

# CAHB-10

Linear actuator



## WARNING

*Read this manual before installing, operating or maintaining this actuator. Failure to follow safety precautions and instructions could cause actuator failure and result in serious injury, death or property damage. Keep this manual nearby for future reference.*



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# 1 General information

## 1.1 Information in this manual

This manual provides important information on how to work with the actuators (also called device) safely and efficiently.

The manual is part of the actuator, must always be kept near the device and should be available for the personnel to read at any time. All personnel working with the actuator must read and understand this manual before starting any work. Strict compliance with all specified safety notes and instructions is a basic requirement.

Moreover, the accident prevention guidelines and general safety precautions applicable at the place of use of the actuator must also be complied with.

For better representation of circumstances, the illustrations used are not necessarily to scale and may vary from the actual design of the actuator.

All information and notes in this manual were compiled by giving due consideration to applicable standards and regulations, the present status of technology and our years of knowledge and experience.

## 1.2 Explanation of symbols and signal words

### Safety precautions

Safety precautions are identified by symbols and signal words defined on the right side of this page.

These signal words indicate the severity of the hazard.

Adhere to these safety precautions and act cautiously in order to avoid accidents resulting in personal injury and property damage.

### Note!

Describes useful hints and recommendations as well as information for efficient and trouble-free operation..

### CAUTION

Is used to indicate a dangerous situation, which can lead to minor or moderate personal injury or property damage, if the precautionary measures are ignored

### WARNING

Is used to indicate a dangerous situation, which can lead to serious injury or death, if the precautionary measures are ignored.

### DANGER

Is used to indicate a dangerous situation, which will lead to serious injury or death, if the precautionary measures are ignored.

## 1.3 Limitation of liability

The manufacturer will not be liable for injury or damage resulting from:

- disregarding this manual
- unintended use
- employment of untrained personnel
- unauthorized conversions
- unauthorized technical modifications
- manipulation or removal of the screws on the actuator
- use of unapproved spare parts

In case the actuator is customised by SKF, the actual product delivered may be different from what is described in the manual. In this case, ask SKF for any additional instructions or safety precautions relevant to these actuators.

We reserve the right to make technical modifications to the actuator to improve usability.



## 1.4 Warranty terms

The applicable and effective warranty terms are those contained in the manufacturer's terms and conditions of sale contained in the SKF sales contract that governs this sale.

## 1.5 Customer service

SKF customer service is always available to provide technical information and answer questions.

See your local SKF customer service on [www.skf.com](http://www.skf.com)



# 2 Safety

This chapter provides an overview of important safety precautions and information necessary for safe and trouble-free installation, operation and maintenance.

Disregarding this manual and safety precautions specified therein may result in considerable danger and possible serious injury or death.

## 2.1 Intended use

The actuator has been designed and built exclusively for its intended purpose as described in these instructions.

### WARNING

#### Risk from misuse!

Any utilization of this actuator beyond its intended purpose may lead to potentially hazardous situations.

Therefore, follow the precautions below:

- Strictly adhere to all safety precautions and instructions in this manual.
- Do not allow this actuator to be subjected to weather conditions, strong UV rays, corrosive or explosive air media as well as other aggressive media.
- Do not modify, retool or change the structural design or individual components of the actuator.
- Never use the actuator outside of the technical application and operational limits.

## 2.2 Responsibility of the owner and processor

The actuator is designed for use in commercial applications by its owner or processor.

The processor is the contracting partner of the reseller or the manufacturer. The processor installs the actuator in a complete system (application).

The owner of the system is the user and therefore subject to the requirements of the Occupational Health and Safety Act.

In addition to the safety instructions in this Manual, the owner or processor must do the following concerning these safety and accident prevention guidelines and environmental protection regulations applicable to the site of the system's installation:

- Inform themselves of applicable industrial safety precautions and determine additional hazards that arise due to the specific working conditions prevailing at the site where the actuator is installed using risk assessment. Risk assessment must be implemented in the form of work instructions for the actuator operation.
- Confirm that the work instructions created for the system including the actuator satisfy current legal requirements and the work instructions must be altered if they don't.
- Clearly regulate and specify the responsibilities for installation, operation, maintenance, and cleaning.
- Ensure that all employees who deal with the actuator have read and understood this Manual.
- Provide personnel with the required protective equipment.

In addition, owner must train personnel at regular intervals and inform personnel of the hazards.

In addition, owner or processors must ensure that the device is in an adequate working condition. They must do the following:

- Ensure that the maintenance intervals described in these instructions are complied with.
- Have all safety devices inspected regularly to ensure proper functionality.

Any injury, damage or loss caused by a failure to follow the instructions in this manual will be the responsibility of the owner.

## 2.3 Personnel requirements

### WARNING

Risk from misuse!  
Improper installation, operation and maintenance can result in serious injury, death or property damage.

Use only qualified, instructed, or trained personnel (as described below) who have read, understand and follow these instructions.

### 2.3.1 Qualifications

The following qualifications are specified for different areas of activity listed in the manual.

- **An instructed person (Operator),**  
has been instructed by the owner in an orientation session on the assigned tasks and possible dangers in case of improper behaviour.
- **Qualified personnel,**  
based on their professional training, know-how and experience as well as knowledge of the applicable standards and regulations, are to perform assigned work activities and to detect and avoid possible dangers on their own.

- **A professional electrician,** based on his/her professional training, know-how and experience as well as knowledge of the applicable standards and regulations, is able to perform work on electrical systems and to detect and avoid possible dangers on his/her own.

The professional electrician has been trained for the special location where he/she works and knows the relevant standards and regulations.

Only persons who are expected to perform their tasks reliably are permitted to work with this device. Persons whose reaction capability are impaired, through, for example, drugs, alcohol or medication, should not work on this device.

## 2.4 Specific dangers

The following section lists the residual risks that have been determined by the performance of a risk assessment.

- **Read the safety instructions listed here and the warnings in subsequent chapters of this Manual to reduce health hazards and to avoid dangerous situations.**

### DANGER

#### **Danger to life caused by electric current!**

Touching conductive parts causes a direct danger to life. Damage to insulation or individual components can cause danger to life.

Therefore, follow the precautions below:

- In the event of damage to insulation, switch off the power supply immediately and have the parts repaired.
- Work on the electrical system must be carried out only by professional electricians.
- De-energize the system for all work on the electrical system.
- Before maintenance, cleaning or repair work, switch off the power supply and perform lockout procedures so it cannot be turned on again.
- Do not bridge fuses or make them ineffective. When changing fuses, make sure you use the correct amperage.
- Keep moisture away from conductive parts. If you do not, this can cause short circuit.



**Electric current**



 **WARNING**
**Danger of injury caused by moving components!**

Rotating and/or linearly moving components can cause serious injury.

Therefore, follow the precautions below:

- Do not work on or place any of your body, hands, or arms near moving components.

## Moving components

## 2.5 Safety equipment

 **WARNING**
**Danger due to malfunctioning safety equipment!**

For safe operation, be sure all safety equipment is in good working order.

Therefore, follow the precautions below:

- Always check functionality of safety equipment according to the maintenance plan.
- Never disengage safety equipment.
- Safety equipment shall never be by-passed or modified.

**Integration in an emergency-stop system required (for specific applications)**

The actuator is only intended for installation into an application or system. It does not have its own operating control elements and does not have an independent emergency-stop-function.

Install the actuator so that it is part of an emergency shut-off system and can be stopped if necessary.

The emergency shut-off system has to be connected in such a way that a disruption of the power supply or the reactivation of the power supply after a power disruption cannot cause a hazardous situation for persons and objects.

The emergency shut-off systems must always be freely accessible.

**Note!**

The processor decides whether the intended application requires the installation of an emergency shut-off system.

The following safety features may have been installed:

In its standard version, the actuator features a thermal switch protection integrated into the motor housing. This switch protects the motor from overheating.

## Thermal switch

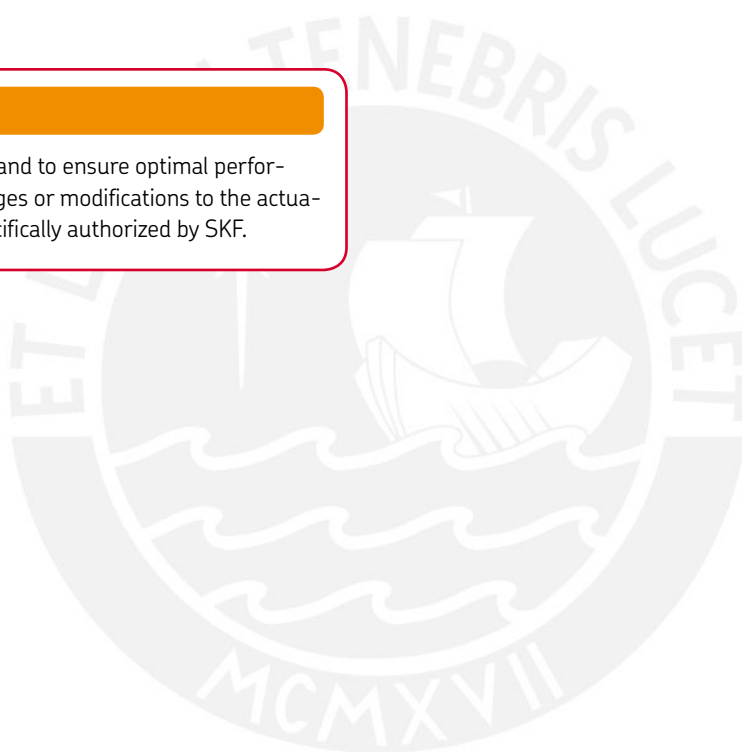
### CAUTION

To prevent damage from overheating, do not try to operate actuator until its temperature has fallen below the threshold for the switch to operate (95 °C).

## 2.6 Changes and modifications on the actuator

### WARNING

To avoid hazardous situations and to ensure optimal performance, do not make any changes or modifications to the actuator unless they have been specifically authorized by SKF.



# 3 Technical data



**Note!**

The technical data (dimensions, weight, output, connection values etc.) can be found in the enclosed drawings and data sheets (→ **Appendix**).

## 3.1 Operating conditions

**Environment**

Information	Value	Unit
Temperature range	-40 to +85	°C
Relative atmospheric humidity (no build up of condensation)	up to 85	%

**Duration (intermittent)**

Information	Value	Unit
Maximum operating time without a break	1	Cycles
Break until next operation	3	Times of operating time

## 3.2 Product label

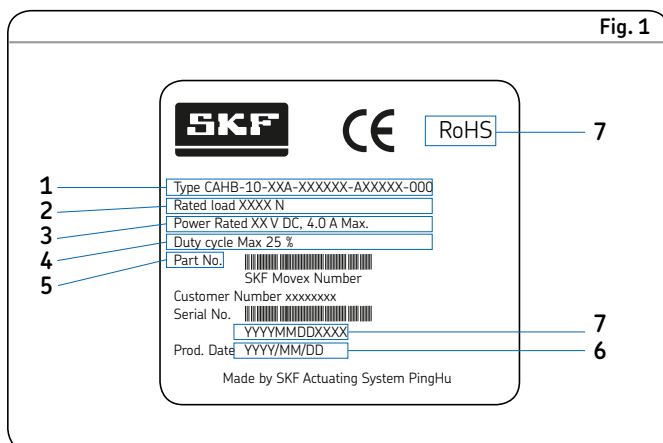


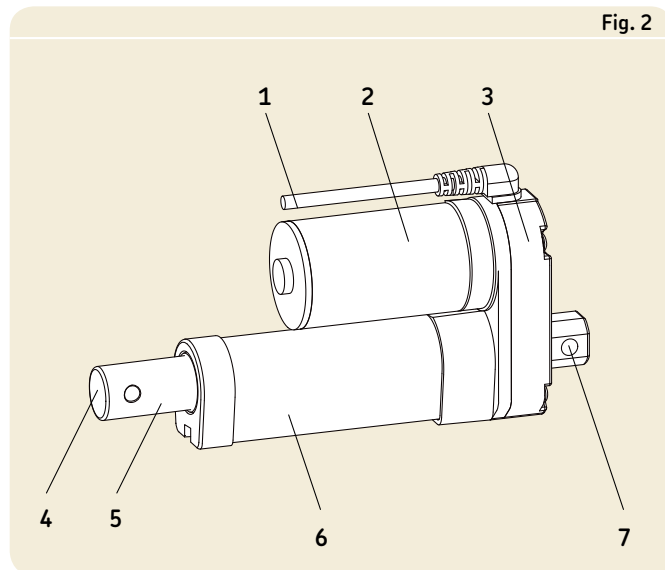
Fig. 1

The product label provides the following information

- 1 Identification of actuator
- 2 Load capacity
- 3 Power voltage and max current
- 4 Duty cycle
- 5 Part number
- 6 Production date
- 7 Serial number
- 8 RoHS mark

# 4 Structure and function

## 4.1 Overview



CAHB-10

- 1 Cable
- 2 Motor part
- 3 Gearbox
- 4 Front hinge head
- 5 Push tube
- 6 Guide tube
- 7 Rear hinge head

## 4.2 Brief description

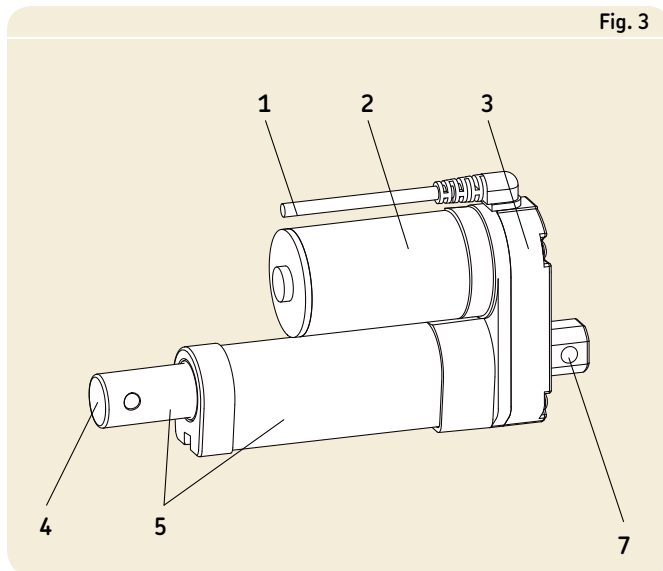


Fig. 3

Overview

This actuator is to be used exclusively for installation into a dynamic centric-compression or tensile-loaded lift.

The linear actuator consists of a motor part (3) and a linear unit (5), connected with each other by a bayonet joint.

The actuator consists of a direct current motor with spur gear which sets in motion a trapezoidal sliding spindle system with shaft joint. Via the lead screw mount, the sliding spindle transforms the rotation of the gear into a linear motion of the actuator (1).

The front hinge head (4) and the rear hinge head (7) transmit the actuator power to both sides of the application.

## 4.3 Construction group description

### Motor

The motor is a 12 or 24 V DC. The motor's shaft powers a spur gear. The lift speed depends on the load. The motor unit is surrounded by metal housing. The metal housing cannot be opened.

### Gear unit

The spur gear is directly powered by the motor shaft which moves a trapezoidal sliding spindle.

### Linear unit

The actuator extends and retracts the push tube. The linear unit is surrounded and protected by the guiding tube. The push tube of the actuator is connected to the spindle with a lead screw nut.

The linear unit is connected to the motor with several screws. These screws should not be loosened or removed.



## 4.4 Connections

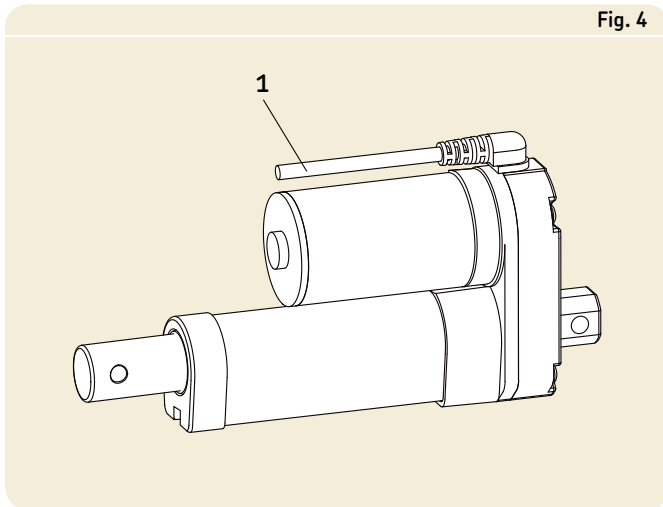


Fig. 4

### CAHB-10 connections

- 1 Wires to connect actuator to power supply or to an external control.

## 4.5 Features

If not specified otherwise, the options listed below are available for the entire series of CAHB-10 linear actuators

### 4.5.1 Limit switch

The limit switch makes it possible to control the stroke of the linear unit by internal setting.

### 4.5.2 Potentiometer

The potentiometer provides a signal indicating the position of the linear actuator.

There is one type of setting for the potentiometer wire.

- Linear actuator with potentiometer unit: colours of wire are white, purple and yellow (→ Fig. 11).

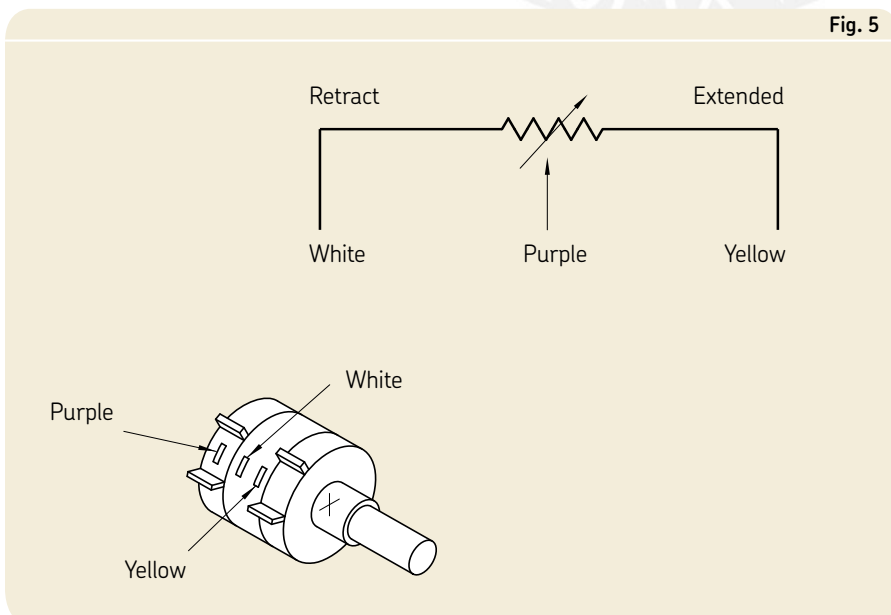


Fig. 5

### Potentiometer

### 4.5.3 Thermal switch

The thermal switch in the motor controls thermal overload by switching off the motor in an emergency.

**⚠ CAUTION**

To prevent damage from overheating, do not try to operate actuator until its temperature has fallen below the threshold for the switch to operate.

### 4.5.4 2-Hall encoder (optional)

The 2-Hall encoder provides a signal indicating the position of the linear actuator.

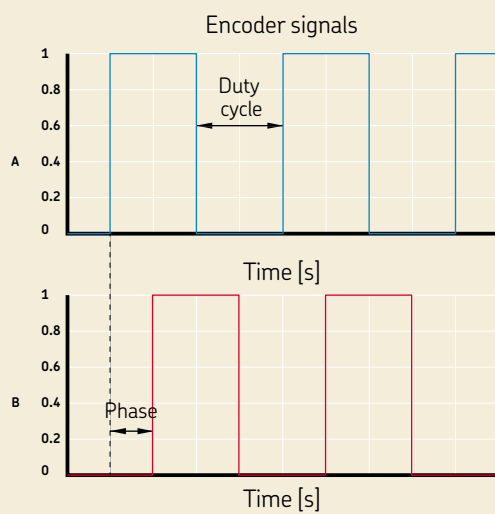
It is equipped with 2 Hall effect sensors 45° electrically shifted.

They are integrated on a PCB and read a 4 poles magnetic ring.

Hall sensors have an open collector output.

Hall sensors shall provide two signal outputs with the following characteristics:

Fig. 6





# 5 Transport, packaging and storage

## 5.1 Safety information for transport

### CAUTION

Significant damage to the actuator can occur if not properly transported, unpacked and stored.

Therefore, follow the precautions below:

- Proceed carefully during the unloading of the packaged items and during the delivery as well as during transport to its final destination. Comply with the symbols and information shown on the packaging.
- Only remove the actuator from its packaging right before installation.
- Note storage requirements for return transport to the manufacturer (→ Chapter *Storage*).

### Improper transport

## 5.2 Transport inspection

The CAHB-10 linear actuator is delivered as one packaged unit in a box or on pallets.

Check the delivery for completeness and damage due to transport immediately upon receipt. Send back actuator to manufacturer if it has cracks in the casing caused during transportation.

### Check completeness of delivery:

- A complete actuator unit.  
If damage to the exterior of the actuator has occurred during transport, do the following:
- Do not accept delivery or do so only with reservations.
- Record scope of damage on the transport documents or on the bill of delivery of the shipping company.
- Initiate complaint.

### Note!

Report any damage as soon as it has been identified. Damage claims can only be asserted within the transporter's applicable complaint period.

## 5.3 Return to the manufacturer

Proceed as follows for the return transport:

- 1 Dismantle the actuator if necessary (→ Chapter *Dismantling*).
- 2 Pack the actuator in its original packaging. Follow storage conditions (→ Chapter *Storage*).
- 3 Send to manufacturer. Contact SKF service to obtain a shipment address.

## 5.4 Packaging

### For packaging

The individual packaged pieces have been packaged appropriately according to the expected transport conditions.

The packaging is supposed to protect the individual components from damage caused by the transport, corrosion and other damage until they are ready for installation. Therefore, do not destroy the packaging and only remove the actuator shortly prior to the installation. Keep packaging for possible return shipment to the manufacturer (→ Chapter 5.3).

If the packaging is to be disposed off, please adhere to the following:

#### CAUTION

##### Environmental damage due to incorrect disposal!

Packaging material consists of valuable raw materials, which, in many cases, can be recycled.

Therefore, follow the precautions below:

- Dispose of packaging material in an environmentally correct way.
- Comply with locally applicable disposal regulations.

### Handling of packaging materials

## 5.5 Storage

Pack the actuator in its original packaging for storage.

- Do not store outside.
- Dry and dust-free storage.
- Keep away from any aggressive media.
- Protect from UV radiation.
- Avoid mechanical vibrations.
- Storage temperature:  $-20$  to  $40$  °C.
- Relative atmospheric humidity: max. 95% (no build up of condensation).
- For storage longer than three months, check the general condition of all parts of the packaging on a regular basis.



### Note!

It is possible that there are notices on the packaging concerning additional storage requirements. If so, follow all requirements.



# 6 Installation and first operation

## Authorized personnel

- The installation and first start of operation may only be conducted by qualified personnel.
- Work on the electric system may only be performed by professional electricians.

### WARNING

#### Electric shock and moving parts hazards

Serious injury or death can be caused by touching live electrical components and by unexpected movement of the actuator.

**Be sure the system's power supply is off and actuator is locked out before installing.**



Electrical equipment

### WARNING

#### Danger if restarted without authorization!

When correcting faults, there is danger of the energy supply being switched on without authorization. This poses a life-threatening hazard for persons in the danger zone.

Therefore, follow the precautions below:

- Prior to starting work, switch off the system and be sure it is locked out.



Safeguarding against restart

### WARNING

#### Risk of injury and device damage due to incorrect installation of the optional devices!

Therefore, follow the precautions below:

- Optional devices, in particular components that are part of a retrofitting, may only be installed in accordance with their respective instructions (circuit diagram).
- The electromagnetic compatibility must be tested for the routing and appropriate measures must be carried out and as described in the device's operating manual.



Optional devices

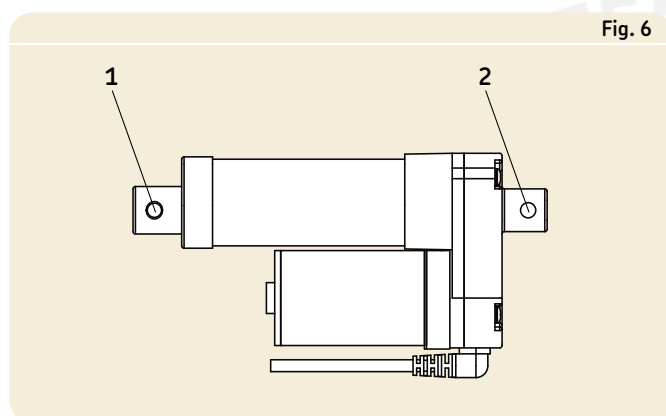
## 6.1 Installation location

- Adhere to the technical data for operating conditions (→ **chapter 11 Appendix**).
- Install in a location where the actuator is not exposed to strong UV radiation or corrosive or explosive air media.

## 6.2 Installation

The CAHB-10 linear actuator can be attached over two elements, via the front rod end (**1**) and the trunnion mount (**2**) (the trunnion has two options: pins and bushings).

- 1 Connect the front rod end and trunnion mount to appropriate elements of the application. Adjustments of the rod end are not allowed!



### Note!

Information concerning the dimensions of the drill holes for fastening bolts can be found in the respective data sheets. (→ *Appendix*).

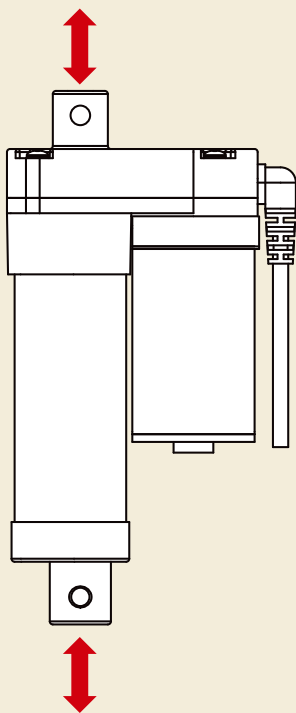
### ⚠ WARNING

#### Risk of injury and device damage due to insufficient fastening!

Only use fastening bolts and secure them adequately. Do not use screws to install. Never loosen or otherwise manipulate screws on actuator or options.

- 2 Ensure the applied force on the linear actuator is always concentric with the axis of the actuator (→ Fig. 7).

Fig. 7



**⚠ WARNING**

**Risk of injury and device damage due to incorrect installation!**

During installation, do not subject the actuator to side-impact or to turning forces.

- 3 During installation, make sure that the linear actuator is not blocked in its movement over the entire stroke.
- 4 During installation, be sure that the motor cable is not squeezed, clamped or pulled.
- 5 Connect linear actuator to power supply (→ **Subchapter Connect to power supply**).
- 6 Ensure that none of the supply or control cables can be pinched by the kinematics of the application or by the linear actuator during the extension or retraction.

## 6.3 Inspections prior to first operation

Prior to the first operation, a professional electrician must perform and document the following tests and readings:

- Check visual condition
- Function check of operating features and safety features
- Reading of protective conductor resistance
- Reading of leakage currents
- Reading of insulation resistance



**Note!**

Additional information concerning inspections and readings (→ Chapter *Maintenance*).

## 6.4 Connect to power supply

**⚠ DANGER**

**Electrical shock hazard**

Incorrect installation can result in serious injury, death or damage.

Only professional electricians should work on electrical systems.



**Electrical equipment**

- 1 Connect cable to electric grid.
- 2 Actuator performs the extending and retracting as defined in **Table 1**.

**Table 1**

	Cable (Red)	Cable (Black)	Actuator (Standard)
I	-	+	Extending
II	+	-	Retracting

# 7 Operation

## 7.1 Safety

### DANGER

#### Risk of crushing!

Actuator may cause serious injury while moving.

Therefore, follow the precautions below:

- Ensure that there are no persons in the stroke area of the actuator while in operation.
- Take note of maximum permissible performance specifications for the actuator (→ Data sheets in **Chapter 11 Appendix**).
- Never tamper with the elements that are connected to the actuator while the actuator is in operation.

### CAUTION

#### Risk of injury through contact with the hinge head!

Therefore, follow the precautions below:

- Do not let objects or body parts come in contact with the hinge head of the actuator.

### CAUTION

#### Device damage due to static and dynamic overload of the actuator!

Therefore, follow the precautions below:

- Adhere to maximum permissible operating data for the actuator (→ Data sheets in **Chapter 11 Appendix**).
- Never exceed nominal load.
- Never tamper with the elements that are connected to the actuator while the actuator is in operation.



**⚠ CAUTION**

The device may be damaged if liquids penetrate the actuator during extension and retraction. Keep liquids away.

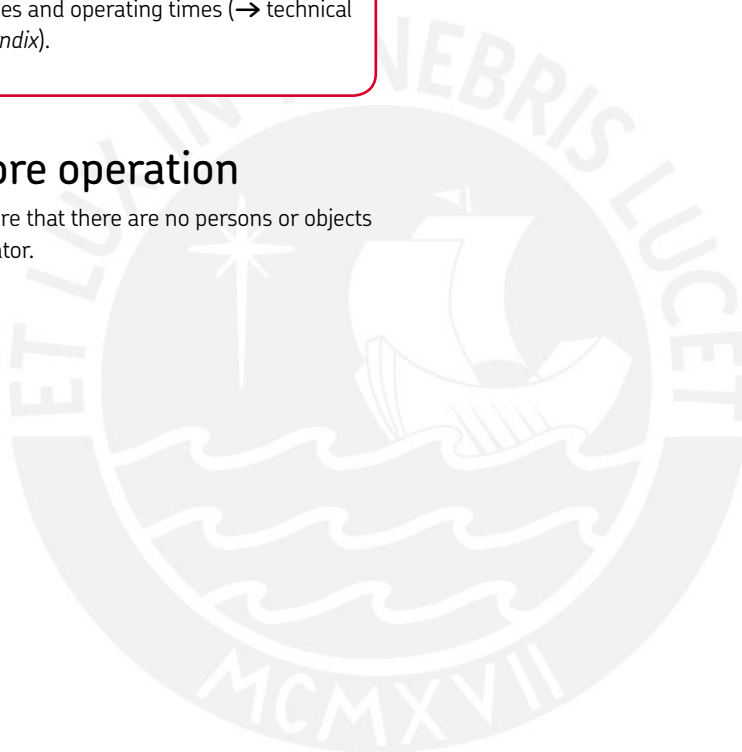
**⚠ CAUTION****Device damage through overheating!**

Therefore, follow the precautions below:

- Only use control integrated thermal switch.
- Never exceed nominal load (→ technical data in **Chapter 11 Appendix**).
- Always adhere to idle times and operating times (→ technical data in **Chapter 11 Appendix**).

## 7.2 Action before operation

Before operating device, ensure that there are no persons or objects in the stroke area of the actuator.



## 7.3 Action during operation

### 7.3.1 Normal operation

During normal operation, the linear actuator lifts and lowers the elements that are connected with the CAHB-10 linear actuator via the hinge head.

The linear actuator can directly connect to electrical grid or be controlled by an operating element.

The linear actuator extends or retracts as long as the power is being supplied or until the linear actuator is completely extended or retracted.

Prevent the linear actuator from completely extending or retracting by cutting off power before the end of the stroke or setting up the external limit switch.

The external limit switch has to cut off the power supply to the linear actuator immediately when the limit switch is activated and before the actuator is completely extended or retracted.

Any component that can perform the same function described above can be used.

#### CAUTION

##### Device damage through overheating!

Therefore, follow the precautions below:

- Only use control integrated thermal switch.
- Never exceed nominal load.
- Always adhere to idle times and operating times (→ technical data in **Chapter 11 Appendix**).

#### DANGER

##### Electrical shock hazard

Incorrect installation can result in serious injury, death or damage.

Only professional electricians should work on electrical systems.



Electrical equipment

## 7.4 Disengagement in case of emergency

In hazardous situations, all movements of the actuator must be stopped as quickly as possible and the power supply must be turned off.

### Proceed as follows in hazardous situations:

- 1 Immediately engage emergency shut-off, if present, or cut off power for actuator.
- 2 Evacuate people from the hazard zone and initiate first aid measures.
- 3 Notify responsible person on-site.
- 4 If rescue vehicles have been requested, keep access paths open for rescue vehicles.
- 5 Based on severity of emergency, notify the authorities if necessary.
- 6 Refer to qualified staff to repair malfunction.

### WARNING

Do not restart until all persons are outside the hazard zone.  
Check the actuator and application that uses the actuator prior to restarting the operation and ensure that all safety equipment is installed and fully functional

## 7.5 Action after use

Separate the actuator from the power supply.

# 8 Maintenance

## Personnel

- The maintenance work described herein can be performed by the operator unless otherwise indicated.
- Some maintenance tasks should only be performed by trained personnel, qualified personnel, or exclusively by the manufacturer; specific reference will be made in each case in the description of the respective maintenance task.

 **DANGER**

**Electrical shock hazard**

Incorrect maintenance can result in serious injury, death or damage.

Only professional electricians should work on electrical systems.



Electrical equipment

 **DANGER**

**Danger if restarted**

When correcting faults, there is danger of the energy supply being switched on without authorization. This poses a life-threatening hazard for persons in the danger zone.

Therefore, follow the precautions below:

- Prior to starting work, switch off the system and be sure it is locked out.



Safeguarding against restart

## 8.1 Spare parts

The CAHB-10 linear actuator is not designed for repair work by the customer. All warranty and service claims become void without notice if any screws on the linear actuator have been manipulated.

**⚠ WARNING**

**Safety hazard caused by wrong spare parts!**

Wrong or faulty spare parts can adversely affect safety and cause damage, malfunctions or total failure.

Therefore, follow the precautions below:

- Spare parts in/on the actuator may only be replaced by SKF.

The actuator must be dismantled and sent to the manufacturer to replace any spare parts..

## 8.2 Maintenance plan

Maintenance tasks that are required for optimal and trouble-free operation are described in the sections below.

If increased wear is detected during regular inspections, shorten the required maintenance intervals according to the actual indications of wear.

### Linear actuator CAHB-10 maintenance plan

Interval	Maintenance work	To be carried out by
<b>Daily</b>	Check actuator for visible damage (→ see below <i>Check of visual condition</i> )	Operator
	Clean off dust and dirt if necessary (→ see below <i>Cleaning</i> )	Operator
<b>Monthly</b>	Function check of operating features and safety features (→ see below <i>Inspections and readings</i> )	Qualified personnel
	Check tight fit of the actuator to the hinge head. Tighten if necessary	Qualified personnel
<b>Annually</b>	Check connection for tight fit	Professional electrician
<b>As suggested by processor</b>	Conduct visual inspection of the condition of the permanent safeguard and the routing of the supply and control cable within the application. Cable routing elements may not be loose or broken.	Qualified personnel

**! Note!**

If the linear actuator is used outside of the environmental conditions specified earlier in this manual, check such components once a month for any changes such as oxidation or sedimentation.

## 8.3 Maintenance

### 8.3.1 Cleaning

To be performed by operator

#### CAUTION

##### Damage due to incorrect cleaning!

Therefore, follow the precautions below:

- Do not use any aggressive cleaning agents. Water used for cleaning including chemical additives must be pH-neutral.
- Liquids must not touch the actuator during the retraction or extension.
- Only use additional cleaning materials listed by the SKF.
- No steam jets or pressure washers may be used to clean.
- Other cleaning agents or cleaning devices may only be utilized with the manufacturer's approval.

##### Clean line actuator:

- 1 Separate the actuator from the energy supply.
- 2 Clean dirty parts with a damp cloth.

### 8.3.2 Inspections and readings

To be performed by professional electrician

- The inspections and readings must be performed as required by the applicable standards and regulations. The list of the applicable standards can be found in the appendix.
- The inspections must be documented (→ "Service Log").

##### Service log

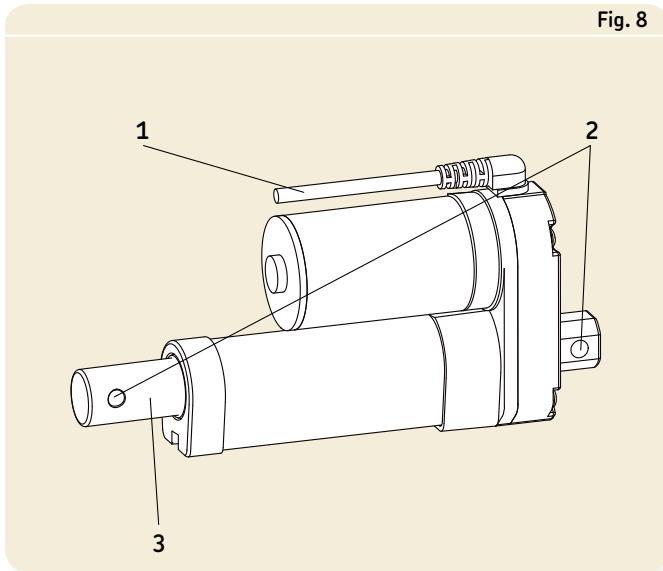
Complete the following entries in the service log:

- Name of the executing body (company, department).
- Names of the staff on duty.
- Identification of the actuator/system (type, serial number, inventory number) and the respective accessories.
- Completed inspections and readings.
- Scope and results of the inspections.
- Measuring method, measuring actuator, measuring results for readings.
- Overall assessment.
- Date and signature of the assessing person; personal coding is a viable alternative for IT applications.

### 8.3.3 Check of visual condition

To be performed by qualified personnel

- 1 Separate the actuator from the energy supply.
- 2 Check the following structural components for visible external damage:



- 1 Check connecting cables for cracks, cuts and pinched sections
- 2 Check hinge hole for cracks, deformation and broken pieces
- 3 Check stainless steel tube for scratches and indentations

- 3 Notify processor or SKF in case of damage
- 4 If there is no damage and the processors/manufacturer has not communicated any concerns, reconnect the actuator to the power supply.

## 8.4 Measures after completed maintenance

Upon completion of the maintenance, the following steps have to be performed prior to restarting the device.

- 1 Ensure that all tools, material and other equipment used during maintenance have been removed from the work area.
- 2 Clean work area and remove potential spills such as liquids, processing material or similar material.
- 3 Ensure that all safety measures of the system work properly without a problem.
- 4 Check to be sure that all actuator and system functions are operating correctly.
- 5 Document the maintenance in the service log.

# 9 Malfunctions

The following chapter describes potential causes for malfunctions and the work that is necessary to restore operation.

In the event of frequent malfunctions, shorten the maintenance intervals.

Contact the manufacturer concerning malfunctions which are not solved by the following suggestions.

## Personnel

- Unless indicated otherwise, the work described herein to solve malfunctions may be performed by the operator.
- Some work may only be carried out by qualified personnel, and is specifically indicated in the description of the individual malfunction.
- Work on the electric system may only be performed by professional electricians.

### DANGER

#### Electric shock and moving parts hazards

Serious injury or death can be caused by touching live electrical components and by unexpected movement of the actuator.

**Be sure power supply is off and actuator is locked out before installing.**



Electrical equipment

### DANGER

#### Danger if restarted

When correcting faults, there is danger of the energy supply being switched on without authorization. This poses a life-threatening hazard for persons in the danger zone.

Therefore, follow the precautions below:

- Prior to starting work, switch off the system and be sure it is locked out.



Safeguarding against restart



 **DANGER****Risk of injury and device damage due to incorrect repair of malfunction**

Therefore, follow the precautions below:

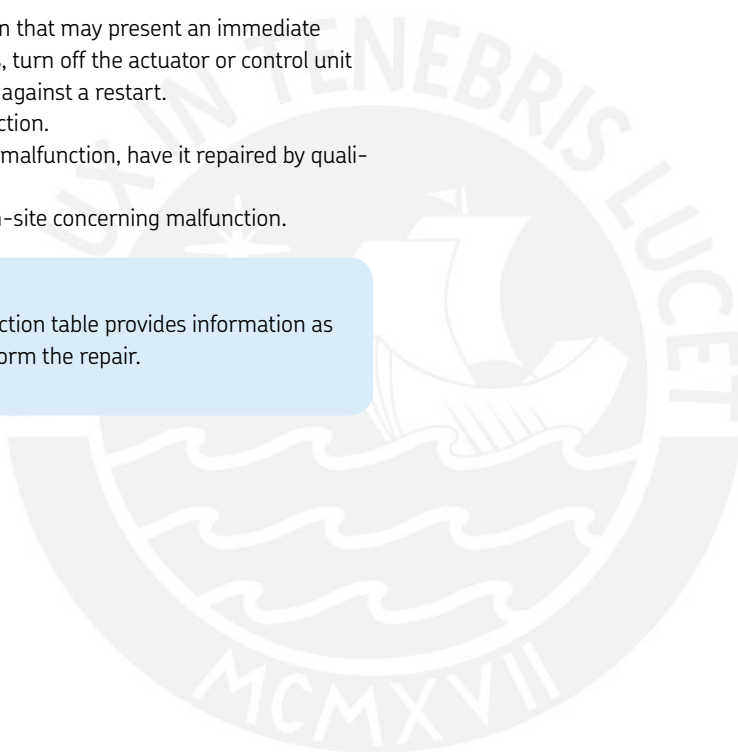
- Never loosen the screws on the device or try to open it.
- In the event of a malfunction that cannot be fixed by following the steps in the malfunction table in this operating manual, dismantle the actuator and send it to SKF for repair. (→ Chapter *Transport, packaging and storage*).

**Optional devices****Actions during malfunctions**

- 1 In the event of a malfunction that may present an immediate danger to persons or assets, turn off the actuator or control unit immediately and safeguard against a restart.
- 2 Determine cause of malfunction.
- 3 Depending on the type of a malfunction, have it repaired by qualified personnel.
- 4 Inform responsible party on-site concerning malfunction.

**Note!**

The following malfunction table provides information as to who is authorized to perform the repair.



## 9.1 Malfunction table

Malfunction	Possible cause	To repair malfunction	To be repaired by
<b>Linear actuator doesn't move</b>	No supply voltage	Check power supply	Professional electrician
	Lack of plug contact or plug has not been inserted properly	Plug contacts: Device control unit, control of voltage network. Check control operating element	Operator
	Defective network cable or power plug	Supply cable and plug of the lines: Check actuator control unit, control of voltage network control operating element for damage, if necessary replace defective elements	Professional electrician
	Obstacle in the stroke area of the linear actuator	Remove all obstacles in the stroke area	Operator
	Incorrect load	Measure static and dynamic load and compare with information concerning the product label. If the load capacity is exceeded, check the nominal load and install stronger actuator if necessary.	Qualified personnel
	Linear actuator cannot be set in motion by any of the above listed measures.	Exchange actuator	Qualified personnel
<b>Linear actuator cannot be lifted</b>	Obstacle in the stroke area of the linear actuator	Remove all obstacles in the stroke area	Operator
	Incorrect load	Remove all loads that are connected to the device	Operator
	Defective screw nut	Exchange actuator	Qualified personnel
<b>Significant reduced speed</b>	Obstacle in the stroke area of the linear actuator	Remove all obstacles in the stroke area	Operator
	Incorrect load	Remove all loads that are on the elements.	Operator
	Defective motor, gear or screw nut	Exchange actuator	Qualified personnel
<b>Significant increase in noise</b>	Obstacle in the stroke area of the linear actuator	Remove all obstacles in the stroke area	Operator
	Incorrect load	Remove all loads that are on the elements.	Operator
	Defective motor, gear or screw nut	Exchange actuator	Qualified personnel

## 9.2 Start of operation after fixing malfunction

After the malfunction has been fixed, perform the steps from the chapter Inspection prior to first operation.



# 10 Dismantling

## Personnel

- Dismantling may only be carried out by qualified personnel.
- Work on the electric system may only be performed by professional electricians.

### DANGER

#### Electric shock and moving parts hazards

Serious injury or death can be caused by touching live electrical components and by unexpected movement of the actuator.

**Be sure power supply is off and actuator is locked out before installing.**



Electrical equipment

### WARNING

#### Risk of injury due to incorrect dismantling!

Stored residual power, sharp-edged components, pins and corners on the individual components or on required tools can cause serious injury.

Therefore, follow the precautions below:

- Ensure there is ample space for dismantling prior to starting with the work.
- Use caution when working with open, sharp-edged structural components.
- Ensure order and cleanliness at the dismantling site! Loosely stacked structural components or structural components and tools on the floor may present a risk for accidents.
- Dismantle structural components pursuant to applicable local regulations.
- Secure structural components in a way so they would not be able to fall or tip over.
- Contact SKF if you have any questions or concerns.



Safeguarding against restart

## 10.1 Dismantling

### 10.1.1 Dismantling of CAHB-10

- 1 Separate actuator from energy supply (→ Chapter *Operation* → *Disengagement in case of emergency*).
- 2 Secure elements of the application in such a fashion that no loads can impact the hinge heads.
- 3 Loosen and remove fastening bolts from the mounting strap of the hinge heads.
- 4 Separate linear actuator from application elements.
- 5 Clean actuator.
- 6 Carefully package for shipment to the manufacturer (→ Chapter *Transport and packaging*).

## 10.2 Disposal

To the extent that no take-back or disposal agreement has been put in place, disassembled components should be recycled:

- Dispose of metals and plastic components at an appropriate recycling center.
- Sort remaining components based on the respective material and dispose of according to applicable local occupational health and environmental regulations.

### CAUTION

#### **Damage can be caused to the environment due to incorrect disposal!**

Electronic waste, electronic components, lubricants and other additives are subject to special waste treatment regulations and may only be disposed of by approved specialized companies!

The local municipal authorities or specialized waste management companies can provide information concerning environmentally appropriate disposal.

# 11 Appendix

## Technical data sheets

The following 4 pages are a reprint from  
PUB MT/P8 10265 EN - May 2013

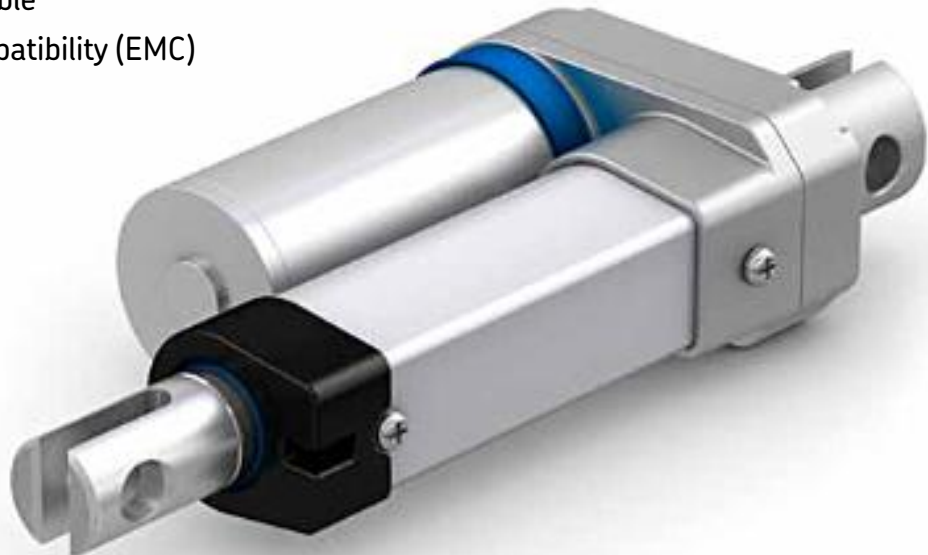


# Linear actuator

## CAHB-10 series

### Benefits

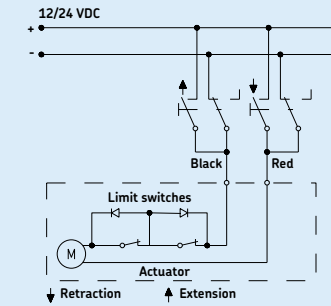
- Compact design
- Designed for harsh environment
- Robust and reliable
- Integrated limit switches
- Quiet operation
- Thermal protection
- Optional potentiometer and 2-Hall encoder available
- Electromagnetic compatibility (EMC) compliant



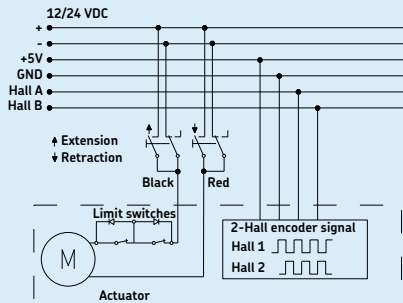
**SKF**

**Connecting diagram**

Basic configuration

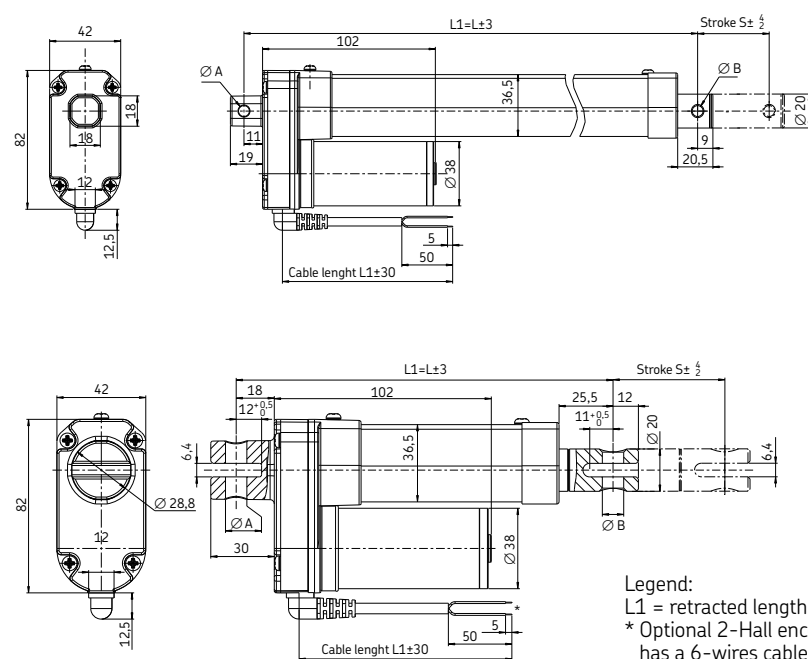


2-Hall encoder



**Dimensional drawing**

Basic configuration and optional 2-Hall encoder



Stroke (mm)	50	100	150	200	250	300
Retracted length (L1)	158	209	260	311	362	413
Retracted length with fork head	179	230	281	332	383	434

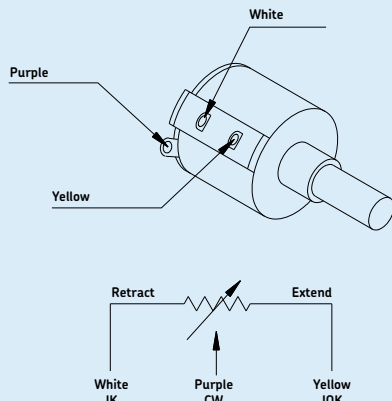
Encoder resolution	5:1	10:1	20:1	30:1	40:1
Gear ratio	5:1	10:1	20:1	30:1	40:1
Mm/pulse	0,3	0,15	0,075	0,05	0,038

Technical data	Unit	CAHB-10... 1	CAHB-10... 2	CAHB-10... 3	CAHB-10... 4	CAHB-10... 5
Push load	N	120	240	500	750	1 000
Pull load	N	120	240	500	750	1 000
Speed (full load to no load)	mm/s	45 to 56	24 to 30	13 to 16	8 to 10	6 to 8
Stroke	mm	50 to 300	50 to 300	50 to 300	50 to 300	50 to 300
Retracted length	mm	-*	-*	-*	-*	-*
Voltage	V DC	12 or 24	12 or 24	12 or 24	12 or 24	12 or 24
Power consumption	W	N/A	N/A	N/A	N/A	N/A
Current consumption 12 V DC	A	4	3,5	3,2	3	2,8
Current consumption 24 V DC	A	2,2	2,0	1,8	1,8	1,6
Duty cycle	%	25	25	25	25	25
Ambient temperature	°C	-40 to +85	-40 to +85	-40 to +85	-40 to +85	-40 to +85
Type of protection	IP	66s	66s	66s	66s	66s
Weight (at 300 mm stroke)	kg	1,5	1,5	1,5	1,5	1,5
Color	-	Silver	Silver	Silver	Silver	Silver
Limit switches	-	Yes	Yes	Yes	Yes	Yes
Thermal protection	-	Yes	Yes	Yes	Yes	Yes

\* See above table

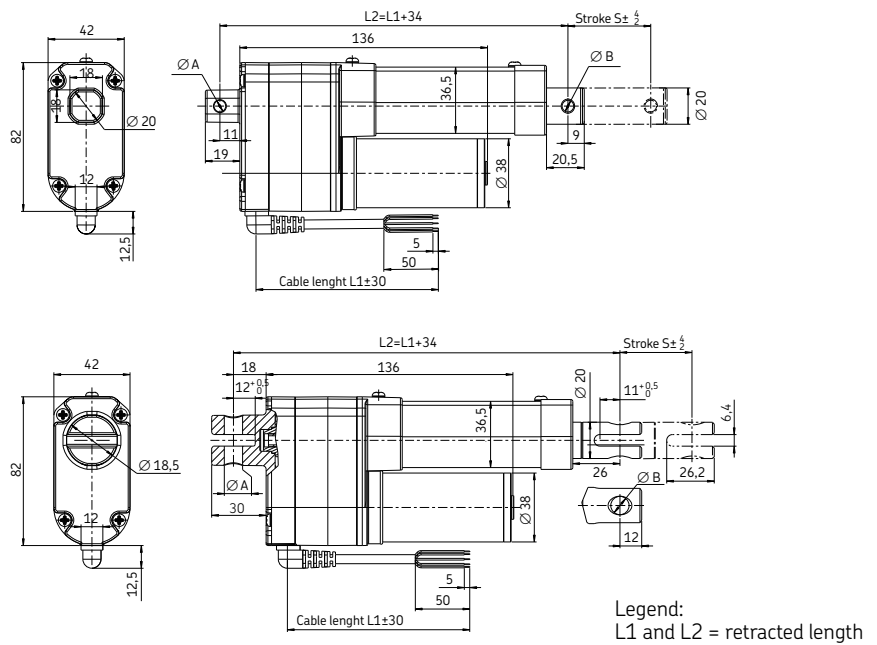


Potentiometer



Dimensional drawing

Optional potentiometer

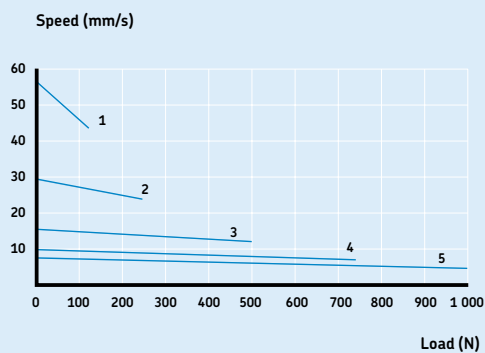


Stroke (mm)	50	100	150	200	250	300
Retracted length (L2)	192	243	294	345	396	447
Retracted length with fork head	213	264	315	366	417	468

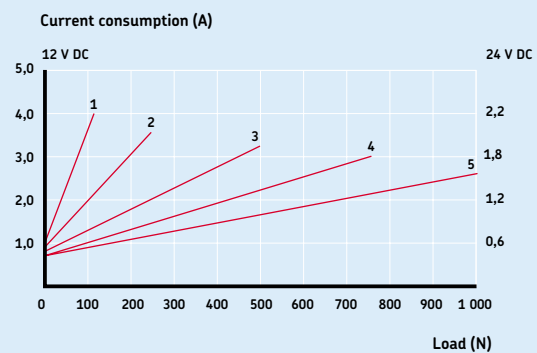
Potentiometer resolution

Stroke (mm)	50-80	80-160	160-300
Minimum resistance value of potentiometer	700-1300 $\Omega$	700-1300 $\Omega$	700-1300 $\Omega$
Potentiometer resolution	100 $\Omega$ /mm	50 $\Omega$ /mm	16,6 $\Omega$ /mm

Performance diagrams



Speed-load diagram



Current-load diagram

Ordering key

C A H B - 1 0 - [ ] [ ] A - [ ] [ ] [ ] [ ] - A [ ] [ ] [ ] [ ] 0 - 0 0 0

Type

Voltage:

12 V DC  
24 V DC

A  
B

Load:

120 N  
240 N  
500 N  
750 N  
1 000 N

1  
2  
3  
4  
5

Screw:

TR12 screw  
Customized

A  
X

Stroke:

50 mm  
100 mm  
150 mm  
200 mm  
250 mm  
300 mm

050  
100  
150  
200  
250  
300

Retracted length:\*

Stroke without potentiometer : \*\*

	A(B)+A(B)	A(B)+C	C+A(B)	C+C
50 mm	158 mm	165 mm	172 mm	179 mm
100 mm	209 mm	216 mm	223 mm	230 mm
150 mm	260 mm	267 mm	274 mm	281 mm
200 mm	311 mm	318 mm	325 mm	332 mm
250 mm	362 mm	369 mm	376 mm	383 mm
300 mm	413 mm	420 mm	427 mm	434 mm

IP:

Standard (IP 66s)

A

Front attachment:

Rod with hole Ø 6,4 mm  
Rod with hole Ø 8 mm  
Fork head with hole Ø 10,1 mm  
Customized

A  
B  
C  
X

Rear attachment:

Rod with hole Ø 6,4 mm  
Rod with hole Ø 8 mm  
Fork head with hole Ø 10,1 mm  
Customized

A  
B  
C  
X

Hole direction of the attachments:

0°  
90°

A  
B

Option 1:

None  
Potentiometer  
2-Hall encoder

O  
P  
H

Cable length:

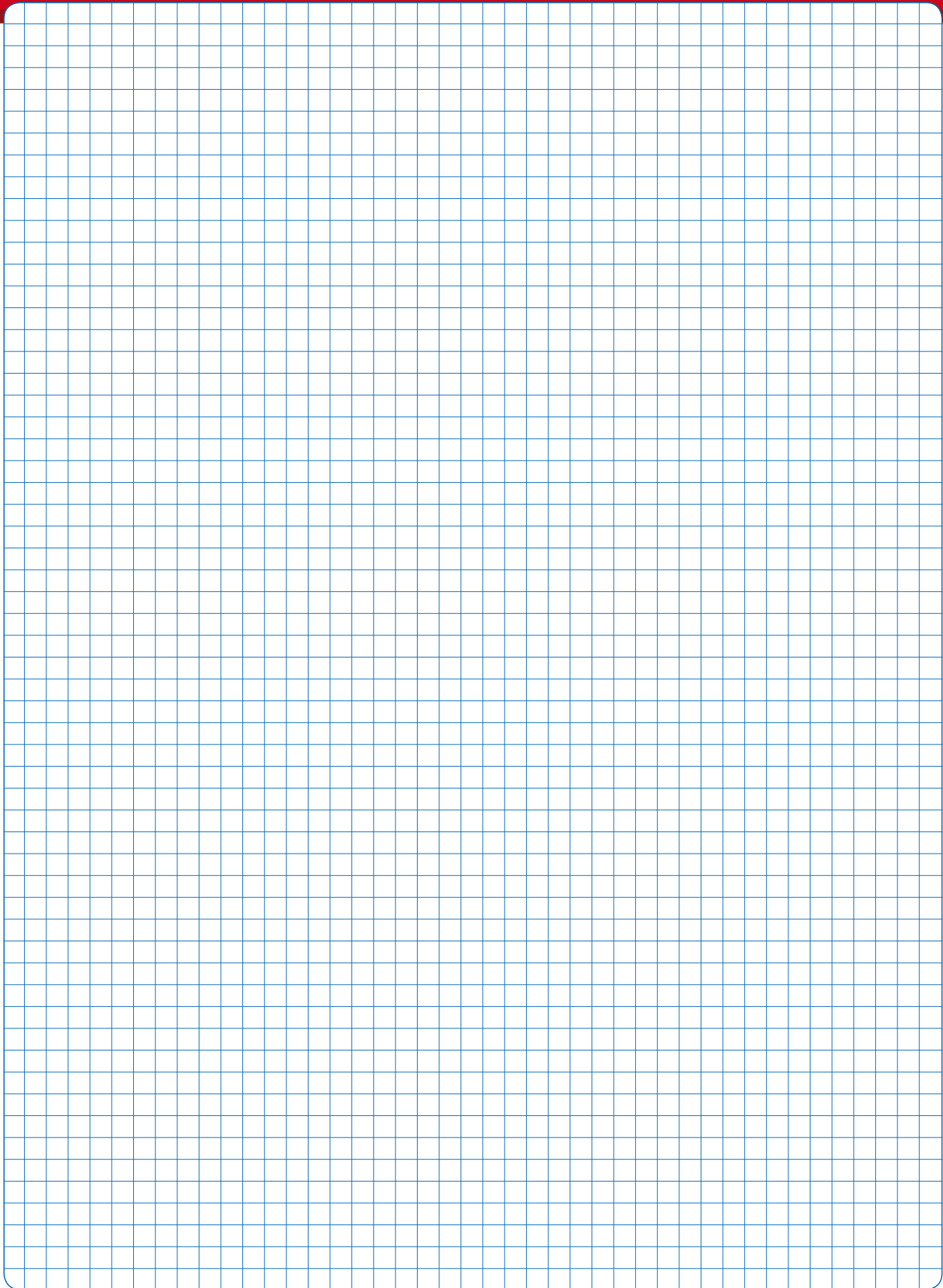
600 mm without connector  
1 000 mm without connector  
1 500 mm without connector  
2 000 mm without connector  
2 500 mm without connector  
3 000 mm without connector  
Customized

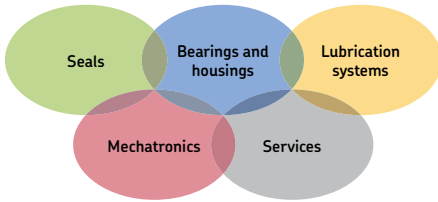
A  
B  
C  
X  
E  
F  
X

Auxiliary code (Standard products are "00")

\* Retracted length will be enlanged 34 mm with Potentiometer option  
\*\* Front attachment + Rear attachment; A, B, C mean the attachment types







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Combining products, people, and application-specific knowledge, SKF delivers innovative solutions to equipment manufacturers and production facilities in every major industry worldwide. Having expertise in multiple competence areas supports SKF Life Cycle Management, a proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership.

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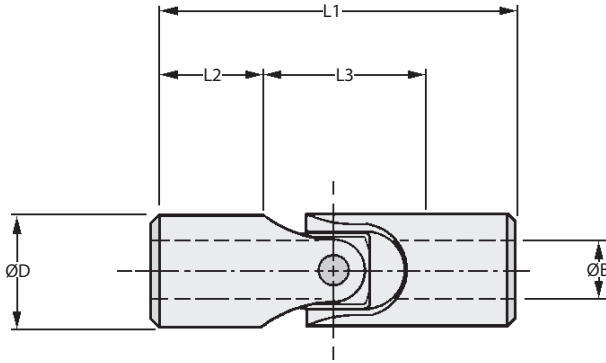
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PUB MT/11 10851/1 EN · June 2014





Discounts: 6+ -10% 30+ -20% 50+ -30% 100+ -35% 200+ -38% 300+ -40% 500+ -42% 1000+ -58%

Part Number	ØB	ØD	L1	L2	L3	Weight g	Price Each 1-5
U803A	1.5	3	12	4.0	4.0	-	£184.72
U804A	2.0	4	14	4.5	5.0	-	£111.05
U805A	2.5	5	15	4.5	6.0	-	£111.05
U806A	3.0	6	18	5.5	7.0	3.0	£93.12
U808A	4.0	8	24	7.2	9.6	7.1	£76.64
U810A	5.0	10	30	9.0	12.0	12.5	£77.90

### Material

Steel with plain bearings.

### Extras

Also available in Stainless Steel P.O.A.

### Performance

Max Speed: 500 Rpm

### Other Info.

Suitable for motorised applications.



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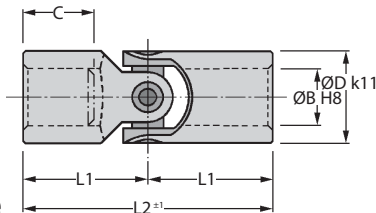
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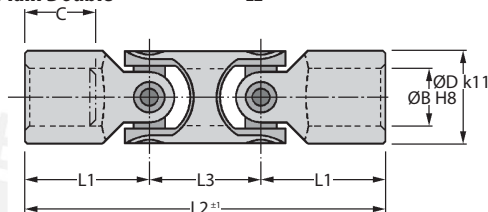
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**U-A & SUJ Type Plain Single**



**U-C & DUJ Type Plain Double**



**Discounts: 6+ -10% 30+ -20% 50+ -30% 100+ -35% 200+ -38% 300+ -40% 500+ -42% 1000+ -58%**

Part Number Universal Joint	Rubber Cover	ØD k11	Std. & Max. ØB H8	C	L1	L2 ±1	L3	Weight g	Backlash at Nm	Backlash arc min	Price Each	
											Joint	1 - 5 Cover
<b>STEEL SINGLE</b>												
U813A	-	13	8	11	21	42	-	25	-	-	£15.44	-
U816A	U8R-02	16	10	15	26	52	-	45	0.2	0°45'	£13.27	£7.40
U820A	U8R-04	20	12	18	31	62	-	90	0.4	0°40'	£16.73	£7.81
U825A	U8R-1	25	16	22	37	74	-	160	1.0	0°32'	£21.91	£8.08
U832A	U8R-3	32	20	25	43	86	-	315	1.7	0°28'	£32.15	£9.81
U840A	U8R-5	40	25	32	54	108	-	650	3.4	0°25'	£55.99	£11.00
U850A	U8R-7	50	32	40	66	132	-	1,260	5.4	0°20'	£75.63	£13.76
<b>STEEL DOUBLE</b>												
U813C	-	13	8	11	21	60	18	36	-	-	£20.93	-
U816C	U8R-19	16	10	15	26	74	22	67	0.2	1°30'	£23.14	£12.98
U820C	U8R-20	20	12	18	31	88	26	127	0.4	1°20'	£35.19	£14.17
U825C	U8R-21	25	16	22	37	104	30	231	1.0	1°04'	£41.44	£16.44
U832C	U8R-23	32	20	25	43	124	37	460	1.7	0°56'	£52.99	£19.65
U840C	U8R-25	40	25	32	54	156	47	950	3.4	0°50'	£91.74	£22.40
U850C	U8R-27	50	32	40	66	188	56	1,800	5.4	0°40'	£129.38	£28.55
<b>STAINLESS SINGLE</b>												
SUJ-13	-	13	8	11	21	42	-	25	-	-	£77.00	-
SUJ-16	U8R-02	16	10	15	26	52	-	45	0.2	0°45'	£81.43	£7.40
SUJ-20	U8R-04	20	12	18	31	62	-	90	0.4	0°40'	£97.93	£7.81
SUJ-25	U8R-1	25	16	22	37	74	-	160	1.0	0°32'	£107.57	£8.08
SUJ-32	U8R-3	32	20	25	43	86	-	315	1.7	0°28'	£137.76	£9.81
SUJ-40	U8R-5	40	25	32	54	108	-	620	3.4	0°25'	£185.71	£11.00
<b>STAINLESS DOUBLE</b>												
DUJ-13	-	13	8	11	21	60	18	36	-	-	£154.05	-
DUJ-16	U8R-19	16	10	15	26	74	22	67	0.2	1°30'	£167.75	£12.98
DUJ-20	U8R-20	20	12	18	31	88	26	127	0.4	1°20'	£195.90	£14.17
DUJ-25	U8R-21	25	16	22	37	104	30	231	1.0	1°04'	£215.28	£16.44
DUJ-32	U8R-23	32	20	25	43	124	37	460	1.7	0°56'	£268.03	£19.65
DUJ-40	U8R-25	40	25	32	54	156	47	916	3.4	0°50'	£373.38	£22.40

**Material**

**U-A & U-C:** Steel 9 SMn Pb28, similar to 230 Mo7 Pb.  
DIN 7551-E (U813A), DIN 808-E (U816A to U850A)  
**SUJ & DUJ:** Stainless Steel 303. DIN 7551-E / DIN 808-E

**Other Info.**

Neoprene or plastic PVC covers available for size 16 upwards.

**Performance**

Max Speed: 200 Rpm (Hand Operated)  
Max Angular Offset (U-A & SUJ): 45°  
Max Angular Offset (U-C & DUJ): 90°  
See technical pages for torque figures.



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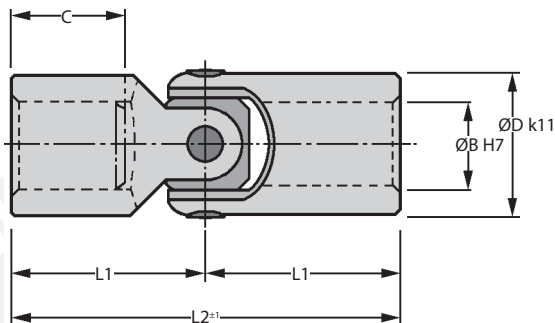
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## Hardened Pin Universal Joint

DIN 808-G (DIN 7551) : 8 - 50mm Bores



### HU-A Type Single Steel



**Discounts: 6+ -10% 30+ -20% 50+ -30% 100+ -35% 200+ -38% 300+ -40% 500+ -42% 1000+ -58%**

Part Number		Std. & Max. ØB H7	ØD K11	C	L1	L2 <sup>±1</sup>	Weight g	Static Axial Load N	Backlash at Nm	Backlash arc min	Price Each 1 - 5	
Universal Joint	Rubber Cover										Joint	Cover
HU813A	-	8	13	11	21	42	30	45	-	-	£37.77	-
HU816A	U8R-02	10	16	15	26	52	50	75	0.2	1°45'	£40.61	£7.40
HU816A1	U8R-02	6	16	9	17	34	35	40	0.2	1°45'	£40.61	£7.40
HU816A2	U8R-02	8	16	11	20	40	40	40	0.2	1°45'	£40.61	£7.40
HU820A	U8R-04	12	20	18	31	62	95	140	0.4	1°40'	£44.49	£7.81
HU820A1	U8R-04	10	20	12	24	48	75	90	0.4	1°40'	£44.49	£7.81
HU825A	U8R-1	16	25	22	37	74	180	260	1.0	1°32'	£51.56	£8.08
HU825A1	U8R-1	12	25	14	28	56	140	150	1.0	1°32'	£51.56	£8.08
HU832A	U8R-3	20	32	25	43	86	330	485	1.7	1°28'	£60.02	£9.81
HU832A1	U8R-3	16	32	16	34	68	290	300	1.7	1°28'	£60.02	£9.81
HU840A	U8R-5	25	40	32	54	108	650	950	3.4	1°25'	£85.15	£11.00
HU840A1	U8R-5	20	40	20	41	82	530	650	3.4	1°25'	£85.15	£11.00
HU850A	U8R-7	32	50	40	66	132	1,260	1,800	5.4	1°20'	£114.41	£13.76
HU850A1	U8R-7	25	50	25	52	104	1,140	1,200	5.4	1°20'	£114.41	£13.76
HU863A	U8R-9	40	63	48	83	166	2,350	3,750	15.0	1°18'	£266.65	£19.27
HU863A1	U8R-9	32	63	33	65	130	2,080	2,400	15.0	1°18'	£266.65	£19.27
HU875A	U8R-11	40	75	43	80	160	3,500	3,500	22.0	1°16'	£386.65	£24.17
HU890A	U8R-13	50	90	52	95	190	6,150	6,150	28.0	1°14'	£637.97	£67.81

### Material

Steel 9SMn Pb36K

### Performance

Max. Speed: 800 Rpm Max.

See technical pages for torques at different speed and angles.

Needs to be well lubricated. Recommend fitting PVC rubber cover filled with grease or for adverse conditions high speed and angle forced oil lubrication may be needed.

Covers available for size 16 upwards

### Options

Smaller bores, keyways (add **K** to end of part number - P.O.A), squares, hexagons, short length series, rubber covers.

Please ask for a quote



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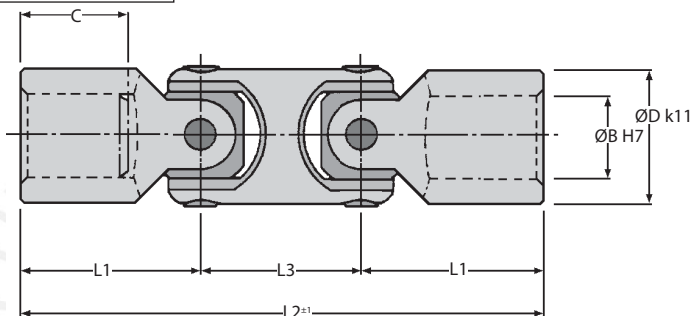
## Hardened Pin Universal Joint

DIN 808-G (DIN 7551) : 8 - 50mm Bores

**HU-C**  
**U8R**



**HU-C Type Double Steel**



**Discounts:** 6+ -10%   30+ -20%   50+ -30%   100+ -35%   200+ -38%   300+ -40%   500+ -42%   1000+ -58%

Part Number Universal Joint	Rubber Cover	Std. & Max. ØB H7	ØD k11	C	L1	L2 <sup>-1</sup>	L3	Weight g	Static Axial Load N	Backlash at Nm	Backlash arc min	Price Each 1 - 5	
												Joint	Cover
HU813C	-	8	13	11	21	60	18	45	-	-	-	£75.48	-
HU816C	U8R-19	10	16	15	26	74	22	75	-	0.2	1°30'	£81.43	£12.98
HU816C1	U8R-19	6	16	9	17	56	22	55	40	0.2	1°30'	£81.43	£12.98
HU816C2	U8R-19	8	16	11	20	62	22	80	40	0.2	1°30'	£81.43	£12.98
HU820C	U8R-20	12	20	18	31	88	26	140	-	0.4	1°20'	£89.49	£14.17
HU820C1	U8R-20	10	20	12	24	74	26	145	90	0.4	1°20'	£89.49	£14.17
HU825C	U8R-21	16	25	22	37	104	30	260	-	1.0	1°04'	£102.84	£16.44
HU825C1	U8R-21	12	25	14	28	86	30	240	150	1.0	1°04'	£102.84	£16.44
HU832C	U8R-23	20	32	25	43	124	37	485	-	1.7	0°56'	£120.46	£19.65
HU832C1	U8R-23	16	32	16	34	104	37	445	300	1.7	0°56'	£120.46	£19.65
HU840C	U8R-25	25	40	32	54	156	47	950	-	3.4	0°50'	£170.01	£22.40
HU840C1	U8R-25	20	40	20	41	128	47	860	650	3.4	0°50'	£170.01	£22.40
HU850C	U8R-27	32	50	40	66	188	56	1,800	-	5.4	0°40'	£275.17	£28.55
HU850C1	U8R-27	25	50	25	52	160	56	1,680	1,200	5.4	0°40'	£229.31	£28.55
HU863C	-	40	63	48	83	236	70	3,750	-	15.0	0°36'	£533.29	-
HU863C1	-	32	63	33	65	200	70	3,280	2,400	15.0	0°36'	£533.29	-
HU875C	-	40	75	43	80	245	85	5,280	3,500	22.0	0°32'	£773.29	-
HU890C	-	50	90	52	90	290	100	9,400	6,150	28.0	0°28'	£1,275.95	-

**Material**

Steel 9SMn Pb36K

**Performance**

Max. Speed: 800 Rpm Max.

See technical pages for torques at different speed and angles.

Needs to be well lubricated. Recommend fitting PVC rubber cover filled with grease or for adverse conditions high speed and angle forced oil lubrication may be needed. Covers available for size 16 upwards

**Options**

Smaller bores, keyways (add **K** to end of part number - P.O.A), squares, hexagons, short length series, rubber covers.

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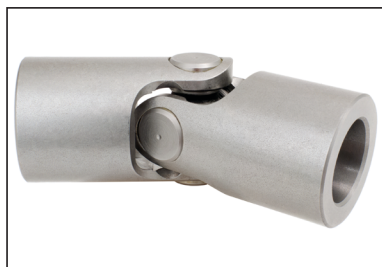


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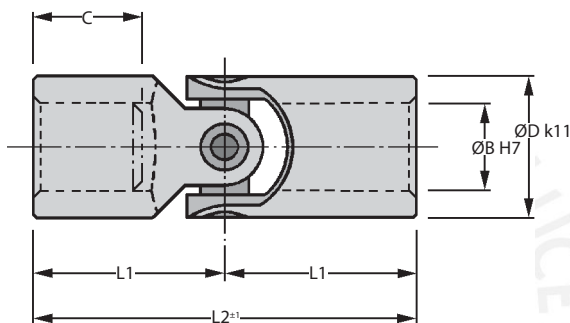


## Needle Roller Universal Joint

DIN 808-W (DIN 7751) Low Backlash : 12 - 50mm Bores



**HNU-A Type Single Steel**



**Discounts:** 6+ -10%   30+ -20%   50+ -30%   100+ -35%   200+ -38%   300+ -40%   500+ -42%   1000+ -58%

Part Number		Std. & Max. ØB H7	ØD k11	C	L1	L2±1	Weight g	Price Each	
Universal Joint	Rubber Cover							Joint	Cover
HNU820A	U8R-04	12	20	18	31	62	80	£133.50	£7.81
HNU820A1	U8R-04	10	20	12	24	48	85	£133.50	£7.81
HNU825A	U8R-1	16	25	22	37	74	150	£142.37	£8.08
HNU825A1	U8R-1	12	25	14	28	56	130	£142.37	£8.08
HNU832A	U8R-3	20	32	25	43	86	275	£150.08	£9.81
HNU832A1	U8R-3	16	32	16	34	68	235	£150.08	£9.81
HNU840A	U8R-5	25	40	32	54	108	545	£170.78	£11.00
HNU840A1	U8R-5	20	40	20	41	82	455	£170.78	£11.00
HNU850A	U8R-7	32	50	40	66	132	1,100	£223.69	£13.76
HNU850A1	U8R-7	25	50	25	52	104	975	£223.69	£13.76
HNU863A	U8R-9	30	63	38	83	166	2,850	£299.76	£19.27
HNU870A	U8R-11	35	70	35	70	140	3,150	£506.62	£24.17
HNU880A	U8R-12	40	80	50	90	180	3,900	£739.68	£35.68
HNU895A	U8R-13	50	95	54	95	190	4,800	£1,013.38	£67.81

### Material

Steel 95Mn Pb36K

Forged centre cross with hard ground ends for needle bearings. (Needle bearings sealed).

### Performance

Max. Speed: 4,000 Rpm Max.

See technical pages for torques at different speed and angles.

### Options

Smaller bores, keyways (add **K** to end of part number - P.O.A.), squares, hexagons, short length series, quick release types, rubber covers.

Please ask for a quote.



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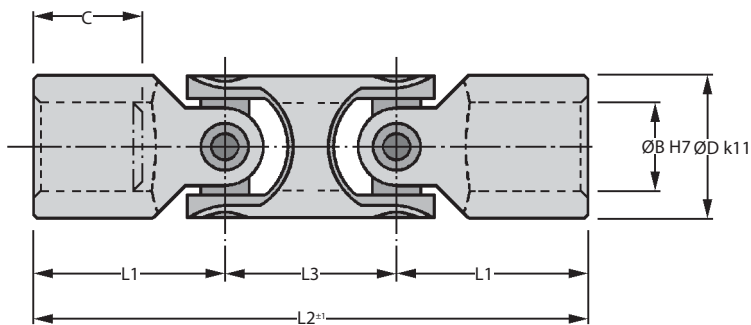
## Needle Roller Universal Joint

DIN 808-W (DIN 7751) Low Backlash : 12 - 50mm Bores

**HNU-C**  
**U8R**



**HNU-C Type Double Steel**



**Discounts: 6+ -10% 30+ -20% 50+ -30% 100+ -35% 200+ -38% 300+ -40% 500+ -42% 1000+ -58%**

Part Number		Std. & Max. ØB H7	ØD k11	C	L1	L2 <sup>±1</sup>	L3	Weight g	Price Each	
Universal Joint	Rubber Cover								Joint	Cover
HNU820C	U8R-20	12	20	18	31	88	26	110	£266.77	£14.17
HNU820C1	U8R-20	10	20	12	24	74	26	115	£266.77	£14.17
HNU825C	U8R-21	16	25	22	37	104	30	200	£284.65	£16.44
HNU825C1	U8R-21	12	25	14	28	86	30	180	£284.65	£16.44
HNU832C	U8R-23	20	32	25	43	124	37	375	£300.35	£19.65
HNU832C1	U8R-23	16	32	16	34	104	37	335	£300.35	£19.65
HNU840C	U8R-25	25	40	32	54	156	47	740	£341.52	£22.40
HNU840C1	U8R-25	20	40	20	41	128	47	650	£341.52	£22.40
HNU850C	U8R-27	32	50	40	66	188	56	1,470	£447.60	£28.55
HNU850C1	U8R-27	25	50	25	52	160	56	1,350	£447.60	£28.55
HNU863C	-	30	63	38	83	238	72	4,100	£599.80	-
HNU870C	-	35	70	35	70	212	72	4,500	£1,013.69	-
HNU880C	-	40	80	50	90	290	110	5,200	£1,480.00	-
HNU895C	-	50	95	54	95	290	100	6,000	£2,027.62	-

### Material

Steel 9SMn Pb36K

Forged centre cross with hard ground ends for needle bearings. (Needle bearings sealed).

### Performance

Max. Speed: 4,000 Rpm Max.

See technical pages for torques at different speed and angles.

### Options

Smaller bores, keyways (add **K** to end of part number - P.O.A.), squares, hexagons, short length series, quick release types, rubber covers. Please ask for a quote.



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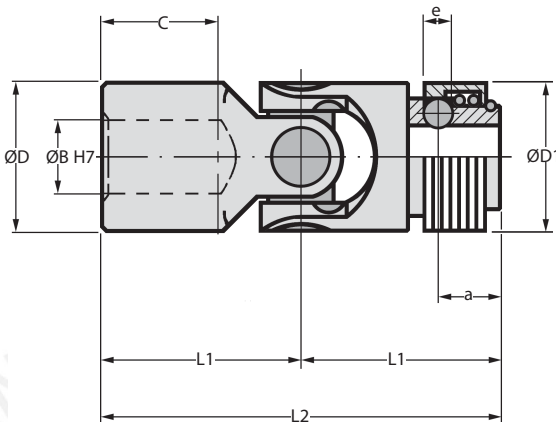
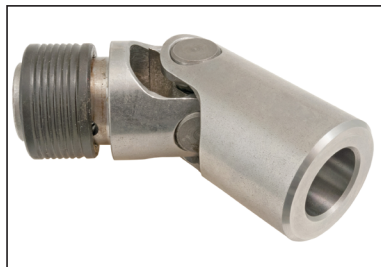


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## HNUQ-A

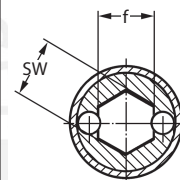
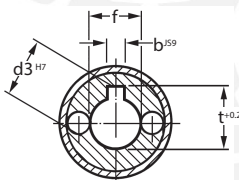
### Quick Release Needle Roller Universal Joint

Bore : DIN 808-W Low Backlash : 10 - 25mm Bores



Quick Release End : Bored & Keyway

Quick Release End : Hex



Discounts: 6+ -10% 30+ -20% 50+ -30% 100+ -35% 200+ -38% 300+ -40% 500+ -42% 1000+ -58%

Part Number	ØB H7	ØD	ØD1	C	L1	L2	Quick Release			Weight g	Hex A/F SW	Ød7 H7	b JS9	t <sup>+0.2</sup>	Price Each 1 - 5
							a	f	e						
HNUQ820A1	10	20	19.8	18	31	62	11.5	8.7	3.95	80	-	10	3	11.0	£133.50
HNUQ820A2	10	20	19.8	18	31	62	11.5	8.0	3.50	80	9.06	-	-	-	£133.50
HNUQ825A1	14	25	24.5	22	37	74	13.5	13.0	4.00	160	-	14	5	15.3	£142.37
HNUQ825A2	14	25	24.0	22	37	74	13.5	10.5	4.00	160	11.15	-	-	-	£142.37
HNUQ825A3	14	25	24.5	22	37	74	13.5	10.5	4.00	160	14.04	-	-	-	£142.37
HNUQ832A1	16	32	31.5	25	43	86	14.0	14.8	6.35	295	-	16	5	17.3	£150.08
HNUQ832A2	16	32	31.5	25	43	86	14.0	14.8	6.35	295	16.00	-	-	-	£150.08
HNUQ832A3	16	32	24.5	25	43	86	14.0	12.8	6.35	295	-	14	5	15.3	£150.08
HNUQ832A4	16	32	24.5	25	43	86	14.0	12.8	6.35	295	14.04	-	-	-	£150.08
HNUQ840A1	20	40	39.5	32	54	108	19.0	18.0	8.00	570	-	20	6	21.7	£170.78
HNUQ840A2	20	40	39.5	32	54	108	19.0	18.0	8.00	570	20.00	-	-	-	£170.78
HNUQ850A1	25	50	49.5	40	66	132	20.5	23.0	10.00	1,150	-	25	8	26.7	£223.69
HNUQ850A2	25	50	49.5	40	66	132	20.5	23.0	10.00	1,150	25.00	-	-	-	£223.69

#### Material

Steel 95Mn Pb36K

Forged centre cross with hard ground ends for needle bearings. (Needle bearings sealed).

#### Performance

Max. Speed: 4,000 Rpm Max.

See technical pages for torques at different speed and angles.



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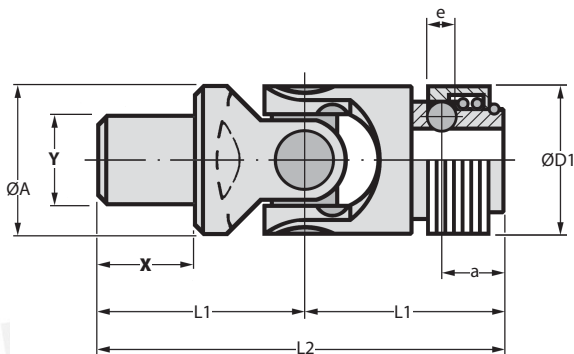
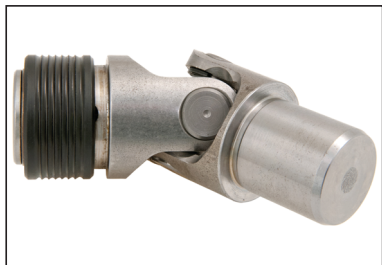


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## Quick Release Needle Roller Universal Joint

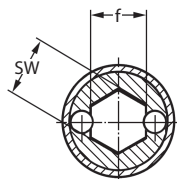
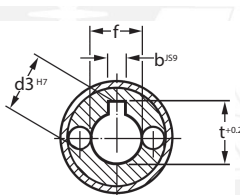
## HNUQ-A

Stud : DIN 808-W Low Backlash : 10 - 25mm Bores



Quick Release End : Bored & Keyway

Quick Release End : Hex



**Discounts:** 6+ -10%   30+ -20%   50+ -30%   100+ -35%   200+ -38%   300+ -40%   500+ -42%   1000+ -58%

Part Number	Quick Release									Weight g	Hex A/F SW	Ød3 H7	b JS9	t <sup>±0.2</sup>	Price Each 1 - 5
	ØA	ØD1	L1	L2	X	Y	a	f	e						
HNUQ820A3	20	19.8	31	62	10-20	0-17	11.5	8.7	3.95	80	-	10	3	11.0	£133.50
HNUQ820A4	20	19.8	31	62	10-20	0-17	11.5	8.0	3.50	80	9.06	-	-	-	£133.50
HNUQ825A4	25	24.5	37	74	12-25	0-21	13.5	13.0	4.00	160	-	14	5	15.3	£142.37
HNUQ825A5	25	24.0	37	74	12-25	0-21	13.5	10.5	4.00	160	11.15	-	-	-	£142.37
HNUQ825A6	25	24.5	37	74	12-25	0-21	13.5	10.5	4.00	160	14.04	-	-	-	£142.37
HNUQ832A5	32	31.5	43	86	16-32	0-25	14.0	14.8	6.35	295	-	16	5	17.3	£150.08
HNUQ832A6	32	31.5	43	86	16-32	0-25	14.0	14.8	6.35	295	16.00	-	-	-	£150.08
HNUQ832A7	32	24.5	43	86	16-32	0-25	14.0	12.8	6.35	295	-	14	5	15.3	£150.08
HNUQ832A8	32	24.5	43	86	16-32	0-25	14.0	12.8	6.35	295	14.04	-	-	-	£150.08
HNUQ840A3	40	39.5	54	108	20-40	0-30	19.0	18.0	8.00	570	-	20	6	21.7	£170.78
HNUQ840A4	40	39.5	54	108	20-40	0-30	19.0	18.0	8.00	570	20.00	-	-	-	£170.78
HNUQ850A3	50	49.5	66	132	25-50	0-34	20.5	23.0	10.00	1,150	-	25	8	26.7	£223.69
HNUQ850A4	50	49.5	66	132	25-50	0-34	20.5	23.0	10.00	1,150	25.00	-	-	-	£223.69

### Material

Steel 9SMn Pb36K

Forged centre cross with hard ground ends for needle bearings. (Needle bearings sealed).

### Ordering

Dimensions **X** and **Y** supplied blank as standard but can be made to your specific requirements - P.O.A.

### Performance

Max. Speed: 4,000 Rpm Max.

See technical pages for torques at different speed and angles.



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# COUPLINGS



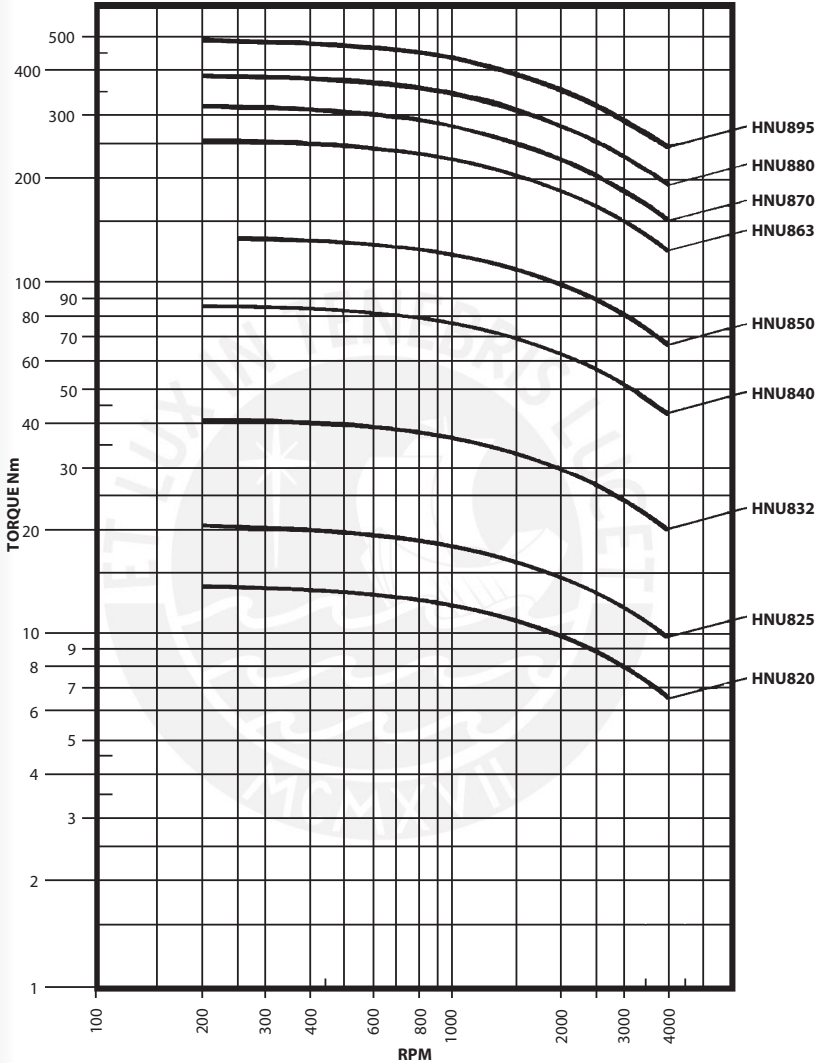
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## Needle Roller Universal Joint

DIN 808-W : Low Backlash, sealed bearings

TECHNICAL

Table HNU - A/C



For use in Calculation 1) on previous page : Ultimate Static Torque (must go though derating on previous page) (Nm)

U/HNU813 = 25 / 30  
 U/HNU816 = 35 / 40  
 U/HNU820 = 80 / 90  
 U/HNU825 = 140 / 150  
 U/HNU832 = 280 / 300  
 U/HNU840 = 600 / 650  
 U/HNU850 = 1100 / 1200

HNU863 = 2400  
 HNU875 = 3400  
 HNU890 = 4600

D/SUJ-13 = 17  
 D/SUJ-16 = 24  
 D/SUJ-20 = 63  
 D/SUJ-25 = 126  
 D/SUJ-32 = 224  
 D/SUJ-40 = 500



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Product information updated April 2016 and subject to change. Please contact Sales for the latest prices and availability.

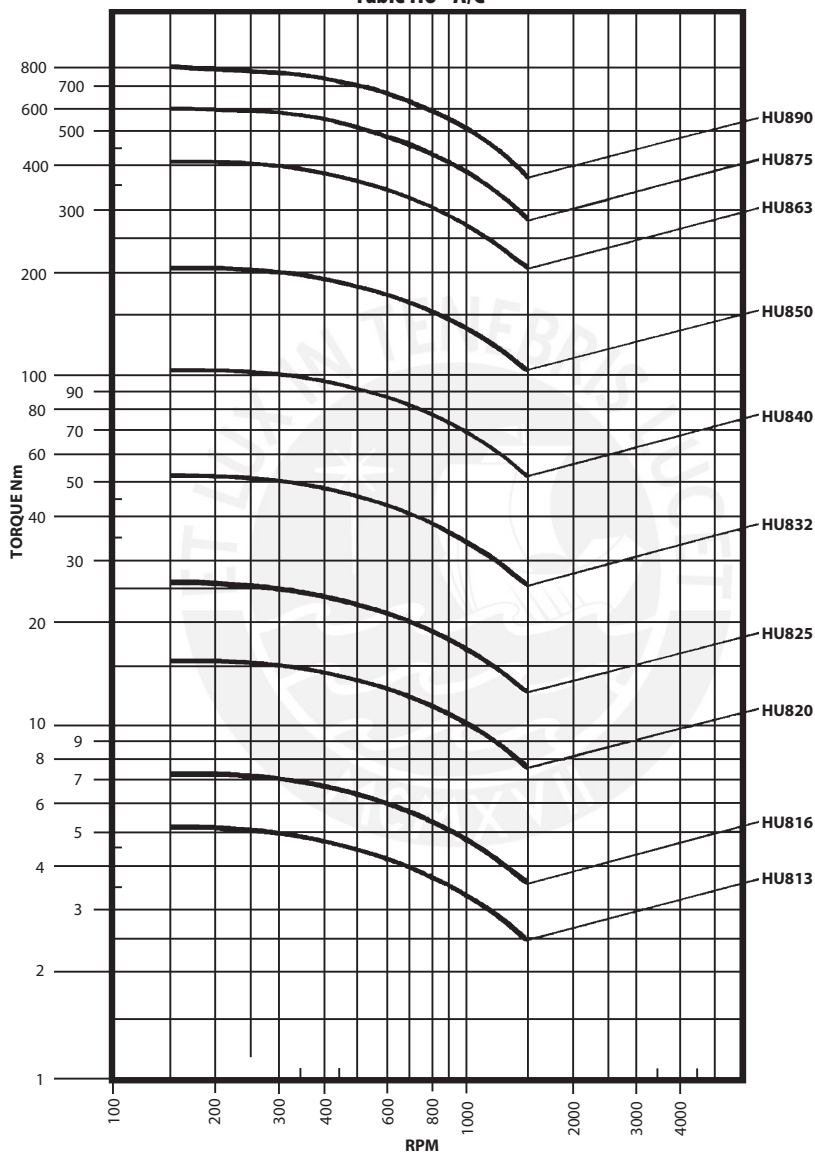
# COUPLINGS

## Hardened Pin Universal Joint



DIN 808-G

Table HU - A/C



TECHNICAL

For use in Calculation 1) 2 pages previous : Ultimate Static Torque (must go though derating 2 pages previous) (Nm)

HU820 = 80  
 HU825 = 120  
 HU832 = 250

HU840 = 500  
 HU850 = 800  
 HU863 = 1500

HU870 = 2200  
 HU880 = 2900  
 HU895 = 3700



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# COUPLINGS

## Universal Joint



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TECHNICAL

### HU & HNU Cardan Joints

#### Determining the joint size:

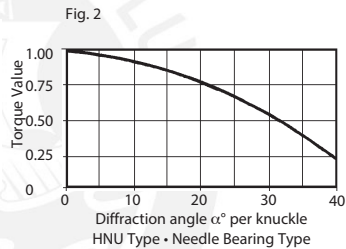
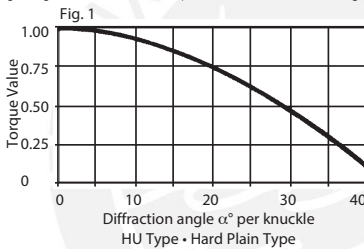
Cardan joints are particularly suitable for transmission of power in the case of higher number of revolutions. The limit of revolutions depends on the operating angle. The greatest operating angle for all types of joint is 45° for single joints and 90° for double joints. For angles over 20° (single joints) or 40° (double joints) only very low revolutions should be used. Standard cardan joints can be used up to 2000 rpm, joints with needle roller bearings up to 4000 rpm. Joints with needle bearings are usually only used for revolutions above 1000 rpm. The ultimate torques given as well as the mechanical characteristics are to be used for determining joint size.

1) If the joint rpm x operating angle is less than 300, please use the figures given for static ultimate torque. For every degree of the operating angle deduct a percentage from that amount. (For 18° angle therefore 18%). This gives you the permissible torque, by taking 1/5 in the case of short operation joints, 1/6 for continuous operating joints, of the maximum value reduced by the angle measurement.

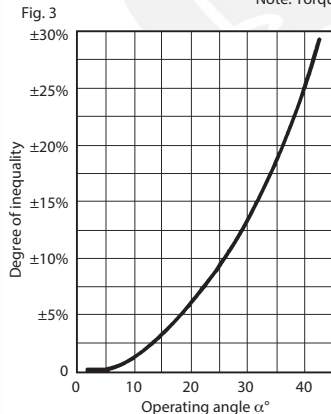
**Example:** HU813A Ultimate Static Torque 25 Nm : 10 Rpm x 5° = 50 (<300) : 25 Nm - 5% = 23.75 Nm  
Continuous Duty (1/6) = 4.75 Nm, Intermittent Duty (1/5) = 5.70 Nm

2) For driving where the rpm x operating angle is greater than 300 the torque mechanical characteristics given in Table HU - A/C and Table HNU - A/C are to be used for determining the joint size. These show the transferable torque dependent on number of revolutions and operating angle. They apply to joints in sustained continuous operation. For joints in short operation the values for permissible torque are 20% higher.

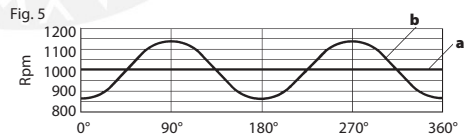
The values given in Table HU-A and Table HNU-A are applicable to a single universal joint operating up to an angle of 5°. With larger angles the transferable torque decreases. Please refer to figs. 1 & 2 for the correction value.



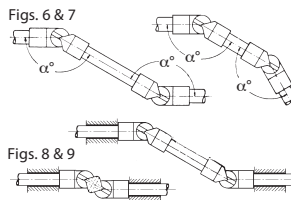
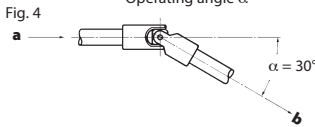
Note: Torque  $M$  (Nm) =  $9550 \times \frac{P \text{ (KW)}}{n \text{ Rpm}}$



The simple joints transfer the initial uniform motion unequally. The rotation between the driving shaft and the driven shaft constitutes a double acceleration and deceleration. The size of the inequality depends upon the operating angle (see fig. 3 & 4)



To get a regular motion two single or one double ended joint has to be used. If small inequalities of the rotation can be tolerated a single joint can be used. For uniform transmission the angular displacement of both the input and output shafts to the intermediate connecting shaft must be equal (see fig. 6 & 7)



Please note that the bearings have to be installed as close as possible to the joints (see fig. 8 & 9). If used in continuous operation, the joints should be lubricated at least once a day. We recommend enclosing the joints with protective covers.



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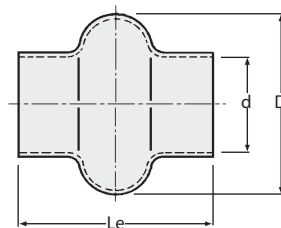


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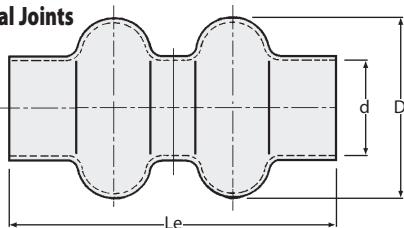
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For Single Universal Joints



For Double Universal Joints



**Discounts:** 6+ -10%   30+ -20%   50+ -30%   100+ -35%   200+ -38%   300+ -40%   500+ -42%   1000+ -58%

Part Number	To Fit Universal Joint Part Number	d	Le	D	Price Each 1 - 5
<b>SINGLE</b>					
U8R-02	HU816A / U816A / SUJ16	16	32	35	£7.40
U8R-04	HU820A / HNU20A / U820A / SUJ20	20	40	36	£7.81
U8R-1	HU825A / HNU25A / U825A / SUJ25	24	45	44	£8.08
U8R-2		28	50	51	£8.87
U8R-3	HU832A / HNU32A / U832A / SUJ32	32	55	62	£9.81
U8R-4		36	65	65	£11.44
U8R-5	HU840A / HNU40A / U840A / SUJ40	40	75	73	£11.00
U8R-6		45	85	80	£13.76
U8R-7	HU850A / HNU850A / U850A	50	95	90	£13.76
U8R-8		55	105	90	£15.80
U8R-9	HU863A / HNU863A	60	115	100	£19.27
U8R-10		65	125	110	£21.68
U8R-11	HU870A / HNU870A	70	137	125	£24.17
U8R-12	HU880A / HNU880A	80	150	135	£35.68
U8R-13	HU895A / HNU895A	90	160	150	£67.81
U8R-14		100	170	170	£71.14
<b>DOUBLE</b>					
U8R-19	HU816C / U816C / DUJ16	16	55	35	£12.98
U8R-20	HU820C / HNU820C / U820C / DUJ20	20	65	36	£14.17
U8R-21	HU825C / HNU825C / U825C / DUJ25	24	70	44	£16.44
U8R-22		28	80	51	£19.11
U8R-23	HU832C / HNU832C / U832C / DUJ32	32	90	62	£19.65
U8R-25	HU840C / HNU840C / U840C / DUJ40	40	120	73	£22.40
U8R-27	HU850C / HNU850C / U850C	50	155	90	£28.55

### Material

Oil resisting synthetic elasticated rubber

### Technical

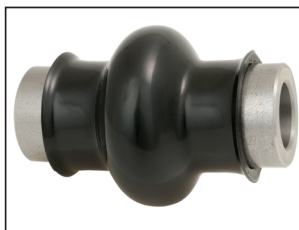
PVC Shore A 1.18g/cm<sup>3</sup>

Constant Temperature Range: -27°C to +70°C

Intermittent Temperature Range: -32°C to +120°C

Electrical Resistance: 8 x 10<sup>10</sup> Ωcm

Resilient to weather and water.



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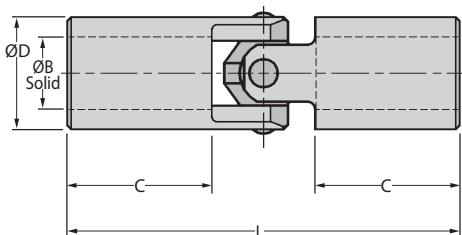
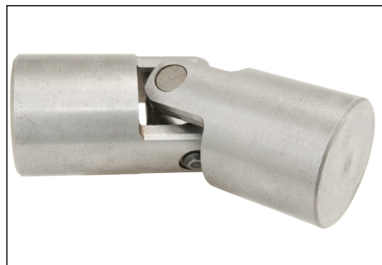


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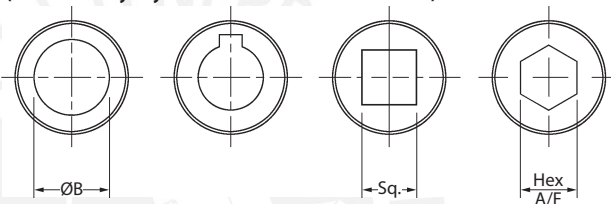


## Heavy Duty Universal Joint

Single Precision, Steel & Stainless Steel : 0 - 50mm Bores



**ØB All supplied solid - no bores**  
(bores and keyways are available to order as below)



**Discounts: 6+ -10% 30+ -20% 50+ -30% 100+ -35% 200+ -38% 300+ -40% 500+ -42% 1000+ -58%**

Part Number			Rubber Cover	L	ØD	C	Max ØB	Max ØB with Keyway	Steel Elastic Limit Nm	Stainless Elastic Limit Nm	Price Each 1-5		
Steel	Stainless	Steel									Stainless	Rubber Cover	
B2201	RME-16	NB2201		58	16	19	10	8	40	19	£69.29	£157.28	£26.55
B2211	RME-20	NB2211		64	20	19	13	11	80	52	£70.28	£172.22	£34.77
B2210	RME-25	NB2210		86	25	26	16	14	124	87	£76.13	£183.47	£46.02
B2220	RME-32	NB2220		95	32	28	22	18	260	182	£93.65	£220.99	£49.01
B2230	RME-40	NB2230		108	40	30	25	22	576	400	£112.41	£288.39	£52.16
B2240	RME-45	NB2240		127	45	36	30	25	926	648	£143.28	£370.72	£53.76
B2250	RME-50	NB2250		140	50	41	35	30	1,186	830	£237.73	£483.15	£60.06
B2260	RME-63	-		178	63	52	45	35	1,920	1,344	£317.39	£681.47	-
B2280	-	-		190	80	55	50	45	3,840	-	£572.72	-	-

Minimum order quantities may apply to other sizes subject to manufacturing preferences and production.

### Material

**B22:** Steel (EN16T) 605 M36

**RME:** Stainless Steel 316

### Performance

**Maximum Speed:** 700 Rpm

**Backlash Guide at Pin:** 0.08 to 0.13mm

**Maximum Angular Offset:** 25° (35° hand operation)

**Torque Capacity - Always use Elastic Limit:**

700 Rpm x 25° times elastic limit by 0.04

100 Rpm x 25° times by 0.26

700 Rpm x 10° times by 0.12

100 Rpm x 10° times by 0.68

Factors affecting performance

Temperature, Load, Speed, Angle of Transmission, Continuous or intermittent Running, Lubrication, Other changes in working conditions.

Grease Retaining Covers should be fitted for maximum performance.

### Extras

Bores, keyways, hexagons, squares available. Special materials also available; aluminium, aerospace grades, etc



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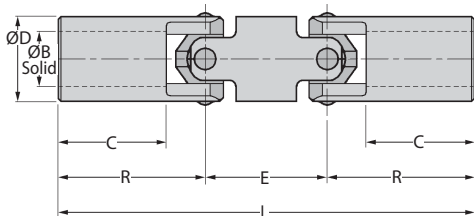


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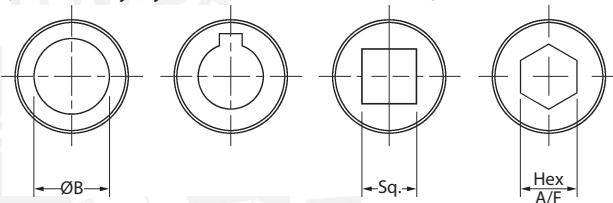
## Heavy Duty Universal Joint

Double Precision, Steel & Stainless Steel : 0 - 55mm Bores

**B23**  
**RMF**



**ØB All supplied solid - no bores**  
(bores and keyways are available to order as below)



**Discounts: 6+ -10%   30+ -20%   50+ -30%   100+ -35%   200+ -38%   300+ -40%   500+ -42%   1000+ -58%**

Part Number	Steel	Stainless	L	ØD	C	E	R	Max ØB	Max ØB with Keyway	Steel Elastic Limit Nm	Stainless Elastic Limit Nm	Price Each 1 - 5	
												Steel	Stainless
<b>B2301</b>	<b>RMF-16</b>	83	16	16.0	25	28.0	10	8	40	19	£152.32	£277.22	
<b>B2311</b>	<b>RMF-20</b>	92	20	18.0	30	31.0	13	11	80	52	£156.64	£370.72	
<b>B2310</b>	<b>RMF-25</b>	122	25	25.0	36	43.0	16	14	124	87	£178.30	£415.60	
<b>B2320</b>	<b>RMF-32</b>	143	32	27.5	47	47.5	22	18	260	182	£240.81	£494.21	
<b>B2330</b>	<b>RMF-40</b>	164	40	30.0	56	54.0	25	22	576	400	£268.44	£651.45	
<b>B2340</b>	<b>RMF-45</b>	190	45	33.5	63	63.5	30	25	926	648	£325.64	£808.66	
<b>B2350</b>	<b>RMF-50</b>	210	50	45.0	70	70.0	35	30	1,186	830	£402.64	£1,067.09	
<b>B2360</b>	<b>RMF-63</b>	262	63	52.0	84	89.0	45	35	1,920	1,344	£538.09	£1,404.27	
<b>B2370</b>	-	322	75	69.0	100	111.0	55	45	3,840	-	£1,247.96	-	

Minimum order quantities may apply to other sizes subject to manufacturing preferences and production.

### Material

**B23:** Steel (EN16T) 605 M36

**RMF:** Stainless Steel 316

### Performance

**Maximum Speed:** 700 Rpm

**Backlash Guide at Pin:** 0.08 to 0.13mm

**Maximum Angular Offset:** 50° (70° hand operation)

**Torque Capacity - Always use Elastic Limit:**

700 Rpm x 25° times elastic limit by 0.04

100 Rpm x 25° times by 0.26

700 Rpm x 10° times by 0.12

100 Rpm x 10° times by 0.68

Factors affecting performance

Temperature, Load, Speed, Angle of Transmission, Continuous or Intermittent Running, Lubrication, Other changes in working conditions.

Grease Retaining Covers should be fitted for maximum performance.

### Extras

Bores, keyways, hexagons, squares available. Special materials also available; aluminium, aerospace grades, etc



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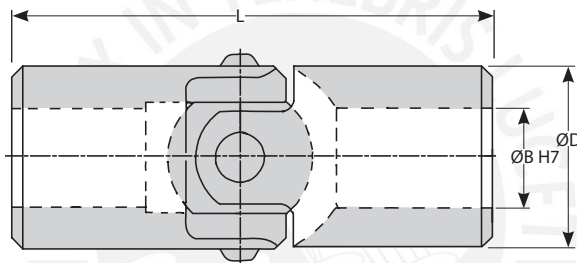
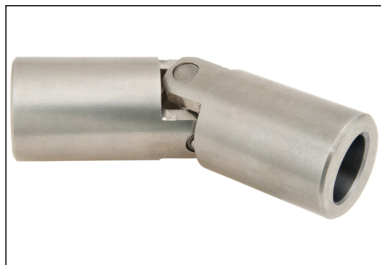
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## Heavy Duty Universal Joint

Precision, Stainless Steel 316 Grade : 8 - 32mm Bores



**Discounts:** 6+ -10% 30+ -20% 50+ -30% 100+ -35% 200+ -38% 300+ -40% 500+ -42% 1000+ -58%

Part Number		ØD	ØB H7	L	Max. ØB	Max. ØB with Keyway	Bore Depth Max	Elastic Limit Nm	Price Each	
Universal Joint	Rubber Cover								Joint	Cover
RMA-16	NB2201	16	8	52	10	8	16	19	£185.83	£26.55
RMA-20	NB2211	20	10	62	13	11	17	52	£203.49	£34.77
RMA-25	NB2210	25	12	74	16	14	19	87	£216.79	£46.02
RMA-32	NB2220	32	16	86	22	18	23	182	£261.04	£49.01
RMA-40	NB2230	40	20	108	25	22	29	403	£340.65	£52.16
RMA-45	NB2240	45	20	120	30	25	31	648	£437.99	£53.76
RMA-50	NB2250	50	25	132	35	30	35	830	£570.74	£60.06
RMA-63	-	63	32	166	45	35	43	1,344	£805.22	-

Minimum order quantities may apply to other sizes subject to manufacturing preferences and production.

### Material

Stainless Steel 316  
Plain pins & bushes

### Performance

Max Speed: 700 Rpm  
Backlash Guide at Pin: 0.08 to 0.13mm

### Extras

Also available in Aluminium L83, P.O.A.  
Neoprene or plastic PVC covers available.



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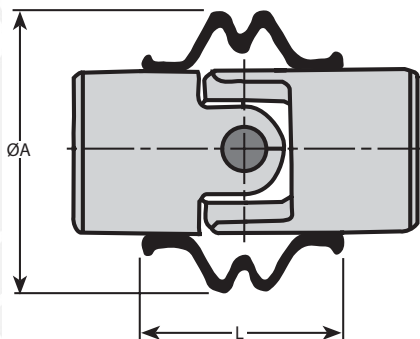
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## Universal Joint Retaining Cover

For B22 & RMA Series



**Discounts:** 6+ -10%   30+ -20%   50+ -30%   100+ -35%   200+ -38%   300+ -40%   500+ -42%   1000+ -58%

Part Number	To Suit Universal Joint	Outside Dia. of Universal Joint	ØA	L	Price Each 1 - 5
NB2201	B2201 / RME16 / RMA16	16	23.81	26.99	£26.55
NB2211	B2211 / RME20 / RMA20	20	31.75	31.75	£34.77
NB2210	B2210 / RME25 / RMA25	25	31.75	31.75	£46.02
NB2220	B2220 / RME32 / RMA32	32	38.10	46.83	£49.01
NB2230	B2230 / RME40 / RMA40	40	44.45	56.36	£52.16
NB2240	B2240 / RME45 / RMA45	45	60.33	74.61	£53.76
NB2250	B2250 / RME50 / RMA50	50	76.20	79.38	£60.06

### Material

Neoprene

### Extras

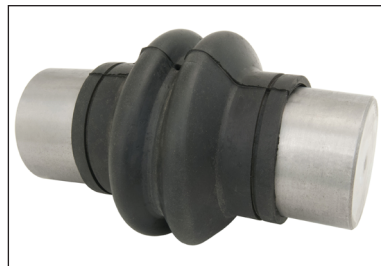
Plastic PVC range available P.O.A.

### Fitting

Fit will be tight.

Ensure joint and shaft are greased when fitting.

Use tapered dummy shaft for easier fitting, grease shaft and coupling.



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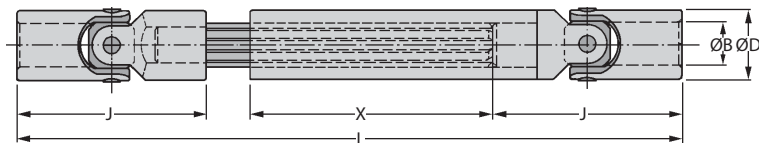
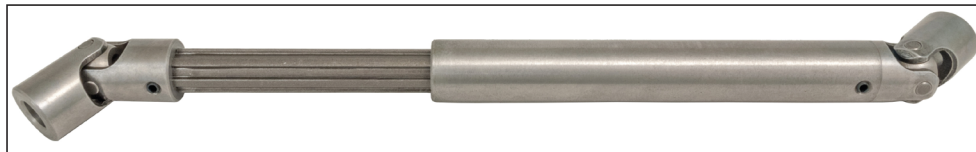


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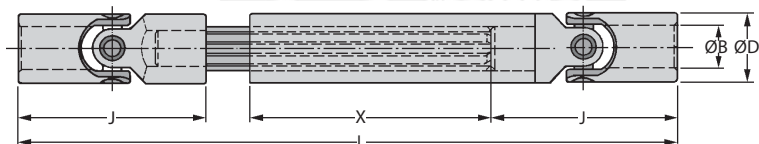


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### THU Type Hardened Pins - DIN 808-G



### THNU Type Needle Roller - DIN 808-W



**Discounts:** 6+ -10%   30+ -20%   50+ -30%   100+ -35%   200+ -38%   300+ -40%   500+ -42%   1000+ -58%

Part Number	ØB H7	ØD	J	X	Min L	Stroke	Max L	Spline Profile	Weight Kg	Price Each 1 - 5
<b>DIN 808-G</b>										
THU-20	10	20	48	120	230	80	310	11-14-3	0.6	<b>£229.91</b>
THU-25	12	25	56	140	260	90	350	13-16-3.5	0.9	<b>£272.61</b>
THU-32	16	32	68	180	340	110	450	16-20-4	2.1	<b>£350.63</b>
THU-40	20	40	82	220	420	130	550	21-25-5	4.0	<b>£439.25</b>
THU-50	25	50	104	260	500	150	650	26-32-6	6.8	<b>£539.25</b>
THU-63	32	63	130	320	600	200	800	36-42-7	10.5	<b>£836.72</b>
<b>DIN 808-W</b>										
THNU-20	10	20	48	120	230	80	310	11-14-3	0.6	<b>£377.97</b>
THNU-25	12	25	56	140	260	90	350	13-16-3.5	0.9	<b>£415.14</b>
THNU-32	16	32	68	180	340	110	450	16-20-4	2.1	<b>£470.90</b>
THNU-40	20	40	82	220	420	130	550	21-25-5	4.0	<b>£552.67</b>
THNU-50	25	50	104	260	500	150	650	26-32-6	6.8	<b>£621.37</b>

### Material

**THU:** Steel 9SMn Pb36K DIN 808-G

**THNU:** Steel 9SMn Pb36K DIN 808-W

### Performance

**Max Speed (THU):** 800 Rpm

**Max Speed (THNU):** 4000 Rpm

### Extras

For keyways in bores, add **K** to end of part number - P.O.A.

### Options

Other bores, square bores and hexagon bores are available on request. Please ask for a quote.



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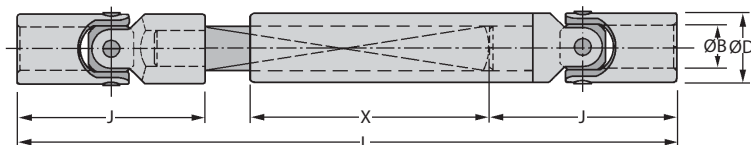
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## Telescopic Universal Joint

Hand Operated : Non-hardened pins : 10 - 32mm Bores



Discounts: 6+ -10%   30+ -20%   50+ -30%   100+ -35%   200+ -38%   300+ -40%   500+ -42%   1000+ -58%

Part Number	ØB H7	ØD	J	X	Min L	Stroke	Max L	Square Profile	Weight Kg	Price Each 1 - 5
TU-16	10	16	52	120	230	80	310	8	0.4	£181.33
TU-20	12	20	62	130	260	90	350	10	0.6	£195.87
TU-25	16	25	74	160	340	110	450	12	1.0	£213.98
TU-32	20	32	86	200	420	130	550	16	2.4	£286.56
TU-40	25	40	108	250	500	150	650	20	4.3	£359.12
TU-50	32	50	132	300	600	180	780	25	7.3	£454.60

**Material**

Steel 9SMn Pb36K

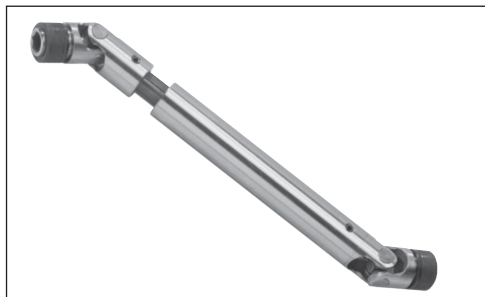
**Performance**

Maximum Speed: Hand motion only

**Extras**

For keyways in bores, add **K** to end of part number, P.O.A.

## Universal Joint Specials Available



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PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ

INGENIERÍA MECÁNICA

ELEMENTOS DE MÁQUINAS 2

UNIONES ENTRE EJE Y CUBO  
PASADORES Y CLAVIJAS

KURT F. PAULSEN MOSCOSO

2009-1

USO INTERNO

## UNIONES ENTRE EJES Y CUBOS

### PASADORES

Los pasadores o bulones se emplean como elementos de unión articulada entre piezas, mediante un ensamble con un ajuste de juegos.

Este ajuste deslizante hace necesario el uso de un seguro que evite se salga. Para este efecto se pueden emplear pasadores de aletas, anillos de seguridad, arandelas de seguridad y anillos elásticos.

Generalmente se fabrican de acero St 60 y por lo tanto pueden resistir más que las piezas aseguradas. Sirven principalmente para articular o dar apoyo a las bridas, eslabones, cabezas y horquillas de tirantes. También se usan como “fusibles” en caso de sobrecargas.

### CLAVIJAS

Las clavijas se usan para evitar el giro o el desplazamiento relativo entre piezas que se ensamblan, es decir se puede ubicar una pieza en una posición exacta respecto de otra. Tienen diversas formas y pueden ser cilíndricas o cónicas con una conicidad 1:50. Dentro de esta clasificación, pueden ser partidas, hendidas, ranuradas, etc.

Las clavijas tiene por función o funciones: unir, fijar, arrastrar, retener, centrar, asegurar, cerrar, etc., los elementos de máquinas. Según el uso pueden ser clavijas transversales o longitudinales. Pueden emplearse para fijar resortes, trinquetes (clavija de botón), tuercas, pasadores, etc.

### CÁLCULO DE LAS UNIONES CON PASADORES Y CLAVIJAS

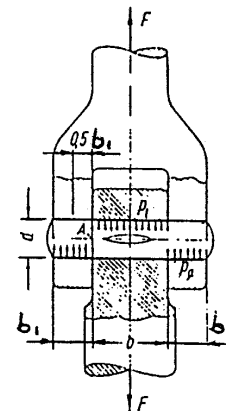
Se deben calcular de tal manera que no fallen por flexión o por corte. Además se debe verificar que el agujero, donde se introduce la clavija o el pasador, no se aplaste.

En los siguientes ejemplos se muestran la distribución de esfuerzos o presión.

Se incluye también la tabla de esfuerzos a flexión y corte admisibles y presión admisible.

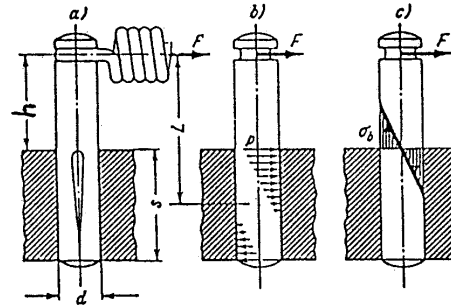
### PASADORES TRANSVERSALES EN TIRANTES:

$$\frac{b}{d} = 1.5 \dots 1.7 \quad ; \quad \frac{b_1}{b} = 0.3 \dots 0.5$$





**CLAVIJAS DE BOTÓN**



**CLAVIJA TRANSVERSAL**

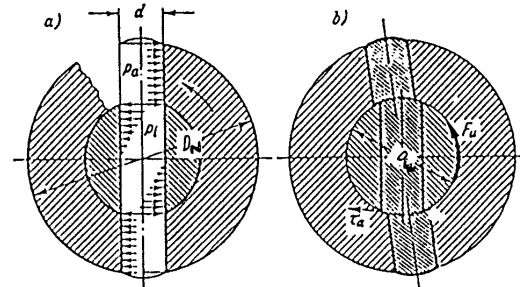
$$\frac{d}{D_w} = 0.2 \dots 0.3$$

Para cubos de acero o acero fundido

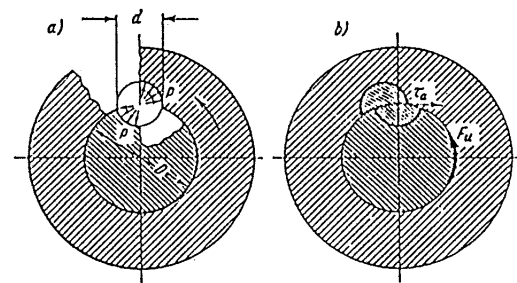
$$\frac{D_N}{D_w} = 2$$

Para cubos de fierro fundido (Fe Fdo)

$$\frac{D_N}{D_w} = 2.5$$



**CLAVIJA AXIAL**



ANEXOS

VALORES ADMISIBLES EN UNIONES CON PASADORES Y CLAVIJAS (Para clavijas ranuradas tomar el 70%)					
Materiales *	Parte fija (extremos)			Partes deslizantes, articulaciones	
	$p_{adm}$ (N/mm <sup>2</sup> ) Cargas			Materiales en contacto	$p_{adm}$ (N/mm <sup>2</sup> ) **
	Fija	Pulsante	Alternante		
Rg, Bronce	30	20	15	Acero/Fe.Fdo	5
Fe. Fdo.	70	50	30	Acero/Acero Fdo	7
Acero Fdo.	80	60	40	Acero/Rg, Bronce	8
St37 (S235JR)	85	65	50	St endur./Rg Bronce	10
St50 (E295)	120	90	60	St endur./St endur.	15
St60 (E335)	150	105	65		
St70 (E360)	180	120	70		

\* Para materiales diferentes en contacto se toma el del menor valor correspondiente  
\*\* Para cargas de punta de corto tiempo se admite valores mayores.

TENSIONES ADMISIBLES PARA PASADORES Y CLAVIJAS (Para clavijas ranuradas tomar el 70%)						
Materiales	$\sigma_{b adm}$ (N/mm <sup>2</sup> ) Cargas			$\tau_{s adm}$ (N/mm <sup>2</sup> )		
	Fija	Pulsante	Alternante	Fija	Pulsante	Alternante
St37 (S235JR), 9S20, 4.6	80	55	35	50	35	25
St50 (E295), 6.8	110	80	50	70	55	35
St60 (E335), C35, C45, 8.8	130	95	60	85	60	42
St70 (E360)	150	110	68	100	68	48