EWELLIX

A Schaeffler Company

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

CAHB-3x series

Linear actuator CAHB-30A

CAHB-31N

Contents

⚠ WARNING

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

1. General information

1.1 Information in this manual

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

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

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

For a better representation of the circumstance of use, the illustrations used are not necessarily to scale and may vary from the actual design of the device.

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTICE

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

NOTE

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

1.2 Manufacturer information

Manufacturer: Ewellix Motion Technologies (Pinghu) Co, Ltd.

Address of the manufacturer: No.888 Changsheng Road , Pinghu City, Zhejiang, China.

1.3 Declaration of incorporation

EWELLIX

CN99-Declaration-EHSQ-5420

Declaration of Incorporation (CAHB3X)

According to Annex IIB of Directive on machinery 2006/42/EC

The products listed below, are partly completed machineries intended to be assembled with other machine, unit or system. Their installation should not be approved until the user has ensured that the provisions of the EC/EU Directives applicable to the end product in question have been fulfilled.

Product
CAHB30-PxA-xxxxxx-xxxxxx-xxx 230V AC
CAHB31-PxN-xxxxxx-xxxxxx-xxx 230V AC

The products are designed and manufactured in conformity to the following directives:

2006/42/EC	Machinery, essential safety requirements
2014/35/EU	Low Voltage Directive

Used standards

Title	Reference- No.	Edition
Safety of machinery – Basic concepts, general principles for design Risk assessment and risk reduction	EN ISO 12100	2010
Household and similar electrical appliances - Safety - Part 1: General requirements	EN 60335-1	2012 +A11:2014
Safety of household and similar electrical appliances - Part 2-97: Particular requirements for drives for rolling shutters, awnings, blinds and similar equipment	EN 60335-2-97	2006 + A11:2008 + A2:2010 + A12: 2015

The technical documentation according annex VII part B is compiled and will transmitted to the national authorities on a reasoned request in electronic form.

Authorized person for the technical documentation: Amy Chen

Manufacturer:

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Approver: Ford Cai
Release Date: 31/Aug/2022
Revision: 0

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2. Technical data

NOTE

The technical data (dimensions, weight, output, connection values etc.) are given in the attached drawings and data sheets (see chapter 5. Reference documents, page 14).

2.1 Operating conditions

Environment information	Value	Unit
Ambient temperature range	– 26 to + 65	°C
Full performance ambient temperature range	0 to + 40	°C
Relative atmospheric humidity, maximum (no build-up of condensation)	Up to 90	%

NOTE

If the expected ambient temperature is lower than – 26 °C, please contact Ewellix Sales to ask for a customization.

The following table describes the maximum duty cycle of the actuator.

Duty cycle describes the maximum continuous operating time in relation to a break time that is required to cool down the actuator. The Duty cycle can be indicated as a number in %.

It is calculated as follows:

Max operating time [s] / (Max operating time [s] + Break time) = Duty cycle in %

Duration information at rated load and 20 °C ambient temperature	Value	Unit
Maximum duration of continuous operation	90	Sec.
Break until next operation	270	Sec.
Max. duty cycle at rated load:	25	%

⚠ CAUTION

If the UL mark is on the label, the duty cycles must be 10 % (90 Sec. on / 810 Sec. off).

2.2 Operating voltages and limits

The actuator is available in two supply voltage options: N for nominal voltage of 115 V AC / 60 Hz and P for nominal voltage of 230 V AC / 50 Hz. Significant voltage fluctuation affects the performance of the motor and electromagnetic brake. The normal operating voltage must be within ± 10 % of the nominal voltage.

2.3 Approximate weight of the actuator

$W_{30} = 5{,}03 + 0{,}0098 \times S$

$W_{30P} = 5{,}48 + 0{,}0098 \times S$

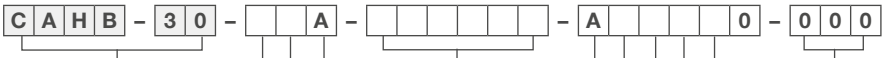
$W_{31} = 5{,}53 + 0{,}0098 \times S$

$W_{31P} = 5{,}98 + 0{,}0098 \times S$

Where:

Symbol	Unit	Definition
W_{30}	kg	Weight of CAHB-30 without potentiometer
W_{30P}	kg	Weight of CAHB-30 with potentiometer
W_{31}	kg	Weight of CAHB-31 without potentiometer
W_{31P}	kg	Weight of CAHB-31 with potentiometer
S	mm	Stroke length

Ordering key



Type

Nominal voltage

N	115 V AC, 60 Hz
P	230 V AC, 50 Hz

Nominal force

1	1 500 N
2	2 300 N

Screw

A	ACME screw

3 digit Stroke and 3 digit Retracted length (mm)

Stroke	Retracted length		
	Base [1]	with Limit switch L	with Potentiometer P
102	380	+ 60	+ 38
153	415	+ 25	+ 38
204	415	+ 25	+ 38
305	465	+ 127	+ 38
457	668	+ 76	+ 38
610	821	+ 76	+ 38

Ingress protection

A	Standard (IP 65)

Attachment diameter (Front and rear)

A	Standard (hole: Ø13,1 mm)
X	Customized [2]

Attachment orientation (Front and rear)

A	Standard (0°)
B	30°
C	60°
D	90°
E	120°
F	150°
X	Customized [2]

Option 1

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

Option 2

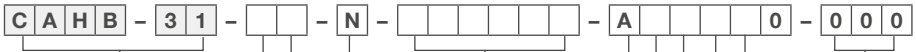
0	None
P	Potentiometer

Customization

[1] Base: the Retracted length without "Limit switch", without "Potentiometer"

[2] Only available on request. Contact Ewellix for more information.

Ordering key



Type

Nominal voltage

N	115 V AC
P	230 V AC

Nominal force

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

Screw

N	Ball screw

3 digit Stroke and 3 digit [1] Retracted length (mm)

Stroke	Retracted length Base [2]	with Limit switch L	with Potentiometer P
102	380	+ 64	+ 38
153	419	+ 25	+ 38
204	419	+ 76	+ 38
305	521	+ 138	+ 38
457	735	+ 76	+ 38
610	888	+ 76	+ 38

Ingress protection

A	Standard (IP 65)

Attachment diameter (Front and rear)

A	Standard (hole: Ø13,1 mm)
X	Customized [3]

Attachment orientation (Front and rear)

A	Standard (0°)
B	30°
C	60°
D	90°
E	120°
F	150°
X	Customized [3]

Option 1

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

Option 2

0	None
P	Potentiometer

Customization

[1] Use the letter "A" to represent "10" if the Retracted length exceeds 999 mm, for example: 1002 mm is A02

[2] Base: the Retracted length without "Limit switch", without "Potentiometer"

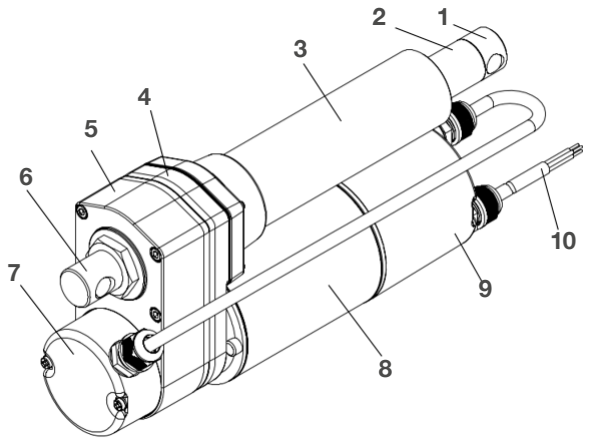
[3] Only available on request. Contact Ewellix for more information.

3. Structure and function

3.1 Overview and structure

Figure 1

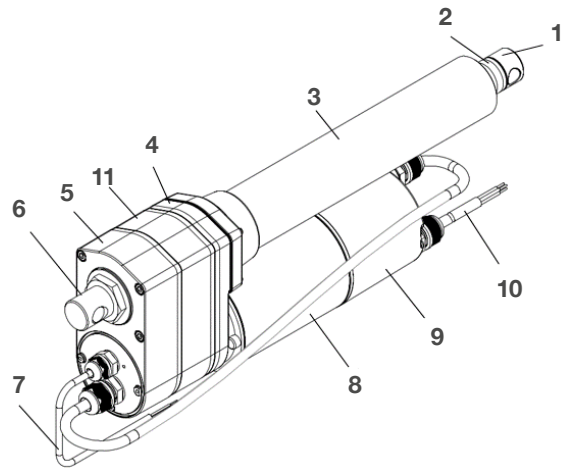
CAHB-30/31 with limit switch option



1. Front attachment
2. Extension tube
3. Guiding tube
4. Gearbox
5. Rear cover
6. Rear attachment
7. Limit switch protection cover
8. Single-phase AC induction motor
9. Electromagnetic brake protection cover
10. Cable

Figure 2

CAHB-30/31 with potentiometer and limit switch options



1. Front attachment
2. Extension tube
3. Guiding tube
4. Gearbox
5. Rear cover
6. Rear attachment
7. Potentiometer output cable
8. Single-phase AC induction motor
9. Electromagnetic brake protection cover
10. Cable
11. Center case (Potentiometer components)

3.2 Brief description

The actuator has been designed and built exclusively for its intended purpose as described in these instructions. The authorized use of the actuator is the dynamic central push-loaded or pull-loaded stroke. If you use the actuator for any use other that cited, the manufacturer cannot be held the responsibility for damage resulting from this.

The linear actuator consists of an AC motor (**8**) (starting capacity is included), that drives a gear unit (**4**) and a linear unit (**1, 2, 3**). The linear unit converts the rotation of the motor and gears to a linear movement. CAHB-30 uses a lead screw and CAHB-31 uses a high efficiency ball screw. The gear unit uses spur gears made of metal, which leads to long lifetime, high efficiency and high reliability. The front attachment (**1**) and the rear attachment (**6**) transmit the actuator power to both sides of the application.

The actuator offers a mechanical clutch and a motor thermal switch for overload and safety protection. The stainless-steel extension tube, the paint coating and the engineered sealing system protect the actuator from water ingress and corrosion. All external components of the actuator except the cable, gland and sealings are made of metal parts, making the actuator robust for harsh environments.

A configuration option is to have electromagnetic limit switches that are external and can be adjusted by the user as well as a potentiometer for position feedback. The functions are referred to in the following chapter.

3.3 Special features and options

3.3.1 Mechanical overload protection

The actuator is equipped with a mechanical overload protection unit (clutch). This overload protection is activated when the external force acting on the linear unit is exceeded. This activation prevents pushing or pulling beyond the maximum force defined in the data sheet and will protects the motor and gear unit from damage.

⚠ CAUTION

Continued operation of the clutch may cause overheating and damage to the linear actuator. If the clutch slips, disconnect power immediately.

⚠ CAUTION

If the limit switches are configurated, the activation of the clutch will result in position loss of limit switch. If the clutch is activated, the position of the limit switch must be recalibrated Contact Ewellix on how to recalibrate the position of the limit switch.

3.3.2 Thermal protection

The thermal switch built into the motor will turn off the power to the motor if it overheats. It automatically resets when the temperature drops.

Overloading or frequent operation of the actuator beyond the maximum duty cycle defined in the data sheet would cause the motor to overheat.

⚠ CAUTION

To prevent damage from overheating, if the actuator stops with a high motor temperature, do not restart the actuator and wait for the actuator to cool down.

3.3.3 Option: Potentiometer

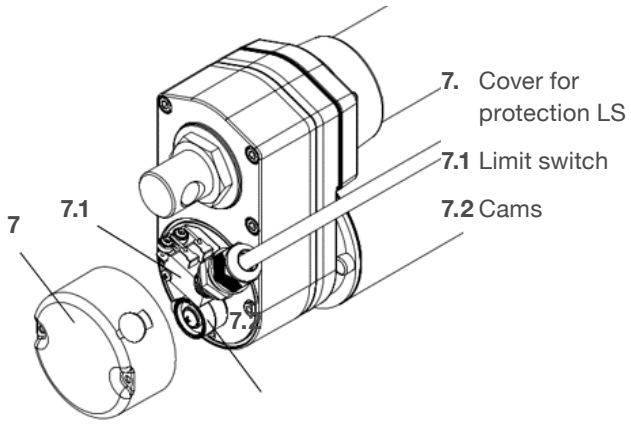
The potentiometer provides a signal that indicates the position of the linear actuator (see chapter 5. Reference documents, page 14).

3.3.4 Option: Limit switch

The limit switch makes it possible to control the stroke of the linear unit. There is a cam connected to the motor through gears. When the actuator runs to the end of stroke, the cam will contact the limit switch, then cutting off the power of motor.

It is possible to adjust the stroke by adjusting the cam angle range. Please contact Ewellix.

Figure 3



⚠ DANGER

Danger to life caused by electric current!

Touching conductive parts causes a direct danger to life (AC power is led with limit switches lead feet).

- Before opening the switch cover (**7**), switch off the power supply and perform lockout procedures so it cannot be turned on again.

⚠ CAUTION

Opening the switch cover (**7**) would damage the seal (due to the sealant around the cover and the locking screws). If cover (**7**) is removed/opened, warranty is voided.

4. Installation and operation

Please read the following safety information carefully. Ensure that all persons who will connect, install, or use the actuators are in possession of the necessary information and have access to this installation manual.

Persons who do not have the necessary experience or knowledge of the actuators must not use them. In addition, persons with reduced physical or mental abilities must not use the products unless they are under supervision or have been thoroughly instructed in the use of the equipment by a person responsible for the safety of such persons. Furthermore, children must be supervised to ensure that they do not play with the product.

NOTE

Failure to follow these instructions may result in damage to or destruction of the actuator.

Ensure that the following points are followed before starting the mounting/dismounting process:

- The actuator is not in operation.
- The mains current supply is switched off and the plug has been pulled out.
- The actuator is free from loads that could be released during this work.

Before you put the actuator into operation, check the following:

- The actuator is correctly installed as described in the instructions. Please refer to **figure 4** for correct installation. **Figures 5** and **6** show common issues that need to be avoided.
- The mechanism that the actuator is supposed to be mounted to is not blocked and can freely move throughout the entire working range of the actuator.
- Ensure that the connection pins/bolts can withstand wear and the nominal force of the actuator and are securely fastened.
- Ensure that the dimensions of the application elements and pins/fixing bolts are appropriate.
- Application elements connected to actuator attachments must be aligned and the pins/fixing bolts must be kept parallel (see **figure 5)**.

Correct & issues schematics:

Figure 4

Correct installation

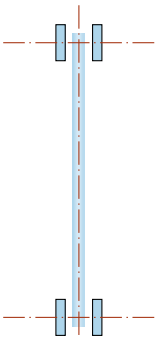


Figure 5

Parallelism issue

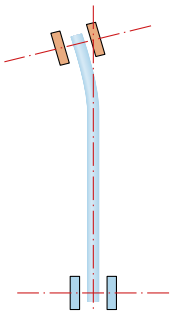
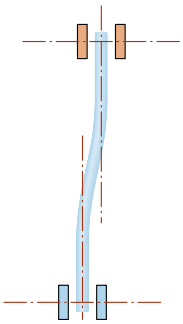


Figure 6

Misalignment issue



- Correctly connect the wires (see **figure 1** and **figure 2**, item **10**) of the power supply and control unit cable according to the specifications (see chapter 4.2 Wiring, page 13).
- Make sure the applied voltage matches the voltage specified on the label or data sheet. Refer to the User's Manual for the operating voltage limits for the standard version.

During operation:

- Listen for unusual sounds and watch out for uneven running. Stop the actuator immediately if anything unusual is observed.
- Do not apply side loads / radial loads to the actuator. Use only coaxial loads/forces.
- Use only the actuator within the specified operating conditions (see chapter 2.1 Operating conditions, page 5).

When the equipment is not in use:

- To prevent accidental operation, turn off the power or unplug the power cord.

⚠ WARNING

Failure to follow these instructions may result in damage to the actuator or accidents resulting in serious personal injury. It is important that anyone who will be connecting, installing or using the actuators has the necessary information and access to the manual at www.ewellix.com.

- If there is visible damage to the product, do not install it.
- If the product makes unusual noises or odor, disconnect the power supply immediately.
- The products must only be used in an environment that corresponds to their IP protection.
- Cleaners must not be highly alkaline or acidic (pH value of 6-8).
- DO NOT exceed the load and duty cycle specified in the data sheets.
- The actuator must only be connected to the voltage within stated range.
- Do not use the actuator outside of its technical application, operating limits and specified working limits.
- Do not work on or place any of your body, hands, or arms near moving components.
- Actuator may cause serious injuries while moving. Ensure that there are no persons in the stroke area of the actuator while in operation.
- Do not allow any objects or body parts to come into contact with the attachments of the actuator.
- Do not touch any conductive parts. Make sure the system power is off and the actuator is locked out before installing.
- If the clutch continuously slips, it may result in overheating and damage to the actuator. If the clutch dis-engages engages, immediately disconnect power.
- The clutch is not considered to be end position protection. Avoid continuously operating the clutch at the actuator end positions.
- During installation, make sure that the linear actuator is not blocked in its movement over the entire stroke range.
- Do not modify, rebuild, or alter any part of the actuator. Never loosen the screws on the linear actuator or attempt to open the linear actuator.
- Disconnect during assembly/installation so actuator can not be started..
- If irregularities are observed, replace the actuator.
- Linear speed of actuators can vary if you intend to use two or more actuators to drive a function in parallel, a synchronization control must be considered.

4.1 Installation

Linear actuator is attached to two elements via the hinge heads (i.e., actuator attachments).

Important information

For limit switch and potentiometer option the actuator is mechanically configured in the plant to the stroke that was ordered. If the extension tube is rotated in relation to the actuator the stroke setting is altered and will not be correct anymore.

With limit switch and without potentiometer:

To compensate alignment of the attachments the tube can be rotated up to ± 90° during installation.

With Potentiometer:

To compensate alignment of the attachments the tube can be rotated up to ± 45° during installation.

⚠ CAUTION

Failure to comply with the above will lead to stroke to miss up or the potentiometer component to be damaged.

Do not connect power to the actuator cable until the actuator is installed on the application.

⚠ CAUTION

If power is applied to the actuator before it is installed, the actuator's extension tube my rotate freely, causing the stroke to be missed or the potentiometer component to be damaged.

⚠ CAUTION

The mounting pins on both ends of the actuator must be protected against rotating!

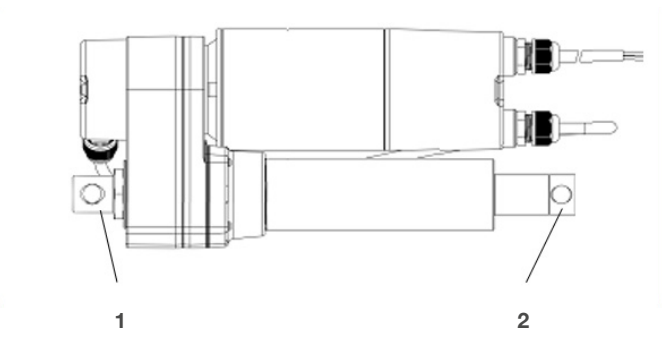
Figure 7

Connect the attachments (see **figure 8**, item **1** and **2**) to the appropriate elements of the application with the pins/fixing bolts. Make sure that the force applied to the mounting bolts is always coaxial to the extension tube and that no lateral force (bending moment) is applied to the extension tube.

⚠ CAUTION

Non-centric load force and lateral force (bending moment) would overwhelm the load capacity of the actuator and cause damage to the actuator.

Figure 8



NOTE

Refer to the data sheet (see **page 14**) for attachment diameter information. The dimensions of fasteners and pins should be appropriate.

⚠ WARNING

Risk of injury and material damage due to inadequate fastening!

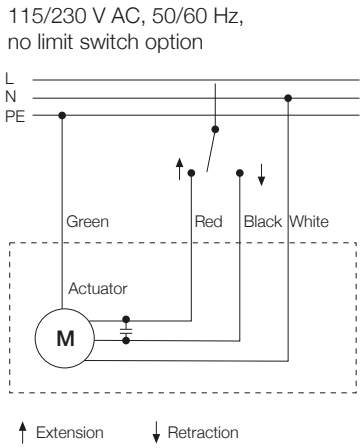
Use mounting bolts and secure them properly. Do not use screws for installation. Never loosen or tamper screws on the drive.

4.2 Wiring

Green wires must be connected to the PE wire to prevent electric shock.

Figure 9

Connecting diagram

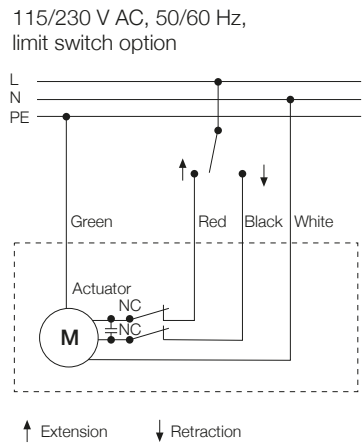


Wire connection for power (see figure 1 and 2, item 10, page 8)

Wire no.	AWG	Colour	Application
1	18	Red	Power (L), Extension
2	18	Black	Power (L), Retraction
3	18	White	Power (N)
4	18	Green	PE

Figure 10

Connecting diagram



Wire connection for power (see figure 1 and 2, item 10, page 8)

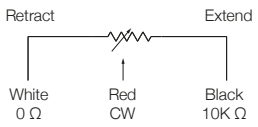
Wire no.	AWG	Colour	Application
1	18	Red	Power (L), Extension
2	18	Black	Power (L), Retraction
3	18	White	Power (N)
4	18	Green	PE

NOTE

When fully extended the switch on the red wire opens.
When fully retracted the switch on the black wire opens.

Figure 11

Wiring diagram for potentiometer



Wire connection with potentiometer (see figure 2, item 7, page 8)

Wire no.	AWG	Colour	Application
1	24	Red	see figure 11
2	24	White	see figure 11
3	24	Black	"see figure 11, recommend input voltage 5 V DC, power rating 2 W"

⚠ WARNING

Electrical shock may result from failure to connect the PE wire correctly to the earth.

5. Reference documents

Supporting documents are available for download on ewellix.com on the CAHB3 product page under Publications or if you scan the below QR code.

Linear actuator CAHB series

Click to open

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