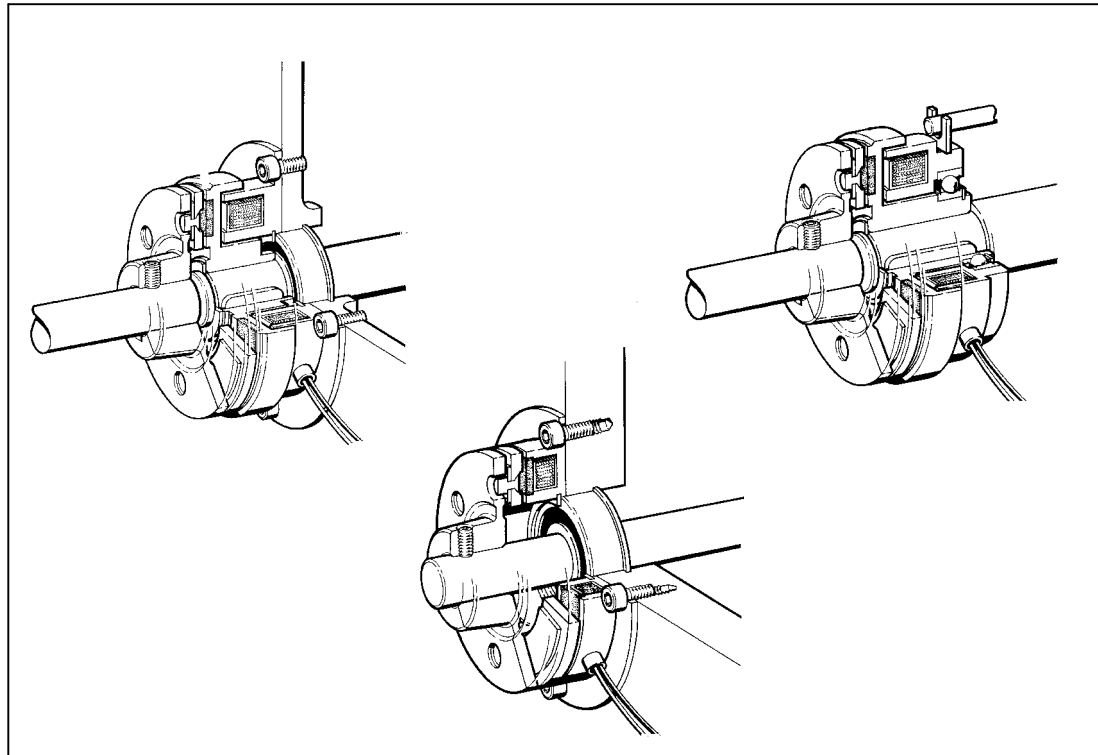


Operating Instructions



***Electromagnetic clutch and brake
INTORQ 14.105 and INTORQ 14.115***

Read Operating Instructions before set-up!

Manufacturer:

INTORQ GmbH & Co. KG
Postfach 11 03
D-31849 Aerzen

Wülmser Weg 5
D-31855 Aerzen
Phone: +49 (0) 51 54 / 95 39-01
Fax: +49 (0) 51 54 / 95 39-10
Email: info@intorq.de
Internet: www.intorq.de

Origin and year of manufacture:

See nameplate (page 4)

These Operating Instructions are only valid for:

Electromagnetic clutches

INTORQ 14.105.06.□.□
INTORQ 14.105.08.□.□
INTORQ 14.105.10.□.□
INTORQ 14.105.12.□.□
INTORQ 14.105.14.□.□
INTORQ 14.105.16.□.□
INTORQ 14.105.20.□.□
INTORQ 14.105.25.□.□

Electromagnetic brakes

INTORQ 14.115.06.□.□
INTORQ 14.115.08.□.□
INTORQ 14.115.10.□.□
INTORQ 14.115.12.□.□
INTORQ 14.115.14.□.□
INTORQ 14.115.16.□.□
INTORQ 14.115.20.□.□
INTORQ 14.115.25.□.□

What is new / what has changed in the Operating Instructions ?

Material number	Edition	Important	Content
00 178 685	1.0 12/1995 TD09	1st edition	First edition for preseries
00 467 314	1.0 07/2002 TD09	1st edition replaces 178 685	All chapters: Correction of faults and complete revision
13056569	2.0 05/2005 TD09	2nd edition replaces 467 314	Change of the firm's name to INTORQ

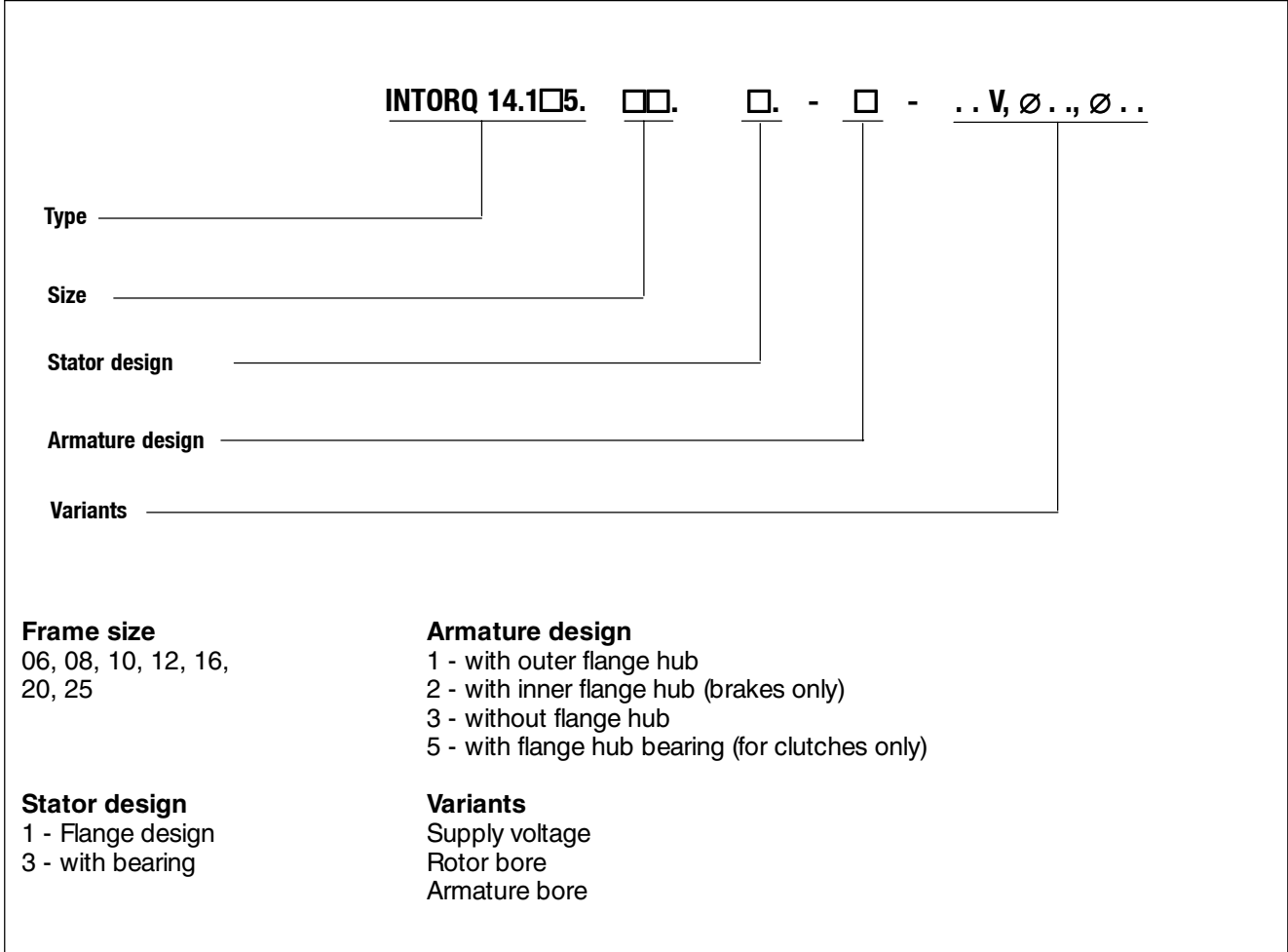
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All information given in this documentation has been carefully selected. Required corrections will be included in updates of this documentation.

Product key

INTORQ 14.105 Electromagnetic clutches, 7.5 - 480 Nm
 INTORQ 14.115 Electromagnetic brakes, 7.5 - 480 Nm



- The specifications in the product key, nameplate and packaging sticker are valid for electromagnetic clutches and electromagnetic brakes.


Nameplate

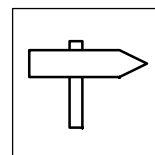
Structure

Field	Content	Example
1	Manufacturer	INTORQ D - Aerzen 14.115.06.1.0 24 V DC 11,5 W Nr. 00034106 7.5 NM 01.04.05
2	Brake type	
3	Rated voltage Rated power	
4	Ident no.. Rated brake torque Date of manufacture	

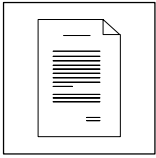
Packaging sticker

Assembly

Field	Content	Example
1	Manufacturer Barcode no.	INTORQ D - Aerzen  Typ:14.115.06.1.0 Nr. 00034106 MAGNETTEIL KPL. 1 Stück 24 V DC 11.5 W 7.5 NM 01.04.05 Rostschutzverpackung-Reibflächen fettfrei halten!
2	Type see product key Type no.	
3	Name Qty. per box	
4	Rated voltage Rated power Rated brake torque Date of packaging	
5	Note	



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1 Preface and general information

1.1 About these Operating Instructions ...

- These Operating Instructions inform about safety-relevant working on and with electromagnetic clutches and brakes. They contain all safety information which must be observed.
- All persons working on or with the stated electromagnetic clutches and brakes must have these Operating Instructions available and observe the information and notes relevant for their work.
- The Operating Instructions must always be in a complete and perfectly readable state.

1.1.1 Terminology used

Clutches and brakes

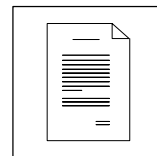
The terms "clutches" and "brakes" will be used for "electromagnetic clutches and brakes" in the following text.

Drive system

The term "drive system" will be used for drive systems with spring-applied brakes and other drive components.

1.2 Items supplied

- The drive systems are individually designed with modules. The list of all items supplied can be obtained from the accompanying papers.
- After receipt of the delivery, check immediately whether the items delivered match the accompanying papers. INTORQ GmbH & Co. KG does not accept any liability for deficiencies claimed subsequently. Claim
 - visible transport damage immediately to the forwarder.
 - visible deficiencies/incompleteness immediately to your INTORQ representative.



1.3 Drive systems

1.3.1 Labelling

- Drive systems and components are clearly labelled and defined by the indications on the nameplates.
- Manufacturer:
INTORQ GmbH & Co. KG
Postfach 11 03
D-31849 Aerzen
Wülmser Weg 5
D-31855 Aerzen
- Clutches and brakes are supplied as individual parts. The user combines them as desired. Specifications, especially packing stickers, nameplate and type code are valid for the entire stator.
- If individual parts are supplied, there is no identification.

1.3.2 Application as directed

- Drive systems
 - are to be used in machines and systems.
 - are only to be used for the ordered and acknowledged application conditions.
 - must only be operated under the conditions prescribed in these Instructions.
 - must not be used at powers higher or lower than indicated in these Instructions.

Any other use shall be deemed as inappropriate!

1.3.3 Legal regulations

Liability

- The information, data, and notes in these Operating Instructions met the state of the art at the time of printing. Claims on modifications referring to controllers which have already been supplied cannot be derived from the information, illustrations, and descriptions.
- Lenze does not accept any liability for damage and operating interference caused by:
 - inappropriate use
 - unauthorized modifications to the drive system
 - improper working on and with the controller
 - operating errors
 - disregarding these Instructions

Warranty

- Warranty conditions: see Sales and Delivery Conditions of INTORQ GmbH & Co. KG.
- Warranty claims must be made to the INTORQ representative responsible for you immediately after detecting defects or faults.
- The warranty is void in all cases where liability claims cannot be made.



2 Safety information

2.1 Persons responsible for the safety

Operators

- An operator is any natural or legal person who uses the clutch or the brake or on whose behalf the clutch or brake is used.
- The operator or the safety personnel must ensure
 - that all relevant regulations, instructions, notes and laws will be maintained.
 - that only qualified personnel works on and with the clutch or brake.
 - that the Operating Instructions are always available
 - that unqualified personnel is not allowed to work on and with the clutch or brake.

Qualified personnel

Qualified personnel are persons who, because of their training, experience and knowledge of all applicable standards and regulations as well as of all operating circumstances, have been entitled by the person responsible for the system to work on and with the system and to see and avoid all possible dangers.

(Definition for qualified personnel to IEC 364)

2.2 General safety information

- These safety notes do not claim to be complete. If any questions or problems occur, please contact your Lenze representative.
- The clutches and brakes met the state of the technology at the time of delivery and are generally safe to operate.
- Clutches and brakes endanger persons, the clutches and brakes themselves and other properties of the user if
 - unqualified personnel works on and with clutches and brakes.
 - the clutches and brakes are used for a purpose other than intended.
- The clutches and brakes must be designed such that they perform their function and do not cause danger for persons if they are installed correctly and used as intended in error-free operation. This also applies to clutches and brakes integrated into a drive system.
- Operate the clutches and brake only in a correct state.
- Retrofittings, modifications or changes of the clutch or brake are generally forbidden. In any case, INTORQ GmbH & Co. KG must be contacted before.
- The friction lining and the friction surfaces must by no means have contact to oil or grease since even small amounts reduce the brake torque considerably.
- Enclosure IP44, temperature class B (130°C).



Application range of the INTORQ clutches and brakes

- No potentially-explosive or aggressive atmosphere.
- Humidity, no restrictions.
- Ambient temperature -20°C to +40°C
- Sparking in switching operation
 - Especially at high speeds and high surface speeds of large clutches and brakes sparking can occur during the switch-on slip phase. This is a completely normal phenomenon of pole face clutches and brakes. If necessary, insulate the drive system depending on the ambient conditions.

2.3 Layout of the safety information

- All safety information given in these Operating Instructions have the same layout:



Signal word!

Note

- The icon characterizes the type of danger.
- The signal word characterizes the severity of danger.
- The note text describes the danger and gives information how to prevent dangerous situations.

Warning of danger to persons

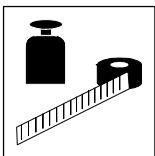
Icons used	Signal words	
<p>Warning of hazardous electrical voltage</p>	Danger!	Warns of impending danger . Consequences if disregarded: Death or severe injuries.
	Warning!	Warns of potential, very hazardous situations . Possible consequences if disregarded: Death or severe injuries.
<p>Warning of a general danger</p>	Caution!	Warns of potential, hazardous situations . Possible consequences if disregarded: Light or minor injuries.

Warning of damage to material

Icons used	Signal words	
	Stop!	Warns of potential damage to material . Possible consequences if disregarded: Damage of the drive system/device or its environment .

Other notes

Icons used	Signal words	
	Tip!	Designates a general, useful note. If you observe it, handling of the drive system/controller will be made easier.



3 Data

3.1 Product description

3.1.1 Flange-mounted clutches

The clutch consists of the stator (1) with encapsulated coil, the rotor (2) with fixed friction lining and an armature assembly (5,6,7) with armature plate and prestressed spring. The stator (1) is centred to the shaft and mounted at the machine panel. The rotor (2) is connected to the shaft using a key. Designs 1.1 and 1.5 are particularly suitable for through-shafts. The magnetic field which is created when a DC voltage is applied attracts the armature plate against the friction face of the rotor (2) via the air gap " $s_{Lü}$ ". The torque is transmitted without backlash by the spring. The prestressed springs draw the armature plate back to its initial position when the DC voltage is no longer applied. The clutch is released without residual torque.

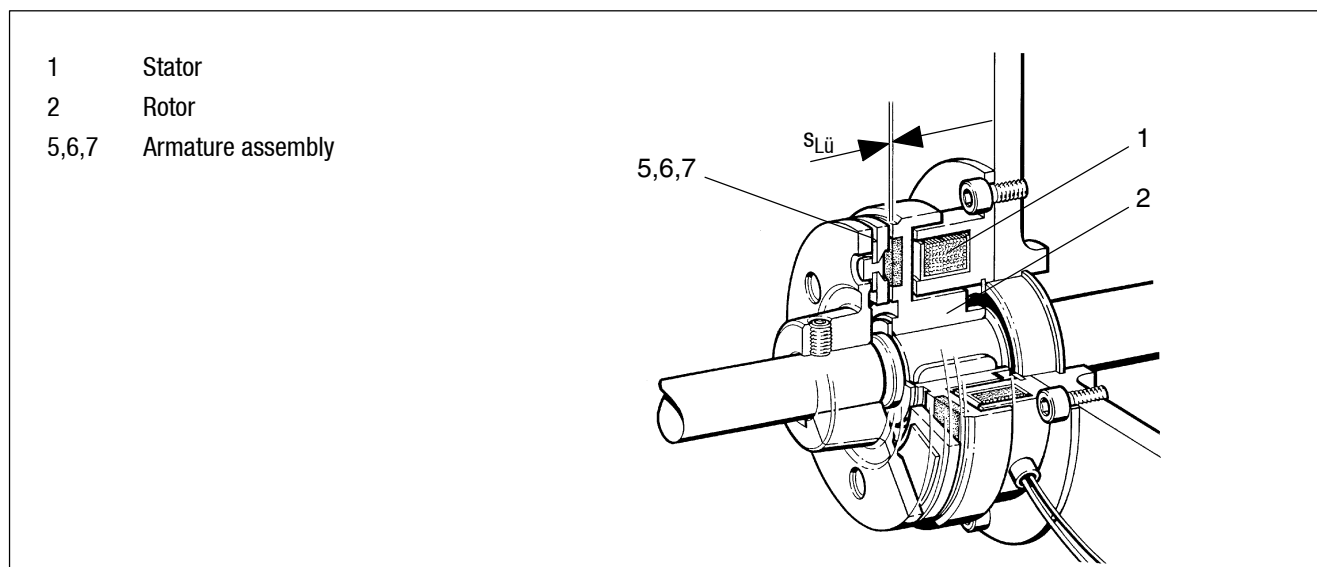


Fig. 1 Flange-mounted clutch INTORQ 14.105.□□.1.1

3.1.2 Shaft-mounted clutches

The clutch with magnet frame with bearing is particularly suitable for the mounting on through-shafts. The stator (1) with encapsulated coil and sealed deep-groove ball bearing is secured against torsion by a torque arm engaging into the lug at the stator. The torque arm must only accept the bearing friction. A circlip holds the stator (1) on the rotor in axial direction. At the same time the rotor (2) with fixed friction lining must be mounted onto the shaft. Centring is not necessary. If a DC voltage is applied the armature plate of the armature assembly (5,6,7) is attracted against the friction surface of the rotor (2) by the magnetic field. The torque is transmitted without backlash. When the DC voltage is switched off the prestressed spring pulls the armature plate back to its initial position. It is released without residual torque.

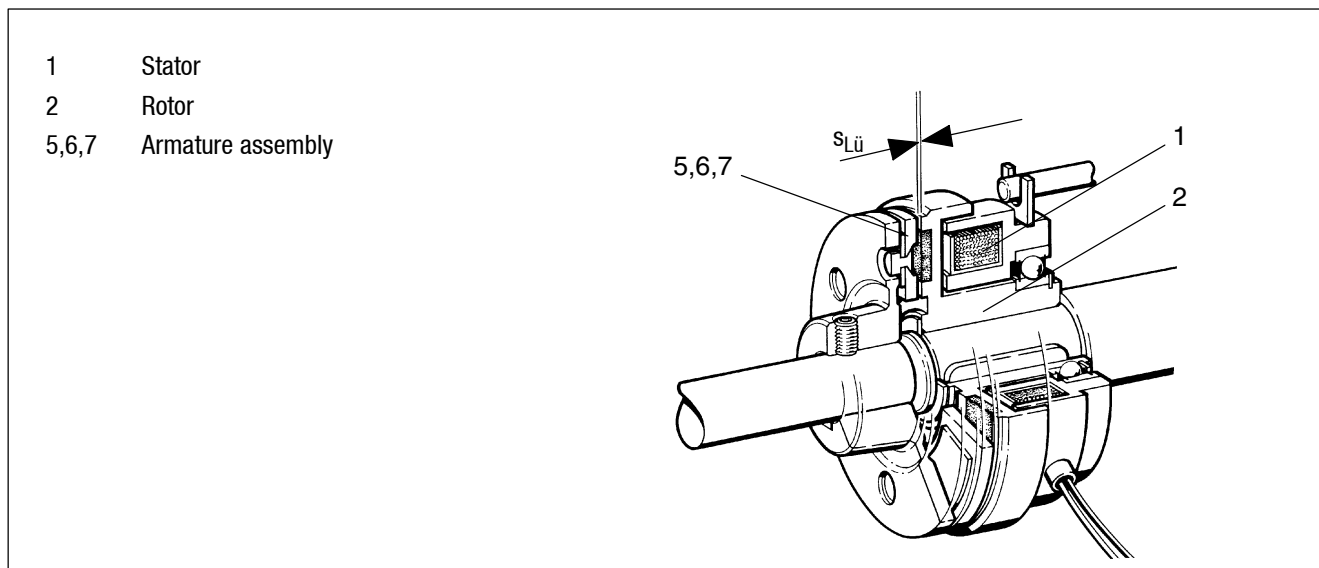
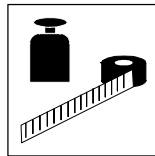


Fig. 2 Shaft-mounted clutch INTORQ 14.105.□□.3.1

3.1.3 Flange-mounted brakes

The brake consists of the stator (1) with encapsulated coil and fixed friction lining and an armature assembly (5,6,7) with armature plate and prestressed spring. The stator (1) is centred to the shaft and mounted at the machine panel. The armature assembly is connected to the shaft to be braked. If a DC voltage is applied the armature plate is attracted against the friction surface of the stator by the magnetic field. The shaft is braked by friction locking. When the DC voltage is switched off the prestressed patented spring pulls the armature plate back to its initial position. It is released without residual torque.

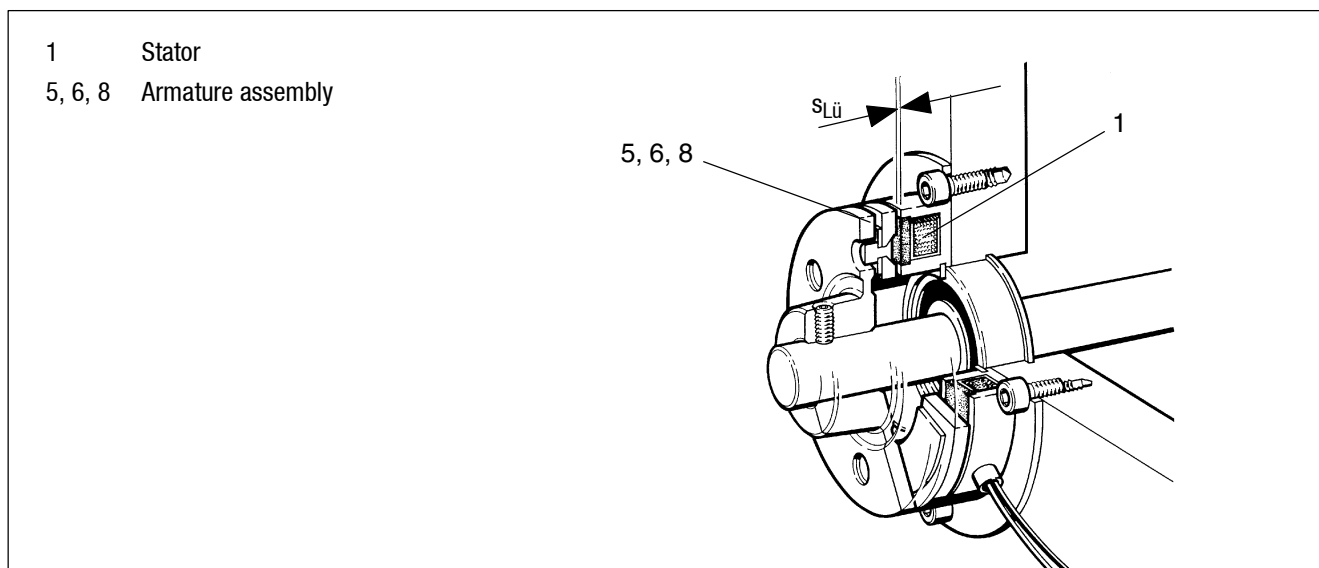
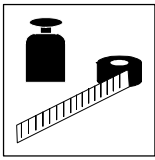


Fig. 3 Flange-mounted brake INTORQ 14.115.□□.1.2



Technical data

3.2 Selection table of clutches

Type	M_K ¹⁾ [Nm]	r_{max} [min ⁻¹]	$P_{20°C}$ [W]	Operating times ²⁾ [ms]				Q_E [J]	Q_{NA} [kWh]	$S_{hü}$ [h ⁻¹]	J [10 ⁻⁵ kgm ²]				
				t_{11}	t_{12}	t_1	t_2				Rotor		Armature assembly		
											1	3	1/2	3	5
INTORQ 14.105.06.□.□	7.5	8000	15	15	30	45	10	3,6x10 ³	10	72	11,9	13,3	6	4.2	9,2
INTORQ 14.105.08.□.□	15	6000	20	20	55	75	15	6x10 ³	16.6	56	26.5	29.4	17.1	11.8	28.2
INTORQ 14.105.10.□.□	30	5000	28	25	85	110	25	10x10 ³	34.7	43	78	86.6	66.4	47.2	92
INTORQ 14.105.12.□.□	60	4000	35	35	105	140	40	16x10 ³	69.5	37	226	246	180	130	258
INTORQ 14.105.16.□.□	120	3000	50	45	125	170	50	25x10 ³	130.5	36	630	690	633.3	480	868
INTORQ 14.105.20.□.□	240	3000	68	60	140	200	60	40x10 ³	277.7	28	2050	2150	1900	1370	2580
INTORQ 14.105.25.□.□	480	2000	85	75	155	230	70	65x10 ³	555.5	22	5470	5660	4800	3580	7200

Tab. 1

3.3 Selection table of brakes

Type	M_K ¹⁾ [Nm]	r_{max} [min ⁻¹]	$P_{20°C}$ [W]	Operating times ²⁾ [ms]				Q_E [J]	Q_{NA} [kWh]	$S_{hü}$ [h ⁻¹]	J [10 ⁻⁵ kgm ²]	
				t_{11}	t_{12}	t_1	t_2				Armature assembly	
											1/2	3
INTORQ 14.115.06.□.□	7.5	8000	11,5	10	20	35	10	3,6x10 ³	10	72	6	4.2
INTORQ 14.115.08.□.□	15	6000	16	15	25	40	20	6x10 ³	16.6	56	17.1	11.8
INTORQ 14.115.10.□.□	30	5000	21	20	40	60	30	10x10 ³	34.7	43	66.4	47.2
INTORQ 14.115.12.□.□	60	4000	28	25	55	80	45	16x10 ³	69.5	37	180	130
INTORQ 14.115.16.□.□	120	3000	38	30	70	100	60	25x10 ³	130.5	36	633.3	480
INTORQ 14.115.20.□.□	240	3000	45	35	80	115	70	40x10 ³	277.7	28	1900	1370
INTORQ 14.115.25.□.□	480	2000	70	40	90	130	80	65x10 ³	555.5	22	4800	3580

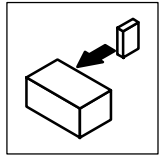
Tab. 2

1) referred to relative speed $n = 100 \text{ min}^{-1}$

2) Average values for switching on the DC side with rated air gap and warm coil

Standard voltage 24V +5% / -10% acc. to VDE 0580

Temperature class B (130°C)



4 Installation

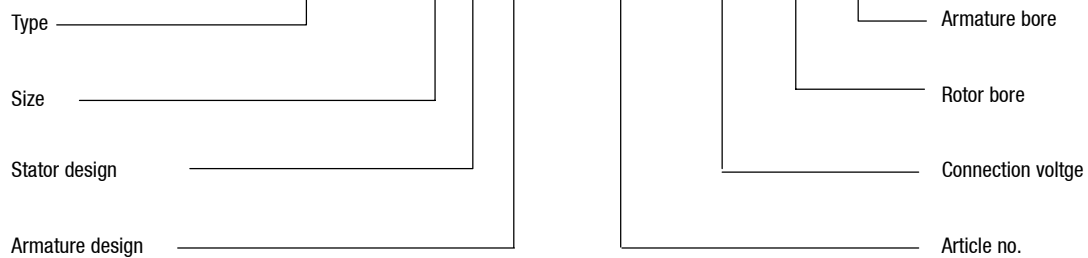
4.1 Preparation

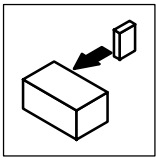
1. Unpack clutch or brake.
2. Check completely.
3. Check nameplate data, especially rated voltage.

4.1.1 Product key

Example:

INTORQ 14.105.16.1.1. - 050480 - 24 - 25 - 30





Installation

4.1.2 Designs

	Size	Stator design	Armature design
INTORQ 14.105.□□.	1. 1		Item 1; 2; 5
INTORQ 14.105.□□.	1. 3		Item 1; 2; 6
INTORQ 14.105.□□.	1. 5		Item 1; 2; 7
INTORQ 14.105.□□.	3. 1		Item 3a; 3b; 5
INTORQ 14.105.□□.	3. 3		Item 3a; 3b; 6
INTORQ 14.105.□□.	3. 5		Item 3a; 3b; 7
INTORQ 14.115.□□.	1. 1		Item 4; 5
INTORQ 14.115.□□.	1. 2		Item 4; 8
INTORQ 14.115.□□.	1. 3		Item 4; 6

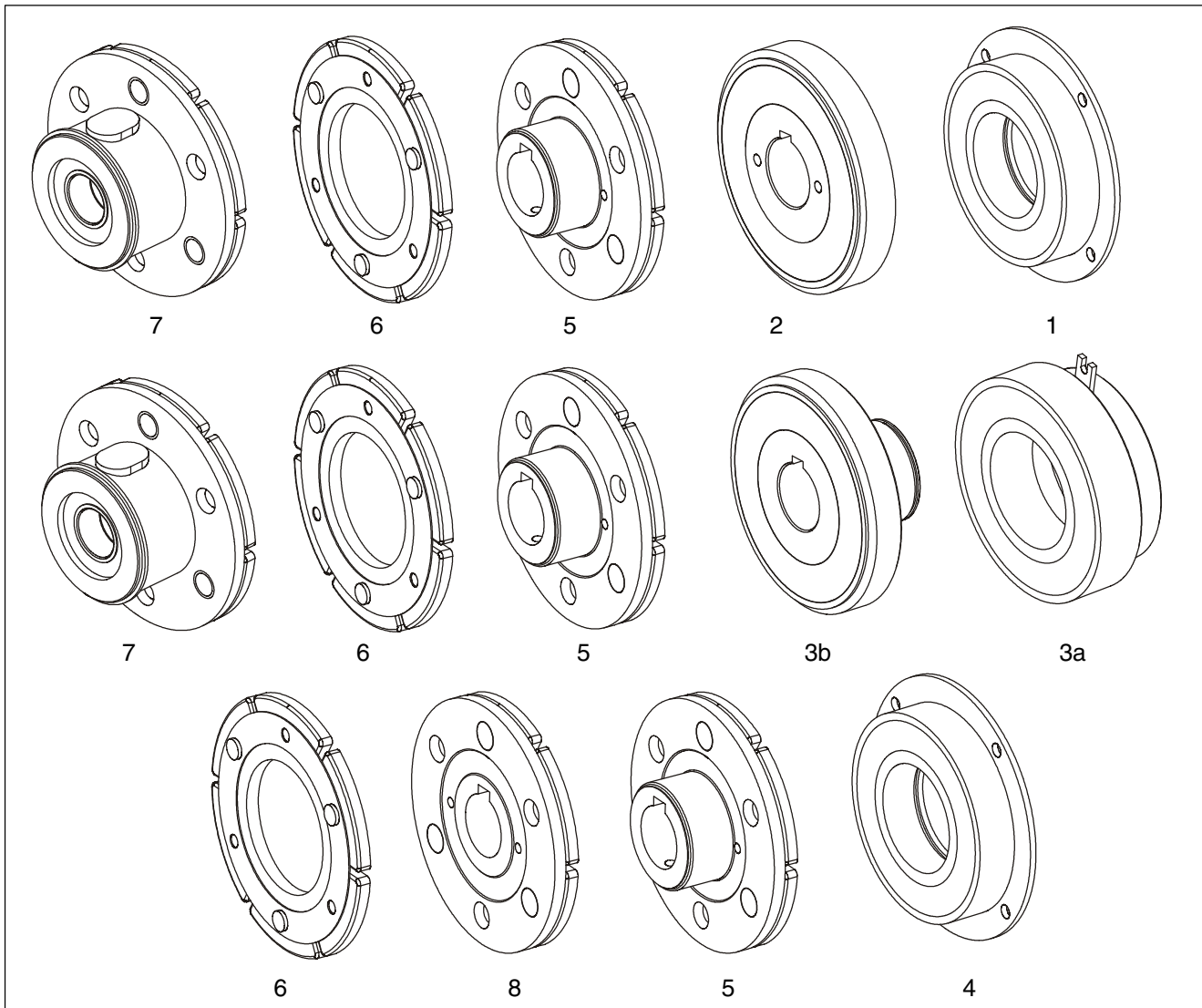
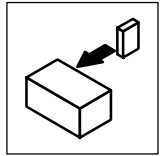


Fig. 4



4.2 Assembly



Stop!

- Keep friction faces free of grease and oil!
- Use oil- and grease-tight deep groove ball bearings only!

4.2.1 Clutch and brake of design 1

The stator of clutch or brake of design 1 must be mounted internally or externally centered (observe dimension " t_k " for max. centricity from Tab. 3). The mounting surface should not exceed a maximum phase run-out " x " (Tab. 3) and should not be convex. In the case of internal centring the register diameter is machined to an oval clearance.

When the rotor is assembled, dimension " b " (Tab. 3) must be observed maintained.



Stop!

The rotor must be secured axially!

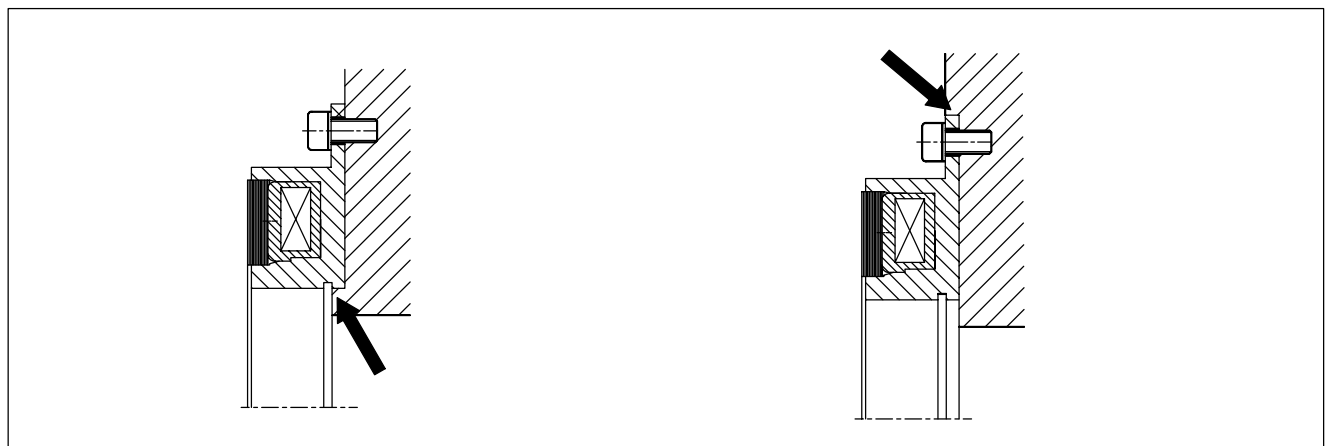


Fig. 5

Internal centring

External centring

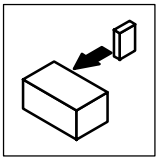
4.2.2 Stator design 3

The stator design 3 does not need a mounting surface as the centring is performed by a deep groove ball bearing on the rotor. A torque arm must be provided for the bearing friction. This torque arm engages in the recess of the anti-rotation tag.



Stop!

The stator must not be strained in any case!



Installation

4.2.3 Mounting of armature assembly of designs 1, 2 and 5

The armature assembly is shifted onto the shaft. The maximum permissible centre offset of the shafts, dimension "tw" can be obtained from Tab. 3. The air gap "sLü" (Tab. 3) must be adjusted using a feeler gauge.

Use shims for the exact air gap setting and for the compensation of wear.



Stop!

The armature assembly must be fixed axially.

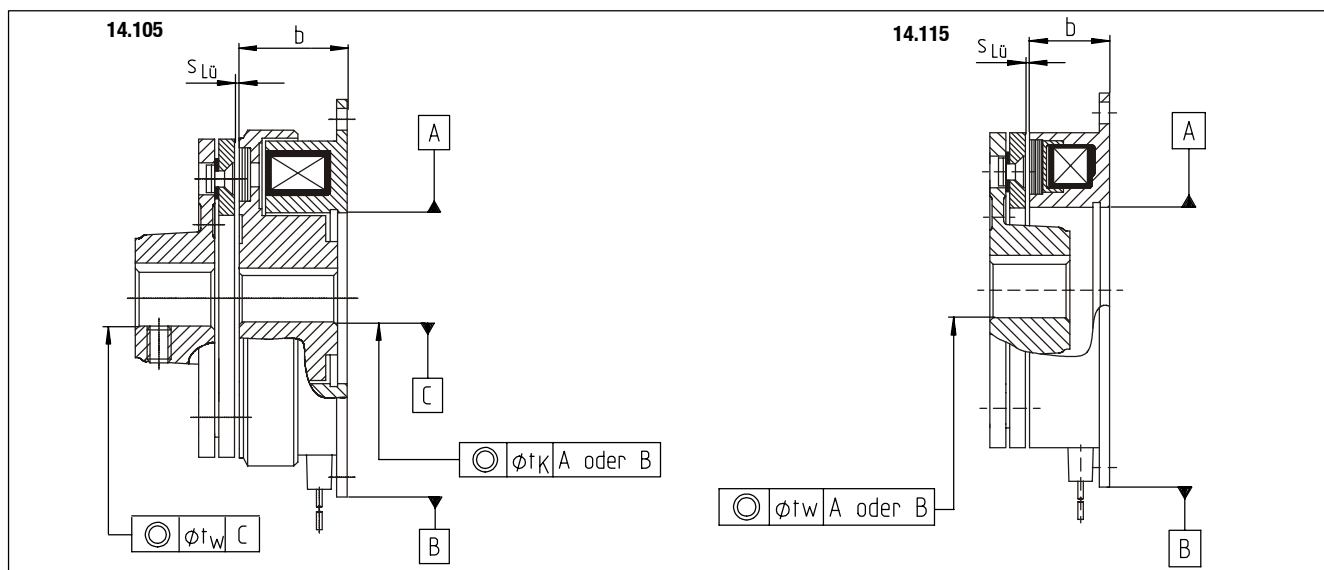
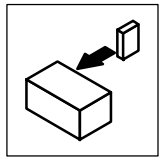


Fig. 6

Size	sLü [mm]	x [mm]	INTORQ 14.105			INTORQ 14.115	
			t _k	t _w	b [mm]	t _w	b [mm]
06	0,2 ± 0.05	0.04	0.2	0.1	24	0.16	18
08	0,2 ± 0.05	0.05	0.3	0.1	26.5	0.16	20
10	0,2 ± 0.05	0.06	0.3	0.1	30	0.16	22
12	0.3 ± 0.1	0.07	0.3	0.1	33.5	0.2	24
16	0.3 ± 0.1	0.09	0.4	0.2	37.5	0.2	26
20	0.5 ± 0.15	0.11	0.4	0.2	44	0.2	30
25	0.5 ± 0.15	0.14	0.5	0.2	51	0.3	35

Tab. 3



4.2.4 Mounting of armature assembly of design 3

Use bolts with threads up to the head to fix the armature assembly.

- For the tapped holes the clearance bores “Ød” and the depth “t” (Tab. 4) must be observed maintained in any case.
- The rivet heads require a sufficient clearance hole.

Size	Screws	DIN	Schnorr lock washer *	Ø d [mm]	t [mm]
06	M 3 x 8	DIN 84	Schnorr lock washer 3	3.1	0.8
08	M 4 x 10	DIN 84	Schnorr lock washer 4	4.1	1.0
10	M 5 x 12	DIN 6912	Schnorr lock washer 5	5.1	3.5
12	M 6 x 16	DIN 7984	Schnorr lock washer 6	6.1	2.8
16	M 8 x 20	DIN 7984	Schnorr lock washer 8	8.2	3.5
20	M 10 x 25	DIN 7984	Schnorr lock washer 10	10.2	3.5
25	M 12 x 25	DIN 7984	Schnorr lock washer 12	12.2	3.8

Tab. 4

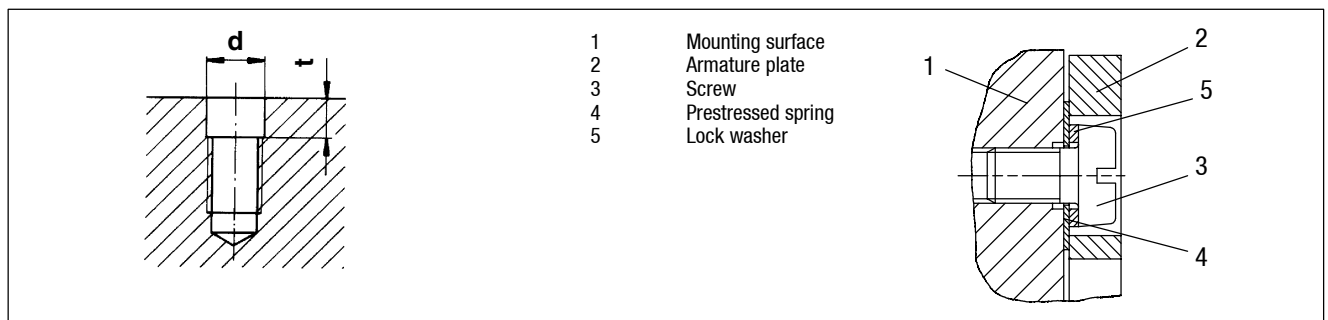
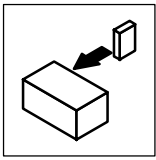


Fig. 7

* Source of supply:
 Adolf Schnorr GmbH & CO KG
 Postfach 60 0162; D-71050 Sindelfingen
 Phone: ++49 7031 - 3020; Fax: ++49 7031 - 382600



Installation

4.3 Electrical connection

The device is connected to DC voltage (observe voltage specification on the stator). Permissible voltage fluctuation acc. to VDE 0580: +6% to -10%.

The standard voltage is 24 V DC. If no DC voltage is available the voltage must be supplied via transformers or rectifiers.

The clutches and brakes should be switched on the DC side to achieve short switch-off times.

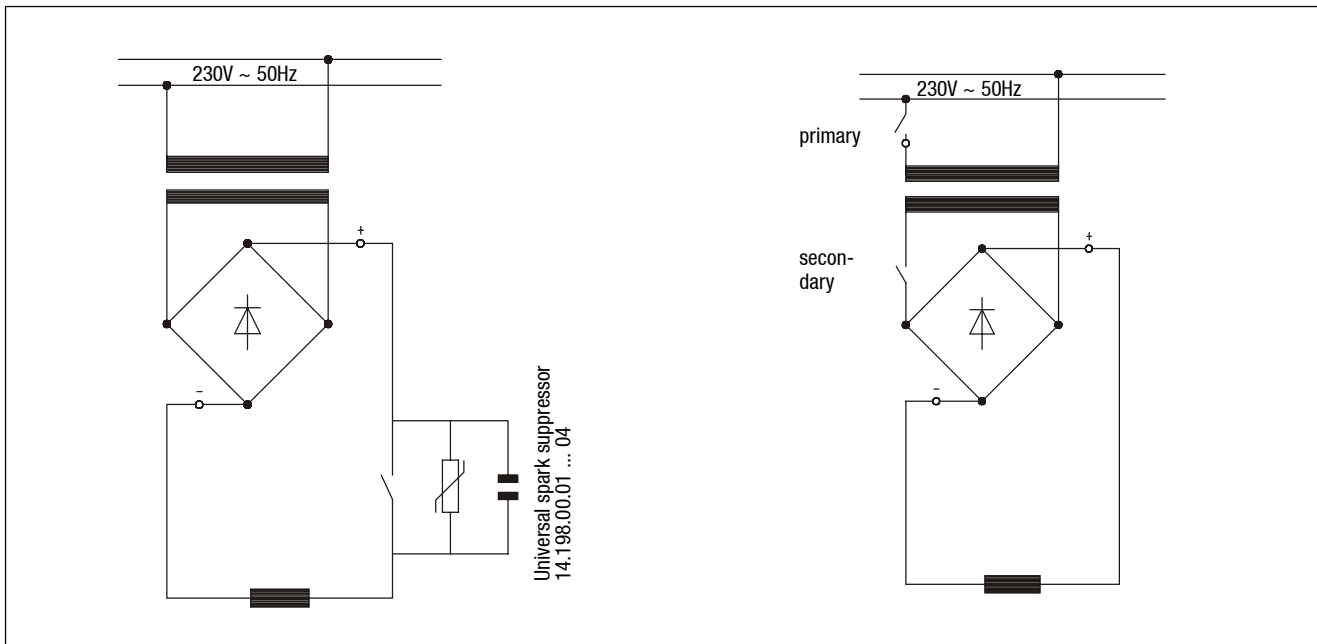


Fig. 8 Switching on the DC side

Switching on the AC side

When switching on the DC side use a spark suppressor to protect coil and contacts from excessive inductive voltages.



Stop!

If there is no protective circuit the inductive voltage can be higher than the values specified in VDE 0580 and cause the coil to fail which destroys switching contacts.

The spark suppressor consists of a non-inductive pulse capacitor which accepts current peaks during switching. When a spark suppressor is used the spark at the contact and thus the contact erosion is considerably reduced.



5 Maintenance

The clutches and brakes are largely free of maintenance. In applications requiring many switching operations the air gap “ $s_{L\ddot{u}}$ ” must be checked and readjusted at certain periods. When the air gap has reached 250% of its rated value “ $s_{L\ddot{u}}$ ” at the latest it must be readjusted to the rated value at the latest.

- For air gap setting “ $s_{L\ddot{u}}$ ” after wear see chapter 5.1, Disassembly.
- The shims mentioned in section 2 can be removed or the spacers can be reduced.

The friction face poles of the rotor or stator of clutches or brakes run into the armature plate. Friction marks are thus normal and must not be re-worked!



Stop!

Friction faces must be kept absolutely free of oil and grease!

5.1 Disassembly

Remove the axial circlip or shaft locking plate Fig. 9 to disassemble the armature assembly of design 1 or 2 or the rotor. After that the armature assembly can be withdrawn from the shaft via the withdrawal thread “ d ” (see Fig. 9 and Tab. 5) provided for disassembly in the flange hub or rotor of the corresponding part. After the armature assembly has been withdrawn, remove the shims depending on the air gap size “ $s_{L\ddot{u}}$ ” (Fig. 6 and Tab. 3) and mount them afterwards between circlip and flange hub.

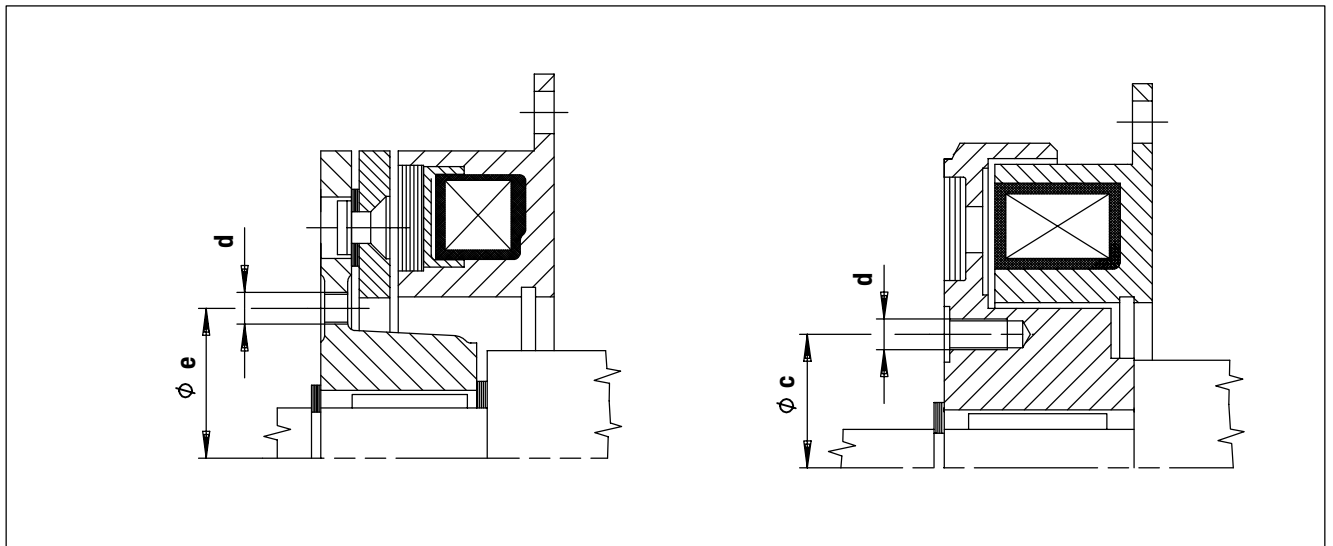
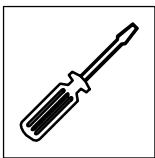


Fig. 9

	Size						
	06	08	10	12	16	20	25
ø c	29	36	46	56	73	92	114
d	M4	M4	M4	M4	M5	M6	M8
ø e	31	37	47	56	73	93	120

Tab. 5 Dimensions in mm

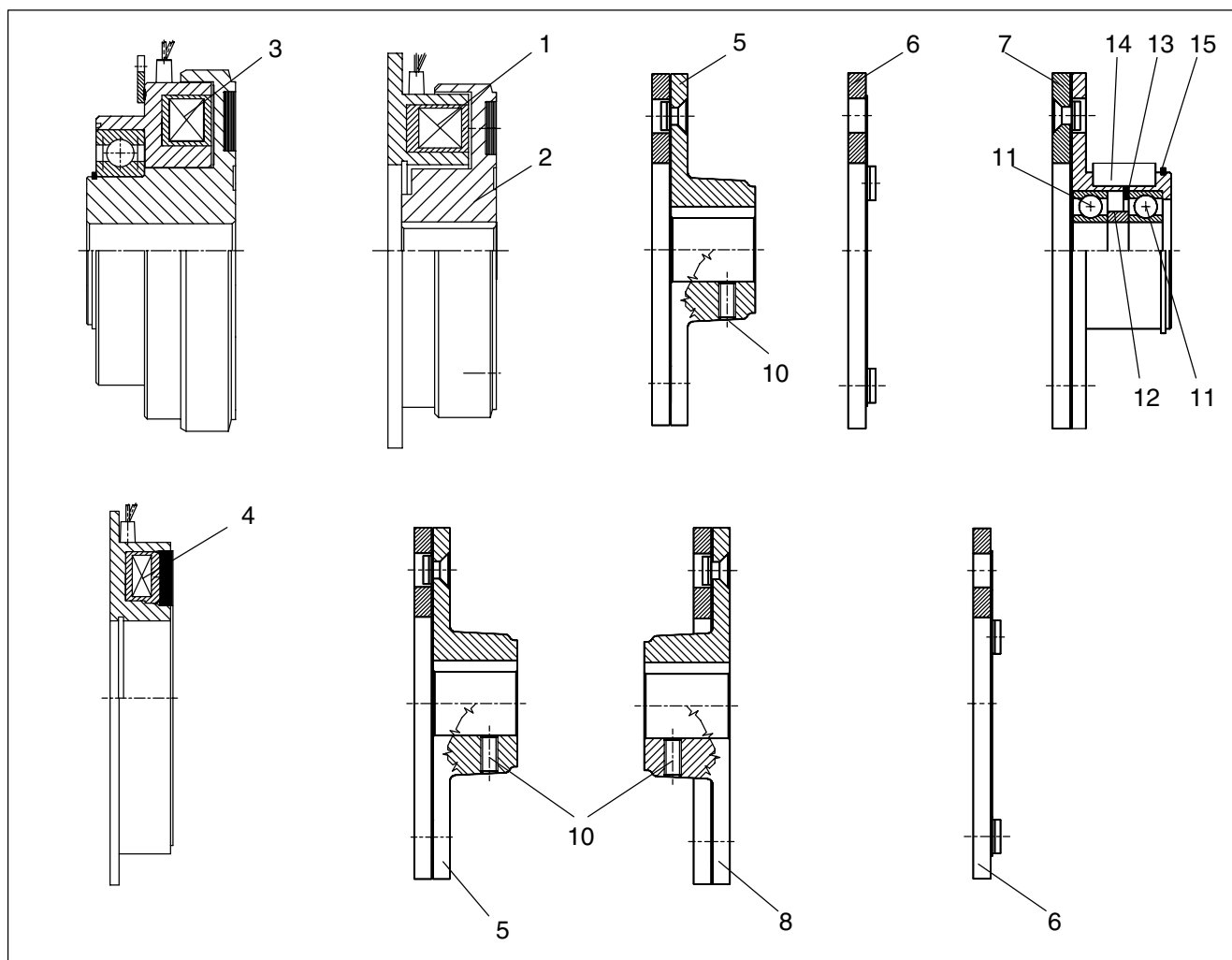


Maintenance

5.2 Spare parts list

The clutches and brakes have a wear reserve of several millimeters. When these are used up after several readjustments the rotor and armature assembly of clutches and the stator and armature assembly of brakes **must be replaced in pairs**.

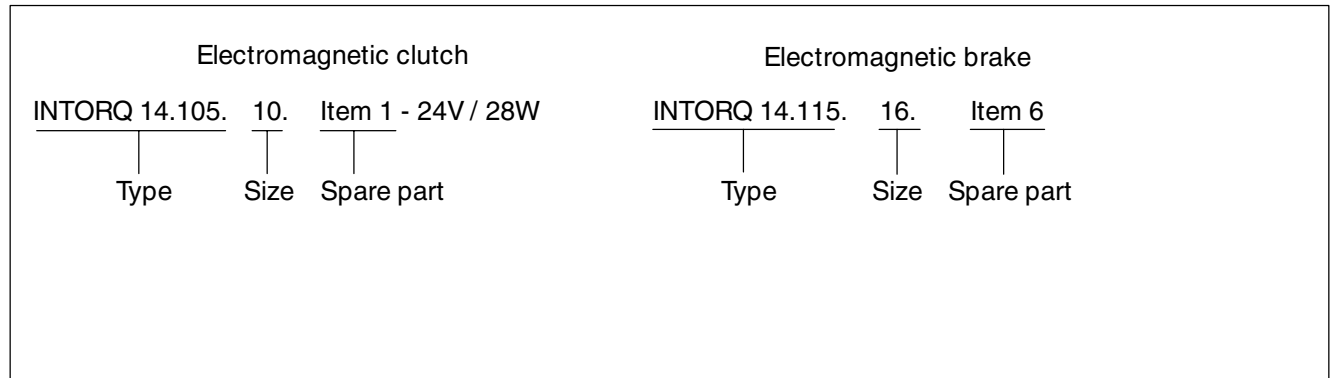
- When ordering spare parts indicate the designation of the parts according to the illustration and list below.



Item	Name	Item	Name
1	Clutch-stator design 1	10	Setscrew
2	Rotor design 1	11	Deep-groove ball bearing 2RS
3	Clutch - stator + rotor	12	Spacer
4	Brake - stator 14.115	13	Circlip
5	Armature assembly design 1	14	Fitted key
6	Armature assembly design 3	15	Spring ring
7	Armature assembly design 5		
8	Armature assembly design 2		



- Spare parts should be ordered according to the following example:



- When you order stators you also have to indicate the coil voltage and power (see section Electrical connection).
- When ordering rotors, armature assemblies of designs 1 and 2 also specify the bore diameter.



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