Installation and Operational Instructions for ROBA®-twinstop® Type 8012._ _ _ _ _ Sizes 150 / 200 / 250 / 350

(B.8012.EN)

Translation of the Original Operational Instructions

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:

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

Approvals

EU Type Examination Certificate
(Elevator Directive):

- EU-BD 845/3
  (EU-BD 845/2, EU-BD 845/1, EU-BD 845)

UK Type Examination Certificate
(Lifts Regulations):

- UK-BD 845/3

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Guidelines on EU Directives

Guidelines on the Declaration of Conformity
A conformity evaluation has been carried out for the product (electromagnetic safety brake) in terms of the EU Low Voltage Directive 2014/35/EU and the RoHS 2011/65/EU with 2015/863/EU. The Declaration of Conformity is laid out in writing in a separate document and can be requested if required.

Guidelines on the EMC Directive 2014/30/EU
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 Machinery 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 initial operation of the product until you have ensured that the machine accords with the regulations stated in the directive.

Guidelines on the EU Directive 2011/65/EU (RoHS II) with 2015/863/EU (RoHS III – from 22 July 2019)
These restrict the use of certain hazardous substances in electrical and electronic devices as well as in products / components (category 11), the proper operation of which is dependent on electric currents and electromagnetic fields.
Our electromagnetic products / components fulfill the requirements laid down in the RoHS Directive(s), taking into account the valid exceptions (according to Appendix III and IV RoHS (2011/65/EU) with delegated Directives (EU) 2018/739-741 from 01.03.2018 for Category 11 – until 21 July 2024) and comply with the RoHS.

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 2014/34/EU.

Guidelines on the REACH Regulation (EC) No. 1907/2006
of the European Parliament and of the Council concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). This regulation governs the manufacture, placing on the market and use of chemical substances in preparations and, under certain conditions, also of substances in finished products.
mayr® power transmission exclusively manufactures products (articles: overload clutches, shaft couplings, electromagnetic brakes / clutches, permanent magnet motors and the appropriate control modules / rectifiers) in accordance with the definition in Article 3 of the REACH Regulation.
mayr® power transmission is aware of its responsibility towards the environment and society. As a matter of precaution, we pay attention to particularly critical substances in the supply chain and strive to avoid using any such substances completely or to replace them in the near future.
In compliance with Article 33 of the REACH Regulation, we would like to inform you that in our overload clutches and shaft couplings, electromagnetic brakes / clutches as well as permanent magnet motors, subcomponents with a lead content of > 0.1% are or may be used. These are manufactured from raw materials such as machining steel / copper alloys (e.g. brass, bronze) or aluminum alloys.
Besides high-melting-point (HMP) solders (electronics), this also affects integrated machine elements as well as standard parts (screws / nuts / set screws / pins / etc.) among others, provided that the relevant standards allow this.
For example, lead can occur as an alloying element with more than 0.1 mass percent, based on the respective total mass, in screws and set screws of the following property classes: 4.6, 4.8, 5.8, 6.8, 04, 4, 5, 6, 14H, 17H, 22H, 33H, 45H.
Products made from copper and copper alloys do not fall within the area of applicability of Regulation (EC) No. 1272/2008 of the European Parliament and Council on the Classification, Labeling and Packaging of Substances and Mixtures (CLP Regulation) and are therefore not subject to the classification and labeling obligations.
To our knowledge, when used for their intended purpose and disposed of correctly (recycling), the contained substances pose no threat to health or environment.
We would like to point out that the proportion of lead used here is not prohibited according to the REACH Regulation. It is merely necessary to declare the use of this substance.

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Notes on UK guidelines / conformity

Products / components from *mayr*® power transmission fulfill the requirements for the British economic area due to currently identical UK and EU directives.
In addition to the CE identification, the UKCA identification is attached to the product.
The UK Declaration of Conformity is available in a separate document.

Directives under EU Law	Directives under UK Law
Machinery Directive 2006/42/EC	Supply of Machinery (Safety) Regulations UK 2008 No. 1597
EMC Directive 2014/30/EU	Electromagnetic Compatibility Regulations UK 2016 No. 1091
EU Low Voltage Directive 2014/35/EU	Electrical Equipment (Safety) Regulations UK 2016 No. 1101
RoHS II 2011/65/EU	The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations UK 2012 No. 3032
Elevator Directive 2014/33/EU	Lifts Regulations UK 2016 No. 1093

Guidelines on EU and UK REACH

According to the European Union (Withdrawal) Act 2018, the EU REACH Regulation was transposed into UK law on January 1, 2021, and is known as UK REACH.
REACH and related legislation have been replicated in the UK with the necessary changes to make it workable in a domestic context.
The fundamental principles of the EU REACH Regulation have been retained in UK REACH.
The remarks on the information obligation according to UK-REACH correspond in content to the REACH Regulation (EC) No. 1907/2006.

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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 lines and components.

Brakes may generate further risks, among other things:

Hand injuries

Danger of seizure

Contact with hot surfaces

Magnetic fields

Severe injury to people and damage to objects may result if:

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

During the risk assessment required when designing the machine or system, the dangers involved must be evaluated and removed by taking appropriate protective measures.

To prevent injury or damage, only specialist personnel are allowed to work on the components.
They must be familiar with the dimensioning, transport, installation, inspection of the brake equipment, 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-energized, disengaged state and secure the system against inadvertent switch-on.

Guidelines for Electromagnetic Compatibility (EMC)

In accordance with the EMC directive 2014/30/EU, the individual components produce no emissions. However, functional components e.g. mains-side energization 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, bedding-in condition / conditioning of the brake linings and wear as well as general ambient conditions can all affect the given values. These factors should therefore be carefully assessed, and alignments made accordingly.

- ❒ Mounting dimensions and connection dimensions must be adjusted according to the size of the brake at the place of installation.
- ❒ Use of the brake in extreme environmental conditions or outdoors, directly exposed to the weather, is not permitted.
- ❒ The brakes are designed for a relative duty cycle of 60 %. A duty cycle > 60 % leads to higher temperatures, which cause premature aging of the noise damping and therefore lead to an increase in switching noises. Furthermore, the switch function of the release monitoring can be impaired. 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 periodic duty S3 60 %. The permitted surface temperature on the brake flange must not exceed 80 °C at a max. ambient temperature of 40 °C. For higher requirements on the friction work in case of EMERGENCY STOP or at temperatures of up to 90 °C on the brake flange, special friction materials and noise damping are to be used (see Type key).
- ❒ The braking torque is dependent on the current bedding-in condition of the brake. Bedding in / conditioning of the friction linings 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 or any other foreign bodies.

Please ensure that the brake is clean and oil-free. In particular in gear applications, special sealing measures, among other precautions, may be necessary!

- ❒ The surfaces of the outer components have been phosphated manufacturer-side to form a basic corrosion protection. The surface is rough-sawn and unprocessed (rolled material).

CAUTION

The rotors may rust up and seize up in corrosive ambient conditions and / or after longer downtimes.
The user is responsible for taking appropriate countermeasures.

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Dimensioning

Attention!
When dimensioning the brake, please take into consideration that a load torque is present when selecting the protection.

- ❒ Load torques reduce the deceleration torque available.
- ❒ Load torques may increase the output speed:
  - ➔ during a possible processing time in the controls
  - ➔ during the brake downtime

When calculating the friction work, please observe that the brake nominal torque is subject to a tolerance.

Climate Conditions

The electromagnetic brake is suitable for mounting / operation on electromotive elevator machinery in enclosed places of installation with an ambient temperature of between -5 °C and +40 °C.

CAUTION

Reduction in braking torque possible
Condensation can form on the brake and cause a loss in braking torque:

- ❒ due to fast changes in temperature
- ❒ at temperatures of around or under freezing point

The user is responsible for taking appropriate countermeasures (e.g. forced convection, heating, drain screw).

CAUTION

Brake malfunction possible
Condensation can form on the brake and cause malfunctions:

- ❒ at temperatures around or under freezing point, the brake can freeze over and not release any more.

The user is responsible for taking appropriate countermeasures (e.g. forced convection, heating, drain screw).

The system function must be checked by the user after longer downtimes.

At high temperatures and in high humidity or with occurring dampness, the rotor can seize up to the armature disk or the bearing shield / the flange plate after longer downtimes.

CAUTION

Temperatures of over 80 °C on the brake mounting flange can have a negative effect on the switching times, the braking torque levels and the noise damping behavior.

Intended Use

This safety brake is intended for use in electrically operated elevators and goods elevators. Furthermore, this brake can be used as a braking device acting on the traction sheave or the shaft of the traction sheave, as part of the protection device against overspeed for the upward-moving car and as a braking element against inadvertent movement of the car.

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

Class of Insulation F (+155 °C)

The insulation components on the magnetic coils are manufactured at least to class of insulation 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 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 -5 °C up to +40 °C.
- ❑ Do not store in direct sunlight or UV light.
- ❑ Do not store aggressive, corrosive substances (solvents / acids / lyes / salts / oils / etc.) near to the brakes.

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

Storage acc. DIN EN 60721-3-1 (including the limitations / additions described above): classes 1K21; 1Z1; 1B1; 1C2; 1S11; 1M11

Handling

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

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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**.
- ❒ **Protection circuit:** When using DC-side switching, the coil must be protected by a suitable protection 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 operating current are sufficient. Depending on the application, the switching contact can also be protected by other protection 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.

Standards, Directives and Regulations Used and To Be Applied

DIN VDE 0580	Electromagnetic devices and components, general specifications
DIN EN 61140	Protection against electric shock - Common aspects for installation and equipment
DIN EN IEC 63000	Technical documentation for the assessment of electrical and electronic equipment regarding the restriction of hazardous substances
DIN EN IEC 60529	Degrees of protection provided by enclosures (IP Code)
2014/35/EU	Low Voltage Directive
2011/65/EU	RoHS II - Directive
2015/863/EU	RoHS III- Directive
CSA C22.2 No. 14-2010	Industrial Control Equipment
UL 508 (Edition 17)	Industrial Control Equipment
2014/33/EU	Elevator Directive
EN 81-20	Safety rules for the construction and installation of lifts – Part 20: Passenger and goods passenger lifts
EN 81-50	Safety rules for the construction and installation of lifts - Examinations and tests – Part 50: Design rules, calculations, examinations and tests of lift components
EN ISO 12100	Safety of machinery – General principles for design - Risk assessment and risk reduction
DIN EN 61000-6-4	Interference emission
EN 12016	Interference immunity (for elevators, escalators and moving walkways)

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!

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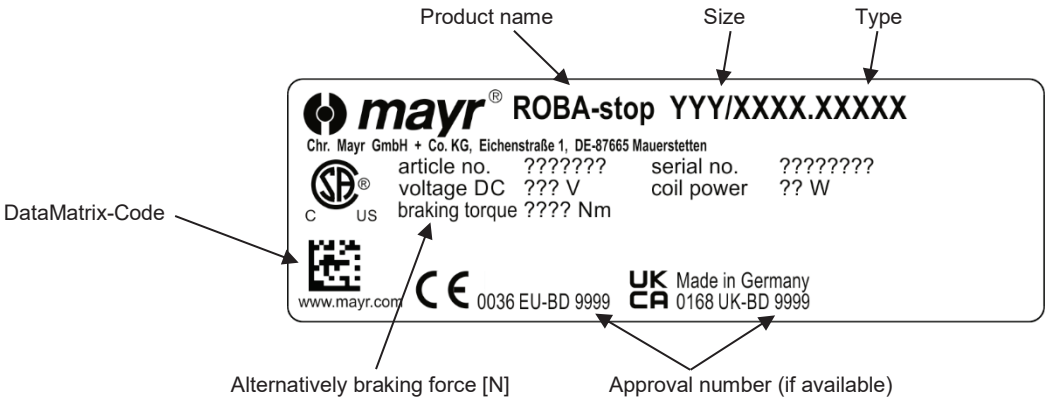
Identification

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



CE Identification

according to the Low Voltage Directive 2014/35/EU (only for DC voltage > 75 V) and/or RoHS Directive 2011/65/EU with 2015/863/EU, and the Elevator Directive 2014/33/EU (with the ID number of the respective inspection authority, for type examination tested brakes only)

UKCA Identification

according to the Low Voltage Directive UK 2016 No. 1101 (only for DC voltage > 75 V) and/or RoHS Directive UK 2012 No. 3032, and the Elevator Directive UK 2016 No. 1093 (with the ID number of the respective inspection authority, for type examination tested brakes only)

Conformity Markings

in terms of the Canadian and American approval

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Brake Illustrations

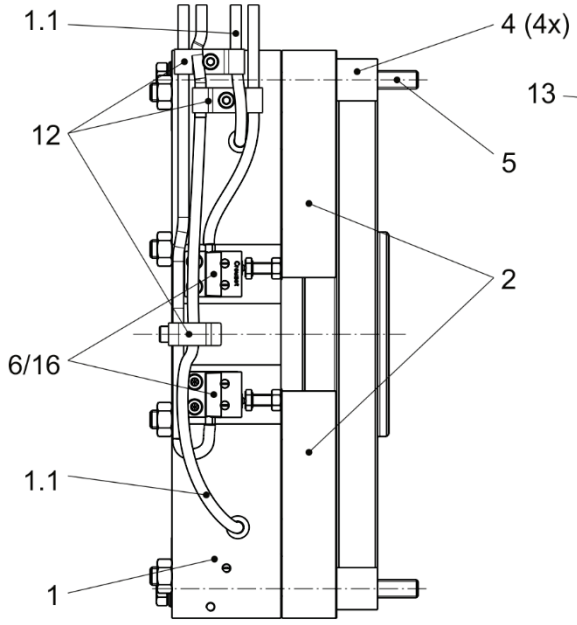

Fig. 1

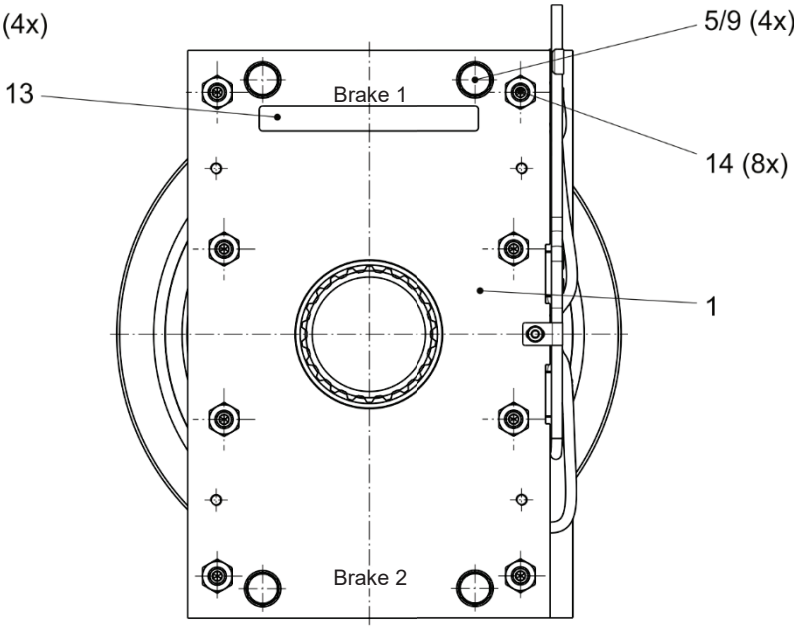

Fig. 2

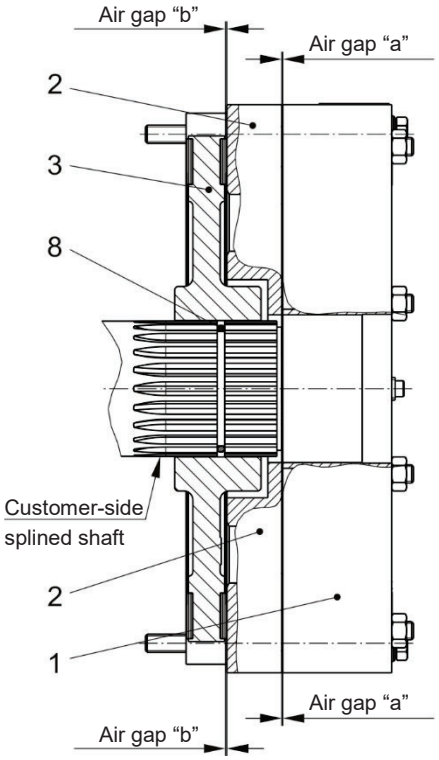

Fig. 3
Design for splined shaft

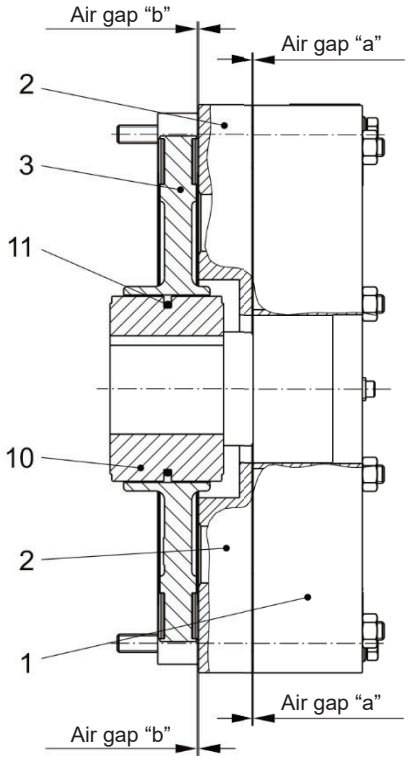

Fig. 4
Hub design

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

Item	Name
1	Coil carrier assembly (incl. magnetic coils)
1.1	Connection cable 2 x AWG18 blue / brown
2	Armature disk
3	Rotor
4	Distance bolt
5	Hexagon head screw according to DIN EN ISO 4014: On Sizes 150 and 200: M8 x 110 / 8.8 On Size 250: M8 x 120 / 10.9 On Size 350: M10 x 120 / 8.8
6	Release monitoring assembly with microswitch
6.1	Microswitch
7	Hand release assembly (page 15)
7.1	Hand release lever (page 15)
7.2	Spring pin (page 15)
8	O-Ring NBR 70 (not included in the standard scope of delivery): On Sizes 150 and 200: D48 x 3 On Size 250: D52 x 3 On Size 350: D52 x 3
9	Washer
10	Hub
11	O-ring
12	Cable clamp
13	Type tag
14	Noise damping
15	Wear monitoring assembly (Fig. 8, page 17)
15.1	Microswitch incl. adaptor plate (Fig. 8, page 17)
16	Release monitoring assembly with proximity switch
16.1	Proximity switch

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Table 1: Technical Data (Independent of Type and Size)

Nominal air gap [1] "a" braked (Figs. 3 / 4)	0.45 mm
Limit air gap [2] "a" at nominal torque (Figs. 3 / 4)	0.9 mm
Inspection air gap "b" on released brake (Figs. 3 / 4)	min. 0.25 mm
Protection (coil/casting compound):	IP54
Protection (mechanical):	IP10
Protection (switch):	IP67
Ambient temperature:	-5 °C to +40 °C
Duty cycle:	60 %

[1] Measured in the horizontal center axis area of the respective armature disk (2).

[2] Once the maximum air gap has been reached, the rotors must be replaced. However, the brake already becomes louder at an air gap > "a" +0.2 mm.

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

CAUTION

The rotor (3) must be replaced at the latest when a maximum air gap of 0.9 mm has been reached.

Table 2: Technical Data

Size	Nominal torque [3] minimum	Nominal voltage DC U_N	Nominal power P (20 °C)	Inductivity 24 V coil	Inductivity 207 V coil	Rotor thickness New condition
150	2 x 150 Nm	24/104/180/207 V	2 x 68 W	2 x 1.6 H	2 x 95 H	$18_{-0.05}$ mm
	2 x 120 Nm					
	2 x 90 Nm					
200	2 x 200 Nm	24/104/180/207 V	2 x 63 W	2 x 2.1 H	2 x 125 H	$18_{-0.05}$ mm
	2 x 160 Nm					
	2 x 120 Nm					
250	2 x 280 Nm	24/104/180/207 V	2 x 79 W	2 x 1.7 H	2 x 105 H	$18_{-0.05}$ mm
	2 x 250 Nm					
	2 x 230 Nm					
	2 x 185 Nm					
350	2 x 410 Nm	24/104/180/207 V	2 x 82 W	2 x 2.0 H	2 x 130 H	$18_{-0.05}$ mm
	2 x 350 Nm					
	2 x 300 Nm					
	2 x 250 Nm					

[3] 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 mean friction radius.

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Table 3: Technical Data

Size	Max. permitted friction work per single circuit [4]	Max. trigger speed	Tightening torque Fixing screw Item 5	Weight
150	17500 J	981 rpm	24 Nm	19.6 kg
200	16500 J	979 rpm	24 Nm	23.7 kg
250	25500 J	800 rpm	32 Nm	27.0 kg
350	23500 J	800 rpm	48 Nm	34.9 kg

[4] Values for trigger speed 460 rpm, nominal torque, new condition and not run in.
The value can be doubled for both brake circuits.
The value increases at lower speeds and decreases at higher speeds (please contact *mayr*®).

Table 4: Switching Times [ms]

Size	Nominal torque minimum	Attraction t_2	Drop-out t_0 DC	Drop-out t_{50} [5] DC	Drop-out t_{90} [5] DC	Drop-out t_{11} AC	Drop-out t_1 [6] AC
150	2 x 150 Nm	200	25	50	80	150	450
	2 x 120 Nm	170	35	60	85	200	510
	2 x 90 Nm	145	40	70	95	250	570
200	2 x 200 Nm	280	45	65	140	190	620
	2 x 160 Nm	225	60	100	170	310	790
	2 x 120 Nm	170	85	145	190	420	980
250	2 x 280 Nm	310	35	55	95	180	540
	2 x 250 Nm	285	45	65	105	215	590
	2 x 230 Nm	260	45	70	110	240	640
	2 x 185 Nm	210	50	75	110	300	720
350	2 x 410 Nm	400	35	60	90	200	510
	2 x 350 Nm	370	45	75	105	270	580
	2 x 300 Nm	330	50	90	120	320	640
	2 x 250 Nm	290	60	100	125	370	700

[5] Referring to the nominal braking torque

[6] Referring to the effective braking torque

The stated switching times can only be achieved using the respective correct electrical wiring. This also refers to the protection circuit for brake control and the response delay times of all control components.
The use of varistors for spark quenching increases the DC-side switching times.

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Torque-Time Diagram

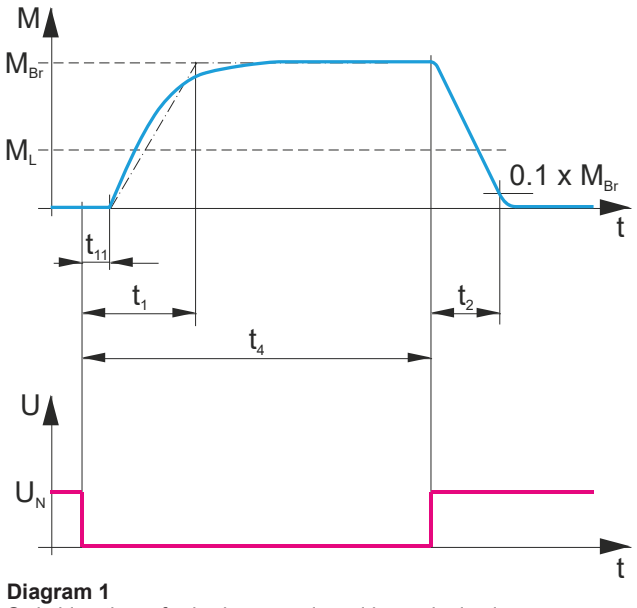

Diagram 1
Switching times for brake operation with nominal voltage

Key

M_{Br}	=	Braking torque
M_L	=	Load torque
t_1	=	Connection time
t_{11}	=	Response delay on connection (≙t_0 acc. Type Examination Certificate)
t_2	=	Separation time
t_4	=	Slip time + t_{11}
U_N	=	Coil nominal voltage

Application

- ROBA®-twinstop® for use as a holding brake with occasional EMERGENCY STOP braking actions.
- The max. permitted speed and friction work (see Technical Data, Table 3) must be observed.

Design

The ROBA®-twinstop® is a spring applied, electromagnetically releasing dual circuit safety brake - a component in terms of DIN VDE 0580.
It is designed for installation into gearless elevator machinery for use as a holding brake with occasional EMERGENCY STOP braking actions.
On dimensioning, the braking torque, the speed as well as the permitted friction work in case of EMERGENCY STOP need to be taken into consideration for safe holding of the load torque and safe compliance with the required braking distance.
Furthermore, the ROBA®-twinstop® can be used as a braking device acting on the shaft of the traction sheave, as part of the protection device against overspeed for the upward-moving car and as a braking element against inadvertent movement of the car.
Please also observe the Annex in the EU Type Examination Certificate.
In order to guarantee the maximum braking distance while both brakes act, an inspection of the protection device including all control and brake times (detector / control / brake) is necessary.
The respective standards, regulations and directives must be observed.

Function

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

Spring applied function:
In de-energized 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 function:
Due to the magnetic force of the coils in the coil carrier (1), the armature disks (2) are attracted against the spring pressure to the coil carrier (1).
The brake is thereby released and the shaft can rotate freely.

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

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Scope of Delivery / State of Delivery

The brake body is pre-assembled with coil carrier (1), armature disks (2) and distance bolts (4) as well as optionally with hand release (7), release monitoring devices (6/15) and wear monitoring device (14). The hand release device (7) as well as the release monitoring and wear monitoring devices (6/14/15) are mounted and set manufacturer-side.
The following are included loose in delivery: rotor (3), hexagon head screws (5), washers (9) as well as - if applicable - the hub (10) with O-ring (11).

Please check the scope of delivery according to the Parts List as well as the state of delivery immediately after receiving the goods. *mayr*® will take no responsibility for belated complaints.
Please report transport damage immediately to the deliverer.
Please report incomplete delivery and obvious defects immediately to the manufacturer.

Adjustment

The brakes are equipped manufacturer-side with the respective springs for the braking torque stated on the Type tag (13). Adjustment is not necessary. Adaptions or modifications are not permitted as a rule. This rule also applies to the manufacturer-side adjusted noise damping. The switches are also adjusted manufacturer-side. Despite great care during the manufacturer-side adjustment, re-adjustment might be necessary after installation due to transportation and handling. Furthermore, such switches cannot be considered fail-safe. Please observe the sections Release Monitoring and Wear Monitoring.

Installation Conditions

- ❒ The eccentricity of the shaft end in relation to the fixing holes must not exceed 0.3 mm.
- ❒ The positional tolerance of the threads 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 in the area of the friction surface.
  Measuring procedure acc. DIN 42955.
  The shaft bearing is to be designed so that the axial backlash of the shaft (absolute) does not exceed the permitted axial run-out value during operation.
  Larger deviations can lead to permanent grinding with overheating of the friction linings and thus to a drop in the braking torque.
- ❒ The splined motor shaft should be designed according to the information given in the applicable assembly drawing.

The dimensions stated in the assembly drawings are manufacturer-side recommendations.

- ❒ On hub designs the fit tolerances of the hub bore (10) and the shaft must be selected so that the hub toothing (10) is not widened. Widening of the toothing leads to the rotor (3) jamming on the hub (10) and therefore to brake malfunctions.
  Recommended hub – shaft tolerance H7/k6.
  If the hub (10) is heated for better joining, the O-ring (11) must be removed beforehand and re-mounted after hub installation.
  The max. permitted joining temperature of 150 °C must not be exceeded.
- ❒ Dimensioning of the key connection according to the requirements shaft diameter, transmittable torque and operating conditions must be carried out. For this, the corresponding user data must be known or the customer must carry out the dimensioning according to the valid calculation basis DIN 6892.
  For the calculation, a hub quality of Re = 300 N/mm^2 should be used.
  The length of the key must lie over the entire hub (10).
- ❒ For the dimensioning of the key connections, the permitted tensions common in machine construction must be considered.
- ❒ The mounting dimensions and the tapped holes s with depth K + 2 mm (K = screw projection) must be provided according to the Catalogue or the applicable assembly drawing (Fig. 5).

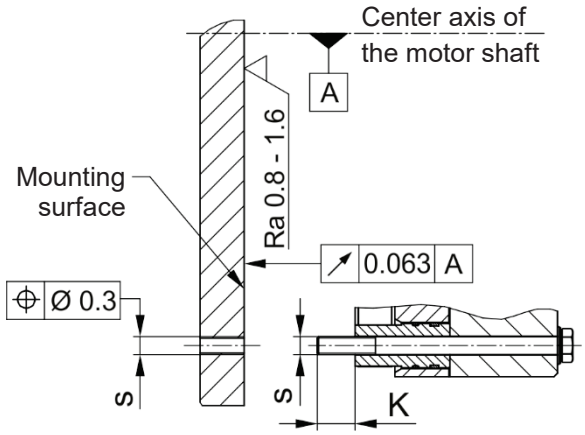

Fig. 5

- ❒ 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 = 0.8 – 1.6 µm. The mounting surface must be turned. The surface must be bare or FE-phosphated (layer thickness approx. 0.5 µm) without oil.
  If corrosion protection is applied, the device must be inspected for possible effects on the braking torque.
  In particular customer-side mounting surfaces made of grey cast iron are to be rubbed down additionally with sandpaper (grain ≈ 60 to 100).
- ❒ The rotor and brake surfaces must be oil and grease-free.
- ❒ The O-ring (8) or O-ring (11) must be lightly greased.
- ❒ The toothings of the motor shaft, rotor (3) and the hub (10) must not be oiled or greased.
- ❒ Please abstain from using cleaning agents containing solvents, as they could affect the friction material.

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Installation: Design for Splined Motor Shaft (Figs. 1 – 3)

1. Insert the O-ring (8), lightly greased, acc. Parts List with NBR 70 material (provided by customer) into the motor shaft groove. Please use a grease based on mineral oil, NLGI Class 2, with a basic oil viscosity of 220 mm^2/s at 40 °C.
2. Push the rotor (3) onto the motor shaft by hand using light pressure.
   Please observe that
   on Sizes 150 and 200 the longer rotor collar faces away from the machine wall,
   on Size 250 the installation direction is unimportant as the rotor (3) is symmetrical,
   on Size 350 the graduated rotor collar faces away from the machine wall.
   Make sure that the toothing moves easily.
   Do not damage the O-ring.
3. Secure the brake bodies using 4 hexagon head screws (5) and washers (9) all-round step-wise evenly (we recommend that you secure the screws using Loctite 243).
   Tighten the hexagon head screws using a torque wrench and observe the tightening torque acc. Table 3.
4. **Check air gap "a" (Fig. 3):**
   Air gap: 0.40 mm ≤ "a" ≤ 0.65 mm
   This air gap must be present in the area of the horizontal center axis on both armature disks (2) (Fig. 1). Connect the brake electrically
5. Connect the brake electrically.
6. **Check air gap "b" > 0.25 mm in energized state on the rotor (3) (Fig. 3).**
   The inspection air gap must be given.

Installation: Hub Design (Figs. 1, 2 and 4)

1. Mount the hub (10) with the inserted O-ring (Item 11 / **O-ring 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).
2. Push the rotor (3) over the O-ring (11) onto the hub (10) by hand using light pressure.
   Please make sure that the rotor collar (longer rotor collar on Size 150) faces the machine wall.
   Make sure that the toothing moves easily.
   Do not damage the O-ring.
3. Secure the brake bodies using 4 hexagon head screws (5) and washers (9) all-round step-wise evenly (we recommend that you secure the screws using Loctite 243).
   Tighten the hexagon head screws using a torque wrench and observe the tightening torque acc. Table 3.
4. **Check air gap "a" (Fig. 2):**
   Air gap: 0.40 mm ≤ "a" ≤ 0.65 mm
   This air gap must be present in the area of the horizontal center axis on both armature disks (2) (Fig. 1).
5. Connect the brake electrically
6. **Check air gap "b" > 0.25 mm in energized state on the rotor (3) (Fig. 4).**
   The inspection air gap must be given.

Braking Torque

The (nominal) braking torque is the torque effective in the shaft train on slipping brakes, with a sliding speed of 1 m/s referring to the mean friction radius.
The brake is loaded statically when used as a service brake and loaded dynamically in EMERGENCY STOP operation (part of the brake equipment against overspeed or inadvertent movement of the elevator cage). Respectively, there are different speed values for the friction material, which in practice also leads to different friction values and therefore braking torques.
Amongst other things, the braking torque is dependent on the respective quality / condition of the friction surfaces (conditioning). Therefore, bedding in of the brake linings on newly installed brakes or on rotor replacement when mounted onto the motor is required, taking into account the permitted loads. The following applies as a reference value for the bedding in of new brake linings. The load in new condition may not be more than 50 % of the max. friction work per individual circuit (see Table 3). This process is to be carried out at reduced speed, approx. 30 % of the operating speed.
If the bedding in should take place under works-specific conditions, we ask you to contact us, so that we can provide the appropriate parameters.
Friction materials develop their optimum effect only under speed at the appropriate contact pressure, as continuous regeneration of the friction surface then takes place (torque consistency). Permanent grinding of the rotor can lead to overheating / damage to the brake linings, and therefore to a drop in braking torque. Furthermore, friction materials are subject to aging, which is also influenced, among other things, by higher temperatures and other ambient influences. We recommend regular inspection of the braking torque (1 x per year) including the respective dynamic braking actions as a refresher.

Noise Damping (Item 14 / Fig. 2)

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

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Hand Release (7)

(Option dependent on Type for mechanical release of both brake circuits individually using a Bowden cable or by hand)

The hand release is set manufacturer-side ready for installation.

For the max. hand release forces, see Table 5.
The brake is released by moving both hand release levers simultaneously (7.1), see Figs. 6 and 7.
The armature disk (2) is attracted to the coil carrier (1); the rotor (3) is then free and the brake is released.
For designs with Bowden cable, the Bowden cable must be adjusted so that the hand release (after actuation) can pivot back to the unreleased neutral position **=> functional inspection**.

DANGER

Please actuate the hand release carefully. Any existing loads are put into motion when the hand release is actuated.

Table 5: Technical Data

Size	Braking torque	Release force per brake circuit with	
		Bowden cable	hand release lever
150	150 Nm	approx. 160 N	approx. 95 N
200	200 Nm	approx. 200 N	approx. 120 N
250	280 Nm	approx. 280 N	approx. 165 N
350	410 Nm	approx. 370 N	approx. 215 N

Do not push the hand release lever (7.1) up to the stop pins (spring pins Item 7.2), but carefully only to the point, at which the traction sheave or the car starts moving.

The stop pins are only used to prevent blockage of the hand release.

A substantially increased force acting on the hand release lever (7.1) may lead to component destruction.

Bowden cable designs must be designed with an end stop for the Bowden cable lever as soon as release of the brake is residual torque-free.

In addition, a suitable return spring must be installed by the customer on Bowden cable designs in order to compensate for friction forces in the Bowden cable.

Adjust the Bowden cable length so that the hand release lever (6.1), after actuation, pivots back to the unreleased neutral position.

When actuating the hand release, a switching signal of the release monitoring device cannot be guaranteed.

The hand release is subject to wear and is not suitable for constant release.
A sufficient number of emergency releases is possible (approx. 1000 x).

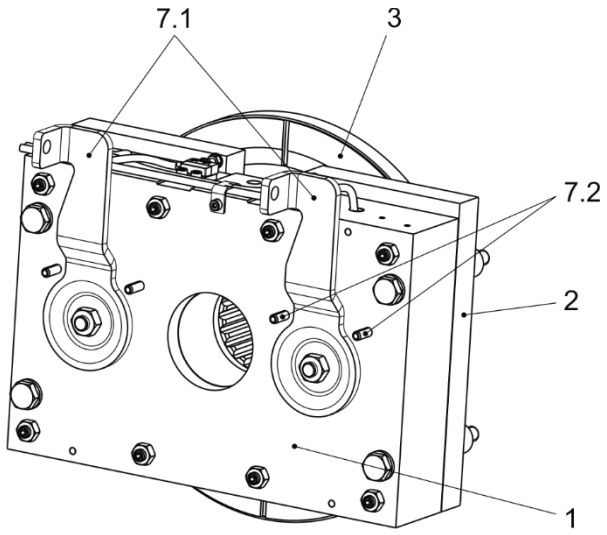

Fig. 6 (Hand release for Bowden cable)

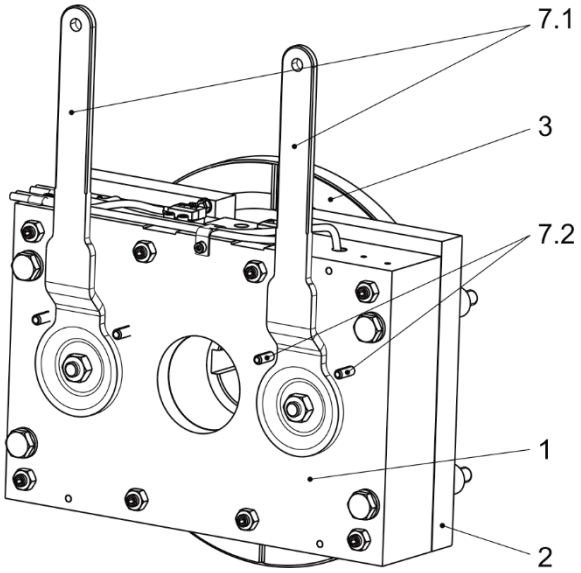

Fig. 7 (Hand release with hand release lever)

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Release Monitoring (Item 6 or 16 / Fig. 1)
(Option, dependent on Type)

Please observe that the microswitches may only be connected to the secondary circuit (requirement resulting from CSA / UL approval).

Please carry out a functional inspection before brake initial operation!

ROBA®-twinstop® brakes are delivered with manufacturer-side adjusted release monitoring devices.
A microswitch (6.1) or a proximity switch (16.1) per brake circuit emits a signal for every brake condition change:
"brake opened" or "brake closed".

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

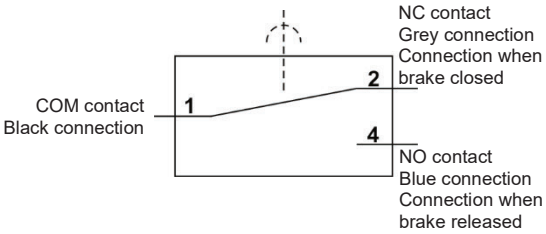
From the point at which the brake is energized, a time span of three times the separation time must pass before the switch signal on the release monitoring is evaluated.

Microswitch Specification (6.1)

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

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

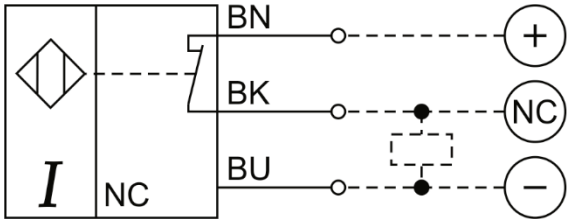
Microswitch (6.1) Wiring Diagram:



Technical Data of the Proximity Switch (16.1)

Operating voltage DC:	10...30 V
Residual ripple content:	≤ 10 % U_{ss}
DC rated operating current:	≤ 150 mA
No-load current I_0:	≤ 15 mA
Residual current:	≤ 0.1 mA
Rated insulation voltage:	≤ 0.5 kV
Short-circuit protection:	yes / synchronizing
Line voltage drop at I_e:	≤ 1.8 V
Wire breakage protection / reverse voltage protection:	yes / completely
Output function:	3-wire, NC contact, PNP
Switching frequency:	≤ 2 kHz

Proximity Switch (16.1) Wiring Diagram:



Function

When the magnetic coil is energized in the coil carrier (1), the armature disk (2) is attracted to the coil carrier (1), the microswitch (6.1) or the proximity switch (16.1) emits a signal, the brake is released.

Customer-side Functional Inspection Once Attachment Has Taken Place

Carry out a functional inspection before brake initial operation.

Microswitch (6.1) for connection as NO contact:
- Brake **de-energized**: Inspection lamp must signal **"OFF"**.
- Brake **energized**: Inspection lamp must signal **"ON"**.

Microswitch (6.1) for connection as NC contact:
- Brake **de-energized**: Inspection lamp must signal **"ON"**.
- Brake **energized**: Inspection lamp must signal **"OFF"**.

Proximity switch (16.1):
- Brake **de-energized**: Inspection lamp must signal **"ON"**.
- Brake **energized**: Inspection lamp must signal **"OFF"**.

Microswitches and proximity switches cannot be guaranteed fail-safe. Therefore, please ensure appropriate access for replacement or adjustment.
The switching contacts of the microswitches are designed so that they can be used for both small switching powers and medium ones.
However, after switching a medium switching power, small switching powers are no longer reliably possible.
In order to switch inductive, capacitive and non-linear loads, please use the appropriate protection circuit to protect against electric arcs and unpermitted loads!

The following prevent actuation of the microswitch (6.1) or proximity switch (16.1) and lead to a malfunction.
- ❑ Heavy contamination between the armature disk (2) and the coil carrier (1).
- ❑ Extreme warping on the armature disk (2).
- ❑ Excessively large air gap "a" between the armature disk (2) and the coil carrier (1) due to wear on the friction linings.
- ❑ Defective brake magnetic coil.
- ❑ No or incorrect voltage on the brake coil.

If none of these error sources prove to be the reason for incorrect release monitoring function, the microswitch (6.1) or the proximity switch (16.1) must be checked and the adjustment corrected if necessary.

If a replacement or new adjustment of the switch (6.1/16.1) is required by the customer, separate adjustment instructions stating the article or serial number of the respective brake can be requested from the manufacturer.

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Wear Monitoring (15) Fig. 8
(Option, dependent on Type)

Please observe that the microswitches may only be connected to the secondary circuit (requirement resulting from CSA / UL approval).

Only one microswitch for wear monitoring (15) is required per **ROBA®-twinstop®** brake, which is mounted onto the right brake (Fig. 8).
The **ROBA®-twinstop®** brake is delivered with manufacturer-side installed and adjusted wear monitoring (15).

Function

Due to wear on the rotor (3), the air gap “a” between the coil carrier (1) and the armature disk (2) increases.
Once the maximum air gap of 0.9 mm has been reached, the microswitch (15.1) contact switches over and emits a signal.
The rotor (3) must be replaced.

The customer is responsible for a signal evaluation.

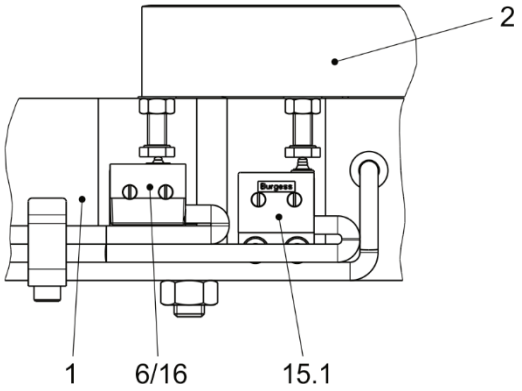
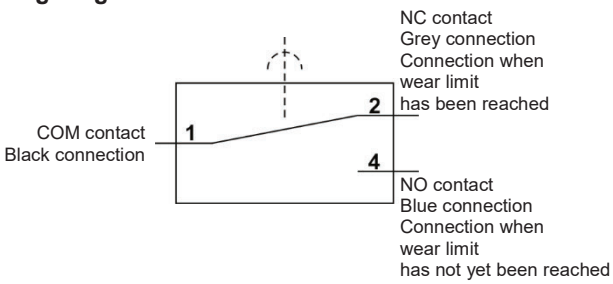


Fig. 8

Wiring Diagram:



If a replacement or new adjustment of the microswitch (15.1) is required by the customer, separate adjustment instructions stating the article or serial number of the respective brake can be requested from the manufacturer.

For switch power values, please see Release Monitoring

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

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Electrical Connection and Wiring

DC current is necessary for operation of the brake. The coil voltage is indicated on the Type tag as well as on the brake body and is designed according to the DIN IEC 60038 (± 10 % tolerance). Operation must take place via DC voltage with a low ripple content, e.g. via a bridge rectifier or with another suitable DC supply. The connection possibilities can vary dependent on the brake equipment. Please follow the exact connections according to the Wiring Diagram. The manufacturer and the user must observe the applicable regulations 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 minimize noise development of the released brake, it must only be operated via DC voltage 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.

Grounding Connection

The brake is designed for Protection Class I. This protection covers therefore not only the basic insulation, but also the connection of all conductive parts to the protective conductor (PE) on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardized inspection of the protective 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 Behavior

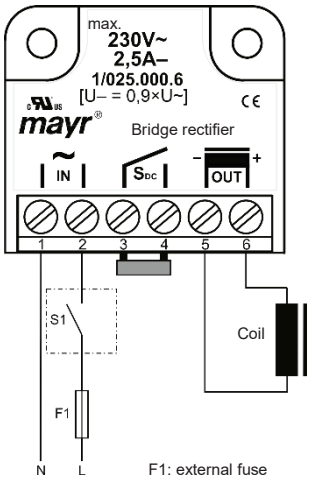
The reliable operational behavior of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the temperature and the air gap between the armature disk and the coil carrier (dependent on the wear condition of the linings).

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

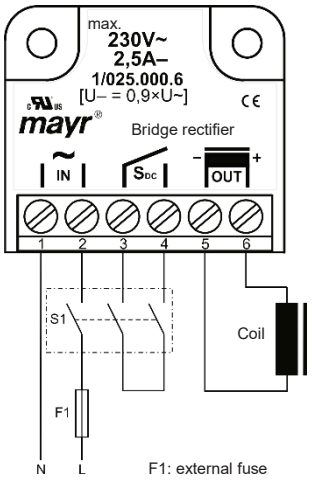


The power circuit is interrupted in front of the rectifier. The magnetic field slowly reduces. This delays the rise in braking torque.

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 (approx. 6-10 times longer than with DC-side disconnection), 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 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 operation)**; however, louder switching noises.

Protection Circuit

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

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Brake Inspection

(Customer-side after Mounting onto the Elevator Machinery)

- ❑ **Individual air gaps inspection (Figs. 3/4)**
  Air gaps “a” of both brake circuits (brake de-energized):
  Air gap 0.40 mm ≤ “a” ≤ 0.65 mm.
  Air gaps “b” of both brake circuits (brake energized):
  air gap “b” > 0.25 mm.
- ❑ **Braking torque inspection:**
  Please compare the requested braking torque with the torque stated on the Type tag.
- ❑ **Release function inspection**
  By energizing the brake via battery operation, to guarantee emergency escape for passengers during a power failure or manually using the hand release.
- ❑ **Switch functions inspection of the release monitoring / for connection as NC contact:**
  Brake de-energized ➔ Signal “ON”
  Brake energized ➔ Signal “OFF”
  for connection as NO contact:
  Brake de-energized ➔ Signal “OFF”
  Brake energized ➔ Signal “ON”
- ❑ **Hand release functional inspection (dependent on Type)**
  Please observe the guidelines on page 15!

Dual Circuit Brake Functional Inspection

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

DANGER

Should the elevator begin to move after release of one brake circuit or should it fail to react to the braking procedure, the energized coil must be switched off immediately!
The dual circuit braking function is not guaranteed.
Shut down the elevator, lower and secure the load, remove and inspect the brake.
Please observe the installation guidelines of the elevator manufacturer as well as the accident prevention regulations.

The individual circuit inspection is carried out by energizing the individual circuits. The braking effect sufficient for the retardation of the elevator cage, which is loaded with nominal load and moving downwards at nominal speed, must be maintained (please observe the permitted friction work acc. Technical Data).

Inspection brake circuit 1:

1. Energize brake circuits 1 and 2 and put the drive into operation.
2. De-energize brake circuit 1 (= EMERGENCY STOP) and inspect the stopping distance according to the elevator regulations.
3. De-energize brake circuit 2.

Inspection brake circuit 2:

1. Energize brake circuits 1 and 2 and put the drive into operation.
2. De-energize brake circuit 2 (= EMERGENCY STOP) and inspect the stopping distance according to the elevator regulations.
3. De-energize brake circuit 1.

Inspection of both brake circuits:

Energize both brake circuits and put the drive into operation. Trigger an EMERGENCY STOP and inspect the stopping distance. The stopping distance must be much shorter than the stopping distance for an individual circuit.
If the brake is used as part of the protection device against inadvertent movement of the car, the functionality of the protection device must be verified using the type examination (compliance of the entire concept - detector/control/brake element - for the elevator system).
The inspection proves that the brake element (both brake circuits work together) releases correctly. Furthermore, it must be confirmed that the travelled distance does not exceed the stated value.
If the brake is normally released using overexcitation, brake release during the inspection must be carried out via DC-side switch-off from the overexcitation voltage.

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Maintenance

ROBA®-twinstop® brakes are mainly maintenance-free. The friction lining pairing is robust and wear-resistant. This ensures a particularly long service lifetime of the brake.
However, the friction lining is subject to operational wear on frequent EMERGENCY STOP braking actions. Normally, such occurrences are recorded and saved by the elevator control, or they require the intervention of qualified personnel. When carrying out this maintenance work (especially when taking DIN EN 13015 Appendix A into account), the causes of the malfunction must be determined, assessed and removed by specialist personnel. Causal events such as the air gap can be checked and respective measures can be taken.

The brakes must be maintained and repaired by a **specialist employee**, taking into consideration the type and intensity of use of the system.
The following inspections / tests are to be conducted within the scope of the defined elevator maintenance interval during maintenance and repairs.

1. Visual inspection
   - ➢ Inspection of condition in accordance with the regulations
   - ➢ Brake rotor: in particular the exterior appearance of the brake surfaces
     - wear
     - free of oil / lubricants
     - sticking of linings
2. Tightening torque inspection of the fixing screws on the brakes. If the brake fixing screws are covered with sealing lacquer, a visual inspection for damage of the sealing is sufficient.
3. Inspection of the air gap – braked (both brake circuits).
4. Inspection of toothing backlash from the splined motor shaft (or the hub (10)) to the rotor (3).
   Max. permitted toothing backlash 0.5°
5. Running noise (brake rotor) during operation
   Attention: Permanent grinding of the rotor can lead to overheating / damage to the brake linings, and therefore to a drop in braking torque. If such indications are present, it is essential that the braking torque is checked and the rotor replaced if required independent of the inspection or the determined wear value!
6. Braking torque or delay inspection (individual brake circuits) at least once per year (within the scope of the maintenance / main inspection).

In order to inspect the wear condition of the rotor (3), please measure the air gap “a”, see Fig. 3/4.

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.
Brake de-installation is carried out by following the instructions in the section Installation (page 14) backwards.

Replacing the Rotor (3)

Before Replacing the Rotor

❑ Clean the brake.

Please observe the section “Cleaning the Brake”, see below.

❑ Measure the rotor thickness “new” (nominal dimension acc. Table 2).

Replace the rotor (3) by following the Brake Installation instructions backwards.

DANGER

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

Information on the Components

The **friction material** contains different inorganic and organic compounds, which are integrated into a system of hardened binding agents and fibers.

Possible hazards:
No potential dangers have been recognized so far when the brake is used according to its intended purpose. When grinding in the brake linings (new condition) and also in case of EMERGENCY STOP braking actions, functional wear can occur (wear on the friction linings); on open brake designs, fine dust can be emitted.

Classification: Hazardous property
Attention: H-classification: H372

Protective measures and rules of behavior:
Do not inhale dusts.
Vacuum the dusts at the point of origin (tested suction devices, tested filters acc. DIN EN 60335-2-69 for dust classes H; maintenance of the suction devices and filter replacement at regular intervals).
If local dust suction is not possible or is insufficient, the entire work area must be ventilated using appropriate technology.

Additional information:
This friction lining (asbestos free) is not a dangerous product in terms of the EU Directive.

Cleaning the Brake

Do not clean the brake using compressed air, brushes or similar devices!

❒ Wear safety gloves / safety goggles.
❒ Use a suction system or wet towels to clean off the brake dust.
❒ Do not inhale brake dust.
❒ In case of dust formation, a dust mask FFP 2 is recommended.

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Disposal

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

Electronic Components (Rectifier / Switch):
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 with coil/cable and all other steel components:
Steel scrap (Code No. 160117)

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

Brake rotor (steel or aluminum pads with friction linings):
Brake linings (Code No. 160112)

Seals, O-rings, V-seals, elastomers, terminal boxes (PVC):
Plastic (Code No. 160119)

Guidelines on the WEEE Directive 2012/19/EU
Avoidance of waste from electrical and electronic devices and the reduction of such waste through recycling.
Our electromagnetic products (brakes, clutches) as well as the components required to control them (rectifiers) are frequently used in electrical and electronic devices within the appropriate area of application of WEEE, independent of the applicable product categories.
The stated products do not fall within the area of application of this Directive. They have been classified as electromagnetic / electronic components (VDE 0580) or as electronic equipment (DIN EN 50178), and have been determined for installation in devices for "use in accordance with the intended purpose". Only products which are to be viewed as devices in terms of the Directive and not as parts or components are subject to registration obligations.

Malfunctions / Breakdowns:

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

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