | *Suspension points* |

Only transport the elevator machine in its original packaging on the pallet.

**Procedure:**

1. Unpack the elevator machine.
2. Check the elevator machine for damage.
3. Dispose of the packing material in accordance with local regulations.

### Lifting the elevator machine

**Procedure:**

1. Select the lifting gear for the elevator machine according to the weight on the rating plate.
2. Visually check that the suspension points are correctly aligned and screwed on.
3. Transport the lifting gear at the two suspension points (1).
   Maintain a minimum sling chain height of 250 mm.
4. Lift the elevator machines on both suspension points (1) simultaneously.

## 3.2 Storage

**Prerequisite:**

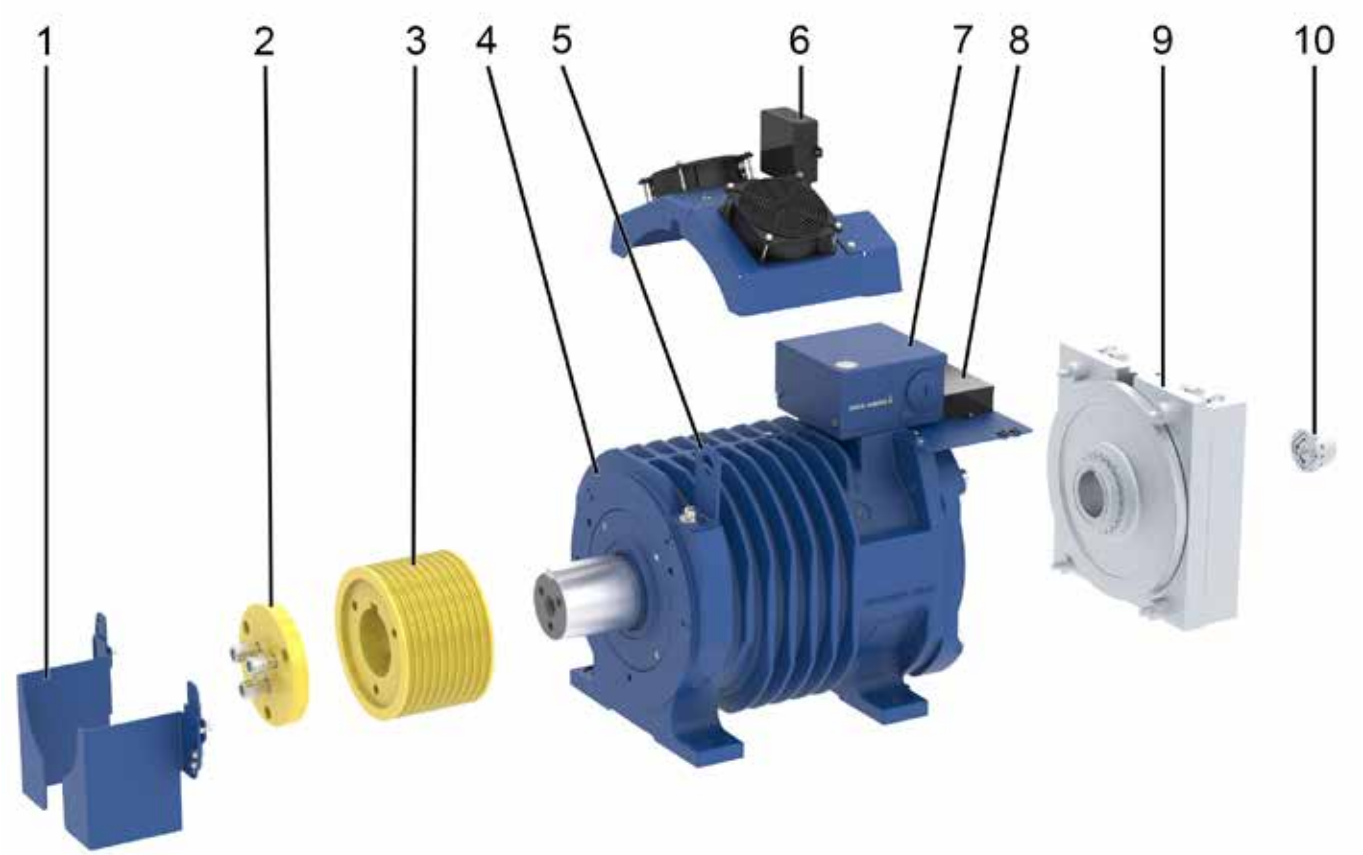
The product is stored in the ambient conditions specified in the technical data, see *Ambient conditions, page 89*.

**Procedure:**

- ▷ Protect the product from moisture, dirt and heat sources.
- ▷ Storage up to 12 months: Before installation, release the brake and turn the motor shaft by hand.
- ▷ Storage longer than 12 months: Every 3 months, release the brake and manually turn the motor shaft 3 turns in both directions.

# 4 Product overview

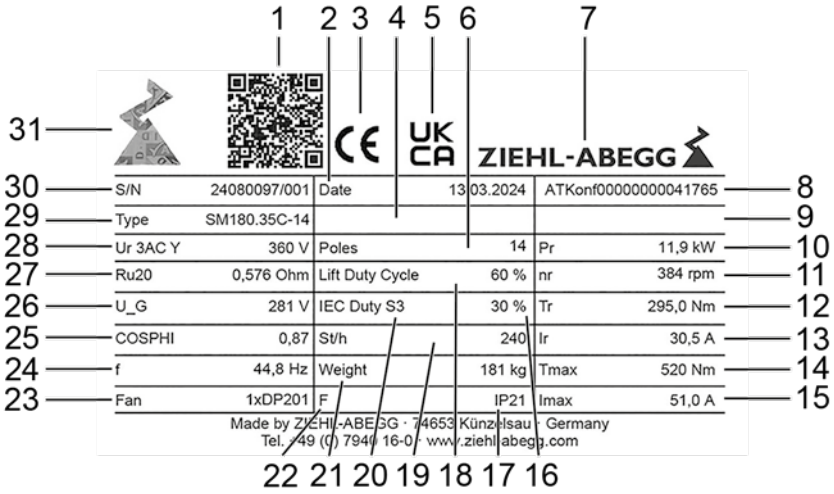
## 4.1 ZAtop SM205.40A-45A




| | | | |
|---|---|---|---|
| *1* | *Rope guard* | *6* | *Forced ventilation, optional* |
| *2* | *Traction sheave mounting plate* | *7* | *Terminal box, motor* |
| *3* | *Traction sheave* | *8* | *Terminal box, brake* |
| *4* | *Housing elevator machine* | *9* | *Brake RTW800* |
| *5* | *Suspension point* | *10* | *Absolute encoder* |

## 4.2 Motor rating plate

Example of motor rating plate:




| | |
|---|---|
| 1 | *QR code* |
| 2 | *Date of manufacture* |
| 3 | *Product certification marking* |
| 4 | *Information field, optional* |
| 5 | *Product certification marking* |
| 6 | *Number of poles* |
| 7 | *Manufacturer* |
| 8 | *Article number* |
| 9 | *Information field, optional* |
| 10 | *Rated power* |
| 11 | *Rated speed* |
| 12 | *Rated torque* |
| 13 | *Rated current* |
| 14 | *Acceleration torque* |
| 15 | *Acceleration current* |
| 16 | *On time as per IEC* |
| 17 | *Degree of protection* |

| | |
|---|---|
| 18 | *Allowed on time in typical elevator operation* |
| 19 | *Trips per hour* |
| 20 | *Mode* |
| 21 | *Weight* |
| 22 | *Insulation class* |
| 23 | *Forced ventilation type* |
| 24 | *Rated frequency* |
| 25 | *Cosine phi - power factor* |
| 26 | *Generator voltage* |
| 27 | *Winding resistance* |
| 28 | *Rated voltage/mains form/circuit type* |
| 29 | *Motor type* |
| 30 | *Motor number* |
| 31 | *Hologram* |

## 4.3 Function description of the elevator machine

### Rope guard

The rope guard is used to protect against intervention in the traction sheave.

The rope guard prevents ropes from leaving the grooves of the traction sheave, e.g.when the rope is slack.

### Traction sheave

The traction sheave transmits the elevator machine's power to the ropes connected to the elevator cabin. It uses friction to make the cabin move.

### Forced ventilation, optional

Forced ventilation is used for additional cooling of the elevator machine.

### Suspension points

The suspension points are designed exclusively for transporting the elevator machine including brake and traction sheave.

### Terminal box

The electrical components, e.g. the brakes, are connected in the terminal box.

The connection diagram is affixed to the cover.

### Brake

The brake is intended as a holding brake for static applications. Dynamic braking must be limited to EMERGENCY STOP braking and braking during inspections.

The brake does not wear if the brake is used only as a holding brake. The more frequently the brake is used for EMERGENCY STOP, the greater the wear on the friction lining.

### Absolute encoder

The absolute encoder sends signals to the frequency inverter for control.

# 5 Installation

Personnel qualifications: Assembly personnel

**⚠ WARNING** **Crushing hazard due to suspended loads and uncontrolled moving parts.**

- ▷ Wear safety helmet, safety gloves and safety shoes.
- ▷ Observe the loads during transport.
- ▷ Do NOT walk or reach under suspended loads.
- ▷ Set down the load when you leave the work area.

**ATTENTION** **Material damage due to additional loads.**

- ▷ DO NOT transport additional loads on the suspension point, e.g. the machine frame.

## 5.1 Preparing for installation

**Procedure:**

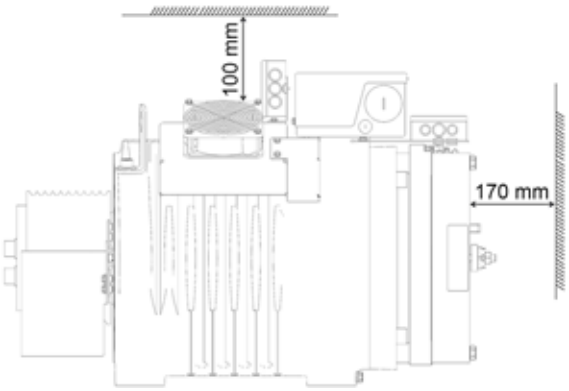
1. Observe the storage duration, see *Storage*, page 9.
2. Select the lifting gear according to the weight on the rating plate.
3. Transport the product on the suspension points.
4. Check the product for damage and dirt. Do NOT put damaged products into operation.
5. Visually check that the locking varnish on the fixing screws on the brake, release monitoring, absolute encoder and traction sheave is undamaged. If the locking vanish is damaged or is not present, do not put the product into operation and contact the service team.
6. Check that the inlet air for cooling the elevator machine is not impaired.

7. Position the elevator machine.

   Spacing for replacing the brake:
   At least 170 mm to the wall

   Spacing for forced ventilation:
   At least 100 mm upwards to overhanging surfaces

   If the distances cannot be observed:
   The elevator machine must be moved during replacement of the brake.
   The function of the forced ventilation is restricted.




## 5.2 Installing the elevator machine

**ATTENTION** **Material damage due to installation under tension.**

▷ DO NOT install the elevator machine under tension.
▷ Observe the permissible unevenness for the screw contact surface of 0.3 mm.
▷ Design the mounting surface so that it is rigid and stable enough to absorb the forces that occur
.

**In addition, use the following special tool:**

- Torque wrench for tightening torque of 390 Nm

**Prerequisite:**

Use the following screw types:

- 4 hexagon head screws ISO4014 - M20 - 8.8
- 4 hexagon head screws ISO 4017 - M20 - 8.8
- 4 cylinder screws ISO 4762 - M20 - 8.8

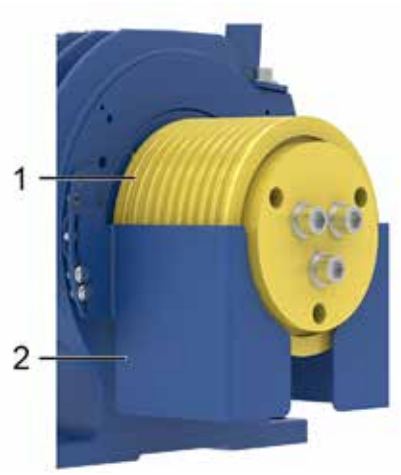
**Procedure:**

1. Mount the elevator machine with the 4 screws.
2. Fasten the screws with a tightening torque of 390 Nm in a crosswise pattern in at least two steps.

## 5.3 Fitting the ropes

**Procedure:**

1. Remove and store the rope guard (2), see *Replacing the rope guard, page 34*.




**ATTENTION** Material damage due to incorrect rope pull force.

▷ If the traction sheave has more grooves than there are ropes, place the ropes in the centre or towards the elevator machine housing.




2. Place the ropes on the grooves on the traction sheave (1).

   Make sure that the ropes are seated correctly:

   - NO inclined rope entry into the traction sheave or rollers.

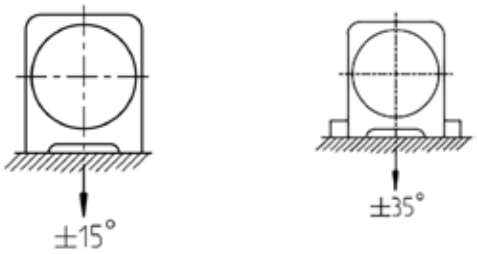
   - Install the ropes without twisting them.

**ATTENTION** Material damage due to resulting incorrect rope force direction.

▷ Only run the main rope pull in the vertical direction towards the motor base.

▷ Adhere to the ±35° rope force direction resulting from the rope pull with side interlocking support.

▷ The rope force direction of ±15° resulting from the rope pull must be met without side interlocking support.




3. Install the rope guard (2), see *Replacing the rope guard, page 34*.

# 6 Electrical installation

Personnel qualifications: Qualified electrician or electrically instructed personnel

## 6.1 Connecting the elevator machine

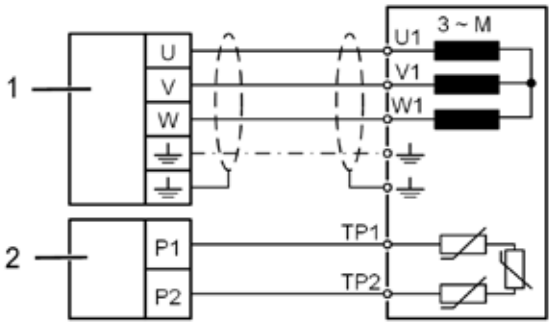
**Prerequisite:**

- Length of motor cable: maximum 25 m
- Shielded lines

**Procedure:**

1. Connect the motor cable to the elevator machine and frequency inverter (1) with the correct phases according to the connection diagram.
2. Connect the motor temperature monitoring (2) according to the connection diagram.

   If the actual direction of travel does not match the selected direction of travel, do NOT replace the phase connections; instead change the direction of rotation of the elevator machine in the parameterization of the frequency inverter, see *operating instructionsfor the frequency inverter*.




## 6.2 Connecting the shielding for the motor cable

The EMC cable gland is located inside the terminal box.

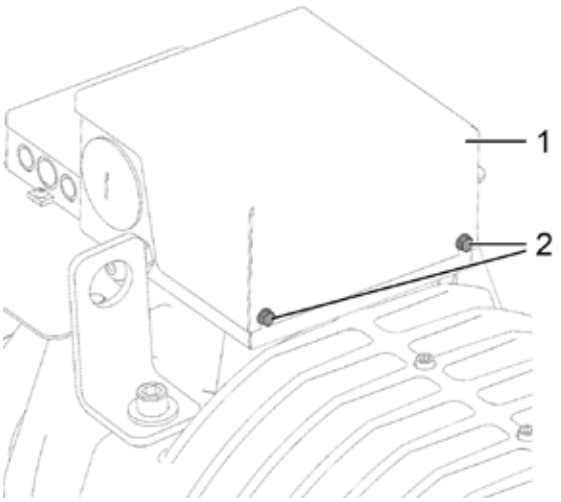
**Prerequisite:**

- Use a shielded motor cable.
- The shield must cover a large area on the side of the frequency inverter.
- The shield of the motor cable is exposed over a length of at least 10 mm.

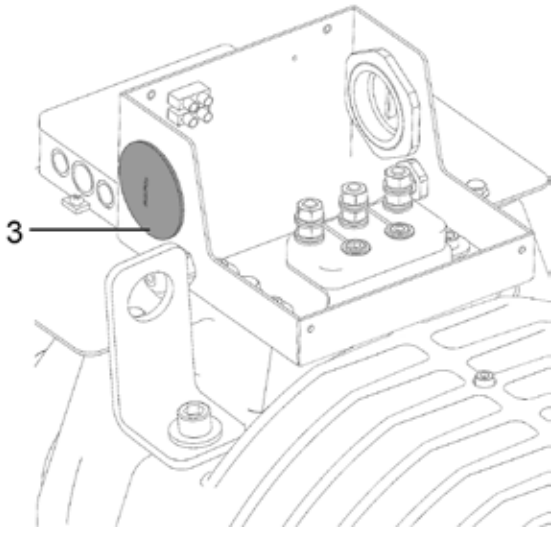
**Procedure:**

1. Release the 2 fixing screws (2) on the terminal box cover (1) and remove the cover.

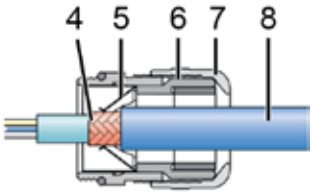
   Keep all removed parts.




2. Unscrew the cover (3).

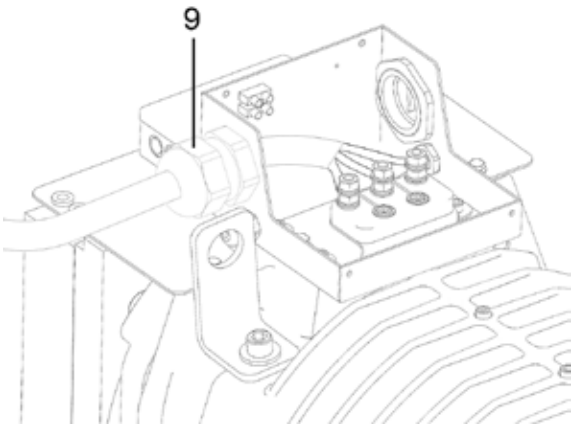


3. Insert the motor cable (8) into the existing EMC cable gland (6).
4. Position the motor cable (8). The contact spring (5) must make contact with the exposed area (4).
5. Check the contacts with a continuity tester.
6. Fasten the EMC cable gland cap nut (7).




7. Guide the EMC cable gland with the motor cable (9) into the opening on the terminal box.
8. Tighten the EMC cable gland with the nut from the inside.

   Refer to the rating plate to determine the motor size, see *Motor rating plate, page 11*.




| Wire sizes | EMC cable gland size | Tightening torque |
|---|---|---|
| **SM200.40E-45E** | | |
| 4 x 2.5 mm² | M25 x 1.5 | 12 Nm |
| 4 x 4 mm²<br>4 x 6 mm² | M32 x 1.5 | 18 Nm |
| 4 x 10 mm² | M40 x 1.5 | 18 Nm |
| **SM205.40A-45A** | | |
| 4 x 2.5 mm² | M25 x 1.5 | 12 Nm |
| 4 x 4 mm²<br>4 x 6 mm² | M32 x 1.5 | 18 Nm |
| **SM210.60B-70B** | | |
| 4 x 2.5 mm² | M25 x 1.5 | 12 Nm |
| 4 x 4 mm²<br>4 x 6 mm² | M32 x 1.5 | 18 Nm |
| 4 x 10 mm²<br>4 x 16 mm² | M40 x 1.5 | 18 Nm |

9. Connect the motor cable (8) to the U, V and W terminals, see *Connection diagram K293 with PTC thermistor, page 17* or *Connection diagram K314 with PT100 temperature sensor, page 18*.
10. Connect the temperature monitoring, see *Connecting temperature monitoring devices, page 17*.
11. Position the cover of the terminal box.
12. Fasten the fixing screws on the terminal box with a tightening torque of 9.5 Nm.

Tightening torque for brass screws:

| Rated motor current | Terminal board thread | Terminal board tightening torque |
|---|---|---|
| up to 20A | M8 | 6 Nm |
| > 20 - 35 A | M8 | 6 Nm |
| > 35 - 63 A | M8 | 6 Nm |
| > 63 - 80 A | M8 | 6 Nm |
| > 80 - 100 A | M10 | 10 Nm |
| > 100 - 125 A | M10 | 10 Nm |

| Rated motor current | Terminal board thread | Terminal board tightening torque |
|---|---|---|
| > 125 A | M12 | 15.5 Nm |

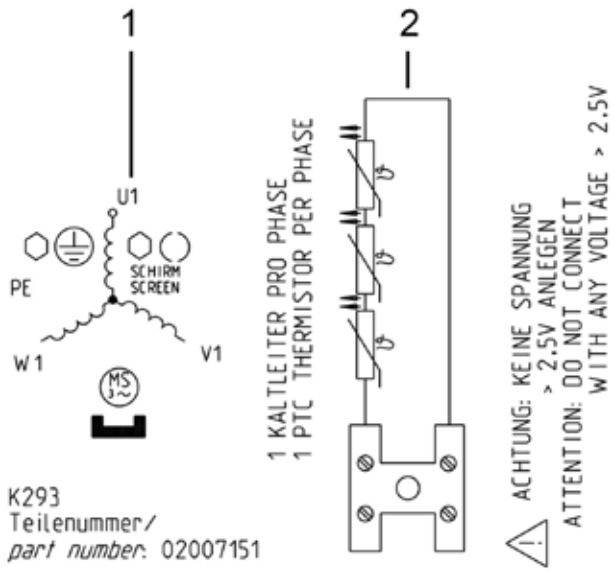
## 6.3 Connecting temperature monitoring devices

PTC thermistors or PT100 temperature sensors are installed in the winding for the purpose of temperature monitoring. Use the PTC thermistors or PT100 temperature sensors for motor protection.

**Procedure:**

1. Connect the temperature monitoring, see the connection diagram. DO NOT apply voltage greater than 2.5 V.
2. Evaluate the temperature monitoring with a suitable monitoring unit.

### Connection diagram K293 with PTC thermistor

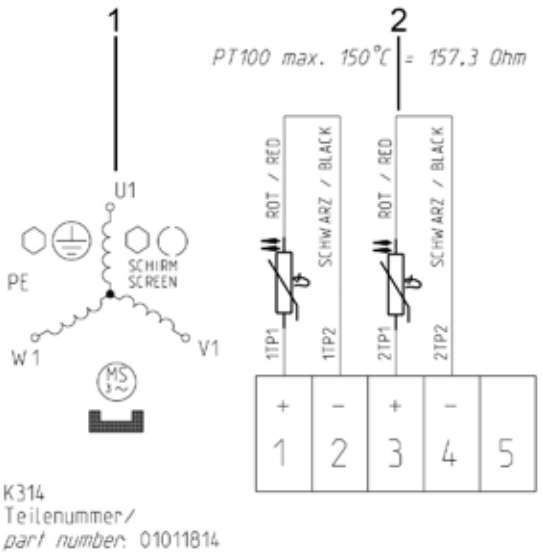



| | |
|---|---|
| *1* | *Motor connection*<br>*Terminals: U1, V1, W1* |
| *2* | *PTC thermistor* |

Connection notes:

▷ Connect the PTC thermistor connecting cable to the control unit.
▷ Maximum test voltage: 2.5 V

### Connection diagram K314 with PT100 temperature sensor




| | |
|---|---|
| *1* | *Motor connection*<br>*Terminals: U1, V1, W1* |
| *2* | *PT100 temperature sensor*<br>Terminals: 1TP1, 1TP2, 2TP1, 2TP2 |

Connection notes:

▷ Connect the PT100 temperature sensor connecting cable to the control unit.

▷ The maximum resistance is 157.3 ohms at the maximum winding temperature of 150°C.

## 6.4 Connecting additional protective conductors

The motor cable's protective conductor must have a cross-section of at least 10 mm². Otherwise, a 2nd protective conductor must be connected.

**Prerequisite:**

The cross-section of the 2nd protective conductor corresponds at least to the cross-section of the motor cable's protective conductor.

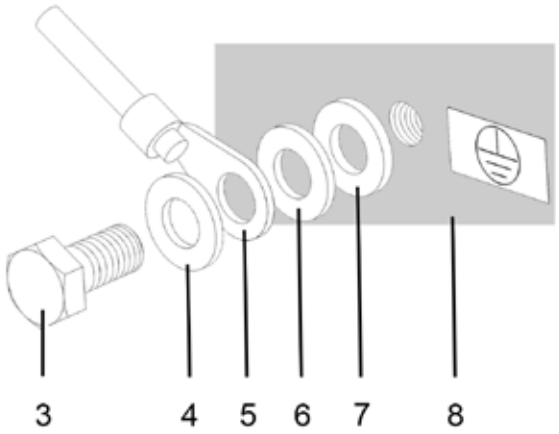
**Procedure:**

1. To connect the 2nd protective conductor, select hexagon head screw (1) or hexagon head screw (2).
2. Unscrew the hexagon head screw with all washers.



3. Connect the 2nd protective conductor to the housing (8) as follows:
   Hexagon head screw M8 (3)
   Washer (4)
   Cable lug (5)
   Washer (6)
   Contact disc (7)
4. Depending on the screw material, fasten the hexagon head screw with the respective tightening torque.

| Material | Tightening torque |
|---|---|
| Brass | 3.5 Nm |
| Stainless steel | 16 Nm |




## 6.5 Connect the absolute encoder

The offset of the absolute encoder is set to 0 at the factory. For this purpose, DC voltage is connected with U to the positive terminal and V and W to the negative terminal.

**ATTENTION** **Loss of factory setting due to loosened screws.**

▷ DO NOT loosen any bolts on the absolute encoder.

▷ If screws have been loosened or the frequency inverter used has a different offset than described, calibrate the absolute encoder, see *frequency inverter operating instructions.*

**Prerequisite:**

- Absolute encoder cable length: maximum 25 m
- Shielded line

**Procedure:**

1. Use the supplied cable or design a corresponding cable, see contact assignments of the existing absolute encoder:
   - *Contact assignment absolute encoders ECN1313 EnDat and ECN1313 SSI, page 20*
   - *Contact assignment absolute encoder AE-S64-BISSC-ZA-5m/AE-S64-SSI-ZA-10m, page 20*
   - *Contact assignment absolute encoder ERN1387, page 21*
   - *Contact assignment, absolute encoder AE-S64-SinCos-AE-7m, page 21*
2. Refer to the table for the connections and cable length, see *Connection and cable length of the absolute encoder, page 19*.
3. Adjust the absolute encoder, see *frequency inverter operating instructions.*

## 6.6 Connection and cable length of the absolute encoder

| Absolute encoder | Connection | Cable length |
|---|---|---|
| ECN1313 EnDat-M16-245 mm<br>ECN1313 SSI-M16-245 mm<br>ERN1387-M16-245 mm | Plug M16 x 0.75 SV120 | 0.245 m |
| ECN1313 EnDat-M16-560 mm<br>ECN1313 SSI-M16-560 mm | Plug M16 x 0.75 SV120 | 0.560 m |

| Absolute encoder | Connection | Cable length |
|---|---|---|
| ECN1313 EnDat-M23-245 mm<br>ERN1387-M23-245 mm | Plug M23 x 1 | 0.245 m |
| ECN1313 EnDat-DSUB-1.8 m | Plug D-SUB 15-pin | 1.8 m |
| ERN1387-DSUB-350 mm | Plug D-SUB 15-pin | 0.350 m |
| AE-S64-BISSC-ZA-5 m | Plug D-SUB 15-pin | 5.0 m |
| AE-S64-BISSC-ZA-10 m<br>AE-S64-SSI-ZA10 m | Plug D-SUB 15-pin | 10.0 m |
| AE-S64-SinCos-AE-7 m | Wire end sleeve | 7.0 m |

Frequency inverter connecting cable, optional

Extension cable, optional

## 6.7 Contact assignment absolute encoders ECN1313 EnDat and ECN1313 SSI

| Plug<br>ZIE-HL-ABEGG<br>M16 x 0.75<br>SV 120 | Plug<br>ZIE-HL-ABEGG<br>D-SUB<br>15-pole | Plug<br>Heiden-hain<br>M23 x 1 | Function | Description |
|---|---|---|---|---|
| A | 1 | 14 | DATA+ | Data line for communication with absolute encoder |
| B | 2 | 17 | DATA- | Data line inverse |
| C | 3 | 1 | Sensor Up | Sensor cable, voltage supply, positive |
| D | 4 | 7 | Up | Voltage supply +5 V DC |
| E | 5 | 10 | 0 V | Ground voltage supply |
| F | 7 | 12 | B+ | Analog track B sine |
| G | 9 | 9 | CLOCK- | Clock line inverse |
| H | 10 | 8 | CLOCK+ | Clock line for serial transfer |
| J | 11 | 4 | Sensor 0 V | Sensor cable, absolute encoder voltage, negative |
| K | 12 | 15 | A+ | Analog track A cosine |
| L | 13 | 16 | A- | Analog track A cosine inverse |
| M | 14 | 13 | B- | Analog track B sine inverse |

## 6.8 Contact assignment absolute encoder AE-S64-BISSC-ZA-5m/AE-S64-SSI-ZA-10m

| Plug<br>D-SUB<br>15-pole | Function | Description |
|---|---|---|
| 1 | DATA+ | Data line for communication with absolute encoder |
| 2 | DATA- | Data line inverse |
| 3 | - | - |
| 4 | VCC | Voltage supply +5 V DC |
| 5 | GND | Ground voltage supply |
| 6 | - | - |
| 7 | B+ | Analog track B sine |

| Plug<br>D-SUB<br>15-pole | Function | Description |
|---|---|---|
| 8 | - | - |
| 9 | CLOCK- | Clock line inverse |
| 10 | CLOCK+ | Clock line for serial transfer |
| 11 | - | - |
| 12 | A+ | Analog track A cosine |
| 13 | A- | Analog track A inverse, cosine inverse |
| 14 | B- | Analog track B inverse, sine inverse |
| 15 | GND Sense | Ground voltage supply |

## 6.9 Contact assignment absolute encoder ERN1387

| Plug<br>ZIE-HL-ABEGG<br>M16 x 0.75<br>SV 120 | Plug<br>ZIE-HL-ABEGG<br>D-SUB<br>15-pole | Plug<br>Heiden-hain<br>M23 x 1 | Function | Description |
|---|---|---|---|---|
| A | 11 | 5 | C+ | Commutation signal cosine |
| B | 10 | 6 | C- | Commutation signal cosine inverse |
| C | 12 | 14 | D+ | Commutation signal sine |
| D | 9 | 10 | Up | Voltage supply +5 V DC |
| E | 7 | 7 | 0 V | Ground voltage supply |
| F | 8 | 11 | B+ | Analog track B sine |
| G | 13 | 4 | D- | Commutation signal sine inverse |
| H | 3 | 3 | R+ | Reference signal |
| J | 4 | 13 | R- | Reference signal inverse |
| K | 5 | 1 | A+ | Analog track A cosine |
| L | 6 | 2 | A- | Analog track A cosine inverse |
| M | 1 | 12 | B- | Analog track B sine inverse |

## 6.10 Contact assignment, absolute encoder AE-S64-SinCos-AE-7m

| Wire end sleeve | Function | Description |
|---|---|---|
| Grey | C+ | Commutation signal cosine |
| Pink | C- | Commutation signal inverse, inverse cosine |
| Black | D+ | Commutation signal sine |
| Brown | VCC | Voltage supply +5 V DC |
| White | GND | Ground voltage supply |
| Blue | B+ | Analog track B sine |
| Violet | D- | Commutation signal inverse, inverse sine |
| Grey/pink | Z+ | Reference signal |
| Red/blue | Z- | Reference signal inverse |
| Green | A+ | Analog track A cosine |

| Wire end sleeve | Function | Description |
|---|---|---|
| Yellow | A- | Analog track A inverse, cosine inverse |
| Red | B- | Analog track B inverse, sine inverse |

## 6.11 Release monitoring of the brake

For details, see *the brake manufacturer's instructions in Appendix, page 60*.

Release monitoring is used to monitor the operating state of the brakes. The elevator control system must evaluate the signals of the microswitches or inductive proximity switches for release monitoring, see:

- *Connection diagram with microswitch V096 , page 23*.
- *Connection diagram with inductive proximity switch V112, page 23*

**Procedure:**

1. Evaluate the release monitoring of the brake. Monitor and evaluate the change in state of the two brake circuits separately.
   If the release monitoring signal does not change at the start of a trip, the elevator machine may not start.

The brakes are supplied with factory-installed and calibrated release monitoring. If a microswitch or inductive proximity switch fails, replace the microswitch or inductive proximity switch:

- See technical data, *Microswitch, page 90*
- See *Setting and assembling microswitches, page 80*
- See technical data, *Inductive proximity switch, page 90*
- See *Adjusting and mounting inductive proximity switches, page 82*

## 6.12 Connecting the brake

Observe the connection diagram affixed in the terminal box. This may deviate from the standard connection diagram in the instructions.

The brake terminal box can be mounted on the building for better accessibility.

**ATTENTION** **Material damage due to excessive on time.**

If the on time is too long over a certain period of time, the brake can no longer be released properly.

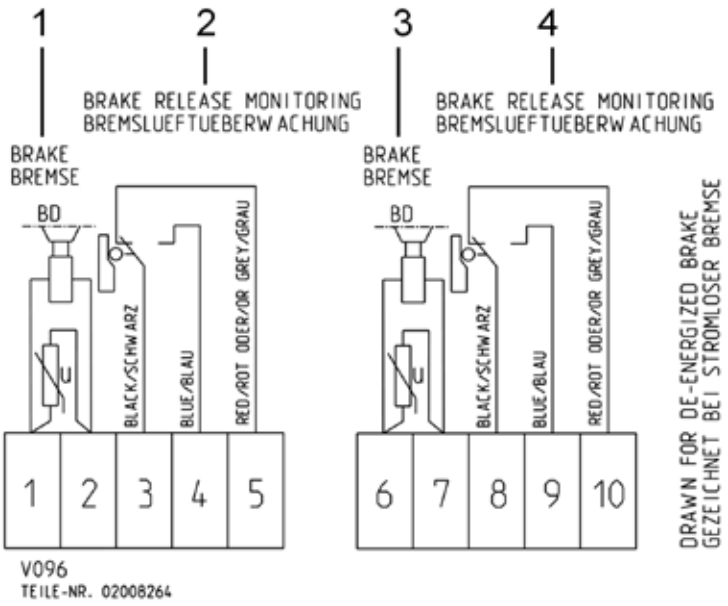
▷ DO NOT release the brake permanently.
▷ DO NOT exceed the brake's maximum allowed on time of 60%.

**Procedure:**

Connect the brake and the microswitches or inductive proximity switches, see connection diagram V096 or V112.

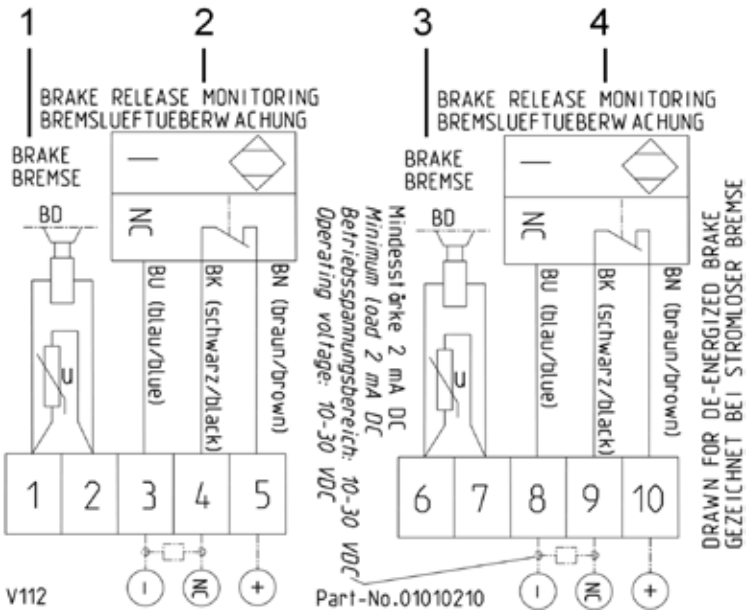
- The 1st brake circuit (1) to terminals 1 and 2.
- The microswitch (2) or the inductive proximity switch (2) for the 1st brake circuit to terminals 3 to 5.
- The 2nd brake circuit (3) to terminals 6 and 7.
- The microswitch (4) or the inductive proximity switch (4) for the 2nd brake circuit to terminals 8 to 10.

### Connection diagram with microswitch V096




| | |
|---|---|
| *1* | *Brake circuit 1*<br>*Terminals: 1, 2* |
| *2* | *Brake release monitoring 1 via microswitch*<br>*Terminals: 3, 4, 5* |
| *3* | *Brake circuit 2*<br>*Terminals: 6, 7* |
| *4* | *Brake release monitoring 2 via microswitch*<br>*Terminals: 8, 9, 10* |

### Connection diagram with inductive proximity switch V112




| | |
|---|---|
| *1* | *Brake circuit 1*<br>*Terminals: 1, 2* |
| *2* | *Brake release monitoring 1 via inductive proximity switch*<br>*Terminals: 3, 4, 5* |
| *3* | *Brake circuit 2*<br>*Terminals: 6, 7* |
| *4* | *Brake release monitoring 2 via inductive proximity switch*<br>*Terminals: 8, 9, 10* |

## 6.13 Actuating the brake

**ATTENTION** **Material damage due to excessive voltage.**

▷ DO NOT remove the installed varistors.

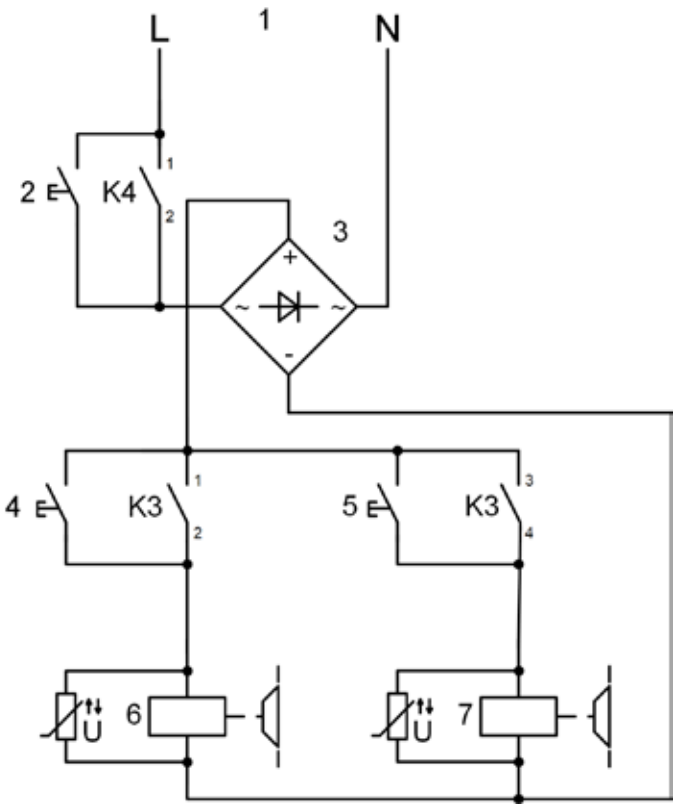
**Procedure:**

1. Connect the brake according to the circuit suggestion. Check the circuit suggestion with the applicable notified body regulations.
2. To reduce noise when the brake is switched off, switch the brake to the AC side (K4). The brake closes more

slowly and quietly through the rectifier.

3. Install a second contactor (K3) that disconnects the brake circuits on the DC side. In an emergency, the brakes are applied without delay during the inspection run and return run.

### Actuating brakes with electromechanical contactors

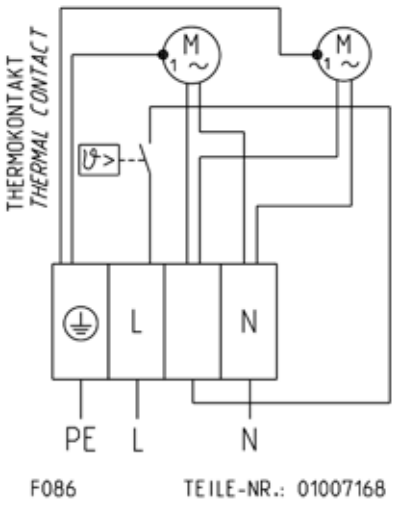



| | |
|---|---|
| *1* | *Voltage supply* |
| *2* | *Dual circuit test button* |
| *3* | *Bridge rectifier* |
| *4* | *Open brake circuit 1 button* |
| *5* | *Open brake circuit 2 button* |
| *6* | *Brake circuit 1* |
| *7* | *Brake circuit 2* |
| *K3* | *Brake contactor, activated by safety circuit* |
| *K4* | *Brake contactor, activated by control or frequency inverter* |

## 6.14 Connecting forced ventilation

**Procedure:**

Connect the forced ventilation according to the connection diagram.



# 7 Start-up

Personnel qualifications: Start-up technician

## 7.1 Checking the elevator system with half load

One of the two tests can be used to check whether the CW-balance is correct.

### Half load test with current measurement

**Procedure:**

1. Load the car according to its counterweight-balance.
   Typical load: 50% of the payload
2. Start a trip. When the car is roughly in the middle of the shaft, measure the motor current in both directions of travel.
   If the difference between the two motor currents is greater than 10% , correct the counterweight-balance and repeat the measurement.

### Release the half load test via the operating brake

**Procedure:**

1. Load the car according to its counterweight-balance.
   Typical load: 50% of the payload.
2. Position the car roughly in the middle of the shaft.
3. Deactivate the short circuit of the motor winding, if present.
4. Release the operating brake. With a load corresponding to the counterweight-balance, the car must not move. If the car moves, correct the counterweight-balance and release the operating brake again.
5. Reactivate the short circuit of the motor winding, if present.

## 7.2 Checking the brake according to EN 81-20:2020

Perform the tests according to EN 81–20:2020:

**Prerequisite:**

1. Position the car in the middle of the shaft during the tests.
2. Observe the car during the tests.

### Test procedure 1: Checking the brake in the event of a brake circuit failure at rated speed and as the cabin descends

**ATTENTION** **Material damage due to permanently open brakes circuits.**

▷ DO NOT open the brake circuits permanently, e.g. electrical release with a button.

**Prerequisite:**

▷ If a brake circuit failure is simulated, it must be possible to keep the two brake circuits open from each other electrically.

**Procedure:**

1. Deactivate the short circuit of the motor winding, if present.
2. Load the car with the nominal load.
3. Start a descent. Wait until a constant speed is reached. Disconnect the power supply to the motor and the 2nd brake circuit. Keep the 1st brake circuit open. The car must be brought to a standstill

.

If there is no noticeable deceleration, immediately close the open brake circuit. Repeat the test or stop the elevator.

4. If the test was successful, repeat the test for the 2nd brake circuit.
5. Reactivate the short circuit of the motor winding, if present.

### Test procedure 2: Check the brake with overload, 125% load

**ATTENTION** **Material damage due to heating of the motor.**

▷ DO NOT travel upwards with 125% of the load.
▷ Transport the load upwards in two parts.
▷ Only travel downwards with 125% of the load.
▷ The trip may only be short in duration.

**Procedure:**

1. Deactivate the short circuit of the motor winding, if present.
2. Load the car with 125% of the nominal load.
3. Start a descent. Wait until a constant speed is reached. Disconnect the power supply to the motor and the brake. The car must come to a standstill.

## 7.3 Pulling the car out of the safety catch

Motor torque increases to 150% of the required motor torque at 125% load.

**Prerequisite:**

- The safety catch is engaged.
- The elevator machine is designed for a maximum torque of 150–200% of the rated torque.

**Procedure:**

1. Perform the capture release in the area of a door according to the specifications set out by the elevator manufacturer. The lower the load in the car, the better the car release function.
   If the torque of the elevator drive is not sufficient, unload the car and start a new attempt.
   If the torque of the elevator machine is still not sufficient, attach the block and tackle to the top of the cabin.
2. Release the engaged safety catch.

## 7.4 Checking emergency evacuation by releasing the brake

This test is not mandatory. We recommend this test for checking the function of the electrical emergency supply for releasing the brake during emergency evacuation of trapped persons.

**ATTENTION** **Material damage due to uncontrolled acceleration and overspeeding.**

If the braking action is not sufficient, the elevator may accelerate in an uncontrolled manner.

▷ NO persons in the car.
▷ Follow the elevator manufacturer’s safety instructions.

**Procedure:**

1. Short circuit the motor winding for evacuation. Create the short circuit via the motor protection or an electronic circuit, e.g. in the frequency inverter. The acceleration of the elevator decreases.
2. Release the brake with an emergency electrical supply, see *Releasing the brakes, page 27*. The elevator moves in the direction of the higher weight. When the car is balanced, put weight on the car.

Monitor the evacuation speed. If the allowed evacuation speed is exceeded, stop the emergency evacuation by closing the brake and repeat step 2.

As soon as the floor is reached, close the brake.

3. Open the elevator door.

## 7.5 Releasing the brakes

### 7.5.1 Checking the manual release function with mechanical levers for hand release

A brake with mechanical levers for hand release is available as an option. The mechanical levers for hand release cannot be retrofitted.

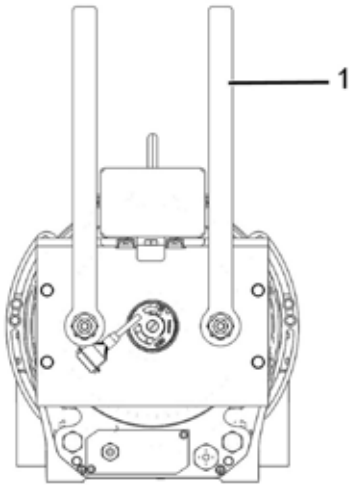
**⚠ WARNING** **Risk of injury from uncontrolled load movement.**

▷ Carefully open the mechanical hand release system.
▷ Observe the car movement.

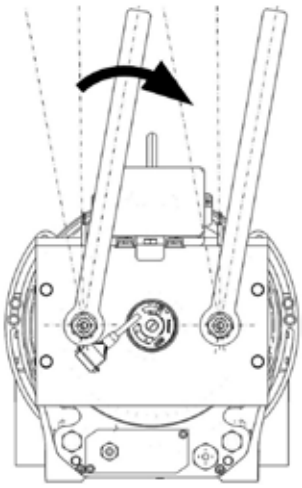
**ATTENTION** **Material damage due to permanently open brakes circuits.**

▷ DO NOT open the brake circuits permanently.

Example: Brake with mechanical levers for hand release (1)




Neutral position



Actuated release lever

**Prerequisite:**

▫ The brake is equipped with mechanical levers for hand release.

**Procedure:**

1. Move the mechanical levers for hand release (1) simultaneously, the release direction is irrelevant. Only actuate the mechanical levers for hand release (1) until the car starts moving. The release angle is approx. 20° to 25° until the brake is released without residual torque.

   Observe the car movement during the release process. If the speed of the car is too high, stop the release process.
2. Return the mechanical levers for hand release (1) to their starting position.

### 7.5.2 Checking the manual release function with mechanical release levers for the

## Bowden cable

A brake with mechanical release levers for the Bowden cable is available as an option. The mechanical hand release lever for the Bowden cable cannot be retrofitted.

A Bowden cable system is optionally available.

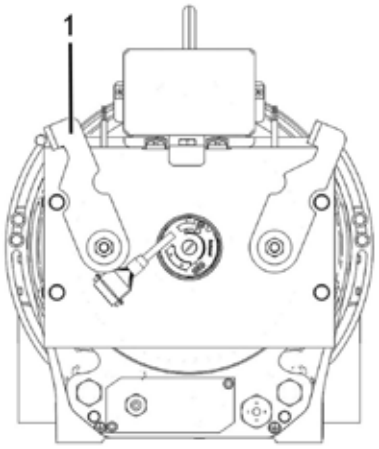
**⚠ WARNING** **Risk of injury from uncontrolled load movement.**

▷ Carefully open the mechanical hand release system.
▷ Observe the car movement.

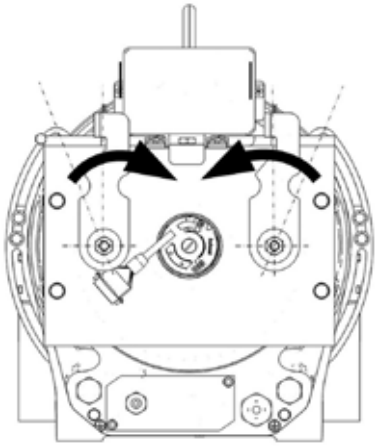
**ATTENTION** **Material damage due to permanently open brakes circuits.**

▷ DO NOT open the brake circuits permanently.

Example: Brake with mechanical release levers for Bowden cable (1)




Neutral position



Actuated release lever

**Prerequisite:**

**⚠ DANGER** **Risk of death due to incorrectly installed Bowden cable system.**

▷ Fit the Bowden cable system with an end stop for the Bowden cable lever as soon as the brake is released without any residual torque.
To prevent damage to the brake, position the end stop of the Bowden cable lever at the first point where the brake is fully released.
▷ Adjust the pulling distance of the Bowden cable so that the release lever swivels back to the non-released neutral position after being actuated.
Refer to the dimension sheet with the Bowden cable system for the pulling distance length, see *Technical data, page 88*.

▫ A Bowden cable system is installed and moves easily.
▫ The brake is equipped with mechanical release levers for the the bowden cable.

**Procedure:**

1. Carefully move the mechanical release levers for the Bowden cable (1) toward each other simultaneously via a Bowden cable system. Only actuate the mechanical release levers for the Bowden cable (1) until the car starts to move.
Observe the car movement during the release process. If the speed of the car is too high, stop the release process.

2. Move the mechanical release levers for the Bowden cable (1) back to their starting position, e.g. with a suitable return spring.

### 7.5.3 Releasing brake with electrical emergency power supply UPS

The brakes can be electrically released with an uninterruptible power supply (UPS), see wiring diagram *Actuating the brake, page 23*.

## 7.6 Automatic emergency evacuation

Carry out the automatic emergency evacuation with the elevator control system according to the operating instructions of the frequency inverter or the evacuation unit with UPS.

# 8 Troubleshooting

Personnel qualifications: Maintenance personnel

## 8.1 Failures

| Failure | Possible cause | Remedy |
|---|---|---|
| The elevator machine makes noises. | The bearing is defective. | ▷ Contact service. |
| | The settings in the frequency inverter are incorrect. | ▷ Check the settings in the frequency inverter, refer to the frequency inverter operating instructions. |
| | The absolute encoder is defective. | ▷ Replace the absolute encoder, see *Replacing the absolute encoder, page 46*. |
| The operating temperatures are too high or the temperature monitoring has triggered. | The elevator machine is covered. | ▷ Install the covers at a greater distance. |
| | The ambient temperature is above 40°C (104°F). | ▷ Improve shaft ventilation. |
| | The settings in the frequency inverter are incorrect. | ▷ Check the settings in the frequency inverter, refer to the frequency inverter operating instructions. |
| | The elevator machine is overloaded. | ▷ Check the motor current, see *Motor rating plate, page 11* and rating plate on the drive. |
| The elevator machine does not start. | The elevator machine is not connected with the correct phases. | ▷ Check the connections, see *Connecting the elevator machine, page 14* . |
| | The frequency inverter is defective. | ▷ Check that the frequency inverter is working correctly. |
| | The brake does not release. | ▷ See Failure:<br>The brake does not release. |
| The elevator machine does not rotate when the brake is released. | The lining carriers of the brake stick to the brake disk after a long storage time. | ▷ Release the brake again.<br>▷ Carefully loosen the lining carriers of the brake from the brake disk. |
| | The brake rotor of the brake sticks to the bearing bracket after a long storage time. | ▷ Release the brake again.<br>▷ Disassemble the brake and carefully detach the brake rotor from the bearing bracket, see *Replacing brake RTW800, page 35*. |

| Failure | Possible cause | Remedy |
|---|---|---|
| The elevator machine moves when the brake is closed. | The brake rotor of the brake is worn. | ▷ Check the brake for wear and air gap, see *Checking the air gap of brake RTW800, page 32*. |
| | The grooves of the traction sheave are soiled. | ▷ Clean the grooves of the traction sheave with isopropyl alcohol.<br>▷ If plastic-coated ropes are used, clean them. |
| | The friction lining on the brake is soiled. | ▷ Remove the brake and clean the brake surface:<br>1. Remove the brake, see *Replacing brake RTW800, page 35*.<br>2. Clean the friction lining on the brake with a dry cloth. |
| | The brake surface on the bearing bracket is soiled. | ▷ Remove the brake and clean the brake surface:<br>1. Remove the brake, see *Replacing brake RTW800, page 35*.<br>2. Clean the surface on the bearing bracket with isopropyl alcohol. |
| | The counterweight-balance is incorrect. | ▷ Check and adjust the weights. |
| The brake makes loud switching noises. | The brake is switched on the DC side first. | ▷ Also switch the brake on the AC side in normal operation, refer to the frequency inverter operating instructions.<br>▷ Provide an additional protective circuit, refer to the frequency inverter operating instructions. |
| | The wear limit of the brake has been reached. | ▷ Replace the brake rotors, see *Replacing brake rotor RTW800, page 46*.<br>▷ Contact service. |
| The brake does not release. | The operating voltage on the brake is too low. | ▷ Check the voltage supply.<br>▷ Check the operating voltage on the brake, see *Actuating the brake, page 23*.<br>▷ Increase the cable cross-section. |
| | The actuation of the brake is incorrect or defective. | ▷ Check the brake actuation, see *Actuating the brake, page 23*. |
| | The brake coil is defective. | ▷ Replace the brake, see *Replacing brake RTW800, page 35*.<br>▷ Contact service. |
| | The wear limit of the brake has been reached. | ▷ Replace the brake rotors, see *Replacing brake rotor RTW800, page 46*.<br>▷ Contact service. |
| The release monitoring does not switch. | One of the microswitches is defective. | ▷ Replace the microswitch, see *Setting and assembling microswitches, page 80*. |
| | The contacts are soiled. | ▷ Switch the microswitch with a contact current of at least 7 mA.<br>▷ Replace the microswitch, see *Setting and assembling microswitches, page 80*.<br>▷ Replace the brake, see *Replacing brake RTW800, page 35*.<br>▷ Contact service. |

# 9 Service

Personnel qualifications: Maintenance personnel

## 9.1 Service plan

**⚠ WARNING** **Risk of injury from high magnetic fields.**

▷ DO NOT disassemble the elevator machine.

| Intervals | Component | Activity |
|---|---|---|
| After the first 3 months, then annually. | Rope guard | ▷ Check the clearance of 2 mm to 3 mm to the ropes, see *Fitting the ropes, page 13* . |
| | Brake | ▷ Check the brake air gap, see *Checking the air gap of brake RTW800, page 32*.<br>▷ Check that the lever for hand release is working correctly, see *Checking the manual release function with mechanical levers for hand release, page 27*.<br>▷ Check that the mechanical release lever for the Bowden cable is working correctly, see *Checking the manual release function with mechanical release levers for the Bowden cable, page 27*.<br>▷ Check the microswitches are working correctly, see *Setting and assembling microswitches, page 80*.<br>▷ Check the function of the inductive proximity switches, see *Adjusting and mounting inductive proximity switches, page 82*. |
| | **Fixing screws** on the brake, release monitoring, absolute encoder, housing and traction sheave | ▷ Carry out a visual check to make sure that the locking varnish is not damaged.<br>In the event of damage, contact ZIEHL-ABEGG. |
| Yearly | Traction sheave | ▷ Visually inspect the grooves of the traction sheave for:<br>- Observe deepenings.<br>- Look for deformation.<br>- Look for uneven wear.<br>- Check for cracks.<br>- Lock for notches.<br>- Pay attention to braid pattern.<br>▷ If the traction sheave is damaged, replace it. |
| | Microswitch | ▷ Check the microswitches are working correctly, see *Setting and assembling microswitches, page 80*. |

## 9.2 Checking the air gap of brake RTW800

If the brake only closes when the elevator is stationary, the brake is wear-free. The friction linings wear out if there is frequent EMERGENCY STOP braking.

**Procedure:**

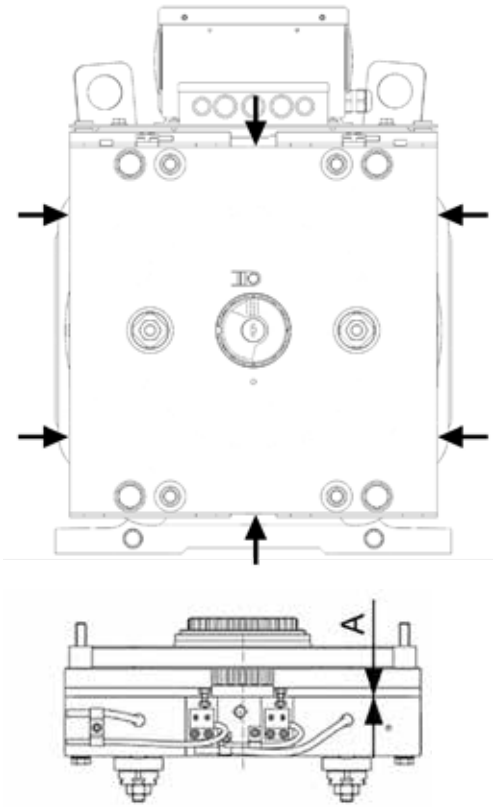
1. De-energise the elevator machine and secure it against restarting.
2. Wait until all moving parts have come to a standstill.

**ATTENTION!** Material damage caused by inserting the feeler gauge too deeply.

▷ Insert the feeler gauge a maximum of 10 mm into the air gap.

3. Check the air gap A at the 6 marked points on the brake.

   If the maximum allowed air gap (A) of 0.8 mm is reached at at least one of the points, replace the brake rotor and O-ring, see *Replacing brake rotor RTW800, page 46*.




## 9.3 Checking the wear limit of the traction sheave

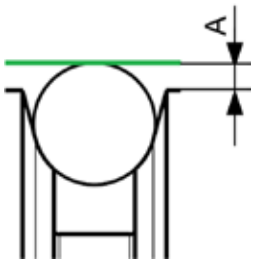
The wear limit of the traction sheave is checked depending on the groove shape.

### Seat groove, unhardened

▷ Check the distance A from the elevator rope to the traction sheave.

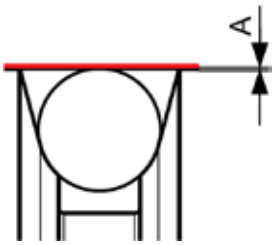
**A > 0 mm**

ALL of the elevator ropes extend beyond the outer diameter of the traction sheave. The traction sheave is OK.



**A ≤ 0 mm**

At least ONE of the elevator ropes does not extend beyond the outer diameter of the traction sheave. Replace the traction sheave, see *Replacing the traction sheave, page 35*.




### V-groove, hardened

▷ Visually inspect the flanks of the groove and elevator cables

Without visible wear



With clearly visible wear

If the hardened flanks on the mating surface of the elevator cables show clearly visible signs of wear, replace the traction sheave, see *Replacing the traction sheave, page 35*.



### Round groove, unhardened

The traction sheave with round grooves for plastic-coated ropes is virtually wear-free.

▷ Visual inspection of the plastic-coated ropes.
If there is visible surface damage, e.g. more strands coming out of the rope than permitted by the rope manufacturer. Replace the traction sheave, see *Replacing the traction sheave, page 35*.

## 9.4 Available spare parts

When ordering spare parts, state the motor number of the elevator machine, see *Motor rating plate, page 11*.




| | |
|---|---|
| *1* | *Rope guard* |
| *2* | *Traction sheave with mounting plate* |
| *3* | *Forced ventilation, optional* |
| *5* | *Brake rotor with O-ring* |

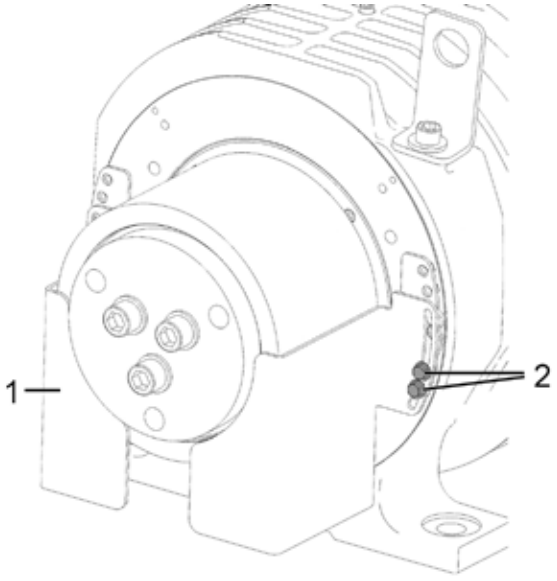
| | |
|---|---|
| *6* | *Brake RTW800* |
| *7* | *Microswitch* |
| *8* | *Absolute encoder* |

## 9.5 Replacing the rope guard

Personnel qualifications: Assembly personnel

**Procedure:**

1. Unscrew the 2 M6 x 12 hexagon head screws (2).
2. Remove the rope guard (1).
3. Install the new rope guard (1) and loosely fasten the 2 hexagon head screws M6 x 12 (2).
4. Install the rope guard (1) at a distance of 2 mm to 3 mm from the ropes. Fasten the hexagon head screws (2) with 9.5 Nm.
5. If the rope retainer has been replaced, dispose of the old rope retainer with all removed parts according to local regulations.



## 9.6 Replacing the traction sheave

Personnel qualifications: Assembly personnel

If a new traction sheave is installed, the ropes should also be replaced.

The replacement of the traction sheave is described in separate assembly instructions:

Replacing the traction sheave see *A-TIA19_02-D / A-TIA19_02-GB*

## 9.7 Retrofitting forced ventilation

Personnel qualifications: Assembly personnel

The process for retrofitting the forced ventilation is described in separate assembly instructions:

Retrofitting the forced ventilation see A-TIA25_07

## 9.8 Replacing brake RTW800

Personnel qualifications: Assembly personnel

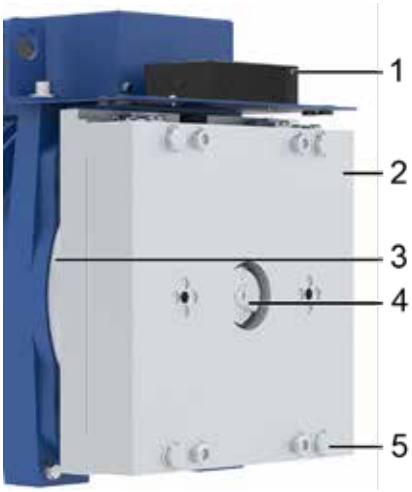
**⚠ DANGER** **Danger to life due to electrical voltage.**

▷ Switch off the main switch before working on the product.
▷ Disconnect the product from the power supply before carrying out any work and secure it against being switched back on.

**⚠ WARNING** **Severe injuries from falling parts.**

▷ Make sure there are NO persons below the elevator machine.
▷ Secure the cabin before starting work.

**Standard version:**




| | |
|---|---|
| *1* | *Terminal box cover* |
| *2* | *Brake body* |
| *3* | *Brake rotor* |
| *4* | *Absolute encoder* |
| *5* | *Fixing screws* |

**Version with mechanical lever for hand release:**




| | |
|---|---|
| *6* | *Mechanical lever for hand release* |

Brake with mechanical lever for hand release:

- Optionally available.
- Retrofitting NOT possible.
- In the event of retrofitting, the brake must be replaced completely.

**Version with mechanical release levers for Bowden cable:**

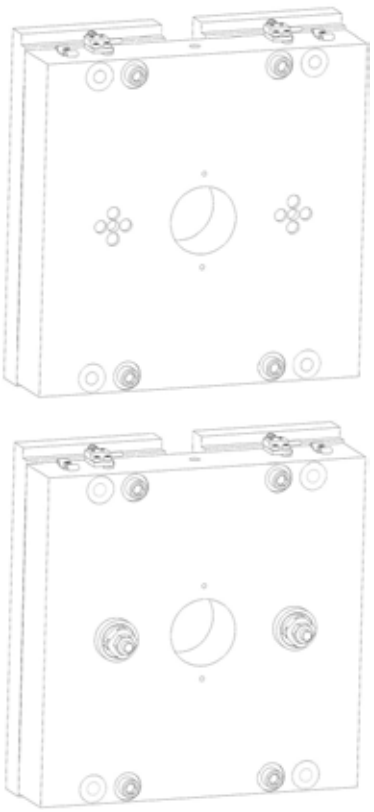
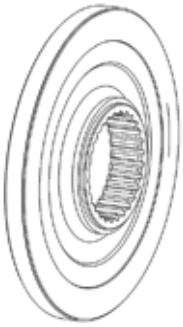



| | |
|---|---|
| *7* | *Mechanical release levers for Bowden cable* |

Brake with mechanical release levers for Bowden cable:

- Optionally available.
- Retrofitting NOT possible.
- In the event of retrofitting, the brake must be replaced completely.

## 9.8.1 Scope of delivery

| Designation | Component | Number |
|---|---|---|
| Brake body<br>Version without mechanical release levers<br><br>Version for mechanical release lever |  | 1 |
| Brake rotor |  | 1 |
| O-ring |  | 1 |
| Hexagon head screws M12 x 130 - 10.9 with washers | | 4 |

| Designation | Component | Number |
|---|---|---|
| Optional assembly kit<br>Item 70029992:<br>- Varistors<br>- Micro-active cloth<br>- Feeler gauges, 13-part<br>- Technical Vaseline<br>- Quick cleaner<br>- Locking varnish*<br><br>Item 70030702:<br>Excluding items marked with *. | | 1 |

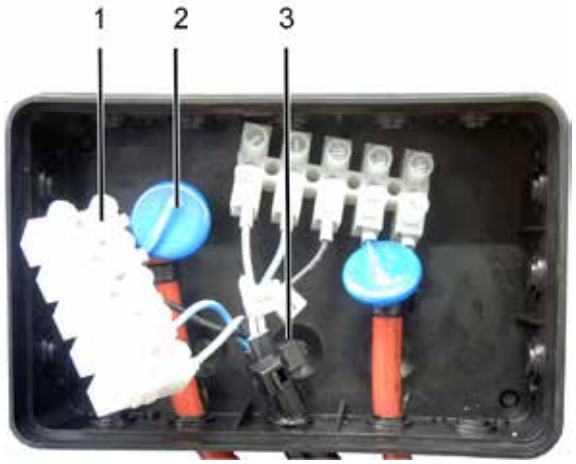
## 9.8.2 Removing the brake

**In addition, use the following special tools:**

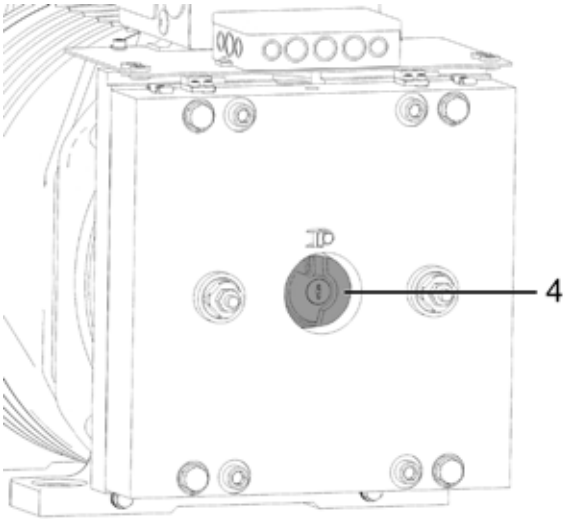
- ZIEHL-ABEGG toolkit item 70030741
  - Torque wrench
  - Threaded bar M12 x 220
  - Assembly aid for ZAtop SM160 and SM200 to SM250
- Torque wrench for tightening torque of 60 Nm, size 32
- Eye bolt M10

**Procedure:**

1. Secure the counterweight.
2. Secure the cabin with additional aids, the block and tackle and the safety catch alone are NOT sufficient.
3. Remove the terminal box cover and retain all parts.
4. Disconnect the microswitches and the brake coils (1).
5. Remove all cable ties (3) from the connecting cables.
6. Cut off the varistors (2).
7. Feed the connecting cables out of the terminal box.



8. Remove and store the absolute encoder (4), see *Replacing the absolute encoder, page 46*.



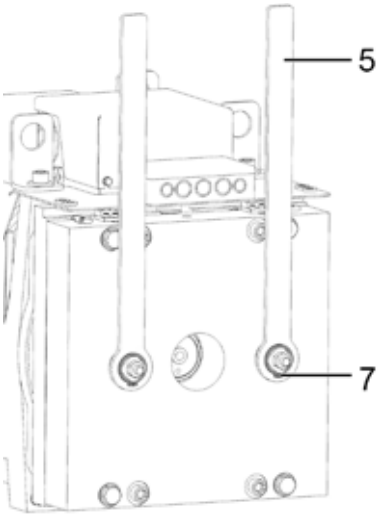

9. If present, remove the release levers.

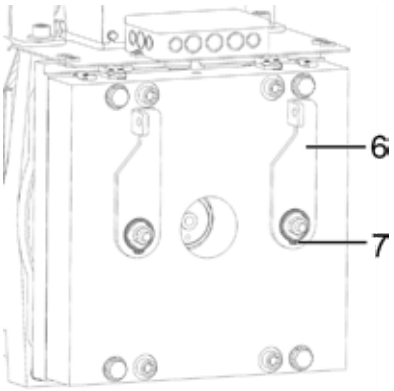
   For version with lever for hand release:

   Loosen the two circlips (7) using circlip pliers and remove the two levers for hand release (5). Retain all parts.

   For version with release lever for Bowden cable:

   Loosen the two circlips (7) using circlip pliers and remove the two release levers for Bowden cable (6). Retain all parts.




10. Disassemble and store the encoder adapter (8) with the torque wrench (9).

    Tools:

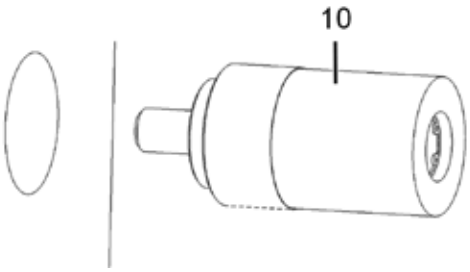
    - Torque wrench (9)
    - Wrench size 32



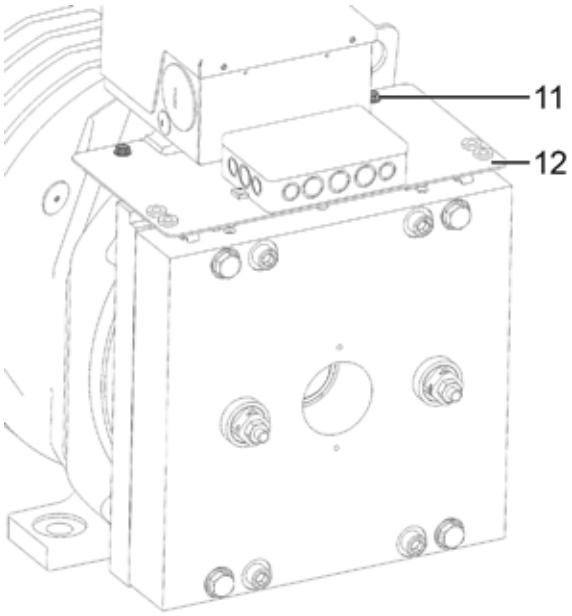
11. Screw the assembly aid (10) onto the drive shaft with a tightening torque of 60 Nm.

    Tools:

    - Torque wrench with Allen key, size 17



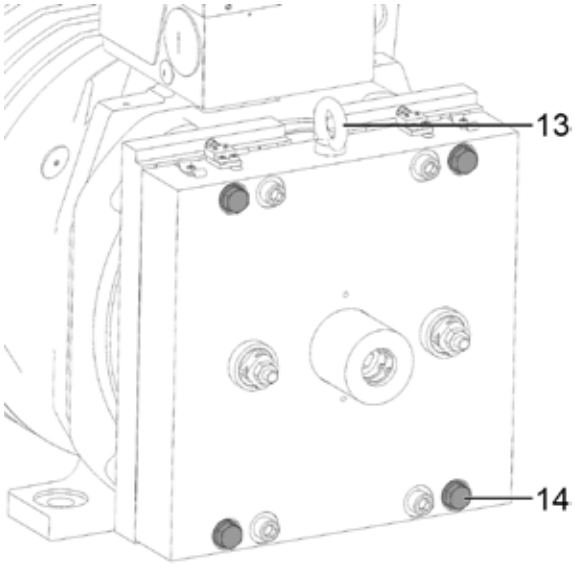

12. Unscrew the M6 x 12 hexagon head screws (11) and keep them for later.
13. Remove the cover plate (12) and keep it for later.



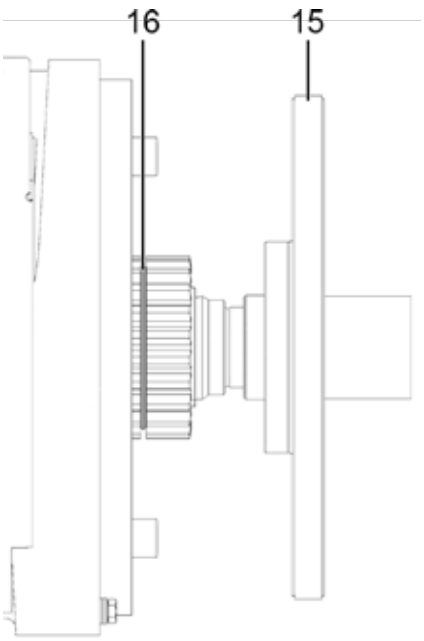

14. Remove the fixing screws (14) by 2 turns alternately.
15. Screw the M10 eye bolt (13) into the brake and secure it with a suitable lifting gear.
16. Pull the brake body off the shaft.

**⚠ DANGER** **Damage to the brake can cause malfunctions.**

▷ DO NOT damage the brake surface on the bearing bracket, for example with a screwdriver.



17. Remove the brake rotor (15).
18. Remove the O-ring (16) from the hub.
19. Dispose of all disassembled parts of the operating brake according to local regulations:
    - Fixing screws
    - Brake body
    - Brake rotor
    - O-ring




### 9.8.3 Assembling the brake

**DANGER** **Risk of explosion from cleaning agents.**

▷ DO NOT smoke.
▷ DO NOT expose to open flames.
▷ DO NOT expose to sparks.

**In addition, use the following special tools:**

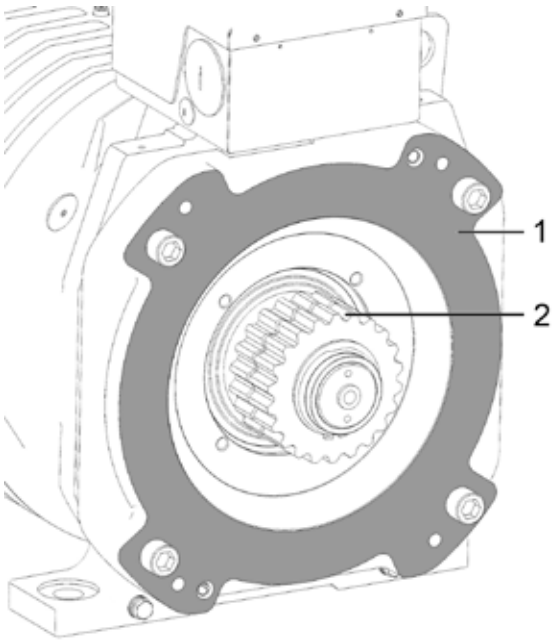
- ZIEHL-ABEGG toolkit item 70030741
  - Torque wrench
  - Assembly aid for ZAtop SM160 and SM200 to SM250
- Torque wrench for tightening torque of 117 Nm with Allen key, size 10
- Torque wrench for tightening torque of 109 Nm, size 19

**In addition, use the following aids:**

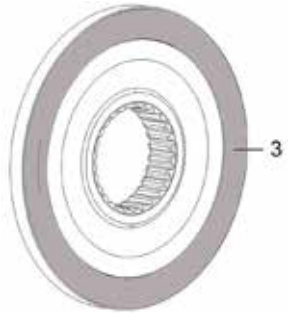
- Eye bolt M10
- ZIEHL-ABEGG assembly kit item 70029992 or
  item 70032079 - without items marked with *.
  - Varistors
  - Micro-active cloth
  - Feeler gauges, 13-part
  - Technical Vaseline
  - Quick cleaner
  - Locking varnish*

**Procedure:**

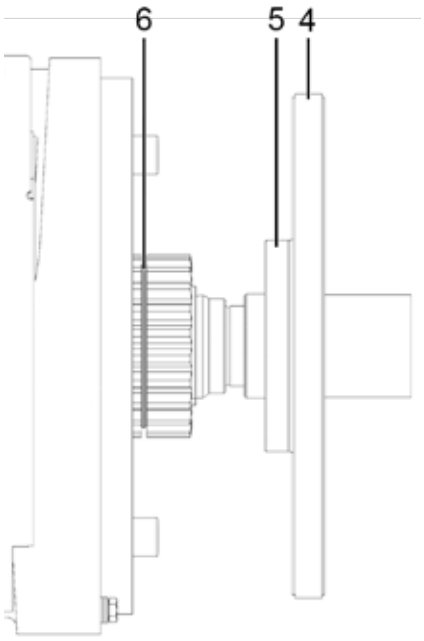
1. Clean the brake surface (1) and the geared hub (2) with isopropyl alcohol.
   Aids:
   - Micro-active cloth
   - Quick cleaner



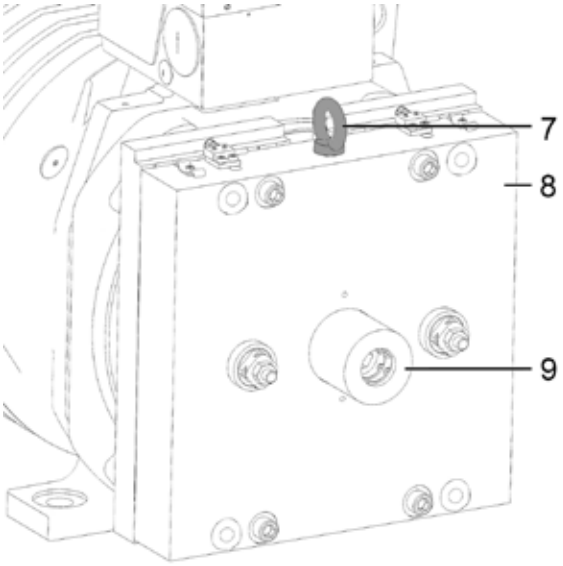

2. Clean the brake rotor friction lining (3).
   Aids:
   - Dry cloth
3. Lightly grease the brake rotor's new O-ring, e.g. with technical Vaseline.



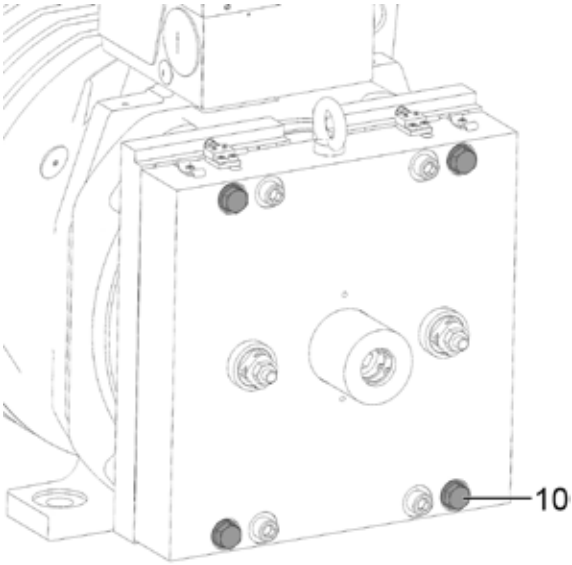

4. Place the O-ring (6) in the groove on the toothed hub.
5. Note the installation direction of the brake rotor (4):
   The rotor collar (5) must point towards the elevator machine housing.
6. Slide the brake rotor (4) onto the geared hub with light pressure. Do NOT damage the O-ring.



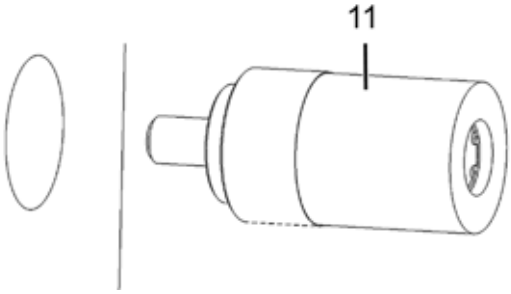
7. Screw the M10 eye bolt (7) into the new brake (8) so it is hand-tight and secure it with a suitable lifting gear.
8. Slide the brake over the assembly aid (9) up to the brake surface.
9. Unscrew the eye bolt (8) from the brake.




10. Screw the M12 x 130 hexagon head screws with washers 10) into the brake so they are hand-tight.
11. Fasten the 4 hexagon head screws in a crosswise pattern with a preliminary torque of 36 Nm.
12. Fasten the 4 hexagon head screws in a crosswise pattern with a tightening torque of 109 Nm.
13. Apply locking varnish to the cylinder head screws.




14. Unscrew the assembly aid (11) from the drive shaft.



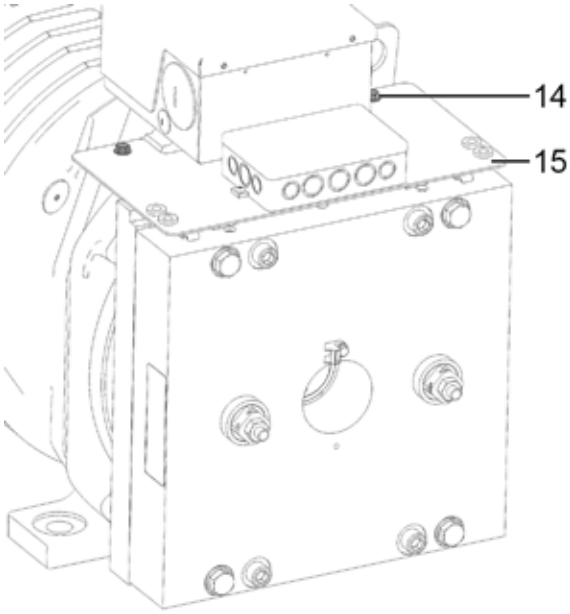

15. Apply screw lock, e.g LOCTITE® 243™, to the thread of the encoder adapter (13).
16. Screw the encoder adapter (13) onto the drive shaft with a tightening torque of 60 Nm.

    Tools:

    - Torque wrench (12)
    - Torque wrench, size 32



17. Fit the cover plate (15) and align with the threaded holes in the housing.
18. Screw in the 2 M6 x 12 hexagon head screws (14) with a tightening torque of 9.5 Nm.



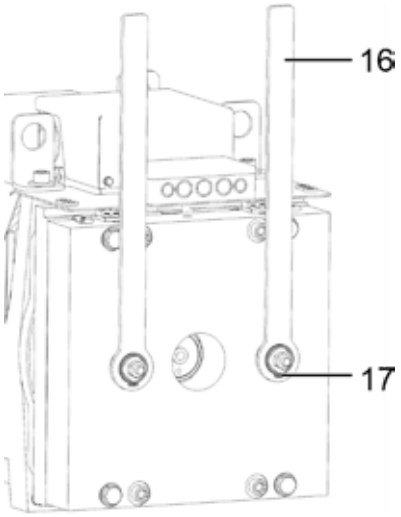

19. If present, mount the release levers.

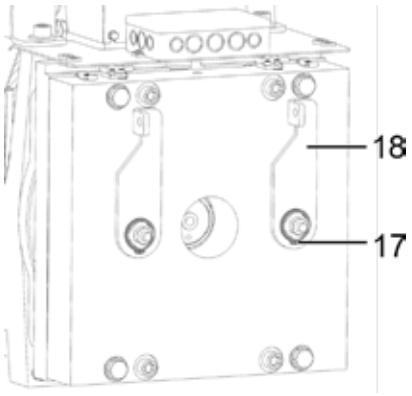
    For version with lever for hand release:

    Attach the two levers for hand release (16) to the brake and secure with circlips (17).

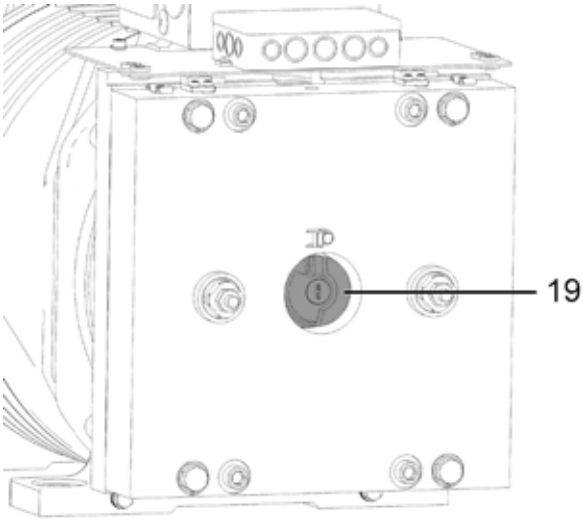
    For version with release lever for Bowden cable:

    Attach the two release levers for the Bowden cable (18) to the brake and secure with circlips (17).
20. Check the air gap, see *Checking the air gap of brake RTW800, page 32*.

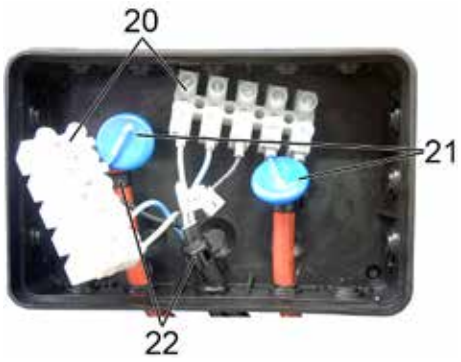


21. Install the absolute encoder (19), see *Replacing the absolute encoder, page 46*.

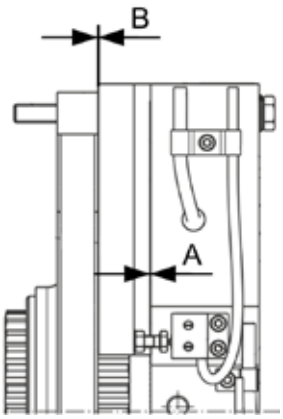



22. Feed the connecting cables into the terminal box.
23. Connect the microswitches and brake coils (20).
24. Connect the varistors (21).
25. Attach the cable ties (22) to the connecting cables.
26. Check the microswitches are working correctly, see *Setting and assembling microswitches, page 80*.
27. Calibrate the absolute encoder, see *Connect the absolute encoder, page 19*.
28. Close the cover to the terminal box.
29. Check the brake, see *Checking the elevator system with half load, page 25*.




### 9.8.4 Checking the brake according to the brake manufacturer

1. Check the individual air gap of both brake circuits, see *Operating instructions for ROBA®-twinstop® brake, type 8012.05_13, page 61*
   Brake, de-energised:
   Air gap a: 0.3 mm ≤ A ≤ 0.5 mm
   Brake, energised:
   Air gap B: B > 0.2 mm




2. Check the braking torque:
   Compare the ordered brake torque with the brake torque printed on the brake rating plate.
3. Check the manual release function, see *Checking emergency evacuation by releasing the brake, page 26*:
   Energise the brake via battery operation to test emergency evacuation of persons in case of power failure.
   Or check the brake release function with the manual hand release system.
4. Check the switch function of the release monitoring when connected as an NO contact:
   Brake, energised = signal OFF
   Brake, de-energised = signal ON

## 9.9 Replacing brake rotor RTW800

Personnel qualifications: Assembly personnel

**⚠ DANGER** **Life-threatening danger due to uncontrolled acceleration and high weight.**

▷ Secure the car and the counterweight.
▷ Secure the brake body.
▷ NEVER walk or reach under suspended loads.
▷ Wear safety helmet, safety gloves and safety shoes.

**Procedure:**

Replace the brake rotor, reuse all other disassembled parts, see *Replacing brake RTW800, page 35*.

## 9.10 Replacing the absolute encoder

Personnel qualifications: Assembly personnel

**Procedure:**

Replace the absolute encoder as described in the separate assembly instructions.

| **Absolute encoder** | **Assembly instructions**<br>**https://www.ziehl-abegg.com/bal/** |
|---|---|
| ECN1313 EnDat<br>ECN1313 SSI | A-TIA17_02 |
| ERN 1387 | A-TIA17_02 |
| AE-S64-BISSC-ZA-5m<br>AE-S64-BISSC-ZA-10m | A-TIA18_03 |
| AE-SinCos-AE-7m | A-TIA20_13 |

## 9.11 Accessories

| **Components** | **For instructions, see https://www.ziehl-abegg.com/bal** |
|---|---|
| Bowden cable system | A-TIA18_09 |
| Cable clamp | A-TIA25_10 |

# 10 Taking out of operation

Personnel qualifications: Qualified electrician or electrically instructed personnel

**Procedure:**

1. Disconnect the line voltage to the motor and secure against being switched back on.

   **WARNING!** Electric shock from live parts.

   ▷ Wait for 5 minutes.
2. Open the terminal box.

3. Check that there is no voltage present.
4. Disconnect all connections.
5. Remove the traction sheave cover, rope retainer and rope guard.
6. Remove the ropes.
7. Loosen the fixing screws of the elevator machine.
8. Remove the elevator machine.

# 11 Disposal



- ▷ Dispose of the product professionally and in an environmentally friendly way in accordance with the respective national legal stipulations.
- ▷ Separate the materials by type and in an environmentally-friendly way.
- ▷ If necessary, employ a specialised contractor to handle the disposal.

# 12 Certificates

## 12.1 EC/EU declaration of conformity

# EC/EU declaration of conformity

- Translation -
(english)

A-KON16_01-GB
2022/26 Index 004

**Manufacturer:** **ZIEHL-ABEGG SE**
**Heinz-Ziehl-Straße**
**74653 Künzelsau**
**Germany**

**The manufacturer shall bear sole responsibility for issuing this EC/EU declaration of conformity.**

**Product description:** **ZAtop** Gearless elevator machine

**Type:** **SM160...** **SM190...** **SM200...** **SM250...** **SM315...**

The type specifications contain further additions for different versions, for example SM250.60B-20/S.

**Valid from serial number:** 22010001/1 or higher

**The above mentioned products of this declaration fulfil all relevant provisions of the following Directives of the Union:**

Machinery directive 2006/42/EC

EMC Directive 2014/30/EU

**The following harmonized standards have been applied:**

| | |
|---|---|
| EN ISO 12100:2010 | Safety of machine tools -<br>General principles for design - Risk assessment and risk reduction |
| EN 60034-1:2010<br>+ AC:2010 | Rotating electrical machines -<br>Part 1: Rating and performance |
| EN 81-20:2020 | Safety rules for the construction and installation of elevators -<br>Lifts for the transport of persons and goods -<br>Part 20: Passenger and goods passenger elevators |
| EN 60204-1:2018 | Safety of machinery - Electrical equipment of machines -<br>Part 1: General requirements |

**For the assessment of the products concerning electromagnetic compatibility the following standards have been used.**

| | |
|---|---|
| EN 12015:2014 | Electromagnetic compatibility-<br>Productfamily standard for lifts, escalators and moving walks - Emission |

This declaration relates exclusively to the product in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

The authorised representative for the assembly of the technical file is:
Mr. André Lagies(see above for address).

Künzelsau, 27.06.2022
(Location, date of issue)

ZIEHL-ABEGG SE
Roland Hoppenstedt
Technical Director Drive Technology
(name, function)



(signature)

ZIEHL-ABEGG SE
André Lagies
Head of R&D Machines Drive Technology
(name, function)



(signature)

## 12.2 EU Declaration of Conformity for Brake

mayr® Antriebstechnik

**EU – Konformitätserklärung**
*EU – Declaration of conformity*
**Déclaration de conformité UE**
*Dichiarazione di conformità UE*
**Declaración de conformidad de la UE**
*Declaração de conformidade da UE*

**Im Sinne der gekennzeichneten Richtlinien erklären wir**
*In accordance with the marked directives, we*
**Conformément aux directives désignées, nous**
*In conformità con le direttive designate dichiariamo,*
**De acuerdo con las directivas designadas declaramos,**
*De acordo com as diretrizes designadas que declaramos,*

**Chr. Mayr GmbH + Co. KG**
**Eichenstraße 1**
**D-87665 Mauerstetten**

**dass die angeführten Produkte den Anforderungen entsprechen**
declare that the listed products meet the requirements.
**déclarons que les produits listés répondent aux exigences.**
*che i prodotti elencati soddisfano i requisiti.*
**que los productos listados cumplan con los requisitos.**
**que os produtos listados atendem aos requisitos**

**Elektromagnetische Federdruckbremse** / *Electromagnetic spring applied brakes* / **Freins électromagnétiques à ressort de pression** / *Freni elettromagnetici a molle compresse* / **Frenos de muelles electromagnéticos** / *Freio eletromagnético de molas*

| **Produkt** / *Product* / **Produit** / *Prodotto* / **Producto** / *Produto* | **Größen** / *Sizes* / **Tailles** / *Grandezze* / **Dimensión** / *Dimensão* | **Typen** / *Types* / **Types** / *Serie* / **Tipos** / *Tipos* | **ANVP** |
|---|---|---|---|
| ROBA®-twinstop® | 800 | 8012._ _ _ _ _ | 1,2 |

**Jahr der Herstellung:** / *Year of manufacture:* / **Année de production:** / *Anno di produzione:* / **Año de fabricación:** / *Ano de fabricação:*
**Siehe Typenschild am Produkt** / *see product label* / **Voir l'étiquette sur le produit** / *vedi l'etichetta sul prodotto* / **ver placa de identificación del producto** / *Ver placa do produto*

| | | |
|---|---|---|
| | **EG-Maschinenrichtlinie 2006/42/EG** | *EC-Machinery directive 2006/42/EC* |
| X | **Richtlinie Niederspannung 2014/35/EU** | *EC-Low voltage directive 2014/35/EU* |
| X | **Elektromagnetische Verträglichkeit 2014/30/EU** | *Electromagnetic compatibility directive 2014/30/EU* |
| X | **EU-Richtlinie Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten 2011/65/EU (RoHs II) inkl. delegierte Richtlinie 2015/863/EU zur Änderung von Anhang II der Richtlinie 2011/65/EU (RoHs III)** | *EU Directive Restriction of use of certain hazardous substances in electrical and electronic equipment 2011/65 / EU (RoHs II) including delegated Directive 2015/863 / EU amending Annex II to Directive 2011/65 / EU (RoHs III)* |
| X | **Aufzüge und Sicherheitsbauteile für Aufzüge 2014/33/EU** | *Lifts and safety components for lifts 2014/33 / EU* |

8012 (4) — **Seite** / *Page* / **Page** / *Pagina* / **Página** / *Página* 1 / 2 — 09.12.2020

mayr® Antriebstechnik

**Angewendete Normen, Vorschriften und Prüfungen (ANVP) /** *Applied standards, regulations and inspections (ANVP)* **/ Normes, prescriptions et contrôles appliqués (ANVP) /** *In conformità alle direttive UE di norme, specifiche e controlli (ANVP)* **/ Normas, regulaciones e inspecciones aplicadas (ANVP) /** *Normas, regulamentações e inspeções aplicadas (ANVP)*

**1 EN 81-20:2014 / EN 81-50:2014**

**2 DIN EN IEC 63000:2019-05 / VDE 0042-12:2019-05**

**Zertifizierungsstelle für Aufzüge und Sicherheitsbauteile, Überwachung gemäß Aufzugsrichtlinie:**
*Certification body for lifts and safety components, monitoring of production acc. lifts directive:*
**Organisme de certification pour ascenseurs et composants de sécurité, contrôle de production selon la directive sur les ascenseurs:**
*Organismo di certificazione per ascensori e componenti di sicurezza, controllo di produzione secondo la Direttiva per ascensori :*
**Centro de certificación para ascensores y componentes de seguridad, supervisión según la directiva de ascensores:**
*Centro de certificação para elevadores e componentes de segurança, monitoramento conforme a diretiva para elevadores:*

**© TÜV SÜD Industrie Service GmbH**
**Westendstraße 199**
**D-80686 München**

**Kennnummer 0036 /** *Identification number 0036* **/ Numéro d'identification 0036 /** *Numero d'identificazione 0036* **/ Número de identificación 0036 /** *Número de identificação 0036 /*

**Sicherheitsfunktion /** *Safety function* **/ Fonction de sécurité /** *Funzione di sicurezza* **/ Función de seguridad /** *Função de segurança*

**Bremseinrichtung, als Teil der Schutzeinrichtung für den aufwärtsfahrenden Fahrkorb gegen Übergeschwindigkeit und Bremselement gegen unbeabsichtigte Bewegung des Fahrkorbs.**
*Braking device as part of the protection device against over speed for the car moving in upwards direction and braking element against unintended car movement.*
**Dispositif de freinage faisant partie d'un système de protection contre la survitesse en montée de la cabine d'ascenseur et élément de freinage contre le déplacement involontaire de la cabine d'ascenseur.**
*Dispositivo di frenatura come parte del dispositivo di protezione contro la fuga verso l'alto della cabina e elemento di frenatura contro i movimenti incontrollati della cabina.*
**Dispositivo de frenado como parte de un dispositivo de seguridad contra la sobrevelocidad de la cabina en movimiento ascendente y como elemento de frenado contra movimientos incontrolados de la cabina.**
*Dispositivo de freio para ser usado como parte da unidade de proteção para prevenir excesso de velocidade da cabine elevadora em movimento ascendente e elemento de freio contra movimentos inadvertidos da cabine elevadora.*

## EU-Baumusterprüfbescheinigung / *EU type examination certificate* / Certificate d'examen de type UE / *Certificato di omologazione UE* / Certificado de examen UE / *Certificado de exame UE*

# EU-BD 1112

| | |
|---|---|
| Mauerstetten, 09.12.2020<br>Ort und Datum / place and date / Lieu et date / luogo – data / fecha y lugar / Lugar e data | Dipl. Ing. (FH) / graduate engineer / Engenheiro graduado<br>Geschäftsführer / Managing Director / Directeur Général / Gerente / Gerente<br>Günther Klingler |

## 12.3 EC Type Examination Certificate

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Industrie Service

# EU-TYPE EXAMINATION CERTIFICATE

**According to Annex IV, Part A of 2014/33/EU Directive**

| | |
|---|---|
| **Certificate No.:** | EU-BD 1112 |
| **Notified Body:** | TÜV SÜD Industrie Service GmbH<br>Westendstr. 199<br>80686 Munich - Germany<br>Identification No. 0036 |
| **Certificate Holder:** | Chr. Mayr GmbH & Co. KG<br>Eichenstr. 1<br>87665 Mauerstetten - Germany |
| **Manufacturer of the Test Sample:**<br>(Manufacturer of Serial Production – see Enclosure) | Chr. Mayr GmbH & Co. KG<br>Eichenstr. 1<br>87665 Mauerstetten - Germany |
| **Product:** | Braking device acting on the shaft of the traction sheave, as part of the protection device against overspeed for the car moving in upwards direction and braking element against unintended car movement |
| **Type:** | RTW 800 / 8012._ _ _ _ _ |
| **Directive:** | 2014/33/EU |
| **Reference Standards:** | EN 81-20:2020<br>EN 81-50:2020 |
| **Test Report:** | EU-BD 1112 of 2020-11-19 |
| **Outcome:** | The safety component conforms to the essential health and safety requirements of the mentioned Directive as long as the requirements of the annex of this certificate are kept. |
| **Date of Issue:** | 2020-11-19 |

Achim Janocha
Notified Body LCC

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

TÜV®

# Annex to the EU Type-Examination Certificate No. EU-BD 1112 of 2020-11-19

## 1 Scope of application

### 1.1 Use as braking device – part of the protection device against overspeed for the car moving in upwards direction – permissible brake torques and tripping rotary speeds

1.1.1 Permissible brake torque when the braking device acts on the shaft of the traction sheave while the car is moving upward

| Permissible brake torque [Nm] | Max. tripping rotary speed of the traction sheave [rpm] |
|---|---|
| 1200 - 1840 | 500 |

1.1.2 Maximum tripping speed of the overspeed governor and maximum rated speed of the lift

The maximum tripping speed of the overspeed governor and the maximum rated speed of the lift must be calculated on the basis of the traction sheave's maximum tripping rotary speed as outlined above taking into account traction sheave diameter and car suspension.

$$v = \frac{D_{TS} \times \pi \times n}{60 \times i}$$

v = Tripping (rated) speed (m/s)
$D_{TS}$ = Diameter of the traction sheave from rope's centre to rope's centre (m)
π = 3,14
n = Rotary speed (rpm)
i = Ratio of the car suspension

### 1.2 Use as braking element – part of the protection device against unintended car movement (acting in up and down direction) – permissible brake torques, tripping rotary speeds and characteristics

1.2.1 Nominal brake torques and response times with relation to a brand-new brake element

Type 8012._4_ _ oder 8012._5_ _

| Min. nominal brake torque* [Nm] | Mid. nominal brake torque* [Nm] | Max. nominal brake torque * [Nm] | Max. tripping rotary speed [rpm] | Maximum response times** [ms] without / with overexcitation | | |
|---|---|---|---|---|---|---|
| | | | | $t_0$ | $t_{50}$ | $t_{90}$ |
| 2 x 600 = 1200 | | | 500 | 50 / -- | 85 / -- | 160 / --- |
| | 2 x 800 = 1600 | | | 30 / --- | 60 / -- | 100 / --- |
| | | 2 x 920 = 1840 | | -- / 45 | -- / 70 | --- / 120 |

Type 8012._0_ _ oder 8012._1_ _

| Min. nominal brake torque* [Nm] | Mid. nominal brake torque* [Nm] | Max. nominal brake torque * [Nm] | Max. tripping rotary speed [rpm] | Maximum response times** [ms] without / with overexcitation | | |
|---|---|---|---|---|---|---|
| | | | | $t_0$ | $t_{50}$ | $t_{90}$ |
| 2 x 600 = 1200 | | | 500 | 120 / --- | 175 / --- | 265 / --- |
| | 2 x 800 = 1600 | | | 75 / -- | 110 / --- | 215 / --- |
| | | 2 x 920 = 1840 | | -- / 85 | --- / 110 | --- / 200 |

**Interim values can be interpolated**

**Explanations:**

* **Nominal brake torque:** Brake torque assured for installation operation by the safety component manufacturer.

** **Response times:** $t_x$ time difference between the drop of the braking power until establishing X% of the nominal brake torque, $t_{50}$ optionally calculated $t_{50}= (t_{10}+ t_{90})/2$ or value taken from the examination recording

**Note:** The English text is a translation of the German original. In case of any discrepancy, the German version is valid only.

## Annex to the EU Type-Examination Certificate No. EU-BD 1112 of 2020-11-19

1.2.2 Assigned execution features

| | |
|---|---|
| Type of powering / deactivation | continuous current / continuous current end |
| Brake control | parallel |
| Nominal air gap | 0.45 mm |
| Damping elements | YES |
| Overexcitation | at double non-release voltage |

### 2 Conditions

2.1 Above mentioned safety component represents only a part at the protection device against overspeed for the car moving in upwards direction and unintended car movement. Only in combination with a detecting and triggering component in accordance with the standard (two separate components also possible), which must be subjected to an own type-examination, can the system created fulfil the requirements for a protection device.

2.2 The installer of a lift must create an examination instruction to fulfil the overall concept, add it to the lift documentation and provide any necessary tools or measuring devices, which allow a safe examination (e. g. with closed shaft doors).

2.3 The manufacturer of the drive unit must provide calculation evidence that the connection traction sheave – shaft – brake disc and the shaft itself is sufficiently safe, if the brake disc is not a direct component of the traction sheave (e. g. casted on). The shaft itself has to be statically supported in two points.

The calculation evidence must be enclosed with the technical documentation of the lift.

2.4 The setting of the brake torque must be secured against unauthorized adjustment (e. g. sealing lacquer).

2.5 The identification drawing no. E02810410000260 including stamp dated 2020-11-19 shall be included to the EU type-examination for the identification and information of the general construction and operation and distinctness of the approved type.

2.6 The EU type-examination certificate may only be used in combination with the corresponding annex and enclosure (List of authorized manufacturer of the serial production). The enclosure will be updated immediately after any change by the certification holder.

### 3 Remarks

3.1 In the scope of this type-examination it was found out, that the brake device also functions as a brake for normal operation, is designed as a redundant system and therefore meets the requirements to be used also as a part of the protection device against overspeed for the car moving in upwards direction and as braking element as part of the protection device against unintended car movement.

3.2 Checking whether the requirements as per section 5.9.2.2 of EN 81-20:2020 (D) have been complied with is not part of this type examination.

3.3 Other requirements of the standard, such as reduction of brake moment respectively brake force due to wear or operational caused changes of traction are not part of this type examination.

3.4 This EU type-examination certificate was issued according to the following standards:

- EN 81-1:1998 + A3:2009 (D), Annex F.7 and F.8
- EN 81-20:2014 (D), part 5.6.6.11, 5.6.7.13 - EN 81-50:2014 (D), part 5.7 and 5.8
- EN 81-20:2020 (D), part 5.6.6.11, 5.6.7.13 - EN 81-50:2020 (D), part 5.7 and 5.8

3.5 A revision of this EU type-examination certificate is inevitable in case of changes or additions of the above mentioned standards or of changes of state of the art.

**Note:** The English text is a translation of the German original. In case of any discrepancy, the German version is valid only.

## Enclosure to the EU-Type Examination Certificate No. EU-BD 1112 of 2020-11-19

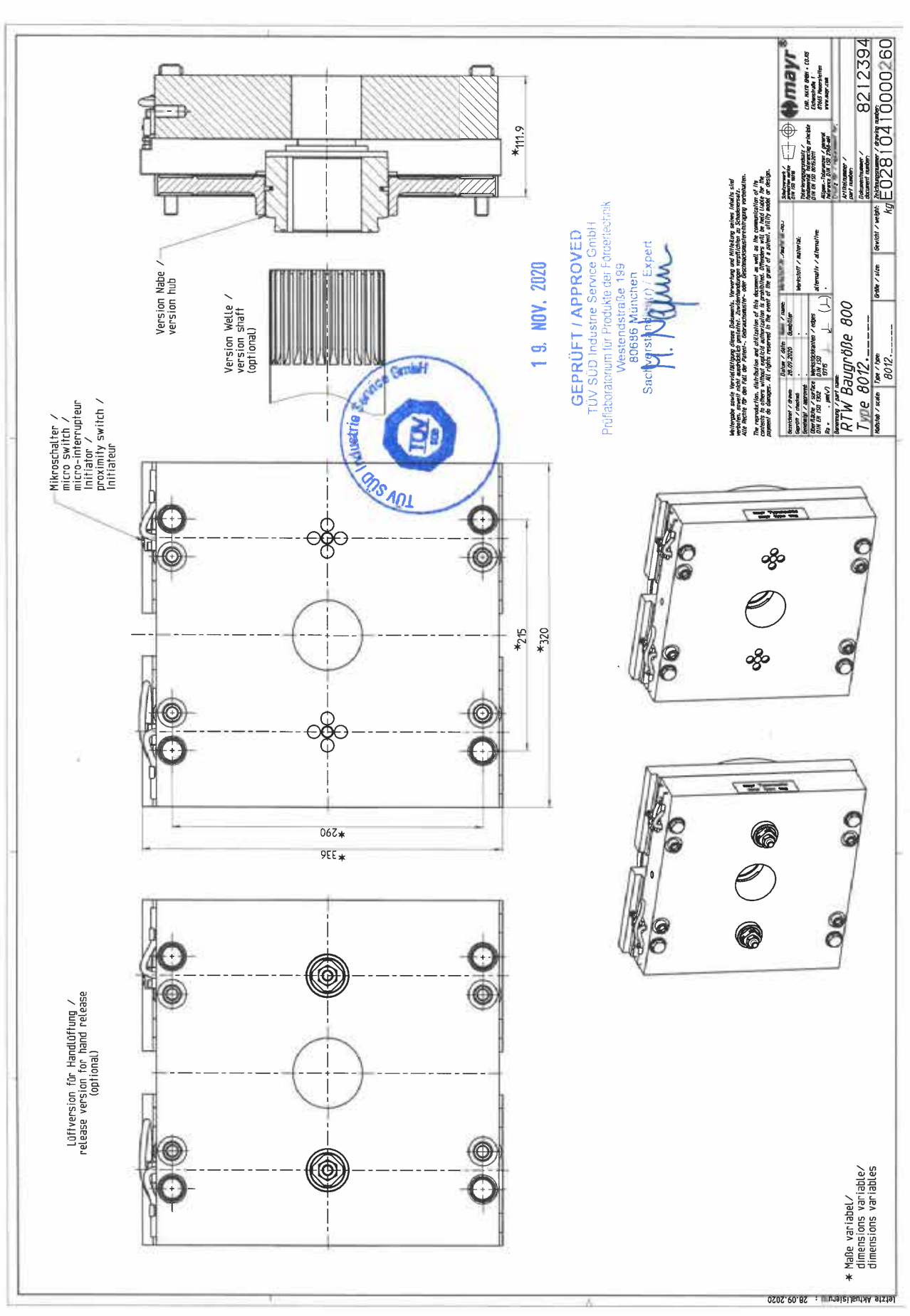
**Authorised Manufacturer of Serial Production – Production Sites (valid from: 2020-07-23):**

| | |
|---|---|
| **Company** | Chr. Mayr GmbH & Co. KG |
| **Address** | Eichenstr. 1<br>87665 Mauerstetten - Germany |

| | |
|---|---|
| **Company** | Mayr Polska Sp. z. o. o. |
| **Address** | Rojów, ul. Hetmanska 1<br>63-500 Ostrzesów - Poland |

- END OF DOCUMENT -

Based on: Application letter from Chr. Mayr GmbH & Co. KG of 2020-07-23


Version Nabe / version hub
Version Welle / version shaft (optional)
*111.9
Mikroschalter / micro switch / micro-interrupteur Initiator / proximity switch / Initiateur
*215
*320
*290
*336
Lüftversion für Handlüftung / release version for hand release (optional)
* Maße variabel/ dimensions variable/ dimensions variables
GEPRÜFT / APPROVED
TÜV SÜD Industrie Service GmbH
Prüflaboratorium für Produkte der Fördertechnik
Westendstraße 199
80686 München
19. NOV. 2020
RTW Baugröße 800
Type 8012.
82123941
E028104100000260
kg
28.09.2020

### 12.3.1 Statement on type examination certificate

The brake nominal torques can be found on the rating plate. The switching times are assigned to the brake torque in the type examination certificate.

Increases in the index (added with “/”) for a type examination certificate are only used for technical improvements and are approved by the authorised body with this condition.

## 12.4 Calculation proof

- Translation -
english
A-BN25_01-GB
2026/09 Index 002

# Calculation proof

**Manufacturer:** ZIEHL-ABEGG SE
Heinz-Ziehl-Strasse
74653 Künzelsau, Germany
Germany

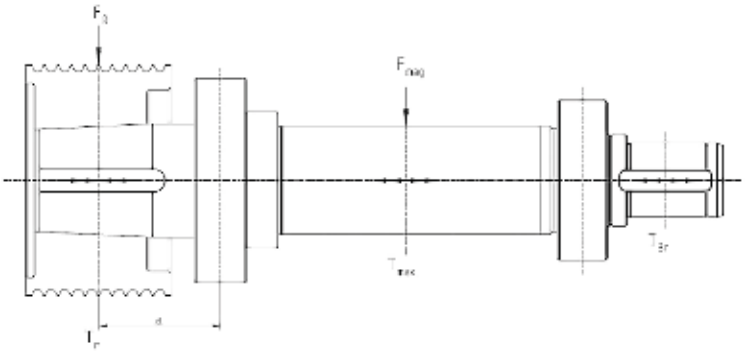
**Verification of the calculations for a traction sheave shaft, including the shaft-hub connection.**

**Type of gearless drive unit:** SM205.40A
SM205.45A

**Object of the verification:** Calculations for traction sheave shaft, including the shaft-hub connections, by IFF ENGINEERING & CONSULTING GmbH No. 25.1.520.3 dated 8 May 2025.

**Basis for verification:**

| | |
|---|---|
| DIN 743-1:2012-12 | Calculation of load capacity of shafts and axles - Part 1: Basic concepts |
| DIN 743-2:2012-12 | Calculation of load capacity of shafts and axles - Part 2: Theoretical stress concentration factors and fatigue notch factors |
| DIN 743-3:2012-12 | Calculation of load capacity of shafts and axles - Part 3: Strength of materials |
| DIN 743-3:2012-12 Correction 1:2014-12 | Calculation of load capacity of shafts and axles - Part 3: Strength of materials, Correction to DIN 743-3:2012-12 |
| DIN 6892:2012-08 | Drive type fastenings without taper action - Parallel keys - Calculation and design |
| DIN 6892 Correction 1:2014-05 | Drive type fastenings without taper action - Parallel keys - Calculation and design, correction to DIN 6892:2012-08 |
| FKM Guidelines 7th edition, 2020 | Analytical strength assessment for engineering components |
| KTA 3902:2012-11 | Design of lifting equipment in nuclear power plants |



**Design drawing:** A-20-121-0043 Index 003 dated 30 January 2025

**Permissible shaft materials:** Steel ISO 683-2:2018-09 - 42CrMo4+QT (1.7225+QT) or higher strength material

**Permissible materials for traction sheave hubs:** Steel EN ISO 683-1 - C45+N (1.0503+QT) or higher strength material

**Permissible materials for traction sheave parallel keys:** Steel EN ISO 683-2:2018-09 - 42CrMo4+QT (1.7225+QT) or higher strength material

**Permissible materials for brake hubs:** Steel EN ISO 683-2:2018-09 - 42CrMoS4+QT (1.7227+QT) or higher strength material

**Permissible materials for brake parallel keys:** Steel EN ISO 683-2:2018-09 - 42CrMo4+QT (1.7225+QT) or higher strength material

**Data on load capacity:**

| | | |
|---|---|---|
| Maximum allowed static operating shaft load | $F_R$ | 47.6 kN |
| Distance between bearing A and centre of traction sheave | a | 108 mm |
| Maximum torque | $T_{max}$ | 1200 Nm |
| Magnetic force | $F_{Mag}$ | -2763 N |
| Nominal brake torque | $T_{Br}$ | 1600 Nm<br>(2 x 800 ) |
| Maximum brake torque | 2 x $T_{Br}$ | 3200 Nm |
| Rated speed | $n_r$ | 478 rpm |

**Results of the verification:**

For verification purposes, IFF ENGINEERING & CONSULTING GmbH performed a calculation of the traction sheave shaft, including the shaft-hub connections. The calculation showed that the traction sheave shaft and the shaft-hub connections are calculated according to the maximum load data.

The prerequisite is tension-free installation and non-movable mounting of the bearings in any direction. The design and strength of the machine frame and the force application points must be calculated according to the bearing forces.

Note that only pure braking torques are allowed on the brake side, as the calculation does not take into account any additional lateral forces due to the braking action on the traction sheave shaft.

Künzelsau, 24 February 2026

(Location, date of issue)

ZIEHL-ABEGG SE

André Lagies

Head of Machine Development Drive Technology

(Name, position)

i.V. A. Lagies

(Signature)

ZIEHL-ABEGG SE

Patrik Kreutz

Mechanical Development for Drive Technology

(Name, position)

i.A. P. Kreutz

(Signature)

# 13 Appendix

## 13.1 Operating instructions for ROBA®-twinstop® brake, type 8012.05_13

# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Translation of the Original Operational Instructions

Design according to

| Drawing number | Article number with release monitoring Microswitch | Article number with release monitoring Proximity switch | Hand release | Nominal voltage | Type |
|---|---|---|---|---|---|
| E028 10 410 000 114 | 8286241 | 8288452 | yes | 207 V | 8012.05113 |
| | 8307511 | | yes | 48 V | 8012.05113 |
| E028 10 410 000 115 | 8286301 | 8286302 | no | 207 V | 8012.05013 |

**Please read these Operational Instructions carefully and follow them accordingly!**

Ignoring these Instructions can lead to lethal accidents, malfunctions, brake failure and damage to other parts.
These Installation and Operational Instructions (I + O) are part of the brake delivery.
Please keep them handy and near to the brake at all times.

**Contents:**

**Page 1:** - Contents
- Safety and Guideline Signs
- Approvals

**Page 2:** - Guidelines on EU Directives

**Page 3:** - Guidelines on UK Directives / Conformity
- Guidelines on EU and UK REACH

**Page 4:** - Safety Regulations

**Page 5:** - Safety Regulations

**Page 6:** - Safety Regulations

**Page 7:** - Identification

**Page 8:** - Brake Illustrations

**Page 9:** - Parts List

**Page 10:** - Table 1: Technical Data
- Table 2: Switching Times

**Page 11:** - Torque-Time Diagram
- Application
- Design
- Function

**Page 12:** - Scope of Delivery / State of Delivery
- Adjustment
- Installation Conditions
- Noise Damping

**Page 13:** - Installation
- Braking Torque

**Page 14:** - Hand Release

**Page 15:** - Release Monitoring

**Page 16:** - Electrical Connection and Wiring

**Page 17**: - Brake Inspection (Customer-side after Mounting)
- Dual Circuit Brake Functional Inspection

**Page 18:** - Maintenance
- De-Installation of the Brake
- Replacing the Rotor

**Page 19:** - Information on the Components
- Cleaning the Brake
- Disposal
- Malfunctions / Breakdowns

**Safety and Guideline Signs**

**DANGER**



Immediate and impending danger, which can lead to severe physical injuries or to death.

**CAUTION**



Danger of injury to personnel and damage to machines.



**Please Observe!**
Guidelines on important points

**Approvals**

EU Type Examination Certificate
(Elevator Directive):

➢ EU-BD 1112

UK Type Examination Certificate
(Lifts Regulations):

➢ UK-BD 1112



*Chr. Mayr GmbH + Co. KG*
*Eichenstraße 1, D-87665 Mauerstetten, Germany*
*Phone: +49 8341 804-0, Fax: +49 8341 804-421*
*www.mayr.com, email: public.mayr@mayr.de*

# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Guidelines on EU Directives

**Guidelines on the Declaration of Conformity**
A conformity evaluation has been carried out for the product (electromagnetic safety brake) in terms of the EU Low Voltage Directive 2014/35/EU and the RoHS 2011/65/EU with 2015/863/EU. The Declaration of Conformity is laid out in writing in a separate document and can be requested if required.

**Guidelines on the EMC Directive 2014/30/EU**
The product cannot be operated independently according to the EMC directive.
Due to their passive state, brakes are also non-critical equipment according to the EMC.
Only after integration of the product into an overall system can this be evaluated in terms of the EMC.
For electronic equipment, the evaluation has been verified for the individual product in laboratory conditions, but not in the overall system.

**Guidelines on the Machinery Directive 2006/42/EC**
The product is a component for installation into machines according to the Machinery Directive 2006/42/EC.
The brakes can fulfil the specifications for safety-related applications in coordination with other elements.
The type and scope of the required measures result from the machine risk analysis. The brake then becomes a machine component and the machine manufacturer assesses the conformity of the safety device to the directive.
It is forbidden to start initial operation of the product until you have ensured that the machine accords with the regulations stated in the directive.

**Guidelines on the EU Directive 2011/65/EU (RoHS II) with 2015/863/EU (RoHS III – from 22 July 2019)**
These restrict the use of certain hazardous substances in electrical and electronic devices as well as in products / components (category 11), the proper operation of which is dependent on electric currents and electromagnetic fields.
**Our electromagnetic products / components fulfill the requirements laid down in the RoHS Directive(s), taking into account the valid exceptions (according to Appendix III and IV RoHS (2011/65/EU) with delegated Directives (EU) 2018/739-741 from 01.03.2018 for Category 11 – until 21 July 2024) and comply with the RoHS.**

**Guidelines on the ATEX Directive**
Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion.
For application of this product in areas where there is a high danger of explosion, it must be classified and marked according to Directive 2014/34/EU.

**Guidelines on the REACH Regulation (EC) No. 1907/2006**
of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). This regulation governs the manufacture, placing on the market and use of chemical substances in preparations and, under certain conditions, also of substances in finished products.
*mayr*® power transmission exclusively manufactures products (articles: overload clutches, shaft couplings, electromagnetic brakes / clutches, permanent magnet motors and the appropriate control modules / rectifiers) in accordance with the definition in Article 3 of the REACH Regulation.
*mayr*® power transmission is aware of its responsibility towards the environment and society. As a matter of precaution, we pay attention to particularly critical substances in the supply chain and strive to avoid using any such substances completely or to replace them in the near future.
In compliance with Article 33 of the REACH Regulation, we would like to inform you that in our overload clutches and shaft couplings, electromagnetic brakes / clutches as well as permanent magnet motors, subcomponents with a lead content of > 0.1% are or may be used. These are manufactured from raw materials such as machining steel / copper alloys (e.g. brass, bronze) or aluminum alloys.
Besides high-melting-point (HMP) solders (electronics), this also affects integrated machine elements as well as standard parts (screws / nuts / set screws / pins / etc.) among others, provided that the relevant standards allow this.
For example, lead can occur as an alloying element with more than 0.1 mass percent, based on the respective total mass, in screws and set screws of the following property classes: 4.6, 4.8, 5.8, 6.8, 04, 4, 5, 6, 14H, 17H, 22H, 33H, 45H.
Products made from copper and copper alloys do not fall within the area of applicability of Regulation (EC) No. 1272/2008 of the European Parliament and Council on the Classification, Labeling and Packaging of Substances and Mixtures (CLP Regulation) and are therefore not subject to the classification and labeling obligations.
To our knowledge, when used for their intended purpose and disposed of correctly (recycling), the contained substances pose no threat to health or environment.
We would hereby like to point out that the proportion of lead used here is not prohibited according to the REACH Regulation. It is merely necessary to declare the use of this substance.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Guidelines on UK Directives / Conformity

Products / components from *mayr*® power transmission fulfill the requirements for the British economic area due to currently identical UK and EU directives.
In addition to the CE identification, the UKCA identification is attached to the product.
The UK Declaration of Conformity is available in a separate document.

| Directives under EU Law | Directives under UK Law |
|---|---|
| Machinery Directive 2006/42/EC | Supply of Machinery (Safety) Regulations UK 2008 No. 1597 |
| EMC Directive 2014/30/EU | Electromagnetic Compatibility Regulations UK 2016 No. 1091 |
| EU Low Voltage Directive 2014/35/EU | Electrical Equipment (Safety) Regulations UK 2016 No. 1101 |
| RoHS II 2011/65/EU | The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations UK 2012 No. 3032 |
| Elevator Directive 2014/33/EU | Lifts Regulations UK 2016 No. 1093 |

## Guidelines on EU and UK REACH

According to the European Union (Withdrawal) Act 2018, the EU REACH Regulation was transposed into UK law on January 1, 2021, and is known as UK REACH.
REACH and related legislation have been replicated in the UK with the necessary changes to make it workable in a domestic context.
The fundamental principles of the EU REACH Regulation have been retained in UK REACH.
The remarks on the information obligation according to UK-REACH correspond in content to the REACH Regulation (EC) No. 1907/2006.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Safety Regulations

**These Safety Regulations are user hints only and may not be complete!**

### General Guidelines

**DANGER**



Danger of death!
Do not touch voltage-carrying lines and components.

Brakes may generate further risks, among other things:


Hand injuries


Danger of seizure


Contact with hot surfaces


Magnetic fields

**Severe injury to people and damage to objects may result if:**

- ❒ the electromagnetic brake is used incorrectly.
- ❒ the electromagnetic brake is modified.
- ❒ the relevant standards for safety and / or installation conditions are ignored.

During the risk assessment required when designing the machine or system, the dangers involved must be evaluated and removed by taking appropriate protective measures.

**To prevent injury or damage, only specialist personnel are allowed to work on the components.**
They must be familiar with the dimensioning, transport, installation, inspection of the brake equipment, initial operation, maintenance and disposal according to the relevant standards and regulations.

Before product installation and initial operation, please read the Installation and Operational Instructions carefully and observe the Safety Regulations. Incorrect operation can cause injury or damage. At the time these Installation and Operational Instructions go to print, the electromagnetic brakes accord with the known technical specifications and are operationally safe at the time of delivery.

- ❒ Technical data and specifications (Type tags and documentation) must be followed.
- ❒ The correct connection voltage must be connected according to the Type tag and wiring guidelines.
- ❒ Check electrical components for signs of damage before putting them into operation. Never bring them into contact with water or other fluids.
- ❒ Please observe the EN 60204-1 requirements for electrical connection when using in machines.



Only carry out installation, maintenance and repairs in a de-energized, disengaged state and secure the system against inadvertent switch-on.

### Guidelines for Electromagnetic Compatibility (EMC)

In accordance with the EMC directive 2014/30/EU, the individual components produce no emissions. However, functional components e.g. mains-side energization of the brakes with rectifiers, phase demodulators, ROBA® switch devices or similar controls can produce disturbance which lies above the allowed limit values. For this reason it is important to read the Installation and Operational Instructions very carefully and to keep to the EMC directives.

### Application Conditions

The catalogue values are guideline values which have been determined in test facilities. It may be necessary to carry out your own tests for the intended application. When dimensioning the brakes, please remember that installation situations, braking torque fluctuations, permitted friction work, bedding-in condition / conditioning of the brake linings and wear as well as general ambient conditions can all affect the given values. These factors should therefore be carefully assessed, and alignments made accordingly.

- ❒ Mounting dimensions and connection dimensions must be adjusted according to the size of the brake at the place of installation.
- ❒ Use of the brake in extreme environmental conditions or outdoors, directly exposed to the weather, is not permitted.
- ❒ The brakes are designed for a relative duty cycle of 60 %. A duty cycle > 60 % leads to higher temperatures, which cause premature aging of the noise damping and therefore lead to an increase in switching noises. Furthermore, the switch function of the release monitoring can be impaired. The max. permitted switching frequency is 240 1/h. On overexcited brakes, the switching frequency must not exceed 180 1/h. These values are valid for intermittent periodic duty S3 60 %. The permitted surface temperature on the brake flange must not exceed 80 °C (temporary 90 °C). The max. permitted ambient temperature is 40 °C.
- ❒ The braking torque is dependent on the current bedding-in condition of the brake. Bedding in / conditioning of the friction linings is necessary.
- ❒ The brakes are only designed for dry running. The torque is lost if the friction surfaces come into contact with oil, grease, water or similar substances or any other foreign bodies.

Please ensure that the brake is clean and oil-free. In particular in gear applications, special sealing measures, among other precautions, may be necessary!

- ❒ The surfaces of the outer components have been phosphated manufacturer-side to form a basic corrosion protection.

**CAUTION**



The rotors may rust up and seize up in corrosive ambient conditions and / or after longer downtimes.
The user is responsible for taking appropriate countermeasures.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Safety Regulations

**These Safety Regulations are user hints only and may not be complete!**

### Dimensioning

**Attention!**
When dimensioning the brake, please take into consideration that a load torque is present when selecting the protection.

- ❒ Load torques reduce the deceleration torque available.
- ❒ Load torques may increase the output speed:
  - ➔ during a possible processing time in the controls
  - ➔ during the brake downtime

When calculating the friction work, please observe that the brake nominal torque is subject to a tolerance.

### Climate Conditions

The electromagnetic brake is suitable for mounting / operation on electromotive elevator machinery in enclosed places of installation with an ambient temperature of between -5 °C and +40 °C.

**CAUTION**



**Reduction in braking torque possible**
Condensation can form on the brake and cause a loss in braking torque:

- ❒ due to fast changes in temperature
- ❒ at temperatures of around or under freezing point

The user is responsible for taking appropriate countermeasures (e.g. forced convection, heating, drain screw).

**CAUTION**



**Brake malfunction possible**
Condensation can form on the brake and cause malfunctions:

- ❒ at temperatures around or under freezing point, the brake can freeze over and not release any more.

The user is responsible for taking appropriate countermeasures (e.g. forced convection, heating, drain screw).

The system function must be checked by the user after longer downtimes.



At high temperatures and in high humidity or with occurring dampness, the rotor can seize up to the armature disk or the bearing shield / the flange plate after longer downtimes.

**CAUTION**



Temperatures of over 80 °C on the brake mounting flange can have a negative effect on the switching times, the braking torque levels and the noise damping behavior.

### Intended Use

This safety brake is intended for use in electrically operated elevators and goods elevators. Furthermore, this brake can be used as a braking device acting on the traction sheave or the shaft of the traction sheave, as part of the protection device against overspeed for the upward-moving car and as a braking element against inadvertent movement of the car.

### Grounding Connection

The brake is designed for Protection Class I. This protection covers not only the basic insulation, but also the connection of all conductive parts to the protective conductor (PE) on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardized inspection of the protective conductor connections to all contactable metal parts!

### Class of Insulation F (+155 °C)

The insulation components on the magnetic coils are manufactured at least to class of insulation F (+155 °C).

### Protection

**(mechanical) IP10:** Protection against large body surfaces and large foreign bodies > 50 mm in diameter. No protection against water.

**(electrical) IP54:** Dust-proof and protected against contact as well as against water spray from any direction.

### Brake Storage

- ❑ Store the brakes in a horizontal position, in dry rooms and dust and vibration-free.
- ❑ Relative air humidity < 50 %.
- ❑ Temperature without major fluctuations within a range from -5 °C up to +40 °C.
- ❑ Do not store in direct sunlight or UV light.
- ❑ Do not store aggressive, corrosive substances (solvents / acids / lyes / salts / oils / etc.) near to the brakes.

For longer storage of more than 2 years, special measures are required (please contact the manufacturer).

Storage acc. DIN EN 60721-3-1 (including the limitations / additions described above): classes 1K21; 1Z1; 1B1; 1C2; 1S11; 1M11

### Handling

**Before installation**, the brake must be inspected and found to be in proper condition.
The brake function must be inspected both **once attachment has taken place** as well as **after longer system downtimes**, in order to prevent the drive starting up against possibly seized linings.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Safety Regulations

**These Safety Regulations are user hints only and may not be complete!**

### User-implemented Protective Measures:

- ❒ Please cover moving parts to protect **against injury through seizure**.
- ❒ Place a cover on the magnetic part to protect **against injury through high temperatures**.
- ❒ **Protection circuit:** When using DC-side switching, the coil must be protected by a suitable protection circuit according to VDE 0580, which is integrated in *mayr* ® rectifiers. To protect the switching contact from consumption when using DC-side switching, additional protective measures are necessary (e.g. series connection of switching contacts). The switching contacts used should have a minimum contact opening of 3 mm and should be suitable for inductive load switching. Please make sure on selection that the rated voltage and the rated operating current are sufficient. Depending on the application, the switching contact can also be protected by other protection circuits (e.g. *mayr* ® spark quenching unit, half-wave and bridge rectifiers), although this may of course then alter the switching times.
- ❒ Take precautions **against freeze-up of the friction surfaces** in high humidity and at low temperatures.

### Standards, Directives and Regulations Used and To Be Applied

| | |
|---|---|
| DIN VDE 0580 | Electromagnetic devices and components, general specifications |
| DIN EN 61140 | Protection against electric shock - Common aspects for installation and equipment |
| DIN EN IEC 63000 | Technical documentation for the assessment of electrical and electronic equipment regarding the restriction of hazardous substances |
| DIN EN IEC 60529 | Degrees of protection provided by enclosures (IP Code) |
| 2014/35/EU | Low Voltage Directive |
| 2011/65/EU | RoHS II - Directive |
| 2015/863/EU | RoHS III- Directive |
| CSA C22.2 No. 14-2010 | Industrial Control Equipment |
| UL 508 (Edition 17) | Industrial Control Equipment |
| 2014/33/EU | Elevator Directive |
| EN 81-20 | Safety rules for the construction and installation of lifts – Part 20: Passenger and goods passenger lifts |
| EN 81-50 | Safety rules for the construction and installation of lifts - Examinations and tests – Part 50: Design rules, calculations, examinations and tests of lift components |
| EN ISO 12100 | Safety of machinery – General principles for design - Risk assessment and risk reduction |
| DIN EN 61000-6-4 | Interference emission |
| EN 12016 | Interference immunity (for elevators, escalators and moving walkways) |

### Liability

The information, guidelines and technical data in these documents were up to date at the time of printing. Demands on previously delivered brakes are not valid.
Liability for damage and operational malfunctions will not be taken if:

- the Installation and Operational Instructions are ignored or neglected.
- the brakes are used inappropriately.
- the brakes are modified.
- the brakes are worked on unprofessionally.
- the brakes are handled or operated incorrectly.

### Guarantee

- ❒ The guarantee conditions correspond with the Chr. Mayr GmbH + Co. KG sales and delivery conditions.
- ❒ Mistakes or deficiencies are to be reported to *mayr*® at once!



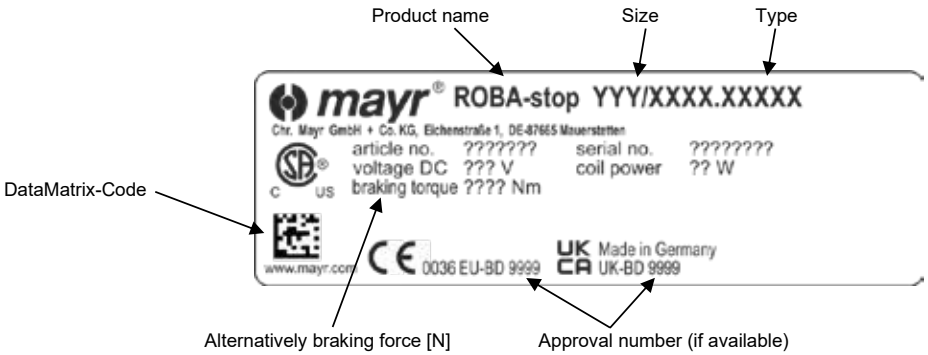
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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Identification

*mayr*® components are clearly marked and described on the Type tag:




### CE Identification

according to the Low Voltage Directive 2014/35/EU (only for DC voltage > 75 V) and/or RoHS Directive 2011/65/EU with 2015/863/EU, and the Elevator Directive 2014/33/EU (with the ID number of the respective inspection authority, for type examination tested brakes only)

### UKCA Identification

according to the Low Voltage Directive UK 2016 No. 1101 (only for DC voltage > 75 V) and/or RoHS Directive UK 2012 No. 3032, and the Elevator Directive UK 2016 No. 1093

### Conformity Markings

in terms of the Canadian and American approval

C US



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Brake Illustrations

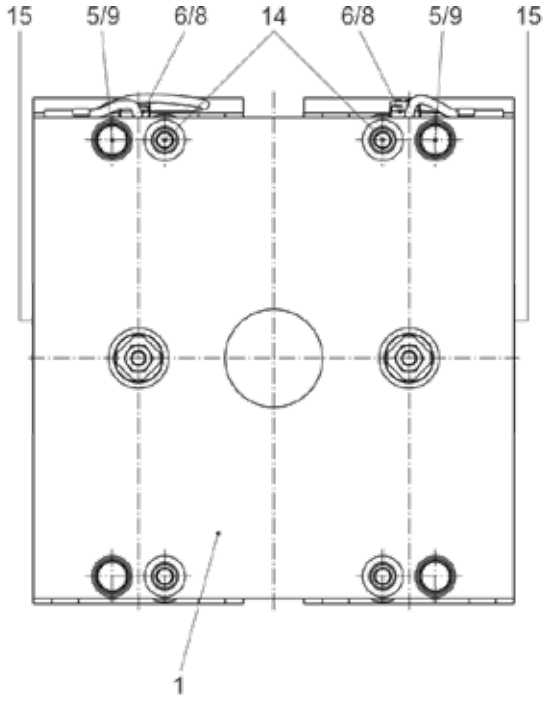



**Fig. 1**

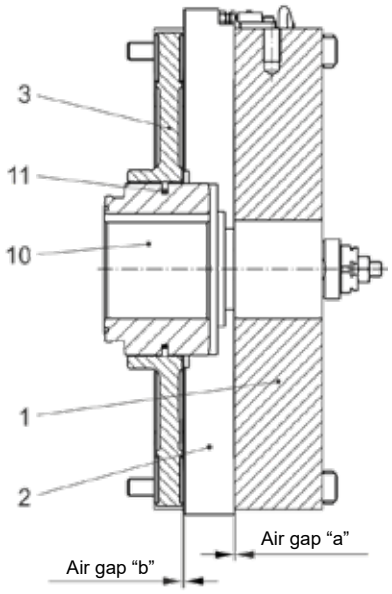



**Fig. 2**

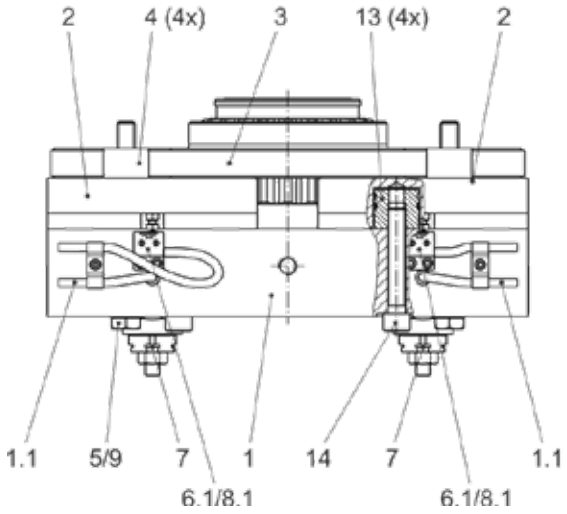



**Fig. 3**



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

**Parts List** (Only use *mayr*® original parts)

| Item | Name |
|---|---|
| 1 | Coil carrier assembly (incl. magnetic coils) |
| 1.1 | Connection cable 2 x AWG18 blue / brown |
| 2 | Armature disk |
| 3 | Rotor |
| 4 | Distance bolt |
| 5 | Hexagon head screw |
| 6 | Release monitoring assembly with microswitch |
| 6.1 | Microswitch |
| 7 | Hand release fixture |
| 7.1 | Hand release lever (Fig. 5, page 14 / must be ordered separately) |
| 8 | Release monitoring assembly with proximity switch |
| 8.1 | Proximity switch |
| 9 | Washer |
| 10 | Hub |
| 11 | O-ring |
| 12 | Noise damping unit (not depicted) |
| 13 | Guide bolt |
| 14 | Cap screw |
| 15 | Type tag |



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Table 1: Technical Data

| | | |
|---|---|---|
| **Nominal voltage $U_N$:** | 207 V | 48 V |
| **Nominal power $P_N$:** | 2 x 131 W | 2 x 127 V |
| **Inductivity:** | 119 H | 7.09 H |
| **Nominal torque [1]:** | 2 x 800 Nm | |
| **Nominal air gap [2] "a" braked (Fig. 2):** | 0.44 mm | |
| **Maximum air gap [3] "a" at nominal torque (Fig. 2):** | 0.8 mm | |
| **Inspection air gap "b" on released brake (Fig. 2):** | min. 0.2 mm | |
| **Protection (coil/casting compound):** | IP54 | |
| **Protection (mechanical):** | IP10 | |
| **Protection (switch):** | IP67 | |
| **Ambient temperature:** | -5 °C to +40 °C | |
| **Duty cycle:** | 60 % | |
| **Rotor thickness, new condition:** | $20_{-0.05}$ mm | |
| **Max. trigger speed:** | 460 rpm | |
| **Permitted friction work per single circuit [4]:** | 75000 J | |
| **Max. permitted friction work per single circuit for max. 1 braking action with subsequent rotor replacement:** | 90000 J | |
| **Max. permitted friction work for both brake circuits [4]:** | 90000 J | |
| **Tightening torque for fixing screw Item 5:** | 109 Nm | |
| **Weight:** | approx. 71.5 kg | |

1) The braking torque (nominal torque) is the torque effective in the shaft train on slipping brakes at a sliding speed of 1 m/s with reference to a mean friction radius.
2) Measured in the vertical center axis area of the respective armature disk (2).
3) Once the maximum air gap has been reached, the rotors must be replaced. However, the brake already becomes louder at an air gap > "a" +0.15 mm.
4) Values for trigger speed 460 rpm, brake linings slightly bedded in (see Chapter "Braking Torque"). The value increases at lower speeds and decreases at higher speeds (please contact *mayr*®).

At temperatures of around or under freezing point, condensation can strongly reduce the braking torque. The user is responsible for taking appropriate countermeasures. The customer is responsible for providing a protective cover against contamination caused by construction sites.

**CAUTION**

The rotor (3) must be replaced at the latest when a maximum air gap of 0.8 mm has been reached.

## Table 2: Switching Times [ms]

| Attraction $t_2$ | Drop-out $t_0$ DC | Drop-out $t_{50}$ [5] DC | Drop-out $t_{90}$ [5] DC | Drop-out $t_{11}$ AC | Drop-out $t_1$ [6] AC |
|---|---|---|---|---|---|
| 620 | 30 | 60 | 100 | 160 | 750 |

5) Referring to the nominal braking torque
6) Referring to the effective braking torque

The stated switching times can only be achieved using the respective correct electrical wiring. This also refers to the protection circuit for brake control and the response delay times of all control components.
The use of varistors for spark quenching increases the DC-side switching times.

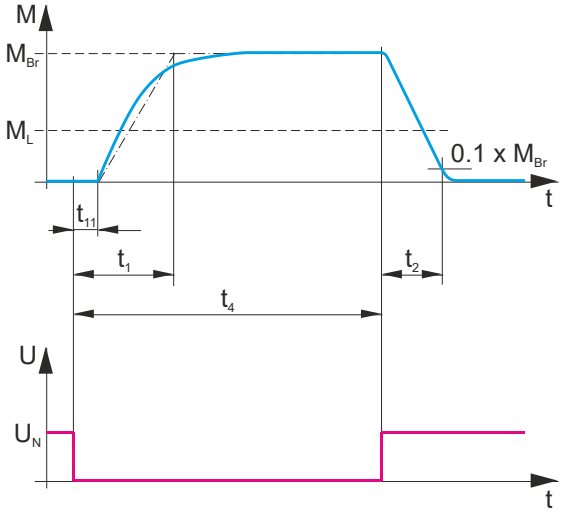


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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Torque-Time Diagram




**Key**

| | | |
|---|---|---|
| $M_{Br}$ | = | Braking torque |
| $M_L$ | = | Load torque |
| $t_1$ | = | Connection time |
| $t_{11}$ | = | Response delay on connection (≙$t_0$ acc. Type Examination Certificate) |
| $t_2$ | = | Separation time |
| $t_4$ | = | Slip time + $t_{11}$ |
| $U_N$ | = | Coil nominal voltage |

## Application

- ROBA® twinstop® for use as a holding brake with occasional EMERGENCY STOP braking actions.
- The max. permitted speed and friction work (see Technical Data, Table 1) must be observed.

## Design

The ROBA® twinstop® is a spring applied, electromagnetically releasing dual circuit safety brake - a component in terms of DIN VDE 0580.
It is designed for installation into gearless elevator machinery for use as a holding brake with occasional EMERGENCY STOP braking actions.
On dimensioning, the braking torque, the speed as well as the permitted friction work in case of EMERGENCY STOP need to be taken into consideration for safe holding of the load torque and safe compliance with the required braking distance.
Furthermore, the ROBA® twinstop® can be used as a braking device acting on the shaft of the traction sheave, as part of the protection device against overspeed for the upward-moving car and as a braking element against inadvertent movement of the car.
Please also observe the Annex in the EU Type Examination Certificate.
In order to guarantee the maximum braking distance while both brakes act, an inspection of the protection device including all control and brake times (detector / control / brake) is necessary.
The respective standards, regulations and directives must be observed.

## Function

ROBA® twinstop® brakes are spring applied, electromagnetic safety brakes.

**Spring applied function:**
In de-energized condition, thrust springs press against the armature disks (2). The rotor (3) with the friction linings is therefore held between the armature disks (2) and the machine screw-on surface.
The motor shaft is braked via the rotor (3).

**Electromagnetic function:**
Due to the magnetic force of the coils in the coil carrier (1), the armature disks (2) are attracted against the spring pressure to the coil carrier (1).
The brake is thereby released and the shaft can rotate freely.

**Safety brake function:**
The ROBA® twinstop® brakes reliably and safely in the event of a power switch-off, a power failure or an EMERGENCY STOP.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Scope of Delivery / State of Delivery

The brake body is pre-assembled with coil carrier (1), armature disks (2), distance bolts (4), guide bolts (13) and release monitoring devices (6/8) as well as hand release device (7, dependent on Type).
The hand release device (7) and the release monitoring devices (6/8) are mounted and set manufacturer-side.
The following are included loose in delivery: the rotor (3), hexagon head screws (Item 5 / 4 pieces), washers (Item 9 / 4 pieces), hub (10) and O-ring (11).

Please check the scope of delivery according to the Parts List as well as the state of delivery immediately after receiving the goods. *mayr*® will take no responsibility for belated complaints.
Please report transport damage immediately to the deliverer.
Please report incomplete delivery and obvious defects immediately to the manufacturer.

## Adjustment

The brakes are equipped manufacturer-side with the respective springs for the braking torque stated on the Type tag (15). Adjustment is not necessary. Adaptions or modifications are not permitted as a rule. The switches are adjusted manufacturer-side. Despite great care during the manufacturer-side adjustment, re-adjustment might be necessary after installation due to transportation and handling. Furthermore, such switches cannot be considered fail-safe. Please also observe the section 'Release Monitoring'.

## Installation Conditions

- ❒ The eccentricity of the shaft end in relation to the fixing holes must not exceed 0.3 mm.
- ❒ The positional tolerance of the threads for the hexagon head screws (5) must not exceed 0.3 mm.
- ❒ The axial run-out deviation of the screw-on surface to the shaft must not exceed the permitted axial run-out tolerance of 0.063 mm in the area of the friction surface.
  Measuring procedure acc. DIN 42955.
  The shaft bearing is to be designed so that the axial backlash of the shaft (absolute) does not exceed the permitted axial run-out value during operation.
  Larger deviations can lead to permanent grinding with overheating of the friction linings and thus to a drop in the braking torque.
- ❒ The tolerances of the hub bore (10) and the shaft must be selected so that the hub toothing (10) is not widened.
  Widening of the toothing leads to the rotor (3) jamming on the hub (10) and therefore to brake malfunctions.
  Recommended hub – shaft tolerance H7/k6.
  If the hub (10) is heated for better joining, the O-ring (11) must be removed beforehand and re-mounted after hub installation. The max. permitted joining temperature of 150 °C must not be exceeded.
- ❒ Dimensioning of the key connection according to the requirements shaft diameter, transmittable torque and operating conditions must be carried out. For this, the corresponding user data must be known or the customer must carry out the dimensioning according to the valid calculation basis DIN 6892.
  For the calculation, a hub quality of Re = 300 N/mm$^2$ should be used.
  The length of the key must lie over the entire hub (10).
- ❒ For the dimensioning of the key connections, the permitted tensions common in machine construction must be considered.
- ❒ The mounting dimensions and the tapped holes s with depth K + 2 mm (K = screw projection) must be provided according to the Catalogue or the applicable assembly drawing (Fig. 4).

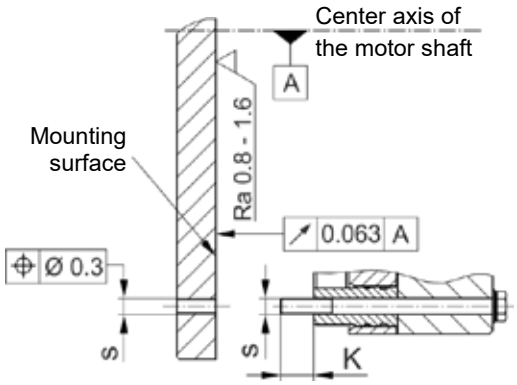



**Fig. 4**

- ❒ A suitable counter friction surface (steel or cast iron) must be used. Sharp-edged interruptions on the friction surfaces must be avoided. Recommended surface quality in the area of the friction surface Ra = 0.8 – 1.6 µm. The mounting surface must be turned. The surface must be bare or FE-phosphated (layer thickness approx. 0.5 µm) without oil.
  If corrosion protection is applied, the device must be inspected for possible effects on the braking torque.
  **In particular customer-side mounting surfaces made of grey cast iron are to be rubbed down additionally with sandpaper (grain ≈ 60 to 100).**
- ❒ The rotor and brake surfaces must be oil and grease-free.
- ❒ The O-ring (11) must be lightly greased.
- ❒ The toothings of the rotor (3) and the hub (10) must not be oiled or greased.
- ❒ Please abstain from using cleaning agents containing solvents, as they could affect the friction material.

## Noise Damping

The brake is designed with an integrated noise damping system, which reduces the switching noises during opening and closing.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Installation (Figs. 1 to 3)

1. Mount the hub (10) in the correct position (according to the respective drawing) onto the shaft, bring it in the correct position (the length of the key must lie over the entire hub) and secure it axially, e.g. using a locking ring.
2. Lightly grease the O-ring (11) and insert it into the hub (10) groove.
3. Push the rotor (3) over the O-ring (11) onto the hub (10) by hand using light pressure.
   Please make sure that the rotor collar faces the machine wall.
   Make sure that the toothing moves easily.
   Do not damage the O-ring.
4. Screw all 4 hexagon head screws (5) with washers (9) placed underneath through the brake body into the machine wall up to the contact with the coil carrier (1).
5. Screw the brake body on evenly and parallel against the spring force until it is in firm contact with the distance bolts (4).



One-sided tightening and the resulting inclined position of the brake may damage the damping.

6. Tighten the hexagon head screws (5) evenly all around step-wise **using a torque wrench to a tightening torque acc. Table 1.**
7. **Check air gap “a” (Fig. 2):**
   **Air gap: 0.40 mm ≤ “a” ≤ 0.6 mm**
   This air gap must be present in the area of the vertical center axis on both armature disks (2) (Fig. 1).
8. **Check air gap “b” > 0.2 mm in energized state on the rotor (3) (Fig. 2).**
   The inspection air gap must be given.

## Braking Torque

The (nominal) braking torque is the torque effective in the shaft train on slipping brakes, with a sliding speed of 1 m/s referring to the mean friction radius.
The brake is loaded statically when used as a service brake and loaded dynamically in EMERGENCY STOP operation (part of the brake equipment against overspeed or inadvertent movement of the elevator cage). Respectively, there are different speed values for the friction material, which in practice also leads to different friction values and therefore braking torques.
Amongst other things, the braking torque is dependent on the respective quality / condition of the friction surfaces (conditioning). Therefore, bedding in of the brake linings on newly installed brakes or on rotor replacement when mounted onto the motor is required, taking into account the permitted loads. The following applies as a reference value for the bedding in of new brake linings. The load in new condition may not be more than 50 % of the max. friction work per individual circuit (see Table 1). This process is to be carried out at reduced speed, approx. 30 % of the operating speed.
If the bedding in should take place under works-specific conditions, we ask you to contact us, so that we can provide the appropriate parameters.
Friction materials develop their optimum effect only under speed at the appropriate contact pressure, as continuous regeneration of the friction surface then takes place (torque consistency). Permanent grinding of the rotor can lead to overheating / damage to the brake linings, and therefore to a drop in braking torque. Furthermore, friction materials are subject to aging, which is also influenced, among other things, by higher temperatures and other ambient influences. We recommend regular inspection of the braking torque (1 x per year) including the respective dynamic braking actions as a refresher.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Hand Release (7)

**The Type 8012.05113 designs are prepared for the attachment of Bowden cable or hand release levers. The hand release fixtures are set manufacturer-side ready for installation.**
Bowden cable or hand release levers must be ordered separately as retrofit kit.
The hand release retrofit kit also includes installation instructions for the installation of the levers.

**DANGER**

Please actuate the hand release carefully. Any existing loads are put into motion when the hand release is actuated.

Actuate the hand release lever (7.1) carefully only to the point, at which the traction sheave or the car starts moving.

A substantially increased force acting on the hand release lever (7.1) may lead to component destruction.

**When actuating the hand release via Bowden cable, the following additionally applies:**

Bowden cable designs must be designed with an end stop for the Bowden cable lever as soon as release of the brake is residual torque-free.

In addition, a suitable return spring must be installed by the customer on Bowden cable designs in order to compensate for friction forces in the Bowden cable.

Adjust the Bowden cable length so that the hand release levers (7.1), after actuation, pivot back to the unreleased neutral position.

When actuating the hand release, a switching signal of the release monitoring device cannot be guaranteed.

The hand release is subject to wear and is not suitable for constant release.
A sufficient number of emergency releases is possible (approx. 1000 x).

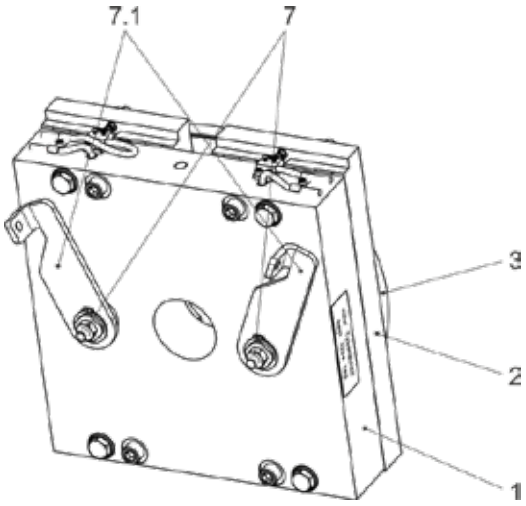



**Fig. 5**



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Release Monitoring (Item 6 or 8 / Figs. 1 and 3)

Please carry out a functional inspection before brake initial operation!

**ROBA® twinstop®** brakes are delivered with manufacturer-side adjusted release monitoring devices.
A microswitch (6.1) or a proximity switch (8.1) per brake circuit emits a signal for every brake condition change:
"brake opened" or "brake closed".

**The customer is responsible for a signal evaluation of both conditions.**

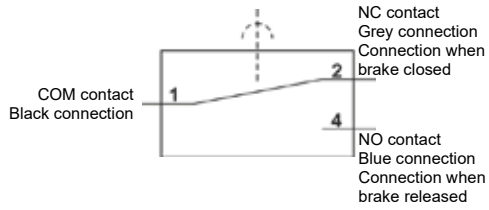
From the point at which the brake is energized, a time span of three times the separation time must pass before the switch signal on the release monitoring is evaluated.

### Microswitch Specification (6.1)

| | |
|---|---|
| **Characteristic values for measurement:** | 250 V~ / 3 A |
| **Minimum switching power:** | 12 V, 10 mA DC-12 |
| **Recommended switching power:** for maximum lifetime and reliability | 24 V, 10...50 mA DC-12 DC-13 with freewheeling diode! |

Usage category acc. IEC 60947-5-1:
DC-12 (resistance load), DC-13 (inductive load)

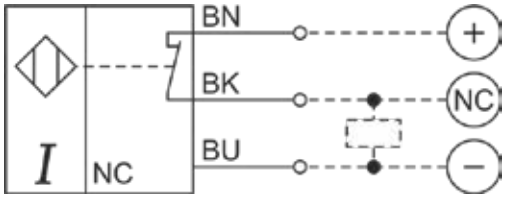
### Microswitch (6.1) Wiring Diagram:




### Technical Data of the Proximity Switch (8.1)

| | |
|---|---|
| Operating voltage: | 10...30 VDC |
| Residual ripple content: | ≤ 10 % $U_{ss}$ |
| DC rated operating current: | ≤ 150 mA |
| No-load current $I_0$: | ≤ 15 mA |
| Residual current: | ≤ 0.1 mA |
| Rated insulation voltage: | ≤ 0.5 kV |
| Short-circuit protection: | yes / synchronizing |
| Line voltage drop at $I_e$: | ≤ 1.8 V |
| Wire breakage protection / reverse voltage protection: | yes / completely |
| Output function: | 3-wire, NC contact, PNP |
| Switching frequency: | ≤ 2 kHz |

### Proximity Switch (8.1) Wiring Diagram:




## Function

When the magnetic coil is energized in the coil carrier (1), the armature disk (2) is attracted to the coil carrier (1), the microswitch (6.1) or the proximity switch (8.1) emits a signal, the brake is released.

## Customer-side Functional Inspection Once Attachment Has Taken Place

Carry out a functional inspection before brake initial operation.

**Microswitch (6.1) for connection as NO contact:**

- Brake **de-energized**: Inspection lamp must signal **"OFF"**.
- Brake **energized**: Inspection lamp must signal **"ON"**.

**Microswitch (6.1) for connection as NC contact:**

- Brake **de-energized**: Inspection lamp must signal **"ON"**.
- Brake **energized**: Inspection lamp must signal **"OFF"**.

**Proximity switch (8.1):**

- Brake **de-energized**: Inspection lamp must signal **"ON"**.
- Brake **energized**: Inspection lamp must signal **"OFF"**.

Microswitches and proximity switches cannot be guaranteed fail-safe. Therefore, please ensure appropriate access for replacement or adjustment.
The switching contacts of the microswitches are designed so that they can be used for both small switching powers and medium ones.
However, after switching a medium switching power, small switching powers are no longer reliably possible.
In order to switch inductive, capacitive and non-linear loads, please use the appropriate protection circuit to protect against electric arcs and unpermitted loads!

**The following prevent actuation of the microswitch (6.1) or proximity switch (8.1) and lead to a malfunction.**

- ❑ Heavy contamination between the armature disk (2) and the coil carrier (1).
- ❑ Extreme warping on the armature disk (2).
- ❑ Excessively large air gap "a" between the armature disk (2) and the coil carrier (1) due to wear on the friction linings.
- ❑ Defective brake magnetic coil.
- ❑ No or incorrect voltage on the brake coil.

If none of these error sources prove to be the reason for incorrect release monitoring function, the microswitch (6.1) or the proximity switch (8.1) must be checked and the adjustment corrected if necessary.

If a replacement or new adjustment of the switch (6.1/8.1) is required by the customer, separate adjustment instructions stating the article or serial number of the respective brake can be requested from the manufacturer.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Electrical Connection and Wiring

DC current is necessary for operation of the brake. The coil voltage is indicated on the Type tag as well as on the brake body and is designed according to the DIN IEC 60038 (± 10 % tolerance). Operation must take place via DC voltage with a low ripple content, e.g. via a bridge rectifier or with another suitable DC supply. The connection possibilities can vary dependent on the brake equipment. Please follow the exact connections according to the Wiring Diagram. The manufacturer and the user must observe the applicable regulations and standards (e.g. DIN EN 60204-1 and DIN VDE 0580). Their observance must be guaranteed and double-checked!

### Supply Voltage Requirements

In order to minimize noise development of the released brake, it must only be operated via DC voltage with low ripple content. AC current operation can take place using a bridge rectifier or another suitable DC power supply. Supplies whose output voltages have a high ripple content (e.g. a half-wave rectifier, a switch-mode mains adaptor, ...) are not suitable for operation of the brake.

### Grounding Connection

The brake is designed for Protection Class I. This protection covers therefore not only the basic insulation, but also the connection of all conductive parts to the protective conductor (PE) on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardized inspection of the protective conductor connections to all contactable metal parts!

### Device Fuses

To protect against damage from short circuits, please add suitable device fuses to the mains cable.

### Switching Behavior

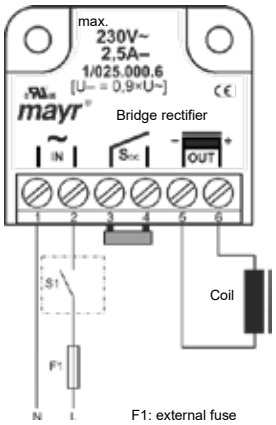
The reliable operational behavior of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the temperature and the air gap between the armature disk and the coil carrier (dependent on the wear condition of the linings).

### Magnetic Field Build-up

When the voltage is switched on, a magnetic field is built up in the brake coil, which attracts the armature disk to the coil carrier and releases the brake.

## Magnetic Field Removal

### AC-side switching



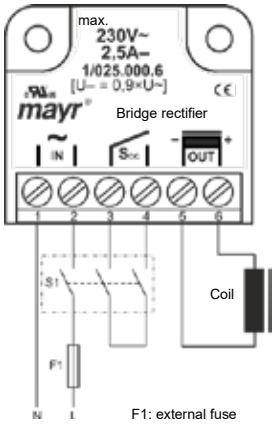

F1: external fuse

The power circuit is interrupted in front of the rectifier. The magnetic field slowly reduces. This delays the rise in braking torque.

When switching times are not important, please switch AC-side, as no protective measures are necessary for coil and switching contacts.

AC-side switching means **low-noise switching**; however, the brake engagement time is longer (approx. 6-10 times longer than with DC-side disconnection), use for non-critical braking times.

### DC-side switching




F1: external fuse

The power circuit is interrupted between the rectifier and the coil as well as mains-side. The magnetic field reduces extremely quickly. This causes a quick rise in braking torque.

When switching DC-side, high voltage peaks are produced in the coil, which lead to wear on the contacts from sparks and to destruction of the insulation.

DC-side switching means **short brake engagement times (e.g. for EMERGENCY STOP operation)**; however, louder switching noises.

### Protection Circuit

When using DC-side switching, the coil must be protected by a suitable protection circuit according to VDE 0580, which is integrated in *mayr*® rectifiers. To protect the switching contact from consumption when using DC-side switching, additional protective measures are necessary (e.g. series connection of switching contacts). The switching contacts used should have a minimum contact opening of 3 mm and should be suitable for inductive load switching. Please make sure on selection that the rated voltage and the rated operating current are sufficient. Depending on the application, the switching contact can also be protected by other protection circuits (e.g. *mayr*® spark quenching unit, half-wave and bridge rectifiers), although this may of course then alter the switching times.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Brake Inspection

**(Customer-side after Mounting onto the Elevator Machinery)**

- ❑ **Inspection of the individual air gaps (Fig. 2)**
  Air gaps “a” of both brake circuits (brake de-energized):
  Air gap 0.40 mm ≤ “a” ≤ 0.6 mm
  Air gaps “b” of both brake circuits (brake energized):
  Air gap “b” > 0.2 mm
- ❑ **Braking torque inspection:**
  Please compare the requested braking torque with the torque stated on the Type tag.
- ❑ **Release function inspection**
  By energizing the brake via battery operation, to guarantee emergency escape for passengers during a power failure or manually using the hand release.
- ❑ **Switch functions inspection of the release monitoring / for connection as NC contact:**
  Brake de-energized ➔ Signal “ON”
  Brake energized ➔ Signal “OFF”
  **for connection as NO contact:**
  Brake de-energized ➔ Signal “OFF”
  Brake energized ➔ Signal “ON”
- ❑ **Hand release functional inspection (dependent on Type)**
  Please observe the guidelines on page 14!

## Dual Circuit Brake Functional Inspection

The **ROBA® twinstop®** brake is equipped with a double safety (redundant) braking system.
This means that, should one brake circuit fail, the braking effect is still maintained.

**DANGER**



Should the elevator begin to move after release of one brake circuit or should it fail to react to the braking procedure, the energized coil must be switched off immediately!
The dual circuit braking function is not guaranteed.
Shut down the elevator, lower and secure the load, remove and inspect the brake.
Please observe the installation guidelines of the elevator manufacturer as well as the accident prevention regulations.

The individual circuit inspection is carried out by energizing the individual circuits. The braking effect sufficient for the retardation of the elevator cage, which is loaded with nominal load and moving downwards at nominal speed, must be maintained (please observe the permitted friction work acc. Technical Data).

### Inspection brake circuit 1:

1. Energize brake circuits 1 and 2 and put the drive into operation.
2. De-energize brake circuit 1 (= EMERGENCY STOP) and inspect the stopping distance according to the elevator regulations.
3. De-energize brake circuit 2.

### Inspection brake circuit 2:

1. Energize brake circuits 1 and 2 and put the drive into operation.
2. De-energize brake circuit 2 (= EMERGENCY STOP) and inspect the stopping distance according to the elevator regulations.
3. De-energize brake circuit 1.

### Inspection of both brake circuits:

Energize both brake circuits and put the drive into operation. Trigger an EMERGENCY STOP and inspect the stopping distance. The stopping distance must be much shorter than the stopping distance for an individual circuit.
If the brake is used as part of the protection device against inadvertent movement of the car, the functionality of the protection device must be verified using the type examination (compliance of the entire concept - detector/control/brake element - for the elevator system).
The inspection proves that the brake element (both brake circuits work together) releases correctly. Furthermore, it must be confirmed that the travelled distance does not exceed the stated value.
If the brake is normally released using overexcitation, brake release during the inspection must be carried out via DC-side switch-off from the overexcitation voltage.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Maintenance

**ROBA® twinstop®** brakes are mainly maintenance-free. The friction lining pairing is robust and wear-resistant. This ensures a particularly long service lifetime of the brake.
However, the friction lining is subject to operational wear on frequent EMERGENCY STOP braking actions. Normally, such occurrences are recorded and saved by the elevator control, or they require the intervention of qualified personnel. When carrying out this maintenance work (especially when taking DIN EN 13015 Appendix A into account), the causes of the malfunction must be determined, assessed and removed by specialist personnel.
Causal events such as the air gap can be checked and respective measures can be taken.

The brakes must be maintained and repaired by a **specialist employee**, taking into consideration the type and intensity of use of the system.
The following inspections / tests are to be conducted within the scope of the defined elevator maintenance interval during maintenance and repairs.

1. Visual inspection
   - ➢ Inspection of condition in accordance with the regulations
   - ➢ Brake rotor: in particular the exterior appearance of the brake surfaces
     - wear
     - free of oil / lubricants
     - sticking of linings
2. Tightening torque inspection of the fixing screws on the brakes. If the brake fixing screws are covered with sealing lacquer, a visual inspection for damage of the sealing is sufficient.
3. Inspection of the air gap – braked (both brake circuits).
4. Inspection of toothing backlash from the hub (10) to the rotor (3).
   Max. permitted toothing backlash 0.5°.
5. Running noise (brake rotor) during operation
   **Attention:** Permanent grinding of the rotor can lead to overheating / damage to the brake linings, and therefore to a drop in braking torque. If such indications are present, it is essential that the braking torque is checked and the rotor replaced if required independent of the inspection or the determined wear value!
6. Braking torque or delay inspection (individual brake circuits) at least once per year (within the scope of the maintenance / main inspection).

In order to inspect the wear condition of the rotor (3), please measure the air gap “a”, see Fig. 3.
If the brake limit air gap (0.8 mm) has been reached, meaning that the friction linings are worn down, the braking torque is lost and the rotor (3) must be replaced.
Brake de-installation is carried out by following the instructions in the section Installation (page 13) backwards.

## De-Installation of the Brake

**DANGER**

The drive-brake must be load-free on hoist drives.
Otherwise there is a danger of load crashes!

Brake de-installation is carried out by following the Brake Installation instructions backwards. Please make sure to unscrew the brake as parallel as possible. We recommend the following procedural method.

1. Loosen all 4 hexagon head screws (5) by 0.5 turns.
2. Continue turning all 4 hexagon head screws (5) one turn at a time in diagonal sequence until the screw heads lift off slightly.
3. Completely remove all 4 hexagon head screws (5) including washers (9) and remove the brake from the machine wall.

An inclined position of the coil carrier to the machine wall must be avoided to prevent damage to the damping.

## Replacing the Rotor (3)

**Before Replacing the Rotor**

❑ Clean the brake.

Please observe the “Cleaning the Brake” section, see page 19.

❑ Measure the rotor thickness “new” (nominal dimension acc. Table 1).

Replace the rotor (3) by following the Brake Installation instructions backwards.



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# Installation and Operational Instructions for ROBA® twinstop® Type 8012.05_13 Size 800

**(E028 10 410 000 4 EN)**

## Information on the Components

The **friction material** contains different inorganic and organic compounds, which are integrated into a system of hardened binding agents and fibers.

**Possible hazards:**
No potential dangers have been recognized so far when the brake is used according to its intended purpose. When grinding in the brake linings (new condition) and also in case of EMERGENCY STOP braking actions, functional wear can occur (wear on the friction linings); on open brake designs, fine dust can be emitted.

**Classification: Hazardous property**
**Attention: H-classification: H372**



**Protective measures and rules of behavior:**
Do not inhale dusts.
Vacuum the dusts at the point of origin (tested suction devices, tested filters acc. DIN EN 60335-2-69 for dust classes H; maintenance of the suction devices and filter replacement at regular intervals).
If local dust suction is not possible or is insufficient, the entire work area must be ventilated using appropriate technology.

**Additional information:**
This friction lining (asbestos free) is not a dangerous product in terms of the EU Directive.

## Cleaning the Brake



Do not clean the brake using compressed air, brushes or similar devices!

- ❒ Wear safety gloves / safety goggles.
- ❒ Use a suction system or wet towels to clean off the brake dust.
- ❒ Do not inhale brake dust.
- ❒ In case of dust formation, a dust mask FFP 2 is recommended.

## Disposal

Our electromagnetic brake components must be disposed of separately as they consist of different materials. Please also observe the relevant authority regulations. Code numbers may vary according to the disassembling process (metal, plastic and cables).

**Electronic Components** (Rectifier / Switch):
Products which have not been disassembled can be disposed of under Code No. 160214 (mixed materials) or components under Code No. 160216, or can be disposed of by a certified disposal firm.

**Brake bodies made of steel with coil/cable and all other steel components:**
Steel scrap (Code No. 160117)

**All aluminum components:**
Non-ferrous metals (Code No. 160118)

**Brake rotor (steel or aluminum pads with friction linings):**
Brake linings (Code No. 160112)

**Seals, O-rings, V-seals, elastomers, terminal boxes (PVC):**
Plastic (Code No. 160119)

**Guidelines on the WEEE Directive 2012/19/EU**
Avoidance of waste from electrical and electronic devices and the reduction of such waste through recycling.
Our electromagnetic products (brakes, clutches) as well as the components required to control them (rectifiers) are frequently used in electrical and electronic devices within the appropriate area of application of WEEE, independent of the applicable product categories.
The stated products do not fall within the area of application of this Directive. They have been classified as electromagnetic / electronic components (VDE 0580) or as electronic equipment (DIN EN 50178), and have been determined for installation in devices for "use in accordance with the intended purpose". Only products which are to be viewed as devices in terms of the Directive and not as parts or components are subject to registration obligations.

## Malfunctions / Breakdowns:

| Malfunction | Possible Causes | Solutions |
|---|---|---|
| **Brake does not release** | ❑ Incorrect voltage on rectifier<br>❑ Rectifier failure<br>❑ Air gap too large (worn rotor)<br>❑ Coil interrupted | ❑ Apply correct voltage<br>❑ Replace the rectifier<br>❑ Replace the rotor<br>❑ Replace the brake |
| **Release monitoring does not switch** | ❑ Brake does not release<br>❑ Defective switch | ❑ Solution as above<br>❑ Replace the switch (manufacturer-side) |



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## 13.2 Setting and assembling microswitches

### Installation and Adjustment of the Release Monitoring with Microswitch on *mayr*® Brakes Type 8010. / 8012. / 894. / 806_. / 896.0/1/7

**(E028 02 000 002 4 EN)**

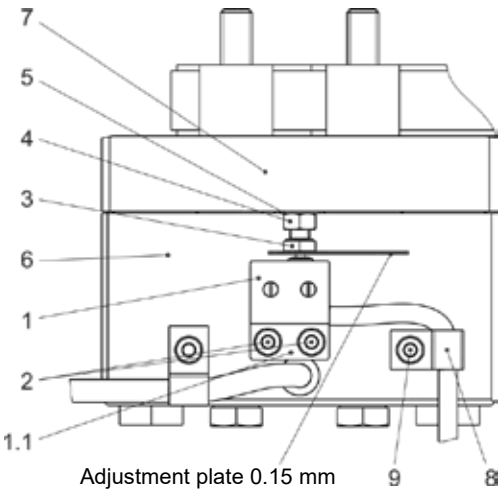



**Fig. 1**

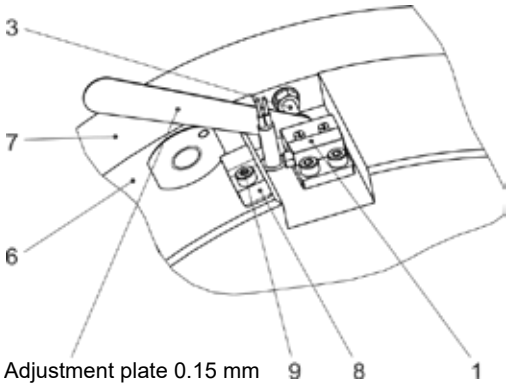



**Fig. 2**

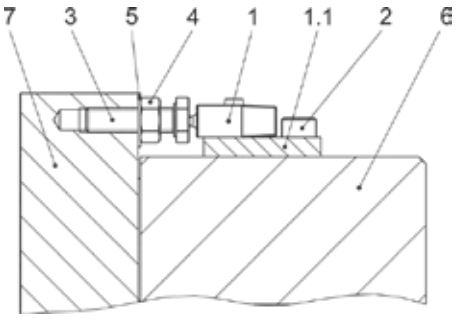



**Fig. 3**

These Additional Instructions serve only as a supplement to the brake Installation and Operational Instructions. Please also observe the Safety Regulations and Protective Measures in the Installation and Operational Instructions!

**Parts List** (Only use *mayr*® original parts)

| Item | Name |
|---|---|
| **1** | Microswitch assembly<br>(glued and screwed onto adaptor plate 1.1) |
| **1.1** | Adaptor plate |
| **2** | Cap screw |
| **3** | Hexagon head screw |
| **4** | Hexagon nut |
| **5** | Spring washer |
| **6** | Coil carrier assembly |
| **7** | Armature disk |
| **8** | Cable clamp |
| **9** | Cap screw |

The brakes are supplied with manufacturer-side installed and adjusted release monitoring devices.
One microswitch (1) per brake circuit emits a signal for every brake signal condition change:
"Brake opened" or "brake closed"

**The customer is responsible for a signal evaluation of both conditions.**
From the point at which the brake is energized, a time span of three times the separation time must pass before the microswitch signal on the release monitoring is evaluated.

### Function

When the magnetic coil in the coil carrier (6) is energized, the armature disk (7) is attracted to the coil carrier (6).
The microswitch (1) emits a signal and the brake is released.

**For brake design with hand release:**
If the hand release is actuated, the switch signal of the microswitch (1) cannot be guaranteed.



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# Installation and Adjustment of the Release Monitoring with Microswitch on *mayr*® Brakes Type 8010. / 8012. / 894. / 806_. / 896.0/1/7

**(E028 02 000 002 4 EN)**

Microswitch replacement must only be carried out by qualified personnel trained at *mayr*®.

## Replacement of a Defective Microswitch

1. Loosen the cap screw (9) and remove the cable clamp (8).
2. Remove the cap screws (2), then remove the adaptor plate (1.1) incl. microswitch (1).
3. Loosen the hexagon nut (4) slightly (< 1/8 turn) making sure that the hexagon head screw (3) remains pre-tensioned by the spring washer (5).
4. Hold the hexagon nut (4) using an open-end wrench and screw the hexagon head screw (3) in by approx. ½ turn in the direction of the armature disk (7) using a second open-end wrench.

The purpose of this is to make sure that the adjustment plate can be joined after installation of a new microswitch (1) without damaging or destroying the microswitch tappet.

5. Screw a new microswitch (1) incl. adaptor plate (1.1) onto the coil carrier (6) using cap screws (2), so that the front end edge of the adaptor plate (1.1) is parallel to the armature disk (7).
   Please observe the tightening torque of 2.9 Nm.
6. Re-install the cable clamp (8) using the cap screw (9).

## Adjustment of the New Microswitch

The brake is screwed onto the machine wall using the tightening torque stated in the Installation and Operational Instructions. The brake must not be energized.

1. Take the loose adjustment plate **0.15 mm** from a standard feeler gauge set and join it between the hexagon head screw (3) and the microswitch tappet (1).
2. Connect the inspection lamp or measuring device (adjustment diode inspection) to the microswitch (1) (connection as NO contact => black and blue).
3. Hold the hexagon nut (4) using an open-end wrench and turn the hexagon head screw (3) in the direction of the microswitch (1) using a second open-end wrench until **the inspection lamp signals "ON".**
4. Hold the hexagon nut (4) using an open-end wrench and turn the hexagon head screw (3) **slowly** in the direction of the armature disk (7) using a second open-end wrench until **the inspection lamp signals "OFF".**

Please make sure that the open-end wrenches do not touch the adjustment plate.

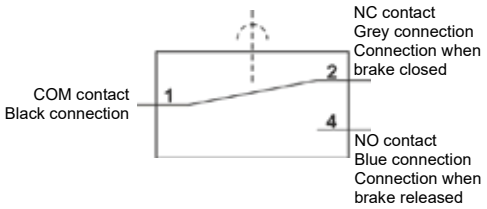
5. Hold the hexagon head screw (3) using an open-end wrench and counter the hexagon nut (4) using a second open-end wrench.
6. Remove the adjustment plate.
7. **Functional inspection without energizing the brake**
   Join the loose adjustment plate **0.15 mm** between the hexagon head screw (3) and the microswitch tappet (1).
   Inspection lamp must signal **"OFF"**.
   Then, actuate the switch tappet using the adjustment plate.
   Inspection lamp must signal **"ON"**.
   Join the loose adjustment plate **0.20 mm** between the hexagon head screw (3) and the microswitch tappet (1).
   Inspection lamp must signal **"ON"**.
8. **Functional inspection with energizing the brake**
   Join the loose adjustment plate **0.15 mm** between the hexagon head screw (3) and the microswitch tappet (1):
   Brake de-energized: Inspection lamp must signal **"OFF"**.
   Brake energized: Inspection lamp must signal **"ON"**.
   Join the loose adjustment plate **0.2 mm** between the hexagon head screw (3) and the microswitch tappet (1).
   Inspection lamp must always signal **"ON"**.

## Functional Inspection

Carry out a functional inspection before brake initial operation.

- ❑ Brake de-energized:
  **Inspection lamp must signal "OFF".**
- ❑ Brake energized:
  **Inspection lamp must signal "ON".**

## Microswitch Wiring Diagram (1):




## Microswitch Specification

| | |
|---|---|
| **Characteristic values for measurement:** | 250 V~ / 3 A |
| **Minimum switching power:** | 12 V, 10 mA DC-12 |
| **Recommended switching power:**<br>for maximum lifetime and reliability | 24 V, 10...50 mA<br>DC-12<br>DC-13 with freewheeling diode! |

Usage category acc. IEC 60947-5-1:
DC-12 (resistance load), DC-13 (inductive load)

Microswitches cannot be guaranteed fail-safe. Therefore, please ensure appropriate access for replacement or adjustment.
The switching contacts are designed so that they can be used for both small switching powers and medium ones. However, after switching a medium switching power, small switching powers are no longer reliably possible. In order to switch inductive, capacitive and non-linear loads, please use the appropriate protection circuit to protect against electric arcs and unpermitted loads!

**The Following Prevent Actuation of the Microswitch (1) and Lead to a Malfunction:**

- ❑ Heavy contamination between the armature disk (7) and the coil carrier (6).
- ❑ Extreme warping on the armature disk (7).
- ❑ Excessively large air gap "a" between the armature disk (7) and the coil carrier (6) due to wear on the friction linings.
- ❑ Defective brake magnetic coil.
- ❑ No or incorrect voltage on the brake coil.

If none of these error sources prove to be the reason for incorrect release monitoring function, the microswitch (1) must be checked and the adjustment corrected if necessary.



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## 13.3 Adjusting and mounting inductive proximity switches

### Installation and adjustment of the release monitoring with proximity switch (NC contact) for modification or replacement

**(E079 13 014 100 4 EN)**

For brake Types and sizes, please see Table 2.

These Additional Instructions serve only as a supplement to the brake Installation and Operational Instructions. Please also observe the Safety Regulations and Protective Measures in the Installation and Operational Instructions!

**Replacement Part Kit, Proximity Switch:**

| Item | Name | Pcs. * |
|---|---|---|
| 1 | Proximity switch NC contact (assembly with adaptor plate and sticker Item 8) | 1 |
| 2 | Cap screw (self-locking) | 2 |
| 3 | Spacer | 1 |
| 4 | Adjusting screw acc. Table 1 | 1 |
| 5 | Hexagon nut M5 | 1 |
| 6 | Spring ring | 1 |
| 7 | Glass fiber insulation tube Ø4 x 35 | 1 |
| 8 | Sticker with dimension for the switching distance | (1) |

* number of pieces per installed release monitoring device

Packed into mini grip bags with marking (sticker) featuring the Mayr article number and – if available – the customer article number.

When selecting the switches for modification or replacement, please make sure that the cable outlet is on the correct side.

**Components:**

| Item | Name |
|---|---|
| A | Coil carrier assembly |
| B | Armature disk |
| C | Switching bolt |
| D | Washer |

When replacing a proximity switch in the design with a switching bolt (Item C) / see Fig. 3), the switching bolt (C) must not be replaced/screwed out.

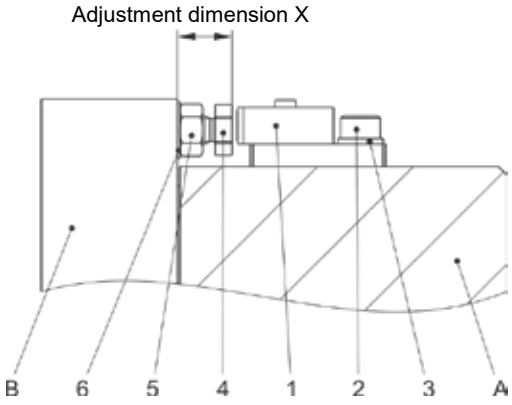



**Fig. 1**

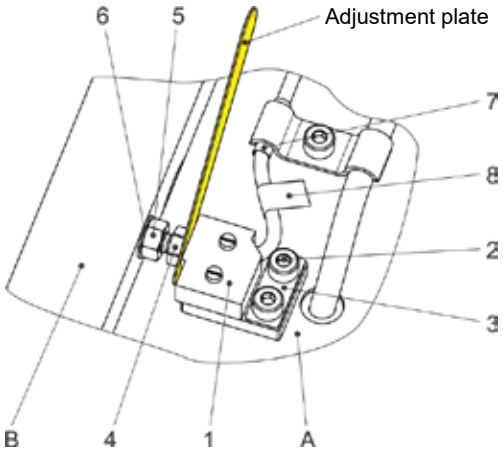



**Fig. 2**
(Example: Switch with cable outlet on the right side)

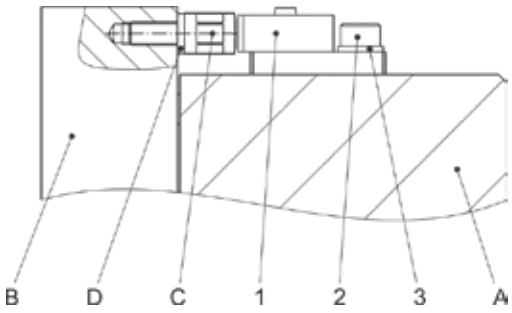



**Fig. 3** (Design with switching bolt)



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# Installation and adjustment of the release monitoring with proximity switch (NC contact) for modification or replacement

**(E079 13 014 100 4 EN)**

**Table 1:** Adjusting Screw (4) Dimensions

| Brake Type | Adjusting screw (4) dimension |
|---|---|
| ROBA®-twinstop® (RTW 450 / Type 8012._0___ + 8012._1___) | M5 x 40 [1] |
| ROBA®-twinstop® (RTW 450 / Type 8012._4___ + 8012._5___) | M5 x 25 [1] |
| ROBA®-twinstop® (RTW / other) | M5 x 18 |
| ROBA®-duplostop® (RSR) | M5 x 18 |
| ROBA®-boxerstop® (RBA) | M5 x 18 |
| ROBA®-diskstop® (RSD) | M5 x 18 |
| RSQ | M5 x 18 |
| ROBA-stop®-silenzio® (RSO) | M5 x 25 |

[1] The adjusting screw is not included in the scope of delivery of the Adjustment Kit for these versions, but can be found in the brake and must not be replaced. The M5 x 18 screw included in delivery is spare in this case.

**Table 2:** Adjustment Dimension X [mm] of the Adjusting Screw (4)

| Brake Type | Sizes | Dimension X [2] | Article number of the Replacement Part Kit |
|---|---|---|---|
| ROBA®-twinstop® (RTW) | 125, 180, 225, 600, 800, 1000, 2000 | 10 | 8265751 (2 x cable outlet on the right side) [3] or 8265921 (1 x cable outlet on the right side / 1 x cable outlet on the left side) [3] |
| ROBA®-twinstop® (RTW) | 150, 250, 350 | 15.7 | 8265751 (2 x cable outlet on the right side) [3] or 8265921 (1 x cable outlet on the right side / 1 x cable outlet on the left side) [3] |
| ROBA®-twinstop® (RTW) | 450 Type 8012._0___ + 8012._1___ | 30 | 8265751 (2 x cable outlet on the right side) The adjusting screw must not be replaced! |
| ROBA®-twinstop® (RTW) | 450 Type 8012._4___ + 8012._5___ | 19 | 8265751 (2 x cable outlet on the right side) The adjusting screw must not be replaced! |
| ROBA®-duplostop® (RSR) | 200, 400, 1500 | 10 | 8265751 (2 x cable outlet on the right side) |
| ROBA®-boxerstop® (RBA) | 800, 1000 | 10 | 8265751 (2 x cable outlet on the right side) |
| ROBA-stop®-silenzio® (RSO) | 1300 (1200 Nm) | 15.7 | 8265750 (2 x cable outlet on the left side) |
| ROBA-stop®-silenzio® (RSO) | 1300 (2200 Nm), 1800 | 19.7 | 8265750 (2 x cable outlet on the left side) |
| ROBA®-diskstop® (RSD) | 9 | 11 | 8301250 (3 x cable outlet on the right side) for entire drive (3 brakes) |
| ROBA®-diskstop® (RSD) | 9 | 11 | 8305309 (1 x cable outlet on the right side) for individual brake |
| RSQ<br>ROBA®-diskstop® (RSD) | 500<br>6 | 11.5<br>14.5 | 8265921 (1 x cable outlet on the left side (RSQ) / 1 x cable outlet on the right side (RSD)) |
| RSQ<br>ROBA®-diskstop® (RSD) | 500<br>8 | 11.5<br>12.5 | 8265921 (1 x cable outlet on the left side (RSQ) / 1 x cable outlet on the right side (RSD)) |

[2] due to component tolerances, the switches might reach their limits in terms of their relocatability. In these cases, the adjustment dimension X of the adjusting screw (4) may be adjusted accordingly.

[3] The article number of the required Replacement Part Kit varies depending on the available brake version. An inspection is required.



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# Installation and adjustment of the release monitoring with proximity switch (NC contact) for modification or replacement

**(E079 13 014 100 4 EN)**

**Table 3:** Dimensions [mm] for the Adjustment Plate

| **Switching distance Proximity switch** (see sticker Item 8) | **Brake Type** | | |
|---|---|---|---|
| | **ROBA-stop®-silenzio®** (RSO) | **ROBA®-duplostop®** (RSR)<br>**ROBA®-twinstop®** (RTW)<br>**ROBA®-diskstop®** (RSD)<br>**RSQ** | **ROBA®-boxerstop®** (RBA) |
| **0.6** | 0.8 | 0.75 | 0.7 |
| **0.65** | 0.85 | 0.8 | 0.75 |
| **0.7** | 0.9 | 0.85 | 0.8 |
| **0.75** | 0.95 | 0.9 | 0.85 |
| **0.8** | 1 | 0.95 | 0.9 |
| **0.85** | 1.05 | 1 | 0.95 |
| **0.9** | 1.1 | 1.05 | 1 |
| **0.95** | 1.15 | 1.1 | 1.05 |
| **1** | 1.2 | 1.15 | 1.1 |
| **1.05** | 1.25 | 1.2 | 1.15 |

The brakes are supplied with manufacturer-side installed and adjusted release monitoring devices.
One proximity switch (1) per brake circuit emits a signal for every brake signal condition change:
"Brake opened" or "brake closed"

**The customer is responsible for a signal evaluation of both conditions.**
From the point at which the brake is energized, a time span of three times the separation time $t_2$ (brake release time) must pass before the switch signal on the release monitoring is evaluated.

## Function

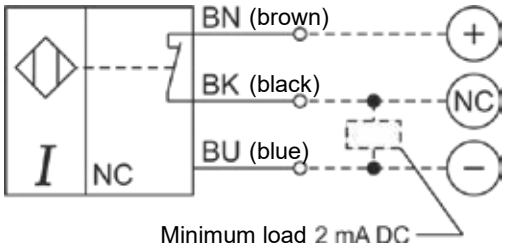
When the magnetic coil is energized in the coil carrier (A), the armature disk (B) is attracted to the coil carrier (A).
The proximity switch (1) emits a signal and the brake is released.

**For brake design with hand release:**
If the hand release is actuated, the switching signal of the proximity switch cannot be guaranteed.

## Technical Data

| | |
|---|---|
| Operating voltage: | 10...30 VDC |
| Residual ripple content: | ≤ 10 % $U_{ss}$ |
| DC rated operating current:<br>(Max. load current for continuous operation) | ≤ 150 mA |
| No-load current $I_0$: | ≤ 15 mA |
| Residual current: | ≤ 0.1 mA |
| Rated insulation voltage: | ≤ 0.5 kV |
| Short-circuit protection: | yes / synchronizing |
| Line voltage drop at $I_e$: | ≤ 1.8 V |
| Wire breakage protection / reverse voltage protection: | yes / completely |
| Output function: | 3-wire, NC contact, PNP |
| Switching frequency: | ≤ 2 kHz |

## Wiring Diagram Proximity Switch (1):






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# Installation and adjustment of the release monitoring with proximity switch (NC contact) for modification or replacement

**(E079 13 014 100 4 EN)**

## Installation and Adjustment

When converting from microswitch to proximity switch and also when replacing a proximity switch, the adjusting screw must be replaced with the new adjusting screw (part of the Replacement Part Kit) according to Table 1 for all brakes **except RTW 450**.
The RTW 450 brakes are already equipped with the required adjusting screw.
**If the old screw is not replaced, reliable functioning of the release monitoring cannot be guaranteed.**
**When replacing a proximity switch in the design with switching bolt (Item C) / see Fig. 3), the switching bolt (C) must not be replaced. In this case, steps 1 and 2 are not necessary.**

The brake is installed using the tightening torque stated in the Installation and Operational Instructions.
The brake must not be energized.

1. Screw the hexagon nut (5) onto the new adjusting screw (4) acc. Table 1 and then push on the spring ring (6).
2. Screw the adjusting screw (4) into the armature disk (B) to the adjustment dimension X acc. Table 2 and then counter this adjustment with the hexagon nut (5).
3. Apply the proximity switch (1) assembly incl. the adaptor plate lightly using two cap screws (2) via the spacer (3) so that the proximity switch (1) can still be moved.

On the proximity switch cable, there is a sticker (8) with the switching distance of the respective proximity switch (1).

4. Please see Table 3 for the dimension of the adjustment plate, dependent on the brake Type and on the switching distance stated on the sticker (8); and join the appropriate adjustment plate between the proximity switch (1) and the adjusting screw (4) or the switching bolt (C) (Figs. 1 to 3).

The adjustment plate for adjustment of the switch should consist of individual plates of a standard feeler gauge set.
Example:
0.8 mm + 0.25 mm for a total dimension of 1.05 mm.

5. Press the proximity switch (1) **lightly and in parallel** against the adjustment plate and the adjusting screw (4) or the switching bolt (C) and secure it using the two cap screws (2). It should still be possible to remove the adjustment plate easily; it must not jam.
   Please observe the tightening torque of 3 Nm.
6. Remove the adjustment plate.
7. Mount the glass fiber insulation tube (7) via the proximity switch cable (1) and secure it onto the free position of a cable clamp already present.
8. Wire the proximity switch cable (1) acc. Wiring Diagram.

## Customer-side Inspection after Attachment

Please inspect the release monitoring unit:
Brake de-energized ➔ Signal “ON”
Brake energized ➔ Signal “OFF”

## The Following Prevent Actuation of the Proximity Switch (1) and Lead to a Malfunction:

- ❑ Heavy contamination between the armature disk (B) and the coil carrier (A).
- ❑ Extreme warping on the armature disk (B).
- ❑ Excessively large air gap "a" between the armature disk (B) and the coil carrier (A) due to wear on the friction linings.
- ❑ Defective brake magnetic coil.
- ❑ No or incorrect voltage on the brake coil.
- ❑ The proximity switch (1) was pressed on too strongly or was tilted during the installation procedure.
- ❑ Adjusting screw (4) was not replaced during modification.

If none of these error sources prove to be the reason for incorrect release monitoring function, the proximity switch (1) must be checked and the adjustment corrected if necessary.



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## 13.4 Instructions for installing the lever for hand release operating brake

### Instructions for Hand Release Installation for ROBA®-twinstop® brake Type 8012._5_13 and RSQ brake Type 8061._4213 Sizes 250 / 350 / 450 / 500 / 800

**(E028 12 237 001 4 EN)**

**Please read these Additional Instructions carefully and follow them accordingly!**
These Additional Instructions serve as a supplement to the brake Installation and Operational Instructions. Please also observe the Safety Regulations and Protective Measures in the Installation and Operational Instructions! Ignoring these Instructions may lead to malfunctions or to brake failure, resulting in damage to other parts.

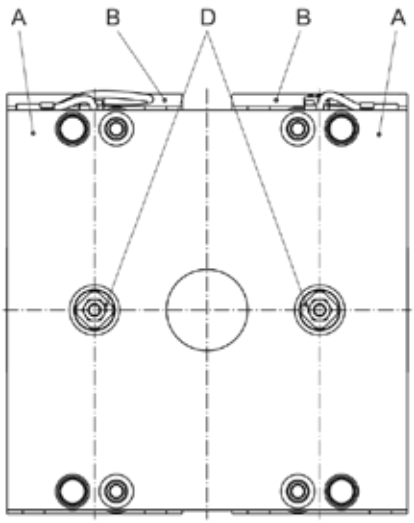



**Fig. 1** (Brake without hand release)

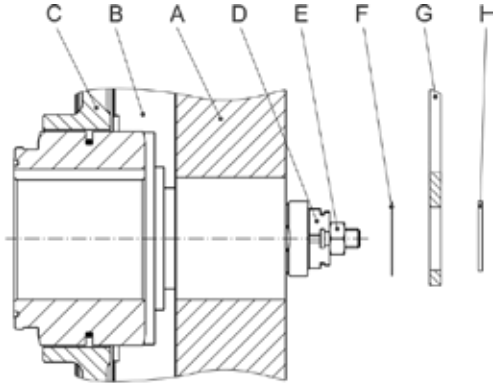



**Fig. 2**

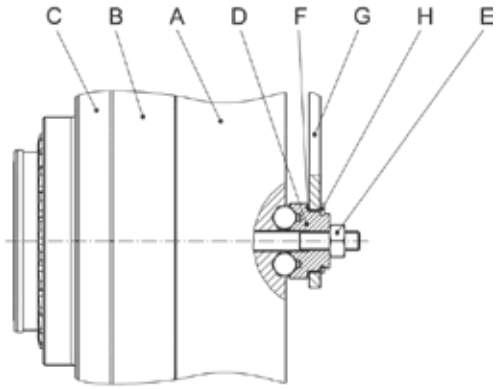



**Fig. 3**

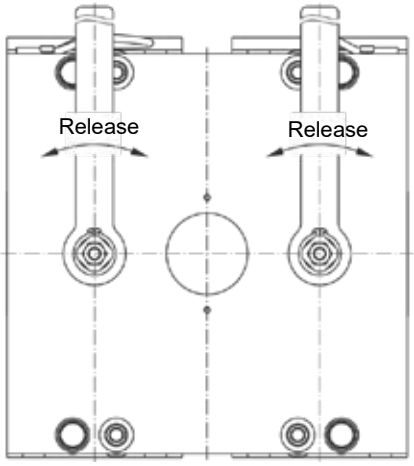



**Fig. 4** (Manually actuated)

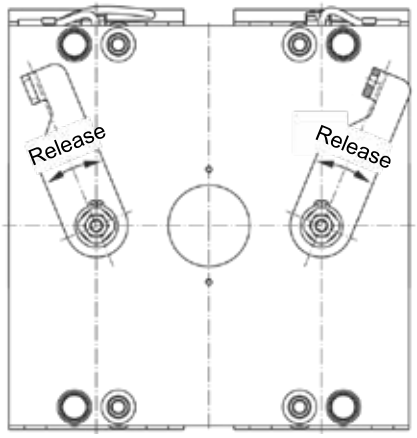



**Fig. 5** (Bowden cable design)



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# Instructions for Hand Release Installation for ROBA®-twinstop® brake Type 8012._5_13 and RSQ brake Type 8061._4213 Sizes 250 / 350 / 450 / 500 / 800

**(E028 12 237 001 4 EN)**

## Components

(A) Coil carrier
(B) Armature disk
(C) Rotor
(D) Connection piece
(E) Hexagon nut

## Parts for Hand Release Installation:

F 2 x Shim washer
(G) 2 x Hand release lever
(H) 2 x Locking ring

## Retrofitting Kit for Hand Release

- Manually actuated: Mayr article number 8283260
- Bowden cable: Mayr article number 8283261

## Instructions for Hand Release Installation

- Number of items per brake circuit

**DANGER**



The hand release is already set to function by the manufacturer.
The hexagon nut (E) must not be loosened by the customer, otherwise the function of the hand release is no longer guaranteed.

1. Push the shim washer (F) onto the connection piece (D).
2. Push the hand release lever (G) onto the connection piece (D) (angular positions in 45° steps are possible).
3. Secure the hand release lever (G) on the connection piece (D) with a locking ring (H).

Then, repeat the procedure on the second brake circuit.

## Hand Release Function Inspection

The brake is released by moving both hand release levers (G) simultaneously, see Figs. 4 and 5.
As a result, the armature disk (B) is attracted to the coil carrier (A); the rotor (C) is then free and the brake is released.
The release angle until the brake is released without residual torque is approx. 20 ° - 25 °.

**DANGER**



Please actuate the hand release carefully.
Any existing loads are put into motion when the hand release is actuated.



Actuate the hand release lever (G) carefully only to the point, at which the traction sheave or the car starts moving.

A substantially increased force acting on the hand release lever (G) may lead to component destruction.

**When actuating the hand release via Bowden cable, the following additionally applies:**

Bowden cable designs must be designed with an end stop for the Bowden cable lever as soon as release of the brake is residual torque-free.

In addition, a suitable return spring must be installed by the customer on Bowden cable designs in order to compensate for friction forces in the Bowden cable.

Adjust the Bowden cable length so that the hand release levers (G), after actuation, pivot back to the unreleased neutral position.



When actuating the hand release, a switching signal of the release monitoring device cannot be guaranteed.

The hand release is subject to wear and is not suitable for constant release.
A sufficient number of emergency releases is possible (approx. 1000 x).



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# 14 Technical data

## 14.1 Motor

Standard configuration, further configurations are possible.

| Motor type | Unit | SM205.40A | | SM205.45A | |
|---|---|---|---|---|---|
| Suspension | | 1:1 | | 1:1 | |
| Typical payload* | kg | 1,000 | | 1,000 | |
| Nominal torque | Nm | 600 | | 710 | |
| Maximum torque | Nm | 1,000 | | 1200 | |
| Maximum short-circuit torque | Nm | 480 at 25 rpm | | 480 at 25 rpm | |
| Permissible axle load | kN | 47.6 | | 47.6 | |
| Speed | m/s | 1.0 | 1.6 | 1.0 | 1.6 |

*Balance ropes may be required depending on the travel distance.

## 14.2 Traction sheave

The diameter and width are dependent on the motor type.

| Motor type | Unit | SM205.40A-45A | |
|---|---|---|---|
| Traction sheave diameter | mm | 160 | 200 |
| Traction sheave width | mm | 128 | 128 |

## 14.3 Tripping speed

| | | |
|---|---|---|
| DTS | = | Diameter of the traction sheave<br>Table contains typical traction sheave diameters, other diameters can be converted linearly. |
| Nbn | = | Maximum nominal speed of the brake rotor |
| Nbmax | = | Maximum trip torque of the brake rotor |
| Vn | = | Maximum rated speed of the elevator |
| Vmax | = | Maximum tripping speed of the elevator |

| Motor type | DTS | Nbn | Nbmax | Vn<br>1:1 | Vmax<br>1:1 |
|---|---|---|---|---|---|
| Unit | mm | rpm | rpm | m/s | m/s |
| SM205.40A-45A | 160 | 435 | 500 | 3.64 | 4.19 |
| SM205.40A-45A | 200 | 435 | 500 | 4.56 | 5.24 |

## 14.4 Degree of protection

| Component | Degree of protection |
|---|---|
| Motor | IP 23 |
| Forced ventilation | IP 21 |
| Absolute encoder | IP 21 |
| Electrical brakes | IP 54 |
| Mechanical brakes | IP 10 |
| Elevator machine total | IP 21 |

## 14.5 Ambient conditions

| Condition | Unit | Values |
|---|---|---|
| Ambient temperature during transport and storage | °C | -20 to +60 |
| | °F | -4 to +140 |
| Ambient temperature for operation | °C | 0 to +40 |
| | °F | +34 to +104 |
| Air humidity | % | max. 95<br>Condensation prohibited |
| Mounting height | | from 1000 m above sea level<br>Torque reduction by 1% per 100 m or duty cycle reduction by 1.5% per 100 m. |

## 14.6 Brake

| **Brake**<br>**ROBA®-twinstop® type 8012.05_13**<br>**(information for each brake circuit)** | |
|---|---|
| **Size** | **Brake torque** |
| RTW800 | 800 Nm |

| Brake type | Unit | **Brake**<br>**RTW800 type 8012.05_13**<br>**(information for each brake circuit)** |
|---|---|---|
| Operating voltage | V DC | 207 |
| Current | A | 1.69 |
| Output | W | 131 |
| Rectifier | | Bridge rectifier* |

*Optionally available.

## 14.7 Microswitch

| Rating | Unit | Value |
|---|---|---|
| Minimum | mA | 10 |
| | V DC | 12<br>13 – with free-running diode |
| Maximum | A | 3 |
| | V AC | 250 |
| Recommended | mA | 10 to 50 |
| | V DC | 24 |

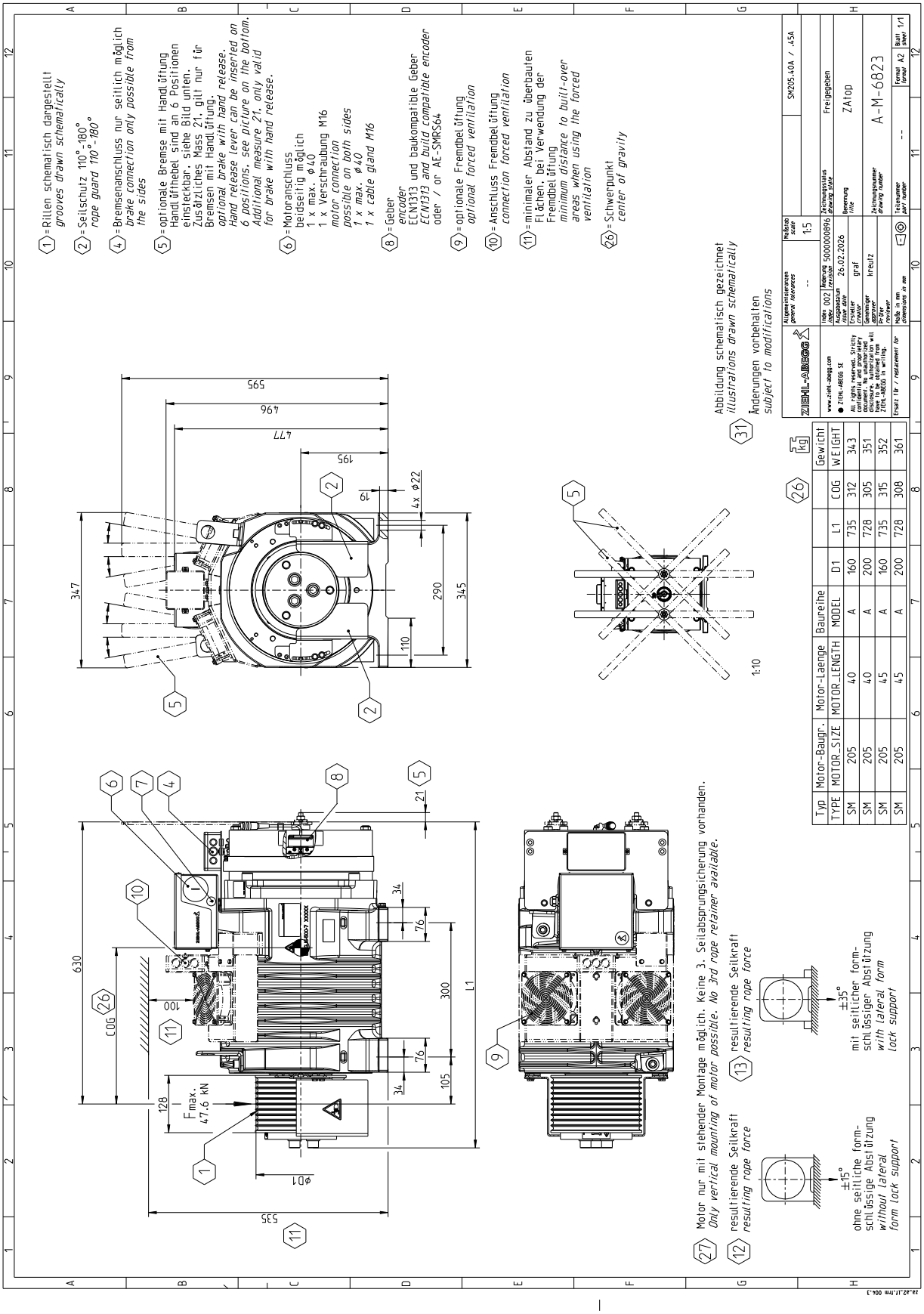
## 14.8 Inductive proximity switch

| Rating | Unit | Value |
|---|---|---|
| Operating voltage | V DC | 10 to 30 |
| Rated operating current | mA DC | ≤ 150 |
| Output function | | NC contact/gauge zero |

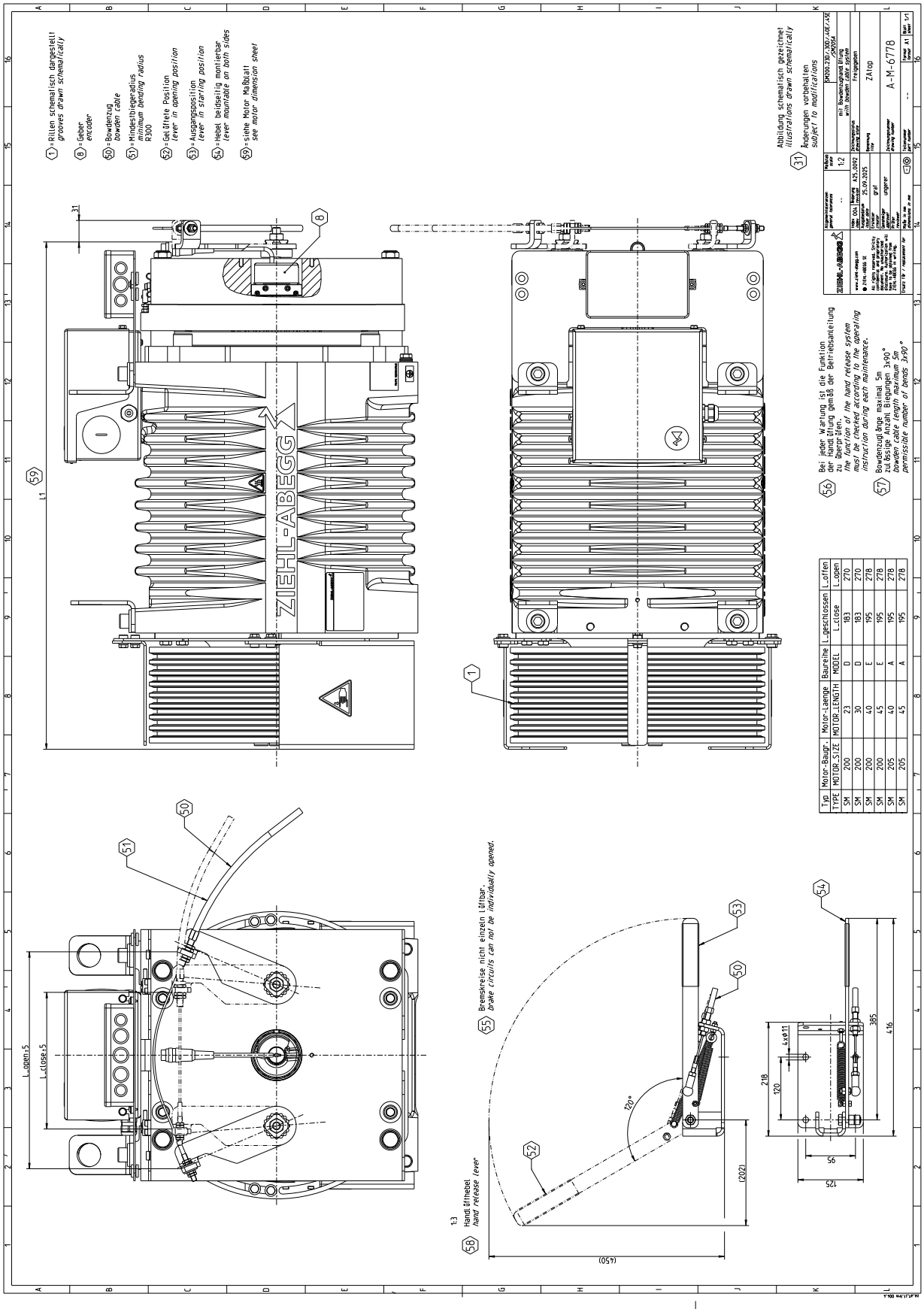
## 14.9 Forced ventilation

| Version | Unit | 2 fans | |
|---|---|---|---|
| Voltage | V | 220 | 240 |
| Frequency | Hz | 50 | 60 |
| Power | W | 2 x 20 | 2 x 19 |
| Current | A | 2 x 0.125 | 2 x 0.11 |

## 14.10 Dimension sheet ZAtop SM205.40A-45A



## 14.11 Dimension sheet with Bowden cable system




| Typ | Motor-Baugr. | Motor-Länge | Baureihe | Lgeschlossen | L.offen |
|---|---|---|---|---|---|
| TYPE | MOTOR-SIZE | MOTOR-LENGTH | MODEL | L.close | L.open |
| SM | 200 | 23 | D | 183 | 270 |
| SM | 200 | 30 | D | 183 | 270 |
| SM | 200 | 40 | E | 195 | 278 |
| SM | 200 | 45 | E | 195 | 278 |
| SM | 205 | 40 | A | 195 | 278 |
| SM | 205 | 45 | A | 195 | 278 |

## 14.12 Legend for dimension sheet

| | |
|---|---|
| *1* | *Grooves represented schematically* |
| *2* | *Rope guard 100° - 108°* |
| *4* | *Brake connection box* |
| *5* | *Brake with hand release system, optional* |
| *6* | *Motor connection* |
| *8* | *Absolute encoder ECN 1313 and construction-compatible absolute encoder* |
| *9* | *Forced ventilation, optional* |
| *10* | *Connection for forced ventilation* |
| *11* | *Minimum distance to overhanging surfaces* |
| *12* | *Resulting rope force without side interlocking support* |
| *13* | *Resulting cable force with side interlocking support* |

| | |
|---|---|
| *20* | *Bowden cable* |
| *21* | *Minimum bending radius 300 mm* |
| *22* | *Released position* |
| *23* | *Starting position* |
| *24* | *Levers mountable on both sides* |
| *25* | *Brake circuits cannot be individually released* |
| *26* | *Whenever performing maintenance, the functioning of the lever for hand release must be checked.* |
| *27* | *Bowden cable length, max. 5m*<br>Allowed number of bends 3 x 90° |
| *28* | *Levers for hand release* |
| *29* | *See motor dimension sheet* |

# Notes

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