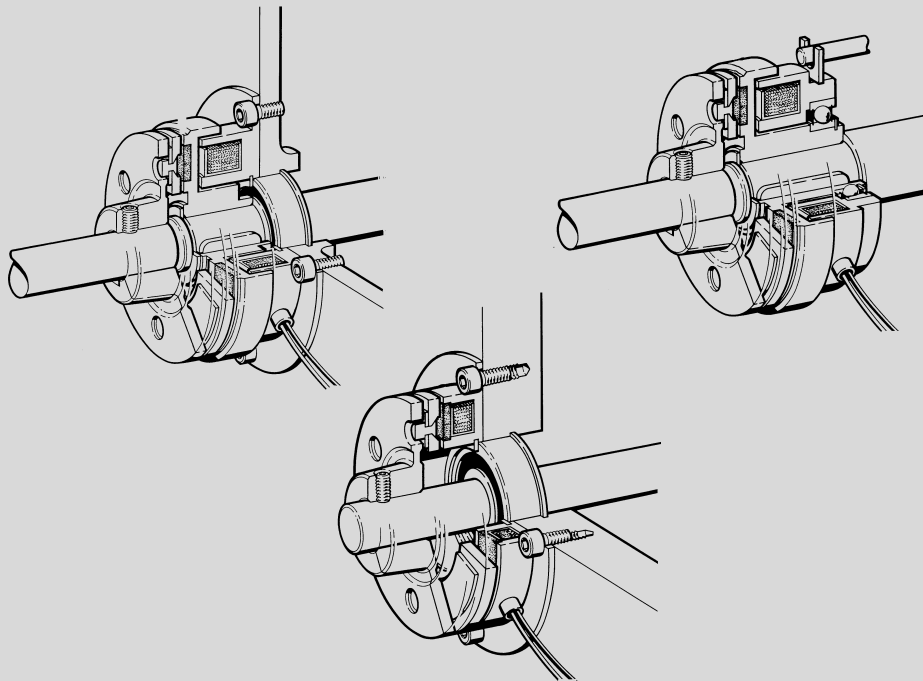


Operating Instructions INTORQ 14.105 und 14.115

Electromagnetic clutches and brakes



INTORQ

setting the standard

www.intorq.de

This documentation is valid for ...

Electromagnetic clutches
7.5 - 480 Nm

- 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
7.5 - 480 Nm

- 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.□.□

Product key

INTORQ 14. 1□ 5. □□. □. - □ - □

A

B

C

D

E

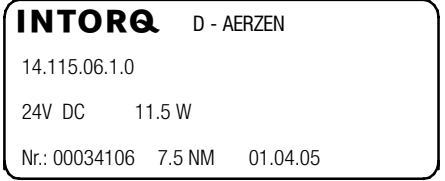
F

Legend for INTORQ 14.105/14.115 product key

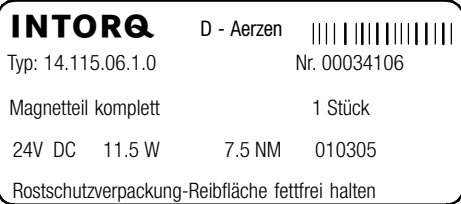
A	Product group	Brakes	
B	Type	105 115	Clutches Brakes
C	Frame size	06, 08, 10, 12, 14, 16, 20, 25	
D	Stator design	1 3	Flange design with bearing
E	Armature design	1 2 3 5	with outer flange hub with inner flange hub (for brakes only) without flange hub with flange hub bearing (for clutches only)
F	Variants	Supply voltage Rotor bore Armature bore	

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

Nameplate

Field	Contents	Example
1	Manufacturer	
2	Brake type	
3	Rated voltage Rated power	
4	Type no. Rated brake torque Date of manufacture	

Packaging sticker

Field	Contents	Example
1	Manufacturer Bar code of no.	
2	Type see product key Type no.	
3	Designation Qty. per box	
4	Rated voltage Rated power Rated brake torque Date of packaging	
5	Note	

Document history

Material number	Version			Description
467314	1.0	12/1995	TD09	First edition for preseries
13056568	2.0	07/2002	TD09	Complete revision
13056568	2.1	02/2005	TD09	Change of company name to INTORQ
13231689	3.0	11/2007	TD09	Revision according to INTORQ layout

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1 Preface and general information

1.1 How to use these Operating Instructions

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

1.2 Terminology used

Term	In the following text used for
Clutches and brakes	Electromagnetic clutches and brakes
Drive system	Drive systems with electromagnetic clutches and brakes and other drive components

1.3 Scope of supply

- The drive systems are combined individually according to a modular design. The scope of delivery is indicated in the accompanying papers.
- After receipt of the delivery, check immediately whether it corresponds to the accompanying papers. INTORQ does not grant any warranty for deficiencies claimed subsequently. Claim
 - visible transport damage immediately to the forwarder.
 - visible deficiencies / incompleteness immediately to INTORQ GmbH & Co.KG.

1 Preface and general information

1.4 Labelling

Drive systems and drive components are clearly labelled and defined by the indications on the nameplates.

Manufacturer: INTORQ GmbH & Co KG, Wülmser Weg 5, D-31855 Aerzen

- The INTORQ electromagnetic clutches and brakes are also available as individual components. The user can combine them as desired. The following indications: packaging sticker, nameplate, and type code are valid for the stator.
- If individual parts are supplied, there is no identification.

1.5 Legal regulations

Liability

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

Warranty

- Terms of warranty: see terms of sale and delivery of INTORQ GmbH & Co. KG.
- Warranty claims must be made to INTORQ immediately after detecting defects or faults.
- The warranty is void in all cases where liability claims cannot be made.

2 Safety instructions

2.1 General safety information

- These safety notes do not claim to be complete. If any questions or problems occur, please contact INTORQ GmbH & Co. KG.
- The clutches and brakes met the state of the art 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 work 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.
- Take appropriate measures to ensure that the failure of the clutches or brakes will not lead to damage to material.
- Do not operate the clutches and brakes unless they are in perfect condition.
- Retrofittings, modifications and changes of the drive system are generally forbidden. In any case, INTORQ GmbH & Co. KG must be contacted beforehand.
- 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).

2 Safety instructions

2.1.1 Personnel responsible for safety

Operators

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

Skilled personnel

Skilled personnel are persons who – because of their education, experience, instructions, and knowledge about corresponding standards and regulations, rules for the prevention of accidents, and operating conditions – are authorised by the person responsible for the safety of the plant to perform the required actions and who are able to recognise potential hazards. (See IEC 364, definition of skilled personnel)

2.1.2 Application as directed

- Drive systems
 - are intended for use in machinery and systems.
 - must only be used for the purposes ordered and confirmed.
 - must only be operated under the ambient conditions prescribed in these Operating Instructions.
 - must not be operated beyond their corresponding power limits.

Any other use shall be deemed inappropriate!

2 Safety instructions

Application range of the INTORQ clutches and brakes

- No explosive or aggressive atmosphere.
- Humidity, no restrictions.
- Ambient temperature -20°C to +40°C.
- With high humidity and low temperatures
 - Take measures to protect armature plate and rotor from freezing.
- Protect electrical connections against contact.
- 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 Safety instructions

2.2 Definition of notes used

The following pictographs and signal words are used in this documentation to indicate dangers and important information:

Safety instructions

Structure of safety instructions:



Danger!

Characterises the type and severity of danger

Note

Describes the danger

Possible consequences:

- List of possible consequences if the safety instructions are disregarded.

Protective measure:

- List of protective measures to avoid the danger.

Pictograph and signal word	Meaning
Danger!	Danger of personal injury through dangerous electrical voltage Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
Danger!	Danger of personal injury through a general source of danger Reference to an imminent danger that may result in death or serious personal injury if the corresponding measures are not taken.
Stop!	Danger of property damage Reference to a possible danger that may result in property damage if the corresponding measures are not taken.

Application notes

Pictograph and signal word	Meaning
Note!	Important note to ensure troublefree operation
Tip!	Useful tip for simple handling
Reference to another documentation	Reference to another documentation

3 Technical 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. Design 1.5 is 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_{air} ". 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.

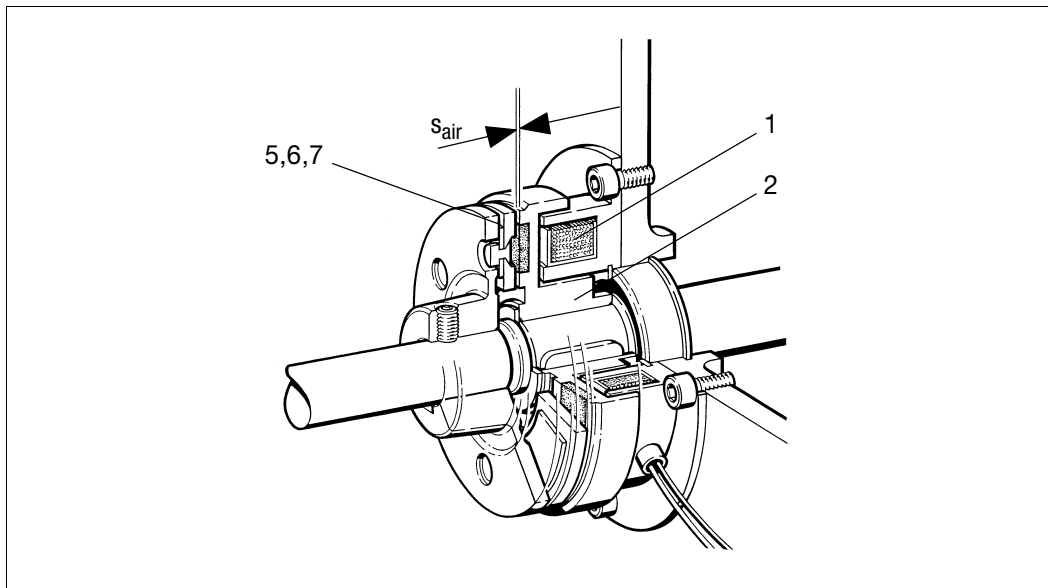


Fig. 1 Flange-mounted clutch INTORQ 14.105.□□.1.1

- | | | | |
|---|--------|-------|-------------------|
| 1 | Stator | 5,6,7 | Armature assembly |
| 2 | Rotor | | |

3 Technical data

3.1.2 Shaft-mounted clutches

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 (2) in axial direction. At the same time, the rotor (2) with fixed friction lining must be mounted onto the shaft. Centrigs are 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.

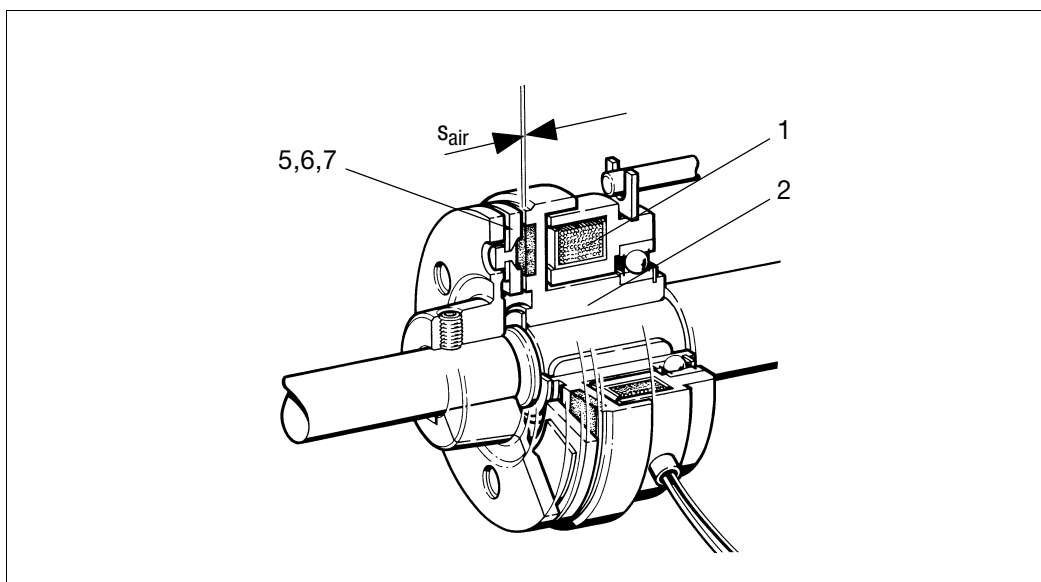


Fig. 2 Shaft-mounted clutch INTORQ 14.105.□□.3.1

- | | |
|----------|-------------------------|
| 1 Stator | 5,6,7 Armature assembly |
| 2 Rotor | |

3 Technical data

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 (5) is connected to the shaft to be braked. If a DC voltage is applied the armature plate is attracted via the air gap " s_{air} " against the friction surface of the stator (1) 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. The brake is released without residual torque.

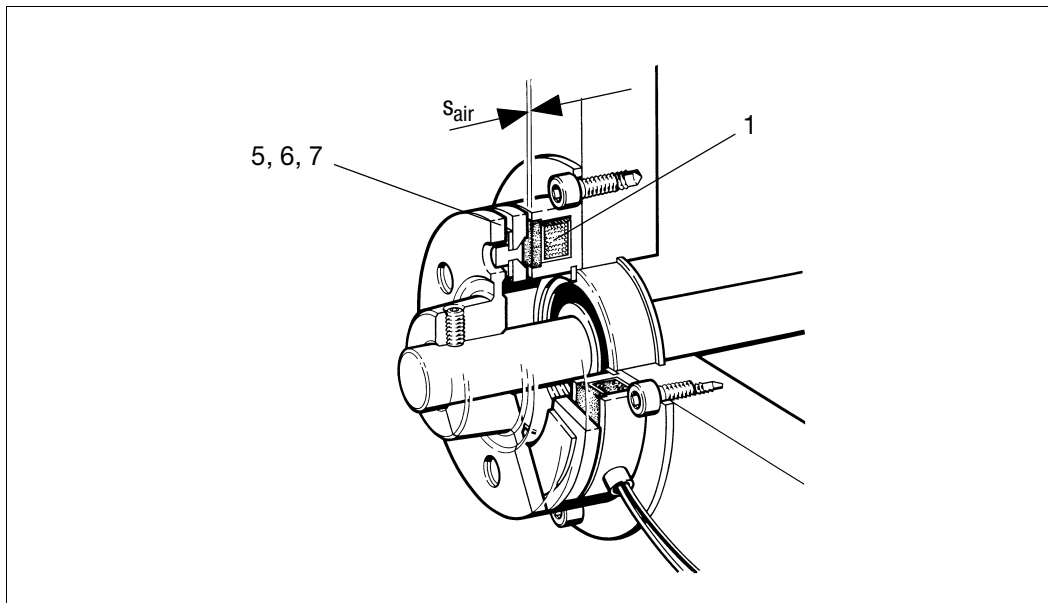


Fig. 3 Flange-mounted brake INTORQ 14.115.□□.1.1

1 Stator

5,6,7 Armature assembly

3 Technical data

3.2 Selection table of clutches

Type	M _r ¹⁾ [Nm]	n _{max} [min ⁻¹]	P _{20°C} [W]	Operating times ²⁾ [ms]				Q _E [J]	Q _{NA} [kWh]	S _{fo} [h ⁻¹]	J [10 ⁻⁵ kgm ²]				
											Rotor		Armature plate		
				t ₁₁	t ₁₂	t ₁	t ₂				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

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 24 V +5% / -10% acc. to VDE0580
Temperature class B (130°C)

3.3 Selection table of brakes

Type	M _r ¹⁾ [Nm]	n _{max} [min ⁻¹]	P _{20°C} [W]	Operating times ²⁾ [ms]				Q _E [J]	Q _{NA} [kWh]	S _{fo} [h ⁻¹]	J [10 ⁻⁵ kgm ²]	
				t ₁₁	t ₁₂	t ₁	t ₂				Armature plate	
											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

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 24 V +5% / -10% acc. to VDE0580
Temperature class B (130°C)

4 Mechanical installation

4.1 Preparation

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

Example

	INTORQ	14.	10 5.	16.	1.	1.	-	050480	-	24	-	25	-	30
A														
B														
C														
D														
E														
F														
G														
H														

Legend for product key

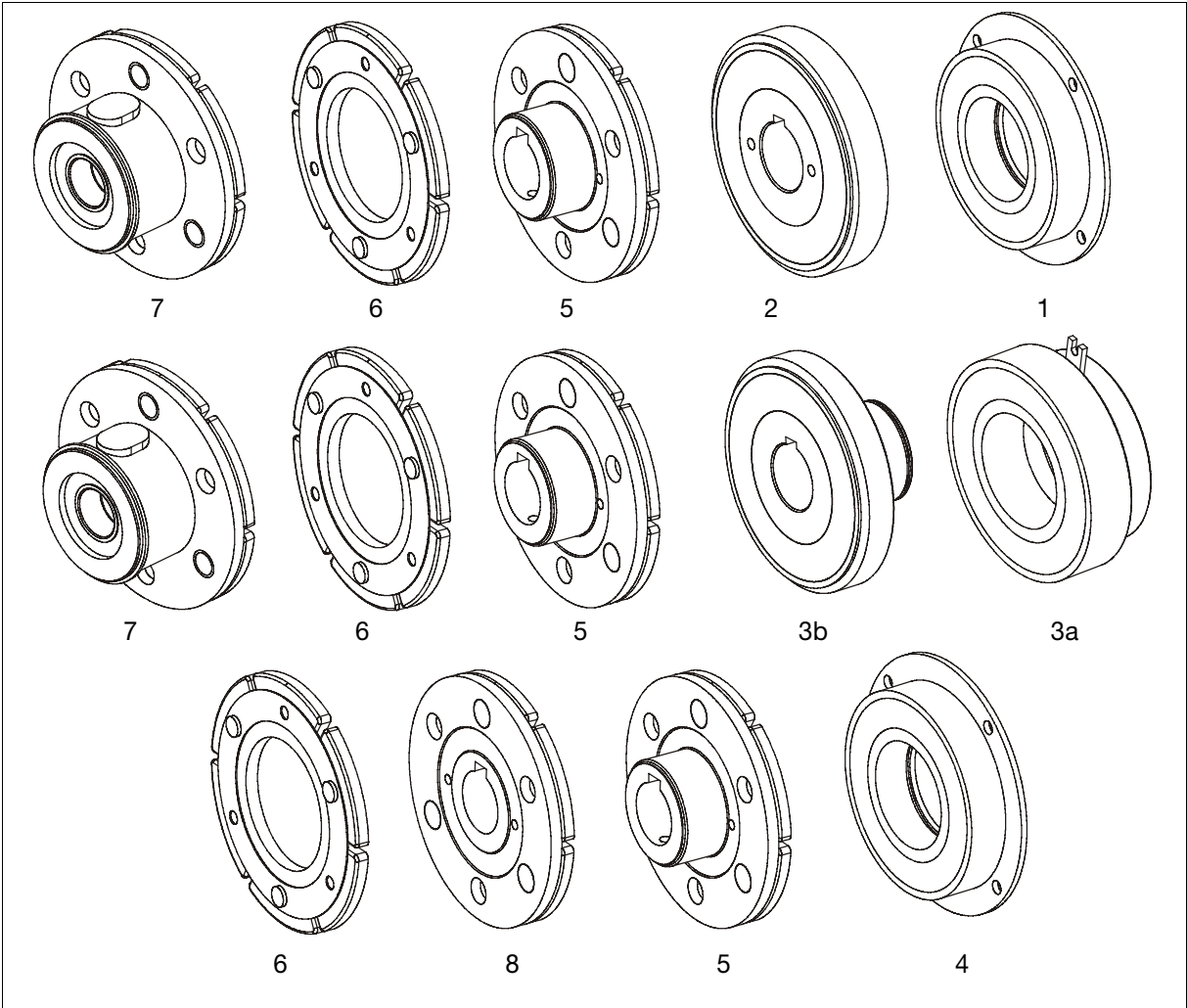
A	Type
B	Size
C	Stator design
D	Armature design
E	Article no.
F	Supply voltage
G	Rotor bore
H	Armature bore

4 Mechanical installation

4.1.1 Designs

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

Size	
Stator design	
Armature design	



4 Mechanical installation

4.2 Mounting



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 centred (observe dimension " t_k for max. centricity from Tab. 1). The mounting surface should not exceed a maximum phase run-out "x" (Tab. 1) and should not be convex. In the case of internal centring, the register diameter is machined to an oval clearance.



Stop!

The rotor must be secured axially!

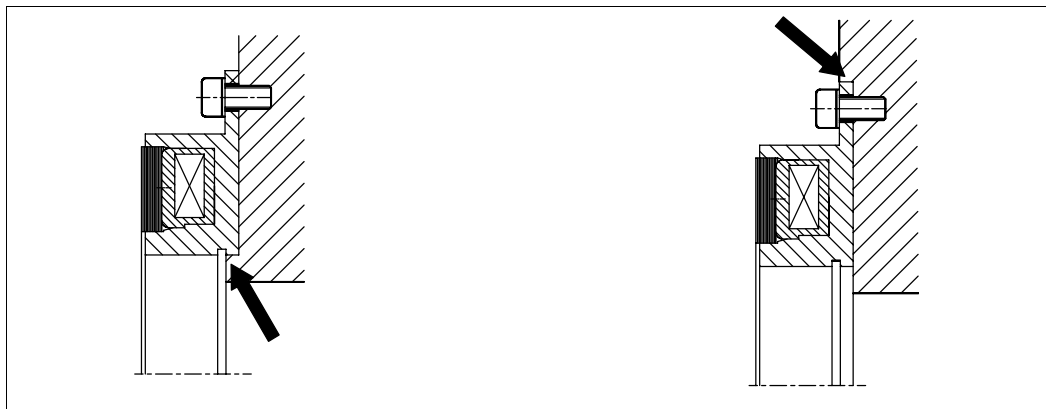


Fig. 4 Internal centring

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!

4 Mechanical 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. 1. The air gap "s_{air}" (Tab. 1) 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.

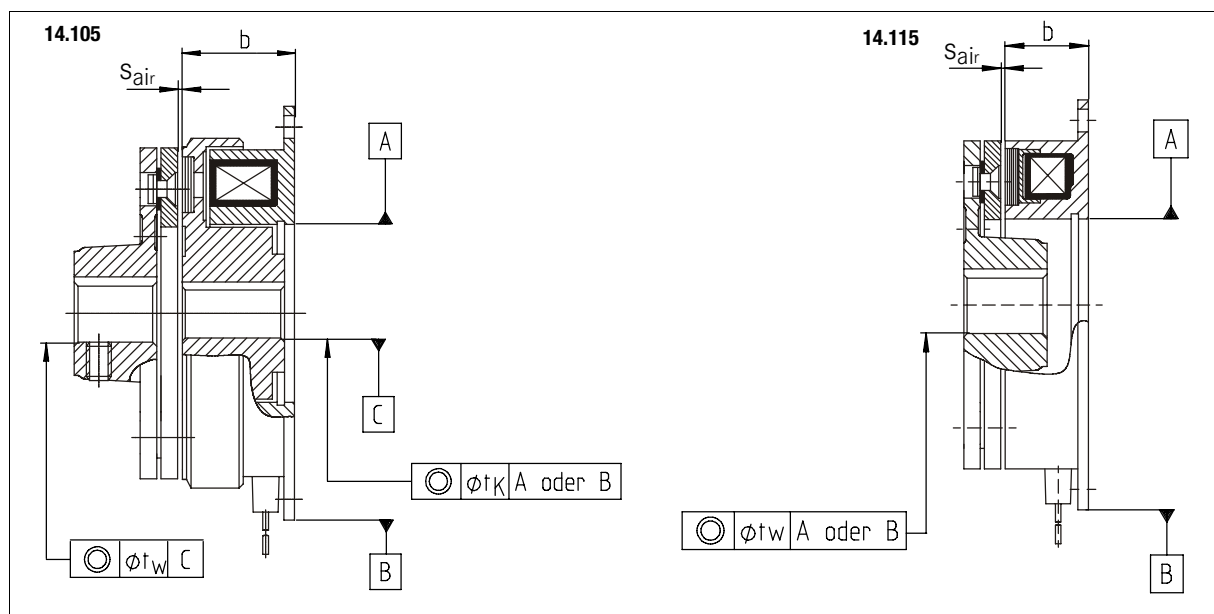


Fig. 5

Size	s _{air} [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. 1

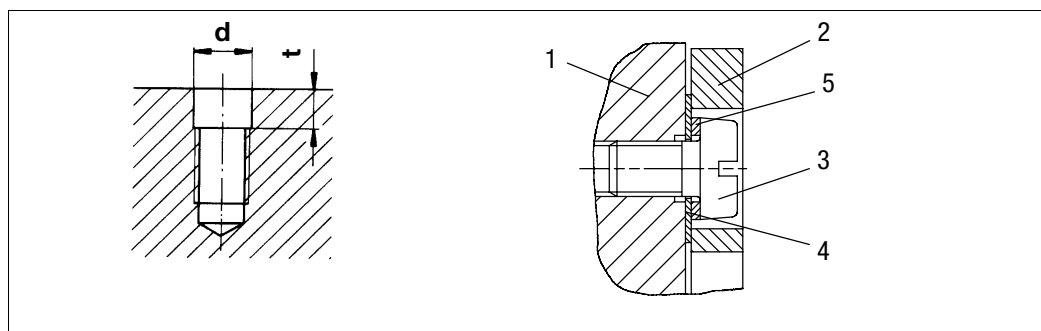
4 Mechanical installation

4.2.4 Mounting of armature assembly of design 3

Size	Screws	DIN	Schnorr lock washer *	Ø d [mm]	t [mm]
06	M3x8	84	Schnorr lock washer 3	3.1	0.8
08	M4x10	84	Schnorr lock washer 4	4.1	1.0
10	M5x12	6912	Schnorr lock washer 5	5.1	3.5
12	M6x16	7984	Schnorr lock washer 6	6.1	2.8
16	M8x20	7984	Schnorr lock washer 8	8.2	3.5
20	M10x25	7984	Schnorr lock washer 10	10.2	3.5
25	M12x25	7984	Schnorr lock washer 12	12.2	3.8

Tab. 2

* Source of supply:
 Adolf Schnorr GmbH & CO KG
 Postfach 60 0162; D-71050 Sindelfingen
 Phone: ++49 (0)7031-3020; Fax: ++49
 (0)7031-382600



- | | |
|--------------------|----------------------|
| 1 Mounting surface | 4 Prestressed spring |
| 2 Armature plate | 5 Lock washer |
| 3 Screw | |

5 Electrical installation

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

The standard voltage is 24V 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.

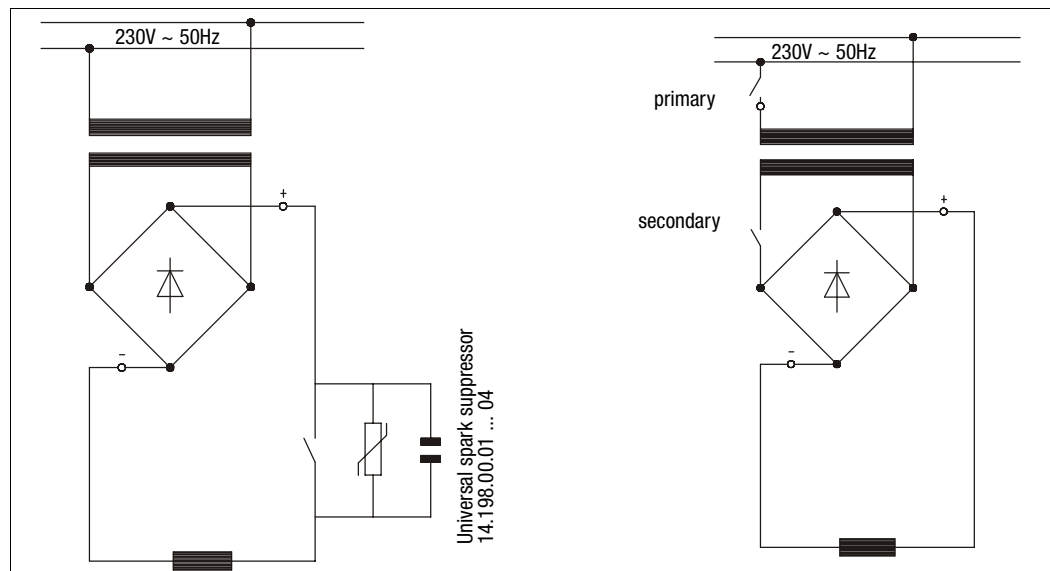


Fig. 6 Switching on the DC side

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 the 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.

6 Maintenance

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

- For air gap setting “ s_{air} ” after wear, see chapter 6.1, Dismounting.
- 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!

6.1 Dismounting

Remove the axial circlip or shaft locking plate Fig. 7 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. 7 and Tab. 3) 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_{air} ” (Fig. 5 and Tab. 1) and mount them afterwards between circlip and flange hub.

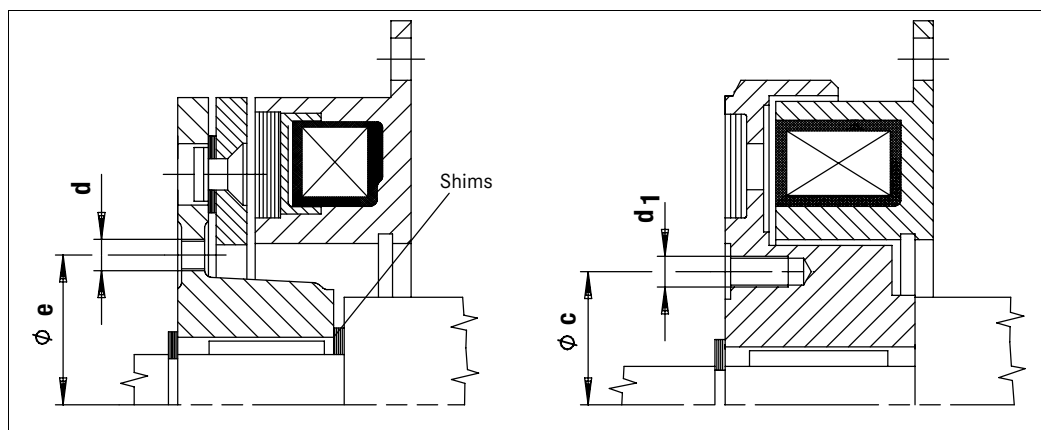


Fig. 7

Dimensions	Size						
	06	08	10	12	16	20	25
Ø c	29	36	46	56	73	92	114
Ø e	31	37	47	56	73	93	120
d	M4	M4	M4	M4	M5	M6	M8
d1	M5	M5	M5	M6	M8	M8	M10

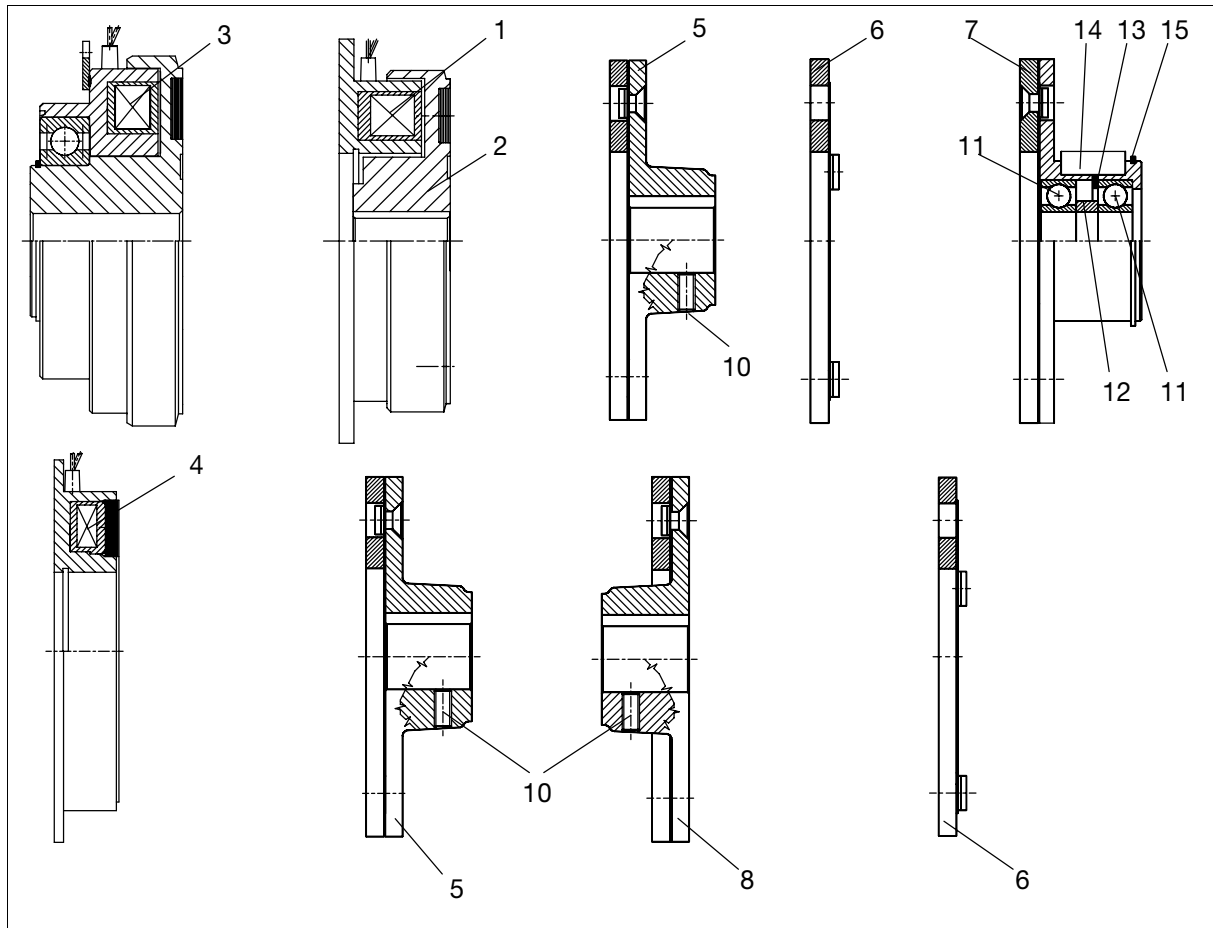
Tab. 3 Dimensions in mm

6 Maintenance

6.2 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	Designation
1	Clutch-stator design 1
2	Rotor design 1
3	Clutch - stator + rotor
4	Brake - stator 14.115
5	Armature assembly design 1
6	Armature assembly design 3
7	Armature assembly design 5

Item	Designation
8	Armature assembly design 2
10	Setscrew
11	Deep-groove ball bearing 2RS
12	Spacer
13	Circlip
14	Key
15	Spring ring

6 Maintenance

6.3 Spare parts order

Example: Electromagnetic clutch INTORQ 14.105 10. Item 1 - 24 V / 28W

Type

Size

Spare part

Example: Electromagnetic brake

INTORQ 14.115 16. Item 6

Type

Size

Spare part

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