

# Linear Actuator LA77

## User Manual



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## Preface

Dear User,

We are delighted that you have chosen a LINAK® product.

LINAK systems are high-tech products based on many years of experience in the manufacture and development of actuators, lifting columns, desk frames, electric control boxes, controls, batteries, accessories and chargers.

This User Manual does not address the end user. It is intended as a source of information for the equipment or system manufacturer only, and it will tell you how to install, use and maintain your LINAK electronics. The manufacturer of the end product has the responsibility to provide a User Manual, where relevant safety information from this manual is passed on to the end user.

We are convinced that your LINAK product/system will give you many years of problem-free operation.

Before our products leave the factory, they undergo both function and quality testing. Should you, nevertheless, experience problems with your product/system, you are always welcome to contact your supplier.

LINAK subsidiaries and some distributors situated all over the world have authorised service centres, which are always ready to help you. Locate your local contact information on the back page.

LINAK provides a warranty on all products. (See warranty section).

This warranty, however, is subject to correct use in accordance with the specifications, maintenance being done correctly, and any repairs being carried out at a service centre, which is authorised to repair LINAK products.

Changes in installation and use of LINAK systems can affect their operation and durability. The products may only be opened by authorised personnel.

This User Manual has been written based on the present technical knowledge. LINAK reserves the right to carry out technical modifications and keeps the associated information updated.

**LINAK A/S**

## Terms of use

LINAK® takes great care in providing accurate and up-to-date information on its products. However, the user is responsible for determining the suitability of LINAK products for a specific application.

Due to continual development, LINAK products are subject to frequent modifications and changes. LINAK reserves the rights to conduct modifications, updates, and changes without any prior notice. For the same reason, LINAK cannot guarantee the correctness and actual status of imprinted information on its products.

LINAK uses its best efforts to fulfil orders. However, for the reasons mentioned above, LINAK cannot guarantee availability of any particular product at any given time. LINAK reserves the right to discontinue the sale of any product displayed on its website or listed in its catalogues or in other written material created and produced by LINAK, LINAK subsidiaries, or LINAK affiliates.

All sales are subject to the 'Standard Terms of Sale and Delivery for LINAK A/S' available on LINAK websites.

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## Introduction

Powerful electric linear actuator designed to handle high loads and demanding environments. It delivers long-lasting reliability as well as a wide choice of industrial control interfaces.

## Safety instructions

Please read this safety information carefully.

Be aware of the following three symbols throughout the document:



### **Warning!**

Failing to follow these instructions can cause accidents resulting in serious personal injury.



### **Recommendations**

Failing to follow these instructions can result in the actuator suffering damage or being ruined.



### **Additional information**

Usage tips or additional information that is important in connection with the use of the actuator.

Furthermore, ensure that all staff who are to connect, mount, or use the actuator are in possession of the necessary information and that they have access to this document.

Persons who do not have the necessary experience or knowledge of the product/products must not use the product/products. Besides, persons with reduced physical or mental abilities must not use the product/products, unless they are under surveillance or they have been thoroughly instructed in the use of the apparatus by a person who is responsible for the safety of these persons.

Moreover, children must be under surveillance to ensure that they do not play with the product.

### **Before you start mounting/dismounting, ensure that the following points are observed:**

- The actuator is not in operation.
- 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 mounted as indicated in the relevant user instructions.
- The equipment can be freely moved over the actuator's whole working area.
- The actuator is connected to a mains electricity supply/transformer with the correct voltage and which is dimensioned and adapted to the actuator in question.
- Ensure that the voltage applied matches to the voltage specified on the actuator label.
- Ensure that the connection bolts can withstand the wear.
- Ensure that the connection bolts are secured safely.

**During operation, please be aware of the following:**

- Listen for unusual sounds and watch out for uneven running. Stop the actuator immediately if anything unusual is observed.
- Do not sideload the actuator.
- Only use the actuator within the specified working limits.
- Do not step on or kick the actuator.

**When the equipment is not in use:**

- Switch off the mains supply in order to prevent unintentional operation.
- Check regularly for extraordinary wear.

**Classification**

The equipment is not suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide.

**Warnings**

- Do not sideload the actuator.
- When mounting the actuator in the application ensure that the bolts can withstand the wear and that they are secured safely.
- If irregularities are observed, the actuator must be replaced.

**Recommendations**

- Do not place load on the actuator housing.
- Prevent impact or blows, or any other form of stress to the housing.
- Ensure that the cable cover is mounted correctly. Use 3.5 Nm torque.
- Ensure that the duty cycle and the usage temperatures for LA77 actuators are respected.
- Ensure that the cable cannot be squeezed, pulled or subjected to any other stress.
- Furthermore, it will be good practice to ensure that the actuator is fully retracted in the "normal" position. The reason is that there will be a vacuum inside the actuator if it is extended which over time can lead to water entering the actuator.

## Features

- Protection class: IP66 for outdoor use (dynamic). Furthermore, the actuator can be washed down by a high pressure cleaner (IP69K - static)
- Highly efficient acme thread spindle
- Static holding load up to 45 kN in push and pull
- Dynamic wind stress loads 15 kN push/pull 100,000 times
- Hand crank for manual operation
- Integrated brake, high self-lock ability
- Endplay - 2 mm max.
- Non-rotating piston rod eye
- Noise level: 76 dB (A). Measuring method: DS/EN ISO 8746 (actuator not loaded)
- Built-in Zero Point initialisation
- Heavy duty aluminium housing for harsh conditions
- Hall effect sensor for precise positioning
- Current monitoring

## Options in general

- 24 / 48 V DC Brushless motor
- Load from 10,000 N - 15,000 N
- Max. speed 7 mm/sec. depending on load and spindle pitch
- Stroke length from 100 mm to 600 mm
- Back fixture turnable in steps of 30 degrees
- Different back fixtures and piston rod eyes
- Exchangeable cables in different lengths
- Analogue or digital feedback for precise positioning
- Endstop reached signals
- IC options (see specific platform manuals at the [TECHLINE webpage](#) for Connection Diagrams and I/O Specifications) including:
  - I/O
  - Ethernet/IP
  - Modbus TCP/IP
  - Modbus RTU
  - IO-Link
  - CAN bus
  - CANopen
- PC configuration tool (Actuator Connect™ and BusLink)



For more information about I/O, please see the [I/O interface user manual](#)

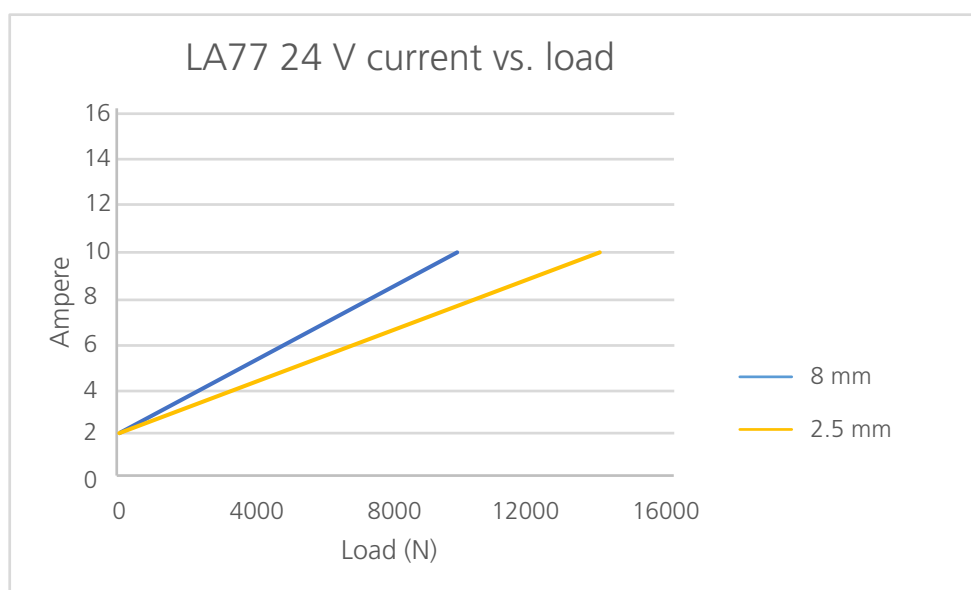
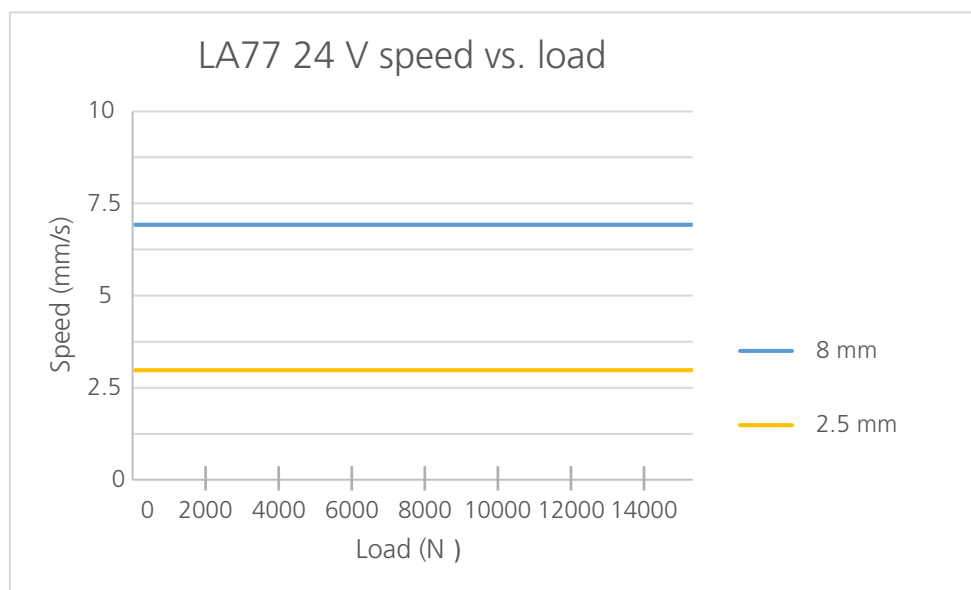
## Usage

- Duty cycle for actuators with a 0-600 mm stroke length is 10%
- Duty cycle for actuators with a 601-1,000 mm stroke length (special item) is 5%
- Ambient operating temperature:
  - Full performance from +5°C to +40°C
  - 25°C to +65°C for IECEx/ATEX T135
  - 30°C (reduced load 50%) to + 85°C (reduced duty cycle 10%)
  - 40°C (no load)
- Storage temperature:
  - 40 °C to +70 °C
  - Actuator is not activated/connected. -40°C to +85°C for 72 hours
  - 55°C to +105°C for 24 hours for Integrated Control platform
- Acclimatization before usage.
- Relative humidity:
  - Full performance from 20 % to 80 % - non-condensing
  - (Actuator is not activated/connected)
- Cyclic state:
  - 93 % to 98 % - non-condensing +25°C to +55°C for 12 hours
- Steady state:
  - 93 % to 95 % - non-condensing +40°C for 56 Days
- Atmospheric pressure:
  - 700 to 1060 hPa
- Meters above sea level:
  - Max. 3000 meters



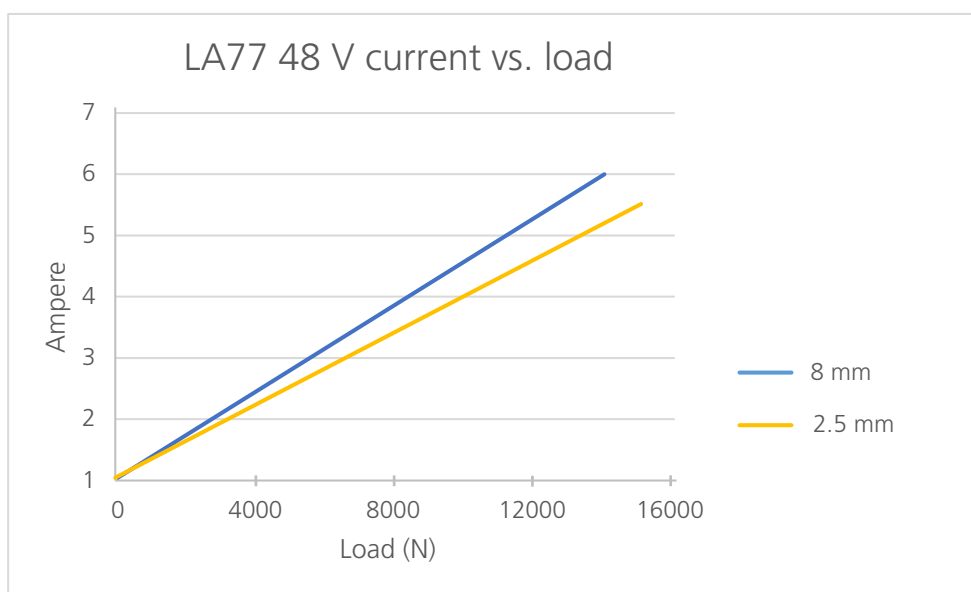
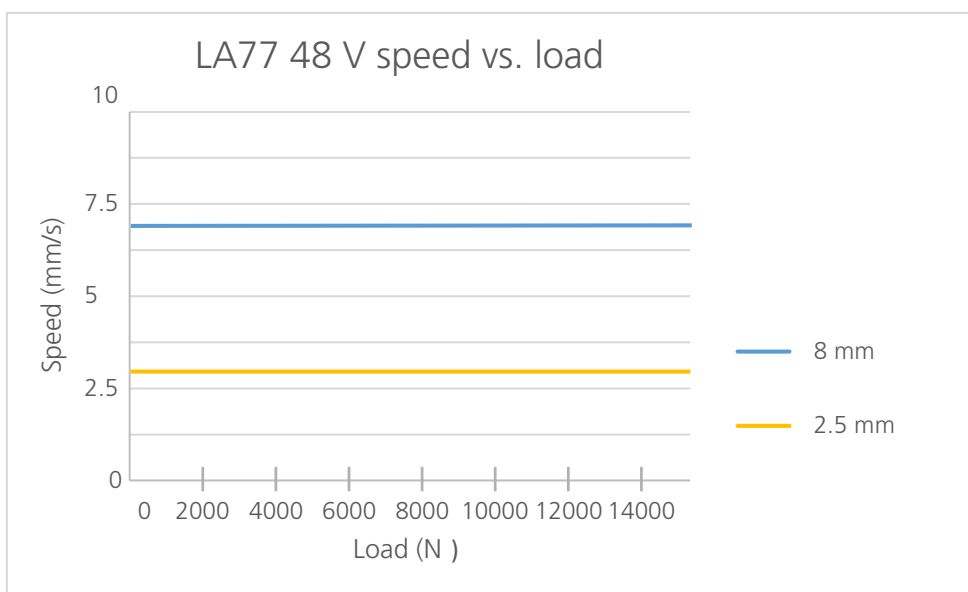
## Speed and current curves

The typical values below are made with a stable power supply of 24 V DC and an ambient temperature of 20°C.



## Speed and current curves

The typical values below are made with a stable power supply of 48 V DC and an ambient temperature of 20°C.



Current limits

Platform	Movement	24 V	48 V	Temperature
All	Outwards	14 A	10 A	Above
	Inwards	14 A	10 A	
	Reference temperature 0°C			Below
	Outwards	26 A	13 A	
	Inwards	26 A	13 A	

## Mounting guidelines

LINAK® linear actuators are quickly and easily mounted by slipping pins through the holes on each end of the units and into brackets on the machine frame and the load.

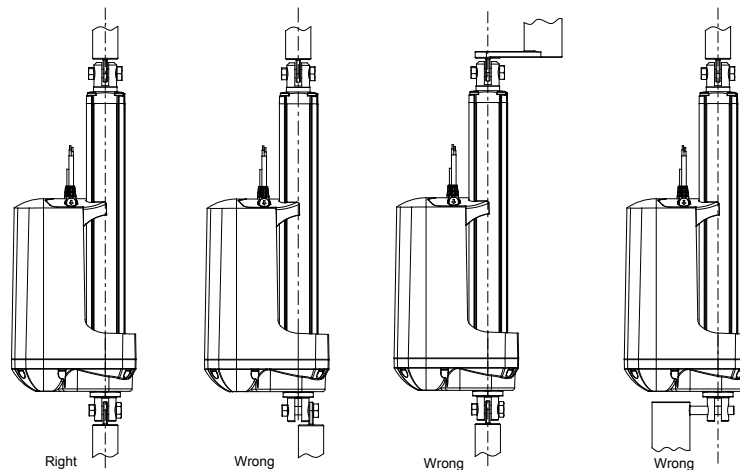
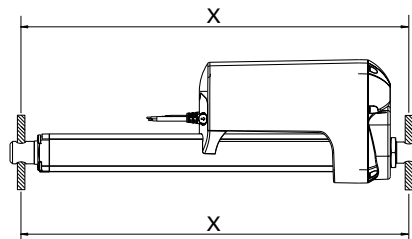
The mounting pins must be parallel to each other as shown in the upper figure. Pins which are not parallel to each other may cause the actuator to bend and be damaged.

The load should act along the stroke axis of the actuator since off centre loads may cause bending and lead to premature failure.

Make sure the mounting pins are supported in both ends. Failure to do so could shorten the life of the actuator. Cantilever mounts are unacceptable.

The actuator can rotate around the pivot point in the front and rear end. If this is the case, it is of high importance that the actuator is able to move freely over the full stroke length, both during the development and daily operation. Please pay special attention to the area around the housing where parts can be trapped and cause damages to the application and actuator.

In applications with high dynamic loads, LINAK recommends not to use the fully extended or retracted position over longer time, as this can damage the endstop system permanently.



## Mounting guidelines

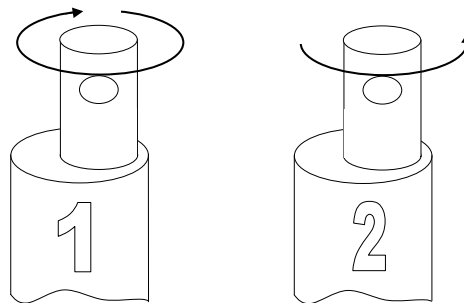


- The mounting pins must have the correct dimension.
- The bolts and nuts must be made of a high quality steel grade (e.g. 10.8). No thread on the bolt inside the back fixture or the piston rod eye.
- Bolts and nuts must be protected so there is no risk for them to fall out.
- Do not use a torque that is too high when mounting the bolts for the back fixture or the piston rod eye. This will stress the fixtures.

**Please note:** The piston rod eye is only allowed to turn 0-90 degrees.

### Instruction concerning the turning of the piston rod eye and inner tube:

- When mounting and taking into use, it is not permitted to make excessive turns of the piston rod eye. In cases where the eye is not positioned correctly, it is permitted to first screw the eye down to its bottom position, at a maximum torque of 2 Nm (1), and thereafter a maximum 90 degrees turn outwards again (2).
- As the piston rod eye can turn freely, it is important to ensure that the eye cannot rotate if the actuator is used in a pull application. If this happens, the actuator will be pulled apart and destroyed.



### Warning!

**If the actuator is used for pull in an application where personal injury can occur, the following is valid:**

It is the application manufacturer's responsibility to incorporate a suitable safety arrangement, which will prevent personal injury from occurring, if the actuator should fail.



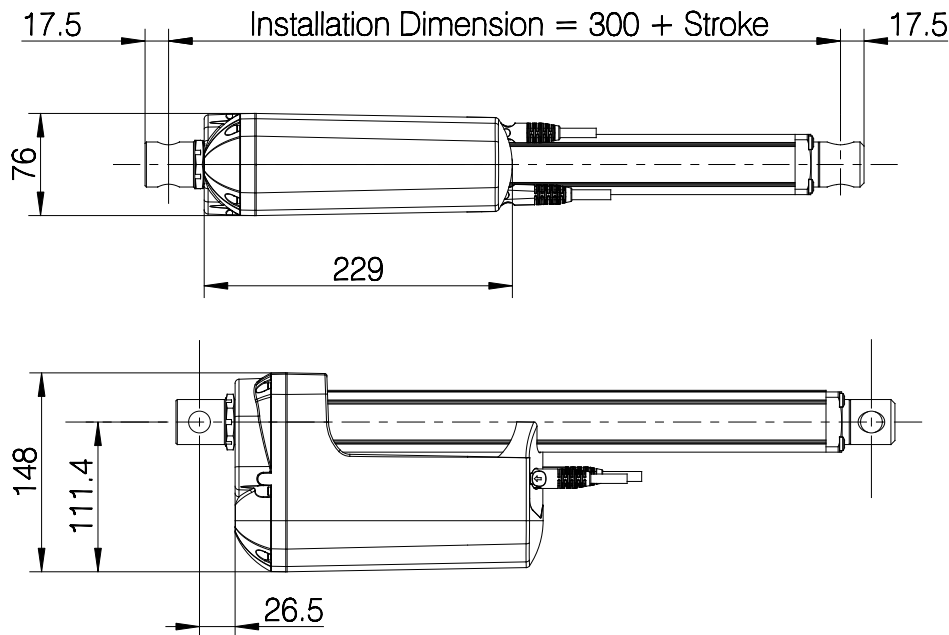
### Warning!

**LINAK® actuators are not designed for use within the following fields:**

- |                                 |                            |
|---------------------------------|----------------------------|
| • Offshore installations        | • Explosive environments   |
| • Aeroplanes and other aircraft | • Nuclear power generation |

## Built-in dimensions

All dimensions are in mm

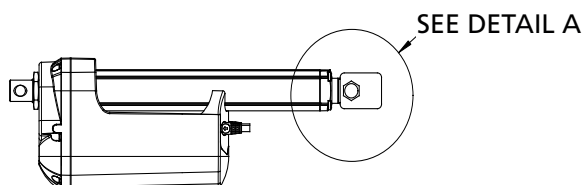


The above dimensions apply for all LA77 piston rod eyes and back fixtures.

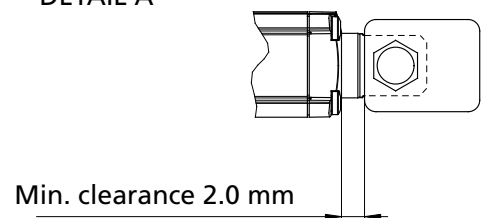
## Keep a clearance when mounting a bracket



When mounting a custom bracket on the moving part of the actuator, please observe the minimum clearance between bracket and cylinder top when fully retracted. This will prevent jamming and destruction of the actuator drive train.



DETAIL A



With Zero Point the minimum stroke is 70 mm.

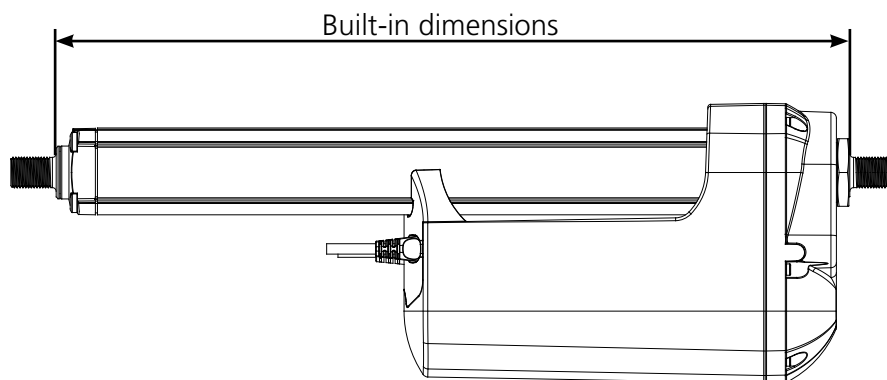
The Zero Point initialisation zone is located between 35-70 mm going from the most inward position. The movement passing the zone has to be stable for the initialisation to succeed - also, no virtual limits can be set in the initialisation zone.

## Built-in dimensions

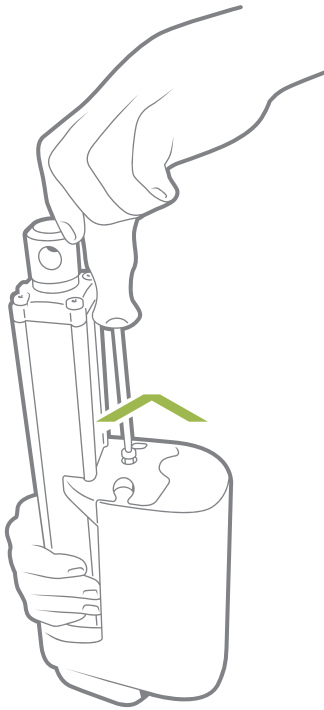
The built-in dimension depends on the chosen safety option and stroke length(s).

	Piston rod	Ball eye Ø20 H7 / to the centre of the hole	Ball eye Ø19.2 / to the centre of the hole	Solid Ø16.2 mm / to the centre of the hole	Solid Ø19.2 mm / to the centre of the hole	Male adapter M16 X 1.5 / from the surface	Male adapter M20 X 1.5/ from the surface
<b>Back fixture</b>		Stroke from 100 to 600	Stroke from 100 to 600	Stroke from 100 to 600	Stroke from 100 to 600	Stroke from 100 to 600	Stroke from 100 to 600
<b>Solid Ø16.2 mm (0° and 90°) / to the centre of the hole</b>		316 + stroke	316 + stroke	300 + stroke	300 + stroke	287 + stroke	287 + stroke
<b>Solid Ø19.2 mm (0° and 90°) / to the centre of the hole</b>		316 + stroke	316 + stroke	300 + stroke	300 + stroke	287 + stroke	287 + stroke
<b>Male adapter M20 / from the surface</b>		297 + stroke	297 + stroke	281 + stroke	281 + stroke	267 + stroke*	267 + stroke*

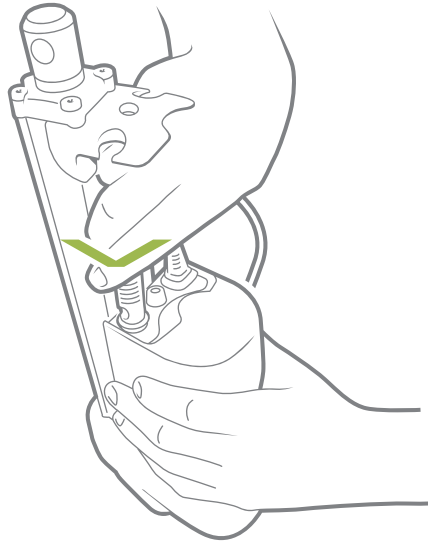
\* These built-in dimensions are measured according to the illustration below.



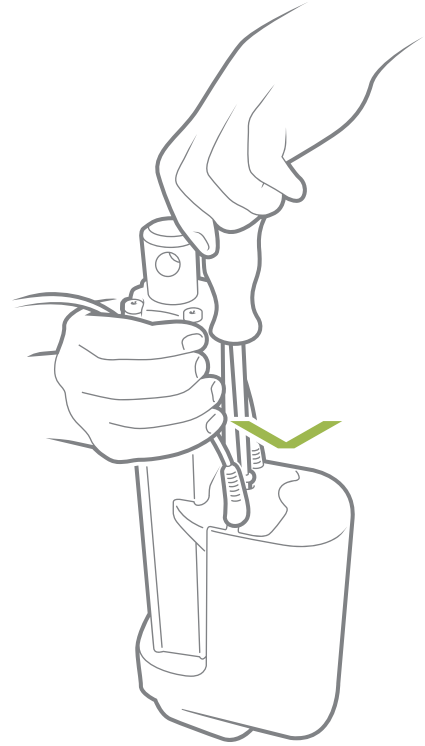
## Cable mounting



1. Unscrew the cover and remove the two blind plugs.



2. Plug in the power cable and/or the signal cable.



3. Slide the cover onto the actuator.

The torque of the cover screw is approx.  $3.5 \pm 0.3$  Nm

TORX 25IP



When changing the cables on a LINAK® actuator, it is important that this is done carefully, in order to protect the plugs and pins. Before the new cable is mounted, we recommend that the socket is greased with Vaseline®, to keep the high IP protection and ensure an easy mounting. Please be sure that the plug is in the right location and fully pressed in before the cable lid is mounted.

Remove the tinned cable end when the cable end is mechanically connected. The tinned end is only to be used when a soldered connection is made.

Please note that if the cables are mounted and dismantled more than 3 times, the plugs can be damaged. Therefore, we recommend that such cables are discarded and replaced. Also note that the cables should not be used for carrying the actuator.

We recommend taking some precaution and designing the wire connection in a way, where the cable end is kept inside a closed, protected area to guarantee the high IP protection.



## Manual hand crank

The manual hand crank can be used in the case of a power failure and is only intended for emergency use.



The cover over the Allen key socket must be unscrewed before the Allen key can be inserted and the hand crank operated.

Hand crank torque: 6-8 Nm

Hand crank RPM: Max. 65

Piston rod movement per turn: Gear H = 4.0 mm



- The power supply has to be disconnected during manual operation.
- If the actuator is operated as a hand crank, it must only be operated by hand - otherwise there is a potential risk of overloading and thereby damaging the actuator. Do NOT use power tools to operate the hand crank!
- After using the hand crank, the ingress protection IP66 cannot be maintained.
- After using the hand crank, always return the actuator to the most inward position. Failing to do so can damage the actuator or the application it is used for.
- Actuators with absolute positioning must be initialised after use of the manual hand crank, because their positioning will be displaced when the power is disconnected.



## DECLARATION OF CONFORMITY

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hereby declares that

Actuator    36\*\*\*\*\*142\*-\*\*\*\*\* , 36\*\*\*\*\*144\*-\*\*\*\*\* , 36\*\*\*\*\*0B2\*-\*\*\*\*\* ,  
                  36\*\*\*\*\*0B4\*-\*\*\*\*\* , 36\*\*\*\*\*E2\*-\*\*\*\*\* , 36\*\*\*\*\*E4\*-\*\*\*\*\* ,  
                  36\*\*\*\*\*A72\*-\*\*\*\*\* , 36\*\*\*\*\*A74\*-\*\*\*\*\* , 36\*\*\*\*\*A82\*-\*\*\*\*\* ,  
                  36\*\*\*\*\*A84\*-\*\*\*\*\*

                 76\*\*\*\*\*142\*-\*\*\*\*\* , 76\*\*\*\*\*144\*-\*\*\*\*\* , 76\*\*\*\*\*0B2\*-\*\*\*\*\* ,  
                  76\*\*\*\*\*0B4\*-\*\*\*\*\* , 76\*\*\*\*\*E2\*-\*\*\*\*\* , 76\*\*\*\*\*E4\*-\*\*\*\*\* ,  
                  76\*\*\*\*\*A72\*-\*\*\*\*\* , 76\*\*\*\*\*A74\*-\*\*\*\*\* , 76\*\*\*\*\*A82\*-\*\*\*\*\* ,  
                  76\*\*\*\*\*A84\*-\*\*\*\*\*

                 37\*\*\*\*\*142\*-\*\*\*\*\* , 37\*\*\*\*\*144\*-\*\*\*\*\* , 37\*\*\*\*\*0B2\*-\*\*\*\*\* ,  
                  37\*\*\*\*\*0B4\*-\*\*\*\*\* , 37\*\*\*\*\*E2\*-\*\*\*\*\* , 37\*\*\*\*\*E4\*-\*\*\*\*\* ,  
                  37\*\*\*\*\*A72\*-\*\*\*\*\* , 37\*\*\*\*\*A74\*-\*\*\*\*\* , 37\*\*\*\*\*A82\*-\*\*\*\*\* ,  
                  37\*\*\*\*\*A84\*-\*\*\*\*\*

                 77\*\*\*\*\*142\*-\*\*\*\*\* , 77\*\*\*\*\*144\*-\*\*\*\*\* , 77\*\*\*\*\*0B2\*-\*\*\*\*\* ,  
                  77\*\*\*\*\*0B4\*-\*\*\*\*\* , 77\*\*\*\*\*E2\*-\*\*\*\*\* , 77\*\*\*\*\*E4\*-\*\*\*\*\* ,  
                  77\*\*\*\*\*A72\*-\*\*\*\*\* , 77\*\*\*\*\*A74\*-\*\*\*\*\* , 77\*\*\*\*\*A82\*-\*\*\*\*\* ,  
                  77\*\*\*\*\*A84\*-\*\*\*\*\*

(The '\*' in the product description can either be a character or a number, thereby defining the variation of the product)

complies with the EMC Directive 2014/30/EU according to following standards:  
 EN 61000-6-2:2019, EN 61000-6-4:2019

complies with the ATEX Directive 2014/34/EU according to following standards:  
 EN IEC 60079-0:2018, EN 60079-31:2014  
 TÜV NORD CERT GmbH, Notified Body No. 0044. Certificate Number TÜV 15 ATEX 143747 X

complies with the RoHS2 Directive 2011/65/EU according to the standard:  
 EN 63000:2018

Nordborg, 2024-08-29

**LINAK A/S**  
 John Kling, B.Sc.E.E.  
 Regulatory Affairs Manager  
 Authorized to compile the relevant technical documentation

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Original Declaration

## DECLARATION OF INCORPORATION OF PARTLY COMPLETED MACHINERY

LINAK A/S  
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DK - 6430 Nordborg

LINAK A/S hereby declares that LINAK DESKLINE® products, characterised by the following models and types:

Control Boxes	CBD6S
Linear Actuators	DB5, DB6, DB14, LA23, LA31
Lifting Columns	DL1A, DL2, DL4S, DL5, DL6, DL8, DL9, DL10, DL11, DL12, DL14, DL15, DL16, DL17, DL18, DL19, DL20, DL21, BASE1, LC1
Desk Panels	DPA, DPB, DPH, DPF, DPG, DPT, DP, DP1CS, DPI
Wireless Controls	BP10
Accessories	BA001, BLE2LIN, CHUSB, DESK Sensor, DF2, Kick & Click, SLS, SMPS, USB2LIN, WiFi2LIN, DC Connector, RFRL

LINAK A/S hereby declares that LINAK HOMELINE® products, characterised by the following models and types:

Control Boxes	CBD6DC
Linear Actuators	LA10, LA18, LA40 HOMELINE
Dual Actuators	TD4, TD5
Controls	BP10, HC10, HC20, HC40
Accessories	BA002, CP, BLE2DC, BLE2LIN, LED Light Rail, MD1, SMPS, WiFi2LIN

LINAK A/S hereby declares that LINAK MEDLINE® & CARELINE® products, characterised by the following models and types:

Control Boxes	CA10, CA20, CA30, CA40, CA63, CAL40, CB6, CB6S, CB6P2, CB8, CB9, CBJ2, CBJ Care, CBJ Home, CO41, CO53, CO61, CO65, CO71, COL50, OPS, PJ2, PJB4
Linear Actuators	LA20, LA23, LA24, LA27, LA28, LA29, LA30, LA31, LA34, LA40, LA44
Lifting Columns	BL1, LC1, LC3
Controls	ABL, ACC, ACK, ACO, ACOM, ACL, DP, DPH, FS, FS3, FPP, HB30, HB70, HB80, HB100, HB190, HB200, HB400, HD80, HL70, HL400
Accessories	BA16, BA18, BA19, BA22, BAJ, BAJL, BAL40, BAL50, CH01, CHJ2, CHL40, CHL50, DJB, LIN2OB, MJB2, MJB5 Plus, Massage Motor, PJB4, QLCI2, SLS, SMPS10, UBL, UBL2, UBL4 Motion, USB-A Power Adapter

LINAK A/S hereby declares that LINAK TECHLINE® products, characterised by the following models and types:

Linear Actuators	LA12, LA14, LA23, LA25, LA30, LA33, LA35, LA36, LA37, LA76, LA77
Lifting Columns	LC3 IC
Accessories	FMB

comply with the following parts of the Machinery Directive 2006/42/EC, ANNEX I, Essential health and safety requirements relating to the design and construction of machinery: 1.5.1 Electricity supply

The relevant technical documentation is compiled in accordance with part B of Annex VII and this documentation or part hereof will be transmitted by post or electronically to a reasoned request by the national authorities.

**This partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive 2006/42/EC where appropriate.**

Nordborg, 2024-07-10



**LINAK A/S**

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Original declaration

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