

Bewegung durch Perfektion | Movement by Perfection

ZIEHL-ABEGG



Die Königsklasse
The Royal League

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



ZA top SM200.30C

Gearless permanent magnet synchronous motor

Translation of the original operating instructions

Store for future use!

Content

1	General information	4
1.1	Application	4
1.2	Structure of the operating instructions	4
1.3	Target group	4
1.4	Exclusion of liability	4
1.5	Copyright	4
2	Safety instructions	4
2.1	General	4
2.2	Pictographs	4
2.3	General safety instructions	5
2.4	Requirements placed on the personnel / due diligence	5
3	Product overview	5
3.1	Operational area	5
3.2	Transport	6
3.3	Storage	6
3.4	Disposal / recycling	6
4	Mechanical installation	6
4.1	General mounting advises	6
4.2	Patent situation	7
4.3	Mounting the drive unit	7
4.4	Fastening the brake	7
4.5	Fastening rope protection clamp	7
5	Electrical installation	8
5.1	Safety precautions	8
5.2	EMC directive	8
5.3	Motor connection	8
5.4	Absolute encoder connection	9
5.5	Brake connection	10
5.5.1	Triggering of the brakes	11
5.6	Connection forced ventilation	11
6	Start-up	12
6.1	Operating conditions	12
6.2	First-time start-up	12
6.3	Drive approval test	12
6.3.1	Half load test	12
6.3.2	Testing the brake according EN 81-1	12
6.4	Pull out of safety gear	13
6.5	Emergency evacuation	14
6.5.1	Manual emergency evacuation	14
6.5.2	Electrical emergency evacuation	14
7	Faults and remedy	15
8	Service and maintenance	16
8.1	General notes on maintenance	16
8.2	Inspection intervals	16
8.2.1	Checking the air gap	16

8.3	Spare parts	17
8.3.1	Replacement of the absolute encoder ECN1313/ERN1387	17
8.3.2	Replacement of the traction sheave	18
8.3.3	Fastening bearing brackets	18
9	Enclosure	19
9.1	Technical data	19
9.2	Dimension sheets	20
9.3	EC-Declaration of conformity	24
9.4	Operating instructions brake	25
9.5	EC-Declaration of conformity of the brake	39
9.6	EC type-examination certificate	41
9.7	Type-examination certificate (A3)	45
9.7.1	Statement concerning ESV-type-examination	48
9.8	Calculation of tripping speed	48
9.9	Shaft calculation	49

1 General information

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 bodily harm is possible if the corresponding precautions are not taken!
	Caution! Material damage is possible if the corresponding precautions are not taken.
	Danger! Danger by dangerous, electric voltage! Death or severe injury can occur if the corresponding precautions are not taken!

	Information Important additional information and advice for user.
	Warning! Danger by hot surface! Slight bodily harm is possible if the corresponding precautions are not taken!

2.3 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!

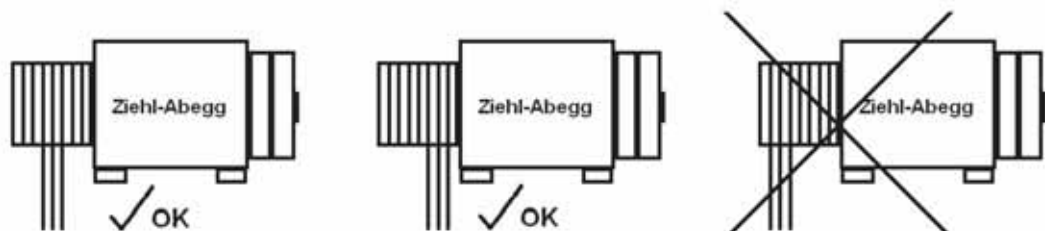
Caution!

- ▷ 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 screws of the motor must not be loaded with shearing force!**
- ▷ If the traction sheave should offer more grooves than the actual number of ropes, the ropes must be applied on the sheave either centred or towards the motor side.



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

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

4.2 Patent situation

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

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

4.3 Mounting the drive unit

- ▷ On the bottom side of the socket are 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:

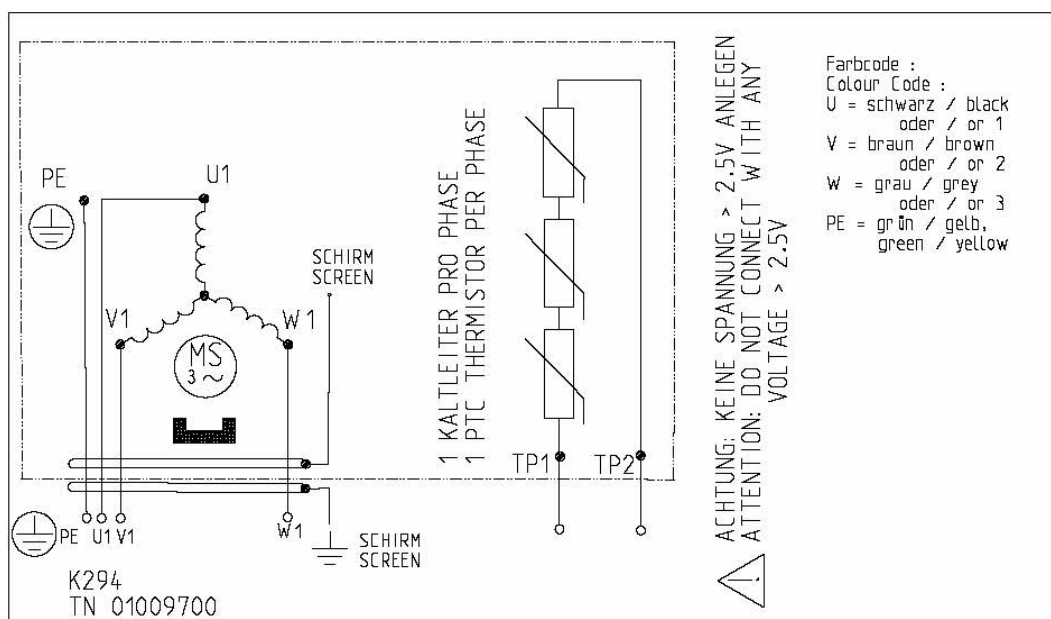
PE	U	V	W	
green/yellow	black	brown	blue	*
green/yellow	black	brown	grey	**
green/yellow	1	2	3	

* 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

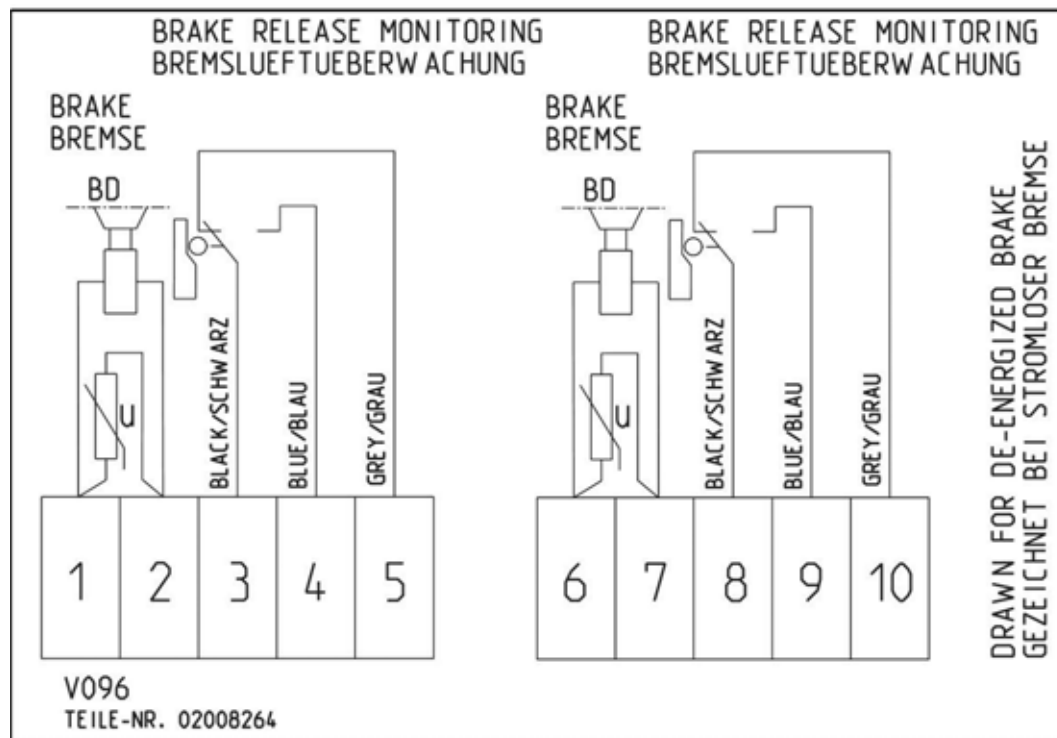
- ▷ Please also refer to the operating instructions of the brake.
- ▷ The brake is designed for static applications only. Any dynamic braking must be restricted to emergency braking and test braking. At static use, there is no brake wear. Therefore the brake is almost maintenance free.
- ▷ Open the brakes:
 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.

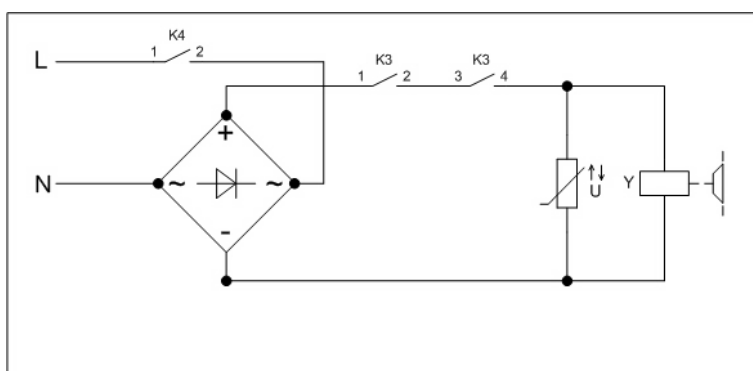
To ensure instantaneous brake application in emergencies, during inspection drives and return rides, use a second contactor (K3), which disconnects the brakes from the direct current side. Integrate this contactor into the safety circuit.

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

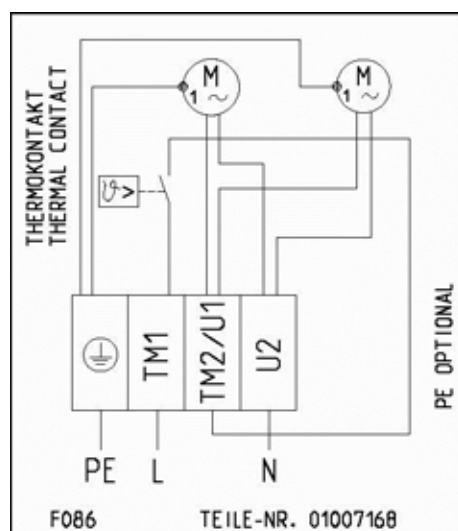
The contacts from K3 must close before the contact from K4 and are only permitted to open after the contact from K4 has opened.

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.

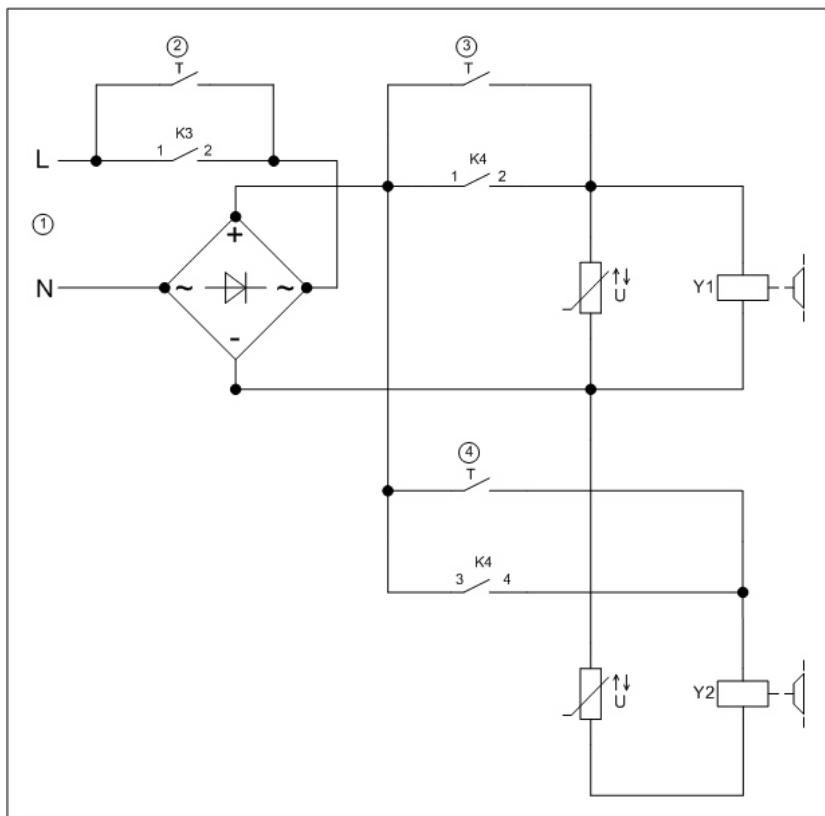
If the circuitry is made corresponding simplified diagram:

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 normally open or normally closed contact one micro switch contact at a time has to be opened or close.

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



Simplified diagram for brake activation

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

6.4 Pull out of safety gear

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

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

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

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

Note

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

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

6.5 Emergency evacuation



Attention!

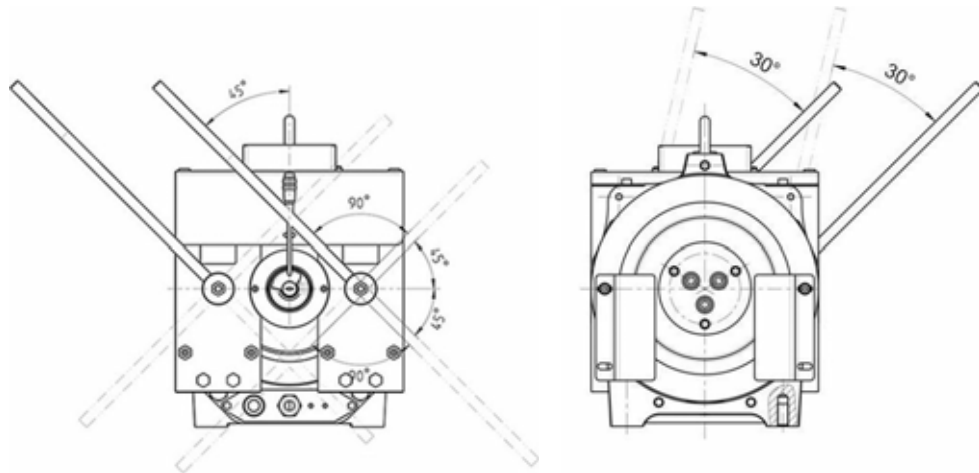
The measures for emergency evacuation described below may only be performed by instructed persons for maintenance of the lift or qualified personnel of lift companies.

6.5.1 Manual emergency evacuation

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

Manual lifting of the brake

The levers for hand release can be 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 too low.	Check power supply, change wiring (and transformer) size
	Brake control wrong / defective	Check brake wiring
	Brake coil defective	Replace brake (Special tools necessary! Contact ZIEHL-ABEGG SE customer service)
	Brake worn out	Replace brake rotors (Special tools necessary! Contact ZIEHL-ABEGG SE customer service)
Brake release monitoring does not switch	Micro switches defective	Replace the micro switch
	Contacts dirty	Switch micro switches with a higher contact current, at least 10 mA or change micro-switches

8 Service and maintenance

8.1 General notes on maintenance

- ▷ Observe the safety-at-work regulations!
- ▷ Disassembling the machine can only be done with special devices!
- Caution, strong magnetic force!**
- ▷ Never use a high-pressure cleaner (e. g. a steam jet cleaner) for cleaning the motor!
- ▷ Take note of abnormal operating noise.
- ▷ The bearings have a lifetime lubrication. There is no possibility to relubricate. Maintenance is not necessary for the bearings.

To check the brake wear or to check the traction sheave, the following instructions have to be referred:

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

The brake wear has to be checked with the brake closed, therefore:

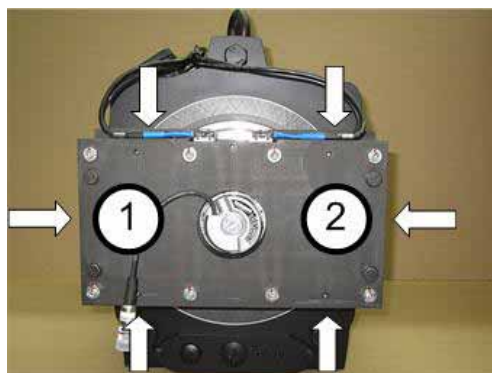
- ▷ Make sure that all moving parts have stopped, secure them mechanically if required!
- ▷ Make sure that the elevator can not be moved from any other person than the one who does the check!

8.2 Inspection intervals

	During commissioning or after the first 3 months	every year
Distance of the rope protection clamp	X	X
Checking the air gap of the brake	X	X
Visual inspection of the fixing screws on the housing, brakes and traction sheave. The locking varnish must be free of damage.	X	X
Check the traction sheave if worn out		X
Check the microswitch		X

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

8.2.1 Checking the air gap



1. The airgap is to be checked with the de-energized brake, 3 times at the circumference 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 then central bolt M5. Remove encoder.



Caution!

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

Mounting:



Caution!

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

- ▷ Attach encoder.
- ▷ Fasten central bolt M5 x 50
- Tightening torque M5 - 8.8: 5,5 Nm**
- ▷ Put on cable cover and fasten cap on the back side of the encoder.
- ▷ Tighten the clamping screw of the absolute encoder (Hexagon key SW2) at the outer clamping ring.
- Tightening torque SW2: 1.2 Nm**
- ▷ Determine the encoder offset again in accordance with the frequency inverter description.
- ▷ If a different encoder system is installed, please contact ZIEHL-ABEGG.

8.3.2 Replacement of the traction sheave



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.

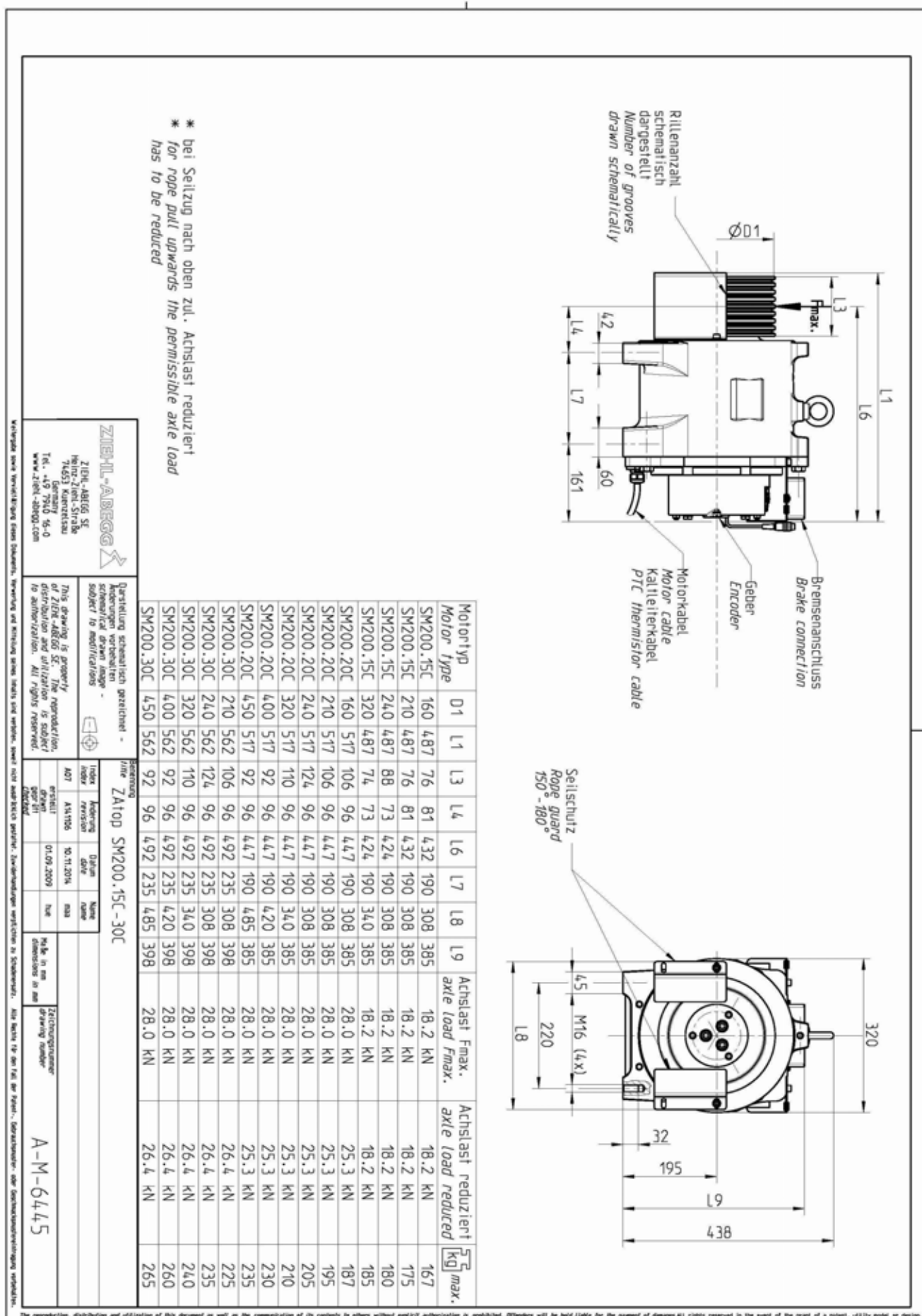
Other rope diameters and groove distances are possible.

* Dependent on travel, compensation ropes may be necessary.

Protection class

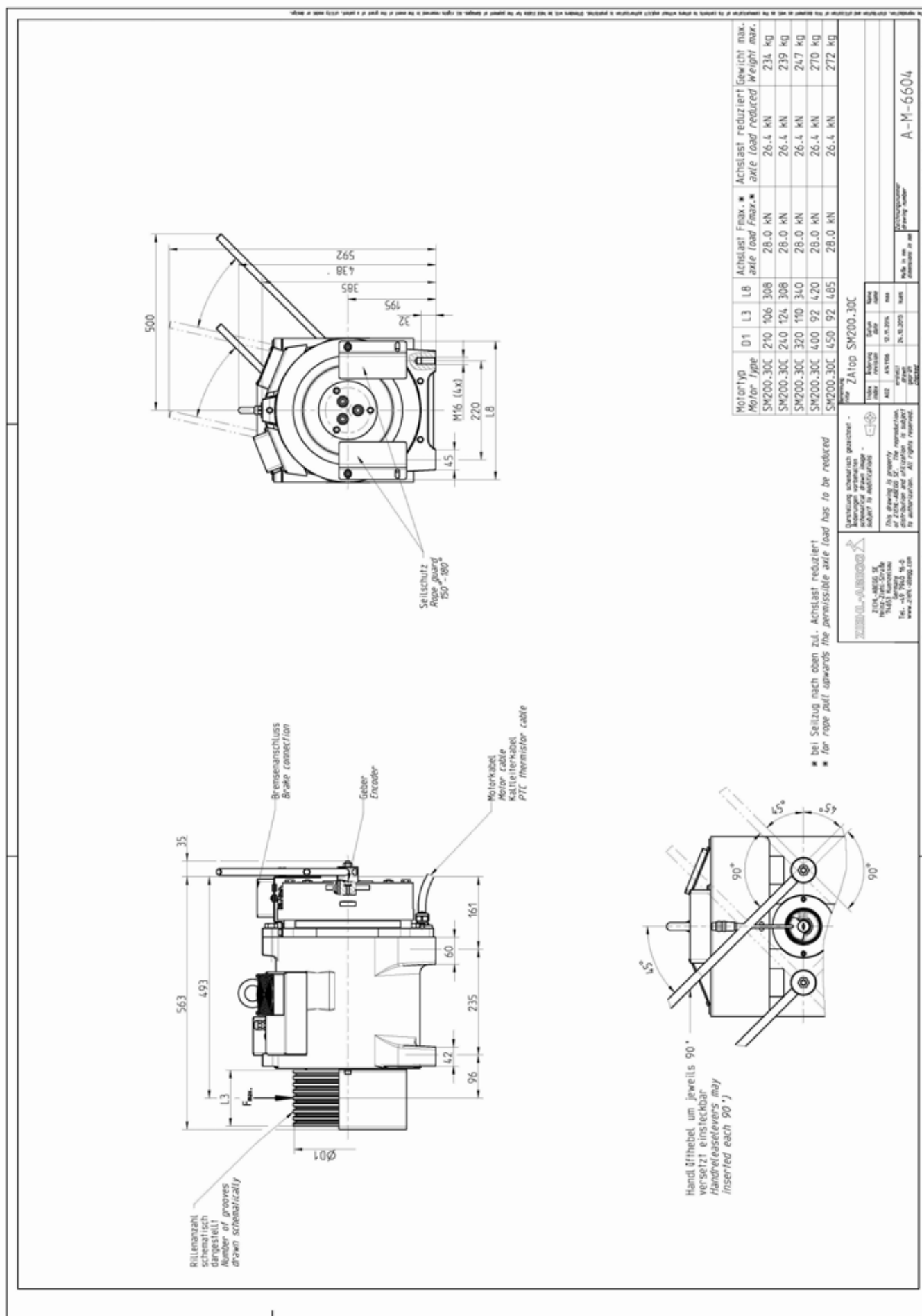
Component	Protection class
Motor	IP 42
Forced cooling	IP 20
Absolute encoder	IP 40
Brake (electrical)	IP 54
Brake (mechanical)	IP 41
Complete machine	IP 21

9.2 Dimension sheets





[illegible]



9.3 EC-Declaration of conformity

A-KON08_02 / 01.11.2008



EG-Konformitätserklärung

Declaration of Conformity

Firma
Company

Ziehl-Abegg AG
Heinz-Ziehl-Straße
D-74653 Künzelsau
Germany

Produkte
Products

Asynchronmotoren
Asynchronous motors

VFD132 VFD160 VFD180 VFD200 VFD225
VFD250 VFD280

Synchronmotoren
Synchronous motors

SM700 SM860
SM160 SM200 SM225 SM250

Diese Produkte sind entwickelt, konstruiert und gefertigt in Übereinstimmung mit der Niederspannungsrichtlinie 2006/95/EG.

These products are developed, designed and manufactured in accordance with the low voltage directive 2006/95/EC.

Folgende harmonisierte Normen sind angewandt:

The following harmonized standards are in use:

EN 60034-1 : 2004	Drehende elektrische Maschinen – Teil 1: Bemessung und Betriebsverhalten <i>Rotating electric machines – Part 1: Rating and performance</i>
EN 60034-5:2001 + A1:2007	Drehende elektrische Maschinen – Teil 5: Schutzarten ... <i>Rotating electric machines – Part 5: Degrees of protection ...</i>
EN 60204-1 : 2006	Sicherheit von Maschinen; Elektrische Ausrüstung von Maschinen Teil 1: Allgemeine Anforderungen <i>Safety of machinery – Electrical equipment of machines. Part 1: General requirements</i>

Eine technische Dokumentation ist vollständig vorhanden.

The complete technical documentation is available.

Die aufgeführten Produkte können nicht selbständig betrieben werden. Die Einhaltung der Richtlinie ist abhängig von der korrekten Installation und Verwendung der Geräte. Die Einbauanweisungen der Betriebsanleitung sind einzuhalten. Die Geräte sind nur für den Einsatz durch Fachkräfte geeignet.

The mentioned products are not to be operated as independent units. The compliance with the directive depends on the correct installation and application of the units. The installation instructions of the manual have to be followed. The units are considered only for professional use.

Künzelsau, den 01.11.2008

Ziehl-Abegg AG

ppa.

Ralf Arnold
Leitung Geschäftsbereich Antriebstechnik / Director Drive Division

9.4 Operating instructions brake

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



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

E028 02 112 000 471
Page 1 of 14
27/09/2010 TK/HW/SU

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

E028 02 112 000 471
Page 2 of 14

27/09/2010 TK/HW/SU

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

mayr®
 Antriebs-technik

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 double 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.

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

E028 02 112 000 471
 Page 3 of 14

27/09/2010 TK/HW/SU

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

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

E028 02 112 000 471
Page 4 of 14

27/09/2010 TK/HW/SU

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



Safety Regulations

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

Liability

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

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

Guarantee

- ☐ The guarantee conditions correspond with the Chr. Mayr GmbH + Co. KG sales and delivery conditions.
- ☐ Mistakes or deficiencies are to be reported to *mayr*[®] 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

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

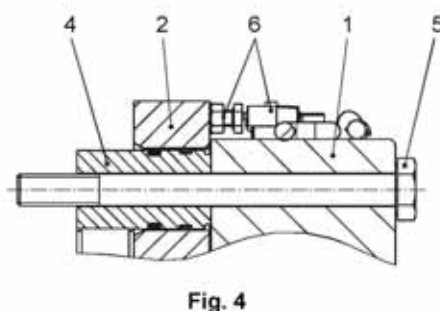
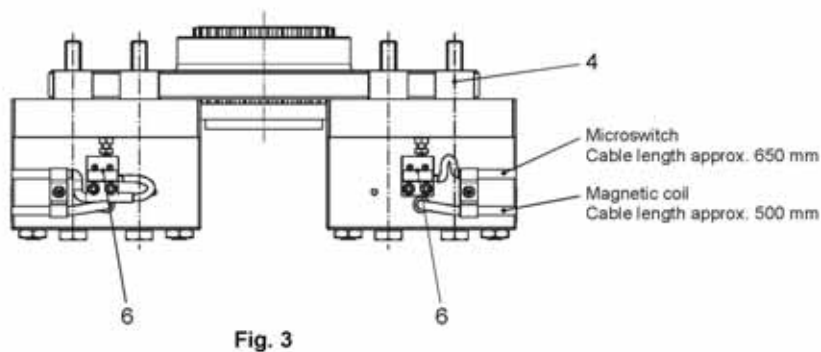
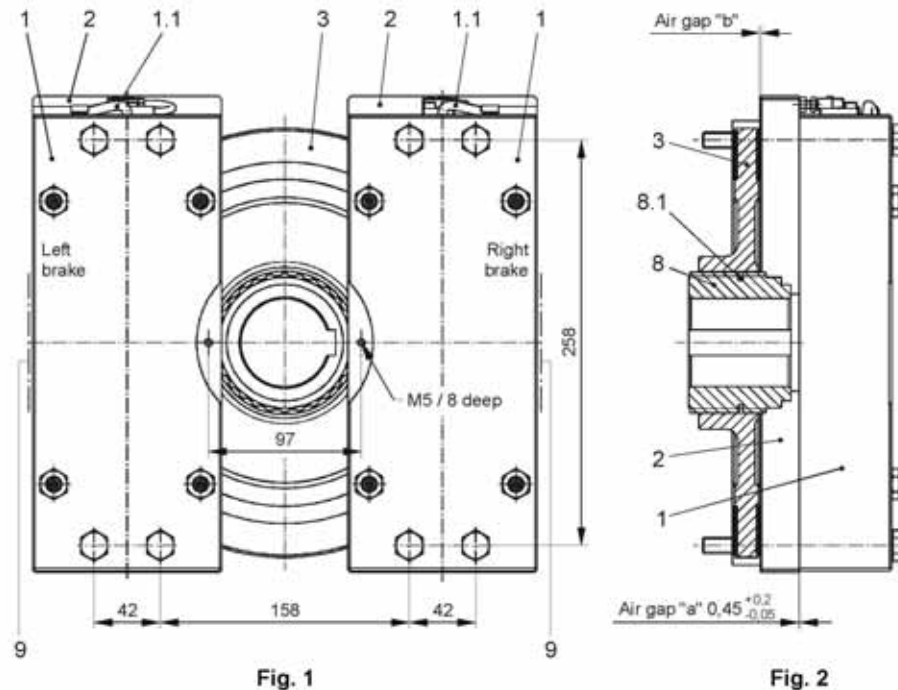
E028 02 112 000 471
Page 5 of 14

27/09/2010 TK/HW/SU

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

mayr®
 Antriebstechnik

Brake Illustrations for Design without Hand Release



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

E028 02 112 000 471
 Page 6 of 14

27/09/2010 TK/HW/SU

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

mayr®
 Antriebstechnik

Brake Illustrations for Design with Hand Release

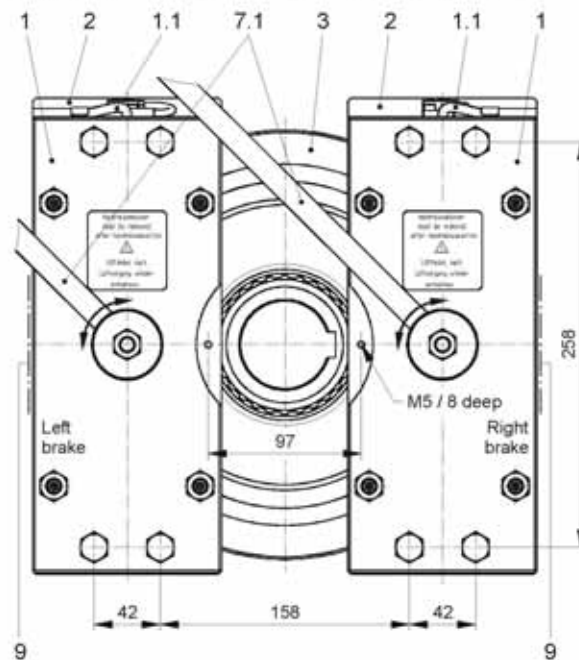


Fig. 5

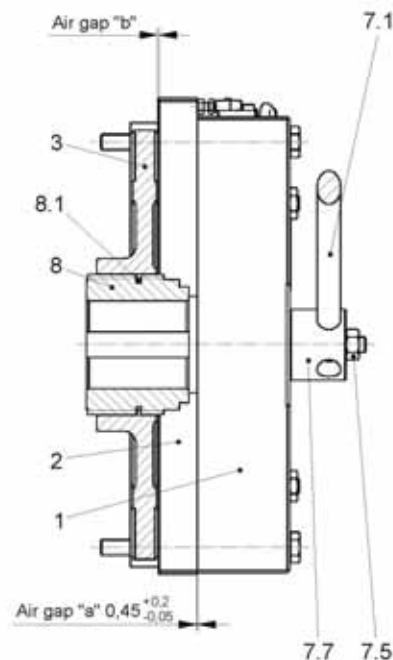


Fig. 6

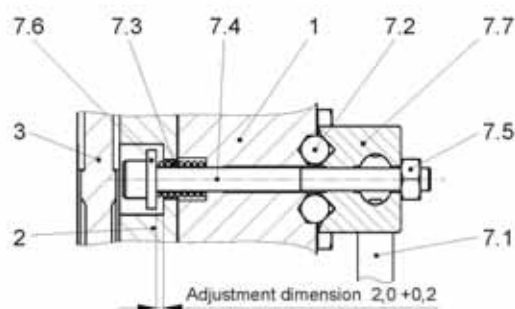


Fig. 7

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

E028 02 112 000 471
 Page 7 of 14

27/09/2010 TK/HW/SU

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

mayr®
 Antriebstechnik

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} _{-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.

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

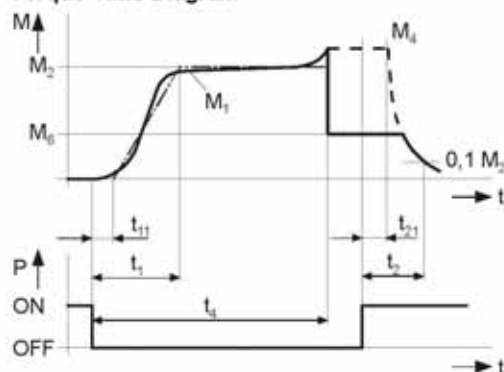
E028 02 112 000 471
 Page 8 of 14

27/09/2010 TK/HW/SU

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

mayr®
 Antriebstechnik

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!

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

E028 02 112 000 471
 Page 9 of 14

27/09/2010 TK/HW/SU

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

mayr®
 Antriebstechnik

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 must 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 $\begin{smallmatrix} -0,20 \\ -0,05 \end{smallmatrix}$ 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 immaterial.

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.

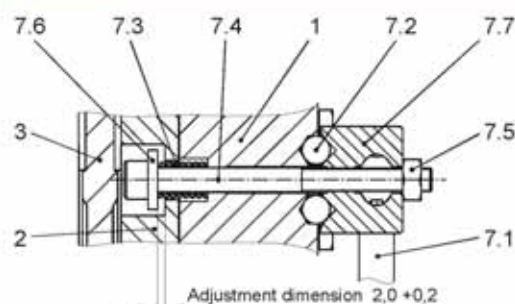


Fig. 8

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

E028 02 112 000 471
 Page 10 of 14

27/09/2010 TK/HW/SU

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

mayr®
 Antriebstechnik

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".

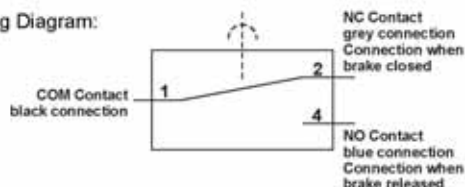
On initial operation:

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.

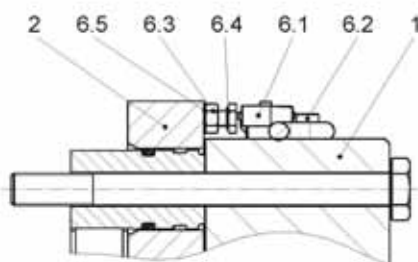


Fig. 9

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

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

E028 02 112 000 471
 Page 11 of 14

27/09/2010 TK/HW/SU

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

mayr®
 Antriebstechnik

Electrical Connection and Wiring

DC current is necessary for operation of the brake. The coil voltage is indicated on the Type tag as well as on the brake body and is designed according to the DIN IEC 60038 ($\pm 10\%$ tolerance). Operation must take place via DC voltage with a low ripple content, e.g. via a bridge rectifier or with another suitable DC supply. 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

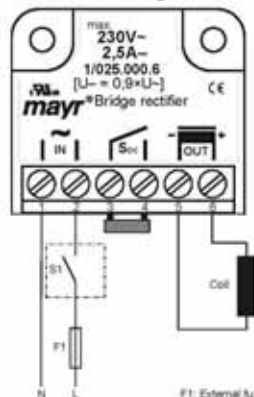
The operational behaviour of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the temperature and the air gap between the armature disk and the coil carrier (dependent on the wear condition of the linings).

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

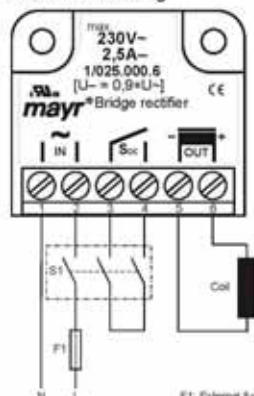


The power circuit is interrupted before the rectifier. The magnetic field slowly reduces. This delays the rise in braking torque.

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
 Eichenstraße 1
 D-87665 Mauerstetten
 Germany

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

E028 02 112 000 471
 Page 12 of 14

27/09/2010 TK/HW/SU

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 $\begin{smallmatrix} +0,20 \\ -0,05 \end{smallmatrix}$ 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)

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

E028 02 112 000 471
Page 13 of 14

27/09/2010 TK/HW/SU

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



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)

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

E028 02 112 000 471
Page 14 of 14

27/09/2010 TK/HW/SU

9.5 EC-Declaration of conformity of the brake



EG – Konformitätserklärung EC – Declaration of conformity Déclaration CE de conformité Dichiarazione CE di conformità Declaración CE de conformidad Declaração de conformidade da CE

Im Sinne der EG-Richtlinie Aufzüge 95/16/EG erklären wir
In terms of the EC Directive 95/16/EC relating to lifts, we
 Conformément à la directive européenne 95/16/CE sur les ascenseurs, nous, la société
Secondo la Direttiva CE per ascensori 95/16/CE, la presente
 En el sentido de la Directiva CE 95/16/CE sobre ascensores
Nos termos da diretiva da CE 95/16/CE relacionados aos elevadores declaramos

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

dass die angeführten Produkte in alleiniger Verantwortung entwickelt, konstruiert und gefertigt wurden in Übereinstimmung mit der oben genannten EG-Richtlinie.
declare that the products stated below have been developed, constructed and manufactured in sole responsibility and in conformity with the above mentioned EC Directive.
 déclarons sous notre seule responsabilité que les produits listés ci-dessous ont été développés, conçus et usinés dans le respect de la directive CE mentionnée ci-dessus.
dichiaro che i prodotti sotto elencati sono stati progettati e realizzati sotto la propria responsabilità e in conformità alle Direttive CE sopra riportate.
 declaramos que los productos indicados han sido desarrollados, construidos y fabricados de acuerdo con la Directiva CE arriba mencionada.
que os produtos abaixo mencionados foram desenvolvidos, construídos e fabricados sob única responsabilidade e em conformidade com a diretiva CE acima mencionada.

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:
Year of manufacture:
 Année de production:
Anno di produzione:
 Año de fabricación:
Ano de fabricação:

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

Mauerstetten den 12.05.2011

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

Seite / Page / Page / Pagina / Página / Página
 1 / 2



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	DIN EN 81-1	05/2000	Sicherheitsregeln – Konstruktion u. Einbau von Aufzügen	95/16/EG
1	DIN EN 81-1	05/2000	Safety rules – Construction and installation of lifts	95/16/EC
1	DIN EN 81-1	05/2000	Règles de sécurité – construction et installation d'ascenseurs	95/16/CE
1	DIN EN 81-1	05/2000	Regole di sicurezza per la costruzione e il montaggio di ascensori	95/16/CE
1	DIN EN 81-1	05/2000	Reglas de seguridad – Construcción y montaje de ascensores	95/16/CE
1	DIN EN 81-1	05/2000	Regras de segurança – Construção e instalação de elevadores	95/16/CE

Zertifizierungsstelle für Aufzüge und Sicherheitsbauteile, Überwachung gemäß Aufzugsrichtlinie:

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

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

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

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

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

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

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

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

Bremsleinrichtung, als Teil der Schutzeinrichtung für den aufwärtsfahrenden Fahrkorb gegen Übergeschwindigkeit.

Brake device to be used as part of the protective unit to prevent excessive speeds on upward-moving elevator cages.

Dispositif de freinage faisant partie du système de protection contre les survitesses en remontée accidentelle des cabines d'ascenseurs.

Dispositivo di frenatura da usare come sistema di protezione per prevenire la fuga verso l'alto della cabina

Dispositivo de frenado que se utiliza como parte del dispositivo de seguridad para evitar velocidades excesivas de la jaula del ascensor en movimiento ascendente

Dispositivo de freio para ser usado como parte da unidade de proteção para prevenir excesso de velocidade nas caixas de elevadores em movimento ascendente

EG-Baumusterprüfbescheinigung / EC type examination certificate / No d'homologation CE / Certificato di esame CE N / Certificado CE de examen de tipo / Certificado de exame "CE de tipo"

ABV 766, 766/1, 766/2, 766/3

	* EG-Maschinenrichtlinie 2006/42/EG98/37/EG * Directive 2006/42/CE sur les machines * Diretiva de Máquinas CE 2006/42/EG98/37/CE	* EC-Machinery directive 2006/42/EC * Direttiva macchine 2006/42/CE * Diretiva para maquinaria CE 2006/42/CE
X	** EG-Richtlinien Niederspannung 2006/95/EG ** Directive 2006/95/CE sur les basses tensions ** Directivas CE de Baja Tensión 2006/95/CE	** EC-Low voltage directive 2006/95/EC ** Direttiva CE per il basso voltaggio 2006/95/CE ** Diretiva de baixa voltagem CE 2006/95/CE
X	*** Elektromagnetische Verträglichkeit 2004/108/EG *** Directive 2004/108/CE sur la compatibilité électromagnétique *** Compatibilidad Electromagnética 2004/108/CE	*** Electromagnetic compatibility directive 2004/108/EC *** Direttiva CE per la compatibilità elettromagnetica 2004/108/CE *** Diretiva de compatibilidade eletromagnética 2004/108/CE

Mauerstetten den 12.05.2011

*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

Seite / Page / Page / Pagina / Página
 2 / 2

9.6 EC type-examination certificate



Industrie Service

EC type-examination certificate

Certificate no.: ABV 766/2

Notified body: TÜV SÜD Industrie Service GmbH
Zertifizierungsstelle für Aufzüge und Sicherheitsbauteile
Westendstr. 199
80686 München - Germany

**Applicant/
Certificate holder:** Chr. Mayr GmbH & Co. KG
Eichenstr. 1
87665 Mauerstetten - Germany

Date of application: 2009-05-19

Manufacturer: Chr. Mayr GmbH & Co. KG
Eichenstr.1
87665 Mauerstetten – Germany

Mayr Power Transmission Zhangjiagang Co.,Ltd.
No. 3 Factory, No. 16 Changxing road,
215600 Zhangjiagang, P.R. China R

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

Type: RSR/8010______, Size 200, 400, 600, 800, 1000

Test laboratory: TÜV SÜD Industrie Service GmbH
Prüflaboratorium für Produkte der Fördertechnik
Prüfbereich Aufzüge und Sicherheitsbauteile
Westendstr. 199
80686 München - Germany

**Date and
number of test report:** 2009-09-16
766/2

EC-directive: 95 / 16 / EC

Result: The safety component conforms to the directive's essential
safety requirements for the respective scope of application
stated on page 1 and 2 of the annex to this EC type-
examination certificate.

Date of issue: 2009-09-16

Certification body for lifts and safety components
Identification number: 0036


Dieter Roas



TUV®



**Annex to the EC type-examination certificate
no. ABV 766/2 dated 2009-09-16**

1. Scope of Application

- 1.1 Permissible brake moment, maximum tripping rotary speed and maximum rated rotary speed of the traction sheave when the brake device acts on the shaft of the traction sheave while the car is moving upward

Seize	Permissible brake moment (Nm)	Max. tripping rotary speed of traction sheave (min ⁻¹)	Max. rated rotary speed of traction sheave (min ⁻¹)
200	200 – 560	811	705
400 „short“	420 – 840	708	616
400 „long“	750 – 1200	1011	879
600	1000 – 1600	500	435
800	1300 – 1900	400	348
1000	1840 – 2400	400	348

- 1.2 Maximum tripping speed of the overspeed governor and maximum rated speed

The maximum tripping speed and the maximum rated speed must be calculated on the basis of the traction sheaves maximum tripping rotary speed and maximum rated rotary speed as outlined in sections 1.1 taking into account traction-sheave diameter and car suspension.

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

v = speed (m/s)
 D = Diameter of the traction sheave from rope's centre to rope's centre (m)
 π = 3,14
 n = Rotary speed (min⁻¹)
 i = Ratio of the car suspension

2. Conditions

- 2.1 Since the brake device represents only a part of the protection device against overspeed for the car moving in upwards direction an overspeed governor as per EN 81-1, paragraph 9.9 must be used to monitor the upward speed and the brake device must be triggered (engaged) via the overspeed governor's electric safety device.

Alternatively, the speed may also be monitored and the brake device engaged by a device other than an overspeed governor as per paragraph 9.9 if the device shows the same safety characteristics and has been type tested.

- 2.2 In order to recognise the loss of redundancy the movement of each brake circuit (each single brake) is to be monitored separately and directly (e.g. by micro switches). If a brake circuit fails to engage (close) while the lift machine is at standstill, next movement of the lift must be prevented.
- 2.3 In cases where the lift machine moves despite the brake being engaged (closed), the lift machine must be stopped at the next operating sequence at the latest and the next movement of the lift must be prevented. (The car may, for example, be prevented from traveling by querying the position of the micro switch which is used to monitor the mechanical movement of the brake circuits, should both brake circuits fail to open).



- 2.4 According to EN 81-1, paragraph 9.10.4 d a braking device must act directly on the traction sheave or on the same shaft on which the traction sheave is situated in the immediate vicinity thereof.

If the braking device does not act in the immediate vicinity of the traction sheave on the same shaft on which the traction sheave is situated, the standard is not complied with. In cases involving shaft failure in the extended area between the traction sheave and the braking device, safety would no longer be ensured by the latter if the lift car made an uncontrolled upward movement.

Shaft failure in the extended area must therefore be ruled out by appropriate design and sufficient dimensioning. In order to eliminate or reduce influencing factors which may lead to failure wherever possible, the following requirements must be satisfied:

- Minimization of bending length between traction sheave and braking device or traction sheave and the next bearing (the next bearing must form part of the drive unit)
- Static defined bearing (e. g. 2-fold borne shaft) otherwise measures are required to obtain a defined loading
- As far as possible, prevention of a reduction in load-bearing capacity in the area of reversed bending stress (reduction in load-bearing capacity caused, for example, by stress concentration and cross-sectional reductions)
- Between traction sheave and braking device the shaft must be continuous (made from one piece)
- Cross-sectional influences on the shaft are only permitted if they act on the following connections: traction sheave – shaft, braking device – shaft, torque of the transmitting component – shaft (situated between traction sheave and braking device).

The manufacturer of the drive unit must provide calculation evidence that the connection braking device – shaft, traction sheave - shaft and the shaft itself is sufficiently safe. If necessary, evidence must be provided for the intended measures, too (see static undefined bearing).

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

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 The permissible brake moments must be applied to the lift system in such a manner that they do not decelerate more than 1 g_n , if the empty car is moving upwards.
- 3.3 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.
This type examination only refers to the requirements pertaining to brake devices as per EN 81-1, paragraph 9.10.
Checking whether the requirements as per paragraph 12.4 have been complied with is not part of this type examination.
- 3.4 In order to provide identification, information about the basic design and it's functioning and to show which parts have been tested pertaining to the tested and approved type, drawing no. E 028 01 000 000 1 61 dated 21 July 2009 is to be enclosed with the EC type-examination certificate and the Annex thereto. The installation conditions and connection requirements are presented or described in separate documents (e.g. assembly and operating instructions).
- 3.5 The EC type-examination certificate may only be used in connection with the pertinent Annex.

ZIEHL-ABEGG 

9.7 Type-examination certificate (A3)



Industrie Service

Type examination certificate

Certificate no.: ESV 766/1

Certification office: TÜV SÜD Industrie Service GmbH
Westendstr. 199
80686 München – Germany

**Applicant/
certificate holder:** Chr. Mayr GmbH & Co. KG
Eichenstr. 1
87665 Mauerstetten - Germany

Date of application: 2010-06-17

Manufacturer of the test sample: Chr. Mayr GmbH & Co. KG
Eichenstr. 1
87665 Mauerstetten - Germany

Product: Braking element acting on the shaft of the traction sheave, as a part of the protection device against unintended car movement

Type: RSR/8010. _____, Größe 200 till 1500

Test laboratory: TÜV SÜD Industrie Service GmbH
Prüflaboratorium für Produkte der Fördertechnik
Prüfbereich Aufzüge und Sicherheitsbauteile
Westendstr. 199
80686 München – Germany

**Date and
number of the test report:** 2011-07-07
ESV 766/1

Examination basis: EN 81-1:1998 + A3:2009 (D), issue December 2009

Result: The safety component conforms to the requirements of examination basis for the respective scope of application stated on page 1 - 2 of the annex to this type-examination certificate.

Date of issue: 2011-07-11

Certification office for products of conveyor systems
Lifts and safety components

C. Rührmeyer
Christian Rührmeyer



TUV®



**Annex to the type-examination certificate
no. ESV 766/1 dated 2011-07-11**

1 Scope of application

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

Name / Size	Minimum nominal brake torque* [Nm]	Maximum nominal brake torque* [Nm]	Maximum tripping rotary speed [rpm]	Maximum response times** [ms]		
				Parallel without overexcitation / Serial 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
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, t₅₀ optionally calculated t₅₀ = (t₁₀ + t₉₀)/2 or value taken from the examination recording

1.2 Assigned execution features

- Type of powering / deactivation Continuous current / continuous current end
- Brake control Parallel and serial
- Maximum air gap 0.45 mm
- Damping elements YES
- Overexcitation (Größe 200 - 1000) at 1.5 non-release voltage
- Overexcitation (Größe 1500) at double non-release voltage

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

2011-07-11/IS-FSA-MUC/we/An_ESV766-1_110711_en

Page 1 of 2



2 Conditions

- 2.1 The above mentioned safety component represents only part of a protective equipment against unintended movement of the elevator car. Only in combination with a detecting and triggering component (two separate components also possible), which must be subjected to an own type examination, can the system created fulfil the requirements for a safety component in accordance with Annex F.8, EN 81-1:1998 + A3:2009 (D).
- 2.2 The safety component is used in combination with the brake device as part of the ascending car over-speed protection means and as a drive brake.
- 2.3 The installer of a lift must create an examination instruction in accordance with D.2 p) of EN 81-1:1998 + A3:2009 (D) for lift(s) 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).
- 2.4 The dimension configuration of the lift system must be designed as regards the brake torques in such a way that the permissible value of deceleration does not exceed $1 g_n$ in either direction. Excluded are decelerations, which are caused by an instantaneous roller safety gear up to a rated speed of the lift system of 0.63 m/s for instance.
- 2.5 The traction and its variance must be taken into account as regards its braking distance (transferable power / torque) and included in the calculation.
- 2.6 For installer of a lift, the compliance of the component with the type examined component and the assured nominal brake torques and response times must be confirmed in writing (e. g., type plate and/or supplement in the declaration of conformity).
- 2.7 The information evaluation for self-monitoring must prevent an operational starting of the lift in the event of a fault.
- 2.8 According to the norm requirements, the brake element of the protective device must impact directly on the drive disc or on the same shaft in the immediate vicinity of the drive disc.

If the brake element does not impact in the immediate vicinity of the brake disc on the same shaft, on which the drive disc is also arranged, a deviation from the norm exists. A failure of the shaft in the area between the drive disc and the brake element must be ruled out using corresponding construction designs and sufficient measurements. The manufacturer of the entire drive must prove the sufficient safety of the connection brake element – shaft and drive – shaft as well as the shaft itself in calculations. This proof must be added to the technical documentation of the lift.

3 Remarks

- 3.1 As part of the type examination, it was detected that the brake element has a redundant design and that the correct function is monitored by sensors.

The examination of compliance with all requirements under Section 12.4 [EN 81-1:1998 + A3:2009 (D)], deterioration of the brake torques/breaking forces due to wear and tear and the operation-related change of the drive capability are not part of this type examination.

This type examination refers to the partial requirements for the protection device against unintended car movement only according to EN 81-1:1998 + A3:2009 (D), Section 9.11.
- 3.2 In order to provide identification, information about the basic design and functioning and to show the environmental conditions and connection requirements, drawing with the relevant latest identification from the associated EC type-examination certification ABV 766/X is to be enclosed with the type-examination certificate and the annex thereto.
- 3.3 The type-examination certificate may only be used in connection with the pertinent annex and the list of the authorized manufacturers (according to enclosure of the corresponding EC type-examination certification ABV 766/X).

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

2011-07-11/IS-FSA-MUC/we/An_ESV766-1_110711_en

Page 2 of 2

9.7.1 Statement concerning ESV-type-examination

The manufacturer confirms according to paragraph 2.6 of the type-examination certificate the compliance of the part with the examined brakes. The nominal brake torque is stated on the name plate. The response times are assigned to the brake torque in the type-examination certificate. The increase of the indices (added with "/") of ABV or ESV certificates serves only the purpose of technical improvement and has been granted by the notified body under this condition. ABV and ESV numbers are (except for the indices) always identical for the same kind of brake and the use of the ABV number always includes the ESV number, which is also assigned by the documentation.

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



Industrie Service

Choose certainty.
Add value.

Certificate

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

Type of the gearless machine: **SM 200.30C**

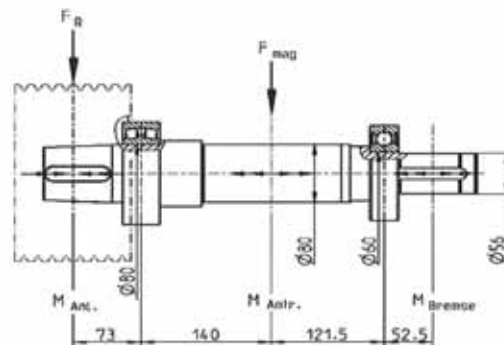
Manufacturer: Ziehl-Abegg AG, Heinz-Ziehl-Strasse
74653 Künzelsau - Germany

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

Excerpts from this document may
only be reproduced and used for
advertising purposes with the
express written approval of
TÜV SÜD Industrie Service GmbH.

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):

$$p_{zul} = f_s \cdot f_H \cdot R_e \text{ respectively } p_{zul} = f_s \cdot f_H \cdot R_{p0.2} \text{ or } p_{zul} = f_s \cdot R_m \text{ (} f_s ; f_H \text{ Table B1)}$$

$$p_{zul} \geq 450 \text{ N/mm}^2$$

Headquarters: Munich
Trade Register Munich HRB 96 889
VAT ID No. DE129484218
Information pursuant to Section 2(1)
DL-InfoV (Germany) at
www.tuev-sued.com/imprint

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

Phone: +49 711 7005-765
Fax: +49 711 7005-588
www.tuev-sued.de/is

TÜV®

TÜV SÜD Industrie Service GmbH
Zentralbereich Fördertechnik
Abteilung Aufzüge und Sicherheitsbauteile
Gottlieb-Daimler-Str. 7
70794 Filderstadt
Germany

Page 2 of 2
 Our reference/Date: IS-FTA-STG/No / 2015-01-09
 Document: BS_G520-2_150109_en



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 $R_e=0,7 \cdot R_m$ DIN EN 10084, values as stated by the manufacturer):

$$p_{zul} = f_s \cdot f_H \cdot R_e \text{ respectively } p_{zul} = f_s \cdot f_H \cdot R_{p0,2} \text{ or } p_{zul} = f_s \cdot R_m (f_s ; f_H \text{ Table B1})$$

$$p_{zul} \geq 660 \text{ N/mm}^2$$

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	$1.5 \times M_{braking}$	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 Nouredine

Customer Service

phone +49 7940 16-308
fax +49 7940 16-249
drives-service@ziehl-abegg.com

Headquarters

ZIEHL-ABEGG SE
Heinz-Ziehl-Straße · 74653 Künzelsau
Germany
phone +49 7940 16-0 · fax +49 7940 16-249
drives@ziehl-abegg.de · www.ziehl-abegg.com

