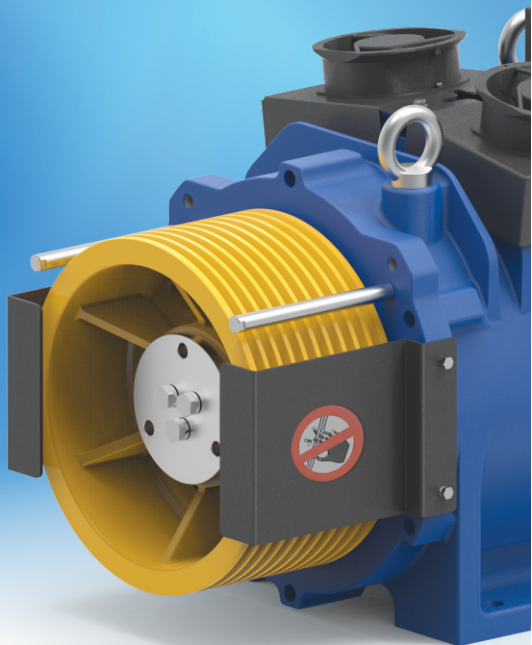


Passione in **movimento**
Passion in **motion**

USER'S MANUAL

GEARLESS




PRIMO[®]
ITALIAN MACHINE



WARRANTY CERTIFICATE

OWNER DETAILS

Customer Name:

Address:

.....

City:

State:

Pin Code:

Country:

Telephone No:

Cell No:

E-Mail ID:

MACHINE DETAILS

Model No:

Machine Serial No:

Warranty Start Date:

Warranty Expiry Date:

Agent:

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1. GENERAL INFORMATION :-

1.1 Application of Gearless Lift Machine :-



The PRIMO S.R.L. is designed as a gearless drive for traction sheave rope elevators. This Manual is part of the drive and must always be kept in its vicinity for reference at all the times. All persons involved in installation, operation, maintenance or repair of the drive must have read and understood this manual. PRIMO S.R.L. Company takes no responsibility for damage or disruption caused by disregard of this manual.

1.2 Scope :-

This manual is design for gearless drive of rope traction elevator

1.3 Use of Gearless Lift machine :-



Traction machines are not Ready-to-use products and May only be Operated after having been installed with other incorporated parts / spares / Machines or plants and established with their Protective grating, barriers, constructive Devices provides as per respective E U Directives and national and local Law.

1.4 Copy Write :-

The copyright to this manual is held by
PRIMO S.R.L., Via Noalese Sud. 66 / 30030 Mellaredo (VE) - ITALY

This manual must not be wholly or partly reproduced for competitive purposes, used in any unauthorized way or made available to third parties without our agreement.




2. SAFETY INSTRUCTIONS :-

2.1 General Safety Instructions :-

By using PRIMO S.R.L. Gearless drive for rope elevators may be followed national legislation reference to EN81-1998 Point 5.5.7 & EN81-20.

2.2 Safety Instructions & Symbols :- WARNING

- Before Using the Gearless Machine , read these "Precautions" thoroughly and operate in the correct way.
- The instructions in this section all relate to safety; be sure to maintain safe operation conditions.
- "Danger", "Warning" and "caution" have the following meanings in these instructions.

 DANGER	This make indicates procedures which, if improperly performed, are most likely to result in the death or serious injury to the users or service personnel
 WARNING	This make indicates procedures which, if improperly performed, might lead to the death or serious injury of the users
 CAUTION	This make indicates procedures which, if improperly performed, might possibly results in personal harm to the users, Or Damage to property.

- PG-0, PG-1, PG-2, PG-3, PG-4 & PG-5. Gearless lift machines are not ready to use product, They may only be operated after they have been installed in lift system and their safe operation has been ensured by taking the appropriate measurement.

2.3 Ensure :-

- Only qualified personnel are authorised to perform installation work or maintenance work, and this must be done in accordance with the relevant instructions. The personnel must be familiar with the installation , maintenance for the machine.

3. PRODUCT OVERVIEW :-

3.1 Operational Area of machine :-

PRIMO S.R.L. Company a permanent magnet inner-rotor synchronous motor, offers benefits which a modern elevator motor demand for :

1. Compact design
2. Low noise level
3. Easy installation
4. Good controllability
5. Highest travel comfort
6. Meet with EU Requirements.

Due to the very compact design the PRIMO S.R.L. is ideal for machine roomless elevators. Of course the certified brakes provide maximum security and are approved as a safety device for ascending car overspeed protection.

3.2 Gearless Hoisting
Dimension Sheet :

3.2 Gearless Hoisting
Dimension Sheet :

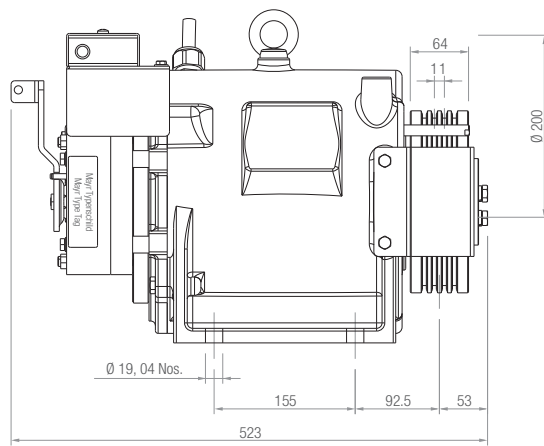
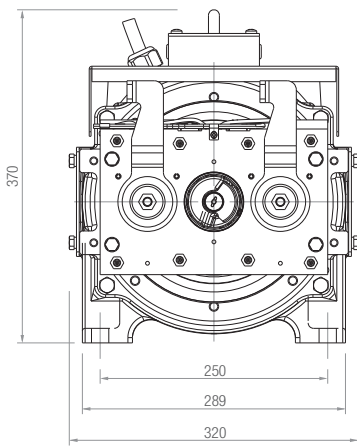
PG 0
HOME LIFT



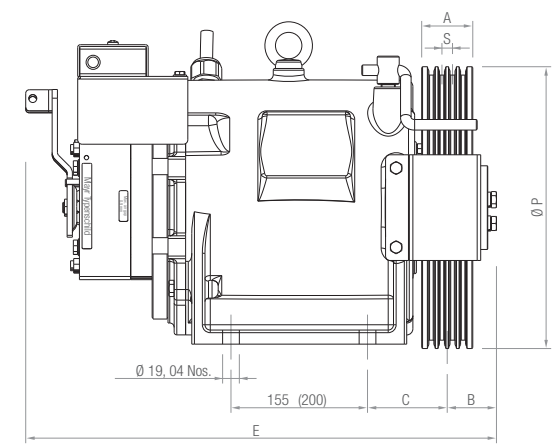
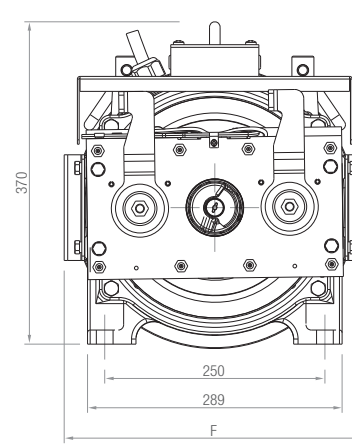
PG 1
GEARLESS



ØP	A	B	C	N X ØD	E	F	S
Ø200	64	53	93.5	4/5 X Ø6/Ø6.5	535	320	11
Ø240							
Ø200	97	56	111	6/7/8 X Ø6/ Ø6.5	555	320	11
Ø240							
Ø320	70	50	96.5	3/4 X Ø8	535	345	12



All dimensions are in mm.
Tutte le grandezze sono espresse in mm.



All dimensions are in mm.
Tutte le grandezze sono espresse in mm.

[Revision Date : 01-01-2027]

[Revision Date : 01-01-2027]

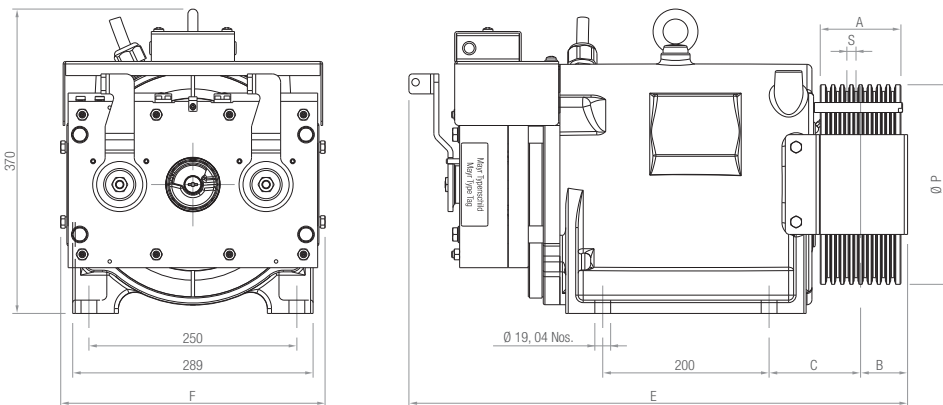
3.2 Gearless Hoisting
Dimension Sheet :

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PG 2
GEARLESS



ØP	A	B	C	N X ØD	E	F	S
Ø200	97	56	111	8 X Ø6	605	320	11
Ø200	108	62	115.5	9 X Ø6	625	320	12
Ø240	97	56	111	6/7/8 X Ø6.5	605	320	11
Ø320	70	50	96.5	4/5 X Ø8	580	345	12



All dimensions are in mm.
Tutte le grandezze sono espresse in mm.

[Revision Date : 01-01-2027]

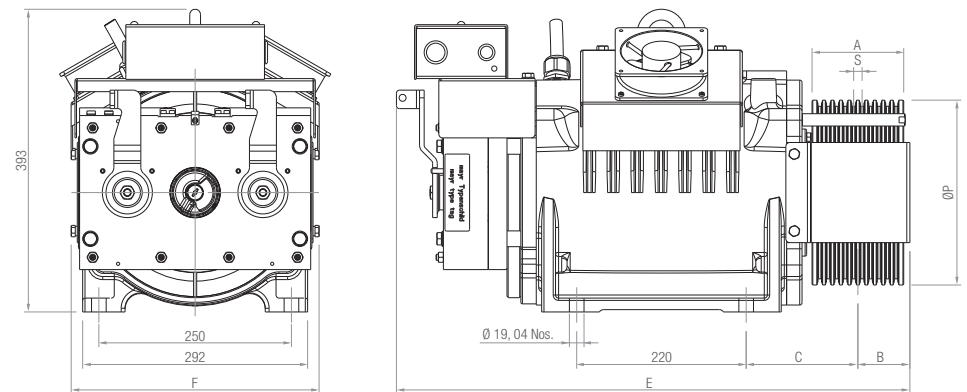
3.2 Gearless Hoisting
Dimension Sheet :

PRIMO
ITALIAN MACHINE

PG 25
GEARLESS



ØP	A	B	C	N X ØD	E	F	S
Ø200	119	67.5	145	9/10 X Ø 6	667	324	11
Ø240				9/10/ X Ø 6.5			
Ø240	97	56.5	134	8 X Ø 6.5	645	324	11
Ø320	106	61	132.5	6/7 X Ø8	640	338	12



All dimensions are in mm.
Tutte le grandezze sono espresse in mm.

[Revision Date : 01-01-2027]

3.2 Gearless Hoisting
Dimension Sheet :

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3.2 Gearless Hoisting
Dimension Sheet :



PG 3 GEARLESS

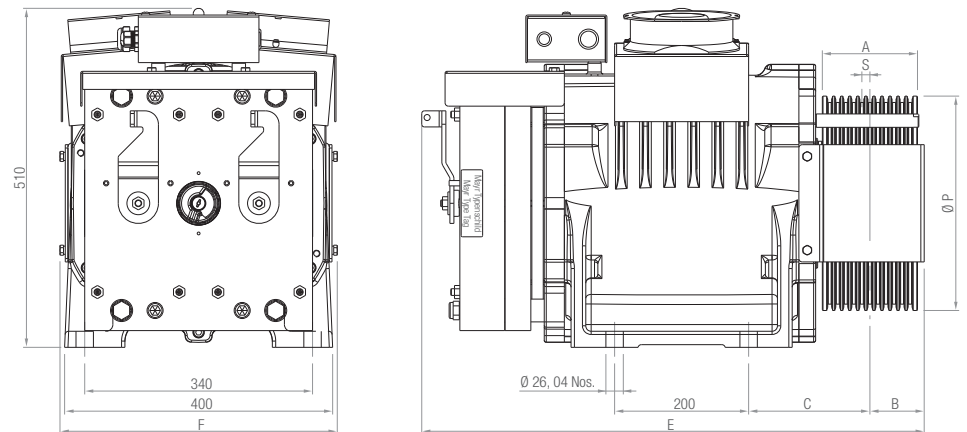
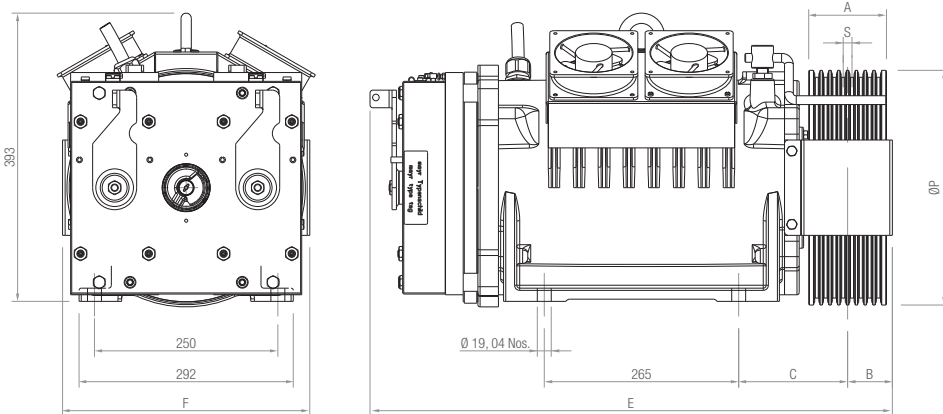


PG 4 GEARLESS



ØP	A	B	C	N X ØD	E	F	S
240	119	67.5	155	10 X Ø 6.5	728	324	11
320	106	61	148.5	8 X Ø 8	715	338	12

ØP	A	B	C	N X ØD	E	F	S
Ø 400	136	78	178	7/8 X Ø10	746	426	16
Ø 320	142	81	181	8/10/11 X Ø8	750	415	12



All dimensions are in mm.
Tutte le grandezze sono espresse in mm.

All dimensions are in mm.
Tutte le grandezze sono espresse in mm.

[Revision Date : 01-01-2027]

[Revision Date : 01-01-2027]

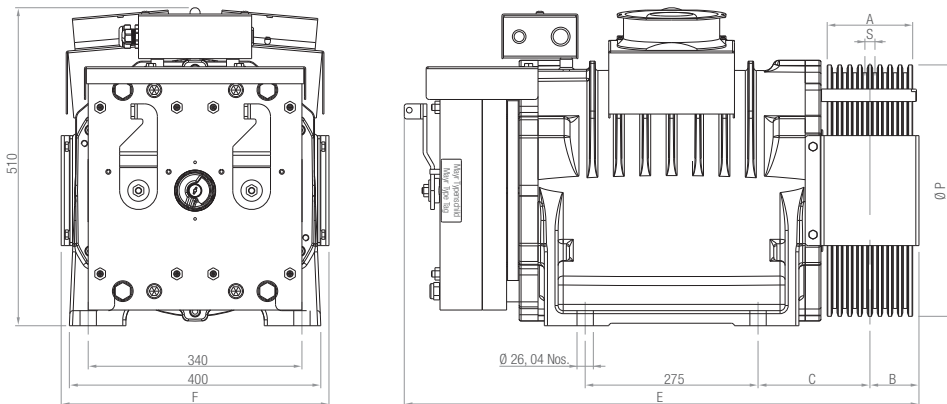
3.2 Gearless Hoisting
Dimension Sheet :

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PG 5 GEARLESS



ØP	A	B	C	N X ØD	E	F	S
Ø 400	136	78	178	8 X Ø10	820	426	16
Ø 320	142	81	181	10/11 X Ø 8	826	415	12



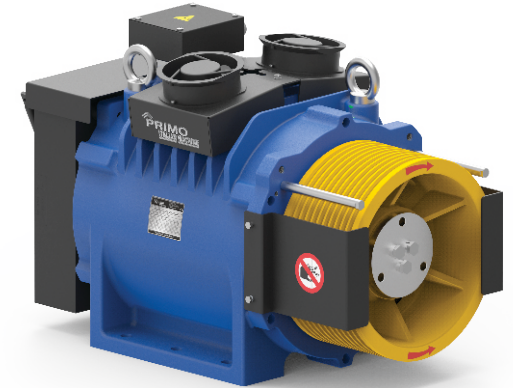
All dimensions are in mm.
Tutte le grandezze sono espresse in mm.

[Revision Date : 01-01-2027]

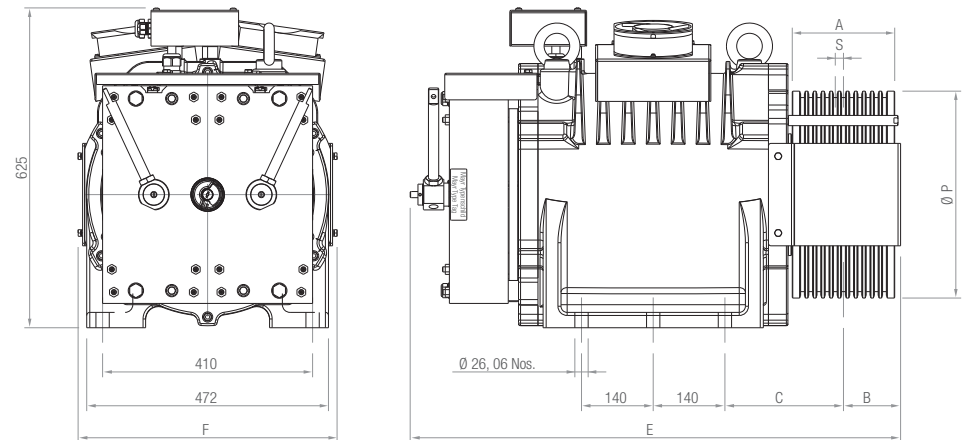
3.2 Gearless Hoisting
Dimension Sheet :



PG 6 GEARLESS



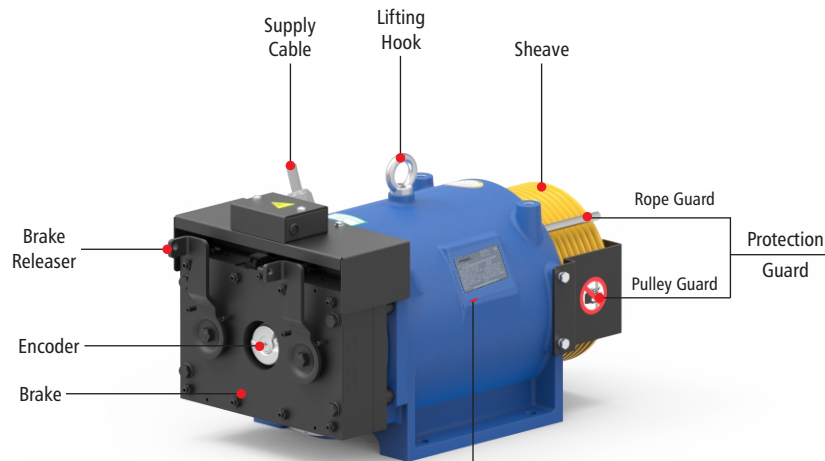
ØP	A	B	C	N X ØD	E	F	S
Ø400	200	112	232	9 / 11 X Ø10	960	510	16
Ø450	185	105.5	224.5	10 X Ø11	945	510	16



All dimensions are in mm.
Tutte le grandezze sono espresse in mm.

[Revision Date : 01-01-2027]

3.3 Machine Identification :-



NAME PLATE

		MADE BY PRIMO VIA NOALESE SUD, 66 30030 MELLAREDO (VE) ITALY EU (T) +39 041 468 966	
TIPO - TYPE : PG-2			
PM SYNCHRONOUS ELEVATOR TRACTION MACHINE			
CARICO STATICO - STATIC LOAD		: 2400 kg	
CARICO DOVERE - DUTY LOAD		: 800 kg	
POWER (kW) : 5.2	RPM : 159	VOLTAGE (V) : 400V , 3Ø	
LIFT SPEED (m/sec) : 1.0	FREQUENCY (Hz) : 31.8		
CURRENT (Ir) : 15.2 A	POLE : 24	TORQUE (Tr) : 315 Nm	
RATING : S5 (40%)	ST/H : 180	IP : 40	INSUL. CLASS : F
BRAKE VOLTAGE : 207 VDC		BRAKING TORQUE : 2 x 450 Nm	
SERIAL Nr :	M & Y :		
www.primoitalianmachine.it			

3.4 Disposal / Recycling



Disposal must be carried out as per National & Local body Laws. Electronic items may be disposed as per WEE directives. Further Instruction of disposal may also Refer Pg.No. 41

4. SAFETY PRECAUTIONS :-



⚠ WARNING

The gearless lift machine should be installed in an area that is strictly kept under lock and key surveillance, Access to this area must be exclusively limited to a qualified installation & maintenance person who has been authorized by the user. At least the following notice must be affixed to the door that provides access to this area.

⚠ DANGER

Traction machinery use Authorized personnel only.

Before the lift machine is installed, the user must make sure that the support systems for moving loads and for the machine itself offer the required safety factors. The user MUST ALSO respect the distance from walls or other machines that is specified in the directives or standards which apply in the country where the machine is installed.

- Before performing any cleaning or maintenance operations. The maintenance worker must remove the lift machine from service by switching off the power supply and allow the hot motor and the machine itself to cool down to ambient temperature.
- Do not rest against or sit on the machine, whether it is in service or out-of-service.
- Do not approach or lean against rotating parts (traction-sheave yellow painted).
- Do not rest objects, containers of liquids, etc. on the machine on its electrical components.
- Never tamper with or deactivate the safety systems. Also, never bypass these systems or use them for purposes other than those for which they are intended.
- Do not tamper, degrade or remove the identification plates. If a plate should deteriorate and become illegible, contact PRIMO S.R.L. immediately for a replacement.
- When working around the machine the installation and maintenance person MUST NEVER WEAR FLUTTERING AND/OR TORN CLOTHING (i.e., scarves, ties, hats, necklaces, straps, watches, bracelets around the wrists, rings on the fingers, etc.) Warning refers to a hazard or unsafe method or practice which CAN result in service personal injury or possible death.
- Depended on the working conditions the surface temperature can be very high.

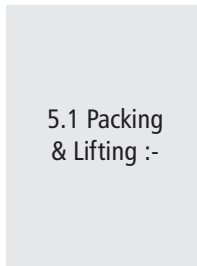
⚠ DANGER

- Do not lift higher loads with these eyelets for example a socket, ropes, etc. Danger of life. !
- Safety components, e.g. the brake release monitoring, may neither be disassembled nor by-passed or disabled.

5. TRANSPORT & STORAGE :-



- Transport the Gearless Lift Machine either with the original packing or at the coasted eyelets using adequate hoists.
- Avoid impacts and shocks.
- Check packing and motor for possible damage and report the forwarding agency about any damages caused by transport. Shipping damages are not covered by our guarantee.
- Store the motor in a dry, weatherproof place in its original packing or protect it from dirt and climatic influences until the final installation.
- Avoid extreme heat or cold (storage temperature – 20 °C until + 60 °C)
- Avoid excessive storage times (we recommend max one year) and check motor bearing for correct function before installing the motor.



5.1 Packing & Lifting :-



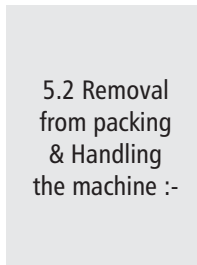
Packing Stage -01



Packing Stage – 02



Final Packing



5.2 Removal from packing & Handling the machine :-



Removing Nail



Remove Wooden Box



Lifting Machine

6. MACHINE INSTALLATION :-

6.1 Commissioning :-

The following points should be checked or completed before Commissioning & Installing Gearless Machine :

- Remove all securing, auxiliary and installation tools from the danger area.
- Check that the lift machine is used for its intended purpose and that the permissible ambient conditions are met.
- Check that the lift machine is properly fastened.
- Are all bolts tightened with the specified torque and secured?
- Check the motor connection and Earthing, see Motor Connection detail in manual and follow process.
- Check the brake Connection, See Brake Connection detail in manual and ensure proper functioning of brake.
- Check the Encoder cable connection, See Encoder Connection detail in manual and ensure proper connection of encoder cable before functioning.
- Check that the offset value indicated on the measuring system (Encoder) agrees with the value set on the Drive system.
- Check the proper functioning of the brake;
- Is the rope guard properly tightened and adjusted?
- An initial function test of the motor and the brake, together with the drive, should be performed before the ropes are put in place ,
- Applied half of full load on inspection mode for testing the machines, Do not apply full load immediately , Test must be carried out 30 minutes for observing performance of machine.
- Now increase the load upto 100 % load and observe the output reading in control system.

7. ELECTRICAL INSTALLATION :-

7.1 Safety Precautions for Electrical Installation :

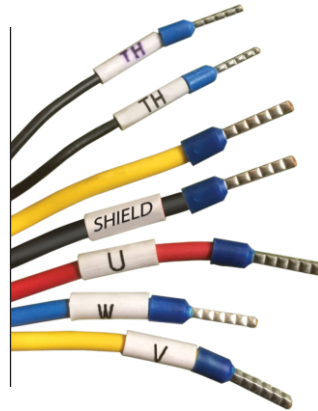
Mounting, electrical connection and commissioning are only to be performed by trained service personnel. Adhere to all machinery-related requirements and specifications supplied by the system manufacturer or machine builder.

7.2 EMC Directive :-

The adherence to the EMC Directive 2004/108/EC only pertains to this product if controllers tested and recommended by Primo S.R.L. are used, which have been installed in accordance with the corresponding controller description and in line with the EMC. If the product is integrated unprofessionally into a system or complemented by and operated with components (e.g. regulators and controllers) which have not been recommended, the operator of the complete system alone shall be responsible for adhering to the EMC Directive 2004/108/EC.

7.3 Motor Connection :-

We are providing main Supply cable 4 core wire with 7 meter length, We mark U, V, W identification on wire for three phase power supply and TH for thermistor wire & remaining wire for Earthing, and another for shield.

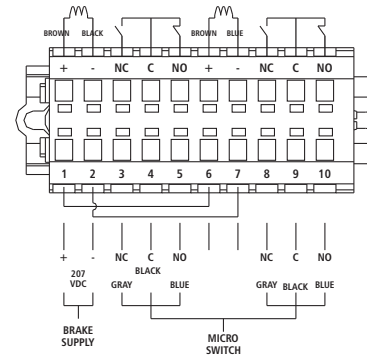


7.4 Brake Connection :-

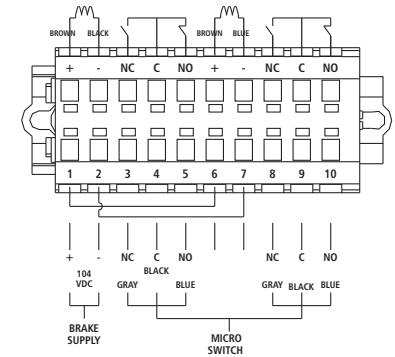


(A) Connection Diagram For PG-0, PG-1, PG-2 & PG-2.5

MAYR BRAKE 207 VDC



MAYR BRAKE 104 VDC

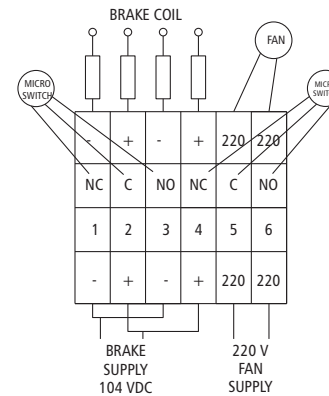


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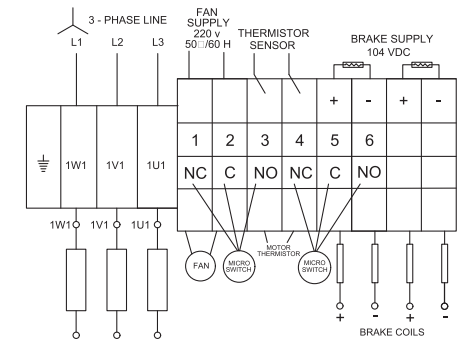
(B) Connection Diagram For PG-3

MAYR BRAKE 207 VDC



(C) Connection Diagram For PG-4, PG-5 & PG-6

MAYR BRAKE 104 VDC



NOTE :-

For brake pg-3, pg-4 & pg-5 must be operate with over excitation rectifier switch for over excitation voltage Of 207vdc only for 1 second is to be applied to release the brake.

[Revision Date : 01-01-2027]

[Revision Date : 01-01-2027]

7.5 Brake Micro Switch

Function :

- There are two Micro switches for brake operation monitoring to protect the motor.
- When brake is properly open at that time micro switch is in function (Normally Close) and give single to drive to run motor,
- In case of brake is not properly open at that time micro switch is not in function (Normally Open) and do not give signal to drive to run motor.
- For Micro Switch connection refer to brake connection diagram.
- Operating Installation of brake as per Mayr

7.6 Thermal Protection of Motor

PTC thermistors are used for temperature monitoring. They are optimally designed for direct installation in the windings of electric motors and transformers. PTC thermistors, in their respective housings, prevent overheating of devices (electronic assemblies, heat sinks, etc.). Please ask for more information.



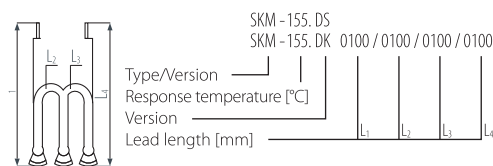
Advantages

- Small dimensions + mechanical stability
- Fast response
- Temperature-resistance characteristics tailored to the application in question

Colour-coding dependent on temperature according to DIN 44081 / DIN 44082

60	70	80	90	100	105	110
white	white	white	green	red	blue	brown
grey	brown	white	green	red	grey	brown
115	120	125	130	135	140	145
blue	grey	red	blue	red	white	white
green	grey	green	blue	brown	blue	black
150	155	160	165	170	180	190
black	blue	blue	blue	white	white	black
black	black	red	brown	green	red	brown

Ordering Instructions :



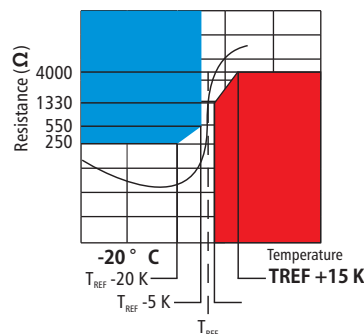
Version: ES: E-Single, S-Standard (520mm wire length)
EK: E-single, K-custom, Z-dual, D-triple, V-quad, S-sixfold

Installation & Functions

Where possible, the PTCs are to be inserted parallel to the coil. As a result, when shaping the coil ends, the mechanical stress of the PTCs is minimised. In so doing, the Mylar® Nomex® shrink cap is highly suited to this purpose due to its mechanical stability (no cold flow in contrast to Teflon®). In connection with the minia ture pill (Ø 1.5 mm) response times of 5 to 10 seconds (max.) are achieved depending on the version.

PTC thermistors correspond to DIN 44081 and/or 44082, IEC60034 11:2004 and are characterised by high resistance to temperatures. Resistance increases greatly in the range of the rated response temperature. Via a trigger device, this change can be used to shut down the load current circuit. Electronic evaluations are also possible in different applications.

Temperature resistance diagram and main parameters in accordance with DIN 44081/44082 and IEC60034 11:2004



General characteristics

Temperature resistance diagram in accordance with IEC60034-11:2004, DIN 44081 (single), DIN 44082 (triplet). Advantageous values : Rated response temperature TREF 60 °C to 190 °C, in each case in increments of 10 K.

Temperature Range	Resistance	Measured Voltage [V _{DC}]
-20 ° C to TREF -20 K	20 Ω to 250 Ω	≤ 2,5 V
Temperature range 90 ° C - 160 ° C		
TREF -5 K	≤ 550 Ω	≤ 2,5 V
TREF +5 K	≥ 1.330 Ω	≤ 2,5 V
TREF +15 K	≥ 4.000 Ω	≤ 7,5 V pulsed

Dielectric strength of the insulation Ueff = 2.500 V

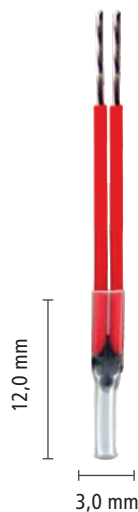
With connector cables; insulation PVDF (KYNAR®)

Insulation material	PVDF (KYNAR®)
Response temperature	70 °C - 180 °C
Operating voltage range	2,5 V DC - 24 V DC
max. permissible operating voltage	30 V DC
max. recommended sensor voltage	2,5 V DC - 7,5 V DC
High voltage resistance	2,5 kV
Length of the insulation cap	12,0 mm
Diameter	≤ 3,0 mm

Require Relay For Ptc Thermistors :-

Technical Data

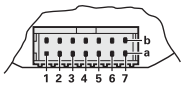
Supply Voltage	110 / 230 / 380 / 415 VAC ± 10 % 50 Hz 24 VDC ± 10 %
Output Contacts	2 Changeover (2 No + 2NC) Potential Free
Input	Max. 6 numbers RTC Thermistors
Rated at	4 Amps 230 Volts.
Ambient Temp	-5 °C to + 55 °C
Operational Lift	1 million on / off Operations



7.7 Encoder Connection

- We are providing Encoder cable with 7 meter length with all gearless machines.
- Encoder cable is kept in bag separately in Machine Box, So first collect Encoder cable from box.
- Encoder cable have 14 wire with one side pin which is going to connect in Encoder socket and on other end of encoder cable there are 14 wire with ferrul mark to connect with Drive PG Card.

In case of loss ferrul mark on wire follow below pin layout connection ,



Cable shield connected to housing

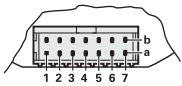
Pin Layout For Connection ERN 1387 :-

1b	7a	5b	3a	6b	2a	3b	5a	4b	4a	7b	1a	2b	6a
Up	Sensor Up	0V	Sensor 0V	A+	A-	B+	B-	R+	R-	C+	C-	D+	D-

The Sensor line is connected inside the encoder to the supply line.

Power supply

Up = 5V ±5%
 I_{max}. 130 mA
 (ohne Last, Without load, sans charge,
 EN 50 178
 PELV ±EN 60204-1



Cable shield connected to housing

Pin Layout For Connection ECN 1313

1b	6a	4b	3a	2a	5b	4a	3b	6b	1a	2b	5a
Up	Sensor Up	0V	Sensor 0V	A+	A-	B+	B-	DATA	DATA	CLOCK	CLOCK

Power supply :- 3.6 to 14V
 Power consumption :- 3.6V : ≤ 600 NW
 (maximum) 14V : ≤ 700 NW
 Current consumption 5V : 85 mA (Without load)
 (typical)
 Protection (EN 60 529) IP 40 when mounted



WARNING

The electrical connection may only be made by a qualified electrician.

8. EMERGENCY EVACUATION :-

8.1.1. MANUAL EMERGENCY EVACUATION :-

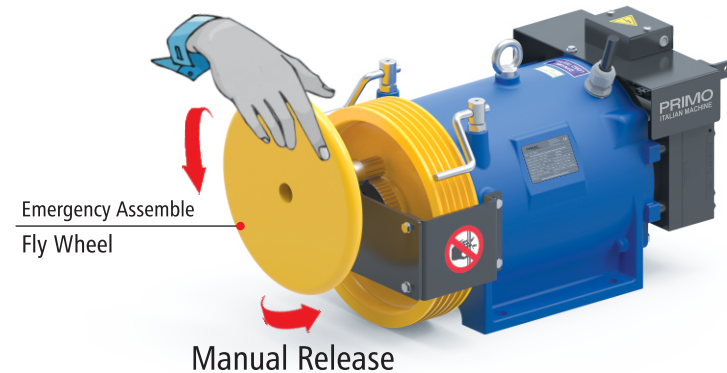
1. Switch off the main switch in machine room.
2. Operate manual operating devices as shown in by rotating handle for release the brake and lift move In high load side.



8.1.2. Optional Emergency Rescue Device :



- We are providing Optional Emergency Mechanical Rescue Device,
- For operating Emergency Rescue Device, First open Brake by means of Manual Brake Operating attachment,
- Now Connect Hand releaser to Sheave Gear and match proper gear and rotate hand releaser by hand in appropriate direction to reach nearest floor.



9. FAULTS & REMEDY :-

Fault	Cause	Root Cause
Running Noise	Bearing Noise Motor Noise Brake Noise	Contact Customer Service Check motor parameter Check brake function
Motor will not start	Motor Phase Connect incorrect Encoder Tuning with drive Brake dose not release	Check motor Connection Check encoder tuning with drive Check Brake Connection
Brake dose not release	Power supply to low Brake control wrong / defective Brake defective	Check power supply Check brake control Change brake

10. Service & Maintenance :-

10.1. General Notes :-

- The regulations concerning operation, maintenance and inspection pursuant to the applicable safety regulations for lift construction such as DINEN81 "Safety rules for the construction and installation of lifts", Part 1 "Electric lifts", and other relevant regulations are to be strictly observed.
- The operator is responsible for ensuring that the motor is installed properly and in accordance with the safety requirements, as well as for its inspection and maintenance as specified in the applicable regulations.
- The proper maintenance of gearless lift machines requires adequately trained specialist personnel and special devices and tools.
- Repairs other than those described in these operating instructions are not to be carried out by the lift fitter/maintenance technician for liability reasons.

10.2. Maintenance Intervals :-

Point To Be Consider	At Initial Operation Resp. After 3 Months	After 6 Month	Every Year
Cleaning	✓	✓	✓
Brake Air Gap		✓	✓
Bearing		✓	✓
Electrical Cables		✓	✓
Visual Check of the Bolts and Screw	✓	✓	✓
Check Traction Sheave for wear out			✓

10.3. SPARE PARTS WARNING

Spare parts and accessories not supplied by Primo S.R.L. have not been tested or approved by us. These parts may be lower in function or quality and therefore can reduce functionality or safety of the installation. Primo S.R.L. will assume no liability or guarantee for damages caused by spare parts that are not approved.

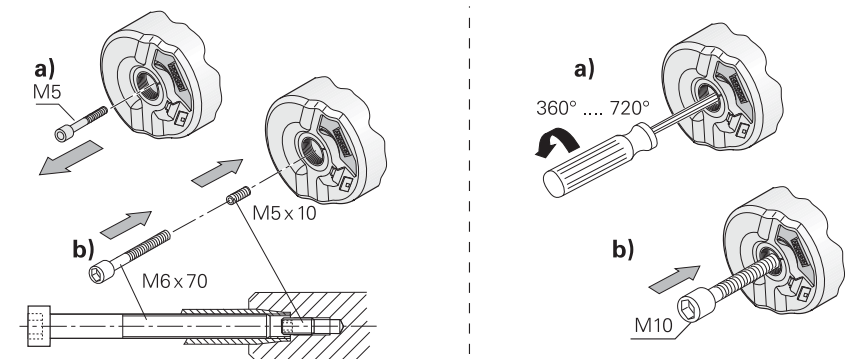
Available spare parts :

- Encoder
- Brake (complete)
- Micro switch for brake
- Traction sheave
- Protection guards
- Rope guard
- Pulley guard

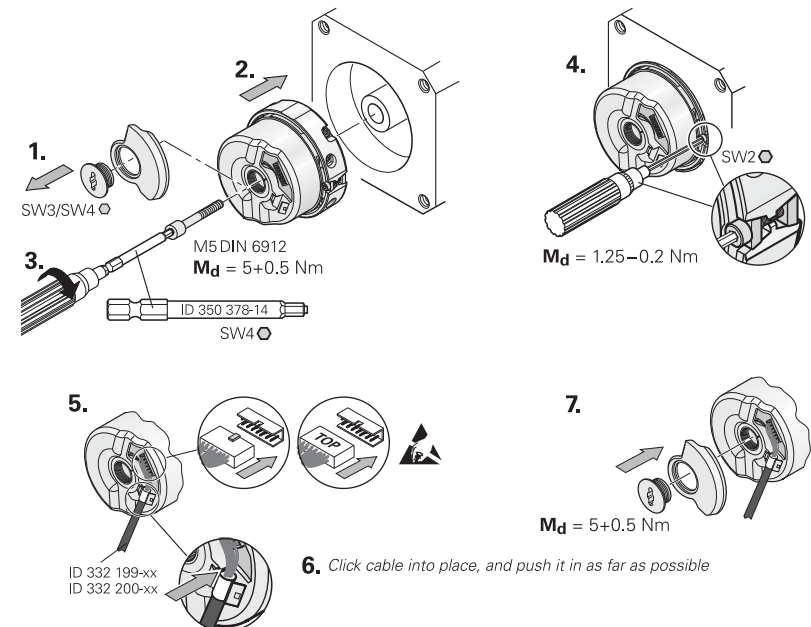
10.3.1. Replacement of Encoder :-

DISASSEMBLY STEP FOR ENCODER:-

- Disassembly in reverse order.
- Two ways of pressing the encoder out during dismantling.

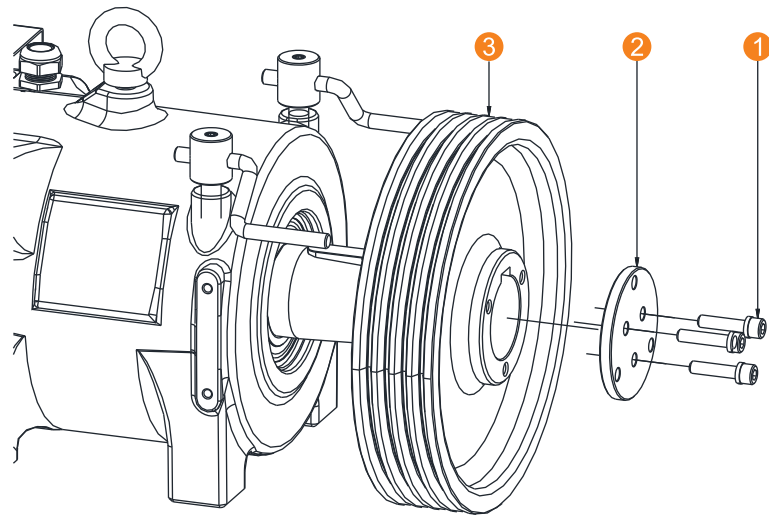


ASSEMBLE STEPS FOR ENCODER



10.3.2. Replacement of Traction Sheave :-

- First of all Remove allen bolt (1) with the help of the spanner.
- Now remove Pulley washer (2) than after put nut between pulley washer and shaft face, Now match pulley's thread with pulley washer's outer hole and tight slowly all three allen bolt equally to remove the pulley.
- Now follow reverse process for reassemble the pulley.



[Revision Date : 01-01-2027]

11. ENCLOSURE :-

11.1. Declaration of Conformity

In term of the low voltage directive 2014/35/EU we
Chr. mayr GmbH + Co. KG
 Eichenstraße 1
 D-87665 Mauerstetten

Declare that the mentioned products have been developed, constructed and manufactured in sole responsibility and in conformity with the above mentioned EC directives.

Safety Brakes

Product	Type	ASRI	CE	Product	Type	ASRI	CE
ROBA-stop®	8_ _ _ _ _	6	9/96	ROBA®-secustop	8020_ _ _ _	6	11/08
ROBA-stop®-S	856.41_ _	6	9/96	ROBA®-topstop®	899_ _ _ _	6	8/06
ROBA-stop®-B	893.0_ _	6	2/06	ROBA-stop®-twin	895_ _ _ _	6	2/06
ROBA-stop®-M	891_ _ _ _	6	10/02	ROBA®-quatropstop®	8040_ _ _ _	6	7/08
ROBA-stop®-silenzio®	896_ _ _ _	6	11/05	ROBA®-twinstop®	8012_ _ _ _	6	2/06
ROBA-stop®-Z	892_ _ _ _	6	4/99	ROBA®-boxerstop	8013_ _ _ _ 3	6	8/12
ROBA®-alphastop®	897_ _ _ _	6	3/06	ROBA®-linerstop	382_ _ _ _	6	4/08
ROBA®-disktop®	894_ _ _ _	6	11/00	ROBA®-servostop	898_ _ _ _	6	11/10
ROBA®-duplostop®	8010_ _ _ _	6	9/05				

Reference to EMC Directive (2014/30/EU)

The products listed herein are products which cannot be operated independently in terms of the EMC directive. Due to the characteristics, brakes and clutches are to be considered to be non-critical products in regards to EMC. An evaluation in terms of the EMC directive is only possible after the installation of the product. For electronic equipment, the individual product has been evaluated and demonstrated under laboratory conditions, but not in the overall system.

Reference to Machinery Directive (2006/42/EC)

The products listed herein are considered to be components for installation into machine according to the Machinery Directive 2006/42/EC. In combination with other components, they can fulfil the specifications for safety-related applications. The type and scope of the required measures for fulfilment of the health and safety requirements result from the machine risk analysis. They then will be part of the machine and the machine manufacturer assesses the conformity of the safety setup to the directive. The initial operation of the products is forbidden until it is assured that all applicable directives for the machine or system into which the product has been installed have been fulfilled.

Applied standards, regulations and inspections (ASRI)

6 DIN VDE 0580 11/2011 Electromagnetic Devices and Components - General Specifications 2006/95/EC

Meuerstetten den 08.03.2016

City / Date

Graduate engineer, Günther Klinger

(Managing director pp)

11.2. Declaration of Incorporation



Declaration Of Incorporation Of Partly Completed Machinery

DIRECTIVE 2006/42/EC - Annex II B

Business name and full address of the manufacturer:

PRIMO S.R.L.

Via Noalese Sud 66 - 30030 Mellaredo di Pianiga (VE) Italia.

Name and address of the person authorised to compile the relevant technical documentation

Marco Santel

Via Noalese Sud 66 - 30030 Mellaredo di Pianiga (VE) Italia.

Hereby declares that for the partly completed machine:

Gearless: PG-0, PG-1, PG-2, PG-3, PG-4, PG-5, PG-6 and PG-β

The following essential requirements of this Directive are applied and fulfilled:

1.1.2 Principles of safety integration	1.4.1 General requirements
1.1.3 Materials and products	1.4.2.1 Fixed guards
1.1.5 Design of machinery to facilitate its handling	1.5.1 Electricity supply
1.2.6 Failure of the power supply	1.5.4 Errors of fitting
1.3.2 Risk of break-up during operation	1.6.1 Machinery maintenance
1.3.4 Risks due to surfaces, edges or angles	1.6.4 Operator intervention
1.3.7 Risks due to surfaces, edges or angles	1.6.5 Cleaning of internal parts
1.3.8 Choice of protection against risks arising from moving parts	1.7.1 Information and warnings on the machinery
1.3.8.1 Moving transmission parts	1.7.1.1 Information and information devices
1.3.8.2 Moving parts involved in the process	1.7.2 Warning of residual risks

The relevant technical documentation is compiled in accordance with part B of Annex II. Relevant information on the partly completed machinery will be transmitted Upon a reasoned request by the national authorities without prejudice the intellectual property rights of the manufacturer of the partly completed machinery;

The partly completed machinery is also built in conformity with the following EU relevant directives:

2014/33/EU Direttiva Ascensori,
2014/35/EU Direttiva Bassa Tensione
2014/30/EU Direttiva EMC - 2011/65/UE RoHS

The partly completed machinery is also built in conformity with the following European harmonized standards:

UNI EN 81-20:2020 UNI EN 81-50:2020

the partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity, where appropriate, with the Directive 2006/42/EC,.

Violation of the provisions in the technical instructions leads to immediate loss of any form of warranty.

Note:- with reference to the requirements 9.7 ref. EN81-1:2010 point 5.5.7 e d EN81-20, Primo SRL provides these protective devices only if specifically requested by the customer in the order.

Place and Date:

Mellaredo di Pianiga (VE)

Signature

PRIMO S.R.L.

iscritta reg. imp. Cciaa VE n° /C.F./P.IVA: 04366080275 REA: VE - 406031 C.S. € 10.000 - interamente versato
Sede Legale - Legal Address: Via Noalese Sud, 66 30030 Mellaredo di Pianiga (VE) - Italy
info@primoitalianmachine.it / www.primoitalianmachine.it

"soggetta ad attività di direzione e coordinamento "PRIMO ENGINEERS" - Art. 2497 bis C.C."

11.3. Operating Instruction of Brake

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

Please read these Operational Instructions carefully and follow them accordingly!
Ignoring these Instructions can lead to lethal accidents, malfunctions, brake failure and damage to other parts.
These Installation and Operational Instructions (I + O) are part of the brake delivery.
Please keep them handy and near to the brake at all times.

Contents:

Page 1	:	Contents
Page 2	:	Safety and Guideline Signs Certification Guidelines on EU Directives
Page 3	:	Safety Regulations
Page 4	:	Safety Regulations
Page 5	:	Safety Regulations
Page 6	:	Brake Illustrations
Page 7	:	Parts List
Page 8	:	Table 1: Technical Data Table 2: Technical Data
Page 9	:	Table 3: Technical Data Table 4: Switching Times
Page 10	:	Torque-Time Diagram Application Design Function
Page 11	:	Scope of Delivery / State of Delivery Adjustment Installation Conditions
Page 12	:	Installation: Design for Splined Motor Shaft Installation: Hub Design Braking Torque Noise Damping
Page 13	:	Hand Release
Page 14	:	Release Monitoring
Page 15	:	Wear Monitoring
Page 16	:	Electrical Connection and Wiring
Page 17	:	Brake Inspection (Customer-side after Mounting) Dual Circuit Brake Functional Inspection
Page 18	:	Maintenance Information on the Components Cleaning the Brake
Page 19	:	Disposal Malfunctions / Breakdowns

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

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.

Certification

EU Type Examination Certificate (Elevator Directive): EU-BD 845



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. 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 use of the product until you have ensured that the machine accords with the regulations stated in the directive.

Guidelines on the EU Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

The electromagnetic brake as well as the rectifiers / microswitches / proximity switches required for control / self-monitoring fulfil the requirements laid down in the EU Directive 2011/65/EC (RoHS). (Restrictions on the use of certain hazardous substances, such as lead (0.1 %), mercury (0.1 %), cadmium (0.01 %), hexavalent chromium (0.1 %), polybrominated biphenyls (PBB) (0.1 %), polybrominated diphenylethers (PBDE) (0.1 %))

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.

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

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

General Guidelines

Danger



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



Brakes may generate further risks, among other things:



Hand injuries

Danger of seizure

Contact with hot surfaces

Magnetic fields

Severe injury to people and damage to objects may result if:
the electromagnetic brake is used incorrectly.
the relevant standards for safety and / or installation conditions are ignored.

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

To prevent injury or damage, only 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-energised, disengaged state and secure the system against inadvertent switch-on.

Guidelines for Electromagnetic Compatibility (EMC)

In accordance with the EMC directives 2014/30/EU, the individual components produce no emissions. However, functional components e.g. mains-side energisation of the

brakes with rectifiers, phase demodulators, ROBA®-switch devices or similar controls can produce disturbance which lies above the allowed limit values. For this reason it is important to read the Installation and Operational Instructions very carefully and to keep to the EMC directives.



Application Conditions

The catalogue values are guideline values which have been determined in test facilities. It may be necessary to carry out your own tests for the intended application. When dimensioning the brakes, please remember that installation situations, braking torque fluctuations, permitted friction work, 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 ageing 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 foreign bodies.



Please ensure that the brake is clean and oil-free, as both brake circuits have an effect on the same linings. 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)



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.

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

Dimensioning

Attention!
When dimensioning the brake, please take into consideration whether 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 applications with an ambient temperature of between -5 °C and +40 °C.



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).



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.



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 behaviour.

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 car moving in upwards direction and as a braking element against unintended car movement.

Earthing Connection

The brake is designed for Protection Class I. This protection covers not only the basic insulation, but also the connection of all conductive parts to the protective conductor (PE) on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardised 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): 1K3; 1Z1; 1B1; 1C2; 1S3; 1M1

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.

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

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
2014/35/EU	Low Voltage 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 81-1	(End of the period of applicability: 31 AUG 2017)
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!

CE Identification

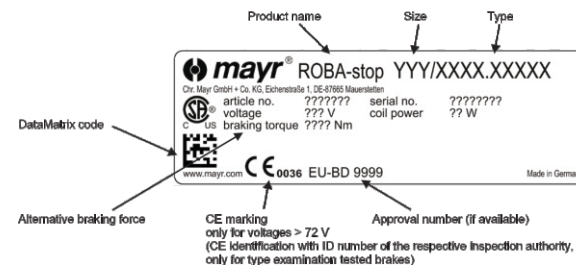
according to the Low Voltage Directive 2014/35/EU and the Elevator Directive 2014/33/EU

Conformity Markings

in terms of the Canadian and American approval

Identification

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



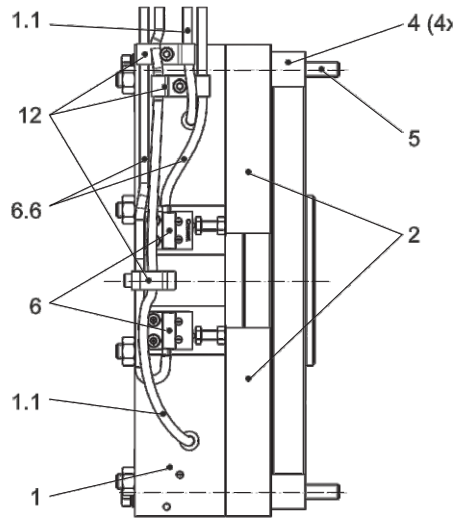


Fig. 1

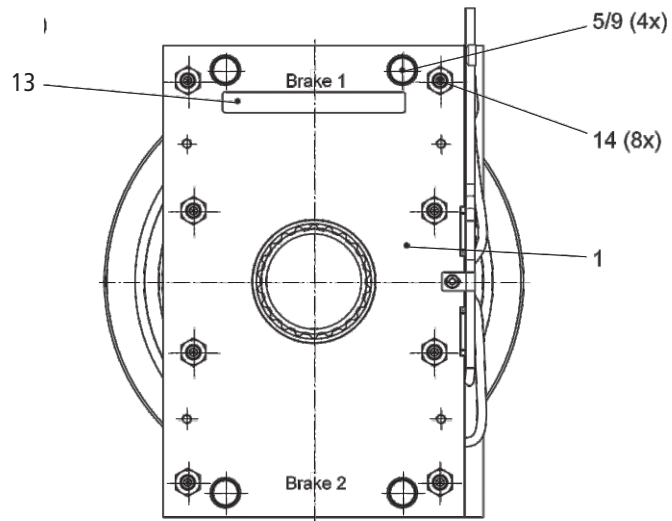


Fig. 2

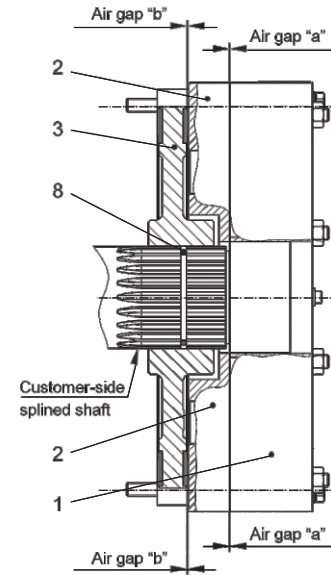


Fig. 3
Design for splined shaft

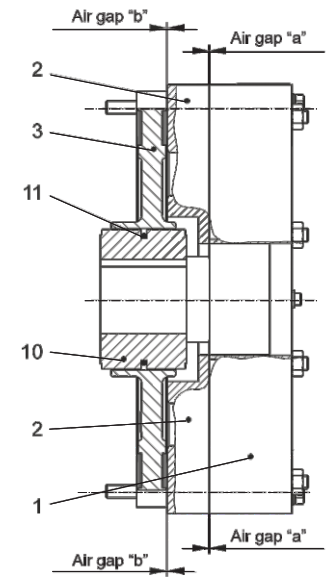


Fig. 4
Hub design

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
6.1	Microswitch incl. adaptor plate (Fig. 8, page 14)
6.2	Cap screw (Fig. 8, page 14)
6.3	Hexagon nut (Fig. 8, page 14)
6.4	Hexagon head screw (Fig. 8, page 14)
6.5	Spring washer (Fig. 8, page 14)
6.6	Microswitch cable 3 x AWG20 black / blue / brown
7	Hand release assembly (page 13)
7.1	Hand release lever (page 13)
7.2	Hexagon nut (page 13)
7.3	Spring pin (page 13)
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. 9, page 15)
15.1	Microswitch inc. adaptor plate (Fig. 9, page 15)
15.2	Cap screw (Fig. 9, page 15)
15.3	Hexagon nut (Fig. 9, page 15)
15.4	Hexagon head screw (Fig. 9, page 15)
15.5	Spring washer (Fig. 9, page 15)

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 centre 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 tension ability of the brake increases, above all when operating with reduced torques and / or in operation with overexcitation.
Due to the brake noise behaviour and for safety reasons, the rotor (3) must however be replaced at the latest when the air gap reaches 0.9 mm (see section on Maintenance, page 18).
If there is still a risk of the device wearing down to an air gap of 0.9 mm unnoticed, we recommend mounting a wear monitoring device (available on request).
When the air gap "a" > 1.8 mm (design with hand release) or "a" > 2.5 mm (design without hand release), the armature disk (2) will lie against the mechanical contacts, which causes a sudden drop in braking torque to 0 Nm and a risk of load crashes.

Table 2 : Technical Data

Size	Nominal Torque 3) minimal	Nominal Voltage UN	Nominal Power P (20 °C)	Inductivity		Rotor Thickness New Condition
				24 V Coil	207 V Coil	
150	2 x 150 Nm	24/104/180/ 207 V DC	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 DC	2 x 63 W	2 x 2.1 H	2 x 125 H	
	2 x 160 Nm					
	2 x 120 Nm					
250	2 x 280 Nm	24/104/180/ 207 V DC	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 DC	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.

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	36 Nm	27.0 kg
350	23500 J	800 rpm	48 Nm	34.9 kg



4) Values for speed 400 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 minimal	Attraction t2	Drop-out t0 DC	Drop-out t50 5) DC	Drop-out t90 6) DC	Drop-out t11 AC	Drop-out t1 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	70		95		570
200	2 x 200 Nm	280	45	65	140	190	620
	2 x 160 Nm	225	60	100	170	310	790
250	2 x 120 Nm	170	85	145	190	420	980
	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
350	2 x 185 Nm	210	50	75	110	300	720
	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 effective braking torque on disconnection from holding voltage (nominal voltage)
 6) Referring to the nominal braking torque on disconnection from holding voltage (nominal voltage)
 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.

Torque-Time Diagram

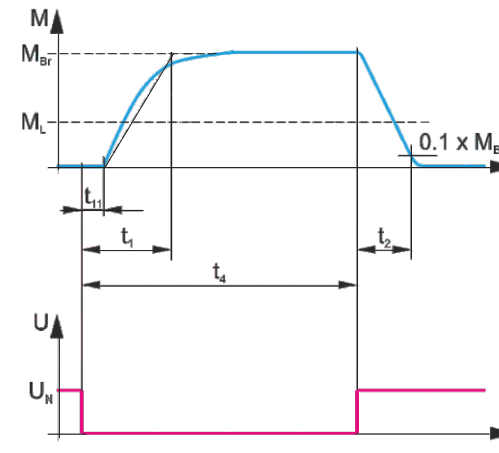


Diagram 1
Switching times for brake operation with nominal voltage

Key
 M_{Br} = Braking torque
 M_L = Load torque
 t₁ = Connection time
 t₁₁ = Response delay on connection (t₀ acc. Type Examination Certificate)
 t₂ = Separation time
 t₄ = Slip time + t₁₁
 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 car moving in upwards direction and as a braking element against unintended car movement. 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-energised condition, thrust springs press against the armature disks (2). The rotor (3) with the friction linings is therefore held between the armature disks (2) and the machine screw-on surface. The motor shaft is braked via the rotor (3).

Electromagnetic 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 brakes:

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

Scope of Delivery / State of Delivery

The brake body is pre-assembled with coil carrier (1), armature disks (2), distance bolts (4), hand release (option dependent on Type) and adjusted microswitches (option dependent on Type). The following are included loose in delivery: the 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 microswitches 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 O-ring groove must be inserted before the shaft is splined. The O-ring groove must be free of burrs.



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

On hub designs the 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 200 °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/mm² should be used.

The length of the key should 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 with depth K + 2 mm (K = screw projection) must be provided according to the Catalogue or the applicable assembly drawing (Fig. 5).

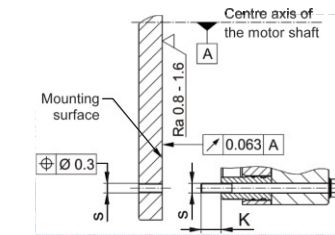


Fig. 5

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.

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 mm²/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. Check 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 centre axis on both armature disks (2) (Fig. 1).
5. Check air gap "b" > 0.25 mm in energised state on the rotor (3) (Fig. 3). **Check air gap "b" > 0.25 mm in energised 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. Check 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 centre axis on both armature disks (2) (Fig. 1).
5. **Check air gap "b" > 0.25 mm in energised 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 ageing, 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.

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.

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.



Operate the hand release carefully. Any existing loads will begin to move when the hand release is operated.

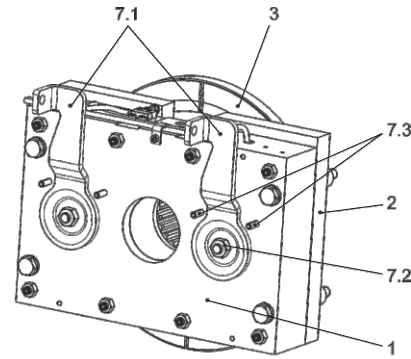


Fig. 6 (Hand release for Bowden cable)

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 7.3), 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. In particular 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 on customer Bowden cable designs in order to align friction forces in the Bowden cable.

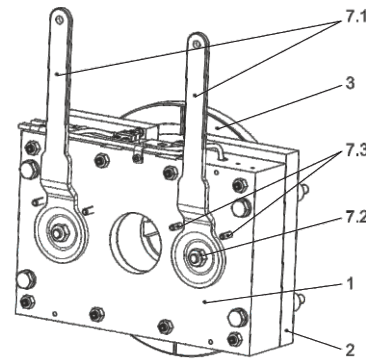


Fig. 7 (Hand release with hand release lever)

Release Monitoring (6) Fig. 8 (Option, dependent on Type)

ROBA®-twinstop® brakes are delivered with manufacturer-side installed and adjusted release monitoring devices.

One microswitch (6.1) per brake circuit emits a signal for every brake condition change "brake opened" or "brake closed"

On initial operation: Connection as NO contact (black and blue strands).

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

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

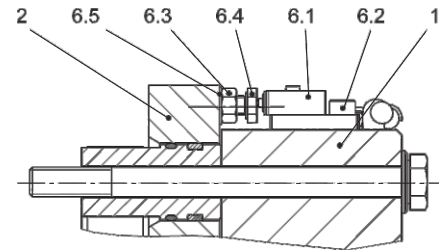
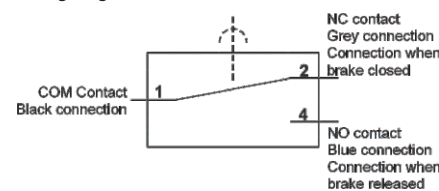


Fig. 8

Function

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

Wiring Diagram of the Microswitch (6.1):



Microswitch Specification

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

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

Customer-side Inspection after Mounting onto the Elevator Machinery

The customer-side contact is an NO contact.

Please inspect the release monitoring on both circuits :

Brake de-energised → Signal "OFF",

Brake energised → Signal "ON"



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!



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

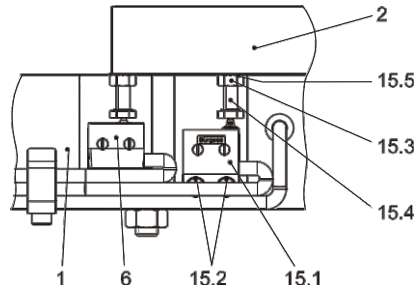
Wear Monitoring (15) Fig. 9 (Option, dependent on Type)

Only one microswitch for wear monitoring (15) is required per ROBA®-twinstop® brake, which is mounted onto the right brake (Fig. 9). The ROBA®-twinstop® brake is delivered with manufacturer-side installed and adjusted wear monitoring (15).

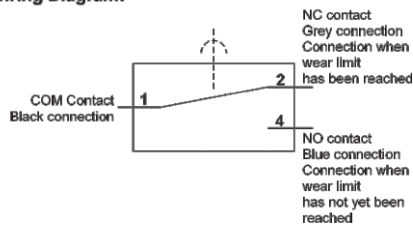
Function

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.



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!

Electrical Connection and Wiring

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

Earthing 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 standardised 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 Behaviour

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

Magnetic Field Build-up

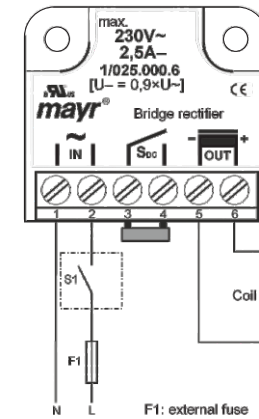
When the voltage is switched on, a magnetic field is built up in the brake coil, which attracts the armature disk to the coil carrier and releases the brake.

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.

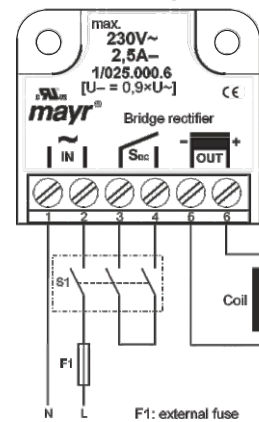
Magnetic Field Removal AC-side Switching



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 the coil and the 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 switching), use for non-critical braking times.



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.

Brake Inspection

(Customer-side after Mounting onto the Elevator Machinery)

Inspection of the individual air gaps (Fig. 3 / 4)
Air gaps "a" of both brake circuits (brake de-energised):
Air gap $0.40 \text{ mm} \leq "a" \leq 0.65 \text{ mm}$. Air gaps "b" of
both brake circuits (brake energised): 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 energising the brake via battery operation, to guarantee emergency escape for passengers during a power failure or manually using the hand release.

Switch function inspection of the release monitoring (NO contact) Brake de-energised Signal "OFF"
Brake energised Signal "ON"

Hand release functional inspection (dependent on Type) Please observe the guidelines on page 13!

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 energised 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 energising the individual circuits with nominal voltage. 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. Energise brake circuits 1 and 2 and put the system into operation.
2. De-energise brake circuit 1 (= EMERGENCY STOP) and inspect the stopping distance according to the elevator regulations.
3. De-energise brake circuit 2.

Inspection brake circuit 2:

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

Inspection of both brake circuits:

Energise 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 unintended car movement, 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.

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 on the elevator system 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 Figs. 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 12) backwards.

Replacing the Rotor (3)

Before Replacing the Rotor
Clean the brake.



Please observe the "Cleaning the Brake" section, 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 fibres.

Possible hazards:

No potential dangers have been recognised so far when the brake is used according to its intended purpose. When grinding in the friction 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 behaviour:

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!

Use a suction system or wet towels to clean off the brake dust.

Do not inhale brake dust (wear safety gloves / safety goggles)

In case of dust formation, a dust mask FFP 2 is recommended.

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 / ROBA®-switch / Microswitch):

Products which have not been disassembled can be disposed of under Code No. 160214 (mixed materials) or components under Code No. 160216, or can be disposed of by a certified disposal firm.

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

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

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

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

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 rectifier Replace the rotor Replace the brake
Release monitoring does not switch	Brake does not release Defective microswitch	Solution as above Replace the microswitch (manufacturer-side)

11.3.2 Instruction and Operational Instructions for ROBA®-twinstop® Type 8012.____ Sizes 600 / 800 / 1000

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.

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Safety and Guideline Signs

DANGER



Immediate and impending danger, which can lead to severe physical injuries or to death.

DANGER



Danger of injury to personnel and damage to machines.



Please Observe! Guidelines on important points.

Certification

EU Type Examination Certificate (Elevator Directive): EU-BD 1014



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. 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 use of the product until you have ensured that the machine accords with the regulations stated in the directive.

Guidelines on the EU Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment

The electromagnetic brake as well as the rectifiers / microswitches / proximity switches required for control / self-monitoring fulfil the requirements laid down in the EU Directive 2011/65/EC (RoHS). (Restrictions on the use of certain hazardous substances, such as lead (0.1 %), mercury (0.1 %), cadmium (0.01 %), hexavalent chromium (0.1 %), polybrominated biphenyls (PBB) (0.1 %), polybrominated diphenylethers (PBDE) (0.1 %))

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.

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-energised, disengaged state and secure the system against inadvertent switch-on.

Guidelines for Electromagnetic Compatibility (EMC)

In accordance with the EMC directives 2014/30/EU, the individual components produce no emissions. However, functional components e.g. mains-side energisation of the

Guidelines for Electromagnetic Compatibility (EMC)

In accordance with the EMC directives 2014/30/EU, the individual components produce no emissions. However, functional components e.g. mains-side energisation of the brakes with rectifiers, phase demodulators, ROBA®-switch devices or similar controls can produce disturbance which lies above the allowed limit values. For this reason it is important to read the Installation and Operational Instructions very carefully and to keep to the EMC directives.



Application Conditions

The catalogue values are guideline values which have been determined in test facilities. It may be necessary to carry out your own tests for the intended application. When dimensioning the brakes, please remember that installation situations, braking torque fluctuations, permitted friction work, 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 ageing 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 foreign bodies.



Please ensure that the brake is clean and oil-free, as both brake circuits have an effect on the same linings. 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.

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

Dimensioning

Attention!
When dimensioning the brake, please take into consideration whether 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 applications with an ambient temperature of between -5 °C and +40 °C.



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).



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.



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 behaviour.

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 car moving in upwards direction and as a braking element against unintended car movement.

Earthing Connection

The brake is designed for Protection Class I. This protection covers not only the basic insulation, but also the connection of all conductive parts to the protective conductor (PE) on the fixed installation. If the basic insulation fails, no contact voltage will remain. Please carry out a standardised 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): 1K3; 1Z1; 1B1; 1C2; 1S3; 1M1

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.

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

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
2014/35/EU	Low Voltage 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 81-1	(End of the period of applicability: 31 AUG 2017)
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!

CE Identification

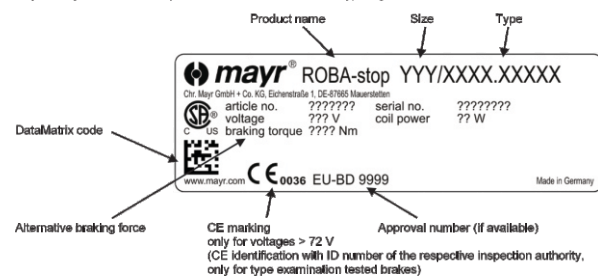
according to the Low Voltage Directive 2014/35/EU and the Elevator Directive 2014/33/EU

Conformity Markings

in terms of the Canadian and American approval

Identification

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



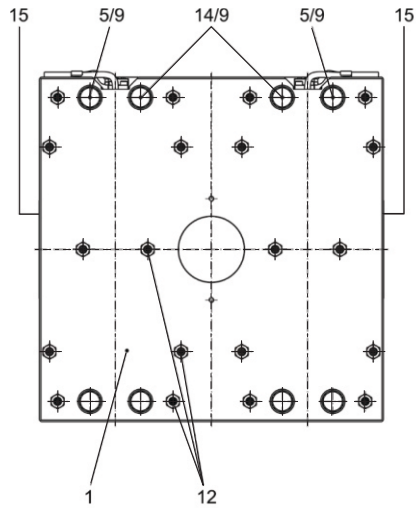


Fig. 1

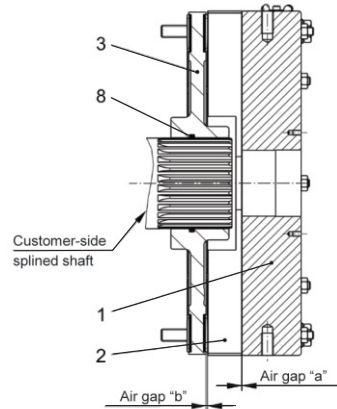


Fig. 2 (Design for splined shaft)

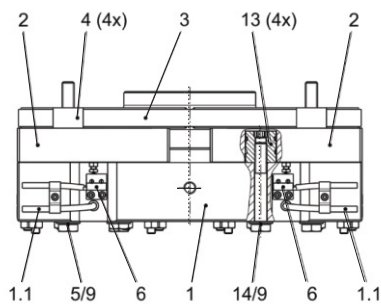


Fig. 3

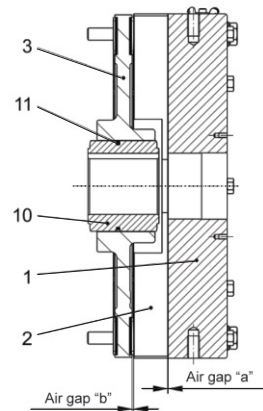


Fig. 4 (Hub design)

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 600 : M10 x 120 / 10.9 On Size 800 : M12 x 140 / 10.9 On Size 1000 : M16 x 150 / 8.8
6	Release monitoring assembly
6.1	Microswitch incl. adaptor plate (Fig. 8, page 14)
6.2	Cap screw (Fig. 8, page 14)
6.3	Hexagon nut (Fig. 8, page 14)
6.4	Hexagon head screw (Fig. 8, page 14)
6.5	Spring washer (Fig. 8, page 14)
6.6	Microswitch cable 3 x AWG20 black / blue / brown
7	Hand release assembly (page 13)
7.1	Hand release lever (page 13)
7.2	Hexagon nut (page 13)
7.3	Washer (page 13 / only for Bowden cable hand release)
7.4	Spring pin (page 13 / only for Bowden cable hand release)
7.5	Connection piece (page 13 / only for lever hand release)
8	O-ring If not included in the standard scope of delivery, the O-ring defined in the applicable assembly drawing must be provided by the customer.
9	Washer
10	Hub
11	O-ring
12	Noise damping
13	Guide bolt
14	Hexagon head screw
15	Type tag

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 centre 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.



The tension ability of the brake increases, above all when operating with reduced torques and / or in operation with overexcitation. Due to the brake noise behaviour and for safety reasons, the rotor (3) must however be replaced at the latest when the air gap reaches 0.9 mm (see section on Maintenance, page 18). If there is still a risk of the device wearing down to an air gap of 0.9 mm unnoticed, we recommend mounting a wear monitoring device (available on request). When the air gap "a" > 1.8 mm (design with hand release) or "a" > 2.5 mm (design without hand release), the armature disk (2) will lie against the mechanical contacts, which causes a sudden drop in braking torque to 0 Nm and a risk of load crashes.

Table 2: Technical Data

Sizes	Nominal torque 3)	Overexcitation Voltage 1.5 to 2 x UN	Nominal voltage UN	Nominal power P (20 °C)	Inductivity (207 V coil)	Rotor thickness New condition
600	2 x 400 Nm	no	24 / 104 / 180 / 207 V DC	2 x 92 W	160 H	20 –0.05 mm
	2 x 550 Nm	no				
	2 x 600 Nm	yes				
800	2 x 550 Nm	no	24 / 104 / 180 / 207 V DC	2 x 131 W	126 H	20 –0.05 mm
	2 x 850 Nm	no				
	2 x 1000 Nm	yes				
1000	2 x 800 Nm	no	24 / 104 / 180 / 207 V DC	2 x 158 W	122 H	20 –0.05 mm
	2 x 1200 Nm	no				
	2 x 1350 Nm	yes				



- 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.

Table 3 : Technical Data

Sizes	Inspected max. speed in the elevator area as a type-examination tested brake	Tightening torque Fixing screw Item 5	Weight without hub / without hand release
600	500 rpm	63 Nm	54 kg
800	500 rpm	109 Nm	73 kg
1000	500 rpm	183 Nm	97 kg

Table 4 : Technical Data

Sizes	Max. permitted friction work 4) for brakes with standard friction lining		Max. permitted friction work 4) for brakes with friction lining for increased friction work	
	Single circuit	Both circuits	Single circuit	Both circuits
600	30000 J	60000 J	100000 J	125000 J
800	35000 J	70000 J	100000 J	125000 J
1000	35000 J	70000 J	100000 J	25000 J



- 4) Values for speed 460 rpm, brake linings slightly bedded in (see Chapter on Braking Torque). The value increases at lower speeds and decreases at higher speeds (please contact mayr ®).

Table 5 : Switching Times [ms]

Size	Nominal torque minimal	Overexcitation	Attraction t ₂	Drop-out t ₀ DC	Drop-out t ₅₀ 5) DC	Drop-out t ₉₀ 6) DC	Drop-out t ₁₁ AC	Drop-out t ₁ AC
600	2 x 400 Nm	no	280	45	95	135	400	870
	2 x 550 Nm	no	380	25	60	100	200	650
	2 x 600 Nm	yes	250	30	65	110	180	550
800	2 x 550 Nm	no	260	100	180	280	400	800
	2 x 850 Nm	no	400	40	100	150	210	570
	2 x 1000 Nm	yes	180	60	115	160	180	530
1000	2 x 800 Nm	no	350	85	160	240	380	820
	2 x 1200 Nm	no	550	40	95	150	180	580
	2 x 1350 Nm	yes	230	45	110	170	160	540



- 5) Referring to the effective braking torque on disconnection from holding voltage (nominal voltage)
 - 6) Referring to the nominal braking torque on disconnection from holding voltage (nominal voltage)
- 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.

Torque-Time Diagram

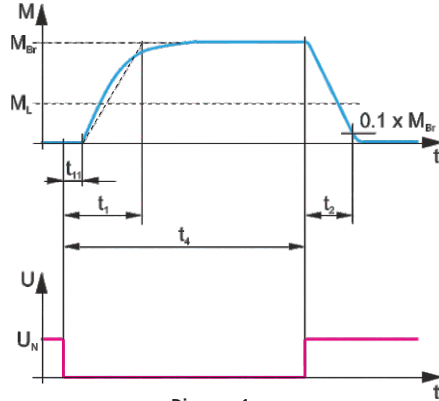


Diagram 1

Switching times for brake operation with nominal voltage

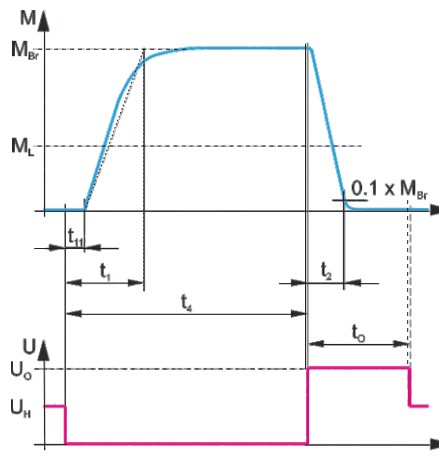


Diagram 2

Switching times for brake operation with overexcitation voltage

Key
 MBr = Braking torque
 ML = Load torque
 t1 = Connection time
 t11 = Response delay on connection
 (⚡ t0 acc. Type Examination Certificate)
 t2 = Separation time
 t4 = Slip time + t11
 t0 = Overexcitation time
 UN = Coil nominal voltage
 UH = Holding voltage
 UO = Overexcitation voltage

Application

ROBA®-twinstop® for use as a holding brake with occasional EMERGENCY STOP braking actions.

The max. permitted speed (Table 3) and friction work (Table 4) must be observed. see technical data.

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 car moving in upwards direction and as a braking element against unintended car movement.

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

Electromagnetic 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 brakes:

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

Scope of Delivery / State of Delivery

The brake body is pre-assembled with coil carrier (1), armature disks (2), distance bolts (4), guide bolts (13), hand release (option dependent on Type) and adjusted microswitches (option dependent on Type). The following are included loose in delivery: the rotor (3), hexagon head screws (5), washers (item 9 / 4 pieces) 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 (15). 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 microswitches 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 also observe the section 'Release 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 O-ring groove must be inserted before the shaft is splined. The O-ring groove must be free of burrs.

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

On hub designs the 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 200 °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/mm2 should be used.

The length of the key should 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).

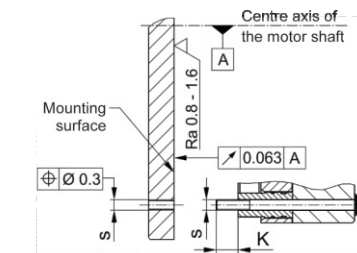


Fig. 5

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.

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

1. Insert the O-ring (8), lightly greased, into the groove of motor shaft or rotor (3). Please use NLGI Class 2 grease with a basic oil viscosity of 220 mm²/s at 40 °C, e.g. Mobilgrease XHP222.
2. Push the rotor (3) onto the motor shaft by hand using light pressure. Please ensure that the rotor collar with the smaller diameter faces away from the machine wall. Check 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 centre axis on both armature disks (2) (Fig. 1).
5. Check air gap "b" > 0.25 mm in energised state on the rotor (3) (Fig. 2). The inspection air gap must be given.

Installation: Hub Design (Figs. 1, 3 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).

 If the hub (10) is heated for better joining, the O-ring (11) must be removed beforehand and re-mounted after hub installation.

2. Push the rotor (3) over the O-ring (11) onto the hub (10) by hand using light pressure. Please ensure that the rotor collar with the smaller diameter faces away from the machine wall. Check 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. 4): Air gap: 0.40 mm ≤ "a" ≤ 0.65 mm This air gap must be present in the area of the horizontal centre axis on both armature disks (2) (Fig. 1).
5. Check air gap "b" > 0.25 mm in energised 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 4). 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 ageing, 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 12 / Fig. 1)

 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.

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.

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.


DANGER  Operate the hand release carefully. Any existing loads will begin to move when the hand release is operated.

Table 5: Technical Data

Size	Braking torque	Release force per brake circuit with	
		Bowden cable	hand release lever
600	600 Nm	approx. 470 N	approx. 120 N
800	1000 Nm	approx. 530 N	approx. 150 N
1000	1350 Nm	approx. 700 N	approx. 200 N

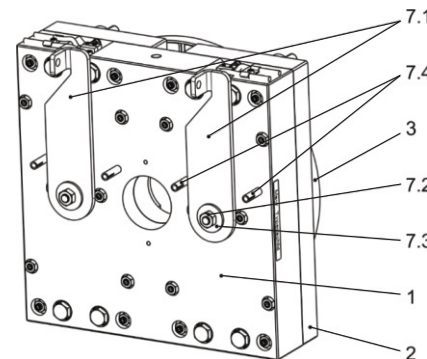



Fig. 6 (Hand release for Bowden cable)

Guidelines on the hand release for Bowden cable (Fig. 6)

 Do not push the hand release lever (7.1) up to the stop pins (spring pins Item 7.3), 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. In particular 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 on customer Bowden cable designs in order to align friction forces in the Bowden cable.

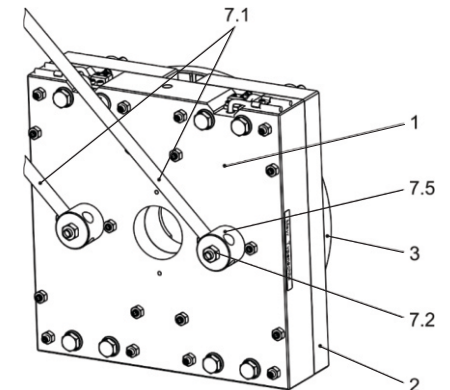



Fig. 7 (Hand release with hand release lever)

Guidelines on the hand release with hand release lever (Fig. 7)

 For manual brake release, both hand release levers (7.1) must be inserted into the connection pieces (7.5), e.g. as shown in Fig. 7. Possible insertion positions 4 x 90°.

Release Monitoring (6) Fig. 8 (Option, dependent on Type)

ROBA®-twinstop® brakes are delivered with manufacturer-side installed and adjusted release monitoring devices.

One microswitch (6.1) per brake circuit emits a signal for every brake condition change "brake opened" or "brake closed"

On initial operation: Connection as NO contact (black and blue strands).

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

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

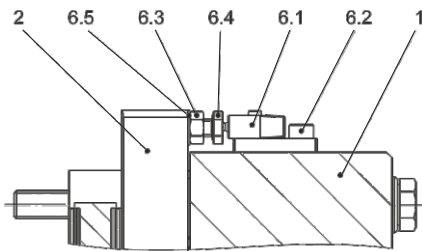
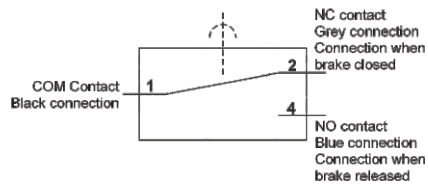


Fig. 8

Function

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

Wiring Diagram of the Microswitch (6.1):



Microswitch Specification

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

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

Customer-side Inspection after Mounting onto the Elevator Machinery

The customer-side contact is an NO contact. Please inspect the release monitoring on both circuits :

- Brake de-energised → Signal "OFF",
- Brake energised → Signal "ON"



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!



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

Electrical Connection and Wiring

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

Earthing 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 standardised 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 Behaviour

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

Magnetic Field Build-up

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

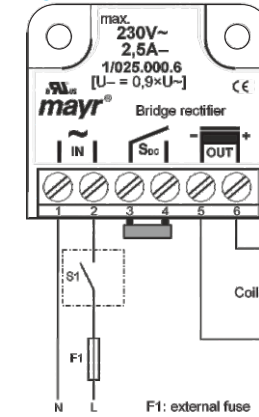
Protection Circuit

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.

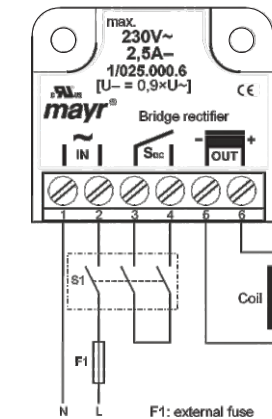
Magnetic Field Removal AC-side Switching



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 the coil and the 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 switching), use for non-critical braking times.



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.

Brake Inspection

(Customer-side after Mounting onto the Elevator Machinery)

Inspection of the individual air gaps (Fig. 3 / 4)
Air gaps "a" of both brake circuits (brake de-energised):
Air gap $0.40 \text{ mm} \leq "a" \leq 0.65 \text{ mm}$. Air gaps "b" of
both brake circuits (brake energised): 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 energising the brake via battery operation, to guarantee emergency escape for passengers during a power failure or manually using the hand release.

Switch function inspection of the release monitoring (NO contact) Brake de-energised Signal "OFF"
Brake energised Signal "ON"

Hand release functional inspection (dependent on Type) Please observe the guidelines on page 13!

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 energised 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 energising the individual circuits with nominal voltage. 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. Energise brake circuits 1 and 2 and put the system into operation.
2. De-energise brake circuit 1 (= EMERGENCY STOP) and inspect the stopping distance according to the elevator regulations.
3. De-energise brake circuit 2.

Inspection brake circuit 2:

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

Inspection of both brake circuits:

Energise 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 unintended car movement, 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.

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 on the elevator system 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 Figs. 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 12) backwards.

Replacing the Rotor (3)

Before Replacing the Rotor
Clean the brake.



Please observe the "Cleaning the Brake" section, 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 fibres.

Possible hazards:

No potential dangers have been recognised so far when the brake is used according to its intended purpose. When grinding in the friction 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 behaviour:

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!

Use a suction system or wet towels to clean off the brake dust.

Do not inhale brake dust (wear safety gloves / safety goggles)

In case of dust formation, a dust mask FFP 2 is recommended.

11. 4. EC - DECLARATION OF CONFIRMITY OF BRAKE

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 / ROBA®-switch / Microswitch):
Products which have not been disassembled can be disposed of under Code No. 160214 (mixed materials) or components under Code No. 160216, or can be disposed of by a certified disposal firm.

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

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

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

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

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 rectifier Replace the rotor Replace the brake
Release monitoring does not switch	Brake does not release Defective microswitch	Solution as above Replace the microswitch (manufacturer-side)

EU Konformitätserklärung EU – Declaration of conformity / Déclaration de conformité UE / Dichiarazione di conformità UE / Declaración de conformidad de la UE / Declaração de conformidade da UE			
Chr. Mayr GmbH + Co. KG Eichenstraße 1 D-87665 Mauerstetten			
DE	erklärt folgende Konformität gemäß EU-Richtlinie und Normen für Artikel	IT	dichiara la seguente conformità secondo la direttiva UE e le norme per l'articolo
EN	explains the following conformity according to EU directives and norms for the following product	ES	declara la siguiente conformidad a tenor de la directiva y normas de la UE para el artículo
FR	déclare la conformité suivante selon la directive CE et les normes concernant l'article	PT	declara a seguinte conformidade, de acordo com as diretiva CE e normas para o artigo
Elektromagnetische Federdruckbremse / Electromagnetic spring applied brakes / Freins électromagnétiques à ressort de pression / Freni elettromagnetici a molle compresse / Frenos de muelles electromagnéticos / Freio eletromagnético de molas			
Produkt / Product / Produit / Prodotto / Producto / Produto		Größen / Sizes / Tailles / Grandezze / Dimensión / Dimensão	Typen / Types / Types / Serie / Tipos / Tipos
ROBA®-twinstop®		150/200/250/350/450	8012.____
	2006/42/EG	X	2011/65/EU (RoHS II) incl. 2015/863/EU (RoHS III)
X	2014/35/EU	X	2014/33/EU
	2014/30/EU		
Certification Notified Body: © TÜV SÜD Industrie Service GmbH Westendstraße 199 D-80686 München: Reg. No.: 0036 Certificate No. EU-BD 845,845/1,845/2,845/3		Monitoring of production (if deviates from the certifier) Notified Body: Reg. No.: Certificate No.:	
Normen Referenz / Standards reference / Référence normes / Riferimenti norme / Referencia normas / Referência padrões: EN 81-20:2020-06 / EN 81-50:2020-06 / DIN VDE 0580:2011-11 / DIN EN IEC 63000:2019-05			
Sicherheitsfunktion / Safety function / Fonction de sécurité / Funzione di sicurezza / Función de seguridad / Função de segurança			
DE	Bremsrichtung, als Teil der Schutzrichtung für den aufwärtsfahrenden Fahrkorb gegen Übergeschwindigkeit und Bremsen gegen unbeabsichtigte Bewegung des Fahrkorbs.		
EN	Braking device as part of the protection device against over speed for the car moving in upwards direction and braking element against unintended car movement.		
FR	Dispositif de freinage faisant partie d'un système de protection contre la survitesse en montée de la cabine d'ascenseur et élément de freinage contre le déplacement involontaire de la cabine d'ascenseur.		
IT	Dispositivo di frenatura come parte del dispositivo di protezione contro la fuga verso l'alto della cabina e elemento di frenatura contro i movimenti incontrollati della cabina.		
ES	Dispositivo de frenado como parte de un dispositivo de seguridad contra la sobrevelocidad de la cabina en movimiento ascendente y como elemento de frenado contra movimientos incontrolados de la cabina.		
PT	Dispositivo de freio para ser usado como parte da unidade de proteção para prevenir excesso de velocidade da cabine elevadora em movimento ascendente e elemento de freio contra movimentos inadvertidos da cabine elevadora.		
Identification:	Jahr der Herstellung: Siehe Typenschild am Produkt <i>Année de production: Voir l'étiquette sur le produit</i> <i>Año de fabricación: Ver placa de identificación del producto</i>	Year of manufacture: see product label <i>Anno di produzione: vedi l'etichetta sul prodotto</i> <i>Ano de fabricação: Ver placa do produto</i>	
Dokumentationsbeauftragter / documentation officer / Spécialiste documentation / ufficiale documentazione / oficial documentación / oficial documentação Qualitätsmanagement			
Mauerstetten, 14.12.2022 <i>Ort und Datum / place and date / Lieu et date / luogo - data / fecha y lugar / Lugar e data</i>		 Geschäftsführer / Managing Director / Directeur Général / Gerente / Gerente Ferdinand Mayr M.Sc.	

EU Konformitätserklärung			
EU – Declaration of conformity / Déclaration de conformité UE / Dichiarazione di conformità UE / Declaración de conformidad de la UE / Declaração de conformidade da UE			
Chr. Mayr GmbH + Co. KG Eichenstraße 1 D-87665 Mauerstetten			
DE	erklärt folgende Konformität gemäß EU-Richtlinie und Normen für Artikel	IT	dichiara la seguente conformità secondo la direttiva UE e le norme per l'articolo
EN	explains the following conformity according to EU directives and norms for the following product	ES	declara la siguiente conformidad a tenor de la directiva y normas de la UE para el artículo
FR	déclare la conformité suivante selon la directive CE et les normes concernant l'article	PT	declara a seguinte conformidade, de acordo com as diretiva CE e normas para o artigo
Elektromagnetische Federdruckbremse / Electromagnetic spring applied brakes / Freins électromagnétiques à ressort de pression / Freni elettromagnetici a molle compresse / Frenos de muelles electromagnéticos / Freio eletromagnético de molas			
Produkt / Product / Produit / Prodotto / Produto / Produto		Größen / Sizes / Tailles / Grandezze / Dimensão	
ROBA®-twinstop®		600/800/1000/2000	
		Typen / Types / Types / Serie / Tipos / Tipos	
2006/42/EG		X	2011/65/EU (RoHS II) incl. 2015/863/EU (RoHS III)
X	2014/35/EU	X	2014/33/EU
2014/30/EU			
Certification		Monitoring of production (if deviates from the certifier)	
Notified Body: © TÜV SÜD Industrie Service GmbH Westendstraße 199 D-80686 München		Notified Body:	
Reg. No.: 0036		Reg. No.:	
Certificate No. EU-BD 1014,1014/1		Certificate No.:	
Normen Referenz / Standards reference / Référence normes / Riferimenti norme / Referencia normas / Referência padrões:			
EN 81-20:2020-06 / EN 81-50:2020-06 / DIN VDE 0580:2011-11 / DIN EN IEC 63000:2019-05			
Sicherheitsfunktion / Safety function / Fonction de sécurité / Funzione di sicurezza / Función de seguridad / Função de segurança			
DE	Bremsenrichtung, als Teil der Schutzvorrichtung für den aufwärtsfahrenden Fahrkorb gegen Übergeschwindigkeit und Bremsenrichtung gegen unbeabsichtigte Bewegung des Fahrkorbs.		
EN	Braking device as part of the protection device against over speed for the car moving in upwards direction and braking element against unintended car movement.		
FR	Dispositif de freinage faisant partie d'un système de protection contre la survitesse en montée de la cabine d'ascenseur et élément de freinage contre le déplacement involontaire de la cabine d'ascenseur.		
IT	Dispositivo di frenatura come parte del dispositivo di protezione contro la fuga verso l'alto della cabina e elemento di frenatura contro i movimenti incontrollati della cabina.		
ES	Dispositivo de frenado como parte de un dispositivo de seguridad contra la sobrevelocidad de la cabina en movimiento ascendente y como elemento de frenado contra movimientos incontrolados de la cabina.		
PT	Dispositivo de freio para ser usado como parte da unidade de proteção para prevenir excesso de velocidade da cabine elevadora em movimento ascendente e elemento de freio contra movimentos inadvertidos da cabine elevadora.		
Identification:	Jahr der Herstellung: Siehe Typenschild am Produkt	Year of manufacture: see product label	
	Année de production: Voir l'étiquette sur le produit	Anno di produzione: vedi l'etichetta sul prodotto	
	Año de fabricación: ver placa de identificación del producto	Ano de fabricação: Ver placa do produto	
Dokumentationsbeauftragter / documentation officer / Spécialiste documentation / ufficiale documentazione / oficial documentación / oficial documentação			
 Qualitätsmanagement			
Mauerstetten, 14.12.2022		 Geschäftsführer / Managing Director / Directeur Général / Gerente / Gerente Ferdinand Mayr M.Sc.	

CE 8012

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1 / 1

14.12.2022

11.5 EC- TYPE EXAMINATION CERTIFICATE

ZERTIFIKAT ◆ CERTIFICATE ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT



EU-TYPE EXAMINATION CERTIFICATE

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

Certificate No.: EU-BD 845/3

Notified Body: TÜV SÜD Industrie Service GmbH
Westendstr. 199
80686 Munich - Germany
Identification No. 0036

Certificate Holder: Chr. Mayr GmbH + Co. KG
Eichenstr. 1
87665 Mauerstetten - Germany

Manufacturer of the Test Sample: Chr. Mayr GmbH + Co. KG
Eichenstr. 1
87665 Mauerstetten - Germany
(Manufacturer of Serial Production – see Enclosure)

Product: Braking device acting on the shaft of the traction sheave, as part of the protection device against overspeed for the car moving in upwards direction and braking element against unintended car movement

Type: RTW Size 150, 200, 250, 350, 450
Type 8012._____

Directive: 2014/33/EU

Reference Standards: EN 81-20:2020
EN 81-50:2020

Test Report: EU-BD 845/3 of 2021-05-17

Outcome: The product conforms to the essential health and safety requirements of the mentioned Directive if the requirements of the annex to this EU-type examination certificate are kept.

Date of Issue: 2021-05-17

Achim Janocha
Notified Body LCC

TUV®

**Annex to the EU-Type Examination Certificate
No. EU-BD 845/3 of 2021-05-17**



Industrie Service

1 Scope of application

1.1 Use as braking device – part of the the protection device against overspeed for the car moving in upwards direction – permissible brake torques and tripping rotary speeds

1.1.1 Permissible brake torques and maximum tripping rotary speeds of the traction sheave when the brake device acts on the shaft of the traction sheave while the car is moving upward

Size	Permissible brake torque [Nm] Typbezeichnung 8012. _ X _ _ _ X = 0, 1, 2, 3	Permissible brake torque [Nm] Typbezeichnung 8012. _ X _ _ _ X = 4, 5	Max. tripping rotary speed of the traction sheave [rpm]
150	180 - 400	240 - 460	981
200	240 - 500	---	979
250	370 - 640	370 - 700	800
350	500 - 920	520 - 1000	800
450	640 - 1100	600 - 1260	600

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

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

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

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

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

1.2.1 Nominal brake torques and response times with relation to a brand-new brake element as well as type designation 8012. _ 0 _ _ _ , 8012. _ 1 _ _ _ , 8012. _ 2 _ _ _ , 8012. _ 3 _ _ _

Size	Min. nominal brake torque* [Nm]	Max. nominal brake torque* [Nm]	Diameter of rotor [mm]	Max. tripping rotary speed [rpm]	Maximum response times** [ms]		
					t ₀	t ₅₀	t ₉₀
150	2 x 90 = 180	2 x 200 = 400	222,5	981	40	70	95
					20	40	80
200	2 x 120 = 240	2 x 250 = 500	235	979	85	145	190
			253		30	60	110
250	2 x 185 = 370	2 x 320 = 640	253	800	50	75	110
					25	45	85
350	2 x 250 = 500	2 x 460 = 920	273	800	60	100	125
					30	50	85
450	2 x 320 = 640	2 x 500 = 1000	253	600	90	130	190
			253		35	60	100
			281				

Interim values can be interpolated

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

**Annex to the EU-Type Examination Certificate
No. EU-BD 845/3 of 2021-05-17**



Industrie Service

1.2.2 Nominal brake torques and response times with relation to a brand-new brake element as well as type designation 8012. _ 4 _ _ _ , 8012. _ 5 _ _ _

Size	Min. nominal brake torque* [Nm]	Max. nominal brake torque* [Nm]	Diameter of rotor (mm)	Max. tripping rotary speed [rpm]	Maximum response times** [ms]		
					t ₀	t ₅₀	t ₉₀
150	2 x 120 = 240	2 x 200 = 400	222,5	981	- / 50	- / 70	- / 110
					40 / -	50 / -	85 / -
250	2 x 185 = 370	2 x 300 = 600	253	800	- / 60	- / 80	- / 120
					- / 35	- / 50	- / 90
					50 / -	60 / -	100 / -
350	2 x 260 = 520	2 x 410 = 820	253	800	- / 60	- / 100	- / 125
			273				
			253		- / 35	- / 50	- / 95
			253				
			273				
			273		40 / -	50 / -	90 / -
450	2 x 300 = 600	2 x 500 = 1000	253	600	- / 90	- / 130	- / 200
			273				
			253		- / 40	- / 65	- / 130
			273				
			253				
			273		45 / -	70 / -	135 / -

Interim values can be interpolated

Explanations:

- * **Nominal brake torque:** Brake torque assured for installation operation by the safety component manufacturer.
- ** **Response times:** t_x time difference between the drop of the braking power until establishing X% of the nominal brake torque, t₅₀ optionally calculated t₅₀ = (t₁₀ + t₉₀)/2 or value taken from the examination recording

1.2.3 Assigned execution features

Type of powering / deactivation	continuous current / continuous current end
Brake control	parallel
Nominal air gap	0.45 mm
Damping elements	YES
Overexcitation	NO or at double non-release voltage

2 Conditions

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

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

Annex to the EU-Type Examination Certificate No. EU-BD 845/3 of 2021-05-17



Industrie Service

- 2.2 The installer of a lift must create an examination instruction to fulfil the overall concept, add it to the lift documentation and provide any necessary tools or measuring devices, which allow a safe examination (e. g. with closed shaft doors).
- 2.3 The manufacturer of the drive unit must provide calculation evidence that the connection traction sheave – shaft – brake disc and the shaft itself is sufficiently safe, if the brake disc is not a direct component of the traction sheave (e. g. casted on). The shaft itself has to be statically supported in two points.
The calculation evidence must be enclosed with the technical documentation of the lift.
- 2.4 The setting of the brake torque has to be secured against unauthorized adjustment (e. g. sealing lacquer).
- 2.5 The identification drawing no. E02812200000163 including stamp dated 2021-05-17 shall be included to the EU-type examination for the identification and information of the general construction and operation and distinctness of the approved type.
- 2.6 The EU-type examination certificate may only be used in combination with the corresponding annex and enclosure (List of authorized manufacturers of the serial production). The enclosure will be updated immediately after any change by the certification holder.
- 3 Remarks**
- 3.1 In the scope of this type-examination it was found out, that the brake device also functions as a brake for normal operation, is designed as a redundant system and therefore meets the requirements to be used also as a part of the protection device against overspeed for the car moving in upwards direction and as braking element as part of the protection device against unintended car movement.
- 3.2 Checking whether the requirements as per section 5.9.2.2 of EN 81-20:2020 (D) have been complied with is not part of this type examination.
- 3.3 Other requirements of the standard, such as reduction of brake moment respectively brake force due to wear or operational caused changes of traction are not part of this type examination.
- 3.4 This EU-type examination certificate was issued according to the following standards:
- EN 81-20:2014 (D), part 5.6.6.11 + 5.6.7.13 – EN 81-50:2014 (D), part 5.7 + 5.8
 - EN 81-20:2020 (D), part 5.6.6.11 + 5.6.7.13 – EN 81-50:2020 (D), part 5.7 + 5.8
- A revision of this EU-type examination certificate is inevitable in case of changes or additions of the above-mentioned standards or of changes of state of the art.

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

Enclosure to the EU Type-Examination Certificate No. EU-BD 845/3 of 2021-05-17



Industrie Service

Authorised Manufacturer of Serial Production – Production Sites (valid from: 2021-05-17):

Company Address	Chr. Mayr GmbH & Co. KG Eichenstr. 1 87665 Mauerstetten - Germany
Company Address	Mayr Power Transmission Co. Ltd. 1298 Fuxin Road, Jiangsu Province 215637 Zhangjiagang - P.R. China
Company Address	Mayr Polska Sp. z. o. o. Rojów, ul. Hetmanska 1 63-500 Ostrzesów - Poland

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Based on: Application letter from Chr. Mayr GmbH & Co. KG of 2021-03-30



Annex to the EC Type-Examination Certificate
No. EU-BD 1014/1 of 2016-09-26



EU TYPE-EXAMINATION CERTIFICATE

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

Certificate No.: EU-BD 1014/1

Certification Body of the Notified Body: TÜV SÜD Industrie Service GmbH
Westendstr. 199
80686 Munich - Germany
Identification No. 0036

Certificate Holder: Chr. Mayr GmbH & Co. KG
Eichenstr. 1
87665 Mauerstetten - Germany

Manufacturer of the Test Sample: Chr. Mayr GmbH & Co. KG
Eichenstr. 1
87665 Mauerstetten - Germany
(Manufacturer of Serial Production – see Enclosure)

Product: Braking device acting on the shaft of the traction sheave, as part of the protection device against overspeed for the car moving in upwards direction and braking element against unintended car movement

Type: RTW Size 600, 800, 1000, 2000
Type 8012: _ _ _ _

Directive: 2014/33/EU

Reference Standards: EN 81-20:2014
EN 81-50:2014
EN 81-1:1998+A3:2009

Test Report: EU-BD 1014/1 of 2016-09-09

Outcome: The safety component conforms to the essential health and safety requirements of the mentioned Directive as long as the requirements of the annex of this certificate are kept.

Date of Issue: 2016-09-26

Achim Janocha
Certification Body "lifts and cranes"

TUV®

1 Scope of application

1.1 Use as braking device – part of the the protection device against overspeed for the car moving in upwards direction – permissible brake torques and tripping rotary speeds

1.1.1 Permissible brake torques and maximum tripping rotary speeds of the traction sheave when the brake device acts on the shaft of the traction sheave while the car is moving upward

Size	Permissible brake torque [Nm]	Max. tripping rotary speed of the traction sheave [rpm]
600	800 - 1200	500
800	1100 - 2000	
1000	1600 - 2700	
2000	3000 - 5000	460

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

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

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

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

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

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

Name / Size	Minimum nominal brake torque * [Nm]	Medium nominal brake torque * [Nm]	Maximum nominal brake torque * [Nm]	Maximum tripping rotary speed [rpm]	Maximum response times** [ms]		
					without t_{01}	with t_{02}	Overexcitation t_{03}
RTW 600	2 x 400 = 800			500	45 / - -	95 / - -	135 / - - -
RTW 600		2 x 550 = 1100			25 / - -	60 / - -	100 / - - -
RTW 600			2 x 600 = 1200		- - / 30	- - / 65	- - - / 110
RTW 800	2 x 550 = 1100				100 / - - -	180 / - - -	280 / - - -
RTW 800		2 x 850 = 1700			40 / - -	100 / - - -	150 / - - -
RTW 800			2 x 1000 = 2000		- - / 60	- - - / 115	- - - / 160
RTW 1000	2 x 800 = 1600			460	85 / - -	160 / - - -	240 / - - -
RTW 1000		2 x 1200 = 2400			40 / - -	95 / - -	150 / - - -
RTW 1000			2 x 1350 = 2700		- - / 45	- - - / 110	- - - / 170
RTW 2000	2 x 1500 = 3000				150 / - - -	230 / - - -	320 / - - -
RTW 2000		2 x 2200 = 4400			90 / - -	150 / - - -	250 / - - -
RTW 2000			2 x 2500 = 5000		- - - / 100	- - - / 165	- - - / 260

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

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

Annex to the EC Type-Examination Certificate
No. EU-BD 1014/1 of 2016-09-26



Interim values can be interpolated

Explanations:

- * **Nominal brake torque:** Brake torque assured for installation operation by the safety component manufacturer.
- ** **Response times:** t_x time difference between the drop of the braking power until establishing X% of the nominal brake torque, t_{50} optionally calculated $t_{50} = (t_{10} + t_{90})/2$ or value taken from the examination recording

1.2.2 Assigned execution features

Type of powering / deactivation	continuous current / continuous current end
Brake control	parallel
Nominal air gap	0.45 mm
Damping elements	YES
Overexcitation	at double non-release voltage

2 Conditions

- 2.1 Above mentioned safety component represents only a part at the protection device against overspeed for the car moving in upwards direction and unintended car movement. Only in combination with a detecting and triggering component in accordance with the standard (two separate components also possible), which must be subjected to an own type-examination, can the system created fulfil the requirements for a protection device.
- 2.2 The installer of a lift must create an examination instruction to fulfil the overall concept, add it to the lift documentation and provide any necessary tools or measuring devices, which allow a safe examination (e. g. with closed shaft doors).
- 2.3 The manufacturer of the drive unit must provide calculation evidence that the connection traction sheave – shaft – brake disc and the shaft itself is sufficiently safe, if the brake disc is not a direct component of the traction sheave (e. g. casted on). The shaft itself has to be statically supported in two points.
The calculation evidence must be enclosed with the technical documentation of the lift.
- 2.4 The setting of the brake torque has to be secured against unauthorized adjustment (e. g. sealing lacquer).
- 2.5 The identification drawing no. E02810400000261 including stamp dated 2016-09-09 shall be included to the EU type-examination for the identification and information of the general construction and operation and distinctness of the approved type.
- 2.6 The EU type-examination certificate may only be used in combination with the corresponding annex and enclosure (List of authorized manufacturer of the serial production). The enclosure will be updated immediately after any change by the certification holder.

3 Remarks

- 3.1 In the scope of this type-examination it was found out, that the brake device also functions as a brake for normal operation, is designed as a redundant system and therefore meets the requirements to be used also as a part of the protection device against overspeed for the car moving in upwards direction and as braking element as part of the protection device against unintended car movement.
- 3.2 Checking whether the requirements as per section 5.9.2.2 of EN 81-20:2014 (D) have been complied with is not part of this type examination.

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

Annex to the EC Type-Examination Certificate
No. EU-BD 1014/1 of 2016-09-26



- 3.3 Other requirements of the standard, such as reduction of brake moment respectively brake force due to wear or operational caused changes of traction are not part of this type examination.

- 3.4 This EU type-examination certificate was issued according to the following standards:

- EN 81-1:1998 + A3:2009 (D), Annex F.7 and F.8
- EN 81-20:2014 (D), part 5.6.6.11, 5.6.7.13
- EN 81-50:2014 (D), part 5.7 and 5.8

- 3.5 A revision of this EU type-examination certificate is inevitable in case of changes or additions of the above mentioned standards or of changes of state of the art.

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

Enclosure to the EU Type-Examination Certificate
No. EU-BD 1014/1 of 2016-09-26



Authorised Manufacturer of Serial Production – Production Sites (valid from: 2016-09-26):

Company Address Chr. Mayr GmbH & Co. KG
Eichenstr. 1
87665 Mauerstetten - Germany

Company Address Mayr Polska Sp. z o. o.
Rojów, ul. Hetmanska 1
63-500 Ostrzeszów - Poland

- END OF DOCUMENT -

Annex to the EC Type-Examination Certificate
No. EU-BD 1014/1 of 2016-09-26



Interim values can be interpolated

Explanations:

- * **Nominal brake torque:** Brake torque assured for installation operation by the safety component manufacturer.
- ** **Response times:** t_b time difference between the drop of the braking power until establishing X% of the nominal brake torque, t_{90} optionally calculated $t_{90} = (t_{10} + t_{90})/2$ or value taken from the examination recording

1.2.2 Assigned execution features

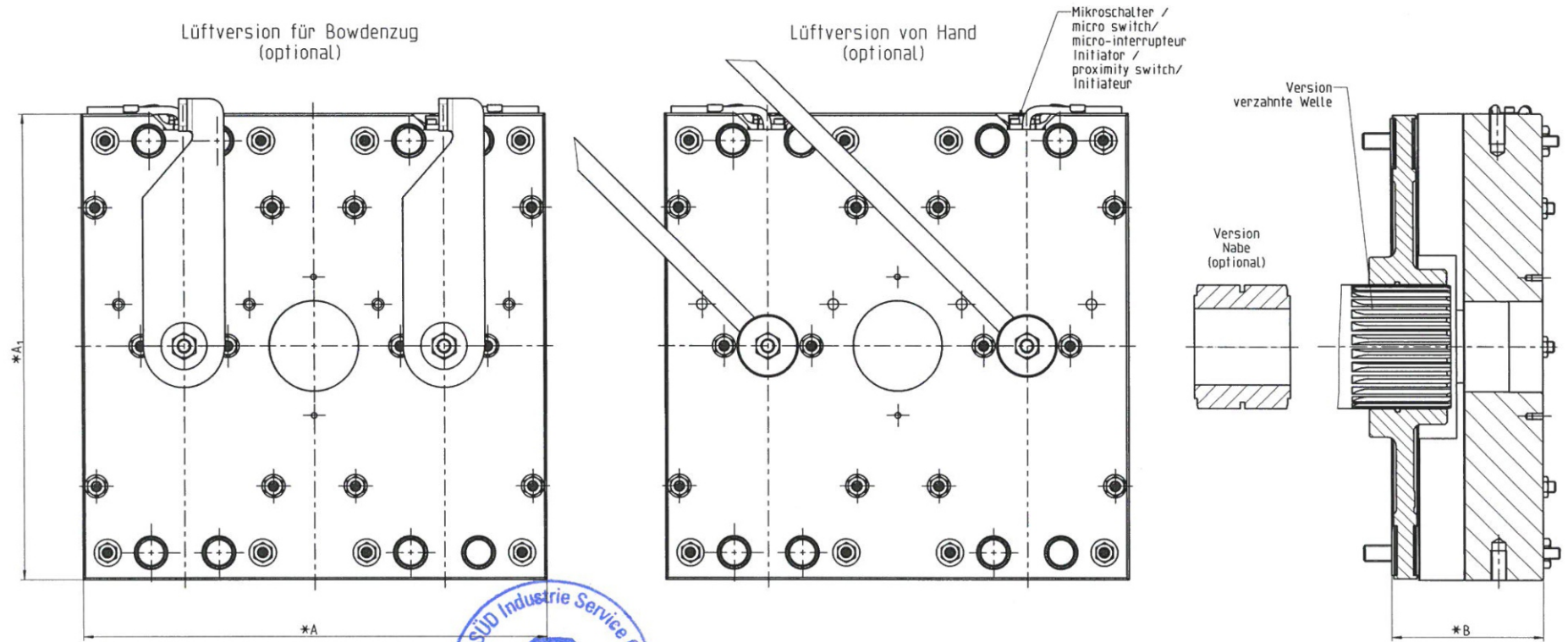
Type of powering / deactivation	continuous current / continuous current end
Brake control	parallel
Nominal air gap	0.45 mm
Damping elements	YES
Overexcitation	at double non-release voltage

2 Conditions

- 2.1 Above mentioned safety component represents only a part at the protection device against overspeed for the car moving in upwards direction and unintended car movement. Only in combination with a detecting and triggering component in accordance with the standard (two separate components also possible), which must be subjected to an own type-examination, can the system created fulfil the requirements for a protection device.
- 2.2 The installer of a lift must create an examination instruction to fulfil the overall concept, add it to the lift documentation and provide any necessary tools or measuring devices, which allow a safe examination (e. g. with closed shaft doors).
- 2.3 The manufacturer of the drive unit must provide calculation evidence that the connection traction sheave – shaft – brake disc and the shaft itself is sufficiently safe, if the brake disc is not a direct component of the traction sheave (e. g. casted on). The shaft itself has to be statically supported in two points.
The calculation evidence must be enclosed with the technical documentation of the lift.
- 2.4 The setting of the brake torque has to be secured against unauthorized adjustment (e. g. sealing lacquer).
- 2.5 The identification drawing no. E0281040000261 including stamp dated 2016-09-09 shall be included to the EU type-examination for the identification and information of the general construction and operation and distinctness of the approved type.
- 2.6 The EU type-examination certificate may only be used in combination with the corresponding annex and enclosure (List of authorized manufacturer of the serial production). The enclosure will be updated immediately after any change by the certification holder.

3 Remarks

- 3.1 In the scope of this type-examination it was found out, that the brake device also functions as a brake for normal operation, is designed as a redundant system and therefore meets the requirements to be used also as a part of the protection device against overspeed for the car moving in upwards direction and as braking element as part of the protection device against unintended car movement.
- 3.2 Checking whether the requirements as per section 5.9.2.2 of EN 81-20:2014 (D) have been complied with is not part of this type examination.



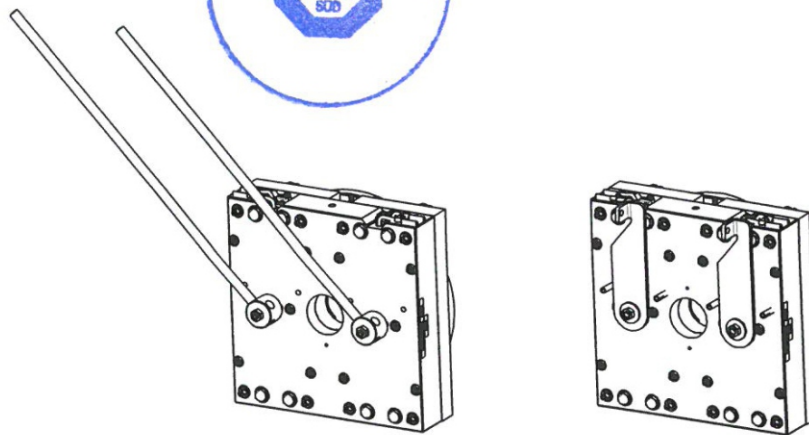
9. SEP. 2016

GEPRÜFT / APPROVED
 TÜV SÜD Industrie Service GmbH
 Prüflaboratorium für Produkte der Fördertechnik
 Westendstraße 199
 80686 München
 Sachverständiger / Expert

H. Nagel

• Maße variabel/
 dimensions variable/
 dimensions variables

Größe/ size/ taille	A	A ₁	B
600	315	303	102.6
800	340	340	112
1000	340	380	126
2000	410	425	135



Gezeichnet / drawn 30.11.2015 FUCHER	Datum / date	Name / name	Verstärk.-Nr. / material-no.	Zeichnungs- / drawing no. and ISO 15701	 CHG, MAYR, GÖPP + COLOS Eisenstraße 4 87663 Pleizenhofen www.mayr.com
Geprüft / checked			Verstärkstoff / material	Toleranzangabe / dimensional tolerancing principle DIN EN ISO 15701	
Genehmigt / approved			Alternativ / alternative	Abg.-Toleranz / general tolerance DIN ISO 2768-MS	
Übersicht / surface DIN EN ISO 15701	Merkmale / edges DIN ISO 15701				
Bezeichnung / part name	RTW Baugröße 600 - 2000 Type 8012			Artikelnummer / part number	485165
Maßstab / scale	Type / type	Größe / size	Gewicht / weight	Zeichnungsnummer / drawing number koE0281040000026	

12. WARRANTY :

1. Unless otherwise agreed upon in the sales contract, this warranty is governed by the following clauses:
 - The warranty on PRIMO S.R.L. products is valid for a period of One year from the date shown on the shipping papers. During the warranty period, PRIMO S.R.L. will replace without charge a component that has been recognized as defective.
 - A component can be declared defective only if the relative defect has been recognized by PRIMO S.R.L.
 - Components that are to be required or replaced under warranty must be sent to PRIMO S.R.L. with all shipping and duty fees prepaid.
 - Request to PRIMO S.R.L. for service calls must be made by the customer in writing.
 - Labor, room and board, and travel costs must be paid for by the customer.
2. This warranty will automatically become null and void if any of the following circumstances occur:
 - The component for which warranty service has been requested has tampered with.
 - The machine has been used in any application which was not previously authorized by or agreed upon with PRIMO S.R.L. in writing.
 - The machine has been used in a way that does not conform to the specification for which it has been built, as indicated in the technical manual and in this Operation and Maintenance Manual.
 - The identification plates are missing, or it is impossible to identify the machine.
3. The following components, which are subjected to normal wear, are not included in this warranty: brake linings, roll bearings, electrical windings.
4. This warranty does not include compensation for shipping fees or down time.

5. All warranty claims must be communicated to PRIMO S.R.L. by mail (or by fax) within 8 days from the day that the relative problem occurs.
 - PRIMO S.R.L. will conform by mail (or by fax) the eventual acceptance of proposed repairs to be executed by the customer will send its own technical personnel.
 - Any defective material replaced by the customer must remain at PRIMO S.R.L. disposition for 30 days so that the necessary verification can be performed; or, the material must be shipped to PRIMO S.R.L. when the company so requests in writing.
 - Absolutely no claims will be accepted for warranty repairs that were not previously authorized in writing by PRIMO S.R.L.
 - In any case, a complete photographic study of the executed repairs operation must be supplied to PRIMO S.R.L. to correct the problem and improve the quality and reliability of its machines.
 - PRIMO S.R.L. reserves the right to ask back defective materials in order to check the cause of the problem. If defective materials don't reach PRIMO S.R.L. by 30 days from PRIMO S.R.L. request, the new part will be invoiced to the customer.



PRIMO S.R.L.

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Website : www.primoitalianmachine.it