

Bewegung durch Perfektion | Movement by Perfection

ZIEHL-ABEGG



Die Königsklasse
The Royal League

Die Königsklasse in Lufttechnik, Regeltechnik und Antriebstechnik | The Royal League in ventilation, control and drive technology



ZA top

SM250.45B

Gearless permanent magnet synchronous motor

Original operating instructions

Store for future use!

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1 General

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, start-up, maintenance, repair, cleaning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

1.1 Meaning of the operating instructions

These operating instructions help you to work safely on and with the elevator machine ZAtop SM250.45B. They contain safety instructions that must be complied with as well as information that is required for failure-free operation of the elevator machine.

The operating instructions must be stored in the vicinity of the elevator machine. It must be ensured that all persons who have to perform activities on the elevator machine can consult the operating instructions at any time. Instructions for use in accordance with the German Occupational Safety and Health Act and the German Work Equipment Ordinance must be provided in addition to these operating instructions.

Keep the operating instructions for continued use. They must be passed-on to all successive owners, users and final customers.

1.2 Target group

The operating instructions address persons entrusted with planning, installation, start-up, maintenance and servicing, who have the corresponding qualifications and skills for their job.

1.3 Exclusion of liability

ZIEHL-ABEGG SE is not liable for damage due to misuse, incorrect use, improper use or as a consequence of unauthorized repairs or modifications.

1.4 Copyright

These operating instructions contain copyright protected information. The operating instructions may be neither completely nor partially photocopied, reproduced, translated or put on data medium without previous explicit consent from ZIEHL-ABEGG SE. Infringements are liable for damages.

All rights reserved, including those that arise through patent issue or registration on a utility model.

2 Safety instructions

2.1 General

The ZIEHL-ABEGG SE elevator machine is not a ready-to-use product and may only be operated after having been installed in machines or plants and its safety, depending on the application, has been ensured by protective grille, barriers, constructive devices or other adequate measures (see DIN EN ISO 13857)!

Installation, connection to the power supply and commissioning may only be performed by qualified service personnel! The relevant regulations must be observed!

Planners, manufacturers and operators of system parts or entire systems are responsible for the correct and safe mounting and a reliable operation.

2.2 Intended use

The ZAtop SM250.45B is a permanent-magnet, gearless elevator machine, designed as an internal rotor motor for elevator with and without a machine room. The elevator machine is not designed for any use other than those listed here – this is considered improper use.

Applications other than the intended use of this elevator machine are not permitted without approval by ZIEHL-ABEGG SE.

Reading these operating instructions and complying with all instructions - especially the safety instructions - they contain is considered part of intended use. It also includes carrying out all the inspection work at the prescribed intervals.

Not the manufacturer, rather the operator of the ZAtop SM250.45B is liable for any personal harm or material damage arising from non-intended use!

2.3 Pictographs

Safety instructions are highlighted with warning triangles and are depicted according to the degree of hazard as follows.

	Danger! General hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!
	Warning! Risk of moderate or minor injury if the corresponding precautions are not taken!
	Caution! Material damage is possible if the corresponding precautions are not taken!

	Danger! Danger by dangerous, electric voltage! Death or severe injury can occur if the corresponding precautions are not taken!
	Information Important additional information and advice for user.
	Warning! Danger by hot surface! Slight bodily harm is possible if the corresponding precautions are not taken!

2.4 Product safety

The elevator machine conforms to the state of the art at the time of delivery and is fundamentally considered to be reliable. The elevator machine and accessories may only be installed and operated in perfect condition and in compliance with the operating instructions. Exceeding the limits stated in the chapter "Enclosure / technical data" can lead to a defect in the elevator machine.

2.5 Requirements placed on the personnel / due diligence

Persons entrusted with the planning, installation, commissioning and maintenance and servicing in connection with the elevator machine must have the corresponding qualifications and skills for these jobs. Based on their training, knowledge and experience as well as knowledge of the relevant standards, they must be able to judge the work transferred to them and be able to recognize possible hazards.

In addition, they must be knowledgeable about the safety regulations, EU directives, rules for the prevention of accidents and the corresponding national as well as regional and in-house regulations. Personnel undergoing training, instruction, or on apprenticeship may only work on the elevator machine under the supervision of an experienced person. This also applies to personnel in general training.

Comply with the legal minimum age.

2.6 General safety instructions



Danger!

▷ Rotation of the drive shaft induces a voltage, which is applied to the connection terminals.



Danger!

▷ The elevator machine has attachment points: integrally cast eyelets or screwed-on eye bolts, eye plates or steel cable loops. The attachment points are designed exclusively for transporting the elevator machine including brake and traction sheave. Do not lift other loads such as bolted on components, ropes lying on top, etc. with the attachment points. Suitable lifting gear must be used.



Warning!

- ▷ Depending on the operating conditions, the elevator machine can have high surface temperatures of $> 80^{\circ}\text{C}$.

Risk of burns!

If the installation situation does not provide sufficient personal protection, then this must be provided by the customer in the form of additional measures.

If work has to be carried out on the elevator machine at normal operating temperature, suitable gloves must be worn.



Warning!

Warning of hand injuries!



- ▷ Risk of injury from reaching into the rope guard.
- ▷ Do not carry out any activities during operation.
- ▷ Only perform maintenance work on the elevator machine when stopped.
- ▷ The elevator machine is only to be operated within the ranges dened on the name plate of the motor!
- ▷ Use the elevator machine only in the authorised fashion and only for the tasks and flow media specified in the order!
- ▷ If the elevator machine is not energised, no electric torque is available. Releasing the brakes can cause uncontrolled acceleration of the elevator.
We recommend short-circuiting the windings of the de-energised elevator machine to generate a brake torque dependent on the speed.
In the event of a short-circuit, a short-circuit current of at least the level of the rated current is flowing.
The windings may not be short-circuited when the elevator machine is energised.
- ▷ Safety features, for example the brake release monitoring, may not be dismantled, circumvented or made inoperative!
- ▷ Thermistor installed in the winding act as protection against excess temperatures in the elevator machine and must be evaluated. When the thermistor are activated, the energy supply to the elevator machine must be switched off.

2.7 Operator's obligation of diligence

The elevator machine has been designed and built after consideration of a risk analysis and after careful selection of the harmonised standards to be complied with as well as other technical specifications. It therefore complies with the state of the art and guarantees maximum safety during operation. However, this safety can only be achieved in practical operation when all the necessary measures are taken. The machine operator therefore has a duty of care to ensure that these measures are planned and to supervise their execution.

In particular, the operator must ensure that

- ▷ the elevator machine is used as intended (see chapter "Product overview")
- ▷ the installation is operated in a flawless, functional condition and the safety devices are periodically checked for their properly functioning condition
- ▷ The required personal safety gear is available to and used by the operating, maintenance and repair personnel
- ▷ the operating instructions are available at the location where the elevator machine is being used, are complete and are in legible condition
- ▷ sufficiently qualified and authorized personnel operate, maintain and repair the elevator machine

- ▷ these personnel receive regular instruction in all relevant industrial safety and environmental protection issues and are familiar with the operating instructions and the safety instructions they contain
- ▷ all safety and warning notices attached to the elevator machine are never removed and remain legible

2.8 Employment of external personnel

Maintenance and service work is frequently carried out by external personnel who are often unfamiliar with the specific circumstances and the resulting hazards.

These persons must be comprehensively informed about the hazards in their area of activity. You must monitor their working methods in order to intervene in good time if necessary.

3 Product overview

3.1 Scope of application

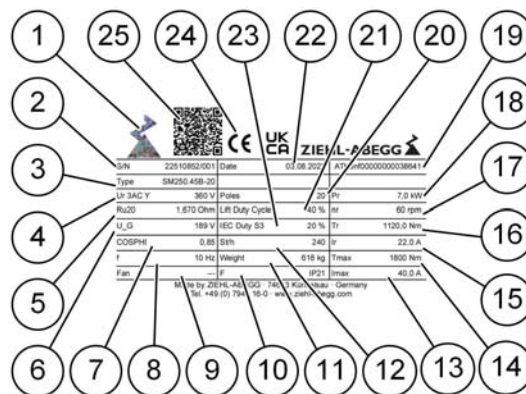
The ZAtop SM250.45B is designed as a gearless elevator machine for traction sheave rope elevators. Owing to its very compact design, the ZAtop SM250.45B is ideal for machine roomless elevators.

The type-tested brake can be used as a:

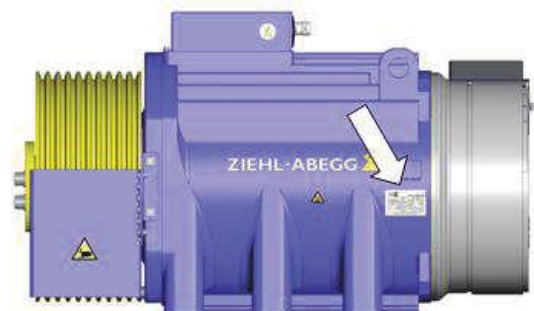
- Brake mechanism acting on the drive shaft as part of the ascending car overspeed protection means
- Brake element acting on the drive shaft as part of the protection against unintended car movement

3.2 Rating plate

The name plate is on the brake-side on the left and right on the housing of the ZAtop SM250.45B.



Example name plate ZAtop SM250.45B



Name plate position

no.	Designation	no.	Designation
1	Hologram	14	Tmax - Acceleration torque [Nm]
2	S/N - Motor number	15	Ir - Rated current [A]
3	Type - Motor type	16	Tr - Rated torque [Nm]
4	Ur 3AC Y - Rated voltage / Network form / Way of connection [V]	17	nr - Rated speed [rpm]
5	Ru20 - Winding resistance [Ω]	18	Pr - Rated power [kW]
6	U_G - Generator voltage [V]	19	ATKonf... - Article number
7	COSPHI - Cosinus phi (power factor)	20	Poles - Polecount
8	f - Rated frequency [Hz]	21	Lift Duty Cycle - Allowed on time in typical elevator operation [%]
9	Fan - Forced ventilation type	22	Date - Date of manufacture
10	F - Insulation class IPxx - Protection class	23	IEC Duty - On time as set out in IEC S3 - Mode [%]
11	Weight - Weight [kg]	24	CE mark UK CA marking
12	St/h - Trips per hour	25	QR code
13	Imax - Acceleration current [A]		

Table 3-2

3.3 Transport

- ZIEHL-ABEGG SE elevator machine are packed by the manufacturer for the types of transport and storage agreed upon.
 - ▷ Transport the elevator machine in the original packing.
 - ▷ Check packing and elevator machine for possible damage and report the forwarding agency about any damages caused by transport. Shipping damages are not covered by our guarantee!
 - ▷ Avoid excessive vibration and shockloads!
 - ▷ Extreme heat or cold (transport temperature -20 °C to +60 °C) must be avoided!

3.3.1 Transport

- ▷ Transport the elevator machine in the original packing.

3.3.2 Lifting

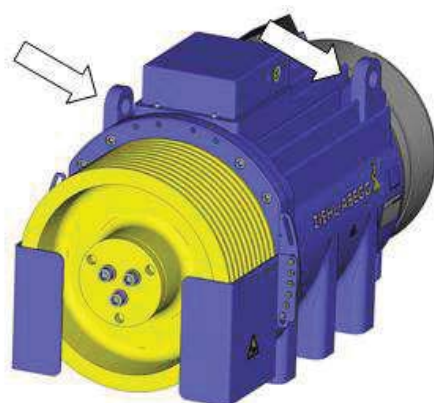


Figure 3-3-2-01 - Position of attachment points

Note the following when lifting the elevator machine:

- ▷ Lift only at the existing attachment points (see Figure 3-3-2-01).
- ▷ Lift at all existing attachment points at the same time.
- ▷ Lift the elevator machine using suitable lifting gear.
- ▷ Lift the elevator machine correctly taking into account the centre of gravity.
- ▷ Lift the elevator machine without additional loads.

3.4 Storage

- ▷ Store the elevator machine in the original packaging in a dry area protected from the weather or protect it from dirt and weather until final mounting.
- ▷ Leave the VCI paper on the grooved surface of the traction sheave or drive shaft for corrosion protection until the elevator machine is installed.
- ▷ Extreme heat or cold (storage temperature -20 °C to +60 °C) must be avoided!
- ▷ High humidity which can lead to condensation must be avoided.
- ▷ Avoid aggressive conditions (for example salt spray)!
- ▷ Maximum storage duration: 12 months
 - Release brake
 - Turn motor shaft manually
 - Listen for unusual bearing noises

If the maximum storage duration is exceeded, the following procedure must be carried out after 12 months at 2-3 month intervals to prevent damage to the bearings:

- Release brake
- Turn motor shaft manually at least 3 turns in both directions to ensure even distribution of the bearing grease

If you encounter any irregularities, please contact ZIEHL-ABEGG SE customer service.

3.5 Disposal / Recycling



Disposal must be carried out professionally and environmentally friendly in accordance with the legal stipulations.

4 Mechanical installation

4.1 General mounting advises

Mounting, electrical connection and commissioning are only to be performed by trained service personnel. Adhere to all machinery-related requirements and specifications supplied by the system manufacturer or machine builder.

CAUTION!

Caution!

- ▷ When working at or in the elevator, the elevator machine and especially the brakes have to be covered and protected against dust and chips.
- ▷ Do not install distorted.
- ▷ Do not apply any force (levering, bending). Above all, do not expose the rotor to any heavy mechanical shocks.
- ▷ Before starting installation, the elevator machine must be checked for transport damage, especially the cables have to be checked.
- ▷ No welding must be carried out on the elevator machine. The elevator machine must not be used as an earthing point for welding. Magnets and bearings could be destroyed.
- ▷ The cooling-airflow around the elevator machine must not be obstructed.
- ▷ We recommend keep at least 220 mm space between the brake and the wall (axial direction) to make access to the encoder possible.
- ▷ **The brake design with manual hand release must be freely accessible since the levers for brake release are moved laterally (see chapter "Start-up / manual emergency evacuation")!**

4.2 Fastening the elevator machine

- ▷ On the bottom side of the socket are 6 threads.
- ▷ To attach the elevator machine, use exclusively the following screw types:
 - 6 hexagon head screws ISO 4014 - M30 - 8.8 or
 - 6 hexagon head screws ISO 4017 - M30 - 8.8 or
 - 6 cheese head screws ISO 4762 - M30 - 8.8

Tightening torque M30 - 8.8: 1350 Nm.

- ▷ Screw-in depth of fixing screws:
 - Minimum 45 mm
 - Maximum 55 mm
- ▷ Fasten the screws crosswise in at least two steps to the required tightening torque.
- ▷ Unevenness of the mounting surface maximum 0.3 mm.

- ▷ The mounting surface has to be rigid and robust enough to withstand the forces.
- ▷ For the vibration decoupling of the elevator system, damping elements should be used.

4.3 Rope fitting



Figure 4-3-01 - Fitting the ropes

- ▷ If the traction sheave should offer more grooves than the actual number of ropes, the ropes must be applied on the sheave either centred or towards the elevator machine side.

4.4 Rope pull



**With side interlocking support, rope pull may be carried out in all directions.
 Without side interlocking support, rope pull may only be carried out in vertical direction.
 The rope force direction resulting from rope pull must be observed.**

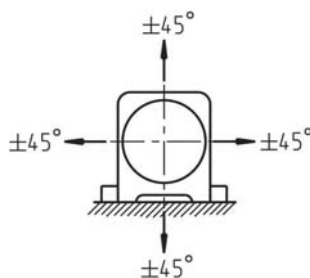


Figure 4-4-01 - Resulting rope force with lateral form lock support

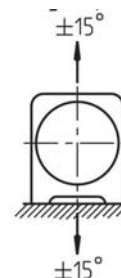


Figure 4-4-02 - Resulting rope force without lateral form lock support

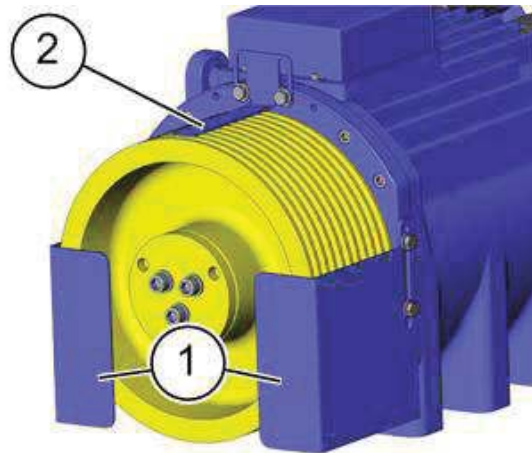
4.5 Fastening rope guard



**Warning!
 Warning of hand injuries!**



- ▷ Risk of injury from reaching into the rope guard.
- ▷ Do not carry out any activities during operation.
- ▷ Only perform maintenance work on the elevator machine when stopped.



Rope guard

- ▷ The elevator machine is on the right and left fitted with rope guard (1).
- ▷ A 3rd rope retainer (2) is optionally available.
- ▷ Set the rope guard to a distance of 2 - 3 mm from the ropes.

Rope guard adjustability

The elevator machine is equipped with a fixed or adjustable rope guard depending on the angle of contact.

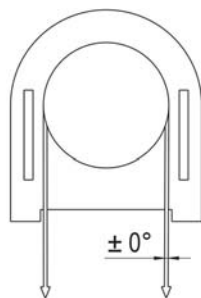


Figure 4-5-02 - For wrap angle 180°.

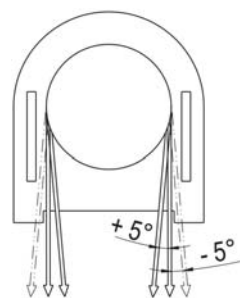


Figure 4-5-03 - Adjustability on both sides $\pm 5^\circ$.
 Normal wrap angles 175° - 185°.

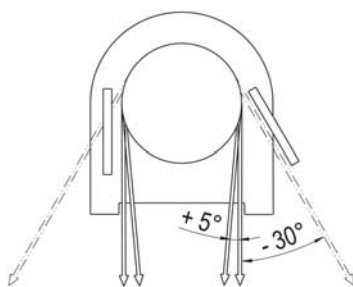


Figure 4-5-04 - Adjustability on both sides $+5^\circ/-30^\circ$.
 Normal wrap angles 150° - 185°.

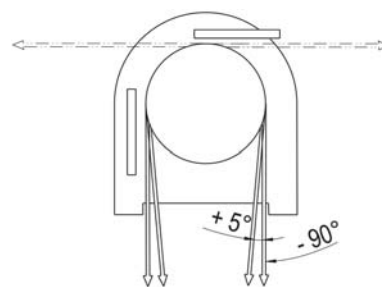
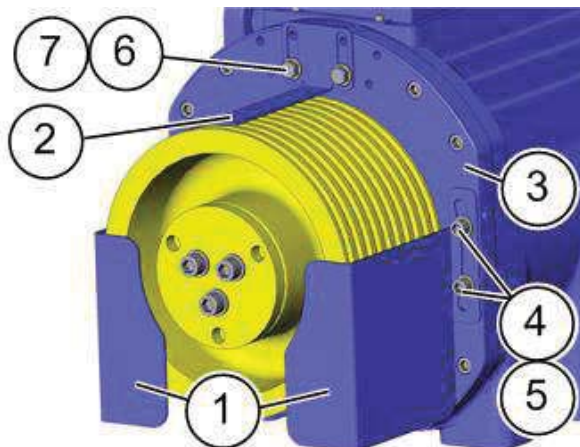


Figure 4-5-05 - Adjustability on both sides $+5^\circ/-90^\circ$.
 Normal wrap angles 90° - 185°.

4.5.1 Rope guard fastening in the case of a traction sheave diameter of 320 mm

Adjustability on both sides + 5°/- 30°. Normal wrap angles 30° - 185°.

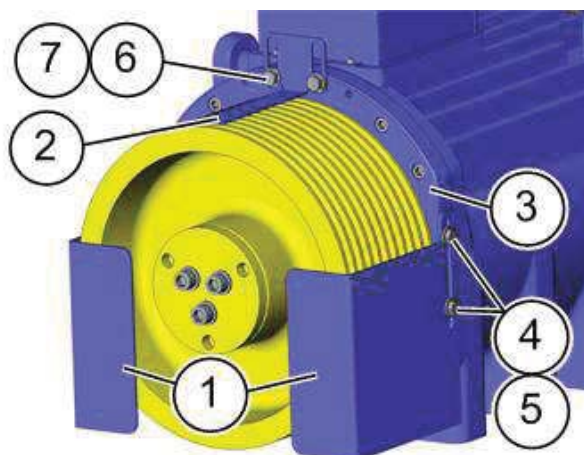


Rope guard in the case of a traction sheave diameter of 320 mm

- ▷ The rope guard (1) is attached to the bearing plate (3) with two socket cap screws M12 x 25 - 8.8 (4) and washers (5).
- ▷ The elongated hole in the rope guard (1) enables the required distance to the ropes to be set at the socket cap screws M12 x 25 - 8.8 (4).
Tightening torque M12 - 8.8: 79 Nm
- ▷ The third rope retainer (2) is fastened with two hexagon head screws M12 x 25 - 8.8 (6) and washers (7).
- ▷ Through the elongated holes in the 3. rope retainer (2) enables the required distance to the ropes to be set at the hexagon nuts M12 (6).
Tightening torque M12 - 8.8: 79 Nm

4.5.2 Rope guard fastening in the case of a traction sheave diameter of 400 mm

For wrap angle 180°.

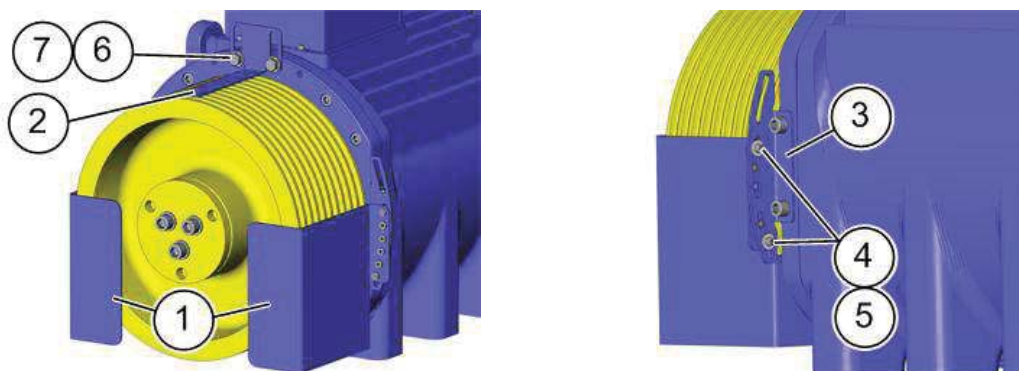


Rope guard in the case of a traction sheave diameter of 400 mm

- ▷ The rope guard (1) is attached to the bearing plate (3) with two socket cap screws M12 x 25 - 8.8 (4) and washers (5).
- ▷ The elongated hole in the rope guard (1) enables the required distance to the ropes to be set at the socket cap screws M12 x 25 - 8.8 (4).
Tightening torque M12 - 8.8: 79 Nm
- ▷ The third rope retainer (2) is fastened with two hexagon head screws M12 x 25 - 8.8 (6) and washers (7).
- ▷ Through the elongated holes in the 3. rope retainer (2) enables the required distance to the ropes to be set at the hexagon nuts M12 (6).
Tightening torque M12 - 8.8: 79 Nm

4.5.3 Rope guard fastening in the case of a traction sheave diameter of 400 mm

Adjustability on both sides + 5°/- 30°. Normal wrap angles 30° - 185°.



Rope guard in the case of a traction sheave diameter of 400 mm

- ▷ The rope guard (1) is fastened in each case with two safety screws M6 x 12 - 8.8 (4) and washers (5) to the relevant fixing plate (3).
- ▷ Through the elongated holes in the fixing plate (3) enables the required distance to the ropes to be set at the safety screws M6 x 12 - 8.8 (4).

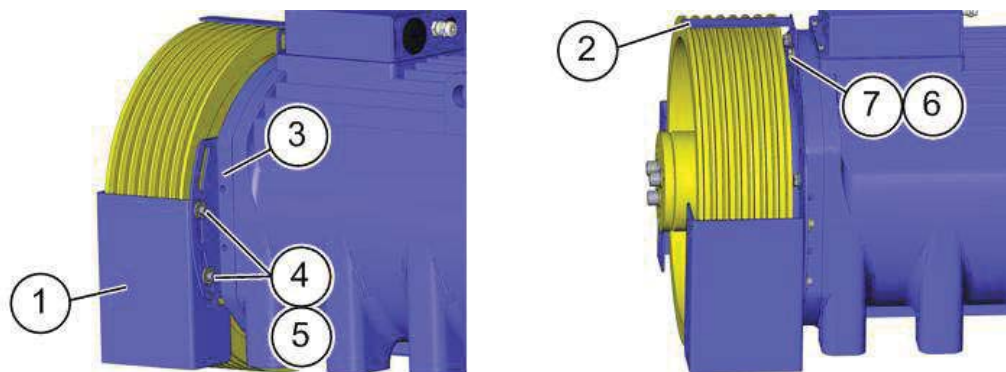
Tightening torque M6 - 8.8: 9,5 Nm

- ▷ The third rope retainer (2) is fastened with two hexagon head screws M12 x 25 - 8.8 (6) and washers (7).
- ▷ Through the elongated holes in the 3. rope retainer (2) enables the required distance to the ropes to be set at the hexagon nuts M12 (6).

Tightening torque M12 - 8.8: 79 Nm

4.5.4 Rope guard fastening in the case of a traction sheave diameter of 500 mm to 640 mm

Adjustability on both sides + 5°/- 30°. Normal wrap angles 30° - 185°.



Rope guard in the case of a traction sheave diameter of 500 mm to 640 mm

- ▷ The rope guard (1) is fastened in each case with two safety screws M8 x 16 - 8.8 (4) and washers (5) to the relevant fixing plate (3).
- ▷ Through the elongated holes in the fixing plate (3) enables the required distance to the ropes to be set at the safety screws M8 x 16 - 8.8 (4).

Tightening torque M8 - 8.8: 23 Nm

- ▷ The third rope retainer (2) is fastened with two hexagon head screws M12 x 25 - 8.8 (6) and washers (7).
- ▷ Through the elongated holes in the 3. rope retainer (2) enables the required distance to the ropes to be set at the hexagon nuts M12 (6).

Tightening torque M12 - 8.8: 79 Nm

4.6 Patent situation

Note the patent situation when using elevator machines in a shaft. When using the ZAtop SM250.45B in line with our installation suggestions there are no patent problems.

Many of the patents relating to installation in the shaft have now elapsed. Installation of the elevator machine in the shaft head is possible and the elevator machine may also protrude over the cab roof if the appropriate safety precautions have been taken.

However, you have a legal obligation to review the details of your elevator design in terms of the applicable patent law. In case of doubt, please contact ZIEHL-ABEGG SE for support.

5 Electrical installation

5.1 Safety precautions

Work on electric components may only be carried out by trained electricians or by persons instructed in electricity under the supervision of an electrician in accordance with electrical engineering regulations.

A second person must always be present when working on energized parts or lines who disconnects in case of emergency.

Electrical equipment must be checked regularly: Loose connections are to be re-tightened and damaged cables must be replaced immediately.

Always keep switch cabinets and all electrical supply facilities locked. Access is only allowed for authorized persons using a key or special tool.

Never clean electrical equipment with water or similar liquids.

5.2 EMC Directive

Compliance with the EMC directive 2014/30/EU only applies to this product if frequency inverters tested and recommended by ZIEHL-ABEGG SE are used and they are installed in line with the associated operating instructions and are EMC-compatible. If this product is improperly integrated into a system or is combined and operated with non-recommended components, the manufacturer or operator of the complete system is solely responsible for compliance with the EMC directive 2014/30/EU.

5.3 motor

CAUTION!

- ▷ **The motor cable for the elevator machine is available as an option.**
- ▷ **The elevator machine may not be connected to the supply voltage without a frequency inverter.**

5.3.1 Cable cross section

The cable cross-section must be specified dependent on the motor current and the ambient conditions (e.g. temperature, wiring method) in accordance with DIN VDE 0298-4

5.3.2 Type of cable

Always use shielded cables for the motor connection. Both rigid and flexible cables can be used.

5.3.3 Cable length

The maximum cable length is 25 m. With a motor line **> 25 m** compliance with DIN EN 12015 (Electromagnetic Compatibility - Interference emissions) and DIN EN 12016 (Electromagnetic Compatibility - Interference immunity) can no longer be guaranteed.

5.3.4 Mechanical connection conditions

Rated motor current [A]	Thread size Terminal board	Thread size Cable glands
up to 20	M8	M25
> 20 - 35	M8	M32
> 35 - 63	M8	M40
> 63 - 80	M8	M50
> 80 - 100	M10	M50
> 100 - 125	M10	M63
> 125	M12	M63

Table 5-3-4

Permissible tightening torque for M8 bolts: 6 Nm

Permissible tightening torque for M10 bolt: 10 Nm

Permissible tightening torque for M12 bolt: 15.5 Nm

5.3.5 Connection



Danger!

The motor cable must be connected to the correct phase of the frequency inverter and the elevator machine: U -> U / V -> V / W -> W.

If the actual direction of travel does not correspond to the selected direction, the turning direction of the elevator machine must be changed in the frequency inverter configuration. If the motor cable is not connected to the correct phase, control of the elevator machine is not possible. It can result in jerky movements or uncontrolled acceleration of the elevator machine.

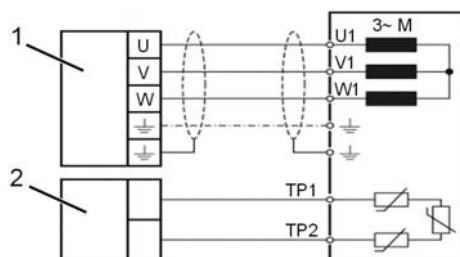


Figure 5-3-5-01

(1) Frequency inverter

(2) Motor temperature monitoring

5.3.6 Temperature monitoring

The elevator machine is supplied with an EMC cable (1) gland.

Motor cable with EMC-optimised screening

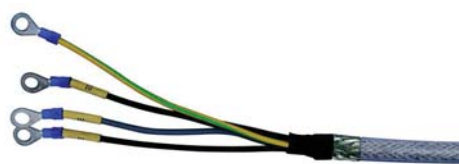


Figure 5-3-6-01

The motor cable must be positioned so that the metal strip (2) is in contact with the screening (3) of the motor cable.

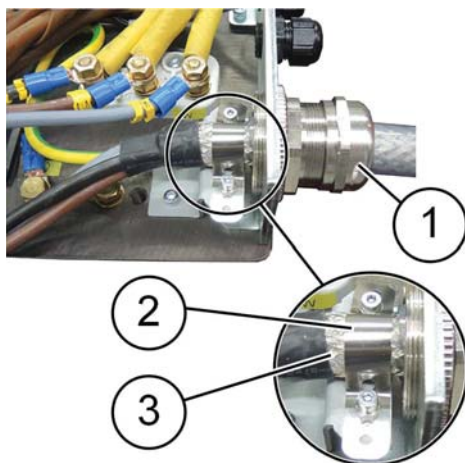


Figure 5-3-6-02
 (1) EMC-cable gland
 (2) Metal strip
 (3) Screening of the motor cable

Motor cable with pigtail

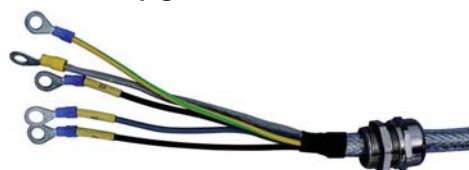


Figure 5-3-6-03

The motor cable is designed with a pigtail (2). Connect the pigtail (2) to the brass screw (3) for the protective conductor.

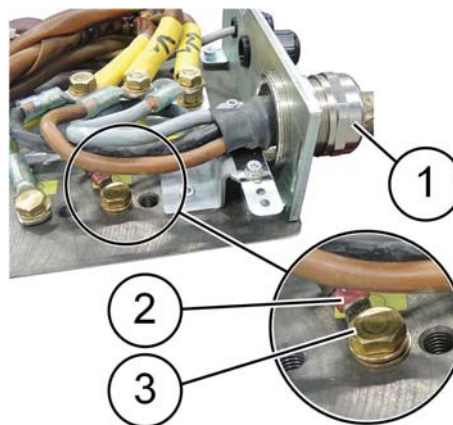


Figure 5-3-6-04
 (1) EMC-cable gland
 (2) Pigtail
 (3) Brass screw for protective conductor

5.3.7 Temperature monitoring

- The temperature monitoring by the PTC thermistor or temperature sensor (PT100) must be evaluated.
- Only connect to the inputs suitable for the relevant monitoring type.
- Maximum permissible test voltage for PTC thermistors: 2.5 VDC.
- When monitoring with a temperature sensor (PT100), the monitoring unit must be set to the limit value (° C) specified in the connection diagram.

5.3.7.1 Connection diagram with PTC thermistor (PTC)

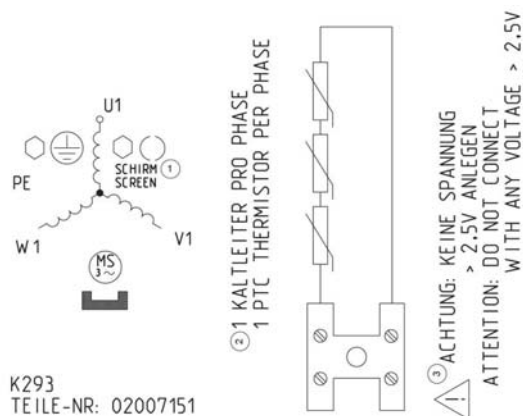
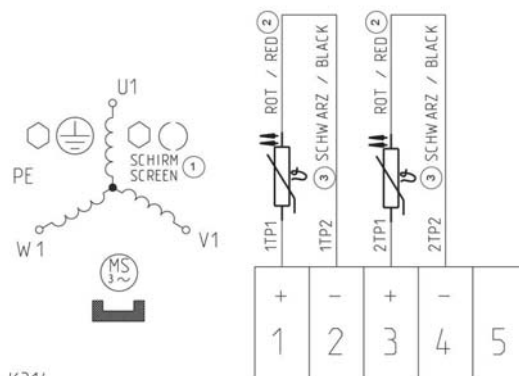


Figure 5-3-7-1-01
 (1) Shielding
 (2) 1 PTC thermistor per phase
 (3) Attention: Do not apply any voltage > 2.5 V!

5.3.7.2 Connection diagram with temperature sensor (PT100)

PT100 max. 150 °C = 157,3 Ohm



K314
 Teilenummer /
 part number: 01011814

Figure 5-3-7-2-01

- (1) Shielding
 (2) red
 (3) black

5.4 Absolute encoder



Caution!

- ▷ Never touch the connection contacts on the position absolute encoder or on the cable! The electronics can be destroyed by static electricity.
- ▷ You must discharge your own body before touching. This can be done, for example, by touching a conductive, earthed object (for example bare metal switch cabinet parts) immediately before.
- ▷ Operation of the elevator machine without an absolute encoder is not permissible.

5.4.1 Cable length

- Maximum line length: 25 m
- Connection and extension cable: Available as an option
- Connection and extension cable version: Shielded twisted pair cable

Absolute encoder			ECN1313 EnDat			ECN1313 SSI		AE- S64- BISSC- xx-ZA	ERN1387			AE- S64- SinCos- 07-AE
Adapter ca- bles	Connection	Jumper M16 x 0,75 (SV120)	x			x			x			
		Jumper M23 x 1		x			x			x		
		Jumper D-SUB 15-pin			x			x			x	
		Wire-end sleeves										x
	Cable length	0.22 m										
		0.245 m	x	x		x	x		x	x		
		0.35 m									x	
		0.56 m	x			x						
		1.8 m			x							
		5.0 m						x				
		7.0 m										x
10.0 m							x					
Connecting cable frequency inverter (optional)			x			x			x			
Extension cable (optional)			x		x	x		x	x			

Table 5-4-1

5.4.2 Connecting cable contact assignment

5.4.2.1 Absolute encoder ECN1313 EnDat/ECN1313 SSI

Pin			Function	Designation
Jumper M16 x 0,75 (SV120)	Jumper M23 x 1	Jumper D-SUB 15 pole		
A	14	1	DATA+	Data line for communication with the absolute encoder
B	17	2	DATA-	Data line inverse
C	1	3	Sensor Up	Voltage supply sensor cable (positive)
D	7	4	Up	Voltage supply +5 V DC
E	10	5	0 V	Power supply ground
F	12	7	B+	Analog track B (sine)
G	9	9	CLOCK-	Clock signal invers
H	8	10	CLOCK+	Clock signal for serial transfer
J	4	11	Sensor 0 V	Sensor cable for absolute encoder voltage (negative)
K	15	12	A+	Analog track A (cosine)
L	16	13	A-	Analog track A invers (cosine invers)
M	13	14	B-	Analog track B invers (sine invers)

Table 5-4-2-1

5.4.2.2 Absolute encoder AE-S64-BISSC-05-ZA/AE-S64-BISSC-10-ZA

Pin	Function	Designation
Jumper D-SUB 15 pole		
1	DATA+	Data line for communication with the absolute encoder
2	DATA-	Data line inverse
3	-	-
4	VCC	Voltage supply +5 V DC
5	GND	Power supply ground
6	-	-
7	B+	Analog track B (sine)
8	-	-
9	CLOCK-	Clock signal invers
10	CLOCK+	Clock signal for serial transfer
11	-	-
12	A+	Analog track A (cosine)
13	A-	Analog track A invers (cosine invers)
14	B-	Analog track B invers (sine invers)
15	GND sense	Power supply ground

Table 5-4-2-2

5.4.2.3 Absolute encoder ERN1387

Pin			Function	Designation
Jumper M16 x 0,75 (SV120)	Jumper M23 x 1	Jumper D-SUB 15 pole		
A	5	11	C+	Commutation signal (cosine)
B	6	10	C-	Commutation signal inverse (inverse cosine)
C	14	12	D+	Commutation signal (sine)
D	10	9	Up	Voltage supply +5 V DC
E	7	7	0 V	Power supply ground
F	11	8	B+	Analog track B (sine)
G	4	13	D-	Commutation signal (inverse sine)
H	3	3	R+	Reference signal
J	13	4	R-	Reference signal inverse
K	1	5	A+	Analog track A (cosine)
L	2	6	A-	Analog track A invers (cosine invers)
M	12	1	B-	Analog track B invers (sine invers)

Table 5-4-2-3

5.4.2.4 Absolute encoder AE-S64-SinCos-07-AE

Wire-end sleeves	Function	Designation
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	Power supply ground
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)
Yellow	A-	Analog track A invers (cosine invers)
Red	B-	Analog track B invers (sine invers)

Table 5-4-2-4

5.4.3 Offset

- ▷ Unless otherwise agreed, the absolute encoder offset is set to 0. This is achieved by connecting DC voltage with **U to +** and **V and W to -**.
- ▷ The absolute encoder may not be mechanically detached to ensure that the factory settings are not lost. If the absolute encoder has been detached, a new absolute value encoder calibration must be performed with the frequency inverter. For details of the procedure, refer to the frequency inverter operating instructions.

5.5 Brake

Brake type ROBA®-stop®-silenzio® (RSO), size 1300, 2 x 1200 Nm

- Also refer to the operating instructions for the brake.

5.5.1 Scope of application

- The brakes are intended for static applications as holding brakes. Dynamic braking must be restricted to emergency and inspection braking. No wear occurs on a holding brake. This means that the brake is maintenance free, and only the air gap has to be checked as described in the "Maintenance and repair - Inspection intervals - Checking the air gap" chapter.

5.5.2 Mechanical releasing

Mechanical release of the brakes is possible by using the manual hand release available as an option. A brake with a mechanical hand release system is available optionally. The hand release system cannot be fitted later. The complete brake must be replaced to retrofit the hand release system.

The mechanical hand release acts on both circuits simultaneously. A separate release of the single circuits for testing purposes is not possible.

5.5.3 Release monitoring

- The brake release monitoring serves as monitoring for redundancy and the operation status of the brakes.
- **The brake release monitoring has to be evaluated; otherwise the type certificate is not fulfilled! The change of state of both brake circuits have to be monitored separately.**
- Release monitoring for the brakes is carried out by a microswitch or inductive proximity switch. For technical data, see chapter "Appendix - Technical data - Microswitch or inductive proximity switch".

5.5.4 modulation

5.5.4.1 Contactorless - ZAsbc4

Electronic and noise-free activation of the brake.

The brake operating mode is set on site.

For information on installation and commissioning, refer to the ZAsbc4 operating instructions.

5.5.4.2 Electromechanical contactors

Brake type	RSO1300	
Operating voltage	207 V	24 V
Rectifier	Bridge rectifier*	

* Bridge rectifier is not included in the scope of delivery,
it is available as option from ZIEHL-ABEGG as article 00154988

To reduce noises during brake disconnect the brakes should be switched to the alternating current side (K4), while normal operation. The brakes are switched-off slower and thus quieter through the rectifier.

To ensure instantaneous brake application in emergencies, during inspection operation and return ride use a second contactor (K3), which disconnects the brake from the direct current side. Integrate this contactor into the safety circuit.

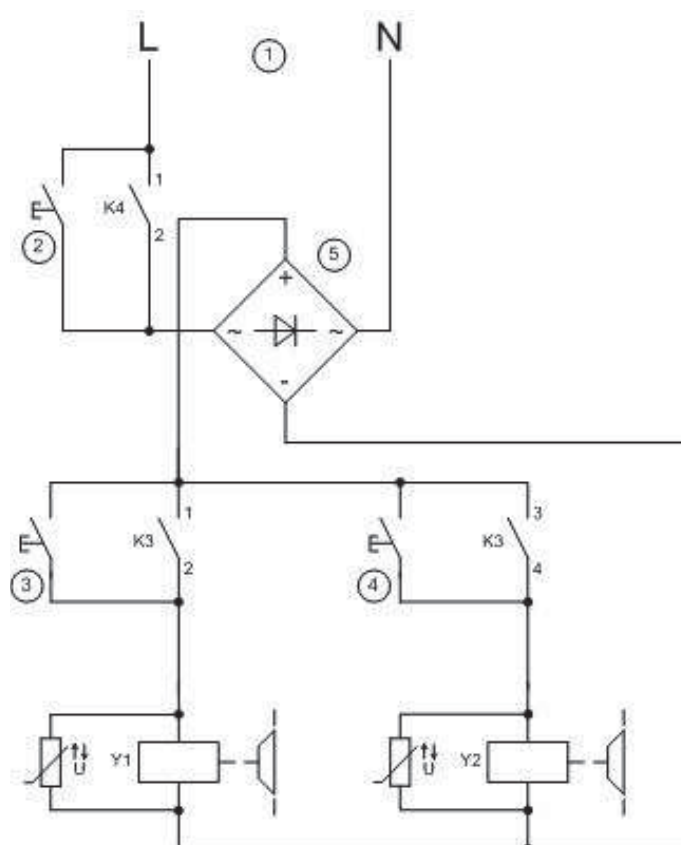


Figure 5-5-4-2-01 - Simplified diagram for brake control

- (1) Voltage supply
- (2) Button two circuit test
- (3) / (4) "Open brake" button
- (5) Rectifier
- (K3) Brake contactor, activated by safety circuit
- (K4) Brake contactor, activated by control or frequency inverter

5.5.5 Connection

- The terminal box for the brake may be removed from the elevator machine and mounted on site for a better attainability.
- The brake is only allowed to be supplied with power when fastened to the motor and after having connected the protective conductor of the motor at the control and the motor side.
- The brakes must be protected with varistors against overvoltage from switching operations. The varistor must lie directly on the coil or its connections.

5.5.6 Connection diagram

The operating instructions Include figures showing the standard connection diagrams with micro switches and inductive proximity switches. Customer-specific connection diagrams are not shown. These are stuck into the terminal box cover on the product and must be observed.

Connection diagram for brake with micro switch

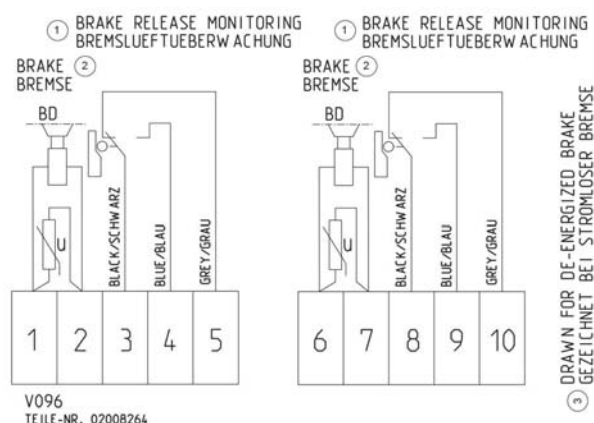


Figure 5-5-6-01

- (1) Brake release monitoring
- (2) Brake
- (3) Shown with currentless brake

Connection diagram for brake with inductive proximity switch

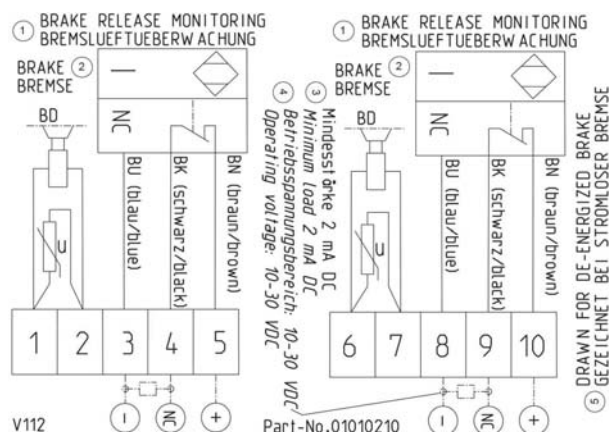


Figure 5-5-6-02

- (1) Brake release monitoring
- (2) Brake
- (3) Minimum strength 2 mA DC
- (4) Operating voltage range 10 - 30 V DC
- (5) Shown with currentless brake

5.6 Forced ventilation

The forced ventilation is optional and can be added afterwards.

5.6.1 Installation of forced ventilation side B

5.6.1.1 Technical data

Voltage	220 - 240	[V]
Frequency	50 / 60	[Hz]
Rated power	48 / 45	[W]
Current	0.24 / 0.23	[A]

Table 5-6-1-1

5.6.1.2 Connection diagram

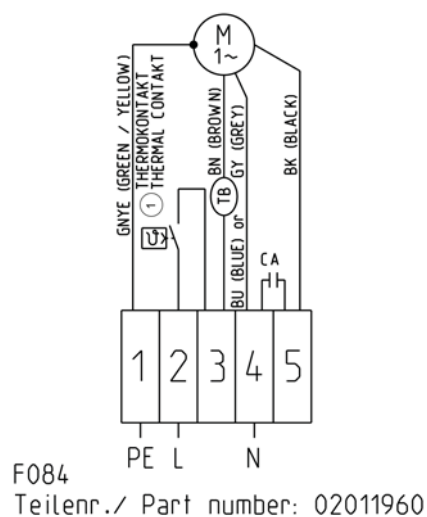


Figure 5-6-1-2-01
 (1) Thermal contact

5.6.2 Forced ventilation installation on top

5.6.2.1 Technical data

Voltage	220 - 240	[V]
Frequency	50 / 60	[Hz]
Rated power	2 x 20 / 19	[W]
Current	2 x 0.125 / 0.11	[A]

Table 5-6-2-1

5.6.2.2 Connection diagram

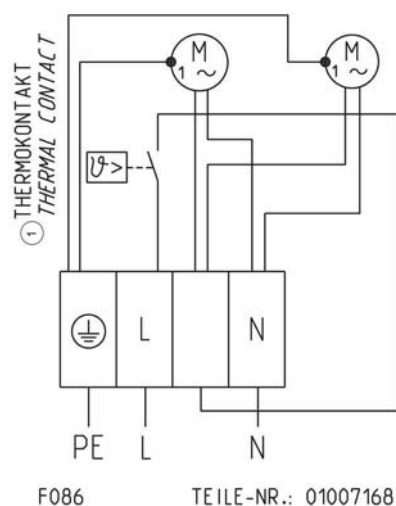


Figure 5-6-2-2-01
 1 Thermal contact
 2 PE optional

6 Start-up

6.1 Operating conditions

- ▷ The elevator machine must be installed in a not free accessible machine room or a closed hoist-way.
- ▷ Be aware of the protection class specified on the name plate.
- ▷ Do not operate the elevator machine in an explosive atmosphere.
- ▷ For all usage conditions that differ from the order, please contact ZIEHL-ABEGG SE.

6.2 First Start-up

Before first-time start-up, check the following:

- ▷ Installation and electrical connection have been properly completed.
- ▷ Safety devices are installed.
- ▷ All leftover installation materials and other foreign materials have been removed.
- ▷ The protective earth is connected.
- ▷ Temperature monitoring is evaluated.
- ▷ Cable entries closed.
- ▷ Mounting, installation position and accessories are o.k.
- ▷ Connection data corresponds to the data on the name plate.

6.3 Checks

Tests on elevator systems can be performed by the assembly company or a certification authority or organisation. This involves discovering of failure-critical and hazardous conditions. The relevant operator is responsible for safety. The descriptions below are intended as recommendations for the technical procedure and do not deal in sufficient depth with safety engineering aspects of the relevant system. Therefore, priority is given to the safety engineering specifications of the assembly company or operator. Only trained specialist personnel may carry out tests.

6.3.1 Half load test with current measurement

The test for the 50 % weight compensation should preferably be carried out as follows:

- ▷ The motor current is to be measured in both travel directions with a half load.
- ▷ The measured currents should correspond as closely as possible.
- ▷ The difference between the measured currents should not show a variation of more than 10 %.

Half load test with release of the brake only

- ▷ The short-circuit of the motor windings, if installed, should be disabled for the duration of the half load test.
- ▷ With a half load and the brake released, the car may not move.
- ▷ After the half load test, the shorting circuit is to be reactivated.

6.3.2 Testing the brake in accordance with EN 81-20:2020

- ▷ To test only the effect of the brake, the short-circuit of the motor windings, if installed, must be disabled.
- ▷ For the test, the cabin should be positioned in the centre of the shaft.

1. Overload

- ▷ The test shall be carried out whilst the car is descending at rated speed with 125 % of the rated load and interrupting the supply to the motor and the brake.
- ▷ If the elevator machine is driven upwards with a load of 125 %, approx. 2.5 x more losses occur than with a 100 % load, which accordingly leads to a rapid heating of the motor. As there is no switch-off in case of overheating during travel, a trip may only be of short duration.
 - ZAtop SM132/ZAtopx BD132: maximum 10 seconds
 - ZAtop SM180/ZAdisc SL506/ZAdisc SL510: maximum 15 seconds
 - ZAtop SM190/SM200/SM210/SM225/SM250: maximum 20 seconds
 - ZAsyn2 500AL/ZAsyn 700AL/ZAsyn 860AL: maximum 20 seconds
- ▷ Longer travel at 125 % nominal load due to a low inspection speed and/or a high travel distance is not permitted.
- ▷ To avoid this problem, we recommend transporting the test load upwards in 2 parts and with a 125 % load only downwards.

2. Failure of one brake circuit:

- ▷ The test shall be carried out whilst the car is descending at rated speed with rated load.
- ▷ To simulate failure of a brake circuit, it must be possible to keep the brake circuits open mechanically independently of one another even when opening the safety circuit.
- ▷ This condition may not be permanent and must therefore be created using buttons or similar.
- ▷ At the same time, the safety circuit should be opened when using this function.
- ▷ For this test, the elevator must be observed.
- ▷ If no discernible delay occurs, the brake circuit held open is to be closed immediately.
- ▷ The system should be stopped and the brake tested.

As an example, refer to the principle circuit diagram in the “Electrical installation / Brake / Brake control” chapter. The logic of the principle circuit diagram should be understood. Transferability to the relevant application must be verified and ZIEHL-ABEGG SE provides no guarantee of suitability.

If the circuit is designed in accordance with the principle circuit diagram:

- ▷ At the nominal speed, press one of the buttons and hold it down until the elevator has stopped.
- ▷ Repeat the test with the other button to test the second brake circuit.

3. Testing the microswitches / inductive proximity switches

- ▷ The release monitoring for the brakes must be evaluated.
- ▷ Before every trip, the change in the state of both brake circuits must be monitored separately.
- ▷ Switching must thus be tested individually, according to the function as an NC and/or NO contact.
- ▷ If there is a missing or incorrect signal, the elevator cabin may not leave the stopping point.

6.4 Pull out of safety gear

If the cabin loaded with rated load is caught by the trap due to a failure or during the acceptance inspection, the capture device could be very tight. In this case it is quite possible that the elevator machine torque is insufficient to pull the cabin out of the trap.

With gearless elevator machines in the shaft, the elevator machine is usually not accessible. A handwheel is unnecessary in such a layout.

With gearless elevator machines in machine rooms, a handwheel does not make any sense because there is no gear reduction. That is because due to the low moment arm of force, only slight force can be applied. A handwheel could even present a hazard, as even with only a slight imbalance in the installation, it is no longer possible to stop the elevator with the handwheel.

For both cases involving gearless elevator machines:

- ▷ If the elevator machine torque or the traction conditions are not sufficient, a block and tackle or similar device should be used.
- ▷ Suitable block and tackle should be provided.

Note

Note that an overload in the car leads to an increase in the motor torque. 25 % overload results in 150 % of the required motor torque! As regulated elevator machines are normally designed for a maximum torque of ca. 170 - 200 % rated torque, only slight reserves are available during such special cases.

Correspondingly, section **6.3.4 "Capture device on the cabin"** in **EN 81-20:2020** must be followed: “In order to facilitate disengagement of the safety gear, it is recommended that the test be carried out opposite a door in order to be able to unload the car.”

6.5 Emergency evacuation



Attention!

The measures for emergency evacuation described below may only be performed by instructed persons for maintenance of the elevator or qualified personnel of elevator companies.

6.5.1 Emergency evacuation by release of the brakes

In case of power failure or failure of the recovery control, emergency rescue is only possible by releasing the brakes. The brake can be released by an electrical emergency power supply or, if available, by a manual hand release.

When the brakes are released manually, the elevator moves in the direction of the greater weight. If there is a balance between the cabin and the counterweight, the cabin must be made heavier by suitable means.

To reduce the acceleration of the elevator, we recommend short-circuiting the motor windings for the evacuation. The short-circuit is generated by the motor contactors or an electronic circuit, as in the frequency inverter type ZAdyn 4C. This is always effective even in the event of a power failure. The short-circuit generates a speed-dependent braking torque. The maximum braking torque is achieved at lower speeds.

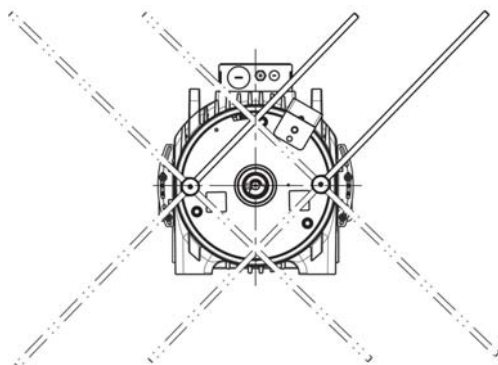
Depending on the system type and weight ratios, it is possible that due to the short-circuit generated braking torque is not sufficient to limit the lift speed. So the speed must be monitored closely during evacuation and evacuation interrupted if necessary.

Releasing of the brake can be ended when a floor is reached. Now the elevator door can be opened with a triangular key.

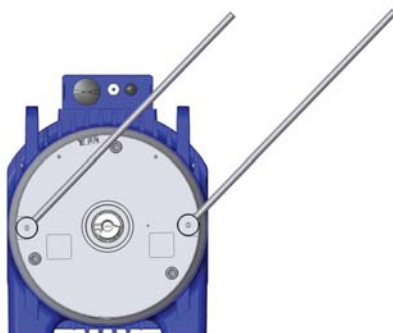
The elevator manufacturer's safety instructions have priority!

6.5.2 Releasing of the brake with the lever for hand release

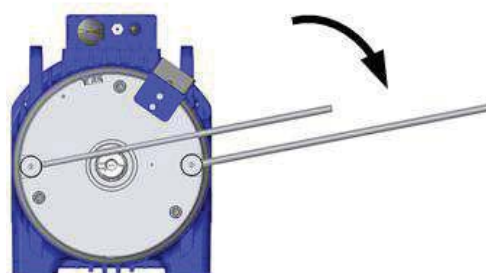
A brake with a mechanical hand release system is available optionally. The hand release system cannot be fitted later. The complete brake must be replaced to retrofit the hand release system. The levers for hand release can each be attached with an offset of 90°.



Figures 6-5-2-01
Possible insertion positions
of the levers for hand release



Figures 6-5-2-02
Brake not opened
Example for hand release lever position



Figures 6-5-2-03
Brake manuell released
Example for hand release lever position

- ▷ Attach the levers for hand release to the brake in any position.
- ▷ The brake is released via simultaneous movement of both levers for hand release. The rotation direction is not of any significance in this regard.



Danger!

Operate the hand release system carefully.
 Operating the hand release system starts movement of the loads.

Brake type	RSO1300
Release force per brake circuit	approx. 200 N

Table 6-5-2-1



Information

Carefully operate the lever for hand release until the traction sheave or the car starts to move.
 A significant increase in the force exerted on the levers for hand release can result in irreparable damage to the components.



Danger!

The levers for hand release must be removed after brake hand release action.

6.5.3 Releasing the brake with electric emergency power supply (UPS)

By means of an uninterruptible power supply (UPS) the brake can be opened electrically. For this purpose, for example, the existing dual circuit testing buttons can be used.
 See "Brake control principle circuit diagram" in the Brake - Brake control chapter.

6.5.4 Automatic emergency evacuation

The automatic emergency evacuation is described in the operation instructions of the control, the frequency inverter and, if available, an evacuation unit with UPS.

7 Faults and remedy

Excessive temperature / Temperature protection trips

Fault	Causes	Remedial measures
Noises on elevator machine	Bearing defective	Contact customer service
	Wrong setting at the frequency inverter	Check setting at the frequency inverter
	Absolute encoder defective	Replace the absolute encoder
Excessive temperature / Temperature protection trips	Surface of the elevator machine is covered	Remove cover from drive or mount with more distance to the elevator machine.
	Ambient temperature higher than 40 °C	Enhance shaft ventilation
	Wrong setting at the frequency inverter	Check setting at the frequency inverter
	Overloading of the elevator machine	Check motor current
Elevator machine does not start	Motor phases connected incorrect	Check motor connection
	VVVF defective	Check VVVF
	Brake does not open	See brake faults
Elevator machine does not turn when the brake is released	Brake rotor sticks after a long storage time on the armature disk	Release the brake mechanically or remove it and loosen the brake rotor carefully from the armature plate.
Brake switching noises	Brake is switched on the DC-side	Modify the control to AC switching for normal operation. Fit an additional protective circuit.
	Air gap of brake too big	Replace the brake rotors (Special tool required! Contact the customer service of ZIEHL-ABEGG SE).
Brake does not open	Power supply too low. The voltage at the brake is too low.	Check supply, if necessary increase cable cross-section (and transformer)
	Incorrect/faulty brake actuation	Check brake actuation
	Brake coil defective	Replace brake (special tool required. ZIEHL-ABEGG SE Contact customer service).
	Brake worn out	Replace the brake rotors (Special tool required! Contact the customer service of ZIEHL-ABEGG SE).
Brake release monitoring does not switch	Microswitch/inductive proximity switch defective	Replace microswitch/inductive proximity switch
	Contacts dirty	Switch micro switches with a higher contact current, at least 10 mA or change micro-switches

Table 7

8 Service and maintenance

8.1 General notes on maintenance

- ▷ Observe the safety-at-work regulations!
- ▷ Disassembly of the elevator machine is not permissible.
- ▷ Never use a high-pressure cleaner (for example steam jet cleaner) for cleaning the elevator machine!
- ▷ Take note of abnormal operating noise.
- ▷ The bearings have a lifetime lubrication. There is no possibility to relubricate. Maintenance is not necessary for the bearings.

To check the brake wear the following instructions have to be referred:

It is not possible to adjust the brakes. The brakes cannot be readjusted. Replace the both brake rotors when the maximum air gap has been reached.

The wear to the brake is checked with the brake closed, therefore:

- ▷ Make sure that all moving parts have stopped, secure them mechanically if required!
- ▷ Make sure that the elevator can not be moved from any other person than the one who does the check!

8.2 Inspection intervals

	During commissioning or after the first 3 months	every year
Distance of the rope guard	x	x
Check vibration isolation The thickness of the vibration isolation must be the same on the right and left.	x	x
Checking the air gap of the brake	x	x
Visual inspection of the mounting screws on the housing, brakes and traction sheave. The locking compound must be free of damage.	x	x
Check the traction sheave if worn out		x
Check the microswitch/inductive proximityswitch		x

Table 8-2

Note: All fixing screws on the housing, brakes and traction sheave are marked with locking varnish. That means a loosened screw is optically visible. If a screw does get turned, it must be tightened using the prescribed tightening torque, the old locking varnish needs to be removed and marking has to be made again.

8.2.1 Checking the air gap



Figure 8-2-1-01 - Air gap measurement position



Figure 8-2-1-02 - Air gap measurement

1. The air gap "A" has to be measured three times at the circumference (see arrows) of both brakes. The maximum value of the four has to be taken into account.
2. If the maximum value of the air gap "A" is exceeded on one of the magnets, it must be replaced both brake rotors and the appendant O-rings.

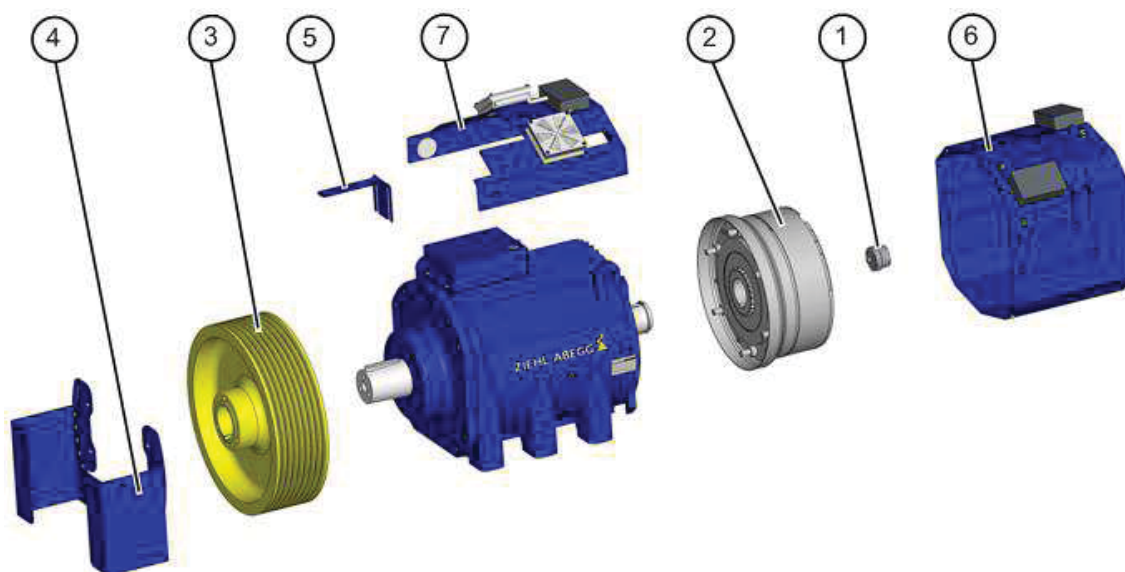
Maximum admissible air gap "A" after wear: 0.8 mm!

Caution!

Feeler gauge do not introduce more than 10 mm into the air gap, to avoid damage to the dampers of noise or deterioration by the springs.

8.3 Spare parts

Spare parts and accessories not supplied by ZIEHL-ABEGG SE have not been tested or approved by us. These parts may be lower in function or quality and there fore can reduce functionality or safety of the elevator machine installation. Will assume no liability or guarantee for damages caused by ZIEHL-ABEGG SE spare parts that are not approved.



Available spare parts:

1. Absolute encoder
2. Complete brake
 - 2.1 Brake rotors with O-rings
 - 2.2 Micro switch for brake
 - 2.3 Inductive proximity switch for brake
3. Traction sheave
4. Rope guard
5. Rope retainer
6. Installation of forced ventilation side B
7. Forced ventilation installation on top

8.3.1 Replace the absolute encoder

The replacement of the absolute encoder is described in separate assembly instructions:

Absolute encoder ECN1313 EnDat/ECN1313 SSI

see A-TIA17_02-D/A-TIA17_02-GB

Absolute encoder ERN1387

see A-TIA17_02-D/A-TIA17_02-GB

Absolute encoder AE-S64-BISSC-05-ZA/AE-S64-BISSC-10-ZA

see A-TIA18_03-D-GB

Absolute encoder AE-S64-SinCos-07-AE

see A-TIA20_13-D-GB

8.3.2 Replacement of the brake

The replacement of the brake is described in separate assembly instructions:

Replacement of the brake

see A-TIA21_08-D/A-TIA21_08-GB

8.3.3 Replacement of the traction sheave

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

Replacement of the traction sheave

see A-TIA19_02-D/A-TIA19_02-GB

8.3.4 Replacement of the bearing bracket



The mounting and dismounting of the magnet rotor and the flange bearing bracket must only be carried out by qualified personnel and with special devices in the factory.

9 Enclosure

9.1 Technical data

9.1.1 motor

Motor type	ZAtop SM250.45B				
Suspension	1:1	2:1	2:1	2:1	2:1
Typical payload* [kg]	1000	2000	1600	1250	1000
Rated torque [Nm]	1120				
Maximum torque [Nm]	1800				
maximum short circuit torque [Nm]	900 at 30 [rpm]				
permissible radial load [kg]	5890				
Speed [m/s]	1.6	1	1.6	2	2.5

Table 9-1-1

Table shows typical data, other values possible.

* Dependent on travel, compensation ropes may be necessary.

9.1.2 Traction sheaves

- Diameter [mm]	320	400	400	500	520	600	640
- Width [mm]	182	150	186	150	150	150	150

Table 9-1-2

9.1.3 Protection rating

Component	Protection rating
motor	IP 21
Absolute encoder	IP 40
Brake (electrical)	IP 54
Brake (mechanical)	IP 10
Complete elevator machine	IP 21

Table 9-1-3

9.1.4 Ambient conditions

The user must ensure that the specified ambient conditions are observed.		
Ambient temperature for operation	[°C]	-5 to +40
Humidity	[%]	Maximum 95 / condensation not permitted
Installation height	[m above sea]	Above 1000 Torque reduction by 1 % per 100 m or On time reduction by 1.5 % per 100 m

Table 9-1-2

9.1.5 Brake

Brake type		RSO1300 (information for each brake circuit)	
Brake torque	[Nm]	1200	
Operating voltage	[V DC]	207	24
Rated power	[W]	156	167
Electrical protection rating		IP 54	
Protection class mechanical with cover		IP 24	

9.1.5.1 Micro switch

Minimum switching capacity	[mA / V DC]	10 / 12
Maximum rating	[A / V AC]	3 / 250
Recommended rating	[mA / V DC]	10 - 50 / 24

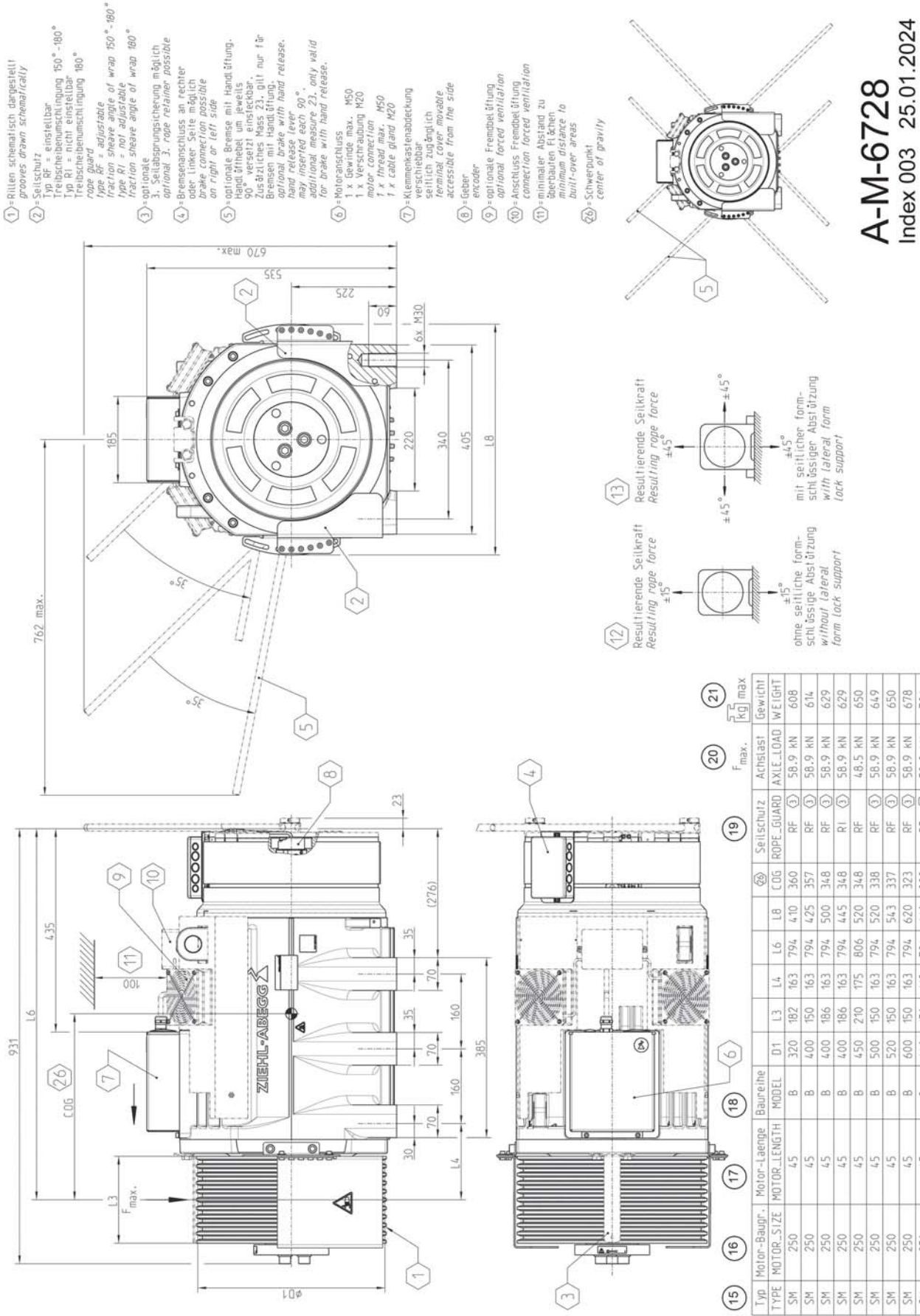
9.1.5.2 Inductive proximity switch

Operating voltage	V DC	10 bis 30
Rated operating current	mA DC	≤ 150
Output functions		NC contact / gauge zero

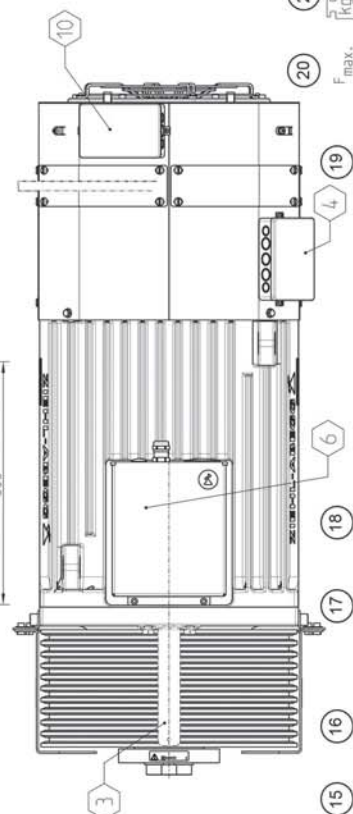
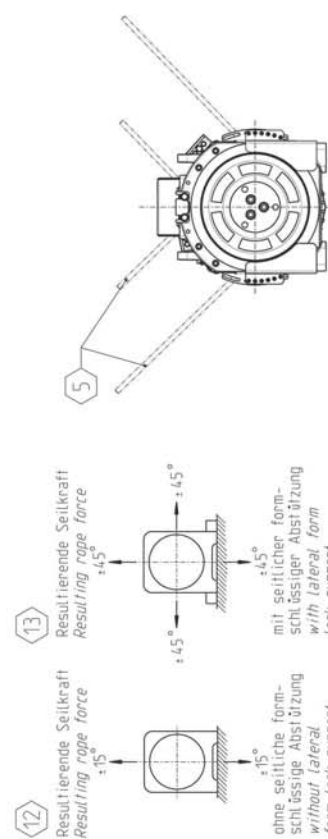
For further information refer to the "Appendix - Brake operating instructions - Assembly and adjustment of the release monitor with inductive proximity switch" chapter.

9.2 Ground

9.2.1 Dimension sheet ZAtop SM250.45B with/without levers for hand release and with/without forced ventilation on top



1	Rillen schematisch dargestellt <i>grooves drawn schematically</i>
2	Seilschutz Typ RF = einstellbar Treibseilbenutzung 150° - 180° Typ RI = nicht einstellbar Treibseilbenutzung 180° <i>type RF = adjustable traction sheave angle of wrap 150° - 180° type RI = not adjustable traction sheave angle of wrap 180°</i>
3	optionale 3. Seilabstürzsicherung möglich <i>optional 3. rope retainer possible</i>
4	Bremsenschluss <i>brake connection</i>
5	optionale Bremse mit Handöffnung, Hand üfthegel an rechter oder linker Seite möglich. <i>optional brake with hand release, hand release lever possible, on right or left side</i>
6	Motoranschluss M50 1 x Verschraubung M20 <i>motor connection 1 x thread max. M50 1 x cable gland M20</i>
7	Klemmenkastenabdeckung verschiebbar seitlich zugänglich <i>terminal cover movable accessible from the side</i>
8	Geber <i>encoder</i>
10	Anschluss Fremdbelüftung <i>connection forced ventilation</i>
11	minimale Wandabstand <i>minimum wall distance</i>
26	Schwerpunkt <i>center of gravity</i>



A-M-6676
Index 003
25.01.2024

(15)	(16)	(17)	(18)	(19)	F _{max}							
Typ	Motor-Baugr. MOTOR-SIZE	Motor-Laenge MOTOR-LENGTH	Baureihe MODEL	Sellschutz COC	Achslast AXLE-LOAD	Gewicht WEIGHT						
			D1	L3	L4	L6	L8					
SM	250	45	B	320	182	163	959	410	366	RF (3)	58.9 kN	612
SM	250	45	B	400	150	163	959	425	363	RF (3)	58.9 kN	617
SM	250	45	B	400	186	163	959	500	354	RF (3)	58.9 kN	632
SM	250	45	B	400	186	163	959	445	354	RI (3)	58.9 kN	633
SM	250	45	B	450	210	175	971	520	353	RF	48.5 kN	653
SM	250	45	B	500	150	163	959	520	344	RF (3)	58.9 kN	652
SM	250	45	B	520	150	163	959	543	343	RF (3)	58.9 kN	653
SM	250	45	B	600	150	163	959	620	329	RF (3)	58.9 kN	681
SM	250	45	B	640	150	163	959	660	304	RF (3)	58.9 kN	729

9.2.3 Legend dimension sheet

- 1 Number of grooves represented schematically
- 2 Rope guard
 - Type RF = adjustable
 - Traction sheave angle of wrap 150° to 180°
 - Type RI = not adjustable
 - Traction sheave angle of wrap 180°
- 3 Optional 3rd rope retainer
- 4 A-M-6676: Brake connection
 - A-M-6728: Brake connection possible on right and left side.
- 5 A-M-6676: Optional brake with hand release system. Lever for hand release possible on right and left side.
 - A-M-6728: Optional brake with hand release system. Lever for hand release may be inserted offset in 90° steps.
- 6 Motor connection
 - 1 x thread maximum M50
 - 1 x with cable gland M20
- 7 Terminal cover movable, accessible from the side
- 8 Encoder
- 9 Optional forced ventilation
- 10 Connection forced ventilation
- 11 A-M-6676: Minimum wall distance 250 mm
 - A-M-6728: Minimum distance to built-over area 100 mm
- 12 Resulting rope force without lateral form lock support
- 13 Resulting rope force with lateral form lock support
- 15 Motor type
- 16 Motor size
- 17 Motor length
- 18 Model
- 19 Type rope guard
- 20 Axle load
- 21 Weight
- 26 Balance point

9.3 EC/EU declaration of conformity

- Translation -
(english)

A-KON16_01-GB
2022/26 Index 004

The manufacturer is **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 - General principles for design - Risk assessment and risk reduction
EN 60034-1:2010 + AC:2010	Rotating electrical machines - Part 1: Rating and performance
EN 81-20:2020	Safety rules for the construction and installation of elevators - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger elevators
EN 60204-1:2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements

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

EN 12015:2014	Electromagnetic compatibility- 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)

i.V. R. Hoppenstedt
(signature)

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

i.V. A. Lagies
(signature)

9.4 Operating instructions brake

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 4 EN)

Translation of the Original Operational Instructions

Design according to
Drawing number: E079 13 033 000 1 10 (without hand release)
Drawing number: E079 13 033 000 1 11 (with hand release)

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 (with Hand Release)
- Page 9:** - Brake Illustrations (without Hand Release)
- Page 10:** - Parts List
- Page 11:** - Technical Data
 - Switching Times
- Page 12:** - Torque-Time Diagram
 - Application
 - Design
 - Function
 - Scope of Delivery / State of Delivery
- Page 13:** - Adjustment
 - Noise Damping
 - Installation Conditions
- Page 14:** - Installation
- Page 15:** - Electrical Connection and Wiring
- Page 16:** - Release Monitoring
- Page 17:** - Braking Torque
 - Brake Inspection
 - Dual Circuit Brake Functional Inspection
- Page 18:** - Maintenance
 - Information on the Components
 - Cleaning the Brake
- Page 19:** - Disposal
 - Malfunctions / Breakdowns

Attachment:

- ☐ Drawing E079 13 033 000 110
for design without hand release
- ☐ Drawing E079 13 033 000 111
for design with hand release

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 760/1 (EU-BD 760)

UK Type Examination Certificate
(Lifts Regulations):

- UK-BD 760/1

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 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 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.

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 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.

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 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 at a max. ambient temperature of 40 °C. For higher requirements on the friction work in case of EMERGENCY STOP or at temperatures of up to 90 °C on the brake flange, special friction materials and noise damping are to be used.
- ☐ 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.

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 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) IP24: Protection against fingers or similar-sized objects, against medium-sized foreign bodies > 12 mm in diameter. Water spray coming from any direction may reduce the braking torque up to max. 50 % of the nominal torque.

(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.

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 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.

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!

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
BGV C1	Safety regulations for theatre stage technical systems
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)

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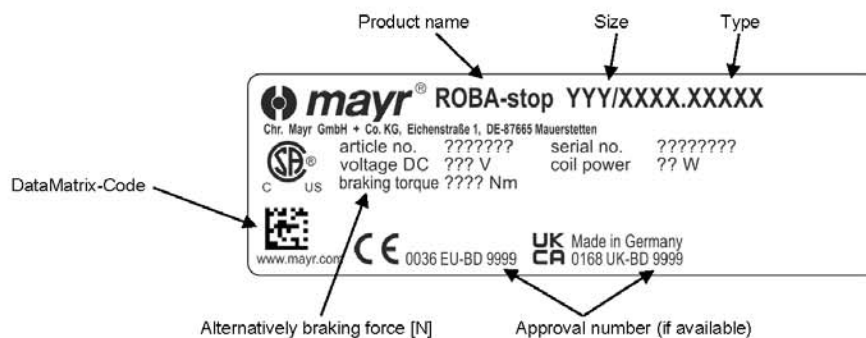

your reliable partner

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 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 (with the ID number of the respective inspection authority, for type examination tested brakes only)

Conformity Markings



in terms of the Canadian and American approval

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 4 EN)

Brake Illustrations for Design with Hand Release

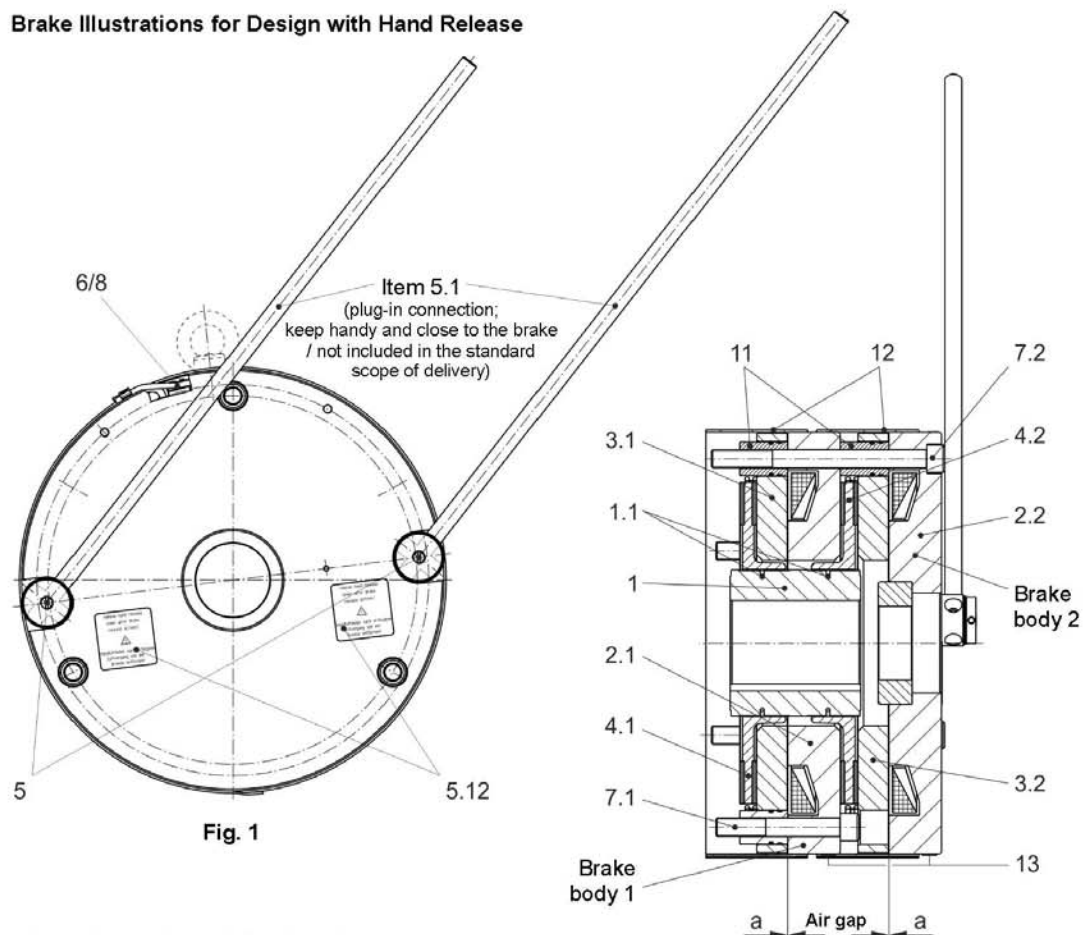
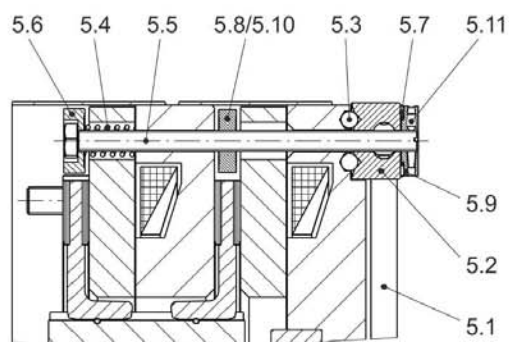


Fig. 3

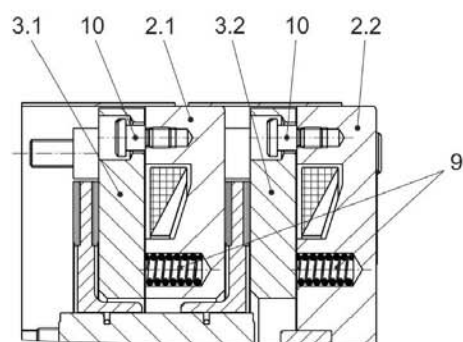


Fig. 4

also applicable for design without hand release

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(E079 13 033 000 4 EN)

Brake Illustrations for Design without Hand Release

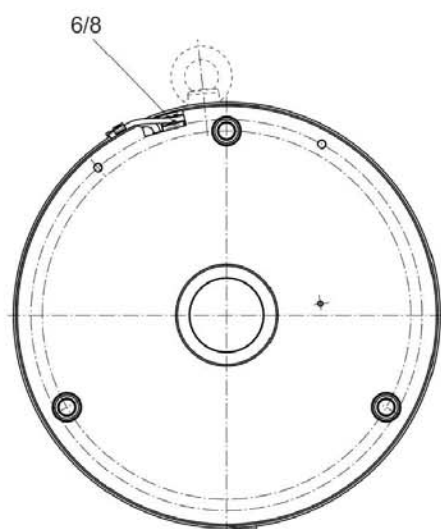


Fig. 5

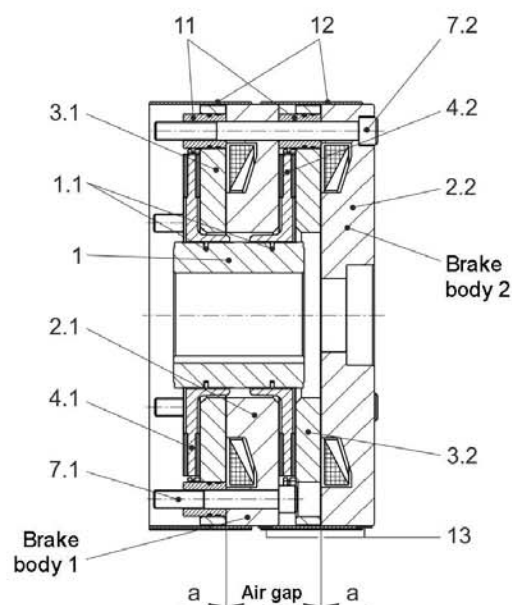


Fig. 6

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Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 4 EN)

Parts List (Only use mayr® original parts)

Item	Name	Pcs.
1	Hub	1
1.1	O-ring	2
2.1	Coil carrier assembly 1	1
2.2	Coil carrier assembly 2	1
3.1	Armature disk 1	1
3.2	Armature disk 2	1
4.1	Rotor 1	1
4.2	Rotor 2	1
5	Hand release (dependent on Type)	1
5.1	Hand release rod	2
5.2	Connection piece	2
5.3	Steel ball	8
5.4	Thrust spring D18.5 / 2.5 x 41	2
5.5	Hexagon head screw M12 x 200	2
5.6	Tension washer	2
5.7	Axial needle roller and cage assembly	2
5.8	Adjusting nut (without centering collar)	2
5.9	Adjusting nut (with centering collar)	2
5.10	Set screw M6 x 10	2
5.11	Set screw M5 x 10	2
5.12	Guideline sign yellow	2
6	Release monitoring with microswitch (dependent on Type)	2
6.1	Microswitch	2
7.1	Cap screw M16 x 110	3
7.2	Cap screw M16 x 190	3
8	Release monitoring with proximity switch (dependent on Type)	2
8.1	Proximity switch	2
9	Thrust spring D22 / 4.5 x 50	24
10	Shoulder screw	4
11	Distance bolt	9
12	Cover	2
13	Type tag	2

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Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 4 EN)

Table 1: Technical Data

Braking torque ¹⁾ :	2 x 1200 Nm
Nominal voltage DC:	2 x 24 V 2 x 207 V
Coil power (at 24 V):	2 x 167 W
Coil power (at 207 V):	2 x 156 W
Inductivity (at 24 V):	2 x 2.5 H
Inductivity (at 207 V):	2 x 160 H
Max. trigger speed:	460 rpm
Max. permitted friction work ²⁾ per brake circuit at 460 rpm:	80000 J
Required hand release force per hand release lever:	approx. 200 N
Rotor thickness, new condition:	15 $\pm$ 0.05 mm
Nominal air gap "a" per brake body:	0.45 mm
Maximum air gap ³⁾ per brake body:	0.9 mm
Tightening torque Item 7.1 and 7.2:	200 Nm
Wrench opening Item 7.1 and 7.2:	SW 14
Protection (electrical):	IP54
Protection (mechanical) with cover:	IP24
Duty cycle with 240 switchings/h:	max. 60 %
Electrical connection (coil):	2 x 0.88 mm ²
Electrical connection (microswitch):	3 x 0.54 mm ²
Electrical connection (proximity switch):	3 x 0.14 mm ²
Ambient temperature:	-5 °C to +40 °C
Mass (without hand release):	105 kg
Mass (with hand release):	113 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⁾ 1 brake circuit brakes / max. 10 braking actions.

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" + 0.2 mm.

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.

Table 2: Switching Times [ms]

Brake						Microswitch
Attraction t_2	Drop-out t_0 DC	Drop-out t_{90} ⁴⁾ DC	Drop-out t_{90} ⁴⁾ DC	Drop-out t_{11} AC	Drop-out t_{11} ⁵⁾ AC	Attraction t_2
570	45	120	140	340	1200	< 650



⁴⁾ Referring to the nominal braking torque

⁵⁾ Referring to the effective braking torque

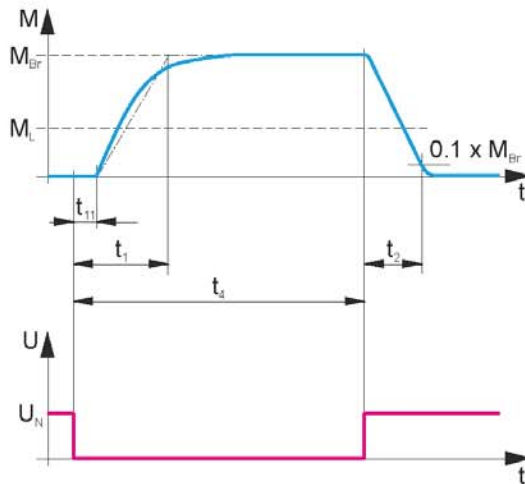
The stated switching times can only be achieved using the respective correct electrical wiring. This also refers to the protection circuit for brake control and the response delay times of all control components. If the brake is operated using overexcitation, the respective switch-on and switch-off times for overexcitation must be taken into account (inadvertent movements of the elevator cage).

The use of varistors for spark quenching increases the DC-side switching times.

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 4 EN)

Torque-Time Diagram



Key

- M_{Br} = Braking torque
- M_L = Load torque
- t_1 = Connection time
- t_{11} = Response delay on connection
(Δt_0 acc. Type Examination Certificate)
- t_2 = Separation time
- t_4 = Slip time + t_{11}
- U_N = Coil nominal voltage

Application

- ☐ ROBA-stop®-silenzio® for use as a holding brake with occasional EMERGENCY STOP braking actions
- ☐ Horizontal brake axis
- ☐ The max. permitted speed and friction work (see Technical Data) must be observed.

Design

The ROBA-stop®-silenzio® 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-stop®-silenzio® 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 car moving in upwards direction and as a braking element against unintended car movement.

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

The ROBA-stop®-silenzio® brake is a spring applied, electromagnetic safety brake.

Spring applied function (brake):

In de-energized condition, thrust springs (9) press against the armature disks (3.1/3.2). The rotor (4.1) in brake body 1 is held between the armature disk (3.1) and the machine wall via frictional locking.

The rotor (4.2) in brake body 2 is held between the armature disk (3.2) and brake body 1 via frictional locking.

The braking torque is introduced into the drive line via the toothing of the rotors.

Electromagnetic function (release):

Due to the magnetic force of the coil in the coil carriers (2.1/2.2), the armature disks (3.1/3.2) are attracted against the spring pressure to the coil carriers (2.1/2.2).

The brake is thereby released and the shaft can rotate freely.

Safety brake function:

The ROBA-stop®-silenzio® brakes reliably and safely in the event of a power switch-off, a power failure or an EMERGENCY STOP.

In de-energized condition, mechanical release of both brake circuits at the same time is possible on the brake with hand release.

By deflecting the hand release using the inserted hand release levers (5.1) in release direction (left or right, see Fig. 1), the armature disks (3.1 and 3.2) are attracted against the thrust springs (8) to the coil carriers (2.1 and 2.2), and the braking torque is cancelled.

! DANGER



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

Scope of Delivery / State of Delivery

Brake bodies 1 (dependent on Type with hand release) and 2 are pre-assembled.

The release monitoring devices (Item 6 or 8 / dependent on Type) are mounted and set manufacturer-side.

The following are included loose in delivery:

- hub (1)
- O-rings (1.1)
- rotors (4.1 and 4.2)
- cap screws (7.1 and 7.2)
- covers (12).

Additional equipment for design with hand release:

- hand release rods (5.1)
- connection pieces (5.2)
- steel balls (5.3)
- axial needle roller and cage assemblies (5.7)
- adjusting nuts (5.9)
- set screws (5.11).

Please check the scope of delivery 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.

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

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Adjustment



The brakes are equipped manufacturer-side with the respective springs for the braking torque stated on the Type tag (13). Adjustment is not necessary. Adaptions or modifications are not permitted as a rule. This rule also applies to the manufacturer-side adjusted noise damping. The switches are also 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 observe the sections Release Monitoring and Wear Monitoring.

Noise Damping



The noise damping was set and adjusted manufacturer-side. However, this component is subject to aging dependent on the application or operating conditions (torque adjustment, switching frequency, ambient conditions, system vibrations etc.). Replacing the damping element is only permitted at the *mayr*® site of manufacture.

Installation Conditions

- ❑ The eccentricity of the shaft end in relation to the mounting pitch circle must not exceed 0.2 mm.
- ❑ The positional tolerance of the threads for the cap screws (7.1 or 7.2) must not exceed 0.2 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 acc. DIN 42955 R.
The reference diameter is the pitch circle diameter for securement of the brakes.
Larger deviations can lead to a drop in torque, to continuous grinding on the rotors and to overheating.
- ❑ The tolerances of the hub (1) and the shaft must be selected so that the hub toothing (1) is not widened.
Widening of the toothing leads to the rotors (4.1 and 4.2) jamming on the hub (1) and therefore to brake malfunctions.
Recommended hub – shaft tolerance H7/k6.
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 $Re = 300 \text{ N/mm}^2$ should be used.
The length of the key must lie over the entire hub.
- ❑ For the dimensioning of the key connections, the permitted tensions common in machine construction must be considered. During initial operation, check whether the key is inserted correctly and whether the brake is secured to the **tightening torque of 200 Nm**.
- ❑ The rotors (4.1 and 4.2) and brake surfaces must be oil and grease-free.
- ❑ 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 $Ra = 0.8 - 1.6 \mu\text{m}$. The mounting surface must be turned. The surface must be bare or FE-phosphated (layer thickness approx. $0.5 \mu\text{m}$) 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 toothings of the hub (1) and the rotors (4.1 and 4.2) must not be oiled or greased.
- ❑ Please abstain from using cleaning agents containing solvents, as they could affect the friction material.

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 4 EN)

Installation (Figs. 1 to 8)



On designs without hand release, points 9 to 16 do not apply.

1. Mount the hub (1) onto the shaft, bring it into the correct position (the length of the key should lie over the entire hub) and secure it axially (e.g. using a locking ring).
2. Lightly grease an O-ring (1.1) and insert it into the hub (1) groove nearest to the machine wall.
3. Push rotor (4.1) by hand using light pressure over an O-ring (1.1) onto the shaft (long rotor collar should be facing away from the machine wall). Make sure that the toothing moves easily. Do not damage the O-ring.
4. Lightly grease the second O-ring (1.1) and insert it into the not occupied hub (1) groove.
5. Push brake body 1 over the hub (1) and the rotor collar of the rotor (4.1) (please make sure that the fixing holes align with the threaded holes in the machine wall). Insert the cap screws (7.1) evenly distributed into brake body 1 (Positions as shown in Fig. 7) and tighten them evenly all around **using a torque wrench and a tightening torque of 200 Nm**.
6. Push rotor (4.2) by hand using light pressure over an O-ring (1.1) onto the shaft, so that the friction linings of the rotor (4.2) lie against brake body 1 (long rotor collar should be facing the machine wall). Make sure that the toothing moves easily. Do not damage the O-ring.
7. Insert the cap screws (7.2) into the bores in brake body 2, join with brake body 1 (see Fig. 2) and screw onto the machine wall. Tighten the cap screws (7.2) evenly all around **using a torque wrench and a tightening torque of 200 Nm**.
8. **Check air gaps "a" (Figs. 2 and 6)**
The air gap $0.40 \text{ mm} \leq "a" \leq 0.60 \text{ mm}$ must be given.
9. Lightly grease 2 x 4 steel balls (5.3) (with a bearing grease) and insert into the grooves in the coil carrier (2.2) (Fig. 8).
10. Push both connection pieces (5.2) with the grooves first onto the hexagon head screws (5.5).
11. Join the axial needle roller and cage assemblies (Item 5.7, lightly greased with the bearing grease) onto the centering collar of the adjusting nuts (5.9); then screw the adjusting nuts (5.9) with the axial needle roller and cage assemblies (5.7) first onto the hexagon head screws (5.5) up to contact onto the connection pieces (5.2).

Hand Release Adjustment (brake de-energized)

12. Push the adjustment plate 1.8 mm between one adjusting nut (Item 5.8) and the armature disk (3.2).
13. Screw the adjusting nut (Item 5.9) onto the hexagon head screw (5.5) until the adjustment plate is clamped, then screw it back out again until the adjustment plate can be removed. It is possible to counter the hexagon head screw (5.5) using the slot on the end of the screw.
14. Paint the set screw (5.11) with Loctite 243, screw it into the adjusting nut (5.9) to a tightening torque of 4 Nm, thus clamping the adjusting nut (5.9) onto the hexagon head screw (5.5).

15. Repeat points 11 – 14 on the opposite side.
16. Check the hand release function:
Insert both hand release rods (5.1) into the connection pieces (5.2) and deflect to the right or the left by approx. 45°. Required hand release force approx. 200 N per lever. The shaft must now be freely rotatable.
17. Mount the covers (12).
18. Connect the brake electrically.

Position for cap screws
(7.1) in brake body 1

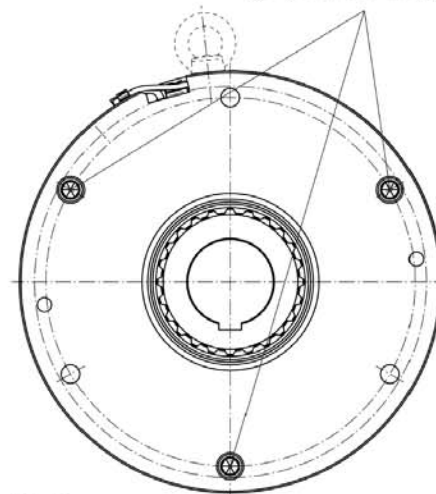


Fig. 7
Depicted without brake body 2

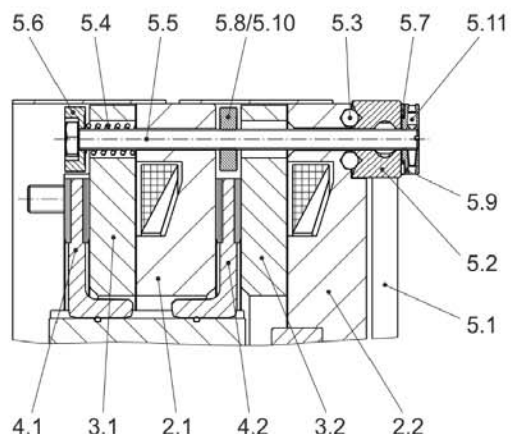


Fig. 8

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

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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 ($\pm 10\%$ 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

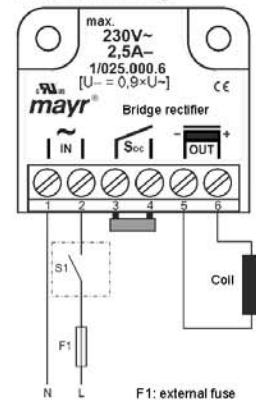
The reliable operational behavior of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the temperature and the air gap between the armature disk and the coil carrier (dependent on the wear condition of the linings).

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

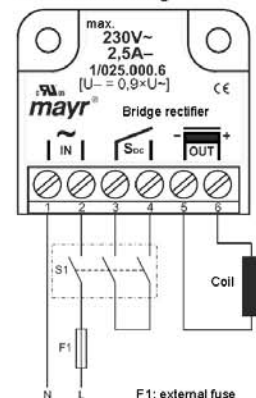


The power circuit is interrupted in front of the rectifier. The magnetic field slowly reduces. This delays the rise in braking torque.

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



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.

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 4 EN)

Release Monitoring (Item 6 or 8 / Figs. 1 and 5)



Please observe that the microswitches may only be connected to the secondary circuit (requirement resulting from CSA / UL approval).

Please carry out a functional inspection before brake initial operation!

The brakes are supplied with manufacturer-side set 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.

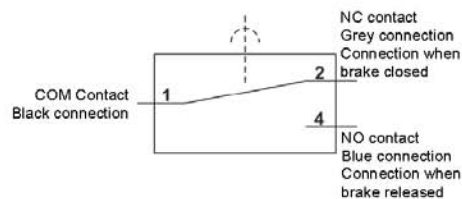
From the point at which the brake is energized, a time span of three times the separation time must pass before the switch signal on the release monitoring is evaluated.

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)

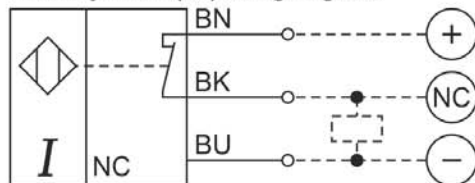
Microswitch (6.1) Wiring Diagram:



Technical Data of the Proximity Switch (8.1)

Operating voltage DC:	10...30 V
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 ₀ :	≤ 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 (2.1/2.2), the armature disk (3.1/3.2) is attracted to the coil carrier (2.1/2.2). 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 (3.1/3.2) and the coil carrier (2.1/2.2).
- ❑ Extreme warping on the armature disk (3.1/3.2).
- ❑ Excessively large air gap "a" between the armature disk (3.1/3.2) and the coil carrier (2.1/2.2) 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.

29/03/2023 TK/HW/MF/GF

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Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 4 EN)

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.

Brake Inspection (before brake initial operation)

- ☐ **Air gaps inspection (Fig. 2):**
Air gaps "a" of both brake circuits (brake de-energized):
Air gap: $0.40 \text{ mm} \leq "a" \leq 0.60 \text{ mm}$
- ☐ **Braking torque inspection:**
Please compare the requested braking torque with the torque stated on the Type tag (13).
- ☐ **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 (dependent on Type).
- ☐ **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)**

Dual Circuit Brake Functional Inspection

The ROBA-stop®-silenzio® 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.

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 4 EN)

Maintenance

ROBA-stop®-silenzio® 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 rotors: 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 (1) to the rotors (Items 4.1 and 4.2). Max. permitted toothing backlash 0.3°.
5. Running noise (brake rotors) during operation

Attention: Permanent grinding of the rotors 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 rotors 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 rotors (4.1 and 4.2), please measure the air gap "a", see Figs. 2 and 6.
If the brake limit air gap (0.9 mm) has been reached, meaning that the friction linings are worn down, the braking torque is lost and the rotors (4.1 and 4.2) must be replaced.
Brake de-installation is carried out by following the instructions in the section Installation (page 12) backwards.

Before Replacing the Rotors

- ☐ Clean the brake.



Please observe the section "Cleaning the Brake", see below.

- ☐ Measure the rotor thickness "new" (nominal dimension acc. Table 1).

Replacing the Rotors (4.1 and 4.2)

Rotor (4.1 and 4.2) replacement is carried out by following the Brake Installation instructions backwards.



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

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.

Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00_.31 Size 1300

(E079 13 033 000 4 EN)

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 ☐ Air gap too large (worn rotors) ☐ Coil interrupted	☐ Apply correct voltage ☐ Replace rotors ☐ Replace the brake
Brake engagement delayed on EMERGENCY STOP	☐ Brake is switched AC-side	☐ Switch DC-side
Release monitoring does not switch	☐ Brake does not release ☐ Defective switch	☐ Solution as above ☐ Replace the switch (manufacturer-side)



mayr® will take no responsibility or guarantee for replacement parts and accessories which have not been delivered by mayr®, or for damage resulting from the use of these products.

9.4.1 Assembly and adjustment of the release monitor with microswitch

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)

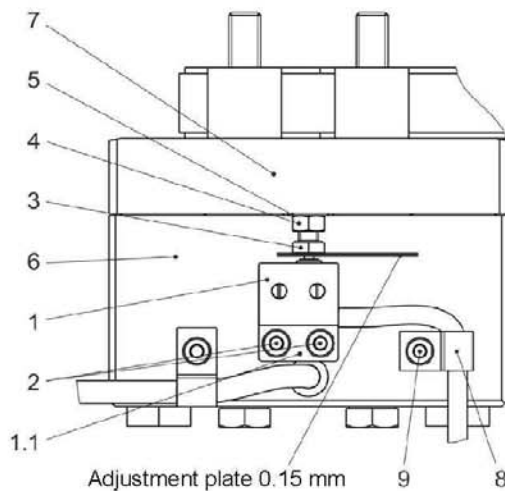


Fig. 1

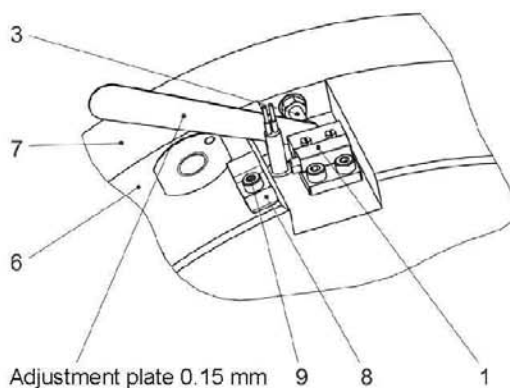


Fig. 2

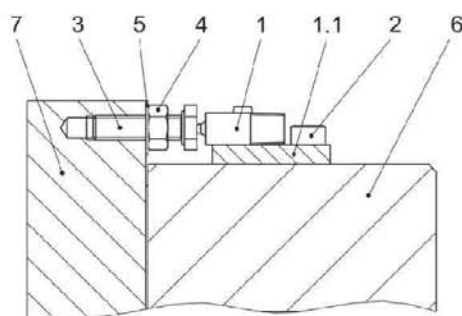


Fig. 3



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 (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.

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. 1/2 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

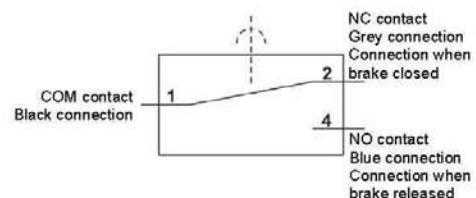
Join the loose adjustment plate 0.15 mm between the hexagon head screw (3) and the microswitch tappet (1):
Brake de-energized: Inspection lamp must signal "OFF".
Brake energized: Inspection lamp must signal "ON".
Join the loose adjustment plate 0.2 mm between the hexagon head screw (3) and the microswitch 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: 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)



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.

9.4.2 Assembly and adjustment of the release monitor with inductive proximity switch

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.

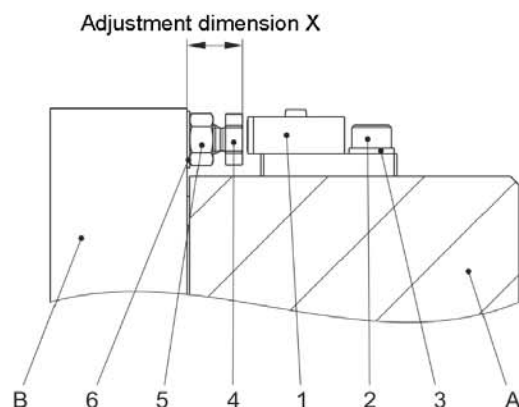


Fig. 1

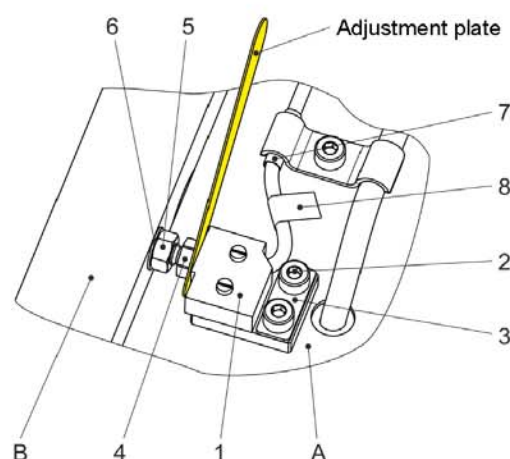


Fig. 2

(Example: Switch with cable outlet on the right side)

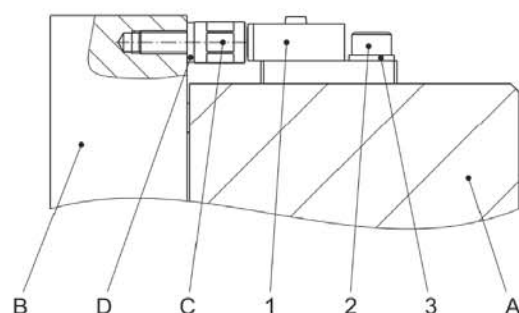


Fig. 3 (Design with switching bolt)

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 ROBA®-diskstop® (RSD)	500 6	11.5 14.5	8265921 (1 x cable outlet on the left side (RSQ) / 1 x cable outlet on the right side (RSD))
RSQ ROBA®-diskstop® (RSD)	500 8	11.5 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.

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) ROBA®-twinstop® (RTW) ROBA®-diskstop® (RSD) 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.

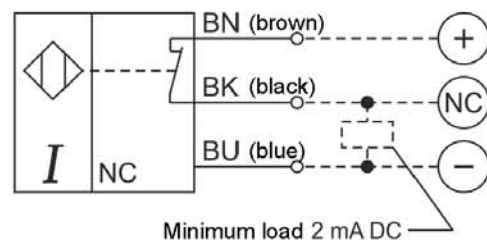


For brake design with hand release:
If the hand release is actuated, the switching signal of the proximity switch cannot be guaranteed.

Technical Data

Operating voltage:	10...30 VDC
Residual ripple content:	≤ 10 % U_{SS}
DC rated operating current: (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_N :	≤ 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):



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.

9.5 EU Declaration of Conformity for Brake

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			
Chr. Mayr GmbH + Co. KG Eichenstraße 1 D-87665 Mauerstetten			
DE	erklärt folgende Konformität gemäß EU-Richtlinie und Normen für Artikel	IT	dichiara la seguente conformità secondo la direttiva UE e le norme per l'articolo
EN	explains the following conformity according to EU directives and norms for the following product	ES	declara la siguiente conformidad a tenor de la directiva y normas de la UE para el artículo
FR	déclare la conformité suivante selon la directive CE et les normes concernant l'article	PT	declara a seguinte conformidade, de acordo com as diretiva CE e normas para o artigo
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	
ROBA-stop®-silenzio®		200/300/500/800/1300/1800	
		Typen / Types / Types / Serie / Tipos / Tipos	
		896.0 _ _ _ _	
	2006/42/EG	X	2011/65/EU (RoHS II) incl. 2015/863/EU (RoHS III)
X	2014/35/EU	X	2014/33/EU
	2014/30/EU		
Certification Notified Body: © TÜV SÜD Industrie Service GmbH Westendstraße 199 D-80686 München Reg. No.: 0036 Certificate No. EU-BD 760, 760/1		Monitoring of production (if deviates from the certifier) Notified Body: Reg. No.: Certificate No.:	
Normen Referenz / Standards reference / Référence normes / Riferimenti norme / Referencia normas / Referência padrões: EN 81-20:2020-06 / EN 81-50:2020-06 / DIN VDE 0580:2011-11 / DIN EN IEC 63000:2019-05			
Sicherheitsfunktion / Safety function / Fonction de sécurité / Funzione di sicurezza / Función de seguridad / Função de segurança			
DE	Bremseinrichtung, als Teil der Schutzeinrichtung für den aufwärtsfahrenden Fahrkorb gegen Übergeschwindigkeit und Bremsselement gegen unbeabsichtigte Bewegung des Fahrkorbs.		
EN	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.		
FR	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.		
IT	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.		
ES	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.		
PT	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.		
Identification:	Jahr der Herstellung: Année de production: Año de fabricación:	Siehe Typenschild am Produkt Voir l'étiquette sur le produit ver placa de identificación del producto	Year of manufacture: Anno di produzione: Ano de fabricação:
			see product label vedi l'etichetta sul prodotto Ver placa do produto
Dokumentationsbeauftragter / documentation officer / Spécialiste documentation / ufficiale documentazione / oficial documentación / oficial documentação  Qualitätsmanagement			
Mauerstetten, 03.03.2023 Ort und Datum / place and date / Lieu et date / lugar – data / fecha y lugar / Lugar e data		 Geschäftsführer / Managing Director / Directeur Général / Gerente / Gerente Ferdinand Mayr M.Sc.	

9.6 EU Type Examination Certificate

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ CERTIFICADO ◆ CERTIFICAT



EU TYPE-EXAMINATION CERTIFICATE

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

Certificate No.:	EU-BD 760/1
Certification Body of the Notified Body:	TÜV SÜD Industrie Service GmbH Westendstr. 199 80686 Munich - Germany Identification No. 0036
Certificate Holder:	Chr. Mayr GmbH & Co. KG Eichenstr. 1 87665 Mauerstetten - Germany
Manufacturer of the Test Sample: (Manufacturer of Serial Production – see Enclosure)	Chr. Mayr GmbH & Co. KG Eichenstr. 1 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:	896.0 __ . __, Size 200, 300, 500, 800, 1300, 1800
Directive:	2014/33/EU
Reference Standards:	EN 81-20:2014 EN 81-50:2014
Test Report:	EU-BD 760/1 of 2019-02-18
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:	2019-02-18


Achim Janocha

Certification Body "lifts and cranes"



TUV®

**Annex to the EC Type-Examination Certificate
No. EU-BD 760/1 of 2019-02-18**



1 Scope of application

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

1.1.1 Permissible brake torques and maximum tripping rotary speeds of the traction sheave when the brake device acts on the shaft of the traction sheave while the car is moving upward

Size	Permissible brake torque [Nm]	Max. tripping rotary speed of the traction sheave [rpm]
200	300 - 600	1000
300	450 - 1000	800
500	760 - 1600	870
800	1200 - 2400	730
1300	1960 - 3600	580
1800	2700 - 4600	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 center to rope's center (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

Size	Min. nominal brake torque* [Nm]	Max. nominal brake torque * [Nm]	Max. tripping rotary speed [rpm]	Maximum response times** [ms]		
				without overexcitation		
				t_0	t_{50}	t_{90}
200	2 x 150 = 300		1000	80	120	170
200		2 x 300 = 600	1000	35	60	100
300	2 x 225 = 450		800	90	170	200
300		2 x 500 = 1000	800	35	100	165
500	2 x 380 = 760		870	100	160	230
500		2 x 800 = 1600	870	45	75	140
800	2 x 600 = 1200		730	95	175	220
800		2 x 1200 = 2400	730	35	75	140
1300	2 x 980 = 1960		580	115	180	250
1300		2 x 1800 = 3600	580	45	90	130
1800	2 x 1350 = 2700		500	145	225	320
1800		2 x 2300 = 4600	500	65	150	190

Interim values can be interpolated

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

Page 1 of 3

**Annex to the EC Type-Examination Certificate
 No. EU-BD 760/1 of 2019-02-18**



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

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	NO

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 has to be secured against unauthorized adjustment (e. g. sealing lacquer).
- 2.5 The identification drawing no. E07909000000260 including stamp dated 2015-09-30 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 A code number for the brake moment effectively adjusted will be marked at the first blank in the type designation 896.0 __ . __ within the permissible scope of application. A code number for design characteristics which are not directly part of the type-examination will be marked at the second, third and fourth blank (e. g. in the second blank: with flange plate, hand release; in the third blank: characteristics for electrical connection; in the fourth blank: with or without cover).
- 3.2 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.

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

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**Annex to the EC Type-Examination Certificate
No. EU-BD 760/1 of 2019-02-18**



Industrie Service

- 3.3 Checking whether the requirements as per section 5.9.2.2 of EN 81-20:2014 (D) have been complied with is not part of this type examination.
- 3.4 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.
- 3.5 This EU type-examination certificate was issued according to the following standards:
 - 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
- 3.6 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.

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**Enclosure to the EU Type-Examination Certificate
No. EU-BD 760/1 of 2019-02-18**



Industrie Service

Authorised Manufacturer of Serial Production – Production Sites (valid from: 2018-12-21):

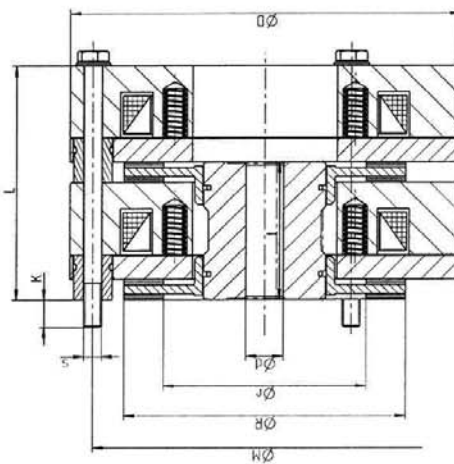
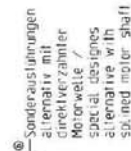
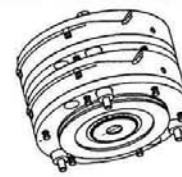
Company Chr. Mayr GmbH & Co. KG
Address Eichenstr. 1
87665 Mauerstetten - Germany

Company Mayr Polska Sp. z. o. o.
Address Rojów, ul. Hetmanska 1
63-500 Ostrzesów - Poland

- END OF DOCUMENT -

Based on: Application from Co. Mayr GmbH of 2018-12-21

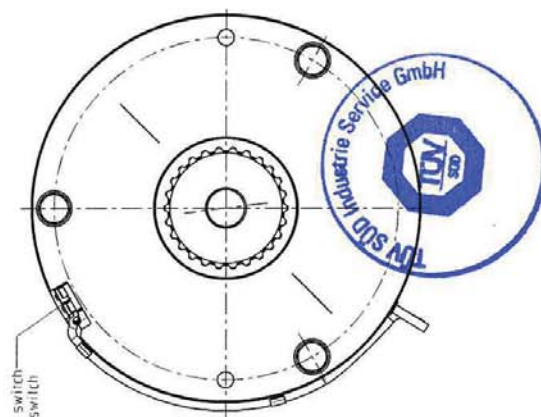
Page 1 of 1



30. SEP. 2015

GEPRÜFT / APPROVED
TUV SÜD Industrie Service GmbH
Prüflaboratorium für Produkte der Fordeertechnik
Westendstraße 199

Sachverständige(r) / Expert
80696 München
H. Nagem



⑤ Maße variabel:
Zuasse Bohrungsdurchmesser, Nabenlängen und Einschraubtiefen sind vom Drehmoment der Brenne abhängig und können an vorgegebene Wellenenden bzw. Motorflansche angepasst sein. / Dimensions variable:
Permitted bore diameters, hub lengths and screw in depth are dependent on
drinking torque an could be adapted to specified motorflanshs and motor flanges.

Groble	Bahutya/ bore d	⑥ Ø0+5	⑦ ØR+4	ØR	ØM	L	h⑧ L	⑨ K	⑩ S
200	30-16	223	170	122	196	152	68	16.4	3xM10 ⑥6xM10
300	24-59	261	188	135	230	159	93	10.7	3xM12 ⑥6xM12
500	40-69	285	213	150	250	172	102	25.5	6xM12
800	45-79	379	246	180	290	189	127	28	6xM16
1300	56-95	370	283.5	208	⑩325/ 330	⑥158- 159	⑥115- 112	24.30	6xM16 8xM16
1800	66-104	415	320	230	370	205	152	37	8xM16

15

[illegible]

9.6.1 Statement on type examination certificates

The rated brake torques can be found on the name 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.

9.7 Calculation of tripping speed

DTS = diameter of the traction sheave (table contains typical traction sheave diameters, other diameters can be recalculated linear)
 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

Type	DTS	Nbn	Nbmax	Vn (1:1)	Vmax (1:1)	Vn (2:1)	Vmax (2:1)
	[mm]	[min ⁻¹]	[min ⁻¹]	[m/s]	[m/s]	[m/s]	[m/s]
SM250.45B	320	400	460	6.70	7.71	3.35	3.85
SM250.45B	400	400	460	8.38	9.63	4.19	4.82
SM250.45B	500	400	460	10.47	12.04	5.24	6.02
SM250.45B	520	400	460	10.89	12.52	5.45	6.26
SM250.45B	600	400	460	12.57	14.45	6.28	7.23
SM250.45B	640	400	460	13.40	15.41	6.70	7.71

9.8

Calculation proof

- Translation -
(english)

A-BN17_08-GB 1817 Index 002

The manufacturer is **ZIEHL-ABEGG SE**
Heinz-Ziehl-Straße
74653 Künzelsau
Germany

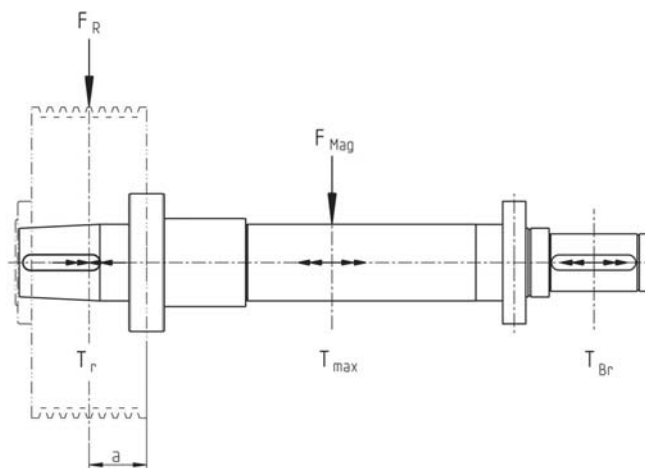
Confirmation concerning the examination of traction sheave shaft calculation including shaft-hub-connections.

Type of the gearless machine: **ZAtop SM250.45B**

Object examined: Calculation of traction sheave shaft including shaft-hub-connections by IFF ENGINEERING & CONSULTING GmbH No. 6.1.528.3 dated 24.08.2016

Examination basis:

DIN 743-1:2012-12	Calculation of load capacity of shafts and axles – Part 1: General
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 Corrigendum 1:2014-12	Calculation of load capacity of shafts and axles – Part 3: Strength of materials, Corrigendum to DIN 743-3:2012-12
DIN 743-4:2012-12	Calculation of load capacity of shafts and axles – Part 4: Fatigue limit, endurance limit – Equivalently damaging continuous stress
DIN 6892:2012-08	Drive type fastenings without taper action - Parallel keys – Calculation and design
DIN 6892 Corrigendum 1:2014-05	Drive type fastenings without taper action – Parallel keys – Calculation and design, Corrigendum to DIN 6892:2012-08
FKM-Guideline 2012	Analytical strength assessment of mechanical components



Construction drawing: A-25-121-0054 Index 000 dated 23.03.2016

Permissible shaft materials: Steel DIN EN 10083-3:2007-01 – 42CrMo4+QT (1.7225+QT)
 Steel DIN EN 10083-3:2007-01 – 42CrMoS4+QT (1.7227+QT)
 Steel DIN EN 10083-3:2007-01 – 50CrMo4+QT (1.7228+QT)

Permissible traction sheave hub materials: Steel DIN EN 10083-2:2006-10 – C45+N (1.0503+N)
 Cast iron DIN EN 1561:2012-01 – EN-GJL-300 (GG-30)

Permissible feather key traction sheave materials: Steel DIN EN 10083-3:2007-01 – 42CrMo4+QT (1.7225+QT)

Permitted materials brake hub: Steel DIN EN 10083-2:2006-10 – C45 (1.0503)
 tensile strength $R_{eN} = 560 \text{ N/mm}^2$

Permissible parallel key brake hub materials: Steel DIN EN 10083-3:2007-01 – 42CrMo4+QT (1.7225+QT)
 Steel DIN EN 10277-2:2008-06 – C45+C (1.0503+C)

Load data:

Maximum permissible static operating shaft load	F_R	58.9 kN
Distance from bearing A to centre traction shaft	t_o	75 mm
Rated torque	T_r	1120 Nm
Maximum torque	T_{max}	2400 Nm
Magnetic force	F_{Mag}	3434 N
Nominal brake torque	T_{Br}	2400 Nm (2 x 1200 Nm)
Maximum brake torque	$2 \times T_{Br}$	4800 Nm
Rated speed	n_r	400 rpm

Examination result:

For the examination a calculation of traction sheave shaft including shaft-hub-connections was carried out by IFF ENGINEERING & CONSULTING GmbH. The result was that the traction sheave and the shaft-hub-connections were designed according to the maximum load data.

An installation free of stresses and an unmovable mounting of the bearings in each direction is presupposed. The machine frame and the points of force introduction have to be designed regarding construction and strength appropriate to the forces imposed on the bearings.

It should be noted that on the brake side only braking torque is applicable, because the calculation does not take into account the additional transverse forces due to the braking effect on the traction sheave shaft.

Künzelsau, 24.04.2018
(Location, date of issue)

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

i.V. R. Hoppenstedt

(signature)

ZIEHL-ABEGG SE
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