EWELLIX

MAKERS IN MOTION

Actuator range catalogue

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The heritage of innovation

Ewellix is a global innovator and manufacturer of linear motion and actuation solutions. Today, our state-of-the-art linear solutions are designed to increase machine performance, maximise uptime, reduce maintenance, improve safety and save energy.

Technology leadership

Our journey began **over 50 years** ago as part of the SKF Group, a leading global technology provider, with the world's first precision ball and roller screw factories. Our history with SKF provided us with the **expertise to continuously develop new technologies** and use them to create cutting edge products that offer our customers a competitive advantage.

In 2019, we became independent from SKF and changed our name to Ewellix. **We are proud of our heritage**. This gives us a unique foundation on which to build an agile business with engineering excellence and innovation as our core strengths.

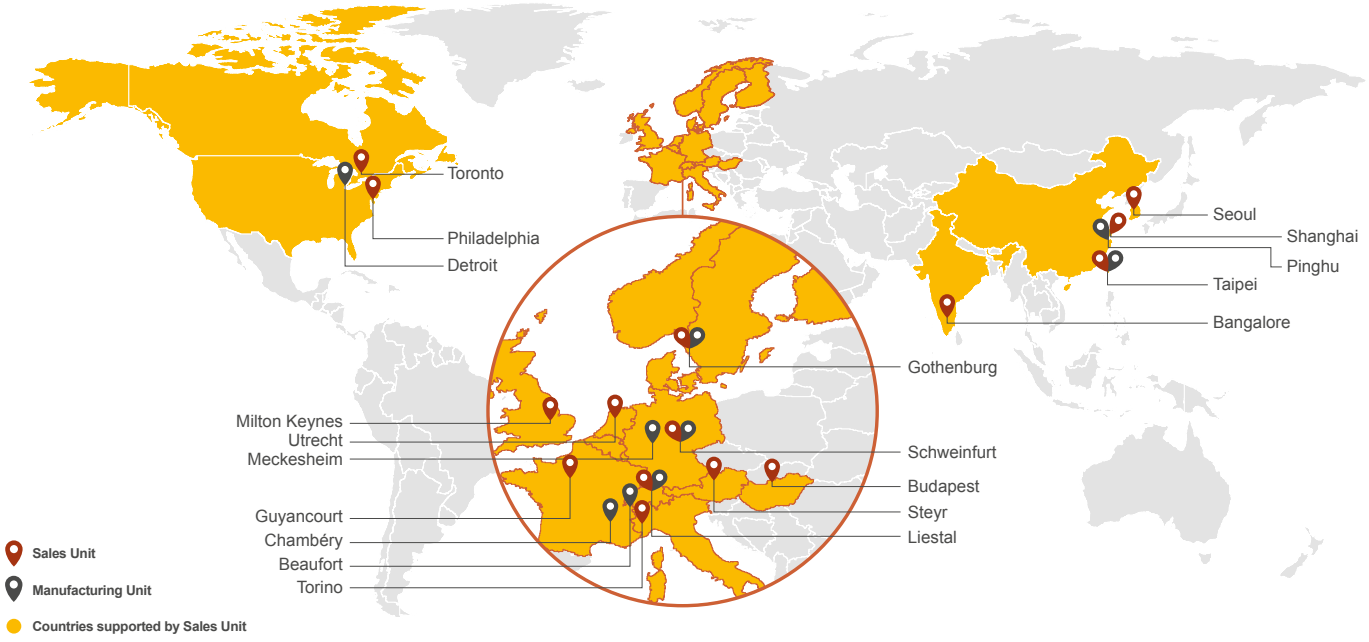
Global presence and local support

With our **global presence**, we are uniquely positioned to deliver **standard components and custom-engineered solutions**, with full technical and applications support around the world. The long lasting relationships with our distributor partners allow us to support customers in a variety of different industries. At Ewellix, we don't just provide products; **we engineer integrated solutions** that help customers realise their ambitions.

1 400 employees

16 sales units

9 factories



Trusted engineering expertise

Our industry is in motion; pushing towards solutions that reduce environmental impact and leverage new technology. We provide technical and manufacturing expertise to overcome our customers' challenges.

Engineering for the future

We work in a **wide range of industries**, where our solutions provide key functionality for business critical applications.

For the **medical industry**, we provide precision components for use in core medical equipment.
Our unparalleled understanding of **industrial automation** systems is based on decades of research into advanced automation components and techniques

Our deep knowledge of **mobile machinery** provides powerful and reliable electromechanical solutions for the harshest conditions. In an **industrial distribution** setting, we supply linear expertise to our partners, empowering them to serve customers with greater efficiency

We offer excellence

We have a **unique understanding of linear equipment** and how it's integrated in customers' applications to provide the best performance and machine efficiency.

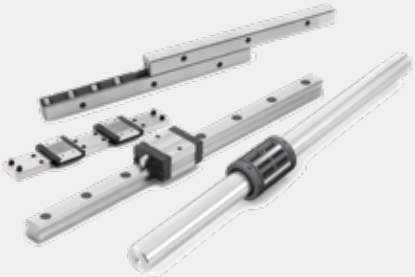
We assist our customers by creating equipment that runs faster, longer and that is safe and sustainable.
We provide a wide variety of **linear motion components** and **electromechanical actuators** for equipping any automation application, helping our customers **reduce footprint, energy use and maintenance**.

We push for lower energy consumption that **increase productivity and reduce the environmental impact**.

Actuation systems

Ball and roller screws

Linear guides and systems



1

Introduction

- Cost effectiveness
- Controllability
- Stability

Core technologies

Actuation technology

Our extensive experience and knowledge of actuation systems allows us to satisfy the most demanding requirements using linear actuators, telescopic pillars and control units.

Linear actuators

We offer a wide range of low- to medium-duty actuator designs and configurations for simple industrial or specific health care applications. Our versatile range provides everything from low- to high-load capacities and medium operating speeds to quiet and aesthetically designed systems (↳ **fig. 1**).

High-performance actuators

Our range of high-duty actuators meets the needs of demanding industrial applications with high loads and speeds in continuous operation. These actuators provide the best controllability and reliability for programmable motion cycles (↳ **fig. 2**).

Telescopic pillars

We offer a wide range of options for several applications. In addition, our telescopic pillars are quiet, robust, powerful, resistant to high offset loads and feature attractive designs (↳ **fig. 3**).

Control units

Ideal for applications focused on system control, Ewellix control units provide connections for foot and hand or desk switches (↳ **fig. 4**).

Operating switches

Ewellix offers different operating switches to control the position of your equipment. The range includes:

- Hand switches
- Foot switches
- Desk switches

These switches can be used with control units to drive linear actuators and telescopic pillars or directly with the devices in AC powered versions.

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Ball and roller screw technology

For applications that require driving by transforming rotary action into linear motion, we provide a comprehensive range of solutions including rolled ball screws, roller screws and ground ball screws.

Miniature ball screws

Ewellix miniature ball screws are very compact and provide silent operations (↳ **fig. 5**).

Rolled ball screws

We offer several, highly precise recirculating systems to cover most application requirements which can reduce or eliminate backlash (↳ **fig. 6**).

Ground ball screws

Ewellix ground ball screws offer increased rigidity and precision.

Roller screws

Ewellix roller screws go far beyond the limits of ball screws providing the ultimate precision, rigidity, high speed and acceleration. In addition, backlash can be reduced or eliminated. Long leads are available for very fast movements (↳ **fig. 7**).

Fig. 5

Fig. 6

Fig. 7

Linear guide technology

To provide optimal solutions for all your guiding needs, our product range features shaft guidings, profile rail guides and precision rail guides.

Fig. 8

Fig. 9

Fig. 10

Linear ball bearings

Cost-effective, simple and self-aligning, Ewellix shaft guidings feature unlimited stroke, adjustable preload and excellent sealing performance. They are also available in corrosion-resistant versions and pre-mounted on an aluminium housing as a unit (↳ **fig. 8**).

Precision rail guides

With a range of modular options, Ewellix precision rail guides feature different rolling elements and cages. These guides feature high precision, high load carrying capacity and stiffness, and also come with an anti-creeping system. They are also available as a ready-to-mount kit (↳ **fig. 9**).

Profile rail guides

Featuring unlimited stroke through joint rails and excellent rigidity, capable of withstanding moment loads in all directions, Ewellix profile rail guides are ready to mount and provide easy maintenance along with high reliability. They are available in ball or roller versions as well as standard and miniature sizes (↳ **fig. 10**).

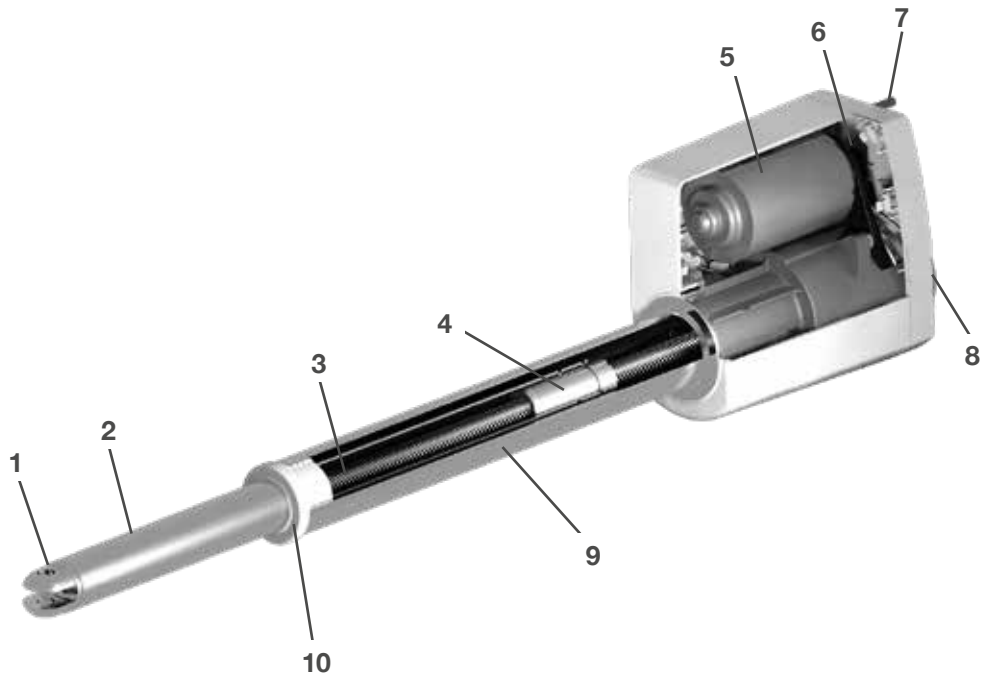
The terms used in the catalog are listed in a **Glossary** ↳ **page 290** and the **Symbols** are described from the ↳ **page 294**.

Product overview

Linear actuators

Electromechanical linear actuators enable precise, controlled, and repeatable push/pull movements in linear drive applications. Linear actuators serve as efficient, virtually maintenance-free, and environmentally friendly alternatives to hydraulic or pneumatic types.

Actuators with a modular design and open architecture offer opportunities to choose and integrate components to achieve customized solutions within existing envelopes. Application potential expands with the introduction of technologies for specific purposes, such as hall sensors, limit switches, potentiometers, friction clutches, or back-up nuts. Equipped with brushed DC motor or AC motor, the duty cycle is rated up to 20% or up to 40% if equipped with a AC motor.



1. Front attachment
2. Inner tube or Push tube
3. Screw
4. Nut
5. Electrical motor
6. Gearbox
7. Electrical cable
8. Rear attachment
9. Outer tube or protection tube
10. Sealing system

Telescopic pillar

Telescopic pillars enable precise, controlled, and repeatable lifting movements of in linear drive applications including with those with torsion and off set loads.

Telescopic pillars with a modular design and open architecture offer opportunities to choose and integrate components like linear actuators or drive to achieve customized solutions within existing aluminum profiles. Application potential expands with the introduction of technologies for specific purposes, such as hall sensors, limit switches but also Integrated Circuits for switch mode power supply and motor control. Equipped with brushes DC motor or AC motor, the duty cycle is rated up to 10%, which means when the load is the maximum.

1. Inner tube
2. Outer tube
3. Screw and nut
4. Cables through
5. Power supply
6. Electrical Motor
7. Gearbox
8. Control board
9. Cable connector

Lead screw

Precision rolled ball screws

Screws

Ball and roller screws are key components to build electric cylinders. They transfer rotary movements of the motor into linear movements. Their efficiency and their load and speed capabilities have a very big influence on the performance of electric cylinders.

Thanks to decades of experience with manufacturing ball and roller screws and continuous product and process development, Ewellix builds electric cylinders with precision screw solutions that fulfill the most demanding applications in terms of efficiency, precision, durability and value. All screws are made of high-strength materials with specific heat-treatment.

Lead screw

These screws transmit torque into linear motion through direct sliding friction. A typical assembly consists of a steel screw and plastic nut. Some of the electric cylinders are equipped with lead screws with a relatively high friction coefficient that makes them well suited for self-locking application. Lead screw actuators accommodate high static force, withstand excessive vibration, operate quietly, and represent cost-effective solutions.

Precision rolled ball screws

Ewellix ball screw assemblies provide high performance solutions suitable for a wide range of applications where high loads, precision driving, durability and value are prerequisites.

High technology machinery associated with precise control of the cold forming and metallurgical processes enable the production of screws that offer virtually the same accuracy and performance of ground ball screws, but at a lower cost. Standard lead precision is G9, according to ISO 286-2:1988. Ewellix production meets G7 lead precision for screw shaft nominal diameter starting from 20 mm. On request, Ewellix can deliver ball screws with G5 lead precision, according to ISO 3408-3:2006, defined for positioning screws, and matching the lead precision of G5 ground ball screws.

Ewellix engineering tools

Web-based solutions

To simplify the product selection process, Ewellix offers a set of free Web tools that allow a quick and easy navigation into the complete linear motion offering.

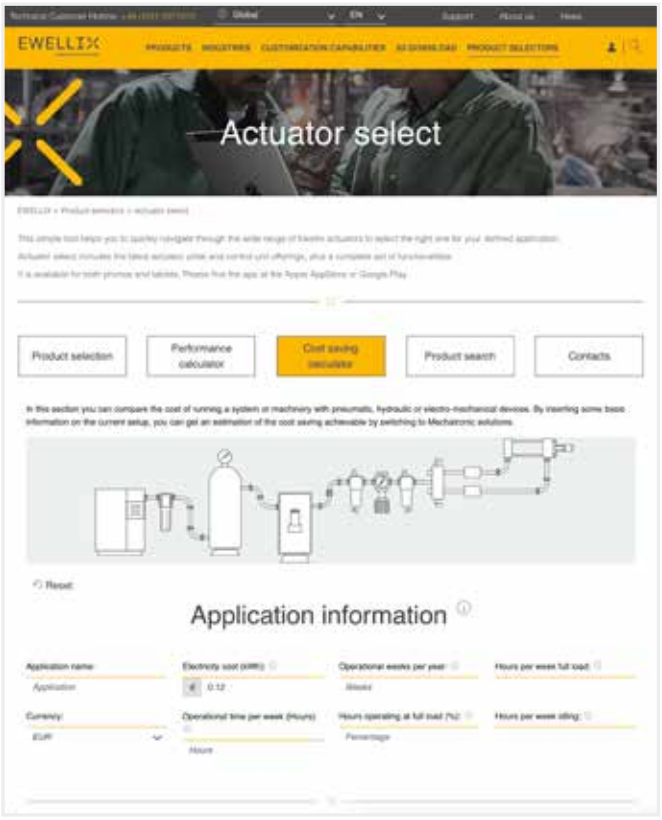
Actuator Select

Users can choose the desired product family among Pillars, Linear Actuators, Rotary Actuators and Controls. Then, by entering few simple parameters, they will be guided in the product selection.

Key features include:

- Four complete product lines
- Dynamic filtering of the results
- Result ranking by application
- Product comparison (up to 3 at time)
- Indication of compatible control unit for selected Pillar or Actuator
- Cost saving calculator
- Direct link to product drawing, technical datasheet and catalogues

A web-based version of the tool is available at **ewellix.com/actuator-select**



Actuation System set-up

Linear actuator definition and type

Electro-mechanical linear actuators enable precise, controlled, and repeatable push/pull movement in linear drive applications.

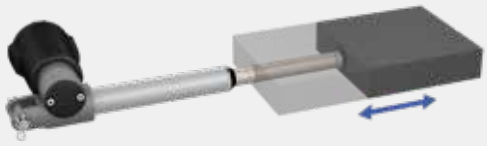
Linear actuators serve as efficient, virtually maintenance-free, and environmentally friendly alternatives to hydraulic or pneumatic types.

Standard versions can handle loads as great as 50 kN, deliver speeds over 150 mm/s, and travel as far as 700 mm. They can be self-contained in aluminum, zinc, or polymer housings and ready-to- mount for easy plug-in operation.

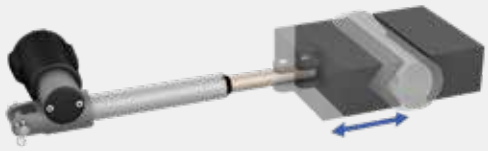
Actuators with modular design and open architecture offer opportunities to choose and integrate components to achieve customized solutions within existing envelopes. Application potential expands with the introduction of technologies for specific purposes, such as hall sensors, limit switches, potentiometers, friction clutches, ball detent clutches, or back-up nuts.

Screw-type linear actuators powered by an electric AC or DC motor basically consist of a lead screw (threaded shaft/spindle) with drive nut and push tube with a gearbox between the motor and the screw also present.

When power is supplied, the motor rotates the lead screw, which causes the drive nut to travel and extend the push tube. Reversing the motor rotation retracts the push tube.

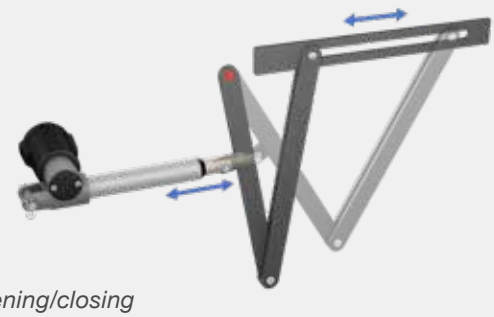


Pushing/pulling



Clamping/gripping

Raising/lowering



Opening/closing

Ball screw vs. acme screw

Traditional types of lead screws include ball screws and acme screws, whose specification will be influenced by an actuator's configuration and load requirements.

Fig. 1
Ball screw

Fig.2
Acme screw

Ball screws

All-steel ball screws consist of a screw shaft, ball nut with a ball recirculation system to convert rotary motion into smooth, accurate, and reversible linear motion (or torque to thrust) (↳ **fig. 1**). The row of circular rolling elements is self-contained in a closed system between the nut and screw for a design exhibiting extremely low friction coefficients. The low frictional resistance minimizes wear, improves efficiency, and reduces operating temperature for longer service life.

Ball screws can handle high loads, with a very good efficiency, achieve high duty cycles, operate over a wide temperature range, and deliver the precision necessary to enable actuators performing over long periods at high speeds and requiring high dynamic capability.

Brakes usually are adopted in ball screw actuators or non-self locking gear boxes to prevent back-drive and provide an high static load performance.

Acme screws

These screws transmit torque into linear motion through direct sliding friction. A typical assembly consists of a steel screw and plastic nut (↳ **fig. 2**).

Some of the products are equipped with acme screws with a relatively high friction coefficient that makes them well suited for self-locking applications. Acme screw actuators accommodate high static load, withstand excessive vibration, operate quietly, and represent cost-effective solutions. Brakes could be adopted to increase the static load performance.

Performance considerations

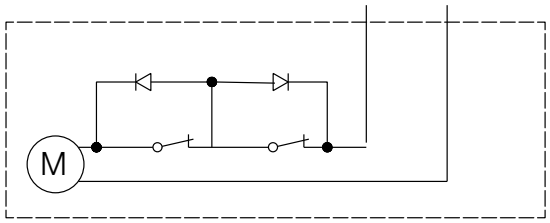
Beyond the basic fundamentals of actuator operation, applications may require feedback on position and/or direction, limits on motion or travel in a particular direction, or protection against dynamic overload. Enabling technologies have been developed for these purposes.

Limit switches

Its purpose is to limit actuator motion or travel in both direction. It is used on DC and AC versions (↳ **fig. 3**). When activated, the switch typically opens an electrical contact integrated on the electrical circuit of the motor. By reversing the voltage, the limit switch circuit is over pass, the motor runs in the opposite direction and the switch is released. The second limit switch will proceed in the same way but for the opposite direction. These devices prevent actuators from running into the mechanical ends.

Fig. 3

Limit switches

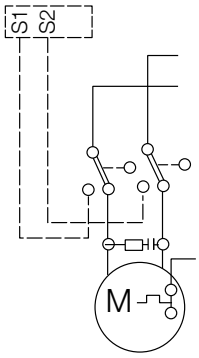


End-stop output

Its purpose is to provide output information on when the actuator reaches a position in a particular direction (↳ **fig. 4**). When activated, the switch opens or closes an electrical contact. When the contact is closed, current will flow through the switch; when the contact is open, no current will flow through the switch. These devices could be used on the application to prevent actuators from running into the mechanical ends and may allow for the adjustment of stroke length. End-stop output could be used by a control board to limit the stroke of the actuator, for instance.

Fig. 4

End-stop outputs

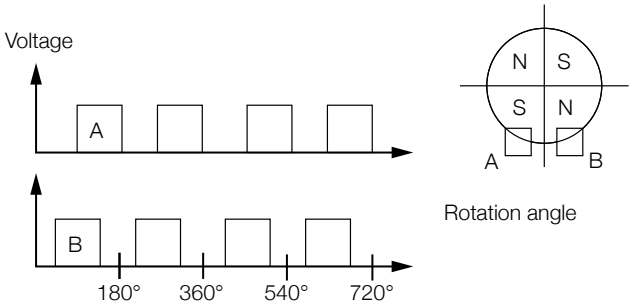


Hall sensors

These rotary or linear sensing devices are incremental no contact sensors that are used to define the relative position of an actuator. Two sensors detect the changing magnetic field created by a rotating magnet and then relay corresponding output pulses to a control unit to provide the travel feedback. Two sensors could detect also the direction of the movement (↳ **fig. 5**). After a homing procedure, the travel distance can be defined with counting the pulse.

Fig. 5

Hall sensor

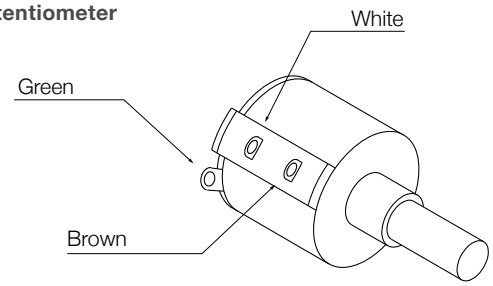


Potentiometer

A potentiometer is an analog feedback device. The potentiometer is considered an absolute sensor with unique value in each position. Sometimes it is called a variable resistance that can be read and fed into a controller for positioning control of the application (↳ **fig. 6**).

Fig. 6

Potentiometer



Absolute analogue position output

An absolute analog position output uses a non-contact sensor, so no wear and the absolute positioning provide an unique value in each position by voltage from 0.5 to 4.5. The input voltage is 5V or 10 to 55 V depending the series. The output signal can be read and fed into a controller for positioning control of the application. It is the best of the two solutions, hall sensor or potentiometer without compromise (↳ **fig. 7**).

Friction clutch

This function will protect the actuator from mechanical damage when it reaches either of its mechanical end positions or when the maximum dynamic load is momentarily exceeded. A friction clutch consists of a series of steel plates engaging a hub and a series of friction rings engaging a housing (↳ **fig. 8**).

Pressure is exerted on the plates and rings by an adjuster acting through a spring and pressure plate. The friction clutch is not intended for use as a load limiter, but only for protection of the actuator and end- use equipment in the event of dynamic overload.

Ball detent clutch

A ball detent type clutch transmits force through hardened balls which rest in detents on the shaft and are held in place with springs. An overtorque/load condition pushes the balls out of their detents, thereby decoupling the lead-screw from the motor.

Back-up nut

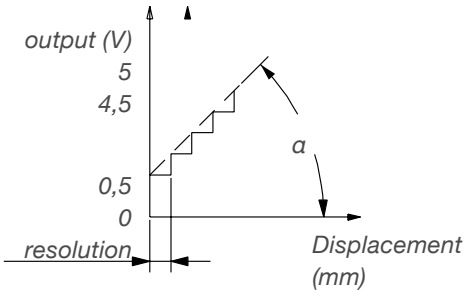
This prevents an actuator from collapsing if a drive nut fails. The back- up nut is usually in metal, exhibits greater anti-shear strength than the drive nut, and only makes contact with the threads of the spindle when the threads of the drive nut fail (↳ **fig. 9**). The back-up nut carries the load and may be able to lower the load (signaling need for repair).

Slip stick effect

The cycle of alternating slipping and sticking as two surfaces rub against each other results in vibration and noise. Resonances within other materials can occur. This effect can sometimes be heard, felt or seen. With linear actuators and pillars, slip stick has been witnessed between the Delrin and aluminum or steel, such as between drive nut and spindle, and glide pad and extrusion.

Fig. 7

Absolute analogue position sensor



tan (α) = output relation to displacement (V/mm)

Fig. 8

Friction clutch

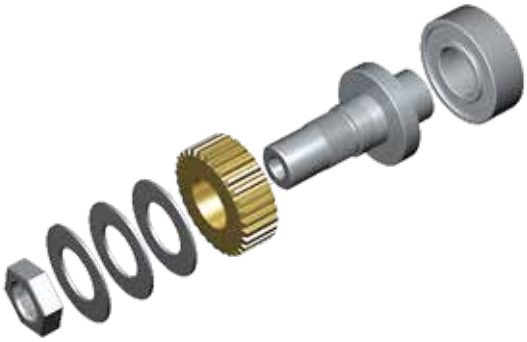


Fig. 9

Back-up nut

Product range comparison

Linear actuators

Ewellix offers a wide range of linear actuators in terms of push or pull load, speed, stroke length and input voltage. Most of them are approved as a component of a medical device that complies with IEC 60601-1 and UL mark RU.

Family	Load kN	Speed mm/s	Stroke mm	Voltage V		See page –
MATRIX	8	13	700	12, 24		57
RUNNER	12	8	700	24		72
CAJA 35C	3,5	7,5	250	24		76
Ecomag	6	9	300	24		80
Magdrive	6	8,5	700	24		84
CAHB	10	60	700	12, 24, 48		89
CAT and CAR	4	193	700	12, 24, 120, 230, 3x400		123
CAHM	50	74	700	24, 230, 3x400		173

Harsh environment Medical

Some products are designed for a specific application but are suitable for others applications that request the similar performance.

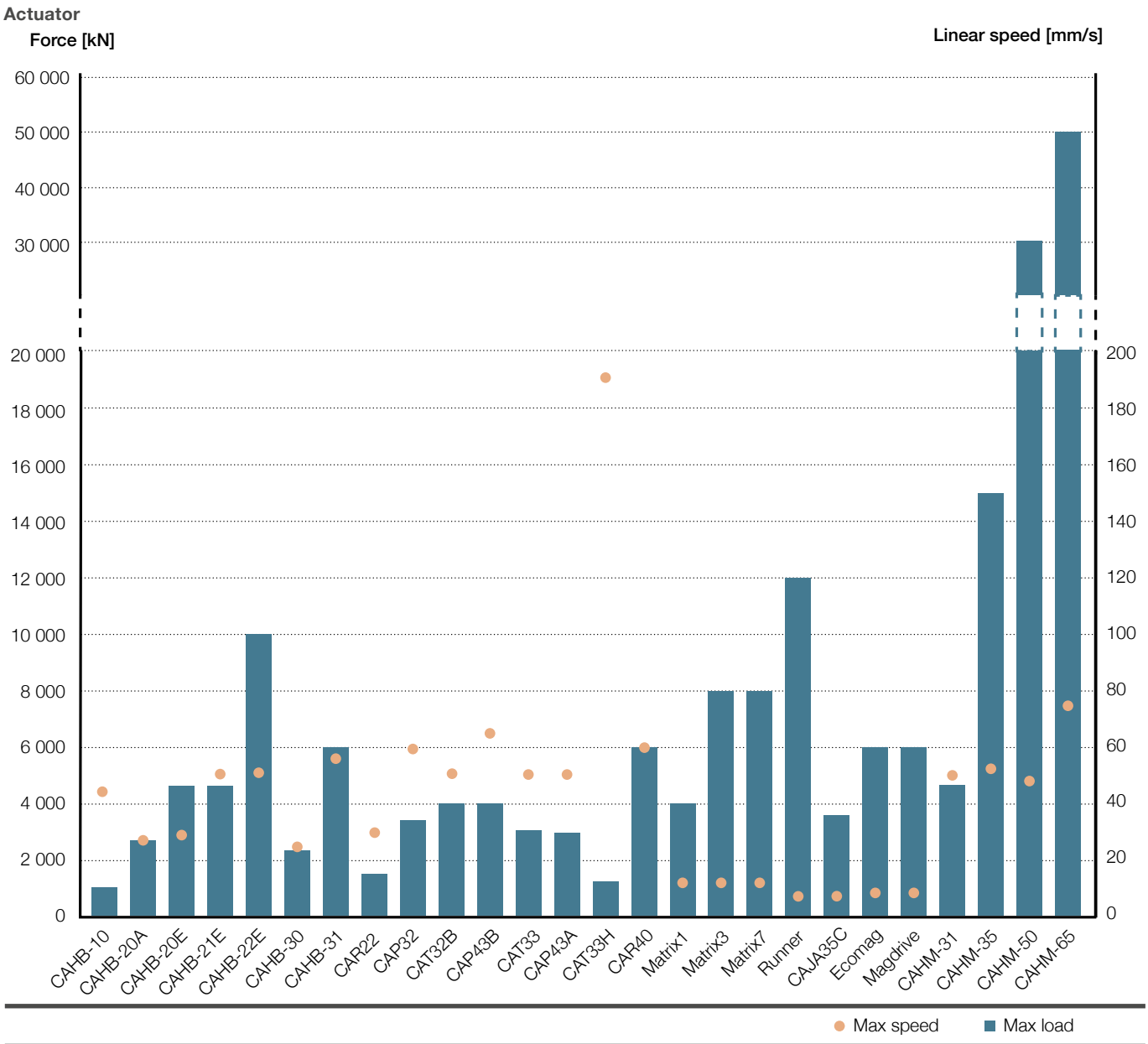
If you request a higher force than 12 kN, we invite you to review the **High performance actuator catalogue (PUB NUM IL-05001-EN-October 2019)**.

Force and speed capabilities

Diagram 1 provides a quick overview of the rated load and the speed of the actuators. Use this graph to quickly evaluate which actuator could fit best in your application.

The rated load describes the weight that the actuator can push or pull at the rated duty cycle without overheating. The speed is the maximum linear speed the actuator can reach without load when powered at the rated voltage.

Diagram 1



Pillars

Ewellix offers a wide range of telescopic pillars in term of push and pull load, offset load in movement, stroke length and input voltage. Most of them are approved as a component of a medical device that complies with IEC 60601-1 and UL mark RU.

Product	Load	Bending moment	Speed	Stroke	Voltage		See page
	kN	Nm	mm/s	mm	V		
CPMA-B	2	250	15	400	24, 100 to 240		180-188
CPMT	6	1 400	34	600	24		196
TFG	2,5	500	15	700	120, 230		202
THG	2	1 000	15	700	24		206
TLC	4	2 100	11	700	120, 230		210
TLG	4	2 800	10	700	24		214
TLT	4	1 000	25	700	24		218
TXG	1,5	210	17	600	24, 120, 230		222
FRE	–	–	–	700	–		226

Medical

Force and speed capabilities

Diagram 2 provides a quick overview of the rated load and the speed of the actuators. Use this graph to quickly evaluate which actuator could fit best in your application.

The rated load describes the weight that the actuator can push or pull at the rated duty cycle without overheating. The speed is the maximum linear speed the actuator can reach without load when powered at the rated voltage.

Some products are designed for a specific application but are suitable for others applications that request the similar performance

Diagram 2

Pillar

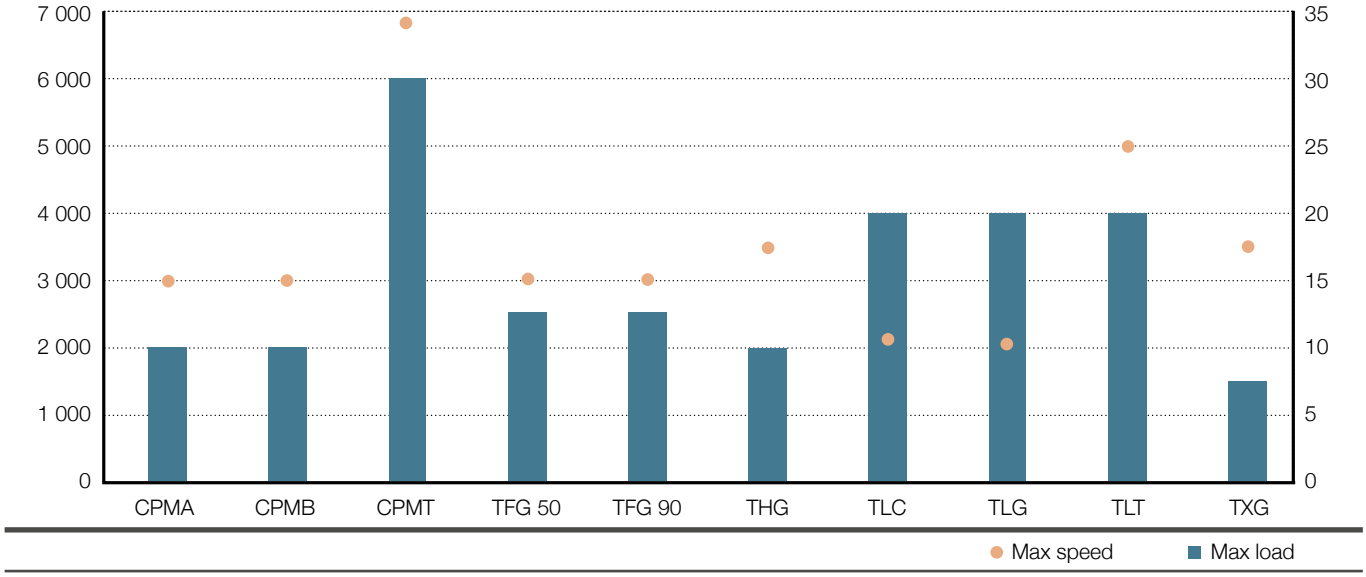
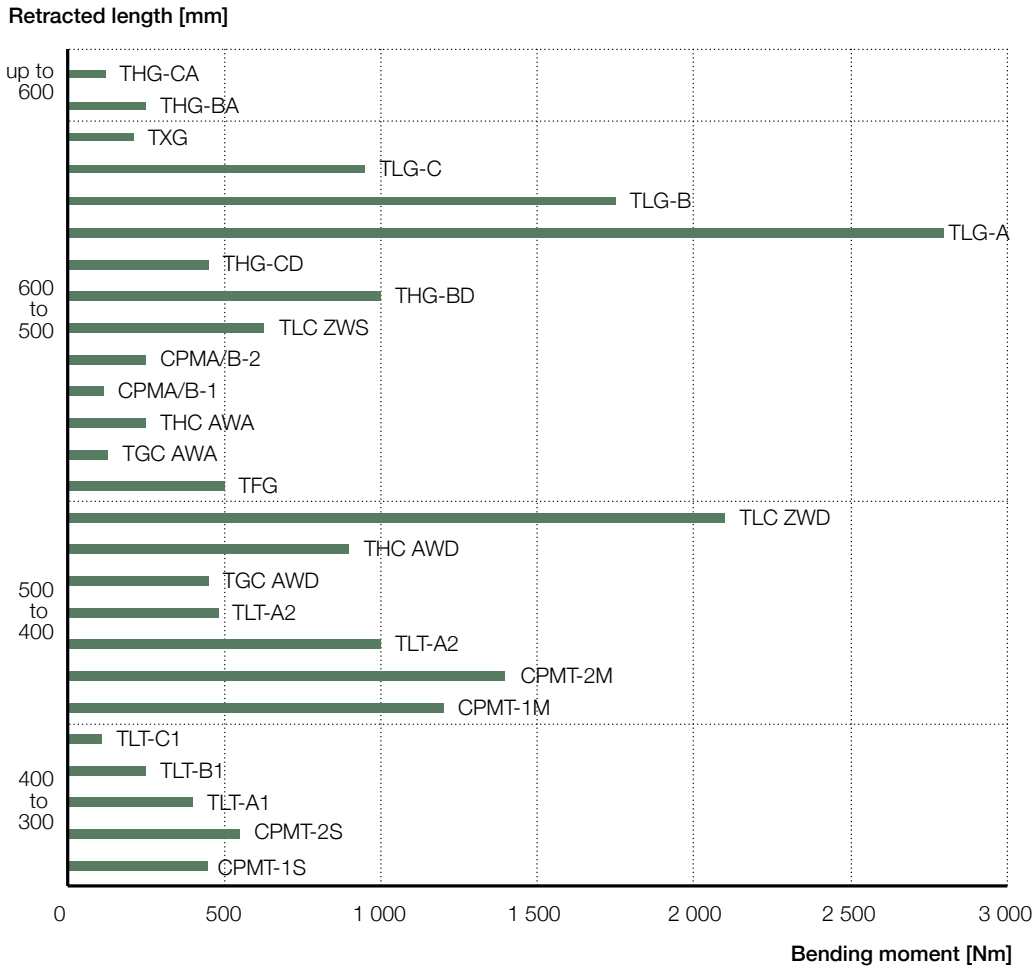


Diagram 3

Bending moment vs retracted length for stroke length of 400 mm



Control units

Ewellix offers a wide range of control units in terms of number of connections, functions and input voltage. They are compatible with Ewellix actuators and pillars. Most of them are approved as components for medical devices that comply with IEC 60601-1 and UL mark RU.

In order to select the proper accessories for linear actuators and telescopic pillars, please use the table below.
Start selecting your actuator or pillar and find horizontally the compatible control units identified by a black dot, then vertically select the appropriate operating switches.

Some products do not need control units, so please continue horizontally to find the appropriate operating switches.

Combination matrix Actuator

	Control units						Operating switches		
	BCU	VCU	SCU	MCU	SEM	COMPACT	Hand switches	Table switches	Foot switches
Linear actuators									
CAHB-10	●	●	–	–	–	–	–	–	–
CAJA	●	●	●	–	–	–	–	–	–
ECOMAG	●	●	●	●	●	–	–	–	–
MAGDRIVE	●	●	●	●	–	–	–	–	–
MAX1/3	●	●	●	●	–	–	–	–	–
MAX70	–	–	–	–	–	–	PHC	PAM	PFP
MAX72	–	–	–	–	–	–	EHA1	STA	STF
RUNNER	●	●	●	●	–	–	–	–	–
Pillars									
CPMA/CPMB	–	–	–	–	–	–	EHA4	STK	STL
CPMT	●	●	●	–	–	–	–	–	–
TFG1	●	●	●	–	–	●	–	–	–
TFG5/9	–	–	–	–	–	–	EHA3, CAJH1	STE	STJ
THG	●	●	●	●	–	–	–	–	–
TLC electric [1]	–	–	–	–	–	–	–	–	–
TLC low voltage	–	–	–	–	–	–	EHA1	–	–
TLC pneumatic	–	–	–	–	–	–	PHC	PAM	PFP
TLG	●	●	●	●	–	–	–	–	–
TLT	●	●	●	●	–	–	–	–	–
TXG1	–	–	–	–	–	●	–	–	–
TXG4/5/8/9	–	–	–	–	–	–	EHE	STA, HSU	STF
Operating switches									
Hand switches									
EHA1	–	–	–	●	–	–			
EHA3	●	●	●	–	–	–			
EHE	–	–	–	–	●				
CAJH1	●	●	●	–	–	–			
Table switches									
STA	–	–	–	●	–	–			
STE	●	●	●	–	–	–			
HSM	–	–	–	–	–	●			
HSF	–	–	–	–	–	●			
HSU	–	–	–	–	–	●			
Foot switches									
STF	–	–	–	●	–	–			
STJ	●	●	●	–	–	–			

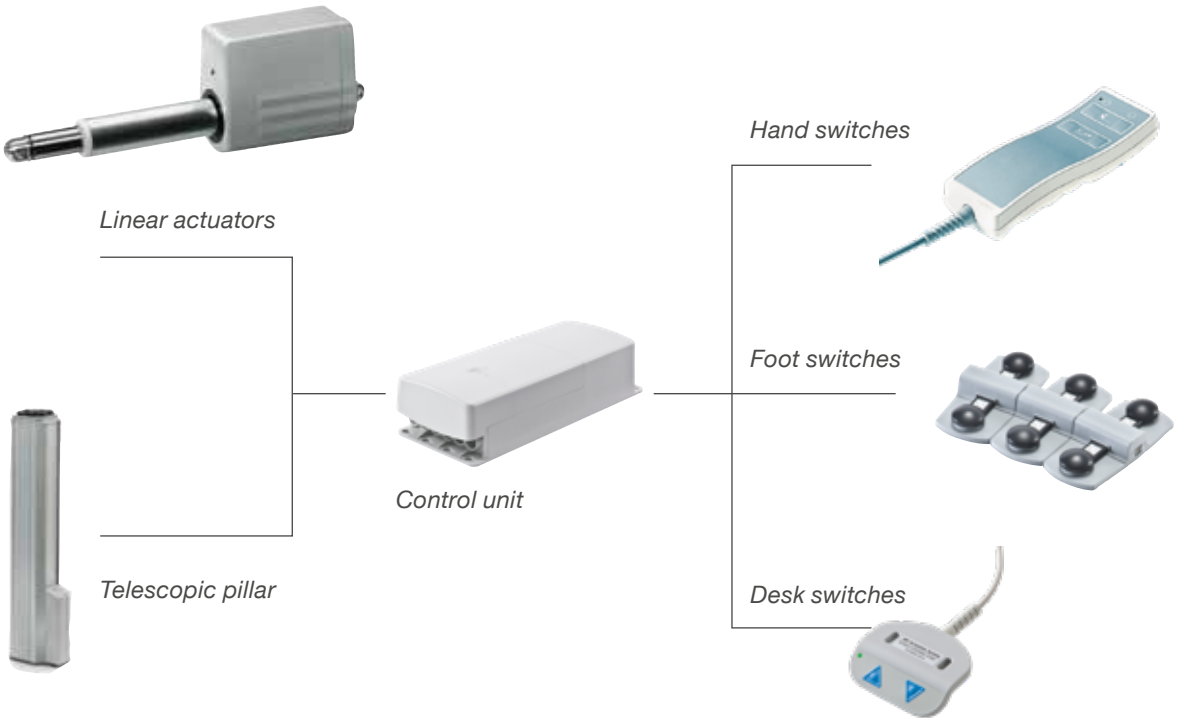
[1] No need of CU, but there is non OS provided by Ewellix

Operating switches

Ewellix offers a wide range of different operating switches to control the position of your equipment. The range includes: Hand switches, Foot switches, Desk switches.

Combination Matrix Control units

	Operating switches		
	Hand switches	Table switches	Foot switches
BCU	EHA3	STE	STJ
VCU	EHA3	STE	STJ
SCU	EHA3	STE	STJ
MCU	EHA1	STA	STF
COMPACT	–	HSM, HSF	–
SEM	EHE	–	–



Input voltage

AC or DC, this is the voltage that is used to power the system or the stand alone linear actuator or telescopic pillar.

For instance, a AC system is one powered by a cable connected to the mains power that provides alternating voltage, typically 230 V AC in Europe and 120 V AC in USA. AC system or linear actuator or telescopic pillar doesn't say that the motor is an AC motor.

For a linear actuator or a telescopic pillar, the motor voltage could be different than mains power. The control unit that drives the DC telescopic pillar or linear actuator is equipped with a power supply to convert the voltage. The linear actuator and the telescopic pillar could be also equipped with a built-in power supply. In this case, the equipment is powered by the mains power but the motor and other equipment are powered by a DC cable. This is the most convenient system; easy to power and to control.

Case of stand alone telescopic pillar with AC motor: TLC

Case of stand-alone linear actuator with DC motor and built in power supply: MAX7

Case of stand alone telescopic pillar with DC motor and built in power supply: CPMA

Case of AC System with DC linear actuator and telescopic pillar: SCU+TLG + Matrix

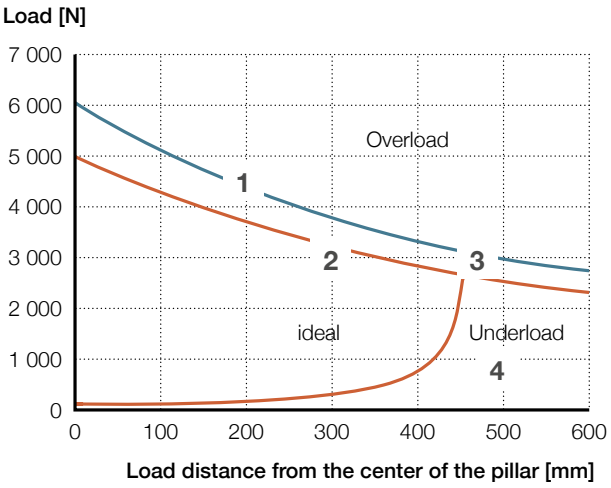
How to read a performance diagram

In the product range chapter, a technical description is available for each actuator family. This includes performance overview, a detailed product description, motors and adapter information. In addition to that, each actuator type and size has a dedicated table with the main technical data.

In particular, for the telescopic pillar, we describe the offset load performance.

Here below is a general description on how to read the axial force /linear speed diagram.

CPMT1-1M, -2M



CPMT1-2M

CPMT1-1M

Offset load at full extension

For a CPMT1-2M

1. (4 500 N at 200 mm): The pillar can lift and lower a load of 450 kg with a center of gravity located at 200 mm from the center of the pillar.
2. (3 000 N at 300 mm): The pillar can lift and lower a load of 300 kg with a center of gravity located at 300 mm from the center of the pillar.
3. (3 000 N at 450 mm): The pillar can lift and lower a load of 300 kg with a center of gravity located at 450 mm from the center of the pillar.
4. (1 000 N at 450 mm): The pillar can lift a load of 100 kg with a center of gravity located at 450 mm form the center of the pillar but during the lowering, the retraction will be not optimal. We recommend to increase the weight or change the load distance. To Increase the load distance, you can change the center of gravity of th e lifted part.

Product benefits

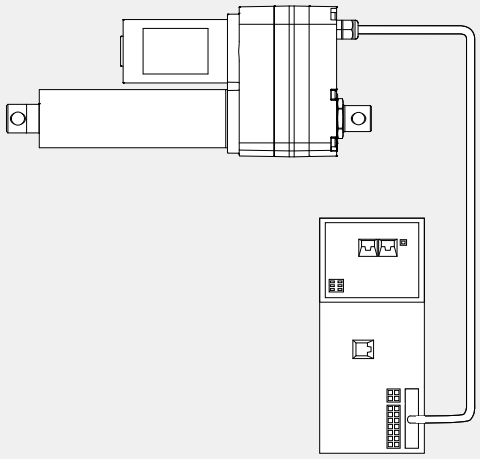
Pneumatic and hydraulic replacement

Linear movements in modern applications place high demand on travel profiles. Pneumatic and hydraulic cylinders quickly reach their system performance limits. Ewellix electric cylinders offer improved performance and simpler setup in applications that were traditionally served by pneumatic and hydraulic cylinders.

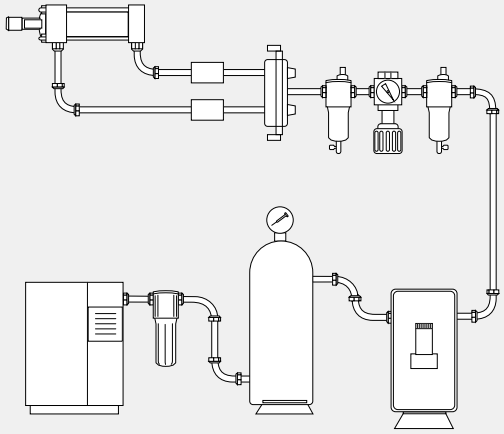
Along with the elimination of air or oil in applications, Ewellix electric linear actuators offer many advantages. Key benefits include a high degree of flexibility, positioning accuracy even to any intermediate target, improved productivity through low maintenance, new options in programming, and seamless integration into machine control systems. These benefits enable new and reliable concepts that can be integrated into a variety of production processes, ultimately allowing new application possibilities.

Electric linear actuators with ball screws provide an energy-saving alternative to pneumatic.

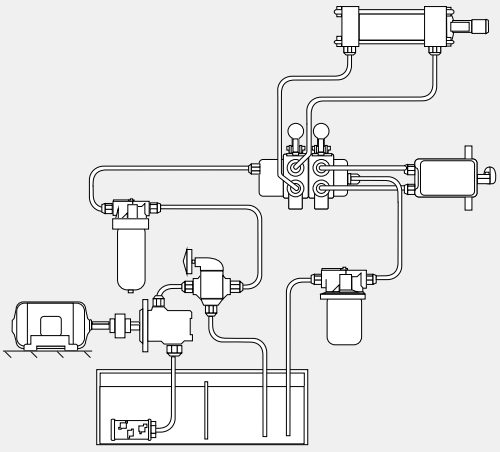
Electromechanical layout



Pneumatic layout



Hydraulic layout



Replacement of pneumatic cylinders

Pneumatic cylinders are based on a technology which was invented in the year 1 728. The commercial use of this technology started at the beginning of the 20th century. The principle of pneumatic technology seems to be simple. Air is pressed via valves either on one side or the other side of a pneumatic cylinder to cause a movement of the push tube.

There is a lot of equipment needed to make the pneumatic system run. The more cylinders in a system, the smaller its section of the cost cake for each cylinder. For a low number of cylinders in a system, the common equipment cost is quite high.

Ewellix electric linear actuators operated by motors with position feedback are fully controllable.

Replacement of hydraulic cylinders

Hydraulic cylinders are traditionally used in high load applications. The force range of Ewellix electric linear actuators has been extended. Indeed, Ewellix electric linear actuators can provide a force up to 12 kN for DC motor version, up to 50 kN for AC motor version, opening up more applications to switch from hydraulic to electric solutions. Ewellix electric linear actuators are more reliable, easier to control and cleaner to operate than hydraulic cylinders. They eliminate typical operational problems such as contamination, oil leaks, fluid maintenance checks and disposal procedures and require no ancillary equipment.

The technology of hydraulic cylinders is based on Blaise Pascal's hydrostatic law and offers virtually unlimited force. It's the most powerful technology for many applications. The cost for a hydraulic cylinder is moderate, but there is a lot of installation equipment needed to make it work. The operating and maintenance cost is high while the waste disposal is problematic.

Hydraulic cylinders get their power from pressurized hydraulic fluid (typically oil). The installation requires expensive plumbing, filtering, pumps and electronic/ fluid interfaces (valves). The control is quite complicated when considering hysteresis, supply pressure and temperature changes. Hydraulic systems are reliable, as long as the hydraulic fluid is well maintained. With low maintenance, the seals are prone to leak which results in contamination.

Ewellix electric linear actuators solve many of the problems of hydraulic cylinders. The motor is directly linked with the linear movement of the push tube which allows excellent position feedback and full controllability. The power transmission is typically made with a rotating screw and a nut with or without rolling element to carry loads of up to 50 kN with AC motor version. The installation is simple, the maintenance low and there is less noise and no contamination. Due to the efficiency of up to 50%, the operating cost is very low.

Controllability

Electric drive systems use a screw that offers an easy controllability by counting the number of turns of the screw or other elements mechanically connected. You can control the position, the displacement as well as the speed.

Precision

The precision depends on the resolution of the position feedback system and how the output is used by the control board. The backlash of the driving mechanism will influence if the direction of the load and movement is changing. The accuracy also depends on the set up and homing procedure of the system.

Holding force

Electric drive systems offer a high stability and self-locking that prevent unplanned movement in case of static overload or shock applied even if not powered. In addition of built-in brake and the short circuit of the brushed DC motor used in the most of the case, all mechanical driving part participates of the stability.

Degrees of protection provided by enclosures

The IP Code, International Protection Marking, IEC standard 60529, sometimes interpreted as Ingress Protection Marking, classifies and rates the degree of protection provided against intrusion (body parts such as hands and fingers), dust, accidental contact, and water by mechanical casings and electrical enclosures (↳ **fig. 1**).

It is published by the International Electrotechnical Commission (IEC). The equivalent European standard is EN 60529.

Safety and environment friendly

The safety typically starts by the high holding force as compared to the load applied during the normal use of the application that should be lower than the rated load of the electric drive system. The risk of abnormal use of the application should also be considered.

For some application or function in the Medical industry, the manufacturer of the medical device should manage the risk assessment and comply with some regulation as IEC 60601-1, general requirements for basic safety and essential performance. As a component of the medical device, some Ewellix electric drive systems were tested under the same condition to demonstrate compliance to IEC 60601-1 and are registered by UL to be marked RU. Saying that the Safety factor of the complete system is 2 or 2.5 or 4 is not enough. This standard requests that each individual component of the drive system used on a suspended mass be checked and could request a tensile safety factor up to 12, depending on the material, the possible alteration, the backup system and the calculation method.

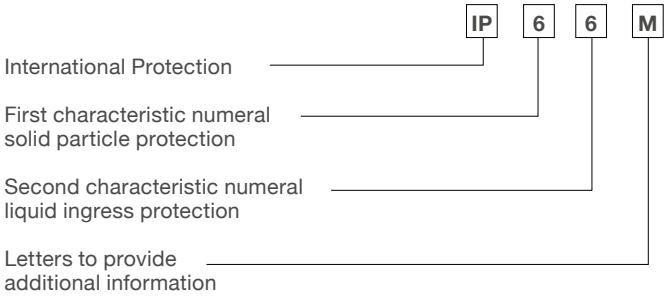
Nor do electric cylinders have problems with fluid leaks or contaminated air. Moreover, the absence of fluid constantly operating under high-pressure eliminates potential risks to operators in case of cylinder failure.

Without fluid to drive or keep in position and with a good ingress protection up to IP66M, means during movement and IP69K when static, the risk of leakage and contamination is almost negligible. With a static ingress protection, the actuator can be cleaned easily. Actuators rated IP69K accept a high pressure and hot temperature cleaning procedure, that contribute to the later elimination of the risk of pollution.

RoHS

Our standard products fall under category 11 in Annex I to Directive 2011/65/EU and therefore do not need to comply with the provisions in the directive before July 22, 2019.

Fig. 1



Nevertheless, most of our standard products are already mentioned on a list where we declare that the products do not contain any of the restricted substances over the threshold values stated in the Annex II to Directive 2011/65/EU in any homogenous part of the product.

REACH

Ewellix has a policy, process and dedicated resources in order to comply with REACH, the Regulation concerning Registration, Evaluation, Authorization and Restriction of Chemicals.

CE mark

Most of our product have CE mark with a Certificate of Compliance signed by the factory.

Installation

The installation is simplified. In most cases, the electric drive systems request just the mechanical connection of the 2 attachment points and the electrical connector plug in. Then, it is ready to work.

Virtually maintenance-free

Ewellix expertise in manufacturing the main components of linear actuator – screws, bearings, guides, seals and lubrication – allows us to maximize service life With the special hardening treatment of the screws and balls, the linear actuators keep high performance and efficiency during the service life. Compared to their fluid power alternatives, the electromechanical linear actuator systems require no maintenance.

With electromechanical system technology, filter changes and air bleeding are a thing of the past . Simply mount the actuator, plug in the cable to the control unit or a Programmable Logic Controller and you are up and running in record time.

Tests

Environmental, electrical and mechanical tests are performed in the Ewellix facilities or by external laboratories and recorded internally or by external bodies like UL.

Customization capabilities

Ewellix electric cylinder customization

On the standard electric cylinder product range, Ewellix offers an extensive customization program that is able to meet virtually any application need. There are 3 levels of customization that depend on specific requirements and the complexity of implementation.

Basic customization

These basic design options can be implemented quickly and easily:

- Stroke length
- Retracted length
- Attachment and Mounting holes
- Colors
- Cables and connectors
- De-rated load

Advanced customization

These design options are more complex and require a dedicated project with the customer:

- Materials
- Housing
- Guiding system (for pillar)
- Gearbox (e.g., with hand crank)
- Screw (e.g., lead, treatments)
- Screw Nut (e.g., additional backup nut)
- Painting and surface treatments
- Output signal

Complete customization

In case the standard actuator offering cannot fully satisfy the technical requirements, Ewellix can offer completely customized solutions that are tailor made for each customer.

Examples of basic and advanced customizations

CPMA coloured tubes

Telescopic pillars with cable through the tubes can allow the designer of the equipment to remove shroud or cover even if wires are requested at each side of the tube set. To enhance its integration in the application, Ewellix proposes a customized color for the inner and outer tubes. This is typically proposed with the CPMA and CPMB telescopic pillar but can be also requested for other telescopic pillars or actuators (↳ **fig. 1**).

CAHB 10 with connector

Cable length and connector can be customized according to a request have perfect integration with a quick assembly on the application and a drop-in solution (↳ **fig. 2**).

CAHB 2xE with trunnion mount

To optimize the design of the application or to create a drop-in solution, Ewellix can customize the retracted and extended lengths and the attachments as well (↳ **fig. 3**).

Pillar low boy

Precise movement, stiffness and reliability are some of the key factors when it comes to patient tables. Ewellix Low-boy pillars provide the precision for easy and safe patient entry with maximum lift functionality. The simple and open motor interface gives the option to mount every motor on customer's side and makes the system very flexible and accessible (↳ **fig. 4**).

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Clam shell grill

Clam shell grills with electrical lifting are automatized with a linear actuator. The cooking of the steak is exactly as requested by the customer and the operator is more efficient (↳ **fig. 5**).

A customization of the motor could be proposed if a long life time is requested.

To ensure perfect French fries, the lifting of basket is automatized with a linear actuator.

The operator appreciates also the simplicity and the comfort and can focus on other preparation.

Special motor and external switches

For specific applications such as commercial kitchen equipment where a higher duty cycle and long life time are requested, Ewellix can propose specific motors like brushless DC version. Ewellix could also propose the integration of external switches to have multiple adjustable position feedback or other full system integration (↳ **fig. 6**).

Very long stroke and graduated tube

On Applications like Medical fluid carts where the liquid pressure is provided by the height of the liquid bag, Ewellix can provide an automatized solution based on a linear actuator with a long and stable inner tube of 1 meter to hang the liquid bag (↳ **fig. 7**).

The laser etched graduated tube provides quick visual information about the height.

Marked on the tube

On Applications like Medical fluid carts where the liquid pressure is provided by the height of the liquid bag, Ewellix can provide an automatized solution based on a linear actuator with a long and stable inner tube of 1 meter to hang the liquid bag (↳ **fig. 8**).

The laser etched graduated tube provides quick visual information about the height.

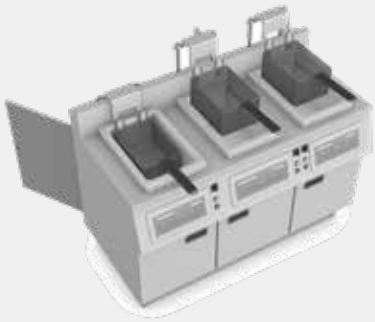


Fig. 5

Fig. 6

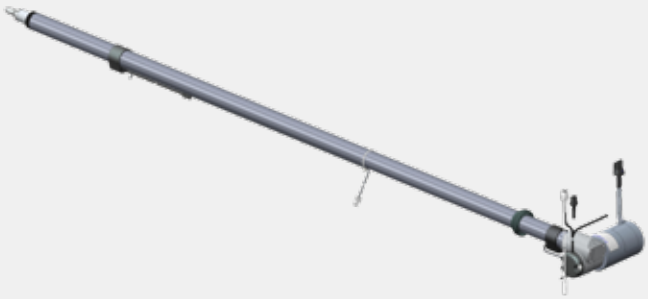


Fig. 7

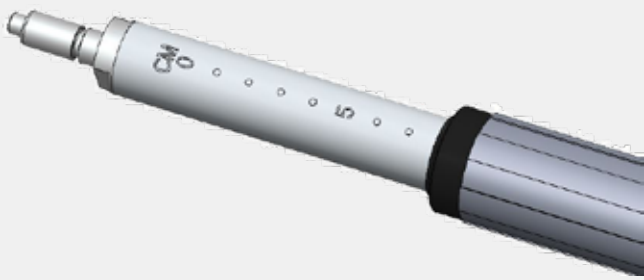


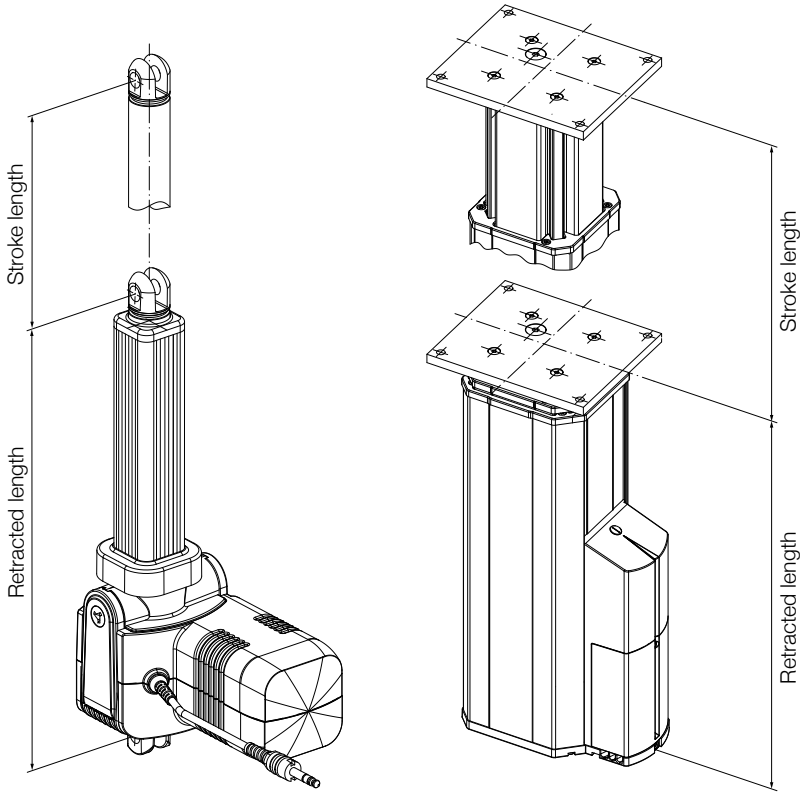
Fig. 8

Customization request form

Customization request for linear actuator or pillar

Company: .....
Country: .....

Contact person: .....
Preferred way to be contacted:.....
☐ Phone, Phone number: .....
☐ e-mail: .....

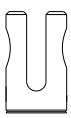


Preferred series (if known) .....

1. Stroke length .....mm
2. Retracted length: .....mm
3. Cable length: .....mm Connector: ..... Pinning: .....
4. Rear attachment: rod with hole ☐ fork head with hole ☐ threaded ☐ Inner diameter and width .....
5. Front attachment: rod with hole ☐ fork head with hole ☐ threaded ☐ Inner diameter and width .....
6. Push / Pull max force: .....
7. Color: .....
8. If you need more, describe here:

.....
.....

Rod with hole



Fork head with hole

Threaded

Application examples

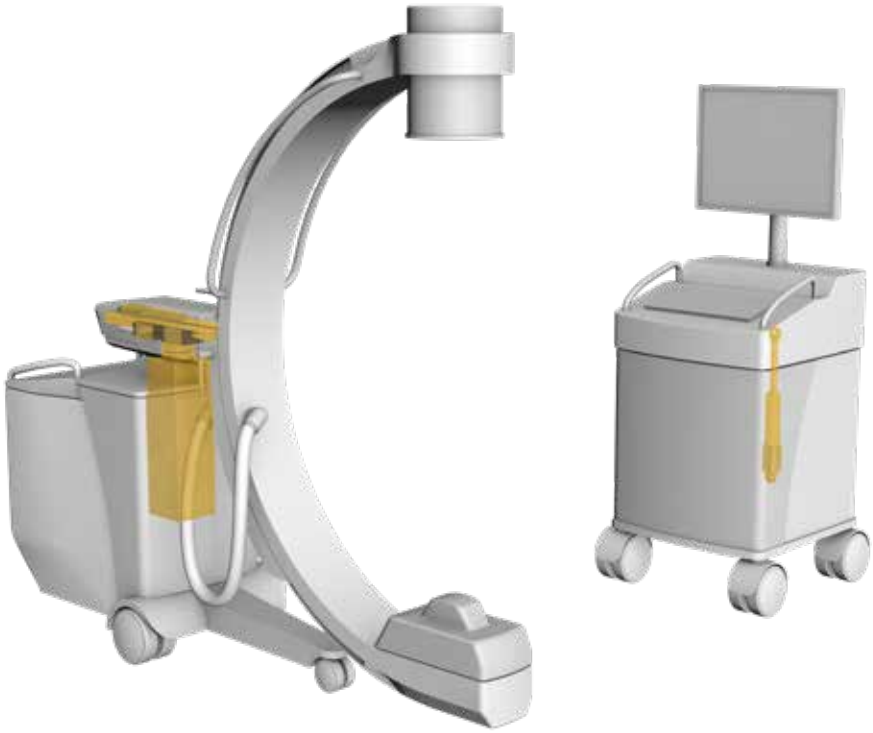
Medical mobile C-arm

In mobile C-arms, the safe and smooth positioning of the x-ray system is essential.

Ewellix pillars deliver high offset load capability, stability and safety to achieve the best possible performance in this application.

The pillars can be individually configured to best match each customer's requirements. Additional customizations, such as cable channelling or special hardware interfaces, are possible and simplify the final installation.

Also the monitor can be adjusted the position (up and down); thanks to the Ewellix actuators is possible to set the right position according to the C-arm.

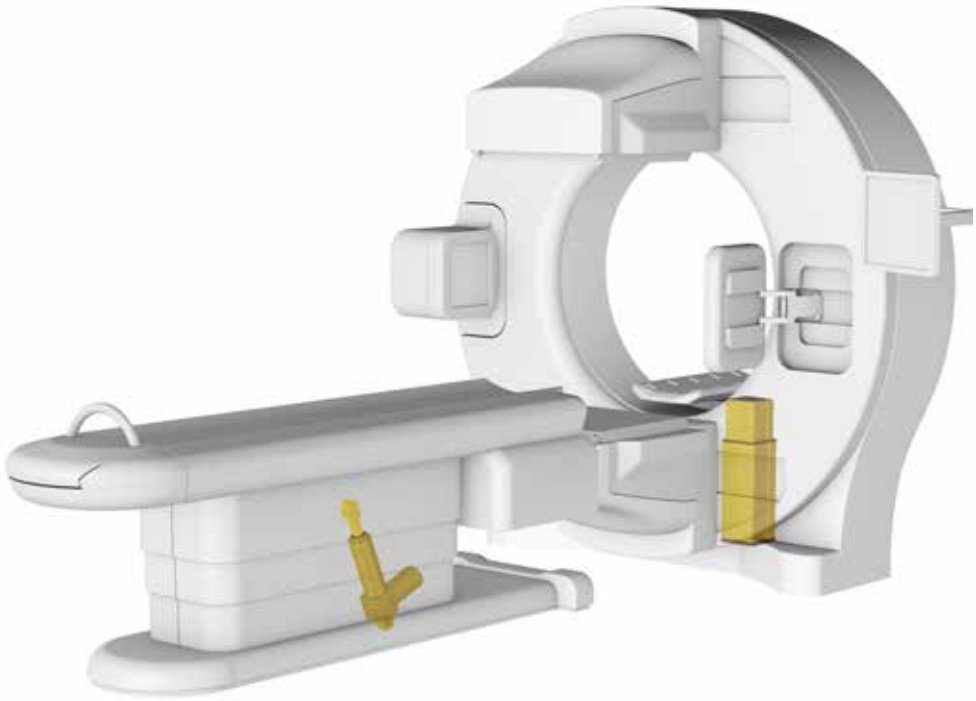


Medical imaging tables

Imaging tables are used for safely positioning patients during imaging procedures, such as general x-ray, CT or MRI.

Ewellix provides different solutions to design the lifting function. For scissor tables, Ewellix medical actuators with high safety levels can be used.

Alternatively, two synchronized pillars deliver an easy to install and very stable complete solution for a table base. Such a pillar solution can greatly reduce development costs for our customers.

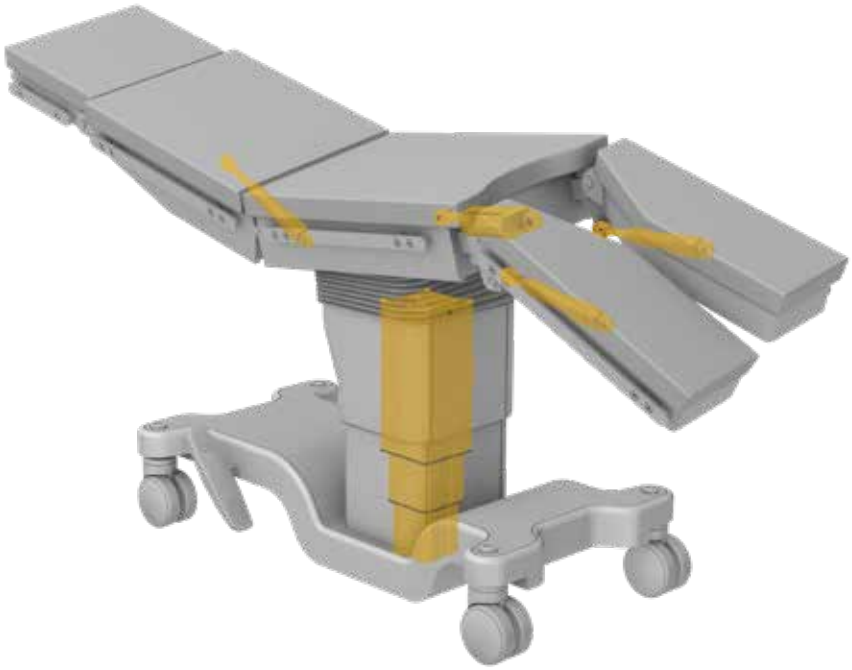


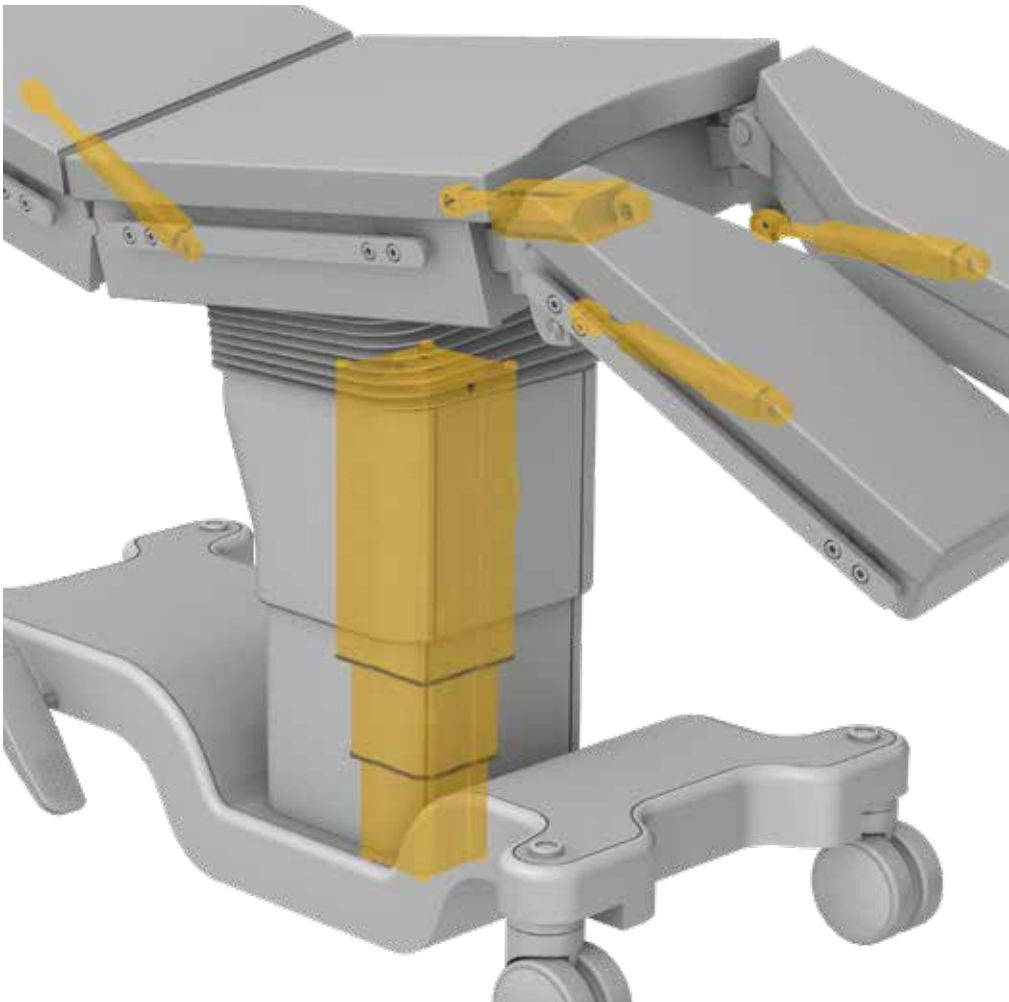
Medical surgical chair/table

Surgical tables or procedure chairs are used in a wide range of medical applications, either in the operating room or in smaller clinics. To optimally position a patient for different procedures, multiple actuators are installed.

Ewellix is able to provide a complete UL certified mechatronic system including actuators, pillars and control units, to meet customer requirements for functionality and safety. Ewellix pillars offer a strong single pedestal solution with low retracted height and high stroke options to meet market demands. Configurable medical controllers can be customized for each customer to exactly meet functional demands.

With an Ewellix system, the market challenges of increasing patient weight, lower entry height and faster patient throughput can be met.



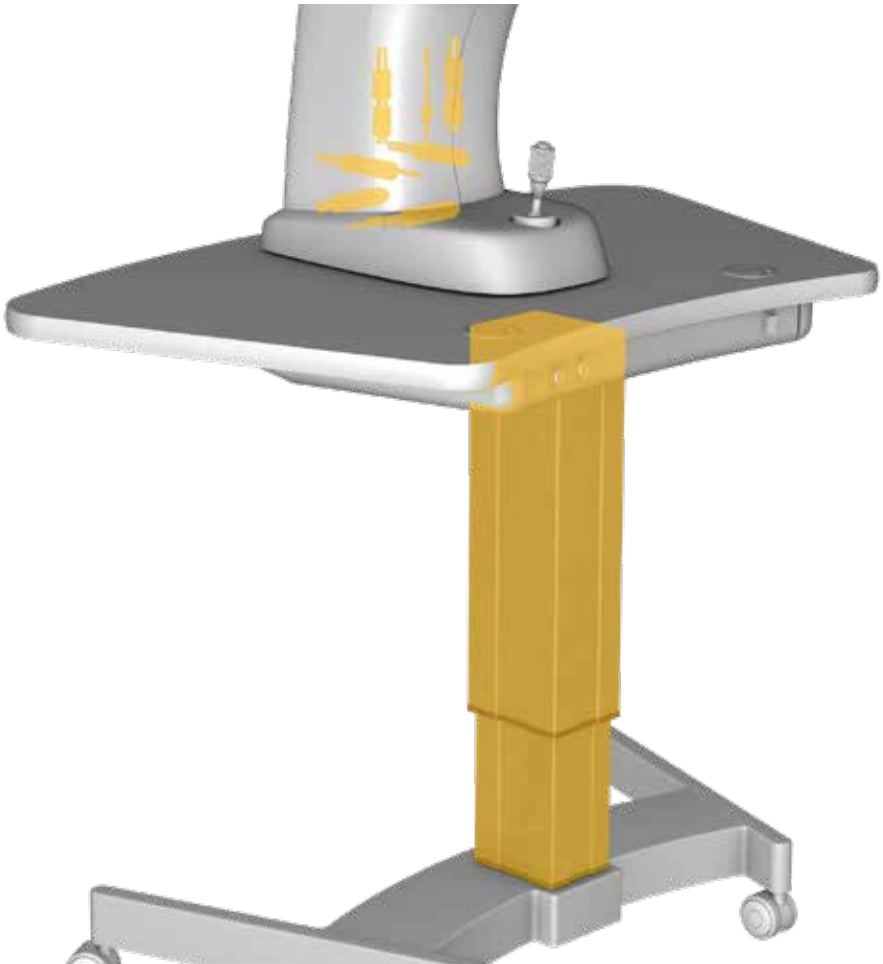


Medical dental X-ray

Dental panoramic x-ray equipment is able to generate a detailed 2D/3D image of all teeth. Ewellix actuators and drive trains help our customers implement the height adjustment in this equipment. High speed, high stroke and a high level of safety are critical features of these actuators and a core strength of Ewellix. A modular set of screw and motors enable an optimal configuration to meet every customer's requirements.

Medical incubator

Modern designs of incubators reduce the stress for babies and minimize the numbers of transfers from incubators to beds. Incubators require pillars with very smooth movement to help keep babies safe and comfortable. Thanks to its long experience with medical equipment, Ewellix has identified such needs and developed pillars to fulfil the exact needs and requirements of baby care, such as soft start/stop, extremely quiet operation and virtually vibration free movement.

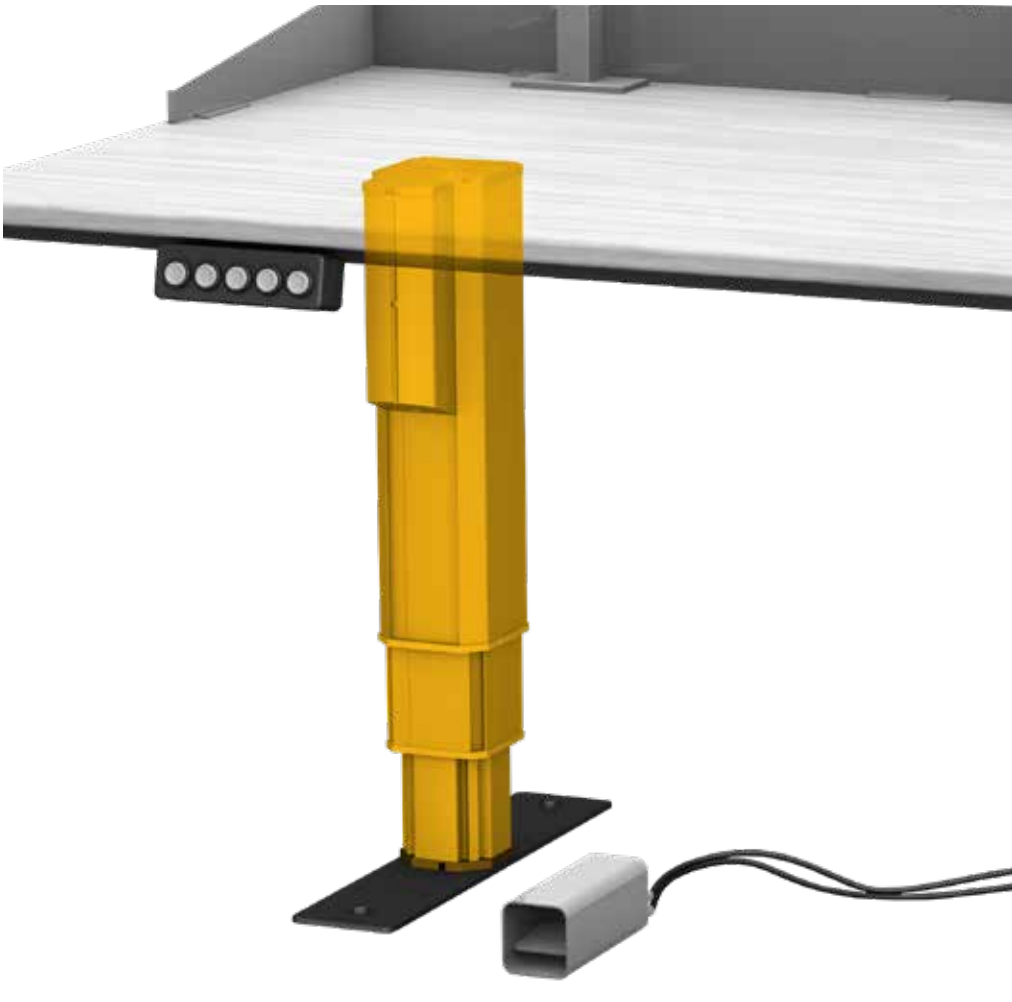


Medical ophthalmic

Ophthalmic instrument tables are used to lift the eye care instruments and measurement devices. All of these instruments and devices are placed on a small table plate and need to be adjusted in height to find the position when the doctor or nurse is doing the measurement on the patient sitting in front of the table. Ewellix pillars offer all the needs of adjustable height functions like iteration or small movements to fine tune the position to help for better accessibility and comfort of the operators and patients.

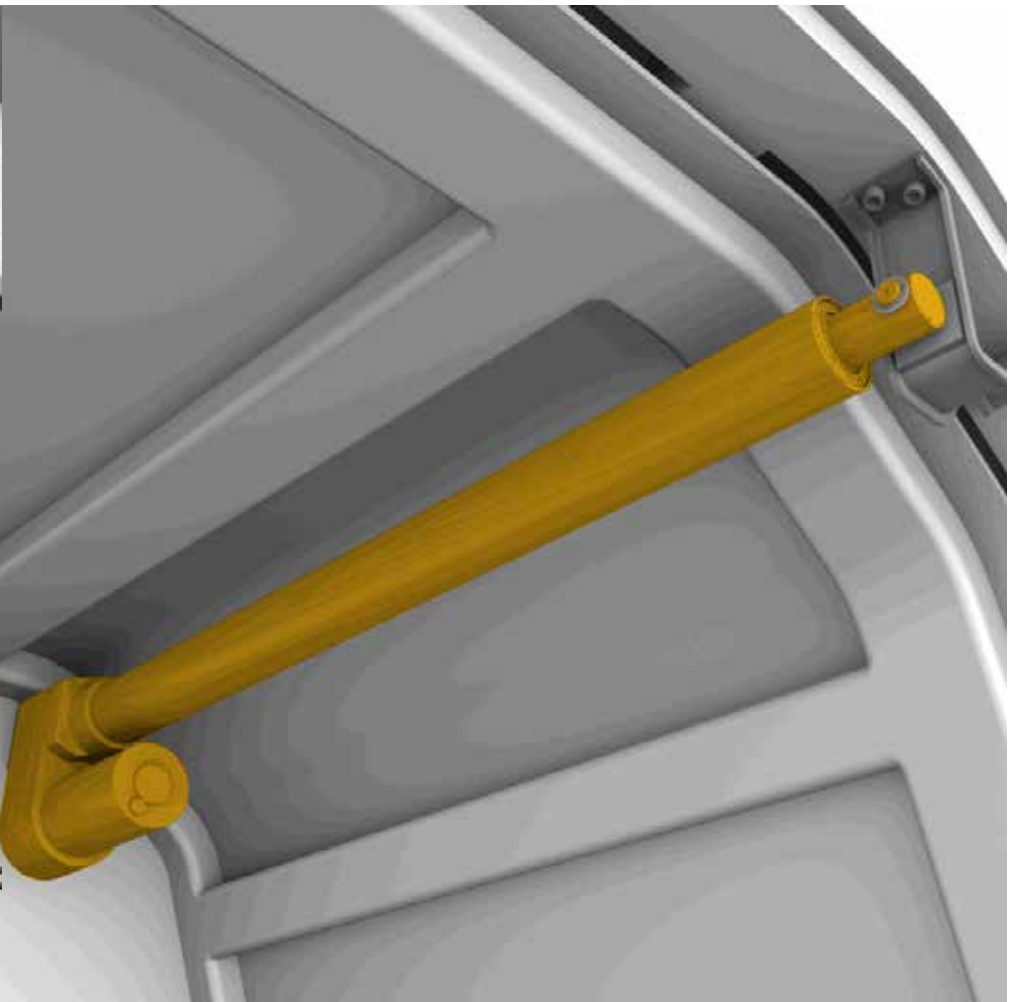
Adjustable industrial workstation

Incorporating Ewellix pillars into your workstation will help create ergonomically appropriate work patterns and ultimately result in satisfied users and increased productivity. Our lifting pillars offer the flexibility and reliability required to create a completely ergonomic workplace in a variety of industrial environments.



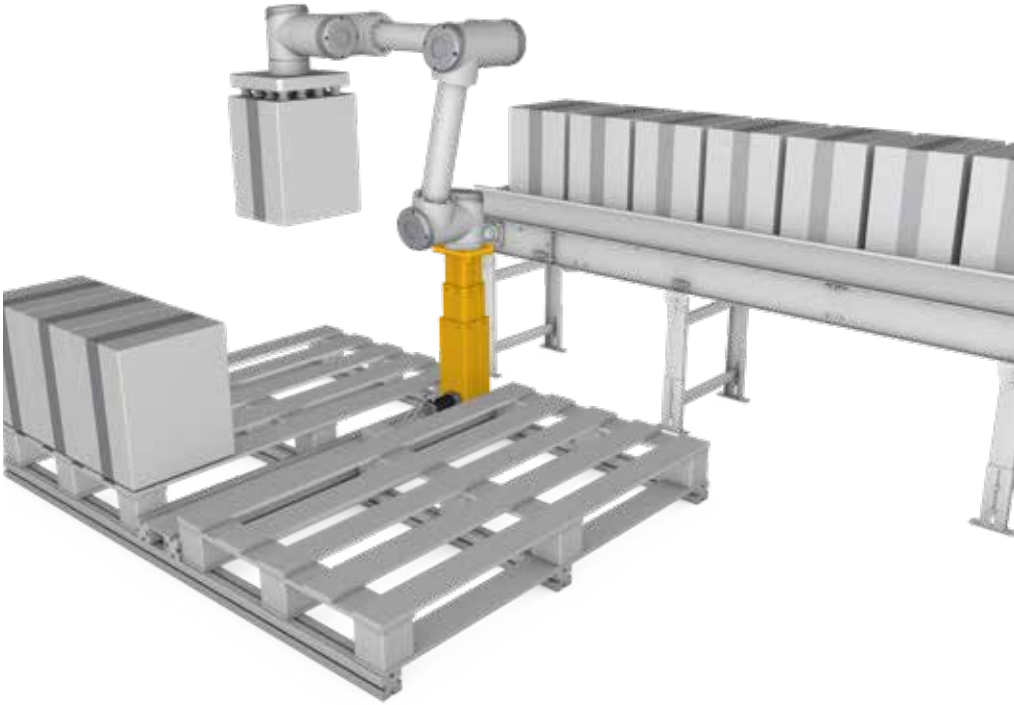
Industrial automation production machines

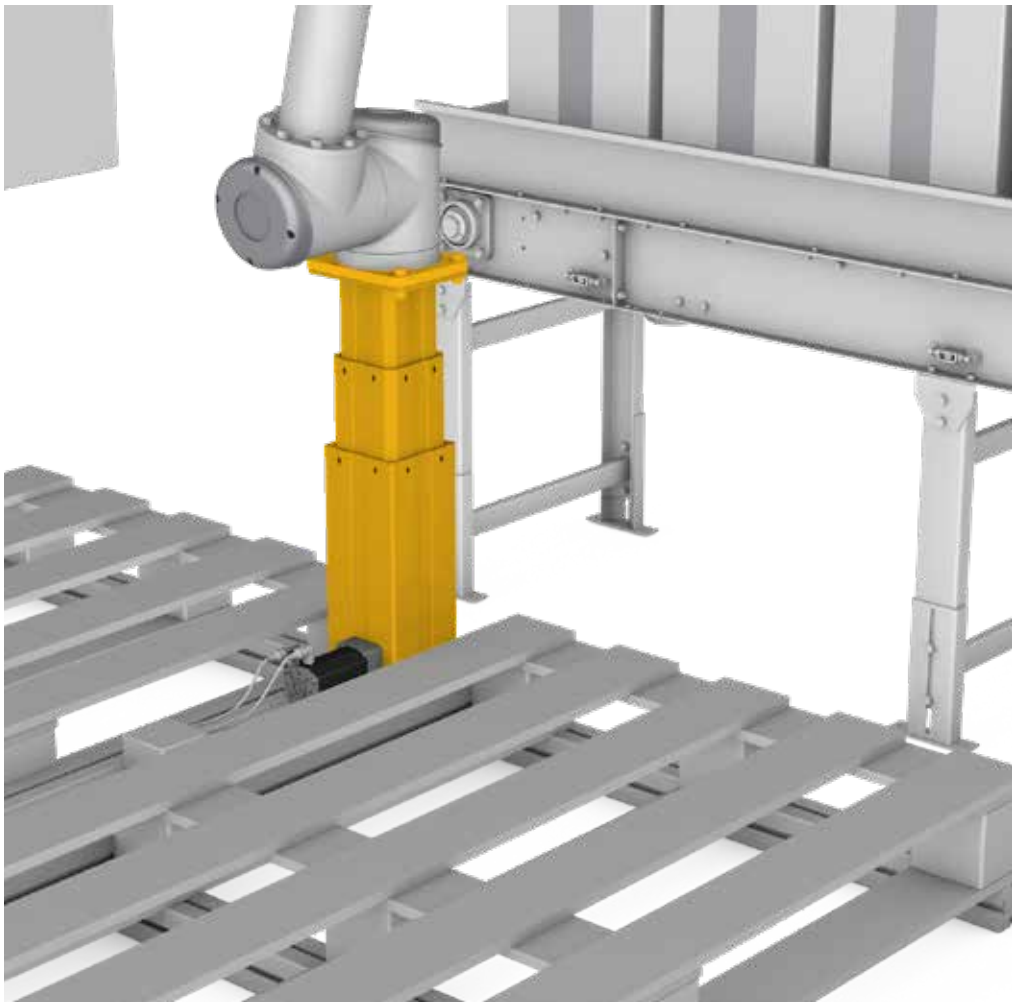
Electromechanical linear actuator can replace pneumatic or hydraulic cylinder to provide control positioning of the door or hood used time to time thanks to the positioning feed-back that secure the movement. It is also easy to operate by PLC or switches.



Factory automation

Competitiveness in factory automation entails a permanent productivity improvement process. In the search for more efficient and ergonomic solutions, many manufacturers have successfully used actuators in many working machinery. The automated movement for hoods and covers helps to reduce production downtime and lessen the workload for operators. In addition, quick lifting of heavy machine parts is helping to increase the speed of the machine maintenance. A lifting system will provide an easy access to component of the machine during maintenance operation like cleaning or repair.





Automation conveyor system

Conveyor lines are heavily used across different industries and applications. The different automatized movements are usually achieved by pneumatic cylinders. The need of increasing energy efficiency and simplifying the system has lead to a usage of electro-mechanical actuators over the conveyor line.

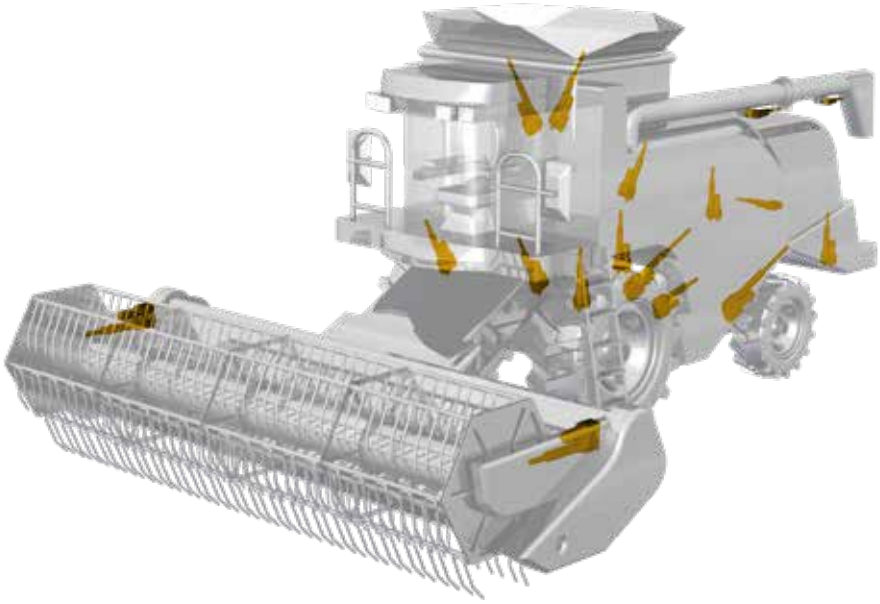
For a stop-pallet function, CAHB-10 actuators have been successfully used to replace standard pneumatic cylinder, thanks to their compact dimension and easy controllability.

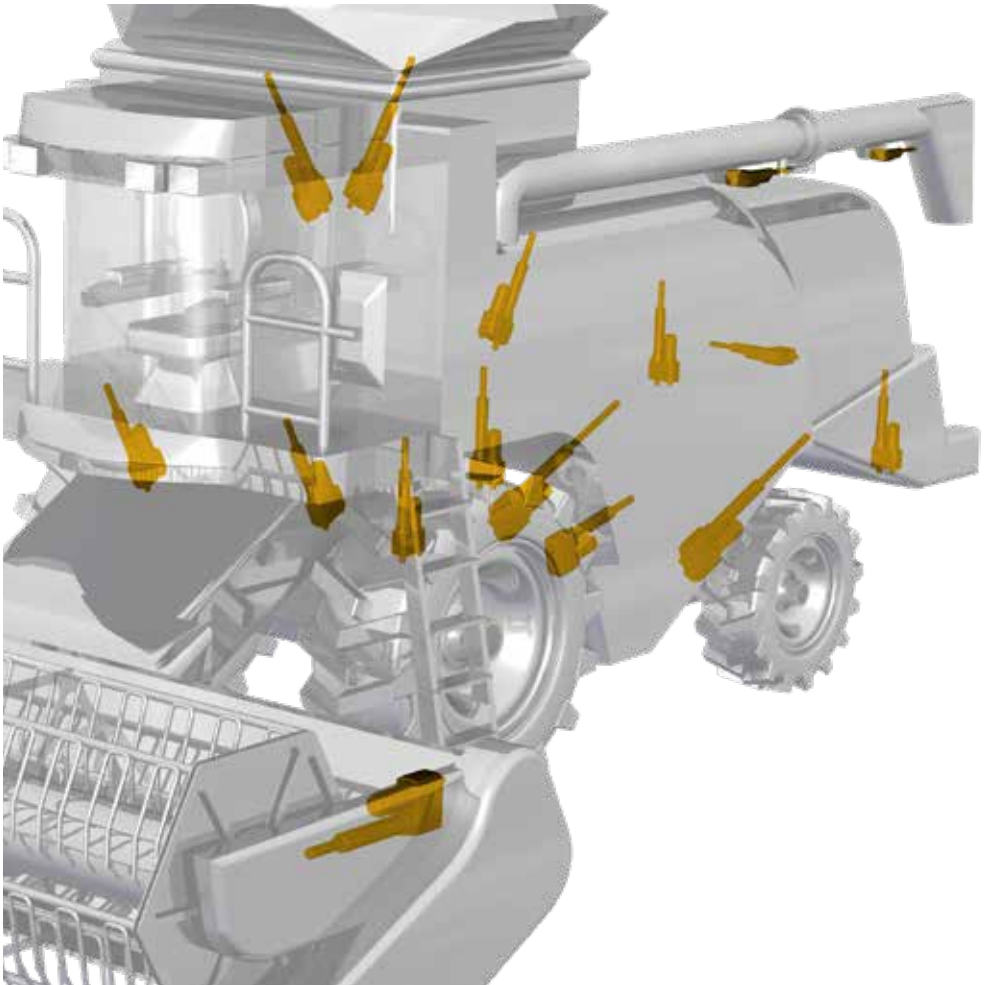
By using electro-mechanical actuators, it has been possible to have a fully electric line, getting rid of the whole pneumatic system (cylinders, hoses, valves...).

Agriculture equipment

Harvester combine

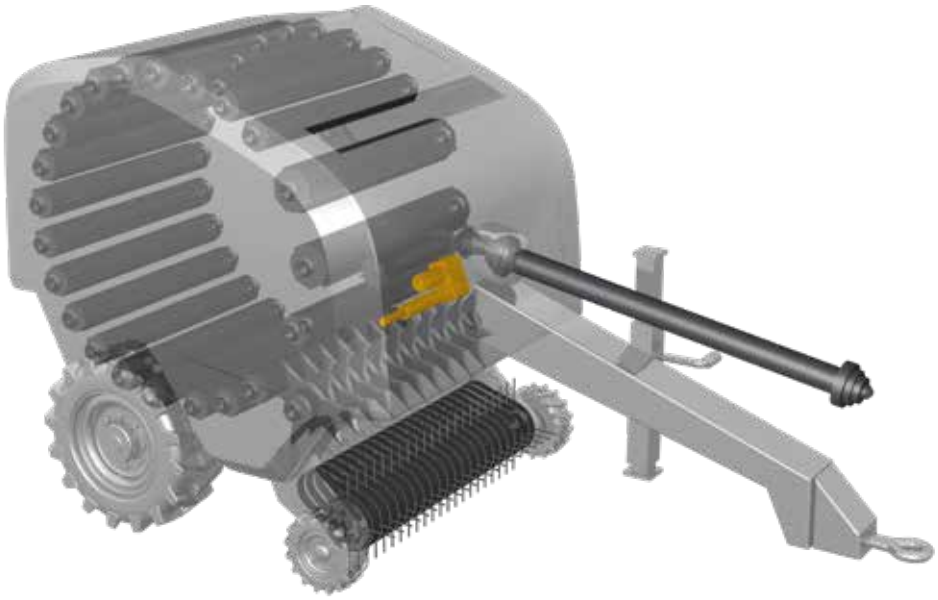
Today's farmers are challenged by the demands on cutting costs while increasing the crop yield. Modern harvester combines use many linear actuators to adjust on demand different equipment like sieve or concave clearance that help to minimize lost crops, thus resulting in the best crop yield. The position signal from the actuator ensures that the position is reached. At the appropriate adjustment, any shock or vibration should move the position of the actuator thanks to the high push and pull force and the high holding force of the linear actuator. To avoid pollution by oil leakage or missin a cleaning process, request the best class of Ingress protection IP69K/66M with a vent.

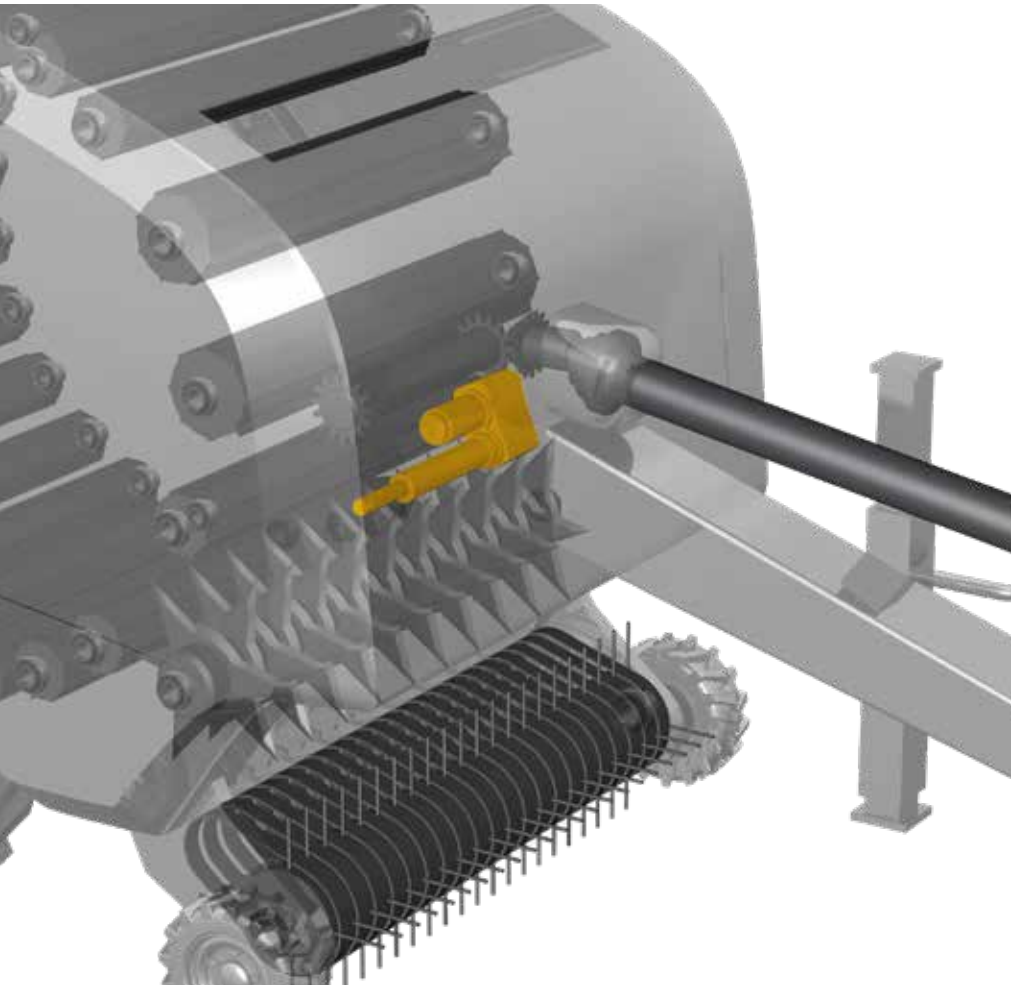




Round baler

Today's farmers are challenged by the demands to cut costs while increasing productivity. The wrapping process of rounded bales needs an accuarate movement to position and cut the net or the twine.





Trucks

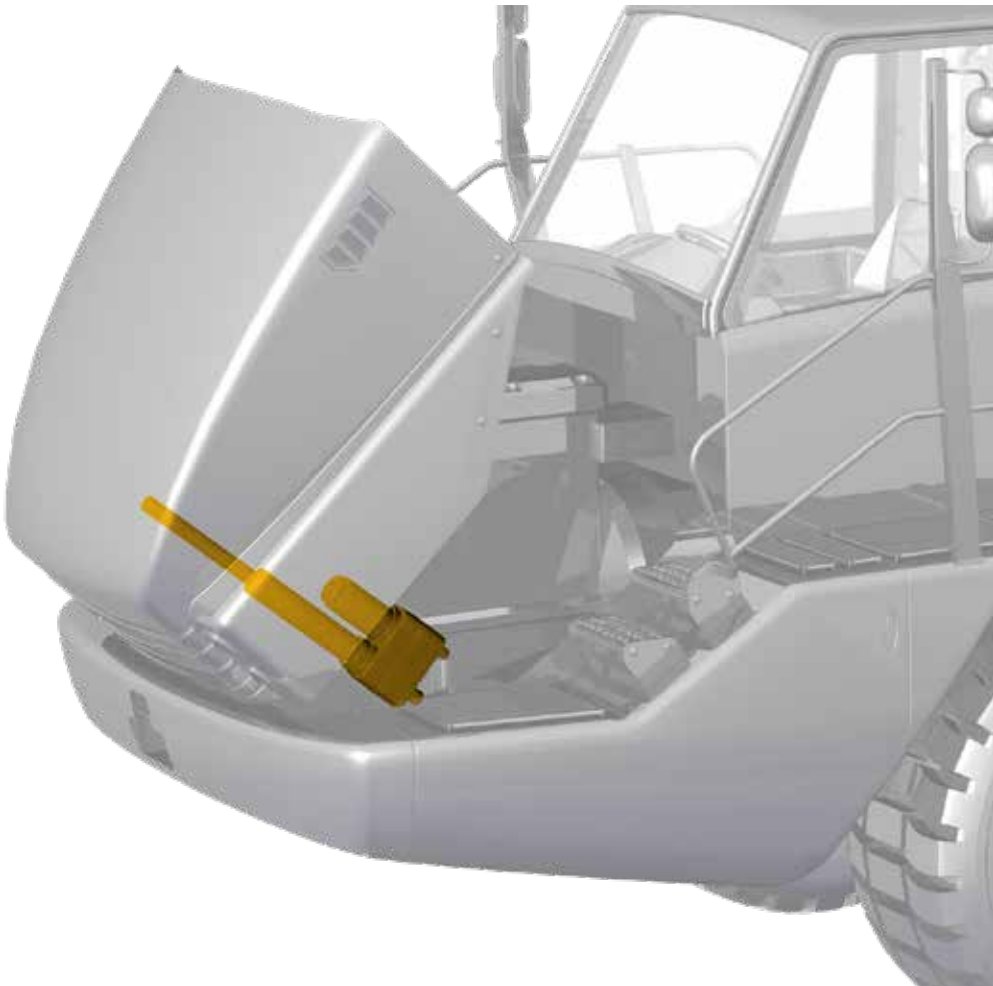
Today's freight companies are challenged by the demands on cutting fuel consumption and better productivity. The truck manufacturers develop innovative devices to optimize air circulation while driving, with or without a trailer. The linear actuator, with or without a motor, provides a quick, safe and precise adjustment of the roof air deflector.

Special vehicles Sweeper

To improve the productivity and increase the comfort and safety of the worker, the electro mechanical linear electrical systems are used on many applications such as warning sign lifter on a vehicle or brush adjustment in the sweeper. Quick and easy to control, the linear actuators are also reliability with an ingress protection IP69K/66M and a vent.

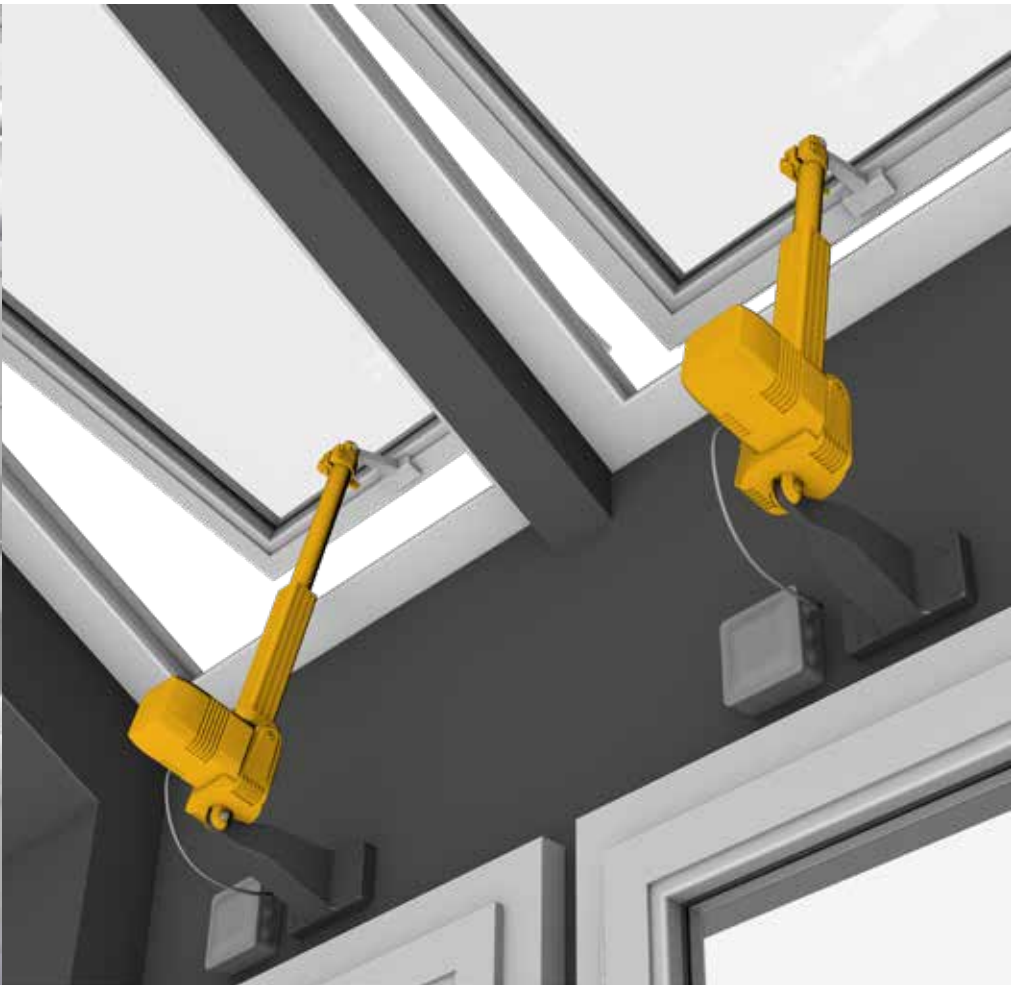
Construction equipment

Today's construction companies are challenged by the demands on cutting fuel consumption and providing better productivity. Products such as Articulated Dump Trucks, wheel loaders or rollers, the engines are more sophisticated to comply with the CO2 emission regulations and the engine hood are bigger and heavier due to the cooling system. The maintenance operation requires the engine hood be lifted. The operator needs a fast and safe operation. The linear actuator can quickly lift the engine hood but also keep it open thanks to the high push force and the high holding force that keep the hood at a stable position even if there is shock or wind.



Building automation

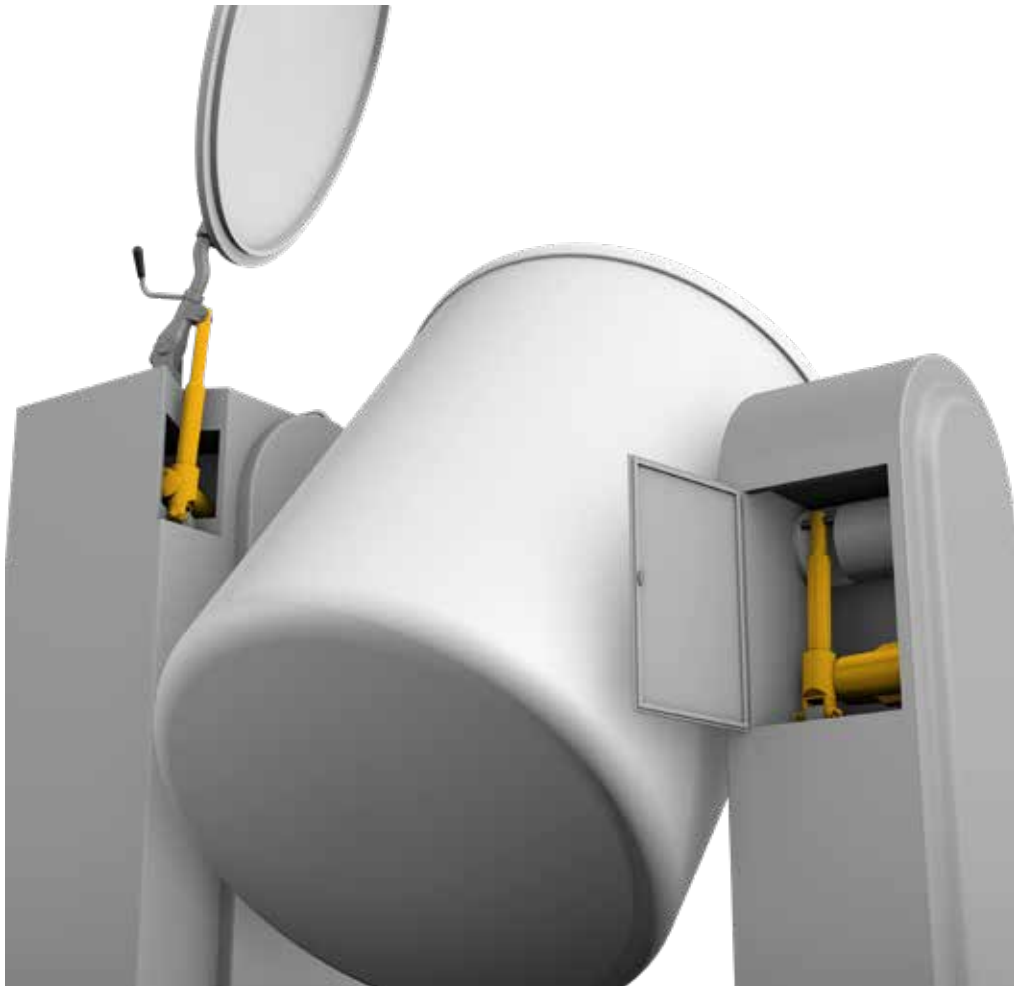
Modern commercial, administrative and industrial buildings, as well as schools and care centers are often fitted with a variety of small electronic appliances which can perform important functions remotely and simply. Actuators for light domes, doors, windows and smoke and heat outlet systems are installed in many modern buildings. These actuators open and close traditional and tilting windows, light domes, facade elements, sun blinds and smoke and heat outlet shutters, at the touch of a button or automatically, using climatic (wind/rain) sensors and temperature and smoke sensors.



Food and beverage Commercial kitchen equipment

Kettles

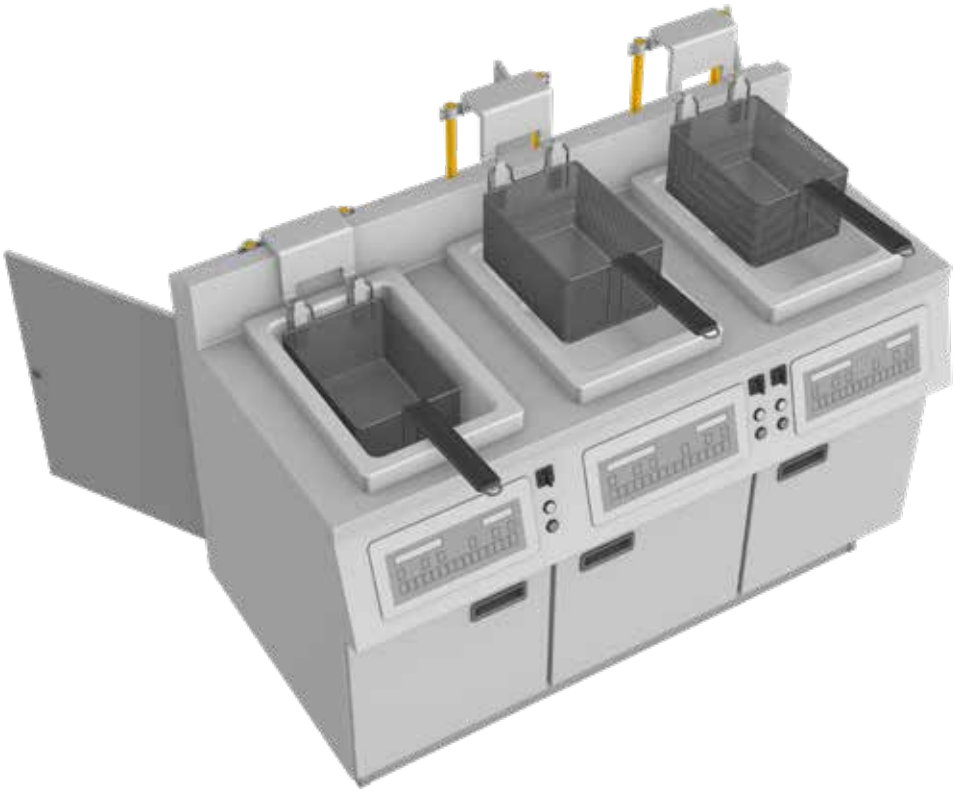
Machine flexibility, process control and cost efficiency are important in modern industrial kitchens. High end food processing equipment requires automated, repetitive and sometimes difficult operations. Whether it is raising or lowering an exhaust hood or a complete stove, actuators can enable people to work more comfortably and efficiently by adjusting the environment to their own personal needs.

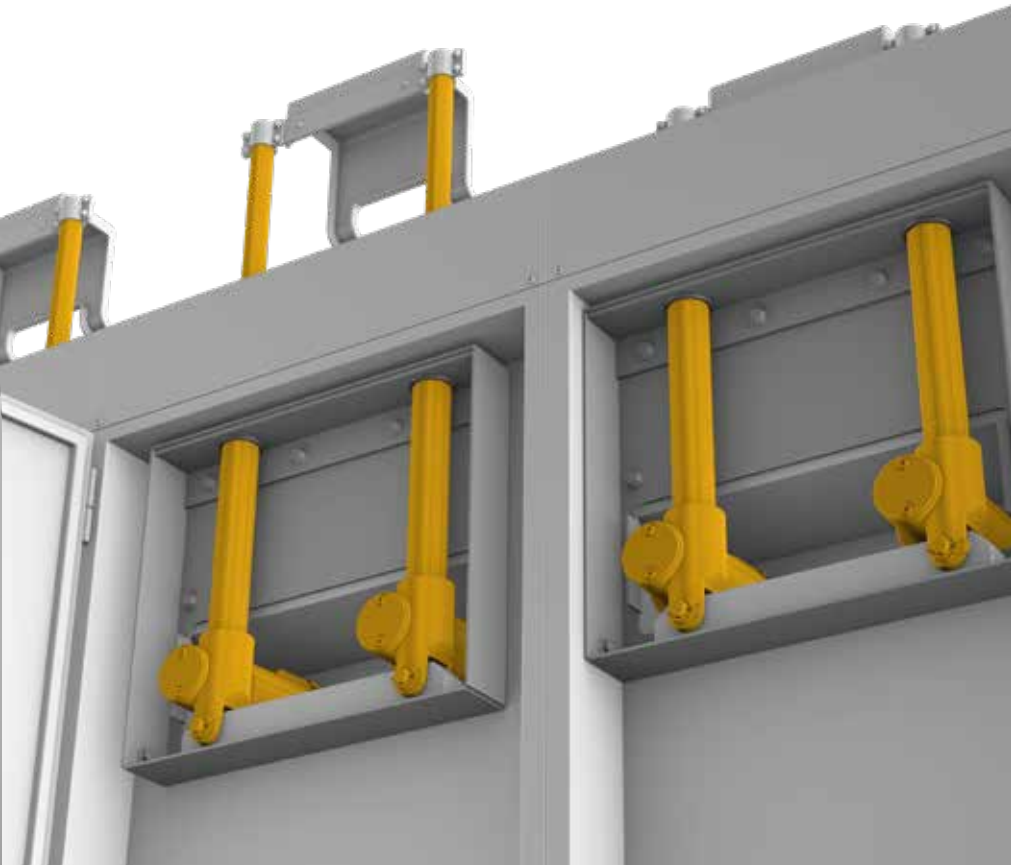


Fryer basket

Clam shell grill with electrical lifting are automatized with a linear actuator. The cooking of the steak is exactly as requested by the customer and the operator is more efficient. A customization of the motor could be proposed if a long life time is requested.

To ensure perfect French fries, the lifting of basket is automatized with a linear actuator. The operator appreciates also the simplicity and comfort and can focus on other preparation.





2

Selection process

- Medical
- Harsh environment
- Automation

Simplified selection process

By following the described flow (↳ **diagram 1**), the user can select the right solution based on linear actuator, telescopic pillar and electronics that fulfill the application needs. If further assistance is needed, please contact Ewellix to get complete technical support (↳ **page 3**).

AC version

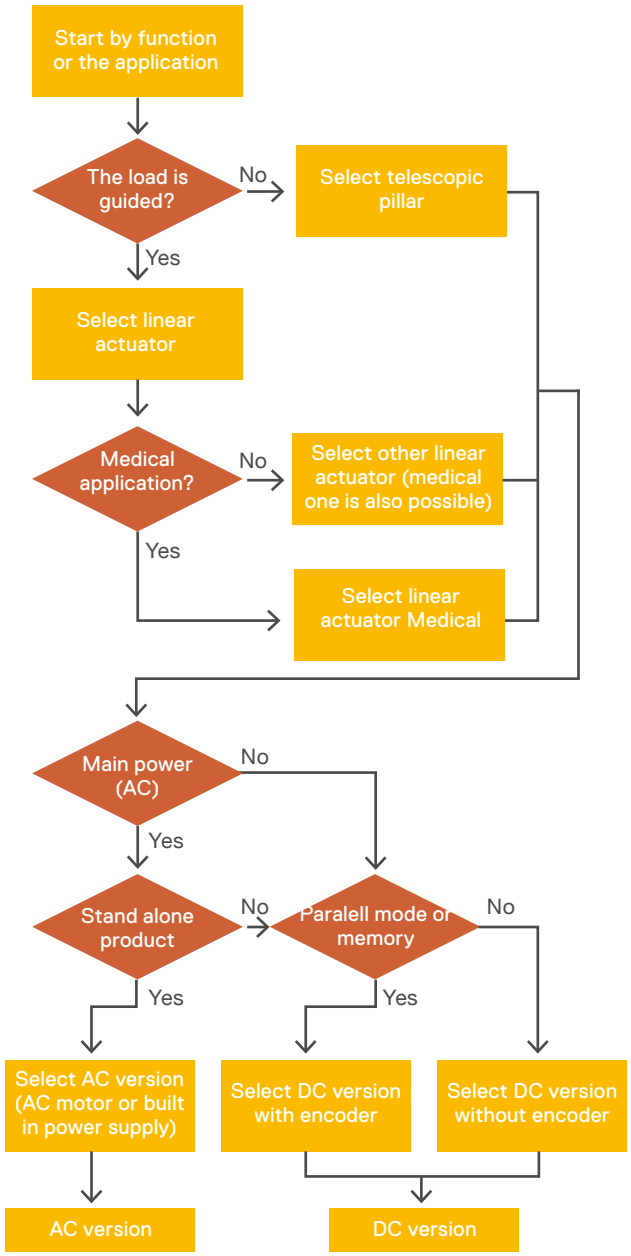
- Selection by load and direction, offset load if pillar, stroke, speed, IP, Self-locking/holding/static force dimension.
- Verify the environment and standard: IP, duty cycle, temperature, standard
- Select accessories if requested. Power cable or Power cord, connection plates, wires, inlet / outlet boxes
- Select the compatible operating device / switches per number of functions to control.

DC version

- Selection by load and direction, offset load if pillar, stroke, speed, IP, Self-locking/holding/static force dimension.
- Verify the environment and standard: IP, duty cycle, temperature, standard
- Select the control unit: Channel per motor, output per channel, Sum output power (see compatibility Matrix), accessories
- Select the compatible operating device / switches per number of functions to control.

See ↳ **pages 52** and **53** for more information.

Diagram 1



Selection by load and direction, off set load if pillar, stroke, speed, Self-locking/ holding/static force, dimensions

- Rated load should match with the maximum force applied to the actuator by the application during the movement. Consider the “worst case scenario” and also the direction; push is the extension and pull is the retraction direction.
- For Pillar, it is the load and offset load / distance that should be considered.
- The static load should match with the force applied on the actuator by the application when the actuator is static. Consider the dynamic effect of vibration or chock on the application.
- The stroke length of the actuator including the tolerance should match with the travel distance of the application. In case of limit switches option, the extra stroke length to reach the mechanical end stop of the actuator could be considered for added safety.
- The speed should match with the expected running time. Consider that the speed will change depending on the load but also depending on the voltage fluctuation in case of a DC motor, except for a Switch Mode Power Supply.
- For some products, you could select the attachment dimension and retracted length. Consider the tolerance.

Verify the environment and standard: IP, duty cycle, temperature, standard

- Each product should have an Environmental and standard specification that should match the environment of the application.
- Ingress Protection.
- Ambient Temperature during working condition, storage condition.
- Duty cycle % or “**Time ON** / **Time OFF**” are specified.
- The longest running time should not exceed the **Time ON** specified.
- The shortest rest time should be longer than the running time multiplied by the “**Time ON** / **Time OFF**” specified, or running time multiplied by (1- Duty cycle specified) and divided by duty cycle.

Formula:

$$\text{Rest time} > \frac{\text{Running time} \times \text{Time ON}}{\text{Time OFF}}$$

or

$$\text{Rest time} > \frac{\text{Running time} \times (1\text{-Duty Cycle\%})}{\text{Duty Cycle\%}}$$

Example:

Time ON / Time OFF = 85 s / 340 s or Duty Cycle 20%;
the Running time must be less than 85 seconds.
If the running time is 30 seconds, the Rest Time should be more than

$$\frac{30 \times 340}{85} = 120 \text{ seconds}$$

or

$$\text{Rest time} > \frac{30 \times (1\text{- }20\%)}{20\%}$$

so

$$\text{Rest time} > \frac{30 \times (1\text{- }0{,}2)}{0{,}2}$$

so at least 120 seconds

Some products are designed for a specific application but are suitable for others applications that request the similar performance.

Select the Control Unit: Channel per motor, output per channel, Sum Output power (see compatibility Matrix)

- Select the control unit that is compatible with the actuator or pillar selected. Consider the sum of the number of channels requested by each product; some pillars could request 2.
- Accessories can be selected: power cable or power cord, extra wires, Inlet and Outlet boxes, Connection plates.

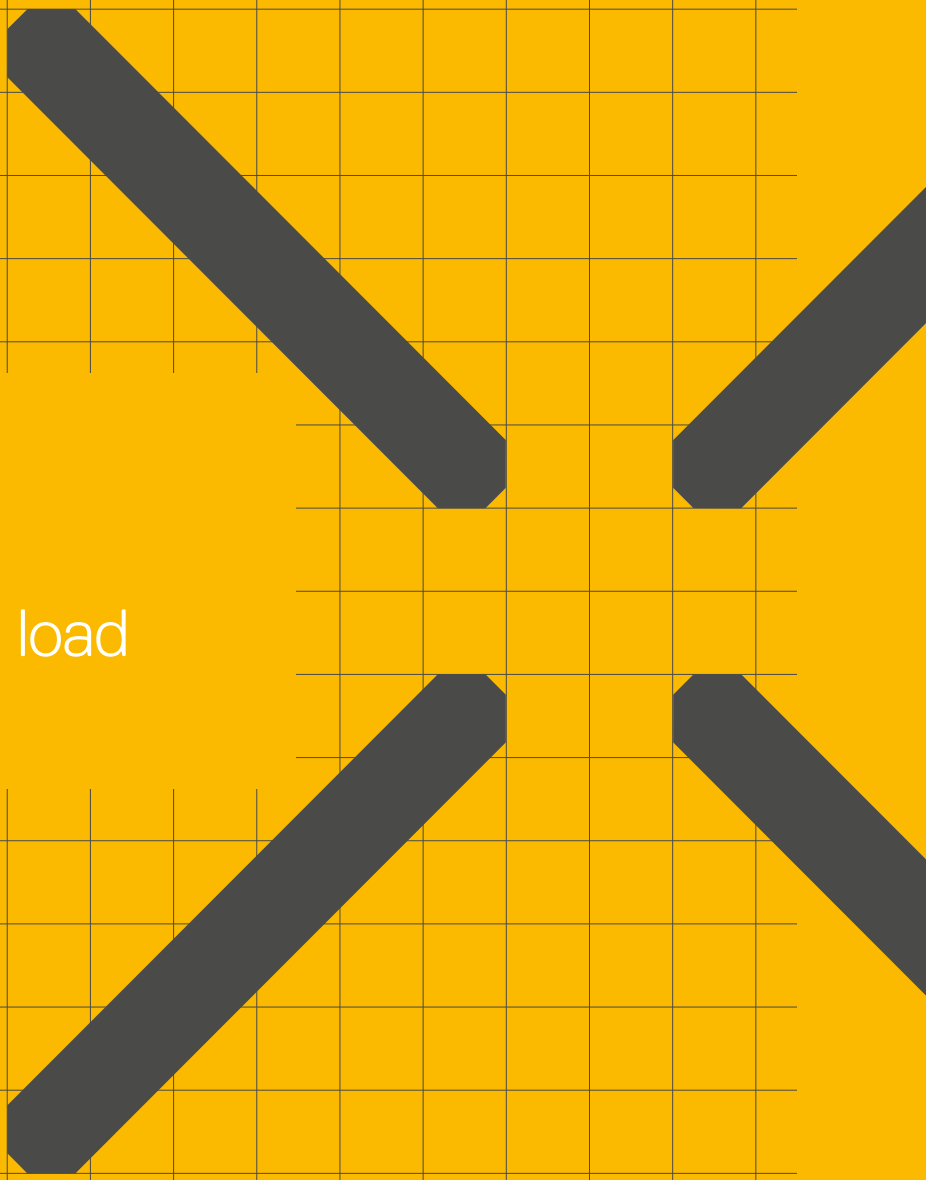
Select the compatible operating device / buttons per number of functions to control

- Select the operating device that is compatible with the control unit.
- The type of switch must be selected: the switch can have different number of buttons according to the numbers of functions to drive (i.e. for only up and down function is necessary two buttons); number of buttons increase according to the number of actuators or pillars to drive or if memory position or other functions are needed.

3

Actuators

Up to 50 kN rated load



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Matrix series

The Matrix series is designed for medical devices and includes powerful AC and DC linear actuators using DC motor.

They run very quietly, take up little space and can be installed at virtually every angle in vertical or horizontal position. The series is medical approved by third parties and available with options like anti-pitching, incremental position feedback and emergency lowering. The Matrix series can be supplied as a full system with controls, operating units and accessories.

Features

- Designed for medical devices
- Full system with controls, operating units and accessories
- Back up nut as standard
- Safety factor up to 4

Benefits

- Synchronization possible
- Silent operation
- Compact and aesthetic
- Back-up nut as standard

Matrix1

Linear actuator

Benefits

- Silent operation
- Full system with control unit, switch and accessories
- Synchronization possible
- Compact and aesthetic
- Back-up nut as standard

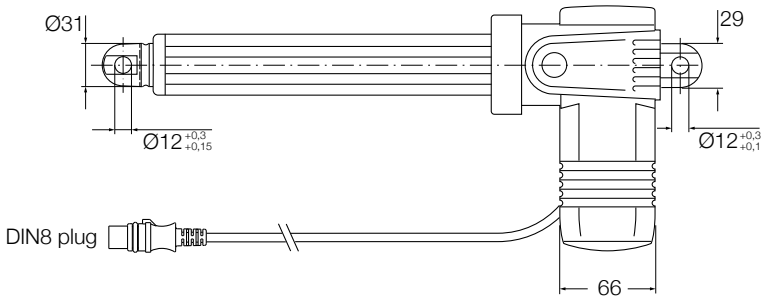
Technical data

	Unit	MAX1..A..	MAX1..B..	MAX1..C..
Rated push load	N	4 000	2 000	1 500
Rated pull load	N	4 000	2 000	1 500
Speed (full load to no load)	mm/s	5 to 7	6 to 9	13 to 18
Stroke	mm	50 to 700	50 to 700	50 to 700
Retracted length	mm	S + 195/260 [1)]	S + 195/260 [1)]	S + 195/260 [1)]
Voltage	V DC	24	24	24
Power consumption	W	120	120	120
Current consumption	A	5	5	5
Duty cycle	%	10 (1/9)	10 (1/9)	10 (1/9)
Ambient temperature	°C	0 to +40	0 to +40	0 to +40
Type of protection	IP	66S	66S	66S
Weight (at 200 mm stroke)	kg	4	3,7	3,6
Color	–	Grey	Grey	Grey

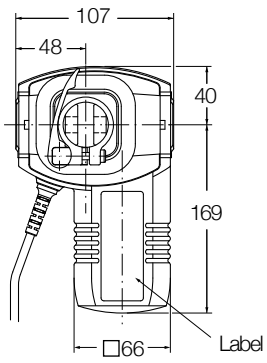
[1)] S < 350 mm, L = 195 + S
S > 350 mm, L = 260 + S

Dimensional drawing

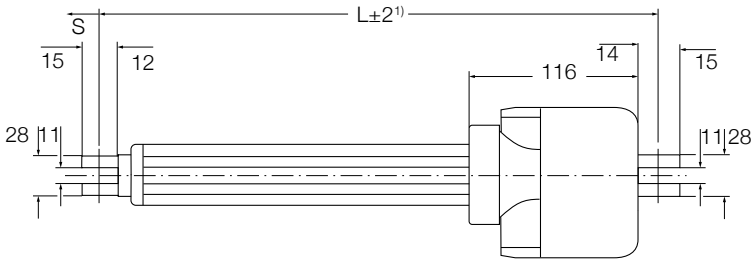
Side view



Front view

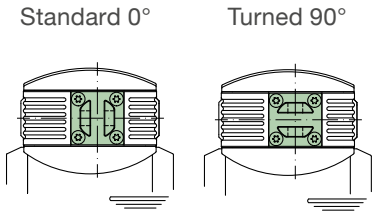


Top view

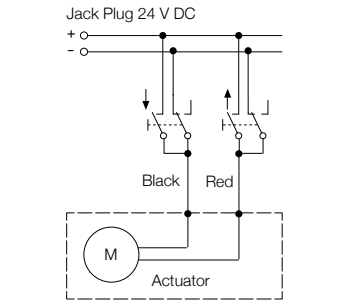


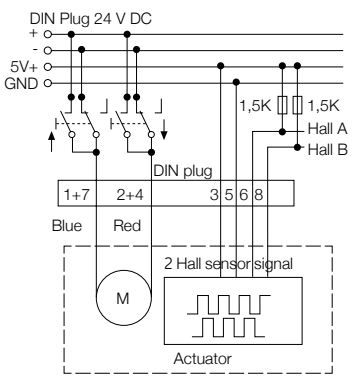
¹⁾ S < 350 mm; L = 195 + S
S > 350 mm; L = 260 + S

Rear view



Connecting diagrams





Suitable control units and accessories

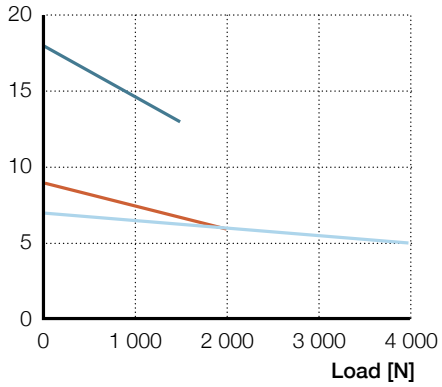
	Control units			
	SCU	VCU	BCU	MCU
MAX 1	•	•	•	•
Operating switches				
EHA 1				•
EHA 3	•	•	•	
STJ	•	•	•	
STF				•
STE	•	•	•	
STA				•

Hand switch Foot switch Desk switch

Performance diagrams

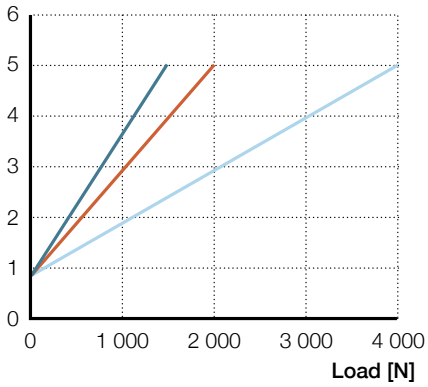
Speed-load diagram

Speed [mm/s]



Current-load diagram

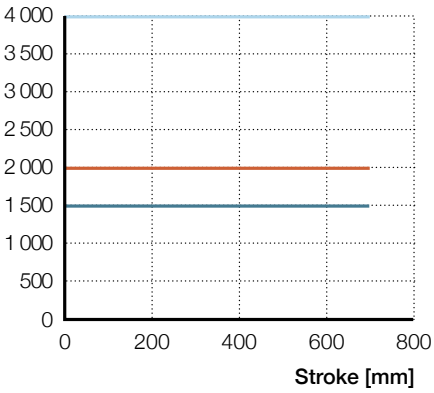
Current consumption [A]



Rated push force 1 500 — Rated push force 2 000 — Rated push force 4 000

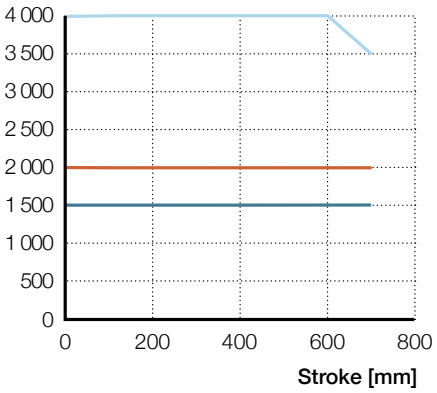
Safety factor load conditions

Load [N]



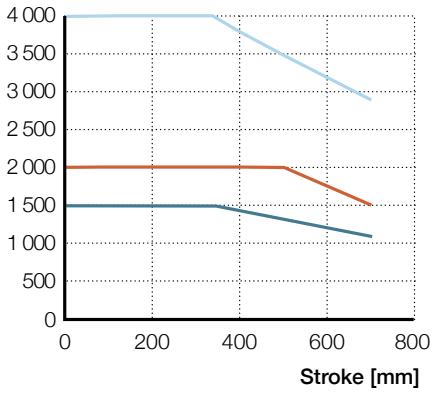
Push load reduction static
Safety factor S=1

Load [N]



Push load reduction static
Safety factor S=2

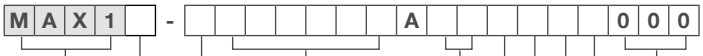
Load [N]



Push load reduction static
Safety factor S=4 (EN60601)

Rated push force 1 500 — Rated push force 2 000 — Rated push force 4 000

Ordering key



Type

Voltage

0	24 V DC
1	24 V DC with integrated current cut-off

Load

A	4 000 N
B	2 000 N
C	1 500 N

Stroke (S)

050 245	50 mm
100 295	100 mm
150 345	150 mm
200 395	200 mm
250 445	250 mm
300 495	300 mm
350 545	350 mm
400 660	400 mm
450 710	450 mm
500 760	500 mm
550 810	550 mm
600 860	600 mm
650 910	650 mm
700 960	700 mm
– – – – – –	Other stroke lengths; 50<S<700 mm

Cable / Connecting plug

0 B	Coiled, 0,75 m (not stretched) / DIN8 plug
C 5	Straight, 2,5 m / DIN8 plug
0 A	Coiled, 0,75 m (not stretched) / Jack plug
2 5	Straight, 2,5 m / Jack plug
– –	Special cable length on request

Orientation of rear attachment

0	No fork head (customized option)
1	Standard (as drawing)
2	Turned 90°

Option 1

0	No option, only valid for actuator “A” (push and pull)
E	Quick-release +EKZm, push, fork head bore parallel to button (for actuator design “C” is L= +115 mm) [1]
F	Quick-release +EKZm, push, fork head bore 90° to button (for actuator design “C” is L= +115 mm) [1]
I	Mechanical anti-pinching, motor direction pull, no fixing in term. position (for load “A”, L= +45 mm; “B”and “C”, L= +30 mm)
J	Mechanical anti-pinching, motor direction push, no fixing in term. position (for load “A”, L= +45 mm; “B”and “C”, L= +30 mm)
M	Push load, for actuator version “B” and “C”
N	Pull load, for actuator version “B” and “C”

Option 2

0	No option
F	2-Hall encoder, DIN8 plug
M	Lifetime monitoring
P	Lifetime monitoring, 2-Hall encoder, DIN8 plug

Option 3

0	No option
V	Emergency lowering, fork head bore parallel to clamping lever (for actuator design "A", L+30 mm)
W	Emergency lowering, fork head bore 90° to clamping lever (for actuator design "A", L+30 mm)

Customized

[1] EKZm: mechanical anti-pinching min. stroke 150 mm up to 300 mm

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

Matrix3

Linear actuator

Benefits

- Silent operation
- Full system with control unit, switch and accessories
- Synchronization possible
- Compact and aesthetic
- Back-up nut as standard

Technical data

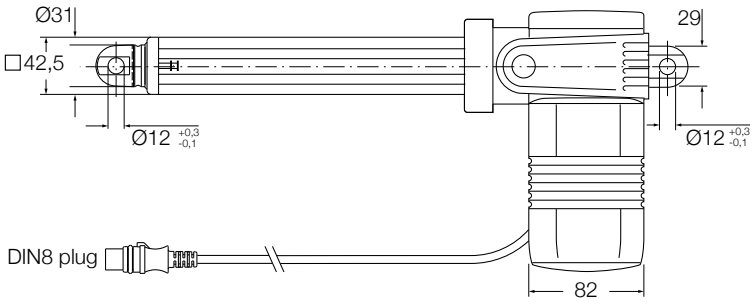
	Unit	MAX3..A..	MAX3..B..	MAX3..C..
Rated push load	N	8 000	4 000	3 000
Rated pull load	N	6 000 [1]	4 000	3 000
Speed (full load to no load)	mm/s	5 to 7	6 to 9	13 to 18
Stroke	mm	50 to 700	50 to 700	50 to 700
Retracted length	mm	S + 215/280 [2]	S + 215/280 [2]	S + 215/280 [2]
Voltage	V DC	12 or 24	12 or 24	12 or 24
Power consumption	W	120	120	120
Current consumption	A	5	5,2	5,2
Duty cycle	%	10 (1/9)	10 (1/9)	10 (1/9)
Ambient temperature	°C	0 to +40	0 to +40	0 to +40
Type of protection	IP	66S	66S	66S
Weight (at 200 mm stroke)	kg	4,5	4,2	4
Color	–	Grey	Grey	Grey

[1] Max load for medical application is 5 000 N

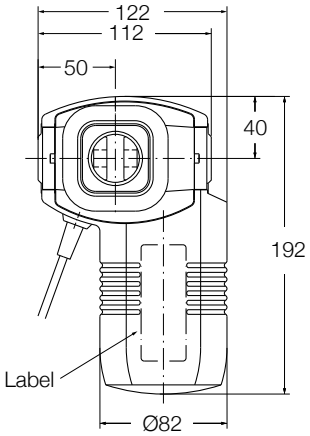
[2] S ≤ 350 mm; L = S + 215
S > 350 mm; L = S + 280

Dimensional drawing

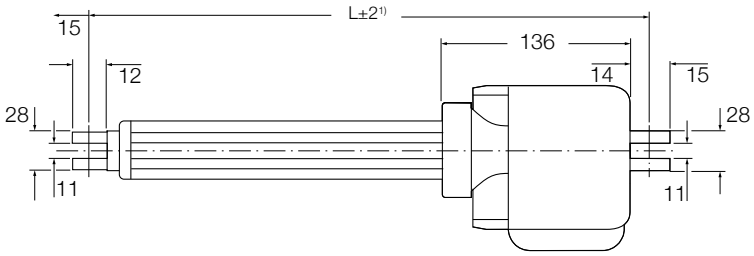
Side view



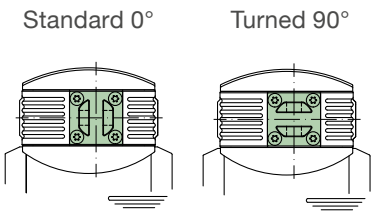
Front view



Top view

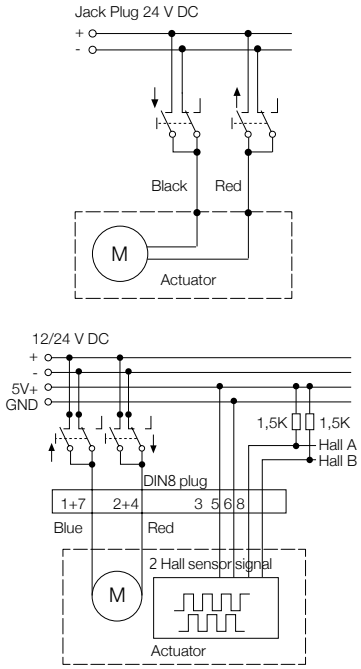


Rear view



¹⁾ S < 350 mm; L = 215 + S
S > 350 mm; L = 280 + S

Connecting diagrams



Suitable control units and accessories

	Control units			
	SCU	VCU	BCU	MCU
MAX 3	•	•	•	•
Operating switches				
EHA 1				•
EHA 3	•	•	•	
STJ	•	•	•	
STF				•
STE	•	•	•	
STA				•

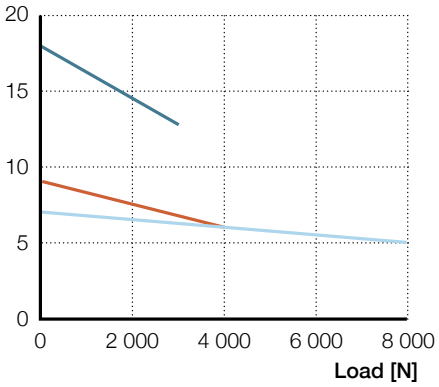
Hand switch Foot switch Desk switch

¹⁾ Only valid for MAX 31. MAX 30 must be operated by a BCU, MCU, SCU or VCU control unit.

Performance diagrams

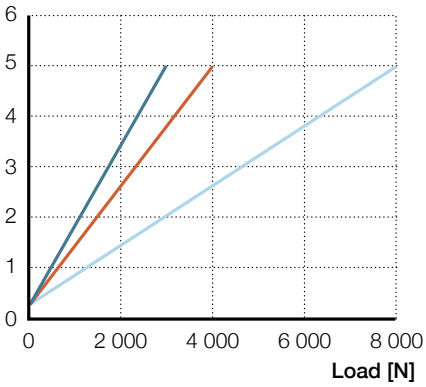
Speed-load diagram

Speed [mm/s]



Current-load diagram

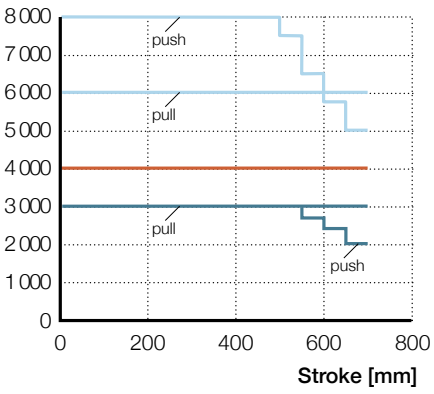
Current consumption [A]



Rated push force 3 000 | Rated push force 4 000 | Rated push force 8 000

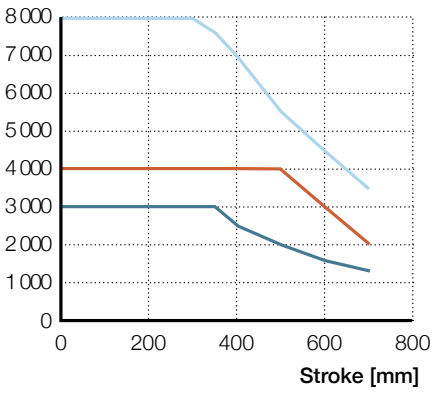
Safety factor load conditions

Load [N]



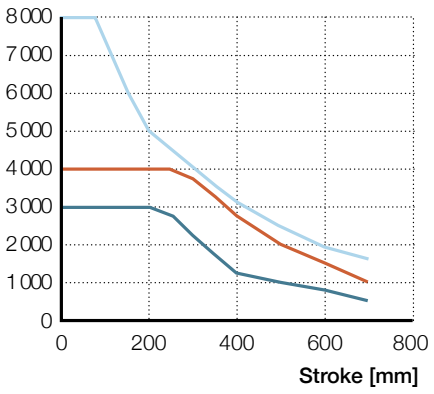
Push load reduction static
Safety factor S=1

Load [N]



Push load reduction static
Safety factor S=2

Load [N]



Push load reduction static
Safety factor S=4 (EN60601)

Rated push force 3 000 | Rated push force 4 000 | Rated push force 8 000

Ordering key

Type

Voltage

0	24 V DC
1	24 V DC with integrated current cut-off
2	12 V DC

Load

A	8 000 N
B	4 000 N
C	3 000 N

Stroke (S)

050 265	50 mm
100 315	100 mm
150 365	150 mm
200 415	200 mm
250 465	250 mm
300 515	300 mm
350 565	350 mm
400 680	400 mm
450 730	450 mm
500 780	500 mm
550 830	550 mm
600 880	600 mm
650 930	650 mm
700 980	700 mm
– – – – – –	Other stroke lengths; 50 < S < 700 mm

Cable / Connecting plug

0 B	Coiled, 0,75 m (not stretched) / DIN8 plug
C 5	Straight, 2,5 m / DIN8 plug
0 A	Coiled, 0,75 m (not stretched) / Jack plug
2 5	Straight, 2,5 m / Jack plug
– –	Special cable length on request

Orientation of rear attachment

0	No fork head (customized option)
1	Standard (as drawing)
2	Turned 90°

Option 1

0	No option, only valid for actuator “A” (push and pull)
E	Quick-release +EKZm, push, fork head bore parallel to button (for actuator design “C” is L= +115 mm) [1]
F	Quick-release +EKZm, push, fork head bore 90° to button (for actuator design “C” is L= +115 mm) [1]
I	Mechanical anti-pinching, motor direction pull, no fixing in term. position (for load “A”, L= +45 mm; “B”and “C”, L= +30 mm)
J	Mechanical anti-pinching, motor direction push, no fixing in term. position (for load “A”, L= +45 mm; “B”and “C”, L= +30 mm)
K	Electrical anti-pinching protection, motor direction pull
L	Electrical anti-pinching protection, motor direction push
M	Push load, for actuator version “B” and “C”
N	Pull load, for actuator version “B” and “C”

Option 2

0	No option
F	2-Hall encoder, DIN8 plug
M	Lifetime monitoring
P	Lifetime monitoring, 2-Hall encoder, DIN8 plug

Option 3

0	No option
V	Emergency lowering, fork head bore parallel to clamping lever (for actuator design "A", L+30 mm)
W	Emergency lowering, fork head bore 90° to clamping lever (for actuator design "A", L+30 mm)

Customized

[1] EKZm: mechanical anti-pinching min. stroke 150 mm up to 300 mm

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

Matrix7

Linear actuator

Benefits

- Universal power supply
- Power indicator
- Plug and play with integrated control unit
- Designed for medical devices, compliant to IEC 60601-1

Technical data

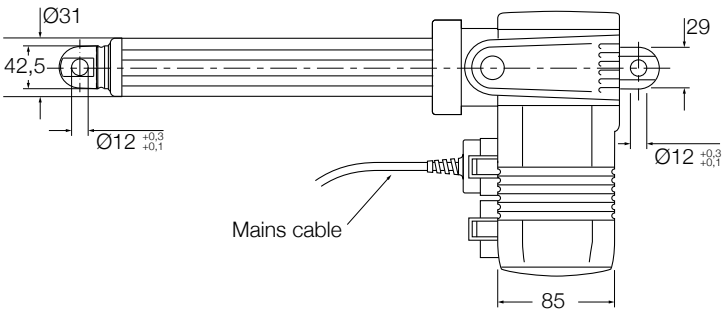
		Unit	MAX7..A..	MAX7..B..	MAX7..C..
Rated push load		N	8 000	4 000	3 000
Rated pull load		N	6 000 [1]	4 000	3 000
Speed (full load to no load)		mm/s	6 to 7,5	8 to 10	13 to 18
Stroke		mm	50 to 700	50 to 700	50 to 700
Retracted length		mm	S + 215/280 [2]	S + 215/280 [2]	S + 215/280 [2]
Voltage		V	100-240 AC 50/60 Hz	100-240 AC 50/60 Hz	100-240 AC 50/60 Hz
Power consumption		W	180	180	180
Current consumption	100 V AC	A	3,2	3,2	3,2
	240 V AC	A	1,6	1,6	1,6
Duty cycle		%	10 (1/9)	10 (1/9)	10 (1/9)
Ambient temperature		°C	0 to +40	0 to +40	0 to +40
Type of protection		IP	66S	66S	66S
Weight (at 200 mm stroke)		kg	4,8	4,5	4,2
Color		–	Grey	Grey	Grey

[1] Max load for medical application is 5 000 N

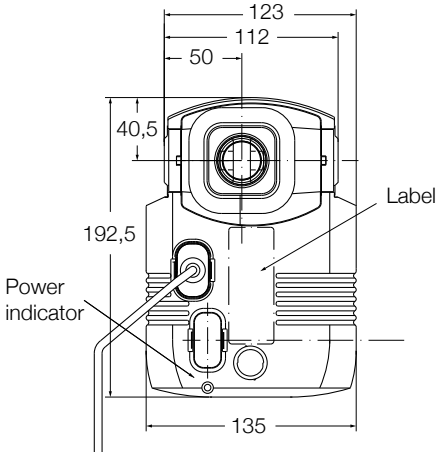
[2] S < 350 mm; L = S + 215
S > 350 mm; L = S + 280

Dimensional drawing

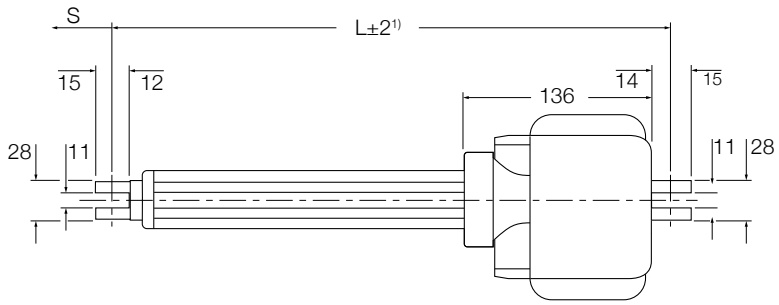
Side view



Front view

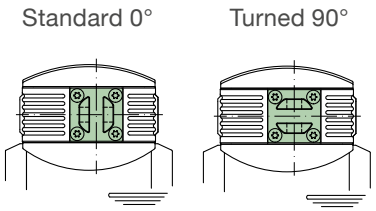


Top view

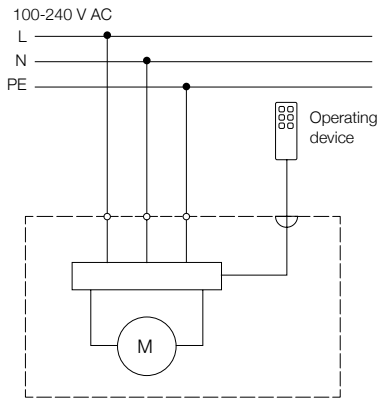


¹⁾ S < 350 mm; L = 215 + S
S > 350 mm; L = 280 + S

Rear view



Connecting diagrams



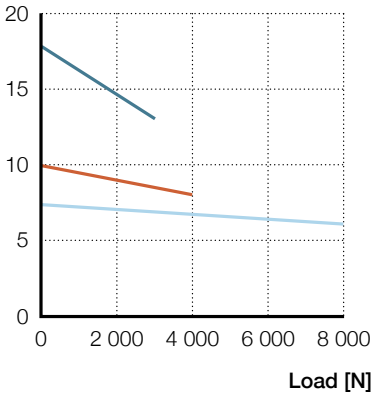
Suitable operating switches

	Operating switches					
	EHA1	PHC	STF	PFP	STA	PAM
MAX70		•		•		•
MAX72/74	•		•		•	

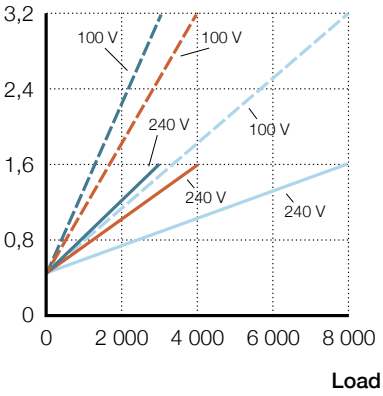
Hand switch Foot switch Desk switch

Performance diagrams

Speed-load diagram

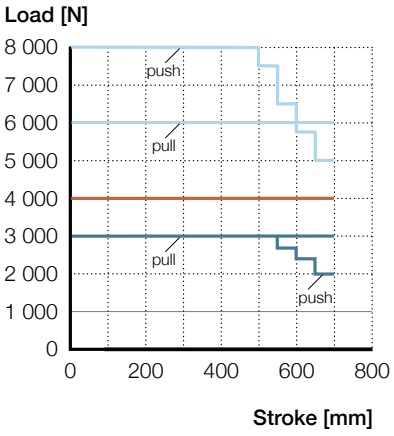


Current-load diagram

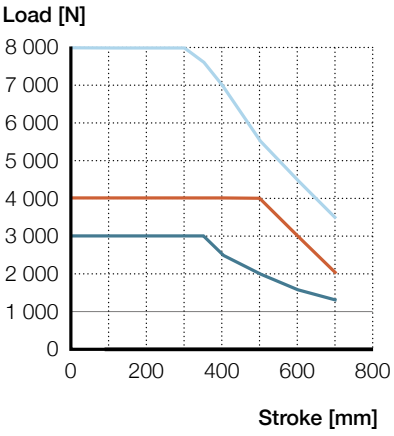


Rated push force 3 000 — Rated push force 4 000 — Rated push force 8 000

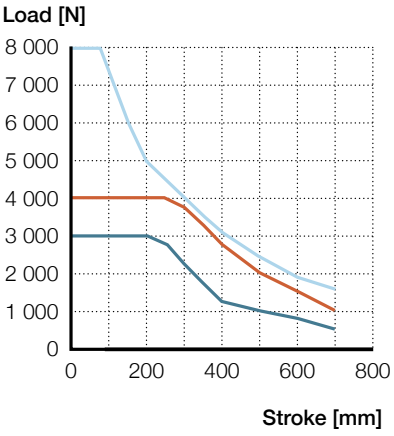
Safety factor load conditions



Push load reduction static
Safety factor S=1



Push load reduction static
Safety factor S=2



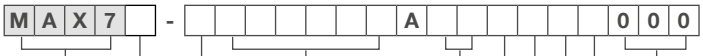
Push load reduction static
Safety factor S=4 (EN60601)

Rated push force 3 000 — Rated push force 4 000 — Rated push force 8 000

Accessories

	Plug	Country	Designation	Order number
Straight cable 3,5 m	Schuko	DE	ZKA-140306-3500	0121723
Straight cable 3,5 m	SEV	CH	ZKA-140316-3500	0121737
Straight cable 3,5 m	UL	USA	ZKA-140355-3500	0121724
Straight cable 3,5 m	Hospital grade	USA	ZKA-140360-3500	0121732
Straight cable 3,5 m	British standard	UK	ZKA-140350-3500	0121743
Coiled cable 1,2 m / 2,2 m	Schuko	DE	ZKA-140342-1500	0121728
Coiled cable 1,2 m / 2,2 m	SEV	CH	ZKA-140378-1200	0121738
Straight polyurethane cable 3,5 m	Schuko	DE	ZKA-140422-3500	0121739
Straight polyurethane cable 3,5 m	SEV	CH	ZKA-140426-3500	0121740
Strain relief for mains cable			ZUB-952253	0102848
Tool for plugs (Jack/D–Sub/Mains)			ZWS-140375	0125322

Ordering key



Type

Voltage

0	100-240 V AC/50-60 Hz, integrated pneumatic control
2	100-240 V AC/50-60 Hz, integrated low voltage control with additional 24 V output
4	100-240 V AC/50-60 Hz, integrated low voltage control

Load

A	8 000 N
B	4 000 N
C	3 000 N

Stroke (S)

050 265	50 mm
100 315	100 mm
150 365	150 mm
200 415	200 mm
250 465	250 mm
300 515	300 mm
350 565	350 mm
400 680	400 mm
450 730	450 mm
500 780	500 mm
550 830	550 mm
600 880	600 mm
650 930	650 mm
700 980	700 mm
– – – – – –	Other stroke lengths; 50<S<700 mm

Cable / Connecting plug

0	No cable

Orientation of rear attachment

0	No fork head (customized option)
1	Standard (as drawing)
2	Turned 90°

Option 1

0	No option, only valid for actuator “A” (push and pull)
E	Quick-release +EKZm, push, fork head bore parallel to button (for actuator design “C” is L= +115 mm) [1]
F	Quick-release +EKZm, push, fork head bore 90° to button (for actuator design “C” is L= +115 mm)1)
I	Mechanical anti-pinching, motor direction pull, no fixing in term. position (for load “A”, L= +45 mm; “B”and “C”, L= +30 mm)
J	Mechanical anti-pinching, motor direction push, no fixing in term. position (for load “A”, L= +45 mm; “B”and “C”, L= +30 mm)
K	Electrical anti-pinching protection, motor direction pull
L	Electrical anti-pinching protection, motor direction push
M	Push load, for actuator version “B” and “C”
N	Pull load, for actuator version “B” and “C”

Option 2

0	No option

Option 3

-	No option
V	Emergency lowering, fork head bore parallel to clamping lever (for actuator design "A", L+30 mm)
W	Emergency lowering, fork head bore 90° to clamping lever (for actuator design "A", L+30 mm)

Customized

[1] EKZm: mechanical anti-pinching min. stroke 150 mm up to 300 mm

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

Runner

Linear actuator

Benefits

- High push/pull load
- Compact
- Back-up nut as standard
- High safety factor
- Silent operation

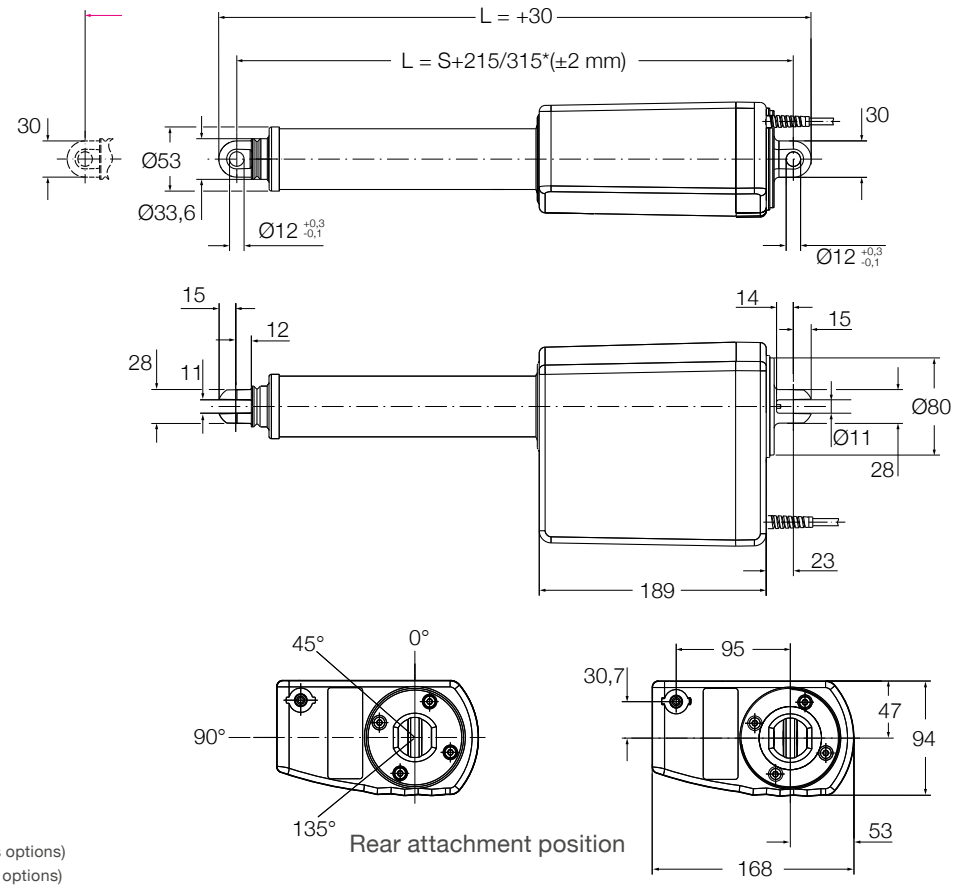
Technical data

	Unit	RU20	RU21	RU22	RU23	RU24	RU25
Rated push load	N	8 000	10 000	12 000 [1]	8 000	10 000	12 000 [1]
Rated pull load	N	8 000	8 000	8 000	8 000	8 000	8 000
Speed (full load to no load)	mm/s	7 to 10	5 to 8	4 to 7	8 to 15	6 to 12	5 to 9
Stroke	mm	100 to 700	100 to 700	100 to 700	100 to 700	100 to 700	100 to 700
Retracted length	mm	S+215/315 [2]	S+215/315 [2]	S+215/315 [2]	S+215/315 [2]	S+215/315 [2]	S+215/315 [2]
Voltage	V DC	24	24	24	24	24	24
Power consumption	W	N/A	N/A	N/A	N/A	N/A	N/A
Current consumption	A	7	7	7	10	10	10
Duty cycle	%	10 (1/9)	10 (1/9)	10 (1/9)	10 (1/9)	10 (1/9)	10 (1/9)
Ambient temperature	°C	+10 to +40	+10 to +40	+10 to +40	+10 to +40	+10 to +40	+10 to +40
Type of protection	IP	×4/×6S	×4/×6S	×4/×6S	×4/×6S	×4/×6S	×4/×6S
Weight	kg	4,7	4,7	4,7	4,7	4,7	4,7
Color	–	Grey	Grey	Grey	Grey	Grey	Grey

[1] Safety working load for medical application is 10 000 N (EN 60601)

[2] S ≤ 500 mm; L = S + 215
S > 500 mm; L = S + 315

Dimensional drawing

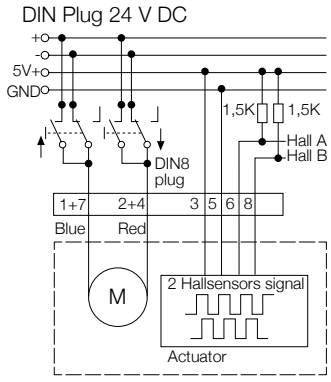


Legend:
S = stroke
L = retracted length

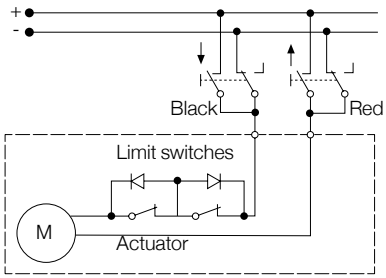
[1] Retracted length:
up to 500 mm stroke: stroke +215 mm (plus options)
from 500 mm stroke: stroke +315 mm (plus options)

Connecting diagrams

DIN Plug 24 V DC



Jack Plug 24 V DC



Suitable control units and accessories

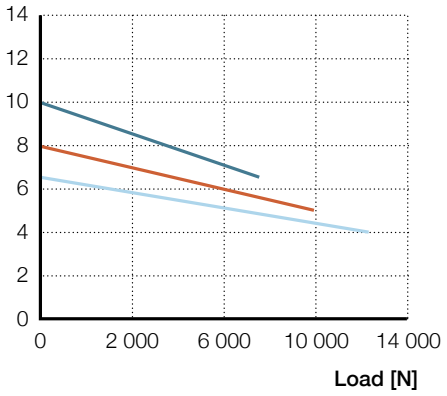
	Control units			
	SCU	VCU	BCU	MCU
RU20, RU21, RU22	•	•	•	•
RU23, RU24, RU25	•	•		•
Operating switches				
EHA 1				•
EHA 3	•	•	•	
STJ	•	•	•	
STF				•
STE	•	•	•	
STA				•

Hand switch Foot switch Desk switch

Performance diagrams

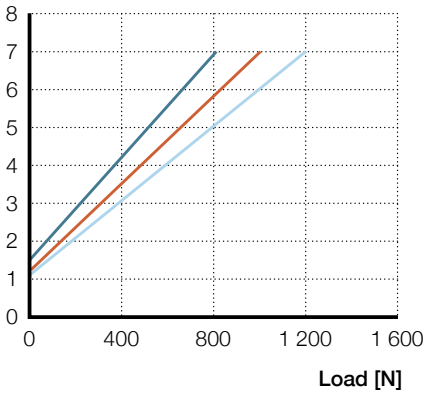
Speed-load diagram

Speed [mm/s]



Current-load diagram

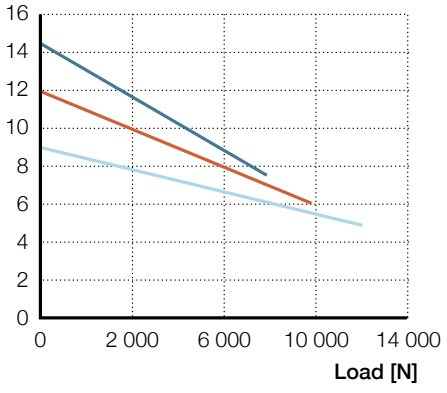
Current consumption [A]



Rated push load 8 000 RU20 — Rated push load 10 000 RU21 — Rated push load 12 000 RU22

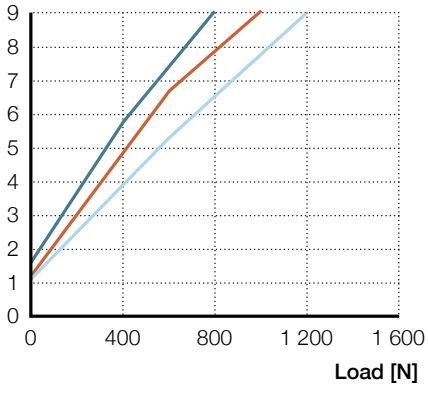
Speed-load diagram

Speed [mm/s]



Current-load diagram

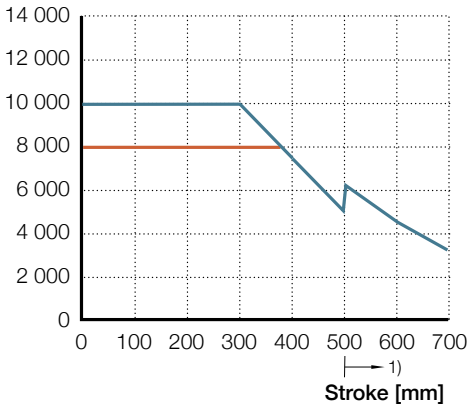
Current consumption [A]



Rated push load 8 000 RU23 — Rated push load 10 000 RU24 — Rated push load 12 000 RU25

Safety factor load conditions

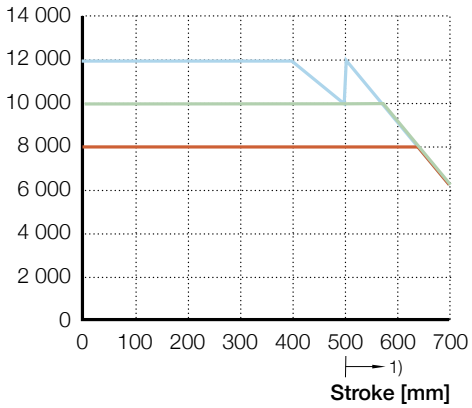
Load [N]



Push load limit, safety factor S=4 (EN 60601)

1) retracted length extension at stroke >500 mm

Load [N]



Push load limit, safety factor S=2

1) retracted length extension at stroke >500 mm

RU21 RU22 RU24 RU25 — RU20 RU23 — RU22 RU25 — RU21 RU24

Ordering key

R U 2 - 0 0

Type

Voltage

24 V DC

Load / Speed

0	8 000 N / 7-10 mm/s
3	8 000 N / 8-15 mm/s
1	10 000 N / 5-8 mm/s
4	10 000 N / 6-12 mm/s
2	12 000 N / 4-7 mm/s
5	12 000 N / 5-9 mm/s

Stroke (S) / Retracted length (L)

050 315	50 mm / 315 mm
100 315	100 mm / 315 mm
150 365	150 mm / 365 mm
200 415	200 mm / 415 mm
250 465	250 mm / 465 mm
300 515	300 mm / 515 mm
350 565	350 mm / 565 mm
400 615	400 mm / 615 mm
450 665	450 mm / 665 mm
500 715	500 mm / 715 mm
550 865	550 mm / 865 mm
600 915	600 mm / 915 mm
650 965	650 mm / 965 mm
700 XXX	700 mm / 1 015 mm
– – – – – –	50 < S ≤ 500 mm / S+215
– – – – – –	500 < S < 700 mm / S+315
XXX XXX	S > 700 mm (customized)

Type of protection / Color

A	IP×4S, grey
B	IP×6S, grey

Cable

15	Straight cable, 1,5 m, DIN8 plug
0D	Straight cable, 1,5 m, Jack plug 180°

Rear attachment orientation / Hole diameter

0	0° / Ø12,0 mm
2	45° / Ø12,0 mm
4	90° / Ø12,0 mm
6	135° / Ø12,0 mm

Option 1

0	No option
K	Electrical anti-pinching (safety switch), pull load, L+20 mm
L	Electrical anti-pinching (safety switch), push load, L+20 mm
M	Mechanical end stop, L+25 mm
N	Electrical anti-pinching, pull load, with mechanical end stop, L+45 mm
P	Electrical anti-pinching, push load, with mechanical end stop, L+45 mm

Option 2

0	No option
A	2-Hall encoder, 14 pulses, DIN8 plug
M	Lifetime monitoring
N	2-Hall encoder, 14 pulses, DIN8 plug, lifetime monitoring

Option 3

-	No option
V	Emergency lowering, L+53 mm (for push load only)

Customized

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

CAJA35C

Linear actuator

Benefits

- Quick-release solution for fast CPR intervention
- Detachable cable for quick assembly and service
- Integrated brake to maintain self-locking and stability under maximum static load in compression

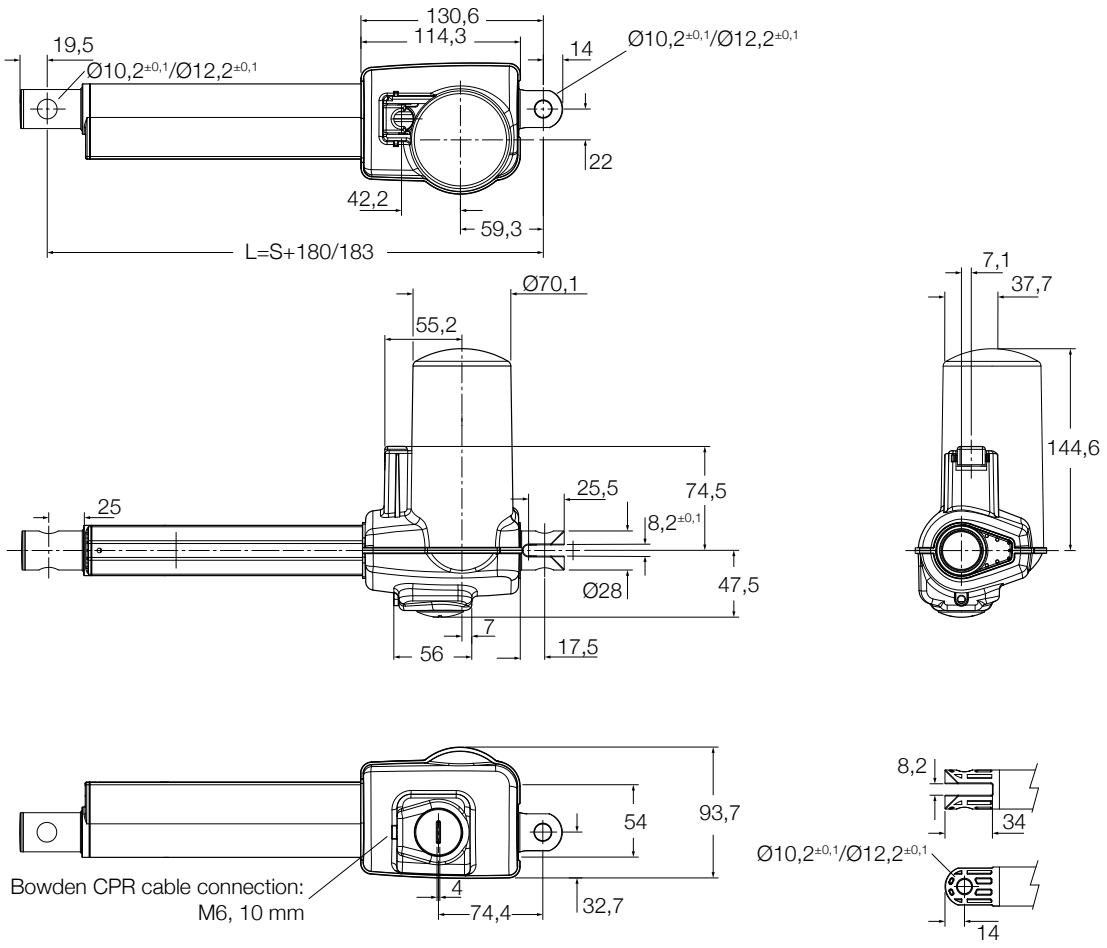
Technical data

	Unit	CAJA35C
Push load	N	3 500
Speed (full load to no load)	mm/s	5,5 to 8,5
Stroke	mm	30 to 250
Retracted length [1]	mm	S+180 [2]
Voltage	V DC	24
Current consumption	A	4
Duty cycle	%	10
Ambient temperature	°C	+10 to +40
Type of protection	IP	56
Weight	kg	2,5
Color	–	Grey

[1] Tolerance ±3 mm

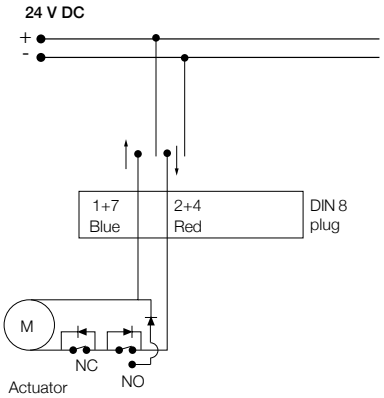
[2] Retracted length +3 mm if U fork used as front attachment (L = S + 183)

Dimensional drawing



Legend:
S = stroke
L = retracted length

Connecting diagrams DC version



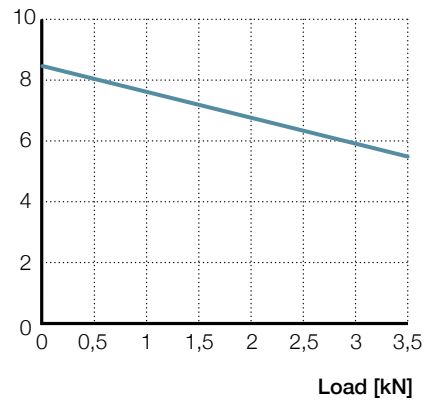
Suitable control units and accessories

	Control units		
	SCU	VCU	BCU
CAJA 35C	•	•	•
Operating switches			
EHA 3	•	•	•
STJ	•	•	•
STE	•	•	•

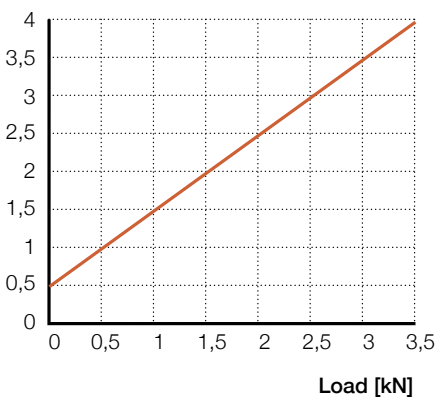
Hand switch Foot switch Desk switch

Performance diagrams

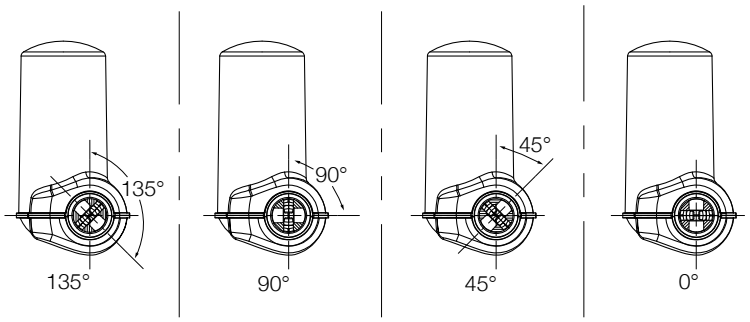
Speed-load diagram



Current-load diagram



Orientation



Accessories

Straight motor cable	Length [mm]
G517C0-094001-0460	460
G517C0-094001-1350	1 350
G517C0-094001-2650	2 650

Ordering key

C A J A 3 5 C [ ][ ][ ] [ ] [ ] [ ][ ]U 6[ ][ ][ ] - [ ][ ][ ]

Type

Stroke
100 100 mm
200 200 mm
250 250 mm
XXX All other customized strokes between 30-250 mm

Rear attachment
A U-fork, metal, Ø10,2 mm
B U-fork, metal, Ø12,2 mm

Front attachment
A Tube with hole and metal bushings, Ø10,2 mm
B Tube with hole and metal bushings, Ø12,2 mm
C U-fork end, metal, Ø10,2 mm (increase “L” by 3 mm)
D U-fork end, metal, Ø12,2 mm (increase “L” by 3 mm)

Attachment orientation (clockwise)
0 0°
1 45°
9 90°
2 135°

Housing material
ABS UL94 V0

Protection class (with power cables M6, 10 mm connected)
IP56

Option 1
0 No option
1 Antipinching solution ("push only" actuator)

Option 2
0 No option
1 With back-up nut (for "push" load)

Option 3
0 No option
1 Motor with thermoswitch

Customization
000 Standard series

Ecomag

Linear actuator

Benefits

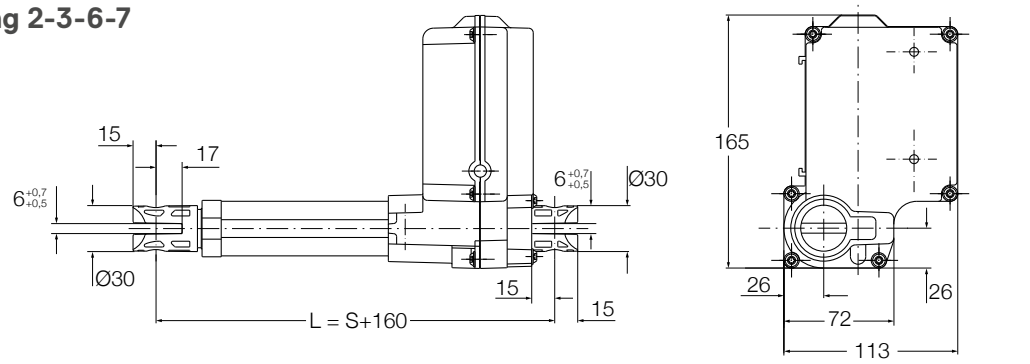
- Compact
- Cost effective
- Silent operation
- Control unit can be mounted to the actuator

Technical data

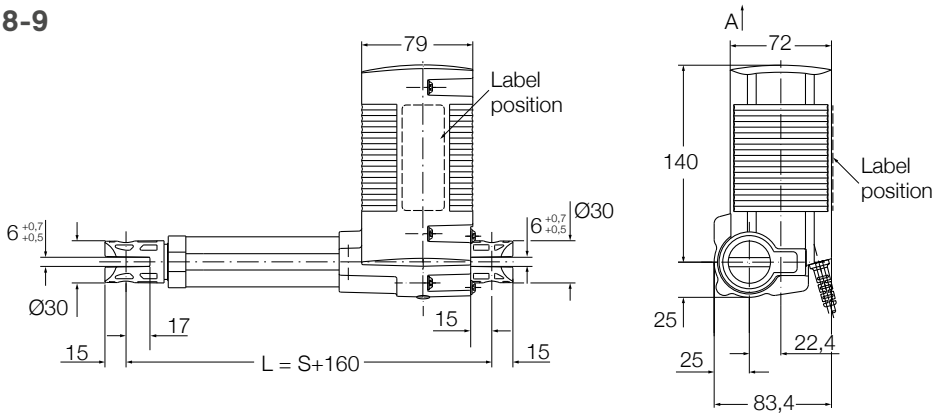
	Unit	ECO 20/40	ECO 60/80	ECO 30/50	ECO 70/90
Rated push load	N	2 000	6 000	2 000	6 000
Rated pull load	N	0	0	2 000	4 000
Speed (full load to no load)	mm/s	9 to 13	4 to 7	9 to 13	4 to 7
Stroke	mm	50 to 300	50 to 300	50 to 300	50 to 300
Retracted length	mm	S+160	S+160	S+160	S+160
Voltage	V DC	24	24	24	24
Power consumption	W	70	120	70	120
Current consumption	A	4	6	4	6
Duty cycle	%	10 (1/9)	10 (1/9)	10 (1/9)	10 (1/9)
Ambient temperature	°C	+10 to +40	+10 to +40	+10 to +40	+10 to +40
Type of protection	IP	x4S	x4S	x4S	x4S
Weight	kg	2,1	2,1	2,5	2,5
Color	–	Black or grey	Black or grey	Black or grey	Black or grey

Dimensional drawing

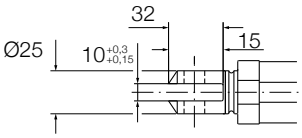
Ecomag 2-3-6-7



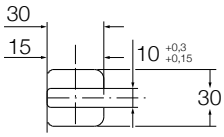
Ecomag 4 -5-8-9



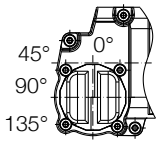
Front attachment push and pull version



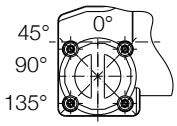
Rear attachment push and pull version



Rear attachment position



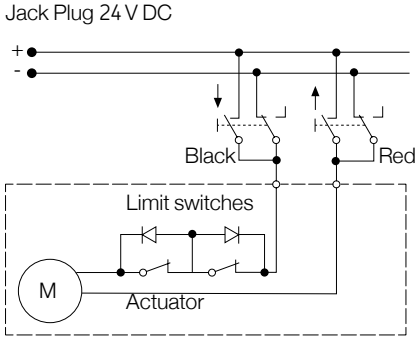
Push version only



Push and pull version

Legend:
S = stroke
L = retracted length

Connecting diagrams



Suitable control units and accessories

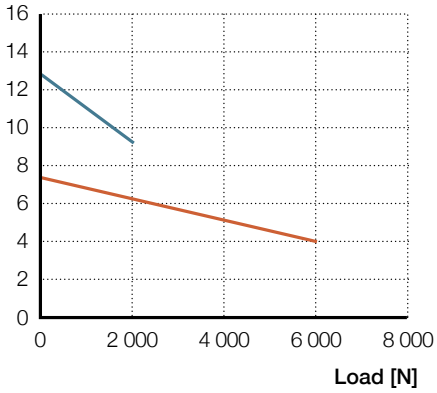
	Control units				
ECOMAG	SCU	VCU	BCU	MCU	SEM
	•	•	•	•	•
Operating switches					
EHA 1				•	
EHA 3	•	•	•		
EHE					•
STJ	•	•	•		
STF				•	
STA				•	
STE	•	•	•		

Hand switch Foot switch Desk switch

Performance diagrams

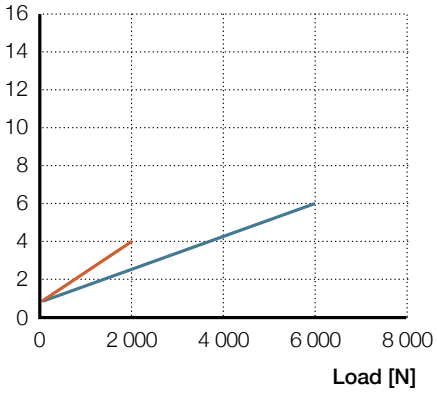
Speed-load diagram

Speed [mm/s]



Current-load diagram

Current consumption [A]



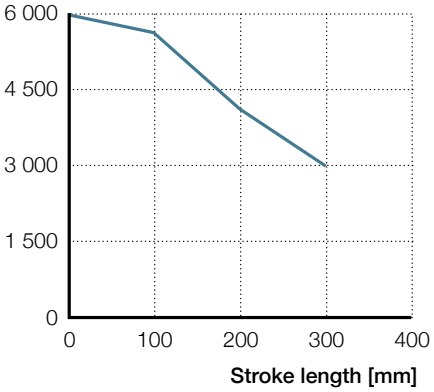
ECO 20 / 30 / 40 / 50

ECO 60 / 70 / 80 / 90

Safety factor load conditions

Push load reduction safety factor = 4

Push load [N]



Ordering key

Type

Load /Housing

	Push	Pull	Housing
2	2 000 N	0 N	Large
3	2 000 N	2 000 N	Large
4	2 000 N	0 N	Small
5	2 000 N	2 000 N	Small
6	6 000 N	0 N	Large
7	6 000 N	4 000 N	Large
8	6 000 N	0 N	Small
9	6 000 N	4 000 N	Small

Encoder

0	No encoder, coiled cable, 2-pin Minifit plug or customization
9	No encoder, coiled cable, DIN8 plug or customization
F	2-Hall encoder, 8 pulses, straight cable, DIN8 plug (small housing only)

Current cut-off

0	No
1	Yes (not available for ECO4.-/ECO5.-/ECO8.-/ECO9.-)

Stroke (S)

05	50 mm
10	100 mm
15	150 mm
20	200 mm
25	250 mm
30	300 mm
00	Other stroke lengths; 50<S<300 mm

Front attachment (groove depth 17 mm)

M	Hole, Ø12 mm, groove width 10 mm
X	Customized

Rear attachment (groove depth 15 mm)

M	Hole, w12 mm, groove width 10 mm
X	Customized

Orientation of rear attachment

1	0°
3	45°
5	90°
7	135°

Color

A	Black
B	Grey

Option

0	No option
A	Back-up nut (available only for drives with 6 kN, mandatory for IEC 60601-1) – only for ECO 7/9, L = +23 mm

Customization

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

Magdrive

Linear actuator

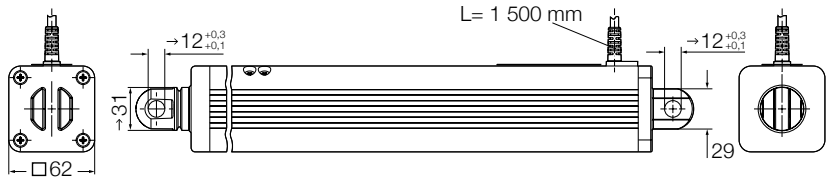
Benefits

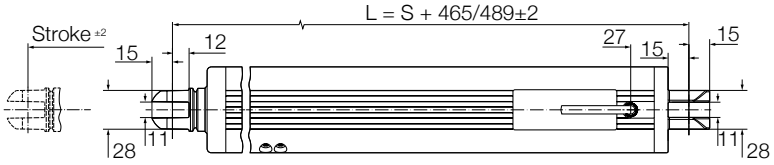
- Slim design
- Aluminium profile
- In-line actuator
- Quiet operation
- High push load

Technical data

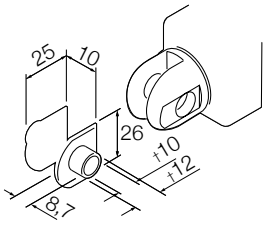
	Unit	MD22/MD24	MD23/MD25
Rated push load	N	6 000	6 000
Rated pull load	N	200 (static only)	6 000
Speed (full load to no load)	mm/s	8,5 to 15	8,5 to 15
Stroke	mm	50 to 700	50 to 700
Retracted length	mm	S+465	S+465
Voltage	V DC	24	24
Power consumption	W	N/A	N/A
Current consumption	A	7	7
Duty cycle	%	10 (1/9)	10 (1/9)
Ambient temperature	°C	+10 to +40	+10 to +40
Type of protection	IP	x0/x4S	x0/x4S
Weight	kg	5,0	5,0
Color	–	Colorless anodized	Colorless anodized

Dimensional drawing

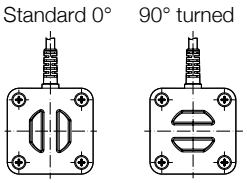




Plastic bushing for forkhead
(hinge delivered separately)



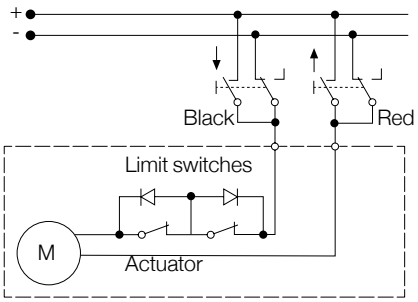
Orientation of rear attachment



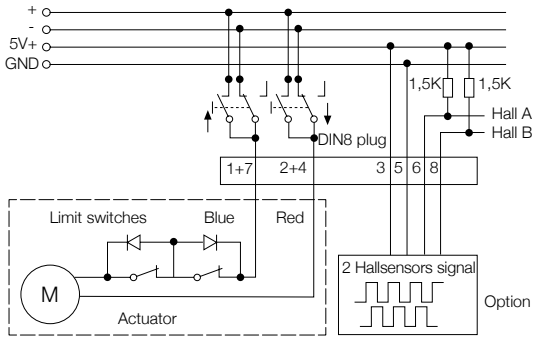
Legend:
S = stroke
L = retracted length

Connecting diagrams

24 V DC



24 V DC (DIN8 plug)



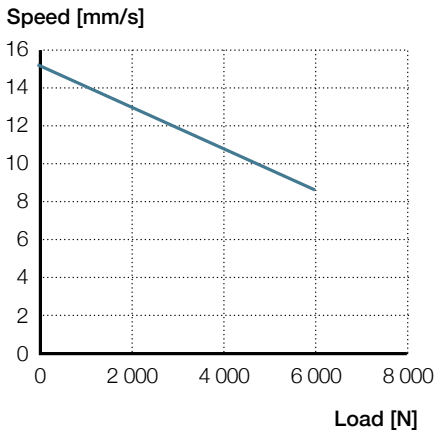
Suitable control units and accessories

	Control units			
	SCU	VCU	BCU	MCU
MAGDRIVE	•	•	•	•
Operating switches				
EHA 1				•
EHA 3	•	•	•	
STJ	•	•	•	
STF				•
STA				•
STE	•	•	•	

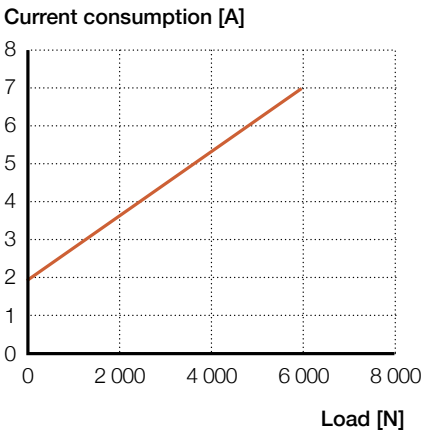
Hand switch Foot switch Desk switch

Performance diagrams

Speed-load diagram

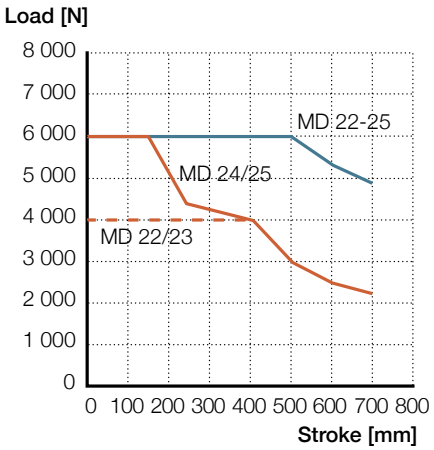


Current-load diagram

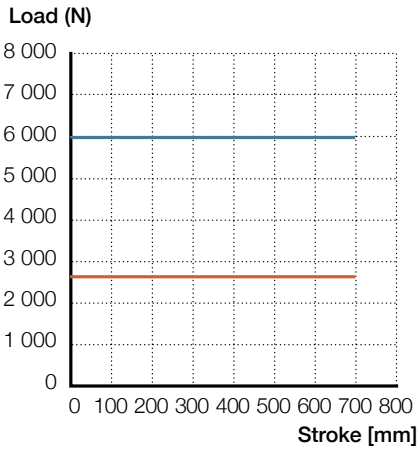


Safety factor load conditions

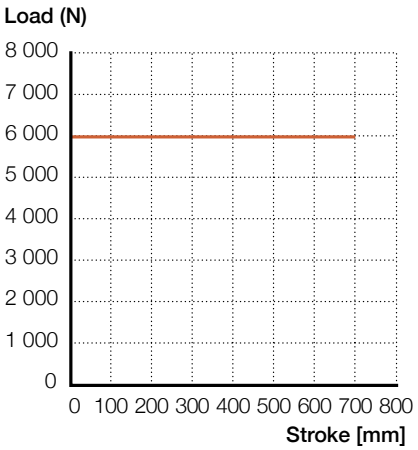
Push load diagram



Pull load diagram MD23



Pull load diagram MD25 (6 000 N)

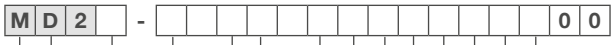


Safety factor S=2
Safety factor according UL60601–1, IEC60601–1

Safety factor S=4
Safety factor according UL60601–1, IEC60601–1

Safety factor according UL60601–1, IEC60601–1

Ordering key



Type

Push/pull force

2	6 000 N/200 N
3	6 000 N/6 000 N
4	6 000 N/200 N (recommended for medical applications- with alu. rear hinge)
5	6 000 N/6 000 N (recommended for medical applications- with alu. rear hinge)

Stroke

050	50 mm
100	100 mm
150	150 mm
200	200 mm
250	250 mm
300	300 mm
350	350 mm
400	400 mm
450	450 mm
500	500 mm
550	550 mm
600	600 mm
650	650 mm
700	700 mm
– – –	Other stroke lengths

Retracted length

– – –	MD22/24: S+465 mm
– – –	MD23/25: S+489 mm
XXX	Over 1 000 mm assembly length, use customer specific adaption
– – –	Others

Type of protection

A	IPX0
B	IPX4S

Motor cable

15	Straight, 1,5 m, DIN8 plug
0D	Straight, 1,5m, jack plug 180°

Rear attachment / Hole diameter

0	Standard 0° / Ø12 mm
4	Rotated 90° / Ø12 mm

Option 1

0	No option
L	Electrical anti-pinching protection, safety switch, motor direction push
K	Electrical anti-pinching protection, safety switch, motor direction pull

Option 2

0	No option
F	2-Hall encoder (only available with DIN8 plug) 2,15 impulse per turn/sensor (= 5,375 imp. per 1 mm)

Option 3

–	No option
V	Emergency lowering fork head bore (add 30 mm to retracted length "L")

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

CAHB series

Designed to operate in harsh environment with temperatures from –40 to 85 °C up to 25 % duty cycle, Ewellix electromechanical actuator CAHB family features robust metal gears and corrosion-resistant housings.

Available in 7 series - CAHB-20A/20E/21E/22E for medium and heavy load applications with an over load protection by clutch, CAHB-10, a compact solution for low-load applications and CAHB-30A/31N for AC version- Ewellix electromechanical actuators, are virtually maintenance-free, self-locking up to 2 times the rated load and rated up to IP69K/66M. Additional design options are available like limit switches, positioning feedback and manual over ride.

Features

- Long stroke and high speed
- High holding force up to 20 000 N
- Absolute or incremental Position feedback and limit switches option
- Low backlash
- Manual override option
- Overload and thermal protection
- Ingress protection IP69K/66M with vent
- Stainless steel push tube and Corrosion protected metal parts
- Wide temperature range (–40 to 85 °C)
- Mechanical, electrical and climatic tests
- High efficiency
- Virtually maintenance-free

See **pages 38** and **39** for test results.

Benefits

- High productivity and usability of the adjustment
- Reliability and safety
- Save development time and shorten the time to market
- Cost effectiveness
- Durable

CAHB-10

Linear actuator

Benefits

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

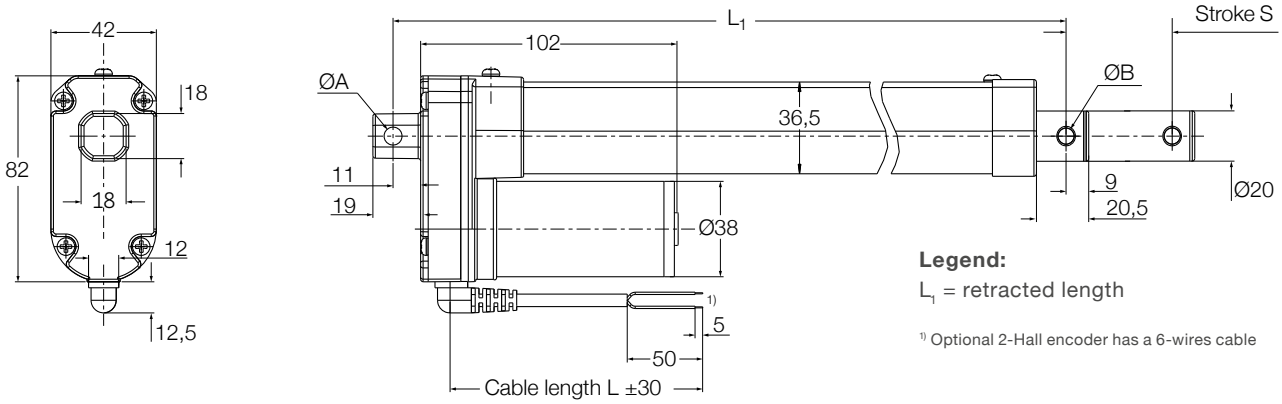
Technical data

Designation	Unit	CAHB–10... 1	CAHB–10... 2	CAHB–10... 3	CAHB–10... 4	CAHB–10... 5	CAHB–10... 6
Push load	N	120	240	500	750	1 000	1 500
Pull load	N	120	240	500	750	1 000	1 500
Speed (full load to no load)	mm/s	45 to 56	24 to 30	13 to 16	8 to 10	6 to 8	5 to 8
Stroke	mm	50 to 300	50 to 300	50 to 300	50 to 300	50 to 300	50 to 300
Retracted length	mm	– [1]	– [1]	– [1]	– [1]	– [1]	– [1]
Voltage	V DC	12 or 24	12 or 24	12 or 24	12 or 24	12 or 24	12 or 24
Power consumption	W	N/A	N/A	N/A	N/A	N/A	N/A
Current consumption 12 V DC	A	4	3,5	3,2	3	2,8	4,4
24V DC	A	2,2	2	1,8	1,8	1,6	2,8
Duty cycle	%	25	25	25	25	25	20
Ambient temperature	°C	–40 to +85	–40 to +85	–40 to +85	–40 to +85	–40 to +85	–40 to +85
Type of protection	IP	66s/69k	66s/69k	66s/69k	66s/69k	66s/69k	66s/69k
Weight (at 300 mm stroke)	kg	1,5	1,5	1,5	1,5	1,5	1,5
Color	–	Silver	Silver	Silver	Silver	Silver	Silver
Limit switches	–	Yes	Yes	Yes	Yes	Yes	Yes
Thermal protection	–	Yes	Yes	Yes	Yes	Yes	Yes

[1] For basic configuration see dimensional drawing (↳ **page 89**)
For potentiometer configuration see dimensional drawing (↳ **page 91**)

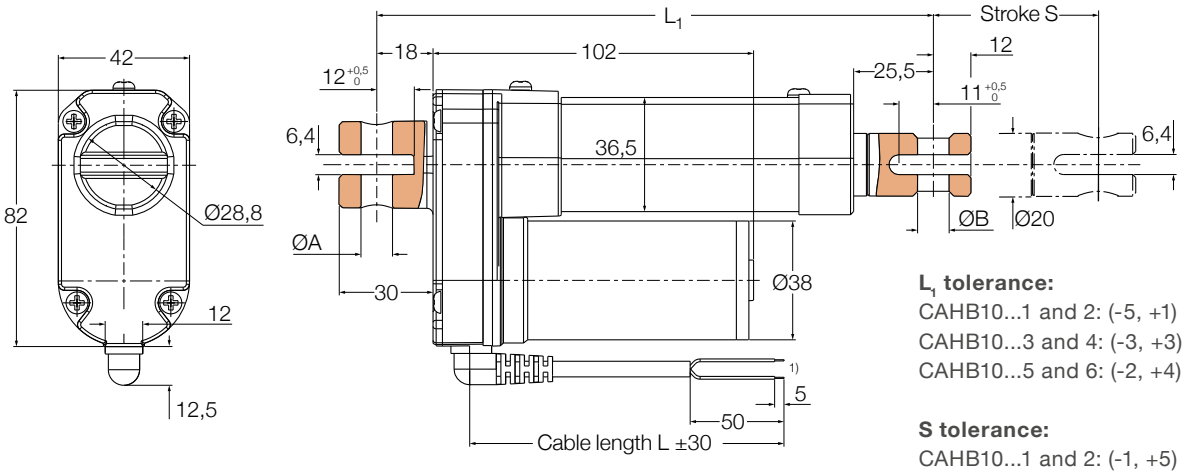
Dimensional drawing

Basic configuration and optional 2-Hall encoder



Legend:
L_1 = retracted length

[1] Optional 2-Hall encoder has a 6-wires cable



L_1 tolerance:
CAHB10...1 and 2: (-5, +1)
CAHB10...3 and 4: (-3, +3)
CAHB10...5 and 6: (-2, +4)

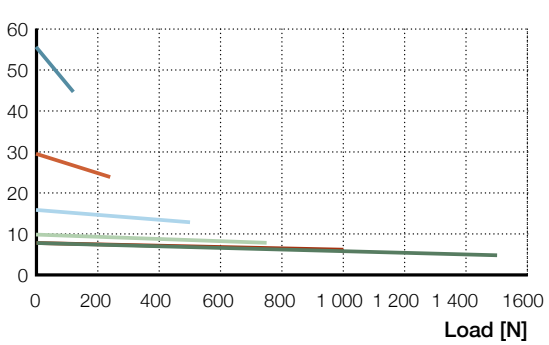
S tolerance:
CAHB10...1 and 2: (-1, +5)
CAHB10...3 and 4: (-3, +3)
CAHB10...5 and 6: (-4, +2)

Stroke [mm]	50	100	150	200	250	300
Retracted length (L_1)	158	209	260	311	362	413
Retracted length with fork head	179	230	281	332	383	434

Performance diagrams

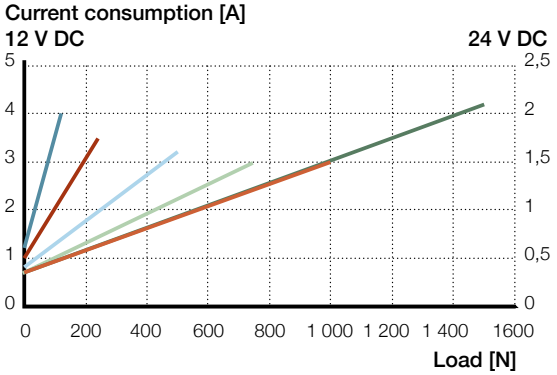
Speed-load diagram

Speed [mm/s]



Current-load diagram

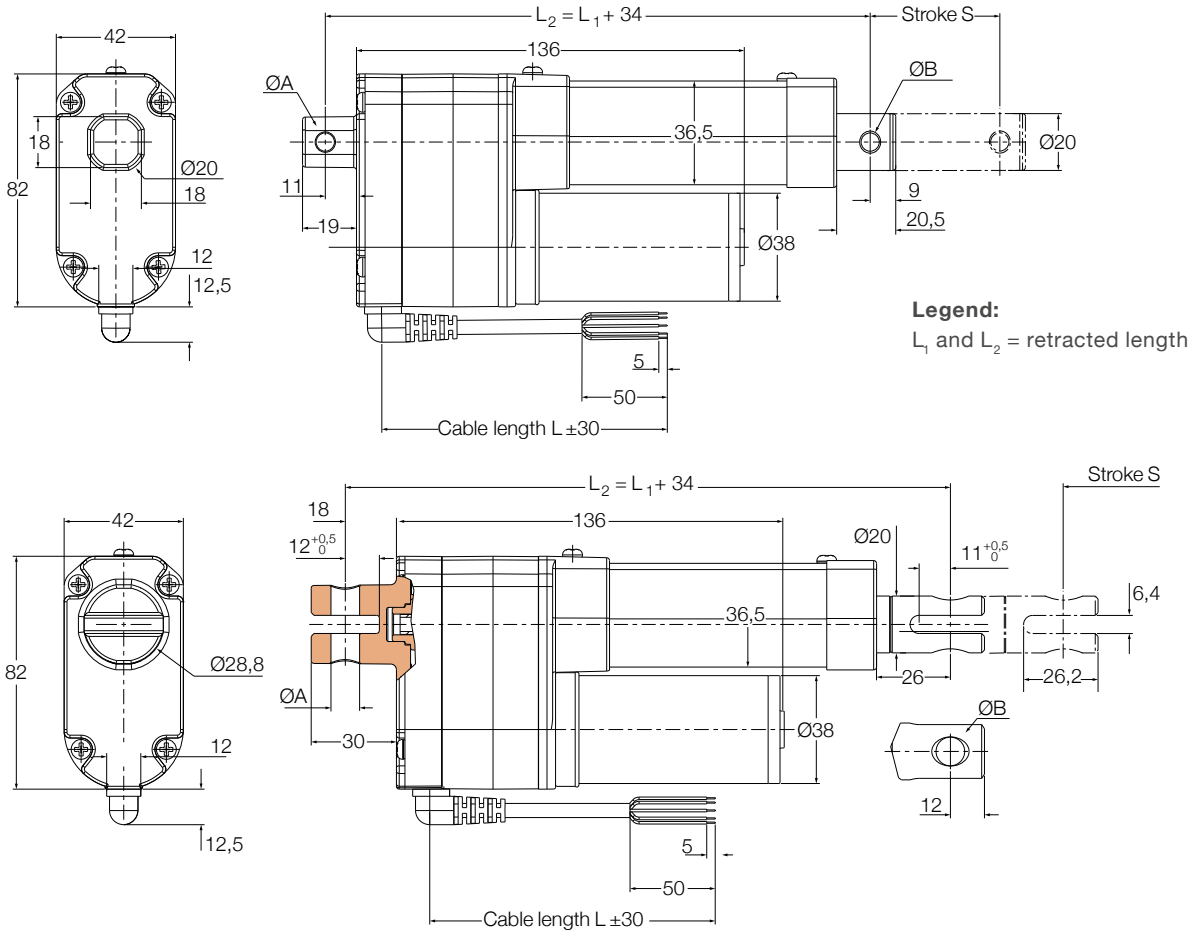
Current consumption [A]



CAHB-10...1
CAHB-10...2
CAHB-10...3
CAHB-10...4
CAHB-10...5
CAHB-10...6

Dimensional drawing

Optional potentiometer

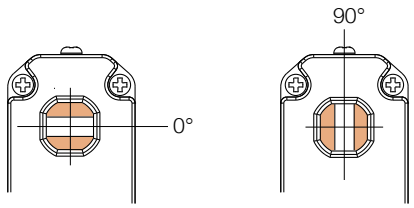


L_1 tolerance:
CAHB10...1 and 2: (-5, +1)
CAHB10...3 and 4: (-3, +3)
CAHB10...5 and 6: (-2, +4)

S tolerance:
CAHB10...1 and 2: (-1, +5)
CAHB10...3 and 4: (-3, +3)
CAHB10...5 and 6: (-4, +2)

Stroke (mm)	50	100	150	200	250	300
Retracted length (L_2)	192	243	294	345	396	447
Retracted length with fork head	213	264	315	366	417	468

Attachment



Encoder resolution

Type	CAHB-10...1	CAHB-10...2	CAHB-10...3	v CAHB-10...4	CAHB-10...5/6
mm/pulse	0,3	0,15	0,075	0,05	0,0375

Potentiometer resolution

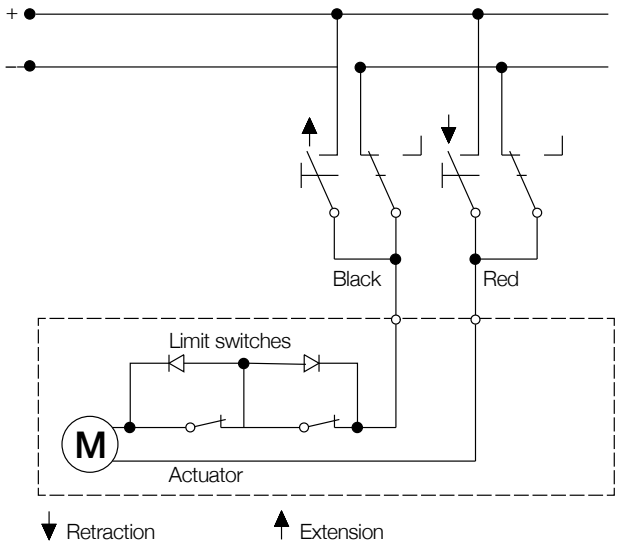
Stroke [mm]	50~80	80~160	160~300
Minimum resistence value of potentiometer	700~1 300 Ω	700~1 300 Ω	700~1 300 Ω
Potentiometer resolution	100 Ω/mm	50 Ω/mm	16,6 Ω/mm

Absolute analog output

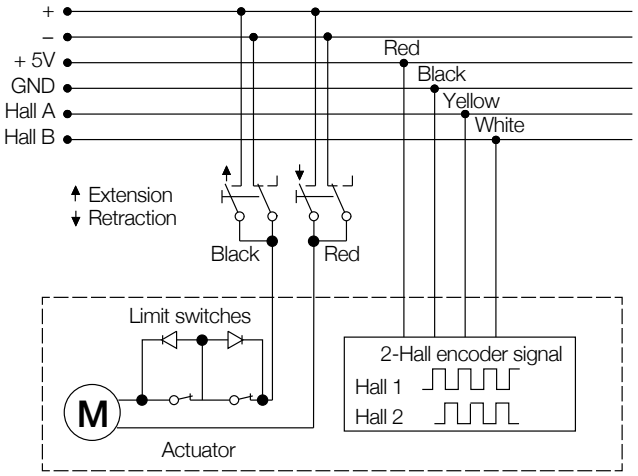
Stroke [mm]	50~80	80~160	160~300
Initial value VS RL position (V)	0,5	0,5	0,5
Resolution (mm)	0,024	0,049	0,146
Position feedback change (V/mm)	0,05	0,025	0,0083

Connecting diagram

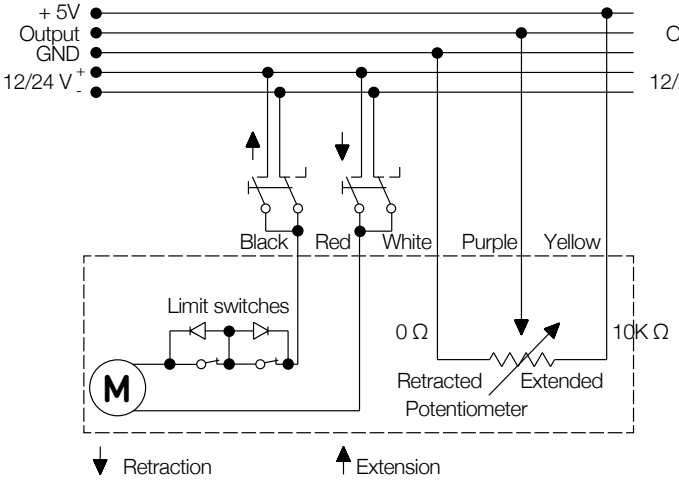
Basic configuration
12/24 V DC



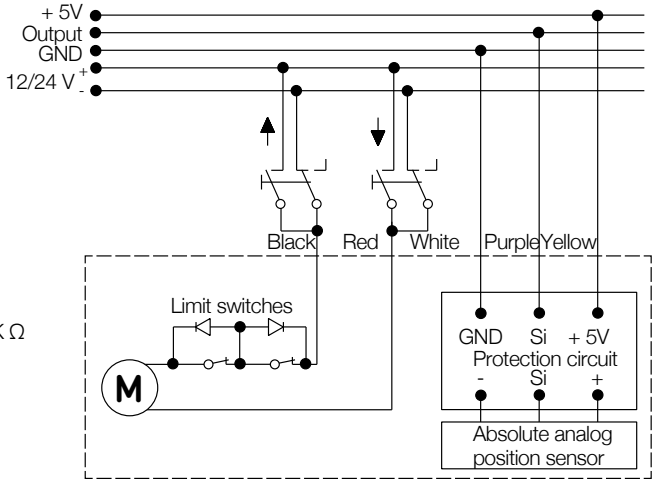
2-Hall encoder
12/24 V DC



Potentiometer



Absolute analog output



Ordering key

Type

Voltage
A 12 V DC
B 24 V DC

Load
1 120 N
2 240 N
3 500 N
4 750 N
5 1 000 N
6 1 500 N

Screw
A TR12 screw
X Customized

Stroke
050 50 mm
100 100 mm
150 150 mm
200 200 mm
250 250 mm
300 300 mm

Retracted length [1]

Stroke without potentiometer: [2]	A(B)+A(B)	A(B)+C	C+A(B)	C+C
50 mm	158	165	172	179
100 mm	209	216	223	230
150 mm	260	267	274	281
200 mm	311	318	325	332
250 mm	362	369	376	383
300 mm	413	420	427	434

IP
A Standard (IP 66s/69k)

Front attachment
A Rod with hole Ø6,4 mm
B Rod with hole Ø8 mm
C Fork head with hole Ø10,1 mm
X Customized

Rear attachment
A Rod with hole Ø6,4 mm
B Rod with hole Ø8 mm
C Fork head with hole Ø10,1 mm
X Customized

Hole direction of the attachments
A 0°
B 90°

Option 1: Position output
0 None
A Absolute analog output
P Potentiometer
H 2-Hall encoder

Cable lenght
A 600 mm without connector
B 1 000 mm without connector
C 1 500 mm without connector
D 2 000 mm without connector
E 2 500 mm without connector
F 3 000 mm without connector

Customized
X

[1] Retracted lenght will be englared 34 mm with Potentiometer or Absolute analog position option
[2] Front attachment + Rear attachment; A, B, C mean the attachment types

CAHB-20A

Linear actuator

Benefits

- ACME screw drive
- Extension tube (stainless steel)
- Protection tube (steel)
- Enhanced corrosion resistance
- Mechanical overload protection (clutch)
- Lubricated for service life
- Robust, designed for tough environment
- Self-locking
- Certified (CE: EN 55011)

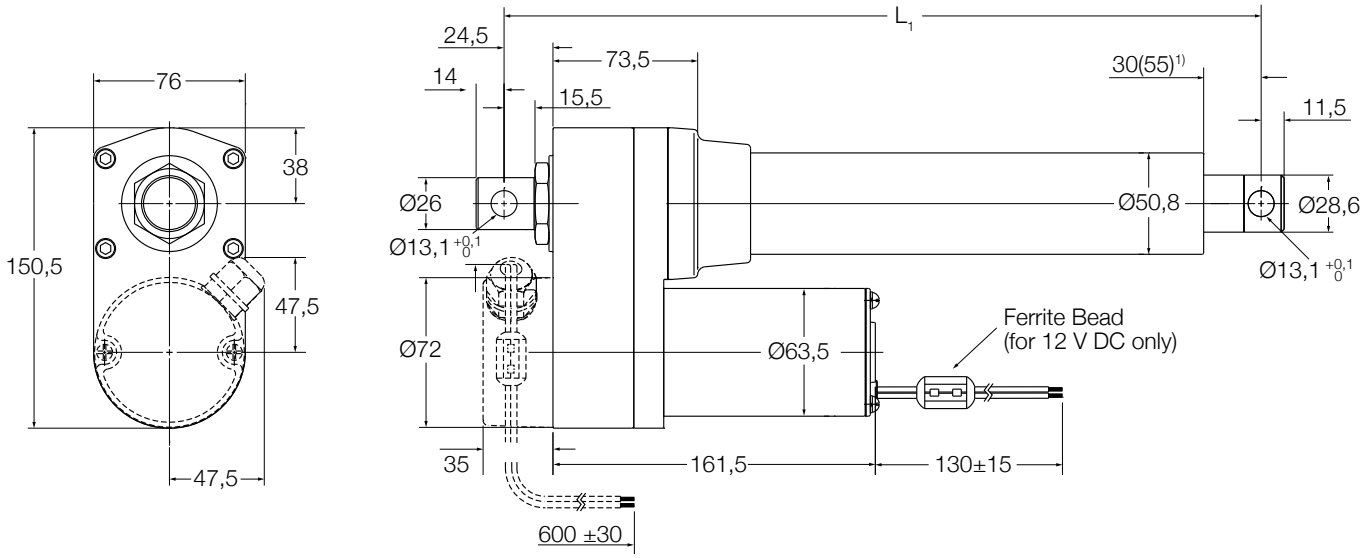
Technical data

Designation	Unit	CAHB-20... 1	CAHB-20... 2
Performance data			
Push load	N	1 500	2 500
Pull load	N	1 500	2 500
Speed (full load to no load)	mm/s	27 to 33	13 to 17
Stroke	mm	102 to 610	102 to 610
Retracted length mm –[1] –[1]	mm	–[1]	–[1]
Voltage	V DC	12 or 24	12 or 24
Power consumption	W	N/A	N/A
Current consumption 12 V DC	A	16	14
24 V DC	A	8	7
Duty cycle	%	25	25
Ambient temperature	°C	–40 to +85	–40 to +85
Type of protection	IP	66	66
Weight (at 305 mm stroke)	kg	5,5	5,5
Color	–	Black	Black

[1] See dimensional drawing (↳ **page 95** and **96**)

Dimensional drawing

Basic configuration (dashed line for optional limit switch)



Without limit swicth:
RED (+) & BLACK (–) = retraction
RED (–) & BLACK (+) = extension

With limit switch:
RED (+) & BLACK (–) = extension
RED (–) & BLACK (+) = retraction

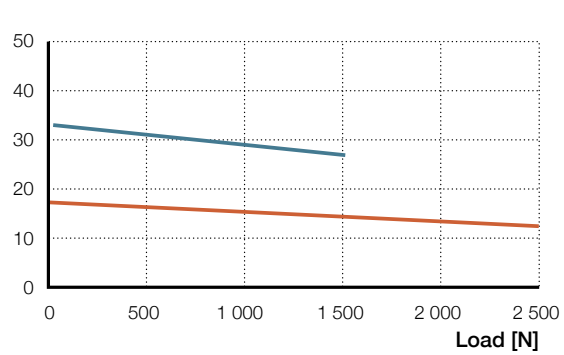
Legend:
L_1 = retracted length
1) 55 = dimension with limit switch

	With limit switch 1)						Without limit switch 2)					
Stroke [mm]	102	153	204	305	457	610	102	153	204	305	457	610
L_1 Retracted length	338	389	440	592	744	897	262	313	364	465	668	821

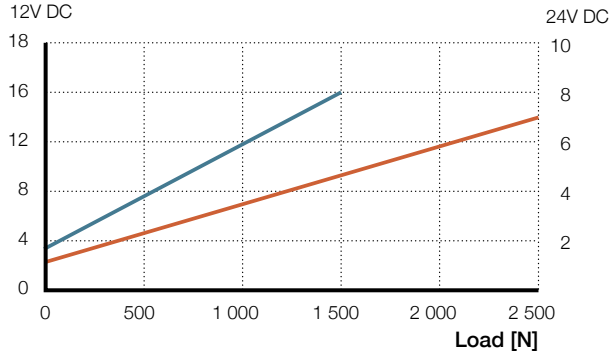
1) Tolerance: S and L1 = ± 5,0 mm (If S ≥ 305 mm, S = ± 7,5 mm)
2) Tolerance: S = ± 2,5 mm and L = ±3,8 mm

Performance diagrams

Speed-load diagram



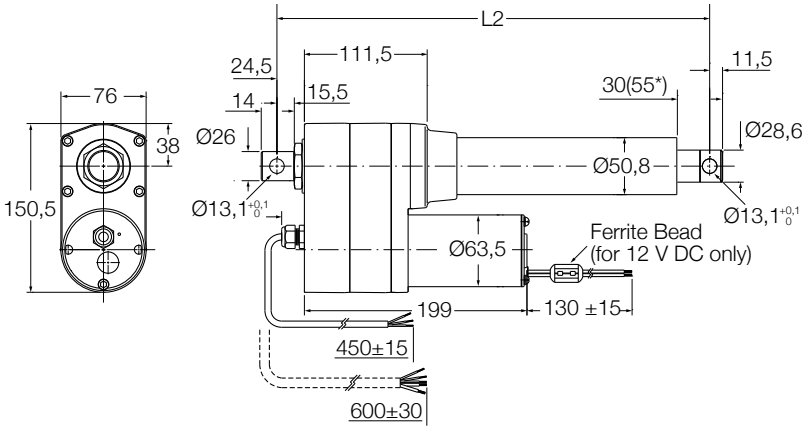
Current-load diagram

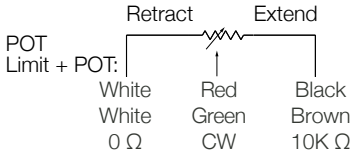


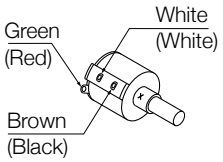
CAHB-20...1 CAHB-20...2

Dimensional drawing

Optional potentiometer (dashed line for optional limit switch)







Without limit swicth:
RED (+) & BLACK (–) = retraction
RED (–) & BLACK (+) = extension

With limit switch:
RED (+) & BLACK (–) = extension
RED (–) & BLACK (+) = retraction

Legend:
L2 = retracted length
[1] 55 = dimension with limit switch

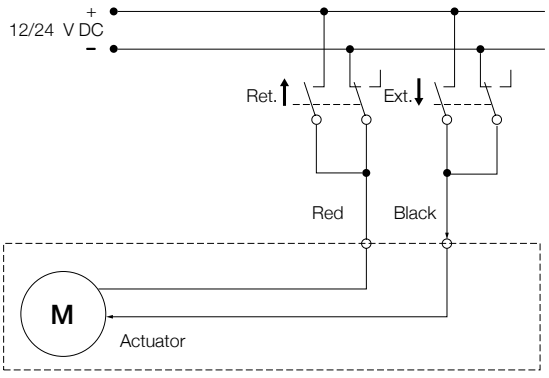
	With limit switch [1]						Without limit switch [2]					
Stroke [mm]	102	153	204	305	457	610	102	153	204	305	457	610
L_1 Retracted length	376	427	478	630	782	935	300	351	402	503	706	859

[1] Tolerance: S and L1 = ± 5,0 mm (If S ≥ 305 mm, S = ± 7,5 mm)
[2] Tolerance: S = ± 2,5 mm and L2 = ± 3,8 mm

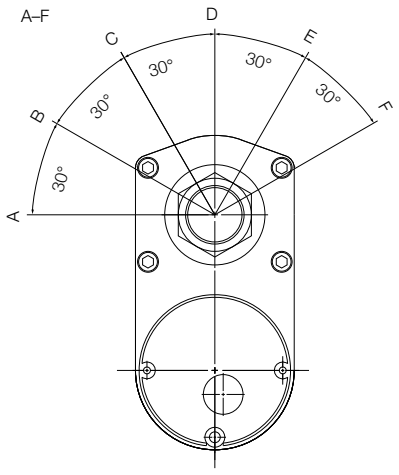
Potentiometer resolution

Stroke [mm]	102	153	204	305	457	610
Ohm/mm	59,0	59,0	29,5	29,5	9,84	9,84

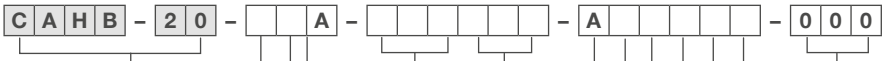
Connecting diagram



Different rear attachment



Ordering key



Type

Voltage

A	12 V DC
B	24 V DC

Load

1	1 500 N
2	2 500 N

Design

Stroke

102	102 mm
153	153 mm
204	204 mm
305	305 mm
457	457 mm
610	610 mm

Retracted length

Stroke	with limit switch	without POT	with POT
102 mm		338	376
153 mm		389	427
204 mm		440	478
305 mm		592	630
457 mm		744	782
610 mm		897	935
	without limit switch		
102 mm		262	300
153 mm		313	351
204 mm		364	402
305 mm		465	503
457 mm		668	706
610 mm		821	859

Ingress protection

A	Standard: IP66

Front attachment

A	Standard (Standard (hole: Ø13,1 mm)
X	Customized

Rear attachment

A	Standard (0° and hole: Ø13,1 mm)
B	30°
C	60°
D	90°
E	120°
F	150°
X	Customized

Option 1

0	None
L	Limit switch (only for load version 2 500 N)

Option 2

0	None
P	Potentiometer

Option 3

0	None
T	Thermal protection

Customization

In standard, the actuators are IP69K / IP66M and equipped with GORE Automotive vent, built-in thermal protection, protection Clutch and EMC filter.

CAHB-20E

Linear actuator

Benefits

- High productivity
- Reliability and safety
- Save development time
- Cost effectiveness

Features

- Holding force
- Mechanical overload protection
- Enhanced ingress protection
- Corrosion protection and stainless steel tube
- Manual override option
- Virtuality maintenance free

Technical data

Designation	Unit	CAHB-20E / 12 V			CAHB-20E / 24 V		
Performance data							
Rated Push Force	N	1 500	2 500	4 500	1 500	2 500	4 500
Rated Pull Force	N	1 500	2 500	4 500	1 500	2 500	4 500
Max pull / push Force [1]	N	2 600	3 800	6 300	2 600	3 800	6 300
Holding force [2]	N						
Speed without load [3]	mm/s	27,0	23,5	13,5	29,0	22,0	13,0
Speed with the rated force [3]	mm/s	24,5	17,5	10,5	25,5	19,0	11,0
Electric data							
Nominal voltage	V DC	12	12	12	24	24	24
Nominal current @ rated load [3]	A	12,5	15	17	5	6,5	8
Rated current (clutch activation)	A	18,4	21	22,4	6,8	8,8	10,4
Duty cycle	%	10 (85/765 s)	10 (85/765 s)	10 (85/765 s)	20 (85/340 s)	20 (85/340 s)	20 (85/340 s)
Mechanical data							
Stroke	mm	50 … 700	50 … 700	50 … 700	50 … 700	50 … 700	50 … 700
Backlash	mm	0,6	0,6	0,6	0,6	0,6	0,6
Weight for 200 mm stroke	kg	4,5	4,5	4,5	4,5	4,5	4,5
Colour	–	Black	Black	Black	Black	Black	Black
Environment and standards							
Ambient temperature [4]	°C	–40 … 85	–40 … 85	–40 … 85	–40 … 85	–40 … 85	–40 … 85
Degree of protection	–	IP 69K/66M					
Standards / EMC	–	EN61000-6-2:2005, EN61000-6-4:2007/A1:2011					
Salt spray test	–	ISO 9227:2012, 250 hours					

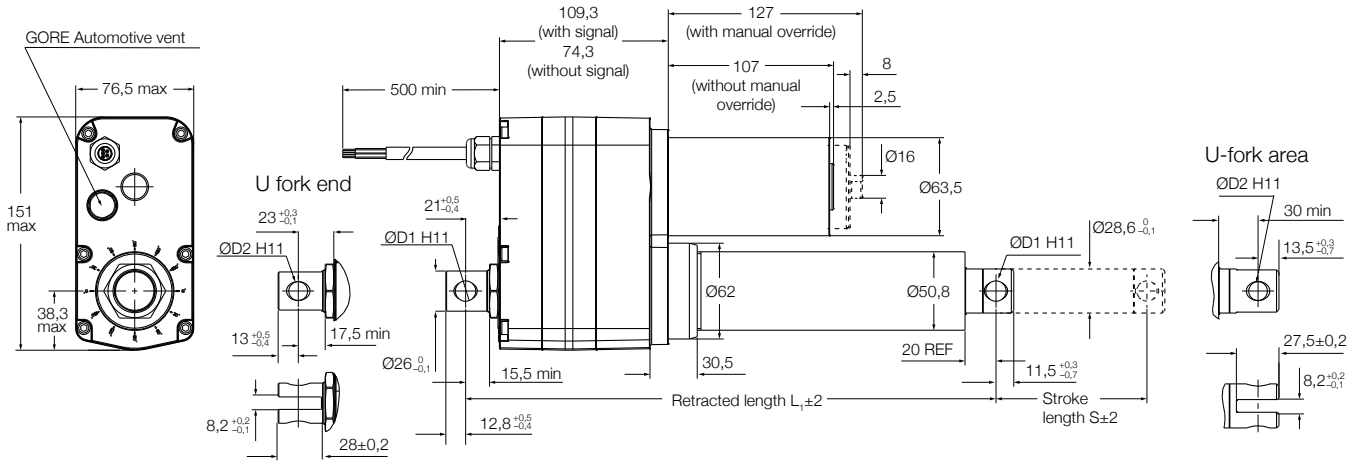
[1] Upper limit of the pull/push force limited by the clutch. The lower limit is just above the rated force. The limitation of the force will happen between these 2 limits

[2] Ultimate Static Load, refer to the “Static load” diagrams

[3] The data of speed and current on this list is defined at +20 °C

[4] Full performance from 0 °C to +40 °C

Dimensional drawing



	Rod end attachment (D1)					U fork attachment (D2)	
Holes symbol	A	B	C	D	E	F	G
Hole dimension	13,1	12,8	12,5	14	12,2	12,2	12,8

	Rod end attachment		U fork attachment	
S Stroke [mm]	50-305	306-700	50-305	306-700
L_1 retracted length no option	160 + stroke	211 + stroke	172 + stroke	223 + stroke
L_1 retracted length with signal	195 + stroke	246 + stroke	207 + stroke	258 + stroke

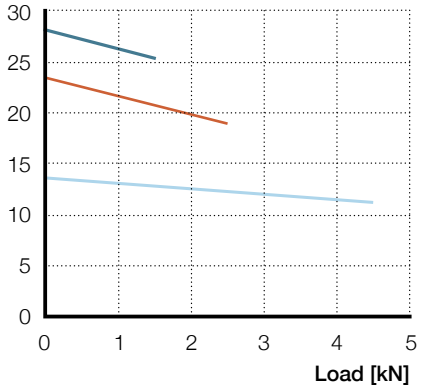
Technical data

Designation	Unit	CAHB-20E / 48 V		
Performance data				
Rated Push Force	N	1 500	2 500	4 500
Rated Pull Force	N	1 500	2 500	4 500
Max pull / push Force [1]	N	2 600	3 800	6 300
Holding force [2]	N			
Speed without load [3]	mm/s	31,0	23,0	13,0
Speed with the rated force [3]	mm/s	27,5	20,0	11,0
Electric data				
Nominal voltage	V DC	48	48	48
Nominal current @ rated load [3]	A	2,6	3,8	4,2
Rated current (clutch activation)	A	4,3	5,6	5,8
Duty cycle	%	20 (85/340 s)	20 (85/340 s)	20 (85/340 s)
Mechanical data				
Stroke	mm	50 ... 700	50 ... 700	50 ... 700
Backlash	mm	0,6	0,6	0,6
Weight for 200 mm stroke	kg	4,5	4,5	4,5
Colour	–	Black	Black	Black
Environment and standards				
Ambient temperature [4]	°C	–40 … 85	–40 … 85	–40 … 85
Degree of protection	–	IP 69K/66M		
Standards / EMC	–	EN61000-6-2:2005, EN61000-6-4:2007/A1:2001		
Salt spray test	–	ISO 9227:2012, 250 hours		

[1] Upper limit of the pull/push force limited by the clutch. The lower limit is just above the rated force. The limitation of the force will happen between these 2 limits
[2] Ultimate Static Load, refer to the “Static load” diagrams
[3] The data of speed and current on this list is defined at +20 °C
[4] Full performance from 0 °C to +40 °C

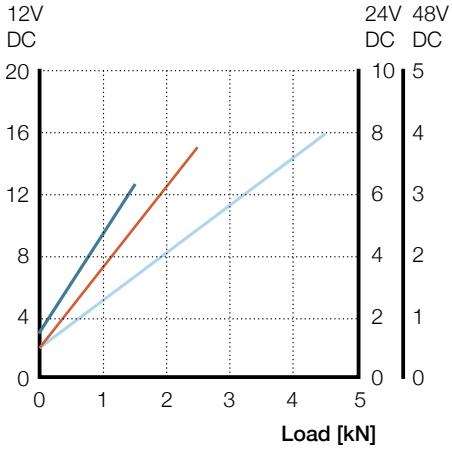
Performance diagrams

Speed-load diagram

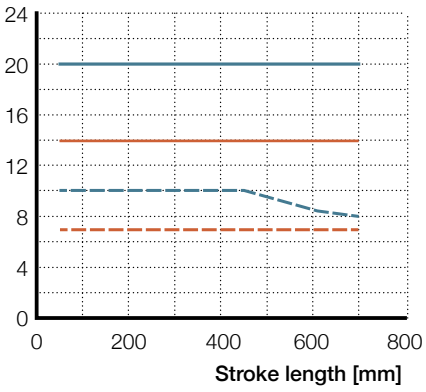


- Rated push force 1 500
- Rated push force 2 500
- Rated push force 4 500

Current load diagram



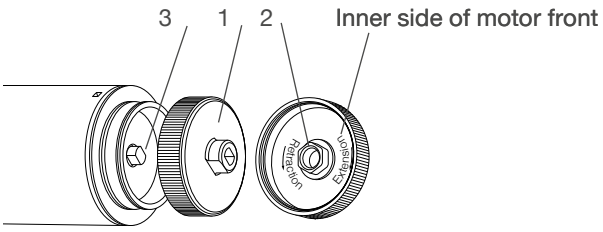
Static load diagram



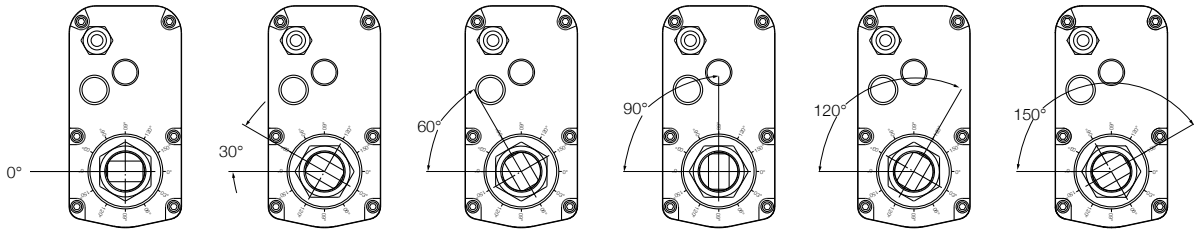
- Ultimate CAHB-20-xxE (pull)
- Ultimate CAHB-20-xxE (push)
- Recommended CAHB 20-xxE (pull)
- Recommended CAHB 20-xxE (push)

Manual override

Release the motor cover (**1**). Use the slot (**2**) to rotate the motor shaft (**3**) in the proper direction



Attachment



Electrical specifications

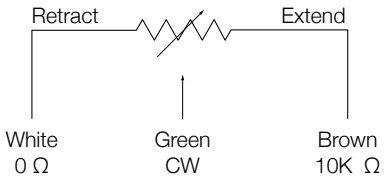
Wire connection with no signal

Wire no.	AWG	Colour	Application
1	14	Red	Motor power(+)=> Extension, (–)=> Retraction
2	14	Black	Motor power(–)=> Extension, (+)=> Retraction

Wire connection with potentiometer

Wire no.	AWG	Colour	Application
1	22	Green	See picture description
2	22	White	See picture description
3	22	Brown	See picture description
4	14	Red	Motor power(+)=> Extension, (–)=> Retraction
5	14	Black	Motor power(–)=> Extension, (+)=> Retraction

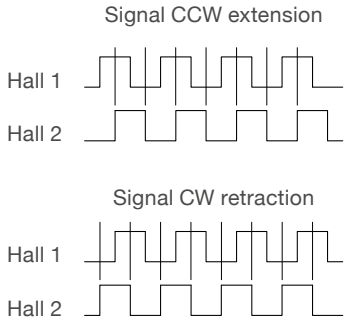
Potentiometer



Wire connection with encoder

Wire no.	AWG	Colour	Application	
1	26	Green	Sensor signal 1	Encoder
2	26	Yellow	Sensor signal 2	Encoder
3	26	Black	Sensor power GND	Encoder
4	26	Red	Sensor power 5 V	Encoder
5	14	Red	Motor power(+)=> Extension, (–)=> Retraction	
6	14	Black	Motor power(–)=> Extension, (+)=> Retraction	

Encoder

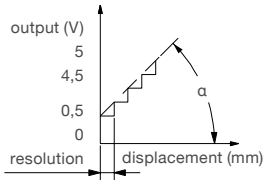


Wire connection with absolute analog output

Wire no.	AWG	Colour	Application
1	22	Green	Output signal
2	22	White	Sensor power GND
3	22	Brown	Sensor power +10~55 VDC
4	14	Red	Motor power(+)=> Extension, (–)=> Retraction
5	14	Black	Motor power(–)=> Extension, (+)=> Retraction

Absolut analog position output

Input voltage:	10~55 V DC
Current consumpion:	15 mA max.
Output analog signal (voltage):	0~5 V DC
Max current output:	5 mA
Absolute analog output set up:	
retraction 0,5±0,15 V	
extension 4,5 to the maximum	

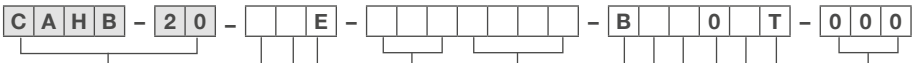


tan (α) = output relation to displacement (V/mm)

Output relation to displacement and resolution

Actuator type	Hall sensor [pulses/mm]	Potentiometer [ohm/mm]	Absolute analogue position output [V/mm]	Resolution of the absolute analog position output [mm]
CAHB-20...E	2,76	59,06 if S=050-125	0,0295 if S=050-125	0,0413 if S=050-125
		29,53 if S=126-250	0,0148 if S=126-250	0,0827 if S=126-250
		9,84 if S=251-700	0,0049 if S=251-700	0,2480 if S=251-700

Ordering key



Type

Voltage

A	12 V DC
B	24 V DC
D	48 V DC
E	12 V DC with manual override
F	24 V DC with manual override
H	48 V DC with manual override

Load

1	1 500 N
2	2 500 N
3	4 500 N

Design

E

Stroke

100	100 mm
150	150 mm
200	200 mm
250	250 mm
300	300 mm
350	350 mm
400	400 mm
450	450 mm
500	500 mm
600	600 mm
700	700 mm

Retracted length[1)]

Stroke	without position output	with position output
100 mm	260	295
150 mm	310	345
200 mm	360	395
250 mm	410	445
300 mm	460	495
350 mm	561	596
400 mm	611	646
450 mm	661	696
500 mm	711	746
600 mm	811	846
700 mm	911	946

Ingress protection

B Standard: IP69K/IP66M

Attachment diameter: (Front and rear)

A	Hole Ø13,1 H11 (+0, +0,11 mm)
B	Hole Ø12,8 H11 (0, +0,11 mm)
C	Hole Ø12,5 H11 (+0, +0,11mm)
D	Hole Ø14 H11(+0,+0,11mm)
E	Hole 12.2 H11(+0,+0,11mm)
F	U fork hole 12.2 H11
G	U fork hole 12.8 H11
X	Customized

Attachment orientation

A	Standard (0°)
B	30°
C	60°
D	90°
E	120°
F	150°
X	Customized

Option 1: Limit switch

0 Not available

Option 2: Position output

0	None
A	Absolute analog output
P	Potentiometer
E	Encoder

Thermal protection

T Standard: Built-in thermal switch

Customization

Stroke length, retracted length, cable, connector, front attachment, rear attachment, color, de-rated load

[1)] Retracted length +12mm when attachments U fork are used.

In standard, the actuators are IP69K / IP66M and equipped with GORE Automotive vent, built-in thermal protection, protection Clutch and EMC filter.

CAHB-21E

Linear actuator

Benefits

- High productivity
- Reliability and safety
- Save development time
- Cost effectiveness

Features:

- High holding force
- High speed
- Mechanical overload protection
- Enhanced ingress protection
- Corrosion protection and stainless steel tube
- Manual override option
- Virtuality maintenance free

Technical data

Designation	Unit	CAHB-21E / 12 V			CAHB-21E / 24 V		
Performance data							
Rated Push Force	N	1 500	2 500	4 500	1 500	2 500	4 500
Rated Pull Force	N	1 500	2 500	4 500	1 500	2 500	4 500
Max pull / push Force [1]	N	2 500	3 600	6 300	2 500	3 600	6 300
Holding force [2]	N						
Speed without load [3]	mm/s	49,5	37	24,0	52,5	38	22,5
Speed with the rated force [3]	mm/s	43	31,5	19,0	50	31,5	21,0
Electric data							
Nominal voltage	V DC	12	12	12	24	24	24
Nominal current @ rated load [3]	A	14,5	16	19	7	7,5	10,5
Rated current (clutch activation)	A	19,2	20,2	24,8	9,1	9,3	13,7
Duty cycle	%	10 (85/765 s)	10 (85/765 s)	10 (85/765 s)	20 (85/340 s)	20 (85/340 s)	20 (85/340 s)
Mechanical data							
Stroke	mm	50 … 700	50 … 700	50 … 700	50 … 700	50 … 700	50 … 700
Backlash	mm	0,6	0,6	0,6	0,6	0,6	0,6
Weight for 200 mm stroke	kg	4,8	4,8	4,8	4,8	4,8	4,8
Colour	–	Black	Black	Black	Black	Black	Black
Environment and standards							
Ambient temperature [4]	°C	–40 … 85	–40 … 85	–40 … 85	–40 … 85	–40 … 85	–40 … 85
Degree of protection	–	IP 69K/66M					
Standards / EMC	–	EN61000-6-2:2005, EN61000-6-4:2007/A1:2011					
Salt spray test	–	ISO 9227:2012, 250 hours					

[1] Upper limit of the pull/push force limited by the clutch. The lower limit is just above the rated force. The limitation of the force will happen between these 2 limits
[2] Ultimate Static Load, refer to the “Static load” diagrams
[3] The data of speed and current on this list is defined at +20 °C
[4] Full performance from 0 °C to +40 °C

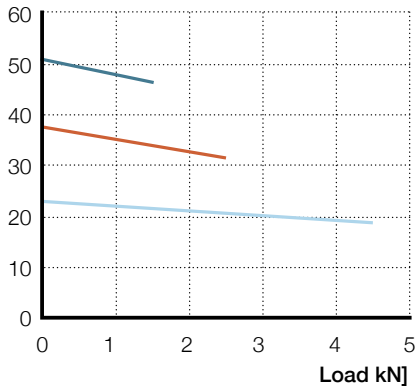
Technical data

Designation	Unit	CAHB-21E / 48 V		
Performance data				
Rated Push Force	N	1 500	2 500	4 500
Rated Pull Force	N	1 500	2 500	4 500
Max pull / push Force [1]	N	2 500	3 600	6 300
Holding force [2]	N			
Speed without load [3]	mm/s	51,5	41,0	23,5
Speed with the rated force [3]	mm/s	46,0	33,5	19,0
Electric data				
Nominal voltage	V DC	48	48	48
Nominal current @ rated load [3]	A	4,0	4,5	5,0
Rated current (clutch activation)	A	5,6	6,1	6,4
Duty cycle	%	20 (85/340 s)	20 (85/340 s)	20 (85/340 s)
Mechanical data				
Stroke	mm	50 ... 700	50 ... 700	50 ... 700
Backlash	mm	0,6	0,6	0,6
Weight for 200 mm stroke	kg	4,8	4,8	4,8
Colour	–	Black	Black	Black
Environment and standards				
Ambient temperature [4]	°C	–40 … 85	–40 … 85	–40 … 85
Degree of protection	–	IP 69K/66M		
Standards / EMC	–	EN61000-6-2:2005, EN61000-6-4:2007/A1:2011		
Salt spray test	–	ISO 9227:2012, 250 hours		

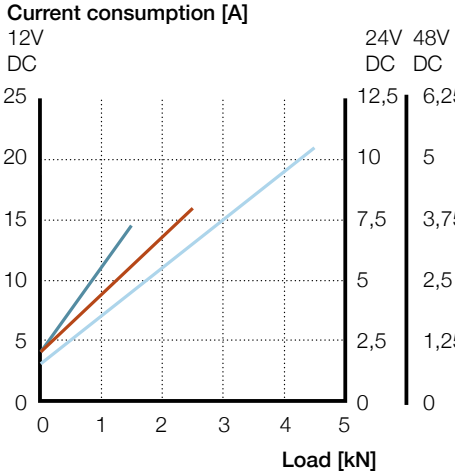
[1] Upper limit of the pull/push force limited by the clutch. The lower limit is just above the rated force. The limitation of the force will happen between these 2 limits
[2] Ultimate Static Load, refer to the “Static load” diagrams
[3] The data of speed and current on this list is defined at +20 °C
[4] Full performance from 0 °C to +40 °C

Performance diagrams

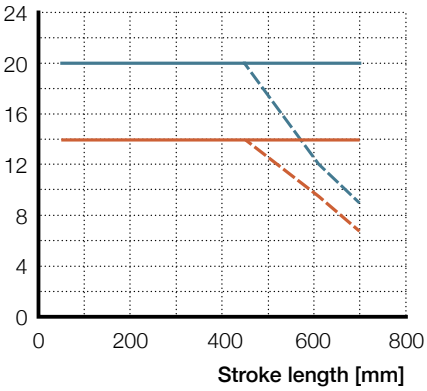
Speed-load diagram



Current load diagram



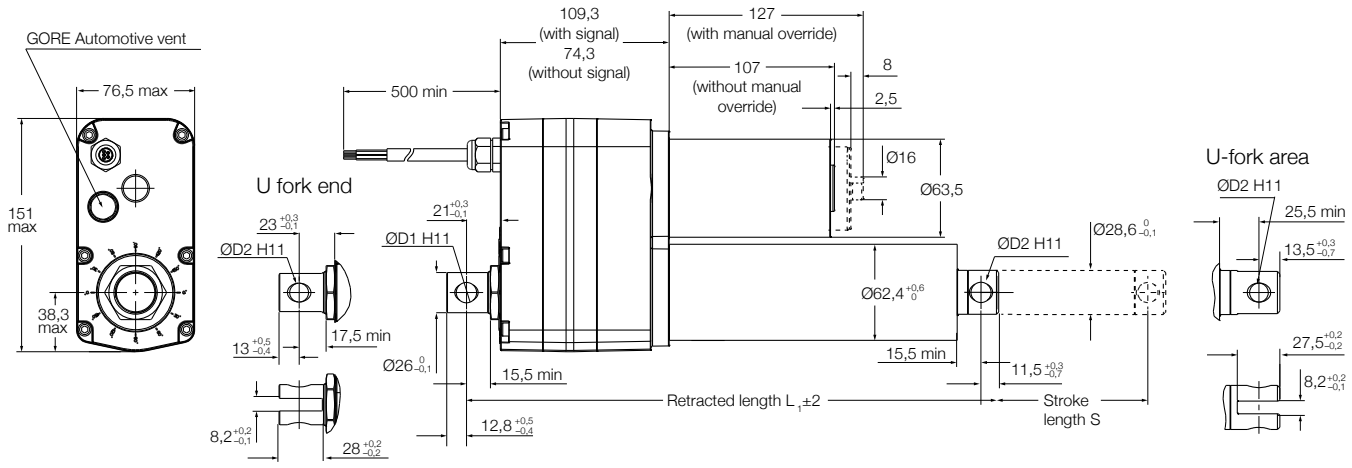
Static load diagram



- Rated push force 1 500
- Rated push force 2 500
- Rated push force 4 500

- Ultimate CAHB-21-xxE (pull)
- Ultimate CAHB-21-xxE (push)
- Recommended CAHB 21-xxE (pull)
- Recommended CAHB 21-xxE (push)

Dimensional drawing



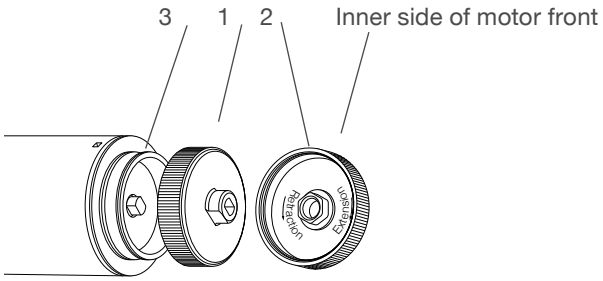
	Rod end attachment (D1)					U fork attachment (D2)	
Holes symbol	A	B	C	D	E	F	G
Hole dimension	13,1	12,8	12,5	14	12,2	12,2	12,8

	Rod end attachment		U fork attachment	
S Stroke [mm]	50-305	306-700	50-305	306-700
L_1 retracted length no option	182 + stroke	217 + stroke	194 + stroke	229 + stroke
L_1 retracted length with LS	191 + stroke	226 + stroke	203 + stroke	238 + stroke
L_1 retracted length with signal	217 + stroke	252 + stroke	229 + stroke	264 + stroke
L_1 retracted length sith LS and signal	226 + stroke	261 + stroke	238 + stroke	273 + stroke

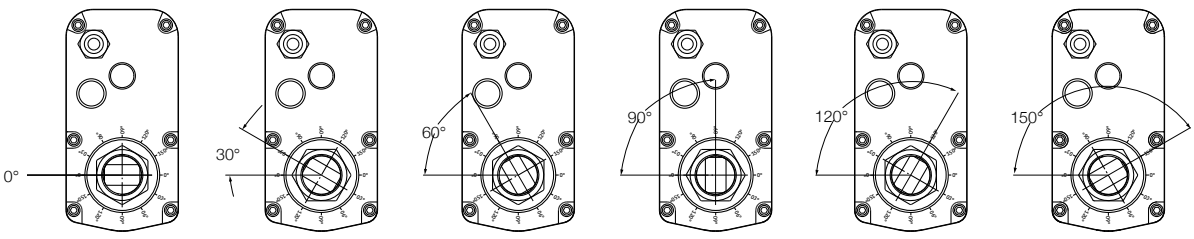
Tolerance of stroke "S"
Without LS: if S ≤ 305 (±2); if S > 305 (±3)
With LS: if S ≤ 3 05 (-2, -0,5); if S > 305 (-3, -1)

Manual override

Release the motor cover (**1**). Use the slot (**2**) to rotate the motor shaft (**3**) in the proper direction



Attachment



Electrical specifications

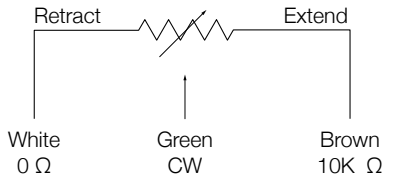
Wire connection with no signal

Wire no.	AWG	Colour	Application
1	14	Red	Motor power(+)=> Extension, (–)=> Retraction
2	14	Black	Motor power(–)=> Extension, (+)=> Retraction

Wire connection with potentiometer

Wire no.	AWG	Colour	Application
1	22	Green	See picture description
2	22	White	See picture description
3	22	Brown	See picture description
4	14	Red	Motor power(+)=> Extension, (–)=> Retraction
5	14	Black	Motor power(–)=> Extension, (+)=> Retraction

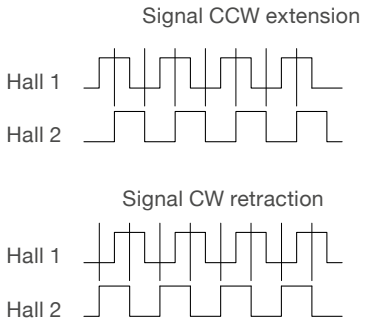
Potentiometer



Wire connection with encoder

Wire no.	AWG	Colour	Application	
1	26	Green	Sensor signal 1	Encoder
2	26	Yellow	Sensor signal 2	Encoder
3	26	Black	Sensor power GND	Encoder
4	26	Red	Sensor power 5 V	Encoder
5	14	Red	Motor power(+)=> Extension, (–)=> Retraction	
6	14	Black	Motor power(–)=> Extension, (+)=> Retraction	

Encoder

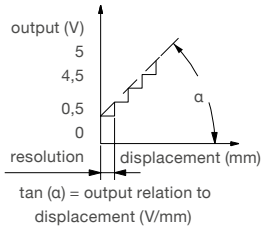


Wire connection with absolute analog output

Wire no.	AWG	Colour	Application
1	22	Green	Output signal
2	22	White	Sensor power GND
3	22	Brown	Sensor power +10~55 VDC
4	14	Red	Motor power(+)=> Extension, (–)=> Retraction
5	14	Black	Motor power(–)=> Extension, (+)=> Retraction

Absolut analog position output

Input voltage:	10~55 V DC
Current consumpion:	15 mA max.
Output analog signal (voltage):	0~5 V DC
Max current output:	5 mA
Absolute analog output set up:	
retraction 0,5±0,15 V	
extension 4,5 to the maximum	



Output relation to displacement and resolution

Actuator type	Hall sensor [pulses/mm]	Potentiometer [ohm/mm]	Absolute analogue position output [V/mm]	Resolution of the absolute analog position output [mm]
CAHB-21...E	1,56	33,33 if S=050-222	0,0167 if S=050-222	0,0732 if S=050-222
		16,67 if S=223-444	0,0083 if S=223-444	0,1465 if S=223-444
		5,56 if S=445-700	0,0028 if S=445-700	0,4395 if S=445-700

EWELLIX

Ordering key

CAHB – 21 – [ ][ ]E – [ ][ ][ ][ ][ ][ ] – B[ ][ ][ ][ ]T – 000

Type

Voltage

A	12 V DC
B	24 V DC
D	48 V DC
E	12 V DC with manual override
F	24 V DC with manual override
H	48 V DC with manual override

Load

1	1 500 N
2	2 500 N
3	4 500 N

Design

E

Stroke

100	100 mm
150	150 mm
200	200 mm
250	250 mm
300	300 mm
350	350 mm
400	400 mm
450	450 mm
500	500 mm
600	600 mm
700	700 mm

Retracted length[1)]

Stroke	with limith switch	without position output	with position output
100 mm		291	326
150 mm		341	376
200 mm		391	426
250 mm		441	476
300 mm		491	526
350 mm		576	611
400 mm		626	661
450 mm		676	711
500 mm		726	761
600 mm		826	861
700 mm		926	961
	without limith switch		
100 mm		282	317
150 mm		332	367
200 mm		382	417
250 mm		432	467
300 mm		482	517
350 mm		567	602
400 mm		617	652
450 mm		667	702
500 mm		717	752
600 mm		817	852
700 mm		917	952

Ingress protection

B	Standard: IP69K/IP66M

Attachment diameter: (Front and rear)

A	Hole Ø13,1 H11 (+0, +0,11 mm)
B	Hole Ø12,8 H11 (0, +0,11 mm)
C	Hole Ø12,5 H11 (+0, +0,11mm)
D	Hole Ø14 H11(+0,+0,11mm)
E	Hole 12.2 H11(+0,+0,11mm)
F	U fork hole 12,2 H11
G	U fork hole 12,8 H11
X	Customized

Attachment orientation

A	Standard (0°)
B	30°
C	60°
D	90°
E	120°
F	150°
X	Customized

Option 1: Limit switch

0	None (mandatory for 1 500 N, 2 500 N version)
L	Limit switch (valid only for load version 4 500 N)

Option 2: Position output

0	None
A	Absolute analog output
P	Potentiometer
E	Encoder

Thermal protection

T	Standard: Built-in thermal switch

Customization

Stroke length, retracted length, cable, connector, front attachment, rear attachment, color, de-rated load

[1)] Retracted length +12mm when attachments U fork are used.

In standard, the actuators are IP69K / IP66M and equipped with GORE Automotive vent, built-in thermal protection, protection Clutch and EMC filter.

CAHB-22E

Linear actuator

Benefits

- High productivity
- Reliability and safety
- Save development time
- Cost effectiveness

Features

- High force
- High speed
- High holding force
- Mechanical overload protection
- Enhanced ingress protection
- Corrosion protection and stainless steel tube
- Manual override option
- Virtuality maintenance free

Technical data

Designation	Unit	CAHB-22E / 12 V				CAHB-22E / 24 V			
Performance data									
Rated Push Force	N	2 300	3 500	6 800	10 000	2 300	3 500	6 800	10 000
Rated Pull Force	N	2 300	3 500	6 800	10 000	2 300	3 500	6 800	10 000
Max pull / push Force [1]	N	3 500	4 900	9 500	14 000	3 500	4 900	9 500	14 000
Holding force [2]	N								
Speed without load [3]	mm/s	55,0	45,0	22,0	13,0	53,0	45,0	22,0	13,0
Speed with the rated force [3]	mm/s	42,0	36,0	15,5	10,2	42,0	37,0	17,0	10,2
Electric data									
Nominal voltage	V DC	12	12	12	12	24	24	24	24
Nominal current @ rated load [3]	A	18	19,5	19,5	19	8	9,5	9,5	8,5
Rated current (clutch activation)	A	24,3	25,5	25,5	25	10,6	12,3	12,3	10,9
Duty cycle	%	10 (85/765 s)	10 (85/765 s)	10 (85/765 s)	10 (85/765 s)	20 (85/340 s)	20 (85/340 s)	20 (85/340 s)	20 (85/340 s)
Mechanical data									
Stroke	mm	50 … 700	50 … 700	50 … 610	50 … 450	50 … 700	50 … 700	50 … 610	50 … 450
Backlash	mm	1,0	1,0	0,6	0,6	1,0	1,0	0,6	0,6
Weight for 200 mm stroke	kg	4,8	4,8	4,8	4,8	4,8	4,8	4,8	4,8
Colour	–	Black	Black	Black	Black	Black	Black	Black	Black
Environment and standards									
Ambient temperature [4]	°C	–40 … 85	–40 … 85	–40 … 85	–40 … 85	–40 … 85	–40 … 85	–40 … 85	–40 … 85
Degree of protection	–	IP 69K/66M							
Standards / EMC	–	EN61000-6-2:2005, EN61000-6-4:2007/A1:2011							
Salt spray test	–	ISO 9227:2012, 250 hours							

[1] Upper limit of the pull/push force limited by the clutch. The lower limit is just above the rated force. The limitation of the force will happen between these 2 limits

[2] Ultimate Static Load, refer to the “Static load” diagrams

[3] The data of speed and current on this list is defined at +20 °C

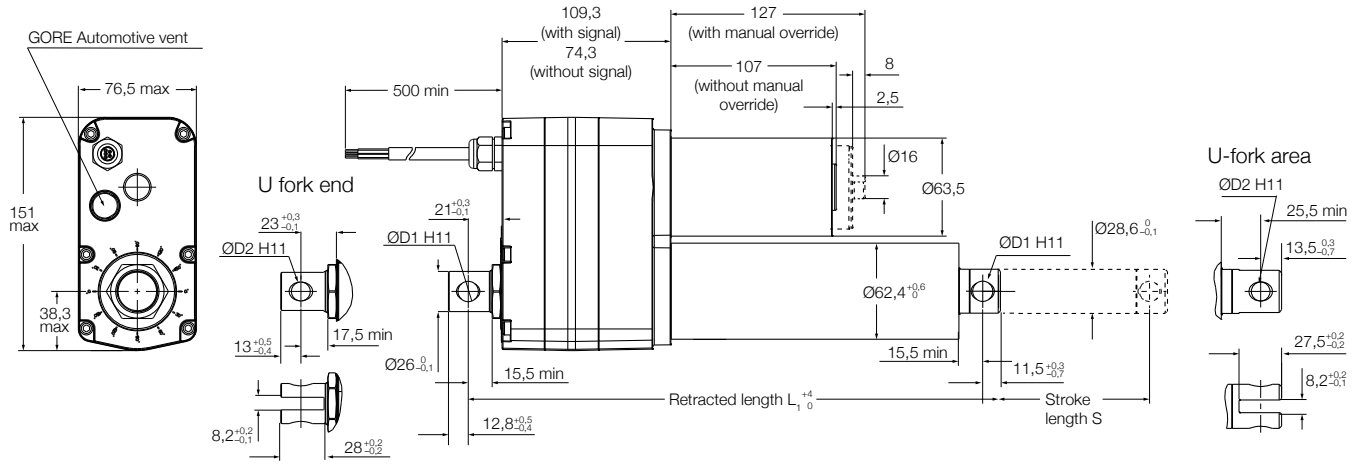
[4] Full performance from 0 °C to +40 °C

Technical data

Designation	Unit	CAHB-22E / 48 V			
Performance data					
Rated Push Force	N	2 300	3 500	6 800	10 000
Rated Pull Force	N	2 300	3 500	6 800	10 000
Max pull / push Force [1]	N	3 500	4 900	9 500	14 000
Holding force [2]	N				
Speed without load [3]	mm/s	57,0	45,0	22,0	13,0
Speed with the rated force [3]	mm/s	50,0	37,0	18,5	10,2
Electric data					
Nominal voltage	V DC	48	48	48	48
Nominal current @ rated load [3]	A	4,5	5	5	4,3
Rated current (clutch activation)	A	6,5	7	7	5,5
Duty cycle	%	20 (85/340 s)	20 (85/340 s)	20 (85/340 s)	20 (85/340 s)
Mechanical data					
Stroke	mm	50 … 700	50 … 700	50 … 610	50 … 450
Backlash	mm	1,0	1,0	0,6	0,6
Weight for 200 mm stroke	kg	4,8	4,8	4,8	4,8
Colour	–	Black	Black	Black	Black
Environment and standards					
Ambient temperature [4]	°C	–40 … 85	–40 … 85	–40 … 85	–40 … 85
Degree of protection	–	IP 69K/66M			
Standards / EMC	–	EN61000-6-2:2005, EN61000-6-4:2007/A1:2011			
Salt spray test	–	ISO 9227:2012, 250 hours			

[1] Upper limit of the pull/push force limited by the clutch. The lower limit is just above the rated force. The limitation of the force will happen between these 2 limits
[2] Ultimate Static Load, refer to the “Static load” diagrams
[3] The data of speed and current on this list is defined at +20 °C
[4] Full performance from 0 °C to +40 °C

Dimensional drawing



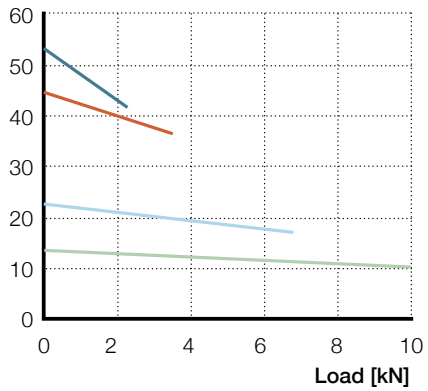
	Rod end attachment (D1)					U fork attachment (D2)	
Holes symbol	A	B	C	D	E	F	G
Hole dimension	13,1	12,8	12,5	14	12,2	12,2	12,8

	Rod end attachment		U fork attachment	
S Stroke [mm]	50-305	306-700	50-305	306-700
L_1 retracted length no option	194 + stroke	229 + stroke	206 + stroke	241 + stroke
L_1 retracted length with LS	200 + stroke	235 + stroke	212 + stroke	247 + stroke
L_1 retracted length with signal	229 + stroke	264 + stroke	241 + stroke	276 + stroke
L_1 retracted length sith LS and signal	235 + stroke	270 + stroke	247 + stroke	282 + stroke

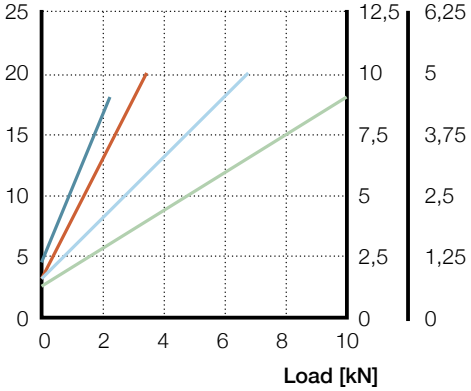
Tolerance of stroke "S"
Without LS: for CAHB22-1E/2E if S ≤ 305 (–3, –1,5); if S > 305 (–4, -2) for CAHB22-3E/4E if S ≤ 305 (–2, –0,5); if S > 305 (–3, –1)
With LS: if S ≤ 305 (±2); if S > 305 (±3)

Performance diagrams

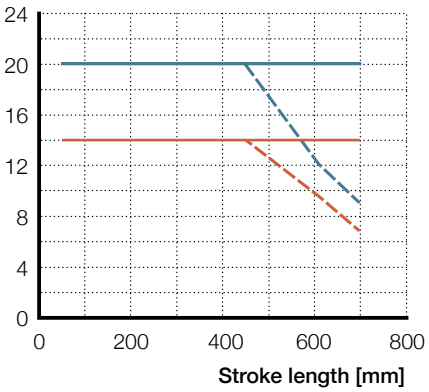
Speed-load diagram



Current load diagram



Static load diagram

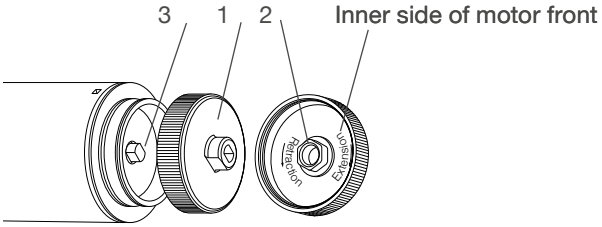


- Rated push force 2 300
- Rated push force 3 500
- Rated push force 6 800
- Rated push force 10 000

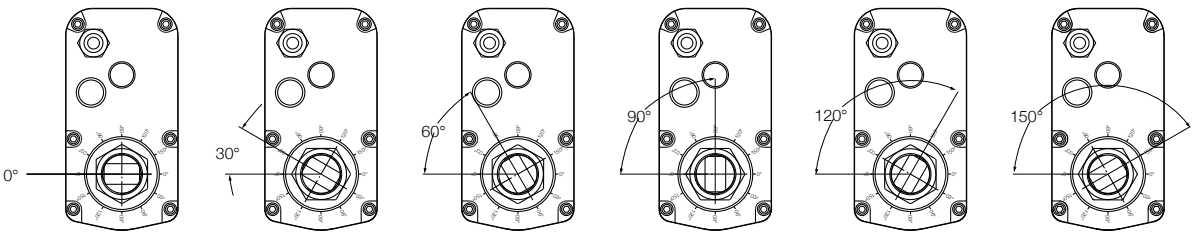
- Ultimate CAHB-22-xxE (pull)
- Ultimate CAHB-22-xxE (push)
- Recommended CAHB 22-xxE (pull)
- Recommended CAHB 22-xxE (push)

Manual override

Release the motor cover (**1**). Use the slot (**2**) to rotate the motor shaft (**3**) in the proper direction



Attachment



Electrical specifications

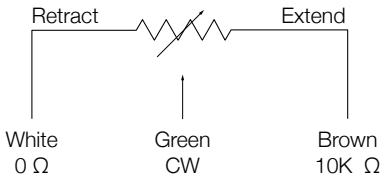
Wire connection with no signal

Wire no.	AWG	Colour	Application
1	14	Red	Motor power(+)=> Extension, (–)=> Retraction
2	14	Black	Motor power(–)=> Extension, (+)=> Retraction

Wire connection with potentiometer

Wire no.	AWG	Colour	Application
1	22	Green	See picture description
2	22	White	See picture description
3	22	Brown	See picture description
4	14	Red	Motor power(+)=> Extension, (–)=> Retraction
5	14	Black	Motor power(–)=> Extension, (+)=> Retraction

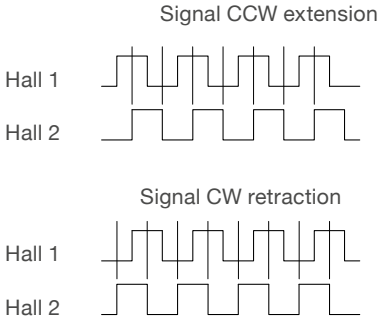
Potentiometer



Wire connection with encoder

Wire no.	AWG	Colour	Application	
1	26	Green	Sensor signal 1	Encoder
2	26	Yellow	Sensor signal 2	Encoder
3	26	Black	Sensor power GND	Encoder
4	26	Red	Sensor power 5 V	Encoder
5	14	Red	Motor power(+)=> Extension, (–)=> Retraction	
6	14	Black	Motor power(–)=> Extension, (+)=> Retraction	

Encoder

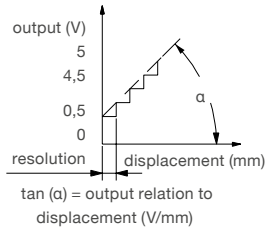


Wire connection with absolute analog output

Wire no.	AWG	Colour	Application
1	22	Green	Output signal
2	22	White	Sensor power GND
3	22	Brown	Sensor power +10~55 VDC
4	14	Red	Motor power(+)=> Extension, (–)=> Retraction
5	14	Black	Motor power(–)=> Extension, (+)=> Retraction

Absolut analog position output

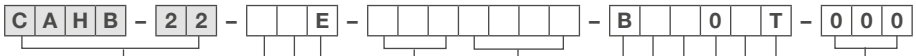
Input voltage:	10~55 V DC
Current consumpion:	15 mA max.
Output analog signal (voltage):	0~5 V DC
Max current output:	5 mA
Absolute analog output set up:	
retraction 0,5±0,15 V	
extension 4,5 to the maximum	



Output relation to displacement and resolution

Actuator type	Hall sensor [pulses/mm]	Potentiometer [ohm/mm]	Absolute analogue position output [V/mm]	Resolution of the absolute analog position output [mm]
CAHB-22...1E	1,4	30 if S=050-254	0,0150 if S=050-254	0,0814 if S=050-254
CAHB-22...2E	1,4	15 if S=255-508	0,0075 if S=255-508	0,1628 if S=255-508
		5 if S=509-700	0,0025 if S=509-700	0,4883 if S=509-700
CAHB-22...3E	2,8	60 if S=050-127	0,030 if S=050-127	0,0407 if S=050-127
CAHB-22...4E	2,8	30 if S=128-254	0,015 if S=128-254	0,0814 if S=128-254
		10 if S=255-700	0,005 if S=255-700	0,2441 if S=255-700

Ordering key



Type

Voltage

A	12 V DC
B	24 V DC
D	48 V DC
E	12 V DC with manual override
F	24 V DC with manual override
H	48 V DC with manual override

Load

1	2 300 N
2	3 500 N
3	6 800 N
4	10 000 N

Design

E

Stroke

100	100 mm
150	150 mm
200	200 mm
250	250 mm
300	300 mm
350	350 mm
400	400 mm
450	450 mm
500	500 mm
600	600 mm
700	700 mm

Retracted length[1)]

Stroke	with limith switch	without position output	with position output
100 mm		300	335
150 mm		350	385
200 mm		400	435
250 mm		450	485
300 mm		500	535
350 mm		585	620
400 mm		635	670
450 mm		685	720
500 mm		735	770
600 mm		835	870
700 mm		935	970
	without limith switch		
100 mm		294	329
150 mm		344	379
200 mm		394	429
250 mm		444	479
300 mm		494	529
350 mm		579	614
400 mm		629	664
450 mm		679	714
500 mm		729	764
600 mm		829	864
700 mm		929	964

Ingress protection

B	Standard: IP69K/IP66M

Attachment diameter: (Front and rear)

A	Hole Ø13,1 H11 (+0, +0,11 mm)
B	Hole Ø12,8 H11 (0, +0,11 mm)
C	Hole Ø12,5 H11 (+0, +0,11 mm)
D	Hole Ø14 H11(+0, +0,11mm)
E	Hole Ø12,2 H11(+0,+0,11mm)
F	U fork hole 12,2 H11
G	U fork hole 12,8 H11
X	Customized

Attachment orientation

A	Standard (0°)
B	30°
C	60°
D	90°
E	120°
F	150°
X	Customized

Option 1: Limit switch

0	None (mandatory for 2 300 N and 3 500 N version)
L	Limit switch (valid only for load version 6 800 N and 10 000 N)

Option 2: Position output

0	None
A	Absolute analog output
P	Potentiometer
E	Encoder

Thermal protection

T	Standard: Built-in thermal switch

Customization

Stroke length, retracted length, cable, connector, front attachment, rear attachment, color, de-rated load

[1)] Retracted length +12mm when attachments U fork are used.

In standard, the actuators are IP69K / IP66M and equipped with GORE Automotive vent, built-in thermal protection, protection Clutch and EMC filter.

CAHB-30A

Linear actuator

Benefits

- ACME screw drive
- Extension tube (stainless steel)
- Protection tube (steel)
- Enhanced corrosion resistance
- Mechanical overload protection (clutch)
- Maintenance free
- Robust, designed for tough environment
- Self-locking
- Motor with thermal protection

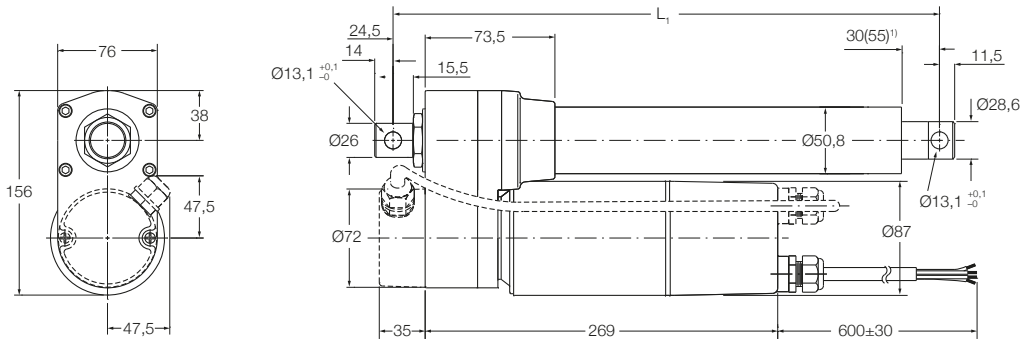
Technical data

		Unit	CAHB–30A... 1	CAHB–30A... 2
Rated push load		N	1 500	2 300
Rated pull load		N	1 500	2 300
Speed (full load to no load)	115 V AC/60 Hz	mm/s	25 to 26	12 to 13
	230 V AC/50 Hz	mm/s	21 to 22	11 to 12
Stroke		mm	102 to 610	102 to 610
Retracted length		mm	–[1)]	–[1)]
Voltage		V AC	115 or 230	115 or 230
Power consumption		W	N/A	N/A
Current consumption	115 V AC/60 Hz	A	2,3	1,8
	230 V AC/50 Hz	A	1,35	1,4
Duty cycle		%	25 (94/376 s)	25 (94/376 s)
Ambient temperature		°C	–26 to +65	–26 to +65
Type of protection		IP	65S	65S
Weight		kg	9	9
Color		–	Black	Black

[1)] See dimensional drawing (↳ **page 115**)
For outdoors application, please contact Ewellix.

Dimensional drawing

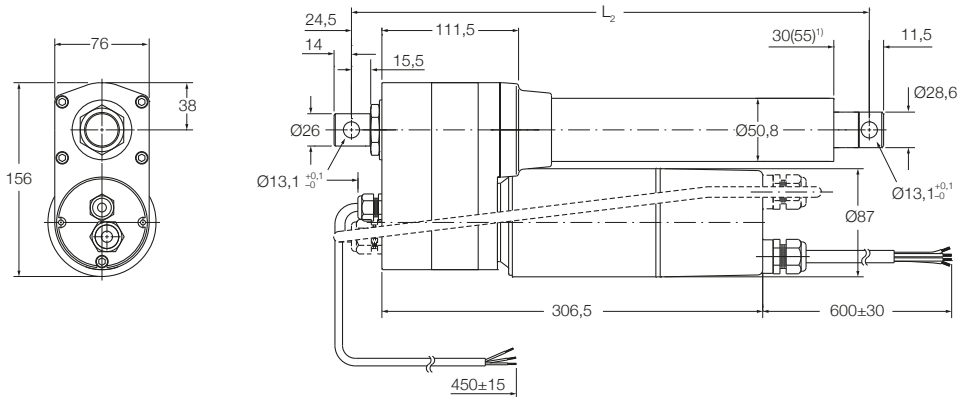
Basic configuration (dashed line for optional limit switch)



Legend:
L_1 = retracted length

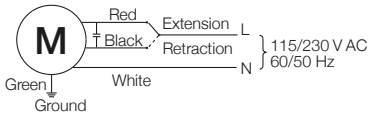
1) 55 = dimension with limit switch

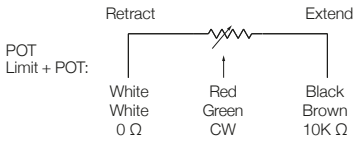
Optional potentiometer (dashed line for optional limit switch)

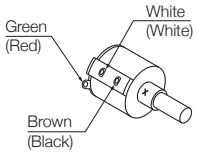


Legend:
L_2 = retracted length

1) 55 = dimension with limit switch

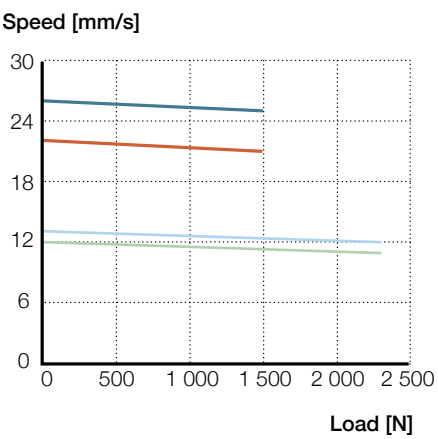




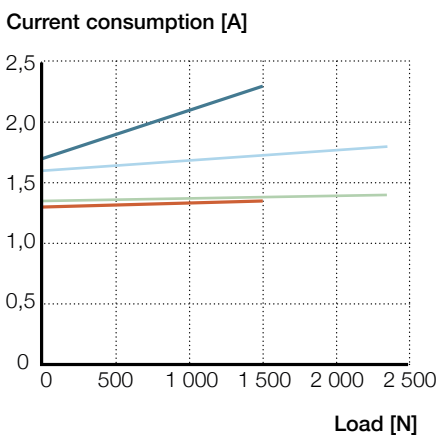


Performance diagrams

Speed-load diagram



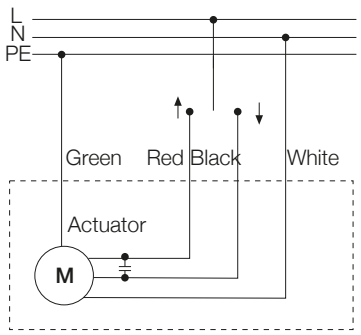
Current-load diagram



1 (115 VAC) — 1 (230 VAC) — 2 (115 VAC) — 2 (230 VAC)

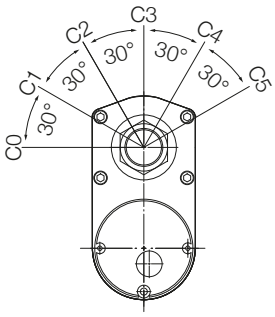
Connecting diagram

115/230 V AC, 50/60 Hz



Different rear attachment

C0–C5



Electrical specifications

Basic configuration

	With limit switch [1]						Without limit switch [2]					
Stroke (mm)	102	153	204	305	457	610	102	153	204	305	457	610
L1 Retracted length	440	440	440	592	744	897	380	415	415	465	668	821

[1] Tolerance: S and L1 = ± 5,0 mm (If S≥305 mm, S = ± 7,5 mm)
[2] Tolerance: S = ± 2,5 mm and L1 = ± 3,8 mm

Optional potentiometer

	With limit switch [1]						Without limit switch [2]					
Stroke (mm)	102	153	204	305	457	610	102	153	204	305	457	610
L2 Retracted length	478	478	478	630	782	935	418	453	453	503	706	859

[1] Tolerance: S and L2 = ± 5,0 mm (If S≥305 mm, S = ± 7,5 mm)
[2] Tolerance: S = ± 2,5 mm and L2 = ± 3,8 mm

Potentiometer resolution

Stroke (mm)	102	153	204	305	457	610
Ohm/mm	59,0	59,0	29,5	29,5	9,84	9,84

Ordering key

C	A	H	B	3	0	–			A	–						–	A					0	–	0	0	0

Type

Voltage

N 115 V AC
P 230 V AC

Load

1 1 500 N
2 2 300 N

Screw

A Acme screw

Stroke

102 102 mm
153 153 mm
204 204 mm
305 305 mm
457 457 mm
610 610 mm

Retracted length

Stroke	with limith switch1)	without POT2)	with POT2)
102 mm		440	478
153 mm		440	478
204 mm		440	478
305 mm		592	630
457 mm		744	782
610 mm		897	935
	without limith switch1)		
102 mm		380	418
153 mm		415	453
204 mm		415	453
305 mm		465	503
457 mm		668	706
610 mm		821	859

IP

A Standard (IP 65)

Front attachment

A Standard (hole: Ø13,1 mm)
X Customized

Rear attachment

A Standard (0° and hole: Ø13,1 mm)
B 30°
C 60°
D 90°
E 120°
F 150°
X Customized

Option 1

0 None
L Limit switch (only for load version 2 300 N)

Option 2

0 None
P Potentiometer

Customization

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

CAHB-31N

Linear actuator

Benefits

- High efficiency ball screw
- Extension tube (stainless steel)
- Protection tube (steel)
- Enhanced corrosion resistance
- Mechanical overload protection (clutch)
- Lubricated for service life
- Robust, designed for tough environment
- No back driving
- Motor with thermal protection

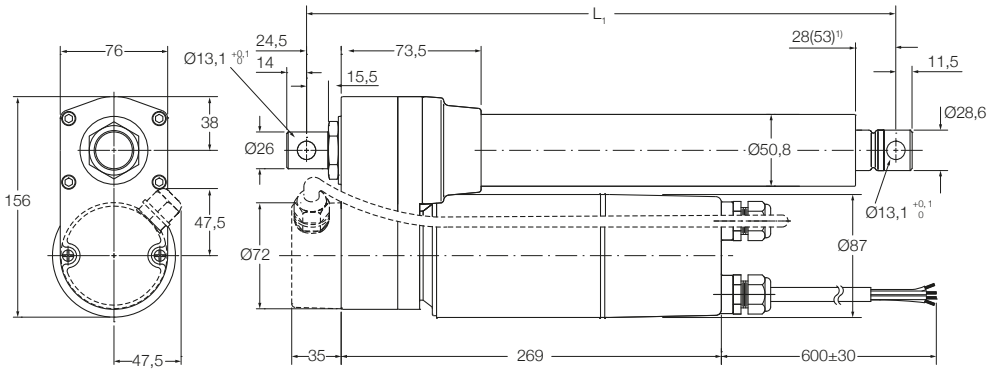
Technical data

		Unit	CAHB–31N... 1	CAHB–31N... 2	CAHB–31N... 3
Rated push load		N	2 300	4 500	6 000
Rated pull load		N	2 300	4 500	6 000
Speed (full load to no load)	115 V AC/60 Hz	mm/s	48 to 57	22 to 28	13 to 15
	230 V AC/50 Hz	mm/s	40 to 50	20 to 24	11 to 13
Stroke		mm	102 to 610	102 to 610	102 to 610
Retracted length		mm	–[1)]	–[1)]	–[1)]
Voltage		V AC	115 or 230	115 or 230	115 or 230
Power consumption		W	N/A	N/A	N/A
Current consumption	115 V AC/60 Hz	A	3	2,6	2,2
	230 V AC/50 Hz	A	1,5	1,4	1,4
Duty cycle		%	25 (94/376 s)	25 (94/376 s)	25 (94/376 s)
Ambient temperature		°C	–26 to +65	–26 to +65	–26 to +65
Type of protection		IP	65S	65S	65S
Weight		kg	9,5	9,5	9,5
Color		–	Black	Black	Black

[1)] See dimensional drawing (↳ **page 119**)
For outdoors application, please contact Ewellix.

Dimensional drawing

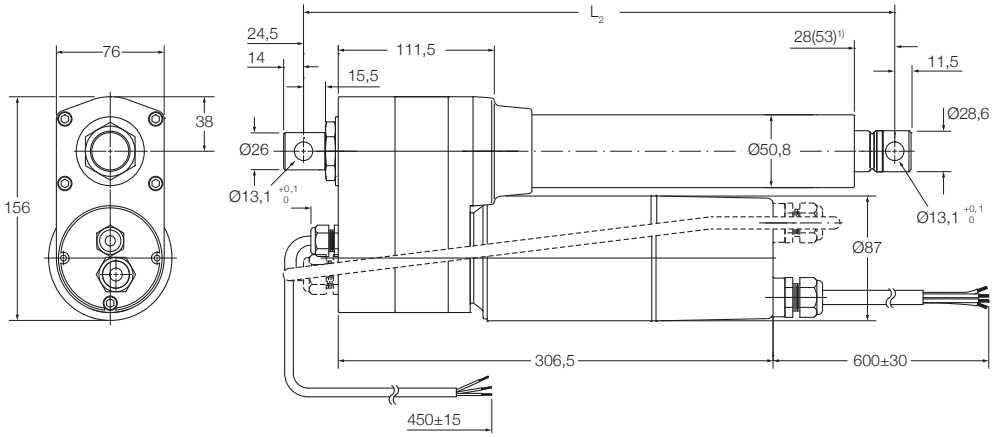
Basic configuration (dashed line for optional limit switch)



Legend:
L_1 = retracted length

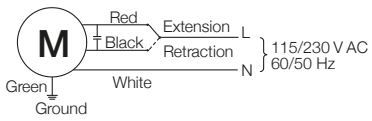
1) 53 = dimension with limit switch

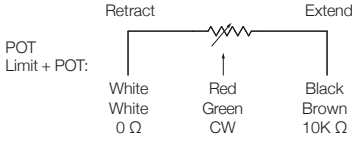
Optional potentiometer (dashed line for optional limit switch)

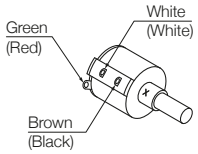


Legend:
L_2 = retracted length

1) 53 = dimension with limit switch



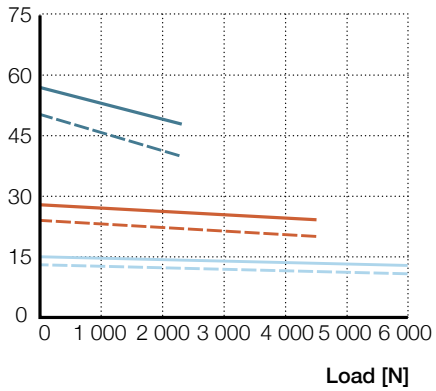




Performance diagrams

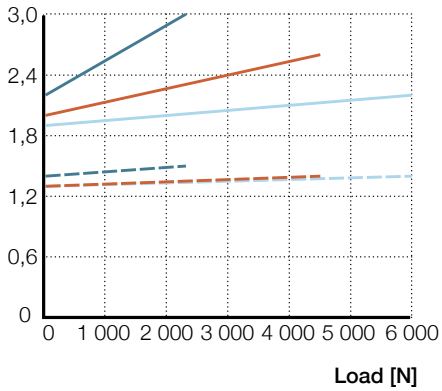
Speed-load diagram

Speed [mm/s]



Current-load diagram

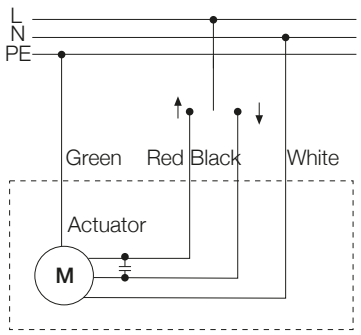
Current consumption [A]



1 (115 VAC) — 2 (115 VAC) — 3 (115 VAC)
1 (230 VAC) — 2 (230 VAC) — 3 (230 VAC)

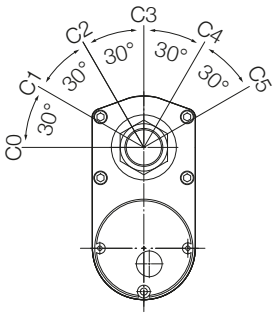
Connecting diagram

115/230 V AC, 50/60 Hz



Different rear attachment

C0–C5



Electrical specifications

	With limit switch [1]						Without limit switch [2]					
Stroke (mm)	102	153	204	305	457	610	102	153	204	305	457	610
L1 Retracted length	444	444	495	659	811	964	380	419	419	521	735	888

[1] Tolerance: S and L1 = ± 5,0 mm (If S≥305 mm, S = ± 7,5 mm)
[2] Tolerance: S = ± 2,5 mm and L1 = ± 3,8 mm

Basic configuration

	With limit switch [1]						Without limit switch [2]					
Stroke (mm)	102	153	204	305	457	610	102	153	204	305	457	610
L2 Retracted length	482	482	533	697	849	1002	418	457	457	559	773	926

[1] Tolerance: S and L2 = ± 5,0 mm (If S≥305 mm, S = ± 7,5 mm)
[2] Tolerance: S = ± 2,5 mm and L2 = ± 3,8 mm

Potentiometer resolution

Stroke (mm)	102	153	204	305	457	610
Ohm/mm	59,0	59,0	29,5	29,5	9,84	9,84

Ordering key

CAHB31 – [ ][ ] – N – [ ][ ][ ][ ][ ][ ] – A – [ ][ ][ ][ ][ ] 0 – 0 0 0

Type

Voltage

N	115 V AC
P	230 V AC

Load

1	2 300 N
2	4 500 N
3	6 000 N

Screw

N	Ball screw

Stroke

102	102 mm
153	153 mm
204	204 mm
305	305 mm
457	457 mm
610	610 mm

Retracted length

Stroke		
with limith switch	without POT	with POT
102 mm	444	482
153 mm	444	482
204 mm	495	533
305 mm	659	697
457 mm	811	849
610 mm	964	A02 (1 002 mm)
without limith switch		
102 mm	380	418
153 mm	419	457
204 mm	419	457
305 mm	521	559
457 mm	735	773
610 mm	888	926

IP

A	Standard (IP 65)

Front attachment

A	Standard (hole: Ø13,1 mm)
X	Customized

Rear attachment

A	Standard (0° and hole: Ø13,1 mm)
B	30°
C	60°
D	90°
E	120°
F	150°
X	Customized

Option 1

0	None
L	Limit switch (only for load version 6 000 N)

Option 2

0	None
P	Potentiometer

Customization

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

CAHB series - Environmental tests

Climatic tests	CAHB-20xE, CAHB-21xE, CAHB-22xE		CAHB-10		CAHB-30, CAHB-31	
Test and Standard	Performance	Report No.	Performance	Report No.	Performance	Report No.
Cold test EN60068-2-1 (Ab)	Storage at low temperature Temperature: –40 °C Duration: 6 hours Not connected Tested at room temperature.	PH_TR0295	Storage at low temperature Temperature: –40 °C Duration: 96 hours Not connected Tested at room temperature.	"Low temperature for CAHB-10"	Storage at low temperature: Temperature: –40 °C Duration: 8 hours Not connected Tested at room temperature.	PH_TR0265
Cold test EN60068-2-1 (Ad)	Storage at low temperature Temperature: –30 °C Duration: 6 hours Actuator is not activated/ connected Tested at low temperature.	PH_TR0295	Storage at low temperature Temperature: –20 °C Duration: 96 hours Actuator is not activated/ connected Tested at low temperature.	"Low temperature for CAHB-10"	Storage at low temperature: Temperature: –26 °C Duration: 8 hours Not connected Tested at room temperature.	PH_TR0265
Dry Heat EN60068-2-2 (Bb)	Storage at high temperature Temperature: +90 °C Duration: 72 hours Actuator is not activated/ connected. Tested at room temperature	PH_TR0278	Storage at high temperature Temperature: +85 °C Duration: 96 hours Actuator is not activated/ connected. Tested at room temperature	"High temperature for CAHB-10"	–	–
Change of temperature EN60068-2-14 (Na)	Rapid change of temperature High temperature: +100 °C in 60 min. Low temperature: –30 in 60 min. Transition time: < 10 seconds Duration: 100 cycles Actuator is not activated/ connected. Tested at room temperature.	PH_TR0278	–	–	–	–
Salt mist EN60068-2-52 (Kb)	Salt spray test Salt solution: 5 % sodium chloride (NaCl) 4 spraying periods, each of 2 hours. Humidity storage 7 days after each. Actuator not activated/ connected. Exposure time: 250 hours	PH_TR0268	Salt spray test Salt solution: 5 % sodium chloride (NaCl) 4 spraying periods, each of 2 hours. Humidity storage 7 days after each. Actuator not activated/ connected. Exposure time: 96 hours	"Salt spray test for CAHB-10"	–	–
Degrees of protection IEC 60529	1. Test Item: IP6XM Test Condition: Movement Test Dust: Talcum powder Dust Concentration: 2 kg/m^3 chamber volume and be kept in suspension during the test Test Duration: 8 hours	SHIN1607036235PS	1. Test Item: IP6XS Test Condition: Static Type of dust: Talcum powder Test Duration: 8 hours	COM12-GPE080184AN, COM12-GPE080183AN	–	–
Degrees of protection IEC 60529	2. Test Item: IPX6M Test Condition: Movement Flux: 100 L/min Nozzle diameter: Ø12,5 mm Distance: 2,5 ~ 3,0 m Test duration: 3 min	SHIN1607036235PS	2. Test Item: IPX6S Test Condition: Static Flux: 100 (1 ±5 %) L/min Nozzle diameter: Ø12,5 mm Distance: 2,5 ~ 3,0 m Test duration: 3 min	COM12-GPE080184AN, COM12-GPE080183AN	2. Test Item: IPX5S Test Condition: Static Flux: 12,5 L/min Nozzle diameter: Ø6,3 mm Distance: 2,5 ~ 3,0 m Test duration: 3 min	SHIN1608042057MR
Degrees of protection ISO 20653:2013	3. Test Item: IPX9K Test Condition: Static Jet angle: 2507 Water flow: 14~16 L/min Water pressure: 8 000~10 000 kPa Water temperature: 80 to -5 °C Test angle: 0°, 30°, 60°, 90° Test distance from jet to sample: 100~150 mm Test duration: 30 s/position	SHIN1607036235PS	3. Test Item: IPX9K Test Condition: Static Jet angle: 2507 Water flow: 14~16 L/min Water pressure: 8 000~10 000 kPa Water temperature: 80 to -5 °C Test angle: 0°, 30°, 60°, 90° Test distance from jet to sample: 100~150 mm Test duration: 30 s/position	SHIN1510048959MR-01	–	–

Mechanical tests

Test and Standfards	CAHB-20xE, CAHB-21xE, CAHB-22xE Performance	Report No.	CAHB-10 Performance	Report No.	CAHB-30, CAHB-31 Performance	Report No.
Vibration EN60068-2-6 (Fdb) EN60068-w2-6(Fc)	Test Item: Random vibration Frequency (Hz) / Power spectral density (g2/Hz) 10 / 0,005 200 / 0,02 300 / 0,01 350 / 0,002 Test Direction: X/Y/Z axis Test Duration: 2 hours/axis, Total 6 hours Test Item: Sinusoidal vibration Test Condition: Frequency range: 5~25~200 Hz Amplitude: 3,3 mm (p-p) Acceleration: 4g Sweep Rate: 10 ct/min Test Direction: X/Y/Z axis Test Duration: 2 hours/axis, Total 6 hours	SHIN1607036235PS SHIN1702007025PS	–	–	–	–
Vibration Ewellix Specified Conditions	–	–	Test Item: Vibration Set Point (Grms) / Dwell Time(min) 5 / 10 10 / 10 15 / 10 20 / 10 20 / 20 20 / 30 Test Equipment Name Halt Tester / Typhoon-2,5+	SHIN1805034119SC SHIN1805032588SC	–	–

Electrical tests

Test and Standars	CAHB-20xE, CAHB-21xE, CAHB-22xE Performance	Report No.	CAHB-10 Performance	Report No.	CAHB-30, CAHB-31 Performance	Report No.
Power supply 12 VDC ASAE EP455 (1990)	Operating voltages: +10 V ~ +16 V Over voltage: +26 V / 5 min. Reverse polarity: –26 V / 5 min. Short circuit to ground: 16 V / 5 min. Short circuit to supply: 16 V	PH_TR0267 PH_TR0302	–	–	–	–
Power supply 24 VDC ASAE EP455 (1990)	Operating voltages: +21 V ~ +26 V Over voltage: +36 V / 5 min Reverse polarity: –36 V / 5 min Short circuit to ground: 32 V / 5 min Short circuit to supply: 32 V	PH_TR0267 PH_TR0302	–	–	–	–
Safety Low Voltage Directive EN 60335-1: 2012 + A11: 2014	–	–	–	–	Rated Voltage: 230 V AC Rated frequency: 50 Hz Rated Current: 1,5 A Degree of protection: IP65	UL 4787638796
EN 60335-2-97 : 2006 + A11: 2008 + A2:2010 + A12: 2015 EN 62233 : 2008	–	–	–	–	Rated Voltage: 230 V AC Rated frequency: 50 Hz Rated Current: 1,5 A Degree of protection: IP65	UL 4787638796
EMC, HF-immunity EN 61000-6-1	–	–	Pass the test for 12 V / 24 V Motor	70.888.12.1063.02	–	–
EN 61000-6-2	Pass the test for 12 V / 24 V Motor	708881688102-00				
EMC, Emission EN 61000-6-3	–	–	Inside limits for 12 V / 24 V motor	70.888.12.1063.02	–	–
EN 61000-6-4	Inside limits for 12 V / 24 V motor	708881688102-00	–	–	–	–
EN 50081-2 (1993) EN 55011 (1998)	–	–	–	–	Class B	EM99777 (IA4=CAHB-30 CAHB-31 series
EMC, Automotive transients ISO 7637-2	ISO 7637 Load dump test only accepted on motor power connection	708881688103-00	–	-	–	–
UL certification					UL 325 ANSI/CAN/UL-Door	20190822-E507157

ST 430

CAR, CAP & CAT series

The CAR, CAP, CAT modular design concept makes it easy to interchange critical components such as motors, gears, screws, attachments, etc. Custom-built actuators are easily and cost efficiently built from standard parts. The CAT range flexibility makes it suitable for a high number of applications.

Features

- Compact
- Robust
- Modular
- Lubricated for service life
- High efficiency

Benefits

- Industrial reliable and robust actuator
- Wide range of components
- Right-hand and left-hand version
- Incremental or absolute position feedback option

CAR 22

Linear actuator

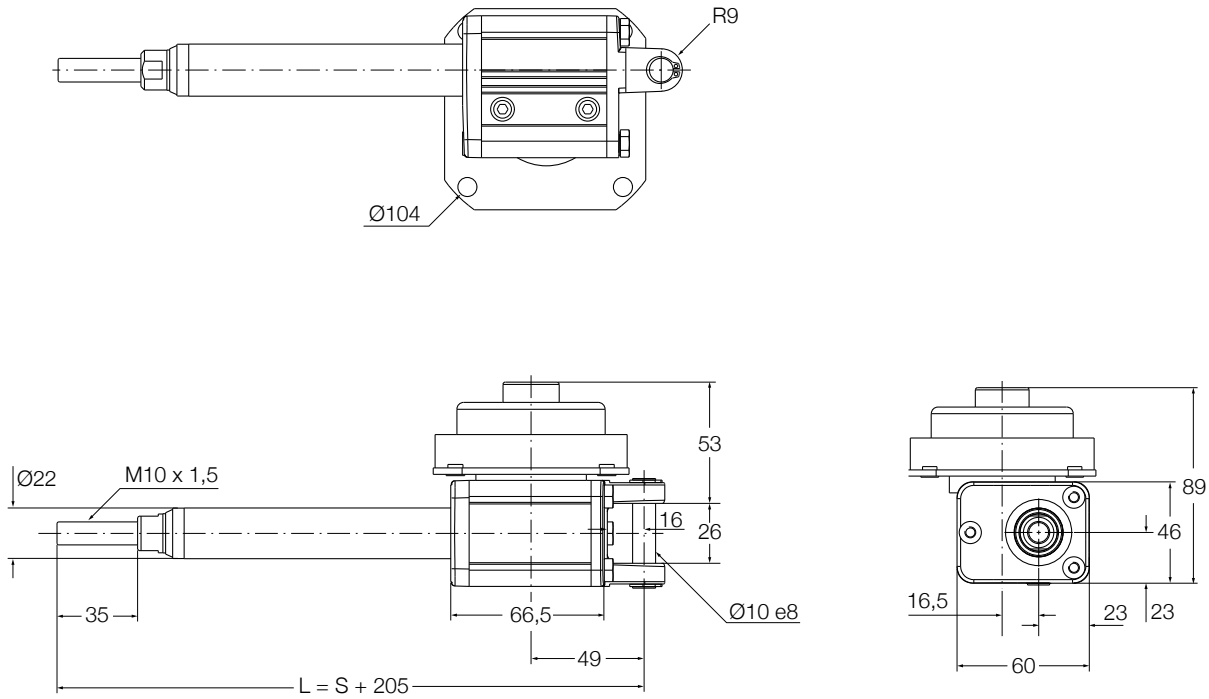
Benefits

- Reliable and robust industrial actuator
- Right- and left-hand version
- Maintenance free

Technical data

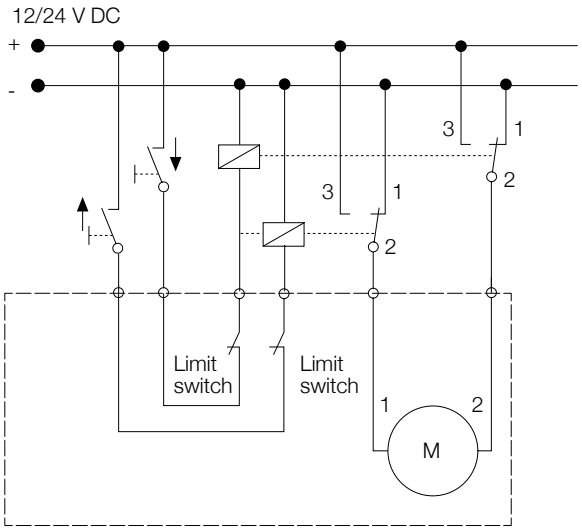
		Unit	CAR 22
Rated push load		N	1 000 to 1 500
Rated pull load		N	1 000 to 1 500
Speed (full load to no load)		mm/s	10 to 30
Stroke		mm	50 to 300
Retracted length		mm	S+ 205
Voltage		V AC	12 or 24
Power consumption		W	120
Current consumption	12 V DC	A	9
	24 V DC	A	5
Duty cycle		%	25
Ambient temperature		°C	–20 to +70
Type of protection		IP	44
Weight		kg	1,2 to 1,6

Dimensional drawing



Legend:
S = stroke
L = retracted length

Connecting diagrams

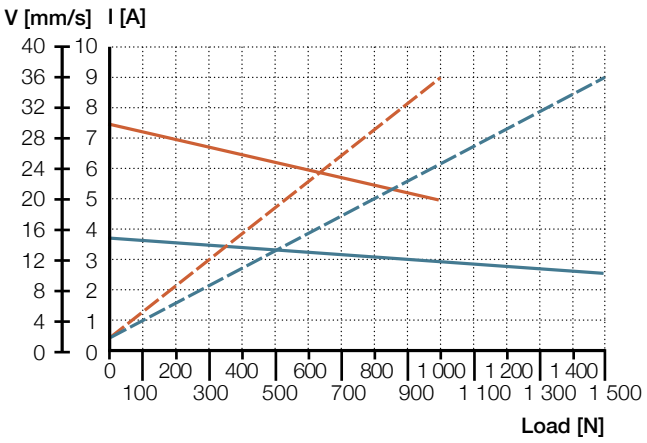


Suitable control units and accessories

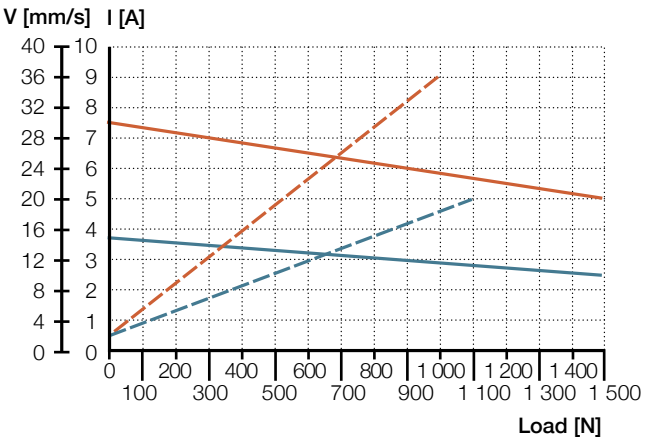
	Control units	Limit switch
	CAED 5-24R	CAXE 22
D12B		•
D24B	•	•

Performance diagrams

CAR 22.../D12B



CAR 22.../D24B

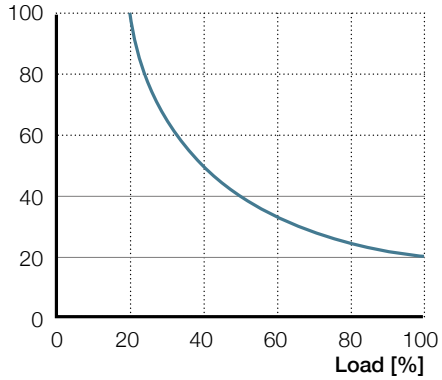


Gear 1 V (mm/s) I (A)

Gear 2 V (mm/s) I (A)

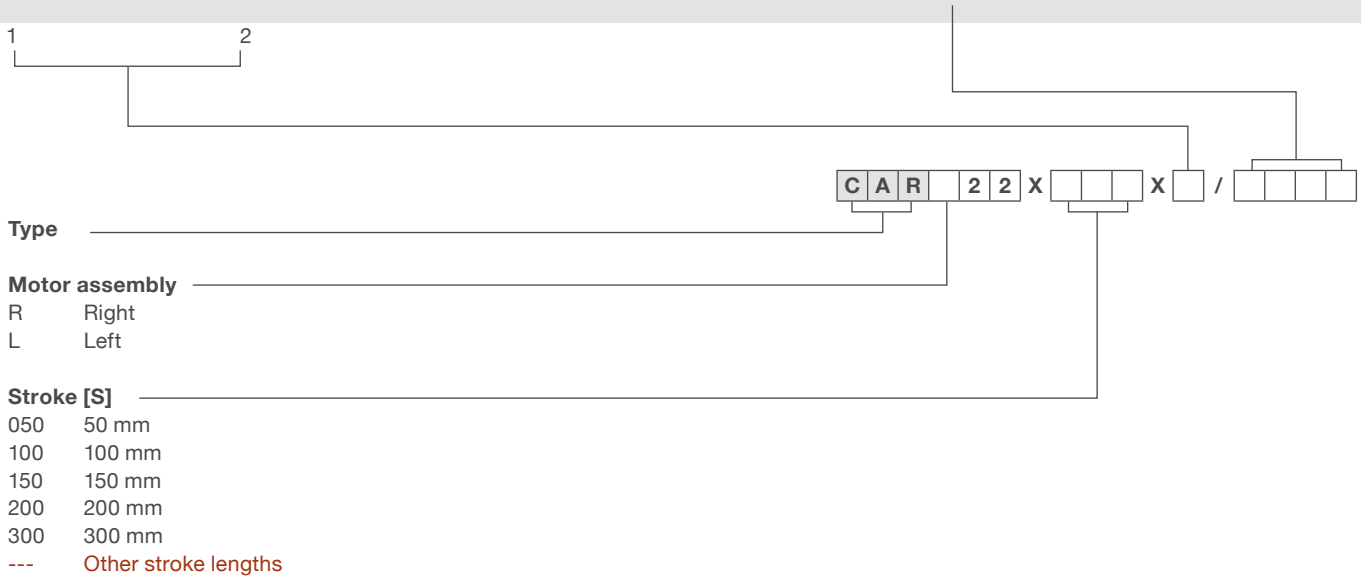
Duty cycle

Duty factor [%] at 20 °C



Ordering key

Load [N] / Full Load Speed [mm/s]		Motor options	
1 500/xx	1 000/xx	No motor	0000
1 500/15–10	1 000/30–20	12 V DC, flat motor, IP44	D12B
1 500/15–10	1 000/30–20	24 V DC, flat motor, IP44	D24B



Type

Motor assembly

R Right
L Left

Stroke [S]

050 50 mm
100 100 mm
150 150 mm
200 200 mm
300 300 mm
--- Other stroke lengths

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

CAR 22 – Type codes for accessories and spare parts

Item code	Type code	Order N°
12 VDC motor (flat motor)	D12B	M/0405516
24 VDC motor (flat motor)	D24B	M/0405517
Limit switch for stroke = 50 mm	CAXE 22 × 50	M/0412019
Limit switch for stroke = 100 mm	CAXE 22 × 100	M/0412020
Limit switch for stroke = 150 mm	CAXE 22 × 150	M/0412021
Limit switch for stroke = 200 mm	CAXE 22 × 200	M/0412022
Limit switch for stroke = 300 mm	CAXE 22 × 300	M/0412023
Proximity switch for CAXE	CAXE Proximity switch	M/0432369
Front mounting attachments type Rod–end	575–22	M/0430575–22
Front mounting attachments type Clevis	576–22	M/0430576–22
Rear mounting attachments type Single ear bracket	580–22	M/0430580–22
Rear mounting attachments type Ball–joint bracket	581–22	M/0430581–22
Control unit (suitable for D24B motor)	CAED 5–24R	M/0420209

CAP 32

Linear actuator

Benefits

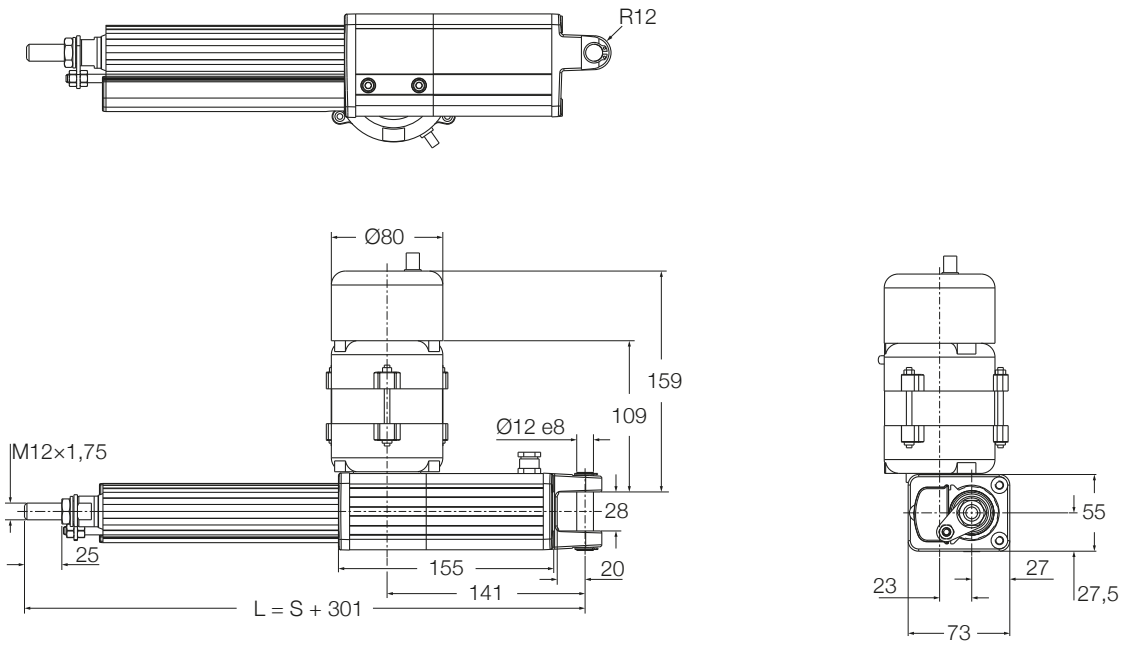
- High efficiency ball screw
- Extension tube (stainless steel)
- Protection tube (steel)
- Enhanced corrosion resistance
- Mechanical overload protection (clutch)
- Lubricated for service life
- Robust, designed for tough environment
- No back driving
- Motor with thermal protection

Technical data

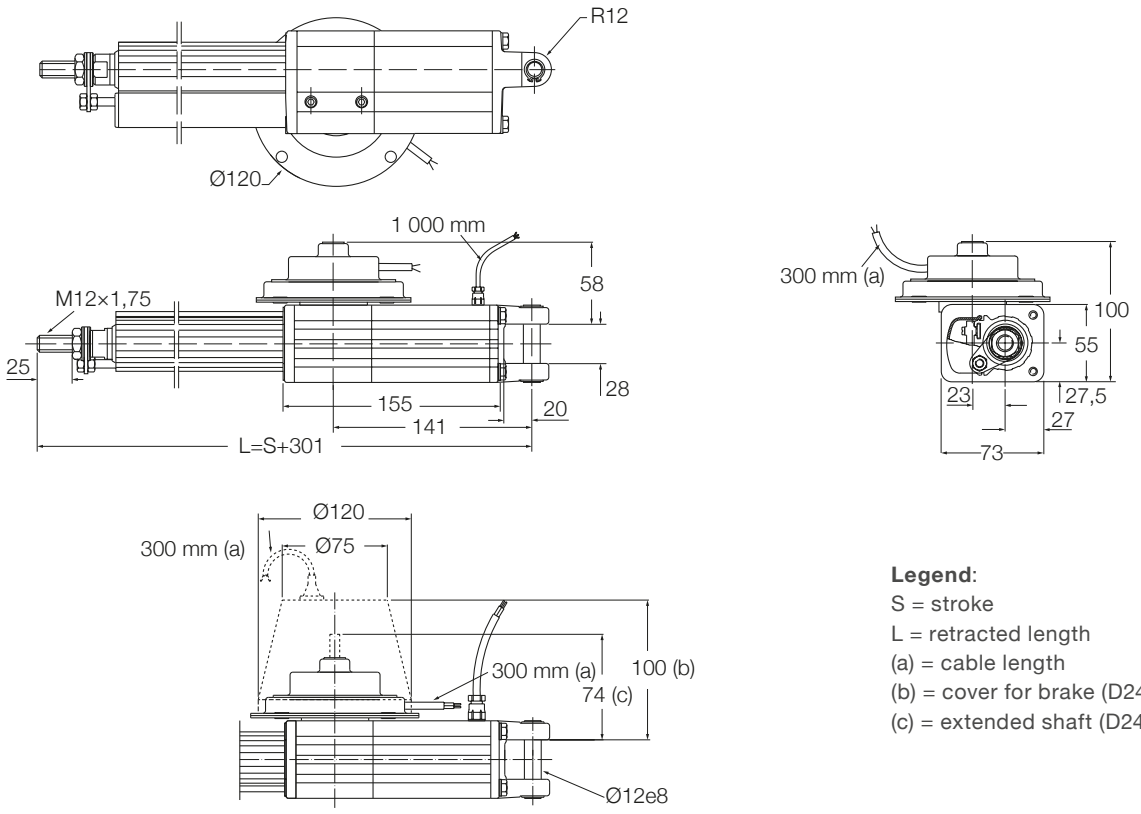
		Unit	CAP 32 – AC version	CAP 32 – DC version
Rated push load		N	1 500 to 3 500	1 000 to 3 500
Rated pull load		N	1 500 to 3 500	1 000 to 3 500
Speed (full load to no load)		mm/s	6 to 32 [1]	5 to 60 [1]
Stroke		mm	50 to 700	50 to 700
Retracted length		mm	S+301	S+301
Voltage		V AC	120 or 230	–
		V DC	–	12 or 24
Power consumption	120 V AC	W	98 (brake 133,2 W)	N/A
	230 V AC	W	92 (brake 117,3 W)	–
	12 or 24 V DC	W	–	N/A
Current consumption	120 V AC	A	0,82 (brake +0,29 A)	–
	230 V AC	A	0,4 (brake + 0,11 A)	–
	12 V DC	A	–	13
	24 V DC	A	–	8
	24 V DC	A	–	5 (for motor D24CW)
Duty cycle		%	30	25
Ambient temperature		°C	–20 to +50	–20 to +50
Type of protection		IP	20/54	20/44
Weight		kg	2,9 to 5,0	2,9 to 5,0

[1] Depending on selected motor

Dimensional drawing – AC version



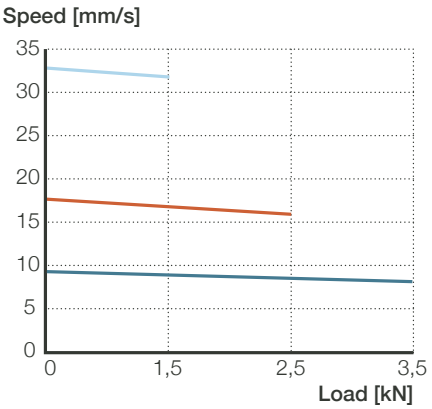
Dimensional drawing – DC version



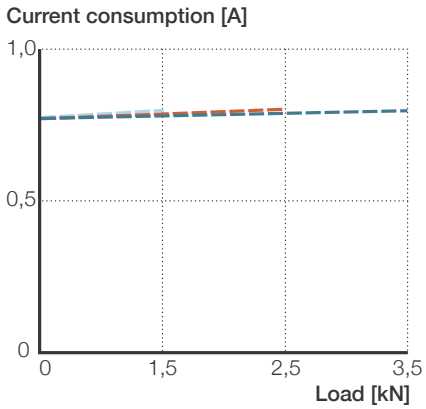
Legend:
S = stroke
L = retracted length
(a) = cable length
(b) = cover for brake (D24CB)
(c) = extended shaft (D24CS)

Performance diagrams – AC version

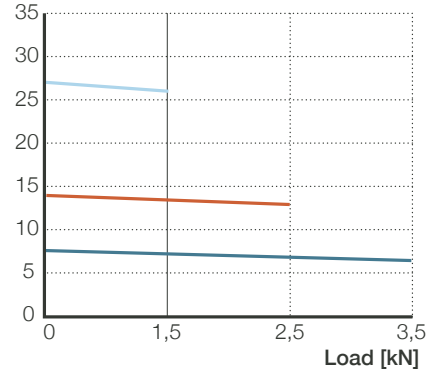
Speed-load diagram CAP 32 ... 120 V AC



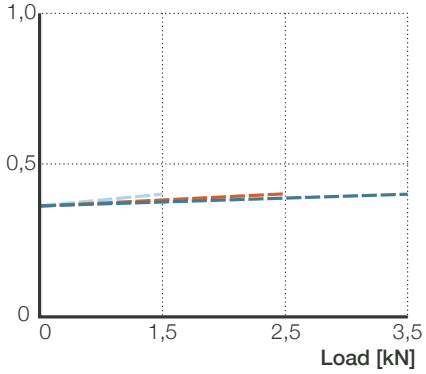
Current-load diagram CAP 32 ... 120 V AC



Speed-load diagram CAP 32 ... 230 V AC



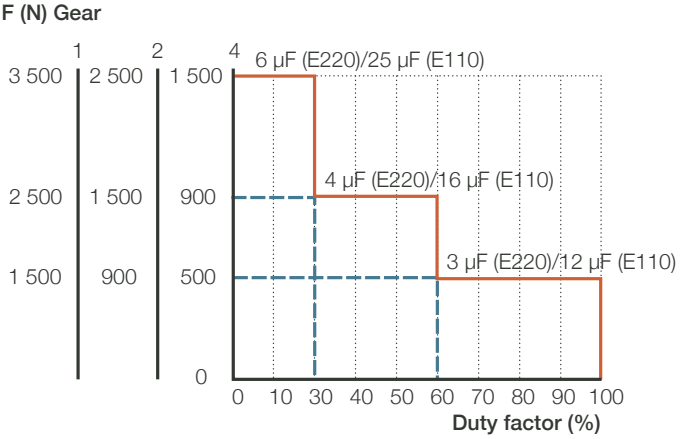
Current-load diagram CAP 32 ... 230 V AC



Gear 1 — V (mm/s) - - - I (A) Gear 2 — V (mm/s) - - - I (A) Gear 4 — V (mm/s) - - - I (A)

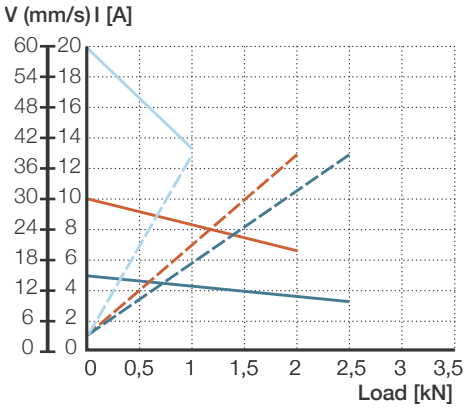
Duty cycle – AC version

CAP 32 ... 230/120 V AC

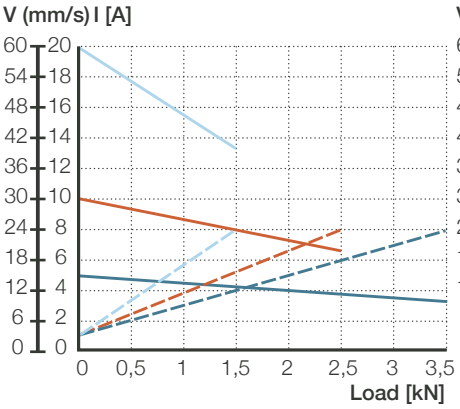


Performance diagrams – DC version

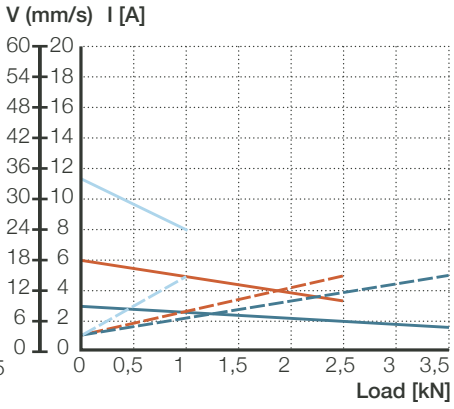
CAP 32.../D12C



CAP 32.../D24C/D24CS/D24CB



CAP 32.../D24CW



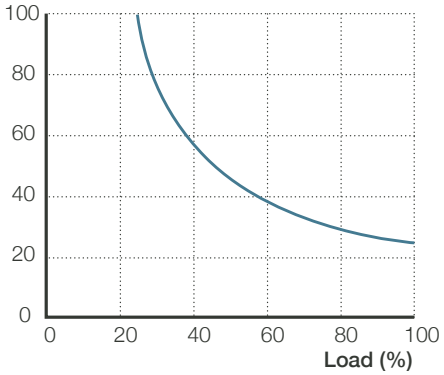
Gear 1 — V (mm/s) - - - I (A)

Gear 2 — V (mm/s) - - - I (A)

Gear 4 — V (mm/s) - - - I (A)

Duty cycle – DC version

Duty factor (%) at 20°C



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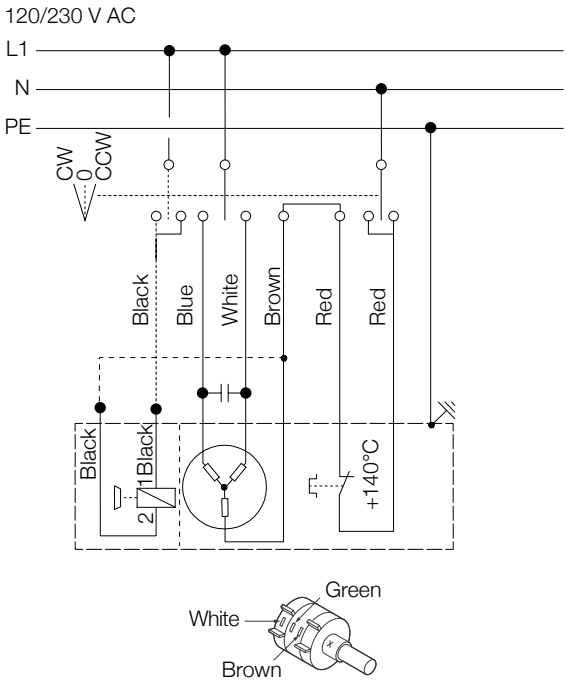
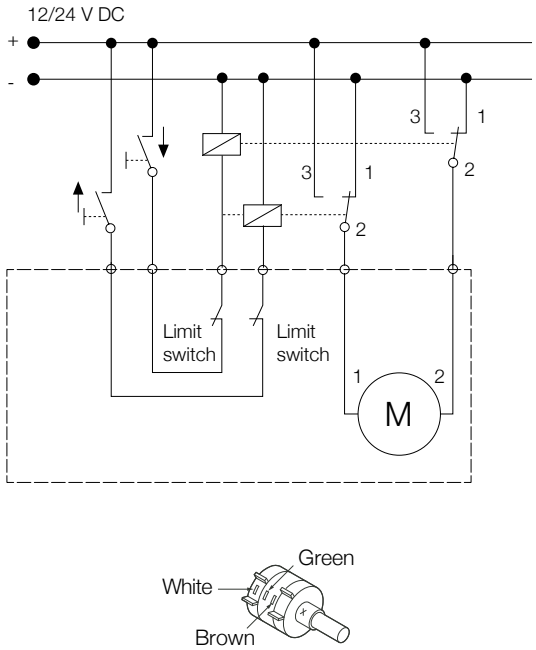
Connecting diagrams – AC version



Connection diagram for rotating potentiometer

Connecting diagrams – DC version



Connection diagram for rotating potentiometer

CAP 32 – Type codes for accessories and spare parts

Item code	Type code	Order N°
12 V DC motor (flat motor)	D12C	M/0405518
24 V DC motor (flat motor)	D24C	M/0405519
24 V DC motor (flat motor with brake)	D24CB	M/0405523
24 V DC motor (flat motor with extended shaft)	D24CS	M/0405522
24 V DC motor (flat motor with low speed)	D24CW	M/0405521
120 V AC motor (cylindrical motor)	E110C	M/0405533
120 V AC motor (cylindrical motor with brake)	E110CB	M/0405534
230 V AC motor (cylindrical motor)	E220C	M/0405531
230 V AC motor (cylindrical motor with brake)	E220CB	M/0405532
Capacitor value 25 µF (120 V AC)	Capacitor 25 µF	M/0430670-06
Capacitor value 6 µF (230 V AC)	Capacitor 6 µF	M/0430670-03
Limit switch for stroke = 50 mm	CAXE 32 × 50	M/0412030
Limit switch for stroke = 100 mm	CAXE 32 × 100	M/0412031
Limit switch for stroke = 200 mm	CAXE 32 × 200	M/0412033
Limit switch for stroke = 300 mm	CAXE 32 × 300	M/0412034
Limit switch for stroke = 500 mm	CAXE 32 × 500	M/0412036
Limit switch for stroke = 700 mm	CAXE 32 × 700	M/0412037
Proximity switch for CAXE	CAXE Proximity switch	M/0432369
Front mounting attachments type Rod-end	575–32	M/0430575–32
Front mounting attachments type Clevis	576–32	M/0430576–32
Rear mounting attachments type Single ear bracket	580–32	M/0430580–32
Rear mounting attachments type Universal joint	582–32	M/0431780–32

Ordering key

Dynamic load (N) / Speed (mm/s)			Motor options	
3 500xx	2 500/xx	1 500/xx	No motor	0000
3 500/8	2 500/16	1 500/32	120 V AC/60 Hz, 1-phase, IP54	E110C
3 500/8	2 500/16	1 500/32	120 V AC/60 Hz, 1-phase, brake, IP20	E110CB
3 500/6	2 500/13	1 500/26	230 V AC/50 Hz, 1-phase, IP54	E220C
3 500/6	2 500/13	1 500/26	230 V AC/50 Hz, 1-phase, brake, IP20	E220CB
3 500/xx	2 500/xx	1 500/xx	No motor	0000
2 500/15–10	2 000/30–20	1 000/60–40	12 V DC, flat motor, IP44	D12C
3 500/15–10	2 500/30–20	1 500/60–40	24 V DC, flat motor, IP44	D24C
3 500/9–5	2 500/18–10	1 500/34–24	24 V DC, flat motor, low speed, IP44	D24CW
3 500/15–10	2 500/30–20	1 500/60–40	24 V DC, flat motor, extended shaft, IP44	D24CS
3 500/15–10	2 500/30–20	1 500/60–40	24 V DC, flat motor, brake, IP20	D24CB

1	2	4

C A P 3 2 X X /

Type

Motor assembly
R Right
L Left

Stroke (S)
050 50 mm
100 100 mm
200 200 mm
300 300 mm
400 400 mm
500 500 mm
700 700 mm
– – – Other stroke lengths

Option
S Back-up nut

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

CAT 32B and CAP 43B

Linear actuator

Benefits

- Compact
- Robust
- Modular
- Lubricated for service life
- High efficiency
- Digital encoder feedback

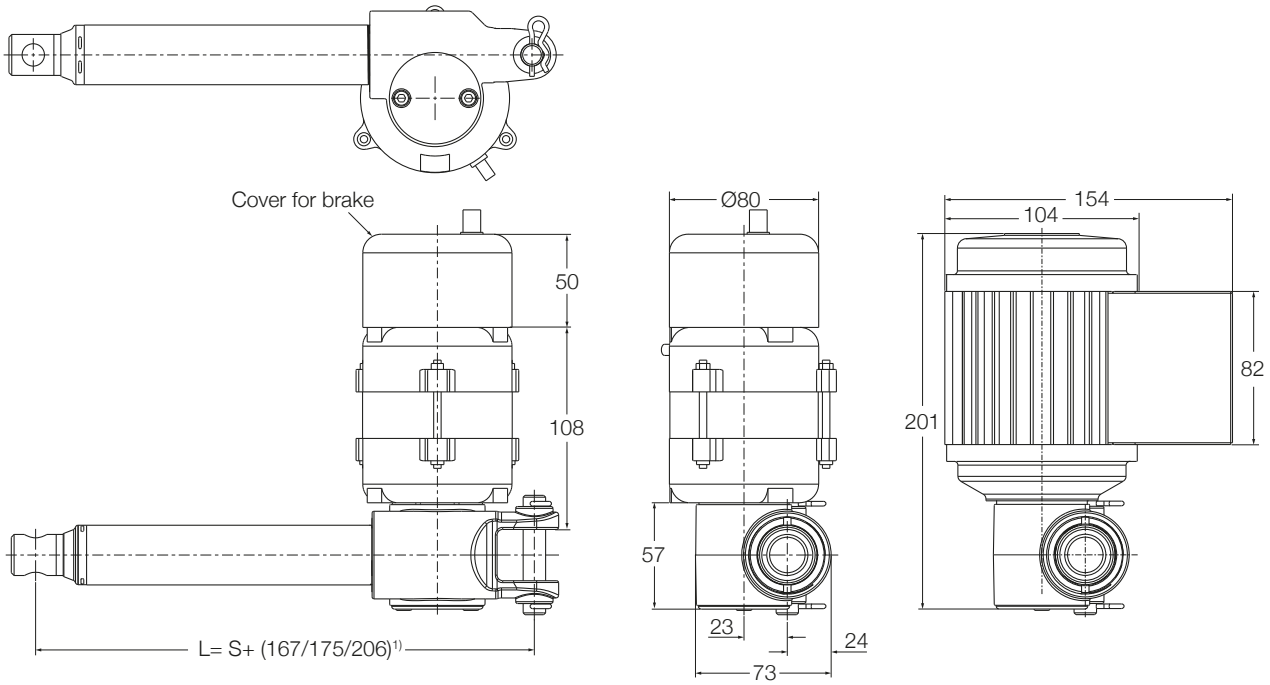
Technical data

		Unit	CAT 32B – AC version	CAT 32B – DC version	CAP 43B
Rated push load		N	1 500 to 3 500	1 000 to 4 000	1 500 to 4 000
Rated pull load		N	1 500 to 3 500	1 000 to 4 000	1 500 to 4 000
Speed (at full load)		mm/s	6,5 to 32 [1]	5 to 52 [1]	5 to 65 [1]
Stroke		mm	50 to 700	50 to 700	50 to 700
Retracted length		mm	S+167/175/206 [2]	S+167/175/206 [2]	S+167/175/206 [2]
Voltage		V AC	120, 230 or 400	–	–
		V DC	–	12 or 24	24
Power consumption	120 V AC	W	98 (brake 133,2 W)	–	–
	230 V AC	W	92 (brake 117,3 W)	–	–
	400 V AC	W	80	–	–
	12 or 24 V DC	W	–	N/A	N/A
Current consumption	120 V AC	A	0,82 (brake +0,29 A)	–	–
	230 V AC	A	0,4 (brake +0,11 A)	–	–
	400 V AC	A	0,2	–	–
	12 V DC	A	–	18	–
	24 V DC	A	–	9	9
	24 V DC	A	–	5 (for motors C24CW and D24CW)	5 (for motors C24CW and D24CW)
Duty cycle		%	30	20	20
Ambient temperature		°C	–20 to +50	–20 to +50	–20 to +50
Type of protection		IP	20/54/55	20/44/66 [1]	44
Weight		kg	2 to 3,5	2 to 3,5	2,0 to 2,7

[1] Depending on selected motor

[2] Dimension depends on selected front attachment

Dimensional drawing – CAT 32B AC version



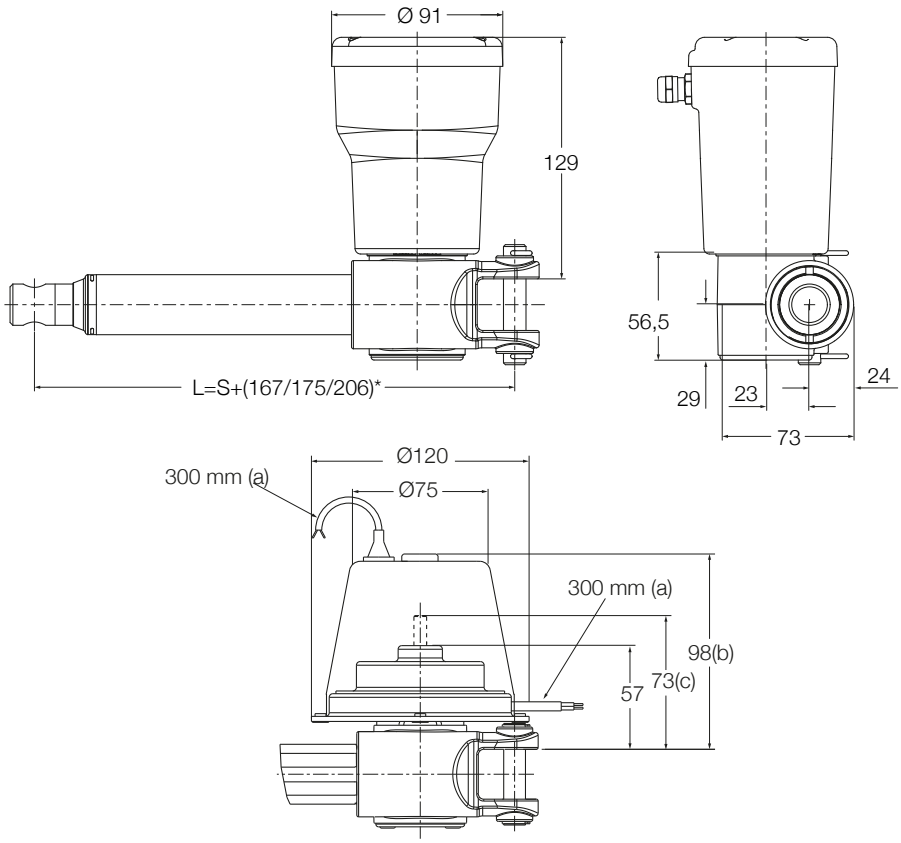
120 or 230 V AC motor

400 V AC motor

Legend:
S = stroke
L = retracted length

1) Dimension depends on selected front attachement

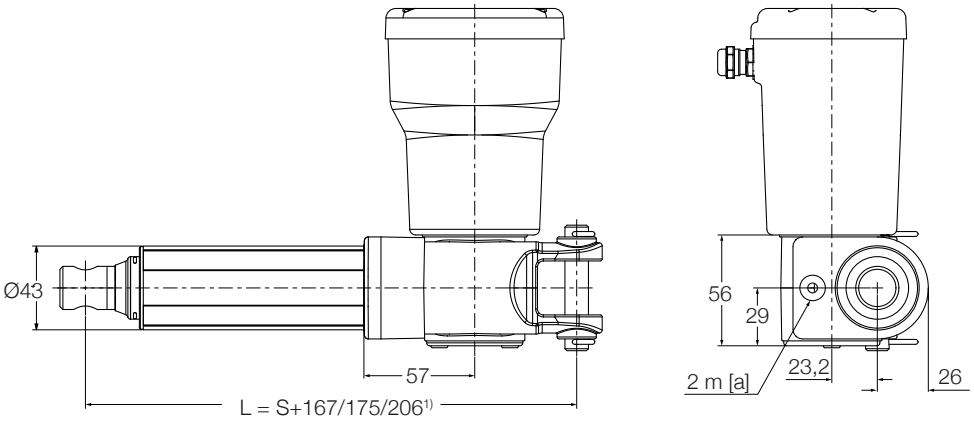
Dimensional drawing – CAT 32B DC version



Legend:
S = stroke
L = retracted length
(a) = cable length
(b) = cover for brake (D24CB)
(c) = extended shaft (D24CS)

D12C, D24C, D24CB, D24CS, D24CW

Dimensional drawing – CAP 43B



D24C/D24CW

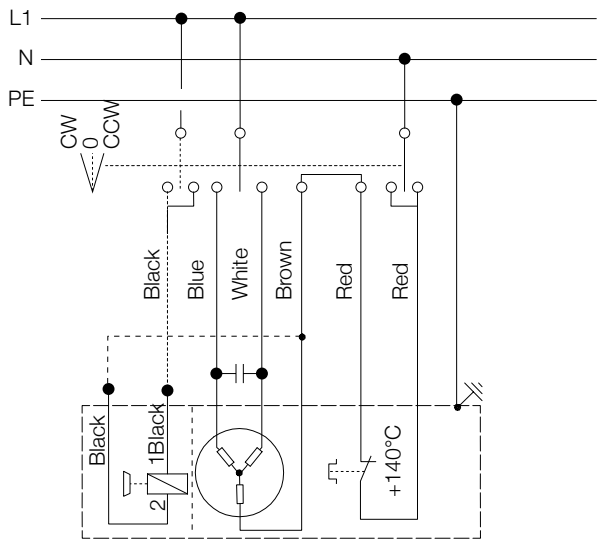
C24C/C24CW

Legend:
S = stroke
L = retracted length
[a] = cable length

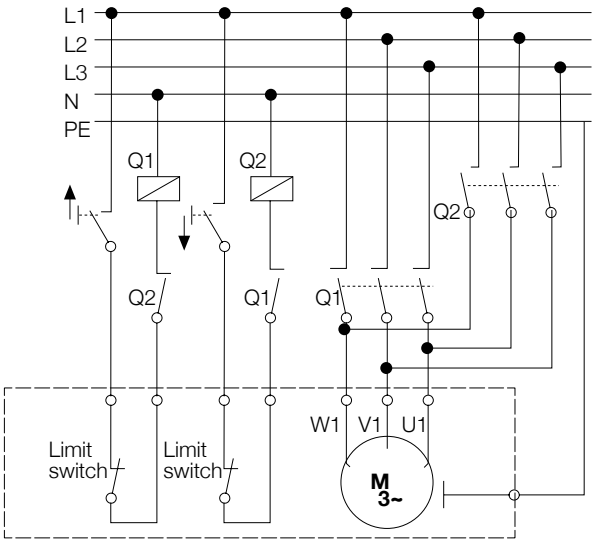
¹⁾ Dimension depends on selected front attachement

Connecting diagrams – AC version

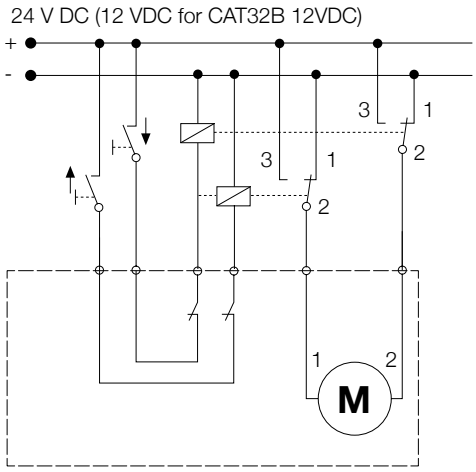
120/230 V AC

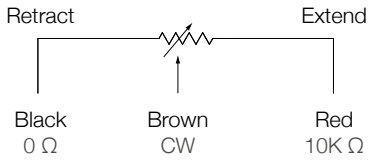


400 V AC



Connecting diagrams – DC version





Connection diagram for linear potentiometer only for CAP 43B.

Suitable control units and accessories AC version

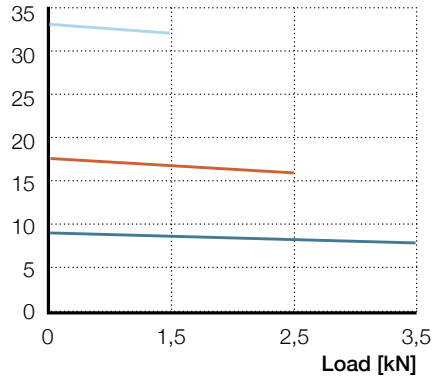
	Limit switch	Encoder
	CAXE32B	E2
E110C	•	•
E110CB	•	•
E220C	•	•
E220CB	•	•
E380C	•	•

Suitable control units and accessories DC version

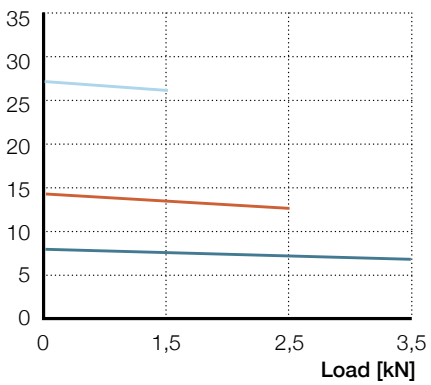
	Control units	Limit switch	Encoder
	CAED 5-24R	CAXE32B	E2
C12C		•	•
D12C		•	•
C24C		•	•
C24CW	•	•	•
D24C		•	•
D24CB		•	•
D24CS		•	•
D24CW	•	•	•

Performance diagrams – AC version

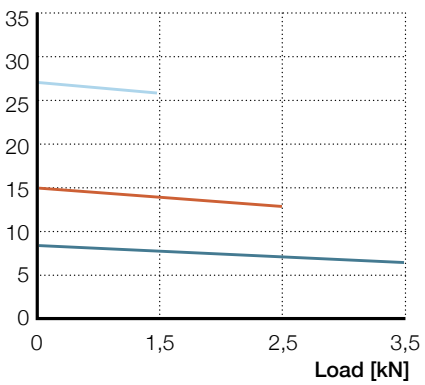
Speed-load diagram CAT 32B ... 120 V AC



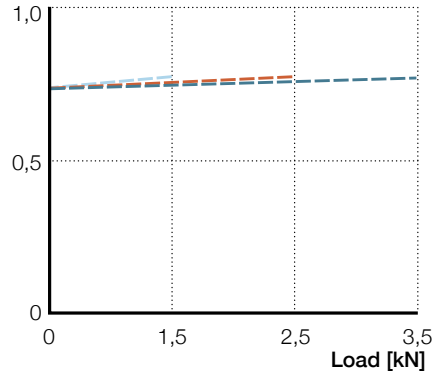
Speed-load diagram CAT 32B ... 230 V AC



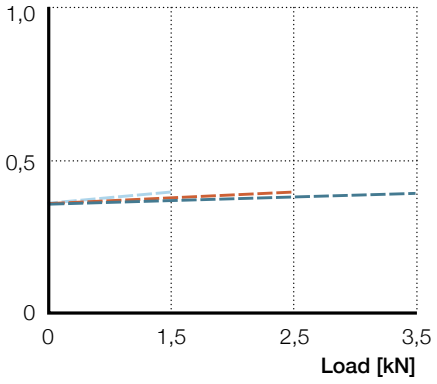
Speed-load diagram CAT 32B ... 400 V AC



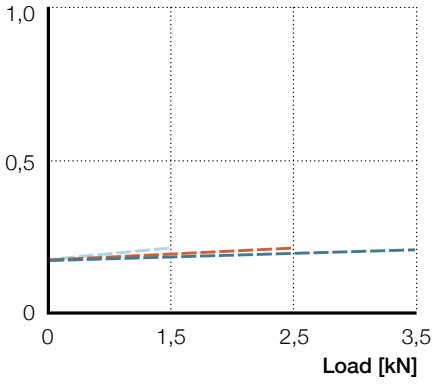
Current-load diagram CAT 32B ... 120 V AC



Current-load diagram CAT 32B ... 230 V AC



Current-load diagram CAT 32B ... 400 V AC



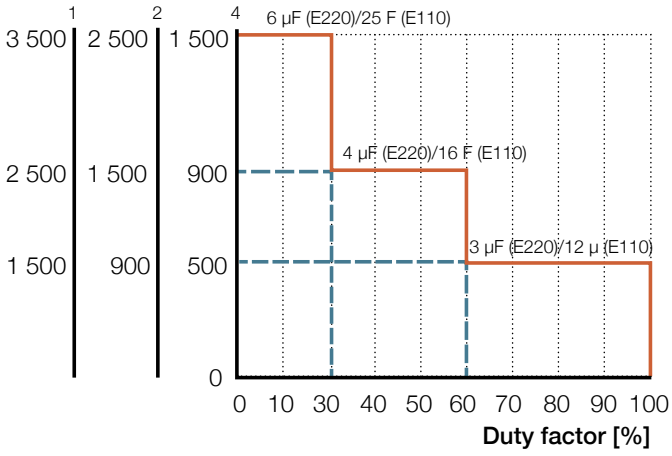
Gear 1 — V (mm/s) — I (A)

Gear 2 — V (mm/s) — I (A)

Gear 4 — V (mm/s) — I (A)

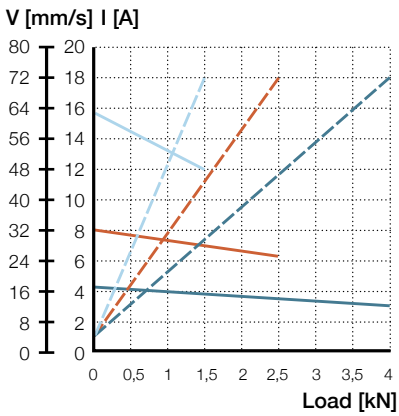
Duty cycle – AC version

CAT 32B…230/120 V AC

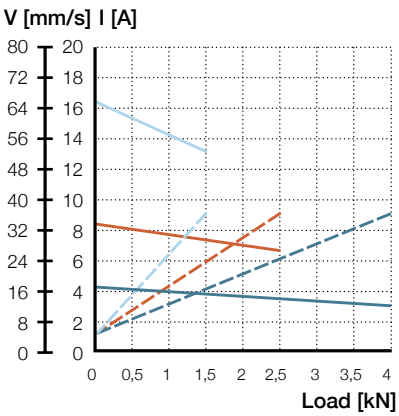


Performance diagrams – DC version

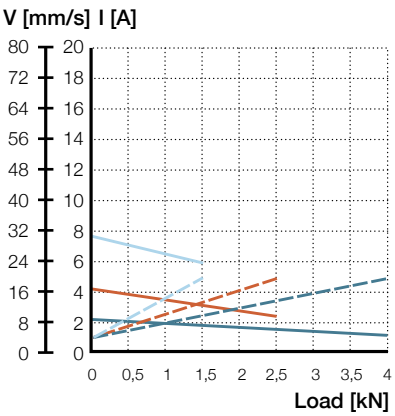
CAT 32B.../C12C



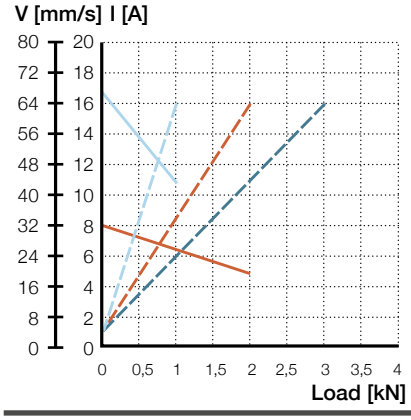
CAT 32B.../C24C
CAP 43B.../C24C



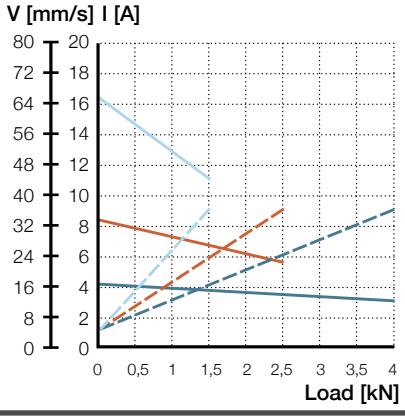
CAT 32B.../C24CW
CAP 43B.../C24CW



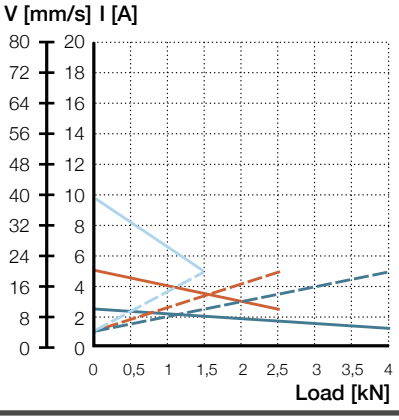
CAT 32B.../D12C



CAT 32B.../D24C/D24CB/D24CS
CAP 43B.../D24C



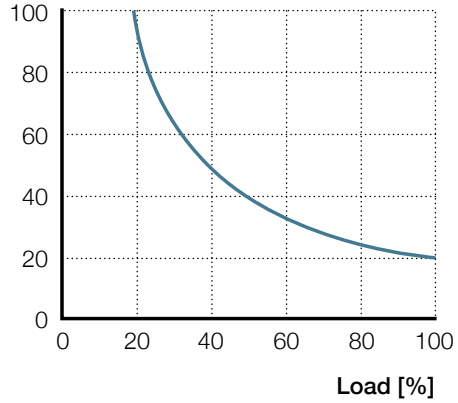
CAT 32B.../D24CW
CAP 43B.../D24CW



Gear 1 — V (mm/s) — I (A) Gear 2 — V (mm/s) — I (A) Gear 4 — V (mm/s) — I (A)

Duty cycle – DC version

Duty factor [%] at 20 °C



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CAR 32B – Type codes for accessories and spare parts

Item code	Type code	Order N°
12 V DC motor (cylindrical motor)	C12C	M/0405535
12 V DC motor (flat motor)	D12C	M/0405518
24 V DC motor (cylindrical motor)	C24C	M/0405536
24 V DC motor (cylindrical with low speed)	C24CW	M/0405537
24 V DC motor (flat motor)	D24C	M/0405519
24 V DC motor (flat motor with brake)	D24CB	M/0405523
24 V DC motor (flat motor with extended shaft	D24CS	M/0405522
24 V DC motor (flat motor with low speed)	D24CW	M/0405521
120 V AC motor (cylindrical motor)	E110C	M/0405533
120 V AC motor (cylindrical motor with brake)	E110CB	M/0405534
230 V AC motor (cylindrical motor)	E220C	M/0405531
230 V AC motor (cylindrical motor with brake)	E220CB	M/0405532
400 V AC motor (cylindrical motor)	E380C	M/0411607
Capacitor value 25 µF (120 V AC)	Capacitor 25 µF	M/0430670–06
Capacitor value 6 µF (230 V AC)	Capacitor 6 µF	M/0430670–03
Limit switch for stroke = 50 mm	CAXE 32B × 50	M/0412070
Limit switch for stroke = 100 mm	CAXE 32B × 100	M/0412071
Limit switch for stroke = 200 mm	CAXE 32B × 200	M/0412073
Limit switch for stroke = 300 mm	CAXE 32B × 300	M/0412074
Limit switch for stroke = 400 mm	CAXE 32B × 400	M/0412075
Limit switch for stroke = 500 mm	CAXE 32B × 500	M/0412076
Limit switch for stroke = 700 mm	CAXE 32B × 700	M/0412077
Proximity switch for CAXE	CAXE Proximity switch	M/0432369
Front mounting attachments type Rod-end	575–32	M/0430575–32
Front mounting attachments type Clevis	576–32	M/0430576–32
Rear mounting attachments type Single ear bracket	580–32	M/0430580–32
Rear mounting attachments type Universal joint	582–32	M/0431780–32
Control unit (suitable for D24CW, C24CW motor)	CAED 5–24R	M/0420209

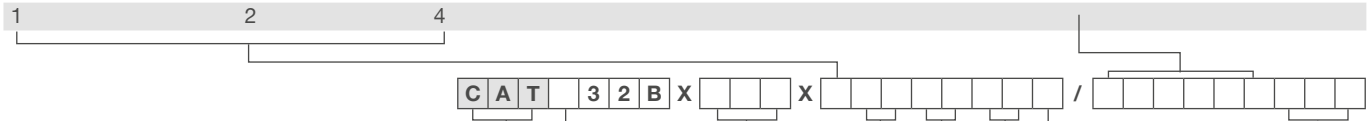
CAP 43B – Type codes for accessories and spare parts

Item code	Type code	Order N°
24 V DC motor (cylindrical motor)	C24C	M/0405536
24 V DC motor (cylindrical with low speed)	C24CW	M/0405537
24 V DC motor (flat motor)	D24C	M/0405519
24 V DC motor (flat motor with low speed)	D24CW	M/0405521
Front mounting attachments type Rod-end	575–32	M/0430575–32
Front mounting attachments type Clevis	576–32	M/0430576–32
Rear mounting attachments type Single ear bracket	580–32	M/0430580–32
Rear mounting attachments type Universal joint	582–32	M/0431780–32

EWELLIX

Ordering key

Load [N] / Full Load Speed [mm/s]			Motor options	
4 000/xx	2 500/xx	1 500/xx	No motor	0000
3 500/8	2 500/16	1 500/32	120 V AC/60 Hz, 1-phase, IP54	E110C
3 500/8	2 500/16	1 500/32	120 V AC/60 Hz, 1-phase, brake, IP20	E110CB
3 500/6,5	40 6/13	20 3/13	230 V AC/50 Hz, 1-phase, IP54	E220C
3 500/6,5	40 6/13	20 3/13	230 V AC/50 Hz, 1-phase, brake, IP20	E220CB
3 500/7	2 500/14	1 500/32	400 V AC/50 Hz, 3-phase, IP55	E380C
4 000/xx	2 500/xx	1 500/xx	No motor	0000
4 000/17-12	2 500/32-25	1 500/63-48	12 V DC, IP44 (65)	C12C
4 000/17-11	2 500/34-19	1 500/67-43	12 V DC, flat motor, IP44	D12C
4 000/17-13	2 500/33-26	1 500/65-52	24 V DC, IP44 (65)	C24C
4 000/9-5	2 500/17-10	1 500/31-24	24 V DC, low speed motor, IP44 (IP65)	C24CW
4 000/16-12	2 500/33-22	1 500/65-44	24 V DC, flat motor, IP44	D24C
4 000/16-12	2 500/33-22	1 500/65-44	24 V DC, flat motor, brake, IP20	D24CB
4 000/16-12	2 500/33-22	1 500/65-44	24 V DC, flat motor, ext.shaft, IP44	D24CS
4 000/10-5	2 500/20-10	1 500/39-20	24 V DC, flat motor, low speed, IP44	D24CW



Type

Motor assembly
R Right
L Left

Stroke (S)
050 50 mm
100 100 mm
200 200 mm
300 300 mm
400 400 mm
500 500 mm
700 700 mm
– – – Other stroke lengths

Rear attachment
A1 Fork ear, Ø12,0 mm
A2 Fork ear, Ø12,7 mm
K1 Single ear, Ø12,0 mm
K2 Single ear, Ø12,7 mm

Front attachment
G1 Hole, Ø12,0 mm
G2 Hole, Ø12,7 mm
G3 Male thread, M12
G4 Female thread, M12
G5 Fork ear, Ø10,1 mm

Feedback
No encoder (no code)
E2 Encoder (for all standard motors)

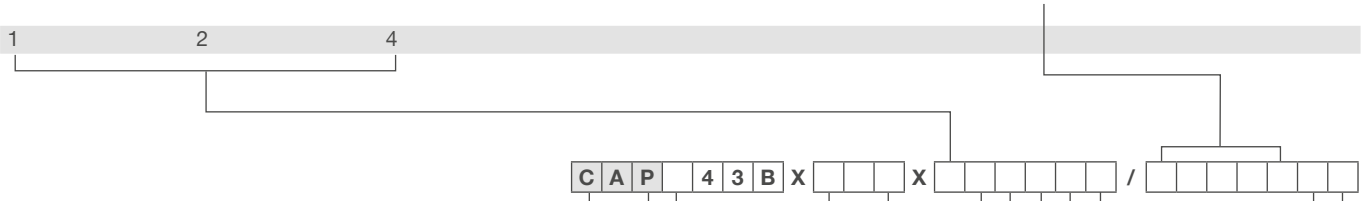
Option
F Friction clutch (not available with option encoder)
Z No friction clutch
S Back-up nut

Option for CxxC motors
T2 Straight cable, 2,0 m, no plug
T2P Straight cable, 2,0 m, jack plug
T6 Straight cable, 6,0 m, no plug

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

Ordering key

Load [N] / Full Load Speed [mm/s]			Motor options	
4 000/xx	2 500/xx	1 500/xx	No motor	0000
4 000/17-13	2 500/33-26	1 500/65-52	24 V DC, IP44	C24C
4 000/9-5	2 500/17-10	1 500/31-24	24 V DC, low speed, IP44	C24CW
4 000/16-12	2 500/33-22	1 500/65-44	24 V DC, flat motor, IP44	D24C
4 000/10-5	2 500/20-10	1 500/39-20	24 V DC, flat motor, low speed, IP44	D24CW
1	2	4		



Type

Motor assembly
R Right
L Left

Stroke [S]
100 100 mm
200 200 mm
300 300 mm
400 400 mm
500 500 mm
700 700 mm

Rear attachment
A1 Fork ear, Ø12,0 mm
A2 Fork ear, Ø12,7 mm
K1 Single ear, Ø12,0 mm
K2 Single ear, Ø12,7 mm

Front attachment
G1 Hole, Ø12,0 mm
G2 Hole, Ø12,7 mm
G3 Male thread, M12
G4 Female thread, M12
G5 Fork ear, Ø10,1 mm

Option
F Friction clutch
S Back-up nut

Cable option for C24C[W] motors
T2 Straight, 2,0 m
T6 Straight cable, 6,0 m, no plug

CAT 33 and CAP 43A

Linear actuator

Benefits

- Small
- Robust
- Highly efficient
- Lubricated for service life
- Digital encoder feedback

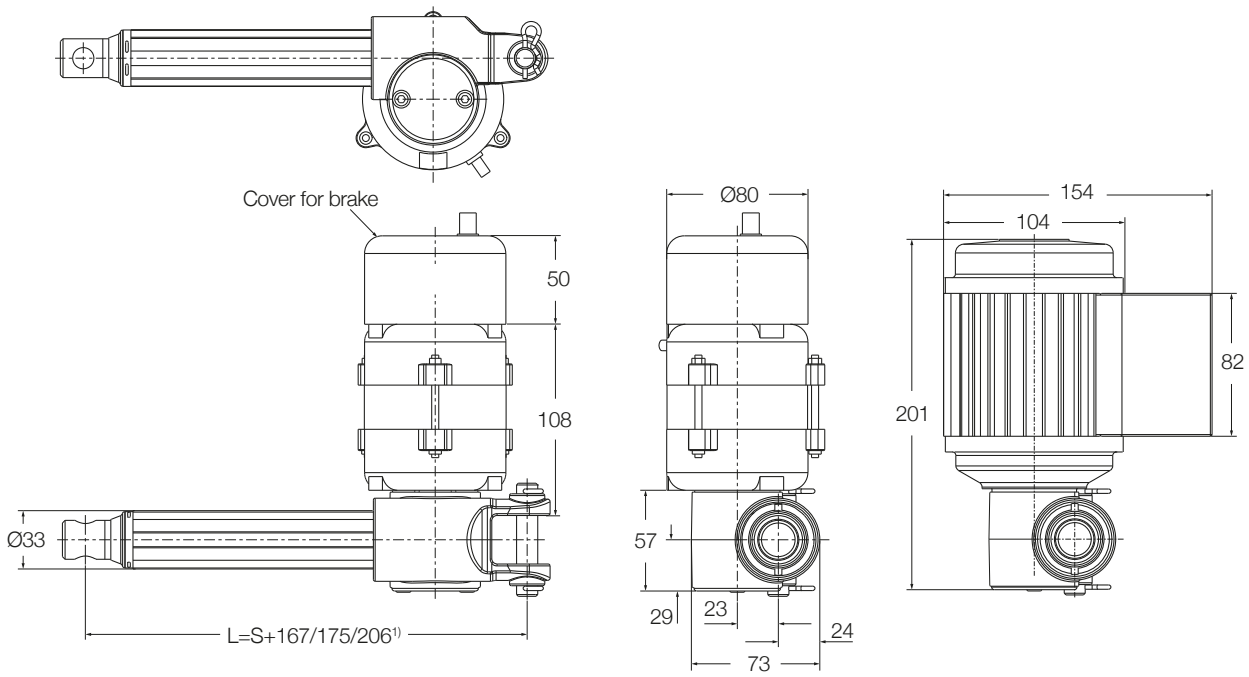
Technical data

		Unit	CAT 33 - AC version	CAT 33 - DC version	CAP 43A
Rated push load		N	800 to 3 000	800 to 3 000	1 000 to 3 000
Rated pull load		N	800 to 3 000	800 to 3 000	1 000 to 3 000
Speed (at full load)		mm/s	5 to 24 [1]	5 to 52 [1]	5 to 52 [1]
Stroke		mm	100 to 400	100 to 400	100 to 400
Retracted length		mm	S+150/158/189 [2]	S+150/158/189 [2]	S+150/158/189 [2]
Voltage		V AC	120, 230 or 400	–	–
		V DC	–	12 or 24	24
Power consumption	120 V AC	W	98 (brake 133,2 W)	–	–
	230 V AC	W	92 (brake 117,3 W)	–	–
	400 V AC	W	80	–	–
	12 or 24 V DC	W	–	N/A	N/A
Current consumption	120 V AC	A	0,82 (brake +0,29 A)	–	–
	230 V AC	A	0,4 (brake + 0,11 A)	–	–
	400 V AC	A	0,2	–	–
	12 V DC	A	–	18	–
	24 V DC	A	–	9	9
	24 V DC	A	–	5 (for motors C24CW and D24CW)	5
Duty cycle		%	30	15	15
Ambient temperature		°C	–20 to +50	–20 to +50	–20 to +50
Type of protection		IP	20/54/55	20/44/66 [1]	44
Weight		kg	2 to 2,7	2 to 2,7	2,0 to 2,7

[1] Depending on selected motor

[2] Dimension depends on selected front attachment

Dimensional drawing – CAT 33 AC version



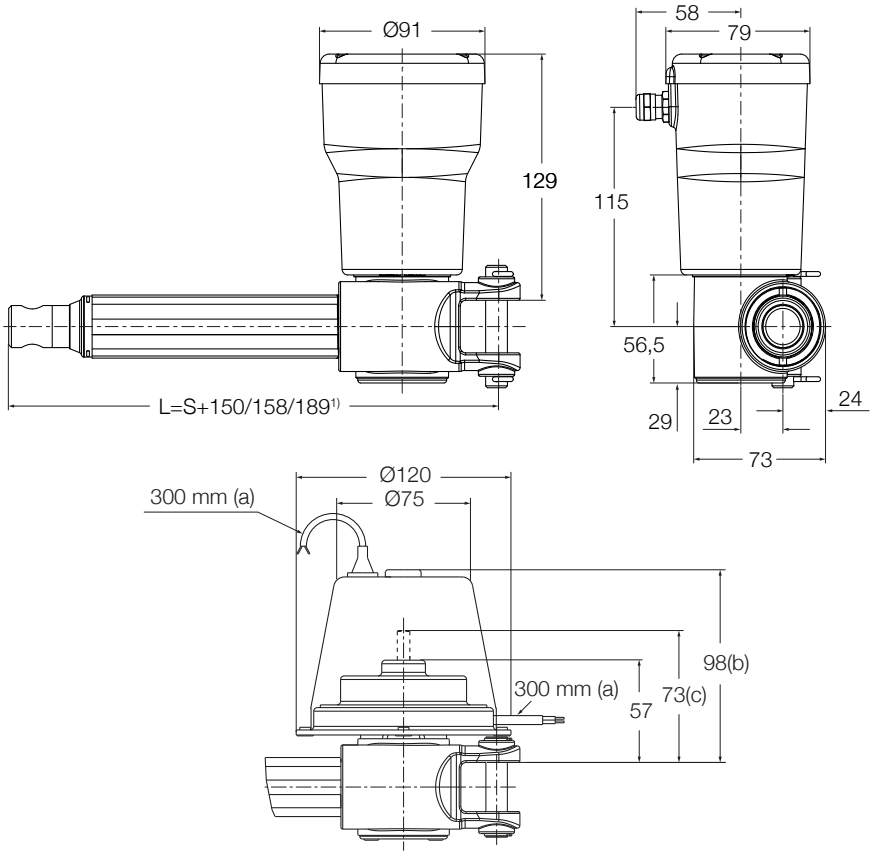
120 or 230 V AC motor

400 V AC motor

Legend:
S = stroke
L = retracted length

¹⁾ Dimension depends on selected front attachement

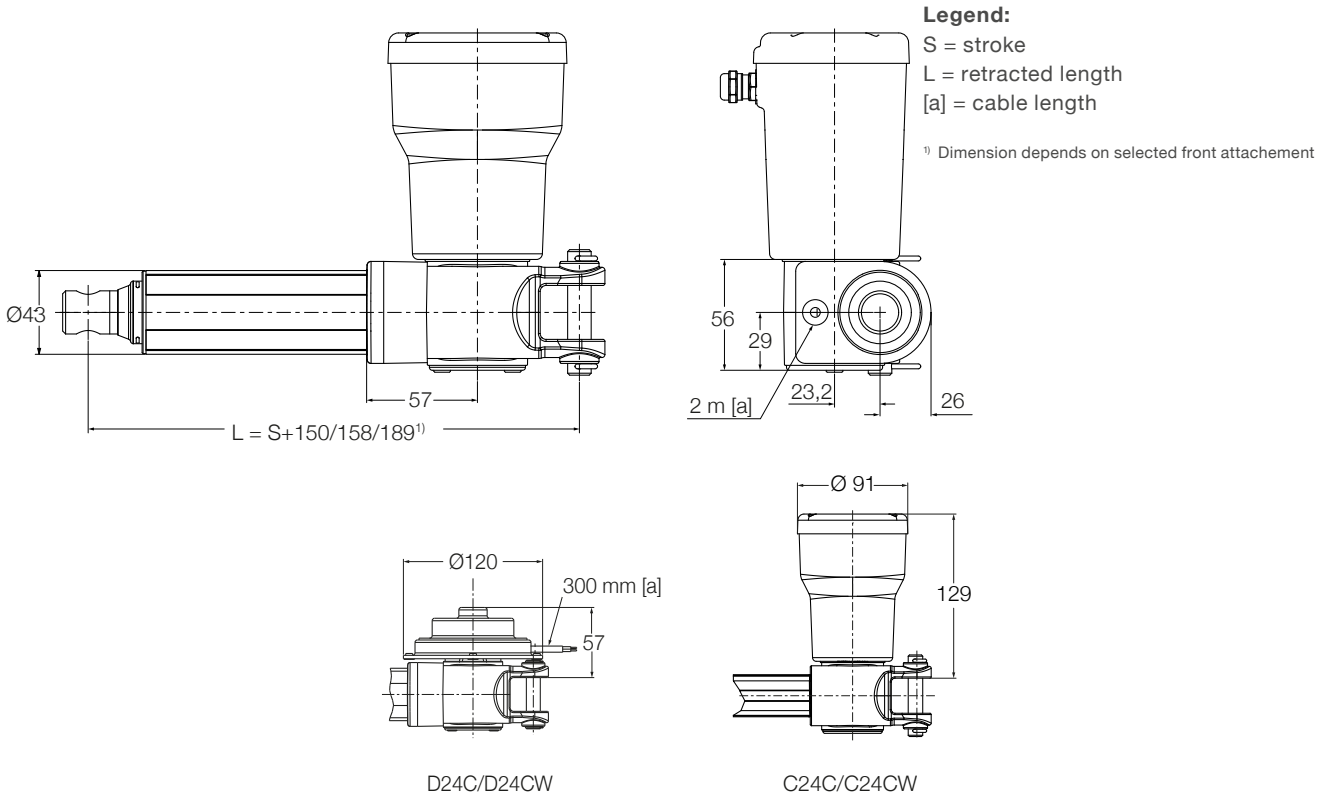
Dimensional drawing – CAT 33 DC version



Legend:
S = stroke
L = retracted length
(a) = cable length
(b) = cover for brake (D24CB)
(c) = extended shaft (D24CS)

¹⁾ Dimension depends on selected front attachement

Dimensional drawing – CAP 43A

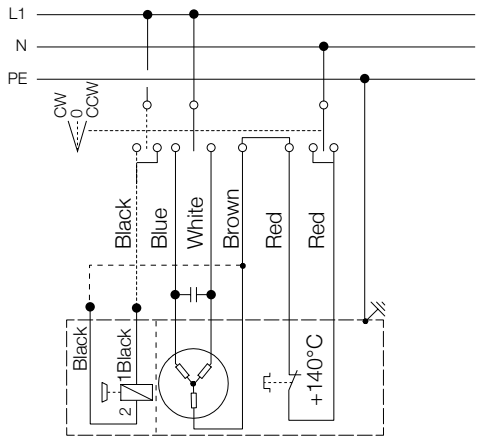


Legend:
S = stroke
L = retracted length
[a] = cable length

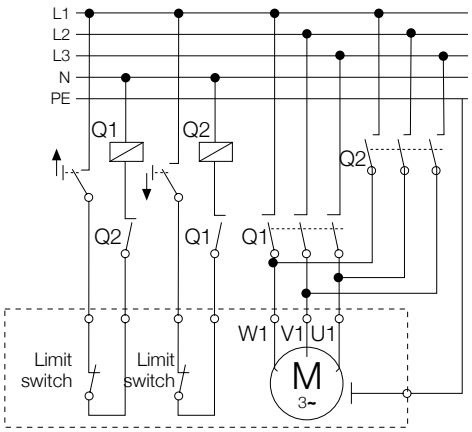
¹⁾ Dimension depends on selected front attachement

Connecting diagrams – CAT 33 AC version

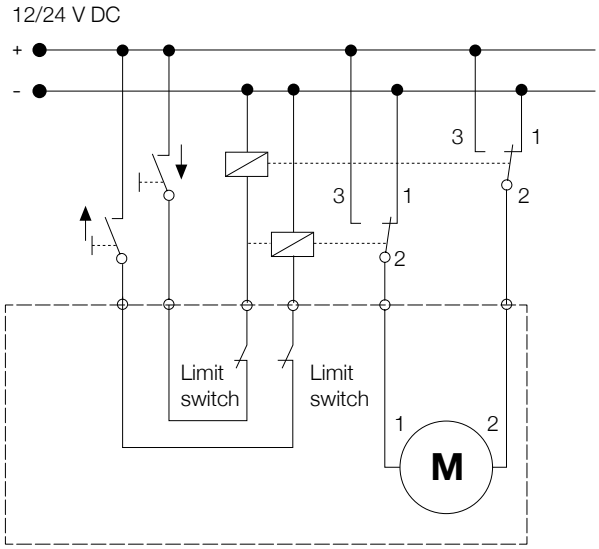
120/230 V AC



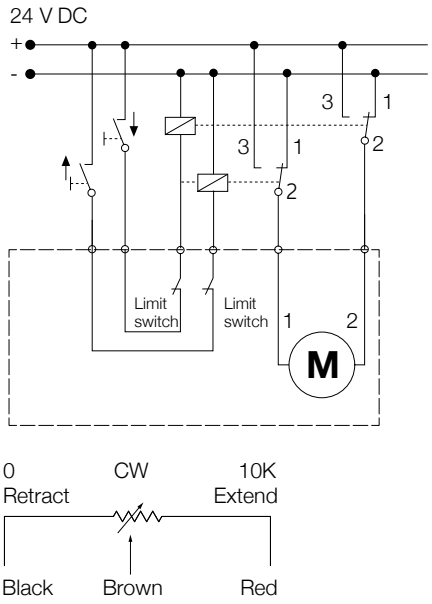
400 V AC



Connecting diagrams – CAT 33 DC version



Connecting diagrams – CAP 43A



Connection diagram for linear potentiometer

Suitable control units and accessories AC version

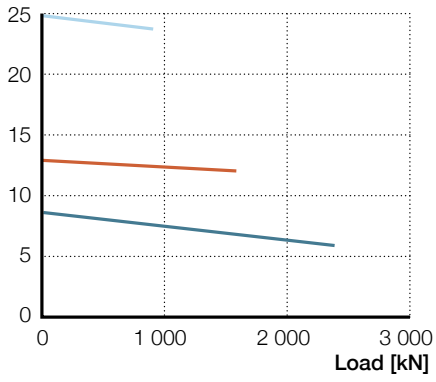
	Limit switch	Encoder
	CAXD33	E2
E110C	•	•
E110CB	•	•
E220C	•	•
E220CB	•	•
E380C	•	•

Suitable control units and accessories DC version

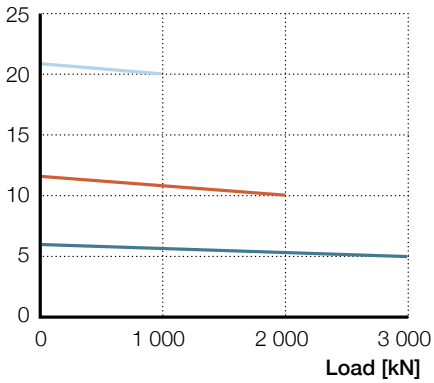
	Control units	Encoder
	CAED 5-24R	E2
C12C		•
D12C		•
C24C		•
C24CW	•	•
D24C		•
D24CB		•
D24CS		•
D24CW	•	•

Performance diagrams – AC version

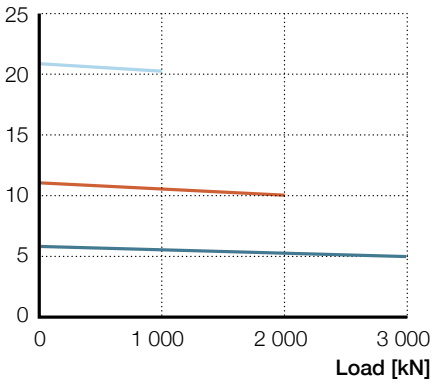
Speed-load diagram CAT 33 ... 120 V AC



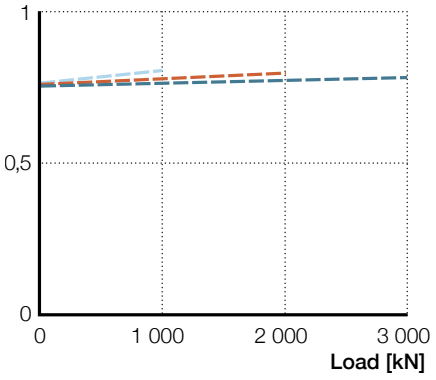
Speed-load diagram CAT 33 ... 230 V AC



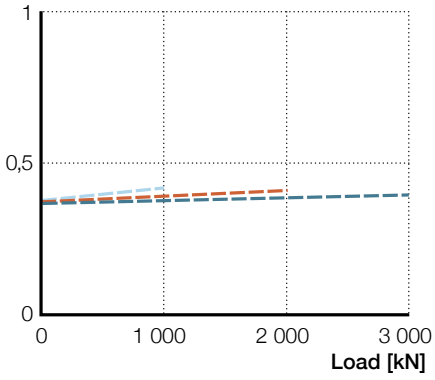
Speed-load diagram CAT 33 ... 400 V AC



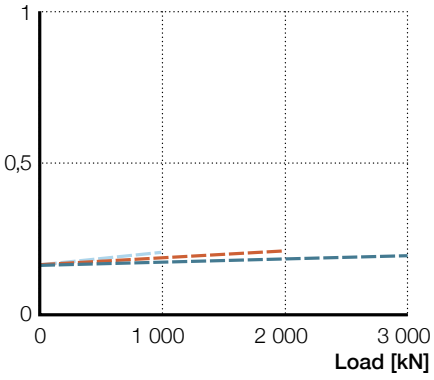
Current-load diagram CAT 33 ... 120 V AC



Current-load diagram CAT 33 ... 230 V AC



Current-load diagram CAT 33 ... 400 V AC



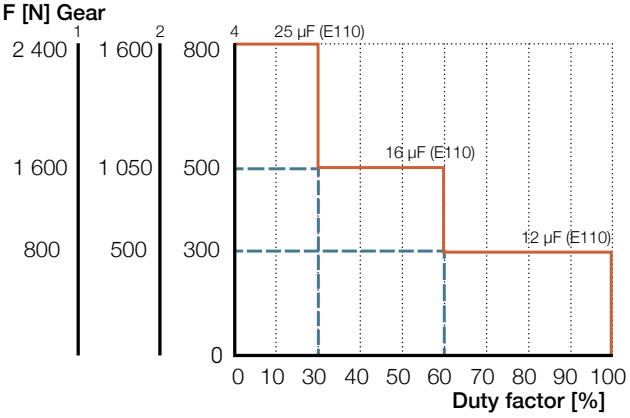
Gear 1 — V (mm/s) — I (A)

Gear 2 — V (mm/s) — I (A)

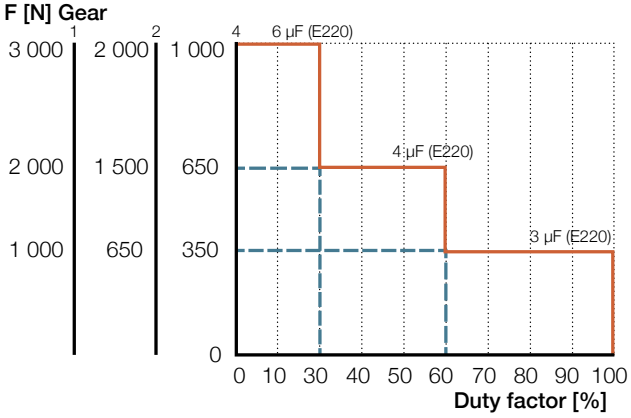
Gear 4 — V (mm/s) — I (A)

Duty cycle

CAT 33 ... 120 V AC

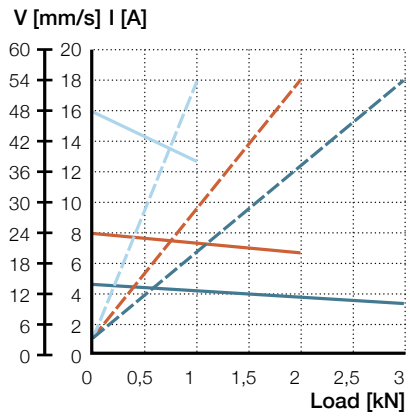


CAT 33 ... 230 V AC

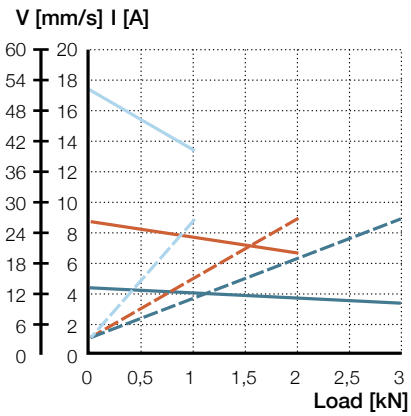


Performance diagrams – DC version

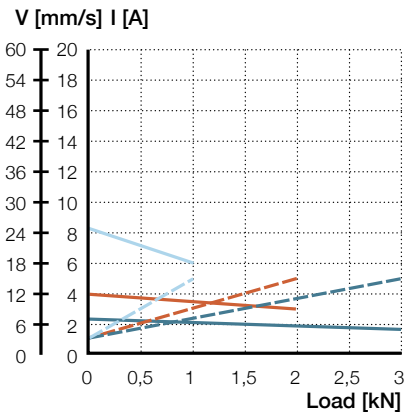
CAT 33.../C12C



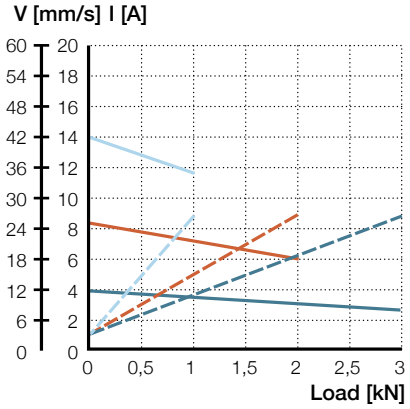
CAT 33.../C24C
CAP 43B.../C24C



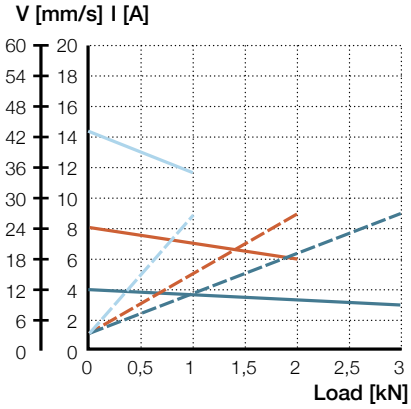
CAT 33.../C24CW
CAP 43B.../C24CW



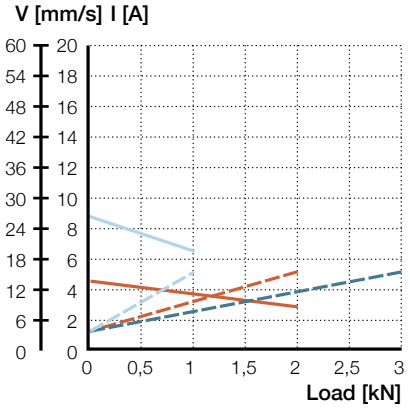
CAT 33.../D12C



CAT 33.../D24C/D24CB/D24CS
CAP 43B.../D24C



CAT 33.../D24CW
CAP 43B.../D24CW



Gear 1 — V (mm/s) — I (A)

Gear 2 — V (mm/s) — I (A)

Gear 4 — V (mm/s) — I (A)

Duty cycle – DC version

151

CAT 33 – Type codes for accessories and spare parts

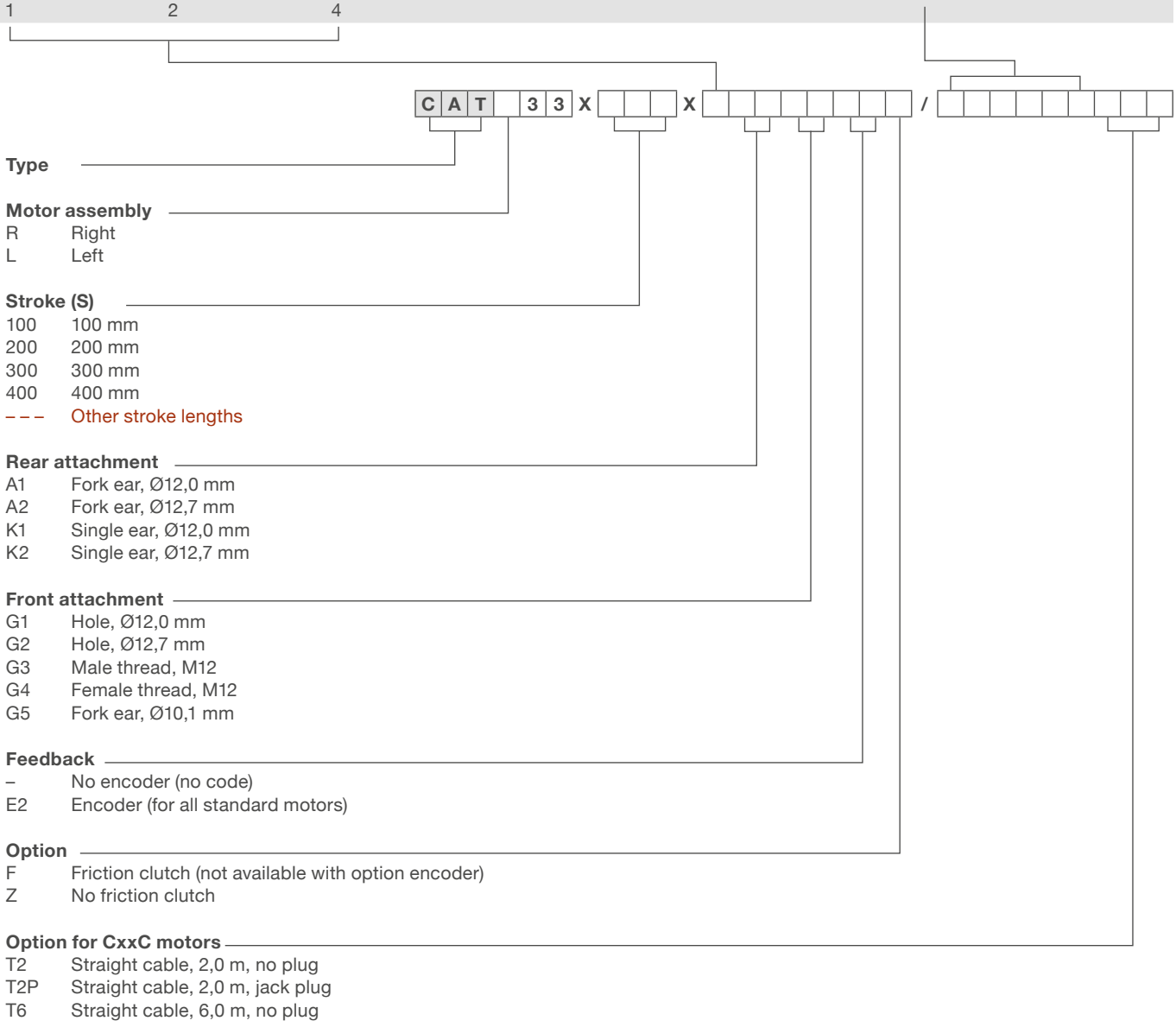
Item code	Type code	Order N°
12 V DC motor (cylindrical motor)	C12C	M/0405535
12 V DC motor (flat motor)	D12C	M/0405518
24 V DC motor (cylindrical motor)	C24C	M/0405536
24 V DC motor (cylindrical with low speed)	C24CW	M/0405537
24 V DC motor (flat motor)	D24C	M/0405519
24 V DC motor (flat motor with brake)	D24CB	M/0405523
24 V DC motor (flat motor with extended shaft)	D24CS	M/0405522
24 V DC motor (flat motor with low speed)	D24CW	M/0405521
120 V AC motor (cylindrical motor)	E110C	M/0405533
120 V AC motor (cylindrical motor with brake)	E110CB	M/0405534
230 V AC motor (cylindrical motor)	E220C	M/0405531
230 V AC motor (cylindrical motor with brake)	E220CB	M/0405532
400 V AC motor (cylindrical motor)	E380C	M/0411607
Capacitor value 25 µF (120 V AC)	Capacitor 25 µF	M/0430670–06
Capacitor value 6 µF (230 V AC)	Capacitor 6 µF	M/0430670–03
Limit switch for any stroke, normally closed	CAXD33, NC	M/0440054
Limit switch for any stroke, normally open	CAXD33, NO	M/0440053
Front mounting attachments type Rod-end	575–32	M/0430575–32
Front mounting attachments type Clevis	576–32	M/0430576–32
Rear mounting attachments type Single ear bracket	580–32	M/0430580–32
Rear mounting attachments type Universal joint	582–32	M/0431780–32
Control unit (suitable for D24CW,C24CW motor)	CAED 5–24R	M/0420209

CAP 43A – Type codes for accessories and spare parts

Item code	Type code	Order N°
24 V DC motor (cylindrical motor)	C24C	M/0405536
24 V DC motor (cylindrical with low speed)	C24CW	M/0405537
24 V DC motor (flat motor)	D24C	M/0405519
24 V DC motor (flat motor with low speed)	D24CW	M/0405521
Front mounting attachments type Rod-end	575–32	M/0430575–32
Front mounting attachments type Clevis	576–32	M/0430576–32
Rear mounting attachments type Single ear bracket	580–32	M/0430580–32
Rear mounting attachments type Universal joint	582–32	M/0431780–32

Ordering key

Load [N] / Full Load Speed [mm/s]			Motor options	
3 000/xx	2 000/xx	1 000/xx	No motor	0000
2 400/6	1 600/12	800/24	120 V AC/60 Hz, 1-phase, IP54	E110C
2 400/6	1 600/12	800/24	120 V AC/60 Hz, 1-phase, brake, IP20	E110CB
3 000/5	2 000/10	1 000/20	230 V AC/50 Hz, 1-phase, IP54	E220C
3 000/5	2 000/10	1 000/20	230 V AC/50 Hz, 1-phase, brake, IP20	E220CB
3 000/5	2 000/10	1 000/20	400 V AC/50 Hz, 3-phase, IP55	E380C
3 000/xx	2 000/xx	1 000/xx	No motor	0000
3 000/13–10	2 000/24-20	1 000/48-38	12 V DC, IP44 (65)	C12C
2 400/ 11–7	1 600/21-15	800/39-21	12 V DC, flat motor, IP44	D12C
3 000/13–10	2 000/26-20	1 000/52-40	24 V DC, IP44 (65)	C24C
3 000/7–5	2 000/13-9	1 000/25-18	24 V DC, low speed, IP44 (65)	C24CW
3 000/12–9	2 000/25-18	1 000/43-35	24 V DC, flat motor, IP44	D24C
3 000/12–9	2 000/25-18	1 000/43-35	24 V DC, flat motor, brake, IP20	D24CB
3 000/12–9	2 000/25-18	1 000/43-35	24 V DC, flat motor, IP44, ext. shaft	D24CS
3 000/7–5	2 000/13-8	1 000/26-19	24 V DC, flat motor, low speed, IP44	D24CW



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

Ordering key

Load [N] / Full Load Speed [mm/s]			Motor options	
3 000/xx	2 000/xx	1 000/xx	No motor	0000
3 000/13–10	2 000/26–20	1 000/52–40	24 VDC, IP44	C24C
3 000/7–5	2 000/13–9	1 000/25–18	24 VDC, IP44	C24CW
3 000/12–9	2 000/25–18	1 000/43–35	24 VDC, flat motor, IP44	D24C
3 000/7–5	2 000/13–8	1 000/26–19	24 VDC, flat motor, low speed, IP44	C24CW
1	2	4		

Type

Motor assembly
R Right
L Left

Stroke [S]
100 100 mm
200 200 mm
300 300 mm
400 400 mm

Rear attachment
A1 Fork ear, Ø12,0 mm
A2 Fork ear, Ø12,7 mm
K1 Single ear, Ø12,0 mm
K2 Single ear, Ø12,7 mm

Front attachment
G1 Hole, Ø12,0 mm
G2 Hole, Ø12,7 mm
G3 Male thread, M12
G4 Female thread, M12
G5 Fork ear, Ø10,1 mm

Option
F Friction clutch

Cable option for C24C[W] motors
T2 Straight, 2,0 m
T6 Straight cable, 6,0 m, no plug

CAT 33H

Linear actuator

Benefits

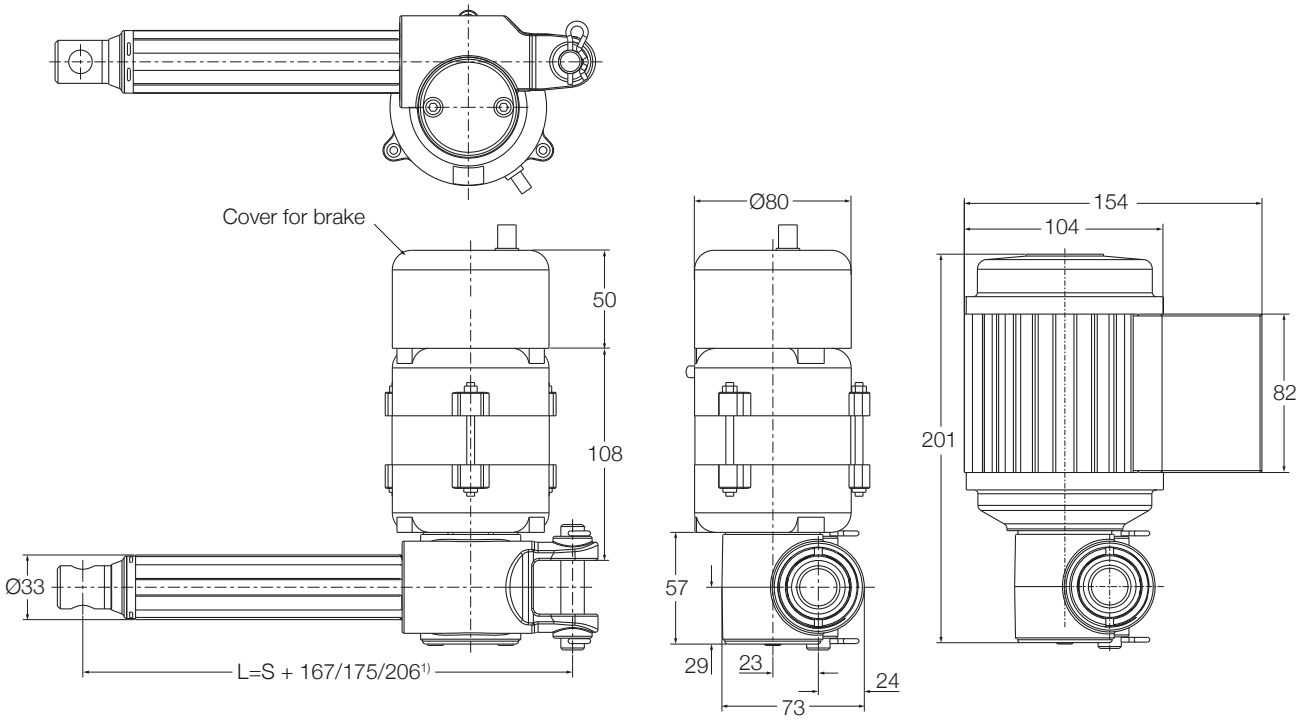
- Compact
- Robust
- Modular
- Lubricated for service life
- High efficiency
- Digital encoder feedback

Technical data

		Unit	CAT 33H – AC version	CAT 33H – DC version
Rated push load		N	500 to 1 200	400 to 1 200
Rated pull load		N	500 to 1 200	400 to 1 200
Speed (at full load)		mm/s	20 to 90 [1]	17 to 193 [1]
Stroke		mm	100 to 400	100 to 400
Retracted length		mm	S+150/158/189 [2]	S+150/158/189 [2]
Voltage		V AC	120, 230 or 400	–
		V DC	–	12 or 24
Power consumption	120 V AC	W	98 (brake 133,2 W)	–
	230 V AC	W	92 (brake 117,3 W)	–
	400 V AC	W	80	–
	12 or 24 V DC	W	–	N/A
Current consumption	120 V AC	A	0,82 (brake +0,29 A)	–
	230 V AC	A	0,4 (brake +0,11 A)	–
	400 V AC	A	0,2	–
	12 V DC	A	–	18
	24 V DC	A	–	9
	24 V DC	A	–	5 (for motors C24CW and D24CW)
Duty cycle		%	30	20
Ambient temperature		°C	–20 to +50	–20 to +50
Type of protection		IP	20/54/55	20/44/66 [1]
Weight		kg	2 to 2,7	2 to 2,7

[1] Depending on selected motor
[2] Dimension depends on selected front attachment

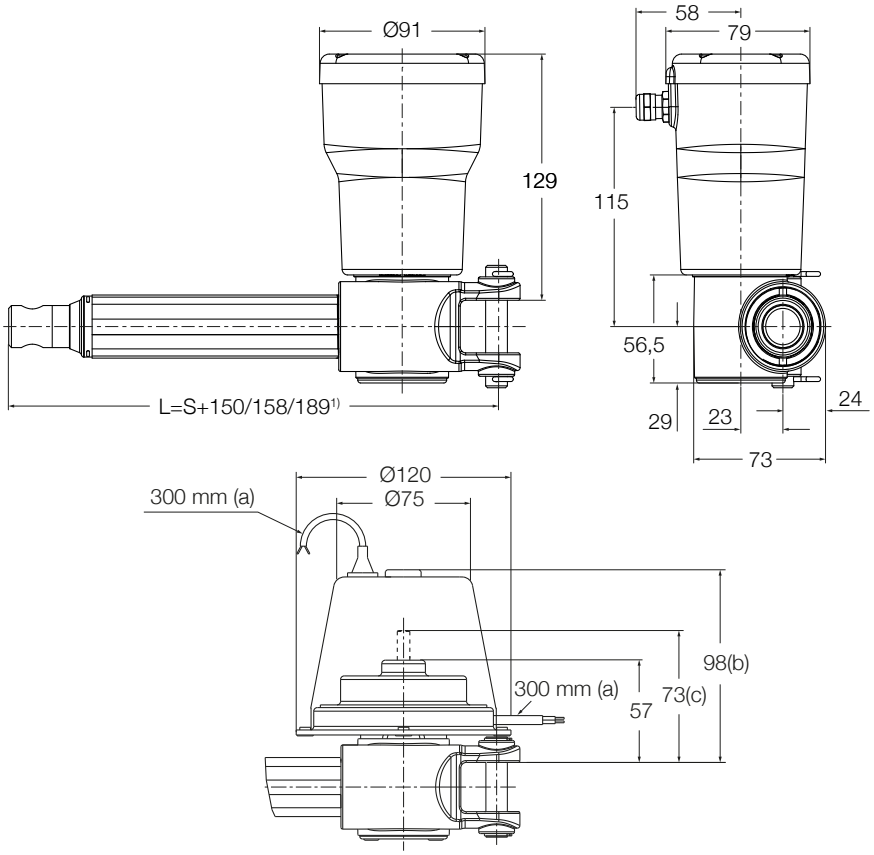
Dimensional drawing – AC version



Legend:
S = stroke
L = retracted length

¹⁾ Dimension depends on selected front attachement

Dimensional drawing – DC version



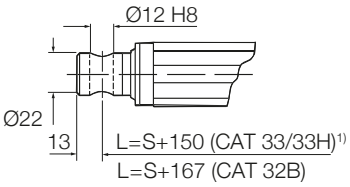
Legend:
S = stroke
L = retracted length
(a) = cable length
(b) = cover for brake (D24CB)
(c) = extended shaft (D24CS)

¹⁾ Dimension depends on selected front attachement

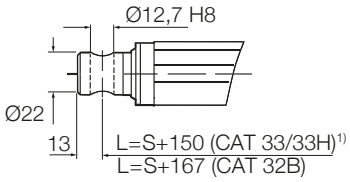
D12C, D24C, D24CB, D24CS, D24CW

Detailed drawings of front and rear attachments for CAT and CAP 43 and motor options for CAT

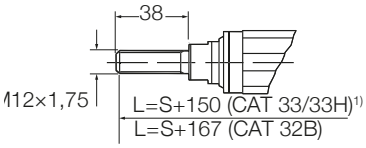
Front attachments and retracted length



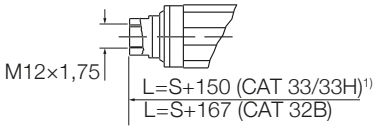
G1



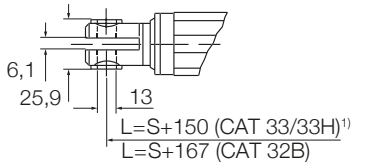
G2



G3

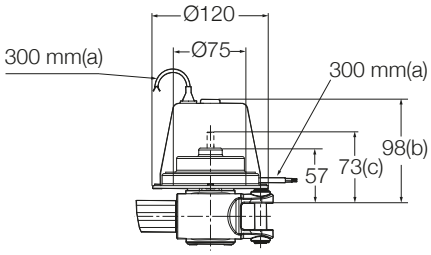


G4

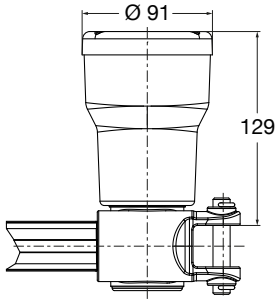


G5

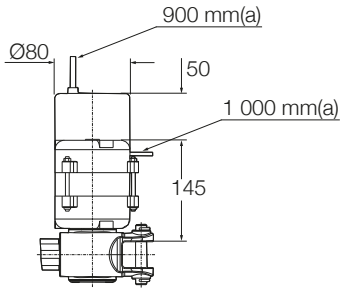
Motor options for CAT



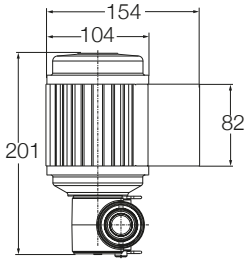
D12C, D24C, D24CB, D24CS, D24CW



C12XX/C24XX

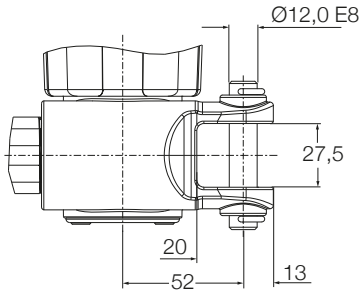


E110C, E110CB, E220C, E220CB

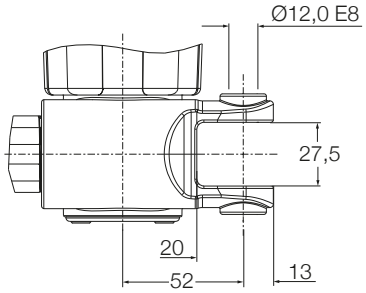


E380C

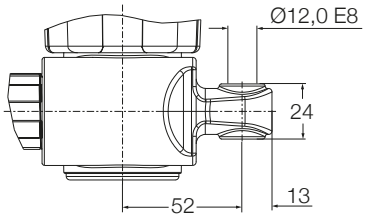
Rear attachments



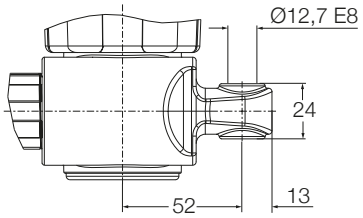
A1



A2



K1



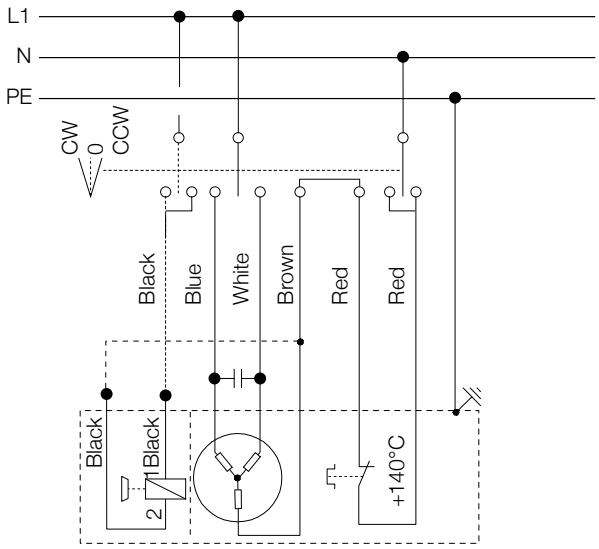
K2

Legend:
S = stroke
L = retracted length
(a) = cable length
(b) = cover for brake
(c) = extended shaft

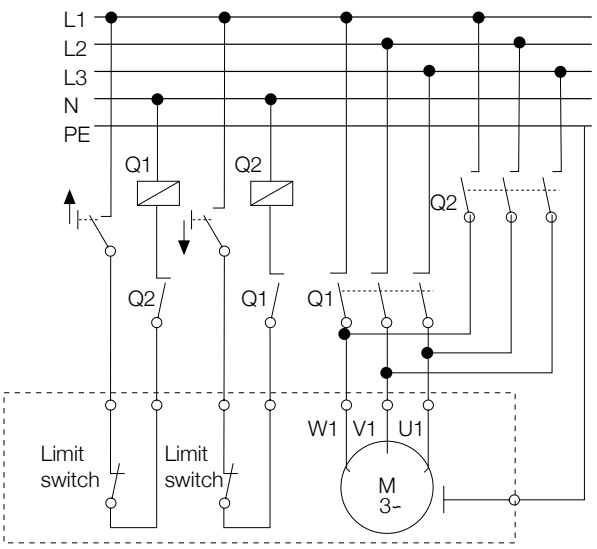
1) If S =400, add 50 mm to retracted length.

Connecting diagrams – AC version

120/230 V AC

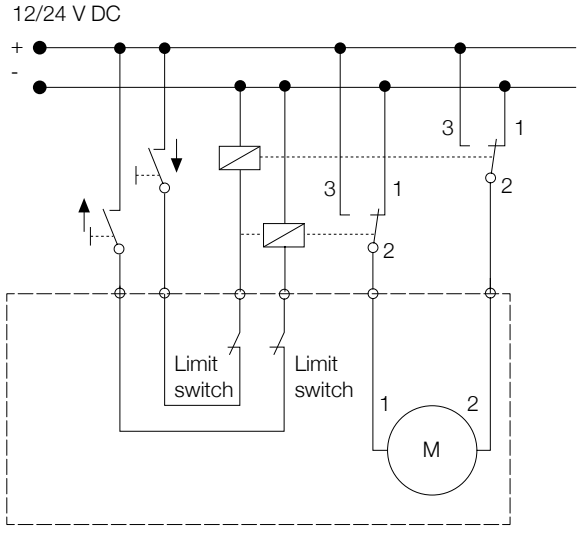


400 V AC



Connecting diagrams – DC version

12/24 V DC



Suitable control units and accessories AC version

	Encoder
	E2
E110C	•
E110CB	•
E220C	•
E220CB	•
E380C	•

Suitable control units and accessories DC version

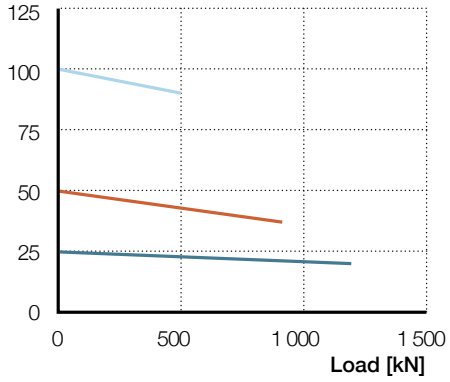
	Control units	Encoder
	CAED 5-24R	E2
C12C		•
D12C		•
C24C		•
C24CW	•	•
D24C		•
D24CB		•
D24CS		•
D24CW	•	•

CAT 33H – Type codes for accessories and spare parts

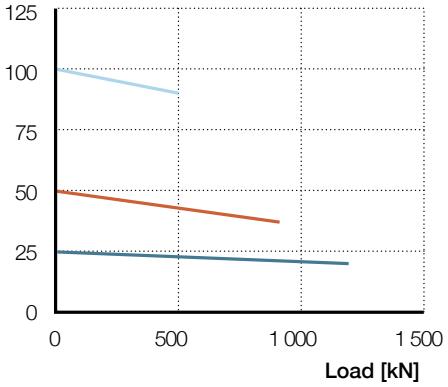
Item code	Type code	Order N°
12 V DC motor (cylindrical motor)	C12C	M/0405535
12 V DC motor (flat motor)	D12C	M/0405518
24 V DC motor (cylindrical motor)	C24C	M/0405536
24 V DC motor (cylindrical with low speed)	C24CW	M/0405537
24 V DC motor (flat motor)	D24C	M/0405519
24 V DC motor (flat motor with brake)	D24CB	M/0405523
24 V DC motor (flat motor with extended shaft)	D24CS	M/0405522
24 V DC motor (flat motor with low speed)	D24CW	M/0405521
120 V AC motor (cylindrical motor)	E110C	M/0405533
120 V AC motor (cylindrical motor with brake)	E110CB	M/0405534
230 V AC motor (cylindrical motor)	E220C	M/0405531
230 V AC motor (cylindrical motor with brake)	E220CB	M/0405532
400 V AC motor (cylindrical motor)	E380C	M/0411607
Capacitor value 25 µF (120 V AC)	Capacitor 25 µF	M/0430670–06
Capacitor value 6 µF (230 V AC)	Capacitor 6 µF	M/0430670–03
Front mounting attachments type Rod-end	575–32	M/0430575–32
Front mounting attachments type Clevis	576–32	M/0430576–32
Rear mounting attachments type Single ear bracket	580–32	M/0430580–32
Rear mounting attachments type Universal joint	582–32	M/0431780–32
Control unit (suitable for D24CW,C24CW motor)	CAED 5–24R	M/0420209

Performance diagrams – AC version

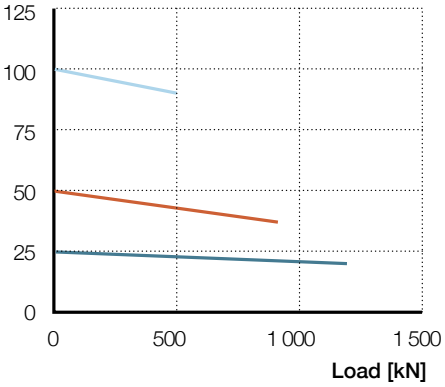
Speed-load diagram CAT 33H ... 120 V AC



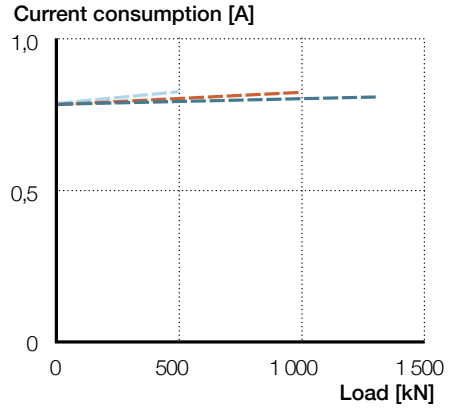
Speed-load diagram CAT 33H ... 230 V AC



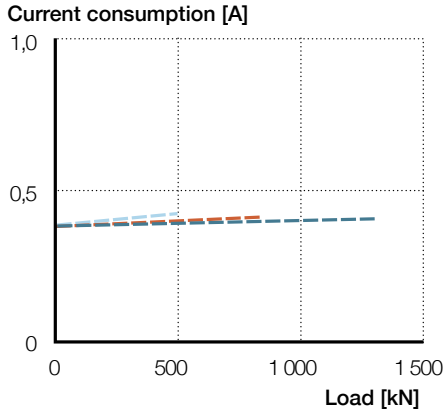
Speed-load diagram CAT 33H ... 400 V AC



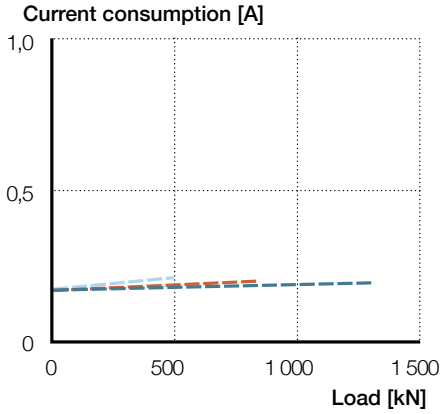
Current-load diagram CAT 33H ... 120 V AC



Current-load diagram CAT 33H ... 230 V AC



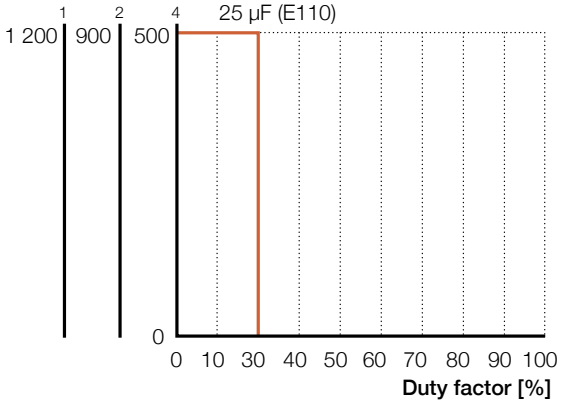
Current-load diagram CAT 33H ... 400 V AC



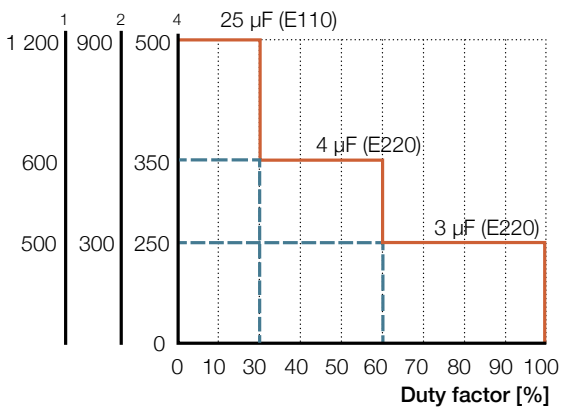
Gear 1 — V (mm/s) — I (A) Gear 2 — V (mm/s) — I (A) Gear 4 — V (mm/s) — I (A)

Duty cycle

F [N] Gear

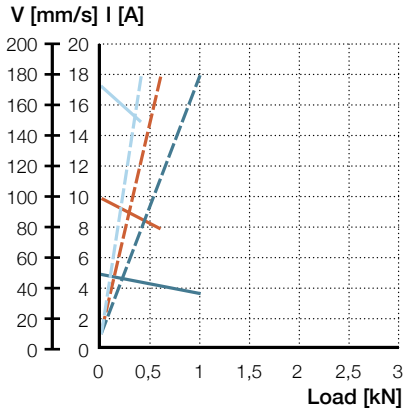


F [N] Gear

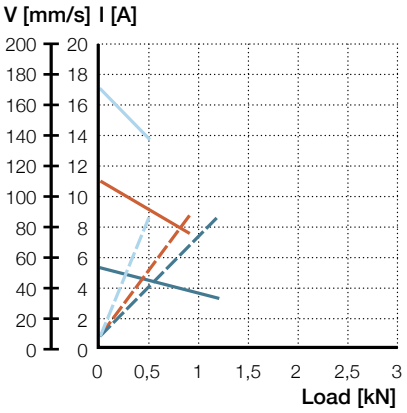


Performance diagrams – DC version

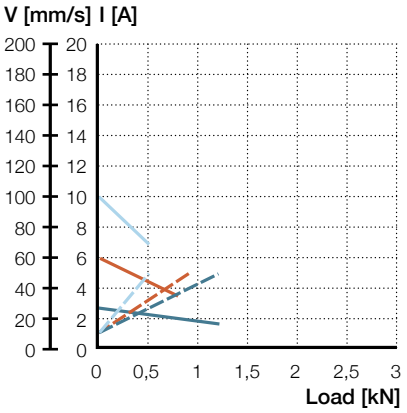
CAT 33H.../C12C



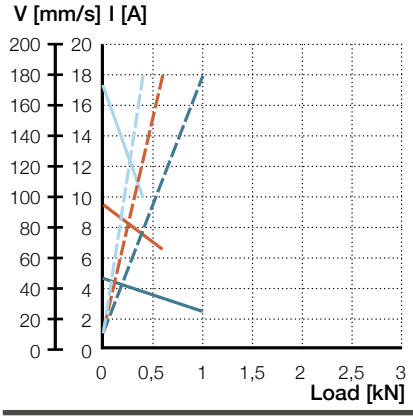
CAT 33H.../C24C



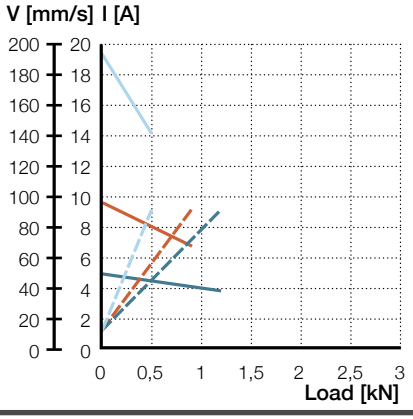
CAT 33H.../C24CW



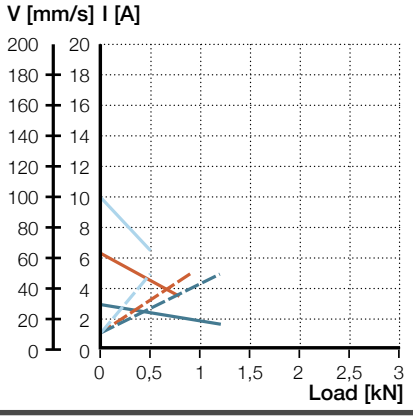
CAT 33H.../D12C



CAT 33H.../D24C/D24CB/D24CS



CAT 33H.../D24CW



Gear 1 — V (mm/s) — I (A)

Gear 2 — V (mm/s) — I (A)

Gear 4 — V (mm/s) — I (A)

Ordering key

Load [N] / Full Load Speed [mm/s]			Motor options	
1 200/xx	900/xx	600/xx	No motor	0000
1 200/20	900/37	500/90	120 V AC/60 Hz, 1-phase, IP54	E110C
1 200/20	900/37	500/90	120 V AC/60 Hz, 1-phase, brake, IP20	E110CB
1 200/20	900/37	500/90	230 V AC/50 Hz, 1-phase, IP54	E220C
1 200/20	900/37	500/90	230 V AC/50 Hz, 1-phase, brake, IP20	E220CB
1 200/20	900/37	500/90	400 V AC/50 Hz, 3-phase, IP55	E380C
1 200/xx	900/xx	600/xx	No motor	0000
1 200/50-38	600/100-80	400/174-150	12 V DC, IP44 (65)	C12C
1 200/47-25	600/95-65	400/170-100	12 V DC, flat motor, IP44	D12C
1 200/56-36	600/113-79	500/174-140	24 V DC, IP44 (65)	C24C
1 200/27-17	600/60-35	500/100-69	24 V DC, low speed motor, IP44 (65)	C24CW
1 200/48-37	600/95-65	500/193-140	24 V DC, flat motor, IP44	D24C
1 200/48-37	600/95-65	500/193-140	24 V DC, flat motor, brake, IP20	D24CB
1 200/48-37	600/95-65	500/193-140	24 V DC, flat motor, ext.shaft, IP44	D24CS
1 200/30-17	600/63-35	500/100-65	24 V DC, flat motor, low speed, IP44	D24CW

1	2	4		

C A T | | 3 3 H X | | | X | | | | | | | | / | | | | | | | |

Type

Motor assembly
R Right
L Left

Stroke (S)
100 100 mm
200 200 mm
300 300 mm
400 400 mm
– – Other stroke lengths

Rear attachment
A1 Fork ear, Ø12,0 mm
A2 Fork ear, Ø12,7 mm
K1 Single ear, Ø12,0 mm
K2 Single ear, Ø12,7 mm

Front attachment
G1 Hole, Ø12,0 mm
G2 Hole, Ø12,7 mm
G3 Male thread, M12
G4 Female thread, M12
G5 Fork ear, Ø10,1 mm

Feedback
No encoder (no code)
E2 Encoder (for all standard motors)

Option
F Friction clutch (not available with option encoder)
Z No friction clutch

Option for CxxC motors
T2 Straight cable, 2,0 m, no plug
T2P Straight cable, 2,0 m, jack plug
T6 Straight cable, 6,0 m, no plug

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

CAR 40

Linear actuator

Benefits

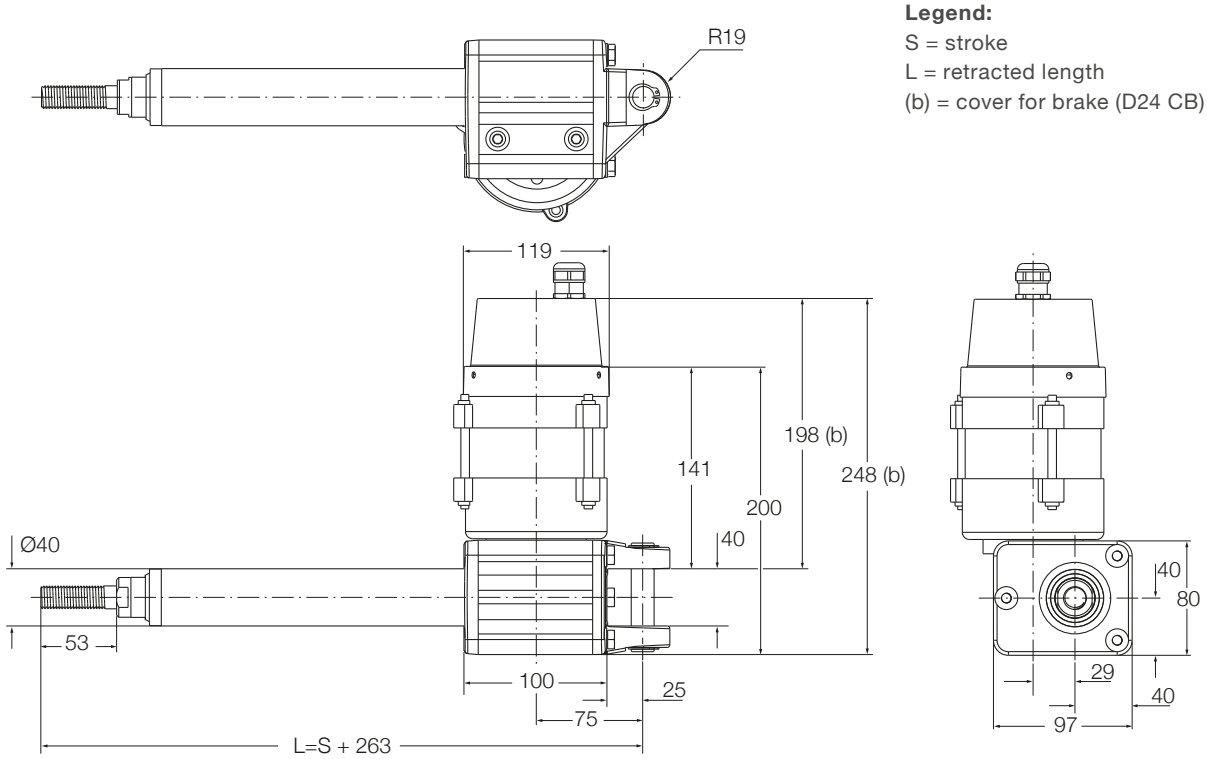
- Reliable and robust industrial actuator
- Wide range of components
- Right- and left-hand version

Technical data - AC version

		Unit	CAR 40 - AC version	CAR 40 - DC version
Rated push load		N	2 000 to 6 000	2 000 to 6 000
Rated pull load		N	2 000 to 6 000	2 000 to 6 000
Speed (at full load)		mm/s	9 to 40 [1]	10 to 60
Stroke		mm	100 to 700	100 to 700
Retracted length		mm	S+263	S+263
Voltage		V AC	120 or 230	–
		V DC	–	24
Power consumption	120 V AC	W	360	–
	230 V AC	W	299	–
	24 V DC	W	–	N/A
Current consumption	120 V AC	A	3 (brake +0,29 A)	–
	230 V AC	A	1,3 (brake +0,11 A)	–
	24 V DC	A	–	16
Duty cycle		%	40	25
Ambient temperature		°C	–20 to +70	–20 to +70
Type of protection		IP	20/54	20/44
Weight		kg	5,8 to 8,4	5,8 to 8,4

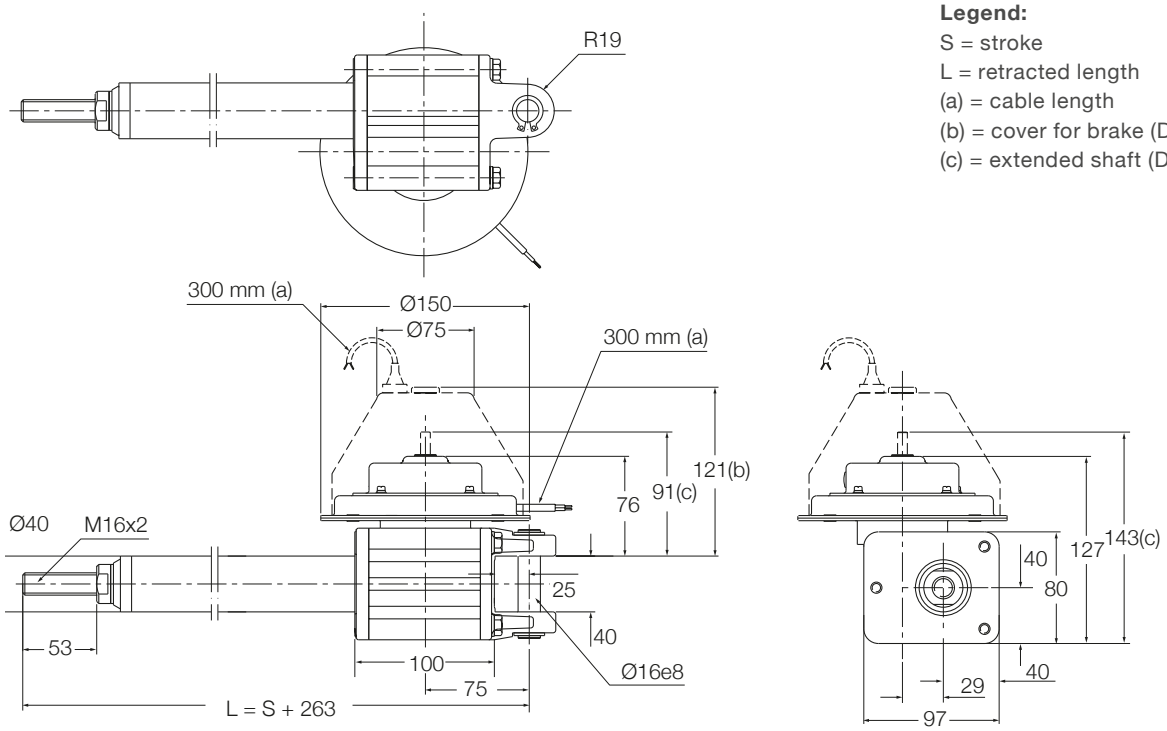
[1] Depending on selected motor

Dimensional drawing – AC version



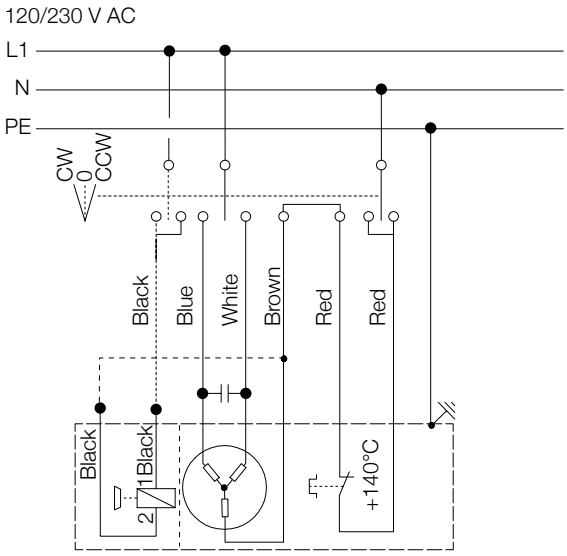
Legend:
S = stroke
L = retracted length
(b) = cover for brake (D24 CB)

Dimensional drawing – DC version

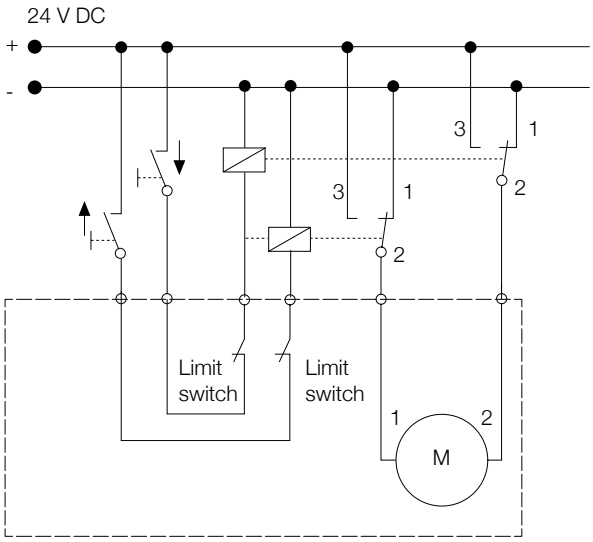


Legend:
S = stroke
L = retracted length
(a) = cable length
(b) = cover for brake (D24CB)
(c) = extended shaft (D24CS)

Connecting diagrams – AC version



Connecting diagrams – DC version



Suitable control unit and accessories AC version

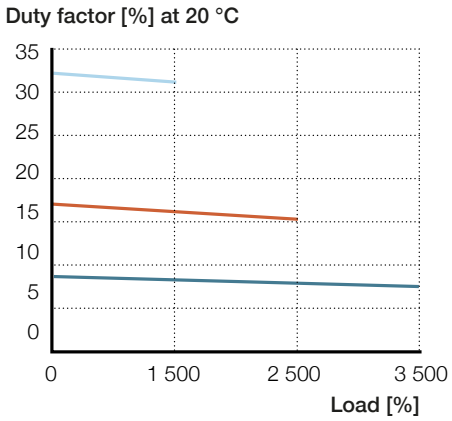
	Limit switch
	CAXE40
E110D	•
E110DB	•
E220D	•
E220DB	•

Suitable control unit and accessories DC version

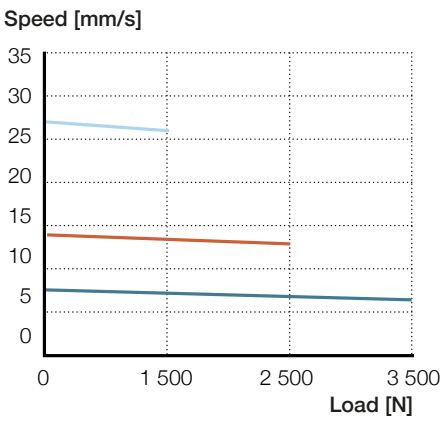
	Limit switch
	CAXE40
D24D	•
D24DS	•
D24DB	•

Performance diagrams – AC version

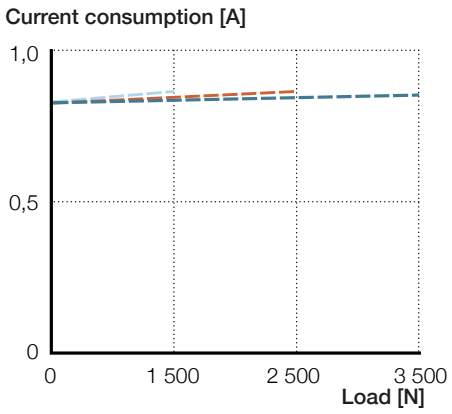
Speed-load diagram CAR 40 ... 120 V AC



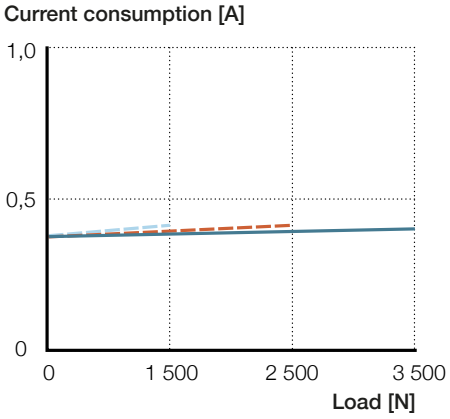
Speed-load diagram CAR 40 ... 230 V AC



Current-load diagram CAR 40 ... 120 V AC

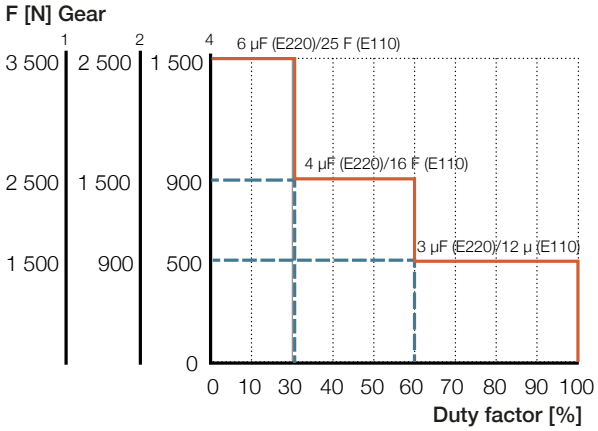


Current-load diagram CAR 40 .. 230 V AC



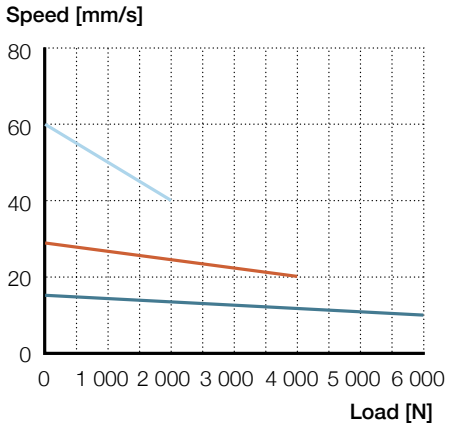
Gear 1 — V (mm/s) — I (A) Gear 2 — V (mm/s) — I (A) Gear 4 — V (mm/s) — I (A)

Duty cycle – AC version

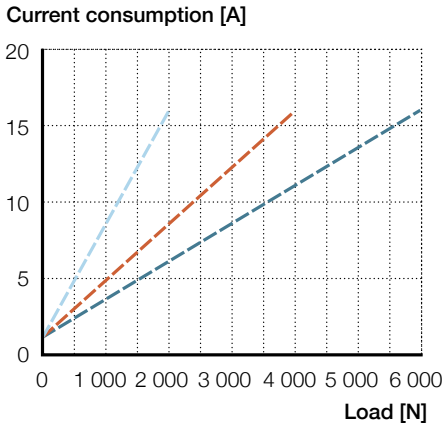


Performance diagrams – DC version

Speed-load diagram CAR 40 ... 24 V DC



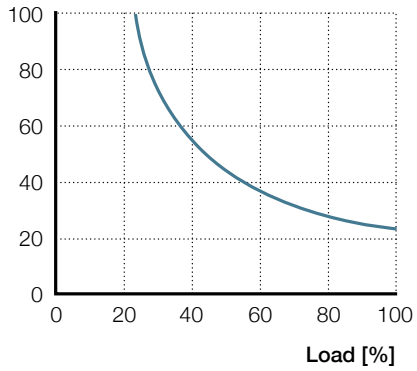
Current-load diagram CAR 40 ... 24 V DC



Gear 1 — V (mm/s) - - - I (A) Gear 2 — V (mm/s) - - - I (A) Gear 4 — V (mm/s) - - - I (A)

Duty cycle – DC version

Duty factor [%] at 20 °C

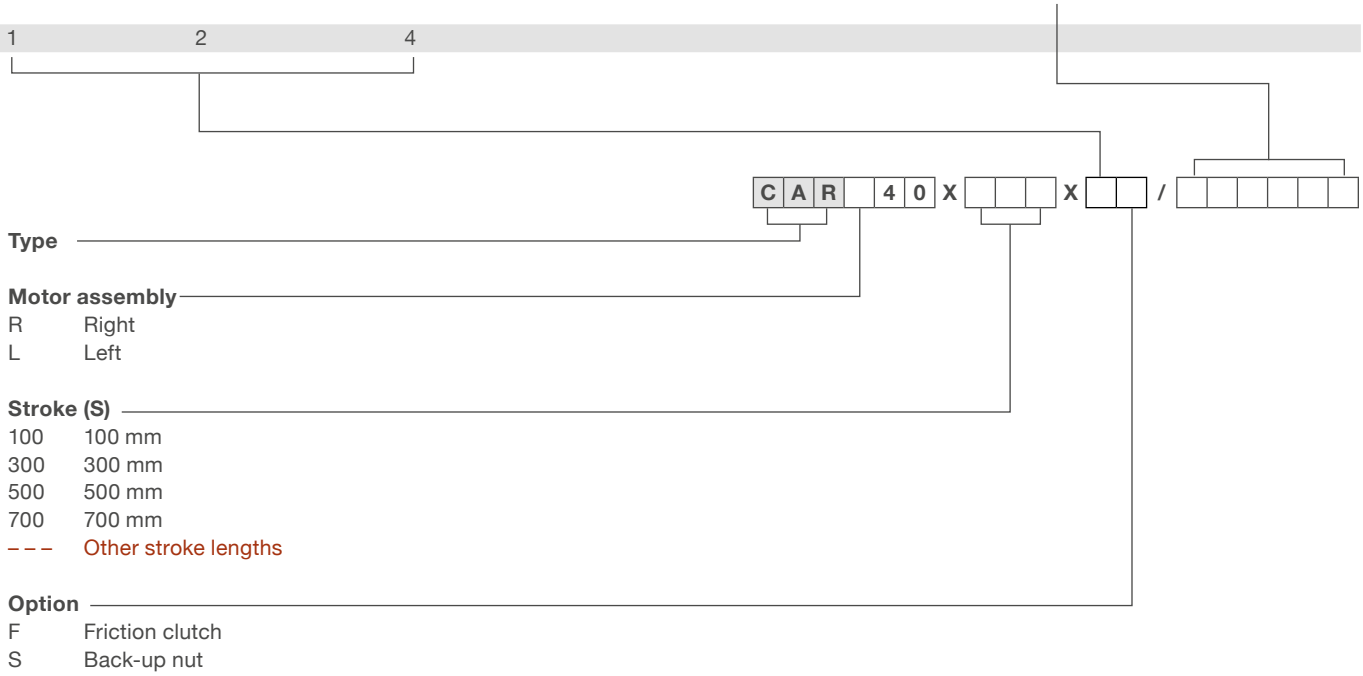


CAR 40 – Type codes for accessories and spare parts

Item code	Type code	Order N°
24 V DC motor (flat motor)	D24D	M/0405524
24 V DC motor (flat motor with extended shaft)	D24DS	M/0405526
24 V DC motor (flat motor with brake)	D24DB	M/0405525
120 V AC motor (cylindrical motor)	E110D	M/0405529
120 V AC motor (cylindrical motor with brake)	E110DB	M/0405530
230 V AC motor (cylindrical motor) E220D M/0405527	590–40	M/0430590–40
230 V AC motor (cylindrical motor with brake)	E220DB	M/0405528
Capacitor value 12 µF (230 VAC–motor)	Capacitor 12 µF	M/0430670–04
Limit switch for stroke =100 mm	CAXE 40 × 100	M/0412051
Limit switch for stroke =300 mm	CAXE 40 × 300	M/0412054
Limit switch for stroke =500 mm	CAXE 40 × 500	M/0412056
Limit switch for stroke =700 mm	CAXE 40 × 700	M/0412057
Proximity switch for CAXE	CAXE Proximity switch	M/0432369
Front mounting attachments type Rod–end	575–40	M/0430575–40
Front mounting attachments type Clevis	576–40	M/0430576–40
Rear mounting attachments type Single ear bracket	590–40	M/0430590–40
Rear mounting attachments type Ball–joint bracket	581–40	M/0430581–40

Ordering key

Dynamic load [N] / Speed [mm/s]			Motor options	
6 000/xx	4 000/xx	2 000/xx	No motor	0000
6 000/10	4 000/20	2 000/40	120 V AC/60 Hz, 1-phase, IP54	E110D
6 000/10	4 000/20	2 000/40	120 V AC/60 Hz, 1-phase, brake, IP20	E110DB
6 000/9	4 000/17	2 000/34	230 V AC/50 Hz, 1-phase, IP54	E220D
6 000/9	4 000/17	2 000/34	230 V AC/50 Hz, 1-phase, brake, IP20	E220DB
6 000/xx	4 000/xx	2 000/xx	No motor	0000
6 000/15–10	4 000/30-20	2 000/60-40	24 V DC, flat motor, IP44	D24D
6 000/15–10	4 000/30-20	2 000/60-40	24 V DC, flat motor, extended shaft, IP44	D24DS
6 000/15–10	4 000/30-20	2 000/60-40	24 V DC, flat motor, brake, IP20	D24DB
1	2	4		



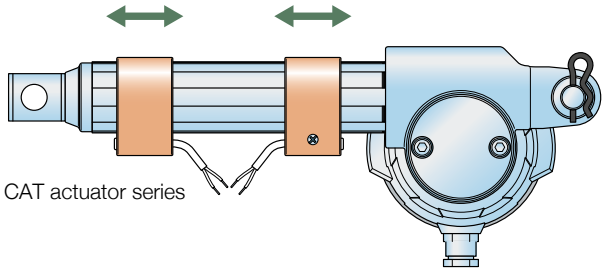
■ Options shown in red are only available on request. Contact Ewellix for more information on minimum quantities and additional costs.

Spare parts

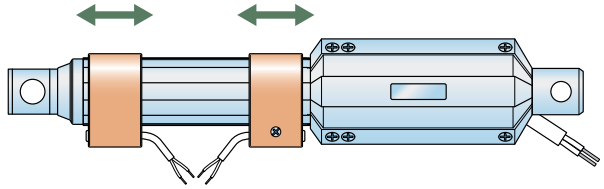
CAXD 33 limit switch

Limit switches, combined with Ewellix control units, make it possible to set the stroke to any desired length.

- CAXD 33 – designed for the following actuators:
  - CAT 33
  - CALA 36A
- One CAXD is needed for each limit position
- Use of limit switches reduce the effective stroke by 20 mm for CAT 33 and 25 mm for CALA 36A (retracted position is affected)



CAT actuator series

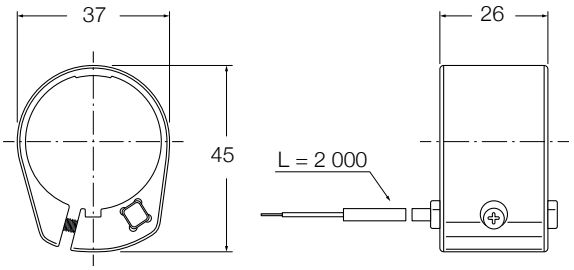


CALA actuator series

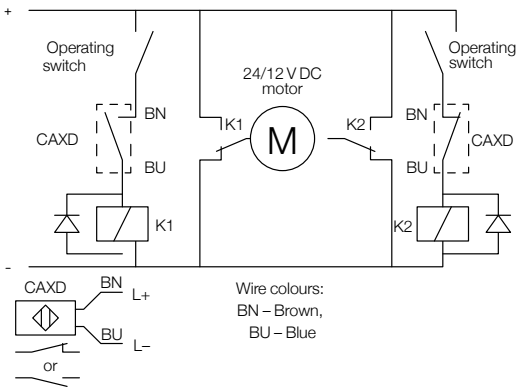
Technical data

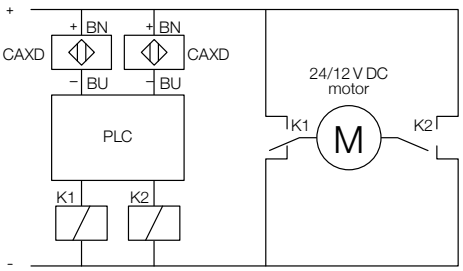
	CAXD 33
Operating voltage	5 to 30 V DC
Max. current	100 mA DC
Voltage drop	< 5 V
Voltage drop	< 5 V
Electrical function	Normally closed or normally open
Make/fall time	0,3 ms / 0,6 ms
Operating temperature	–20 °C to +50 °C
Ingress protection	IP 67 (sensor element)
Vibration/shock	According to IEC 90947-5-2 (sensor element)
Cable dimensions (L × D)	2 m × 3 mm (PUR)
Cable area	2 × 0,14 mm²
Housing colour	Black

Dimensional drawing



Connecting diagrams





Important! For DC-supply only

Ordering key

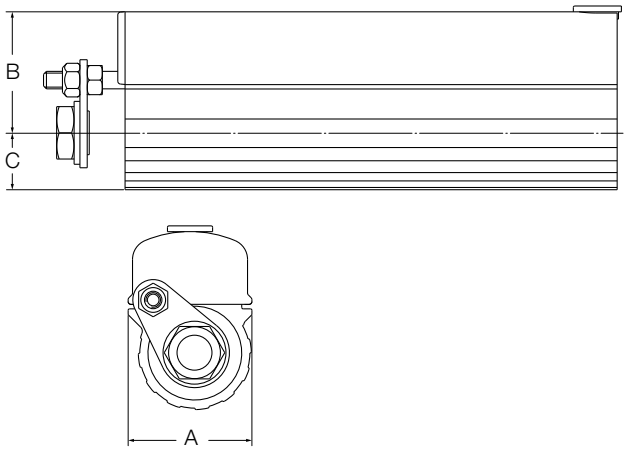
Code	Description
CAXD 33 LIMIT SWITCH, NC	Normally Closed
CAXD 33 LIMIT SWITCH, NO	Normally Open

CAXE limit switch

Limit switches, combined with Ewellix control units, make it possible to set the stroke to any desired length.

- CAXE - designed for the following actuators:
  - CAR 22
  - CAR 32
  - CAR 40
  - CAT 32B
  - CARN 32
- It is recommended to place the limit switch at least 10 mm from the end stop to avoid mechanical failure
- Front attachment G3 must be selected for this option

Dimensional drawing



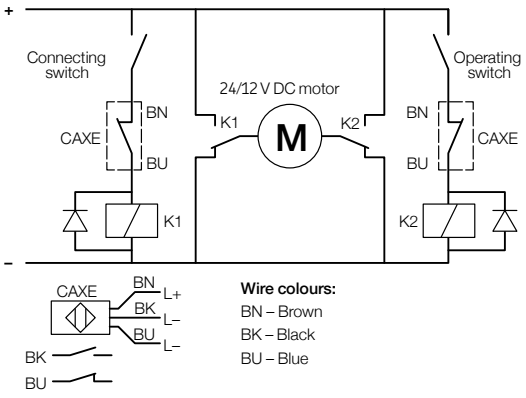
	A	B	C
CAXE 22	42,5	37	14
CAXE 32/32B	47,5	40	20
CAXE 40	46	46	23

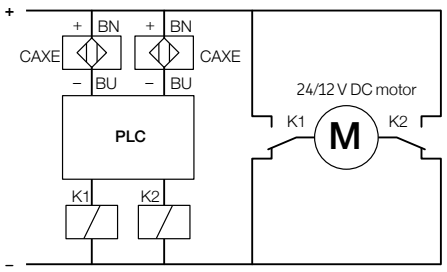
Technical data

	CAXE
Operating voltage	5 to 30 V DC
Max. current	100 mA DC
Protection class	III
Voltage drop	< 5 V
Electrical function	Normally Closed (NC) and Normally Open (NO)
Make/break time	0,3 ms / 0,6 ms
Operating temperature	–20 to +70 °C
Degree of protection	IP 67 (sensor element)
Vibration/shock	According to IEC 60947-5-1 (sensor element)
Cable dimensions (L x D)	2 000 x 3 mm (PUR)
Cable area	3 × 0,14 mm²

Important! The sensor has no overload protection and no reverse polarity protection.

Connecting diagrams





Important! For DC-supply only

Ordering key

C A X E –

Type

022	CAXE32	CAR 22
032	CAXE32	CAR 32, CARN 32
32B	CAXE32B	CAT 32B
040	CAXE40	CAR 40

Actuators stroke (mm)

050	050	CAR 22, 32 CARN 32 and CAT 32B
100	100	CAR 22, 32, 40, CARN 32 and CAT 32B
150	150	CAR 22
200	200	CAR 22, 32 CARN 32 and CAT 32B
300	300	CAR 22, 32, 40, CARN 32 and CAT 32B
400	400	CAT 32B
500	500	CAR 32, 40, CARN 32 and CAT 32B
700	700	CAR 32, 40, CARN 32 and CAT 32B

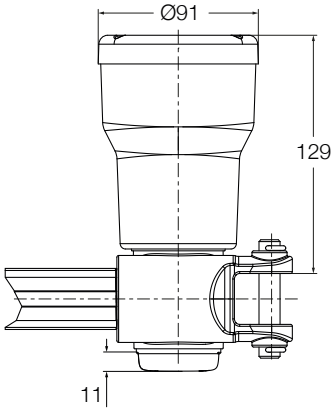
Feedback for CAT series – Encoder E2

- Can be fitted to all standard motors
- Hall effect, two channels with 90° displacement
- Located on gear housing, see drawing
- 2 pulses/channel and motor revolution
- Supply voltage: 5–24 V DC
- Final resolution according to gear ratio and actuator basic type (see table)

Feedback

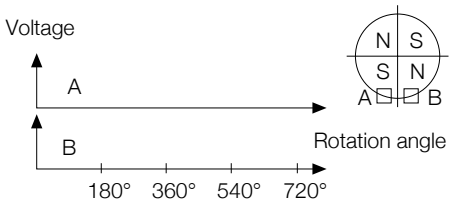
	Gear	Pulses at 1mm stroke	Resolution (mm) per pulse
CAT 33	1	16,67	0,06
	2	8,33	0,12
	4	4,17	0,24
CAT 33H	1	4,00	0,25
	2	2,00	0,50
	4	1,00	1,00
CAT 32B	1	12,50	0,08
	2	6.25	0,16
	4	3,13	0,32

Dimensional drawing

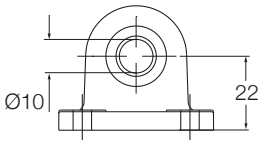


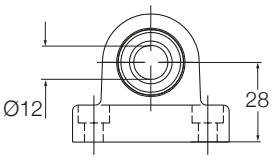
Encoder option E2

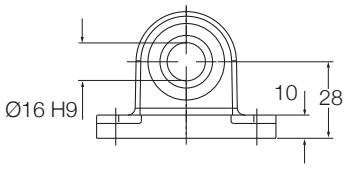
Connecting diagrams

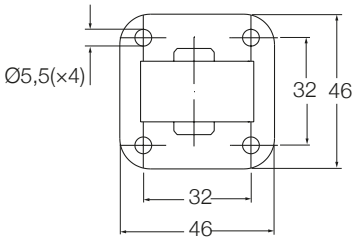


Attachments

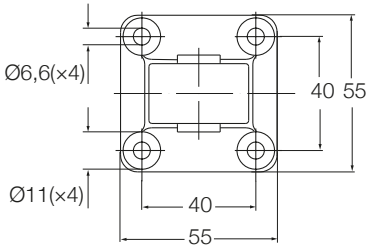




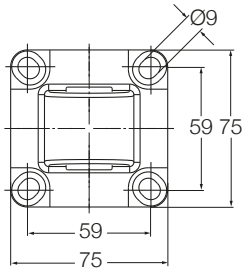




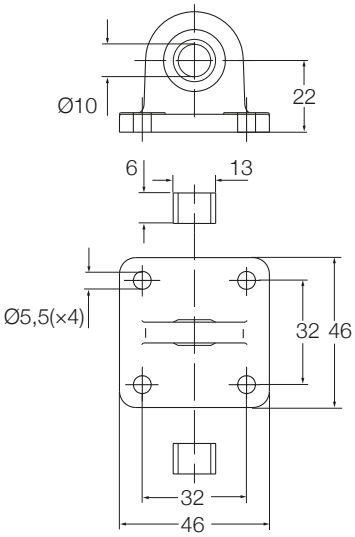
580–22



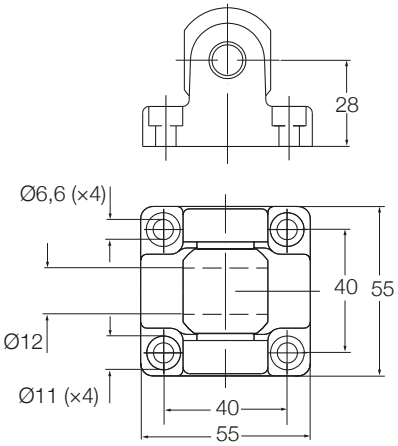
580–32



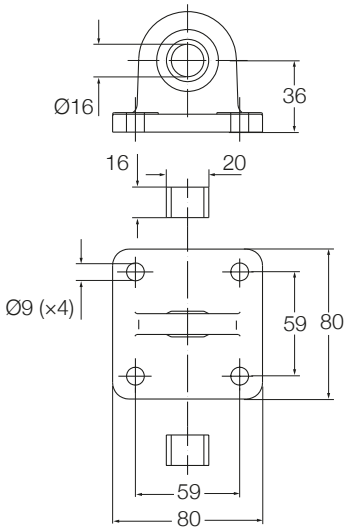
590-40



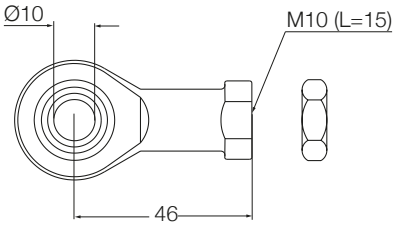
581–22



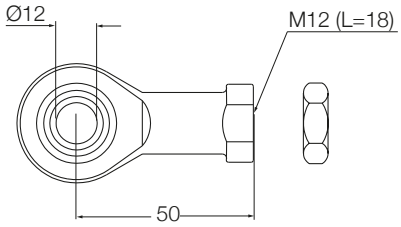
582–32



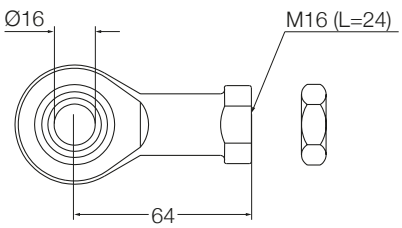
581–40



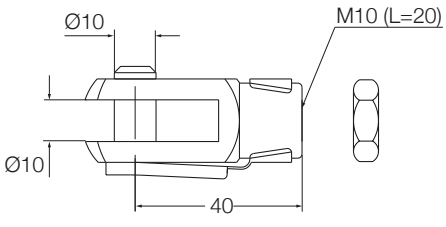
575–22



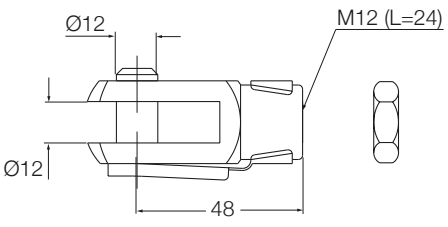
575–32



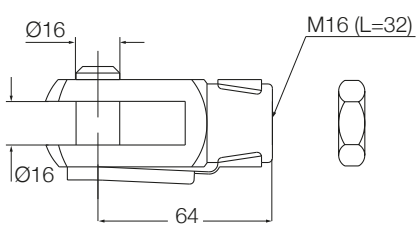
575–40



576–22



576–32



576–40

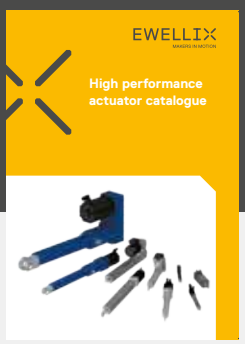
CAHM series

The CAHM series consists of spindle lifting actuators with worm gears. They fulfil the highest demands for industrial and other applications. The actuators are available in several different motor versions. CAHM series offers strong (up to 50 000 N), fast and quiet movements with high safety and duty cycle. The actuators include many interface options as hall encoder, end-switch, extended shaft etc.

Features

- Ideal for heavy load applications
- Wide speed/force range
- Robust design

All complete datas sheet are available on skfmotiontechnologies.com.
If you request higher force than 12 kN, refer to **High performance actuator catalogue (PUB NUM IL-05001-EN-October 2019)**.



Benefits

- Modular
- Robust
- Reliable
- High speed and/or high load
- All metal design

Technical data

12 and 24 V DC

	Unit	CAHM-31XX-D1	CAHM-31XX-D3	CAHM-35XX-D2
Voltage	V DC	12	24	24
Screw type	–	LN and LS	LN and LS	LN and LS
Max rated push load	N	1 000 to 4 000	1 000 to 4 000	10 000 to 15 000
Max rated pull load	N	1 000 to 4 000	1 000 to 4 000	10 000 to 15 000
Max speed (at full load)	mm/s	5 to 50	5 to 45	3 to 27
Stroke	mm	100 to 700	100 to 700	100 to 700
Retracted length	mm	S+230	S+230	–
Power consumption	W	168 to 192	144 to 192	528 to 840
Current consumption	A	14 to 16	6 to 8	22 to 35
Duty cycle	%	10	10	10
Ambient temperature	°C	–10 to +40	–10 to +40	–10 to +40
Type of protection	IP	44	44	54

230 V AC

	Unit	CAHM-31XX-A2	CAHM-35XX-A2
Voltage	V AC	230	230
Screw type	–	LN and LS	LS
Max rated push load	N	500 to 2 600	5 000 to 15 000
Max rated pull load	N	500 to 2 600	5 000 to 15 000
Max speed (at full load)	mm/s	5 to 50	2 to 12
Stroke	mm	100 to 700	100 to 700
Retracted length	mm	S+230	–
Power consumption	W	200 to 230	700 to 750
Current consumption	A	1 to 11	3,3 to 3,5
Duty cycle	%	25	10 to 15
Ambient temperature	°C	–10 to +40	–10 to +40
Type of protection	IP	54	54

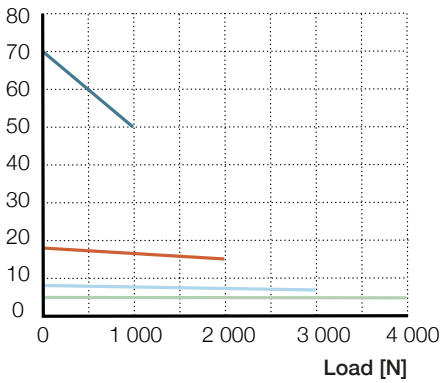
3×400 V AC

	Unit	CAHM-31XX-A4	CAHM-35XX-A4	CAHM-50XX-A4	CAHM-65XX-A4
Voltage	V AC	3×400	3×400	3×400	3×400
Screw type	–	LN and LS	LS and BN	BN	BN
Max rated push load	N	1 000 to 4 500	10 000 to 15 000	15 000 to 30 000	18 000 to 50 000
Max rated pull load	N	1 000 to 4 500	10 000 to 15 000	15 000 to 30 000	18 000 to 50 000
Max speed (at full load)	mm/s	5 to 50	2 to 25	9 to 45	9 to 74
Stroke	mm	100 to 700	100 to 700	100 to 700	100 to 700
Retracted length	mm	S+230	–	S+465	S+446
Power consumption	W	210 to 280	500 to 920	1 200 to 1 650	1 900 to 3 000
Current consumption	A	0,5 to 0,6	1,4 to 1,8	2,8 to 3,5	3,6 to 3,9
Duty cycle	%	40	10 to 25	10	10
Ambient temperature	°C	–10 to +40	–10 to +40	–10 to +40	–10 to +40
Type of protection	IP	54	54	54	54

Performance diagrams

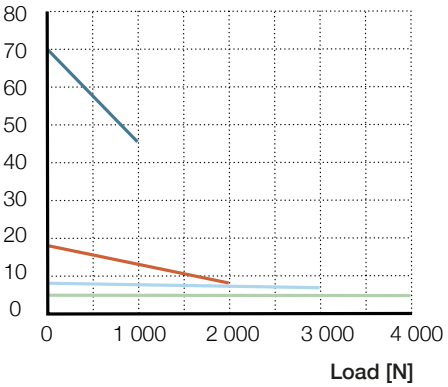
CAHM-31 - DC version

Motor: D1 - 12 V DC
Speed [mm/s]



Speed load diagram

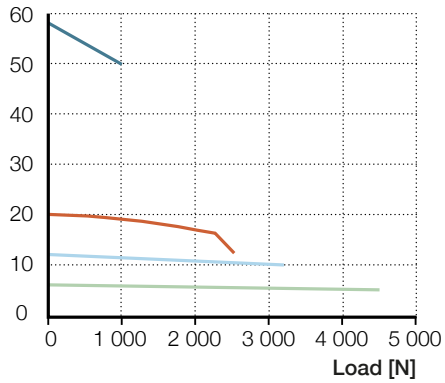
Motor: D2 - 24 V DC
Speed [mm/s]



Speed load diagram

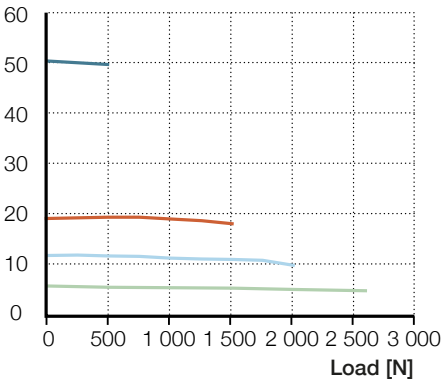
CAHM-31 - AC version

Motor: A4 - 3x400 V AC
Speed [mm/s]



Speed load diagram

Motor: A2 - 230 V AC
Speed [mm/s]



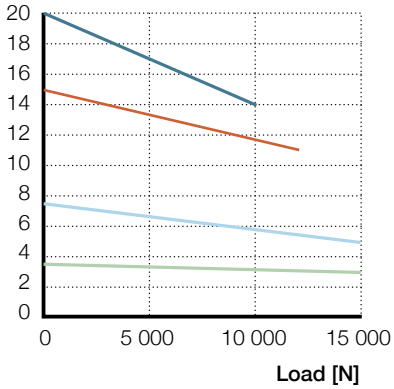
Speed load diagram

CAHM 3110-LN CAHM 3130-LN CAHM 3110-LS CAHM 3150-LS

CAHM-35 - DC version

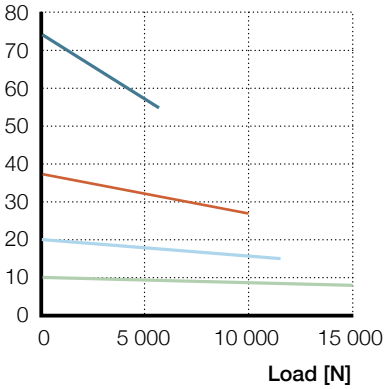
Motor: D2 - 24 V DC
LS - Lead screw 20x4

Speed [mm/s]



Motor: D2 - 24 V DC
BN - Ball screw 25x10

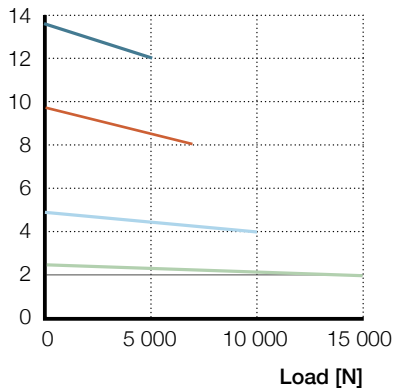
Speed [mm/s]



CAHM-35 - AC version

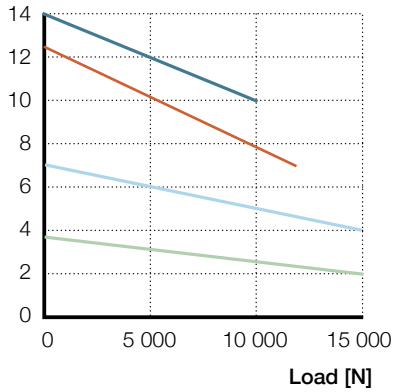
Motor: A2 - 230 V AC
LS - Lead screw 20x4

Speed [mm/s]



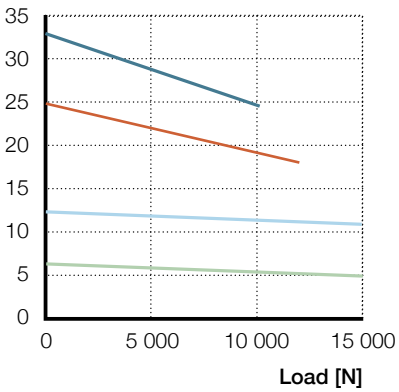
Motor: A4 - 3x400 V AC
LS - Lead screw 25x10

Speed [mm/s]



Motor: A4 - 3x400 V AC
BN - Ball screw 25x10

Speed [mm/s]

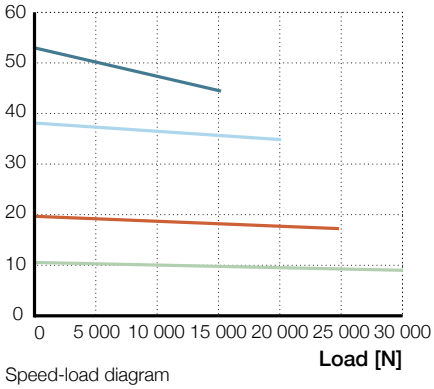


CAHM-3507 CAHM-3510 CAHM-3520 CAHM-3540

CAHM-50 - AC version

Motor: A4 - 3x400 V AC

Speed [mm/s]



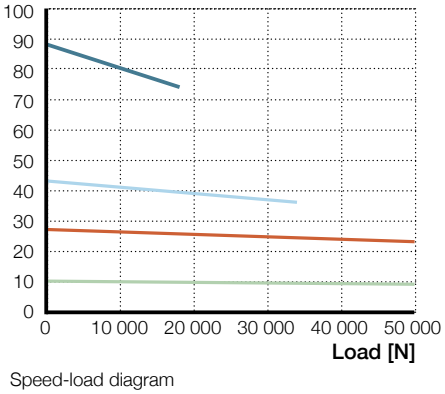
Speed-load diagram

CAHM-5004 CAHM-5012
CAHM-5006 CAHM-5023

CAHM-65 - AC version

Motor: A4 - 3x400 V AC

Speed [mm/s]



Speed-load diagram

CAHM-6506 CAHM-6520
CAHM-6513 CAHM-6550

4

Telescopic pillars

Up to 2,8 kNm bending load

Chapter contents

CPMA 182
CPMB 190
CPMT 198
TFG 204
THG 208
TLC 212
TLG 216
TLT 220
TXG 224
FRE 228

CPMA

For ophthalmic equipment

Benefits

- Universal power supply
- Plug and play
- Soft start and stop control
- Multiple outlet socket accessories
- Cable through pillar

Standards

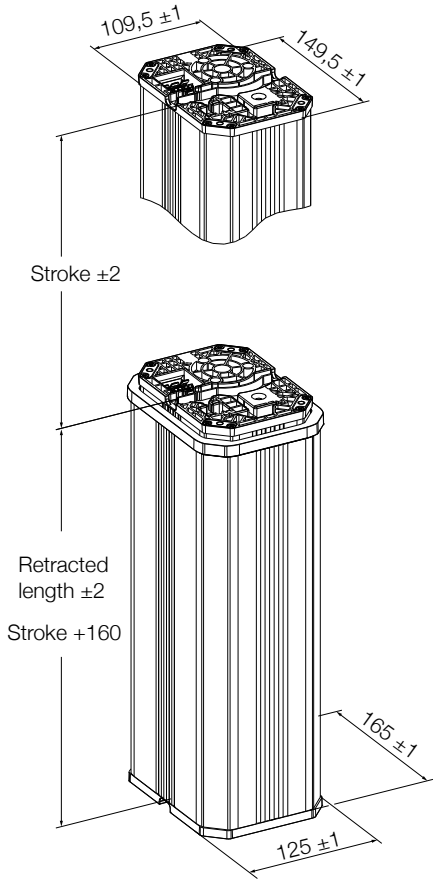
- IEC 60601-1:2005 (3rd edition) compliant

Technical data

	Unit	CPMA1-1	CPMA1-2	CPMA2-2
Rated push load (with self locking)	N	1 000	2 000	2 000
Rated pull load	N	0	0	0
Bending moment (dynamic)	Nm	up to 115[1)]	up to 250[1)]	up to 250[1)]
Speed (full load to no load)	mm/s	14 to 15	11 to 15	11 to 15
Telescopic pillar version	# of section	2-section	2-section	2-section
Stroke	mm	230 to 400	230 to 400	200 to 400
Retracted length	mm	S+160	S+160	S+160
Static Load (Max) in push way	N	8 000	8 000	8 000
Static bending moment (Max)	Nm	500	500	500
Voltage (rated)	V	100–240 AC 50/60 Hz	100–240 AC 50/60 Hz	24 DC
Input current (rated)	A	1,5	1,6	5
Duty cycle: intermittent operation	on/off	1 min./9 min.	1 min./9 min.	1 min./9 min.
Ambient temperature	°C	+10 to +40	+10 to +40	+10 to +40
Type of protection	IP	30	30	30
Protection class	–	I	I	–
Type of control	–	electrical	electrical	electrical
Noise level (Max)	dB(A)	45	45	45
Weight	kg	8 to 11	9 to 12	8 to 11
Standby power (Max)	W	2,1	1,9	–

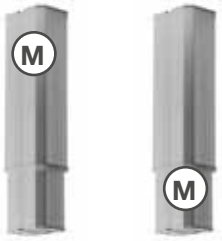
[1)] For details, see offset load diagrams (↳ **page 184**)

Dimensional drawing



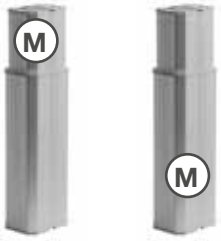
More flexibility with Series CPMA design options

Built-in with outer tube on top
More hygienic and easy-to-clean design



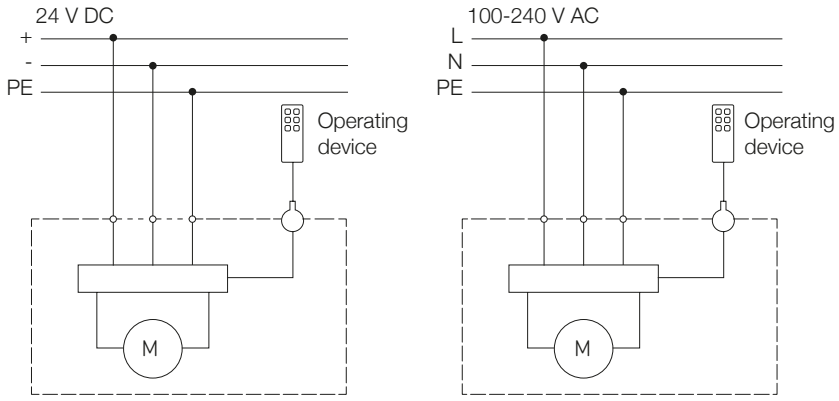
Motor orientation B **Motor orientation A**

Built-in with outer tube on bottom
More aesthetic design



Motor orientation A **Motor orientation B**

Connecting diagrams

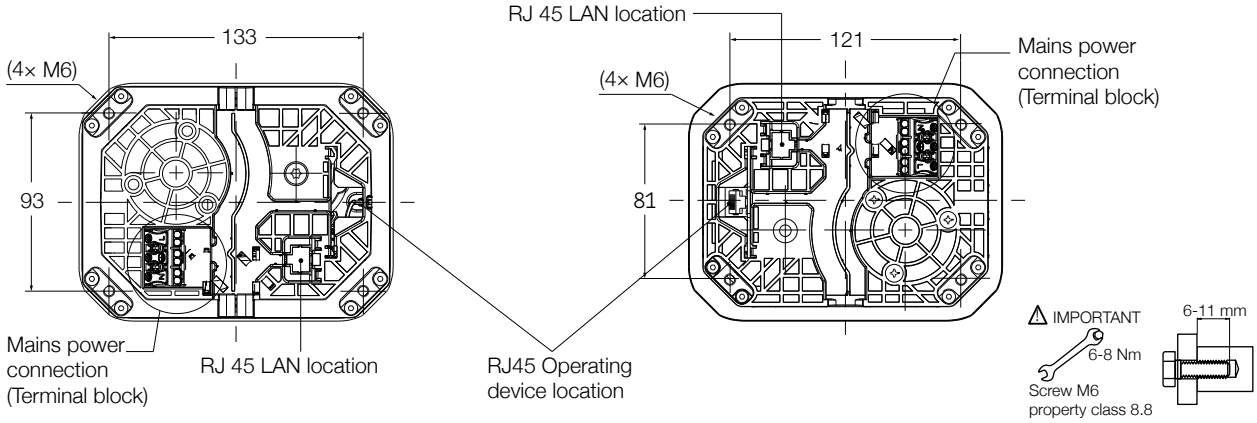


Suitable products

	External power supply 24 V DC	EHA4	STL	STK	ZDV-348220-002	ZDV-348221-002	ZKA-140449-2500	ZKA-140450-2500	ZKA-140451-2500	ZKA-140452-2500	ZKA-140458-2500	ZKA-140460-2500	ZKA-140453-2500	ZKA-140454-2500	ZKA-140455-2500	ZKA-140456-2500	ZKA-140459-2500	ZKA-140461-2500
CPMA1-1		•	•	•	•	•	•	•	•	•	•	•						
CPMA1-2		•	•	•	•	•	•	•	•	•	•	•						
CPMA2-2	•	•	•	•														

Hand switch · Foot switch · Desk switch · Socket box · Mains cable · Detachable mains cord

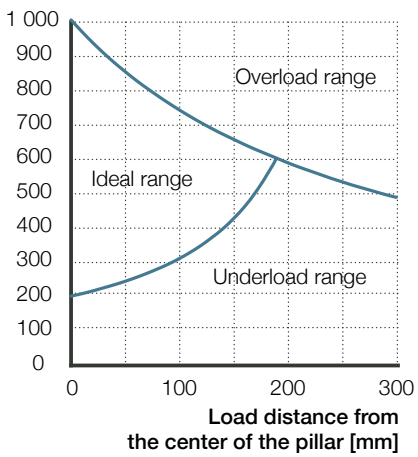
Connections and fastening



Pillar must be attached on plane and rigid surface by 4 screws M6 with a depth of 6 to 11 mm in the pillar.
The total length of the screw must be adjusted to the height of the fixture.

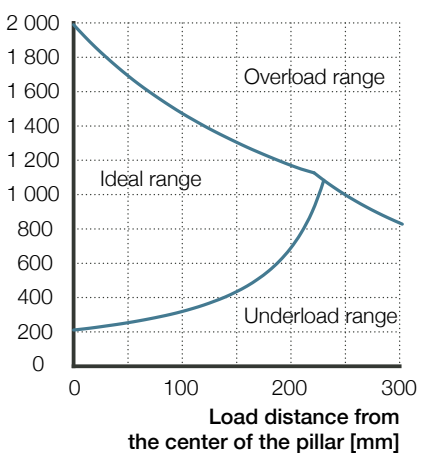
Offset load diagrams

CPMA1-1



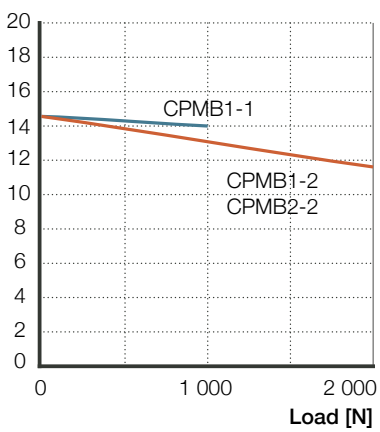
Offset load at full extension in the best axis

CPMA1-2 and CPMA2-2



Offset load at full extension in the best axis

Performance diagram



CPMA1-1
CPMA1-2, CPMA2-2

Inlet socket box – ZDV

Suitable operating devices

	Pillars			Hand switches	Foot switches	Desk switches		Mains cables						Detachable mains cords					
	CPMA1-1	CPMA1-2	CPMA2-2	EHA41-13N10N-000	STL01-GW1000-X190	STK01-SW3000-X100	STK01-UW3000-X100	ZKA-140449-2500	ZKA-140450-2500	ZKA-140451-2500	ZKA-140452-2500	ZKA-140458-2500	ZKA-140460-2500	ZKA-140453-2500	ZKA-140454-2500	ZKA-140455-2500	ZKA-140456-2500	ZKA-140459-2500	ZKA-140461-2500
ZDV-348220-002	•	•		•	•	•	•							•	•	•	•	•	•

Benefits

- Multifunction plug and play accessory
- Detachable mains power cord
- Replaceable fuses
- LAN Connector
- Easy to use
- Cord strain relief

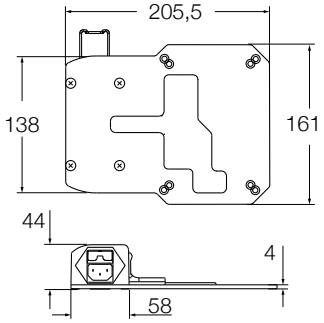
Standards

- IEC 60601-1:2005 (3rd edition) compliant

Technical data

- IEC inlet mains power socket with retainer
- 1 RJ45 for operating device
- 1 RJ45 for LAN
- 2 replacable fuses 8 A
- Plate with holes as the plates of the pillar CPMA
- Can be fastened on inner and outer tube

Dimensional drawing



Outlet socket box – ZDV

Suitable operating devices

	Pillars			Hand switches	Foot switches	Desk switches		Mains cables						Detachable mains cords					
	CPMA1-1	CPMA1-2	CPMA2-2	EHA41-13N10N-000	STL01-GW1000-X190	STK01-SW3000-X100	STK01-UW3000-X100	ZKA-140449-2500	ZKA-140450-2500	ZKA-140451-2500	ZKA-140452-2500	ZKA-140458-2500	ZKA-140460-2500	ZKA-140453-2500	ZKA-140454-2500	ZKA-140455-2500	ZKA-140456-2500	ZKA-140459-2500	ZKA-140461-2500
ZDV-348220-002	•	•		•	•	•	•												

Benefits

- Multifunction plug and play accessory
- 3 IEC outlet sockets
- Replaceable fuses
- Integrated mounting plate
- LAN Connector
- Easy to use

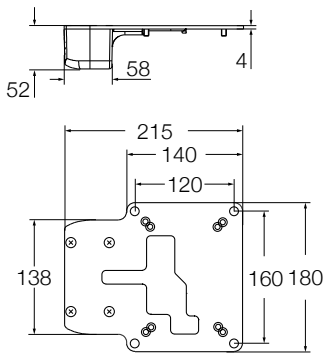
Standards

- IEC 60601-1:2005 (3rd edition) compliant

Technical data

- 3 IEC mains power outlet sockets
- 1 RJ45 for operating device
- 1 RJ45 for LAN
- 2 replacable fuses 8 A
- Integrated mounting plate with 4 holes 9 mm diameter
- 4 screws to fasten on pillar CPMA
- Can be fastened on inner and outer tube

Dimensional drawing

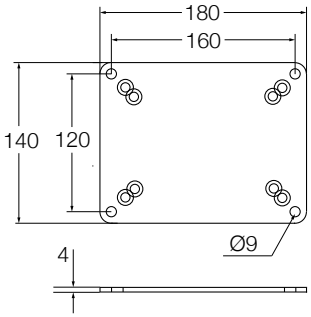


Mounting plate – ZPL

Suitable operating devices

	Pillars		
	CPMA1-1	CPMA1-2	CPMA2-2
ZPL	•	•	•

Dimensional drawing



Benefits

- Easy to use

Technical data

- Can be fastened on inner and outer tube
- Mounting plate with 4 holes 9 mm diameter

Mains cable and detachable mains cord – ZKA

Mains cable

Detachable mains cord

Mains cable

	Pillars			Socket boxes	
	CPMA1-1	CPMA1-2	CPMA2-2	ZDV-348220-002	ZDV-348221-002
ZKA-140449-2500	•	•			
ZKA-140450-2500	•	•			
ZKA-140451-2500	•	•			
ZKA-140452-2500	•	•			
ZKA-140458-2500	•	•			
ZKA-140460-2500	•	•			

Detachable mains cord

	Pillars			Socket boxes	
	CPMA1-1	CPMA1-2	CPMA2-2	ZDV-348220-002	ZDV-348221-002
ZKA-140453-2500	•	•			
ZKA-140454-2500	•	•			
ZKA-140455-2500	•	•			
ZKA-140456-2500	•	•			
ZKA-140459-2500	•	•			
ZKA-140461-2500	•	•			

Benefits

- Easy to use
- Identification by a product label

Standards

- IEC 60601-1:2005 (3rd edition) compliant

Desk switch – STK

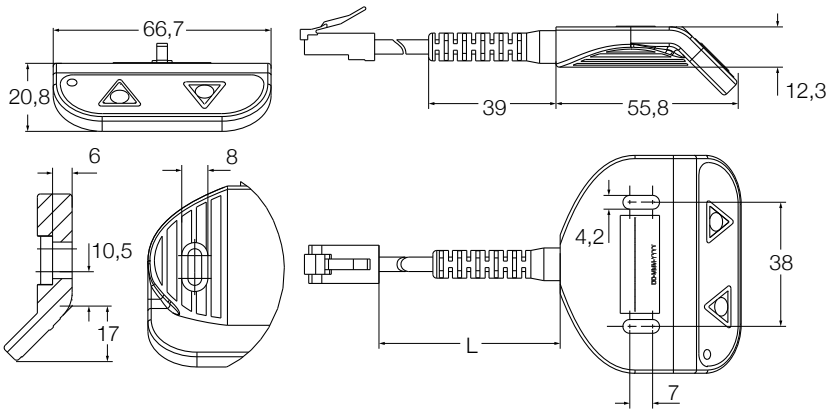
Benefits

- Easy and precise
- Stylish design
- Tactile buttons with finger guide
- 2 colors LED for power and feedback status

Standards

- IEC 60601-1:2005 (3rd edition) compliant

Dimensional drawing



Suitable operating devices

	Pillars			Socket boxes	
	CPMA1-1	CPMA1-2	CPMA2-2	ZDV-348220-002	ZDV-348221-002
STK01-SW3000-X100	•	•	•	•	•
STK01-UW3000-X100	•	•	•	•	•

Designation	L [mm]
STK01-SW3000-X100	500
STK01-UW3000-X100	1 000

See ↳ **page 188** and **189** for technical data and ordering key

Hand switch – EHA

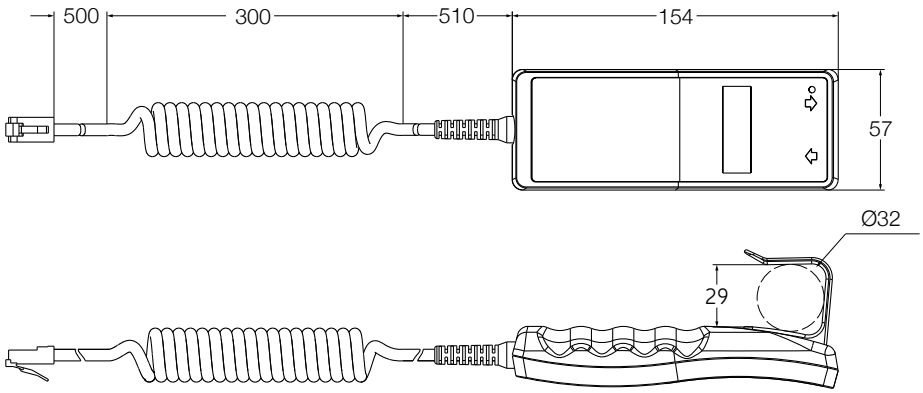
Benefits

- Robust ergonomic design
- Tactile buttons
- Easy mountable fastening hook
- 2 colors LED for power and feedback status

Standards

- IEC 60601-1:2005 (3rd edition) compliant

Dimensional drawing



Suitable operating devices

	Pillars			Socket boxes	
	CPMA1-1	CPMA1-2	CPMA2-2	ZDV-348220-002	ZDV-348221-002
EHA	•	•	•	•	•

See ↳ **page 188** and **189** for technical data and ordering key

Foot switch – STL

Benefits

- Easy to use
- Ergonomic design

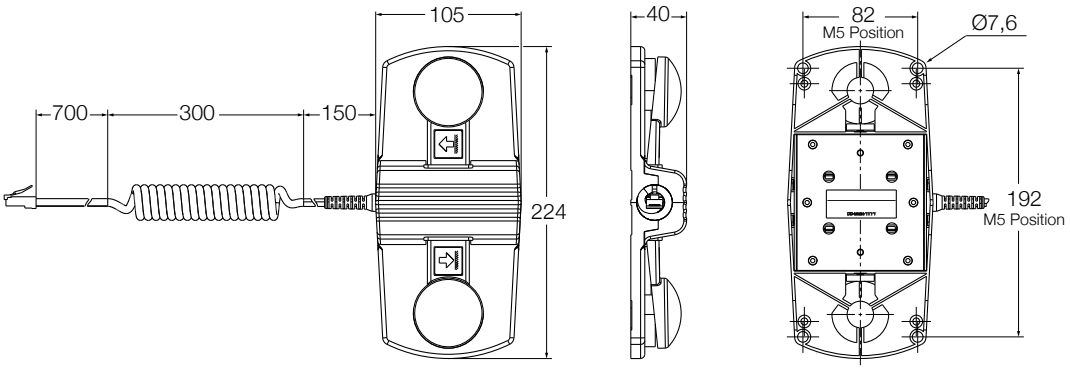
Standards

- IEC 60601-1:2005 (3rd edition) compliant

Suitable operating devices

	Pillars			Socket boxes	
	CPMA1-1	CPMA1-2	CPMA2-2	ZDV-348220-002	ZDV-348221-002
STL01	•	•	•	•	•

Dimensional drawing



Switches technical data

	Unit	EHA4	STL	STK
Max. operating channels	n°	1	1	1
Operating power	V DC/mA	5/20	5/20	5/20
Type of protection	IP	67	x2	–
Color	–	Grey	Grey and anthracite	Grey
Indicator		LED 2 colors for power and feedback status	–	LED 2 colors for power and feedback status
Plug	–	RJ45	RJ45	RJ45
Hook	–	with hook	–	–
Symbols	–	with arrows up/down	with arrows up/down	with arrows up/down

Accessories

Description	Plug	Country	Part number	Order Number
Mains cable straight 2,5 m	Schuko	Germany, France, ...	ZKA-140449-2500	130015
	Typ-L	Italy	ZKA-140450-2500	130016
	British standard	UK	ZKA-140451-2500	130017
	NEMA	USA, Japan, …	ZKA-140452-2500	130018
	SEV	CH	ZKA-140458-2500	130256
	AS 3112	PRC, Australia, ...	ZKA-140460-2500	130391
Detachable mains cord straight 2,5 m	Schuko	Germany, France, ...	ZKA-140453-2500	130019
(to plug in socket box Inlet)	Typ-L	Italy	ZKA-140454-2500	130020
	British standard	UK	ZKA-140455-2500	130021
	NEMA	USA, Japan, …	ZKA-140456-2500	130022
	SEV	CH	ZKA-140459-2500	130257
	AS 3112	PRC, Australia, ...	ZKA-140461-2500	130392
Desk switch with LED, cable 0,5 m			STK01-SW3000-X100	130025
Desk switch with LED, cable 1,0 m			STK01-UW3000-X100	130026
Handset with LED, cable coiled 1,3 m			EHA41-13N00N-000	131033
Foot switch, cable coiled 1,3 m			STL01-GW1000-X100	131873
Mounting plate			ZPL-348382	130024
Socket box inlet: IEC, RJ45 LAN, RJ45 op. device			ZDV-348220-002	130030
Socket box outlet: 3xIEC, RJ45 LAN, RJ45 op. device			ZDV-348221-002	130032

Ordering key

C P M A [ ] – [ ] 2 [ ] [ ] [ ] [ ] [ ] [ ] – 0 0 0

Type

Voltage

1	100–240 V AC 50/60 Hz	
2	24 V DC	

Load

	Push	
1	1 000 N	Only for AC version
2	2 000 N	

Tube set

2	2-section	

Stroke length

200	200 mm	Only for DC version
230	230 mm	
250	250 mm	
300	300 mm	
400	400 mm	
---	Other per 10 mm from 200 mm or 230 mm for AC version up to 400 mm	

Motor orientation[1)]

A	Motor in inner tube	
B	Motor in outer tube	

Operating device orientation

A	Operating device socket as the motor	
B	Operating device socket at both sides	

LAN cable through

0	No	
1	LAN cable through	Not compatible with op. device socket at both sides

[1)] Pillar can be placed with outer tube on the top or bottom (↳ **page 183**)

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

CPMB

For infant care

Benefits

- Universal power supply
- Plug and play
- Soft start and stop control
- Low noise level
- Cable through pillar
- Grounding continuity

Standards

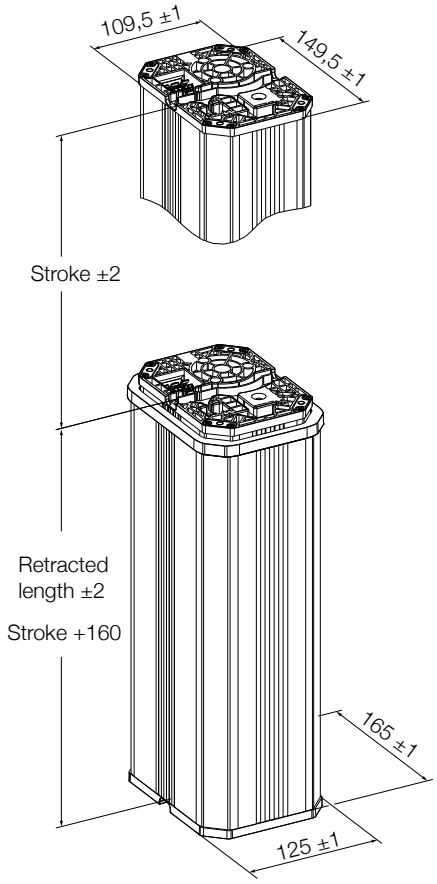
- IEC 60601-1:2005 (3rd edition) compliant

Technical data

	Unit	CPMB1-1	CPMB1-2	CPMB2-2
Rated push load (with self locking)	N	1 000	2 000	2 000
Rated pull load	N	0	0	0
Bending moment (dynamic)	Nm	up to 115[1)]	up to 250*	up to 250[1)]
Speed (full load to no load)	mm/s	14 to 15	11 to 15	11 to 15
Telescopic pillar version	# of section	2-section	2-section	2-section
Stroke	mm	230 to 400	230 to 400	200 to 400
Retracted length	mm	S+160	S+160	S+160
Static Load (Max) in push way	N	8 000	8 000	8 000
Static bending moment (Max)	Nm	500	500	500
Voltage (rated)	V	100–240 AC 50/60 Hz	100–240 AC 50/60 Hz	24 DC
Input current (rated)	A	1,5	1,6	5
Duty cycle: intermittent operation	on/off	1 min./9 min.	1 min./9 min.	1 min./9 min.
Ambient temperature	°C	+10 to +40	+10 to +40	+10 to +40
Type of protection	IP	30	30	30
Protection class	–	I	I	–
Type of control	–	electrical	electrical	electrical
Noise level (Max)	dB(A)	45	45	45
Weight	kg	8 to 11	9 to 12	8 to 11

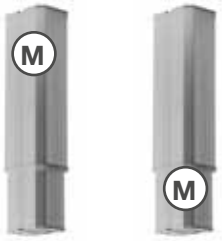
[1)] For details, see offset load diagrams (↳ **page 192**)

Dimensional drawing



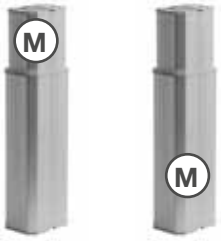
More flexibility with Series CPMB design options

Built-in with outer tube on top
More hygienic and easy-to-clean design



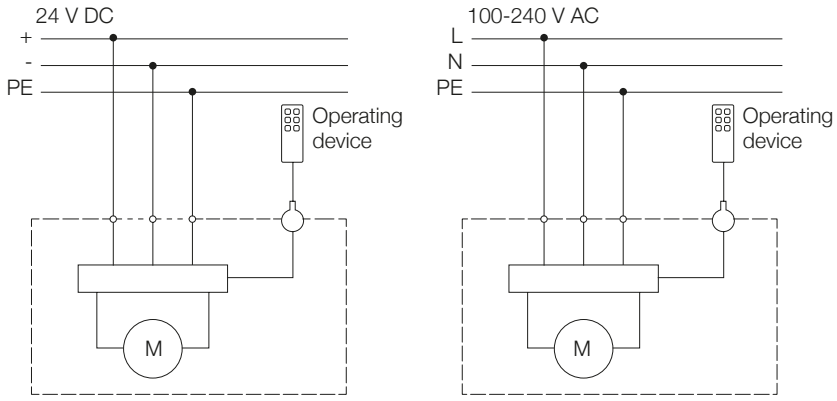
Motor orientation B **Motor orientation A**

Built-in with outer tube on bottom
More aesthetic design



Motor orientation A **Motor orientation B**

Connecting diagrams

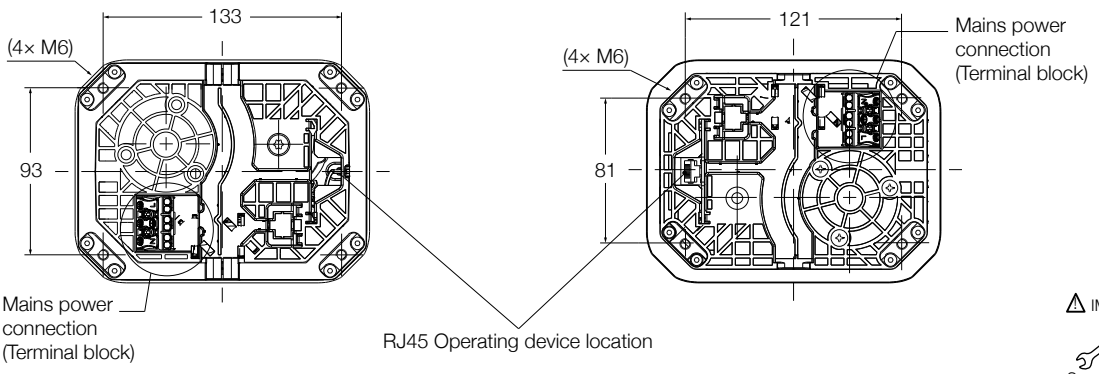


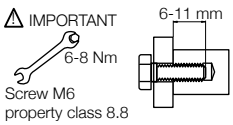
Suitable operating devices

	External power supply 24 V DC	EHA4	STL	STK
CPMB1-1		•	•	•
CPMB1-2		•	•	•
CPMB2-2	•	•	•	•

Hand switch Foot switch Desk switch

Connections and fastening

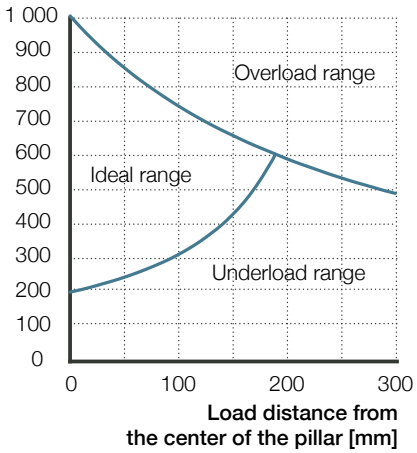




Pillar must be attached on plane and rigid surface by 4 screws M6 with a depth of 6 to 11 mm in the pillar.
The total length of the screw must be adjusted to the height of the fixture.

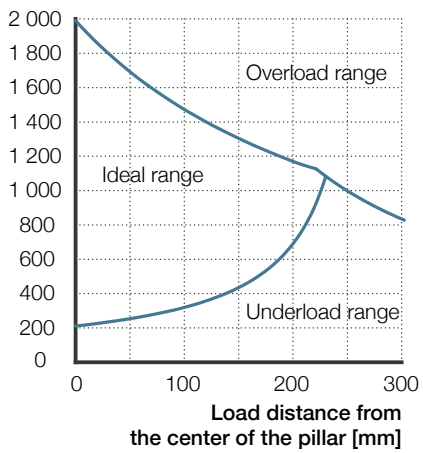
Offset load diagrams

CPMA1-1



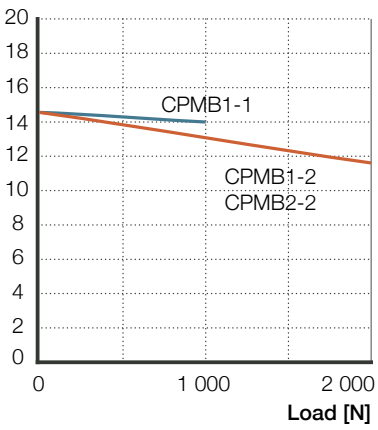
Offset load at full extension in the best axis

CPMA1-2 and CPMA2-2



Offset load at full extension in the best axis

Performance diagram



CPMA1-1
CPMA1-2, CPMA2-2

Inlet socket box – ZDV

Suitable operating devices

	Pillars			Hand switches	Foot switches	Desk switches		Mains cables						Detachable mains cords					
	CPMB1-1	CPMB1-2	CPMB2-2	EHA41-13N10N-000	STL01-GW1000-X190	STK01-SW3000-X100	STK01-UW3000-X100	ZKA-140449-2500	ZKA-140450-2500	ZKA-140451-2500	ZKA-140452-2500	ZKA-140458-2500	ZKA-140460-2500	ZKA-140453-2500	ZKA-140454-2500	ZKA-140455-2500	ZKA-140456-2500	ZKA-140459-2500	ZKA-140461-2500
ZDV-348220-002	•	•		•	•	•	•							•	•	•	•	•	•

Benefits

- Multifunction plug and play accessory
- Detachable mains power cord
- Replaceable fuses
- LAN Connector
- Easy to use
- Cord strain relief

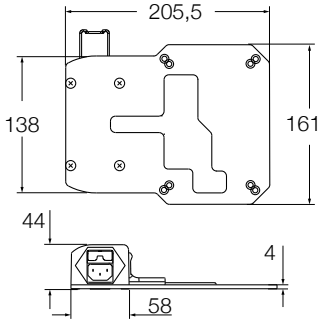
Standards

- IEC 60601-1:2005 (3rd edition) compliant

Technical data

- IEC inlet mains power socket with retainer
- 1 RJ45 for operating device
- 1 RJ45 for LAN
- 2 replacable fuses 8 A
- Plate with holes as the plates of the pillar CPMA
- Can be fastened on inner and outer tube

Dimensional drawing



Outlet socket box – ZDV

Suitable operating devices

	Pillars			Hand switches	Foot switches	Desk switches		Mains cables						Detachable mains cords					
	CPMB1-1	CPMB1-2	CPMB2-2	EHA41-13N10N-000	STL01-GW1000-X190	STK01-SW3000-X100	STK01-UW3000-X100	ZKA-140449-2500	ZKA-140450-2500	ZKA-140451-2500	ZKA-140452-2500	ZKA-140458-2500	ZKA-140460-2500	ZKA-140453-2500	ZKA-140454-2500	ZKA-140455-2500	ZKA-140456-2500	ZKA-140459-2500	ZKA-140461-2500
ZDV-348221-002	•	•		•	•	•	•												

Benefits

- Multifunction plug and play accessory
- 3 IEC outlet sockets
- Replaceable fuses
- Integrated mounting plate
- LAN Connector
- Easy to use

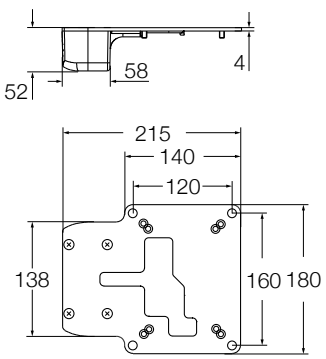
Standards

- IEC 60601-1:2005 (3rd edition) compliant

Technical data

- 3 IEC mains power outlet sockets
- 1 RJ45 for operating device
- 1 RJ45 for LAN
- 2 replacable fuses 8 A
- Integrated mounting plate with 4 holes 9 mm diameter
- 4 screws to fasten on pillar CPMA
- Can be fastened on inner and outer tube

Dimensional drawing

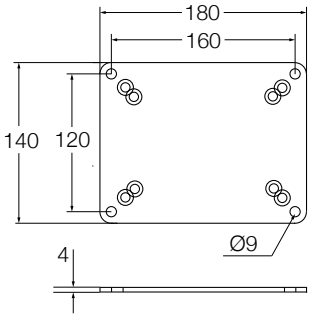


Mounting plate – ZPL

Suitable operating devices

	Pillars		
	CPMA1-1	CPMA1-2	CPMA2-2
ZPL	•	•	•

Dimensional drawing



Benefits

- Easy to use

Technical data

- Can be fastened on inner and outer tube
- Mounting plate with 4 holes 9 mm diameter

Mains cable and detachable mains cord – ZKA

Mains cable

Detachable mains cord

Mains cable

	Pillars			Socket boxes	
	CPMB1-1	CPMB1-2	CPMB2-2	ZDV-348220-002	ZDV-348221-002
ZKA-140449-2500	•	•			
ZKA-140450-2500	•	•			
ZKA-140451-2500	•	•			
ZKA-140452-2500	•	•			
ZKA-140458-2500	•	•			
ZKA-140460-2500	•	•			

Detachable mains cord

	Pillars			Socket boxes	
	CPMB1-1	CPMB1-2	CPMB2-2	ZDV-348220-002	ZDV-348221-002
ZKA-140453-2500	•	•			
ZKA-140454-2500	•	•			
ZKA-140455-2500	•	•			
ZKA-140456-2500	•	•			
ZKA-140459-2500	•	•			
ZKA-140461-2500	•	•			

Benefits

- Easy to use
- Identification by a product label

Standards

- IEC 60601-1:2005 (3rd edition) compliant

Desk switch – STK

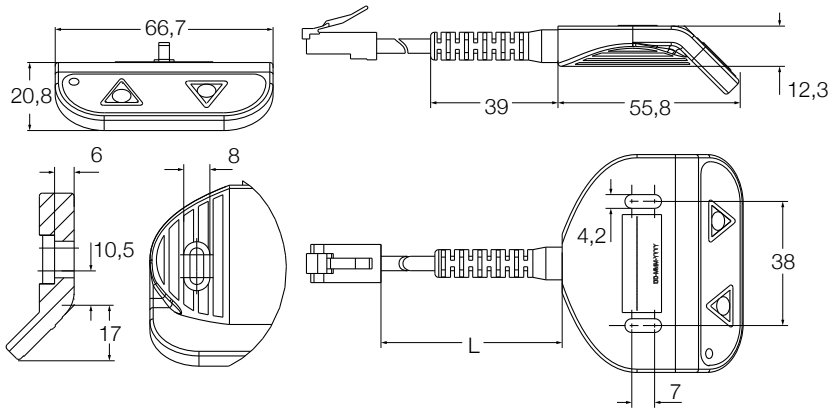
Benefits

- Easy and precise
- Stylish design
- Tactile buttons with finger guide
- 2 colors LED for power and feedback status

Standards

- IEC 60601-1:2005 (3rd edition) compliant

Dimensional drawing



Suitable operating devices

	Pillars			Socket boxes	
	CPMA1-1	CPMA1-2	CPMA2-2	ZDV-348220-002	ZDV-348221-002
STK01-SW3000-X100	•	•	•	•	•
STK01-UW3000-X100	•	•	•	•	•

Designation	L [mm]
STK01-SW3000-X100	500
STK01-UW3000-X100	1 000

See **page 196** and **197** for technical data and ordering key

Hand switch – EHA

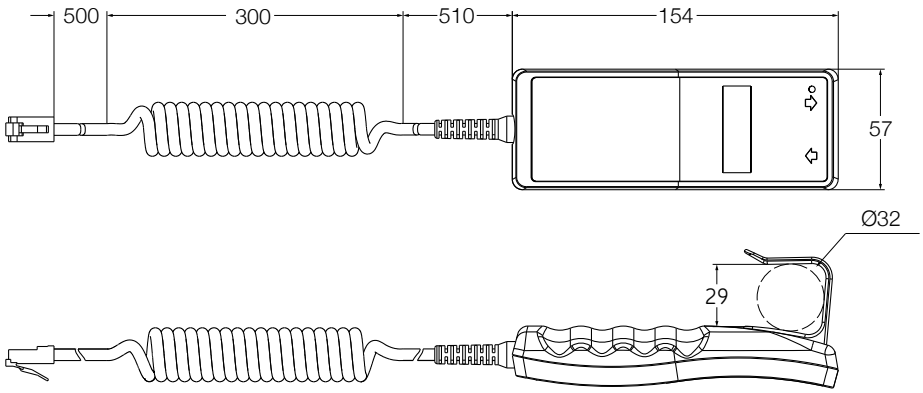
Benefits

- Robust ergonomic design
- Tactile buttons
- Easy mountable fastening hook
- 2 colors LED for power and feedback status

Standards

- IEC 60601-1:2005 (3rd edition) compliant

Dimensional drawing



Suitable operating devices

	Pillars			Socket boxes	
	CPMB1-1	CPMB1-2	CPMB2-2	ZDV-348220-002	ZDV-348221-002
EHA	•	•	•	•	•

See **page 196** and **197** for technical data and ordering key

Foot switch – STL

Benefits

- Easy to use
- Ergonomic design

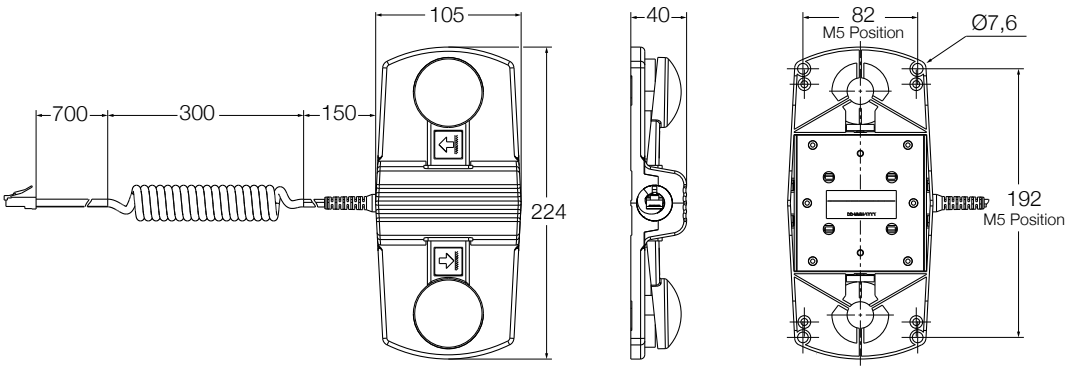
Standards

- IEC 60601-1:2005 (3rd edition) compliant

Suitable operating devices

	Pillars			Socket boxes	
	CPMB1-1	CPMB1-2	CPMB2-2	ZDV-348220-002	ZDV-348221-002
STL01	•	•	•	•	•

Dimensional drawing



Switches technical data

	Unit	EHA4	STL	STK
Max. operating channels	n°	1	1	1
Operating power	V DC/mA	5/20	5/20	5/20
Type of protection	IP	67	x2	–
Color	–	Grey	Grey and anthracite	Grey
Indicator		LED 2 colors for power and feedback status	–	LED 2 colors for power and feedback status
Plug	–	RJ45	RJ45	RJ45
Hook	–	with hook	–	–
Symbols	–	with arrows up/down	with arrows up/down	with arrows up/down

Accessories

Description	Plug	Country	Part number	Order Number
Mains cable straight 2,5 m	Schuko	Germany, France, ...	ZKA-140449-2500	130015
	Typ-L	Italy	ZKA-140450-2500	130016
	British standard	UK	ZKA-140451-2500	130017
	NEMA	USA, Japan, …	ZKA-140452-2500	130018
	SEV	CH	ZKA-140458-2500	130256
	AS 3112	PRC, Australia, ...	ZKA-140460-2500	130391
Detachable mains cord straight 2,5 m	Schuko	Germany, France, ...	ZKA-140453-2500	130019
(to plug in socket box Inlet)	Typ-L	Italy	ZKA-140454-2500	130020
	British standard	UK	ZKA-140455-2500	130021
	NEMA	USA, Japan, …	ZKA-140456-2500	130022
	SEV	CH	ZKA-140459-2500	130257
	AS 3112	PRC, Australia, ...	ZKA-140461-2500	130392
Desk switch with LED, cable 0,5 m			STK01-SW3000-X100	130025
Desk switch with LED, cable 1,0 m			STK01-UW3000-X100	130026
Handset with LED, cable coiled 1,3 m			EHA41-13N00N-000	131033
Foot switch, cable coiled 1,3 m			STL01-GW1000-X100	131873
Mounting plate			ZPL-348382	130024
Socket box inlet: IEC, RJ45 LAN, RJ45 op. device			ZDV-348220-002	130030
Socket box outlet: 3xIEC, RJ45 LAN, RJ45 op. device			ZDV-348221-002	130032

Ordering key

C P M B [ ] – [ ] 2 [ ] [ ] [ ] [ ] [ ] 0 – 0 0 0

Type

Voltage

1	100–240 V AC 50/60 Hz
2	24 V DC

Load

	Push	
1	1 000 N	Only for AC version
2	2 000 N	

Tube set

2	2-section

Stroke length

200	200 mm	Only for DC version
230	230 mm	
250	250 mm	
300	300 mm	
400	400 mm	
---	Other per 10 mm from 200 mm or a mm for AC version up to 400 mm	

Motor orientation1)

A	Motor in inner tube
B	Motor in outer tube

Operating device orientation

A	Operating device socket as the motor
B	Operating device socket at both sides

[1] Pillar can be placed with outer tube on the top or bottom (↳ **page 191**)

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

CPMT

For medical procedure equipment

Benefits

- Low retracted height
- High stroke
- High load capacity
- High safety and reliability
- Design flexibility

Standards

- IEC 60601-1:2005
- ANSI/AAMI ES60601-1:2005
- IEC 60601-1-2:2007

Technical data

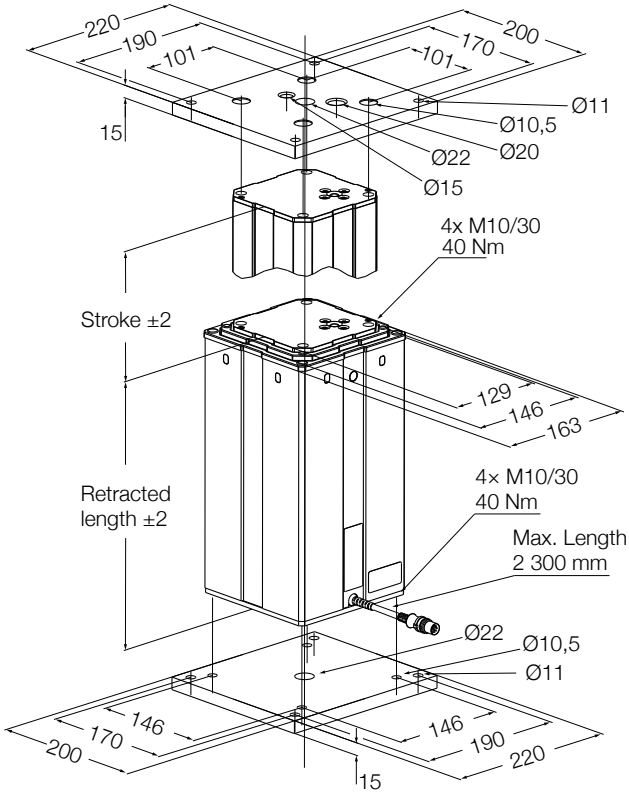
	Unit	CPMT1-1S	CPMT1-1M	CPMT1-2S	CPMT1-2M
Rated push load	N	5 000	5 000	6 000	6 000
Rated pull load	N	4 000	4 000	4 000	4 000
Static load (push)[1]	N	15 000	15 000	15 000	15 000
Safety factor on rated load[2]		4	4	4	4
Dynamic bending moment	Nm	up to 450[3]	up to 1 200[3]	up to 550[3]	up to 1 400[3]
Static bending moment (max.)	Nm	1 000	3 000	1 000	3 000
Retracted length	mm	stroke/2 + 120 mm	stroke/2 + 240 mm	stroke/2 + 120 mm	stroke/2 + 240 mm
Stroke (S)	mm	400 to 600	300 to 600	400 to 600	300 to 600
Speed	mm/s	14 to 34	14 to 34	12 to 26	12 to 26
Voltage	V DC	24 to 30	24 to 30	24 to 30	24 to 30
Current (push, max.)	A	12	12	10	10
Current (pull, max.)	A	10	10	7	7
Duty cycle	on/off	1 min./9 min.	1 min./9 min.	1 min./9 min.	1 min./9 min.
Ambient temperature	°C	+10 to +40	+10 to +40	+10 to +40	+10 to +40
IP protection		20	20	20	20
Weight	kg	16,5 to 20	19 to 23,5	16,5 to 20	19 to 23,5

[1] Compliant with static load according to IEC 60601-2-46:2010

[2] Static tensile safety factor to prevent mechanical hazard according to IEC 60601-1:2005

[3] For details, see offset load diagrams (↳ **page 199**)

Dimensional drawing



Configuration options

Option S Option M

DIN8 or flying leads cable for connector flexibility

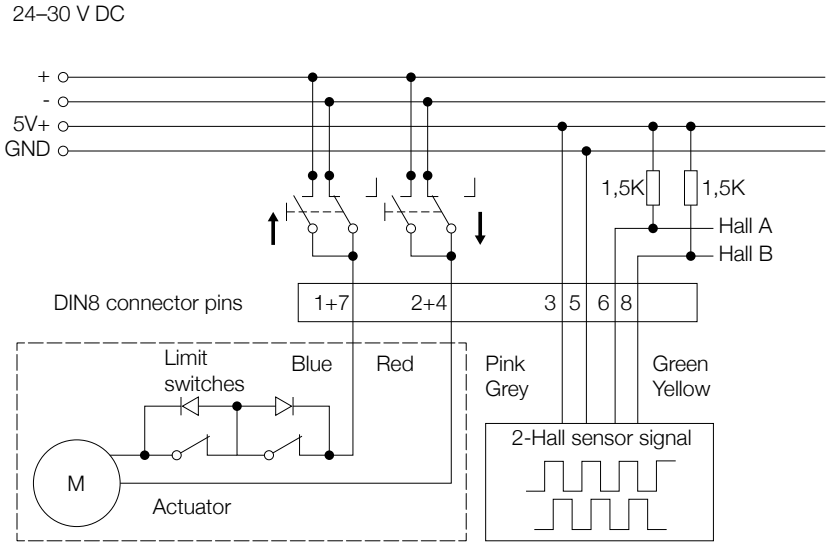
Suitable control units and accessories

	Control units		
	SCU	VCU	BCU[1]
CPMT	•	•	•
Operating switches			
EHA 3	•	•	•
STJ	•	•	•
STE	•	•	•

Hand switch Foot switch Desk switch

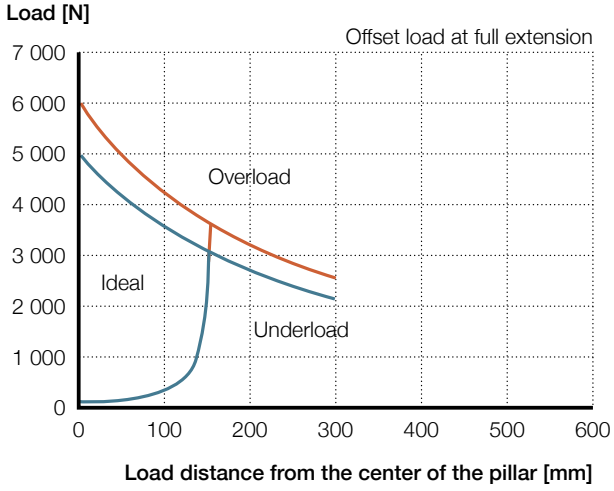
[1] Reduced load capacity:
CPMT1-1 up to 3 000 N
CPMT1-2 up to 4 000 N

Connecting diagrams

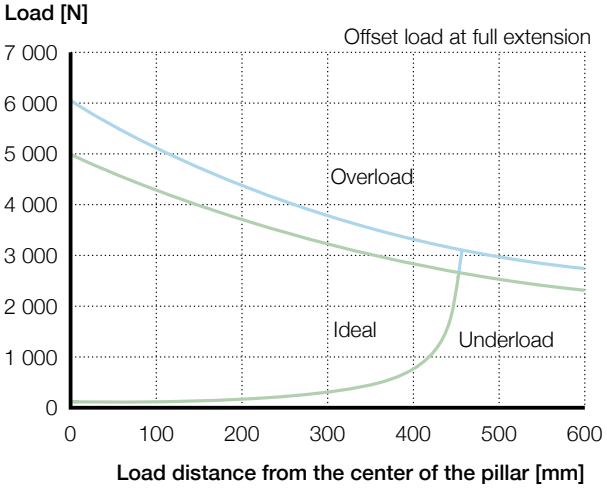


Offset load diagrams

CPMT1-1S, -2S



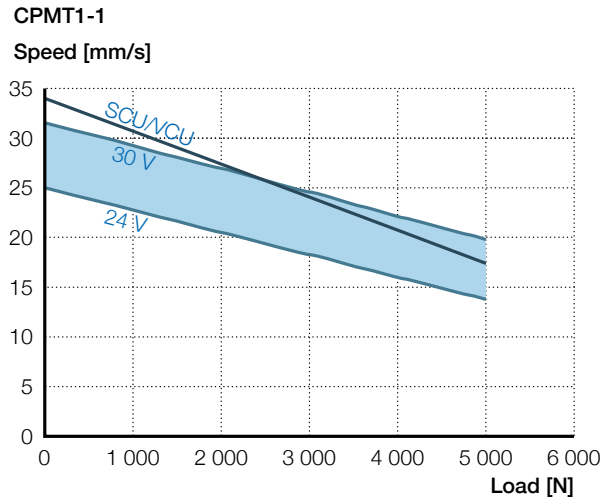
CPMT1-1M, -2M



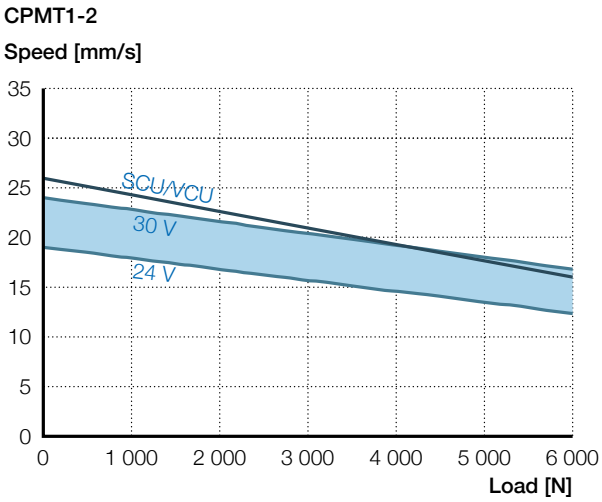
CPMT1-1S CPMT1-2S CPMT1-2M CPMT1-1M

Speed-load diagrams

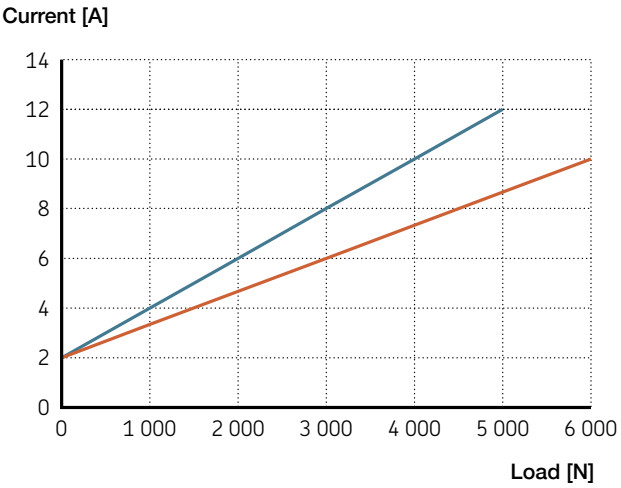
CPMT1-1



CPMT1-2



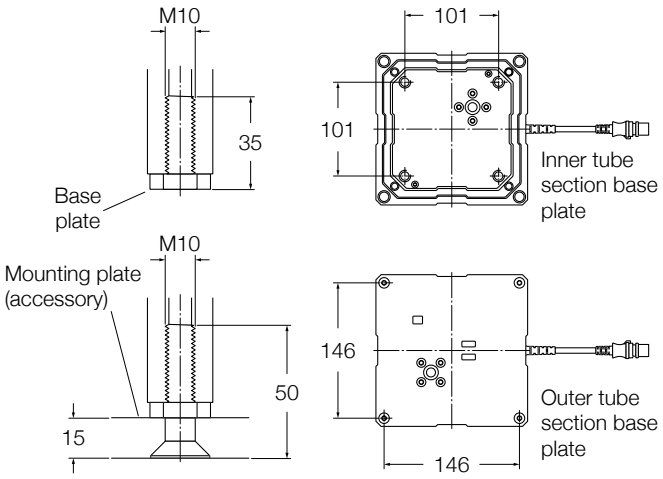
For medical procedure equipment



CPMT1-1

CPMT1-2

Mounting details



The pillar must be mounted on a plane and rigid surface by 4 screws M10 (accessory) with a screw in depth of 25 to 35 mm in the pillar.

Additional attachment options

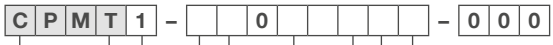
Optional threads on outer tube section can be configured for additional attachment options. Please contact Ewellix for more details.

- Choice in size and position
- High strength to support attached actuators

Accessories

Description	Part number
Control Unit SCU (3 or 6 ports)	SCUXX-003XXX-000
Control Unit VCU (3 or 5 ports)	VCUXX-003XX0-000
Control Unit BCU (3 ports)	BCUX3-XX3100-0000
Foot switch STJ (1-3 channels)	STJ0X-XXXXXX-XX00
Hand switch EHA3 (1-5 channels)	EHA3X-23MXXN-000
Top mounting plate	ZPL-290268
Bottom mounting plate	ZPL-290265
Screw (4/plate) for mounting plate	ZBE-510707

Ordering key



Type

Voltage

1	24–30 V DC

Load

	Push (N)	Pull (N)
1	5 000	4 000
2	6 000	4 000

Retracted length

S	Stroke/2 + 120 mm
M	Stroke/2 + 240 mm

Stroke length (mm)

300	300 mm	Only for retracted length M
350	350 mm	Only for retracted length M
400	400 mm	
450	450 mm	
500	500 mm	
550	550 mm	
600	600 mm	
---	Other	per 10 mm from 300 mm (or 400 mm for retracted length S) to 600 mm

Electrical options

F	2-Hall encoder, end limit switches

Cable options

1	1 m DIN8 cable
2	2,3 m DIN8 cable
3	2,3 m flying leads cable

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

TFG

Telemag

Benefits

- Push or pull load
- Compact design
- Fast movement
- Powerful
- Plug and play

Standards

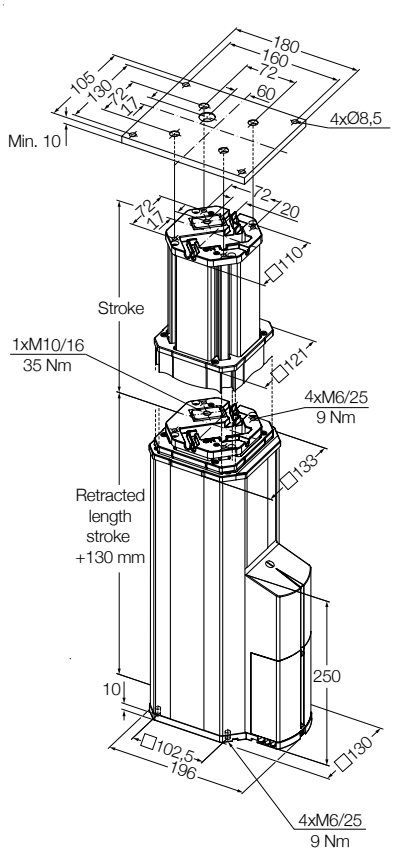
- EN/IEC 60601–1
- UL 60601–1

Technical data

	Unit	TFG 50	TFG 90
Rated push load	N	2 500	2 500
Rated pull load	N	2 500	2 500
Bending load	Nm	up to 500[1)]	up to 500[1)]
Speed (full load to no load)	mm/s	15 to 19	15 to 19
Telescopic pillar version	# of section	3-section	3-section
Stroke	mm	200 to 700	200 to 700
Retracted length	mm	S+130	S+130
Voltage	V AC	120	230
Power	W	160	160
Current	A	1.8	1
Duty cycle: intermittent operation	min.	1 min./9 min.	1 min./9 min.
Duty cycle: short-time operation	min.	3	3
Ambient temperature	°C	+10 to +40	+10 to +40
Type of protection	IP	30	30
Protection class	-	I	I
Type of control	-	electrical	electrical
Weight	kg	8 to 19	8 to 19

[1)] For details, please see bending load diagrams (↳ **page 205**)

Dimensional drawing

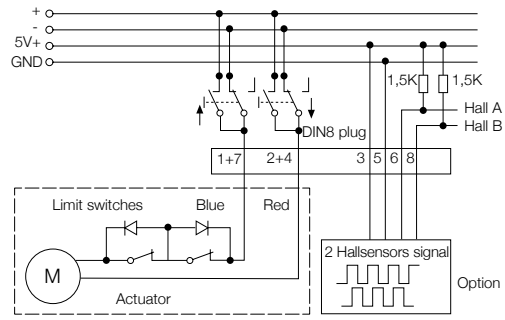


Note: mounting plates are not included.
To be ordered separately.

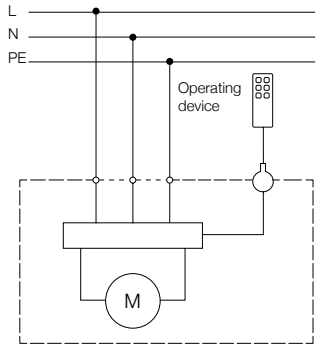
Legend:
S = stroke
L = retracted length

Connecting diagrams

24 V DC (TFG10 only)



120/230 V AC



Suitable control units and accessories

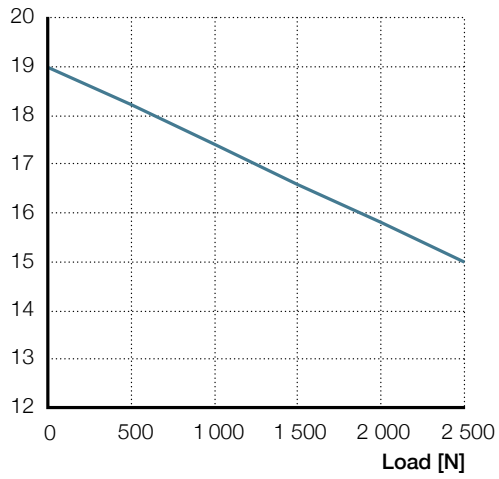
	Control units				
	SCU	VCU	BCU	COMPACT	SEM
TFG1	•	•	•	•	•
Operating switches					
EHA 3	•	•	•		
EHE					•
STJ	•	•	•		
STE	•	•	•		
HSM				•	
HSF				•	

Hand switch Foot switch Desk switch

Performance diagrams

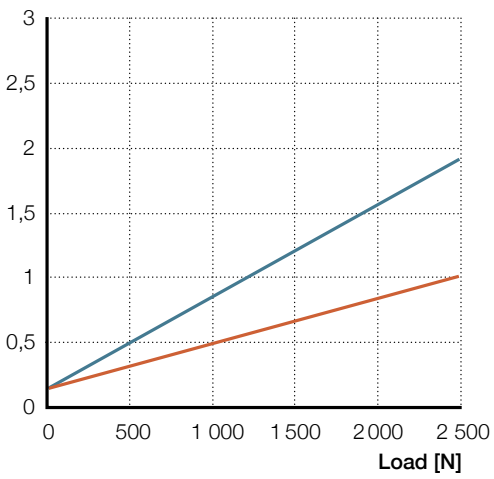
Speed-load diagram

Speed [mm/s]



Current-load diagram

Current consumption [A]

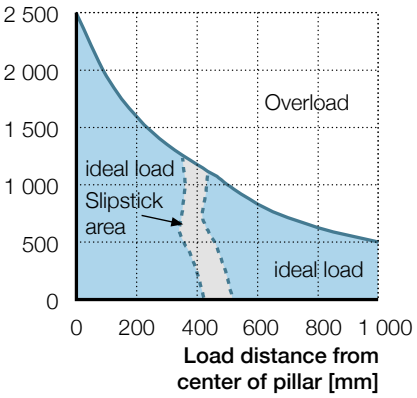


TFG 50 TFG 90

Bending load diagrams

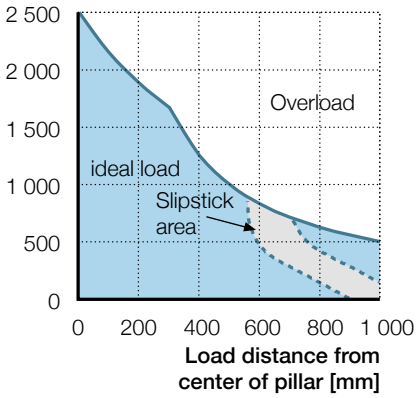
200 mm stroke

Load [N]



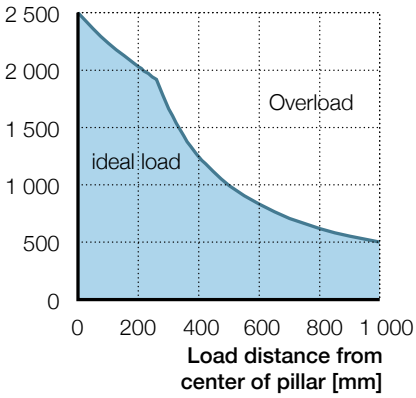
300 mm stroke

Load [N]



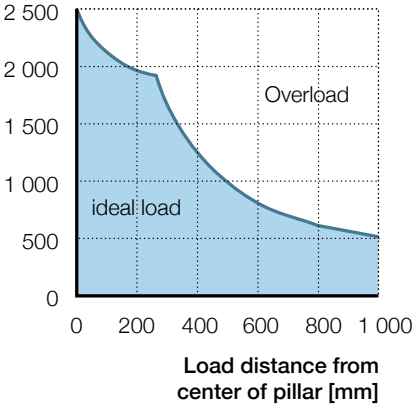
400 mm stroke

Load [N]



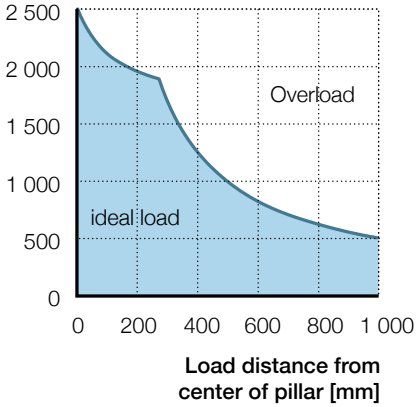
500 mm stroke

Load [N]



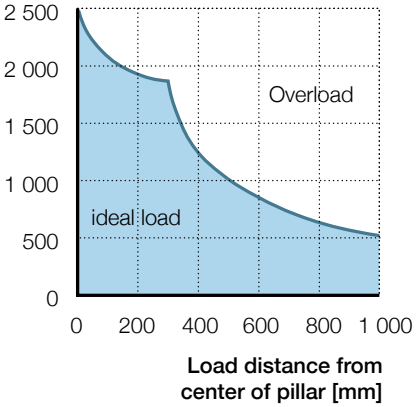
600 mm stroke

Load [N]



700 mm stroke

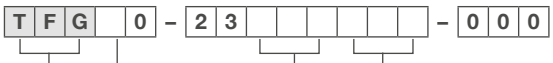
Load [N]



Accessories

	Designation	Order N°
Top mounting plate Bore 72 × 72 mm	ZPL-333360	0124808
Bottom mounting plate Bore 102,5 × 102,5 mm	ZPL-264363	0124814
Screw for top mounting plate M10 × 25 (1 screw required)	ZBE-510978	0125359
Screw for top mounting plate M6 × 30 (4 screws required)	ZBE-510709	0125560
Screw for bottom mounting plate M6 × 30 (4 screws required)	ZBE-510709	0125560
Mains cable SEV plug 3 000 mm, black, 3 × 0.75 mm^2	ZKA-304345-3000	0128699
Mains cable Schuko plug 3 000 mm, black, 3 × 0.75 mm^2	ZKA-304346-3000	0121729
Mains cable US plug 3 000 mm, black, 3 × 0.75 mm^2	ZKA-304347-3000	0121762
Mains cable British Standard plug 3 000 mm, black, 3 × 0.75 mm^2	ZKA-304355-3000	0121755

Ordering key



Type

Voltage

5 120 V AC (50/60 Hz)
9 230 V AC (50 Hz)

Stroke [S]

200 200 mm
250 250 mm
300 300 mm
350 350 mm
400 400 mm
500 500 mm
700 700 mm

Option

000 No option
E_ _ With 2-Hall encoder, 14 pulses per 9 mm travel
_C_ With mains cable feedthrough (3xAWG16)
_ _H With control cable feedthrough (10xAWG28)

THG

Telemag telescopic pillar

Benefits

- Compact design
- Robust

Standards

- EN/IEC 60601–1
- UL 60601–1

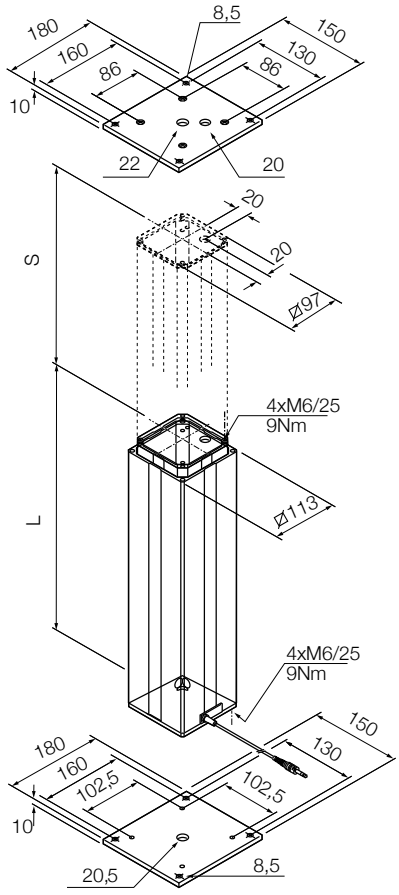
Technical data

	Unit	THG 10/11–BA	THG 10/11–CA	THG 10/11–BD	THG 10/11–CD
Rated push load	N	2 000	1 000	2 000	1 000
Rated pull load	N	0	0	0	0
Bending load	Nm	up to 250[1)]	up to 120[1)]	up to 1 000[1)]	up to 450[1)]
Speed (full load to no load)	mm/s	5 to 7	12 to 15	5 to 7	12 to 15
Telescopic pillar version	# of section	2-section	2-section	3-section	3-section
Stroke	mm	200 to 700	200 to 700	200 to 700	200 to 700
Retracted length	mm	S+270	S+270	S+180	S+180
Voltage	V DC	24	24	24	24
Power	W	120	120	120	120
Current	A	5	5	5	5
Duty cycle: intermittent operation	min.	1 min./9 min	1 min./9 min	1 min./9 min	1 min./9 min
Ambient temperature	°C	+10 to +40	+10 to +40	+10 to +40	+10 to +40
Type of protection	IP	30	30	30	30
Protection class	–	SELV	SELV	SELV	SELV
Type of control	–	electrical	electrical	electrical	electrical
Weight	kg	8 to 14	8 to 14	8 to 14	8 to 14

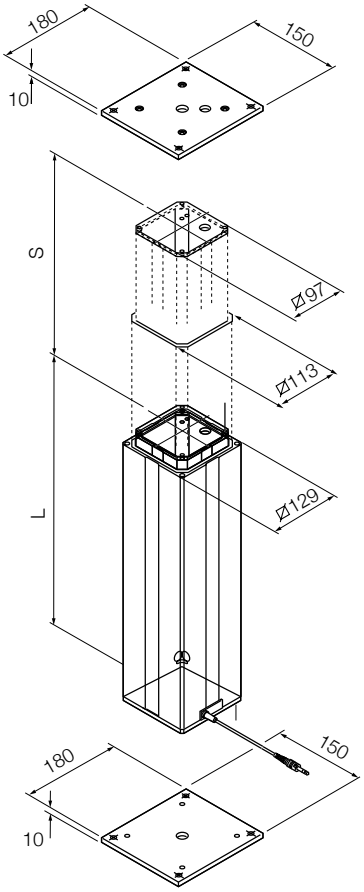
[1)] For details, please see bending load diagrams (↳ **page 209**)

Dimensional drawing

2-section



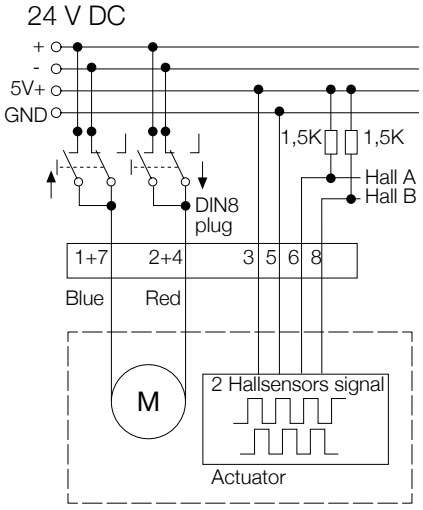
3-section



Note: mounting plates are not included.
To be ordered separately.

Legend:
S = stroke
L = retracted length

Connection diagram[1)]



[1)] Only valid with THG11. THG10 must be operated by a BCU, SCU or VCU control unit.

Suitable control units and accessories

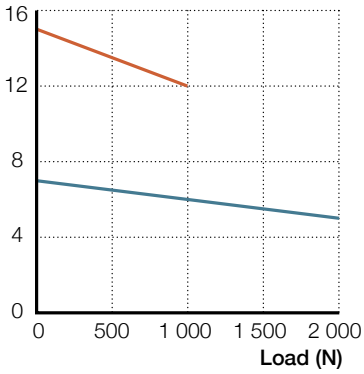
	Control units			
	SCU	VCU	BCU	MCU
THG	•	•	•	•
Operating switches				
EHA 1				•
EHA 3	•	•	•	
STF				•
STJ	•	•	•	
STA				•
STE	•	•	•	

Hand switch Foot switch Desk switch

Performance diagrams

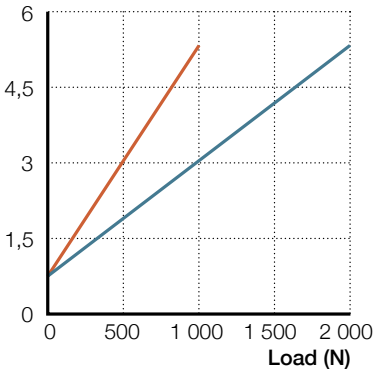
Speed-load diagram

Speed (mm/s)



Current-load diagram

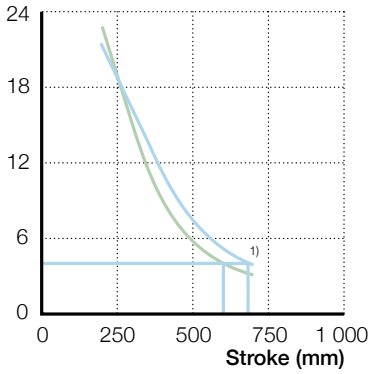
Current consumption (A)



THG...B. THG...C.

Safety factor load conditions

Safety factor (screw buckling)



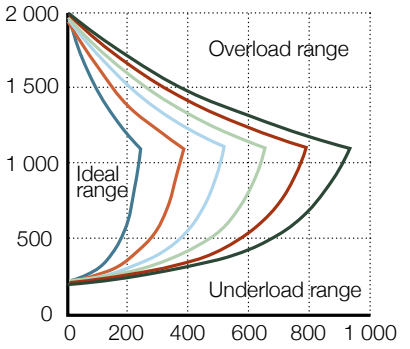
1) Safety factor = 4

B/Tr 15x5 C/Tr 12,5x5

Bending load diagrams

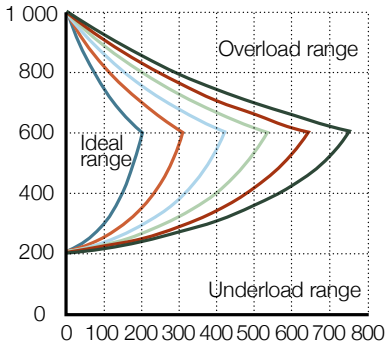
Bending load diagram THG...BD

Load [N]



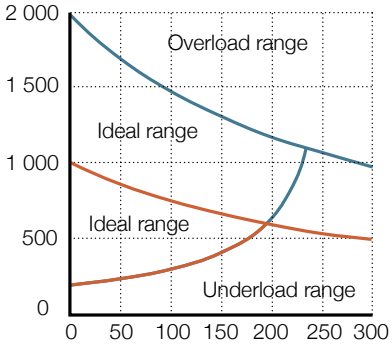
Bending load diagram THG...CD

Load [N]



Bending load diagram THG...BA/CA

Load [N]



Stroke: 200 300 400 500 600 700

THG...BA THG...CA

Accessories

	Designation	Order number
Top mounting plate for 2× tube set	SPL-264265	0125688
Bottom mounting plate for 2× tube set	SMT-264363	0124814
Top mounting plate for 3× tube set	SPL-264265	0125688
Bottom mounting plate for 3× tube set	SPL-264237	0125623
Screw (4/plate) for mounting plate	ZBE-510707	0125622
Plug AC Telemag 3 pin	ZBE-510707	0125360

Ordering key

T H G 1 [ ] – [ ] [ ] [ ] [ ] [ ] – 0 0 0

Type

Voltage
0 24 V DC
1 24 V DC with integrated current cut-off

Load
B 2 000 N
C 1 000 N

Tube set
A Tube set 2×
D Tube set 3×

Stroke (S)
2 200 mm
3 300 mm
4 400 mm
5 500 mm
6 600 mm
7 700 mm

Cable / connecting plug
1 Straight, 1,0 m / jack plug
2 Straight, 2,3 m / jack plug
A Coiled, 0,6 m / jack plug
3 Straight, 1,0 m / DIN8 plug
4 Straight, 2,3 m / DIN8 plug
B Coiled, 0,6 m / DIN8 plug

Option
0 No option 0
A 1-Hall encoder, 8 pulses, cable with jack plug
B Potentiometer, 1 k, 2 Watt, 0,25 % linearity, 10 turns (tube set 3 × only)
C Cable feedthrough, 5 × 0,75 mm2, top +160 mm, bottom +800 mm
D Cable feedthrough, 1-Hall encoder, 8 pulses, cable with jack plug
E Cable feedthrough, potentiometer (tube set 3 × only)
F 2-Hall encoder, cable with DIN8 plug
G Cable feedthrough, 2-Hall encoder, cable with DIN8 plug

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

TLC

Telemag telescopic pillar

Benefits

- Push or pull load
- High bending load
- Quiet
- Powerful
- Plug and play

Standards

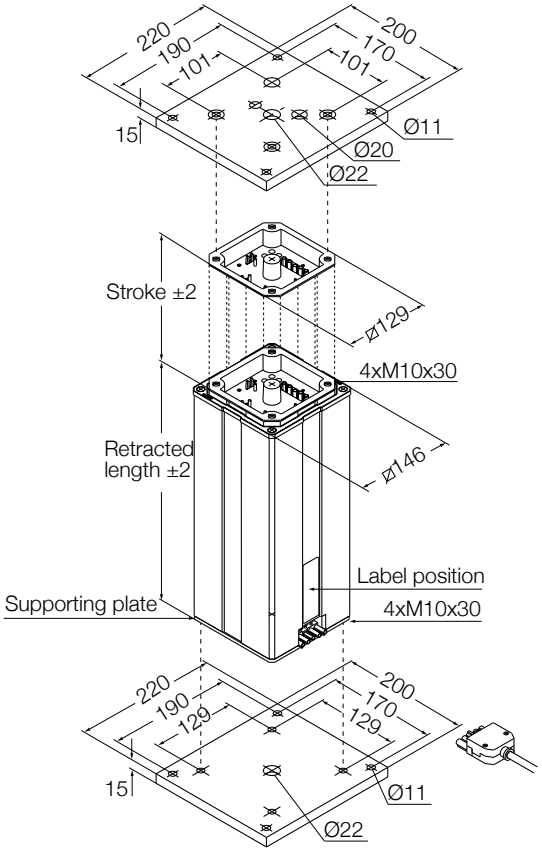
- EN/IEC 60601–1
- UL 60601–1

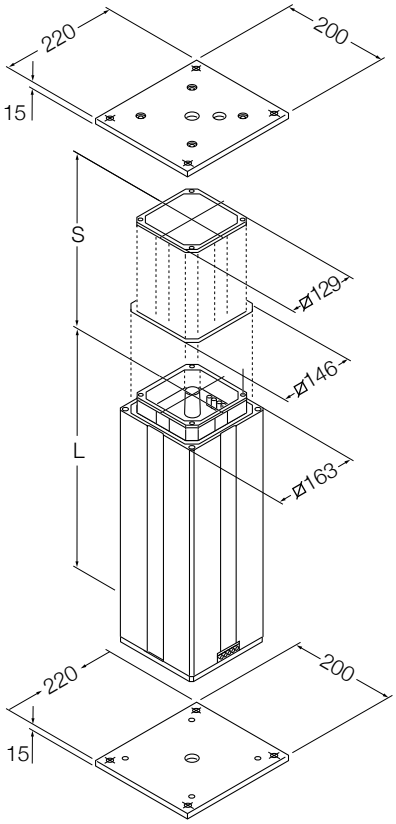
Technical data

		Unit	TLC 12ZWAS	TLC 12ZWAK	TLC 12ZWDS	TLC 12ZWDK
Rated push load		N	4 000	4 000	4 000	4 000
Rated pull load		N	4 000	4 000	4 000	4 000
Bending load		Nm	up to 630[1)]	up to 630[1)]	up to 2 100[1)]	up to 2 100[1)]
Speed (full load to no load)	120 V AC	mm/s	16 to 22	16 to 22	16 to 22	16 to 22
	230 V AC	mm/s	11 to 17	11 to 17	11 to 17	11 to 17
Telescopic pillar version		# of section	2-section	2-section	3-section	3-section
Stroke		mm	100 to 700	100 to 700	255 to 700	255 to 700
Retracted length (push version)		mm	S+175	S+175	S+60	S+60
Retracted length (pull version)		mm	S+185	S+185	S+70	S+70
Voltage		V AC	120 or 230	120 or 230	120 or 230	120 or 230
Power	120 V AC	W	1 200	1 200	1 200	1 200
	230 V AC	W	890	890	890	890
Current	120 V AC	A	10	10	10	10
	230 V AC	A	4,1	4,1	4,1	4,1
Duty cycle: intermittent operation	120 V AC	min.	0,8 min./37 min.	0,8 min./37 min.	0,8 min./37 min.	0,8 min./37 min.
	230 V AC	min.	1 min./37 min.	1 min./37 min.	1 min./37 min.	1 min./37 min.
Duty cycle: short-time operation	120 V AC	min.	1,2	1,2	1,2	1,2
	230 V AC	min.	2	2	2	2
Ambient temperature		°C	+10 to +40	+10 to +40	+10 to +40	+10 to +40
Type of protection		IP	20/30	20/30	20/30	20/30
Protection class		–	I	I	I	I
Type of control		–	electrical	pneumatic	electrical	pneumatic
Weight		kg	15,2-24,5	15,2-24,5	18,3-30,5	18,3-30,5

[1)] For details, please see bending load diagrams (↳ **page 213**)

Dimensional drawing

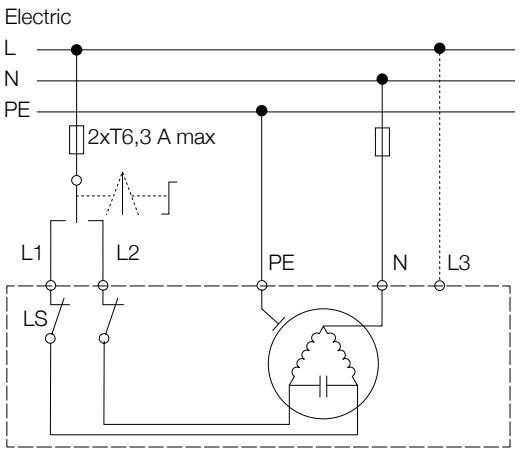


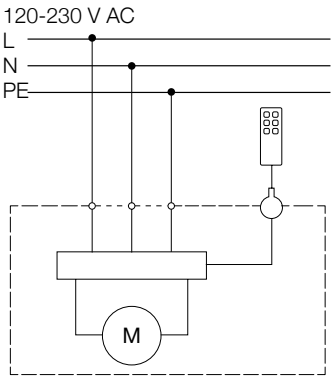


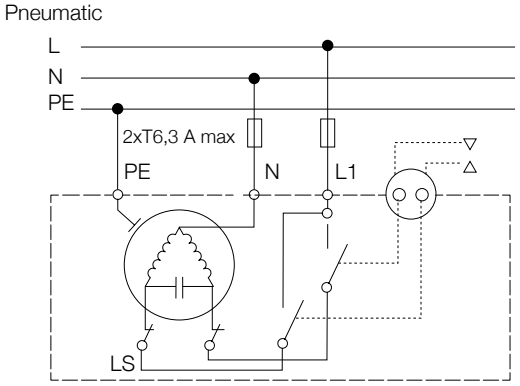
Note: mounting plates are not included.
To be ordered separately.

Legend:
S = stroke
L = retracted length

Connecting diagrams







Suitable control units and accessories

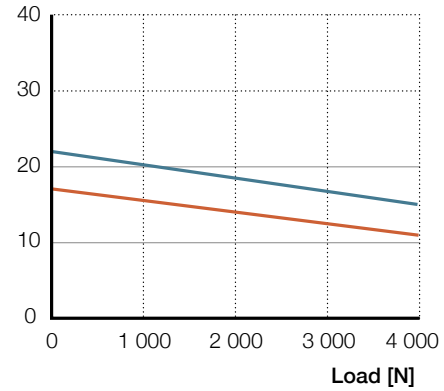
	PHC	PFP	PAM
TLC pneumatic*	•	•	•

* Integrated control unit

Hand switch
Foot switch
Desk switch

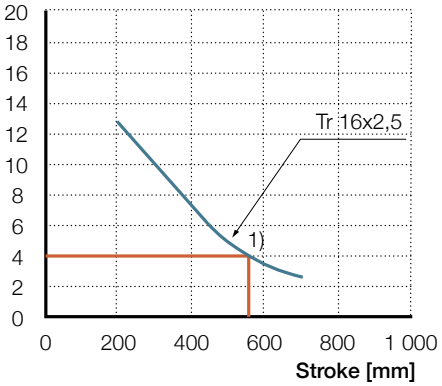
Performance diagram

Speed-load diagram



120 V AC version 230 V AC version

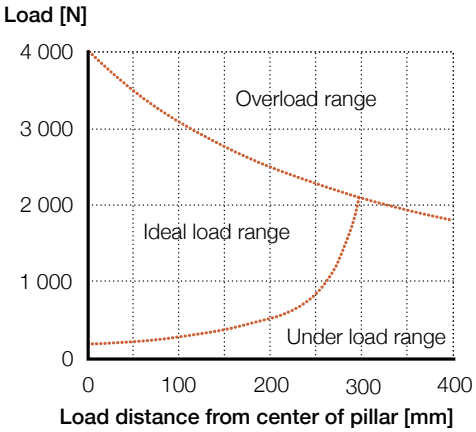
Safety factor load conditions



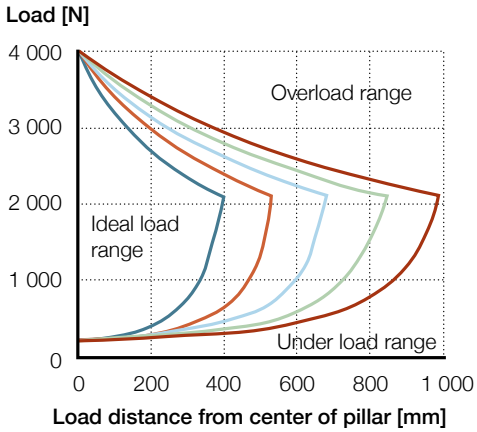
[1] Safety factor =4

Bending load diagrams

Bending load diagram 2-section



Bending load diagram 3-section



300 400 500 600 700

Accessories

	Designation	Order number
Top mounting plate for 2× tube set	ZPL–290268	0125624
Bottom mounting plate for 2× tube set	ZPL–290351	0125625
Top mounting plate for 3× tube set	ZPL–290268	0125624
Bottom mounting plate for 3× tube set	ZPL–290265	0125623
Screw (4/plate) for mounting plate	ZBE–510707	0125360
Plug AC Telemag 3 pin	ZEL–265518	0124866
Plug AC Telemag 5 pin	ZEL–265519	0124864

Ordering key

Type

Load
Z 4 000 N

Tube set
A Tube set 2×
D Tube set 3×

Control
S Electrical control
K Pneumatic control
N Low-voltage control

Voltage
– 230 V AC/50 Hz (no code)
2U 120 V AC/60 Hz

Construction
0 Push load
1 Customer-specific
3 Pull load

Stroke [S]
1 100 mm, only for tube set 2×, push
1 255 mm, only for tube set 3×, push
2 200 mm, only for tube set 2×
3 300 mm
4 400 mm
5 500 mm
6 600 mm
7 700 mm

■ Options shown in red are only available on demand. Contact Ewellix for more information on minimum quantities and additional cost.

TLG

Telemag telescopic pillar

Benefits

- High bending load
- Powerful

Standards

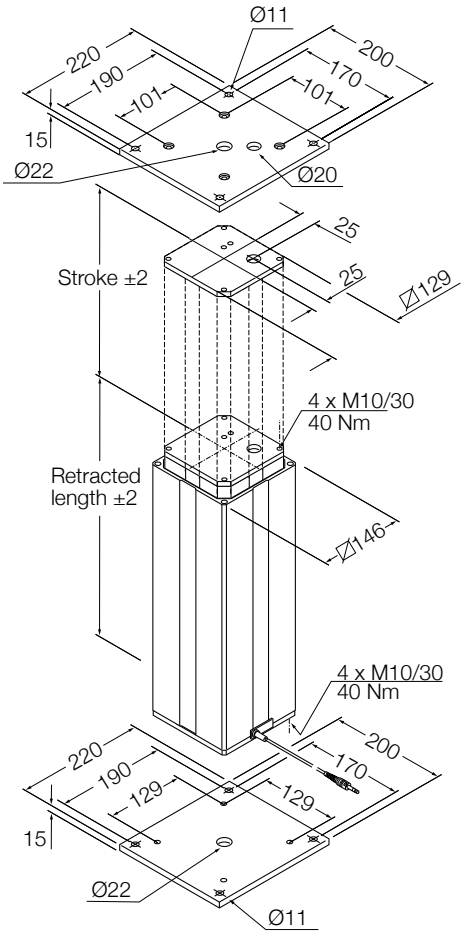
- EN/IEC 60601–1
- UL 60601–1

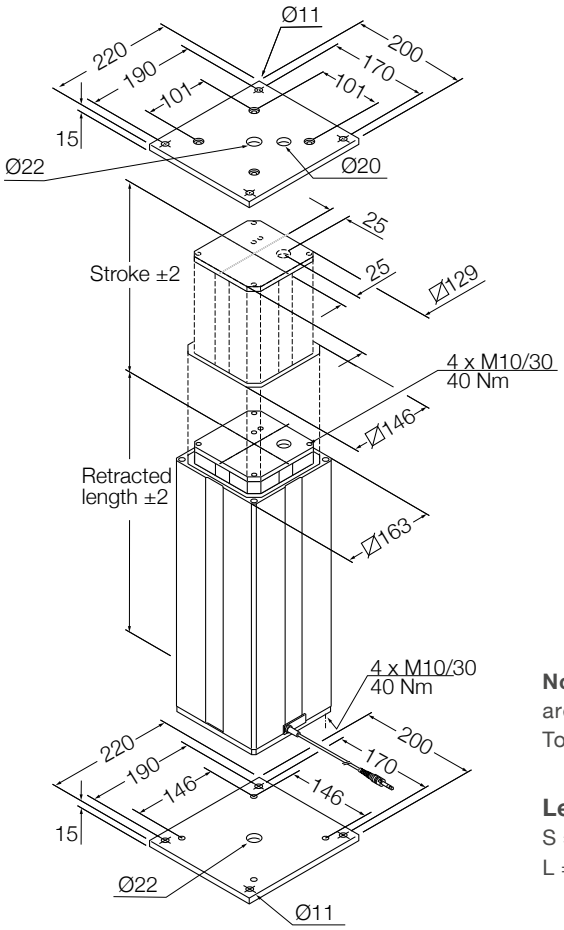
Technical data

	Unit	TLG 10/11–A	TLG 10–B	TLG 10/11–C
Rated push load	N	4 000	2 500	1 500
Rated pull load	N	0	0	0
Bending load	Nm	up to 2 800[1)]	up to 1 750[1)]	up to 950[1)]
Speed (full load to no load)	mm/s	10 to 14	13 to 17	25 to 33
Telescopic pillar version	# of section	2 or 3-section	2 or 3-section	2 or 3-section
Stroke	mm	200 to 700	200 to 700	200 to 700
Retracted length	mm	S+180	S+180	S+180
Voltage	V DC	24	24	24
Power	W	156	156	156
Current	A	6	6	6
Duty cycle: intermittent operation	min.	1 min./9 min	1 min./9 min	1 min./9 min
Ambient temperature	°C	+10 to +40	+10 to +40	+10 to +40
Type of protection	IP	30	30	30
Protection class	–	SELV	SELV	SELV
Type of control	–	electrical	electrical	electrical
Weight	kg	15 to 30	15 to 30	15 to 30

[1)] For details, please see bending load diagrams (↳ **page 217**)

Dimensional drawing

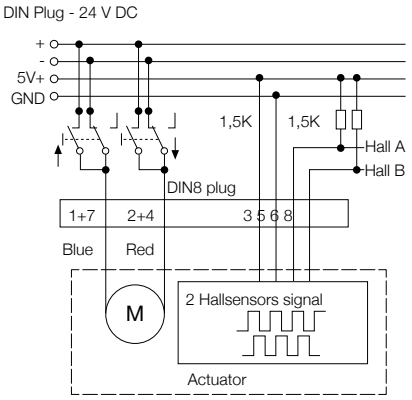


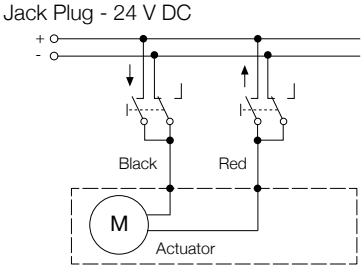


Note: mounting plates are not included.
To be ordered separately.

Legend:
S = stroke
L = retracted length

Connecting diagrams





Suitable control units and accessories

	Control units			
	SCU	VCU	BCU	MCU
TLG	•	•	•	•
Operating switches				
EHA 1				•
EHA 3	•	•	•	
STF				•
STJ	•	•	•	
STA				•
STE	•	•	•	

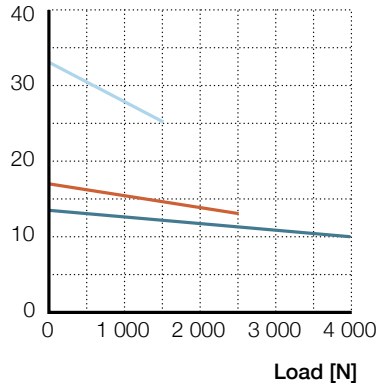
Hand switch Foot switch Desk switch

[1] Only valid with TLG11. TLG10 must be operated by a BCU, MCU, SCU or VCU control unit.

Performance diagrams

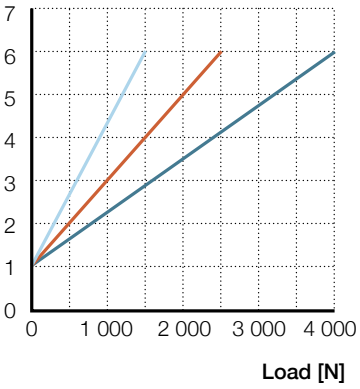
Speed-load diagram

Speed [mm/s]



Current-load diagram

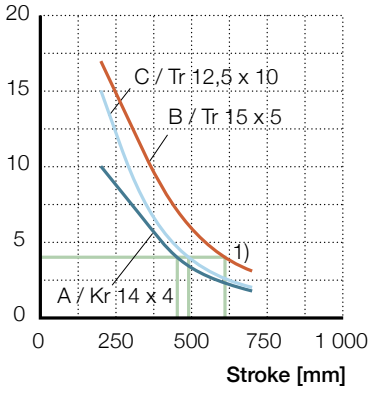
Current consumption [A]



A B C

Safety factor load conditions

Safety factor

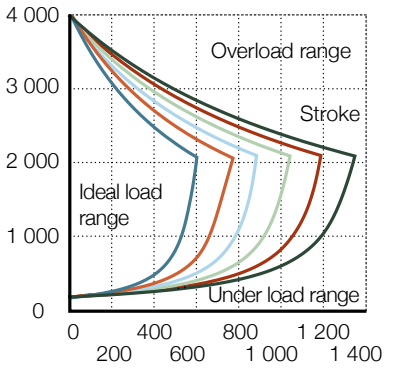


[1] Safety factor =4

Bending load diagrams

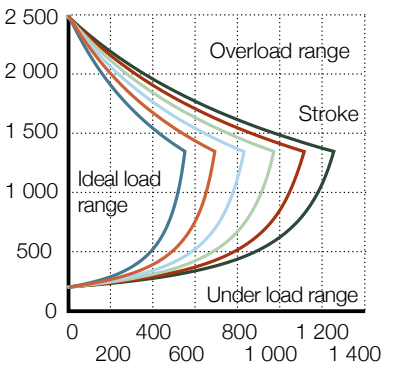
Bending load diagram TLG ...AD

Load [N]



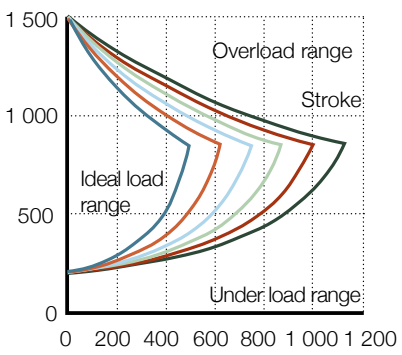
Bending load diagram TLG ...BD

Load [N]



Bending load diagram TLG ...CD

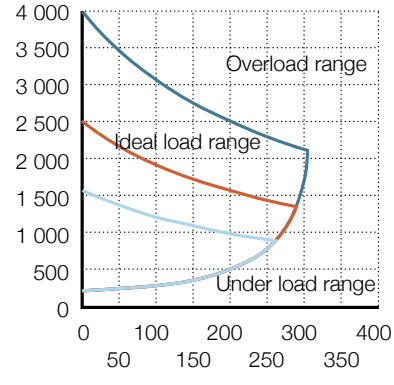
Load [N]



Stroke: 200 300 400 500 600 700

Bending load diagram TLG...AA/BA/CA

Load [N]



TLG1-AA

TLG1-BA

TLG1-CA

Accessories

	Designation	Order number
Top mounting plate for 2 × tube set	ZPL-290268	0125624
Bottom mounting plate for 2 × tube set	ZPL-290351	0125625
Top mounting plate for 3 × tube set	ZPL-290268	0125624
Bottom mounting plate for 3 v tube set	ZPL-290265	0125623
Screw (4/plate) for mounting plate	ZBE-510707	0125360

Ordering key

Type

Voltage
0 24 V DC
1 24 V DC with integrated current cut-off (only for 4 000 N and 1 500 N load version)

Load
A 4 000 N
B 2 500 N
C 1 500 N

Tube set
A Tube set 2×
D Tube set 3×

Stroke [S]
2 200 mm
3 300 mm
4 400 mm
5 500 mm
6 600 mm
7 700 mm

Cable / connecting plug
1 Straight, 1,0 m / jack plug
2 Straight, 2,3 m / jack plug
A Coiled, 0,6 m / jack plug
3 Straight, 1,0 m / DIN8 plug
4 Straight, 2,3 m / DIN8 plug
B Coiled, 0,6 m / DIN8 plug

Option
0 No option
A 1-Hall encoder, 8 pulses, cable with jack plug
B Potentiometer, 1 kΩ, 2 Watt, 0,25 % linearity, 10 turns
C Cable feedthrough, 5 × 0,75 mm2, led out, top +160 mm, bottom +800 mm
D Cable feedthrough, 1-Hall encoder, 8 pulses, cable with jack plug
E Cable feedthrough, potentiometer
F 2-Hall encoder, cable with DIN8 plug
G Cable feedthrough, 2-Hall encoder, cable with DIN8 plug

■ Options shown in red are only available on demand. Contact Ewellix for more information on minimum quantities and additional cost.

TLT

Telemag telescopic pillar

Benefits

- Very small built-in dimension
- Powerful

Standards

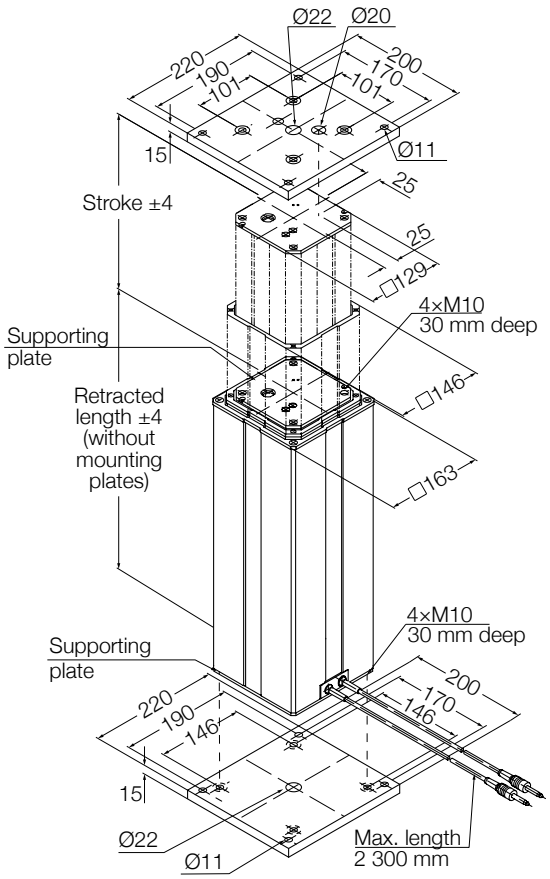
- EN/IEC 60601–1
- UL 60601–1

Technical data

	Unit	TLT10–A1	TLT10–A2	TLT10–B1	TLT10–C1	TLT10–C2
Rated push load	N	3 000	4 000	2 000	1 000	2 000
Rated pull load	N	0	0	0	0	0
Bending load	Nm	up to 400[1)]	up to 1 000[1)]	up to 250[1)]	up to 110[1)]	up to 480[1)]
Speed (full load to no load)	mm/s	11 to 16	13 to 19	13 to 19	25 to 36	25 to 42
Telescopic pillar version	# of section	3-section	3-section	3-section	3-section	3-section
Stroke	mm	300 to 700	300 to 700	300 to 700	300 to 700	300 to 700
Retracted length	mm	0,5 × S+170	0,5 × S+240	0,5 × S+170	0,5 × S+170	0,5 × S+240
Voltage	V DC	24	24	24	24	24
Power	W	168	168	192	192	216
Current	A	2×3,5	2×3,5	2×4,5	2×4,5	2×4,5
Duty cycle: intermittent operation	min.	1 min./9 min	1 min./9 min	1 min./9 min	1 min./9 min	1 min./9 min
Ambient temperature	°C	+10 to +40	+10 to +40	+10 to +40	+10 to +40	+10 to +40
Type of protection	IP	40	40	40	40	40
Protection class	–	SELV	SELV	SELV	SELV	SELV
Type of control	–	electrical	electrical	electrical	electrical	electrical
Weight	kg	15 to 30	15 to 30	15 to 30	15 to 30	15 to 30

[1)] For details, please see bending load diagrams (↳ **page 221**)

Dimensional drawing

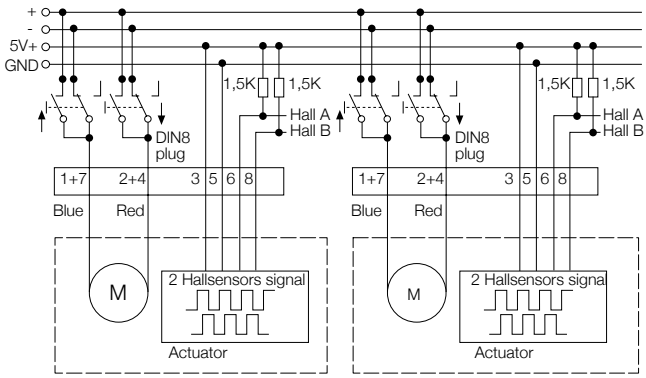


Note: mounting plates are not included.
To be ordered separately.

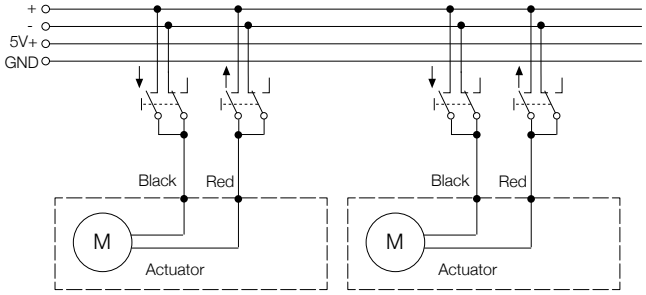
Legend:
S = stroke
L = retracted length

Connecting diagrams

DIN Plug 24 V DC



Jack Plug 24 V DC



Suitable control units and accessories

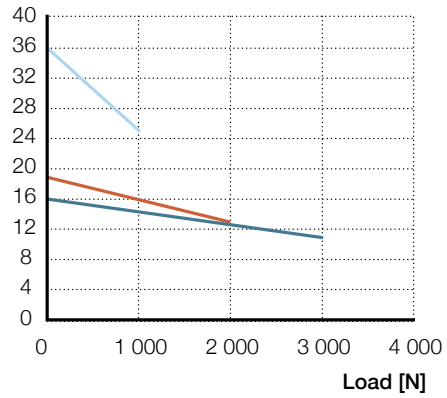
	Control units			
	SCU	VCU	BCU	MCU
TLT	•	•	•	•
Operating switches				
EHA 1				•
EHA 3	•	•	•	
STF				•
STJ	•	•	•	
STA				•
STE	•	•	•	

Hand switch Foot switch Desk switch

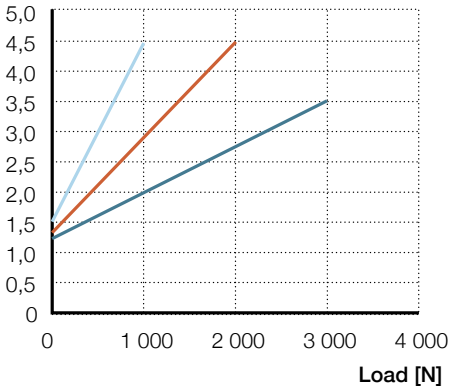
[1] Only valid with TLG11. TLG10 must be operated by a BCU, MCU, SCU or VCU control unit.

Performance diagrams

Speed-load diagram

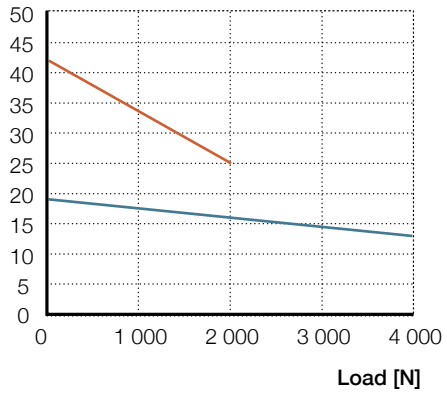


Current-load diagram

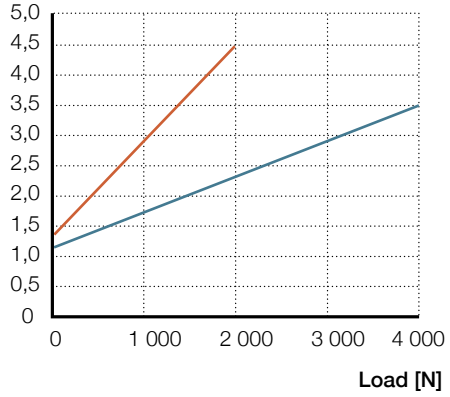


A1 B1 C1

Speed-load diagram



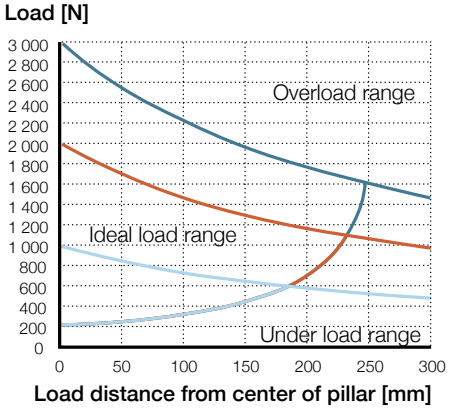
Current-load diagram



A2 C2

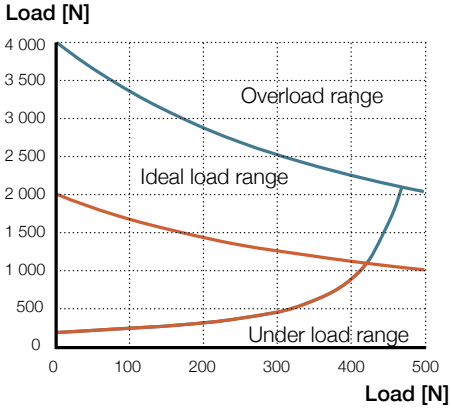
Bending load diagrams

Bending load diagram A1, B1, C1



TLT1 A-1 TLT1 B-1 TLT1 C-1

Bending load diagram A2, C2



TLT1 A-2 TLT1 C-2

Accessories

	Designation	Order number
Top mounting plate	ZPL-290268	0125624
Bottom mounting plate	ZPL-290265	0125623
Screw (4/plate) for mounting plate	ZBE-510707	0125360

Ordering key

Type

Voltage

0 24 V DC
1 24 V DC with integrated current cut-off (only for A2 and C2)

Load / Speed

A2 4 000 N
A1 3 000 N
B1 2 000 N / 19 to 13 mm/s
C2 2 000 N / 42 to 25 mm/s
C1 1 000 N

Stroke [S]

3 300 mm
4 400 mm
5 500 mm
6 600 mm[1)]
7 700 mm[1)]

Cable / connecting plug

1 Straight, 1,0 m / jack plug
2 Straight, 2,3 m / jack plug
A Coiled, 0,6 m / jack plug
3 Straight, 1,0 m / DIN8 plug
4 Straight, 2,3 m / DIN8 plug
B Coiled, 0,6 m / DIN8 plug

Option

0 No option
A 1-Hall encoder, 8 pulses, cable with jack plug
C Cable feedthrough, 3x1,5 mm2, top +160 mm, bottom +800 mm
D Cable feedthrough, 1-Hall encoder, 8 pulses, cable with jack plug
F 2-Hall encoder, cable with DIN8 plug

[1)] Reduced safety factor

■ Options shown in red are only available on demand. Contact Ewellix for more information on minimum quantities and additional cost.

TXG

Telesmart telescopic pillar

Benefits

- Powerful and fast lifting
- Aesthetic design

Standards

- EN/IEC 60601–1
- UL 60601–1

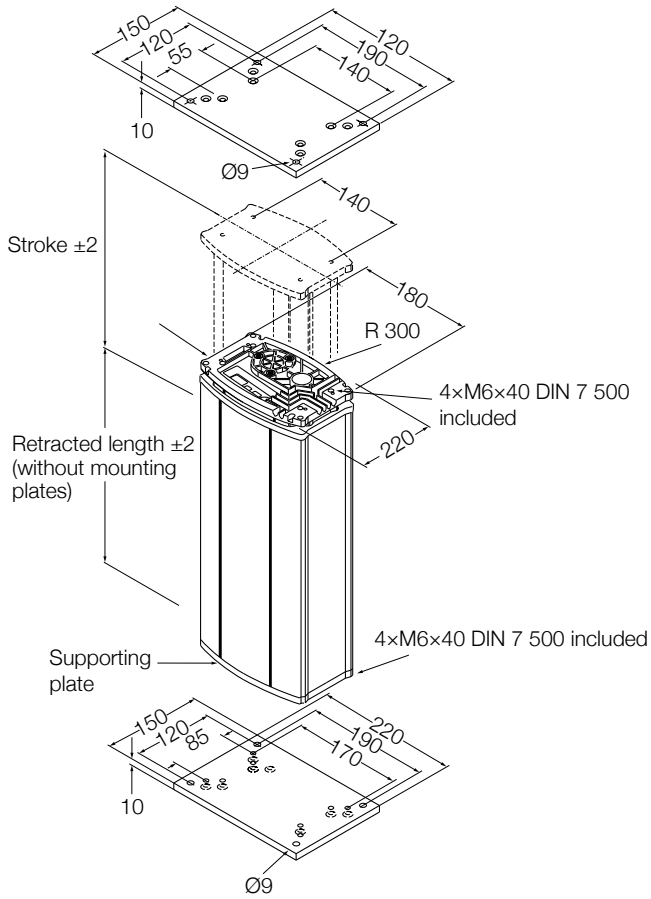
Technical data

	Unit	TXG1	TXG4/5	TXG8/9
Rated push load	N	1 500	1 500	1 500
Rated pull load	N	0	0	0
Bending load	Nm	up to 210[1)]	up to 210[1)]	up to 210[1)]
Speed (full load to no load)	mm/s	17 to 23	17 to 23	17 to 23
Telescopic pillar version	# of section	2-section	2-section	2-section
Stroke	mm	200 to 600	200 to 600	200 to 600
Retracted length	mm	S+180	S+180	S+180
Voltage	–	24 V DC	120 V AC	230 V AC
Power	W	–	N/A	N/A
Current	A	5	1,8	0,9
Duty cycle: intermittent operation	min.	1 min./9 min.	1 min./9 min.	1 min./9 min.
Duty cycle: short-time operation	min.	–	N/A	N/A
Ambient temperature	°C	+10 to +40	+10 to +40	+10 to +40
Type of protection	IP	30	30	30
Protection class	–	SELV	II/(I)2)	II/(I)2)
Type of control	–	electrical	electrical	electrical
Weight	kg	8 to 13	9 to 14	9 to 14

[1)] For details, please see bending load diagrams (↳ **page 225**)

[2)] Mandatory for cable feedthrough option

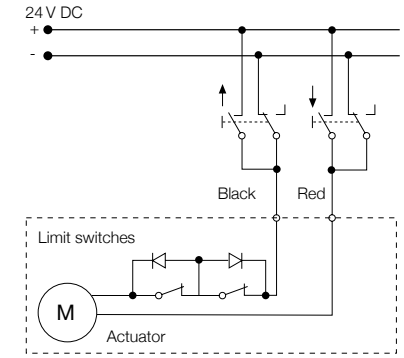
Dimensional drawing

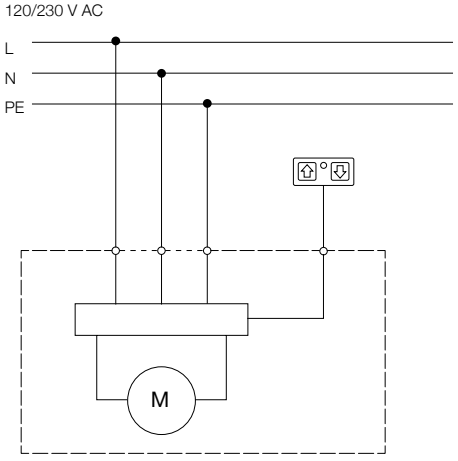


Note: mounting plates are not included.
To be ordered separately.

Legend:
S = stroke
L = retracted length

Connecting diagrams





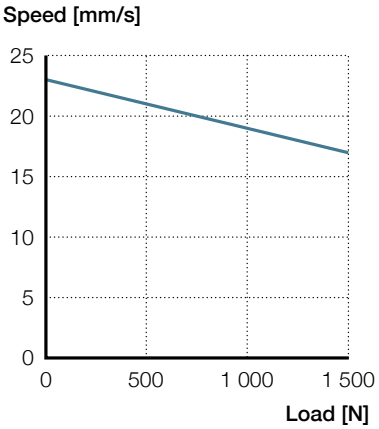
Suitable control units and accessories

	Control units
	COMPACT
TXG 10	•
Operating switches	
EHA	
HSM	•
HSF	•

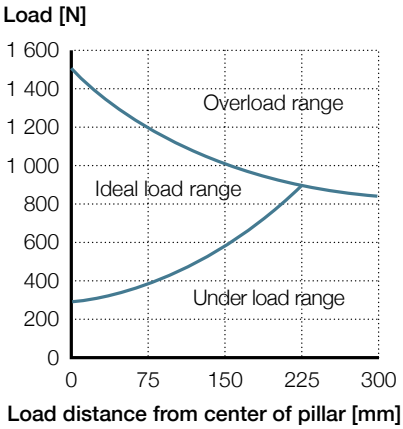
Hand switch Foot switch Desk switch

Performance diagram

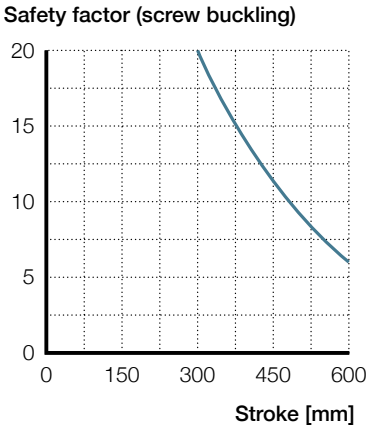
Speed-load diagram



Bending load diagram



Safety factor load conditions

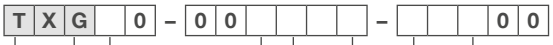


Accessories

Mains cable	Plug	Country	Order number	Comment
Straight cable 3 m	Euro	General	0121730	2-pole
Straight cable 3 m	Schuko	General	0121729	3-pole
Straight cable 3 m	UL	USA	0126322	2-pole
Straight cable 3 m	SEV	Switzerland	0128699	3-pole
Straight cable 3 m	UL	USA	0121762	3-pole
Top or bottom mounting plate			0124874	

Mounting screws are included in the TXG.

Ordering key



Type

Voltage

1	24 V DC (slave actuator)
4	120 V AC, 50/60 Hz, class II
5	120 V AC, 50/60 Hz, class I (mandatory for cable feedthrough option)
8	230 V AC, 50 Hz, class II
9	230 V AC, 50 Hz, class I (mandatory for cable feedthrough option)

Color

5	Natural anodized coating

Option

000	None
EYX	Control connection feedthrough
EYF	Mains cable feedthrough
EYS	1-Hall encoder for Compact/slave use
2AA	Control connection feedthrough, mains cable feedthrough
EXG	Connection of TXG to BCU/VCU
KKK	Customer-specific

Stroke (S) / Retr. length (L=S+180 or L= S+160 mm)

L=S+180	L=S+160	
200	4CY	200 mm
300	4DY	300 mm
400	4EY	400 mm
500	4FY	500 mm
600	4GY	600 mm

■ Options shown in red are only available on demand. Contact Ewellix for more information on minimum quantities and additional cost.

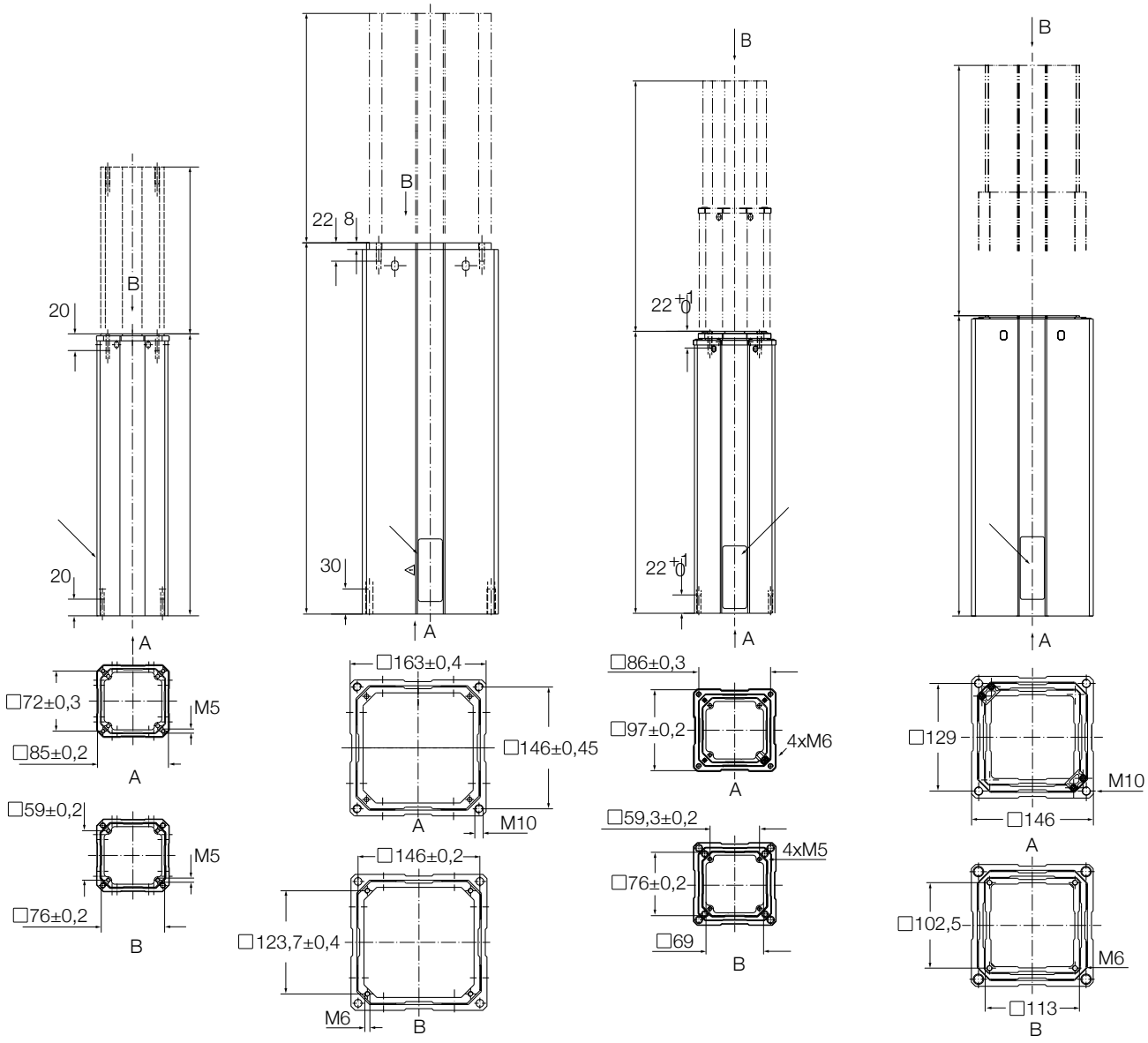
FRE

Telescopic pillar

Benefits

- Attractive design
- Stable
- Universal use

Dimensional drawing



Type	Sections		Profile dimensions in mm							Retracted length in mm
	2 sections	3 sections	76 x 76	85 x 85	97 x 97	113 x 113	129 x 129	146 x 146	163 x 163	
FRE–A085	•									Stroke + 138
FRE–A113	•									Stroke + 148
FRE–A146	•									Stroke + 168
FRE–D097		•								Stroke + 38
FRE–D129		•								Stroke + 53
FRE–D163		•								Stroke + 53
FRE–B097	•									N/A
FRE–B129	•									N/A
FRE–B163	•									N/A
FRE–E113		•								N/A
FRE–E146		•								N/A

■ Options shown in red are only available on demand. Please contact Ewellix.

Ordering key

FRE – □□□□ – □□□□□□ – 000

Type

Combination

2 sections tube-set /Largest tube size
A085 85×85 mm
A113 113×113 mm
A146 146×146 mm
B097 97×97 mm
B129 129×129 mm
B163 163×163 mm

3 sections tube-set /Largest tube size
D097 97×97 mm
D129 129×129 mm
D163 163×163 mm
E113 113×113 mm
E146 146×146 mm
V_ 4 sections tube-set (on request)
F_ 5 sections tube-set (on request)
S_ 6 sections tube-set (on request)
Z_ 7 sections tube-set (on request)

Color

5 Natural anodized
6 Black anodized

Option

000 No option
MCM Cover
MCN Pull version
2EA Pull version, with cover

Stroke

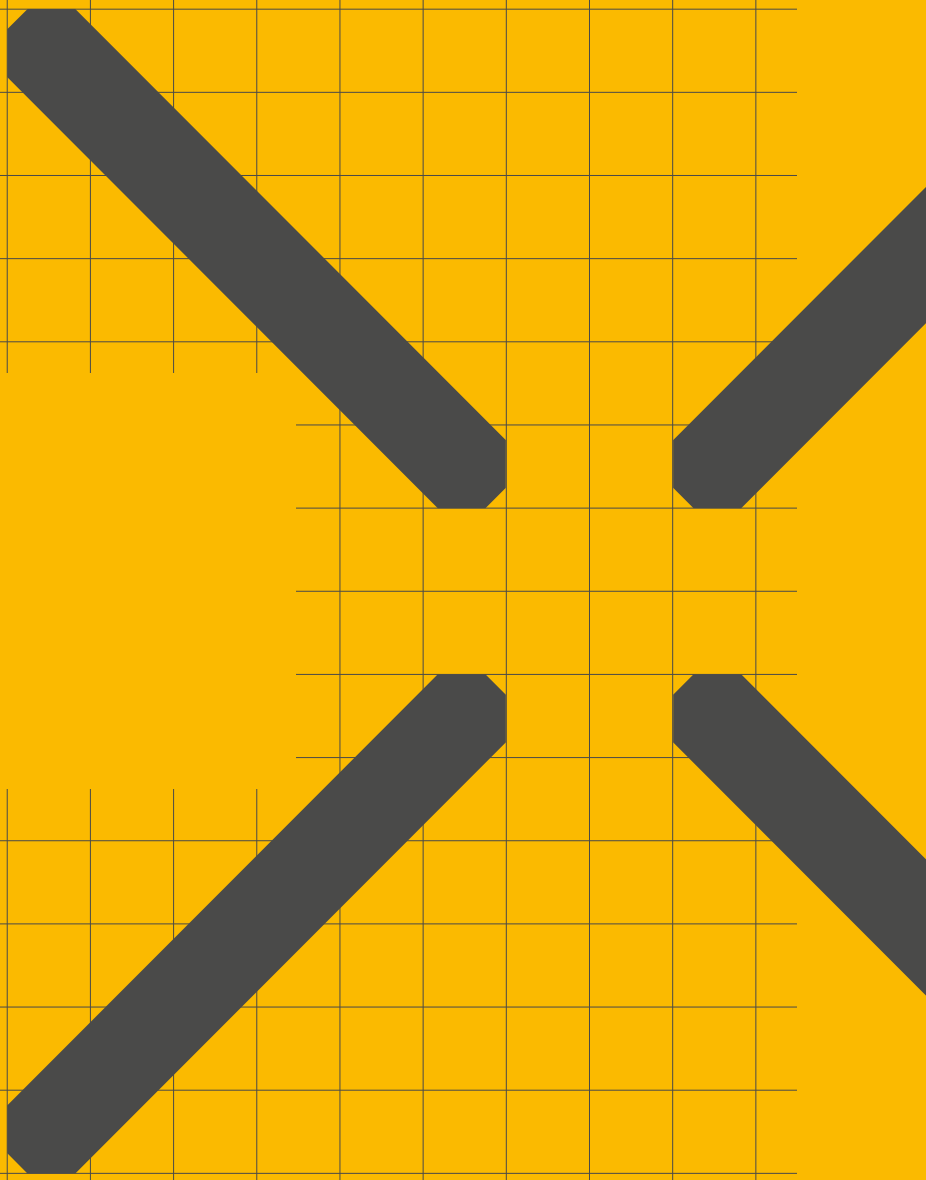
20 200 mm
30 300 mm
40 400 mm
50 500 mm
60 600 mm
70 700 mm
--- Other stroke lengths

■ Options shown in red are only available on demand. Contact Ewellix for more information on minimum quantities and additional cost.

5

Control units

Up to 6 channels



Chapter contents

BCU 232
VCU 236
SCU 240
MCU 244
COMPACT 248
SEM 252

BCU

Control unit

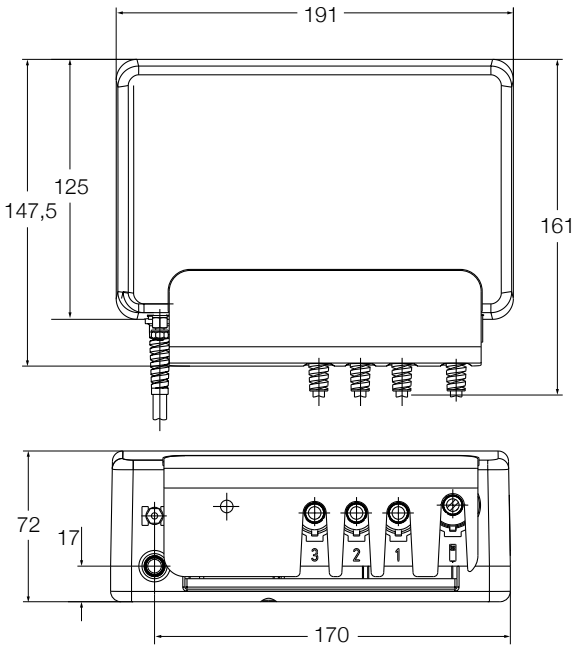
Benefits

- Compact 3-channel actuator control unit
- Single fault safety
- Overload and over-temperature protection
- Approved for medical applications
- Easy to clean
- Low standby current

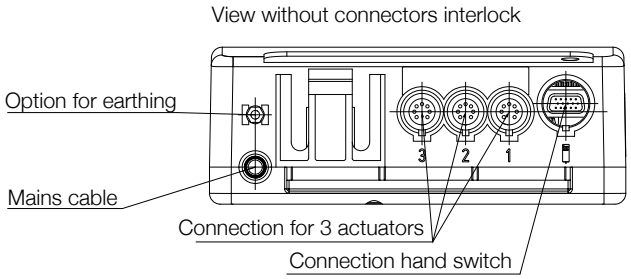
Technical data

	Unit	BCU 5	BCU 8
Motor ports (DIN8)	#	3	3
Operating device ports (HD15)	#	1	1
Battery ports	#	0	0
Limit switch ports	#	0	0
Single fault safety	yes/no	yes	yes
Encoder processing	yes/no	no	no
Input voltage	V AC	120	230
Frequency	Hz	60	50
Input current (max)	A	2,5	1,3
Standby power	W	1,2	1,5
Output voltage	V DC	24	24
Output current (max)	A	7	7
Duty cycle: intermittent	min.	1 min./9 min.	1 min./9 min.
Duty cycle: short time	min.	2	2
Ambient temperature	°C	0 to +40	0 to +40
Humidity	%	5 to 85	5 to 85
Type of protection	IP	×4	×4
Approvals		IEC 60601-1(ed.3)	IEC 60601-1(ed.3)
Weight	kg	2,3	2,3

Dimensional drawing



Connecting diagrams



Suitable control units and accessories

	Linear actuators						Pillars						Operating switches			
	CALA 36A (24 V DC)	CARE 33A	Magdrive MD22, MD23	RU20, RU21, RU22	MAX 10, MAX 30	ECOMAG	THG 10	TLG 10	TLT 10	TFG 10	CPMT1	TXG 10	EHA3	CAJH1	STJ	STE
BCU 5	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BCU 8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Hand switch Foot switch Desk switch

5

Ordering key

BCU control unit

Voltage

5 120 V AC, 60 Hz, class I
8 230 V AC, 50 Hz, class II

Mains power supply cable

2J Class II, straight 3,5 m, 2-pole plug, EU (for voltage type 8)
2H Class II, straight 3,5 m, 2-pole plug, UK (for voltage type 8)
2L Class I, straight 3,5 m, 3-pole plug, UL (for voltage type 5)

Each BCU needs a BCP

BCU parameterization

Functionality

11 All channels individually
21 Channel 2+1
30 All channels simultaneously
T1 Trendelenburg

Motors

A	CALA 36A (24V DC), ECO2, ECO3, ECO4, ECO5	3,7 A	Actuator 1	–
C	CARE 33A, TLT10[1], TXG10 (EXG)	4,7 A	Actuator 2	–
E	TFG, ECO6, ECO8, ECO9	5,7 A	Actuator 3	–
M	MAX10, MAX30, THG10, TLG10	6,7 A		
R	RU20, RU21, RU22	8,5 A		
D	MD22, MD23	8,5 A		
S	CPMT1–1[2]	8,5 A		
T	CPMT1–2[2]	8,5 A		

Soft start/stop

0 Hard
3 Medium
6 Soft (on request)

[1] TLT is a 2-motor actuator. If simultaneous run is needed, BCP21-CC... is recommended.
[2] Reduced lift capability : CPMT-1 up to 3 000 N, CPMT1-2 up to 4 000 N

VCU

Control unit

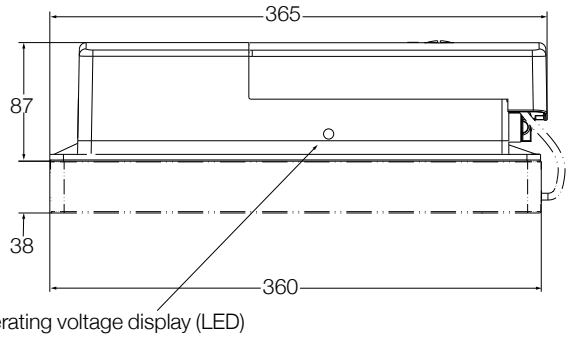
Benefits

- Compact 5-channel actuator control unit
- Single fault safety
- Overload and over-temperature protection
- Approved for medical applications
- Easy to clean
- Low standby current

Technical data

	Unit	VCU 5	VCU 8	VCU 9
Motor ports (DIN8)	#	3 or 5	3 or 5	3 or 5
Operating device ports (HD15)	#	2	2	2
Battery ports (DSub9)	#	1	1	1
Limit switch ports (HD15)	#	2	2	2
Single fault safety	yes/no	yes	yes	yes
Encoder processing	yes/no	no	no	no
Input voltage	V AC	120	230	230
Frequency	Hz	60	50	50
Input current (max)	A	2,5 resp. 6,5	1,3 resp. 3,3	1,3 resp. 3,3
Standby power	W	2,6 resp. 3,9	2,6 resp. 3,9	2,6 resp. 3,9
Output voltage	V DC	24	24	24
Output current (max)	A	7 resp. 18	7 resp. 18	7 resp. 18
Duty cycle: intermittent	min.	1 min./9 min.	1 min./9 min.	1 min./9 min.
Duty cycle: short time	min.	2	2	2
Ambient temperature	°C	+5 to +40	+5 to +40	+5 to +40
Humidity	%	5 to 85	5 to 85	5 to 85
Type of protection	IP	×4	×4	×4
Approvals	EN/UL	EN 60601–1	EN 60601–1	EN 60601–1
		UL 60601–1	UL 60601–1	UL 60601–1
Weight without battery	kg	2,4 resp. 3,8	2,4 resp. 3,8	2,4 resp. 3,8
Weight with battery	kg	5,4 resp. 8,8	5,4 resp. 8,8	5,4 resp. 8,8

Dimensional drawing

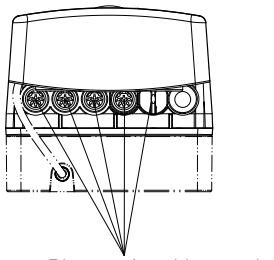


Suitable control units and accessories

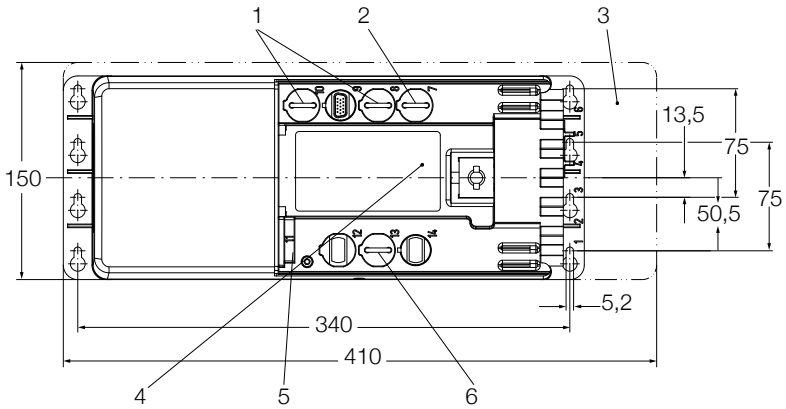
	Linear actuators						Pillars						Operating switches			
	CALA 36A (24 V DC)	CARE 33A	Magdrive MD22, MD23	RU20, RU21, RU22	RU23, RU24, RU25	MAX 10, MAX 30	ECOMAG	THG 10	TLG 10	TLT 10	TFG 10	TXG 10	EHA3	CAJH1	STJ	STE
VCU 5	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
VCU 8	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
VCU 9	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Hand switch Foot switch Desk switch

Connecting diagrams

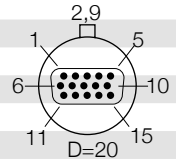
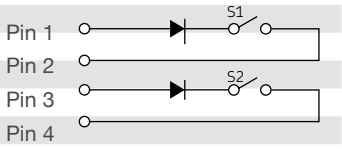


Bis zu 5 Anschlüsse mit DIN8 Stecker



1. Two connections for HD15 operating devices
2. HD15 limit switch connection
3. Additional space for mounting
4. Data plate software
5. Mains connection
6. D-Sub 9 battery connection (optional)

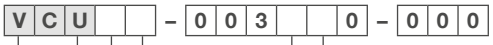
Pinning of HD15 limit switch connection

Function	Pin	Wire color (ZKA-160627-2500)	Connecting diagram
24 V DC (common)	1,3,5,7,9	white/yellow, white/green, grey–pink, black, blue	
Switch 1	2	brown–green	
Switch 2	4	red–blue	
NC	6,8,10,11,12,14	violet, red, pink, grey, yellow, brown	
20–40 V DC, max. 50 mA	13	green	
GND	15	white	
			

Accessories

	Plug	Designation	Order number
Mains cable, 2 pole	Euro	ZKA-160608-3500	0105726
Mains cable, 3 pole	Schuko	ZKA-160637-3500	0118821
Mains cable, 3 pole	SEV	ZKA-160638-3500	0118822
Mains cable, 3 pole	UL	ZKA-160639-3500	0105588
Mains cable, 3 pole	UK	ZKA-160609-3500	0105631
Mains cable, 3 pole	UL, hospital grade	ZKA-160640-3500	0118823
Battery pack 2,7 Ah		ZBA-160208-0400	0118806
Rack for 4,5 Ah battery		ZBA-160207-1000	0121266
Detachable battery 4,5 Ah		ZBA-160209	0119846

Ordering key



VCU control unit

Voltage

5	120 V AC, 60 Hz, class I
8	230 V AC, 50 Hz, class II
9	230 V AC, 50 Hz, class I

Number of channels

3	3 channels
5	5 channels

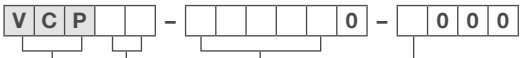
Option 1

1	No option (only VCUx3)
2	Prepared for mounting of battery

Transformer

1	7 A transformer
3	18 A transformer (for 5-channel version only)

Each VCU needs a VCP



VCU parameterization

Functionality

11	All channels individually
21	2 channels simultaneously + 1 or 3 individually
22	2 + 2 channels simultaneously + 1 individually
30	All channels simultaneously, only 3-channel version
41	4 channels simultaneously + 1 individually, only 5-channel version
50	All channels simultaneously, only 5-channel version
T1	Trendelenburg (2 channels) + 1 or 3 individually

Actuators

A	CALA 36A (24V DC), ECO2, ECO3, ECO4, ECO5	3,7 A	Actuator 1	–
C	CARE 33A, TLT10[1], TXG10 (EXG)	4,7 A		
E	TFG, ECO6, ECO7, ECO8, ECO9	5,7 A	Actuator 2	–
M	MAX10, MAX30, TLG10, THG10	6,7 A	Actuator 3	–
R	RU20, RU21, RU22	8,5 A	Actuator 4	–[2]
D	MD22, MD23	8,5 A	Actuator 5	–[2]
U	RU23, RU24, RU25	11,7 A		

Softstart

0	Hard= start 0 ms, stop 0 ms
3	Medium= start 400 ms, stop 200 ms

The SCU solution offers many more possibilities than those given in the type keys.
Please feel free to ask for more functions like “virtual limit switches”, “external limit switches” and so on.

[1] TLT is a 2-motor actuator. If simultaneous run is needed, VCP21-CC... is recommended
[2] for VCUx3: insert zero

SCU

Control unit

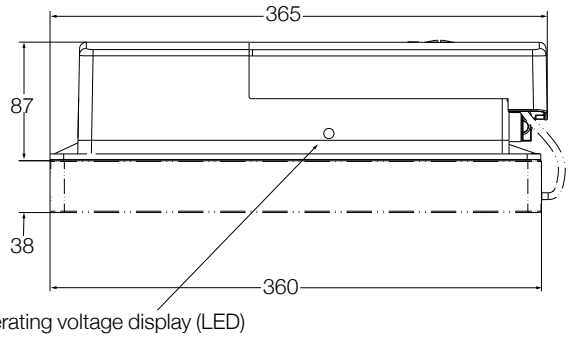
Benefits

- Compact 6-channel actuator control unit
- Single fault safety
- Overload and over-temperature protection
- Approved for medical applications
- Easy to clean
- Low standby current
- Remote control RS232

Technical data

	Unit	SCU 1	SCU 5	SCU 9
Motor ports (DIN8)	#	6	3 or 6	3 or 6
Operating device ports (HD15)	#	3	3	3
Battery ports (DSub9)	#	1	1	1
Limit switch ports (HD15)	#	4	4	4
Single fault safety	yes/no	yes	yes	yes
Encoder processing	yes/no	yes	yes	yes
Input voltage	V	24 DC	120 AC	230 AC
Frequency	Hz	N/A	60	50
Input current (max)	A	30	6,5	3,3
Standby power	W	0,8	4,3	4,3
Output voltage	V DC	24	24	24
Output current (max)	A	30	18	18
Duty cycle: intermittent	min.	1 min./9 min.	1 min./9 min.	1 min./9 min.
Duty cycle: short time	min.	2	2	2
Ambient temperature	°C	+5 to +40	+5 to +40	+5 to +40
Humidity	%	5 to 85	5 to 85	5 to 85
Type of protection	IP	×4	×4	×4
Approvals	EN/UL	EN 60601–1	EN 60601–1	EN 60601–1
		UL 60601–1	UL 60601–1	UL 60601–1
Weight without battery	kg	1,2	3,8	3,8
Weight with battery	kg	4,2	6,8	6,8

Dimensional drawing



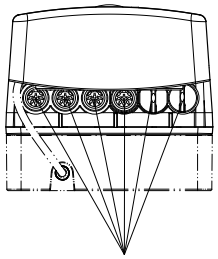
Operating voltage display (LED)

Suitable control units and accessories

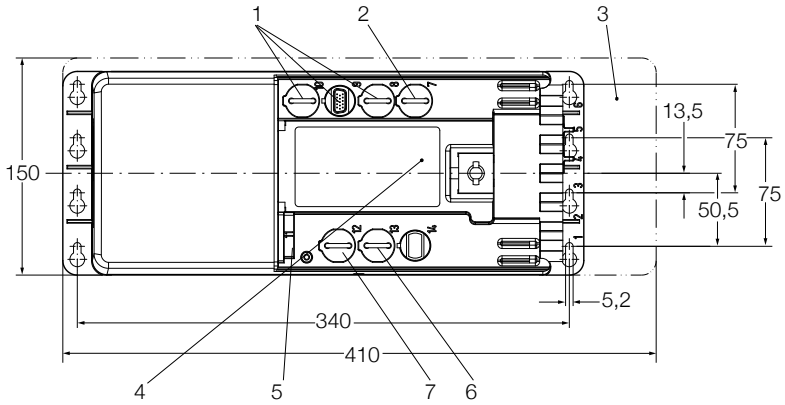
	Linear actuators						Pillars				Operating switches			
	Magdrive MD22, MD23	RU20, RU21, RU22	RU23, RU24, RU25	MAX 10, MAX 30	ECO4F, ECO5F, ECO8F, ECO9F	CAJA35C	THG 10	TLG 10	TLT 10	TFG 10	EHA3	CAJH1	STJ	STE
SCU 1	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SCU 5	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SCU 9	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Hand switch Foot switch Desk switch

Connecting diagrams



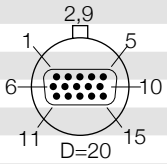
Up to 6 connections with DIN8 plug

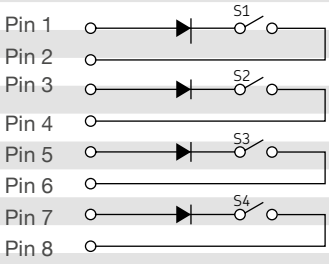


1. Two connections for HD15 operating devices
2. HD15 limit switch connection
3. Additional space for mounting
4. Data plate software
5. Mains connection
6. D-Sub 9 battery connection (optional)
7. Communication interface (optional)

Pinning of HD15 limit switch connection on request (needs a customized SCP)

Function	Pin	Wire color (ZKA-160627-2500)	Connecting diagram
Switch 1	2	brown/green	
Switch 2	4	red/blue	
Switch 3	6	violet	
Switch 4	8	red	
24 V DC (com)	1, 3, 5, 7	white/yellow, white/green, grey/pink, black	
Optional external power supply			
for binary outputs	9	blue	
Binary output 1 (22-40 V DC/1 A)	10	pink	
Binary output 2 (22-40 V DC/1 A)	11	grey	
GND for binary outputs	12	yellow	
20-24 V DC, max. 50 mA	13	green	
5 V DC pulsed	14	brown	
GND	15	white	





Accessories

	Plug	Designation	Order number
Mains cable, 3 pole	Schuko	ZKA-160637-3500	0118821
Mains cable, 3 pole	SEV	ZKA-160638-3500	0118822
Mains cable, 3 pole	UL	ZKA-160639-3500	0105588
Mains cable, 3 pole	UK	ZKA-160609-3500	0105631
Mains cable, 3 pole	UL, hospital grade	ZKA-160640-3500	0118823
Battery pack 2,7 Ah		ZBA-160208-0400	0118806
Rack for 4,5 Ah battery		ZBA-160207-1000	0126155
Detachable battery 4,5 Ah		ZBA-160209	0126154

Ordering key

S C U – 0 0 3 – 0 0 0 0

SCU control unit

Voltage

1	24 V DC (only for 6-channel version)
5	120 V AC, 60 Hz, class I
9	230 V AC, 50 Hz, class I

Number of channels

3	3 channels
6	6 channels

Battery

1	None (only for SCU16)
2	Prepared for mounting of battery
3	Under floor 2.7 Ah battery mounted

Transformer

0	
3	

Interface

0	Without RS232
1	With RS232 (only for 6-channel version)

S C P – – 0 0 0

Each SCU needs a SCP

SCU parameterization

Functionality

11	All channels individually
21	Channel 2+1(+1+1+1)
22	Six (6) channel version 2+2+1+1
30	Three (3) channel version, all channels synchronously
31	Six (6) channel version 3+1+1+1
41	Six (6) channel version 4+1+1
60	Six (6) channel version, all channels synchronously
T1	Trendelenburg T+1 (+1+1)

Actuators

A	ECO4F, ECO5F	3,7 A	Actuator 1 –
C	TLT 10[1]	4,7 A	Actuator 2 –
E	TFG10, ECO8F, ECO9F	5,7 A	Actuator 3 –
M	MAX10, MAX30, TLG10, THG10	6,7 A	Actuator 4 –[2]
R	RU20, RU21, RU22	8,5 A	Actuator 5 –[2]
D	MD22, MD23	8,5 A	Actuator 6 –[2]
U	RU23, RU24, RU25	11,7 A	
S	CPMT1-1	11,7 A	
T	CPMT1-2	10,2 A	

Softstart

0	Hard
3	Medium
6	Soft (on request)

The SCU solution offers many more possibilities than those given in the type keys.
Please feel free to ask for more functions like “virtual limit switches”, “external limit switches” and so on.

[1] TLT is a 2-motor actuator. If simultaneous run is needed, VCP21-CC... is recommended

[2] For SCUx3: insert zero

MCU

Control unit

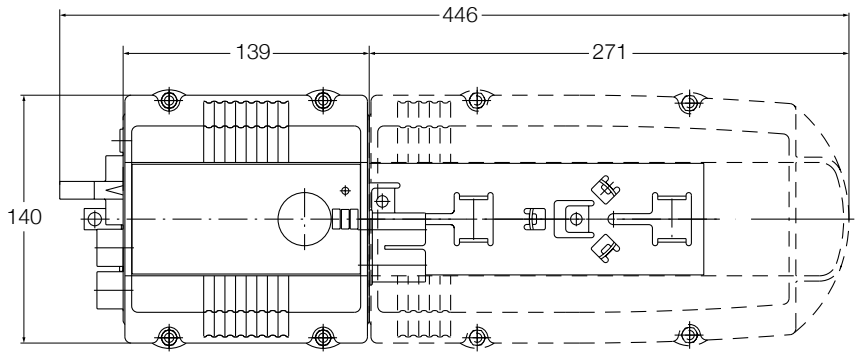
Benefits

- Suitable for mobile applications
- LED indication for battery charge level
- Audible signal for low charge condition

Technical data

	Unit	MCU
Motor ports	#	2
Operating device ports	#	1
Battery ports	#	1
Limit switch ports	#	0
Single fault safety	yes/no	no
Encoder processing	yes/no	no
Input voltage	V DC	28
Frequency	Hz	N/A
Input current (max)	A	0,5
Standby power	W	N/A
Output voltage	V DC	24
Output current (max)	A	9,5
Duty cycle: intermittent	min.	1 min./9 min.
Duty cycle: short time	min.	N/A
Ambient temperature	°C	+10 to +40
Humidity	%	85
Type of protection	IP	™4
Approvals	EN/UL	EN 60601-1/EN 60601-1-2/
		UL 2601/EN ISO 10535
Weight	kg	4,9

Dimensional drawing

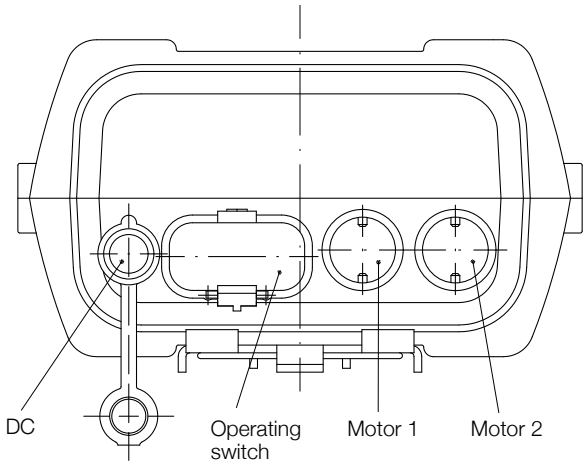


Suitable control units and accessories

	Linear actuators			Pillars		Operating switches		
	MAX1	MAX3	ECOMAG	THG	TLG	EHA 1	STF	STA
MCU	•	•	•	•	•	•	•	•

Hand switch Foot switch Desk switch

Connecting diagrams



Accessories

Description	Plug	Designation	Order number
Battery unit 4,5 Ah		ZBA-142211	0100667
Mains adapter 100-240 V AC	Euro	ZDV-142378-2500	0132841
Mains adapter 100-240 V AC	UL	ZDV-142381-2500	0132843
Mains adapter 100-240 V AC	UK	ZDV-142380-4000	0132842
Wall charging station		ZLA-142221	0126159
Tool for connectors (Jack/D–Sub/Mains)		ZWS-140375	0125322

Ordering key

Type

Number of channels

1 1 channel
2 2 channels

Option

000 Current cut-off 6 A
EXP Current cut-off 9 A
EYE Current cut-off 6 A, electric emergency lowering of channel 1
2AT Current cut-off 9 A, electric emergency lowering of channel 1
EYR Individual current cut-off 6 A (only for 2-channel version)

COMPACT

Control unit

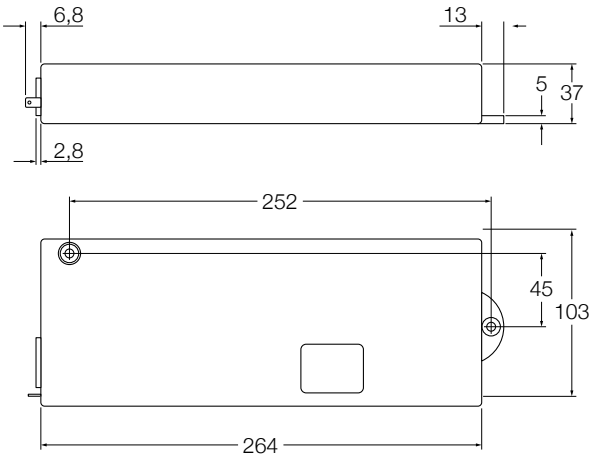
Benefits

- Synchronized movement of 3 actuators possible
- Up to 4 memory positions (depending on handset)
- Linking possibility of up to 4 control boxes
- Enhanced drive comfort
- Adjustable container – and shelf-stop positions
- Low speed area
- High efficient switch mode power supply (SMPS)
- Low standby power consumption, low field emission

Technical data

	Unit	COMPACT
Motor ports (DIN8)	#	3
Operating device ports (DIN7)	#	1
Battery ports	#	0
Limit switch ports	#	1
(LogicConnector DATA)		
Single fault safety	yes/no	no
Encoder processing	yes/no	yes
Supply voltage / Frequency	V AC/Hz	EU: 207 - 254,4 / 50
		US: 90 -127 / 50-60
Nominal voltage / Frequency	V AC/Hz	EU: 230 / 50
		US: 120 / 60
Input current (max)		
120 V AC	A	10
230 V AC	A	5
Standby power	W	0,5
Output voltage (rated)	V DC	24
Output sum current (rated)	A	15
Output current per channel (max)	A	8
Ambient temperature	°C	0 to +30
Humidity	%	5 to 85
Type of protection	IP	20
Protection class	–	I
Approvals	EN/UL	EN 60335-1 / UL 60950-1
Weight	kg	0,5

Dimensional drawing



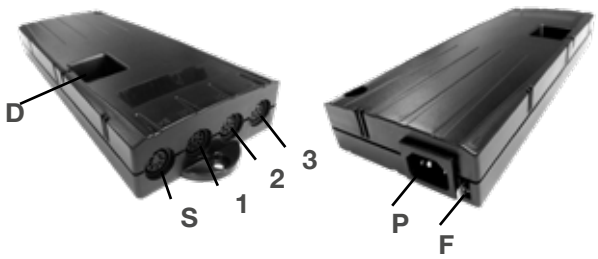
Suitable control units and accessories

	Pillars				Operating switches		
	TMA	TMD	TFG10	TXG10	TOUCH-UD-MDF-4M2-LD	HSM-OD-2-LD	HSF-MDF-4M4-LD
COMPACT	•	•	•	•	•	•	•

Hand switch Foot switch Desk switch

Switching cycles

High-Power cycle:	20 s Up	19 A @20 V, 380 W
	20 s Down	7 A @33 V, 231 W
	Pause:	9 min
Normal cycle 1/9:	30 s Up:	15 A @ 24 V, 360 W
	30 s Down:	7 A @ 33 V, 231 W
	Pause:	9 min
Normal cycle 2/18	2 min run:	7 A @ 33 V, 231 W
	Pause:	18 min



1 Motor socket 1 (M1)
2 Motor socket 2 (M2)
3 Motor socket 3 (M3)
S Handswitch socket (HS)
P Mains socket
F Functional earth
D LogicConnector DATA for sensors, squeeze lines and cascading

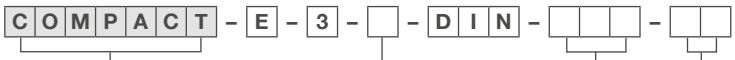
Desk switches

Description	Designation	Order number
Extra simple desk switch (up/down)	HSM-OD-2-LD	123247
Desk switch with display for 2 motorgroups (up/down and memory)	HSF-MDF-4M4-LD	123246
Desk switch with smart touch display (up/down and memory)	TOUCH-UD-MDF-4M2-LD	131740

Accessories

Description	Designation	Order number
Mains cable straight 3 m, Schuko plug (Germany, France, ...)	LOG-CBL-PWK	131665
Mains cable straight 3 m, UK plug (UK)	LOG-CBL-PWK-UK	131825
Mains cable straight 3 m, UL plug (US)	LOG-CBL-PWK-US-SJT	131666
Cascading cable 0,5 m length	LOG-CBL-HT-SYNC-500	131678
Cascading cable 1,5 m length	LOG-CBL-HT-SYNC-1500	132061
Split cable for LogicConnector DATA	LOG-CBL-HT-LC-DATA-Y	132062
Connection cable (squeeze bar to control box)	LOG-CBL-HT-MOLEX-RJ45	132063

Ordering key



Type

Number of used motors (optional, depending on parameter)

	3 motors (no additional designation required)
2	2 motors
1	1 motor

Actuator type

TMA	TMA10
TMD	TMD10
TFG	TFG10
TXG	TXG10

Voltage

US	120 VAC, 60 Hz, class I
EU	230 VAC, 50 Hz, class I

SEM

Control unit

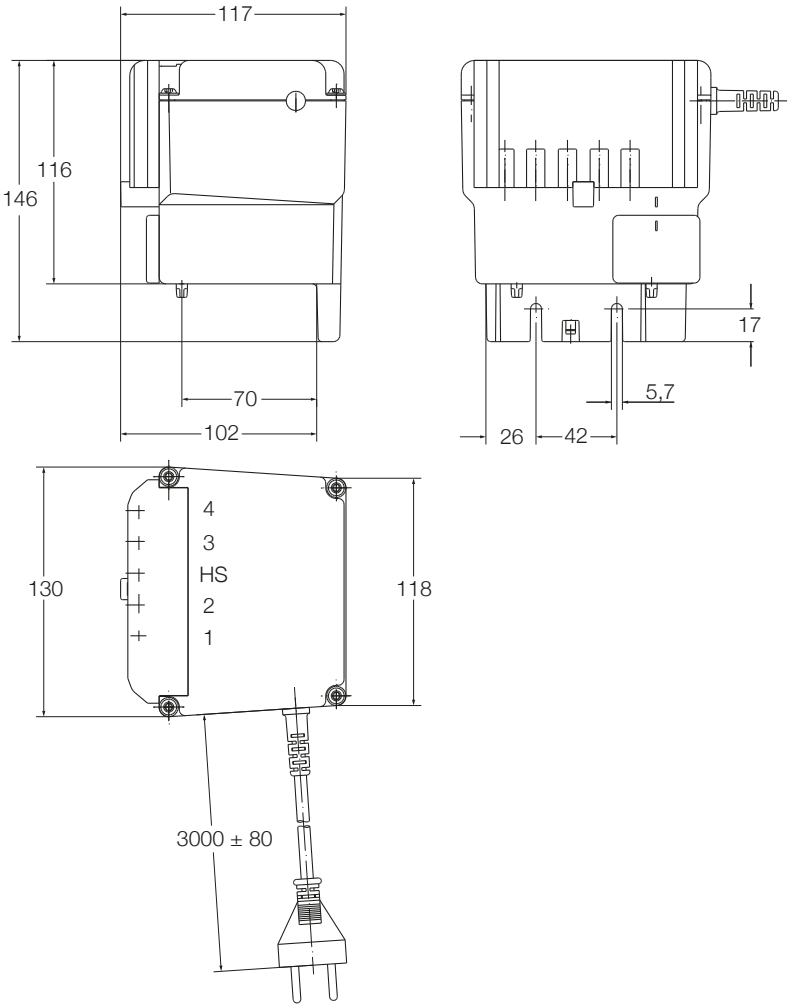
Benefits

- Controls up to 4 actuators
- Suitable for homecare and nursing beds

Technical data

	Unit	SEM1
Motor ports	#	4
Operating device ports	#	1
Input voltage/Frequency	V AC	230/50 HZ
	V AC	120/60 HZ
Output voltage rating	V DC	24
Output current (max)	A (DC)	5
Duty cycle	min.	1 min./9 min.
Ambient temperature	°C	+10 to +40
Type of protection	IP	×4
Approvals	UL	UL60601-1 (1st edition)
Weight	kg	1,8

Dimensional drawing



Suitable control units and accessories

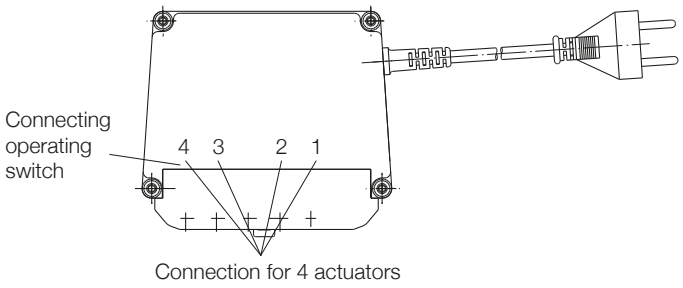
	Linear Actuators	Operating switches
	ECOMAG	EHE1
SEM1	•	•

Hand switch

Foot switch

Desk switch

Connecting diagrams



Ordering key

Type

Number of channels

2 2 channel
4 4 channels

Voltage / Frequency

1 230V / 50Hz
2 120V / 60Hz

Mains plug

1 Protection class II 2-pin mains plug (Euro standard)
2 Protection class II 2-pin mains plug (British standard)
3 Protection class II 2-pin mains plug (US)
B Protection class I 3-pin mains plug (Schuko)
E Protection class I 3-pin mains plug (US)

Colours

A Black
B Grey RAL 7035

Options, electrical

0 None

Fastening

0 Piggyback on Ecomag

6

Operating switches

Up to 10 keys

Chapter contents

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EHA1 260
EHA3 262
EHE1 264
HSM, HSF, HSU 266
PHC 268
PFP 270
ST 272
ST 274
STK 276
CAJH1 278
PAM 280

CAES

Hand switch

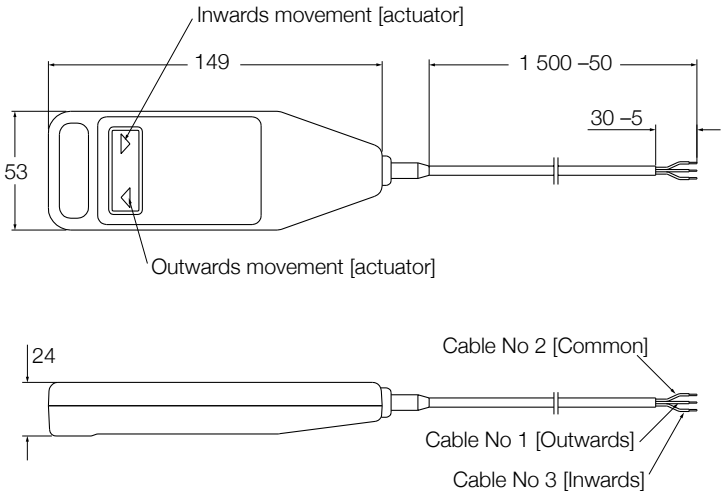
Benefits

- Robust ergonomic design
- Membrane keyboard
- Clearly marked keys

Technical data

	Unit	CAES 31C
Max. operating channels	n°	1
Operating power	V DC/mA	30/33
Type of protection	IP	54
Color	–	Black

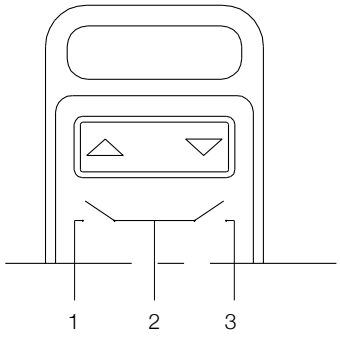
Dimensional drawing



Suitable control units

	Control units			
	CAED 3-24R	CAED 5-24R	CAED 9-24R	CAEV 110/220
CAES 31C	•	•	•	•

Connecting diagrams



Ordering key

CAES 31C (No connector, 2 buttons)

EHA1

Hand switch

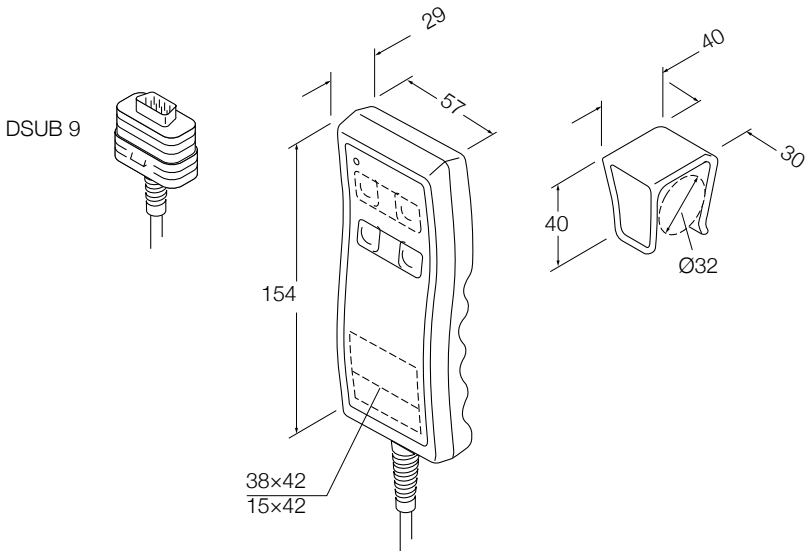
Benefits

- Robust ergonomic design
- Tactile buttons, clearly marked
- Easy mountable fastening hook

Technical data

	Unit	EHA 1
Max. operating channels	n°	2
Operating power	V DC/mA	12/50
Type of protection	IP	67
Color	–	Grey

Dimensional drawing



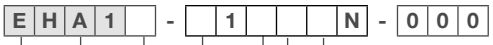
Suitable control units and linear actuators

	Linear actuators	Control units
	MAX7	MCU
EHA1	•	•

Accessories

Description	Designation	Order number
Hook with sticker	ZBG–145361–000	0125538

Ordering key



Type

Number of channels
1 1 channel
2 2 channels

Hook
1 Yes mounted with hook
2 Hook supplied separately

Cable / connecting plug
B Coiled, 1,3 m/2,5 m / D-sub 9-pin plug
C Straight 2,5 m (min DIN 6-pin plug)
D Coiled 1,0 m/2,0 m (min DIN 6-pin plug)
F Coiled 2,5 m/3,5 m / D-sub 9-pin plug

Symbols
00 None
11 1 channel: Head
20 2 channels: Arrow up/down

EHA3

Hand switch

Benefits

- Robust ergonomic design
- Tactile buttons, clearly marked
- Easy mountable fastening hook

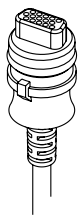
Technical data

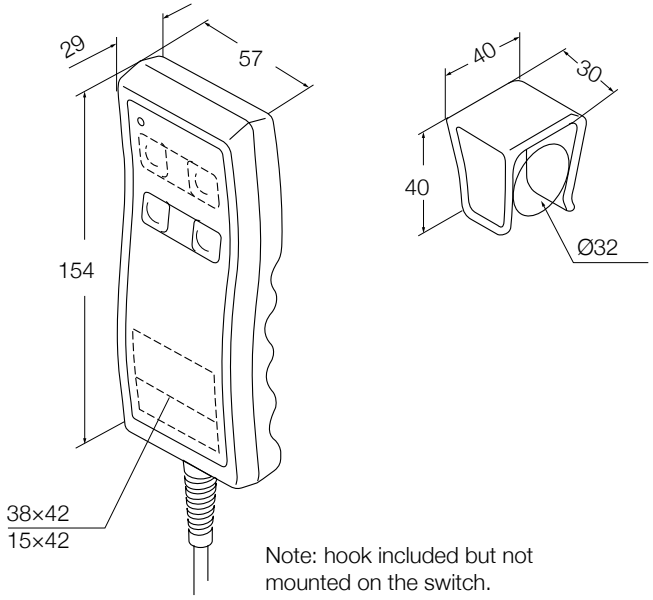
	Unit	EHA 3
Max. operating channels	n°	5
Operating power	V DC/mA	12/50
Type of protection	IP	67
Color	–	Grey
Cable: Coiled 1,3 m/2,5 m	–	D-sub 15-pin

Dimensional drawing

High density

D-Sub 15





Note: hook included but not mounted on the switch.

Suitable control units and pillars

	Pillars		Control units							
	TFG 50	TFG 90	SCU 1	SCU 5	SCU 9	VCU 5	VCU 8	VCU 9	BCU 5	BCU 8
EHA3	•	•	•	•	•	•	•	•	•	•

Accessories

Description	Designation	Order number
Hook with sticker	ZBG–145361–000	0125538

Ordering keys

E H A 3 [ ] - 2 3 M [ ] [ ] N - 0 0 0

Type

Number of channels

1	1 channel
2	2 channels
3	3 channels
4	4 channels
5	5 channels
A	1 channel with 3 memory positions (only for SCU)
B	2 channels with 3 memory positions (only for SCU)
C	3 channels with 3 memory positions (only for SCU)

Symbols

00	None	
10	1 channel: 2nd row from top	Arrow up/down
11		Head
12		Foot
13		Level
14		Anti-Trendelenburg
20	2 channels: 1st-2nd row from top	Arrow up/down
21		Head/foot
22		Head/level
23		Level/head
29		Level/Anti-Trendelenburg
30	3 channels: 1st-3rd row from top	Arrow up/down
31		Head/foot/level
32		Level/head/foot
39		Level/Anti-Trendelenburg/Head
40	4 channels: 1st-4th row from top	Arrow up/down
47		Level/Anti-Trendelenburg/Head/Foot
50	5 channels: 1st-5th row from top	Arrow up/down

■ Options shown in red are only available on demand. Please contact Ewellix.

EHE1

Hand switch

Benefits

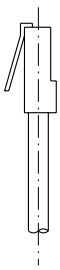
- Easy and precise
- Flexible and remote operation
- Ergonomic design

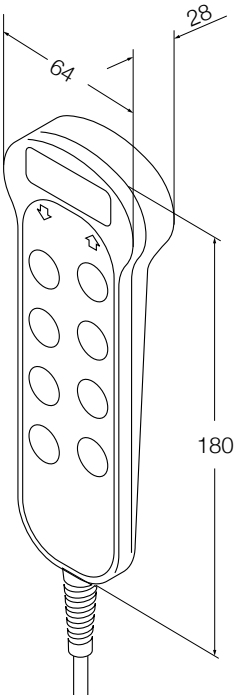
Technical data

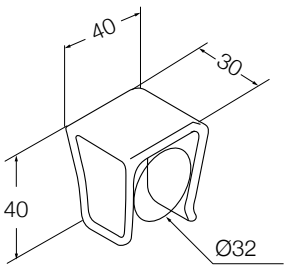
	Unit	EHE 1
Max. operating channels	n°	2
Operating power	V DC/mA	38/50
Type of protection	IP	×67
Color	–	Grey
Cable: Coiled 1,1 m/2,5 m	–	FCC plug

Dimensional drawing

FCC plug







Note: hook mounted on the switch

Suitable control units and pillars

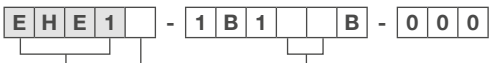
	Pillars				Control units	
	TXG 4[1]	TXG 5[1]	TXG 8[1]	TXG 9[1]	SEM1 2	SEM1 4
EHE1	•	•	•	•	•	•

[1] Only with FCC plug

Accessories

Description	Designation	Order number
Hook	ZBG–145361–000	0125538

Ordering key



Type

Number of channels

1 1 channel
2 2 channels

Symbols

10 1 channel: Arrow up/down
20 2 channels: Arrow up/down

HSM, HSF, HSU

Hand switch

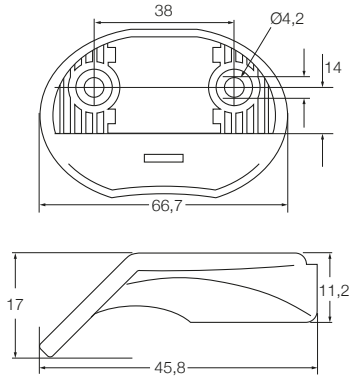
Benefits

- Easy and precise
- Stylish design
- Different functions

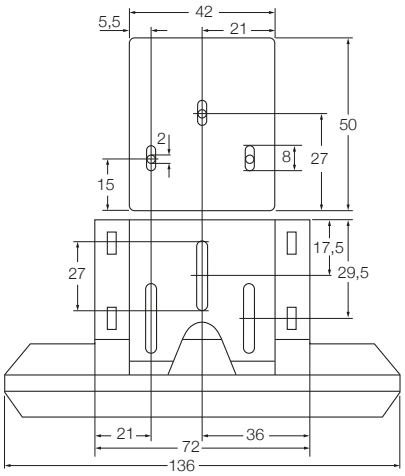
Technical data

	Unit	HSM-OD-2-LD	HSF-MDF-4M4-LD	HSU-OD-2-FCC
Max. operating channels	n°	1	1 or 2	1
Operating power	V DC/mA	5/50	5/50	5/50
Type of protection	IP	32	32	32
Color	–	Black	Black	Black

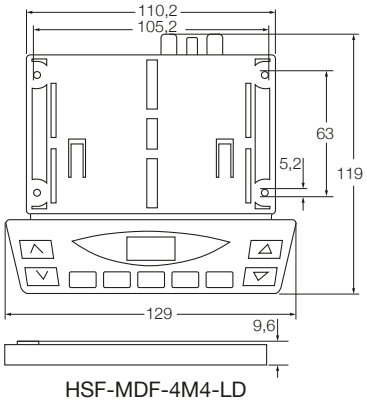
Dimensional drawing



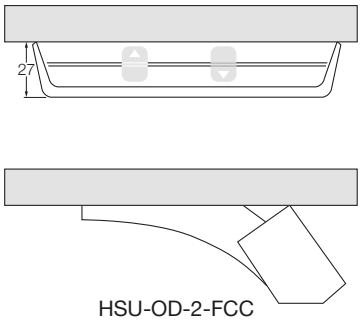
HSM-OD-2-LD



HSU-OD-2-FCC



HSF-MDF-4M4-LD



HSU-OD-2-FCC

Suitable control units and pillars

	Pillars	Control units
	TXG	COMPACT
HSM-OD-2-LD		•
HSF-MDF-4M4-LD		•
HSU-OD-2-FCC	•	

Ordering key

HSM-OD-2-LD (DIN7 plug)
HSF-MDF-4M4-LD (DIN7 plug)
HSU-OD-2-FCC (FCC plug, only for TXG)

PHC

Hand switch

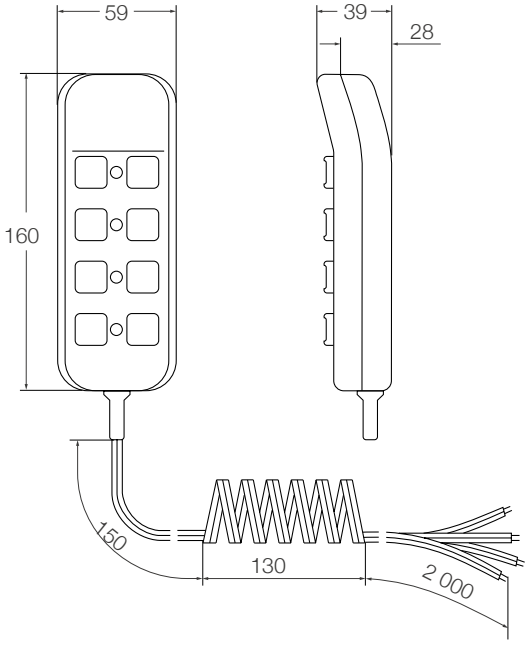
Benefits

- Easy and precise
- Flexible and remote operation
- Ergonomic design

Technical data

	Unit	PHC
Max. operating channels	n°	4
Operating power	V DC/mA	N/A
Type of protection	IP	66
Color	–	Grey

Dimensional drawing



Suitable linear actuators and pillars

	Linear actuators		Pillars		
	MAX 7	MAX 7	TLC pneumatic	TGC pneumatic	THC pneumatic
PHC	•	•	•	•	•

Ordering key

PHC 1 – 130517 (1 channel with arrows up/down, without hook)
PHC 2 – 130625 (2 channels with arrows up/down, without hook)
PHC 3 – 130756 (3 channels with arrows up/down, without hook)
PHC 4 – 130955 (4 channels with arrows up/down, without hook)

Other symbols / with hook on demand.

PFP

Foot switch

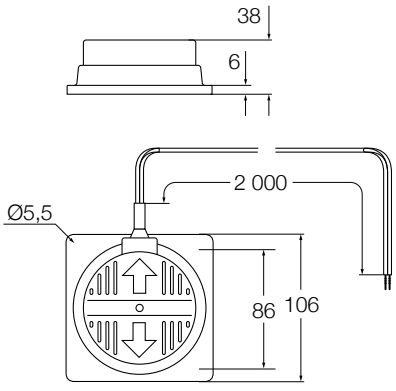
Benefits

- Robust ergonomic design
- Easy and precise
- Flexible and remote operation

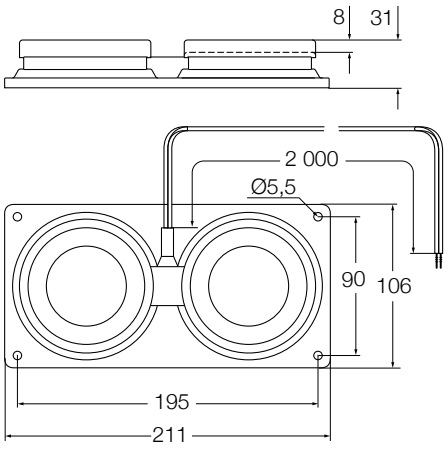
Technical data

	Unit	PFP 1K	PFP 1
Max. operating channels	n°	1	1
Operating power	V DC/ mA	N/A	N/A
Type of protection	IP	21	21
Color	–	Grey	Anthracite

Dimensional drawing



PFP 1K–130652



PFP 1–121545

Suitable linear actuators and pillars

	Linear actuators		Pillars		
	MAX 7	MAX 7	TLC pneumatic	TGC pneumatic	THC pneumatic
PFP	•	•	•	•	•

Ordering key

PFP 1K – CAES 31C (No connector, 2 buttons) 130652
PFP 1 – 121545

Other versions on request.

ST

Foot switch

Benefits

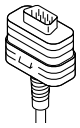
- Easy and precise
- Ergonomic design
- Different plug options

Technical data

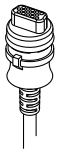
	Unit	ST
Max. operating channels	n°	3
Operating power	V DC/mA	12/50
Type of protection	IP	×5
Color	–	Blue/anthracite

Dimensional drawing

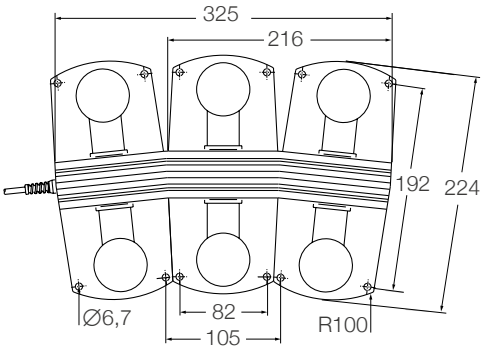
D-Sub 9 plug

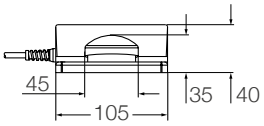


HD15 plug



FCC plug





Suitable pillars, linear actuators and control units

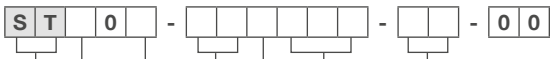
	Pillars		Linear Actuators	Control units								
	TFG 50/90	TXG 4/5/8/9[1]	MAX 7	SCU 1	SCU 5	SCU 9	VCU 5	VCU 8	VCU 9	BCU 5	BCU 8	MCU
STJ	•			•	•	•	•	•	•	•	•	
STF		•	•									•

[1] Only with FCC plug

Accessories

Description	Designation	Order number
Rubber feet (100 pcs.)	ZBE-135310	0102879
Sticker arrow up	ZKL-135309-0001	0124871
Sticker arrow down	ZKL-135309-0002	0124870

Ordering key



Type

Product group:
F Classic, D-Sub9 or FCC plug
J Standard, single-fault safety, HD15 plug

Number of channels:
1 One (1) channel
2 Two (2) channels
3 Three (3) channels

Cable / connecting plug:
LU Coiled cable 1,3-2,5 m / D-sub plug
LW Coiled cable 1,3-2,5 m / HD15 plug
0U Straight cable 2,5 m / D-sub plug
0V Straight cable 2,5 m / FCC plug (only for STF01 and STF02)
0W Straight cable 2,5 m / HD15 plug

Color:
1 Anthracite
4 Blue

Option:
000 None
MAY Mounted with rubber feet

Symbols:
X1 Arrow up/down (on each pair of buttons), 1–3 channels
37 Arrow up/down, M/1, 2/3 (3 memory buttons) only for STJ03

ST

Desk switch

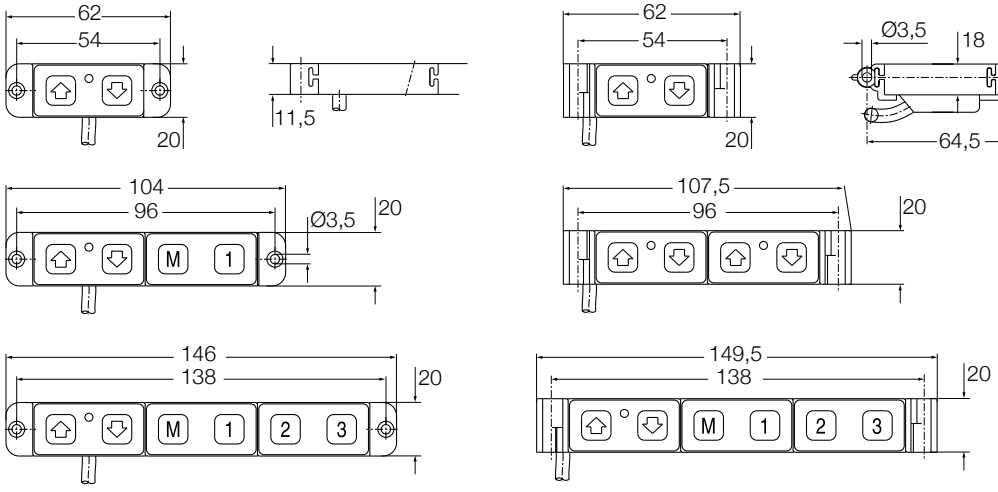
Benefits

- Easy and precise
- Stylish design
- Memory position

Technical data

	Unit	ST
Max. operating channels	n°	3
Operating power	V DC/mA	12/50
Type of protection	IP	×0
Color	–	Black

Dimensional drawing



STA straight

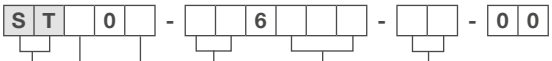
STA 90°

Suitable pillars, linear actuators and control units

	Pillars[1]		Linear Actuators[1]	Control units								
	TFG 50/90	TXG 4/5/8/9[2]	MAX 7	SCU 1	SCU 5	SCU 9	VCU 5	VCU 8	VCU 9	BCU 5	BCU 8	MCU
STA		•	•									•
STE	•			•	•	•	•	•	•	•	•	

[1] With integrated control units
[2] Only with FCC plug

Ordering key



Type

Product group:
A Classic, D-Sub9 or FCC plug
E Standard, single-fault safety wiring, HD15 plug

Number of channels:
1 One (1) channel
2 Two (2) channels
3 Three (3) channels

Cable / connecting plug:
0U Straight cable 2,5 m / D-sub plug
WV Straight cable 1,5 m / FCC plug
0W Straight cable 2,5 m / HD15 plug

Option:
000 No option
MAU Mounted on or underneath desktop, at a 90° angle

Symbols:
X1 Up/down arrow on each pair of keys (1-3 channels)
37 Up/down arrow, 3 memory functions M/1, M/2, M/3 (3 channels)

STK

Desk switch

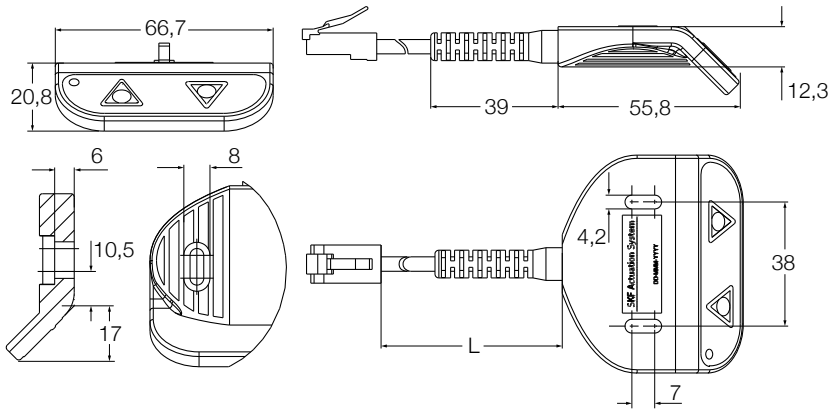
Benefits

- Easy and precise
- Stylish design
- Tactile buttons with finger guide
- 2 colors LED for power and feedback status

Technical data

	Unit	STK
Max. operating channels	n°	1
Operating power	V DC/mA	12/50
Color	–	Grey
Indicator	–	2 colors LED for power and feedback status
Plug	–	RJ45
Symbols	–	with arrows up/down

Dimensional drawing



	STK01-SW3000-X100	STK01-UW3000-X100
L [mm]	500	1 000

Suitable pillars and accessories

	Pillars			Socket boxes	
	CPMA1–1	CPMA1–2	CPMA2–2	ZDV–348220–002	ZDV–348221–002
STK01-SW3000-x100	•	•	•	•	•
STK01-UW3000-x100	•	•	•	•	•

Ordering key

Description	Part number	Order number
Desk switch with LED, cable 0,5 m	STK01-SW3000-x100	130025
Desk switch with LED, cable 1 m	STK01-UW3000-x100	130026

CAJH1

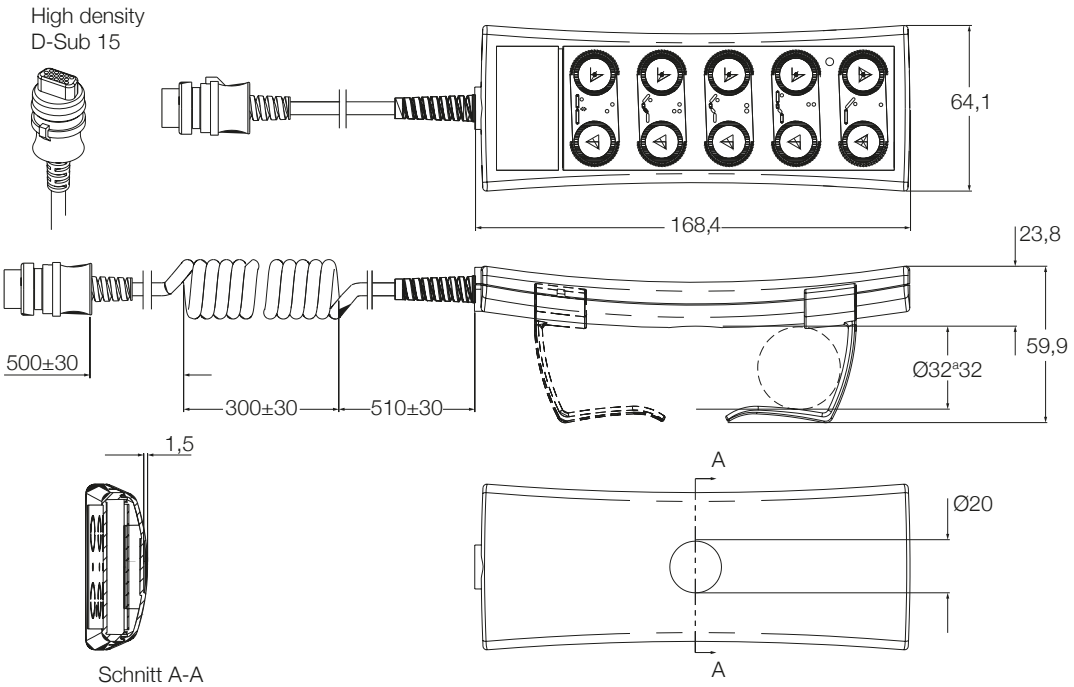
Benefits

- Robust and elegant ergonomic design with LED
- 2 positions fastening hook
- Ready for add-on customer sticker

Technical data

	Unit	CAJH1
Max. operating channels	n°	5
Operating power	V DC/mA	12/50
Type of protection	IP	×4
Color	–	Grey
Cable: Coled 1,3 m/2,5 m	–	0-sub 15-pin

Dimensional drawing



Suitable pillars and control units

	Pillars		Control units							
	TFG 50	TFG 90	SCU1	SCU5	SCU9	VCU5	VCU8	VCU9	BCU5	BCU8
CAJH1	•	•	•	•	•	•	•	•	•	•

Accessories

Description	Part number	Order number
Hook with clips	ZBG–145361–000	M/0125538

Ordering key

C A J H 1 - _ _ _ _ _ A 4

Type

Number of channels/Symbols

100	1 channel	No symbols
1A0		Arrow up/down
1A1		Arrow up/down / with 3 memory positions
1B1		Customized
200	2 channels	No symbols
2A0		Arrow up/down
2A1		Arrow up/down / with 3 memory positions
2B1		Customized
300	3 channels	No symbols
3A0		Arrow up/down
3A1		Arrow up/down / with 3 memory positions
3B1		Customized
400	4 channels	No symbols
4A0		Arrow up/down
4B1		Customized
500	5 channels	No symbols
5A0		Arrow up/down
5B1		Customized

Suspension

0	without hook
1	hook mounted

Logo

0	no
1	Logo according to customer specification

Cable

A	High density D-Sub 15p	Coiled cable 1,3 m / 2,3 m

Protection Class

4	IPX4

PAM

Pneumatic desk switch

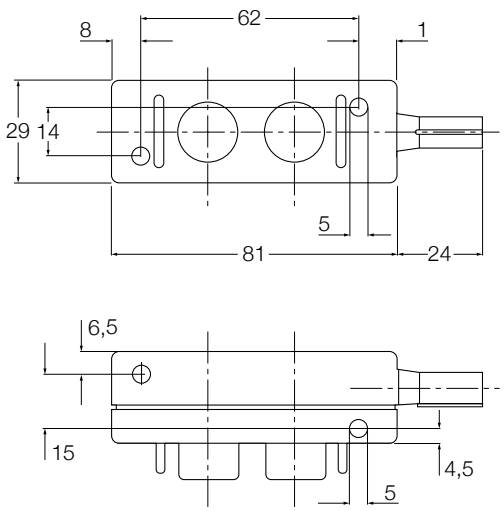
Benefits

- Operation with air (no electricity)
- Stylish design

Technical data

	Unit	PAM –130256
Max. operating channels	n°	1
Operating power	V DC/ mA	N/A
Type of protection	IP	N/A
Tube	–	Straight, 1,50 m
Color	–	Anthracite

Dimensional drawing



Suitable linear actuators and control units

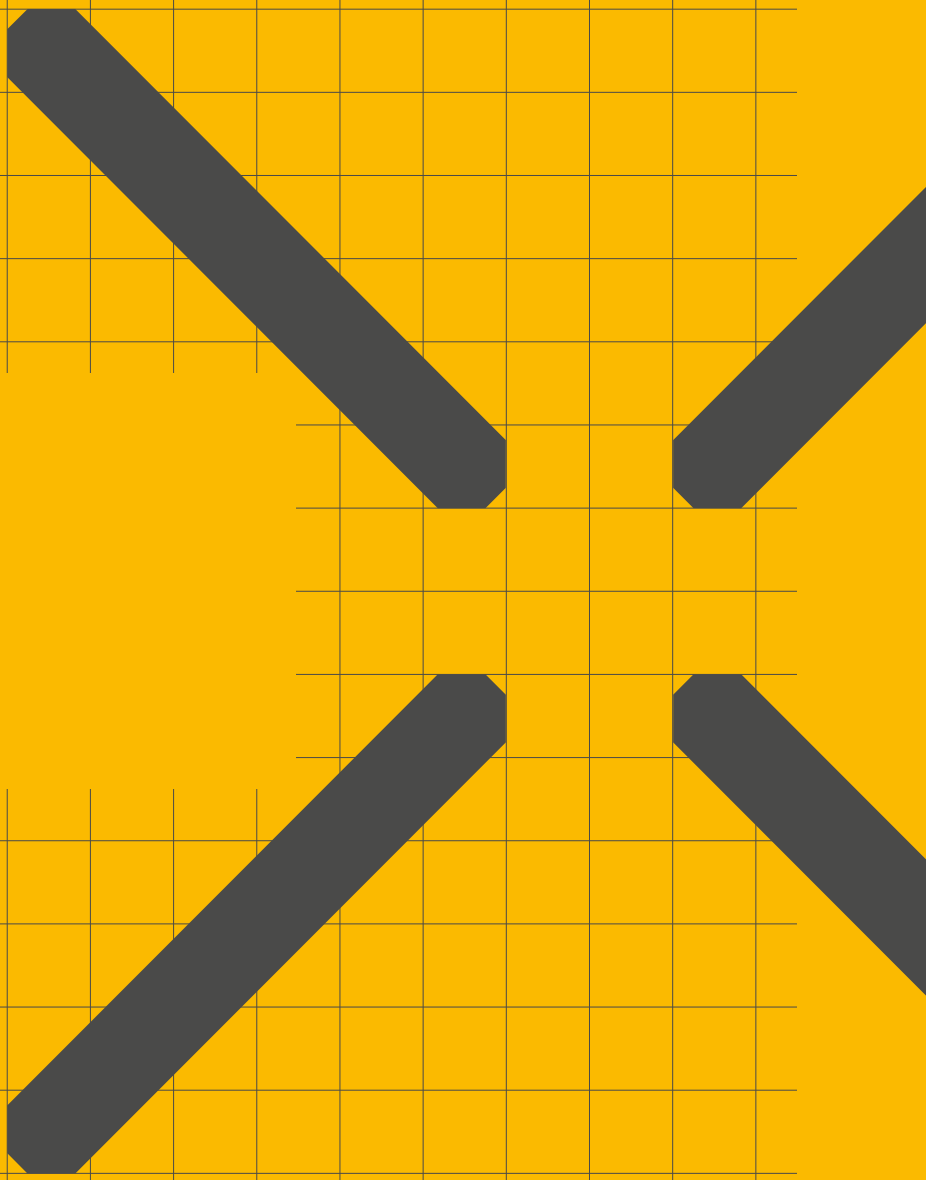
	Linear actuators		Control units		
	MAX7	MAX7	TLC pneumatic	TGC pneumatic	THC pneumatic
PAM	•	•	•	•	•

Ordering key

PAM–130256

7

New medical solution



CAMT

Linear actuator for surgical tables and procedure chairs

Benefits

- Play free motion
- Easy installation
- Compact design

Standards

- IEC/UL 60601-1 (Edition 3.1)
- IEC/UL 60601-1-2 (Edition 4)

Technical data

	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 work load in push direction is reduced. For details, see diagram **Safety factor load conditions**
[4] Speed with 24 V DC, speed with V/SCU is higher. For details, see diagram **Load-Speed**
[5] For stroke 250 mm, without attachment

Product benefits

Play free motion – Extra comfort

Feel the smooth movement introduced by CAMT because all parts are play-free. Unlike common actuators which shake when the load direction changes, CAMT keeps the movement smooth throughout the whole process (↳ **diagram 1**).

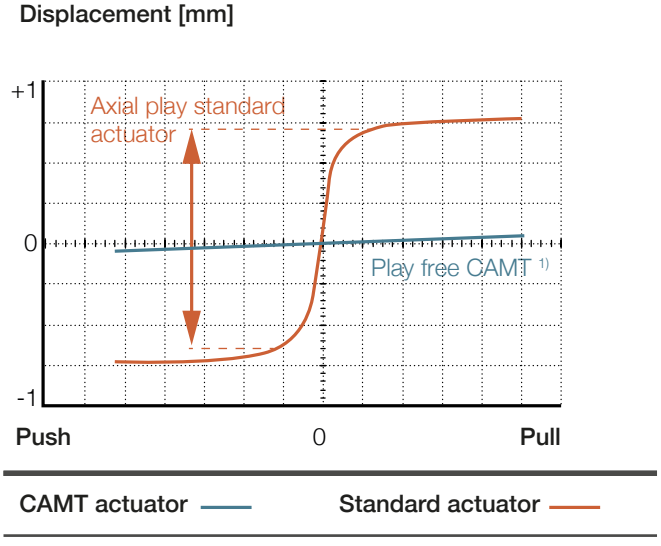
Easy installation – Simplicity

It is easy to install thanks to the new design with extra front and rear attachment with 1 or 2 DOF in motion (↳ **fig. 1 and 2**).

Compact design – Perfect system integration

The compact design enables a perfect system integration. It can be installed as a single actuator or be combined with other CAMT actuators and a pillar (e.g. CPMT) to achieve combined motion in any direction (↳ **fig. 3**).

Diagram 1



[1] Actuator after service life of 10 years in a typical medical procedure equipment application, with the meaning of 60 000 cycles at average load of 3 000 N and average stroke of 100 mm.

Fig. 1

Front attachment: play-free

Fig. 2

Rear attachment: play-free

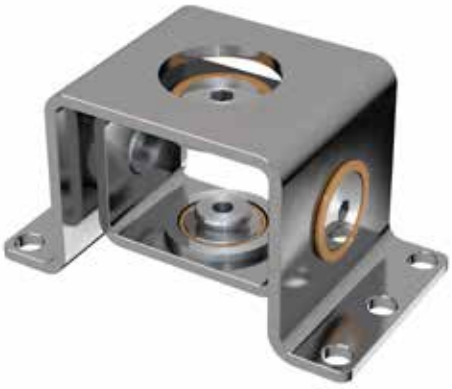
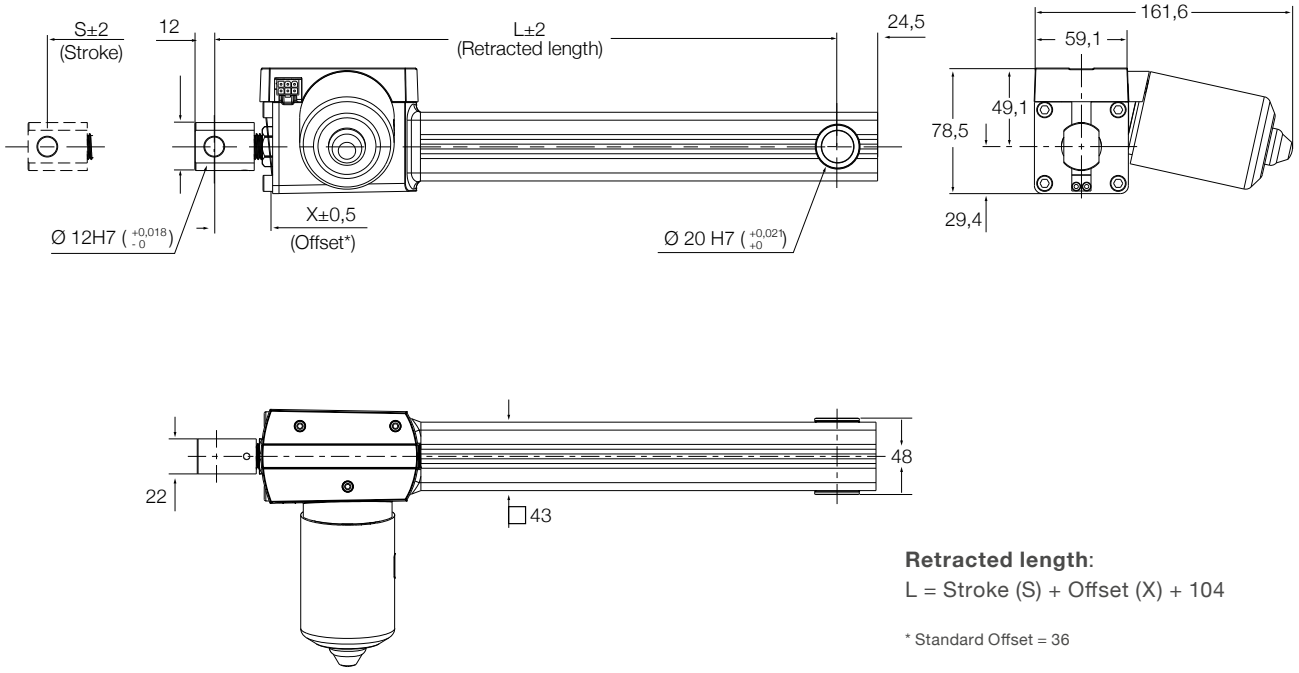


Fig. 3

Surgical module

Dimensional drawing

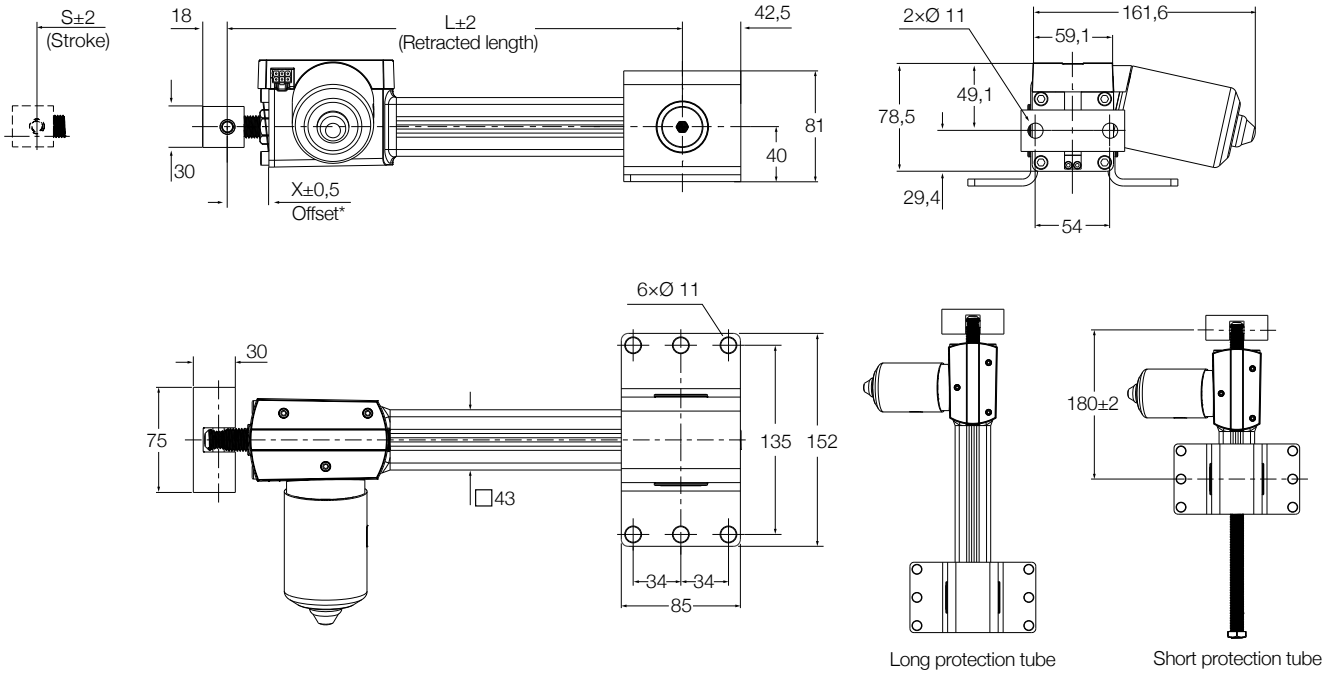
Clevis attachment (CAMT20-xxxxx-00L-AA-AFx-000)



Retracted length:
L = Stroke (S) + Offset (X) + 104

* Standard Offset = 36

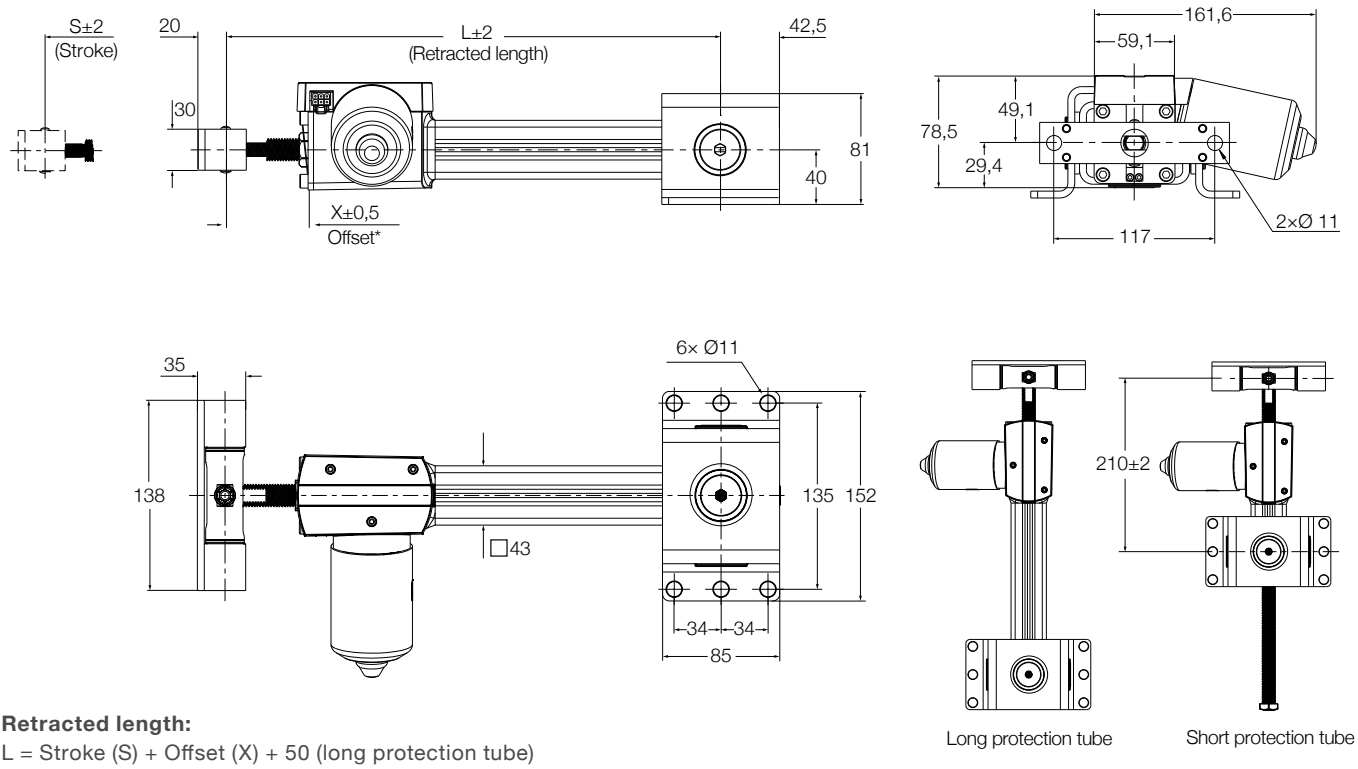
1 DOF attachment (CAMT20-xxxxx-00x-BB-AFx-000)



Retracted length:
L = Stroke (S) + Offset (X) + 50 (long protection tube)
L = Offset (X) + 150 (short protection tube)

* Standard Offset = 30

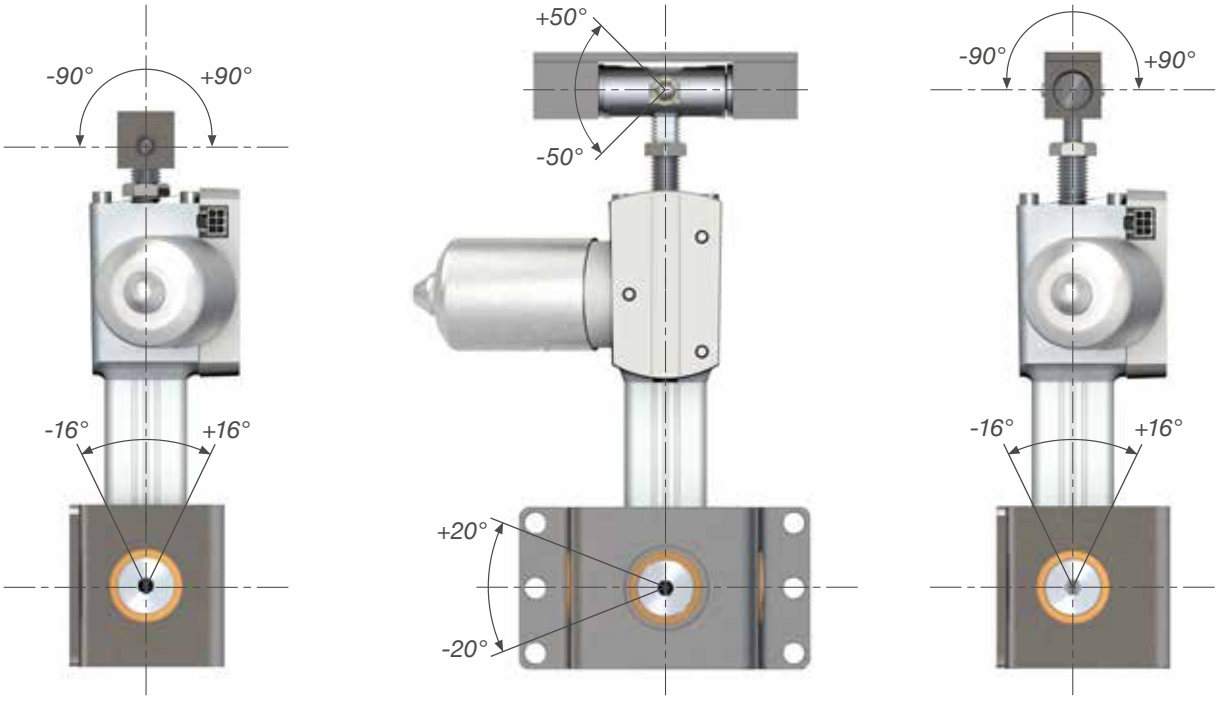
2 DOF attachment (CAMT20-xxxxx-00x-CC-AFx-000)



Retracted length:
L = Stroke (S) + Offset (X) + 50 (long protection tube)
L = Offset (X) + 150 (short protection tube)

* Standard Offset = 60

Motion angles of play front and rear attachments

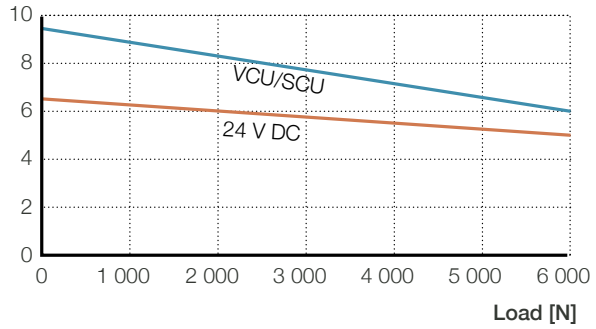


1 DOF **2 DOF**

Performance diagrams

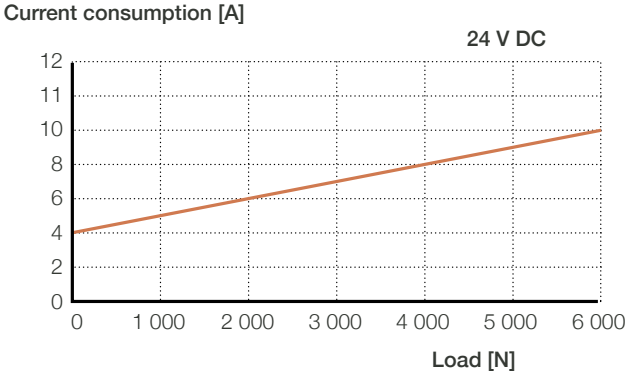
Speed-load diagram

Speed [mm/s]



Current-load diagram

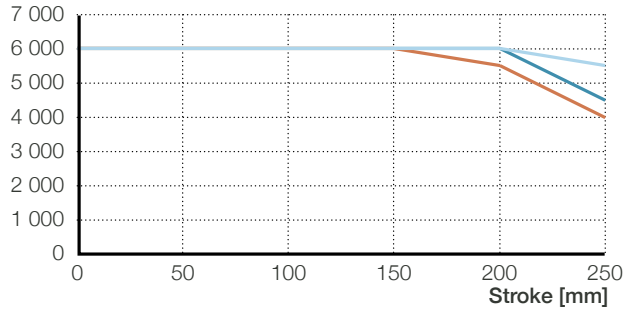
Current consumption [A]



Safety factor load conditions

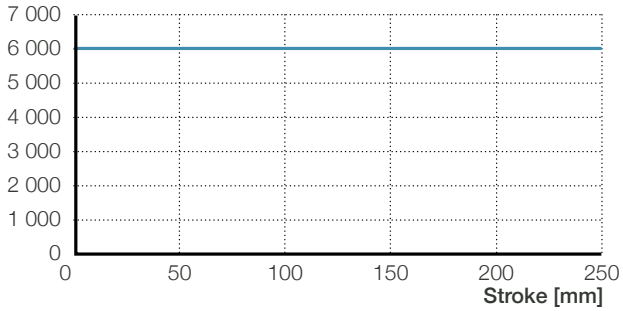
Push load reduction for static safety factor S=4 (IEC/UL 60601-1)

Load [N]



Safe push and pull load for static safety factor S=2.2 (IEC/UL 60601-2-46)

Load [N]

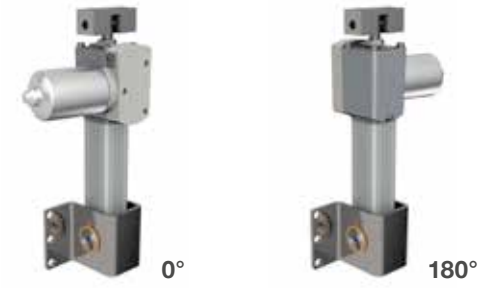


- Clevis attachment
- 1 DOF attachment, with long protection tube [1) 2)]
- 2 DOF attachment, with long protection tube [1)]
- Valid for all CAMT configurations

[1)] No load reduction with short protection tube

[2)] No load reduction for 1DOF U-bracket

Rear attachment orientation



Standard bracket (1 DOF and 2 DOF)

U-bracket (1 DOF)

Suitable control units and accessories

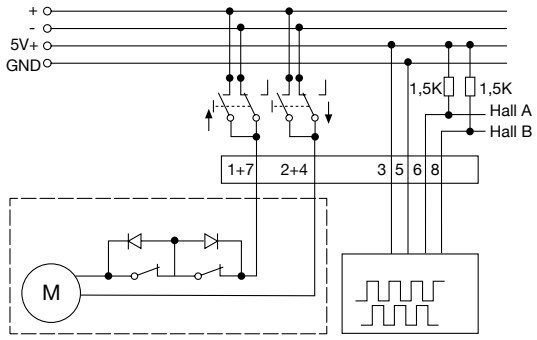
	Control units							
CAMT	SCU 1	SCU 5	SCU 9	VCU 5	VCU 8	VCU 9	*BCU 5	*BCU 8
Operating switches								
EHA 3	•	•	•	•	•	•	•	•
STJ	•	•	•	•	•	•	•	•
STE	•	•	•	•	•	•	•	•

Hand switch Foot switch Desk switch

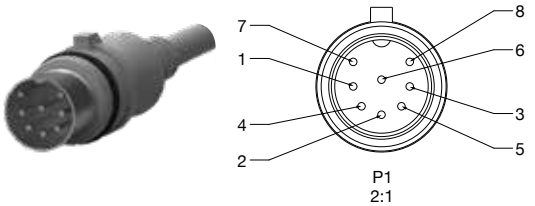
Reduced to 4 kN

Connecting diagram

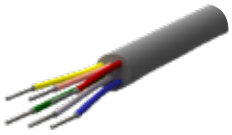
24 V DC



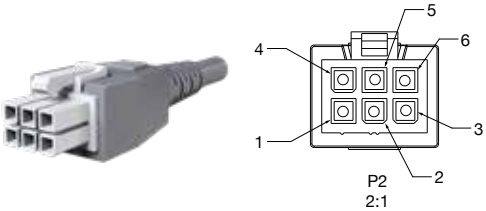
Electrical connection



Plug P1: DIN-8 connector



Flying leads



Plug P2: Molex Mini-fit Jr. 6-pole

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

Ordering key

Type

Load

2 6 000 N

Voltage

0 24 VDC

Stroke length

0 5 0 50 mm
1 0 0 100 mm
1 5 0 150 mm
2 0 0 200 mm
2 5 0 250 mm
x x x Customised (10 mm steps)

Distance between front pivot and gear box (Offset "X", see dimensional drawing)

0 0 Standard
x x Customised (1 mm steps)

Protection tube length

0 0 S Short (shortest possible length)
0 0 L Long (lead screw covered when retracted)
x x x Customised (10 mm steps)

Front attachment

A Rod clevis D12 H7 bore
B 1 DOF attachment
C 2 DOF attachment
D Rod with D8 H7 bore

Rear attachment

A Rear clevis D20 H7 bore 0° (only with long protection tube)
B 1 DOF attachment 0°
C 2 DOF attachment 0°
D Rear clevis D20 H7 90° (only with long protection tube)
E 1 DOF attachment 180°
F 1 DOF U-bracket attachment 0°
G 1 DOF U-bracket attachment 90°
H 1 DOF U-bracket attachment 180°
I 2 DOF attachment 180°

Mechanical options

A Backup nut

Electrical options

F End limit switches

Cable options

A 1 m straight with DIN8 plug
B 2,3 m straight with DIN8 plug
C 2,3 m straight with flying leads
0 Without cable

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

8

Glossary and symbolsW

Glossary

A		
	Absolute movement	A move referenced from a fixed absolute zero position
	Acceleration	The change in velocity as a function of time, going from a lower speed to a higher speed
	Accuracy	An absolute measurement defining the difference between expected and actual position
	Actuator	An actuator is a device that is responsible for moving or controlling a mechanism or system also known as cylinder, electromechanical cylinder or linear actuator
	Ambient temperature	The temperature of the cooling medium, usually air, immediately surrounding the actuator or another device
	Angular contact ball bearing	Angular contact ball bearings have raceways in the inner and outer rings that are displaced relative to each other in the direction of the bearing axis. This means that they are designed to accommodate combined loads, i.e. simultaneously acting radial and axial loads.
	Anodized	Protective treatment for aluminium that involves subjecting the metal to electrolytic action in a chemical bath, to create a protective film of aluminium oxide with a very smooth finish
	Axial load	Load where the force is acting along the axis of actuator (bearing) in any direction
B		
	Backlash	The amount of play between a set of moveable parts when changing the direction of travel. Typically seen in drive trains, ball/ lead screws and bearings
	Ball bearing	A support device which allows a smooth low friction motion between two surfaces loaded against each other with balls as rolling elements
	Ball screw	A screw assembly which uses a ball nut which contains one or more circuits of recirculating steel balls which roll between the nut and the screw
	Bearing	A support device which allows a smooth low friction motion between two surfaces loaded against each other
	Brushless DC motor	Synchronous motor type that are powered by a DC electric supply through an inverter that produce an AC signal to drive the motor
	Bushing	A cylindrical sleeve inserted into a machine part to reduce friction between moving parts
C		
	Configurator (product)	Name given to the software that uses the configuration string to build-up a specific actuator from an existing list of components and options
	Continuous torque	Is the torque that the motor is able to provide continuously with no limitation in time
	Current	The flow of charge through a conductor
	Cycle	A complete motion of an actuator from the start position via intermediate positions and back to the start position
	Cycle time	Time for one complete motion cycle, from the start of the cycle until the start of the next cycle
	Cylinder	A mechanical device which produces a linear force to achieve a reciprocating linear motion. There three common types: pneumatic, hydraulic and electromechanical (or electric). The first two use the power of compressed media (gas or liquid) while the latter uses a mechanical device (screw) to transform the rotational input movement of a motor into a linear one.
D		
	Deceleration	The change in velocity as a function of time, going from a higher speed to a lower speed
	Duty cycle	The ratio of motor on time and total cycle time within a given cycle of operation
	Dynamic load rating	Constant that is used to calculate the service life of a screw drive. The value for the dynamic load rating represents the load under which 90 % of a sufficient large number of identical screw drives can achieve a service life of one million revolutions
E		
	Efficiency	Ratio of output power versus input power

	Electric cylinder	A self-contained system which converts rotary motion (from a motor) to linear motion
	Electromechanical cylinder	A self-contained system which converts rotary motion (from a motor) to linear motion
	Electrode	The part of a resistance welding gun that facilitates the high voltage current path to the parts being welded
	Equivalent dynamic axial load	Load of constant magnitude over a full motion cycle which has the same influence on the linear unit's service life as the actual fluctuating load
F		
	Foot mount	Mounting plates, attached to front and end of a cylinder, to mount the cylinder in parallel to a flat surface
	Force	The action of one body on another which tends to change the state of motion of that body. Typically described in terms of magnitude, direction and point of application
	Friction	The resistance to motion of two surfaces that are in direct contact
G		
	Gear ratio	This relates to the transmission and conversion of movements, linear and rotary speeds, forces and torques in a geared mechanism. The gear ratio (also known as reduction ratio) is the ratio between the input and output variable, e.g. the ratio of input speed to output speed
H		
	Hall effect sensor	A magnetically controlled transistor switch controlling DC power. It has no moving parts and theoretically unlimited contact life.
	Holding force	Maximum external force that can be applied to a stopped actuator, without causing any linear movement. It is usually given by the holding torque of an electromechanical brake applied on the motor
	Humidity (relative)	A ratio that indicates the amount of water vapor in the air. It is usually expressed as a percentage. At any temperature, it is the amount of water vapor in the air, divided by the amount that would be present at saturation
I		
	Inertia	Property of an object that resists a change in motion. It is dependent on the mass and shape of the object. The greater an object's mass, the greater its inertia and the more force is necessary to accelerate and decelerate it
	IP	Degrees of protection provided by enclosures, according with IEC standard 60529
K		
	Keyway	An axially-located groove in the length of a shaft along which a key may be located
L		
	Lead	Describes the axial distance a nut is moving on a screw at one full rotation of either the screw or the nut
	Lead screw	A screw which uses a threaded screw design (e.g. with trapezoidal shaped thread) with sliding surfaces between the screw and nut
	Lifetime	Service life in km that 90 % of a sufficiently large group of apparently identical cylinders can be expected to reach or exceed.
	Limit switch	A switch that is actuated by some part of motion of a machine or equipment to alter the electrical circuit associated with it
	Linear speed **Max. linear speed**	The linear speed is the change in position as a function of time. Maximum linear speed, a linear unit or a cylinder can reach without damaging the mechanical system. Limiting factors can be the recirculating system of the balls or rollers, or the heat dissipation when using lead screws, or others. If the motor of the cylinder could turn faster, it needs to be limited
	Load	A mass or weight of an application acting on the in axial direction on the push tube

M		
	Mass	The quantity of matter that an object contains
	Moment	Rotational forces applied to a linear axis, typically expressed as yaw, pitch and roll
	Motion profile	A method of describing a move operation in terms of time, position and velocity. Typically, velocity is characterized as a function of time or distance which results in a triangular or trapezoidal profile
	Motor	A device which converts electrical energy into mechanical energy
O		
	O-ring	A ring of synthetic rubber with a circular cross-section, used as a gasket or seal
	Overheating	The heat in a system is mostly dissipated into the surrounding air. Dissipation can be accelerated by various forms of ventilation. In case the dissipation level is lower than the heat generation, overheating takes place
P		
	Peak force	The peak force is the maximum force an actuator can push or pull for a short time (peak), without being mechanically damaged or overheating
	Peak torque	The peak force is the maximum torque a motor can provide for pull for a short time (peak), without being mechanically damaged or overheating
	PLC (programmable logic controller)	An industrial digital computer that is used to control machines and processes by continuously monitoring analog and digital inputs and making decisions based on customer programs
	Positioning accuracy	Is the maximum deviation between the actual position and the target position, as defined in VDI/DGQ 3441 norms
	Power	How much work is done in a specific amount of time
	Proximity sensor	A device for sensing a position of an actuator or application. Proximity sensors supply either a sourcing or sinking signal to a device such as a programmable logic controller
R		
	Radial load	Load where the force is acting perpendicular to the axis of the actuator
	Repeatability	The ability of a positioning system to return to an exact location during operation (from the same direction with the same load and speed)
	Resolver	A feedback device consisting of a stator and rotor that provides position and velocity information to the drive for motor commutation
	RMS	The root mean square is the square root of a mean square value
	Rod cylinder	A cylinder using a rod attached to its piston to transmit force
	Roller screw	A screw assembly which uses a roller nut which contains guided steel rollers which are rotating around their own axis and around the screw (planetary rollers)
S		
	Screw assembly	Device which converts rotary motion into linear motion
	Service life	The nominal life is expressed by the number of revolutions (or number of operating hours at constant rotary speed) that will be attained or exceeded by 90 % of a sufficiently large number of identical screw drives before the firsts signs of material fatigue become evident
	Servomotor	A motor which is used in closed loop systems where feedback is used to control motor velocity, position or torque
	Spur gear	Is a gear or a system of gearing having radial teeth parallel to the axle
	Static axial force	Maximum axial force which can be applied on a linear unit only if it is not moving
	Stiffness	Is the rigidity of an object, representing its resistance to deformation from an applied force
	Stroke length	The linear distance that the push tube of a cylinder can extend or retract

T		
	Thermal load	The thermal load describes the force which the actuator can permanently move without overheating. The thermal load is calculated by a formula in respect of changing load conditions over different time phases of a full motion cycle.
	Torque	A measure of angular force which produces rotational motion
U		
	Units (metric)	A decimal system of weights and measures based on the kilogram and meter
V		
	Volt	Difference in electrical potential between two points
W		
	Watt	A unit of power or a rate of doing work. The power dissipated by a one-ohm resistor with one ampere of current is one watt
	Weight	Force of gravity acting on a body. Determined by multiplying the mass of the object by the acceleration due to gravity

Symbols description

A				
	a	m/s²	**Acceleration**	The change in velocity as a function of time, going from a lower speed to a higher speed
	a_{max}	m/s²	**Max. acceleration**	The maximum allowed change in velocity as a function of time from a lower speed to a higher speed. Exceeding this value can cause damages.
C				
	C	kN	**Dynamic load capacity**	Constant that is used to calculate the service life of a ball or roller screw. The value for the dynamic load rating represents the load under which 90 % of a sufficient large number of identical screws can achieve a service life of one million revolutions
D				
	D	%	**Duty cycle of the cylinder**	The ratio of active time at full load and total cycle time within a given cycle of operation
	D_{unit}	%	**Duty cycle of the linear unit**	The ratio of active time and total cycle time within a given cycle of operation
	d_{screw}	mm	**Screw diameter**	Describes the outer diameter of the screw shaft
E				
	η	%	**Efficiency**	Ratio of output power versus input power
	η_{lu}	%	**Efficiency of the linear unit**	Ratio of output power versus input power of the linear unit.
F				
	F	N	**Force (cylinder) or load (application)**	The action of one body on another which tends to change the state of motion of that body. Typically described in terms of magnitude, direction and point of application. The force is related to the capability of the cylinder while the load is related to the mass or weight of an application acting on the axial direction on the push tube.
	F_{Amax}	N	**Maximum dynamic axial load of the application**	Maximum axial push or pull load which is needed to fulfill the specifications of the application.
	F_c	N	**Continuous force at max speed**	The continuous force at max speed describes the force the cylinder can permanently move at maximum allowed linear speed, without overheating.
	F_{c0}	N	**Continuous force at zero speed**	The continuous force at zero speed describes the force the cylinder can permanently hold without overheating and without using a brake.
	F_{cont}		**Continuous force curve**	A curve that represents the continuous force an actuator can permanently move at maximum allowed linear speed, without overheating.
	F_{Hold}	kN	**Holding force of the brake**	Describes the maximum axial load the engaged brake (optional motor brake) can hold if the motor is disabled. This value must not exceed the maximum axial force of the cylinder
	F_m	N	**Equivalent dynamic axial load**	Load of constant magnitude over a full motion cycle which has the same influence on the linear unit's service life as the actual fluctuating load
	F_{max}	N	**Maximum dynamic axial force**	The maximum dynamic axial force describes the maximum force an electric cylinder can deliver during movements without damaging parts. The acceleration/ deceleration of masses need to be considered.
	F_{max0}	N	**Max. static axial force**	Maximum axial force which can be applied on a linear unit only if it is not moving.
	F_p	N	**Peak force**	The peak force describes the maximum force the cylinder can push or pull for a short time, without being mechanically destroyed or by overheating. The length of the peak is depending on the temperature of the system when the peak is initiated.
	F_{p0}	N	**Peak force at zero speed**	The peak force at zero speed is the maximum force the cylinder can hold for a short time without using a brake.
	F_{peak}		**Peak force curve**	A curve that represents the continuous force an actuator can push or pull for a short time, without being mechanically destroyed or by overheating. The length of the peak is depending on the temperature of the system when the peak is initiated.

I				
	i	#	**Gear reduction**	Describes the factor between the number of revolutions of the input of the gear divided by the number of revolutions of the output of the gear. A gear reduction 2 means that the output of the gear (linear unit side) is turning with half speed compared to the input of the gear (motor side). Using a gear reduction enables for using smaller motors with less torque to bring higher force but with lower speed
	I	A	**Nominal Current**	Is the nominal current consumption of the motor
	I_{peak}	A	**Peak current**	Is the maximum current consumption of the motor for a short period of time.
	IP		**Degree of protection**	International protection (also ingress protection) describes the protection of a product with two digits. The first digit describes the protection against dust, the second against water. The higher the value the better the protection.
J				
	J	10^{-4} kgm^2	**Inertia**	Property of an object that resists a change in motion. It is dependent on the mass and shape of the object. The greater an object's mass, the greater its inertia and the more force is necessary to accelerate and decelerate. As an electric cylinder is available in different lengths, the inertia is typically given for stroke 0, followed by an inertia indication ΔJ for each additional 100 mm.
	J_{brake}	10^{-4} kgm^2	**Inertia of the brake**	Property of an object that resists a change in motion. It is dependent on the mass and shape of the object. The greater an object's mass, the greater its inertia and the more force is necessary to accelerate and decelerate. As the brake is typically an option, this value has to be added to the Inertia of the electric cylinder.
	J_{lu}	10^{-4} kgm^2	**Inertia of the linear unit**	Property of an object that resists a change in motion. It is dependent on the mass and shape of the object. The greater an object's mass, the greater its inertia and the more force is necessary to accelerate and decelerate. As the linear unit is available in different lengths, the inertia is typically given for stroke 0, followed by an inertia indication ΔJ for each additional 100 mm.
L				
	$L_{10\ dist}$	km	**Lifetime distance**	Service life in km that 90 % of a sufficiently large group of apparently identical cylinders can be expected to reach or exceed.
M				
	m	kg	**Weight**	Force of gravity acting on a body. Determined by multiplying the mass of the object by the acceleration due to gravity
	Δm	kg	**Weight difference**	As electric cylinders are available in different lengths, the weight is typically given for stroke 0, followed by a weight indication Δm for each additional 100 mm.
	m_{arot0}	kg	**Weight of the anti-rotation device**	The weight of the optional anti-rotation device has to be added to the weight of the cylinder.
	m_{brake}	kg	**Weight of the brake**	The weight of the optional brake has to be added to the weight of the cylinder
	m_{lu}	kg	**Weight of the linear unit**	As the linear unit is available in different lengths, the weight is typically given for stroke 0, followed by a weight indication Δm for each additional 100 mm.
	M	Nm	**Torque**	A measure of angular force applied to a linear axis to produce rotational motion
	M_{Ac}	Nm	**Required continuous torque**	A measure of continuous angular force (torque) a motor has to deliver without overheating
	M_{Amax}	Nm	**Required maximum torque of the motor**	Maximum angular force (torque) of a motor which is required that the cylinder is able to push or pull the maximum load of the application
	M_{max}	Nm	**Maximum torque**	The maximum torque is the upper limitation of the torque. Exceeding this value can cause damages of related parts.
N				
	n_{cycles}	#	**Number of cycles**	The number of motion cycles a cylinder has to have without damage during the expected life of the application
	n_{max}	1/min	**Max. rotational speed**	Describes the maximum allowed number of full rotations of an axis. Exceeding this value can cause damages.

P				
	P	W	**Nominal Power**	Nominal power of the motor, given by multiplying the nominal voltage and the nominal current
	p_{screw}	mm	**Screw lead**	Describes the axial distance a nut is moving on a screw at one full rotation of either the screw or the nut
R				
	R	Ω	**Resistance**	The opposition to the flow of charge through a conductor
S				
	s	mm	**Stroke**	The linear distance that the push tube of a cylinder can extend or retract
	s_0	mm	**Internal over stroke**	Additional stroke which is not part of the specified stroke length of the cylinder. It is used to prevent the screw nut touching the mechanical end stops when moving over the full specified stroke.
	$s_{backlash}$	mm	**Backlash**	Axial play that the cylinder push tube has without turning the screw. It's equivalent with the mechanical axial play of the inner parts of the cylinder.
	s_{cycle}	m	**Distance travelled per motion cycle**	Travelled distance of a push tube for a full motion cycle, from the start to the next start in both directions.
	s_{max}	mm	**Maximum stroke**	The maximum stroke describes the mechanical limitation which a cylinder can extend or retract. Limiting factors are side loads (buckling), speed (wobbling of the screw inside), limitations in the manufacturing process and others
T				
	t	s	**Time**	Time in seconds which is needed for a certain activity.
	t_{cycle}	s	**Cycle time**	Time for one complete motion cycle, from the start of the cycle until the start of the next cycle
	t_L	h	**Required lifetime in hours**	The lifetime of a cylinder in hours which is required to serve an application without damage during the expected life of the application.
	T	Nm	**Torque**	A measure of angular force applied to a linear axis to produce rotational motion
	$T_{ambient}$	°C	**Ambient temperature**	Temperature of the environment around the object
U				
	U	V	**Nominal voltage**	Is the supply voltage required by the electric motor
V				
	v	m/s	**Linear speed**	The linear speed is the change in position as a function of time.
	v_{max}	mm/s	**Max. linear speed**	Maximum linear speed, a linear unit or a cylinder can reach without damaging the mechanical system. Limiting factors can be the recirculating system of the balls or rollers, or the heat dissipation when using lead screws, or others. If the motor of the cylinder could turn faster, it needs to be limited
	v_{min}	mm/s	**Min. linear speed**	Minimum linear speed of a LEMC-A cylinder equipped with asynchronous motors that can be adjusted through the integrated frequency inverter

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