

Assembly instructions | EN

AX2090-+ECxx

Elastomer coupling



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- EP1590927
- EP1789857
- EP1456722
- EP2137893
- DE102015105702



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- Improper use
- Use of untrained personnel
- Use of unauthorized spare parts

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Version numbers



Provision of revision levels

On request we can send you a list of revision levels for changes to the installation instructions.

- Send requests to: info@beckhoff.de

Origin of the document

These installation instructions were written in German. All other languages are derived from the German original.

Product properties

The valid product properties are always those specified in the current installation instructions. Further information given on the product pages of the Beckhoff homepage, in emails or in other publications is not authoritative.

Scope of the documentation

Documentation	Definition
Installation instructions	Description of the mechanical parameters and all information necessary for the use of the elastomer coupling

Staff qualification

These operating instructions are intended for trained control and automation specialists with knowledge of the applicable and required standards and directives.

Specialists must have knowledge of drive technology and electrical equipment as well as knowledge of safe working on electrical systems and machines. This includes knowledge of proper setup and preparation of the workplace as well as securing the working environment for other persons.

The operating instructions published at the respective time of each installation and commissioning is to be used. The products must be used in compliance with all safety requirements, including all applicable laws, regulations, provisions and standards.

Instructed person

Instructed persons have a clearly defined task area and have been informed about the work to be carried out. Instructed persons are familiar with:

- the necessary protective measures and protective devices
- the intended use and risks that can arise from use other than for the intended purpose

Trained person

Trained persons meet the requirements for instructed persons. Trained persons have additionally received training from the machine manufacturer or vendor:

- machine-specific or
- plant-specific

Trained specialists

Trained specialists have received specific technical training and have specific technical knowledge and experience. Trained specialists can:

- apply relevant standards and directives
- assess tasks that they have been assigned
- recognize possible hazards
- prepare and set up workplaces

Qualified electricians

Qualified electricians have comprehensive technical knowledge gained from a course of study, an apprenticeship or technical training. They have an understanding of control technology and automation. They are familiar with relevant standards and directives. Qualified electricians can:

- independently recognize, avoid and eliminate sources of danger
- implement specifications from the accident prevention regulations
- assess the work environment
- independently optimize and carry out their work

Customer service

Customer service personnel and service personnel are verifiably trained and authorized by Beckhoff or the machine manufacturer for the work on the machine or plant.

Safety and instruction

Read the contents that refer to the activities you have to perform with the product. Always read the chapter in the installation instructions entitled For your safety. Observe the warning notes in the chapters so that you can handle and work properly and safely with the product.

Explanation of symbols

Various symbols are used for a clear arrangement:

- ▶ The triangle indicates instructions that you should execute
- The bullet point indicates an enumeration
- [...] The square parentheses indicate cross-references to other text passages in the document
- [+] The plus sign in square brackets indicates ordering options and accessories

Pictograms

In order to make it easier for you to find text passages, pictograms and signal words are used in warning notices:

DANGER

Failure to observe will result in serious or fatal injuries.

WARNING

Failure to observe may result in serious or fatal injuries.

CAUTION

Failure to observe may result in minor or moderate injuries.



Notes

Notes are used for important information on the product. The possible consequences of failure to observe these include:

- Malfunctions of the product
- Damage to the product
- Damage to the environment



Information

This sign indicates information, tips and notes for dealing with the product or the software.



Examples

This symbol shows examples of how to use the product or software.



QR-Codes

This symbol shows a QR code, via which you can watch videos or animations. Internet access is required in order to use it.

You can read the QR code, for example, with the camera of your Smartphone or Tablet PC. If your camera doesn't support this function you can download a free QR code reader app for your Smartphone. Use the Appstore for Apple operating systems or the Google Play Store for Android operating systems.

If you cannot read the QR code on paper, make sure that the lighting is adequate and reduce the distance between the reading device and the paper. In the case of documentation on a monitor screen, use the zoom function to enlarge the QR code and reduce the distance.

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Beckhoff and its international partner companies offer comprehensive support and service.

Support

The Beckhoff Support offers technical advice on the use of individual Beckhoff products and system planning. The employees support you in the programming and commissioning of complex automation systems.

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Training in Germany takes place in our training center at the Beckhoff headquarters in Verl, at branch offices or, by arrangement, at the customer's premises.

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Download area

In the download area you can obtain product information, software updates, the TwinCAT automation software, documentation and much more.

Web: www.beckhoff.de/download

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The addresses of the international Beckhoff branch offices can be found on the Beckhoff website: <http://www.beckhoff.de>

Read this chapter containing general safety information. Furthermore, the chapters in these installation instructions contain warning notes. Always observe the safety instructions for your own safety, the safety of other persons and the safety of the product.

When working with control and automation products, many dangers can result from careless or incorrect use. Work particularly thoroughly, not under time pressure and responsibly towards other people.

General safety instructions

In this chapter, instructions are given on safety when handling the elastomer coupling. The elastomer couplings are not capable of running independently and are therefore regarded as incomplete machines. They must be installed in a machine / plant by the machine manufacturer. The documentation created by the machine manufacturer must be read.

Before operation

Keep the immediate environment clean

Keep your workplace and the surrounding area clean. Ensure safe working.

Shut down and secure the machine or plant

Shut down the machine or plant. Secure the machine or plant against being inadvertently started up.

Observe tightening torques

Mount and repeatedly check connections and components, complying with the prescribed tightening torques.

Only use original packaging for further processing

Use the original packaging for dispatch, transportation, storage and packing.

During operation

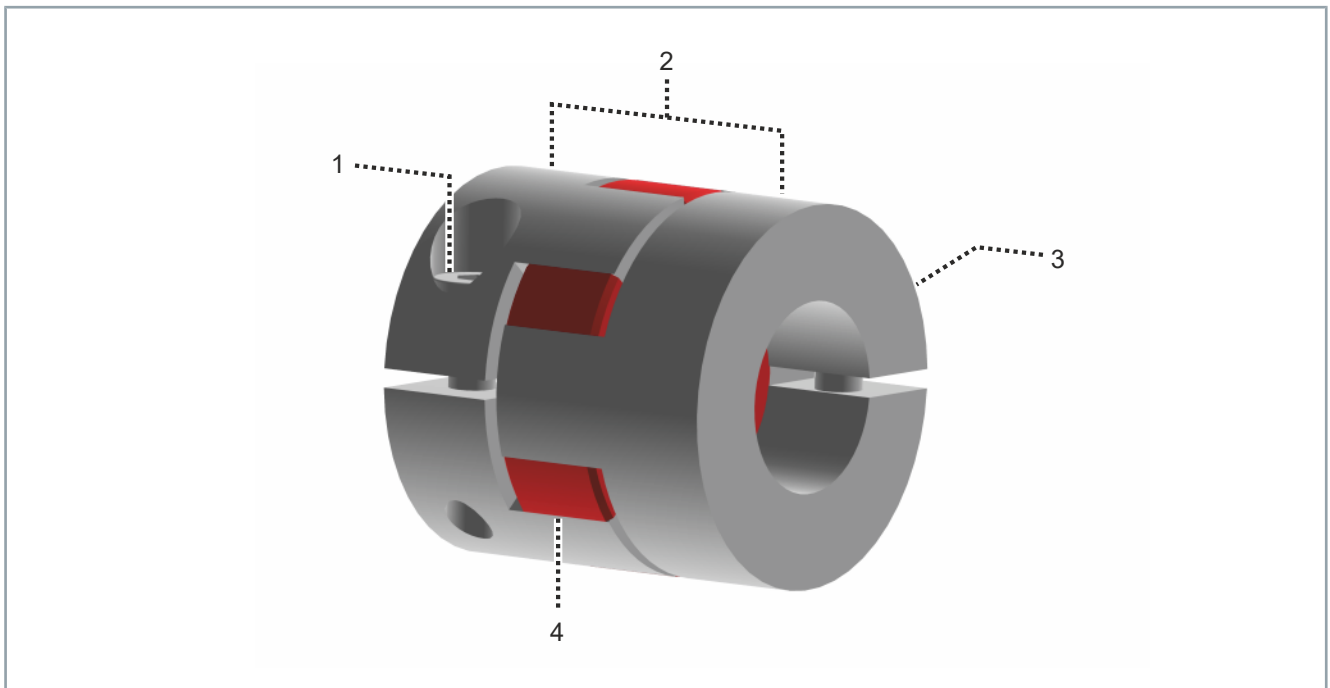
Do not touch any moving or rotating components

Do not touch any moving or rotating parts during operation. Fasten all parts or components on the machine or plant.

After operation

De-energize and switch off components before working on them

Check the functionality of all safety-relevant devices. Secure the working environment. Secure the machine or plant against being inadvertently started up. See chapter: "Decommissioning"



Number	Explanation
1	Bolt
2	2x clamping hub for output side and motor side
3	Bolt
4	Elastomer ring

Type key

AX2090 → EC bb – c/d	Explanation
AX2090	Product area Drive Technology Accessories
EC	Article description Elastomer coupling
bb	Flange sizes 05 = N2, NEMA 23 for AS202x 10 = N3, NEMA 34 for AS204x
c/d	Diameter c = motor shaft diameter d = output shaft diameter

Product characteristics

Elastomer ring

The elastomer ring transmits torques without backlash and dampens vibrations. This determines the properties of a complete coupling or a complete drivetrain.

Freedom from backlash

The compressive prestressing of the elastomer ring ensures the freedom of the coupling from backlash. The torsional vibration of a complete drivetrain is optimized through the hardness of the elastomer ring.

Intended use

The elastomer couplings from the AX2090-ECxx series may be operated only for the intended activities defined in this documentation, taking into account the prescribed environmental conditions.

The components are to be installed in electrical systems or machines and only put into operation as integrated components of the system or machine.



Read the entire drive system documentation:

- These installation instructions
- Translation of the original operating instructions for the motors
- Complete machine documentation provided by the machine manufacturer

Improper use

Any use exceeding the permissible values specified in the Technical data is considered improper and therefore prohibited.

The elastomer couplings from the AX2090-ECxx series are not suitable for use in the following areas:

- ATEX zones without suitable housing
- Areas with aggressive environments, for example aggressive gases or chemicals

Information is given below on the environmental and operating conditions as well as technical data for the elastomer couplings.

Data for operation and environment



Operate elastomer couplings only under the specified environmental conditions

Operate the elastomer couplings only in accordance with the specifications for operation and the environment listed in this chapter. This way you can ensure a long service life and operation as intended.

The elastomer couplings could be damaged if you do not adhere to the permissible temperatures and specifications for operation and environment.

Beckhoff products are designed for operation under certain environmental conditions, which vary according to the product. The following specifications must be observed for operation and environment in order to achieve the optimum service life of the products.

Environmental requirements	
Temperature range	-30 °C to + 100 °C

AX2090-+EC05

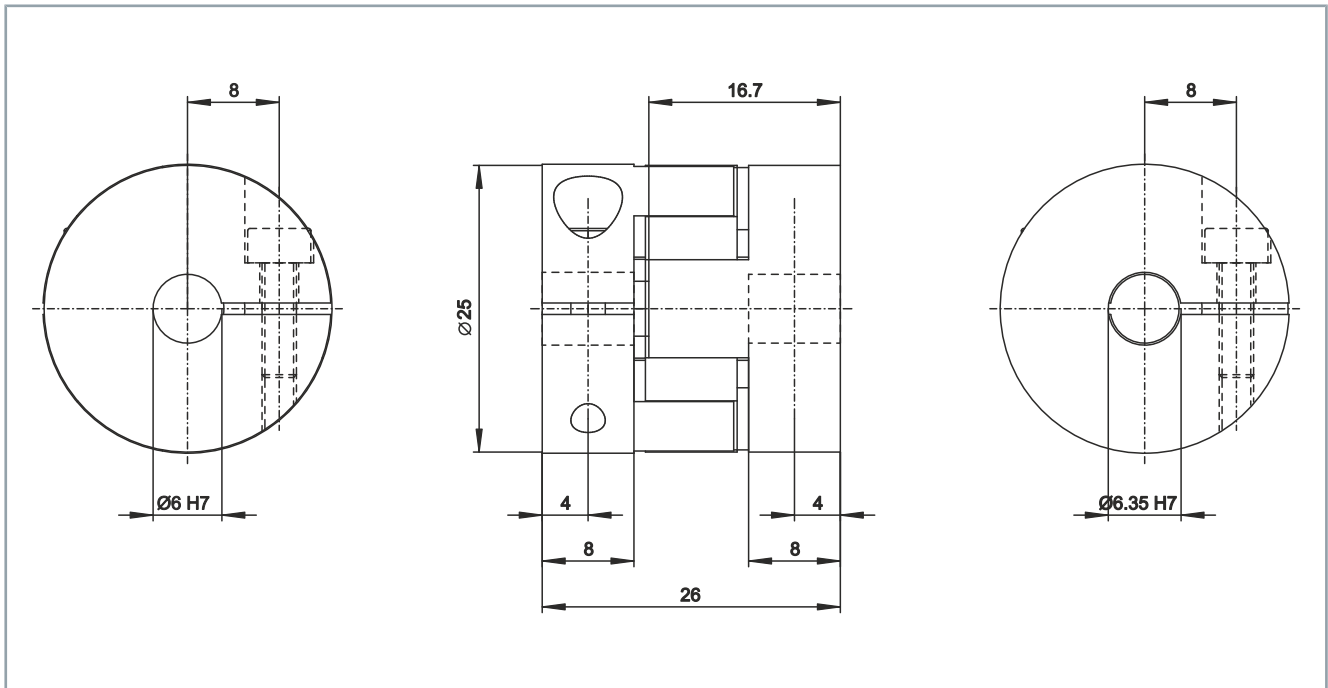
Mechanical data	AX2090-+EC05-c/d		
	Motor shaft diameter c / output shaft diameter d		
	6.35 / 6.00	6.35 / 6.35	6.35 / 8.0
Shore hardness of elastomer ring [Sh]	98		
Proportionate attenuation [ψ]	0.4 to 0.5		
Rated torque T_{KN} [Nm]	9		
Max. torque T_{KMAX} [Nm]	18		
Spacing distance A [mm]	9		
Fit length C [mm]	8		
External diameter B [mm]	25		
External diameter of bolt head B_S [mm]	25		
Moment of inertia per hub J_1/J_2 [kg cm ²]	0.02 / 0.02		
Approx. mass [kg]	0.02		
Center-to-center distance F [mm]	8		
Distance F [mm]	4		
Standard speed [rpm]	15000		
Hub length H [mm]	16.7		
Installation length A [mm]	26		
Maximum internal diameter of elastomer ring D_E [mm]	10.2		
Offset			
Lateral [mm]	0.08		
Angular [degrees]	1		
Axial [mm]	± 1		
Screws			
Thread E	M3		
Tightening torque E [Nm]	2		
Fit	H7		

Dimensional drawing

- All figures in millimeters

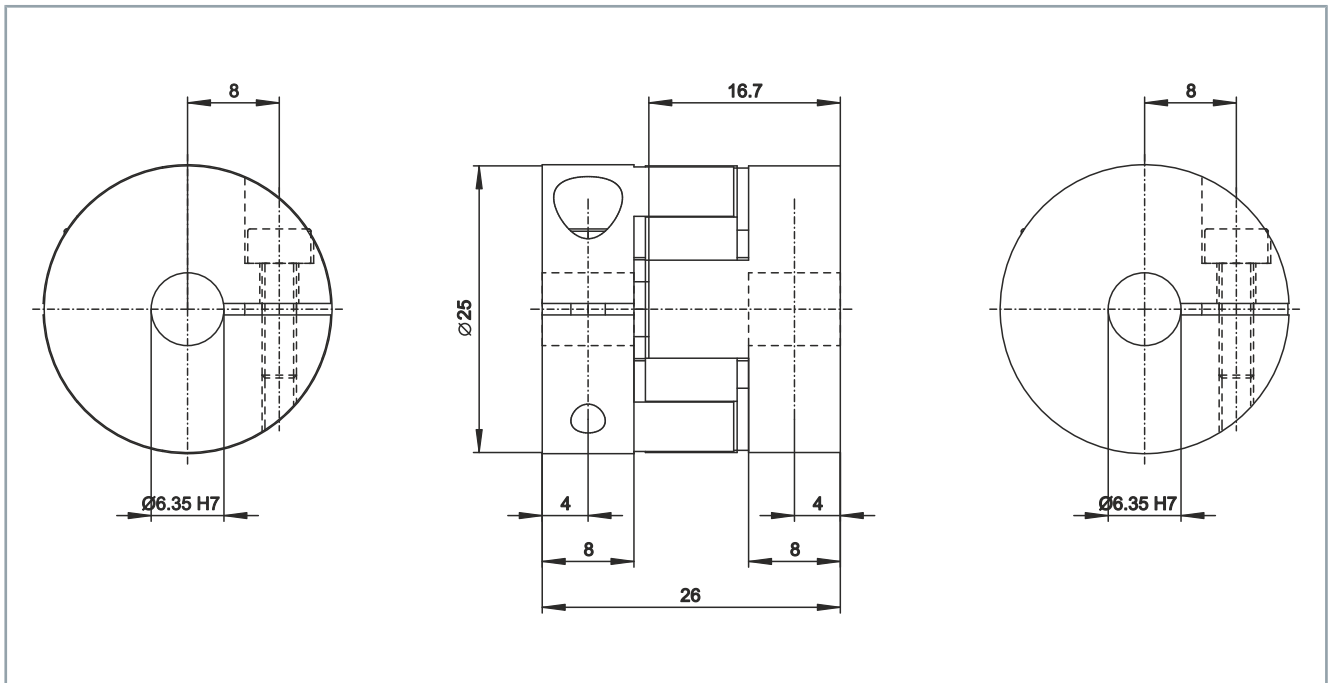
6.35 / 6.00

- Motor shaft diameter / output shaft diameter



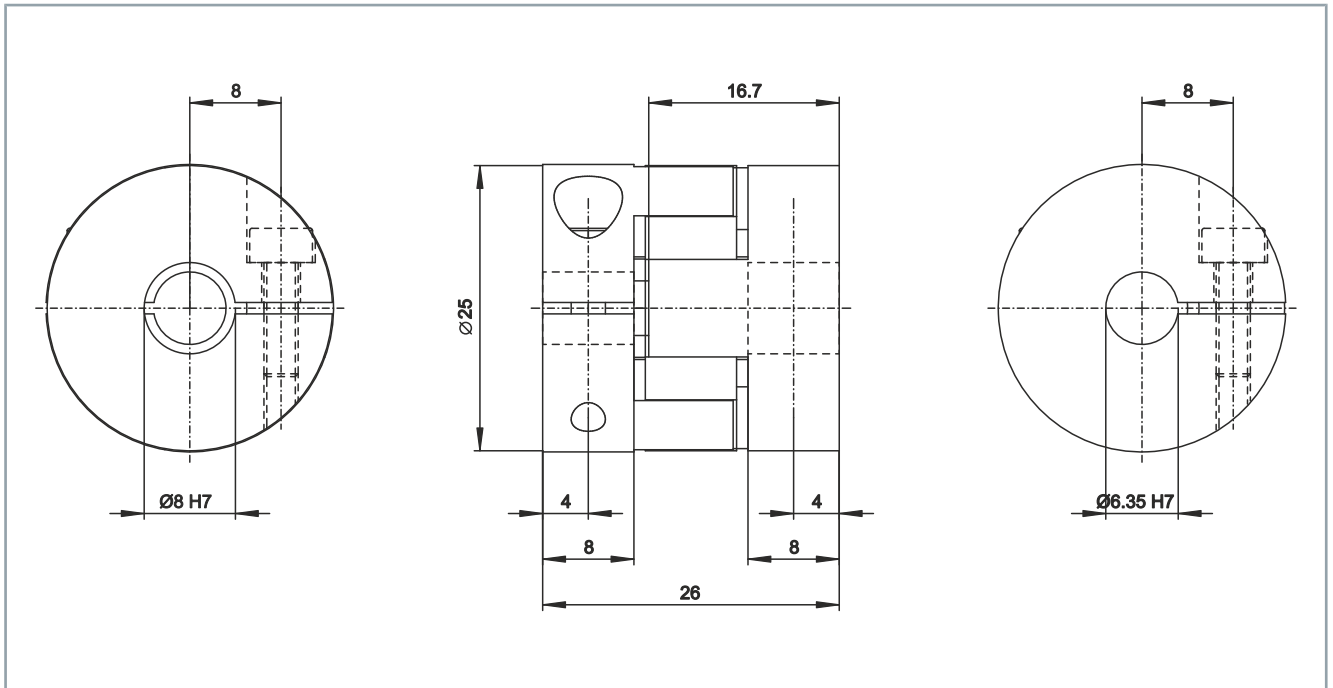
6.35 / 6.35

- Motor shaft diameter / output shaft diameter



6.35 / 8.00

• Motor shaft diameter / output shaft diameter



AX2090-+EC10

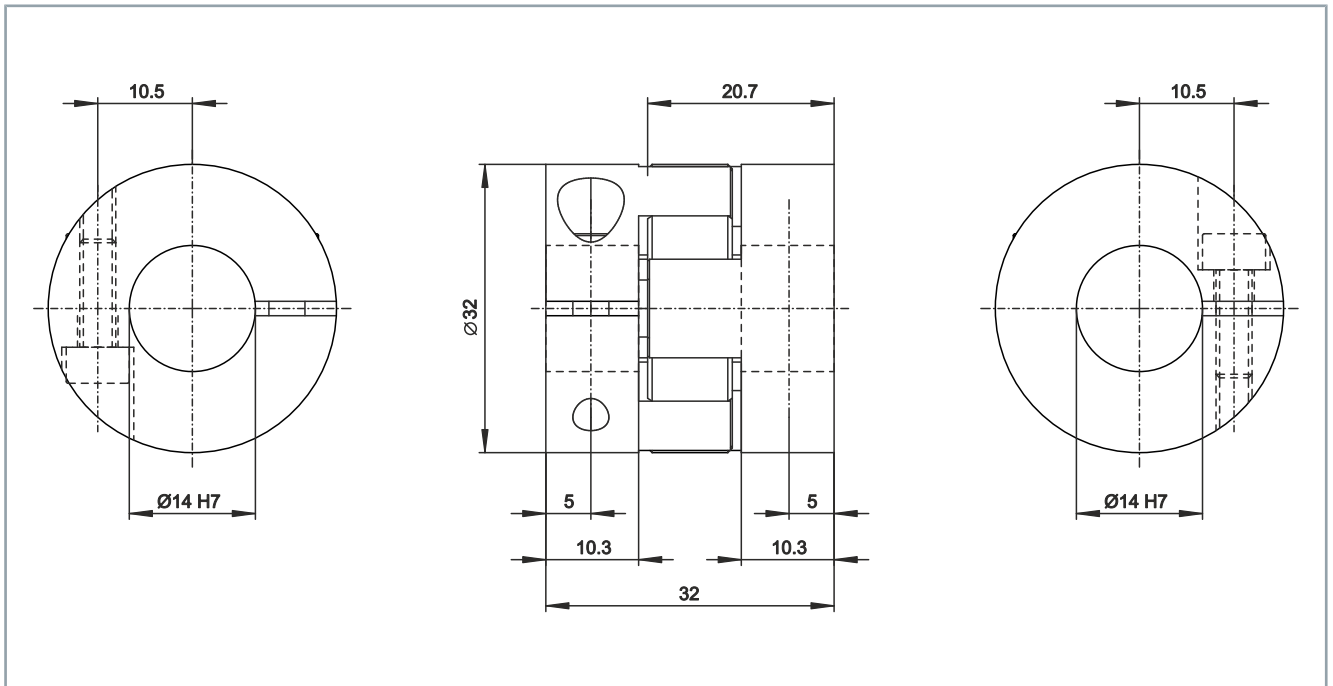
Mechanical data	AX2090-+EC10-c/d	
	Motor shaft diameter c / output shaft diameter d	
	14.00 / 14.00	14.00 / 16.00
Shore hardness of elastomer ring [Sh]	98	
Proportionate attenuation [ψ]	0.4 to 0.5	
Rated torque T_{KN} [Nm]	12.5	
Max. torque T_{KMAX} [Nm]	25	
Spacing distance A [mm]	11.5	
Fit length C [mm]	10.3	
External diameter B [mm]	32	
External diameter of bolt head B_S [mm]	32	
Moment of inertia per hub J_1/J_2 [kg cm ²]	0.03 / 0.03	
Approx. mass [kg]	0.05	
Center-to-center distance F [mm]	10.5	
Distance F [mm]	5	
Standard speed [rpm]	13000	
Hub length H [mm]	20.7	
Installation length A [mm]	32	
Maximum inner diameter of elastomer ring D_E [mm]	14.2	
Offset		
Lateral [mm]	0.1	
Angular [degrees]	1	
Axial [mm]	±1	
Screws		
Thread	M4	
Tightening torque [Nm]	4	
Fit	H7	

Dimensional drawing

- All figures in millimeters

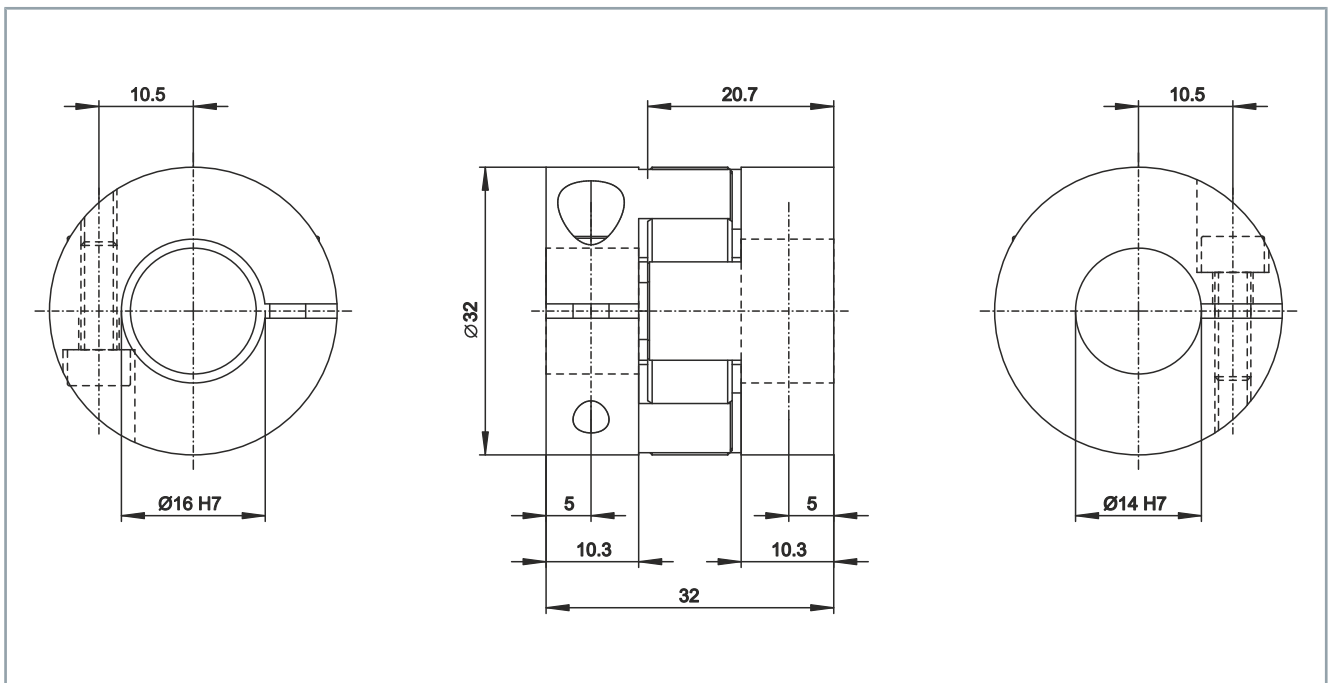
14.00 / 14.00

- Motor shaft diameter / output shaft diameter



14.00 / 16.00

- Motor shaft diameter / output shaft diameter





Check missing or damaged parts

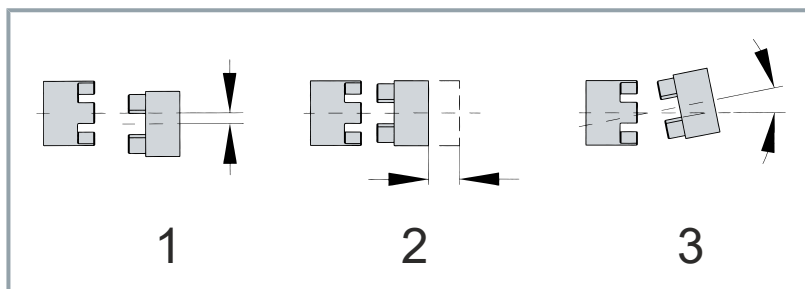
Check your delivery for completeness. If any parts are missing or became damaged during transport, contact the carrier, vendor or our service department immediately.

Please check that the delivery includes the following items:

- 2x clamping hub
- Elastomer ring
- 2x fastening screws according to ISO 4762

Shaft offset

The purpose of the elastomer couplings is to compensate the lateral, axial and angular shaft offsets.



Number	Meaning
1	Lateral offset
2	Axial offset
3	Angular offset



Prolonged service life through precise alignment

The service life of the elastomer coupling will be prolonged by precise alignment. The load on the bearing is thereby reduced so that the running smoothness of the entire drivetrain is positively affected.

Beckhoff recommends alignment using a dial gauge if you use the elastomer coupling with very high speed drives.

The maximum permissible guide values for the different types of offset are given in the "Technical data", [Page 16]. Operationally-related influences such as thermal elongation can be compensated by adhering to the permissible guide values. The maximum permissible guide values must be reduced if several types of offset occur simultaneously. The sum of the actual offsets as a percentage of the maximum value may not exceed 100%.

Installation



Check the spacing distance

Check the spacing distance specified in the Technical data so that the elastomer ring is axially movable.

The elastomer coupling can be damaged and fail if you do not adhere to the permissible spacing distance.

With intermediate flange

If you install the elastomer coupling in an intermediate flange, be sure to make the centering fits and plane parallelisms of machine and intermediate flange as well as of intermediate flange and motor as exact as possible. This will keep the offset very small.



Damage to the coupling through lack of axial mobility

When installing the elastomer coupling without an intermediate flange, ensure that the coupling has axial play and is freely movable in the axial direction.

The elastomer coupling can be damaged or fail if it is incorrectly installed.

Without intermediate flange

If you install the elastomer coupling between a stationary motor and the gear unit, carry out a precise alignment and check it with a dial gauge, rule and feeler gauge.

Preparation



Use TPU-compatible lubricants

Do not use lubricating pastes, other high-pressure additives or oils and greases containing molybdenum disulphide. Use Vaseline, for example.

The use of unsuitable lubricants can lead to incompatibility with the elastomer ring and impair the functionality.



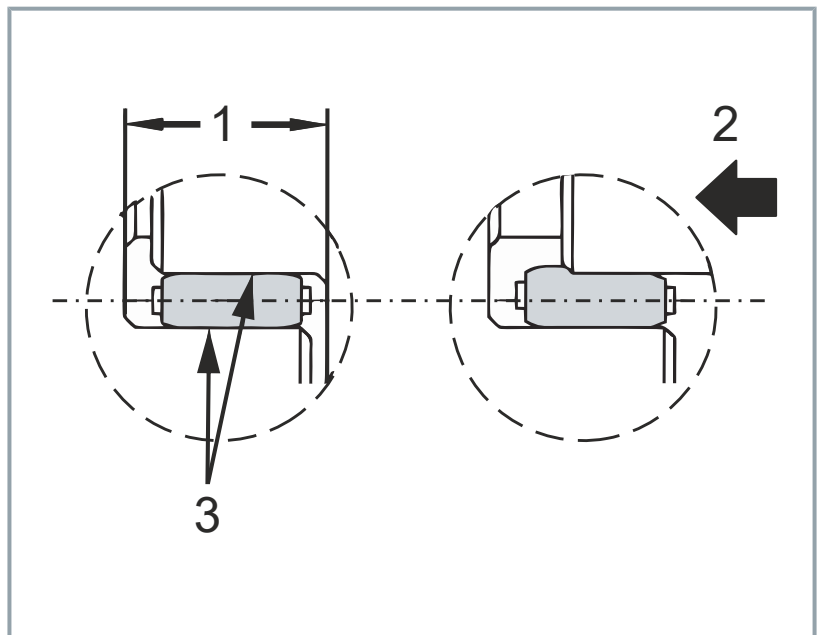
Facilitated assembly

The bores in the coupling hub have an H7 fit. Beckhoff recommends play of 0.1 – 0.5 mm between the coupling hub and the shaft.

The fitting tolerance and the oiling of the shaft journals simplify the assembly and disassembly of the coupling.

Check the shaft connection dimensions and the tolerances. Make sure that the shafts to be connected and bores in the hub are clean and free from burrs. Adhere to the fitting tolerance and oil the shaft journals prior to assembly.

When pushing the coupling hubs together, the compressive pre-stressing of the elastomer ring requires an axial mounting force. The axial force can be reduced after cleaning the elastomer ring and by lightly oiling the contact surfaces.



Number	Meaning
1	Spacing distance, see "Technical data", [Page 16]
2	Axial mounting force
3	Contact surfaces

Pre-drilled coupling hub

⚠ WARNING

Do not exceed the permissible bore diameter

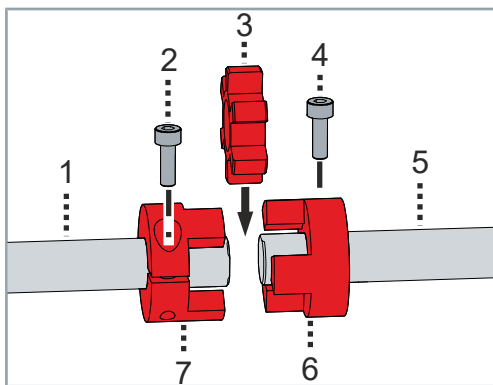
Do not exceed the maximum permissible bore diameters; see "Technical data", [Page 16].

If you exceed the maximum values, the coupling may break and parts may be ejected. Flying parts can lead to serious or even fatal injuries.

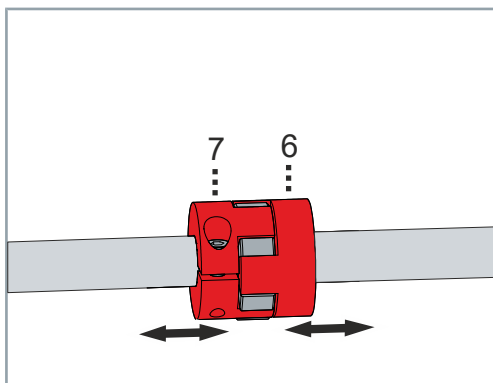
Adhere to the concentricity and axial run-out accuracies and do not clamp to the hub bridges.

For customer-specific special solutions and changes to the coupling hubs, contact our Applications Department. Beckhoff GmbH & Co. KG accepts no liability for unapproved, unauthorized conversions and modifications of the components.

Mounting



- ▶ Mount the coupling hubs [6] and [7] on the shafts [1] and [5]
- ▶ Insert the screws [2] and [4]
- ▶ Position the elastomer ring 3



- ▶ Push the coupling hubs [6] and [7] together and align
- ▶ Make sure that you adhere to the spacing distance between the coupling hubs as specified in the "Technical data", [Page 16]
- ▶ Tighten the screws to the torque specified in the "Technical data", [Page 16]

⚠ WARNING

Shut down and secure the machine or plant

Make sure that the machine or plant is shut down and secured against accidental start-up.

Failure to observe may result in components moving in the machine or plant. Rotating or moving components can lead to serious injuries.

Contamination, dust or chips can have a negative effect on the function of the components. In the worst case, contamination can lead to failure. Therefore, clean and service the components at regular intervals.

The elastomer couplings are generally maintenance-free. However, the elastomer ring may wear if operated under extreme environmental and operating conditions.

During regular maintenance, carry out a visual inspection of the elastomer ring and use only original spare parts.

Disassembly may only be carried out by qualified and trained personnel. For more information please refer to Chapter: Documentation notes.

When disposing of electronic waste, make sure that you dispose of it in accordance with the regulations applicable in your country. Read and follow the instructions for proper disposal.

Disassembly

Loosen the screws in order to disassemble the elastomercouplings.

Disposal

Depending on your application and the products used, ensure the professional disposal of the respective components:

Cast iron and metal

Dispose of cast and metal parts as scrap metal for recycling.

Cardboard, wood and foam polystyrene

Dispose of packaging materials made of cardboard, wood or foam polystyrene in accordance with the regulations.

Plastics and hard plastics

You can recycle parts made of plastic and hard plastic via the recycling depot or re-use them depending on the component designations and markings.

Oils and lubricants

Dispose of oils and lubricants in separate containers. Hand over the containers at the used oil collection station.

Batteries and rechargeable batteries

Batteries and rechargeable batteries may also be marked with the crossed-out trash can symbol. You must separate these components from the waste and are legally obliged to return used batteries and rechargeable batteries within the EU. Observe the relevant provisions outside the area of validity of the EU Directive 2006/66/EC.

Returning to the vendor

In accordance with the WEEE-2012/19/EU directives, you can return used devices and accessories for professional disposal. The transport costs are borne by the sender.

Send the used devices with the note "For disposal" to:

Beckhoff Automation GmbH & Co. KG
Gebäude „Service“
Stahlstraße 31
D-33415 Verl

In addition, you have the option to contact a local certified specialist company for the disposal of used electrical and electronic appliances. Dispose of the old components in accordance with the regulations applicable in your country.

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