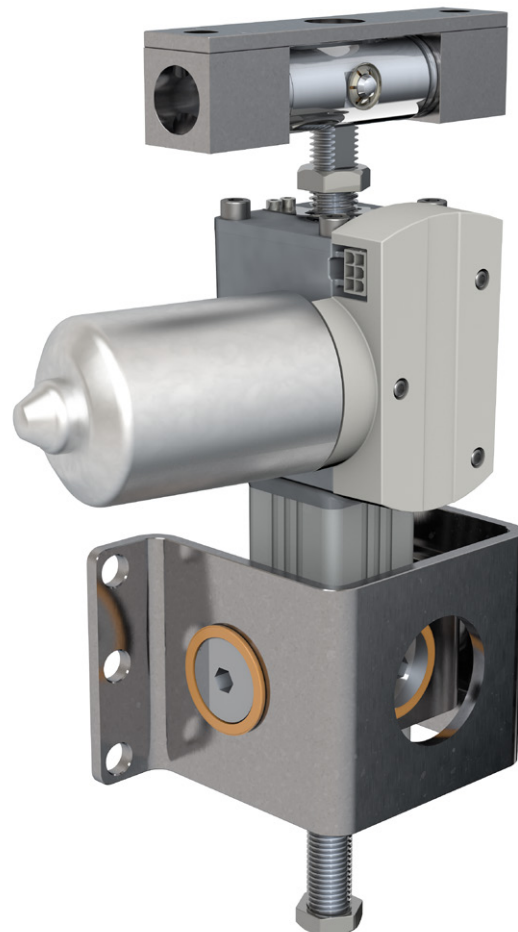


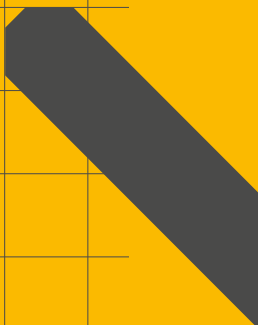
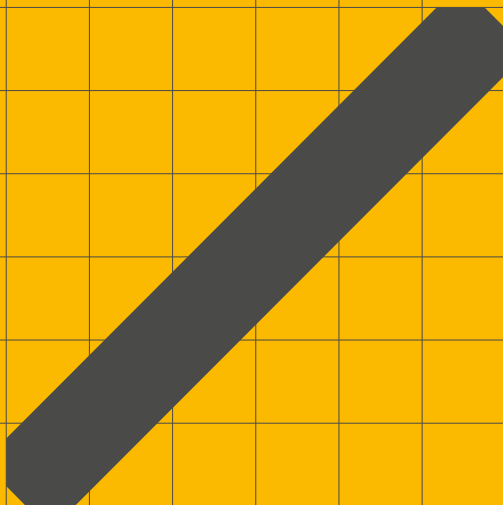
EWELLIX

A Schaeffler Company

CAMT20

Linear actuator





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⚠ 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.

1.0 General information

1.1 Information in this manual

This manual provides important information on how to work with the actuator (also called the device) safely and efficiently. The manual is part of the device, must always be kept and should be available for personnel to read at all times. Personnel working with the device must read and understand this manual before starting any operation. Strict compliance with all specified safety notes and instructions is a basic requirement for safety at work.

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

For clarity, illustrations in this manual are not necessarily to scale and may vary from the actual design of the device.

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

1.2 Explanation of symbols and signal words

Safety precautions are identified by symbols and signal words defined on the right-hand side of this page. These signal words indicate the severity of the hazard.

Adhere to these safety precautions and take caution to avoid accidents that may result in personal injury or damage to property.

DANGER

Indicates a dangerous situation, which may lead to death or serious personal injury, if the precautionary measures are ignored.

WARNING

Indicates a dangerous situation, which can lead to minor or moderate injury or property damage, if the precautionary measures are ignored.

CAUTION

Indicates a dangerous situation which can lead to minor or moderate injury if the precautionary measures are ignored.

NOTICE

Indicates information considered important, but not hazard-related (e.g. messages relating to property damage).



NOTE

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

1.3 Limitation of liability

All information and notes in this manual were compiled taking into consideration current standards and regulations, present status of technology and years of knowledge and experience.

The manufacturer is not liable for damage resulting from:

- disregarding this manual
- unintended use
- employment of untrained personnel
- unauthorized alterations
- unauthorized technical modifications
- manipulation or removal of screws on the device

Where the device has been custom-made, the delivered product may differ from that described in this manual. In this case, please ask Ewellix for any additional instructions or safety guidelines relevant to these actuators.

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

1.4 Copyright

This manual is protected by copyright law and is to be used exclusively by Ewellix customers for internal purposes.

Passing this manual on to third parties, duplication of any kind – also by selection – as well as the use and/or disclosure of the contents without the written consent of the manufacturer is not permitted, other than for internal purposes.

Violation of Ewellix's copyright may result in future claims of damages.

1.5 Spare parts

This actuator is not designed to be repaired. All warranty and service claims become null and void without notice if any screws have been tampered with.

WARNING

Safety hazard caused by incorrect parts

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

Therefore:

Use only genuine spare parts from the manufacturer.

Spare parts in/on the device may only be replaced by the manufacturer.

If the device cannot be repaired on-site by authorised personnel it must be dismantled and sent to the manufacturer.

1.6 Warranty terms

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

1.7 Customer service

Ewellix Customer Service is always available to provide technical information and answer any questions.

Contact information for Ewellix Customer Service can be found on www.ewellix.com

2.0 Safety

This section provides an overview of important safety aspects of installing, operating and maintaining this device. Disregarding this Manual and safety regulations specified therein may result in danger possible serious injury/death or damage to the device or equipment.

2.1 Use

2.1.1 Intended use

The device has been designed and built exclusively for its intended purpose as described in these instructions. The device is to be used only for dynamic centric compression and tensile-loaded lifting of a load.

It is intended for interior use only. The device has been designed for the movement of medical equipment, specifically medical procedure chairs, surgery and imaging tables. Please note, the device is not designed for uncovered systems. To prevent patient and operator injury the device must always be covered, ensuring the patient or operator cannot access the device.

WARNING

Risk from misuse

Any use of this device beyond its intended purpose may lead to potentially hazardous situations.

Therefore:

- Strictly adhere to all safety precautions and instructions in this operating manual.
- Do not expose this device subject to weather conditions, strong UV rays, corrosive or explosive agents as well as any other aggressive substances.
- Do not modify, retool or change the structural design or individual components of the actuator.
- Never use the device outside of the technical application and operational limits.

Range of environmental conditions:

- ambient temperature: 10 °C to + 40 °C
- relative humidity : 5% to 85%
- atmospheric pressure: 700 hPa to 1 060 hPa

Product lifetime

The CAMT linear actuator is designed for a service life of 10 years in a typical medical procedure equipment application. The product service life of the CAMT linear actuator depends on the stroke and load of the application. According to the L10 lifetime of the device, 60 000 cycles can be achieved in an average medical procedure application (average load of 3 000 N and an average stroke of 100 mm).

2.1.2 Unintended Use

Any use other than the intended use, or modifications to the device without the manufacturer's written agreement, or operation beyond the technical limits, is considered unauthorised.

Specific application exemptions are:

- Flammable anaesthetic mixture with air
- Flammable anaesthetic mixture with oxygen or nitrous oxide
- Increased radiation
- Places exposed to water (wet rooms).



NOTE

Any unauthorised use of the device can cause personal injury and property damage. Always adhere to the instructions given in this manual.

2.1.3 Essential performance

The essential performance of the CAMT is to move or hold a load within the boundaries defined by the device specifications given in this operating manual and the datasheet.

Any injury, damage or loss caused by violating these instructions will be the responsibility of the customer.

2.2 Responsibility of the owner and processor

The device is designed for commercial applications by its owner or processor. The processor is the contracting partner of the reseller or the manufacturer. The processor installs the device in a complete system (application).

The owner or processor of the system is 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 also do the following concerning health and safety prevention guidelines as well as environmental protection regulations applicable to the installation site:

- Understand appropriate industrial safety regulations, including determining additional hazards that may arise due to specific working conditions on the site where the device is being installed by using a risk assessment. The risk assessment must be implemented in the form of work instructions for device operation.
- Confirm that the work instructions created for the system, including the device, satisfies current legal requirements and alter the instructions accordingly.
- Regulate and specify the responsibilities for installation, operation, maintenance and cleaning.
- Ensure that all employees who handle the device have read and understood this manual.
- Provide personnel with the required protective equipment.
- Provide training for personnel at regular intervals and inform personnel of any hazards.

Also, the owner or processors must ensure that the device is in good 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 for performance and completeness.

2.3 Personnel requirements

⚠ WARNING

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, understood and followed these instructions.

2.3.1 Qualifications

The following qualifications are specified for different areas of activity listed in this manual:

- **An instructed person (operator)**
Instructed by the customer in an orientation session on the assigned tasks and possible dangers arising from improper use.
- **Qualified personnel**
Based on their professional training, know-how and experience as well as knowledge of the applicable standards and regulations, can independently perform assigned work activities and to detect and avoid possible dangers.
- **Professional electrician**
Based on his/her professional training, know-how and experience, as well as knowledge of the applicable standards and regulations, can independently perform work on electrical systems and to detect and avoid possible dangers.
In addition, the professional electrician has been trained in the specialist location where he/she works and knows the relevant standards and regulations.

Only persons who can be expected to perform their tasks reliably are permitted to do so. Persons whose reaction capabilities are impaired, e.g. through the use of drugs, alcohol or medication, are not permitted to carry out the task.

2.4 Specific dangers

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

Follow the safety instructions listed here, as well as the warnings in the following chapters of this manual to reduce health hazards and to avoid dangerous situations.

⚠ WARNING

Crush hazard

Do not let any object or person come in contact with the lead screw and/or protection tube and/or the front and rear attachment. Risk of damage to the linear actuator caused by static and dynamic overloading of the actuator. Do not use the actuator beyond the permissible operating data.

⚠ WARNING

Pinch hazard

When the actuator runs into fixed objects, the driving force can cause personal injury. If the actuator is left unattended, check that the full stroke length is free of obstacles and that there is nobody in the stroke area. Alternatively, provide a means of disconnecting all conductors from the mains power supply.

⚠ WARNING**Injury due to cracks and related openings in the housing of the actuator and/or its accessories.**

If the housing is damaged due to shock, breakage or heavy wear, cease using the device and follow the dismantling instructions.

⚠ WARNING

Any side-acting forces can destroy the actuator and pose a risk of serious injury. During the stroke, do not manipulate any of the elements connected to the actuator.

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

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

Therefore:

- Do not work on, or place, hand, arms or any other parts of the body, close to moving components.

2.5 Safety equipment

Integration of an emergency-stop system (for certain applications)

The device is intended only 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. Therefore, the device must be installed so that it is part of an emergency shutoff system and can be stopped if necessary.

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

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

**NOTE**

The processor decides which applications require installation of an emergency shut-off system.

Integration of a patient release system (for certain applications)

The device is intended only for installation into an application or system. It does not have its own operating control elements and does not have an independent patient release mechanism. In the event of a malfunction, the device cannot extend or retract.

If required by the application, a separate provision for patient release must be installed, to allow the safe release of the patient in case of emergency or equipment failure.

**NOTE**

The processor decides whether the intended application requires the installation of an emergency patient release system.

Integration of a safety mechanism to prevent unintended triggering of the operating device (for certain applications)

The device does not have its own operating control elements and does not have a safety mechanism against the unintended triggering of the operating device.

If required by the application, a safety provision must be provided to prevent unintended triggering of the operating device.

**NOTE**

The processor decides whether the intended application requires the installation of a safety mechanism to prevent unintended triggering of the operating device.

The following safety mechanisms have been installed:

- Backup nuts are fitted on the leadscrew to prevent the linear actuator from collapsing if there is a gear nut failure.
- End limit switches are installed to provide a safe current cut-off when the end of stroke position of the device is reached. In case of failure of the end limit switches, a mechanical safety end-stop prevents the device from exceeding its intended stroke.

2.6 Safeguard against restart

⚠ WARNING**Life-threatening situation through unauthorised restart!**

For work in hazard zones, there is a risk that the power supply could be turned on without prior authorisation. This presents a potentially life-threatening situation for people in the hazard zone.

Therefore:

- Read the information contained in this manual, concerning safeguarding against any unintentional restart of the power supply.
- Always follow the procedure as described below.

Protect CAMT against an unauthorised restart

Disconnect the power line plug out of the control unit and / or the linear actuator.

2.7 Modifications of device

⚠ WARNING

To avoid hazardous situations and to ensure optimal performance, do not make changes or modifications to the device unless they have been specifically authorised by Ewellix.

2.7.1 Warning labels

The following symbols and information decals can be found in the danger zone. They refer to the immediate vicinity around their location.

⚠ WARNING

Danger of injury because of illegible symbols

Over time stickers and decals may become dirty or illegible for some reason.

Therefore:

- Keep any safety, warning and operation related decals in legible condition at all times
- Replace damaged decals or stickers immediately

2.8 Manufacturer's declaration of EMC compliance

EN 60601-1-2:2015 (IEC 60601-1-2:2014) Medical Electrical Equipment -

Part 1-2: General requirements for basic safety and essential performance –

Collateral Standard: Electromagnetic disturbances – Requirements and tests

2.8.1 Instructions for use

General

Professional healthcare facility environment

Physician offices, dental offices, clinics, limited care facilities, freestanding surgical centres, freestanding birthing centres, multiple treatment facilities, hospitals (emergency rooms, PATIENT rooms, intensive care, surgery rooms, except near HF SURGICAL EQUIPMENT, an MR system outside an RF shielded room of an ME SYSTEM for magnetic resonance imaging).

Essential performance

The essential performance about the CAMT is to keep, hold and move weights and loads.

The risk management (Document L5671,0031) identifies the function regarding the safety of these linear actuators. All features or functions are performed properly. Unacceptable risks for patients, operators or others are performed and assessed to prevent or reduce harm.

The following points identify and describe the EMC-risks related to the CAMT linear actuator according to EMC-measurements:

Warning against the stacking of equipment

⚠ WARNING

Stacked with other equipment

Use of this equipment adjacent to or stacked with other equipment should be avoided as it could result in improper operation. If such use is necessary, this equipment and the other equipment should be monitored to verify that they are operating normally.

List of cables, length of cables, accessories

⚠ WARNING

Use of accessories, transducers and cables

The use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation.

Connection cable (CAMT <-> Control unit SCU; SCU <-> Operating elements)

Description	Plug	Drawing-No	Type	Length m
Connecting cable straight: CAMT – SCU	DIN 8p – Molex 6p	777400-1000	2 x AWG16 & 4 x AWG24	1
Connecting cable straight: CAMT – SCU	DIN 8p – Molex 6p DIN 8p – open wire	777400-2300	2 x AWG16 & 4 x AWG24	2.3
Connecting cable coiled: SCU – Hand switch	HD 15p	160600-1350	15 x AWG30	1.3/2.3
Connecting cable straight: SCU – Foot switch	HD 15p	160632-2500	10 x AWG28	2.5
Connecting cable coiled: SCU – Foot switch	HD 15p	160633-2500	10 x AWG28	1.2/2.5
Connecting cable straight: SCU – Desk switch	HD 15p	160634-2500	10 x AWG28	2.5

Power cables (Main <-> Control unit SCU)

Description	Plug	Country	Drawing-No	Length m	Comment
Straight power cable	Schuko	Euro	ZKA-160637-3500	3.5	
Straight power cable	SEV	CH	ZKA-160638-3500	3.5	
Straight power cable	UL/CSA (NEMA 5-15p)	USA/CAN	ZKA-160639-3500	3.5	SJT-cable
Straight power cable	UL/Hospital grade (NEMA 5-15p)	USA/CAN	ZKA-160640-3500	3.5	SJT-cable
Straight power cable	British plug	UK	ZKA-160609-3500	3.5	

RF Communication Equipment

⚠ WARNING

Portable RF communications equipment

Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of CAMT, including cables specified by the manufacturer. Otherwise, it could lead to a reduction in the performance of this equipment.

2.8.2 Technical description

Requirements applicable to all ME equipment and ME systems

This chapter describes precautions to be taken to prevent adverse events to the patient and operator due to electro-magnetic disturbances.

Compliance for each Emission and Immunity standards

The CAMT linear actuator (CAMT & SCU) is intended for use in the electromagnetic environment specified. It complies with the standard for emission class and group and immunity test level as follows.

a) CAMT stand-alone

CISPR 14-1

The CAMT is intended for use in the electromagnetic environment specified below. The customer or the user of the CAMT should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 14-1	Complies	The CAMT is not suitable for interconnection with other equipment.
Harmonic emissions IEC 61000-3-2	Not applicable	The CAMT is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Voltage fluctuations / flicker emissions IEC 61000-3-3	Not applicable	

Electromagnetic immunity environment tested

The CAMT is intended for use in the electromagnetic environment specified below. The customer or the user of the CAMT should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 8 kV contact ± 2, ± 4, ± 8, ± 15 kV air	± 8 kV contact ± 2, ± 4, ± 8, ± 15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 610004-4		± 2 kV, 5 and 100 kHz for power supply lines* ± 1 kV, 100 kHz for input/output lines*	Mains power quality should be that of typical commercial or hospital environment. *Not applicable for DC and I/O if cable < 3 m
Surge IEC 61000-4-5	±0.5, ±1 kV line(s) to line(s)* ±0.5, ±1, ± 2 kV line(s) to earth*	Not applicable	Mains power quality should be that of typical commercial or hospital environment. *Not applicable for DC and I/O if cable < 3 m
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% UT: 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% UT: 1 cycle At 0° 0% UT: 250/300 cycles At 0° 70% UT: 25/30 cycles At 0°"	Not applicable	Mains power quality should be that of typical commercial or hospital environment. *Not applicable for DC and I/O if cable < 3 m If the user of the CAMT requires continued operation during power mains interruptions, it is recommended that the CAMT be powered from an uninterruptible power supply or battery. UT is the a.c. mains voltage (24 VDC) before application of the test level.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A/m 50/60 Hz	30 A/m 50/60 Hz	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

b) CAMT and SCU

CISPR 14-1

The CAMT is intended for use in the electromagnetic environment specified below. The customer or the user of the CAMT should assure that it is used in such an environment.

Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 14-1	Complies	The CAMT is not suitable for interconnection with other equipment.
Harmonic emissions IEC 61000-3-2"	Class A	The CAMT is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Voltage fluctuations / flicker emissions IEC 61000-3-3	Complies	

Electromagnetic immunity environment tested

The CAMT is intended for use in the electromagnetic environment specified below. The customer or the user of the CAMT should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	± 8 kV contact ± 2, ± 4, ± 8, ± 15 kV air	± 8 kV contact ± 2, ± 4, ± 8, ± 15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 610004-4	± 2 kV, 100 kHz for power supply lines* ± 1 kV, 100 kHz for input/output lines*	±2 kV, 5 and 100 kHz for power supply lines* ±1 kV, 100 kHz for input/output lines*	Mains power quality should be that of typical commercial or hospital environment. *Not applicable for DC and I/O if cable < 3 m
Surge IEC 61000-4-5	±0.5, ±1 kV line(s) to line(s)* ±0.5, ±1, ± 2 kV line(s) to earth*	±0.5, ±1 kV line(s) to line(s)* ±0.5, ±1, ± 2 kV line(s) to earth*	Mains power quality should be that of typical commercial or hospital environment. *Not applicable for DC and I/O if cable < 3 m
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	0% UT: 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% UT: 1 cycle At 0° 0% UT: 250/300 cycles At 0° 70% UT: 25/30 cycles At 0°"	0% UT: 0.5 cycle At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315° 0% UT: 1 cycle At 0° 0% UT: 250/300 cycles At 0° 70% UT: 25/30 cycles At 0°	Mains power quality should be that of typical commercial or hospital environment. *Not applicable for DC and I/O if cable < 3 m If the user of the CAMT requires continued operation during power mains interruptions, it is recommended that the CAMT be powered from an uninterruptible power supply or battery. UT is the a.c. mains voltage (24 VDC) before application of the test level.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A/m 50/60 Hz	30 A/m 50/60 Hz	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

c) CAMT stand-alone / CAMT and SCU

Electromagnetic immunity environment tested

Portable and mobile RF communications equipment should be used no closer to any part of the CAMT, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz outside ISM bands and radio amateur band *	10 Vrms 150 kHz to 80 MHz outside ISM bands and radio amateur band *	If the measured field strength in the location in which the CAMT is used exceeds the applicable RF compliance level, the CAMT should be checked to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the CAMT.
	6 Vrms 150 kHz to 80 MHz in ISM bands and radio amateur band *	10 Vrms 150 kHz to 80 MHz in ISM bands and radio amateur band *	
Radiated RF IEC 61000-4-3	10 V/m 80 MHz to 2.7 GHz 80% AM at 1 kHz	10 V/m 80 MHz to 2.7 GHz 80% AM at 1 kHz	Minimum separation distance shall be calculated using the following equation: $E = \frac{6}{d} \sqrt{P}$ E is the immunity test level in [V/m] d is the minimum separation in [m] P is the maximum power in [W]
Proximity field from RF wireless communication equipment IEC 61000-4-3	27 V/m 380-390 MHz 50 % PM 18 Hz	27 V/m 380-390 MHz 50 % PM 18 Hz	RF wireless equipment maximum output power and separation distance tested (at 30 cm) :
	28 V/m 430-470 MHz FM ±5 kHz deviation, 1kHz sine	28 V/m 430-470 MHz FM ±5 kHz deviation, 1kHz sine	TETRA 400: max 1.8 W GMRS 460, FRS 460: max 2 W LTE Band 13 and 17: max 0.2 W GSM 800/900: max 2 W TETRA 800: max 2 W iDEN 820: max 2 W CDMA 850: max 2 W LTE Band 5: max 2 W GSM 1800/1900: max 2 W CDMA 1900: max 2 W DECT: max 2 W LTE Band 1, 3, 4 and 25: max 2 W UMTS: max 2 W Bluetooth: max 2 W WLAN 802.11b/g/n: max 2 W RFID 2450: max 2 W LTE Band 7: max 2 W WLAN 802.11 a/n: max 0.2 W
	9 V/m 704-787 MHz 50 % PM 217 Hz	9 V/m 704-787 MHz 50 % PM 217 Hz	
	28 V/m 800-960 MHz 50 % PM 18 Hz	28 V/m 800-960 MHz 50 % PM 18 Hz	
	28 V/m 1700-1990 MHz 50% PM 217 Hz	28 V/m 1700-1990 MHz 50% PM 217 Hz	
	28 V/m 2400-2570 MHz 50% PM 217 Hz	28 V/m 2400-2570 MHz 50% PM 217 Hz	
	9 V/m 5100-5800 MHz 50% PM 217 Hz	9 V/m 5100-5800 MHz 50% PM 217 Hz	Interference may occur in the vicinity of equipment marked with the following symbol:

*The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 - 6.795 MHz, 13.553 - 13.567 MHz, 26.957 - 27.283 MHz and 40.66 - 40.7 MHz. The amateur radio bands between 0.15 MHz and 80 MHz are 1.8 MHz - 2 MHz, 3.5 - 4.0 MHz, 5.3 - 5.4 MHz, 7 - 7.3 MHz, 10.1 - 10.15 MHz, 14 - 14.2 MHz, 18.07 - 18.17 MHz, 21.0 - 21.4 MHz, 24.89 - 24.99 MHz, 28.0 - 29.7 MHz and 50.0 - 54.0 MHz.

If the measured field strength in the location in which the CAMT is used exceeds the applicable RF compliance level above, the CAMT should be checked to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the CAMT.

Recommended separation distances between portable and mobile RF communications equipment and the CAMT

The CAMT is intended for use in the electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the CAMT can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the CAMT as recommended below, according to the maximum output power of the communication equipment.

Rated maximum output power of transmitter [W]	Separation distance according to frequency of transmitter [m]		
	150 kHz to 80 MHz outside ISM and radio amateur bands *	150 kHz to 80 MHz in ISM and radio amateur bands *	80 MHz to 2700 MHz (for define RF Wireless transmitters see table before)
	$d = 0,35\sqrt{P}$ **		
0,01	0,04	0,12	0,06
0,1	0,13	0,38	0,19
1	0,40	1,2	0,60
10	1,3	3,8	1,9
100	4,0	12	6,0

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres [m] can be determined using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts [W] according to the transmitter manufacturer.

$$E = \frac{6}{d} \sqrt{P}$$

*The ISM (industrial, scientific and medical) bands between 150 kHz and 80 MHz are 6.765 - 6.795 MHz, 13.553 - 13.567 MHz, 26.957 - 27.283 MHz and 40.66 - 40.7 MHz. The amateur radio bands between 0.15 MHz and 80 MHz are 1.8 MHz - 2 MHz, 3.5 - 4.0 MHz, 5.3 - 5.4 MHz, 7 - 7.3 MHz, 10.1 - 10.15 MHz, 14 - 14.2 MHz, 18.07 - 18.17 MHz, 21.0 - 21.4 MHz, 24.89 - 24.99 MHz, 28.0 - 29.7 MHz and 50.0 - 54.0 MHz.

**Formulas coming from Ed.3 of the IEC 60601-1-2

Results and Deviations from Standards and allowances used

Information about results, deviations see **chapter 2.8.2**. There is no other deviation from the collateral standard.

Maintaining BASIC Safety and Essential performance

It is mandatory to maintain the Linear actuator (and the SCU control unit) To save the essential performance for the expected Service life.



NOTE

Do not change the once installed final application due to EMC view.



WARNING

This product was tested against actual conditions of frequency wireless environment present in Europe.

3.0 Technical data

3.1 Ambient conditions

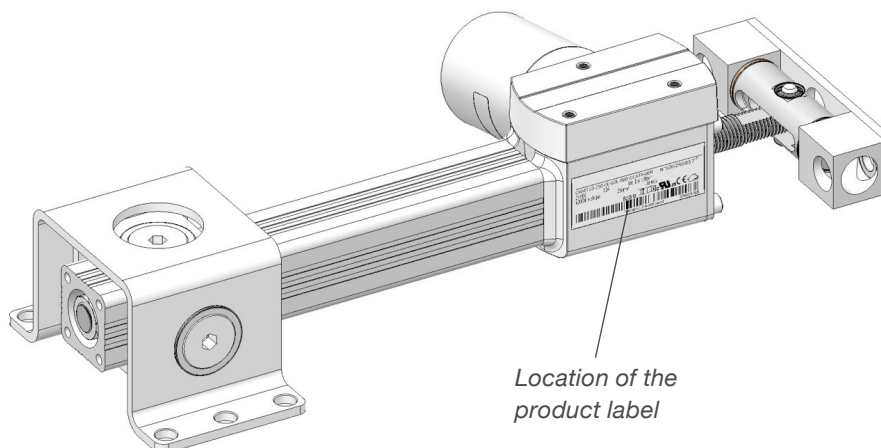
- Indoor use only
- Ambient temperature +10 to +40 °C
- Atmospheric humidity from 5% to 85%
- Air pressure from 700 to 1 060 hPa

3.2 Product label



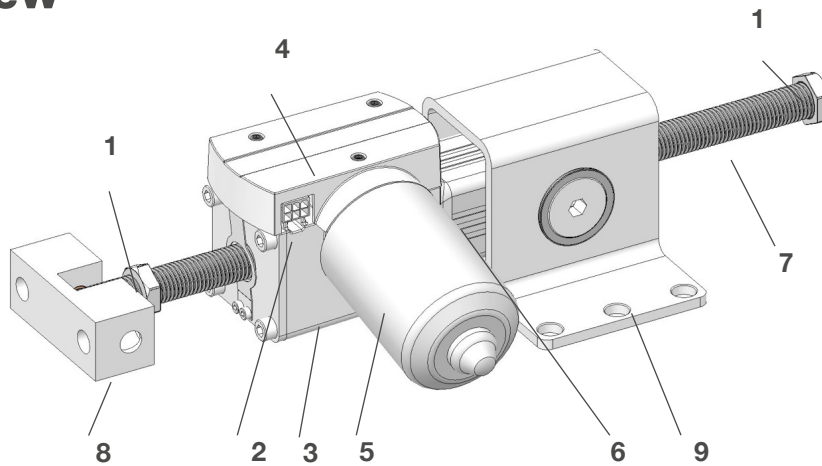
Type label (without options)

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Type designation 2. Manufacturer 3. Maximum current consumption 4. Duty cycle of operation (ON/OFF time) 5. Nominal Speed 6. Serial number 7. Indoor use only 8. CE mark | <ol style="list-style-type: none"> 9. UL certification mark 10. Recommendation to read the operating manual 11. Disposal information 12. Date of manufacture (month, year) 13. Maximum stroke 14. Manufacturer's address 15. Nominal force 16. Voltage |
|--|--|



4.0 Structure and function

4.1 Overview



- 1. Adjustable front and rear end stop
- 2. Connection port (Molex Mini-Fit Jr. 6 Pole)
- 3. Gearbox
- 4. Limit switches with cover
- 5. DC Motor
- 6. Protection tube
- 7. Lead screw
- 8. Front attachment
- 9. Rear attachment

4.2 Brief description

The CAMT linear actuator is implemented in an application and is exclusively for the centric tensile- and compressive-loaded lift. The actuator requires an external control unit to power the motor. The control unit is connected to the actuator via a detachable connection cable. The Ewellix operating control element is also connected to the control unit.

The actuator consists of a gearbox that is common to all versions. Several front and rear attachment options are available (↳ 4.4 Attachment Options, page 19).

The gearbox is made up of a direct current motor that drives a trapezoidal sliding screw via a worm gear.

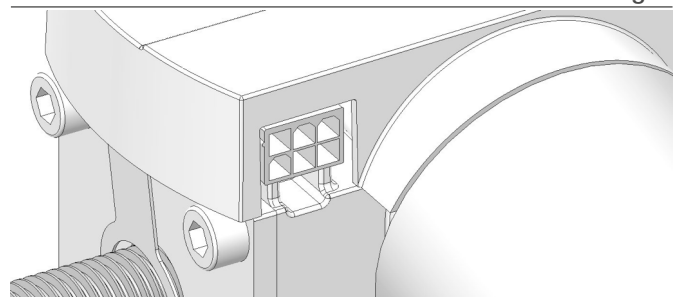
The leadscrew itself is self-locking to prevent the actuator from driving back, without an additional brake.

4.3 Structure and function

Connection port

The connection port uses a 6-pole Molex Mini-fit Jr. connector. It is used to interface the CAMT with the control unit by the means of an optional detachable motor cable that can be supplied in different lengths (↳ fig. 1). For detailed control and connection details please refer to chapter 4.5 Requirements for third-party control units (mandatory in medical applications) (↳ page 23) and chapter 4.6 Connections (↳ page 23).

Fig. 1



Motor

The motor is a 24V brush DC motor. Its speed depends on the magnitude and the direction of the load as well as the direction of the movement. The motor has a 2-Hall Encoder impulse transmitter with a 2 poles magnet built-in. For de-

tailed control and connection details please refer to chapter **4.5 Requirements for third party control units (mandatory in medical applications)** (↳ page 23) and chapter **4.6 Connections** (↳ page 23).

Gearbox

The gearbox contains the drive system that converts the motor’s rotary motion into the translation motion of the spindle.

This is done through the use of a worm gear and a lead-screw. The worm shaft is directly integrated to the motor and the worm wheel is integrated to the trapezoidal lead screw nut.

A backup nut is located on the leadscrew to prevent the collapse of the actuator in case of a failure of the screw nut.

The gearbox is pre-loaded to eliminate the axial clearance.

Protection tube

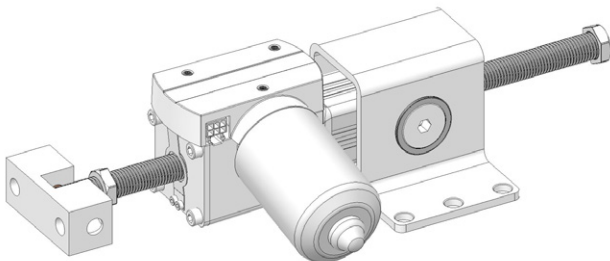
The main function of the protection tube is to provide an interface for the rear attachment.

The length and the machining of the protection tube, therefore, vary depending on the selected attachment options.

The protection tube can be delivered as 'short' or 'long'.

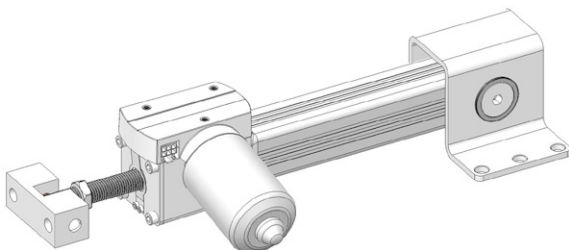
When 'short' (↳ **fig. 2**), the protection tube is just long enough to provide the space necessary for the attachment regardless of the stroke. This option leaves the spindle uncovered for all strokes from 100 mm and above.

Fig. 2



When 'long' (↳ **fig. 3**), the protection tube covers the entire spindle. Even so, the rear side of the tube remains open to leave access to the adjustable end-stop.

Fig. 3

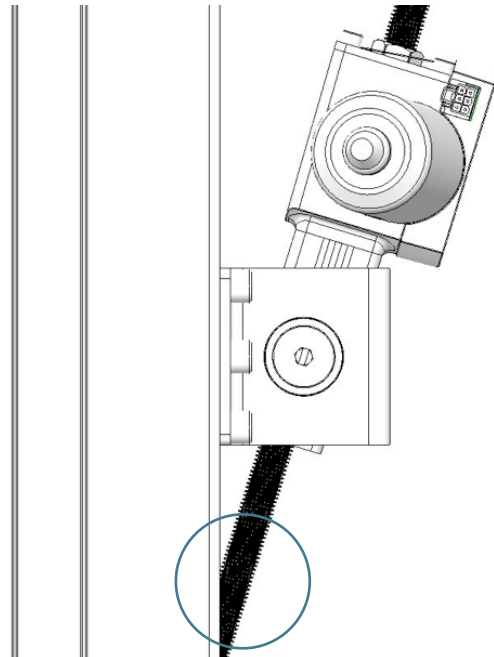


⚠ WARNING

Safety hazard caused by interference

When using a short protection tube in combination with a long leadscrew, the kinematic of the system should be carefully studied to not get any interference between the back of the spindle and the supporting column (or supporting structure in general).

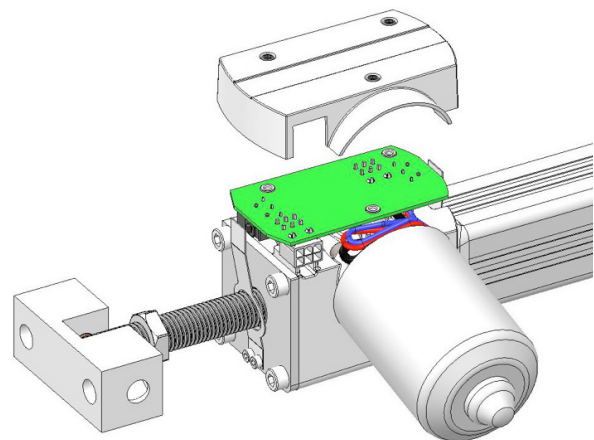
In worst cases the interference could lead to a break or collapse of the actuator and/or the support structure.



End position

The actuator stroke is limited by integrated end limit switches that cut the power to the DC motor.

The end-stops are used to activate the limit switches via the two flat springs that are attached on both sides of the main housing and front cover. When the end-stops contact the flat springs, the latter deflect and activate the limit switches that are located on a PCB above the gearbox.



The upper and lower end position may be adjusted by changing the position of the end stops using standard tools:

- 22 mm flat wrench for the front end-stop
- 22 mm tube spanner for the rear end-stop

In case of a system malfunction, when the spindle moves beyond the end limit switches, the end-stops act as mechanical safety end-stops and halt the movement.

When an end-stop hits a fixed surface on the housing or cover, the external control unit detects the peak of current that results from this and consequently cuts it off, preventing the motor from overheating.

⚠ WARNING

Safety hazard caused by loosening and stopping

The end stops are designed to be adjusted several times. However, after every adjustment, it must be checked so that the torque is still high enough to hold the position. Minimum torque must be 0,5 Nm. In case the torque is too low, there is a risk that the end stop could unintentionally change the position or in the worst case, the rear end stop could drop from the leadscrew. This could lead to the collapsing of the actuator.

External control unit

The DC motor is powered via an external control unit through the connection port. The control unit controls the running direction of the linear actuator. The 2 motor built-in hall encoder signals can be accessed by the controller to enable variable speed control or positioning.

The control unit is also used to provide a soft start/stop function to avoid shocks that could negatively affect the user experience of the device on which the CAMT is mounted.

Ultimately, in case of overload the control limits the current to prevent the motor from overheating and damaging the actuator.

Ewellix advises to use one of the following control units together with the CAMT actuator:

	Control units							
	SCU 1	SCU 5	SCU 9	VCU 5	VCU 8	VCU 9	*BCU 5	*BCU 8
CAMT	●	●	●	●	●	●	●	●

NOTE

When using a third-party control unit, refer to chapter 5.4 **Requirements for third party control units (mandatory in medical applications)** (→ page 24) and chapter 4.6 **Connections** (→ page 25).

4.4 Attachment options

Several types of attachments provide flexibility to install the CAMT on the supporting structure.

Most feature a set of matching front and rear interfaces:

- Ø8 bore on spindle (front), clevis attachment (rear) (↳ **fig. 4**)
- clevis attachments (front and rear) (↳ **fig. 5**)
- brackets, 1-axis (1 degree-of-freedom, front and rear) (↳ **fig. 7**)
- brackets, 2-axis (2 degree-of-freedom, front and rear) (↳ **fig. 8**)
- U-bracket, 1-axis (1 degree-of-freedom, rear only) (↳ **fig. 6**)

Clevis attachments are popular in the industry and are in this case, available with high accuracy bores (H7) to keep the play in the attachment reduced to the minimum.

The 1 and 2 degree-of-freedom rear brackets are designed to fit directly on an Ewellix lifting column (CPMT, TLG and TLT) and respectively allow the 1 or 2-axis movements necessary to the application.

Fig. 4

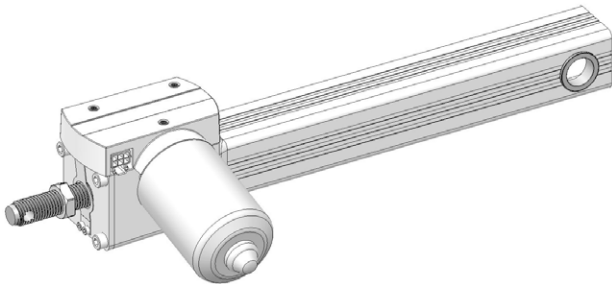


Fig. 5

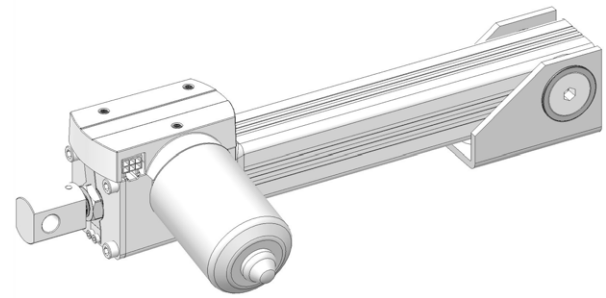
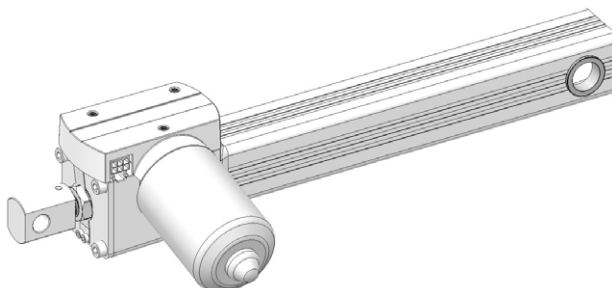


Fig. 6

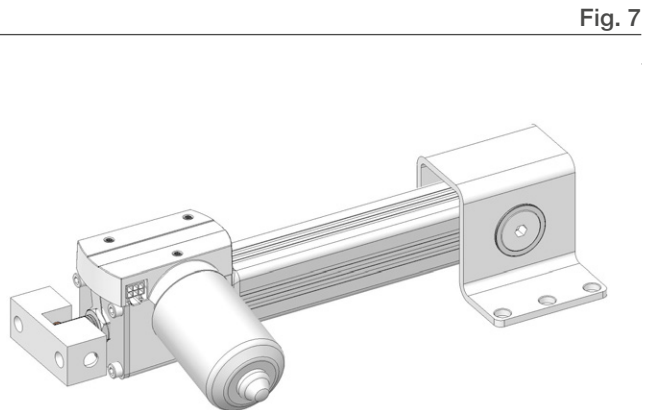
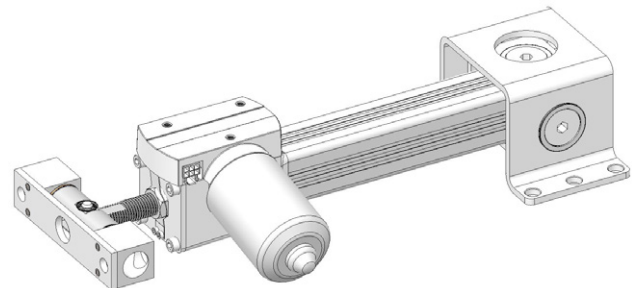


Fig. 7

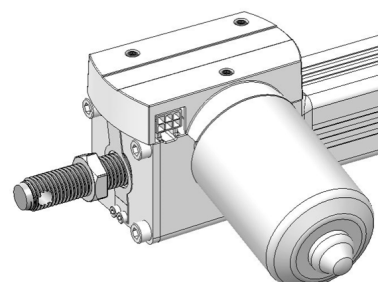
Fig. 8



4.4.1 Spindle with 8H7 bore (front attachment)

The simplest available standard front attachment is a Ø 8H7 (+0.015/0.000) bore in the lead screw (↳ **fig. 9**).

Fig. 9





NOTE

If the bore is to be used as the pivot point, it is recommended to use a DIN 6325 cylinder pin with $\varnothing 8h7 (+0,000/-0,015)$ to have a loose fit.

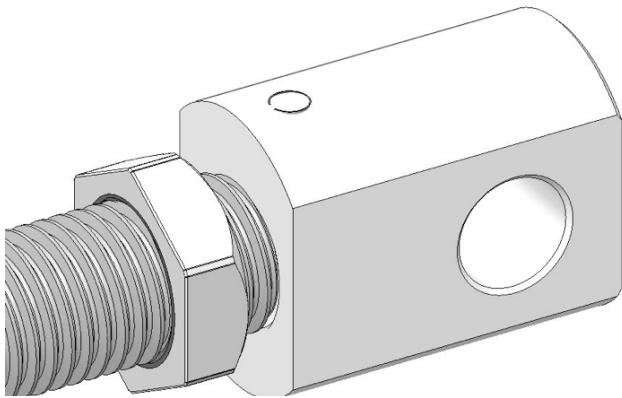
In case the pin should be fixed in the lead screw bore and the pivot point is provided by a customer designed clevis, it is recommended to use a DIN 6325 cylinder pin with $\varnothing 8m6 (+0,015/+0,06)$ to have a transition fit.

4.4.2 Clevis attachments

The clevis attachment set is comprised of specific front and rear interfaces.

The clevis front interface (↳ **fig. 10**) includes an additional head that is put at the extremity of the spindle and that features a $\varnothing 12H7 (+0,018/-0,000)$ bore. An elastic pin is cross fitted through the clevis head and spindle to ensure the clevis head will not get loose over time.

Fig. 10



NOTE

If the bore will be used as the pivot point, it is recommended to use a DIN 6325 cylinder pin with $\varnothing 12h7 (+0,000/-0,018)$ to have a loose fit.

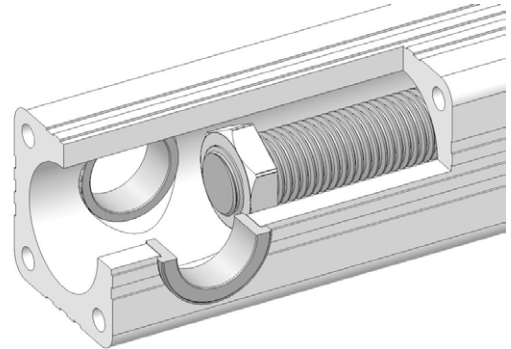
In case the pin should be fixed in the bore and the pivot point is provided by a customer designed clevis, it is recommended to use a DIN 6325 cylinder pin with $\varnothing 12m6 (+0,018/+0,007)$ to have a transition fit.

The rear interface (↳ **fig. 11**) is comprised of 2 bushings with $\varnothing 20H7 (+0,021/0,000)$ that are fitted to the protection tube.

As standard, these bushings are located under the spindle so that a pin can cross tube, toward the gearbox. In this case, the mounting can only be in a trunnion configuration.

It should be noted that to keep a low play configuration, the clevis pins used both for the front and rear attachments should be of matching dimension/tolerance.

Fig. 11



NOTE

It is recommended to use a DIN 6325 cylinder pin with $\varnothing 20h7 (+0,000/-0,021)$ to have a loose fit.

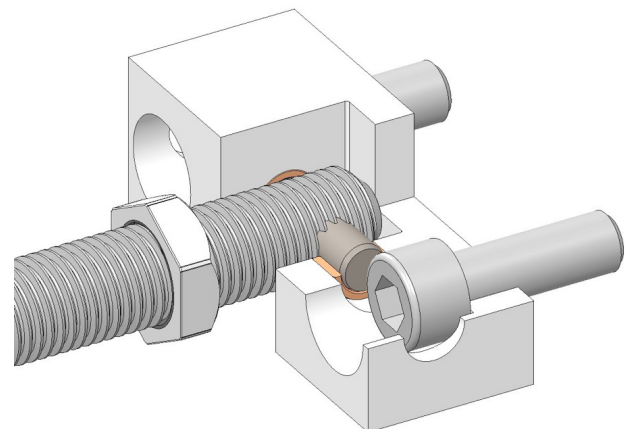
4.4.3 Degree-of-freedom (1-DOF) brackets

brackets

The front bracket is attached to the CAMT spindle through a $\varnothing 8$ dowel pin and allows for a single axis movement only, around this same pin (↳ **fig. 12**). The dowel pin is fixed relative to the spindle and the bracket swivels around it, supported by 2 bushings.

The connection to the upper structure is made through 2 standard M10 screws.

Fig. 12



⚠ WARNING**Safety hazard caused by wrong attachment**

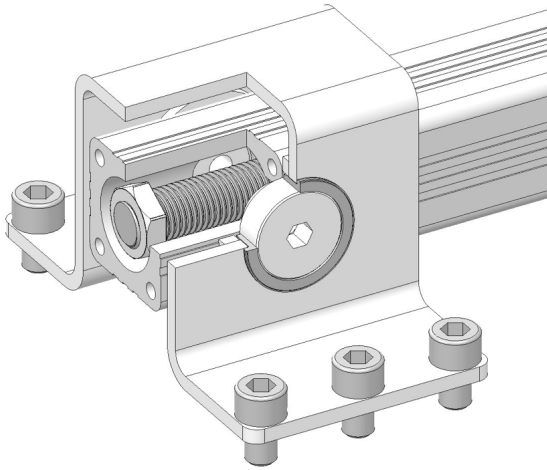
The front bracket is designed and tested to be working with the load in an axial direction. If the customer wants to connect the attachment in a radial direction, it is his responsibility to verify the strength of the support structure and the screw attachment. Detailed requirements such as the tightening torque and the strength class are specified in chapter **6.4 Installation** (↳ **page 29**).

Disregard of the installation guide could have a serious impact on safety and/or operation of the device.

The rear bracket comes as a standard attachment to the CAMT protection tube through 2 large pivot pins/bushings (↳ **fig. 13**).

The rear bracket fits to the size of the outer tube of several Ewellix lifting columns and it should be fastened using 6 standard M10 screws.

Fig. 13

**⚠ WARNING****Safety hazard caused by wrong attachment**

The front bracket is designed for a direct attachment to the following Ewellix lifting columns: CPMT, TLG and TLT. However, it could also be attached to an adapter plate or a support structure.

Detailed requirements like the tightening torque and the strength class are specified in chapter **6.4 Installation** (↳ **page 29**).

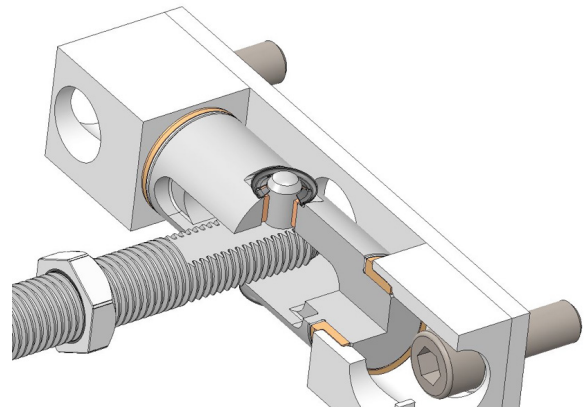
Disregard of the installation guide could have a serious impact on safety and/or operation of the device.

4.4.4 Degrees-of-freedom (2-DOF) brackets

The front bracket is attached to the CAMT spindle through a Ø8 dowel pin and allows for a dual-axis movement (↳ **fig. 14**). The 2 axes free in rotation being in a cartesian coordinate system, the 2 complementary axes, perpendicular to the main spindle axis.

The dowel pin is fixed relative to the spindle and the bracket swivels around it, supported by 2 bushings. Washers act as a backup device iif, over time, the pin press-fit connection loosen by keeping it in place.

Fig. 14

**⚠ WARNING****Safety hazard caused by wrong attachment**

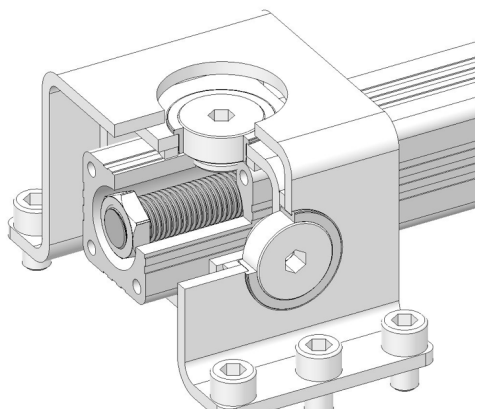
The front bracket is designed and tested to be working with the load in an axial direction. If the customer wants to fix the attachment placed radially, it is his responsibility to verify the strength of the support structure and the screw attachment. Detailed requirements like the tightening torque and the strength class are specified in chapter **6.4 Installation** (↳ **page 29**).

Disregard of the installation guide could have a serious impact on safety and/or operation of the device.

The 2 DOF rear brackets have the same 2 axes of rotation as the front one (↳ **fig. 15**).

It also comes fully assembled, adjusted to reduce the play to a minimum and is, as standard, attached to the CAMT protection tube through 2 large pivot pins/bushings that define the first axis of rotation.

Fig. 15



The rear bracket fits to the size of the outer tube of several Ewellix lifting columns and it should be fastened using 6 standard M10 screws.

⚠ WARNING

Safety hazard caused by wrong attachment

The front bracket is designed for a direct attachment to the following Ewellix lifting columns: CPMT, TLG and TLT. However, it could also be attached to an adapter plate or a support structure.

Detailed requirements like the tightening torque and the strength class are specified in chapter **6.4 Installation** (↳ **page 32**).

Disregard of the installation guide could have a serious impact on safety and/or operation of the device.

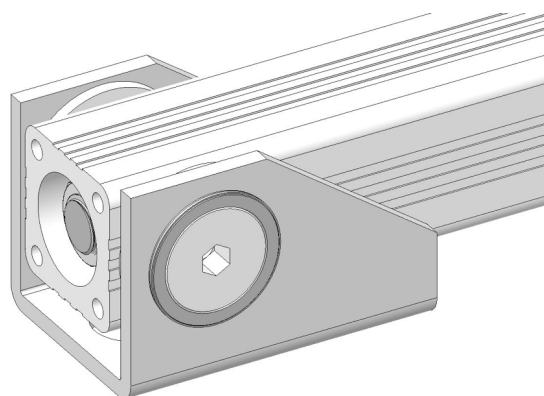
4.4.5 U-Bracket

It is also possible to get a variant of the 1 DOF rear attachment, the U-bracket (↳ **fig. 16**).

In most cases, when the actuator is mounted centric on the supporting column, it is advised to use a standard 1-DOF bracket.

In some cases, when the actuator cannot be mounted centric on the column, the U-bracket can be used together with an adaptor plate to be connected to the lifting column.

Fig. 16



⚠ WARNING

Safety hazard caused by wrong attachment

Detailed requirements like the tightening torque and the strength class are specified in chapter **6.4 Installation** (↳ **page 32**).

Disregard of the installation guide could have a serious impact on safety and/or operation of the device.

4.5 Requirements for third party control units (mandatory in medical applications)

Control units not approved by Ewellix for CAMT linear actuators are treated as third party control units.



NOTE

It is strongly recommended to use original Ewellix controls for the operation of the CAMT linear actuator. If third party controls are used, there must be well-documented evidence that the requirements listed below are complied with.

The secondary circuit of third party control units must be designed as an overvoltage category 1 circuit. The third-party control unit must be fitted with an overload safety current cut-off. The nominal current consumption is 10A. However, at cold start conditions, the current consumption could go up to 12.5A for a few seconds. Therefore the recommended value for the current cut-off is 13.7A. The maximum delay time for the shut off must not exceed 50ms. The third-party control must enable the linear actuator to draw currents up to 25 A for 200 ms after switching on (start-up current). The excess power shut off feature can also be temporarily deactivated for this purpose. The operating voltage of the CAMT linear actuator is 24 V DC. The no-load voltage of 36 V DC must not be exceeded. After the system has been installed, ensure electromagnetic compatibility. The operating time and duty cycle of the CAMT linear actuator may not be exceeded (↳ 11.1 Technical data, page 41).



NOTE

The third-party power supply must have isolation between the primary and secondary circuits according to 2 MOPP and provide a non-grounded secondary circuit.

Push-to-run operation (recommended): The linear actuator operates as long as the switch is pressed. The device does not have signals to indicate operation, and depending on the application, it is recommended to have an operational signal installed in the third party control unit.

For the 2-Hall encoder impulse transmitter, the third party control unit must fulfil the following additional requirements:

- Feed the hall sensors with a voltage of 5 V DC $\pm 10\%$ and a current limit of no more than 20 mA.
- Load the hall sensor outlets with a maximum of 20 mA.
- Connect the hall sensor outlets to the supply with pull-up resistors so that the signal of the open collector outlets can be analysed.

For detailed connection details please see chapter 4.6 Connections (↳ page 23).

4.6 Connections

Electrical connection

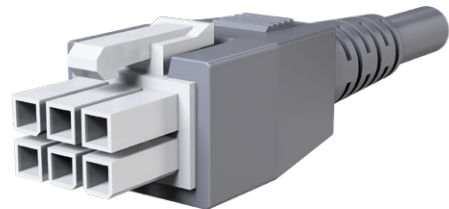
The linear actuator is connected to the control unit via a motor cable. The motor cable has a 6-pole Molex Mini-fit Jr. connector on one end and a DIN-8 connector or flying leads on the other end.

Connected load is 24 V DC and up to 10 A according to the technical data (↳ 11.1 Technical data, page 41).

Important

- Ensure that cables cannot get pinched or damaged
- Check that the supply voltage corresponds to the nominal values on the type plate.

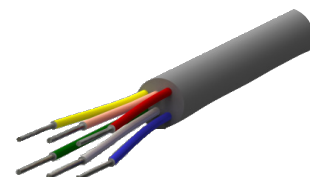
Molex Mini-fit Jr. 6-pole connector



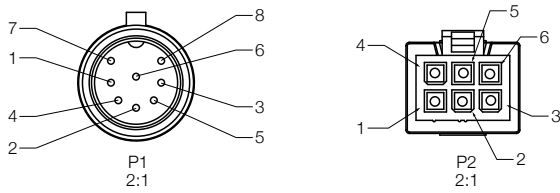
DIN-8 connector



Flying leads



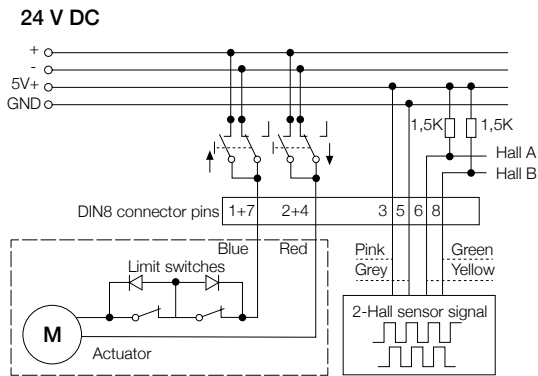
Pin assignment



Connecting data

Plug P1	Wire color	Section	Function	Plug P2
1+7	Blue	AWG 16	- on, + off	4
2+4	Red	AWG 16	+ on, - off	1
3	Pink	AWG 24	+ 5 V	2
5	Grey	AWG 24	gnd	5
6	Yellow	AWG 24	hall sensor 1 signal	3
8	Green	AWG 24	hall sensor 2 signal	6

Connection diagram



4.7 Operating elements

Requirements for operating elements (mandatory in medical applications)

The general safety requirements are according to IEC 60601-1 standard, in the currently valid edition, corresponding with national directives (Means of protection: 1 Mean Of Patient Protection [MOPP]).

NOTE

The device does not feature its own operating elements. The operation takes place via external Ewellix control units (see related operating manual).

4.8 Standard and Optional Features

Standard and optional features can be determined from the type of designation on the type label.

4.8.1 Standard features

Load

6 000 N push and pull force per standard.

Voltage

24 V DC Supply voltage per standard.

Stroke length

From 50 mm to 250 mm with 50 mm Steps per standard. Other stroke length variations are also available as customisation with 10 mm steps.

Backup nut

The CAMT is always equipped with a backup nut on the trapezoidal lead screw to prevent the linear actuator from collapsing in case the thread of the gear nut fails.

End limit switches

The CAMT is always equipped with electro-mechanical end limit switches. These switches shut-off the current to the motor and short cut the motor to shut off the motion quickly when the end position has been reached. The limit switches do not provide a signal for further processing.

2-Hall encoder

The CAMT always comes equipped with a 2-hall sensor integrated on the motor and can be accessed by the controller to enable variable speed control or positioning.

4.8.2 Optional features

Distance between the front pivot and gearbox (offset “X”)

Defines the distance between the pivot point of the front attachment to the front cover of the gearbox. Depending to the selected front attachment option the distance may vary. The standard offset is designed to allow full motion angle to the front attachment without having an intersection with the front cover.

Other distance variations are also available as customisation with 1 mm steps.

Protection tube length

Defines the length of the protection tube. The two available standard options are short and long. With the long tube the lead screw is covered when it is completely retracted. Short is the shortest possible length, without having an intersection between the rear attachment and the gearbox a full-motion angle.

Other tube length variations are also available as customisation with 10 mm steps.

Front and rear attachment

Several standard options are available. Details are described in chapter **4.4 Attachment options** (↳ **page 19**).

Cable options

Available cable options are: With DIN-8 cable, in lengths of 1 m or 2.3 m and with flying leads termination, in length of 2.3 m.

5.0 Transport, packaging and storage

5.1 Safety information for transportation

⚠ CAUTION

To prevent damage due to improper transport.

- Proceed carefully during delivery and unloading of the packaged items, as well as during the transportation to the final destination. Comply with the symbols and information shown on the packaging.
- Do not remove the Operating elements and Accessories from its packaging until just before installation.
- Note storage requirements for return transportation of the device to the manufacturer.

5.2 Transport inspection

The linear actuators are delivered as one packaged unit in a plastic bag, box or on pallets. Check the delivery immediately upon receipt for completeness and any signs of damage incurred during transport.

Check completeness of delivery for:

- A complete linear actuator with built-in options as defined by the Type key on the type plate.
- Installed cable and low voltage connector (depending on the option chosen, with DIN-8 connector or flying leads).
- Any signs of damage to the plastic casing, such as cracks.

If exterior transport damage is evident:

- Do not accept delivery or accept with exceptions (due to fulfilled orders)
- Record scope of damage on the transport documents or bill of delivery of the shipping company
- Initiate complaint



NOTE

Report any damage as soon as possible, as damage claim can only be submitted within the transporter's applicable complaint period.

5.3 Return to the manufacturer

If the device is damaged, arrange for return transportation as follows:

1. Dismantle the device if necessary (↳ **10 Dismantling, page 40**).
2. Pack the device in its original packaging. Follow storage conditions (↳ **5.5 Storage, page 27**).
3. Send to the manufacturer. Contact Ewellix customer service to obtain a shipment address.

5.4 Packaging

Requirements:

All parts are packaged appropriately for anticipated transport conditions, using only environmentally-friendly packaging materials.

The packaging is intended to protect the individual components from damage caused during transportation, or by corrosion and other potential hazards, until the components are ready for installation. Only remove packaging shortly before installation. The packaging should not be destroyed but kept for possible return shipment to the manufacturer (↳ **5.3 Return to the manufacturer, page 26**).

If the packaging is to be disposed of, please note and adhere to the following notices:



NOTE

Environmental damage due to incorrect disposal

Packaging material consists of valuable materials, much of which can effectively be recycled and reused.

Therefore:

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

5.5 Storage

- Keep the device 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 60 °C
- Relative atmospheric humidity: max. 85% (non-condensing)
- For storage for longer than three months, check the general condition of all parts of the packaging regularly. If necessary, refresh or renew the conservation.

**NOTE**

There may be notices on the packaging concerning additional storage requirements not listed here. If so, follow these accordingly.

6.0 Installation and first operation

This chapter is intended for technicians and those involved with further processing. It provides the information needed to assemble, connect and start up the device.

6.1 Safety

Qualification (↳ 2.3.1 Qualification, page 7)

Authorized personnel

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

⚠ WARNING

Electric shock and moving parts hazards.

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

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

⚠ WARNING

Danger if restarted without authorisation

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

Therefore:

- Before starting work, switch off the system and safeguard it from being lockout.

⚠ WARNING

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

Therefore:

- Optional devices, in particular components that are part of a retrofitting, may only be installed following the respective instructions (circuit diagram).
- The electromagnetic compatibility must be tested for the routing and appropriate measures must be carried out if necessary.

⚠ WARNING

Special precautions regarding EMC

The device requires special precautions regarding EMC and must be installed and put into service according to the EMC information provided in this manual (↳ 2 Safety, page 6).

6.2 Installation location

Adhere to the technical data in accordance with operating conditions.

Install in a location according to the ambient operating conditions and where the devices are not exposed to strong UV radiation or corrosive or explosive air media.

6.3 Inspections before initial operation

Perform an installation check before you start up the system with operating devices for the first time:

- To be performed by a professional electrician
- Before first operation, a professional electrician must perform and document the following tests and readings:
 - Visual condition check
 - Function check of operating features and safety features
 - Reading of leakage currents
 - Reading of insulation resistance



NOTE

Additional information concerning inspections and readings (↳ 8 Maintenance, page 35).

⚠ WARNING

Crush hazard

Risk of damage to the linear actuator CAMT caused by static and dynamic overload. Do not use the actuator beyond the permissible operating data.

- Note the maximum permissible operating data in the datasheet
- Note the product label of the actuator (end warning box)

6.4 Installation

To be performed by qualified personnel

⚠ WARNING

Risk of injury and device damage due to manipulation of the screws on the device

Manipulation or loosening of the screws on the device or the optional devices may lead to injury and device damage during the operations.

Therefore:

- Never loosen screws on the device or the options, except for the transportation screws installed in the mounting bores.

⚠ WARNING

Safety hazard caused by wrong screw connections

It is important to respect length, material, quality and tightening torques of the screws to use or it could have a serious impact on the safety or operation of the linear actuator.

Details are specified in the following chapters: **6.4.2 Standard installation procedure** (↳ page 29) and **6.4.3 U-Bracket assembly variant** (↳ page 30).

6.4.1 Brief description

The CAMT must be attached using the mounting holes provided (↳ **11.4 Plans and diagrams, page 42**).

The fastening screws must be used in quantity, quality and dimensions according to the specifications.

The extension and alignment procedures to ease the assembly of the device, as well as the electrical connections, are described in the following sections.

The **fig. 17** describes a typical installation of CAMT:

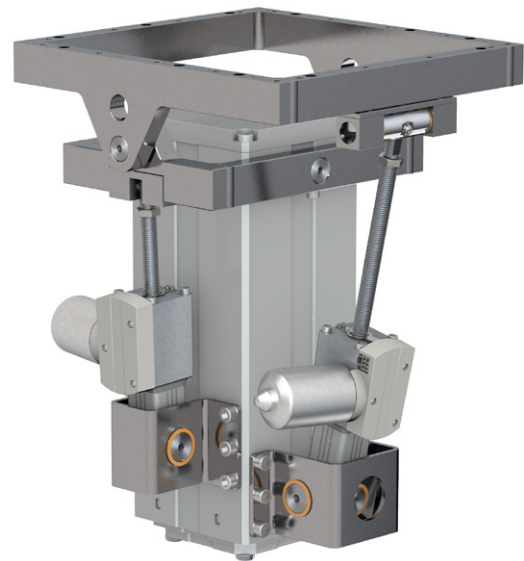
A CPMT lifting column providing the elevation, working together with two CAMT actuators (1 and 2-DOF) to add axial and lateral movements.

As all devices are different, there are different possibilities to install CAMT actuators to lifting columns.

The simplest one is to have, at the bottom, the rear attachments directly fastened to the lifting column outer profile using a standard interface and, at the top, using the existing mounting brackets to be screwed to the upper structure.

When this is not possible to do, an intermediate plate can be used to bring the CAMT to the desired location (mandatory with the U-bracket) plate, that is itself reusing the CAMT standard fixing points.

Fig. 17



6.4.2 Standard Installation procedure

For the following procedure, it is assumed that the cardan system is the interface between the column and the upper structure (surgery table, procedure chair...) and is already attached securely to the column as well as fixed to be able to assemble the actuators easily.

The procedure is, therefore, the same when a CAMT needs to be replaced on an already fully assembled final product.

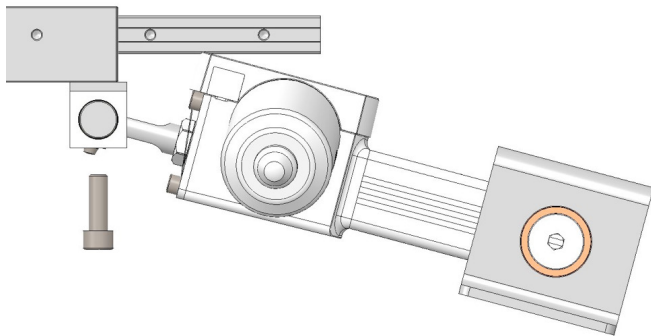
The following sequence then describes a typical way to mount a CAMT actuator onto an Ewellix lifting column and is valid for both 1 and 2-DOF configurations. However, depending on the personal configurations, this procedure may be adapted to every situation.

Front attachment

The space between the front attachment and the actuator gearbox can be relatively limited depending on the configuration so it is a good idea to start with the assembly from that area to allow more flexibility.

1. Take the actuator
2. Present it in a way to align the front attachment screw holes with the relevant ones of the Cardan structure.
3. Rotate the front interface at an angle sufficient to clear the access to the holes completely (→ fig. 18).

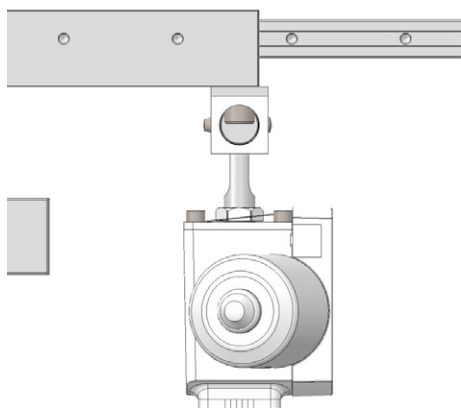
Fig. 18



4. Insert and torque the fixing screws as follows:
 - Screws: ISO4762, M10x40 min, class 10.9, Zn plated
 - Tightening torque: 60 ±1.5 Nm
 - Lock washer M10
 - Thread locker: Loctite 243

The actuator now hangs under the Cardan structure and may be adjusted in length. (→ fig. 19).

Fig. 19



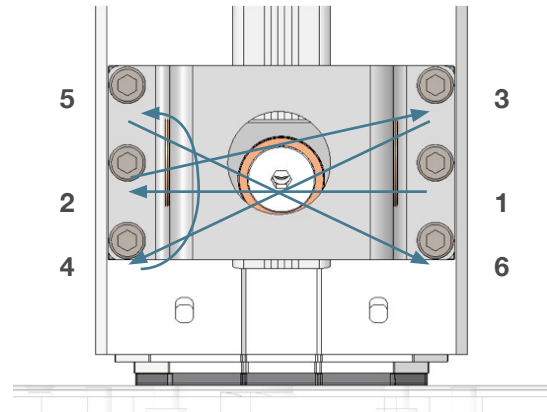
Extension and alignment of the CAMT

Out of the box, in the delivery condition, the distance between attachments likely needs to be adjusted so that the actuator fits on both sides. This is done connecting the CAMT to a control unit and then manually adjusting the stroke using a handset.

Rear attachment

Once the hole pattern on the rear attachment matches the one for the column (or support plate), the screws can be fastened according to the pattern of fig. 20.

Fig. 20



Screws to use:

Attachment direct to Ewellix column

- Screws: ISO4762, M10x16, class 8.8, Zn plated
- Tightening torque in column: 25 ±1.5 Nm
- Lock washer M10
- Thread locker: Loctite 243

Attachment to support steel plate (thickness min 10 mm)

- Screws: ISO4762, M10x16 min, class 8.8, Zn plated
- Tightening torque in steel plate: 35 ±1.5 Nm
- Lock washer M10
- Thread locker: Loctite 243

6.4.3 U-Bracket assembly variant

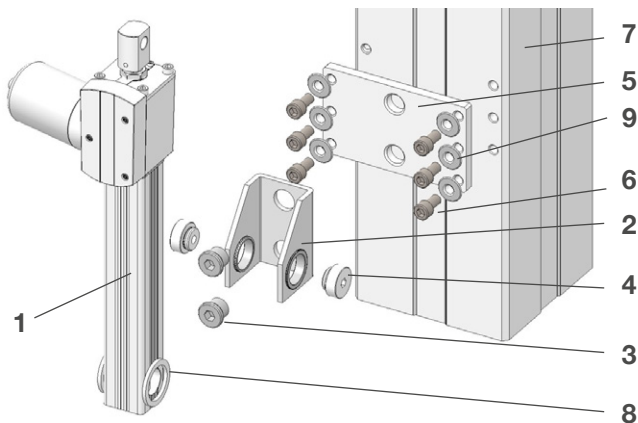
In most cases, the actuator and attachments come as a unit that does not need to be dismantled before being attached directly to the column.

The U-bracket is however different:

1. It requires a support plate an interface with the column.
2. The bracket needs to be disconnected from the actuator to be able to fasten the two fixing screws.
3. Remove the pivot screws. Do not clean the greased pivot screws. Mount the U-Bracket to the support plate.
4. Assemble the CAMT back to the U-Bracket. The pivot screws must be secured with Loctite 2701. The tightening torque is 50Nm +/-2Nm.

The support plate needs to be fastened to the column in the same way as the attachments described above using the standard M10 hole pattern.

Fig. 21



Included in delivery

- 1. CAMT
- 2. U-Bracket
- 4. Pivot screw
- 8. Spacer

Not included in delivery

- 3. DIN908 M20x1.5 plug
- 5. Support plate
- 6. ISO4762 M10 screws
- 7. CPMT lifting column outer profile
- 9. Lock washer

Screws to use:

Support plate (thickness min 10 mm) attachment to Ewellix column

- Screws: ISO4762, M10x16, class 8.8, Zn plated
- Tightening torque: 25 ±1.5 Nm
- Lock washer M10
- Thread locker: Loctite 243

U-Bracket attachment to support plate

- Plug: DIN908, M20x1.5, class 5.8, Zn plated
- Tightening torque: 50 ±2 Nm
- Thread locker: Loctite 243

6.5 Connection to the control unit

All control units not approved by Ewellix for the CAMT linear actuator are treated as third-party controls. For further details regarding third-party control units, please refer to the guidelines in chapter 4 **Structure and function** (↳ page 16).

CAUTION

The use of a third-party control unit may lead to material damage. If a third-party control unit is used, the manufacturer does not assume any liability for damage that may be caused. Therefore:

- It is recommended that an Ewellix control unit be used
- When using a third-party control unit, the requirements stipulated for the third-party control unit must adhere to chapter 4.5 **Requirements for third-party control units (mandatory in medical applications)** (↳ page 24).

NOTE

A low-voltage plug connects the device to an external control unit. Follow the Ewellix control unit's operating manual instructions during the connection process.

Depending on the selected option, the CAMT can be delivered with or without cable.

When a cable is selected, the actuator side of the cable is mandatorily equipped with the matching Molex mini fit connector as can be found on the CAMT actuator.

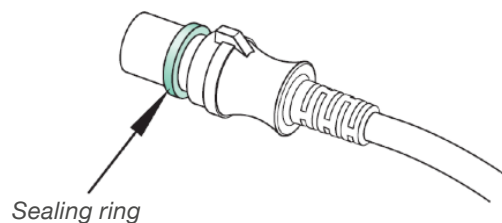
The other side, on the other hand, can either be delivered with a DIN-8 connector when used in combination with an Ewellix control unit or flying leads to adapt to a custom control unit.

6.5.1 Connecting DIN-8 plug to Ewellix control unit

The insertion position is given by the geometric shape of the plug. Strain relief for this system is provided via attached components of the respective Ewellix control unit casing.

1. Check the sealing ring of the DIN-8 plug (↳ fig. 22) and the plug, for any damage.

Fig. 22



NOTE

Damaged sealing rings and twisted plugs can no longer guarantee protection according to IP40. They must be replaced by the manufacturer (↳ 5.2 **Transport inspection, page 28**)

2. Lightly apply lubricant, Klübersynth VR 69-252 (part no. 0118037), to sealing ring (↳ fig. 22).

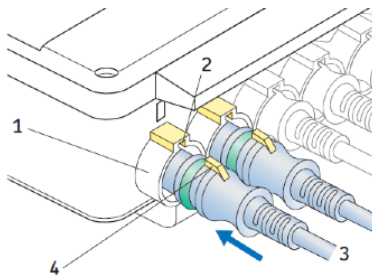
CAUTION**Damage due to wrong lubricants**

The use of incorrect additives may cause significant material damage.

Therefore:

- Use only the auxiliary products listed by the manufacturer.
3. Insert DIN-8 plug (3) into the connecting socket (1) of the control unit. Ensure the correct positioning of the groove (2) and the lug (4) (↳ fig. 23).

Fig. 23



6.5.2 Connecting flying leads cable to connector or external control unit

1. Follow the colour coding of the leads defined in the technical details section (↳ 4.6. Connections, page 23).
2. Ensure that the control unit complies with the requirements for external control units defined in this operating manual.

6.6 Connection to the operating element

**NOTE**

Operational conditions are not displayed on CAMT linear actuators. However, this feature is mandatory in medical applications and must be present on the control unit being used.

6.7 Connection to a power supply

**NOTE**

A control unit connects the device to the electric power supply via a low voltage plug. Follow the control unit's operating manual instructions during the connection process.

1. Connect linear actuator CAMT to control unit (↳ 6.5 Connection to the control unit, page 31).
2. Connect control unit to mains power supply (see related operating manual for the control unit).
3. Ensure that the plug of the power line is accessible at all times.

6.8 Initial start-up

Before the initial start-up, check that the following points have been dealt with:

- All instructions followed in the above sections of this chapter.
- All cables secured against pinching and trapping, and properly connected.
- Electric supply secured.
- Operating device connected to the control unit.
- No persons or obstacles near any movement.
- No mechanical hazard for all movements

Initial start-up

Before the first operation, a professional electrician must perform and document the following test and readings:

- Visual condition check
- Function check of operating features and safety features
- Reading of leakage currents
- Reading of insulation resistance

After the installation check has been completed, it is possible to start up the device, the system.

Make sure that all functions are correctly operational.

7.0 Operation

7.1 Safety

⚠ WARNING

Risk of crushing

While moving onto solid objects, the force of the device may cause injuries.

Therefore:

- Ensure that there are no person in the stroke area of the device while in operation.
- Take note of maximum permissible operating data for the device (↳ **11.1 Technical data, page 42**).
- Never tamper with the elements connected to the device while the device is in operation.

⚠ CAUTION

Material damage due to a static and dynamic overload of the device

Static and dynamic overload can lead to damage and failure of the device.

Therefore:

- Adhere to maximum permissible operating data for the device (↳ **11.1 Technical data, page 41**).
- Never exceed nominal load.
- Never tamper with the elements that are connected to the device while the device is in operation.

⚠ CAUTION

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

⚠ CAUTION

Risk of injury through contact with the attachment adapter.

Therefore:

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

⚠ CAUTION

Material damage through overheating.

An overheating of the device can cause damage.

Therefore:

- Only use an integrated thermal switch
- Never exceed the nominal load
- Always adhere to idle times and operating times (↳ **11.1 Technical data, page 41**)

7.2 Turn on



NOTE

The device does not feature its own operating control elements. The operation takes place via a separate operating element (↳ **Separate operating manual**)

7.3 Turn off



NOTE

The device does not feature its own operating control elements. The operation takes place via a separate operating element (↳ **Separate operating manual**)

7.4 Action before use

Perform an installation check before starting up the linear actuator CAMT for the first time.

Installation check:

- All instructions from the above sections on 'Operation' have been followed.
- No side-acting forces impacting on the linear actuator.
- Fastening screws secured tightly.
- Entire stroke area unobstructed, so that the linear actuator CAMT cannot be driven into a fixed object.
- All cables protected against pinching and trapping and properly connected.
- If connected with a flying leads cable, the leads are connected following the wiring diagram in the appendix.
- Electrical supply secured and the linear actuator CAMT securely connected to a control unit.
- Operating device connected to the control unit.

7.5 Actions during operation

7.5.1 Normal operation

During normal operation, the linear actuator lifts or lowers elements connected to it via the front and rear attachment. The linear actuator is driven via an external control unit and the corresponding operating device (↳ **11.2 Approved Accessories, page 41**).

Use directional buttons UP and DOWN on the operating device to operate CAMT.

- Button UP: CAMT extends.
- Button DOWN: CAMT retracts.

The CAMT moves until the button is released or the end positions are reached. When the end position is reached an end limit switch is triggered and power to the DC motor is cut off. An end position can also be defined by a pre-programmed position in the control unit triggered by the encoder signal from the CAMT linear actuator.

CAUTION

Excessive current consumption, unusual noises or an unwanted movement indicate damage to the linear actuator CAMT. Cease operation of the CAMT and contact the manufacturer responsible for carrying out an inspection.

7.5.2 Operate options

It is recommended not to exceed the duty cycle laid out in the Technical Details.

Details of specific operations can be found in the following sections:

- Installation and the first operation
- Maintenance
- Malfunctions
- Dismantling

7.6 Emergency disengagement

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

Procedure in hazardous situations:

1. Immediately engage emergency shut-off, if present, or cut off power to the actuator (↳ **7.6.1 Shut down, page 34**).
2. Evacuate people from the hazard zone, initiate first aid measures.
3. Notify doctor and fire department, if necessary.
4. Notify responsible person on-site.
5. Keep access paths open for rescue vehicles.
6. Based on the severity of the emergency, notify the authorities if necessary.
7. Instruct specialised staff to repair the malfunction.

WARNING

Do not restart until all persons are outside the hazard zone.

8. Check the device and application that uses the device before restarting the operation. Ensure that all safety equipment is installed and fully functional.



NOTE

The CAMT linear actuator does not have an on/off switch and must be disconnected from the external control unit. Only this measure will de-energize the CAMT.



NOTE

For medical equipment, the application in which the CAMT linear actuator is installed must provide an emergency stop switch or isolation from the mains supply on all poles.

7.6.1 Shut down

1. Pull the power line plug of the control unit out of the power outlet.
2. Pull the DIN-8 plug of the device's cable out of the control unit connection socket.

8.0 Maintenance

Personnel

- The maintenance work described here can be performed by the operator unless otherwise indicated.
- Some maintenance tasks should only be carried out by specially trained, qualified personnel, or exclusively by the manufacturer. This will be indicated in the description of the respective maintenance tasks.
- Only professional electricians should perform work on the electrical equipment.

WARNING

Electric shock hazard

Incorrect maintenance can result in serious injury, death or damage. Only professional electricians should work on electrical systems.

DANGER

Danger if a restart is unintentional

When correcting faults, there is a risk of the energy supply being switched on without authorisation. This poses a life-threatening situation to persons in the danger zone.

Therefore

- Before starting fault repair work, switch off the system and be sure it is locked out.
-



NOTE

It is recommended that you comply with IEC62353 regarding maintenance.

8.1 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.

Interval	Maintenance work	To be carried out by
Daily	Clean off dust and dirt if necessary (↳ 8.2.1 Cleaning, page 36).	Qualified personnel
	Check for visible damage (↳ 8.2.4 Visual check of external condition, page 37).	Qualified personnel
	Check linear actuator for unusual noise or change in performance	Operator
Monthly	Function check of operating and safety features (↳ 8.2.2 Inspections and readings, page 37).	Qualified personnel
	Check the tight fit of the attachment and fixing screws and correct it if necessary	Qualified personnel
Every 6 months	Check the function of the emergency cut-off switch, if present.	Qualified electrician
	Check that all plugs are properly inserted.	Operator
Annually	Check lubrication of the lead screw and re-grease it if necessary (Use Berlub FR 150-21)	Qualified personnel
As determined by the processor	Conduct visual inspection of the routing of the motor and controller cables of the permanent within the application. Cable routing elements should not be loose or broken.	Qualified electrician



NOTE

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

8.2 Maintenance work

8.2.1 Cleaning

To be performed by qualified personnel

WARNING

Damage due to incorrect cleaning

Therefore:

- Do not use aggressive cleaning agents. Water used for cleaning, including chemical additives, must be pH-neutral.
- No liquids are to come in contact with the linear actuator during retraction or extension.
- No steam jets or pressure washers to be used for cleaning.
- The use of other cleaning agents or cleaning devices only with the manufacturer's approval.
- The leadscrew must not be cleaned.

Clean the device

1. Separate the device from the energy supply
2. Clean soiled parts with a damp cloth

8.2.2 Inspections and readings

- To be performed by a professional electrician.
- To be conducted according to the applicable standards and regulations.
- To be fully documented (↳ **Service Log, Manual**).

Complete the following entries in the service log:

- Name of the executing body (company, department)
- Names of the staff on duty
- Identification of the device/system (type, serial number, inventory number) and the respective accessories
- Completed inspections and readings
- Scope and results of the inspections
- Measuring method, measuring device, measurement readings
- Overall assessment / verification of all functions compared to specifications
- Date of inspection or reading and signature of the assessor; personal coding is a viable alternative for IT applications.

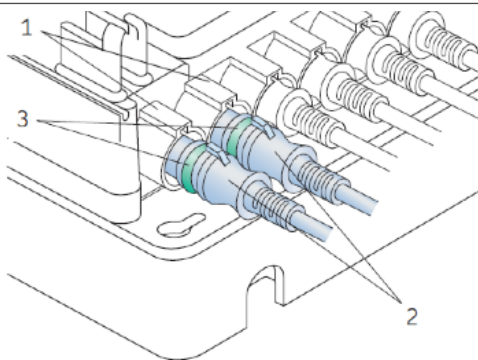
8.2.3 Check sealing function of DIN-8 plug

To be performed by a professional electrician

Check sealing function of DIN-8 plug

1. Unplug the device from the energy supply.
2. Check sealing O-ring (3) of DIN-8 plug (2) for damage.
3. Ensure there is no irregular gap between the DIN-8 plug (2) and the connection outlet (1) of the housing.
4. If sealing O-rings (3) are damaged, have the manufacturer replace them.
5. If there is no damage, reconnect the device to the energy supply.

Fig. 24



⚠ CAUTION

Device damage due to damaged or wrong sealing rings

Damaged or wrong sealing rings cannot guarantee protection under IPX4 (IP-Protection BCU,VCU,SCU).

Therefore:

- Ask the manufacturer to replace the damaged sealing rings immediately.

8.2.4 Visual check of external condition

To be performed by qualified personnel

1. Unplug the device from the energy supply.
2. Check the following structural components for visual external damage:
 - 2.1. Connecting cables for cracks, cuts and pinched sections
 - 2.2. Rim covers for cracks, gaps and broken pieces
 - 2.3. Tube set for scratches and indentations
3. Notify processor or manufacturer if any damage is evident.
4. If no damage is evident and the processor/manufacturer has not communicated any concerns, reconnect the device to the power supply.

8.3 Measures following completed maintenance

Upon completion of the maintenance work, the following steps must be performed before restarting the device.

1. Check all previously loosened screw connections for a tight fit.
2. Ensure that all used tools, materials and other equipment have been removed from the work area.
3. Clean work area and remove potential spills such as e. g. liquids, processing materials or similar substances.
4. Ensure that all the system's safety measures are working satisfactorily.
5. Check all functions against the product specifications
6. Document the inspections in the service log.

9.0 Malfunctions

This chapter describes the potential causes of equipment malfunction and the work required to restore operation. In the event of more frequent malfunctions, shorten the maintenance intervals.

For any malfunction not resolved using the information provided here, contact the manufacturer. See service contact details listed on the back cover.

Personnel

- Unless otherwise indicated, the work required to solve malfunctions may be performed by the operator.
- Some work may only be carried out by qualified personnel, which is indicated in the description of the specific malfunction.
- Work on the electrical system may only be performed by professional electricians.

DANGER

Uncontrolled restart

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

Therefore:

- Before starting fault repair work, switch off the system and safeguard it by activating lockout.

WARNING

Risk of injury and material damage due to incorrect repair

Incorrect repair of a malfunction may lead to personal injury or device damage.

Therefore:

- Never loosen the screws on the device or try to open the device
- If a malfunction cannot be fixed by following the steps in the malfunction table below, dismantle the device and send it to the manufacturer for repair (↳ **5.0 Transport, packaging and storage, page 28**).

Actions during malfunctions

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

The linear actuator does not move.



NOTE

The following malfunction table provides information as to the personnel authorised to perform the repair.

9.1 Malfunction table

Fault description	Cause	Remedy	Personnel
The linear actuator does not move	Control unit not operational	Check mains power connection to the control unit	Professional electrician
		Ensure that the operating device is connected correctly to the control unit	Qualified personnel
		Ensure that the current limit of the control unit matches the requirements defined in this manual	Qualified personnel
		Consult the operating manual of the control unit	Qualified personnel
	Operating device defective	Replace the operating device	Qualified personnel
		Consult the operating manual of the operating device	Qualified personnel
	Poor connection contact to control unit	Ensure that the connector is inserted correctly into the control unit	Operator.
	Incorrect load	Ensure that the load does not exceed the load limit in the technical specification	Qualified personnel.
	Obstacle in the stroke area of the device	Remove all obstacles in the stroke area	Operator
	Cable defective	Check cable for squeezing, tearing or other damage	Professional electrician
	Motor has stopped due to high-temperature safety shut off	Observe the duty cycle in the technical specification. Wait 20 minutes and try again	Qualified personnel
Device cannot be set in motion by any of the suggested repair measures	Contact Ewellix service	Qualified personnel	
Lifespan of the drive is exceeded	Replace the drive, if the drive is older than 10 years	Qualified personnel	
The linear actuator only operates in one direction	Linear actuator reached internal end limit switch	Operate in other direction	Operator
	Control unit malfunction	Consult operating manual of control unit	Qualified personnel
	Operating device malfunction	Consult operating manual of operating device	Qualified personnel
The linear actuator stops before reaching its maximum stroke	Control unit cuts off power	Ensure the centric load does not exceed the load limits given in the specification	Qualified personnel
	Obstacle in the stroke area of the device	Remove all obstacles in the stroke area	Operator
Significant reduction in speed of movement	Incorrect load	Ensure that the load of the linear actuator does not exceed the load limit in the technical specification	Qualified personnel.
	Obstacle in the stroke area of the device	Remove all obstacles in the stroke area	Operator
	Motor, gearbox, lead screw or nut defective	Contact Ewellix service	Qualified personnel
	Incorrect voltage set	Ensure the correct voltage is set	Qualified personnel

9.2 Start of operation after malfunction repair

To restart device following repair of the malfunction, perform the steps described in chapter **6.0 Installation, page 28**.

10.0 Dismantling

This chapter is intended for technicians and those carrying out further processing. It provides all the information needed for removing the devices from service, including dismantling and disposal.

Personnel

- Dismantling may only be carried out by specifically qualified personnel.
- Work on the electrical 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 the unexpected movement of the linear actuator.

Be sure power supply is off and the actuator is locked out before dismantling.

WARNING

Risk of injury due to incorrect dismantling

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

Therefore:

- Ensure there is ample space for dismantling before starting 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 increase risk of accidents.
- Dismantle structural components professionally, following applicable local regulations.
- Secure structural components carefully, to ensure they cannot fall or tip over.
- Contact the manufacturer if you have any questions or concerns.

10.1 Dismantling

The linear actuator CAMT is to be removed from service in the following sequence:

1. De-energise the CAMT by unplugging the cable from the external control unit or the CAMT.
2. Secure the elements of the application in such a way that there is no pulling or pushing force resting on the CAMT.
3. Dismantle the CAMT from the application.
 - 3.1. Ensure there is no pressure acting on the linear actuator.
 - 3.2. Loosen and remove the fastening screws or pins.
 - 3.3. Separate the linear actuator CAMT from the mounting points in the application.
4. Clean the device.
5. Carefully pack for shipment to the manufacturer.

10.2 Disposal

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

- Dispose of metals and plastic components at an appropriate recycling centre.



NOTE

Damage can be caused to the environment by incorrect disposal.

Electronic waste, electronic components, lubricant and other additives are subject to special waste treatment regulations and may only be disposed of by approved specialised companies.

- Sort remaining components based on the respective materials and dispose of according to applicable local occupational health and environmental regulations. The local municipal authorities or specialised waste management companies can provide information concerning environmentally appropriate disposal.

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

11.0 Appendix

11.1 Technical data

The technical information and operating data can be found in the current datasheet.

Datasheet for linear actuator for surgical tables and procedure chairs – Series CAMT

PUB IL-07014-EN

Current data sheets are available on the Ewellix website (see ewellix.com).

	Unit	CAMT20
Rated push load	N	6 000
Rated pull load	N	6 000
Static load (push/pull) ¹⁾	N	13 200
Safety factor on rated load ^{2) 3)}	–	4
Speed (full load to no load) ⁴⁾	mm/s	5 to 6,5
Stroke	mm	50 to 250
Voltage	VDC	24
Current consumption	A	10
Duty cycle	%	10 (1/9 minutes)
Ambient temperature	°C	+10 to +40
IP protection	–	IP20
Noise level (max)	dB	<= 55
Weight ⁵⁾	Kg	5,8

¹⁾ Compliant with static load according to IEC/UL 60601-2-46

²⁾ Static safety factor to prevent mechanical hazards according to IEC/UL 60601-1

³⁾ Depending on stroke and attachment type, safe workload in push direction is reduced.

⁴⁾ Speed with 24 V DC, the speed with V/SCU is higher.

⁵⁾ For stroke 250 mm, without attachment

11.2 Approved Accessories

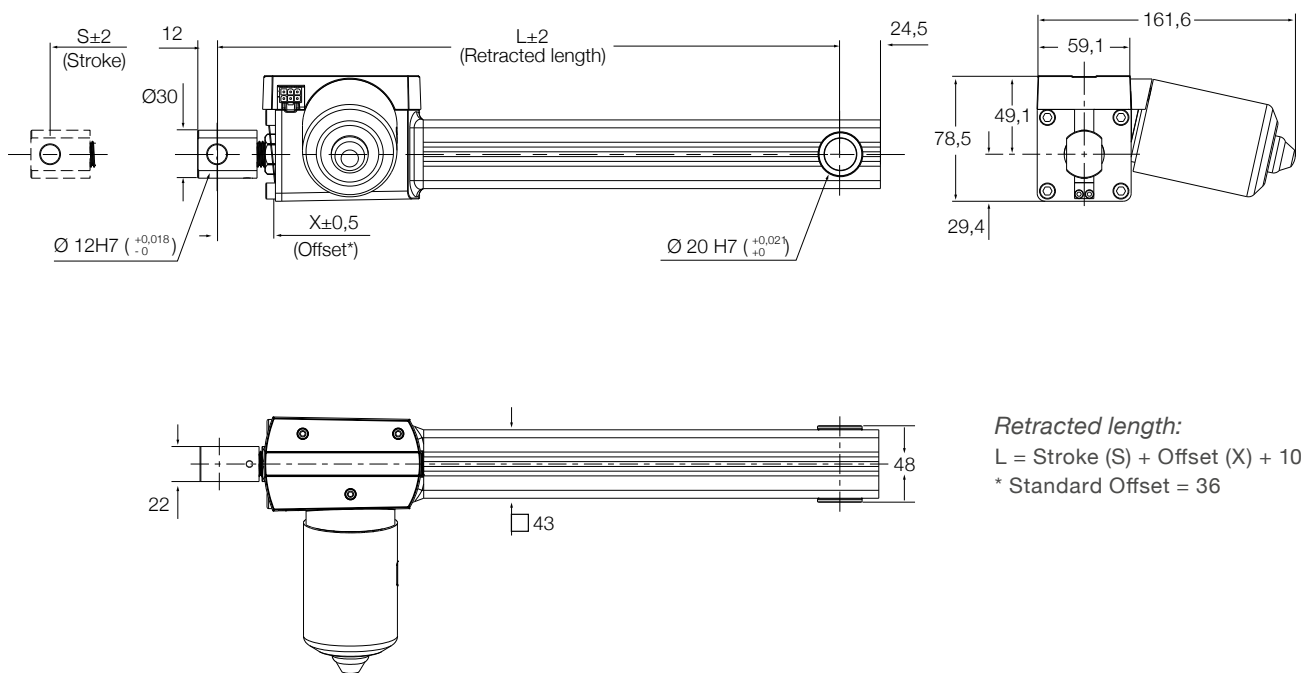
	Control units							
	SCU 1	SCU 5	SCU 9	VCU 5	VCU 8	VCU 9	*BCU 5	*BCU 8
CAMT	•	•	•	•	•	•	•	•
Operating switches								
EHA 3	•	•	•	•	•	•	•	•
STJ	•	•	•	•	•	•	•	•
STE	•	•	•	•	•	•	•	•

11.3 Standards Compliance

The declaration of incorporation according to annexe IIB of Directive on machinery 2006/42/EC can be supplied upon request.

11.4 Plans and Diagrams

11.4.1 Dimensional drawing - Clevis attachment (CAMT20-xxxxx-00L-AA-AFx-000)

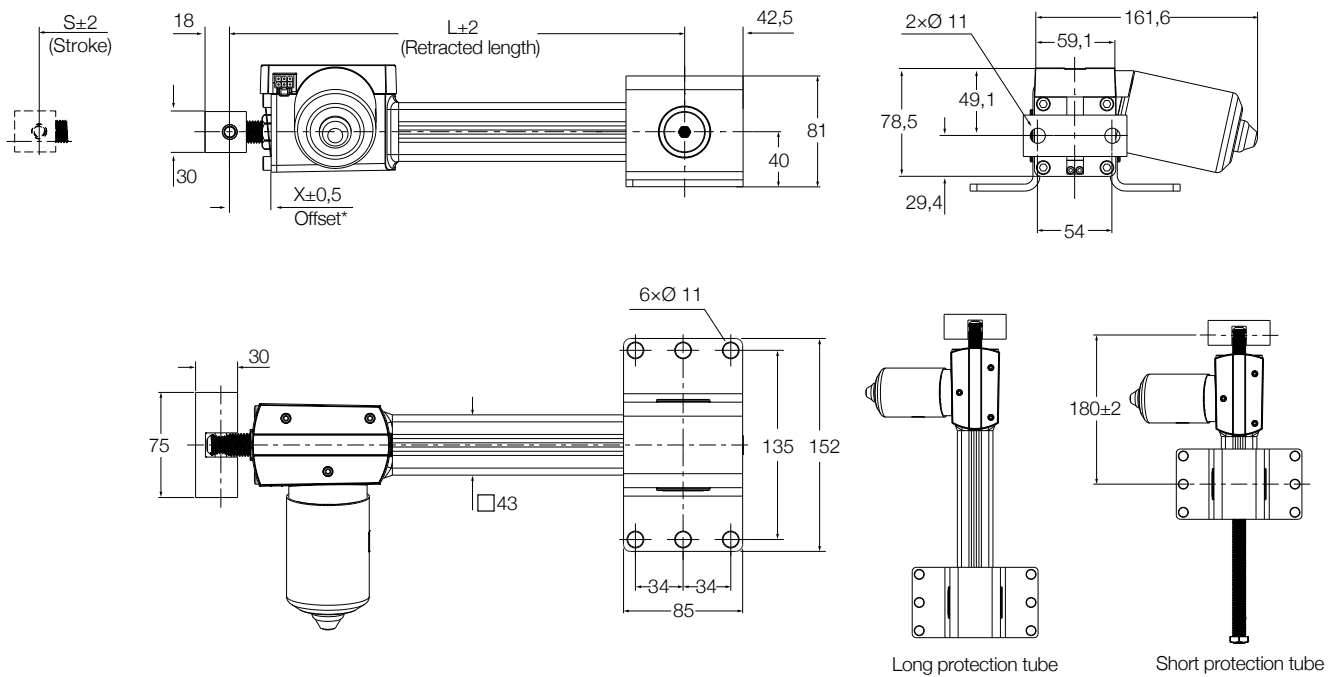


Retracted length:

$$L = \text{Stroke (S)} + \text{Offset (X)} + 104$$

* Standard Offset = 36

11.4.2 Dimensional drawing – 1DOF (degree-of-freedom) attachment



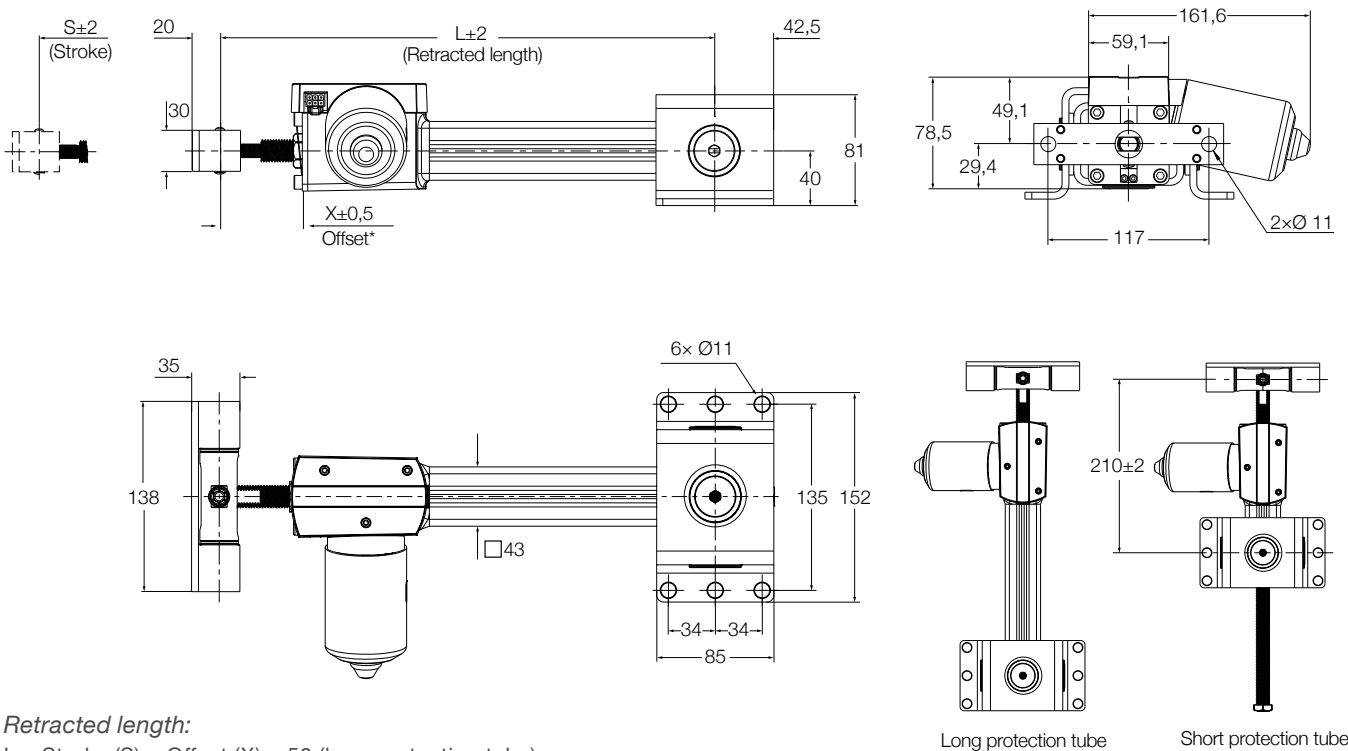
Retracted length:

$L = \text{Stroke (S)} + \text{Offset (X)} + 50$ (long protection tube)

$L = \text{Offset (X)} + 150$ (short protection tube)

* Standard Offset = 30

11.4.3 Dimensional drawing – 2DOF (2 degree-of-freedom) attachment



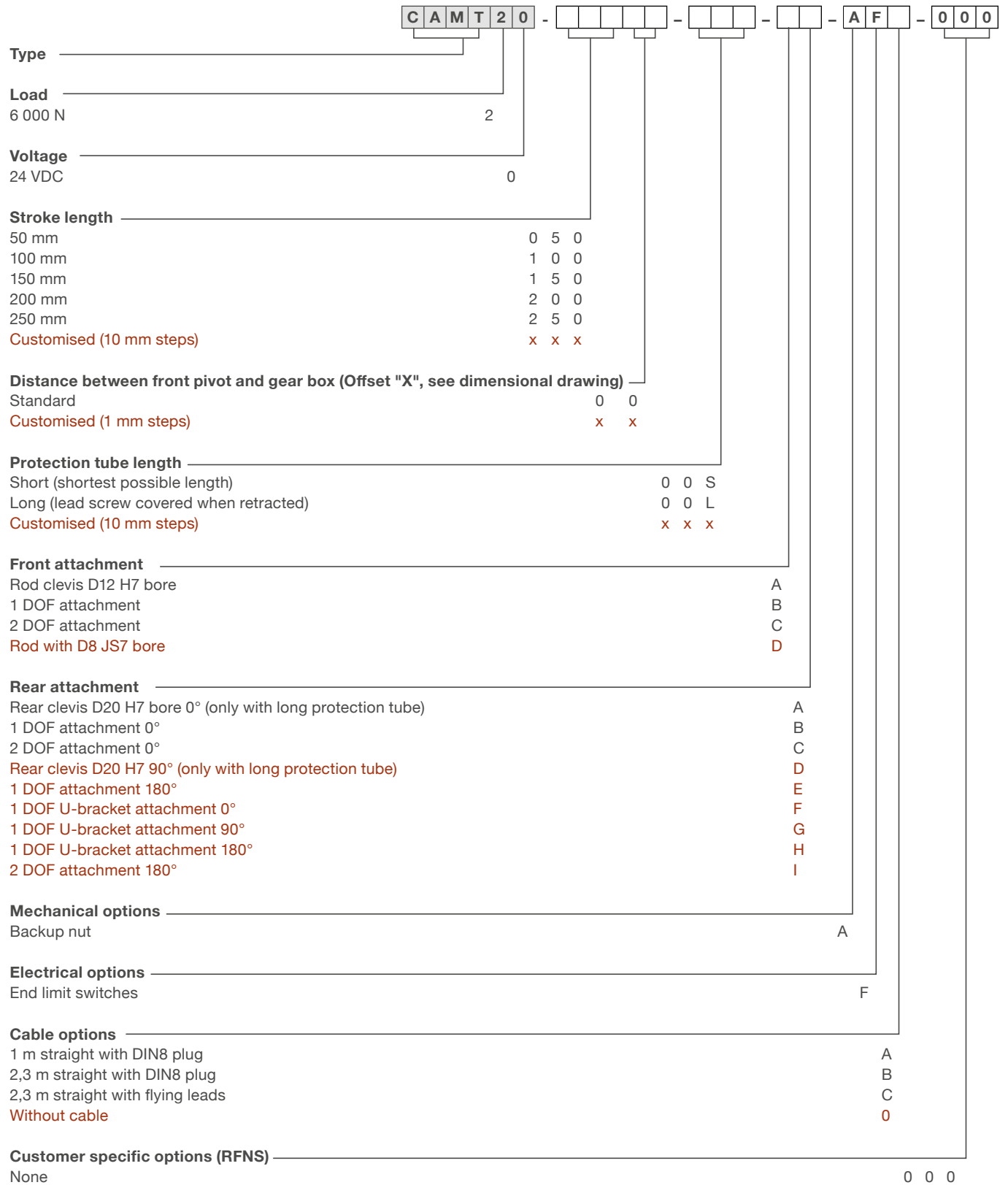
Retracted length:

$L = \text{Stroke (S)} + \text{Offset (X)} + 50$ (long protection tube)

$L = \text{Offset (X)} + 150$ (short protection tube)

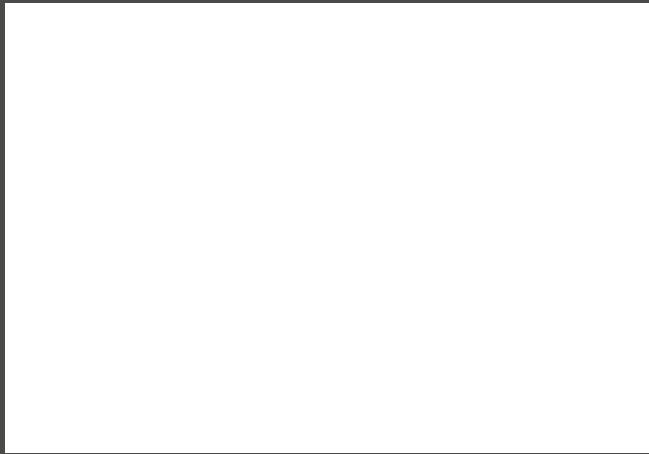
* Standard Offset = 60

11.5 Ordering key



Options shown in red are only available on request. Contact Ewellix for more information on minimum quantities and additional costs





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