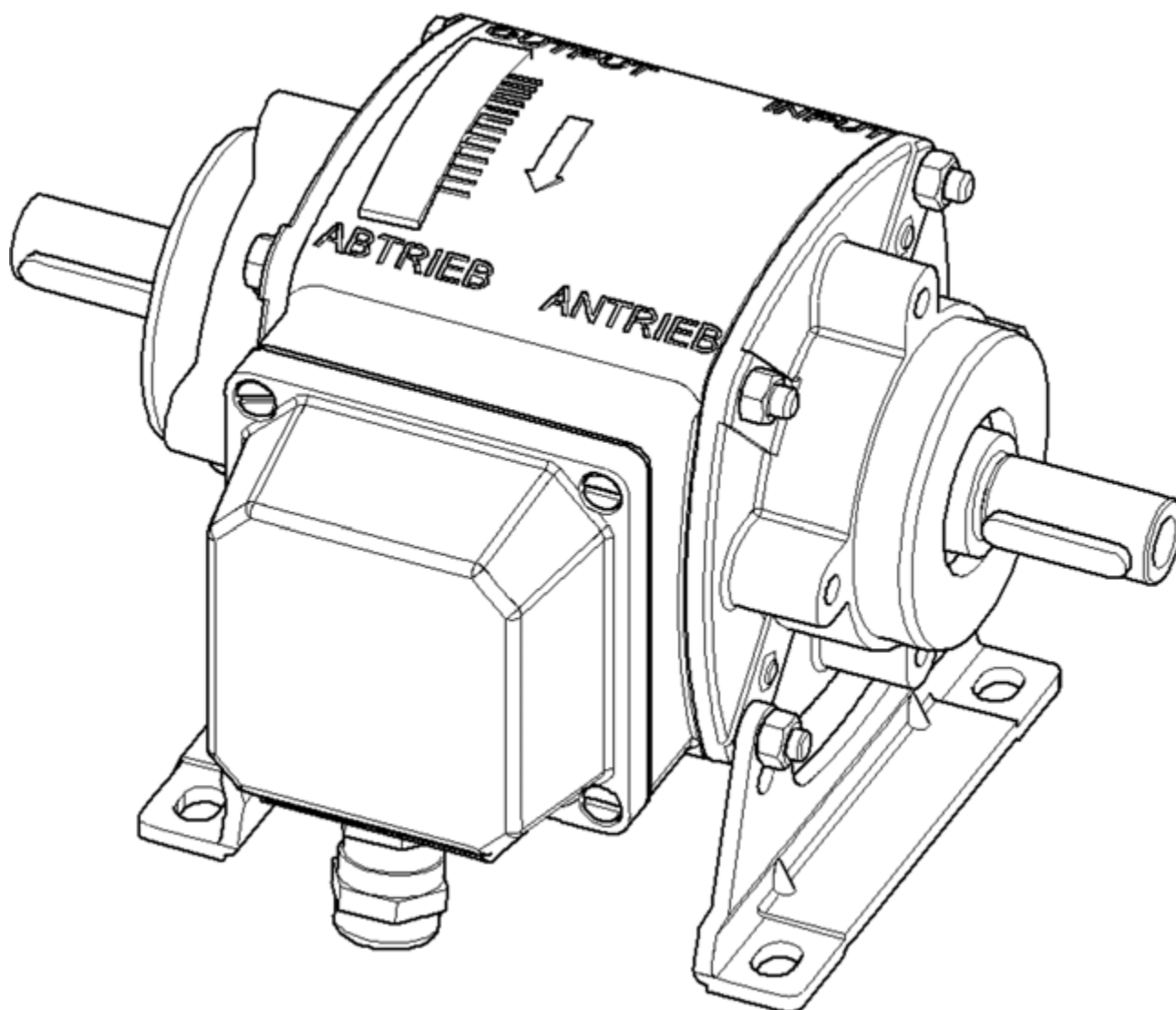


Перейти на сайт официального дистрибьютора >>

**INTORQ**

setting the standard



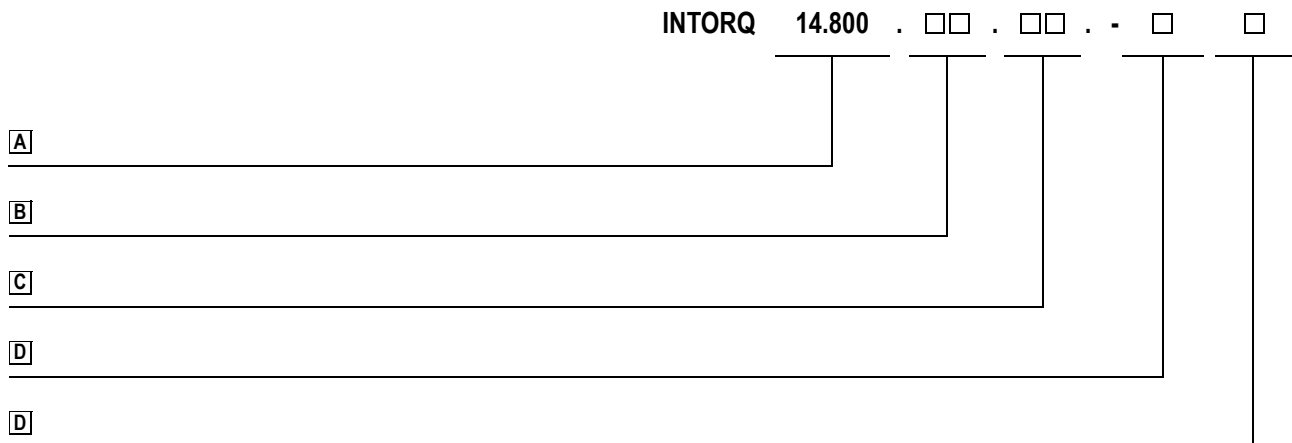
## INTORQ CBC

Electromagnetic clutch-brake combinations

Translation of the Original Operating Instructions

[www.intorq.com](http://www.intorq.com)

## Product key

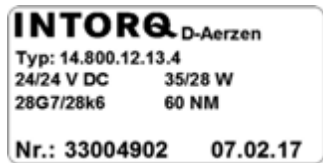


### Legend for the product key

#### INTORQ CBC

<b>A</b>	Type	14.800	without motor
<b>B</b>	Size	06, 08, 10, 12, 16	
<b>C</b>	On the output end design	10	free output shaft, without foot, without flange
		11	free output shaft, with foot, without flange
		12	free output shaft, without foot, with flange
		13	free output shaft, with foot, with flange
		20	with hollow shaft, without foot, without flange
		21	with hollow shaft, without foot, with flange
		22	with hollow shaft, with foot, without flange
		23	with hollow shaft, with foot, with flange
<b>D</b>	On the input end design	1	splined armature, free input shaft
		2	splined armature, free input shaft and flange
		3	splined armature, hollow shaft, B5 flange
		4	splined armature, hollow shaft, B14 flange
		6	backlash-free diaphragm armature, free input shaft
		7	backlash-free diaphragm armature, free input shaft and flange
		8	backlash-free diaphragm armature, hollow shaft, B5 flange
		9	backlash-free diaphragm armature, hollow shaft, B14 flange
<b>E</b>	Variants	Clutch / brake voltage Shaft diameter / bore diameter flange diameter / foot height / terminal box position	

## Identification

Name plate		Example
Manufacturer		 <p> <b>INTORQ</b> D-Aerzen              Typ: 14.800.12.13.4              24/24 V DC      35/28 W              28G7/28k6      60 NM              Nr.: 33004902      07.02.17           </p>
Type		
Rated voltage: clutch / brake	Coil power: clutch / brake	
Shaft diameter: clutch / brake	Rated torque	
Customer No.		
Type No.	Date of manufacture	

## Document history

Material number	Version			Description
33006105	1.0	06/2017	SC	First edition

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# 1 Preface and general information

## 1.1 About these Operating Instructions

- These Operating Instructions will help you to work safely with the electromagnetic clutch-brake combination. They contain safety instructions that must be followed.
- All persons working on or with the electromagnetic clutch-brake combinations must have the Operating Instructions available and observe the information and notes relevant for them.
- The Operating Instructions must always be in a complete and readable condition.

## 1.2 Terminology used

Term	In the following text used for
CBC	Electromagnetic clutch-brake combination
Drive system	Drive system with electromagnetic clutch-brake combination and other drive components




## 1.3 Abbreviations used

Letter symbol	Unit	Designation
$F_R$	N	Rated frictional force
$I$	A	Current
$I_H$	A	Holding current, at 20 °C and holding voltage
$I_L$	A	Release current, at 20 °C and release voltage
$I_N$	A	Rated current, at 20 °C and rated voltage
$M_A$	Nm	Tightening torque of fastening screws
$M_{dyn}$	Nm	Braking torque at a constant speed of rotation
$M_K$	Nm	Rated torque of the brake, rated value at a relative speed of rotation of 100 rpm
$n_{max}$	rpm	Maximum occurring speed of rotation during the slipping time $t_3$
$P_H$	W	Coil power during holding, after voltage change-over and 20 °C
$P_L$	W	Coil power during release, before voltage change-over and 20 °C
$P_N$	W	Rated coil power, at rated voltage and 20 °C
$Q$	J	Quantity of heat/energy
$Q_E$	J	Max. permissible friction energy for one-time switching, thermal parameter of the brake
$Q_R$	J	Braking energy, friction energy

Letter symbol	Unit	Designation
$Q_{Smax}$	J	Maximally permissible friction energy for cyclic switching, depending on the operating frequency
$R_m$	N/mm <sup>2</sup>	Tensile strength
$R_N$	Ohms	Rated coil resistance at 20 °C
$R_z$	µm	Averaged surface roughness
$S_h$	1/h	Switching frequency: the number of switching operations evenly spread over the time unit
$S_{hue}$	1/h	Transition operating frequency, thermal parameter of the brake
$S_{hmax}$	1/h	Maximum permissible operating frequency, depending on the friction energy per switching operation
$s_L$	mm	Air gap: the lift of the armature plate while the brake is switched
$s_{LN}$	mm	Rated air gap
$s_{Lmin}$	mm	Minimum air gap
$s_{Lmax}$	mm	Maximum air gap
$s_{HL}$	mm	Air gap for hand-release
$t_1$	ms	Engagement time, sum of the delay time and braking torque - rise time $t_1 = t_{11} + t_{12}$
$t_2$	ms	Disengagement time, time from switching the stator until reaching 0.1 $M_{dyn}$
$t_3$	ms	Slipping time, operation time of the brake (according to $t_{11}$ ) until standstill
$t_{11}$	ms	Delay during engagement (time from switching off the supply voltage to the beginning of the torque rise)
$t_{12}$	ms	Rise time of the braking torque, time from the start of torque rise until reaching the braking torque
$t_{ue}$	s	Overexcitation period
$U$	V	Voltage
$U_H$	V DC	Holding voltage, after voltage change-over
$U_L$	V DC	Release voltage, before voltage change-over
$U_N$	V DC	Rated coil voltage; in the case of brakes requiring a voltage change-over, $U_N$ equals $U_L$

## 1.4 Conventions in use

This document uses the following styles to distinguish between different types of information:

<b>Spelling of numbers</b>	Decimal separator	Point	The decimal point is always used. For example: 1234.56
<b>Symbols</b>	Page reference		Reference to another page with additional information For example:  16 = refer to page 16
	Note		Important notice about ensuring smooth operations or other key information.

## 1.5 Scope of delivery

- 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 the items delivered match the accompanying papers. INTORQ does not accept any liability for deficiencies claimed subsequently.  
You should make a complaint concerning:
  - Visible transport damage immediately to the shipping agent.
  - Visible deficiencies / incompleteness immediately to your INTORQ representative.

## 1.6 Disposal

The CBC consists of different types of material.

- Recycle metals and plastics.
- Ensure professional disposal of assembled PCBs according to the applicable environmental regulations.

## 1.7 Drive systems

### Labelling

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

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

- The CBC is also delivered as individual components which can then be put together by the customer according to their requirements. The specifications – particularly the name plate and the type code – apply to the complete CBC.
- If individual parts are supplied, there is no identification.

## 1.8 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 this 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 the documentation

### Warranty

- Terms of warranty: Refer to the terms of sale and delivery for INTORQ GmbH & Co. KG.
- Please submit warranty claims to your INTORQ representative immediately after the deficiency or fault has been discovered.
- The warranty is void in all cases when liability claims cannot be made.



## 2 Safety instructions

### 2.1 Personnel responsible for safety

#### Operator

- An operator is any natural or legal person who uses the CBC or on whose behalf the CBC 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 will be available to the personnel working on and with the brake at all times,
  - that unqualified personnel will not be allowed to work on or with the CBC.

#### Qualified personnel

Qualified personnel refers to those who – due to their training, experience, instruction and knowledge of relevant standards and regulations, accident prevention regulations and operating conditions related to the safety of the facility – have been entitled by the person responsible for the safety of the system to work on and with the system and to recognize and avoid all possible dangers.

(Definition of qualified employees according to IEC 364)

#### Application as directed

- Drive systems
  - are intended for use in machinery and systems.
  - must only be used for their intended and confirmed purposes.
  - 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 is considered improper!

### 2.2 General safety instructions

- We make no claim to completeness concerning these safety notices. Please contact your local INTORQ representative if you have questions or problems.
- The clutch-brake combination met the state of the art at the time of delivery and is generally safe to operate.
- The clutch-brake combination endangers persons, the clutch-brake combination itself and other properties of the user if
  - non-qualified personnel work on or with the CBC.
  - the CBC is used inappropriately.

- The clutch brake combination (CBC) must be designed so that it carries out its functions properly and does not cause danger for persons if it is installed correctly and used as intended in error-free operation. This also applies to the interaction with the overall system.
- Do not operate the CBC unless it is in perfect condition.
- Retrofittings or changes to the CBC are prohibited. They always require prior consultation with INTORQ GmbH & Co. KG.
- The friction lining and the friction surfaces must never contact oil or grease since even small amounts reduce the braking torque considerably.
- The brake torque will usually not be influenced if the brake is used under the environmental conditions that apply to IP40. Because of the numerous possibilities of using the brake, it is however necessary to check the functionality of all mechanical components under the corresponding operating conditions. Higher protection degrees are available on request.

### 2.3 Application range of the CBC




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

### 2.4 Safety instructions and notices








The following icons and signal words are used in this document to indicate dangers and important safety information:

#### Safety instructions

Structure of safety instructions:

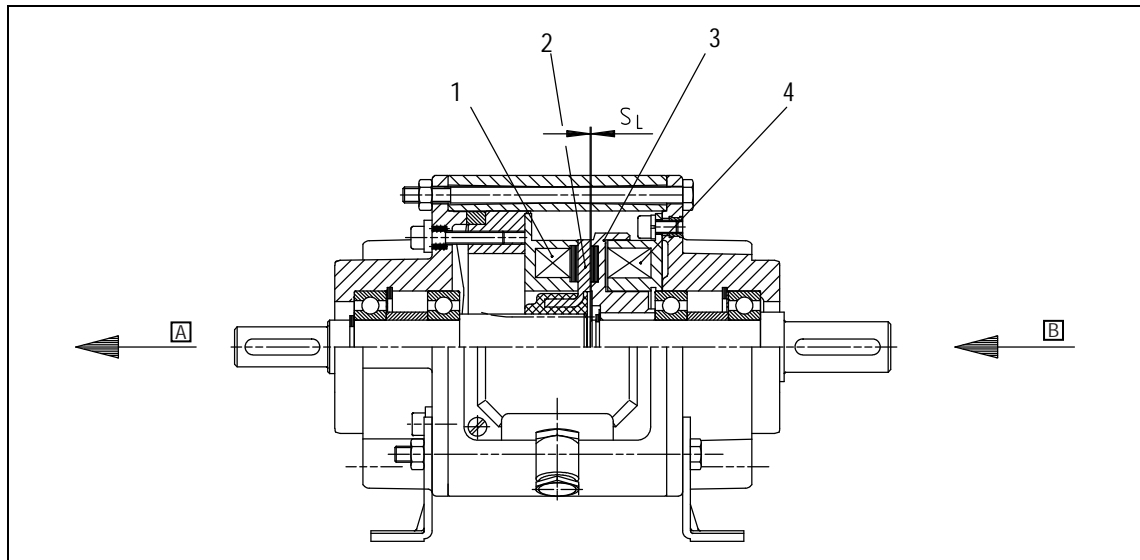
	 <b>SIGNAL WORD</b>
	<b>Icon</b> Indicates the type of danger
	<b>Signal word</b> Characterises the type and severity of danger
	<b>Note</b> Describes the danger
	<b>Possible consequences</b> ■ List of possible consequences if the safety instructions are disregarded.
	<b>Protective measure</b> ■ List of protective measures to avoid the danger.

**Danger level**

	<p> <b>DANGER</b></p> <p>DANGER indicates a hazardous situation which, if not avoided, <i>will</i> result in death or serious injury.</p>
	<p> <b>WARNING</b></p> <p>WARNING indicates a potentially hazardous situation which, if not avoided, <i>could</i> result in death or serious injury.</p>
	<p> <b>CAUTION</b></p> <p>CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.</p>
	<p><b>NOTICE</b></p> <p>Notice about a harmful situation with possible consequences: the product itself or surrounding objects could be damaged.</p>

### 3 Technical specifications

#### 3.1 Product description



**Abb. 1 Design of the CBC**

1	Brake stator	3	Rotor	A	Output
2	Armature	4	Clutch stator	B	Drive

##### 3.1.1 General information

The type 14.800 CBCs are electromagnetic encased units with asbestos-free friction linings.

The CBCs are used for engaging and disengaging shafts in all types of mechanical engineering applications. The modular system that is used allows for many variations and mounting options. Clutches and brakes from the 14.105/115 series transmit the speed or brake torque by means of friction whenever DC voltage is applied.

In addition to the splined armature that permits high switching frequencies, a backlash-free torque transmission is ensured by the diaphragm armature. A low brake torque remains present even if the voltage is disconnected.

As the drive runs continuously with the clutch motor, the energy from the upstream drive can be used to accelerated the output.

3.1.2 Shaft loads

The radial forces specified in the table relate to the centre of the shaft ends.

" $F_{Rmax}$ " is the max. permissible radial force in relation to the shaft strength. The force " $F_N$ " underlies a bearing service life of " $L_h$ " = 10 000 hours at " $n$ " = 1500 rpm.

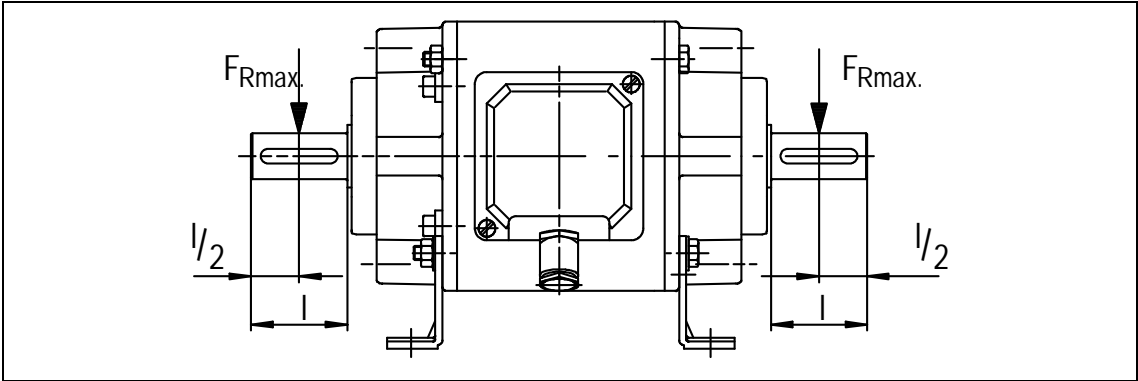


Abb. 2 Design of a clutch-brake combination (CBC)

- $F_{Rmax.}$
- Max. permissible radial force in N, in relation to the shaft strength
- $F_N$
- Permissible radial force in N for  $L_h = 10\,000$  hours and  $n = 1500$  rpm

Type	Force	
	$F_{R\,max.}\,[N]$	$F_N\,[N]$
14.800.06	600	325
14.800.08	900	425
14.800.10	1300	590
14.800.12	1900	870
14.800.16	2300	1350

Tab. 1: Radial forces

NOTICE

The permissible radial forces must not be exceeded!

3.2 Switching times

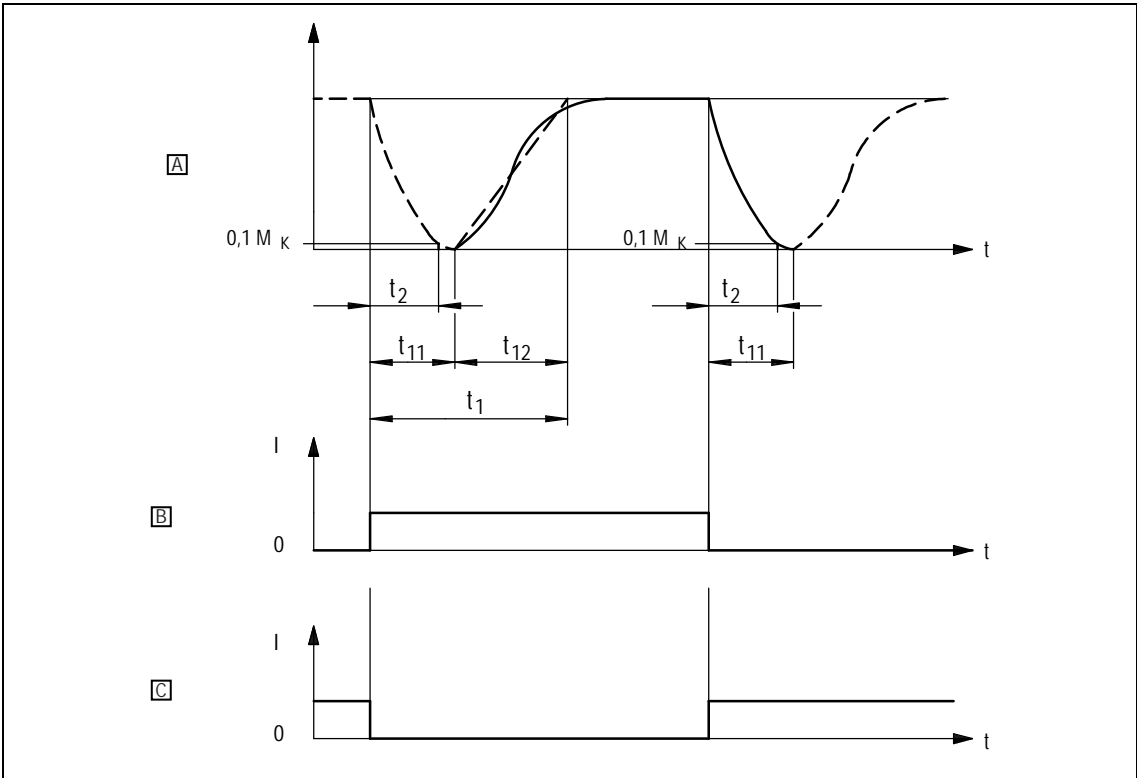


Abb. 3 Clutch / brake switching times

- |   |                   |              |                              |
|---|-------------------|--------------|------------------------------|
| A | Rated torque      | $t_{11}$     | Reaction delay of engagement |
| B | Clutch excitation | $t_{12}$     | Rise time of the torque      |
| C | Brake excitation  | $t_1$        | Engagement time              |
| 0 | off               | $t_2$        | Disengagement time           |
| I | on                | $t_2$ Brake  | $\approx t_{11}$ Clutch      |
| t | Time              | $t_2$ Clutch | $\approx t_{11}$ Brake       |

Type	Switching times [ms]				
	$t_{11} \approx t_2$	E-clutch		E-brake	
		$t_{12}$	$t_1$	$t_{12}$	$t_1$
14.800.06	20	35	55	25	45
14.800.08	25	70	95	30	55
14.800.10	35	85	120	50	85
14.800.12	50	120	170	75	125
14.800.16	65	145	210	85	150

Tab. 2: Switching times in ms

The transition from a state free of braking torque to one of steady braking torque is not immediate. The engagement times apply to switching on the DC side with a spark suppressor at induction voltages of approx. 5 to 10 times of the rated voltage. When switching on the AC side, the disengagement times increase approx. by a factor of 6 compared to switching on the DC side. The diagram shows the delay time for engagement " $t_{11}$ ", the rise time of the brake torque " $t_{12}$ ", the engagement time " $t_1 = t_{11} + t_{12}$ " and the disengagement time " $t_2$ ".

### 3.2.1 Disengagement time

The disengagement time can be shortened by special equipment for fast-response excitation or overexcitation.

### 3.3 Rated data

#### Armature version with splined armature

Type	$M_K^{1)}$ 14.105 14.115	$P_{20}^{2)}$		$n_{max.}$ [rpm]	$Q_E$ [J]	$Q_{NA}$ [kwh]	Moments of inertia $J \times 10^{-5}$ [kgm <sup>2</sup> ]		
		Clutch	Brake				Rotor	Armature	Input shaft
14.800.06	7.5	15	11.5	3000	$3.6 \times 10^3$	6.5	11.9	4.2	0.7
14.800.08	15	20	16		$6 \times 10^3$	11	26.6	13.9	2.4
14.800.10	30	28	21		$10 \times 10^3$	17	78	41.4	6.5
14.800.12	60	35	28		$16 \times 10^3$	42	226	120	15.8
14.800.16	120	50	38		$25 \times 10^3$	68	630	378	64

Tab. 3: Rated data for the CBC with splined armature

#### Armature version with backlash-free diaphragm armature

Type	$M_K^{1)}$ 14.105 14.115	$P_{20}^{2)}$		$n_{max.}$ [rpm]	$Q_E$ [J]	$Q_{NA}$ [kwh]	Moments of inertia $J \times 10^{-5}$ [kgm <sup>2</sup> ]		
		Clutch	Brake				Rotor	Armature	Input shaft
14.800.06	7.5	15	11.5	3000	$3.6 \times 10^3$	6.5	11.9	6.5	1.2
14.800.08	15	20	16		$6 \times 10^3$	11	26.6	25.3	3.7
14.800.10	30	28	21		$10 \times 10^3$	17	78	82.1	10.2
14.800.12	60	35	28		$16 \times 10^3$	42	226	241	23.3
14.800.16	120	50	38		$25 \times 10^3$	68	630	800	85

Tab. 4: Rated data for the CBC with backlash-free diaphragm armature

<sup>1)</sup> Rated torque  $M_K$  [Nm], related to the relative speed  $\Delta n = 100$  rpm

<sup>2)</sup> P at 20°C

### 3.4 Switching energy / operating frequency

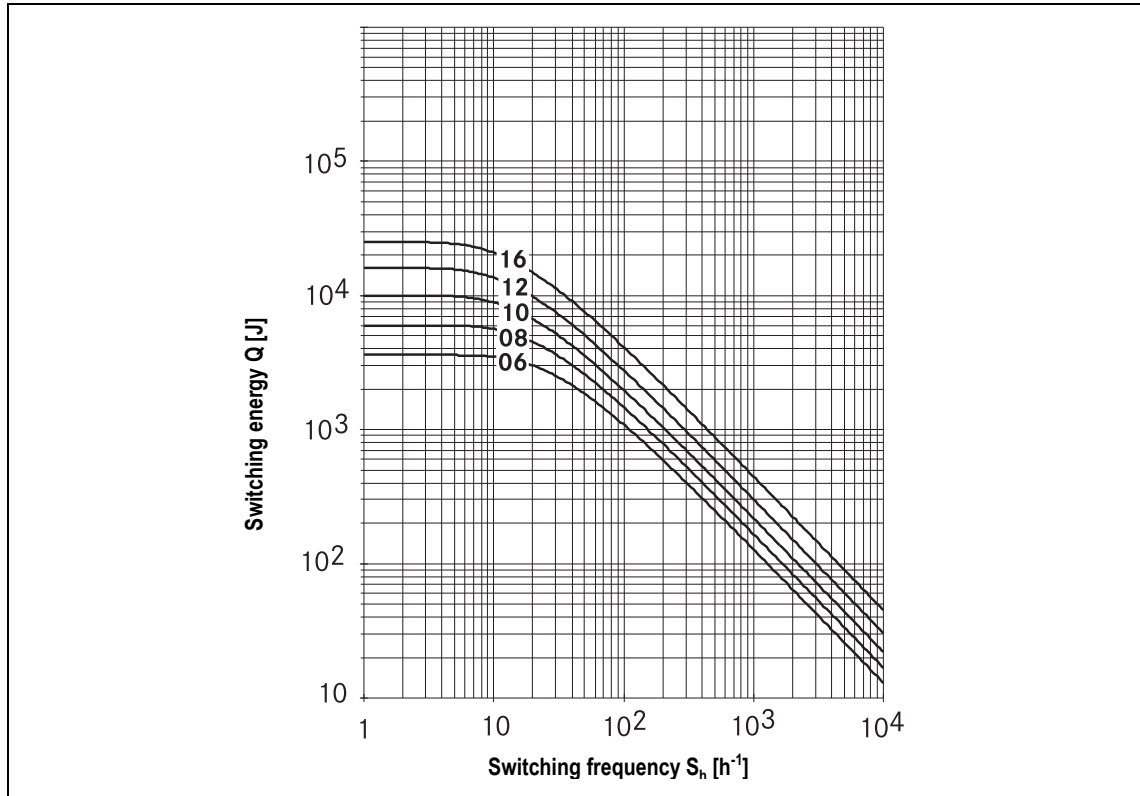


Abb. 4 Friction work as a function of the switching frequency for the INTORQ 14.800

$$S_{hzul} = \frac{-S_{hue}}{\ln\left(1 - \frac{Q}{Q_E}\right)} \quad Q_{zul} = Q_E \left(1 - e^{\frac{-S_{hue}}{S_h}}\right)$$



The permissible switching frequency " $S_{hzul}$ " depends on the switching energy " $Q$ ". At a pre-set switching frequency " $S_h$ ", the permissible amount of switching energy is " $Q_{zul}$ ".


With high speeds of rotation and switching energy, the wear increases strongly, because very high temperatures occur at the friction surfaces for a short time.



## 4 Mechanical installation

### Important notes

	 <b>DANGER</b>
	<p><b>There is a risk of injury by electrical shock!</b></p> <ul style="list-style-type: none"> <li>■ The clutch-brake combination must only be installed when no voltage is applied!</li> </ul>

	<b>NOTICE</b>
	In any mounting position, ensure that no liquid or foreign particles ingress into the housing!


### 4.1 Assembly

#### 4.1.1 Preparing the installation

1. Unpack clutch-brake combination.
2. Check for completeness.
3. Check whether the name plate data correspond to the accompanying papers.

### 4.2 Installation

The drives can be used in either a horizontal or vertical mounting position.

	<b>NOTICE</b>
	<ul style="list-style-type: none"> <li>■ Avoid shocks onto shafts and hollow shafts!</li> <li>■ Grease shafts and hollow shafts only lightly!</li> <li>■ The friction linings of rotor and brake must be kept free of grease and oil!</li> </ul>



#### **NOTICE**

A vertical mounting position makes motor and gearbox mounting easier.

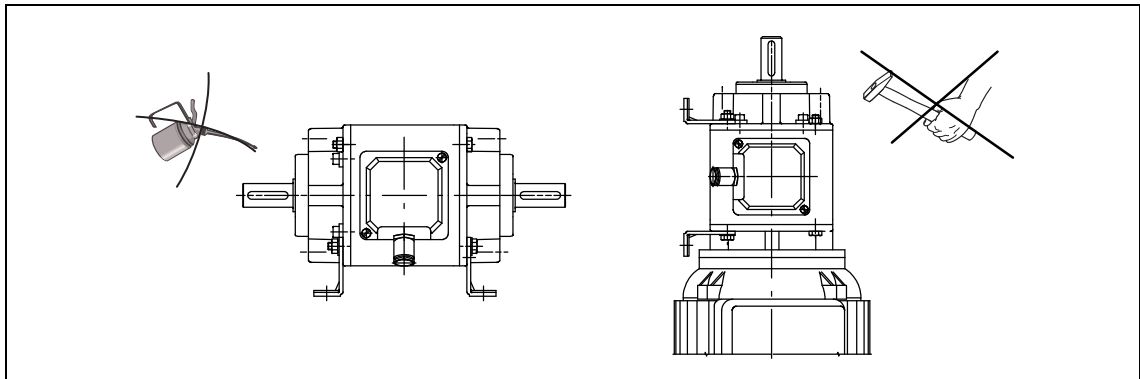


Abb. 5 Mounting instructions

### 4.3 Disassembly

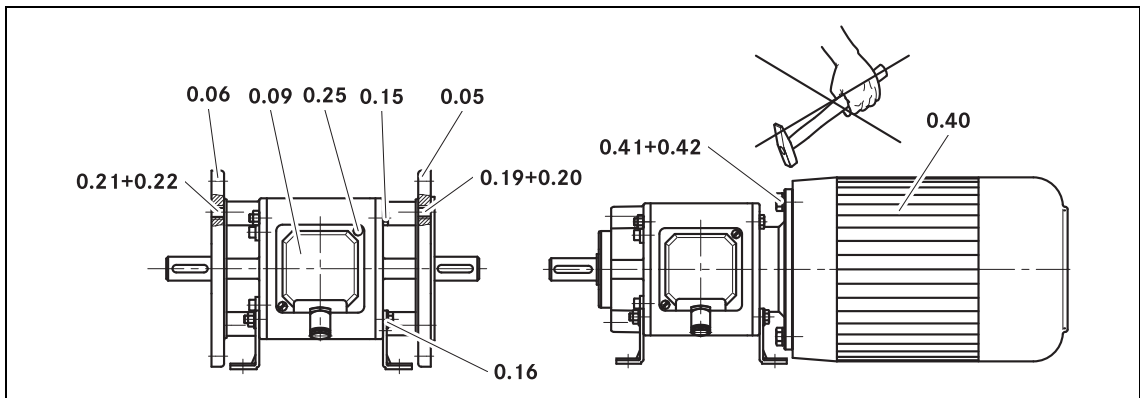


Abb. 6 Design: 14.800. □ □ 13.2(7)

1. Interrupt the power supply.
2. Loosen socket head cap screws (0.25). Remove terminal box (0.09).
3. Loosen pigtailed. Remove terminal strip.
4. Loosen hexagon socket head cap screws (0.41) with spring washer (0.42) and remove motor (0.40) from the CBC.



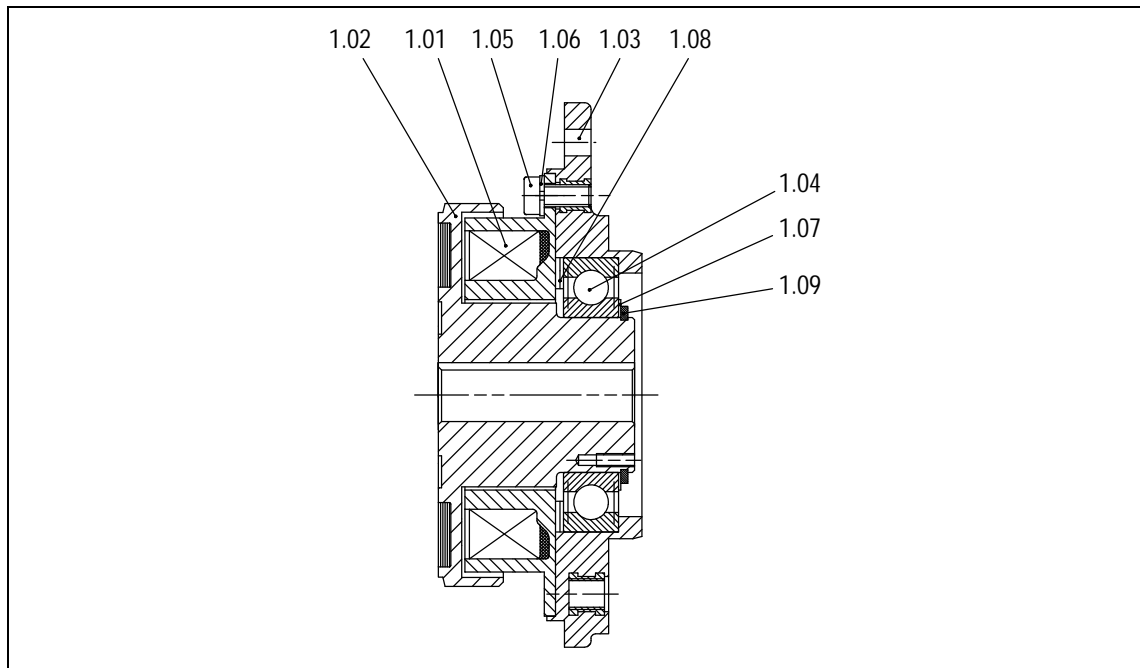
#### NOTICE

Avoid shocks and blows! Carefully loosen flange cutouts!

5. Loosen socket head cap screws (0.21). Remove flange (0.06).
6. Loosen hexagon socket head cap screws (0.15 and 0.16).
7. Remove drive and output cover.

#### 4.4 Disassembly of complete drive cover

##### 4.4.1 Design 1.00



**Abb. 7 Drive cover 1.00**

1.01 Stator	1.04 Ball bearing	1.07 Shim
1.02 Rotor	1.05 Socket head cap screw	1.08 Shim
1.03 Cover	1.06 Spring washer	1.09 Circlip

1. Remove circlip (1.09) and shims (1.07).
2. Press rotor (1.02) out of ball bearing (1.04).
3. Loosen socket head cap screws (1.05). Remove stator (1.01).
4. Remove shims (1.08).
5. Press ball bearing (1.04) out of cover (1.03).

## 4.4.2 Design 2.00

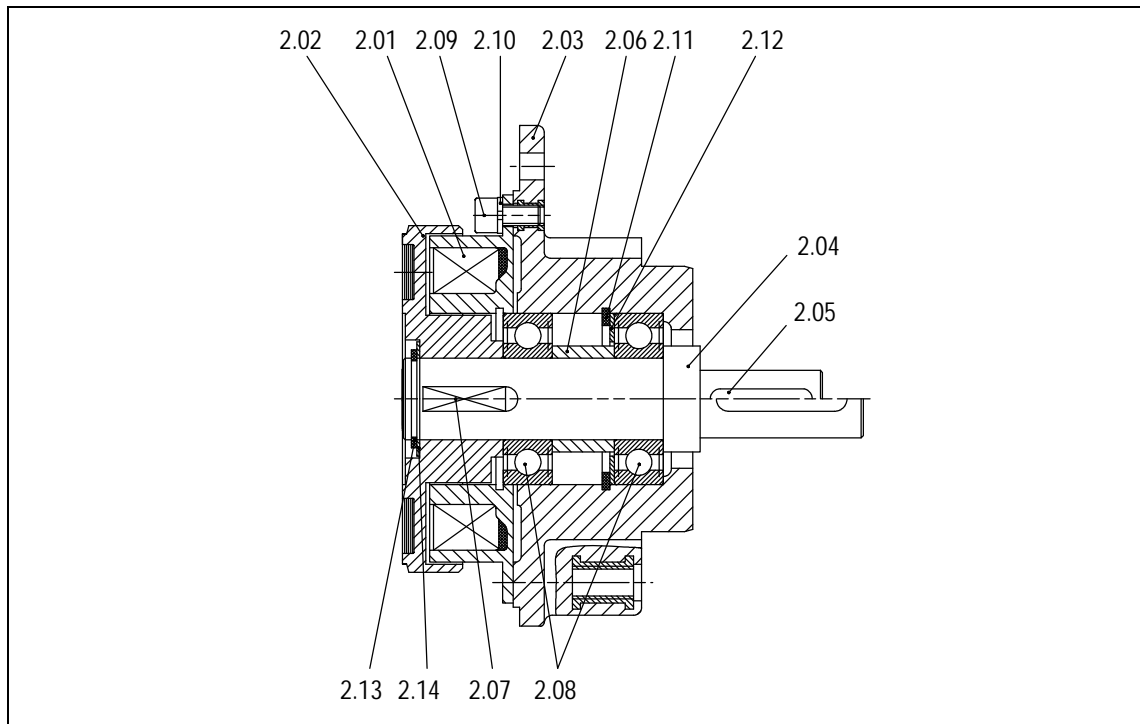


Abb. 8 Drive cover 2.00

2.01 Stator	2.06 Sleeve	2.11 Circlip
2.02 Rotor	2.07 Key	2.12 Shim
2.03 Cover	2.08 Deep-groove ball bearing	2.13 Circlip
2.04 Shaft	2.09 Socket head cap screw	2.14 Shim
2.05 Key	2.10 Spring washer	

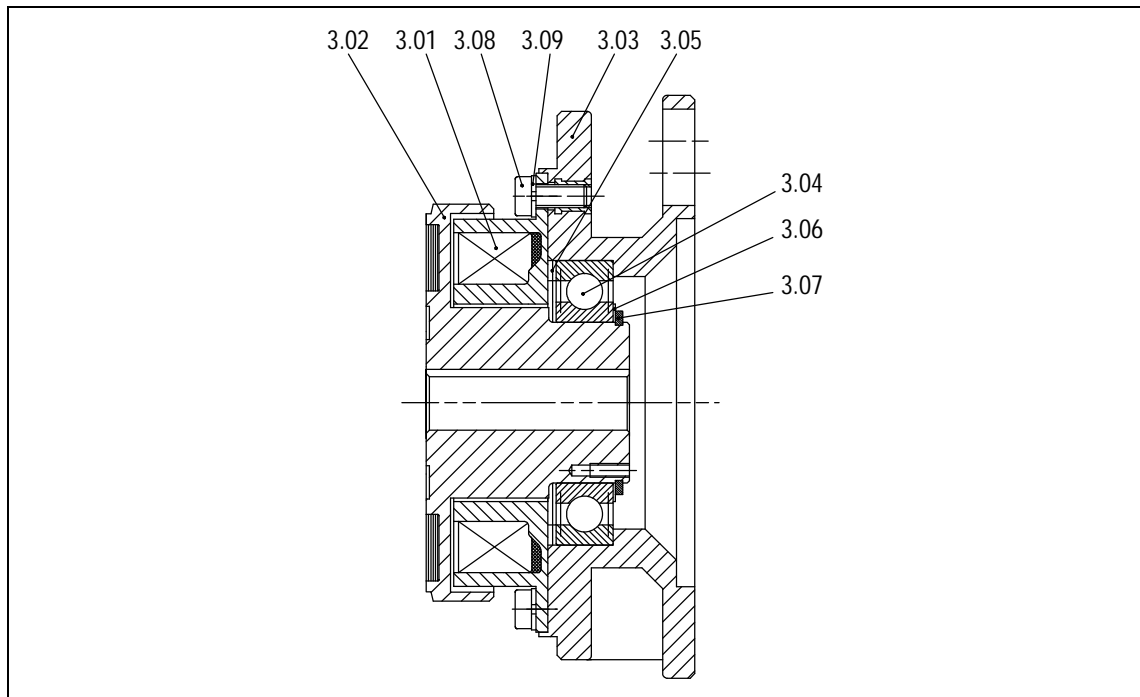
1. Remove the circlip (2.13) and the shim (2.14).
2. Press shaft (2.04) out of cover (2.03).

**NOTICE**

The keyway must not be covered by the pin!

3. Loosen socket head cap screws (2.09). Remove the stator (2.01).
4. Press out the ball bearing (2.08). Remove the sleeve (2.06).
5. Remove the circlip (2.11) and the shim (2.12).
6. Press out the ball bearing (2.08).

## 4.4.3 Design 3.00

**Abb. 9 Drive cover 3.00**

3.01 Stator	3.04 Deep-groove ball bearing	3.07 Circlip
3.02 Rotor	3.05 Shim	3.08 Socket head cap screw
3.03 Flange	3.06 Shim	3.09 Spring washer

1. Remove the circlip (3.07) and the shim (3.06).
2. Press rotor (3.02) out of ball bearing (3.04).
3. Loosen socket head cap screws (3.08). Remove stator (3.01).
4. Remove the shim (3.05).
5. Press ball bearing (3.04) out of flange (3.03).

## 4.4.4 Design 4.00

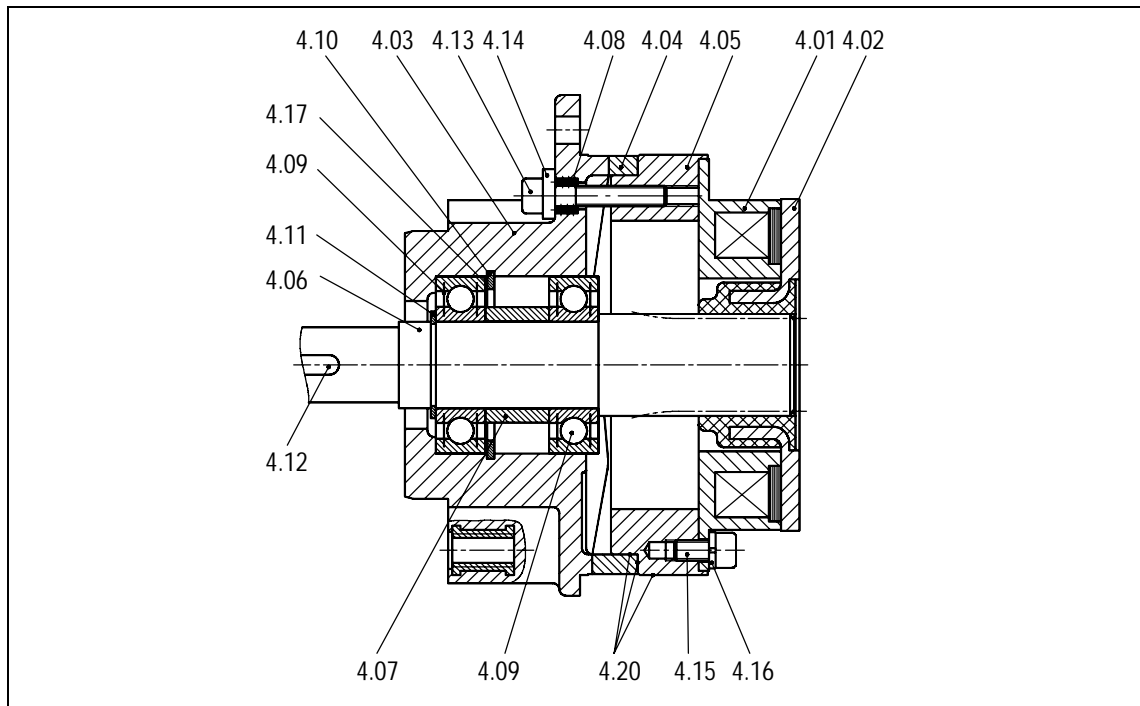


Abb. 10 Output cover 4.00

4.01 Stator	4.08 Pressure spring	4.15 Socket head cap screw
4.02 Armature	4.09 Deep-groove ball bearing	4.16 Spring washer
4.03 Cover	4.10 Circlip	4.17 Shim
4.04 Setting ring	4.11 Circlip	4.20 Mounting paste
4.05 Flange	4.12 Key	
4.06 Shaft	4.13 Socket head cap screw	
4.07 Sleeve	4.14 Disc	

1. Remove armature (4.02) from splined shaft (4.06).
2. Loosen socket head cap screws (4.13). Remove disc (4.14), pressure spring (4.08) and setting ring (4.04).
3. Loosen socket head cap screws (4.15). Remove stator (4.01) from flange (4.05).
4. Remove circlip (4.11). Press out shaft (4.06).
5. Press out ball bearing (4.09). Remove sleeve (4.07).
6. Remove circlip (4.10) and shim (4.17).
7. Press ball bearing (4.09) out of cover (4.03).

**NOTICE**

Mounting is carried out in inverse order!

## 4.4.5 Design 5.00

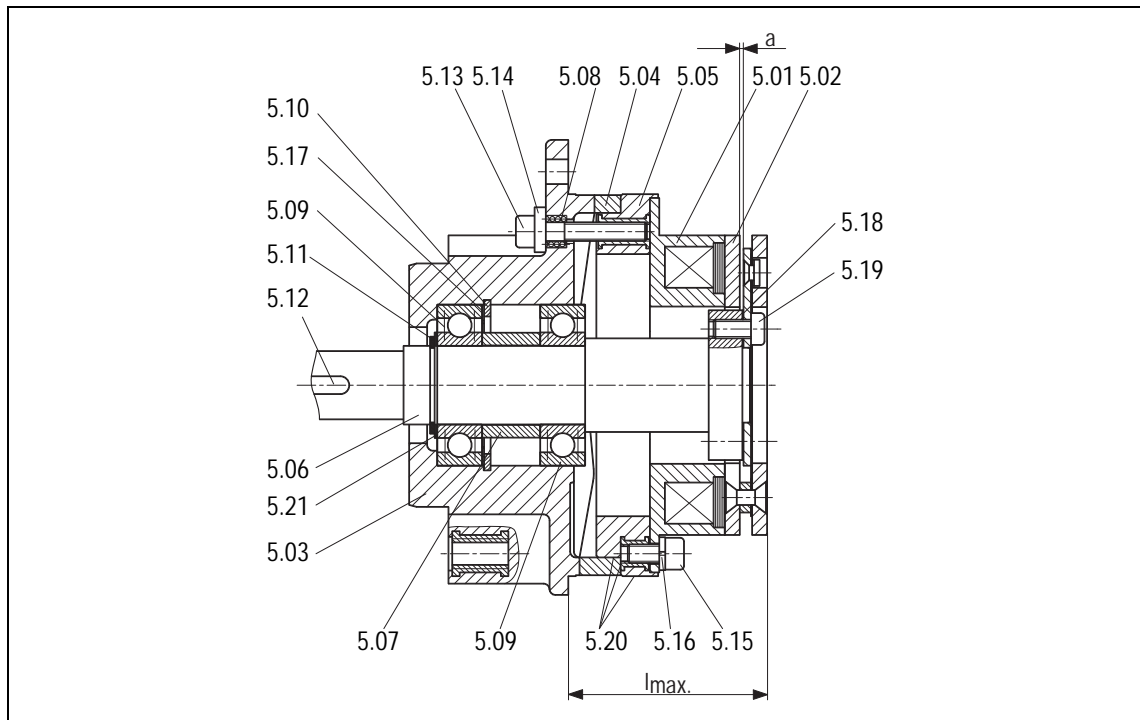


Abb. 11 Output cover 5.00

5.01 Stator	5.08 Pressure spring	5.15 Socket head cap screw
5.02 Armature	5.09 Deep-groove ball bearing	5.16 Spring washer
5.03 Cover	5.10 Circlip	5.17 Shim
5.04 Setting ring	5.11 Circlip	5.18 Disc
5.05 Flange	5.12 Key	5.19 Socket head cap screw
5.06 Shaft	5.13 Socket head cap screw	5.20 Mounting paste
5.07 Sleeve	5.14 Disc	5.21 Shim

1. Loosen socket head cap screws (5.19). Remove armature (5.02) and discs (5.18).
2. Loosen socket head cap screws (5.13). Remove discs (5.14), pressure springs (5.08) and setting ring (5.04).
3. Loosen socket head cap screws (5.15). Remove stator (5.01) from flange (5.05).
4. Remove circlip (5.11). Press out shaft (5.06).
5. Press out ball bearing (5.09). Remove sleeve (5.07).
6. Remove circlip (5.10) and shims (5.17).
7. Press ball bearing (5.09) out of cover (5.03).

**Assembly of complete output cover, design 5.00**

1. Use shims (5.17) to compensate for axial play.
2. Screw down the socket head cap screws (5.13) so that the pressure springs (5.08) are only slightly pre-stressed.
3. Screw the armature (5.02) onto the shaft (5.06). Then set the dimension " $l_{max}$ " (refer to table 4 15) using the setting ring (5.04).

4. Tighten socket head cap screws (5.13).
5. Check dimension "a" using a feeler gauge. Determine the difference between dimension and table dimension, and select discs (5.18) with a corresponding thickness.
6. Unscrew armature (5.02) from shaft (5.06) and insert discs (5.18) between armature (5.02) and shaft shoulder.
7. Put glue on the socket head cap screw threads (5.19) and screw down the armature (5.02).

Type	A [mm]	$l_{\max.}$ [mm]	$M_a$ [mm]
14.800.06	1.2	45.8	3.6
14.800.08	1.2	53.4	7.1
14.800.10	1.5	61.9	12.0
14.800.12	2.0	71.3	30.0
14.800.16	2.8	82.3	60.0

Tab. 5: Mounting dimensions

#### 4.4.6 Design 6.00

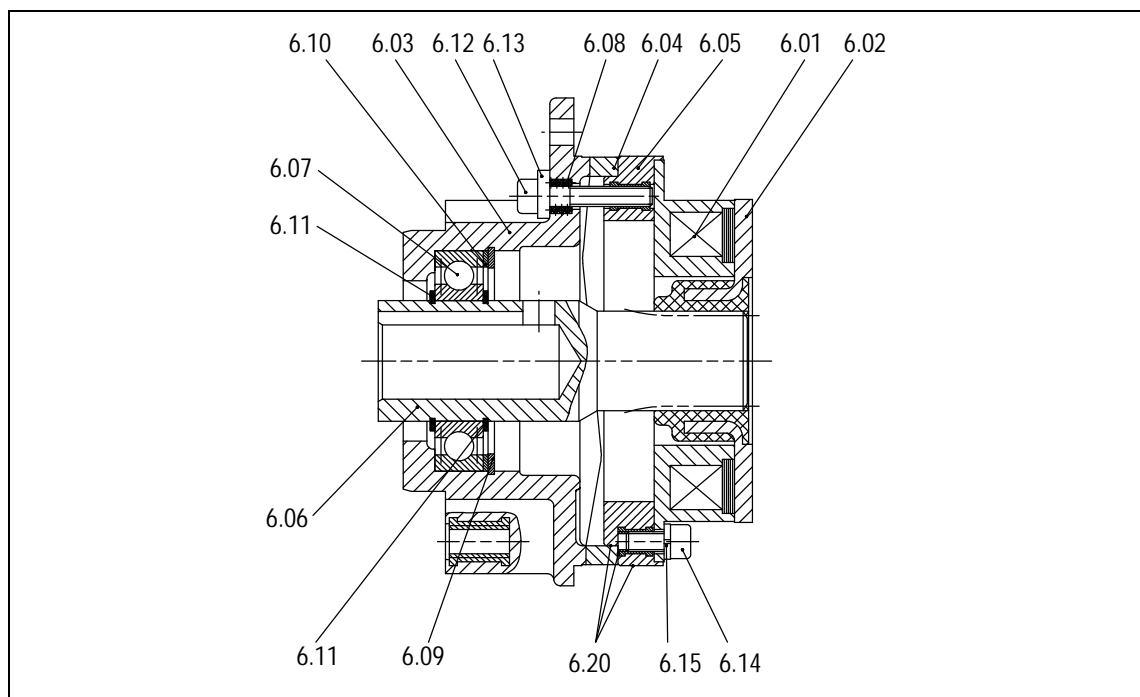


Abb. 12 Output cover 6.00

- |                   |                               |                            |
|-------------------|-------------------------------|----------------------------|
| 6.01 Stator       | 6.07 Deep-groove ball bearing | 6.13 Disc                  |
| 6.02 Armature     | 6.08 Pressure spring          | 6.14 Socket head cap screw |
| 6.03 Cover        | 6.09 Circlip                  | 6.15 Spring washer         |
| 6.04 Setting ring | 6.10 Shim                     | 6.20 Mounting paste        |
| 6.05 Flange       | 6.11 Circlip                  |                            |
| 6.06 Hollow shaft | 6.12 Socket head cap screw    |                            |

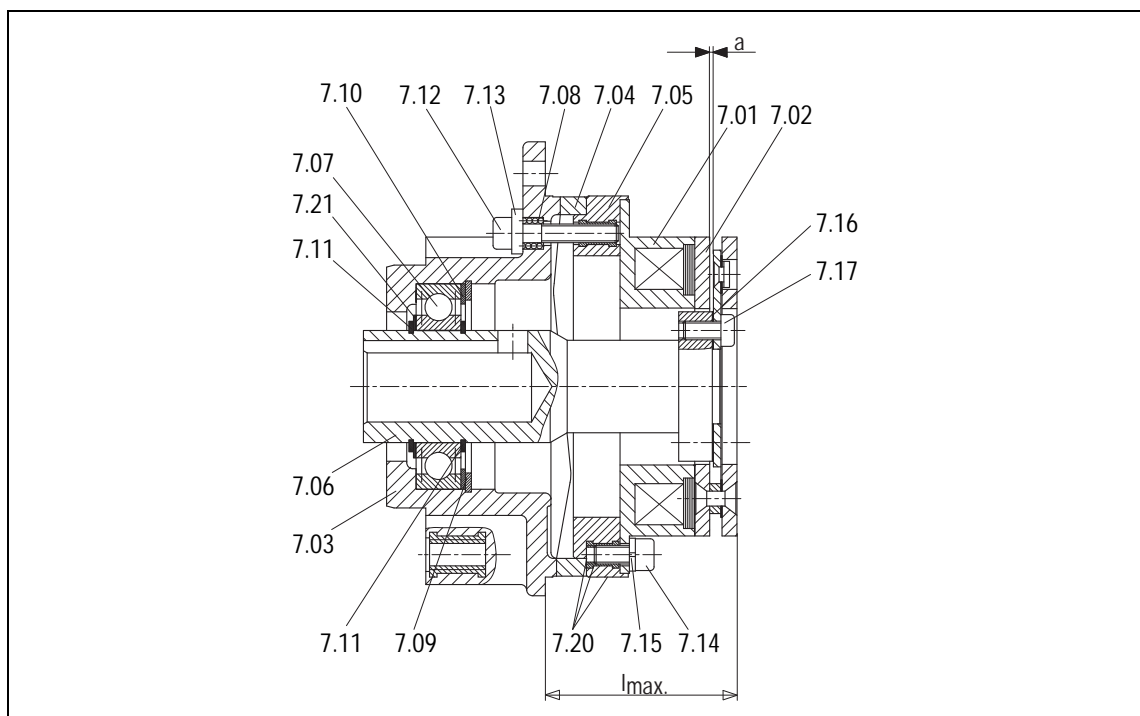


1. Remove armature (6.02) from splined hollow shaft (6.06).
2. Loosen socket head cap screws (6.12). Remove discs (6.13), pressure springs (6.08) and setting ring (6.04).
3. Loosen socket head cap screws (6.14). Remove stator (6.01) from flange (6.05).
4. Remove circlips (6.11) and circlip (6.09) with shims (6.10). Press out the hollow shaft (6.06).
5. Press out the ball bearing (6.07).

**NOTICE**

Mounting is carried out in inverse order!

#### 4.4.7 Design 7.00




**Abb. 13 Output cover 7.00**

5.01 Stator	5.08 Pressure spring	5.15 Spring washer
5.02 Armature	5.09 Circlip	5.16 Disc
5.03 Cover	5.10 Shim	5.17 Socket head cap screw
5.04 Setting ring	5.11 Circlip	5.20 Mounting paste
5.05 Flange	5.12 Socket head cap screw	5.21 Shim
5.06 Hollow shaft	5.13 Disc	
5.07 Deep-groove ball bearing	5.14 Socket head cap screw	

1. Loosen socket head cap screws (7.17). Remove armature (7.02) and discs (7.16).
2. Loosen socket head cap screws (7.12). Remove discs (7.13), pressure springs (7.08) and setting ring (7.04).
3. Loosen socket head cap screws (7.14). Remove stator (7.01) from flange (7.05).

4. Remove circlip (7.11) and circlip (7.09) with shims (7.10). Press out hollow shaft (7.06).
5. Press out ball bearing (7.07).

#### Assembly of complete output cover, design 7.00

1. Press deep-groove ball bearing (7.07) into cover (7.03) and fix with circlip (7.09) and shim (7.10).
2. Mount circlip (7.11) onto hollow shaft (7.06). Press hollow shaft (7.06) into cover (7.03). Mount circlip (7.11) and shims (7.21).
3. Fasten the flange (7.05) with the setting ring (7.04), via the socket head cap screw (7.12), disc (7.13) and the spring (7.08), to the cover (7.03). Screw down the socket head cap screw (7.12) so that the pressure springs (7.08) are only slightly pre-stressed.
4. Screw the armature (7.02) onto the hollow shaft (7.06). Adjust the dimension "l<sub>max.</sub>" (refer to table 4  15) using the setting ring (7.11).
5. Tighten socket head cap screws (7.12).
6. Check dimension "a" using a feeler gauge. Determine the difference between dimension and table dimension, and select discs (7.16) with matching thickness.
7. Unscrew armature (7.02) from hollow shaft (7.06) and insert discs between armature and shaft shoulder.
8. Put glue on the socket head cap screw threads (7.17) and screw down armature (7.02).

Type	A [mm]	l <sub>max.</sub> [mm]	M <sub>a</sub> [mm]
14.800.06	1.2	45.8	3.6
14.800.08	1.2	53.4	7.1
14.800.10	1.5	61.9	12.0
14.800.12	2.0	71.3	30.0
14.800.16	2.8	82.3	60.0

Tab. 6: Mounting dimensions

## 4.5 Assembly

## 4.5.1 Complete CBC

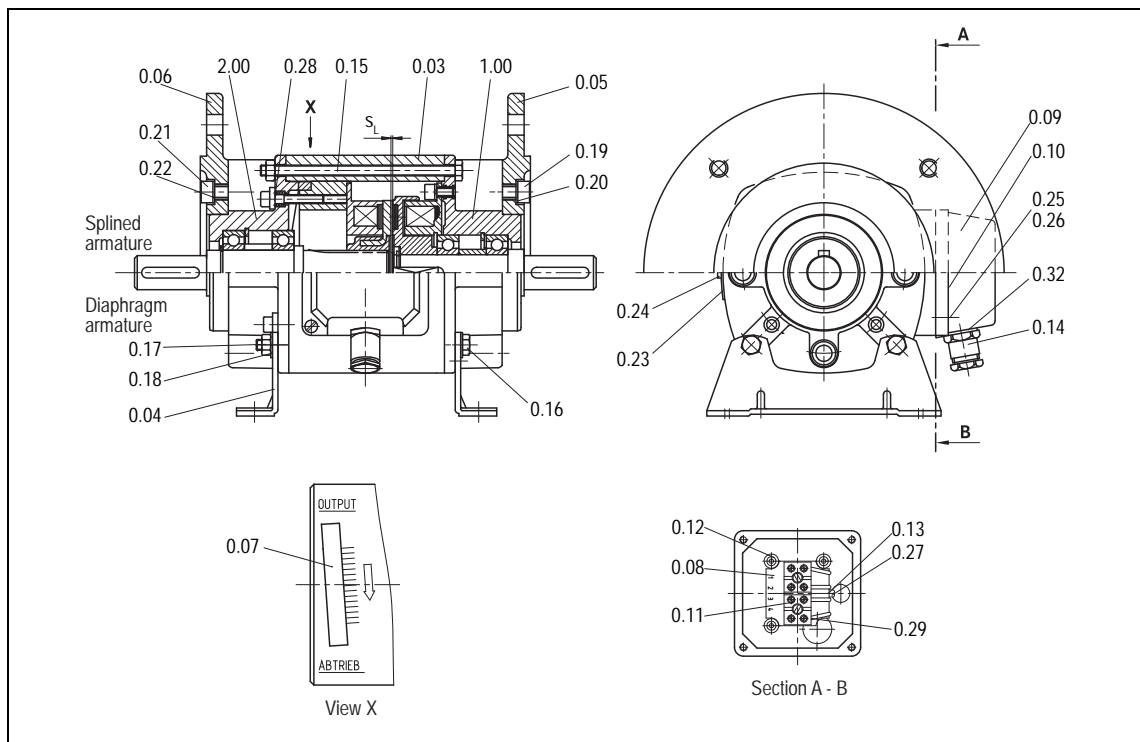





Abb. 14 Installing the CBC

1. Press complete drive cover (1.00 / 2.00 / 3.00) into housing (0.03), leading the pigtails through the bore provided into the terminal box.
2. Press complete output cover (4.00 / 5.00 / 6.00 / 7.00) into housing (0.03), leading the pigtails through the bore provided into the terminal box.
3. Use hexagon socket head cap screws (0.15) and hexagon nuts (0.17) to screw complete drive and complete output cover onto housing (0.03).
4. For foot-mounted design: Use hexagon socket head cap screws (0.16) and hexagon nuts (0.17) to screw down the feet (0.04).
5. Attach the clamping plate (0.08) and terminal strip (0.11). Screw down using socket head cap screws (0.12).
6. Cut pigtail to length. Put on the wire end ferrules (0.29) and connect as shown on clamping plate (0.08) for clutch and brake.
7. Combine pigtails using cable tie (0.13).
8. Adjust the air gap (refer to section 6.1.1,  31, Wear Adjustment).
9. Fit protection cover (0.07) onto housing (0.03).
10. Assembly of terminal box (0.09) and screwed connection (0.14).
11. Screw on the seal (0.10) and terminal box (0.09) onto housing (0.03) using socket head cap screws (0.25) and discs (0.26).
12. For the input-end flange design: Screw down the flange (0.05) using the spring washer (0.20) and socket head cap screws (0.19).
13. For the output-end flange design: Screw down the flange (0.06) using the spring washers (0.22) and socket head cap screws (0.21).

## 5 Electrical installation

### 5.1 Electrical connection

The CBCs are supplied with direct current; the coil voltage is indicated on the name plate.

	 <b>DANGER</b>
	<p><b>There is a risk of injury by electrical shock!</b></p> <p>■ The electrical connections should be made only when no voltage is applied.</p>

The performance of both clutch and brake coils must be taken into account when dimensioning a transformer rectifier.

#### 5.1.1 DC switching

DC switching means short switch-on and switch-off times that can be reduced further by using SEGC high-speed switchgears.

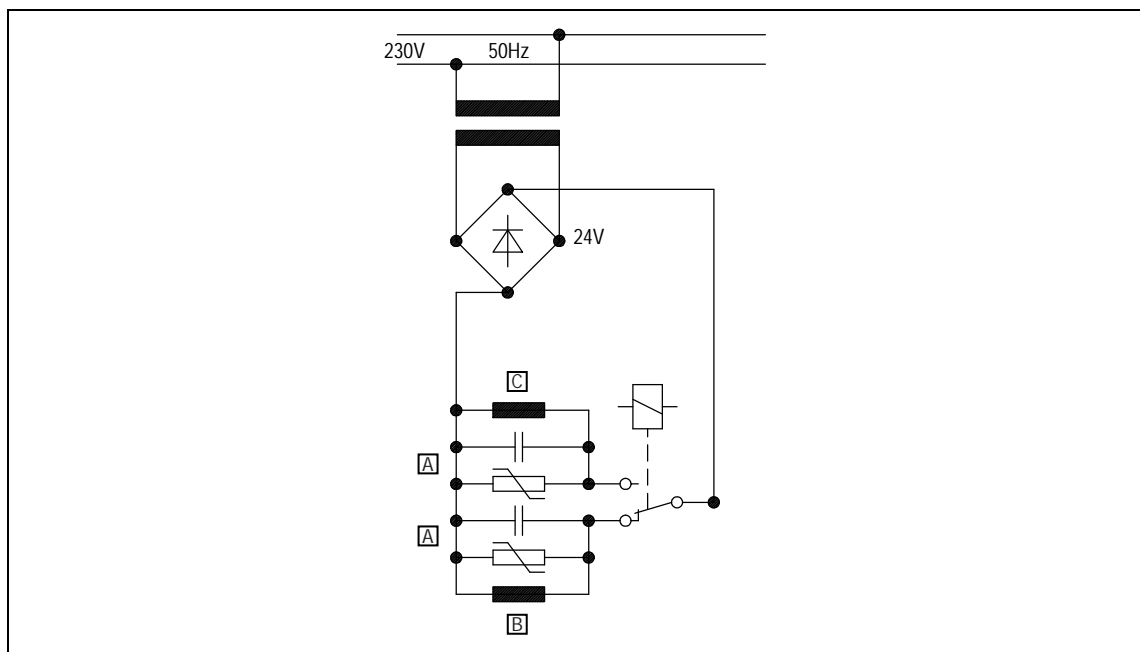


Abb. 15 Clutch and brake are energised to engage

**A** Spark suppressor (14.198.00.01-24V) **B** Brake coil

**C** Clutch coil

### 5.1.2 Spark suppressor

#### INTORQ 14.198.00.0 □

During DC switching, the INTORQ spark suppressor protects the coil and the contact against improper high induced voltages. The induced voltage can exceed the permissible values according to VDE 0580 if the protective circuit is missing. This can lead to the failure of the coil.

#### Application area

- Spark suppression at switching contacts
- Limitation of inductive coil voltage
- Increase in service life of coils and contacts
- Additional protection for rectifiers operated on mains with extreme interference voltage peaks
- Compliance with VDE 0580 § 26
- Reduction of switch-off times of clutch, brakes and spring-operated brakes

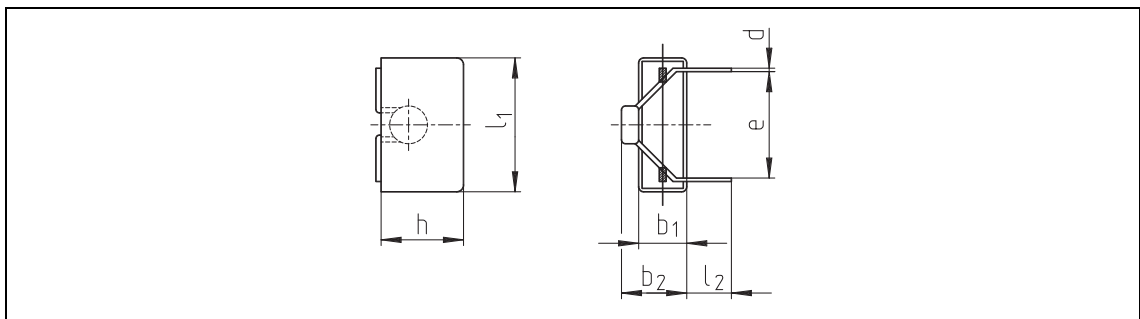


Abb. 16 Dimensions

Four designs of the INTORQ spark suppressors are available for the following voltage ranges:

Type	Coil voltage	max. supply voltage	max. coil power	Capacitor voltage	b <sub>1</sub>	b <sub>2</sub>	d	e	h	l <sub>1</sub>	l <sub>2</sub>	m
	[V]	[V~]	[W]	[V~]	[mm]							[kg]
14.198.00.01	20-50	60	110	250	8.5	12.5	0.7	22.5	18.5	26.5	25	7
14.198.00.02	50-120	250		630	15				26		20	22
14.198.00.03	120-200	400		1000	13	20		37.5	24	41.5	15	17
14.198.00.04	200-250	555										10

### 5.1.3 Wiring example

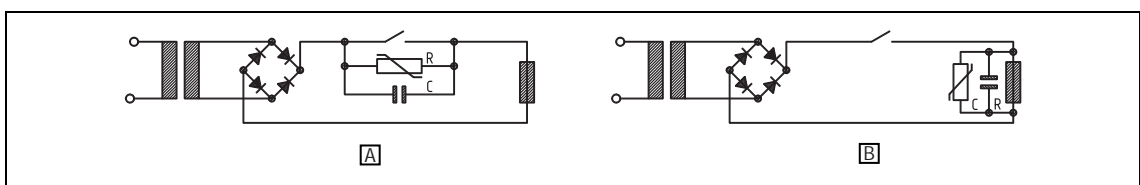





Abb. 17 Wiring example

**A** Parallel to contact Parallel to coil

**B** Parallel to coil

## 6 Maintenance and repair


### Important notes

	 <b>DANGER</b>
	<p><b>There is a risk of injury by electrical shock!</b></p> <p>Repairs must only be carried out when the machine is at standstill and the power supply is interrupted!</p>
	<b>NOTICE</b>
	Remove or secure all loads acting on the CBC.

### 6.1 Inspection intervals

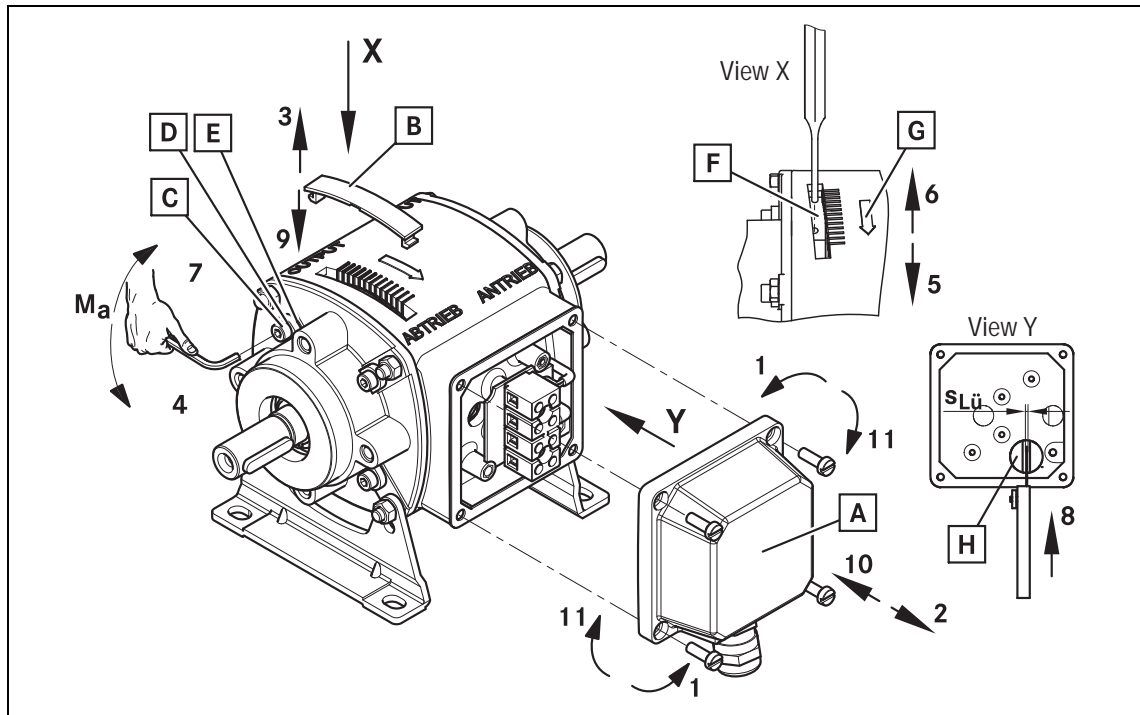


#### NOTICE

Check and readjust the air gap regularly to ensure correct operation and functionality (refer to section 6.1.1  31). For applications using higher switching energy, the air gap should be checked and adjusted more frequently.

### 6.1.1 Readjusting the air gap

Air gap compensation can be carried out quickly and without disassembling the clutch-brake combination thanks to our patented wear adjustment mechanism.



**Abb. 18 CBC air gap setting**

1. Unscrew screws from the terminal box cover (A).
2. Remove terminal box cover (A).
3. Remove cover (B).
4. Use a hex screw driver to loosen the socket head cap screws (C) (refer to table 6 32) until the springs (E) below the discs (D) are released.
5. Turn setting ring (F) with pin (refer to table 6 32) in the direction indicated by the arrow (G) until you can feel resistance.
6. Turn back setting ring with pin by approx. one graduation mark against the direction indicated by the arrow (G).
7. Tighten the socket head cap screws (C) (refer to table 6 32 for tightening torque).
8. Use a feeler gauge to check air gap "s<sub>L</sub>" (refer to table 6 32) through the check bore hole (H) in the terminal box. If necessary, repeat steps 4 through 8.
9. Fit cover (B).
10. Fit terminal box cover (A).
11. Tighten screws on the terminal box cover.

Type	Rated air gap $s_{LN}$ [mm]	Tightening torque $M_a$ [NM]	Pin diameter $d$ [mm]	Hexagon screw- driver
14.800.06	0.15 - 0.25	3.0	3.0	3
14.800.08		6.0		4
14.800.10		10.0	4.0	5
14.800.12	0.2	20.0	6.0	6
14.800.16	0.35			

Tab. 7: Air gap data

### 6.1.2 Order details

If the readjustment range for the clutch-brake combination is exhausted, the wearing parts must be replaced.

■ Wearing parts are:

- Rotor
- Armature
- Brake stator

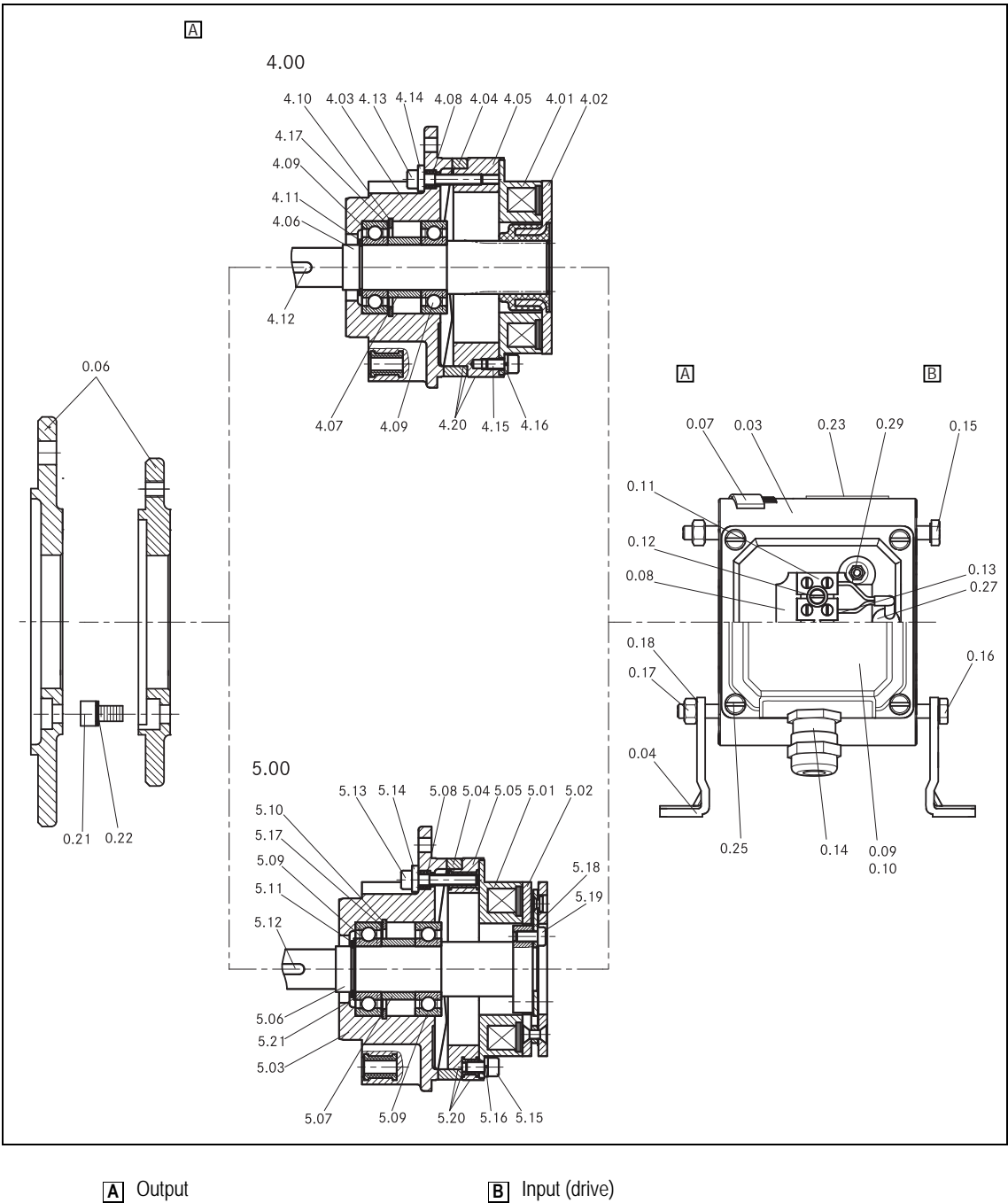
The maximum adjustment range has been reached when the marking on the setting ring has reached the end of the housing slot. Please specify the name plate, type designation, voltage and bore diameter when you order.

Example	INTORQ	14.800	...	...	1	Name plate data
Type						
Size						
Output-end version						
Input-end version						



6.2 Spare-parts list

6.2.1 CBC output-end design 4.00 and 5.00



**CBC - complete housing**

0.03 Housing	0.11 Terminal strip	0.18 Disc
0.04 Foot	0.12 Socket head cap screw	0.21 Socket head cap screw
0.06 Output flange	0.13 Cable tie	0.22 Disc
0.07 Cap	0.14 Screwed connection	0.23 Name plate
0.08 Clamping plate	0.15 Hex head screw	0.25 Socket head cap screw
0.09 Terminal box	0.16 Hex head screw	0.27 Insulating sleeve
0.10 Seal	0.17 Hex nut	0.29 Wire end ferrule

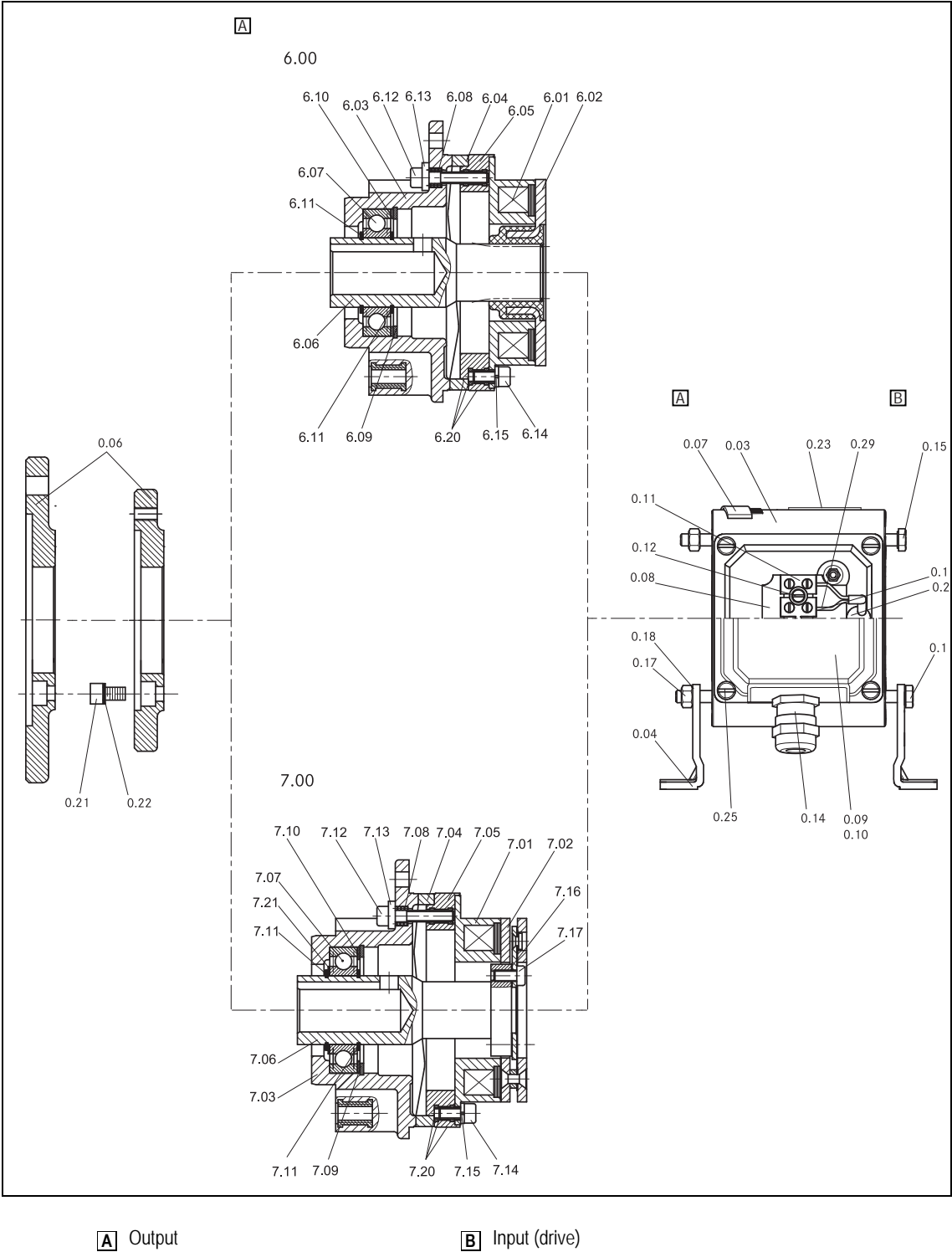
**Complete output cover, design 4.00**

4.01 Stator	4.07 Sleeve	4.13 Socket head cap screw
4.02 Armature	4.08 Pressure spring	4.14 Disc
4.03 Cover	4.09 Deep-groove ball bearing	4.15 Socket head cap screw
4.04 Setting ring	4.10 Circlip	4.16 Spring washer
4.05 Flange	4.11 Circlip	4.17 Shim
4.06 Shaft	4.12 Key	4.20 Mounting paste

**Complete output cover, design 5.00**

5.01 Stator	5.08 Pressure spring	5.15 Socket head cap screw
5.02 Armature	5.09 Deep-groove ball bearing	5.16 Spring washer
5.03 Cover	5.10 Circlip	5.17 Shim
5.04 Setting ring	5.11 Circlip	5.18 Disc
5.05 Flange	5.12 Key	5.19 Socket head cap screw
5.06 Shaft	5.13 Socket head cap screw	5.20 Mounting paste
5.07 Sleeve	5.14 Disc	5.21 Shim

6.2.2 CBC output-end designs 6.00 and 7.00



**CBC - complete housing**

0.03 Housing	0.11 Terminal strip	0.18 Disc
0.04 Foot	0.12 Socket head cap screw	0.21 Socket head cap screw
0.06 Output flange	0.13 Cable tie	0.22 Disc
0.07 Cap	0.14 Screwed connection	0.23 Name plate
0.08 Clamping plate	0.15 Hex head screw	0.25 Socket head cap screw
0.09 Terminal box	0.16 Hex head screw	0.27 Insulating sleeve
0.10 Seal	0.17 Hex nut	0.29 Wire end ferrule

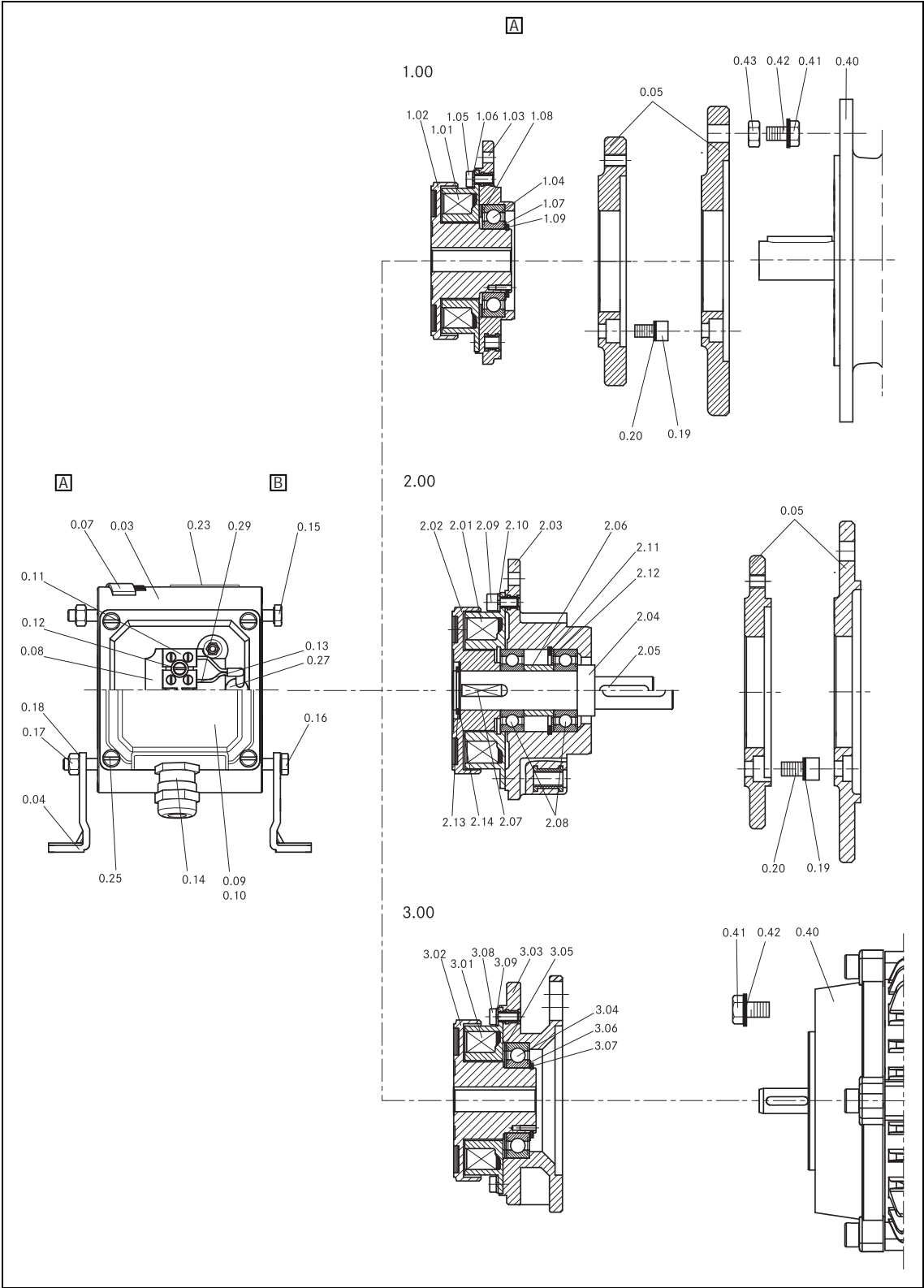
**Complete output cover, design 6.00**

6.01 Stator	6.07 Deep-groove ball bearing	6.13 Disc
6.02 Armature	6.08 Pressure spring	6.14 Socket head cap screw
6.03 Cover	6.09 Circlip	6.15 Spring washer
6.04 Setting ring	6.10 Shim	6.20 Mounting paste
6.05 Flange	6.11 Circlip	
6.06 Hollow shaft	6.12 Socket head cap screw	

**Complete output cover, design 7.00**

7.01 Stator	7.08 Pressure spring	7.15 Spring washer
7.02 Armature	7.09 Circlip	7.16 Disc
7.03 Cover	7.10 Shim	7.17 Socket head cap screw
7.04 Setting ring	7.11 Circlip	7.20 Mounting paste
7.05 Flange	7.12 Socket head cap screw	7.21 Shim
7.06 Hollow shaft	7.13 Disc	
7.07 Sleeve	7.14 Socket head cap screw	

6.2.3 CBC input-end designs 1.00, 2.00 and 3.00



[A] Input (drive)

[B] Output

**CBC - complete housing**

0.03 Housing	0.13 Cable tie	0.25 Socket head cap screw
0.04 Foot	0.14 Screwed connection	0.27 Insulating sleeve
0.06 Drive flange	0.15 Hex head screw	0.29 Wire end ferrule
0.07 Cap	0.16 Hex head screw	0.40 Motor
0.08 Clamping plate	0.17 Hex nut	0.41 Hex head screw
0.09 Terminal box	0.18 Disc	0.42 Spring washer
0.10 Seal	0.21 Socket head cap screw	0.43 Hex nut
0.11 Terminal strip	0.22 Disc	
0.12 Socket head cap screw	0.23 Name plate	

**Complete output cover, design 1.00**

1.01 Stator	1.04 Deep-groove ball bearing	1.07 Shim
1.02 Rotor	1.05 Socket head cap screw	1.08 Shim
1.03 Cover	1.06 Spring washer	1.09 Circlip

**Complete output cover, design 2.00**

2.01 Stator	2.06 Sleeve	2.11 Circlip
2.02 Rotor	2.07 Key	2.12 Shim
2.03 Cover	2.08 Deep-groove ball bearing	2.13 Circlip
2.04 Shaft	2.09 Socket head cap screw	2.14 Shim
2.05 Key	2.10 Spring washer	

**Complete output cover, design 3.00**

3.01 Stator	3.04 Deep-groove ball bearing	3.07 Circlip
3.02 Rotor	3.05 Shim	3.08 Socket head cap screw
3.03 Flange	3.06 Shim	3.09 Spring washer

Notes







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