Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896._3_._ _ Sizes 200 – 1800

(B.8.7.2.GB)

Please read the Operational Instructions carefully and follow them accordingly!
Ignoring these Instructions may lead to malfunctions or to brake failure, resulting in damage to other parts.

Contents:

Declaration of Conformity

A conformity evaluation for the applicable EU directives has been carried out for this product.
The conformity evaluation is set out in writing in a separate document and can be requested if required.
It is forbidden to start use of the product until the machine or system into which it should be built is operating in accordance with all applicable EU directives.
Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion.
This statement is based on the ATEX directive.

Safety and Guideline Signs

Danger!
Danger of injury to personnel and damage to machines.

Please Observe!
Guidelines on important points.

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

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mayr® Antriebstechnik

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(B.8.7.2.GB)

Safety Regulations

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

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

To prevent injury or damage, only professionals and specialists should work on the devices.

Danger!
This warning applies if:

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

Please Observe!
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. The electromagnetic brakes have been developed in accordance with the latest technology regulations and are, at the point of delivery, operationally safe.

Please Observe!

- ❒ Only specialists who are trained in the transport, installation, operation, maintenance and general operation of these devices and who are aware of the relevant standards should be allowed to carry out this work.
- ❒ Technical data and specifications (Type tags and documentation) must be followed.
- ❒ The correct connection voltage must be connected according to the Type tag.
- ❒ Never loosen electrical connections or carry out installation, maintenance or repairs while the voltage connection is energised.
- ❒ Cable connections must not be placed under mechanical strain.
- ❒ Check electrical components for signs of damage before putting them into operation. Never bring them into contact with water or other fluids.
- ❒ The braking torque is lost if the friction lining and / or the friction surface come into contact with oil or grease.

Appointed Use

mayr® brakes are for use in machines and systems and must only be used in the situations for which they are ordered and confirmed.
Using them for any other purpose is not allowed!

Guidelines for Electromagnetic Compatibility (EMC)

In accordance with the EMC directives 89/336/EEC, the individual components produce no emissions. However, functional components e.g. rectifiers, phase demodulators, ROBA®-switch devices or similar controls for mains-side energisation of the brakes 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.

Device Conditions

Please Observe!
The catalogue values are standards which can, in certain cases, vary. When dimensioning the brakes, please remember that installation situations, braking torque fluctuations, permitted friction work, run-in behaviour and wear as general ambient conditions can all affect the given values These factors should therefore be carefully assessed, and alignments made accordingly.

Please Observe!

- ❒ Mounting dimensions and connecting dimensions must be adjusted according to the size of the brake at the place of installation.
- ❒ The brakes are designed for a relative duty cycle of 100 %.
- ❒ For safe and fast brake release, overexcitation (double the nominal voltage) is necessary.
- ❒ The brakes are only designed for dry running.
  The torque is lost if the friction surfaces come into contact with oil, grease, water or similar substances.
- ❒ The braking torque is dependent on the present run-in condition of the brakes.
- ❒ Manufacturer-side corrosion protection of the metal surface is provided.

Protection Class I

This protection can only be guaranteed if the basic insulation is intact and if all conductive parts are connected to the PE conductor. Should the basic insulation fail, the contact voltage cannot function (VDE 0580).

Protection (mechanical) IP 10:

Protected against large body surfaces and against large foreign bodies > 50 mm diameter. Not waterproof.

Protection (electrical) IP 54:

Dust-proof and protected against contact as well as against splashing water from all directions.

Ambient Temperature –20 °C up to +40 °C

Warning!

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

Insulation Material Class F (+155 °C)

The magnetic coil and the casting compound are suitable for use up to a maximum operational temperature of +155 °C.

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Safety Regulations

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User-implemented Protective Measures:

- ❑ Please cover moving parts to protect against injury through seizure and catapulted objects.
- ❑ Place a cover on the magnetic part to protect against injury though high temperatures.
- ❑ Protect against electric shocks by installing a conductive connection between the magnetic component and the PE conductor on the permanent installation (Protection Class I) and by carrying out a standardised inspection of the continuous PE conductor connection to all contactable metal parts.
- ❑ Protect against highly inductive switch-off peaks by installing varistors, spark quenching units or similar devices according to VDE 0580/2000-07, Paragraph 4.6, to prevent damage to the coil insulations or switch contact consumption in extreme conditions (this protection is contained in *mayr*® rectifiers).
- ❑ Install additional protective measures against corrosion if the brake is subject to extreme ambient conditions or is installed in open air conditions, unprotected from the weather.
- ❑ Take precautions against freeze-up of the friction pads 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
98/37/EC	Machine directive
89/336/EEC	EMC directive
95/16/EC	Elevator directive
EN 81-1	Safety directives for the construction and installation of elevators and small goods elevators

Please Observe the Following Standards:

DIN EN ISO 12100-1 and 2	Machine safety
DIN EN61000-6-4	Noise emission
EN12016	Interference resistance (for elevators, escalators and moving walkways)
EN60204	Electrical machine equipment

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 malfunction will not be taken when
  - 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 Marks

The product conforms to the CE according to the low voltage directive 2006/95/EC.

Identification

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

Manufacturer

***mayr*®**

Name / Type

Article number

Serial number

TÜV (Technical Inspectorate) Licenses:

The installation sizes 200 up to 1800, equipped with a microswitch for release monitoring, are prototype-inspected by the Southern German Technical Inspectorate for their effect as a brake assembly on the drive sheave shaft and as part of the protective equipment against excessive upward-moving cage speeds.

Design	License number
Double brake	ABV 760/1
Single brake	ABV 761/1

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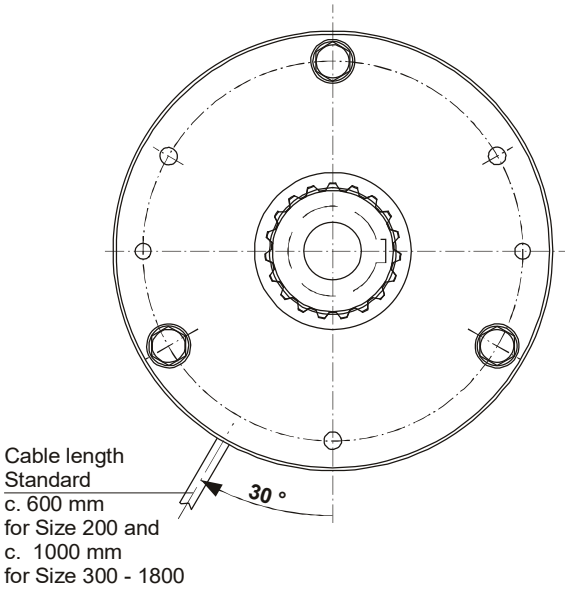

Fig. 1

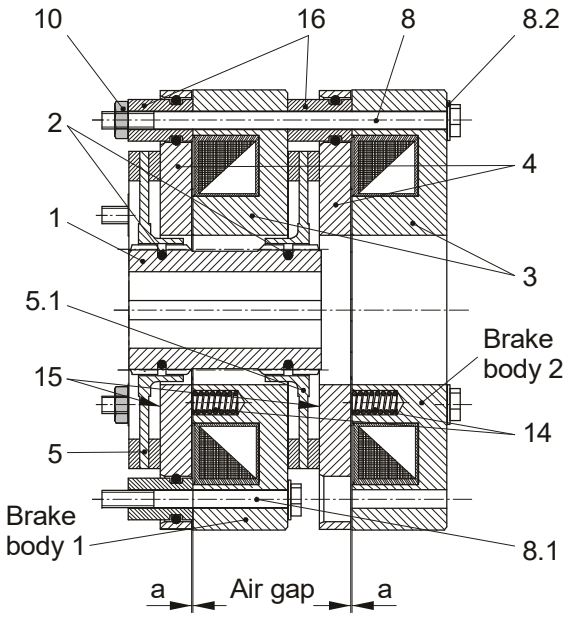

Fig. 2

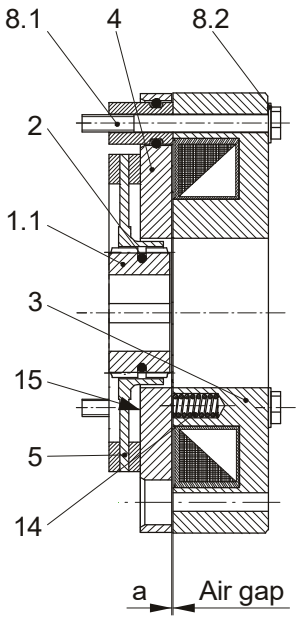

Fig. 3
(Single brake)

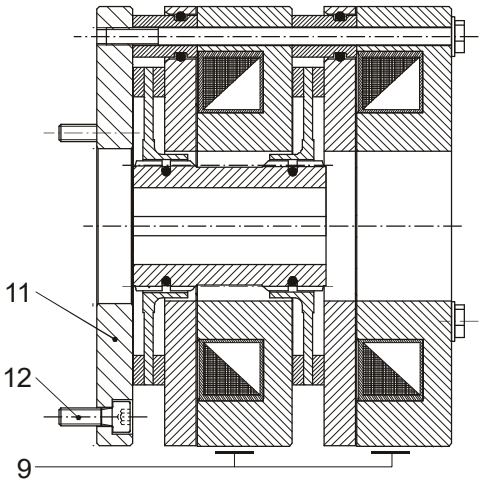

Fig. 4

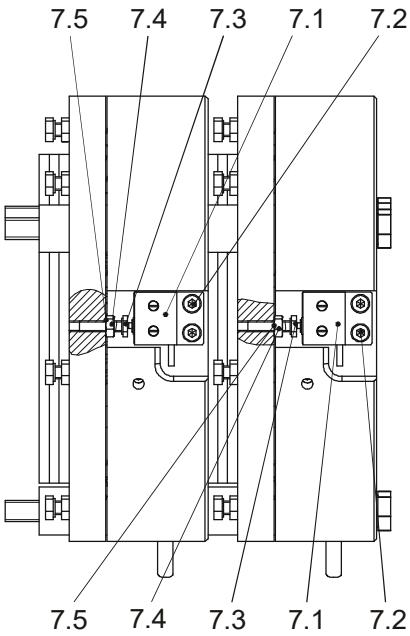

Fig. 5

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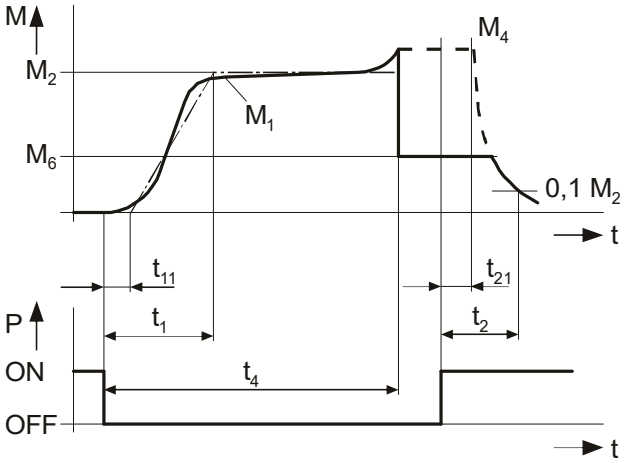
Parts List

(Only use mayr® original parts)

Item	Name
1	Hub assembly with 2 O-rings (2)
1.1*	Hub assembly with 1 O-ring (2)
2	O-ring
3	Coil carrier assemblies 1 and 2
4	Armature disks 1 and 2
5	Rotor 1
5.1	Rotor 2
7	Release monitoring assembly
7.1	Microswitch
7.2	Cap screw
7.3	Hexagon head screw
7.4	Hexagon nut
7.5	Spring washer
8	Hexagon head screw
8.1	Hexagon head screw
8.2	Washer
9	Type tag
10	Shipping brace
11	Flange plate
12	Cap screw
13	Noise damping
14	Thrust spring
15	Shoulder screw
16	Distance bolt

* Only for single brake design

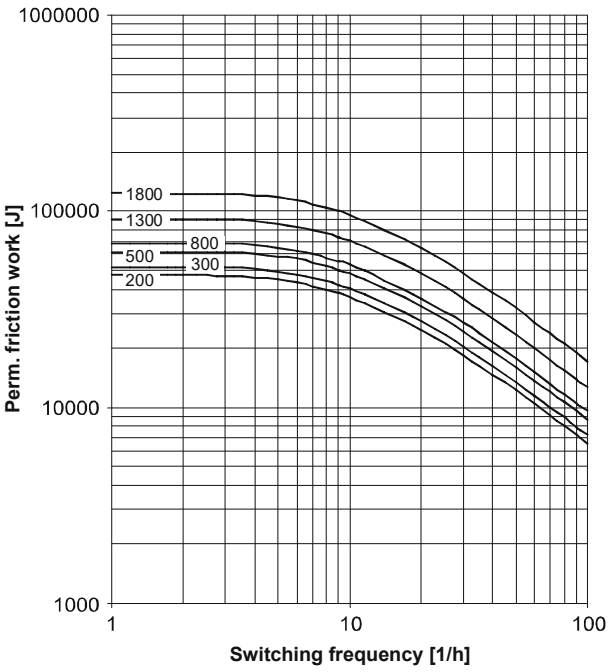
Torque-Time Diagram



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 = Total switch-on time + t_{11}

Friction-Power Diagram at n = 250 rpm



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Technical Data

Preferred voltages for operation with ROBA-switch:			
Nominal voltage:104 V	**Overexcitation voltage:**	207 V	**Using alternating voltage:**230 VAC
Nominal voltage:180 V	**Overexcitation voltage:**	360 V	**Using alternating voltage:**400 VAC
Nominal voltages: 24 V and 207 V available on request			
Protection (electrical)	IP54		
Protection (mechanical)	IP10		
Duty cycle:	100 %		
Connection:	2 x 0,88 mm²		
Ambient temperature:	-20 °C up to +40 °C		

Please Observe!
For safe and fast brake release, overexcitation (double the nominal voltage) is necessary.

Table 1: Technical Data (dependent on size)

Size	Braking torque (tolerance +60 %) Type 896._3_._ _	Max. speed [rpm]	Electrical nominal power at nominal voltage / overexcitation [W]	Mass [kg]	Switching times for Type 896._3_._ _ Separation time t_2 with overexcitation [ms]	Connection time t_1 (AC) [ms]	Connection time t_1 (DC) [ms]
200	2 x 300	500	2 x 76 / 304	2 x 17	170	590	185
300	2 x 500	500	2 x 87 / 348	2 x 24	193	600	160
500	2 x 800	250	2 x 88 / 352	2 x 30	245	953	266
800	2 x 1200	250	2 x 103 / 412	2 x 46	280	1100	250
1300	2 x 1800	250	2 x 125 / 500	2 x 63	350	1300	250
1800	2 x 2300	250	2 x 138 / 552	2 x 79	480	1700	390

Guideline for Single Brakes
The ROBA-stop®-silenzio® brake is also available in single brake design. In this case, the individual values for braking torque, electrical nominal power and mass apply.

Table 2

Size	Rotor thickness new condition [mm]	Nominal air gap "a" per brake body [mm]	Maximum air gap * per brake body [mm]	Fixing screws with wrench opening and tightening torques Items 8 und 8.1	SW	[Nm]	Item 12	SW	[Nm]
200	13,9	0,5 +/-0,07	1,0	6 x M10	16	71	6 x M10	8	71
300	13,9	0,5 +/-0,07	1,0	6 x M12	18	123	6 x M12	10	123
500	16	0,5 +/-0,07	0,9	6 x M12	18	123	6 x M16	14	200
800	18	0,5 +/-0,07	0,8	6 x M16	24	250	6 x M16	14	300
1300	18	0,5 +/-0,07	0,9	8 x M16	24	250	8 x M16	14	300
1800	18	0,5 +/-0,07	0,9	8 x M16	24	300	8 x M20	17	470

* Once the maximum air gap has been reached, the rotors must be replaced.
However, the brake will become louder at an air gap > "a" +0,2 mm.

Danger!
For brakes with overexcitation, the braking function cannot be guaranteed when air gap > maximum air gap.

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State of Delivery

Please check the state of delivery immediately!
mayr® will take no responsibility for belatedly returned goods.
Please report transport damage immediately to the deliverer.
Please report incomplete delivery and obvious defects to the manufacturer.

Application

As a holding brake with EMERGENCY OFF braking actions

- ❒ **in enclosed buildings (in tropical areas, in high humidity with long downtimes and in sea climates only to be used with special measures)**
- ❒ **in dry running**
- ❒ **installation position: horizontal and vertical**
- ❒ **in clean ambient conditions (larger particles of dust and liquids of any kind have a negative influence on the braking function, ⇒ cover the brake).**

Functional Description, Double Brake

The ROBA-stop®-silenzio® is designed as a double brake, in which two brake bodies working independently from one another provide high operational safety.
The braking torque in brake body 1 (3) is produced by the contact pressure of several thrust springs (14) via frictional locking between both rotor (5) friction linings, the armature disk 1 (4) and the flange plate (11) or the machine wall.
The braking torque in brake body 2 (3) is produced by the contact pressure of several thrust springs (14) via frictional locking between both rotor (5.1) friction linings, the armature disk 2 (4) and the coil carrier 1 (2).
The bake is released electromagnetically.

Installation Conditions

- ❑ The eccentricity of the shaft end in relation to the mounting pitch circle must not exceed 0,2 mm.
- ❑ The position tolerance of the threaded holes for the hexagon head screws (8 or 8.1) must not exceed 0,2 mm.
- ❑ The axial run-out deviation of the screw-on surface to the shaft must not exceed the permitted axial run-out tolerance of **0,05 mm** for Sizes 200 and 300 or **0,063 mm** for Sizes 500 up to 1800 according to DIN 42955 R.
  The related diameter is the pitch circle diameter for brake attachment.
  Larger deviations can lead to a drop in torque, to continuous slipping on the rotors and to overheating.
- ❑ The tolerances of the hub (1 or 1.1) and the shaft are to be chosen so that the hub (1 or 1.1) toothing is not widened. Toothing widening leads to the rotors (5 and 5.1) clamping on the hub (1 or 1.1) and therefore to brake malfunctions (recommended hub – shaft tolerance H7/k6).
  If the hub (1) is heated up in order to make joining easier, the O-rings must be removed beforehand. They must be replaced after hub installation.
  The max. joining temperature of 200 ℃ must not be exceeded.
- ❑ The O-rings on the hub (1 or 1.1) must be lightly greased.
- ❑ The rotors (5 und 5.1) and brake surfaces must be oil and grease-free. A suitable counter friction surface (steel or cast iron) must be used. Sharp-edged interruptions on the friction surface are to be avoided.
  Recommended surface quality in the friction surface area: Ra = 1,6 µm.
  In particular customer-side mounting surfaces made of grey cast iron are to be rubbed down with fine sandpaper (grain ~ 400).
- ❑ Please abstain from using cleaning agents containing solvents, as they could affect the friction material.
- ❑ During longer downtimes, we recommend the use of suitable corrosion protection measures for the mounting surface (e.g. zinc-phosphate coating) until initial operation.

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Installation (Figs. 1, 2 and 4)

1. Remove the flange plate (11 / dependent on Type) from the brake or remove the shipping brace (Item 10, only up to Size 500) from the hexagon head screws (8).
2. If necessary, mount the flange plate (11) onto the mounting surface using the cap screws (12) (Please observe the tightening torque acc. Table 2).
3. Mount the hub assembly with the O-rings (Item 1 / **O-rings must be lightly greased**) onto the shaft, bring it into the correct position (the length of the key should lie over the entire hub) and secure it axially (e. g. using a locking ring).
4. Push rotor 1 (5) by hand using light pressure over both O-rings (2) onto the hub (1) (The rotor collar should face away from the machine wall or the flange plate).
   Please make sure that the toothing runs smoothly.
   Do not damage the O-rings.
5. Insert 3 hexagon head screws (8.1 / 4 pieces for Sizes 1300 and 1800) evenly distributed in brake body 1 and tighten them evenly all around **with a torque wrench to tightening torque (acc. Table 2)**.
6. Push rotor 2 (5.1) by hand using light pressure over an O-ring (2) onto the hub (1), so that the friction lining of rotor 2 (5.1) lies against brake body 1
   (The rotor collar should face away from the machine wall or the flange plate).
   Please make sure that the toothing runs smoothly.
   Do not damage the O-rings.
7. Insert the hexagon head screws (8) **into the bores in brake body 2, which are equipped with distance bolts (16),** then join with brake body 1 (see Fig. 2) and screw onto the machine wall or flange plate.
   Tighten the hexagon head screws (8) evenly all around **with a torque wrench to tightening torque (acc. Table 2)**.
8. **Check air gaps "a" acc. Table 2.**
   The nominal air gap must be given.

Brake Inspection (Before initial operation of the brake)

- **Braking torque inspection:**
  Please compare the requested braking torque with the torque stated on the Type tag.
- **Please carry out a release inspection:**
  by energising the brake.
- **Please carry out a functional inspection of the release monitoring:**
  see page 12 (dependent on Type).

Dual Circuit Brake Functional Inspection on a Double Brake

The ROBA-stop®-silenzio® brake is equipped with a double safety (redundant) brake system.
This means that, should one brake circuit fail, the braking torque is maintained.

Danger!
Should the elevator begin to move after releasing one brake circuit or should it fail to slow down during the braking procedure, the energised coil must be switched off immediately.
The dual circuit function is not guaranteed.
Stop the elevator and disassemble and check the brake.

The inspection of the individual circuits is carried out by energising the individual circuits with nominal voltage, see Type tag (9).

Inspection brake circuit 1:

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

Inspection brake circuit 2:

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

Inspection both brake circuits:

1. Energise both brake circuits with nominal voltage, see Type tag (9).
2. Trigger an EMERGENCY STOP braking action and inspect the stopping distance according to the elevator regulations.
3. The stopping distance must be much shorter than the stopping distance / individual circuit.

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Deviations on Single Brake Design:

Please Observe!
The ROBA-stop®-silenzio® brake is also available in single brake design.
In this case, the individual values for nominal braking torque, electrical nominal power and weight apply.

Danger!
Single brakes do not comply with the requirements of the standards EN81-1 and BGV C1 (formerly VGB 70), DIN 56925 and DIN 56921-11 for the installation in elevators and theatre stage technical systems.

➢ Deviant Parts

Item 1.1: Hub for single brake (instead of Item 1)

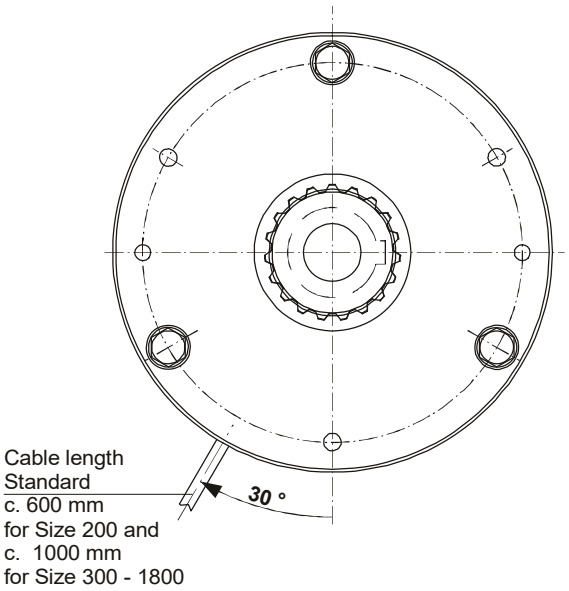

Fig. 6

➢ Functional Description Single Brake

The braking torque in brake body 1 (3) is produced by the contact pressure of several thrust springs (14) via frictional locking between both rotor (5) friction linings, the armature disk 1 (4) and the flange plate (11) or the machine wall.

Single Brake Installation (Figs. 6, 7 and 8)

1. Remove the flange plate (11 / dependent on Type).
2. If necessary, mount the flange plate (11) using the cap screws (12)
   (Please observe the tightening torque acc. Table 2).
3. Mount the hub assembly with the O-ring (Item 1.1 / **O-ring must be lightly greased**) onto the shaft and bring it in the correct position.
   Please make sure that the length of the key lies over the entire hub and secure it axially (e. g. using a locking ring).
4. Push the rotor (5) by hand using light pressure over the O-ring (2) onto the hub (1.1).
   (The rotor collar should face away from the machine wall or the flange plate (11)).
   Please make sure that the toothing runs smoothly.
   Do not damage the O-ring.
5. Push brake body 1 over the hub (1.1) and the rotor collar of rotor 1 (5) (the fixing holes and the threaded holes in the flange plate (11) or the machine wall must align).
6. Insert the hexagon head screws (8.1) in brake body 1 and screw onto the machine wall or flange plate (11).
   Tighten the hexagon head screws (8.1) evenly all around **with a torque wrench and a tightening torque (acc. Table 2**.
7. **Check the air gap "a" acc. Table 2.**
   The nominal air gap must be given.

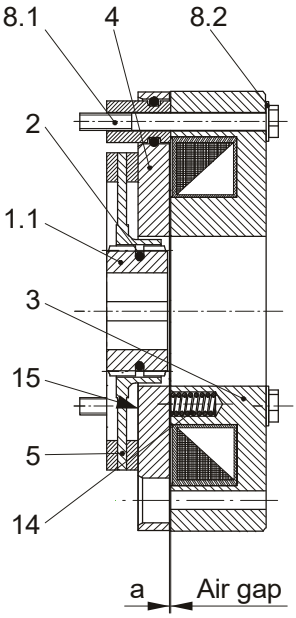

Fig. 7

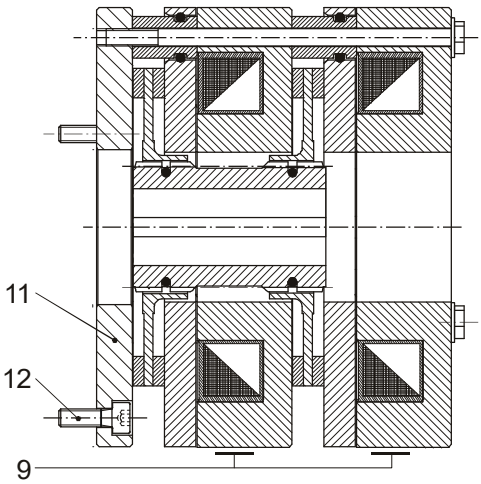

Fig. 8

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Electrical Connection and Wiring

Danger!
The brake must be operated with overexcitation.

DC current is necessary for the operation of the brake. The coil voltage is indicated on the Type tag as well as on the brake body and is designed according to the DIN IEC 60038 (± 10 % tolerance). The brake must only be operated with overexcitation (e.g. with ROBA®-switch or -multiswitch fast acting rectifier and phase demodulator). 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.

Earthing Connection

The brake is designed for Protection Class I. This protection covers not only the basis insulation but also the connection of all conductive parts to the PE conductor on the fixed installation. If the basis 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 safe 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

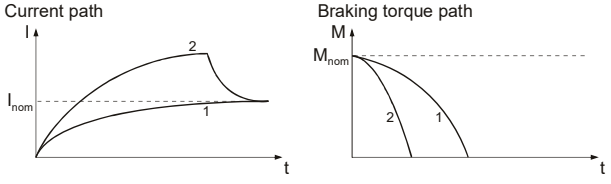
When the voltage is switched on, a magnetic field is built up in the brake coil, which attracts the armature disk to the coil carrier and releases the brake.

- **Field Build-up with Normal Excitation**

If we energise the magnetic coil with nominal voltage, the coil voltage does not immediately reach its nominal value. The coil inductivity causes the current to rise slowly as an exponential function. Accordingly, the build-up of the magnetic field happens more slowly and the braking torque drop (curve 1) is also delayed.

- **Field Build-up with Overexcitation**

A quicker drop in braking torque is achieved if the coil is temporarily placed under a higher voltage than the nominal voltage, as the current then increases more quickly. Once the brake is released, switch to the nominal voltage (curve 2). The ROBA®-(multi)switch fast acting rectifier and phase demodulator work on this principle.



Operation with overexcitation requires testing of:
- the necessary overexcitation time*
- as well as the RMS coil capacity** for a cycle frequency higher than 1 cycle per minute.

*** Overexcitation time t_{over}**

Increased wear and therefore an enlarged air gap as well as coil heat lengthen the brake separation time t_2. Therefore, as overexcitation time t_{over}, please select at least double the separation time t_2 with nominal power on each brake size.

**** RMS coil capacity P_{RMS}**

$P_{RMS} \leq P_{nom}$
Coil capacity P_{RMS} must not be larger than P_{nom}, as otherwise the coil may fail due to thermic overload.

Calculations:

P_{RMS} [W] RMS coil capacity, dependent on switching frequency, overexcitation, power reduction and switch-on time duration

$$P_{RMS} = \frac{P_{over} \times t_{over} + P_{hold} \times t_{hold}}{t_{tot}}$$

P_{nom} [W] Coil nominal capacity (catalogue values, Type tag)

P_{over} [W] Coil capacity on overexcitation

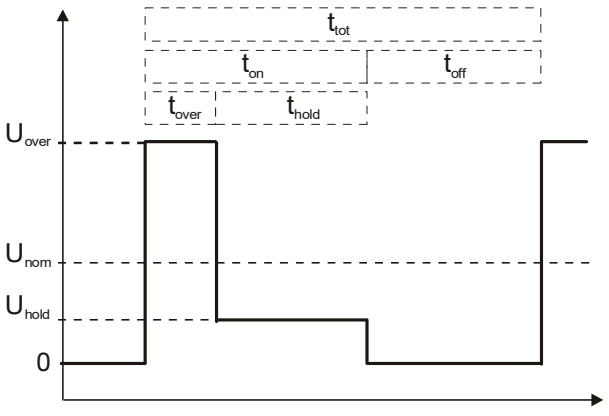
$$P_{over} = \left(\frac{U_{over}}{U_{nom}}\right)^2 \times P_{nom}$$

P_{hold} [W] Coil capacity on power reduction

$$P_{hold} = \left(\frac{U_{hold}}{U_{nom}}\right)^2 \times P_{nom}$$

t_{over} [s] Overexcitation time
t_{hold} [s] Time of operation with power reduction
t_{off} [s] Time without voltage
t_{tot} [s] Total time (t_{over} + t_{hold} + t_{off})
U_{over} [V] Overexcitation voltage (bridge voltage)
U_{hold} [V] Holding voltage (half-wave voltage)
U_{nom} [V] Coil nominal voltage

Time Diagram



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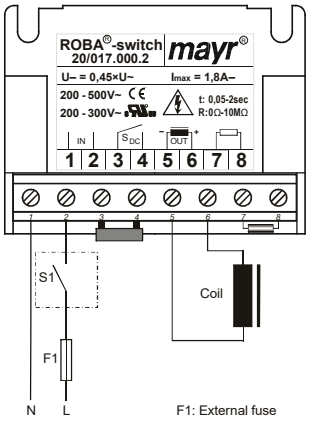
Magnetic Field Removal

- **AC-side Switching**

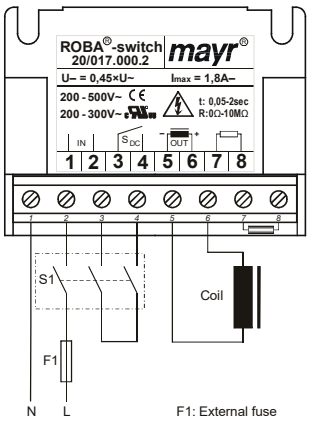


The power circuit is interrupted before the rectifier. The magnetic field slowly reduces. This delays the rise in braking torque.

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 switch-off). Use for non-critical braking times.

- **DC-side Switching**



The power circuit is interrupted between the rectifier and the coil as well as mains-side. The magnetic field is removed very quickly, resulting in a rapid rise in braking torque.

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

DC-side switching means **short brake engagement times (e.g. for EMERGENCY STOP operation)**. However, this produces 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 may be 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 rectifier), although this may of course then alter the switching times).

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Installation and Operational Instructions for ROBA-stop®-silenzio® Type 896._3_._ _ Sizes 200 – 1800

(B.8.7.2.GB)

Release Monitoring

The **ROBA-stop®-silenzio®** brakes are (dependent on Type) delivered with a manufacturer-side set release monitoring.
One microswitch (Item 7.1) per brake circuit emits a signal every time the brake condition changes:
"Brake open" or "Brake closed"

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

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

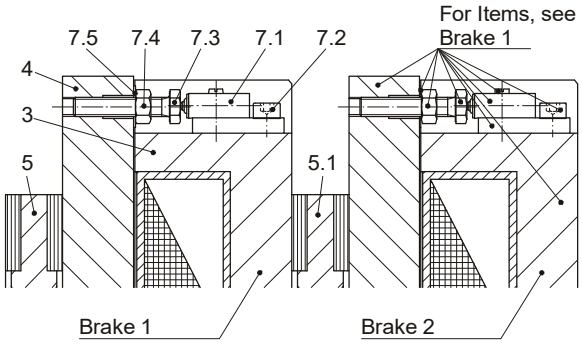

Fig. 9

Function!

When the magnetic coil in the coil carrier (3) is energised, the armature disk (4) is attracted to the coil carrier (3).
A microswitch (7.1) emits a signal that the brake is released.

Wiring Diagram per Microswitch (7.1):

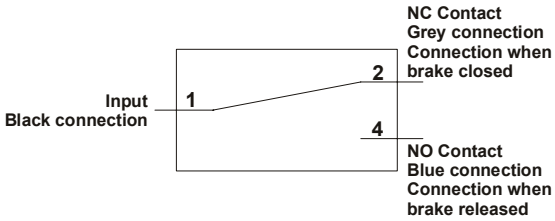

Table 2: Switching Capacities

AC-side Switching		DC-side Switching	
Voltage [VAC]	Resistance load [A/R_{Load}]	Voltage [VDC]	Resistance load [A/R_{Load}]
125	5	Up to 30	5
250	5	125	0,5
-	-	250	0,25

Minimum switching capacity: 0,12 VA (> 12 V, > 10 mA)
Contact material: Silver

Installation and Adjustment (manufacturer-side Fig. 9)

Please Observe!
The brake must be screwed onto the installation device to tightening torque acc. Table 2, and the coil must not be energised.

1. Join the hexagon head screw (7.3) with the hexagon nut (7.4) and the spring washer (7.5). Paint the thread circumference with LOCTITE 243 and screw it into the armature disk (4).
2. Screw the microswitch assembly (7.1) onto the pre-assembled brake bodies 1 and 2 using cap screws (7.2) (secure with LOCTITE 243).

Switch Adjustment

3. Turn the hexagon head screw (7.3) in the direction of the switch (7.1) up to the contact on the microswitch tappet.
4. Connect an inspection or measuring device (diode inspection) to the NO contact black/blue.
5. Insert a feeler gauge 0,1 mm (loose sensor plate) between the switch tappet (7.1) and the hexagon head screw (7.3).
6. Turn the hexagon head screw (7.3) in the direction of the switch (7.1) until the **signal "ON"**, then turn it back until the **signal "OFF"**, then counter the hexagon head screw (7.3) with the hexagon nut (7.4).
7. Energise the brake ➔ **Signal "ON"**
   De-energise the brake ➔ **Signal "OFF"**.
   If necessary, readjust and repeat the inspection (synchronise 3 to 5 times).
8. Inspection with feeler gauge 0,15 mm
   Brake energised ➔ **Signal "ON"**,
   Brake de-energised ➔ **Signal "OFF"**
9. Inspection with feeler gauge 0,10 mm
   Brake energised ➔ **Signal "EIN"**,
   Brake de-energised ➔ **Signal "OFF"**
10. Join the feeler gauge 0,3 mm between the armature disk (4) and the coil carrier (3) in the switch (7.1) area.
    Energise the brake, the **signal must be "ON"**.
11. Paint Items 7.4 und 7.2 with securing lacquer.

Customer-side Inspection after Installation

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

Please Observe!
Microswitches cannot be guaranteed fail-safe. Therefore, please ensure an opening for replacement or adjustment.

Please Observe!
The switching contacts are designed so that they can be used for both small switching capacities and medium ones.
However, after switching a medium switching capacity, small switching capacities are no longer reliably possible.
In order to switch inductive, capacitative and non-linear loads, please use the appropriate protective circuits to protect against electric arcs and unpermitted loads!

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Maintenance

ROBA-stop®-silenzio® brakes are mainly maintenance-free. The friction linings are robust and wear-resistant. This ensures a particularly long service lifetime.
However, the friction lining is subject to functional wear when EMERGENCY STOP braking actions are carried out. Therefore, please carry out the following inspections at regular intervals:

- Braking torque inspection or delay inspection (individual brake circuits) (min. 1 x per year)
- Braked air gaps "a" inspection (min. 1 x per year)

The wear condition of rotors 1 (5) and 2 (5.1) is inspected by measuring the air gaps "a" (Fig. 2 and Table 2).
Once the maximum air gap has been reached, the rotors must be replaced (Table 2).

Before replacing the rotors (Items 5 and 5.1):

❒ Clean the brake, remove abraded particles (provide an industrial vacuum cleaner / wear a dust mask)
❒ Measure the rotor thickness (new condition), the rotor thickness acc. Table 2 must be given

Replacing the rotors (Items 5 and 5.1)

Replace the rotors by following the instructions for brake installation backwards.

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

Disposal

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

Electronic components
(Rectifier / ROBA®-switch / Microswitch):

Products which have not been dismantled can be disposed of under the Code No. 160214 (Mixed Materials) or Components under Code No. 160216; or the objects can be disposed of by a certified waste disposal firm.

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

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

Brake rotors (steel or aluminium pads with friction linings):
Brake linings (Code No. 160112)

Seals, O-rings, V-seals, elastomers:
Plastics (Code No. 160119)

Malfunctions / Breakdowns:

Malfunction	Possible Causes	Solution
Brake does not release	❑ Incorrect voltage on the rectifier ❑ Air gap too large (rotors worn) ❑ Coil interrupted	❑ Apply the correct voltage ❑ Replace the rotors ❑ Replace the brake
Brake engagement delay on EMERGENCY STOP	❑ Brake is switched AC-side	❑ Switch DC-side

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