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 SM200.30C

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.

	**Danger!** General hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!
	**Warning!** Middle or slight bodilies harm is possible if the corresponding precautions are not taken!
CAUTION!	**Caution!** Material damage is possible if the corresponding precautions are not taken.

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

2.3 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
- compact design

Due to the very compact design the ZAtop is ideal for machine roomless elevators. Of course the certified brakes provide maximum security and are approved as a safety device for ascending car overspeed protection. Protected through registered design and patents application pending one can for the very first time build a new dimension of machine roomless elevators.

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

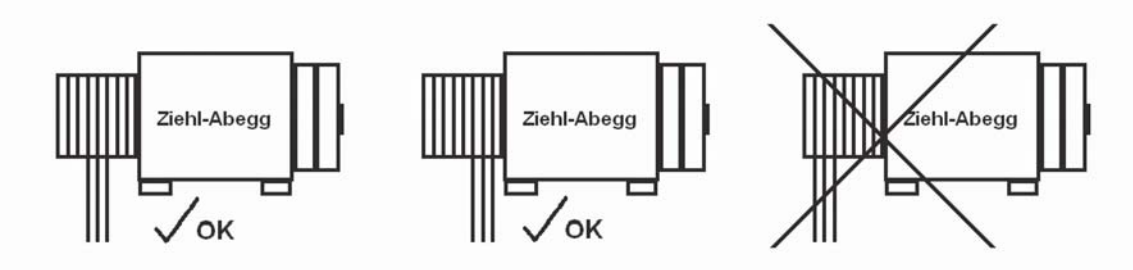
4.1 General mounting advises

▷ 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 scews 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

Pleasepayattention 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 channals or girders. The drive must not be placed of 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 4 threads.
▷ The motor has to be fixed with 4 screws M16 - 8.8 at the mounting plate.
Tightening torque M16 - 8.8: 195 Nm
▷ Screw-in depth at least 1.5 times of screw size. (minimum 24 mm, maximum 32 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 protection clamps will be fastened at the housing with two screws M8 x 16 and washers.
Tightening torque M8 - 8.8: 23 Nm
▷ Through the longholes in the clamp the required distance to the ropes 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.**

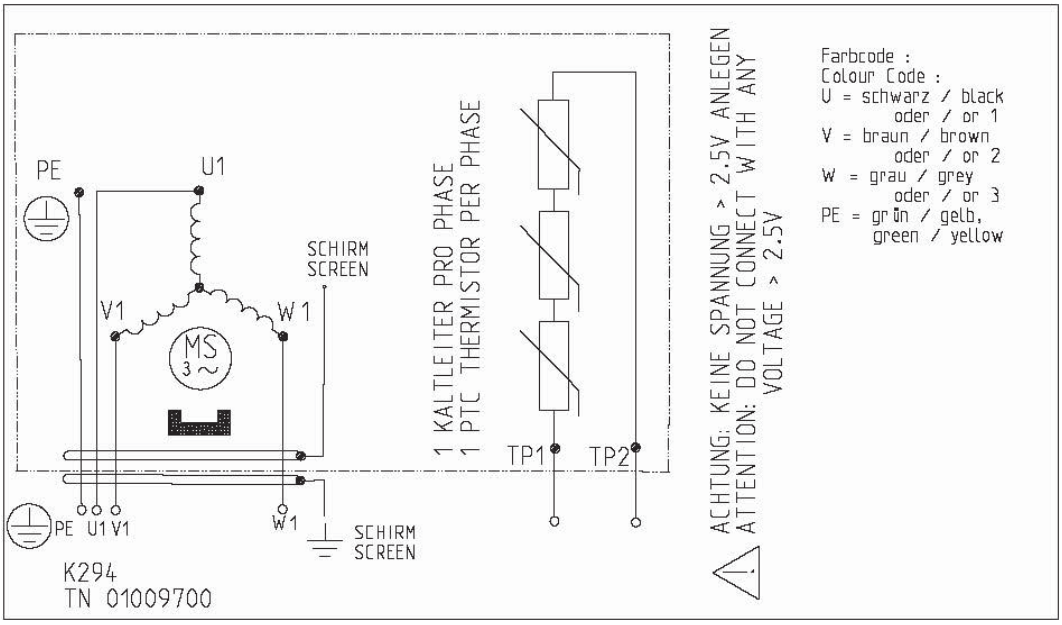
▷ Connect to the motor terminal box depending on the motor cable as follows:

PE	**U**	**V**	**W**	
green/yellow	black	brown	blue	*
green/yellow	black	brown	grey	**
green/yellow	1	2	3	

* *DIN VDE 0243: 1990-01*
** *DIN VDE 0293-308: 2003-01*

▷ 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.

Wiring diagram Motor



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)

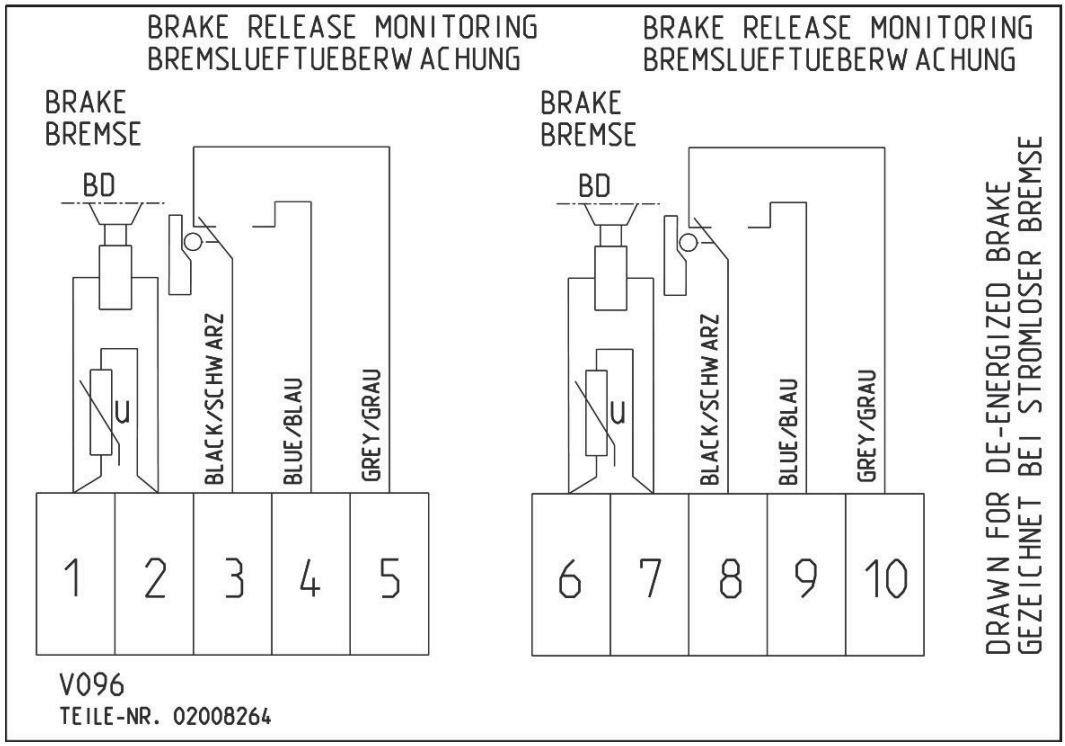
5.5 Brake connection

- ▷ **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 3,8 A per circuit!
- ▷ The brake circuits can be opened mechanically. They are separated from each other.
- ▷ 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

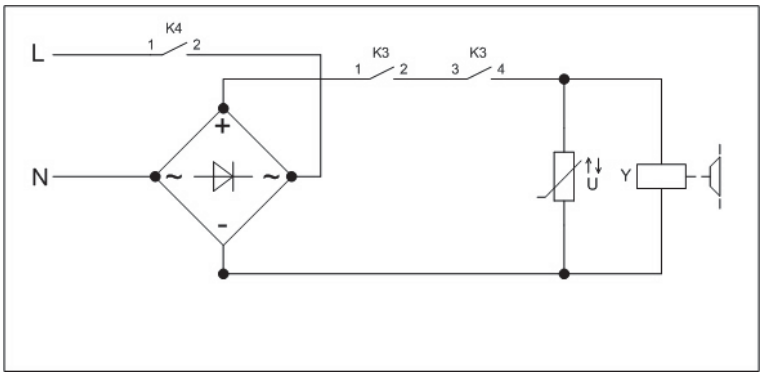


5.5.1 Triggering of the brakes

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

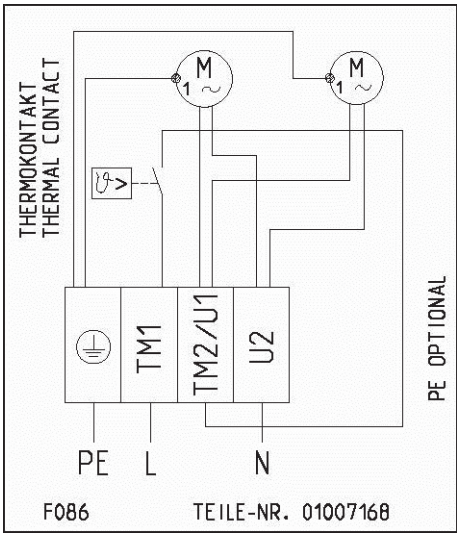
The contacts from K3 must close before the contact from K4 and are only permitted to open after the contact from K4 has opened.

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 14,5 / 14	W
Current	2 x 0.07 / 0,06	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

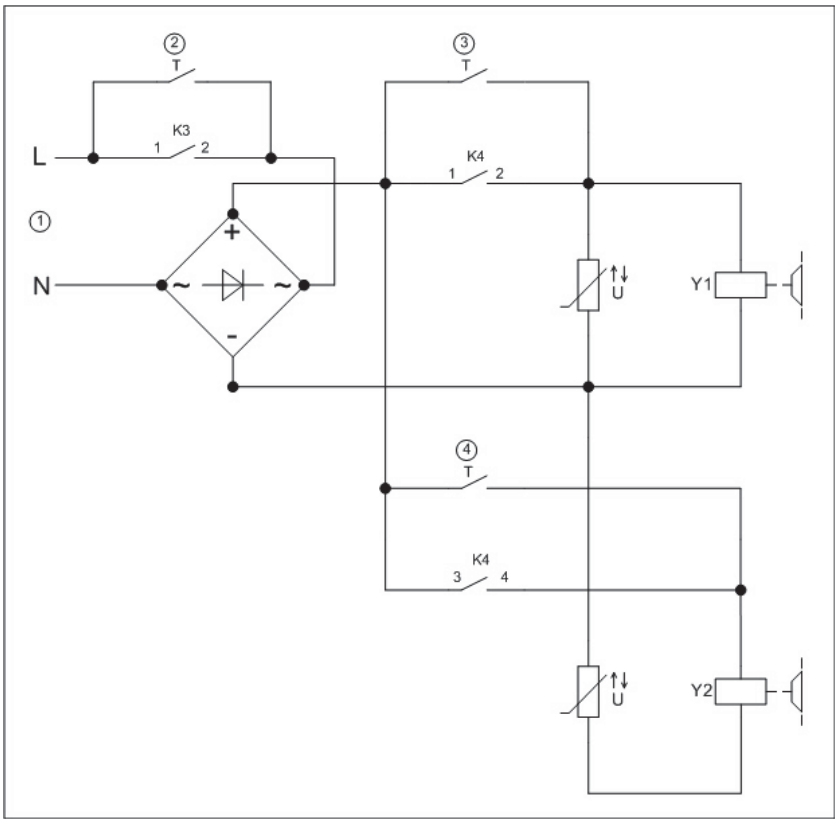
▷ When testing the brakes, the short-circuit wiring has to be deactivated to only test the effect of the brake.
▷ It is recommended to perform the tests when the car position is about in the middle of the shaft.

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 normely open or normaly 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.

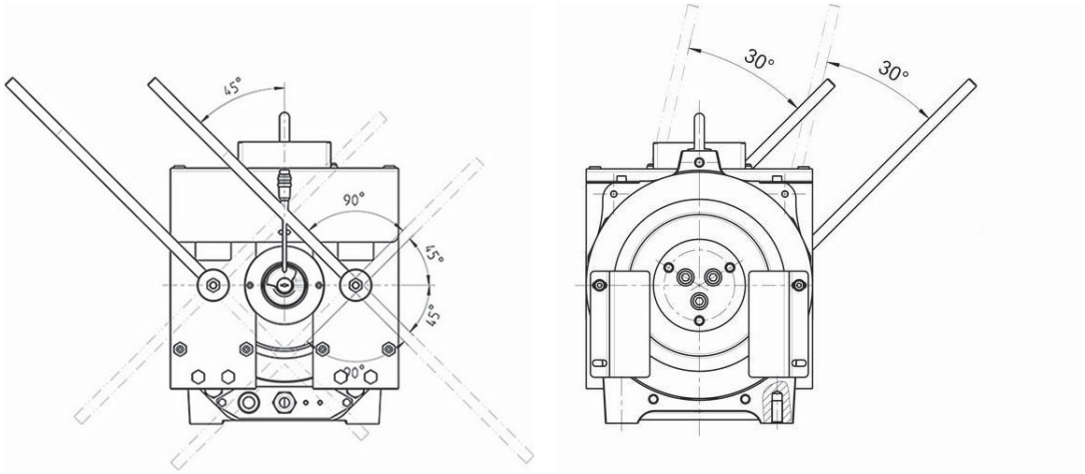
6.5 Emergency evacuation

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 inserted with an offset of 90°.



possible insertion positions of the levers for hand release brake manuell released

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!

Hand release version is available as an option. Retrofitting the hand release is not possible.

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 to 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 microswitches

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 treaction 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.

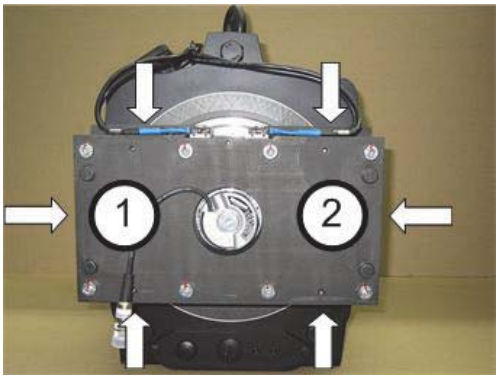
The brake wear has to be checked with the brake closed, therefore:
▷ Make sure that all moving parts have stopped, secure them mechanically if required!
▷ Make sure that the elevator can not be moved from any other person than the one who does the check!

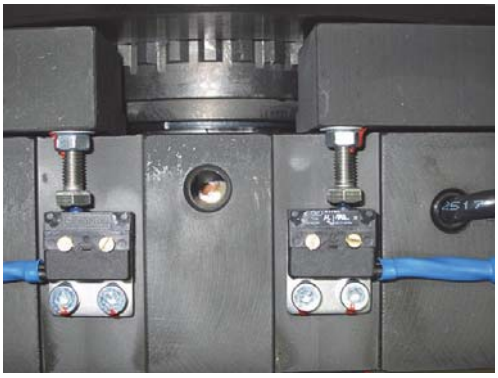
8.2 Inspection intervals

	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. The airgap is to be check with the de-energized brake, 3 times at the circumfence of both brakes (brake 1 + brake 2). 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 boltM5 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.
Ttightening 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



Danger!
Incorrect assembly of the traction sheave can cause the sheave to come loose.
Attention! Please check firstly the screw quality. This can be 8.8 or 10.9. Different tightening torques apply!

Disassembling:

- Interrupt the electrical circuit of the installation and secure it against switching-on, secure the elevator car and the counterweight.
- Release the traction sheave and put down the ropes.
- **Secure sheave to prevent that it jumps off the shaft!**
- Remove the screws and the washers of the traction sheave 3 x M12 and insert the screws at external hole diameter of the plate
- Put a distance plate with a thickness of 5 - 8 mm between the shaft end and plate.
- Remove the traction sheave from the cone of the motor shaft by uniformly tightening the screws.

Mounting:

- Traction sheave and input shaft must be cleaned.
- Insert the key into the motor shaft.
- Add the traction sheave to the conical motor shaft (please observe the position of the key).
- Put the plate at the traction sheave and fasten it with the three screws and washers with a torque wrench at the inner hole circle of the plate. Fasten screws in three torque steps (8.8: 20, 40 & 79 Nm respectively 10.9: 25, 50 & 117 Nm, one after another, by turns in circle until no more rotary motion of the screws is recognizeable.
  Tightening torque M12 - 8.8: 79 Nm
  Tightening torque M12 - 10.9: 117 Nm
- Use glue for screws Loctite 243 or a similar product.
- The washers DIN 6796 must always be used.

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

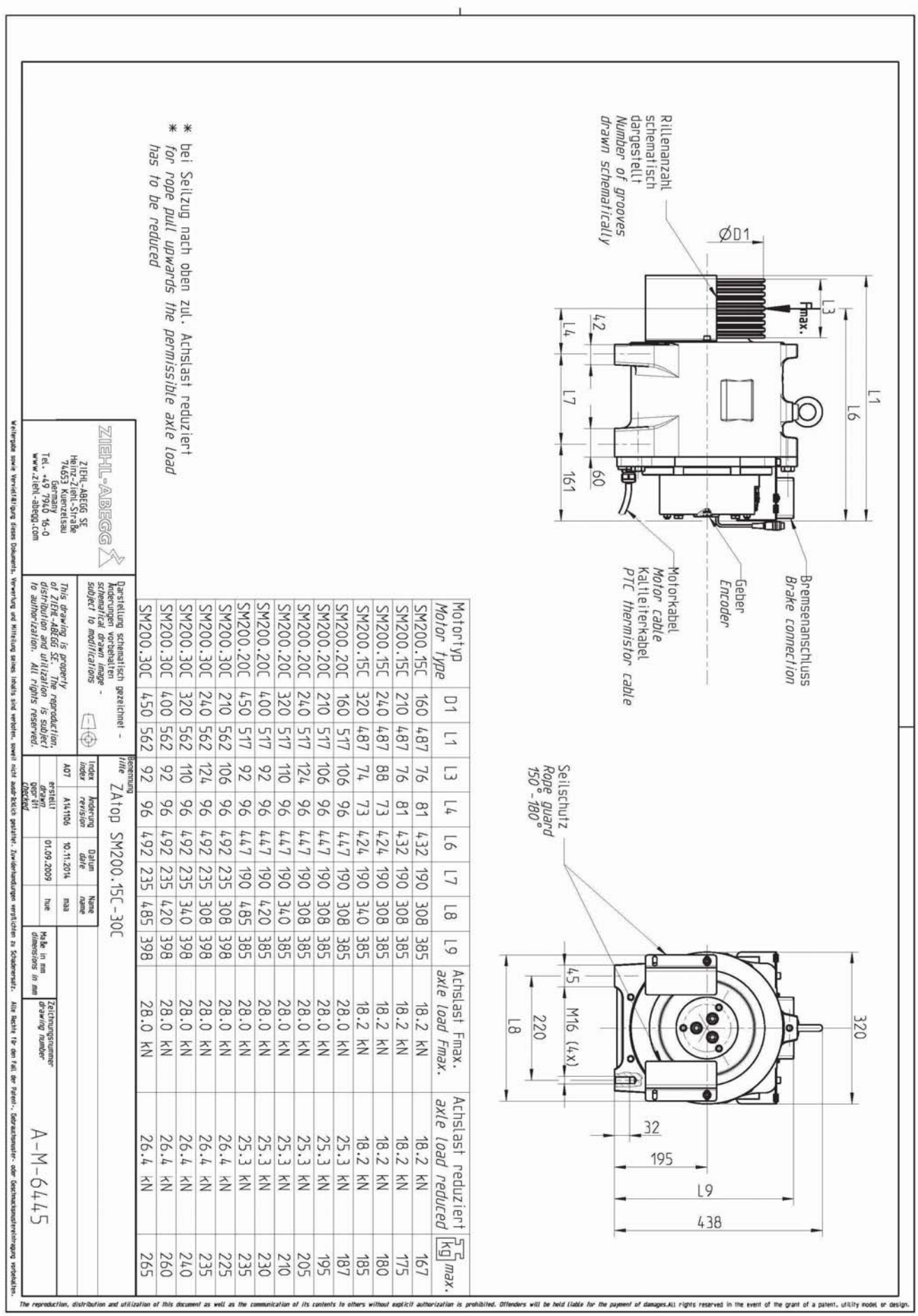
Motor type	**200.30C**		
Suspension	1:1	2:1	
typical payload*	630	1250	kg
Rated torque	475		Nm
Maximum torque	820		Nm
permissible radial load	2800		kg
Rated brake torque	2 x 550		Nm
Speed	1.6		m/s
Total weight	235		kg
Traction sheave			
- Diameter	240		mm
- Width	124		mm
- Rope diameter	6 - 7		mm
- Standard number of grooves	10		
- Standard groove distance	10		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
Forced cooling	IP 20
Absolute encoder	IP 40
Brake (electrical)	IP 54
Brake (mechanical)	IP 41
Complete machine	IP 21

9.2 Dimension sheets



* bei Seilzug nach oben zul. Achslast reduziert
* *for rope pull upwards the permissible axle load has to be reduced*

Motortyp *Motor type*	D1	L1	L3	L4	L6	L7	L8	L9	Achslast Fmax. *axle load Fmax.*	Achslast reduziert *axle load reduced*	max. kg
SM200.15C	160	487	76	81	432	190	308	385	18.2 kN	18.2 kN	167
SM200.15C	210	487	76	81	432	190	308	385	18.2 kN	18.2 kN	175
SM200.15C	240	487	88	73	424	190	308	385	18.2 kN	18.2 kN	180
SM200.15C	320	487	74	73	424	190	340	385	18.2 kN	18.2 kN	185
SM200.20C	160	517	106	96	447	190	308	385	28.0 kN	25.3 kN	187
SM200.20C	210	517	106	96	447	190	308	385	28.0 kN	25.3 kN	195
SM200.20C	240	517	124	96	447	190	308	385	28.0 kN	25.3 kN	205
SM200.20C	320	517	110	96	447	190	340	385	28.0 kN	25.3 kN	210
SM200.20C	400	517	92	96	447	190	420	385	28.0 kN	25.3 kN	230
SM200.20C	450	517	92	96	447	190	485	385	28.0 kN	25.3 kN	235
SM200.30C	210	562	106	96	492	235	308	398	28.0 kN	26.4 kN	225
SM200.30C	240	562	124	96	492	235	308	398	28.0 kN	26.4 kN	235
SM200.30C	320	562	110	96	492	235	340	398	28.0 kN	26.4 kN	240
SM200.30C	400	562	92	96	492	235	420	398	28.0 kN	26.4 kN	260
SM200.30C	450	562	92	96	492	235	485	398	28.0 kN	26.4 kN	265

ZIEHL-ABEGG

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www.ziehl-abegg.com

Darstellung schematisch gezeichnet - Änderungen vorbehalten
schematical drawn image - subject to modifications

Benennung *title* ZAtop SM200.15C-30C

Index *index*	Änderung *revision*	Datum *date*	Name *name*
A07	erstellt *drawn*	10.11.2014	maa
	geprüft *checked*	01.09.2009	hue

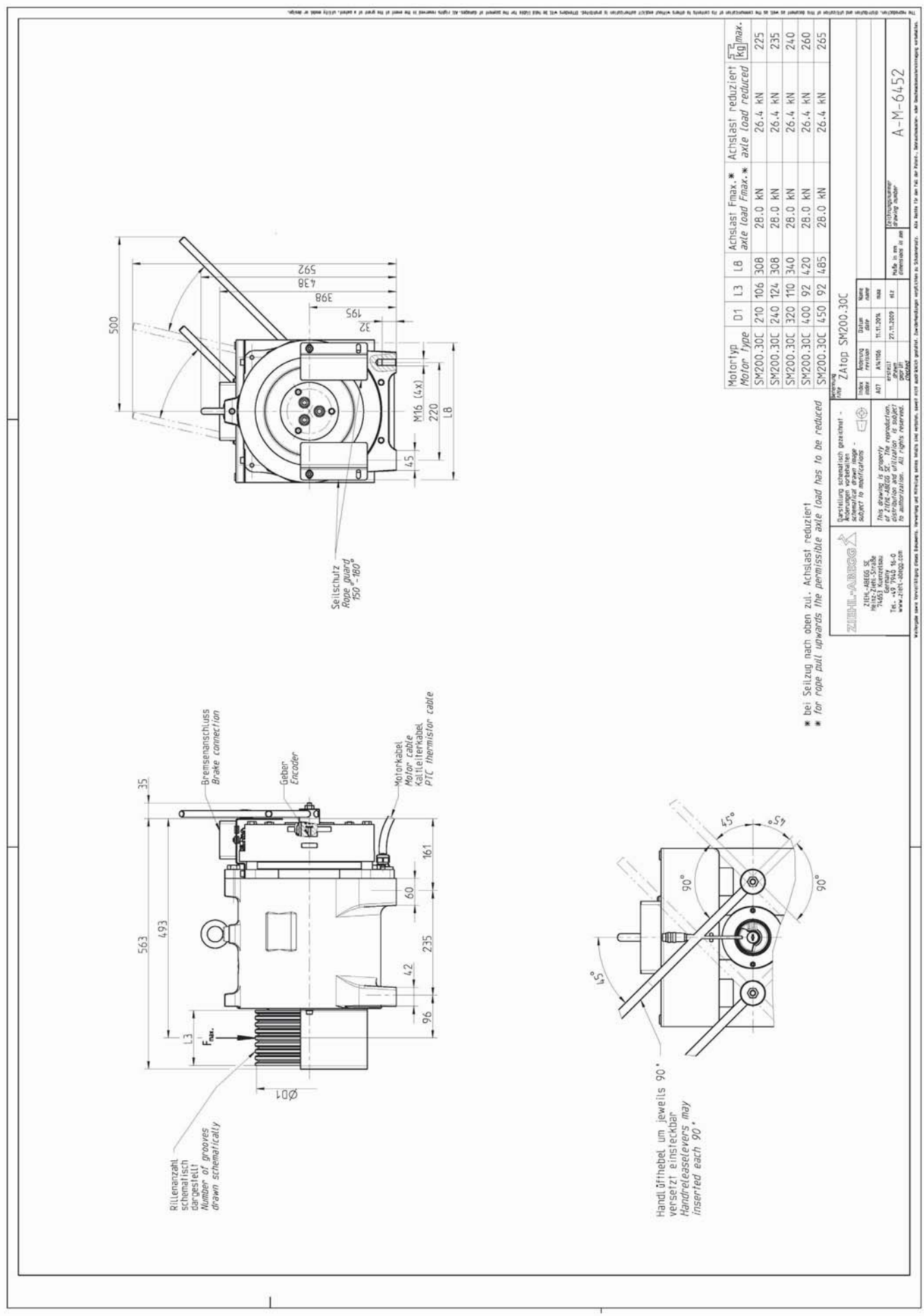
Maße in mm *dimensions in mm*

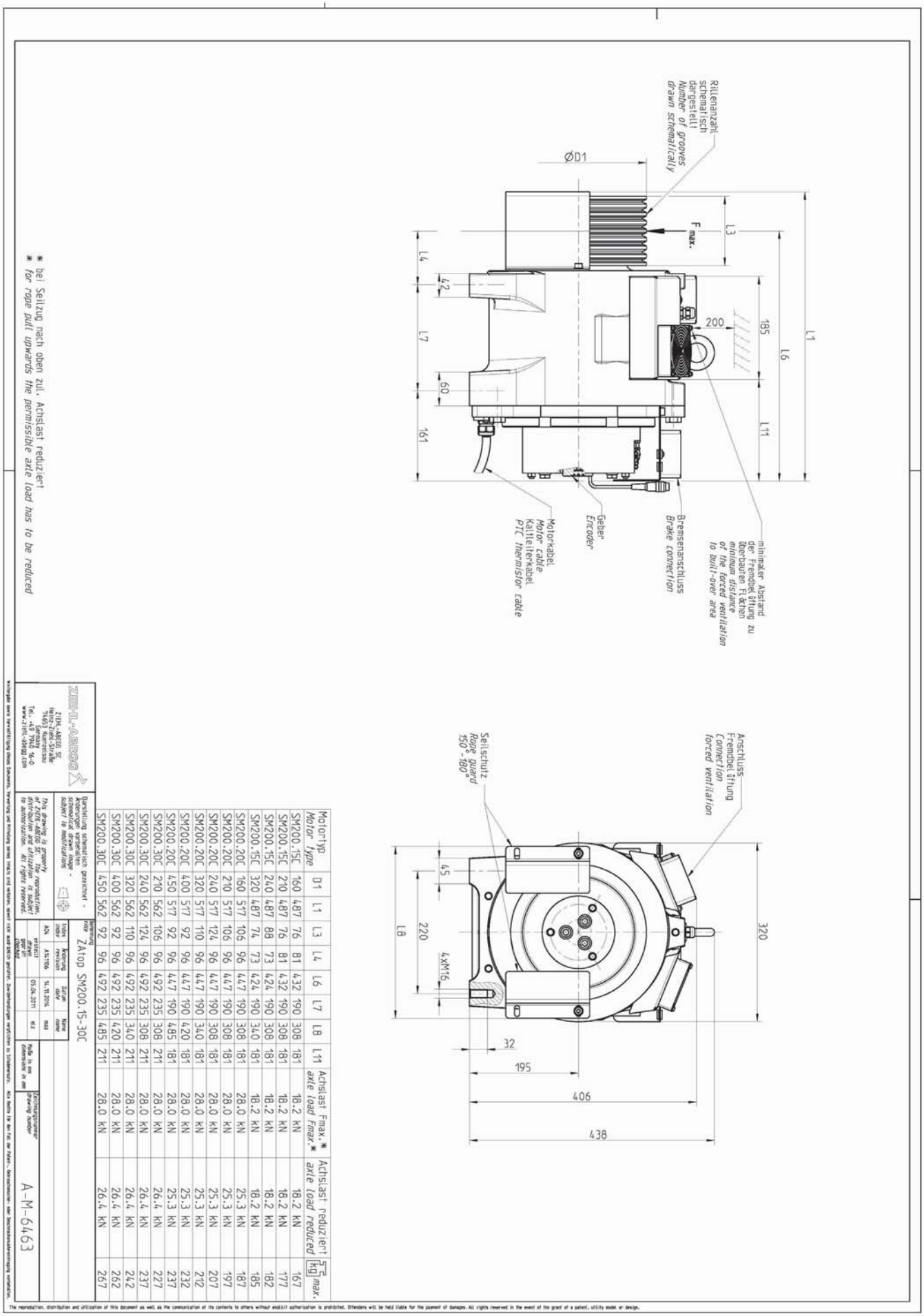
Zeichnungsnummer *drawing number* A-M-6445

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Motortyp
Motor type
D1
L3
L8
Achslast Fmax.*
axle load Fmax.*
Achslast reduziert
axle load reduced
max.
SM200.30C 210 106 308 28.0 kN 26.4 kN 225
SM200.30C 240 124 308 28.0 kN 26.4 kN 235
SM200.30C 320 110 340 28.0 kN 26.4 kN 240
SM200.30C 400 92 420 28.0 kN 26.4 kN 260
SM200.30C 450 92 485 28.0 kN 26.4 kN 265
* bei Seilzug nach oben zul. Achslast reduziert
* for rope pull upwards the permissible axle load has to be reduced
ZIEHL-ABEGG
ZAtop SM200.30C
A-M-6452
500
592
438
398
195
32
M16 (4x)
220
L8
45
Seilschutz
Rope guard
150°-180°
Bremsenanschluss
Brake connection
Geber
Encoder
Motorkabel
Motor cable
Kaltleiterkabel
PTC thermistor cable
35
563
493
161
60
235
42
96
L3
Fmax.
ØD1
Rillenanzahl schematisch dargestellt!
Number of grooves drawn schematically
45°
90°
Handlüfthebel um jeweils 90° versetzt einsteckbar
Handreleaselevers may inserted each 90°



* bei Seilzug nach oben zul. Achslast reduziert
* *for rope pull upwards the permissible axle load has to be reduced*

Motortyp *Motor type*	D1	L1	L3	L4	L6	L7	L8	L11	Achslast Fmax.* *axle load Fmax.**	Achslast reduziert *axle load reduced*	max. kg
SM200.15C	160	487	76	81	432	190	308	181	18.2 kN	18.2 kN	167
SM200.15C	210	487	76	81	432	190	308	181	18.2 kN	18.2 kN	177
SM200.15C	240	487	88	73	424	190	308	181	18.2 kN	18.2 kN	182
SM200.15C	320	487	74	73	424	190	340	181	18.2 kN	18.2 kN	185
SM200.20C	160	517	106	96	447	190	308	181	28.0 kN	25.3 kN	187
SM200.20C	210	517	106	96	447	190	308	181	28.0 kN	25.3 kN	197
SM200.20C	240	517	124	96	447	190	308	181	28.0 kN	25.3 kN	207
SM200.20C	320	517	110	96	447	190	340	181	28.0 kN	25.3 kN	212
SM200.20C	400	517	92	96	447	190	420	181	28.0 kN	25.3 kN	232
SM200.20C	450	517	92	96	447	190	485	181	28.0 kN	25.3 kN	237
SM200.30C	210	562	106	96	492	235	308	211	28.0 kN	26.4 kN	227
SM200.30C	240	562	124	96	492	235	308	211	28.0 kN	26.4 kN	237
SM200.30C	320	562	110	96	492	235	340	211	28.0 kN	26.4 kN	242
SM200.30C	400	562	92	96	492	235	420	211	28.0 kN	26.4 kN	262
SM200.30C	450	562	92	96	492	235	485	211	28.0 kN	26.4 kN	267

Darstellung schematisch gezeichnet - Abweichungen konstruktiv möglich - *Illustration schematically drawn image - subject to modifications*

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www.ziehl-abegg.com

Benennung *name*: ZAtop SM200.15-30C

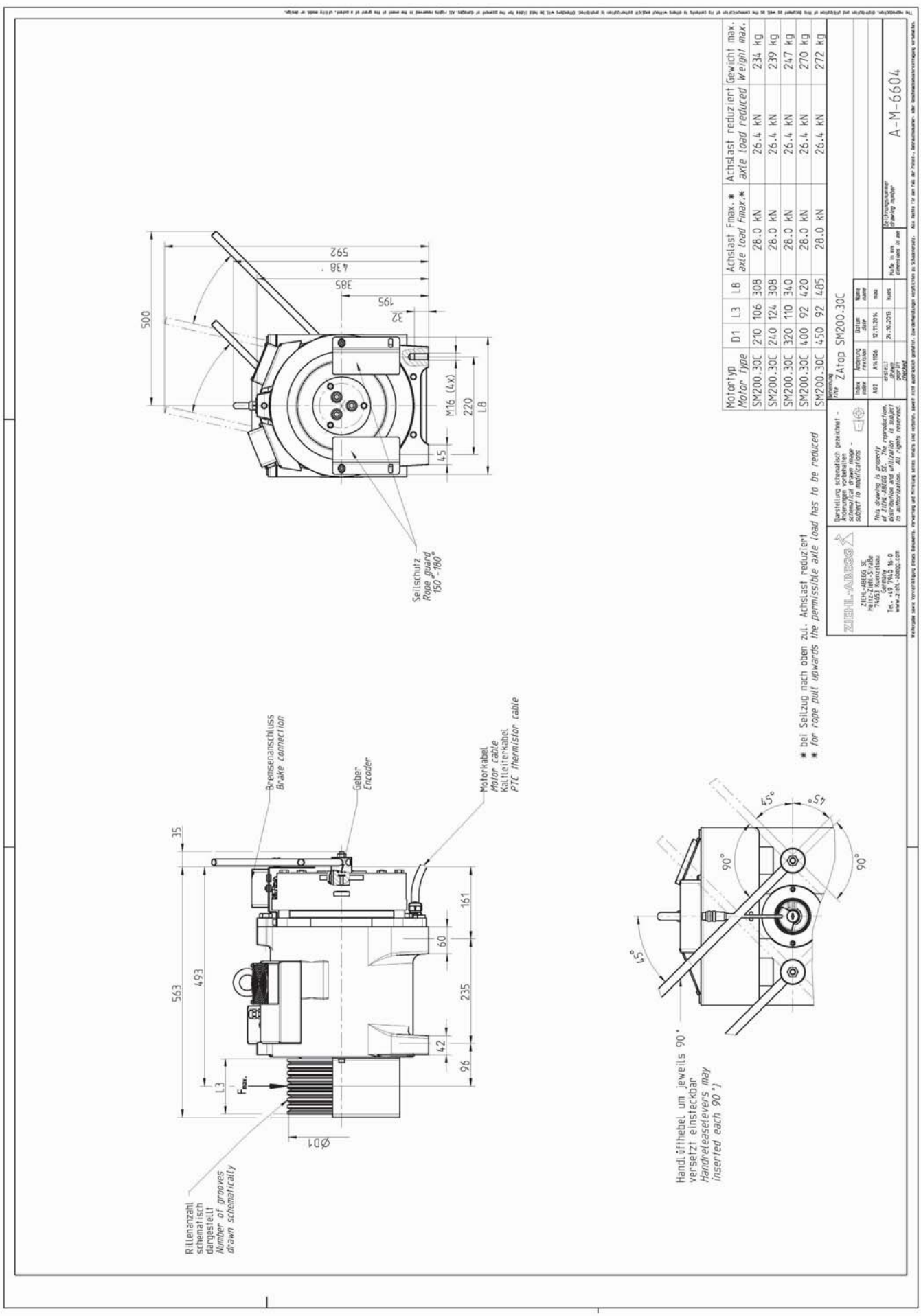
Index / *index*	Änderung / *revision*	Datum / *date*	Name / *name*
AZA	ersetzt / *replaces* AZA-17606	14.11.2014	maa
gepr. / *checked*		05.04.2011	wiz

Zeichnungsnummer / *drawing number*: A-M-6463

Maße in mm / *dimensions in mm*

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Motortyp
Motor type
D1
L3
L8
Achslast Fmax.*
axle load Fmax.*
Achslast reduziert
axle load reduced
Gewicht max.
Weight max.
SM200.30C 210 106 308 28.0 kN 26.4 kN 234 kg
SM200.30C 240 124 308 28.0 kN 26.4 kN 239 kg
SM200.30C 320 110 340 28.0 kN 26.4 kN 247 kg
SM200.30C 400 92 420 28.0 kN 26.4 kN 270 kg
SM200.30C 450 92 485 28.0 kN 26.4 kN 272 kg
* bei Seilzug nach oben zul. Achslast reduziert
* for rope pull upwards the permissible axle load has to be reduced
ZAtop SM200.30C
A-M-6604
500
592
438
385
195
32
M16 (4x)
220
L8
45
Seilschutz
Rope guard
150 - 180°
Bremsenanschluss
Brake connection
Geber
Encoder
Motorkabel
Motor cable
Kaltleiterkabel
PTC thermistor cable
35
563
493
L3
FRas.
ØD1
161
60
235
42
96
Rillenanzahl schematisch dargestellt
Number of grooves drawn schematically
45°
90°
Handlüfthebel um jeweils 90° versetzt einsteckbar
Hand release levers may inserted each 90°

9.3 EC/EU declaration of conformity

EC/EU declaration of conformity

- original -
(english)
A-KON16_01 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.

EN 12015:2014	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)

i.V.

(signature)

9.4 Operating instructions brake

Installation and Operational Instructions for ROBA®-duplostop® Type RSR 8010.10_13 Size 400

mayr® Antriebstechnik

Design according to:

Type	Drawing Number	Article Number	Voltage	Hand Release	Prototype Inspection
8010.10013	E028 02 112 000 212	8203591	24 V	No	ABV 766/2
8010.10013	E028 02 112 000 212	8203587	207 V	No	ABV 766/2
8010.10213	E028 02 112 000 213	8203588	207 V	Yes	ABV 766/2

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

Page 2: - Guidelines on EU Directives
- Safety and Guideline Signs
- TÜV (German Technical Inspectorate) Certificate

Page 3: - Safety Regulations

Page 4: - Safety Regulations

Page 5: - Safety Regulations

Page 6: - Brake Illustrations for Design without Hand Release

Page 7: - Brake Illustrations for Design with Hand Release

Page 8: - Parts List
- Technical Data

Page 9: - Torque-Time Diagram
- Application
- Design
- Function
- State of Delivery

Page 10: - Installation Conditions
- Installation
- Hand Release

Page 11: - Braking Torque Adjustment
- Noise Damping
- Release Monitoring

Page 12: - Electrical Connection and Wiring

Page 13: - Brake Inspection (Customer-side after Installation)
- Dual Circuit Brake Functional Inspection
- Maintenance
- Disposal

Page 14: - Malfunctions / Breakdowns

Attachment: Assembly Drawing according to Article Number

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

Tel.: 08341/804-0
Fax: 08341/804-421
http://www.mayr.de
E-mail: info@mayr.de

Installation and Operational Instructions for ROBA®-duplostop® Type RSR 8010.10_13 Size 400

mayr® Antriebstechnik

Guidelines on the Declaration of Conformity
A conformity declaration has been carried out for the product (electromagnetic safety brake) according to the EC Low Voltage Directive 2006/95/EC. The conformity declaration 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 according to the EMC directive.
Due to their passive state, brakes are also non-critical equipment according to the EMC.
Only after integration of the product into an overall system can this be evaluated in terms of the EMC.
For electronic equipment, the evaluation has been verified for the individual product in laboratory conditions, but not in the overall system.

Guidelines on the Machinery Directive (2006/42/EC)
The product is a component for installation into machines according to the Machine Directive 2006/42/EC.
The brakes can fulfil the specifications for safety-related applications in coordination with other elements.
The type and scope of the required measures result from the machine risk analysis. The brake then becomes a machine component and the machine manufacturer assesses the conformity of the safety device to the directive.
It is forbidden to start 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 high danger of explosion.
For application of this product in areas where there is a high danger of explosion, it must be classified and marked according to directive 94/9/EC.

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 766/2**

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

Tel.: 08341/804-0
Fax: 08341/804-421
http://www.mayr.de
E-mail: info@mayr.de

Installation and Operational Instructions for ROBA®-duplostop® Type RSR 8010.10_13 Size 400

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.
- ❒ If the relevant standards for safety and / or installation conditions are ignored.

During the required risk assessment 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, braking 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 connecting 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 100 %. However, a duty cycle > 60 % leads to higher temperatures, which cause premature ageing of the noise damping and therefore lead to an increase in switching noises. The max. permitted switching frequency is 240 1/h. On overexcited brakes, the switching frequency must not exceed 180 1/h.
  These values are valid for intermittent operation S3 60 %. The permitted surface temperature on the brake flange must not exceed 80 °C at a max. ambient temperature of 45 °C. The overexcitation time must be at least dou ble the separation time t_2.
- ❒ 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.



Please ensure that the brake is clean and oil-free, as both brake circuits have an effect on the same linings. Special sealing measures, among other precautions, may be necessary - in particular in gear applications!

- ❒ 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 block in corrosive ambient conditions and/or after long periods of storage.
The user is responsible for taking appropriate counter measures.

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Eichenstraße 1
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Installation and Operational Instructions for ROBA®-duplostop® Type RSR 8010.10_13 Size 400

mayr® Antriebstechnik

Safety Regulations

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

Ambient Temperature: 0 °C up to + 45 °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) IP10: Protection against large body surfaces and large foreign bodies > 50 mm in diameter. No protection against water.

(electrical) IP54: Dust-proof and protected against contact as well as against water spray 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 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* ®-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, 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

Please Observe the Following Standards:

DIN EN ISO 12100-1 and 2	Machine safety
DIN EN ISO 14121-1	Risk assessment
DIN EN 61000-6-4	Noise emission
EN12016	Interference resistance (for elevators, escalators and moving walkways)
EN 60204	Electrical machine equipment

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Liability

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

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

Guarantee

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

Conformity Markings

CE according to the Low Voltage Directive 2006/95/EC

CSA/UL in terms of the Canadian and American standards

Identification

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

Manufacturer
mayr®
Name/Type
Article number
Serial number

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Brake Illustrations for Design without Hand Release

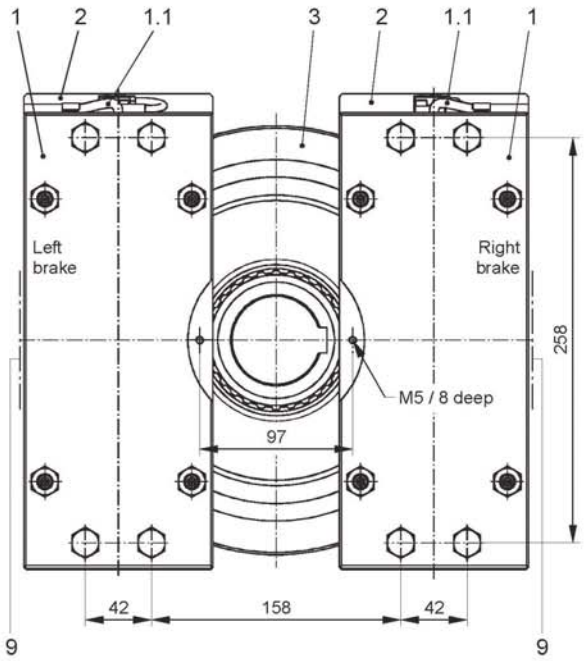


Fig. 1

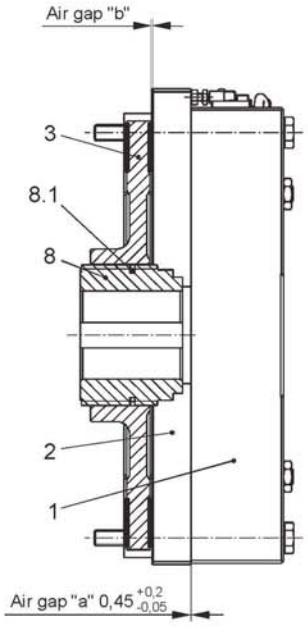


Fig. 2

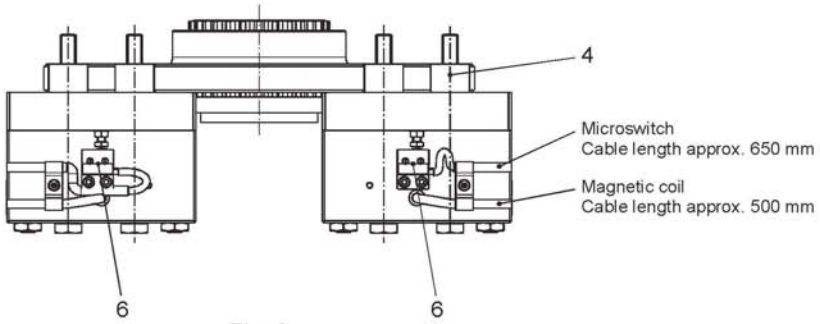


Fig. 3

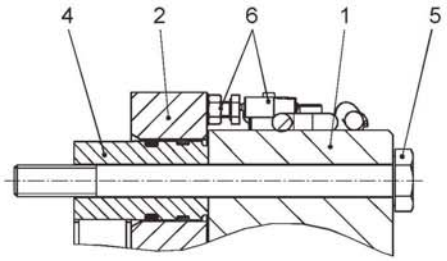


Fig. 4

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Brake Illustrations for Design with Hand Release

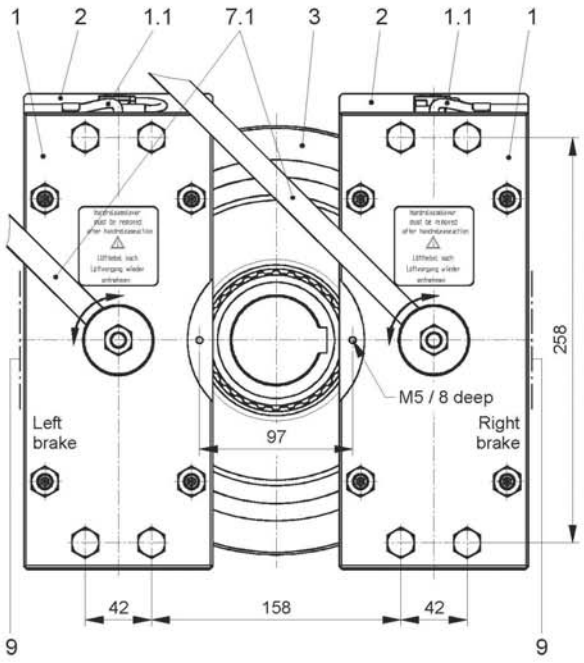


Fig. 5

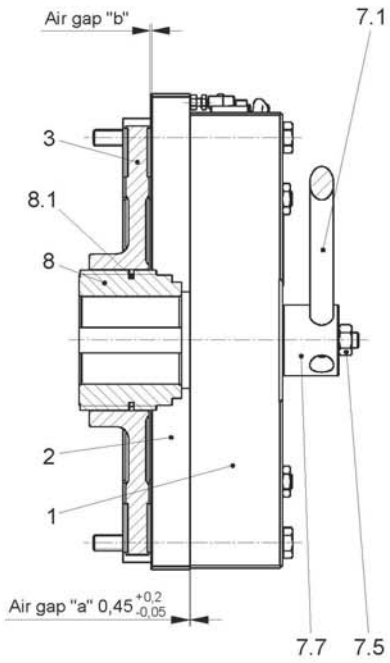


Fig. 6

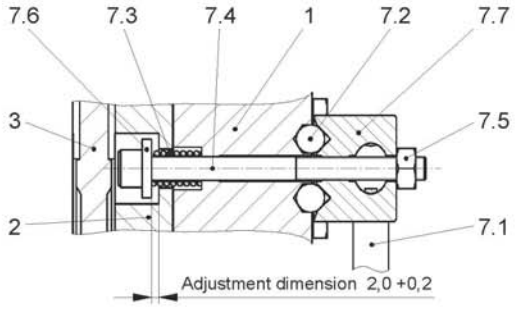


Fig. 7

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

Item	Name
1	Coil carrier assembly (inc. magnetic coil)
1.1	Connection cable 2-wire; Connection coil blue/brown
2	Armature disk
3	Rotor assembly
4	Distance bolts
5	Hexagon head screw
6	Release monitoring assembly
6.1	Microswitch inc. adapter plate (Fig. 9; page 11)
6.2	Cap screw (Fig. 9; page 11)
6.3	Hexagon nut (Fig. 9; page 11)
6.4	Hexagon head screw (Fig. 9; page 11)
6.5	Spring washer (Fig. 9; page 11)
7	Hand release assembly (dependent on Type)
7.1	Hand release lever
7.2	Steel ball
7.3	Thrust spring
7.4	Cap screw
7.5	Hexagon nut
7.6	Washer
7.7	Connection piece
8	Hub
8.1	O-ring
9	Type tag

CAUTION

The tension capability of the brake is larger, but the rotor (3) must be replaced at the latest when the air gap reaches 0,9 mm, also due to the brake noise behaviour. On brakes with hand release and / or operation with overexcitation, unpermittedly high wear on the rotor (3) will not be noticed via the brake switching behaviour. As the magnetic coil is capable in this constellation of achieving a very large armature disk (2) tension path, unpermittedly high wear on the rotor (3) leads to relaxation of the thrust springs, which in turn causes a drop in braking torque. In extreme cases, the armature disks (2) may even contact the shoulder screws or the adjusting screw on the hand release (air gap 2,0 mm) which would lead to the braking torque being lost. We therefore recommend an additional wear monitoring device for brakes with hand release and/or operation with overexcitation.

Technical Data

Nominal voltage:	24 V / 207 V
Nominal capacity P (on 20°C / 24 V design):	2 x 93 W
Nominal capacity P (on 20°C / 207 V design):	2 x 92 W
Max. speed:	1000 rpm
Inspected max. friction work [4] on EMERGENCY STOP: (per braking circuit)	30000 J
Protection (coil/casting compound):	IP54
Protection (mechanical):	IP10
Protection (microswitch):	IP67
Duty cycle:	60 %
Nominal torque [1] (minimum):	500 Nm
Rotor thickness, new condition:	$18_{-0,05}$ mm
Nominal air gap [2] "a" braked	$0,45\ ^{+0,20}_{-0,05}$ mm
Limit air gap [3] "a" at nominal torque:	0,9 mm
Inspection air gap "b" on released brake:	min. 0,25 mm
Hand release force:	approx. 150 N
Release angle:	approx. 25 °
Tightening torque hexagon head screw (Item 5):	48 Nm
Weight (design with hand release):	46,5 kg
Weight (design without hand release):	45 kg
Ambient temperature:	0 °C up to +45 °C

Switching times (mean values on nominal air gap):

Tightening t_2: 400 ms
Drop-out t_{11} AC: 160 ms
Drop-out t_1 AC: 600 ms
Drop-out t_{11} DC: 15 ms
Drop-out t_1 DC: 140 ms

[1] The braking torque (nominal torque) is the torque effective in the shaft train on slipping brakes, with a sliding speed of 1 m/s referring to the medium friction radius.

[2] Measured in the armature disk (2) area, middle, vertical centre axis.

[3] The nominal torque is given up to the limit air gap (0,9 mm).

[4] Max. 3 movements in sequence with a 5-minute break between each movement.

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

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

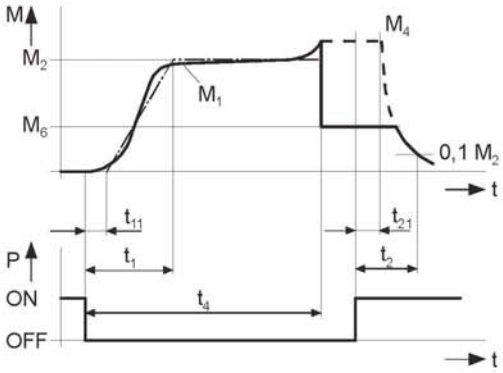
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Torque-Time Diagram



Key:

M_1 = Switching torque
M_2 = Nominal torque (characteristic torque)
M_4 = Transmittable torque
M_6 = Load torque
t_1 = Connection time
t_{11} = Response delay on connection
t_2 = Separation time
t_{21} = Response delay on separation
t_4 = Slipping time + t_{11}

Application

- **ROBA®-duplostop® for use as a holding brakes with occasional EMERGENCY STOP braking actions**
- **The max. permitted speed and friction work (see Technical Data) must be observed.**

Design

The ROBA®-duplostop® is a spring applied, electromagnetically releasing dual circuit brake.
It is used for installation in a gearless elevator and serves as a brake assembly on the drive sheave shaft and as part of the protective assembly against excessive upward-moving cage speeds.

Function

ROBA®-duplostop® brakes are spring applied, electromagnetic safety brakes.

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

Electromagnetic:
Due to the magnetic force of the coils in the coil carriers (1), the armature disk (2) is attracted against the spring force to the coil carrier (1).
The brake is released and the shaft can rotate freely.

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

State of Delivery

The brake bodies are manufacturer-assembled with coil carrier (1), armature disks (2) and distance bolts (4).
The release monitoring devices (6) as well as the hand release devices (7) are set manufacturer-side.
Included loose in delivery are: the hub (8), the O-ring (Item 8.1 / lightly greased and packed in a bag), the rotor (3), the hexagon head screws (Item 5; 8 pieces) and on design with hand release the hand release lever (7.1).
Please check state of delivery!

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Installation Conditions

- ❒ The eccentricity of the shaft end in relation to the fixing holes must not exceed 0,3 mm.
- ❒ The position tolerance of the threaded holes for the hexagon head screws (5) must not exceed 0,3 mm.
- ❒ The axial run out deviation of the screw-on surface to the shaft must not exceed the permitted axial run out tolerance of **0,063 mm** according to DIN 42955 R.
  Measuring procedure acc. DIN 42955.
  Larger deviations can lead to a drop in torque, to continuous slipping on the rotor (3) and to overheating.
- ❒ The hub bore (8) tolerances and the shaft must be selected so that the hub toothing (8) is not widened. Widening of the toothing leads to the rotor (3) jamming on the hub (8) and therefore to brake malfunctions.
  Recommended shaft tolerance k6.
  If the hub (8) is heated for better joining, the O-ring (8.1) must be removed beforehand and re-mounted after hub installation.
  The max. permitted joining temperature of 200 °C mu st not be exceeded.
- ❒ The mounting dimensions 42/158/258 and the tapped hole M10 (8x) with a depth of 21 must be present (Figs. 1 to 7).
- ❒ The rotor 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 ≈ 200 – 400), or ideally with a sander.
- ❒ The toothings of the hub (8) and the rotor (3) must not be oiled or greased.
- ❒ 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.

Please Observe!
After a release procedure has been carried out, both hand release levers (7.1) must be removed from the connection pieces (7.7).

Installation (Figs. 1 - 7)

1. Insert the O-ring (Item 8.1 / lightly greased manufacturer-side) into the hub (8) groove.
2. Mount the hub (8) onto the shaft, bring it into the correct position and secure it axially (e.g. using a locking ring).
   The length of the key should lie over the entire hub.
3. Push the rotor (3) over the O-ring (8.1) onto the hub (8) by hand using light pressure (the rotor collar Ø 110 should be facing in the direction of the machine wall).
   The rotor toothing must lie over the entire length of the hub (8), which means that the axial position of the hub (8) according to the respective attached drawing must be observed.
   Please make sure that the toothing moves easily.
   Do not damage the O-ring (8.1).
4. Secure the left brake body using hexagon head screws (Item 5; 4 pieces) evenly (we recommend that you secure the screws using Loctite 243).
   Tighten the hexagon head screws (5) using a torque wrench and observe the tightening torque of 48 Nm.
   Then, repeat the procedure with the brake body on the right side.
5. **Check air gap "a" = 0,45 $^{+0,20}_{-0,05}$ mm**
   The nominal air gap must be given in the armature disk (2) area middle, vertical centre axis (Figs. 1 / 5).
6. **Check air gap "b" > 0,25 mm in energised state on the rotor (3) (Figs. 2 / 6).**
   The inspection air gap must be given.

Hand Release (Option Dependent on Type)

The hand release is completely assembled and adjusted manufacturer-side.
In order to manually release the brake, both hand release levers (7.1) must be inserted into the connection pieces (7.7), as shown in Fig. 5.
The brake is released by moving both hand release levers (7.1) simultaneously, see Fig. 5.
The rotational direction is immatenal.
By lifting both connection pieces (7.7) up from the steel balls (7.2), both cap screws (7.4) inc. washers (7.6) together with the armature disk (2) are pulled against the coil carrier (1) (Fig. 8).
After this, the rotor (3) is free and the brake is released.

DANGER
Operate the hand release carefully.
Existing loads are put into motion when the hand release is activated.

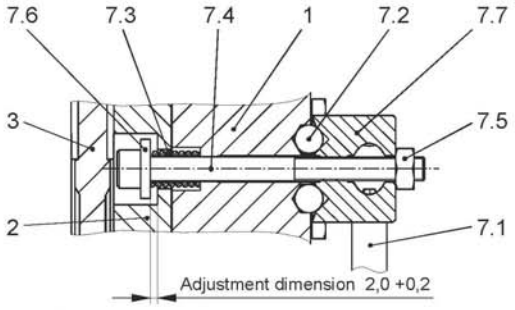


Fig. 8

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Braking Torque Adjustment

ROBA®-duplostop® brakes are delivered adjusted to the braking torque required on order.

Noise Damping

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

Release Monitoring (Fig. 9)

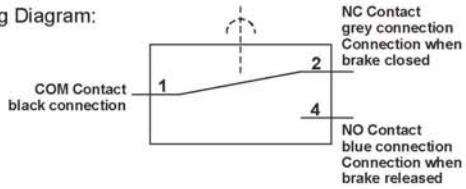
ROBA®-duplostop® brakes are delivered with one release monitoring (6) per brake circuit.
The microswitches (6.1) emit a signal for every brake condition change "signal brake opened or brake closed"

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.

Wiring Diagram:



Re-adjustment is possible via the hexagon head screws (6.4) and the hexagon nuts (6.3).
If this proves necessary, please contact the manufacturers.

Function

When the magnetic coils are energised in the coil carriers (1), the armature disks (2) are attracted to the coil carrier (1), the microswitches (6.1) emit a signal and the brake is released.

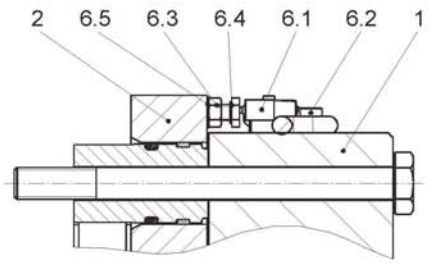


Fig. 9

Manufacturer-side Adjustment and Functional Inspection of the Microswitch (6.1), see Fig. 9:

The brake is screwed onto the installation device to a tightening torque of 48 Nm and the coil is de-energised.

1. Turn the hexagon head screw (6.4) in the direction of the microswitch (6.1) up to the microswitch tappet.
2. Tighten the hexagon nut (6.3), so that the hexagon head screw (6.4) is placed under pre-tension by the spring washer (6.5).
3. Put a feeler gauge 0,12 mm (loose sensor plate) between the switch tappet and the hexagon head screw (6.4).
4. Connect the inspection or measurement device (diode inspection) to the NO contact black/blue.
5. Turn the hexagon head screw (6.4) in the direction of the switch (6.1) up to **signal "ON",** turn it back to the **signal "OFF"** and counter the hexagon head screw (6.4) with the hexagon nut (6.3).
6. Energise brake → **Signal "ON"**,
   De-energise brake → **Signal "OFF"**,
   Re-adjust if necessary and repeat the inspection.
7. Inspection with feeler gauge 0,16 mm
   Energised → **Signal "ON"**
   De-energised → **Signal "ON"**
8. Inspection with feeler gauge 0,12 mm
   Energised → **Signal "ON"**
   De-energised → **Signal "OFF"**
9. Put the feeler gauge 0,20 mm between the armature disk (2) and the coil carrier (1) in the microswitch (6.1) area and then energise the brake. **The signal must be "ON".**
10. Paint items 6.2, 6.3 and 6.4 with sealing lacquer.

Customer-side Inspection after Mounting onto the Elevator Machine

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

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)

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, capacitative and non-linear loads, please use the appropriate protective circuit to protect against electric arcs and unpermitted loads!

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Electrical Connection and Wiring

DC current is necessary for operation of the brake. The coil voltage is indicated on the Type tag as well as on the brake body and is designed according to the DIN IEC 60038 (± 10 % tolerance). Operation must take place via DC voltage with a low ripple content, e.g. via a bridge rectifier or with another suitable DC supply. Dependent on the brake equipment, the connection possibilities can vary. 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, a switch-mode mains adaptor, ...) 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

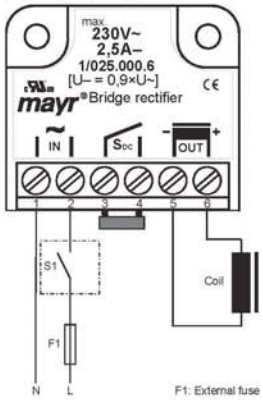
The operational behaviour of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the temperature and the air gap between the armature disk and the coil carrier (dependent on the wear condition of the linings).

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

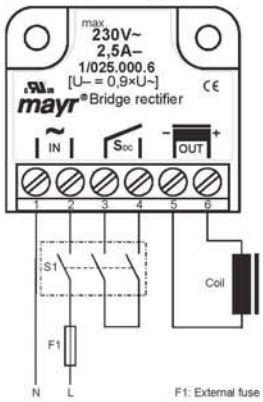


The power circuit is interrupted before the rectifier. The magnetic field slowly reduces. This delays the rise in braking torque.

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

AC-side switching means **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.

DC-side switching means **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, half-wave and bridge rectifiers), although this may of course then alter the switching times.

Chr. Mayr GmbH + Co. KG
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E-mail: info@mayr.de

Installation and Operational Instructions for ROBA®-duplostop® Type RSR 8010.10_13 Size 400

mayr® Antriebstechnik

Brake Inspection

(Customer-side after Mounting onto Elevator Machine)

- ❑ **Individual air gap inspection**
  (Nominal air gap "a" both brake circuits 0,45 $^{+0,20}_{-0,05}$ mm).
- ❑ **Braking torque inspection:**
  Please compare the requested braking torque with the torque stated on the Type tag.
- ❑ **Release function inspection**
  (Battery operated to guarantee emergency escape for passengers during a power failure).
- ❑ **Switching function inspection**
  Energised brake **Signal "ON" (NO contact)**
  De-energised brake **Signal "OFF" (NO contact)**

Dual Circuit Brake Functional Inspection

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

Inspection left brake circuit:

1. Energise the right brake circuit.
2. Trigger an EMERGENCY STOP with the left brake circuit and inspect the stopping distance according to the elevator regulations.
3. De-energise the right brake circuit.

Inspection right brake circuit:

1. Energise the left brake circuit.
2. Trigger an EMERGENCY STOP with the right brake circuit and inspect the stopping distance according to the elevator regulations.
3. De-energise the left brake circuit.

Inspection both circuits:

Energise both braking circuits with nominal voltage.
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.

Maintenance

ROBA®-duplostop® brakes are mainly maintenance-free. The friction linings are robust and wear-resistant. This ensures a particularly long lifetime of the brake.
However, the friction linings are subject to operational wear on frequent use of EMERGENCY STOP. Normally, such occurrences are registered and saved by the elevator control system or they require the intervention of qualified personnel. Within the scope of an intervention and/or maintenance work (especially when carrying out measures acc. DIN EN 13015 Appendix A), the causes for malfunction must be elicited, assessed and solved by qualified personnel. Here, resulting states, for example the air gap, can be inspected and respective counter measures can be carried out.

The following inspections should be carried out at regular intervals:

- ❑ Braking torque or retardation inspection (individual brake circuits). (TÜV interval)
- ❑ Inspection of air gap braked (both brake circuits) (TÜV interval)
- ❑ Inspection of toothing backlash from the hub (8) to the rotor (3). Max. permitted toothing backlash 0,5°. (TÜV interval)



In order to inspect the rotor (3) wear condition, please measure the air gap "a" acc. Technical Data and Figs. 2 or 6.
If the brake limit air gap (0,9 mm) has been reached, meaning that the friction linings are worn down, the braking torque is lost and the rotor (3) must be replaced.
Please follow the Installation section (page 10) backwards to dismantle the brake.

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 / ROBA®-switch / 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)

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Installation and Operational Instructions for ROBA®-duplostop® Type RSR 8010.10_13 Size 400

mayr® Antriebstechnik

Malfunctions / Breakdowns:

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

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9.5 EU declaration of conformity of the brake

mayr® Antriebstechnik

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

Im Sinne der 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®-duplostop®	200/400/600/800/1000/1500	8010._ _ _ _ _	1,**,***

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

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mayr® Antriebstechnik

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

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

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Westendstraße 199
D-80686 München

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

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

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

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

EU-BD 766

	*** 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

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9.6 EU type-examination certificate

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

Industrie Service

EU TYPE-EXAMINATION CERTIFICATE

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

Certificate No.:	EU-BD 766
Certification Body of the Notified Body:	TÜV SÜD Industrie Service GmbH Westendstr. 199 80686 Munich - Germany Identification No. 0036
Certificate Holder:	Chr. Mayr GmbH & Co. KG Eichenstr. 1 87665 Mauerstetten - Germany
Manufacturer of the Test Sample: (Manufacturer of Serial Production – see Enclosure)	Chr. Mayr GmbH & Co. KG Eichenstr. 1 87665 Mauerstetten - Germany
Product:	Braking device acting on the shaft of the traction sheave, as part of the protection device against overspeed for the car moving in upwards direction and braking element against unintended car movement
Type:	RSR/8010._ _ _ _, Size 200, 400, 600, 800, 1000, 1500
Directive:	2014/33/EU
Reference Standards:	EN 81-20:2014 EN 81-50:2014 EN 81-1:1998+A3:2009
Test Report:	EU-BD 766 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

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

Achim Janocha
Certification Body "lifts and cranes"

TÜV®

Annex to the EC Type-Examination Certificate No. EU-BD 766 of 2015-09-30

Industrie Service

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	200 - 560	811
200 „lang"	500 - 700	820
400 „kurz"	420 - 840	708
400 „lang"	750 - 1200	1011
600	1000 - 1600	500
800	1300 - 1900	400
1000	1840 - 2400	400
1500	2400 - 3600	400

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

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

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

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

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

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

Size	Min. nominal brake torque* [Nm]	Max. nominal brake torque * [Nm]	Max. tripping rotary speed [rpm]	Maximum response times** [ms] parallel without overexcitation / seriell with overexcitation		
				t_0	t_{50}	t_{90}
200	2 x 100 = 200		820	100 / 110	160 / 230	230 / 330
200		2 x 280 = 560	820	25 / 30	60 / 80	110 / 135
200 „lang"	2 x 250 = 500		820	25 / 30	50 / 65	110 / 135
200 „lang"		2 x 350 = 700	820	15 / 20	30 / 50	80 / 100
400 „kurz"	2 x 210 = 420		710	135 / 140	185 / 265	240 / 340
400 „kurz"		2 x 420 = 840	710	50 / 55	90 / 130	160 / 230
400 „kurz" - leistungsoptimiert		2 x 350 = 700	335	30 / 40	80 / 100	100 / 150
400 „lang"	2 x 375 = 750		500	40 / 45	75 / 105	135 / 190
400 „lang"		2 x 550 = 1100	500	25 / 40	60 / 75	100 / 120
600	2 x 500 = 1000		500	85 / 100	140 / 200	185 / 260

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 766 of 2015-09-30

Industrie Service

600		2 x 800 = 1600	500	30 / 40	70 / 100	120 / 170
800	2 x 650 = 1300		400	80 / 100	145 / 180	170 / 230
800		2 x 950 = 1900	400	35 / 45	80 / 115	120 / 160
1000	2 x 920 = 1840		400	80 / 95	125 / 180	180 / 250
1000		2 x 1200 = 2400	400	40 / 50	95 / 130	150 /210
1500	2 x 1200 = 2400		400	75 / 90	160 / 190	270 / 310
1500		2 x 1800 = 3600	400	35 / 40	105 / 115	180 / 240

Interim values can be interpolated

Explanations:

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

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

1.2.2 Assigned execution features

Type of powering / deactivation	continuous current / continuous current end
Brake control	parallel or serial
Nominal air gap	0.45 mm
Damping elements	YES
Overexcitation (Seize 200 – 1000)	at 1.5 non-release voltage
Overexcitation (Seize 1500)	at double non-release voltage

2 Conditions

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

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

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

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

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

2.5 The identification drawing no. E02801000000161 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.

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 766 of 2015-09-30

Industrie Service

3 Remarks

3.1 A code number for the brake moment effectively adjusted will be marked at the first blank in the type designation 8010._ _ . _ _ 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 rest of the blanks (e. g. in the second blank: with flange plate, in the third blank: with hand release; in the fourth blank: release control and/or wear control; in the fifth blank: characteristics for electrical connection).

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.

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.

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Enclosure to the EU Type-Examination Certificate No. EU-BD 766 of 2015-09-30

Industrie Service

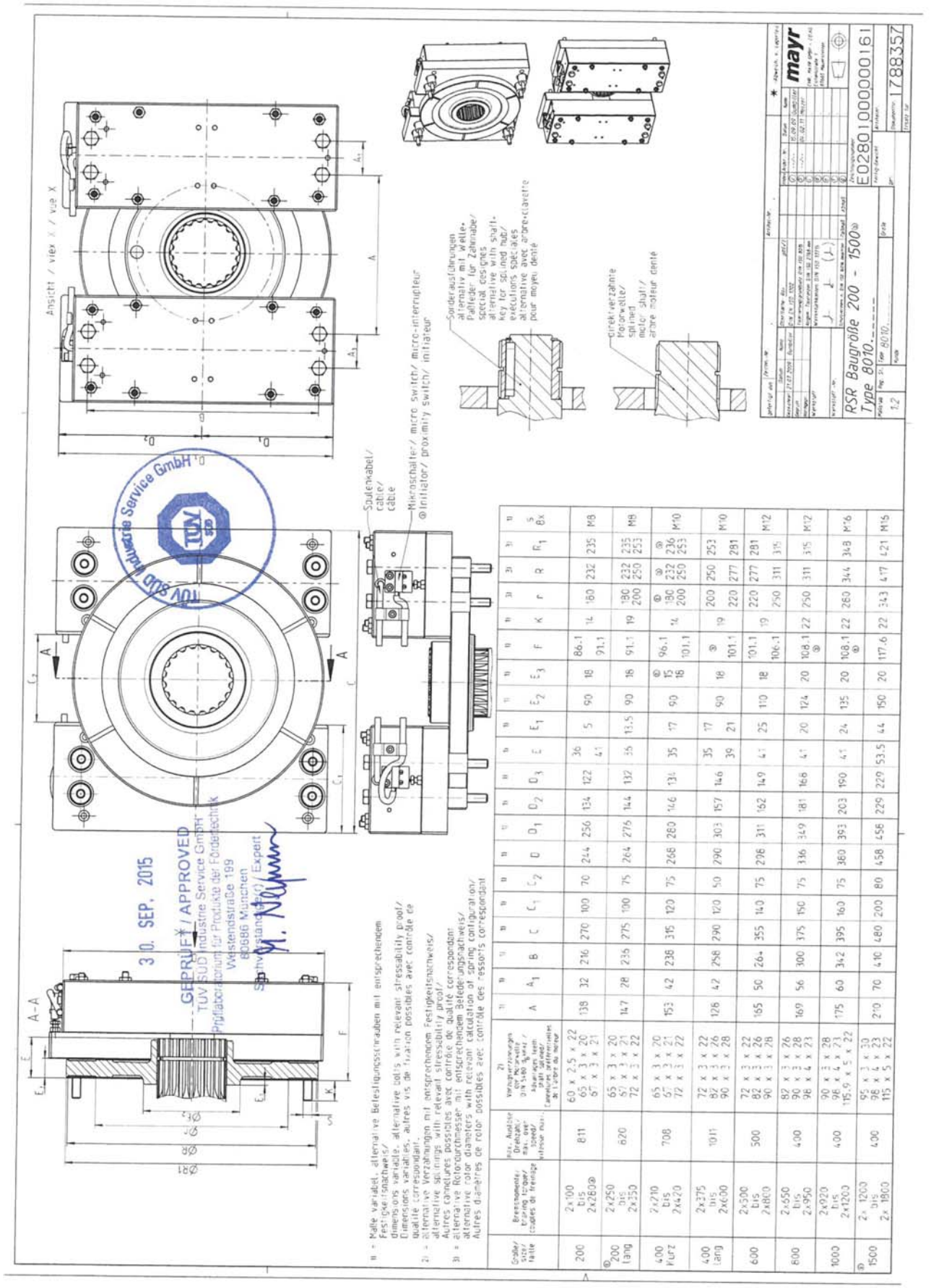
Authorised Manufacturer of Serial Production – Production Sites (valid from: 2016-01-13):

Company	Chr. Mayr GmbH & Co. KG
Address	Eichenstr. 1 87665 Mauerstetten - Germany
Company	Mayr Power Transmission Co. Ltd.
Address	7 Fuxin Road, Jiangsu Province 215637 Zhangjiagang - P.R. China
Company	Mayr Polska Sp. z. o. o.
Address	Rojów, ul. Hetmanska 1 63-500 Ostrzesów - Poland

- END OF DOCUMENT -

Based on: Application form from Co. Chr. Mayr GmbH & Co. KG of 2016-01-13

Page 1 of 1



Größe/ size/ taille	Bremsmoment/ Bremsmoment/ Braking torque/ couples de freinage	Max. Ausbohrung/ Max. bore/ Alésage maxi.	Zahnwellenprofil DIN 5480 Welle/ Anbau nach Seite 21 geteilt/ Splined/ Cannelure extérieure	A	A_1	B	C	C_1	C_2	D	D_1	D_2	D_3	E	E_1	E_2	E_3	F	K	r	R	R_1	S 8x
200	2x100 bis 2x260②	811	60 x 2,5 x 22 65 x 3 x 20 67 x 3 x 21	138	32	216	270	100	70	244	256	134	122	36 41	5	90	18	86,1 91,1	14	180	232	235	M8
②200 lang	2x250 bis 2x350	620	65 x 3 x 20 67 x 3 x 21 72 x 3 x 22	147	28	236	275	100	75	264	276	144	132	35 41	13,5	90	16	91,1	19	180 200	232 250	235 253	M8
400 Kurz	2x210 bis 2x420	708	65 x 3 x 20 67 x 3 x 21 72 x 3 x 22	153	42	238	315	120	75	268	280	146	134	35 41	17	90	⑥ 15 18	96,1 101,1	14	⑥ 180 200	⑥ 232 250	⑥ 236 253	M10
400 Lang	2x375 bis 2x630	1011	72 x 3 x 22 82 x 3 x 26 90 x 3 x 28	126	42	258	290	120	50	290	303	157	146	35 39	17 21	90	18	③ 101,1	19	200 220	250 277	253 281	M10
600	2x500 bis 2x800	500	72 x 3 x 22 82 x 3 x 26 90 x 3 x 28	165	50	264	355	140	75	296	311	162	149	41	25	110	18	101,1 106,1	19	220 250	277 311	281 315	M12
800	2x550 bis 2x950	400	82 x 3 x 26 90 x 3 x 28 98 x 4 x 23	169	56	300	375	150	75	336	349	181	166	41	20	124	20	108,1 ③	22	250	311	315	M12
1000	2x920 bis 2x1200	400	90 x 3 x 28 98 x 4 x 23 115,9 x 5 x 22	175	60	342	395	160	75	360	393	203	190	45	24	135	20	108,1 ④	22	260	344	348	M16
③ 1500	2x 1200 bis 2x 1800	400	95 x 3 x 30 98 x 4 x 23 115 x 5 x 22	210	70	410	480	200	80	458	458	229	229	53,5	44	150	20	117,6	22	343	417	421	M16

① = Maße variabel, alternative Befestigungsschrauben mit entsprechendem Festigkeitsnachweis/
Dimensions variable, alternative bolts with relevant stressability proof/
Dimensions variables, autres vis de fixation possibles avec contrôle de qualité correspondant.
2) = alternative Verzahnungen mit entsprechendem Festigkeitsnachweis/
alternative splinings with relevant stressability proof/
Autres cannelures possibles avec contrôle de qualité correspondant
3) = alternative Rotordurchmesser mit entsprechendem Befederungsnachweis/
alternative rotor diameters with relevant calculation of spring configuration/
Autres diamètres de rotor possibles avec contrôle des ressorts correspondant

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	IS-FT1-MUC/ng Manfred Negru	+49 89 5791-3336 manfred.negru@tuev-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

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Trade Register Munich HRB 96 869
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Information pursuant to § 2 [1] DL-InfoV (Germany) at www.tuv-sud.com/imprint

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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 planed, 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^{-1}]	[min^{-1}]	[m/s]	[m/s]	[m/s]	[m/s]
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

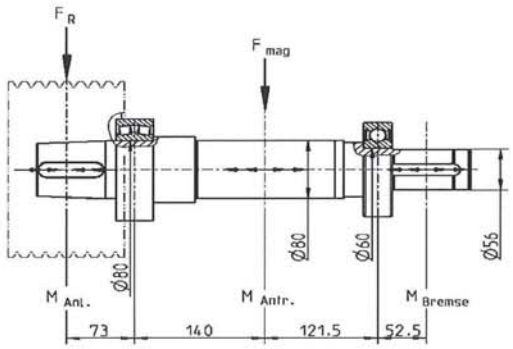
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Certificate

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

Type of the gearless machine:	**SM 200.30C**
Manufacturer:	Ziehl-Abegg AG, Heinz-Ziehl-Strasse 74653 Künzelsau - Germany
Examination number:	**G 520/2**
Tested product:	Traction sheave shaft including Shaft / Hub connections Test Report of IFF ENGINEERING & CONSULTING GmbH No. 4.1.551.3-3 dated 2014-11-25 (Page 1 – 17)
Basis of examination:	DIN 743 (10/2000), calculation of the safe working load of shafts and axis In connections with KTA 3902 (06/1999)
	DIN 6892 (11/98), fitting key springs, calculation and design Niemann, machine elements 1981, Volume no. 1



Date: 2015-01-09

Our reference:
IS-FSA-STG/No

Document: BS_G520-2_150109_en

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-20-121-0014, Index A03 dated 2009-10-19
Material:	Steel EN 10083-1 (10/2006) – 42CrMo4+QT (1.7225+QT) Steel EN 10083-1 (10/2006) – 42CrMoS4+QT (1.7227+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 EN-GJL-300, DIN EN 1561, values as stated by the manufacturer):

$p_{zul} = f_s * f_H * R_e$ respectively $p_{zul} = f_s * f_H * R_{P0,2}$ or $p_{zul} = f_s * R_m$ (f_s ; f_H Table B1)

$p_{zul} \geq 450$ N/mm²

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Minimum permissible surface pressure according to DIN 6892, paragraph 5.1.2 for the material of the hub connections of the **brake rotor** (Material 16MnCr5, approximate value R_e=0,7*R_m DIN EN 10084, values as stated by the manufacturer):

$p_{zul} = f_s * f_H * R_e$ respectively $p_{zul} = f_s * f_H * R_{P0,2}$ or $p_{zul} = f_s * R_m$ (f_s ; f_H Table B1)

$p_{zul} \geq 660$ N/mm²

Details for the calculation, applicable to the event of load

Maximum permissible static load	F_R	28.0 kN
Maximum torque of the installation	M_{Inst}	550 Nm
Maximum starting-up torque	M_{Max}	820 Nm
Magnetic force	$F_{magnetic}$	5.495 kN
Rated braking torque	$M_{braking}$	1100 Nm (2 x 550 Nm)
Maximum braking torque	1.5 x $M_{braking}$	1650 Nm
Maximum nominal speed of rotation		510 min^{-1}

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-ETK2-14-0101 dated 2014-12-15. 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.

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

Peter Retzbach

The expert

Chadi Noureddine

Zusatzhinweis zu den Betriebsanleitungen
Additional instructions for manuals
ZAtop / ZAsyn / ZAdisc

ZIEHL-ABEGG

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.

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.

Beispielhaftes Typenschild:

Example for name plate:

		IMB3	F	IP21	IEC60034-1
S/N 16231769/01		U_G	204 V	P_r	18/13 kW
Typ SM225.60B-20		240 st/h	26 Hz	n	156 rpm
3 ~ Y 360 V	S3	duty	20/40 %	I_r	53,5/38 A
cos φ	0,9/0,95			I_{max}	98 A
J_M	0,75 kgm2	R_{U20}	0,37 Ω	T_r	1120/800 Nm
		mass		T_{max}	1900 Nm

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Tel. +49 (0) 7940 16-0 · www.ziehl-abegg.com

Werte für maximale Belastung:
1120 Nm; 20 % ED; 18,0 kW; 53,5 A

Values for maximum load:
1120 Nm; 20 % ED; 18.0 kW; 53.5 A

Werte für mittlere Belastung:
800 Nm; 40 % ED; 13,0 kW; 38 A

Values for average load:
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.

Note:
The first rated currrent 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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