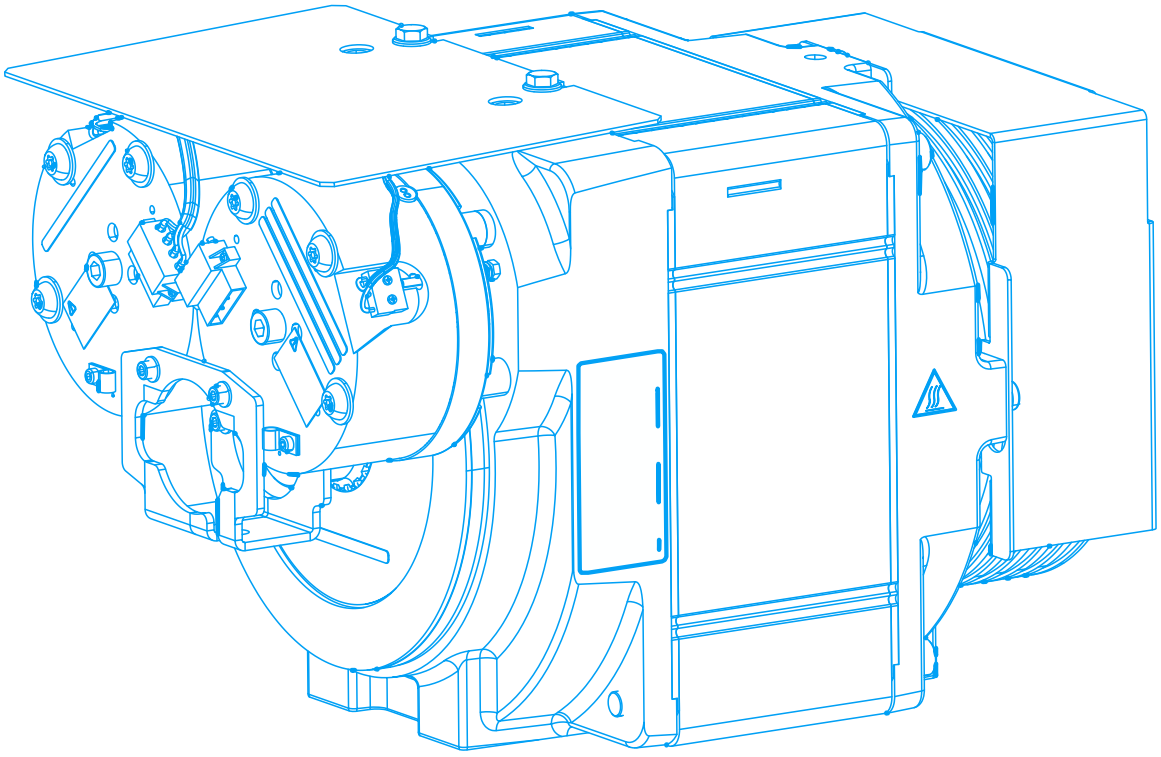
Product catalogue
PMC145-2

Drive
02/2018



thyssenkrupp

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Table of Contents

1 Description

1.1 Standards and legal requirements

The product complies with the following standards:

- DIN EN60034/VDE 0530
- DIN EN81-1:1998 + A3:2009
- DIN EN81-1:2010-06
- DIN EN81-20:2014-11
- DIN EN81-50:2015-02
- DIN EN81-77:2014-02

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

1.2 Product family gearless

thyssenkrupp Aufzugswerke currently offers the following model series of gearless machines:

	Range of performance	Synchronous	Asynchronous	Without machine room	With machine room
Mini gearless®					
PMC125 S/M/L	Lower	x		x	
PMC145 S/XS/M/XM/L/XL	Lower	x		x	x [1)]
PMC170 S	Lower	x		x	x
PMC170 M/L/XL	Middle	x		x	x
DAF210 M/L	Lower	x		x	x [1)]
DAF270 S/M/L	Middle	x		x	x
Compact gearless®					
DAF380 M1xx	Middle		x		x
SC300 S/M	Middle	x			x
SC400 S/M	Middle	x			x
SC500 M	Upper	x			x
External rotor gearless					
DAB450 S	Middle		x		x
DAB450 L	Upper		x		x
DAB530 L/XL	Upper		x		x
SF gearless					
SF600 M	Upper	x			x
SF700 M	High Rise	x			x
SF800 M	High Rise	x			x
SF1000 M	High Rise	x			x

Tab. 1

ATR_1_10_0001_0

1) Optional version available with brake and manual release for machine room

Information on each of the machines mentioned in the table can be found in the corresponding product catalogue.

1.3 Product group Mini gearless

The product group of Mini gearless has the following features:

- Compact design for elevators without machine rooms (optionally with manual brake release also in the machine room)
- Traction sheave supported by bearings on one side

The machine can be deployed with

- Single wrap with rope pulley
- Single wrap without rope pulley (180° wrap)

1.4 Product

The PMC145 is a frequency-controlled (V3F) synchronous machine excited by permanent magnets and belongs to the product group of the thyssenkrupp Mini gearless.

Range of application

The range of applications of the machines is listed in the following table. Only guide values are listed to provide an overview.

Machine	Suspension	Rated load Q [kg]	Speed v [m/s]	Traction sheave D_T [mm]
PMC145 S 203	1:1	275	1	240
PMC145 M 202		400	1 - 1,2	
PMC145 L 201		630		
PMC145 M 202		400	1	210
PMC145 L 201		630		
PMC145 M 202		300		320
PMC145 L 201		500		
PMC145 S 203	2:1	450	1	240
PMC145 XS 205			1.6	
PMC145 XM 205			2	320
PMC145 M 202		630	1	210, 240
PMC145 XM 205			1.6 - 1.75	240
PMC145 XL 204			2	320
PMC145 L 201		1000	1	210, 240
PMC145 XL 204			1.6 - 1.75	240

Tab. 2

ATR_1_11_0001_0

The PMC145 is conceived for deployment in machine-room-less (MRL) elevators using suspension ropes with diameter 6 mm (e.g. synergy model series).

Deployment of the machines in installations with machine room is also possible with the version of the brake with manual brake release and optional handwinding wheel.

Product key

Example: PMC145 XM 205

	Meaning	Explanation
PM	Permanent-magnet-excited synchronous machine	Main designation for the machine
C	Compact	Design
145		Machine size
S, M, L	Length of the three basic types (1 m/s) S: 450 kg - 1 m/s M: 630 kg - 1 m/s L: 1000 kg - 1 m/s	Length of the machine (assignment for 2:1 application)
X	Prefix X for extension of the basic types XS: 450 kg - 1.6 m/s XM: 630 kg - 1.6 m/s XL: 1000 kg - 1.6 m/s	
2..	1st digit designates the machine generation 0 for DHM machine [1)] 1 for tkAW machine **2 for tkAW machine of 2nd generation**	Generation of the machine
.05	2nd and 3rd digit for the winding design	Winding category

Tab. 3 *ATR_1_11_0035_5*

1) Technical documents available on request

1.4.1 Version for machine-room-less installations (MRL)

PMC145-2 S and XS

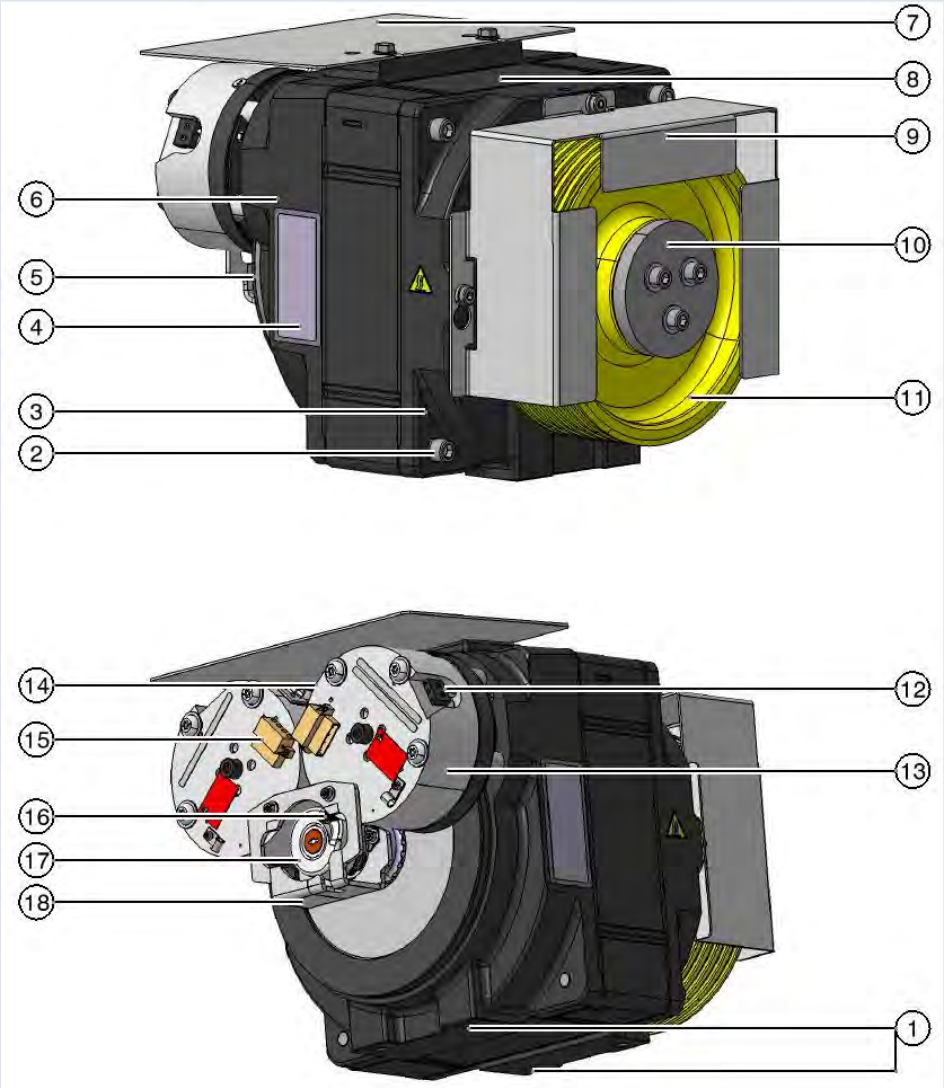


Fig. 1 ATR_2_11_0043_0

Item	Designation	Item	Designation
1	Mounting surface for connection with machine base frame (2 M16 threads per bearing bracket)	2	Connecting bolts for stator package with bearing brackets
3	Bearing bracket – traction sheave side	4	Motor name plate (on both sides)
5	Brake rotor	6	Bearing bracket – brake side
7	Cover plate for brake and encoder	8	Motor unit (stator package with the rotor inside the stator)
9	Rope guard (not adjustable)	10	Tension disc with screws for traction sheave mount (conical connection 1:15)
11	Traction sheave	12	Brake monitoring switch (adjustable and interchangeable)
13	Brake (Warner ERS VAR 15)	14	Plug connector for motor cable
15	Plug connector for brake cable	16	Line for encoder
17	Encoder	18	Encoder bracket

PMC145-2 M, XM, L, XL

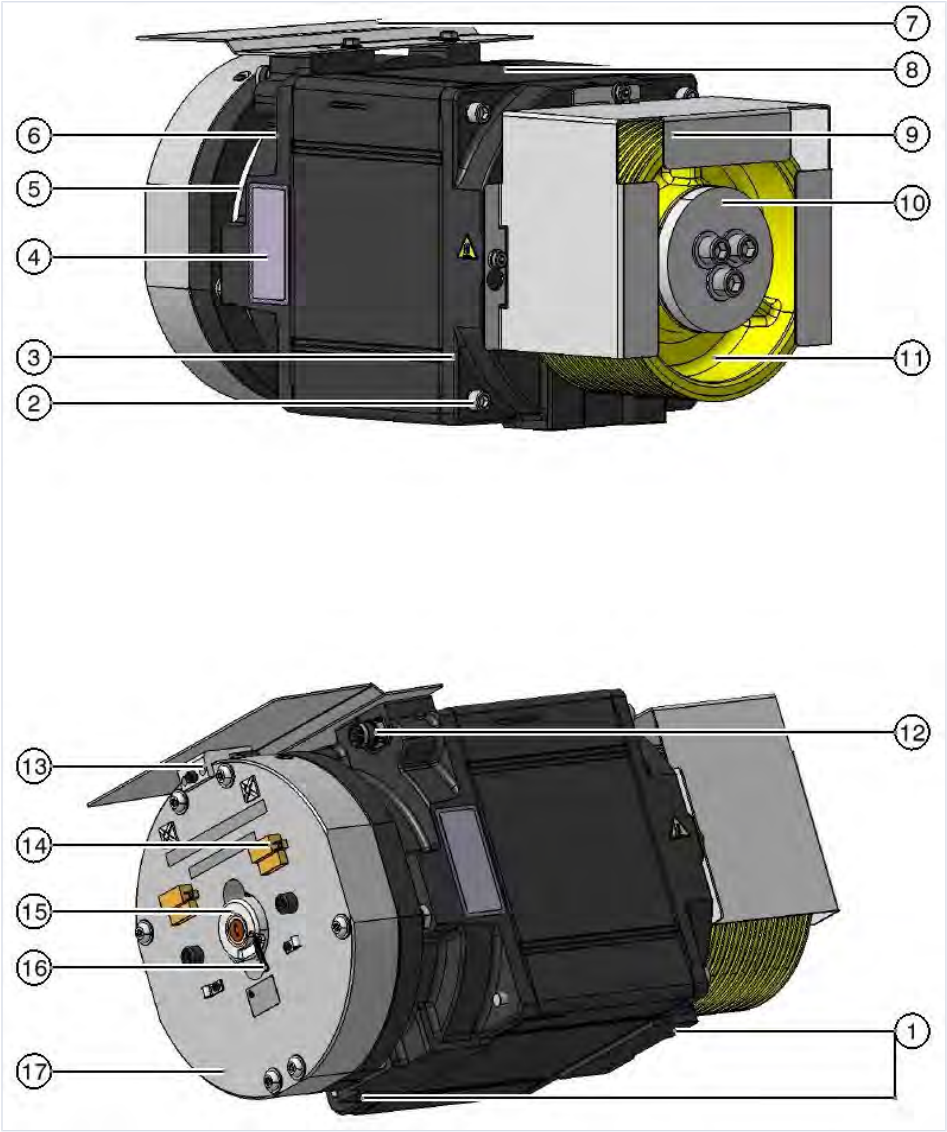


Fig. 2 ATR_2_11_0042_0

Item	Designation	Item	Designation
1	Mounting surface for connection with machine base frame (2 M16 threads per bearing bracket)	2	Connecting bolts for stator package with bearing brackets
3	Bearing bracket – traction sheave side	4	Motor name plate (on both sides)
5	Brake rotor	6	Bearing bracket – brake side
7	Cover plate for brake and encoder	8	Motor unit (stator package with the rotor inside the stator)
9	Rope guard (not adjustable)	10	Tension disc with screws for traction sheave mount (conical connection 1:15)
11	Traction sheave	12	Plug connector for motor cable
13	Brake monitoring switch (adjustable and interchangeable)	14	Plug connector for brake cable
15	Encoder	16	Line for encoder
17	Brake (Warner ERS VAR 07)		

1.4.2 Version for installations with machine room

PMC145-2 S and XS with manual brake release and optional handwinding wheel

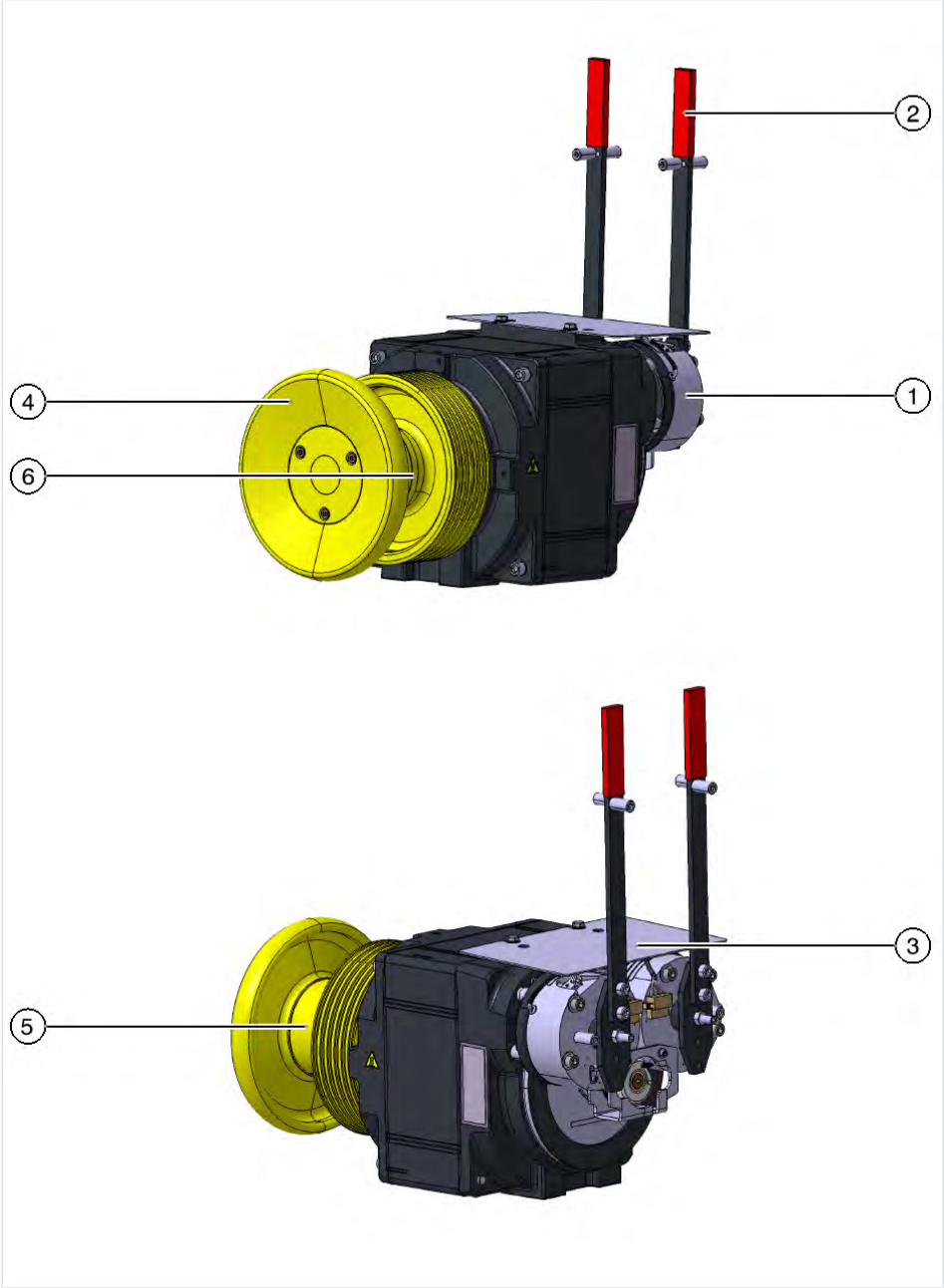


Fig. 3 ATR_2_11_0041_0

Item	Designation	Item	Designation
1	Brake with manual brake release	2	Brake release lever (can be mounted rotated by 180°)
3	Cover plate	4	Handwinding wheel D270 (optional)
5	Adapter piece for add-on handwinding wheel	6	Tension disc (version for add-on handwinding wheel)

PMC145-2 M, XM, L and XL with manual brake release and optional handwinding wheel

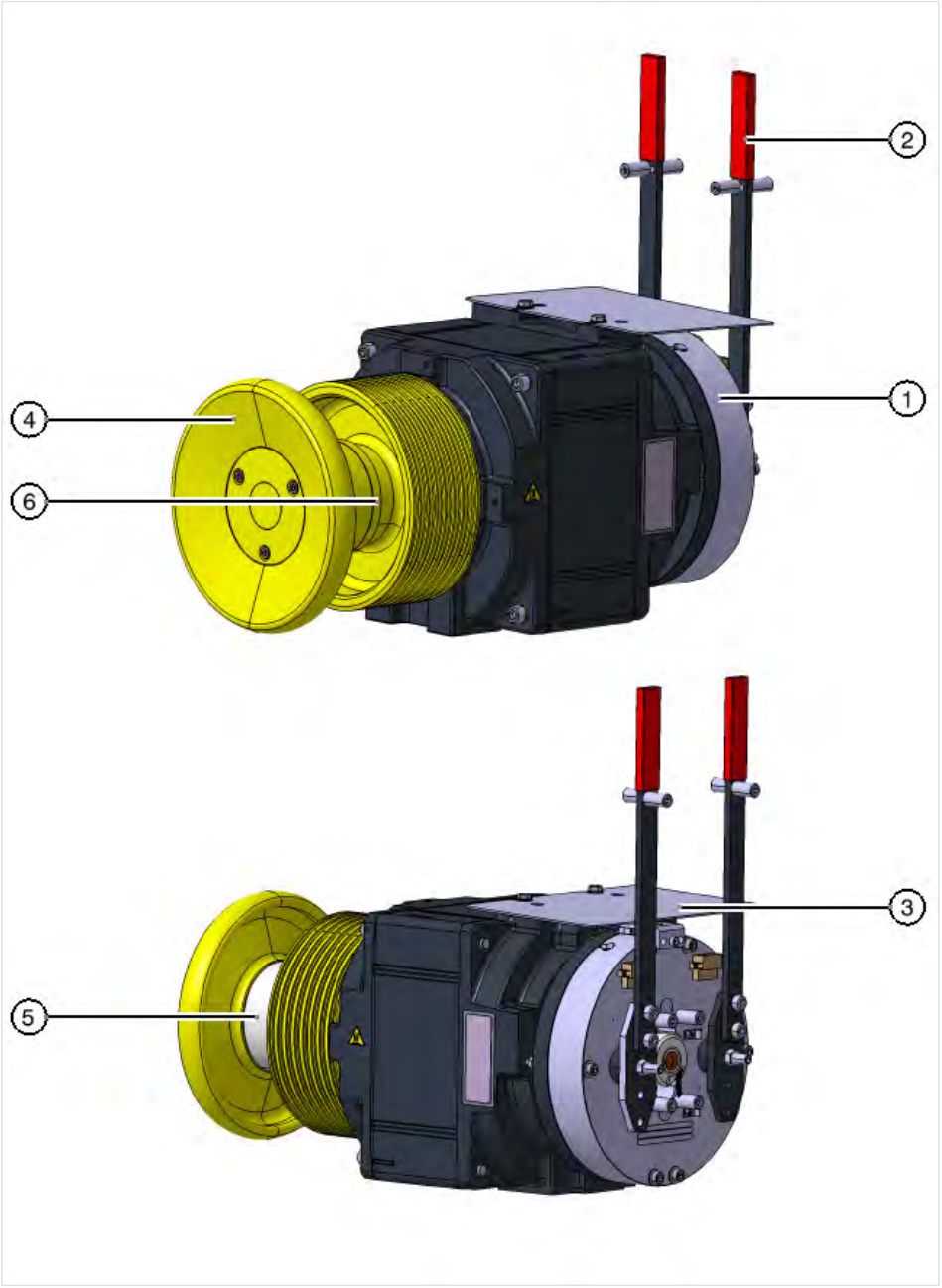


Fig. 4

ATR_2_11_0040_0

Item	Designation	Item	Designation
1	Brake with manual brake release	2	Brake release lever (can be mounted rotated by 180°)
3	Cover plate	4	Handwinding wheel D270 (optional)
5	Adapter piece for add-on handwinding wheel	6	Tension disc (version for add-on handwinding wheel)

1.4.3 Engineering design

The motor design corresponds to design IM B3.

The drives of the PMC145 model series are designed as machines without a housing.

They comprise a stator package with bearing brackets on each side. The assemblies are connected via 4 screwed connections to form a stable unit.

The brake is attached to one of the bearing brackets. The connection box for the motor line is integrated in the bearing bracket on the brake side.

The one-piece traction sheave (rim and hub) is mounted in a floating arrangement (overhung) via a conical connection on the drive shaft. For safety reasons, microencapsulated screws and locking washers are used to mount the disc.

The PMC145 is conceived for deployment in installations with single wrap and resulting rope pull direction plumb (90°) on the mounting surfaces.

The rope guard is available in two versions for a wrap angle of 180° and 175°.

The machine is mounted via the two bearing brackets with 2 screws (M16) each on a machine base frame.

For use in the area of synergy, the machine is screw-connected onto a bracket located in the shaft headroom on the guide rails. Product catalogue for synergy machine-room-less elevators.

A standardised machine base frame is available for deployment in the machine room for modernisations. Operating manual MO61A.

With a diameter of traction sheave of 320 mm, it must be taken into account that the traction sheave protrudes beyond the outer contour of the machine.

The PMC145 is designed with concentrated windings.

1.4.4 Brake

The brakes of the PMC145 are intended as a stop brake for static application and perform the additional function of a braking device for protection of the upward-moving elevator car against overspeed and against unintentional movement of the elevator car Chap. 3.2, P. 36. Dynamic braking is restricted to emergency and inspection braking.

There are various versions of brakes depending on the machine size, the electrical operating conditions and the required braking torque.

The redundant brakes of the machine each consist of two disc brakes with a shared brake rotor that directly affect the traction sheave shaft.

A cover plate is fitted over the brake to provide protection against contamination.

The brake is opened electromagnetically during operation to ensure failure safety.

In the tkAW standard version, both brake circuits are operated in a series connection, which means that a joint signal is generated.

It is not possible to set the braking torque or air gap.

1.4.5 Brake monitoring

The customer must evaluate the monitoring signals.

A microswitch is fitted to monitor the brake function of each brake circuit and detect redundancy loss. This reports the current position of the brake (opened/closed) by means of a corresponding signal. In the event of a false signal, the installation is to be shut down immediately.

The switches are fitted, adjusted and provided with safety coating varnish at the plant.

1.4.6 Encoder

The PMC145 is fitted with a sine-cosine encoder for recording the speed and angular position.

It is mounted on the end of the motor shaft and on the brake.

1.4.7 Electrical connection

The optional connection lines of the motor, temperature monitoring, encoder and brake have a length of 5 or 10 m.

The optional lines of the brakes (coils and microswitches) are supplied loose. The connectors on both sides of the connecting lines enable simple connection of the brakes to the brake control system and/or frequency inverter.

1.4.8 Cooling

The PMC145 has no fan. The machine is cooled by means of free convection.

1.4.9 Protection devices for earthquake regions

The rope guard available as standard (non-adjustable) meets the requirements in accordance with DIN EN81-77 for all construction sizes of the PMC145 series up to and including earthquake category 3.

1.4.10 Maintenance instructions

The rolling bearings of the traction sheave shaft have lifetime lubrication, making the PMC145, including the brake, maintenance free.

Following replacement of the encoder or a change in position in relation to the rotor, the encoder must be readjusted in the case of synchronous machines.

1.5 Accessories

1.5.1 Handwinding wheel

For deployment in the machine room, a handwinding wheel (diameter 270 mm) is available as an option.

It is bolted onto the front of the traction sheave and is used to move the installation when the weight of the car and counterweight are more or less balanced.

2 Technology

2.1 Mechanical data

2.1.1 General data of the machine

Version		S	XS	M	XM	L	XL
Permitted radial shaft load Ft_{zul} [1]	[kN]	14	15	18	19	32	30
Weight including traction sheave	[kg]	132	158	172 172 [2] 185 [3]	189 189 [2] 202 [3]	216 214 [2] 225 [3]	229 227 [2] 238 [3]
Mass moment of inertia (including traction sheave)	[kgm²]	0.18	0.22	0.247 0.216 [2] 0.436 [3]	0.281 0.249 [2] 0.469 [3]	0.348 0.292 [2] 0.532 [3]	0.376 0.320 [2] 0.560 [3]
Max. sound pressure level	[dB(A)]	58					
Momentum grade		G2.5					
Protection class		IP21					

Tab. 4

ATR_1_11_0005_0

1) Resulting rope pull direction plumb (90°) onto the mounting surface of the machine.

2) Value for traction sheave 210 mm

3) Value for traction sheave 320 mm

2.1.2 Brake

Additional data for the brake: Chap. 3.2, P. 36.

Version		S/XS	M/XM	L/XL
Manufacturer		Warner Electric Europe		
Designation		ERS-VAR15	ERS-VAR07	
		-02	SZ420/350	SZ600/550
Design		2-surface disc brake in double configuration (2 brake circuits)		
Braking torque	[Nm]	2 x 250	2 x 350	2 x 550
Weight	[kg]	2 x 10	32	42
Braking torque setting		not possible		
Diameter of brake disc	[mm]	237	233	243
Air gap	[mm]	0.35		
Manual brake release		Standard version: no Version with brake release lever: yes		
Protection class		IP21		
Type test certificate		EU-BD 777 [1]	EU-BD 819 [1]	EU-BD 819 [1]
Type test certificate		EU-BD 777 [1]	EU-BD 819 [1]	EU-BD 819 [1]
Times $t_{10}/t_{50}/t_{90}$	[ms]	70/85/100	95/128/160	80/108/135
Certificate for traction sheave shaft		PMC145S/XS - ERS VAR 15	PMC145M/XM - ERS VAR 07 SZ420	PMC145L/XL - ERS VAR 07 SZ600

Tab. 5

ATR_1_11_0013_0

1) Complying with EN81-20/50:2014 and EN81-1:1998+A3:2009

2.1.3 Traction sheave

Overview of versions

Version		S/XS	M/XM			L/XL			
Diameter D_T	[mm]	240	240	210	320	240		210	320
Rim width B_T	[mm]	75	100		77	122	135		92
Weight	[kg]	11	14		22	17.5	19	17	24
max. number of grooves x rope diameter z x dia. [1]	[mm]	6 x 6 6 x 6.5	8 x 6 8 x 6.5		6 x 6 6 x 6.5 5 x 8	10 x 6 10 x 6.5	11 x 6 11 x 6.5		7 x 6 7 x 6.5 6 x 8
max. number of grooves x rope diameter z x dia. [2]	[mm]	7 x 6 6 x 6.5 5 x 8 [5]	9 x 6 8 x 6.5 6 x 8 [5]		6 x 6 6 x 6.5 5 x 8	11 x 6 10 x 6.5	13 x 6 11 x 6.5 9 x 8 [5]		7 x 6 7 x 6.5 6 x 8
Groove shape [3] [4]		Seat/V-groove							
Vee groove angle β [4]	[°]	Order-dependent							
Material		EN-GJS 600-3			EN-GJL 250 [6]	EN-GJS 600-3			EN-GJL 250 [6]

Tab. 6

ATR_1_11_0009_0

1) With standardised groove clearance RA = 12 mm for diameter = 6/6.5 and 14 mm for diameter = 8 mm

2) With minimum permissible groove clearance RA = 10 mm for diameter = 6, RA = 11 mm for diameter = 6.5 and 14 mm for diameter = 8 mm

3) Depending on order

4) Version in accordance with product description "Groove profiles"

5) Versions possible, for example with wire rope Drako 250T, PAWO 819W or PAWO F7S. Comply with the rope manufacturer's specifications! Adjustment of the rope cover on the traction sheave to rope diameter 8 mm is required!

6) Specially alloyed

Standardised versions for tkE applications

synergy OU CENE with D_T = 240 mm

Version		S	XS	M	XM	L	XL
Load	[kg]	450		630		1000	
Speed	[m/s]	1	1.6 – 1.75	1	1.6 – 1.75	1	1.6 – 1.75
Standardised versions for synergy OU CENE z x diameter/β	[mm] °	6 x 6 S100	-	7 x 6 S100	-	10 x 6 S100	-

Tab. 7

ATR_1_11_0009_1

synergy OU SEAME with D_T = 240 mm

Version		S	XS	M	XM	L	XL
Load	[kg]	320, 450, 480	450	630		1000	
Speed	[m/s]	1	1.6 – 1.75	1	1.6 – 1.75	1	1.6 – 1.75
Standardised versions for synergy OU SEAME z x diameter/β	[mm] °	6 x 6 S80	-	8 x 6 S90	-	10 x 6 S100 11 x 6 S90	11 x 6 S95

Tab. 8

ATR_1_11_0009_2

2.2 Electrical data

2.2.1 Version data

The tables contain guide values that can change depending on the machine version and project planning conditions. A layout with e.g. TLD is required in all cases.

PMC145 S/XS

Electrical version		S203		XS206
Suspension r		1:1	2:1	
Rated speed v	[m/s]	1		1.6
Rated load (guide value) Q	[kg]	275	450	
Diameter of traction sheave D_T	[mm]	240		
Nominal power P_N	[kW]	1.59 [2]	2.8 [1]	4.4 [1]
Rated torque M_N	[Nm]	190	170	165
Rated speed n_N	[rpm]	80	159	255
Rated current I_N	[A]	8.4	7.5	9.9
Effective voltage $U_{\sim, eff}$	[V]	180	295	294
Stator frequency f_{Stator}	[Hz]	13.3	26.5	42.5
Efficiency (at rated load) η [3]	[%]	66	81	91
Power factor cos φ [3]		0.92	0.91	0.96
Approach moment M_A	[Nm]	300		350
Starting current I_A	[A]	13.8		21.1
Max. permitted current $I_{max. per.}$	[A]	15		30
Inverter type (standard) [4]		RPI5.5/MFR5.5 CPI09 FS MFC21-09		RPI5.5/ MFR5.5 CPI09/15 FS MFC21-09/15

Tab. 9

ATR_1_11_0037_0

1) S5 (240 c/h, 50% duty cycle).

2) S5 (180 c/h, 50% duty cycle).

3) Machine warm at 20°C ambient temperature.

4) Allocation of frequency inverter via calculation program (e.g. TLD).

PMC145 M/XM

Electrical version		M202							XM205		
Suspension r		1:1				2:1					
Rated speed v	[m/s]	1			1.2	1			1.6	1.75	2
Rated load (guide value) Q	[kg]	300	400			480	630				450
Diameter of traction sheave D_T	[mm]	320	240	210	240	320	240	210	240		320
Nominal power P_N	[kW]	1.79 [2]	2.38 [2]	2.72 [2]	2.86 [2]	3.1 [1]	3.91 [1]	3.9 [1]	6 [1]	6.9 [1]	5.5 [1]
Rated torque M_N	[Nm]	285				245	235	205	225	236	220
Rated speed n_N	[rpm]	60	80	91	96	119	159	182	255	279	239
Rated current I_N	[A]	11.5				9.9	9.5	8.3	14.8	15.6	13.9
Effective voltage $U_{\sim, eff}$	[V]	147	181	200	211	240	300	335	270	295	255
Stator frequency f_{Stator}	[Hz]	10	13.3	15.2	16	19.8	26.5	30.3	42.5	46.5	39.8
Efficiency (at rated load) η [3]	[%]	65	71	73	74	80	84	87	89	90	89
Power factor cos φ [3]		0.94	0.93		0.92	0.93	0.94		0.97	0.96	
Approach moment M_A	[Nm]	455				415			440	460	
Starting current I_A	[A]	18.9				17.2			29.3	30.8	
Max. permitted current $I_{max. per.}$	[A]	23							41		
Inverter type (standard) [4]		RPI5.5/MFR5.5 CPI09/15 FS MFC21-09/15							RPI7.5/MFR7.5 CPI15 FS MFC21-15		

Tab. 10

ATR_1_11_0038_0

1) S5 (240 c/h, 50% duty cycle).

2) S5 (180 c/h, 40% duty cycle).

3) Machine warm at 20°C ambient temperature.

4) Allocation of frequency inverter via calculation program (e.g. TLD).

PMC145 L

Electrical version		L201						
Suspension r		1:1				2:1		
Rated speed v	[m/s]	1			1.2	1		
Rated load (guide value) Q	[kg]	500	630			800	1000	
Diameter of traction sheave D_T	[mm]	320	240	210	240	320	240	210
Nominal power P_N	[kW]	2.76 [3]	3.69 [3]	4.2 [3]	4.42 [3]	4.7 [2]	6.01 [1]	6 [1]
Rated torque M_N	[Nm]	440				375	360	315
Rated speed n_N	[rpm]	60	80	91	96	119	159	182
Rated current I_N	[A]	18.3				15.5	14.9	13
Effective voltage $U_{\sim, eff}$	[V]	144	182	200	209	240	298	330
Stator frequency f_{Stator}	[Hz]	10	13.3	15.2	16	19.8	26.5	30.3
Efficiency (at rated load) η [4]	[%]	65	68	71	72	80	85	86
Power factor cos φ [4]		0.93	0.94	0.93		0.92		0.95
Approach moment M_A	[Nm]	700				615		
Starting current I_A	[A]	30				26		

Electrical version		L201
Max. permitted current $I_{max. per.}$	[A]	34
Inverter type (standard) [5]		RPI7.5/MFR7.5 CPI15 FS/MFC21-15

Tab. 11

ATR_1_11_0039_0

1) S5 (240 c/h, 50% duty cycle).

2) S5 (180 c/h, 50% duty cycle).

3) S5 (180 c/h, 40% duty cycle).

4) Machine warm at 20°C ambient temperature.

5) Allocation of frequency inverter via calculation program (e.g. TLD).

PMC145 XL

Electrical version		XL204		
Suspension r		2:1		
Rated speed v	[m/s]	1.6	1.75	2
Rated load (guide value) Q	[kg]	1000		630
Diameter of traction sheave D_T	[mm]	240		320
Nominal power P_N	[kW]	9.4 [1]	10.2 [1]	8 [1]
Rated torque M_N	[Nm]	352	350	320
Rated speed n_N	[rpm]	255	279	239
Rated current I_N	[A]	24.7	24.6	22.4
Effective voltage $U_{\sim, eff}$	[V]	260	285	248
Stator frequency f_{Stator}	[Hz]	42.5	46.5	39.8
Efficiency (at rated load) η [2]	[%]	90		87
Power factor cos φ [2]		0.96		
Approach moment M_A	[Nm]	650		700
Starting current I_A	[A]	46		50
Max. permitted current $I_{max. per.}$	[A]	60		
Inverter type (standard) [3]		RPI18/MFR18		
		CPI26FS MFC21-32		CPI32

Tab. 12

ATR_1_11_0040_0

1) S5 (240 c/h, 50% duty cycle).

2) Machine warm at 20°C ambient temperature.

3) Allocation of frequency inverter via calculation program (e.g. TLD).

2.2.2 Pole pairs

The machine has 10 magnetic pole pairs (20 poles).

2.2.3 Brake

Additional data for the brake: Chap. 3.2, P. 36.

Version		S/XS	M/XM	L/XL
Manufacturer		Warner Electric Europe		
Designation		ERS-VAR15	ERS-VAR07	

Version		S/XS	M/XM	L/XL
		-02	SZ420/350	SZ600/550
Electrical brake release		1 solenoid per brake circuit (series connection)		
Holding voltage	[VDC]	2 x 72 = 144		
Pull-in voltage	[VDC]	2 x 103.5 = 207		
Holding power	[W]	2 x 38	2 x 64.8	2 x 74
Pull-in power	[W]	2 x 78	2 x 132.4	2 x 156
Number of switch operations (S5)	[c/h]	240		
Duty cycle	[%]	50		
Monitoring devices		1 microswitch per brake circuit (monitoring of brake release)		

Tab. 13 ATR_1_11_0013_1

2.2.4 Encoder

Additional encoder data: Chap. 3.2, P. 36.

Manufacturer		Kübler	Baumer [1]	Heidenhain
Designation		Sendix absolute, type 5873	EAL580-B55	ECN 413
Data interface		BISS-C [1], SSI [2]		EnDat01
Code		binary [1], grey [2]		binary
Positions per revolution		8192 (13 bit)		
System accuracy			+- 0.025°	+-20"
Incremental signals (sine/cosine)		2 x 2048; 1 Vpp		
Limit frequency (-3 dB)	[kHz]	400	200	400
Supply voltage	[VDC]	4.5 ... 5.5		3.6 ... 14
Current consumption	[mA]	max. 70 [5VDC]	max. 50	max. 160
Protection class		IP65	IP64	
Vibration 50 to 2000 Hz in accordance with EN 60 068-2-6	[m/s²]	max. 100		max. 300
Shock according to EN 60 068-2-27		max. 2500 m/s² 6 ms	max. 2000 m/s² 3 ms	max. 1000 m/s², 6 ms max. 2000 m/s², 2 ms
Operating temperature	[°C]	-40 … +105	-20 … +105	-40 … +100
Mechanical structure		Conical shaft 1 : 10		
Electrical connection		15-pin D-Sub plug connector (2-row) [1]		
		15-pin D-Sub plug connector (3-row) [2]		
Cable length	[m]	5 or 10 [3]		

Tab. 14 ATR_1_11_0017_0

1) Standard version, encoders made by Kübler and Baumer are compatible

2) For deployment in USA/Canada

3) 10 m only in conjunction with standard version

2.2.5 Temperature monitoring

NOTICE

Overheating of the motor

Motor can be damaged.

→ In the case of overtemperature, the elevator installation must be shut down.

For temperature monitoring, a thermistor is embedded in the stator winding; this outputs a switching signal in the case of overtemperature.

The temperature monitoring must be connected to an evaluation unit that complies with the standard DIN VDE V 0898-1-401 and must be monitored by the elevator control system.

Type		PTC triplex PTC thermistor
Tripping temperature	[°C]	110 (± 5)
Measurement voltage	[V]	2.5
Max. operating voltage	[V]	30

Tab. 15 ATR_1_10_0004_1

2.3 Limit values

The maximum temperature on the surface of the PMC145 is 95°C at 45°C ambient temperature.

The specified electrical data apply to the ambient conditions described in Chap. 2.3.1, P. 20.

Max. permitted voltage (earth cable, measured at the terminal blocks)	[V]	1200
Voltage at the motor terminals (wire-wire)	[V]	1200
Rise time of measured voltage (10- 90%) at the motor terminal	[ns]	100
Layout of insulation material according to insulating material class		B
Utilization according to insulating material class		A

Tab. 16 ATR_1_11_0036_0

2.3.1 Ambient conditions

The machine is designed for operation under the following ambient conditions:

- Relative air humidity up to 95% (no dewfall)
- Ambient temperature between +5 °C and +40 °C
- Site altitude without derating up to 1000 m amsl
- A minor dust and/or salt content in the air is permitted (harbour towns)

With the following conditions, the brake is able to hold the stationary elevator securely:

- Air humidity up to 99% (no dewfall)
- Temperature between -30°C and +70°C

2.3.2 Service life

The machine is configured for a service life of:

- At least 20 years or
- 20 000 hours of operation or
- 3.6 million elevator runs

2.4 Derating

Besides the electric motor, the brake is also affected by derating. Additional information: Chap. 3.2, P. 36

If the conditions stated in Chap. 2.3.1, P. 20 are exceeded, the deratings in accordance with DIN EN60034 and/or VDE0530 apply. A power increase for reduced requirements is not possible.

2.5 Dimensions

2.5.1 PMC145 S2 machine

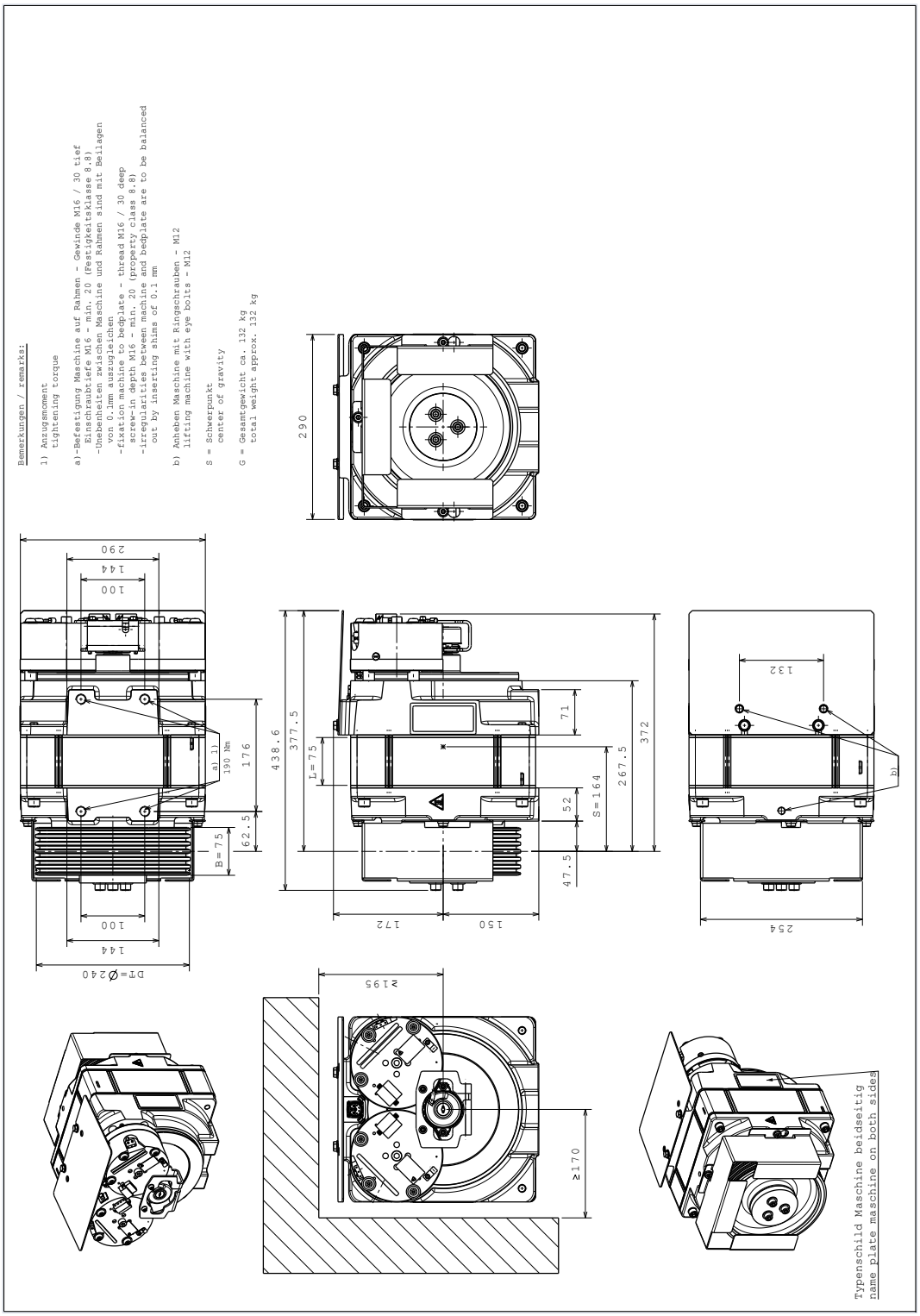


Fig. 5

ATR_2_11_0032_0

2.5.2 PMC145 XS2 machine

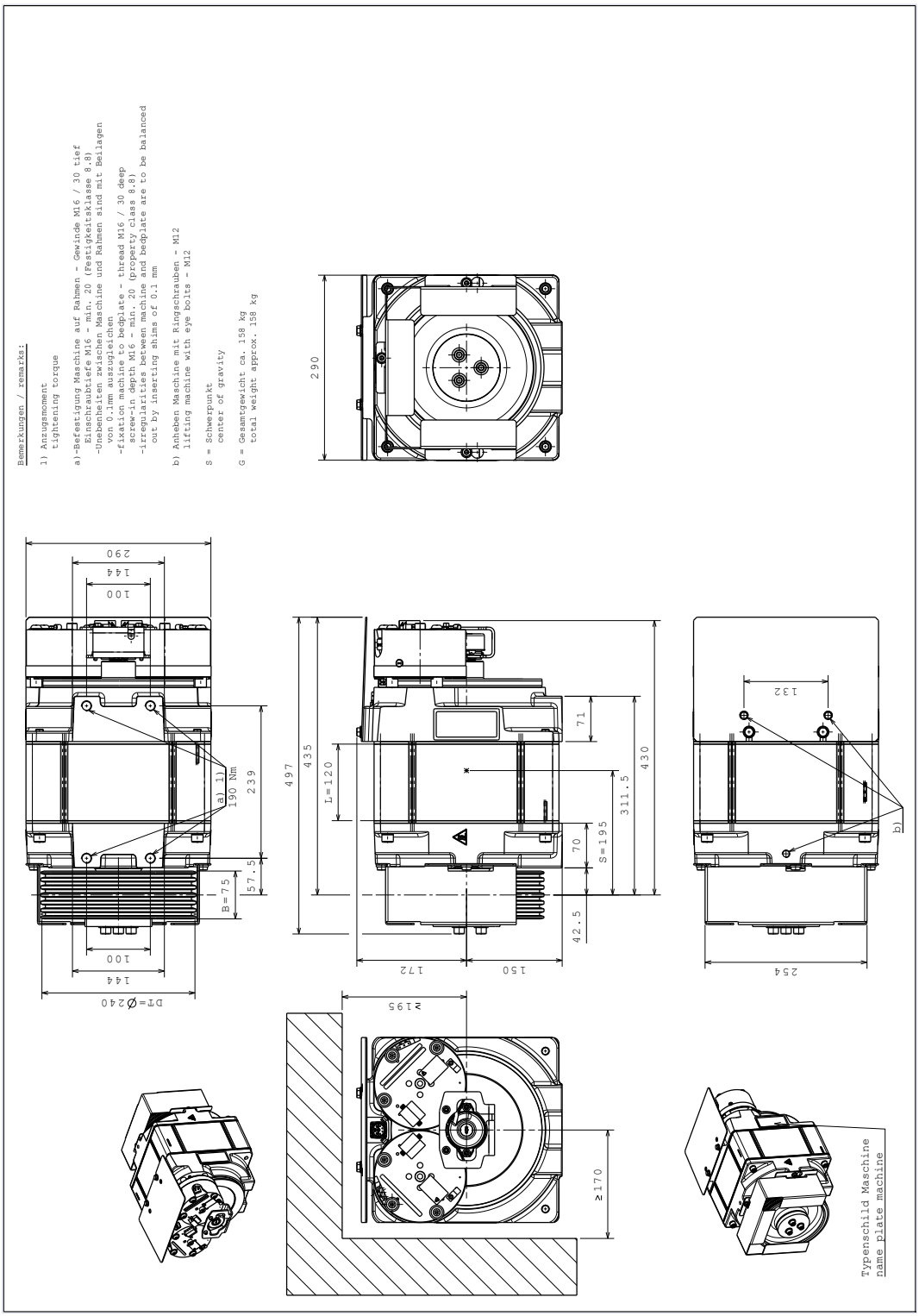


Fig. 6

ATR_2_11_0036_0

2.5.3 PMC145 M2 machine

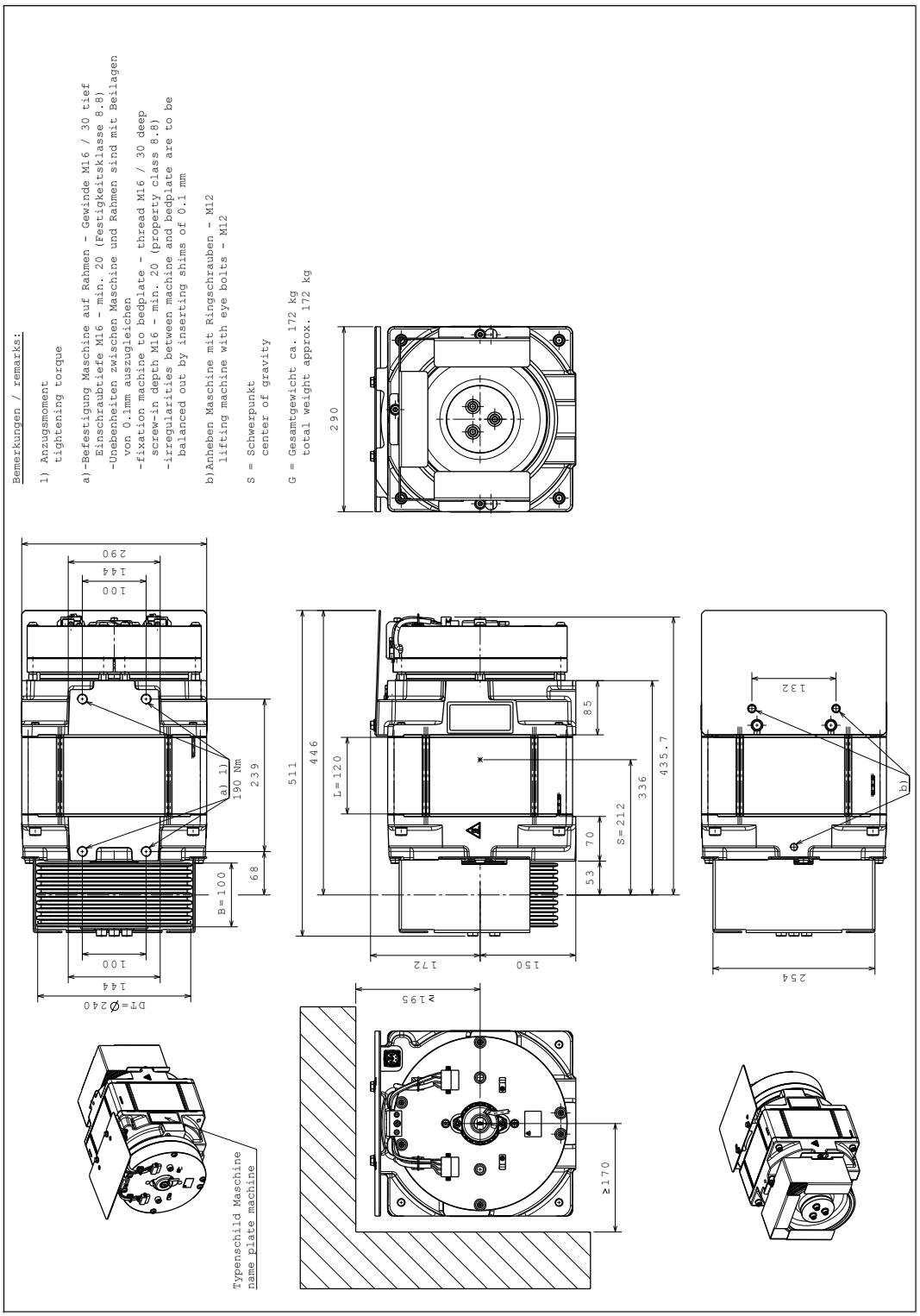


Fig. 7

ATR_2_11_0033_0

2.5.4 PMC145 XM2 machine

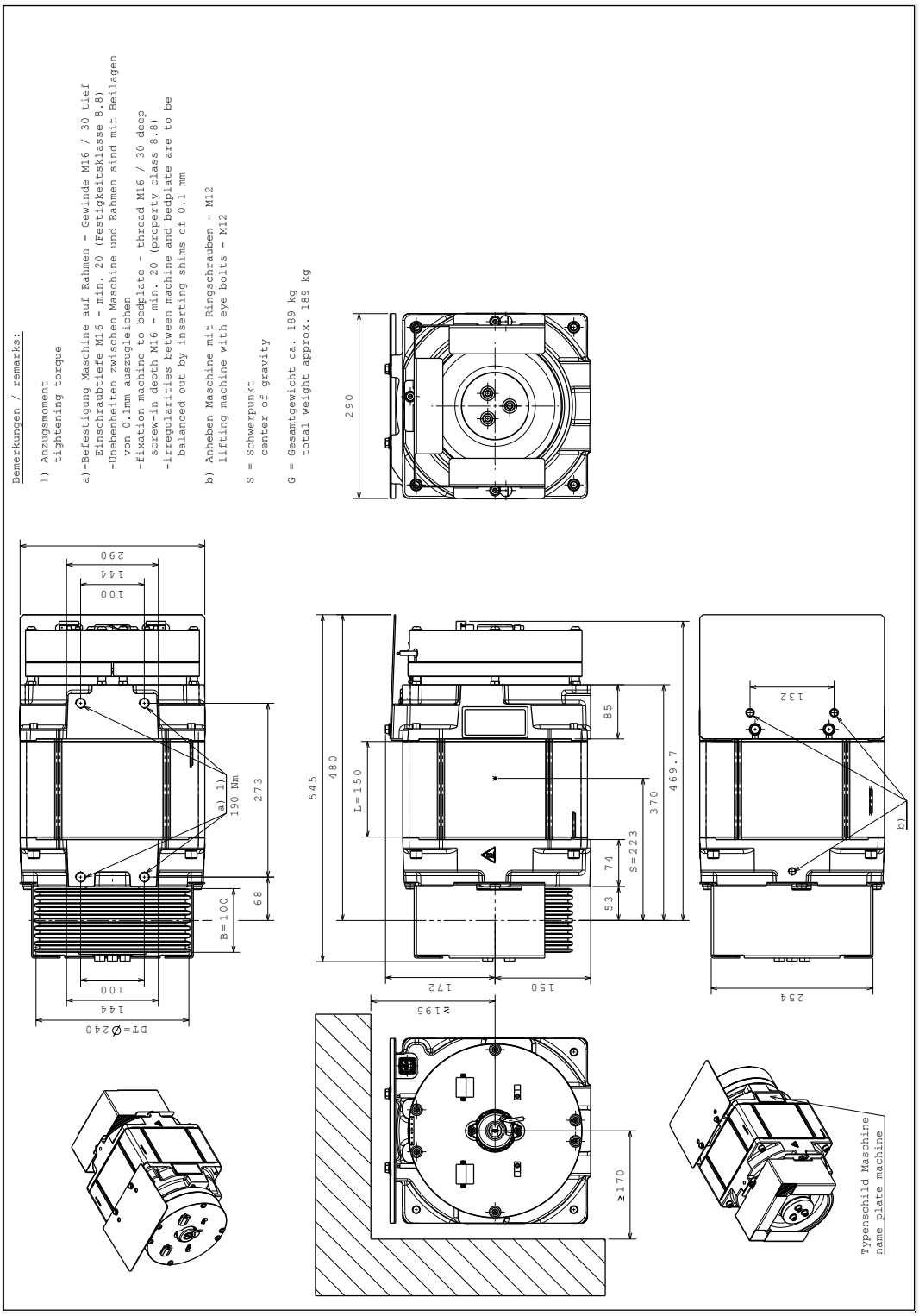


Fig. 8

ATR_2_11_0038_0

2.5.5 PMC145 L2 machine

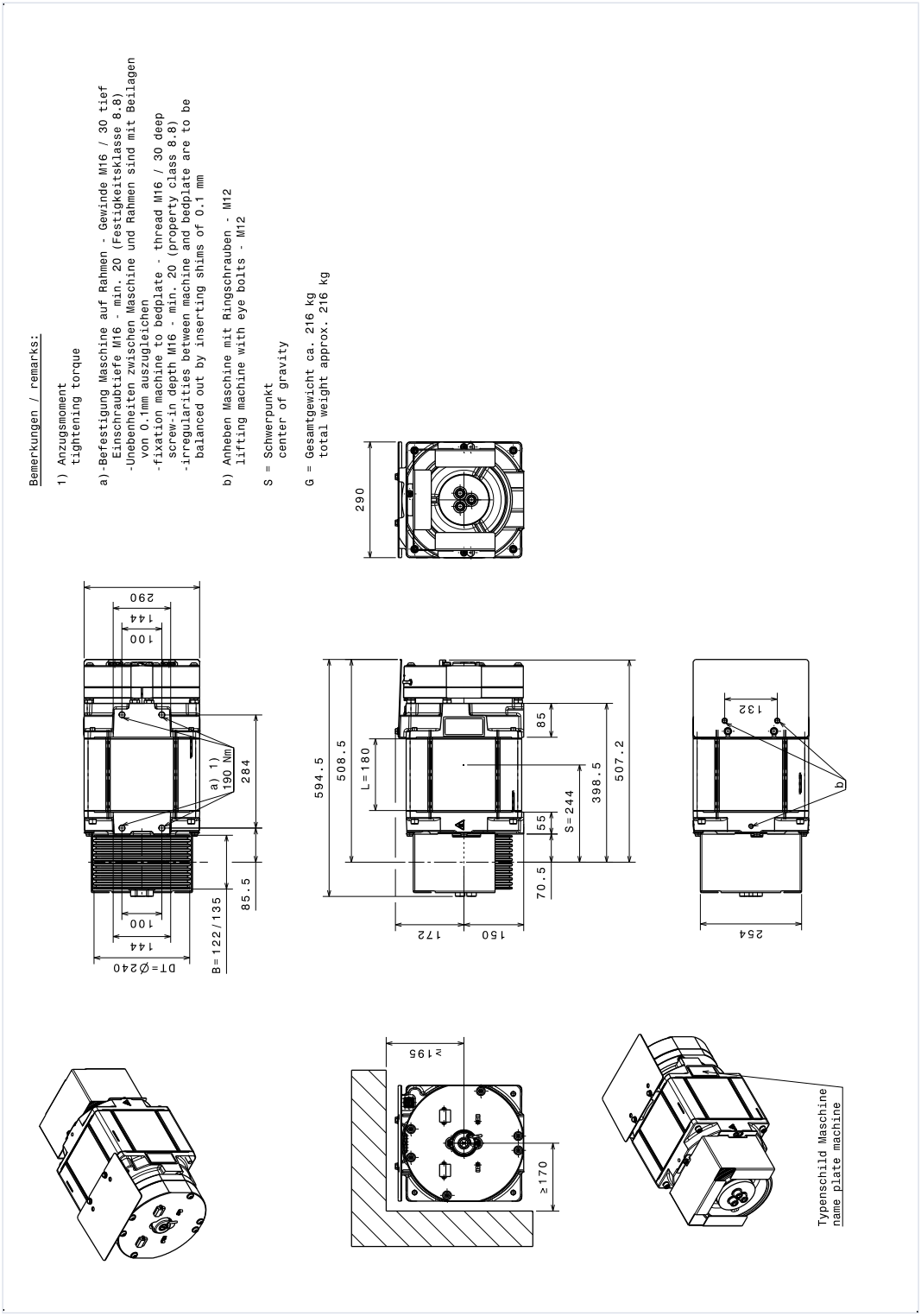


Fig. 9

ATR_2_11_0035_0

2.5.6 PMC145 XL2 machine

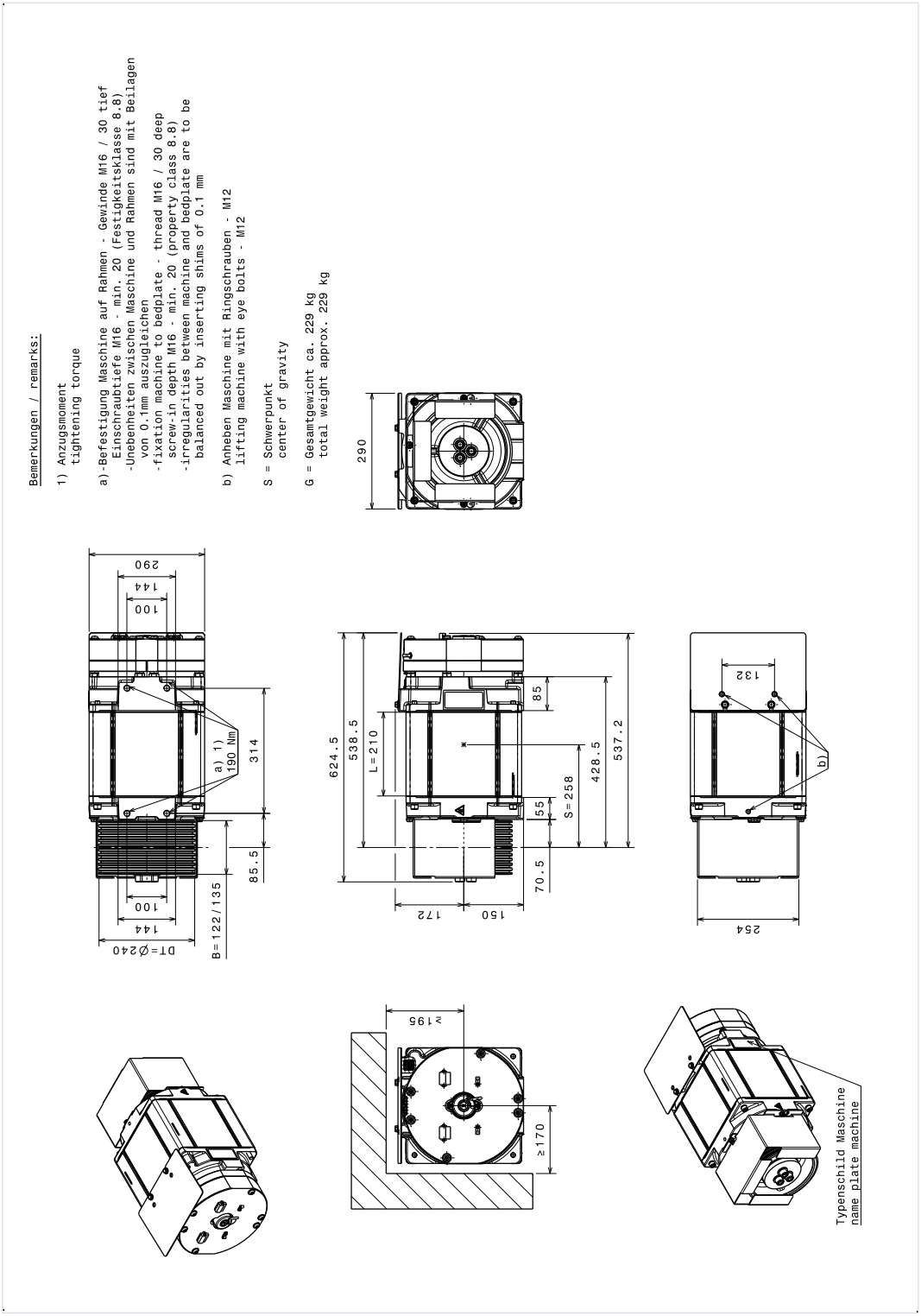


Fig. 10

ATR_2_11_0039_0

2.5.7 Additional dimensions for brake with manual brake release and add-on handwinding wheel

PMC145 S and XS

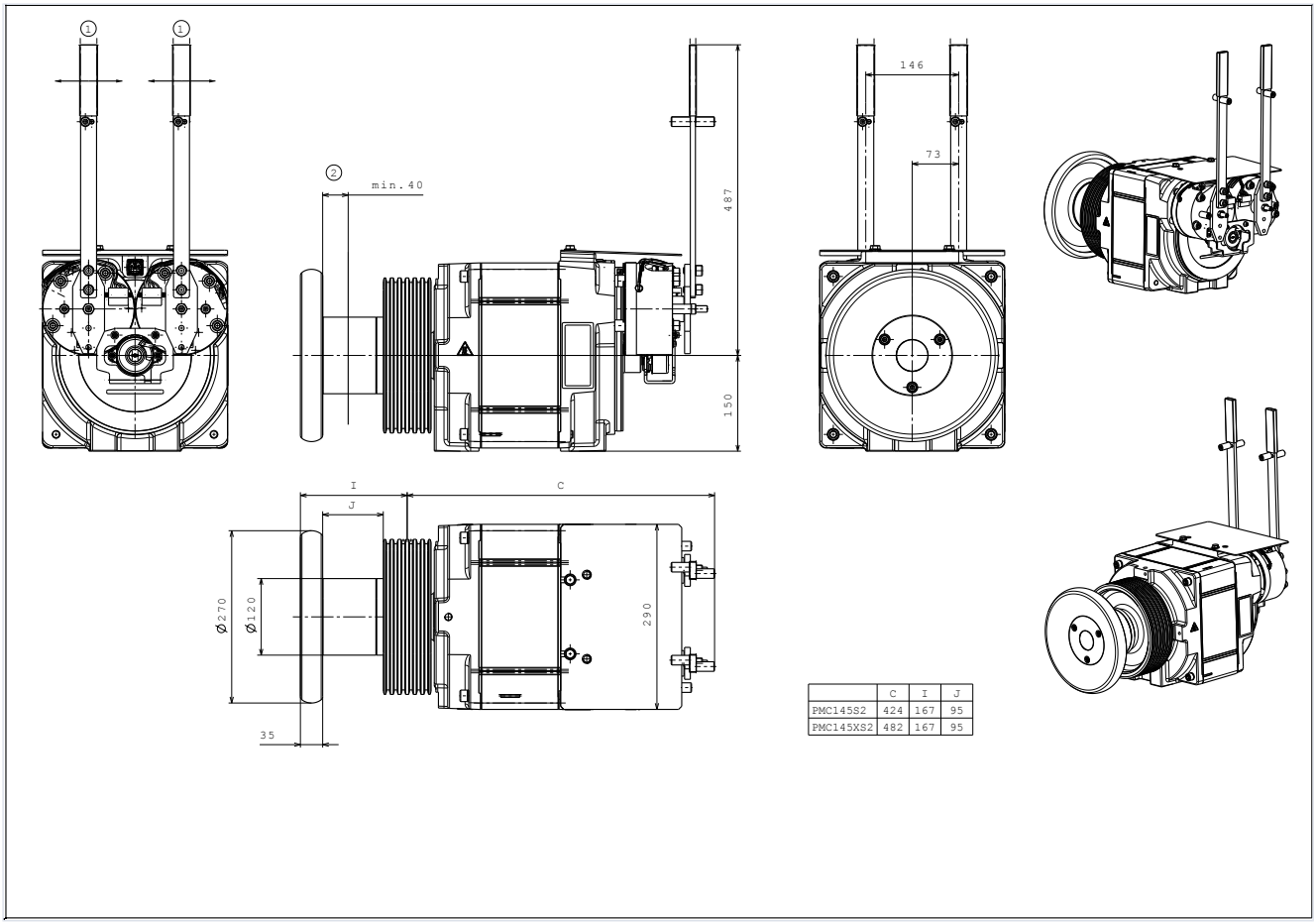
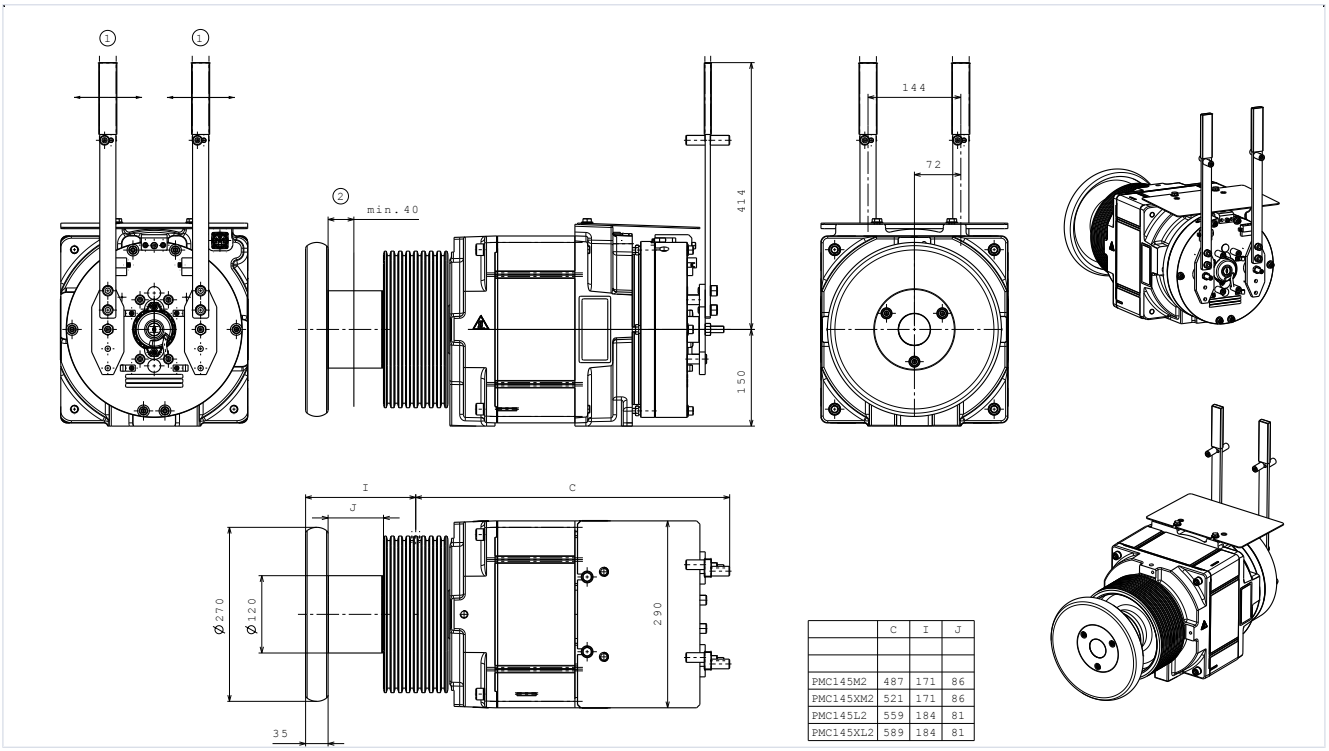


Fig. 11

ATR_2_11_0037_0

PMC145 M, XM, L, XL



	C	I	J
PMC145M2	487	171	86
PMC145XM2	521	171	86
PMC145L2	559	184	81
PMC145XL2	589	184	81

Fig. 12

ATR_2_11_0034_0

2.5.8 Side of traction sheave for traction sheave diameters 240 mm, 210 mm and 320 mm

PMC145 M and PMC145 XM

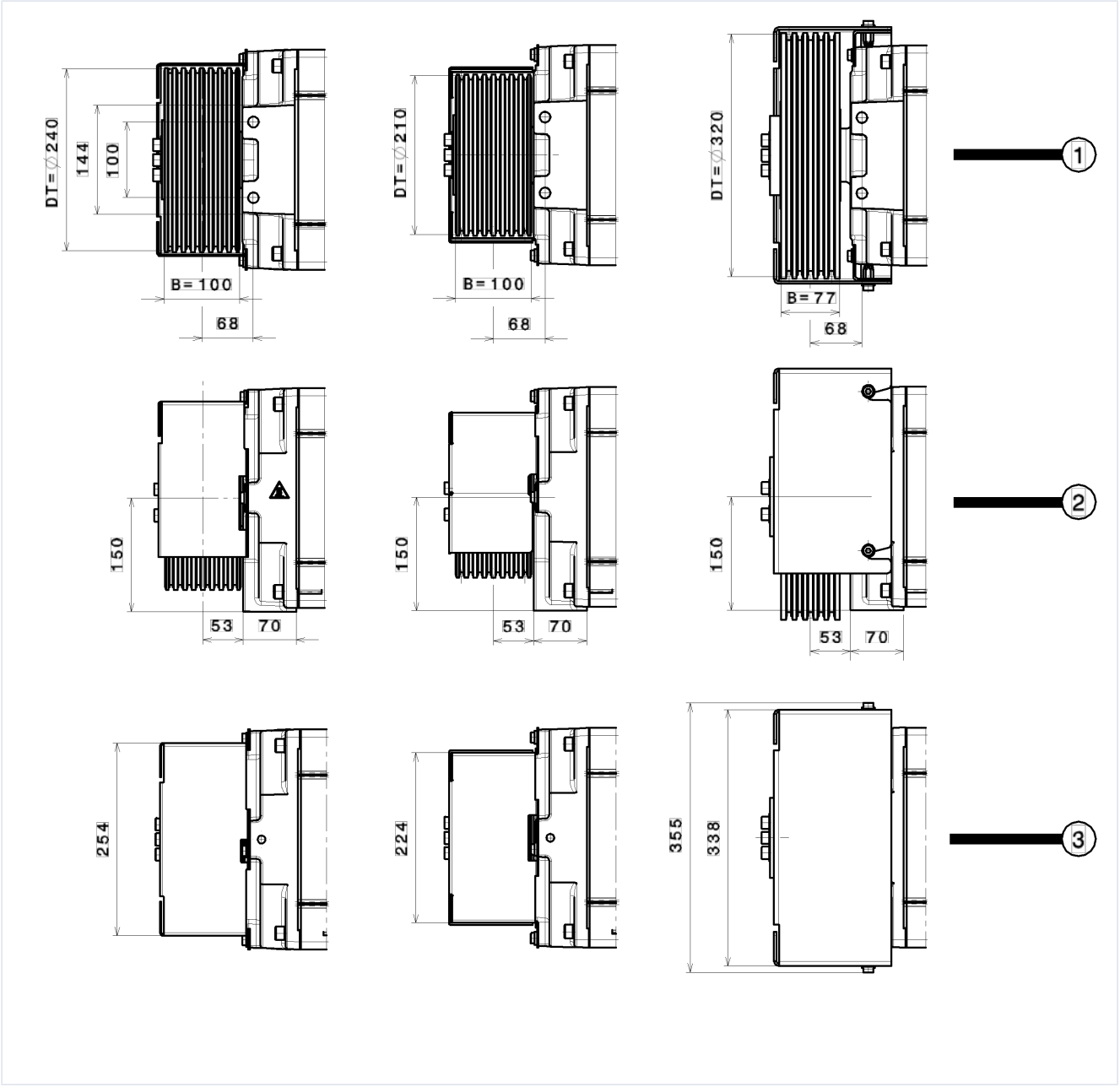


Fig. 13

ATR_2_11_0045_0

Item	Designation	Item	Designation
1	View from below	2	Side view
3	Top view		

PMC145 L and PMC145 XL

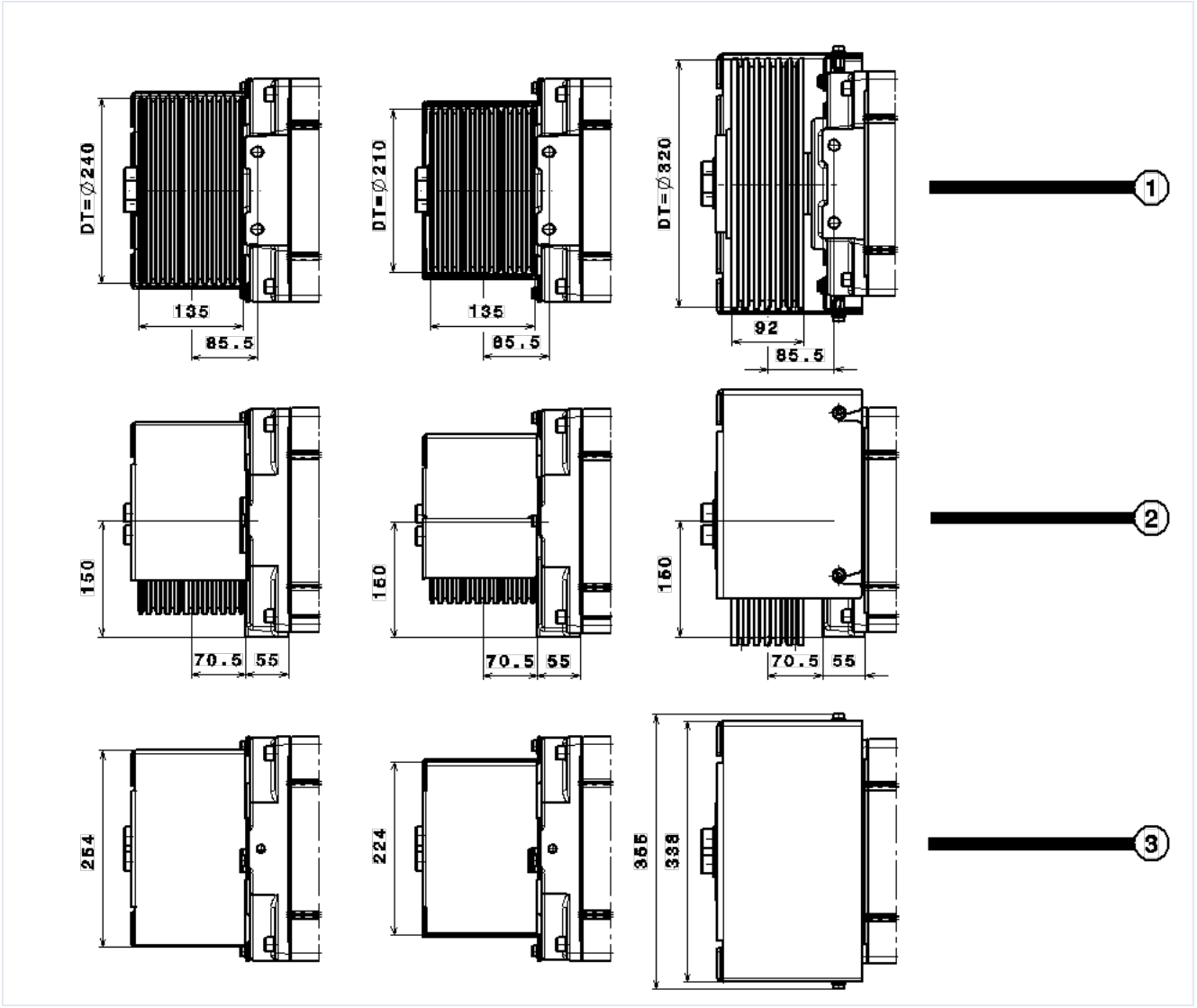


Fig. 14 ATR_2_11_0046_0

Item	Designation	Item	Designation
1	Top view	2	Side view
3	View from below		

2.6 Wiring diagram

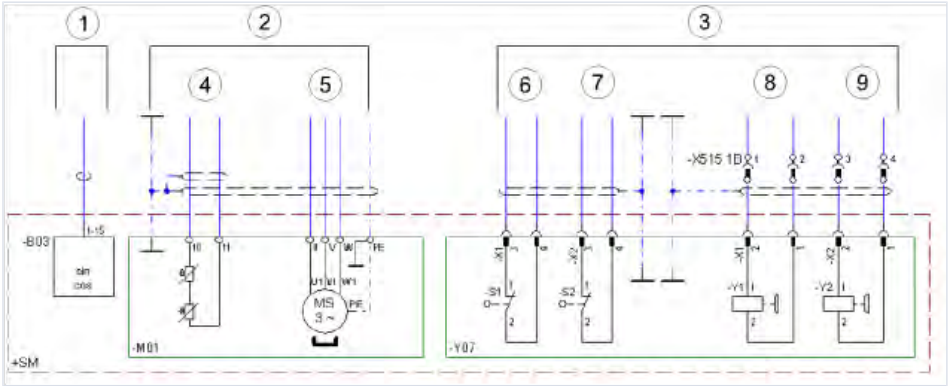


Fig. 15 ATR_2_11_0028_0

Item	Designation	Item	Designation
1	Encoder	2	Motor
3	Brake	4	Thermistor
5	Motor winding	6	Brake opening monitoring - brake 1
7	Brake opening monitoring - brake 2	8	Coil – brake 1
9	Coil – brake 2		

2.7 Electrical connection

The machine has 3 different connection lines. All lines are provided with shielding to prevent disruptive influences.

- Motor/thermistor — on both sides with plug connectors, connected on machine side
- Brake — supplied loose, with plug connectors on both sides
- Encoder — installed on encoder, on inverter side with plug connector

Cable lengths and areas of application

The above-mentioned connection lines are available with the following lengths:

- 5 m: preferably in installations without machine room (MRL, for example synergy)
- 10 m: if 5 m is not sufficient

2.7.1 Motor

Different versions of the motor cables

The motor cable is available in the following versions:

- On the motor side, always with round plug.
- On the inverter side, there are the following versions:
  - With connector for connection to the RPI/MFR inverter
  - Without connector, i. e. with end sleeves for connection to the CPI/MFC inverter or third-party inverters.

The motor cable contains four conductors for the power supply and two conductors for temperature monitoring.

Machine size	Motor cable size [mm²]
PMC145 S, XS, M, XM	2.50
PMC145 L, XL	4.00

Tab. 17 ATR_1_11_0018_0

Motor cable connection to CPI/MFC devices

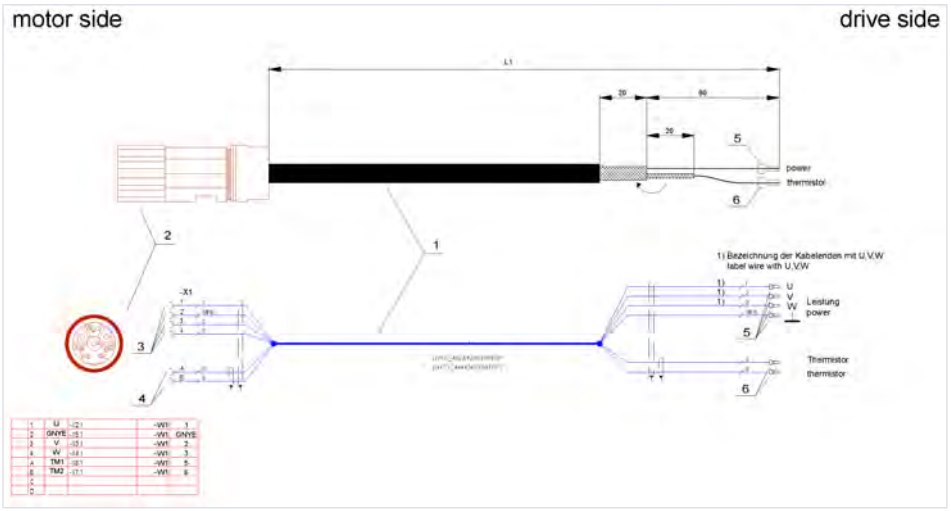


Fig. 16 ATR_2_11_0025_0

Motor cable connection to RPI/MFR devices

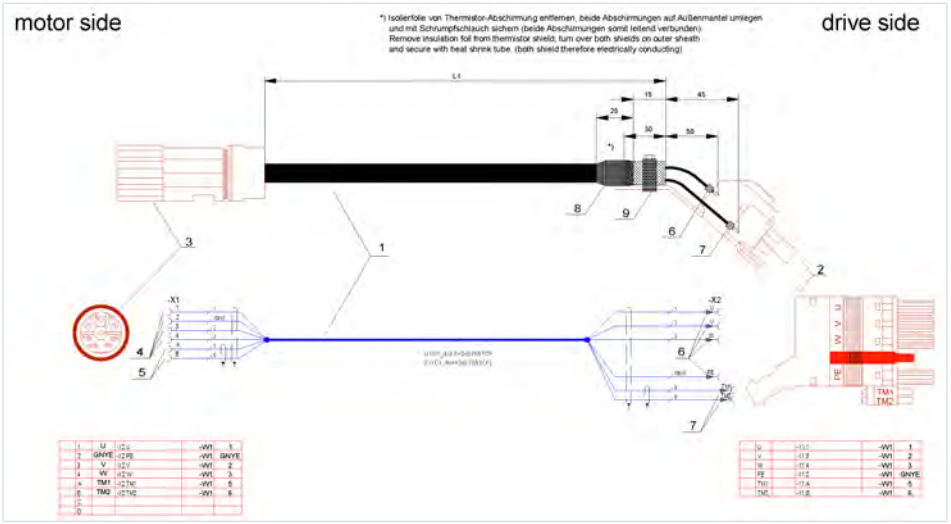


Fig. 17 ATR_2_11_0026_0

2.7.2 Brake

On connecting the brakes, the manufacturer of the elevator installation must implement suitable measures that enable testing of the brake (separately for each brake circuit) and rescue operation (also in the event of a power failure).

Brake-side connection of the brake line

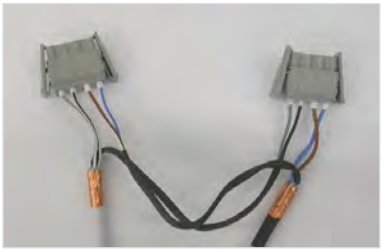


Fig. 18 ATR_2_11_0022_0

Inverter-side connection of the brake line

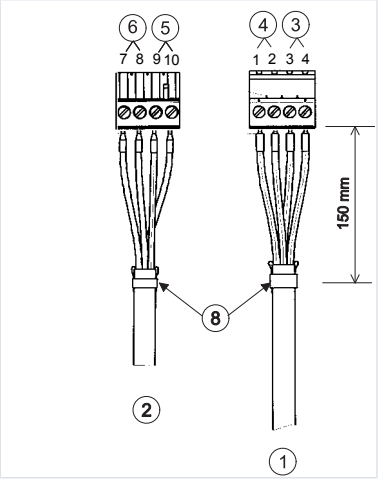


Fig. 19 ATR_2_11_0023_0

Item	Designation	Item	Designation
1	Cable for magnet coils with Phoenix Contact connector type GIC2.5/4-ST-7.62	2	Cable for monitoring devices with Phoenix connector FKC 2.5/4-ST-5.08
3	Coil – brake 1	4	Coil – brake 1
5	Brake release control microswitch – brake 2	6	Brake release control microswitch – brake 1
		8	Exposed shielding

2.7.3 Encoder

NOTICE

The encoder connection cable makes contact with hot machine surface

Cable is damaged.

→ The connection cable must not make contact with the machine surface.

NOTICE

Signal is connected to an unused pin.

The encoder is damaged.

→ Unused pins must not be used.

The encoder fitted as standard is specially geared to the drive and must not be changed. If an incorrect encoder position means that no more torque can be transferred, controlled movement of the elevator is no longer possible.

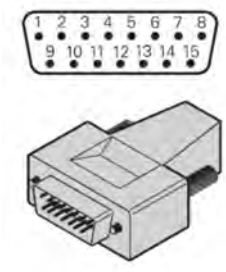


Fig. 20 ATR_2_12_0053_2

Terminal connecting plan for encoder with 2-row plug connector

4	12	2	10	1	9	3	11	5	13	8	15	6
5V U_P	5V sensor	0V U_N	0V sensor	A+	A-	B+	B-	DATA	$\overline{\text{DATA}}$	CLOCK	$\overline{\text{CLOCK}}$	Innenschirm Internal shield (0V)
br/gn BN/GN	bl BL	ws/gn WH/GN	ws WH	gn/sw GN/BK	ge/sw YL/BK	bl/sw BL/BK	rt/sw RD/BK	gr GY	rs PK	vio VI	ge YL	

Fig. 21 ATR_2_12_0053_1

An external screen is fitted at the housing. The sensor line is connected internally to the power supply. **Connections 7 and 14 are not used and must not be used.**

Additional information: Chap. 3.2, P. 36

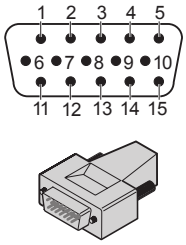


Fig. 22 ATR_2_11_0016_0

Terminal connecting plan for encoder with 3-row plug connector

13	14	1	2	3	4	5	6	11	12	14
+V (U_P)	0V (U_N)	A+	A-	B+	B-	DATA	$\overline{\text{DATA}}$	CLOCK	$\overline{\text{CLOCK}}$	Innenschirm Internal shield (0V)
br/gn BN/GN	ws/gn WH/GN	gn/sw GN/BK	ge/sw YL/BK	bl/sw BL/BK	rt/sw RD/BK	gr GY	rs PK	vio VI	ge YL	

Fig. 23 ATR_2_11_0017_0

An external screen is fitted at the housing.

Connections 7, 9, 10 and 15 are not used and must not be used!

Connection 8 with Kübler encoder with SSI: set input for zeroing.

Connection 8 with Heidenhain encoder is not used and must not be used!

Additional information: Chap. 3.2, P. 36

3 Appendix

3.2 Manufacturer information

Also see about this

ThyssenKrupp Aufzugswerke

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

Neuhausen, den 14. Januar 2016

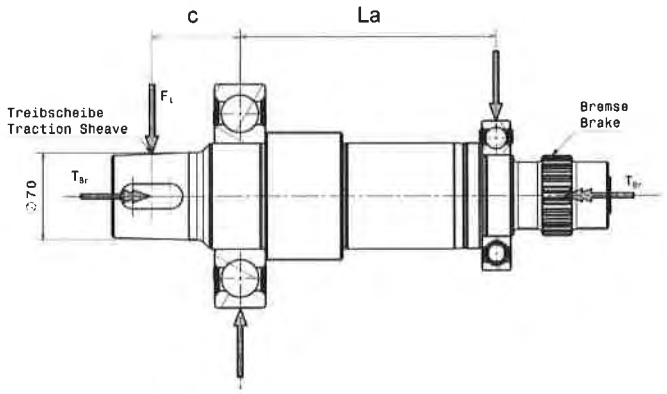
Lift machine type: **PMC145S2/XS2**

Brake type: **ERS VAR 15-02 – 2x250Nm** according
- EC-Type – Examination ABV 777/x
- EC-Type – Examination EU-BD 777/x

Manufacturer: ThyssenKrupp 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, DIN743, machine elements Niemann/Winter/Höhn (2005)



Design drawing: 6251 000 0217 (PMC145S2), 6251 000 0216 (PMC145XS2)
Material: C45R+N (1.1201)

Load data:

Lift machine type	Distance Traction sheave c	Bearing Distance La	Max. Shaft load F_t	Nominal brake torque T_{Br}	Max. brake torque 2,0 x T_{Br}
	(mm)	(mm)	(kN)	(Nm)	(Nm)
PMC145S2	60,5	158	14	2x250=500	1000
PMC145XS2	70,5	206	15		

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 the EC Type-Examination Certificate no. ABV777/x respectively EC Type-Examination Certificate EU BD 777/x are herewith fulfilled.

..... (Executive board)

..... (Engineering CCU-TD)

ThyssenKrupp Aufzugswerke

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

Neuhausen, den 14. Januar 2016

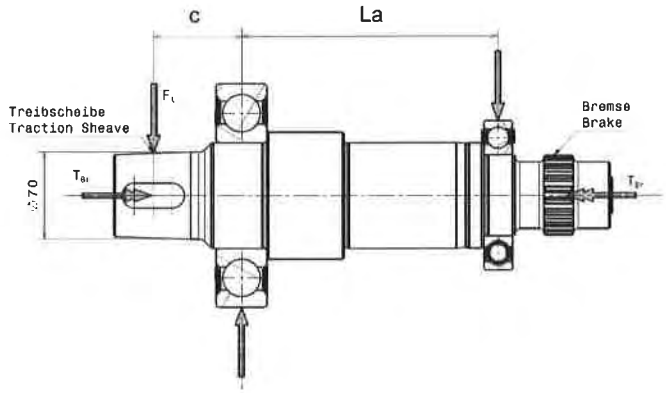
Lift machine type: **PMC145M2/XM2**

Brake type: **ERS VAR 07 SZ420 – 2x350Nm** according
- EC-Type – Examination ABV 843/x
- EC-Type – Examination EU-BD 819/x

Manufacturer: ThyssenKrupp 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, DIN743, machine elements Niemann/Winter/Höhn (2005)



Design drawing: 6251 000 0246 (PMC145M2), 6251 000 0245 (PMC145XM2)
Material: C45R+N (1.1201)

Load data:

Lift machine type	Distance Traction sheave c	Bearing Distance La	Max. Shaft load F_t	Nominal brake torque T_{Br}	Max. brake torque 2,0 x T_{Br}
	(mm)	(mm)	(kN)	(Nm)	(Nm)
PMC145M2	81	206	18	2x350=700	1400
PMC145XM2	83	238	19		

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 the EC Type-Examination Certificate no. ABV 843/x respectively EC Type-Examination Certificate EU BD 819/x are herewith fulfilled.

(Executive board)

(Engineering CCU-TD)

ThyssenKrupp Aufzugswerke

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

Neuhausen, den 14. Januar 2016

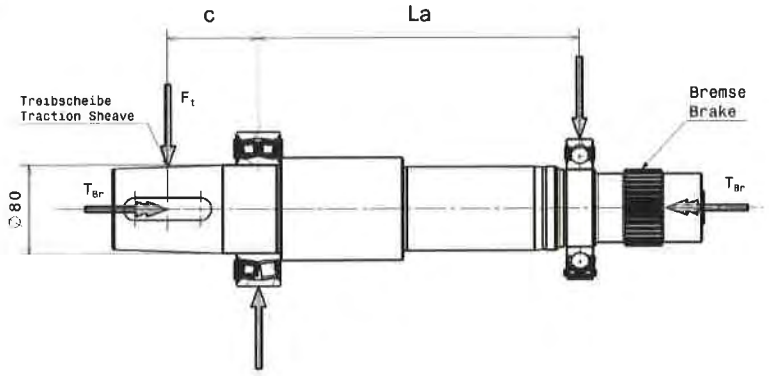
Lift machine type: **PMC145L2/XL2**

Brake type: **ERS VAR 07 SZ600 – 2x550Nm** according
- EC-Type – Examination ABV 844/x
- EC-Type – Examination EU-BD 819/x

Manufacturer: ThyssenKrupp 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, DIN743, machine elements Niemann/Winter/Höhn (2005)



Design drawing: 6251 000 0252 (PMC145L2), 6251 000 0251 (PMC145XL2)
Material: C45R+N (1.1201)

Load data:

Lift machine type	Distance Traction sheave c	Bearing Distance La	Max. Shaft load F_t	Nominal brake torque T_{Br}	Max. brake torque 2,0 x T_{Br}
	(mm)	(mm)	(kN)	(Nm)	(Nm)
PMC145L2	85	262	32	2x550=1100	2200
PMC145XL2	85	292	30		

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 the EC Type-Examination Certificate no. ABV 844/x respectively EC Type-Examination Certificate EU BD 819/x are herewith fulfilled.

(Executive board)

(Engineering CCU-TD)

Baumer
Passion for Sensors

EN Translation of the original operating and mounting instructions

EAL580-B55.T$6B.13009.2/

Absolute encoder – BISS-C

CE

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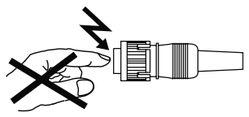
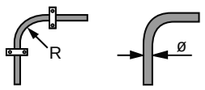
Printed in Germany · 05.15 · Version 01 · 81157096



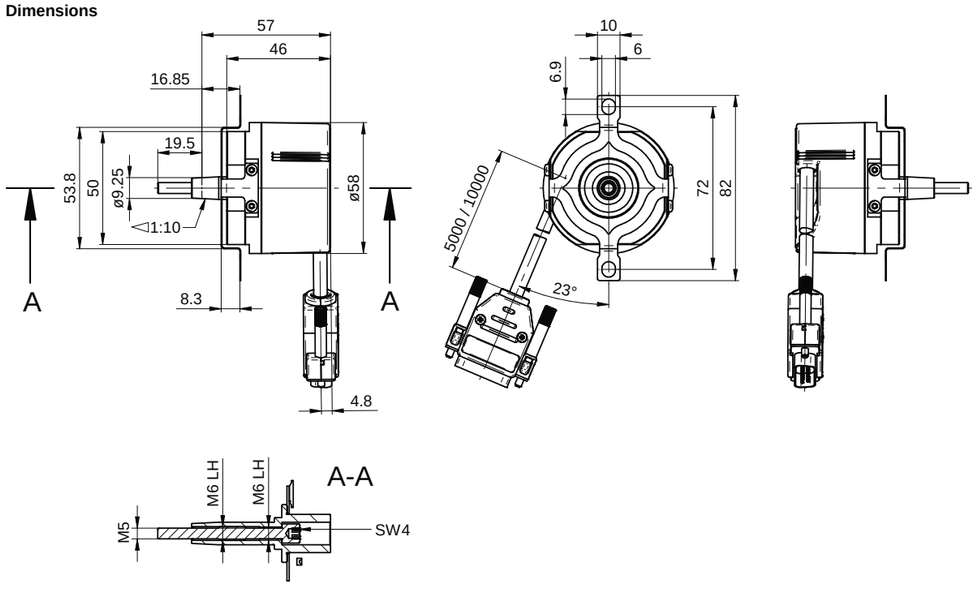


ø = 6.4 mm

R fix ≥23 mm
R flexible ≥46 mm

Tensile strength of cable outlet:
30 N compliant to EN 50262

Dimensions



Safety instructions
Observe the applicable law, directives and standards for use respectively intended use.

Do not put encoder into service if there is any visible evidence of damage.
Please refer to and observe the operating instructions of the machine manufacturer.
Do not operate the system outside the specifications.
Prior to commissioning the system, check every electrical connection.
Installation, electrical commissioning or any other work at encoder or system is to be performed by appropriately qualified staff only.
Appropriate safety precautions must eliminate any risk of personal injury, damage to property or installations which may result from encoder failure or malfunction.

Mounting and installation
Encoder mounting and installation are to be performed by appropriately qualified electronic experts only.

Intended use of the device
The encoder is a precision instrument for the acquisition of angular positions, their electronic evaluation and provision in the form of electronic output signals for the downstream device. The encoder must not be used for any other purpose.

Transport, storage and disposal
Only ever store and transport the encoder in its original packaging. Do not drop the encoder; otherwise it must no longer be deployed. Dispose of components according to the country-specific applicable law.

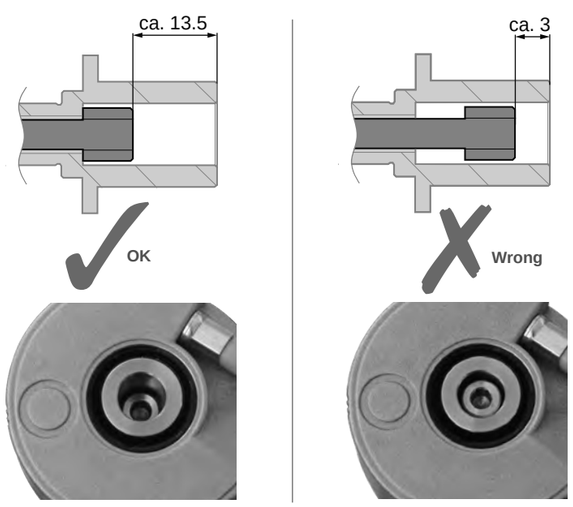
Maintenance
The encoder is maintenance-free and must not be opened or mechanically/electrically modified in any way.

Mounting instructions
Avoid any shocks or mechanical impact on housing or shaft.

Mounting the encoder:
- Countersink center screw M5 (SW4) to have it fully rest on the inside shoulder of the encoder shaft (see drawing ①).
- Fasten center screw onto motor shaft (tightening torque 3 Nm ±0.05 Nm).
- Slightly pull back the encoder while screwing (see drawing ②). This way it is ensured the center screw will fully rest on the inside shoulder of the encoder shaft!
- Attach stator coupling to the contact surface using two screws (not included) Make sure the spring arms remain free to move (see drawing ③).

The fastening screw provides microencapsulation and requires the motor shaft being absolutely free from oil and grease! Due to microencapsulation, the center screw can be used only once. Observe at least 6 h hardening time.

①



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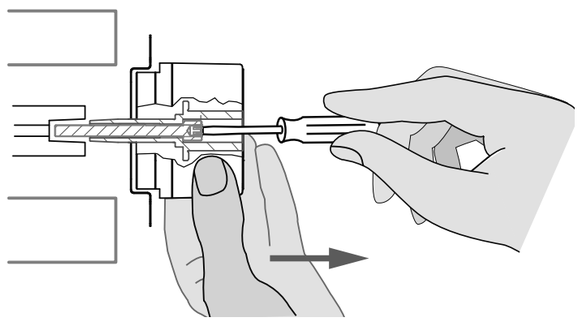
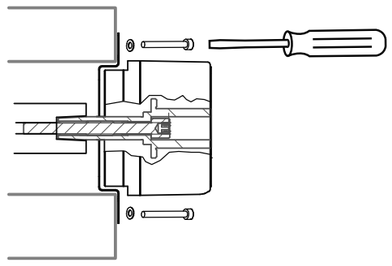


③



Fastening screws for stator coupling are not included!

Failure to observe will result in impaired operational safety.

Electrical commissioning
Do not modify the encoder electrically nor perform any wiring work while the encoder is live. Any output which is left unassigned must not be wired. Make sure the entire system installation is EMC compliant. Installation environment and wiring affect the encoder EMC. Encoder and supply lines must be spatially separated or routed at a great distance from cables with high interference level (frequency converters, contactors, etc.). Provide separate encoder supply where consumers with high interference levels are present. Encoder housing and connecting cable must be fully shielded. Grounding at both ends is recommended. Connector attachment at a temperature below -10 °C requires re-tightening the fastening screws as soon as the surroundings are warming up.

Terminal assignment

Connector	Assignment
Pin 1	A
Pin 2	GND
Pin 3	B
Pin 4	UB
Pin 5	Data+
Pin 6	–
Pin 7	–
Pin 8	Clock+
Pin 9	A inv.
Pin 10	GND-Sense
Pin 11	B inv.
Pin 12	UB-Sense
Pin 13	Data-
Pin 14	–
Pin 15	Clock-

Encoder deinstallation
1. Unscrew the encoder stator coupling from the contact surface.
2. Fully loosen the center screw and remove encoder from drive shaft.

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EN Translation of the original operating and mounting instructions

EAL580-B55.T$5B.13009.2/

Absolute encoder – SSI

CE

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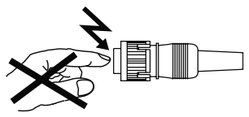
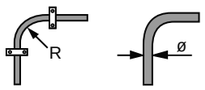
Printed in Germany · 05.15 · Version 01 · 81157095





ø = 6.4 mm

R fix ≥23 mm
R flexible ≥46 mm

Tensile strength of cable outlet:
30 N compliant to EN 50262

Safety instructions
Observe the applicable law, directives and standards for use respectively intended use.

Do not put encoder into service if there is any visible evidence of damage.
Please refer to and observe the operating instructions of the machine manufacturer.
Do not operate the system outside the specifications.
Prior to commissioning the system, check every electrical connection.
Installation, electrical commissioning or any other work at encoder or system is to be performed by appropriately qualified staff only.
Appropriate safety precautions must eliminate any risk of personal injury, damage to property or installations which may result from encoder failure or malfunction.

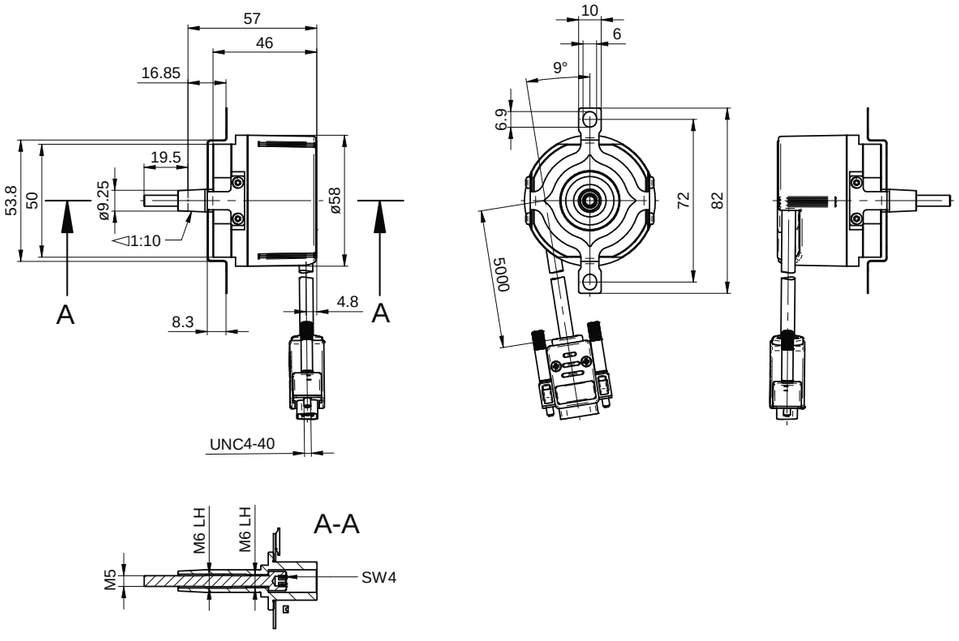
Mounting and installation
Encoder mounting and installation are to be performed by appropriately qualified electronic experts only.

Intended use of the device
The encoder is a precision instrument for the acquisition of angular positions, their electronic evaluation and provision in the form of electronic output signals for the downstream device. The encoder must not be used for any other purpose.

Transport, storage and disposal
Only ever store and transport the encoder in its original packaging. Do not drop the encoder; otherwise it must no longer be deployed. Dispose of components according to the country-specific applicable law.

Maintenance
The encoder is maintenance-free and must not be opened or mechanically/electrically modified in any way.

Dimensions

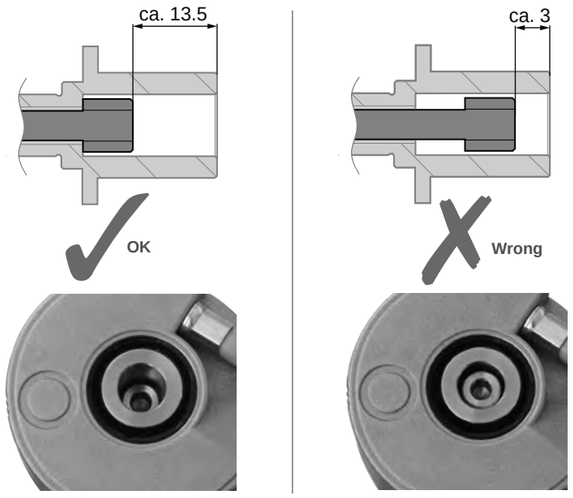


Mounting instructions
Avoid any shocks or mechanical impact on housing or shaft.

Mounting the encoder:
- Countersink center screw M5 (SW4) to have it fully rest on the inside shoulder of the encoder shaft (see drawing ①).
- Fasten center screw onto motor shaft (tightening torque 3 Nm ±0.05 Nm).
- Slightly pull back the encoder while screwing (see drawing ②). This way it is ensured the center screw will fully rest on the inside shoulder of the encoder shaft!
- Attach stator coupling to the contact surface using two screws (not included) Make sure the spring arms remain free to move (see drawing ③).

The fastening screw provides microencapsulation and requires the motor shaft being absolutely free from oil and grease! Due to microencapsulation, the center screw can be used only once. Observe at least 6 h hardening time.

①



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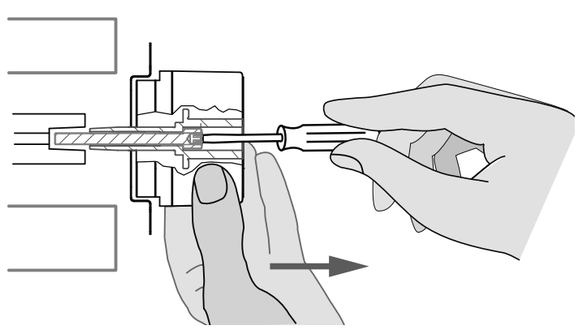
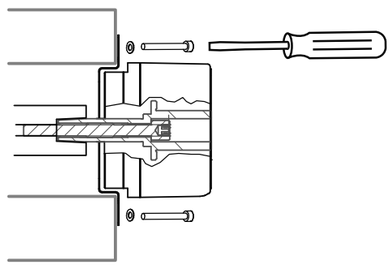


③



Fastening screws for stator coupling are not included!

Failure to observe will result in impaired operational safety.

Electrical commissioning
Do not modify the encoder electrically nor perform any wiring work while the encoder is live. Any output which is left unassigned must not be wired. Make sure the entire system installation is EMC compliant. Installation environment and wiring affect the encoder EMC. Encoder and supply lines must be spatially separated or routed at a great distance from cables with high interference level (frequency converters, contactors, etc.). Provide separate encoder supply where consumers with high interference levels are present. Encoder housing and connecting cable must be fully shielded. Grounding at both ends is recommended. Connector attachment at a temperature below -10 °C requires re-tightening the fastening screws as soon as the surroundings are warming up.

Terminal assignment

Connector	Assignment
Pin 1	A
Pin 2	A inv.
Pin 3	B
Pin 4	B inv.
Pin 5	Data+
Pin 6	Data-
Pin 7	–
Pin 8	Zero setting
Pin 9	–
Pin 10	–
Pin 11	Clock+
Pin 12	Clock-
Pin 13	UB
Pin 14	GND
Pin 15	–

Encoder deinstallation
1. Unscrew the encoder stator coupling from the contact surface.
2. Fully loosen the center screw and remove encoder from drive shaft.

Baumer

Passion for Sensors

EU-Konformitätserklärung
EU Declaration of Conformity
Déclaration UE de Conformité

Wir erklären in alleiniger Verantwortung, dass die Produkte, auf die sich diese Erklärung bezieht, die grundlegenden Anforderungen der angegebenen Richtlinie(n) erfüllen und basierend auf den aufgeführten Norm(en) bewertet wurden.

We declare under our sole responsibility that the products to which the present declaration relates comply with the essential requirements of the given directive(s) and have been evaluated on the basis of the listed standard(s).

Nous déclarons sous notre seule responsabilité que les produits auxquels se réfère la présente déclaration sont conformes aux exigences essentielles de la directive/ des directives mentionnée(s) et ont été évalués sur la base de la norme/ des normes listée(s).

Hersteller
Manufacturer
Fabricant
Baumer IVO GmbH & Co. KG

Bezeichnung
Description
Description
Drehgeber
Encoder
Codeurs

Typ(en) / Type(s) /Type(s)

EAL580-BS5.T$5B
EAL580-BS5.T$6B

nicht vorgesehen für örtliche(s) DC-Elektrizitätsversorgungsnetz / Batterie mit Verbindungskabel ≥ 30m.
not intendent for local DC electricity grid / battery with connecting cable ≥ 30m.
pas prévu(s) au rèseau èlectrique local à courant continu DC / Batterie avec câble de raccordement ≥ 30m

Richtlinie(n)
Directive(s)
Directive(s)
2014/30/EU, 2011/65/EU

Norm(en)
Standard(s)
Norme(s)
EN 61000-6-2:2005, EN 61000-6-4:2007+A1:2011, EN 50581:2012, EN 12015:2004
EN 12016:2013

Ort und Datum Place and date Lieu et date	Villingen-Schwenningen, 25.05.2016	Unterschrift/Name/Funktion Signature/name/function Signature/nom/fonction	Daniel Kleiner Head of R&D Motion Control Baumer Group

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Ust-IdNr.: DE 142983906 • Persönlich haftende Gesellschafterin: IVO Verwaltungs-GmbH • Villingen-Schwenningen • HRB Nr. 602261
Deutsche Bank • VS-Villingen • Konto 0431 767 • BLZ 694 700 39 • IBAN: DE57694700390043176700 • BIC Code: DEUTDE6F694

Deutsch

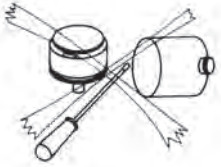
Installationsanleitung Drehgeber

Wichtig!

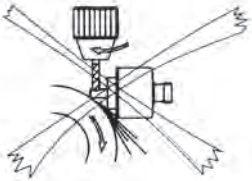
Vor Inbetriebnahme des Gebers unbedingt lesen.

Mit diesem Geber haben Sie ein Präzisionsmessgerät erworben. Beachten Sie stets die Angaben und Hinweise des Datenblattes, um eine problemlose Funktion des Gebers zu gewährleisten und um die Garantieleistung aufrecht zu erhalten. Falls im Datenblatt nichts anderes angegeben ist, bitte folgendes unbedingt beachten:

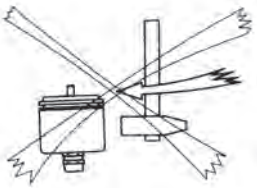
Mechanisch:



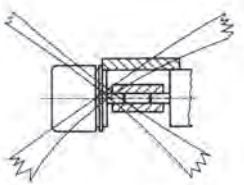
– Der Drehgeber darf weder teilweise noch ganz zerlegt oder modifiziert werden.



– Die Welle nicht nachträglich bearbeiten (schleifen, sägen, bohren, usw.). Die Genauigkeit des Gebers und die Zuverlässigkeit von Lager und Dichtung nehmen sonst Schaden. Wir sind gerne bereit, auf Ihre Kundenwünsche einzugehen.



– Das Gerät niemals mit dem Hammer ausrichten.
– Schlagbelastungen unbedingt vermeiden.
– Drehgeberwelle nicht über die im Datenblatt angegebenen Werte belasten (weder axial noch radial).



– Drehgeber und Antriebsgerät nicht an Wellen und Flanschen starr miteinander verbinden. Benutzen Sie grundsätzlich eine Kupplung (zwischen Antriebswelle und Geberwelle, bzw. zwischen Hohlwellen-Geber-Flansch und Antriebsflansch).

Für die Gebermontage empfehlen wir Ihnen den Einsatz unserer Montagehilfen und Kupplungen (siehe Zubehör-Datenblätter).

Bitte beachten Sie die umseitig stehenden Montagehinweise!

English

Installing instructions for rotary encoders

Important!

It is imperarive to read these instructions before setting the encoder in operation.

This encoder is a precision measuring instrument.
Always observe the information and instructions of the data sheet to ensure trouble-free function and to maintain warranty claims. Unless otherwise stated in the data sheet, the following has to be absolutely observed:

Mechanical:

– It is not permissible to dismantle the encoder entirely or in part or to modify it.

– Do not alter the shaft (by grinding, sawing, drilling, etc.), otherwise the accuracy of the encoder and the dependability of bearing and gasket will suffer. We are prepared to discuss special designs.

– Never align the instrument with a hammer.
– It is imperative to avoid impact loads.
– Radial and axial load capacity as stated in the data sheet have to be observed under any circumstances.

– Do not connect encoder and drive rigidly to one another at shafts and flanges. Always use a coupling (between drive shaft and encoder shaft, or between hollow-shaft encoder flange and drive flange).

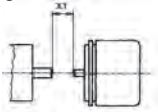
We recommend that you use our assembly aids and couplings to install the encoder (see accessory data sheets).

Please observe the installation instructions on the back page, too.

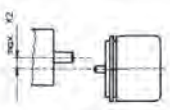
Deutsch

Montagehinweis für Geber mit Welle:

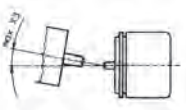
① Wellen auf Versatz überprüfen.



Axialversatz / *Axial offset*



Radialversatz / *Radial offset*

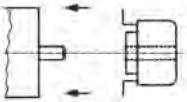


Winkelfehler / *Angle error*

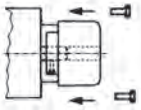
Entnehmen Sie die Werte X1, X2 und X3 dem Datenblatt der Kupplung.

② Kupplung während der Montage vor zu starker Biegung sowie Beschädigung schützen.
③ Kupplung auf den Wellen ausrichten.
④ Spann- oder Klemmschrauben vorsichtig anziehen.

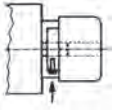
Montagehinweise für Hohlwellengeber mit Kupplung:



Geber mit Kupplung auf Welle montieren. *Mount encoder with coupling on shaft.*



Kupplung mit Antriebflansch verschrauben *Bolt coupling to drive flange.*



Klemmnabe vorsichtig anziehen *Carefully tighten clamping hub*

Elektrisch:

1. Geltende Sicherheitsnormen
– Vor Inbetriebnahme sind alle benötigten Kabeladern laut Datenblatt anzuschließen! Isolieren Sie alle nicht benötigten Enden sauber, um Kurzschlüsse zu vermeiden.
– Bei der Konfektionierung des Gegensteckers ist eine, evtl. dem Stecker beigelegte, Anleitung zu beachten.
– An Leistungslängen empfehlen wir:
• bei asymmetrischer Übertragung, d.h. invertierte Signale werden nicht verwendet, max. 10 m Leitungslänge.
• bei symmetrischer Übertragung (z.B. nach RS 422) max. 50 m Leitungslänge (Leitungslänge mit verdrillten Aderpaaren)
– Gegenstecken am Geber nur im spannungslosen Zustand ziehen oder stecken.
– Die richtige Betriebsspannung und den maximal zulässigen Ausgangsstrom berücksichtigen (siebe Datenblatt)!
– Ein- bzw. Ausschalten der Betriebsspannung für den Geber und das Folgegerät muss gemeinsam erfolgen.
2. Um CE-Konformität zu erreichen, ist eine EMV-gerechte Installation Voraussetzung:
– Als Steuerleitungen sind durchgehend geschirmte Kabel zu verwenden. Bei symmetrischer Übertragung (z.B. RS 422) muss ein Kabel mit verdrillten Aderpaaren verwendet werden.
Der Kabelschirm wird idealerweise rundum (360°) über schirmbare Stecker oder kabeldurchführungen an den Geber und die Auswertung angelegt.
– Die Schutzerde (PE) ist bevorzugt beidseitig, am Geber und an der Auswertung, impedanzarm aufzulegen.
– Bei Problemen durch Erdschleifen ist die Schutzerde (PE) auf der Geberseite aufzutrennen. Der Geber sollte hierhei gegenüber dem Antrieb elektrisch isoliert angebaut werden.
– Die Geberleitungen sind getrennt von Leitungen mit hohem Störpegel zu verlegen.
– An der Spannungsversorgung des Gebers sollten keine Verbraucher mit hohem Störpegel, wie z.B. Frequenzumrichter, Magnetventile, Schütze etc. angeschlossen werden. Andernfalls ist für eine geeignete Spannungsfilterung zu sorgen.

Sicherheitshinweise:

1. Wenn anzunehmen ist, dass ein gefahrloser Betrieb nicht mehr gewährleistet ist, muss das Gerät außer Betrieb gesetzt und gegen unbeabsichtigtes Einschalten gesichert werden.
2. Wenn durch den Ausfall oder eine Fehlfunktion des Gebers eine Gefährdung von Menschen oder eine Beschädigung von Betriebseinrichtungen nicht auszuschließen ist, so muss dies durch geeignete Sicherheitsmaßnahmen wie Schutzvorrichtungen oder Endschalter usw. verhindert werden.

Bei Missachtung der obigen Richtlinien können wir keine Garantie gewähren.
Wir bitten um Verständnis.

English

Installation instructions for encoders with shaft:

① Check shafts for offset.

Refer to the coupling data sheet for the values X1, X2, and X3.

② During assembly, protect coupling against excessive bending or damage.
③ Align coupling on the shafts.
④ Carefully tighten pulling or clamping bolts.

Installation instructions for hollow-shaft encoders with coupling:

Electrical:

1. The existing safety devices for electrical installations have to be observed.
– Before setting in operation, connect all required strands as per data sheet. To prevent short-circuits, neatly insulate the ends of all strands which are not required
– When preassembling the mating connector, comply with any instructions accompanying the connector.
– Our recommendations regarding cable lengths:
• in case of asymmetrical transmission, i.e. inverted signals are not used, cable length max. 10 m.
• in case of symmetrical transmission (e.g. to RS 422), cable length max. 50 m (cable with twisted pairs of wires).
– Plug in or pull out mating connector at the encoder only when encoder is deenergized.
– Make certain that the operating voltage is correct and the max. permissible output current is not exceeded (see data sheet).
– The operating voltage for encoder and succeeding device must be turned on and off together.
2. In order to obtain CE-Conformity, EMC installation conformity should be observed.
Shielded cables should be used or control lines.
In case of symmetrical transmission (e.g. Rh 422) a cable with twisted pairs of wire has to be used.
The cable shield should it possible be connected fully enclosed (360°) by shielded connectors or cable bushings. This has to be done at the encoder and transmision end.
– The protection earth should be put with low impedance on both face and back of the encoder and the transmission end.
– In case of earth loop problems, the protection earth of the encoder side has to be removed. On this occasion, the encoder should be placed electrically isolated opposite the actuation.
– The encoder lines should run separately to cables with high noise levels.
– Consumer with high disturbance level, e.g. frequency converters, solenoid valves, contactors etc. should not be connected to the same voltage supply. Otherwise, a suitable voltage filtering has to be installed.

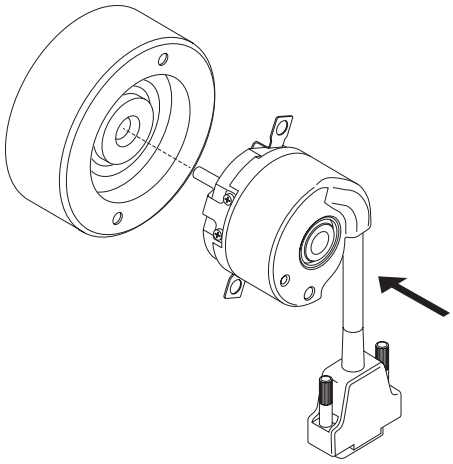
Safety precautions:

1. If operation without danger can no longer be assured of some point, the unit must be shut down and secured against accidental activation.
2. If personal injury or damage to equipment is possible should the encoder fail or malfunction, this must be prevented by suitable safety precautions such as protective devices or limit switches, etc.

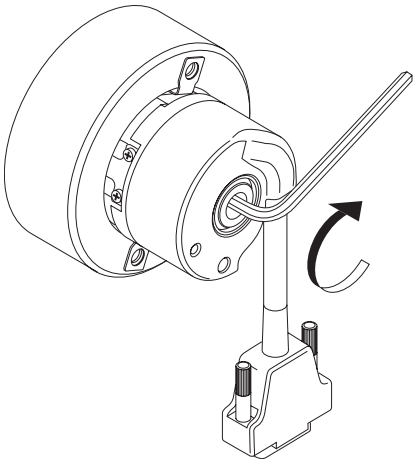
We can assume no warranty it the above directives are disregarded.
We ask for your understanding.

Montageanweisung – Drehgeber Typ 5873 mit Konuswelle

Assembly instructions – encoder type 5873 with tapered shaft



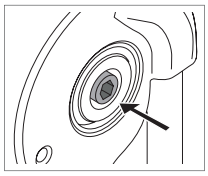
1. Befestigungsschraube in die Motorwelle schrauben. Dabei wird der Drehgeber in den Konus gezogen.
   Screw the fixing bolt into the motor shaft. This causes the encoder to be drawn into the cone.



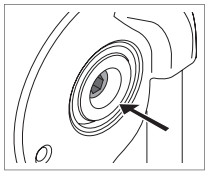
2. Befestigungsschraube mit $3^{+0,5}$ Nm anziehen.
   Tighten the fixing bolt with $3^{+0.5}$ Nm.

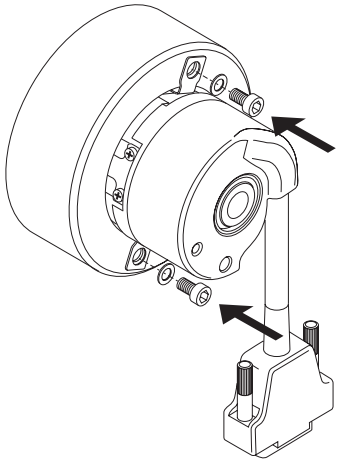
   Überprüfung der korrekten Montage.
   Check of correct mounting.

Falsch, Schraube nicht versenkt.
***Wrong,** screw not inside.*

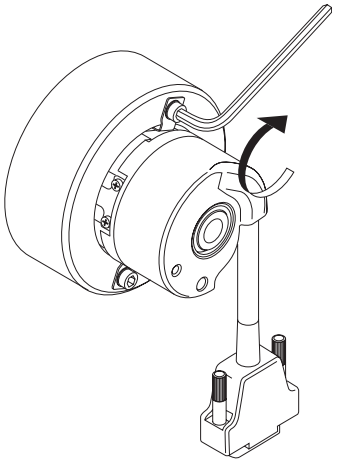


Richtig, Schraube in Welle versenkt.
***Right,** screw inside the shaft.*





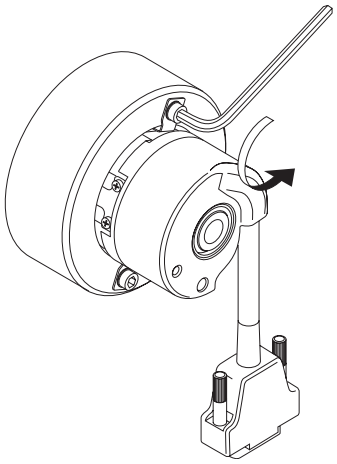
3. Drehgeber mit 2x Schrauben und Unterlegscheiben befestigen.
   Attach the encoder with 2 x bolts and washers.



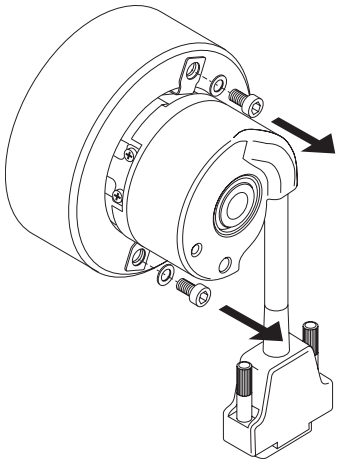
4. 2x Schrauben anziehen.
   Tighten the 2 x bolts.

Demontageanweisung – Drehgeber Typ 5873 mit Konuswelle

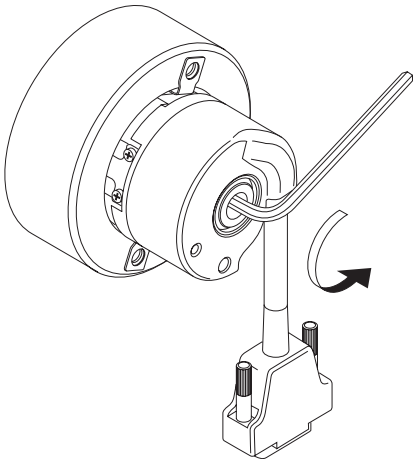
Disassembly instructions – encoder type 5873 with tapered shaft



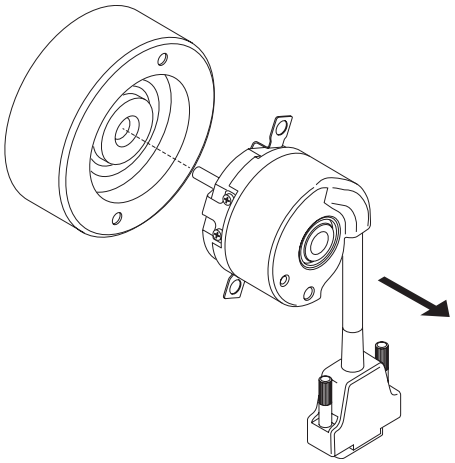
1. 2x Schrauben lösen.
   Loosen 2 x bolts.



2. 2x Schrauben mit Unterlegscheiben entfernen.
   Remove 2 x bolts with washers.



3. Befestigungsschraube lösen.
   Loosen fixing bolt.



4. Durch das Lösen der Befestigungsschraube trennt sich der Drehgeber von der Motorwelle.
   Unscrewing the fixing bolt causes the encoder to disengage from the motor shaft.

Kübler Group
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Fax: +49 7720 21564
info@kuebler.com
www.kuebler.com

R600925.0009 - Index 1

approval for production: | checked: company & sign | date

technical subject to modifications

Mechanical characteristics:

Max. speed up to 70°C:	12000min^{-1}, continuous 10000min^{-1}
Max. speed up to Tmax:	8000min^{-1}, continuous 5000min^{-1}
Starting torque:	<0.01 Nm
Moment of inertia:	3x10^{-6}kgm^2
Radial load capacity of shaft:	80N
Axial load capacity of shaft:	40N
Weight:	approx. 0.35kg
Protection acc. to EN 60 529:	shaft.side: IP65 housing.side: IP67
Working temperature:	.40°C up to +105°C [1]
Shaft:	stainless steel
Flange:	aluminum,
Housing:	die cast zinc
Shock resistance acc. to DIN.IEC 68.2.27:	2500 m/s^2, 6 ms
Vibration resistance acc. to DIN.IEC 68.2.6:	100 m/s^2, 55A 2000Hz
torgue bracket max. axial misalignment:	± 1,5mm
torgue bracket max. radial misalignment:	± 0,13mm

1) temperature measured on the flange

General electrical characteristics:

Supply voltage:	4,5VDC A 5,5VDC
Current consumption (w/o output load)	5V DC, max. 70mA
Reverse polarity protection at power supply (Ub)	no
Conforms to CE requirements acc. to EN 61000.6.2, EN 61000.6.3 and EN 61000.6.4	

General Interface characteristics:

Transceiver type:	RS 485
Permissible load/channel:	max.±25mA
Signal level high:	typ. 3.8V
Signal level low at load=20mA	typ. 1.3V
Short circuit proof outputs:	yes [1]

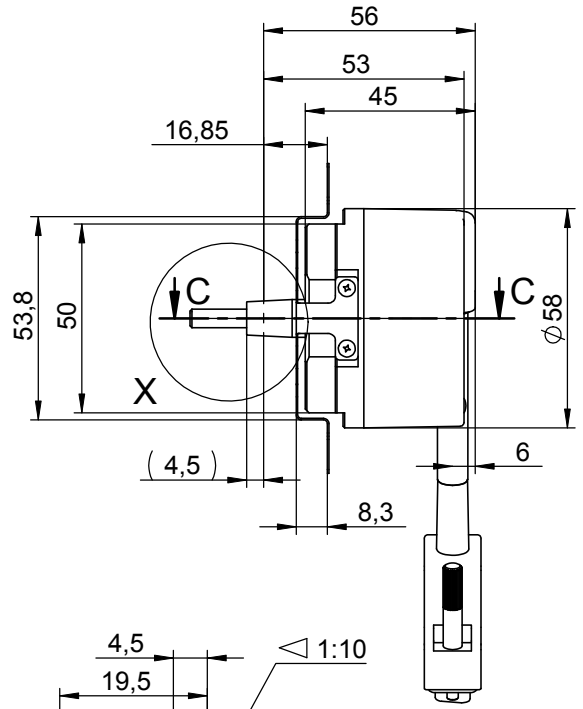
Interface characteristics BiSS

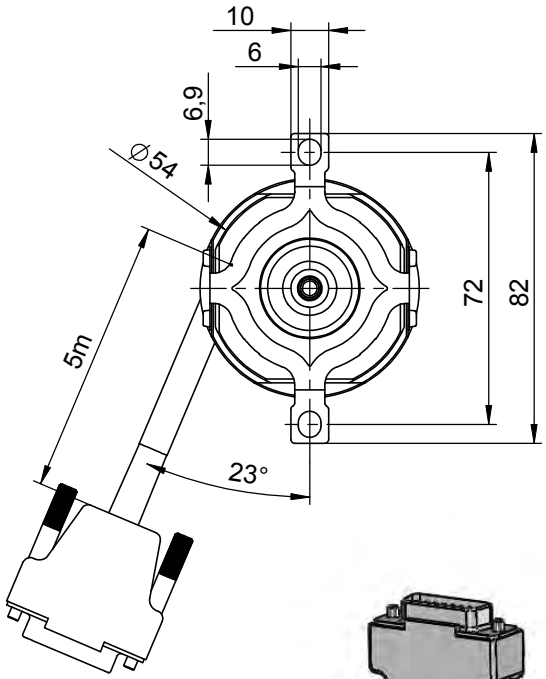
Protocol:	BiSS C
Resolution:	13bit
Code:	binary
Clock rate:	up to 10MHz
Time jitter:	< 1Gs
Data update rate	< 10Gs

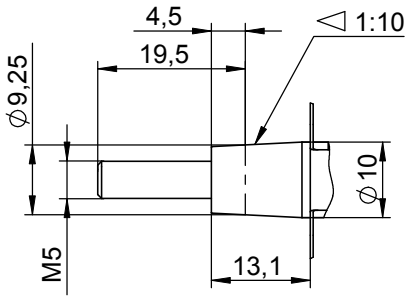
Output sine/cosine 2048 ppr:

Max. frequency .3dB:	400kHz
Signal level:	1 Vpp (±20%)
Short circuit proof:	yes [2]

2) Short circuit to 0V or to output, one channel at a time, supply voltage correctly applied

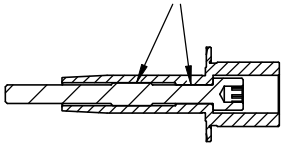


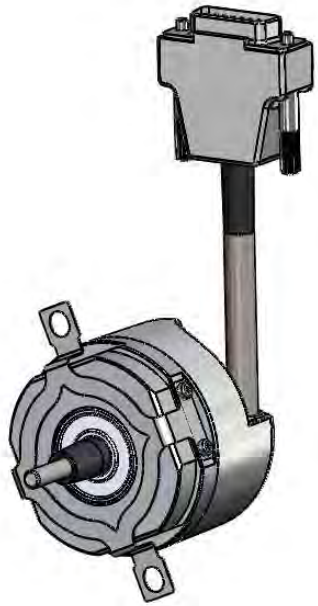




X
(1 : 1)

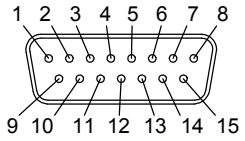
srew and shaft with M6 LH thread for demontation of the encoder



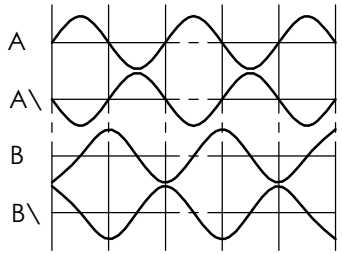


Terminal assignment:

SUB-D connector (male) 15pin	
Pin	Signal
1	A
2	GND
3	B
4	+V
5	+D
6	.
7	.
8	+C
9	A\
10	0V sensor
11	B\
12	+V sensor
13	.D
14	.
15	.C



Signals:



A leads B when shaft is rotated clockwise viewing the encoder shaft end

Index	Date	Name	Unit of measurement		ThyssenKrupp	Fritz Kübler GmbH Zähl- und Sensortechnik 78054 VS-Schwenningen
4	22.11.11	ih	millimeter			
3	22.6.11	tg				
2	9.5.11	df	Tolerances unless otherwise specified ISO 2768 mH	DG1706	Customer Type: 9950 001 0874 (5)	Kübler Type: Sendix 8.5873.0000.C302.S014
1	16.12.10	df		scale 1:2	Absolut Singleturn Encoder	drawing ID. A1796
0	15.10.10	tg				customer drawing

approval for production: | date | checked: company & sign

technical subject to modifications

Mechanical characteristics:

Max. speed up to 70°C:	12000min^{-1}, continuous 10000min^{-1}
Max. speed up to Tmax:	8000min^{-1}, continuous 5000min^{-1}
Starting torque:	<0.01 Nm
Moment of inertia:	3x10^{-6}kgm^2
Radial load capacity of shaft:	80N
Axial load capacity of shaft:	40N
Weight:	approx. 0.35kg
Protection acc. to EN 60 529:	shaft/side: IP65 housing/side: IP67
Working temperature:	/40°C up to +105°C [1]
Shaft:	stainless steel
Flange:	aluminum,
Housing:	die cast zinc
Shock resistance acc. to DIN/IEC 68/2/27:	2500 m/s^2, 6 ms
Vibration resistance acc. to DIN/IEC 68/2/6:	100 m/s^2, 55A 2000Hz
torgue bracket max. axial misalignment:	± 1,5mm
torgue bracket max. radial misalignment:	± 0,13mm

1) temperature measured on the flange

General electrical characteristics:

Supply voltage:	4,5VDC A 5,5VDC
Current consumption (w/o output load)	5V DC, max. 70mA
Reverse polarity protection at power supply (Ub)	no
Conforms to CE requirements acc. to EN 61000/6/2, EN 61000/6/3 and EN 61000/6/4	

General Interface characteristics:

Transceiver type:	RS 485
Permissible load/channel:	max.±25mA
Signal level high:	typ. 3.8V
Signal level low at load=20mA	typ. 1.3V
Short circuit proof outputs:	yes [1]

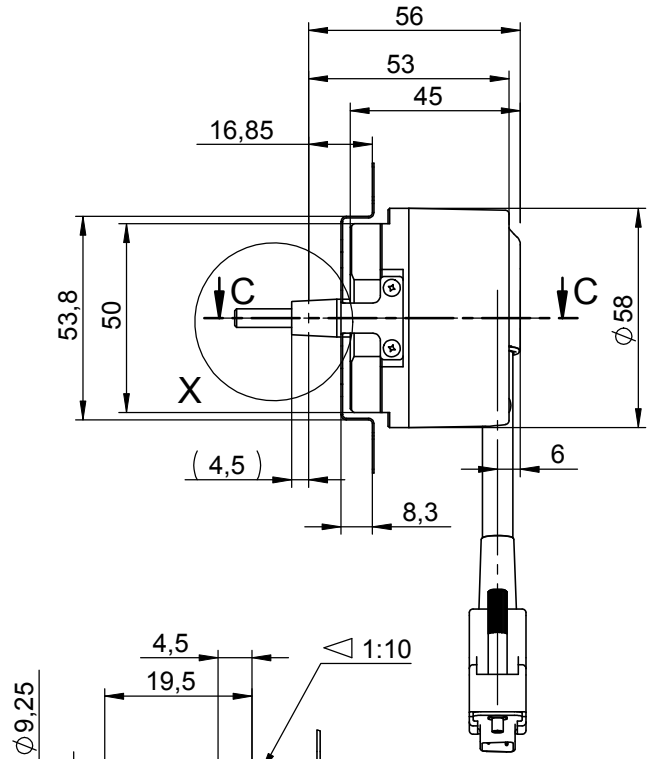
Interface characteristics SSi:

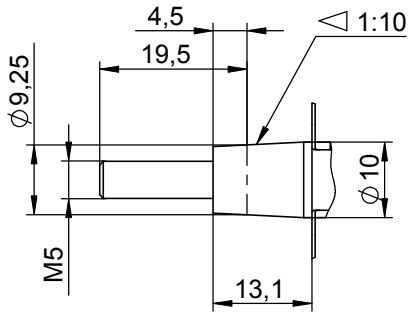
Protocol:	SSi
Resolution:	13bit (8192)
Code:	Gray
Clock rate:	50KHzA 2MHz
Time jitter:	< 1Hs
Data update rate:	< 15Hs

Output sine/cosine 2048 ppr:

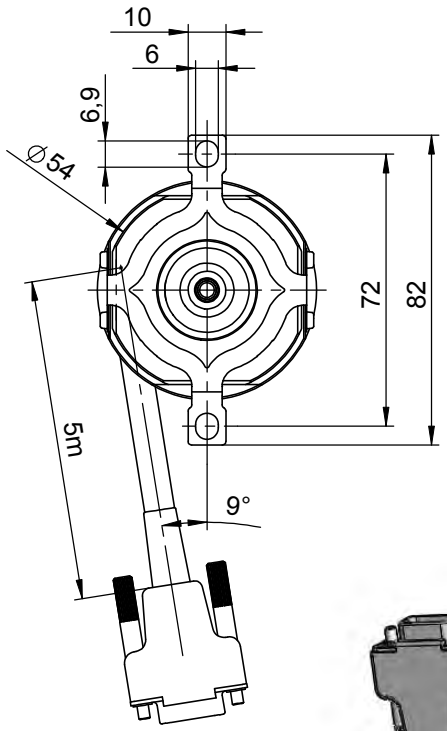
Max. frequency /3dB:	400kHz
Signal level:	1 Vpp (±20%)
Short circuit proof:	yes [2]

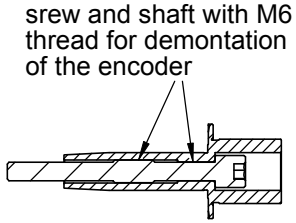
2) Short circuit to 0V or to output, one channel at a time, supply voltage correctly applied

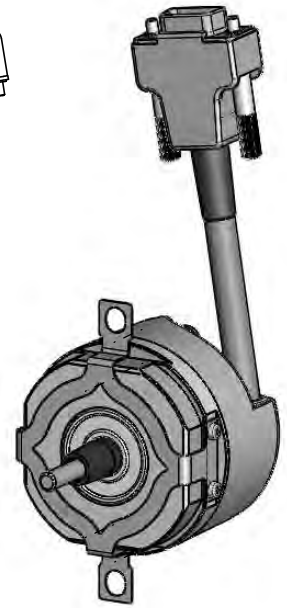




X
(1 : 1)

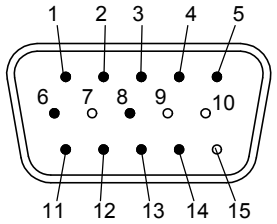




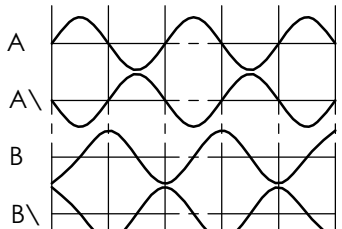


Terminal assignment:

SUB-D HD connector (male) 15pin	
Pin	Signal
1	A
2	A\
3	B
4	B\
5	+D
6	/D
7	/
8	SET
9	/
10	/
11	+T
12	/T
13	+V
14	0V
15	/



Signals:



A leads B when shaft is rotated clockwise viewing the encoder shaft end

Index	Date	Name	Unit of measurement		Thyssen Krupp	Fritz Kübler GmbH Zähl- und Sensortechnik 78054 VS-Schwenningen
6	17.4.12	ih	millimeter			
5	12.3.12	al				
4	17.2.12	al	Tolerances unless otherwise specified	DG2189	Customer Type: 9950 001 0877 (6)	Kübler Type: 8.5873.0000.G302.S019
3	22.11.11	ih				
2	3.11.11	ih				
			ISO 2768 mH	scale 1:2	Absolut Singleturn Encoder	drawing ID. A1964
						customer drawing Sheet 1 /2

EU-Konformitätserklärung
Declaration of EU-Conformity
Certificat de conformité EU

Kübler Gruppe
Fritz Kübler GmbH
Schubertstraße 47
D -78054 Villingen-Schwenningen
www.kuebler.com

Produktbezeichnung: Product designation: *Désignation du produit:*	Absolute Encoder Singleturn

Typenreihe: Type code: *Type:*	Sendix 5853 Sendix 5873

Hersteller: Manufacturer: *Fabricant:*	Fritz Kübler GmbH Schubertstraße 47 D-78054 Villingen-Schwenningen

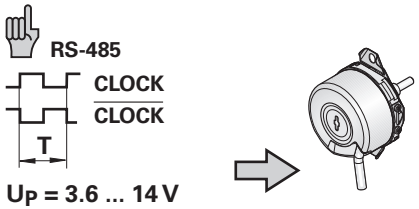
Das bezeichnete Produkt stimmt mit der folgenden Europäischen Richtlinie überein: We herewith confirm that the above mentioned product meets the requirements of the following european standard: *Le produit désigné ci-dessus est conforme à la ligne directrice européenne suivante:*	**Die Übereinstimmung des bezeichneten Produktes mit den Vorschriften der Richtlinie wird nachgewiesen durch die vollständige Einhaltung folgender Normen:** The correspondance of the above mentioned product with these requirements is proved by the fact that these products meet with the following single standards: *La conformité du produit désigné aux prescriptions de la ligne directrice est certifiée par la observation totale des normes suivantes:*
Richtlinien / Directives / *Directives*	**Norm** / Standard / *Norme*
EMV Richtlinie: 2014/30/EU EMC Directive: 2014/30/EU *Directive CEM: 2014/30/EU*	EN 55011 Klasse B:2009+A1:2010 EN 61000-6-3:2007 + A1:2011 EN 61000-6-2:2005/AC:2005 EN 61326-1:2013
ATEX Richtlinie: 2014/34/EU ATEX Directive: 2014/34/EU *Directive ATEX: 2014/34/EU* II 3G Ex nA IIC T4 Gc X II 3D Ex tc IIIC T135°C Dc IP6X X	EN 60079-0:2012+A11:2013 EN 60079-15:2010 EN 60079-28:2007 EN 60079-31:2014
RoHS Richtlinie: 2011/65/EU RoHS Directive: 2011/65/EU *Directive RoHS: 2011/65/EU*	EN 50581:2012

Der Hersteller trägt die alleinige Verantwortung für die Ausstellung der Konformitätserklärung.
The manufacturer is solely responsible for issuance of the declaration of conformity.
Le fabricant est seul responsable de la délivrance du certificat de conformité.

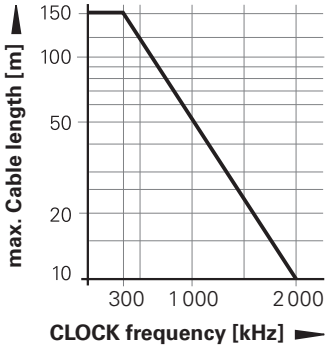
Villingen-Schwenningen, 20.04.2016

Ort und Datum der Ausstellung
Place and date of issue
Lieu et date d'établissement

Dr. Jochen Bolte
Leiter Entwicklung
rechtsverbindliche Unterschrift
Name and signature of authorised person
Nom et signature de la personne autorisée

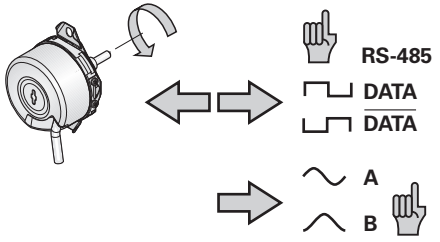


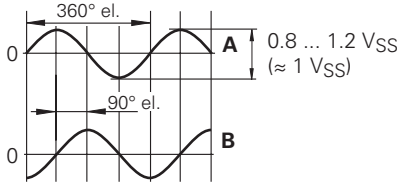
$f_C = \frac{1}{T}$

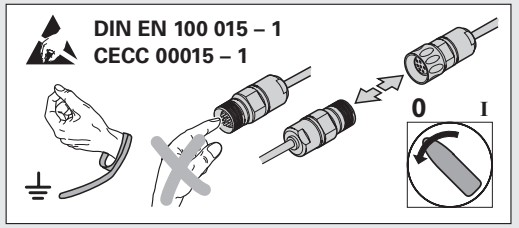


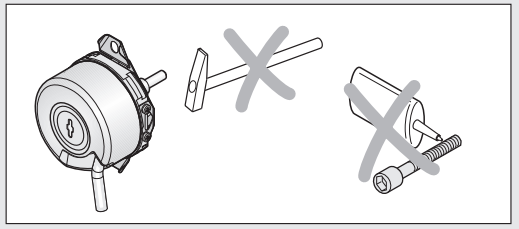
Up = 3.6 ... 14 V
(max. 160 mA)
am Gerät, *at encoder,* sur l'appareil, *integrato,* en el aparato.

EN 50 178/4.98; 5.2.9.5
IEC 364-4-41: 1992; 411(PELV/SELV)
(siehe, *see,* voir, *vedi,* véase
HEIDENHAIN D 231 929)





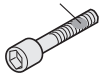




Im Lieferumfang enthalten
Included in delivery
Contenu dans la fourniture
Standard di fornitura
Elementos suministrados

Fleckbeschichtung
Patch coating
Enduit autofreinant
Rivestimento
Recubrimiento tintado

M5 x 50-8.8 DIN 6912
ID 202 264-36



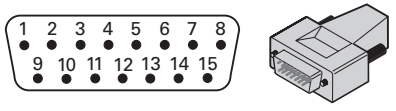
HEIDENHAIN

Montageanleitung
Mounting Instructions
Instructions de montage
Istruzioni di montaggio
Instrucciones de montaje

ECN 413 EnDat01

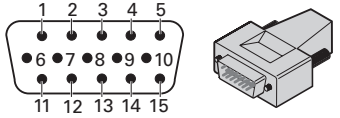
11/2007

16S15-58



4	12	2	10	1	9	3	11	5	13	8	15	6
UP	**Sensor** UP	**0 V**	**Sensor** 0 V	**A+**	**A–**	**B+**	**B–**	**DATA**	**$\overline{\text{DATA}}$**	**CLOCK**	**$\overline{\text{CLOCK}}$**	**1)**
BNGN	BU	WHGN	WH	GNBK	YEBK	BUBK	RDBK	GY	PK	VT	YE	

56S15-P5



13	14	1	2	3	4	5	6	11	12	14
UP	**0 V**	**A+**	**A–**	**B+**	**B–**	**DATA**	**$\overline{\text{DATA}}$**	**CLOCK**	**$\overline{\text{CLOCK}}$**	**1)**
BNGN	WHGN	GNBK	YEBK	BUBK	RDBK	GY	PK	VT	YE	

Kabelschirm mit Gehäuse verbunden
Cable shield connected to housing
Blindage du câble relié au boîtier
Collegare lo schermo del cavo alla carcassa
Pantalla del cable conectada a carcasa

1) Innenschirm
Internal shield
Blindage interne
Schermo interno
Blindaje interno

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TNC support ☎ +49 (8669) 31-3101
E-Mail: service.nc-support@heidenhain.de
NC programming ☎ +49 (8669) 31-3103
E-Mail: service.nc-pgm@heidenhain.de
PLC programming ☎ +49 (8669) 31-3102
E-Mail: service.plc@heidenhain.de
Lathe controls ☎ +49 (8669) 31-3105
E-Mail: service.lathe-support@heidenhain.de

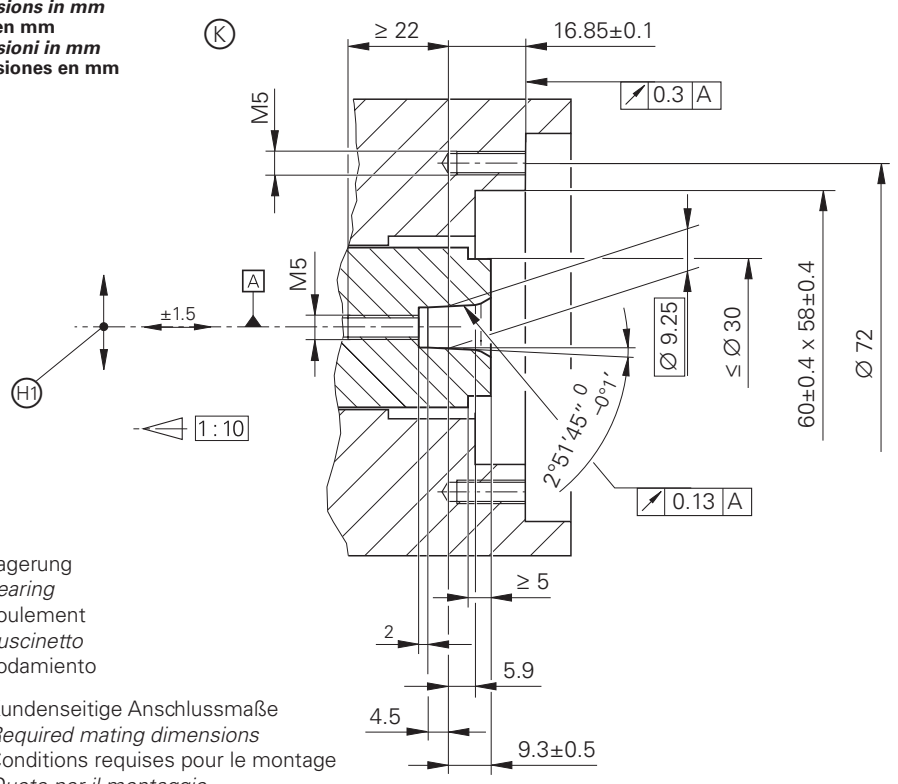
www.heidenhain.de

WELLA1:65B,
KUPPA1:66A,
ANELA1:16S15, 56S15
BELEA1:58, P5
SPVEA2:37

Ve 00
619 091-91 · 12 · 11/2007 · E · Printed in Germany · Änderungen vorbehalten
Subject to change without notice · Sous réserve de modifications · *Con riserva di modifiche* · Sujeto a modificaciones

ECN 413 EnDat01

Maße in mm
Dimensions in mm
Cotes en mm
Dimensioni in mm
Dimensiones en mm

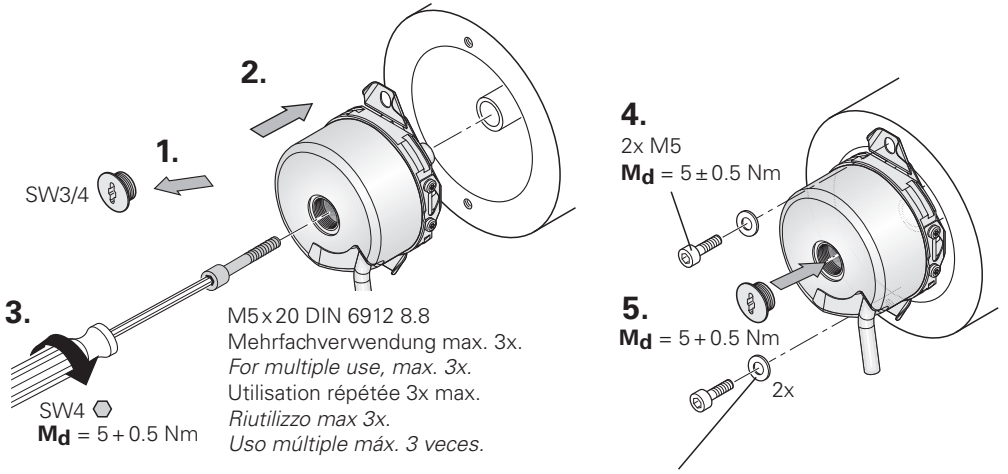


A = Lagerung
Bearing
Roulement
Cuscinetto
Rodamiento

Ⓚ = Kundenseitige Anschlussmaße
Required mating dimensions
Conditions requises pour le montage
Quote per il montaggio
Cotas de montaje requeridas

Ⓗ1 = Max. zul. statischer radialer Versatz der Motorwelle in gezeichneter Richtung ±0,13 mm
Max. permissible static radial offset of motor shaft in indicated direction ±0.13 mm
Désaxage radial statique max. adm. de l'arbre moteur dans le sens dessiné ±0,13 mm
Gioco massimo statico ammissibile nella direzione indicata ±0,13 mm
Máx. desviación radial estática admisible del eje del motor en la dirección indicada ±0,13 mm

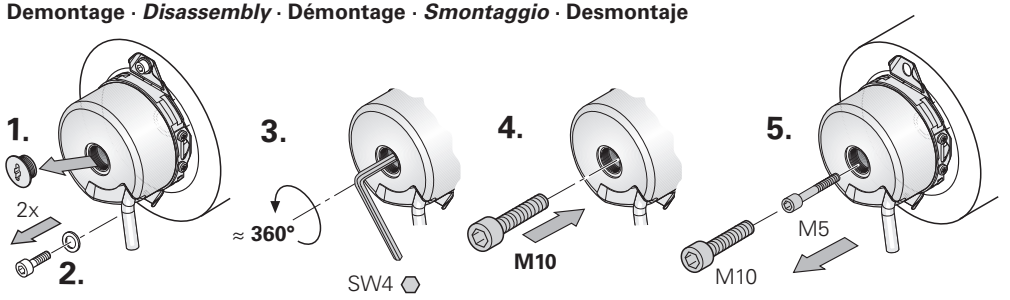
Montage · *Assembly* · Montage · *Montaggio* · Montaje



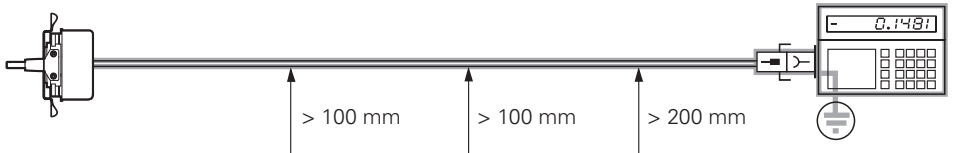
M5 x 20 DIN 6912 8.8
Mehrfachverwendung max. 3x.
For multiple use, max. 3x.
Utilisation répétée 3x max.
Riutilizzo max 3x.
Uso múltiple máx. 3 veces.

Sperrkantscheibe SKM5 (nicht im Lieferumfang enthalten).
Lock washer SKM5 (not included in items supplied).
Rondelle à bord d'arrêt SKM5 (non contenue dans la fourniture).
Rondelle di sicurezza SKM5 (non inclusa nella fornitura).
Arandela de bloqueo SKM5 (no incluida en los elementos suministrados).

Demontage · *Disassembly* · Démontage · *Smontaggio* · Desmontaje

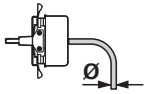


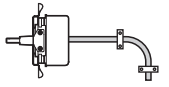
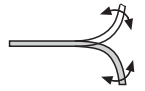
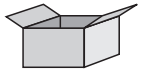
M10 Schraube nur soweit eindrehen, bis sich die Konusverbindung löst.
*Turn the **M10** screw only far enough in to release the taper shaft.*
Ne tourner la vis **M10** que jusqu'à ce que l'attache du cône se desserre.
*Ruotare la brugola **M10** fino al distacco della sede conica dell'albero.*
Apretar el tornillo **M10** sólo hasta que la conexión cónica se suelte.



Schirm auf Gehäuse
Shield on housing
Blindage sur boîtier
Schermo sulla carcassa
Blindaje a carcasa

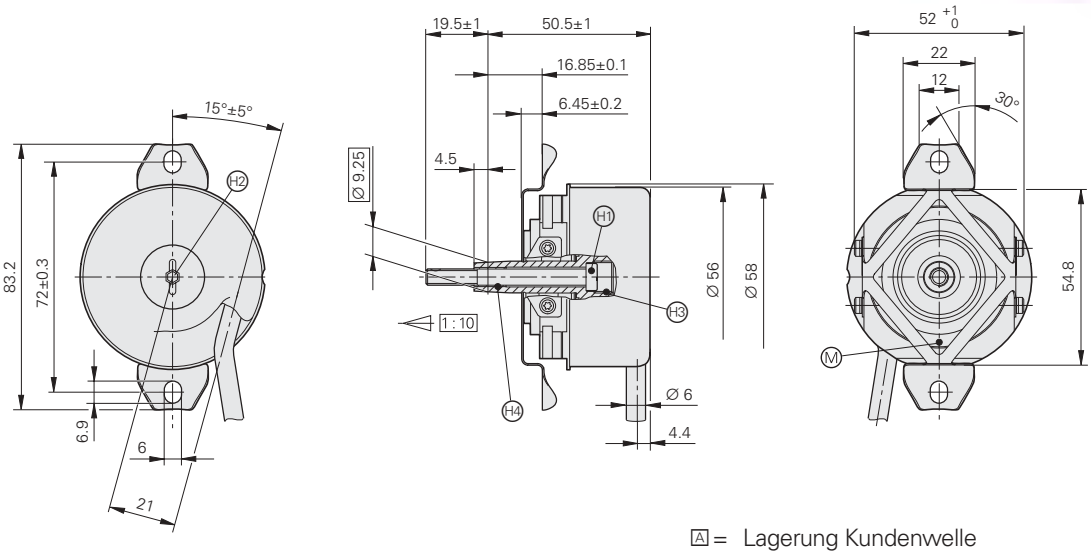
Störquellen
Noise sources
Sources parasites
Origine del disturbo
Fuentes de interferencias

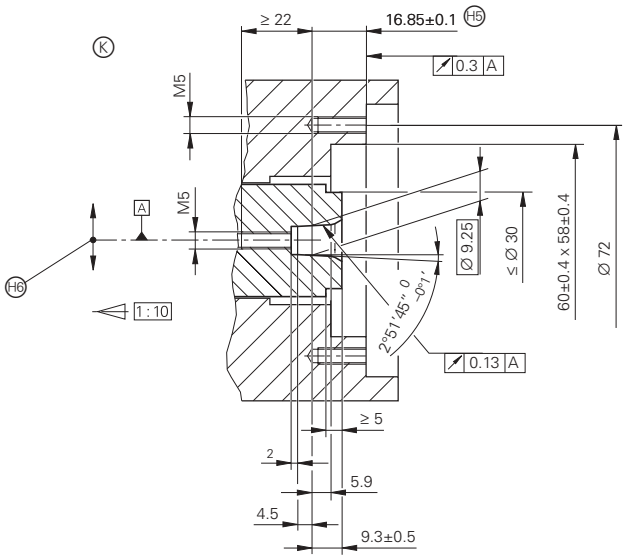
		
Ø 6 mm	$R_1 \geq 20$ mm	$R_2 \geq 75$ mm

 °C (°F)	 T ≥ –40 °C (–40 °F)	 T ≥ –10 °C (14 °F)
		–30 ... 80 °C (–22 ... 176 °F)

ECN 413

- **Absoluter Singleturn-Drehgeber/Absolute singleturn encoder**
- **Version Thyssen**
- **Konuswelle/Taper shaft**

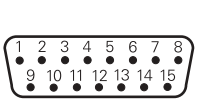


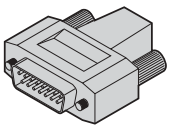


A = Lagerung Kundenwelle
K = Kundenseitige Anschlussmaße
M = Messpunkt Arbeitstemperatur
H1 = Selbstsichernde Schraube M5 x 50 DIN 6912 SW4, Anzugsmoment 5+0.5 Nm
H2 = Verschlussschraube SW3 und 4, Anzugsmoment 5+0.5 Nm
H3 = Abdrückgewinde M10
H4 = Abdrückgewinde M6
H5 = Max. zul. Toleranz mit Bewegung der Motorwelle ±1.5 mm
H6 = Max. zul. statischer radialer Versatz der Motorwelle in gezeichneter Richtung ±0.13 mm

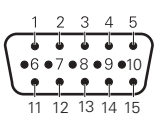
A = *Bearing of mating shaft*
K = *Required mating dimensions*
M = *Measuring point for operating temperature*
H1 = *Self-tightening screw M5 x 50 DIN 6912 width A/F 4*
Tightening torque 5+0.5 Nm
H2 = *Screw plug sizes 3 and 4, Tightening torque 5+0.5 Nm*
H3 = *Back-off thread M10*
H4 = *Back-off thread M6*
H5 = *Max. permissible tolerance during motor shaft rotation ±1.5 mm*
H6 = *Max. permissible static radial offset of motor shaft in indicated direction ±0.13 mm*

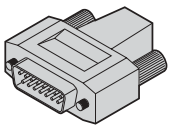
Elektrischer Anschluss/*Electrical Connection*





2





3

2	**4**	**12**	**2**	**10**	**1**	**9**	**3**	**11**	**5**	**13**	**8**	**15**	**6**
3	**13**	**/**	**14**	**/**	**1**	**2**	**3**	**4**	**5**	**6**	**11**	**12**	**14**
	5 V U_P	**5 V sensor**	**0 V U_N**	**0 V sensor**	**A+**	**A–**	**B+**	**B–**	**DATA**	**$\overline{\text{DATA}}$**	**CLOCK**	**$\overline{\text{CLOCK}}$**	1)
	br/gn BN/GN	bl BL	ws/gn WH/GN	ws WH	gn/sw GN/BK	ge/sw YL/BK	bl/sw BL/BK	rt/sw RD/BK	gr GY	rs PK	vio VI	ge YL	

Die Sensorleitung ist intern mit der Versorgungsleitung verbunden.
The sensor line is connected internally with the power supply.
Nicht verwendete Pins oder Litzen dürfen nicht belegt werden!
Vacant pins or wires must not be used!

1) Innenschirm/*Internal shield*
Außenschirm auf Gehäuse/*External shield on housing*

	ECN 413
Absolute Positionswerte ***Absolute position values***	**EnDat 2.2**
Bestellbezeichnung/*Ordering designation*	EnDat 01
Positionen/U / *Positions per revolution*	8 192 (13 bit)/*8192 (13 bits)*
Code/*Code*	Dual/*Pure binary*
Elektr. zul. Drehzahl/bei Genauigkeit *Elec. permissible speed/at accuracy*	≤ 1 500 min^{-1}/± 1 LSB; ≤ 12 000 min^{-1}/± 50 LSB *≤ 1500 rpm/± 1 LSB; ≤ 12 000 rpm/± 50 LSB*
Rechenzeit t_{cal}/*Calculation time* t_{cal}	≤ 5 µs
Inkrementalsignale/*Incremental signals*	∿ 1 V_{SS}[1)]/ ∿ *1* V_{PP}[1)]
Strichzahlen/*Line counts*	2 048
Grenzfrequenz –3 dB/*Cutoff frequency –3 dB*	≥ 400 kHz
Systemgenauigkeit/*System accuracy*	± 20"
Spannungsversorgung/*Power supply* **Stromaufnahme/*Current consumption***	3,6 bis 14 V/3.6 to 14 V ≤ 160 mA (ohne Last / *without load)*
Elektrischer Anschluss* ***Electrical connection****	• Kabel 5 m, mit Sub-D-Stecker (Stift), 15-polig, 2-reihig Cable 5 m, with D-sub connector (male), 15-pin, 2-row • Kabel 5 m, mit Sub-D-Stecker (Stift), 15-polig; 3-reihig Cable 5 m, with D-sub connector (male), 15-pin; 3-row
Welle/*Shaft*	Konuswelle Ø 9,25 mm, Konus 1/10/*Taper shaft Ø 9.25 mm, taper 1:10*
Mech. zul. Drehzahl n[2)]**/*Mech. perm. speed n***[2)]	≤ 12 000 min^{-1}/≤ *12000 rpm*
Trägheitsmoment Rotor/***Moment of inertia*** *of rotor*	2,6 · 10^{-6} kgm^2
Vibration 55 bis 2 000 Hz/***Vibration*** *55 to 2000 Hz* **Schock** 6 ms/2 ms/***Shock*** *6 ms/2 ms*	≤ 300 m/s^2 (EN/*IEC* 60 068-2-6) ≤ 1 000 m/s^2/≤ 2 000 m/s^2 (EN/*IEC* 60 068-2-27)
Max. Arbeitstemperatur[2)] ***Max. operating temperature***[2)]	115 °C
Min. Arbeitstemperatur ***Min. operating temperature***	Kabel fest verlegt: –40 °C/*Flange socket or fixed cable: –40 °C* Kabel bewegt: –10 °C/*Moving cable: –10 °C*
Schutzart EN 60 529/***Protection*** *IEC 60529*	IP 67 am Gehäuse; IP 64 am Welleneingang/*IP 67 at housing; IP 64 at shaft inlet*
Masse/*Weight*	ca. 0,3 kg/0.3 kg

1) eingeschränkte Toleranzen: Signalgröße 0,8 bis 1,2 V_{SS}
2) Zusammenhang zwischen Arbeitstemperatur und Drehzahl bzw. Versorgungsspannung siehe Katalog *Drehgeber*
*) bei Bestellung bitte auswählen

1) *Restricted tolerances: Signal amplitude 0.8 to 1.2* V_{PP}
2) *For the correlation between the operating temperature and the shaft speed or supply voltage, see Rotary Encoders catalog*
*) *Please indicate when ordering*

HEIDENHAIN

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www.heidenhain.de

Mb 1108 · 11/2007 · Änderungen vorbehalten/*Subject to change without notice*

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EG-Konformitätserklärung
EC Declaration of Conformity

Die Singleturn-Absolutdrehgeber der Baureihe ECN 413
The Absolute Singleturn Rotary Encoders of the ECN 413 Series

Identnummer Basic part number	Varianten Variant
586 645	01, 02, 10 – 12, 22 - 24

erfüllen die grundlegenden Vorschriften folgender EG Richtlinien:
comply with the regulations of the following EC Directive:

EMV-Richtlinie 89/336/EWG
EMC Directive 89/336/EEC

Die Übereinstimmung mit den Vorschriften der oben genannten Richtlinie wird durch die Einhaltung folgender Normen nachgewiesen:
This product complies with these regulations by meeting the following standards:

DIN EN 55022, Klasse B
DIN EN 61000-6-1
DIN EN 61000-6-2
DIN EN 61000-6-3
DIN EN 61000-6-4

Traunreut, 05.02.2007

DR. JOHANNES HEIDENHAIN GmbH

Dr. Sesselmann
Geschäftsführer
Managing Director

i.V. Israel
Qualitätsbeauftragter
Quality Officer

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Beschaffenheitsgarantie. Die Sicherheitshinweise der mitgelieferten Produktdokumentationen sind zu beachten.
This declaration certifies that this product complies with the above guidelines. It is not, however, a guarantee of quality. Please comply with the safety instructions in the accompanying documentation.

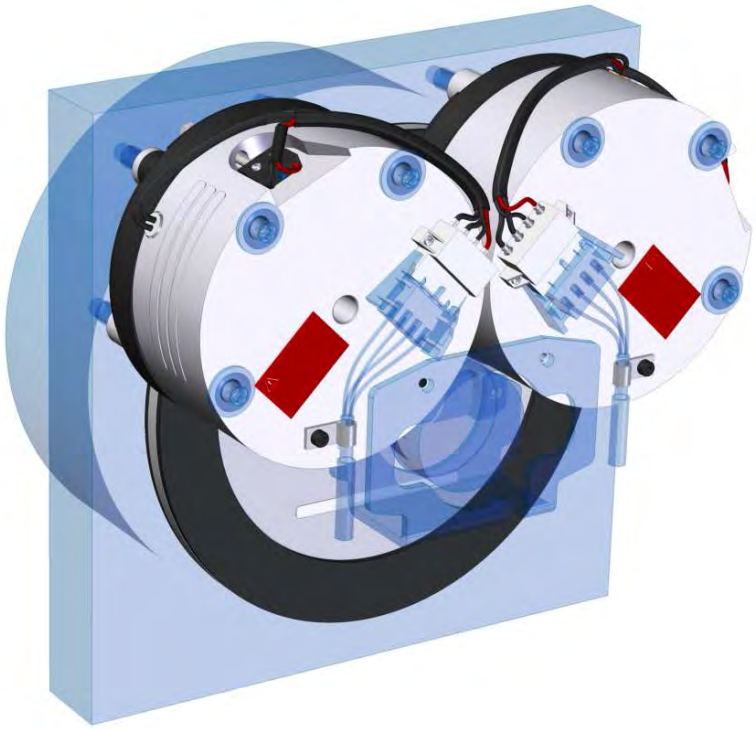
Service manual

Industrial Clutches, Brakes, Controls, Tension Systems, Sensors, and Switches

SM426gb - rev 02/14

Electrically Released Brake

ERS VAR15-02 - 250 Nm



Warner Electric
An Altra Industrial Motion Company

WARNER ELECTRIC EUROPE
Rue Champfleur, B.P. 20095, F- 49182 St Barthélemy d'Anjou Cedex
Tél. +33 (0)2 41 21 24 24, Fax + 33 (0)2 41 21 24 00
www.warnerelectric-eu.com

CONTENTS

1- Standards and Directives

Declaration of conformity:

During the design of this product, the EU directives applicable were taken into account.
An attestation of conformity is available on request.
For incorporating the product, the manufacturer of a machine or system needs to take into account the EU directives applicable.

Summary of the directives and standards used:

Directives:	
2006/95/CE	Low voltage equipment directive
2004/108/CE	Electromagnetic compatibility directive
95/16/CE	Lifts directive
Standards:	
DIN VDE 0580	Electromagnetic devices and components, General requirements
EN 81-1	Safety rules for the construction and installation of lifts - Part 1: Electric lifts
NFC 79300	Industrial electrical apparatus. Electromagnetic apparatus for mechanical applications requirements

2- Precautions and safety measures

Precautions and safety measures must be read before any installation or maintenance of the brake.
Compliance with the instructions and values given by the documentation and marking of the unit is imperative in order to ensure a proper functioning of the brake.

2-1 Symbols used in this manual


Action that might damage the brake.


Action that might be dangerous to human safety.


Electrical action that might be dangerous to human safety.


Handling of loads that might be dangerous to human safety.


Surface temperature that might be dangerous to human safety.

2-2 Safety precautions for installation and maintenance

During maintenance, make sure that the driving mechanism is stopped and that there is no risk of accidental starting. The intervention must be signaled and the work area delimited.

All intervention must be done by authorized and qualified personnel, having read and understood this manual, using adapted procedures and professional tools. All intervention must be done according the regulation of the country of the installation.

All works on the electrical connections must be done with power off.

Magnetic field generated by the magnet, can create dysfunctions on near machine or device. Users must also be careful about attractions of tools or other devices during interventions.

Due to the magnetic field generated by the magnet, the bearers of a heart pace-maker or an implant must avoid the proximity of the unit.

During operation the brake surface can reach temperatures higher than 80°C. Users must be careful during contact with the unit.

Respiratory protection
Inhalation of large amounts of dust can cause coughs and difficulty in breathing.
Respirator must be worn if exposed to friction material dust. [Dust mask FFP2].
Move to fresh air in case of accidental inhalation of dusts.
In the event of persistent symptoms receive medical treatment.
In case of ingestion of friction material dust, consult a doctor.

Provide appropriate exhaust ventilation at places where friction material dust can be generated.
Do not use brushes, pressurized air or hazardous agents to clean the brake. The use of a vacuum cleaner is recommended.

Hand protection
Protective and dust-resistant gloves.

Eyes protection
Friction material dust particles, like other inert materials, may be mechanically irritating the eyes.
Safety goggles with side protection.
In case of contact with eyes, carefully rinse with plenty of water.
In the event of persistent symptoms seek medical treatment.

Skin protection
Prolonged skin contact may cause mechanical irritation.
Dust resistant protective clothing.
In case of contact with skin, wash with soap and water as a precaution.
Consult a doctor if skin irritation persists.

Feet protection
Safety shoes must be worn.

Helmet protection
Safety helmet must be worn.

Protective and hygiene measures
Do not breathe friction material dust.
Wash hands before breaks and at the end of workday.
During maintenance, do not eat, drink or smoke.
Handle in accordance with the general hygienic rules.
Remove and wash contaminated clothes before re-use.

2-3 Precautions for handling

Avoid any impact or damage to the brake during handling.

To avoid risk of injury (see mass of the units in the service manual of the brake), use an adapted device, hoist or crane, for the handling of the unit.

Never lift the brake using the coil cables.

2-4 Precautions on use

Customer is responsible of brake qualification with his interface in order to guaranty that brake performances are not reduced.
The use of the 2 circuits in redundancy is mandatory.
This brake is designed to work in clean conditions. Friction faces must be kept completely clean of any oil, water, grease or abrasive dust.
The friction flange, on customer side, must be, also, carefully cleaned and degreased.

The friction faces must be protected, with adapted devices (cover, heating devices, etc…):

- To avoid pollution and rusting during the lifetime of the unit.
- To avoid condensation, resulting in freezing conditions, in low temperature/high humidity, or sticking of the disc.

This brake is designed to work in ambient temperature between 0°C and 40°C.

This brake is designed to work with duty cycle of 50% (Insulation class: 155°C). The temperature of customer friction flange must not exceed 90°C.

This brake can only be used on « horizontal » position.

When switching on DC-side the coil must be protected against voltage peaks, according DIN VDE0580.

Make sure the rated supply voltage is set within the tolerances, an under-voltage supply, generates a reduction of the maximum air gap.

An over-voltage supply generates additional heat on the surface of the brake, with risks of injury by burning and possible damage to the coil.

Emergency braking: for emergency braking the switching OFF must be connected on DC current side, in order to obtain short engaging time of the brake.

Service braking: for service braking, the switching OFF and ON must be connected on DC current side, in order to obtain silent switching.

2-5 Restrictions on use

Any modification made to the brake without the express authorisation of a representative of Warner Electric, as far as, any use out of the contractual specification accepted by "Warner Electric", will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

If maximum rotation speed is exceeded, the guarantee is no longer valid.

The brake must be replaced it is submitted to water projections.

For the brake to comply with directive 95 / 16 / EC, the installer must observe the general conditions for installations and use as defined in the EC type certificate, drawn up by the TÜV SÜD Industrie Service (see ABV number in **table 1**), including the mandatory use of a speed limiting device, in compliance with EN 81-1 paragraphs 9.9 and 9.10.10. Under no circumstances, this device can replace the system case against the car overspeed in the descending phase.

The customer must be careful to not alter the factory set parameters: Microswitch adjustment.
This brake must not be dismantled.

This brake is designed for static applications. Dynamic brakings are restricted to emergency braking and test braking.

Unless otherwise specified in the manual service, this range of product is not designed to be used according EC/94/9 directive “Equipment for explosive atmospheres” (ATEX).

3- Storage

These devices are delivered in a package guaranteeing the preservation of the product providing it is by surface transportation.
In case of a specific request (air or sea transport, long-term storage, etc) contact our factory.

4- Technical specification

4-1 Brake description

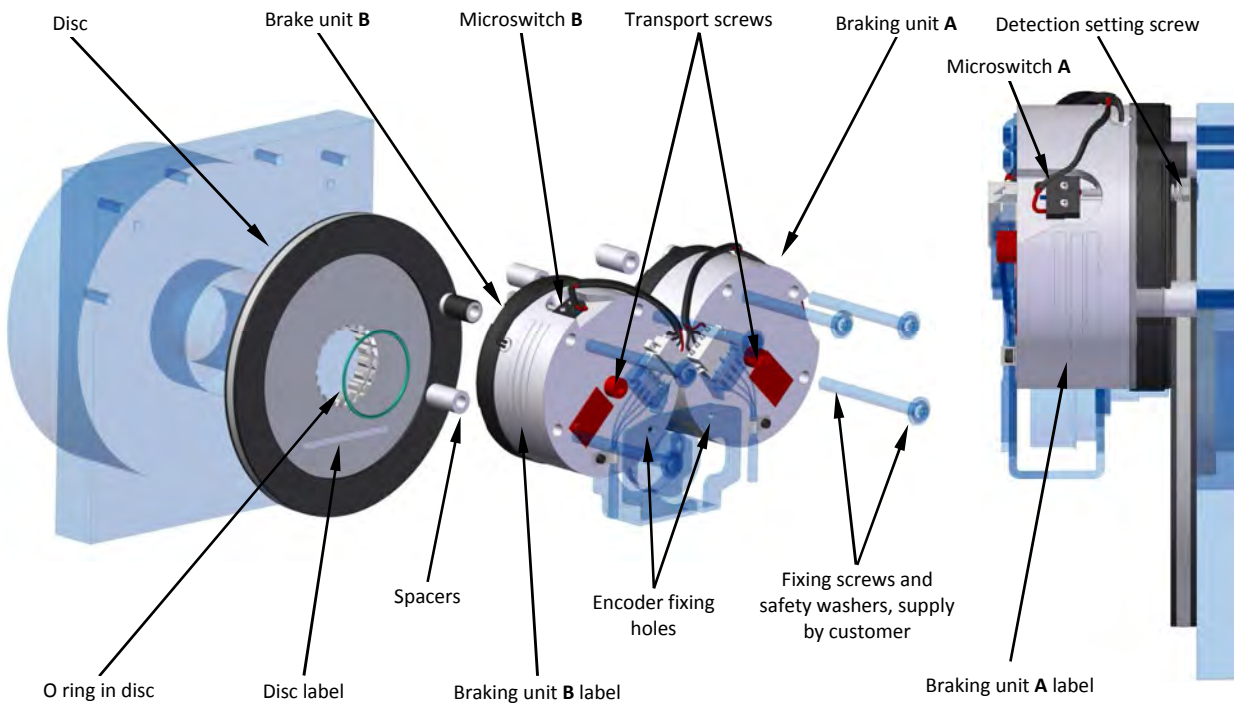


Fig. 1

4-2 Technical data

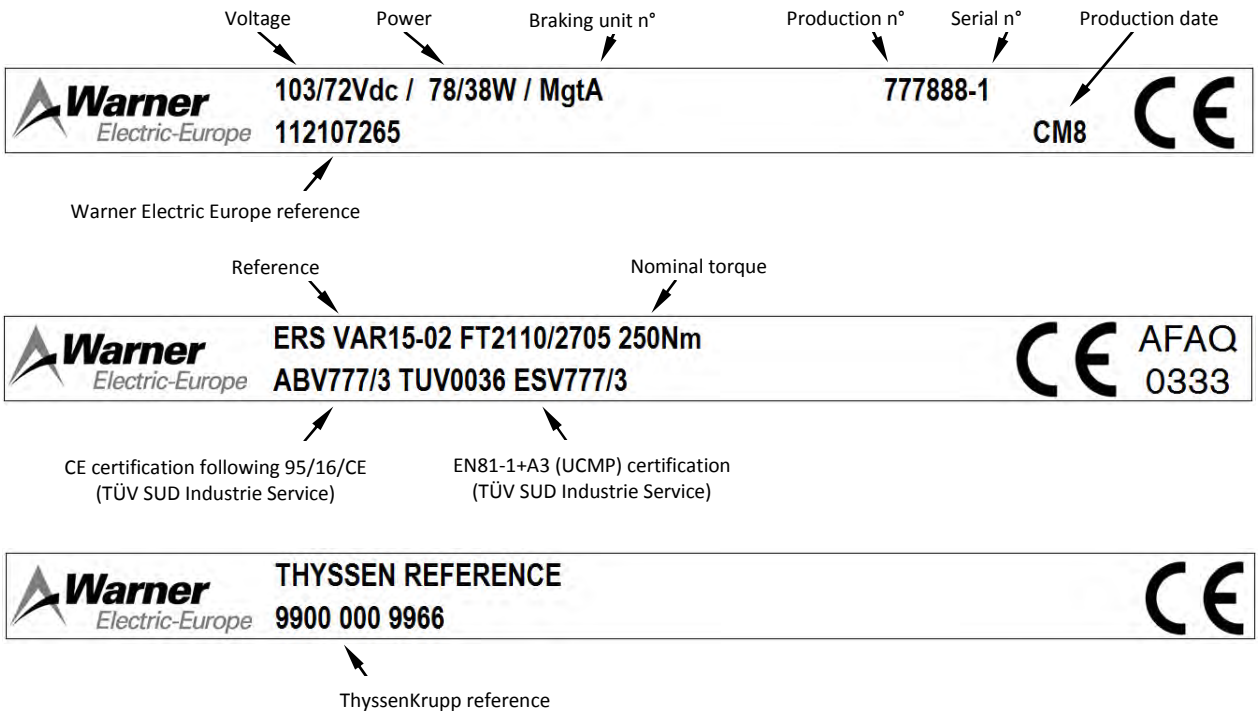
Table 1		**ERS VAR15-02**
Certificate : 95/16/EC EN81-1+A3 (UCMP)		 ABV777/3 (TÜV) ESV777/3 (TÜV)
Size		**250**
ThyssenKrupp reference		9900 000 9966
Warner Electric Europe reference		1 12 107265
Warning : Use power supply with over excitation		
Nominal torque	Nm	**250**
Voltage-over excitation (1 sec.) +5% / -10%	Vdc	103
Voltage-holding +5% / -10%	Vdc	72
Power-over excitation	W	78
Power-holding	W	38
Resistance	Ω	137
Electrical response time **T10**	ms	70
Response time **T90**	ms	100
Maximum speed	Tr/min	255
Nominal air gap	mm	0.33 +0.06 / -0.05
Maximum air gap (after wear)	mm	0.7
Duty cycle	ED	50%
Number of cycle per hour max.		240
Weight	Kg	20
Electrical protection class		IP42
Mechanical protection class		IP10 (without cover)

Per braking unit

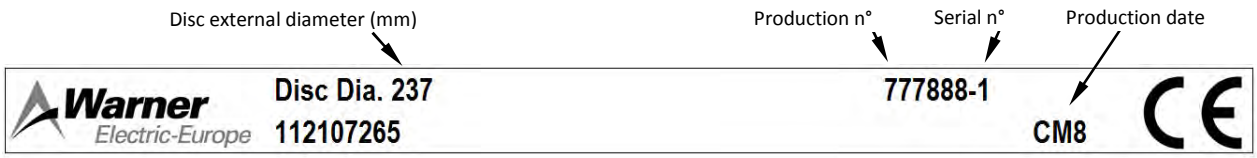
4-3 Labeling details

For location of labeling on brake, please refer to **Fig. 1**, page 7.

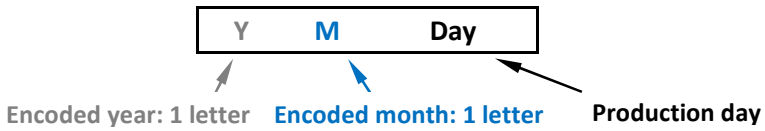
Braking unit labels



Disc label



Encoded date details:



Encoded year letter

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K

Encoded month letter

January	February	March	April	May	June	July	August	September	October	November	December
M	N	O	P	Q	R	S	T	U	V	W	X

Example: YN16 is, 2010, 16th February

5- Installation

5-1 Customer interface specification

Customer friction flange specification:

- Material: Cast iron EN. GJS400 (NFEN1563)
- Roughness: ≤ Ra 3.2
- Finishing: Dry phosphate (with manganese or zinc)
- Geometrical tolerances:

⌖	0,1	Customer shaft axis
⏥	0,1	

5-2 Brake mounting

Reminder:

Precautions and safety measures must be read before any installation or maintenance of the brake. Compliance with the instructions and values given by the documentation and marking of the unit is imperative in order to ensure a proper functioning of the brake.

Avoid any impact or damage to the brake during handling.
Never lift the brake using the coil cables.
This brake is designed to work in clean conditions. Friction faces must be kept completely clean of any oil, water, grease or abrasive dust.

The brake is delivered pre-assembled with detection already set.
The O ring is delivered already assembled in the disc.
Fixing screws and safety washers are supplied by the customer.

For the operations described below please refer to **Fig. 1**, page 7.

- ✓ Engaged the disc (equipped with O ring) on customer shaft.
- ✓ Put in place braking units and tighten fixing screws (with safety washers) as it is shown in **Fig. 3** page 10, with a pre-tightening torque, see **tableau 2** below.

The spacer located in the middle must be mounted with the plastic part inside the brake as it is shown in **Fig. 2** below. If this is not respected, fretting corrosion can be generated.

Fig. 2

Size	**ERS VAR15-02 – 250 Nm**
Fixing screw	6 x M10
Pre-tightening torque Nm	22
Tightening torque Nm	44

Table 2

✓ Remove transport screws.

✓ Make all permanent electrical connections.

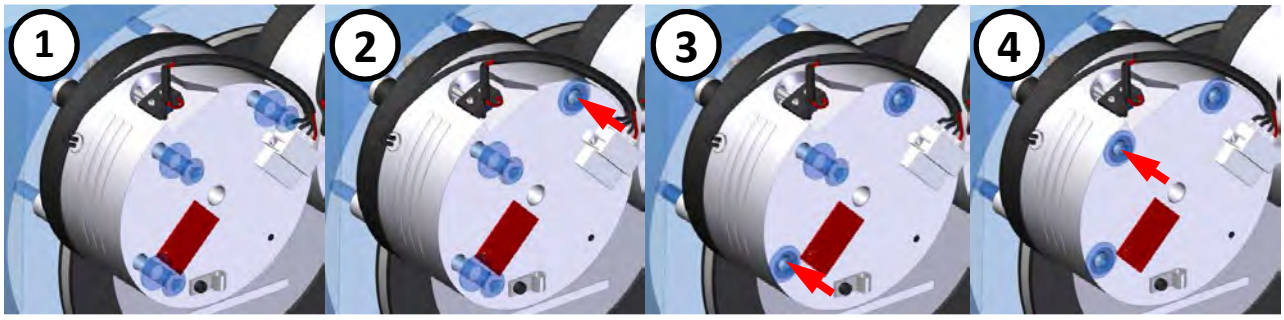


Fig. 3

6- Electrical connection

Brake **ERS VAR15-02** operates on a direct current supply. Polarity does not affect the way the brake operates.

All works on the electrical connections have to be made with power off.

Make sure that the nominal supply voltage is always maintained. A lack of power results in a reduction to the maximum air gap.

When switching on DC-side the coil must be protected against voltage peaks, according DIN VDE0580.

Emergency braking: for emergency braking the switching OFF must be connected on DC current side, in order to obtain short engaging time of the brake.

Service braking: for service braking, the switching OFF and ON must be connected on DC current side, in order to obtain silent switching.

The connecting wires must be thick enough to help prevent sudden drops in voltage between the source and the brake.

Cable length	m	0 -> 10	10 -> 20
Cross section	mm²	1.5	2.5

Table 3

Tolerances on the supply voltage at the brake terminals: +5% / -10% (NF C 79-300).

6-1 Connector connection

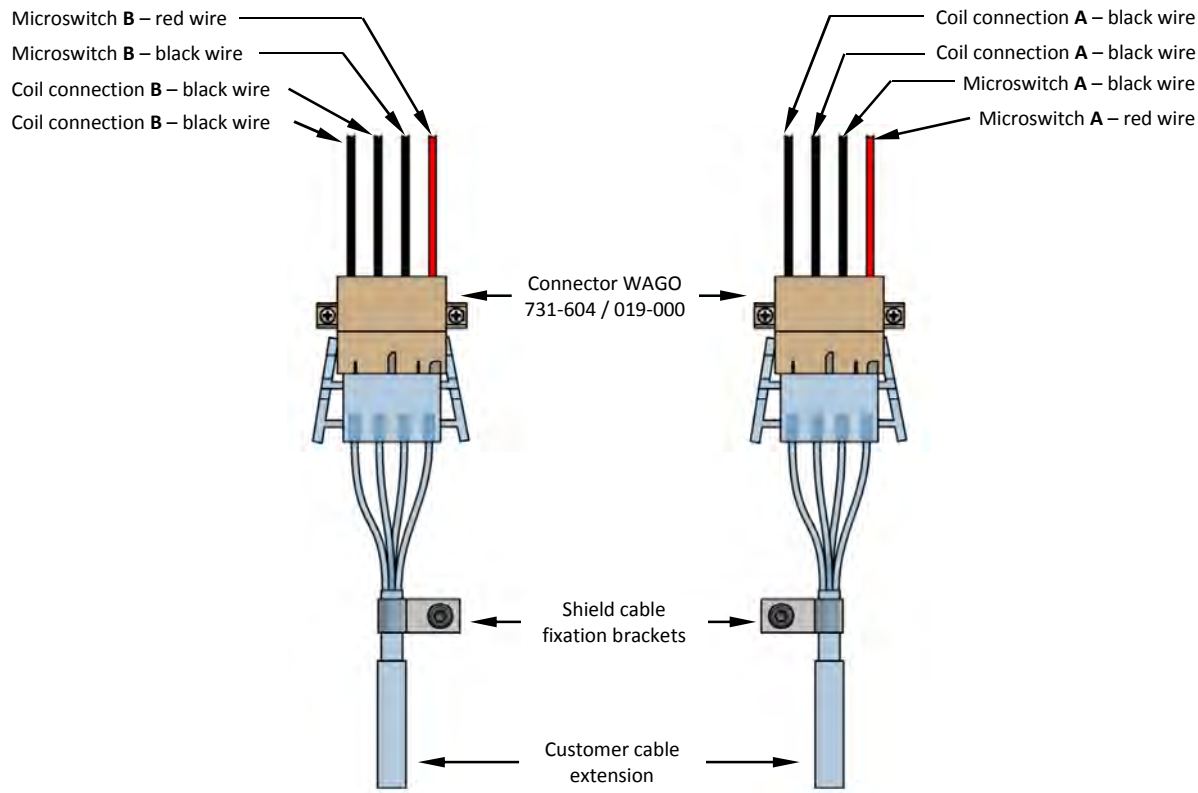


Fig. 4

6-2 Microswitch technical data

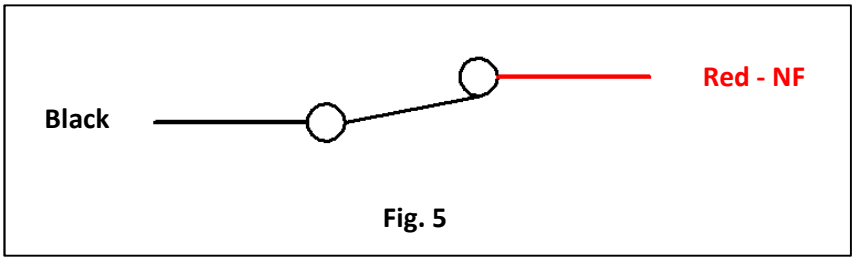


Fig. 5

- **Current range:** 10 mA à 100 mA at 24 Vdc
- For maximum electrical lifetime of the microswitch ensure switching under resistive load only.

7- Maintenance

7-1 Air gap checking

Check the air gap at each maintenance inspection.

This brake is intended for a static application as a safety brake. Any dynamic braking is restricted to emergency and test braking. Normal use will not lead to any noticeable wear on the lining.
Under no circumstances, this device can replace the system case against the car overspeed in the descending phase.

Air gap has to be measured in 3 points at the circumference and at each braking circuit (see **Fig. 6**). If the maximum value of the airgap (see Table 1) is exceeded in one point for one of the two circuits, change the disc and the O-ring.

Do not introduce the shims more than 10 mm into the air gap.
Avoid the springs and the dampers of noise.

Any modification made to the brake without the express authorisation of a representative of Warner Electric, as far as, any use out of the contractual specification accepted by "Warner Electric", will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

The customer must be careful to not alter the factory set parameters: Microswitch adjustment.
This brake must not be dismantled.

Location of feeler gauges per braking unit:

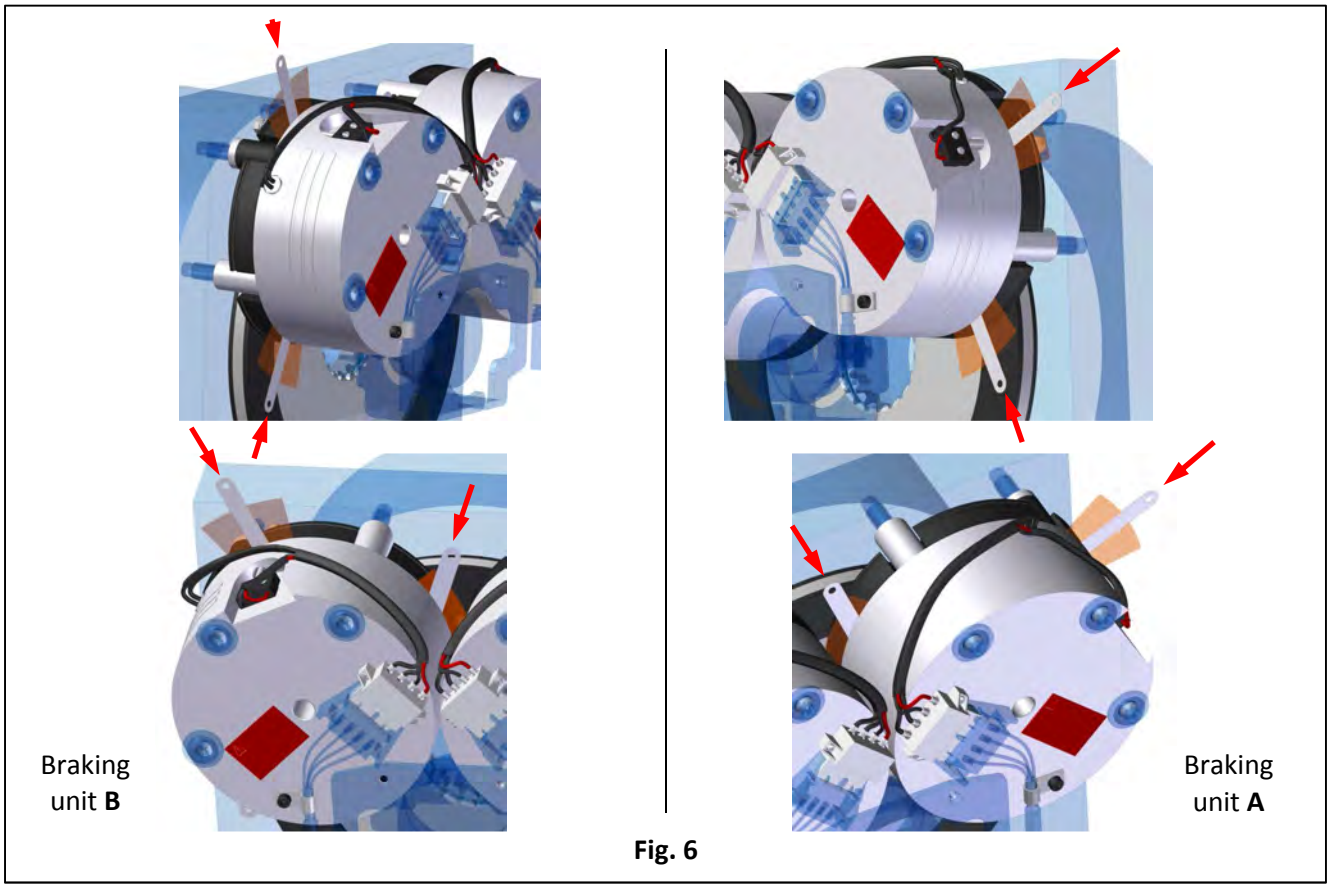


Fig. 6

7-2 Disc exchange

During maintenance, make sure that the driving mechanism is stopped and that there is no risk of accidental starting. The intervention must be signaled and the work area delimited.

All intervention must be done by authorized and qualified personnel, having read and understood this manual, using adapted procedures and professional tools. All intervention must be done according the regulation of the country of the installation.

Warning: It is mandatory that disassembling and assembling of the encoder is done according the instructions of the drive manufacturer.

Warning: not to damage the electric cables during the maintenance action.

This brake is designed to work in clean conditions. Friction faces must be kept completely clean of any oil, water, grease or abrasive dust.
Customer friction flange must be also carefully cleaned.

For the operations described below please refer to **Fig. 1**, page 7.

- ✓ Disconnect the brake electrically.
- ✓ Remove fixing screws.
- ✓ Remove braking units and disc.
- ✓ Clean the friction faces (on brake and flange) with clean and dry cloth.
- ✓ After the replacement of disc and O ring, re-assemble the brake as it is described in chapter 5-1.

7-3 Detection checking

Any modification made to the brake without the express authorisation of a representative of Warner Electric, as far as, any use out of the contractual specification accepted by "Warner Electric", will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

The customer must be careful to not alter the factory set parameters: Microswitch adjustment.
This brake must not be dismantled.

For the operations described below please refer to **Fig. 7** below.

- ✓ Switch ON the brake; the state of both microswitches must change.
- ✓ Switch OFF the brake.
- ✓ Insert a feeler gauge **0.20 mm** thick as it is shown in **Fig. 7**.
- ✓ Switch ON the brake; the state of both microswitches must not change.

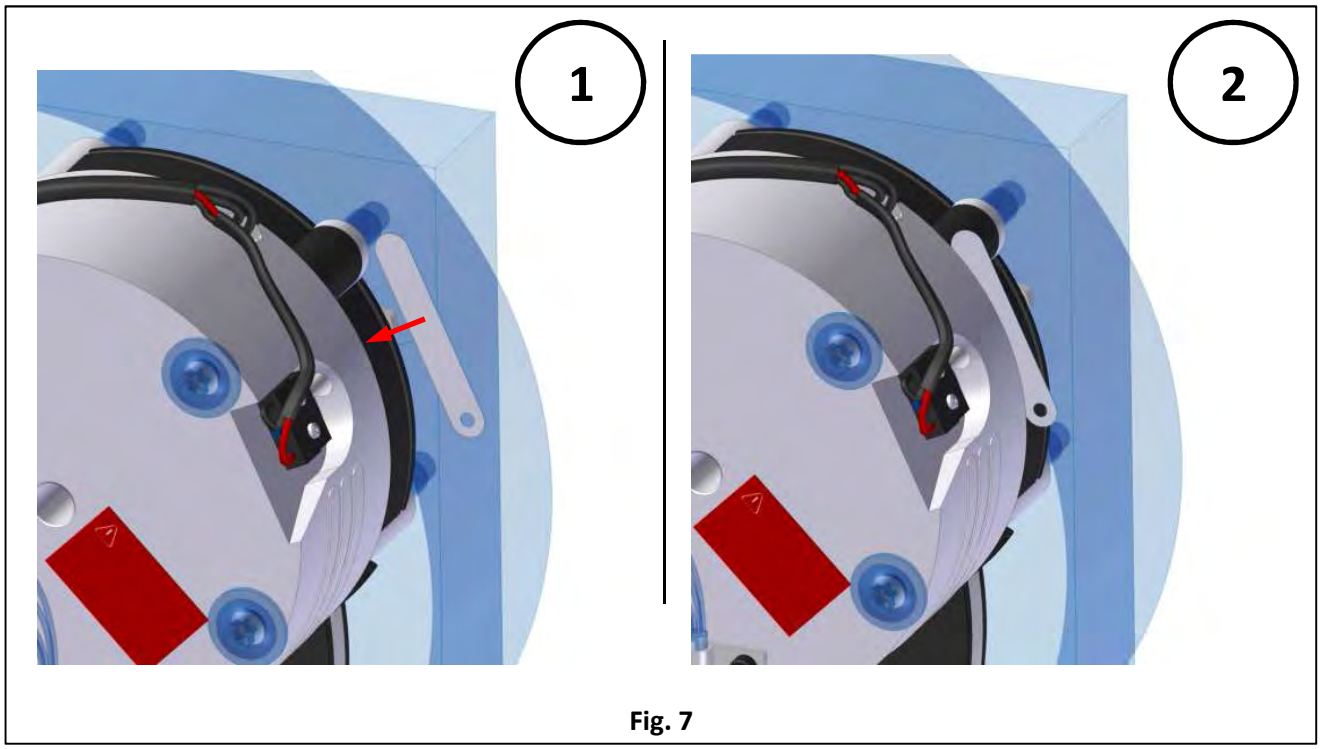


Fig. 7

7-4 Detection setting

For the operations described below please refer to **Fig. 7**, page 14 and **Fig. 8a** and **Fig. 8b** below.

- ✓ Insert a feeler gauge **0.15 mm** thick as it is shown in **Fig. 7**.
- ✓ Switch ON the brake and adjust the setting screw (**Fig. 8a & 8b**) until to obtain detection.
- ✓ Untighten carefully the setting screw until to have no detection.
- ✓ Switch OFF the brake and perform 3 detection checking as it is described in chapter 7-3.

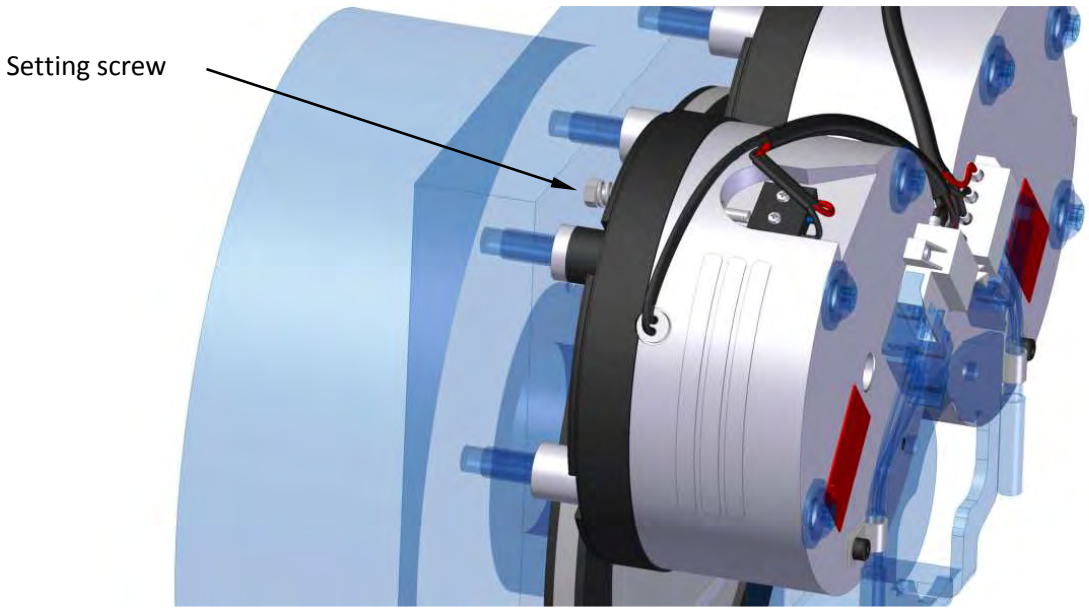


Fig. 8a

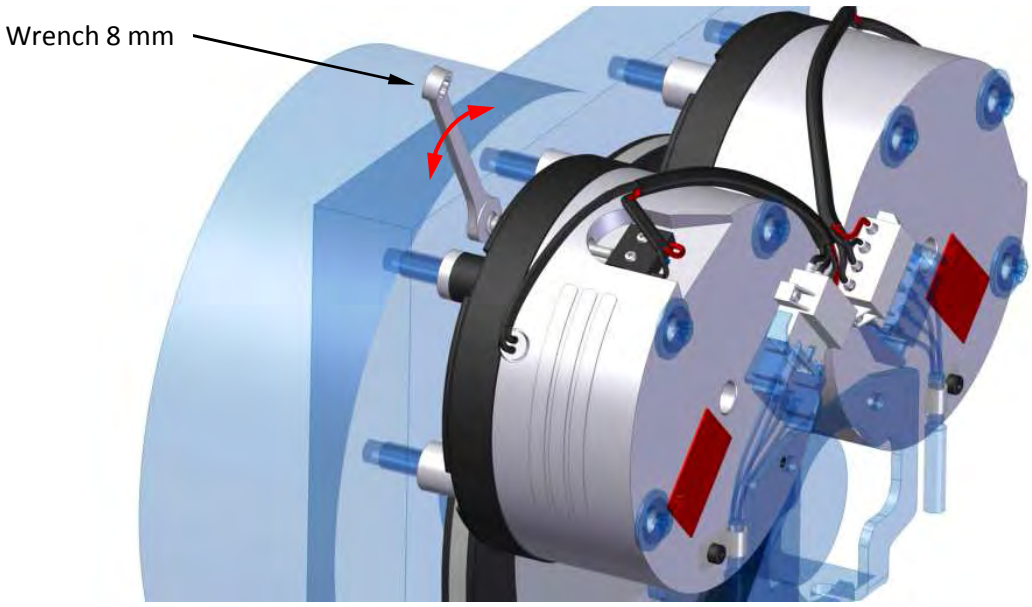


Fig. 8b

7-5 Microswitch exchange

During maintenance, make sure that the driving mechanism is stopped and that there is no risk of accidental starting. The intervention must be signaled and the work area delimited.

All intervention must be done by authorized and qualified personnel, having read and understood this manual, using adapted procedures and professional tools. All intervention must be done according the regulation of the country of the installation.

Warning: not to damage the electric cables during the maintenance action.

For the operations described below please refer to **Fig. 10,** page 17.

- ✓ Remove microswitches wires from connectors, see **Fig. 4**, page 11 & **Fig. 9** below.
- ✓ Cut and remove heatshrinks around microswitches wires.
- ✓ Untighten and remove microswitch fixing screws.
- ✓ Replace microswitch and re-tighten fixing screws.
- ✓ Re-connect microswitches wires into connectors.
- ✓ Perform detection checking as it is described in chapter 7-3.
- ✓ If the detection checking fails, perform a detection setting as it is described in chapter 7-4.

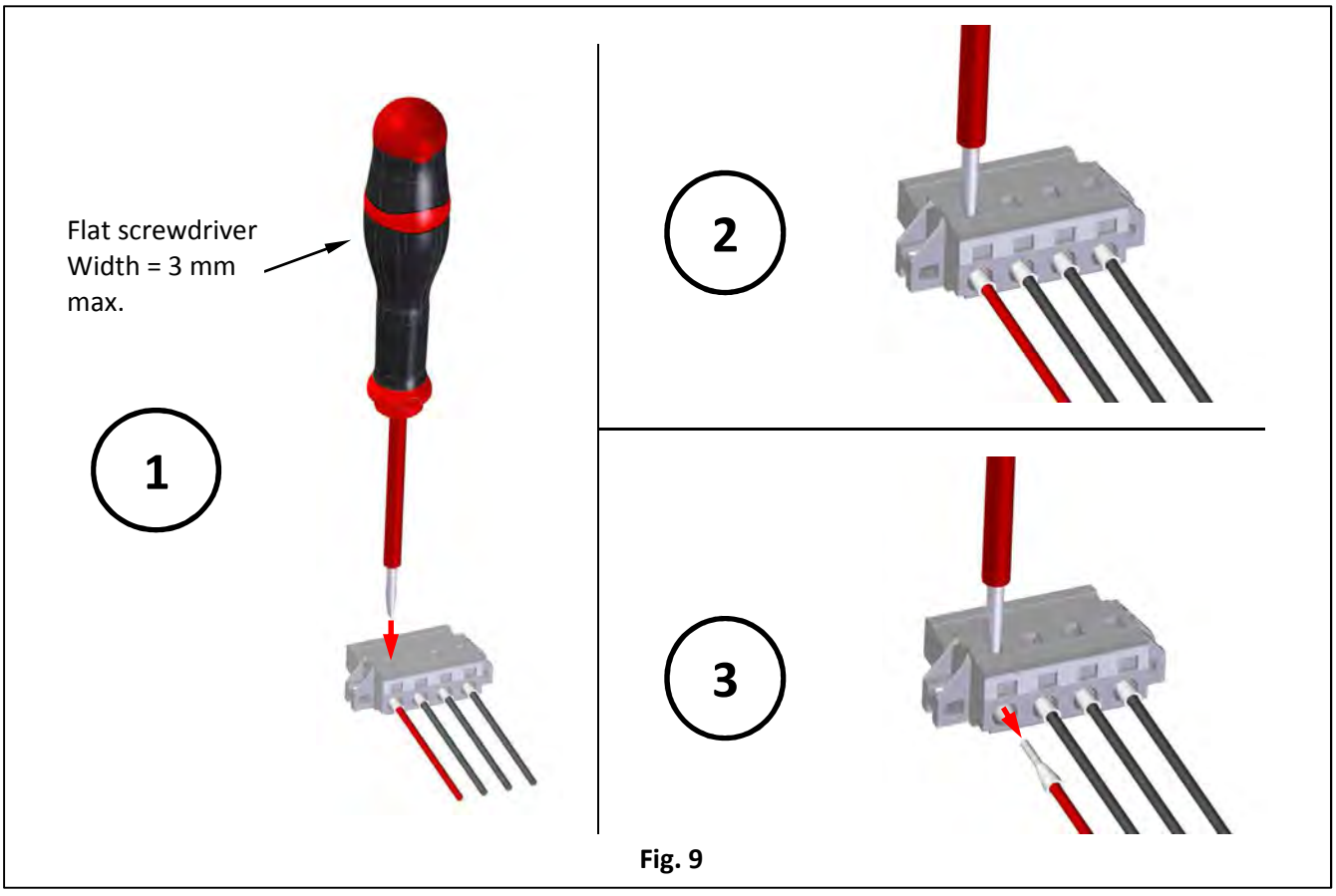


Fig. 9

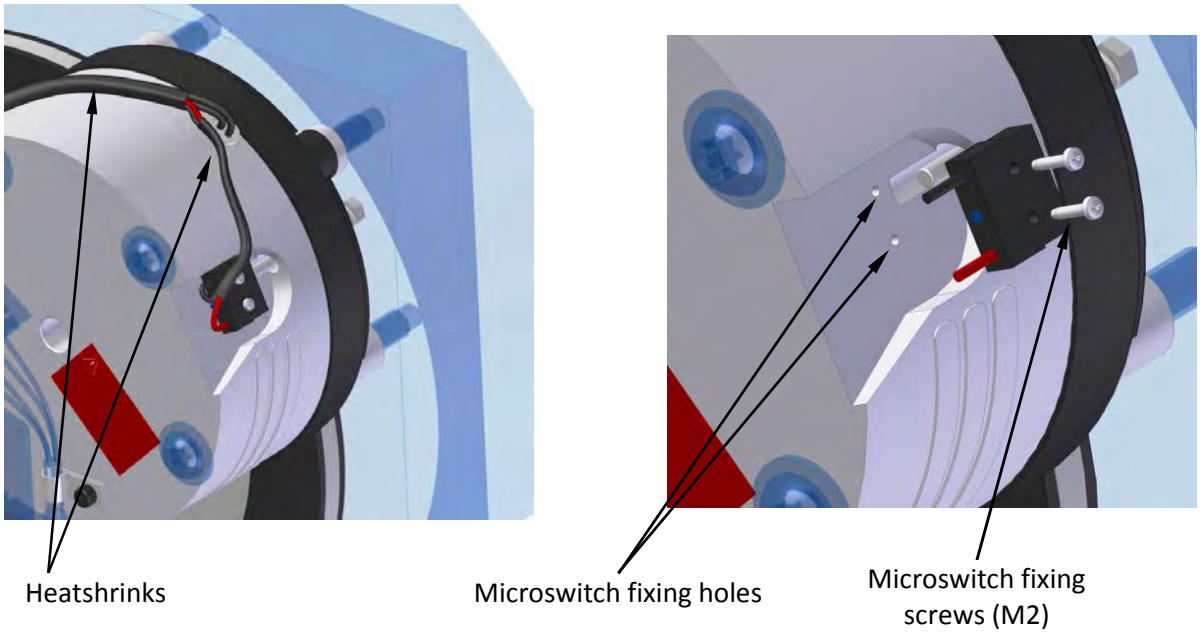


Fig. 10

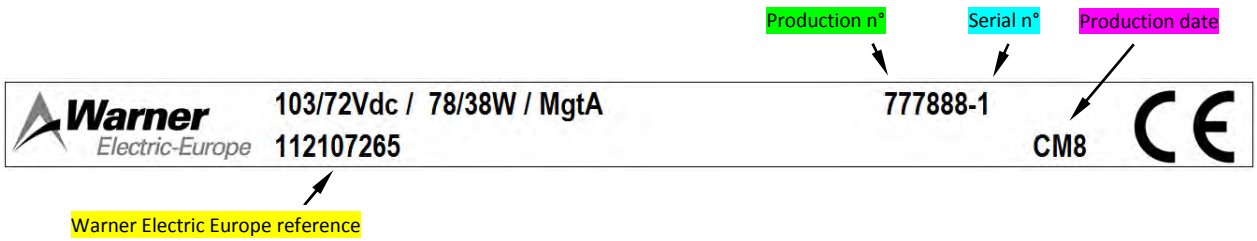
8- Spare parts

Available spare parts for this brake are the following:

- Disc
- O ring (to put into the disc)
- Microswitch

Please, join to your spare part request the following information:

- Warner Electric Europe reference
- Production number
- Serial number
- Production date



9- Tooling

Tooling	Function
Torque wrench (measurement range > 50 Nm)	Brake fixing screws
Feeler gauges play	Air gap checking Detection checking Detection setting
Wrench 8 mm	Detection setting
Flat screwdriver 3mm width	Microswitch exchange
Cruciform screwdriver (screw M2)	Microswitch exchange
Multimeter	Voltage checking

10- Troubleshooting

Troubleshooting		
Fault	**Cause**	**Remedy**
Brake does not release	• OEX time too short • Voltage too low • Power supply is interrupted • Air gap too large • Disc worn • Coil damaged	• Re-set OEX time • Re-set voltage • Re-connect the power supply, check detection • Replace disc and O ring • Replace disc and O ring • Replace the braking unit
Brake does not brake	• Voltage present at switch off Position • Grease on friction faces • Transport screw still in place	• Check detection and customer power supply • Clean the friction faces, change disc and O ring • Remove transport screw
Nuisance braking	• Holding voltage too low • Wrong information from microswitch	• Re-set voltage • Re-set detection

11- Contact

Any question? You can contact us at: *info@warnerelectric-eu.com*

Subject to alteration without prior notice

Service manual

Industrial Clutches, Brakes, Controls, Tension Systems, Sensors, and Switches

SM426gb - Annex 2- rev 03/14

Electrically Released Brake

ERS VAR15-02 - 250 Nm - H/R

Warner Electric
An Altra Industrial Motion Company

WARNER ELECTRIC EUROPE
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Tél. +33 (0)2 41 21 24 24, Fax + 33 (0)2 41 21 24 00
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Declaration of conformity:
During the design of this product, the EU directives applicable were taken into account.
An attestation of conformity is available on request.
For incorporating the product, the manufacturer of a machine or system needs to take into account the EU directives applicable.

Summary of the directives and standards used:

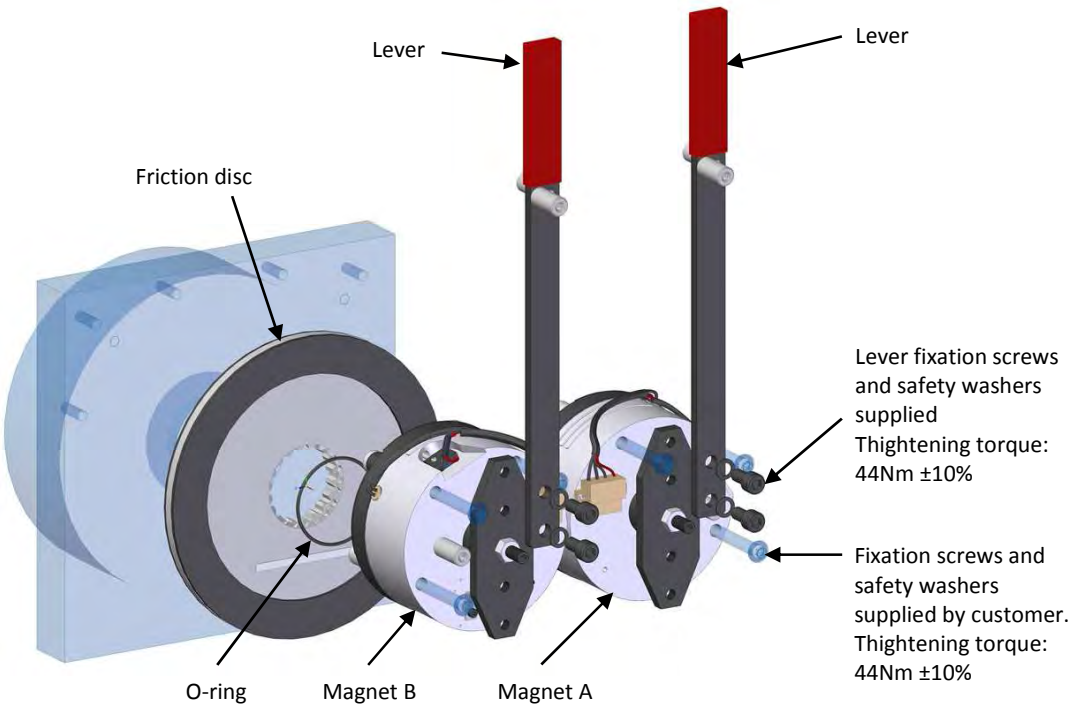
Directives:	
2006/95/CE	Low voltage equipment directive
2004/108/CE	Electromagnetic compatibility directive
95/16/CE	Lifts directive
Standards	
DIN VDE 0580	Electromagnetic devices and components, General requirements
EN 81-1	Safety rules for the construction and installation of lifts - Part 1: Electric lifts
NFC 79300	Industrial electrical apparatus. Electromagnetic apparatus for mechanical applications requirements.

This manual is an annex to SM426gb, it explains how to install and use the hand-release system. For any other information, or manipulation, please refer to the Service Manual SM426gb.

CONTENTS

1 Technical specifications

Fig. 1



2 Installation of the Hand-release system

In order to be able to use the hand-release system:

- Fit the two lever on top position (Fig. 2a) or on bottom position (Fig. 2b).

Fig. 2a

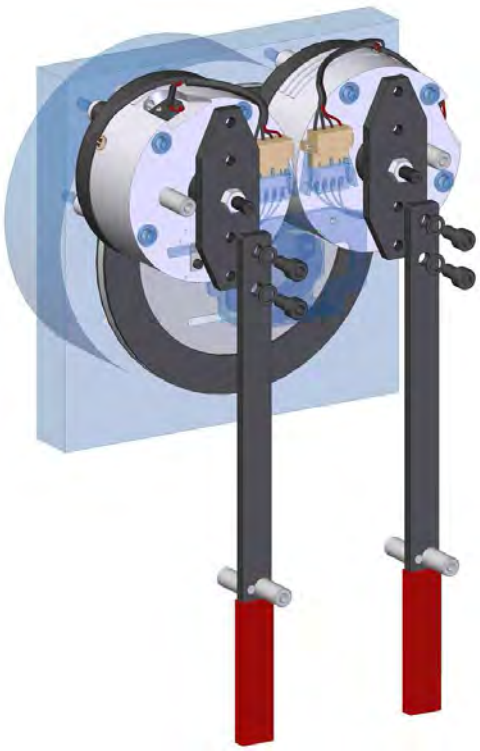


Fig. 2b

- Turn the levers (20° to 25° approx.) as it is shown in Fig 3a, Fig 3b or Fig 3c (positions are similar for bottom mounting).

Fig. 3a

Fig. 3b

Fig. 3c

Subject to alteration without prior notice

Service manual

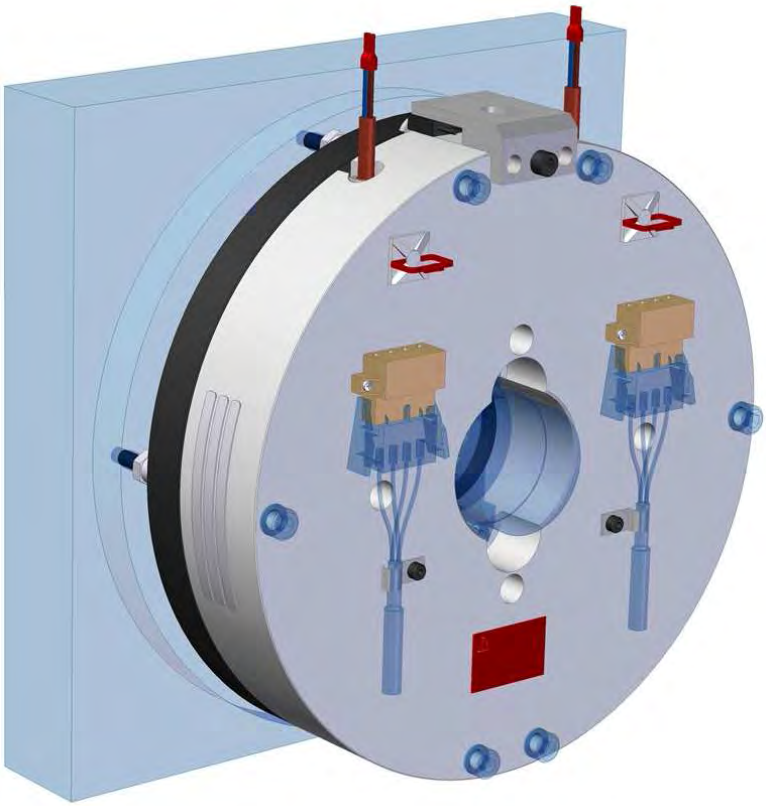
Industrial Clutches, Brakes, Controls, Tension Systems, Sensors, and Switches

SM431gb - rev 01/14

Electrically Released Brake

ERS VAR07 SZ 600/550

ERS VAR07 SZ 420/350



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www.warnerelectric-eu.com

CONTENTS

1- Standards and Directives

Declaration of conformity:

During the design of this product, the EU directives applicable were taken into account.
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Standards:	
DIN VDE 0580	Electromagnetic devices and components, General requirements
EN 81-1	Safety rules for the construction and installation of lifts - Part 1: Electric lifts
NFC 79300	Industrial electrical apparatus. Electromagnetic apparatus for mechanical applications requirements

2- Precautions and safety measures

Precautions and safety measures must be read before any installation or maintenance of the brake.
Compliance with the instructions and values given by the documentation and marking of the unit is imperative in order to ensure a proper functioning of the brake.

2-1 Symbols used in this manual


Action that might damage the brake.


Action that might be dangerous to human safety.


Electrical action that might be dangerous to human safety.


Handling of loads that might be dangerous to human safety.


Surface temperature that might be dangerous to human safety.

2-2 Safety precautions for installation and maintenance

During maintenance, make sure that the driving mechanism is stopped and that there is no risk of accidental starting. The intervention must be signaled and the work area delimited.

All intervention must be done by authorized and qualified personnel, having read and understood this manual, using adapted procedures and professional tools. All intervention must be done according the regulation of the country of the installation.

All works on the electrical connections must be done with power off.

Magnetic field generated by the magnet, can create dysfunctions on near machine or device. Users must also be careful about attractions of tools or other devices during interventions.

Due to the magnetic field generated by the magnet, the bearers of a heart pace-maker or an implant must avoid the proximity of the unit.

During operation the brake surface can reach temperatures higher than 80°C. Users must be careful during contact with the unit.

Respiratory protection
Inhalation of large amounts of dust can cause coughs and difficulty in breathing.
Respirator must be worn if exposed to friction material dust. [Dust mask FFP2].
Move to fresh air in case of accidental inhalation of dusts.
In the event of persistent symptoms receive medical treatment.
In case of ingestion of friction material dust, consult a doctor.

Provide appropriate exhaust ventilation at places where friction material dust can be generated.
Do not use brushes, pressurized air or hazardous agents to clean the brake. The use of a vacuum cleaner is recommended.

Hand protection
Protective and dust-resistant gloves.

Eyes protection
Friction material dust particles, like other inert materials, may be mechanically irritating the eyes.
Safety goggles with side protection.
In case of contact with eyes, carefully rinse with plenty of water.
In the event of persistent symptoms seek medical treatment.

Skin protection
Prolonged skin contact may cause mechanical irritation.
Dust resistant protective clothing.
In case of contact with skin, wash with soap and water as a precaution.
Consult a doctor if skin irritation persists.

Feet protection
Safety shoes must be worn.

Helmet protection
Safety helmet must be worn.

Protective and hygiene measures
Do not breathe friction material dust.
Wash hands before breaks and at the end of workday.
During maintenance, do not eat, drink or smoke.
Handle in accordance with the general hygienic rules.
Remove and wash contaminated clothes before re-use.

2-3 Precautions for handling

Avoid any impact or damage to the brake during handling.

To avoid risk of injury (see mass of the units in the service manual of the brake), use an adapted device, hoist or crane, for the handling of the unit.

When handling, use the handling holes intended for this purpose.
Never lift the brake using the coil cables.

2-4 Precautions on use

Customer is responsible of brake qualification with his interface in order to guaranty that brake performances are not reduced.
The use of the 2 circuits in redundancy is mandatory.
This brake is designed to work in clean conditions. Friction faces must be kept completely clean of any oil, water, grease or abrasive dust.
The friction flange, on customer side, must be, also, carefully cleaned and degreased.

The friction faces must be protected, with adapted devices (cover, heating devices, etc…):

- To avoid pollution and rusting during the lifetime of the unit.
- To avoid condensation, resulting in freezing conditions, in low temperature/high humidity, or sticking of the disc.

This brake is designed to work in ambient temperature between 0°C and 40°C.

This brake is designed to work with duty cycle of 50% (Insulation class: 155°C). The temperature of customer friction flange must not exceed 90°C.

This brake can only be used on « horizontal » position.

When switching on DC-side the coil must be protected against voltage peaks, according DIN VDE0580.

Veiller au respect de la tension nominale d'alimentation. Une sous-alimentation entraîne une réduction de la distance d'appel.


An over-voltage supply generates additional heat on the surface of the brake, with risks of injury by burning and possible damage to the coil.

Emergency braking: for emergency braking the switching OFF must be connected on DC current side, in order to obtain short engaging time of the brake.

Service braking: for service braking, the switching OFF and ON must be connected on DC current side, in order to obtain silent switching.

2-5 Restrictions on use

Any modification made to the brake without the express authorisation of a representative of Warner Electric, as far as, any use out of the contractual specification accepted by "Warner Electric", will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

If maximum rotation speed is exceeded, the guarantee is no longer valid.

The brake must be replaced it is submitted to water projections.

For the brake to comply with directive 95 / 16 / EC, the installer must observe the general conditions for installations and use as defined in the EC type certificate, drawn up by the TÜV SÜD Industrie Service (see ABV number in **table 1**), including the mandatory use of a speed limiting device, in compliance with EN 81-1 paragraphs 9.9 and 9.10.10. Under no circumstances, this device can replace the system case against the car overspeed in the descending phase.

The customer must be careful to not alter the factory set parameters: Microswitch adjustment.
This brake must not be dismantled.

This brake is designed for static applications. Dynamic brakings are restricted to emergency braking and test braking.

Unless otherwise specified in the manual service, this range of product is not designed to be used according EC/94/9 directive “Equipment for explosive atmospheres” (ATEX).

3- Storage

These devices are delivered in a package guaranteeing the preservation of the product providing it is by surface transportation.
In case of a specific request (air or sea transport, long-term storage, etc) contact our factory.

4- Technical specification

4-1 Brake description

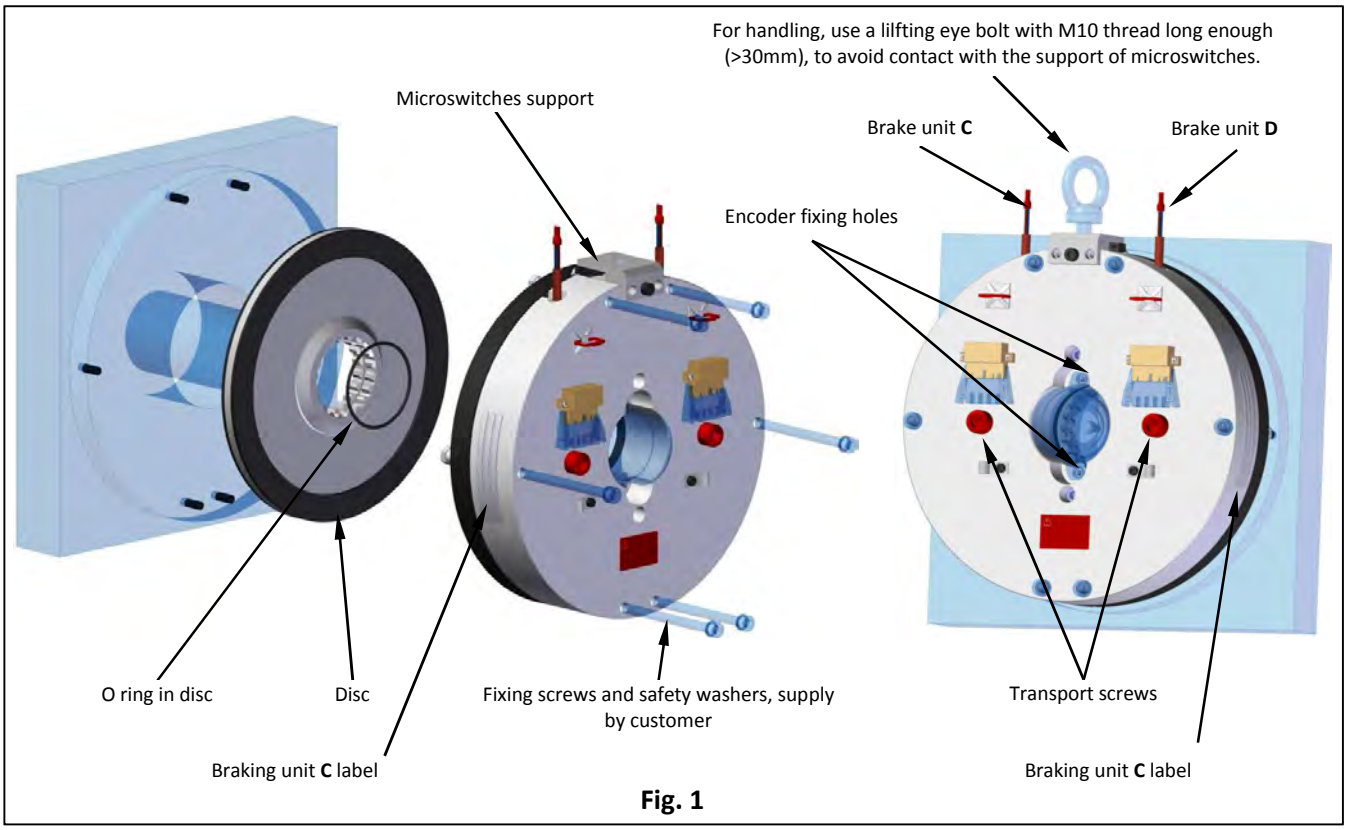


Fig. 1

4-2 Technical data

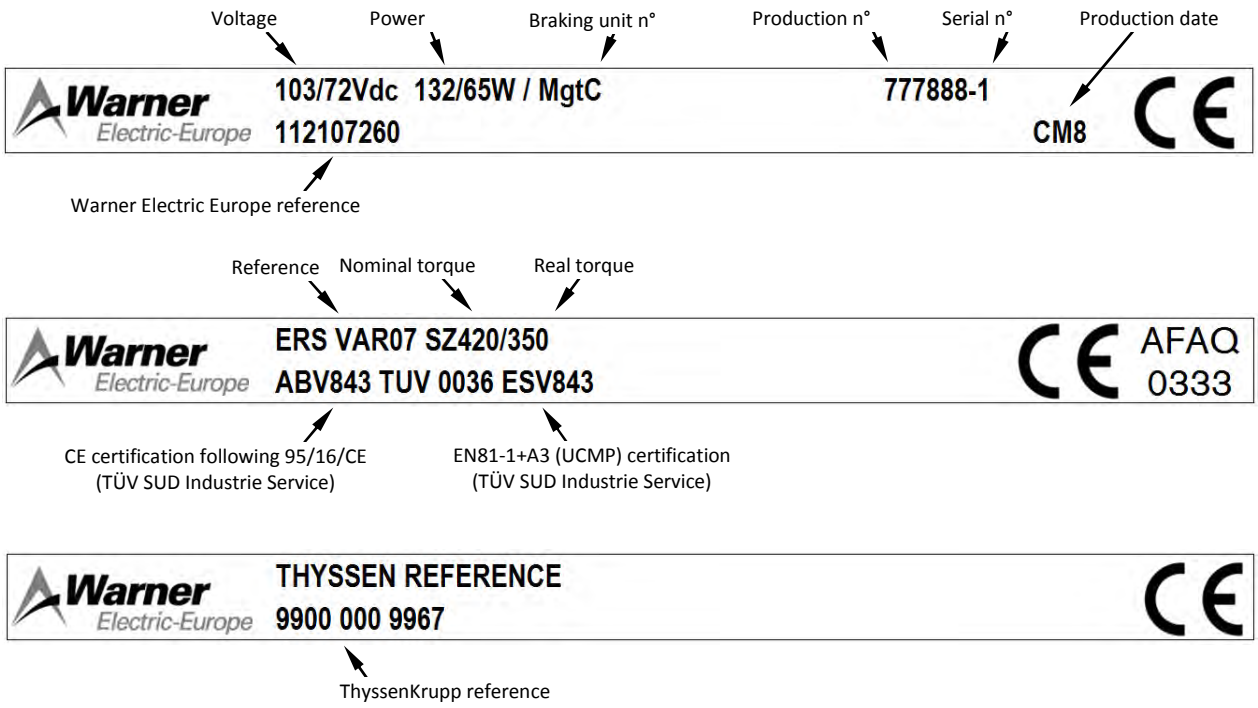
Table 1		**ERS VAR07**	
Certificat : 95/16/EC EN81-1+A3 (UCMP)		ABV843 (TÜV) ESV843 (TÜV)	ABV844 (TÜV) ESV844 (TÜV)
Size		**SZ420/350**	**SZ600/550**
ThyssenKrupp reference		9900 000 9967	9900 000 9968
Warner Electric Europe reference		1 12 107260	1 12 107261
Warning : Use power supply with over excitation			
Nominal torque	Nm	**350**	**550**
Voltage-over excitation (1 sec.) +5% / -10%	Vdc	103	
Voltage-holding +5% / -10%	Vdc	72	
Power-over excitation	W	132	156
Power-holding	W	65	74
Resistance	Ω	80	70
Electrical response time **T10**	ms	95	80
Response time **T90**	ms	160	135
Maximum speed	Tr/min	279	
Nominal air gap	mm	0.4 +0.05 / -0.1	
Maximum air gap (after wear)	mm	0.6	
Duty cycle	ED	50%	
Number of cycle per hour max.		240	
Weight	Kg	32	42
Electrical protection class		IP42	
Mechanical protection class		IP10 (sans capot)	

Per braking unit

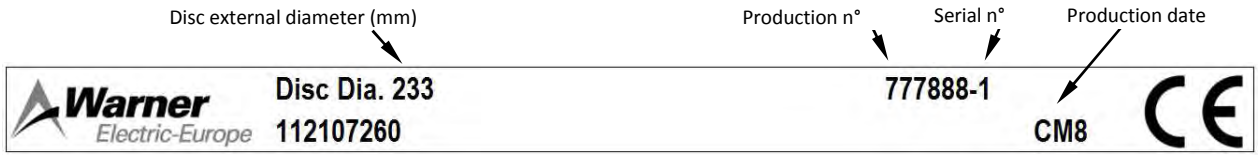
4-3 Labeling details

For location of labeling on brake, please refer to **Fig. 1**, page 7.

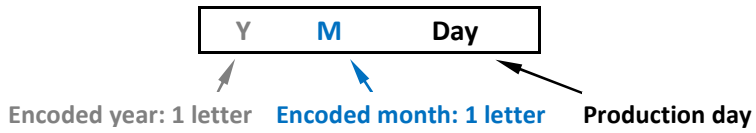
Braking unit labels



Disc label



Encoded date details:



Encoded year letter

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K

Encoded month letter

January	February	March	April	May	June	July	August	September	October	November	December
M	N	O	P	Q	R	S	T	U	V	W	X

Example: YN16 is, 2010, 16th February

5- Installation

5-1 Customer interface specification

Customer friction flange specification:

- Material: Cast iron EN. GJS400 (NFEN1563)
- Roughness: ≤ Ra 3.2
- Finishing: Dry phosphate (with manganese or zinc)
- Tolérances géométriques :

	0,1	Customer shaft axis
	0,1	

5-2 Brake mounting

Reminder:

Precautions and safety measures must be read before any installation or maintenance of the brake. Compliance with the instructions and values given by the documentation and marking of the unit is imperative in order to ensure a proper functioning of the brake.

Avoid any impact or damage to the brake during handling.
Never lift the brake using the coil cables.
This brake is designed to work in clean conditions. Friction faces must be kept completely clean of any oil, water, grease or abrasive dust.

The brake is delivered pre-assembled with detection, air gap and dampening system already set.
The O ring is delivered already assembled in the disc.
Fixing screws and safety washers are supplied by the customer

For the operations described below please refer to **Fig. 1**, page 7.

- ✓ Engaged the disc (equipped with O ring) on customer shaft.
- ✓ Put in place brake and tighten the fixing screws, (star sequence tightening, first to initial torque, final setting torque after, see **Table** 2).

Taille	**SZ420/350**	**SZ600/550**
Fixing screw	6 x M8	6 x M10
Pre-tightening torque Nm	11	22
Tightening torque Nm	22	44

Table 2

- ✓ Remove transport screws.
- ✓ Make all permanent electrical connections.

6- Electrical connection

Brake **ERS VAR07** operates on a direct current supply. Polarity must be respected (see chapter 6-1) to guaranty a proper brake operation.

All works on the electrical connections have to be made with power off.

Make sure that the nominal supply voltage is always maintained. A lack of power results in a reduction to the maximum air gap.

When switching on DC-side the coil must be protected against voltage peaks, according DIN VDE0580.

Emergency braking: for emergency braking the switching OFF must be connected on DC current side, in order to obtain short engaging time of the brake.

Service braking: for service braking, the switching OFF and ON must be connected on DC current side, in order to obtain silent switching.

The connecting wires must be thick enough to help prevent sudden drops in voltage between the source and the brake.

Cable length	m	0 -> 10	10 -> 20
Cross section	mm^2	1.5	2.5

Table 3

Tolerances on the supply voltage at the brake terminals: +5% / -10% (NF C 79-300).

6-1 Connector connection

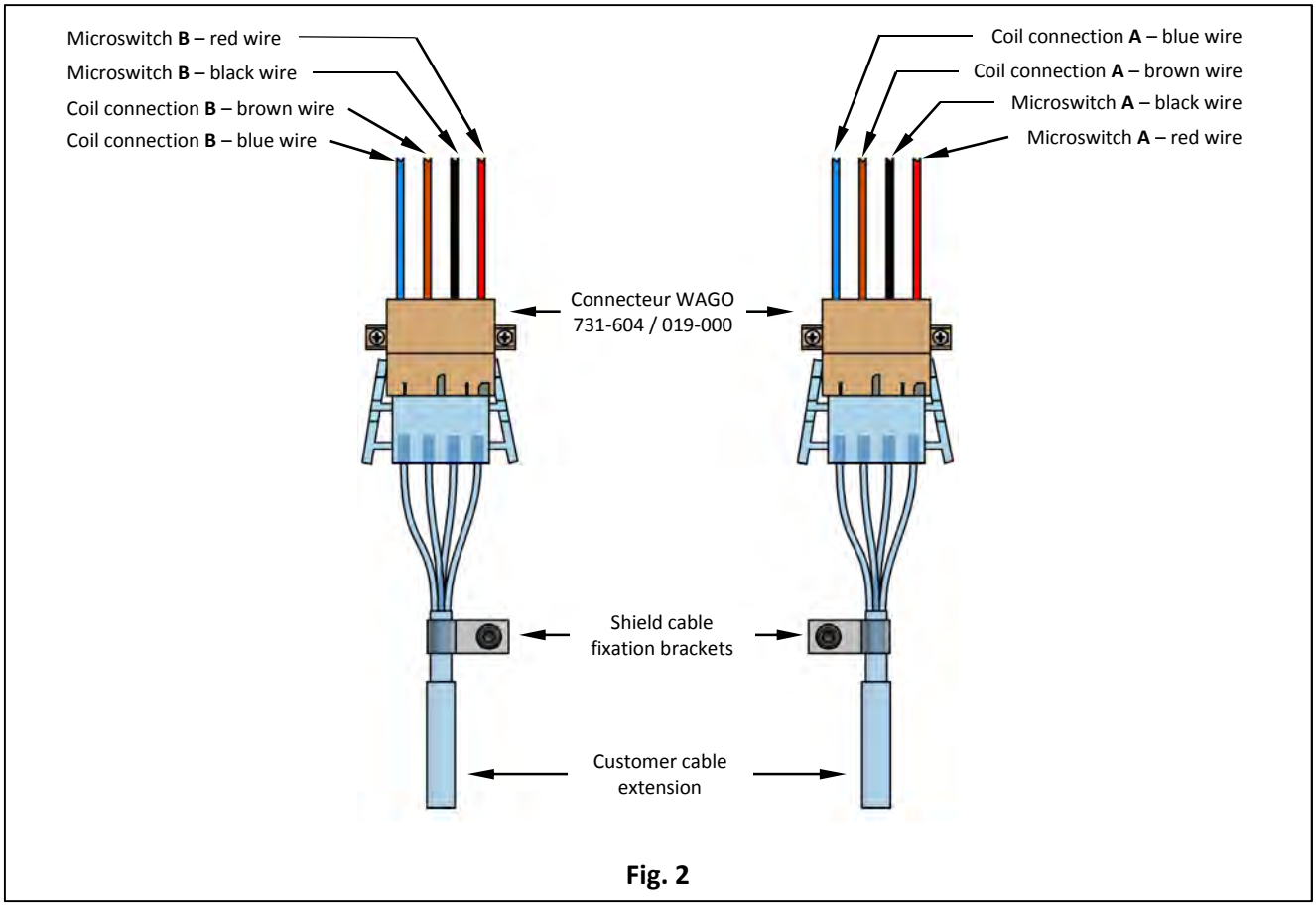


Fig. 2

6-2 Microswitch technical data

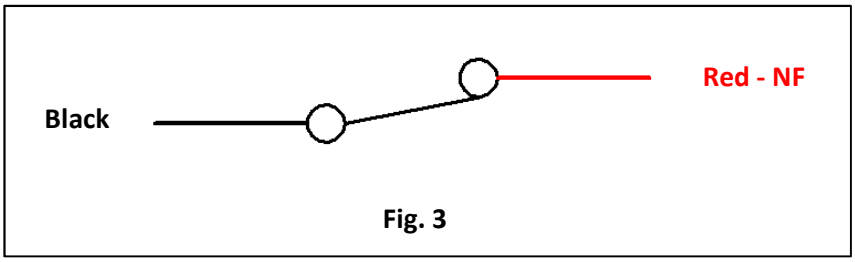


Fig. 3

- **Current range:** 10 mA à 100 mA at 24 Vdc
- For maximum electrical lifetime of the microswitch ensure switching under resistive load only.

7- Maintenance

7-1 Air gap checking

Check the air gap at each maintenance inspection.

This brake is intended for a static application as a safety brake. Any dynamic braking is restricted to emergency and test braking. Normal use will not lead to any noticeable wear on the lining.
Under no circumstances, this device can replace the system case against the car overspeed in the descending phase.

Air gap has to be measured in 3 points at the circumference and at each braking circuit (see **Fig. 4**). If the maximum value of the air gap (see Table 1) is exceeded in one point for one of the two circuits, change the disc and the O-ring.

Do not introduce the shims more than 10 mm into the air gap.
Avoid the springs and the dampers of noise.

Any modification made to the brake without the express authorisation of a representative of Warner Electric, as far as, any use out of the contractual specification accepted by "Warner Electric", will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

The customer must be careful to not alter the factory set parameters: Microswitch adjustment, air gap adjustment and dampening system. This brake must not be dismantled.

Location of feeler gauges per braking unit:

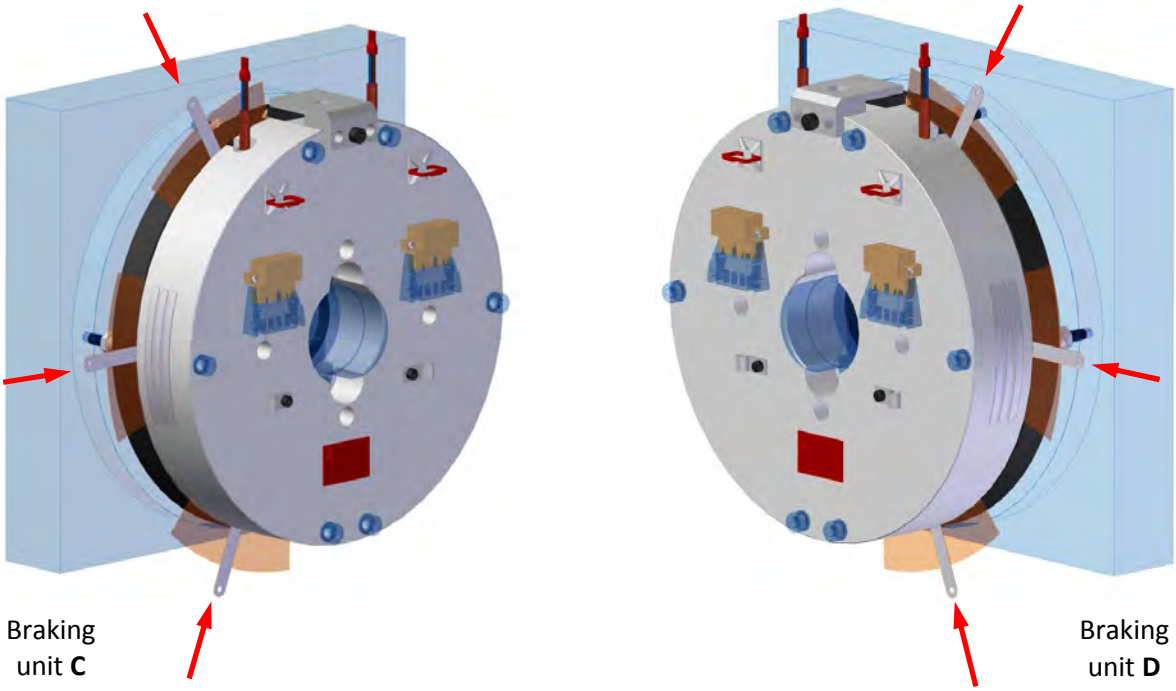


Fig. 4

7-2 Disc exchange

During maintenance, make sure that the driving mechanism is stopped and that there is no risk of accidental starting. The intervention must be signaled and the work area delimited.

All intervention must be done by authorized and qualified personnel, having read and understood this manual, using adapted procedures and professional tools. All intervention must be done according the regulation of the country of the installation.

Warning: It is mandatory that disassembling and assembling of the encoder is done according the instructions of the drive manufacturer.

Warning: not to damage the electric cables during the maintenance action.

This brake is designed to work in clean conditions. Friction faces must be kept completely clean of any oil, water, grease or abrasive dust.
Customer friction flange must be also carefully cleaned.

For the operations described below please refer to **Fig. 1**, page 7.

- ✓ Disconnect the brake electrically.
- ✓ Remove fixing screws.
- ✓ Remove braking units and disc.
- ✓ Clean the friction faces (on brake and flange) with clean and dry cloth.
- ✓ After the replacement of disc and O ring, re-assemble the brake as it is described in chapter 5-1.

7-3 Detection checking

Any modification made to the brake without the express authorisation of a representative of Warner Electric, as far as, any use out of the contractual specification accepted by "Warner Electric", will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

The customer must be careful to not alter the factory set parameters: Microswitch adjustment, air gap adjustment and dampening system adjustment. This brake must not be dismantled.

For the operations described below please refer to **Fig. 5** below.

- ✓ Switch ON the brake; the state of both microswitches must change.
- ✓ Switch OFF the brake.
- ✓ Insert a feeler gauge **0.25 mm** thick as it is shown in **Fig. 5**.
- ✓ Switch ON the brake; the state of both microswitches must not change.

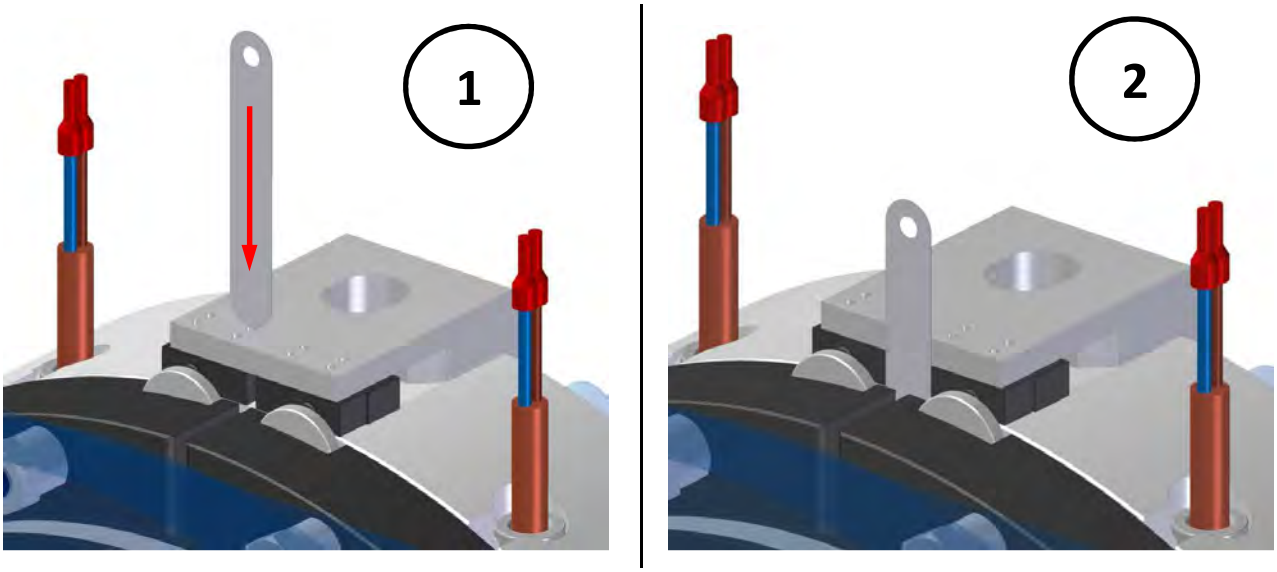


Fig. 5

7-4 Detection setting

For the operations described below please refer to **Fig. 5**, page 14 and **Fig. 6a** and **Fig. 6b** below.

- ✓ Insert a feeler gauge **0.20 mm** thick as it is shown in **Fig. 5**.
- ✓ Switch ON the brake and adjust the setting screw (**Fig. 6a & 6b**) until to obtain detection.
- ✓ Re-tighten carefully the setting screw until to have no detection.
- ✓ Switch OFF the brake and perform 3 detection checking as it is described in chapter 7-3.

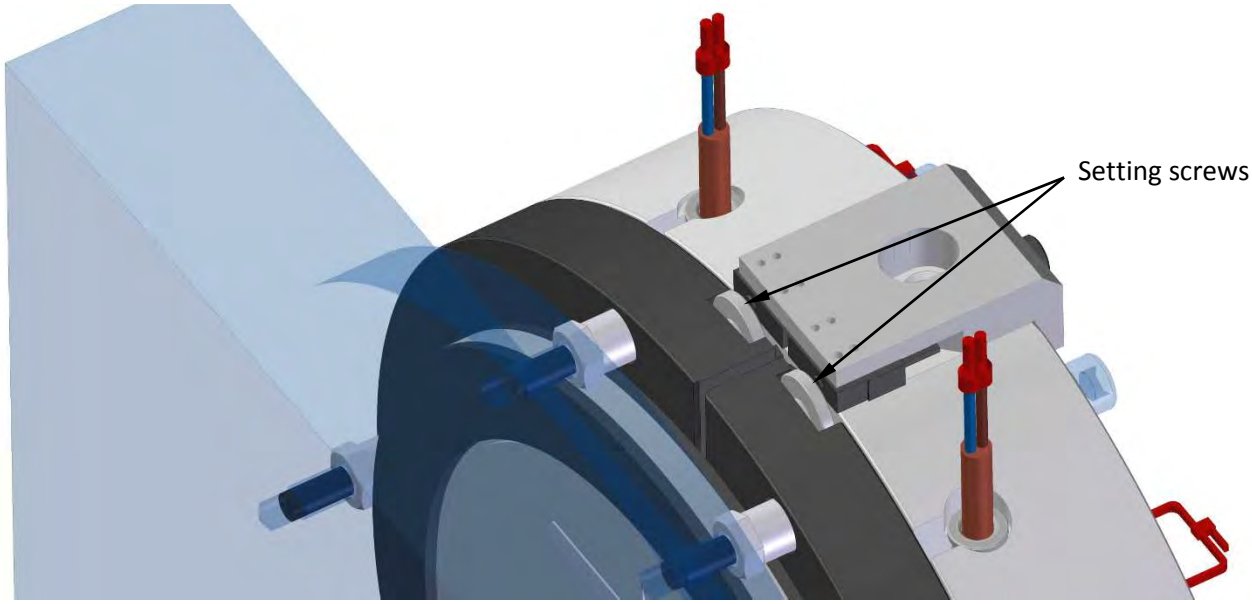


Fig. 6a

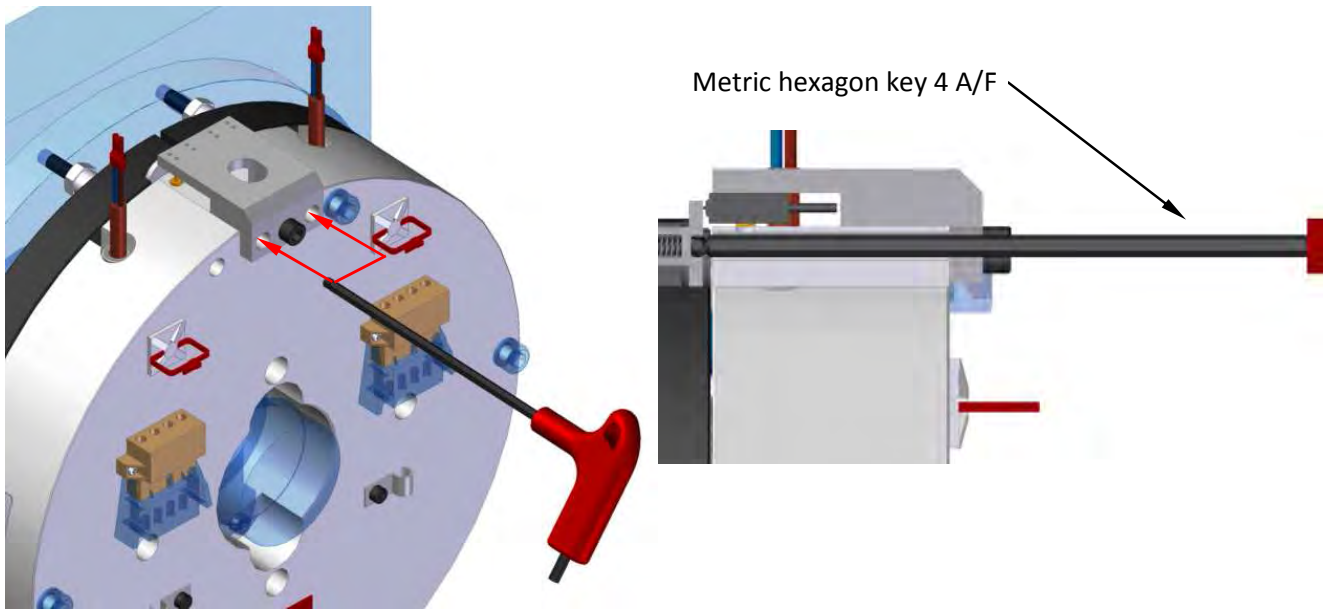


Fig. 6b

7-5 Microswitch exchange

During maintenance, make sure that the driving mechanism is stopped and that there is no risk of accidental starting. The intervention must be signaled and the work area delimited.

All intervention must be done by authorized and qualified personnel, having read and understood this manual, using adapted procedures and professional tools. All intervention must be done according the regulation of the country of the installation.

Warning: not to damage the electric cables during the maintenance action.

For the operations described below please refer to **Fig. 8,** page 17.

- ✓ Remove microswitches wires from connectors, see **Fig. 2**, page 11 & **Fig. 7** below.
- ✓ Untighten and remove microswitches support fixing screw.
- ✓ Replace microswitches support and re-tighten fixing screw.
- ✓ Ensure that the new support is completely in contact on both surfaces.
- ✓ Re-connect microswitches wires into connectors.
- ✓ Perform detection checking as it is described in chapter 7-3.
- ✓ If the detection checking fails, perform a detection setting as it is described in chapter 7-4.

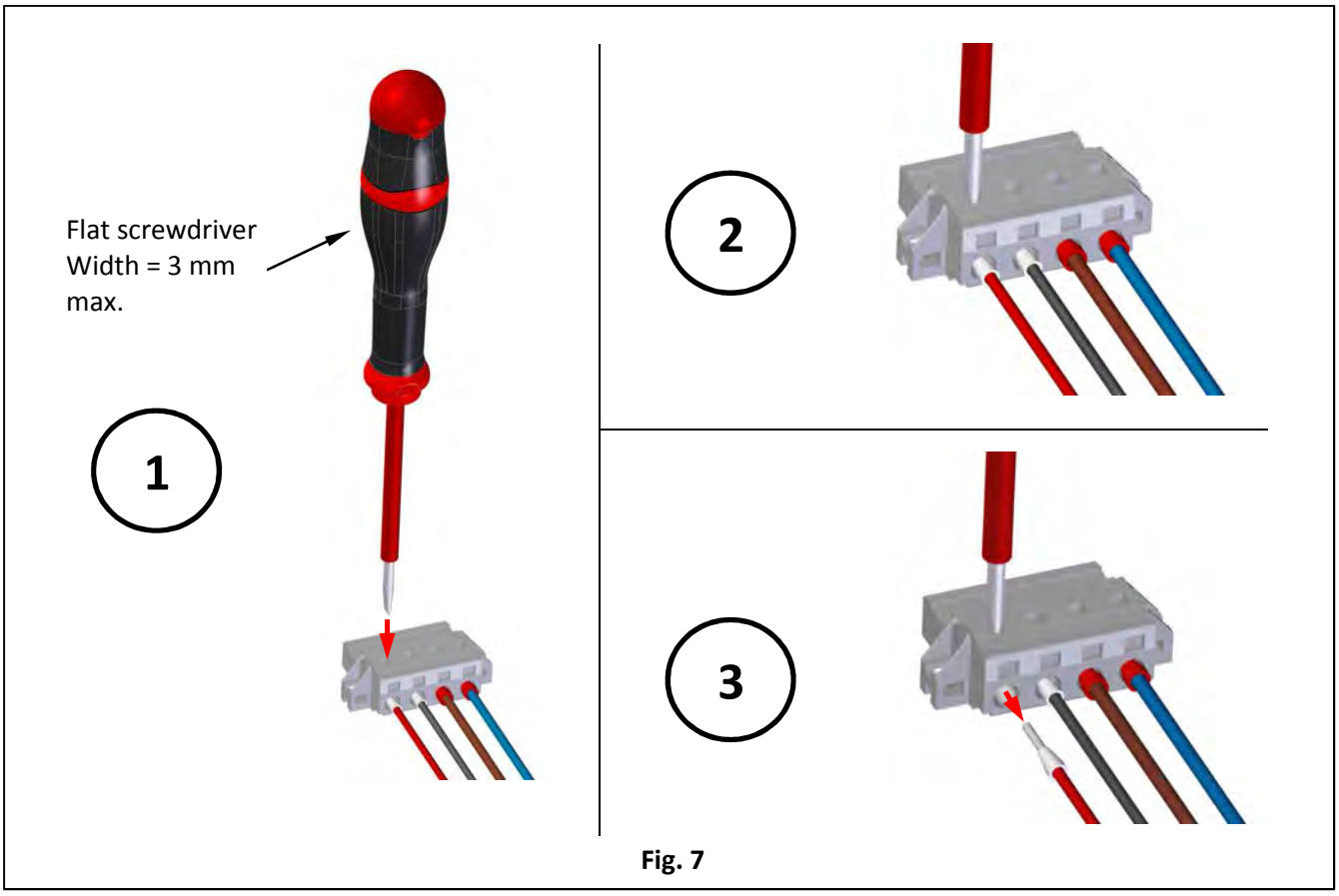


Fig. 7

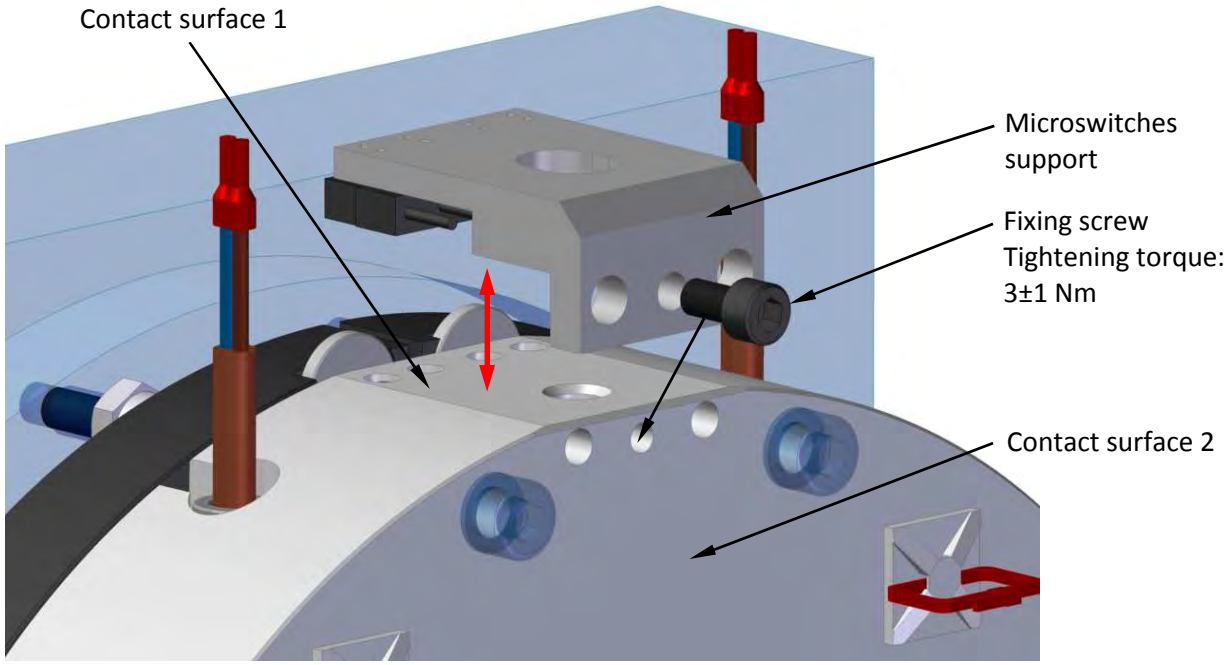


Fig. 8

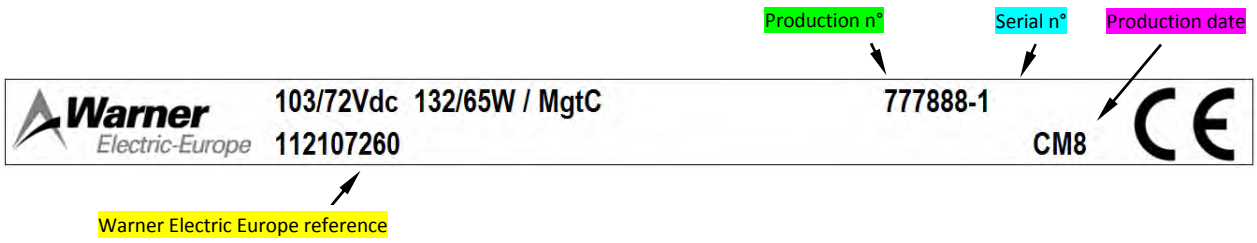
8- Spare parts

Available spare parts for this brake are the following:

- Disc
- O ring (to put into the disc)
- Microswitch

Please, join to your spare part request the following information:

- Warner Electric Europe reference
- Production number
- Serial number
- Production date



9- Outillage

Tooling	Function
Torque wrench (measurement range > 50 Nm)	Brake fixing screws
Feeler gauges play	Air gap checking Detection checking Detection setting
Metric hexagon key 4 A/F (lg mini = 80 mm)	Detection setting
Metric hexagon key 5 A/F	Microswitch exchange
Flat screwdriver (Width=3mm max.)	Microswitch exchange
Multimeter	Voltage checking

10- Troubleshooting

Troubleshooting		
Fault	**Fault**	**Fault**
Brake does not release	• OEX time too short • Voltage too low • Power supply is interrupted • Air gap too large • Disc worn • Coil damaged	• Re-set OEX time • Re-set voltage • Re-connect the power supply, check detection • Replace disc and O ring • Replace disc and O ring • Replace the braking unit
Brake does not brake	• Voltage present at switch off Position • Grease on friction faces • Transport screw still in place	• Check detection and customer power supply • Clean the friction faces, change disc and O ring • Remove transport screw
Nuisance braking	• Holding voltage too low • Wrong information from microswitch	• Re-set voltage • Re-set detection
Brake vibration under holding voltage	• Bad electrical connection incorrect polarity)	• Check the good connector connection configuration (chapter 6-1).

11- Contact

Any question? You can contact us at: *info@warnerelectric-eu.com*

Manuel de service

Industrial Clutches, Brakes, Controls, Tension Systems, Sensors, and Switches

SM431gb - Annex 1 - rev 01/14

Electrically Released Brake

ERS VAR07 SZ 600/550
ERS VAR07 SZ 420/350

Warner Electric
An Altra Industrial Motion Company

WARNER ELECTRIC EUROPE
Rue Champfleur, B.P. 20095, F- 49182 St Barthélemy d'Anjou Cedex
Tél. +33 (0)2 41 21 24 24, Fax + 33 (0)2 41 21 24 00
www.warnerelectric-eu.com

Declaration of conformity:
During the design of this product, the EU directives applicable were taken into account.
An attestation of conformity is available on request.
For incorporating the product, the manufacturer of a machine or system needs to take into account the EU directives applicable.

Summary of the directives and standards used:

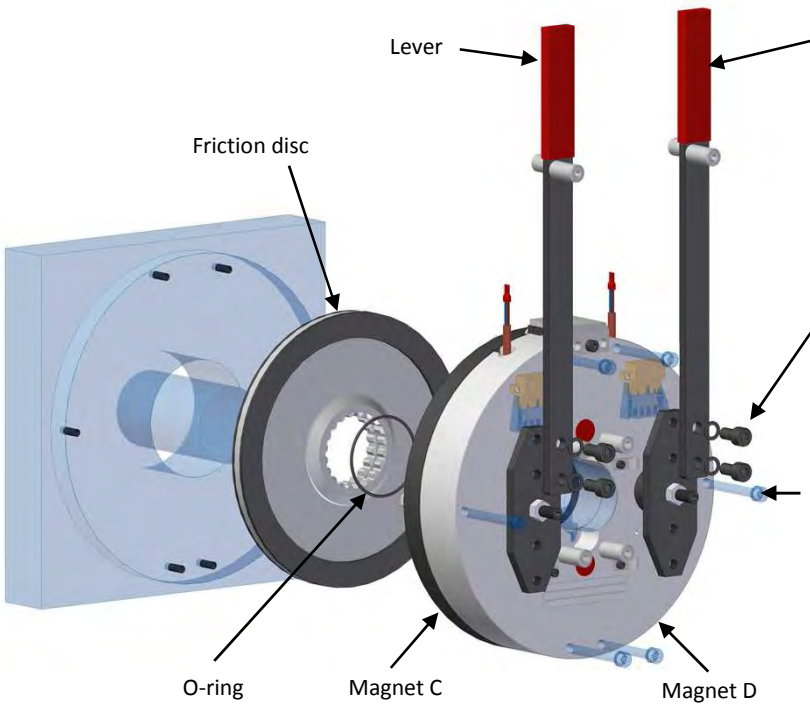
Directives:	
2006/95/CE	Low voltage equipment directive
2004/108/CE	Electromagnetic compatibility directive
95/16/CE	Lifts directive
Standards	
DIN VDE 0580	Electromagnetic devices and components, General requirements
EN 81-1	Safety rules for the construction and installation of lifts - Part 1: Electric lifts
NFC 79300	Industrial electrical apparatus. Electromagnetic apparatus for mechanical applications requirements.

This manual is an annex to SM431gb, it explains how to install and use the hand-release system. For any other information, or manipulation, please refer to the Service Manual SM431gb.

CONTENTS

1 Technical specifications

Fig. 1



2 Installation of the Hand-release system

In order to be able to use the hand-release system:

- Fit the two lever on top position (Fig. 2a) or on bottom position (Fig. 2b).

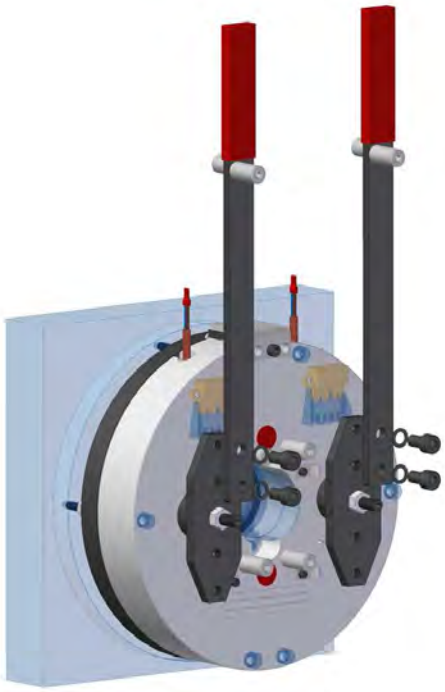


Fig. 2a

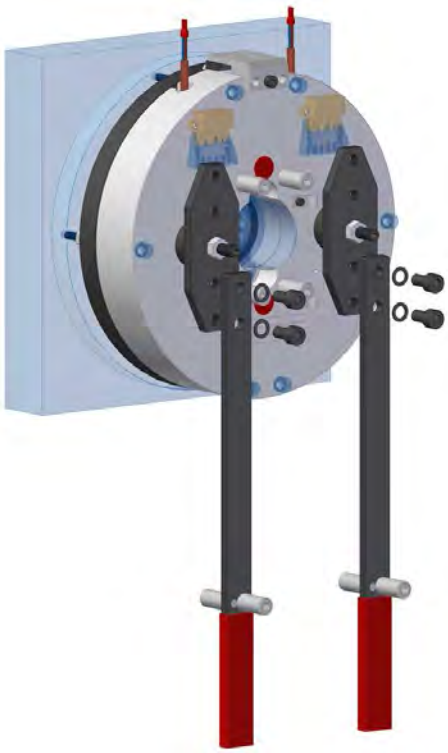


Fig. 2b

- Turn the levers (22° approx.) as it is shown in Fig 3a, Fig 3b or Fig 3c (positions are similar for bottom mounting).

Fig. 3a

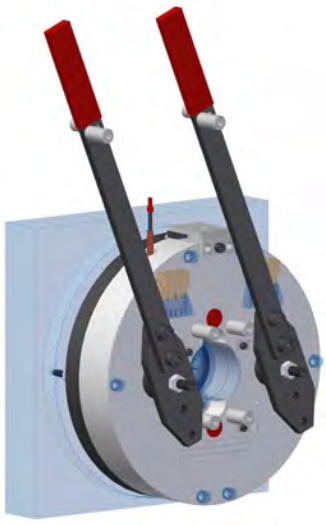


Fig. 3b

Fig. 3c

Subject to alteration without prior notice

Service manual

Industrial Clutches, Brakes, Controls, Tension Systems, Sensors, and Switches

SM431gb - Annex 2 - rev 01/14

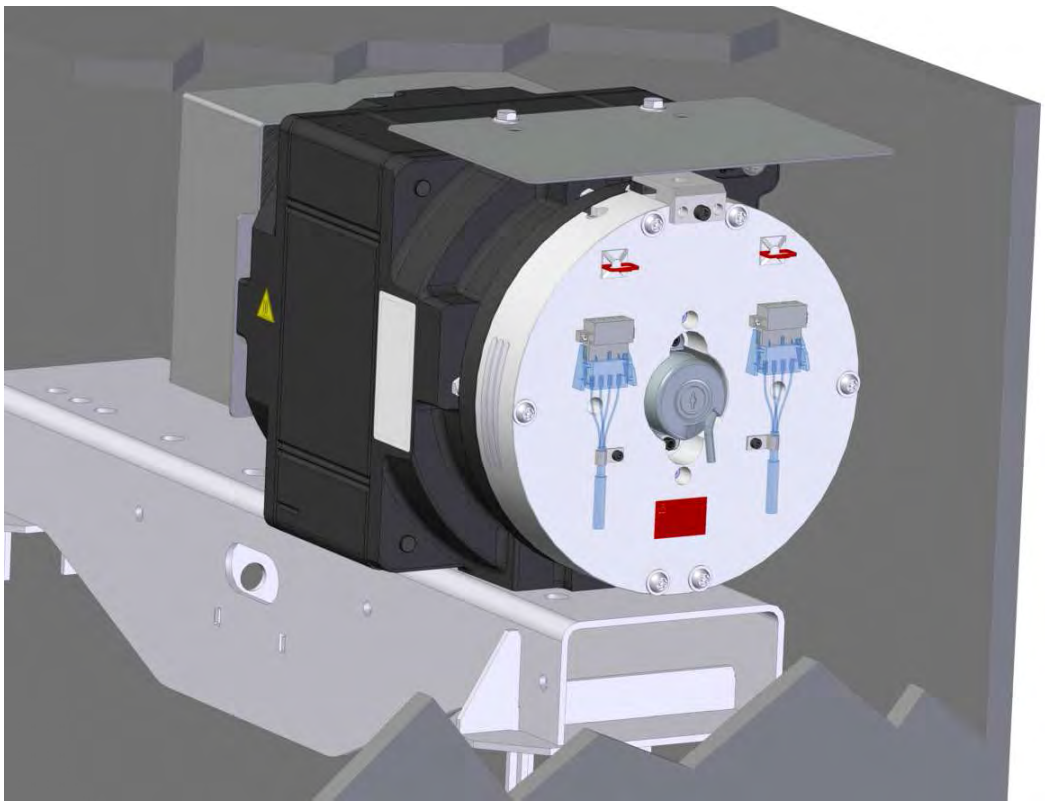
Electrically Released Brake

Microswitches checking/setting

(Brake already installed in the field)

ERS VAR07 SZ 600/550

ERS VAR07 SZ 420/350



Warner Electric
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www.warnerelectric-eu.com

CONTENTS

1- Standards and Directives

Declaration of conformity:

During the design of this product, the EU directives applicable were taken into account.
An attestation of conformity is available on request.
For incorporating the product, the manufacturer of a machine or system needs to take into account the EU directives applicable.

Summary of the directives and standards used:

Directives:

2006/95/CE	Low voltage equipment directive
2004/108/CE	Electromagnetic compatibility directive
95/16/CE	Lifts directive

Standards:

DIN VDE 0580	Electromagnetic devices and components, General requirements
EN 81-1	Safety rules for the construction and installation of lifts - Part 1: Electric lifts
NFC 79300	Industrial electrical apparatus. Electromagnetic apparatus for mechanical applications requirements

2- Precautions and safety measures

Precautions and safety measures must be read before any installation or maintenance of the brake.
Compliance with the instructions and values given by the documentation and marking of the unit is imperative in order to ensure a proper functioning of the brake.

2-1 Symbols used in this manual


Action that might damage the brake.


Action that might be dangerous to human safety.


Electrical action that might be dangerous to human safety.


Handling of loads that might be dangerous to human safety.


Surface temperature that might be dangerous to human safety.

3- Technical specification

3-1 Installation description

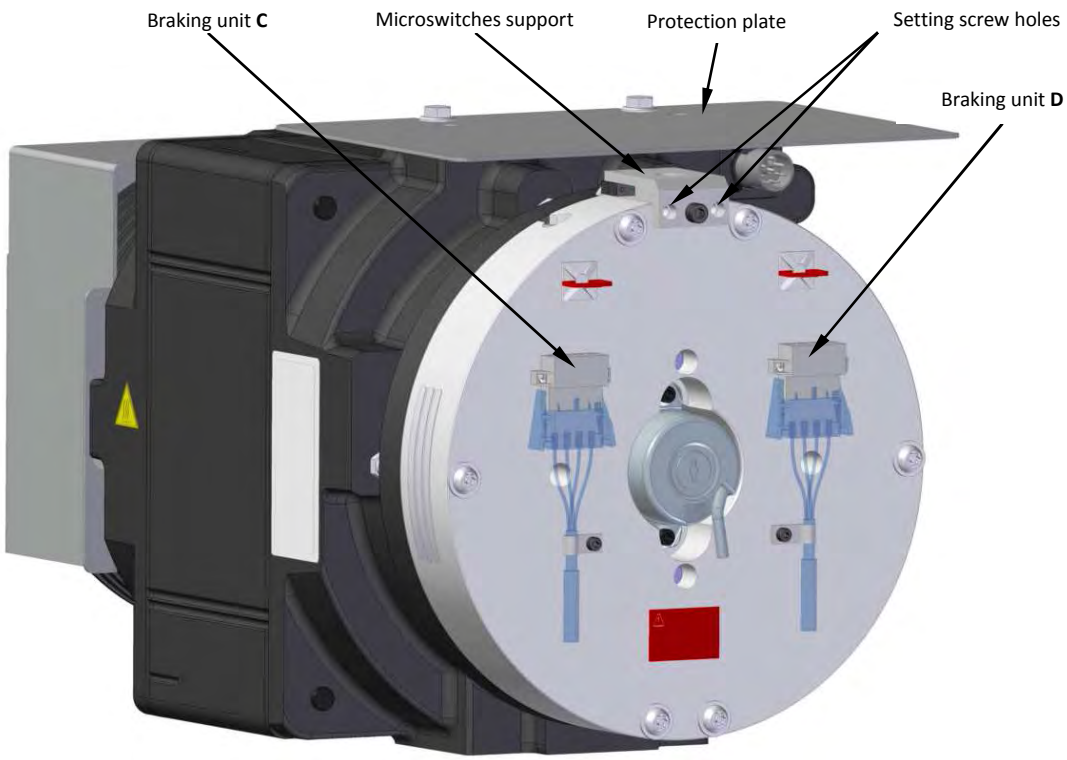


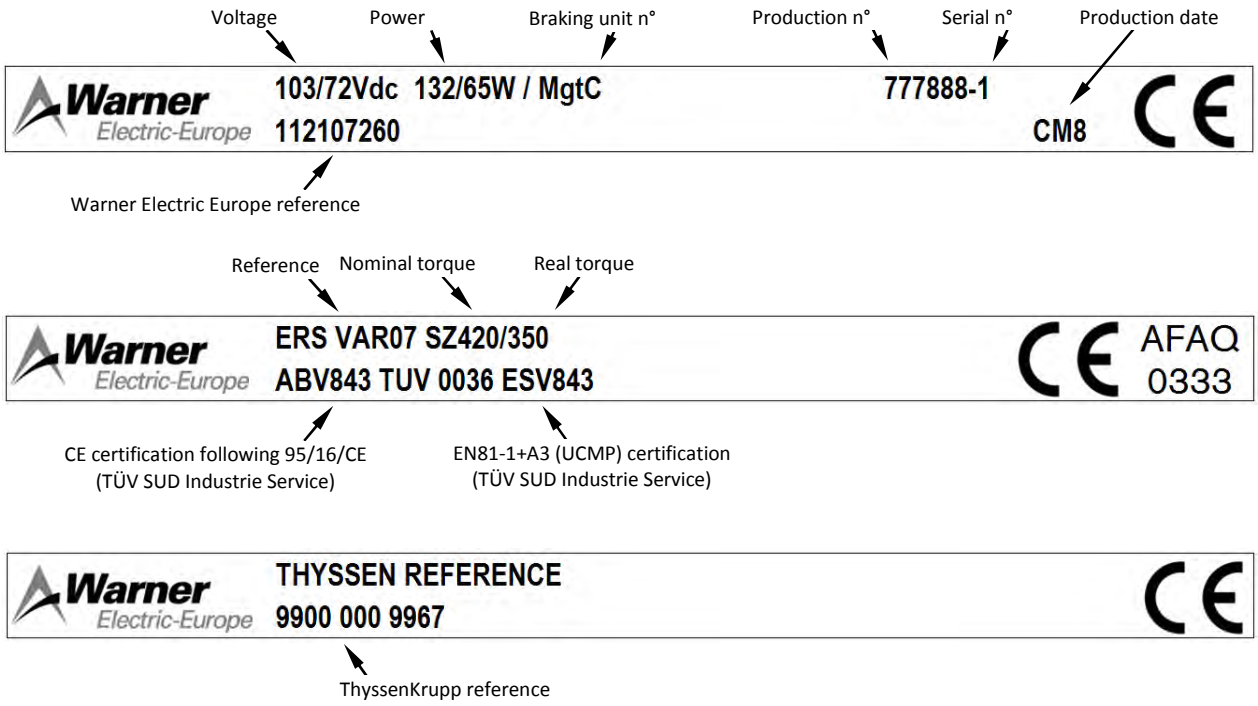
Fig. 1

3-2 Technical data

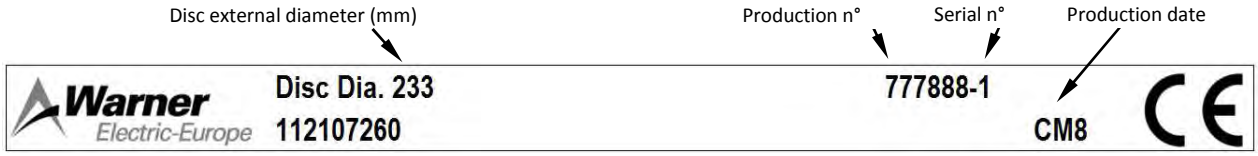
Table 1		**ERS VAR07**	
Certificat : 95/16/EC EN81-1+A3 (UCMP)		ABV843 (TÜV) ESV843 (TÜV)	ABV844 (TÜV) ESV844 (TÜV)
Size		**SZ420/350**	**SZ600/550**
ThyssenKrupp reference		9900 000 9967	9900 000 9968
Warner Electric Europe reference		1 12 107260	1 12 107261
Warning : Use power supply with over excitation			
Par inducteur			
Nominal torque	Nm	**350**	**550**
Voltage-over excitation (1 sec.) +5% / -10%	Vdc	103	
Voltage-holding +5% / -10%	Vdc	72	
Power-over excitation	W	132	156
Power-holding	W	65	74
Resistance	Ω	80	70
Electrical response time **T10**	ms	95	80
Response time **T90**	ms	160	135
Maximum speed	Tr/min	279	
Nominal air gap	mm	0.4 +0.05 / -0.1	
Maximum air gap (after wear)	mm	0.6	
Duty cycle	ED	50%	
Number of cycle per hour max.		240	
Weight	Kg	32	42
Electrical protection class		IP42	
Mechanical protection class		IP10 (sans capot)	

3-3 Labeling details

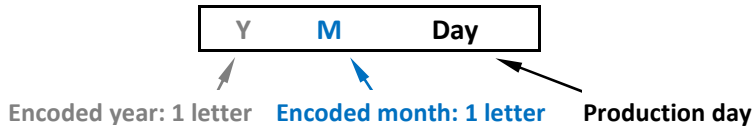
Braking unit labels



Disc label



Encoded date details:



Encoded year letter

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K

Encoded month letter

January	February	March	April	May	June	July	August	September	October	November	December
M	N	O	P	Q	R	S	T	U	V	W	X

Example: YN16 is, 2010, 16th February

4- Electrical connection

4-1 Connector connection

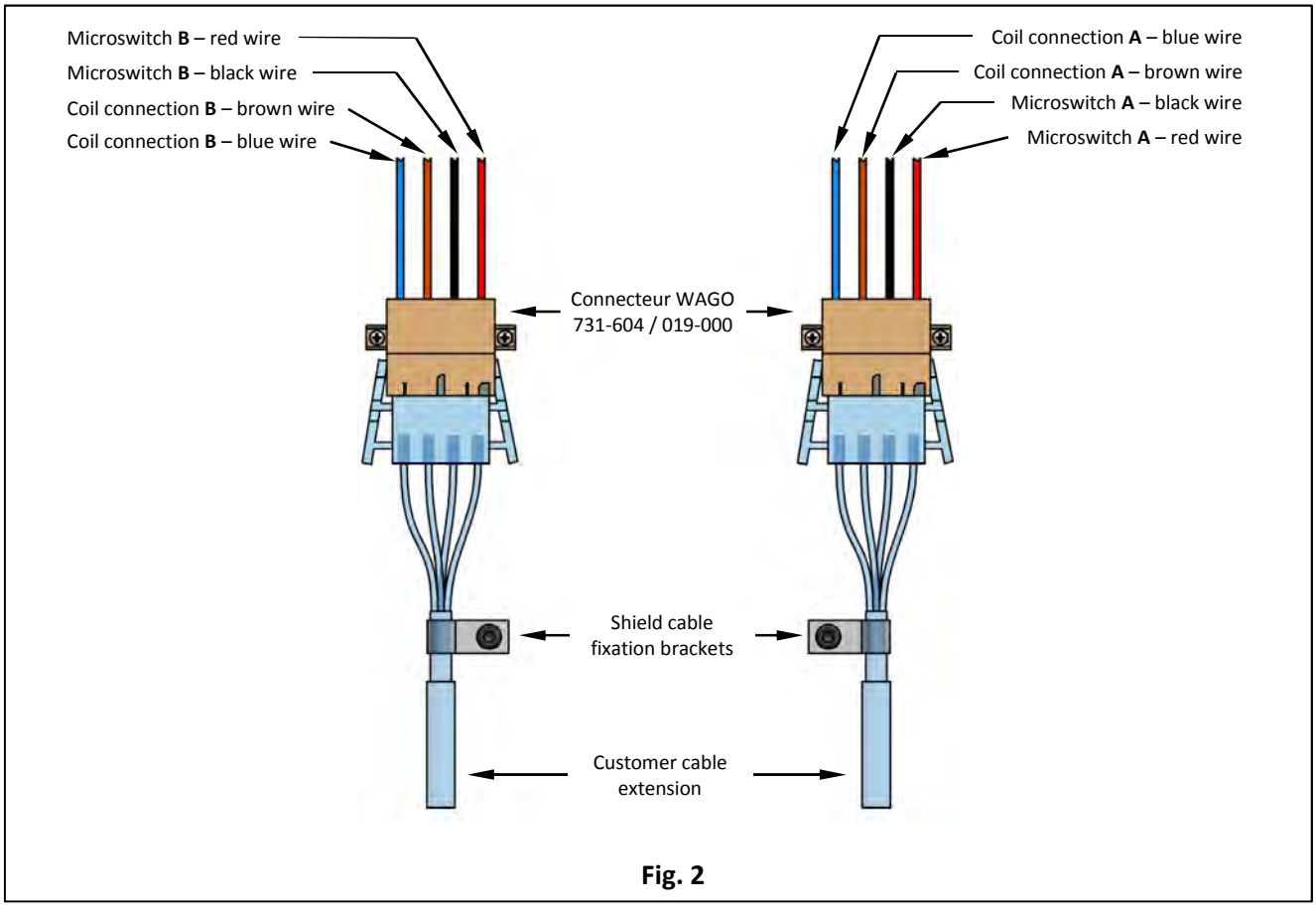


Fig. 2

4-2 Microswitch technical data

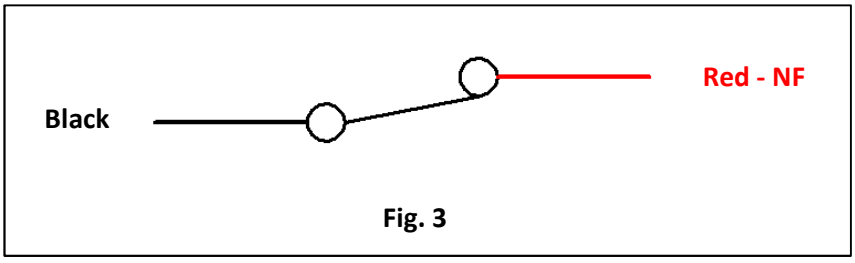


Fig. 3

- **Current range:** 10 mA à 100 mA at 24 Vdc
- For maximum electrical lifetime of the microswitch ensure switching under resistive load only.

5- Detection setting / checking

5-1 Air gap checking

Air gap has to be measured in 3 points at the circumference and at each braking circuit (see **Fig. 4**).

Do not introduce the shims more than 10 mm into the air gap.
Avoid the springs and the dampers of noise.

Any modification made to the brake without the express authorisation of a representative of Warner Electric, as far as, any use out of the contractual specification accepted by "Warner Electric", will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

The customer must be careful to not alter the factory set parameters: Microswitch adjustment, air gap adjustment and dampening system. This brake must not be dismantled.

The protection plate must be removed to perform these operations.
Location of feeler gauges per braking unit:

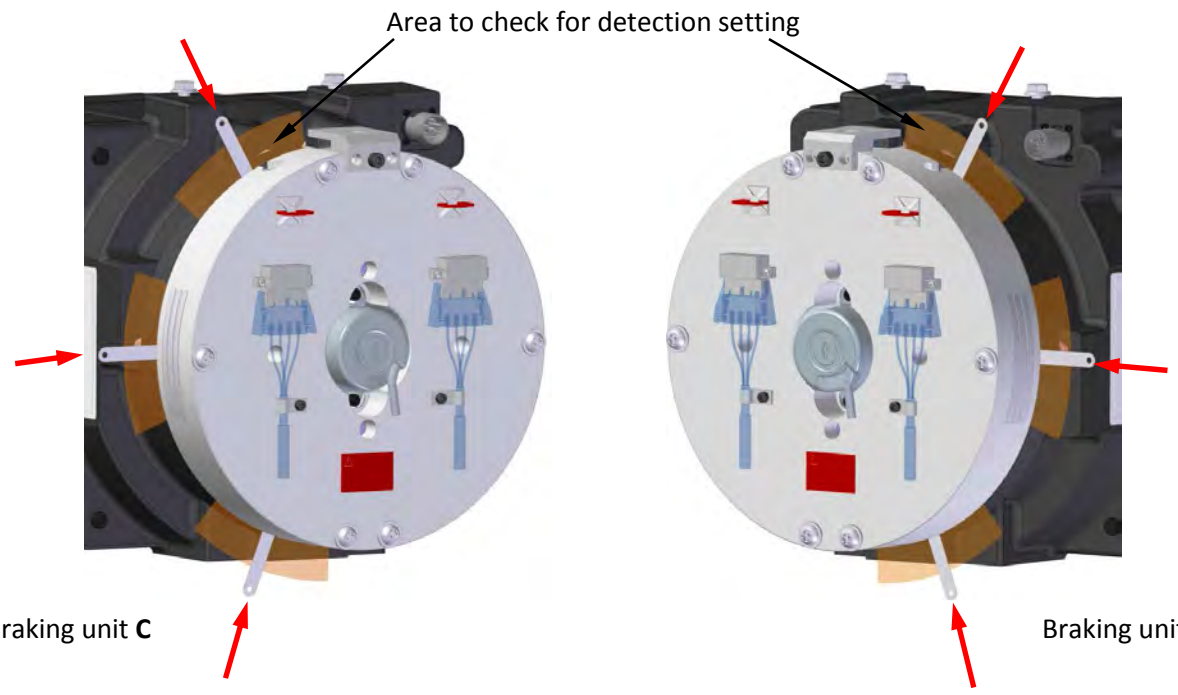


Fig. 4

5-2 Detection checking

Any modification made to the brake without the express authorisation of a representative of Warner Electric, as far as, any use out of the contractual specification accepted by "Warner Electric", will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

The customer must be careful to not alter the factory set parameters: Microswitch adjustment, air gap adjustment and dampening system adjustment. This brake must not be dismantled.

The protection plate must be removed to perform these operations.
For the operations described below please refer to **Fig. 5** below.

- ✓ Switch ON the brake; the state of both microswitches must change.
- ✓ Switch OFF the brake.
- ✓ Insert a feeler gauge **0.25 mm** thick as it is shown in **Fig. 5**.
- ✓ Switch ON the brake; the state of both microswitches must not change.

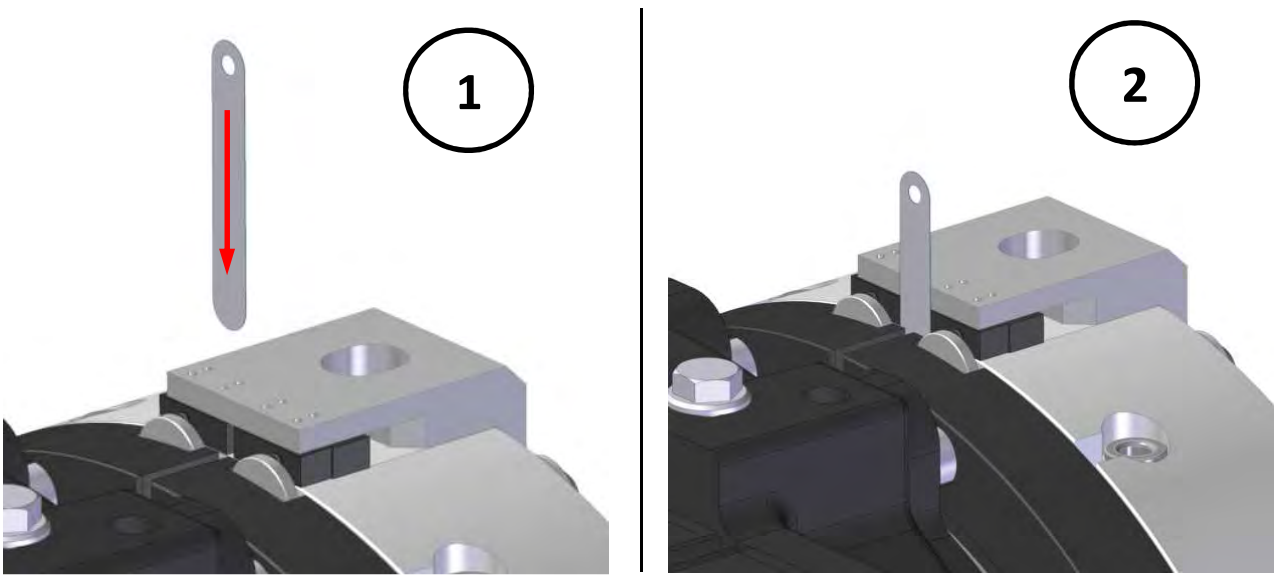


Fig. 5

5-3 Detection setting

The protection plate must be removed to perform these operations.
For the operations described below please refer to **Fig. 1, Fig. 4**, **Fig. 6a** and **Fig. 6b**.

- ✓ Measure brake air gap in areas close to microswitches (see **Fig. 4**).
- ✓ Adjust setting screws until to have detection.
- ✓ Following the brake air gap values measured, re-tighten setting screws performing ¼ or ½ turn of key (see **Table 2**).

Air gap measured mm	0.3	0.35	0.4
Key turn to perform	1/4	1/4	1/2

Table 2

- ✓ Perform detection checking as it is described in chapter 5-2.

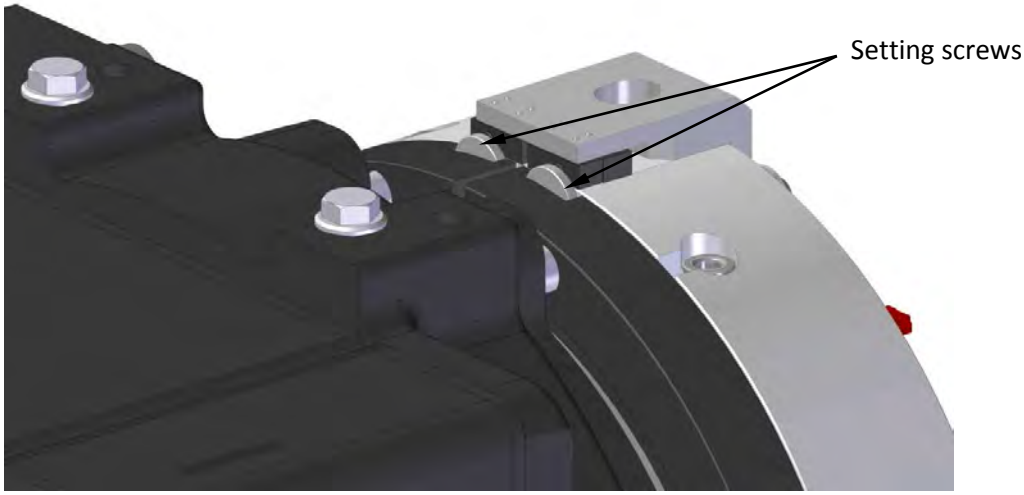


Fig. 6a

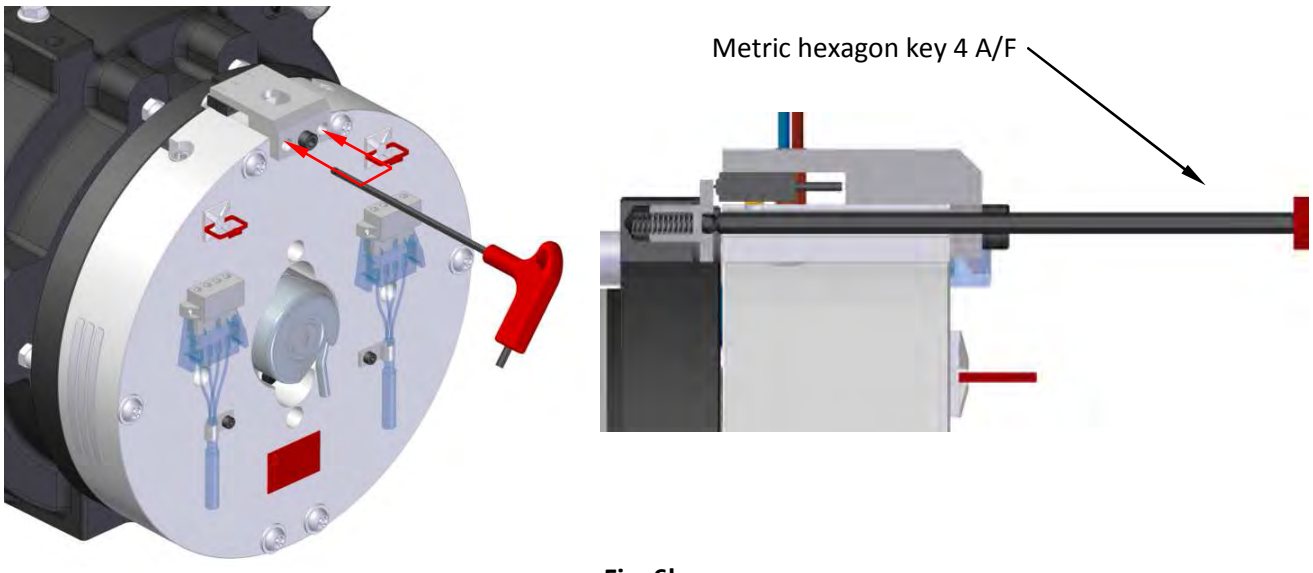


Fig. 6b

5-4 Microswitch exchange

During maintenance, make sure that the driving mechanism is stopped and that there is no risk of accidental starting. The intervention must be signaled and the work area delimited.

All intervention must be done by authorized and qualified personnel, having read and understood this manual, using adapted procedures and professional tools. All intervention must be done according the regulation of the country of the installation.

Warning: not to damage the electric cables during the maintenance action.

For the operations described below please refer to **Fig. 8,** page 11.

- ✓ Remove microswitches wires from connectors, see **Fig. 2**, page 6 & **Fig. 7** below.
- ✓ Untighten and remove microswitches support fixing screw.
- ✓ Replace microswitches support and re-tighten fixing screw.
- ✓ Ensure that the new support is completely in contact on both surfaces.
- ✓ Re-connect microswitches wires into connectors.
- ✓ Perform detection checking as it is described in chapter 5-3.

If the detection checking fails, perform a detection setting as it is described in chapter 5-4.

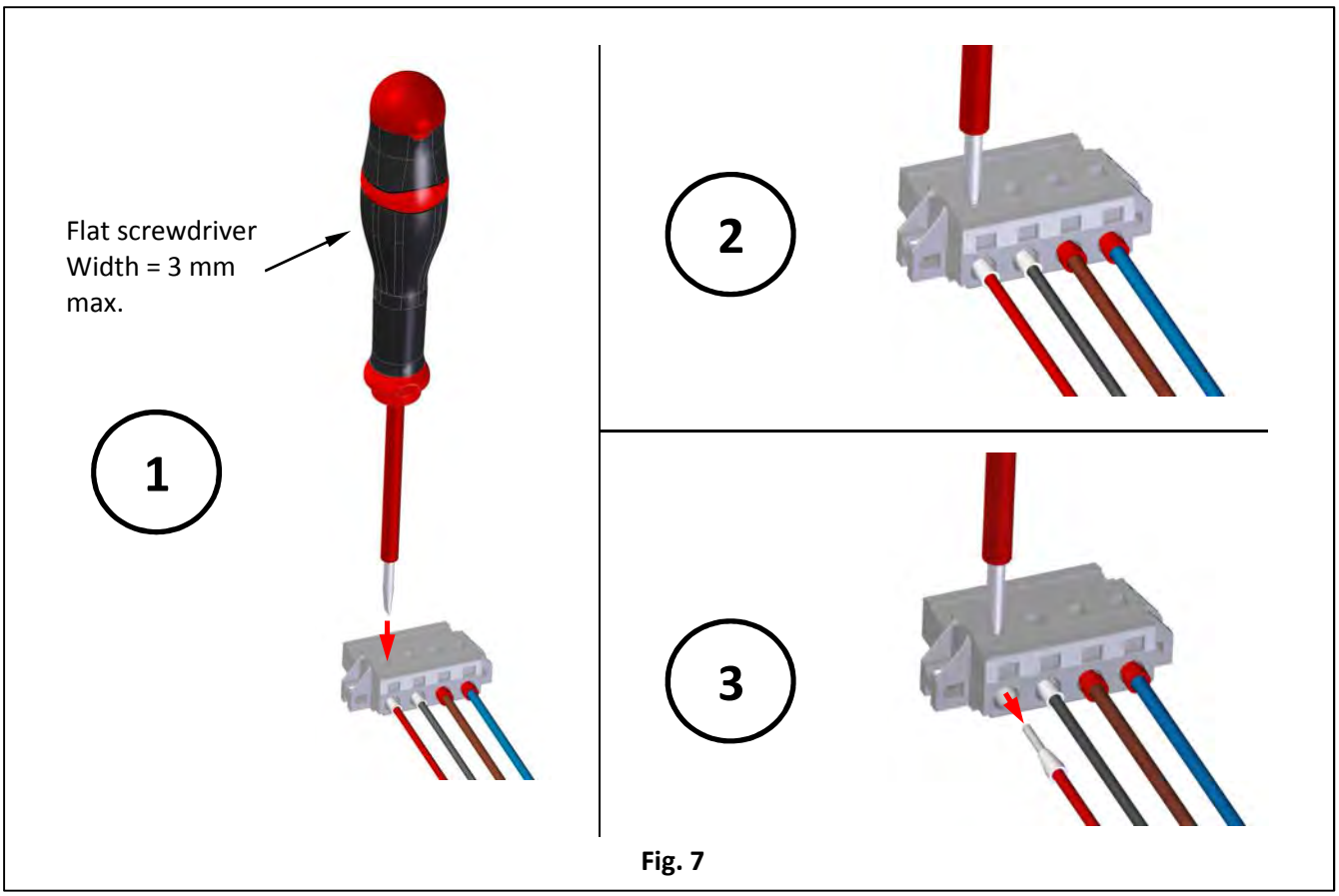


Fig. 7

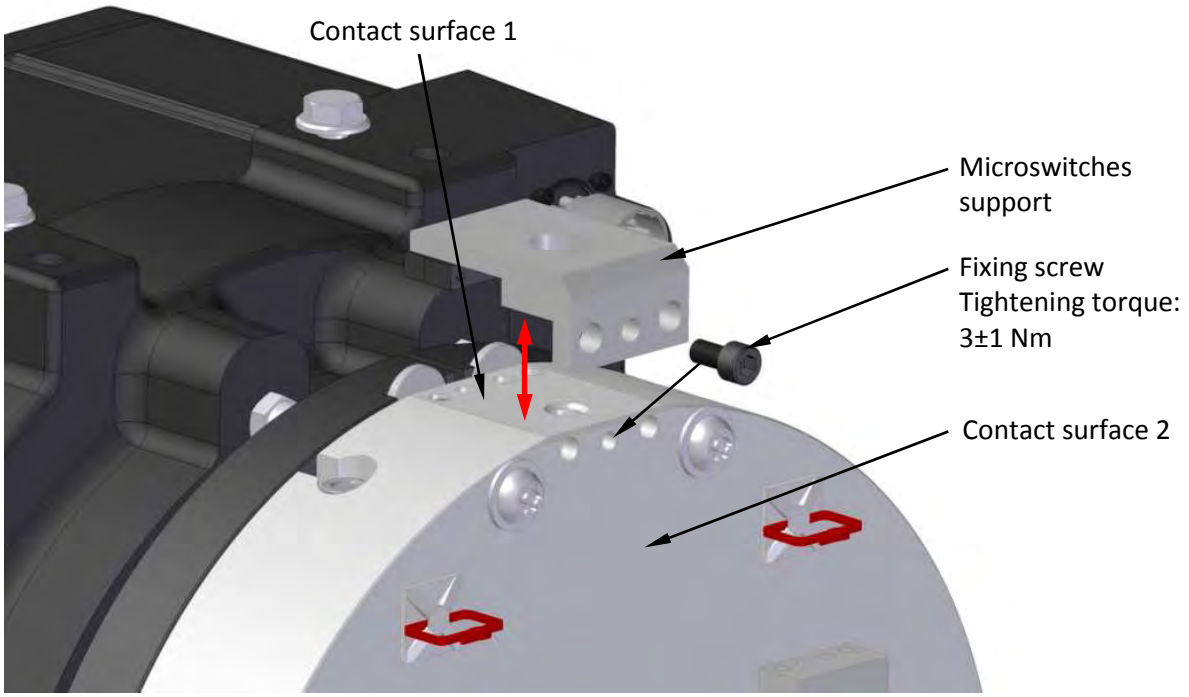


Fig. 8

6- Tooling

Tooling	Function
Feeler gauges play	Air gap checking Detection checking Detection setting
Metric hexagon key 4 A/F (lg mini = 80 mm)	Detection setting
Metric hexagon key 5 A/F	Microswitch exchange
Flat screwdriver (Width = 3mm max.)	Microswitch exchange

7- Contact

Any question? You can contact us at: info@warnerelectric-eu.com

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

Industrie Service

EU TYPE-EXAMINATION CERTIFICATE

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

Certificate No.:	EU-BD 777
Certification Body of the Notified Body:	TÜV SÜD Industrie Service GmbH Westendstr. 199 80686 Munich - Germany Identification No. 0036
Certificate Holder:	WARNER Electric Europe 7, rue de Champfleur BP 20095 49124 Saint Barthélemy d'Anjou - France
Manufacturer of the Test Sample: (Manufacturer of Serial Production – see Enclosure)	WARNER Electric Europe 7, rue de Champfleur BP 20095 49124 Saint Barthélemy d'Anjou - France
Product:	Braking device acting on the shaft of the traction sheave, as part of the protection device against overspeed for the car moving in upwards direction and braking element against unintended car movement
Type:	Type: ERS VAR15-02 Size: FT2110/_ _ _ _, FT2110/_ _ _ _ SY
Directive:	2014/33/EU
Reference Standards:	EN 81-20:2014 EN 81-50:2014 EN 81-1:1998+A3:2009
Test Report:	EU-BD 777 of 2016-03-04
Outcome:	The safety component conforms to the essential health and safety requirements of the mentioned Directive as long as the requirements of the annex of this certificate are kept.
Date of Issue:	2016-03-04
Date of Validity:	from 2016-04-20

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

Werner Rau
Certification Body "lifts and cranes"

TÜV®

Annex to the EU Type-Examination Certificate
No. EU-BD 777 of 2016-03-04

Industrie Service

1 Scope of application

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

1.1.1 Permissible brake forces and maximum tripping speeds (gliding speeds) of the brake disc when the braking device acts on the shaft of the traction sheave while the car is moving upward

Size	Permissible brake force per braking device (single brake) [N]	Max. tripping speed (gliding speed) on the middle friction diameter of the brake disc [m/s]
FT2100/_ _ _ _	2157 - 3092	3.25
FT2100/_ _ _ _	1868 - 2694	6.5
FT2100/_ _ _ _ SY	2231 - 3111	6.5

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

The maximum tripping speed of the overspeed governor and the maximum rated speed of the lift must be calculated on the basis of the brake disc maximum tripping speed (gliding speed) as outlined above taking into account the middle friction diameter of the brake disk, traction sheave diameter and car suspension.

$$v = \frac{D_{TS} \times v_{BS}}{D_{BS} \times i}$$

v = Tripping (rated) speed (m/s)
D_{TS} = Diameter of the traction sheave from rope's centre to rope's centre (m)
D_{BS} = middle friction diameter of the brake disk (m)
v_{BS} = Gliding speed on middle friction diameter of the brake disk (m/s)
i = Ratio of the car suspension

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

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

Size	Scope of application according to manufacturer specification	Min. nominal brake force* [N]	Intermediate nominal brake force* [N]	Max. nominal brake force* [N]	Max. tripping speed [m/s]	Maximum response times** [ms] with / without overexcitation		
						t_{10}	t_{50}	t_{90}
FT2100/_ _ _ _	1	2 x 1932 = 3864			3.25	70	100	130
FT2100/_ _ _ _	2		2 x 2560 = 5120		3.25	60	90	120
FT2100/_ _ _ _	3			2 x 2802 = 5604	3.25	50	78	105
FT2100/_ _ _ _	4	2 x 1932 = 3864			3.25	90	120	150
FT2100/_ _ _ _	5		2 x 2512 = 5024		3.25	60	100	140
FT2100/_ _ _ _	6			2 x 3092 = 6184	3,25	50	95	140
FT2100/_ _ _ _	7	2 x 1643 = 3286			6.5	85	108	130
FT2100/_ _ _ _	8		2 x 2222 = 4444		6.5	60	83	105
FT2100/_ _ _ _	9			2 x 2512 = 5024	6.5	50	75	100
FT2100/_ _ _ _ SY	- -		2 x 2415 = 4830		6.5	70	85	100

Interim values can be interpolated

Explanations:

* **Nominal brake force:** Brake force assured for installation operation by the safety component manufacturer.

** **Response times:** t_X time difference between the drop of the braking power until establishing X% of the nominal brake force, t_{50} optionally calculated $t_{50}= (t_{10}+ t_{90})/2$ or value taken from the examination recording

1.2.2 Assigned execution features

Size	Type of powering / deactivation	Brake control	Nominal air gap [mm]	Damping elements / adhesive foil integrated	Overexcitation
FT2100/_ _ _ _	Continuous current / continuous current end	serial	0.6	yes / yes	at double non-release voltage
FT2100/_ _ _ _ SY	Continuous current / continuous current end	serial	0.6	yes / no	at double non-release voltage

2 Conditions

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

2.2 The installer of a lift must create an examination instruction to fulfil the overall concept, add it to the lift documentation and provide any necessary tools or measuring devices, which allow a safe examination (e. g. with closed shaft doors).

2.3 In order to comply with the redundancy required in section 5.6.6.2 of EN 81-20:2014 (D), at least two braking circuits (single brake actuator) must be used.

2.4 Where more than two braking devices are used (positioning according to approval drawing), redundancy requirements necessitate that a sufficient braking effect as outlined in section 5.9.2.2.2.1 of EN 81-20:2014 (D) is still maintained if one of the braking circuit fails. It is not assumed that two braking circuits will fail simultaneously.

2.5 The manufacturer of the drive unit must provide calculation evidence that the connection traction sheave – shaft – brake disc and the shaft itself is sufficiently safe, if the brake disc is not a direct component of the traction sheave (e. g. casted on). The shaft itself has to be statically supported in two points.

An evidence must be enclosed with the technical documentation of the lift.

2.6 The setting of the brake force has to be secured against unauthorized adjustment (e. g. sealing lacquer).

2.7 The respective identification drawing according to the following table shall be included to the EU type-examination certificate for the identification and information of the general construction and operation and distinctness of the approved type:

Size	No. of the identification drawing	Date of stamp
FT2100/_ _ _ _	I-1 12 106967	04.03.2016
FT2100/_ _ _ _ SY	I-1 12 108240	04.03.2016

2.8 The EU type-examination certificate may only be used in combination with the corresponding annex and enclosure (List of authorized manufacturer of the serial production). The enclosure will be updated immediately after any change by the certification holder.

3 Remarks

3.1 The brake force effectively adjusted of one brake circuit will be marked at the blank after the type designation ERS VAR15-02 FT2110/_ _ _ _ XX.

3.2 In the scope of this type-examination it was found out, that the brake device also functions as a brake for normal operation, is designed as a redundant system and therefore meets the requirements to be used also as a part of the protection device against overspeed for the car moving in upwards direction and as braking element as part of the protection device against unintended car movement.

3.3 Checking whether the requirements as per section 5.9.2.2 of EN 81-20:2014 (D) have been complied with is not part of this type examination.

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

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

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

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

Enclosure to the EU Type-Examination Certificate
No. EU-BD 777 of 2016-03-04

Industrie Service

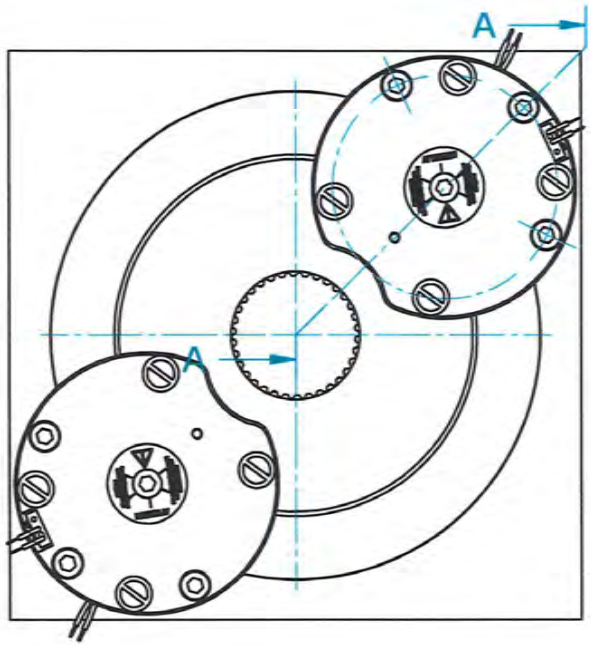
Authorised Manufacturer of Serial Production – Production Sites (valid from: 2016-01-22):

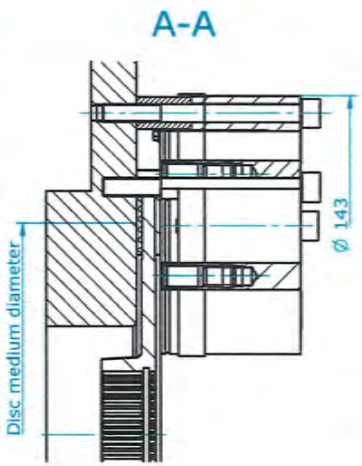
Company	WARNER Electric Europe
Address	7, rue de Champfleur BP 20095 49124 Saint Barthélemy d'Anjou - France

Company	Altra Industrial Motion Shenzhen Co. Ltd.
Address	Dabo Industry Zone 18 Huanzhen Road Bogang County, Shajing Town Baoan District, Shenzhen City 518104 Guangdong province - China (PRC)

- END OF DOCUMENT -

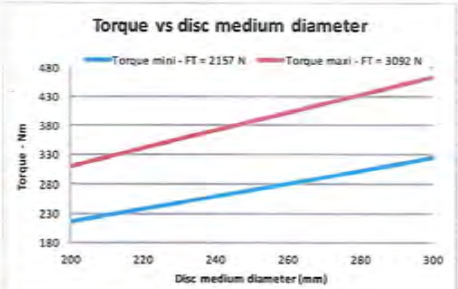
Based on: e-mail from Warner Electric Europe of 2016-01-15





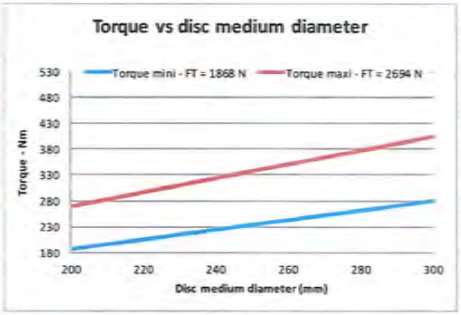
Tripping Speed N°1

Maximum tripping speed	3.25 m/s
Maximum rated speed	2.83 m/s
Min permissible brake force	2157 N
Max permissible brake force	3092 N
Disc Ø237 mm - torque level	
Medium Ø	207 mm
Min permissible brake moment	223 Nm
Max permissible brake moment	320 Nm
Disc Ø270 mm - torque level	
Medium Ø	235 mm
Min permissible brake moment	253 Nm
Max permissible brake moment	363 Nm



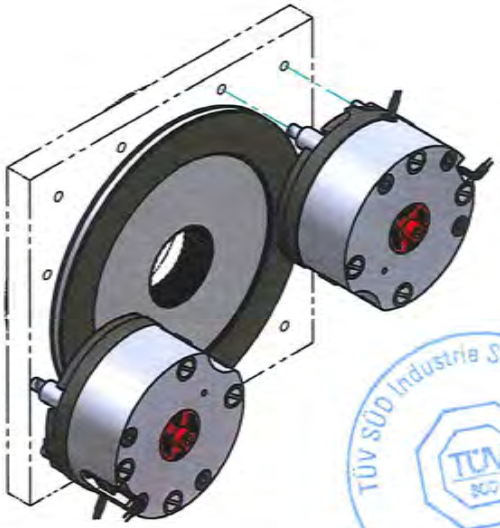
Tripping Speed N°2

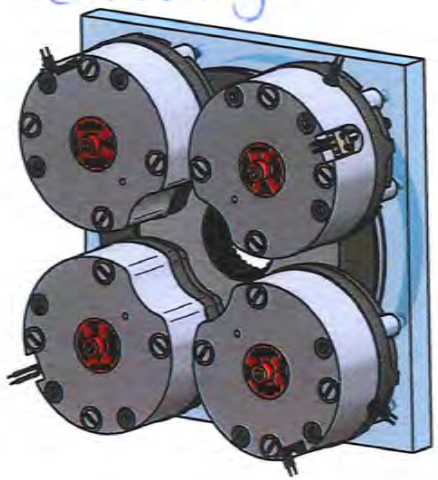
Maximum tripping speed	6.5 m/s
Maximum rated speed	5.65 m/s
Min permissible brake force	1868 N
Max permissible brake force	2694 N
Disc Ø237 mm - torque level	
Medium Ø	207 mm
Min permissible brake moment	193 Nm
Max permissible brake moment	279 Nm
Disc Ø270 mm - torque level	
Medium Ø	235 mm
Min permissible brake moment	219 Nm
Max permissible brake moment	317 Nm



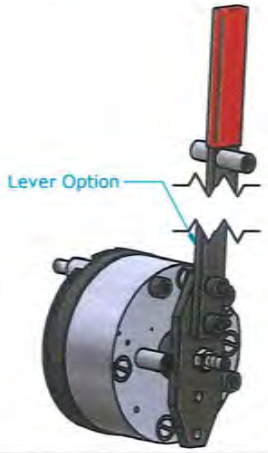
04. MRZ. 2016

GEPRÜFT / APPROVED
TÜV SÜD Industrie Service GmbH
Prüflaboratorium für Produkte der Fördertechnik
Westendstraße 199
80686 München
Sachverständige(r) / Expert





TÜV SÜD Industrie Service GmbH



Dernières modifications en Bleu
Last modifications in Blue

	D	Drg Update - Certif EU-BD	28-01-16	XG	
	C	Drg updated with new modifs	14-10-14	JC J	
	B	Type description updated	11-10-10	JC J	
	A	Drg updated with new modifs	28-06-10	JC J	
FM	LT	REVISION	DATE	By	Ch.

Client/customer:

Ms (Nm) :
Md (Nm) :
n Md (min-1) :
n max (min-1) :
U (Vdc) :
P20°C (W) :
Insulation class (°C):

Customer ref :

Dimensions in mm

Manual/Notice :

Mass : 19.0 kg

Scale: 1:1

Drawn : M Menager Date: 07-11-05
Checked: Date:

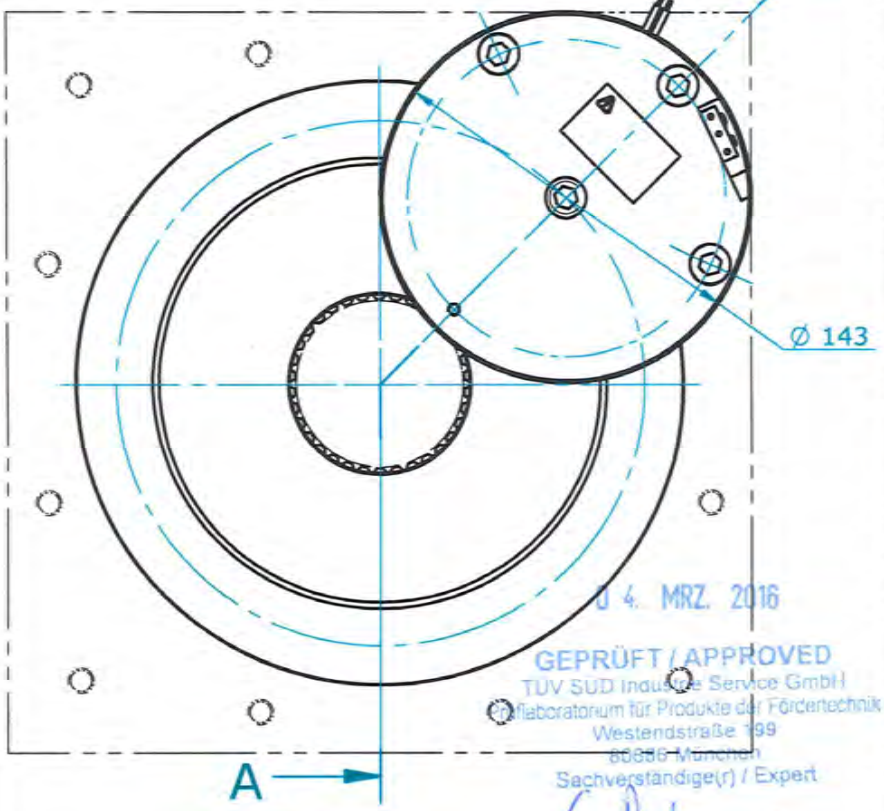
Warner Electric Europe

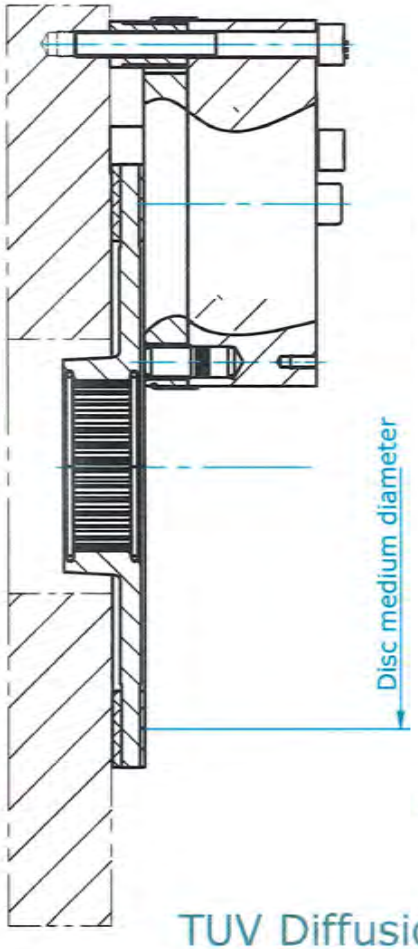
Design.: **Frein électromagnétique**
Electromagnetic brake

Type: **ERS VAR15-02 FT2110/----**

N° **I-1 12 106967** D

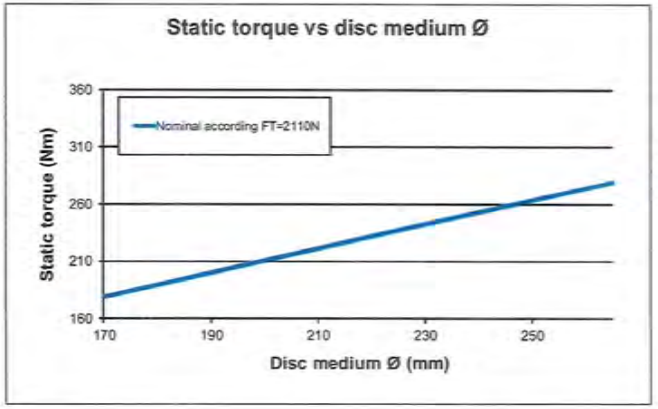
CAD SE A2

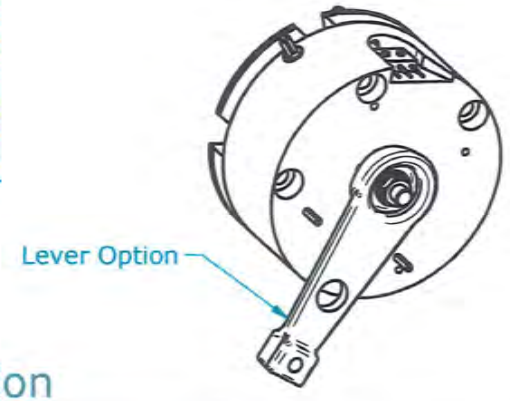




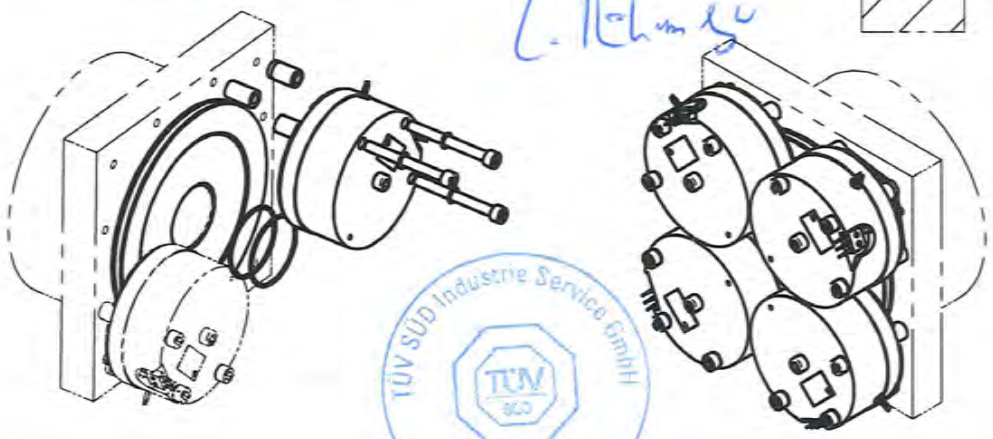
Les cotes sans indication de tolérances sont des cotes nominales.
Untoleranced dimensions are nominal dimensions.

NOTES





04. MRZ. 2016
GEPRÜFT / APPROVED
TÜV SÜD Industrie Service GmbH
Prüflaboratorium für Produkte der Fördertechnik
Westendstraße 199
80686 München
Sachverständige(r) / Expert



TÜV SÜD Industrie Service GmbH

TUV Diffusion

Last modifications in Blue / Dernières modifications en Bleu							
			A	Drawing creation	18/02/16	JE	
			FM	LT	REVISION	DATE	By	Ch.

Client / Customer:

Ms (Nm) :
Md (Nm) :
n Md (min-1) :
n max (min-1) :
U (Vdc) :
P 20°C :
Insulation class (°C) :

Customer ref:
Dimensions in mm
Manual / Notice:
Mass:
Scale:

Drawn: J.Emery Date: 18/02/16
Checked: Date: 19/02/16

Design.: **Frein électromagnétique**
Electromagnetic brake

Type: **ERS VAR15-02 FT=2110/---- SY**

SAP N°:

Dwg N°: I-1 12 108240 Rev. A

Altra Electric Clutch Brake Group
Warner Electric • Marsh International
Inertia Dynamics • Warner Linear
www.altramotion.com

CAD SE
A3ens-1

TÜV SÜD Industrie Service GmbH · 80684 Munich · Germany

Industrie Service

Choose certainty.
Add value.

WARNER Electric Europe
7, rue de Champfleur
49124 St. Barthélemy d'Anjou
France

Your reference/letter of	Our reference/name	Tel.-Extension/E-Mail	Fax-Extension	Date	Page
	IS-FT1-MUC/cr Christian Rührmeyer	+49 89 5791-3450 christian.ruehrmeyer@tuev-sued.de	+49 89 5791-3337	2016-03-21 Warner_Bestätigung_EN81-20_50_160321_en.docx	1 of 3

Fulfillment of requirements concerning type-examinations of ascending car overspeed protection means (ACOP) and protection devices against unintended car movement according to the harmonized standard EN 81-50:2014 (D) by (EC) type-examination certificates according to Directive 95/16/EC

Dear Sirs,

For the products listed below were issued (EC) type-examination certificates according to Directive 95/16/EC. Test basis was the harmonized standard EN 81-1. In the meantime EU type-examination certificates according to Directive 2014/33/EU were issued for the tested products. So far as relevant, additional requirements of the harmonized standard EN 81-20:2014 (D) were taken into consideration.

Type:	(EC) type-examination certificate	EU type-examination certificate
ERS VAR08 Size: SZ600/_ _ _, SZ1050/_ _ _ _, SZ1700/_ _ _ _	ABV 590/3, ESV 590/5 ABV 818/1, ESV 818/2 ABV 880, ESV 880	EU-BD 590
ERS VAR09 Size: SZ200/_ _ _, SZ800/_ _ _, SZ1700/_ _ _ _	ABV 817/1, ESV 817 ABV 729/2, ESV 729/1 ABV 591/5, ESV 591/8 ABV 591/6, ESV 591/9	EU-BD 591

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ERS VAR09 Size: SZ200/_ _ _, SZ600/_ _ _, SZ600/_ _ _ FZ, SZ800/_ _ _, SZ1000/_ _ _, SZ1700/_ _ _ _, SZ1700/1200 CH	ABV 817/1, ESV 817 ABV 809/3, NL 11-400-1002-153-01 (R2) ABV 809/2, NL 11-400-1002-153-01 (R1) ABV 729/2, ESV 729/1 ABV 811/2, NL 11-400-1002-153-02 (R2) ABV 591/5, ESV 591/8 ABV 591/6, ESV 591/9 ABV 591/4, ESV 591/6	EU-BD 591/1
ERS VAR10 Size: SZ1010/_ _ _ _, SZ2500/_ _ _ _, SZ5000/_ _ _ _	ABV 592/3, ESV 592/2 ABV 604/3, ESV 604/3 ABV 829/1, ESV 829/1	EU-BD 592
ERS VAR15-02 Size: FT2110/_ _ _ _, FT2110/_ _ _ _ SY	ABV 777/5, ESV 777/5 ABV 777/3, ESV 777/3	EU-BD 777
ERS VAR07 Size: SZ300/_ _ _, SZ420/_ _ _, SZ600/_ _ _, SZ800/_ _ _	ABV 819/2, ESV 819/1 ABV 826/2, ESV 826/1 ABV 843/1; ESV 843/1 ABV 844/1, ESV 844/1	EU-BD 819
ERS VAR07 Size: SZ300/_ _ _, SZ420/_ _ _, SZ420/_ _ _ SY, SZ600/_ _ _, SZ600/_ _ _ SY, SZ800/_ _ _, SZ800/_ _ _ AZ	ABV 819/2, ESV 819/1 ABV 826/2, ESV 826/1 ABV 843, ESV 843 ABV 843/1; ESV 843/1 ABV 844, ESV 844 ABV 844/1, ESV 844/1	EU-BD 819/1
ERS FENIX 08 Size: 06-_ _ _ _, 10-_ _ _ _	ASBV 905/1 ASBV972	EU-BD 905
ERS FENIX 09 Size: 06-_ _ _ _, 10-_ _ _ _	ASBV 906/1 ASBV 973	EU-BD 906
ERS FENIX 10 Size: 12-_ _ _ _, 20-_ _ _ _	ASBV 907/1 ASBV 974	EU-BD 907

According to the new standard EN 81-50:2014 (D) there are new requirements for the type-examination of the braking devices as part of the ascending car overspeed protection means (ACOP) and against unintended car movement (UCM) respectively the requirements have changed. But these requirements already have been considered in the past. For this reason additional tests were not necessary. The content of the EC type examination certificates was formally adapted. The safety components mentioned above fulfill the requirements of the harmonized standard EN 81-50:2014 (D) already.

For the function as safety component as part of the ascending car overspeed protection means (ACOP) the transitional regulation according to Article 44 of the Directive 2014/33/EU is fully applicable.

In the future protecting devices against unintended car movement (UCM) will be safety components according to Annex III of the Directive 2014/33/EU.

Furthermore according to Article 44 of the Directive 2014/33/EU the making available on the market of safety components for lifts covered by Directive 95/16/EC which are in conformity with that Directive and which were placed on the market before 20 April 2016 shall not be impeded. To avoid problems in the meantime with document NB-L/2015-061 of 2015-07-06 Notified Bodies Lift (NB-Lift) suggested to apply Article 44 for components of protecting devices against unintended car movement (UCM) analogously. A definitive statement of NB-Lift respectively the European Commission is planed, but is pending. After

Industrie Service

consideration a transformation of the existing type-examination certificates in EU type-examination certificates is possible.

For this reason, additional formal requirements and due to the validity of the new Lift Directive 2014/33/EU from 2016-04-20, EU type-examination certificates already may be issued, but they are valid from 2016-04-20 only.

Best regards

Achim Janocha
Leiter der Zertifizierungsstelle
für Produkte der Fördertechnik

Christian Rührmeyer
Niederlassung München
Abteilung Fördertechnik

Warner Electric Europe
7, rue Champfleur
B.P. 20095
49182 St Barthélemy d'Anjou

DECLARATION OF CONFORMITY TO THE DIRECTIVE 2014/33/EU

This is to declare that the following safety device listed in appendix III point 2 of the directive 2014/33/EU

Product: **Braking system**

According to the following specification:

Brake type	Part N°	Drawing N°	Voltage (Vdc)	Torque or Tangential Force	EU type examination + NB		T10 (ms)	T90 (ms)
ERS VAR07 SZ420/350 SY	30315184	I-112107260	103/72	2x350Nm	EU-BD819/1	NB0036	95	160
	30315418	I-112107763	103/72	2x350Nm	EU-BD819/1	NB0036	95	160
ERS VAR07 SZ600/550 SY	30315185	I-112107261	103/72	2x550Nm	EU-BD819/1	NB0036	80	135
	30315419	I-112107764	103/72	2x550Nm	EU-BD819/1	NB0036	80	135
ERS VAR08 SZ1700/1700	To Create	I-112108241	180/90	1700Nm	EU-BD590	NB0036	70	250
ERS VAR09 SZ1700/1250	30351931	I-112108213	103/52	2x1250Nm	EU-BD591	NB0036	80	230
ERS VAR09 SZ1700/1700	30315074	I-112106605-R	103/72	2x1700Nm	EU-BD591	NB0036	50	160
ERS VAR10 SZ2500/2500	30343591	I-112108034	180/90	2500Nm	EU-BD592	NB0036	70	170
ERS VAR10 SZ2500/3000	30343588	I-112108036	180/90	3000Nm	EU-BD592	NB0036	70	230
ERS VAR10 SZ5000/5000	30348450	I-112108167	180/90	5000Nm	EU-BD592	NB0036	125	255
ERS VAR15-02 FT2110/2415N SY	30315189	I-112107265	103/72	2415N	EU-BD777	NB0036	70	100
	30315417	I-112107762	103/72	2415N	EU-BD777	NB0036	70	100
ERS FENIX 09 10-1200	30343444	I-112108053	103/72	2x1200Nm	EU-BD906	NB0036	100	185

Warner Electric Europe
7, rue Champfleur
B.P. 20095
49182 St Barthélemy d'Anjou

DECLARATION OF CONFORMITY TO THE DIRECTIVE 2014/33/EU

Year of manufacture : **See brake label**
Manufactured by : **Warner Electric Europe**

That has obtained the UE type examination N° ***(see table above)*** by the following notified body :

Notified body (NB)
TÜV SÜD Industrie Service GmBh
Westendstr. 199
D 80686 MÜNCHEN

Covered par the Quality Insurance attestation Module E N°2002/2820/013D delivered by the following body :

AFNOR Certification NB 0333
11 rue Francis de Pressenssé
93571, La pleine St Denis Cedex France

Is compliant with the Directive 2014/33/EU and applied the harmonized standard EN81-20:2014 and EN81-50:2014

Function : **Operation Quality Manager**
Name : **Ms Lucie Godicheau**
Date : 19/04/16
Visa :

WARNER ELECTRIC EUROPE
CS 20095
49182 ST-BARTHELEMY D'ANJOU CEDEX
Tél. 02 41 21 24 24
Fax. 02 41 21 24 00
E-mail : warnerelectric-eu.com

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

Industrie Service

EU TYPE-EXAMINATION CERTIFICATE

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

Certificate No.:	EU-BD 819/1
Certification Body of the Notified Body:	TÜV SÜD Industrie Service GmbH Westendstr. 199 80686 Munich - Germany Identification No. 0036
Certificate Holder:	WARNER Electric Europe 7, rue de Champfleur BP 20095 49124 Saint Barthélemy d'Anjou - France
Manufacturer of the Test Sample: (Manufacturer of Serial Production – see Enclosure)	WARNER Electric Europe 7, rue de Champfleur BP 20095 49124 Saint Barthélemy d'Anjou - France
Product:	Braking device acting on the shaft of the traction sheave, as part of the protection device against overspeed for the car moving in upwards direction and braking element against unintended car movement
Type:	ERS VAR07 Size: SZ300/_ _ _, SZ420/_ _ _, SZ420/_ _ _ SY, SZ600/_ _ _, SZ600/_ _ _ SY, SZ800/_ _ _, SZ800/_ _ _ AZ
Directive:	2014/33/EU
Reference Standards:	EN 81-20:2014 EN 81-50:2014 EN 81-1:1998+A3:2009
Test Report:	EU-BD 819/1 of 2016-03-09
Outcome:	The safety component conforms to the essential health and safety requirements of the mentioned Directive as long as the requirements of the annex of this certificate are kept.
Date of Issue:	2016-03-09
Date of Validity:	from 2016-04-20

Werner Rau
Certification Body "lifts and cranes"

TÜV SÜD Industrie Service GmbH 00 36 Notified Body

TÜV®

Annex to the EU Type-Examination Certificate
No. EU-BD 819/1 of 2016-03-09

Industrie Service

1 Scope of application

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

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

Size	Permissible brake torque [Nm]	Max. tripping rotary speed of the traction sheave [rpm]
SZ300/_ _ _	482 - 747	300
SZ300/_ _ _	434 - 689	600
SZ420/_ _ _	547 - 999	300
SZ420/_ _ _	502 - 788	600
SZ420/_ _ _ SY	603 - 1070	600
SZ600/_ _ _	947 - 1306	300
SZ600/_ _ _	724 - 1045	600
SZ600/_ _ _ SY	811 - 1688	600
SZ800/_ _ _	1144 - 2177	300
SZ800/_ _ _ AZ	1007 - 1871	400
SZ800/_ _ _	1042 - 1997	600

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

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

$$v = \frac{n}{i}$$

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

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

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

Size	Min. nominal brake torque* [Nm]	Intermediate nominal brake torque * [Nm]	Max. nominal brake torque * [Nm]	Max. tripping rotary speed [rpm]	Maximum response times** [ms] with / without overexcitation		
					t_{10}	t_{50}	t_{90}
SZ300/_ _ _	2 x 250 = 500			300	60	93	125
SZ300/_ _ _			2 x 350 = 700	300	50	100	150
SZ300/_ _ _	2 x 250 = 500			600	55	88	120
SZ300/_ _ _			2 x 315 = 630	600	50	90	130
SZ420/_ _ _	2 x 250 = 500			300	60	90	120
SZ420/_ _ _			2 x 450 = 900	300	50	105	160
SZ420/_ _ _	2 x 225 = 450			600	60	75	90
SZ420/_ _ _			2 x 350 = 700	600	60	80	100
SZ420/_ _ _ SY	2 x 360 = 720			600	95	128	160

SZ420/_ _ _ SY			2 x 420 = 840	600	95	148	200
SZ600/_ _ _	2 x 420 = 840			300	80	120	160
SZ600/_ _ _		2 x 550 = 1100		300	50	85	120
SZ600/_ _ _			2 x 600 = 1200	300	50	100	150
SZ600/_ _ _	2 x 315 = 630			600	70	90	110
SZ600/_ _ _			2 x 500 = 1000	600	50	90	130
SZ600/_ _ _ SY	2 x 550 = 1100			600	80	108	135
SZ800/_ _ _	2 x 665 = 1330			300	65	95	125
SZ800/_ _ _			2 x 1000 = 2000	300	55	153	250
SZ800/_ _ _ AZ	2 x 667 = 1334			400	120	160	200
SZ800/_ _ _ AZ			2 x 800 = 1600	400	100	125	150
SZ800/_ _ _	2 x 665 = 1330			600	65	103	140
SZ800/_ _ _		2 x 800 = 1600		600	55	93	130
SZ800/_ _ _			2 x 900 = 1800	600	55	115	175

Interim values can be interpolated

Explanations:

* **Nominal brake torque:** Brake torque assured for installation operation by the safety component manufacturer.

** **Response times:** t_X time difference between the drop of the braking power until establishing X% of the nominal brake torque, t_{50} optionally calculated $t_{50}= (t_{10}+ t_{90})/2$ or value taken from the examination recording

1.2.2 Assigned execution features

Size	Type of powering / deactivation	Brake control	Nominal air gap [mm]	Damping elements / adhesive foil integrated	Overexcitation
SZ300/_ _ _	Continuous current / continuous current end	serial	0.6	yes / yes	at double non-release voltage
SZ420/_ _ _	Continuous current / continuous current end	serial	0.6	yes / yes	at double non-release voltage
SZ420/_ _ _ SY	Continuous current / continuous current end	serial or parallel	0.65	yes / no	at double non-release voltage
SZ600/_ _ _	Continuous current / continuous current end	serial	0.6	yes / yes	at double non-release voltage
SZ600/_ _ _ SY	Continuous current / continuous current end	serial or parallel	0.65	yes / no	at double non-release voltage
SZ800/_ _ _	Continuous current / continuous current end	parallel	0.6	yes / yes	at double non-release voltage
SZ800/_ _ _ AZ	Continuous current / continuous current end	parallel	0.65	no / no	no

2 Conditions

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

2.2 The installer of a lift must create an examination instruction to fulfil the overall concept, add it to the lift documentation and provide any necessary tools or measuring devices, which allow a safe examination (e. g. with closed shaft doors).

2.3 The manufacturer of the drive unit must provide calculation evidence that the connection traction sheave – shaft – brake disc and the shaft itself is sufficiently safe, if the brake disc is not a direct component of the traction sheave (e. g. casted on). The shaft itself has to be statically supported in two points.

An evidence must be enclosed with the technical documentation of the lift.

2.4 The setting of the brake torque has to be secured against unauthorized adjustment (e. g. sealing lacquer).

2.5 The respective identification drawing according to the following table shall be included to the EU type-examination certificate for the identification and information of the general construction and operation and distinctness of the approved type:

Size	No. of the identification drawing	Date of stamp
SZ300/_ _ _	1 12 107185	01.07.2009
SZ420/_ _ _	1 12 107272	15.03.2010
SZ420/_ _ _ SY	I-1 12 108237	09.03.2016
SZ600/_ _ _	1 12 107273	15.03.2010
SZ600/_ _ _ SY	I-1 12 108239	09.03.2016
SZ800/_ _ _	I-1 12 107213	09.03.2016
SZ800/_ _ _ AZ	I-1 12 108244	09.03.2016

2.6 The EU type-examination certificate may only be used in combination with the corresponding annex and enclosure (List of authorized manufacturer of the serial production). The enclosure will be updated immediately after any change by the certification holder.

3 Remarks

3.1 The brake moments effectively adjusted of one brake circuit will be marked at the blank after the type designation ERS VAR07 SZXXX/_ _ _ XX.

3.2 In the scope of this type-examination it was found out, that the brake device also functions as a brake for normal operation, is designed as a redundant system and therefore meets the requirements to be used also as a part of the protection device against overspeed for the car moving in upwards direction and as braking element as part of the protection device against unintended car movement.

3.3 Checking whether the requirements as per section 5.9.2.2 of EN 81-20:2014 (D) have been complied with is not part of this type examination.

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

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

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

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

Enclosure to the EU Type-Examination Certificate
No. EU-BD 819/1 of 2016-03-09

Industrie Service

Authorised Manufacturer of Serial Production – Production Sites (valid from: 2016-01-22):

Company WARNER Electric Europe
Address 7, rue de Champfleur
BP 20095
49124 Saint Barthélemy d'Anjou - France

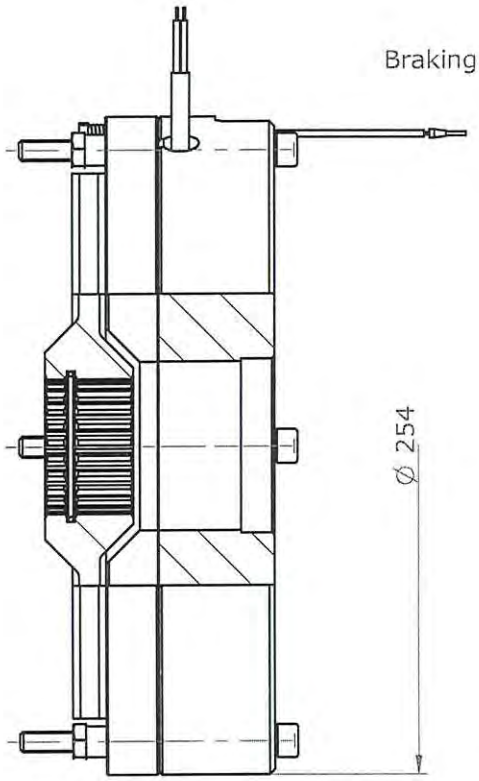
Company Altra Industrial Motion Shenzhen Co. Ltd.
Address Dabo Industry Zone
18 Huanzhen Road
Bogang County, Shajing Town
Baoan District, Shenzhen City
518104 Guangdong province - China (PRC)

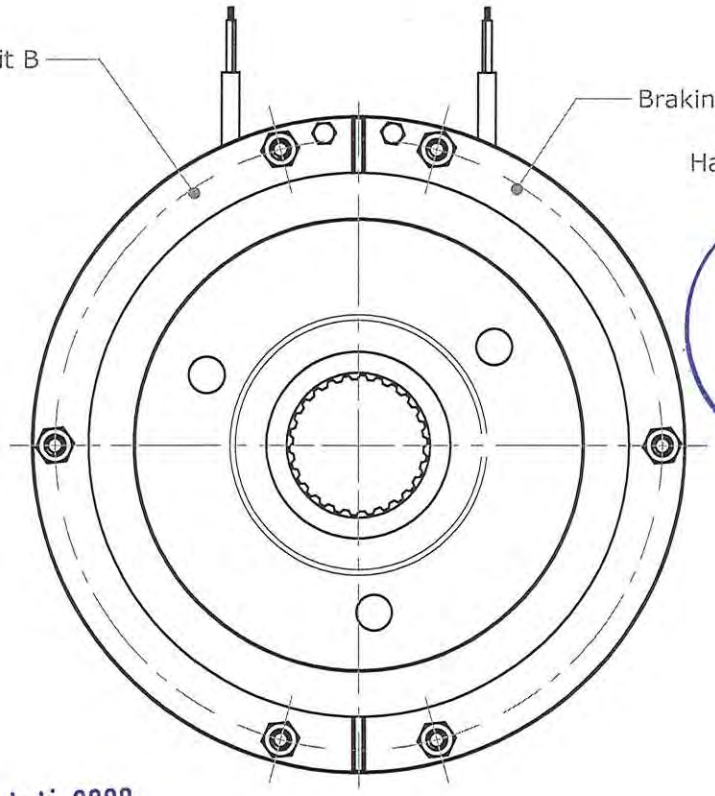
- END OF DOCUMENT -

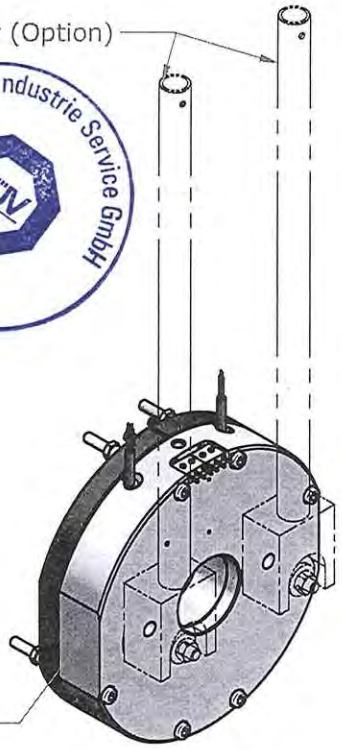
Based on: e-mail from Warner Electric Europe of 2016-01-15

Les cotes sans indication de tolérances sont des cotes nominales.
Untoleranced dimensions are nominal dimensions.

NOTES







TÜV SÜD Industrie Service GmbH

- 1. Juli 2009
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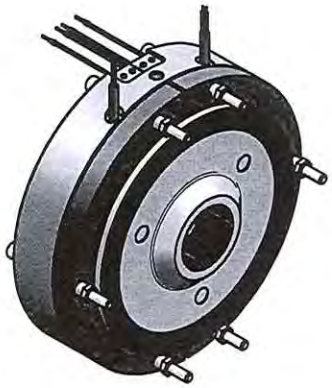
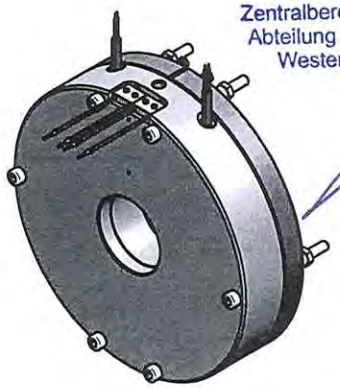
TÜV SÜD Industrie Service GmbH
Zentralbereich Fördertechnik-Sonderbauten
Abteilung Aufzüge und Sicherheitsbauteile
Westendstr. 199, D-80686 München
Der Sachverständige





TUV DIFFUSION

Client/customer:								
Ms (Nm) :	Customer ref :							
Md (Nm) :								
n Md (min-1) :	Dimensions in mm	FM	LT	REVISION	DATE	By	Ch.
n max (min-1) :								
U (Vdc) :	Manual/Notice : SM	Drawn : G. Ferrand			Date: 21.04.09		
P20°C (W) :	Mass : / Scale: 1:1	Checked:			Date: 21.04.09		
Insulation class (°C):		Design.: Frein électromagnétique / Electromagnetic brake					
		Type: ERS VAR07 SZ300/300					
		N° 1 12 107185					

Warner Electric Europe

CAD SE

A3

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Untoleranced dimensions are nominal dimensons.

NOTES

15. März 2010

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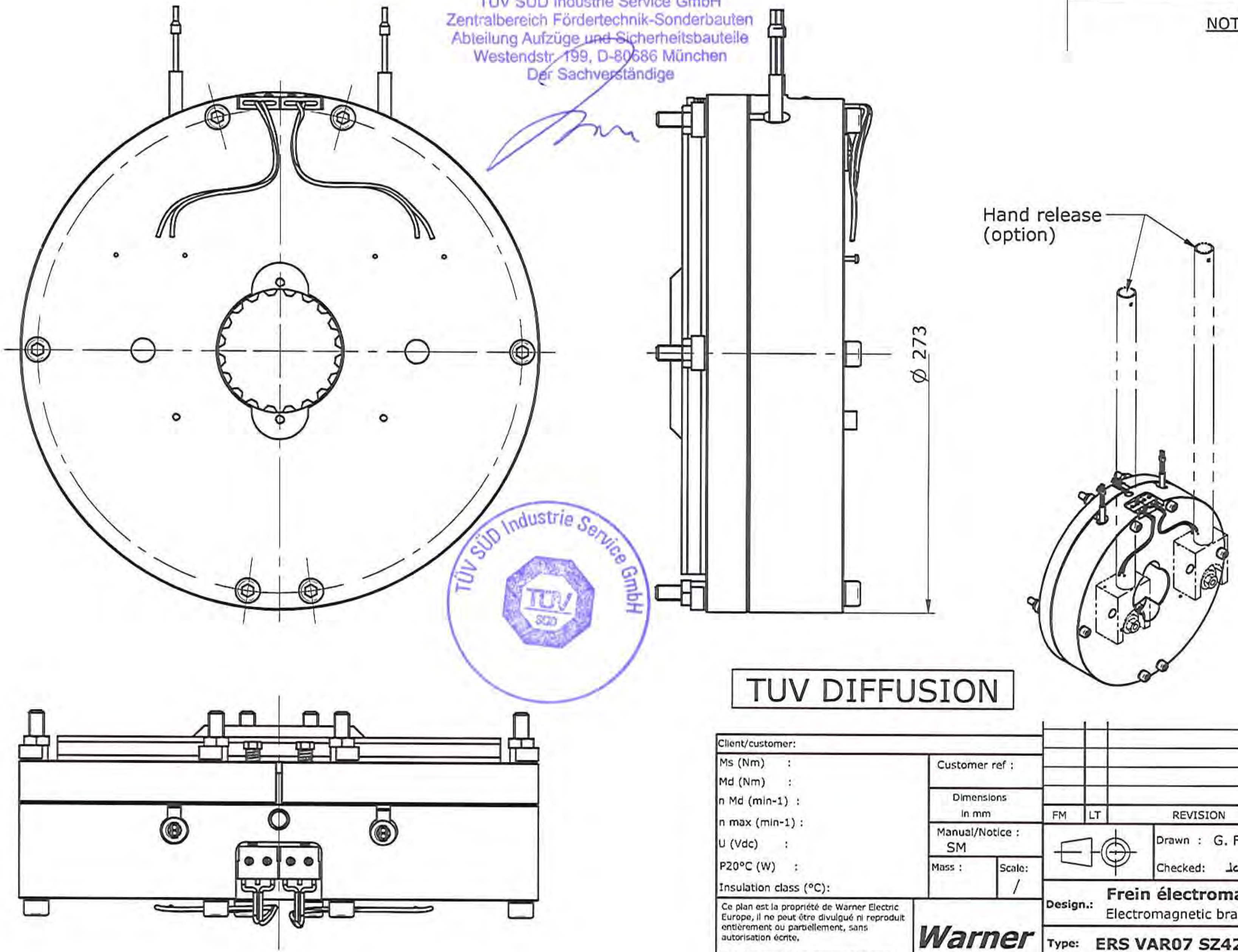
Abteilung Aufzüge und Sicherheitsbauteile
Westendstr. 199, D-80686 München
Der Sachverständige

TÜV SÜD Industrie Service GmbH



TUV DIFFUSION

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Ms (Nm) :	Customer ref :		
Md (Nm) :			
n Md (min-1) :	Dimensions in mm		
n max (min-1) :			
U (Vdc) :	Manual/Notice : SM		
P20°C (W) :	Mass :	Scale: /	
Insulation class (°C):			

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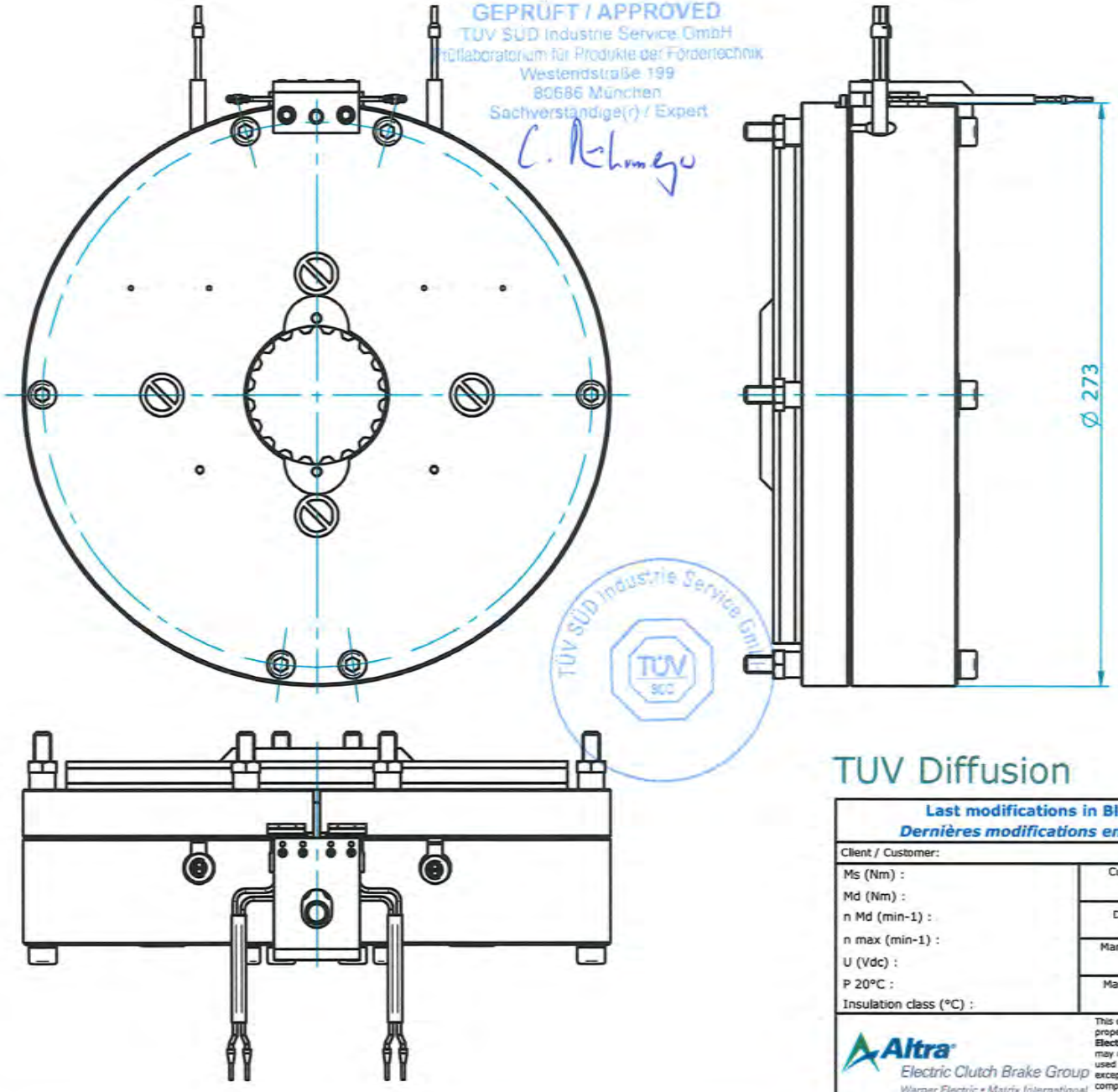
FM	LT	REVISION	DATE	By	Ch.
		Drawn : G. Ferrand	Date: 04.01.10		
		Checked:	Date: 04.01.10		

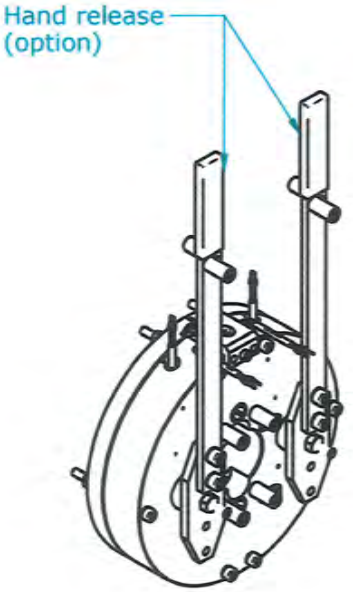
Design.: **Frein électromagnétique**
Electromagnetic brake

Type: **ERS VAR07 SZ420/----**

N° **1 12 107272**

CAD SE
A3





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NOTES

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Last modifications in Blue
Dernières modifications en Bleu

Client / Customer:

Ms (Nm) :
Md (Nm) :
n Md (min-1) :
n max (min-1) :
U (Vdc) :
P 20°C :
Insulation class (°C) :

Customer ref:
Dimensions in mm
Manual / Notice:
Mass:
Scale:

	A	Drawing creation	18/02/16	JE	
FM	LT	REVISION	DATE	By	Ch.

Drawn: J.Emery Date: 18/02/16
Checked: Date: 19/02/16

Design.: **Frein électromagnétique**
Electromagnetic brake

Type: **ERS VAR07 SZ420/--- SY**

SAP N°:

Dwg N°: **I-1 12 108237** Rev. **A**

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www.altramotion.com

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A3ens-1

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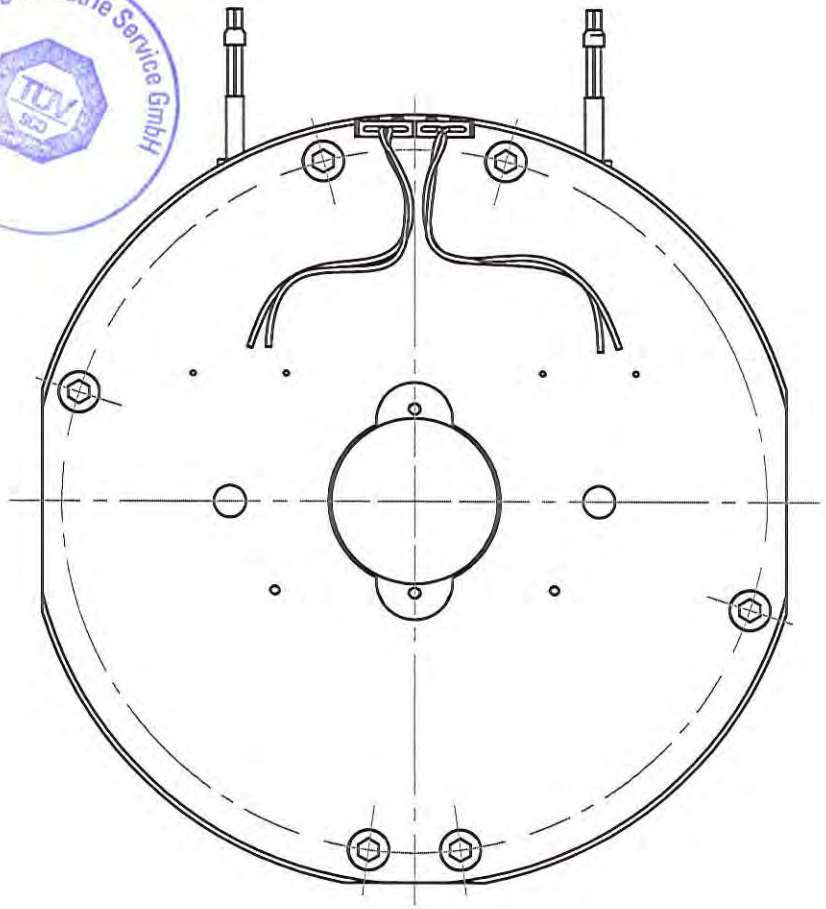
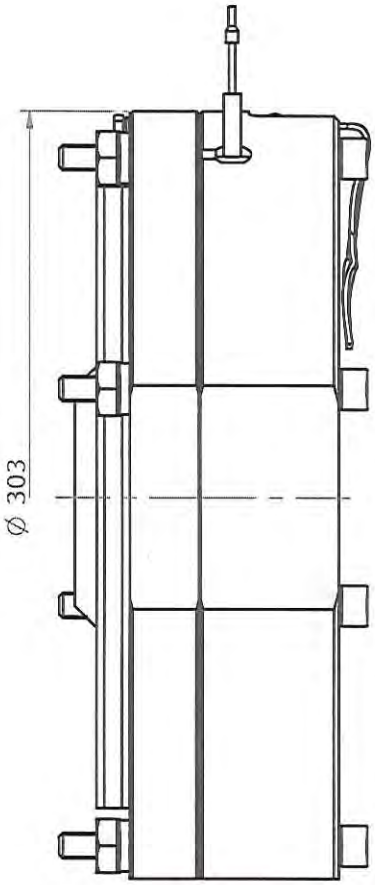
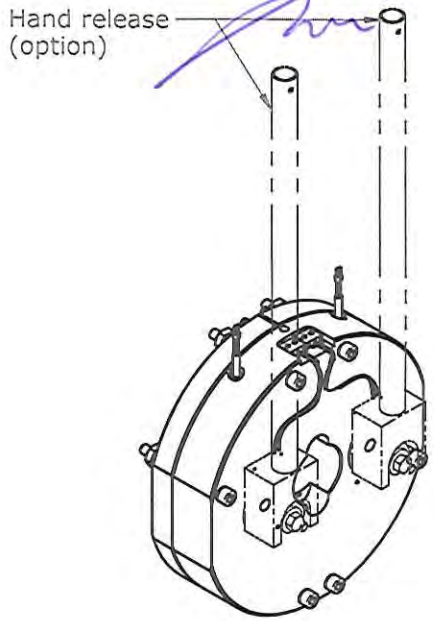
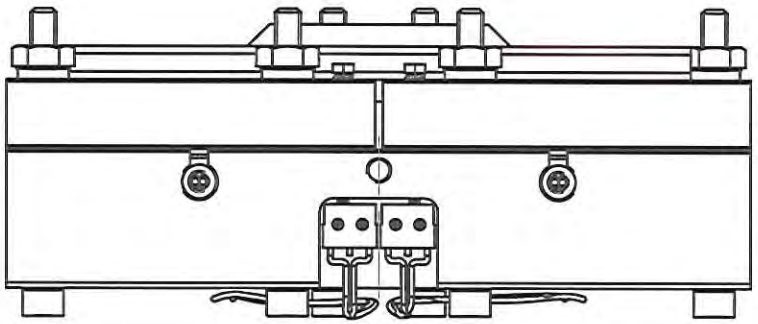
Der Sachverständige









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FM	LT	REVISION			DATE	By	Ch.	

Client/customer:

Ms (Nm) :
Md (Nm) :
n Md (min-1) :
n max (min-1) :
U (Vdc) :
P20°C (W) :
Insulation class (°C):

Customer ref :

Dimensions in mm

Manual/Notice : SM

Mass :

Scale: /

Drawn : G. Ferrand Date: 04.01.10
Checked: Date: 04.01.10

Design.: Frein électromagnétique
Electromagnetic brake

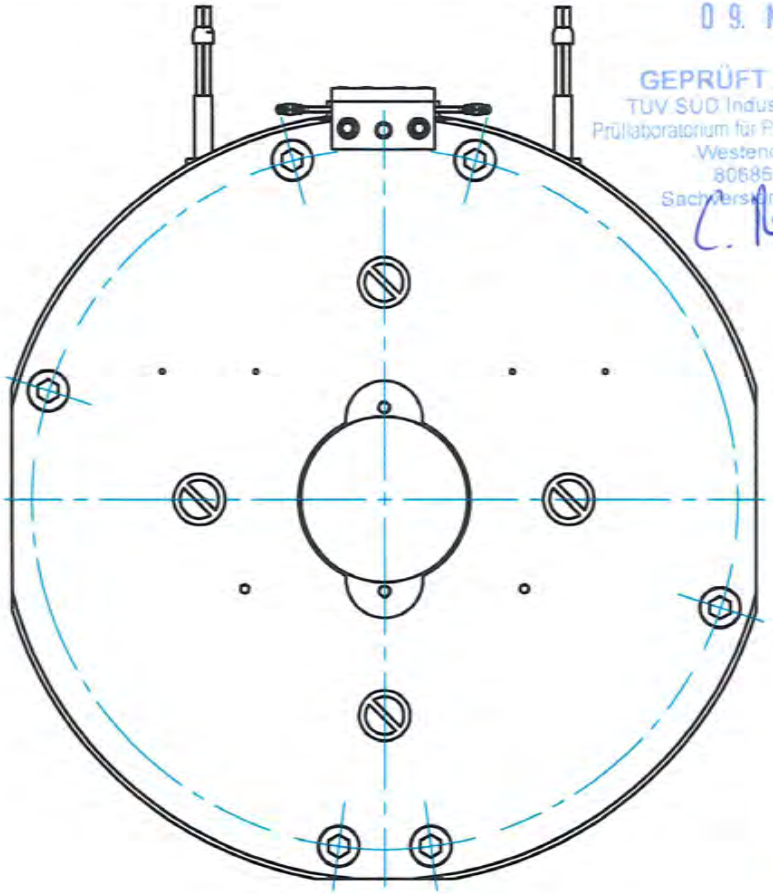
Type: ERS VAR07 SZ600/---

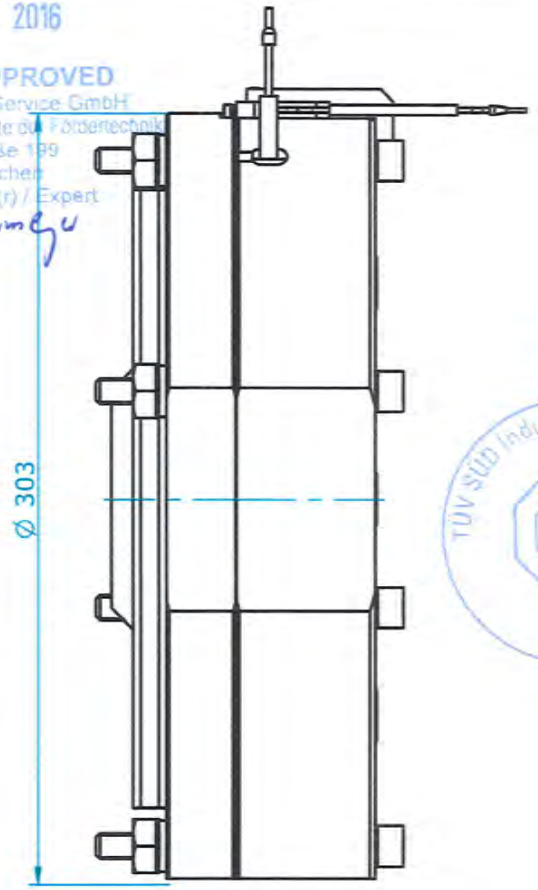
N° 1 12 107273

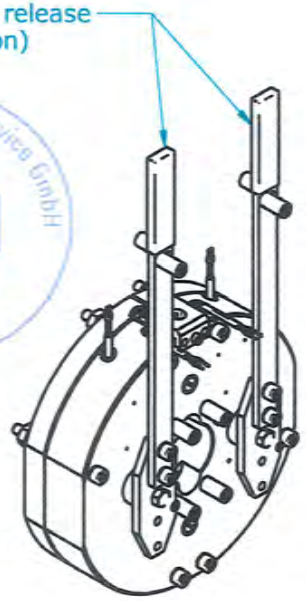
A3

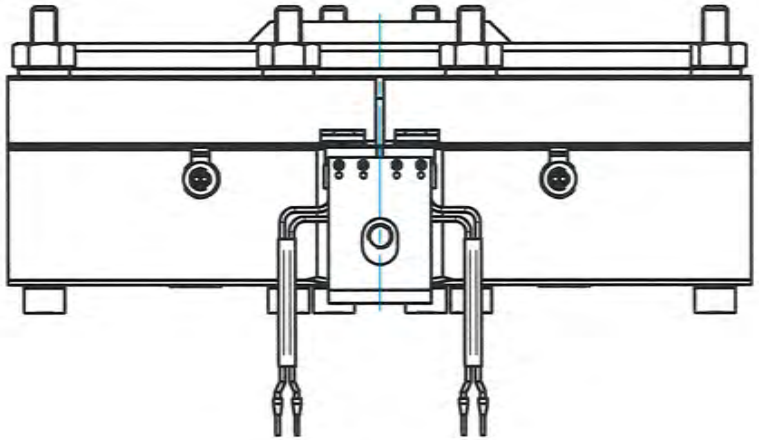
Warner Electric Europe

CAD SE









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Prüflaboratorium für Produkte der Fördertechnik
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NOTES

TUV Diffusion

Last modifications in Blue *Dernières modifications en Bleu*								
			A	Drawing creation	18/02/16	JE	JG	
			FM	LT	REVISION	DATE	By	Ch.

Client / Customer:

Ms (Nm) :
Md (Nm) :
n Md (min-1) :
n max (min-1) :
U (Vdc) :
P 20°C :
Insulation class (°C) :

Customer ref:

Dimensions in mm

Manual / Notice:

Mass: Scale:

Drawn: J.Emery Date: 18/02/16
Checked: JG Date: 19/02/16

Design.: **Frein électromagnétique**
Electromagnetic brake

Type: **ERS VAR07 SZ600/--- SY**

SAP N°:

Dwg N°: **I-1 12 108239** Rev. **A**

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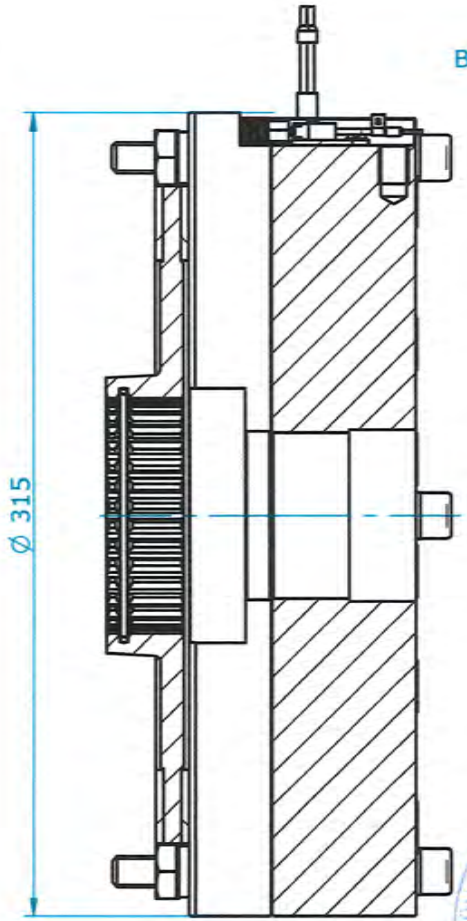

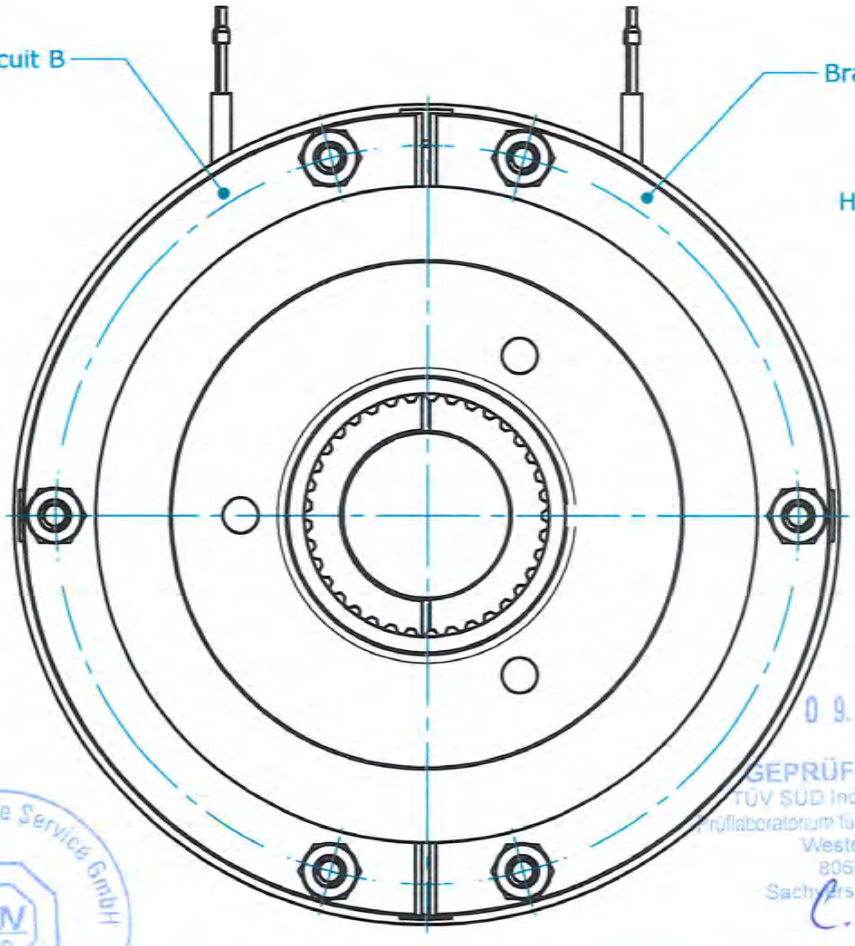

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Prüflaboratorium für Produkte der Fördertechnik
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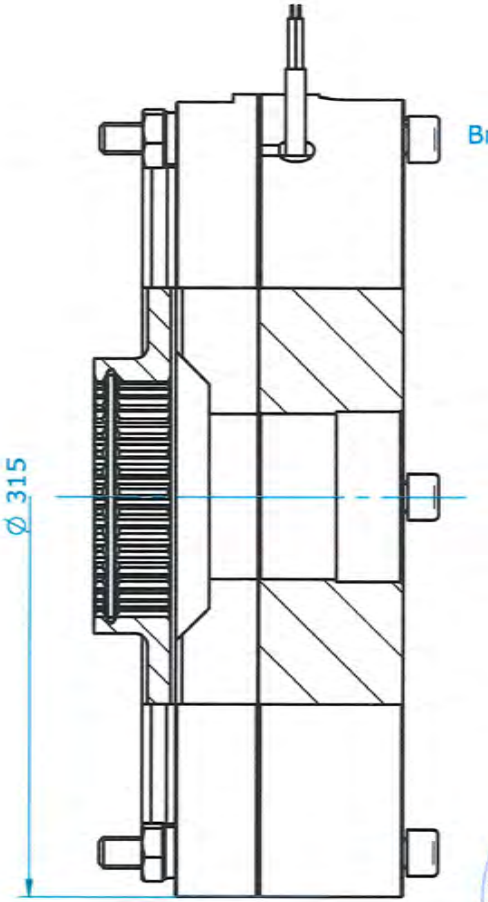
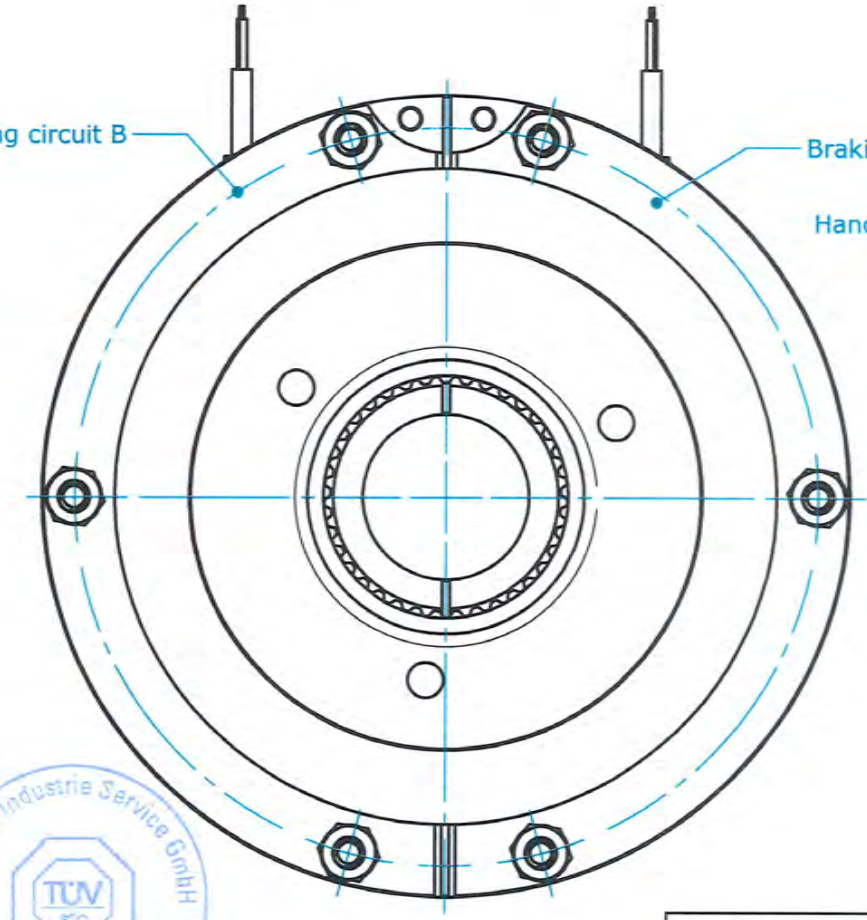
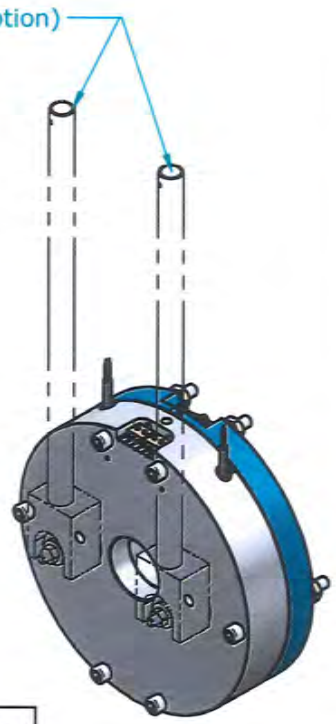
Last modifications in Blue *Dernières modifications en Bleu*						
Client / Customer:						
Ms (Nm) :	Customer ref:					
Md (Nm) :						
n Md (min-1) :	Dimensions in mm	B	Drawing updating	25/02/16	JE	
n max (min-1) :	Manual / Notice: SM	FM	LT	REVISION	DATE	By	Ch.
U (Vdc) :		Drawn: J.Emery		Date: 25/02/16		
P 20°C :	Mass: Scale:	Checked:		Date: 25/02/16		
Insulation class (°C) :		Design.: **Electromagnetic Brake** Frein Electromagnétique				
Altra Electric Clutch Brake Group — Warner Electric • Matrix International • Inertia Dynamics • Warner Linear	This document is the property of **Warner Electric Europe SAS**, it may not be copied or used for any purpose, except directly for the company, without their prior written consent, nor is it to be shown to any third party.	Type: **ERS VAR07 SZ800/---**				
		Dwg N°: **I-1 12 107213**			Rev. **B**	
		SAP N°:				

CAD SE

A3ens







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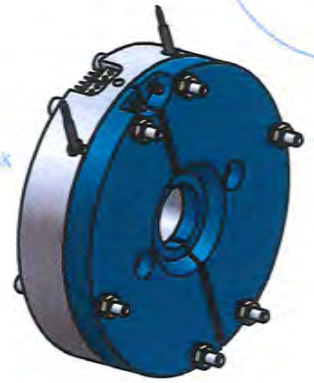

TUV DIFFUSION

Last modifications in Blue
Dernières modifications en Bleu

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FM	LT	REVISION	DATE	By	Ch.	

Client / Customer:

Ms (Nm) :	Customer ref:	
Md (Nm) :		
n Md (min-1) :	Dimensions in mm	
n max (min-1) :	Manual / Notice: SM	
U (Vdc) :		
P 20°C :	Mass:	Scale:
Insulation class (°C) :		

Drawn: J.Emery Date: 25/02/16
Checked: Date: 25/02/16

Design.: Frein électromagnétique
Electromagnetic brake

Type: ERS VAR07 SZ800/--- AZ

Dwg N°: I-1 12 108244

Rev. **A**

SAP N°:

Altra Electric Clutch Brake Group
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Your reference/letter of	Our reference/name	Tel.-Extension/E-Mail	Fax-Extension	Date	Page
	IS-FT1-MUC/cr Christian Rührmeyer	+49 89 5791-3450 christian.ruehrmeyer@tuev-sued.de	+49 89 5791-3337	2016-03-21 Warner_Bestätigung_EN81-20_50_160321_en.docx	1 of 3

Fulfillment of requirements concerning type-examinations of ascending car overspeed protection means (ACOP) and protection devices against unintended car movement according to the harmonized standard EN 81-50:2014 (D) by (EC) type-examination certificates according to Directive 95/16/EC

Dear Sirs,

For the products listed below were issued (EC) type-examination certificates according to Directive 95/16/EC. Test basis was the harmonized standard EN 81-1. In the meantime EU type-examination certificates according to Directive 2014/33/EU were issued for the tested products. So far as relevant, additional requirements of the harmonized standard EN 81-20:2014 (D) were taken into consideration.

Type:	(EC) type-examination certificate	EU type-examination certificate
ERS VAR08 Size: SZ600/_ _ _, SZ1050/_ _ _ _, SZ1700/_ _ _ _	ABV 590/3, ESV 590/5 ABV 818/1, ESV 818/2 ABV 880, ESV 880	EU-BD 590
ERS VAR09 Size: SZ200/_ _ _, SZ800/_ _ _, SZ1700/_ _ _ _	ABV 817/1, ESV 817 ABV 729/2, ESV 729/1 ABV 591/5, ESV 591/8 ABV 591/6, ESV 591/9	EU-BD 591

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ERS VAR09 Size: SZ200/_ _ _, SZ600/_ _ _, SZ600/_ _ _ FZ, SZ800/_ _ _, SZ1000/_ _ _, SZ1700/_ _ _ _, SZ1700/1200 CH	ABV 817/1, ESV 817 ABV 809/3, NL 11-400-1002-153-01 (R2) ABV 809/2, NL 11-400-1002-153-01 (R1) ABV 729/2, ESV 729/1 ABV 811/2, NL 11-400-1002-153-02 (R2) ABV 591/5, ESV 591/8 ABV 591/6, ESV 591/9 ABV 591/4, ESV 591/6	EU-BD 591/1
ERS VAR10 Size: SZ1010/_ _ _ _, SZ2500/_ _ _ _, SZ5000/_ _ _ _	ABV 592/3, ESV 592/2 ABV 604/3, ESV 604/3 ABV 829/1, ESV 829/1	EU-BD 592
ERS VAR15-02 Size: FT2110/_ _ _ _, FT2110/_ _ _ _ SY	ABV 777/5, ESV 777/5 ABV 777/3, ESV 777/3	EU-BD 777
ERS VAR07 Size: SZ300/_ _ _, SZ420/_ _ _, SZ600/_ _ _, SZ800/_ _ _	ABV 819/2, ESV 819/1 ABV 826/2, ESV 826/1 ABV 843/1; ESV 843/1 ABV 844/1, ESV 844/1	EU-BD 819
ERS VAR07 Size: SZ300/_ _ _, SZ420/_ _ _, SZ420/_ _ _ SY, SZ600/_ _ _, SZ600/_ _ _ SY, SZ800/_ _ _, SZ800/_ _ _ AZ	ABV 819/2, ESV 819/1 ABV 826/2, ESV 826/1 ABV 843, ESV 843 ABV 843/1; ESV 843/1 ABV 844, ESV 844 ABV 844/1, ESV 844/1	EU-BD 819/1
ERS FENIX 08 Size: 06-_ _ _ _, 10-_ _ _ _	ASBV 905/1 ASBV972	EU-BD 905
ERS FENIX 09 Size: 06-_ _ _ _, 10-_ _ _ _	ASBV 906/1 ASBV 973	EU-BD 906
ERS FENIX 10 Size: 12-_ _ _ _, 20-_ _ _ _	ASBV 907/1 ASBV 974	EU-BD 907

According to the new standard EN 81-50:2014 (D) there are new requirements for the type-examination of the braking devices as part of the ascending car overspeed protection means (ACOP) and against unintended car movement (UCM) respectively the requirements have changed. But these requirements already have been considered in the past. For this reason additional tests were not necessary. The content of the EC type examination certificates was formally adapted. The safety components mentioned above fulfill the requirements of the harmonized standard EN 81-50:2014 (D) already.

For the function as safety component as part of the ascending car overspeed protection means (ACOP) the transitional regulation according to Article 44 of the Directive 2014/33/EU is fully applicable.

In the future protecting devices against unintended car movement (UCM) will be safety components according to Annex III of the Directive 2014/33/EU.

Furthermore according to Article 44 of the Directive 2014/33/EU the making available on the market of safety components for lifts covered by Directive 95/16/EC which are in conformity with that Directive and which were placed on the market before 20 April 2016 shall not be impeded. To avoid problems in the meantime with document NB-L/2015-061 of 2015-07-06 Notified Bodies Lift (NB-Lift) suggested to apply Article 44 for components of protecting devices against unintended car movement (UCM) analogously. A definitive statement of NB-Lift respectively the European Commission is planed, but is pending. After

Industrie Service

consideration a transformation of the existing type-examination certificates in EU type-examination certificates is possible.

For this reason, additional formal requirements and due to the validity of the new Lift Directive 2014/33/EU from 2016-04-20, EU type-examination certificates already may be issued, but they are valid from 2016-04-20 only.

Best regards

Achim Janocha
Leiter der Zertifizierungsstelle
für Produkte der Fördertechnik

Christian Rührmeyer
Niederlassung München
Abteilung Fördertechnik

Warner Electric Europe
7, rue Champfleur
B.P. 20095
49182 St Barthélemy d'Anjou

DECLARATION OF CONFORMITY TO THE DIRECTIVE 2014/33/EU

This is to declare that the following safety device listed in appendix III point 2 of the directive 2014/33/EU

Product: **Braking system**

According to the following specification:

Brake type	Part N°	Drawing N°	Voltage (Vdc)	Torque or Tangential Force	EU type examination + NB		T10 (ms)	T90 (ms)
ERS VAR07 SZ420/350 SY	30315184	I-112107260	103/72	2x350Nm	EU-BD819/1	NB0036	95	160
	30315418	I-112107763	103/72	2x350Nm	EU-BD819/1	NB0036	95	160
ERS VAR07 SZ600/550 SY	30315185	I-112107261	103/72	2x550Nm	EU-BD819/1	NB0036	80	135
	30315419	I-112107764	103/72	2x550Nm	EU-BD819/1	NB0036	80	135
ERS VAR08 SZ1700/1700	To Create	I-112108241	180/90	1700Nm	EU-BD590	NB0036	70	250
ERS VAR09 SZ1700/1250	30351931	I-112108213	103/52	2x1250Nm	EU-BD591	NB0036	80	230
ERS VAR09 SZ1700/1700	30315074	I-112106605-R	103/72	2x1700Nm	EU-BD591	NB0036	50	160
ERS VAR10 SZ2500/2500	30343591	I-112108034	180/90	2500Nm	EU-BD592	NB0036	70	170
ERS VAR10 SZ2500/3000	30343588	I-112108036	180/90	3000Nm	EU-BD592	NB0036	70	230
ERS VAR10 SZ5000/5000	30348450	I-112108167	180/90	5000Nm	EU-BD592	NB0036	125	255
ERS VAR15-02 FT2110/2415N SY	30315189	I-112107265	103/72	2415N	EU-BD777	NB0036	70	100
	30315417	I-112107762	103/72	2415N	EU-BD777	NB0036	70	100
ERS FENIX 09 10-1200	30343444	I-112108053	103/72	2x1200Nm	EU-BD906	NB0036	100	185

Warner Electric Europe
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B.P. 20095
49182 St Barthélemy d'Anjou

DECLARATION OF CONFORMITY TO THE DIRECTIVE 2014/33/EU

Year of manufacture : **See brake label**
Manufactured by : **Warner Electric Europe**

That has obtained the UE type examination N° ***(see table above)*** by the following notified body :

Notified body (NB)
TÜV SÜD Industrie Service GmBh
Westendstr. 199
D 80686 MÜNCHEN

Covered par the Quality Insurance attestation Module E N°2002/2820/013D delivered by the following body :

AFNOR Certification NB 0333
11 rue Francis de Pressenssé
93571, La pleine St Denis Cedex France

Is compliant with the Directive 2014/33/EU and applied the harmonized standard EN81-20:2014 and EN81-50:2014

Function : **Operation Quality Manager**
Name : **Ms Lucie Godicheau**
Date : 19/04/16
Visa :

WARNER ELECTRIC EUROPE
CS 20095
49182 ST-BARTHELEMY D'ANJOU CEDEX
Tél. 02 41 21 24 24
Fax. 02 41 21 24 00
E-mail : warnerelectric-eu.com

List of abbreviations

A	
ASL	Distance between rope departures
C	
CSA	Canadian standard
D	
D_S	Rope diameter
D_t	Traction sheave diameter
D_p/D_{SR}	Pulley diameter
DW	Double wrap
E	
ED	Duty cycle
EM	Setting gauge
F	
F_t	Resulting load on the traction sheave
H	
HRc	Rockwell hardness
L	
L	Left-hand version
M	
M	Middle offset
MRE	Machine room unit
N	
NC	Normally closed (break contact)
NO	Normally open (make contact)
Q	
Q	Rated load
R	
R	Right-hand version
R_A	Groove gap dimension (centre-to-centre distance between ropes)
RS-RC	Rope suspension with rear counterweight
RS-SC	Rope suspension with side counterweight
S	
SC	Synchron Compact
SW	Single wrap
T	
TLD	Calculation program (thyssenkrupp Lift Designer)
U	
UCM	Unintended elevator car movement

Elevator Technology

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02/2018

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