

DL5/DL6 systems User manual



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Preface

Dear User,

We are delighted that you have chosen a product from LINAK[®]. LINAK systems are high-tech products based on many years of experience in the manufacture and development of actuators, electric control boxes, controls and chargers.

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

We are sure that your LINAK product/system will give you many years of problem-free operation. Before our products leave the factory they undergo full function and quality testing. Should you nevertheless experience problems with your LINAK product/system, you are always welcome to contact your local dealer. LINAK subsidiaries and some distributors situated all over the world have authorised service centres, which are always ready to help you.

LINAK provides a warranty on all its products. 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 products/systems can affect their operation and durability. The products are not to be opened by unauthorised personnel.

The User Manual has been written based on our present technical knowledge. We are constantly working on updating the information and we therefore reserve the right to carry out technical modifications.

LINAK A/S

Important information

Important information on $\mathsf{LINAK}^{\circledast}$ products can be found under the following headings:



Warning!

Failure to comply with these instructions may result in accidents involving serious personal injury.



Failing to follow these instructions can result in the product being damaged or being destroyed.

Safety instruction



General

Safe use of the system is possible only when the operating instructions are read completely and the instructions contained are strictly observed.

Failure to comply with instructions marked with the "NOTE" symbol may result in serious damage to the system or one of its components.



It is important for everyone who is to connect, install, or use the systems to have the necessary information and access to this User Manual. Follow the instructions for mounting – risk of injury if these instructions are not followed.



The appliance is not intended for use by young children or infirm persons without supervision.



If there is visible damage on the product it must not be installed.



Note that during construction of applications, in which the actuator is to be fitted, there must be no possibility of personal injury, for example the squeezing of fingers or arms.



Assure free space for movement of application in both directions to avoid blockade.

Before installation, re-installation, or troubleshooting:

- Stop the DL5/DL6
- Pull out the mains plug.
- Relieve the DL5/DL6 of any loads, which may be released during the work.

Before start-up:

- Make sure that the system has been installed as instructed in this User Manual.
- Make sure that the voltage of the control box is correct before the system is connected to the mains.
- System connection. The individual parts must be connected before the control box is connected to the mains. See the User Manual for LINAK actuators, if necessary.

During operation

- If the control box makes unusual noise or smells, switch off the mains voltage immediately.
- Take care that the cables are not damaged.
- Unplug the mains cable on mobile equipment before it is moved.
- The products must only be used in an environment, that corresponds to their IP protection.

Misc.

The actuator system has a sound level below 55dB(A) in typical applications.

Updated manuals and declarations can always be found here: www.linak.com/deskline

Only for EU markets



This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.



Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.

Only for Non EU markets



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, sensory 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.



It is the operator's responsibility to ensure that there is free space for the n application to move without risk for the operator or bystanders before operating the application.

Misuse



Do not overload the actuators - this can cause danger of personal injury and A damage to the system.



Do not use the actuator system for lifting persons. Do not sit or stand on a Lable while operating – risk of personal injury.



Do not use the system in environments other than the intended indoor use

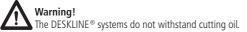
Repairs

In order to avoid the risk of malfunction, all DESKLINE[®] repairs must only be carried out by authorised LINAK workshops or repairers, as special tools must be used and special gaskets must be fitted. Lifting units under warranty must also be returned to authorised LINAK workshops.



Warning!

If any of the DESKLINE[®] products are opened, there will be a risk of subsequent malfunction.



DECLARATION OF INCORPORATION OF PARTLY COMPLETED MACHINERY

LINAK A/S Smedevænget 8 DK - 6430 Nordborg

Herewith declares that LINAK DESKLINE® products as characterized by the following models and types:

Control Boxes	CBD4, CBD5, CBD6, CBD6S
And	
Linear Actuators	LA31, DB4, DB5, DB6, DB7, DB9, DB12, DB14, DB16, LA23
Lifting Columns	DL1A, DL2, DL4, DL5, DL6, DL7, DL8, DL9, DL10, DL11, DL12, DL14, DL15,
	DL16, DL17, LP2, LP3, BASE1
And	
Desk Panels	DP, DPA, DPB, DPH, DPF, DPT, DP1C, DP1K, DP1L, DP1V, DP1U, WDPL1
RF Controls	HB10, HB20, RFR and RFT
And	
Accessories	SLS

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 that 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, 2014-04-10

John Eling

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

Misc. on the DESKLINE® DL5/DL6 system

This system is a DESKLINE system developed for desks and for indoor use in offices. Do not use it in industrial kitchens or in other environments that have to be cleaned with aggressive detergents.

Do not bolt the legs to the floor so that free movement is prevented. This could cause serious damage to the legs in fault situations.

Warranty - 60 months on DESKLINE® (NEW)

This will be valid for all DESKLINE® products produced after the 1st of May 2015.

Products produced before 1st of May 2015 will still be covered by 36 months.

Products used in DESKLINE application: If these products are used in another application, they will be covered by 18 months warranty.

If there is any doubt that returned products are within the warranty period it is to be treated as if they are covered by the warranty. We recommend that you use the date of the Control box or actuator as reference if possible. We will have our purchase no. printed on the label.

Maintenance

Clean dust and dirt on the outside of the system at appropriate intervals and inspect them for damage and breaks. Inspect the connections, cables, and plugs and check for correct functioning as well as fixing points.

Service of double-insulated products:

Class II



A Class II or **double insulated** electrical appliance is one which has been designed in such a way that it does not require a safety connection to electrical earth (US: ground).

The basic requirement is that no single failure can result in dangerous voltage becoming exposed so that it might cause an electric shock and that this is achieved without relying on an earthed metal casing. This is usually achieved at least in part by having two layers of insulating material surrounding live parts or by using reinforced insulation.

There is no earthing/grounding means provided on the product, and no earthing/grounding means is to be added to the product.

In Europe, a double insulated appliance must be labelled "Class II", "double insulated" or bear the double insulation symbol (a square inside another square).

Servicing a double-insulated product requires extreme care and knowledge of the system, and is to be done only by qualified service personnel. Replacement parts for a double-insulated product must be identical to the parts they replace.



The cleaners and disinfectants must not be highly alkaline or acidic (pH value 6-8).

Description of the DESKLINE® DL5/DL6 system

Each DESKLINE® DL5/DL6 lifting units is equipped with a motor and parallel/memory drive is ensured by means of software in the CBD4/CBD5/CBD6 that also takes account of oblique load on the desk. Soft start and stop are also part of this software, which ensures a soft start and stop when adjusting the desk.

Application of the DESKLINE® DL5/DL6 system:

Irrespective of the load the **duty cycle 10%** ~ 6 min./ hour or max. 2 min. at continuous use stated in the data sheets, must **NOT** be exceeded as this will result in a superheating of the motor, the brake and the spindle nut. Exceeding the duty cycle will result in a dramatic reduction of the life of the system.

The DESKLINE® DL5/DL6 system range contains the following products:

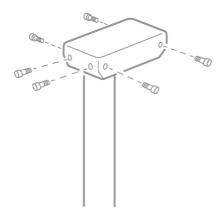
- 1 control box CBD4/CBD5/CBD6
- 1 single DL5/DL6 or 2, 3, or 4 parallel
- 1 exchangeable mains cable
- 1, 2, 3, or 4 motor cables
- 1 DP1U/DPF1M (if memory function is required) DP1C/WDPL/DP7/DPF1C (if memory function and display is required) or 1 DPA/DPB/DP1K/DP1V/DPF1K (if only up/down is required) or DPF1D (if display is required).

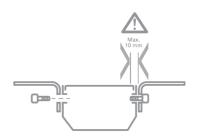
Mounting guidelines for the DESKLINE DL5/DL6 system



The lifting units are normally mounted with the motor housings upwards and pointing towards each other. The steel motor housing is supplied with 6 pcs. of M6 threaded holes meant for mounting on the desk frame.

The motor housing is supplied with 6 pcs. of M6 threaded holes meant for mounting on the desk frame. We advise you to fasten the desk frame by means of 6 pcs. of M6 screws of a good quality and a suitable length, which must not go further than max.10 mm into the motor housing. The thrust moment must not exceed max. 7.5 Nm.





Use all 6 threaded mounting holes M6 for screws. Thrust moment is $7.5 \mbox{Nm}$

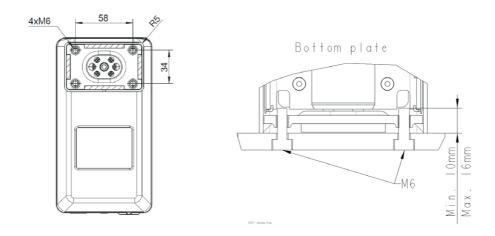
DL5/DL6 motor housing: be aware of the screw length.



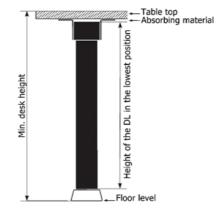
It is recommended to use all 6 M6 threaded holes to mount the desk frame. The values for the bending moments of the lifting units are only valid if the desk frame is mounted in this way. Tests with fixing the motor housing only by means of the 4 threaded holes have proved that this is not enough to obtain a sufficient torsional stability of the desk.

Mounting of the foot part

The DL5/DL6 is supplied with 4 threaded holes M6 for mounting of the foot. We advise you to fasten the foot by means of 4 screws M6 of a good quality (min. 8.8) and of a suitable length; it must go min. 10 mm into the DL5/DL6 column and not further than 16 mm. The thrust moment must not exceed 10 Nm in the bottom plate thread.



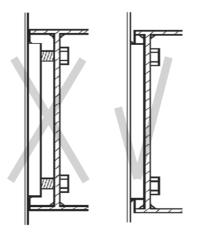
The 4 holes in the bottom of the column are placed from each other 58/34 mm respectively.



Mounting of the desk

As the tabletop amplifies the sound, we advise you to place a vibration/ shock-absorbing material between the tabletop and the desk frame.

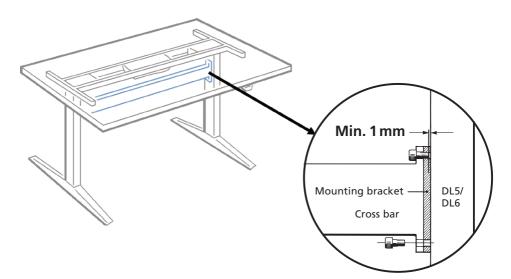
Guidelines for mounting of crossbar





If the crossbar connection is made with a design where the bracket is hidden inside the crossbar profile, you have to make sure that you do not pull out the bracket in the column when tightening the screws for the assembly.

The maximum torque for tightening the 2 x M8 screws in the bracket should not exceed 15 Nm.



Be aware of the length of the screws!

To avoid damage of the lifting unit there must be at least 1 mm space between the ends of the 2 pcs. M8 screws for the mounting bracket and the surface of the lifting unit. Screws that are too long will come into contact with the inner parts. This will result in an irregular operation or even damage the lifting unit.



Placement of a monitor directly above the motor housing may cause malfunction of the monitor. Magnets inside the motor may interrupt the picture on the monitor depending on the distance and type of monitor. If this is the case the problem may be solved by placing an iron plate/tube or another magnetic material, somewhat larger than the motor housing, between the motor, and the tabletop.



The end-stop system in the DL is based on a buffer system meaning that you must be aware of the lengths when initialising. The products must be able to drive:

Inwards direction: built-in dimension - tolerances - 5 mm Outwards direction: built-in dimension + stroke length + tolerances + 5 mm

Mounting guidelines CBD4/CBD5/CBD6

The control box is to be fastened with 4 screws (3 screws for CBD5 and CBD6) with a head diameter between ø 8 and ø 10 mm. Out of regard for the tension surface ø 10 mm is preferable due to lower surface tension. See drawing appendix for placing of mounting holes and the space the CBD takes up.



CBD4 - Control box



CBD5 - Control box



CBD6 - Control box

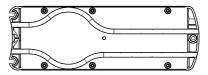
The CBD must not be packed in heat insulating material, but must be placed so that it can emit waste heat into the surroundings. There are no ventilation holes to consider, the CBD emits heat through the surface.

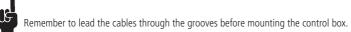
The plug must be visible when the CBD is mounted so that the supply to the CBD can be disconnected at replacement, if any. The mounting screws on the control box must be fastened with a max. torque of 1 Nm.

The mounting surface to which the control box is attached should have a surface evenness of better than \pm 0.5 mm.

CBD5/CBD6 - bottom with cable grooves

The bottom of CBD5/CBD6 is equipped with two cable grooves improving the cable management when mounting. The grooves can be used to bypass the CBD for both motorcables and the mains cable (EU version only) from one side to the other, giving a cleaner design.





For mounting and operation of the desk panel, please see the separate user manual for desk panels.

Electrical connection of the DL5/DL6 system

The DESKLINE® DL5/DL6 system is to be connected as shown on figure 4. Each DL5/DL6 is to be connected to the sockets on the control box by means of the motor cables, which have an 6-pin plug in each end.

Finally, the mains cable is to be mounted and power switched on.



Please note that the control box must only be connected to the voltage stated on the label.

CBD4/CBD5/CBD6 with earth

The CBD4/CBD5/CBD6 earth cable to be mounted on the desk construction (typically the top frame)in a way that ensures good electrical contact. The function of the earth cable is to earth the desk and ground static electricity. The earth connection does not protect other electrical products.



CBD4/CBD5 with mains cut-off (non ZERO models)

If the power cable is damaged it has to be replaced by an authorized LINAK service centre to avoid any danger.



Figure 4

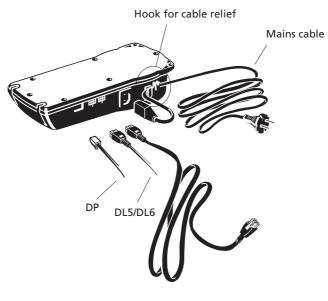


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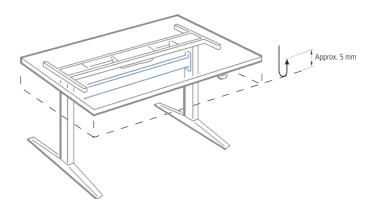
Initialisation of the DESKLINE DL5/DL6 parallel systems

The DESKLINE system is initialised by pressing the down button once or twice and holding it down until DL5/DL6 runs into end stop, it will then automatically run approx. 3 mm out again and hereafter slowly running in again. Only release the down button when the movement has completely stopped.



If the key is released before the sequence is completed then the initialisation is interupted and must be started again from the beginning.

It is sometimes necessary to press the down button twice to start the initialisation this is because the system can be in different modes when the initialisation starts.



The CBD5 and CBD6 can control DL5 and DL6 in 2 parallel while the CBD4 can control DL5 and DL6 in 2, 3, and 4 parallel so that the desk is always kept horizontal.

Anti-Collision™

The function (anti-collision) is an option for the standard CBD4/CBD5/CBD6 advanced/control box software 0077432 version 1.66 and later. A system with anti-collision can limit material damages on a desk if a collision with a solid object should occur.

Enabling the anti-collision

To enable the anti-collision function a little plug called a dongle must be mounted in one of the 2 control ports. The function is only active when the dongle is mounted. – If you remove the dongle again you disable the function.

Method of operation

When the DL/DB's are running the CBD4/CBD5/CBD6 monitors the current consumption on each channel using a special algorithm. If the current consumption on one channel is increased more than a predefined slope, a collision is assumed and all channels are stopped immediately and all DL/DB's will start to run in the opposite direction (approx. 50 mm). This return drive is done automatically and continues with or without any control key pressed (for max. 2.5 sec.).

The anti-collision sensitivity is different in upward and downward direction. Upwards the force is approx. 20 kg. Downwards the load will be approx. 40 kg + the load on the DL/DB (the desk + what is on top of the desk). The 40 kg are needed to activate the anti-collision function.

Situations where the anti-collision does not work

There are situations where the anti-collision will not be activated. These situations are:

- If the collision happens during the initialisation phase
- If the collision happens within the first 1000 msec or after the control button has been released
- If the collision happens between the floor and the table and the load on the desk + the weight of the legs are lower than 40 kg
- If the collision happens over too long time, e.g. if the collision is with a soft object.

DL6 with **PIEZO[™]**: description of the feature

For optimised safety against squeezing and blocking on a desk, LINAK has developed DL6 columns with integrated sensor, called PIEZO. The option minimises the risk for damages on a desk caused by squeezing or blocking of obstacles in up and down direction. Examples could be driving down into an office chair or into a container or up into a windowsill. To a certain extent, the system also increases the personal safety, but it <u>does not</u> comply with legislation describing personal safety.

PIEZO allows the DL6 columns to have the standard built-in dimension and the standard stroke length. There are no visible changes to the column.



Do not use the DL6 with PIEZO in combination with a crossbar or a foot construction where you place the column in a tube welded on the foot.









Examples where PIEZO avoids squeezing situations.

Accessories and repair

Ordering accessories

Order from your nearest LINAK® dealer or subsidiary.

Accessories

Please contact your nearest LINAK dealer for information.

Repairs

Systems should only be repaired by an authorised LINAK service centre or engineer. Systems to be repaired under warranty must be sent to an authorised LINAK service centre.



Warning!

By unauthorised opening of the system there is a risk that it may malfunction at a later date.

Spare parts

Please contact your nearest LINAK dealer for information on spare parts.

Disposal of LINAK's products

As LINAK's customers often ask us how our products can be disposed or scrapped we have prepared this guidance that enables a classification to different waste fractions for recycling or combustion.

Guidance

We recommend our products to be disassembled as much as possible and divided into different waste groups for recycling or combustion.

For example, waste can be sorted into metals, plastics, cable scrap, combustible material, and recoverable resources.

Some of these main groups can be further divided into subgroups; e.g. metal can be divided into steel/aluminium/copper and plastic can be divided into ABS/PA/PE/PP.

As an example, the table below breaks down the different components in LINAK products to various recycling groups:

Product	Components	Recycling group
Columns/ Actuator :	Spindle and motor Plastic housing Cable PCB boards	Scrap Plastic recycling or combustion Cable scrap or combustion Electronics scrap
Control Box :	PCB boards Plastic housing Cable Transformer	Electronics scrap Plastic recycling or combustion Cable scrap or combustion Metal scrap
Handset/Control :	Plastic housing Cable PCB board	Plastic recycling or combustion Cable scrap or combustion Electronics scrap

By now almost all our casted plastic parts are supplied with an interior code for plastic type and fibre contents, if any.

Main groups of disposal

Product main groups	Metal Scrap	Cable scrap	Electronics scrap	Plastic recycling or combustin	Comments
DL5/DL6	Х	Х	Х	Х	
CBD4/CBD5/CBD6	Х	Х	Х	Х	
DPXX		Х	Х	Х	
WDPL		Х	Х	Х	

Disposal of batteries

Details regarding safe disposal of used and leaking batteries:

Batteries should be disposed in accordance with appropriate federal, state and local regulations. LINAK recommends that used or leaking batteries are disposed through local recycling system. Please do not throw used or leaking batteries in normal household waste or in nature. This will cause damage to the environment.

How to deal with leaking batteries.

Leaking batteries should be disposed as described above.

If leaking batteries are discovered in the product the batteries must be removed at once to minimise damage to the product. If leaking batteries are left in the product it might become defect.

It is recommended to use plastic gloves when handeling leaking batteries. The contents of a leaking batteries can cause chemical burns and respiratory irritation.

If exposed to the contents of a leaking battery, please wash with soap and water. If irritation persists, please seek medical attention. In case of eye contact, please flush eyes thoroughly with water for 15 minutes and seek medical attention."

WE IMPROVE YOUR LIFE	
Item No. : DL5000BN0500645 Prod. Date : 2006.05.09 Max Load : 800 N Power Rate : 18 V≕ / 10 Amp Power Rate : 18 V≕ / 10 Amp Duty Cycle : 10%, Max. 2 min./18 min. Not To Be opened by VNAUHORZED PERSONNEL ▲	

Label for CBD4









P.O. 123456 ASSEMBLED IN EU 01

Label for CBD6





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Label for DL6



WE IMPROVE YOUR LIFE

DESIGNED IN DENMARK

Item : CBD4P00020A-009

Op. : 10%, Max. 2 min./18 min.

IDENTICAL REPLACEMENT PARTS

DOUBLE INSULATED - WHEN SERVISING USE ONLY

S.W. P/N .: 0077432 Ver. 1.22

Date : YYYY.MM.DD

U Out: 12-24 V=

CAUTION:

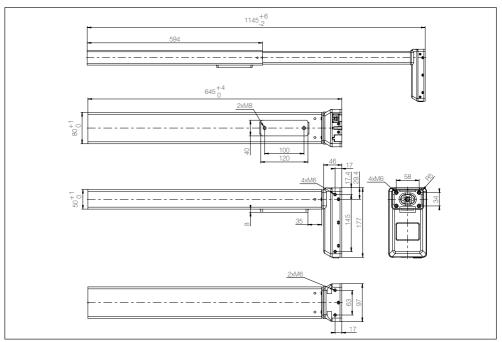
U In : 230 V ~, 50 Hz P In : 400 W



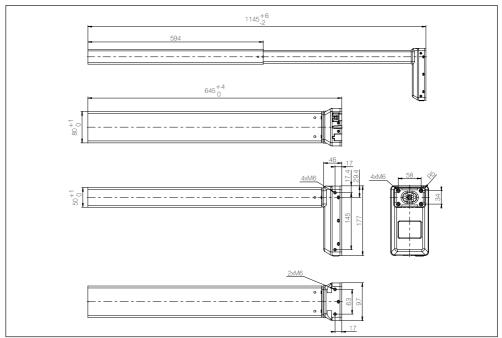
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DRAWING APPENDIX

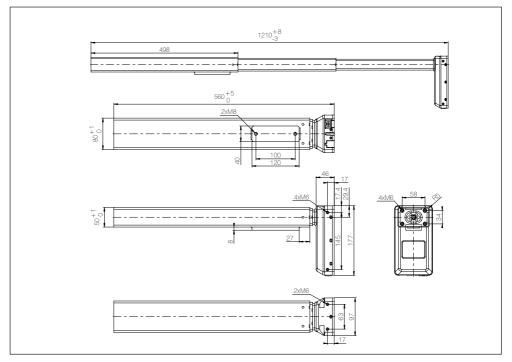
DL5 with bracket



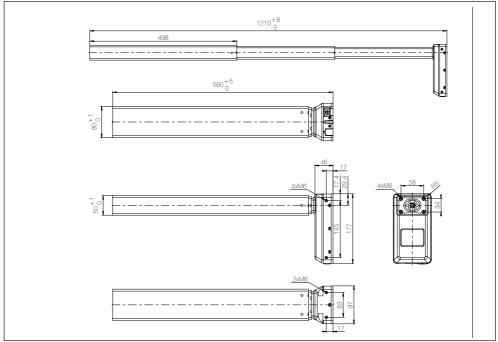
DL5 without bracket



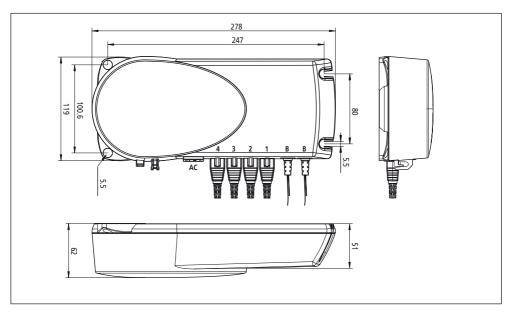
DL6 with bracket



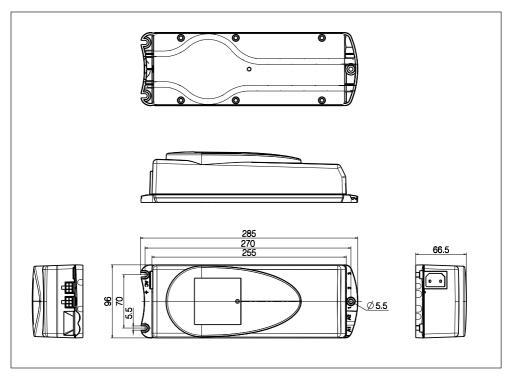
DL6 without bracket

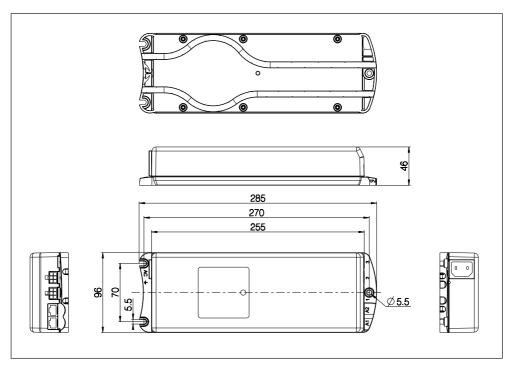


CBD4



CBD5





LINAK APPLICATION POLICY

The purpose of the application policy is to define areas of responsibilities in relation to applying a LINAK product defined as hardware, software, technical advice, etc. related to an existing or new customer application.

LINAK products as defined above are applicable for a wide range of applications within the Medical, Furniture, Desk and Industry areas. Yet, LINAK cannot know all the conditions under which LINAK products will be installed, used, and operated, as each individual application is unique.

The suitability and functionality of the LINAK product and its performance under varying conditions (application, vibration, load, humidity, temperature, frequency, etc.) can only be verified by testing, and shall ultimately be the responsibility of the LINAK customer using any LINAK product.

LINAK shall be responsible solely that the LINAK products comply with the specifications set out by LINAK and it shall be the responsibility of the LINAK customer to ensure that the specific LINAK product can be used for the application in question.

DECLARATION OF CONFORMITY

LINAK A/S Smedevænget 8 DK - 6430 Nordborg

hereby declares that LINAK Actuator System composed of:

Control Box(s) CBD6S

And

Linear Actuator(s) 31xxxH-xxxxx50S, DB4, DB5, DB6, DB7, DB9, DB12, DB14, DB16, LA23 and / or Lifting Column(s) DL1A, DL2, DL4, DL5, DL6, DL7, DL8, DL9, DL10, DL11, DL12, DL14, DL15, DL16, DL17, BASE1

And

 Desk Panel(s)
 DP1C, DP1K, DP1L, DP1V, DP1U, DPA, DPB, DPF, DPH, DPT, WDPL1
 and / or

 Handset(s)
 RFT000, RFRL00x, HB1xRF3000, HB2xRFx000
 mt/display="block">https://display=block
 mt/display=block

complies with EMC Directive: 2004/108/EC according to following standards: EN 61000-6-1:2007, EN 61000-6-3:2007, EN 55014-1:2007+A1+A2, EN 55022:2011 Class B,

complies with Low Voltage Directive 2006/95/EC according to the standard: EN 60335-1:2012

complies with Machinery Directive 2006/42/EC according to the standard: EN 13849-1:2008 SRP/CS Cat. B, PL = b and SRESW PL = b

complies with RoHS2 Directive 2011/65/EU according to the standard: EN 55581:2012

and RF Controls:

RF-transmitter: HB1xRF3000 RF-transmitter: HB2xRFx000 RF-receiver: RFT000, RFRL and/or and/or

complies with the Radio equipment and Telecommunications terminal equipment Directive 1999/5/EC: EN 300220-2:2007, EN 61000-6-1:2007, EN 61000-6-3:2007, EN 60335-1:2012, EN 62311:2008

Nordborg, 2014-04-09

John kling

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

Original Declaration

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