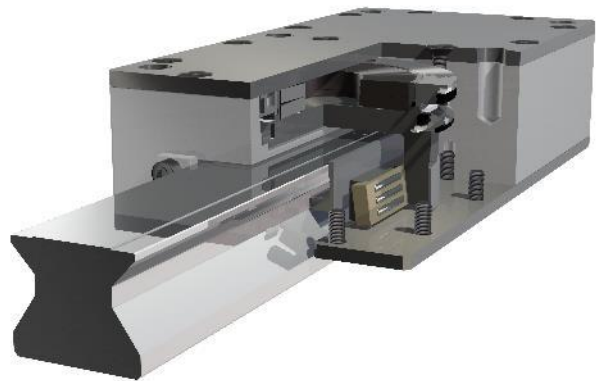


Safety brake for profiled rail guides

ROBA[®]-guidestop
Type 384_.0 _ 0 _ _
Sizes 35 – 65

Issue status 2017-09



Translation of the Original Operational Instructions

B.384.DE

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Operational Instructions for ROBA®-guidestop Type 384_0_0_ _ Profiled rail brake Size 35 - 65

(B.384.EN)

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Please read these Operational Instructions carefully and follow them accordingly!

Ignoring these Instructions may lead to malfunctions or to brake failure, resulting in damage to other parts. These Operational Instructions are part of the brake delivery.
Please keep them handy and near to the brake at all times.





1 General Guidelines

1.1 Definition of Terms

Term	Meaning
ROBA®-guidestop	Hydraulically-actuated safety brakes as components for holding and decelerating of moved machine parts.
Nominal holding force F	The theoretical nominal holding force assigned to the designation. The nominal holding force lies within the stated nominal holding force tolerances.
Load mass	Designation of the weight, which must be held by the brake.

2 Safety

2.1 Safety and Guideline Signs

Symbol	Signal word	Meaning
	DANGER	Designates a directly pending danger. If not avoided, death or severe injuries will be the consequence.
	WARNING	Designates a possibly hazardous situation. If not avoided, death or severe injuries will be the consequence.
	CAUTION	Designates a hazardous situation. If not avoided, slight or minor injuries can be the consequence.
	ATTENTION	Possible property damage can be the consequence.
	Please Observe	Designates tips for application and other particularly useful information. Not a signal word for dangerous or damaging situations.

2.2 General Guidelines

Brakes may generate further risks, among other things:



- ☐ Technical data and specifications (Type tags and documentation) must be followed. General Guideline:

General Guideline:

During the risk assessment required when designing the machine or system, the dangers involved must be evaluated and removed by taking appropriate protective measures in accordance with the Machinery Directive 2006/42/EC.

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

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

Brakes for safety-related applications are to be installed singly or as redundant devices in accordance with the required category, in order to fulfil the required Performance Level (PL_r) acc. EN ISO 13849. This is in principle the task of the system manufacturer.

2.2.1 Personnel Requirements

To prevent injury or damage, only professionals and specialists are allowed to work on the components.

They must be familiar with the dimensioning, transport, installation, 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 hydraulic brakes accord with the known technical specifications and are operationally safe at the time of delivery.

2.3 Intended Use

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

ROBA®-guidestop brakes by mayr® are used for holding and deceleration of profiled rails.

ROBA®-guidestop brakes by mayr® prevent inadvertent dropping or crashing of gravity-loaded axes.

- ☐ Not suitable for operation in areas where there is a danger of explosion

2.4 Handling

Before installation, the brake must be inspected and found to be in proper condition (visual inspection). The following are not considered as being representative of a proper condition:

- ☐ External damage
- ☐ External oiling
- ☐ Outer contamination

The brake function must be inspected both **once attachment has taken place** as well as **after longer system downtimes**.

2.5 User-implemented Protective Measures

- ☐ Please cover moving parts to protect **against injury through seizure**.
- ☐ Install additional protective measures **against corrosion** if the brake is subject to extreme ambient conditions or is installed in open air conditions, unprotected from the weather.

2.6 Dimensioning Other Machine Elements



The effects of the maximum and minimum braking force on the other machine components must be observed in order to provide sufficient dimensioning. The ROBA®-guidestop has (at room temperature) a maximum braking force of 2.5 x brake nominal holding force and a minimum braking force of 1 x brake nominal holding force.

If other brakes are positioned behind the ROBA®-guidestop, and if the braking times of the different brakes overlap, the loads will add up.

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3 Legal Provisions

3.1 Standards, Directives and Regulations Used

(also to be observed during installation and operation)

EN ISO 4413	General rules and safety requirements for hydraulic systems and their components
EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN ISO 13849-1	Safety of machinery – Safety related parts of control systems

3.2 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.

3.4 Guidelines



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 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.

3.3 Guarantee

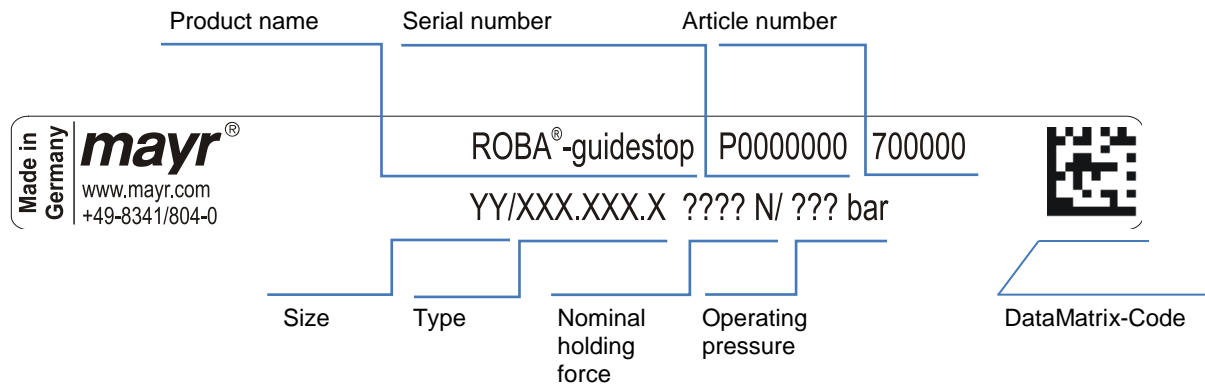
- ☐ The guarantee conditions correspond with the Chr. Mayr GmbH + Co. KG sales and delivery conditions (www.mayr.com → Service → General Terms and Conditions)
- ☐ Mistakes or deficiencies are to be reported to *mayr*® at once!

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3.5 Identification/ Type tag

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



Serial number

Year	Code	Year	Code
2000	A	2011	N
2001	B	2012	P
2002	C	2013	R
2003	D	2014	S
2004	E	2015	T
2005	F	2016	U
2006	H	2017	V
2007	J	2018	W
2008	K	2019	X
2009	L	2020	A
2010	M		

3.5.1 Order Number

Standard				Rail manufacturer				Rail type			
Short design				INA A				0 see Table			
				BOSCH B				1			
				Schneeberger C				2			
				HIWIN D				0			
				THK E				1			
				Rollon F							
				NSK G							
				NTN-SNR H							
				IKO J							
				SKF M							
3				8				0			
4											
Clamping unit				0							
Options				0 Standard (Basic Type)							
				1 with switching condition monitoring							
				2 with wiper							
				3 with switching condition monitoring and wiper							

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4 Product Description

4.1 Scope of Delivery / State of Delivery

- ☐ ROBA®-guidestop brake are manufacturer-assembled and ready for installation.
- ☐ The ROBA®-guidestop is set to the nominal holding force stipulated in the order.
- ☐ Please observe the Type tag.
- ☐ Please check the state of delivery immediately! *mayr*® will take no responsibility for belated complaints. Please report transport damage immediately to the supplier. Please report incomplete delivery and obvious defects immediately to the manufacturer.

ATTENTION

The brake could be damaged

Removal of the transportation lock (10) in de-pressurised condition of the brake leads to damage

Remove the transportation lock (10) (red screw head) only in pressurized condition.

Caution



Please observe the own weight of the brake

The brake may drop during lifting / transport.

The consequences may be crush injuries and impact injuries.

4.2 Function

The spring-loaded, enclosed **ROBA®-guidestop**, which can be opened hydraulically, clamps a profiled rail steplessly and backlash-free.



Please Observe!

The maximum clamping force can only be reached when the brake is pressureless.

Due to the spring-loaded system, the fail-safe principle can be guaranteed, the **ROBA®-guidestop** works as a **safety brake**.

The required operating pressure is stated on the Type tag.



Please Observe!

In case the operating pressure is too low, the brake cannot be pressurized (opened) correctly.

- ☐ Through pressurization of the **ROBA®-guidestop** with the required operating pressure, the clamping element of the brake is pressed against the cup spring. The profiled rail can be moved (Illustration 1).

- ☐ By pressure release the **ROBA®-guidestop**, the cup spring has an effect on the clamping element of the brake. The profiled rail is clamped (Fig. 2).

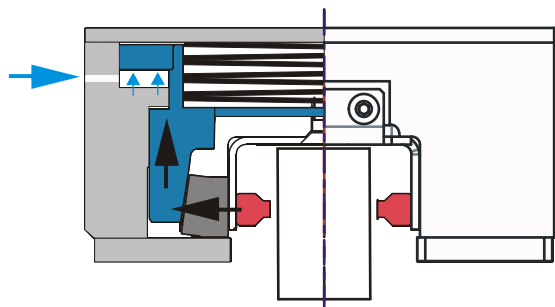


Illustration 1 Moveable profiled rail on pressurization

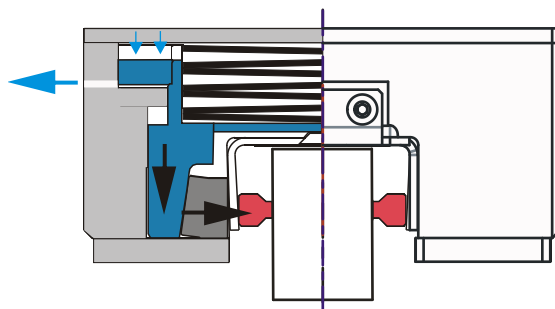


Illustration 2 Clamped profiled rail on pressure release

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4.3 Views

Type 3840_ _ 0 _ _ Standard

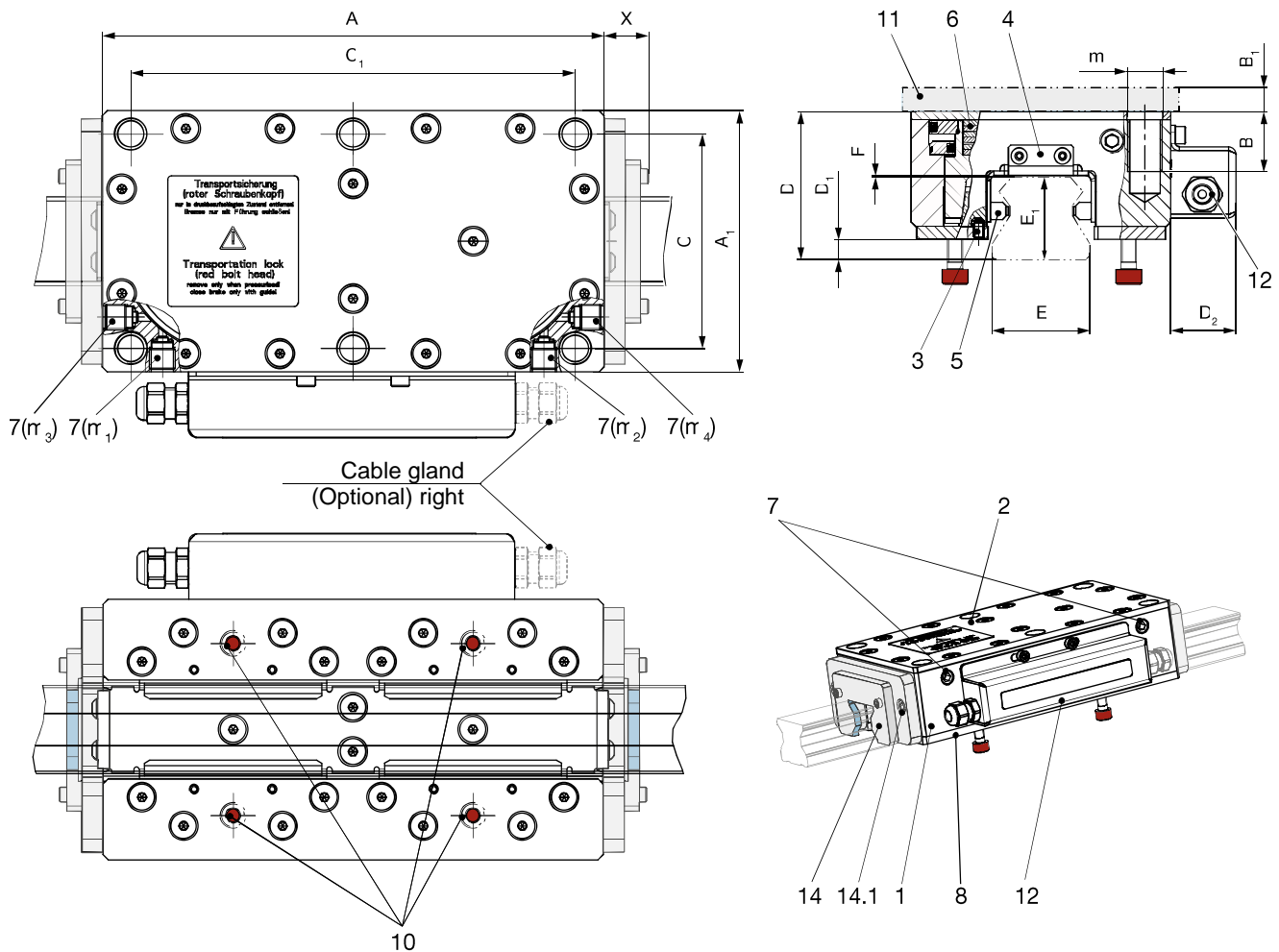


Fig. 1

Operational Instructions for ROBA®-guidestop Type 384_.0 _ 0 _ _ Profiled rail brake Size 35 - 65

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Type 3841._.0 _._ short design

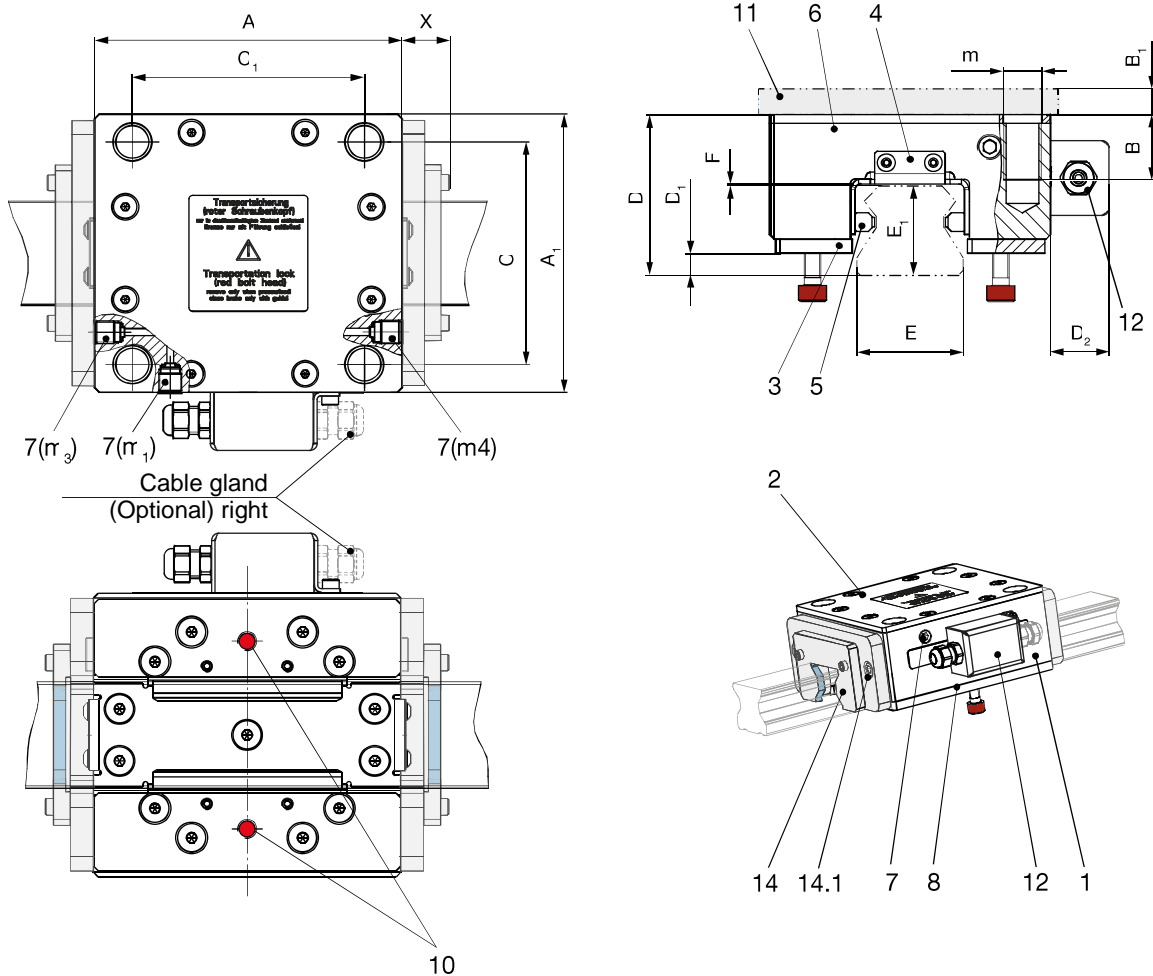


Fig. 2

4.4 Parts List

(Only use *mayr*® original parts)

Item	Name
1	Cylinder housing
2	Cylinder cover
3	Ball point screw
4	Carrier plate
5	Brake shoe
6	Cup springs
7	Hydraulic connection
8	Sealing cover
9	Screw plug hydraulic connection (7) (not depicted)
10	Transportation lock
11	Mounting flange customer-side
12	Switching condition monitoring (option dependent on Type)

Item	Name
12.1	Proximity switch
12.2	Hexagon nut
12.3	Cover plate
12.4	Cap screws
12.5	Cable gland
13	Type tag (not depicted)
14	Wiper (optional)
14.1	Fixing screws wiper

5 Technical Data

5.1 Guidelines

5.1.1 Application Conditions



The stated 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, permitted friction work and braking distances as well as general ambient conditions can all affect the given values.

- ☐ 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 surfaces of the outer components have been phosphated manufacturer-side to form a basic corrosion protection.
- ☐ The provision of the required operating pressure must be guaranteed.

5.1.2 Ambient Temperature

–10 °C up to +60 °C

The Technical Data refers to the stated temperature range.

5.1.3 Protection

(mechanical) IP44: In installed condition, protected against solid foreign bodies >1 mm in diameter as well as protected against water spray from all directions.

5.1.4 Noise Emissions

Normally no noise development

5.1.5 Installation Position

The ROBA®-guidestop can be operated in any installation position.

5.1.6 Pre-requisites for Product Application

Compare the limit values stated in these operational instructions with the actual application, e.g.

- ☐ Pressure
- ☐ Clamping forces
- ☐ Braking distance
- ☐ Masses
- ☐ Temperatures etc.
- ☐ Pressure medium

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5.2 Technical Data

5.2.1 Type 3840.0_0_ _ standard

Technical Data			Sizes			
			35	45	55	65
Nominal holding force F		[N]	10000	15000	20000	34000
Weight		[kg]	6	9	16	27
Operating pressure	min.	[bar]	70	70	70	75
	max.	[bar]	90	90	90	90
Rigidity		[N/μm]	380	490	860	1000
Maximum sliding speed		[m/s]	2			
Hydraulic connection m ₁	Tightening torque	[Nm]	12			
	Thread		1/8"			
Pressure medium			Use hydraulic oil acc. DIN 51524-1:2006-04			
Absorption volume		[cm ³]	14	21	34	48
Ambient temperature		[°C]	-10 to +60			
Proximity switch Hexagon nut Item 12.2	Tightening torque	[Nm]	2			
	Thread		M5			

Dimensions [mm]	Sizes			
	35	45	55	65
A	192	225	270	325
A1	100	120	140	170
B	21.7	27.7	35.7	43
B1	10	15	25	35
C	82	96	110	134
C1	170	196	240	288
D2	25	25	25	25
E	34	45	53	63
m	6 x M12	6 x M16	6 x M20	6 x M24
X	Dimension depends on the rail manufacturer			

Dimensions [mm]			Sizes															
Rail manufacturer		Rail type	35				45				55				65			
			E1	D	D1	F	E1	D	D1	F	E1	D	D1	F	E1	D	D1	F
INA	A	0 TSX-E	30	57	6.3	1	38	68.5	9.5	1	45	83.8	11.5	1	53.8	97.5	10.8	1
		1 TKSD	29.7	56.7	6.0	1	37.2	67.7	8.7	1	not available				not available			
		2 TKVD	27	56	5.3	3	34.2	67.2	8.2	3.5	41.5	85.0	12.7	5.7	not available			
Bosch	B	0 R1805/6/7, R1845/6/7	30.8	57.8	7.1	1	38.8	69.3	10.3	1	47.6	86.4	14.1	1	57.9	101.6	14.9	1
		1 R1605/6/7, R1645/7, R2045/7	31.9	58.9	8.2	1	39.9	70.3	11.3	1	47.9	86.7	14.4	1	59.9	103.5	16.8	1
Schneeberger	C	0 MR	32.0	59	8.2	1	40	70.5	11.5	1	48	86.8	14.5	1	58	101.7	15	1
HIWIN	D	0 RG	30.2	57.2	6.5	1	38	68.5	9.5	1	44	82.8	10.5	1	53	96.7	10	1
		1 HG	29	56.0	5.3	1	not available				not available				not available			
THK	E	0 SRG	30	57	6.3	1	37	69	10	2.5	43	81.8	9.5	1	54	99.2	12.5	2.5
		1 SHS	26	54.5	3.8	2.5	32	66	7	4.5	38	78	5.7	2.2	53	96.7	10	1
Rollon	F	0 MR	29	55.5	5.5	1	38	68.5	9.5	1	38	78.8	6.5	3	not available			
NSK	G	0 RA	31	58	7.3	1	38	68.5	9.5	1	43.5	83.5	11.2	2.2	55	100.2	13.2	2.5
NTN-SNR	H	0 BG	26	54.5	3.8	2.5	31.1	65	6	4.4	38	78	5.7	2.2	not available			
IKO	J	0 LRX/MX	32	59	8.3	1	38	68.5	9.5	1	43	81.8	9.5	1	56	99.7	13	1
SKF	M	0 LLU	32	59	8.3	1	39.8	70.3	11.3	1	47.8	86.6	14.3	1	55	99.8	13	2
		1 LLR	31.8	58.8	8.1	1	39.8	70.3	11.3	1	not available				not available			

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5.2.2 Type 3841.0_0_ _ short design

Technical Data			Sizes			
			35	45	55	65
Nominal holding force F		[N]	5000	7500	10000	17000
Weight		[kg]	3.5	5.5	9	16
Operating pressure	min.	[bar]	70	70	70	75
	max.	[bar]	90	90	90	90
Rigidity		[N/μm]	380	490	860	1000
Maximum sliding speed		[m/s]	2			
Hydraulic connection m ₁	Tightening torque	[Nm]	12			
	Thread		1/8"			
Pressure medium			Use hydraulic oil acc. DIN 51524-1:2006-04			
Absorption volume		[cm ³]	7	10.5	17	24
Ambient temperature		[°C]	-10 to +60			
Proximity switch Hexagon nut Item 12.2	Tightening torque	[Nm]	2			
	Thread		M5			

Dimensions [mm]	Sizes			
	35	45	55	65
A	115	130	155	190
A1	100	120	140	170
B	21.7	27.7	35.7	43
B1	10	15	25	35
C	82	96	110	134
C1	92	98	125	152
D2	25	25	25	25
E	34	45	53	63
m	4 x M12	4 x M16	4 x M20	4 x M24
X	Dimension depends on the rail manufacturer			

Dimensions [mm]		Sizes															
Rail manufac- turer	Rail type	35				45				55				65			
		E1	D	D1	F	E1	D	D1	F	E1	D	D1	F	E1	D	D1	F
INA	A 0 TSX-E	30	57	6.3	1	38	68.5	9.5	1	45	83.8	11.5	1	53.8	97.5	10.8	1
	A 1 TKSD	29.7	56.7	6.0	1	37.2	67.7	8.7	1	not available				not available			
	A 2 TKVD	27	56	5.3	3	34.2	67.2	8.2	3.5	41.5	85.0	12.7	5.7	not available			
Bosch	B 0 R1805/6/7, R1845/6/7	30.8	57.8	7.1	1	38.8	69.3	10.3	1	47.6	86.4	14.1	1	57.9	101.6	14.9	1
	B 1 R1605/6/7, R1645/7, R2045/7	31.9	58.9	8.2	1	39.9	70.3	11.3	1	47.9	86.7	14.4	1	59.9	103.5	16.8	1
Schneeberger	C 0 MR	32.0	59	8.2	1	40	70.5	11.5	1	48	86.8	14.5	1	58	101.7	15	1
HIWIN	D 0 RG	30.2	57.2	6.5	1	38	68.5	9.5	1	44	82.8	10.5	1	53	96.7	10	1
	D 1 HG	29	56.0	5.3	1	not available				not available				not available			
THK	E 0 SRG	30	57	6.3	1	37	69	10	2.5	43	81.8	9.5	1	54	99.2	12.5	2.5
	E 1 SHS	26	54.5	3.8	2.5	32	66	7	4.5	38	78	5.7	2.2	53	96.7	10	1
Rollon	F 0 MR	29	55.5	5.5	1	38	68.5	9.5	1	38	78.8	6.5	3	not available			
NSK	G 0 RA	31	58	7.3	1	38	68.5	9.5	1	43.5	83.5	11.2	2.2	55	100.2	13.2	2.5
NTN-SNR	H 0 BG	26	54.5	3.8	2.5	31.1	65	6	4.4	38	78	5.7	2.2	not available			
IKO	J 0 LRX/MX	32	59	8.3	1	38	68.5	9.5	1	43	81.8	9.5	1	56	99.7	13	1
	J 0 LLU	32	59	8.3	1	39.8	70.3	11.3	1	47.8	86.6	14.3	1	55	99.8	13	2
SKF	M 0 LLR	31.8	58.8	8.1	1	39.8	70.3	11.3	1	not available				not available			
	M 1 LLR	31.8	58.8	8.1	1	39.8	70.3	11.3	1	not available				not available			

6 Intended Use

See also section **2.3**

6.1 Guidelines for Application

- ☐ Static application:
 - Holding and clamping in case of power failure
 - In case of pressure drop
 - EMERGENCY STOP
- ☐ Please observe the correct dimensioning of clamping force and switching frequency at an EMERGENCY STOP for safe holding of the mass and safe compliance of the required brake path.
- ☐ Application in clean environments (penetration of lubricating greases, coarse dust and other substances which reduce friction value can have a negative effect on the clamping / braking function).
- ☐ Application in enclosed buildings (in tropical regions, in high humidity and temperatures below 0 °C with long downtimes, and sea climates only after taking special measures).

► Please contact **mayr®** power transmission.

6.2 Limits

- ☐ The brake is not suitable for use in severely contaminated environments
- ☐ The brake is not suitable for application in high ambient temperatures >70 °C
- ☐ Brake is not suitable for use in liquid media
- ☐ Brake is not suitable for use in a vacuum
- ☐ Brake is not suitable for contact with abrasive media (e.g. abrasive and grinding dust)
- ☐ Brake is not suitable for contact with aggressive, corrosive media (e.g. solvents, acids, lyes, salts etc.)
- ☐ Brake is not suitable for contact with foodstuffs

6.3 Reasonably Foreseeable Misuse

The following uses are prohibited and may generate hazards.

- ☐ Any opening of the screws on the housing.
- ☐ Operation without profiled rail.
- ☐ Exceedance of the stated maximum operating pressure.
- ☐ Changes to brakes through additional cut-outs, drillholes etc.

6.4 Duration of Use

20 years or on reaching the T10d (for definition, see EN ISO 13849-1) duration of use.

6.5 Brake Dimensioning

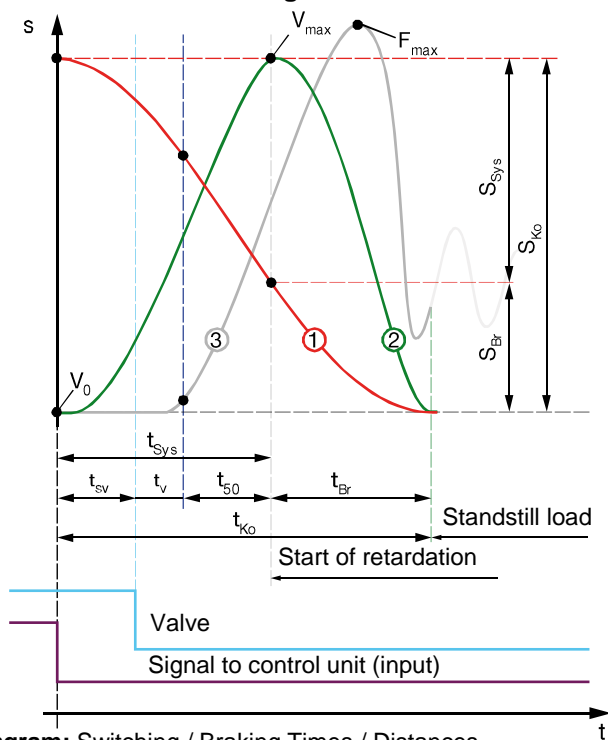


Diagram: Switching / Braking Times / Distances

Name

1		Distance
2		Speed
3		Axial force
β	[°]	Angular position 0° (horizontal) to 90° (vertical)
a_B	[m/s ²]	Acceleration of the downward-moving load, dependent on the angular position
a_v	[m/s ²]	Retardation
g	[m/s ²]	Gravitational acceleration (9.81 m/s ²)
F_{Br}	[N]	Braking force for dynamic calculation
$F_{erf.}$	[N]	Required holding force
F_{Nenn}	[N]	Nominal holding force (minimum holding force)
F_{NGes}	[N]	Total nominal holding force (one or more brakes)
F_{max}	[N]	Maximum holding force
m	[kg]	Load mass
S_{Br}	[m]	Braking distance: Distance from the beginning of the retardation up to the standstill of the load
S_{Sys}	[m]	System distance: Distance travelled by the load until the retardation begins.
S_{Ko}	[m]	Stopping distance: Distance from the signal interruption up to standstill of the load
t_{50}	[s]	Brake switching time
$t_v^{1)}$	[s]	Valve switching time
t_{sv}	[s]	Switching time control unit (signal processing time)
t_{sys}	[s]	System switching time
t_{Br}	[s]	Brake braking time

General

When selecting the brake, the nominal holding force must be greater or equal to the required holding force.

$$F_{Nenn} \geq F_{erf.} \quad [N]$$

Dimensioning for dynamic braking (EMERGENCY STOP)

For safety reasons, at least the weight load of the masses to be held +100 % reserve must be provided.

The larger the ratio of the nominal holding force to the required holding force, the shorter the stopping distance (for the same technical conditions)

The minimum required holding force can be calculated with the following formula:

$$F_{erf.} = \frac{m \times g}{0.5} \quad [N]$$

Dimensioning for static holding (clamping)

For safety reasons, at least the minimum weight load of the masses to be held +20 % reserve must be provided.

The minimum required holding force can be calculated with the following formula:

$$F_{erf.} = \frac{m \times g}{0.8} \quad [N]$$

The stopping distance / stopping time of the load to be braked is strongly dependent on the following influences:

- ☐ Switching time control unit (signal processing)
- ☐ Switching time of the control valve
- ☐ Switching time of the brake
- ☐ Cross-section and length of the lines

The larger the sum of the switching times, the later the retardation of the load occurs (due to longer periods of acceleration). The stopping distance / the stopping time becomes longer (with constant holding force).

Name

t_{Ko}	[s]	Stopping time: Time from the signal interruption up to standstill of the load
V_0	[m/s]	Initial speed
V_{max}	[m/s]	Maximum speed

If you have any questions, please contact **mayr®** power transmission.

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6.5.1 Calculation example (dynamic braking)

Data		
Angular position profiled rail	β	= 90° (vertical axis)
Mass	m	= 700 kg
Initial speed	V0	= 0.5 m/s
Valve switching time	t _v	= 0.016 s
Switching time control system	t _{sv}	= 0.020 s
Existing operating pressure		= 75 bar

1. Pre-selection of braking force

$$F_{\text{erf.}} = \frac{m \times g}{0.5} \quad [\text{N}]$$

$$F_{\text{erf.}} = \frac{700 \times 9.81}{0.5} = 13734 \quad [\text{N}]$$

Selected: ROBA®-guidestop Size 45,
Type 3840.0_0_ _ Nominal holding force $F_{\text{Nenn}} = 15000$ N
(from section 5.2 Table "Technical Data")

2. Calculation of the stopping distance/stopping time

Checking the selected brake size

Acceleration of the load

$$a_B = g \times \sin(\beta) = 9.81 \times \sin(90^\circ) = 9.81 \quad [\text{m/s}^2]$$

System distance

$$S_{\text{Sys}} = V_0 \times t_{\text{Sys}} + a_B \times t_{\text{Sys}}^2 \times 0.5 \quad [\text{m}]$$

$$S_{\text{Sys}} = 0.5 \times 0.081 + 9.81 \times 0.081^2 \times 0.5 \quad [\text{m}]$$

$$S_{\text{Sys}} = 0.073 \quad [\text{m}]$$

$$t_{\text{Sys}} = t_{50} + t_v + t_{sv} = 0.045 + 0.016 + 0.02 \quad [\text{s}]$$

$$t_{\text{Sys}} = 0.081 \quad [\text{s}]$$

Braking distance

$$S_{\text{Br}} = \frac{V_{\text{max}}^2}{2 \times \left(\frac{F_{\text{NGes}}}{m} - a_B \right)} \quad [\text{m}]$$

$$S_{\text{Br}} = \frac{1.29^2}{2 \times 12,065} = 0.069 \quad [\text{m}]$$

$$V_{\text{max}} = V_0 + a_B \times t_{\text{Sys}} \quad [\text{m/s}]$$

$$V_{\text{max}} = 0.5 + 9.81 \times 0.081 = 1.29 \quad [\text{m/s}]$$

Stopping distance

$$S_{\text{Ko}} = S_{\text{Br}} + S_{\text{Sys}} \quad [\text{m}]$$

$$S_{\text{Ko}} = 0.069 + 0.073 = 0.142 \quad [\text{m}]$$

Stopping time

$$t_{\text{Ko}} = t_{\text{Br}} + t_{\text{Sys}} \quad [\text{s}]$$

$$t_{\text{Ko}} = 0.111 + 0.081 = 0.192 \quad [\text{s}]$$

$$t_{\text{Br}} = \frac{V_{\text{max}}}{\frac{F_{\text{NGes}}}{m} - a_B} = \frac{1.29}{12.06} = 0.111 \quad [\text{s}]$$

Retardation (for system dimensioning)

$$a_v = \frac{F_{\text{NGes}} \times 2.5}{m} \cdot g = \frac{15000 \times 2.5}{700} \cdot 9.81 = 43.76 \quad [\text{m/s}^2]$$

$$\text{Load} = \frac{a_v}{g} = \frac{43.76}{9.81} = 4.46 \quad [\text{g}]$$

6.5.2 Switching Times

Switching Times			Sizes			
			35	45	55	65
Brake switching time	t50	[s]	0.030	0.035	0.035	0.040

7 Storage

7.1 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 0 °C up to +40 °C.
- ☐ Do not store in direct sunlight or UV light.
- ☐ Do not store aggressive, corrosive substances (solvents / acids / lyes / salts etc.) near to the brakes.

For longer storage lasting more than 2 years, special measures are required.

► **Please contact *mayr*® power transmission.**

8 Installation

8.1 Installation Conditions

Please observe before installation!

8.1.1 General

- ☐ The brake is delivered assembled ready for installation.



Please Observe!

Leave the brake in its installed condition!

- ☐ The ball-headed tensioning screws (3) for adjustment of the stroke path are secured against twisting with Loctite 243. The ball-headed tensioning screws (3) for adjustment of the stroke path are secured against twisting with Loctite 243.



CAUTION The nominal holding force might be influenced.

Customer-side turning of the ball point screw (3) can lead to malfunctions.
Never turn the ball point screws.

8.1.2 Profiled rail

Requirements on the profiled rail design

The profiled rail must accord with the manufacturer and rail type stated in the order number.



Please Observe!

The ROBA®-guidestop function can only be guaranteed on a proper rail surface.

ATTENTION

Never operate the brake without a profile rail

Activation of the brake without a profile rail will cause damage. The brake can no longer be used.



CAUTION The clamping effect might get influenced by friction value-reducing materials, such as tough greasy lubricants, greases or separating agents - please clean, if necessary; see section **11.4**

8.1.3 Controls

The *mayr*® transmission company recommends the following hydraulic controls.

The piston space is filled with hydraulic oil, thus suspending the spring force. The compressed air in the piston space is deduced in case of power failure. The spring force has an effect on the clamping element. The profiled rail is clamped/ braked.

During every operational movement of the profile rail, the 3/2-way valve is electrically switched and the brake opened.

Recommendation:

- ☐ Pressure fluctuations can be reduced through a non-return valve.
- ☐ In order to guarantee fastest possible switching of the brake, the largest possible line diameter should be used in the area of the return flow lines. In addition, no choke valves may be installed in this area, and the hydraulic lines between the brake and the valve must be kept as short as possible.
- ☐ The size and speed of the 3/2 directional control valve has an effect on the switching time.

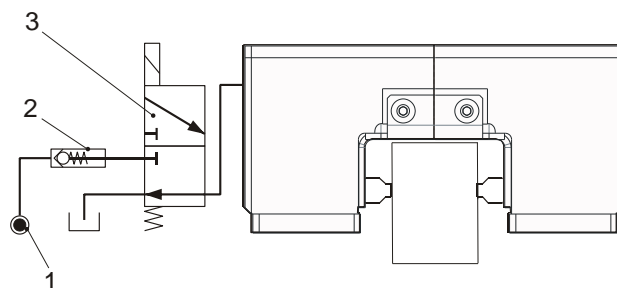


Fig. 5

Item	Name
1	Pressure source
2	Non-return valve (in case of pressure fluctuations)
3	3/2-directional control valve

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8.2 Installation (Figs. 1 and 2)

8.2.1 Pre-requisites

- ☐ Unpack the brake
- ☐ Check for completeness
- ☐ Check the data on the Type tag
- ☐ Visual inspection (e.g. after longer storage period)



CAUTION Please observe the own weight of the brake

The brake may drop during lifting / disassembly. The consequences may be crush injuries and impact injuries.

8.2.2 Preparation

- ☐ Have the necessary tools ready:
 - Spanners etc.
 - Torque wrenches
- ☐ Please observe the required minimum thickness of the customer-side mounting flange (dimension B₁, see Chapter 5.2).
- ☐ Provide fixing screws (not included in the standard scope of delivery)

Fixing screw sizes and tightening torques				
Size	Thread	Tightening torque	Property class	Max. Screw-in depth B
35	6 x M12	109 Nm	10.9	21.7 mm
45	6 x M16	260 Nm	10.9	27.7 mm
55	6 x M20	520 Nm	10.9	36 mm
65	6 x M24	900 Nm	10.9	43 mm

All tightening torques are recommendations only. These data do not relieve the user from checking the data regarding the actual installation situation.

8.2.3 Bleed

The ROBA®-guidestop is filled manufacturer-side with hydraulic oil.



Bleeding is only necessary in case of an oil leakage, for example during the assembly process

With a wiper (optional), connections m₃ and m₄ can no longer be used.

1. Remove the screw plug (9) from the required hydraulic connection (7)
2. Connect the hydraulic hose via a thread on the hydraulic connection (7)
3. Remove the second screw plug (9) from the hydraulic connection (7) on the opposite side
4. Fill the brake with oil until the oil leaks out of the second hydraulic connection (7) lying opposite
5. Screw in the second screw plug (9) and tighten to a tightening torque of 12 Nm

8.2.4 Installation Procedure

1. Remove the screw plug (9) from the required hydraulic connection (7)
2. Connect the hydraulic hose via a thread on the hydraulic connection (7)
3. Pressurize the brake with operating pressure see technical data section 5.2.
4. Unscrew and remove the transportation lock (10)

ATTENTION The brake could be damaged

Removal of the transportation lock (10) in de-pressurized condition of the brake leads to damage

Remove the transportation lock (10) (red screw head) only in pressurized condition.

5. **Optional:** Screw on the wiper (14) with the fixing screws for wiper (14.1) without torque. Screw securement with Loctite 243.
6. Push the brake onto the profiled rail.
7. Screw in the fixing screws (without torque).
8. Screw securement with Loctite 243
9. Switch the brake in de-pressurized state, thereby placing it under tension (centring).

ATTENTION Only close the brake with guides

Brake must be pushed onto the profiled rail.

10. Tighten the fixing screws using a tightening torque of 10 Nm .
11. Pressurize the brake.
12. Switch the brake in de-pressurized state.
13. Tighten the fixing screws using the torque (see table in section 8.2.2)

CAUTION Load crash possible



The brake will not work with the transportation locks (10) screwed in.

The transportation lock (10) (red screw head) must be removed.

14. **Optional:** Tighten the fixing screws for wiper (14.1) to the torque stated in the table.

Sizes	Thread	Tightening torque
35	4 x M5	5 Nm
45	4 x M5	5 Nm
55	4 x M6	9 Nm
65	4 x M6	9 Nm

9 Options

9.1 Switching condition monitoring (NO contact)

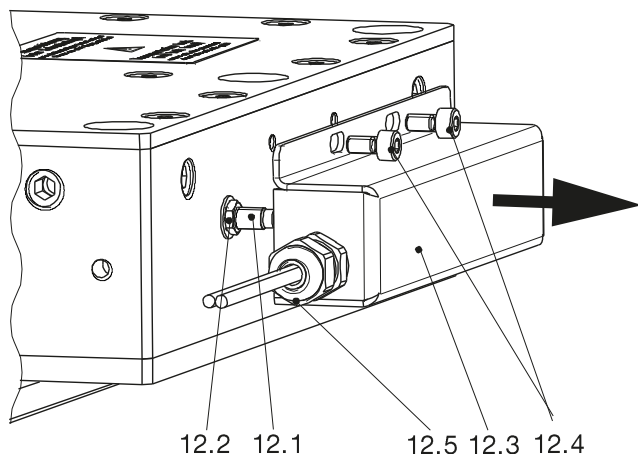


Fig. 6



Please Observe!

The switching condition monitoring is installed and set manufacturer-side.

A proximity switch (12.1) emits a signal for every brake condition change.

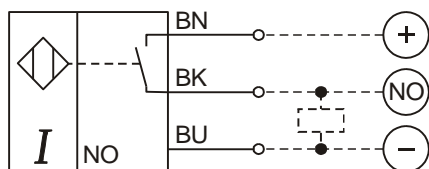
On type 3840 2 proximity switches (12.1) are installed.

Plausibility check

Brake opened	Pressure switched on	Signal "OFF"
Brake closed	Pressure switched off	Signal "ON"

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

Wiring Diagram:



Technical Data	
PNP/NO contact	
Rated operating voltage:	$U_e = 24 \text{ VDC}$
Operating voltage:	$U_B = 10 \dots 30 \text{ VDC}$
Cable length:	5000 mm

Replacement of the proximity switch



Please Observe!

Proximity switches cannot be guaranteed fail-safe. Therefore, please ensure appropriate access for replacement or adjustment.

Pre-requisites



WARNING Load crash possible

Gravity loaded axes must be secured before beginning the work: this secures them against dropping.

- ☐ Brake is pressureless (enclosed) on the profiled rail.

De-installation

1. Unscrew the cable gland (12.5)
2. Unscrew the cap screws (12.4)
3. Remove the cover plate (12.3)
4. Unscrew the hexagon nut (12.2), unscrew and remove the proximity switch (12.1).

Installation and Adjustment

Initial position: Proximity switch is not connected

Activity		Result
1.	Check whether the brake is de-pressurized	
2.	Screw the proximity switch in carefully up to its limit	
2.1	Unscrew the proximity switch one full turn (360°)	
3.	Counter the proximity switch (12.1) with the hexagon nut (12.2) (tightening torque see section 5.2)	
4.	Connect the proximity switch (see wiring diagram)	Signal "ON"
5.	Adjust the operating pressure	Signal "OFF"
6.	Carry out a functional inspection	
6.1	Switch off the pressure	Signal "ON"
6.2	Switch on the pressure	Signal "OFF"
7.	Pull the cable through the cable gland (12.5)	
8.	Screw on the cover plate (12.3)	
9.	Tighten the cable gland (12.5)	

10 Initial Operation

10.1 Brake Inspection (before initial operation)

- ☐ Check all fixing screws for the required tightening torque.
- ☐ Visual inspection of the hydraulic connections and lines.
- ☐ Check for leakages (on pressurization).

10.2 Brake Test (Static)



Caution During the Brake Test danger to personnel and damage to machines cannot be ruled out in case of malfunctions (incorrect installation, control errors etc.). risks to personnel and machine damage cannot be ruled out.

Do not enter the danger zone.

Possibly take measures for catching or damping the load.

Check dimensioning!

10.2.1 (Static) Brake Inspection

- ☐ On vertical axes, a brake inspection is carried out via load assumption or via the drive.



Recommendation!

Test the brake using the nominal holding force or the maximum load mass.

10.3 Brake Inspection (During Operation)



Recommendation!

A test must be carried out to guarantee the necessary holding force with all control and brake times if a risk is generated by gravity-loaded axes. A cyclic brake inspection during running operation provides additional safety. Depending on the danger, please observe the respective regulations and standards.

10.3.1 Regular Function Inspection (static)

- ☐ Depending on the application requirements, we recommend carrying out regular braking force inspections (depending on the application), e.g. check the static holding force 1 x per shift with nominal holding force or with maximum load mass.
- ☐ In addition to the regular inspection of the holding force, we recommend the application of a switching condition monitoring device (option), in order to request the brake switching condition or to prevent a possible load crash on vertical installation.



Recommendation!

The holding force may be reduced by friction value-reducing materials. If the brake during the functional inspection does not achieve the nominal holding force, repeat using 90 % of the nominal holding force and clean the profiled rail at the next opportunity (see section **11.4**).

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11 Maintenance / Inspection / Switching Frequency

11.1 Switching Frequency

The ROBA®-guidestop is designed for a switching frequency of up to 200.000 switching actions.

11.2 Inspection

Check the condition

Measure	Condition		Interval	Implementation
Visual inspection	Hydraulic	Check that the connections and connection lines are leak-proof.	To be determined by machine operator depending on the installation situation ► Please contact <i>mayr</i> ® power transmission.	Qualified personnel
	Profiled rail	Typ 384_0_0_ _ Check the profiled rail for wear	After every EMERGENCY STOP occurrence.	
	Wear indicators	Nominal holding force is not reached (slipping). Replace brake	To be determined by machine operator depending on the installation situation ► Please contact <i>mayr</i> ® power transmission.	Company <i>mayr</i> ®

11.3 Maintenance

The ROBA®-guidestop is mainly maintenance-free.

Measure	Note/comment	Interval	Implementation
Functional Inspection	Carry out a regular functional inspection	see section 10.3	Qualified personnel
Check the profiled rail	The profiled rail must be checked regularly for contamination with friction value-reducing materials; it must be cleaned, if necessary (see section 11.4). Special maintenance work may be necessary if the device is subject to large amounts of dirt or dust or is operating in extreme ambient conditions. Please contact <i>mayr</i>® power transmission.	at least every 6 months	



Should the ROBA®-guidestop no longer meet the required characteristics or should the necessary safety for work on the machine or system no longer be given, the brake must be checked at *mayr*® power transmission and, if necessary, professionally repaired and approved.

11.4 Cleaning

Only in case severe contamination has an adverse effect on the brake function

- ☐ Clean the profiled rail (with a clean, lint-free cloth) using ethyl alcohol.



Rail may be greased with oil or standard bed track greases.

12 De-installation

CAUTION



Please observe the own weight of the brake

The brake may drop during lifting / disassembly. The consequences may be crush injuries and impact injuries.

WARNING



Load crash possible

The brake must be load-free.
Please check that it is load-free before de-installation.

- ☐ Provide security in the danger zone
- ☐ Support the load

De-installation takes place by following the "Installation procedure" section 8.2.4 backwards.

13 Disposal

For disposal, please observe the specific regulations of the respective country of application.

All steel components:

Steel scrap (Code No. 160117)

Seals, O-rings, V-seals, elastomers:

Plastic (Code No. 160119)

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14 Malfunctions / Breakdowns

Malfunction	Possible Causes	Solutions	Implementation
Brake does not release	Operating pressure too low	Check operating pressure and increase if necessary	Qualified personnel
	Defective valve	Replace defective valve	
	Leakage in the oil feed line	Seal leakage	
Brake does not brake	Brake wear limit reached	Replace brake	mayr ® power transmission
	Defective valve	Replace defective valve	Qualified personnel
	The profile rail does not fit to the brake	Check dimensioning, check technical data	
Delays in brake opening	Cross-section of oil feed too small	Mount line with larger cross-section	Qualified personnel
Braking distance too long	The profile rail does not fit to the brake	Check dimensioning, check technical data	
	Excessive wear on profiled rail / brake shoe	Replace brake	mayr ® power transmission
	Cross-section of oil output too small / too long	Mount line with larger cross-section	Qualified personnel
	Friction value-reducing materials on the profiled rail	Clean the profiled rail	
	Incorrect dimensioning	Check dimensioning, check technical data	
	3/2-directional control valve too slow		
Brake (severely) oil-contaminated	Operating pressure too high	Check operating pressure and reduce if necessary	mayr ® power transmission
	Use of a hydraulic oil (aggressive) which has not been recommended by mayr ® power transmission	Replace brake	Qualified personnel
	Screw connection / oil feed line leaking	Replace screw connection or feed line	
Switching condition monitoring emits no signal	Incorrect assembly and adjustment of the switching condition monitoring system	Repeat adjustment process, see section 9.1	Qualified personnel
	Brake does not release	See Malfunctions → Brake does not release	
	Defective cable	Replace defective cable	
	Defective proximity switch	Replace defective proximity switch	



Mayr® transmission will take no responsibility or guarantee for replacement parts and accessories which have not been delivered by mayr® power transmission, or for damage resulting from the use of these products.