MEDLINE® CARELINE®
IMPROVING EFFICIENCY IMPROVING EFFICIENCY

Controls
User Manual

LINAK®
WE IMPROVE YOUR LIFE

Contents

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 product/system. 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 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 product/system, you are always welcome to contact your local supplier.

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 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 are only to be opened by authorised personnel.

This User Manual has been written on the basis of the present technical knowledge. LINAK is constantly keeping the information updated and we therefore reserve the right to carry out technical modifications.

The introductory pages of this manual may contain information that is not applicable to the technical product pages and are to be seen as general information for all LINAK products.

LINAK A/S

GENERAL ASSEMBLY INSTRUCTIONS

Please read the following safety information carefully. 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 assembly instruction.

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.

Warnings

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

It is important for everyone who is to connect, install, or use the systems to have the necessary information and access to the User Manual on www.linak.com.

- If there is visible damage on the product it must not be installed.
- If the control box / Twindrive makes unusual noises or smells, switch off the mains voltage immediately.
- The products must only be used in an environment that corresponds to their IP protection.
- The cleaners and disinfectants must not be highly alkaline or acidic (pH value must be 6 to 8).
- Irrespective of the load, the duty cycle stated in the data sheets, must NOT be exceeded.
- The DESKLINE® systems can only be used in push applications.
- The control box / Twindrive must only be connected to the voltage stated on the label.
- System not specified for pull must only be used in push applications.
- Fastening screws and bolts must be tightened correctly.
- Do not open the closing device on the Twindrive during operation.
- Specifications on the label must under no circumstances be exceeded.
- NOT TO BE OPENED BY UNAUTORISED PERSONNEL.
- Use only the actuator within specified working limits.
- Note that during construction of applications, in which the actuator is to be fitted, there must be no risk of personal injury, such as squeezing of fingers or arms.
- If irregularities are observed, the actuator must be replaced.
- 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.
- MEDLINE® & CARELINE® products products are rated to operate at an altitude < 2000 m.

Recommendations

Failure to follow these instructions can result in the actuator being damaged or being destroyed.

- Before you start mounting/dismounting, ensure that the following points are observed:
  - 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 mounted correctly 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 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
  - Listen for unusual sounds and watch out for uneven running. Stop the actuator immediately if anything unusual is observed.
  - Do not side load the actuator.
  - Use only the actuator within the specified working limits.
  - Do not kick or step on the actuator.
- When the equipment is not in use
  - Switch off the mains supply or pull out the plug in order to prevent unintentional operation.
  - Check regularly the actuator and joints for extraordinary wear.
- Note: If the actuator is operated as a hand crank, it must be operated by hand, otherwise there is a risk of overloading the actuator and hereby damage the actuator.
  When changing the cables on a LINAK actuator, it is important that this is done carefully, in order to protect the plugs and pins.
  Please ensure that the plug is in the right location and fully pressed in before mounting the cable lid.

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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, 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

John Kling

LINAK A/S

John Kling, B.Sc.E.E., Certification and Regulatory Affairs

Authorised to compile the relevant technical documentation

Original declaration

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Important information

LINAK® products, within the scope of this manual, are not classified as medical electrical equipment or systems, nor do they fall within the scope of the EU Medical Device Directive/Regulation or other similar national regulations. The products are components to be built into a piece of medical electrical equipment by a manufacturer.

To support the assessment and certification task of the complete medical electrical equipment or system worldwide, LINAK provides certification, on a component level, according to the IEC 60601-1, (Medical electrical equipment – Part 1: General requirements for basic safety and essential performance) as recognised components by NRTL (Nationally Recognized Testing Laboratories).

Description of the various signs used in this manual:

Warnings

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

Recommendations

Failing to follow these instructions can result in product damage.

Please read the following safety information carefully:

Ensure that all staff who are to connect, mount, or use the actuator system are in possession of the necessary information and that they have access to these assembly instructions.

Persons who do not have the necessary experience or knowledge of LINAK products should not use these. Moreover, persons with reduced physical or mental abilities must not use the products, unless they are under surveillance or they have been thoroughly instructed in the use of the equipment 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.

Please be aware that LINAK has taken precautions to ensure the safety of the actuator system. The manufacturer/OEM is responsible for the overall approval of the complete application.

LINAK recommends to use the actuators in push applications rather than pull applications.

LINAK actuators are not to be used for repeated dynamic push-to-pull movements.

For general pull applications or repeated dynamic push-to-pull movements in the application, please contact LINAK A/S if in doubt.

LINAK actuators and electronics generally fall outside the IEC 60601-1 definition of applied parts and are not marked as such.

However, assessing the risk whether actuators and electronics can unintentionally come into contact with the patient, determines that they are subject to the requirements for applied parts. All the relevant requirements and tests of the standard are carried out as part of the IEC CB* Scheme/NRTL** assessment.

* CB: Certification Body

**NRTL: Nationally Recognised Testing Laboratory

General warnings

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

The medical device manufacturer is responsible for the incorporation of a suitable safety arrangement, if the actuator or lifting column is used for pull in an application where personal injury can occur, which will prevent personal injury from occurring in case of actuator failure.

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.

The plastic parts in the system cannot tolerate cutting oil.

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

The application and actuators are only to be operated by instructed personnel.

In applications with spline function, the blockage by an obstacle when the application is moving inwards, the removal of the obstacle will cause the load to drop until the spindle hits the nut.

Do not turn the outer tube.

Do not use chemicals.

Inspect the actuator system regularly for damage and wear.

Do not expose LINAK actuator system components to high intensity ultraviolet radiation disinfection lamps. This may damage the enclosure, supporting parts and cables.

LINAK actuators and electronics are not designed for use within the following fields:

- In the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide
- Planes and other aircrafts
- Explosive environments
- Nuclear power generation

If faults are observed, the products must be replaced.

A LINAK control box, actuator and accessory component must, in the final application, be placed where it is not exposed to any impact. This is to prevent damage if a passer-by accidentally hits it with an object or when cleaning the floor with a broom or a mop. On a medical bed e.g. this might be underneath the mattress support platform. If necessary to mitigate this risk, additional protection might be required.

To avoid unintended movement, prevent foreign objects or persons from unintentionally activating a footswitch or a hand control at any time, for instance during normal use or maintenance.

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

If the actuator system makes unusual noise or smells, switch off the mains voltage immediately and disconnect batteries, if applicable.

The products must only be used in an environment that corresponds to their IP protection class.

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

Irrespectively of the load, the duty cycle stated on the product label must NOT be exceeded.

The control box must only be connected to the voltage stated on the label.

Systems not specified for pull must only be used in push applications.

Fastening screws and bolts must be tightened correctly.

Specifications on the product label must under no circumstances be exceeded.

NOT TO BE OPENED BY UNAUTHORISED PERSONS.

Only use the actuator within specified working limits.

Be aware that during the design of medical devices, the risk of personal injury (for instance squeezing of fingers or arms) must be minimised.

If irregularities are observed, the actuator must be replaced.

All cables must be mounted in such a way that they are not trapped or exposed to tension or sharp objects when the application is moved in different directions.

General recommendations

Failing to follow these instructions may result in actuator system damage:

The duty cycle printed on the actuator system label must always be respected. If exceeded, there is a risk that the actuator system is damaged. Unless otherwise specified on the label, the duty cycle is max. 10%, max. 2 min. in use followed by 18 min. not in use.

All detachable connections between components must be locked by the cable locking mechanism - when applicable.

It is recommended to have options like quick release, manual lowering or similar built into the system in case of power loss or system failure or if movement of the system is critical. After service it is recommended to test the system for correct functionality before it is put back into operation.

Prior to assembly/disassembly, ensure that the following points are observed:

- The actuator system is not in operation.
- The mains current supply is switched off and the plug has been pulled out.
- Batteries - if applicable - may also power the system.
- Actuators are free from loads that could be released during this work.

Prior to operating the actuator system, check the following:

- Actuator system components are correctly mounted as indicated in the product-specific user instructions.
- The equipment can be operated in its entire intended range of movement.
- Ensure that the load-supporting bolts can withstand the wear.
- Ensure that the load-supporting bolts are secured safely.

During operation:

- Listen for unusual sounds and watch out for uneven movement. Stop the actuator system immediately if anything unusual is observed.
- Do not sideload the actuator.
- Do not step on or kick any LINAK component.

When the equipment is not in use:

- Switch off the mains supply or pull out the plug in order to prevent unintentional operation.

Cables and plugs:

- It is important to remove the transport plastic bag before using the cable.
- When changing the cables on a LINAK® actuator system, it is important that this is done carefully in order to protect the plugs and pins.
- Please ensure that the plug is in the right location and properly inserted before the cable lid is mounted.

General warranty periods

As general warranty period, LINAK provides 5 years (60 months) warranty on MEDLINE and CARELINE products used in beds and medical applications. If MEDLINE and CARELINE products are used in other applications, they will be covered by 1½ years (18 months) warranty.

Batteries are covered by a specific product warranty of 12 months.

External products that are not manufactured by LINAK A/S: 12 months are added to the warranty period, for instance for transportation and stocking. Relabelling of these products only takes place, if the production date exceeds one year from the date of dispatch to the customer.

If there is any doubt whether returned products are covered by the warranty, they are covered by the warranty. Please use the date of the control box or actuator as reference, if possible.

Electromagnetic Compatibility (EMC)

EMC Warnings

Electromagnetic compatibility – general

LINAK® actuator systems bear the CE marking as an attestation of compliance with the EMC Directive 2014/30/EU. The systems are designed to meet all requirements of applicable standards and have been tested to meet IEC 60601-1-2 requirements.

Emission:

LINAK Actuator Systems are CISPR 11, Group 1, Class B products, comply with IEC 61000-3-2, Class A and IEC 61000-3-3.

Immunity:

Test levels are according to Professional Healthcare Facility and Home Healthcare Facility Environment.

Electromagnetic phenomena are evaluated on a system level, with the actuator connected to a LINAK control box and accessories.

LINAK always recommends to perform verification tests on the final medical device.

Electromagnetic compatibility – third party components

Use of accessories, transducers and cables other than those specified by LINAK could result in increased electromagnetic emissions or decreased electromagnetic immunity of the actuator system and result in improper operation.

Electromagnetic compatibility – interference with other equipment in general

Use of the actuator system adjacent to or stacked with other equipment should be avoided as this could result in improper operation. If such use is necessary, the actuator system and the other equipment should be observed to verify that they are operating properly.

If the user notes unusual behavior of the actuator system, in particular if such behaviour is intermittent and associated with the standing right next to mobile phones, microwaves and radio broadcast masts, this could be an indication of electromagnetic interference.

If such behaviour occurs, try to move the actuator system further away from the interfering equipment.

Electromagnetic compatibility – interference with other equipment, RF communications

Portable RF communication equipment (including peripherals such as antenna cables and external antennas) should be used at a distance no closer than 30 cm (12 inches) to any part of the actuator system. This also applies to cables specified by the manufacturer. Otherwise, a performance degradation of this equipment could result.

EMC responsibilities for LINAK actuator systems

LINAK verifies the EMC performance of each LINAK product and approves them individually. The LINAK products can be combined and integrated into many different systems. LINAK also verifies the system EMC performance on commonly used combinations.

LINAK has certificates in accordance with applicable standards for each product and provides the customers, who are building the application and integrating these products into systems (systems with control box, actuators, cables, batteries, etc.), with these certificates.

However, EMC testing of LINAK products in generic LINAK systems is not made in an environment that corresponds to the specific application environment which differs from the generic testing environment. There will be differences that can affect the EMC performance in the specific target application.

The customer is responsible for qualifying and approving the complete application including the LINAK system.

Regulatory standard

LINAK products, being components to be incorporated by a Manufacturer [definition: IEC 60601-1 ed.3.1, cl. 3.55] into Medical Electrical Equipment [definition: IEC 60601-1 ed.3.1, cl. 3.63], are tested concerning the EMC phenomena according to the Collateral Standard IEC 60601-1-2 ed. 4.1.

IEC 60601-1-2 ed. 4.1 sets forth the requirements for the electromagnetic compatibility of Medical Electrical Equipment, ensuring that devices operate safely and effectively within their intended environments. Compliance with this standard is essential to minimize electromagnetic interference and maintain the integrity and performance of Medical Devices.

Furthermore, IEC 60601- 1-2 ed. 4.1 states:

"This collateral standard recognizes that the Manufacturer has the responsibility to design and perform Verification of Medical Electrical Equipment and Medical Electrical Systems to meet the requirements of this Collateral Standard and to disclose information to the Responsible Organization or Operator so that the Medical Electrical System will remain safe throughout its Expected Service Life."

Qualification process of a new application

The qualification process for a new application is normally done in cooperation between the customer and LINAK. LINAK provides the relevant support, competence and documentation needed for the customer's overall development plan and test plan for the specific application.

The driver of the qualification process is the customer who has the ultimate application responsibility (MDS). The customer identifies and specifies the needed testing based on many different parameters (experience, risk management, requirements from standards, etc.).

In many cases, the customer is establishing and verifying tests early in the project to ensure that the approval process has a low risk of failing when tested in the approval institute.

The customer identifies which tests to make and when they are to be performed in the project to mitigate the risk of failure in the approval process which also includes EMC testing.

Electrostatic discharge (ESD)

LINAK® considers ESD to be an important issue and years of experience have shown that equipment designed to meet the levels specified in standards might be insufficient to protect electronic equipment in certain enviroments.

1. Handling and mounting electrostatic discharge sensitive devices (ESDS devices).

- Handling of sensitive components shall only take place in an ESD Protected Area (EPA) under protected and controlled conditions.
- Wrist straps and/or conductive footwear (personal grounding) shall always be used when handling ESDS devices.
- Sensitive devices shall be protected outside the EPA by the use of ESD protective packaging.

2. Responsibility LINAK/customer

- ESDS devices must under no circumstances, during transport, storage, handling, production or mounting in an application, be exposed to harmfull ESD.
- LINAK can only guarantee the lifetime of ESDS devices if they are handled in the same way from production at LINAK A/S until they are mounted in the manufacturer's application. It is therefore important that the ESDS devices are not removed from the ESD protected packaging before they are physically within the EPA area at the customer premises.

Please refer to EN61340 for further information:

EN61340-5-1, Electrostatics - Protection of electronic devices from electrostatic phenomena - General requirements

EN61340-5-2, Electrostatics - Protection of electronic devices from electrostatic phenomena - User guide

RF transmitter/receiver properties

Some LINAK products emit RF-power by intention for communication purposes.

Frequency band of transmission: 2402 MHz - 2480 MHz

Type: BLUETOOTH® Low Energy BLE 4.2

Modulation: GFSK

Maximum Effective Radiated Power (ERP): 10 dBm

FCC and IC Statements

For RF-emitting products (e.g. Bluetooth®, Wi-Fi) intended to be used on the North American continent, the following applies:

FCC statement

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

IC statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) L' appareil ne doit pas produire de brouillage;

(2) L' appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d' en compromettre le fonctionnement.

Symbols

The following symbols are used on the LINAK product labels, where applicable:

	IEC 60417-5172: Class II equipment		Compliance to all relevant EC directives
	IEC 60417-5840: Applied part type B		UK Conformity Assessment
	IEC 60417-5019: Class I equipment Protective earth; protective ground		Regulatory compliance mark: The Australian Safety/EMC Regulations
	IEC 60417-5002: Positioning of cell		Alternating current
	ISO 7000-0434A: Caution, consult accompanying document		Direct current
	ISO 7000-1641 Operating instructions		Reduced ETL recognised component mark for Canada and the United States. X: The mark is always accompanied by a control number of 6 or 7 figures. For complete description, see ETL marking on next page.
	Electronics scrap		
	Electronics scrap		Bluetooth®
	Recycle		Japanese TELEC
	Recognised Component mark for Canada and the United States		
	PSE diamond mark		
	PSE circle mark		

Electrical Testing Laboratories (ETL) marking

Due to space limitations, the complete ETL marking demands are not represented on the marking plates.

The full ETL recognised component markings are shown here:

C/N 120690
Conforms to ANSI/AAMI Std. ES60601-1
Cert. to CSA Std. C22.2 No. 60601-1

C/N 4008004
Conforms to ANSI/AAMI Std. ES60601-1
Cert. to CSA Std. C22.2 No. 60601-1

C/N 4008838
Conforms to ANSI/AAMI Std. ES60601-1
Cert. to CSA Std. C22.2 No. 60601-1

C/N 9901916
Conforms to ANSI/AAMI Std. ES60601-1
Cert. to CSA Std. C22.2 No. 60601-1

C/N 4008005
Conforms to ANSI/AAMI Std. ES60601-1
Cert. to CSA Std. C22.2 No. 60601-1

C/N 4008671
Conforms to ANSI/AAMI Std. ES60601-1
Cert. to CSA Std. C22.2 No. 60601-1

C/N 4008003
Conforms to ANSI/AAMI Std. ES60601-1
Cert. to CSA Std. C22.2 No. 60601-1

C/N 4008623
Conforms to ANSI/AAMI Std. ES60601-1
Cert. to CSA Std. C22.2 No. 60601-1

C/N 4009507
Conforms to ANSI/AAMI Std. ES60601-1
Cert. to CSA Std. C22.2 No. 60601-1

Batteries

General battery warnings

Handle batteries carefully. Do not short circuit the battery.

Avoid continuous battery discharge when the medical device is not in use, as this may cause lead sulphate formation, which, if left in this state for too long, will irreversibly damage the battery.

LINAK battery packs may emit flammable gases. Do not expose the battery packs to fire or equipment that emits sparks. Moreover, do not store the battery in a closed environment or incorporate it into a closed structure of an enclosure as this may cause an explosion, fire, equipment damage, or injury.

Handle tools carefully and do not wear jewelery when handling batteries. A short-circuit of the battery terminals can cause burn injuries, damage or trigger explosions.

Only connect LINAK batteries to compatible chargers.

LINAK battery packs contain toxic substances. If the internal battery fluid leaks out and gets onto skin or clothing, make sure it is washed off with clean water. Moreover, if the fluid gets into the eyes, rinse them immediately with clean water and seek medical assistance.

Do not use or store LINAK battery packs in places where the ambient temperature exceeds 50 °C, such as inside a hot automobile, in direct sunlight, or in front of a stove or a source of intense heat. Doing so can shorten the battery life, lower its performance level, cause the battery to leak fluid, explode, cause fire, or be damaged.

Lithium ion batteries

Li-Ion batteries are moving in the direction of minimising the physical size and, at the same time, increasing the capacity. This gives a very compact battery with a high energy concentration. It also increases the risk of thermal runaway (see note below) due to internal short circuits.

The general use of Li-Ion batteries has increased, and the inherent risk of thermal runaway has led to stricter rules within the transport industry, specifically air transport with tightened restrictions on the quantity, handling, and storage of specific products.

The OEMs and consumers must recognise that although safe to use, Li-Ion cells always have a very small risk of thermal runaway. The risk could be as little as 1 PPM or even less.

LINAK currently bases our Li-Ion battery design on cell types with an industry-proven history (e.g. electric cars). The use of well-proven cell technology reduces the risk of thermal runaway, but it does not eliminate it. LINAK has completed activities to reduce this risk and the complete battery package is approved in accordance with UL.

An external, internationally recognised expert has also reviewed the design to ensure that it is manufactured according to the latest recommendations. Further to that, we only use cells from well-recognised manufacturers.

LINAK recommends that when using Li-Ion batteries, the customers should carry out proper risk analysis on their application. The risk analysis must also take into consideration that these products are not mounted in positions where they are in direct contact with flammable materials.

LINAK Li-Ion batteries have no greater risk of thermal runaway than other Li-Ion cells from well-recognised manufacturers within the market. Therefore, LINAK cannot take responsibility for any failures that occur due to a failure that is inherent in the nature of Li-Ion batteries.

If any of the Li-Ion batteries built into LINAK products are found to be defective under warranty, LINAK will provide the OEM with a new product. LINAK explicitly disclaims all other remedies. LINAK shall not in any event be liable under any circumstances for any special indirect punitive incidental or consequential damages or losses arising from any incident related to the inherent risk of thermal runaway in the Li-Ion cell and any use of LINAK products. Moreover, LINAK explicitly disclaims any responsibility for profit loss, failure to realise expected savings, any claim against our customer by a third party, or any other commercial or economic losses of any kind, even if LINAK has been advised of the possibility of such damages or losses.

Note: ‘Thermal runaway’ is overheating of a cell, and it could lead to a small fire and smoke from the cell.

Transportation

The lithium ion batteries must be packed and transported in accordance with applicable regulations. Always ask your local transportation provider how to handle the transportation of lithium ion batteries.

Please see the general assembly instructions and the mounting section for detailed information.

Warnings

When using Li-Ion batteries with patient lift control boxes, loss of power might happen due to the battery deep discharge protection. This will only happen in case of continuous battery use despite warnings. In this event, there may be no warning, and the application may not be able to move when expected.

In his risk analysis, the customer must take into consideration how to assure alternative means to make movement, for instance quick release or manual lowering.

Do not open the battery housing as damaging the cell or circuitry may develop excessive heat.

If product caution is not clearly visible at low light intensity, read the product label instructions symbol. A warning must be included in the application manufacturer manual for the medical device.

The application manufacturer must test the application and ensure that intentional and unintended operations do not exceed the battery specification limits.

Defective or damaged Li-Ion batteries are not allowed for transportation.

For safety reasons, please adhere to the indicated charging and operation temperature.

In case the battery is too hot, disconnect it, evacuate the room, and wait for 2 hours before taking further steps.

Mounting instructions must be followed in order to avoid exposing batteries to water.

In general, recharging of batteries must take place every 12 months. However, please note:

- New Li-Ion batteries, shipped from LINAK are in a deep-sleep state, where the self-discharge is very little
- When mounted in an application, LINAK Li-Ion batteries wake up, resulting in a higher rate of charge, depending on the application/system
- Application manufacturer must consider this idle consumption for his specific system and make precautions to avoid discharged batteries.
- Contact your LINAK sales team for further information

If batteries are to be shipped by air, they shall not be charged to more than 30%

Disposal of the battery takes place in accordance with local regulations.

Recommendations

- Do not exceed the storage temperature as it will shorten the product life and performance.
- Allow the battery to settle to room temperature before use.
- Lithium ion batteries are not intended for use in outdoor applications and indoor pool environments.
- If the battery is completely discharged, then recharge the battery before storage.
- Always use correct LINAK charger

DO NOT:

- Heat or burn the batteries.
- Expose the batteries to high impact/excessive force.
- Crush or puncture the batteries.
- Use batteries with signs of damage or corrosion.
- Charge or store the batteries near combustible material.
- Exceed IP-ratings.
- Overcharge or fully discharge the batteries.

Safety feature

Lithium ion batteries contain several mechanisms to protect themselves from being damaged due to excessive use. In case of overheating, the device will activate a thermal protection. No power output will be available until the temperature is again within normal operating range.

Overheating may occur by extensive use at high temperatures or when exceeding the duty cycle (see product label).

Lead acid batteries

Maintenance of batteries

Prior to first use of LINAK® batteries, please make sure that they are charged at least 24 hours and if possible even longer for proper functioning and prolonging the battery lifetime.

Replacement of batteries

The batteries must only be replaced by the same type of batteries or mechanical and electrical equivalent types. The batteries must be new or maintained by means of charging at least every 6 months. The batteries, which make a set, must be supplied with identical production codes.

Production code mismatch may lead to a severely reduced lifetime expectancy.

Before mounting, ensure that the battery set is correctly connected, compare with the drawing in the battery room and check that no connectors are loose.

Warnings in connection with battery replacement

Please observe the following maintenance, replacement, and disposal requirements to ensure a safe and reliable operation.

The batteries are to be replaced after 4 years at the latest. Perhaps earlier, depending on the pattern of use. Frequent and high-powered discharges reduce the battery life. For an optimum lifetime, the product must be connected to the mains voltage as often as possible. It is recommended that the batteries are to be charged for at least every 6 months - otherwise the batteries will have reduced capacity due to self-discharge. It is recommended to test the battery function at least once every year.

The battery compartment is hermetically separated from the electronics compartment. When replacing the batteries this separation must not be damaged or modified as this may allow penetration of battery gas into the electronics compartment with risk of explosion.

When replacing batteries in waterproof products (IPX5 and IPX6), precautions must be taken that the sealing material (silicone ring or joint filler) is not damaged and that it is correctly placed in the groove. Hereafter, the screws in the cover are to be fastened with approx. 1 Nm.
If necessary, replacement sealing is available at LINAK.

The battery compartment is supplied with ventilation that ensures correct and necessary airing of the battery compartment. This airing must not be blocked or covered as a positive pressure may occur with risk of explosion.

If the product has been exposed to mechanical overload (lost on the floor, collision/squeezing in the application or a powerful stroke), the product must be sent to an authorised workshop for control of the hermetic separation between the battery and electronics compartment.

Disposal

Lead acid batteries must be disposed of in the same way as car batteries. Alternatively, they may be returned to LINAK.

System description

LINAK® actuators, lifting columns and electronics have been developed for use in all places where a linear movement is required.

LINAK products can for example be used for:

- Adjustment of beds
- Patient lifts within the care and hospital sector
- Adjustment of dentist chairs/gynaecological chairs

Connecting the system

Do not connect the mains cable until all actuators and hand controls have been connected to the control box.

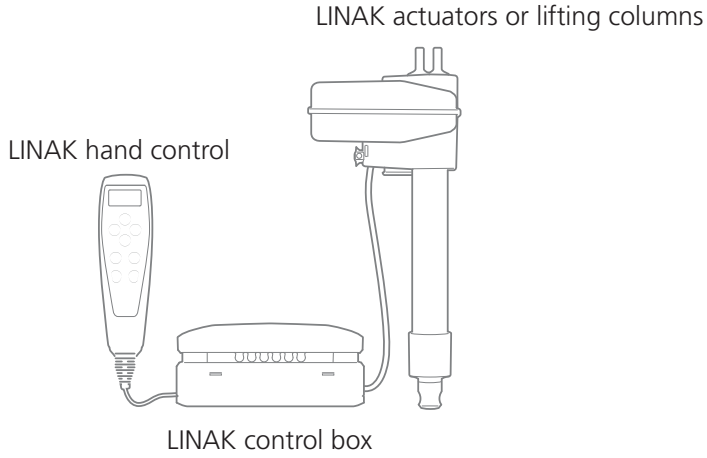
Start by connecting the hand control to the control box. The connection in the control box is marked with "HB".

Connect the different actuators to the different channels on the control box. Each channel is marked with a number (e.g. "1", "2", "3"…….).

Check that all plugs are well connected and firmly pushed into the connector. Due to the fact that LINAK® control boxes are designed for a high IP degree, a firm force can be required.

Connect the mains cable.

The actuators can now be operated by pressing a button on the hand control button.



Any non-detachable power supply cord with mains plug is considered to be the disconnecting device.

Charging is only allowed in dry environment, and the appliance inlet must be thoroughly dried before connecting to mains.

General mounting of controls

- The mounting screws on the controls must be tightened with a maximum torque of 1 Nm
- The mounting surface to which the accessory is attached should have a surface evenness of more than ± 0.5 mm
- Systems must not be installed/deinstalled while in operation
- Nuts and bolts must be made of steel
- Nuts and bolts must be tightened securely

General environmental conditions

Operating, storage and transport	
Operating temperature	+5 °C to +40 °C
Relative humidity	20% to 80% - non-condensing
Atmospheric pressure	700 to 1060 hPa (Rated to be operated at an altitude ≤ 3000 m)
Storage temperature	-10 °C to +50 °C
Relative humidity	20% to 80% - non-condensing
Atmospheric pressure	700 to 1060 hPa (Rated to be stored at an altitude ≤ 3000 m)
Transport temperature	-10 °C to +50 °C
Relative humidity	20% to 80% - non-condensing
Atmospheric pressure	700 to 1060 hPa (Rated to be transported at an altitude ≤ 3000 m)
If the actuator is assembled in the application and is exposed to push or pull during transportation, the actuator can be damaged. Do not drop a LINAK component or otherwise damage the housing during disassembly or transportation. We do not recommend to use a LINAK component that has been damaged.	

Information on start-up, deinstallation and operation

Before installation, deinstallation or troubleshooting

- Stop the actuator/lifting column.
- Switch off the power supply or pull out the mains plug and pull out the plug to the actuator/lifting column.
- Relieve the actuator/lifting column of any loads, which may be released during the work.

Before start-up

- Make sure that the system has been installed as instructed in the relevant product manual.
- The individual parts (actuator/lifting column/hand controls etc.) must be connected before the control box is connected to the mains.
- Make sure that the mains voltage to be connected to the product or the system is the one stated on the label.
- The equipment can be moved freely over the whole working area of the actuator/lifting column.
- Check correct function after mounting.
- The actuator/lifting column must not be loaded in excess of the values indicated in the specifications on the product label.
- The duty cycle noted on the product label must always be observed. Otherwise there is a risk of product damage. Exceeding the duty cycle will result in a dramatic reduction of the system lifetime.
- Unless specified otherwise on the product label, the duty cycle is max. 10%, max. 2 minutes in use followed by 18 minutes not in use.
- The actuator/lifting column system may only be used in an environment corresponding to the IP rating of the system. LINAK products are marked with the actual IP rating on the label.
- If any individual parts are suspected to be damaged, do not install the parts, but return them for inspection/service.

During operation

- Check for unusual sounds and irregular movement. Stop the actuator/lifting column immediately if anything unusual is observed.
- If the control box makes unusual noises or smells, switch off the mains voltage immediately and the external battery, if any.
- Take care that the cables are not damaged.
- Unplug the mains cable on mobile equipment before it is moved.

Cleaning

The products can be cleaned as described in the following according to their IP protection stated on the product label.

The IP code specifies the protection degree provided by the enclosures. For most products, only the protection against ingress of water (second characteristic numeral) is specified, ingress of solid foreign objects or dust (first characteristic numeral) is not specified and therefore replaced by the letter X in the code.

IP protection	Cleaning instructions
IPX0	Clean with a damp cloth
IPX1	Clean with a damp cloth
IPX2	Clean with a damp cloth
IPX3	Clean with a damp cloth
IPX4	Clean with a damp cloth
IPX5	Wash with a brush and water, but not water under pressure
IPX6	Wash with a brush and water. The water can be under pressure, but the system must not be cleaned directly with a high pressure cleaner. Max. 20 oC
IPX6 Washable according to IEC 60601-2-52	Clean by the use of wash tunnels according to IEC 60601-2-52
IPX6 Washable DURA™	Clean by the use of wash tunnels according to IEC 60601-2-52, extended washing cycle test

To avoid degreasing of the piston rod, the actuator should be retracted to minimum stroke and without load before washing.

Cleaning warnings

The systems must not be sprayed directly with a high pressure cleaner.

Interconnecting cables must remain plugged in during cleaning to prevent water ingress.

Cleaning with a steam cleaner is not permitted

UV cleaning is not permitted.

IPX6 Washable

LINAK® washable products frequently undergo a fully regulated washing test.

At LINAK, 'IPX6 Washable' means that the products conform only to this test.

Standard washing procedure

Reference: The standard IEC 60601-2-52 newest revision, which includes special demands to fundamental safety and relevant functional characteristics for hospital beds.
The demands for the washing process are described in the German "Maschinelle Dekontamination" from the organisation AK-BWA (Arbeitskreis Bettgestell- und Wagen-Dekotaminationsanlagen).

Description: At LINAK, the washing test takes place in an instrument washing machine, which is fitted and programmed in such a way that it duplicates the process used in a typical hospital installation for the cleaning of beds and other medical equipment.
During the test, the products are exposed to both thermal and chemical effects.
To avoid degreasing of the piston rod, the actuator should be retracted to minimum stroke and without load before washing.

Preparation: As plastic materials to a larger or lesser degree change characteristics and shape with time and climatical exposure, an ageing of the products is carried out first. The conditions for ageing are 65 °C +/- 2 °C in normal dry air for 10 days followed by a minimum of 16 hours at room temperature before the washing process starts.

Water: Degree of hardness, no more than 5° dH and no demineralised water.

Detergents: **LINAK recommends the following products:**

Sekumatic FDR or FRE from Ecolab

Neodisher Dekonta from Dr. Weigert

Thermosept NDR from Schülke or similar with a pH-value of 5 - 8 and in a concentration of 0.5 %

Rinsing aids

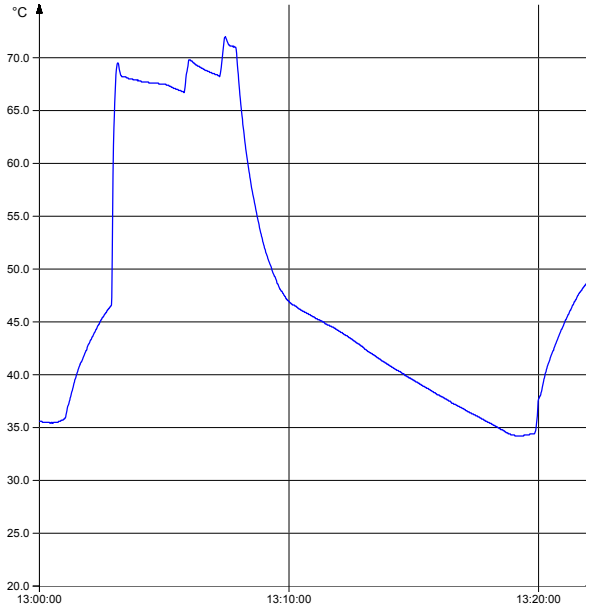
LINAK® recommends the following products:

- Sekumatic FKN from Ecolab
- Neodisher BP or TN from Dr. Weigert
- Thermosept BSK from Schülke or similar with a pH-value of 5 - 8 and in a concentration of 0.2 %.

Demands to chemicals:

- They must not contain caustic solutions
- They must not change the surface structure or adhesive properties of the plastic
- Must not break down grease

LINAK washing profile according to IEC 60601-2-52



LINAK washing machine

IPX6 Washable DURA™

Description of washing test

LINAK washable products frequently go through a fully controlled washing test. The LINAK term "IPX6 Washable DURA" signifies that the products conform exclusively to this test.

The "IPX6 Washable DURA" washing test is used to ensure that products that are rated "IPX6 Washable DURA" comply with the agreed terms and conditions. This washing test differs from the norm EN60601-2-52 as the products are not aged and each washing cycle is followed by a 30 minute cooling process.

Further information regarding the washing process can be found in the German document "Maschinelle Dekontamination" from the organisation AK-BWA.

Estimated time consumption: Approximately 1 month.

Amount of samples: During the development process, the number of tested samples is in accordance with GP082. During running production, the number of tested samples complies with UM-41-22-001.

General: The process applies to the IPX6 Washable DURA system.

Test conditions:

- The units are not aged.
- Products with adhesive foils must be hardened before ageing.
- The hardening time depends on the used adhesive, but is typically 3 days at 20°C.
- The units are washed with new plugs/cables.
- The cables should be as long as possible and free ends should be shut off.
- Detergent and rinsing aids used:
  - Detergent 1: DR. WEIGERT neodisher Dekonta AF
  - Rinsing aid 1: DR. WEIGERT neodisher TN

Test procedure:

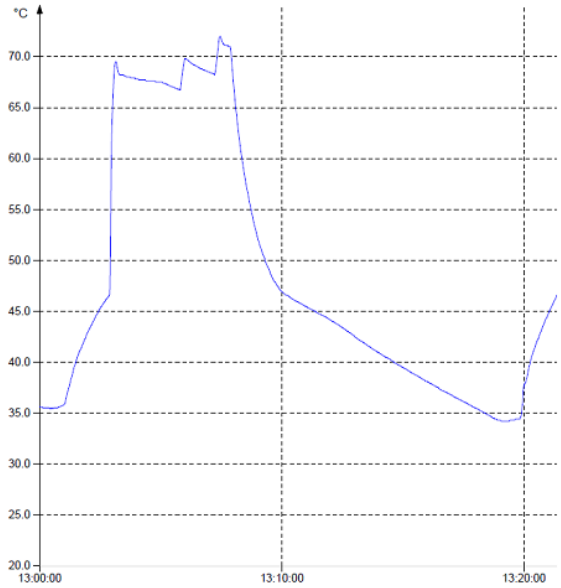
- The units are placed in the washing machine in the intended mounting direction (in the most sensible direction regarding water penetration, if this is not the same direction).
- The washing process (see picture below) is repeated 11 times and consists of:
  - Washing with 0.3 % alkaline detergent for 2 minutes in 70 °C hot water. (Note: the temperature is measured in the tank, not necessarily at the unit).
  - Rinsing with neutral rinsing aid for 20 seconds.
  - Drying and cooling for 30 minutes in the open air at approx. 20 °C.
- After 11 cycles, the products are left in a ventilated room for 24 hours. The above steps are repeated until a total of 250 cycles has been reached.
- Immediately after washing and after further 24 hours, the products are subjected to a high voltage test in accordance with UM-31-30-072.
- A population sample of the products is opened for water penetration control immediately after the washing test.
  Accept criteria are in accordance with UM-20-30-002.

Options: The following options can be used for the test:

- The units may be weighed prior to and after the washing test to detect water.
- The bubble test may be used to detect any leakages.
- X-ray may be used to detect any leakages.

LINAK washing profile for the “IPX6 Washable DURA” process

LINAK washing profile according to DURA™



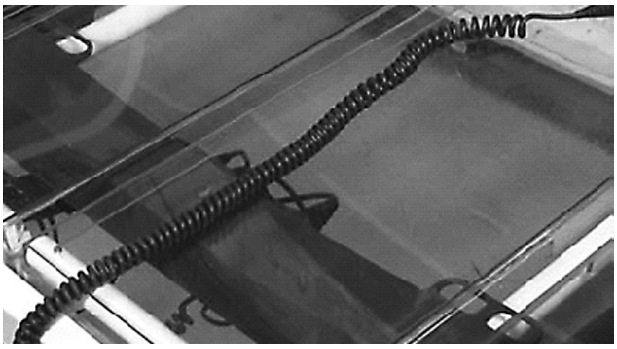
(Note: The temperature is measured at the unit)

LINAK washing machine

Cable wash

Before the washing procedure starts

In order to maintain the flexibility of the cables, it is important that the cable is placed in such a way that the cable’s own weight does not strain the coil during the washing process. This can be done by placing the cable ON the bed or another form of support for the cable. Please see the examples in the picture to the right.



General maintenance

If not otherwise stated in the specific product section.

- LINAK products must be cleaned at regular intervals
- Frequent inspection for malfunction, mechanical damage, wear and cracks. Worn-out parts must be replaced
- Inspection/maintenance intervals are to be recommended by the medical device manufacturer
- LINAK products are closed units and require no internal maintenance
- LINAK products must be IPX6 Washable and IPX6 Washable DURA when cleaning in wash tunnels
- O-rings: When individual parts are replaced in a LINAK IPX6, IPX6 Washable or IPX6 Washable DURA system, the O-rings must be replaced at the same time on all parts. On all products where replaceable cables or fuses have been dismounted or replaced, the O-ring must be replaced, and the O-rings and the receptacle insert must be greased with an acid-free Vaseline.

Maintenance of all LINAK controls

- Electronics must be inspected at attachment points, wires, enclosure, and plugs
- Inspect the connections, cables, enclosure, and plugs, and check for correct functioning
- LINAK electronics are maintenance-free (however, this does not apply to lead acid batteries)

Repair and disposal

Only an authorised LINAK® service centre should repair the LINAK actuator systems. Systems to be repaired under warranty must be sent to an authorised LINAK service centre.

In order to avoid the risk of malfunction, all actuator repairs must only be carried out by an authorised LINAK Service shop or repairers, as special tools and parts must be used.

If a system is opened by unauthorised personel there is a risk that it may malfunction at a later date.

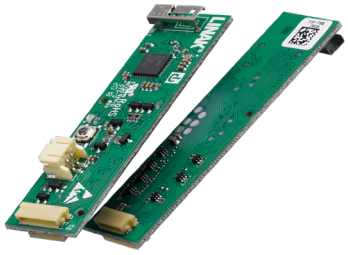
LINAK systems or components may be disposed of, possibly by dividing them into different waste groups for recycling or combustion.

We recommend that our product is disassembled as much as possible at the disposal and that you try to recycle it. LINAK systems or components should be disposed of in accordance with the environmental regulations applicable in the respective country.

Troubleshooting

Symptom	Possible cause	Action
No motor sound or movement of piston rod	- The actuator is not connnected to the control box - Blown fuse in the control box - Cable damaged	- Connect the actuator to the control box - Fuse must be changed - Send actuator for repair
Excessive electricity consumption		- Send actuator for repair
Motor runs but spindle does not move	- Gear wheel or spindle damaged	- Send actuator for repair
Actuator cannot lift full load	- Clutch is worn - Motor is damaged	- Send actuator for repair
Motor sound but no movement of piston rod		- Send actuator for repair
No signal from Reed or Hall switch		- Send actuator for repair
Motor runs and quick release does not function or is noisy	- Declutching arm turns less than approx. 75 °C	- Adjust cable
Piston rod will only move inwards and not outwards	- Safety nut has operated	- Send actuator for repair
	- Not connected to mains	- Connect to mains
Power indicator does not light up	- The fuse has blown	- Replace fuse, if the system is prepared for external fuse replacement, or send the system for repair
	- Defective power cable	- On control boxes with exchangeable power cable, change the cable. - On control boxes with fixed cable, send it for repair
	- Control box defective	- Send control box for repair
	- Actuator plug not pushed into control box properly	- Push actuator plug properly into control box
Power indicator lights up, but actuator does not run	- Actuator defective	- Replace actuator - Defective control box - Replace the control box
Control box relays are clicking	- Control box defective	- Send control box for repair
Power indicator lights up, but actuator does not run	- Hand control defective	- Send hand control for repair
No relay noise is heard from control box Not valid for CB20/CB6S OBF/CB16 OBF	- Battery completely flat	- Charge battery
Control box completely dead on battery and no relay clicking	- Battery defective	- Replace battery
	- Actuator plug not properly pushed into control box	- Push actuator plug properly into control box
Actuator does not run on battery, but relay clicking can be heard	- Actuator defective	- Replace actuator
	- Control box defective	- Replace control box
	- Hand control defective	- Send hand control for repair
	- Control box defective	- Send control box for repair
Control box okay apart from one direction on one channel		

ABL



With the small ABL print it is possible to convert analogue input to Bluetooth Low Energy.

The ABL print can be used as attendant control or hand control integrated in side rails in for instance healthcare applications and offers easy access to different positioning functions.

Usage

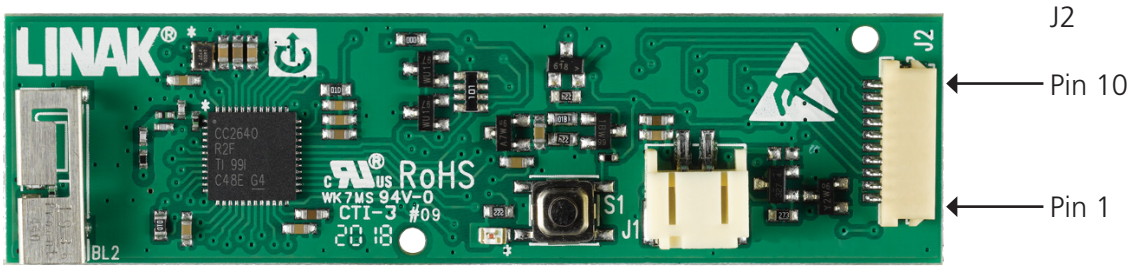
Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Compatibility:	Compatible with LINAK Bluetooth Low Energy (BLE) control boxes. Please contact LINAK.
Relative humidity:	20% to 80% – non-condensing
Atmospheric pressure:	700 to 1060 hPa
Meters above sea level:	Max. 3000 meters
Approvals:	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

Connectors on PCBA

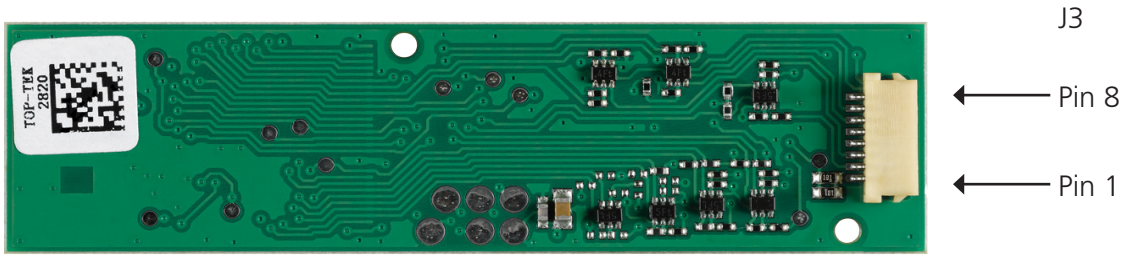
Top side



J2

Pin	Connection	Bluetooth Low Energy command (V0/V1/V2)
3 (input)	Active when connected to pin 2 (GND)	I0/I10/I20
4 (input)		I1/I11/I21
5 (input)		I2/I12/I22
6 (input)		I3/I13/I23
7 (input)		I4/I14/I24
8 (input)		I5/I15/I25
9 (input)		I6/I16/I26
10 (input)		I7/I17/I27

Bottom side



J3

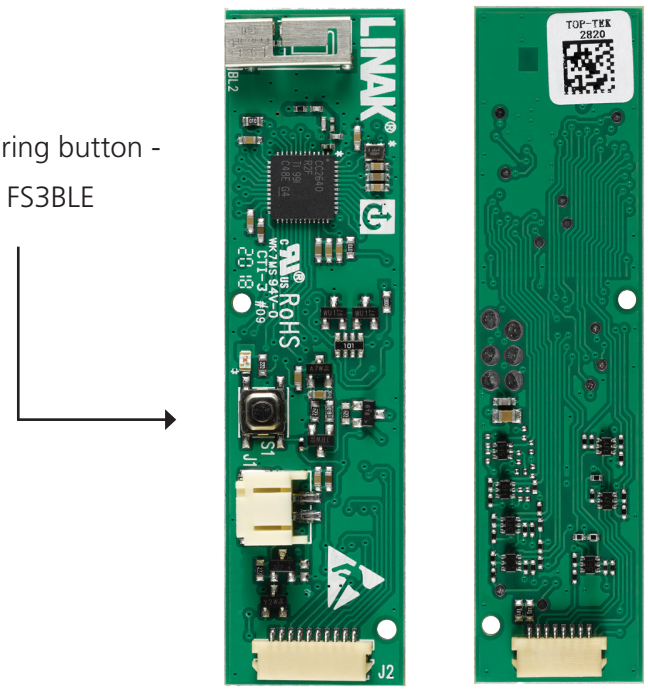
Pin	Connection	Bluetooth Low Energy command (V0/V1/V2)
2 (input)	Active when connected to pin 8 (GND)	I8/I18/I28
3 (input)		I9/I19/I29
4 (output)	Voltage between this pin and pin 1 is equal to supply voltage on J1 when LED is active	LED1/LED11/LED21
5 (output)		LED2/LED12/LED22
6 (output)		LED3/LED13/LED23
7 (output)		LED4/LED14/LED24

ABL pairing

Direct Pairing can also be initiated by activating pin 3 and 4 on J2 and pin 2 on J3 simultaneously.

Confirm on pin 3, J2.

Direct Pairing button - similar to FS3BLE



ABL - Commands and pairing

Function	Details	Default		
Direct Pairing Activation	To enter Direct Pairing mode	S1 (Tactile switch next to battery connector)	OR	Pin 3 (J2) + Pin 4 (J2) + Pin 2 (J3) Connected simultaneously to GND
Direct Pairing Confirmation	To confirm Direct Pairing	S1 (Tactile switch next to battery connector)	OR	Pin 3 (J2)
OEM ID and type	Used to filter in CB whitelist	OEM ID: 000000001		
		OEM type: 2000 (ABL V0) 2001 (ABL V1) 2002 (ABL V2)		

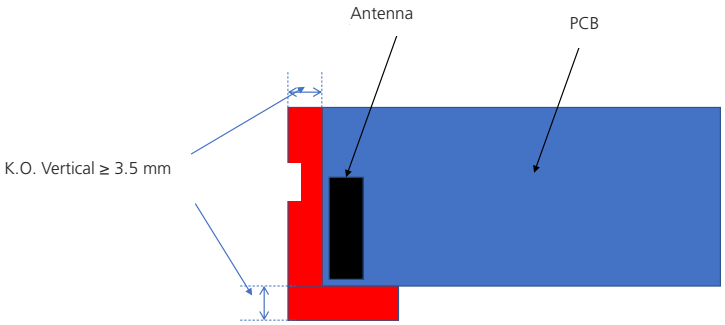
Mounting

When mounting the PCBA print in a housing be aware of the minimum recommended distance between antenna and housing – see drawings below.

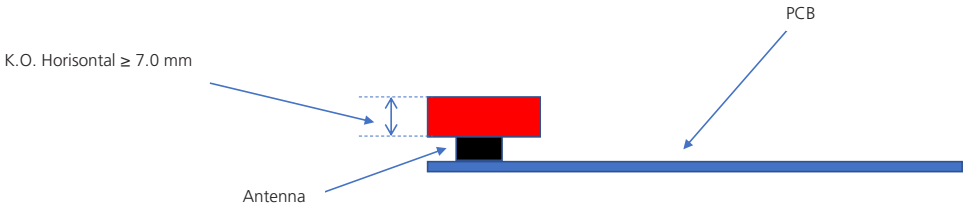
The housing material should be non-conducting due to the BLE signal.

The customer is responsible for testing and ensuring the BLE performance/range of the final system.

Keep out zone (K.O)
Seen from above



Keep out zone (K.O)
Side view



Recommendations

- Please ensure that you use the right cable type to ensure the wished functionality. In case of lack of functionality of your hand control, check that the hand control cable is the right one for the intended control box or contact your local LINAK representative.
- Please note that HB3X0L0 version (analogue with diode) is not supported by the CBJC. The diode will light up at all times if used with the CBJC.
- Do not submerge the hand control under water.
- Unless otherwise specified or agreed with LINAK, the hand control is only intended to be used on LINAK systems.
- Do not sit or lie down on the hand control. It can cause unintended movement of the application.
- When changing hand controls for OpenBus™ systems, the power must be switched off.
- The force of the magnet depends on the thickness and the type of the lacquering, stickers, steel thickness etc. It is the responsibility of the customer to verify that the holding force on the application is acceptable.
- For hand controls with magnets it is the responsibility of the user/operator to evaluate any possible risk caused by use of permanent magnets.
- For hand controls with magnets it is recommended to have a parking place for the hand control on the application, where the customer ensures that the hand control does not fall off.

- The customer responsibility includes making a proper design of the cable strain relief inside the side rail panel.
- The customer should consider the existence of vibrations when defining and specifying the housing, i.e. we recommend the customer to carry out a vibration test on the final product.
- The customer must ensure a proper IP rating/test.
- The customer must ensure proper drop testing according to IEC60601-2-52, §201.15.3.4.1. In this clause there is an additional reference to IEC60601-2-31.
- The customer is responsible for correct mounting of the PCBA. Among other things, it means
  - ensuring proper and safe mounting of the PCBA into for instance the side rail
  - ensuring proper and correct mounting between key pad connection tails and the ABL PCBA
  - ensuring proper and correct mounting of the key pad
  - the customer should consider proper precautions against ESD (Electrostatic discharge)
- When handling ESDS (Electrostatic Discharge Sensitive) devices – e.g. during transport, storage, handling, production or mounting in an application, exposure to harmful ESD must be avoided.
- Consider proper creepage and clearance measures to fulfil IEC 60601.
- With One MOPP (One Means Of Patient Protection / Secondary side of the actuator system).
- It is not recommended to dismount the membrane front cover after mounting as this may cause damage.

Wireless risks and recommendations

Due to some customer concerns regarding the range of BLE, LINAK decided to set the RF sensitivity and the transmit power settings to a maximum. In addition to that, LINAK Standard BLE allows pairing all the time.

Risk 1

If a BLE hand control is to be paired with an application, this can be done without coming closer to the application, as the above-mentioned settings are at a maximum. In such a scenario, there is a risk of pairing with another application from a longer distance as opposed to the distance of the application you want to pair with. The rule is that a BLE hand control is paired with the closest BLE device that it detects, however, the BLE device is not always physically closest.

Recommendation for Risk 1

The pairing process must always be made in near proximity to the application. It must also be ensured that the pairing is done with the correct application by simply operating the application after the pairing process.

Risk 2

In case that there are more LINAK BLE applications in a building and the BLE hand controls are accidentally swapped, there is a risk of operating another BLE application if within range. This can cause unintended movement and can have severe consequences for the patients' health.

Recommendation for Risk 2

When intending to operate an application with LINAK BLE, it must be ensured that the correct BLE hand control is used. Otherwise, there is a risk of unintended movement of the application that has been paired with the BLE control.

ACC

The ACC (Attendant Control Compact) is a cost optimised and compact box with up to 11 buttons that can be used as hand control keys or lock-outs.

The lock-out function can be made visable by using LEDs.

The ACC is compatible with control boxes that use an OpenBus™ interface, for instance CO61.

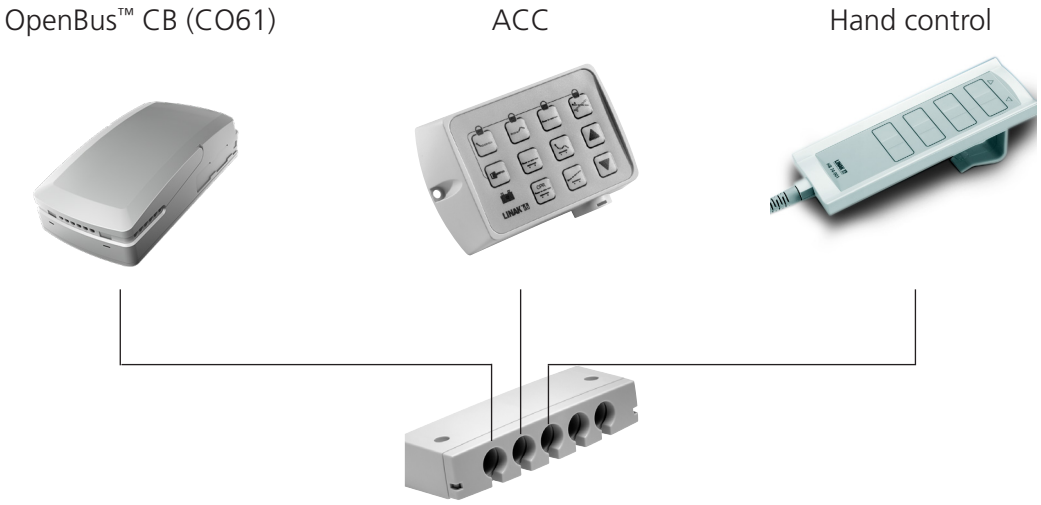
Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% non-condensing
Atmospheric pressure:	700 to 1060 hPa
Approvals:	IEC 60601-1 ANSI/AAMI ES60601-1 CAN/CSA-C22.2 No. 60601-1

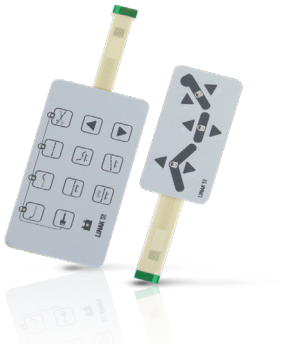
Recommendations

- Always use locking ring and cables w. O-rings
- If other front covers than standards are requested, the customer must design them

How to connect the ACC box



ACK



With the OpenBus™ system it is possible to use ACK membrane front covers as attendant control or hand controls integrated in the bed side rails.

There are two different variants of ACK: ACK1 and ACK3.

The ACK1 is a single membrane front cover, whereas the ACK3 comes with two membrane front covers, typically used on an inside side rail and an outside side rail.

Features and options

- Straight cables: 1250 mm, 1800 mm or 2500 mm
- The standard ACK colour is grey (RAL 7035)

Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Compatibility:	Compatible with LINAK control boxes. Please contact LINAK
Relative humidity:	20% to 80% non-condensing
Atmospheric pressure:	700 to 1060 hPa (3000 m)
Meters above sea level:	Max. 3000 meters
Approvals:	IEC 60601-1 ANSI/AAMI ES60601-1 CAN/CSA-C22.2 No. 60601-1

Generel information

For LINAK standard ACKs, the following is applicable:

- Adhesive for the standard ACK is 3M 7955
- For information re. suitable and unsuitable surfaces, please see 3M's webpage
- Standard recommendation for curing time is 72 hours
- The customer is responsible for correct mounting on suitable surfaces

Recommendations

- The customer responsibility includes making a proper design of the cable strain relief inside the side rail panel.
- The customer should consider the existence of vibrations when defining and specifying the housing, i.e. we recommend the customer to carry out a vibration test on the final product.
- The customer must ensure a proper IP rating/test
- The customer must ensure proper drop testing according to IEC60601-2-52 §201.15.3.4.1. In this clause there is an additional reference to IEC60601-2-31.
- The customer is responsible for correct mounting of the PCBA. Among other things, it means
  - ensuring proper and safe mounting of the PCBA into e.g. the side rail
  - ensuring proper and correct mounting between key pad connection tails and the ACK PCBA
  - ensuring proper and correct mounting of the key pad
  - the customer should consider proper precautions against ESD (Electrostatic discharge)
- When handling ESDS (Electrostatic Discharge Sensitive) devices – e.g. during transport, storage, handling, production or mounting in an application, exposure to harmful ESD must be avoided.
- Consider proper creepage and clearance measures to fulfil IEC 60601. With One MOPP (One Means Of Patient Protection / Secondary side of the actuator system).
- It is not recommended to dismount the membrane front cover after mounting as this may cause damage.

ACL

The Attendant Control Lock (ACL) box is a one turn button box for various applications where the patient positioning must be carefully controlled by the medical staff.

The ACL disconnects all functions on the hand control either by means of turn button or turn key.

Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% – non-condensing
Atmospheric pressure:	700 to 1060 hPa
Meters above sea level:	Max. 3000 meters
Approvals:	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

ACO

The Attendant Control OpenBus™ (ACO) is a cost optimised and compact unit with up to 21 buttons that can be used as hand control keys or lock-outs. The lock-out function can be made visable by using yellow LEDs.

The antimicrobial ACO version includes active additives in the plastic of the hand control housing and the hook. The front cover has a second layer that is antimicrobial.

Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% non-condensing
Atmospheric pressure:	700 to 1060 hPa
Flammability rating:	V2
Meters above sea level:	Max. 3000 meters
Approvals:	IEC 60601-1 IEC 60601-1-6 ANSI/AAMIES60601-1 CAN/CSA-C22.2 NO. 60601-1

In order to comply with the norm, the ACO must hang vertically from its hook during the washing process.

Recommendations

- Always use Locking ring and cables with O-rings
- Locking ring and cables with O-rings must be fitted to ensure IP degree
- If other front covers than standards are requested, the front cover guidelines should be consulted

ACOD

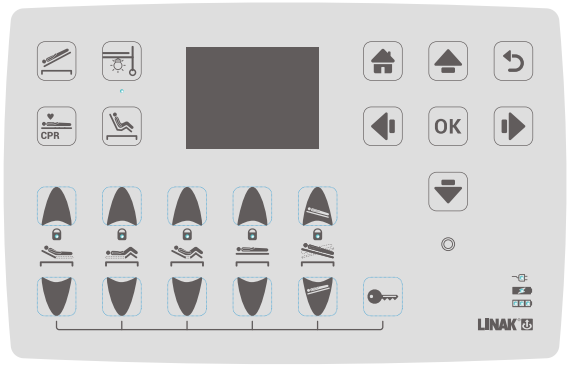
ACOD is an intelligent attendant control for hospital and nursing home beds, which is based on LINAK OpenBus™ platform. It has up to 25 buttons, of which 7 are dedicated to display navigation, 13 LEDs and one 2.4" colour LCD display panel, allowing full functionality of the bed.

Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% – non-condensing
Atmospheric pressure:	700 to 1060 hPa
Meters above sea level:	Max. 3000 meters
Flammability rating:	UL94V-2
Approvals (pending):	IEC60601-1 IEC60601-1-2 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

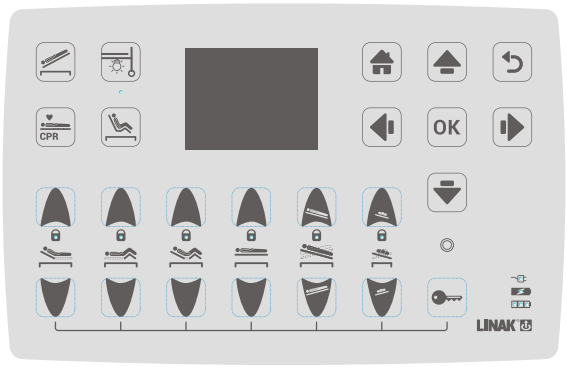
Standard front covers

22 buttons



00ACOD2211000-A

24 buttons



00ACOD2412000-A

Locking via Hall sensor

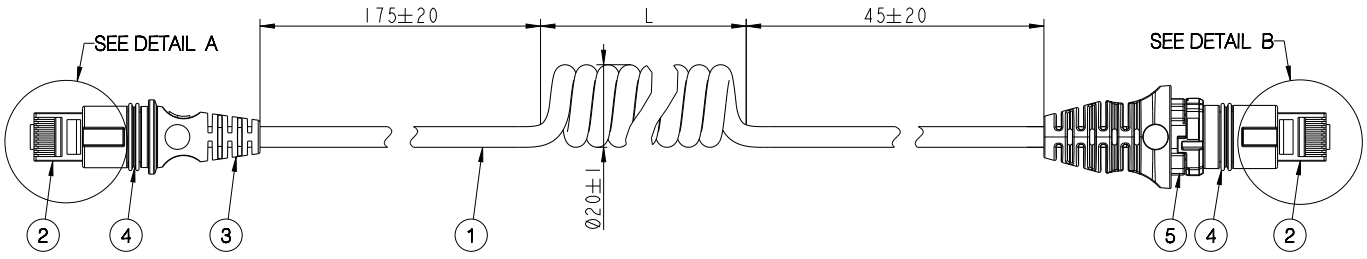
The ACOD can be locked via Hall sensor by hovering the magnet key over the Hall sensor icon:

Remember to order magnet key:

Magnet key - ordering no. 0858008 (RAL 7035 light grey).

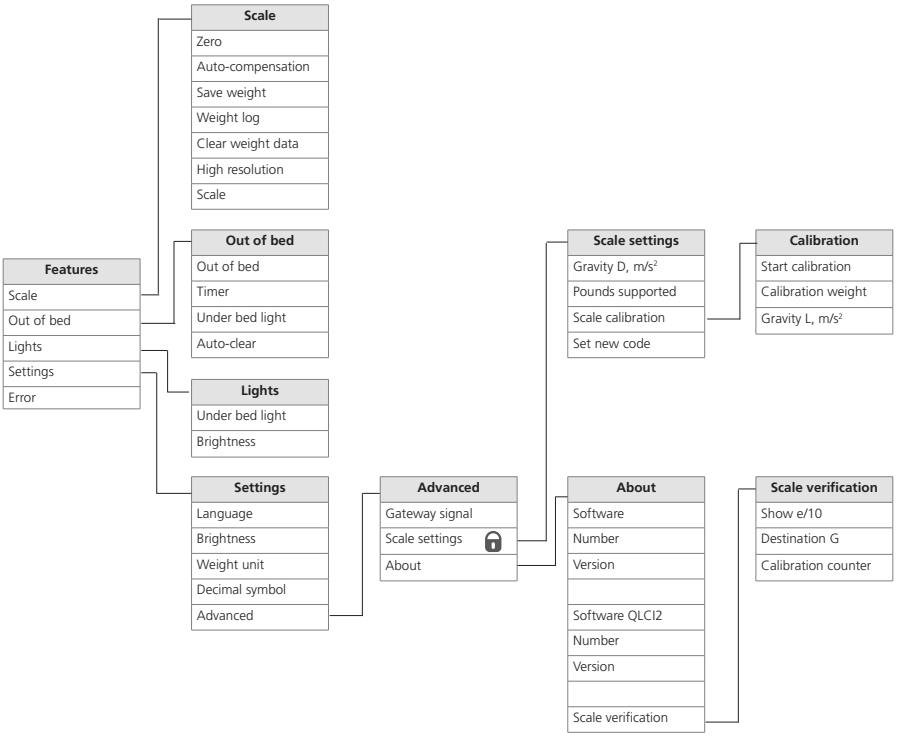
Cable

The ACOD uses an exchangeable OpenBus cable, item number: 1034w7002-0600 (cable is included).



Drawing no.: 1034w7002

Menu structure

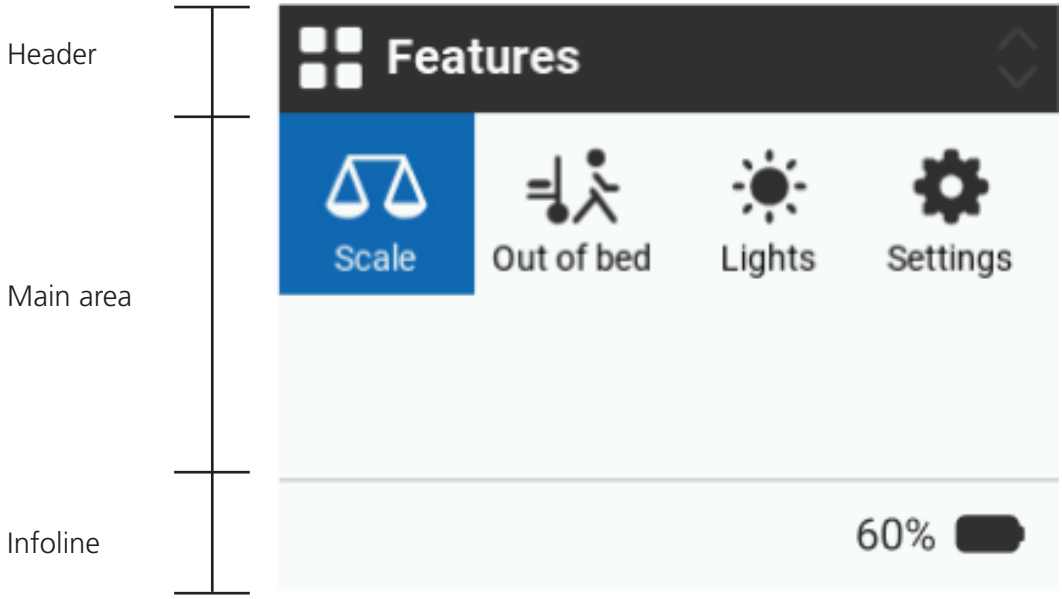


Information

- Please note that the menu structure depends on the accessories that have been connected.
- To be able to use all functions, it is necessary to have UBL2 1.1 OpenBus™ and QLCI2 connected to the system.

General

On the first start-up, and subsequently each time the power supply has been disconnected, an automatic scan of the systems starts after which the control is then ready for use. The scan ensures that only connected devices are visible on the display.



Header

The header contains an icon, a headline of the current menu and an up/down arrow showing if more items are hidden below or above what is shown in the main area. When nothing is hidden, the arrows are faded. The header is always visible when navigating through the menu.

Infoline

The infoline is used to give the user information about the feature without having to enter the menu. The far-left side of the infoline is used to show notifications and errors. The infoline is always visible.

Main area

The main area has five different views:

- Main menu (tiles)
- List menu
- Selection
- Movement
- Pop-ups

Information

LINAK does NOT provide support with screen dumps, but offers a standard simulator of the relevant control that can be used by the OEM to take the desired screen dumps themselves. The simulator can be obtained upon request from your local sales engineer at LINAK A/S.

Main menu

The main menu is divided into 8 tiles (2x4) and can be navigated via the arrow keys. 8 tiles can be seen at a time. If some features are hidden, they can be accessed by pressing the down key twice or more.

The blue focusing colour indicates the tile that is currently selected.

	Scale	Out of bed	Lights	Settings
Neutral tile				
Selected tile				

List menu

The list menu can have from 1 to 4 visible items at a time.

List items can have two main functions: toggle (for instance on/off) and go to edit mode (for example language). Some features need to be turned on before other settings can be set.

When the feature is off, list items will be in a greyed out state and cannot be accessed.

Edit mode

The edit mode is accessed through the list menu. The list will focus on the selected item and is navigated by using the up/down arrow keys. Press OK to confirm choices or BACK to leave the menu without saving.

If there are more options than visually shown, the arrows above and under the choices are black to illustrate what direction you are able to move in, otherwise the arrows will be faded.

Pop-ups

Pop-ups occur when the user needs to take action.

There are four pop-up types:

User instructions:	These are messages to the user, asking to wait or accept certain changes. User instructions will have a black background with white text.
Notifications:	Notification pop-ups occur when you enter a menu with a notification. Notifications will have a yellow background.
Errors:	The error pop-up will be shown when an error/user error occurs. Errors will have an orange background. An error list can be found later in this document.
Low battery:	Low battery (below 20%) icon will flash in left area of Infoline.

Prioritising

In case that multiple pop-ups occur at the same time, the priority of the icons is listed as below:

High - Errors

Mid - Notification - Out of bed

Low - Notification - low battery

Pop-up icon list

The below icons are being displayed either when activated or being detected.

	Timer
	Under bed light
	Error
	Out of bed
	Low battery
	Low battery

Power

The control can be operated when the control box is on mains or in battery mode. Please be aware that all features other than scale will be disabled in battery mode.

Power source

The power source will be shown in the right corner of the infoline, when running features

Battery level ONLY shows on features/overview screen, not in submenus or when view IDs are displaying on the control screen.

	Power source	
	Mains	Battery
(battery full)		✓
(charging)	✓	✓
(mains)	✓	

Information

For lithium batteries, the LINAK system only charges the battery to full if the battery level is below 80%. This to avoid increased wear and increase the lifetime on the lithium cells inside the battery.

The battery status will be shown as percentage in steps of 10:

100% (91 to 100 percent capacity)

90% (81 to 90 percent capacity)

80% (71 to 80 percent capacity)

70% (61 to 70 percent capacity)

60% (51 to 60 percent capacity)

50% (41 to 50 percent capacity)

40% (31 to 40 percent capacity)

30% (21 to 30 percent capacity)

LO (0 to 20 percent capacity)

While running functions on low battery, a warning notification sound and flashing battery icon will be activated.

Functions

Scale

The scale feature is used to monitor the patient weight. The scale menu itself is a special list menu view with focus on showing the patient weight. The list contains up to seven items, depending on calibration.

Scale:	Turns the feature on or off. When turned on, the current weight on the application will immediately be shown, first with blue letters, which indicates that the weight on the bed is still not stable. When the weight on the bed is stable, then the letters will turn black, indicating the stable weight. Please note that, when scale turned on, this tile moved at the bottom of the Scale menu. When the feature is off, list items will be in a greyed-out state and cannot be accessed.
Zero:	Zeroes the bed. The bed can only be zeroed if the weight is below 50 kg (This value can be changed when calibrating the bed)
Auto-compensation:	Is used to add/remove items from the bed, such as a new pillow or equipment, without impacting the patient weight.
Save weight:	Save weight of the patient. There are 10 memory spaces for saving the weight.
Weight log:	View the last saved weight/s of the patient. It is only possible to see the latest 10 saved weight entries.
Clear weight data:	Is used to clean up the weight log.
High resolution:	Only accessible if the calibration is made with a value other than 100 g precision (e=0,1). Pressing the high precision will show a 100 g weight for 5 seconds and then return to showing for instance 500 g again. The marking plate shows the range in which the scale will measure and if it supports kilograms and pounds. Values are determined by the QLCI2 and how it is calibrated.

Abbreviations

Min: Minimum weight to be measured

Max: Maximum weight to be measured

e: Weight resolution

d: Detailed weight resolution (only visible when e≠d)

Information

To use the scale feature, a QLCI2 must be connected to the system.

If the system needs to have a weighing approval, the control must be created as a special item due to upcoming software updates. This is to avoid the automatic software update when the software has a new version.

In the main area, the following scale icons can be seen:

Description	Neutral icon	Selected icon
Default		
ON		
Error		
Disabled		

Out of bed

The out of bed feature is used to set what happens when the patient leaves the bed. The out of bed menu contains up to six items, depending on connected accessories.

To use the out of bed feature, the system requires a QLCI2 with 4 third-party load cells.

Out of bed:	Turns the feature on or off. When the patient leaves the bed, the out of bed icon in the main menu will turn to the notification icon. The out of bed icon and the warning text will be displayed in the infoline at the same time. When the patient returns the bed, the out of bed alarm is automatically cleared if auto-clear is enabled. If not, the alarm needs to be cleared by entering the out of bed menu.
Timer:	The timer determines how much time will pass after the person has left the bed and a notification appears and/or a signal is sent via a gateway. Values, which can be set, can be between 1 sec – 60 min. If the timer is enabled, below timer icon will be shown in the infoline, when the out of bed tile, on the main menu is selected.
Under bed light:	Possible to toggle between on/off. Activates when the patient leaves the bed and requires an under bed light. If the under bed light is enabled, below light icon will be shown in the Infoline, when the out of bed tile, on the main menu is selected.
Auto-clear:	Possible to decide if the out of bed notification should be removed automatically when the patient returns to the bed. The default setting is on.

In the main area, the following out of bed icons can be seen:

	Neutral	Selected
Default		
ON		
Error		
Notification		

Lights

It is possible to connect an under bed light.

Under bed light:	Toggle on/off When the under bed light is turned on, the under bed light icon will be shown in the infoline
Brightness:	Set up the under bed light brightness - (Min./Max.)

In the main area, the following light icons can be seen:

	Neutral	Selected
Default		
ON		
Error		

Settings

Language:	Choose system language (English, German, French, Spanish, Danish, Portuguese, Polish, simplified Chinese and traditional Chinese).
Brightness:	Choose the display brightness level (Min., Mid., Max.)
Weight unit:	Choose kilograms or pounds. The list item is only visible if the calibration supports pounds.
Decimal symbol:	Choose between a comma or dot.
Advanced:	Set up gateway signal, scale calibration, about and scale verification

In the main area following settings icons can be seen:

	Neutral	Selected
Default		

List menu inside “Advanced”:

Gateway signal: (only needed if gateway is connected)	Choose how the gateway signal is sent, either pulse or follow. In case of an event using the gateway, such as a person leaving the bed with out of bed active.	
	Pulse:	Sends a signal via the gateway and shuts off. Will send a new signal when the person returns to bed.
	Follow:	Will keep sending a signal as long as the person is out of bed.
Scale settings:	This section contains settings including calibration from the control.	
About:	Software:	This section outlines the current software and version programmed in the control box.
	Software QLCI2 (if QLCI2 is connected):::	This section outlines the current software and version programmed in the QLCI2.
	Scale verfication (if QLCI2 is connected):	This tab contains information on the specified precision of the scale, the determined gravitational force at the destination, and the number of calibration procedures that have been conducted.

Calibration via scale display unit

To calibrate the QLCI2 via a scale display unit, there is no need for an additional calibration SW or a calibration cable. The calibration is performed via the "Scale calibration" function, which is placed under Settings - Advanced. (This feature can be disabled via calibration tool)

Press OK button to get into the "Scale settings" feature. Please note that the calibration function is password-protected and the default password is "0001". Use the up and down arrow keys to change each digit and use left and right arrow to move between digits. Press "OK" button to enter the password.

If calibration on scale display unit is required, be aware that system calibration is enabled by default.

List menu inside "Scale calibration":

Gravity D, m/s²:	The gravity of the destination in m/s². In order to type the new value and navigate between the digits, simply use the arrow keys. Press OK button, when the new value is typed.
Pounds supported:	If selected, the marking plate in the display will also include the equivalent settings and the user can select between pounds and kg.
Set new code:	To change the default code to enter the calibration menu. In order to type the new code and navigate between the digits, simply use the arrow keys. Press OK button, when the new code has been typed.
Scale calibration:	Opens the calibration menu (1-point calibration), including two list items together with the marking plate view: Calibr. weight: Weight of the calibration load in kilograms. In order to type the new weight and navigate between the digits, simply use the arrow keys. Press OK button, when the new weight has been typed. Start calibration: When all the settings are done, press the OK button, when start calibration item is selected.

Information

Be aware that the default calibration weight and password can be set in LIX edit.

Steps in "Start calibration" mode:

Establish no load:	Remove any weight on the application that is not intended to be a weight of the application and press OK to proceed. It is recommended to make calibration without for instance the mattress and other things that the end users can change themselves.
Establish calibration load:	Place your calibration weight centrally on the application and press OK to proceed.
Calibration complete:	Calibration is successfully completed. Press OK to save the calibration data.

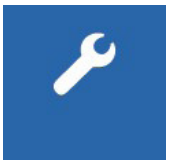
Error codes

Message type detail

E: Error, something which blocks normal operation

W: Warning, something which leads to lower performance

U: User error, the application has detected that the system is used incorrectly, the usual user is able to fix the problem

Description	Neutral icon	Selected icon
Error		

General

Message ID	Message type	Short description	Long description	Troubleshoot guide
E1AA01	E	OB inactive	E1AA01: OB inactive	Check connections and cables and restart system
E1AB01	E	Fatal error	E1AB01: Fatal error	Check connections and cables and restart system

Scale

Message ID	Message type	Short description	Long description	Troubleshoot guide
E1AE01	E	Comm. error	E1AE01: Communication error	Turn scale on/off
E1AE04	E	LC1 disconnected	E1AE04: Load cell 1 disconnected	Check load cell 1 connection and calibrate system
E1AE05	E	LC2 disconnected	E1AE05: Load cell 2 disconnected	Check load cell 2 connection and calibrate system
E1AE06	E	LC3 disconnected	E1AE06: Load cell 3 disconnected	Check load cell 3 connection and calibrate system
E1AE07	E	LC4 disconnected	E1AE07: Load cell 4 disconnected	Check load cell 4 connection and calibrate system
E1AE08	E	Not calibrated	E1AE08: Not calibrated	Please calibrate the system again
E1AE09	E	Incorrect calibration	E1AE09: Wrong calibration	Please calibrate the system again
E1AE10	E	Checksum failure	E1AE10: Checksum failure	Turn scale on/off
E1AE11	E	Hardware error	E1AE11: Hardware error	Check connections and cables and restart system
U1AE01	U		U1AE01: Overload	Remove weight from the bed. Risk of damaging the bed
U1AE02	U		U1AE02: Insufficient load	Please add weight to the bed or check if load cells are unloaded due to external factors.
U1AE03	U		U1AE03: Weight unstable	Make sure the weight is stable. If retry, make sure not to change the weight.
U1AE04	U		U1AE04: Weight above max.	Please remove weight from the bed and try again
U1AE05	U		U1AE05: Weight below min.	Please add weight to the bed and try again
U1AE06	U		U1AE06: Zero above max.	Please remove weight from the bed and try again
W1AE01	W	Scale missing	W1AE01: missing	Check connections and cables and restart system

Out of bed

Error codes generated by out of bed:

Message ID	Message type	Short description	Long description	Troubleshoot guide
E1AD01	E	Comm. error	E1AD01: Communication error	Turn out of bed on/off
E1AD02	E	OOB not ready	E1AD02: Out of bed not ready	Check connections and cables
E1AD03	E	CB not ready	E1AD03: Control box not ready	Current backrest position doesn't allow OOB monitor. Run the backrest down
E1AD04	E	Load cell 1 error	E1AD04: Load cell 1 error	Check load cell 1 connections and cables
E1AD05	E	Load cell 2 error	E1AD05: Load cell 2 error	Check load cell 2 connections and cables
E1AD06	E	Load cell 3 error	E1AD06: Load cell 3 error	Check load cell 3 connections and cables
E1AD07	E	Load cell 4 error	E1AD07: Load cell 4 error	Check load cell 4 connections and cables
E1AD08	E	Scale not calibrated	E1AD08: Not calibrated	Calibrate system
E1AD09	E	Hardware error	E1AD09: Hardware error	Check connections and cables and restart system
W1AD01	W	OOB missing	W1AD01: Out of bed missing	Check connections and cables and restart system

Under bed light

Error codes generated by under bed light:

Message ID	Message type	Short description	Long description	Troubleshoot guide
E1AF01	E	UBL missing	E1AF01: Under bed light missing	Check connections and cables and restart system
E1AF02	E	UBL missing	E1AF02: Under bed light missing	Check connections and cables and restart system
W1AF01	W	UBL missing	W1AF01: Under bed light missing	Check connections and cables and restart system

Recommendations

- Clean the control regularly to ensure good hygiene standards.
- It is recommended to make a functional test of the application before setting it into operation.
- If an error occurs on a component installed on the system, the error will be shown in the display. If the error is still valid after a restart of the system, the component will be shown as disabled (greyed out). When entering the component, it will show the error again. If the feature/component is not intended to be in the system, it is recommended to disable the component in the scan system to avoid the misleading error.
- Keep the control upright when washing.
- Inform the customer only to use the magnet key supplied by LINAK.
- When a defective ACOD is replaced, check that the new ACOD has the same specification and functionality.
- Check the control after connecting all devices to make sure that all features are recognised and visible in the display. If not, it is recommended to restart the system.
- Do not submerge the control in water.
- Unless otherwise specified or agreed with LINAK, the control is only intended to be used for LINAK systems.
- Inspect the cable lock before use. If the red indicator is visible, the cable is unsecured. The detachable cable must also be locked.
- When changing controls for OpenBus™ systems, the power must be switched off.
- Perform regular inspection for wear and damage.
- It is recommended to have a parking place for the control on the application where the customer ensures that the control does not fall off.
- Please note that using the magnet key cannot wake up a low-power system or a system running on battery. The system will wake up when a key is activated to unlock the system.

Warnings

- Do not sit or lie on the attendant control as this can cause unintended movement of the application.
- If the control shows any signs of damage, its use may not be advisable as it could display incorrect information.
- Always use O-ring on connectors and cable locks.
- The application manufacturer must write an end-user manual based on the LINAK user manual which also includes relevant warnings, information on how to carry out regular inspection and a functionality description. End-users must be trained in all functions

ACOM

ACOM is the obvious control for hospital and nursing home beds where patient positioning needs careful control by medical staff. ACOM is an OpenBus™ control.

Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% non-condensing
Atmospheric pressure:	700 to 1060 hPa (3000 m)
Height above sea level:	Max. 3000 meters
Approvals:	IEC 60601-1 Edition 3.1 (2012) IEC 60601-1-6:2010 + A1:2013
Compatibility:	Compatible with LINAK OpenBusTM control boxes, CO-generation

Recommendations

- Clean the hand control regularly to ensure good hygiene standards.
- When a defective ACOM is replaced, check that the new ACOM has exactly the same specification and functionality.
- Do not submerge the hand control in water.
- Unless otherwise specified or agreed with LINAK, the hand control is only intended to be used for LINAK systems.
- When changing hand controls for OpenBusTM systems, the power must be switched off.
- It is recommended to check the hand control and cable for damage and holes caused by violent handling before washing the application or at least once a year.
- It is recommended to have a parking place for the hand control on the application where the customer ensures that the hand control does not fall off.

Warnings

- Do not sit or lie on the hand control as this can cause unintended movement of the application.

DPH Medical

The desk panel control DPH is made especially for the medical segment. It makes it possible to differentiate product design and achieve a more aesthetic control solution.

The DPH (DPH1K10-210007) works with MJB (MJB5061101-00) and is OpenBus™ compatible.

The DPH (DPH1K10-210008 and DPH1K10-210009) fits directly into the analogue control box (CA30/CA40 or CA63).

The MJB 000 port repeater version can be used in systems where several DPH controls are needed.

Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% non-condensing
Atmospheric pressure:	700 to 1060 hPa
Height above sea level:	Max. 3000 meters
Compatibility:	DPH is compatible with analogue or OpenBus™ control boxes
Modular Junction Box:	MJB5061101-00 to be used with DPH1K10-210007 or MJB version 000 port repeater to be used with DPH1K10-210008 or DPH1K10-210009
Approvals:	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

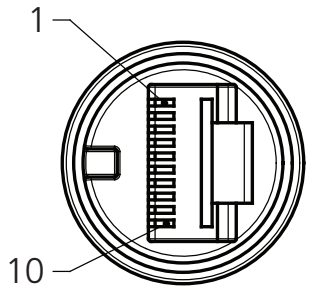
Functionality

DPH1K10-210007 combined with MJB5061101-00 creates the OpenBus™ codes:

Up arrow: H0
Down arrow: H1

Wrong mounting is not an issue with the MJB5061101-00 and the modular jack plug of the DPH cable. The plug will only fit into the correct MJB ports.

PIN diagram



Circuit diagram	DPH1K10-210007	DPH1K10-210008	DPH1K10-210009
Common	2 (blue)	2 (red)	2 (red)
Down	8 (red)	3 (orange)	7 (orange)
Up	9 (green)	4 (green)	8 (green)
System	OpenBus	Analogue	Analogue

FPP

The FPP is for use with a variety of different bed types and is therefore compatible with control boxes that use an OpenBus™ interface.

Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% non-condensing
Atmospheric pressure:	700 to 1060 hPa (3000 m)
Flammability rating:	V2
Approvals:	IEC 60601-1:2005 (Edition 3) ANSI/AAMI ES60601-1:2005 CAN/CSA-C22.2 No. 60601-1:2008

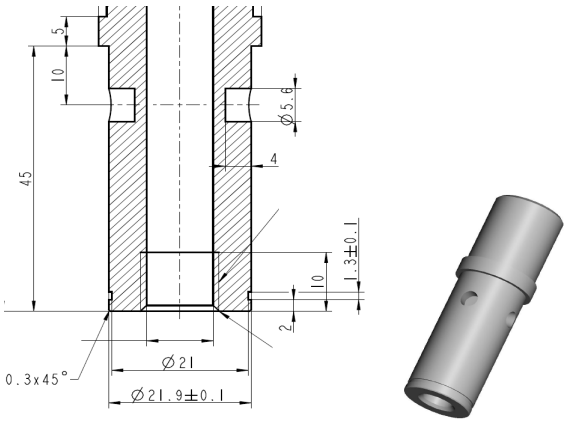
Mounting instructions

The FPP is intended for mounting at the head end of a bed in order for the patient to be able to see and operate it with an easy push of a button. After use, it can easily be moved a short distance aside.

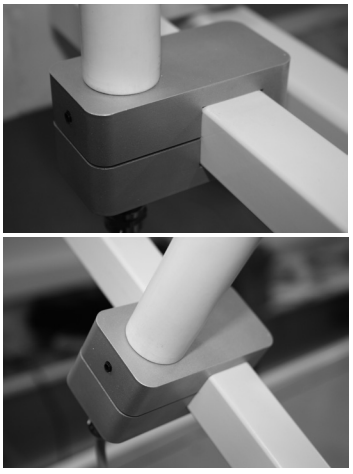
The FPP comes with a cable attached. The bottom part of the arm is prepared for mounting inside a bracket - fitting the diameter of the arm.

The bracket is not supplied by LINAK but must be designed and manufactured by the customer. It must fit the dimensions shown. A suggestion to a design and dimensions of the fixation parts are shown below:

Dimensions illlustration



Possible bracket design



The FPP must be mounted in such a manner that it is secured against rotation. For this purpose the bracket end of the arm has 4 drilled holes - one of the 4 holes must be secured via the bracket with a slotted set screw with cone point (pointed screw). Otherwise it may slide away from the user when operated.

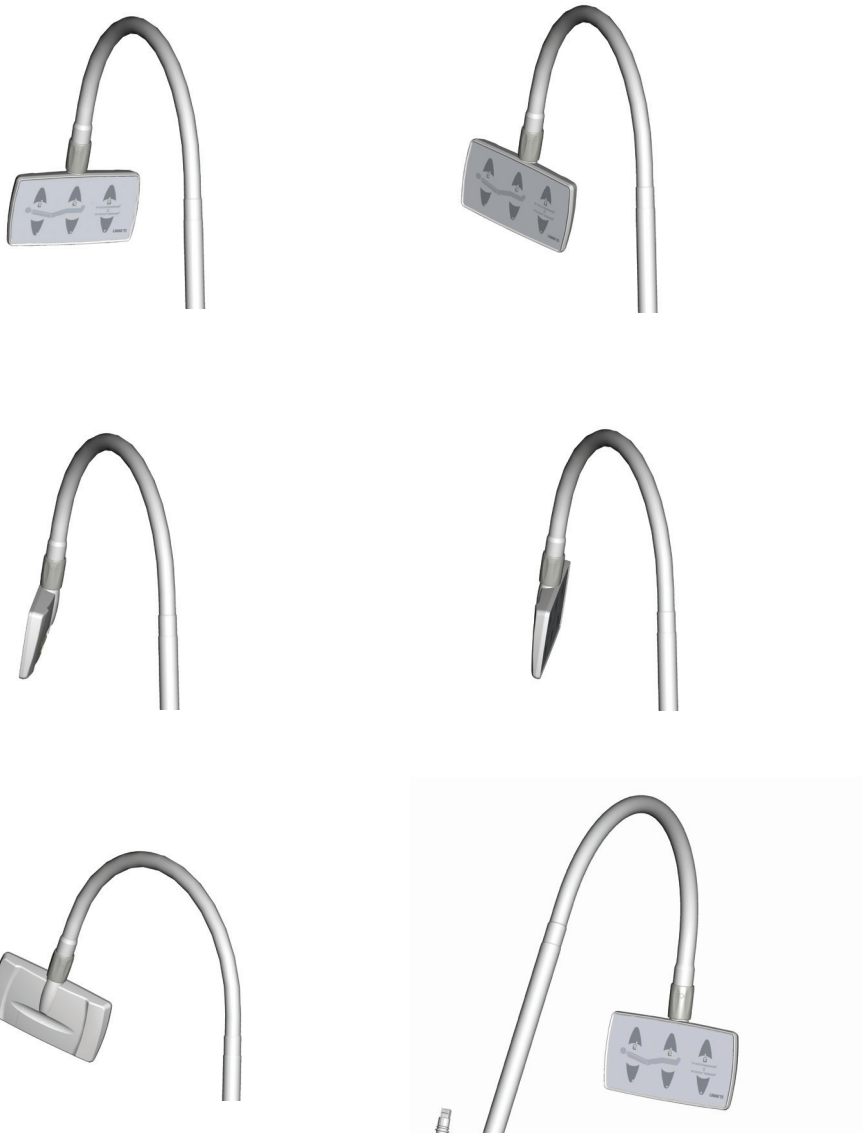
Recommendations

- The application manufacturer must ensure a proper installation of the FPP in the application which is convenient for the end user.
- To ensure proper activation, the lock above the housing must be properly locked by turning it clockwise.
- The application manufacturer must use the correct torque for the slotted set screw of the bracket to ensure a stable positioning of the FPP.
- The application manufacturer must consider the bracket position carefully. If the FPP is mounted on a moveable part, it will move and might touch the patient or parts of the application. If, however, mounted on a fixed part, the FPP might not be within the reach of the patient.
- The end user must not apply a torque to the FPP housing of more than 8 Nm between the flexible arm and the panel.
- The end user must not bend the FPP arm to a radius smaller than 105 mm.
- The FPP must never be used as a handle for moving the application.
- The end user must be informed that the FPP must not be used for other purposes (such as table, handle) than intended.
- The end user must take care that the FPP does not touch items or persons when the application is moved.

Warnings

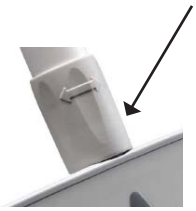
- The FPP must be placed readily accessible for the patient. Never let the FPP hand out of the bed.
- Never use the FPP as a handle.
- Do not use sharp devices to activate buttons on the FPP.
- Never use the FPP as support device. The FPP must not be used as table or notepad, nor can it be used to hang objects on.

As illustrated in the pictures below the panel itself can be moved and angled in a number of positions. The arm can also be bent to move it closer or move it further away from the user.



The lock function

Between the arm and the panel there is a lock/unlock function, (a hose type connection).



It enables the user to turn the panel into a preferred position.

Locking of the panel

Turn the panel to a preferred position. With one hand on the panel turn the hose clockwise with the other hand.

The panel is fully locked when it cannot be turned.

Unlocking of the panel

With one hand on the panel, turn the hose counterclockwise with the other hand until the panel can be moved freely.

FS

The Foot Switch is a modular system, developed for use together with LINAK control boxes. The LINAK Foot Switch is designed for control of physiotherapeutic beds, hospital beds, dentist chairs, gynaecologist chairs, computer workstations and working desks etc. It can also be used as a "stand alone" item for industrial applications.

Usage

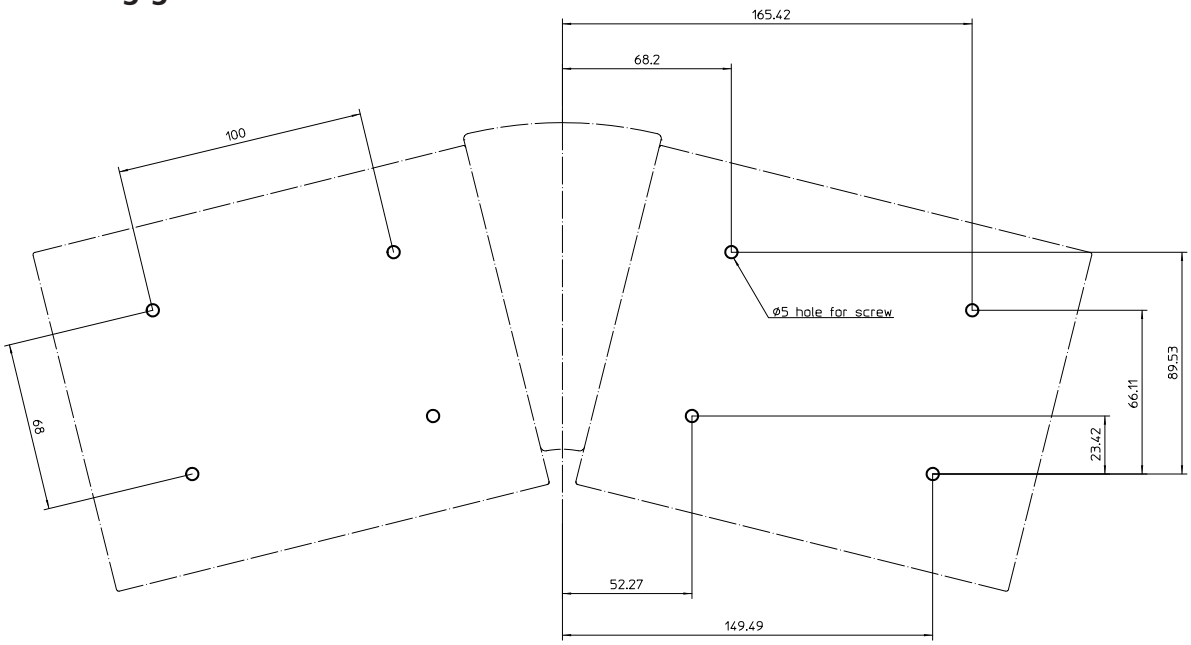
Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Compatibility:	To be used with the following control boxes: CB8, CB9, CBJ2
Relative humidity:	20% to 80% – non-condensing
Atmospheric pressure:	700 to 1060 hPa
Meters above sea level:	Max. 3000 meters
Approvals:	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

Combination possibilities

	CB8	CB9**	CBJ2
FSEXX0	X	X	
FSEXXB			X

X = Combination allowed
** = Not CB9..Px

Mounting guidelines



Recommended screw:

EJOT DELTA PT WN 5452, 40 x L

Torque: 1.0 Nm

Screw length = thickness of the support plate +10mm

Do not use countersunk head screws

FS3

The LINAK® Foot Switch FS3 is an elegant control unit, allowing healthcare professionals across the sector to have both hands free when attending to patients, thus also helping to improve ergonomics.

It is designed to be used in modular adjustment systems consisting of LINAK control boxes and electric LINAK IC actuators.

Usage

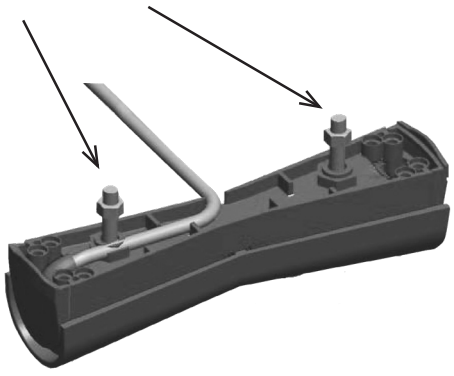
Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% non-condensing
Atmospheric pressure:	700 to 1060 hPa (3000 m)
Height above sea level:	Max. 3000 meters
Compatibility:	Compatible with LINAK analogue and OpenBus™ control boxes. Please contact LINAK.

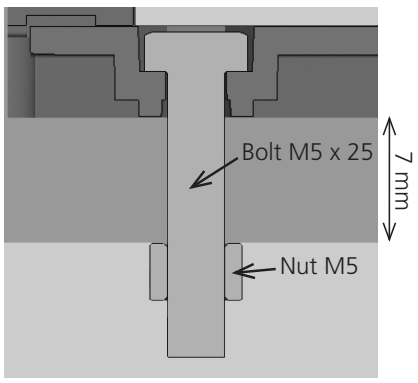
Approvals:	**Safety**	**Radio**
	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No. 60601-1	RED FCC (US) IC (Canada) Telec (Japan)

Mounting of the FS3 bed model

To mount the FS3 bed model, you have to use the bolt and the nut which have already been fitted to the FS3 bed model (see picture below).

Bolt and nut for mounting

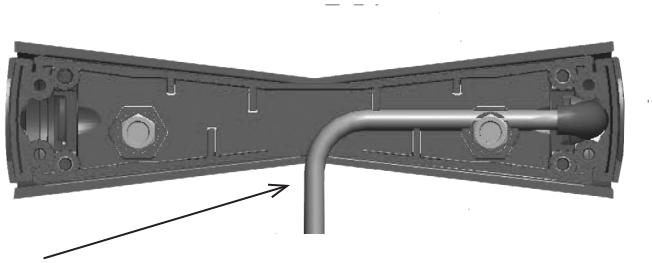




You have to remove the nut before mounting the FS3 on the bed and after mounting the FS3 to the bed, the nut is fastened to secure that the FS3 is fixed to the bed frame.

Please note that the max. torque on the nut should be 2.0 Nm (20 kg f. cm).

When mounting the FS3 bed model, it is important to run the cable through the hole of the FS3 in order to lead the cable through (see picture below).



Location of the notch for the cable of the FS3 bed model.

Functionality

Functionality overview analogue

	Left pedal		Single/Right pedal	
Code nos.	**+**	**-**	**+**	**-**
FS3X0S1	N/A	N/A	1UP	1DW
FS3X0S2	N/A	N/A	2UP	2DW
FS3X0S3	N/A	N/A	3UP	3DW
FS3X0S4	N/A	N/A	4UP	4DW
FS3X012	1UP	1DW	2UP	2DW
FS3X013	1UP	1DW	3UP	3DW
FS3X014	1UP	1DW	4UP	4DW
FS3X021	2UP	2DW	1UP	1DW
FS3X023	2UP	2DW	3UP	3DW
FS3X024	2UP	2DW	4UP	4DW
FS3X031	3UP	3DW	1UP	1DW
FS3X032	3UP	3DW	2UP	2DW
FS3X034	3UP	3DW	4UP	4DW
FS3X041	4UP	4DW	1UP	1DW
FS3X042	4UP	4DW	2UP	2DW
FS3X043	4UP	4DW	3UP	3DW
FS3X011	1UP	1DW	1UP	1DW
FS3X022	2UP	2DW	2UP	2DW
FS3X033	3UP	3DW	3UP	3DW
FS3X044	4UP	4DW	4UP	4DW

Functionality overview OpenBus™

	Left pedal		Single/Right pedal	
Code nos.	**+**	**-**	**+**	**-**
FS3XVS0	N/A	N/A	H0	H1
FS3XVS1	N/A	N/A	H10	H11
FS3XVS2	N/A	N/A	H20	H21
FS3XV00	H0	H1	H2	H3
FS3XV11	H10	H11	H12	H13
FS3XV22	H20	H21	H22	H23
FS3XV01	H0	H1	H0	H1
FS3XV10	H10	H11	H10	H11
FS3XV20	H20	H21	H20	H21

Functionality overview - wireless

	2nd left pedal		Single right pedal	
Code nos.	**+**	**-**	**+**	**-**
Key mapping	**Key 4**	**Key 3**	**Key 2**	**Key 1**
FS34AS5	**N/A**	**N/A**	I0	I1
FS34BS5	**N/A**	**N/A**	I10	I11
FS34CS5	**N/A**	**N/A**	I20	I21
FS35A55	I2	I3	I0	I1
FS35B55	I12	I13	I10	I11
FS35C55	I22	I23	I20	I21

The same software is used in both pedal 1 and 2 setups. The single pedal is always the BLE master with software. The 2nd pedal is a standard analogue FS3 driven by a single pedal.

Functionality overview - FS3 3-stage

	2nd left pedal		Single right pedal	
	LEFT	**LEFT**	**RIGHT**	**RIGHT**
Key mapping	**Key 4**	**Key 3**	**Key 2**	**Key 1**
FS3XES1	**N/A**	**N/A**	1UP/STOP	1DW/STOP
FS3XES2	**N/A**	**N/A**	2UP/STOP	2DW/STOP

FS3 3-stage is only available as single version foot switch.

LED functionality

Function	LED behaviour (FS3)	LED behaviour (CB)
Enter pairing mode	LED flashes green	LED solid green
Locating control box	LED flashes green Closer = faster flashing	LED flashes green and yellow and buzzer is ON, same speed as FS3. The closer to the control box, the faster the flash. When the buzzer and the LEDs have the same sound and visual frequency, FS3 and CB are ready for pairing.
Pair	2 long LED flashes	Buzzer and LED confirmation with 2 long flashes and 2 long buzzer sounds.
If more control boxes	LED flashes	The nearest control box will increase in sound and is paired to the foot switch.

Recommendations

- Do not pull the cable or drop the FS3 on the floor.
- Do not play with the FS3.
- Do not submerge the foot switch into water.
- Unless otherwise specified or agreed with LINAK, the foot switch is only intended to be used for LINAK systems.
- It is recommended to check the foot control for damage and holes caused by violent handling before washing the application or at least once a year.
- Always perform the pairing of foot switch and control box in close proximity to the application. Also ensure that the pairing has been made with the correct application by operating the application after ended pairing.
- When intending to operate an application with LINAK Bluetooth® Low Energy, please ensure that the correct BLE foot switch is used. Otherwise, there is a risk of unintended movement of the application that has been paired with the BLE foot switch.

Warnings

Wireless risks and recommendations

RF sensitivity and the transmitting power have been set to a maximum. In addition, LINAK standard BLE allows pairing all the time.

Risk 1

If a BLE foot switch is to be paired with an application, this can be done without being next to the application as the transmitting power settings have been set to a maximum. Under such circumstances, there is a risk of pairing with another application from the distance. As a rule, a BLE foot switch is paired with the closest detectable BLE device, however, the BLE device is not always physically closest.

Risk 1 - remedy

The pairing procedure must always be made in near proximity to the application. It must also be ensured that the pairing has been made with the correct application by simply operating the application after ended pairing.

Risk 2

If a building is equipped with several LINAK BLE applications and the BLE foot switch is accidentally swapped, there is a risk of operating another BLE application if within range. This can cause unintended movement and consequently influence patients' health.

Risk 1 - remedy

When intending to operate an application with LINAK BLE, it must be ensured that the correct BLE foot switch is used. Otherwise, there is a risk of unintended movement of the application that has been paired with the BLE foot switch.

Batteries

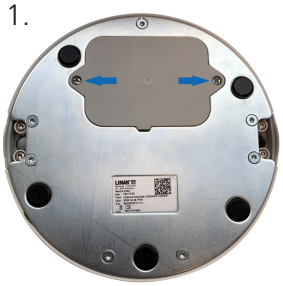
What batteries to use

The FS3 Wireless must be equipped with two AAA batteries. Due to the availability of AAA batteries, we recommend that you buy the batteries locally. If you prefer to buy from LINAK A/S, the LINAK part number is: 0063010.

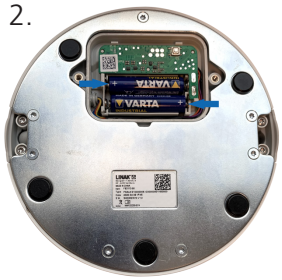
How to mount batteries correctly

1. Underneath the FS3 Wireless. Remove Phillips screws and remove battery cover
2. Place batteries correctly to ensure the electrical polarity and place battery cover again

1.



2.



Battery replacement

Depending on usage, the lifetime is estimated to 3-4 years.

Low battery indication

When the FS3 Wireless foot switch is activated and the battery voltage = < 2.4 V and > 2.2 V, the LED will flash with 250 m/s ON/OFF 4 times and then turn off.

When the battery voltage is lower than 2.2 V, the LED does not flash anymore and the battery must be replaced.

FS3 wireless pairing

Open the battery cover on the back of FS3. Place batteries and move within 2 meters of the control box.

Move the foot switch within 10 cm of the control box until the buzzer frequency changes from slow to fast.

Activate Direct Pairing by pressing the button under the battery cover for 3 seconds. Buzzer and LED are now activated.

Confirm pairing by pressing the button under the battery cover. A double confirmation beep means that pairing is OK.

HB30

The HB30 hand control is designed for better user experience and ergonomic fit for the hands of caregivers. The compact size ensures one hand operation. The HB30 is especially suitable for patient lifts and other MEDLINE® and CARELINE® applications like couches, tables and chairs for treatment and examination. The HB30 is available in an analogue version and an OpenBus™ version.

Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Compatibility:	Analogue JUMBO Systems Analogue JUMBO systems with diode and OpenBus JUMBO versions All OpenBus control boxes CAL40, CAL40+ and COL50
Approvals:	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

The HB30 has a compact design and therefore it cannot be approved according to EN IEC60601-2-52 (Application Environment 4 for care beds used in Domestic areas (or EN1970)).

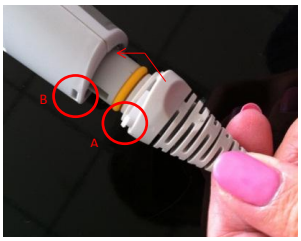
How to identify a cable:

Each cable has a label for easy identification of item number and for which control box it is intended.

How to mount a cable:

Step 1:

Mount the cable lock and fix it to the slot marked in the picture.



Step 2:

Fix the cable tab on the hand control's front side first.

Push in and twist a bit to fix the tab (see picture fit A into B).

Step 3:

Fix the tab on the back as well by pushing.

How to remove a cable:

Step 1:

Release the cable by pushing e.g. a screwdriver into the hole on the back of the hand control. Twist and release.

Recommendations

- Please ensure that you use the right cable type to ensure the wished functionality. In case of lack of functionality of your hand control, check that the hand control cable is the right one for the intended control box or contact your local LINAK representative.
- Please note that HB3X0L0 version (analogue with diode) is not supported by the CBJC. The diode will light up at all times if used with the CBJC.
- Do not submerge the hand control under water.
- Unless otherwise specified or agreed with LINAK, the hand control is only intended to be used on LINAK systems.
- Do not sit or lie down on the hand control. It can cause unintended movement of the application.
- When changing hand controls for OpenBus™ systems, the power must be switched off.
- The force of the magnet depends on the thickness and the type of the lacquering, stickers, steel thickness etc. It is the responsibility of the customer to verify that the holding force on the application is acceptable.
- For hand controls with magnets it is the responsibility of the user/operator to evaluate any possible risk caused by use of permanent magnets.
- For hand controls with magnets it is recommended to have a parking place for the hand control on the application, where the customer ensures that the hand control does not fall off.

HB30 Display

HB30 Display is designed for better user experience with good ergonomic fit for caregiver hands as the compact size ensures one-hand operation.

This well-designed hand control is especially suitable for patient lifts and offers relevant features for standard OpenBus™ systems, while at the same time allowing for data readout.

Usage

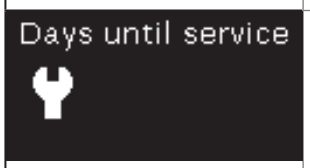
Usage temperature:	5 °C to 40 °C
Storage temperature	-10 °C to +50 °C
Approvals:	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

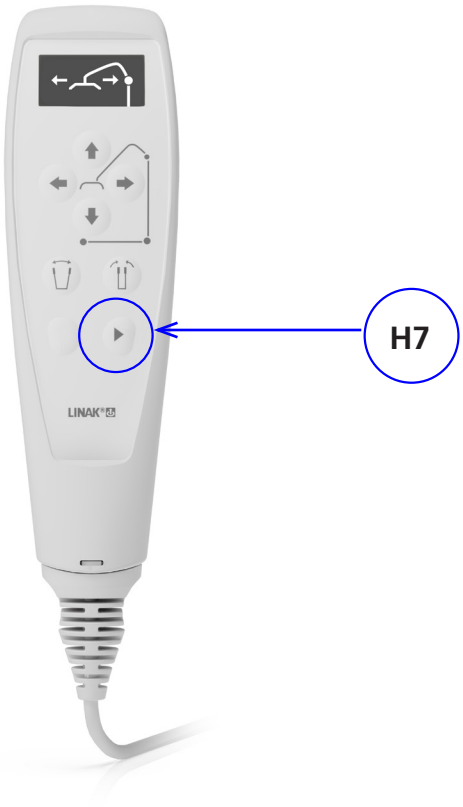
Display functionality

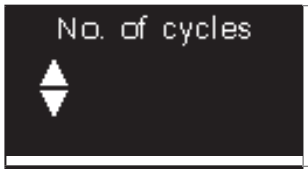
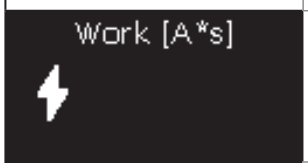
It is possible to read out the following information via the HB30 display. This can be divided into categories: menu, system notification, movement and errors.

Menu

The menu is structured on the basis of a rotating platform which is possible to scroll through via key H7 (clockwise). The images shown below are standard for the HB30 display.

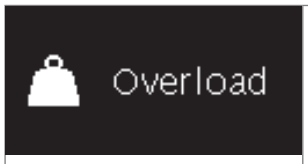
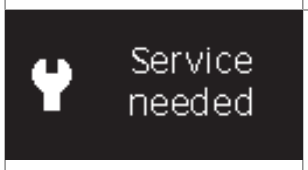
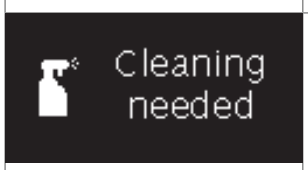
	Startup screen
	If multiple hand controls are in use at the same time, only one will receive data, the other will show the following screen
	On mains. This will automatically overrule the battery icons when mains is connected
	Battery low 1-2 cycles possible
	Charging - flashing between image with and without lightning inside
	Charging - flashing between image withand without lightning inside
	Number of days until service is needed
	Number of weight overloads (not channel-specific)

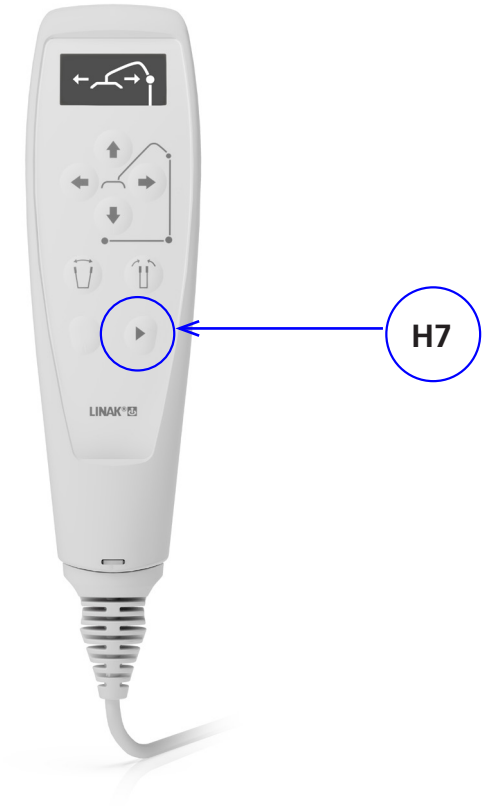


	Number of cycles (not channel-specific)
	Battery showing state of charge in %
	Battery communication not available
	Amount of work in A*s (not channel-specific)

System notifications

The icons shown below will pop up as a notification and must be accepted by pressing the menu scroll button (H7). When the system is reactivated, the notification will show again unless action has been taken.

	Weight overload (not channel-specific)
	Service is needed
	Error in system detected
	Emergency switch has been pressed
	Cleaning is needed
	Position is lost (not channel-specific)
	Battery is low



Movements

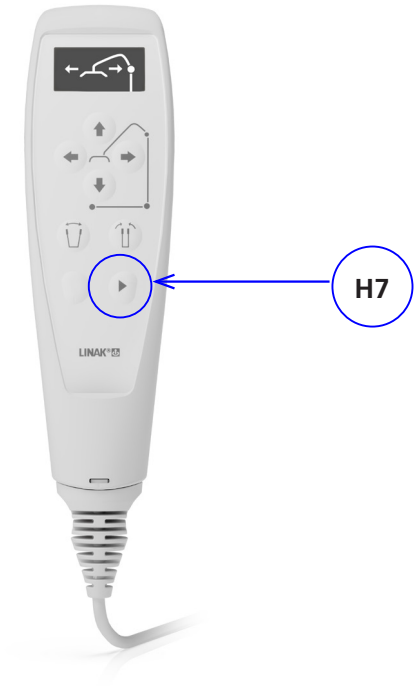
When pressing the movement button, it will show the screen related to the requested function. When the button has been released, it will go back to the menu screen which was last shown.

	Lift arm moving upwards
	Lift arm moving downwards
	Lift leg-spread moving inwards
	Lift leg-spread moving outwards
	Lift sling moving to the left or to the right

Error codes

The error code is a fixed picture that cannot be hidden by using the menu key (H7).

	Communication problem/ no communication. Can be triggered if control box is not compatible
	View-ID unknown to display



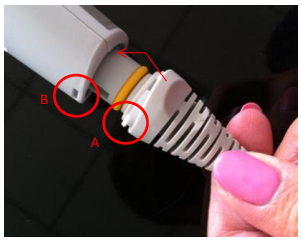
For further information regarding display behaviour, please contact your ususal LINAK contact.

How to mount a cable

Step 1:

Mount the cable lock and fix it to the slot marked in the picture

.



Step 2:

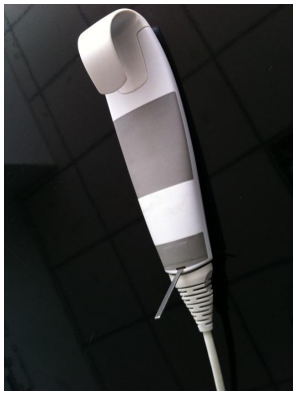
Fix the cable tab on the hand control's front side first.

Push in and twist a bit to fix the tab (see picture fit A into B).

Step 3:

Fix the tab on the back as well by pushing.

How to remove a cable



Step 1: Release the cable by pushing for instance a screwdriver into the hole on the back of the hand control. Twist and release:

Recommendations

- Please ensure that you use the right cable type to ensure the requested functionality. In case of lack of hand control functionality, check that the hand control cable is the right one for the intended control box or contact your local LINAK representative.
- Do not submerge the hand control under water.
- Do not sit or lie down on the hand control. It can cause unintended movement of the application.
- When changing hand controls for OpenBusTM systems, the power must be switched off.

Warnings

- Do not sit or lie on the hand control. It can cause unintended movement of the application.
- If the hand control shows signs of damage, the use of HB30 Display might be inappropriate as it might show incorrect information.
- The application manufacturer must write an end user manual based on the LINAK user manual which also includes relevant warnings, information on how to carry out regular inspection and a functionality description. End users must be trained in all functions.
- Always use O-ring on connectors and cable locks.

HB70

The HB70 offers simultaneous drive of multiple actuators which can be used for the memory options. The hand control HB70 can be used for both OpenBus™ and analogue systems and comes in 3 colours: black, dark grey and light grey.

Usage

Compatibility:	Compatible with most LINAK control boxes
Approvals:	EN 60601-1, EN 60335-1 and UL 60601-1 as part of a LINAK actuator system

Recommendations

- It is not possible to combine HB7x with the binary based CB9..PM/PN
- The IPX6 Washable version has a special adhesive for the front covers
- The HB75xE0 used together with CB140 will give trend and anti-trend on channel 1 and 2 of the control box when using the last button row
- All front covers use the codes W0 (not Washable) and WW (Washable) Memory:

Memory:

- The memory and parallel functions require the control box to have a microprocessor
- When storing a memory position on the control box, the actuators must run to the desired position and the “store” button (S) must be pushed
- Then the desired memory position button (1, 2 or 3) must be activated within 2 seconds

HB80

The HB80 hand control has an optimised ergonomic design shaped for the hand. The hand control is suitable for all kinds of MEDLINE and CARELINE applications such as hospital beds, patient lifts, treatment and examination couches etc.

The antimicrobial HB80 version includes active additives in the plastic of the hand control housing and the hook. The front cover has a second layer that is antimicrobial.

Usage

Usage temperature:	5 °C to 40 °C
Storage temperature:	-10 °C to +50 °C
Compatibility:	Compatible with many LINAK control boxes. For further questions, please ask your local LINAK.
Approvals:	Approvals: IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1 The HB86 version has a shorter distance between the buttons and cannot be approved according to EN IEC60601-2-52 Application Environment 4 for care beds used in Domestic area (or EN1970). HB80 is designed and tested in accordance with EN60601-2-52, cl. 201.11.6.6.101 (machine washable medical beds). The HB80 must hang vertically from it's hook during the washing process. In order to maintain the flexibility of the cables, it is important that a coiled cable is placed in such a way that the cable's own weight does not strain the coil during the washing process.

Recommendations

- Clean the hand control regularly to ensure good hygiene standards.
- When a defective HB80 is replaced, check that the new HB80 has exactly the same specification and functionality.
- Do not submerge the hand control under water.
- Unless otherwise specified or agreed by LINAK - the hand control is only intended to be used on LINAK systems.
- When changing hand controls for OpenBus™ systems, the power must be switched off.
- It is recommended to check the hand control and cable for damage and holes made by violent handling before washing the application or at least once a year.
- It is recommended to have a parking place for the hand control on the application, where the customer ensures that the hand control does not fall off.

For hand controls with magnets:

- If hand controls with magnet are attached to a smooth surface, a movement or twisting of the cable, for example during transport, can cause the hand control to move and result in damage if the cable is squeezed.
- The force of the magnet depends on the thickness of the lacquering, the lacquering type, stickers, steel thickness etc. It is the responsibility of the customer to verify that the holding force on the application is acceptable.
- It is the responsibility of the user/operator to evaluate any possible risk caused by use of permanent magnets.

Warnings

- Do not sit or lie on the hand control. It can cause unintended movement of the application.
- There is a risk that items with internal magnet for mounting instead of hook can disturb function of cardiac pacemaker, implantable cardioverter defibrillators or magnetic implants!

HB100

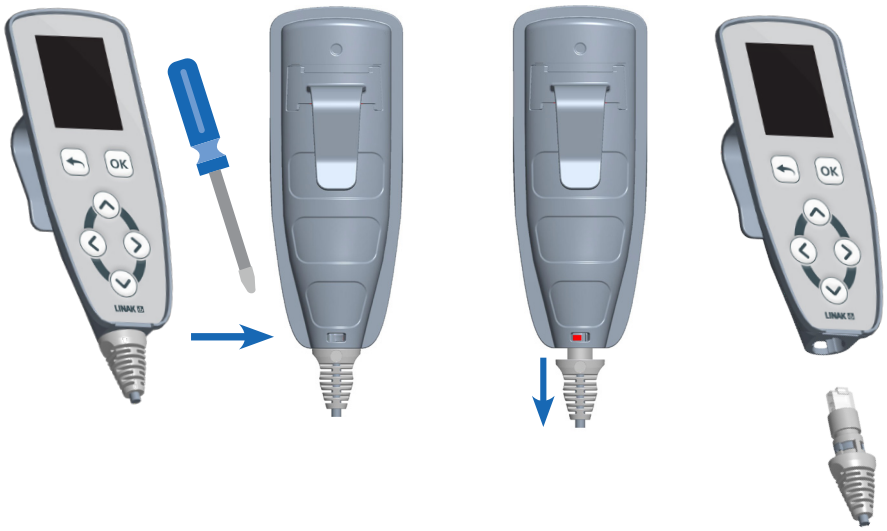
The HB100 is an intelligent hand control with the LINAK Weighing Solution and many other features.

Usage

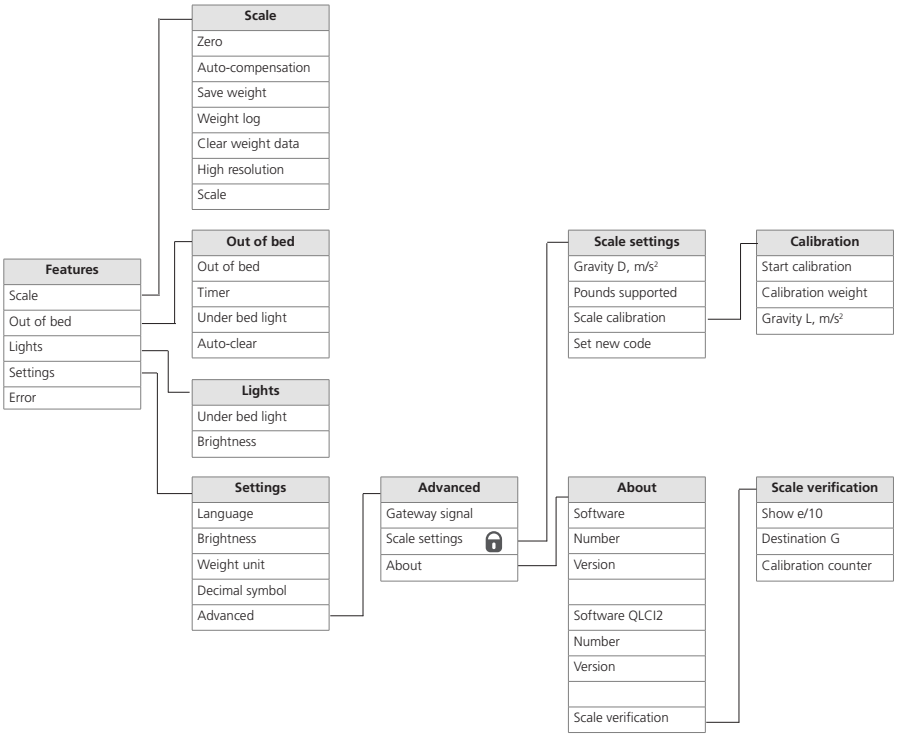
Usage temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% - non-condensing
Atmospheric pressure:	700 to 1060 hPa
Height above sea level:	Max. 3000 meters
Approvals:	IEC 60601-1:2005 + Amd.1:2012 (Consolidated version IEC 60601-1:2012 Ed. 3.1) IEC 60601-1-2:2014 Ed. 4
Compatibility:	All OpenBus™ control boxes
Flammability rating:	V2
Latex free:	Yes

Replacing the cable

The cable for the HB100 can be replaced if damaged. To remove the cable, the cable lock must first be unlocked. This is done by moving the lock-pin clockwise with a screwdriver or another small object, until a red marker shows. When inserting a new cable, the lock pin must be moved counter-clockwise to secure a fastened cable connection.

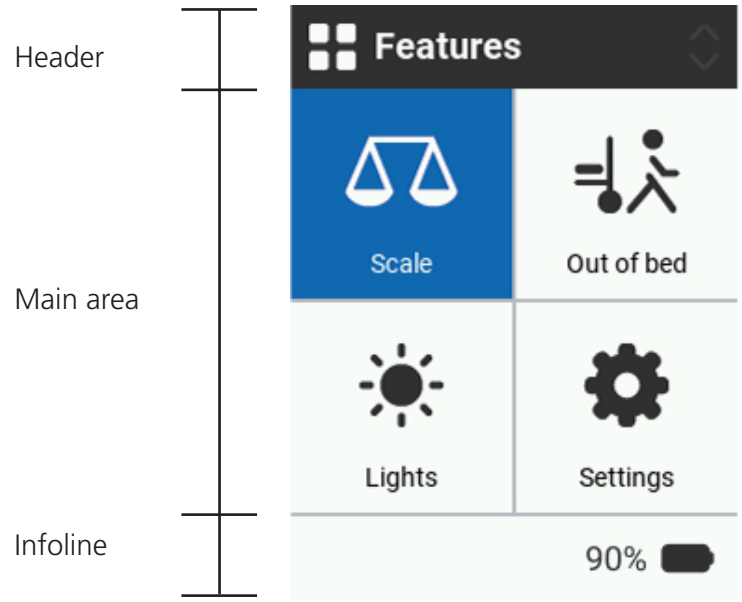


Menu structure



Information

- Please note that the menu structure depends on the accessories that have been connected.
- To be able to use all functions, it is necessary to have UBL2 1.1 OpenBus™ and QLCI2 connected to the system.



Header

The header contains an icon, a headline of the current menu and an up/down arrow showing if more items are hidden below or above what is shown in the main area. When nothing is hidden, the arrows are faded. The header is always visible when navigating through the menu.

Infoline

The infoline is used to give the user information about the feature without having to enter the menu. The far-left side of the infoline is used to show notifications and errors. The infoline is always visible.

Main area

The main area has four different views:

- Main menu (tiles)
- List menu
- Selection
- Pop-ups

Information

LINAK does NOT provide support with screen dumps, but offers a standard simulator of the relevant control that can be used by the OEM to take the desired screen dumps themselves. The simulator can be obtained upon request from your local sales engineer at LINAK A/S.

Main menu

The main menu is divided into 4 tiles (2x2) and can be navigated via the arrow keys. 4 tiles can be seen at a time. If some features are hidden, they can be accessed by pressing the down key twice or more.

The blue focusing colour indicates the tile that is currently selected.

	Scale	Out of bed	Lights	Settings
Neutral tile				
Selected tile				

List menu

The list menu can have from 1 to 6 visible items at a time.

List items can have two main functions: toggle (for instance on/off) and go to edit mode (for example language). Some features need to be turned on before other settings can be set.

When the feature is off, list items will be in a greyed out state and cannot be accessed.

Edit mode

The edit mode is accessed through the list menu. The list will focus on the selected item and is navigated by using the up/down arrow keys. Press OK to confirm choices or BACK to leave the menu without saving.

If there are more options than visually shown, the arrows above and under the choices are black to illustrate what direction you are able to move in, otherwise the arrows will be faded.

Pop-ups

Pop-ups occur when the user needs to take action.

There are four pop-up types:

User instructions:	These are messages to the user, asking to wait or accept certain changes. User instructions will have a black background with white text.
Notifications:	Notification pop-ups occur when you enter a menu with a notification. Notifications will have a yellow background.
Errors:	The error pop-up will be shown when an error/user error occurs. Errors will have an orange background. An error list can be found later in this document.
Low battery:	Low battery (below 20%) icon will flash in left area of Infoline.

Prioritising

In case that multiple pop-ups occur at the same time, the priority of the icons is listed as below:

High - Errors

Mid - Notification - Out of bed

Low - Notification - low battery

Pop-up icon list

The below icons are being displayed either when activated or being detected.

	Timer
	Under bed light
	Error
	Out of bed
	Low battery
	Low battery

HB100 on mains or in battery mode

HB100 can run when the control box is on mains or in battery mode. Please be aware that all other features than Scale will be disabled in battery mode.

Battery status (default on HB100 Standard)

When HB100 runs in battery mode and 'battery status' (*) is selected as battery monitoring, the battery status is monitored and displayed with the following icons shown in the infoline area:

Low battery

 1 sec.  1 sec.

Battery charging

 1 sec.  1 sec.  1 sec.

On battery

The priority of displaying the battery statuses is the following:

1. Battery charging
2. Low battery
3. On battery

Battery warning

When HB100 runs in battery mode and 'battery monitoring' (*) is selected as battery monitoring, the HB100 will only display the following icon, representing the battery mode in the infoline area:

No battery status or warning (special item)

When HB100 runs in battery mode and 'disabled' (*) is selected as battery monitoring, the HB100 will not display any icon, representing the battery mode in the infoline area.

(*) The behaviour in battery mode can be customised in LixEdit. The default selection in HB100 Standard is 'battery status'.

Functions

Scale

The scale feature is used to monitor the patient weight. The scale menu itself is a special list menu view with focus on showing the patient weight. The list contains up to seven items, depending on calibration.

Scale:	Turns the feature on or off. When turned on, the current weight on the application will immediately be shown, first with blue letters, which indicates that the weight on the bed is still not stable. When the weight on the bed is stable, then the letters will turn black, indicating the stable weight. Please note that, when scale turned on, this tile moved at the bottom of the Scale menu. When the feature is off, list items will be in a greyed-out state and cannot be accessed.
Zero:	Zeroes the bed. The bed can only be zeroed if the weight is below 50 kg (This value can be changed when calibrating the bed)
Auto-compensation:	Is used to add/remove items from the bed, such as a new pillow or equipment, without impacting the patient weight.
Save weight:	Save weight of the patient. There are 10 memory spaces for saving the weight.
Weight log:	View the last saved weight/s of the patient. It is only possible to see the latest 10 saved weight entries.
Clear weight data:	Is used to clean up the weight log.
High resolution:	Only accessible if the calibration is made with a value other than 100 g precision (e=0,1). Pressing the high precision will show a 100 g weight for 5 seconds and then return to showing for instance 500 g again. The marking plate shows the range in which the scale will measure and if it supports kilograms and pounds. Values are determined by the QLCI2 and how it is calibrated.

Abbreviations

Min: Minimum weight to be measured

Max: Maximum weight to be measured

e: Weight resolution

d: Detailed weight resolution (only visible when e≠d)

In the main area, the following scale icons can be seen:

Description	Neutral icon	Selected icon
Default		
ON		
Error		
Disabled		

Out of bed

The out of bed feature is used to set what happens when the patient leaves the bed. The out of bed menu contains up to six items, depending on connected accessories.

To use the out of bed feature, the system requires a QLCI2 with 4 third-party load cells.

Out of bed:	Turns the feature on or off. When the patient leaves the bed, the out of bed icon in the main menu will turn to the notification icon. The out of bed icon and the warning text will be displayed in the infoline at the same time. When the patient returns the bed, the out of bed alarm is automatically cleared if auto-clear is enabled. If not, the alarm needs to be cleared by entering the out of bed menu.
Timer:	The timer determines how much time will pass after the person has left the bed and a notification appears and/or a signal is sent via a gateway. Values, which can be set, can be between 1 sec – 60 min. If the timer is enabled, below timer icon will be shown in the infoline, when the out of bed tile, on the main menu is selected.
Under bed light:	Possible to toggle between on/off. Activates when the patient leaves the bed and requires an under bed light. If the under bed light is enabled, below light icon will be shown in the Infoline, when the out of bed tile, on the main menu is selected.
Auto-clear:	Possible to decide if the out of bed notification should be removed automatically when the patient returns to the bed. The default setting is on.

In the main area, the following out of bed icons can be seen:

	Neutral	Selected
Default		
ON		
Error		
Notification		

Lights

It is possible to connect an under bed light.

Under bed light:	Toggle on/off When the under bed light is turned on, the under bed light icon will be shown in the infoline
Brightness:	Set up the under bed light brightness - (Min./Max.)

In the main area, the following light icons can be seen:

	Neutral	Selected
Default		
ON		
Error		

Settings

Language:	Choose system language (English, German, French, Spanish, Danish, Portuguese, Polish, Chinese).
Brightness:	Choose the display brightness level (Min., Mid., Max.)
Weight unit:	Choose kilograms or pounds. The list item is only visible if the calibration supports pounds.
Decimal symbol:	Choose between a comma or dot.
Advanced:	Set up gateway signal, scale calibration, about and scale verification

In the main area following settings icons can be seen:

	Neutral	Selected
Default		

List menu inside “Advanced”:

Gateway signal: (only needed if gateway is connected)	Choose how the gateway signal is sent, either pulse or follow. In case of an event using the gateway, such as a person leaving the bed with out of bed active.	
	Pulse:	Sends a signal via the gateway and shuts off. Will send a new signal when the person returns to bed.
	Follow:	Will keep sending a signal as long as the person is out of bed.
Scale settings:	This section contains settings including calibration from the control.	
About:	Software:	This section outlines the current software and version programmed in the control box.
	Software QLCI2:	This section outlines the current software and version programmed in the QLCI2.
	Scale verfication:	This tab contains information on the specified precision of the scale, the determined gravitational force at the destination, and the number of calibration procedures that have been conducted.

Calibration via scale display unit

To calibrate the QLCI2 via a scale display unit, there is no need for an additional calibration SW or a calibration cable. The calibration is performed via the "Scale calibration" function, which is placed under Settings - Advanced. (This feature can be disabled via calibration tool)

Press OK button to get into the "Scale settings" feature. Please note that the calibration function is password-protected and the default password is "0001". Use the up and down arrow keys to change each digit and use left and right arrow to move between digits. Press "OK" button to enter the password.

If calibration on scale display unit is required, be aware that system calibration is enabled by default.

List menu inside "Scale calibration":

Gravity D, m/s²:	The gravity of the destination in m/s². In order to type the new value and navigate between the digits, simply use the arrow keys. Press OK button, when the new value is typed.
Pounds supported:	If selected, the marking plate in the display will also include the equivalent settings and the user can select between pounds and kg.
Set new code:	To change the default code to enter the calibration menu. In order to type the new code and navigate between the digits, simply use the arrow keys. Press OK button, when the new code has been typed.
Scale calibration:	Opens the calibration menu (1-point calibration), including two list items together with the marking plate view: Calibr. weight: Weight of the calibration load in kilograms. In order to type the new weight and navigate between the digits, simply use the arrow keys. Press OK button, when the new weight has been typed. Start calibration: When all the settings are done, press the OK button, when start calibration item is selected.

Information

Be aware that the default calibration weight and password can be set in LIX edit.

Steps in "Start calibration" mode:

Establish no load:	Remove any weight on the application that is not intended to be a weight of the application and press OK to proceed. It is recommended to make calibration without for instance the mattress and other things that the end users can change themselves.
Establish calibration load:	Place your calibration weight centrally on the application and press OK to proceed.
Calibration complete:	Calibration is successfully completed. Press OK to save the calibration data.

Error codes

Message type detail

E: Error, something which blocks normal operation

W: Warning, something which leads to lower performance

U: User error, the application has detected that the system is used incorrectly, the usual user is able to fix the problem

Description	Neutral icon	Selected icon
Error		

General

Message ID	Message type	Short description	Long description	Troubleshoot guide
E1AA01	E	OB inactive	E1AA01: OB inactive	Check connections and cables and restart system
E1AB01	E	Fatal error	E1AB01: Fatal error	Check connections and cables and restart system

Scale

Message ID	Message type	Short description	Long description	Troubleshoot guide
E1AE01	E	Comm. error	E1AE01: Communication error	Turn scale on/off
E1AE04	E	LC1 disconnected	E1AE04: Load cell 1 disconnected	Check load cell 1 connection and calibrate system
E1AE05	E	LC2 disconnected	E1AE05: Load cell 2 disconnected	Check load cell 2 connection and calibrate system
E1AE06	E	LC3 disconnected	E1AE06: Load cell 3 disconnected	Check load cell 3 connection and calibrate system
E1AE07	E	LC4 disconnected	E1AE07: Load cell 4 disconnected	Check load cell 4 connection and calibrate system
E1AE08	E	Not calibrated	E1AE08: Not calibrated	Please calibrate the system again
E1AE09	E	Incorrect calibration	E1AE09: Wrong calibration	Please calibrate the system again
E1AE10	E	Checksum failure	E1AE10: Checksum failure	Turn scale on/off
E1AE11	E	Hardware error	E1AE11: Hardware error	Check connections and cables and restart system
U1AE01	U		U1AE01: Overload	Remove weight from the bed. Risk of damaging the bed
U1AE02	U		U1AE02: Insufficient load	Please add weight to the bed or check if load cells are unloaded due to external factors.
U1AE03	U		U1AE03: Weight unstable	Make sure the weight is stable. If retry, make sure not to change the weight.
U1AE04	U		U1AE04: Weight above max.	Please remove weight from the bed and try again
U1AE05	U		U1AE05: Weight below min.	Please add weight to the bed and try again
U1AE06	U		U1AE06: Zero above max.	Please remove weight from the bed and try again
W1AE01	W	Scale missing	W1AE01: missing	Check connections and cables and restart system

Out of bed

Error codes generated by out of bed:

Message ID	Message type	Short description	Long description	Troubleshoot guide
E1AD01	E	Comm. error	E1AD01: Communication error	Turn out of bed on/off
E1AD02	E	OOB not ready	E1AD02: Out of bed not ready	Check connections and cables
E1AD03	E	CB not ready	E1AD03: Control box not ready	Current backrest position doesn't allow OOB monitor. Run the backrest down
E1AD04	E	Load cell 1 error	E1AD04: Load cell 1 error	Check load cell 1 connections and cables
E1AD05	E	Load cell 2 error	E1AD05: Load cell 2 error	Check load cell 2 connections and cables
E1AD06	E	Load cell 3 error	E1AD06: Load cell 3 error	Check load cell 3 connections and cables
E1AD07	E	Load cell 4 error	E1AD07: Load cell 4 error	Check load cell 4 connections and cables
E1AD08	E	Scale not calibrated	E1AD08: Not calibrated	Calibrate system
E1AD09	E	Hardware error	E1AD09: Hardware error	Check connections and cables and restart system
W1AD01	W	OOB missing	W1AD01: Out of bed missing	Check connections and cables and restart system

Under bed light

Error codes generated by under bed light:

Message ID	Message type	Short description	Long description	Troubleshoot guide
E1AF01	E	UBL missing	E1AF01: Under bed light missing	Check connections and cables and restart system
E1AF02	E	UBL missing	E1AF02: Under bed light missing	Check connections and cables and restart system
W1AF01	W	UBL missing	W1AF01: Under bed light missing	Check connections and cables and restart system

Limitations

- Maximum 3 pictures per view ID. A maximum of 120 IDs per product can be used in a control box software. It is not possible to create different graphics that are dependant on the language.
- The infoline is locked and there is no option to modify the text and format.
- Customisation is only possible for movement graphics; the menu structure, icons, error codes, and infolines cannot be modified.

Recommendations

- Unless otherwise specified or agreed with LINAK, the hand control is only intended to be used for LINAK systems.
- Be aware only to use a LINAK magnet key.
- Check the hand control after connecting all devices to make sure that all features are recognised and visible in the display.
- Inspect the cable lock before use. If the red indicator is visible, the cable is unsecured. The detachable cables must be locked.
- It is recommended to make a functional test of the application before setting it into operation.
- If an error occurs on a component installed on the system, the error will be shown in the display. If the error is still valid after a restart of the system, the component will be shown as disabled (greyed out). When entering the component, it will show the error again.
- Clean the hand control regularly to ensure good hygiene standards.
- Perform regular inspection for wear and damage.
- Do not submerge the hand control into water.
- Keep the hand control in upright position with the cable downward when washing.
- In order to maintain the cable flexibility, it is important to place a coiled cable in such a way that its own weight does not strain the coil during the washing process.
- Please note that using the magnet key cannot wake up a low-power system or a system running on battery. The system will wake up when a key is activated to unlock the system.

Warnings

- Do not sit or lie on the hand control. It can cause unintended movement of the bed.
- If the hand control shows signs of damage, the use of HB100 might be inappropriate as it might show incorrect information.
- The application manufacturer must write an end user manual based on the LINAK user manual which also includes relevant warnings, information on how to carry out regular inspection and a functionality description. End users must be trained in all functions.
- Always use O-ring on connectors and cable locks.

HB190

The HB190 is an advanced hand control designed for high-end medical equipment. It contains 9.5 rows, giving the care staff 19 buttons for activation. It is equipped with 21 LEDs, providing user-friendliness due to the clear overview of the battery status, locking status and service indication.

Furthermore, the HB190 comes with an exchangeable cable and is IPX6 Washable DURA™, ensuring a long product lifetime.

Usage

Operation temperature:	+5 °C to + 40 °C
Storage temperature:	-10 °C to + 50 °C
Relative humidity:	20% to 80% - non-condensing
Operational atmospheric pressure:	800 to 1060 hPa
Storage atmospheric pressure:	700 to 1060 hPa
Operational meters above sea level:	Max. 2000 meters
Approvals:	IEC60601-1 IEC60601-1-2
Compatibility:	All OpenBusTM control boxes
Flammability rating:	UL94 V2
Latex free:	Yes

Recommendations

- Unless otherwise specified or agreed with LINAK, the hand control is only intended to be used for LINAK systems.
- Inform the customer only to use the magnet key supplied by LINAK.
- It is recommended to make a functional test of the application before setting it into operation.
- Inspect the cable lock before use. If the red indicator is visible, the cable is unsecured. The detachable cables must also be locked.
- In order to maintain the cable flexibility, it is important to place a coiled cable in such a way that its own weight does not strain the coil during the washing process.
- When changing hand controls for OpenBus™ systems, the power must be switched off.
- Clean the hand control regularly to ensure good hygiene standards.
- It is recommended to check the hand control and cable for damage and holes caused by violent handling before washing the application or at least once a year.
- Do not submerge the hand control into water.
- Keep the hand control in upright position with the cable downward when washing.
- Does not comply with the 10/15 rule (IEC 60601-2-52:2009 Annex BB. 3.3.3)
- Be aware of the current consumption which is 28 mA. With all LEDs lit it will be 65 mA.
  LED current consumption:

Red LED	1.2 mA
Yellow LED	1.7 mA
Green LED	3.9 mA
White LED	1.3 mA

Warnings

- Do not sit or lie on the hand control. It can cause unintended movement of the bed.
- If the hand control shows signs of damage, is dropped or otherwise damaged, the LEDs and backlight might be unfit to use and might show incorrect information.
- Inform the customer that after loss of mains power, the lock state is reset to the default setting. Be aware of a special setup for a magnet lock of low power system in case of power down on mains. Also be aware that the lock is reset when running on battery or when powered down.
- Inform the customer that using the magnet key cannot wake up a low-power system or a system running on battery. The system will wake up when a key is activated.
- Inform the customer that a powerful magnetic field may change the lock state.
- Always use O-ring on connectors and cable locks.

HB200

The HB200 Wireless is a Bluetooth® Low Energy (BLE) hand control for the medical and beds segments. It is available with up to 5 rows and locking of individual channels by using a magnet key. One LED will function as pairing and battery indicator.

Usage

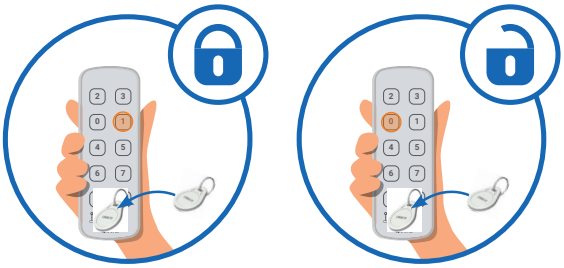
Operation temperature:	+5 °C to + 40 °C
Storage temperature:	-10 °C to + 50 °C
Relative humidity:	20% to 80% non-condensing
Atmospheric pressure:	700 to 1060 hPa
Approvals:	IEC 60601-1 IEC 60601-1-6 IEC 60601-1-2 ANSI/AAMI ES60601-1 CSA CAN/CSA-C22.2 NO. 60601-1 RED 2014/53/EU FCC Part 15.249 IC RSS247 Telec MIC.
Compatibility:	All OpenBus™ BLE control boxes

Functionality

Locking is possible with/without the magnet and pressing a key on the HB200.

Please note that the way to lock must be defined in the control box software.

As an example to lock with magnet: hold the magnet key over the marking (◎) and press an odd key number (Typically the up arrow). To unlock a row use the magnet key and press an even number (Typically the down arrow).



Magnet key

Remember to order magnet key:

Magnet key - ordering no. 0858008 (RAL 7035 light grey)

Battery

The battery in the HB200 is a standard CR2032 coin cell battery.

Battery lifetime

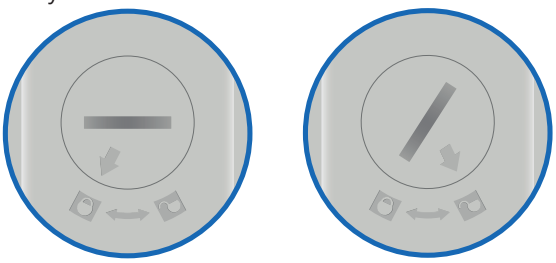
With a usage of 140 sec/day, the HB200 will last approximately two years.

Changing the battery

To change the HB200 battery, open the battery cover on the back using a coin or a similar tool to turn the arrow counterclockwise from the locked state to the unlocked state.

Low battery indication - When the battery power level falls below 20%, the LED will flash 4 times when a key is pressed.

New battery indication - When the battery has been changed, the LED will be lit for 4 seconds after the first keypress.



Battery cover

It is possible to order extra battery covers.

Battery cover ordering no. SA1031W9012

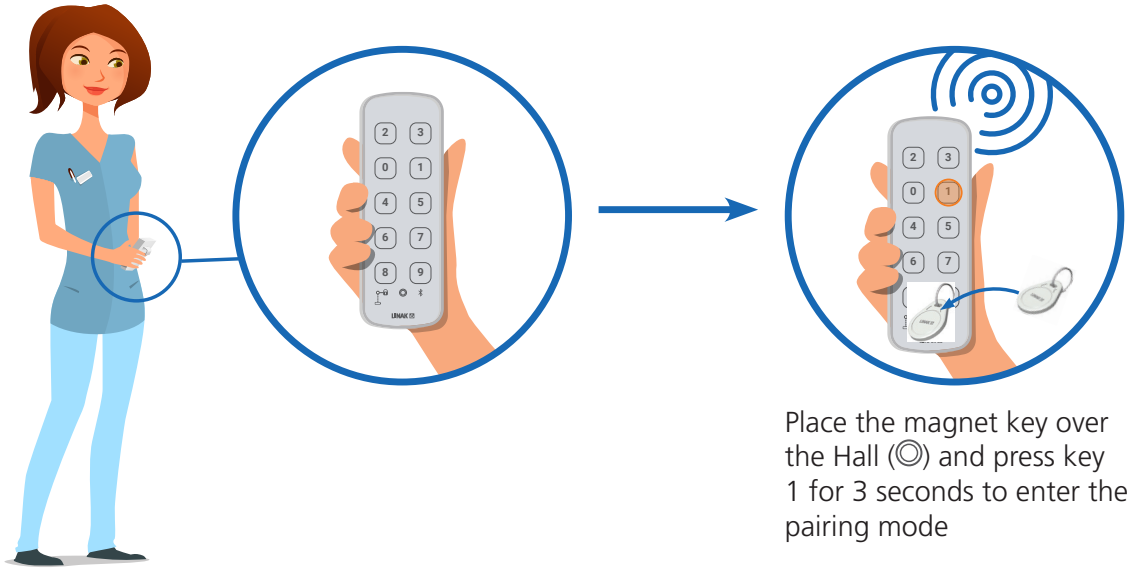
Pairing Bluetooth devices

Direct pairing

Direct pairing is used for pairing a LINAK control directly to a LINAK control box that supports BLE.

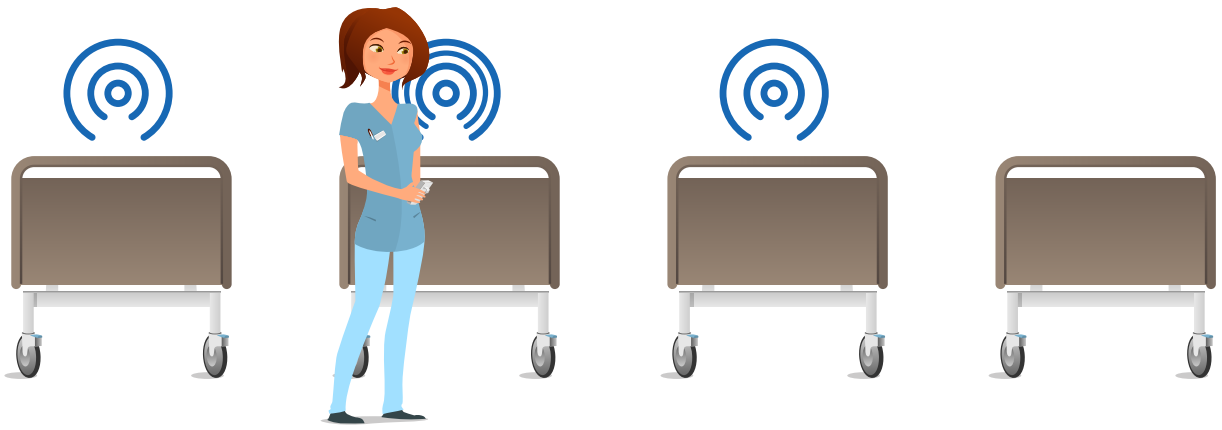
1. Enter pairing mode
2. Move the hand control closer to the control box you want to pair with
3. Pair the hand control with the control box

Entering Pairing Mode



Place the magnet key over the Hall (◎) and press key 1 for 3 seconds to enter the pairing mode

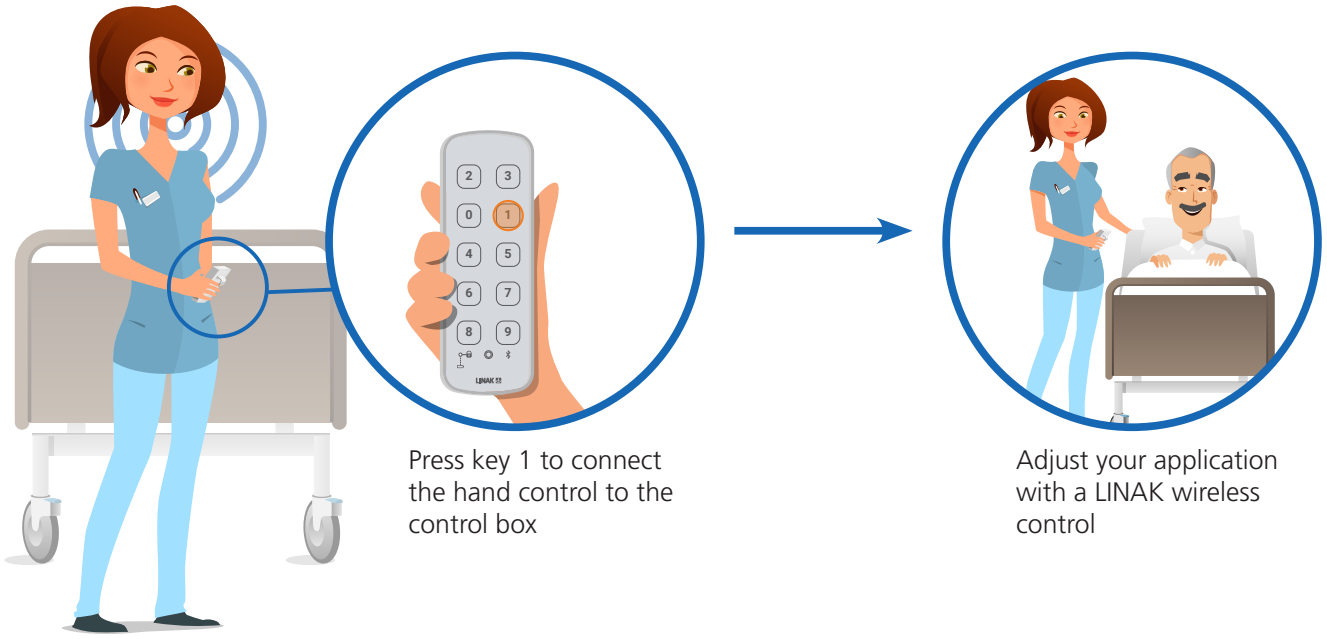
When in pairing mode, the control box buzzer will begin to beep, and the LED will begin to blink. The control unit LED will also begin to blink with the same frequency as the nearest control box.



In pairing mode, the light/sound frequency will increase when the HB200 gets closer to a control box.

Connecting to the control box

When the hand control LED is blinking fast and the control box gives a high frequency sound in the same speed, the devices are ready for pairing. To finalise the pairing, press Key 1 on the hand control.



Press key 1 to connect the hand control to the control box

Adjust your application with a LINAK wireless control

Recommendations

- Do not submerge the hand control in water.
- Unless otherwise specified or agreed with LINAK, the hand control is only intended to be used for LINAK systems.
- It is recommended to check the hand control for damage and holes caused by violent handling before washing the application or at least once a year.
- Always perform the pairing of hand control and control box in close proximity to the application. Also ensure that the pairing has been made with the correct application by operating the application after ended pairing.
- When intending to operate an application with LINAK BLE, please ensure that the correct BLE hand control is used. Otherwise, there is a risk of unintended movement of the application that has been paired with the BLE hand control.
- When changing the battery, the battery cover must be lubricated with technical white Vaseline for easy mounting and to avoid fluids from entering the hand control.
- The string attachment hole must not be used as a magnet key placeholder. The HB200 locking mode can be activated by the magnet key both on the front and the back of the hand control resulting in unavailable drive functions.

Warnings

Wireless risks and recommendations

Due to some customer concerns regarding the range of BLE, LINAK decided to set the RF sensitivity and the transmit power settings to a maximum. In addition to that, LINAK Standard BLE allows pairing all the time.

Risk 1

If a BLE hand control is to be paired with an application, this can be done without coming closer to the application, as the above-mentioned settings are at a maximum. In such a scenario, there is a risk of pairing with another application from a longer distance as opposed to the distance of the application you want to pair with. The rule is that a BLE hand control is paired with the closest BLE device that it detects, however, the BLE device is not always physically closest.

Recommendation for Risk 1

The pairing process must always be made in near proximity to the application. It must also be ensured that the pairing is done with the correct application by simply operating the application after the pairing process.

Risk 2

In case that there are more LINAK BLE applications in a building and the BLE hand controls are accidentally swapped, there is a risk of operating another BLE application if within range. This can cause unintended movement and can have severe consequences for the patients' health.

Recommendation for Risk 2

When intending to operate an application with LINAK BLE, it must be ensured that the correct BLE hand control is used. Otherwise, there is a risk of unintended movement of the application that has been paired with the BLE hand control.

HB400

The HB400 hand control is designed for a wide range of applications such as hospital beds, nursing home beds and other medical applications such as treatment chairs and couches.

Usage

Operation temperature:	+5 °C to + 40 °C
Storage temperature:	-10 °C to + 50 °C
Relative humidity:	20% to 80% - non-condensing
Atmospheric pressure:	700 to 1060 hPa
Height above sea level:	Max. 3000 meters
Flammability rating:	HB
Latex free:	Yes
Approvals:	IEC 60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

Magnet key - article no. 0858008

Recommendations

- It is recommended to make a functional test of the LINAK system in order to ensure that control box and hand control are communicating correctly.
- Unless otherwise specified or agreed with LINAK, the hand control is only intended to be used for LINAK systems.
- Inform the customer only to use the magnet key supplied by LINAK.
- Do not submerge the hand control into water.
- It is recommended to check the hand control and cable for damage and holes caused by violent handling before washing the application or at least once a year.
- In order to maintain the cable flexibility, it is important to place a coiled cable in such a way that its own weight does not strain the coil during the washing process.
- When changing hand controls for OpenBus™ systems, the power must be switched off.
- When a defective HB400 is replaced, check that the new HB400 has exactly the same specification and functionality.

Warnings

- Do not sit or lie on the hand control. It can cause unintended movement of the application.
- The application manufacturer must write an end-user manual based on the LINAK user manual which also includes relevant warnings, information on how to carry out regular inspection and a functionality description. End users must be trained in all functions.
- Inform the customer that using the magnet key cannot wake up a low-power system or a system running on battery.
- The system will wake up when a key is activated and the magnet key will then unlock the system.
- Inform the customer that a powerful magnetic field may change the locking state.
- Always use O-ring on connectors and cable locks.

HD80

The HD80 makes it possible to have two hand controls in one unit. The hand control is equipped with a magnet locking function, making it possible to have two levels of operation – one for the patient and relatives and one for the caregiver staff. The HD80 provides a great overview using LED indication of functions being locked or unlocked. The hand control is designed to work with OpenBus™ systems.

Usage

Usage temperature:	5 °C to 40 °C
Storage temperature:	-10 °C to +50 °C
Compatibility:	Compatible with CB6 and OpenBus™ control boxes. Please contact LINAK
Relative humidity:	20% to 80% - non-condensing
Atmospheric pressure:	700 to 1060 hPa (3000 m)
Height above sea level:	Max. 3000 meters
Approvals:	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

Standard HD80

HD84C1J0550004-200120012D1C000

Item number J90208

This hand control can be used as a combination of a hand control and the ACO. It has two levels of operation, where the first is a patient mode with regular operations like hi/lo and trend/anti-trend. Use the magnet key to operate the next level, care mode, where it is possible to lock functions.

The LEDs show which functions are locked and which are not.

Magnet key - article no. 0858008

Warnings

- Do not sit or lie on the hand control. It can cause unintended movement of the bed.
- Inform the customer that after loss of mains power, the lock state is reset to the default setting. Be aware of a special setup for a magnet lock of low power system in case of power down on mains. Also be aware that the lock is reset when running on battery or when powered down.
- Inform the customer that using the magnet key cannot wake up a low power system or a system running on battery. The system will wake up when activating a key and then the magnet key can unlock the system.
- Inform the customer that a powerful magnetic field may change the lock state.
- Always use O-rings on connectors and cable locks.
- There is a risk that items with internal magnet for mounting instead of hook can disturb function of cardiac pacemaker, implantable cardioverter defibrillators or magnetic implants

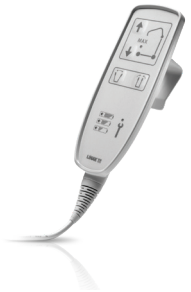
Recommendations

- Inform the customer to use only the magnet key supplied by LINAK. We also recommended to make a functional test of the application before putting it into operation.
- Clean the hand control regularly to ensure good hygiene standards.
- When replacing a defective HD80, check that the new HD80 has exactly the same specification and functionality.
- Do not submerge the hand control under water.
- Unless otherwise specified or agreed by LINAK, the hand control is only intended to be used on LINAK systems.
- When changing hand controls for OpenBus™, the power must be switched off.
- It is recommended to check the hand control and cable for damage and holes made by violent handling before washing the bed or at least once a year.
- In order to maintain the flexibility of the cables, it is important that a coiled cable is placed in such a way that the cable's own weight does not strain the coil during the washing process.

For hand controls with magnets:

- If hand controls with magnets are hooked on a smooth surface, a movement or twisting of the cable, for example during transport, can cause the hand control to move and result in damage if the cable gets squeezed somewhere.
- The force of the magnet depends on the thickness of the lacquering, the lacquering type, stickers, steel thickness etc. It is the responsibility of the customer to verify that the holding force on the application is acceptable.
- It is the responsibility of the user/operator to evaluate any possible risk caused by use of magnets.
- It is recommended to have a parking place for the hand control on the application where the customer ensures that the hand control does not fall off.

HD80 JUMBO



The HD80 JUMBO is a hand control with an optimised ergonomic design and functions that are activated via dome buttons.

Usage

Usage temperature:	5° C to 40° C
Storage temperature:	-10° C to +50° C
Compatibility:	Only compatible with CBJ Care
Relative humidity:	20% to 80% - non-condensing
Atmospheric pressure:	700 to 1060 hPa (3000 m)
Height above sea level:	Max. 3000 meters
Flammability rating:	UL94-V2
Approvals:	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

Warnings

- Do not sit or lie on the hand control. It can cause unintended movement of the application.
- Always use O-ring on connectors and cable locks.
- There is a risk that items with internal magnet for mounting instead of hook can disturb cardiac pacemaker functions, implantable cardioverters, defibrillators or magnetic implants.

Recommendations

- Clean the hand control regularly to ensure good hygiene standards.
- When a defective HD80 is replaced, check that the new HD80 has exactly the same specification and functionality.
- Do not submerge the hand control under water.
- Unless otherwise specified or agreed by LINAK, the hand control is only intended to be used on LINAK systems.
- When changing hand controls for OpenBus™, the power must be switched off.
- It is recommended to check the hand control and cable for damage and holes made by violent handling before washing the bed or at least once a year.
- In order to maintain the flexibility of the cables, it is important that a coiled cable is placed in such a way that the cable's own weight does not strain the coil during the washing process.

Hand controls with magnets

- If hand controls with magnet are hooked on a smooth surface, a movement or twisting of the cable, for instance during transport, can cause the hand control to move and result in damage, if the cable is squeezed somewhere.
- The force of the magnet depends on the lacquering thickness, the lacquering type, stickers, steel thickness etc. The customer has the responsibility to verify that the holding force on the application is acceptable.
- The user/operator is responsible for evaluating any potential risk caused by the use of magnets.
- It is recommended to have a parking spot for the hand control on the application where the customer ensures that the hand control does not fall off.

HL70

The HL70 is a hand control with integrated locking function, where a selective locking of the different functions is available by use of a special key.

HL70 is an alternative to HB70 combined with an attendant control panel such as the ACL.

Usage

Exchangeability:	Exchangeable with HB70
Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% - non-condensing
Atmospheric pressure:	700 to 1060 hPa
Height above sea level:	Max. 3000 meters
Compatibility:	Compatible with many LINAK control boxes
Approvals:	IEC 60601-1 IEC 60601-1-6 ANSI/AAMI ES60601-1 CAN/CSA-C22.2 NO. 60601-1

Recommendations

- To switch between locked and unlocked position a small knob between the two push buttons has to be turned 20° by use of a special key.
- The key is for the use of the nursing staff only, there are two types, one is made of plastic the other metal.
- For all types: Attention should be given to ensure that the channels shown correspond to the channels available on the chosen control box.
- The HL70 must hang vertically from its hook during the washing process. In order to maintain the flexibility of the cables, it is important that a coiled cable is placed in such a way that the cable weight does not strain the coil during the washing process.

HL400

HL400 is designed for various healthcare applications, such as home care and nursing home beds and other medical applications, for instance chairs and lifts. It offers up to 5 rows of buttons and mechanical locking that makes it possible to do a selective locking of the different functions by use of a key.

Usage

Operation temperature:	5 °C to 40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% – non-condensing
Atmospheric pressure:	700 to 1060 hPa
Meters above sea level:	Max. 3000 meters
Flammability rating:	HB
Latex-free:	Yes
Approvals:	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1

Technical specification – analogue

HL400 analogue can be used together with all analogue control boxes that support modular plugs and where an analogue input can be handled.

Locking and unlocking is a manual function. Insert key into the two gaps of the circular lock and turn clockwise to lock.

Turn counterclockwise to unlock. As factory setting, the hand control is unlocked. When the hand control is unlocked, the indicator is green. When locked, the indicator is yellow.

The indicators are made as coloured dots as a part of the lock itself. Either green or yellow is shown through the transparent part of the standard front cover.

The indicator must show green for the selected function to be activated.

Unlocked

Locked

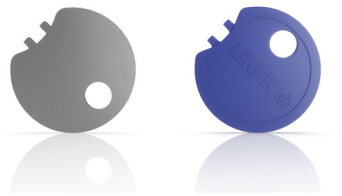
LINAK® keys

LINAK hand control keys are intended for nursing staff use only.

There are two different types of keys available for locking and unlocking the hand control:

Article no. 00914516	plastic, PANTONE 660 (blue)
Article no. 00914721	metal

The keys must be ordered separately.



Recommendations

- It is recommended to make a functional test of the LINAK system to ensure that control box and hand control are communicating correctly.
- Unless otherwise specified or agreed with LINAK, the hand control is only intended to be used for LINAK systems.
- Inform the customer only to use the hand control key supplied by LINAK.
- Do not submerge the hand control into water.
- It is recommended to check the hand control and cable for damage and holes caused by violent handling before washing the application or at least once a year.
- To maintain the cable flexibility, it is important to place a coiled cable in such a way that its own weight does not strain the coil during the cleaning process.
- When changing the hand control for OpenBus™ systems, the power must be switched off.
- When a defective HL400 is replaced, check that the new HL400 has the exact same specification and functionality.
- Violent use of the HL400 key can cause either damage to the keyhole or the key itself.
- If a lock key is missing, then full control over the application could be missing.
- Inform the customer only to use the hand control key supplied by LINAK.
- Clean the hand control regularly to ensure good hygiene standards
- It is recommended to have a parking place for the hand control on the application, where the customer ensures that the hand control does not fall off.

For hand controls with magnet:

- If hand controls with magnets are attached to a smooth surface movement or twisting of the cable, for example during transport, can cause the hand control to move and result in damage if the cable is squeezed.
- The force of the magnet depends on the thickness of the lacquering, the lacquering type, stickers, steel thickness etc. The customer is responsible for verifying that the holding force on the application is acceptable.
- The user/operator is responsible for evaulation of any possible risk caused by use of permanent magnets.

Warnings

- Do not sit or lie on the hand control. It can cause unintended movement of the application.
- The application manufacturer must write an end user manual based on the LINAK user manual which also includes relevant warnings, information on how to carry out regular inspection and a functionality description. End users must be trained in all functions.
- Always use O-ring on connectors and cable locks.
- When using the locking function of the HL400, check that the hand control switches are actually locked.
- The HL400 locking function only locks the actual hand control.
- Locking of a single HL400 channel does not necessarily prevent this channel from activation, if the same channel is covered by another hand control button (for instance in case of simultaneous drive) or another control unit.
- There is a risk that items with internal magnet for mounting instead of a hook can disturb the function of cardiac pacemakers, implantable cardioverter defibrillators or magnetic implants.

SC01

With the OpenBus™ system it is possible to use SC01 as attendant controls integrated in the bed side/end rails.

Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Relative humidity:	20% to 80% – non-condensing
Atmospheric pressure:	700 to 1060 hPa
Height above sea level:	Max. 3000 meters
Approvals:	IEC60601-1 ANSI/AAMI ES60601-1 CAN/CSA-22.2 No 60601-1
Compatibility:	LINAK CO control box platform

General information

For LINAK standard SC01, the following is applicable:

- Adhesive for the standard SC01 is 3M9495LE
- For information re. suitable and unsuitable surfaces, please see 3M's webpage
- Standard recommendation for curing time is 72 hours
- The customer is responsible for correct mounting on suitable surfaces

Recommendations

- The customer is responsible for correct mounting of the SC01. Among other things, it means:
- Ensuring proper and safe mounting of the SC01 into e.g. the side rail
- The customer should consider proper precautions against ESD (Electrostatic discharge)
- Clean the surface of SC01 regularly to ensure good hygiene standards.
- The customer should consider the existence of the vibrations when defining ad specifying the housing I.e. we recommend the customer to carry out a vibration test on the final product.
- The customer must ensure a proper IP rating/test
- When handling ESDS (Electrostatic Discharge Sensitive) devices – e.g. during transport, storage, handling, production or mounting in an application – exposure to harmful ESD must be avoided.
- When a defective SC01 is replaced, check that the new SC01 has the same specification and functionality.
- Unless otherwise specified or agreed with LINAK, the SC01 is only intended for LINAK systems.
- When changing SC01 for OpenBus systems, the power must be switched off.
- It is recommended to check the SC01 and cable for damage and holes caused by violent handling before washing the application or at least once a year.
- It is NOT recommended to dismount the membrane front cover after mounting as it may cause damage.

Warnings

- Do not sit or lie on the SC01 as this can cause untended movement of the application.

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