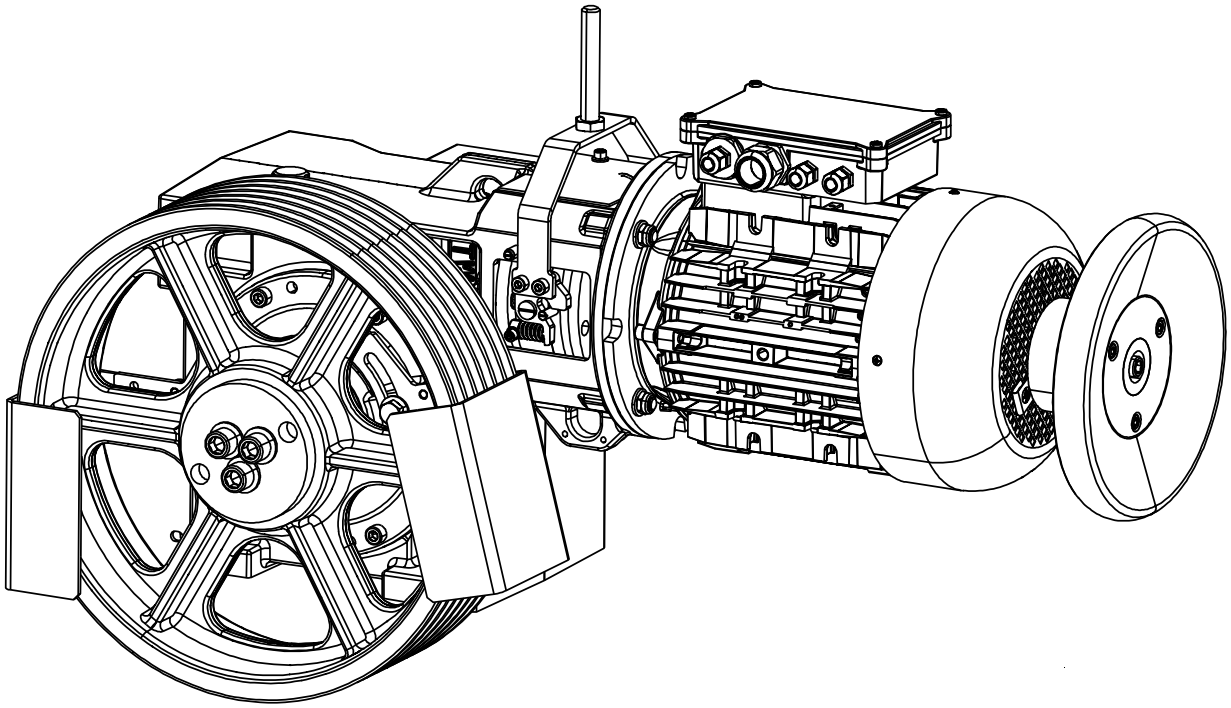
OPERATING MANUAL
TW45C

Drive
09/2023



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Company and contact information

Proprietary notice ISO 16016

Subject to change without notice

We expressly reserve the right to make changes of a technical nature for the purpose of improving our products or enhancing the safety standard – including without a separate announcement.

Colour coding

The colour coding of the components used in our documents is exclusively for documentation purposes.

You can find out about the colours for your products from your TK Aufzugswerke GmbH sales partner.

Form of address

In the interest of better legibility, we use exclusively the masculine grammatical form, for example "fireman". At the same time, it always refers to human genders: male, female, diverse.

Issued by

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Sequence of actions involving several steps

✓ Requirement for the sequence of actions (optional).

1. First action step.
2. Second action.
   ▷ Interim result (optional)
3. Third action step.

▷ Result of action (optional)

Sequence of actions involving independent steps

→ Action step.

→ Action step.

→ Action step.

Information

i Information must always be read and followed.

Reference

↗ Chap. 1 P. 6

List

- Top item of a list
  - Sub-item of a list
  - Sub-item of a list
- Top item of a list
- Top item of a list

2 Safety

2.1 Warning notes

- Warning notes are intended for the protection of persons and property.
- Warning notes must be read and observed by every person who works on the product.
- Warning notes precede activities that pose a hazard for people and the product.

2.1.1 Structure

⚠ SIGNAL WORD AND SIGNAL COLOUR

Type and source of danger

Consequences if danger disregarded.

→ Measures to avert the danger.

2.1.2 Indications of danger to persons

⚠ DANGER

Danger with a high degree of risk!

If ignored, leads to death or serious injury.

→ Read and comply with the warning.

⚠ WARNING

Danger with a high degree of risk!

If ignored, may lead to death or serious injury.

→ Read and comply with the warning

⚠ CAUTION

Danger with a low degree of risk!

If ignored, may lead to minor or moderate injury.

→ Read and comply with the warning.

2.1.3 Indication of possible damage to property

NOTICE

Hazard with possible damage to property!

May lead to product function impairments or function loss.

→ Read and comply with the warning.

2.2 Safety requirements

This document contains important information for safe operation of the product.

→ Keep this document and all other applicable documents at the location of use for the entire working life of the product.

2.2.1 Area of applicability

This document applies only to the product described here.

Other applicable documents

- International occupational health and safety regulations

2.2.2 Basic requirements for safety

- All existing safety devices are to be tested regularly in accordance with the maintenance schedule.
- This document, in particular the chapter entitled "Safety", together with the warnings and all other applicable documents, must be followed by all persons who work with the product.
- In addition to this document, the rules at the location of use with regard to environmental protection and the occupation health and safety and accident prevention regulations must be followed.
- All safety and hazard warnings on the installation must be kept in legible condition.
- Safety information and instructions required by law must be displayed to users in such a way that they are clearly visible.
- A requirement for safe handling and non-disruptive operation of this product is knowledge of the fundamental safety regulations.

2.2.3 Obligations of the operating company and installation firm

→ Only deploy trained and instructed qualified personnel.

→ Provide personnel with the required personal protective equipment.

→ Check personnel at regular intervals to ensure that they follow safety-conscious work practices and comply with national provisions.

→ Make all other applicable documents as well as this document available to personnel.

2.2.4 Duties of personnel

→ Clearly establish all areas of responsibility prior to any activity.

→ Always wear the personal protective equipment made available to you.

→ Prior to work, make people aware of the dangers of electrical current.

2.2.5 Dangers in handling the drive

⚠ DANGER

Residual voltage after switching off the elevator installation!

Electric shock that can lead to death or severe injury.

→ Perform work on energised parts of the drive only after the waiting period and/or when the DC link voltage is less than 60 V (check with a measuring instrument)

⚠ WARNING

Inadequate connection

Electric shock. Damage to drive.

→ Earth the motor and brake magnet in accordance with country-specific regulations.

→ Electrical connections must correspond to at least the protection class in accordance with the name plate and/or required country-specific protection class.

⚠ WARNING

Contact with rotating or moving parts!

Entanglement of clothing or body parts can lead to crushing or even loss of limbs.

→ Maintain an adequate distance to rotating and moving parts, for example traction sheave, ropes.

→ Wear tight-fitting clothing.

→ Make sure you assume a firm stance.

- The drive may only be operated in a closed machine room or secured shaft.
- The machine may only be operated with the cover and rope guard fitted to the traction sheave.
- The drive is not suitable for operation in explosive or aggressive atmospheres.
- On entering the machine room, adequate safety clearance to all rotating parts is to be maintained.
- In the event of improper use of the machine, there is a risk of personal injury or to the life of the user or third parties, or impairment on the assembly or other assets can arise. Malfunctions that can adversely affect safety must be rectified immediately.
- It must be ensured that a fault generated by the encoder, the brake or the brake control system is detected by the elevator control system or frequency inverter. The control system must immediately place the elevator in a safe state.
- The elevator installation must ensure that emergency braking by the mechanical brake system takes place in the following cases:
  - Uncontrolled movement out of the stopping zone

  - Failure of the inverter (due to short circuit with triggering of the fuse)
- The elevator installation must be fitted with a safety device complying with EN81 or A17 that detects exiting the elevator car with the door opened and initiates suitable measures.

2.3 Warranty and liability

The "General Terms of Sale and Delivery" of TK Aufzugswerke GmbH apply.

Warranty and liability claims in the event of personal injury and material damage shall be excluded if they arise due to at least one of the following causes:

- Improper use that is not in line with the intended purpose of the product
- Incorrect installation, commissioning, operation and maintenance of the product
- Operation of the product with defective or inoperative safety and/or protection devices
- Non-observance of the instructions in the operating manual with regard to transport, storage, installation, commissioning, operation and maintenance
- Structural modification to the product without agreement or approval
- Modification to product features without agreement or approval
- Inadequate monitoring of parts that are subject to wear
- Repairs that are carried out improperly
- Cases of catastrophe due to third-party interference or force majeure
- Use of non-approved auxiliary materials and operating fluids

2.3.1 Structural modification of the product

The product is configured in the factory and delivered ready for operation.

If changes are made to the product, the entire warranty of TK Aufzugswerke GmbH shall become null and void.

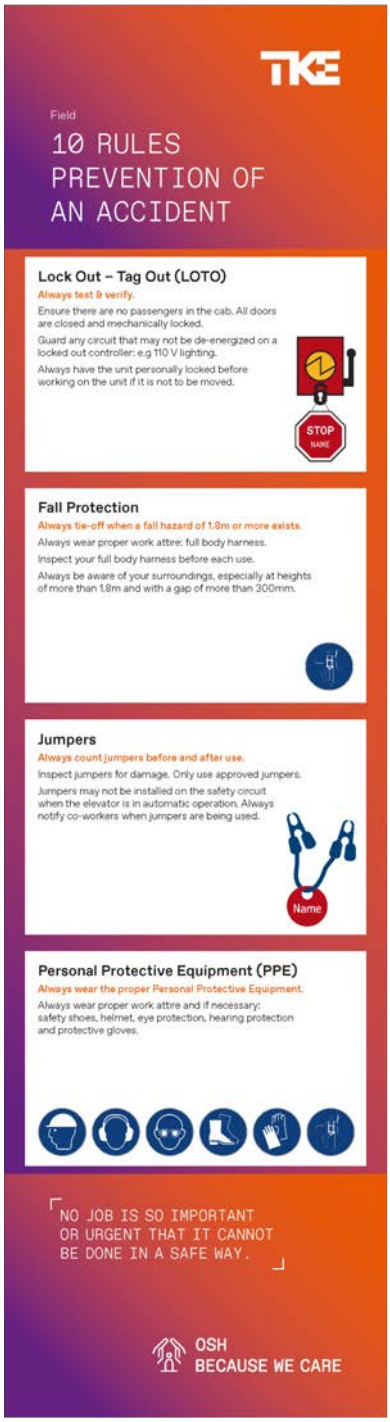
2.3.2 Use in line with intended use

The product has been constructed using state-of-the-art technology and in line with the recognised technical safety regulations. It may only be used in accordance with its intended use and when the technical safety devices are free from defects. Any other or additional form of use shall be regarded as **non-**compliant with the intended use. TK Aufzugswerke GmbH shall **not** be liable for any damage arising from such use and any damage arising due to operator errors.

In order to comply with the intended use of the product:

- Use the product as a Drive of elevators only
- Read and comply with the document, in particular the chapter entitled "Safety", together with the warnings and all other applicable documents
- Comply with the commissioning instructions, the installation description as well as the required inspection and maintenance work

2.4 10 rules for health and safety at work



The international rules for occupational health and safety can also be found on our online platform ELI for download at: ↗ https://eli.tkelevator.com/support/occupational-safety-health

2.5 Personal protective equipment

Danger	Cause	Risks	Remedy	Equipment
	▪ Unprotected shaft	Falling		Safety harness
 	▪ **WARNING!** **Do not walk underneath suspended loads** ▪ Falling tools ▪ Transport of heavy loads ▪ Sharp-pointed objects	Head injury		Head protection
 	▪ **WARNING!** **Do not walk underneath suspended loads** ▪ Falling tools ▪ Transport of heavy loads ▪ Sharp-pointed objects	Danger of crushing in the foot area Cut or stab injury in the foot area		Foot protection
  	▪ Sharp objects ▪ Mechanical parts ▪ Sharp-pointed objects ▪ Caustic substances	Danger of crushing in the hand area Stab injury in the hand area Acid/alkali burns		Protective gloves
	▪ Severe noise pollution	Noise damage		Ear protection
 	▪ Flying parts ▪ Flying particles ▪ Laser beams ▪ Emissions of optical rays	Eye injury Loss of sight/blinding		Protective goggles
	▪ Electrical voltage	Electric shock		Enable source of energy

3 Description

3.1 Standards and legal requirements

The product complies with the following regulations:

- DIN EN 81-20:2020-06
- DIN EN 81-50:2020-06
- DIN EN 81-77:2019-01

For operation in line with standards, the elevator installation must comply with each standard.

3.2 Product Group TW Machines

The designation of this series (successor generation of W series) is composed of the combination of TK Elevator, Wormgear (TW) and a figure for the main performance point (e.g. Q = 1600 kg → 160) of the machine, as well as an indicator of the generation (e.g. "B").

As part of further technical development, these machines are designed completely with low-friction rolling bearings.

The use of a synthetic gear oil (polyalkylene glycol with additives) not only increases the power density and the gear efficiency, but also extends the oil change intervals.

3.3 Product

The TW45C machine (**T**K Elevator, **W**ormgear / Q = **45**0 kg / generation C) is used within the framework of the TW model series (machines with worm gears, anti-friction bearings, lubrication with synthetic gear oil) for traction elevators in the lower range of performance.

The TW45C has been available since May 2011 and it differs from the previous version TW45B in that there are modified anti-friction bearings with optimised sealing (stroke unit on worm shaft).
The TW45C machine, conceived for systems with rated load 450 kg at 1.0 / 1.25 m/s, consists of a worm gear with integrated service brake, overhung traction sheave, flange-connected three-phase motor in IMB5/V1 structural shape as well as the optionally possible emergency brake, NBS.

The corresponding production, assembly and assignment of the components means that the versions of the machine described below are possible:

- Vertical upright motor position; traction sheave position on left; with / without emergency brake system, NBS – for machine location in the machine room.
- Horizontal motor position; traction sheave position on left / on right; with / without emergency brake system, NBS – for machine location in the machine room.

- ISIS1 version: Horizontal motor position; traction sheave position on left / right, with emergency brake system, NBS – for location in the shaft pit.

The machine is exclusively available with frequency-controlled motors (V3F).

TW45C in horizontal version for installation in the machine room

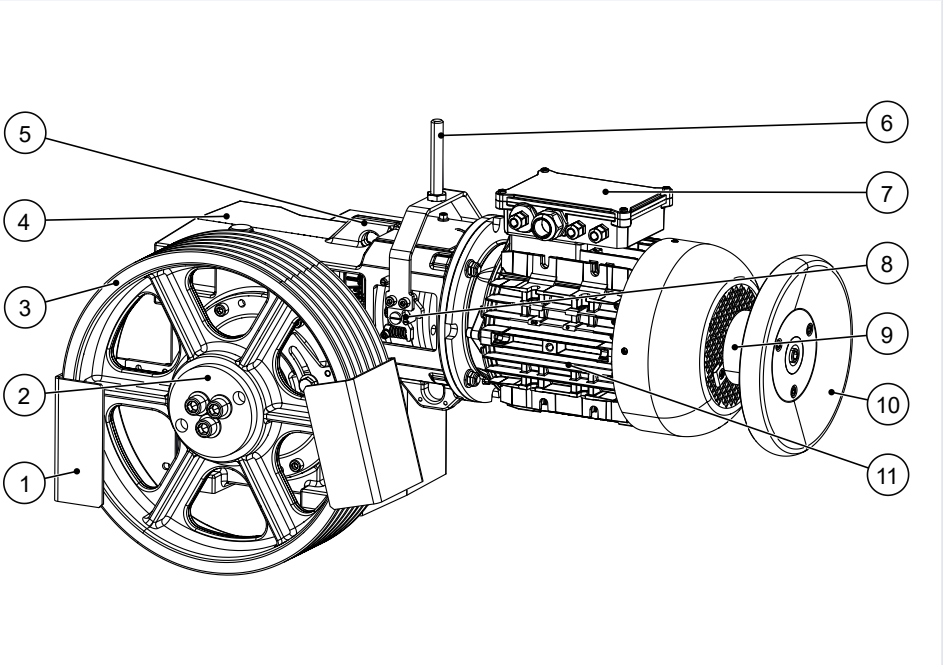


Fig. 1

ATR_2_21_0027_0

Item	Designation	Item	Designation
1	Rope guard	2	Tension disc on traction sheave shaft with screwed connection
3	Traction sheave	4	Gear
5	Transport eyebolt	6	Brake release lever
7	Motor terminal box, including intermediate terminal connection for brake	8	Service brake
9	Encoder	10	Handwinding wheel
11	Motor		

Installation in the machine room / vertical motor position IMV1

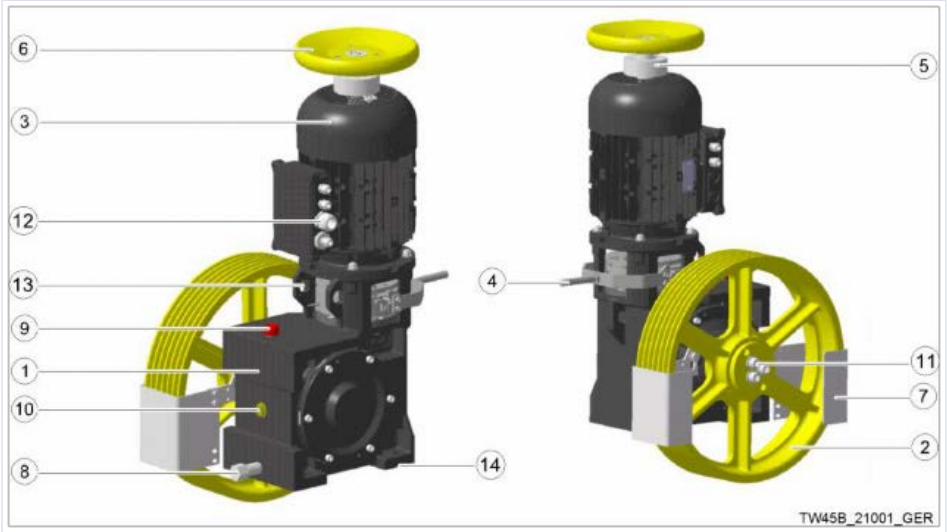


Fig. 2

ATR_2_21_0028_0

Item	Designation	Item	Designation
1	Driving gear (vertical motor position)	2	Traction sheave (D440 / D520 / D590)
3	Motor (version with terminal box for connection of the service brake)	4	Service brake Mayr RSZ125-2x50 Nm, including mounted lever for manual release
5	Encoder	6	Handwinding wheel (D270)
7	Rope guard (adjustable)	8	Oil drain (3/4")
9	Oil filling hole and ventilation (R3/4")	10	Oil level monitoring (gauge glass)
11	Traction sheave mounting (tension disc with screwed connection)	12	Motor connection (M16x1.5 / M25x1.5) Brake connection (2x M16x1.5)
13	Transport eyebolts	14	Mounting surface for machine base frame

Installation in the machine room / horizontal motor position IMB5

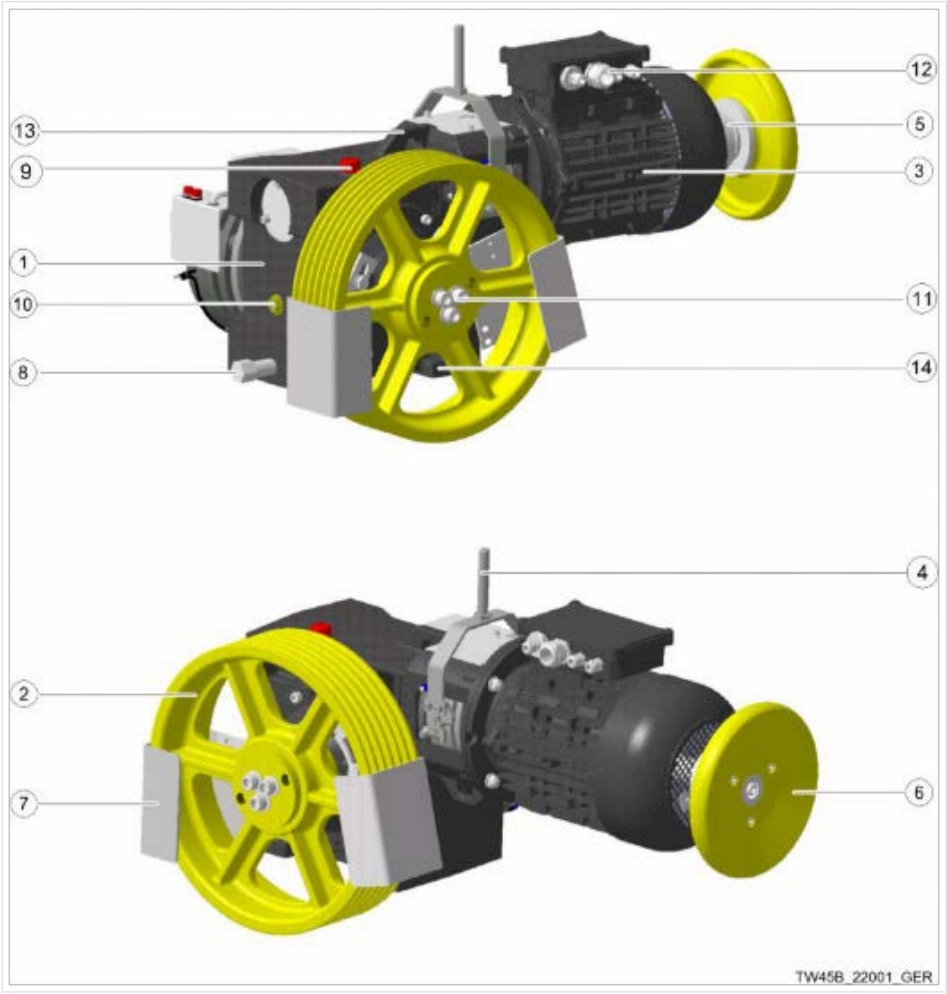


Fig. 3

ATR_2_21_0029_0

Item	Designation	Item	Designation
1	Driving gear (horizontal motor position)	2	Traction sheave (D440 / D520 / D590)
3	Motor (version with terminal box for connection of the service brake)	4	Service brake Mayr RSZ125-2x50 Nm, including mounted lever for manual release
5	Actual-value sensor	6	Handwinding wheel (D270)
7	Rope guard (adjustable)	8	Oil drain (R3/4")
9	Oil filling hole and ventilation (R3/4")	10	Oil level monitoring (gauge glass)
11	Traction sheave mounting (tension disc with screwed connection)	12	Motor connection (M16x1.5 / M25x1.5) Brake connection (2 M16x1.5)
13	Transport eyebolt	14	Mounting surface for machine base frame

Installation in the machine room / with emergency brake system, NBS (shown with machine in horizontal motor position)

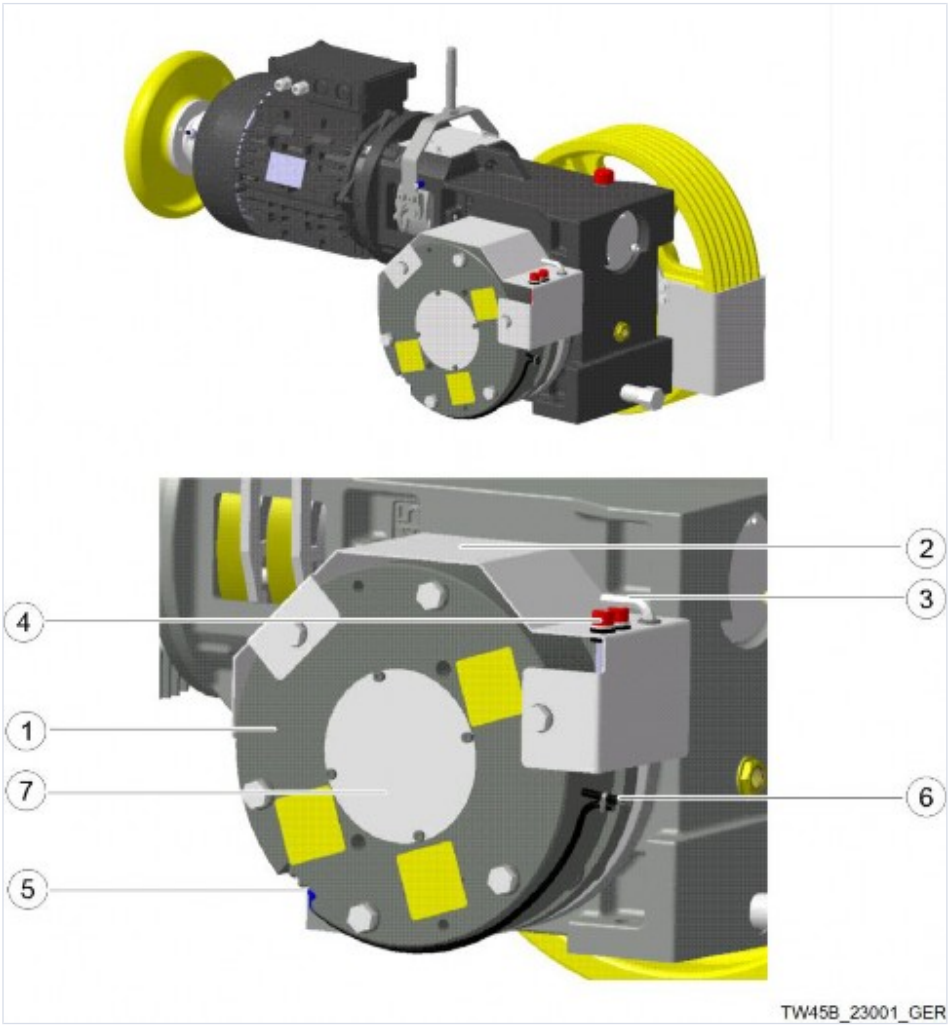


Fig. 4

ATR_2_21_0030_0

Item	Designation	Item	Designation
1	Disc brake - emergency brake system, NBS	2	Cover plate for brake
3	Socket wrench for manual release	4	Screws for manual release (screw head marked in red)
5	Brake test switch with connection line	6	Connection line, brake voltage
7	Protective cover for brake		

Machine room with horizontal rope departure direction (shown is the left traction sheave position / horizontal motor position)

Fig. 5 ATR_2_12_0105_0

The machine contains only the components for the rope guard of the top rope line. To assist installation of these components, the bearing bracket on the traction sheave side has been fitted at the plant rotated by 60°. The horizontal rope departure direction is possible in both directions (opposing the motor and/or towards the motor with horizontal motor position). With a vertical motor position, both horizontal directions are also possible. The top rope guard can be adjusted +/- 15° in relation to the horizontal. The additional components required for the rope guard of the bottom rope line and/or in the area between the rope entry and departure points required in accordance with EN81-1:1998 and/or EN81-20/5.5.7 are not included in the scope of supply of the machine and must be fitted on the machine base frame depending on the order.

Machine room with earthquake safeguard complying with EN81-77 (shown in the left traction sheave position / vertical motor position and earthquake safeguard complying with EN81-77)

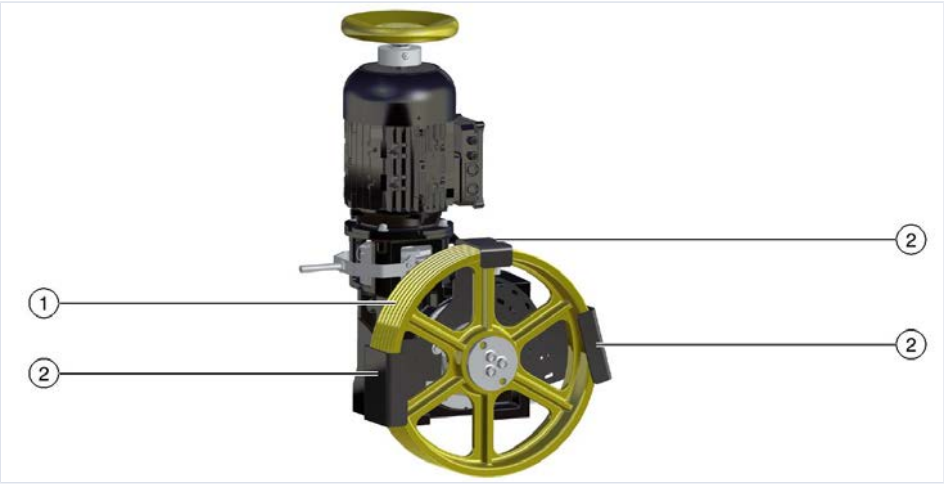


Fig. 6 ATR_2_12_0106_0

Item	Designation	Item	Designation
1	Traction sheave (D440 / D520 / D590)	2	Earthquake safeguard complying with EN81-77

Special version SA1 (modified mounting of the machine, including compensation washers)

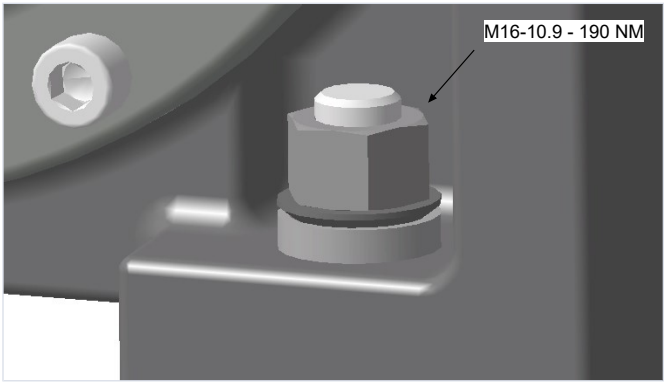


Fig. 7

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ISIS1 version (MRL – machine in the shaft pit)

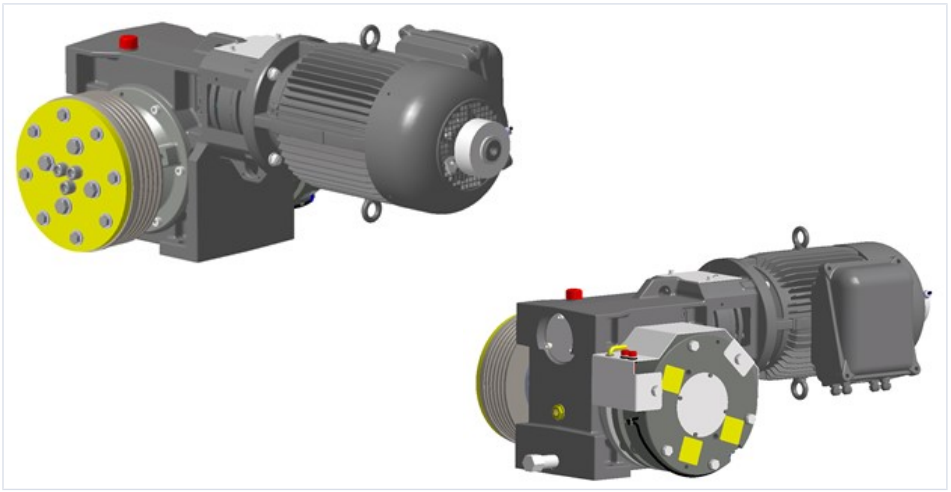

Fig. 8

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The machine has a "horizontal" motor position.

The position of the motor terminal box is at the side opposite the traction sheave.

In general, the ISIS1 version of the machine has the NBS emergency brake system.

The traction sheave shown in the diagram is not included in the scope of supply. It is made available by TKE-NA.
The components for the rope guard and the fastening elements for the machine on the machine base frame are also made available by TKE-NA.
The connection lines of the service and emergency brakes are routed through the enlarged motor terminal box and routed by means of conduits into a motor interface box (MIB).

The motors made by EMOD are voltage interchangeable 230 / 460 V and have no handwinding wheel. The motors have CSA certification.

Deviating from the standard version, the versions of the service brake and emergency brake are operated with a lower voltage of 110 / 55 V DC. Both brakes have CSA certification.

The service brake with 2x50 Nm is regarded as a 100 Nm brake (ASME A17.1) for this use case.

The encoder used is a Wachendorff WDG100-2x2048 TTL with a 3 m line length.

3.3.1 Machine base frame

Various machine base frame versions are possible. Consult the general arrangement drawings.

The machine base frames with / without rope pulley described below are intended for installation of the machine in the machine room above the shaft.

The machine base frame without rope pulley consists of three plated-edge longitudinal brackets with two welded face plates. The hole pattern in the machine base frame allows the machine to be shifted on the machine base frame in the hole distance 40/50 mm.

The machine base frame with rope pulley consists of the machine base frame without rope pulley as an upper frame part and bolted-on supports for the rope pulley bearings and insulation elements.

With this machine base frame, there is the option for right-hand or left-hand configuration of the pulley hub position with the corresponding installation of the supports.

Setup

As a rule, the machine base frame is set up on insulation elements (rubber blocks) either on a machine base frame support (steel support) or directly on the machine room floor.

The components for the rope guard in accordance with EN81-1/9.7 and EN81-20/5.5.7 are part of the machine.

Weight of the machine base frame

Rope pulley version [mm]	Weight, including rope pulley [kg]
D360	140
D450	170

Weight of machine base frame without rope pulley: 50 kg

AY TW45B O SR machine base frame

The TW45B O SR machine base frame (shown with machine in vertical motor position and traction sheave position on left) in the version without rope pulley is used for:

- Installations with rope suspension 1:1 and direct rope departure with a rope distance elevator car – counterweight ASL ≤ (DT + 100) mm with traction sheave diameter 520 or 590 mm
- Installations with rope suspension 2:1 and traction sheave diameters 440, 520, or 590 mm

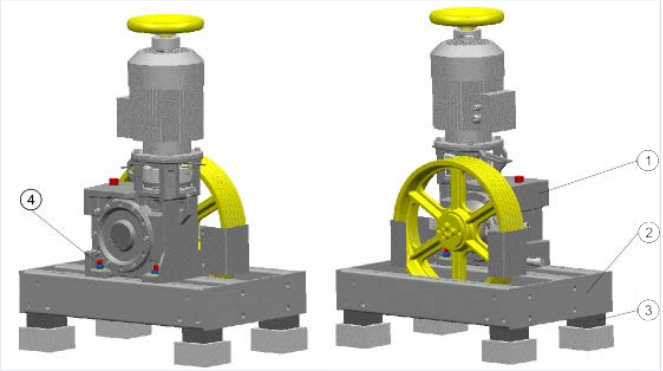


Fig. 9 ATR_2_21_0039_0

Item	Designation	Item	Designation
1	TW45C machine	2	TW45B O SR machine base frame
3	Insulation elements	4	Mounting parts for machine base frame

AY TW45B M SR machine base frame

The TW45B M SR machine base frame (shown with the rope pulley in the right-hand arrangement with the machine in horizontal motor position and left-hand traction sheave position, including emergency brake, NBS) in the version with a rope pulley based on the pulley hub position in the left-hand or right-hand configuration for use on:

- Installations with rope suspension 1:1 and rope distance elevator car – counterweight
  ASL = 608 to 833 mm and traction sheave diameter 440 or 520 mm
- The rope pulleys that are used are the versions D360-7xdia.8 (traction sheave with 5/7xdia.8), dia.450-7xdia.10/11 mm (traction sheave with 5xdia.10/11) or dia.450-8xdia.10/11 mm (traction sheave with 6xdia.10/11). The rope pulleys (versions, see product description of rope pulleys) are designed with maintenance-free roller bearings.

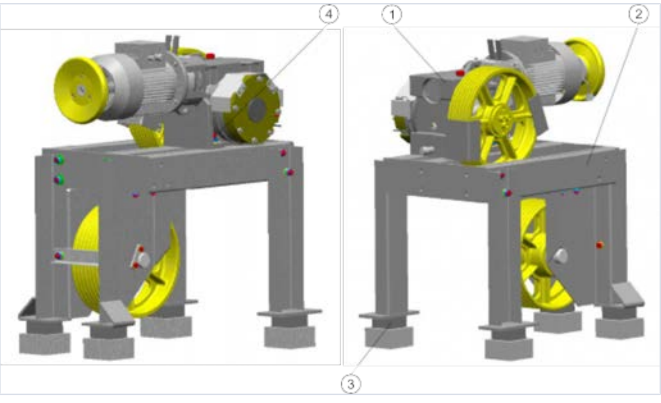


Fig. 10 ATR_2_21_0040_0

Item	Designation	Item	Designation
1	TW45C machine	2	TW45B M SR machine base frame
3	Insulation elements	4	Mounting parts for machine base frame

Mounting parts for machine on TW45B machine base frame

A set of screw connection elements (M16 – 8.8) is available for mounting the TW45C machine on the TW45B O SR/M SR machine base frames.

A modified mounting SA1 (4 x M16-10.9 – 190 Nm) is required for TW45C machine use cases with horizontal or vertical upward rope departure – except for the housing with flange fixing.

Version with earthquake safeguard in accordance with EN81-77

Optional components are available for the TW45B O SR and TW45B M SR base frames; these meet the requirements for protection devices complying with EN81-77.

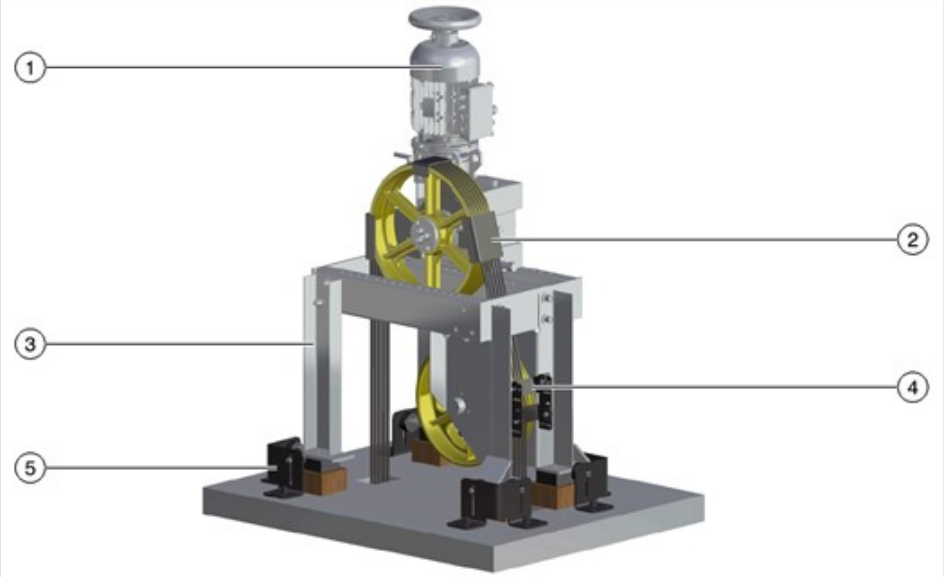


Fig. 11 ATR_2_12_0155_0

Item	Designation	Item	Designation
1	TW45C machine, vertical	2	Rope guard in accordance with EN81-77 for traction sheave
3	TW45B M SR machine base frame	4	Rope guard in accordance with EN81-77 for rope pulley diameter D450
5	Shift protection device in accordance with EN81-77		

The safeguard measures are only suitable for machine base frames with locations in the machine room.

The protection device consists of a modified rope guard for rope pulleys of diameter D360 or D450 which prevent the ropes from departing from the grooves.

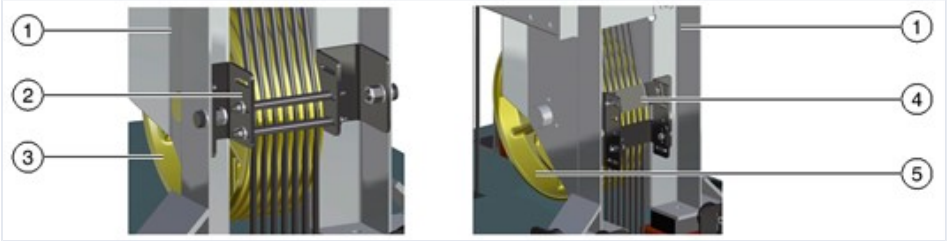


Fig. 12 ATR_2_12_0156_0

Item	Designation	Item	Designation
1	TW45B M SR machine base frame	2	Rope guard in accordance with EN81-77 for rope pulley diameter D360
3	Rope pulley diameter D360	4	Rope guard in accordance with EN81-77 for rope pulley diameter D450
5	Rope pulley diameter D450		

The safeguard measures also consist of shift protection devices that prevent the machine from changing its position.

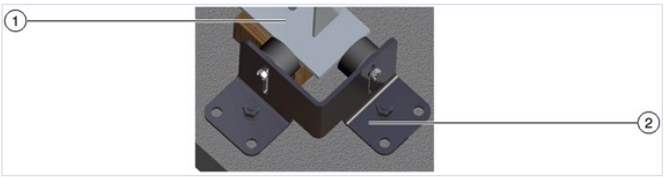


Fig. 13 ATR_2_12_0157_0

Item	Designation	Item	Designation
1	TW45B M SR machine base frame	2	Shift protection device in accordance with EN81-77

3.3.2 Motor versions

Frequency-controlled three-phase motors made by CEG and EMOD are used (for ISIS1). The mechanical layout (design IMB5/V1, flange A250, AS/BS shaft ends, encoder mounting, etc.) is executed in accordance with building code BV 6531- 07 Sheet 1 and/or the dimension sheets of CEG and EMOD.

In extension of the building code, the motors are modified and receive a larger terminal box with the option to connect the connection lines of the operational brake (type Mayr RSZ 125) to a terminal block. To connect the brake (coil and microswitch) on the installation side, two M16x1.5 cable glands are available on the motor terminal box.

Related to the motor axis, mounting and thus the location of the motor terminal box is possible under 4x90°.

In the case of the ISIS1 version, the position of the motor terminal box is generally at the side opposite the traction sheave.

The specified electrical data applies to the following site conditions:

- Max. altitude 1000 m amsl
- Max. temperature + 40 °C at max. 50% air humidity
- Max. relative air humidity 70% at 20 °C

If the conditions stated above are exceeded, the deratings in accordance with VDE0530 apply.

The encoders (for description and technical data, see elevator motors product catalogue) for the standard version include a 10 m long connection cable including connectors (types 1024/4096 TTL) for connection to TK elevator frequency inverters. An encoder with 2048 TTL and 3 m connection line is used for the ISIS1 (MRL).

3.3.3 Special versions

The following optional versions are possible:

- Emergency brake, NBS (only with machine location in the machine room or ISIS1)
- Actual-value sensor in accordance with ↗ Chap. 4.1.3 P. 30
- Earthquake safeguard complying with EN81-77 (only with machine location in the
  machine room; not with horizontal rope departure direction)
- SA1 - modified machine fastening (including compensating sheaves) for horizontal or vertical upward force resulting from rope pull
- Horizontal rope departure direction; other information Product
- Version for ISIS1 (description Product)

Other special versions or options are currently not available.

3.3.4 Standard version for machine in the machine room

The standard version of the machine TW45C comprises the following components:

- Driving gear (incl. oil filling; vertical/horizontal motor position; traction sheave position – left/right)
- Gear ratios 46:1, 32:1, 41:2, 40:3 or 32:3 (32:3 only for ISIS1)
- Service brake type Mayr RSZ125-2x50 Nm including permanently mounted brake release lever and brake monitoring (microswitch)
- Motor in version EME (CEG) MT132 (5.2 kW) or EME (CEG) MT132 (7 kW); mounting with terminal box location Product and as standard; motor versions with intermediate terminal connection for connection lines of the service brake
- Encoder; version WDG100-1024 TTL as standard
- Handwinding wheel, diameter 270
- Traction sheave dia. 440, dia. 520 or dia. 590 as standard
- Components for the rope guard; standardised for traction sheave dia. , 440, 520 and dia. 590
- Blocking clamp

3.3.5 Version with emergency brake, NBS

The optional version of the emergency brake (NBS) meets the requirements for the protection device that prevents overspeed in the upward-moving elevator car in accordance with EN81-1:1998 / 9.10 and/or EN81-20/5.6.6 and unintended elevator car movements in accordance with EN81-1:2010-06 / 9.11 (EN81-1/A3) and/or EN81-20/5.6.7.

In the ISIS1 version, the NBS emergency brake also meets the requirements in accordance with ASME A17.1.

Alongside the service brake, an additional braking device is fitted on the drive shaft, consisting of the components:

- Type-approved electromagnetic disc brake in accordance with ↗ Chap. 4.1.6 P. 34
- Driving gear in emergency brake NBS version (bearing bracket NBS, brake flange NBS for fitting the brake)
- Traction sheave / worm wheel shaft NBS (including components for sealing)

The braking device is located on the machine side opposite the traction sheave and directly affects the traction sheave shaft.

A certificate with respect to the calculation of the traction sheave shaft for the machine TW45C with emergency brake system (NBS) shall be enclosed with the technical documentation.

The emergency brake is activated via a separate control unit including terminal box and connecting lines as well as an additional safety switch at the overspeed governor (TK Aufzugswerke GmbH) to activate the facility in the event of overspeed (not for ISIS1 version).

For the version in the machine room, the emergency brake is released manually (e.g. emergency rescue in the event of a power failure) via screws that are screwed into the brake in the event of triggering, thus releasing the brake/ armature base plate of the disc brake. During normal operation, the screws and a socket wrench are kept in the guard plate of the brake.

For installation of the manual release screw, a minimum distance of 100 mm is to be set between the emergency brake and the adjoining wall of the machine room or similar.

Later fitting of the emergency brake, NBS, on existing machines is not possible.

3.3.6 Version with earthquake safeguard complying with EN81-77

The optional version of the rope guard complying with EN81-77 enables compliance with the requirements for protection devices in earthquake regions up to earthquake category 1 as standard.

The rope guard fitted as standard is replaced with the modified rope guard which, in the event of an earthquake, prevents the ropes from leaving the groove of the traction sheave. Attention should be paid to ensuring that the rope guard is installed in accordance with the installation instructions.

The rope guard complying with EN81-77 is standardised for the traction sheave diameters 440 / 520 / 590. The rope guard is designed in such a way that all standard gaps between the ropes on the rope departure can be covered with the TW45B O SR and TW45B M SR base frames.

3.3.7 Version for machine location in the shaft pit for ISIS1

This version is intended for TKE-NA. The machine is located in the shaft pit with upward vertical rope pull and is intended for a range of performance from 2100 lbs/100 fpm to 3000 lbs/200 fpm, with traction sheave 10.5 in (D267 mm) and rope attachment 2:1 in each case.

As gear ratios, the versions 40:3 and 32:3 are intended. The versions EMOD 5.5 / 7.5 and 11 kW in voltage interchangeable version 230 / 460 V are deployed as motors.

3.4 Combination of versions / options

Combination	46:1	32:1	41:2	40:3	32:3	C5.2	C7.0	E5.5	E7.5	E11.0	Machine room	Horizontal	Vertical	440	520	590	NBS	EN81-77	ISIS1	SA1
46:1																				
32:1	O																			
41:2	O	O																		
40:3	O	O	O																	
32:3	O	O	O	O																
C5.2	X	X	X	X	O															
C7.0	X	X	X	X	O	O														
E5.5	O	O	O	X	X	O	O													
E7.5	O	O	O	X	X	O	O	O												
E11.0	O	O	O	X	X	O	O	O	O											
Machine room	X	X	X	X	O	X	X	O	O	O										
Horizontal	X	X	X	X	X	X	X	X	X	X	X									
Vertical	X	X	X	X	O	X	X	O	O	O	X	O								
440	X	X	X	X	O	X	X	O	O	O	X	X	X							
520	X	X	X	X	O	X	X	O	O	O	X	X	X	O						
590	X	X	X	X	O	X	X	O	O	O	X	X	X	O	O					
NBS	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
EN81-77	X	X	X	X	O	X	X	O	O	O	X	X	X	X	X	X	X			
ISIS1	O	O	O	X	X	O	O	X	X	X	O	X	O	O	O	O	X	O		
SA1	X	X	X	X	O	X	X	O	O	O	X	X	X	X	X	X	X	O	O	

Tab. 1 *ATR_1_21_0047_0*

X Combination possible
O Combination not possible or not intended
46:1 / 32:1 / 41:2 / 40 :3 / 32:3 versions - gear ratio
C 5.2 / 7.0 kW versions - motor CEG / E 5.5 / 7.5 /. 11.0 kW versions - motor EMOD
TWR machine location - machine room
Horizontal / vertical versions - motor position
440 / 520 / 590 traction sheave versions
NBS Version with emergency brake-NBS
EN81-77 Version with earthquake protection in accordance with EN81-77
ISIS1 Delivery version for ISIS1 / SA1 version with modified fastening

4 Technology

4.1 Mechanical data

4.1.1 Gear unit

Single-stage worm gear with:

- Housing in monoblock design (EN-GJL 250) with separate AS and BS bearing brackets
- Two housing variants in the respective version adapted for the mounting surface to machine base frame and motor position:
  - Vertical motor position (NBS emergency brake possible)
  - Horizontal motor position (NBS emergency brake possible)
- Motor flange (construction size A250) integrated on housing
- Worm shaft made of case-hardened steel (16MnCrS5); optimised roller bearings via stroke unit with life-time grease lubrication and optimised seal system
- Worm wheel made of centrifugally cast bronze (CuSn12Ni-C-GZ) with screw-connected hub
- Traction sheave shaft made of tempering steel (C60R+N and/or 42CrMo4+QT), roller bearings with oil-bath lubrication
- Contact pattern position of gear teeth adjustable; backlash not adjustable
- Components for the rope guard suitable for traction sheaves dia. / 440 / 520 and 590 in accordance with EN81-1:1998 and/or EN81-20/5.5.7 (not generally with horizontal rope departure direction).
- With vertical motor position, gear teeth run under oil; with horizontal motor position, with transport oil from oil sump via worm wheel gear teeth
- Oil level monitoring via gauge glass; oil drain (R3/4"); casing ventilation
- Machine type plate

Version	Unit	TW45C
Axle distance	[mm]	120
Ratio		40:3/41:2/32:1/46:1/32:3
Oil filling (motor position)	[L]	Horizontal 4.0/vertical 5.0
Oil grade		Synthetic gear oil (polyalkylene glycol with additives)
Designation		SM1
Backlash	[°]	0.03-0.07
Weight	[kg]	approx. 105

Tab. 2 *ATR_1_21_0005_0*

4.1.2 Brake

Version for deployment in the machine room and ISIS1 (MRL)

Designation	Unit	Technical data	
Manufacturer		Chr. Mayr GmbH	
Type		ROBA-stop RSZ125	
Version		Machine room	ISIS1 (MRL)
Braking torque	[Nm]	2 x 50	100 (2 x 50)
Braking torque setting		Not possible	
Design		2-surface disc brake (2 mechanical brake circuits with a joint electro-magnetic circuit for release)	
Brake linings		Asbestos-free	
Brake disc diameter	[mm]	130	
Air gap	[mm]	0.5 +0.25	
Air gap setting		Not possible	
Electrical release		1 magnetic clamp with armature base plate	
Operating voltage Overexitation / holding current	[VDC]	180 / 90	110 / 55
Operating current Overexitation / holding current	[A]	1.68 / 0.84	2.58 / 1.29
Performance data Overexitation / holding current	[W]	303 / 76	284 / 71
Monitoring devices		Release monitoring (microswitch)	
Manual release		Manual release lever (permanently mounted) [1)]	without
Connection lines, coil and microswitch	[m]	1 m (with end sleeves; connection lines have intermediate clamping in the motor terminal box)	3 m (with end sleeves; connection lines are routed through the motor terminal box)
Type of protection		IP54	
Weight	[kg]	approx. 11	
CSA		LR 34805	
Type approval code		without (not required)	

Tab. 3 *ATR_1_21_0023_0*

[1)] Manual release of both brake circuits; single-circuit test by means of pluggable test gauges.

In general, this brake is made with brake monitoring (microswitch).

This brake is also used for the ISIS1 version with the machine in the shaft pit, but in an adapted version with altered voltage and without a manual release lever. With ASME A17.1, the brake is regarded as 100 Nm (2x50 Nm).

Version with NBS emergency brake

Designation	Unit	Technical data	
Manufacturer		Chr. Mayr GmbH	
Type		Mayr RSO500/1200 Nm	
Version		Machine room	ISIS1 (MRL)
Braking torque	[Nm]	1200	
Braking torque setting		Not possible	
Design		4-surface disc brake	
Version of brake linings		Asbestos-free	
Brake disc diameter	[mm]	213	
Air gap	[mm]	0.6	
Air gap setting / stroke		Not possible	
Electrical release		1 magnetic clamp with armature base plate	
Operating voltage Overexitation / holding voltage	[VDC]	207 / 104	110 / 55
Operating current Overexitation / holding current	[A]	1.7 / 0.85	3.28 / 1.64
Performance data Overexitation / holding power	[W]	353 / 88	361 / 90
Monitoring devices		Release monitoring (microswitch)	
Manual emergency release		2 x M10 screws	
Connection lines, coil and microswitch		approx. 1 m (with end sleeves)	approx. 4 m (with end sleeves; connection lines are routed through the motor terminal box)
Type of protection		IP54	
Weight	[kg]	approx. 50	
Type approval code		EU-BD 762 [2] and/or ABV 762/2 [3]	
Type approval code		EU-BD 762 [2] and/or ESV 762/2 [3]	
Times: t10 / t50 / t90 [1]	[ms]	55 / 90 / 180	
Certificate for traction sheave shaft Test number:		TW45C-RSO500/1200 Nm	
CSA		LR 34805	

Tab. 4 *ATR_1_21_0040_0*

1) DC - direct current cut-off (emergency stop).
2) Complying with EN81-20/50.
3) Complying with EN81-1:1998+A3:2009.

4.1.3 Encoder

The following hollow shaft encoders are available:

Number of pulses	Version	Connection
2x1024	TTL	Line and connector hard-wired
2x4096	TTL	Line and connector hard-wired
2x2048	TTL	Line stripped of insulation and wire end sleeves attached

Tab. 5 ATR_1_21_0072_0

4.1.4 Traction sheave

Different versions of traction sheave are used, depending on the location of the machine.

The one-part traction sheaves are secured overhung on the traction sheave shaft using a cone (1:15) and a mounting plate, including three screws (M16-8.8 microencapsulated with locking washer).

Designation	Unit	Technical data		
Diameter - DT	[mm]	440	520	590
Rim width - B	[mm]	115		
Max. number of grooves - z x d [2)]		9 x 8 (8 x 8)		
		8 x 9 (7 x 9)		
		7 x 10 (6 x 10)		
		6 x 11		
			6 x 12 (5 x 12)	
Groove type		Seat/vee groove [1)]		
Groove angle	[°]	Depends on project specs [1)]		

Tab. 6 ATR_1_21_0011_0

[1)] Version in accordance with product description, groove profiles with hardened groove flanks (min. 50 HRc).
[2)] With minimum groove clearance - RAmin - in accordance with product description for groove profiles for seat grooves (for vee grooves, if deviating).
TKE-NA provides a D267 mm traction sheave for the ISIS1 (MRL) version (not in the scope of supply of TK Aufzugswerke GmbH).

4.1.5 Performance chart

Applications in the standard

r	v_n	n1	DT	i	vn1	Q´max	F´max	x
1:1	0.50	1000	440	46:1	0.50	630	800	50
						675		45
	0.63	1250	440		0.63	550	850	50
						630	800	45
		1070	520			500	850	50
						550		45
		940	590			450	800	50
						500		45
	0.80	1600	440		0.80	450		50
						500		45

r	v_n	n1	DT	i	vn1	Q´max	F´max	x
		1350	520			450		50
						500		45
		1190	590			400		50
						450		45
		1100	440			630		50
						675		45
	1.00	1390	440		1.00	550	850	50
						630	800	45
		1180	520			500	850	50
						550		45
		1040	590	32:1		450	850	45/50
	1.25	1740	440		1.25	475	900	50
						525	850	45
		1470	520			425	900	50
						475		45
		1300	590			400	800	45/50
	1.60	1650	590	32:1	1.60	350	700	50
						375	800	45
		1420	440	41:2		400	1000	50
						450		45
		1200	520			400	900	45
		1060	590			375	850	45
		930	440	40:3		450	800	45/50
2:1	0.40	1600	440	46:1	0.40	1000	1600	50
		1350	520			900		
		1110	440	32:1		1300		
	0.50	1390	440		0.50	1150		
		1180	520			1050		
	0.63	1750	440		0.63	1000		
		1470	520			900		
		1300	590	32:1		850	1600	50
		1120	440	41:2		1050	1500	50
						1200	1400	45
	0.80	1420	440		0.80	950	1350	50
						1050		45
		1210	520			850	1350	50
						950		45
		1060	590	41:2		750	1500	50
						850	1400	45
		930	440	40:3		1050	1500	50
	1.00	1780	440	41:2	1.00	825	1300	

r	v_n	n1	DT	i	vn1	Q´max	F´max	x
						900	1400	45
		1510	520			750	1250	50
						825	1300	45
		1330	590	41:2		675	1300	50
						750		45
		1160	440	40:3		900	1500	50
						1000		45

Tab. 7 ATR_1_21_0048_0

r - Rope suspension
v_n fpm (m/s) rated speed
n1 (rpm) Motor speed
DT in (mm) Diameter of traction sheave
i - Gear ratio
Q´max lbs (kg) Rated load (maximum)
F´max lbs (kg) Mass of car (maximum at Q´max)
x (%) Counterweight compensation

Applications in the ISIS1

r	v_n	n1	DT	i	Q´max	F´max	x
2:1	100 (0.508)	970	10.5 (267)	40:3	3000 (1361)	3500 (1588)	45
	150 (0.762)	1455	10.5 (267)	40:3			
	200 (1,016)	1555	10.5 (267)	32:3			

Tab. 8 ATR_1_21_0050_0

r - Rope suspension
v_n fpm (m/s) rated speed
n1 (rpm) Motor speed
DT in (mm) Diameter of traction sheave
i - Gear ratio
Q´max lbs (kg) Rated load (maximum)
F´max lbs (kg) Mass of car (maximum at Q´max)
x (%) Counterweight compensation

All specified performance data in ↗ Chap. 4.1.5 P. 31 apply to the following application conditions:

- Operating data max. 180 c/h at 50% duty cycle
- Ambient temperature + 5°C to + 40°C

For types of performance not shown in the chart or deviating installation data, there is the possibility to use a calculation program (e.g. TK Liftdesigner) to check the operational safety of the machine.

The machines are conceived for a service life of at least 15 years and/or 20,000 hours of operation.

4.1.6 Motor versions

Standard versions of motors

Designation	Unit	Technical data			
Manufacturer		Orange1			
Type		MT132STD		MT132STD	
		20197S		20193S	
Motor version		C5.2 400		C7.0 400	
TKAW designation					
Voltage/frequency	[V/Hz]	340/42			
S5 – operating data		180 c/h / 50% DC			
Speed range	[rpm]	1000–1249	1250–1800	1000–1249	1250–1800
Performance	[kW]	4.2–5.2	5.2	5.6–7.0	7.0
Torque	[Nm]	40	40–28	54	54–37
Rated current	[A]	12.5		16.5	
Permitted starting torque	[Nm]	70	70–63	88	88–79
Permitted starting current	[A]	20		25	
Effective voltage	[V]	340		340	
cos ϕ		0.87		0.88	
Efficiency		0.82		0.82	
Design		IMB5/V1			
Type of protection		IP55			
Ventilation		Internal ventilator			
Handwinding wheel [1)]	[mm]	D270 (plastic)			
kproj.	[mm]	485			
Weight	[kg]	50		60	
Actual-value sensor		WDG100-38-1024/4096 TTL			

Tab. 9

ATR_1_21_0034_0

Motors in voltage interchangeable version with CSA for ISIS1

Designation	Unit	Technical data								
Manufacturer		EMOD								
Type		132S/4			132M/4			132M/4a		
Motor version TKAW designation		E5.5 230/460			E7.5 230/460			E11.0 230/460		
S5 operating data		180 c/h / 50% DC								
Rated speed	[rpm]	970	1460	1555	970	1460	1555	970	1460	1555
Nominal frequency	[Hz]	34.0	50.4	53.7	34.0	50.7	53.7	34.0	50.7	54.0
Rated voltage [1)]	[V]	156// 312	230//460		156// 312	230//460		156// 312	230//460	
Rated power	[kW]	3.7	5.5	5.5	5.0	7.5	7.5	7.4	11	11

Designation	Unit	Technical data								
Rated torque	[Nm]	36.4	36.0	33.8	49.2	49.1	46.1	72.8	71.9	67.5
Rated current	[A]	21.0//10.5		20.4// 10.2	28.0//14.0		27.2// 13.6	41.0//20.5		39.0// 19.5
max. starting torque	[Nm]	45			100			140		
Max. starting current	[A]	42//21			56//28			86//43		
cos ϕ		0.81			0.83			0.80		
Efficiency		86			85			87		
Design		IMB5/V1								
Type of protection		IP55								
CSA		LR 34805								
Ventilation		Internal ventilator								
Handwinding wheel	[mm]	without								
kproj.	[mm]	437			475			503		
Weight	[kg]	57			70			75		
Actual-value sensor		WDG100-38-2048 TTL								

Tab. 10 *ATR_1_21_0046_0*

[1] Voltage interchangeable YY//Y

The specified electrical data applies to the following site conditions:

- Max. altitude 1000 m amsl
- Max. temperature + 40 °C at max. 50% air humidity
- Max. relative air humidity 70% at 20 °C

If the conditions stated above are exceeded, the deratings in accordance with VDE0530 apply.

Please refer to the product catalogue ↗ Product catalogue for elevator motors for detailed technical data for the motors and encoders.

4.1.7 Load data - traction sheave shaft

The load value F_{tzul} listed below is the limit value of the permitted radial stress for the traction sheave shaft calculated from the overall mass present on the installation.

The overall mass of the installation is determined and the load is checked as part of the calculation program TK LiftDesigner.

- Radial shaft load for $n_2 = n1 / i \leq 50$ rpm: $F_{tzul} \leq 30$ kN
- Radial shaft load for $n_2 = n1 / i > 50$ rpm: $F_{tzul} \leq 26$ kN
- Radial shaft load for ISIS1 version: $F_{tzul} \leq 27.9$ kN

4.1.8 Load data for upward horizontal / vertical rope pull direction

For the configuration of the machine with the standard version of the traction sheave shaft or in the version for the emergency brake system, NBS, there are restrictions due to the housing strength for the permitted load $Ft_{zul\text{-}stat}$ depending on the installation data for the upward horizontal or vertical rope pull direction.

TW45C with vertical motor position

- Horizontal rope pull: $Ft_{zul\text{-}stat}$ = 76 kN ≤ $Ft_{stat\text{-}max}$
- Upward vertical rope pull: $Ft_{zul\text{-}stat}$ = 56 kN ≤ $Ft_{stat\text{-}max}$
- Horizontal rope pull: $Ft_{zul\text{-}stat}$ = 94 kN ≤ $Ft_{stat\text{-}max}$
- Upward vertical rope pull: $Ft_{zul\text{-}stat}$ = 70 kN ≤ $Ft_{stat\text{-}max}$

The load $Ft_{stat\text{-}max}$ present for the static overload case is determined via the TK-LiftDesigner, etc.

The values for upward horizontal and/or vertical rope pull directions can be used up to +/- 45° respectively for rope pull directions between upward horizontal and vertical.

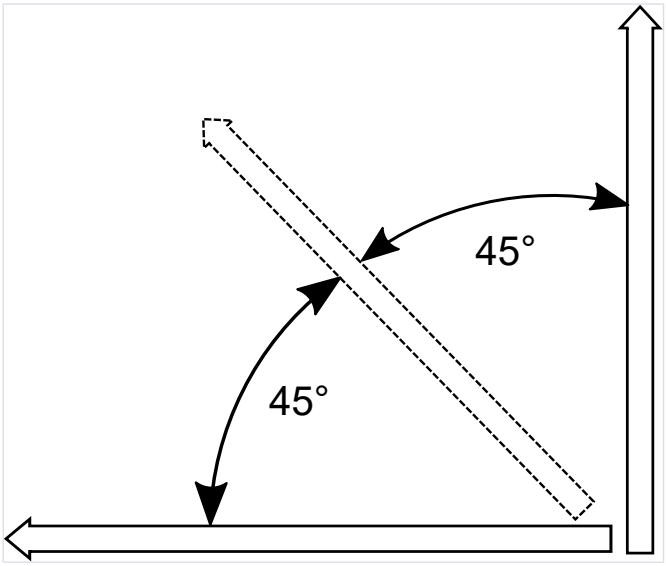


Fig. 14 ATR_2_12_0168_0

For installations on which $Ft_{stat\text{-}max}$ is > $Ft_{zul\text{-}stat}$, the permitted load and possible constructive measures must be clarified with TK Aufzugswerke GmbH on request.

4.1.9 Gear efficiency

The specified gear efficiencies η_G and $\eta_{G'}$ are extreme values which are to be applied for dimensioning the motor, frequency inverter and braking resistor, etc. The rated efficiency η_n provides information on the value η_G that can be achieved under optimum operating conditions.
The efficiencies η_{an} and $\eta_{an'}$ describe the state of gear starting (overcoming static friction or build-up of lubricating film in the gear teeth; with η_{an} values < 0.5 - the gear, when stopped, must be viewed as self-inhibiting).

- η_g: minimum design efficiency, driving
- η_g: maximum design efficiency, driven (braking)

- η_n: rated efficiency - driving
- η_{an}: starting efficiency – driving
- $\eta_{an'}$: starting efficiency – driven

Ratio /	η_g		$\eta_{g'}$		η_n	η_{an}	$\eta_{an'}$
Speed (rpm)	800 - 1249	1250 -1800	800 - 1249	1250 -1800	1250 -1800	-	-
46:1	0.68	0.70	0.70	0.72	0.73	0.39	-0.08
32:1	0.72	0.74	0.74	0.76	0.77	0.46	0.18
41:2	0.80	0.82	0.82	0.84	0.85	0.56	0.47
40:3	0.86	0.88	0.88	0.90	0.91	0.66	0.66
32:3	0.87	0.89	0.89	0.91	0.92	0.67	0.67

Tab. 11 ATR_1_21_0051_0

4.1.10 Mass moment of inertia

Machine location	J_{rot}		Machine room
ASY TW45C winch [1]	(kgm^2)	0.0045	x
Motor 5.2 kW	(kgm^2)	0.018	x
Motor 7.0 kW	(kgm^2)	0.024	
Handwinding wheel D270	(kgm^2)	0.01	x
ASY complete machine	(kgm^2)	-	0.0325

Tab. 12 ATR_1_21_0049_0

The following values for the machine apply to the ISIS1 versions depending on the motor construction size:

- E 5.5 J_{rot} = 0.028 kgm^2
- E 7.5 J_{rot} = 0.036 kgm^2
- E 11.0 J_{rot} = 0.040 kgm^2

The mass moment of inertia for versions of the machine not listed in the table is to be determined according to the details of the individual components.

4.1.11 Weight

Machine location	Weight [kg]	Machine room		
ASY TW45C winch [1]	120	x		
ASY TW45C winch [2]	160		x	x
Motor 5.2 kW	50	x	x	x
Motor 7.0 kW	60			
Traction sheave D590	60			
Traction sheave D520	55	x		x

Machine location	Weight [kg]	Machine room		
Traction sheave D440	45		x	
ASY complete machine [kg]	-	225	275	285

Tab. 13 ATR_1_21_0007_0

[1] Version without emergency brake.
[2] Version with emergency brake, NBS

The following values for the machine apply to the ISIS1 versions depending on the motor construction size:

- E 5.5 m = 227 kg
- E 7.5 m = 240 kg
- E 11.0 m = 245 kg

The overall mass for versions of the machine not listed in the table is to be determined according to the weight data of the individual components.

4.1.12 Noise levels

The airborne noise levels in the machine room at a distance of 1 m for the standard version of the machine TW45C with operation at normal rating are:

Version	[dB(A)]	Motor speed n1
TW45C	approx. 63	≤ 1250 rpm
	approx. 65	≤ 1500 rpm
	approx. 67	≤ 1800 rpm

Tab. 14 ATR_1_21_0015_0

ATR_1_22_032_0

4.2 Dimensions

4.2.1 Machine

Machine room version / vertical motor position

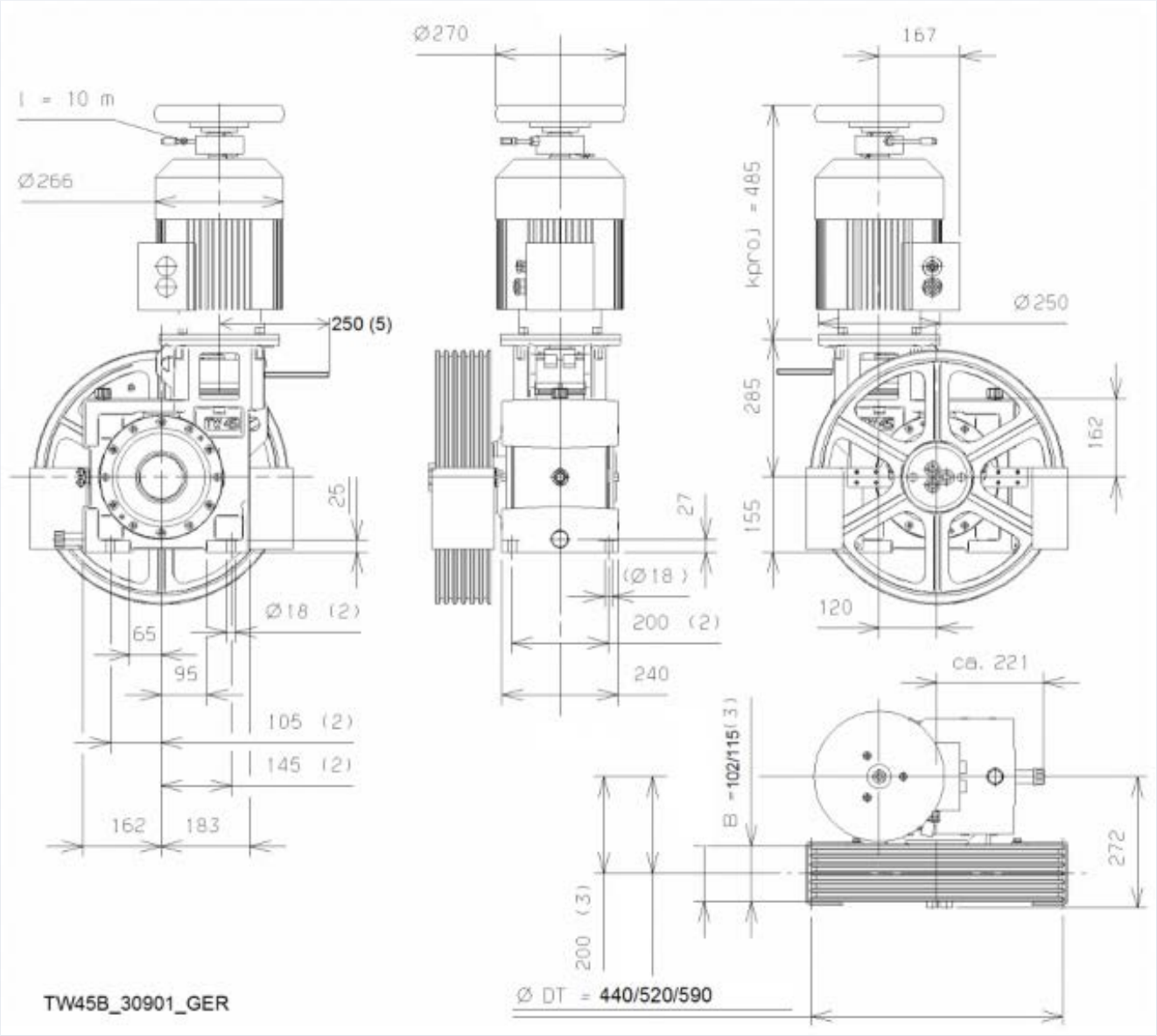


Fig. 15

ATR_2_21_0034_0

Item	Designation	Item	Designation
2	Screwed connections - machine base frame M16 -8.8	3	with DT = 440 / 520 / 590
5	Manual brake release for Mayr brake RSZ125-2x50 Nm		

Machine room version / horizontal motor position

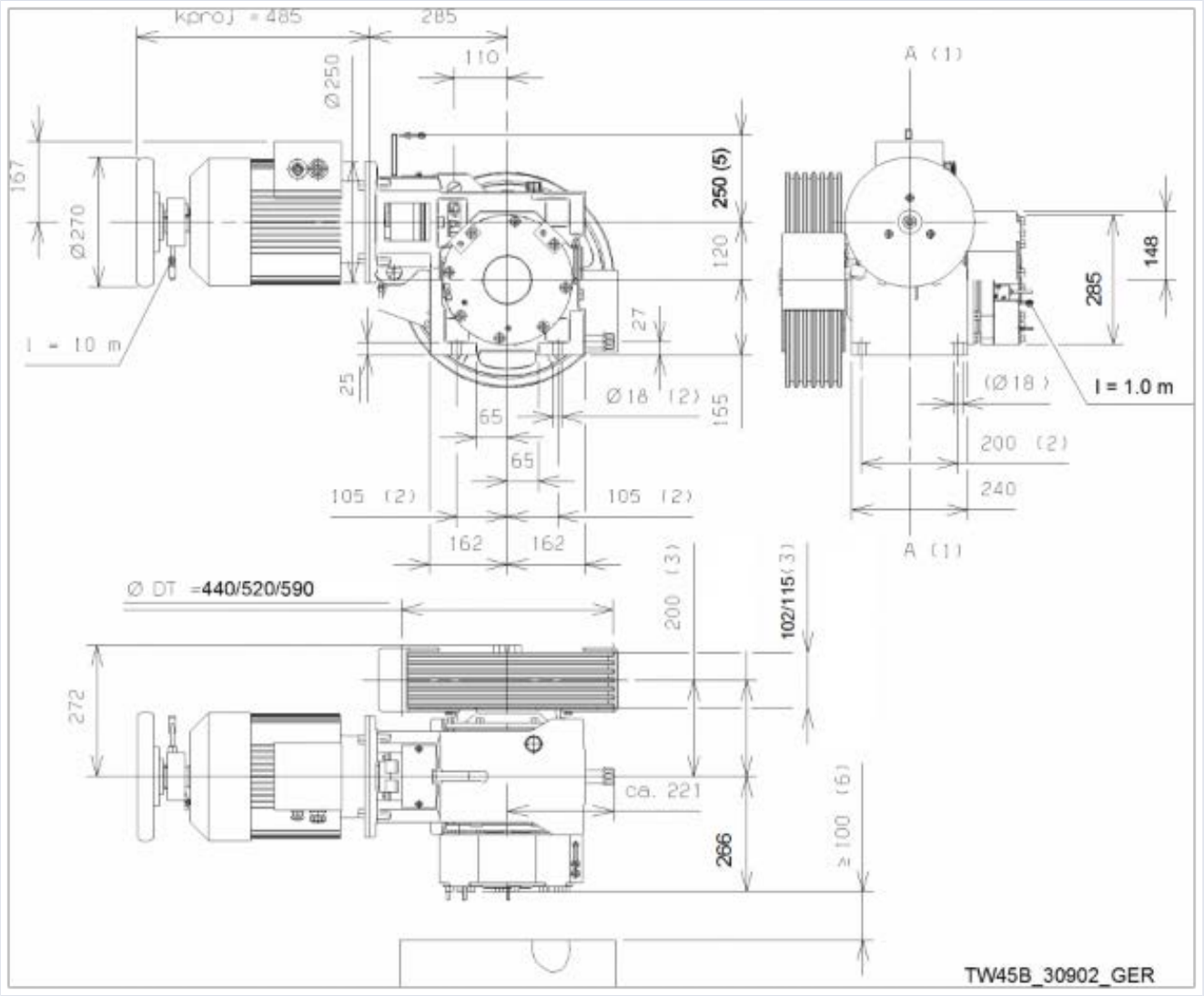


Fig. 16

ATR_2_21_0035_0

Item	Designation	Item	Designation
1	Traction sheave position on right, mirror-inverted to A-A	2	Screwed connections - machine base frame M16 -8.8
3	with DT = 440 / 520 / 590		
5	Manual brake release for Mayr brake RSZ125-2x50 Nm	6	Clearance for manual release of the emergency brake, NBS

ISIS1 version (MRL – machine in the shaft pit)

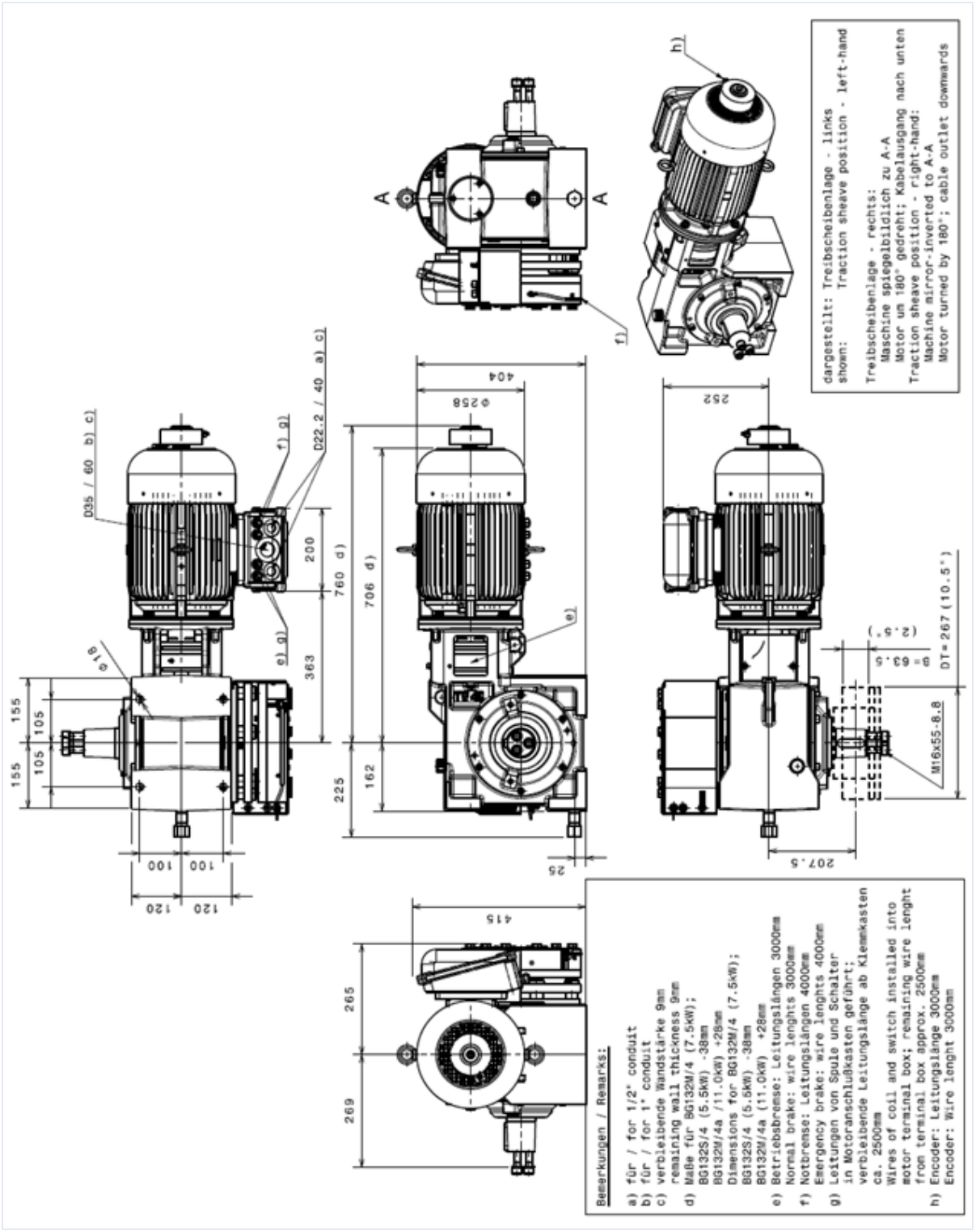


Fig. 17

ATR_2_12_0152_0

Machine room version with horizontal rope departure direction

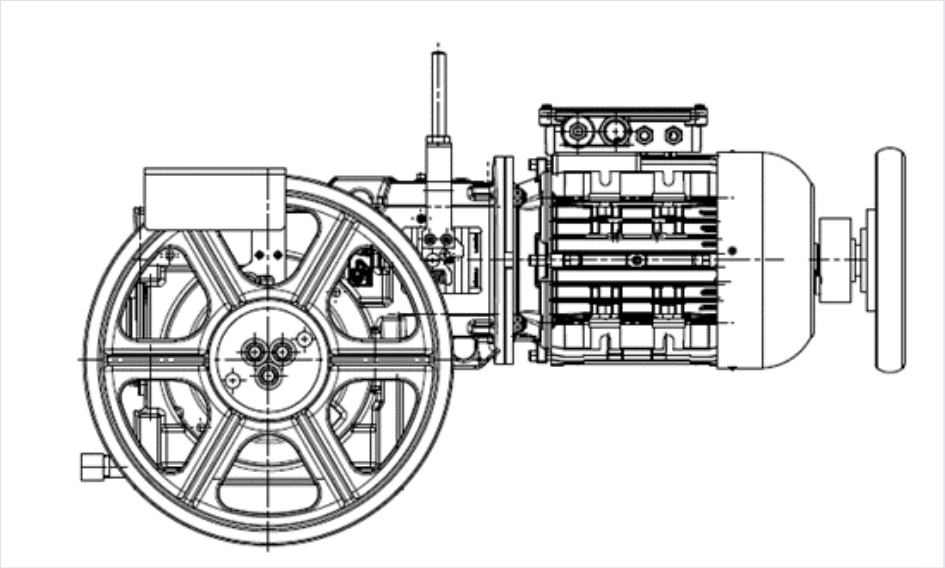


Fig. 18 ATR_2_12_0153_0

(Adjustable range of the upper rope guard +/- 15° to the horizontal)

4.2.2 Machine base frame

Machine base frame without rope pulley

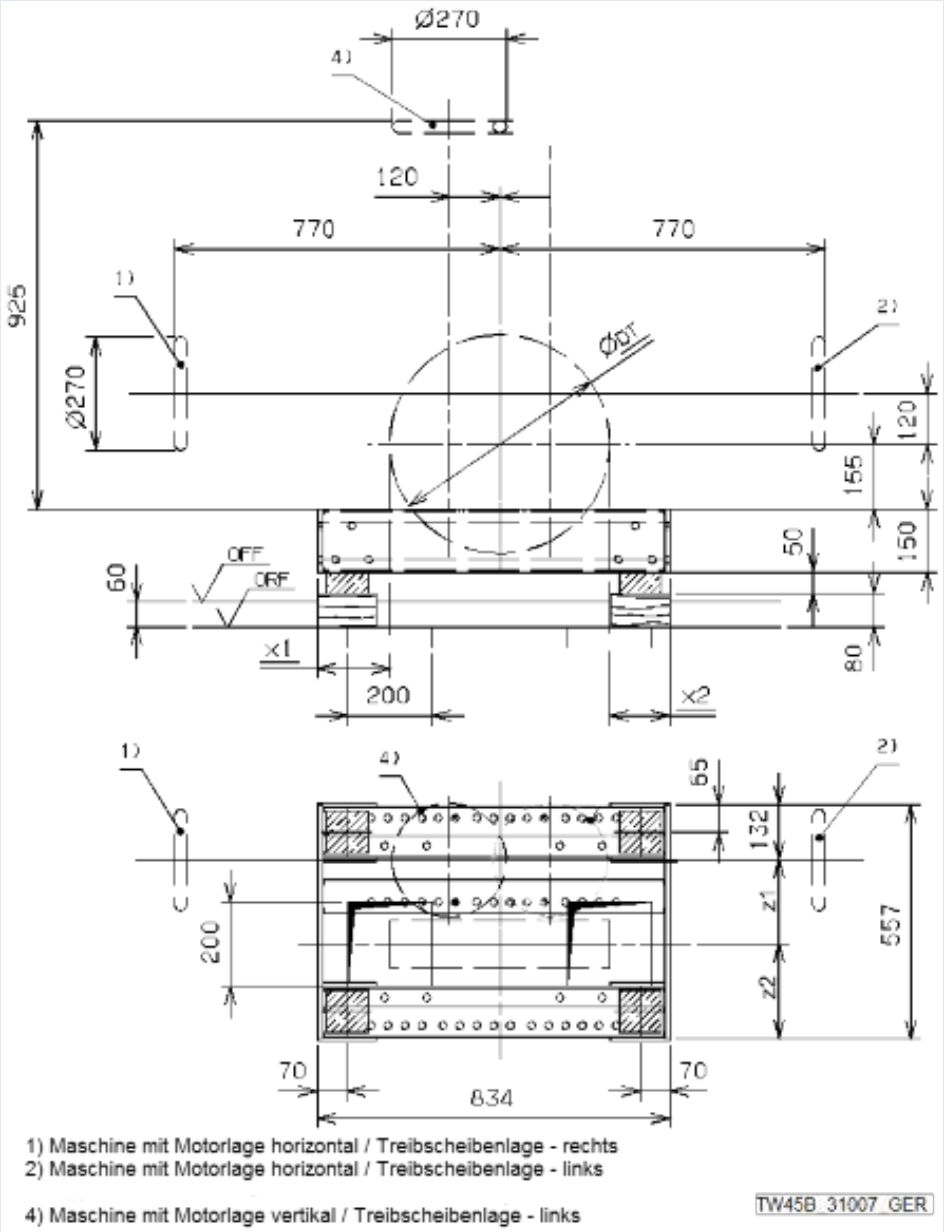


Fig. 19

ATR_2_21_0041_0

Project planning dimensions:

Traction sheave version	Unit	Project planning dimension		Machine arrangement			
DT				left		right	
(mm)		z1	z2	$x1_{min}$	$x1_{max}$	$x2_{min}$	$x2_{max}$
440	(mm)	200	225	52	332	52	332
520				52	252	52	252
590				57	177	57	177

Tab. 15

ATR_1_21_0019_0

Intermediate values for x1 and x2 in the modular dimension of 40 mm possible

Machine base frame with rope pulley - right-hand version of the rope pulley position

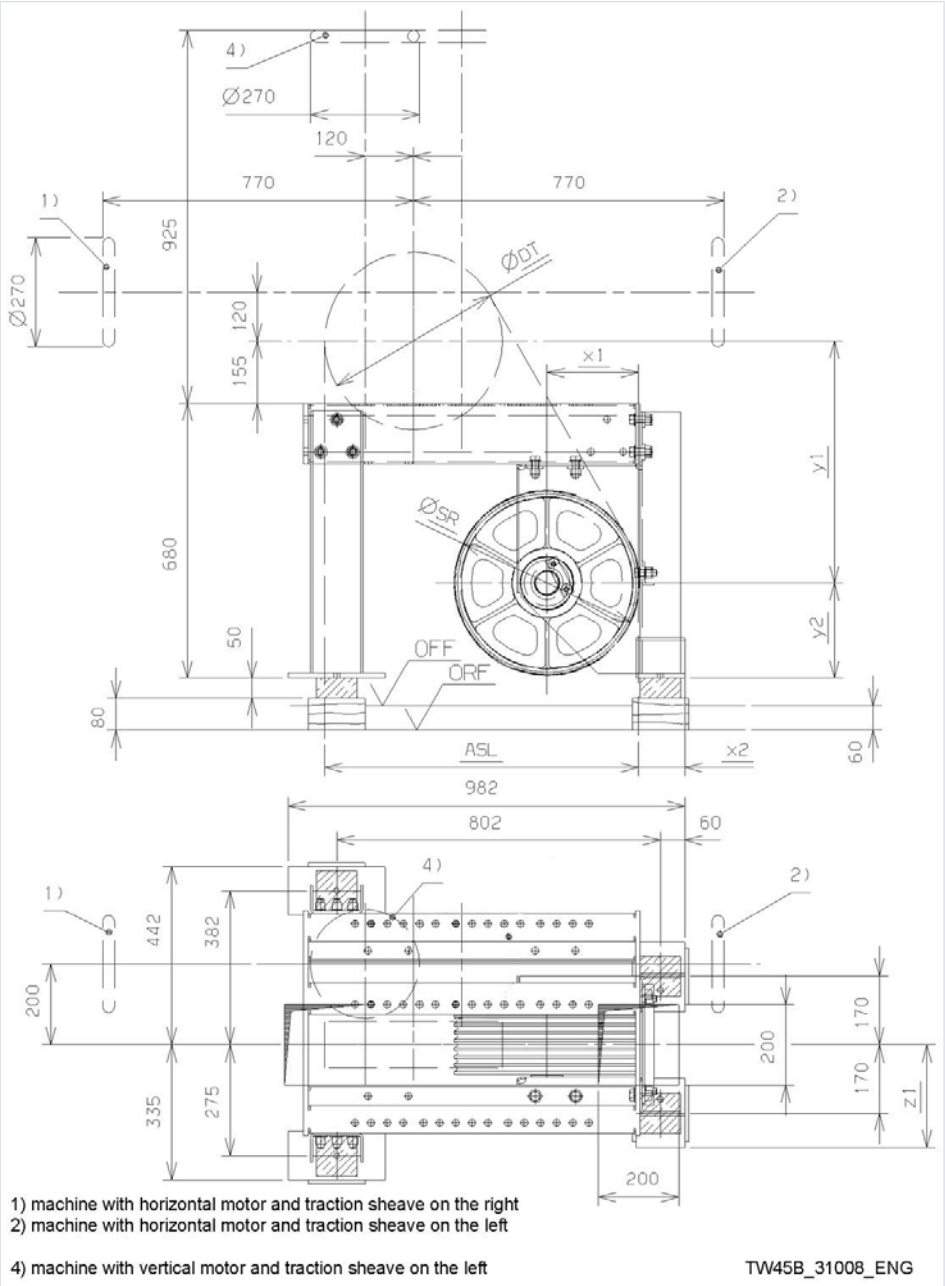


Fig. 20

ATR_2_21_0042_0

Project planning dimensions:

Traction sheave version	Unit	Rope pulley version (mm)							
Diameter of traction sheave Dt [mm]		D360				D450			
		ASL	α	ASL	α	ASL	α	ASL	α
		min	max	max	min	min	max	max	min
440	(mm) / (°)	592	167	832	149	576	168	776	150
520	(mm) / (°)	672			154	616	170		157

Tab. 16 ATR_1_21_0020_0

Intermediate values for ASL in the modular dimension of 40 mm possible.

Distances:

Rope pulley version	Unit	Project planning dimension				
(mm)		x1	x2	y1	y2	z1
D360	(mm)	130	61	645	190	245
D450	(mm)	231	116	600	235	255

Tab. 17 ATR_1_21_0021_0

Machine base frame with rope pulley - left-hand version of the rope pulley position

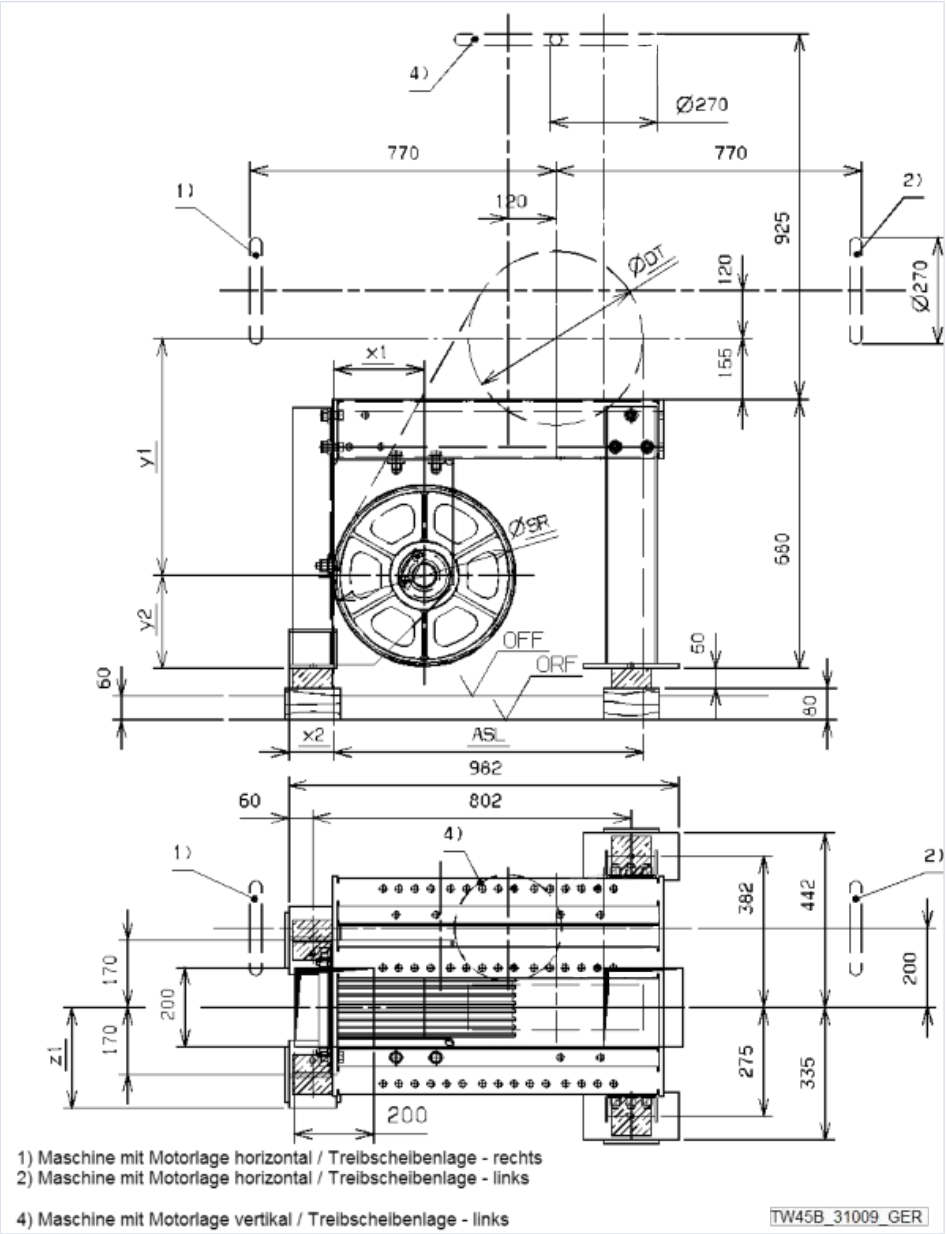


Fig. 21

ATR_2_21_0043_0

Project planning dimensions:

Traction sheave version	Unit	Rope pulley version (mm)							
Diameter of traction sheave Dt [mm]		D360				D450			
		ASL	α	ASL	α	ASL	α	ASL	α
		min	max	max	min	min	max	max	min
440	(mm) / (°)	592	167	832	149	576	168	776	150
520	(mm) / (°)	672			154	616	170		157

Tab. 18

ATR_1_21_0020_0

Intermediate values for ASL in the modular dimension of 40 mm possible.

Distances:

Rope pulley version	Unit	Project planning dimension				
(mm)		x1	x2	y1	y2	z1
D360	(mm)	130	61	645	190	245
D450	(mm)	231	116	600	235	255

Tab. 19 *ATR_1_21_0021_0*

5 Transportation and storage

5.1 Packaging

NOTICE

Rust on components of the drive!

Damage and possibly loss of function of the product.

→ Check the "anti-corrosion foil" for damage.

In the case of larger traction sheaves, the gear box casing is bolted onto wooden blocks.

Fig. 22 ATR_2_21_0044_0

The gear box is screw-connected directly onto the pallet (special pallet 1200x800)

Fig. 23 ATR_2_21_0045_0

Further packaging depends on the order and is country-specific (air/sea/land freight).

→ Refer to the delivery note for the dimensions and weight.

→ Observe the symbols attached to the packaging or in visible locations.

→ Dispose of used packing material in an environmentally responsible manner.

Specific transport equipment and shipping braces remain with the customer.

5.2 Transport

NOTICE

Improper transport!

Damage and possibly loss of function of the product.

- → Do not place heavy objects on the assembly when packaged.
- → Protect it against impacts and falling.
- → Protect it against water and extreme temperatures .
- → Comply with safety regulations.
- → Pay attention to the centre of gravity of the product.

5.3 Fork-lift truck transport

⚠ WARNING

Protruding or tilting parts.

In the event of impact, transported goods can lead to severe crushing injuries or cuts and possibly fatal injuries.

- → When effecting transport with a fork lift, use adequately long forks to prevent tipping over.
- → During transport, keep a safe distance to persons.
- → Always pick up at the frame or transport pallet with the forks, not the machine itself.

5.4 Crane transport

⚠ WARNING

Suspended load!

Falling transported goods can lead to severe crushing injuries or cuts and possibly fatal injuries.

- → Do not walk underneath suspended loads.
- → Only use tested and adequately dimensioned lifting gear.
- → The specified means of transport are only configured for transportation of the machine, the installed brake and traction sheave. Do not use them to transport any other loads.

Dimensions and weight

1. Specified weights, see packaging with label.
2. Dimensions, see delivery note.
3. Approximate specifications, see ↗ Chap. 4.1.11 P. 37.
4. Machine without frame on rope with transport hanger.
5. In the case of a machine that is mounted on the machine base frame, attach a transport rope to the base frame.

6. Secure the machine against slipping and falling over.
7. In the case of machines without a machine base frame, attach a transport rope to the transport hanger.

Fig. 24 ATR_2_21_0046_0

8. Use the thread fitted below the vertical version of the motor for transport hooks.

⚠ NOTICE!
Do not damage the handwinding wheel. Ropes or chains must not make contact with the handwinding wheel during transport.

9. Use the transport hanger with the horizontal version.

5.5 Checking the delivery

⚠ WARNING

Severe transport damage to the product.

Can lead to a malfunction of the product and thus to death or serious injury.

→ Before commissioning, ensure that there is no severe damage to the product.

1. Check delivery for completeness.
2. Compare with the ordering and delivery documents.
3. Check the packaging for damage and any other conspicuous anomalies.

In the case of damage

1. Do not commission a damaged product.
2. Any damage that is determined is to be documented immediately by means of a sketch, photo or description of the damage.
3. Report damage to the manufacturer.

5.6 Intermediate storage

- The product may be exposed to a maximum relative air humidity of 60% (at 20 °C).
- Store the product carefully in a protected location:
  - Protect it against the formation of condensation and moisture.
  - Protect against dirt in the machine.

→ For down times of longer than one year, carry out standstill maintenance via ↗ Chap. 9.1 P. 74.

6 Installation

6.1 Setting up the machine base frame

To reduce noise and sound transmission, we offer insulation elements that can be inserted between the frame supports and floor. These differ according to the type of mounting:

- A rubber block 100 x 100 x 50 high without base is used to mount the drive on the machine room floor without a cement floor or directly surface-mounted on the cement floor.
- For installation on cement floor, packing cast into cement floor (thickness ≤ 60 mm). The packing component must be cast in when installing the cement floor. A rubber block 100 x 100 x 50 with additional packing 140 x 140 x 80 mm is used here.

The number and arrangement of rubber elements is based on the total load and the distance between the rope lengths (ASL dimension = distance between rope departures).

When arranging the supports, the overall centre of gravity must lie within the rubber elements.

The arrangement under the machine base frame should be such that the stress and/or buffering of the insulation elements (maximum difference 3–5 mm) is as even as possible.

6.2 Aligning the machine

The machine is to be set up according to the plan of installation. The rope departure from the traction sheave is to be aligned plumb to the elevator car mounting or the elevator car rope pulley and the counterweight according to the drawing. With load applied to the ropes, the machine should be aligned vertically on its installation surface. Irregularities must be balanced out by inserting shims under the floor support.

6.3 Mounting the frame with rope pulley

NOTICE

One-sided load on component and or drive set up on a slant!

Failure of the drive involving damage.

→ The drive must be horizontal.

→ Use a spirit level to check; add support if necessary.

▷ Secure the drive on the machine base frame against shifting with adjusting screws or stops.

→ Arrange the suspension ropes symmetrically on the suspension plate, traction sheave and rope pulleys.

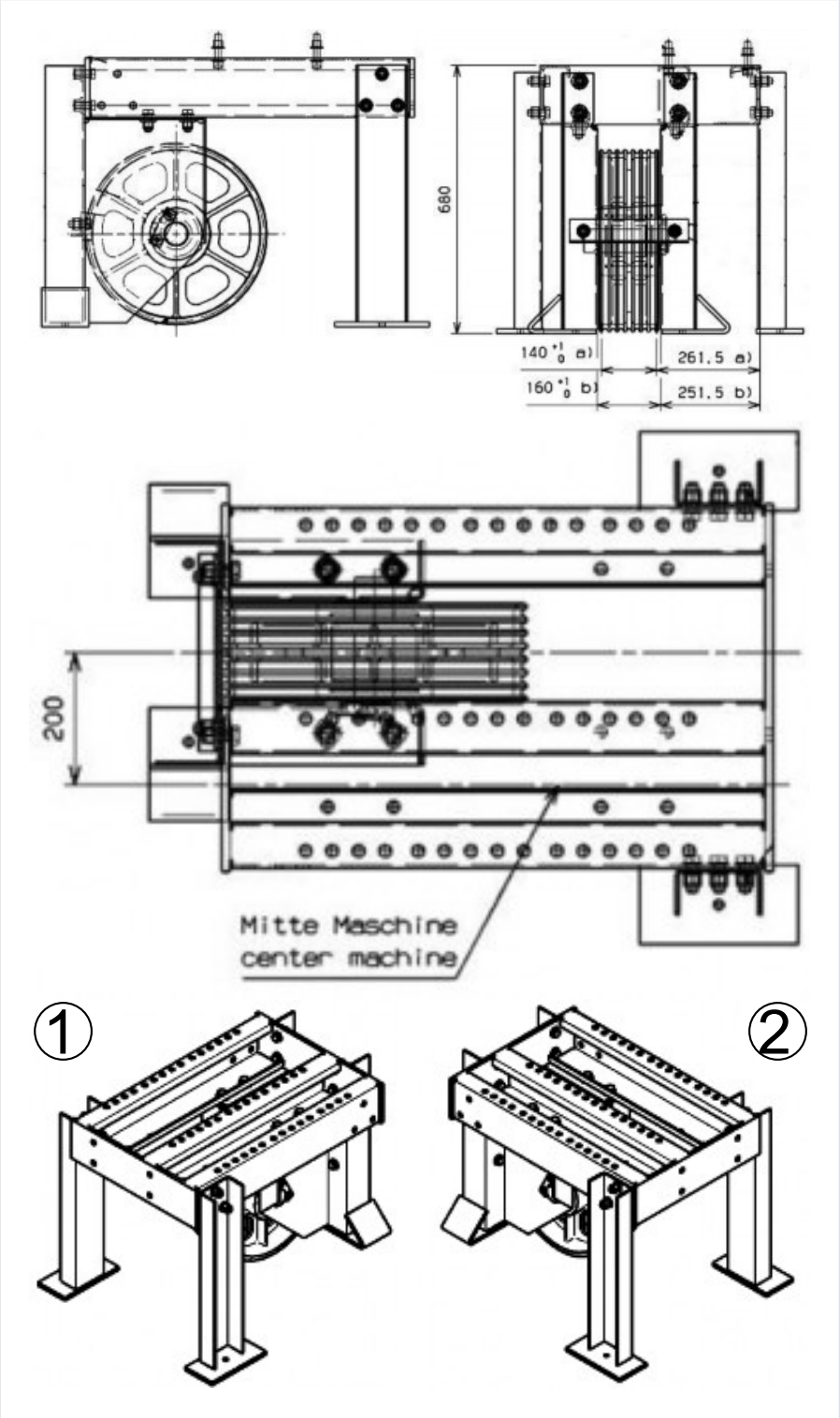


Fig. 25 ATR_2_21_0215_0

Item	Designation	Item	Designation
1	Left-hand version	2	Right-hand version

1. The version can be found in the plan of installation.
2. Mount the delivered frame (upper frame part, supports and pulley frame with rope pulley) loosely together in the machine room.
3. Position the frame on the insulation elements in accordance with the plan of installation.

4. Lift the machine onto the frame using lifting tackle.
   ▷ The traction sheave must rest on the diverter pulley side.
5. Move the machine sideways on the base frame until the required ASL dimension (parallel clearance between the ropes at the rope departure) is reached.
6. Bolt the machine onto the frame, whereby the machine housing must not be tensioned.
   ▷ Use the supplied shims for compensation.
7. Align the rope grooves of the traction sheave and diverter pulley in parallel.
8. Tighten the screws to the required torque.
   ▷ Tighten 4x M16-8.8 to 190 Nm
9. Plumb the rope departure on the rope pulley and/or mounting on elevator car and counterweight.

6.4 Mounting the rope guard

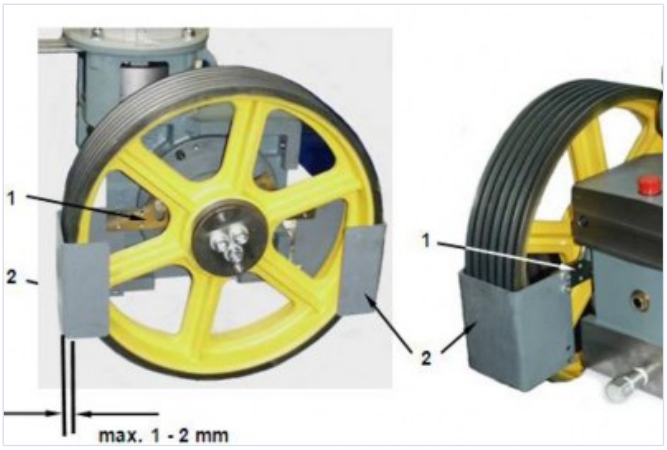


Fig. 26 ATR_2_21_0051_0

1. Use the enclosed screws to bolt the rope guard onto the rope guard carrier.
2. Pivot the rope guard carrier to set the guard in such a way that the clearance between the rope and hoop guard on the rope run-in and run-out side of the traction sheave is as small as possible (1–2 mm).
3. Adapt the inclined pulling location of the rope guard carrier by remounting the changed rope pull direction.
4. Align the winch and tighten the securing bolts of the rope guard carrier to the prescribed torque ↗ Chap. 10.1 P. 75.

i	For machines with rope run-in direction of 0–90° above the horizontal (e.g.: machine arrangement up/down beside), an additional rope guard is required to prevent foreign bodies from entering between the rope and groove. If the rope run-in zone is protected within the machine base frame, the function "protection against injury" is not required.

6.5 Shift protection on the machine base frame

The fastening materials (Hilti HST M16/25 or Fischer M16/25 FAZ II) are included in the scope of supply and must be attached to the unfinished floor.

→ Comply with the installation instructions of the manufacturer.

In locations where the distance to the wall is < 250 mm, the standard shift protection devices must be replaced by devices for low wall clearances.

The shift protection is configured for the following machine insulations:

- Insulation elements without underlay for machine room without floor pavement
- Insulation elements with underlay for machine room with floor pavement (≤ 60 mm height); support made from Multiplex laminated wood 140x140x80 mm.

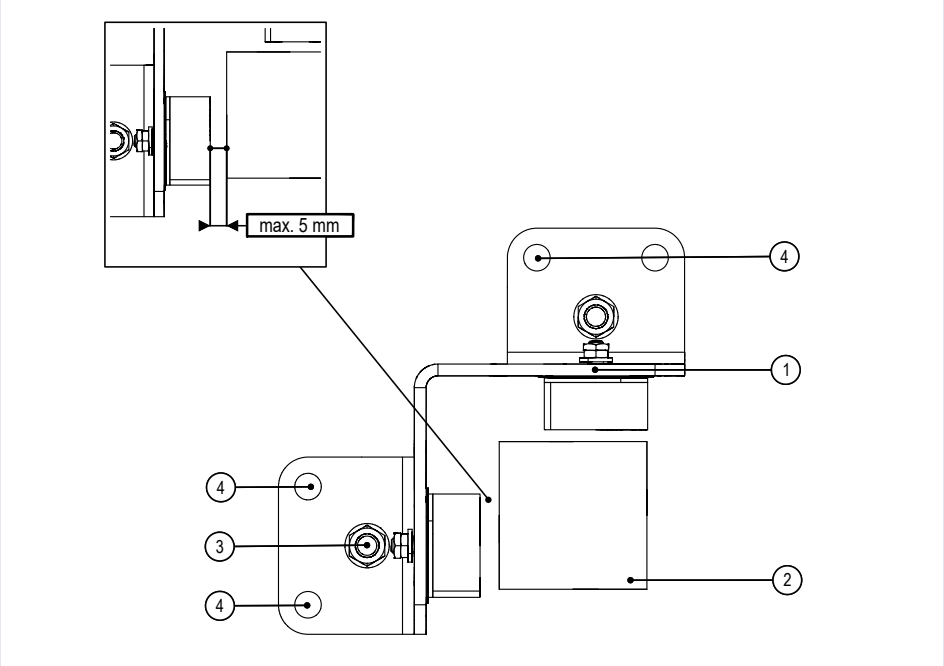


Fig. 27 ATR_2_00_0002_0

Item	Designation	Item	Designation
1	Shift protection	2	Machine base frame
3	Anchoring device	4	Alternative holes

1. Position the shift protection elements contact-free with a slight clearance (maximum 5 mm) to the machine base frame and make marks.
2. Drill holes for the anchoring devices at the marked positions.
   ▷ If there is steel reinforcement in the concrete, use alternative holes.
3. Secure the shift protection elements with 2 anchoring devices.
   ▷ Use 1 anchoring device per tab.

6.6 Electrical connection

⚠ WARNING

Inadequate connection

Electric shock. Damage to drive.

→ Earth the motor and brake magnet in accordance with country-specific regulations.

→ Electrical connections must correspond to at least the protection class in accordance with the name plate and/or required country-specific protection class.

⚠ WARNING

Live parts!

Electric shock.

→ When connecting the machine, comply with the relevant regulations. Never work when the voltage is switched on!

→ Ensure reliable earthing (loop resistance).

→ Here, configure connections in both terminal boxes.

6.6.1 Connecting the machine

NOTICE

Incorrectly connected cables!

May lead to impairment or loss of function of the product.

→ When connecting the motor, comply with the terminal connecting plan on the back of the cover on the motor terminal box and/or the motor connection terminal diagram.

→ In the case of frequency-controlled machines, ensure EMC-compliant installation of the motor and posistor (use suitable shielding).

Motor connection box - Make: CEG

Representation in star circuit Y and various versions. If necessary, reconnect in delta section Δ according to wiring diagram

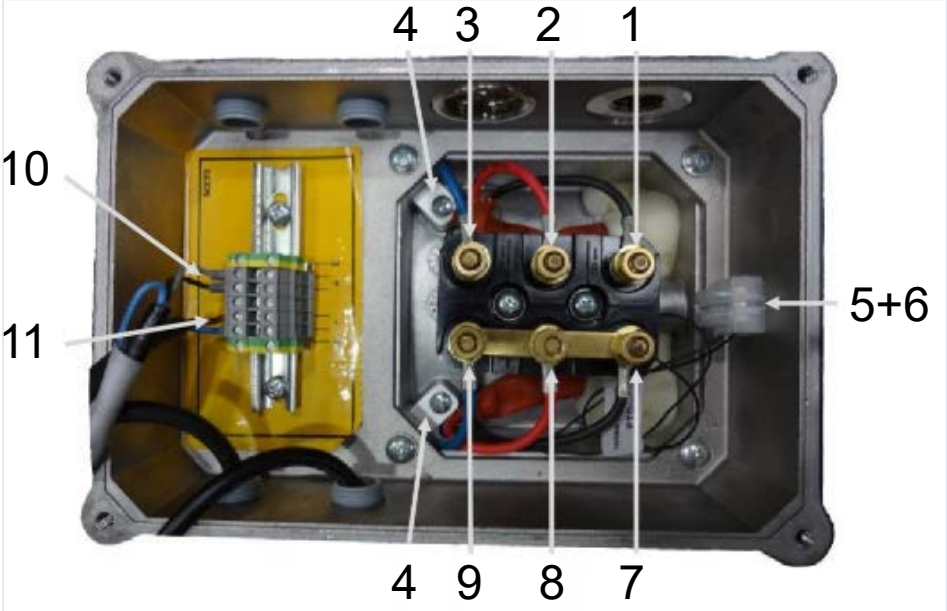


Fig. 28 ATR_2_21_0052_0

Item	Designation	Item	Designation
1	U1	2	V1
3	W1	4	Connection for PE conductor
5	Posistor temperature sensor	6	Posistor temperature sensor
7	W2	8	U2
9	V2	10	Connection for brake microswitch
11	Connection for brake magnet coil		

230 / 460 V motors made by EMOD

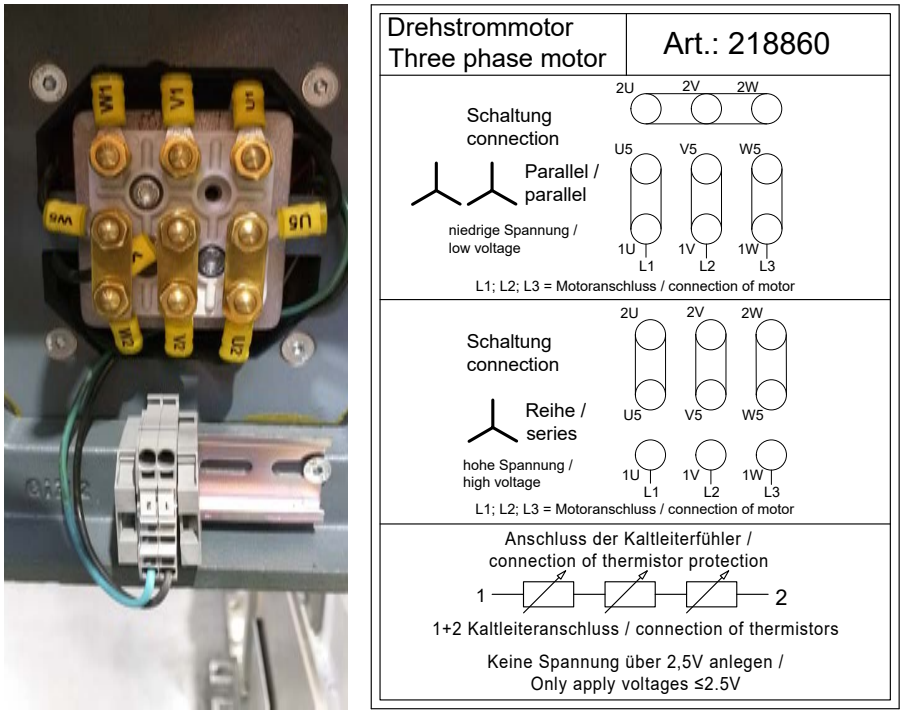


Fig. 29 ATR_2_12_0160_0

6.6.2 Connecting the motor line

1. Strip the insulation from the connection line.
2. Route cable through the cable gland.
3. Connect the PE conductor to the screwed connection specifically designed for the purpose.
4. Connect the three motor wires to the terminals U, V and W as specified in the terminal connecting plan.
5. Pull the shielding braid evenly over the lamellar insert.
6. The braid must not protrude beyond the lamellar insert into the thread.
7. Pull the cable through the cap nut.
8. Push the cap nut over the shielding.
9. Tighten the cap nut with the recommended torque in accordance with manufacturer documentation ↗ Chap. 10.2 P. 75.

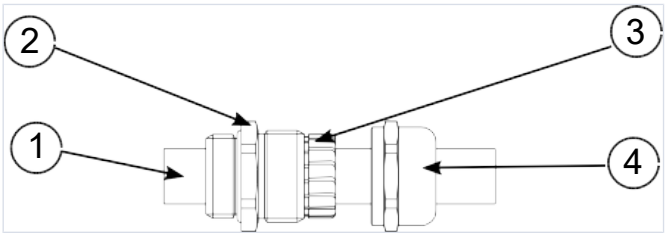


Fig. 30 ATR_2_21_0055_0

Item	Designation	Item	Designation
1	Cable with shielding braid	2	Lock nut
3	Lamellar insert	4	Cap nut

6.6.3 Connecting the posistor

NOTICE

Overvoltage at the measuring device!

Defective measuring device.

→ Do not apply a voltage greater than 2.5 V.

A triggering device (motor protection device) is required for evaluation of the posistor temperature sensor installed in the motor.

1. Strip the insulation from the connection line.
2. Connect both wires in accordance with the terminal connecting plan.
3. Tighten the cap nut with the recommended torque in accordance with manufacturer documentation ↗ Chap. 10 P. 75.

6.6.4 Connecting the brake

Connect the brake (coil and microswitch) via the motor terminal box ↗ Chap. 6.6.1 P. 56.

Emergency brake NBS (optional)

If the emergency brake system is fitted, a description with all the details regarding connection and operation of the emergency brake can be found in the separately enclosed operating manual for the emergency brake system, NBS.

7 Work on the product

7.1 Testing the brake

(At least once a year within the framework of central maintenance)

Test the braking deceleration at each brake circuit

⚠ WARNING

Elevator car movement by means of specific brake release.

The elevator car can move in an uncontrolled manner through the shaft.

→ Be prepared to brake at all times.

→ Regulate the travel speed of the elevator car by opening/closing the brake manually if manual brake release is present.

→ The movement of the elevator car must be slow (0.3 m/s).

→ Immediately deactivate the live coils and check the brake.

1. Signs indicating that maintenance work is under way must be attached to the elevator at all landing doors.
2. All doors must be properly and adequately locked.
3. Check that no persons are in the elevator car.
4. Position the elevator car at least two floors below the top landing.
5. For the single-circuit test with lever for the Mayr brake, ensure that the brake magnet coil is connected with inrush/holding voltage (180 V/90 V).
6. Test the brake circuit separately.
   ▷ The brake of the brake circuit not being tested must remain open during the entire test operation via the testing levers. ↗ Chap. 10.2 P. 75.

Test the braking deceleration on one brake circuit in each case

1. Initiate normal travel (brake to be tested is opened).
2. After the rated speed has been reached, trigger an emergency stop (brake to be tested closes).
3. Determine the deceleration value for the first brake circuit with the measuring system.
4. Compare the measurement result with the default value.
5. Compare the measurement results with the default values.
6. Connect the measuring system to the second brake circuit.
7. Repeat the test operation on the second brake circuit.

Examination of both brake circuits

Deceleration values for brake circuits

- The minimum deceleration value for one brake circuit is approx. 0.4 m/s²
- The minimum deceleration value for both brake circuits is approx. 1.0 m/s²

1. Run a brake test with both brake circuits by triggering emergency braking.
   ▷ The deceleration value must be significantly higher than the values determined in the individual test.

Check for wear

1. Use a feeler gauge to check the air gap between the bobbin and armature base plate with the brake closed (coils without current).
2. Repeat the operation at different positions.
   ▷ Nominal air gap: Brake closed (without current), new lining.
   ▷ Limit air gap: Brake closed (without current), lining worn.
   ▷ Test air gap: Brake opened (under voltage), minimum distance between the friction lining and bearing surface.
3. Replace the complete brake if the limit air gap has been reached.
   ▷ Repairs can only take place at TK Aufzugswerke GmbH.

7.2 Replacing the brake

7.2.1 Mayr brake

When the wear limit (1.0 mm / gap) is reached or there is a defect in the brake, the complete brake is to be replaced in all cases.

1. Installation and removal, see ↗ Chap. 10 P. 75.

2. Check the brake before commissioning the installation.

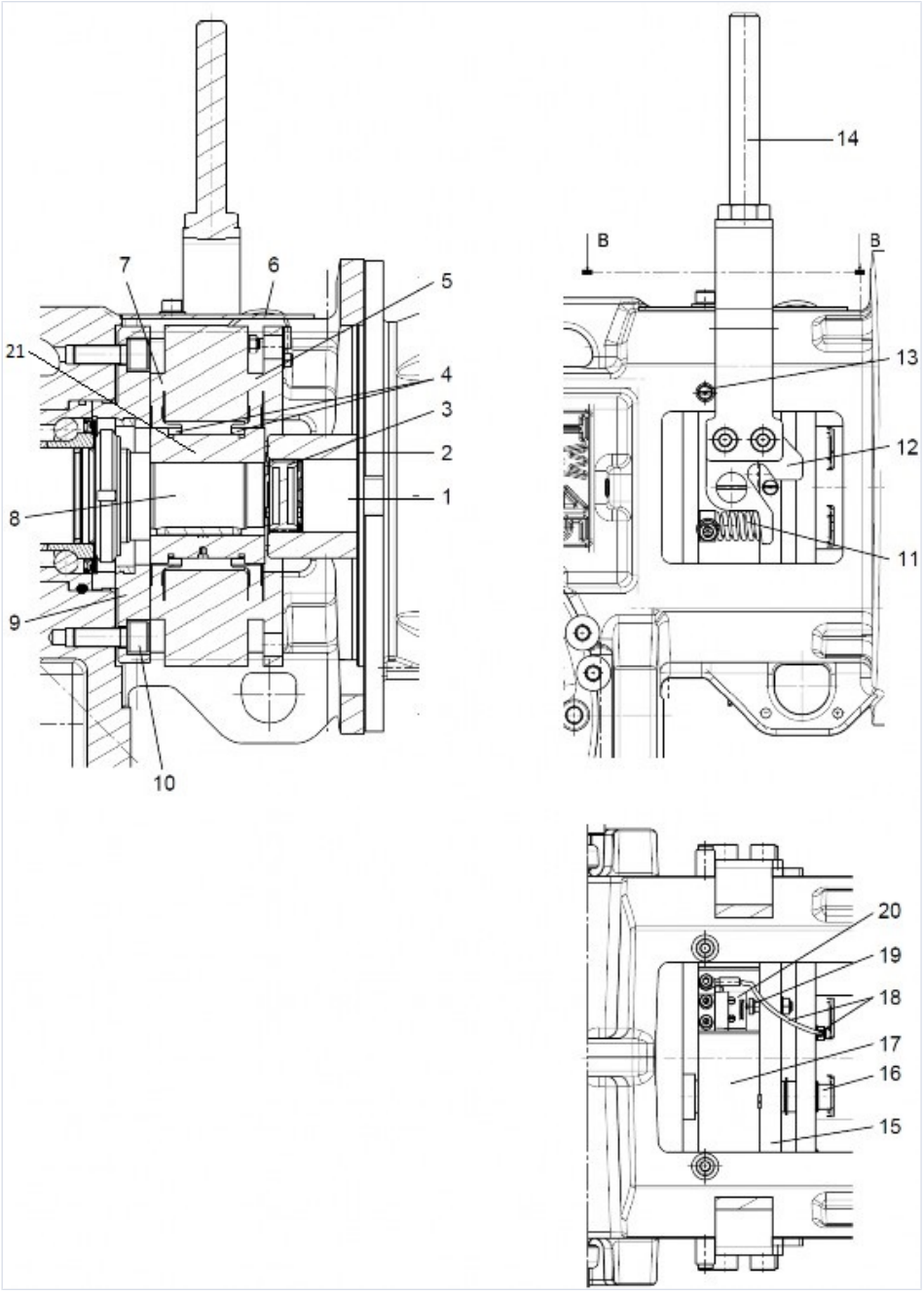


Fig. 31

ATR_2_12_0062_0

Item	Designation	Item	Designation
1	Motor shaft	2	Coupling hub (motor side)
3	Elastic gear ring	4	O-rings for brake rotors
5	Brake rotor brake circuit 2	6	Brake cover plate
7	Brake rotor brake circuit 1	8	Worm shaft
9	Bearing cover	10	Screwed connection bearing cover
11	Return spring for manual release with mounting parts	12	Switch bracket for manual release with mounting parts
13	Switch bracket for manual release with mounting parts	14	Manual release lever with mounting parts

Item	Designation	Item	Designation
15	Anchor disc	16	Fastening screws Brake 3x M8 -8.8
17	Magnetic coil	18	Earth braid with screwed connections
19	Setting screw for microswitch	20	Microswitch

During work on the brake, comply with information and details of the brake manufacturer ↗ Chap. 10 P. 75.

7.3 Checking the oil level

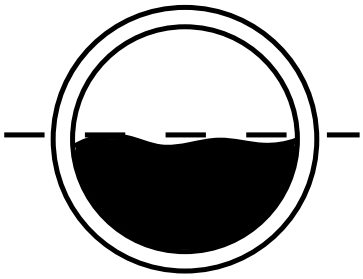


Fig. 32 ATR_2_12_0316_0

→ Check the oil level.
  ▷ The oil level should be ± 5 mm outside of the centre.
  ▷ To top up, the machine should be out of service for five minutes.

7.4 Lubrication

NOTICE

Possible bearing damage!

Damage to the gear due to unsuitable lubricant.

→ Only use the specified gear oil.

The machine is delivered full of oil.

Lubricant	Replacement interval	Motor position/filling quantity
Synthetic gear oil SM1	For the first time after 4 years then every 8 years	vertical approx. 5.0 litres horizontal approx. 4.0 litres

Tab. 20 ATR_1_21_0024_0

⚠ WARNING

Danger of scalding

Long-term car operation heats up the oil!

→ During work on the drive, wait until the housing has cooled down, if necessary.

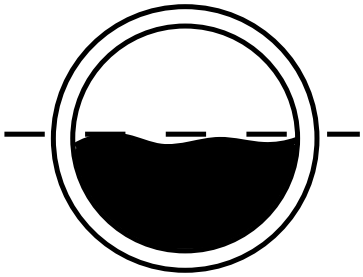


Fig. 33 ATR_2_12_0316_0

1. Heat the gear to operating temperature (approx. 35 °C) before changing the oil.
2. Drain off the gear oil by removing the cap on the oil drain pipe.
3. Collect the old oil in a container specifically designed for the purpose.
4. Empty the gear and close off the cap on the oil drain pipe with PTFE sealing tape.
   ▷ Check for leakage.
5. Remove the red locking screw "**OIL**" and fill the gear housing until the prescribed oil quantity is reached.
6. Check the level at the oil gauge glass.
7. Never mix different types of oil
8. Do not dispose of oil where it can enter the groundwater.
9. Dispose of old oil as well as cloths contaminated with oil and grease according to prevailing regional regulations.
10. Use of gear oil approved by TK Aufzugswerke GmbH.
11. TK Aufzugswerke GmbHwill not be held liable for damage resulting from the use of non-approved lubricants.

Vertical motor position

Fig. 34 ATR_2_12_0059_0

Item	Designation	Item	Designation
1	Ventilation, filling opening	2	Oil gauge glass
3	Oil drain	4	

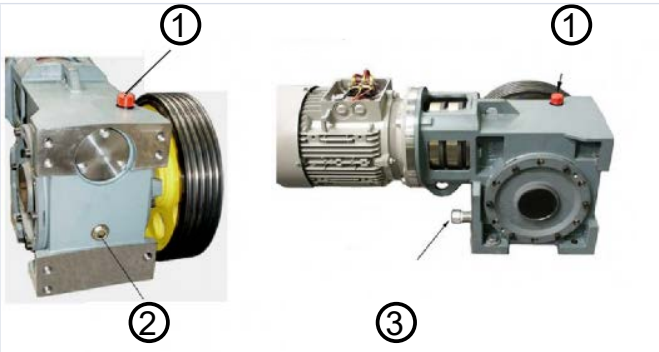


Fig. 35 ATR_2_12_0060_0

Item	Designation	Item	Designation
1	Ventilation, filling opening	2	Oil gauge glass
3	Oil drain	4	

7.5 Checking the backlash

If the running performance deteriorates, this might have been caused by excessive backlash in the worm gear toothing.

Wear on the worm wheel gear toothing changes the actual tooth thickness and this can be determined using the following measurement of the backlash.

NOTICE

Backlash too great!

Teeth on worm wheel worn; deterioration in running performance.

→ If the running performance deteriorates (noises, jerking, etc.), measure the backlash.

→ If a wear limit value (backlash) of 1.5 mm is reached, replace the gear teeth.

1. Disconnect the power from the installation and secure it against reactivation.
2. Secure the car and counterweight against movement.
3. Take the load off the traction sheave.
   ▷ The traction sheave must be free to move.
4. Perform the measurement with the operational brake closed.
5. Release the emergency brake, if present.
6. Fit a measuring attachment to the traction sheave, e.g. screw clamp.
7. Specify the measured radius (M) and mark the measuring point.
   ▷ The radius (r) for the TW45C = 95 mm.
8. Attach a dial gauge with magnet stator at the gear drive housing and align to the measuring point (M).
9. Turn the traction sheave by hand until the dial gauge pointer moves.
10. Move the traction sheave back and forth until resistance is felt.
11. Read the dial gauge (ME).

12. Use the formula below to calculate the backlash.
    ▷ Backlash = (ME*r)/M

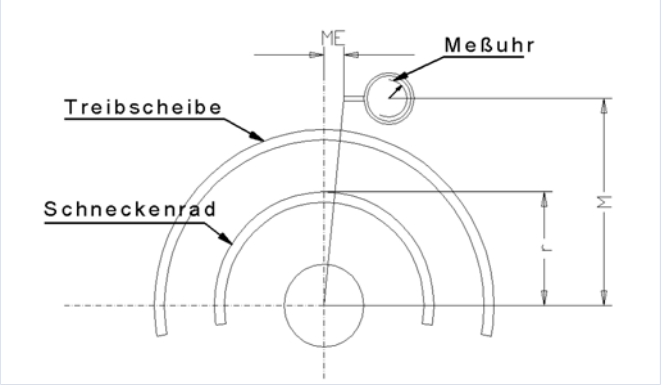


Fig. 36 ATR_2_22_0027_0

Item	Designation	Item	Designation
M	Radius	ME	Measurement result
r	Radius – worm wheel, all dimensions in mm		

7.6 Replacing the traction sheave

⚠ WARNING

Traction sheave not resting properly on cone (is loose)!

Traction sheave tumbles and can come loose. The elevator car can move in an uncontrolled manner through the shaft.

→ Do not change the dimension of the feather key, groove, cone shaft or traction sheave bore hole under any circumstances.

→ Avoid damage to and contamination of the cone shaft and traction sheave.

→ Secure the traction sheave with a chain or ropes.

→ Ensure correct installation.

1. Disconnect the power from the installation and secure it against reactivation.
2. Secure the car and counterweight against movement.
3. Remove the cover plate on the traction sheave.
4. Take the load off the traction sheave (slack rope).
5. Take off and secure the ropes.
6. Remove the mounting bolts with tension disc.
7. Secure the traction sheave using lifting tackle.
8. Loosely screw in the tension disc with screws in the outer circle of holes of the tension disc on the traction sheave hub.
9. Place a metal spacer (e.g. disc) of approx. 10 mm thickness between the tension disc and shaft end. The diameter of the spacer must be such that it does not protrude beyond the front face of the shaft.

10. By evenly and alternately tightening the screws, pull the traction sheave off the shaft (cone).

Installation of the traction sheave

1. Clean the shaft end and traction sheave bore hole (free of oil, grease, paint)
   ▷ Do **not** apply grease or oil to the shaft and hub!
2. Place the new traction sheave on the conical shaft end of the motor shaft.
3. Align the locations of the feather key and groove in relation to one another.
4. Push the traction sheave onto the motor shaft.

⚠ WARNING!
Adhesion force of the microencapsulated screws has no effect! The traction sheave can come looses and the elevator car can move in an uncontrolled manner through the shaft. Use microencapsulated screws a maximum of twice.

5. Use the supplied **new** microencapsulated screw and detent edged washers to attach the tension disc to the motor shaft at the inner circle of holes.
   ▷ Retighten the screws several times to obtain the prescribed tightening torque on all three screws.
6. Comply with the prescribed tightening torque of 90 Nm.
   ▷ Compare torque with drawing.

Fig. 37 ATR_2_12_0063_0

Item	Designation	Item	Designation
1	Mounting bolt	2	Hole for forcing screw
3	Traction sheave	4	Tension disc
5	Rope guard plate	6	

1. Release the mounting of the traction sheave from the lifting tackle.
2. Hang up the ropes on the traction sheave.
3. Mount the rope guard plates.
4. Align the rope guard plates.
5. Remove the safety devices from the car and counterweight.

7.7 Replacing the motor

Order a motor with coupling hub on the motor side. Motors of the make CEG general include a clutch hub.

Disassembly

1. Disconnect the power from the installation and secure it against reactivation.
2. Secure the car and counterweight against movement.
3. Attach and secure the motor to the lifting tackle.
4. Unplug the electrical connections and lines from the motor.
5. Undo the nuts of the motor mounting on the housing flange.
6. Carefully pull the motor off the dog clutch coupling connection.
7. If the replacement motor was delivered without a handwinding wheel and encoder, remove these from the old motor and, including the encoder mount (clip nut), use them for the new motor.

Installation

1. Place the replacement motor ready for use.
2. Compare the motor data.
3. Attach and secure the motor to the lifting tackle.
4. Align the motor to the coupling and housing flange of the gear.
5. By turning the motor shaft, align the lightly greased coupling halves to one another (tooth to gap; the elastic gear ring must be located between the clamps of the two coupling halves.)
6. Push the motor and gear coupling together.
7. The locations of the mounting holes must match those of the screws.
8. Push on the motor until the face of the motor contacts the gear flange or flange ring.
9. Mount the motor on the gear flange.
10. Tighten the nuts evenly alternately and cross-wise up to the prescribed tightening torque ↗ Chap. 10.1 P. 75.
11. Connect the connection line in the terminal box.
12. Make the electrical connections as per terminal connecting plan Installation.
13. Establish the connections of the brake and encoder to the control system.
14. Check the function of the brake before starting up.

7.8 Replacing the encoder

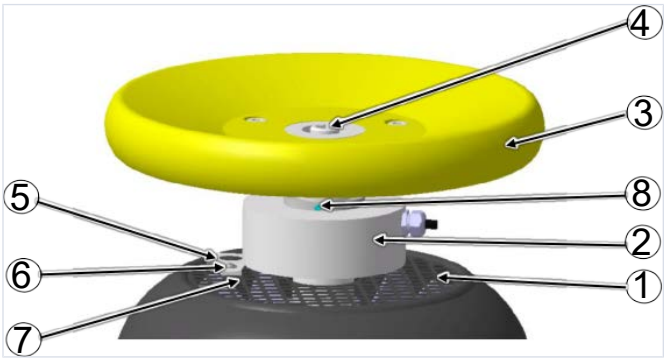


Fig. 38 ATR_2_12_0064_0

Item	Designation	Item	Designation
1	Fan hood of motor	2	Encoder
3	Handwinding wheel with hub	4	Central screw for handwinding wheel mount
5	Encoder mount (spring plate)	6	Screw for encoder mount
7	Clip nut	8	Studs for mounting encoder on shaft

Disassembly

Preparatory measures

1. Disconnect the power from the installation and secure it against reactivation.
2. Unplug the encoder connection cable at the frequency inverter.
3. Remove the central screwed connection in the middle of the handwinding wheel hub or the handwinding wheel.
4. Release the two headless set screws at the collar of the encoder inner ring (do not remove completely).
5. Unscrew the slotted pan head tapping screw at the bracket of the encoder mount.
6. Remove the cable ties holding back the cables.
7. Pull the encoder off the end of the motor shaft.
8. Check that the technical data of the new encoder matches

Installation

1. Fit the encoder mount (spring plate) of the removed encoder onto the new encoder.
2. Push the new encoder onto the cleaned shaft end of the motor until it makes contact with the shaft collar.
3. The mounting collar must point towards the shaft end.
4. Screw on the encoder mount at the motor.
5. Secure the encoder inner ring by tightening the headless set screw on the motor shaft.

6. Align handwinding wheel D270 with the hub to the axial pin in the shaft and mount the hub with the handwinding wheel by means of the central screw and disc, then tighten to 75 Nm.
7. Secure the connection line to the motor using cable ties.
8. Connect the encoder connection cable to the frequency inverter.

7.9 Checking for grease/oil leakage

⚠ WARNING

Loss of the brake function!

The elevator car can move in an uncontrolled manner through the shaft.

→ Make sure the brake drum and other components of the brake are free of grease and oil.

→ Rectify the cause of grease/oil leakage.

→ Run the brake test.

→ Replace the contaminated brake.

NOTICE

Danger when using commercially available brake cleaning agents!

Damage to the brake

→ For cleaning work on the brake, only use the cleaning agent isopropanol (isopropyl alcohol). Observe the information provided by the brake manufacturer Appendix.

Degree of contamination	Procedure	
If a small amount of oil/grease leakage is determined	Clean and check regularly within the framework of maintenance	Every 3 months (and/or every 6 months in the case of low frequency of use: fewer than 50,000 runs per year)
If a large amount of oil/grease leakage is determined or brake disc/brake linings are already fouled with oil/grease	Clean the machine and, if necessary, the brake, and repair as quickly as possible. Before continuing operation until modification, run a brake test. If the braking effect is inadequate: Shut down installation. If necessary, check on a daily basis whether oil/grease is still leaking. If this is the case: Shut down installation.	Repair after 4 weeks at the latest

Tab. 21 ATR_00_0004_0

See manufacturer's instructions ↗ Chap. 10 P. 75

7.10 Blocking clamp

NOTICE

Blocking clamp not removed.

May lead to impairment or loss of function of the product.

→ Remove the blocking clamp after completion of the installation work.

Each machine has a blocking clamp that matches the traction sheave.

Deployment of the blocking clamp

Use the blocking clamp to prevent movements due to slipping ropes during installation work on the elevator car or counterweight or during work where the rope traction of the installation is insufficient (e.g. pulling out of the safety gear).

The blocking clamp should be pre-tensioned by evenly tightening the hexagon nuts so that the ropes are unable to slip.

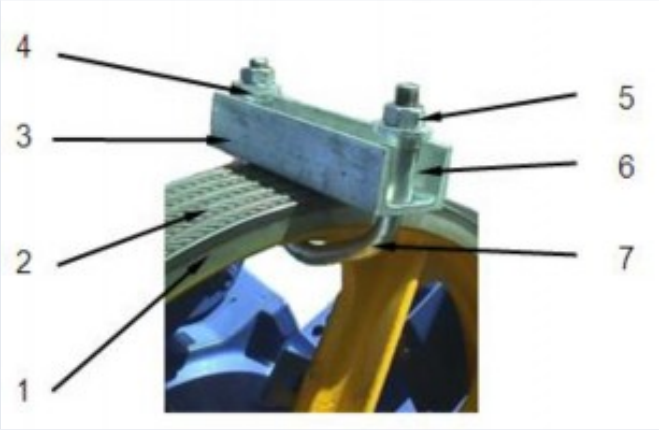


Fig. 39 ATR_2_12_0066_0

Item	Designation	Item	Designation
1	Traction sheave	2	Rope
3	Pressure piece	4	Washer
5	Hexagon nut	6	Spacer sleeve
7	Clamp clip		

8 Commissioning

8.1 Work steps

Check the following points:

1. Check the machine, traction sheave and base frame.
2. Check the rope guard.
3. Check the distance to the traction sheave.
4. Check the setup of the machine, base frame, pedestal and rope departure.
5. With a side or oblique rope departure, secure the gear box casing against moving using steady plates and set screws.
6. Tighten the screws to the required torque ↗ Chap. 10.1 P. 75.
7. Check the oil level.
8. Check the installation of the filling and/or ventilation screw.
9. Check the power connections and grounding at the motor.
10. Check the connection of the magnetic clamp and the brake test switch.
11. Check the connection values (voltage, frequency) against the manufacturer specifications.
12. Check the function of the monitoring devices (encoder, thermal element).
13. Check the parking brake and emergency brake NBS (if present).
14. Check the brake function.
15. Attach the direction arrow (up/down) according to the direction of travel and clearly visible on the motor near the handwinding wheel.
16. Remove safety, auxiliary and installation tools from the danger zone.

For assembly and repair, use only original parts from TK Aufzugswerke GmbH, as otherwise no warranty can be provided.

8.2 Emergency operation

Emergency rescue of trapped persons

⚠ CAUTION

Rapid movement of the elevator car!

Abrasion injuries.

→ Only use the handwinding wheel for assembly and maintenance purposes with a safe stance.

→ In the event of uncontrolled elevator car movement, let go of the handwinding wheel immediately.

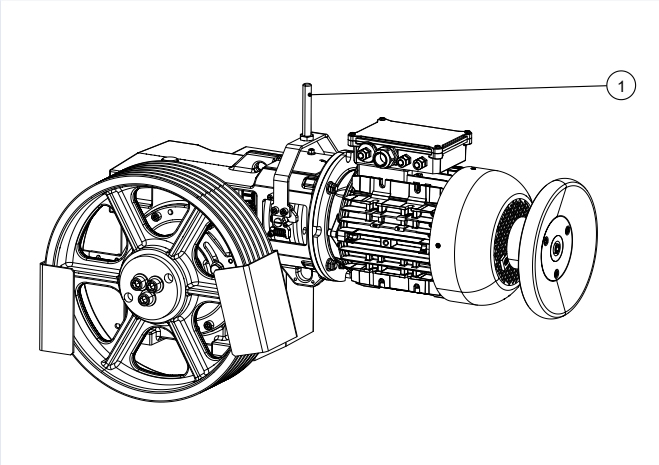


Fig. 40 ATR_2_21_0242_0

Item	Designation	Item	Designation
1	Brake release lever		

Drives with brake (make: Mayr) in machine room version (TWR) without emergency brake, NBS

The TW45C machine room version is equipped for emergency operation with a handwinding wheel and brake release lever.

1. To open the brake, check that the brake release lever is in the direction of the motor.
2. The handwinding wheel might also have to be moved to bring the elevator car into the nearest landing.
3. Depending on the load, the elevator car can begin to move quickly after opening the brake.
4. Immediately let go of the handwinding wheel and control the speed of the elevator car by pressing the brake release lever with varying degrees of force.

Drive with emergency brake (NBS)

i	Mounting the emergency brake, NBS, fundamentally changes the procedure and sequence for emergency operation. Comply with the separate NBS operating manual. The operating manual for drives with emergency brake system equipment is delivered separately. ↗ Emergency brake system, NBS.

9 Maintenance

9.1 Maintenance

Measurements must be taken annually:

1. Check the oil level; top up if necessary.
2. Change the oil at the prescribed intervals.
3. Clean the ventilation screw on the gear housing; the ventilation opening must be clear.
4. Check the gear and bearings for leakage
5. Check the brake and release gap.
6. Check the brake setting of the shoe stroke.
7. Check the brake function
8. Check the braking deceleration
9. Check the worm gear toothing for wear
10. Check the groove profile on the traction sheave for damage and wear
11. Check that the screws of the traction sheave mount are securely seated
12. With the drive on the machine base frame, check the mounting of the machine, supports and rope pulley carriers.
13. Check the rope pulley grooves for damage and wear.
14. Check that the electrical connections are in proper and adequate condition, and check that they are securely attached.
15. Check that protective and safety devices are present and correctly set.
16. Check the seals at the shaft in the area of the brake and at the bearing for grease and/or oil leakage.

9.2 Standstill maintenance

Standstill maintenance must be carried out on stored machines that have been at a standstill for over a year.

Standstill maintenance must be carried out on stored machines that have been at a standstill for over a year. Release the operational brake by means of the brake release lever and (if available) release the emergency brake manually via the emergency release screws.

The traction sheave is rotated (clockwise and anticlockwise) via a handwinding wheel on motor 3.

Depending on the storage conditions, replace the corrosion protection of the bare parts (for example with Rivolta KSP 317 corrosion protection wax).

10 Appendix

10.1 Tightening torques

⚠ DANGER

Insecure threaded connection.

Death or severe physical injury due to parts coming loose.

→ When working on the machine or replacing parts, care must be taken to ensure that the prescribed bolt/screw strength and tightening torques are complied with.

→ Only use suitable tools (torque wrench).

The values listed below apply to screwed connections with **regular threads** (not fine threads):

- Slotted pan head tapping screws DIN 912 ISO 4762
- Hexagon head bolts DIN 931/933 ISO 4014/4017
- These specifications do not apply to microencapsulated bolts/nuts. The specifications of the manufacturer apply here.

If other tightening torques are specified in the drawings or elsewhere in the document for each screw size, these are to be complied with.

Tightness Screw/bolt size	8.8	10.9	12.9
	Tightening torque [Nm]		
M4	2.6	-	-
M5	5.3	-	-
M6	9.0	12	15
M8	20	30	35
M10	40	60	75
M12	75	105	130
M14	120	170	205
M16	190	265	320
M20	370	520	620
M24	640	900	1080
M30	1300	1800	2150

Tab. 22 *ASY_1_00_0001_0*

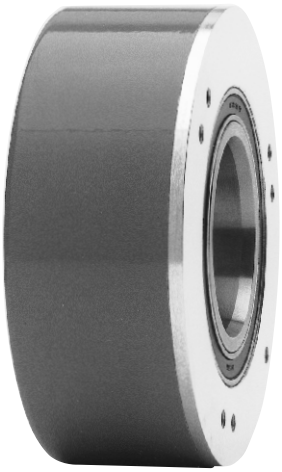
10.2 Manufacturer information

Also see about this

↗ Wachendorff encoder WDG100H_38-1024 - Data sheet P. 77

Wachendorff Automation GmbH & Co. KG
Industriestrasse 7
D-65366 Geisenheim
Tel.: +49 (0) 67 22 / 99 65 - 25
Fax: +49 (0) 67 22 / 99 65 - 70
www.wachendorff.de

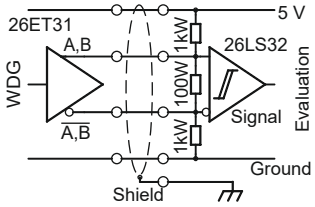
Hollow shaft Encoder WDG 100H



Order-No.: WDG 100H-38-1024-AB-R05-K3-J66-100

Suggested shaft adjustment:
about hollow shaft diameter 38mm: 38m6 (k6, j6)
Max. concentricity deviation of motor shaft: 0,05 mm

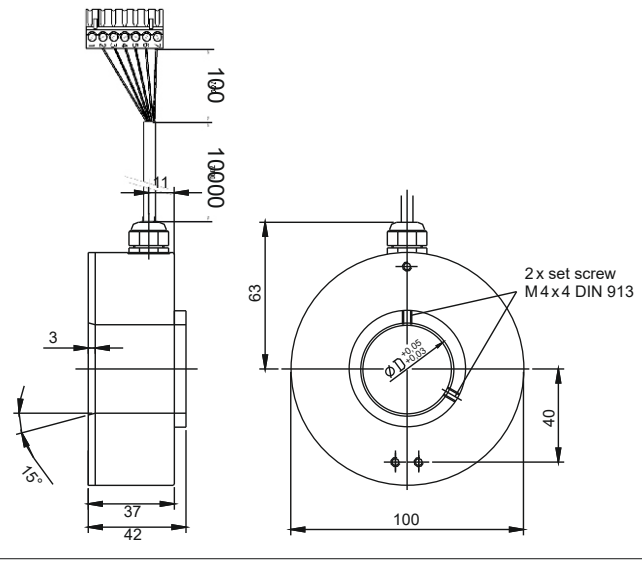
Thyssen-No.: 9950 001 1304



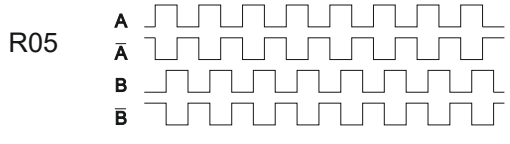
Electrical data:

Power supply:	4,75 ... 5,5 VDC
Current consumption:	max. 70 mA
Channels:	A, B and AB inv.
Output:	push-pull
Load:	max. 40 mA
Signal level:	bei 20 mA H > 2,5 VDC L < 1,2 VDC
Pulse frequency:	max. 200 kHz
Circuit protection:	no

Output circuit: 5 VDC: R05



Dimensional drawing WDG 100H, Dimensional specifications in mm.



View from shaft end, rotating clockwise.

Specifications

Mechanical Data

Housing

- Servo flange:	Aluminium
- Housing:	Aluminium,
- Depth:	42 mm
- Attachment:	about Hollow-shaft with 2 set screw M4

Hollow shaft

- Material:	Stainless steel
- Diameter::	38 mm
- Loading on shaft-end:	max. 200 N radial max. 100 N axial
- Starting torque:	approx.1.5 Ncm at ambient temperatur
Attachment:	2 x Hub M4, DIN 913

Bearings

- Type:	2 precision ball bearings
- Service life:	3×10^{10} revs. at 100% of full rated shaft load 4×10^{11} revs. at 40% 3×10^{12} revs. at 20%
Speed:	max. 3.500 r.p.m.
Weight:	ca. 720 g
Connection:	radial with 10 m shielded cable with connector (7-pol. Phönix terminal)

Electrical Data

General Layout:	DIN VDE 0160
Supply / Output:	® Output circuit
Cable lenght:	max. 100 m

Optics

Light source:	IR - LED
Service life:	typ. 100.000 hrs.
Scanning:	differential

Accuracy

in % einer Periodendauer des Signals A

Quadratue phasing:	90° ± 7,5%
Pulse on/off ratio:	50% ± 7%

Environmental Data

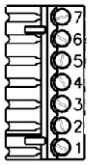
Measured mounted and housing grounded.

ESD (DIN EN 61000-4-2):	8 kV
Burst (DIN EN 61000-4-4):	2 kV
Protection rating (EN 60529):	IP54
Vibration (DIN EN 60068-2-6):	50m/s² (10-2000 Hz)
Shock (DIN EN 60068-2-27):	1000m/s² (6 ms)
Operating temperature:	-20°C to +80°C
Storage temperature:	-30°C to +80°C

Cable connection, 10 m shielded cable

Pin arrangemant:

Function	Pin	Colour
Negative	6	white
Positiv	7	brown
A	5	green
A inv.	4	grey
B	3	yellow
B inv.	2	pink
Shield	6	braiding



Certificate concerning the examination of traction sheave shaft calculation including shaft to collar connections

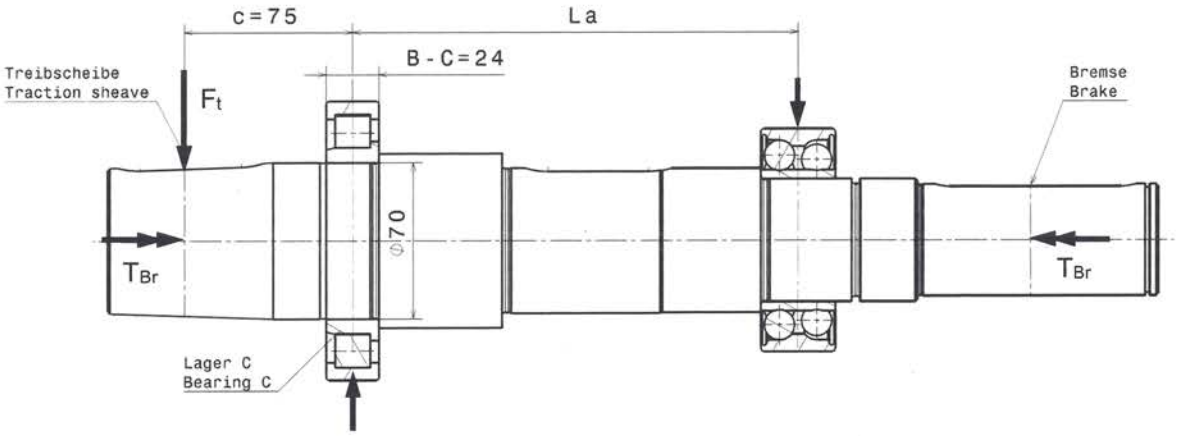
Lift machine, type: TW45

Brake type: **RSO 500 - 1200Nm**
according EC-Type Examination EU-BD 762/X

Manufacturer: TK Aufzugswerke GmbH
Bernhäuser Str.45, 73765 Neuhausen a.d.F.

Object examined: Calculation of traction sheave shaft including shaft to collar connections

Examination basis: DIN743, machine elements Niemann/Winter/Höhn (2005)



Design drawing: 6231 000 9239

Material: C60R +N (1.1223); as well equivalent or better material in respect of the material characteristics

Load data:

Machine	Max. shaft load F_t	Nominal brake torque T_{Br}	Max. brake torque 1.6 x T_{Br}	Distance traction sheave C	Bearing distance La
	(kN)	(Nm)	(Nm)	(mm)	(mm)
TW45	30	1200	1920	75	200

Examination result:

For the examination calculations were carried out based on the examination basis.
The result was that the traction sheave shaft and the shaft to collar connections were designed according the maximum load data. The remarks in the maintenance instructions are to be observed.

The conditions mentioned in annex of the EC-Type-Examination Certificate EU-BD 762/X are herewith fulfilled

(Head of PDC Neuhausen, TKE IaO) (Cluster Lead TM, TKE IaO)

TK Elevator Innovation and Operations GmbH
E-Plus-Straße 1, 40472 Düsseldorf, Germany
Phone: +49 (0) 7158 12-0, Telefax: +49 (0) 7158 12-2585

Management Board: Katrin van der Velden, Dr. Philipp Voet van Vormizeele
Commercial Register: Düsseldorf HRB 89950
Company Domicile: Düsseldorf, Germany

Installation and Operational Instructions for ROBA-stop®-Z Type 892.101.0 Size 125

(E073 01 046 000 4 EN)

Translation of the Original Operational Instructions

Design according to

Drawing number: E073 01 046 000 1 10	Article number: 8227821
Drawing number: E073 01 046 000 1 11	Article number: 8253118 (without hub (12))
Drawing number: E073 01 046 000 1 12	Article number: 8292346 (without hand release (18))

Please read these Operational Instructions carefully and follow them accordingly!

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

Contents:

Safety and Guideline Signs

DANGER

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

CAUTION

Danger of injury to personnel and damage to machines.

Please Observe!
Guidelines on important points.

Chr. Mayr GmbH + Co. KG
Eichenstraße 1, D-87665 Mauerstetten, Germany
Phone: +49 8341 804-0, Fax: +49 8341 804-421
www.mayr.com, E-Mail: public.mayr@mayr.de

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

Guidelines on the EMC Directive 2014/30/EU
The product cannot be operated independently according to the EMC directive.
Due to their passive state, brakes are also non-critical equipment according to the EMC.
Only after integration of the product into an overall system can this be evaluated in terms of the EMC.
For electronic equipment, the evaluation has been verified for the individual product in laboratory conditions, but not in the overall system.

Guidelines on the Machinery Directive 2006/42/EC
The product is a component for installation into machines according to the Machinery Directive 2006/42/EC.
The brakes can fulfil the specifications for safety-related applications in coordination with other elements.
The type and scope of the required measures result from the machine risk analysis. The brake then becomes a machine component and the machine manufacturer assesses the conformity of the safety device to the directive.
It is forbidden to start use of the product until you have ensured that the machine accords with the regulations stated in the directive.

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

Guidelines on the ATEX Directive
Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion.
For application of this product in areas where there is a high danger of explosion, it must be classified and marked according to Directive 2014/34/EU.

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

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Installation and Operational Instructions for ROBA-stop®-Z Type 892.101.0 Size 125

(E073 01 046 000 4 EN)

Safety Regulations

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

General Guidelines

DANGER

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

Brakes may generate further risks, among other things:

Hand injuries

Danger of seizure

Contact with hot surfaces

Magnetic fields

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

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

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

To prevent injury or damage, only specialist personnel are allowed to work on the components.
They must be familiar with the dimensioning, transport, installation, inspection of the brake equipment, initial operation, maintenance and disposal according to the relevant standards and regulations.

Before product installation and initial operation, please read the Installation and Operational Instructions carefully and observe the Safety Regulations. Incorrect operation can cause injury or damage. At the time these Installation and Operational Instructions go to print, the electromagnetic brakes accord with the known technical specifications and are operationally safe at the time of delivery.

- ❒ Technical data and specifications (Type tags and documentation) must be followed.
- ❒ The correct connection voltage must be connected according to the Type tag and wiring guidelines.
- ❒ Check electrical components for signs of damage before putting them into operation. Never bring them into contact with water or other fluids.
- ❒ Please observe the EN 60204-1 requirements for electrical connection when using in machines.

Only carry out installation, maintenance and repairs in a de-energized, disengaged state and secure the system against inadvertent switch-on.

Guidelines for Electromagnetic Compatibility (EMC)

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

Application Conditions

The catalogue values are guideline values which have been determined in test facilities. It may be necessary to carry out your own tests for the intended application. When dimensioning the brakes, please remember that installation situations, braking torque fluctuations, permitted friction work, bedding-in condition / conditioning of the brake linings and wear as well as general ambient conditions can all affect the given values. These factors should therefore be carefully assessed, and alignments made accordingly.

- ❒ Mounting dimensions and connection dimensions must be adjusted according to the size of the brake at the place of installation.
- ❒ Use of the brake in extreme environmental conditions or outdoors, directly exposed to the weather, is not permitted.
- ❒ The brakes are designed for a relative duty cycle of 50 %. A duty cycle > 50 % leads to higher temperatures, which cause premature aging of the noise damping and therefore lead to an increase in switching noises. Furthermore, the switch function of the release monitoring can be impaired. The max. permitted switching frequency is 180 1/h.
  These values are valid for intermittent periodic duty S3 50 %. 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.
- ❒ The braking torque is dependent on the current bedding-in condition of the brake. Bedding in / conditioning of the friction linings is necessary.
- ❒ The brakes are only designed for dry running. The torque is lost if the friction surfaces come into contact with oil, grease, water or similar substances or any other foreign bodies.
- ❒ The surfaces of the outer components have been phosphated manufacturer-side to form a basic corrosion protection.

CAUTION

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

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Dimensioning

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

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

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

Climate Conditions

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

CAUTION

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

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

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

CAUTION

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

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

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

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

At high temperatures and in high humidity or with occurring dampness, the rotors can seize up to the friction surfaces after longer downtimes.

CAUTION

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

Intended Use

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

Grounding Connection

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

Class of Insulation F (+155 °C)

The insulation components on the magnetic coils are manufactured at least to class of insulation F (+155 °C).

Protection

(mechanical) IP10: Protection against large body surfaces and large foreign bodies > 50 mm in diameter. No protection against water.

(electrical) IP54: Dust-proof and protected against contact as well as against water spray from any direction.

Brake Storage

- ❑ Store the brakes in a horizontal position, in dry rooms and dust and vibration-free.
- ❑ Relative air humidity < 50 %.
- ❑ Temperature without major fluctuations within a range from -5 °C up to +40 °C.
- ❑ Do not store in direct sunlight or UV light.
- ❑ Do not store aggressive, corrosive substances (solvents / acids / lyes / salts / oils / etc.) near to the brakes.

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

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

Handling

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

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User-implemented Protective Measures:

- ❒ Please cover moving parts to protect **against injury through seizure**.
- ❒ Place a cover on the magnetic part to protect **against injury through high temperatures**.
- ❒ **Protection circuit:** When using DC-side switching, the coil must be protected by a suitable protection circuit according to VDE 0580, which is integrated in *mayr* ®-rectifiers. To protect the switching contact from consumption when using DC-side switching, additional protective measures are necessary (e.g. series connection of switching contacts). The switching contacts used should have a minimum contact opening of 3 mm and should be suitable for inductive load switching. Please make sure on selection that the rated voltage and the rated operating current are sufficient. Depending on the application, the switching contact can also be protected by other protection circuits (e.g. *mayr* ®-spark quenching unit, half-wave and bridge rectifiers), although this may of course then alter the switching times.
- ❒ Take precautions **against freeze-up of the friction surfaces** in high humidity and at low temperatures.

Standards, Directives and Regulations Used and To Be Applied

DIN VDE 0580	Electromagnetic devices and components, general specifications
2014/35/EU	Low Voltage Directive
2011/65/EU	RoHS II - Directive
2015/863/EU	RoHS III- Directive
CSA C22.2 No. 14-2010	Industrial Control Equipment
UL 508 (Edition 17)	Industrial Control Equipment
2014/33/EU	Elevator Directive
EN 81-20	Safety rules for the construction and installation of lifts – Part 20: Passenger and goods passenger lifts
EN 81-50	Safety rules for the construction and installation of lifts - Examinations and tests – Part 50: Design rules, calculations, examinations and tests of lift components
EN ISO 12100	Safety of machinery – General principles for design - Risk assessment and risk reduction
DIN EN 61000-6-4	Interference emission
EN 12016	Interference immunity (for elevators, escalators and moving walkways)

Liability

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

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

Guarantee

- ❒ The guarantee conditions correspond with the Chr. Mayr GmbH + Co. KG sales and delivery conditions.
- ❒ Mistakes or deficiencies are to be reported to *mayr*® at once!

CE Identification

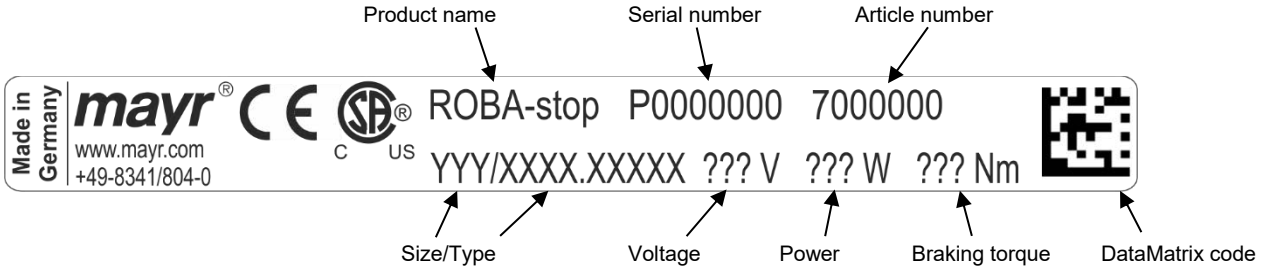
CE in accordance with the Low Voltage Directive 2014/35/EU (only in case of voltages > 75 V DC) and / or the RoHS Directive 2011/65/EU with 2015/863/EU,
and the Elevator Directive 2014/33/EU
(with the ID number of the respective inspection authority, for type examination tested brakes only)

Conformity Markings

c SP US in terms of the Canadian and American approval

Marking

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



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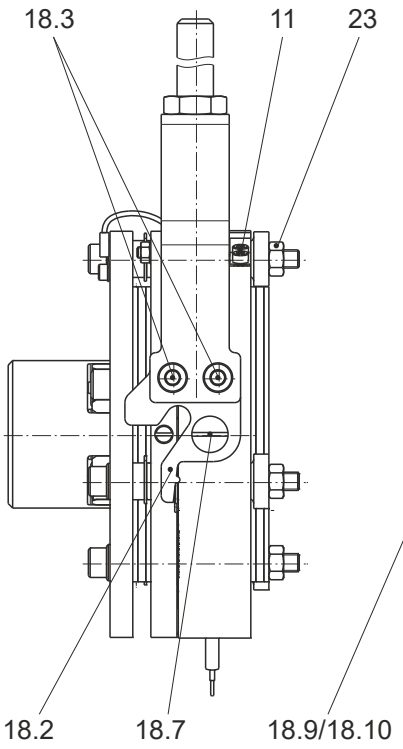

Fig. 1

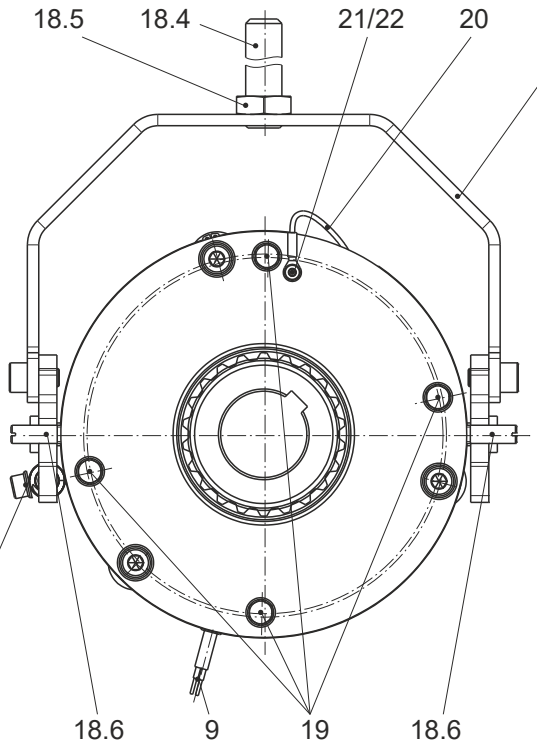

Fig. 2

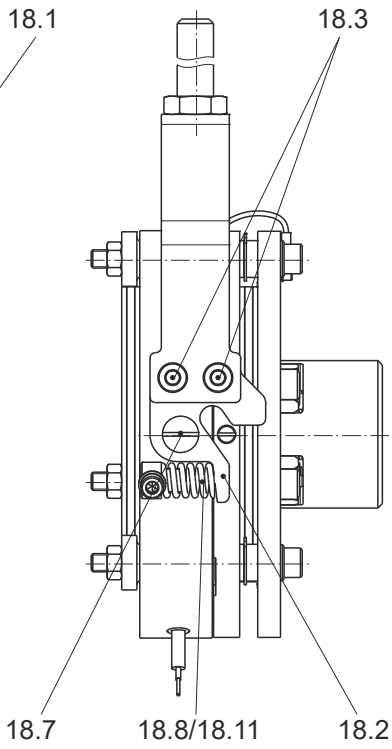

Fig. 3

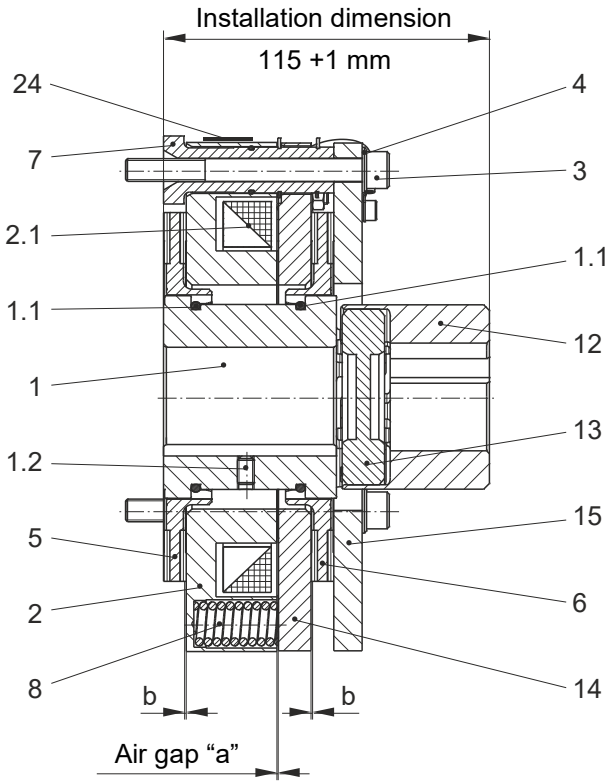

Fig. 4

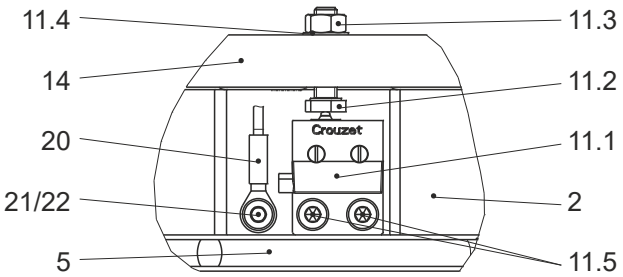

Fig. 5

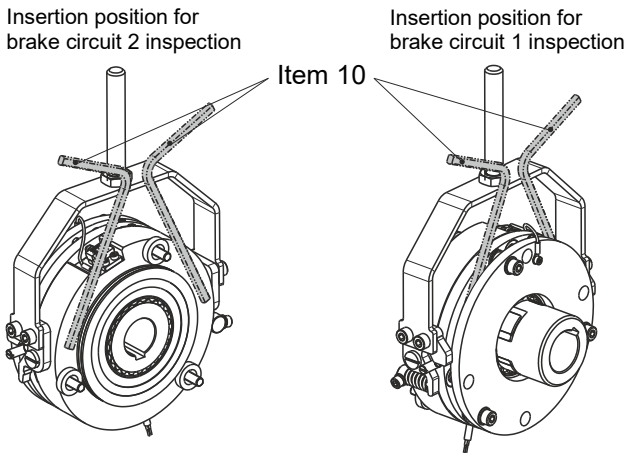

Fig. 6 **Fig. 7**

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

Item	Name		Pcs.
1	Hub		1
1.1	O-ring	D60 x 3	2
1.2	Set screw	M6 x 10	1
2	Brake body		1
2.1	Magnetic coil		1
3	Cap screw	M8 x 85	3
4	Washer	D16 / 8.4 x 1.6	3
5	Rotor 1		1
6	Rotor 2		1
7	Distance bolt		3
8	Thrust spring	D15.5 / 2.8 x 39.5	4
9	Cable	2 x AWG18	1
10	Reference gauge		2
11	Release monitoring (page 12)		1
11.1	Microswitch		1
11.2	Hexagon head screw	M5 x 20	1
11.3	Hexagon nut	M5	1
11.4	Spring washer	A5	1
11.5	Cap screw	M4 x 8	2
12 [1)]	Hub		1
13	Elastomeric element		1
14	Armature disk		1
15	Brake plate		1
16 [2)]	Headless screw	M8 x 30	2
17 [2)]	Plastic tube	D10 / 8 x 14	2
18 [3)]	Hand release		1
18.1	Switch bracket A		1
18.2	Switch bracket B		2
18.3	Cap screw	M8 x 14	4
18.4	Hand release rod		1
18.5	Hexagon nut	M16	1
18.6	Headless screw	M8 x 30	2
18.7	Flat headed screw	M8 x 10	2
18.8	Thrust spring holder		1
18.9	Cap screw	M6 x 25	1
18.10	Washer	A6.4	1
18.11	Thrust spring	D15.5 / 2.5 x 28	1
19	Noise damping		4
20	Grounding strand		1
21	Cap screw	M4 x 8	2
22	Contact washer	M4	2
23 [4)]	Hexagon nut	M8	1
24	Type tag		1

We reserve the right to make dimensional and constructional alterations!

[1)] On article number 8253118, the hub is not included in the standard scope of delivery.

[2)] Items 16 and 17 are included loose in delivery and are not shown in the Figure.

[3)] On article number 8292346, the hand release is not included in the standard scope of delivery.

[4)] Plastic nut, serves only as transportation lock.

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Table 1: Technical Data

Article number	8227821	8253118	8292346
Nominal voltage	90 V	90 V	55 V
Overexcitation voltage	180 V	180 V	110 V
Coil power (nominal power at 20°C)	76 W	76 W	71 W
Coil power on overexcitation	303 W	303 W	284 W
Overexcitation time span	1 s		
Nominal braking torque (+60 %)	100 (2 x 50) Nm		
Rotor thickness, new condition	10.5 mm		
Nominal air gap "a" total (braked)	$0.5^{+0.25}$ mm		
Limit air gap "a" for rotor replacement	1.0 mm		
Inspection air gap "b" released, per single circuit	min. 0.15 mm		
Tightening torque Item 1.2	3 Nm		
Tightening torque Item 3	24 Nm		
Tightening torque Item 16	8.5 Nm		
Tightening torque Item 18.3	24 Nm		
Tightening torque Item 18.6	8.5 Nm		
Tightening torque Item 18.7	8.5 Nm		
Tightening torque Item 18.9	10 Nm		
Max. Speed	2250 rpm		
Max. permitted friction work for both rotors at a speed of 1800 rpm	5000 J		
Weight	11.4 kg		

Table 2: Switching Times

Attraction t_2	50 ms
Drop-out t_0 (DC):	25 ms
Drop-out t_{50} (DC) [5]:	35 ms
Drop-out t_{90} (DC) [5]:	40 ms
Drop-out t_{11} AC	180 ms
Drop-out t_1 AC [6]	340 ms

[5] Referring to the nominal braking torque

[6] Referring to the effective braking torque

The stated switching times can only be achieved using the respective correct electrical wiring. This also refers to the protection circuit for brake control and the response delay times of all control components. If the brake is operated using overexcitation, the respective switch-on and switch-off times for overexcitation must be taken into account.
The use of varistors for spark quenching increases the DC-side switching times.

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Installation and Operational Instructions for ROBA-stop®-Z Type 892.101.0 Size 125

(E073 01 046 000 4 EN)

Application

- ROBA-stop®-Z brake for use as a holding brake with occasional EMERGENCY STOP braking actions (max. 10 per day).
- The max. permitted speed and friction work (see Technical Data) must be observed.

Design

The ROBA-stop®-Z brake is a spring applied, electromagnetically releasing dual circuit safety brake, which applies a defined braking effect after the voltage is switched off or after a voltage failure.
This brake is combined with a positive-locking, flexible coupling (ROBA®-ES coupling) for connecting two shafts whilst compensating for shaft misalignments.
The ROBA®-ES coupling compensates for axial, radial and angular shaft misalignments.

Function

The ROBA-stop®-Z brake is a spring applied, electromagnetic safety brake.

Spring applied function (brake):
In de-energized condition, thrust springs (8) press against the armature disk (14). Rotor 2 (Item 6) is held between the armature disk (14) and the brake plate (15), rotor 1 (Item 5) is held between the brake body (2) and the machine wall via frictional locking.
The braking torque is introduced into the drive line via the toothing of the rotors (5 and 6) and the hub (1).

Electromagnetic function (release):
Due to the magnetic force of the coil in the brake body (2), the armature disk (14) is attracted against the spring pressure (8) to the brake body (2). The brake is released and the brake rotors (5 and 6) with the hub (1) can rotate freely.

Safety brakes:
The ROBA-stop®-Z brake 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 ROBA-stop®-Z brake is pre-assembled.
On brake article number 8253118, the hub (12) is not included in the standard scope of delivery.
Brake article number 8292346 is designed without hand release (18).
The release monitoring (11) device is installed and set manufacturer-side.
The brakes are set manufacturer-side to the braking torque stipulated on order.
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.

Installation Conditions

- The eccentricity of the shaft end in relation to the mounting pitch circle must not exceed 0.2 mm.
- The positional tolerance of the threads for the cap screws (3) must not exceed 0.2 mm.
- The axial run-out deviation of the screw-on surface to the shaft must not exceed the permitted axial run-out tolerance of **0.05 mm** acc. DIN 42955 R.
  The reference diameter is the pitch circle diameter for securement of the brakes.
  Larger deviations can lead to a drop in torque, to continuous grinding on the rotors and to overheating.
- The fit tolerance of the shaft must be selected so that the hub toothing (1) is not widened. Widening of the toothing leads to the rotors (5 and 6) jamming on the hub (1) and therefore to brake malfunctions.
  Recommended fit tolerance for the shaft: k6
  The max. permitted joining temperature of 150 °C must not be exceeded.
- The O-rings (1.1) on the hub (1) must be lightly greased.
- The rotors (5 and 6) and the brake surfaces must be oil and grease-free.
- A suitable counter friction surface (steel or cast iron) must be used. Sharp-edged interruptions on the friction surfaces must be avoided. Recommended surface quality in the area of the friction surface Ra = 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 toothings of the hub (1) and the rotors (5 and 6) must not be oiled or greased.
- Friction value-increasing surface treatments are not permitted.
- Please abstain from using cleaning agents containing solvents, as they could affect the friction material.

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Installation

All the screws (except the cap screw Item 21) and the set screws mounted by the customer must be tightened using the tightening torque stated in Table 1.
We recommend that you secure the screws using Loctite 243.

1. Remove all 3 hexagon nuts (Item 23 / transportation lock) and remove the brake plate (15) from the brake body (2).
2. Mount the hub (1) onto the shaft with inserted key and secure it axially.
   Axial securement takes place using the set screw (1.2), which presses onto the customer-side key.
3. Lightly grease the first O-ring (1.1) and insert it into the hub (1) groove nearest to the machine wall.
4. Push the rotor 1 (Item 5) over the inserted O-ring (1.1) onto the hub (1) by hand using light pressure (the rotor collar should be facing away from the machine wall).
   Make sure that the toothing moves easily.
5. Lightly grease the second O-ring (1.1) and insert it into the other (not occupied) hub (1) groove.
6. Push brake body (2) over the hub (1) and insert it in the gear housing.
7. Push the rotor 2 (6) over the O-ring (1.1) onto the hub (1) by hand using light pressure (the rotor collar should be facing the machine wall).
   Make sure that the toothing moves easily.
8. Insert the cap screws (3) including the washers (4) in the distance bolts (7) through the brake plate (15).
9. Secure the brake evenly all around using the cap screws (3) with a torque wrench.
10. Attach the grounding strand (20) onto the brake body (2) using the cap screw (21) and the contact washer (22).
    To do this, the contact washer (22) must be inserted between cable lug and brake body (2).
11. Attach the grounding strand (20) onto the brake plate (15) using the cap screw (21) and the contact washer (22). To do this, the contact washer (22) must be inserted between cable lug and brake plate (15).

Steps 12 to 20 do not apply for article number 8292346.

12. Screw the headless screws (18.6) on both sides into the armature disk (14).
13. Attach both switch brackets B (18.2) in the correct position onto the brake body (2) using the flat headed screws (18.7).
14. Secure the thrust spring holder (18.8) onto the brake body (2) using the cap screw (18.9) and the washer (18.10), so that the pin of the thrust spring holder (18.8) points in the direction of the knob of switch bracket B (18.2).
15. Tilt switch bracket B (18.2) and join the thrust spring (18.11) between the thrust spring holder (18.8) and switch bracket B (18.2).
16. Screw switch bracket A (18.1) onto switch bracket B (18.2) on both sides using the cap screws (18.3).
17. Screw the hexagon nut (18.5) up to contact on the thread end onto the hand release rod (18.4).
18. Screw the hand release rod (18.4) into switch bracket A (18.1) and counter the hexagon nut (18.5) with an open-end wrench.
19. Screw both headless screws (Item 16 / not shown) as contact for the hand release into the gear housing.
20. Mount plastic hoses (17) onto both headless screws (16) in order to dampen vibration noises.
21. Insert the elastomeric element (13) in the claws of the hub (1).
22. Mount the hub (12) onto the motor shaft with the inserted key and bring it into the correct axial position (installation dimension 115 +1 mm, see Fig. 4).
23. Establish the positive locking between the hub (12) and the elastomeric element (13).
    Due to the pre-tension on the flexible elastomeric element (13), an axial installation force is required when joining both hubs (1 and 12) (Fig. 5). The force required can be reduced by lightly greasing the elastomeric element (13).

Use PU-compatible lubricants
(e. g. Vaseline or HP 222)!

After joining both hubs, no axial pressure must be placed on the elastomeric element (13).
Keep to the installation dimension 115 +1 mm, see Fig. 4.

24. **Check air gap “a” (Fig. 4).**
    The nominal air gap acc. Table 1 must be given.
25. **Check the air gap single circuits "b" (Fig. 4) on rotors 1 and 2.**
    The respective minimal air gap acc. Table 1 must be given.

Adjustment

The brakes are equipped manufacturer-side with the respective springs for the braking torque stated on the Type tag (24). Adjustment is not necessary. Adaptions or modifications are not permitted as a rule. This rule also applies to the manufacturer-side adjusted noise damping. The switches are also adjusted manufacturer-side. Despite great care during the manufacturer-side adjustment, re-adjustment might be necessary after installation due to transportation and handling. Furthermore, such switches cannot be considered fail-safe.
Please also observe the section ‘Release Monitoring’.

Noise Damping (Item 19 / Fig. 2)

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

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Electrical Connection and Wiring

In safety applications, the rules for risk minimisation and error avoidance (e.g. redundance, diversity, resistance, monitoring etc.) must be observed during electrical activation.
The power is connected using a 2-core cable (9).

The brake must only be operated with overexcitation (see Technical Data).

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

Grounding Connection

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

Device Fuses

To protect against damage from short circuits, please add suitable device fuses to the mains cable.

Switching Behavior

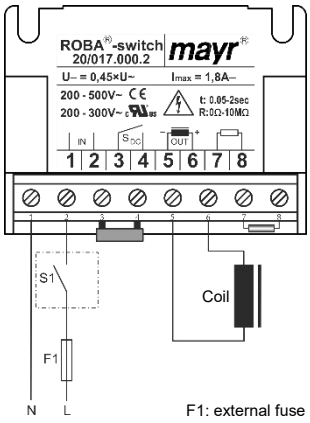
The reliable operational behavior of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the temperature and the air gap between the armature disk and the coil carrier (dependent on the wear condition of the linings).

Magnetic Field Build-up

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

Magnetic Field Removal

AC-side switching



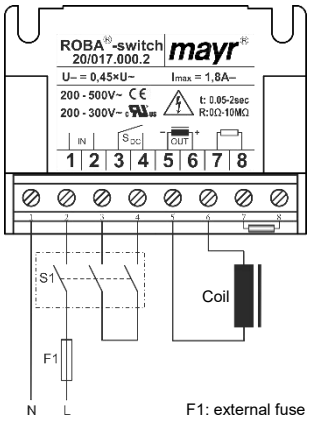
F1: external fuse

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

When switching times are not important, please switch AC-side, as no protective measures are necessary for coil and switching contacts.

AC-side switching means **low-noise switching**; however, the brake engagement time is longer (approx. 6-10 times longer than with DC-side disconnection), use for non-critical braking times.

DC-side switching



F1: external fuse

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 can lead to wear on the switching contacts from sparks and to destruction of the insulation.

DC-side switching means **short brake engagement times (e.g. for EMERGENCY STOP operation)**; however, louder switching noises.

Protection Circuit

When using DC-side switching, the coil must be protected by a suitable protection circuit according to VDE 0580, which is integrated in *mayr*®-rectifiers. To protect the switching contact from consumption when using DC-side switching, additional protective measures are necessary (e.g. series connection of switching contacts). The switching contacts used should have a minimum contact opening of 3 mm and should be suitable for inductive load switching. Please make sure on selection that the rated voltage and the rated operating current are sufficient. Depending on the application, the switching contact can also be protected by other protection circuits (e.g. *mayr*®-spark quenching unit, half-wave and bridge rectifiers), although this may of course then alter the switching times.

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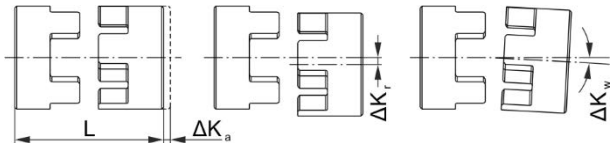
Permitted Shaft Misalignments

ROBA®-ES coupling compensates for radial, axial and angular shaft misalignments (Fig. 3) without losing its backlash-free function. However, the permitted shaft misalignments indicated in Table 3 must not simultaneously reach their maximum value.
If more than one kind of misalignment takes place simultaneously, they influence each other. This means that the permitted misalignment values are dependent on one another, see Fig. 4.
The sum total of the actual misalignments in percent of the maximum value must not exceed 100 %.
The permitted misalignment values given in Table 3 refer to coupling operation at nominal torque, an ambient temperature of +30 °C.
If the coupling is operated in other or more extreme operating conditions, please contact the manufacturers.

Table 3

Max. Permitted Shaft Misalignments	
ΔK_a	± 1.5 mm
ΔK_r	0.11 mm
ΔK_w	0.9 °



Axial displacement | Radial misalignment | Angular misalignment

Fig. 8

Shaft Alignment

Exact alignment of the shafts improves the running smoothness of the coupling substantially, reduces the load on the shaft bearings and increases the coupling service lifetime.
We recommend alignment of the coupling using a dial gauge or special laser on drives operating at very high speeds.

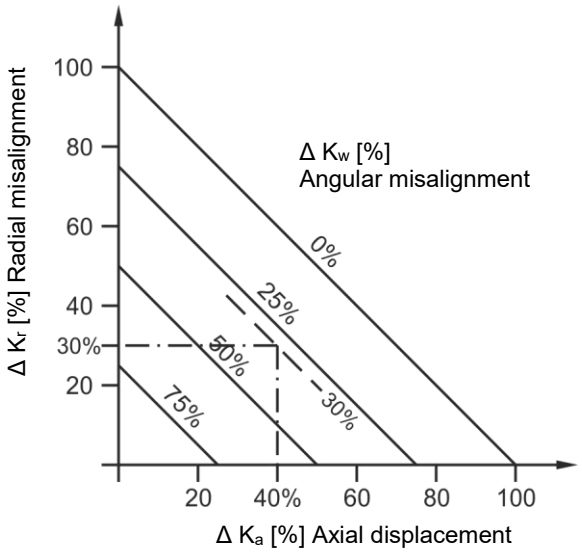


Fig. 9

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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.
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 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, acc. Technical Data. 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 rotors can lead to overheating / damage to the brake linings, and therefore to a drop in braking torque.
Furthermore, friction materials are subject to aging, which is also influenced, among other things, by higher temperatures and other ambient influences. We recommend regular inspection of the braking torque (1 x per year) including the respective dynamic braking actions as a refresher.

Brake Inspection (before brake initial operation)

- ❑ **Air gaps inspection (Fig. 4)**
  Measure the air gap “a” (brake de-energized) several times on the circumference.
  The nominal air gap acc. Table 1 must be given.
  Measure the min. individual air gap "b" (brake energized) of brake circuit 1 (inside) and brake circuit 2 (outside) several times on the circumference.
  The respective minimal air gap acc. Table 1 must be given.
- ❑ **Braking torque inspection:**
  Please compare the requested braking torque with the torque stated
  on the Type tag (24).
- ❑ **Release function inspection**
  by energizing the brake.
- ❑ **Switch function inspection of the release monitoring with microswitch (NO contact)**
  Brake de-energized ➔ Signal “OFF”
  Brake energized ➔ Signal “ON”
- ❑ **Hand release functional inspection**
  By deflecting the hand release (18) manually, the friction linings are relieved. The brake is free but for a residual torque of max. 8 %.

When actuating the hand release (18), a switching signal of the release monitoring device (11) cannot be guaranteed.

Dual Circuit Brake Functional Inspection

The ROBA-stop®–Z brake is equipped with a double safety (redundant) braking system. If one brake circuit fails, min. 50 % of the braking torque remain. The single brake circuit inspection is carried out using the reference gauges (10) included in delivery.

DANGER

Should the load begin to move after tilting the feeler gauges (10) or should it fail to react to the braking procedure, the reference gauges must be pivoted back and removed immediately.
The dual circuit braking function is not guaranteed.
Shut down the system, lower and secure the load, remove and inspect the brake.
Please observe the accident prevention regulations.

Remove the **reference gauges** (ideally attached to the motor or the gearbox).

Inspection brake circuit 1 (mounting-side, see Fig. 1):

1. Push both reference gauges, 180° offset to each other, with the flattened section between the brake body (2) and the machine wall.
   Set up the reference gauges at 90° (tilt) and hold in this position (no spring force on rotor 1 (Item 5)).
2. Energize the brake and put the drive into operation.
3. De-energize the brake (= EMERGENCY STOP) and inspect the stopping distance.
4. Turn the flat sections of the reference gauges once more and remove them from the brake.

Inspection brake circuit 2 (brake plate-side, see Fig. 1):

1. Push both reference gauges, 180° offset to each other, with the flattened section between the armature disk (14) and the brake plate (15). Set up the reference gauges at 90° (tilt) and hold in this position (no spring force on rotor 2 (Item 6)).
2. Energize the brake and put the drive into operation.
3. De-energize the brake (= EMERGENCY STOP) and inspect the stopping distance.
4. Turn the flat sections of the reference gauges once more and remove them from the brake.

Attach the reference gauges to the motor or gearbox again.

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Release Monitoring

The brakes are supplied with manufacturer-side installed and adjusted release monitoring device.
The microswitch (11.1) emits a signal for every brake condition change: "brake opened or brake closed"

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

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

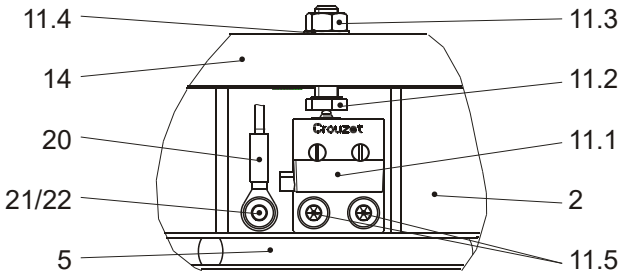


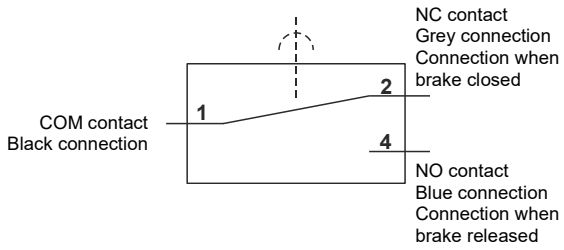
Fig. 10

Function

When the magnetic coil (2.1) is energized in the brake body (2), the armature disk (14) is attracted to the brake body (2), the microswitch (11.1) emits a signal, the brake is released.

When actuating the hand release (18), a switching signal of the release monitoring device (11) cannot be guaranteed.

Microswitch Wiring Diagram:



Microswitch Specification

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

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

Customer-side Inspection after Attachment

For customer-side connection as NO contact.

Brake de-energized ➔ Signal "OFF",
Brake energized ➔ Signal “ON”

For customer-side connection as NC contact.

Brake de-energized ➔ Signal “ON”,
Brake energized ➔ Signal “OFF”

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

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Maintenance

ROBA-stop®–Z 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 rotors: 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
4. Inspection of toothing backlash from the splined motor shaft to the rotors (5 and 6)
   Max. permitted toothing backlash 0.3°
5. Running noise (brake rotors) during operation
   Attention: Permanent grinding of the rotors 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 rotors 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 rotors (5 and 6), please measure the air gap "a", see Fig. 4.
If the brake limit air gap (1.0 mm) has been reached, meaning that the friction linings are worn down, the braking torque is lost and the rotors (5 and 6) must be replaced.
Brake de-installation is carried out by following the instructions in the section Installation (page 9) backwards.

7. Hand release function inspection.

Automatic resetting of the hand release to its initial position (after actuation) must be given.

Replacing the Rotors (5 and 6)

Before Replacing the Rotors

- ❑ Cleaning of the brake.

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

- ❑ Measure the rotor thickness “new condition” (nominal dimension $8\ ^{-0.05}$ mm).

Rotor (5 and 6) replacement is carried out by following the Installation section (page 9) backwards.

DANGER

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

Information on the Components

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

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

Classification: Hazardous property
Attention: H-classification: H372

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

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

Cleaning the Brake

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

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

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Disposal

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

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

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

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

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

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

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

Malfunctions / Breakdowns:

Malfunction	Possible Causes	Solutions
Brake does not release	❑ Incorrect voltage on rectifier ❑ Rectifier failure ❑ Air gap too large (worn rotors) ❑ Coil interrupted	❑ Apply correct voltage ❑ Replace rectifier ❑ Replace rotors ❑ Replace brake
Brake engagement delayed on EMERGENCY STOP	❑ Brake is switched AC-side	❑ Switch DC-side
Release monitoring does not switch	❑ Brake does not release ❑ Defective microswitch	❑ Solution as above ❑ Replace the microswitch (manufacturer-side)

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Installation and Operational Instructions for ROBA-stop®-Z Type 892.101.0 Size 125

(E073 01 046 000 4 EN)

Translation of the Original Operational Instructions

Design according to

Drawing number: E073 01 046 000 1 10	Article number: 8227821
Drawing number: E073 01 046 000 1 11	Article number: 8253118 (without hub (12))
Drawing number: E073 01 046 000 1 12	Article number: 8292346 (without hand release (18))

Please read these Operational Instructions carefully and follow them accordingly!

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

Contents:

Safety and Guideline Signs

DANGER

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

CAUTION

Danger of injury to personnel and damage to machines.

Please Observe!
Guidelines on important points.

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

Guidelines on the EMC Directive 2014/30/EU
The product cannot be operated independently according to the EMC directive.
Due to their passive state, brakes are also non-critical equipment according to the EMC.
Only after integration of the product into an overall system can this be evaluated in terms of the EMC.
For electronic equipment, the evaluation has been verified for the individual product in laboratory conditions, but not in the overall system.

Guidelines on the Machinery Directive 2006/42/EC
The product is a component for installation into machines according to the Machinery Directive 2006/42/EC.
The brakes can fulfil the specifications for safety-related applications in coordination with other elements.
The type and scope of the required measures result from the machine risk analysis. The brake then becomes a machine component and the machine manufacturer assesses the conformity of the safety device to the directive.
It is forbidden to start use of the product until you have ensured that the machine accords with the regulations stated in the directive.

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

Guidelines on the ATEX Directive
Without a conformity evaluation, this product is not suitable for use in areas where there is a high danger of explosion.
For application of this product in areas where there is a high danger of explosion, it must be classified and marked according to Directive 2014/34/EU.

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

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Installation and Operational Instructions for ROBA-stop®-Z Type 892.101.0 Size 125

(E073 01 046 000 4 EN)

Safety Regulations

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

General Guidelines

DANGER

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

Brakes may generate further risks, among other things:

Hand injuries

Danger of seizure

Contact with hot surfaces

Magnetic fields

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

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

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

To prevent injury or damage, only specialist personnel are allowed to work on the components.
They must be familiar with the dimensioning, transport, installation, inspection of the brake equipment, initial operation, maintenance and disposal according to the relevant standards and regulations.

Before product installation and initial operation, please read the Installation and Operational Instructions carefully and observe the Safety Regulations. Incorrect operation can cause injury or damage. At the time these Installation and Operational Instructions go to print, the electromagnetic brakes accord with the known technical specifications and are operationally safe at the time of delivery.

- ❒ Technical data and specifications (Type tags and documentation) must be followed.
- ❒ The correct connection voltage must be connected according to the Type tag and wiring guidelines.
- ❒ Check electrical components for signs of damage before putting them into operation. Never bring them into contact with water or other fluids.
- ❒ Please observe the EN 60204-1 requirements for electrical connection when using in machines.

Only carry out installation, maintenance and repairs in a de-energized, disengaged state and secure the system against inadvertent switch-on.

Guidelines for Electromagnetic Compatibility (EMC)

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

Application Conditions

The catalogue values are guideline values which have been determined in test facilities. It may be necessary to carry out your own tests for the intended application. When dimensioning the brakes, please remember that installation situations, braking torque fluctuations, permitted friction work, bedding-in condition / conditioning of the brake linings and wear as well as general ambient conditions can all affect the given values. These factors should therefore be carefully assessed, and alignments made accordingly.

- ❒ Mounting dimensions and connection dimensions must be adjusted according to the size of the brake at the place of installation.
- ❒ Use of the brake in extreme environmental conditions or outdoors, directly exposed to the weather, is not permitted.
- ❒ The brakes are designed for a relative duty cycle of 50 %. A duty cycle > 50 % leads to higher temperatures, which cause premature aging of the noise damping and therefore lead to an increase in switching noises. Furthermore, the switch function of the release monitoring can be impaired. The max. permitted switching frequency is 180 1/h.
  These values are valid for intermittent periodic duty S3 50 %. 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.
- ❒ The braking torque is dependent on the current bedding-in condition of the brake. Bedding in / conditioning of the friction linings is necessary.
- ❒ The brakes are only designed for dry running. The torque is lost if the friction surfaces come into contact with oil, grease, water or similar substances or any other foreign bodies.
- ❒ The surfaces of the outer components have been phosphated manufacturer-side to form a basic corrosion protection.

CAUTION

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

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Safety Regulations

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

Dimensioning

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

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

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

Climate Conditions

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

CAUTION

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

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

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

CAUTION

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

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

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

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

At high temperatures and in high humidity or with occurring dampness, the rotors can seize up to the friction surfaces after longer downtimes.

CAUTION

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

Intended Use

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

Grounding Connection

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

Class of Insulation F (+155 °C)

The insulation components on the magnetic coils are manufactured at least to class of insulation F (+155 °C).

Protection

(mechanical) IP10: Protection against large body surfaces and large foreign bodies > 50 mm in diameter. No protection against water.

(electrical) IP54: Dust-proof and protected against contact as well as against water spray from any direction.

Brake Storage

- ❑ Store the brakes in a horizontal position, in dry rooms and dust and vibration-free.
- ❑ Relative air humidity < 50 %.
- ❑ Temperature without major fluctuations within a range from -5 °C up to +40 °C.
- ❑ Do not store in direct sunlight or UV light.
- ❑ Do not store aggressive, corrosive substances (solvents / acids / lyes / salts / oils / etc.) near to the brakes.

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

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

Handling

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

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Installation and Operational Instructions for ROBA-stop®-Z Type 892.101.0 Size 125

(E073 01 046 000 4 EN)

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
2011/65/EU	RoHS II - Directive
2015/863/EU	RoHS III- Directive
CSA C22.2 No. 14-2010	Industrial Control Equipment
UL 508 (Edition 17)	Industrial Control Equipment
2014/33/EU	Elevator Directive
EN 81-20	Safety rules for the construction and installation of lifts – Part 20: Passenger and goods passenger lifts
EN 81-50	Safety rules for the construction and installation of lifts - Examinations and tests – Part 50: Design rules, calculations, examinations and tests of lift components
EN ISO 12100	Safety of machinery – General principles for design - Risk assessment and risk reduction
DIN EN 61000-6-4	Interference emission
EN 12016	Interference immunity (for elevators, escalators and moving walkways)

Liability

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

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

Guarantee

- ❒ The guarantee conditions correspond with the Chr. Mayr GmbH + Co. KG sales and delivery conditions.
- ❒ Mistakes or deficiencies are to be reported to *mayr*® at once!

CE Identification

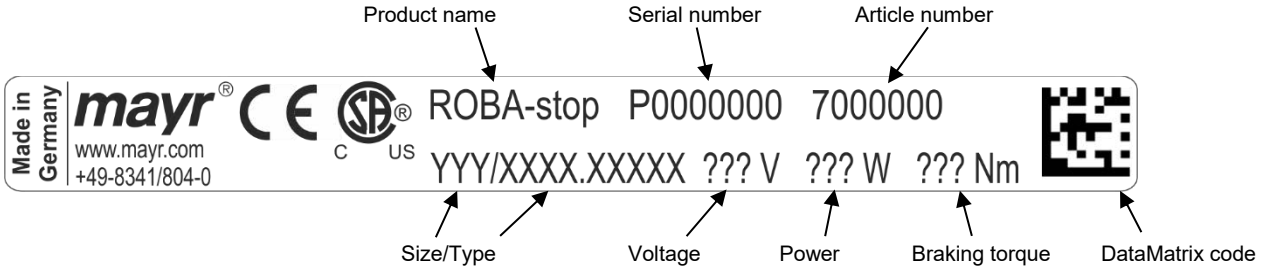
CE in accordance with the Low Voltage Directive 2014/35/EU (only in case of voltages > 75 V DC) and / or the RoHS Directive 2011/65/EU with 2015/863/EU,
and the Elevator Directive 2014/33/EU
(with the ID number of the respective inspection authority, for type examination tested brakes only)

Conformity Markings

c SP US in terms of the Canadian and American approval

Marking

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



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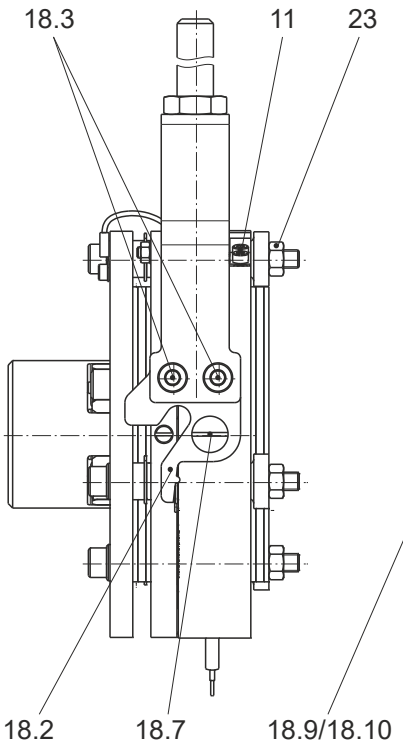

Fig. 1

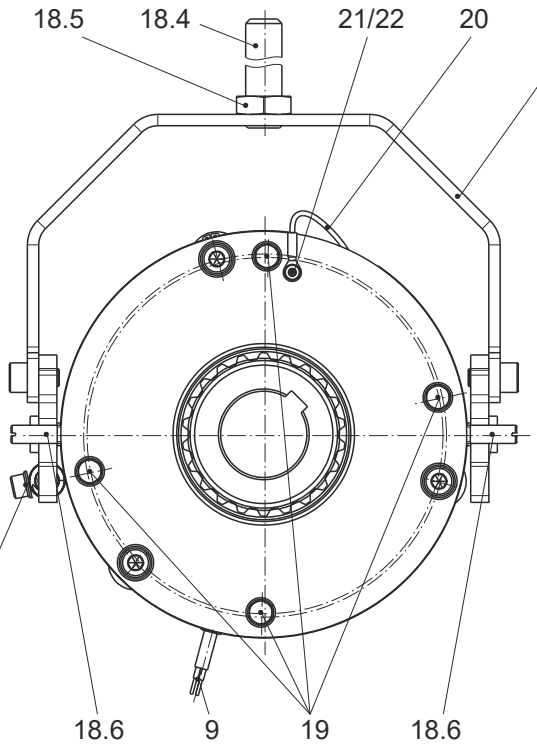

Fig. 2

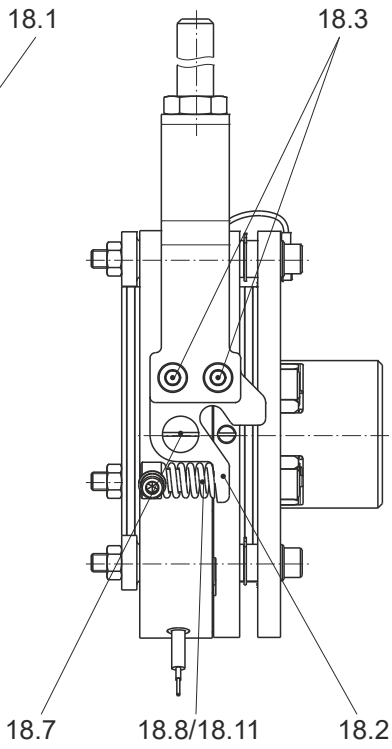

Fig. 3

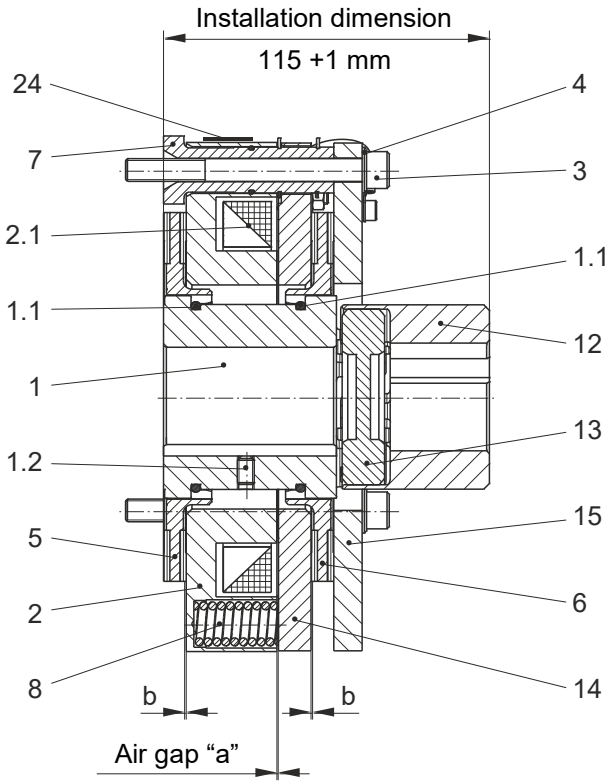

Fig. 4

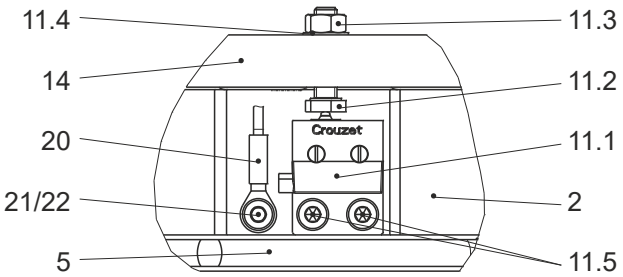

Fig. 5

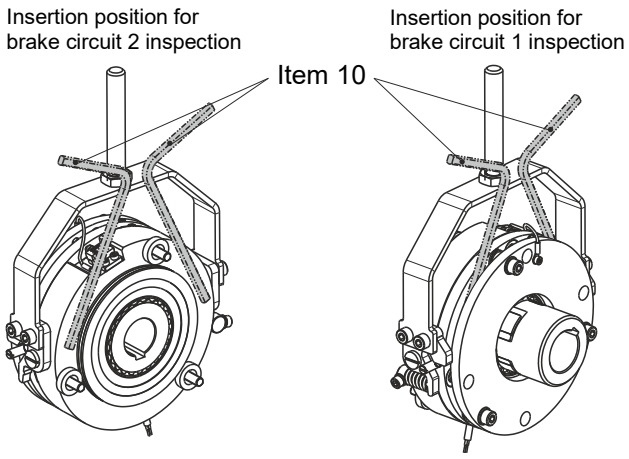

Fig. 6 **Fig. 7**

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

Item	Name		Pcs.
1	Hub		1
1.1	O-ring	D60 x 3	2
1.2	Set screw	M6 x 10	1
2	Brake body		1
2.1	Magnetic coil		1
3	Cap screw	M8 x 85	3
4	Washer	D16 / 8.4 x 1.6	3
5	Rotor 1		1
6	Rotor 2		1
7	Distance bolt		3
8	Thrust spring	D15.5 / 2.8 x 39.5	4
9	Cable	2 x AWG18	1
10	Reference gauge		2
11	Release monitoring (page 12)		1
11.1	Microswitch		1
11.2	Hexagon head screw	M5 x 20	1
11.3	Hexagon nut	M5	1
11.4	Spring washer	A5	1
11.5	Cap screw	M4 x 8	2
12 [1)]	Hub		1
13	Elastomeric element		1
14	Armature disk		1
15	Brake plate		1
16 [2)]	Headless screw	M8 x 30	2
17 [2)]	Plastic tube	D10 / 8 x 14	2
18 [3)]	Hand release		1
18.1	Switch bracket A		1
18.2	Switch bracket B		2
18.3	Cap screw	M8 x 14	4
18.4	Hand release rod		1
18.5	Hexagon nut	M16	1
18.6	Headless screw	M8 x 30	2
18.7	Flat headed screw	M8 x 10	2
18.8	Thrust spring holder		1
18.9	Cap screw	M6 x 25	1
18.10	Washer	A6.4	1
18.11	Thrust spring	D15.5 / 2.5 x 28	1
19	Noise damping		4
20	Grounding strand		1
21	Cap screw	M4 x 8	2
22	Contact washer	M4	2
23 [4)]	Hexagon nut	M8	1
24	Type tag		1

We reserve the right to make dimensional and constructional alterations!

[1)] On article number 8253118, the hub is not included in the standard scope of delivery.

[2)] Items 16 and 17 are included loose in delivery and are not shown in the Figure.

[3)] On article number 8292346, the hand release is not included in the standard scope of delivery.

[4)] Plastic nut, serves only as transportation lock.

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Table 1: Technical Data

Article number	8227821	8253118	8292346
Nominal voltage	90 V	90 V	55 V
Overexcitation voltage	180 V	180 V	110 V
Coil power (nominal power at 20°C)	76 W	76 W	71 W
Coil power on overexcitation	303 W	303 W	284 W
Overexcitation time span	1 s		
Nominal braking torque (+60 %)	100 (2 x 50) Nm		
Rotor thickness, new condition	10.5 mm		
Nominal air gap "a" total (braked)	$0.5^{+0.25}$ mm		
Limit air gap "a" for rotor replacement	1.0 mm		
Inspection air gap "b" released, per single circuit	min. 0.15 mm		
Tightening torque Item 1.2	3 Nm		
Tightening torque Item 3	24 Nm		
Tightening torque Item 16	8.5 Nm		
Tightening torque Item 18.3	24 Nm		
Tightening torque Item 18.6	8.5 Nm		
Tightening torque Item 18.7	8.5 Nm		
Tightening torque Item 18.9	10 Nm		
Max. Speed	2250 rpm		
Max. permitted friction work for both rotors at a speed of 1800 rpm	5000 J		
Weight	11.4 kg		

Table 2: Switching Times

Attraction t_2	50 ms
Drop-out t_0 (DC):	25 ms
Drop-out t_{50} (DC) [5]:	35 ms
Drop-out t_{90} (DC) [5]:	40 ms
Drop-out t_{11} AC	180 ms
Drop-out t_1 AC [6]	340 ms

[5] Referring to the nominal braking torque

[6] Referring to the effective braking torque

The stated switching times can only be achieved using the respective correct electrical wiring. This also refers to the protection circuit for brake control and the response delay times of all control components. If the brake is operated using overexcitation, the respective switch-on and switch-off times for overexcitation must be taken into account.
The use of varistors for spark quenching increases the DC-side switching times.

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Installation and Operational Instructions for ROBA-stop®-Z Type 892.101.0 Size 125

(E073 01 046 000 4 EN)

Application

- ROBA-stop®-Z brake for use as a holding brake with occasional EMERGENCY STOP braking actions (max. 10 per day).
- The max. permitted speed and friction work (see Technical Data) must be observed.

Design

The ROBA-stop®-Z brake is a spring applied, electromagnetically releasing dual circuit safety brake, which applies a defined braking effect after the voltage is switched off or after a voltage failure.
This brake is combined with a positive-locking, flexible coupling (ROBA®-ES coupling) for connecting two shafts whilst compensating for shaft misalignments.
The ROBA®-ES coupling compensates for axial, radial and angular shaft misalignments.

Function

The ROBA-stop®-Z brake is a spring applied, electromagnetic safety brake.

Spring applied function (brake):
In de-energized condition, thrust springs (8) press against the armature disk (14). Rotor 2 (Item 6) is held between the armature disk (14) and the brake plate (15), rotor 1 (Item 5) is held between the brake body (2) and the machine wall via frictional locking.
The braking torque is introduced into the drive line via the toothing of the rotors (5 and 6) and the hub (1).

Electromagnetic function (release):
Due to the magnetic force of the coil in the brake body (2), the armature disk (14) is attracted against the spring pressure (8) to the brake body (2). The brake is released and the brake rotors (5 and 6) with the hub (1) can rotate freely.

Safety brakes:
The ROBA-stop®-Z brake 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 ROBA-stop®-Z brake is pre-assembled.
On brake article number 8253118, the hub (12) is not included in the standard scope of delivery.
Brake article number 8292346 is designed without hand release (18).
The release monitoring (11) device is installed and set manufacturer-side.
The brakes are set manufacturer-side to the braking torque stipulated on order.
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.

Installation Conditions

- The eccentricity of the shaft end in relation to the mounting pitch circle must not exceed 0.2 mm.
- The positional tolerance of the threads for the cap screws (3) must not exceed 0.2 mm.
- The axial run-out deviation of the screw-on surface to the shaft must not exceed the permitted axial run-out tolerance of **0.05 mm** acc. DIN 42955 R.
  The reference diameter is the pitch circle diameter for securement of the brakes.
  Larger deviations can lead to a drop in torque, to continuous grinding on the rotors and to overheating.
- The fit tolerance of the shaft must be selected so that the hub toothing (1) is not widened. Widening of the toothing leads to the rotors (5 and 6) jamming on the hub (1) and therefore to brake malfunctions.
  Recommended fit tolerance for the shaft: k6
  The max. permitted joining temperature of 150 °C must not be exceeded.
- The O-rings (1.1) on the hub (1) must be lightly greased.
- The rotors (5 and 6) and the brake surfaces must be oil and grease-free.
- A suitable counter friction surface (steel or cast iron) must be used. Sharp-edged interruptions on the friction surfaces must be avoided. Recommended surface quality in the area of the friction surface Ra = 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 toothings of the hub (1) and the rotors (5 and 6) must not be oiled or greased.
- Friction value-increasing surface treatments are not permitted.
- Please abstain from using cleaning agents containing solvents, as they could affect the friction material.

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Installation

All the screws (except the cap screw Item 21) and the set screws mounted by the customer must be tightened using the tightening torque stated in Table 1.
We recommend that you secure the screws using Loctite 243.

1. Remove all 3 hexagon nuts (Item 23 / transportation lock) and remove the brake plate (15) from the brake body (2).
2. Mount the hub (1) onto the shaft with inserted key and secure it axially.
   Axial securement takes place using the set screw (1.2), which presses onto the customer-side key.
3. Lightly grease the first O-ring (1.1) and insert it into the hub (1) groove nearest to the machine wall.
4. Push the rotor 1 (Item 5) over the inserted O-ring (1.1) onto the hub (1) by hand using light pressure (the rotor collar should be facing away from the machine wall).
   Make sure that the toothing moves easily.
5. Lightly grease the second O-ring (1.1) and insert it into the other (not occupied) hub (1) groove.
6. Push brake body (2) over the hub (1) and insert it in the gear housing.
7. Push the rotor 2 (6) over the O-ring (1.1) onto the hub (1) by hand using light pressure (the rotor collar should be facing the machine wall).
   Make sure that the toothing moves easily.
8. Insert the cap screws (3) including the washers (4) in the distance bolts (7) through the brake plate (15).
9. Secure the brake evenly all around using the cap screws (3) with a torque wrench.
10. Attach the grounding strand (20) onto the brake body (2) using the cap screw (21) and the contact washer (22).
    To do this, the contact washer (22) must be inserted between cable lug and brake body (2).
11. Attach the grounding strand (20) onto the brake plate (15) using the cap screw (21) and the contact washer (22). To do this, the contact washer (22) must be inserted between cable lug and brake plate (15).

Steps 12 to 20 do not apply for article number 8292346.

12. Screw the headless screws (18.6) on both sides into the armature disk (14).
13. Attach both switch brackets B (18.2) in the correct position onto the brake body (2) using the flat headed screws (18.7).
14. Secure the thrust spring holder (18.8) onto the brake body (2) using the cap screw (18.9) and the washer (18.10), so that the pin of the thrust spring holder (18.8) points in the direction of the knob of switch bracket B (18.2).
15. Tilt switch bracket B (18.2) and join the thrust spring (18.11) between the thrust spring holder (18.8) and switch bracket B (18.2).
16. Screw switch bracket A (18.1) onto switch bracket B (18.2) on both sides using the cap screws (18.3).
17. Screw the hexagon nut (18.5) up to contact on the thread end onto the hand release rod (18.4).
18. Screw the hand release rod (18.4) into switch bracket A (18.1) and counter the hexagon nut (18.5) with an open-end wrench.
19. Screw both headless screws (Item 16 / not shown) as contact for the hand release into the gear housing.
20. Mount plastic hoses (17) onto both headless screws (16) in order to dampen vibration noises.
21. Insert the elastomeric element (13) in the claws of the hub (1).
22. Mount the hub (12) onto the motor shaft with the inserted key and bring it into the correct axial position (installation dimension 115 +1 mm, see Fig. 4).
23. Establish the positive locking between the hub (12) and the elastomeric element (13).
    Due to the pre-tension on the flexible elastomeric element (13), an axial installation force is required when joining both hubs (1 and 12) (Fig. 5). The force required can be reduced by lightly greasing the elastomeric element (13).

Use PU-compatible lubricants
(e. g. Vaseline or HP 222)!

After joining both hubs, no axial pressure must be placed on the elastomeric element (13).
Keep to the installation dimension 115 +1 mm, see Fig. 4.

24. **Check air gap “a” (Fig. 4).**
    The nominal air gap acc. Table 1 must be given.
25. **Check the air gap single circuits "b" (Fig. 4) on rotors 1 and 2.**
    The respective minimal air gap acc. Table 1 must be given.

Adjustment

The brakes are equipped manufacturer-side with the respective springs for the braking torque stated on the Type tag (24). Adjustment is not necessary. Adaptions or modifications are not permitted as a rule. This rule also applies to the manufacturer-side adjusted noise damping. The switches are also adjusted manufacturer-side. Despite great care during the manufacturer-side adjustment, re-adjustment might be necessary after installation due to transportation and handling. Furthermore, such switches cannot be considered fail-safe.
Please also observe the section ‘Release Monitoring’.

Noise Damping (Item 19 / Fig. 2)

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

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Electrical Connection and Wiring

In safety applications, the rules for risk minimisation and error avoidance (e.g. redundance, diversity, resistance, monitoring etc.) must be observed during electrical activation.
The power is connected using a 2-core cable (9).

The brake must only be operated with overexcitation (see Technical Data).

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

Grounding Connection

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

Device Fuses

To protect against damage from short circuits, please add suitable device fuses to the mains cable.

Switching Behavior

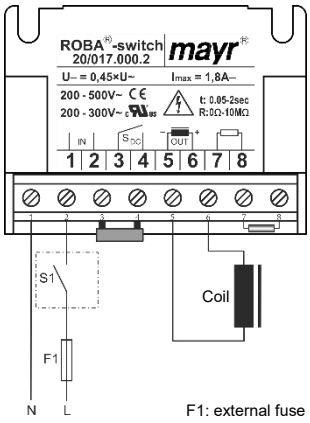
The reliable operational behavior of a brake is to a large extent dependent on the switching mode used. Furthermore, the switching times are influenced by the temperature and the air gap between the armature disk and the coil carrier (dependent on the wear condition of the linings).

Magnetic Field Build-up

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

Magnetic Field Removal

AC-side switching



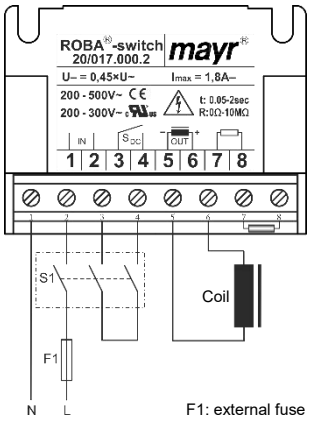
F1: external fuse

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

When switching times are not important, please switch AC-side, as no protective measures are necessary for coil and switching contacts.

AC-side switching means **low-noise switching**; however, the brake engagement time is longer (approx. 6-10 times longer than with DC-side disconnection), use for non-critical braking times.

DC-side switching



F1: external fuse

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 can lead to wear on the switching contacts from sparks and to destruction of the insulation.

DC-side switching means **short brake engagement times (e.g. for EMERGENCY STOP operation)**; however, louder switching noises.

Protection Circuit

When using DC-side switching, the coil must be protected by a suitable protection circuit according to VDE 0580, which is integrated in *mayr*®-rectifiers. To protect the switching contact from consumption when using DC-side switching, additional protective measures are necessary (e.g. series connection of switching contacts). The switching contacts used should have a minimum contact opening of 3 mm and should be suitable for inductive load switching. Please make sure on selection that the rated voltage and the rated operating current are sufficient. Depending on the application, the switching contact can also be protected by other protection circuits (e.g. *mayr*®-spark quenching unit, half-wave and bridge rectifiers), although this may of course then alter the switching times.

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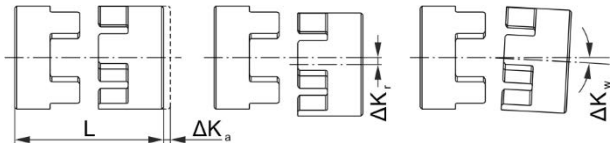
Permitted Shaft Misalignments

ROBA®-ES coupling compensates for radial, axial and angular shaft misalignments (Fig. 3) without losing its backlash-free function. However, the permitted shaft misalignments indicated in Table 3 must not simultaneously reach their maximum value.
If more than one kind of misalignment takes place simultaneously, they influence each other. This means that the permitted misalignment values are dependent on one another, see Fig. 4.
The sum total of the actual misalignments in percent of the maximum value must not exceed 100 %.
The permitted misalignment values given in Table 3 refer to coupling operation at nominal torque, an ambient temperature of +30 °C.
If the coupling is operated in other or more extreme operating conditions, please contact the manufacturers.

Table 3

Max. Permitted Shaft Misalignments	
ΔK_a	± 1.5 mm
ΔK_r	0.11 mm
ΔK_w	0.9 °



Axial displacement | Radial misalignment | Angular misalignment

Fig. 8

Shaft Alignment

Exact alignment of the shafts improves the running smoothness of the coupling substantially, reduces the load on the shaft bearings and increases the coupling service lifetime.
We recommend alignment of the coupling using a dial gauge or special laser on drives operating at very high speeds.

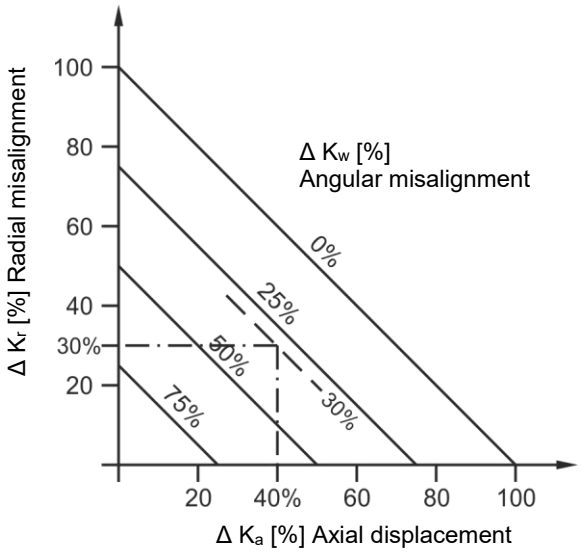


Fig. 9

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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.
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 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, acc. Technical Data. 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 rotors can lead to overheating / damage to the brake linings, and therefore to a drop in braking torque.
Furthermore, friction materials are subject to aging, which is also influenced, among other things, by higher temperatures and other ambient influences. We recommend regular inspection of the braking torque (1 x per year) including the respective dynamic braking actions as a refresher.

Brake Inspection (before brake initial operation)

- ❑ **Air gaps inspection (Fig. 4)**
  Measure the air gap “a” (brake de-energized) several times on the circumference.
  The nominal air gap acc. Table 1 must be given.
  Measure the min. individual air gap "b" (brake energized) of brake circuit 1 (inside) and brake circuit 2 (outside) several times on the circumference.
  The respective minimal air gap acc. Table 1 must be given.
- ❑ **Braking torque inspection:**
  Please compare the requested braking torque with the torque stated
  on the Type tag (24).
- ❑ **Release function inspection**
  by energizing the brake.
- ❑ **Switch function inspection of the release monitoring with microswitch (NO contact)**
  Brake de-energized ➔ Signal “OFF”
  Brake energized ➔ Signal “ON”
- ❑ **Hand release functional inspection**
  By deflecting the hand release (18) manually, the friction linings are relieved. The brake is free but for a residual torque of max. 8 %.

When actuating the hand release (18), a switching signal of the release monitoring device (11) cannot be guaranteed.

Dual Circuit Brake Functional Inspection

The ROBA-stop®–Z brake is equipped with a double safety (redundant) braking system. If one brake circuit fails, min. 50 % of the braking torque remain. The single brake circuit inspection is carried out using the reference gauges (10) included in delivery.

DANGER

Should the load begin to move after tilting the feeler gauges (10) or should it fail to react to the braking procedure, the reference gauges must be pivoted back and removed immediately.
The dual circuit braking function is not guaranteed.
Shut down the system, lower and secure the load, remove and inspect the brake.
Please observe the accident prevention regulations.

Remove the **reference gauges** (ideally attached to the motor or the gearbox).

Inspection brake circuit 1 (mounting-side, see Fig. 1):

1. Push both reference gauges, 180° offset to each other, with the flattened section between the brake body (2) and the machine wall.
   Set up the reference gauges at 90° (tilt) and hold in this position (no spring force on rotor 1 (Item 5)).
2. Energize the brake and put the drive into operation.
3. De-energize the brake (= EMERGENCY STOP) and inspect the stopping distance.
4. Turn the flat sections of the reference gauges once more and remove them from the brake.

Inspection brake circuit 2 (brake plate-side, see Fig. 1):

1. Push both reference gauges, 180° offset to each other, with the flattened section between the armature disk (14) and the brake plate (15). Set up the reference gauges at 90° (tilt) and hold in this position (no spring force on rotor 2 (Item 6)).
2. Energize the brake and put the drive into operation.
3. De-energize the brake (= EMERGENCY STOP) and inspect the stopping distance.
4. Turn the flat sections of the reference gauges once more and remove them from the brake.

Attach the reference gauges to the motor or gearbox again.

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Release Monitoring

The brakes are supplied with manufacturer-side installed and adjusted release monitoring device.
The microswitch (11.1) emits a signal for every brake condition change: "brake opened or brake closed"

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

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

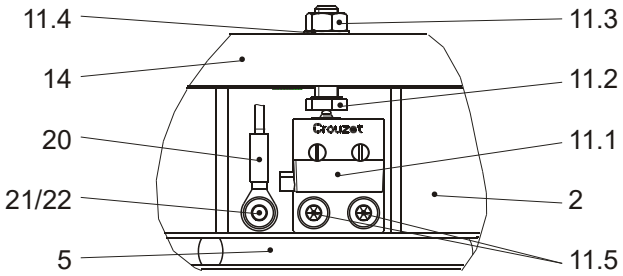


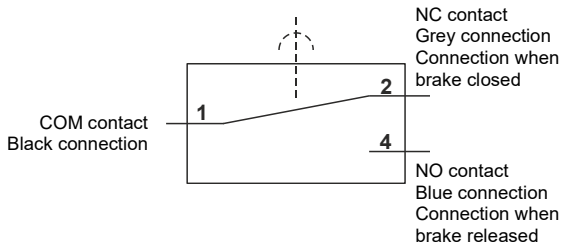
Fig. 10

Function

When the magnetic coil (2.1) is energized in the brake body (2), the armature disk (14) is attracted to the brake body (2), the microswitch (11.1) emits a signal, the brake is released.

When actuating the hand release (18), a switching signal of the release monitoring device (11) cannot be guaranteed.

Microswitch Wiring Diagram:



Microswitch Specification

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

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

Customer-side Inspection after Attachment

For customer-side connection as NO contact.

Brake de-energized ➔ Signal "OFF",
Brake energized ➔ Signal “ON”

For customer-side connection as NC contact.

Brake de-energized ➔ Signal “ON”,
Brake energized ➔ Signal “OFF”

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

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Maintenance

ROBA-stop®–Z 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 rotors: 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
4. Inspection of toothing backlash from the splined motor shaft to the rotors (5 and 6)
   Max. permitted toothing backlash 0.3°
5. Running noise (brake rotors) during operation
   Attention: Permanent grinding of the rotors 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 rotors 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 rotors (5 and 6), please measure the air gap "a", see Fig. 4.
If the brake limit air gap (1.0 mm) has been reached, meaning that the friction linings are worn down, the braking torque is lost and the rotors (5 and 6) must be replaced.
Brake de-installation is carried out by following the instructions in the section Installation (page 9) backwards.

7. Hand release function inspection.

Automatic resetting of the hand release to its initial position (after actuation) must be given.

Replacing the Rotors (5 and 6)

Before Replacing the Rotors

- ❑ Cleaning of the brake.

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

- ❑ Measure the rotor thickness “new condition” (nominal dimension $8\ ^{-0.05}$ mm).

Rotor (5 and 6) replacement is carried out by following the Installation section (page 9) backwards.

DANGER

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

Information on the Components

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

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

Classification: Hazardous property
Attention: H-classification: H372

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

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

Cleaning the Brake

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

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

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Disposal

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

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

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

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

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

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

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

Malfunctions / Breakdowns:

Malfunction	Possible Causes	Solutions
Brake does not release	❑ Incorrect voltage on rectifier ❑ Rectifier failure ❑ Air gap too large (worn rotors) ❑ Coil interrupted	❑ Apply correct voltage ❑ Replace rectifier ❑ Replace rotors ❑ Replace brake
Brake engagement delayed on EMERGENCY STOP	❑ Brake is switched AC-side	❑ Switch DC-side
Release monitoring does not switch	❑ Brake does not release ❑ Defective microswitch	❑ Solution as above ❑ Replace the microswitch (manufacturer-side)

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Internet:www.lappkabel.de

GEBRAUCHSANWEISUNG
INSTRUCTION SHEET

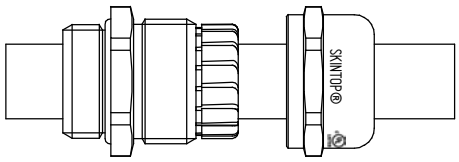
SKINTOP® MS-M, MSR-M, MS-M-XL, MSR-M-XL
MS-SC-M, MS-SC-M-XL

Bezeichnung Product		Klemm- und Dichtbereich Clamping and Sealing range					Approbationen Approvals
		EN 50262			UL 514 B		
Größe/Size M		Kat.der Zug-entlastung	Anzugsdreh-momente Nm	Klemm-bereich Ø mm	Diameter inch	∅ mm	
12x1,5	MS-M, MS-M-XL	A	8	3,5 - 7	.12 - .27	3,5 - 7	
	MSR-M, MSR-M-XL			3,5 - 5	.04 - .20	1 - 5	
	MS-SC-M, MS-SC-M-XL			3,5 – 7	.12 - .27	3,5 - 7	
16x1,5	MS-M, MS-M-XL	A	10	4,5 - 10	.17 - .35	4,5 - 10	
	MSR-M, MSR-M-XL			3,5 - 7	.08 - .27	2 - 7	
	MS-SC-M, MS-SC-M-XL			4,5 – 9	.17 - .35	4,5 – 9	
20x1,5	MS-M, MS-M-XL	A	12	7 – 13	.27 - .51	7 – 13	
	MSR-M, MSR-M-XL			5 - 10	.20 - .04	5 - 10	
	MS-SC-M, MS-SC-M-XL			7 – 12,5	.27 - .49	7 – 12,5	
25x1,5	MS-M, MS-M-XL	A	12	9 – 17	.35 - .65	9 – 17	
	MSR-M, MSR-M-XL			6 - 13	.23 - .51	6 - 13	
	MS-SC-M, MS-SC-M-XL			9 – 16,5	.35 - .65	9 – 16,5	
32x1,5	MS-M, MS-M-XL	A	18	11 - 21	.43 - .83	11 - 21	
	MSR-M, MSR-M-XL			7 - 15	.27 - .59	7 - 15	
	MS-SC-M, MS-SC-M-XL			11 - 21	.43 - .83	11 - 21	
40x1,5	MS-M, MS-M-XL	A	18	19 - 28	.75 – 1.1	19 - 28	
	MSR-M, MSR-M-XL			15 - 23	.59 - .9	15 - 23	
	MS-SC-M, MS-SC-M-XL			19 - 28	.75 – 1.1	19 - 28	
50x1,5	MS-M, MS-M-XL	A	20	27 - 35	1.06 – 1.38	27 - 35	
	MSR-M, MSR-M-XL			22 - 29	.87 – 1.14	22 - 29	
	MS-SC-M, MS-SC-M-XL			27 - 35	1.06 – 1.38	27 - 35	
63x1,5	MS-M	A	20	34 - 45	1.34 – 1.77	34 - 45	
	MSR-M			28 - 39	1.1 – 1.53	28 - 39	

Bemerkungen/ ***Remarks***

Schutzart: IP 68; 5bar/30min.nach EN 60 529
IP 69K nach DIN 40 050

1. SKINTOP ins Gehäuse schrauben oder mit Gegenmutter festziehen
   Screw SKINTOP into housing or tighten with locknut
2. Leitung durchziehen
   Put cable through
3. Hutmutter mit empfohlenem Drehmoment festziehen
   Tighten nut with recomanded tightening torque



Ohne Gegenmutter:
NUR IN GEWINDEBOHRUNGEN VERWENDEN!

Usage without Locknut:
ONLY IN THREADED HUB!

1 inch = 25,4mm
Temperaturbereich: –25 bis +100°C
Temperature range: -25 up to +100°C

UL File No. E 79903, Control Number 54 B 2

Hinweis / Note:
Sollte der Inhalt dieser Verpackung auf neue Verpackungen verteilt werden, so muss jeder neuen Verpackung eine Kopie dieser Betriebsanleitung beigelegt werden.
If the content of this bag will be split on two or more units, a copy of this instruction sheet must be placed in every packing units.

Art.Nr. 91100008

BS 04/2889-5

Druckfarbe: schwarz, Papierfarbe: hellgelb "CARNEVAL" 80g/qm (igepa Art.Nr.323-31)
Größe angepasst auf DIN A5, Falzung Kreuzbruch, Druck aussen

Toleranzen / *tolerances:*	Werkstoff / *material:*		Oberfläche / *surface*	Gewicht / *weight:*	Volumen / *volume:*	Farbe / *color:*
DIN	Papier					
	Bearb. *edited*	Datum/*date* 27.05.04	Name/*name* M. Schmid	Geprüft *checked*	Datum / *date* 23.04.08	Name / *name* D.Müller

Maßangaben in *dimension units*: mm

Projektion / *projection* :	Maßstab / *scale:*	Benennung / *name:*
	1:1	SKINTOP MS-M Beipackzettel *SKINTOP MS-M operating instuction*

05	500000001032	Mast1	26.03.2009	U.I. Lapp GmbH	Zeichnungs-Nr. / *drawing no.:* BS04_2889	Blatt *sheet:* 1/1	Dok. Art *doc. type* LBZ
Ind. vs	Änderungs-Nr. *change number*	Datum / *date* Bearb./*edited*	Gepr./*check.*			DIN A 4	

Ersatz für / *substitute for: BS04_2889-3*

JOST1 / 08.10.2009 / freigegeben

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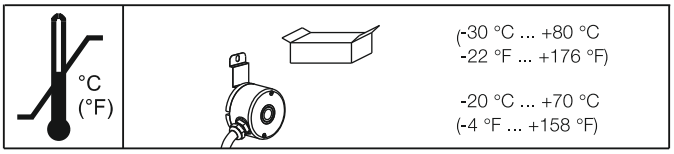
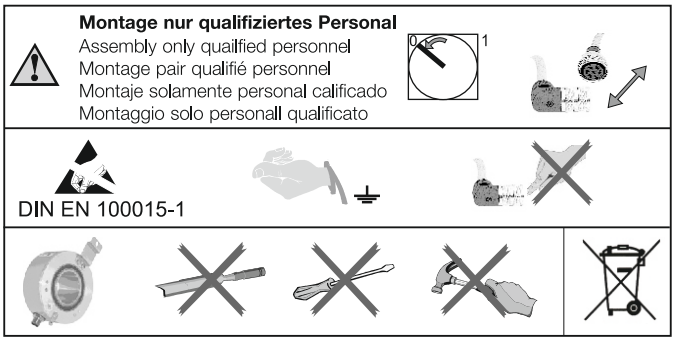
www.wachendorff-automation.de

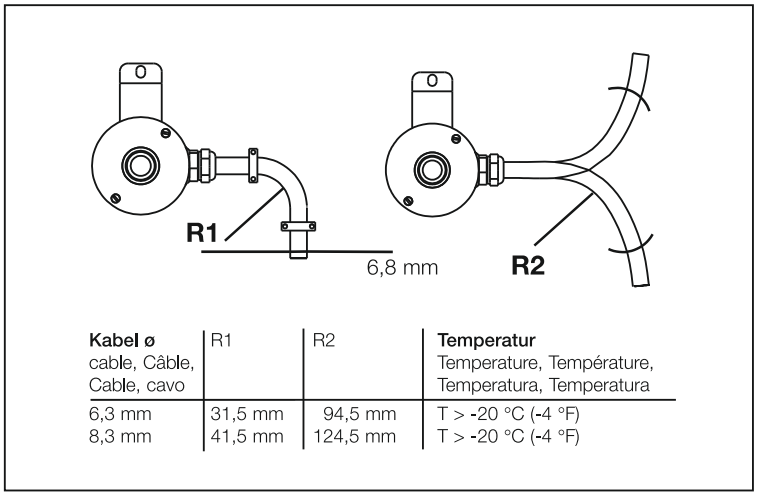
WDG100H-xx-yyyy-ABN-I05-K3-D56-zzz
xx = Ø 25, 25.4, 28, 30, 38, 40, 42, 45
yyyy = PPR = 1024, 2048, 4096
zzz = 130 = 13m, 200 = 20m, blank = 10m

Montageanleitung Hohlwellengeber, D56

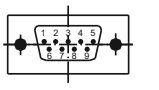
Assembly instructions hollowshaft encoder, Notice de montage codeur rotatif à arbre creux,
Instrucciones de montaje encoder ad albero cavo, istruzioni di montaggio encoders de eje hueco



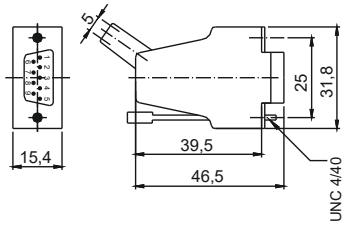




Kabel ø cable, Câble, Cable, cavo	R1	R2	Temperatur Temperature, Température, Temperatura, Temperatura
6,3 mm	31,5 mm	94,5 mm	T > -20 °C (-4 °F)
8,3 mm	41,5 mm	124,5 mm	T > -20 °C (-4 °F)



	Kabel, cable, Câble, Cable, cavo	
	SUBD9 9-pin	K3
Minus U-	7	WH
Plus U+	9	BN
A	2	GN
B	3	YE
N	5	GY
A inv.	1	RD
B inv.	4	BK
N inv.	6	VT
n. c.		-
Schirm Shield Ecran Pantalla Schermo	8	Litze, Flex, Toron, Cordón, Cavetto



Steckergehäuse/Schirm mit Gebergehäuse leitend verbunden

Connector housing/shield electrically connected to encoder housing

Bôtier de connexion/Ecran avec boîtier d'ementteur liés de manière conductrice

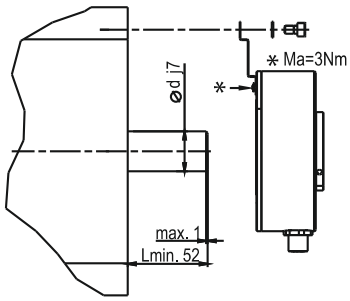
Caja de conector/Pantalls conectada en conductancia com caja de transmisor

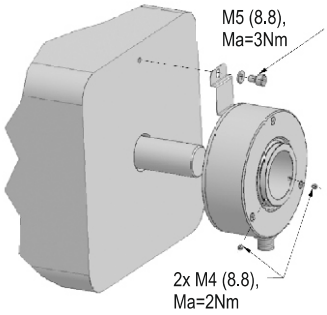
scatola prese/Schemo con scatola transmettitore collegata da condure

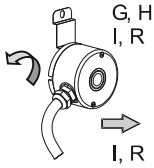
WH: weiss,
white, blanc, blanco, bianco
BN: braun,
brown, brun, marrón, marrone
GN: grün,
green, vert, verde, verde
YE: gelb,
yellow, jaune, amarillo, giallo
GY: grau, grey, gris, gris, grigio
PK: rosa, pink, rose, rosa, rosa
RD: rot, red, rouge, rojo, rosso
BK: schwarz,
black, noir, negro, nero
BL: blau, blue, bleu, azul, blu
VT: violett,
violet, violet, violeta, violetto
Litze: Litze,
Flex, Toron, Cordón, Cavetto

100H

	d/mm
WDG 100H	25,25.4,28, 30, 38, 40, 42, 45



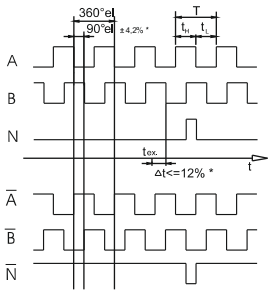




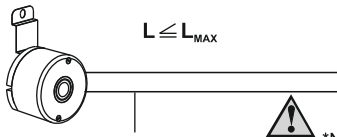
$$\frac{t_L}{T} = \frac{t_H}{T} = 50\% \pm 4{,}2\% *$$

$$360°el = \frac{360°mech}{n \text{ Imp.}}$$

alle % bezogen auf 360°el
all % refer to 360°el
tous les % se réfèrent à 360°el
todos los % se refieren a 360°el
tutta la % riferita a 360°el



	Vcc	I_{supply}	Output TTL / RS422	$I_{OUT,max}$
G05, H05, I05, R05	4,75...5,5VDC	≤70mA	V_H>2,5V_{DC} V_L<0,5V_{DC}	40mA
Bemerkungen Remarks Notas Observaciones osservazioni	*	**Ohne Last** Without load resistance Sans charge Sin carga senza carico	@20mA	**Pro Kanal** Per channel Par canal Por canal Per canale



	L_{MAX}
	100m
	150m

Abstand zu Störquellen!
Distance to sources of interference!
Distance aux source des parasites!
Distancia a las fuentes de interferencias!
Distanza dalle fonti di disturbo!

*Nur, only, seulement, solamente, soltanto G24, H24, I24, R24, 245:
hat Verpolschutz, ist kurzschlussfest;
Protection against polarity reversal, short circuit protection;
Protecion contro l´inversion de polarité, Protection court-circuit;
Protegido contra inversión de polaridad,proteccíon contra cortocircuito;
protezione contro inversione di polarità, protezione contro corto circuito

Technical Support
Germany:
Tel.: +49 (0) 67 22 / 99 65 131
Fax: +49 (0) 67 22 / 99 65 70
email: support-wdgi@wachendorff.de

Other countries, please contact your distributor.
Autres pays, veuillez contacter votre distributeur.
Otros paises, rogamos contacten a su distribuidor.
Per gli altri paesi si prega di contattare il vostro distributore.

Drehgeber WDG 100H

www.wachendorff-automation.de/wdg100h

Wachendorff Automation

... Systeme und Drehgeber

- Komplette Systeme
- Industrierobuste Drehgeber für Ihren Anwendungsfall
- Standardprogramm und Kundenversionen
- Höchste zulässige Lasten
- 48 Stunden Eilproduktion
- Fertigung in Deutschland
- Weltweites Distributoren-Netzwerk

IndustrieROBUST

Drehgeber WDG 100H

- Robuster und extrem flacher Hohlwellengeber für den Anbau an Leistungsmotoren
- Durchgehende Hohlwelle mit max. 45 mm Bohrung
- Voller Anschlussschutz bei 10 VDC bis 30 VDC
- Einfache Montage
- Hohe Schutzart IP54
- Bis zu 20.480 I/U
- Optional: -40 °C bis +80 °C, Schutzart IP55 rundum

www.wachendorff-automation.de/wdg100h

Auflösung	
Max. Impulszahl	bis 20480 I/U

Mechanische Daten	
Gehäuse	
Flanschtyp	Hohlwelle (durchgehend)
Flanschmaterial	Aluminium
Flanschmaterial Rückseite	Aluminium, beschichtet
Drehmomentstütze	inkl. 1 Drehmomentstütze WDGDS10001
- 1. Federblechausgleich	axial: ±0,8 mm, radial: ±0,2 mm
Gehäusedurchmesser	Ø 100 mm
Welle(n)	
Wellenmaterial	Edelstahl
Anlaufdrehmoment	ca. 1,5 Ncm bei Raumtemperatur
Befestigung	2 x M4, DIN 913; Anzugsdrehmoment: 2,5 Nm
Wellendurchmesser	Ø 25 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N
Wellendurchmesser	Ø 25,4 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N
Wellendurchmesser	Ø 28 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N
Wellendurchmesser	Ø 30 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N
Wellendurchmesser	Ø 32 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N
Wellendurchmesser	Ø 35 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N
Wellendurchmesser	Ø 36 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N
Wellendurchmesser	Ø 38 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N
Wellendurchmesser	Ø 40 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N
Wellendurchmesser	Ø 42 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N
Wellendurchmesser	Ø 45 mm
Wellenlänge	L: 42 mm
Max. Wellenbelastung radial	200 N
Max. Wellenbelastung axial	100 N

Lager	
Lagertyp	2 Präzisionskugellager
Lebensdauer	3 x 10'10 U bei 100 % Lagerlast 1 x 10'11 U bei 40 % Lagerlast 1 x 10'12 U bei 20 % Lagerlast
Max. Betriebsdrehzahl	3500 min'-1

Kenndaten für funktionale Sicherheit	
$MTTF_d$	200 a
Gebrauchsdauer (TM)	25 a
Lebensdauer Lager (L10h)	1 x 10'12 U bei 20 % Lagerlast und 3500 min'-1
Diagnosedeckungsgrad (DC)	0 %

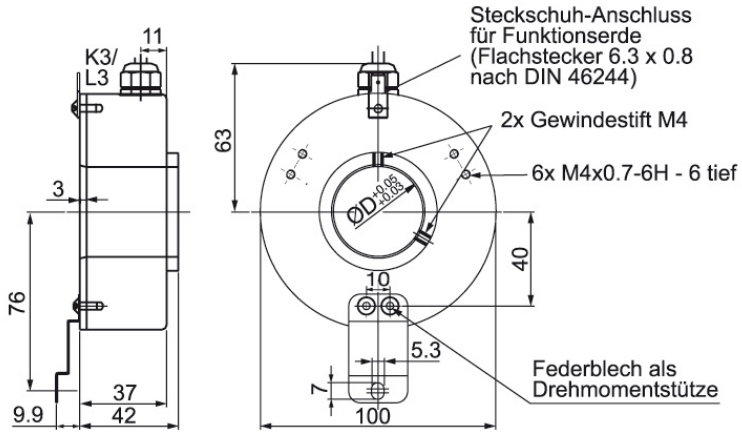
Elektrische Daten	
Betriebsspannung/ Eigenstromaufnahme	4,75 VDC bis 5,5 VDC: typ. 100 mA
Betriebsspannung/ Eigenstromaufnahme	5 VDC bis 30 VDC: typ. 70 mA
Betriebsspannung/ Eigenstromaufnahme	10 VDC bis 30 VDC: typ. 100 mA
Ausgangsschaltung	TTL TTL, RS422 kompatibel, inv. HTL HTL, inv. 1 Vss Sin/Cos
Impulsfrequenz	TTL bis 5000 I/U: max. 200 kHz HTL bis 5000 I/U: max. 200 kHz TTL über 1200 I/U: max. 2 MHz HTL über 1200 I/U: max. 600 kHz 1 Vss Sin/Cos: max. 100 kHz
Kanäle	AB ABN und invertierte Signale
Belastung	max. 40 mA / Kanal bei 1 Vss Sin/Cos: min. 120 Ohm
Anschlussschutz	nur bei H24 und R24

Genauigkeit	
Phasenversatz	90° ± max. 7,5 % einer Teilungslänge
Impuls-/Pausenverhältnis	≤5000 I/U: 50 % ± max. 7 % Ausgangsschaltungen F24, P24, F05, P05, 645: 50 % max. ±10 %

Allgemeine Daten	
Gewicht	ca. 720 g
Anschluss	radialer Kabel- oder Steckerabgang
Schutzart (EN 60529)	IP54
Arbeitstemperatur	-20 °C bis +80 °C 1 Vss: -10 °C bis +70 °C
Lagerungstemperatur	-30 °C bis +80 °C

Weitere Informationen
Allgemein technische Daten und Sicherheitshinweise **http://www.wachendorff-automation.de/atd**
Passendes Zubehör **http://www.wachendorff-automation.de/zub**

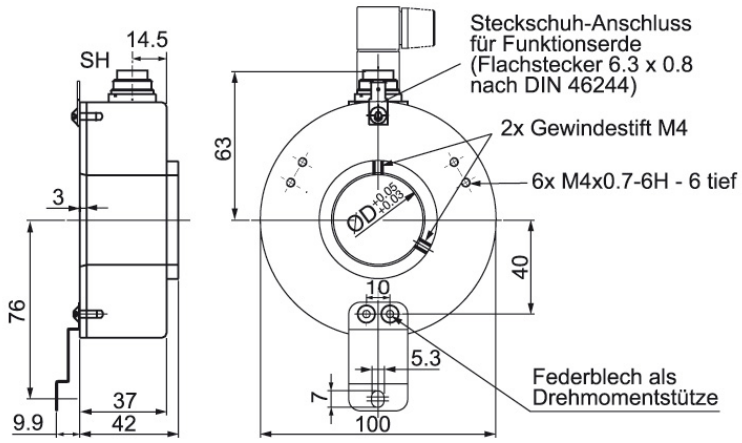
Kabelanschluss K3, L3 mit 2 m Kabel



Beschreibung		ABN inv. möglich
K3	radial, Schirm offen	•
L3	radial, Schirm mit Gebergehäuse leitend verbunden	•

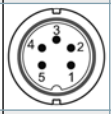
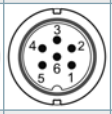
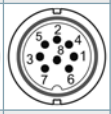
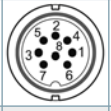
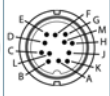
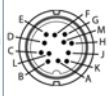
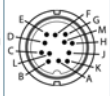
Anschlussbelegungen				
	K3, L3	**K3, L3**	**L3**	**L3**
Schaltung	F05, H05, F24, H24, H30	P05, R05, P24, R24, 245, 645, R30	SIN	SIF
GND	WH	WH	WH	WH
+UB	BN	BN	BN	BN
A	GN	GN	GN	GN
B	YE	YE	GY	GY
N	GY	GY	BK	BK
Frühwarnausgang	-	-	-	RD
A inv.	-	RD	YE	YE
B inv.	-	BK, (BU bei ACA)	PK	PK
N inv.	-	VT	VT	VT
Schirm	Litze	Litze	Litze	Litze

Stecker (M16x0,75) SH, 5-, 6-, 8-, 12-polig

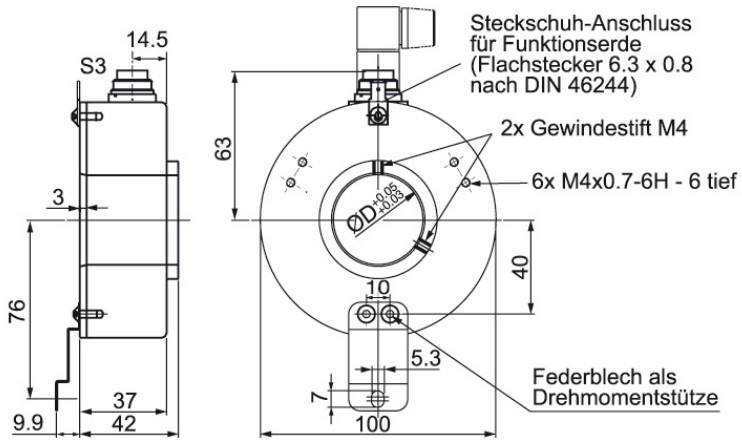


Beschreibung		ABN inv. möglich
SH5	radial, 5-polig, Stecker mit Gebergehäuse leitend verbunden	-
SH6	radial, 6-polig, Stecker mit Gebergehäuse leitend verbunden	-
SH8	radial, 8-polig, Stecker mit Gebergehäuse leitend verbunden	•
SH12	radial, 12-polig, Stecker mit Gebergehäuse leitend verbunden	•

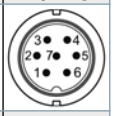
Anschlussbelegungen

	SH5	SH6	SH8	SH8	SH8	SH12	SH12	SH12
	5-polig	6-polig	8-polig	8-polig	8-polig	12-polig	12-polig	12-polig
								
Schaltung	F05, H05, F24, H24, H30	F05, H05, F24, H24, H30	F05, H05, F24, H24, H30	P05, R05, P24, R24, R30, 245, 645	SIN	P05, R05, P24, R24, 245, 645, R30	F05, H05, F24, H24, H30	SIN
GND	1	6	1	1	1	K, L	K, L	K, L
+UB	2	1	2	2	2	M, B	M, B	M, B
A	3	2	3	3	3	E	E	E
B	4	4	4	4	4	H	H	H
N	5	3	5	5	5	C	C	C
Frühwarnausgang	-	-	-	-	-	-	-	-
A inv.	-	-	-	6	6	F	-	F
B inv.	-	-	-	7	7	A	-	A
N inv.	-	-	-	8	8	D	-	D
n. c.	-	5	6, 7, 8	-	-	G, J	A, D, F, G, J	G, J
Schirm	-	-	-	-	-	-	-	-

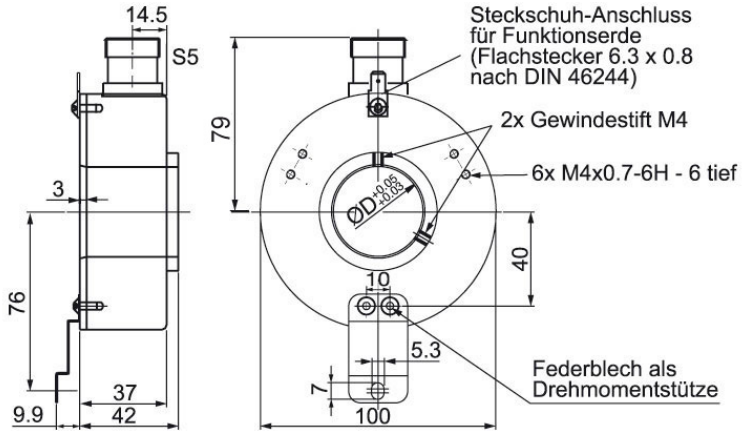
Stecker (M16x0,75) S3, 7-polig



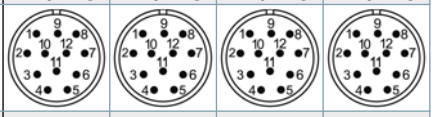
Beschreibung		ABN inv. möglich
S3	radial, 7-polig, Stecker mit Gebergehäuse leitend verbunden	-

Anschlussbelegungen	
	S3
	7-polig
	
Schaltung	F05, H05, F24, H24, H30
GND	1
+UB	2
A	3
B	4
N	5
Frühwarnausgang	-
A inv.	-
B inv.	-
N inv.	-
n. c.	6, 7
Schirm	-

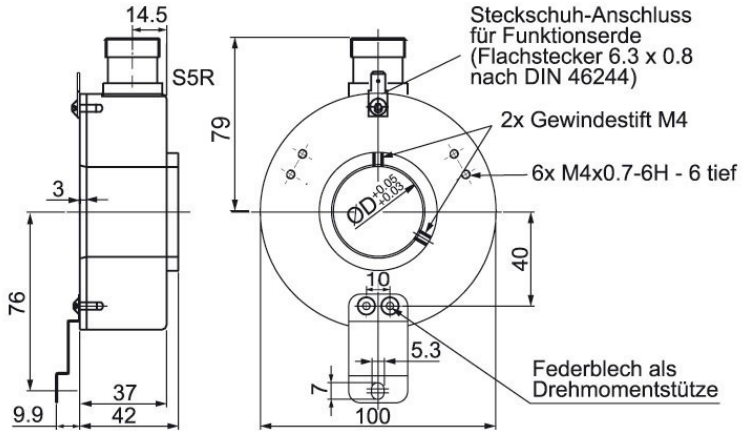
Stecker (M23) S5, 12-polig



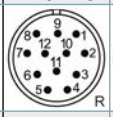
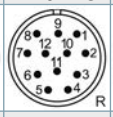
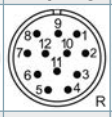
Beschreibung		ABN inv. möglich
S5	radial, 12-polig, Stecker mit Gebergehäuse leitend verbunden	•

Anschlussbelegungen				
	S5	**S5**	**S5**	**S5**
	12-polig	**12-polig**	**12-polig**	**12-polig**
				
Schaltung	F05, H05, F24, H24, H30	P05, R05, P24, R24, 245, 645, R30	SIN	SIF
GND	10	10	10	10
+UB	12	12	12	12
A	5	5	5	5
B	8	8	8	8
N	3	3	3	3
Frühwarnausgang	-	-	-	7
A inv.	-	6	6	6
B inv.	-	1	1	1
N inv.	-	4	4	4
n. c.	1, 2, 4, 6, 7, 9, 11	2, 7, 9, 11	2, 7, 9, 11	2, 9, 11
Schirm	-	-	-	-

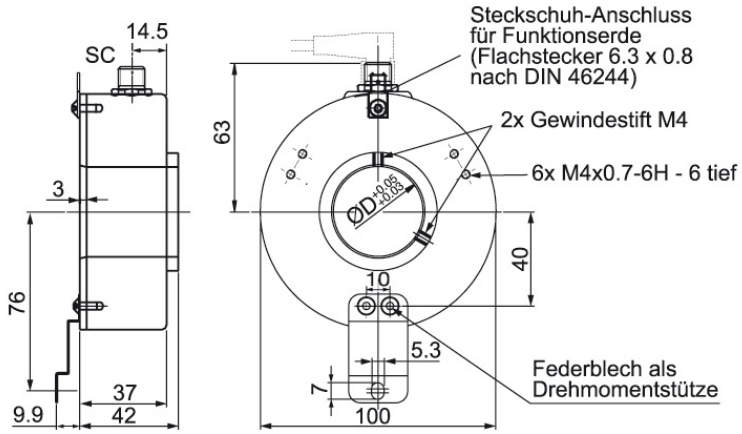
Stecker (M23) S5R, 12-polig (rechtsdrehend)



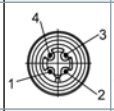
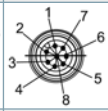
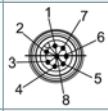
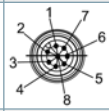
Beschreibung		ABN inv. möglich
S5R	radial, 12-polig, Stecker mit Gebergehäuse leitend verbunden	•

Anschlussbelegungen				
	S5R	**S5R**	**S5R**	**S5R**
	12-polig	**12-polig**	**12-polig**	**12-polig**
				
Schaltung	F05, H05, F24, H24, H30	P05, R05, P24, R24, 245, 645, R30	SIN	SIF
GND	10	10	10	10
+UB	12	12	12	12
A	5	5	5	5
B	8	8	8	8
N	3	3	3	3
Frühwarnausgang	-	-	-	7
A inv.	-	6	6	6
B inv.	-	1	1	1
N inv.	-	4	4	4
n. c.	1, 2, 4, 6, 7, 9, 11	2, 7, 9, 11	2, 7, 9, 11	2, 9, 11
Schirm	-	-	-	-

Sensor-Stecker (M12x1) SC, 4-, 5-, 8-polig



Beschreibung		ABN inv. möglich
SC4	radial, 4-polig, Stecker mit Gebergehäuse leitend verbunden	-
SC5	radial, 5-polig, Stecker mit Gebergehäuse leitend verbunden	-
SC8	radial, 8-polig, Stecker mit Gebergehäuse leitend verbunden	•

Anschlussbelegungen					
	SC4	**SC5**	**SC8**	**SC8**	**SC8**
	4-polig	**5-polig**	**8-polig**	**8-polig**	**8-polig**
					
Schaltung	F05, H05, F24, H24, H30	F05, H05, F24, H24, H30	F05, H05, F24, H24, H30	P05, R05, P24, R24, R30, 245, 645	SIN
GND	3	3	1	1	1
+UB	1	1	2	2	2
A	2	4	3	3	3
B	4	2	4	4	5
N	-	5	5	5	7
Frühwarnausgang	-	-	-	-	-
A inv.	-	-	-	6	4
B inv.	-	-	-	7	6
N inv.	-	-	-	8	8
n. c.	-	-	6, 7, 8	-	-
Schirm	-	-	-	-	-

Optionen

Niedrig Temperatur	Bestell-Code
Der Drehgeber WDG 100H mit den Ausgangsschaltungen F24, H24, P24, R24, F05, H05, P05, R05, 245, 645 ist auch mit dem erweiterten Temperaturbereich -40 °C bis +80 °C (gemessen am Flansch) lieferbar.	**ACA**

IP55 rundum (nicht bei 1 Vss Sin/Cos)	Bestell-Code
Der Drehgeber WDG 100H ist auch mit der hohen Schutzart IP55 rundum lieferbar. Max. Betriebsdrehzahl: 1500 min'-1 Zulässige Wellenbelastung, axial: 100 N Zulässige Wellenbelastung, radial: 120 N Max. Impulszahl: 5000 I/U Anlaufdrehmoment: ca. 5 Ncm bei Raumtemperatur	**ACP**

Kabellänge	Bestell-Code
Der Drehgeber WDG 100H ist auch mit mehr als 2 m Kabel erhältlich. Die max. Kabellänge ist abhängig von der Betriebsspannung und der Frequenz; siehe www.wachendorff-automation.de/atd Bei der Bestellung ergänzen Sie bitte die Bestellnummer mit einer 3-stelligen Ziffer welche die Länge in Dezimeter angibt. Beispiel: 5 m Kabellänge = 050	**XXX = Dezimeter**

Beispl. Bestell-Nr.	Typ	Ihr Drehgeber
WDG 100H	WDG 100H	WDG 100H

	Hohlwellendurchmesser	
25	25; 1Z=Ø 25,4 mm,Ø 1"; 28; 30; 32; 35; 36; 38; 40; 42; 45	

	Impulszahlen:	
1024	512, 1024, 2048, 2500, 3600, 4096, 4500, 5000, 8192, 10240, 16384, 20480 1 Vss Sin/Cos nur bei 1024, 2048 Andere Impulszahlen auf Anfrage	

	Impulsfolge:	
ABN	AB, ABN	

	Ausgangsschaltung					
	Auflösung I/U	**Betriebs-spannung VDC**	**Ausgangsschaltung**	**Frühwarn-ausgang**	**Bestellschlüssel**	
H24	bis 2500	5 - 30	HTL	-	H30	
		5 - 30	HTL invertiert	-	R30	
	bis 5000	4,75 - 5,5	TTL	-	H05	
		4,75 - 5,5	TTL, RS422 komp., invertiert	-	R05	
		10 - 30	HTL	-	H24	
		10 - 30	HTL invertiert	-	R24	
		10 - 30	TTL, RS422 komp., invertiert	-	245	
	8192 bis 20480	4,75 - 5,5	TTL	-	F05	
		4,75 - 5,5	TTL, RS422 komp., invertiert	-	P05	
		10 - 30	HTL	-	F24	
		10 - 30	HTL invertiert	-	P24	
		10 - 30	TTL, RS422 komp., invertiert	-	645	
	1024, 2048	4,75 - 5,5	1 Vss Sin/Cos	•	SIF	
		4,75 - 5,5	1 Vss Sin/Cos	-	SIN	

	Elektrischer Anschluss			
	Beschreibung	**ABN inv. mögl.**	**Bestellschlüssel**	
K3	**Kabel: Länge (2 m Standard, WDG 58T: 1 m)**			
	radial, Schirm offen	•	K3	
	radial, Schirm mit Gebergehäuse leitend verbunden	•	L3	
	Stecker: (Stecker mit Gebergehäuse leitend verbunden)			
	Stecker, M16x0,75, 5-polig, radial	-	SH5	
	Stecker, M16x0,75, 6-polig, radial	-	SH6	
	Stecker, M16x0,75, 8-polig, radial	•	SH8	
	Stecker, M16x0,75, 12-polig, radial	•	SH12	
	Stecker, M16x0,75, 7-polig, radial	-	S3	
	Stecker, M23, 12-polig, radial	•	S5	
	Stecker, rechtsdrehend, M23, 12-polig, radial	•	S5R	
	Sensorstecker, M12x1, 4-polig, radial	-	SC4	
	Sensorstecker, M12x1, 5-polig, radial	-	SC5	
	Sensorstecker, M12x1, 8-polig, radial	•	SC8	

	Optionen		
	Beschreibung	**Bestellschlüssel**	
	Keine Option gewählt	Leer	
	Niedrig Temperatur	ACA	
	IP55	ACP	
	Kabellänge	XXX = Dezimeter	

Bsp-Bestell-Nr.=	WDG 100H	25	1024	ABN	H24	K3		WDG 100H							Ihr Drehgeber

Ansprechpartner

Für technische Fragen
(Anwendungsberatung, Anpassungsentwicklung, inkrementale Drehgeberauswahl)
wenden Sie sich bitte an:

Technische Anwendungsberatung inkrementale Drehgeber
Thomas Post
Tel: +49 6722 9965131
Fax: +49 6722 996570
E-Mail: support-wdgi@wachendorff.de

Für kaufmännische Fragen und Angebote
wenden Sie sich bitte an:

Vertriebsinnendienst
Tatjana Weigelt
Tel: +49 6722 9965242
Fax: +49 6722 996570
E-Mail: sales-wa@wachendorff.de

Im deutschsprachigen Ausland
wenden Sie sich bitte an:

Ihren Distributor

https://www.wachendorff-automation.de/distributoren.html

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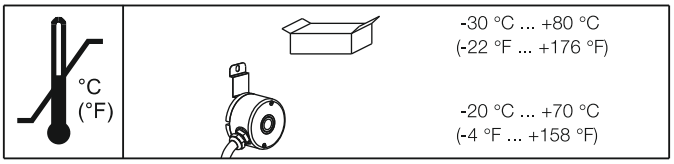
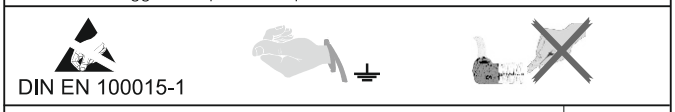
WDG100H-xx-yyyy-ABN-R05-L3-CTF-zzz

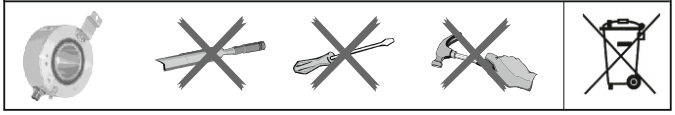
xx = Ø = 25, 28, 38, 42, 45mm
yyyy = PPR, 1024, 2048, 4096
zzz = 100= 10m, 050 = 5m, 200 = 20m, blank = 2m

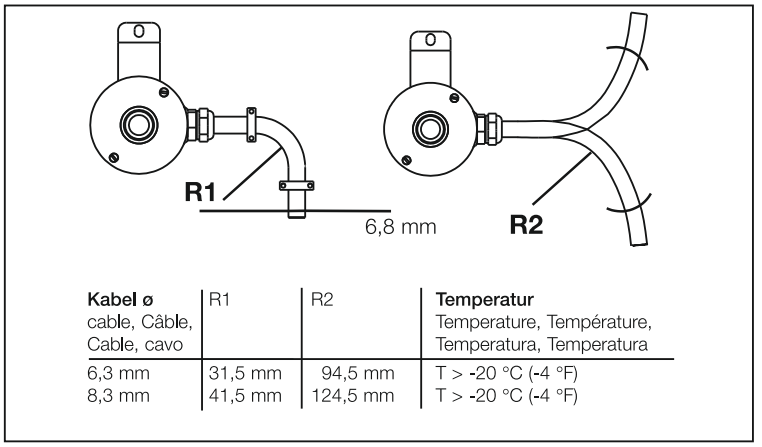
Montageanleitung Hohlwellengeber,

Assembly instructions hollowshaft encoder, Notice de montage codeur rotatif à arbre creux,
Instrucciones de montaje encoder ad albero cavo, istruzioni di montaggio encoders de eje hueco

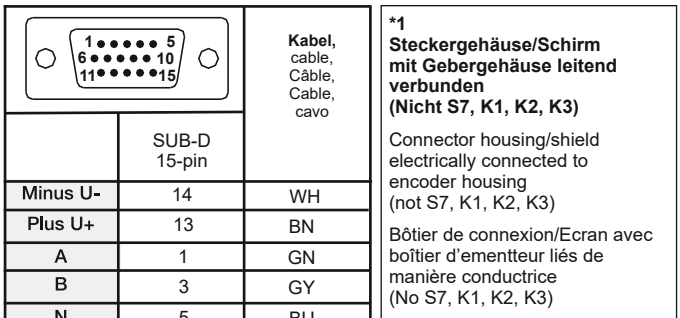








Kabel ø cable, Câble, Cable, cavo	R1	R2	Temperatur Temperature, Température, Temperatura, Temperatura
6,3 mm	31,5 mm	94,5 mm	T > -20 °C (-4 °F)
8,3 mm	41,5 mm	124,5 mm	T > -20 °C (-4 °F)



	SUB-D 15-pin	Kabel, cable, Câble, Cable, cavo
Minus U-	14	WH
Plus U+	13	BN
A	1	GN
B	3	GY
N	5	BU
A inv.	2	YE
B inv.	4	PK
N inv.	6	RD
n. c.	7, 8, 9, 10, 11, 12, 15	-
Schirm *1 Shield Ecran Pantalla Schermo		Litze, Flex, Toron, Cordón, Cavetto

Zubehör
Accessories, Accessoires, Accesorios, Accessori

-

***1**
Steckergehäuse/Schirm mit Gebergehäuse leitend verbunden (Nicht S7, K1, K2, K3)

Connector housing/shield electrically connected to encoder housing (not S7, K1, K2, K3)

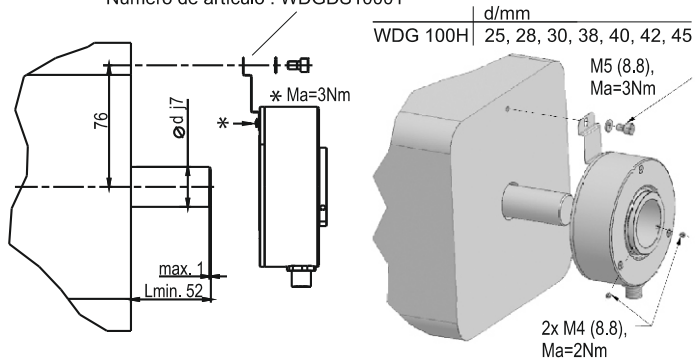
Bôtier de connexion/Ecran avec boîtier d'ementteur liés de manière conductrice (No S7, K1, K2, K3)

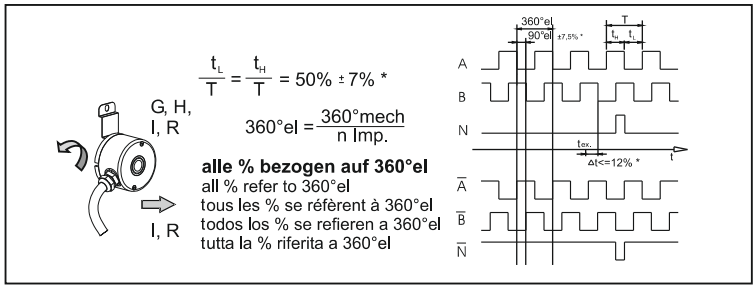
Caja de conector/Pantalls conectada en conductancia com caja de transmisor (No S7, K1, K2, K3)

scatola prese/Schemo con scatola transmettitore collegata da condure (No S7, K1, K2, K3)

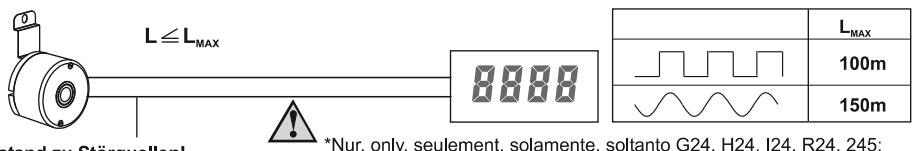
WH: weiss, white, blanc, blanco, bianco
BN: braun, brown, brun, marrón, marrone
GN: grün, green, vert, verde, verde
YE: gelb, yellow, jaune, amarillo, giallo
GY: grau, grey, gris, gris, grigio
PK: rosa, pink, rose, rosa, rosa
RD: rot, red, rouge, rojo, rosso
BK: schwarz, black, noir, negro, nero
BU: blau, blue, bleu, azul, blu
VT: violett, violet, violet, violeta, violetto
Litze: Litze, Flex, Toron, Cordón, Cavetto

100H **Artikelnr.,** Item number, Numéro d'article, Número de artículo : WDGDS10001





	Vcc	I_{supply}	Output TTL / RS422	$I_{OUT,max}$
G05, H05, I05, R05	4,75...5,5VDC	≤70mA	V_H>2,5V_{DC} V_L<0,5V_{DC}	40mA
Bemerkungen Remarks Notas Observaciones osservazioni	*	**Ohne Last** Without load resistance Sans charge Sin carga senza carico	@20mA	**Pro Kanal** Per channel Par canal Por canal Per canale



Abstand zu Störquellen!
Distance to sources of interference!
Distance aux source des parasites!
Distancia a las fuentes de interferencias!
Distanza dalle fonti di disturbo!

*Nur, only, seulement, solamente, soltanto G24, H24, I24, R24, 245: hat Verpolschutz, ist kurzschlussfest;
Protection against polarity reversal, short circuit protection;
Protecion contro l´inversion de polarité, Protection court-circuit;
Protegido contra inversión de polaridad,proteccíon contra cortocircuito;
protezione contro inversione di polarità, protezione contro corto circuito

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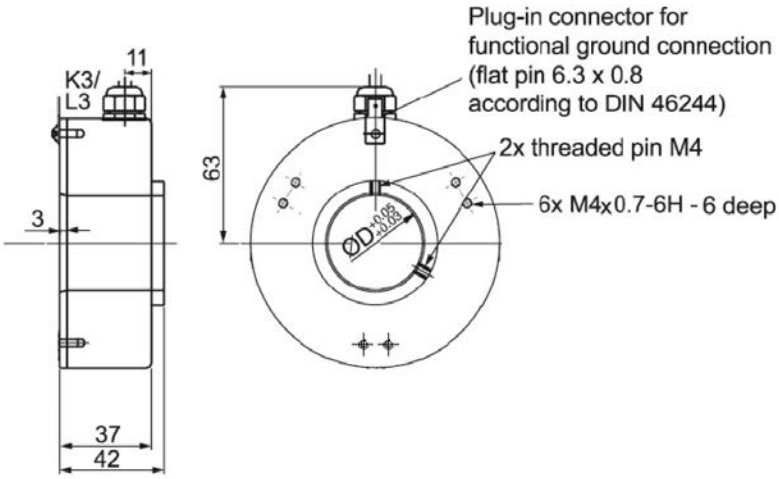
Other countries, please contact your distributor.
Autres pays, veuillez contacter votre distributeur.
Otros paises, rogamos contacten a su distribuidor.
Per gli altri paesi si prega di contattare il vostro distributore.

Encoder WDG 100H-38-2048-ABN-245-L3-AJE-030

Resolution	
Pulses per revolution PPR	2048 ppr
Mechanical Data	
Housing	
Flange	hollow shaft (through-bored)
Flange material	aluminum
Housing cap	aluminum, powder coated
Torque supports	without torque support
Housing	Ø 100 mm
Shaft(s)	
Shaft material	stainless steel
Starting torque	approx. 1.5 Ncm at ambient temperature
Fixing	2 x M4, DIN 913; Starting torque: 2,5 Nm
Shaft	Ø 38 mm
Shaft length	L: 42 mm
Max. Permissible shaft loading radial	200 N
Max. Permissible shaft loading axial	100 N
Bearings	
Bearings type	2 precision ball bearings
Nominale service life	3 x 10'10 revs. at 100 % rated shaft load 1 x 10'11 revs. at 40 % rated shaft load 1 x 10'12 revs. at 20 % rated shaft load
Max. operating speed	3500 rpm
Machinery Directive: basic data safety integrity level	
$MTTF_d$	200 a
Mission time (TM)	25 a
Nominale service life (L10h)	1 x 10'12 revs. at 20 % rated shaft load and 3500 rpm
Diagnostic coverage (DC)	0 %
Electrical Data	
Power supply VDC	10 - 30 VDC
Current consumption	typ. 70 mA
Signal shape	square-wave
Output circuit	TTL, RS422 comp., inverted
Channels	ABN
Output	push-pull
Load	max. 40 mA / channel
Signal level mA	at 20 mA
Signal level H>	H > 2.5 VDC
Signal level L<	L < 1.2 VDC
Output frequency	max. 200 kHz
Circuit protection	inverse-polarity protection only
Light reserve warning	no
General Data	
Weight	approx. 720 g
Connections	cable, radial
Protection rating (EN 60529)	IP55
Operating temperature	-20 °C up to +80 °C
Storage temperature	-30 °C up to +80 °C

More Information
General technical data and safety instructions **http://www.wachendorff-automation.com/gtd**
Options **http://www.wachendorff-automation.com/acc**

Cable connection K3, L3 with 20 dm cable



Description		ABN inv. poss.
L3	radial, shield connected to encoder housing	•

Assignments	
	L3
Circuit	245
GND	WH
(+) Vcc	BN
A	GN
B	YE
N	GY
Light reserve warning	-
A inv.	RD
B inv.	BK
N inv.	VT
Shield	flex

Example Order No.	Type					Your encoder
WDG 100H	WDG 100H					WDG 100H
	Bore size					
38	38					38
	Pulses per revolution PPR:					
2048	2048					2048
	Channels:					
ABN	ABN					ABN
	Output circuit					
245	**Resolution PPR**	**Power supply VDC**	**Output circuit**	**Light reserve warning**	**Order key**	245
	up to 5000	10 - 30	TTL, RS422 comp., inverted	-	245	
	Electrical connections					
L3	**Description**			**ABN inv. poss.**	**Order key**	L3
	Cable: length (2 m standard, WDG 58T: 1 m)					
	radial, shield connected to encoder housing			•	L3	
	Options					
AJE-xxx	IP55, with ferrules, without torque support,			**Order key**		AJE-xxx
	xxx= cable length in dm (without xxx= 20 dm)			AJE		

Example Order No.=	WDG 100H	38	2048	ABN	245	L3	AJE

WDG 100H	38	2048	ABN	245	L3	AJE	Your encoder

Authorized Distributor

For further information please contact our local distributor.
Here you find a list of our distributors worldwide.
https://www.wachendorff-automation.com/

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09/2023