

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**  
**SM225.60B**

Gearless permanent magnet synchronous motor

**Original operating instructions**

Store for future use!

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# 1 General information

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 Application

The ZAtop is designed as a gearless drive for traction sheave rope elevators.

**No other drive applications are permitted without the disengagin by the ZIEHL-ABEGG SE company!**

## 1.2 Structure of the operating instructions

This manual is part of the drive and must always be kept in its vicinity for reference at all times. All persons involved in mounting, operation, maintenance or repair of the drive must have read and understood this manual. ZIEHL-ABEGG SE takes no responsibility for damage or disruption caused by disregard of this manual.

## 1.3 Target group

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

## 1.4 Exclusion of liability

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

## 1.5 Copyright

The copyright to this operation instructions is held by ZIEHL-ABEGG SE, Künzelsau. This operation instructions must not be wholly or partly reproduced for competitive purposes, used in any unauthorised way or made available to third parties without our agreement.

# 2 Safety instructions

## 2.1 General




ZIEHL-ABEGG SE electric motors are not ready-to-use products and may only be operated after having been installed into machines or plants and established their safety, depending on the application, by protective grating, barriers, constructive devices or other adequate measures (see also 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 Pictographs

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

	<p><b>Danger!</b>                  General hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!</p>
	<p><b>Warning!</b>                  Middle or slight bodily harm is possible if the corresponding precautions are not taken!</p>
	<p><b>Caution!</b>                  Material damage is possible if the corresponding precautions are not taken.</p>

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

## 2.3 General safety instructions



**Danger!**

When the motor shaft is turning, voltage will be induced and applied to the connection terminals!



**Danger!**

▷ The motor has casted eyelets or threads to suit eyebolts. The eyelets are for the transport of the motor including sheave and brake only. Do not lift higher loads with these eyelets for example a socket, ropes, etc. Use adequate hoists. **Danger to life!**



**Warning!**

▷ Dependent on the working conditions the surface temperature can be very high. **Danger of burns!**

- ▷ The motor is only to be operated within the ranges specified on the type plate!
- ▷ Use the motor only as intended and only for the specified tasks in the purchase order!
- ▷ **When the motor current is off, it can not develop any electric torque. When opening the brakes the lift will accelerate uncontrolled! Therefore it is recommended to short-circuit the motor windings, when the motor current is off. This induces a speed dependent braking torque similar to the friction of a worm gearbox. The short-circuit has to be made by main contacts of the contactors, because the current is approx. rated current. In any case do not short-circuit the windings, while the motor wires still carry current.**
- ▷ Safety features, for example the brake release monitoring, may not be dismantled, circumvented or made inoperative!
- ▷ A temperature sensor is installed into the winding as motor protection and must be connected!

## 2.4 Requirements placed on the personnel / due diligence

- ▷ 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.

# 3 Product overview

## 3.1 Operational area

The ZAtop, a permanent magnet inner-rotor synchronous motor, offers all benefits which a modern elevator motor asks for:

- simple installation
- best controllability
- lowest noise level
- highest travel comfort

The BEST solution for elevators with and without machine rooms. The certified brakes provide maximum security and are approved as a safety device for ascending car overspeed protection. Protected through registered design and patent applications, this product allows you to built an elevator without machine room.

### 3.2 Transport

- ▷ ZIEHL-ABEGG SE electric motors are packed by the manufacturer for the types of transport and storage agreed upon.
- ▷ Transport the motor(s) either with the original packing or at the casted eyelets or eyebolts using adequate hoists.
- ▷ Transport motor without any additional load and taking the centre of gravity into account!
- ▷ The threads in the shaft ends are not to suit eyebolts to transport the motor.
- ▷ Avoid excessive vibration and shocks.
- ▷ Check packing and motor for possible damage and report the forwarding agency about any damages caused by transport. Shipping damages are not covered by our guarantee!

### 3.3 Storage

- ▷ Store the motor in the original packaging in a dry area protected from the weather or protect it from dirt and weather until final mounting.
- ▷ 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)!
- ▷ Avoid excessive storage times (we recommend max. one year) and check motor bearing for correct function before installing the motor. (Ease the brakes and move the rotor by hand. Take care if the bearing makes untypical noises)

### 3.4 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!

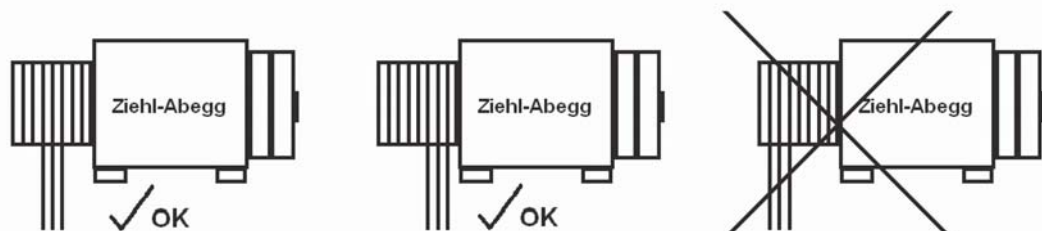
#### Caution!

- ▷ When working at or in the lift, the drive and especially the brakes have to be covered and protected against dust and chips.

**Any violation will result in a loss of guarantee on the motors and accessories!**

The following general rules apply:

- ▷ The rope pull may be vertical or horizontal.
- ▷ **At lateral (horizontal) rope pull, the motor housing must be supported on the side. The fixings screws of the motor must not be loaded with shearing force!**
- ▷ 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 motor side.



- ▷ Do not install distorted.
- ▷ Do not apply any force (levering, bending). Above all, do not expose the rotor to any heavy mechanical shocks.
- ▷ Carry out the electrical connection in accordance with the enclosed wiring diagram.
- ▷ Before starting installation, the drive must be checked for transport damage, especially the cables have to be checked.

- ▷ No welding must be carried out on the drive. The drive must not be used as an earthing point for welding. Magnets and bearings could be destroyed.
- ▷ The cooling-airflow around the motor must not be obstructed.
- ▷ Keep at least 290 mm space between the brake and the wall (axial direction) to make access to the encoder possible.

#### 4.2 Patent situation

**Please pay attention to the patent situation concerning the use of elevator machines in the shaft. When using the ZAtop according to our installation examples there are no problems with patents. In doubt please contact ZIEHL-ABEGG SE.**

- ▷ When installing the motor in the elevator shaft, the motor can be placed in the shaft head, with the motor axle parallel to the nearest wall.
- ▷ The motor must not be hanged over the cabin.
- ▷ The motor should be fastened at the framework, Halfen cast-in channels or girders. The drive must not be placed or fastened onto all four guide rails.
- ▷ If the girder that supports the motor is fastened at one wall, the motor has to be installed on top of the girder. A hanging motor is not permissible!

#### 4.3 Mounting the drive unit

- ▷ On the bottom side of the socket are 6 threads.
- ▷ The motor has to be fixed with 6 screws M30 - 8.8 at the mounting plate.  
**Tightening torque M30 - 8.8: 1350 Nm**
- ▷ Screw-in depth at least 1.5 times of screw size. (minimum 45 mm, maximum 60 mm)
- ▷ Fasten the screws crosswise in at least two steps to the required tightening torque.
- ▷ The permissible unevenness for the mounting surface is 0.3 mm.
- ▷ The mounting surface has to be rigid and robust enough to withstand the forces.
- ▷ For the installation, insulating elements should be used to absorb the vibration.

#### 4.4 Fastening the brake

The drive will be delivered with the mounted brake.  
Brake fixation in accordance with the brake operating instructions.



#### Information

**An exchange of the brake can be carried out only with special centering tool. Please contact the ZIEHL-ABEGG SE customer service in case of a brake exchange!**

#### 4.5 Fastening rope protection clamp

- ▷ The drive unit is equipped with two rope protection clamps.
- ▷ Each of the two rope protection clamps will be fastened at the bearing bracket with two screws M12 x 25 and washers.  
**Tightening torque M12 - 8.8: 79 Nm**
- ▷ Through the longholes in the clamp the required rope direction can be adjusted.
- ▷ The rope protection clamps must be fastened in a distance of 2 - 3 mm to the ropes.
- ▷ **On installations with rope pull upwards a protection must be installed to prevent foreign bodies to entering between rope and traction sheave.**

## 5 Electrical installation

### 5.1 Safety precautions

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.



### 5.2 EMC directive

The adherence to the EMC Directive 2004/108/EC only pertains to this product if controllers tested and recommended by ZIEHL-ABEGG SE are used, which have been installed in accordance with the corresponding controller description and in line with the EMC. If the product is integrated unprofessionally into a system or complemented by and operated with components (e. g. regulators and controllers) which have not been recommended, the operator of the complete system alone shall be responsible for adhering to the EMC Directive 2004/108/EC.

### 5.3 Motor connection

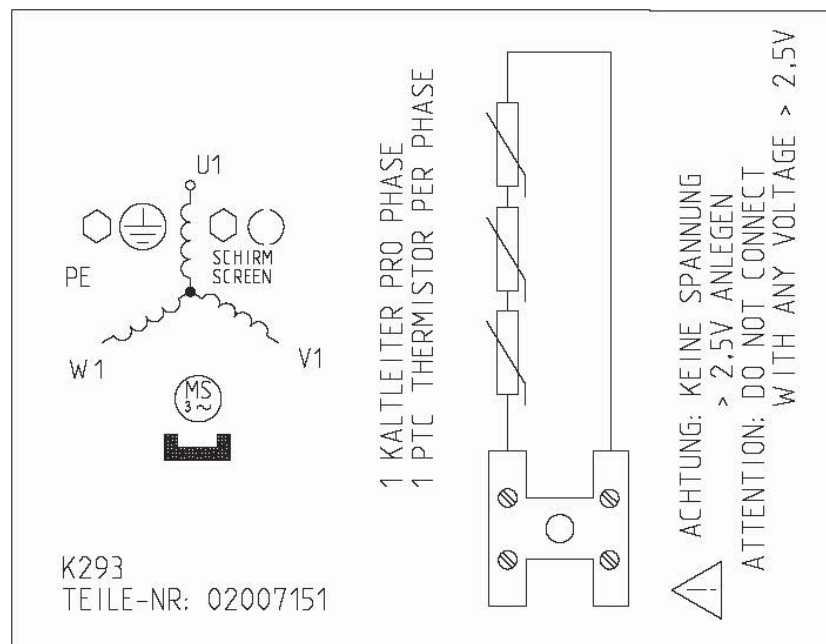
CAUTION!

- ▷ **The drive must not be connected to the mains supply without a controller!**
- ▷ **The motor is permitted to be used at frequency inverters with a maximum DC-link voltage of < 750 V DC!**
- ▷ **A screened motor cable has to be used. The screen has to be connected on both ends. The maximum motor cable length is 25 m.**
- ▷ If no other agreement was met, the absolute encoder offset is set to 0 To do that, connect the direct current with **U to +** and **V and W to -**.
- ▷ The motor connection lines U, V and W have to be connected on the motor and inverter side to the correct phases and must not be changed. Otherwise the motor may speed up uncontrolled.
- ▷ The motor is protected by PTC-resistors. The connection has to be made via a PTC resistor controller! The admissible test voltage of PTC resistors is maximum 2.5 V DC.

#### Mechanical connection conditions

Motor rated current [A]	Terminal board	Thread
up to 20	M 8	M 25
> 20 - 25	M 8	M 32
> 25 - 35	M 8	M 32
> 35 - 50	M 8	M 40
> 50 - 63	M 8	M 40

#### Wiring diagram Motor



permissible tightening torque for bolts M8: 6 Nm



## 5.4 Absolute encoder connection



### Caution!

Never touch the connection contacts on the position absolute encoder or on the cable! The electronics can be destroyed by static electricity.

- ▷ The absolute encoder must be connected to the frequency inverter.
- ▷ The absolute encoder contains components that may be damaged by electrostatic discharge. The body of the person touching them must first be discharged, for example, by touching a conductive, earthed object, (e.g. bright metal parts of a control panel), immediately beforehand.
- ▷ A shielded cable must be used for the encoder connection. It is recommended to use a ZIEHL-ABEGG SE cable which guarantees a sufficient shield connection.
- ▷ The absolute encoder must not be detached mechanically in order not to lose the factory settings. If the absolute encoder has been detached, the new encoder-offset has to be determined with the frequency inverter. Please see the inverter operation instructions for this procedure.

### Contacts SV120 round connector at absolute encoder ECN1313 (ZIEHL-ABEGG SE standard)

Pin	Signal	Description
A	DATA	Data line for communication with the absolute encoder
B	DATA /	Data line inverse
C	5 V Sensor Up	Sensor cable for encoder voltage (5 V positive)
D	5 V Up	Controlled +5 V voltage supply (positive)
E	0 V Un	Ground voltage supply absolute encoder (negative)
F	B+ (sine)	Analog track B (sine)
G	CLOCK /	Clock signal invers
H	CLOCK	Clock signal for serial transfer
J	0 V Sensor Un	Sensor cable for encoder voltage (negative)
K	A+ (cosine)	Analog track A (cosine)
L	A- (cosine inverse)	Analog track A invers (cosine invers)
M	B- inverse (sine inverse)	Analog track B invers (sine invers)

## 5.5 Brake connection

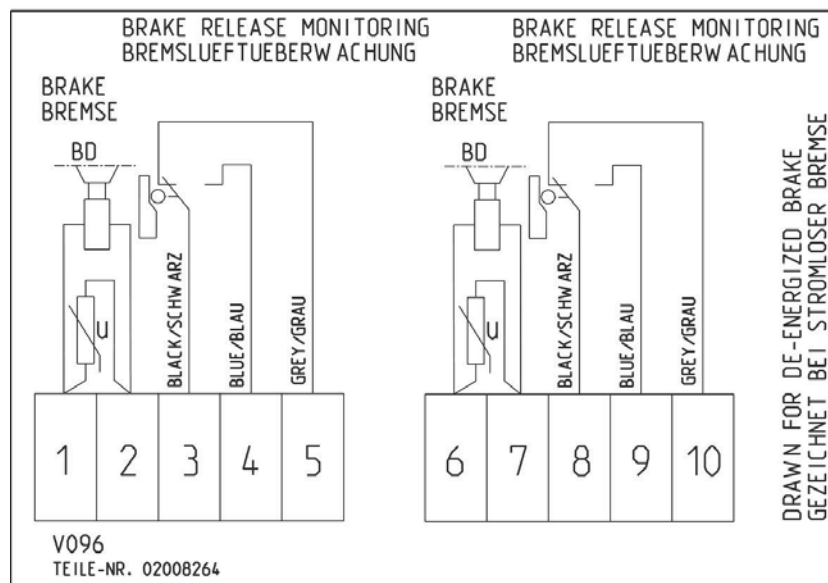
- Please also refer to the operating instructions of the brake.
- The brake is designed for static applications only. Any dynamic braking must be restricted to emergency braking and test braking. At static use, there is no brake wear. Therefore the brake is almost maintenance free.
- Open the brakes:  
 If exist, Electrical release of the brakes with a supply by accumulators/UPS is possible. Mechanical release of the brakes is possible. Hand release version is available as an option. Retrofitting the hand release is not possible.
- Dimension the supply and the wiring adequate for the 24 V brake. Brake current about 7,2 A per circuit!
- The terminal box for the brake may be removed from the motor 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 have to be protected against over voltage from switching by varistors. The brakes are supplied with varistors ex factory.
- **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.**
- The brake release monitoring is realized by micro-switches. Please assure with adequate wiring, that the contact-current is at least 10 mA to keep the contacts clean.
- After a long storage period, the brake rotor may stick to the bearing bracket. Then the motor will not move even if the brake is released. In this case, please demount the brake from the motor and separate the brake rotor and the bearing bracket with care.



### Danger!

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

Wiring diagram brake



### 5.5.1 Triggering of the brakes

It is recommended to switch the brake through two contactors, one is switching the AC-side (K4) and the other is switching the DC-side (K3).

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.

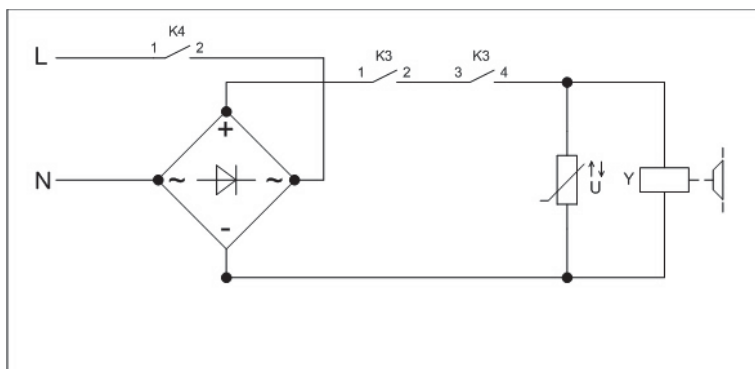
To ensure instantaneous brake application in emergencies, during inspection drives and return rides, use a second contactor (K3), which disconnects the brakes from the direct current side. Integrate this contactor into the safety circuit.

CAUTION!

**Caution!**

Brakes, which are connected to the direct current side, must be protected against excess voltage from the switching actions by using corresponding varistors!

Due to the high operating current, master contactors must be used to switch the brakes!



Simplified diagram for brake activation

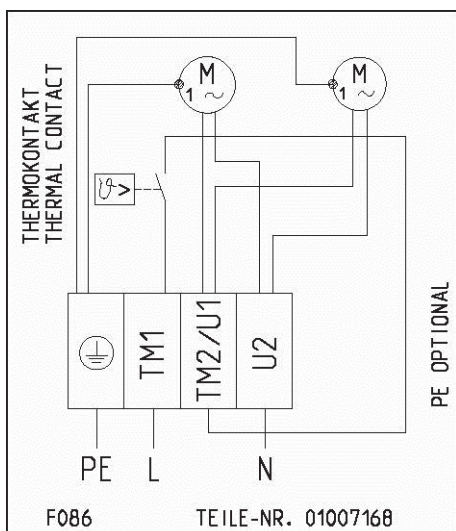
The contacts from K3 must close before the contact from K4 and are only permitted to open after the contact from K4 has opened.

**5.6 Connection forced ventilation**

The forced ventilation is optional and can be added afterwards.

Connection data		
Voltage	220 - 240	V
Frequency	50 / 60	Hz
output	2 x 20 / 19	W
Current	2 x 0.125 / 0.11	A

Wiring diagram forced ventilation



On-site connection must be made by the customer according to the wiring diagram in the separate terminal box of the external ventilation.

## 6 Start-up

### 6.1 Operating conditions

- ▷ The drive must be installed in a not free accessible machine room or a closed hoistway.
- ▷ Be aware of the protection class specified on the name plate.
- ▷ Do not operate the motor in an explosive atmosphere.
- ▷ The ambient temperature may be within 0 °C and +40 °C.
- ▷ Maximum permissible humidity 95 %, not wet.
- ▷ Reduced cooling when installed 1000 m above sea level. Therefore, the torque by 1 % per 100 m must be reduced or the duty cycle time of 1.5 % per 100 m.
- ▷ Please contact ZIEHL-ABEGG SE in case of orders deviating from the corresponding application conditions.

### 6.2 First-time 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.
- ▷ Motor protection correctly connected and operative.
- ▷ Cable entries closed.
- ▷ Mounting, installation position and accessories are o.k.
- ▷ Connection data corresponds to the data on the name plate.

### 6.3 Drive approval test

#### 6.3.1 Half load test

Due to the short-circuit of the motor while the VVVF is inactive, the motor will create a speed depending braking torque. This braking torque will be produced already at a very low speed.

If the car with half load does not move when the brakes are opened, the short-circuit wiring should be deactivated. After that the test should be repeated.

After testing the short-circuit wiring must be activated again.

#### Half load test (alternative):

If deactivating of the short-circuit wiring is not possible or not desired, the testing of 50 % balance can be made as follows:

With half load the motor current has to be measured in up and down direction. Mostly this is possible at the VVVF (please see operating instructions of your VVVF). The measured currents should not divert by more than 10 %.

#### 6.3.2 Testing the brake according EN 81-1

- ▷ When testing the brakes, the short-circuit wiring has to be deactivated to only test the effect of the brake.
- ▷ It is recommended to perform the tests when the car position is about in the middle 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.

##### 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 the failure of one brake circuit, the brake circuits have to be released separated from each other, also if the safety circuit is open. The brake circuits can be released mechanically or electrically. This state must not be permanently, it has to be done by a key button or equivalent. While using this function the safety circuit should always be opened.

While performing this test the elevator has to be observed. If there should be no visible deceleration, the open brake circuit has to be closed immediately! The elevator has to be put out of service and the brake to be checked!

As an example take a look at simplified diagram. The diagram is to be understood analogously. Their adaptation to other applications must be investigated. ZIEHL-ABEGG does not guarantee their suitability in such circumstances.

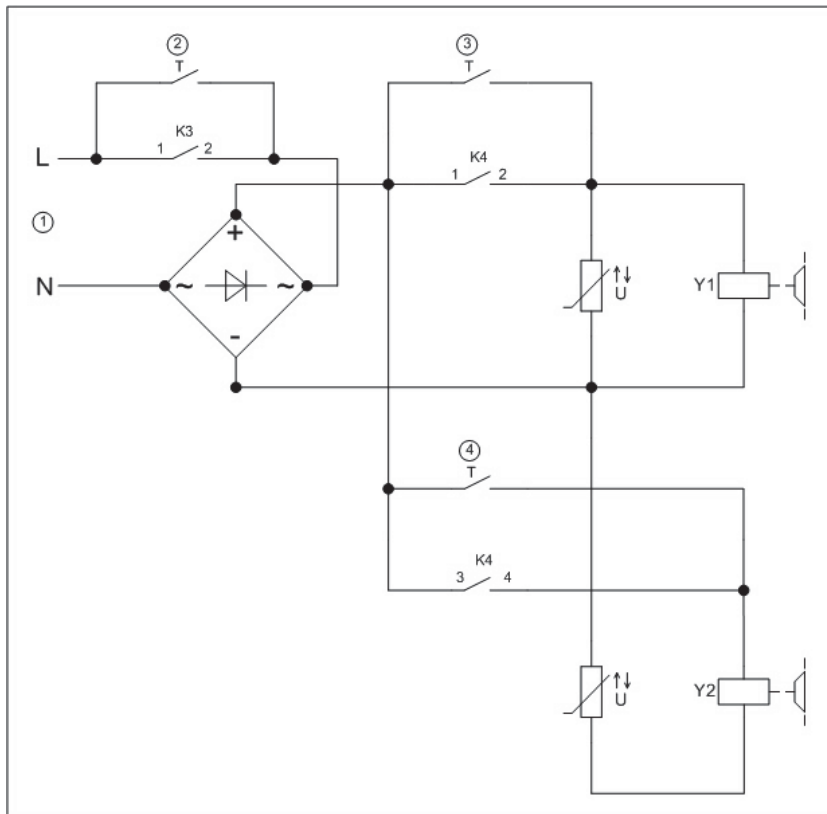
If the circuitry is made corresponding simplified diagram:

Press one of the key buttons at nominal speed until the elevator stops. Repeat the test by pressing the other key button to test the second brake circuit.

### 3. Testing the micro switches

The micro switches have to be single tested. According to their use as a normally open or normally closed contact one micro switch contact at a time has to be opened or close.

If there is a wrong or missing micro switch signal, a travel must not be started.



Simplified diagram for brake activation

- 1 Voltage supply
- 2 Button two circuit test
- 3/4 "Open brake" button

## 6.4 Pull out of safety gear

If the car loaded with the nominal load enters the trap due to a malfunction or during the TÜV certification, it is possible that the trap device is seated rather firmly. In such a case, it is entirely possible that the drive torque is no longer sufficient to pull the car out of the trap.

With gearless drives 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.

With gearless drives in the shaft, the motor is usually not accessible. A handwheel is unnecessary in such a layout.

In both cases with gearless drives, applicable is: One must fall back on a chain hoist or similar if the drive torque is insufficient or if there is a lack of drive on the rope. It makes sense to keep a suitable chain hoist ready during the TÜV inspection.

### 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 drives are normally designed for a maximum torque of ca. 170 - 200 %, only slight reserves are available during such special cases.

For that reason it is recommended, just as described in EN 81-1 Appendix D.2 j), to perform a TÜV trap inspection in the door area so that the car can be unloaded there to relieve the drive.

## 6.5 Emergency evacuation



### Attention!

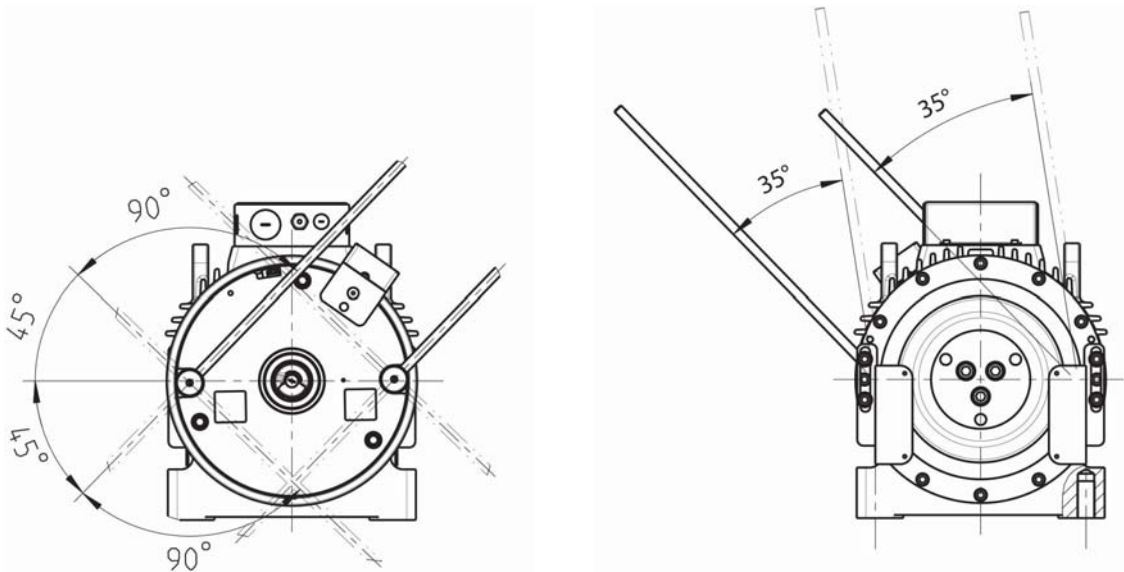
The measures for emergency evacuation described below may only be performed by instructed persons for maintenance of the lift or qualified personnel of lift companies.

### 6.5.1 Manual emergency evacuation

In case of power failure or failure of the recovery control, emergency rescue is only possible by releasing the brakes manually. The picture shows how the levers must be actuated for hand release.

#### Manual lifting of the brake

- ▷ The levers for hand release can be opened in both directions.
- ▷ The levers for hand release can be inserted with an offset of 90° in every position and can be actuated ±35° on both sides.
- ▷ Move both levers for hand release to the end stop to open the brake.



### Danger!

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

- ▷ When the brakes are released manually, the lift 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 lift, we recommend to short-circuit the motor for the evacuation. The short-circuit is generated by the motor contactors.
- ▷ 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.**
- ▷ Manual release of the brake is finished when a floor is reached. Now the lift door can be opened with a triangular key.
- ▷ **The lift manufacturer's safety instructions have priority!**

**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.**

### 6.5.2 Electrical emergency evacuation

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

## 7 Faults and remedy

Failure	Causes	Adjustment
Running noise	Bearing defective	Contact customer service
	VVVF-settings wrong	Check VVVF settings
	Absolute encoder defective	Change absolute encoder
Excessive temperature / Temperature protection trips	Motor surface covered	Remove cover from motor or mount with more distance to motor.
	Ambient temperature higher than 40 °C	Enhance shaft ventilation
	VVVF-settings wrong	Check VVVF settings
Motor will not start	Motor phases connected incorrect	Check motor connection
	VVVF defective	Check VVVF
	Brake does not release	See brake faults
Brake switching noises	Brake is switched on the DC-side	Change brake wiring to AC-switching at normal operation. Add overvoltage protection.
	Air gap of brake too big	Replacement of the brake rotors
Brake does not release	Power supply too low. The voltage at the brake is too low.	Check power supply, change wiring (and transformer) size
	Brake control wrong / defective	Check brake wiring
	Brake coil defective	Replace brake (Special tools necessary! Contact ZIEHL-ABEGG SE customer service)
	Brake worn out	Replace brake rotors (Special tools necessary! Contact ZIEHL-ABEGG SE customer service)
Brake release monitoring does not switch	Micro switches defective	Replace the micro switch
	Contacts dirty	Switch micro switches with a higher contact current, at least 10 mA or change micro-switches

## 8 Service and maintenance

### 8.1 General notes on maintenance

- ▷ Observe the safety-at-work regulations!
- ▷ Disassembling the machine can only be done with special devices!  
**Caution, strong magnetic force!**
- ▷ Never use a high-pressure cleaner (e. g. a steam jet cleaner) for cleaning the motor!
- ▷ 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 or to check the traction sheave, 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 brake wear has to be 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 protection clamp	X	X
Checking the air gap of the brake	X	X
Visual inspection of the fixing screws on the housing, brakes and traction sheave. The locking varnish must be free of damage.	X	X
Check the traction sheave if worn out		X
Check the microswitch		X

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

1. Theairgap has to be checked 3times at the circumference. The maximum value of the three has to be taken into account.
2. If the maximum value of the air gap is exceeded on one of the magnets, it must be changed the brake rotor and the O-ring.

**Maximum admissible air gap after wear: 0.9 mm!**

**Caution!**

**Feeler gaugh 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 therefore can reduce functionality or safety of the installation. ZIEHL-ABEGG SE will assume no liability or guarantee for damages caused by spare parts that are not approved.

Available spare parts:

- Absolute encoder
- Brake (complete)
- Brake rotor & O-rings
- Micro switch for Brake
- Traction sheave
- Rope guard

### 8.3.1 Replacement of the absolute encoder ECN1313/ERN1387

**Disassembling:**

- ▷ Loosen the clamping bolt of the encoder (Hexagon key SW2) at the outer clamping-ring.
- ▷ Turn out small cap on encoder back side (slot or hexagon). Remove cap and cable cover.
- ▷ Open the central bolt M5 x 50 1 - 2 turns (360° - 720°).
- ▷ Screw the draw off screw M10 (not included) into the thread on the encoder back side and press the encoder off the flange.
- ▷ Turn out draw off screw M10 first and than central bolt M5. Remove encoder.



**Caution!**

Due the electrostatic discharge the absolute encoder can be destroyed! Do not touch the pins of the encoder cable as well as the electronics of the absolute encoder!

### Mounting:



#### Caution!

Never touch the connection contacts on the position absolute encoder or on the cable! The electronics can be destroyed by static electricity.

▷ Attach encoder.

▷ Fasten central bolt M5 x 50

**Tightening torque M5 - 8.8: 5,5 Nm**

▷ Put on cable cover and fasten cap on the back side of the encoder.

▷ Tighten the clamping screw of the absolute encoder (Hexagon key SW2) at the outer clamping ring.

**Tightening torque SW2: 1.2 Nm**

▷ Determine the encoder offset again in accordance with the frequency inverter description.

▷ If a different encoder system is installed, please contact ZIEHL-ABEGG.

### 8.3.2 Replacement of the traction sheave



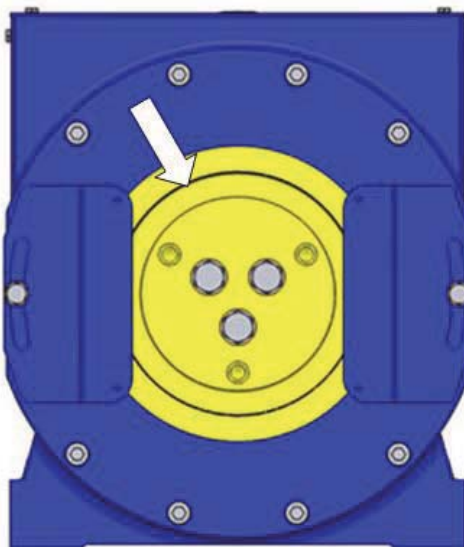
#### Warning!

Due to incorrect mounting the traction sheave can get loose from the drive shaft!

#### Requirements:

- Release the traction sheave and put the ropes off the traction sheave.
- Secure the traction sheave so that it does not jump off the shaft.

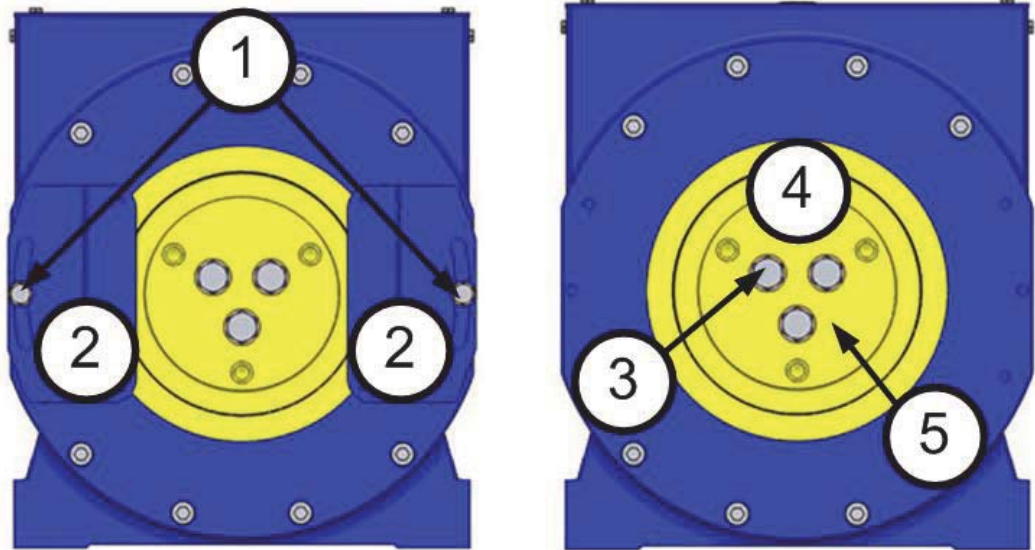
The traction sheave is mounted on the power take-off side of the motor (see arrow).



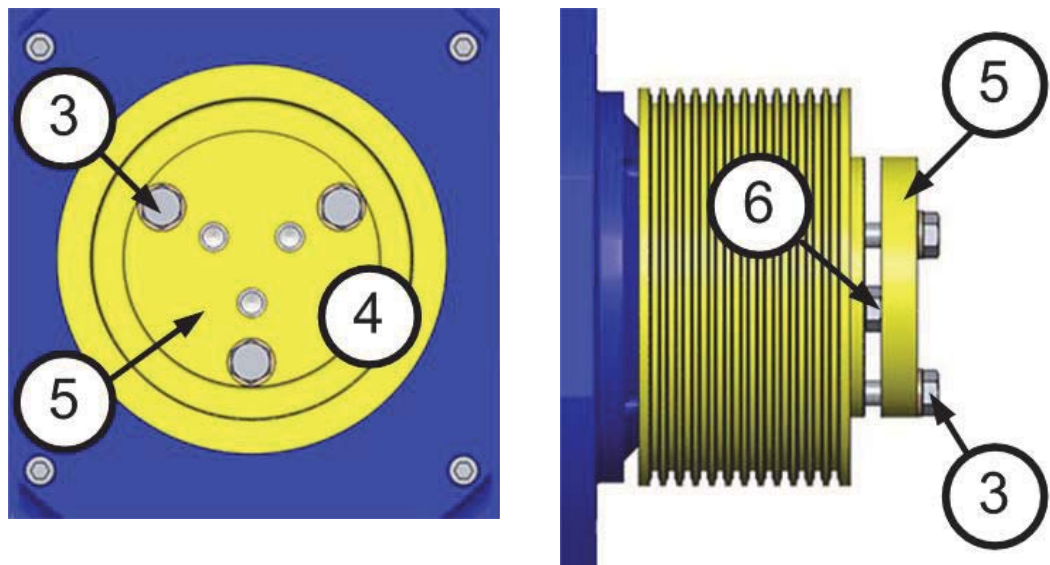
#### 8.3.2.1 Required tools for the replacement of the traction sheave:

- screw wrench SW16
- screw wrench gage 24
- Torque wrench for tightening torque 195 Nm with SW 24
- 5 - 8 mm spacer or hexagon nut

### 8.3.2.2 Dismounting the traction sheave

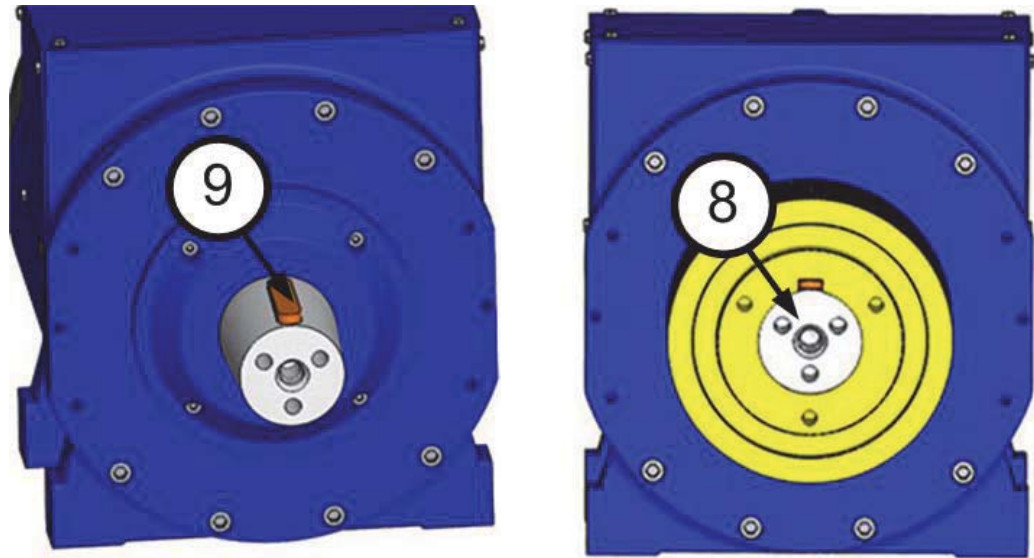


1. Undo the fixing screws M10 x 16 (1) of the rope guards (2) with a screw wrench SW 16 and remove the rope guards (2).
2. Release the fixing screws M16 x 55 (3) of the traction sheave (4) with an screw wrench SW 24 and remove the fixing plate (5).

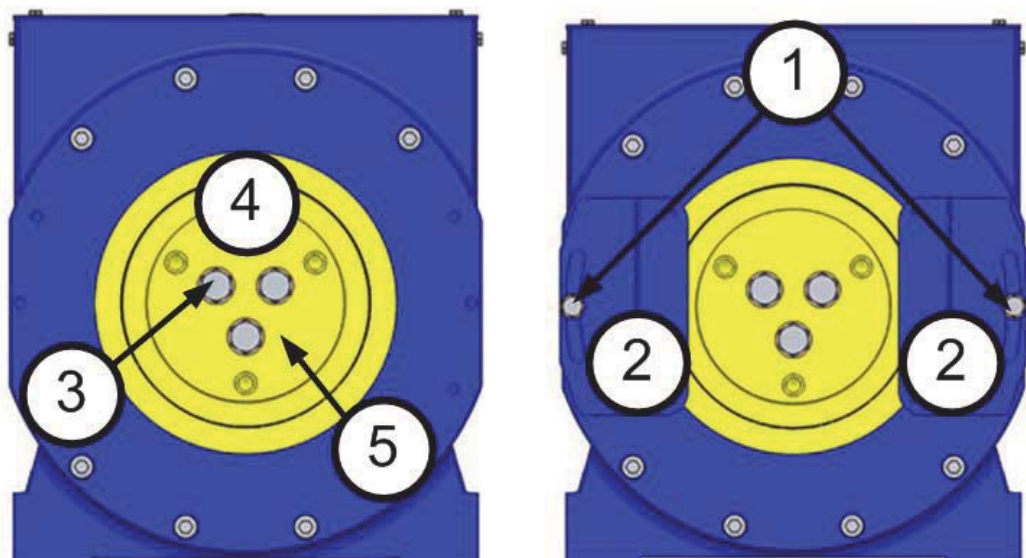


3. Turn the front plate (5) to press off.
4. 5 - 8 mm spacer or hexagon nut (6) must be placed between shaft end and front plate (5).
5. Screw front plate (5) to the traction sheave (4) at the outer circle of holes using hexagon head screws M16 x 55 (3).
6. Tighten the hexagon head screws M16 x 55 (3) uniformly with an screw wrench SW 24. By tightening the screws the traction sheave (4) will be pulled from the drive shaft (8).

### 8.3.2.3 Mounting the traction sheave



1. Clean the traction sheave (4) and the motor shaft (8). Both parts have to be free of dirt and grease.
2. The fitting key (9) has to be available.
3. Put traction sheave (4) on drive shaft (8). The bores for the hexagon head screws M16 must point outwards. Observe the position of the groove for the parallel key.



4. Screw front plate (5) to the drive shaft (8) at the inner circle of holes using three hexagon head screws M16 x 55 (3). Apply threadlocker Loctite 243 or a similar product to the fixing screws.  
**Do not forget washers!**
5. Tighten the fixing screws (3) with a torque key with SW 24 uniformly in steps:
  - **Tightening torque step 1: 50 Nm**
  - **Tightening torque step 2: 100 Nm**
  - **Tightening torque step 3: 195 Nm**
6. Coat the fastening screws (3) with sealing varnish.
7. Fit rope guards (2) with screw wrench SW 16

### 8.3.3 Fastening bearing brackets



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

Motor type	SM225.60B					
Suspension	1:1	2:1	2:1	2:1	2:1	
typical payload*	1000	2000	1600	1250	1000	kg
Rated torque	1120					Nm
Maximum torque	1900					Nm
permissible radial load	5300					kg
Rated brake torque	2 x 1200					Nm
Speed	1,6	1	1,6	2	2,5	m/s
Total weight	630		640	660	680	kg
Traction sheave						
- Diameter	320		400	500	600	mm
- Standard rope diameter	8		10			mm
- Standard number of grooves	10		8			
- Standard groove distance	17					mm

Table shows typical data, other values possible.

Other rope diameters and groove distances are possible.

\* Dependent on travel, compensation ropes may be necessary.

#### Protection class

Component	Protection class
Motor	IP 42
Absolute encoder	IP 40
Brake (electrical)	IP 54
Brake (mechanical)	IP 24
Complete machine	IP 21
Forced cooling	IP 20



**9.2 Dimension sheets**

Klemmenkastenabdeckung verschiebbar, seitlich zugänglich  
*Terminal cover movable, accessible from the side*

Seilschutz  
*Rope guard 150 -180*

Geber  
*Encoder*

Rillenzahl schematisch dargestellt  
*Number of grooves drawn schematically*

Bremsenschluss an rechter und linker Seite möglich  
*Brake connection possible on right or left side*

Motoranschluss  
 1 Gewinde max. M50  
 1 Verschraubung M20  
*Motor connection 1 thread max. M50 1 cable gland M20*

Dimensions (mm): 907, 777, 212, 185, 160±0.2, 60, 30, 60, 60, 30, 30, 163, 160±0.2, 380, 264, 510, 225, 60, 250, 340±0.2, 400, 6xM30, L3, L8, D1.

Motor typ <i>Motor type</i>	D1	L3	L8	kg max.
SM225.60B	280	118	410	590
	320	182	400	605
	400	150	425	615
	500	150	522	640
	520	150	543	643
	600	150	622	665

Mayr-Bremse  
*Mayr-brake*

Genehmigung / *Approval*  
**ZAtop SM225.60B**

Index	Änderung / <i>revision</i>	Datum / <i>date</i>	Name
A06	A4:106	10.11.2014	ma
	erstellt / <i>drawn</i>	20.05.2011	elz
	geprüft / <i>checked</i>		

Zeichnungsnummer / *Drawing number*  
**A-M-6489**

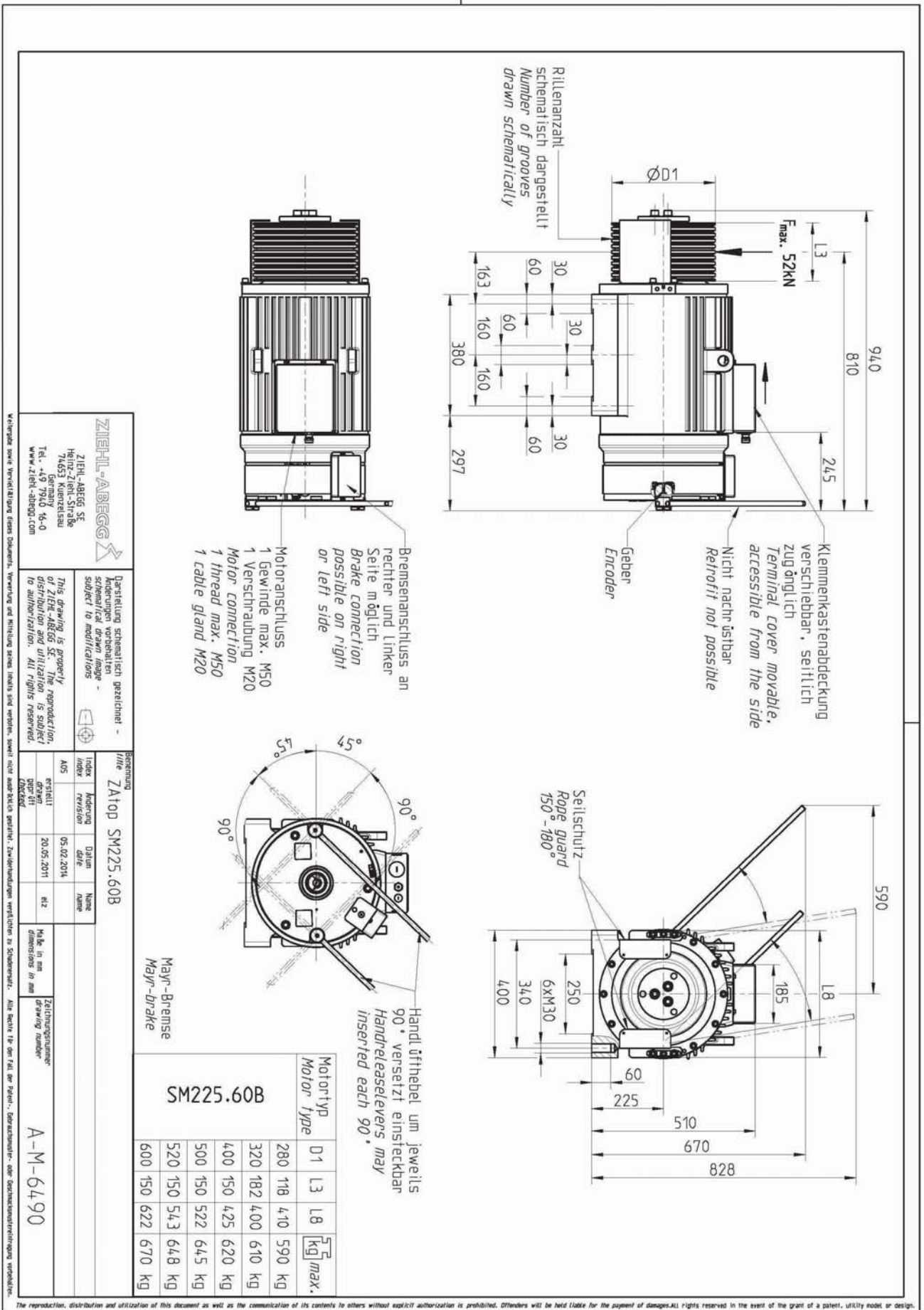
Maße in mm / *Dimensions in mm*

Quantität schematisch gezeichnet / *Quantity drawn schematically*  
 subject to modifications

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Bestimmung: ZAtop SM225.60B

Änderung Datum Name  
 05.02.2014  
 20.05.2011

Zeichnungsnummer: A-M-6490

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minimale Abstand der Fremdbelüftung zu überbauten Flächen  
*minimum distance of the forced ventilation to built-over area*

Klemmenkastenabdeckung verschiebbar, seitlich zugänglich  
*Terminal cover movable, accessible from the side*

Geber  
*Encoder*

Rillenzahl schematisch dargestellt  
*Number of grooves drawn schematically*

Seitenschutz  
*Rope guard 150°-180°*

Bremsenschluss an rechter und linker Seite möglich  
*Brake connection possible on right or left side*

Motoranschluss  
 1 Gewinde max. M50  
 1 Verschraubung M20  
*Motor connection  
 1 thread max. M50  
 1 cable gland M20*

Anschluss Fremdbelüftung  
*Connection forced ventilation*

Motor type	D1	L3	L8	$\frac{P_{Nmax}}$
SM225.60B	280	118	410	590
	320	162	400	607
	400	150	425	617
	500	150	522	642
	520	150	543	645
	600	150	622	667

Typ ZAtop SM225.60B

Hersteller ZIEHL-ABEGG SE  
 Werk Zehn-Ströbe  
 74635 Zehn  
 Tel. +49 7141 344-0  
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Motoranschluss  
 1 Gewinde max. M50  
 1 Verschraubung M20  
 1 thread max. M50  
 1 cable gland M20

Brennanschluss an rechte und linke Seite möglich Brake connection possible on right or left side

Motoranzahl  
 1 Gewinde max. M50  
 1 Verschraubung M20  
 1 thread max. M50  
 1 cable gland M20

Anschluss Fremdbelüftung  
 Connection forced ventilation

Handl drehen um jeweils 90° versetzt einsetzbar  
 Hand levers may be inserted each 90°

Motor typ  
 Motor type

Motor typ	D1	L3	L8	kg max.
280	118	410	596	kg
320	182	400	512	kg
400	150	425	622	kg
500	150	522	64,7	kg
520	150	54,3	650	kg
600	150	622	672	kg

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Produktionstechnische gezeichnete -  
 schematische Zeichnung -  
 skizze in handgezeichnetem  
 Maßstab

Zeichnungs- nummer	Revisions- datum	Gezeichnet von	Gezeichnet am	Geprüft von	Geprüft am
407	04/10/06		12.11.2011		02.06.2011

Werte in mm  
 Dimensions in mm

Drucknummer  
 A-M-6496

### 9.3 EC/EU declaration of conformity

## EC/EU declaration of conformity

- Translation -  
(english)

A-KON16\_01-GB  
1612 Index 001

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

The manufacturer is solely responsible for issuance of the EC/EU declaration of conformity.

**Product description:** ZAtop Gearless elevator machine

**Type:** SM160... SM190... SM200... SM225... SM250...

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

**Serial number:** 16010001/1 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 harmonised standards have been used:

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 81-20:2014	Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts
EN 60204-1:2006 + A1:2009 + AC:2010	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.

EN12015:2014	Electromagnetic compatibility - Product family 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. Roland Hoppenstedt (see above for address).

Künzelsau, 20.04.2016  
(place and date of issue )

ZIEHL-ABEGG SE  
Werner Bundscherer  
Director Drive Division  
(name, function)



(signature)

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



(signature)

## 9.4 Operating instructions brake

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

**mayr**®  
Antriebstechnik

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  
- TÜV (German Technical Inspectorate) Certificate  
- Guidelines on EU Directives
- Page 2:** - Safety Regulations
- Page 3:** - Safety Regulations
- Page 4:** - Safety Regulations
- Page 5:** - Brake Illustrations
- Page 6:** - Brake Illustrations  
- Parts List
- Page 7:** - Technical Data  
- Max. Friction Work per Brake Circuit  
- Torque-Time Diagram
- Page 8:** - State of Delivery  
- Application  
- Function Description  
- Installation Conditions
- Page 9:** - Installation
- Page 10:** - Brake Inspection  
- Dual Circuit Brake Functional Inspection
- Page 11:** - Release Monitoring
- Page 12:** - Brake Electrical Connection
- Page 13:** - Maintenance  
- Disposal  
- Malfunctions / Breakdowns

#### Safety and Guideline Signs

##### DANGER



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

##### CAUTION



Danger of injury to personnel and damage to machines.



**Please Observe!**  
Guidelines on important points.



According to German notation, decimal points in this document are represented with a comma (e.g. 0,5 instead of 0.5).

#### TÜV (German Technical Inspectorate) Certificate

Certificate number: **ABV 760/2**

#### Attachment:

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



##### Guidelines on the Declaration of Conformity

A conformity evaluation has been carried out for the product (electromagnetic safety brake) in terms of the EC Low Voltage Directive 2006/95/EC. The declaration of conformity is set out in writing in a separate document and can be requested if required.

##### Guidelines on the EMC Directive (2004/108/EC)

The product cannot be operated independently in terms of the EMC directive.  
Due to their passive quality, brakes are also non-critical equipment according to the EMC.  
Only after integration of the product into an overall system can it 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 connection 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 use of the product until you have ensured that the machine accords with the regulations stated in the directive.

##### Guidelines on the ATEX Directive

Without a conformity evaluation, this product is not suitable for use in areas where there is a 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 94/9/EC.

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27/05/2011 TK/HW/SU



## Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00\_31 Size 1300

**mayr**®  
Antriebstechnik

### 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 cables 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 professionals and specialists are allowed to work on the devices.** They must be familiar with the dimensioning, transport, installation, 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-energised, released state and secure the system against inadvertent switch-on.

#### Guidelines for Electromagnetic Compatibility (EMC)

In accordance with the EMC directive 2004/108/EC, the individual components produce no emissions. However, functional components e.g. mains-side energisation 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, torque fluctuations, permitted friction work, run-in behaviour 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 magnetic coils are designed for a relative duty cycle of 60 %.
- The braking torque is dependent on the present run-in condition of the brakes.
- 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 foreign bodies.
- The surfaces of the outer components have been zinc 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 long periods of storage. The user is responsible for taking appropriate counter measures.

## Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00\_31 Size 1300

**mayr**<sup>®</sup>  
Antriebstechnik

### Safety Regulations

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

#### Ambient Temperature: – 5 °C up to + 40 °C

##### CAUTION



At temperatures of around or under freezing point, condensation can strongly reduce the torque, or the friction surfaces can freeze up. The user is responsible for taking appropriate counter measures.

#### Appointed Use

This safety brake is intended for use in electrically operated elevators and goods elevators according to EN 81-1/1998 / A3: 2009. The safety brake corresponds to DIN EN 81, Part 1 [Sections 12.4.2.1 (2nd paragraph), 12.4.2.2, and 12.4.2.5] in its general design and its mode of operation.

#### Earthing 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 PE conductor on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardized inspection of the PE conductor connections to all contactable metal parts!

#### Insulation Material Class F (+155 °C)

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

#### Protection

**(mechanical) IP24:** Protection against fingers or similarly-sized objects and against medium-sized foreign bodies > 12 mm in diameter. Water spray coming from any direction may reduce the braking torque to max. 50 % of the nominal torque.

**(electrical) IP54:** Dust-proof and protected against contact as well as against water spray coming 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 – 20 ° up to +60° C.
- Do not store in direct sunlight or UV light.
- Do not store aggressive, corrosive substances (solvents / acids / lyes / salts etc.) near to the brakes.

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

#### Handling

**Before installation**, the brake must be inspected and found to be in proper condition.

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

#### 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 dangerously high temperatures**.
- Protective circuit:** When using DC-side switching, the coil must be protected by a suitable protective circuit according to VDE 0580, which is integrated in *mayr*<sup>®</sup>-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 operation current are sufficient. Depending on the application, the switching contact can also be protected by other protective circuits (e.g. *mayr*<sup>®</sup>-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.

#### Regulations, Standards and Directives Used:

DIN VDE 0580	Electromagnetic devices and components, general directives
2006/95/EC	Low voltage directive
CSA C22.2 No. 14-2010	Industrial Control Equipment
UL 508 (Edition 17)	Industrial Control Equipment
95/16/EC	Elevator directive
EN 81-1	Safety regulations for the construction and installation of elevators and small goods elevators
BGV C1	(previously VGB 70) Safety regulations for theatre stage technical systems
EN ISO 12100	Safety of Machinery – General principles – Risk assessment and risk reduction
DIN EN 61000-6-4	Noise emission
EN12016	Interference resistance (for elevators, escalators and moving walkways)
EN 60204-1	Electrical machine equipment

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## Installation and Operational Instructions for ROBA-stop<sup>®</sup>-silenzio<sup>®</sup> Type 896.00\_31 Size 1300

**mayr**<sup>®</sup>  
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### Safety Regulations

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

#### 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*<sup>®</sup> at once!

#### CE Marking



According to the  
- Low Voltage Directive 2006/95/EC  
- Machinery Directive 2006/42/EC

#### Conformity Marking



in terms of the Canadian and American standards

#### Identification

*mayr*<sup>®</sup> components are clearly marked and described on the Type tag:

**Manufacturer**  
***mayr*<sup>®</sup>**  
**Name/Type**  
**Article number**  
**Serial number**

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D-87665 Mauerstetten  
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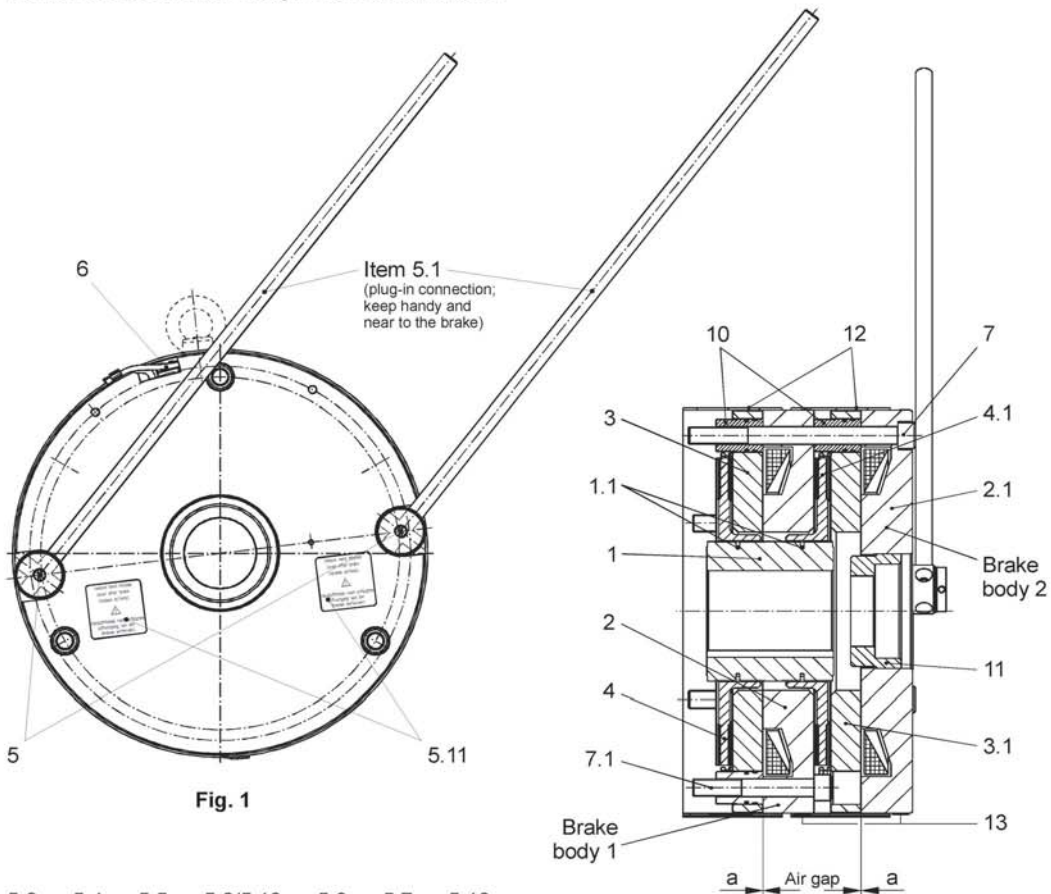
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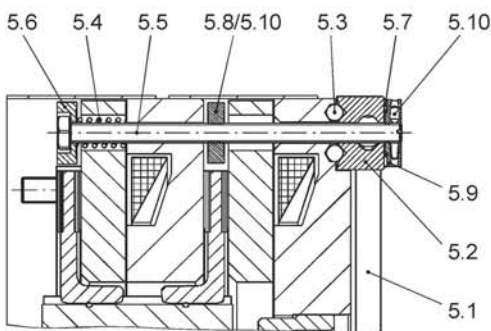


**Brake Illustrations for Design with Hand Release**

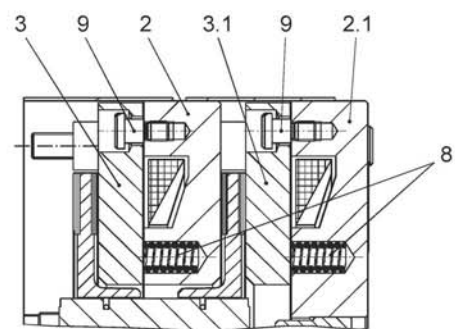


**Fig. 1**

**Fig. 2**



**Fig. 3**



**Fig. 4**

also valid for design without hand release

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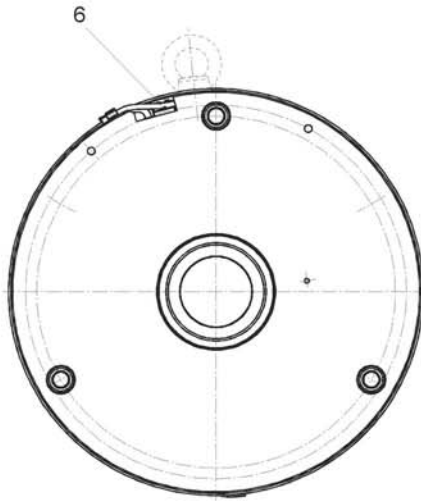
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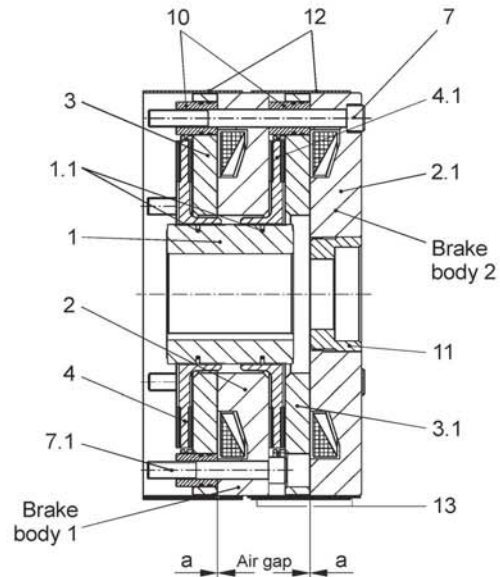
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**Brake Illustrations for Design without Hand Release**



**Fig. 5**



**Fig. 6**

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

Item	Name	Pcs.
1	Hub	1
1.1	O-ring	2
2	Coil carrier assembly 1	1
2.1	Coil carrier assembly 2	1
3	Armature disk 1	1
3.1	Armature disk 2	1
4	Rotor 1	1
4.1	Rotor 2	1
5	Hand release	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 disk	2
5.7	Axial needle cage	2
5.8	Adjusting nut (without centring collar)	2

Item	Name	Pcs.
5.9	Adjusting nut (with centring collar)	2
5.10	Set screw	4
5.11	Guideline sign, yellow	2
6	Release monitoring	2
6.1	Microswitch inc. adapter plate	2
6.2	Cap screw M4 x 8	4
6.3	Hexagon head screw M5 x 20	2
6.4	Hexagon nut M5	2
6.5	Spring washer A5	2
7	Hexagon head screw M16 x 190	3
7.1	Hexagon head screw M16 x 110	3
8	Thrust spring D22 / 4,5 x 50	24
9	Shoulder screw	4
10	Distance bolts	9
11	Adaptor flange	1
12	Cover	2
13	Type tag	2

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**Installation and Operational Instructions  
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**Technical Data**

Braking torque:	2 x 1200 Nm
Nominal voltages:	2 x 24 V 2 x 110 V 2 x 207 V
Coil power (at 24 V):	2 x 172 W
Coil power (at 104 V):	2 x 166 W
Coil power (at 207 V):	2 x 156 W
Motor nominal speed <sup>1)</sup> :	217 / 400 rpm
Overspeed <sup>1)</sup> :	250 / 460 rpm
Max. hand release force at 1200 Nm:	approx. 200 N per lever
Rotor thickness, new condition:	15 <sub>-0,05</sub> mm
Nominal air gap "a" per brake body:	0,48 <sup>+0,12</sup> <sub>-0,05</sub> mm
Maximum air gap <sup>2)</sup> per brake body:	0,9 mm
Tightening torque Items 7 and 7.1:	200 Nm
Key width Items 7 and 7.1:	SW 14
Protection (electrical):	IP 54
Protection (mechanical) with cover:	IP 24
Duty cycle:	60 %
Electrical connection:	2 x 0,88 mm <sup>2</sup>
Ambient temperature:	-5 °C to +40 °C
Weight (without hand release):	107 kg
Weight (with hand release):	117 kg
<b>Brake switching times in new condition:</b>	
Tightening t <sub>2</sub> :	570 ms
Response delay on connection t <sub>11</sub> (AC):	340 ms
Drop-out t <sub>1</sub> (AC) at nominal torque:	1200 ms
Drop-out t <sub>1</sub> (AC): at 90 % of the nominal torque	770 ms
Drop-out t <sub>1</sub> (AC): at 50 % of the nominal torque	650 ms
Response delay on connection t <sub>11</sub> (DC):	45 ms
Drop-out t <sub>1</sub> (DC) at nominal torque:	260 ms
Drop-out t <sub>1</sub> (DC): at 90 % of the nominal torque	140 ms
Drop-out t <sub>1</sub> (DC): at 50 % of the nominal torque	120 ms
<b>Proximity sensor switching times:</b>	
Tightening t <sub>2</sub> :	650 ms

<sup>1)</sup> Increased speed and friction work only via special measure on the rotors (has currently been deferred).

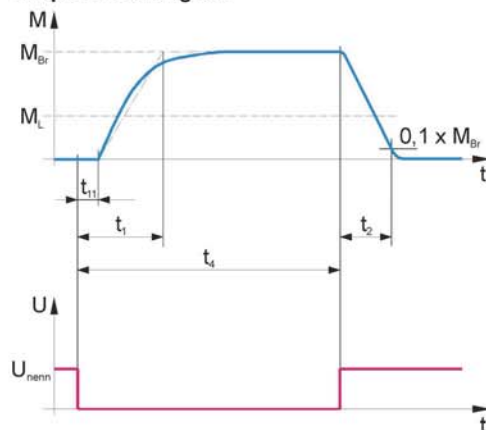
**i** <sup>2)</sup> Once the maximum air gap has been reached, the rotors must be replaced. However, the brake already becomes louder at an air gap > "a" +0,2 mm.

**Max. permitted friction work Q<sub>zul.</sub> per brake circuit dependent on the speed**

At 250 rpm => Q<sub>zul.</sub> = 62000 J  
 (Initial sample test / 3 EMERGENCY STOPS per brake circuit)

At 250 rpm => Q<sub>zul.</sub> = 100000 J  
 This is a theoretical calculation.  
 The project has currently been deferred.  
 Special measures on the rotors would be necessary.  
 After one braking action with this friction work, the rotors would have to be replaced.

**Torque-Time Diagram**



- Key**
- M<sub>Br</sub> = Braking torque
  - M<sub>L</sub> = Load torque
  - t<sub>1</sub> = Connection time
  - t<sub>11</sub> = Response delay on connection
  - t<sub>2</sub> = Separation time
  - t<sub>4</sub> = Slipping time + t<sub>11</sub>
  - U<sub>nenn</sub> = Coil nominal voltage



## Installation and Operational Instructions for ROBA-stop<sup>®</sup>-silenzio<sup>®</sup> Type 896.00\_31 Size 1300

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### State of Delivery

Brake bodies 1 and 2 including adaptor flange (11) are pre-assembled, with release monitoring systems (6) mounted and set manufacturer-side.

The following are included loose in delivery:

Hub (1), O-rings (1.1), rotors (4 and 4.1), cap screws (7 and 7.1) and covers (11).

The following applies additionally for hand release designs: Hand release rods (5.1), connection pieces (5.2), steel balls (5.3), axial needle cages (5.7), adjusting nut (5.9) and 2 set screws (5.10).

Please check the state of delivery immediately!

mayr<sup>®</sup> will take no responsibility for belated complaints.

Please report transport damage immediately to the deliverer.

Please report incomplete delivery and obvious defects to the manufacturer.

### Application

For use as holding brakes with EMERGENCY STOP braking actions

- in enclosed buildings  
(in tropical regions, in high humidity with long downtimes and sea climates only after taking special measures)
- in dry running
- horizontal installation position (vertical brake axis)
- in clean environments (coarse dust and liquids of any kind have a negative effect on the braking function;  
⇒ please mount a cover).

### Function Description

The ROBA-stop<sup>®</sup>-silenzio<sup>®</sup> is designed as a double brake in which two brake bodies working independently of each other ensure high operational safety.

The braking torque in brake body 1 is generated via the clamping force of several thrust springs (8) using frictional locking between both friction linings of the rotor (4), the armature disk (3) and the machine wall.

The braking torque in brake body 2 is generated via the clamping force of several thrust springs (8) using frictional locking between both friction linings of the rotor (4.1), the armature disk (3.1) and coil carrier (2).

The brake is released electromagnetically.

In de-energised 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 hand release levers (5.1) inserted into it in release direction (left or right, see Fig. 1), the armature disks (3 and 3.1) are attracted against the thrust springs (8) to the coil carriers (2 and 2.1), and the braking torque is cancelled.

#### DANGER



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

### Installation Conditions

- The eccentricity of the shaft end in relation to the mounting pitch circle must not exceed 0,2 mm.
- The position tolerance of the threads for the hexagon head screws (7 or 7.1) 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** according to 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 slipping on the rotor 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 and 4.1) jamming on the hub (1) and therefore to brake malfunctions.  
Recommended hub - shaft tolerance H7/k6.  
The max. permitted joining temperature of 200 °C must not be exceeded.
- Dimensioning of the key connection according to the requirements shaft diameter, transmittable torque and operating conditions must be carried out. For this, the corresponding user data must be known or the customer must carry out the dimensioning according to the valid calculation basis DIN 6892.  
For the calculation, a hub quality of Re = 300 N/mm<sup>2</sup> should be used.  
The length of the key should 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 correct **tightening torque of 200 Nm**.
- The rotors (4 and 4.1) 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 = 1,6 µm.  
**In particular customer-side mounting surfaces made of grey cast iron are to be rubbed down additionally with fine sandpaper (grain ≈ 400).**
- The toothings of the hub (1) and the rotors (4 and 4.1) must not be oiled or greased.
- Friction value-increasing surface treatments are not permitted.
- Please abstain from using cleaning agents containing solvents, as they could affect the friction material.
- During longer downtimes, we recommend the use of suitable corrosion protection measures for the mounting surface (e.g. zinc-phosphate coating) until initial operation.

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## Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00\_31 Size 1300

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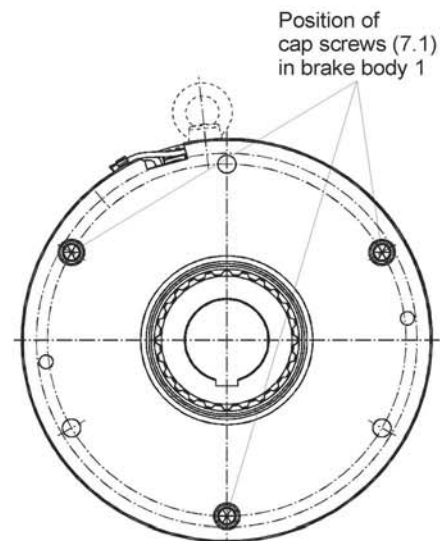
### Installation (Figs. 1 to 8)



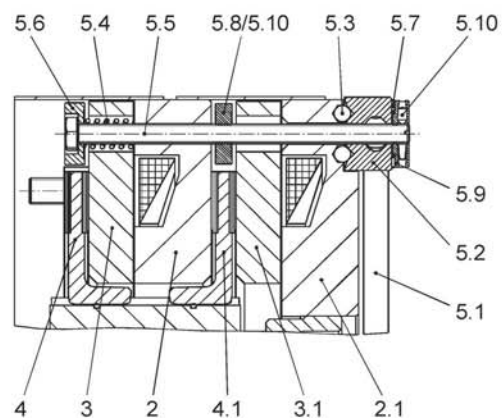
Points 9 to 16 do not apply on designs without hand release.

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 one O-ring (1.1) and insert it into the machine wall-side hub (1) groove.
  3. Push the rotor (4) by hand using light pressure over the O-ring (1.1) onto the shaft (long rotor collar should be facing away from the machine wall). Check that the tothing moves easily. Do not damage the O-ring.
  4. Lightly grease the second O-ring (1.1) and insert it into the hub (1) groove, which is still free.
  5. Push brake body 1 over the hub (1) and the rotor (4) collar (please make sure that the fixing holes align with the threaded holes in the machine wall). Insert the cap screws (7.1) evenly distributed (as depicted in Fig. 7) into brake body 1 and tighten them evenly all around **using a torque wrench to a tightening torque of 200 Nm**.
  6. Push the rotor (4.1) by hand using light pressure over the O-ring (1.1) onto the shaft, so that the friction linings of the rotor (4.1) lie against brake body 1 (long rotor collar should be facing the machine wall). Check that the tothing moves easily. Do not damage the O-ring.
  7. Insert the cap screws (7) into the bores in brake body 2, then join with brake body 1 (see Fig. 2) and screw them onto the machine wall. Tighten the hexagon head screws (7) evenly all around **using a torque wrench and a tightening torque of 200 Nm**.
  8. **Check air gap "a" (Figs. 2 or 6)**  
 The nominal air gap  $0,48^{+0,12}_{-0,05}$  mm must be given.
  9. Grease 2 x 4 steel balls (5.3) lightly (using a bearing grease) and insert them into the grooves in the coil carrier (2.1) (Fig. 8).
  10. Push both connection pieces (5.2) with the grooves on the facing side onto the hexagon head screws (5.5).
  11. Join the axial needle roller and cage assemblies (Item 5.7, lightly greased using a bearing grease) onto the centring collar of the adjusting nuts 2 (Item 5.9) and then screw the adjusting nuts 2 with the axial needle roller and cage assemblies (5.7) facing-side onto the hexagon head screws (5.5) up to contact on the connection pieces (5.2).
- Adjusting the hand release (brake not energised)**
12. Push the adjusting plate 2 mm between an adjusting nut (Item 5.8) and the armature disk (3.1).
  13. Screw the adjusting nut (Item 5.9) onto the hexagon head screw (5.5) up to the point where the adjusting plate clamps, then turn it back to the point when the adjusting plate can be removed. It is possible to counter the hexagon head screw (5.5) through the slot at the screw end.
  14. Paint the set screw (5.10) with Loctite 243, turn it into the adjusting nut (5.9) using a tightening torque of 4 Nm, thereby 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 them left or right by approx. 45°. The required hand release force per lever is approx. 200 N. It must now be possible to turn the shaft freely.
17. Mount the covers (12).



**Fig. 7**  
 Depicted without brake body 2



**Fig. 8**

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### Brake Inspection (before brake initial operation)

- **Braking torque inspection:**  
Please compare the requested braking torque with the torque stated on the Type tag (13).
- **Carry out a release inspection:**  
by energising the brake or manually using the hand release (dependent on Type).
- **Carry out a function inspection of the release monitoring device:**  
see page 11.

### Dual Circuit Brake Functional Inspection

The ROBA-stop<sup>®</sup>-silenzio<sup>®</sup> brake is equipped with a double safety (redundant) brake system. This means that, should one 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 energised coil must be switched off immediately! The dual circuit braking function is not guaranteed. Shut down the elevator, de-install and inspect the brake.

The individual circuit inspection is carried out by energising the individual circuits with nominal voltage, see Type tag (13).

#### Inspection brake circuit 1:

1. Energise brake circuit 2.
2. Put the system into operation; trigger an EMERGENCY STOP and inspect the stopping distance according to the elevator regulations.
3. De-energise brake circuit 2.

#### Inspection brake circuit 2:

1. Energise brake circuit 1.
2. Put the system into operation; trigger an EMERGENCY STOP and inspect the stopping distance according to the elevator regulations.
3. De-energise brake circuit 1.

#### Inspection both circuits:

Put the system into operation; trigger an EMERGENCY STOP and inspect the stopping distance according to the elevator regulations. The stopping distance must be much shorter than the stopping distance for an individual circuit.

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## Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00\_31 Size 1300



### Release Monitoring (6) Figs. 1 and 9

The ROBA-stop®-silenzio® brakes are delivered with manufacturer-side set release monitoring.  
 One microswitch (Item 6.1) per brake circuit emits a signal for every brake condition change:  
 "Brake opened" or "brake closed".

#### On initial operation:

Connection as NO contact (black and blue strands).

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

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

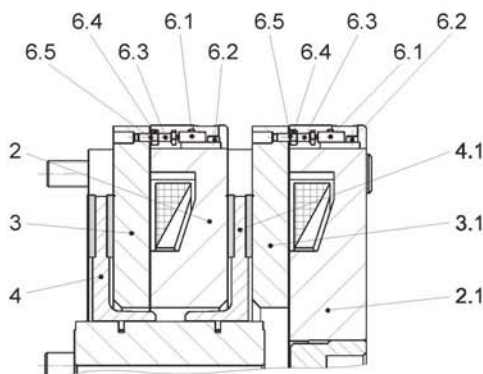
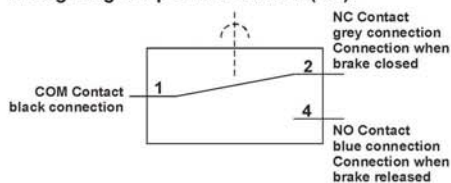


Fig. 9

#### Function

When the magnetic coil is energised in the coil carriers (2 and 2.1), the armature disks (3 and 3.1) are attracted to the coil carriers, the microswitches (6.1) emit signals and the brake is released.

#### Wiring Diagram per Microswitch (6.1):



#### Microswitch Specifications

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

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

### Installation and Adjustment (manufacturer-side, Fig. 6)



The brake is mounted, secured with a tightening torque of 200 Nm and the coil is de-energised.

- Turn the hexagon head screw (6.3) in the direction of the switch (6.1) up to the microswitch tappet.
- Tighten the hexagon nut (6.4), so that the hexagon head screw (6.3) is placed under pre-tension by the spring washer (6.5).
- Put a feeler gauge 0,16 mm (loose sensor plate) between the switch tappet (6.1) and the hexagon head screw (6.3).
- Connect the inspection or measurement device (diode inspection) to the NO contact black/blue.
- Turn the hexagon head screw (6.3) in the direction of the switch (6.1) up to the signal "ON", turn it back to the signal "OFF" and counter the hexagon head screw (6.3) with the hexagon nut (6.4).
- Energise brake → Signal "ON",  
 De-energise brake → Signal "OFF",  
 Re-adjust if necessary and repeat the inspection (align 3 to 5 times).
- Inspect using feeler gauge 0,19 mm  
 a) Energise the brake → Signal "ON",  
 b) De-energise the brake → Signal "ON"
- Inspect using feeler gauge 0,16 mm  
 a) Energise the brake → Signal "ON",  
 b) De-energise the brake → Signal "OFF"
- Put the feeler gauge 0,20 mm between the armature disk (3/3.1) and the coil carrier (2/2.1) in the switch (6.1) area, then energise the brake. The signal must be "ON".
- Paint Items 6.2, 6.3 und 6.4 with sealing lacquer.

#### Customer-side Inspection after Mounting

The customer-side contact is an NO contact.  
 Please inspect the release monitoring units:  
 Brake de-energised → Signal "OFF",  
 Brake energised → Signal "ON"



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 capacities and medium ones. However, after switching a medium switching capacity, small switching capacities are no longer reliably possible.  
 In order to switch inductive, capacitive and non-linear loads, please use the appropriate protective circuit to protect against electric arcs and unpermitted loads!

## Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00\_31 Size 1300



### 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 can take place with AC current using a rectifier or another suitable DC power 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 directives 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 minimise noise development of the released brake, it must only be operated via DC current 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, phase angle control systems, ...) are not suitable for operation of the brake.

### Earthing 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 PE conductor on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardized inspection of the PE 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 Behaviour

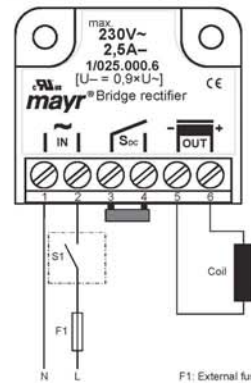
The operational behaviour of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the temperature and the air gap between the armature disk and the coil carrier (dependent on the wear condition of the linings).

### 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

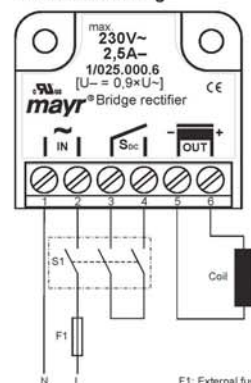


The power circuit is interrupted before the rectifier. The magnetic field slowly reduces. This delays the rise in braking torque.

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

→ **Low-noise switching**; however, the brake engagement time is longer (c. 6-10 times longer than with DC-side switching). Use for non-critical brake 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.

→ **Short brake engagement times** (e.g. for **EMERGENCY STOP**); however, louder switching noises.

### Protective Circuit

When using DC-side switching, the coil must be protected by a suitable protective 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 operation current are sufficient. Depending on the application, the switching contact can also be protected by other protective circuits (e.g. *mayr*® spark quenching unit), although this may of course then alter the switching time.

## Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896.00\_31 Size 1300



### Maintenance

ROBA-stop®-silenzio® brakes are mainly maintenance-free. The friction linings are robust and wear-resistant. This ensures a particularly long service lifetime.

However, the friction lining is subject to operational wear on frequent use of EMERGENCY STOP braking actions. Therefore, the following inspections should be carried out at regular intervals.

- Braking torque or retardation inspection (individual brake circuits) (min. 1 x per year)
- Inspection of air gap "a" braked (min. 1 x per year)

Check the wear condition of the rotors (4 and 4.1) by measuring the air gaps "a" (Fig. 2 and Technical Data).

The rotors must be replaced at the latest when the maximum air gap of **0,9 mm** has been reached.

### Before Replacing the Rotors

- Clean the brake and remove abraded particles using compressed air.
- Do not inhale brake dust (wear a dust mask).
- Measure the rotor thickness (nominal size dimension 15<sub>-0,05</sub> mm).

### Replacing the Rotors (4 and 4.1)

Replace the rotors (4 and 4.1) by following the Brake Installation instructions backwards.

#### DANGER



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

### Disposal

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

#### Electronic Components (Rectifier / Microswitch):

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 pads with coil / cable and all other steel components:

Steel scrap (Code No. 160117)

#### Aluminium components:

Non-ferrous metals (Code No. 160118)

#### Brake rotor (steel or aluminium pads with friction linings):

Brake linings (Code No. 160112)

#### Seals, O-rings, V-seals, elastomers, terminal boxes (PVC):

Plastic (Code No. 160119)

### Malfunctions / Breakdowns:

Malfunction	Possible Causes	Solutions
Brake does not release	<ul style="list-style-type: none"> <li><input type="checkbox"/> Incorrect voltage on rectifier</li> <li><input type="checkbox"/> Air gap too large (worn rotor)</li> <li><input type="checkbox"/> Coil interruption</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Apply correct voltage</li> <li><input type="checkbox"/> Replace rotors</li> <li><input type="checkbox"/> Replace brake</li> </ul>
Brake engagement delayed on EMERGENCY STOP	<ul style="list-style-type: none"> <li><input type="checkbox"/> Brake is switched AC-side</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Switch DC-side</li> </ul>



## 9.5 EU declaration of conformity of the 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

Im Sinne der Richtlinie Aufzüge 2014/33/EU erklären wir  
*In terms of the Directive 2014/33/EU relating to lifts, we*  
Conformément à la directive 2014/33/UE sur les ascenseurs, nous déclarons par la présente,  
*Secondo la Direttiva per ascensori 2014/33/UE, la presente*  
En el sentido de la Directiva 2014/33/UE sobre ascensores  
*Nos termos da diretiva 2014/33/UE declaramos*

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

dass die angeführten Produkte den Anforderungen der oben genannten EU-Richtlinie entsprechen.  
*declare that the listed products meet the requirements of the above mentioned EU Directive.*  
que les produits décrits satisfont aux exigences de la directive UE susmentionnée.  
*dichiara che i prodotti sotto elencati soddisfano i requisiti della suddetta Direttiva UE.*  
declaramos que los productos indicados arriba cumplen los requisitos de la Directiva UE.  
*que os produtos abaixo mencionados correspondem às exigências da diretiva UE supramencionada.*

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

Produkt / Product / Produit / Prodotto / Producto / Produto	Größen / Sizes / Tailles / Grandezze / Dimensión / Dimensão	Typen / Types / Types / Serie / Tipos / Tipos	ANVP
ROBA-stop®-silenzio®	200/300/500/800/1300/1800	896.0 _ _ _ _	1, **, ***

Jahr der Herstellung:  
*Year of manufacture:*  
Année de production:  
*Anno di produzione:*  
Año de fabricación:  
*Ano de fabricação:*

Siehe Typenschild am Produkt  
*see product label*  
Voir l'étiquette sur le produit  
*vedi l'etichetta sul prodotto*  
ver placa de identificación del producto  
*Ver placa do produto*

Mauerstetten, gültig ab dem 20.4.2016

Ort und Datum / place and date / Lieu et date /  
luogo – data / fecha y lugar / Lugar e data

  
Dipl. Ing. (FH) / graduate engineer / Engenheiro graduado  
Geschäftsführer / Managing Director / Directeur Général / Gerente / Gerente  
Günther Klingler



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

1	EN 81-20:2014 / EN 81-50:2014 / EN 81-1:1998 + A3:2009	Sicherheitsregeln – Konstruktion u. Einbau von Aufzügen <i>Safety rules – Construction and installation of lifts</i> Règles de sécurité – construction et installation d'ascenseurs <i>Regole di sicurezza per la costruzione e il montaggio di ascensori</i> Reglas de seguridad – Construcción y montaje de ascensores <i>Regras de segurança – Construção e instalação de elevadores</i>	2014/33/EU 2014/33/EU 2014/33/UE 2014/33/UE 2014/33/UE 2014/33/UE
---	--	--	--

**Zertifizierungsstelle für Aufzüge und Sicherheitsbauteile, Überwachung gemäß Aufzugsrichtlinie:**

*Certification body for lifts and safety components, monitoring of production acc. lifts directive:*

**Organisme de certification pour ascenseurs et composants de sécurité, contrôle de production selon la directive sur les ascenseurs:**

*Organismo di certificazione per ascensori e componenti di sicurezza, controllo di produzione secondo la Direttiva per ascensori :*

**Centro de certificación para ascensores y componentes de seguridad, supervisión según la directiva de ascensores:**

*Centro de certificação para elevadores e componentes de segurança, monitoramento conforme a diretiva para elevadores:*

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

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

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

Bremseinrichtung, als Teil der Schutzeinrichtung für den aufwärtsfahrenden Fahrkorb gegen Übergeschwindigkeit und Bremsselement gegen unbeabsichtigte Bewegung des Fahrkorbs.

*Braking device as part of the protection device against over speed for the car moving in upwards direction and braking element against unintended car movement.*

Dispositif de freinage faisant partie d'un système de protection contre la survitesse en montée de la cabine d'ascenseur et élément de freinage contre le déplacement involontaire de la cabine d'ascenseur.

*Dispositivo di frenatura come parte del dispositivo di protezione contro la fuga verso l'alto della cabina e elemento di frenatura contro i movimenti incontrollati della cabina.*

Dispositivo de frenado como parte de un dispositivo de seguridad contra la sobrevelocidad de la cabina en movimiento ascendente y como elemento de frenado contra movimientos incontrolados de la cabina.

*Dispositivo de freio para ser usado como parte da unidade de proteção para prevenir excesso de velocidade da cabine elevadora em movimento ascendente e elemento de freio contra movimentos inadvertidos da cabine elevadora.*

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

**EU-BD 760**

	* EG-Maschinenrichtlinie 2006/42/EG * Directive 2006/42/CE sur les machines * Directiva de Máquinas 2006/42/CE	* EC-Machinery directive 2006/42/EC * Direttiva macchine 2006/42/CE * Diretiva para maquinaria 2006/42/CE
X	** Richtlinie Niederspannung 2014/35/EU ** Directive 2014/35/UE sur les basses tensions ** Directivas de Baja Tensión 2014/35/UE	** EC-Low voltage directive 2014/35/EU ** Direttiva per il basso voltaggio 2014/35/UE ** Diretiva de baixa voltagem 2014/35/UE
X	*** Elektromagnetische Verträglichkeit 2014/30/EU *** Directive 2014/30/UE sur la compatibilité électromagnétique *** Compatibilidad Electromagnética 2014/30/UE	*** Electromagnetic compatibility directive 2014/30/EU *** Direttiva per la compatibilità elettromagnetica 2014/30/UE *** Diretiva de compatibilidade eletromagnética 2014/30/UE

Mauerstetten, gültig ab dem 20.4.2016

*Ort und Datum / place and date / Lieu et date /  
 luogo - data / fecha y lugar / Lugar e data*

Dipl. Ing. (FH) / graduate engineer / Engenheiro graduado  
 Geschäftsführer / Managing Director / Directeur Général / Gerente / Gerente  
 Günther Klingler



## 9.6 EU type-examination certificate



Industrie Service

# EU TYPE-EXAMINATION CERTIFICATE

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

**Certificate No.:** EU-BD 760

**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:** Chr. Mayr GmbH & Co. KG  
Eichenstr. 1  
87665 Mauerstetten - Germany  
(Manufacturer of Serial Production – see Enclosure)

**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  
EN 81-1:1998+A3:2009

**Test Report:** EU-BD 760 of 2015-09-30

**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:** 2015-09-30

**Date of Validity:** from 2016-04-20

Achim Janocha  
Certification Body "lifts and cranes"



TUV®

**Annex to the EC Type-Examination Certificate  
 No. EU-BD 760 of 2015-09-30**



**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	730
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)  
 $\pi$  = 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		730	100	160	230
500		2 x 800 = 1600	730	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.



**Annex to the EC Type-Examination Certificate  
 No. EU-BD 760 of 2015-09-30**



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**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. E0790900000260 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 of 2015-09-30**



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 81-1:1998 + A3:2009 (D), Annex F.7 and F.8
  - EN 81-20:2014 (D), part 5.6.6.11, 5.6.7.13
  - EN 81-50:2014 (D), part 5.7 and 5.8
- 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 of 2015-09-30**

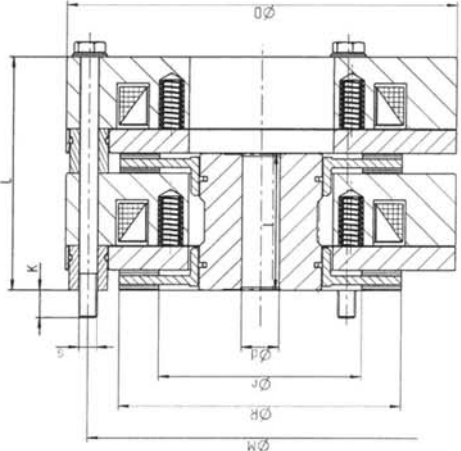


**Authorised Manufacturer of Serial Production – Production Sites (valid from: 2015-09-30):**

**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

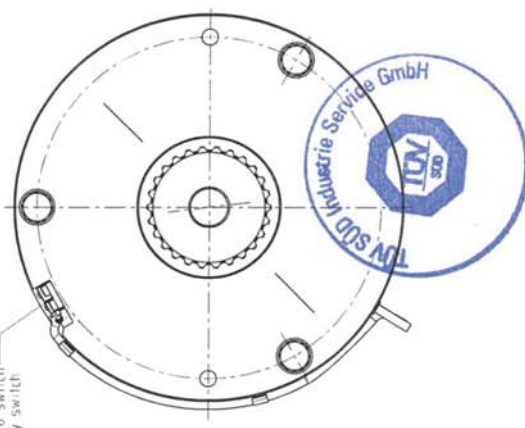
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30. SEP. 2015

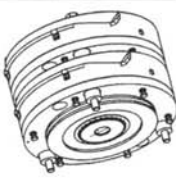
**GEPRÜFT / APPROVED**  
 TÜV SÜD Industrie Service GmbH  
 Prüflaboratorium für Produkte der Fördertechnik  
 Westendstraße 199  
 80686 München  
 Sachverständigen / Expert  
*H. Nijm*

Sonderausführungen  
 alternativ mit  
 direktverzahnter  
 Motorwelle /  
 special designed  
 alternative with  
 skinned motor shaft



Mikroschalter / micro switch  
 @ Initiator / proximity switch

15



\*) Maße variabel:  
 Zulässige Bohrungsdurchmesser, Nabenlängen und Einschraubtiefen sind vom Drehmoment der Bremse abhängig und können an vorgegebene Wellenenden bzw. Motorflansche angepasst sein. /  
 Dimensions variable:  
 Permitted bore diameters, hub lengths and screw in depth are dependent on  
 braking torque at load be adapted to specified motor shafts and motor flanges.

Größe Size	Bohrung/ bore d	Ø ± 0,1	Ø R ± 0,1	Ø r	Ø M	L	H <sup>1)</sup>			H <sup>2)</sup>
							L	L	K	
200	30-46	223	170	122	196	152	69	16,4	3xM10 @ 6xM10	
300	24-59	261	188	135	230	159	93	18,7	3xM12 @ 6xM12	
500	40-69	285	213	150	250	172	102	25,5	6xM12	
800	45-79	329	246	180	290	189	122	28	6xM16	
1300	56-95	370	283,5	208	330	205	142	30	6xM16 @ 2xL	
1800	66-104	415	320	230	370	205	152	32	6xM16	

RSO 200-1800 / 896.0

Zustimmungs-Nr. E079090000000260

Produktions-Nr. 066.3888



Industrie Service

TÜV SÜD Industrie Service GmbH · 80684 Munich · Germany

**Choose certainty.  
 Add value.**

Chr. Mayr GmbH & Co. KG  
 Eichenstraße 1  
 87665 Mauerstetten – Germany



Your reference/letter of	Our reference/name	Tel.-Extension/E-Mail	Fax-Extension	Date	Page
	IS-FT1-MUC/ng Manfred Negru	+49 89 5791-3336 manfred.negru@tuv-sued.de	+49 89 5791-3337	2015-11-09 C_Mayr_Bestätigung_EN81-20_50_151109_en	1 of 2

**Fulfillment of requirements concerning type-examinations of ascending car overspeed protection means (ACOP) and protection devices against unintended car movement according to the harmonized standard EN 81-50:2014 (D) by (EC) type-examination certificates according to Directive 95/16/EC**

Dear Sirs,

For the products listed below were issued (EC) type-examination certificates according to Directive 95/16/EC. Test basis was the harmonized standard EN 81-1. In the meantime EU type-examination certificates according to Directive 2014/33/EU were issued for the tested products. So far as relevant, additional requirements of the harmonized standard EN 81-20:2014 (D) were taken into consideration.

Type:	(EC) type-examination certificate	EU type-examination certificate
894.001.1 SO, Größe 8	ABV 550/2, ESV 550	EU-BD 550
RSD 500/891 ____ . __, Größe 500	ABV 703, ESV 703	EU-BD 703
RSD 1000/891 ____ . __, Größe 1000	ABV 704, ESV 704	EU-BD 704
896.0 ____ . __, Größe 200, 300, 500, 800, 1300, 1800	ABV 760/2, ESV 760	EU-BD 760
896.1 ____ . __, Größe 200, 300, 500, 800, 1300, 1800	ABV 761/2, ESV 761	EU-BD 761
896.2 ____ . __, Größe 300, 500, 800, 1300, 1800	ABV 762/2, ESV 762/1	EU-BD 762
RSR/8010. ____ . __, Größe 200, 400, 600, 800, 1000, 1500	ABV 766/3, ESV 766/1	EU-BD 766
RSO 1300/896.30_3 SO	ABV 783/2, ESV 783	EU-BD 783
RSD Größe 10 / 894.0 ____ . __ RSD Größe 10 / 894.2 ____ . __	ABV 822/1, ESV 822/1	EU-BD 822
RSO 1800/896.03_--	ABV 834/1, ESV 834	EU-BD 834

Headquarters: Munich  
 Trade Register Munich HRB 96 869  
 VAT ID No. DE129484218  
 Information pursuant to § 2 [1] DL-InfoV  
 (Germany) at [www.tuv-sud.com/imprint](http://www.tuv-sud.com/imprint)

Supervisory Board:  
 Karsten Xander (Chairman)  
 Board of Management:  
 Ferdinand Neuwieser (CEO),  
 Dr. Ulrich Klotz, Thomas Kainz

Phone: +49 89 5791-3336  
 Fax: +49 89 5791-3337  
[www.tuv-sud.com/fis](http://www.tuv-sud.com/fis)

TÜV SÜD Industrie Service GmbH  
 Niederlassung München  
 Abteilung Fördertechnik  
 Westendstrasse 199  
 80686 Munich  
 Germany



Page 2 of 2  
 Our reference/Date: IS-FT1-MUC/ing /2015-11-09  
 Document: C\_Mayr\_Bestätigung\_EN81-20\_50\_151109\_en



Industrie Service

RTW Größe 150, 200, 250, 350 Type 8012.	ABV 845, ESV 845	EU-BD 845
RSO 1300/896.2	ABV 891, ESV 891	EU-BD 891
RSO 1800/896.2	ABV 892, ESV 892	EU-BD 892
RTW Größe 125, 180, 225 Type 8012.	ABV 954, ESV 954	EU-BD 954

According to the new standard EN 81-50:2014 (D) there are new requirements for the type-examination of the braking devices as part of the ascending car overspeed protection means (ACOP) and against unintended car movement (UCM) respectively the requirements have changed. But these requirements already have been considered in the past. For this reason additional tests were not necessary. The content of the EC type examination certificates was formally adapted. The safety components mentioned above fulfill the requirements of the harmonized standard EN 81-50:2014 (D) already.

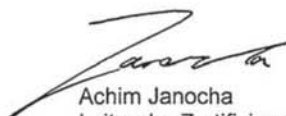
For the function as safety component as part of the ascending car overspeed protection means (ACOP) the transitional regulation according to Article 44 of the Directive 2014/33/EU is fully applicable.

In the future protecting devices against unintended car movement (UCM) will be safety components according to Annex III of the Directive 2014/33/EU.

Furthermore according to Article 44 of the Directive 2014/33/EU the making available on the market of safety components for lifts covered by Directive 95/16/EC which are in conformity with that Directive and which were placed on the market before 20 April 2016 shall not be impeded. To avoid problems in the meantime with document NB-L/2015-061 of 2015-07-06 Notified Bodies Lift (NB-Lift) suggested to apply Article 44 for components of protecting devices against unintended car movement (UCM) analogously. A definitive statement of NB-Lift respectively the European Commission is planned, but is pending. After consideration a transformation of the existing type-examination certificates in EU type-examination certificates is possible.

For this reason, additional formal requirements and due to the validity of the new Lift Directive 2014/33/EU from 2016-04-20, EU type-examination certificates already may be issued, but they are valid from 2016-04-20 only.

Best regards

  
 Achim Janocha  
 Leiter der Zertifizierungsstelle  
 für Produkte der Fördertechnik

  
 Manfred Negru  
 Niederlassung München  
 Abteilung Fördertechnik



### 9.6.1 Statement on type examination certificates

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

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

## 9.8 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 <sup>-1</sup> ]	[min <sup>-1</sup> ]	[m/s]	[m/s]	[m/s]	[m/s]
132	120	520	598	3.27	3,75	1,63	1,87
132	160	520	598	4.35	5.00	2.17	2.50
SM160A/B	160	384	441	3.22	3.69	1.61	1.85
SM160A/B	200	384	441	4.02	4.62	2,01	2.31
SM160A/B	210	384	441	4.22	4.85	2.11	2.42
SM160A/B	240	384	441	4.83	5.54	2.41	2.77
SM190	200	300	345	3.14	3.61	1.57	1.81
SM190	240	300	345	3.77	4.34	1.88	2.17
SM200C	160	300	345	2.51	2.89	1.26	1.45
SM200C	210	300	345	3.30	3.79	1.65	1.90
SM200C	240	300	345	3.77	4.34	1.88	2.17
SM200C	320	300	345	5.03	5.78	2.51	2.89
SM200C	400	300	345	6.28	7.23	3.14	3.61
SM200C	450	300	345	7.07	8.13	3.53	4.06
SM200C	500	300	345	7.85	9.03	3.93	4.52
SM225(B)	320	217	250	3.64	4.19	1.82	2.09
SM225(B)	400	217	250	4.54	5.24	2.27	2.62
SM225(B)	500	217	250	5.68	6.54	2.84	3.27
SM225(B)	600	217	250	6.82	7.85	3.41	3.93
SM225C	240	400	460	5.03	5.78	2.51	2.89
SM225C	320	400	460	6.70	7.71	3.35	3.85
SM225C	400	400	460	8.83	9.63	4.19	4.82
SM250.60B	320	400	460	6.70	7.71	3.35	3.85
SM250.60B	400	400	460	8.83	9.63	4.19	4.82
SM250.60B	500	400	460	10.47	12.04	5.24	6.02
SM250.60B	600	400	460	12.57	14.45	6.28	7.23
SM250D	440	400	460	9.22	10.60	4.61	5.30
SM250C	450	400	460	9.42	10.84	4.71	5.42
SM250C	500	400	460	10.47	12.04	5.24	6.02
SM250C/D	520	400	460	10.89	12.52	5.45	6.26

## 9.9 Shaft calculation



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### Certificate

about the verification of the calculation of a traction sheave shaft including Shaft / Hub connections

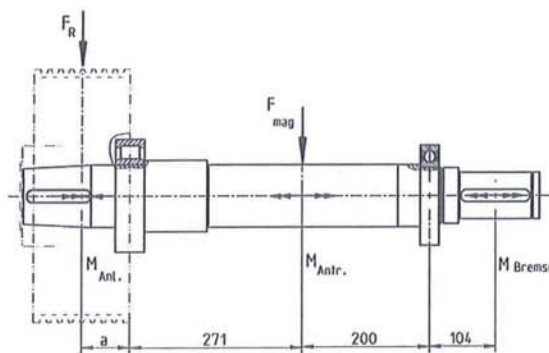
Type of the gearless machine: SM 225.60B-20

Manufacturer: Ziehl-Abegg AG, Heinz-Ziehl-Strasse  
 74653 Künzelsau - Germany

Examination number: G 371/2

Tested product: Traction sheave shaft including Shaft / Hub connections  
 Test Report of IFF ENGINEERING & CONSULTING GmbH dated 2011-08-01 (Page 1 – 15 with annex 7 pages)

Basis of examination: DIN 743 (10/2000), calculation of the safe working load of shafts and axis  
 DIN 6892 (11/1998), fitting key springs, calculation and design  
 FKM-Guideline (2003), Analytical Strength Assessment of Mechanical Parts



Date: 2012-11-14

Our reference:  
 IS-FSA-STG/No

Document: BS\_G371-  
 2\_121114\_en.docx

This Document consists of  
 2 Pages.  
 Page 1 of 2

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The test results refer exclusively to the units under test.

Construction drawing: A-22-121-0165 dated 2006-06-09 with Index A06 dated 2010-12-14

Material: Steel EN 10083-1 (10/2006) – 42CrMo4+QT (1.7225+QT)  
 Steel EN 10083-1 (10/2006) – 42CrMoS4+QT (1.7227+QT)  
 Steel EN 10083-1 (10/2006) – 50CrMo4+QT (1.7228+QT)

Minimum permissible surface pressure according to DIN 6892, paragraph 5.1.2 for the material of the hub connections of the traction sheave (Material GG30 EN-JL 1050, DIN EN 1561 (08/1997) as stated by the manufacturer):

$$p_{zul} = f_s \cdot f_H \cdot R_e \text{ respectively } p_{zul} = f_s \cdot f_H \cdot R_{p0,2} \text{ or } p_{zul} = f_s \cdot R_m$$

( $f_s$ ;  $f_H$  Table B1)  $p_{zul} \geq 420 \text{ N/mm}^2$

Headquarters: Munich  
 Trade Register Munich HRB 96 869  
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 Document: BS\_G371-2\_121114\_en.docx



Minimum permissible surface pressure according to DIN 6892, paragraph 5.1.2 for the material of the hub connections of the **brake rotor** (Material unknown, values as stated by the manufacturer):

$$p_{zul} = f_s \cdot f_H \cdot R_0 \text{ respectively } p_{zul} = f_s \cdot f_H \cdot R_{P0,2} \text{ or } p_{zul} = f_s \cdot R_m$$

( $f_s$ ;  $f_H$  Table B1)  $p_{zul} \geq 367,5 \text{ N/mm}^2$

**Details for the calculation, applicable to the event of load**

Maximum permissible static load	$F_R$	52 kN für a = 75 mm 42 kN für a = 91 mm
Maximum starting-up torque	$M_{Max}$	1900 Nm
Magnetic force	$F_{mag}$	14 kN
Rated braking torque	$M_{braking}$	2400 Nm (2 x 1200 Nm)
Maximum braking torque	$\geq 2.0 \times M_{braking}$	5000 Nm
Maximum nominal speed of rotation		400 min <sup>-1</sup>

**Test result**

The verification of the shaft calculation including the Shaft / Hub connections was carried out by means of a comparative calculation and is documented and evaluated in the test report no. FIL-ETK2-12-0130 dated 2012-11-06. The test proved that the traction sheave shafts are dimensioned in accordance with the details of maximum load according to the requirements of the basis of examination.

An installation free of stresses and a unmoveable mounting of the supports 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 supports.

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

Notice: This certificate only refers to the sufficient calculation of the traction sheave shaft and hub/shaft connections but not to the sufficient dimensioning of the brake.

Prüflaboratorium für Produkte der Fördertechnik  
 Prüfbereich Aufzüge und Sicherheitsbauteile

  
 Gerold Jilg

The expert

  
 Chadi Noureddine

# Zusatzhinweis zu den Betriebsanleitungen

## Additional instructions for manuals

### ZAtop / ZAsyn / ZAdisc



A-TIA16\_02-D-GB

#### Typenschild:

Auf den Typenschildern der ZAtop / ZAsyn / ZAdisc Antriebe werden jeweils zwei Werte als Nennwerte für Leistung, Strom, Drehmoment und Einschaltdauer angegeben.

Die jeweils ersten Werte stehen für die maximale Belastung bei Betrieb des Aufzugs (Fahrt mit leerer Kabine abwärts, bzw. mit voller Kabine aufwärts). Die jeweils zweiten Werte stehen für die mittlere Belastung bei Betrieb des Aufzugs.

#### Beispielhaftes Typenschild:

CE		ZIEHL-ABEGG	
S/N 16231769/01	IMB3	F	IP21 IEC60034-1
Typ SM225.60B-20	U <sub>G</sub> 204 V	P <sub>r</sub> 18/13 kW	
3 ~ Y 360 V	240 st/h	26 Hz	n 156 rpm
S3	duty 20/40 %	I <sub>r</sub> 53,5/38 A	
cos φ 0,9/0,95		I <sub>max</sub> 98 A	
J <sub>M</sub> 0,75 kgm <sup>2</sup>	R <sub>U20</sub> 0,37 Ω	T <sub>r</sub> 1120/800 Nm	
	mass	T <sub>max</sub> 1900 Nm	
Made by ZIEHL-ABEGG · 74653 Künzelsau · Germany Tel. +49 (0) 7940 16-0 · www.ziehl-abegg.com			

#### Werte für maximale Belastung:

1120 Nm; 20 % ED; 18,0 kW; 53,5 A

#### Werte für mittlere Belastung:

800 Nm; 40 % ED; 13,0 kW; 38 A

#### Hinweis:

Für die Auswahl des Frequenzumrichters sowie des Querschnittes der Motorleitung ist der jeweils erste Stromwert relevant.

#### Kundenservice

Telefon +49 7940 16-308  
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[drives-service@ziehl-abegg.com](mailto:drives-service@ziehl-abegg.com)

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[www.ziehl-abegg.com](http://www.ziehl-abegg.com)

#### Name plate:

On the name plates of ZAtop / ZAsyn / ZAdisc motors, two values are mentioned respectively as the rated values for output power, current, torque and duty cycle.

The first value indicated refers to the maximum load while the lift is in operation (empty car travels downwards /loaded car travels upwards).

The second value respectively refers to average load while the lift is in operation.

#### Example for name plate:

CE		ZIEHL-ABEGG	
S/N 16231769/01	IMB3	F	IP21 IEC60034-1
Typ SM225.60B-20	U <sub>G</sub> 204 V	P <sub>r</sub> 18/13 kW	
3 ~ Y 360 V	240 st/h	26 Hz	n 156 rpm
S3	duty 20/40 %	I <sub>r</sub> 53,5/38 A	
cos φ 0,9/0,95		I <sub>max</sub> 98 A	
J <sub>M</sub> 0,75 kgm <sup>2</sup>	R <sub>U20</sub> 0,37 Ω	T <sub>r</sub> 1120/800 Nm	
	mass	T <sub>max</sub> 1900 Nm	
Made by ZIEHL-ABEGG · 74653 Künzelsau · Germany Tel. +49 (0) 7940 16-0 · www.ziehl-abegg.com			

#### Values for maximum load:

1120 Nm; 20 % ED; 18.0 kW; 53.5 A

#### Values for average load:

800 Nm; 40 % ED; 13.0 kW; 38 A

#### Note:

The first rated current is the decisive factor in the selection of both the frequency inverter and the line cross section of the motor cable.

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