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

(B.8.7.2.GB)

Please read and observe this Operating Instruction carefully!
A possible malfunction or failure of the clutch and damage may be caused by not observing it.

Table of contents:

Manufacturer declaration

The product is to be seen as an option or component for installation into machines or equipment according to the machinery directive 98/37 EC. The machinery (product) must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the applicable EC-directives.

The product corresponds to the low voltage directives 73/23/EEC.

The product corresponds to the elevator guideline 95/16/EC.

The observance of the relevant EMV-guideline 89/336/EEC is to be guaranteed.

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(B.8.7.2.GB)

Safety Regulations

With this safety regulations no claim on completeness is raised!

Attention!
Hazardous conditions when contacting hot connections and components.

Only qualified and well-trained specialists should work on the units to avoid any personal injury or damage to machinery.

Danger!

If the electromagnetic brake is used in an improper way.

If the electromagnetic brake has been modified or reconverted.

If the relevant standards of the safety or installation conditions are not observed.

Attention!
The installation and operating instructions must be read carefully and all safety regulations observed before installation and initial operation as danger to personnel and damage to machinery may be caused.
The electromagnetic brakes are developed and manufactured in conformance with the temporally known rules of the technology and they are basically considered as fail-safe at the time of the delivery.

Attention:

Based on the guideline 94/9/EC (ATEX-guideline) this product is not suitable for the application in potential explosive areas without evaluation of the conformity.

Observe!

- ❒ Only qualified and well trained specialists who are familiar with the transport, installation, initial start-up, maintenance and operation of the units as well as with the relevant standards may carry out the corresponding works.
- ❒ Technical data and indications (Type tag and documentation) are to be kept absolutely.
- ❒ Correct supply connection according to Type tag.
- ❒ Supply connections must not be released and assembly, maintenance or repair must not be made when the unit is energized.
- ❒ Electrical leads must not be under tension when connected.
- ❒ Check current carrying components regarding damage before installation. Current carrying components must not be in contact with water.
- ❒ The braking torque does not exist any more, if the friction lining and friction surface come into contact with oil or grease.

Intended use

mayr®-brakes are determined for the use in machines and equipment and may only be used for the ordered and confirmed purpose.

The use beyond of the corresponding technical indications is considered as incorrect.

Notes to the electromagnetic compatibility (EMC)

There are no emissions from the listed single components within the meaning of the EMC-directive 89/336/EEC, however, increased interference levels can occur when working components are operated outside their specification limits as for example, energising the brake with rectifiers, phase demodulators or ROBA®-switch in the line side. Therefore, the installation and operating instructions must be read carefully the EMC-directives are to be observed.

Conditions of the unit

The catalogue values are reference values, which can deviate in some cases. When selecting the brake, site of installation, braking fluctuations, permissible friction work, behaviour during run-in, wear and ambient conditions are to be carefully checked and agreed with the unit manufacturer.

Observe!

- ❒ The mounting and connecting dimensions at the site of installation must match to the size of the brake.
- ❒ The brakes are designed for a relative switch on period of 100 %.
- ❒ For a safe and fast release of the brake overexcitation (double the nominal voltage) is necessary with sizes 200 to 800.
  For the sizes 1300 and 1800 overexcitation is recommended.
- ❒ The brakes are designed for a dry running only.
  Should oil, grease, water or similar materials come in contact with the friction surfaces the braking torque could be reduced.
- ❒ The braking torque depends on the corresponding running-in condition of the brake.
- ❒ The metallic surface of the brake is protected against corrosion arranged by the factory.

Protection class I

The protection is not only based on the basis isolation, but that all conductive components must be connected with the protective conductor (PE) of the fixed installation. In case the basis isolation fails, no contact voltage can remain existing (VDE 0580).

Protection (mechanical) IP 10:

Protection against large body surfaces, against large foreign bodies > 50 mm diameter. No water protection.

Protection (electrical) IP 54:

Dust-tight and protection against contact as well protection against splashing water from all directions.

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

Attention!

The torque could be severely reduced in case of temperatures over or under the freezing point due to dewing. The user must provide corresponding counter measures.

Thermal class F (+155 °C)

The magnetic coil as well as the casting compound is designed for a max. operating temperature of +155 °C.

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Safety Regulations

With these safety regulations no claim on completeness is raised!

Necessary protective measures to be undertaken by the user:

Cover all moving parts to prevent personnel injury as squeezing and seizing and centrifuging out.
Cover dangerously hot magnetic parts to prevent contact.
Attach a conductive connection between magnetic part and electrical conductor (PE) of the fixed installation (protection class I) to prevent electrical shock and inspection conforming to standards of the unified protective connection to all contactable metallic components.
Protection against high inductive cut-off peaks according to VDE 0580/2000-07, par. 4.6 by fitting varistors, spark quenching units or similar, in order to prevent damage of coil insulations or the burn-off of the switching contact (this protection is included in *mayr*®-rectifiers).
Provide additional necessary safety measures against corrosion of the brake, if they are used in extreme ambient conditions or in the open with direct atmospheric influences. Measures against freezing from armature disc and rotor with high humidity and deep temperatures.

Following directives, standards and guidelines have been used:

98/37/EC	Machinery directive
73/23/EEC	Low-voltage directive
89/336/EEC	EMC-directive
EN 81-1	Safety regulations for the design and installation of elevators and small goods elevators
BGV C1	(so far VGB 70) safety regulations for theatre and stage applications
DIN VDE 0580	Electromagnetic units and components, general regulations

Following standards are to be observed:

DIN EN ISO 12100-1 and 2	Security of machines
DIN EN61000-6-4	Interference emission
EN12016	Interference resistance (for elevators, escalators and moving sidewalks)
EN60204	Electrical equipment of machines

Liability

- The information, notes and technical data indicated in the documentation were at the time of printing on the latest state.
  Claims on brakes already supplied cannot be made valid from it.
- Liability for damages and breakdowns is not taken over, with
  - ignoring the installation and operating instructions,
  - improper use of the brakes,
  - arbitrary modification of the brakes,
  - inappropriate working at the brakes,
  - handling or operating errors.

Guarantee

- The warranty conditions correspond to the sales and supply conditions of Chr. Mayr GmbH + Co. KG.
- Defects are to be advised immediately after detection to *mayr*®.

Test mark

CE corresponding to the low voltage directive 73/23/EEC.

Marking

mayr®-components are clearly identified by means of the content of the Type tags.

Manufacturer

***mayr*®**

Designation/Type

Article No.

Series number

TÜV-Approvals:

The sizes 200 up to 1800, with micro switch for release monitoring, are tested for type examination with the TÜV South Germany as braking equipment acting on the drive sheave shaft and as part of the protective device for the lift cage driving upward against overspeed.

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

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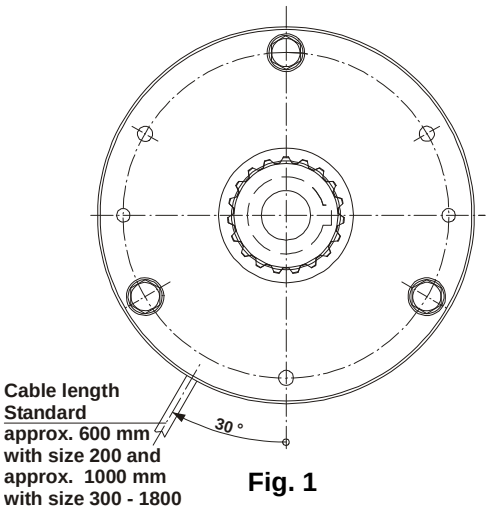

Fig. 1

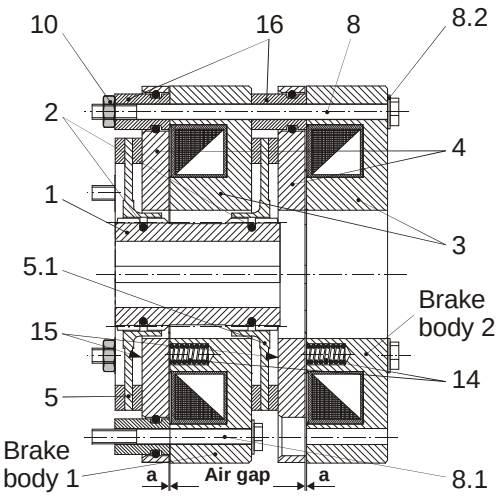

Fig. 2

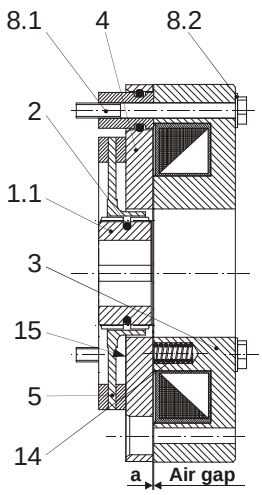

Fig. 3
(Single brake)

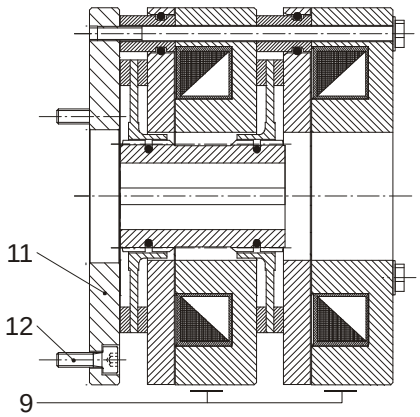

Fig. 4

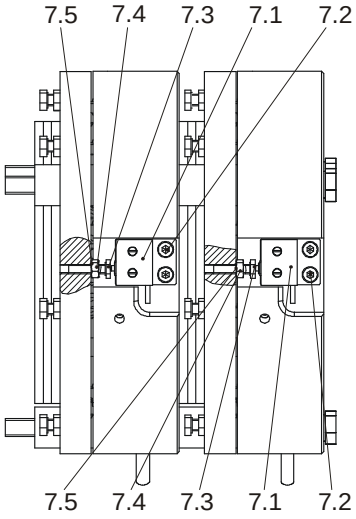

Fig. 5

Parts List *(Only mayr® original parts are to be used)*

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

***** Only with the design as single brake

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Warning and Attention symbols

Caution!
Possible danger of injury to persons and damages to the machine.

Attention!
Important points to be observed.

Technical data

For a safe and fast release of the brake overexcitation (double the nominal voltage) is necessary with sizes 200 to 800. For the sizes 1300 and 1800 overexcitation is recommended.

Preferred voltages for an operation with ROBA®-switch:

Nominal voltage:	104 V	**Overexcitation voltage:**	207 V	**with alternating voltage:**	230 VAC
Nominal voltage:	180 V	**Overexcitation voltage:**	360 V	**with alternating voltage:**	400 VAC

Nominal voltages: 24 V and 207 V on request

Protection (electrical) IP54

Protection (mechanical) IP10

Duty ratio: 100 %

Connection: 2 x 0,88 mm²

Ambient temperature: -20 °C up to +40 °C

Table 1: Technical data (size-dependently)

Size	Braking torque (toler. +60 %) Type 896._3_._ _	Max. speed [rpm]	electric rated power with nominal voltage / overexcitation [W]	Mass [kg]	Switching times with Type 896._3_._ _		
					Pick up t_2 with overexcitation [ms]	Drop t_1 (AC) [ms]	Drop 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

Notes for single brakes

The ROBA-stop®-silenzio® brake is also available as single brake. In this case the single values for braking torque, electrical rated power and mass are valid.

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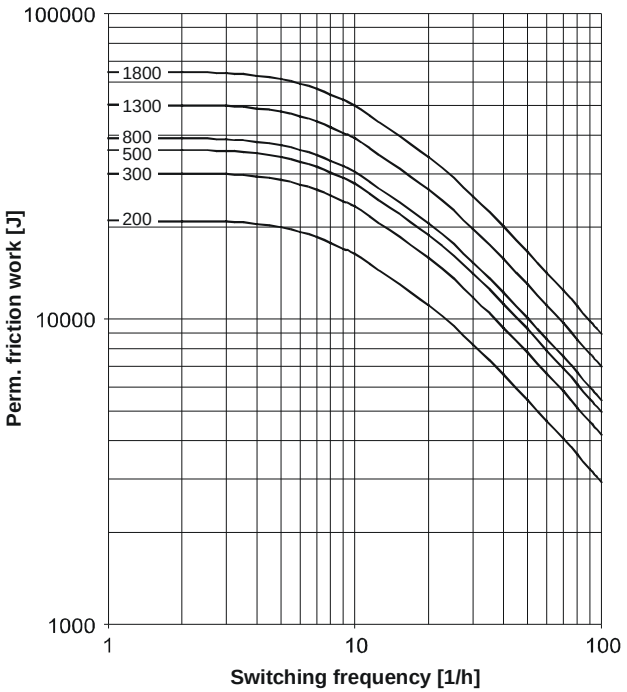
Friction power diagram with n = 250 rpm



Scope of delivery / Delivery condition

The scope of supply or the delivery condition must immediately be checked after receipt of the shipment.
mayr® does not overtake any guarantee for faults complained subsequently.

Transportation damages must immediately be advised to the forwarder.
Recognizable faults / incompleteness of the shipment must immediately be advised to the manufacturing company

Application

As a holding brake with emergency-stop

- ❒ **In enclosed buildings (in tropical area, with high air humidity with long downtimes and sea climate only with special measurements).**
- ❒ **In a dry running environment.**
- ❒ **Horizontal and vertical mounting positions.**
- ❒ **In a clean environment (coarse dust as well as liquids of all kinds impair the brake function, ⇒ fit a cover).**

Functional description double brake

The ROBA-stop®-silenzio® is designed as double brake in which two independently working brake bodies provide for high operational reliability.
The braking torque in the brake body 1 (3) is generated by the applied force of several thrust springs (14) by means of a frictional locking between both friction linings of the rotor (5), the armature disc 1 (4) and the flange plate (11) or machine wall.
The braking torque in the brake body 2 (3) is generated by the applied force of several thrust springs (14) by means of a frictional locking between both friction linings of the rotor (5.1), the armature disc 2 (4) and the coil carrier 1 (2).
The brake is electromechanically released.

Assembly conditions

- ❒ The eccentricity of the shaft end relative to the fixing hole P.C.D. must not exceed 0,2 mm.
- ❒ The positioning tolerance of the threads for the hexagon head cap screws (8 or 8.1) must not exceed 0,2 mm.
- ❑ The deviation in the true running of the screw-on surface to the shaft must not exceed the permissible true running tolerance acc. to DIN 42955 R of **0,05 mm** with sizes 200 and 300, or **0,063 mm** with sizes 500 to 1800.
  Reference diameter is the pitch circle diameter for brake attachment.
  Larger deviations can cause a drop of the torque, continuous wear of the rotor and overheating.
- ❑ The hub (1 or 1.1) and shaft fits are to be selected to avoid any distortion of the hub splines (1 or 1.1). It can clamp the rotors (5 and 5.1) on the hub (1 or 1.1) impairing the brake function, (recommended hub-shaft fit H7/k6).
  If the hub (1) is heated up for a better joining, the O-rings must be removed before and drawn up again after hub assembly.
  The max. joining temperature of 200 °C must not be exceeded.
- ❑ The O-rings at the hub (1 or 1.1) must be slightly greased.
- ❑ Rotors (5 and 5.1) and braking surfaces must be free of oil and grease. There has to be a suitable counter friction face (steel or cast iron). Sharp-edged interruptions of the friction face must be avoided.
  Recommended surface quality of the friction surface Ra = 1,6 µm.

  Especially mounting areas made of cast iron arranged by the customer are additionally to be drawn off with a fine abrasive paper (granulation ≈ 400).

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Table 2

Size	Rotor thickness new condition [mm]	Nominal air gap "a" for each body [mm]	Max. air gap * for each body [mm]	Fixing screws with spanner gaps and tightening torques					
				Pos. 8 and 8.1	SW	[Nm]	Pos. 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

***** The rotors must be exchanged when the maximum air gap is achieved. However the brake is already getting louder with an air gap > "a" +0,2 mm.

Attention!
The braking function is not guaranteed any more with an air gap > max. air gap for an operation with overexcitation.

Assembly (Figs. 1, 2 and 4)

1. Disassemble the flange plate (11 / type dependently) or remove the shipping braces (pos. 10 only up to size 500) from the hexagon head cap screws (8).
2. If necessary, assemble flange plate (11) using cap screws (12) at the mounting surface (observe tightening torque according to Table 2).
3. Assemble hub (assembly) with O-rings **(pos, 1 / O-rings must slightly be greased)** onto the shaft and bring it to the correct position (supporting length of the keyway over the complete hub and lock it axially (e.g. with a retaining ring).
4. Push rotor 1 (5) manually with a gentle pressure over both O-rings (2) onto the gear hub (1)
   (rotor collar pointing away from the machine wall or flange plate).
   Ensure that the splines slide easily.
   No damage to the O-ring.
5. Insert 3 hexagon head screws (8.1 / with sizes 1300 and 1800 4 pcs) uniformly distributed into the brake body 1 and uniformly tighten them all around **with a torque wrench and tightening torque (according to Table 2)**.
6. Push rotor 2 (5.1) manually with a gentle pressure over a O-ring (2) onto the hub (1) so that the friction lining from rotor 2 (5.1) contacts the brake body 1.
   (Rotor collar pointing to the machine wall or flange plate).
   Ensure that the splines slide easily.
   No damage to the O-ring.
7. Put hexagon head cap screws (8)
   into the bores in the brake body 2, which are provided with distance bolts (16),
   afterwards joint it with brake body 1 (see Fig. 2) and screw them at the machine wall or flange plate.
   Uniformly tighten hexagon head cap screws (8) **with torque wrench and tightening torque (according to Table 2)** all around.
8. **Check air gap "a" according to Table 2.**
   Nominal air gap must be given.

Brake inspection **(Before initial start of the brake)**

- **Inspection of the braking torque:**
  compare ordered braking torque with the braking torque indicated on the type tag.
- **Release inspection:**
  by energising the brake or manually with hand release (type dependently).
- **Inspection of the hand release function:**
  see page 12 (type dependently).

Inspection dual circuit braking function with a double brake

The ROBA-stop®-silenzio® brake has a double safe (redundant) brake system. If one brake circuit fails the braking effect however maintains.

Attention!
Should the elevator move after release of one brake circuit or not decelerate sensibly during the braking process, the energised coil must be switched off immediately.
The dual circuit braking function is not guaranteed. Stop elevator, disassemble brake and check it.

The inspection of the single circuit is arranged by energizing the single circuit with nominal voltage see Type Tag (9).

Inspection brake circuit 1:

1. Energise brake circuit 2.
2. Release emergency braking and check stopping distance according to specifications for passenger lifts.
3. De-energise brake circuit 2.

Inspection brake circuit 2:

1. Energise brake circuit 1.
2. Release emergency braking and check stopping distance according to specifications for passenger lifts.
3. De-energise brake circuit 1.

Inspection of both brake circuits:

Energise both brake circuits with nominal voltage see Type tag (9).
Release emergency braking and check stopping distance according to specifications for passenger lifts.
The stopping distance must be essentially shorter than the stopping distance / single circuit.

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Differences in case of the design as single brake:

➢ Note

The ROBA-stop®-silenzio brake is also available as single brake.
In this case the individual values are valid for nominal braking torque, electrical nominal rating and mass.

Attention!
Single brakes do <u>not</u> fulfil the requirements of the standard EN81-1 as well as BGV C1 (so far VGB 70), DIN 56925 and DIN 56921-11 for installation in passenger lifts and theatre and stage applications.

➢ Deviating components

Position 1.1: hub for single brake (instead of position 1)

➢ Functional description single brake

The braking torque in the brake body 1 (3) is generated by the applied force of several thrust springs (14) by means of frictional locking between both friction linings of the rotor (5), armature disc 1 (4) and the flange plate (11) or machine wall.

Assembly (Figs. 1, 3 and 4)

1. Disassemble the flange plate (11/ type dependently).
2. If necessary, assemble flange plate (11) using cap screws (12) (observe tightening torque according to Table 2).
3. Assemble hub (assembly) with O-ring (pos. 1.1/ **O-ring must be slightly greased**) on the shaft and bring it to the correct position.
   <u>Observe the complete supporting length of the keyway over the complete hub</u> and secure it axially (e.g. with a locking ring).
4. Push rotor (5) manually with a gentle pressure over the O-ring (2) onto the gear hub (1.1)
   <u>(rotor collar pointing away from the machine wall or flange plate (11)).</u>
   Ensure that the splines slide easily.
   No damage to the O-ring.
5. Push brake body 1 over the hub (1.1) and rotor collar from the rotor 1 (5) (mounting holes are aligned to the tapped holes in the flange plate (11) or machine wall).
6. Put hexagon head screws (8.1) in brake body 1 and screw them at machine wall or flange plate (11).
   Uniformly tighten hexagon head screws (8.1) **with torque wrench and tightening torque (according to Table 2)** all around.
7. **Check air gap "a" according to Table 2.**
   Nominal air gap must be given.

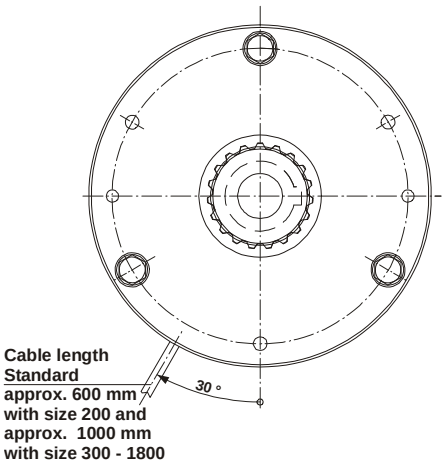

Fig. 1

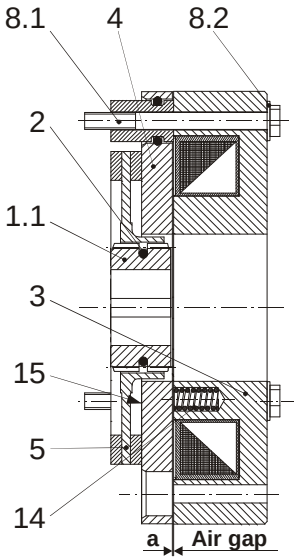

Fig. 3

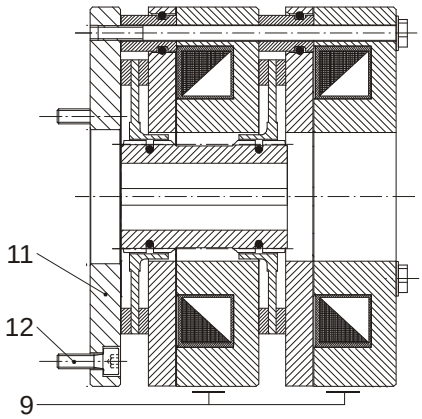

Fig. 4

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Electrical connection

DC current is necessary for the operation. The coil voltage is indicated on the Type tag and brake body and designed acc. to DIN IEC 60038 (± 10 % tolerance). It can be operated both via AC voltage in connection with a rectifier and with another suitable DC supply. Dependent on the brake design the wiring facilities can vary. The exact terminal assignment is to be taken from the connection diagram. The valid regulations and standards (e.g. DIN EN 60204-1 as well as DIN VDE 0580) are to be observed by the engineer and operator. Their observance must be guaranteed and examined.

Grounding

The brake is designed for protection class I. The protection is based thus not only on the basis insulation, but also on the connection of all conductive components with the protective earth (PE) of the fixed installation. During failure of the basis insulation thus no contact voltage can remain existing. An inspection conforming to standards of the connections of all accessible metal parts to PE is to be accomplished!

Fuse

The supply line is to be provided with appropriate fuses for the protection against damage due to short-circuits.

Switching behaviour

The operating performance of a brake depends on the used switching mode. Furthermore, the switching times are influenced by the temperature as well as the air gap between the armature disk and coil carrier (dependent on the wear condition of the linings).

Build-up of the magnetic field

When switching-on the voltage a magnetic field in the brake coil is built-up and the armature disk is attracted to the coil carrier; the brake is released.

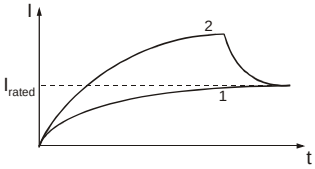
Field build-up with standard excitation

When rated voltage is applied to a brake coil using a half-wave or bridge rectifier, the coil current does not achieve its nominal value immediately. The inductivity of the coil effects that the current slowly rises in the form of an exponential function. The build-up of the magnetic field and, therefore, the brake torque also rises delayed (curve 1).

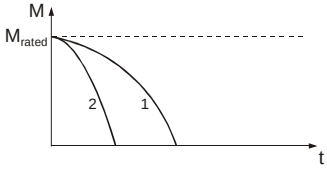
Field build-up with overexcitation

A fast drop of the brake torque can be achieved, if a higher voltage than the rated voltage is applied to the coil for a short time. Herewith the current rises faster. When the brake has released you can switch over to the rated voltage (curve 2). The interrelationship between overexcitation and switching time is approximately proportional up to 4 times the rated voltage, i.e. doubling the rated voltage, halves the switching time for releasing the brake. The effective output however, must not be bigger than the nominal power of the coil.
This principle is used by the ROBA®-switch fast acting rectifier and the phase demodulator and is specified for a safe operation of the brake.
For a safe and fast release of the brake overexcitation (double the nominal voltage) is necessary with sizes 200 to 800.
For the sizes 1300 and 1800 overexcitation is recommended.

Flow of the current

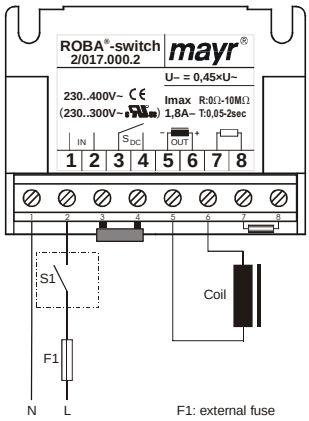


Brake torque diagram



Breakdown of the magnetic field

AC-side switching

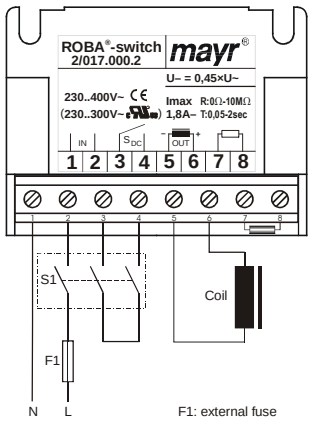


The circuit is interrupted before the rectifier. The magnetic field gets reduced slowly. This effects the brake torque slowly to rise.

An AC-side switching should be used if switching times are insignificant, as protective arrangements for coil and switching contacts are not required here.

Silent switching, however longer engaging time of the brake (approx. 6-10 times longer than switching-off on the DC-side), application with uncritical brake times.

DC-side switching



The circuit is interrupted between rectifier and coil as well as on the line side. The magnetic field gets reduced quickly. This effects the brake torque quickly to rise.

In case of DC-side switching high voltage spikes are generated in the coil. This causes a wear off of the switching contacts due to sparking and a damage of the insulation.

Short engaging time of the brake (e.g. for emergency stop operation), however, louder switching noises.

Protective wiring

In case of a DC-side switching the coil is to be protected by a suitable protective wiring according to VDE 0580, which is already integrated in *mayr*®-rectifiers. Additional protective arrangements may be necessary in case of DC-side switching for protection of the switching contact against loss of contact material (e.g. series connection of switching contacts). The used switching contacts should have a minimum open contact distance of 3 mm and be suitable for switching of inductive loads. Furthermore with the selection a sufficient rated voltage as well as sufficient rated operating current must be observed. Depending on the application the switching contact can also be protected by other protective wirings (e.g. *mayr*®-spark quenching), whereby the switching time can change however again.

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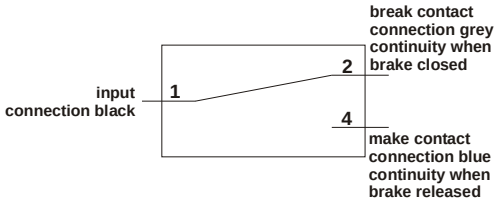
mayr® Antriebstechnik

Release monitoring (7) Fig. 6 (type dependently)

The **ROBA-stop®-silenzio®** brakes are supplied with factory set release monitoring units.
A micro switch each (pos. 7.1) per brake circuit gives signal for every change of the brake condition:
"brake released" or "brake closed".

An evaluation of the signal of both conditions must be made by the customer.
From the time on of energising the brake a period of three times the separation time must have passed, before the micro switch signal of the release monitoring is evaluated.

Wiring diagram per micro switch (7.1) each:



Function

When the magnetic coil is energised in the coil carrier (3) the armature disc (4) is attracted to the coil carrier (3), a micro switch (7.1) gives signal, the brake is released.

AC switch capacity		DC switch capacity	
Voltage [VAC]	**Resistance load [A/R load]**	**Voltage [VDC]**	**Resistance load [A/R Last]**
125	**5**	**up to 30**	**5**
		125	**0,5**
250	**5**	**250**	**0,25**

Minimum switch capacity: 0,12VA (> 12V, > 10mA)
Contact material: silver

Assembly and adjustment per brake circuit each (at the factory Fig. 6)

Attention!
The brake should be screwed onto the installation device, for tightening torque see Table 2. The coil should be de-energised.

1. Joint the hexagon head cap screw (7.3) with hexagon nut (7.4) and spring washer (7.5), put LOCTITE 243 at the beginning of the thread and screw them into the armature disc (4).
2. Screw the micro switch (7.1) with cap screws (7.2) to the pre-assembled brake bodies 1 and 2 (secure it with LOCTITE 243).

Switch adjustment

3. Turn hexagon head cap screw (7.3) towards the switch (7.1) until contact of the micro switch ram.
4. Connect test or measuring devices (diode inspection) at the make contact black/blue.
5. Joint feeler gauge 0,1 mm (loose feeler sheet) between switch ram (7.1) and hexagon head screw (7.3).
6. Turn hexagon head cap screw (7.3) towards the switch (7.1) until s**ignal "ON"**, return it until **signal "OFF"**, lock hexagon head cap screw (7.3) with hexagon nut (7.4).
7. Energise brake ➔ **signal "ON"**.
   De-energise brake ➔ **signal "OFF"**.
   If necessary, re-adjust it and repeat inspection.
8. Inspection with feeler gauge 0,15 mm
   Brake energised ➔ **signal "ON"**,
   Brake de-energised ➔ **signal "ON"**
9. Inspection with feeler gauge 0,10 mm
   Brake energised ➔ **signal "ON"**,
   Brake de-energised ➔ **signal "OFF"**
10. Joint feeler gauge 0,3 mm between armature disc (4) and coil carrier (3) in the range of the switches (7.1), energise brake, **signal must be "ON"**.
11. Provide positions 7.4 and 7.2 with securing lacquer.

Inspection after attachment

The connection at the customer is made as make contact.
The release monitoring are to be checked:
brake de-energised ➔ Signal "OFF",
brake energised ➔ Signal "ON"

Micro switches are not considered as fail safe, an appropriate access for the exchange or adjustment must be possible.

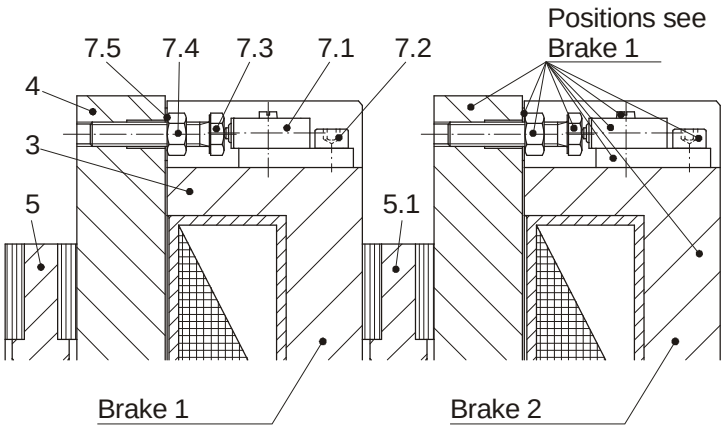


Fig. 6

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Maintenance

ROBA-stop®-silenzio® brakes are virtually maintenance free. The friction linings are robust and wear resistant ensuring a very long brake service life.
However, the friction lining are subject to wear as a result of emergency stops. Therefore, the following inspections must be carried out at regular intervals:

- Inspection of the braking torque or deceleration (Brake circuit individually) (min. once a year)
- Inspection of the air gap "a" braked (min. once a year)

The inspection of the wear on the rotors 1 (5) and 2 (5.1) is carried out by measuring the air gap "a" (Fig. 2 and Table 2). At the latest after achieving the maximum air gap the rotors are to be exchanged (Table 2).

Before replacing the rotors (pos. 5 and 5.1):

- ❒ Clean brake, remove abrasive dust. (provide exhaust, wear dust respirator)
- ❒ Measure rotor thickness (new), rotor thickness according to Table 2 must be available.

Rotor replacement (pos. 5 and 5.1)

When replacing the rotors the brake should be dismantled by reversing the assembly sequence.

Attention!
In case of hoisting drives the drive-brake must be free of any load, otherwise there is the danger of the load falling.

Disposal

Electronic components
(rectifier / micro switch):

The not disassembled products can be supplied to the material utilization according to EAK 150106 (mixed material) or via the household waste (code No. 200301) to the disposal.

The components of our Electromagnetic Brakes must separately be supplied to the utilisation due to the different material components. Additionally the legal instructions are to be observed. Code numbers can change with the kind of the separation (metal, plastic and cable).

Brake body made of steel with coil/cable and all other steel components:
Scrap (Code No. 160117)

Distance ring made of aluminium:
Non iron metal (Code No. 160118)

Brake rotor (steel or aluminium with friction lining):
Brake linings (Code No. 160112)

Seals, O-rings, V-Seal, Elastomere, Terminal boxes (PVC):
Plastic (Code No. 160119)

Breakdowns:

Failures	Possible reasons	Solution
Brake does not release	❑ False voltage measured at the rectifier	❑ Apply correct voltage
	❑ Air gap too big (rotor worn down)	❑ Replace rotor
	❑ Coil interrupted	❑ Replace brake
Brake engages with delay in case of Emergency stop.	❑ Brake is switched to AC switching side	❑ Switch to DC switching side

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