

Linear Actuator LA76 **User Manual**





Contents

Preface	
Terms of use	4
Introduction	5
Safety instructions	5
Features	
Options in general	7
Usage	
Speed and current curves	g
Current limits	11
Mounting guidelines	12
Built-in dimensions	14
Keep a clearance when mounting a bracket	14
Cable mounting	
Label for LA76	
Decleration of Conformity	
Contacts	22

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. LINAK and the LINAK logotype are registered trademarks of LINAK A/S. All rights reserved.



Introduction

Versatile electric linear actuator that delivers both robustness and long-term reliability. It excels in challenging environments and is a wise choice for a wide array of industrial machinery and applications that require high-level performance.

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
- Hand crank for manual operation
- Integrated brake with high self-lock ability
- Endplay: max. 3.5 mm
- Non-rotating piston rod eye
- Noise level: 73 dB (A). Measuring method: DS/EN ISO 3746 (actuator not loaded)
- Built-in Zero Point positioning
- 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 500 N 6,800 N depending on gear ratio and spindle pitch
- Max. speed 160 mm/sec. depending on gear ratio and spindle pitch
- Stroke length from 100 to 1,200 mm
- Back fixture turnable in steps of 30 degrees
- Exchangeable cables in different lengths
- When ordering AISI (304 and up) piston rod eye and back fixture, stainless steel screws are automatically included
- Endstop reached signals
- IC options (see specific interface user manuals at the <u>TECHLINE webpage</u> 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™)



Usage

• Duty cycle up to 600 mm stroke: max. 10% (2 min. drive and 18 min. rest)

• Duty cycle at 601-999 mm stroke: max. 5% (1 min. drive and 19 min. rest)

• Ambient operating temperature (AOT): Full performance from +5°C to +40°C

-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 +95°C for 24 hours for Standard platform

-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

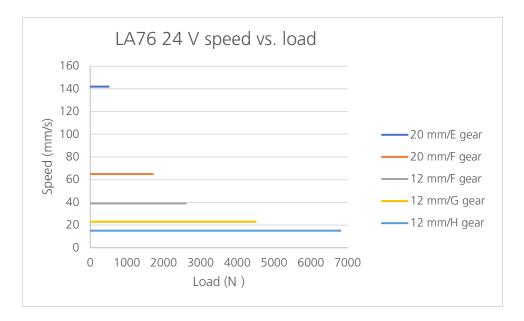
• Steady state 93 % to 95 % - non-condensing +40°C for 56 Days

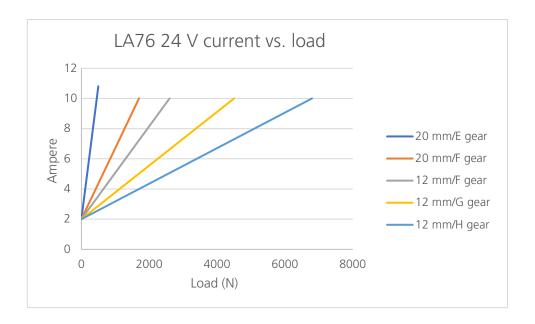
• Atmospheric pressure: 700 to 1060 hPa

• Meters above sea level: Max. 3000 meters

Speed and current curves

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

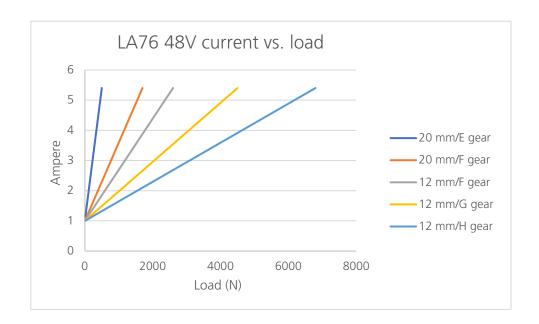




Speed and current curves

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







All measurements above describe the spindle pitch (e.g. 20mm) and the gear type (e.g. H gear) of the actuator.

Current limits

Platform	24 V	48 V	Reference temperature: 0°C
All	13 A	8 A	Above
	26 A	13 A	Below

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.

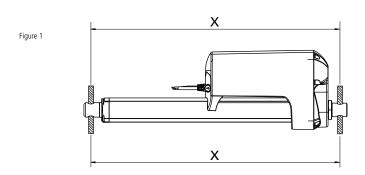
The mounting pins must be parallel to each other as shown in Figure 1. Pins, which are not parallel to each other, may cause the actuator to bend and be damaged.

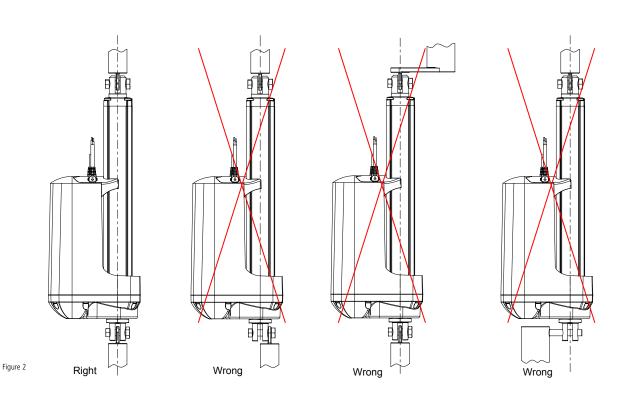
The load should act along the stroke axis of the actuator since off centre loads may cause bending and lead to premature failure. See Figure below.

Make sure the mounting pins are supported in both ends. Failure to do so could shorten the life of the actuator. Also, avoid applying a skew load on the actuator.

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 during 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 forces LINAK recommends not to use the fully extended or retracted position over longer time, as this can damage the endstop system permanently.







Please be aware that if the actuator is used for solar applications the actuator must be mounted with the motor housing turned upwards and the wires pointing downwards.



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.

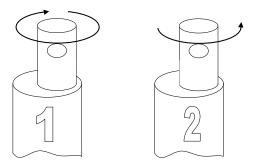


Please note:

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:

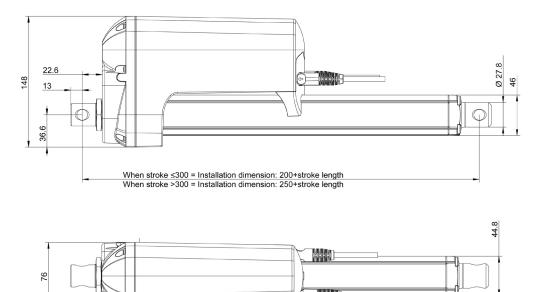
Offshore installations

- Explosive environments
- Aeroplanes and other aircraft
- Nuclear power generation



Built-in dimensions

All dimensions are in mm



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

229

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, to avoid jamming and destruction of actuator drive train.



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.

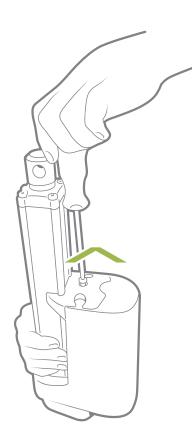
The movement passing the zone has to be stable for the initialisation to succeed. No virtual limits can be set in the initialisation zone.

Built-in dimensions

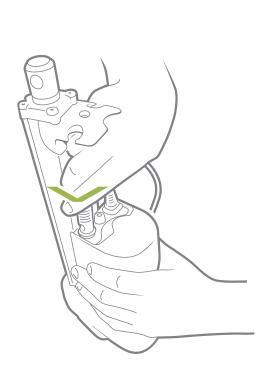
All dimensions are in mm

	Back fixture						
Length of stroke		<=300	>300	<=300	>300	<=300	>300
Piston rod eye		Inner thread - from the surface		Solid or slotted fixture - to center of the hole		Outer thread - from the surface	
	Inner thread - from the surface	189	239	195	245	180	230
	Solid or slotted fixture - to center of the hole	194	244	200	250	185	235
	Outer thread - from the surface	181	231	187	237	173	223
	Ball eye - to center of the hole	209	259	215	265	200	250

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 ± 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 dismounted 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:			
	12 mm	20 mm	
Gear F	11 mm	18 mm	
Gear G	6 mm	10 mm	
Gear H	4 mm	7 mm	
Gear E	-	27 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.



Label for LA76



Designed in Denmark DK - 6430 Nordborg

:76120200A0F34B=614H30387ACS000

Item No. 76XXXX-XX Prod Date 2024.05.14

Max Load : Push 6800 N / Pull 6800 N IP66

Power Rate: 48 V=, Max.8 A Duty Cycle: 20%, Max 4 min. / 16 min.

Model: LA76IO; FCC ID: XBE-LAXXIO; IC: 12338B-LAXXIO











Type: 76120200A0F34B-614H30387ACS000

Describes the basic functionality of the product

Item no.: 76XXXX-XX Sales and ordering code

3. Prod. Date: YYYY.MM.DD

Production date describes when the product has been produced. This date is the reference for warranty claims

Max Load: Push 6800 N / Pull 6800 N IP66

Describes the maximum load that the product can be exposed to in compression and tension. This line also contains a reference to the product's IP protection degree

Power Rate: 48 V DC / Max. 8 Amp

Input voltage for the product and maximum current consumption

Duty Cycle: 20%, Max. 4 min. / 16 min.

The duty cycle defines the maximum period during operation without interruption. After operation, a pause must be observed. It is important that the operator follows the instructions of the duty cycle; otherwise, a possible overload may result in reduced product life/errors

7. W/O: # -0001

The LINAK work order followed by a unique sequential identification number

Decleration of Conformity





DECLARATION OF CONFORMITY

LINAK A/S Smedevænget 8

DK - 6430 Nordborg

hereby declares that

Actuator	36********B31*-************, 36*******B32*-**********, 36*********B34*-*********, 36*********, 36*********, 36********, 36*********, 36********, 36*********, 36*********, 36*********, 36*********, 36*********, 36*********, 36*********, 36*********, 36*********, 36*********, 36*********, 36**********
	76*******B32*=************, 76******B34*=**********, 76******F32*=***********, 76********, 76**********, 76**********
	37******B31*-************, 37*******B32*-**********, 37*******B34*-***********, 37********, 37*********, 37*********, 37**********
	77******B32*=**************, 77*******B34*=*************, 77******F32*=***********, 77*******F34*=*******************, 77**********, 77********

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

complies with the Radio Equipment Directive (RED) 2014/53/EU according to following standards:

EN 300 328 V2.2.2. (2019-07)

EN 301 489-1 V2.2.3 (2019-11), EN 301 489-17 V3.2.4 (2020-09)

EN IEC 62368-1:2020

EN 62479:2010

EN 50663:2017

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

Additional information:

The system does comply with the selected parts of the standards:

EN IEC 61000-6-2:2019, Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN IEC 61000-6-4:2019: Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

Nordborg, 2024-08-26

LINAK A/S

John Kling, B.Sc.E.E. Regulatory Affairs Manager

John Eling

Authorized to compile the relevant technical documentation

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







DECLARATION OF CONFORMITY

LINAK A/S Smedevænget 8

DK - 6430 Nordborg

hereby declares that

Actuator	36*********0B4*-**************, 36*****************, 36**********
	76*********0B4*=**************, 76********144*=***************, 76********0B2*=**************, 76************, 76**********
	37*******0B2*-****************************
	77*******142*=****************************

(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

John Eling

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 Smedevænget 8 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, LC

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

John Eling





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